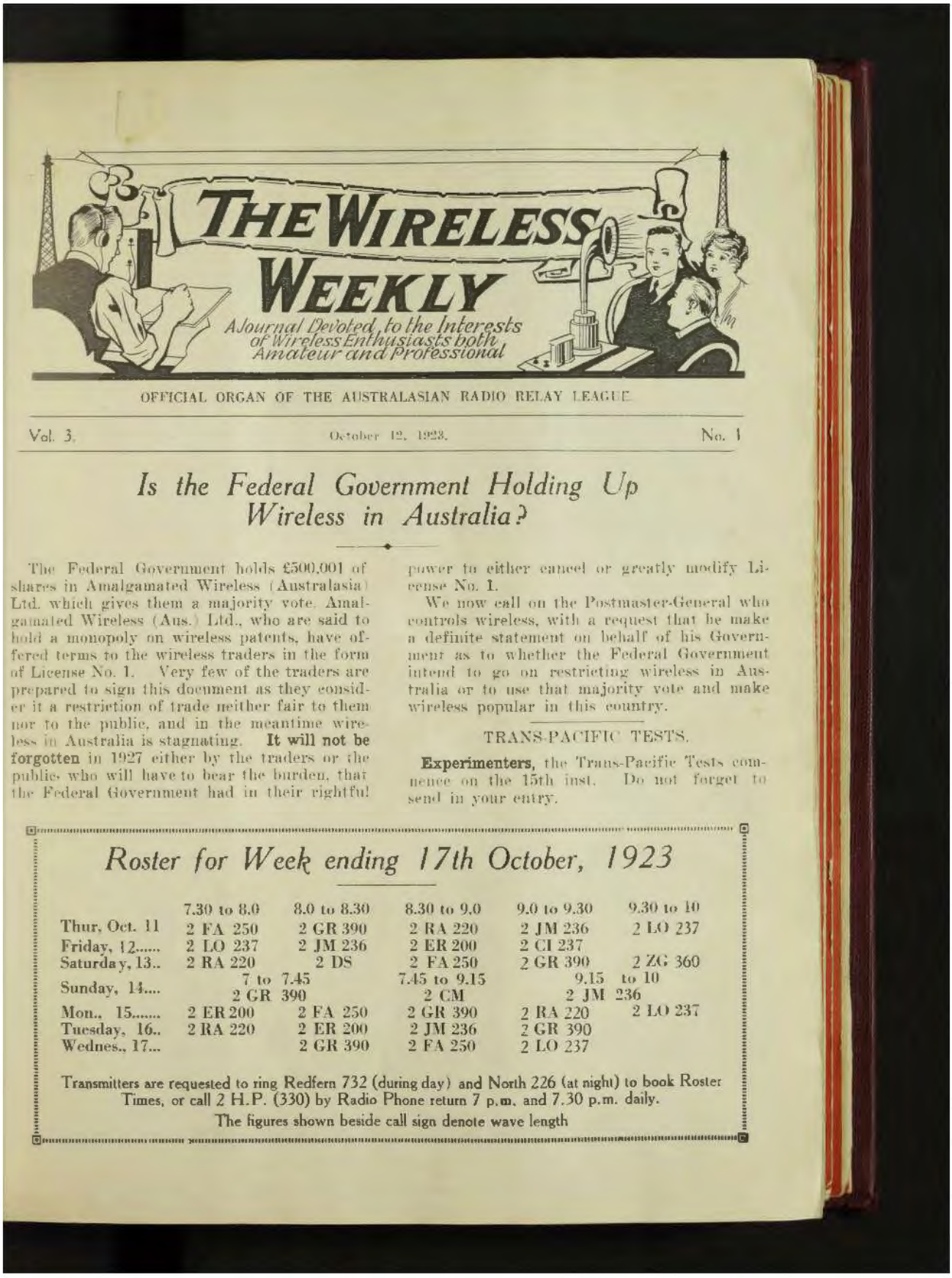


THE WIRELESS WEEKLY

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

OFFICIAL ORGAN OF THE AUSTRALASIAN RADIO RELAY LEAGUE

Vol. 3. October 12, 1923. No. 1

Is the Federal Government Holding Up Wireless in Australia?

The Federal Government holds £500,001 of shares in Amalgamated Wireless (Australasia) Ltd. which gives them a majority vote. Amalgamated Wireless (Aus.) Ltd., who are said to hold a monopoly on wireless patents, have offered terms to the wireless traders in the form of License No. 1. Very few of the traders are prepared to sign this document as they consider it a restriction of trade neither fair to them nor to the public, and in the meantime wireless in Australia is stagnating. **It will not be forgotten** in 1927 either by the traders or the public who will have to bear the burden, that the Federal Government had in their rightful power to either cancel or greatly modify License No. 1.

We now call on the Postmaster-General who controls wireless, with a request that he make a definite statement on behalf of his Government as to whether the Federal Government intend to go on restricting wireless in Australia or to use that majority vote and make wireless popular in this country.

TRANS-PACIFIC TESTS.

Experimenters, the Trans-Pacific Tests commence on the 15th inst. Do not forget to send in your entry.

Roster for Week ending 17th 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. 11	2 FA 250	2 GR 390	2 RA 220	2 JM 236	2 LO 237
Friday, 12.....	2 LO 237	2 JM 236	2 ER 200	2 CI 237	
Saturday, 13..	2 RA 220	2 DS	2 FA 250	2 GR 390	2 ZG 360
Sunday, 14....	7 to 7.45 2 GR 390		7.45 to 9.15 2 CM	9.15 to 10 2 JM 236	
Mon., 15.....	2 ER 200	2 FA 250	2 GR 390	2 RA 220	2 LO 237
Tuesday, 16..	2 RA 220	2 ER 200	2 JM 236	2 GR 390	
Wednes., 17...		2 GR 390	2 FA 250	2 LO 237	

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

More World's Records Gone West.

Charles D. Maclurcan Again

Mr. Chas. D. Maclurean has again broken all records by transmitting easily readable signals from his station at Strathfield to Mr. Bell, of New Zealand, on a power so low that standard instruments could hardly measure it.

It seems hardly feasible that a valve would oscillate on a watt, yet Mr. Maclurean's did.

Absolute efficiency is the only solution we can offer for these astounding records.

We publish below the logs of 2 CM in his tests with Mr. Bell and Mr. Hull.

PARTICULARS OF LOW POWER TEST WITH 4AA.

Frank Bell, Waihemo, Shag Valley, New Zealand.

Wednesday, October 3rd
9.30 p.m.

After half hour's traffic had been carried on with full power (about 7 watts), power was reduced as follows:

Plate input volts 175; Current M. A., 4; Power 7 watts.

4AA replied QSA, QRP, and give plate voltage and current.

Power reduced to:

Volts 40, Current 1 M.A., Power .04 watts.

Bell replied QSA, QRP on .04 watts.

Reduced to:

Volts 20, Current .5 M.A., Power .01 watts.

Bell replied QSA, QRP on .01 watts.

Reduced to:

Volts 15, .25 M.A., .0037 watts Power.

Bell replied O.K. QSA, Sigs. strong and steady throughout. Another world's record gone west. Mim. Congratulations O.M. G.M. Bell.

I was present during this entire test and took the above readings.

(Signed) G. S. GOW
5 Moore Street, Strathfield.

Log Vised by:

Phil Renshaw, 4/10/23, and W. J. Maclardy, Editor Wireless Weekly, October 4. Telegram received from Odgers, Charter's Towers, Queensland:

"Heard you lowest power last night. Writing."

Mr. Maclurean's measuring instruments certified correct within 1 per cent.

(Signed) E. JOSEPH.

PARTICULARS OF LOW POWER DAYLIGHT TEST

Worked between 2CM and 3JU, Hull, Melbourne.
Monday, September 24th.
(Not checked)

Powers Used:
Plate input.

Volts	Current M.A.	Watts	Code Letter
390	20	7.8	F
270	16	4.32	K
220	10	2.2	R
122	4	.48	V
80	3	.24	L
52	1.5	.078	X

Hull reported receiving F K V L X Sigs. on last power still QSA and could be read about two feet from phones. Requested to reduce much further.

Tuesday, September 25th.
(same time)
Checked by J. S. Barling.

Powers used:
Plate input.

Volts	Current M.A.	Watts	Code Letter
380	18	6.8	F
192	5	.96	K
120	3	.36	R
60	2	.12	U
44	1	.044	L

Hull reported receiving H K R U. Then jammed by V I M X's but last letter U could be read through V I M.

Friday, September 28th.
(Same time.)
Taken and checked by J. P. Cureton.

Powers used:
Plate input.

Volts	Current M.A.	Watts	Code Letter
380	16	6.08	X
212	8	1.6	K
172	4	.688	J
60	2	.12	P
40	1	.04	Y
24	.5	.012	Z

Hull reported: All jammed after K, conditions very bad, X's strong and induction bad.

Mr. Maclurean's measuring instrument certified correct within 1 per cent.

(Signed) E. JOSEPH.

AN INTERESTING EXPERIMENT.

Following on the recent low power record established by Mr. Maclurean (2CM) with Mr. F. Bell, New Zealand, wherein 2CM transmitted signals to 4AA (received Q SA) using using a plate input power of .0037 watts, many experimenters expressed surprise that the valves would oscillate on such a low input.

Mr. Maclurean therefore carried out a series of tests on Friday, October 5th in the presence of about 20 members of the Kuringai Radio Club to determine the lowest power necessary to start the transmitting valves oscillating. The results as will be seen was remarkably interesting.

The power input was regulated by the filament rheostat of the Kenotron rectifier valves. The measuring instruments used were a Weston volt ammeter, model 280 and a Paul unipivot galvanometer with thermo couple both of which have been certified correct within 1 per cent. by Mr. E. Joseph.

The President of the Kuringai Radio Club, Mr. W. E. Wilson, manipulated the oscillating wavemeter which was used to make sure that the transmitter was still oscillating. Other members of the club took and checked the meter readings.

The following readings were taken:
Plate input.

Volts 3.5; Current, 4.2 milliamps.; Power, .0147 watts.

Volts, 1.1; Current 1.8 milliamps; Power .00198 watts.

Volts .4; Current .8 milliamps.; Power .00032 watts.

The lowest power it will be seen was .00032 watts, and the valves were still oscillating strongly.

Mr. Maclurean's log has been signed by all those members present during the experiment.

Valve or Crystal as Rectifier

Amateurs who have been successful in handling the crystal often regard valve rectification as a superfluous consumption of high and low tension current. The amateur who has never found "a decent point" hails the prospect of a soft rectifying valve with genuine ecstacy.

RELATIVE DISADVANTAGES.

Neither the crystal or the valve can be regarded as perfect rectifiers. There is, however, greater scope for improving the valve as a rectifier than there is of perfecting the crystal method. The crystal fails because, if the detector is shaken, it needs readjustment owing to the comparative insensitiveness of many of its points.

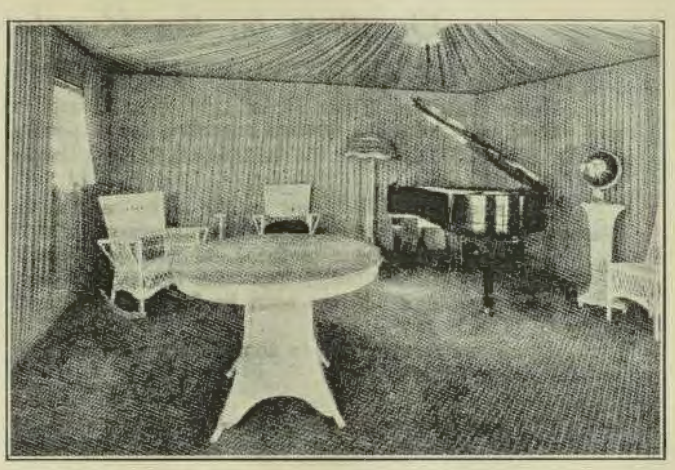
The majority of the valves manufactured to-day are too hard to function as rectifiers. It would at present not be a paying proposition for a firm to start manufacturing a very soft valve on purpose for rectifying, because the average valve purchaser requires a good amplifying valve, and to amplify well a valve has essentially to be hard—"hard" implies highly exhausted. Furthermore, when using the valve as a detector or rectifier the grid leak is often as much trouble to adjust as adjusting the potentiometer of the crystal circuit or even the contact point.

RELATIVE ADVANTAGES.

The brighter side of the question shows that the crystal will reproduce speech or music absolutely faithfully, while the valve is often guilty of distortion. Having adjusted the grid leak to the requirements of the valve in use (different makes of valves require different values in meghoms of grid leaks) there is no further operation than to switch on the H.T. and L.T. to affect a steady rectification. The valve has an additional advantage and that is that a single valve detector set has a range of at least 40 miles for telephony, using a P.M.G. aerial, while the crystal is not of much use over 30 miles from a high power station.

IN CONJUNCTION WITH VALVE.

The next case to be considered is the relative advantages and disadvantages of valve and crystal rectifiers when employed with high and low frequency amplifiers.



A Broadcast Station Studio

High frequency or "radio" frequency is affected by amplifying the incoming signals before they reach the rectifying panel. This increases the range of the set considerably, but, remembering that the current reaching the detector varies as the square of the sound produced in the phones, it will be seen that it increases the sound considerably also. The crystal rectifying circuit may be connected to plate and the filament of the amplifying valve by a direct connection. The transformer may be used in conjunction with a crystal rectifier if desired, but a considerable loss of energy is the result, and it is not advised. The valve is thus seen to be superior as a detector following high frequency amplification for this and a second reason.

When a stage of high frequency amplification is employed, the incoming signals come in at some five times the strength, using the average valve in the high frequency socket; this means that the current arriving at the detector will be five times the strength, and this will cause a "cat-whisker" detector to "jog" from point to point; the sound produced will vary as the difference of the square of sensitivity of the points, and not merely as the difference of the points. This actually happens and is very unsatisfactory. The valve, however, does not "jog."

LOW FREQUENCY.

Low frequency or "audio" frequency is affected by amplifying the signals after rectification, when they may be regarded as rather less mobile. Here again, the crystal detecting circuit is connected directly to the valve amplifying circuit, but, remember, the detector comes first. The valve this time is coupled to the valve amplifying circuit by an "iron core" or low frequency transformer and this gives the crystal a distinct advantage as a direct coupled detector, for the iron core transformer does unless it is of very superior quality, cause distortion. This distortion is due to induced currents set up in the iron, and when two stages of L.F. are used for loud-speaker work it quite spoils reception of faint telephony. The crystal, therefore, is the better rectifier if it is to be followed by low frequency amplification.

WHICH FREQUENCY TO BE UTILISED.

Low frequency should be employed when the station to be heard is within the range of the detector alone. Do not think that because a station is just audible using detector alone, low frequency should be employed—try high frequency. The lengthening of range as explained may be superior as regards an increase in volume to merely increasing the sounds already received.

Questions on the Regulations.

EXPERIMENTING—BROADCASTING—TRADING.

Since Statutory Rules 97, of 1923, were issued on the 1st August, many and varied have been the queries regarding the respective liberties and restrictions on the EXPERIMENTER, the BROADCASTER (Transmitter and Receiver), and the TRADER.

"Wireless Weekly" now offers to its readers the correct answers to any reasonable questions on or concerning Statutory Rules 97, of 1923.

Answers will appear in these columns each week.

Address: "Questions," Box 378, G.P.O., Sydney.

The name and address must be forwarded, but will not be published unless desired.

Questions received up to noon, Friday, of each week, will be answered in the following week's issue.

1. Is it necessary for a trader to hold a dealer's license to sell apparatus to experimenters only?

Answer: Yes.

2. Under what circumstances will an experimenter be permitted to use a circuit that will energise the aerial?

Answer: Where the licensee is known to be a competent and careful person in handling the apparatus, and is known to be actually experimenting in a useful direction, permission will be granted to use a regenerative circuit reacting on the aerial. This permission, of course, will be granted sparingly. It may be necessary to restrict this permit to hours during which broadcasting is not in progress.

SECOND AUDIENCE 2550 MILES AWAY HEARS SPEAKER FIRST.

Words spoken in a public hall in Schenectady reached a radio listener in San Francisco, Cal., 25550 miles away before they were heard by a listener 150 feet from the speaker.

That statement looks a bit fantastic, but it is mathematically true. The apparent absurdity becomes reasonable when it is realised that speed of sound is 1126ft. per second, and the speed of electrical vibrations or radio waves is 180,000 miles per second.

The listener in the back of the hall, 150 feet from the speaker heard the words in 0.1332 seconds.

A microphone connected to the radio transmitting set was 2 feet in front of the speaker and picked up the words in 0.002 seconds. Time required to transform into electrical energy, 0.002 seconds.

Time required for radio waves to travel 2550 miles, 0.0137 seconds.

Time required at receiving end, to convert radio waves to sound waves, 0.001 seconds.

Total elapsed time from the speaker to the listener, 2550 miles away 0.0187.

Listener in hall heard words in 0.1332 seconds.

Man 2550 miles away heard words 0.1145 seconds sooner. Radio wins.

AN EMERGENCY TUBE REPAIR.

By B. M. SLEEPER.

It sometimes happens that the grid of a vacuum tube touches the filament, or if the vacuum tube is mounted horizontally, the filament may sag on the grid.

When this occurs some remedy is

IS THERE A LITTLE BATTLE GROUND IN YOUR HOME

necessary, for the set will not operate with the audions in that condition. If the grid has not stuck to the filament, it can be jarred away by wrapping the tube on the palm of the hand. At times, however, this is not sufficient.

If you are not sure whether the grid and filament are touching, or something else may be wrong, you can find out easily by connecting two volts from one cell of your storage battery across one of the filament contact pins and the grid contact pin. If one-half the filament lights, you may know that they are touching. Do not apply the full voltage, for that might burn out the filament with only one-half of it offering resistance in the circuit.

If the grid and filament are stuck together connect both filament terminals together and put two volts across the grid filament connections. Then, while the filament is dimly lighted strike the tube on the palm of your hand gently. This will cause the grid to become disengaged. Then it can be jarred back into its place.

CLEARING THE LINE.

Static, the radio bugbear, is to be painlessly put out of harm's way. A new invention, the "Clearphone," evolved by W. J. Scott, now chief electrician in the U.S. Navy, is at present occupying the attention of the Naval Research Department. It claims to assist in clearing if not to entirely eliminate "static" from radio signals. The method used will entirely revolutionise radio telegraphy, but it seems that it does not apply to radio telephony. The saviour of the radiophone, therefore, has yet to be born.

The U.S. Navy have taken over the invention, and, true to their policy, will make nothing public until about two years after it has been in use in the departments.

* * *

THE "LEVIATHAN'S" RADIO RECORDS.

New marine radio records were established by the "Leviathan" on her trial trip, apart from her world-speed performance, for range of transmission, volume of traffic handled, and duplex telephone and telegraph systems of operation. The estimated total of words received and transmitted by operators was seven hundred and fifty thousand, at a rate of many thousand words a day, most of which were Press communications.

David Sarnoff, vice-president of the Radio Corporation of America, who was a guest on board, also supervised, and had to take his turn at the keys on the last day to relieve his exhausted operators.

* * *

THE FIRST RADIO PRESIDENT.

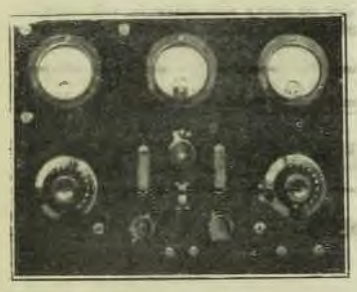
During his Alaskan trip, President Harding has a large number of speeches to make. Many of these will be broadcasted and radio is to be used to keep him in touch with matters at home during the whole of his trip.

The President's car is thoroughly equipped with both transmission and reception apparatus. Powerful amplifying units and large loud-speaking horns will be used in order to carry his voice to the crowds who will wish to hear him speak.

MAKE YOUR OWN

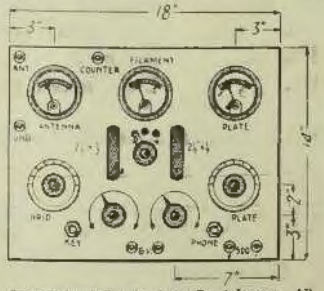
Five Watt C.W. and Phone Set.

The following described C.W. and phone transmitter was built by the author some six months ago, and has given excellent results. For various reasons the circuit that was chosen for this set was the Colpitts Oscillator, as it was desired to use a counterpoise. The modulator chosen was the Heising, which is the only real system of modulation. With the settling of the circuit to be used the choice of apparatus was the next consideration. And as I was desirous of getting the set on the air with a minimum of labour and in a short time, all the apparatus that suited the design was purchased outright.



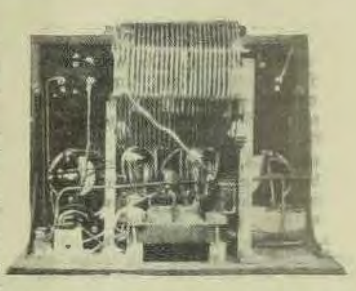
The panel is a 3-16 in. piece of bakelite, 14 in. by 18 in. in size. It was first laid out as shown in the figure and the necessary holes were drilled. Then the base was attacked and braced on by means of iron brackets, so that the whole formed a rigid unit. The instruments were then mounted on the base and panel in the following order, which made assembling easy. Rheostats, jacks, binding posts, condensers, H.C. mounting, sockets, modulation transformer, grid leak, grid choke, high voltage, shunt condenser, filament transformer, meters and last, the inductance, which was fitted but not fastened.

The transmitter is now ready to begin wiring. With a clear copy of the circuit to be used before you and a red pencil to draw over each connection as it is made, start to wire. First connect up the rheostats and the filament leads to the tubes and the transformer. These leads should, by the way, be of either copper or brass strip about ¼ in. wide and fairly thick. This being done, start from where the high voltage enters the panel and wire through the modulator tube, radio frequency choke, oscillator tube and isolation condenser. Then on the negative lead go to the milliameter and thence to the centre filament and ground. Now wire the grid of the modulator tube to the bias battery terminals, modulation transformer secondary and to the negative high voltage post. Next wire from the oscillator grid to the grid condenser and to the choke coil with its shunted condenser, thence through the grid leak to the ground post. Now the inductance may be mounted in place and a flexible lead run from the open side of the grid condenser to a clip to be fastened on the inductance, another lead and clip connects to the open side of the isolation condenser, and with the completion of a clip for the aerial and counterpoise all is done with the exception of the filament voltmeter. This is wired with the switch so that the voltage on either the oscillator or on the modulator filament may be measured by a throw of the switch.



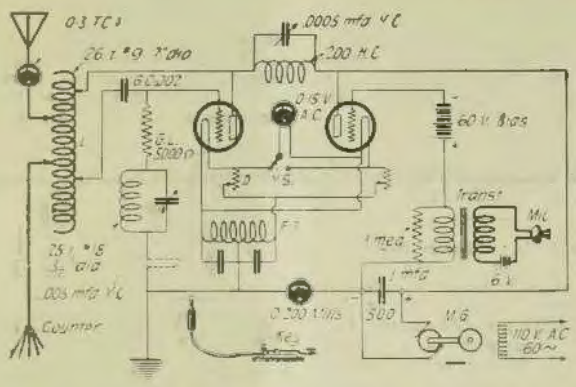
Constructional Details of the Panel Layout All the Necessary Dimensions Are Given

A suitable filter system should be built in a separate panel and may well consist of a couple of 3-henry chokes of 500-milli-ampere capacity shunted on the input and output ends by two 1 M.F. 1000-volt condensers. This may seem rather liberal for a 5-watt set, but by so making it the cost is not raised greatly and if ever desired it will function with 50 watters. The filter used with the set at present is one from a Signal Corps 67A set.



The inductance was built up by the writer and consists of 25 turns of No. 10 soft copper wire wound on bakelite strips with an outside diameter of 7 inches. This gives a range with an aerial whose fundamental is 176 metres, of from 190 to 260 metres, which is more than ample. There are six bakelite strips equally spaced around the periphery of the 7 in. wood circles. The strips have grooves cut in them to secure the wire which was wound on with all the tension that it was possible to give it. The completed instrument was then mounted by three legs fastened to the wooden ends, so that it sets well up over the filament transformer. If desirous, lugs of copper may be soldered to each turn to facilitate clipping, but is not necessary.

The tuned choke in the grid circuit was made by winding 25 turns of No. 18 magnet wire on a 3½ in. form then shunting this by a 23 plate condenser. This will give with such a coil and condenser a range



The Colpitts Oscillator Circuit Was Used in Preference to all Others These Are the Exact Connections as in the set Described

of from about 150 to 400 metres, which is more than ample.

The tuned choke in the plate circuit is in my case a 250-turn honeycomb coil tuned to resonance by a 13-plate condenser.

In tuning the set up it is best to remove the modulator tube and if a source of high voltage A.C. of about 400 or 500 volts is available, use this until the set is tuned. First light the tube till the proper voltage is indicated (7.5) and it is well to remember that you gain nothing by crowding the tube filament to gain a few extra tenths radiation. Place the antenna and plate clips close together and the grid clip between these and the counterpoise clip. Apply the high voltage and note the reading of the plate metre and the antenna metre. Now adjust the grid tap until the greatest radiation is secured, then see if better can be obtained by adjustment of the plate or counterpoise taps. If not then turn the condenser across the plate choke till the plate current drops, then turn the condenser across the grid choke until the plate current again drops, at which point the antenna current will rise slightly. Now, by means of a wavemeter, obtained in any of the approved ways (bought, borrowed or swiped just so you have one), see what the wave is. If it is too high move the counterpoise clip nearer the antenna and readjust the grid and plate clips first, then the condensers. Once a resonance point is obtained it is an easy matter to move to a higher or lower wave.

With the set tuned you may safely apply the full D.C. voltage. To use the phone insert the modulator tube and remove the plug in the key jack and insert the microphone plug. Light both tubes to proper brilliancy, apply the D.C., and being sure the battery is in the microphone circuit and the bias battery are connected, talk into the transmitter. This should cause a variation of the plate current and the antenna current. By varying the bias battery and the shunt across the transformer you will be able to clear up the quality of the speech. The best test is through a distant receiving station.

For calling on the C.W. it is more convenient to have a switch so as to cut out the filter and thereby let the commutation frequency modulate the output, which will make it much easier to find on the tuner, but when once found the filter may be cut back in and work done on the D.C. C.W.

The author makes no claims for originality in this set, but rather the application of economical methods and the practice of modern efficiency. Thus while perhaps the only difference in this from hundreds of other sets is in either, or both, the tuned plate choke and tuned grid choke, these, either of them, especially the latter, made a world of difference in the power input to the tubes and more difference yet in the over-all efficiency of the set. I am sure that anyone's time will be well spent in following out the design of this set as it was given a lot of careful consideration by the author before construction, and there are no regrets.

A Panel Switch

Progressive design, as well as public demand, is pointing the way toward the simply controlled or uni-controlled receiver. The average person enjoying radio for the amusement or economic results obtained alone is averse to the manipulation of many knobs, handles, and dials in order to bring in the desired signals.

Herewith is illustrated the design for a switch which serves several purposes. When at the off position, the antenna is disconnected and grounded, thus guarding against

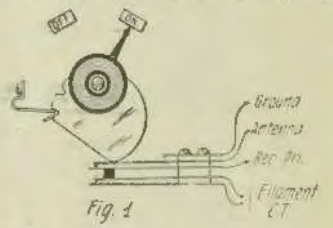


Fig. 1

Full View of the Panel Switch, Showing How the Cam Bears Upon the Telephone Jack

damage from heavy static charges while the set is not in actual use. At the same time the filament circuits are opened and waste of current through carelessness in not cutting off the "A" battery is avoided. Possible failure of the antenna wires and possible contact with power wires resulting in damaged circuits is also avoided by grounding of the primary lead from the antenna. The receiving transformer is disconnected.

At the on position the reverse of the above is true. All the operator is required to do when wishing to listen in is to throw the switch to the on side and the filament is lighted. The antenna disconnected from ground and connected to the receiver transformer.

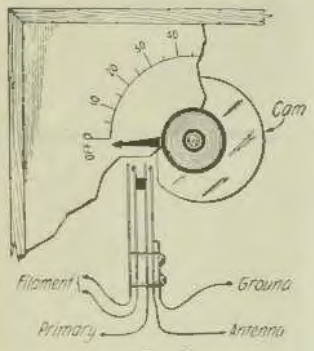


Fig. 2

Another View of a Similar Arrangement, Which Can Be Attached Directly to the Shaft of the Tuning Variable Condenser

The action and construction of the switch is simplicity itself. A cam of bakelite or other insulator is so shaped as to depress the jack leaves while in one position and to release them when at a certain point, which in this case is the off position. Fig. 1 shows the switch cam using a stop which works in the notches and retains the cam at a desired position. In Fig. 2 is shown a similar application, with the exception that the switch works automatically when the receiver inductance or condenser knob is moved to the tuning position. The filament and antenna circuits remain closed until the pointer is moved to the off scale position. If automatic filament current adjusters are used in the filament circuits the use of the switch reduces the necessary manipulations required for placing the receiver in operation to a fewer number than heretofore.

A Variometer with a Wide Range of Inductancy

Herewith is a description of a variometer that can be used to cover a wide band of wave-lengths without the necessity of employing a switching arrangement. It is especially adaptable to a Colpitts tuner, or as an inter-valve coupling for a tuned impedance radio frequency amplifier. This is in reality a 360 degrees variometer, as the coils oppose each other at one parallel setting, thus affording a lower value of inductance, providing the windings of the coils are equal. As the rotor is turned through 180 degrees, the inductance increases, until it equals the sum of the inductances of the two coils, viz., the rotor and stator. Continuing the rotation in the same direction, the coils are connected to assist each other. Therefore, the inductance increases through another 180 degrees until the maximum of self-inductance is reached, when the coils are again parallel. This arrangement for switching the coils is accomplished by a commutating or switching arrangement that is mounted directly on the shaft of the rotor coil. This can be better understood by referring to the sketch, Fig. 1.

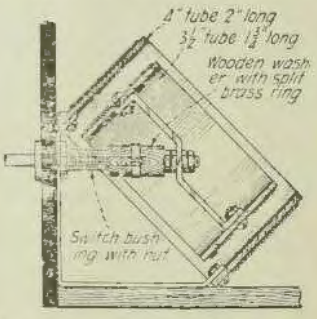


Fig. 1 Constructional Details of the 360-degree Variometer. The Two Brushes Are Attached Directly to the Front Panel and Make Contact With the Split Ring on the Wooden Washer

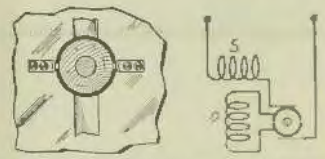


Fig. 2. A Section of the Commutator Arrangement and the Two Brushes, Showing How the Coils Are Connected to It

Due to this switching arrangement, a very large number of turns can be used on both the stator and rotor coils, with a corresponding broad range of tuning; 100 turns or more are suggested for each coil. Referring to Fig. 2, the variometer is connected as follows: One terminal of the stator coil is connected to a binding post. The second terminal of the stator is connected to one brush, and the other brush to

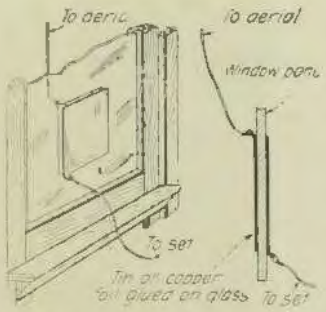
the second binding post. The terminals of the rotor are connected to the split ring on the wooden washer.

The construction of this variometer is very simple, as it is made of standard parts easily obtained. The details given in the sketches are self-explanatory. A variometer of this type constructed by the writer was used in the Colpitts' circuit, where it efficiently covered all waves of from 200 to 3000 metres. Each coil had a winding of 100 turns, these being bank wound in the usual manner to save space.

A Convenient Aerial Lead-in

By FREDERICK J. SWIFT, JR.

This idea is for little Willie, whose mother won't let him bring his lead-in wire under the window because in summer the mosquitoes get in, and in winter the cold gets



A Clever Stunt in the Form of an Aerial Lead-In. The Metal Sheets to Which the Wires Are Connected Act as a Condenser

in. The accompanying sketch illustrates the idea. On the outside of the upper pane of the window cement a piece of tin or copper foil of from 8 in. to 1 ft. square, and connect this to the aerial lead-in wire. On the inside of the window pane, and directly opposite the outer sheet of foil, cement another sheet of the same dimensions. A wire is led from this directly to the aerial binding post of the receiving set. These two sheets of foil, with the glass window pane between them, act as a condenser in series with the aerial. If it is necessary to have these two sheets smaller than the dimensions given, it is suggested that a variable condenser be connected in series with the inside sheet and the aerial binding post on the receiving set, as a small capacity tends to cut down the wave length of the aerial proper. You hams who have transmitting sets will find this idea very convenient for use as a series antenna condenser.

The Electron.

What is an electron? That was for a long time the problem that confronted every scientist. For years our text books had told us mildly, but firmly, that all matter was made up of molecules and indivisible elemental particles called atoms. But experiments proved that these same atoms were decidly divisible into infinitesimally smaller particles, and which could only be accounted for as minute negative and positive electric charges, revolving in diverse and reverse directions, and by the very force induced by their motions affecting the atoms of which they were a part.

These particles were given the name of electrons, and granting this theory, it was found easier to understand that this force generated by their movements under certain conditions became an electric current, which by "harnessing," as it were, opened up new fields of thought and action.

The electric lamp with which we are all familiar was one of these new fields.

Originally a carbon filament was fixed in a vacuum bulb, and which could be connected to negative and positive poles of a battery. To the oncoming current or electron flow this fine thread formed a check, but the rush is great, the negative electrons want to join their positive brethren, and consequently force increases. In their hurry to get from the negative pole to the positive, the electrons produce more and more molecular vibration. They are checked by the filament, but are they downhearted? Not a bit of it. Push on, brother, push on, whatever the result. And the result is, first heat, the filament glows till at last it is white hot, faster and faster becomes the vibrations, till the ether in which it is permeated is acted upon and a speed of 186,000 miles a second is produced, and then the result is—light. And now this is where Mr. Electron is made to take a bigger step in the right direction. Professor Fleming, one of the first experimenters in radio-activity, noticed, "even as you and I," as the poet says, that the bulb of carbon filament electric lamp grew black in the course of time and use. He found that these particles, presumedly of carbon, had been shot off from the white-hot filament, that they were, indeed, negatively-charged electrons driven out of house and home by the atomic storm of vibrations.

Now we come to the great fields of "wireless," only just then beginning to be exploited. Hitherto only the "crystal" had been in use, and the power obtained but very weak.

Professor Fleming continued his experiments. Inside a vacuum tube he ran our old friends the filament, but placed round it a metal cylinder which we have since called "the plate." As the electrons would obviously only work when they were hot, he named it the thermionic tube or valve.

Now, having got his current or electron flow from one battery of sufficient power to heat the filament, and which by reason of the backwards and forwards movements of the electrons would necessarily be an oscillating or alternating current, he wanted to get a one-way or direct current, as well as obtain more power. He took now another dry battery, and connected its positive pole to the plate of the valve and its negative pole to the filament, thus providing a condition in which many of the negative electrons, in their desire to rush along the "straight and narrow way" of the filament to join their brethren on the opposite pole would be forced out of the running and fly on to the plate. From this the dry battery carried them to the negative pole, and which, being connected to the filament, thus provided a constant flow. No flow can pass from the plate if it is cold, for the electrons only shoot off when white-hot, and thus the bulb became what is

called a rectifying valve, since it will only allow the negative electrons to flow in one direct way.

Then a still greater improvement was made by De Forrest. He found that by inserting a grating or "grid," of fine parallel wires between the filament and the plate, he could gain bigger control over the oncoming electrons.

Naturally, being nearer than the plate, the first batch of electrons that got thrust off from the filament made for the "grid," as if it were the last 'bus home, and stayed there till the cry went forth "Full up," and if the "grid" had not been connected, the increasing number of negative electrons would have given it a negative charge, thus repelling the oncoming electrons and preventing them from reaching the plate at all. But by giving the "grid" a slight positive charge, it helps to attract the electrons and carry them "over the top," making what is called the "plate current." As more and more of the discharge negative electrons are taken up by the plate, the incoming current from the aerial is thereby amplified, and as these electrons drawn up to the plate can only go through the circuit, the current, in addition to being amplified, has become direct or rectified, and it is thus that the thermionic valve has been made useful to "wireless."

APPROPRIATELY TITLED.

Apparently the question of copyright fees for broadcasted music is still agitating Chicago. As a result of the American Society of Composers, Authors and Publishers' demanding a licence fee for every copyrighted selection broadcasted, an association calling itself the N.A.B. (National Association of Broadcasters) has been formed. This society has resolved to boycott any and all of the Society's selections, and is composed of some of the most influential broadcasters in the State.

Their contention is the usual one, that to broadcast music is to popularise it, if it is any good, and that therefore the music publisher should pay, not be paid for, the privilege of having his selections used. The N.A.B. is prepared to give full programmes of well-known composers' works which do not come within the compass of the American Society, so that the radiophan will not suffer much.

Intervalve Transformers.

The design of transformers for intervalve operation on wireless telegraph and telephone receiving sets is one requiring a very careful study of all the conditions encountered when transforming audio-frequency currents from low to high voltages, to ensure the purity of the signal, or, in the case of telephony, of articulation, while, at the same time, the efficiency of transformation is kept as high as possible.

Like all power transformers, intervalve transformers consist essentially of three parts:

Primary winding,
Iron circuit,
Secondary winding,

and to produce a satisfactory transformer these three parts must be studied separately as well as in combination with one another.

PRIMARY WINDING.

The primary winding of the transformer receives a current from the detecting apparatus of the receiving set, having, in the case of telephony, an oscillation varying from 200 up to 3,000 cycles per second.

In an articulator circuit there are not only the oscillations mentioned, but also rapid changes from one frequency to another as the speech is carried on. To maintain this articulation in its pure form, it is essential that the primary circuit shall be entirely free from such conditions as will tend to vary the frequencies of the oscillating current imposed on it or prevent the rapid change of frequency. This interference is brought about by resonance in the circuit, while the former is caused by the presence of any form of natural or superimposed non-synchronous oscillatory current in the primary winding. Further, it is essential from the point of view of efficiency that the impedance of this primary winding shall be as low as possible, whereas, from a "functioning" point of view, when operating in conjunction with a thermionic valve, it is essential that the impedance of this circuit shall not be less than the impedance of the valve. Finally, the size of the coil, and the high-frequency resistance of the conductor, together with its current carrying capacity have to be considered.

The requirements of such a winding are, from a collective consideration of all the above points, found to be:—

(1) Low impedance (but not less than the impedance of the valve).

(2) Low capacity (to effect non resonance).

(3) High inductance (to bring the natural wavelength of the winding just outside the range of audible frequencies).

(4) Low high-frequency resistance wire.

(5) Ample current carrying capacity.

Item (1) is, in itself, in the form of a compromise, while items (1) and (3) are opposed one to the other.

The natural frequency of a circuit (and in this case the winding with its natural inductance and capacity may be considered as a circuit) neglecting pure resistance, is given by

$$n = \frac{1}{2\pi} \cdot \frac{1}{\sqrt{LC}},$$

where L is the co-efficient of self-induction of the circuit, and C its capacity. To bring the natural frequency outside the desired range of frequencies the product LC must, therefore, be made very small, so that the natural frequency is high.

Since the primary of a transformer having a low impedance must have a low inductance, it will follow that the number of turns and layers or turns and the consequent capacity of winding will also be low; and this, at first sight, would appear amply to meet the condition of having a frequency outside the range of audible frequencies.

But a trouble not yet enumerated now arises, owing to the production of what has come to be termed "howling" by the persistence of the very high-frequency oscillation. It may, however, be overcome by bringing the frequency of the oscillation closer to the range of audible frequency, but to do this is is necessary to increase either the inductance or the capacity. Both these methods are detrimental; the former from an impedance, and the latter from a resonance, point of view. The final solution is to connect an independent condenser of the correct value across the winding, and to

keep the inductance as low as possible. By this means impedance and capacity of coil itself are kept low, and, at the same time, the natural frequency of the winding, combined with the condenser, is brought closer to the range of audible frequency, thus eliminating the "howling." A further advantage of shunting the condenser across the winding is the improvement in power-factor, and consequently, in efficiency, which is obtained.

From tabulated data on high-frequency resistances of various gauges of wire, a suitable size can be chosen to suit the range of frequencies obtaining in this coil; and, as a general rule, it has been found that No. 36 S.W.G. is the size of wire which of all the sizes made, best meets these conditions together with the current carrying requirements.

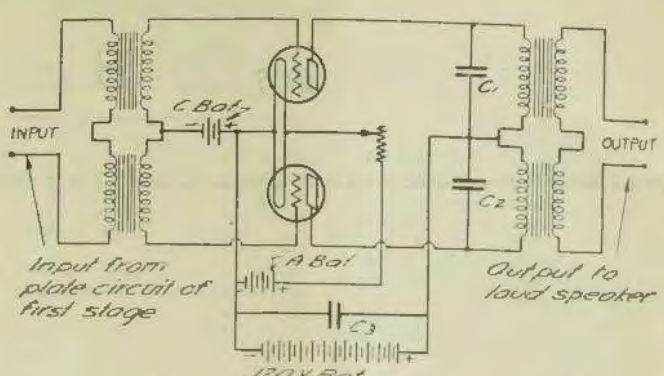
To be continued

PUSH-PULL CIRCUIT WITH DOUBLE TRANSFORMERS.

Many amateurs who have been unable to find mid-tapped transformers for a push-pull power amplifier for a loud speaker will be interested in knowing that one mid-tapped transformer may be replaced by two audio-frequency transformers properly connected in series. The push-pull circuit employs two tubes instead of one in the second stage, so as to prevent the distortion caused by overloading one tube.

The accompanying hook-up shows the method of connecting the tubes and transformers for the second stage of amplification. It will be noted that two input and two output transformers are used with their primary and secondary windings connected in series in the same direction around the transformer cores. In the input transformers connection to the negative of the C battery is made between the two secondary windings. In the output transformers connection to the positive of the B battery is made between the two primary windings. The input transformers should have a 3:1 ratio and the output transformers a 1:1 ratio.

Similar results with slightly less



Push Pull Circuit with Double Transformers

amplification may be secured by shunting the respective secondaries and primaries of single transformers with a resistance whose mid point is tapped.

The theory the push-pull circuit is that one tube is working on one-half the cycle of the audio-frequency wave and the other tube during the other half of the cycle. Ordinary amplifier tubes can be used.

A represents the diagonal stays, of which there are four. These are cut from 7-8 in. square wood, with a 3-8 in. slot cut in each end, and holes drilled to take securing bolts. B shows the four spacing pieces, which are made from 3-8 in. and 7-8 in. wood. The centre hole is drilled to receive a 5-8 in. dowel, which is, in its turn, drilled to receive the wire. These drillings are made to correspond with the number of

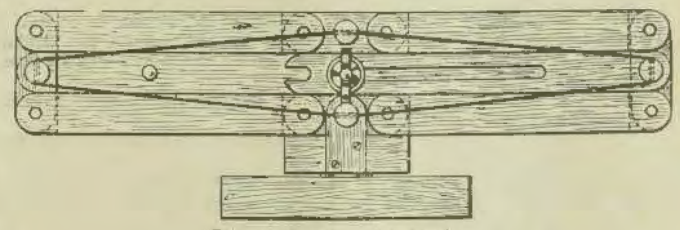


Fig. 1.—Frame aerial closed

A Collapsible Frame Aerial.

By "H.B."

A frame aerial is in many instances used where space is limited. It is not an ornamental article, and cannot therefore be looked on as a piece of furniture. A collapsible frame aerial has several advantages, both from the point of view of appearance and the space it occupies. The Aerial described in this note can be adapted to a table stand, a wall bracket, or may be suspended from the ceiling. In Figs. 1 and 2 the general construction of the frame open and the frame closed are shown. Fig. 3 shows the details of construction.

turns of wire desired, and should be a running fit for the gauge of Wire used. The end holes are drilled to fit into the ends of piece A. C shows the centre stay, which is drilled one end to receive a 3-8 in. dowel. The positions of the pin and wing nut can be determined from the open position of the assembled frame, the slot in piece D being long enough to operate in the closed position. The piece D is slotted to make a running fit on the bolt of the wing nut. The pin is to locate the two stays in a horizontal position when the frame is open. The nick cut in the end of piece D is for this purpose. The wing nut when tightened up locks the frame

Continued on Page 13

Pages for Beginners.

CAPACITY OF THE AERIAL TUNING CONDENSER.

The maximum capacity of this component depends essentially upon the wave length to which the circuit is to be tuned. For broadcast reception it may invariably be connected in series with the inductance, and when used with a single or double wire aerial of the usual dimensions a maximum value of 0.0005 microfarads is most suitable. It may be thought that as larger condensers give low values near the zero position they should be suitable for short wave work, but it will be found that the wave length change produced by a given movement of the condenser scale is too great, and fine tuning on short wave lengths rendered difficult. For 600 metres a maximum of 0.001 microfarad in series with the inductance is required, whilst for longer wave lengths 0.0015 mfds., with a switch for connecting condenser and inductance in series or parallel, is a good arrangement. It is difficult to procure variable condensers with air dielectric having a larger value than 0.0015 mfds.

* * *

CAPACITY OF THE CLOSED CIRCUIT CONDENSER.

The condenser connected across the closed circuit inductance of a tuner should have a maximum value of 0.0003 mfds. for tuning to wave lengths below 500 metres. For longer wave lengths 0.0005 mfds. is adopted. The lower the value of this condenser the greater will be the potential built up across it, and hence stronger signals will be obtained. Use the closed circuit condenser near its minimum position, and when a given signal is tuned in with the condenser near its maximum setting the value of the inductance should be increased in order that the value of the condenser may be reduced.

* * *

CORRECT VALUE OF GRID CONDENSER AND LEAK.

To obtain good results with a valve arranged to operate as a detector it is necessary to employ a grid condenser and leak having precisely suitable values. With the usual "R" type valve the condenser should have value of 0.00025 microfarads, and the leak 2 megohms, to correct the grid potential and produce good rectifying effects. It is usual to employ a condenser of this value in a circuit operating on low wave lengths. A value of 0.0003 mfds. is more suitable for use on the longer wave lengths.

* * *

HOW TO MEASURE RESISTANCE.

It is often useful to be able to measure the resistance of the windings of an intervalve transformer in order to be able to form some idea of the number of turns of wire with which it is wound. Connect the winding to be measured in circuit with a milliammeter reading to 10 milliamps (an instrument which every experimenter should possess), and a 4-volt accumulator. The voltage of the accumulator can be relied upon to be exactly four volts if it has been in use for a short while after a full charge. The resistance is calculated by dividing one thousand times the voltage by the reading in milliamps shown on the meter. To be precisely correct the resistance of the meter must be deducted from the figure obtained. The meter resistance is usually given on the scale and with medium priced instruments it is usually of the order of 40 to 60 ohms.

* * *

GAUGE OF WIRE FOR RECEIVING INDUCTANCES.

The tuning coils of crystal and single detector valve receivers should not be wound with finer wire than No. 24 S.W.G. For valve sets employing reaction or high frequency amplification No. 26 S.W.G. is a convenient gauge, for although a little resistance introduced into such circuits will have no serious effect, the gauge stated is durable, and permits of tappings being made without danger of breakage. In coupled circuits employing an inductance wound on a rotating former, it often becomes necessary to include a large number of turns in a limited space in order to provide a sufficient degree of coupling. In such cases use No. 30 S.W.G. The

sizes 24 and 26 should be double cotton covered, and the No. 30 double silk.

* * *

SOLDERING FLUXES.

The safest flux for securing the connecting leads of instruments is resin and it is best applied in form of resin-cored solder. As it is a little difficult to use, the merest trace of "Fluxite" may be employed in combination with it. For joining large brass surfaces such as may occur in the component parts of an instrument, "killed salts" (zinc chloride) is used. It is made by adding scrap zinc to strong commercial hydrochloric acid (spirits of salts) until no more will dissolve. The resultant liquid is poured off from the black deposit which may be produced if certain impurities are present in the zinc, and diluted with an equal volume of water. Ammonium chloride (sal ammoniac) in the form of a block is often used for cleaning the iron, but it will be found to rapidly act upon an iron which is frequently made too hot, and "Fluxite" will generally be found more suitable for the purpose.

* * *

PAYING OUT AERIAL WIRE.

When unwinding aerial wire from a hank, it is essential to avoid the introduction of twist which may give rise to kinks, and any case will not permit of the wire hanging in a perfectly straight fashion. While paying out, the coil should either be revolved or held in the hand, and three loops released from either side in turn, reversing the coil to do so.

EAST AND WEST THE RADIOP HANS ARE STILL BUSY.

LOOKING AHEAD.

A startling experiment was carried out in Germany recently which may have sinister effect upon the future warfare. Twenty motor cars were sent out from Berlin with instructions to follow the first car. The drivers knew they were out for a test of some kind, but the exact nature of it was not disclosed to them.

When the procession had proceeded as far as the outskirts of Mecklenburg, at a certain point in the road the whole twenty stopped dead. Every effort to start up the engines proved useless, as they all refused to spark. After some excited parley, the man in charge of No. 1 car explained to the others that the stoppage was quite according to plan, and was an experimental test from Nauen radio station. The idea was to demagnetise the magnets of each engine by means of a new kind of radio wave.

* * *

WERE THEY SPECIAL CARS?

Electrical waves, transmitted from the high towers of the radio station effectively brought the train of cars to a standstill. Therefore, further developments, in the shape of still more powerful stations, capable of demagnetising engines of warfare and even neutralising enemy demagnetising stations, are plausible possibilities. But an American expert on ignition declared that most American motors use ignition systems which depend upon storage batteries charged by the car's own generator for starting, and that these would not be effected by the paralysing radio wave.

European cars, though, are magneto equipped, so are aeroplane engines. Several other experts declare the idea to be effective only when the station and its prospective prey are in co-operation, making it simply a stunt.

* * *

SAFETY FIRST.

An engineer called Paul Nearl declares that even if the new invention, or rather the perfecting of a system which has already been used in Europe and America for operating vessels in sea manoeuvres becomes a recognised thing it could be neutralised.

If the magnetos of any motor, aeroplane, or other vessel be cased in iron, and the "iron shield" grounded, the enemy waves would be rendered powerless. This theory has many followers. Also, self-igniting engines which obviate the necessity of magnetos and other electrical starting devices may be perfected to cope with the new menace. Then fleets of tanks or heavy artillery could not be unexpectedly put out of action by enemy radio waves operated from a distant base. Any way, to the pleasing prospect of warfare in which deadly fumes, bacterial menaces, and similar terrors are called in as allies, is added the electrical enemy in the form of the new paralytic wave.

Continued from Page 11

in both the open and closed positions. The wire working in the holes

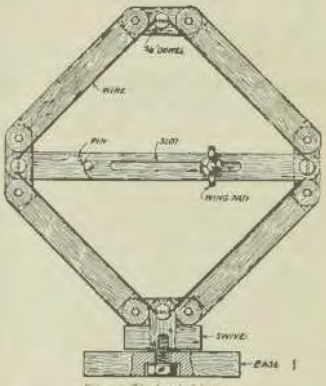


Fig. 1.—The finished frame.

in the dowels retains the same length in both positions. E shows the swivel base which may be adapted with a little ingenuity as a bracket.

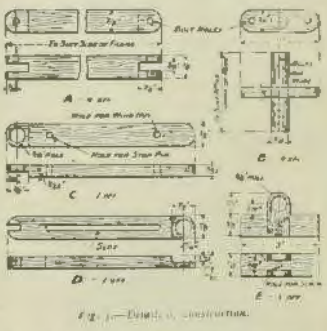


Fig. 2.—Details of construction.

A HUGE TRANS-OCEANIC STATION.

At Port Jefferson, Long Island, stand the largest radio towers in use by any commercial station. Each one stands 652 feet high, and is self supporting, with no guy wires whatever. There are seventy-two in all, arranged in sixes, each six forming one spoke of a huge wheel with swelve spokes.

This arrangement takes directional effect into consideration, so that radio stations in all quarters of the earth can be in communication at the same time. Although each set of towers is provided with its own controls and transmitters,

the whole twelve sets can be linked together for special work, if necessary. The station belongs to the Radio Corporation of America.

* * *

BROADCASTING BIBLE CLASSES.

A regular course of consecutive Bible study has been conducted by the pastor of the First Presbyterian Church of Dallas, Texas, for some time. Asked by the management of the "Dallas News" to conduct a service at the opening of their broadcasting station, he agreed, though somewhat uncertain of the effect. He found the ordeal a bit nerve shattering, but, after some effort, delivered an address.

Listeners-in approved of it, also of a suggestion that the invisible Sunday afternoon "class" should enrol themselves by letter. They would then receive a certificate bearing the teacher's signature declaring the person named a member of the first Radio Bible Class. By telephone, telegraph and post, names poured in at above six hundred a week. A class of over three thousand now "attend" each week, and many members are invalids, people who cannot get out and attend chapel, and even orphans and others in homes. Members usually have their Bibles at hand, and follow in them the reading and explanation of the passages they are studying.

* * *

IN SOLITARY STATE.

To date there is but one fully qualified and accepted woman radio engineer in the world. Mrs. Edward M. Munzer, of Hewlett, L.I. (America), holds this position. She studied at Hunter College during the war and obtained a grade "A" license as operator. After this she became Government Inspector at the De Forest station at Highbridge, N.Y., and when the war ended she remained there experimenting and testing. She is still engaged in radio research work with the Davidson Radio Corporation.

Amateur Stations.

SOUTH AUSTRALIA

Wireless Licenses for experimental purposes have been issued to the following:—

CALL SIGN.	NAME.	ADDRESS.
5 D K	Freeman, G. A. A.	Hughes Street, Sandwell, Port Adelaide. R.
5 D L	Griffiths, O. K.	Young Street, Blackwood. R.
5 D M	Toll, A. M.	22 Broadway, Glenelg. R.
	Margetts, C. A.	McHenry Street, Murray Bridge. R.
	Symes, G. W. J.	Two Wells, South Australia. R.
	Anderson, M. B.	Torrens Road, Cheltenham. R.
	Ford, W. E.	Caroline, Moonta. R.
	Corbin, C. W.	163 East Terrace, Adelaide. R.
	Nicholas, M.	420 Moonta Mines, South Australia. R.
	Unbehaun & Johnstone (Lawrence, E.)	9 Rundle Street, Adelaide. R.
	Fotheringham, H.	4 Ada Street, Hyde Park. R.
	French, T.	Wirraminna, East-West Railway. R.
	Williams, J. P.	20 Ningana Avenue, King's Park. R.
	Tamblyn, J. R.	Stirling Terrace, Wallaroo Mines. R.
	Bissett, H. F. R.	25 Ophir Street, Goodwood Park. R.
	Sobels, M. D.	Watervale, South Australia. R.

VICTORIA

NATURE OF LICENCE.	NAME.	ADDRESS.
V	Morris, T.	165 Fisher Street, Malvern, Uney. R.
C	Ryan, T. J.	Oliver Street, Murray Bridge. R.
C	Merry, D. J.	25 Prospect Terrace, Prospect. R.
C	Brook, L. J.	Elizabeth Street, Murray Bridge. R.
C	Hookham, P. G. P.	21 Walkerville Terrace, Gilberton. R.
C	Hunn, M. J. M.	47 Alexander Avenue, Rose Park, Adelaide. R.
C	Martin, R. J.	29 King William Road, Uney. R.
C	Keley, W. A.	Christie Street, Largs Bay. R.
C	Forwood, W. R.	749 Henley Beach Road, Torrensville. R.
C	Errington, S. E.	Holbrook's Road, Underdale. R.
C	Corbell, S. J.	185 Wattle Street, Malvern. R.
C	Bruggemann, L. W.	39 Alexander Avenue, Rose Park. R.
V	Magraith, M. W.	12 Avenel Gardens Road, Medindie, Adelaide. R.
5 B F	Miller, F. G.	Murray Bridge. T.

The following has removed to the address indicated:—

5 A B	Hodge, W. C.	27 Waterloo Street, Glenelg. R.
5 B O	Sando, R. V.	16 Augusta Street, Glenelg. R.
5 B R	Geake, W. V.	Florence Street, Murray Bridge. R.

CALL SIGN.	NAME.	ADDRESS.
C	Ohrbom, R.	61 Grantham St., Brunswick. R.
C	Hickey, J. F.	"Coventry," Grand View Terrace, Kew. R.
C	Bell, W.	"Vindethana," St. Bernard Rd., Alphington. R.
C	Mackinnon, L. J.	"Laluma," Orrong Rd., Toorak. R.
C	May, A.	28 Upton Rd., Windsor. R.
C	Sutcliffe, F. B.	68 Chomley St., Windsor. R.
V	Sexton, C. E.	90 Mathoura Rd., Toorak. R.
C	Kinsella, T. W.	Mayo Park, Lubeck. R.
V	Anderson, G. W.	20 Clarence St., East Malvern. R.
7 A H	Medhurst, F. W.	Beach Rd., Lower Sandy ... R.
C	Berger, A. E.	6 Osborne Street, Brunswick. R.
C	Styles, I. J.	1 Osborne Street, West Brunswick. R.
C	Gosewinckel, A.	"Wansbeek," Bennong Ave., Sandringham. R.
V	Vernon, J. H.	20 Robert Street, Spotwood. R.
V	First Barwon Troop Boy Scouts (H. E. Hurst)	"Eumeralla," Geelong. R.

(Continued on Page 20)

S. A. TRANSMISSIONS.

The members of the South Australian Division of the Wireless Institute of Australia, who are in possession of transmitting licenses have arranged a programme of transmissions to take place for at least half an hour each evening, between 8 p.m., and 8.30 p.m., on about 200 metres. The programme was opened on Thursday, September 20th, by Mr. Bland 5AG, who transmitted several musical selections by means of a gramophone on Friday and Saturday, with records and songs by several artists. On Sunday, Mr. Cook, 5AC took up the running. On Monday, Mr. Bland again took charge of the ether; on Tuesday Mr. Austin again officiated; Wednesday was to have been taken by Mr. Jones, 5BQ, but not having his new transmitter finished in time Mr. Austin again took charge. At the finish of Mr. Austin's programme on Wednesday, several banjo selections were transmitted from Mr. Ame's station at Hindmarsh, 5AV by Mr. H. Blackburn, of the Adelaide Banjo Club.

These programmes are to be rearranged each week so that any experimenter having a new valve or crystal to test, or a new circuit to try out, will be sure to have some transmission each evening for his benefit.

Several transmitters here have been overwhelmed with requests for transmissions, sometimes, being called up by telephone at times when they should be in bed, by some chap who has a new valve; we leave you to guess what the transmitter owner says on occasions like this; however, the new arrangement should bring relief to the weary ether splitter, as listeners in will be sure of something doing every evening.

South Australian transmitters will be pleased to receive a post card from the other States hearing their music of C.W.

A DEMONSTRATION AT ST. PETER'S COLLEGE.

A club for radio enthusiasts among the scholars at St. Peter's College has been formed and on Saturday, September 22nd, a demonstration of wireless telephony and telegraphy was given at the College, a large number of scholars and friends being in attendance. Mr. Oldfield, who is an enthusiastic experimenter and a teacher at the college, had arranged a very fine programme and a number of artists sang from the platform of the hall and were then driven in a motor car to the station of Mr. H. L. Austin, at Norwood, 5BN, from where they again sang, this time into the microphone, the music being received at the hall on a seat in charge of Mr. L. C. Jones, and made audible by means of a magnavox.

A feature of the evening was a speech by the headmaster, Mr. Bickerstitch, which was transmitted from Mr. Austin's station, and heard clearly at the hall, as well as at the homes of many other experimenters who were listening in.

Mr. Austin also transmitted signals by C.W. giving the transaction by voice afterwards.

Altogether the demonstration was very successful, and quite a revelation to the uninitiated.

The demonstration was given by the kind permission of the Chief Manager of Telegraphs and Wireless.

TRANS-PACIFIC TESTS.

Mr. Slade's Request to Transmitters.

All amateur transmitters using wave lengths below 230 metres are requested to refrain from transmitting before 9 p.m. between the 15th October and 3rd November.

The American amateurs will be transmitting during this period. They have gone to a great deal of trouble and expense to ensure success from their end, and it behoves us to do our share here.

I feel absolutely sure that the honours of these tests will come to N.S.W. if we all pull together and minimise the howling valves.

LEICHHARDT AND DISTRICT RADIO SOCIETY.

The final Tuesday night meeting and, incidentally, the last meeting of the first year of the Society's activities, was held in the club room, 176 Johnston St., Annandale, on Tuesday, October 2nd, when a number of visitors were treated to a demonstration of reception of music and speech. The weekly meeting night has now been altered to Monday, commencing from last meeting, which was the first annual general meeting, and a report of which will be published in our next issue.

Members have entered upon their second year full of hope and optimism for the future, and with the big membership of 55, which still continues to increase with every meeting, it is felt that there is every ground for such optimism.

The next meeting will be held on Monday night next, when all interested are invited to be present. All communications should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth Street, Annandale.

CROYDON RADIO CLUB.

The usual weekly meeting was held on Saturday, August 29th, at "Rockleigh," Lang Street, Croydon at 7.30 p.m.

Final arrangements were discussed for the experimental launch trip on 1st October.

Mr. W. Cottrell (2ZN) of Coogee, gave the members a very interesting lecture.

He showed how to utilise the three coil circuit with the secondary coil as a radio frequency choke so that transformers were not required.

Mr. C. W. Slade thanked Mr. Cottrell for his lecture on behalf of the members of the club and also for the loan of his receiver for experiments on a motor launch.

The Secretary will be pleased to hear from experimenters wishing to join the club, and it is hoped that experimenters in the district who are not already members will soon become such.

All communications to the Hon. Secretary, G. Maxwell Cutts, "Carwell," Highbury St., Croydon.

THE CROYDON RADIO CLUB PICNIC.

On Monday, October 1st the above club enjoyed a launch picnic on the harbour. By permission of the Radio Inspector a receiving set was installed on the launch.

Mr. W. Cottrell (2ZN) of Coogee, lent the club his receiving set, a very efficient three valve set, with white xylonite panel. Messrs. Colville Moore, were good enough to lend a magnavox loud speaker.

Messrs. Luckman, Craig and Slade made a cage aerial which was fixed on the small masts of the launch.

While the boat was in motion the spark of the engine was very audible in telephones, but C.W. and spark signals were easily readable. When the launch stopped at Flat Rock, in Middle Harbour (2DS) Jack Davis was heard transmitting music and speech. The reception was loud and clear. Later in the afternoon (2CI) Mr. R. D. Charlesworth was heard. Screening by surrounding hills was very noticeable. 2DK was also heard.

Owing to the rough weather, tuning was very difficult, but some very interesting experiments could be carried out in calm weather on a small launch.

Members of the Club were very satisfied with the results obtained under such bad conditions and it is intended to make another experiment at a later date.

STATIONS HEARD.

Mr. E. L. Norris, 4CK, Toowoomba, Queensland, forwards a list of stations heard during last fortnight on 4 valve neutrodyne: 2CM, 2JM, 2GR, 2DS, 2DK, 2ER, 2FA, 2ZG, 2LO, 2UW, 2CI, 2BM, 2BB, 2AR.

All these stations have been heard clearly by Mr. Norris on telephony —3BY was also heard on C.W. only.

We would be pleased if more country amateurs would write in giving lists of stations heard.—Editor.

Static again predominated throughout the week-end.

Reception of the usual Sunday night concerts was well nigh impossible.

Some interesting developments in the retail wireless trade are about to take place; from an onlooker's point of view there should be "some scrap."

NORTHBRIDGE AND DISTRICT WIRELESS EXPERIMENTAL SOCIETY.

A general meeting of the Northbridge and District Wireless Experimental Society was held at the Club room, on Wednesday, October 3rd, at 8 p.m. Mr. L. Woolridge.

Vice President occupied the chair.

Matters of general importance were discussed, and a Committee was formed to make arrangements to hold a concert locally.

It was decided to make Wednesday, October 10th, an open night to residents and friends of the district, and a good attendance is expected.

At the previous meeting, Mr. H. Vincent, Hon. Secretary, tendered his resignation, which was accepted with regret, and Mr. A. N. Curtis, whose address is Bligh Street, Northbridge, was elected to fill the position.

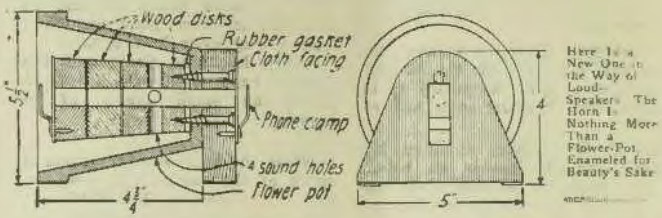
A GOOD LOUD SPEAKER.

By JAMES MECHAN.

An inexpensive, compact, lightweight, efficient, non-metallic loud speaker is a rare prize. We own three at our house, two of which represent a considerable investment. The third, and by far the most satisfactory one, is constructed of a ten-cent. flower pot and a few bits of wood, cloth, rubber, brads and screws. It is a of neat appearance and weighs only one and a half pounds. It can be built in about one hour.

Any hardware man who handles screen wire will give you the four wooden discs shown in the drawing. These are about 2 in. in diameter by 7-8 in. thick. Clamp two of these in a vice and bore two ¼ in. holes edgewise through and between them, as shown. Bore a ¾ in. hole through the centre of the discs flatwise. Assemble the four wooden discs as shown, using brads and glue. The rubber gasket shown was cut from an old inner tube. Make rear end of 7-8 in. wood and bore as shown and use as template in drilling corresponding holes in bottom of flower pot. Two phone clamps made of strips of spring brass ½ in. wide are screwed on where shown. Assemble these. Glue a woollen cloth phone gasket at each end of speaker. Glue three pieces of cloth for the feet, where shown. Paint with auto enamel.

This is the clearest and most distinct loud speaker for song and speech that I have ever heard. You will like it.

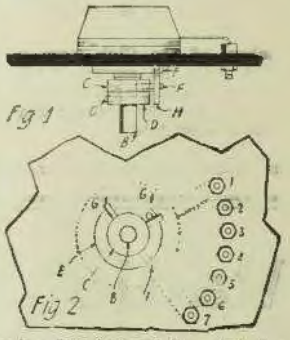


Here Is a New One in the Way of Loud-Speakers. The Horn Is Nothing More Than a Flower-Pot Enameled for Beauty's Sake

REAR PANEL SWITCH STOPS..

By J. C. MUNDAY.

Thinking switch stops are unsightly and detract from the appearance of a receiving set, I devised a unique method of eliminating them. It is very simple, the only auxiliary parts necessary being three short lengths of brass rod, and an extra collar (D in Fig. 1), from a discarded switch.



This Is a Good Stunt and Not a Hard One to Accomplish. The Switch Stops Are Mounted on the Shaft.

The set screws are removed from the collars (C) and (D), and two rods, after being threaded, are substituted. In the nut (E) a hole is drilled and threaded, and the third rod threaded and screwed in. Be sure that this hole is outside the circumference of the collars (C) and (D) when the switch is put together. It is assembled as shown in Fig. 1.

This switch may be adjusted to stop on the last of any number of switch points, by using following instructions: Tighten the rod (F) of the collar (C) in the same plane as the switch lever, as in Fig. 2. The lever is put on the first point and the nut (E) turned until the rod (H) touches (F). The bushing is then tightened from the front side of the panel. Turn the lever to point 6, or 10, or whatever it may be, the tighter the rod (G) ,being sure it touches the rod (H) as in the diagram.

When the lever is turned to point 1, the rod (F) colliding with (H) prevents its sliding off the point on to the panel, while the rod (G) stops the lever at the right place at the other extreme.

AMPLIFYING TRANSFORMER

By TOSHIHARU OKA.

After reading over Mr. Arthur Vance's article in the Radio Wrinkle Contest for the construction of an audio frequency amplifying transformer, I started to make one myself. I took apart the Ford ignition coil carefully and removed the secondaries of same. Then the trouble began. In trying to separate the (one) secondary winding into two parts for the primary and the secondary windings of the amplifying transformer with a pocket knife as directed, I couldn't get the two parts separated. When I did separate them, the primary was nothing but a tangled mass of wires. I stopped to think for a moment as to what I should do next. Then I hit upon the following solution. I cleaned out the inside of the secondary (transformer) and soldered a rubber covered wire on the inside end of the winding and covered it with two or three turns of paraffined paper. Then I unwound the "left-over" secondary winding until it was just large enough to fit into the other winding snugly and connected both ends of the transformer primary to rubber-covered wires by soldering. A layer of paraffined paper was placed over the primary to prevent the larger wire from breaking into the secondary and the whole inserted into the secondary carefully. The transformer is then immersed in melted paraffin and when dried the

The Australasian Radio Relay League.

WORKING RULES.

The State will be divided up into nine (9) districts. Three (3) of these districts will cover Sydney and suburban areas, the other six (6) geographically dividing the State.

Each district shall be under the official supervision of a district organiser and assistant organiser.

They shall arrange all the local tests and supervise all official relays passing through their district.

Be responsible for the co-operation in his district in all League work.

Collect all local reports and forward originals thereof to headquarters, Sydney.

Recommend and report on new members and arrange affiliation of Radio Clubs with the League as far as in their power.

Be a member of one or more Radio Clubs in the district allocated to him.

Endeavour to promote a feeling of good fellowship amongst all experimenters and broadcast listeners.

Report immediately any breach of W/T regulations to headquarters.

Make available to authorised officers of the Postmaster-General's Department copies of all messages and provide facilities for such officers to examine or enquire into methods of working.

REPORTS.

Receiving and transmitting messages shall be in accordance with the regulations as laid down for commercial working of W/T stations under the W/T Act and in accordance with the Radio-Telegraph Convention of London, 1912, and subsequent rulings thereof, as per P.M.G. handbook, a copy of which must be kept on every relay station.

Reports shall be made up on official Form No. 1 (a copy of which is attached hereto in triplicate and shall embody date of receipt and/or despatch of message to and from whom sent or received, system of transmission, whether C.W., I.C.W., Modulated C.W., or Spark; number of message, number of words or check, and any special remarks as to characteristics of signals Q.R.M. and Q.R.N., etc.

Original copies of above reports will be delivered to headquarters, through district organiser, who will file—for local reference, duplicate copy. Triplicate will be filed by relay operator at his station for official and personal use.

Form 2.

LOG SHEETS.

Log sheets will be furnished in reasonable quantities to members on application.

Members are especially requested to log every experimental station heard, giving particular attention to the remarks' column. Where long distance reception is being accomplished and/or where a new station is being logged, it is desired that acknowledgement of the received signals be immediately sent, advising such station of the fact and embodying in your advice W/L (where possible) strength heard, special remarks re signals, aerial and receiver used, etc. If 'phone is being used, percentage of modulation and generator hum to C/W strength should also be advised. It will be evident from this acknowledgment that considerable assistance to the transmitting operator will result.

Form 3.

"Q.S.L."

Q.S.L. cards (acknowledgements) will be available to members on application and too much importance as to their scientific value cannot be placed thereon. Consider a new station opening up and having at its disposal, through the League, some five hundred (500) stations to listen in, and report results, the assistance in this particular instance would be invaluable and save many weary days of testing and the depreciation of apparatus usually attendant in these experiments.

Messages of an experimental nature only may be transmitted between League members, Radio Clubs (affiliated), etc., providing strict compliance with the regulations under the Post and Telegraph Act be observed. English language to be exclusively used in all relay work.

Form 4.

ACTIVE MEMBERS.

Active member's duties are as follows:

He will adhere strictly and without fail to a working schedule laid down and agreed upon. If under unforeseen circumstances he is unable to do so, he will arrange with another member and advise his organiser of the arrangements made. Every endeavour must be made to always keep the chan of stations intact, and it should be the pride of every member to say, "We always get through."

PRIORITY OF MESSAGES.

No priority shall be given to any message unless:

Such be of National Interest, or vital importance to the interests of the League.

Form 5.

ALTERATION OF RULES.

Alteration, amendment or recission of any of the above working rules may be made from time to time by the Committee.

Further information may be obtained from the Hon. Organising Secretary, Box. 378, G.P.O., Sydney.

WHAT THEY WANT MOST.

With the U.S.A. farmers the movements of the livestock markets come highest in popular regard; then weather reports, followed by fruit and vegetable prices, ditto dairy products, and other marketable foods, cotton, etc., produced on a farm. These radio reports are being very widely received and made use of by farmers and also by consumers of farm products, who can thus regulate supplies according to the state of the markets day by day. Acting upon a consensus of all the replies, the efficiency of the service has been still further developed.

Continued from page 18

cure wires are bound in place as directed by Mr. Vance.

Many amateurs have found this in constructing their transformers, but many more may be thinking of building them so I thought this might save them a little trouble in the making.

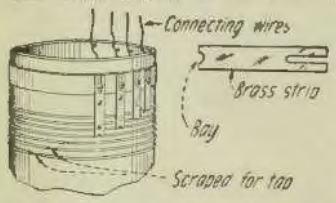
Convenient Method for Tapping Coils.

Not Only Does This Make a Neat Looking Job, but it Insures a Ruggedness that is Not Found in the Usual Tapped Coil.

By KARL L. MARTIN.

A very neat looking job of tapping tuning coils can be done with little work in the following manner. The entire winding is done first with enamelled wire, which ensures tightness and neatness, after which about a quarter of an inch of the selected turns are scraped of insulation with a knife.

The tapping leads are cut from stiff brass ribbon, as shown in the



Not Only Does This Make a Neat-Looking Job, But It Insures a Ruggedness That Is Not Found in the Usual Tapped Coil

drawing, being about quarter of an inch wide, with a slot cut in one end, and a bay as wide as the diameter of the wire, in the other end. The slot should be wide enough to be slid on to a small screw fastened to the tube, by a nut on the other side. The lengths of the strips vary according to the distance of the tapped wires from the screws. The small bay at the other end permits soldering.

In order to bring the contacts exactly on the wires, the former should be bent slightly downward, and slid back and forth under the screws until adjusted. Connecting wires are fastened with another nut on the screws inside the tube. The wires in the drawing are shown spaced only for clearness.

Published by W. J. Maclardy, of 58 Murdoch St., Cremorne, for the Proprietors, at the offices of Publicity Press Ltd., 33/37 Regent St., Sydney.

Amateur Stations

VICTORIA.

Nature of Licence.	Name.	Address.
V	Young, E. A.	15 York Street, Mont Albert. R.
C	Nicoll, E. C.	Main Street, Tynong. R.
V	McLeod, J. C.	18 Boundary Road, Surrey Hills. R.
V	Davey, J. A.	209 St. Kilda Street, Brighton. R.
V	Nilsen, O. J.	Avondale Avenue, Brighton. R.
C	Steward, A.	C/o Norris & Shelley, Post Office Place, Melbourne. R.
C	Sims, S. R.	76 Harold Street, Middle Park. R.
C	Cameron, C. H.	509 Melbourne Road, Newport. R.
C	Ellis, S. H.	19 Orrong Crescent, Caulfield. R.
V	Gardiner, W. S.	56 Riversdale Road, Camberwell. R.
V	Cromie, C. T.	42 Aroona Road, Caulfield. R.
C	Wilson, H.	Miners' Rest, via Ballarat. R.
V	O'Connell, E. J.	23 Albion Street, Essendon . R.
V	Isaacs, K. A.	36 Westbury Street, East St. Kilda. R.
V	Hetherington, I. W.	Nerbein. R.
C	Faul, A. H.	3 St. Leonard's Avenue, St. Kilda. R.
V	Edgar, J. M.	12 Henry Street, East Geelong. R.
V	Chrisfield, W.	Thursby Grove, Ivanhoe. R.
V	Harrison, W. C.	C/r. Bay Street and Bluff Road, Black Rock. R.
V	Dane, J. E.	501 Latrobe Street, Melbourne. R.
V	Curtin, E. F.	213 Dandenong Street, Windsor. R.
V	Nichols, G. H. C.	C/o Dr. Nichols, Ararat. R.
V	Cook, W. J.	64 Kingsley Street, Elsmore. R.
C	Dowsley, E. J.	63 Guildford Road, Surrey Hills. R.
V	Jacobs, J. W.	40 Munro Street, Ascot Vale. R.
V	Williams, G.	36 Closeburn Avenue, Windsor. R.
C	Guildford, W.	4 Kipling Street, East St. Kilda. R.
V	Edwards, B.	52 Alexander Avenue, Canterbury. R.
V	Gilbert, G. A.	289 Maribyrnong Road, Ascot Vale. R.
V	Linnell, J. E.	67 Glenora Avenue, Coburg. R.
C	Kissick, A. L. H.	7 McFarlane Street, Brunswick. R.
C	Greer, H. A. A.	"Naura," Lumeah Road, Caulfield. R.
Call Sign.		
3 J R	Dunstan, W. J.	7 Cameron Street, Ballarat East. T.
3 J P	Michell, H.	Kean Street, Caulfield. T.
3 P H	Hall, R. F.	Glindabourn Avenue, Toorak. T.
3 Z J	Lempriere, C. L.	Terrara Road, Vermount. T.
3 Z K	Bradley, F. R.	Beach Crescent, Sandringham. T.
2430	Kells, A. C. E.	366 Ascot Vale Road, Moonee Ponds. T.
3 Z E	McGregor, K. W.	23 Molesworth Street, Armadale. T.
	The following have removed to the addresses indicated:—	
803	Norris and Skelly	Howie Place, Melbourne.
2675	Taylor, W. H.	Emilton Avenue, St. Kilda.
2676	Brand, J.	Beaconsfield Parade, St. Kilda.
3 U Z	O. J. Nilsen & Co., (N. Boyd)	45 Bourke Street, Melbourne.
500	Day, C. N.	6 Arundel Flats, Commercial Road, Melbourne.
1641	Crow, K. A.	4 Oak Avenue, West Hawthorn.
2252	Stirling, K.	Chatswood Avenue, Brighton.
1382	Falconbridge, J. M.	29 Sims Street, Sandringham.
2679	Bull, P.	34 Patterson Street, Middle Park.
2779	Wright, A. M.	Erindale Street, Murrumbeena.
2564	Jennings, R. S.	39 Mackay Street, Essendon.
1398	Mansell, A.	13 Victoria Avenue, Canterbury.
	The undermentioned have been cancelled:—	
3 Z B	Dxon, R. H.	1 Hopetoun Avenue, Canterbury.
644	Wain, W. J.	21 Scott Street, St. Kilda.
V	Watts, N. E.	39 Burton Street ,Concord. R.
C	Hucker, F.	"Coralie," Warwick Street, Penshurst. R.
C	Burgess, J. S.	14 Bay Road, North Sydney. R.