News, New Inventions, Scientific Achievements, In the World of Radio

RADIO REVIEW

To-Day Is Your Last Opportunity To See Radio Show At Capitol Theater

RADIO RECEIVING SETS

Continued From Last Week.

By W. B. Cartmel, B.S., M.A., M.E.I.C., Northern Electric Company Limited, Montreal

ARTICLE VI.

In the last few years very radical changes have been made in receiving sets. Our magazines have been filled with all sorts of different hook-ups. These all belong to the three classes of receiving sets previously mentioned, by far the larger part belonging to the regenerative class. It is not surprising that the regenerative hook-up should have attracted so much attention when we remember what tremendous distances one may obtain reception by this method using only a single tube. Radio-frequency hook-ups, however, are coming more to the front at the present time because people are becoming more critical in their requirements, and radio-frequency not only gives reception from distances greater even than may be reached by means of regeneration, but still more important, brings the distant stations in much more sweetly and clearly. A new type of hook-up is now coming into use

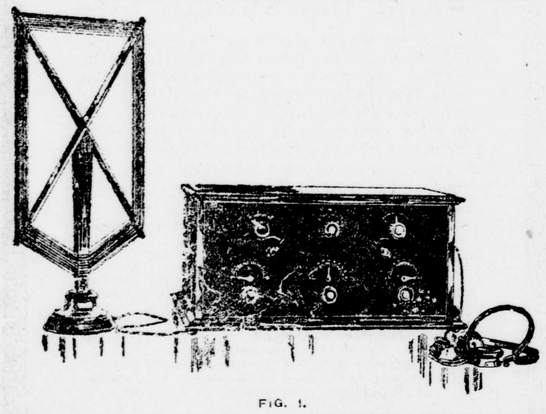


FIG. 1.

which has such very remarkable qualities that at the risk of seeming rather technical I feel compelled to devote a chapter to it. This set is shown in figure 1, connected to a small loop antenna, and figure 2 gives an interior view of the set. It will be noted that there are six peanut tubes used, which are necessary in order to produce the remarkable results that may be obtained from a set of this kind. The operation, however, is not as costly as it might seem, because the total amount of B battery consumed by the six tubes is less than would be required for a single one of the larger tubes.

The word super-heterodyne need not frighten us. It merely means that in this set we change the wavelength before detecting the signals. As is well known, broadcasting is done on wave lengths between 220 and 550 meters. In this set the short wavelength signals from the broadcasting station are picked up by the antenna and in the first tube the short wavelength signals are changed to 6,000 meters, which it will be noted is a very much longer wavelength than is used in broadcasting. Transatlantic wireless telegraph stations operate on waves as long as this, or even longer, but broadcasting confines itself to the use of the short waves just mentioned. The change in wavelength is produced in what is shown in figure 2, as the first detector tube. The chief object of the change in wavelength is to enable amplification to be carried out more easily and more efficiently. On these longer wavelengths we can use an iron core transformer between tubes just as we do in the case of audio-frequency, whereas air core transformers only are used in amplifying at short wavelengths. More important than this, the vacuum tube itself does not amplify as efficiently at short wavelengths as it does at long wavelengths in fact, at very short wavelengths it amplifies very badly indeed. Not only that, but very curiously the vacuum tube produces even higher amplification at these long wavelengths than at audio-frequencies. At audio-frequency we obtain an amplification of from 200 to 250 times. At short wave radio-frequency the amplification per

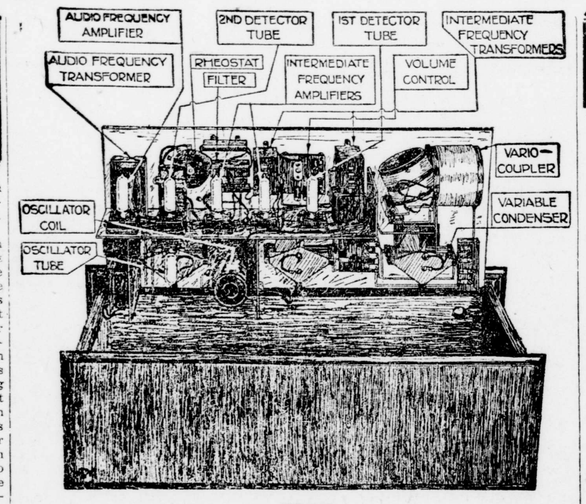


FIG. 2

SUPERHETERODYNE RECEIVER

brings the incoming signals to the high frequency detector. It will be noted that there is also an oscillator connected to the high-frequency detector, furnishing high-frequency vibrations which combine with those received by the loop, giving them a lower frequency or longer wavelength than they had when received by the loop. In the first high-frequency detector the wavelength is changed to exactly 6,000 meters, or in other words a vibration frequency of 50,000 vibrations per second. No matter what the wavelength of the incoming waves, they are always changed to exactly this wavelength and this wavelength only. Following the high-frequency detector is the intermediate frequency amplifier. There are two stages of intermediate frequency amplification, two tubes and two transformers being shown for this purpose in figure 2. After having been given these two stages of amplification at a wavelength of 6,000 meters, the signals are passed through a filter which clarifies them an deliminates noises. This filter consists of a coil wound on a wooden spool and a condenser, the two being anown together as indicated by a two-headed arrow in figure 2. After leaving the filter the signals are detected and made audible by the second detector and then after detection are again amplified at audio-frequency.

Although this may seem like a complicated method of receiving radio signals, we may explain the whole thing simply by saying that the signals are changed from short wavelength signals to long wavelength signals so that they are more easily amplified, and then after being amplified twice they

FIG. 3.

are detected. It will be readily understood that a set of this kind requires the utmost skill and experience in order to be made up in such a way as to give the best results. When made up properly, however, such a set leaves nothing to be desired as regards simplicity of operation and the purity which it will bring in the reproduction of musical concerts as transmitted by radio. On the other hand, if a set of this kind is made up without giving due regard to all of the finer details of design, the results produced will be very poor, as far as the quality of received music is concerned, although it is not so difficult to make a superheterodyne that will give marvelously long-distance reception merely on a loop.

stage is less than this, while the radio-frequency amplification in some superheterodynes is as much as 6,000 times per stage. This will give us some idea of the tremendous amplification given by one or two stages of intermediate frequency amplification. With such tremendous amplification previous to detection, a very weak signal indeed may be brought up to sufficient strength to permit of detection, especially when we remember how weak a signal may be detected by a vacuum tube.

Perhaps we can understand best about the operation of a super-heterodyne by considering figure 3, in which the superheterodyne is shown divided up into its different elements. At the left we see that there is a loop antenna which

RADIO NOTES.

Get a good grade of porcelain insulator for your aerial.

Yale has started a "communications course."

There are 36 broadcasters in Canada.

Rubber tape is better than friction tape for aerial work.

There are 3,000 radio manufacturers and 1,000 distributors and jobbers in the United States.

Three of the world's most powerful transmitting stations are in Moscow.

French amateur has been heard from Paris to Algeria with a two-tube receiver on 35 meters.

Station KFNF, Shenandoah, Pa., has a pig for mascot.

Rub panel with pumice on long distance reception.

Grid and plate leads of tube sockets should be away from the panel.

About 160 German firms are manufacturing amateur radio apparatus and parts.

United States navy is gradually substituting tube sets for the old-fashioned sparks.

Station KGO, Oakland, Calif., reports an orphanage of Eskimo children at Taller, Alaska, among its fans.

Variometer shafts should be of brass or copper, not or iron or steel.

Once the reception is good, let the set alone.

King George of England has a seven-tube receiving set.

Simultaneous broadcasting in England has received great popularity.

A broadcast receiving license in Great Britain costs $2.50 a year.

British amateurs recently heard an Argentine station.

China technically bars radio under an embargo forbidding the importation of anything usable as war material.

For economy buy a honeycomb coil, rather than make one.

Wilson was the first United States president to broadcast his voice.

Sunlight shortens the life of a storage battery.

Acid should not be used as a soldering flux, because it attacks the copper.

Radio manufacturers and others suggest the use of "radiocast" instead of "broadcast."

American Radio Relay League is checking up amateur [illegible] stations in foreign countries.

RADIOGRAMS For The RADIOPHANS

BY. F. E. GRIMMETT.

Radio, like many family quarrels, is just words over nothing.

When we started this column we decided to wrap ourself in the cloak of indifference and adopt the demeanor of the bearded old fogy with the perpetual grouch in an attempt to remain sanely enthusiastic about the better things in broadcasting.

Bouquets in ink are more lasting than verbal superlatives and we treasure highly any praise that drips from our pen, but we are forced to register enthusiasm and believe it to be an almost sacred duty to commend the management of radio station CJGC for the interest they are taking in the radio enterprise.

The work of the studio man and artists of station CJGC have not gone unheralded, as is simply shown by the hundreds of congratulatory letters received from the fans. But this is not enough.

At least 200 congratulatory post cards should be received at the above station every week. Broadcasting is free, and it is only a small effort for us to forward a bouquet in ink to encourage the studio man and artists in their work.

We fail to realize the financial outlay necessary to give us radio entertainment, and like many other things neglect to appreciate luxuries until we are deprived of them.

Let us all mail a congratulatory post card this week. It is not our duty to boost any station in this collumn, but we feel that it is absolutely essential that we, broadcast a little propaganda to enable us to retain what we have.

Last week we published a letter from A. Hick, esquire, outlining a plan to eliminate static.

Hick stated that he placed a funnel under his aerial and a sponge in the funnel. The static, according to Hick, dripped from the aerial into the funnel and was filtered through the sponge, allowing him to use the filtered static to recharge his batteries.

We are in receipt of a letter received from another fan, who states that he made use of A. Hick's suggestion with some success.

The writer states that he failed in his first attempt to catch static, owing to tuning in to a temperance speech.

He says that the speech dried the sponge to a cinder.

His second attempt was also unsuccessful in that he tuned in to a speech being broadcast by advocates of Government control.

The sponge was saturated by the second speech, and in its soaking condition was of no use for filtering purposes.

The writer says his efforts were crowned with success in his third attempt when he tuned in to speeches being simultaneously broadcast by advocates of Government control and the O. T. A.

He states that the static from the "wet" speeches just dripped down the funnel, and after filtering through the sponge was evaporized by the "dry" static.

Result was that at the end of the evening he had a pail full of concentrated static.

He placed this pail of static in the yard where he keeps his cows and one of the cows ate it, mistaking the substance for bran.

Now the writer declares that the cow that ate the plebiscite static refuses to be milked unless a gilded rail, upon which it can rest one of its forefeet, is placed before it.

There are at least three wonderful things in this world: namely, radio, penitentiaries and laundries.

It is said that some laundrymen tear up shirts left over the week-end as an easy way to get rid of them.

Penitentiaries are full of men who have killed their laundryman because the only washed part of their linen was the button-hole.

They at least got rid of the laundryman.

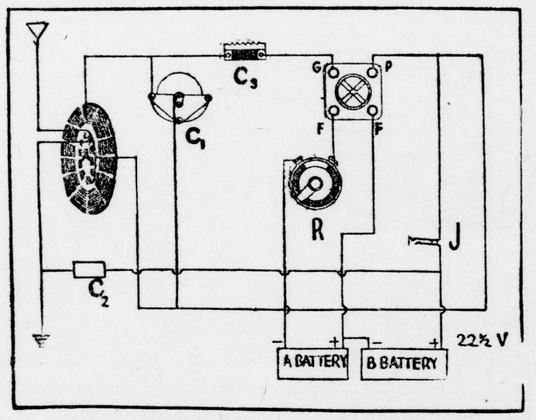
Both of the above have at least put the disappearing act on something.

Radio has its vituperative writers and critics, who, since the inception of radio, have endeavored to put the disappearing act on a few so-called artists.

Laundrymen are killed to save the trouble of looking for the shirt.

Bearing a striking resemblance to penitentiaries and radio, in that they both save trouble in the family.

LOW-LOSS COILS AND ONE CONTROL FOR DETECTOR



Hook-Up of One-Control Detector

BY ISRAEL KLEIN

Upon the low-loss coil depends much of the success in construction of a simple detector. The tapped inductance, the variocoup'er or variometer has given way to the honeycomb primary and secondary, the basket weave, diamond weave, spiderweb or similar type of winding. For it has been definitely established that there is a minimum of loss in reception by means of such coils.

A simple detector circuit with such coils has only one control, that of the variable condenser. Once the primary and secondary low-loss tuners are fixed, there is no longer need of tampering with them to tune in a station. The condenser does that.

A good type of coil for the set considered here is a simple spiderweb. Both the primary, A, and the secondary, B, are wound similarly around a two and a half inch inner circle. The best way to do this is to set an odd number of spikes, nine or 11 preferably, evenly around a thick wood hub, 2½ inches in diameter, and wind the wire in and out about these, going under two spikes, over the next two, under the next two and so on.

CONDENSER IMPORTANT.

Coil A gets six windings of No. 16 DCC wire, while coil B is wound with about 48 turns of No. 18 wire. The exact number of windings depends on the condenser. Different condensers give varying results, therefore the best way to learn the exact number of turns needed is to experiment as follows:

Wind about 55 turns on the secondary, and when you are finished with the set and ready to listen in, decide on a definite station with a wavelength of, say 360 meters. Turn the condenser dial until this station comes in strongly and note the reading.

If the reading is at 30 on the dial, the number of windings is correct. Otherwise, strip off one turn at a time until the dial reaches 30 for a 360-meter station. This will enable you to cover all broadcasting wavelengths.

The two coils, A and B, are set alongside each other, with the centers coinciding, about an inch apart. Two or three pieces of wood an inch long may be set between them for this purpose, and nails hammered into the ends through the coils, to keep them together

OTHER PARTS.

A piece of doweling about ⅜-inch thick can be used to hold the coils upright. Bore a ⅜-inch hole in the baseboard, where the coils are to go, put the dowel into one of the openings of the larger coil, leaving enough to be glued into the hole in the base.

The variable condenser should be of the best low-loss type available. A 23-plate type is called for. Of course it should be vernier-controlled.

The fixed condenser, C2, should be of .001 mfd. capacity, and the grid condenser, C3, should have a capacity of .00025 mfd., with a variable grid leak of from 1 to 2 megohms.

The phone jack, J, is of the open circuit type if no audio amplifier is to be added to the detector. But it should be of the closed circuit type if an amplifier is attached.

The tube depending on the use of dry or wet batteries for filament current, may be either UV-199, UV-200 or any other detector of reputable make.

Fascinating lectures

Interesting talks on the swift-moving progress of science and the arts are sent into the air nightly from radio stations by world-famous authorities. As a means of keeping posted on the progress of mankind, radio is unequalled. For reception so clear that you seem to be in the room with the lecturer use a

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WILLIAM'S RADIOLAYS

One night as I sat at my radio set I wuz weary an' ill at ease an' I twisted the dials idly tho' none of the tunes seemed to please. I don't know what stations I lissened to or what I wuz dreamin' when I heard the most wonderful music an' it brought back my youth again. I lissened an' out of the stillness came those songs that we sang of old—"In the Evenin' by the Moonlight," "Silver Threads Among the Gold," "Wait Till the Sun Shines, Nellie," "Moonlight Bay," "Sweet Adeline," an' it took me back in mem'ry to that old home town of mine. When the fellers got together those are days I can't forget an' I sung a right good tenor in that old Scrap Iron Quartet. Mind how we went serenadin' Herb an' Pat an' Don an' me harmonizin' every evenin' "In the Shade of the Old Apple Tree." As I sat at the set an' lissened to those songs of years ago it made me feel sorter homesick for the gang I used to know. I wonder if they were lis'nin' wherever they may be an' hearin' our fav'rite selections, I wonder if they thought of me. I've tuned in a dozen station where music wuz bein' played, but none of them made the impression like that one program made. Here's hopin' that some of these evenin's they'll send out another supply of that real old-fashioned music to remind me of days gone by.—Copyright, 1924, Westinghouse Electric and Manufacturing Co.

TORONTO HOME ROBBED

Trophies, Medals and Liquor Taken From Residence in Fashionable Street.

TORONTO, Oct. 31. — While his family were at their summer house at West Hill, about 12 miles from this city, the residence of Col. John F. Lash, on Prince Arthur avenue, a fashionable residential district, was ransacked and household goods, trophies, medals, firearms, money and a quantity of liquor were stolen.

The robbers forced an entrance to the house through a window and carted the loot away in a truck.

The value of the goods is placed at $5,000.

BLIND MAY DRIVE

There is no clause in any of the Louisville or Kentucky codes prohibiting a blind person from driving an automobile. But the police traffic head, who brought up this point, has decided to arrest such drivers on the charge of "breach of the peace."

HALF-SECOND DELAY

The United States bureau of standards finds there is an average delay of half a second between the signal to a driver to stop and the application of the brakes. During this time a car with a speed of 30 miles an hour would travel 22 feet.

TRADE WITH AMERICA IS CHIEF FACTOR IN JAPAN'S COMMERCE

TOKIO, Oct. 30.—Trade with the United States is still by far the leading factor in Japan's foreign commerce, according to figures for the empire's trade for the first half of 1924, issued by the department of finance. The United States bought 35.5 per cent. of Japan's exports during this period and sold Japan 29.4 per cent. of her imports.

America leads all countries in imports sold to Japan. Imports for the six months period totaled 1,462,000,000 yet, of which 432,000,000 yen represented purchases from the United States. India ranked second, with 227,000,000 yen, and Great Britain third, with 171,000,000 yen.

Of the total exports, amounting to 808,000,000 yen, the United States bought 287,000,000 yen worth, China 194,000,000 yen, and France 45,000,000 yen.