

# RADIO

(Title Reg. U. S. Pat. Off.)

# WORLD

ILLUSTRATED

WEEKLY

## RADIO HOUR ABOARD SHIP



(C. Photo News)

Many times while a ship is in port the officers and men have a lot of time on their hands. In the old days, they, of course, would go "around the corner," but since Mr. Volstead has put "the corner" out of style, it is hard for some of them to fill the weary hours. In that case, they just go up and "listen in" to the many programs that are being broadcast from the various stations. This photograph shows Operator H. Gilder and T. Knox listening to the Sunday sermon broadcast from St. Thomas Church, while the S. S. Megantic lay in port. Visiting the operators has come to be quite an institution of late, if reports circulated to that effect hold any truth, and it certainly must be a pleasure to listen in when apparatus such as shown herewith can be used. The set is of English make, and, as can be seen, utilizes 6 tubes, which are quite different from those of American make, resembling an overgrown glass grid leak more than anything, but they are said to be wonderful detectors and amplifiers. Operator Knox is seen tuning in.

## JACKIE PHONES



(C. Kadel and Herbert)

One of the recent treats for the listening public was an address over the radio telephone by Jackie Coogan, the world's highest paid juvenile star. The talk was given from the broadcasting station WOR of L. Bamberger & Co., Newark, N. J. Master Coogan gave a very interesting talk to the boys and girls, and was literally flooded with letters in answer to the request made over the phone that all who heard should communicate by letter. The incident impressed Jackie so much he insisted that his father buy him a radio outfit so that he could hear the stories and news of the day.



# FREE ADVERTISING PRIZE CONTEST FREE FOR RADIO FANS

## FIRST PRIZE—

\$250.00 Radio Set Free—Six Tube Radio-Audio Frequency Set

## SECOND PRIZE—

\$150.00 Radio Set Free—Four Tube Set, Detector and 3 stages Amplification

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\$100.00 Radio Set Free—Three Tube Set, Detector and 2 stages Amplification

To advertise our business we will give the above prizes to the three persons sending us a list of five or more names of Radio fans and who compose the best slogan or phrase of words we can use for our advertising matter. We are interested in sending our catalogue and price lists to Radio fans.

If you are interested in Radio and in its future possibilities don't overlook this opportunity to get acquainted with us, secure low prices on your purchases and an opportunity to win one of the above prizes free of charge.

In the event of two or more persons submitting the slogan judged the best, second best, or third best, each will receive the full amount of the prize tied for. All entries must be received by us not later than March 31, 1923.

**We Retail at Wholesale Prices.**

**Lowest Prices on Standard Radio Goods in the U. S. A.**

## Our Peanut Tube Does the Work of W D -11

For Detector and Amplifying uses. Can be used on 1½ volt dry cells or regular 6 volt A Batteries. Fits standard V.T. socket. Uses about 1/10 ampere, on two 1½ volt dry batteries. Price of tube, \$2.50, includes adapter.

1½ VOLT TUBE (not WD-11, but for same use) .....\$5.00

## THIS WEEK'S SPECIALS

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  - WD-11 1½ Volt ..... 6.50
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  - Myers Audion High-Mu ..... 4.50
- Vacuum Tubes Repaired. Broken and burned out tubes repaired. Mail them parcel post insured. Price, \$2.75 each, cash with your order. Tubes returned by Parcel Post, prepaid. We guarantee them to burn equal to new tubes.

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- Moulded ..... 4.00
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- Baldwin ..... 4.00

### VARIOCOUPERS

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- Acme ..... " 5.00, " 3.75
- WD-11 ..... " 5.00, " 3.75

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Space being limited, we are obliged to omit other money-saving items. Write for quotations or ask for our latest Price Sheet Catalog.

**National Radio Products Corporation**  
Mail Order Dept., 509 FIFTH AVENUE NEW YORK



VOLUME TWO OF  
**RADIO WORLD**

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# Intricate Receiving Set Embodies Both Crystal and Tube Detector

*By Louis S. Fielder*

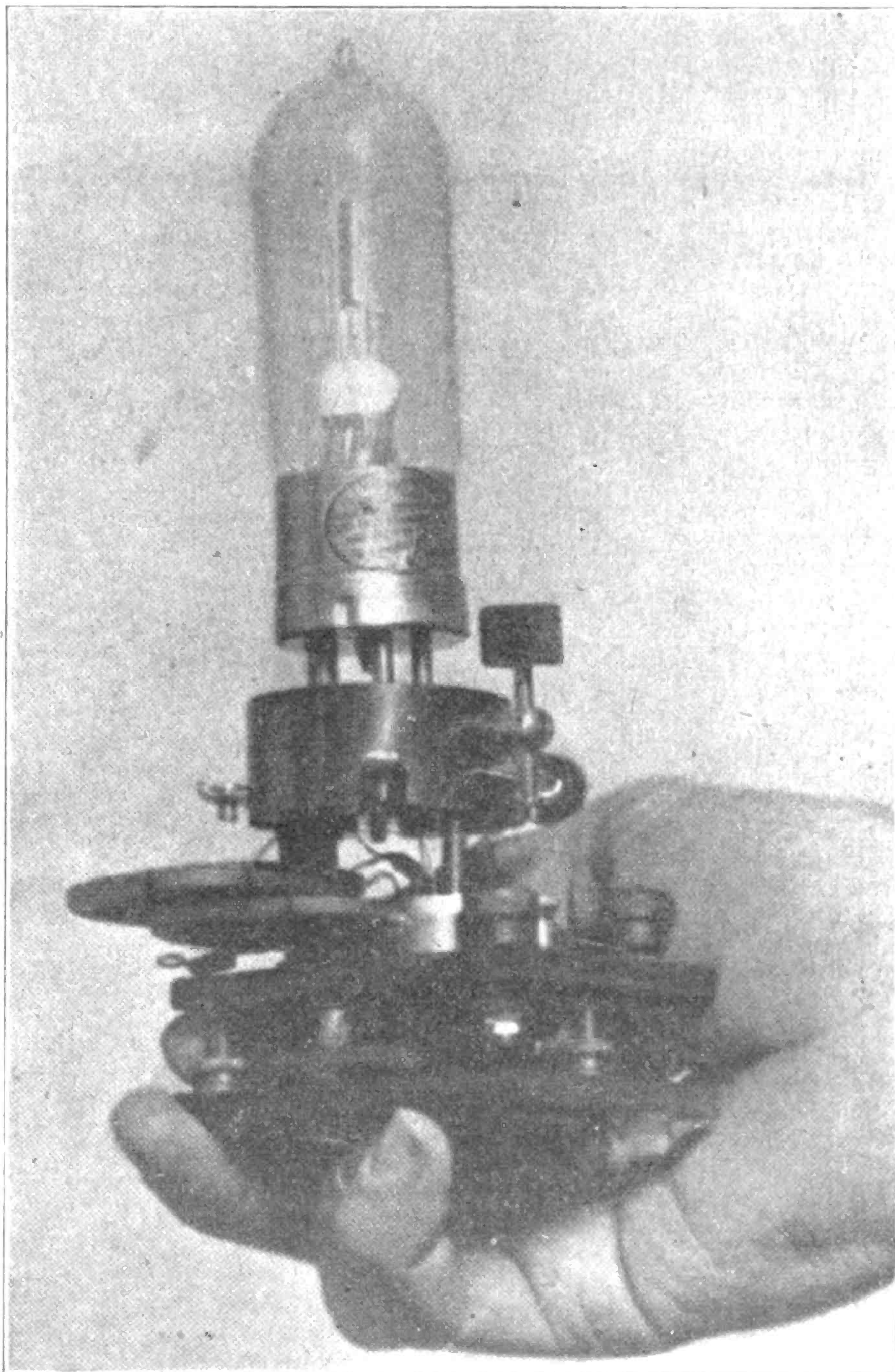
ONE of the features of the amateur contest at the Permanent Radio Fair at the Hotel Imperial, New York City, and one which created much interest, was a miniature set so small that it was easily held in the palm of the hand and yet was a most complete receiving set. The set embodies both a tube and crystal detector, either of which may be used at the operator's desire. The set proper consists of spider web inductances, the relation of which is varied in a sliding motion, somewhat like sliding doors. The inductance is varied by a tiny switch, and has 13 switch points. One of the detectors used is a regulation WD-11 with a specially made socket which takes up very little space. There is also a crystal detector, to be used for local work and when batteries are not available.

This set is so extremely small and compact that it is a constant source of wonder to the layman that it can be made to work. But when the set is closely examined it is found to have been constructed with all the care that a watchmaker would take in making a small wrist watch. When the small space that the maker had to use in the construction is taken into consideration, it surely is a wonder that any man had patience enough even to attempt to make such a small machine.

Its excellent receiving qualities were demonstrated, and although an allowance was made for the smallness, wonderful results were obtained.

This set is extremely efficient on short waves due to the fact that it is so compact that short leads are possible.

This set is one of many which various builders have made to illustrate the fact that a set does not have to occupy half a table in order to work successfully, and is one of the smallest and most compact yet seen. Of course, this small set while practical, cannot be expected to accomplish the work of one of its larger brothers. These miniature sets seem to crop up overnight, and more models will be shown in these columns in the near future.



(C. Photonews)

One of the most intricate miniature radio receiving sets made by an amateur. The set is equipped with both crystal and vacuum tubes, as can be seen in the photo. Tuning is accomplished by sliding the spider web inductances and by means of a small 13 point switch. This set is extremely small and compact, as can be seen by comparison with the size of the man's hand.



# Multitube Reflex Circuits

By *W. S. Thompson, E. E.*

**I**N the multitube reflex sets the importance of the by-pass condenser cannot be too strongly emphasized. There must be a path for the radio-frequency oscillations, or waves, so when using two audio-frequency transformers and phones they must be shunted by condensers to make the impedance of the circuit as near zero as possible.

The inductance of the windings of the transformers and phones is very high so we must place in the same circuit a capacity to counteract the inductance. This is accomplished by shunting a condenser around every winding that would act as a choke coil. No choking effect will be caused by the radio-frequency transformers because they are designed to pass the high-frequency waves.

As we add tubes to our set the precautions taken to prevent oscillations must be greater, for there is more chance that one of the tubes will start local oscillations. The proper use of the potentiometer will go a long way towards preventing this disturbing factor, but the further precaution of a high resistance in the plate circuits will have to be resorted to in some cases. If the operator can get results from the set by proper tuning and use of the potentiometer

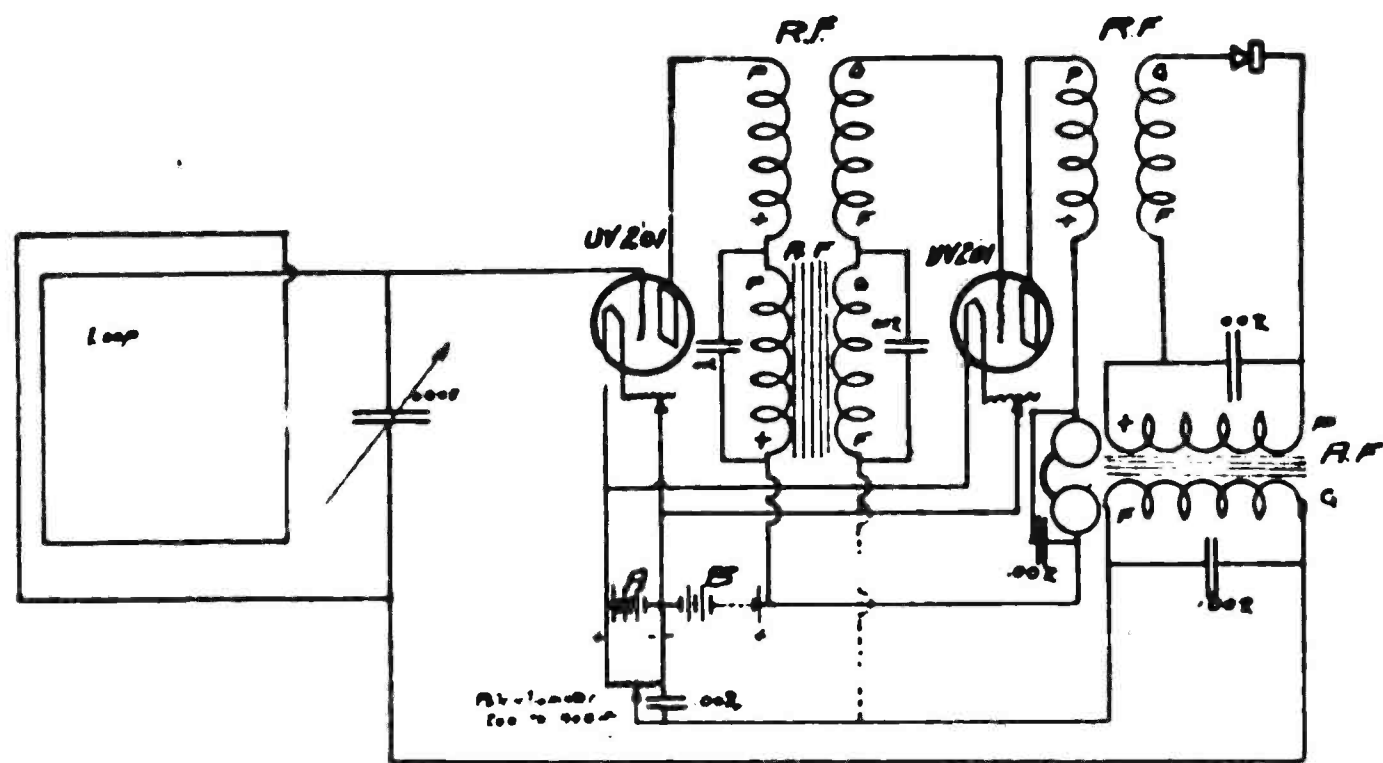


Fig. 1. Diagram of a reflex circuit using two tubes with crystal detector. This circuit is equal to two stages of radio frequency and two of audio frequency amplification.

he will not need any additional apparatus, but the grids work best when they have a normal negative potential and in this condition the tubes are very liable to start oscillating. For this reason the author believes that time in tuning will often be saved and results almost equal will be obtained by inserting these resistances. For a high resistance the author used noninductive coils of very fine German silver wire, but has since seen advertised a B battery potentiometer that would be of great help for this purpose.

The author has not tried every hook-up given, but is giving them here to enable a reader to pick out the ones that he wishes to try, or the ones, the apparatus for which, he already has on hand.

There is nothing particularly new about the reflex circuits for they have been known for some time and have been used by French and English amateurs. The reason we have not used this hook-up or radio-frequency amplification more than we have is probably because there has not been any proper coupling apparatus and because our American tubes have a high internal capacity. To-day there are on the market several very good transformers, so there is no reason why any amateur who is using two or more tubes should not be having the added advantages of two or more stages of radio-frequency amplification. It is a great DX getter and is a static eliminator when using a loop. The loop shown in the hook-up may be replaced by any antennae tuning arrangement such as a single slide tuning coil, variometer, and other parts.

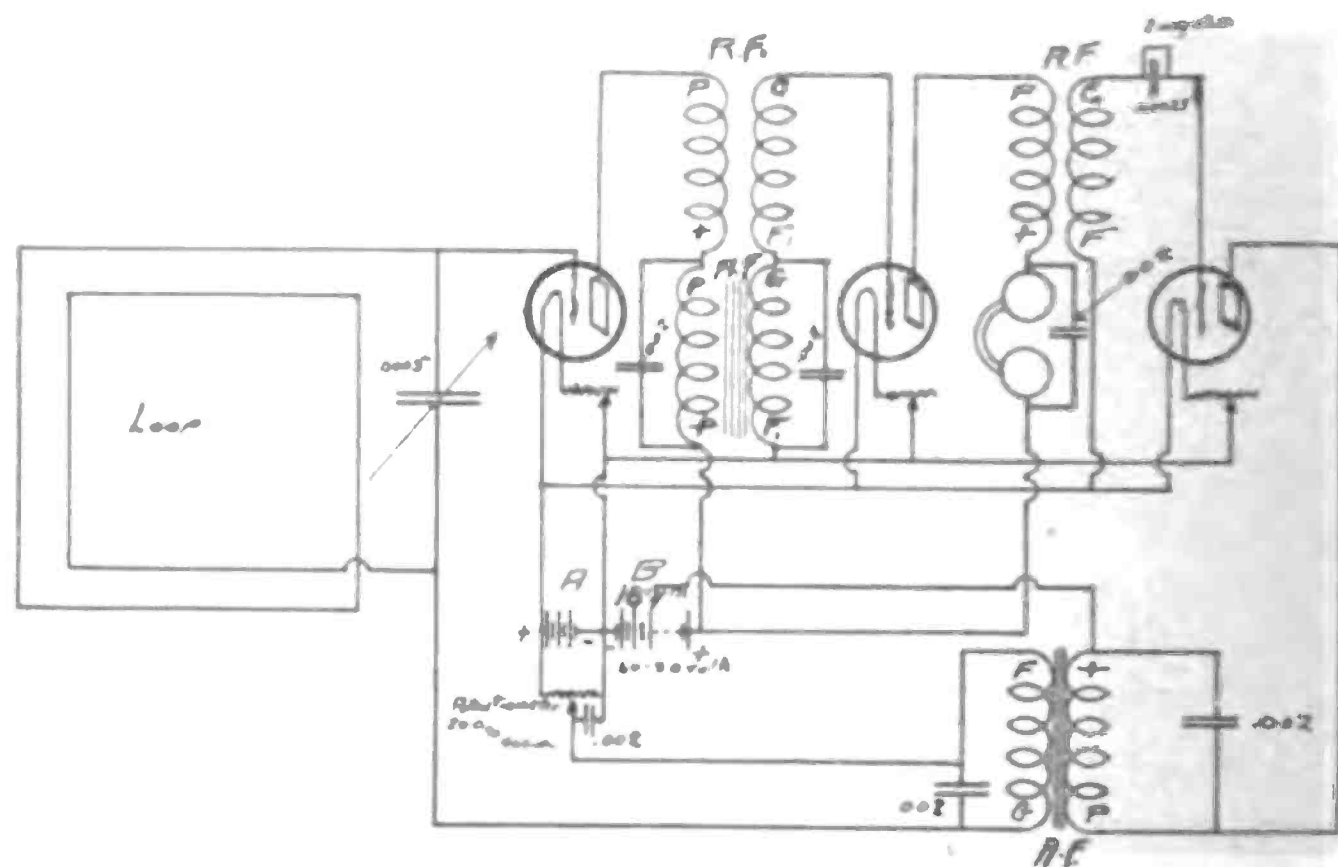


Fig. 2. Diagram of reflex circuit using a tube detector. This is exactly the same as Fig. 1, but a tube is used as a detector.

## Figure 1

This two-tube set is the equivalent of two stages of radio-frequency amplification, detector and two stages of audio-frequency amplification. Using this set with a loop the signals come in clear and strong with a range that will delight the user. The only additional feature is the use of a by-pass condenser around the potentiometer. This is to provide a low resistance path for the radio-frequency waves in the grid circuits of both tubes. The dotted line in the grid circuit is an optional connection which may be used or not as suits the builder. The difference lies in the fact that if connected as shown the grid potential of the second tube is always negative, while dotted connection would allow the grid potential to be varied.

## Figure 2

This is a modification of the above circuit using a tube as a detector or rectifier. The tracing of circuits for this hook-up is exactly similar to that of the one tube set. The wave is amplified twice by the two hard tubes through the radio-frequency amplifying transformers, and goes to the grid of the detector tube in the plate circuit of which audio-frequency waves are set up. This plate circuit is coupled to the grid circuit of the first tube by an audio-frequency amplifying transformer and the two hard tubes again amplify the signal, this time in the form of an audio-frequency wave, so a very loud response is obtained in the phones which are placed in the plate circuit of the second

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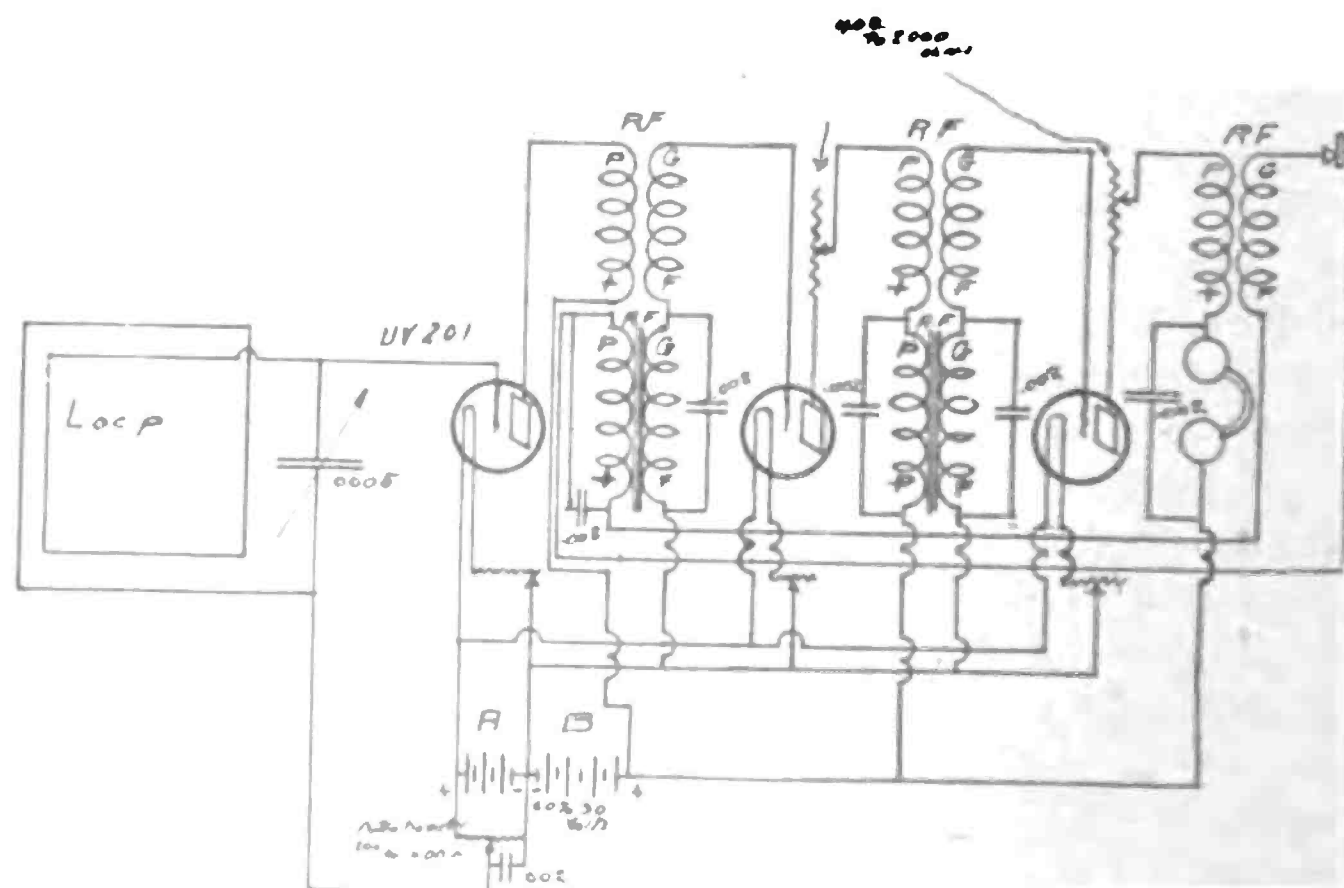
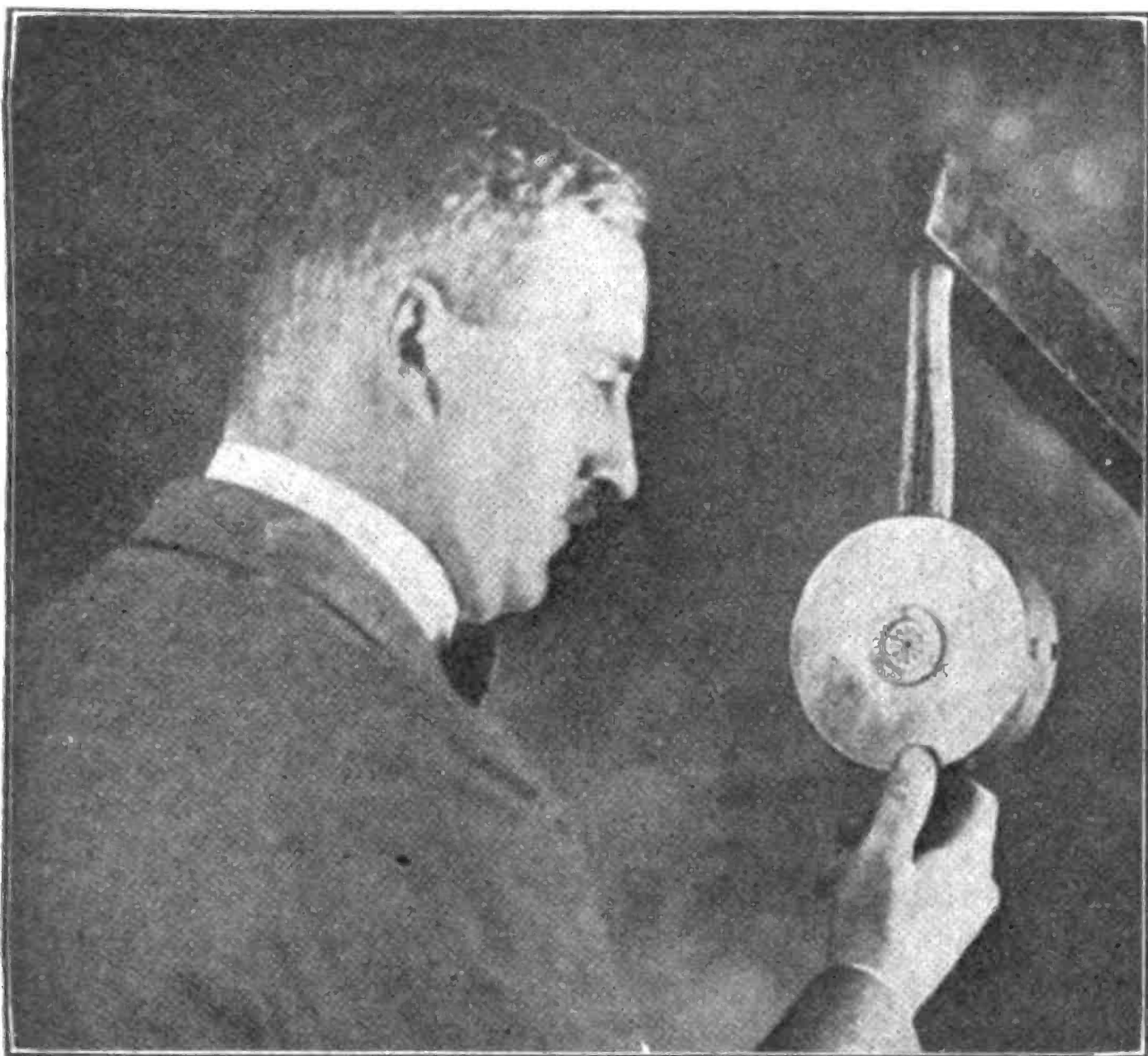


Fig. 3. Diagram of a reflex circuit using three tubes and crystal detector. This circuit is equal to three stages of both radio and audio frequency amplification.



# Perfect Broadcasting Now Possible

By Peter A. Sensenig



Dr. Phillips Thomas and his newest invention, the "Glow Discharge" Transmitter. This device has been thoroughly tested out, and has been found to eliminate many of the troubles that are now attendant upon broadcasting, due to microphonic noises. The old type of microphone was the cause of spoiling many fine programs, due to the fact that it would pick up and magnify all small noises, such as a person's footsteps across the floor. This new device, which is thoroughly explained in the accompanying text, does away with all this trouble and provides a means for absolutely perfect broadcasting.

not transmit extremely high and extremely low notes satisfactorily. The piano is a case in point. The radio audience hears the highest notes as a series of clicks and the very bass notes as a roar.

In the Thomas transmitter, a minute electrical discharge takes the place of the mechanical disk. This discharge flows between two points, separated by a very small fraction of an inch. It is affected by sound waves, just like the diaphragm, but being non-material and having no perceptible inertia, it responds equally well to all vibrations. Hence music broadcasted, by means of it, is transmitted in all its original purity.

Dr. Thomas has recently been experimenting with his transmitter at the Westinghouse Pittsburgh Station, KDKA. Listeners all over the country have noticed from time to time the great improvement in the quality of the voice of this station, but have naturally been unaware of the cause. Within the near future all Westinghouse stations will be regularly equipped with this device, and the art of broadcasting will take another step forward.

In appearance, the Thomas transmitter resembles a large watch, with the front and back covered by wire gauze. On looking into it, a point of light can be seen, caused by the flow of the electric energy against one of the terminals. From this fact it is called the Glow-Discharge Transmitter.

**P**ITTSBURGH, PA.—Millions of radio fans will be benefited by a new radio transmitter invented by Dr. Phillips Thomas, research engineer of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The new transmitter makes possible the broadcasting of music and other sounds exactly as produced. It has been used at the Westinghouse broadcasting station KDKA within the past few months, which explains the clarity and strength of this station's signals.

The basis of Dr. Thomas's inven-

tion is the elimination of the diaphragm now used in all transmitters in practical service. This diaphragm consists of a thin disk of metal or other substance and operates by being vibrated by the sound waves which strike it. But because of its inherent inertia, no material diaphragm is capable of vibrating in perfect sympathy with the entire range of audible sounds. If it can transmit low notes successfully, it will fail on high notes; and vice versa. The ordinary diaphragm is designed with reference to the middle register, and it therefore does

(Continued from preceding page)

tube. Bypass condensers are used in shunting any high impedance coils as in all other circuits. The signal strengths obtained in this set are as loud as can be obtained unless more external stages of audio-frequency amplification are added. This set is recommended for good, clear, strong signals, where maximum DX is not desired.

Figure 3

Circuit 3 is the most popular reflex set that is in use today and is recommended as one of the best sets for the average amateur. It is the equivalent of three stages of radio-frequency amplification, detector and two stages of audio-frequency amplification. Any further addition to this set would have to consist of more stages of straight radio or audio-frequency amplification. In fact, the first tube of this set is used but once, the hook-up being given to enable any reader to build this set if he desires one of the best sets for long-distance work.

This set incorporates radio-frequency amplifying transformers as have all hook-ups so far given. The results obtained by circuits to follow were not sufficiently better to warrant using them unless existing conditions would make their use advisable or unless some experimenter wishes to try them.

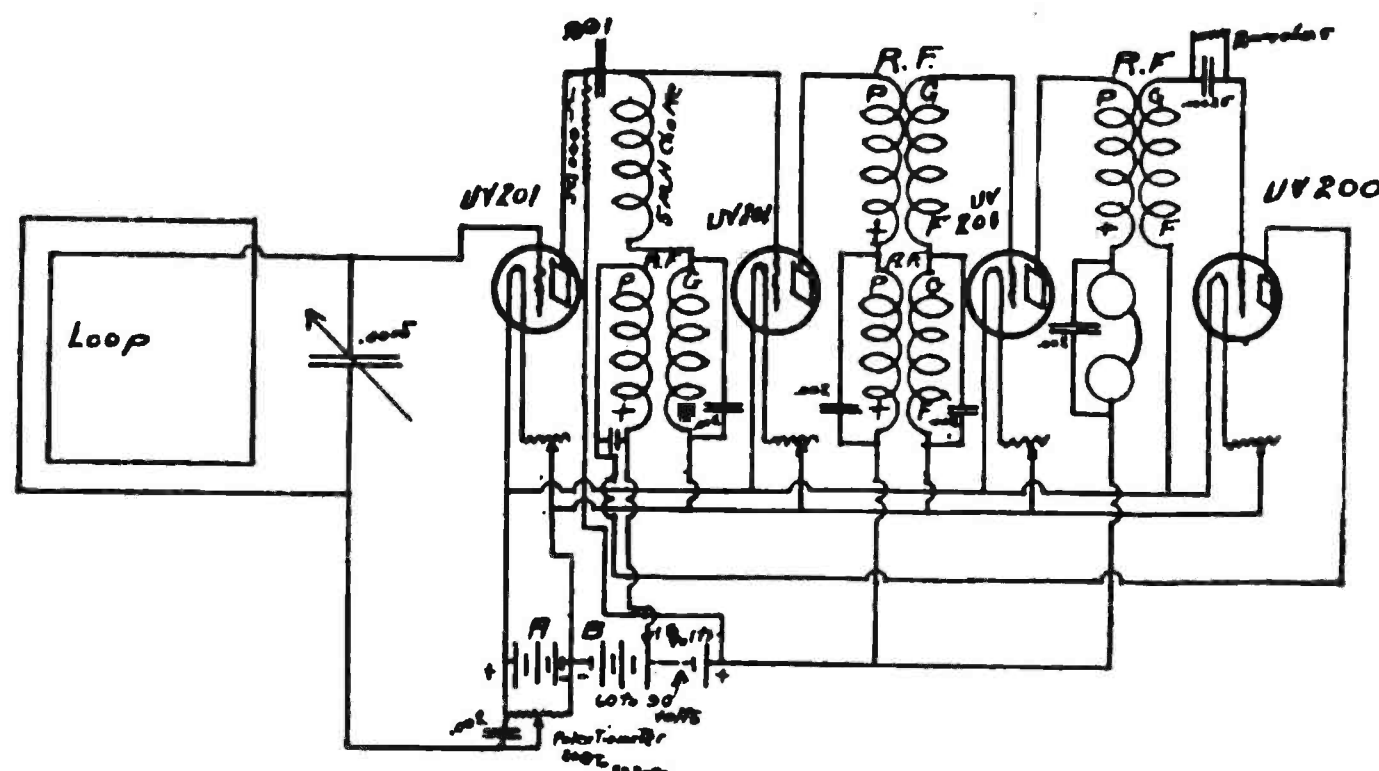


Figure 4. Commercial type reflex circuit, using one stage of resistance-coupled radio frequency amplification, and two stages of transformer-coupled amplification.

Plate resistances are shown in the preceding hook-up, and it is recommended that they be used, for it adds to the ease of tuning. The set will be very selective and easy to tune if resistances, variable from 500 to 2,000 ohms, are used. When this set is used with an outdoor antenna the range will be greatest and will depend almost entirely upon the skill of the operator for it is a DX getter.



# How I Received the American Signals in France

By *Marius Thouvais, President Radio Club of Salogne, France*

**T**HE receiving set which I used during the transatlantic tests was not at all designed in anticipation of such DX work. The tuning is effected by means of interchangeable coils of various sizes covering the whole range of 150 m. to 2400 m. As it stood, I believed it to be far less efficient than a Grebe, a Paragon, or any standard two-variometer regenerative receiver, and I believed also it was absolutely unable to give such a performance.

My aerial is not high, having been erected between the chimney of my house and a wooden mast in the garden. It is 27 feet high at each end, and hardly 23 feet in the middle, as the wires stretched three years ago and form a graceful curve now. It is a three-wire antenna, 120 feet long. The lead in is shaped as Fig. 1. The fundamental wave length of the whole is something like 230 meters.

This aerial has proved rather efficient, as immediately after the war, when audions were not obtainable, I was able to read, regularly, on a crystal detector, many DX spark stations such as Lisbon, Gibraltar, Bizerte, Malta, Vienna, Budapest, Copenhagen, Karlsborg, etc., and I even picked up the First Chelmsford telephony in February and March, 1920, and always on galena.

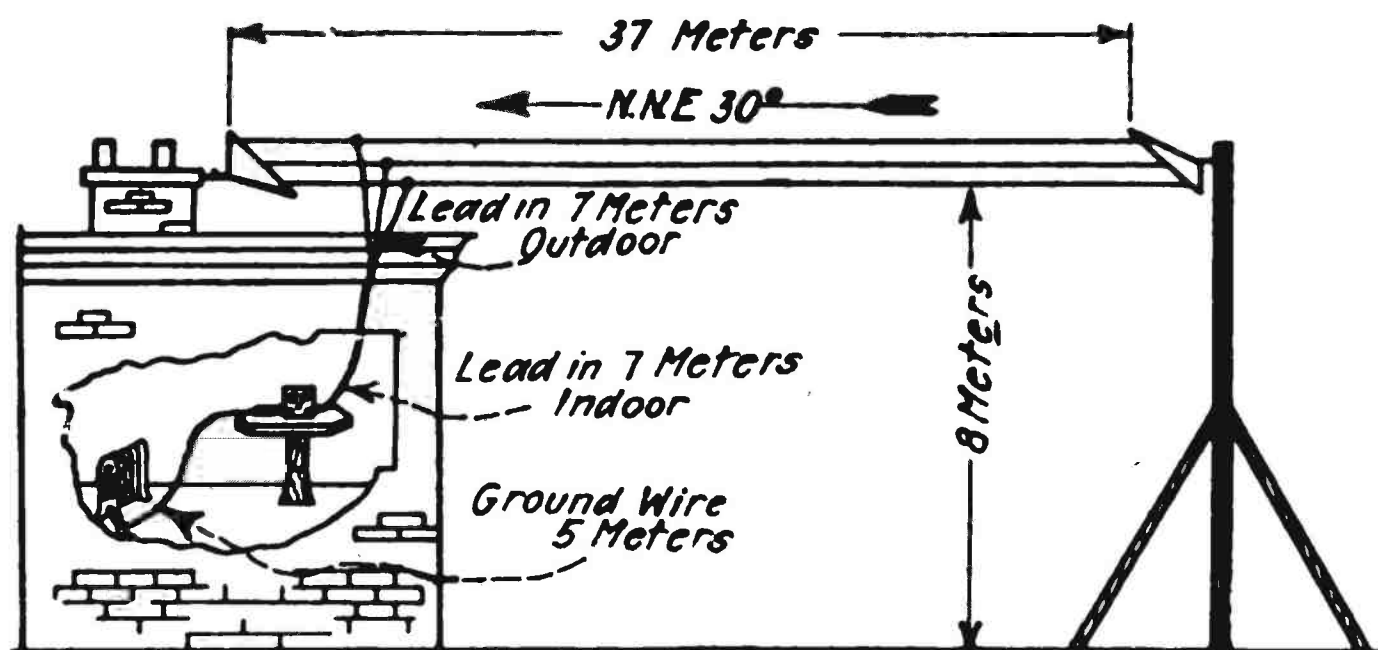


Fig. 1. The antenna system, with measurements, used by the author in receiving American amateur signals. The antenna was 8 meters, or 25 feet, high at each end, but due to the wire stretching was only 23 feet high in the center. Suggested by M. Thouvais. Drawn by S. Newman.

My actual equipment, entirely home made, consists of a single audion receiver, a separate heterodyne and a single stage audio frequency amplifier.

The accompanying diagram (Fig. 2), shows the three pieces of apparatus. The single audion receiver and the heterodyne unit have the same appearance, as they are each housed within a similar wooden box. The only difference between the two sets is that the receiver is fitted with a grid leak and condenser for detection. Each box contains a regular .0001 mfd. variable condenser, a small vernier condenser, and a filament rheostat. Both sets use basket (spider web) coils for short and mean waves and flat pancake or honeycomb coils for longer ones. The heterodyne is used for long waves only, from 10,000 to 24,000 meters. It becomes unnecessary below 5,000 meters and is practically useless for really short waves.

The single audion receiver is the usual single circuit tuner with tickler coil. It has allowed me to receive with a fair intensity, sufficient for reading, all the high power United States stations such as USS, WSO, WII, WGG, WGK, etc.

The single stage low frequency amplifier does not greatly increase the weak signals, as everyone knows. I believed that it required a tremendous amount of radio frequency amplification to get such DX signals, and believed my

much simpler material quite unable to receive the easiest test.

On the WL 350-450 meter I heard three British broadcasting stations with very great intensity, both music and speech being too loud to be comfortable when wearing the headset, and it could be almost continuously heard in the whole room without any loud speaking device.

A little while later, that is, barely a week before the commencement of the tests, I at last succeeded in getting my receiver oscillating freely on as short a wave as 200 meters. I got this result by using a special type of winding of my own design. This type of inductance is somewhat like the well-known spider web coils, but over which it is an improvement. The different manner in which it is wound gives a still lower self-capacity and a greater inductance for a given number of turns, thus making it especially efficient for short wave work. As previously stated, I used simple single circuit—a fixed coil in series with a variable condenser. This method is doubtless less selective than using a variocoupler, but it is really efficient, and is much simpler to manage. With the aerial described and the variable condenser in series, a 30 turn coil tunes from 180 to 300 meters, while a 50 turn one covers the WL range—250 to 500. In either case a 30 turn inductance is quite suitable as tickler coil.

Before the tests I had only heard two French amateurs, 8AG and 8AB, the latter extremely loud, although located about 375 miles away. British amateurs, 2AW, 2OD and 2YZ, were also received with excellent intensity, as well as several telephones from British amateurs. These results decided me to spend one night in listening in to try if I could pick up anything during the tests. I was not at all confident, to say the least, and it was on the fifth day only of the tests that I tried. During the nights of December 16th and 17th I only was able to enjoy the concerts sent out on 360 meters by several American broadcasters, among which is WJZ. It was on my third night, December 18th, that I caught two American amateurs in addition to the usual broadcasting.

It was then that I realized that my set worked much worse on 200 meters than on 360 meters. To remedy this on the following days I built a new variable condenser of the air dielectric type to replace my inefficient paper-insulated condenser. Also, in view of lowering the radio frequency resistance of the whole, I tripled the single ground wire. Immediately my apparatus oscillated much more freely on as short a wavelength as 150 meters, and the efficiency on the band—180-250—was very greatly increased. I was enabled to receive ten additional call letters on the following night. The next day, having again found time to improve several details—increasing my plate battery voltage to 80 volts and removing the aerial lead in a little further from the wall—I was quickly rewarded for my trouble on December 20 by picking up not less than twenty-five calls from the United States amateurs within a period of less than two hours.

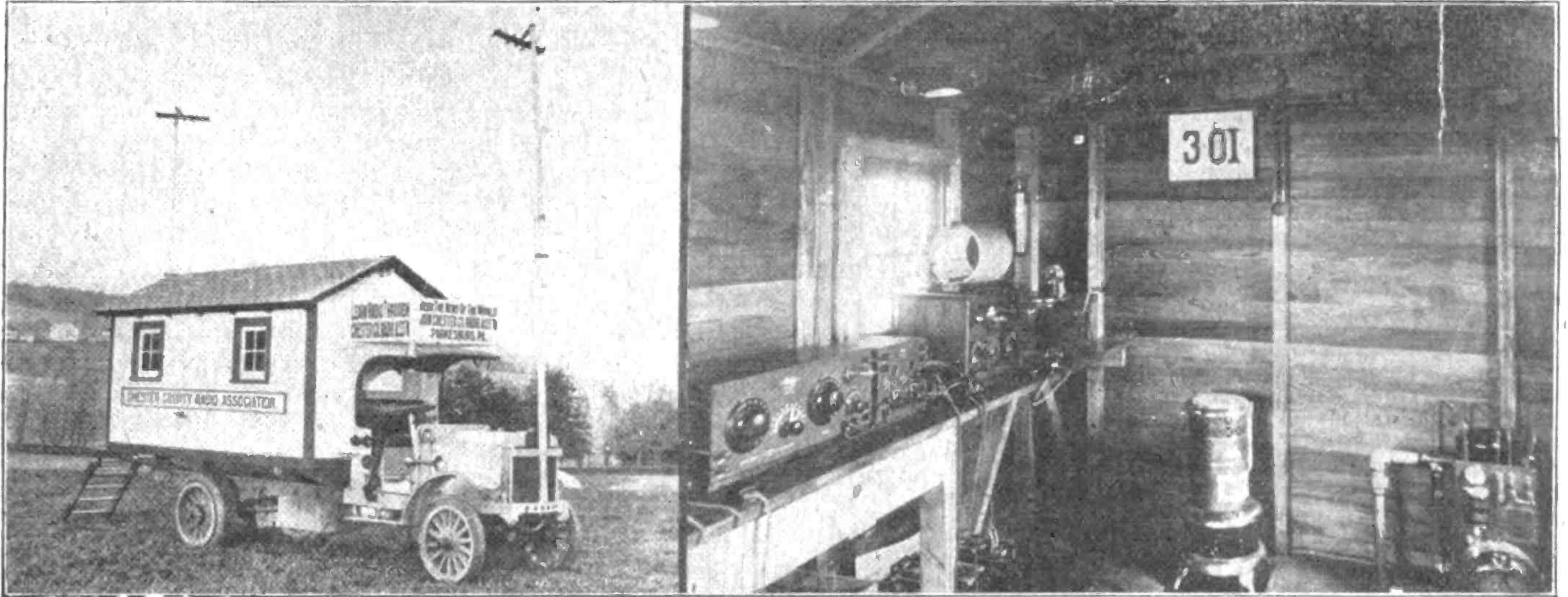
For the last night, being no longer afraid of lack of filament current, I decided to listen in up to the end, and, fighting against sleep, I worked continuously from midnight up to and after 5 A. M. (G. M. T.). But this last night was certainly among the worst on which I had experimented. The static was very bad and arc jamming at

(Continued on next page)



# Radio Broadcasting Station on Wheels

By John Kent



(C. Kadel & Herbert)

Exterior view of the traveling broadcasting station. The antenna is strung on poles from the front of the radiator to the back of the portable house, which serves as an operating room. It is a great stimulator for radio, and numerous people who have never taken interest in radio have become "fans" through the agency of this novel station.

Interior of the traveling broadcasting station. Both the receiving and transmitting sets are arranged on the table at the left. Current is furnished by the little generator shown in the lower right hand corner. The station is a fully licensed station and operates through the rural district of Parkesburgh, Pennsylvania.

**W**HAT is probably the most unique broadcasting station in the world, was recently built by Horace A. Beale of Parkesburgh, Pa. It is a complete broadcasting and up-to-date receiving station on wheels. It is called the Chester County Radio Association, and travels from place to place in the different townships, giving instruction in radio, as well as allowing the people in the rural districts to see just what broadcasting is.

Many people listen to broadcasting but do not understand exactly how it is accomplished. When the "station on wheels" comes around, they have a chance to "peek at the innards" of such a station.

As can be seen from the photographs, which show both

the exterior and interior, it is a most complete station. The current for the operation of the transmitting set is furnished by the little gasoline engine driven generator, shown in the lower right hand corner of the composite picture. The receiving set is shown in the center of the illustration and as can be seen is of the well known regenerative type with two stages of audio frequency. The transmitter is located directly next to it, with the tuning inductance on top of the set proper. It is a tube transmitter, using one tube as an oscillator, and one as a modulator. The phonograph is situated directly to the right of it. The call of this traveling broadcasting station is 30I, and is registered as Parkesburgh, Pa.

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times made reception impossible over a wide band of wavelength. The usual jamming from ship and coast stations covered the rest, so that I received only two or three calls during the free-for-all period.

The latter part of the final night was a little better. The arc jamming having disappeared, I was enabled to log a dozen more calls.

In conclusion, I wish to point out that I listened in six days, and that on the first three my set worked badly on 200 meters. Further, it was only on the last night that I worked for as long as five hours. On all previous nights I had spent only three hours on account of my attending to business throughout the day. Also, I dare say, that if I had shown more confidence in my set and had started to listen in from the first night of the tests, and if my apparatus had been carefully prepared to work right down to as short as 180 meters, a little while before the outset of the tests, I honestly believe that I should have been enabled to receive most of the stations heard throughout Europe, as most of the calls that I logged were strong enough and would have been received as well without the second tube, that is, with the detector tube alone. The second audion acting as an audio frequency amplifier is by no means an element of sensitivity. It was only useful on particularly good nights, as it gave body to the signals

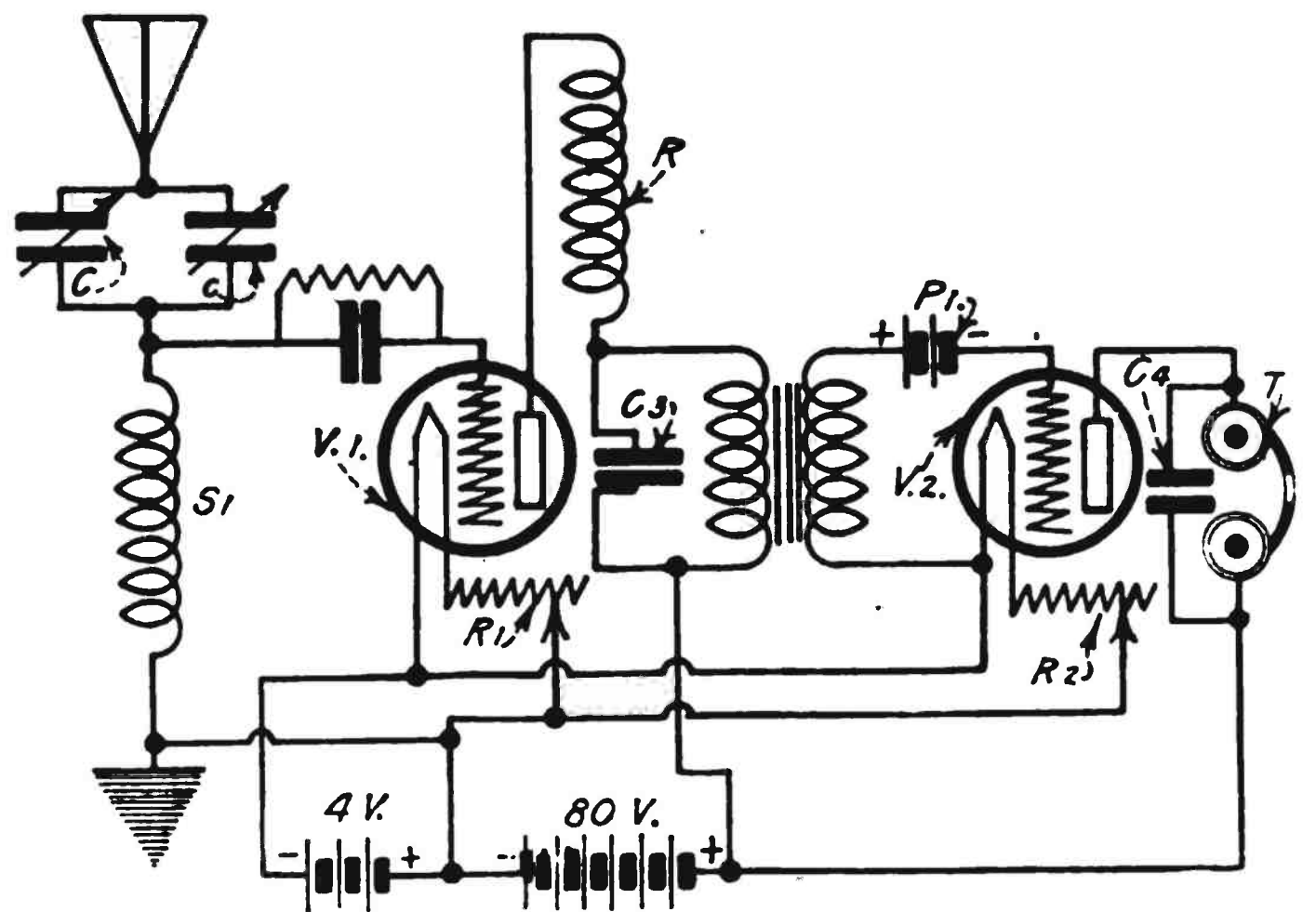


Fig. 2. Circuit used by Marius Thouvalis in the reception of American amateur signals. The condenser in the antenna circuit C2 is a vernier. As can be seen, it is a single circuit hookup, and testifies to the efficiency of single circuits in long distance reception. Suggested by M. Thouvalis. Drawn by S. Newman.

and to some extent facilitated reading, but on bad nights when there was heavy static and jamming it was rather a bother than a help.



# Department of Communications Suggested

*By Carl H. Butman*

**W**ASHINGTON, D. C.—The creation of a Department of Communications including radio is suggested in the report on the Reorganization of the Executive Departments submitted to the joint Committee of Congress by the President a few days ago.

The committee, headed by Walter F. Brown, suggests that the Post Office Department be renamed the Department of Communications and that it include an Assistant Secretary for Telephone and Telegraph, including radio.

In the report Mr. Brown says in part:

"The only important change contemplated is the addition of a bureau (to the Post Office) to develop and extend telephone and telegraph communications, including wireless, for the general public benefit."

Apparently the Navy would retain its communication system as would the Signal Corps, but it is evident that radio regulation would be transferred from the Commerce Department to the Department of Communications, although the Bureau of Navigation, under which the radio section operates today, is left in the Commerce Department.

Although the report is labeled as recommended by the President, his letter of transmittal states that with few exceptions, the changes have the sanction of the Cabinet, and adds that it is his hope that the suggestions will be of assistance to the committee. Further than that, the President does not appear to urge its adoption and he has refused up to date to state any of his views on the subject, outside of stating his recommendation.

## There's a Town Called Radio

*By Washington R. Service*

**W**ASHINGTON—Radio is the name of a town in Virginia, just across the Potomac from Washington. It is there that the gigantic towers of the Naval Radio Station, from which the name came, is situated.

Usually it is known as Arlington, being near the great National Cemetery, but the call letters of the station NAA are known almost around the world. In the Postal Guide the tiny village at the foot of the three great towers, one of which is 600 feet high, is listed as Radio.

This naval radio station was put in operation in 1912 and was the first of the navy's chain of high-powered radio stations to be established. It has only become well known to American fans since the government broadcasting was

transferred there in January, but today many thousands of radio owners listen in on 710 when NAA speaks.

When the station was first put in operation only code signals were sent and received. Ten years ago, all operations were conducted on a single set from a little hut nearby under the direction of a superintendent of communications. To-day it is different; seven separate transmitting circuits are operated by remote control from the Naval and Munitions buildings in Washington, from which wire lines link up with the radio circuits for both army and naval use. All receiving is done in Washington by special antenna and loops. Simultaneous operation is permitted with six sending sets without interference, thanks to "duplex operation."

## Back in Early Days

**W**ASHINGTON, D. C.—Back in the early days, Chief J. W. Scanlin was listening in one night—on Dec. 29, 1912, to be exact. He heard a curious series of numerals and letters forming words unintelligible to him. He had heard similar characters in code for several nights, but on the night mentioned he copied the message and told his superior officers in Washington that he had heard and copied "FL." He was laughed at. FL was the call of the Eiffel Tower in Paris, and no one believed he could pick up a message from that distant station. He insisted, however, and a report containing the copied message was transmitted to Paris through the Department of State. The reply proved that he was correct. He had copied Eiffel Tower, and correctly except for a few characters. For the first time, an American naval station had caught a European radio station.

The message dealt with longitudes, and was sent to a small French expedition in Egypt. It was partly an experiment to learn how far inland an expedition could go and

copy on a portable set the messages from home. Curiously the message copied nearly got the transmitting officer into trouble with his Government. He had added a personal postscript to a fellow officer on the expedition, which was against the French regulations, but he escaped court martial and is now very near the head of the French Army communication service. Soon thereafter experiments were undertaken between NAA and the Eiffel Tower and direct two-way communication was established in 1913.

### Seven Sets at Arlington

With the old 100 K.W. Fessenden spark set, put in operation in 1913, some remarkable long distance results were achieved. Naval vessels in the Mediterranean have copied the time signals, which are still sent out from NAA on this set, after nineteen years of service. An amateur in Brazil heard NAA as long ago as 1914, but this is not uncommon today.

Some of the first radio telephone experiments were conducted from Arlington in 1915 with Western Electric apparatus, and the announcements were received in Pearl Harbor, Honolulu.



# A Simple and Improved WD-11 Receiver

By C. White, Consulting Engineer

**N**OT so very many months ago amateurs were striving to build as small a radio receiver as possible and still be able to get fairly good results when near a large station. Many of the sets developed certainly were as small as one could possibly imagine a radio set could be, but other than that they were of little practical use.

Things have changed and the ambitious amateur is no longer spending his time trying to get miniature curiosities and is, on the contrary, trying to evolve radio apparatus that is capable, under normal conditions, of receiving from distant stations with ease. Not only are radio fans trying to accomplish this feat in designing, but they are trying also to accomplish it in the simplest possible manner. They are not using any very complicated circuits, but they are using simple circuit receivers that are built in the right way.

Simplicity is often the keynote to success. In designing and constructing sets it is always good to bear in mind that the fewer the controls and circuits the better the results in the average case. In the construction of the receiver that I describe herewith I wish to call special attention to the fact that there are absolutely no switchpoints used, and there are only three variable controls, two variable condensers, and the filament rheostat. The tuning and tickler coils are rather small and compact, thus conserving on cabinet space as well as panel space. Nevertheless, despite the small size, the controls on this set fully allow flexibility in tuning since they are associated with inductance coils that are calculated according to the right size for broadcasting and general amateur work.

The diagram herewith illustrates the schematic hook-up. In theory it is very little different from the standard single circuit regenerative hook-up, except in the fact that the coupling between the tickler coil F and the main tuning inductance coil E is not variable mechanically, since the coils E and F are wound together on the same 3-inch tube. However, the coupling is variable from the electrical standpoint by means of the condenser C-2. Hence since C-2 is a small size of condenser it is possible to adjust for the right point of regeneration by a slow movement of the condenser plates. With this type of coupling it is not as hard to adjust to the point where the tube is on the verge of oscillating, as in the case with an inductance type where the tube is thrown suddenly into oscillation by the slightest change of the tickler coupling.

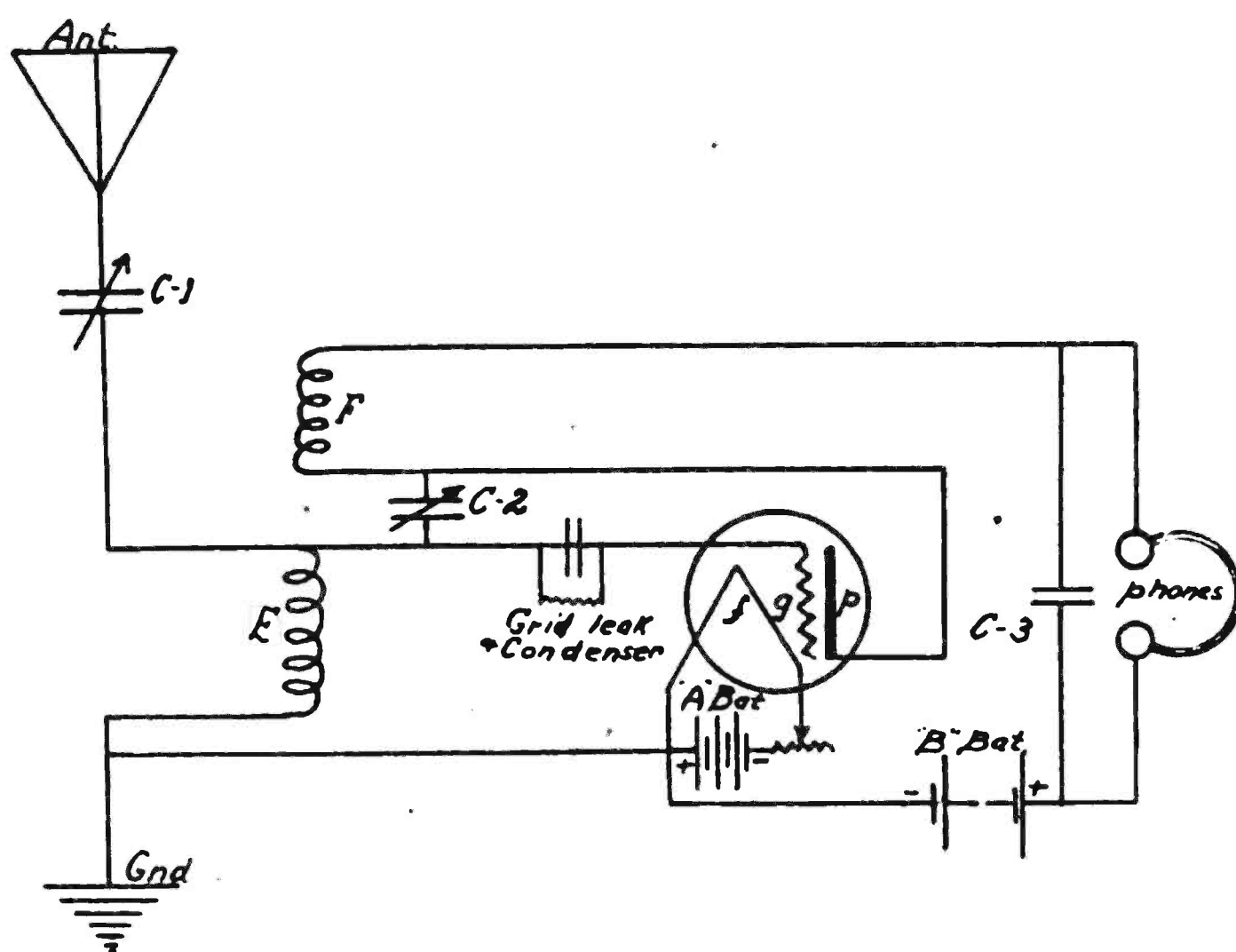
The receiver is designed to work efficiently within the normal amateur and broadcasting range. The best operation is at the broadcasting range; that is, from 300 to 450 meters wave-length. If it is wished to use the receiver frequently on the lower wave-lengths it would be better to either tap the winding E at a midpoint or use a smaller condenser in the antenna ground circuit.

The constants for the circuits are as follows: C-1 is a 13-plate air variable condenser. C-2 is an air variable of the 11-plate type. C-3 is a mica condenser of .001 mfd. capacity used solely as a bypass for the phones. The grid leak has a resistance of one megohm and a capacity of .00025 mfd. The coils E and F are wound on the same 3-inch tube with No. 22 D. C. C. magnet wire, coil E having 70 turns, and F, 40 turns. The spacing between the end of E and the beginning of F should be about  $\frac{1}{4}$  of an inch, and the total length of tube required will be six inches.

It is advisable to purchase the standard type of tube socket and then an adapter for the WD-11 tube. This will enable the constructor to change rapidly to any other style or make of tubes if the owner so desires. It is better to

mount the tube socket on a pad of  $\frac{3}{4}$ -inch felt so as to avoid serious microphone hums that are transmitted to a sensitive dry cell tube when the tube is firmly attached to a metal holder. Owing to the fact that only two dials and the filament control knob are to be mounted on the panel, this set can be easily laid out on a panel 6x10 inches without any undue crowding.

This set is simplicity itself, and still it works with great ease and brings in results that veritably make you believe it is a mystery box. It is possible to assemble this tuner complete in a good cabinet for less than \$15, because there are no expensive variometers or vario-couplers to be purchased. For the man who wants to bring in just the broadcasting stations this set will find no equal for cost and efficiency. With a dry cell vacuum tube it is capable of operating for more than two weeks on a single No. 6 dry cell.



The coupling of the coils in this circuit is fixed, the variation of the circuit to produce oscillation is accomplished by means of the condenser C-2, which is of small capacity.

A good reliable make of B battery will last about a year with one tube, if it is not abused. The construction is so simple that a complete assembly can be readily made in half a day. Only three holes have to be drilled for controls, and about three more for peep holes for the bulb. Shielding the inner side of the panel and the cabinet is recommended. If it is not desired to shield the whole cabinet and panel, then it is advisable to at least shield the panel in the vicinity of the two variable condensers, so that disagreeable body capacity effects can be eliminated. The shielding should be copper foil and grounded.

## To Radioize Atlantic City Boardwalk

According to plans of the Western Electric Company, a test has been carried out as to the practicability of broadcasting concerts and operas by special apparatus installed along the walk at Atlantic City.

This plan would, when carried out and completed, permit concerts given in Chicago and other large cities in the United States to be heard while strolling or wheeling along the Boardwalk. If plans are fully carried out, Atlantic City will be known as one of the largest radio centers of the world.



# The Radio Primer

*For Thousands of Beginners Who  
Are Coming Into Radio Circles*

**Weekly A B C of Radio Facts and Principles Fully and Tersely Explained**

*By Lynn Brooks*

**H**OW many times can a signal be amplified?

While there is no set number of stages that can be used in the amplification of radio signals, where audio frequency is used (signals amplified after they have been rectified or detected), there is, of course, a practical limit. This has generally been set to two or three stages at the most. This is because of the fact that when more than 3 stages are used, the inter-tube noises and coupling cause such a great amount of distortion that they often render the signals indistinguishable, and may entirely kill them. In the use of radio frequency (amplifying the signals before they are rectified) any number of stages can be used up to six or seven. Due to the fact that it is extremely expensive both from the operating standpoint and from the initial cost, not more than three stages are advisable, although more can be used.

\* \* \*

*Which is the most practical form of amplification?*

In the amplification of radio signals there are two different methods that can be used—namely, radio and audio frequency. In the first-mentioned method, the signals are amplified while they are still inaudible to the ear. That is, they are amplified while they are still in the form of high frequency energy. This method allows greater detection strengths, because of the fact that the detector cannot rectify any signal that is inaudible or too weak to be heard after the rectification. Thus it is seen that in order to get better results from a set, it should embody both radio and audio frequency amplification.

\* \* \*

*Is radio frequency advisable with regeneration?*

Radio frequency is advisable with regeneration, but, due to the fact that the principle of regeneration tends to amplify signals itself, it is not necessary. In a set embodying both radio frequency and regeneration, there is likely to be a lot of extraneous noise, due to the use of radio frequency and regeneration. Regeneration itself is noisy, and as radio frequency is absolutely quiet, the advantage of the latter is somewhat lost, due to the noise.

\* \* \*

*Which is the best detector to use when using radio frequency?*

On account of the fact that radio frequency allows more energy to be put in the detector circuit than if a detector had been used alone, it is possible to use a crystal detector. A crystal detector is by nature one of the quietest detectors known. It is also distortionless, rectifying the signals clearly. Thus it is seen that if a crystal detector is used with radio frequency, ideal reception will be possible.

\* \* \*

*What tubes should be used when using radio frequency, and why?*

In the use of radio frequency hard tubes (not gas filled) should be used. This is because they perform the work of amplifiers and are therefore necessarily hard tubes.

\* \* \*

*Can 1½-volt tubes be used for radio frequency?*

To a certain extent the popular 1½-volt tubes can be used for radio frequency. That is, not over four stages of

radio frequency should be attempted when using the tubes. Due to the nature of their construction they will not stand too much current, and if more than four stages are used there is a great liability of their "breaking down."

\* \* \*

*What voltage should be applied to the plate of the 1½-volt tube for radio frequency?*

In the use of the 1½-volt tube as a radio frequency amplifier, approximately 45 to 60 volts should be put on the plate. Tubes will operate on as low as 22½ volts, but not with any fair amount of success.

\* \* \*

*Is one stage of radio frequency amplification practical?*

Due to the fact that no appreciable increase can be noticed in the strength of the rectified signals when using one stage of radio frequency, outside of a slight clearing of the signals, it is not advisable. Two stages to five should be used to get the benefit that comes of using radio frequency.

\* \* \*

*Can audio frequency transformers be used in radio frequency?*

Audio frequency transformers generally incorporate an iron core. In the general method of making radio frequency transformers, this is not done, due to the inherent quality of iron to dissipate a large amount of the current in high frequency currents in hysteresis. Therefore, audio frequency transformers cannot be used.

\* \* \*

*What is a reflex circuit?*

A reflex circuit is one that uses the same tubes for two different purposes. First, it amplifies them at radio frequency, then they are rectified and then by means of back coupling them through the transformers they are amplified at audio frequency. This is possible because advantage is taken of the principle of superimposition. Due to the fact that radio frequency is at a much higher frequency than audio, the two can be passed through the same tube and not interfere, much the same as the vision of two people can cross and not interfere with either one seeing the object desired.

## One Year Lost

**T**HE White Bill, safely through the House, is doomed to die in the Senate, says the *New York Evening Mail*.

Long neglected, sidetracked, pigeon-holed and evaded, it finally made its way through the lower body of the legislature.

It seemed for a time as if it might get on the books.

But a jealous, partisan Democrat from Texas, fearing Republican control of the air, and a Senate, fearful of giving too much power to a capable man like Secretary Hoover, have combined to act as executioners.

These pigeon-minded solons say they tremble at the thought of Hoover as the absolute dictator of radio.

Meanwhile the progress of radio in this country is to be set back at least a year, or until such time as public opinion becomes great enough to force the issue, which time will not be long.

The demise of the White bill itself isn't the serious part of the matter. It was anything but an ideal bit of legislation. Nevertheless, it would have clarified the broadcasting situation considerably and would have served a very good purpose until something better could have been devised.

All of which should bring every thinker interested in radio to the realization that NOW is the time to get ready a better bill, to force through the two branches, if need be, at the next session.

Here is a chance for the real minds in radio to contribute something. If you have some ideas on the subject, or only one, make yourself heard. Some one else may have another. With enough brains working on the subject, a practical bill can be drafted.

Send in your ideas and let the bunch talk 'em over in the columns which this magazine has set aside for that purpose.

If we can, *The Mail* will find some one to sponsor it and push it.

You are the one who will have to listen and have to suffer, unless you can think of something better than has been brought out yet.



# An Efficient Single Tube Super-Regenerator

By Frederick J. Rumford, E.E., R.E.

THE improved Armstrong regenerative hook-up better known as the super-regenerative hook-up, has been experimented with many times since it first made its appearance. One of the very latest is the single tube super set, which has been experimented with by the writer and has been found to be practical and efficient. This single tube hook-up is the result of the extensive experiments carried on by Mr. Philip Robinson, of the American Radio Relay League, and also has been experimented with by a great number of the advanced radio men.

This set can be constructed at a very slight cost to the experimenter. The writer has blueprinted, construction drawings, and hook-up full size which can be had for a reasonable cost to help offset the cost of tracing and blueprints. There are very few parts necessary for the actual constructing of this set, and the parts that are really needed can be obtained at a slight cost to the prospective builder.

This set will cover successfully a distance of 400 or 500 miles in radius with an average size loop antenna. The writer personally has covered a distance of three hundred miles with a set of this kind.

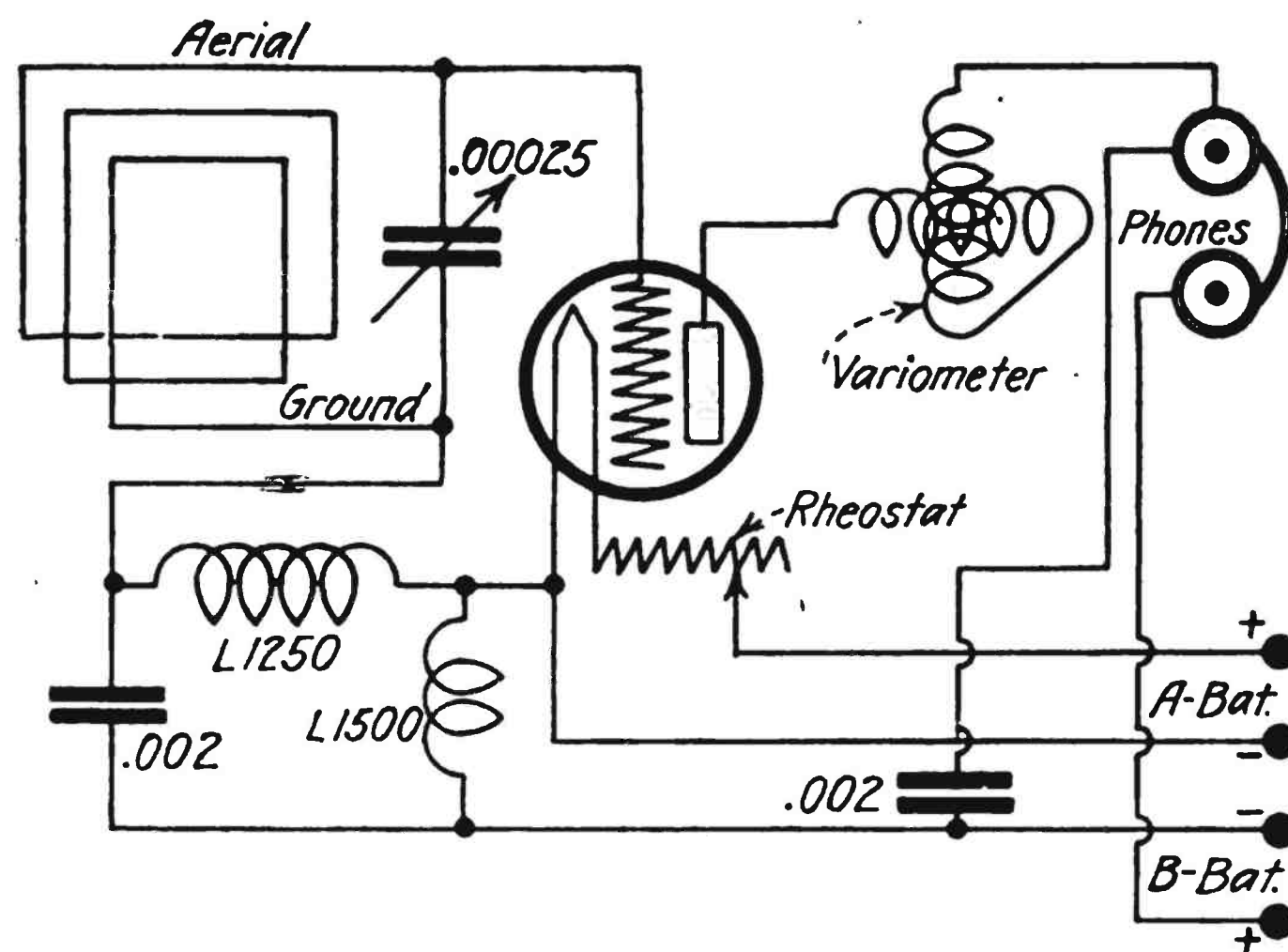
The diagram gives the correct hook-up, both internally and externally, of this remarkably efficient single tube super-regenerative receiver.

The following is a list of parts and the respective costs are about as follows:

1 Variometer .....	\$5.00
1 1250 turn honeycomb coil, unmounted....	2.50
1 1500 turn honeycomb coil, unmounted....	3.00
1 .00025 variable condenser.....	2.50
1 Rheostat .....	1.00
1 Vacuum tube socket.....	.50
2 .002 mfd. fixed condensers.....	2.00
8 Binding posts .....	.80
1 Radiotron vacuum tube U. V. 201.....	6.50
	\$23.80

When the parts named have been purchased, the builder should go through the usual procedure of mounting the parts upon the panel and the base, the panel being of the desired size, as also the base. He is then ready to proceed with the actual wiring of this set as shown in the illustration on this page. Great care must be taken that the wiring is correct in every respect and it is advisable for the prospective builder to study the diagram thoroughly before even attempting the actual wiring.

On mounting the various parts upon the base care must be taken that the honeycomb coils are mounted at right angles to each other. They can be touching, for that matter, but right angled to each other they must be. The variometer is used to obtain regeneration, which will give a range of from between 400 and 500 miles in radius by using the usual loop antenna. This also has the advantage of giving directional effects, which in turn reduce interference and also eliminate a large amount of static. It is not



Schematic diagram of the super-regenerative circuit described in the accompanying text. The variometer in this circuit is used to obtain regeneration, and will give a range of from 100 to 500 meters, depending of course upon what type is employed.

advisable to use an outdoor aerial. If the builder of one of these sets wishes, he need not use the usual loop antenna, but can use either a small honeycomb coil or a spider web coil for a loop, grounding the set at the posts marked B. This latter arrangement has not the directional effect that the usual loop antenna has.

This set is somewhat critical in operation, but when it is functioning properly there will be a very high note in the head receivers until a phone station carrier wave is picked up. In turn, this high note will give away, bringing in the music or voice, whichever the case may be, with the very best of results.

The accompanying diagram is self-explanatory and anyone building this set should get satisfaction.

## Britons Demand More Electricity and Wireless Apparatus

ECONOMIC conditions are forcing a broader use of electricity in England, says Commercial Attache W. S. Tower in a report to the Department of Commerce summarizing the British electrical industry in 1922. Only here and there is this trend revealed at present, but there are enough indications to show that, apart from the impetus that will be given by greater activity on the part of the Electricity Commissioners, the people of England have today an attitude toward electricity in factory and home that did not exist a few years ago. The domestic market of the United Kingdom, therefore, may be expected to show growing strength during the next few years. The electrical export trade during 1922 has

not been any more satisfactory than has the domestic, though two large colonial contracts which were placed with English manufacturers during the past year have helped to some extent.

The total value of the electrical goods and apparatus exports in 1922 was hardly more than half of that for the previous year, and this reduction is apparent in all items included in the table, more particularly in those items relating to electric wires and cables. Telegraph and telephone instruments and switchboards constitute the exceptions to this general reduction.

The demand for electrical supplies in the home market improved somewhat during the year; a feature was the interest in new

wireless apparatus and heating appliances. It must not be forgotten, says Mr. Tower, that the use of electricity and appliances in Great Britain has always been held back by the activities and influence of the big gas companies who were naturally strongly entrenched throughout the United Kingdom for many years prior to the establishment of electric companies. The gas companies cooperatively have spent many thousands of pounds sterling annually in advertising appliances to promote the use of gas, while electric current suppliers are usually of the opinion that the business of selling appliances should be left entirely to the manufacturers in order that proper and efficient progress may be made.



# Radio Wrinkles

By Arthur S. Gordon

WHEN the amateur hits on a novel way of doing this, that, and the other thing with his radio apparatus, he feels more or less ambitious and tries to get out a patent. According to his way of thinking, he has "discovered" something; while, according to others, he has merely added one more "wrinkle" to the several thousand now running around uncopyrighted. As a general rule, wrinkles are too easily explained in a few words for a fellow to write a whole article about them, and so a neat half-dozen are presented in this article, five of which are illustrated. All of them have been tried out, and work as well as they look.

## A Novel Hook for Headphones

It is safe to say that ninety per cent of the hornless breed of radio amateurs hang their phones on a hook when they are "signing off" for the night. It is also safe to say that a great many have forgotten to turn off the filament rheostat at least once in their radio career, much to the ruination of the A battery. Did you ever think of linking up the craze for hooks with the failing for filament rheostats?

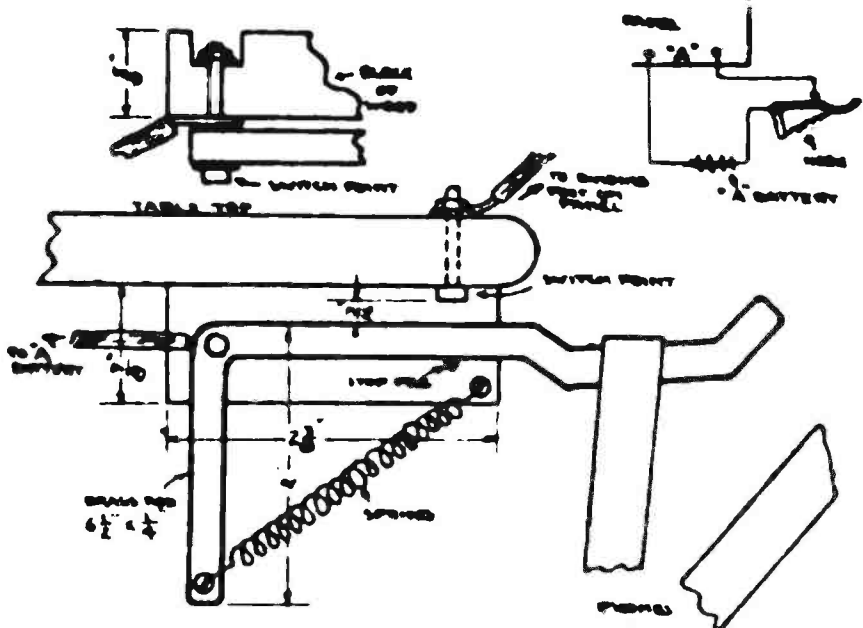


Fig. 1. A wrinkle that will save many "A" batteries, as well as a lot of worry. When you hang up your phones, the filament current is automatically shut off. That is, if you are methodical and hang your phones on a hook. If not, you will have to cultivate the habit and then everything will be O. K.

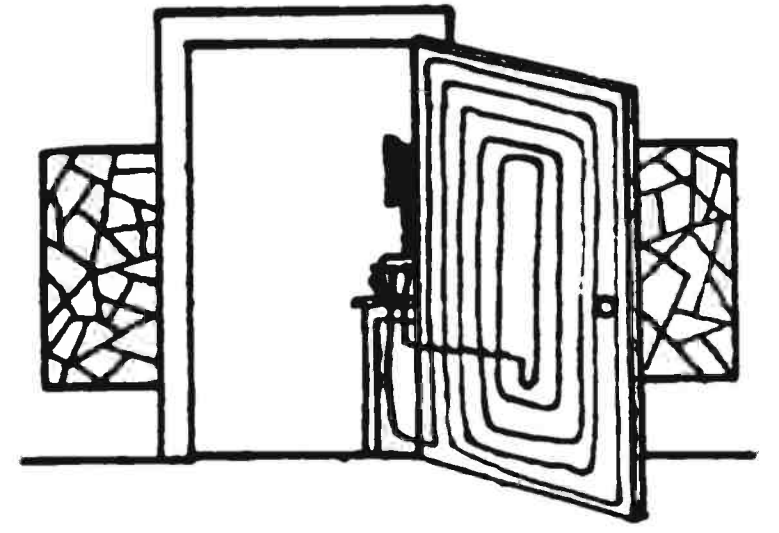
Wrinkle No. 1 does just that. It is the design of a headset hook which automatically turns off the filament current when the phones are on the hook. Figure 1 gives the constructional details of this wrinkle, and shows quite plainly that when the phones are lifted from the hook, the spring pulls the brass rod—out of which the hook is made—against the head of a switch point. A connection is made and the A battery current flows as it should. The moment the phones are replaced, however, this connection is broken, and even if the rheostat has been left on, no current will flow through the filament of the tube.

The hook proper is made of a piece of  $\frac{1}{4}$ -inch brass rod,  $6\frac{1}{2}$  inches long. It is bent into a right angle shape, as shown, and drilled at the angle to take a  $\frac{6}{32}$  switch point which acts as the fulcrum. A spring is extended from the lower end of the part which is bent down to the corner of the base upon which the hook is mounted. This base is of wood, the dimensions of which are given. The contact point is embedded in the top of the wireless table, so that only the head of the switch point shows underneath the table. The connections from the A battery to the hook and from the hook to the binding posts on the panel, are shown in a small insert in the upper right, Figure 1.

## An Idea for an Indoor Loop

There are many kinds of folding or portable loops for household use, designed to give the least amount of trouble with the maximum of pleasure. Who, but the amateur who simply had to have a loop that was practically invisible, could have thought of winding one in a vertical plane on a door, as shown in Figure 2? The wire used is No. 22 D. C. C. There are ten complete turns in all, each turn spaced one inch from its fellow. Small brads or brass tacks are placed at the corners, and the result is an attractive loop that is far from being a disfiguration.

Fig. 2. For those who do not like to have loop antennae hanging all over the room the accompanying sketch will be a welcome suggestion. Variation of the loop is accomplished by swinging the door. It does not take up extra space, and at the same time allows a greater amount of wire to be used. A good idea is to tap the wire, and then tuning can be accomplished by using the different taps of the loop.



A really worth-while feature about this loop is that it can be swung for directional effects by merely opening and closing the door, putting a floor stop to hold the door in the most effective position.

## Roll Your Own Phone Condenser

It's a terrible job to make a condenser pack come out right, so why not roll the condensers? Figure 3 gives a very good idea of how this is done. A is a cardboard form coated with tinfoil and directly connected to the tinfoil sheet F. The tinfoil sheet D is separated from F by the waxed-paper dielectric E and is connected with the cardboard form B. Two other pieces of waxed paper, C and G,

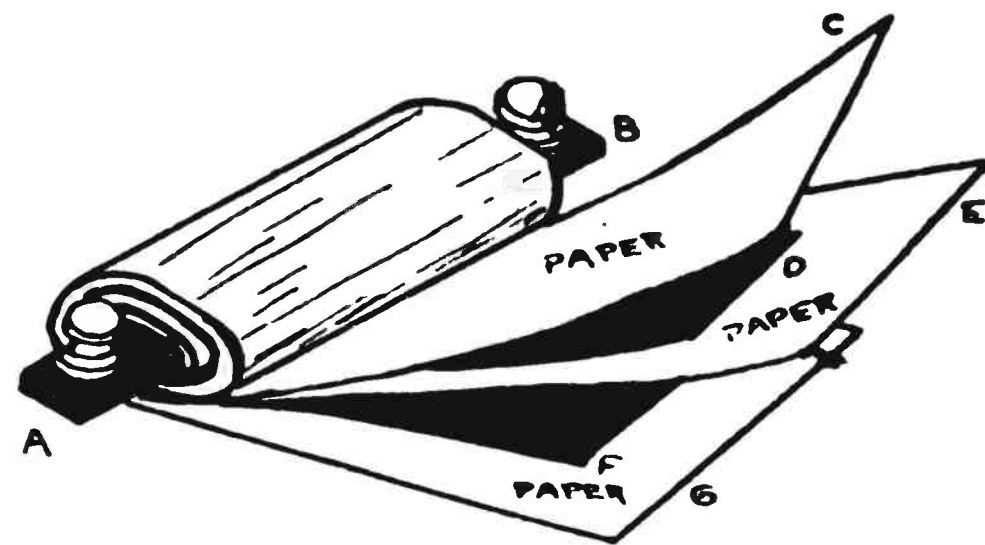


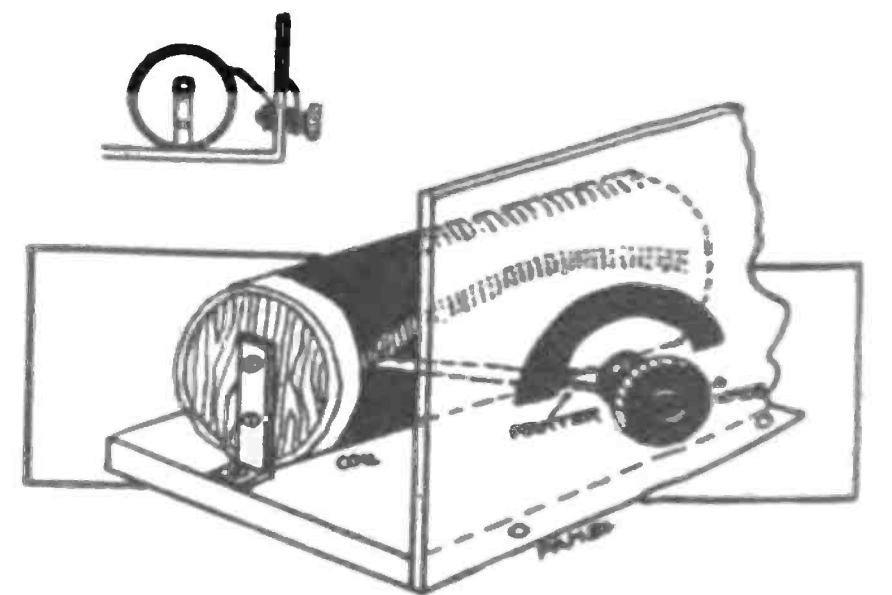
Fig. 3. Illustration shows the method of "rolling your own" condenser. Not quite as neat as the manufactured product, but serves the purpose admirably and doesn't cost much. Care should be taken when making that there is a generous margin of waxed paper left.

are used as shown, and then the whole assembly is wrapped around the two cardboard forms. The result is a neat and inexpensive phone or grid condenser. To get a capacity of .00025 mfd., use two tinfoil sheets, each 5 inches long by  $1\frac{5}{8}$  inches wide. Cut the waxed paper so that there is a generous margin all around, particularly at the ends.

## An Every Turn Contact Switch

If you dislike making taps when winding a coil, or if you would rather have a scale and pointer on your panel than a row of switch points, this wrinkle will give you an idea that may be of value. Figure 4 shows what is termed as an every-turn contact switch.

Fig. 4. If you dislike to make taps, here is an idea that will eliminate the troublesome drilling of holes and locating of switchpoints, and at the same time permit of single turn variation. The switch arm should preferably be of spring brass or phosphor bronze, and of sufficient length to reach to the ends of the coil.



The sketch explains itself. The switch knob is of the ordinary type, with its arm replaced by a pointer. Attached to its back-panel end is a long contact arm which describes an arc on the coil when the knob is turned. This arc is scraped bare so that an electrical contact is made with the contact arm. Spring brass will be ideal material for this arm, and the switch should be located so that when the contact arm is straight up and down, it is also in the center of the coil.

## A Hole Plugging Solution for Old Panels

Take a pint of denatured wood-alcohol and break up in  
(Continued on next page)



# Radio Saves Time and Money for Ship Owners

By Arthur G. Shirt

NOT so many years ago it was not an uncommon experience for a shipowner to wake up in the morning and find that one of his ships had unexpectedly entered port the previous night. He sometimes became excited, because before the ship could dock there was much to do in the way of arrangements. While these were being made, time was lost as well as money.

Now, when a ship approaches port, the Captain sends in the exact time of arrival, so that the home office may prepare for the routine of handling the ship in the harbor, getting her to the pier, discharging her passengers and mail, and opening her hatches to discharge her cargo. Before the ship is within sight of the lightship at the entrance to the channel, the Captain is informed by radio whether or not he can dock that day. He knows when he can pay off his crew, and even knows the day when he will again set sail for foreign parts. While the ship is two hundred miles away, her owners know how much coal she will need for the next trip, what repairs are needed, or changes in the official personnel of the vessel.

Another feature of radio service while the ship is at sea is the transmission of the daily TR, or "position report." These reports enable the home office to follow the progress of the ship by plotting the noon positions on a special chart.

Besides these direct aids there are other ways in which radio saves time for shipowners. One of these is ridding the seas of derelicts—one of the greatest dangers that beset the navigator. The Hydrographic Office issues a monthly Pilot Chart of the great ocean bodies, and, because of the nature of the information of such charts, they are much sought for by navigators. These Pilot Charts show the position of floating and half-submerged derelicts when and where last seen.

This information does not help the navigator a great deal because a derelict will not "stay put." One seen and narrowly escaped, for instance, by Captain Brown, of the freighter Brazen Bell, should have remained to be blown up by the first Coast Guard Cutter that could respond to Captain Brown's warning. But it didn't. Instead, it led seamen a merry chase, and got under the bows of many vessels and was reported many times.

Now, when the radio operator brings the Captain the report that a derelict has been seen in the vicinity, the Old Man is greatly relieved. He carries the warning into the chart room and plots the position of the obstruction on the

chart. Then he runs down his course line, ascertains how far away he will pass, computes the direction and speed of the current and the probable drift of the derelict, and then changes course or doesn't, according to his judgment.

Just as derelicts frequently annoy a ship's navigator, so do chronometers. How fast are they? How slow are they? To ease the mind of the navigator in the matter of time, various government stations deem it part of their duties to send out time signals twice daily, and these signals, arriving at the ship by means of radio, are used to place the everlasting check on the ship's chronometers. Present day navigators have become so attentive to chronometers that they lose their poise when the radio signals are not forthcoming at least once in twenty-four hours.

As time "ticks" are rapidly becoming a matter of course, so are the weather reports and special storm warnings. A skipper feels that he has a justifiable grudge against the radio man if the ship runs into a storm without eight or ten hours warning by radio.

What a benefit these weather reports are to seamen! They contain information that may help the sailor dodge the storm or prepare for it. Seamen get the position of the storm center, the direction of the wind, its velocity, the direction in which the storm is moving and its rate of speed. The number of ships which have thus been saved from the consequences of a storm would mount up into thousands.

## Can You Carry a Message to Garcia?

In most every city (outside of New York) are manufacturers of radio goods who are really anxious to get the patronage of our 70,000 readers.

These manufacturers would sign an advertising contract quick if they only knew what a wonderful advertising medium RADIO WORLD really is, but we have all been so busy here in New York we have not had the time to go out and personally solicit them. Will you undertake to carry one message a day for us? We will supply the message, tell you whom to carry it to, and, if you put over the message, pay you a handsome commission, and all without interfering with your other work. If you have the ambition to earn some substantial extra money, write F. S. Clark, Manager, RADIO WORLD, 1493 Broadway, N. Y.

(Continued from preceding page)

it an old phonograph-record, so that all the pieces of the record are covered by the alcohol. Let the mixture stand for a day and a half. At the end of that time, you will find that the formerly hard record has dissolved into a workable paste or black plaster. With this putty like substance fill up the holes in your discarded panel, and use it again on that new set you may be making. When the holes are filled up, and the hard rubber paste is dry and hard, give the face of the panel a coating of the same thinned-down solution. Then polish it with a fine piece of sand paper, or with pumice stone, and you will have the neatest dull-finished panel you ever want to see.

In using a one-step amplifier with dry cell tubes, it has been found more economical to use two dry cells—that is to say, one separate dry cell to each tube—rather than to

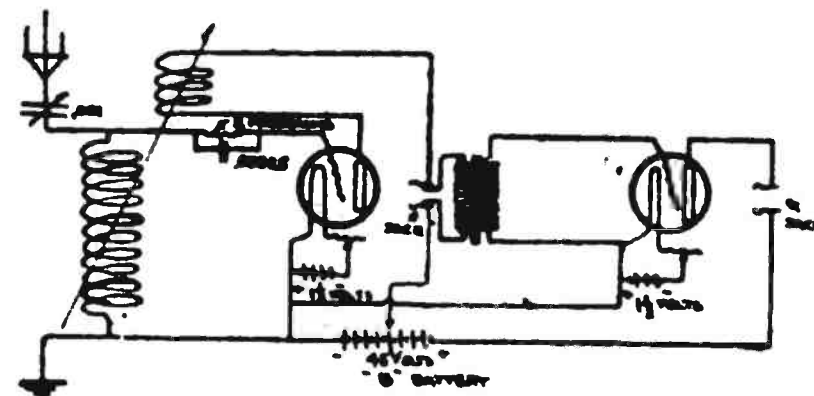


Fig. 5. A hookup for two WD-11 tubes, which is more economical in the use of filament current because of the fact that each tube has a separate dry cell supplying the filament.

connect the two filaments to the same dry cell. A hook-up showing how this is done is given in Figure 5. The essential qualities of a regenerative hook-up are in no way changed, with the exception that the extra filament battery is inserted for lighting the filament of the amplifying tube. This last idea, although it has to do with a hook-up, is as much a radio wrinkle as those ideas which concern the constructional features of a radio outfit.



# Radio and the Woman

By Crystal D. Tector

A FRIEND of mine recently returned from Sunny France, and outside of bringing various beautiful gowns and other personal things, she brought me the dearest little French tube you ever saw. I might mention, by the way, that until she sailed for France she had never taken the least interest in radio, aside from coming in to listen to the style and fashion talks every little while. It was quite evident that the operator on the ship must have been a very handsome chap, from the way in which she talked about the "ship's radio."

\* \* \*

THE fact that radio is an important science in our daily life was illustrated the other day in the following way: Friend Husband (who is a lawyer) had a case in which a young man had absconded with a sum of money and for two months had not been located. As a final resort the firm had his description broadcast through one of the larger stations. Result: He was found in a nearby town, living under an assumed name and working nights to escape detection. One of the men he was working with had heard the broadcast and advised the police of the town that the man wanted could be obtained at a certain address. Well, that is just another step in putting the fear of God and the dread of police in the hearts of evildoers, is my way of thinking.

\* \* \*

POOR F. H. told me last night that he is going away for a few days on a business trip. When I started to feel sorry for him in the conventional wifely manner because he would miss his daily radio ration, he smiled indulgently at me and said: "Have you lost your respect for my resourcefulness? Why, I've already made arrangements for my railroad passage on a line which has installed radio sets for the convenience of its passengers and I've also wired for reservations at a hotel where radio is part of the service!" After all, it really is difficult to discourage a real fan, even if he is a husband and is more or less accustomed to being suppressed.

\* \* \*

EVERY once in a while some of my friends get a "wild idea," and appeal to me to help them carry it out. The latest "wildness" was suggested to me by a little lady who had recently been married to a fine boy we all know. The "idea" was that she wanted to give him a present, preferably a radio set. She had seen pictures in RADIO WORLD of a set concealed in a tie-pin and wanted to know if F. H. wouldn't build her one to give him. She said that she had gone down to Tiffany's and bought the "dearest little pin you ever saw, and I want to leave it here for you to fix up for me. You know his birthday is next Wednesday and I'd love to give it to him then." Oh! Oh! Evidently radio sets in tie-pins must be the easiest thing in the world to make, outside of writing the Lord's prayer on the head of a pin.

## Radiograms

A GERMAN electrician and radio expert recently made a study of atmospheric, commonly called static. Among other things he found out that with an outside antenna it took .000000005 ampere to cause a disturbance in a receiving set.

\* \* \*

A SPECIAL program was arranged at the Cuban radiophone station PWX when Lemuel Bolles, National Adjutant of the American Legion, addressed the veterans of the World War. The program started at 9 P. M., Eastern standard time, and Mr. Bolles addressed the vast unseen audience at 10:30. After the address, the American Military Band of Havana gave an interesting program of American military music of pre-war days.

\* \* \*

THE first authentic attempt to talk from coast to coast by means of radio telephony was only partly successful, due to outside interference. The test was made between the two stations WOR (L. Bamberger, Newark, N. J.) and KHJ ("Times-Mirror" of Los Angeles, Calif.). The experiment was made between 2 and 4 o'clock Sunday morning, Feb. 18. Dr. Lee de Forest was operating at the Newark end, and made an address, part of which was successfully reported at the Los Angeles station. The Los Angeles station then followed him up with its regular program, part of which were very plainly heard at the Newark station. The entire programs would have been received had it not been for the interference, chiefly from ships at sea, and from numerous CW stations in between, which caused enough interference to make signals entirely inaudible at times.

GIRLS, I have a new scheme for making "pin money." The idea is perfectly legitimate, and I can make enough to treat myself to a matinee and tea at least once a week. I simply get my friends to subscribe to the RADIO WORLD. The idea was suggested to me by a visit to "Ye Editor" the latter part of last week. I think that it is a very fine idea, and it doesn't take much time to sell anyone a subscription to a good radio magazine these days, especially when the magazine is a weekly, and is therefore weeks and weeks ahead of the other magazines in its news and pictures. Write in.

\* \* \*

FOR every wrong way there is an easier right way" was demonstrated to me very forcibly last Wednesday. The occasion that causes me to wax philosophical was this: I had tried and tried for days and days to get "hubby dear" (you girls will understand what I mean), to buy me another pair of Radio Boots, but without success. Well, I finally became tired of telling him to stop in and bring a pair home, so that memorable morning I arose from my "downy" with a very apparent "grouch." During the course of breakfast I "took it out on the boss," and when he very meekly returned at night, he brought me a pair of boots and, also, a box of candy. Nothing like doing things "in the right way."

\* \* \*

A GREAT many of my friends tell me that they have no trouble in operating their sets, but would like to try a few experiments once in a while. They set those cute little diagrams of various DX hook-ups in RADIO WORLD, but always complain that they can not possibly hope to understand the meanings of all the little hooks and dashes and wires. Take a page from the book of your younger days, ladies, and think how difficult it was for you to understand the first dress pattern you used for the first (and sometimes, only) frock you made. A diagram of a hook-up is no more intricate or harder to solve than a dress pattern, so don't be discouraged. And remember—you don't have to wear the set you build yourself!

\* \* \*

SOME people are certainly persistent. The other evening a few of my friends gathered in my house to have the regular Thursday night "Radio and Gabfest." During the evening, a little old lady hapened to mention the word wireless. "By the way," she remarked, "they don't use wireless much now since radio has come in, do they?" "Why, that is just two names for the same thing," I replied. Well, for the rest of an hour and a quarter the argument waxed hot and heavy, and in the end we had to resort to the almost sagacious advice of F. H., who settled the matter by telling the opposing parties that wireless and radio were the same thing, and that wireless did not mean code alone and that radio did not mean broadcasting and telephone. Oh! some people are so stupid—they simply will not listen or believe.

A NEW secret coding device was recently demonstrated before the officials of the navy during its recent manoeuvres. By means of this device, over twelve million codes are possible, each one controlled by a secret key-wheel which is the basis of the invention. The device resembles a typewriter, but instead of the regular type faces, there are numerous dials that are revolved. At present the entire device is being kept a secret, but in a statement given out it is said that it will make the decoding of messages impossible without the use of a duplicate set of key-wheels at the receiving station. This device will do away with the code books now used, and which are in constant danger of being stolen. It will do no good for anyone to steal the code wheels, as the code is used only once, it being impossible to get the same combination a second time without going through the entire twelve million combinations.

\* \* \*

THE fact that radio is important to the churches was recently shown vividly in an address made by the Rev. Dr. E. J. Van Etten, of Calvary Protestant Episcopal Church, Pittsburgh. Dr. Van Etten said in part: "Radio broadcasting of church services will prove something of a disintegrating force of the church organizations themselves. Only the fittest preachers will survive, and struggling churches will more or less be backed to the wall." This, explained Dr. Van Etten, was because of the fact that the larger churches that broadcast sermons proved so much more of a magnet to a larger number of people that it was actually drawing among the congregations of the smaller churches, if not taking them away. "Many people," he continued, "are taking the following view of the entire matter: 'Why should I go to hear so-and-so when I can sit at home and listen to the entire services of any one of a half-dozen of the larger and more important churches scattered throughout the eastern part of the country?'"



# Sends Stock Reports Over Radiophone

By Otto M. Falhaber

**T**HE Huth-Funken Telephone Company, of Berlin, is sending stock reports to its clients by means of radio instead of through the ticker, as in this country. Subscribers wishing the stock service have a radio receiving outfit such as is pictured in the accompanying photograph over which they receive the reports of the various bull and bear activities on the Berlin Exchange.

This was made possible through an arrangement with the Berlin Stock Exchange, and has proved a success.

The only drawback is that as radio broadcasting is open to every one, any one owning a receiving set can get the reports. But this is not a serious drawback as any person can look at a ticker, the only difference being that where you probably had to go around the corner to reach a ticker you now have only to pick up your head phones and listen.

The idea has proved such a success in Berlin that there are several other countries seriously thinking of adapting it to their stock exchanges.

The idea is a time-saver in more ways than one inasmuch as with the present system wires have to be installed whenever a new ticker is to be installed, and also the apparatus used in the present system is so complicated that it takes a staff of expert mechanics to keep it in constant repair.

With the new system, of course, this is rendered unnecessary.



(C. Gilliams Service)

Interior of the Huth-Funken Telephone Co., which sends Berlin Stock Reports over radiophone. The girl at the left of the photograph is transmitting the reports, which are picked up by the various offices by means of a receiver identical to the one directly over the head of the man seated at the desk. The receiver, as will be noted, is of the type that needs no tuning, being switched on by simply raising the receivers off the hook.

## Radio Service for Army Chaplains

**C**HIEF of Army Chaplains John T. Axton announces, with great pride, the broadcasting of Army religious services from four Army radio stations. This new public religious service, which was undertaken with the authority of the Secretary of War and the cooperation of the Signal Corps, was first broadcast from Army posts at Forts Crockett and Sam Houston, Texas, and followed at Camp Lewis, Wash., and Fort Leavenworth, Kansas, with marked success. At the two Texan posts radio sermons and services were both sent and received, indicating that broadcasting is possible in order to cover a large territory where Sunday services are not available.

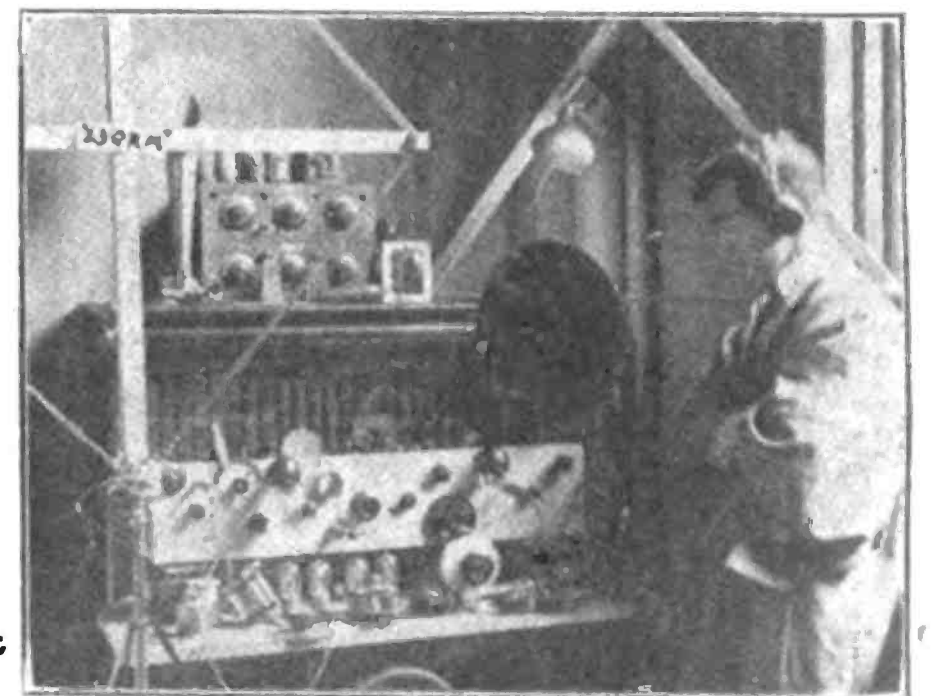
It is said that some radio-fans in districts

far from community centers heard services on the Sabbath for the first time in months. Instead of being confined to small assemblies audiences of unlimited size are assured Army chaplains for the first time. The transmission of sacred music by voices and bands is also handled as part of Sunday programs. At small posts where no chaplains are stationed receiving sets rigged by Signal Corps men, now pick up the divine services broadcasted from distant stations.

Capt. Robert H. Smith, who sent the first cablegram across the Atlantic on the second cable, laid by Cyrus W. Field in 1866, died recently in his eighty-third year.

## Suzuki "Breaks Through"

**H**AVE been reading RADIO WORLD right along and I would say that all the DX Owls making record with the conventional outside aerial but how about mine? I am getting all the stations within 1,000 miles from here, but I heard KFI, Los Angeles, at 2 A. M. last Sunday Q. S. A., and listen, my outfit is of 3 stages of radio frequency amplification with UV 1714s, W.



Suzuki's Super-regenerative Set

E. 216a tubes and UV200, Baldwin C fones with 5 turns of 4 foot loop in steel Bldg. KFI is more than 2,000 miles air line. Do I get any credit for my set? Do you consider my set just the same as the one with outside aerial? My hook up is a regular Radio Corporation's, but used with best parts that I can find on market.

Yours truly,  
73's Y. T. SUZUKI,  
(Japanese Radio Bug)

420 Post Bldg.  
Battle Creek, Mich.

## Rothafel Returns from England

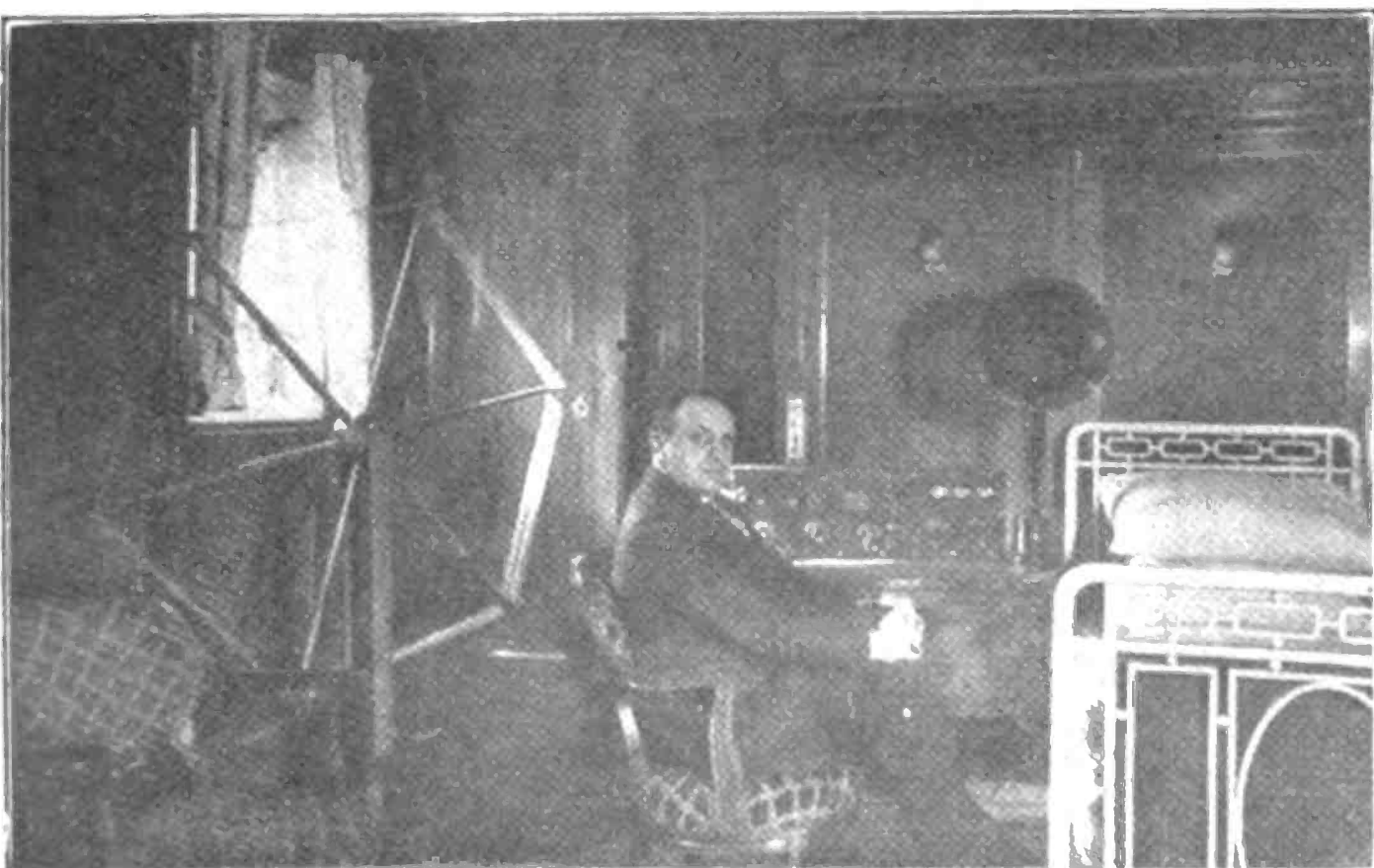


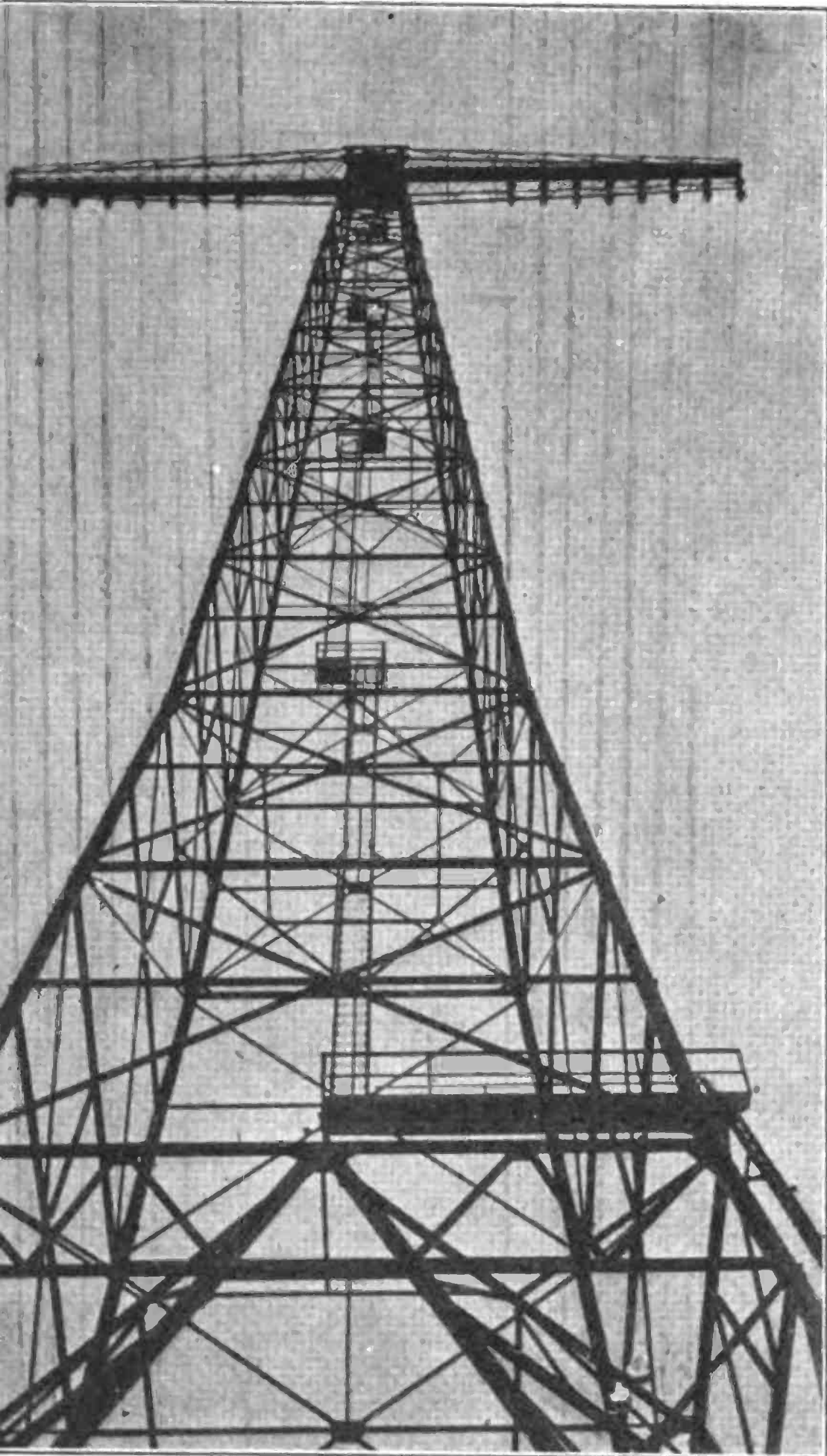
Photo by Bradley & Merrill

S. L. Rothafel, director of the Capitol Theatre, New York City, is shown here in his stateroom on the Berengaria during his recent trip to England. The radio set enabled him, during the voyage, to hear the Capitol orchestra through the Am. Tel. & Tel. Co.'s station, WEAF.



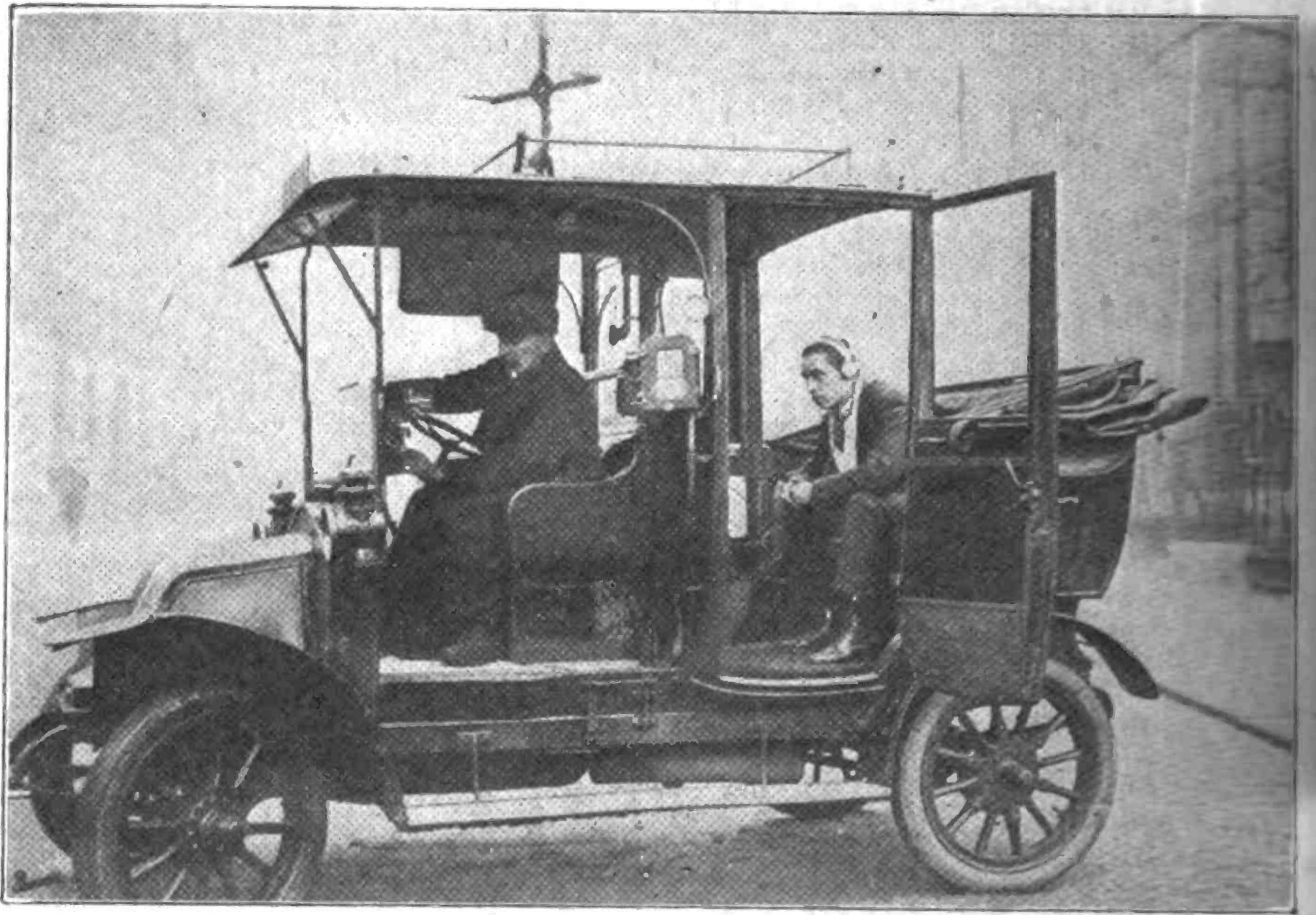
# News Pictures from Radio World R

*Captions by Robert L. 1*



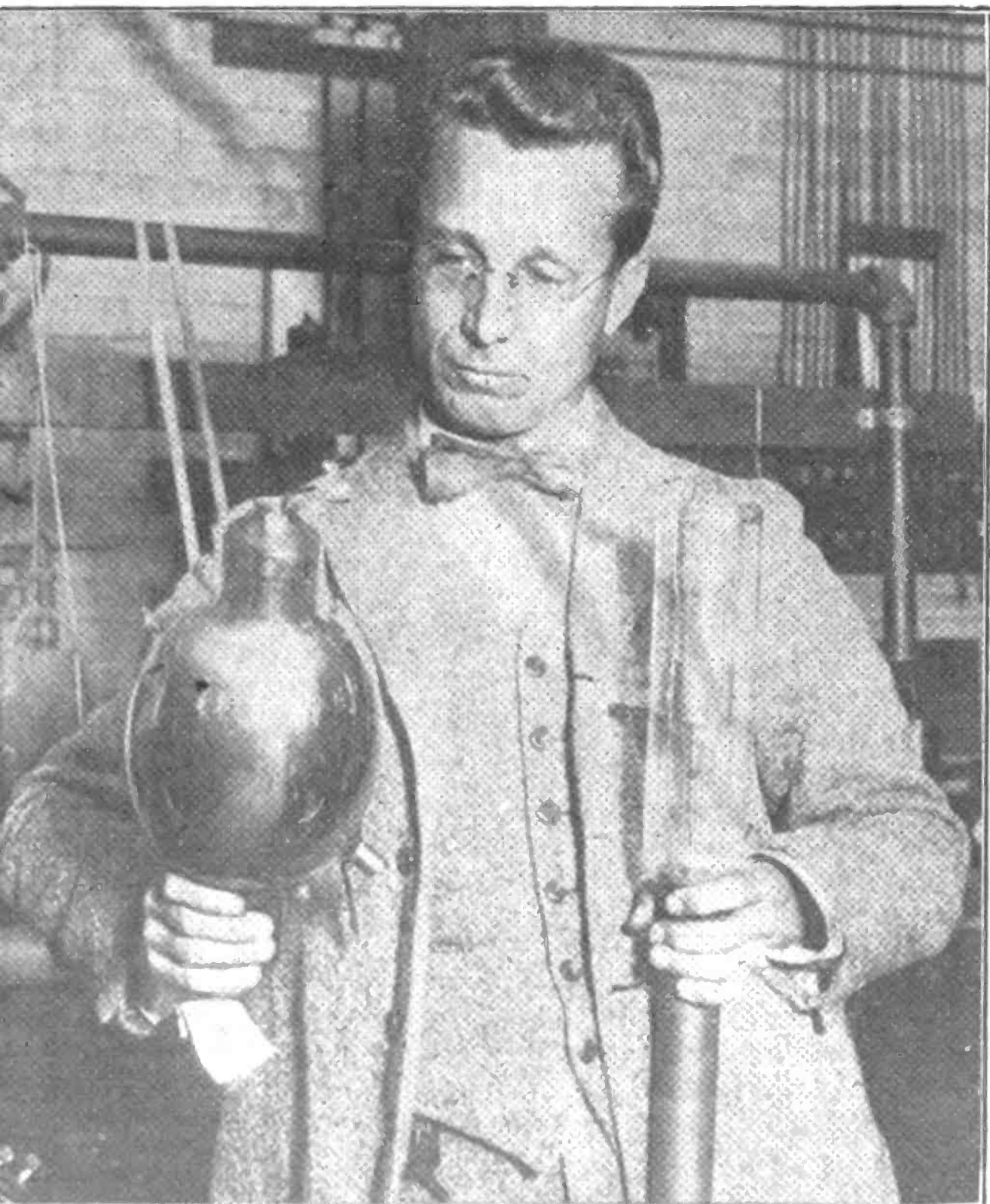
(C. Gilliams Service)

One of the huge steel towers of the Radio Central Wireless Station at Rocky Point, Long Island, N. Y. There are to be seventy-two of these monstrous towers, arranged in the form of the spokes of a wheel, the periphery of which is to be three miles in diameter. Each of the spokes is to have six of these towers, and there are to be twelve spokes. The towers are 410 feet high and weigh 180 tons each.



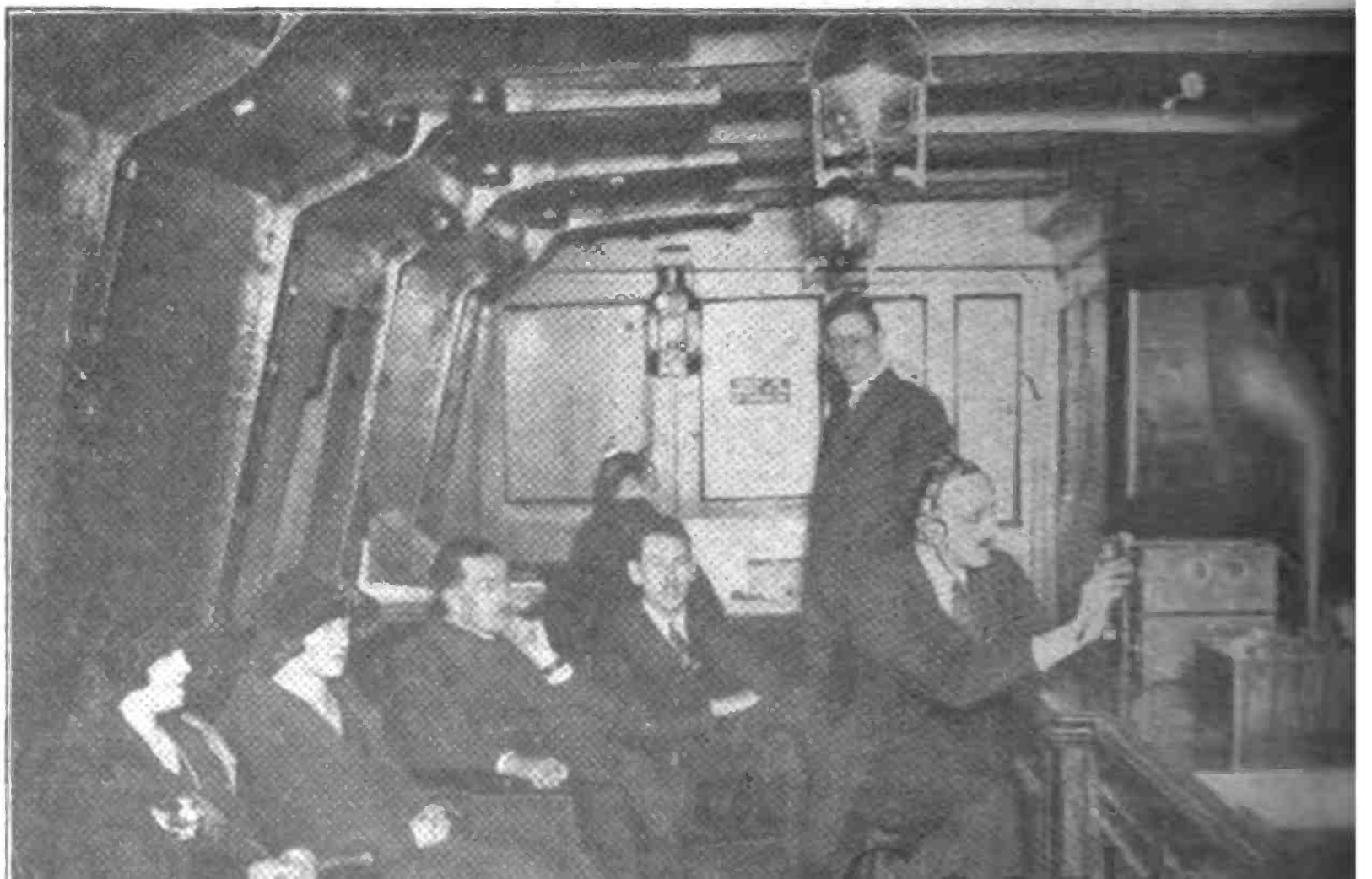
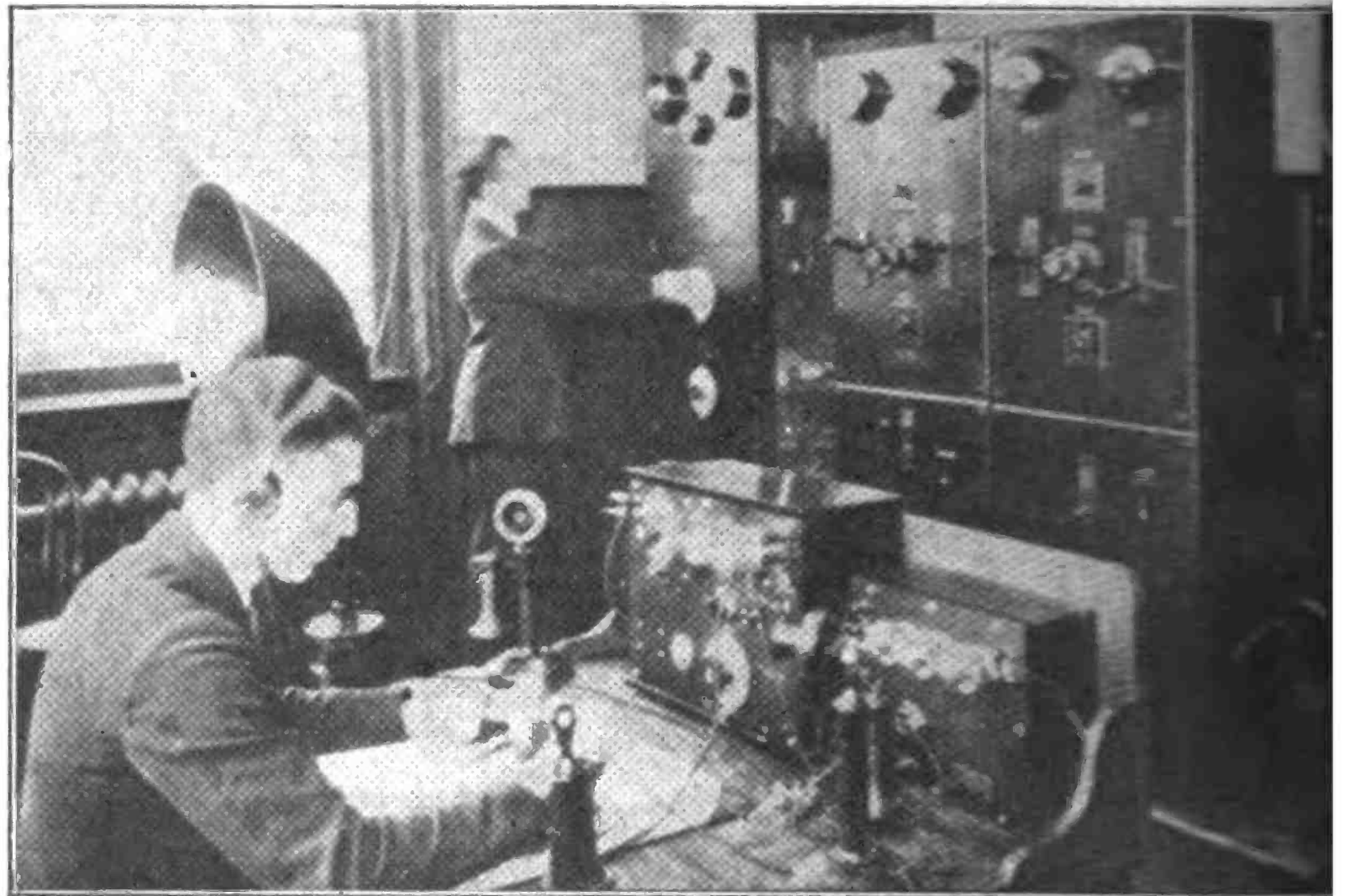
(C. Keystone Views)

Frederick Charles Fleche, a London taxi-driver, is an ardent radio fan. This is denoted by the fact that he has even installed a set on the cab he uses to "pick-up" fares. His cab is in great demand, because it is the only one in "dear ol' Lunnnon" having a radio set on it.



(H. Naucl and Herbert)

Two new water-cooled vacuum tubes used in place of the high frequency alternators for trans-oceanic radio work. Up to the present time it has been the custom to use large alternators for providing the high frequency currents for trans-oceanic work, but recent experiments with 20 water-cooled tubes...





# Over for ders herthy



(C. Kadel and Herbert)  
Operator C. P. Morgan, of the S. S. St. Mihiel, entertaining little Anna Cauthorn, one of the children of the American soldiers of the Army of Occupation who recently returned to our shores. This operator was kept busy entertaining the children during the trip.



(C. Kadel and Underwood)  
Using a steel fire escape as an antenna, Mawhinney, of 801 Riverside Drive, N. Y., has been able to pick up concerts from Stockton, Cal. The set used is a receiver using two stages of radio frequency, a detector and two stages of audio-frequency.

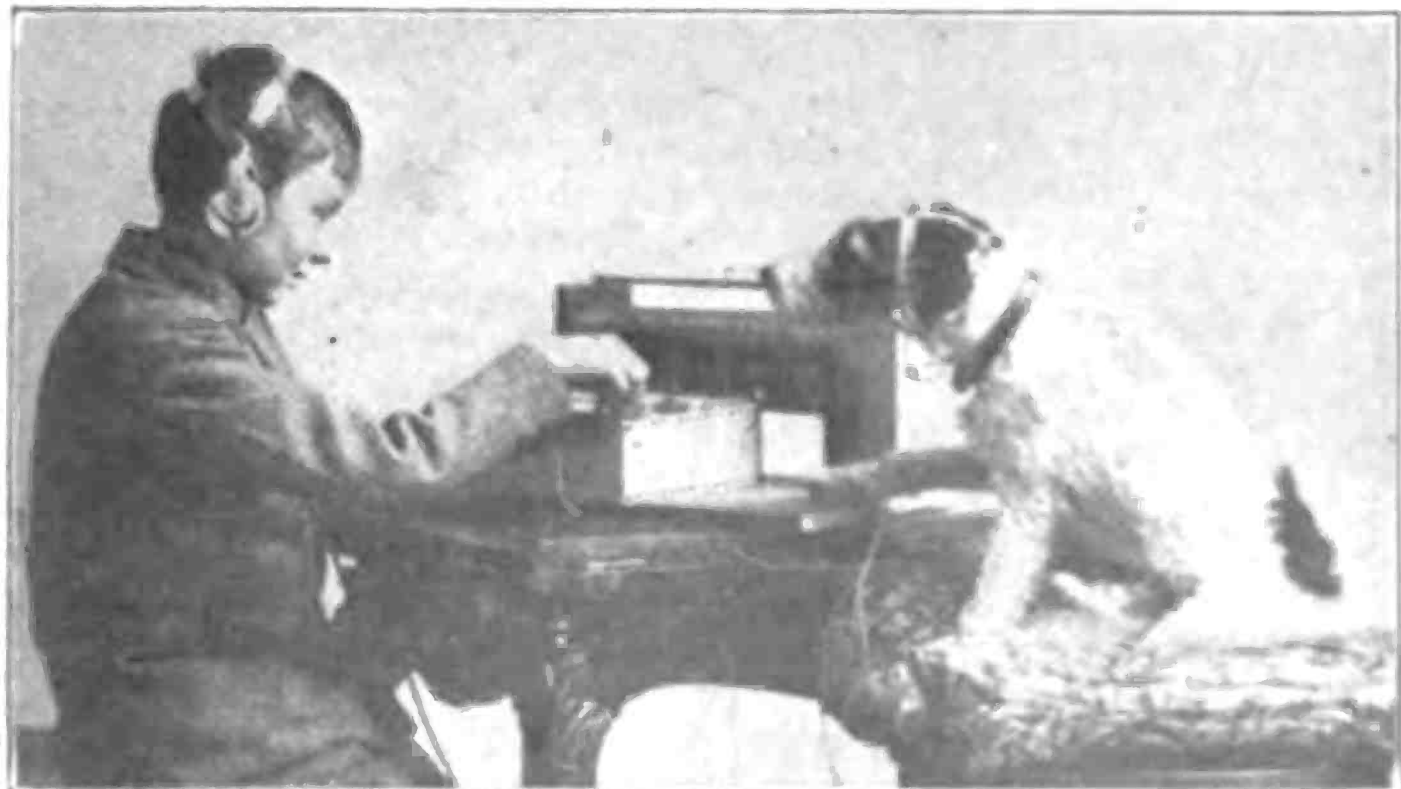


(C. Kadel and Herbert)  
The operating room of the highest broadcasting station in the world, located on the top of Mount Corcovado, Rio de Janeiro, South America. The call of this station is SPC and has been heard over long distances by many amateurs.



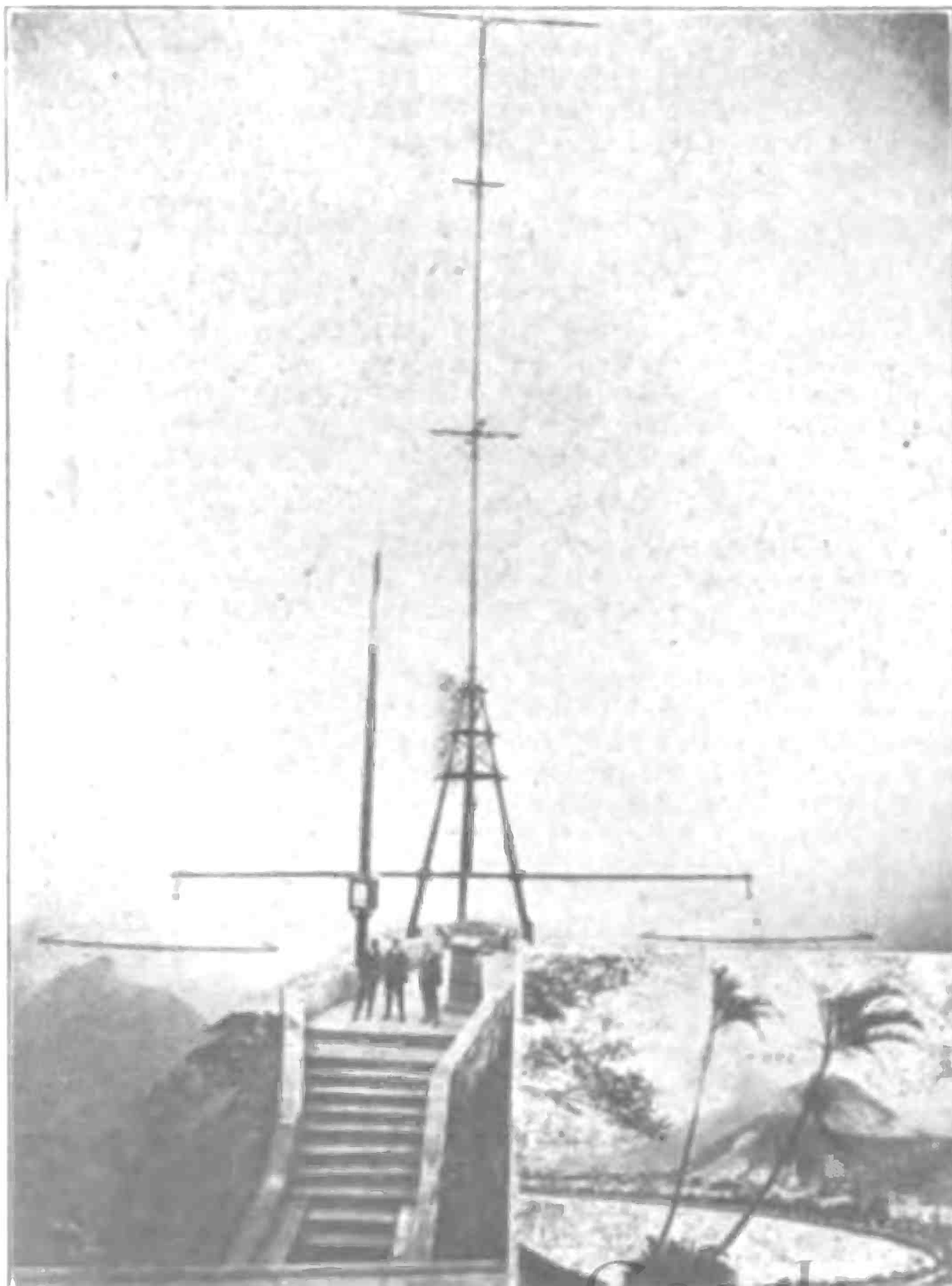
(C. Fotograms)  
The apparatus used in one of the most unique meetings ever held. The Western Electric Co., of New York and Chicago, recently held a formal yearly meeting in both cities, which was presided over by the same officer though the two groups of officers were separated by more than 1,000 miles. Two-way reception and communication were successfully established for the first time.

(C. Kadel and Herbert)  
The antenna system of SPC, the highest broadcasting station in the world. This station is 2,175 feet above sea level, and was established by the Westinghouse Electric International Co. Small insert in lower corner shows location of station atop the mountain.



(C. Keystone Views)  
Cabin of the H. M. S. Impregnable that has been re-erected in Auto-voyer's Wireless Store in Victoria Street, London, as a demonstration room. It is complete in every detail, even the brass fittings and lamps of the original ship being used. It is one of the novelties of the largest radio store in London.

(C. International Newsreel Photos)  
Rover listening in to a concert with his master. He evidently is not in favor of "ear-muffs," judging by the expression on his face. The set that the young man has built is constructed of parts of a Mecanno outfit that was laying around. Evidently steel has lost its original qualities and can be





# Answers to Readers

I have a regenerative set, but when listening to distance stations I am bothered with a whistle and squeal and cannot hear them. My set is shielded. How can I remedy the trouble?—Nick Tirone, 261 Seaton Avenue, Roselle Park, N. J.

Decrease the B battery current, or better yet, use a potentiometer. Don't burn your tubes too high. Burn them just high enough get the oscillations started. If burnt too high, they force oscillations.

\* \* \*

1. Enclosed please find diagram of my set. It worked fine until a couple of days ago, then it refused to work. My connections are all tight. What can be the trouble? When I disconnect the variable condenser in the aerial circuit and hook my aerial directly to the set, I get music faintly.

2. Why are some tubes (detectors) louder than others?—Karl Day, Dwight, Kansas.

1. Your diagram is correct. We suggest that you put a new B battery in the circuit, and go over your connections very carefully. If they are soldered, look at them very carefully, as the flux might cause corrosion, which will seriously damage the sensitivity of the circuit. Your connections on your condenser are evidently making bad contact. Also, examine the lugs of your tubes, and sandpaper them lightly to remove any dirt or corrosion that may have accumulated. Keep all the contacts clean.

2. This is due to the fact that some tubes are exhausted to a greater extent than others.

What is the tube U. V. 201 A, and where is it possible to get it?—R. Prentiss, c/o Chas. Parker, High Street, Meriden, Conn.

This is a new tube recently brought out by the Radio Corporation, and does not consume as much current as the regular U. V. It consumes one-sixth of the regular current. It can be had at any of the larger radio supply stores, or the nearest branch office of the Radio Corp., or Westinghouse Electric Co.

\* \* \*

I have constructed the WD-11 set described in your Jan. 20. issue, but cannot get it to work properly. What can I do?—Chas. G. Rose, Lorain, Ohio.

Switch the B battery leads and put on more plate voltage. See that the set is wired correctly. Use a variable grid leak. Test out your circuits by means of a battery and buzzer.

\* \* \*

How can I make a rectifier for charging a 6-volt 40-ampere hour battery from a 110-volt 60-cycle alternating current line.—L. A. Remfry, Jackson, Miss.

Take two plates of aluminum about 6x3 inches and two like plates of lead. Fasten an aluminum and a lead plate on a block of wood about 1-inch square, and long enough to project one inch beyond each end. When both of these units are made up, take 2 mason jars or any receptacle that will hold the plates and fill them full of a solution of borax and water. Allow this solution to stand for about an hour, when the borax that did not dissolve will precipitate and lay on the bottom. Poul off the solution, and wash the rest of the borax out of the jar. Replace the solution and put the two aluminum and lead elements in the two jars. This will give you two rectifiers each containing a lead and an aluminum plate immersed in a solution of borax. The wooden piece that projects will serve to prevent the element

from falling into the jar. Fasten a wire onto each, and hook-up as follows: The aluminum plate of one of the jars goes to the positive pole of the battery, and the aluminum plate of the other goes to the line. Then connect the lead plate of the first rectifier to the series bank of lamps (4 60-watt lamps in series parallel will do) and the aluminum plate of the other jar to the other or open end of the line. This will allow you to rectify both sides of the current and when your battery is bubbling or tested by a hydrometer the correct charge can be found. It will generally take about 10 or 15 hours to charge a battery.

\* \* \*

Will the set described by John Kent in the Jan. 27 issue tune out local stations? If not give me a hook-up of a two tube (WD-11) set that will accomplish this.—Robert Jacobs, 112 W. Irvington Place, Denver, Colo.

This set is extremely sharp in tuning, and will tune out local stations. Of course, it is impossible to tune out stations if you are very really close to them. If they are at some distance, it is possible with this hook-up.

\* \* \*

My antenna is between the house and barn, and is strung up on two poles. Will it be necessary to ground the poles, or is grounding the antenna when not in use sufficient? The aerial is 150 feet long.—Leo Clark, Seward, Nebraska.

It will not be necessary to ground the poles, provided they do not project too high above the roof. If they are over fifteen or twenty feet above the highest part of the roof, it is better if they were grounded; that is, provided that they are metal. If they are wooden, you cannot ground them, as you cannot ground any wooden object, it being an insulator even if a poor one.

\* \* \*

Publish a hook-up for a U. V. 200, one vario coupler, two variometers, condensers, rheostats, etc.

With my present regenerative hook-up I am enabled to get only nearby stations. Will this improve my reception?—J. Walton Holmes, 521 Kew Gardens Road, Richmond Hill, N. Y.

We refer you to our issue of RADIO WORLD dated Oct. 14. On page 4 you will find a hook-up similar to the one you request, with full constructional details of the variometers and variocoupler construction, by G. W. May.

\* \* \*

1. Kindly furnish me with a hook-up using a WD-11, 2 honeycomb coils, and condensers.

2. Also a hook-up with one honeycomb coil tube and condensers.

3. Can a WD-11 tube be used with the Flewelling circuit, or is a six-volt tube necessary?

4. Are honeycomb coils better than variocouplers?—D. V. Keedwell, Independence, Missouri.

1. We refer you to the hook-up by Ortherus Gordon, published in our issue of Jan. 20. This article includes all the particulars for panel, and also for making the coils.

2. See the article by G. W. May in RADIO WORLD of Feb. 17, on page 11.

3. The WD-11 can be used with this hook-up, but only 60 volts should be put on the plate, as if more than that is used there is a liability of the tube breaking down.

4. Due to the fact that a greater range of wave length is possible with the honey-

comb coils, they are sometimes preferred to the coupler, which is only useful throughout a comparatively small range.

\* \* \*

1. Does the De Forest D7 Reflex set use a variocoupler, or is it tuned by a condenser?

2. If a tuner is used, is a variable condenser used in the open circuit?

3. Can you give me the capacities of the condensers?

4. How can I construct a 50,000-ohm resistance unit?—S. J. Gordon, 458 Tompkins Street, New York City.

1. This set is constructed in such a manner that either antenna and ground, or loop can be used. This is accomplished by using a double circuit plug. When the loop is plugged in, it automatically cuts the coupler out. Across the secondary of the variocoupler there is a condenser. When the loop is inserted the set is tuned by means of the condenser.

2. There is also a condenser in the open circuit. This is cut out when the loop is inserted.

3. The capacities are .001 in the primary, and .0005 in the secondary.

4. It is cheaper to buy these than to make them, as winding high resistance wire on a suitable core entails a lot of work. They can be obtained in any radio or electrical shop.

\* \* \*

What is the diameter of the pasteboard tubes used for the variocoupler in the article by Ortherus Gordon in the Jan. 20th issue of RADIO WORLD?—F. N. Cash, Norwich, Conn.

The diameter of these coils should be 2 inches.

\* \* \*

1. How can I construct the coils mentioned in your article by Ortherus Gordon in RADIO WORLD, Jan. 20?

2. Should the coils be in opposition, or must both the windings run in the same position?

3. Does it matter which coil goes to the plate?—Richard Blair, 17 Clifton Park, Pittsburgh, Pa.

1. These coils and their construction are fully explained in the text under the heading "The Variocoupler."

2. The coils should run in the same position; that is, the windings should follow each other.

3. The top coil should go to the plate, and the outside end of the winding is the one that connects with the phones. The inside of the winding goes to the plate itself.

\* \* \*

Please publish a reflex amplifier circuit using two tubes.—Honore Girouard, B.Sc.A., Drummondville, P. Q.

We refer you to the article appearing in this issue, by W. S. Thompson, E.E.

\* \* \*

Can you give me a hook-up using two tubes and a crystal with two stages audio and two of radio?—R. B. Eaton, 20 Maple Baine Avenue, Toronto, Ont., Can.

We refer you to the hook-up published in this issue, under the heading "Multiple Tube Reflex Circuits," by W. S. Thompson, E.E. The first article of this series was published in our issue of Feb. 24, and contains some very good explanations of reflex circuits, as well as several very interesting diagrams.

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# Latest Radio Patents

## New Method of Signal Reception

No. 1,443,289: Patented Jan. 23, 1923. Patentee: Burke Bradbury, Schenectady, N. Y.

**T**HE present invention of Mr. Bradbury relates to a radio receiving system, particularly to systems for receiving continuous wave signals.

In some cases where it is desired to receive continuous wave signals by some method, such for example as the heterodyne method, for rendering such signals audible,

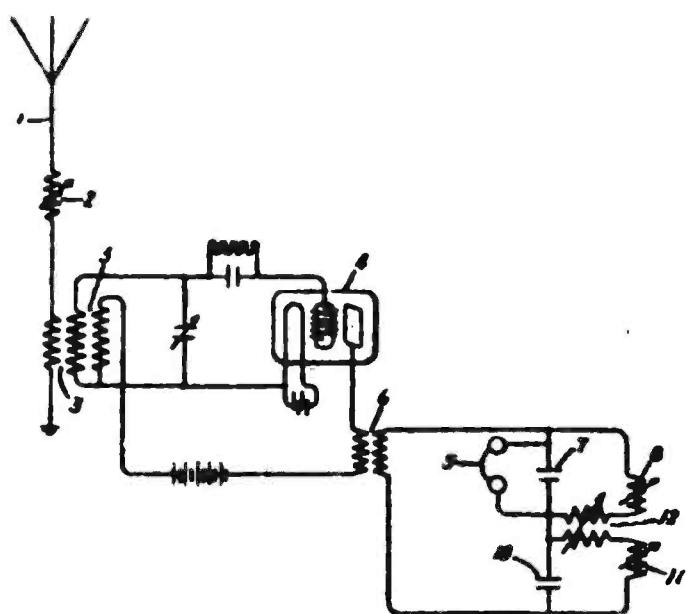


Diagram of Mr. Burke Bradbury's invention, making it possible to receive continuous wave signals without the use of the regular heterodyne method generally employed. As will be seen, a double coupled circuit is used with a valve detector.

it will be found difficult to tune a receiving system sharply enough to eliminate the effects in the receiver of stations of neighboring wave length which are either of higher power or located much nearer a receiving station than the one from which signals are to be received.

The object of the invention is to overcome such difficulties as the one mentioned and to provide a means for eliminating the effect in the receiver of interfering signals.

The novel features which are believed to be characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation will best be understood by reference to the following description taken in connection with the accompanying drawing in which is illustrated diagrammatically one way in which the invention may be carried into effect.

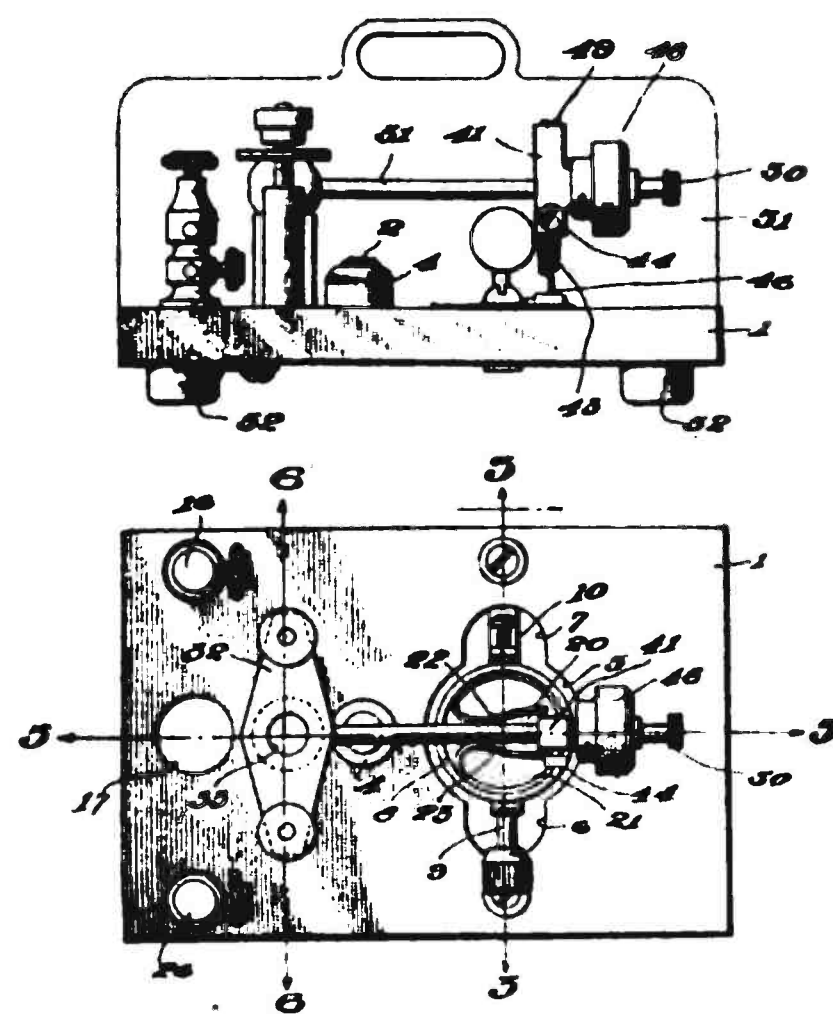
There is indicated in the drawing an antenna 1 with the usual tuning inductance 2 and a coupling transformer 3 by means of which the received signals are impressed upon the grid circuit of a detector 4 of the electron discharge type. The plate and grid circuits of the detector are coupled together at 5 in order that the detector may generate local oscillations of a frequency slightly different from that of the signals which are to be received. Coupled to the plate circuit of the detector 4 by means of the transformer 6 is a separate circuit in which are provided two frequency traps. One of these which comprises the capacity 7 and parallel inductance 8 is tuned for the frequency of the signals to be received, the usual telephone receiver 9, or any other desired form of indicator, being connected in parallel to this trap. The second trap made up of the condenser 10 and parallel inductance 11 is tuned to the frequency of the interfering signals which it is desired to suppress. This second trap offers a high impedance in the circuit to the flow of currents of the interfering frequency and thereby prevents such currents from affecting the telephone receivers a coupling 12 may be provided between the two frequency traps for the purpose of impressing upon the first frequency trap a current of the proper phase and intensity to neutralize any current of the undesired frequency which may flow in the first trap.

different frequency for transmission and reception, by providing separate antennae for transmitting and receiving, the said antennae being located a considerable distance from each other, and by neutralizing the inductive action of the transmitting system proper on the receiving system by means of balancing circuits.

## New Crystal Detector

No. 1,441,968: Patented Jan. 9, 1923. Patentee: Emmet P. Lindner, Indianapolis, Ind.

**T**HIS invention of Mr. Lindner's relates to crystal detectors as used in wireless receiving apparatus, and an object of the invention is to provide a carborundum detector which is constructed to permit movement in any necessary direction, making it possible to engage any sensitive spot on the mineral crystal with centralogical pressure of the contact point of the detector, thus making the detector very sensitive, as



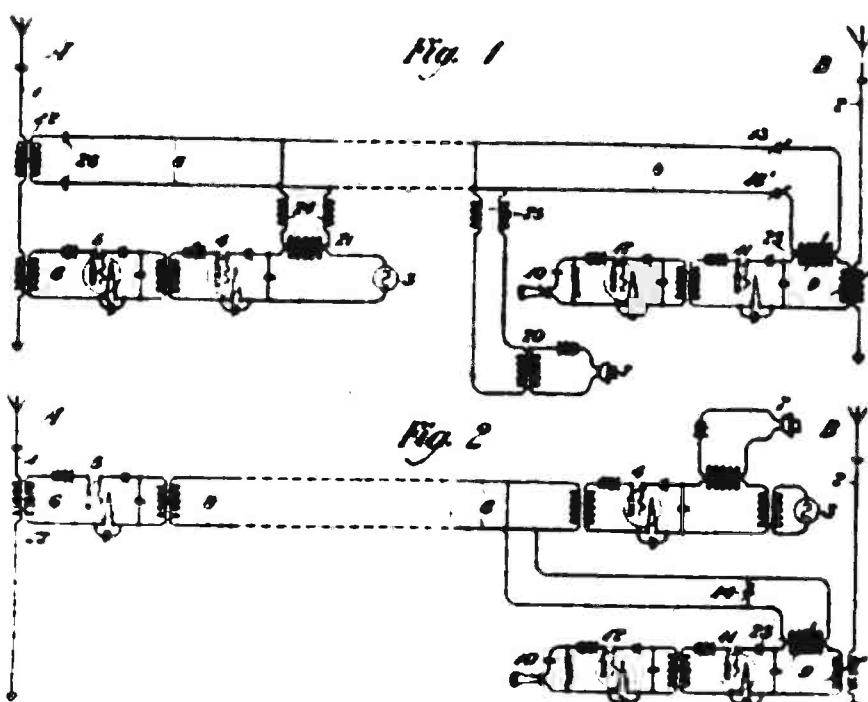
A new crystal detector invented by Emmet P. Lindner, which allows flexibility in finding the most sensitive spot, as well as making the adjustment permanent when once found. It is for use with a carborundum detector or one requiring a very hard and steady pressure.

## Duplex Wave Transmitter

No. 1,443,965: Patented Feb. 6, 1923. Patentee: Lloyd Espenschied, Hollis, L. I., N. Y.

**T**HE invention of Mr. Espenschied's relates to wireless signaling systems, and more particularly to a wireless duplex signaling system. The object of the invention is to provide a system for the simultaneous transmission and reception of signals, and in particular to provide means for duplex communication between two stations. For successful duplex operation it is necessary that the receiving arrangement be effectively protected from interference by the transmitting arrangements associated therewith; that is protected from what is known as "side tr...". It is well known that in wireless telegraph and telephone systems the magnitude of the transmission current is enormously greater than that excited in the antenna by the received waves, the relative magnitude of the former with respect to the latter being of the order of one million to one. This enormous ratio renders inapplicable to wireless systems the means of transmission interference elimination which are successfully employed in ordinary wire telegraph and telephone systems. The wireless system is, however, differentiated in two important respects from the ordinary wire system; first, signals are transmitted on high frequency carrier waves of definite

frequencies, this fact permitting of the employment of different frequencies for transmission and reception, and secondly resonant tuned circuits may be employed, thus ren-



Mr. Lloyd Espenschied's method of transmitting. This new system will permit duplex transmission. The figures show two different methods of accomplishing this, as explained in the accompanying text.

dering the receiving system selective with respect to the waves it is desired to receive. In the invention I provide successful duplex operation by employing carrier waves of

any spot on the surface of the mineral crystal can be met at any required pressure; also to provide a detector as specified, which is constructed to securely maintain the movable contact in any adjusted position against vibration occasioned during the use of the apparatus, and which will also permit the contact to be maintained in proper engagement with a sensitive piece of mineral crystal without the contact slipping.

Another object of the invention is to provide a wave detector which comprises a carrying rod, on which it is mounted, for longitudinal movement; a carrying block for the contact spring, the contact point of which is sharpened to permit sensitive and accurate engagement between the contact point of the spring and a carborundum or mineral crystal, and also to provide a supporting structure for the carrying rod, which comprises a sphere or ball on the end of the rod, engageable in a suitable socket, the frictional engagement of the ball with the socket being regulated by a spring plate which grips the surface of the ball opposite the socket, and the tension of which is adjusted by adjustable thumb nuts.

A further object of the invention is to provide a holder for the mineral crystal, which is rockably supported relative to the detector, and comprises a suitable cup in which a spring clip is mounted for yieldably engaging the mineral crystal and maintaining it in proper position.



# New Records of The DX Nite Owls

## Well Repaid by the Enjoyment

From Charles A. Smith, Roselle, N. J.

After reading your column, "Latest from the DX Nite Owls," I am not ashamed to submit this list of distant stations. These have all been tuned in on detector only. My set is a single circuit regenerative two-step audio amplification, designed by the Consolidated Radio Call Book Co., and built by the writer from plans furnished by them.

I feel that I am well repaid by the enjoyment gotten for the loss of time and sleep. I don't know what kind of an owl "DX" is, but I must be some sort of a "bird" to stay up half the night. The stations alluded to are as follows:

Distant Stations, 360 Meters—WGY, Schenectady, N. Y., General Electric Co., 150 M.; WGI, Medford Hills, Mass., American Radio and Research Corp., 250 M.; WFI, Philadelphia, Pa., Strawbridge & Clothier, 90 M.; WHK, Cleveland, O., Westinghouse, 410 M.; WSY, Birmingham, Ala., Alabama Power Co., 900 M.; WLW, Cincinnati, O., Crosley Mfg. Co., 560 M.; WLK, Indianapolis, Ind., Hamilton Mfg. Co., 725 M.; WWT, Buffalo, N. Y., McCarthy Bros. & Ford, 300 M.; WRW, Tarrytown, N. Y., Tarrytown Radio Laboratory, 35 M.; WBT, Charlotte, N. C., Southern Radio Corp., 500 M.; WMAF, South Dartmouth, Mass., Round Hills Radio Corp., 225 M.; WDAP, Chicago, Ill., Midwest Radio Central, 525 M.; KDKA, Pittsburgh, Pa., Westinghouse Mfg. Co., 325 M.; WHAM, Rochester, N. Y., Rochester University, 300 M.; WLAG, Minneapolis, Minn., Cutting & W'ton Radio Co., 1,050 M.; WDAJ, College Park, Ga., Atlanta & West Point R. R., 800 M.; KOP, Detroit, Mich., Detroit Police Department, 325 M.; WFAJ, Asheville, N. C., High Grade Wireless Co., 675 M.; WEAN, Providence, R. I., Shepard Stores, 175 M.; WHN, Ridgewood, L. I., Ridgewood Times, 20 M.; WHAS, Louisville, Ky., Courier-Journal, 675 M.; WOAX, Trenton, N. J., Frank J. Wolf, 40 M.; CFCA, Toronto, Can., Star Pub. & Printing Co., 350 M.

Local Stations, 360 Meters—WJZ, Newark, N. J., Westinghouse, 7 M.; WBS, Newark, N. J., D. W. Mays, Inc., 7 M.; WDT, Tompkinsville, N. Y., Ship Owners' Radio Service, 10 M.; WNO, Jersey City, N. J., Wireless Telephone Co., 12 M.; WVP, New York, N. Y., Signal Corp., 15 M.; WAAM, Newark, N. J., I. R. Nelson & Co., 7 M.; WBAN, Paterson, N. J., Wireless Phone Corp., 20 M.; WWZ, New York, N. Y., John Wanamaker, 15 M.; WEAM, N. Plainfield, N. J., Borough of N. Plainfield, 10 M.; WDAM, New York, N. Y., Western Electric Co., 15 M.

Distant Stations, 400 Meters—WBZ, Springfield, Mass., Westinghouse, 200 M.; WSB, Atlanta, Ga., Atlanta Journal, 800 M.; WIP, Philadelphia, Pa., Gimbel Bros., 90 M.; KSD, St. Louis, Mo., Post-Dispatch, 950 M.; WHB, Kansas City, Mo., Sweeny School, 1,200 M.; WOC, Davenport, Iowa, Palmer School, 950 M.; WWJ, Detroit, Mich., Detroit News, 325 M.; WNAC, Boston, Mass., Shepard Stores, 225 M.; WHAZ, Troy, N. Y., Rensselaer Institute, 175 M.; WGM., Atlanta, Ga., Atlanta Constitution, 800 M.; WBAP, Fort Worth, Texas, The Star Democrat, 1,500 M.; KYW, Chicago, Ill., Westinghouse, 525 M.

Local Stations—WOR, Newark, N. J., L. Bamberger & Co., 8 miles; WCAF, New York, N. Y., Western Electric Co., 15 M.; WBAY, New York, N. Y., American Tel. & Tel. Co., 15 M.

Your magazine is much enjoyed by me and my friends, and it carries "the real dope."

THE Editor of RADIO WORLD will be pleased to receive sketches of hook-ups drawn carefully in black ink or heavy pencil from the "DX Nite Owls" who send in records with a view to publishing them.

Send hook-ups of your sets, provided they contain something unusual. Send, also, the names of the various makes of apparatus you are using.

Make your letters brief and informative. Write on one side of the paper only.

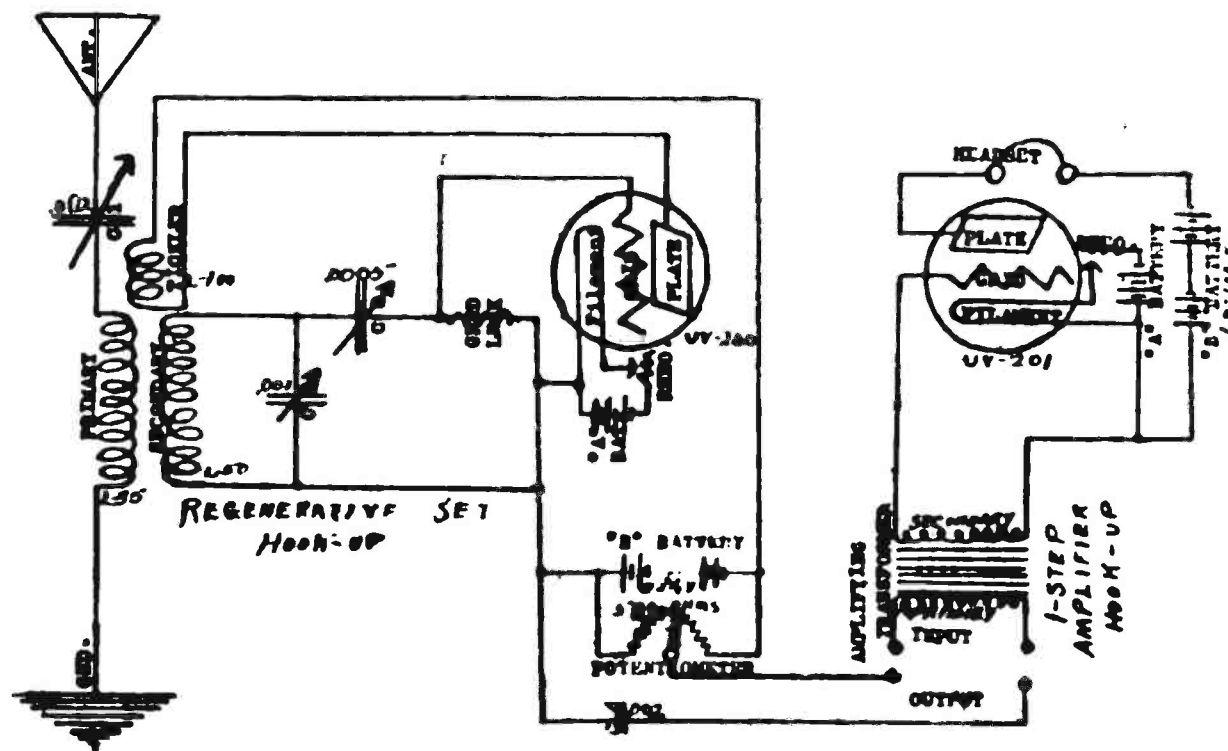
The letters and hook-ups will be published in the earliest possible numbers of RADIO WORLD.

## A Five-Months Fan

From Quentin Weaver, Saratoga, Texas

Enclosed you will find a hook-up which I believe gives remarkable results. As I have been a fan only five months, I think that the following is a fair record. To date I have received 76 stations in 26 different States and Havana, Cuba. The farthest station being KDZT at Seattle, Washington, at the distance of 2,100 miles. Here is a partial list: WLW, WEAO, WHK, WWJ, KLZ, KWH, KHJ, WHA, WLB, WAAM, WPJ, KFAE, WFAF, WBZ, KZN, and PWX.

My aerial is a single wire 150 feet long and 50 feet high. The primary condenser C1 should be treated in both series and parallel for best results. The coils are honeycomb coils and the turns are marked on the diagram. On the diagram I show 22½ volts on the B battery of the first tube, but I find that 45 volts work the best. The potentiometer is 500 ohms, but any potentiometer of 500 ohms or over can be used.



I noticed in a recent RADIO WORLD a story about Radio Golf. I have a fairly good score myself. Here it is: WEV, Houston, Texas, 70 miles; WMAM, Beaumont, Texas, 40 miles; WFAF, Houston, Texas, 70 miles; WDAO, Dallas, Texas, 260 miles; WOS, Jefferson City, Mo., 605 miles; WOC, Davenport, Iowa, 865 miles; WBAP, Fort Worth, Texas, 278 miles; WOAI, San Antonio, Texas, 263 miles; WPA, Fort Worth, Texas, 278 miles; WGM, Atlanta, Ga., 679 miles; WDAF, Kansas City, Mo., 635 miles; WHB, Kansas City Mo., 635 miles; WRW, Tarrytown, N. Y., 1,515 miles; WHAS, Louisville, Ky., 755 miles; KSD, St. Louis, Mo., 637 miles; WDAJ, College Park, Ga., 639 miles; WFAA, Dallas, Texas, 260 miles; WLB, Minneapolis, Minn., 1,065 miles; PWX, Havana, Cuba, 901 miles; WKAL, Orange, Texas, 67 miles; WSB, Atlanta, a., 679 miles; WDAP, Chicago, Ill., 933 miles.

Total: 12,129 miles in three hours and thirty minutes. Mileage per hour, 3,465 miles. I believe this nears the record of Mr. Anthony, of Needham, Mass.

## Joins Our "Nite Owls"

From Willis Nye, 310 East Sonoma Avenue, Stockton, California

WOULD like to join your "DX Nite Owls" Society. I will give my qualifications. I use an inductance with 8 taps, in inductive relation to a variometer, a 23 plate condenser, one vernier condenser, grid leak (variable), grid condenser, one telephone jack, vernier rheostat, tube, variable "B" battery, and "A" battery and Federal phones. I have got the following DX stations beside many local stations within one hundred miles radius of my home. My aerial is 20 ft. high, 80 ft. long; 1 wire KHJ, Los Angeles; KZN, Salt Lake City; KGG, Portland; KFC, Seattle, Washington; CKCK, Regina, Saskatchewan, Canada; KLZ, Denver, Colorado; KFI, Los Angeles, Cal.; KFBC, San Diego, Cal.; CFCN, Calgary, Canada; KFAF, Denver, Colorado; WBAP, Ft. Worth, Texas; KWH, Los Angeles, Cal.; KDYL, Salt Lake City; KFBD, Hanford, Cal.; KNI, Eureka, Cal.; KFAY, Medford, Oregon; KGW, Portland, Oregon; 6XAD, Catalina Island; KFAE, Pullman Washington; CFCB, Vancouver, British Columbia, Canada.

Locals within 120 miles: KUO, S. F., Cal.; KWG, Stockton, Cal.; KFBK, Sacramento, Cal.; KJQ, Stockton, Cal.; KXD, Modesto, Cal.; KFGH, Palo Alto, Cal.; KFDB, S. F., Cal.; KVO, Sacramento, Cal.; KZY, S. F. Cal.; KDN, S. F. Cal.; KJJ, Sunnyvale, Cal.; AGI, Presidio, Cal.; KRE, Berkeley, Cal.; KZM, Oakland, Cal.; KLX, Oakland, Cal.; 6XJ, S. F. Cal.; KLS, Oakland, Cal.; KQW, San Jose, Cal.; 6AJD, Stockton, Cal.; KYY, San Francisco, Ca.

I use only one tube.

Hookup with which Mr. Weaver (see letter on this page) has done some remarkable work. Take note of the fact that he uses separate batteries for his amplifier. This is a good idea, if the builder has sufficient space to accommodate the extra batteries. It allows better reception through the amplifying circuits. This is because there is less chance of the amplifier oscillating, due to enforced oscillations through the battery circuits from the detector circuit.

## Without Amplification

From Kenneth I. Scouten, Los Angeles, California.

HAVE a record which I consider unusual for a crystal set without amplification. Have listened in to concerts from KPO and KUO, San Francisco, and KZN and KDPT of Salt Lake City, coming in loud and clear.

Local stations can be heard all over the room with phones hanging on the wall. My aerial is 4-wires 60 feet, 30 feet high. The set is entirely home-made, with the exception of the phones.

\* \* \*

## Another 1-Tube

From Fred Hoffman, 1963 61st St., Brooklyn, N. Y.

Would like to mention the stations I have heard on a 1 bulb (W-D11) set using a variocoupler, variable condenser. PWX, Cuba; WGAD, Porto Rico; WHAZ, Troy; KDKA, Pittsburgh; WIP, Phila.; WOO, Phila.; KYW, Chicago; WSB, Atlanta; WGM, Atlanta; WWJ, Detroit; WBZ

(Continued on page 24)



## WJZ's Children's Story Heard in British Isles

TO Florence Smith Vincent, a charming and talented New York woman is accorded the distinction of being the first of her sex to be heard in Great Britain over the radio from WJZ, the Westinghouse Radio Corporation at Newark, N. J. At least she is the first woman to be heard talking and it was during one of her recent stories from "Peter's Adventures in Birdland," that J. W. F. Cardell in Cornwall, England, not only heard every word of the tale but received a Christmas greeting from the young woman. So impressed was Mr. Cardell by the marvelous experience that he forthwith wrote to the Radio Corporation Westinghouse Station, congratulating WJZ and Mrs. Vincent on their achievement. WJZ is the only broadcasting station to be heard regularly in Europe.

Other women's voices have been heard in songs as far as England but only in fragmentary shape, and later at night. Mrs. Vincent tells her stories to the children at seven o'clock in the evening when the air is full, which makes the achievement all the more extraordinary.

Mrs. Vincent, who has been relating her delightful stories of "Peter's Adventures" over the radio for the past year has received more than 4,000 letters from pleased listeners and these have come from all parts of this country and as far north in Canada as Banff. From Maine and all the other New England States, from towns as far south as Miami, Florida, from Texas, Iowa, Missouri and in fact from almost every state this side of the Rockies have come letters from young and old. And every letter has been answered either personally by Mrs. Vincent or through her publishers, Frederick A. Stokes Company.

Mrs. Vincent has another distinction which might be mentioned in connection with her great success as a radio broadcaster and that is that she is the author of more than two thousand children's stories. Many of these have been compiled in "Peter's Adventures in Meadowland," and "Peter's Adventures in Birdland." A third book, "Peter's Adventures in Animal-land," is shortly to be published. These form an interesting children's library.

## More Work for NAA

THE broadcasting of weather reports and market news from the Agricultural Department was transferred from the Washington Post Office station recently to Naval station NAA at Radio, Va.

In all, NAA got eleven new schedules comprising nearly three hours a week more of broadcasting. This station now handles an average of 18 schedules of fifteen minutes each a day, totaling approximately 25 hours a week or almost 4½ hours daily except on Saturday and Sunday.

The new schedules are all on radio telephone circuit carried on the 710 meter waves. They include reports on live stock, fruit and vegetable, hay and feed, dairy products previously carried by the Post Office but now broadcast via land wire from

the Agriculture Department, Washington. Weather reports and forecasts as well as warnings are now sent twice daily by voice directly from the Weather Bureau, so that several thousand more recipients can understand the broadcasts, than get the code reports. It is understood that all work previously handled by the Post Office stations will soon be transferred to Army or Naval Radio stations.

A new schedule from the Civil Service will be handled by NAA every Wednesday evening at 7:25, so that a radio civil want ad broadcast will soon be in operation.

Marine and Naval Band music will be continued each Wednesday and Friday evenings, Chief Radio Man B. L. Moore, U.S.N., doing the announcing.

### A Real Opportunity

OF late, there has been a general and marked improvement in shipping, and of course with the increase in the number of ships doing business, there naturally is an increasing demand for competent radio operators. All over the country there is need of radio operators, and on a canvass it was learned that 15 out of every 20 amateurs did not know enough of the rudimentary principles of the science to pass the examinations.

The graduates of the Radio Institute of America (formerly the Marconi Institute), are placed in berths by the Radio Corporation of America, of which the Radio Institute is a part. The Radio Institute has not at present enough operators to go around and as a result there are many ships that are inadequately supplied with operators. The present pay of operators range from \$75 per month and board, upward, depending upon the class of the vessel they work on. This pay, of course, is absolutely all clear, there being no deductions for expenses, meals, etc., and the operator is classed as one of the officers of the ship.

This Institute was founded in 1909 to train operators for the American merchant marine, but it now offers instruction to anyone interested in the science of radio telegraphy and telephony. Its graduates are under no restrictions as to where they may seek employment, although upon the ter-

mination of the course they are placed immediately by the Radio Corporation.

The requirements necessary for obtaining a position as a wireless operator are: 1st Class Commercial License Certificate, either 1st, 2nd or 3rd grade; 18 years of age or older, preferably American citizens, or those possessing citizenship papers. There is no physical examination given, but the applicant should have no major disabilities, requiring the use of crutch or canes.

Here is one of the best opportunities of seeing the world, and is also one of the most complete ways of obtaining an electrical education.

### Unique Washington's Birthday Broadcast

FROM Washington a unique broadcast went out over NAA to the country on Washington's Birthday at 9 o'clock in the morning. Plans provided for the broadcasting of a salute to the Flag rendered by Army field musicians from Fort Meyer on fifes and drums.

Arrangements undertaken by the Bureau of Public Buildings and Grounds provided, through the co-operation of the Chesapeake and Potomac Telephone Co., a land line and a pick-up instrument installed at the base of the Washington Monument where the celebration was held. This carried the music to the Arlington Naval Station.



This Combination  
Completes any RADIO  
RECEIVING SET



TO own a good receiving set without Magnavox equipment, is like having your house properly wired and then using only small, feeble candle-power lamps in the sockets!

Whether placed in the average living room or large dance hall, Magnavox Radio floods the desired area with clear, resonant music or speech—its volume perfectly controlled from the Magnavox Power Amplifier constructed specially for it.

Combination R-3 Reproducer and 2 stage Power Amplifier (as illustrated).

R-2 Magnavox Reproducer with 18-inch horn: the utmost in amplifying power, fog store demonstration, large audiences, dance halls, etc.

R-3 Magnavox Reproducer with 14-inch curvex horn: ideal for homes, offices, etc.

Model C Magnavox Power Amplifier insures getting the largest possible power input for your Magnavox Reproducer. 2 stage 3 stage

Magnavox Products can be had of good dealers everywhere

The Magnavox Co.,  
Oakland, California  
New York: 370 Seventh Avenue

Write for booklet illustrating and describing the

MAGNAVOX  
Radio  
The Power Amplifier  
and Reproducer Supreme



Advertising Rates, Display, \$5.00 per inch, \$150.00 per page

# Radio Merchandising

Classified Quick-Action Advertising, 5 cents per word

Telephone Bryant 4796

## New Radio Firms

(The new firms and corporations mentioned in these columns can be reached directly or by communicating with the attorneys, whose addresses are given when ever possible.)

Altex Electrical Supply Company. (Attorney, N. B. Finkelstein, 51 Chambers Street, N. Y. C.)  
Baker & Son, Mozart theatre Building, Elmira, N. Y.

Rubes Radio Manufacturing Co., \$125,000; V. G. Swope, Raymond Swope, New York; W. W. Lecount, Brooklyn. (Attorney, Colonial Charter Co.)

Parkway Electric Company, 1330 Commonwealth Avenue, Boston, Mass.

E. R. LeManquais Company, Inc., 134 Worth Avenue, Plainfield, N. J.

Radio Electric Company, 102 West 9th Street, Frank T. Scudder, prop., Fort Worth, Texas.

Automotive and Radio Manufacturing Corporation, New York, \$1,000,000 to \$2,000,000.

Cresson Electric Supply Co., Keystone Avenue, C. A. Klemstein, prop., Cresson, Pa.

The Radio Shop, 841 Main Street, Westbrook, Me.

Bluestone Electrical Company, Philadelphia. (Attorney, Corporation Guarantee & Trust Co.)

Carroll-Edwin Co., 3217 Fourteenth Street, N. W., Washington, D. C.

Scott & Knies, Atler and Third streets, Hazleton, Pa.

Chamberlain Electric Co., N. Y., to make radio instruments, \$25,000; E. Gross, E. Bensamou, R. Kessler. (Attorneys, Reit & Kaminsky, 305 Broadway.)

Lee S. Geddes, 389 Madison Avenue, Albany, N. Y.

Alcon Electrical Supply Co., N. Y. C. (Attorney, S. B. Cardozo, 30 East 42d Street.)

University Electric Co., 1353 University Avenue, Madison, Wis.

M. B. Sleeper, publishing of radio books, incorporated for \$5,000. Directors, J. E. Whiting, E. Webster, G. O. Castell. (Attorneys, Avery & Whiting, 5 Nassau Street, N. Y. C.)

## This Radio Mfg. Firm Works 24 Hours a Day

THE fact that the radio industry is continually growing was indicated the other day in a bulletin issued by the Alden Manufacturing Co. of Springfield, Mass. In a letter to RADIO WORLD they say in part:

"Our process has worked so that sockets being shipped to customers today were only raw materials yesterday. This is our third month of operating on three shifts, eight hours each. By this is seen that the factory is running 24 hours a day, and due to the fact that our orders are increasing at such an enormous rate, we are forced to increase our floor space over 25 per cent. We believe that we are right in the claims that we are now the largest manufacturers of tube sockets in the entire world. It is partly due to the fact of our enormous advertising campaign, and wholly due to the quality of our product, which is the best that can be made, and in which no pains are spared to make it absolutely the best."

Some idea of the extent of this concern's development may be gained from the volume of sales. These have increased over 700 per cent in less than two years, and it is a constant rush to keep up with the ever-increasing orders coming in.

Sales offices have been established in all parts of the country, and the company is also well established in Cuba, South America, and Canada. There have even been considerable call for their products from Continental Europe.

## Radio Stocks

(Quotations as of February 21, 1923, furnished by Frank T. Stanton & Company, 35 Broad Street, New York City, Specialists in Wireless Securities.)

American Marconi Stamped.....	5c	20c
American Marconi Unstamped.....	\$5	\$7
American Tel. & Tel.....	123	123½
Canadian Marconi .....	2½	3½
De Forest Radio.....	7	10
Dubelier Condenser .....	5½	5¾
English Marconi com.....	11	15
English Marconi pfd.....	11½	15½
Federal Tel. Calif.....	5	6
General Electric .....	185½	186
Hennessy Radio Pub. ....	9	11
Mackay Company com.....	116½	117
Manhattan Elec. Supply .....	55	57
Marconi Int. Marine .....	8	10
Radio Corporation com. ....	3½	3¾
Radio Corporation pfd. ....	3½	3¾
Spanish Marconi .....	1	3
Western Union .....	118	119
Westinghouse E & M .....	65	65½

## Move Because of Increase of Business

BECAUSE of the tremendous growth in their business, Chas. Freshman Co., Inc., manufacturers of the well-known radio appliances, Antenellas, Micons and Variable Resistance Leaks, found their quarters at 97 Beekman street, New York, totally inadequate to meet the prevailing demand for their products.

They have, therefore, taken much larger quarters in a modern, up-to-date building at 106 Seventh avenue, on the corner of 17th street, and are now doing business on an even larger scale.

Production has been increased many fold and everything possible is being done to assure a maximum of service to all customers.

## Radio Wanted in Brooklyn Parks

A radio set in every Brooklyn, N. Y., park has been urged in a letter to Borough President Riegelmann by Arthur J. Olmstead, head of the Municipal Civic Service League of Brooklyn. Mr. Riegelmann is reported to favor the suggestion.

## Coming Events

PERMANENT RADIO FAIR FOR BUYERS, Hotel Imperial, New York City. Open from September, 1922, to May, 1923.

SECOND DISTRICT RADIO CONVENTION, Hotel Pennsylvania, New York City, March 1, 2, and 3, 1923.

## A Suggestion to Broadcasters

Editor RADIO WORLD—Many of us (meaning radio bugs), like Jazz, and others like music, and it is our pleasure to sit at our receivers and fish about until we get just what we prefer, and when we get it we like to know who is giving the treat.

But too often the broadcasting station neglects to give its call letters and we cannot give the proper credit.

Radio is good advertising for anyone whether it be an individual, a business concern or a city, and the broadcaster should not be so modest as to hide his light under a bushel.

A statement through your medium might correct this and we, who try for long distances, would be relieved of an awful strain sometimes.

Have 'em shout who they are from the housetops, so to speak, long, loud and often—Frank D. Fox, Minneapolis, Minn.

It is a good suggestion brought out by Mr. Fox in the above letter. The RADIO WORLD would be glad to hear from others on the subject, especially from broadcasters. Our columns are open to you.—The Editor.



# GALENA CRYSTAL

Mounted in special prepared metal 30c. Unmounted 25c. All guaranteed. Manufacturers, dealers and jobbers write for quantity prices. We also manufacture Radio parts to order. PRECISION TOOL & MFG. CO., 102 Lewis St., N.Y.C.

## Let Radio Radiate Your Home

List	Our Price
\$8.00 Federal Phones.....	\$5.95
1.50 Kleaner Vernier Rheostats .79	
1.75 Bright Star "B" Batteries, 2 1/2 volt.....	1.10
7.70 43 Plate Vernier Condenser .....	4.75
6.60 33 Plate Vernier Condenser .....	4.25
5.00 WD-11 Transformer.....	3.75
1.00 WD-11 Socket.....	.49
22.50 Bristol Loud Speaker.....	19.50
4.75 Variable Condenser 43 Plate .....	3.00

Write for free catalogue. Perfection Pays Parcel Post

### Perfection Radio Corp. of America

119 WEST 23RD STREET, NEW YORK

### 180 DEGREE VARIOCOUPLER

**\$2.15**

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414 W. 42nd St. New York City

## NATIONAL RADIO SERVICE CO.

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NEW YORK CITY  
NEW YORK

Flecher Variocoupler .....	\$2.75
Flecher Variometer (Small).....	2.15
Flecher Variometer (Large).....	2.50
Arrow Variocoupler .....	2.15
Arrow Variometer (Small).....	2.15
Arrow Variometer (Large).....	2.50
A. B. C. 43 Plate Condenser.....	1.85
A. B. C. 23 Plate Condenser.....	1.65
Freshman Var Gr Lk & Condenser...	.70
Freshman Var Grid Leak.....	.50
U. V. 201 Amplifying Unit.....	6.00
W. D. 11 Amplifying Unit.....	7.50
Framingham Vernier Rheostat.....	1.15
De Forest Rheostat.....	.85
Socoat (Socket & Rheostat Combined) .....	1.65
Bannard Phones .....	2.85
Dr. Siebt Phones.....	5.75
Federal Phones .....	5.25
Four Way Plug.....	1.10
Firth Bull Dog Plug.....	.75

ALL PARTS FOR LATEST CIRCUITS LIKE FLEWELLING AND REFLEX

We Pay the Postage

## Second District Amateurs' Convention at the Hotel Pennsylvania

THOSE who attended the Second District Executive Radio Council held at the Hotel Pennsylvania last year will remember very distinctly that "a good time was had by all." Those who attended last year's exposition will most surely attend this year's affair scheduled for March 1, 2 and 3, at the Hotel Pennsylvania. The present plans as outlined will make the last year's meeting look like an old straw hat.

The following clubs will be represented at the Pennsylvania Hotel, and are the larger clubs of the Second District: Hudson River Yacht Club, Radio Association of Greater New York, Hudson, Chelsea, Down Town, City College, Radio Club of Harlem, Bronx, Bronxville, White Plains High School, North Jersey Radio Association, Bloomfield, Hill City, Radio Club of Irvington, N. J.; Rutherford, Ridgewood, Westfield, Hackensack, Nutley, Roselle Park, Bushwick Evening Trade School, Vocational School for Boys, Nassau Radio League, Radio Club of Long Island, Staten Island, Baldwin, Radio Club of Brooklyn; Stuyvesant, Highway Radio Club, and Yonkers, Passaic High School, Radio Club of Hudson County, Hudson City, Ridgewood Park, Radio Club of Jamaica, Universal, Radio Division.

The convention opens at 2 p. m., March 1, on the Roof Garden of the Hotel Pennsylvania, and the following booths have been set aside for the Radio Clubs: Booth 26, Radio Club of Brooklyn; booth 27, Hackensack and Ridgewood Park, N. J., Radio Clubs; booth 29, Radio Association of Greater New York; booth 30, Ridgewood Radio Club; booth 31, Hudson Radio Club; booth 35, Department of Commerce; booth 36, Bronx Radio Club, New York; booth 38, Staten Island Radio Club; booth 39, Radio Club of Jamaica, L. I.; booth 40, Radio Division Hudson River Yacht Club; booth 42, Roselle Park Radio Club.

At the Department of Commerce booth, wave meters will be checked and calibrated free of charge by United States radio inspector. This is a feature in itself, and one that should not be overlooked. If you own a wave meter, bring it along, and have it corrected and then you won't stand any chance of running your wave up among the BRs, which "isn't nice."

The banquet will be held in the grand dining of the Hotel on March 3, and from present indications it will be "some feast." Music during the banquet will be furnished by Ted Schuster's Society Orchestra.

### Is It Always the Fault of the Amateur?

Much has been said about the interference that is created when tuning up a regenerative set. Rumors of official reprimanding for those found to be the owners of re-radiating sets have caused considerable uneasiness among some novices. This is unnecessary worry. Unless one owns and operates an outfit consisting of two or more amplifying tubes the possibility of creating serious interference is nil. So says the *New York Globe*, and continues:

It is the amateur who is using 5-watt power tubes and high plate voltages that is the real cause of this form of interference. Yet it is doubtful if the wave he puts on the air is bothersome to any one except the owner of an ultra-sensitive receiver who unfortunately happens to live nearby.

#### White's "Varioment" Cement

Make your own coils. Construct variometers, variocouplers, etc. No distributed capacity. Holds windings securely and permanently.

Send 25c. for sample bottle

WHITE RADIO COMPANY  
123 East 23rd Street New York City

# D-X-

(DISTANCE)

## Free Catalogue

This Catalogue should be called "Recipes for Long Distance." The D-X-RADIO COMPANY was founded to help amateurs pull in the most distant stations. This Catalogue is a compilation of radio instruments designed for D-X (DISTANCE) Work.

### The Thrill of Your Life

When you first hear a voice from a ship at sea,—or on one of these snowy days you pull in a song from a concert down in Florida—say that's the thrill that comes once in a life time!

### D-X-Radio Company Specializes

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## D-X-Radio Co.

123 Liberty Street New York City

## RADIO BROADCASTING MAP

FOR the benefit of those interested in Radio and those who are becoming interested, Rand McNally & Company have prepared a publication containing a wealth of information of greatest value. It shows in the most comprehensive way, the location of the broadcasting stations, gives their classification, the call letters, wave lengths, ownership, etc., of each.

Everyone who wishes to get the maximum pleasure and enjoyment from Radio should have a Rand McNally Radio Map of United States. It is complete, accurate and up-to-date.

The Rand McNally Radio Map of United States is 26x20 inches in size. The locations of broadcasting stations are shown by distinctive symbols. The call letters of each station are given, also the wave lengths of each. The Radio Districts with numbers are shown in red and the Radio Relay Divisions are in blue. Time zones are included. Alphabetical lists of stations and alphabetical lists of call letters are in the margins. Convenient pocket form with cover.

Price 35c Each

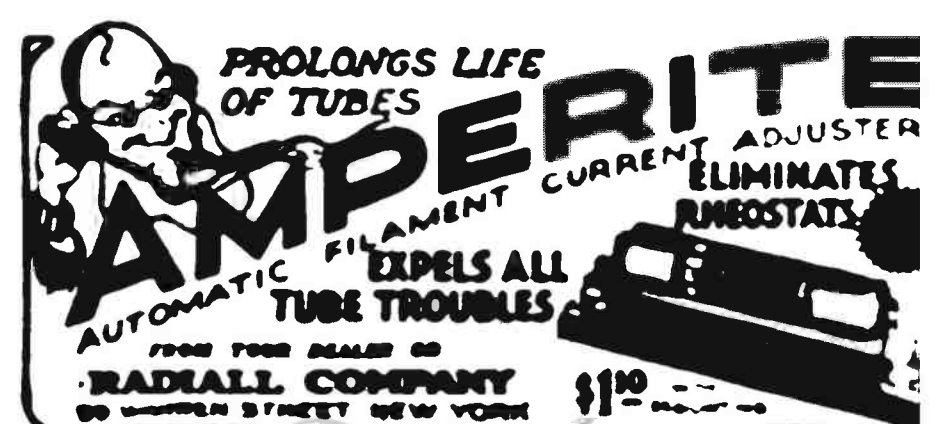
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EXPELS ALL TUBE TROUBLES  
FROM YOUR DEALER OR  
RADIALL COMPANY \$1.00  
60 WASHINGTON STREET NEW YORK



### DX Nite Owls

(Continued from page 20)

#### A Pretty Good Record

From C. Parkinson, Toronto, Canada

**I**N your January 27 issue I noticed several very remarkable records, and hard ones to beat. These reports were under the heading, "With the DX Nite Owls." Well, here is my record for the month of January. The stations are: WGY, Schenectady; WGR, Buffalo; WEAJ, New York City; WMAQ, Chicago; WOO, Philadelphia; WFI, Philadelphia; WNOK, New York; KDKD, Pittsburgh; WJZ, Newark; WCAE, Pittsburgh; WLW, Cincinnati; WLK, Indianapolis; WOR, Newark; WWJ, Detroit. For all of these stations I can use a small Brown's loud speaker. The following are a list of the long distance stations that I have heard: WHAS, Louisville; WSB, Atlanta, Ga.; WDAF, Kansas City; WOC, Davenport; CSCG, Winnipeg; CKCK, Regina, Canada; WDAJ, College Park, Ga.; WCAT, Rapid City, S. D.; WDAO, Dallas, Texas; WCAJ, Milwaukee, Wis.; CHAC,

Halifax, Canada; WBAP, Fort Worth, Texas. This completes my list, all but these two KDZH, Fresno; KWH, Los Angeles. What do you think of these two for long distance work? All of the other stations I can tune in or out whenever I wish, all but the last two. And I have only heard these twice. All of latter stations are over 600 miles from Toronto. The circuit that I am using is regenerative. When I tune into our own local station CFCA you can hear it 40 feet from the horn. My aerial is 130 feet long, one wire, and 70 feet above the ground; the lead-in is 50 feet. I think for a one-bulb set this is a pretty good record. (I use a WD-11 tube.)

#### Using Only One WD-11

From William Brantly, 1115 Humboldt St., Bakersfield, Calif.

I am sending you a list of stations I have heard in the past three nights. They are: 6BM, 6BAC, 6ZM, 6ORE, 6XAS, 6BA, 6BVW, 6BO, KWH, KDYL, KZN, KDYO, KSL, KFBK, KHJ, KFEB, KFI, KFDS, KWG, KQW, KFAF, KMJ, KPO, KFZ, KLZ, KVO, KFCK, KGG, KFAY, KGW.

### Another Home-Made Set

From James W. Turner, Norfolk, Virginia.

**H**ERE are my records for a single-circuit, home-made receiving set with which I have had remarkable success. It is very selective both for phone or C. W. On November 25 I heard 27 stations during five hours. These were: WJZ, WOR, WSB, WGY, WIP, WGM, WHAF, KDKA, WBS, WDAF, WRR, WEAJ, WMAK, KSD, WLAG, PWX, WHAS, WOC, KYW, WBAJ, WGR, WOI, WEAJ, WNAC, WDAP, WNAN, WOO, WOS.

I have codes from almost all of these stations. I have heard over 100 since I constructed the set, and I am using only a single, 7-strand aerial, 25 feet high and 150 feet long. The vario-coupler was made by myself, and it works on wave-lengths from 170 to 500 meters. All battery connections, as well as aerial and ground, are on the rear of this set, which leaves a very pleasing effect from front. I used no shielding, as I found there was practically no body capacity effect when using the I. R. adjusters. The set is bus bar, wired with square tinned copper wire, which makes it very neat if care is taken in wiring. I am enclosing circuit of tuner and construction of coupler. I should be glad to give any other information.

### Twenty-five an Evening in N. S.

From Horace S. Olding, New Glasgow, Nova Scotia

Using single circuit regenerative and one tube I have heard the stations listed below: WJZ, WBZ, WOO, WIP, KDKA, WAAM, WGL, WHAM, CFCA, WBAP, WCM, WSB, WHP, CFCF, CKAC, CHYC, WGR, WBAN, WFI, WWJ, WBAK, WNAC, WEAJ, WHAZ, WMAK, PWX, WKAQ, WDAF, WMAF, WMAK, KLK, WHAS, WBAF, KDOW, WGY, WRW, KHJ, WCAE, WNAT, WQAA, WGI, KOP, WDAP, WJAX, WPL, WDAK, WOC, WLAK, WFAB, WWB, WBU, WFAC, WBAU, WNAN, WCAP, NOF, NSF, WJAZ, PBAN, KYW, WJX, WAAT. I have heard as many as twenty-five in one evening and enjoyed them all.

### The Heart of the City

From Charles Kohlman, New York City

**A**FTER reading the lists of many DX fans in your magazine I decided to send you my list. I am situated in the heart of the city.

WAAQ, Greenwich, Conn.; WOC, Davenport; 2XJ, Deal Beach; WCAE, Pittsburgh; WIP, Philadelphia; WBZ, Springfield; WSZ, Toledo; NOF, Anacostia, D. C.; WLW, Cincinnati; WWJ, Detroit; WDAP, Chicago; WGI, Medford Hillside; WNAC, Boston; WHAS, Louisville; WHB, WDAF, Kansas City; WSB, Atlanta; WHAZ, Troy; WFAA, Dallas; WEAN, Providence; WEY, Wichita, Kansas; WBT, Charlotte, N. C.; WSY, Birmingham, Ala.; WNAP, Springfield, O.; WCAL, Northfield, Minn.; WGY, Schenectady; WMAK, Lockport.

### All the Way from K. C.

From Frank M. Faxon, 216 W. 53d St., Kansas City

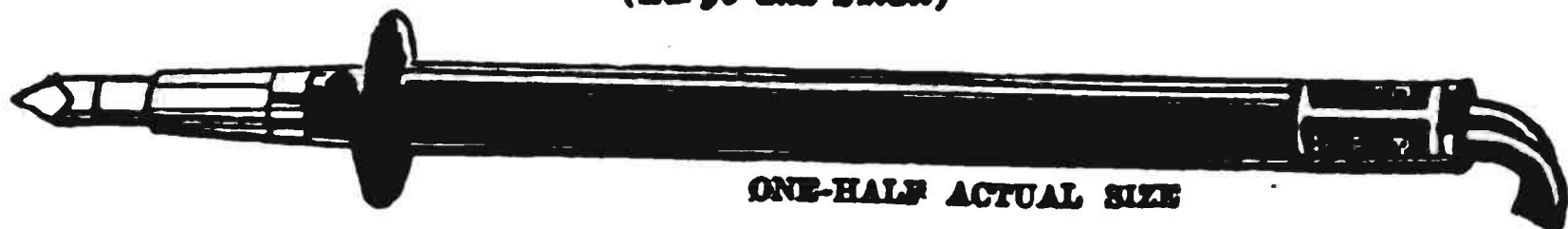
The Sweeney Automobile School in Kansas City, Mo., lays claim to broadcasting records. They started broadcasting at 7:00 p. m. Feb. 1 and broadcast until 7:28½ a. m. Feb. 2. They broadcast continuously for 12 hours and 28½ minutes, and the engineers did not replace tubes or do any work on the set. Chamber of Commerce members spoke and Ted Lewis and his jazz band playing in the "Greenwich Village Follies" entertained. The Radio Bug reigned supreme from 2:00 a. m. to 5:00 a. m. and choir music was furnished by the Central Episcopal Church of Kansas City from 5:00 a. m. till 7:15. The program ended with a short talk by E. J. Sweeney about the Sweeney School.

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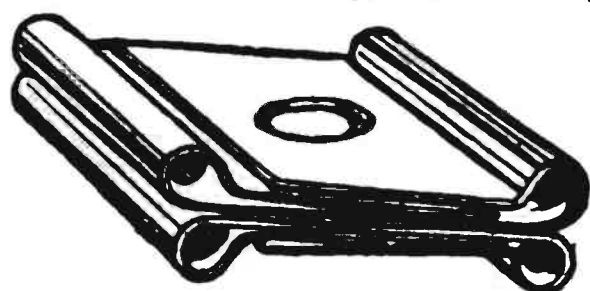
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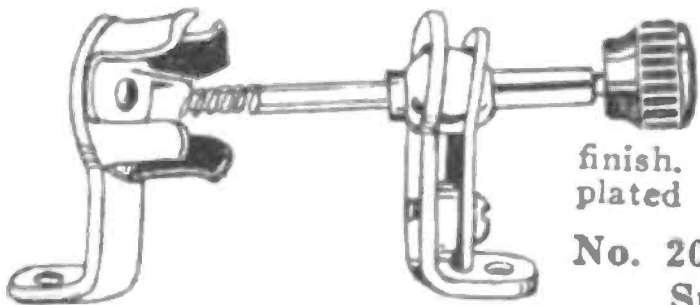


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Special Price, 2 for 5c

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ASSEMBLED

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No. 20 Fixed Condenser, Special 39c each Post Paid



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FROM PUBLICATION OFFICE  
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**Alphabet Tells Use of Battery in Radio Set**

AT one time the various batteries necessary to the operation of a radio set could easily be distinguished by their type, as storage or dry battery. But with the wide use of the dry cell tube with which a dry cell does the work of the storage battery, the use of the letters "A," "B," and "C" is to be recommended.

For no other reason than that some dry cell sets contain instructions directing the owner to attach the 1½-volt dry cell to the filament posts, hundreds of vacuum tubes have had a short but merry life. To the novice a dry cell is a dry cell whether it be one of 22 or 2 volts, and it takes no longer to attach the higher potential battery to the filament binding posts than the bell ringing cell.

The letters A and B were given to batteries in the filament and plate circuit, respectively, for no special reason. Likewise, when it was found that some tubes needed a supplementary battery in the grid circuit to make the tube work at the proper place on the characteristic curve it was only natural that the method of lettering be continued to call the new battery "C."—New York "Globe."

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A model electrical farm to encourage the use of electricity in agriculture is being established near Stockholm, Sweden, and demonstrations of electrically operated plows, harrows, harvesters, threshing machines, churns, separators, etc., will be given.

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"Osagan (via Ignace, Ont.)

"General Electric Co.,  
Radio Station WGY,  
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"Many thanks and greetings—shake!

"On Saturday morning at 10 o'clock, central time, we received a radio receiving set and at 5 o'clock we were listening to your concert at Schenectady, N. Y.

"You will not find us on any map you may have, but we are situated, geographically, on longitude 92 west, and, I think, about 1,100 miles to the northwest of Schenectady. In the morning, we were only a lumber camp on the edge of the Aurora Borealis, and before supper time,

thanks to you and others, we became the centre of the world.

"Your program came through perfectly and was heard in a room 16x20 as clearly as if you and your concert company were with us.

"In the evening after your concert, we were in Minneapolis, Chicago, Denver, St. Louis, Louisville, Davenport, Kansas City, Winnipeg, Regina and Calgary. In fact every place on the face of the North American Continent was contributing to our pleasure, and they were doing it as if it were the greatest pleasure in the world to do so, freely and without stint.

"Sincerely yours,  
"E. Appleton."

## Radio Audience Builds Scenery for Dramas

EVERY listener constructs his own scenery when the WGY Players broadcast their weekly play from the Schenectady radio station of the General Electric Co. and the probabilities are that nearly everyone is seeing the play in a different setting. The listener hears a telegraph key and the lines refer to a railroad station in a small village, as in the case of the first act of "The Traveling Salesman." At once is created in the mind of every fan a picture of a railroad station, and to him all the succeeding action denoted by the voices of the players takes place in the mind-picture of the listener.

In the radio drama only sound "atmosphere" is possible. Telephone bells, closing doors, thunder, an automobile horn, the whistle of a train or the whistle of the wind, the rattle of dishes or the rattle of a typewriter all help to convey pictures to the listeners, and these pictures are made fairly definite by the lines.

Players of radio drama are handicapped by the necessity of conveying all emotion by the voice, by intonation and shading. The real artist of the stage need not utter a word to express emotion; the clinching of the hand or the twisting of a handkerchief are stronger than words.

The radio audience of to-day gets its drama exactly as the blind man formerly "saw" the stage play, entirely through the ears, but supplemented by imagination and experience. Radio drama is the direct opposite of motion pictures; the former depends upon sound, the latter upon sight. It is reasonable to expect that the growing popularity of the radio drama will result in a revival of interest in the spoken drama. After every play presented by WGY Players the studio receives from 800 to 1,000 letters from radio fans, expressing appreciation and enjoyment. It is interesting to note that a great many of these letters come from those who have seen the stage production of the broadcast plays.

## Radio Story Told in Movies

UNSEEN things like radio waves, electrons, electric current and voltage are pictorially presented in a two-reel picture called "The Wizardry of Wireless" just completed by the General Electric Co. The unseen is made visible by means of animated drawings and the result of the 2,000 feet of celluloid is a gripping, interesting and convincing explanation of the fundamentals of radio, the newest and most popular of arts.

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parably reducing trans-

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WHILE listening to a broadcasting station the radio novice, studying the exterior mechanism of the receiving set, usually discovers that he can change music into discordant squeals and squawks by putting his finger against the grid leak or transformer, or merely by passing one hand near some part of the sensitive tuning apparatus, says the New York "Globe." If he seeks an explanation of the phenomenon he is told that "body capacity" causes it. This means, in simple English, that a charge of electricity from the body has entered into the delicately adjusted circuit of the radio apparatus, thereby putting the receiver out of tune.

Such an experience serves to give tangible evidence that the human body is in effect an aerial sharing with the wires of the radio apparatus a capacity to store electricity. In the technical phrase of the radio fan the body, like the wire aerial, has inductance and capacity. It transmits electricity as well as it stores it. It also offers a certain resistance to the passing of an electric current. And since these qualities are essential characteristics of the apparatus with which the radio operator traps the radio waves and brings the message bearing current to his receiver, it follows that the body is virtually an aerial.

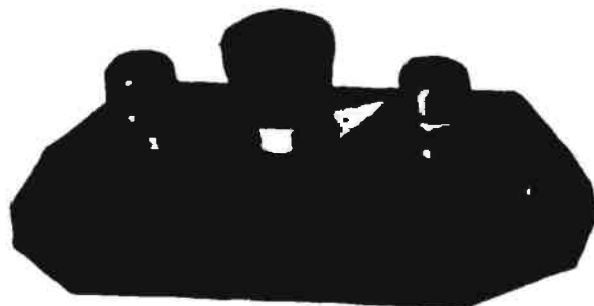
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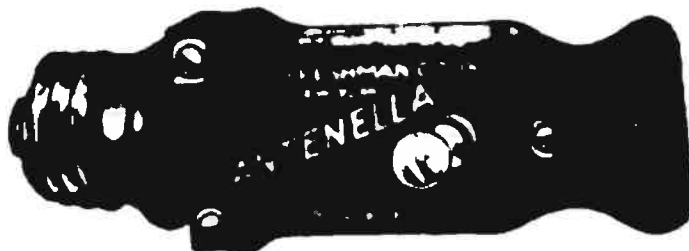
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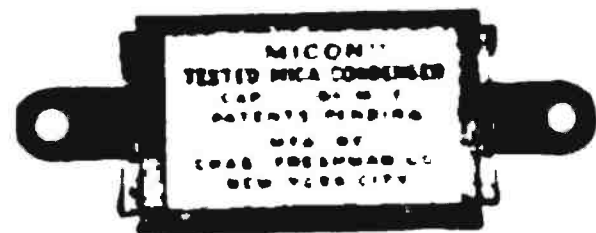
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THE constant reception of WJZ's signals in England makes it unnecessary for the Radio Corporation-Westinghouse Broadcasting Station to run a trans-Atlantic test. This fact became known recently when Geoffrey E. Duveen, Director of the Burndept Ltd., of London visited Station WJZ, and who stated that the signal strength of WJZ is so strong phonograph records can be made of it in the British Isles. Mr. Duveen is a most enthusiastic radio telephonist. He demonstrated the new science in the British Isles by a unique method. He took his fishing rod and a receiving set in his Cadillac Sedan and toured the British Isles. When he came to a large tree he would cast his line over it and then reel in his line until the eight ounce lead would give him a tight line. He then attached his copper wire to the stretched fishing line, drove his Cadillac several hundred yards and tuned in his radio apparatus to catch the music in the sky broadcast from America.

J. H. Redley, a Burndept engineer, was the first Englishman to receive a continuous broadcast from an American broadcasting station, namely an Estey Organ Recital from New York City broadcast by WJZ using remote control wires.

Mr. Duveen, who has been a candidate for Parliament, stated that the British Broadcasting Stations copied after WJZ's programs beginning at 5:30 with Bedtime Stories, followed by news bulletins, weather forecasts, musical and speaking programs.

Upon his return to England, Mr. Duveen will try to arrange a trans-Atlantic test for 2 LO, the Broadcasting Station in London, the test will probably be run in the early part of March at 1:00 A. M., or 7:00 P. M., Eastern Standard Time, WJZ, standing by three nights during this period in order to give the American amateurs an opportunity to hear the first broadcast from the British Isles.

The trans-Atlantic unofficial test requested by the British amateurs was heard in several parts of the British Isles according to Mr. Duveen. The newspaper clippings from English papers that came to the attention of WJZ checked up in detail with the programs broadcast. This unofficial test was also heard in Haiku, on the Island of Maui of the Hawaiian group, or about 100 miles southeast of Honolulu by Jack Costa, who reported hearing the British National Anthem. The report from Haiku brings to light a most unusual program broadcast from WJZ. Wm. D. Ager, the New York representative of Selfridge, through whom the unofficial test was arranged, distributed pencil copies of "God Save the King" to WJZ's announcers and operators. The impromptu chorus was made up of the British Consul General, Groster Armstrong, and his wife and daughter; Milton J. Cross, tenor, announcer AJN; Vaughn de Leath, the "Original Radio Girl," and Thomas Cowan, announcer ACN, a light opera tenor, took high C whenever it was due, while George Bliziotis, Chief Operator, added a slight Greek accent to his bass voice. The chuckle of the special policeman was neutralized by the dialect singing of Alvan Simmons, who is slightly darker in complexion than the Hawaiians. The accompaniment was played by the Black and White Melody Orchestra.

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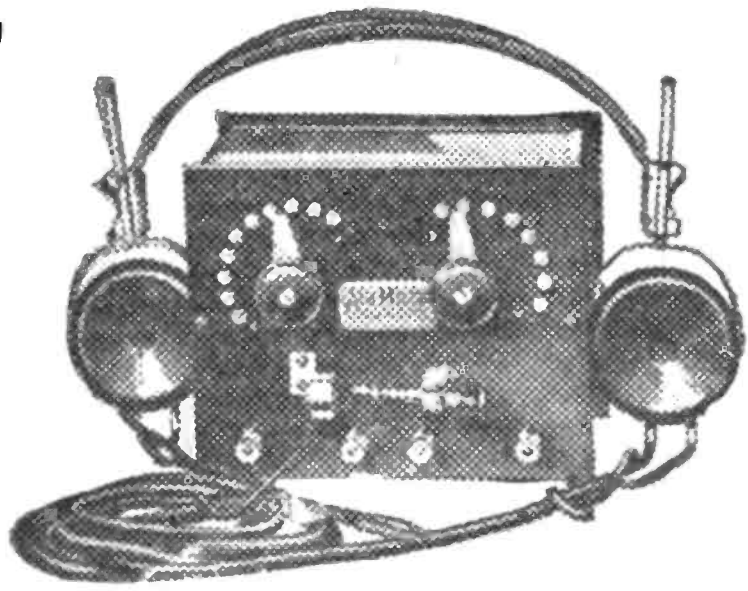
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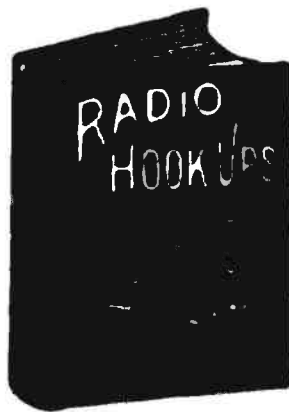
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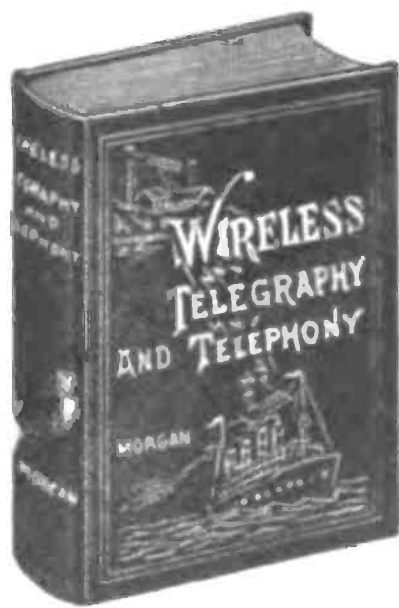
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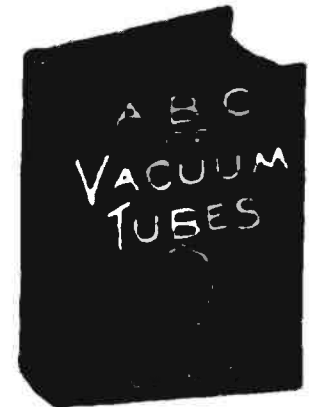


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