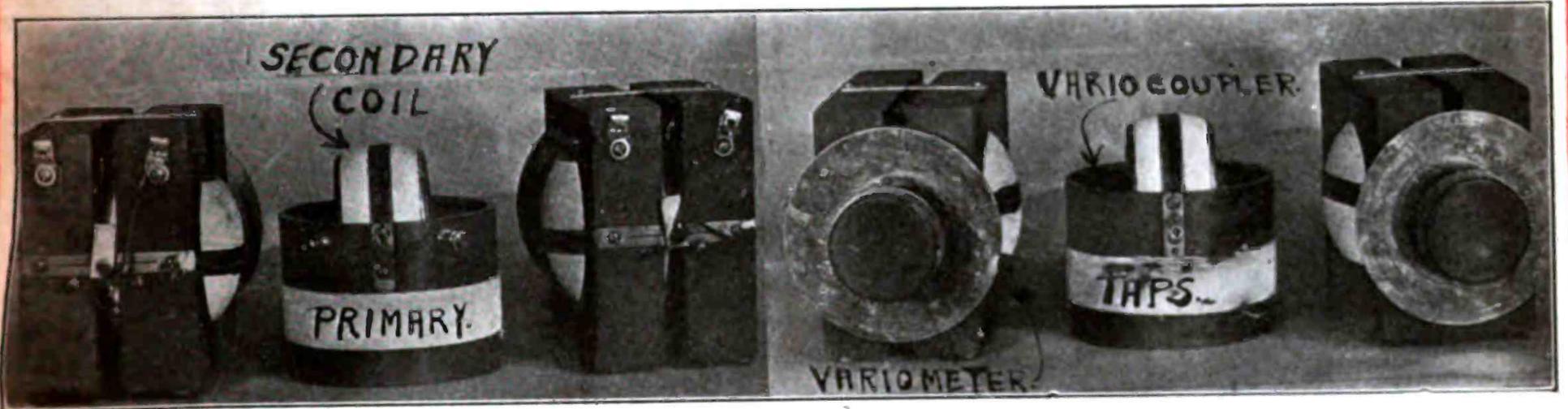


RADIO WORLD

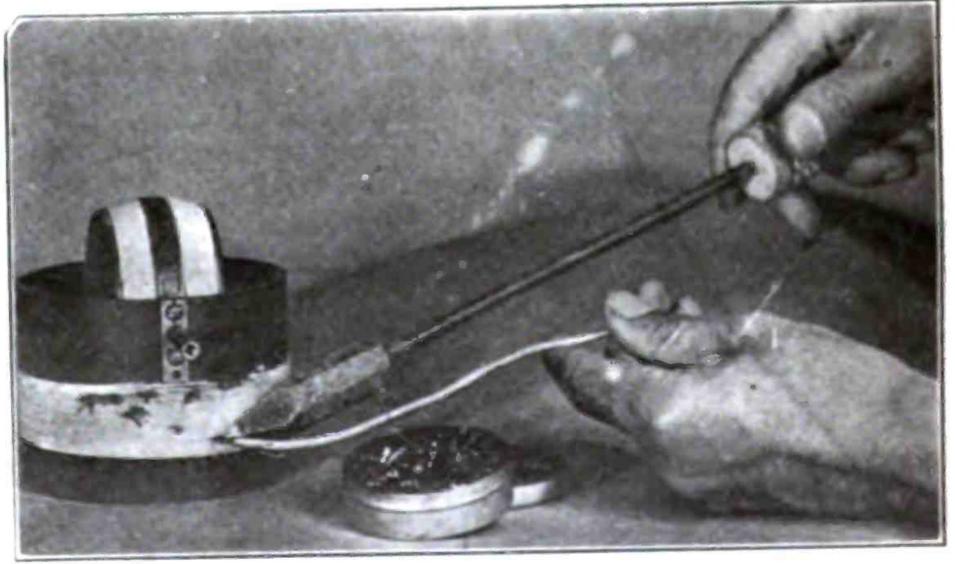
*I L L U S T R A T E D
P U B L I S H E D E V E R Y S E V E N D A Y S*

Necessary Parts for a Short-Wave Receiver

See page 13 for hook-up and description



RADIO has been surrounded by so much mystery that thousands of enthusiasts have been misinformed. The information gathered has led many to expect results from their receiving sets which should not have been anticipated. For this reason, the half-tones herewith presented show the necessary instruments the average amateur will need in making up a short-wave receiver. If assembled correctly this receiver should pick up broadcast matter over a considerable distance. It is the part of a set which makes up the Armstrong regenerative circuit. The upper half-tone shows a back and rear view of the parts needed, such as the two variometers and the tapped variocoupler. The half-tone to the right is that of the variocoupler, showing the method used in soldering the leads of the taps of the primary to the contact points, which are fastened to the outside panel. The regenerative receiver, using such variometers, has come into common use in the reception of both radiophone and radio-telegraph communication, and the added increase in strength of signals makes it possible for this type receiver to catch very weak signals from exceedingly far distances. In other forms of receivers, amplifying tubes are required to increase the loudness of the signals. A common type of regenerative receiver with a complete diagram using



these instruments is published on page 13 of this issue, together with an article entitled, "A Regenerative V.-T. Receiver for Short Waves," by Fred Chas. Ehlert.

**USING THE VARIO-COUPLER IN A SHORT-WAVE
REGENERATIVE SET. By GEORGE W. MAY—SEE PAGE 4**

PHONES FREE

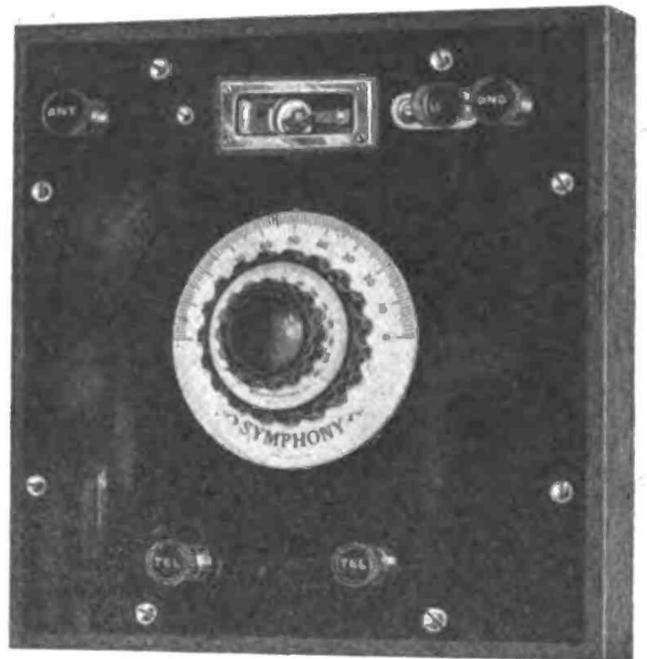
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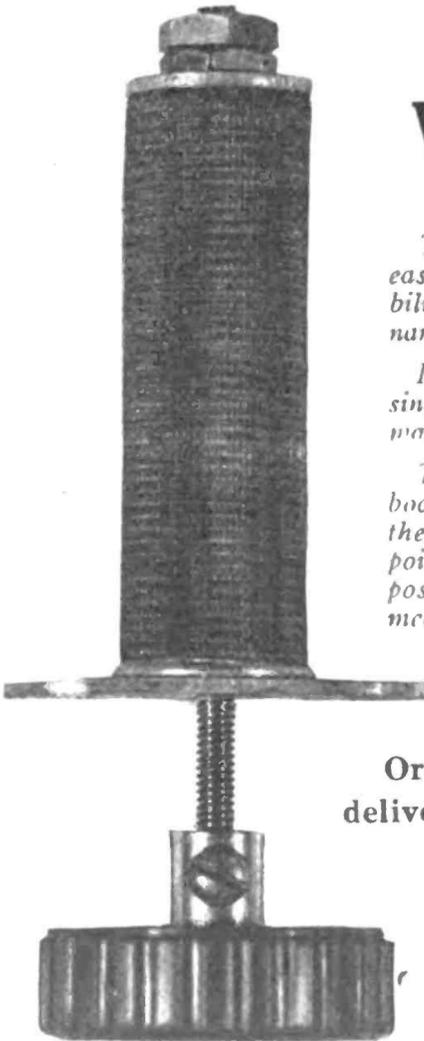


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VOLUME TWO OF RADIO WORLD

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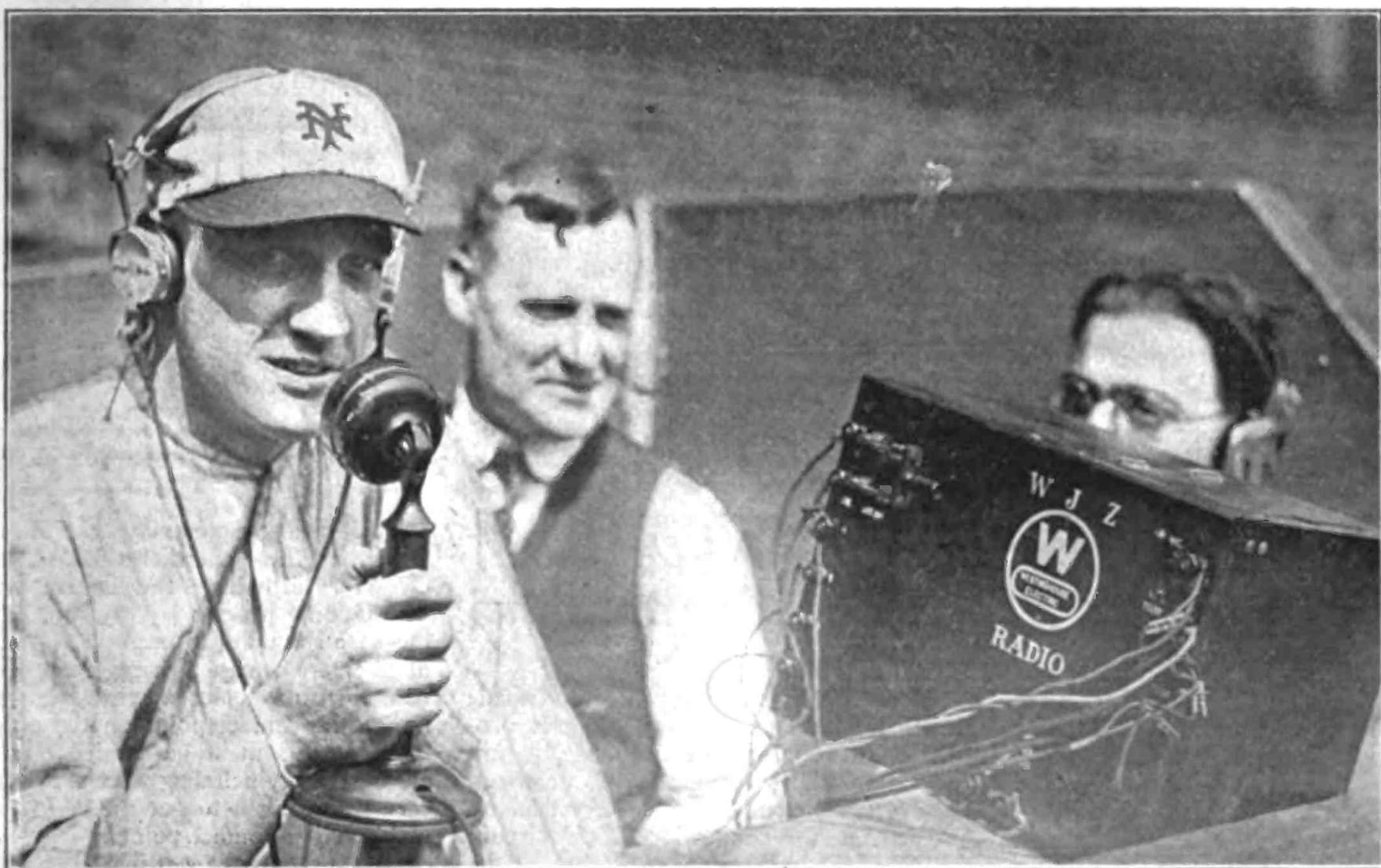
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Radio Adds Interest to World's Series



(C. Underwood & Underwood, N. Y.)

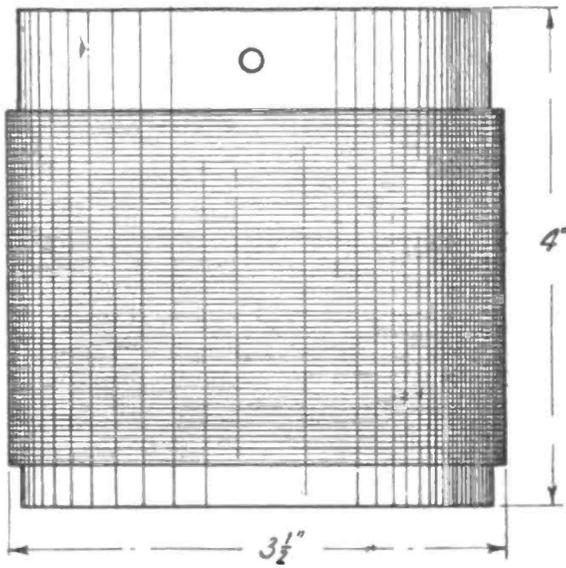
MORE people were in touch with the World's Series, at the Polo Grounds, New York City, this year than ever before in the history of the great American baseball classic—the one sporting event dear to the heart of every citizen. And radio was responsible, because, by radio, the news of each play made was immediately broadcast all over the American continent and far out to sea. Even in out-of-the-way hamlets, where, in other years, people had to await the arrival of a week-old newspaper, the news came through and each play was described almost as quickly as it was made. In the upper half-tone you will see George Kelly, first baseman of the Giants, trying out the transmitter by which the news was sent to WJZ, Newark, to be broadcast. The lower half-tone is a splendid view of the radio section of the press box, showing the baseball expert writer, and radio operator at work. A notable radio service was conducted by Grantland Rice, baseball expert of "The Tribune," New York. Through his paper, the games were broadcast, and, it is reported, the news was picked up as far north as Quebec. Though the weather was unusually warm for October, many feared that there would be an unusual amount of static interference; but, from all reports, the broadcasting came through unusually clear. WJZ has received many letters attesting this. It is reported that next season the Polo Grounds will be equipped with its own transmitting apparatus.



(C. Fotograms, N. Y.)

Using the Vario-coupler in a Short-Wave Regenerative Set

By George W. May, R. E.



Primary of the Vario-Coupler.

FOR receiving short-wave lengths up to 600 meters, the circuit employing the grid and plate variometers is the most popular. This circuit has been in use for a long time. Such a set will be found in nearly every amateur station. To the novice the different circuits used at present are more or less confusing, and it is hard to pick out the most satisfactory. For best results on most wave lengths, duo-lateral coils are hard to beat; but the set described in this article is best for short-wave lengths. For broadcasting, as it is operated at present, this circuit cannot be surpassed.

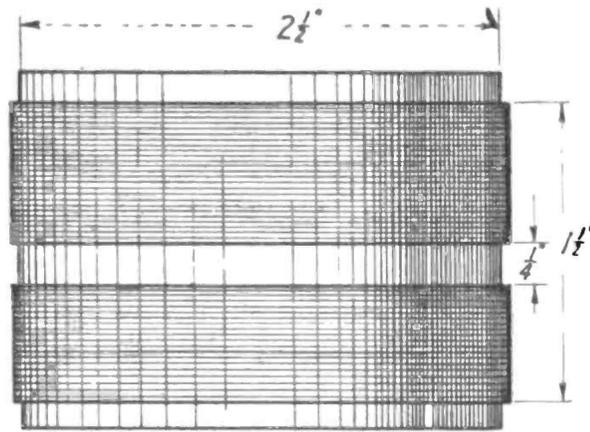
The parts may be purchased or may be built at home. Two variometers will be needed, also a vario-coupler. As variometers are cheap enough to buy we will only describe the making of the coupler and the wiring of the set.

The inductive tuner used in short-wave regenerative sets is sometimes called the vario-coupler. The distinctive features of the vario-coupler are the use of the rotor for the secondary, which is placed in the field of the primary, and the use of the untapped secondary-winding. The rotor, which is frequently in the shape of a ball, is made to revolve through 90 degrees to change the coupling between the primary and the secondary circuits.

The primary of the vario-coupler is made of a tube, or cardboard, about 3 1/2 inches long and about 4 inches high. It is then wound with about 64 turns of No. 22 double cotton-covered wire in one layer. The winding is tapped every 10th turn starting from 1, 10, 20, 30, 40, 50, and then every 2 turns thereafter. This will give a tap for every 10 turns and every 2 turns. Thus there are 5 ten-

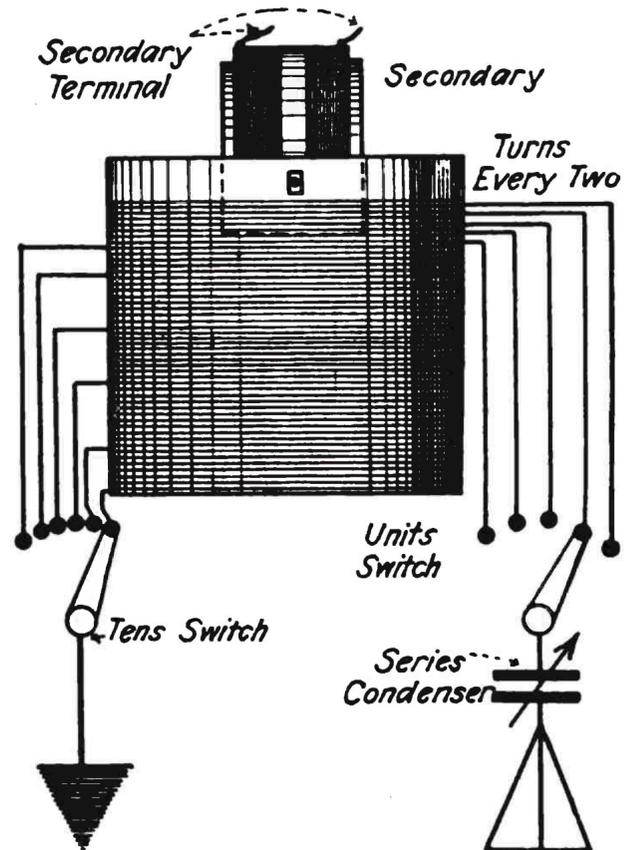
turns and 7 unit turns. The tapping wants to be diagonal along the tube to prevent short circuiting. It will be easier to make the connections of the primary to the taps on the panel. A 1/4-inch hole is drilled about the secondary shaft-bearing. It should be 1/2-inch from the top, in such manner that it will be concentric to the primary and not rub against the sides.

The secondary consists of a piece of tubing about 1 1/2 inches long and of such diameter as to allow it to rotate freely within the primary tube. A piece of tubing about 2 1/2 inches long will do. It is wound with about 52 turns of No. 24 double cotton-covered wire in 2 equal sections separated by about 1/4 inch. A 1/4-inch shaft is



Secondary of the Vario-Coupler.

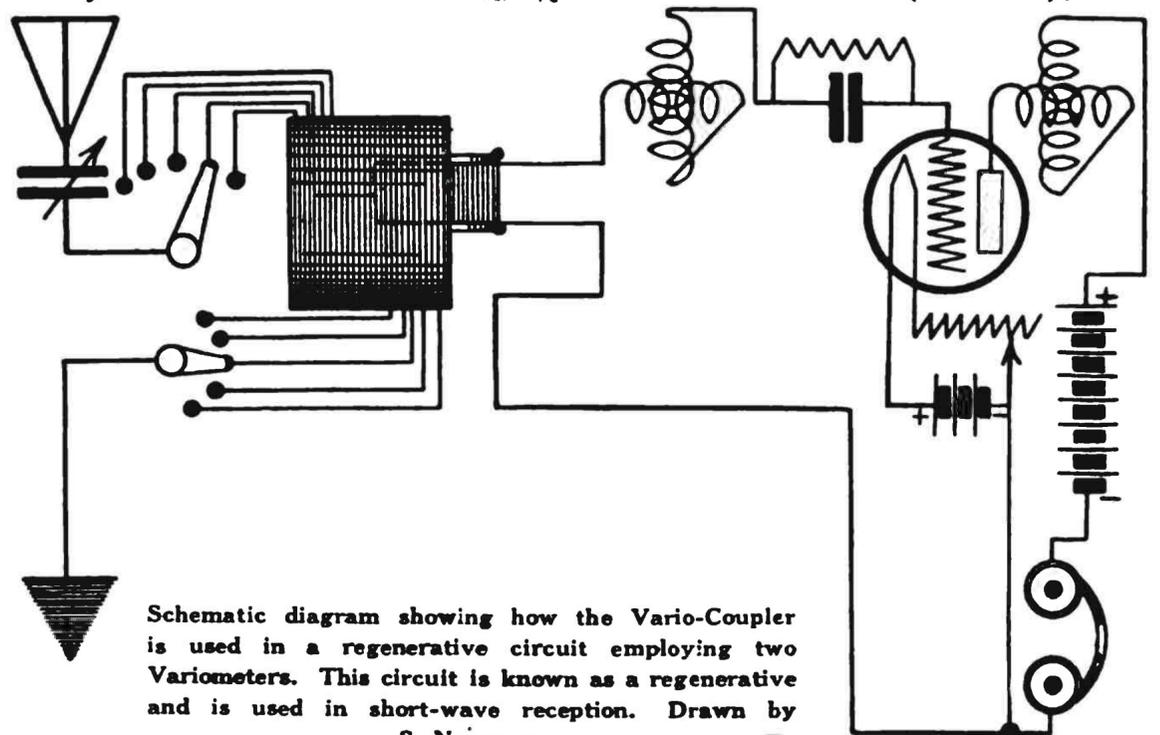
fitted to the secondary tube and made fast with lock nuts. The shaft projects through a hole and made to turn freely. Two flexible cords, or wires, are fastened to the secondary leads to provide for connection in the circuit. Enough slack must be allowed so the coil can rotate without injury of breaking the windings or leads from the secondary.



Schematic diagram of the top of the primary of the Vario-Coupler, Ground and Aerial connection.

This vario-coupler may be mounted on a bakelite panel with knobs and taps for adjusting the instruments. The tapping process is very simple, as the wire is wound to keep track of the number of turns. Bring each 10th turn out and solder a wire from the tap to the contact point on the panel. This process must be carried out on all the taps, including the unit taps, care being taken to get the right taps on the right contact points.

In wiring up the set, what is needed first is a piece of bakelite panel, two variometers, one grid leak and condenser, one tube (detector), one B-



Schematic diagram showing how the Vario-Coupler is used in a regenerative circuit employing two Variometers. This circuit is known as a regenerative and is used in short-wave reception. Drawn by S. Newman.

First Alaska Broadcaster Is WLAY

13 Class A Stations and 11 of the New Class B Stations Makes Grand Total of 534

By Carl H. Butman

THIRTEEN regular broadcasting licenses, now known as Class "A," were issued by the Department of Commerce during the week which ended September 30. Among them is the license for the first broadcasting station in Alaska, WLAY. This is the station of the Northern Commercial Company, located at Fairbanks, nearly in the center of that territory. It will broadcast a program of entertainment for the benefit of those living within a radius of about 500 miles.

The following are the Class A stations in this issue:

WLAV—Electric Shop, Inc., Pensacola, Fla.

WNAF—Enid Radio Distributing Co., Enid, Okla.

WOAA—Dr. Walter Hardy, Ardmore, Okla.

WLAZ—Hutton & Jones Electric Co., Warren, Ohio.

WOAE—Medland College, Fremont, Neb.

WLAY—Northern Commercial Company of Alaska, Fairbanks, Alaska.

WMAK—Norton Laboratories, Lockport, N. Y.

WNAD—Oklahoma Radio Eng. Co., Norman, Okla.

WNAB—Park City Daily News, Bowling Green, Ky.

WMAL—Trenton Hardware Co., Trenton, N. J.

WMAP—Utility Battery Service, Easton, Pa.

WLAW—New York Police Department, New York City.

WNAH—Wilkes Barre Radio Repair Shop, Wilkes Barre, Pa.

During the week which ended September 30, the Department of Commerce licensed 11 broadcasting stations in the new Class "B." This is the first issuance of the new licenses to the superbroadcasters, and celebrates the licensing of the first broadcasters a year ago. All of the stations licensed under the new regulations are old ones which have been listed under limited commercial stations engaged in broadcasting for some time. They comprise large stations which have qualified with the rigid requirements of the department and are now entitled to use the special 400-meter wave length assigned exclusively to these stations. Only high-class entertainment will be carried; mechanical music is forbidden. The stations

which remains in Class A, over 500, are permitted to broadcast "canned" music if they desire.

Among the B stations are the well-known calls of Westinghouse, General Electric, Western Electric, the A. T. & T. Company, and such papers as the "Detroit News," "St. Louis Post Dispatch" and "Dallas News."

The first Class B list follows:

WFAA—A. H. Belo & Co., "Dallas News," Dallas, Texas.

WBAY—American Telephone & Telegraph Co., New York.

WOR—Bamberger, L. & Co., Newark, N. J.

WWJ—Evening News Association, "Detroit News," Detroit, Mich.

WGY—General Electric Co., Schenectady, N. Y.

KSD—Pulitzer Publishing Co., St. Louis, Mo.

WHAZ—Rensselaer Polytechnic Institute, Troy, N. Y.

WOO—John Wanamaker, Philadelphia, Pa.

WEAF—Western Electric Co., York.

KYW—Westinghouse Electric and Mfg. Co., Chicago.

WCX—"Detroit Free Press," Detroit, Mich.

The grand total is now 534.

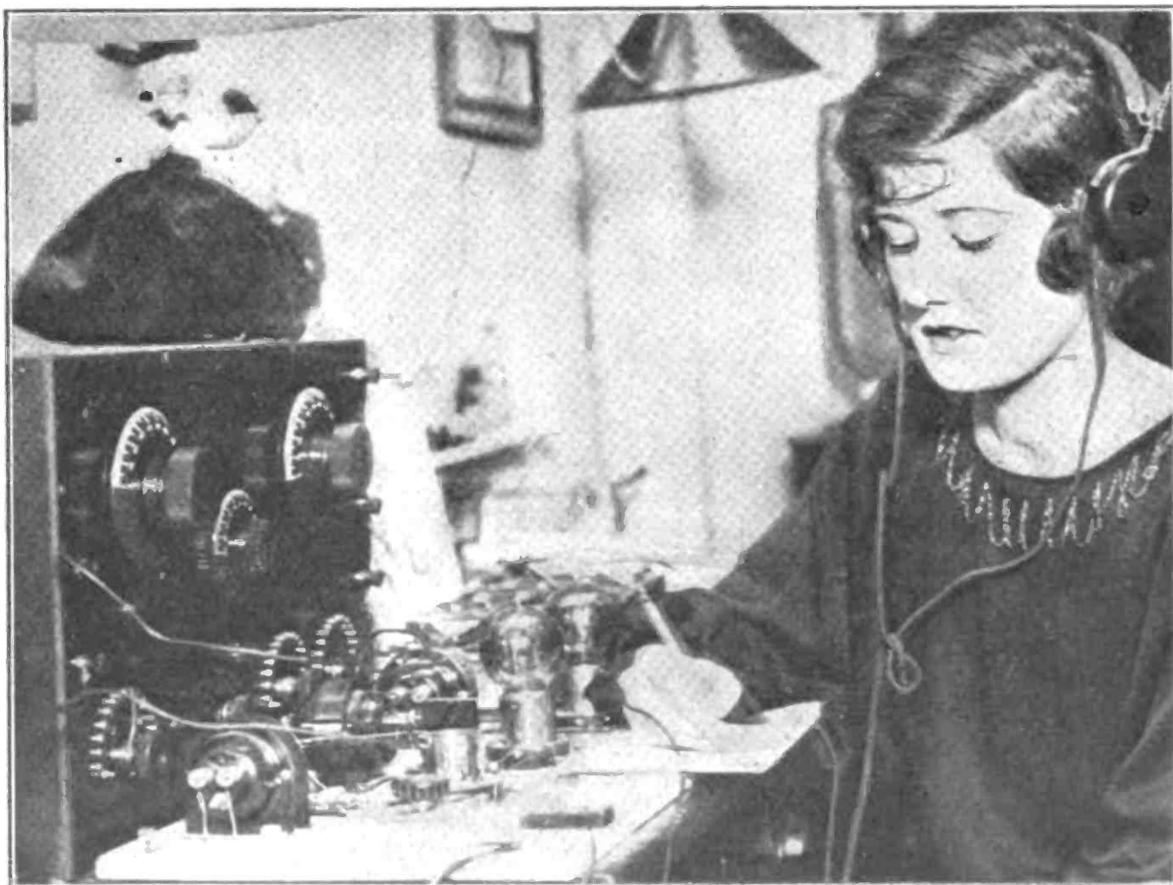
(Continued from preceding page)

battery (22 volts variable), one pair telephones, one storage battery, aerial and ground. The accompanying diagram shows the internal wiring of the set and should be so wired. One variometer is placed in the grid circuit and the other in the plate circuit. Arrange the panel in such a way that the tube, socket, and rheostat are located in one end and the vario-coupler in the middle, with the variometers, one on each side. Before attaching any of the wires, lay out the work carefully. Be particularly careful to keep all the wires as short as possible. Remember that every bit of wire added makes just so much more resistance to the set and will cut down the signal strength.

The lead wires from the primary taps to the contact taps on the panel should be covered with "spaghetti." This prevents howling and squealing if amplifiers should be added to the set.

By doing this it will also lessen the danger of getting the B-battery through the filament by short circuit from some of these wires.

"Two on the Aisle!" by Radio

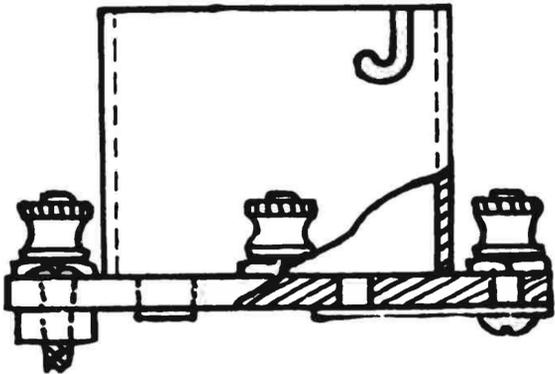


(C. Central News Photo Service)

Miss Lillian MacKenzie in the box office of the Globe Theatre, New York, where radio has been installed and reservations may be made by means of the receiving set. Passengers on incoming liners can comfortably engage seats for their first evening on Broadway, and isolated subscribers may reserve tickets with ease.

Neat Home-Made Tube Socket

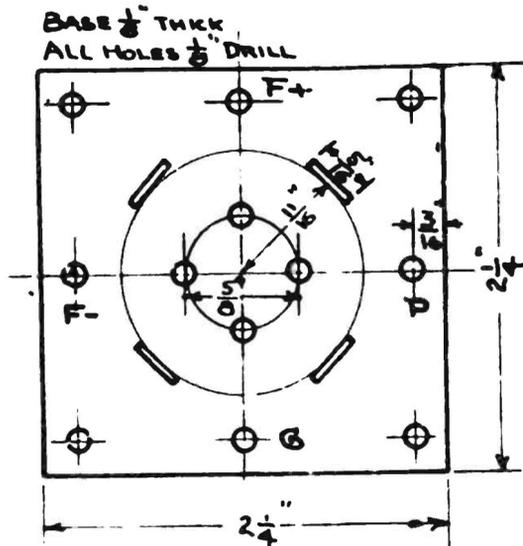
By Gordon S. Arthur



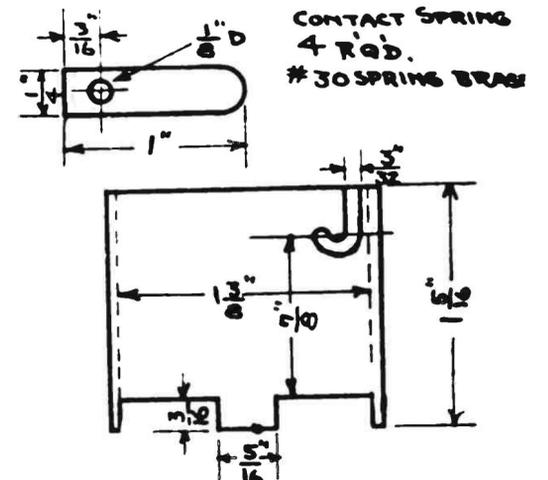
Assembly drawing (full size) emphasizing the neatness and compactness of this socket.

It happens frequently that defects in tube sockets drive many amateurs to making their own. Sometimes porcelain sockets crack and break, while bakelite, or hard rubber, softens and gets out of shape when subjected to the heat of C-W transmission. The drawings accompanying this article show the detailed construction of a neat and compact tube-socket. It has been made and operated successfully. The dimensions given provide sufficient clearance between the binding posts and the socket to prevent short circuits. Many amateurs may wish to enlarge the base so that there will be more room for making connections. This, of course, is permissible since it does not effect the important dimensions of fitting the tube base into the socket.

The cylindrical tubing that forms the upright of the complete socket may be of brass, aluminum, or any other metal that may be available.



BASE



SOCKET

Scale drawings for making tube socket described in this article.

It should be about 1/16 of an inch thick and 1 and 13/32 inside diameter. The contact fingers, of which 4 are required, must be of thin spring brass and cut accurately to dimensions. The base may be of hard wood, fiber, bakelite, hard rub-

ber, or any other insulator. Make it about 1/8 inch thick. The position of the slot in the tube must be so effected that when the bulb is in place the 4 little projecting lugs on the base of the bulb make contact with the proper contact-spring.

Radio Facts

THE reason that dials cannot be calibrated on wave lengths is because different users have to erect different types of aerials of different lengths, and all this affects the tuning of the receiver.

Always remember that when there is more than one tuned circuit, each circuit must be equally tuned to secure resonance or equilibrium. Many who have receiving sets containing two or more circuits simply put a loading coil in the primary circuit and then wonder why they do not get results.

A vacuum-tube receiver is not necessary to obtain the time service of Arlington. A crystal detector, especially a piece of galena, will pick the signals up several hundred miles distant from Washington.

To understand the language of high-powered Hertzian waves it is necessary for the operator to be familiar with the code. The radio alphabet can best be mastered by practicing on some instrument which will emit dots and dashes similar to those formed by the regular radio transmitter.

With the Radio Cartoonists



WHY BOYS STAY ON THE FARM
(Thomas, in the Detroit "News")



MANDY SPOILS A GOOD JAZZ CONCERT
(Washington "Star")

Crystals May Yet Be Best for Receiving

RADIO is now in a stage where owners of sets are not satisfied with some of the local broadcasting, but are diligently moving their dials and adding more equipment in hope of bringing in the so-called long-distance broadcasting stations. More often, the only portions that are heard are the call letters and the signing-off data. But what else goes with this tuning may be mentioned only by the owner himself, with its hissing, howling, and rearrangement of batteries and connections.

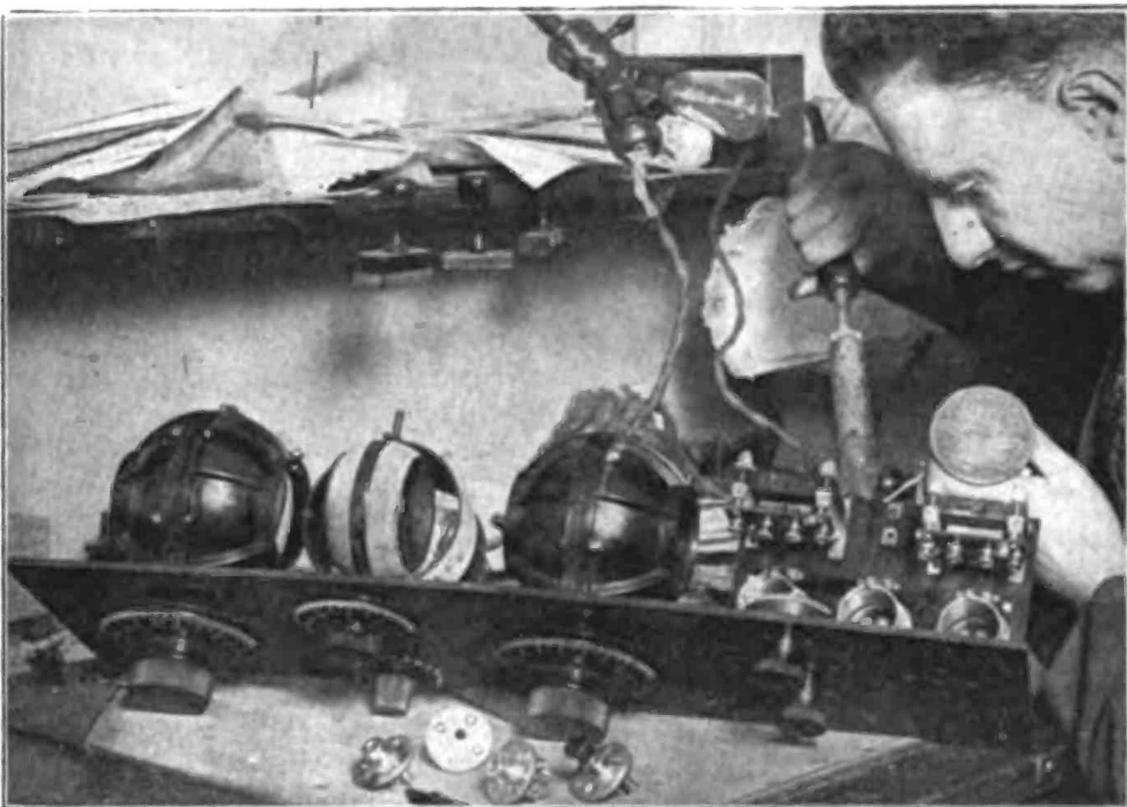
Radio this year is in the same condition as last, particularly in regard to creating long-distance reception of phone. Being a new instrument, we have realized its delights and enjoyed the entertainment it has produced; and as soon as fans learn that the long-distance records are being accomplished by most everyone, the idea will soon fall by the wayside. When this happens, the crystal-detector sets will either be used alone or in conjunction with the vacuum-tube amplifiers as a means of amplification. It may be said that a crystal is the only detecting device that will receive the phone without distortion during its action. Whatever the sounds may be, instrumental or vocal, the crystal does not become paralyzed or get out of order. A good crystal-detector once set works alone, unaided by batteries.

Crystal sets have a range from 25 to 30 miles to depend on. If the radio-broadcasting stations are to remain where they are for some months to come, every receiving set will be within range of one of them.

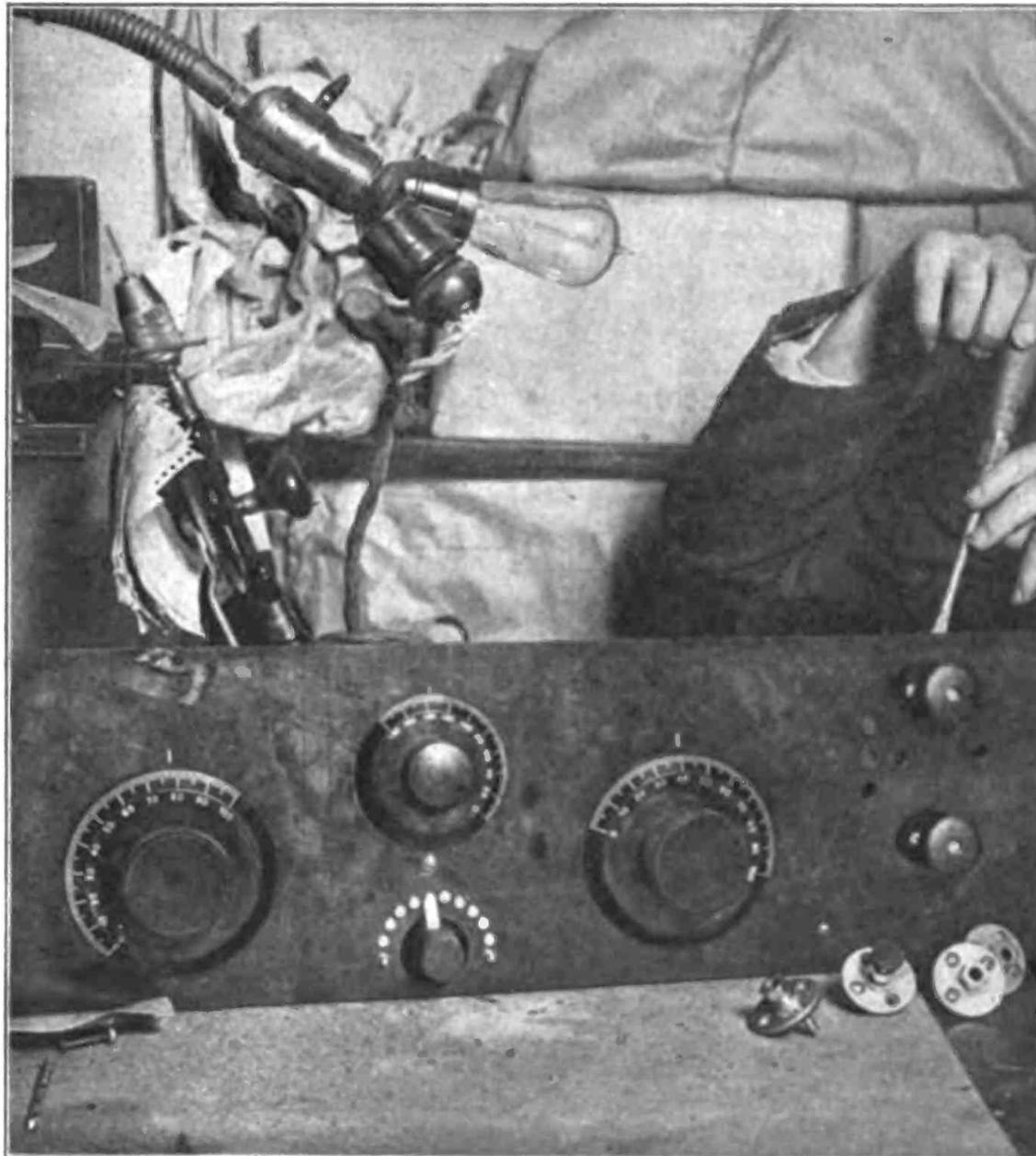
Radio Knowledge Greater Than Instinct

NO less an authority than Dr. C. P. Steinmetz, America's foremost scientist, stated these facts recently in a public address, and gave it as his opinion that an antenna was a safeguard rather than a liability in case of electrical storms. Those of you who feel timid when storms are in the vicinity might well remember that Dr. Steinmetz' *knowledge* is more likely to be correct than your *instinct*. Even if these other stations are on exactly the same wave length as the one you are hearing, they will cause no signal at all to be received. You see, of course, that in localities where there are many stations, this ability to select to some extent the station you want to hear may be very useful.

This Long-distance Regenerative Set Was Made for \$27.80



(Both photographs C. Kadel & Herbert News Photos.)



With the many types of receiving sets now on the market, it would be impossible to give precise directions regarding the building and operation of each. However, vacuum-tube receiving sets come under a general head, so that broad instructions on each class are certain to fit each individual case with due allowance for the peculiarities of each particular set. The use of the regenerative arrangement complicates the operation of a set not a little; but it also makes for louder signals that could not be obtained with a simple circuit. Regeneration is obtained by either the tickler coil or by a grid and plate variometer. Such a set is shown in the above half-tones. The upper half-tone is from a photograph of Mr. Samuel Lebowitz, working on a set that he constructed for only \$27.80. He is shown making some soldering connections on his amplifier section. Note the two variometers with the variocoupler in the center of the photograph. The half-tone at the bottom is the front of the panel.

Vessels Now Guided Through Fog by New System of Radiotelegraphy

By Ortherus Gordon

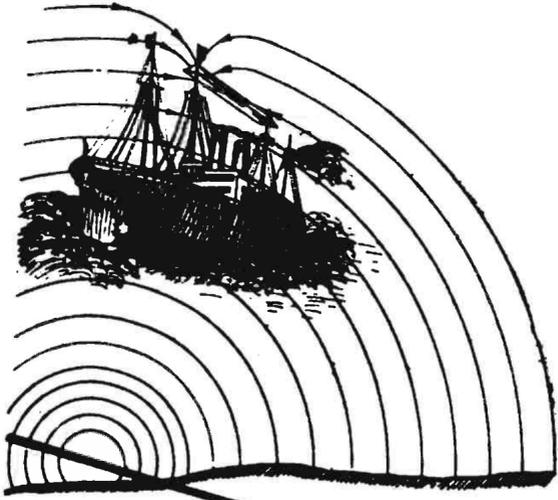


Figure 1.—When a ship is directly over the radio-piloting cable, the waves strike both collector coils with the same force and effect. The slanting line is the cable from Fort Lafayette to Ambrose Lightship. Drawn by S. Newman.

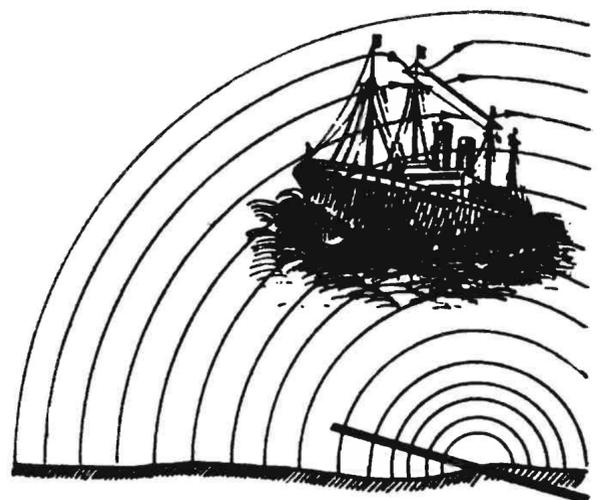


Figure 2.—When a ship is out of the channel and off her course, the collector coils on the side furthest from the cable receive little or no excitement; while the other one gets an overdose. The difference in intensity warns the helmsman, who brings the ship back on her course. The slanting line is the cable from Fort Lafayette to Ambrose Channel Lightship. Drawn by S. Newman.

FOR more than two years, the aids to navigation on the surface of the Ambrose Channel fairway, in the harbor of New York, have been supplemented by a radio-piloting cable. It is submerged and in construction is similar to trans-Atlantic cables, excepting that it is thinner and has only a moderate number of strands. It follows the course of the ship channel for twenty miles, from Fort Lafayette at the Narrows to the outer buoy near Ambrose Lightship; and this fact, together with its name, "radio-piloting cable," gives some indication of the purpose for which it was designed and laid.

Having perfected a system of radio-compass stations whereby a ship approaching any port on the Atlantic or Pacific seaboard, in a fog, may safely pick up the light vessel, or buoy, at the harbor's entrance, the United States Navy Department turned its attention to continuing that service right up the bays and into the basins or docks. It was not enough that a ship should be guided to the outer entrance of the harbor. That ended her navigational difficulties, to be sure; but it did not get the vessel to a dock, where her passengers and valuable cargo might be discharged. It often happened that all the time saved in making the channel entrance by means of the radio compass was lost in waiting for fog to lift so that the ship might proceed up the harbor to the docks. Time is valuable where steamships are concerned. Delay means not a few hundred dollars a day, but thousands of dollars an hour, according to the size of the ship and the demand for her services.

Perhaps the success of the submarine-signalling devices now employed on all vessels suggested the use of a submerged piloting-cable. By means

of two microphones placed in a vessel's forward hold, below the waterline and on the outer shell of the ship on each side, the navigator in the chartroom with headphones on, can hear the distinctive underwater signals of certain lighthouses, sometimes for as much as fifteen miles. Not only that, but by switching from one microphone to the other, he could determine the direction from which the sound waves were coming and steer his ship accordingly.

This is the successful principle of submarine, or submerged, signaling. A device placed at strategic points for transmitting sound waves, and the ship has "ears" to catch them. Why not an electrified cable along the channel course, with suitable ears on the ship for detecting the impulses sent out by that cable?

The suggestion was seized upon and carried out. Experimenting took place at New London, Connecticut, and the project declared practicable. At once the Navy Department proceeded to larger experimentation in New York Harbor. The cable was laid and the tug, "Algorma," fitted with "collector coils" which were to serve as "ears." The inner end of the cable was brought into Fort Lafayette and attached to the apparatus for producing the buzzer impulses sent out on this new form of transmitter. A flow of three amperes was found ample for practical purposes.

On board the ship, the collector coils were placed on each side of the vessel at an equal distance from the 'midship lines. They consisted of from 400 to 800 turns of insulated wire, it having been demonstrated in the preliminary tests that the number of turns directly affected the audibility of the signals received. There must be a rigid sameness about the coils, and all wires leading to and from them must be identically placed in relation to the central position of the headphones. In other words, the effective electrical constant must be the same. On this depends the accuracy with which the path of the submerged cable may be followed, since the guiding instinct is derived from comparing the strength of the signals as caught by the extended ears.

If a tuner is used; that is, if the collector coils are employed as antennas and supplemented by a resonance receiving-circuit, the efficiency of the outfit is increased a thousandfold. For such work as this system will be called upon to perform for the present, tuned circuits, while desirable, are not necessary.

The ears may be placed above or under water—no difference is noted in the result. It is probable that they will eventually take their place in the bows of the vessel, alongside the microphones of the submarine bell and whistling device. In that position they will reduce to a minimum the distortion due to the shielding effect of the ship's hull.

In the pilot house, the radio helmsman stands at the wheel, headphones on his ears. The left ear-piece is connected with the coil and circuit on the port side of the vessel; the right is connected with that of the starboard side. The man who actually steers the vessel may be an "old salt" unacquainted with the mysteries of wireless, or a high-strung radio engineer with little or no knowledge of ships. If he can hear, and has intelligence enough to distinguish between varying sound intensities, then he can guide a vessel along the path of the radio cable without training or experience. All he must do is to keep the "hum" in his left ear equal to that in his right. He might be blinded, and the bridge blanked off by canvas screens, yet the ship would faithfully make her way through the fog which hangs between her and a journey's end.

To one familiar with the elementary theories of radiotelegraphy, the principle upon which the success of the cable depends is readily understandable. The Hertzian waves emanate from the cable in concentric circles, growing larger and larger as they move away from it. A ship directly over the cable, as in Figure 1, cuts these waves into exact halves, so that the "collector coils" on either side of

What Makes the Radio Receiver Work

By Donald Van Wyck

WIRELESS receivers are made in various forms and designated as single, bi-polar, and watch-case. In radio the watch-case receiver is used exclusively. Usually two of these receivers are placed on a head band and made to fit the head. The complete article is termed a head set. As these head phones, or receivers, must respond to very weak signals they must be made with very light diaphragms and wound with copper wire. Now, if the cap of the receiver is unscrewed, a thin piece of metal, known as the diaphragm, will be noticed. It is held by magnetism. This diaphragm may be taken off; but be careful not to bend it. Under the metal diaphragm are usually two electromagnets, or permanent magnets, with steel cores. On these magnets are wound many turns of copper wire. Both ends of the magnets are termed "poles." One is the north pole; the other, the south pole. The names are used so any person may understand the direction in which the respective poles would be attracted if the magnet were free to swing like a magnetic compass. If a piece of iron is brought into proximity with these poles, it will be attracted. Whenever current passes through such a coil, it becomes a magnet and attracts pieces of iron. The fact that the magnetic pull is present only when the current is on makes the device a very useful one for changing electrical energy into mechanical energy. These coils are seen everywhere in electricity—in door bells, relays, alarms, and telegraph sounders used in telegraph offices.

In the telephone receiver, these magnets are mounted, one each, on the ends of the permanent steel-magnets. With this arrangement, the magnetism from the permanent magnets is carried up through the iron in the coils so that

(Continued from preceding page)

the vessel receive signals of equal strength. This is the navigating position of the vessel, and the one continually sought for as the ship veers from side to side.

As this veering there is a noticeable increase in the strength of the signals in one ear-piece and a corresponding decrease in the other. A slight shift of the helm and the condition is corrected. Thus, in the thickest of harbor fogs, or in heavy rain or in blinding snow, American ports will present a safe entrance to vessels equipped with "ears," the installation of which costs less than a thousand dollars.

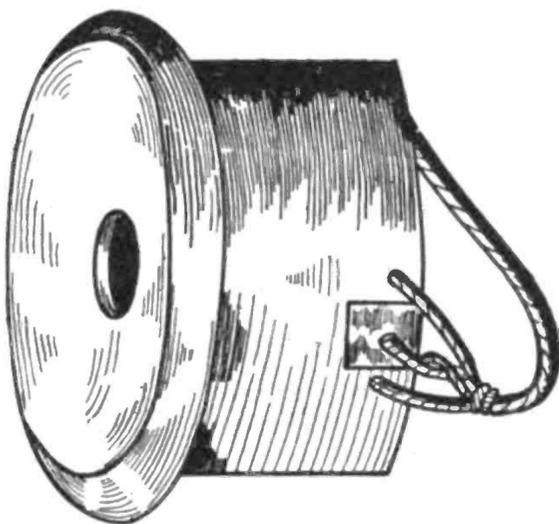


Diagram showing the watch-case receiver. This type of receiver is used exclusively in radio. It is small, light and durable.

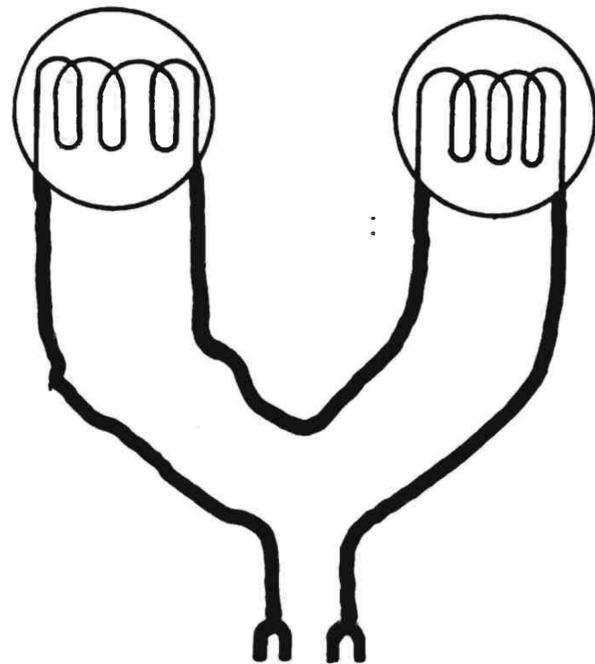
the thin sheets of iron, or the diaphragm, is attracted. When the feeble radio-currents arrive at the telephone receiver, all the energy is used in magnifying the attraction that the magnet exerts on the diaphragm. This diaphragm is an exceedingly sensitive piece of telephone mechanism. It takes very little energy to move it. Telephone receivers will not operate when alternating current is used. The current moving in one direction would neutralize the current moving in the opposite direction, and there would be no vibration of the diaphragm. Therefore, the ether waves, or radio waves, which are alternating current must be changed by means of the crystal or vacuum tubes when used as detectors.

Receivers look more or less alike to a beginner; but there is a vast difference between them, especially on the inside. A receiver, to really work right, should be wound with copper wire; but the sole idea, or principle, of the receiver hinges on the fact that there must be many turns of wire very close to the iron core. Receivers are usually rated by their resistance; but this method is entirely wrong. The easiest way to rate receivers is by the resistance of the wire used; but a great mistake is made when this is done, as this resistance is detrimental to the telephones. What is expected from a telephone receiver is the number of turns, or ampere turns, with the least amount of resistance. To get this resistance, a larger size of wire could be used; but when this is done, it will be found that, owing to the thickness of the wire and the distance from the poles, the resistance will increase, thereby lowering the efficiency of the phones.

But this is absolutely contrary to correct receiver design. As the receiver has the resistance, it lacks the number of turns and, actually, less

wire is used. This will give the receiver less efficiency in its work, as the high resistance will deaden the signals. Each receiver will have a total resistance of 1,000 ohms. The two receivers in series will have a combined resistance through which a current of 2,000 ohms must pass. It does not pay to go much higher than the 2200-ohm receiver. It is far better to secure the extra value in getting the very best mechanical design. As the wire used in receivers is very fine, great care must be exercised, when the receiver is open, not to touch and break these fine wires where they connect to the binding posts located inside the receiver.

Another thing in a receiver that may be greatly improved upon is the diaphragm. It is evident that if the diaphragm is to give out sound, it must be able to vibrate freely. Some of the trouble with receiver diaphragms is



How two receivers are connected and how the electro-magnets appear inside the receiver.

due to the fact that they have not sufficient clearance from the pole pieces, making them inoperative. When this is evident, tighten a little on the cap and notice the result. If no change is noticed, then remove the cap, reverse the diaphragm, and then rest the receiver.

If the diaphragm does not clear the pole pieces, a paper washer may be used. The washer is inserted between the base of the receiver and the diaphragm. The iron diaphragm is held in position by means of the cover and the action of the poles. Should a current pass through the coils of the bobbins, the pull of the poles on the diaphragm will be varied. This variation causes the vibration of the diaphragm and, consequently, produces sound. This is satisfactory in most cases.

Plate Voltage an Important Element of V-T Transmitters

By John Kent

ONE of the most essential parts of any radio transmitter is the correct high-plate voltage applied to the plates of the vacuum tube. A very good plan to follow in the construction of any type set, is to design the apparatus so that it will work efficiently with as few pieces of apparatus as possible; and yet, parts may be added from time to time that will improve the set in general and not put on the builder too great a financial stress. A simple vacuum-tube transmitter is no more complicated than the average regenerative receiver, which it resembles. A simple vacuum-tube transmitter making use of the standard parts and utilizing the B batteries for high-plate voltage may be assembled easily in any radio amateur's workshop.

The parts needed for a small transmitter consist of an inductance—which is used as the inductance for the antenna as well as for the grid—plate coupling-coils of a vacuum tube and its controls; a variable condenser; a means of modulating the currents generated by the oscillator of a high voltage

source for the plate circuit and a microphone.

For the plate voltage, ordinary B batteries may be used. However, use batteries that have a variable voltage from 22 to 500 volts. This will enable the operator to cut in just the amount of power needed for the plates of the tubes.

The ordinary flashlight cells will not work so well, because there will be quite a call on the battery and, of course, these batteries will not hold up and will have to be renewed frequently.

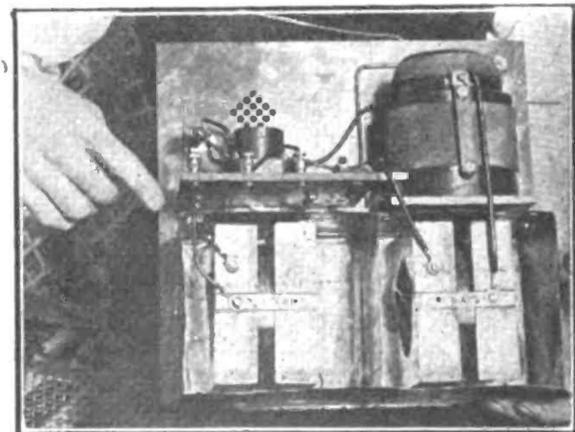
If a transmitter tube is used, the plate voltage will have to be between 350 and 500 volts. Hundreds of amateurs who are now using a transmitter for C-W (continuous wave) work, employ the Colpitts circuit in order to know what the plate voltage does. It may be repeated that a good battery for the plate voltage makes the set work in a satisfactory manner. Signals have been transmitted over some distances, and by using the regular transmitting tube the range is increased considerably.

Regarding the aerial, the average

radio fan will have to improve upon his aerial which is being used for broadcast receiving. It is quite impossible to send out signals of a wave length, and keep within the law, on a single wire 100 feet long. The radio fan will have to build an antenna for his sending set which will give him a sending wave-length of 200 meters. Such an aerial may be constructed by building a four-wire inverted-L aerial, 50 feet high and about 100 feet long. Particular care should be taken in the erection of it. It should not be placed near metallic objects, and the best of insulation should be used.

Satisfactory results will be secured only after careful adjustment of the various pieces of apparatus used. Do not be discouraged by the first results, which are often very poor. Further experimenting, the changing of a tube, renewing a battery, lighting the tube more brightly, will increase the radiation, and improve the experiment. A thorough understanding of the apparatus, and the workings of the circuit, and patience, will work wonders.

How to Use Your Bed Spring as an Aerial



ments, there are certain essentials which must be provided: The correct aerial, the proper ground, a means for altering the wave length, an instrument for changing the radio frequency, audio frequency, and the correct telephone receivers. The large half-tone shows Harry Luckert, of New York, who is using his bed spring as an aerial, and a very good aerial this useful domestic element makes, Mr. Luckert was refused permission to erect an aerial on his roof—and utilized his bed. He has accomplished surprising results, hearing WWJ, Detroit; KDKA, Pittsburgh; WGY, Schenectady, and WJZ, Newark. He is using, as may be seen, a one-tube receiver of the regenerative type, consisting of two variometers, and a vario-coupler. This set is carefully shielded and he claims his results are due largely to this, admitting, however, that his location is apparently favorable for long-distance reception. The smaller half-tone shows the rear view of the set with Mr. Luckert's finger pointing to a variometer. This set is small and very compact.

There is nothing complicated about radio reception. The apparatus may be of the simplest sort. If the distance to be spanned is relatively small, but little experience is necessary; for anyone may turn the knobs and adjust the detector. No license is required and anyone may intercept radio waves without formality of any kind. The

cost is low, considering the wonderful possibilities of a receiving set. After all, it is a question of what is expected of the receiving equipment, and successful results demand that the receiving equipment be fitted to the requirements of the owner. No matter how simple a receiving set may be, or how modest the require-

(Both photos C. Kael & Herbert News Service)

Latest Important Radio News of the Week

IN Missouri a movement was started recently for state control of broadcasting. This movement is showing signs of spreading to other states, and it was the radio interests of Massachusetts that suggested the conference here between the radio and motion picture people. It was believed that the best time to hold the conference was during the Chicago Radio Show, the first manufacturers' show ever held, because the leaders in the industry would be here.

"Listening In," by Carlyle Moore, will be produced out of town October 21, with Ernest Glendinning in the leading role.

Amsterdam, which boasted the first successful Marconi wireless telephone communication with London, is broadcasting concerts regularly from The Hague to London, thus following the example given by America. American enterprise and initiative have supplied the Amsterdam Stock Exchange with direct cable communication to New York.

Dr. Albert Abrams, of San Francisco, originator of the electronic method of diagnosis and treatment of disease, is in New York. He claims that missing persons can be located by radio. Dr. Abrams visits the East, seeking support for clinics for his theory in this country and Europe. In an interview he expressed his eagerness to give all his time and energy to these clinics and to contribute the needed apparatus. The "Electronic Reactions of Abrams" have elicited highest praise from his followers and provoked bitter criticism from doctors of medicine and other scientists. As a retort to criticism in the "Journal of the American Medical Association,"

Dr. Abrams resigned from that association. Dr. Abrams says all material things are radio-active and that sufficiently delicate apparatus can measure the degree of radio-activity and determine a substance being examined without even seeing it. Dr. Abrams says he has devised such a sufficiently delicate apparatus. "A drop of blood," said Dr. Abrams, "with its billions of electrons, is a condensation of the multitudinous vibrations of the body."

With the work of installing a large radio broadcasting station at Police Headquarters, New York, the Western Electric Company has begun putting in receiving sets in police stations, starting first with the borough headquarters station. Material for the Bronx headquarters in the Bathgate Avenue Station has been delivered and installation will start immediately. It has no apparatus for broadcasting and comprises the usual reception apparatus, with amplifiers and loud speaker. All notices sent from the general headquarters will be copied.

E. F. W. Alexanderson, inventor of the Alexanderson alternator, is expected from Sweden next month.

Senator Marconi announces that he will take a personal interest in building up radio interest in his native country, Italy.

European electrical scientists and radio experts of international reputation will visit America and meet this country's radio experts at the National Radio Show, to be held at Madison Square Garden the week of November 20-25.

What a Microphone Looks Like

TWO buttons, or carbon granule chambers, characterize the Western Electric microphone used in WBAY, New York. One button is located on each side of the vibrating diaphragm, so that at any given point in the vibration one button is compressing carbon granules while the other is releasing pressure. This means that current flow, affecting the voice transmission, is being increased on one side of the diaphragm and decreased on the other.

Every fan who has studied the action of the single-button microphone knows that its results are not exactly proportional to the amplitude of the sound waves producing them. Some distortion takes place. With the two-button device this distortion is cut down tremendously. The two buttons of the microphone are connected with one side of the transformer—or in telephone language, the repeating coil—in such a way that the resulting currents are both in the same direction and their combined effect is the production of waves that are quite free from distortion.

The electrical equipment is so arranged that another type of transmitter may be used when desired. It is not a microphone at all, but what is generally known as a condenser transmitter. It contains no little cups of carbon granules which characterize the microphone although it has a vibrating steel diaphragm and makes use of air damping. It requires considerably more preliminary amplification than the microphone but it has certain characteristics which at times makes its use desirable.

He Had Something to Brag About!

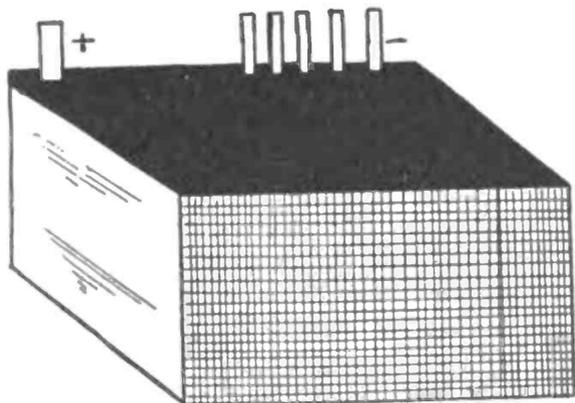


Radio Bug:—"Son, I can't brag about your quality or modulation, but you sure are there with the distant audibility."

The Radio Primer

Weekly A B C of Radio for the Beginner, in which Elementary Facts and Principles Are Fully and Tersely Explained

By Lynn Brooks



This larger size of battery, also a B battery, is known as the variable type. This battery can be used where a change of voltage is required.

WHAT is the variable B-battery used for? How can you tell it from any other batteries?

The variable B-battery is used in conjunction with the plate of the tube to carry out the principle of making the tube function. The positive pole of the B-battery is connected always to the plate of the vacuum tube whether the tube is a detector or an amplifier. If, by accident, the negative connection from the B-battery is connected to the plate the tube will not function at all. The B-battery is a necessary element for the tubes and may be detected easily by their size. The accompanying illustration shows what the variable B-battery looks like. It is much smaller than the storage battery. The variable taps are brought out on the top of the battery.

* * *

Are there any non-variable B-batteries?

Yes—B-batteries of the non-variable type. They are the same size, carry no taps, have a constant voltage and can be used with fixed voltage.

* * *

Describe the storage battery.

A storage battery consists of a number of cells, each cell made up of a number of plates and grids in an electrolyte solution of such character that the electrical energy supplied to it is converted into electrical energy—a process called discharging.

* * *

What is the theory of the storage battery?

The action of the storage battery is practically the same as that of the primary battery and is subject to the same general laws. The cells of a storage battery are connected in the same way as primary cells and, when charged, are capable of generating a current of electricity in a manner similar to that of the primary battery. It differs, however, from the primary

battery. It is capable of being recharged after exhaustion by passing an electric current through it in a direction opposite to that of the current of discharge. This difference constitutes the principal advantage of the storage battery over the primary battery.

* * *

How is the electrolyte generally used?

The electrolyte consists of a weak solution of sulphuric acid which permits ready conduction of the current from the primary battery. The greater proportion of acid, within certain limits, the smaller the resistance offered.

* * *

What is the effect of the current passing through the electrolyte?

It decomposes the water into oxygen and hydrogen. This is indicated by the formation of bubbles on the exposed surfaces of both plates. These bubbles are formed by oxygen gas on the plate connected to the positive pole of the primary battery, and hydrogen on the plate connected to the negative pole.

* * *

How is the electrolyte prepared?

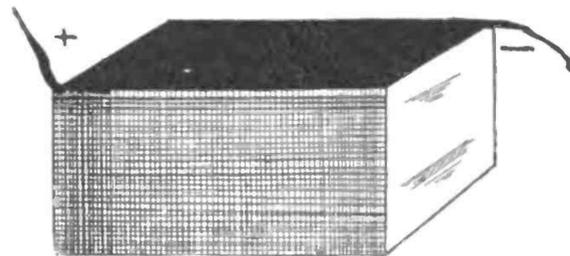
One part of chemically pure concentrated sulphuric-acid is mixed with several parts of water. The proportion of water differs with several types of cell from 3 to 8 parts, as specified in the directions accompanying the cells.

* * *

In preparing the electrolyte, how should the water and acid be mixed?

The mixture should be made by pouring the acid slowly into the water. Never do it the reverse way as an accident will result. It cannot be too strongly stated, in mixing the liquid,

THOUSANDS of radio beginners have come into the radio field since summer. They will find "The Radio Primer," published weekly in RADIO WORLD, a regular source of instruction and aid. For this reason, RADIO WORLD will republish, from time to time, some of the valuable primer articles that appeared in its early issues. These articles, by experts, contain a vast amount of radio information that cannot be duplicated. Every beginner will find them necessary to the building of sets and cooperative with the new material being printed weekly.



B battery of the non-variable type.

that it should be stirred with a clean wooden stick, the acid being added slowly to the water. The acid is corrosive and will burn the flesh. Distilled water should be used in preparing the solution. The mixing of the two ingredients causes them to become very hot.

* * *

How should the cells be filled?

Sufficient of the electrolyte should be poured into the jars to either completely cover the plates or to come within half an inch of the top of the jar. Large cells should be filled by means of an acid-proof pump. During this operation wear rubber gloves.

* * *

What about the density of the electrolyte?

It should never exceed 1,300 when the battery is fully charged.

* * *

What should be done with the old electrolyte?

When a battery is taken down, the electrolyte may be saved and used when reassembling the battery, provided great care is exercised when pouring it out of the jar not to draw off any of the sediment. It should be stored in convenient receptacles, preferably carboys which have been thoroughly washed and never used for any other purposes.

* * *

What is the voltage of a secondary cell?

This depends generally on the density of the electrolyte, the character of the electrodes, and the condition of the cell. It is independent of the size of the cell.

* * *

What are the colors of the plates?

In the case of formed plates, and before the first charging, the plates that are positive are of a dark-brown color with light- or red-gray spots, while the negatives are of a yellowish gray. These spots, on the positive plates, are small particles of lead sulphate which have not been reduced to lead peroxide during the process of forming. They represent imperfect sulphation.

Regenerative V-T Receiver for Short Waves

Describing Photographs on Front Cover of This Issue

By Fred. Chas. Ehlert

A MATEURS are asking constantly: "What is the most efficient hook-up, or diagram, whereby loud signals may be obtained?" The tube detector undoubtedly is the most sensitive detector yet devised; but a new circuit has been created, to be used with the vacuum tube, which will render the tube self-amplifying. This is the regenerative circuit.

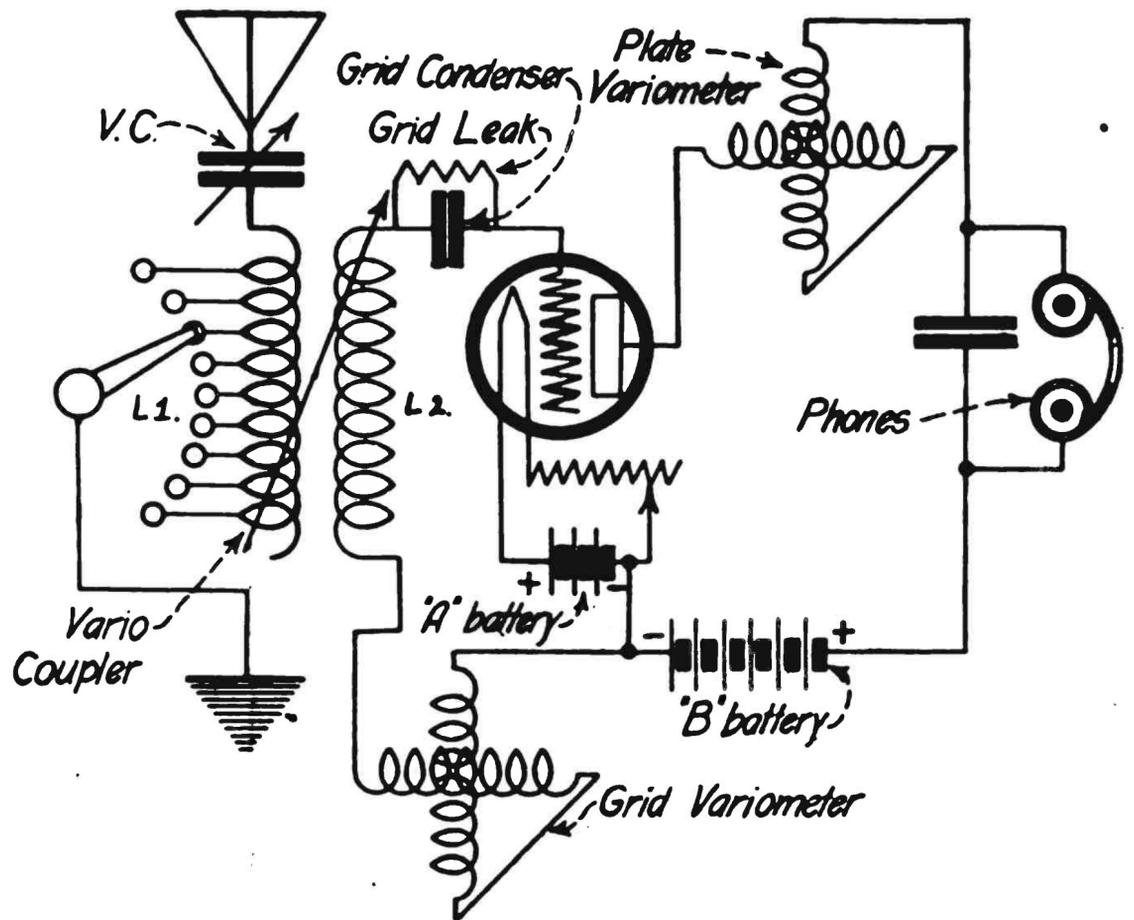
A vacuum tube, when hooked-up to a special circuit, will generate oscillations whose frequency can be controlled by varying the capacity and inductance of the circuit. The inventor of this circuit is Major Edwin H. Armstrong, U. S. A. He has contributed what is universally acclaimed as the most important invention since radio was first discovered. One type of a circuit where regeneration can be produced is shown in the accompanying circuit, whereby variometers are employed to produce that effect. All regenerative circuits are delicate to operate for the regenerative effect which gives rise to all kinds of noises in the telephone receivers.

The equipment needed for this circuit are two variometers, one vario-coupler, grid condenser and leak, tube socket, and tube detector, with batteries and phones.

This circuit is a short-wave regenerative circuit employing the variometer in the plate circuit for production of such regeneration as that of Major Armstrong's invention. L-1 is the primary winding of the vario-coupler and L-2 the secondary of the vario-coupler. In series with the primary is a variable condenser, but this is to be "tried out" to see if it is needed. Personally, I believe it should be left out.

A grid condenser and leak is shown which should be connected in series with the grid of the tube. This grid condenser has a capacity of .00025 mfd., and may be purchased at most any radio shop.

The 22-volt battery is connected in the plate circuit of the tube with the plus side of the battery connected to the plate of the tube. One side of the filament of the tube is connected to the wire running from the telephones to the grid variometer. Be sure that the 6-volt battery is connected in right. Before making connections, be positive that the battery leads are correct. If the leads from the 22-volt B-battery become crossed with the filament of the tube, don't be surprised if your



Schematic diagram of a complete regenerative receiver employing variometers. One variometer is placed in the grid circuit while the other variometer is placed in the plate circuit of the vacuum tube. This receiver will respond to the shorter waves with a good volume of sound. Suggested by Fred. Chas. Ehlert. Drawn by S. Newman.

tube does not light. This means that you have a burnt-out tube and that another tube must be purchased. But be sure that all connections are right before lighting.

The rheostat in series with the tube which controls the filament lighting of the tube is also shown. In case it is turned too high, the tube also will burn out. These precautions will have to be taken care of, but aside from this, there is not much to worry about. Generally the socket for the tube is marked as follows: P, for plate; G, for grid; F plus and F minus for filament. These two F marks are to be

connected to the 6-volt storage battery. Be sure to connect them to the proper polarity with the rheostat. In working this set, you will learn by experience when lighting the tube that it will start to hiss. The most sensitive spot is just below where the tube starts to hiss.

Again I caution you not to turn the filaments too high, as probably they will burn out the tube. By keeping the filaments at their proper brilliancy the tube's life will be lengthened. By using the tube you will soon learn its great advantages over the crystal detector.

WJZ Celebrates First Anniversary

WJZ, radio call-letters on the lips of thousands of radio enthusiasts, held its first anniversary services during the evening of October 5, when several of the artists who broadcast from WJZ last fall again visited this station.

It is generally regarded that KDKA is the father of broadcasting; also that WJZ popularized the broadcasting idea and introduced it in the Metropolitan area, where it attracted the best of talent and, with the assistance of New York radio publications, aroused the nation to the great possibilities of radio broadcasting.

WJZ was officially opened October 5, 1921, at 1:55 p. m. when several records were played to enable the radio audience to tune in their radio sets to receive, a

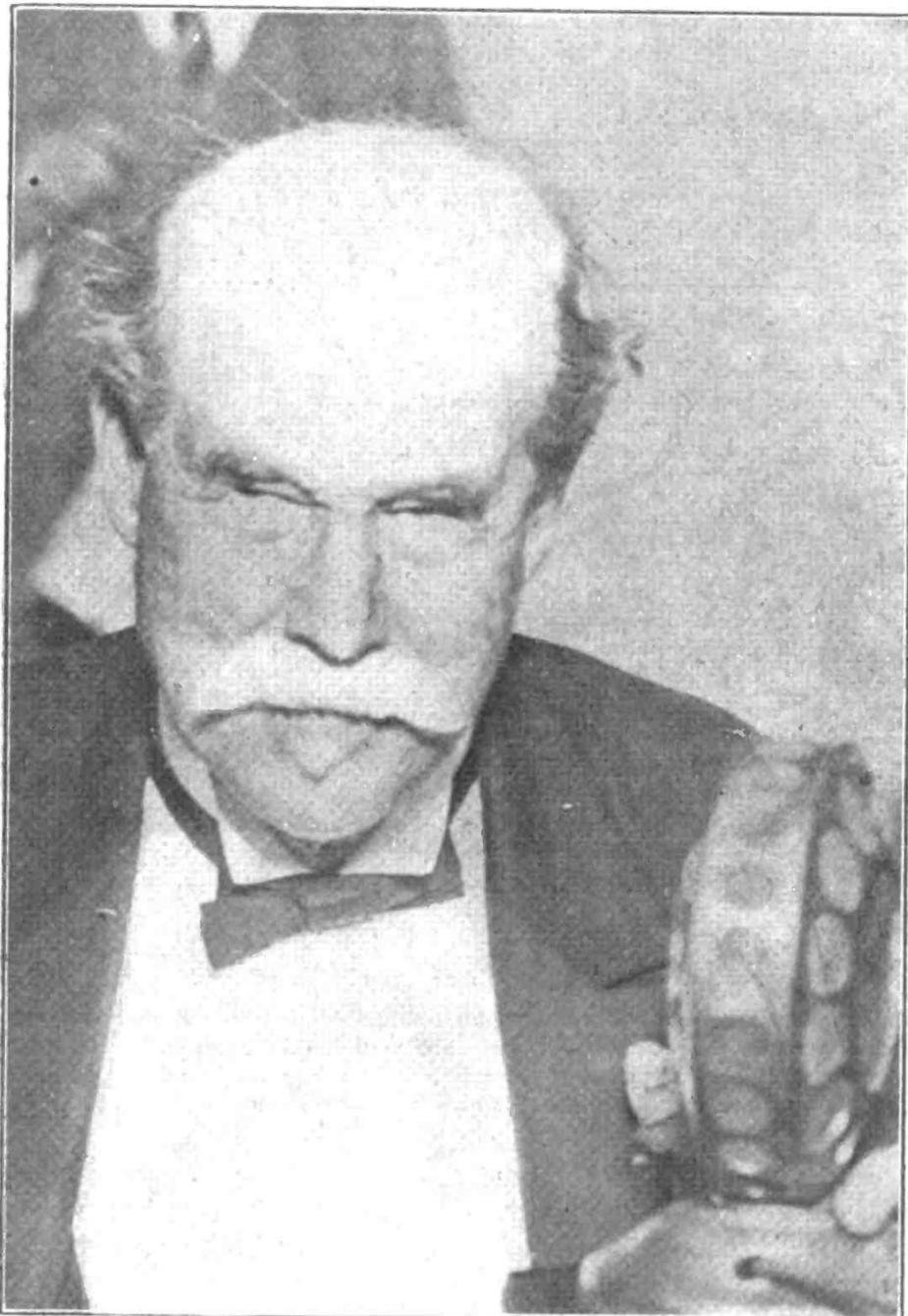
few minutes later, the play by play results of the World Series.

The response to the broadcasting by WJZ was immediate, as suggested by letters received from Massachusetts, West Virginia, Ontario, Pennsylvania, New York, and New Jersey.

The first artists to broadcast in person were: The Shannon Four, well known recording quartette, consisting of Charles Hart, tenor; Elliott Shaw, baritone; Wilfred Glenn, bass, and Louis James, tenor. Soon thereafter the foremost recording team, Billy Jones, tenor, and Ernest Hare, bass-baritone, entertained the growing invisible audience. Two prominent instrumentalists, Constance Karla, violinist, and Anna Welch, harpist, followed and other artists of note.

Radiograms

Latest Important News of Radio Garnered from the World Over, and Reduced to Short Wave-Lengths for the Busy Reader.



(C. Central News Photo Service.)

Sir Thomas Lipton as he appeared just after talking, by radio, across the Atlantic. The instrument at his left is the transmitter, or acousticon, into which he spoke, and which started his words on their long journey to London. Commenting on the experiment, Sir Thomas said: "This is the biggest thing of its kind in the world—and worthy of America as a big part of this world."

AT WOR, the broadcasting station of L. Bamberger & Sons, Newark, New Jersey, an attempt was made, last Saturday night, to bridge the Atlantic Ocean with the human voice. W. S. Moler, publicity manager for WOR, reported that a message had been received from Gordon Selfridge, "the Marshall Field of London," stating that the voice was heard "more or less distinctly." The person who spoke into the transmitter at WOR was Sir Thomas Lipton, at present visiting the United States. Mr. Selfridge's cable also stated that a vocal selection was distinctly heard. According to Mr. Moler, this is the first time the human voice has been broadcast such a distance, over a 400-meter apparatus. It was necessary to tune up to over 2,000 watts, or twice the ordinary capacity of a 400-meter outfit. Sir Thomas and a few friends went to Newark to make the experiment. The radio message was sent to Mr. Selfridge at Marconi House, London.

Consul Wesley Frost, Marseilles, states that owing to governmental restrictions the development of amateur radio clubs in France has been so retarded that up to date there have been few in existence outside of Paris. The Radio Club of France has recently established its first branch office at Marseilles, and its local representative has offices at 44 Rue des Abeilles and in the grounds of the French National Colonial Exposition.

Sweden sent missions to England, France, Germany and the United States, two years ago, to study the various wireless systems and types of apparatus in use. In 1921, the mission,

under the direction of Seth Sjungquist, head of the Royal Telegraph Administration of the Kingdom of Sweden, visited America to inspect the high-power station of the Radio Corporation and to particularly see the Alexanderson alternators in operation. When the Reichstag met this year it sent a special legislative committee to England to study the vacuum tube as developed there, and it was only after hearing this report that the Reichstag recommended the use of the Alexanderson alternator and authorized the signing of the contract by the Telegraph Administration.

* * *

The installation of small radio outfits in all lighthouses of the Department of Communications, Mexico, is to be given a trial. Two sets are being supplied, after which, if the results are satisfactory, all lighthouses will be similarly equipped.

* * *

The announcement, "Flowers sent by radio," is made by a Bond street, London, firm of florists. "Altogether we have 2,300 agents," said the manager of the firm, "and flowers can be delivered in all parts of America and Canada in a few hours. The idea is spreading rapidly in England, though we receive more orders from the other side than we send."

* * *

The latest use of radio is to locate missing relatives. Amateurs are requested to send out general or QST calls containing complete descriptions of the person missing with such other data as may be given them for broadcasting.

* * *

An interesting innovation in broadcasting was started last week at station WLW, Cincinnati, when Paul Briol inaugurated a tri-weekly book review by radio. Books by the best authors of the present were reviewed briefly and interesting anecdotes regarding the authors were read. This feature will be worked into the evening programmes on Tuesday, Thursday, and Friday nights.

* * *

For the third time, American radio amateurs plan communication with continental stations using their own amateur sets. This year's transatlantic tests will be conducted from December 12 to December 31 by the American Radio Relay League in cooperation with the amateur organizations in Canada, England, France and Holland.

* * *

English manufacturers have organized for the purpose of building and operating broadcasting stations with the approval of the government. Special wave-lengths will be allotted and stations will be erected in various areas, so that the whole territory of England will be well covered, and yet no interference will be experienced. By following a systematic method of locating stations and distributing wave lengths, the English will not have to suffer the early inconveniences which accompanied the advent of broadcasting in this country.

* * *

Secretary of Labor Davis started broadcasting, on October 2, for the Department of Labor through the Naval Air Station at Anacosta, NOE. The service will be for three fifteen-minute periods each week from 7:15 to 7:30 every Monday, Tuesday and Thursday. Secretary Davis, in his first broadcast, presented a short exposition of what the Department of Labor can do and is doing for American wage earners. A definite program will be announced later.

* * *

Sunday religious services have been added to the weekly schedule of WGY, Schenectady, New York. Every Sunday, a Schenectady church will be connected to the radio transmitting-outfit by land wire and the entire service of that church will be sent out, beginning at 10:30 a. m. At 4:30 o'clock, every Sunday afternoon, vesper services will be held in the studio of WGY, and a short address will be delivered.

* * *

W. K. Vanderbilt has departed from Southampton, England, on his new motor-yacht, said to be the most costly and luxurious pleasure craft afloat. Her radio apparatus, it is reported, is as powerful as that of any of the transatlantic liners.

* * *

The first radiophone exchange in the world, installed by the Air Ministry, is in daily use at the London Air Station, Croydon, England. Its main purpose is to connect the aerial-traffic controller with the pilots of airplanes operating between Great Britain and the Continent.

Radio and the Woman

By
Crystal D. Tector

I AM not unmindful of the fact that radio has me on my toes most of my waking hours—and, perhaps, more of the hours when I should be asleep than my doctor would approve—but even after a night with the "owls" I feel as chipper and gay as if I had set up counting an unexpected legacy. Most everything can be overdone. A plethora of riches produces nausea. One can have too much of a good thing, and all that; but I have yet to become bored by the varied excitement that radio throws in my way.

* * *

The other night, for instance, I attended a radio party down on Long Island. The hostess was one of the most charming young matrons of New York's very charming set. She sent out cards for a hundred guests. "You are invited to a radio evening," was the simple but alluring phrase in the corner of the invitations. Of course, I had the usual argument getting Friend Husband to put on his evening togs. He swore the weather was still too warm and made other petty excuses, but I had my way. Luckily some dear friends motored us down.

* * *

Our hostess has one of those huge country homes that make one positively jealous. Her big living room,—I suppose I should be "class" and call it a "reception room"—where the chairs were arranged in a semi-circle before a radio-set banked with flowers. All one could see were the tuning knobs and the huge loud-speaker jutting forth from a mass of pink roses. When the music and the vocal selections began to come through, the scene was unusually attractive. I believe that it was the first affair of its kind ever held in America. If there have been others I have never heard of them—and if any of my readers can enlighten me, I wish they would write.

The programs rendered that evening were particularly fine. Only one number—a violin solo—seemed to suffer until a few turns of the dial and when the minimum of volume was reached, everything was perfect. Believe me, there was not a bored person in the room. Every one remained seated until the time tick came through from Washington, and all considered it quite a novel thing to see if their timepieces were correct.

* * *

The broadcasting programs over, a supper was served. While this was the "matter of the moment," the chairs in the reception room were removed and the floor made ready for dancing. And—after some maneuvering, during which dozens of men, who never before had taken even the smallest interest in radio, peered into the set and asked a thousand questions—we picked up dancing music being broadcast from St. Louis! Imagine the charm of it! Dancing on Long Island to music being played in St. Louis.

I wish I had the space to give more than this mere outline of this very attractive affair. But I can drop a hint to all hostesses who are looking for something new this winter in the way of entertainment: Give a radio party. If you want some inside suggestions, drop me a line and I will help you all I can.

* * *

I have had a rather big "mail" since my last "copy" was written for RADIO WORLD. One of my correspondents who requests me to withhold both her name and her address, because her husband would "never forgive her" if he knew that she wrote to me, wants to know if iron pipe may be used for stays on an aerial 40 feet high, or is iron pipe obstructive to radio waves. Listen, dearie—and don't tell your husband—but iron pipe may be used for poles to support your aerial, but it will absorb some of the radio waves. Wood is better.

Heard Atlanta, Georgia, in Des Moines, Iowa

EDITOR, RADIO WORLD: In RADIO WORLD of September 23, page 29, "Who Is This Broadcaster?" I heard this program very plainly, and as I have been keeping a radio log I find that "Little Red Riding Hood" was given by a woman, in a child's dialect, from the broadcast station WSB, the "Atlanta Journal," Atlanta, Georgia. I heard this program which started at 10:45 P. M., and ended in the morning; for when he signed off the operator said, "Good morning."

As a rule, WSB is very clear here and everybody here looks to 10:45 as they know Atlanta, Georgia, will come in no matter how bad the weather is—static or not. This program was received on one-step single circuit using an A-P detector and one 301-Cunningham, amplified bulb. The outfit is home-made.

Hoping this information will help out radio fans.—Jack Clemons, Des Moines, Iowa.

* * *

Also in Cleveland

EDITOR, RADIO WORLD: On August 16, 1922, at 1 A. M., we received the message, and commented on the hour for a bed-time story and we heard the entire program. It was from Station WSB, Atlanta, Georgia.—Mrs. W. C. Blackburn, Cleveland, Ohio.

Only Relative Values

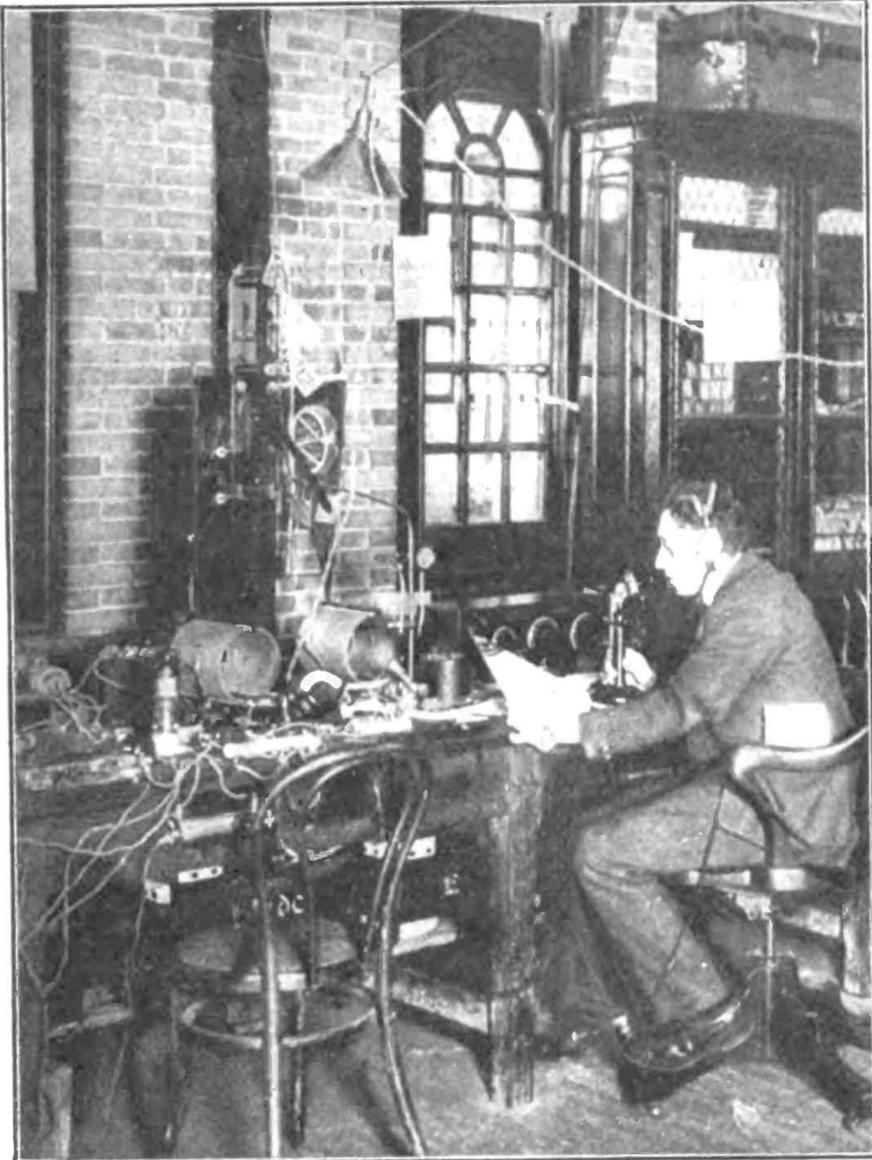
Always remember that the divisions and markings on dials and switches have only relative values, and do not directly indicate wave-length. They afford an easy means of resetting your instruments to tune in to a certain station.

New York Hotel Phone Operator Now Answers by Radio



Here is Miss Millie Culligan, telephone operator of the Vanderbilt Hotel, New York City, who was not content to remain the operator of an ordinary switchboard, but so familiarized herself with the radio system installed in the Vanderbilt that she is able to operate a set to perfection. Radio is fast becoming an essential of the leading hotels and hotel systems of the East. In general, it is now used for paging guests. During the past week, when New York City was crowded with guests—owing to the World's Series and Banker's Convention—a number of hotels installed temporary radio sets to keep their guests in touch with the latest news.

Interesting News Photos Collected for Busy



(C. Central News Photo Service)

Did you hear the news of the World's Series Baseball played at the Polo grounds, New York? Here is the room from which it was broadcast, play by play. J. C. Smith is the operator who is "shooting" the news to the millions who could not get seats for the big event.



(C. Central News Photo Service)

The world's greatest radio station is opened, and here is a hal-
hustling commercial institution, and so it is, for it is the ge-
America Station, situated at Rocky Point, near Port Jefferson, I-
of all the world. From it, President Harding flashed radiograms o-
part of the receiving room into which messages are delivered fo-
recording code messages. Radio Central, as the big station is k-
of separate transmitters so as to ensure simultaneous commu-
at the Rocky Point Station enable the powerful transmitters to
modulate, or control, the flow of power from the alternators to
employed at Radio Central. It consists of a line of 410-f-



(C. International Newsreel Photo)

Clara Kimball Young, famous motion-picture star, talking over the transmitting apparatus of "The Examiner," Los Angeles. On this occasion Miss Young recited the late James Whitcomb Riley's poem, "That Old Sweetheart of Mine," and she received letters from radio fans even in the Middle West who heard her. The apparatus at her right is a 250-watt radiophone.



Photographs of the Week Radio Readers



Some reproduction of its busy office. It looks like the office of a radio operating room in New York City of the Radio Corporation of America. This station established America as the radio center for the continent, sending to twenty-eight other countries. The half-tone shows a station operating abroad. The typewriters with reels of paper are for receiving and transmitting. In reality, several stations in one. It comprises a number of stations with a number of stations abroad. The magnetic amplifiers are operated at long distance. These ferromagnetic devices accurately radiating system, or aerial wires. The latest form of aerial is towers, or masts, with 150-foot spreaders at the top of each.



The Grand Army veteran in the half-tone at the left wanted to listen in and the owner of a set obliged him. Before he had satisfied his longing, the old soldier was able to tune in himself. He asked, however, that his name should not be published—a request always adhered to by responsible editors. But the old fighter said that becoming acquainted with this new wonder gave him a new lease on life.

In the half-tone at the right, two electrical engineers of the College of the City of New York are testing aural, one of the most fascinating "test ups" in radio. With the equipment laid out before them, it is possible to tell how aural will work before being put up, thus precluding the possibility of erecting them in unsuitable locations. The young engineer with pencil and pad is Abraham Ringel. The other is Samuel Miller. RADIO WORLD has frequently referred to the splendid work in radio by the students and the faculty of this New York City institution.

(C. Kadel & Herbert News Service)



(C. Central News Photo Service)

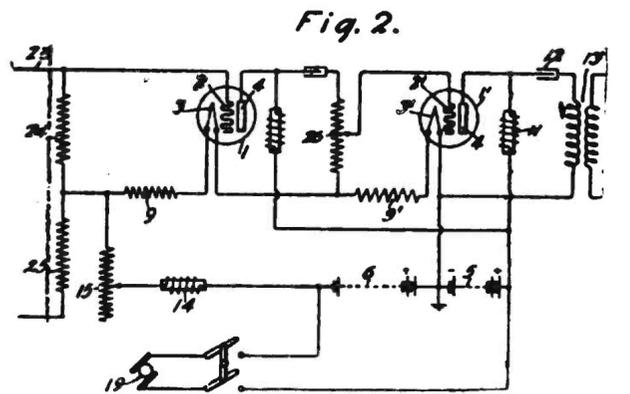
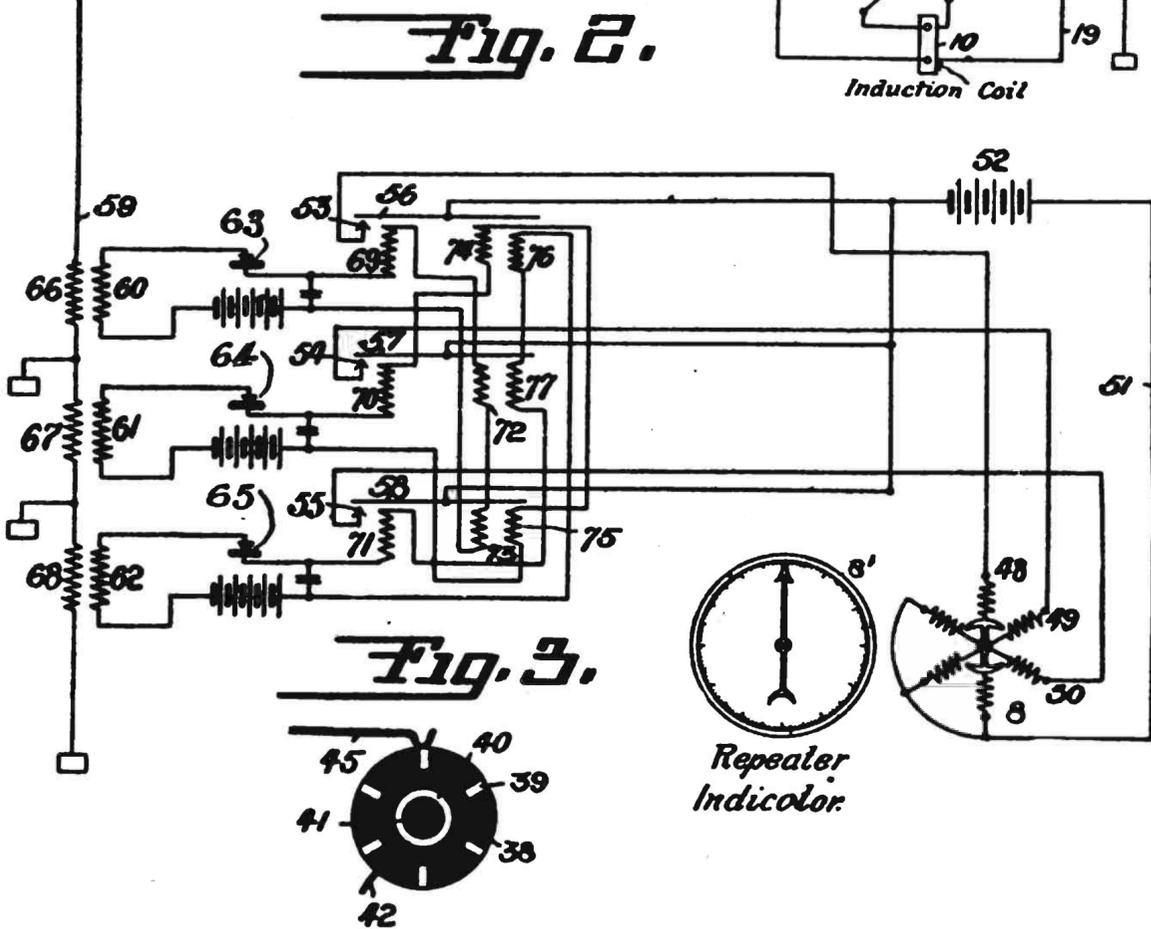
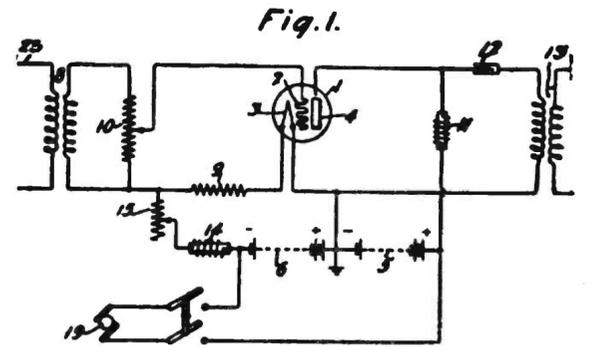
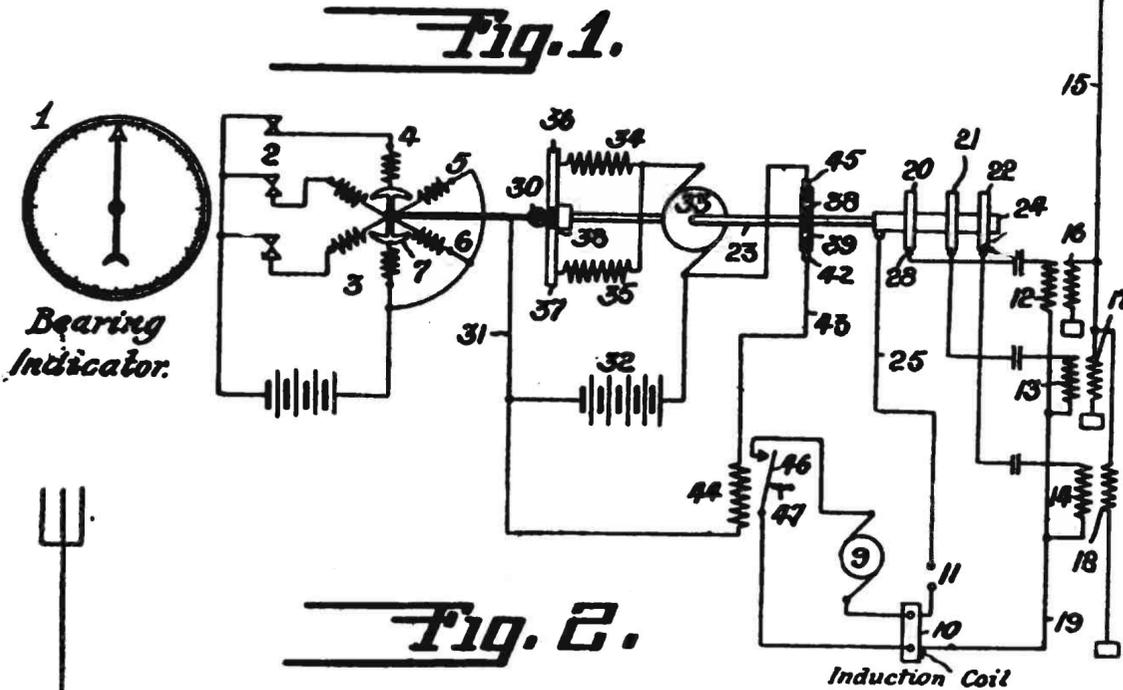
Over in Ridgefield Park, New Jersey, they call this "The Dugout." It is a "quick-lunch" establishment, and the enterprising proprietor has installed radio for the benefit of his chef and customers.



Radio Patents

ized by the indirect use of the heating battery, or of some other source; but in either case associating this source with the output circuit battery.

It is well known that the current flowing through the output circuit undergoes fluctuations owing to sudden or gradual internal changes within the power battery. Such fluctuations in the space current of the vacuum tube are very troublesome. The method by which this invention overcomes this error may be explained as follows: Assume that the vacuum-tube circuits are so arranged, as hereinafter described, that the current for the input circuit comes from a source in series with the source for the output circuit. For illustration, suppose there is a decrease in the potential from the output circuit battery due to some internal change; this will necessarily tend



Schematic diagrams of Mr. Sperry's invention, the chief purpose of which is to provide simple and efficient means for causing an indicator, by means of radiant impulses, to follow automatically the movements of another indicator at a distant point.

Schematic diagrams of the invention of Mr. Robert C. Mathes for the discharge of electrons.

Wireless Repeater System

No. 1,428,507. Patented, September 5, 1922. Patentee: Elmer A. Sperry, Brooklyn, N. Y.

THIS invention is for the purpose of automatically transmitting the readings of an indicating member by wireless to a distant point. It is particularly useful, the inventor claims, in automatically transmitting by wireless to an aircraft or other distant point the readings of a compass, fire-control instrument, or other indicator on a ship, whereby the ship's heading, or the bearing of a target observed from the ship may be constantly

communicated in safety to a distant point.

Such a system has especial uses in the aerial ordnance-control for heavy guns where the target is only visible from airplanes, which signal to the ship or other firing station the bearings of the target. In such a system, it is very desirable that the airplane pilot should know the bearing of his object.

The chief purpose of Mr. Sperry's invention is to provide simple and efficient means for causing an indicator, by means of radiant impulses, to follow automatically the movements of another indicator at a distant point.

Circuits for Electron-Discharge Devices

No. 1,428,754. Patented, August 22, 1922. Patentee: Robert C. Mathes, New York City.

THE sources of direct current potential for the input circuit of an electron-discharge device of the audion type, is the basic element of this invention of Mr. Mathes. It is intended to provide

a more convenient and desirable method than has heretofore been used for securing a desired difference of potential between the filament and the grid of a tube of the audion type. A further object is to furnish a method and means for compensating for fluctuations in the potential of the output circuit battery of the vacuum tube.

Specifically, these objects may be real-

to decrease the space current between the filament and anode of the vacuum tube. If the input and output batteries are of similar nature, this change, in all probability, will also decrease the potential of the input-circuit battery, which is in series with it, so that the grid potential will become less negative thereby tending to increase the space current to its former value. The compensation would take place in a similar manner for an increase in the voltage of the batteries, due, for instance, to the batteries being charged by some suitable means.

This scheme works especially well if the negative grid-voltage is derived from the drop of potential across the terminals of a resistance which derives its current from a battery associated with the output circuit battery.

You Will Need RADIO WORLD as a Radio Reference

Be sure to see that your file of RADIO WORLD is complete. There will soon be so great a demand for back numbers that the supply will not be sufficient to cover it. RADIO WORLD has been issued every week from April 1 to date. Start with No. 1.—RADIO WORLD. Mail, postpaid, for 15c a copy; any seven copies for \$1.00. Or send \$6.00 for one year (52 issues) and have your subscription start with No. 1.—RADIO WORLD, 1493 Broadway, New York City.

At the Radio Shows

Coming Events

The editors of RADIO WORLD will gladly publish news items of all contemplated radio shows and expositions. Keep us posted by mailing full information.

CHICAGO RADIO SHOW, Coliseum, Chicago, Ill., October 4 to 22. U. J. Hermann, managing director, 549 McCormick Building.

SECOND NATIONAL RADIO EXPOSITION, direction International Trade Exposition Co., Chicago, January 13 to 20, inclusive, 1923, George A. King, director of publicity, 417 South Dearborn Street, Chicago, Ill.

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

AMERICAN RADIO EXPOSITION, Grand Central Palace, New York City, December 21 to 31,

inclusive. Direction American Radio Exposition Company, 120 Broadway.

TRI-STATE TOBACCO GROWERS' RADIO SHOW, Covington, Ohio, October 21 to 23, inclusive.

NEW YORK ELECTRICAL AND INDUSTRIAL EXPOSITION, Grand Central Palace, New York City, October 7 to 14, inclusive.

SPRINGFIELD RADIO EXPOSITION, Springfield Auditorium, Springfield, Mass., October 3 to 7, inclusive.

SOUTHERN CALIFORNIA RADIO SHOW. Combined exhibition of the Southern California Broadcasting Association, the Southern California Radio Association, and the Southern California Radio Trade Association. Los Angeles, October 9 to 14 inclusive.

INTERNATIONAL RADIO SHOW, Madison Square Garden, New York City, November 20 to 25, inclusive. E. C. Buchignani, director of publicity.

A Warning to Radio-Show Exhibitors

AS to the value of radio exhibitions: Radio expositions are all right in their way. They have a legitimate place in radio affairs—BUT THEY MAY BECOME A NUISANCE AND A MENACE UNLESS THE INTERESTS OF THE TRADE ARE PROPERLY SAFEGUARDED.

Radio exhibitions, organized and conducted with an honest regard for radio art, science, and business, are excellent things. When run on go-as-you-please principles by promoters who have nothing in mind except the sale of space to exhibitors, they are likely to do much more harm than good.

For instance, how many of us have visited radio expositions and been confounded by the din and noise, by the barrage of unrestricted announcements and the cannoading by batteries that filled the air with meaningless sounds, making the would-be enthusiasts wonder what it all was about, and sending them out into the night filled with the idea that radio is a noisy, senseless thing.

A properly regulated method of receiving and sending messages in connection with radio shows and in making

business and official announcements, would greatly lessen the resentment of the judicious, and this could, and undoubtedly would, be regulated if practical radiomen had anything to do with the actual management of the show.

Therefore, RADIO WORLD ISSUES THIS WARNING TO MANUFACTURERS of radio goods and to all others interested as radio exhibitors:

Don't sign up for space at the next radio show whose representative calls on you for a reservation of space unless that representative can prove positively and convincingly that the board of management contains the names of practical radio men. Even then be sure that these radio men will have something to say about the ACTUAL RUNNING OF THE SHOW IN ALL ITS PHASES.

Beware of the radio show promoter who hasn't any more interest in radio than he has in canned milk or typewriters.

RADIO SHOWS SHOULD BE RUN BY RADIO MEN. Until they are, the radio industry and our constantly growing army of "fans" will not get a square deal.—THE EDITOR.

Chicago Radio Show

THE Chicago Radio Show, the first show ever endorsed by the National Radio Chamber of Commerce and the Radio Division of the National Electrical Manufacturers, promises to be one of the largest trade expositions ever held. When the doors of the Coliseum are thrown open to the public on Saturday, October 14, practically every large manufacturer of radio apparatus will be represented in the show, which will continue until Saturday, October 21. It will be open to the public both afternoon and evening for the eight days.

It will be the first time that the manufacturer has taken the opportunity to meet the jobber, dealer, and public at the same time.

Ed Wynn, the famous comedian, and his company, will put on "The Perfect Fool" the opening night for broadcasting. There will be a society night, a radio ball, a children's afternoon and other features during the week. While the entire Coliseum will be given over to the exhibits, the Coliseum Annex will be given over to meetings.

General radio-trade problems will also be taken up at conferences of manufacturers. One of these problems will be broadcasting. Many manufacturers believe that the industry is being held back by poor broadcasting, poor programs, and a general lack of knowledge of what the public wants.

Another problem to be discussed is, what is regarded as some, a boycott in England against radio apparatus made in the United States. James F. Kerr, business manager of the Chicago Radio Show, who recently returned from a trip to New York, Boston, and other Eastern cities, reports that not less than 127,000 radio sets, manufactured in the United States and shipped to England, are now being returned to the manufacturers. The Eastern manufacturers were depending largely on their export trade. The Western manufacturers have been better off because the farmers of the Middle West are going in stronger than ever for radio and are making the market one of the busiest ever known.

Radio brings it MAGNAVOX Radio tells it



Make your receiving set complete. Equip it with the wonderful Magnavox Radio that tells it clearly and in full volume to all within reach of its voice

AFTER once using a Magnavox Radio, the Reproducer Supreme, you would no more go back to the telephone headset than you would exchange your electric light for a tallow candle.

With the Magnavox Radio, due to the electrodynamic principle involved in its construction, you hear every program or message at its best.

A Magnavox Radio so increases the use and enjoyment of any receiving set that it is considered the one essential part of the receiving station.

R-3 Magnavox Radio with 14-inch horn (here illustrated), is ideal for use in homes, offices, etc.
Price \$45.00

R-2 Magnavox Radio with 18-inch horn for those who wish the utmost in amplifying power; for large audiences, dance halls, etc.
Price \$85.00



Model "C" Magnavox Power Amplifier insures getting the largest possible power input for your Magnavox Radio.

AC-2-C, 2-Stage - - - - **\$90.00**
AC-3-C, 3-Stage - - - - **110.00**

Magnavox Products May Be Had of Good Dealers Everywhere

The Magnavox Company
Home Office and Factory: Oakland, Cal.
New York Office: 370 Seventh Avenue

3000 Ohm Sets \$3.98
 PLUS 20 CTS. POSTAGE AND PACKING
 Satisfaction Guaranteed or Money Back.



We mail phones the day your order arrives. Every pair tested, matched and guaranteed as sensitive as \$8 to \$10 Sets. Circular Free.

Tower Mfg. Company
 113 STATION ST BROOKLINE, MASS.

**Complete Radio Station
 for Rent**

THE Navy Department is offering its radio station at Miami Beach, Florida, for lease to the highest bidder, pending the enactment of legislation authorizing its sale. Bids will be opened at the Central Sales Office, Navy Yard, Washington, October 17, 1922. NGE, the station, is completely equipped and, on 1620 meters, has a radius of about 300 miles.

The site comprises 13,650 square feet on Miami Beach, and includes an operating building, bungalow, storehouse, steel antenna-towers and complete radio-equipment. The operating building is built of terra cotta faced with stucco, contains machinery, operating, store and wash rooms, and an office built in 1921. The operating room is modern, being sound proof and copper-screened on all sides. The bungalow contains six living and sleeping rooms, suitable as quarters and fully equipped for the radiomen of the station.

Two steel towers, 210 feet high, support the large L-type and shorter T-type aerials, both of which are said to be in good condition.

The equipment includes a rotary spark-gap transmitter, generators, motor generators, switchboards, transformers, protective devices, condensers, loading coils, instruments, tools, and batteries; even clocks and typewriters.

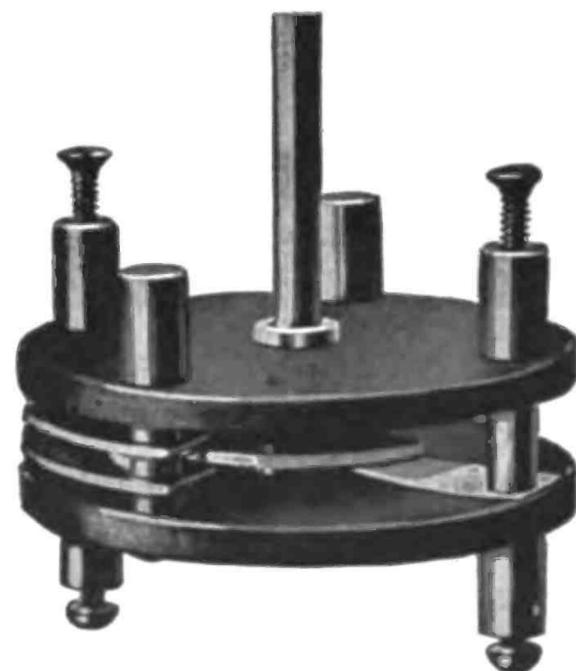
Bidders, who are required to be of the Caucasian race, must make an offer of a yearly rental, not to exceed five years, and forward three months' rental in advance. The successful bidder must furnish a \$25,000 bond to the Navy.

**"RADIO"
 VARIABLE
 CONDENSERS**



These condensers are the Standard of Quality. Carefully tested, inspected, balanced and adjusted to give maximum satisfaction.

- 3 plate Vernier\$1.50
- 23 plate 4.00
- 43 plate 5.00



Sent prepaid on receipt of price.
 Special discounts to Radio Clubs.

Jobbers and Dealers write or wire for the biggest proposition in Radio—TODAY!

**FREDERICK H. PRUDEN
 INCORPORATED**
 LERNER BUILDING
 993 Bergen Ave.
 JERSEY CITY, N. J.

**Q S T
 RADIO FANS
 Perfection in Radio
 Headsets attained in
 "ECHO HEADSETS"**

give clear, distinct tones, reproduce perfectly the most sensitive radio signals in music, speech and code.



No matter how perfect or expensive your apparatus; no matter how strong or perfect the waves; without "ECHO HEADSETS" your results cannot be perfect. We ship phones the day your order arrives. Every pair tested, matched and guaranteed as sensitive as the most expensive headsets made.

Sold with money-back guarantee.

Sent C. O. D. by express, who will hold money for 48 hours' trial, if not satisfied express company will return money.

S. Pearson RADIO Co.
 142 Maple Street
 Richmond Hill Long Island, N. Y.

At Your Service!

There appeared in RADIO WORLD dated April 1, 15, and 29 the following articles:

April 1—A 500-Mile Radiophone Employing a 5-Watt Tube, by Frank A. Hahnel. "Tell Me, Please, How Will This Set Receive?" by E. L. Bragdon. Short Cuts in Receiver-Circuit Design, by O. C. Roos. Making a Short-Wave Regenerator, by Fred. Chas. Ehlert.

April 15—First Principles of Electricity as Applied to Radio, by John P. Miles. Your Storage Battery, by E. L. Bragdon. What Makes Radio Possible, by Edward Linwood. Ground Connection as Vital as Antenna, by Fred. Chas. Ehlert.

April 29—Valuable Pointers on Aerial Construction, by Edward Linwood. What Is Meant by Tuning, by E. L. Bragdon. Radio-Frequency Amplification and Regeneration, by Frank Armstrong. Honey-Comb Coils and Condensers, by Edward Linwood. Charging the Storage Battery, by E. L. Bragdon. How to Construct the Variocoupler, by Frederick J. Rumford.

Each copy sent on receipt of 15c. per copy, or the three copies for 45c.; or better still, send your subscription beginning with any one of these numbers, and we will send this paper for 52 issues, and you will then have a complete file for ready and constant reference. RADIO WORLD, 1493 Broadway, New York.

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

Radio Merchandising

Classified Quick-Action Advertising, 5 cents per word

Telephone Bryant 4796

Radio Goods that Stand the Test

Manufacturers, send a sample of your goods to our Technical Editor, Fred. Charles Ehlert, 8008 Pleasant Street., Queens, Long Island, N. Y. It will be carefully tested and returned. If your goods satisfy our experts, RADIO WORLD'S endorsement will be published in our merchandise department without charge or obligation of any kind on your part. This is a free service on the part of RADIO WORLD, calling for no expense whatsoever on the part of the manufacturer, except the sending of a sample of his goods.

Excellent Vernier Variable Condenser

(Manufactured by Frank P. Marsh, 50 Linden Street New Haven, Connecticut)

A WELL-CONSTRUCTED variable condenser of the vernier type. It has 23 plates with three end-plates to make up the vernier condenser. Its capacity was found to be .00036 mfd., employing the 23 plates, while with the vernier alone the capacity was approximately .00007 mfd. The construction of the condenser is as follows: End plates are of bakelite, with edges and faces polished. All plates are of the best grade even-gauge hard aluminum with edges cut to allow no burrs. The movable plates are mounted on a solid brass shaft accurately spaced and locked to correct position. The vernier which is a handy element of this condenser is made up of three plates with the center plate movable. It is a two-knob control, one knob controlling the condenser adjustment while the other knob, located in the center of the condenser knob, is used for the vernier adjustment. This enables the operator to adjust his set for fine tuning of concerts and gives loud signals. The condenser is nicely finished and when used in a set comprises a satisfactory condenser ready for panel mounting.

Vermica Variable Condenser

(Manufactured by C. S. Cherpeck, 3125 Davlin Court, Chicago)

A GOOD and inexpensive variable condenser is now being placed on the market. By means of a special screw-adjustment, fine, accurate tuning is made possible. In fact, with only a single knob, or dial, what is essentially vernier control is obtained.

Another feature of this condenser is that it can be knocked about without being put out of order or having its efficiency impaired. This makes it a handy and ideal piece of equipment for experimental, amateur and general radio work. Its capacity was found to be .0005 mfd.

Its convenient size makes it readily adaptable for either table or panel mounting. It can be mounted on any size panel up to half an inch. The Vermica Variable Condenser is neat and attractive.

Correction

In RADIO WORLD, Vol. II., No. 1, dated September 30, in the published test of the "P-T" Ultra-Sensitive Crystal Detector Contact Wire, the address of the manufacturer was incorrectly given. Address: "P-T" Crystal Contact Co., Box 1641, Boston, Mass.

Radio Goods Active As Indoor Season Begins

RADIO goods have seen enough activity lately to confirm the views of leaders in the business that the slump which occurred early in the summer was merely seasonal and that the business would return to its former scale in the fall, says C. F. Hughes, financial authority on the staff of "The World," New York. In other words, it appears certain now that radio is essentially a feature of indoor entertainment. A good deal of progress has been made in perfecting merchandise plans and in standardizing equipment. Retail stores are now offered the buying discount they were after and also may guarantee the various sets, which was another of their desires.

New Firms and Corporations

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

Radio Simplex Corporation, Wilmington, Apparatus. \$8,000. (Delaware Incorporating Co.)

W. W. Letts Service, Inc., Utica, N. Y. Manufacture of storage batteries. W. W. Letts, president and general manager; M. C. Welch, secretary and treasurer.

Eclipse Radio Co., Geneva, Ill. H. E. Krans, president and general manager; F. W. Krans, vice-president; J. Eric Anderson, secretary and treasurer.

Machen Radio Mfg. Co., 4639 East Thompson Street, Philadelphia.

North American Radio & Supply Corp., 5 Columbus Circle, New York, N. Y.

Ship Owners Radio Service, Inc., New York City, has moved its Baltimore office from 17 South Gay Street to 11 North Eutaw Street.

Victor Radio Corp., 801 East 135th Street, New York City, is appointing jobbers to handle its products.

The Radio Chain Store Company. \$125,000. Leon Abrams, Abraham Young, New York City, N. Y., and Maurice Abrams, Newark, N. J.

World Radio Corp., 423 West 55th Street, New York City. Wholesale distribution of radio materials and supplies. J. P. Johnson, general manager.

Banker Enters Radio Business

ARTHUR D. JENKINS has been appointed sales manager of the Tri-State Radio Company 825 South Meridian Street, Indianapolis. Mr. Jenkins was formerly in the investment-banking business in Chicago and New York, and for the past three years was connected with The National City Company, New York City. He has contributed articles to many of

the leading financial magazines. He will have charge of the national exploitation to be carried on by the Tri-State Radio Company in the near future.

H. G. Cisin with Dictograph Products

THE Dictograph Products Corporation has acquired the services of H. G. Cisin, author of "The Radio Telephone Handbook." Mr. Cisin has been placed in charge of Dictograph Radio sales promotion, advertising and publicity. He was formerly engineering editor of "Electrical Record." Mr. Cisin is a Cornell graduate, holding the degree of mechanical engineer and certificate of electrical engineer.

Homcharger Now Operating Three Plants

THE Automatic Electrical Devices Company, Cincinnati, manufacturers of the "Homcharger," which has proved popular in the radio field, has been compelled to add a third plant to take care of the unprecedented demand for this device.

The three factories, all located in Cincinnati, have a capacity of over 1,000 "Homchargers" a day, which, it is expected, will enable dealers and jobbers to obtain prompt shipments on their orders.

C. Brandes, Inc., Goes into Canada

C. BRANDES, INC., 237 Lafayette Street, New York City, radio manufacturers, have organized a Canadian subsidiary, C. Brandes, Ltd., and have leased a factory in Toronto, where work will commence as soon as alterations have been completed. In the meantime C. Perkins Ltd., Montreal, will represent the company in the Dominion. Edgar Rypinski has been appointed resident manager.

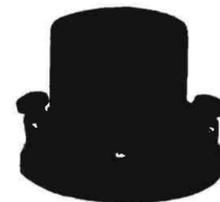
V. T. SOCKETS

Standard size, metal parts nickel plated, positive contact. Guaranteed satisfactory or money refunded.

20 cents each, 3 for 50 cents
POSTPAID

C. A. HOLLISTER

254 Court Ave. Lyndhurst, N. J.



NA-ALD

DE LUXE
V. T. SOCKET

Contact strips of laminated phosphor bronze press firmly against contact pins, regardless of variation in length. No open current trouble possible. Socket moulded from genuine Condensite. Practically unbreakable. Special protected slot, with exterior reinforcement. Unaffected by heat of bulbs or soldering iron. All excess metal eliminated, aiding reception. May be used for 5 Watt power tube. Highest quality throughout. Price, 75c.

Special proposition for dealers and jobbers.

ALDEN-NAPIER CO.

52 Willow St. Dept. L. Springfield, Mass.

JUST OUT!

50

"VACUUM TUBE HOOK-UPS FOR RADIO RECEIVING CIRCUITS"

Largest collection of V. T. Diagrams applying to Radio Reception ever Published under one cover.

Contains Latest on Radio Frequency and Super-Regeneration

PRICE PREPAID \$1.00

W. A. DICKSON

400 E. Fort St. Detroit, Mich.

Radio Now One of the Greatest Assets of Shipping

By W. Randall

SIR THOMAS FISHER, C. B. E., R. N. (retired), general manager of Canadian Pacific Steamships, Ltd., London, who is now in America, says radio is one of the greatest assets of maritime service.

"The most enthusiastic supporters of Marconi did not dream that radio telegraphy would develop to the extent it has during the past twenty years," said Sir Thomas to a representative of RADIO WORLD. "The usefulness and value of the new system of communication were soon apparent and radio was at once applied by the British Admiralty at Lloyds. The advancement of the science, insofar as it has affected shipping, has been great, and today no vessel of size is without wireless equipment. The question of safety at sea is undoubtedly the paramount benefit conferred by radio telegraphy; but other considerations, such as the facilities given for commercial and personal communications, and the means provided for keeping passengers informed of world events, are of such vast importance that the conditions of ocean travel have been revolutionized.

"The highest standard of efficiency has always been maintained in the equipment of the ships of the Canadian Pacific fleets. Up-to-date improved radio installation is carried on all ships. The installation in a typical radio room, on the "Empress of Scotland," comprises a one and one-half-kilowatt quenched-gap transmitter, five hundred cycle, with normal daylight working range of 500 miles; one quenched-gap emergency transmitter with range greater than 100 miles; a one and one-half-kilowatt continuous-wave valve-transmitter which has worked a distance of three thousand miles under favorable conditions; type ninety-one four-electrode valve receiver; type one and twenty-seven piano tuner, and type one hundred and twenty-three hydrodyne receiver, capable of receiving signals of a wave length up to thirty thousand meters. Also a direction finding apparatus.

"The Marconi operators aboard our ships tell many yarns about the efforts made by passengers to send the utmost in messages crowded into the fewest words. What is becoming a popular message is "Third epistle, St. John, verses thirteen fourteen," which, upon being decoded, if such a term may be used refers to the text: "I have many things to write but I will not with pen and ink write unto thee, but I trust I shall shortly see thee and we shall speak face to face." There are similar texts which convey explicit messages with a few words of wireless.

"We are just a bit proud to be able to say that the Canadian Pacific was the first

Canadian company to establish a daily all-Canadian news service for its fleet of steamships on the Atlantic, and that it maintains this exclusive feature for its passengers. The results have been very satisfactory. This news is made up daily by the Canadian Pacific, at Montreal, from the latest press dispatches from all over the Dominion and is transmitted to all Canadian Pacific ships on the Atlantic. The Canadian Marconi Company erected a special press station at Louisburg, Nova Scotia, for the purpose of transmitting such news.

"The Canadian Pacific is giving much attention to the importance of providing the latest radio direction-finding equipment on its ships, by means of which the position of a steamer may be quickly and accurately determined."

Of course the public appreciates the fact that radio programs are free, but broadcasting free verse is carrying generosity too far.—"The Evening Telegram," New York.

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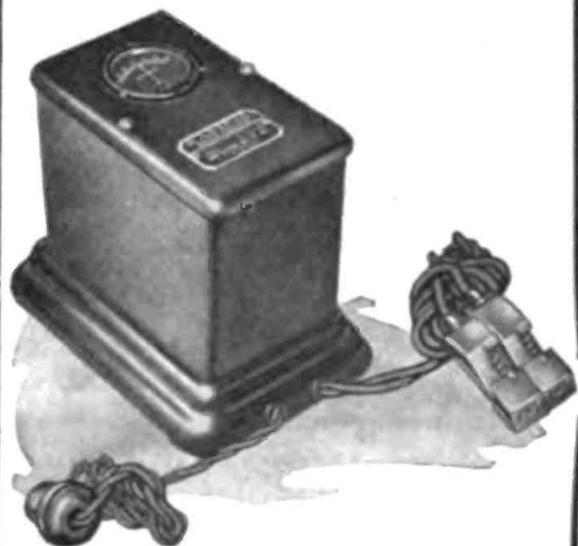
An accurately made, fully efficient instrument that cannot get out of order or adjustment. Fully guaranteed. Extra heavy aluminum plates. Condensite end pieces. All other parts heavily nickel-plated. Knob and pointer included.

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11	.00025	\$2.50	\$2.00
21	.0005	\$3.25	\$2.50
43	.001	\$3.98	\$2.98

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THE RADIO-A is a highly efficient dependable piece of apparatus, absolutely fool-proof, easily attached by simply plugging into ordinary 110 volt lamp socket. In case of current failure, the unit cuts out automatically until current is resumed, without discharging battery.

It is designed expressly for re-charging radio filament batteries, but may be used for automobile or any other storage battery of reasonable size and capacity.

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We have been exceptionally careful to see to it that every Manufacturer, Jobber and Dealer is listed and under the PROPER CLASSIFICATION. Most mailing list concerns charge more than \$100 for a list of this kind and, as a rule, those supplied are far from being correct. Compare this list with any other, and you will find it to be the very best obtainable anywhere at any price.

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Answers to Readers

What is the power of the Naval station, NAH, New York? Does this station maintain a C-W transmitter? Is this the only station operated by the United States Navy near New York?—David Lloyd Jones, Fall River, Mass.

The power at the Naval Station at New York is 5 kilowatts. There is a 3-kilowatt radiotelephone transmitter in the station which can be used for straight C-W, interrupted C-W, and, also, for voice production. This station is operated at the remote control station, New York, and is not the only United States Navy station near this city. There is a radio station at Sayville, L. I., and another at Amagansett, L. I., operated by the Navy but under the remote control station in New York City. The Navy also maintains four radio-compass stations at Sandy Hook, N. Y., Mantoloking, N. J., Amagansett, L. I., and Rockaway, N. Y. The last-named station is for compass work with the airplanes.

* * *

Will you please publish a diagram showing the method for using a buzzer for detecting the sensitive spot on a crystal detector?—RADIO WORLD Reader.

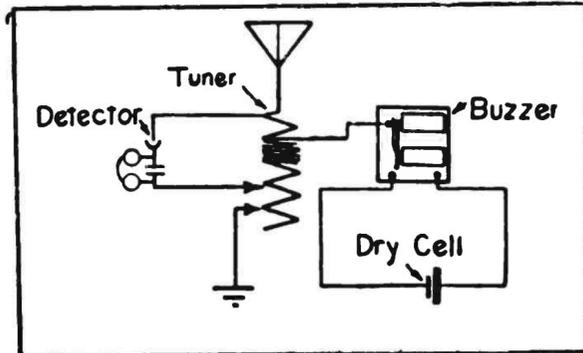


Diagram of simple method used in the selection of detector crystals, requested by "Radio World Reader." The same hook-up can be employed to assist in the adjustment of the set.

The accompanying schematic diagram shows the method of employing a buzzer with a tuning coil.

* * *

What is the relation between the length and height of an aerial?—Frank S. Smith, Omaha, Neb.

For receiving it is not necessary to have the aerial at such an excessive height. About thirty feet will do very nicely. An aerial about 100 feet long is necessary for receiving broadcasting stations.

* * *

I have a set consisting of a single-slide tuner with a pair of 2200-ohm phones, 3-wire aerial 35 feet long and 45 feet high. My aerial runs straight with the telephone lines, the distance from them being about two inches. Will this interfere with my set? At times I have trouble hearing voice from the telephone lines. What can I do to hear distinctly and eliminate interference?—Radio Student.

Answering your first query: Try and see if you can run your aerial in one stretch of about 100 feet. One wire aerial is far better than a number at a shorter distance. When erecting your aerial run it in such a manner that it will be at right angles to the telephone wires. If possible keep it clear from them as much as possible. The further you get away from telephone wires the better will be the results. Don't place your ground wire on the same ground as

(Continued on following page)

If you did not get copies of Radio World No. 1 to No. 26, send us \$3.00. Or we will send you this paper for one year, (\$6.00 for 52 issues) and start it with our first issue, which will be mailed you as soon as possible after receipt of order.

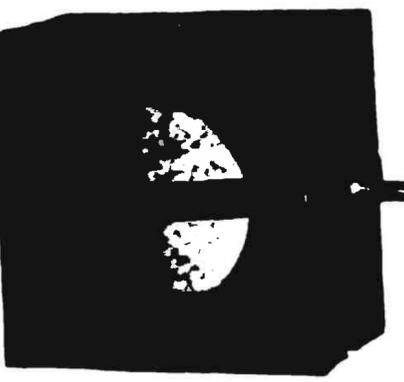
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Want to Know All About Aerials?
 Send 15 cents for a copy of RADIO WORLD, No. 28, dated Oct. 7.
 This number contains an article on the erection, care, size, and style of aerials.
 It is informative, practical, and simple.
 It is brief and to the point.
 It was written by C. D. Wagoner, a radio expert.
RADIO WORLD, 1493 Broadway, New York, N. Y.

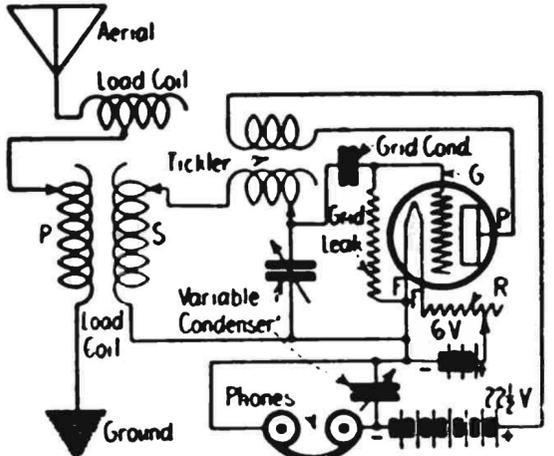
Answers to Readers
 (Continued from preceding page)

that of the telephone ground. Seek a new ground, preferably an outside ground. With all this in view signals should respond, provided you have a good crystal detector. However, we advise you to read and digest the article entitled "Why the Open Antenna Is Best for the Radio Listener," by C. D. Wagoner, in RADIO WORLD, Vol. II, No. 2, dated October 7. This is very important.

Why can't I hear the broadcasting with a one-slide tuning-coil 4 inches in diameter wound with approximately 260 turns of No. 28 wire, phone condenser, phones, detector of the crystal type, and a 1-wire aerial 80 feet long. The lead-in is about 45 feet. What should the wave-length of this set be?—Milton Semken, Salt Lake City, Utah.

It seems that your aerial is a bit short for good results. Another thing: the size of wire you are using is too small. Its resistance is too high. This wire does not operate efficiently in a tuning coil. Too many turns have a bad dead-end effect. As your set stands the maximum wave should be about 3000 meters and the minimum about 200 meters. You will have poor results on the smaller waves. You should either make dead-end switches or employ a shorter coil for the 360-meter wave.

Will you publish a hook-up of a receiver that will respond to long waves having the use of regeneration?—Harold Yankton, Detroit, Mich.



Regenerative circuit employing tickler coil and loading coil for long waves, requested by Harold Yankton, Detroit, Mich.

The accompanying schematic diagram shows the proper connections for receiving the longer wave-lengths in a receiver. All connections should be carefully inspected before any attempt is made to listen in on the set.

I am enclosing diagram of circuit used in my receiver. I would like to see a hook-up whereby one stage of radio frequency is employed with such a circuit. Have tried several hook-ups and this one gives the best results.—Thomas E. Cecil, Erwin, Conn.

In RADIO WORLD, Vol. II, No. 2, dated October 7, this circuit was fully described by Mr. C. White in his article "Constructing a Radio-Frequency Regenerator."

Can you show by diagram how the wiring is accomplished on the tuner in RADIO WORLD, No. 26, dated September 23, page 13, Figure 5? Show the number of turns and taps thereon.—M. L. Proctor, Valdosta, Ga.

This information can be had only from the Bureau of Standards, Washington, D. C., the designers of this particular receiver.

A broadcasting map for 15c. That is, a complete broadcasting map appeared in RADIO WORLD, No. 8, dated May 20 Mailed on receipt of 15c. Radio World Company, 1493 Broadway, New York City.

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EXPERIMENTS in connection with the operation of the Eastman School radio broadcasting station WHAM, Rochester, N. Y., resulted in the broadcasting of one of the finest concerts ever heard.

As radio enthusiasts have waited anxiously for the station to announce a schedule of music, experiments have been going ahead night and day in the hope that the auxiliary equipment would make possible the broadcasting of the excellent musical features of the Eastman Theatre.

Walking into the sending station yesterday morning, Arthur Alexander, director of the Eastman Theatre Orchestra and a member of the Eastman School of Music faculty, who has had years of experience in radio activities, suggested the elimination of some of the auxiliary equipment used to relay the music from the theatre to the sending station. It was agreed that it would be wise to try and simplify the equipment. Mr. Alexander directed the activities of the radio staff, and the experiments proved successful.

Those who were "listening in" were treated to a real surprise when the peal of the big Eastman pipe organ was heard distinctly and with little or no distortion. This surprise was magnified a hundredfold, however, when the strains of the fine orchestra were heard.

Football by Radio

An interpretation of this year's football rules and a general discussion of college athletics will be given from WGY, Schenectady, N. Y., on Thursday night, October 12, by Lieut. Elmer Q. Oliphant, director of physical education at Union College. Lieut. Oliphant is considered one of the greatest athletes ever developed in an American university.

He is the only graduate of Purdue University, or West Point, to win four letters, making the varsity teams in baseball, football, basketball, and track. He was All-American choice for half-back in 1915, 1916, and 1917. In 1915, he was All-American choice in basketball and as catcher in baseball. The address by Lieutenant Oliphant will be part of a "college night" program to be put on by the instrumental and glee clubs of Union College. The program will include the songs and cheers of many colleges and universities. Dr. A. R. Brubacher, president of the New York State College for Teachers, will also speak on "Tradition in College Education."

Rain by Radio

RAIN will come and go at your own will, in the future: says "The Gazette," Falls, New York.

This possibility is another prediction for the field of radio.

It was made by Marconi, the famous inventor, at his recent visit to America. Other radio engineers also have expressed the opinion that the control of rainfall by radio is possible.

Just as a bolt of lightning and thunder are forerunners of a rainstorm, says Marconi, so might radio produce the same result.

"We undoubtedly will accomplish this wonder some day," he says. "And then we will become the lords and masters of life on this planet. We will be able then to obtain any amount of power almost without effort.

"All the work will be done by the sun. Man will merely press the button.

"The developers of water power and of the radio transmission of electrical energy produced by water power will become exporters of electrical energy to less fortunately situated countries."

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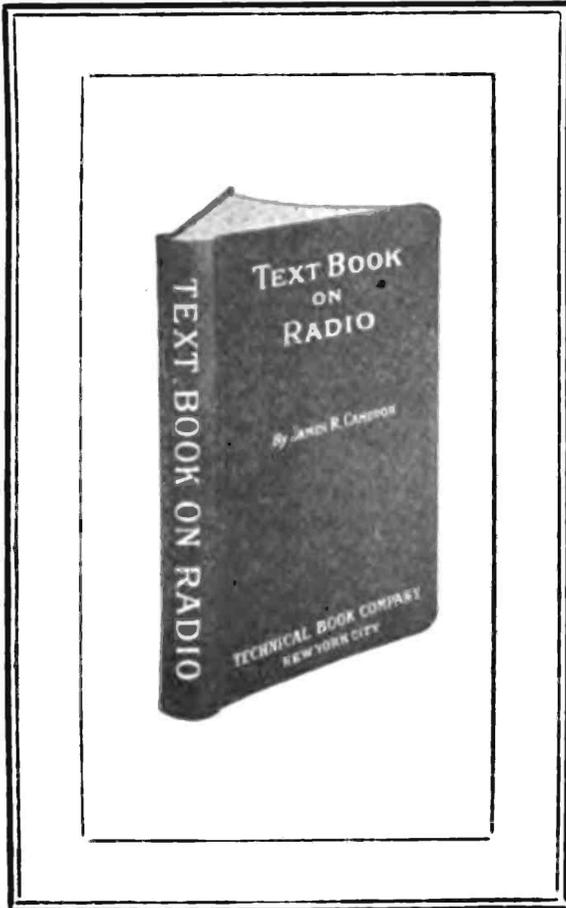
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A TABLE OF CONTENTS

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	Page		Page
"A" Battery.....	264	Aeriola Sr. Receiving Set.....	185
A C Radiophone Circuit.....	125	Alternating Current.....	38
Adjustable Filament Rheostat.....	47	Alternator, The	44
Adjusting Receiving Sets.....	177	American Radio Transmission Set.....	108
Adjusting Transmitting Sets.....	103	Ammeter Connections	56
Aerial Protective Device.....	89	Ampere	23
Aerial Construction.....	71	Apparatus for Reception of Electro-Magnetic Waves	169
Aerial Outfit.....	88	Apparatus for Undamped Wave Transmis- sion	107
Aerial Switch.....	75	Armstrong Super Regenerative Circuit.....	231
Aerial Wire.....	73	Audio Frequencies	43
Aerials	59	Audio Frequency Amplification.....	153
Aerials for Various Wavelengths.....	59		
Aeriola Jr.....	185		

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9270 Retail Radio Dealers, United States	per M.	\$7.50
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RADIO CITIZENS

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Send us a list of your radio needs for our prices.

If It's Radio, we have it and we sell it for less.

JOHN W. COCH COMPANY
WEST VIRGINIA
since 1918

RADIO WORLD

TELEPHONE, BRYANT 4796
PUBLISHED EVERY WEDNESDAY (Dated SATURDAY OF SAME WEEK)
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Advertising rates on request.

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IMPORTANT NOTICE:
While every possible care is taken to state correctly matters of fact and opinion in technical and general writings covering the radio field, and every line printed is gone over with a scrupulous regard for the facts, the publisher disclaims any responsibility for statements regarding questions of patents, priority of claims, the proper working out of technical problems, or other matters that may be printed in good faith and on information furnished by those supposed to be trustworthy. This statement is made in good faith and to save time and controversy in matters over which the publisher cannot possibly have control.

SCR-79-A, Radiotelegraph Set Heard 2,700 Miles

IN testing out the radius of one of its standard radiotelegraph sets, designated as SCR-79-A, the United States Signal Corps has established a new record of transmission between 1,175 and 2,700 miles.

A 79 set was temporarily installed in the headquarters of the 9th Corps Area, San Francisco, with the call WYCH, and communication was undertaken with Army transports on the Pacific. On one occasion, the "Sherman" reported having heard the signals from WYCH while she was 700 miles west of Honolulu—a distance of, approximately, 2,700 miles. Other signals were exchanged between the Signal Corps station and the "Buford" over a distance of 1,550 miles, and with the "Sherman" again when she was 1,486 miles away.

This record is considered very remarkable for a set designed for under 100 miles, although communication was not maintained for any length of time and interference was at a minimum.

Motorcycle Recharges Battery

A LONG spin on his motorcycle is necessary for Stanley E. Schnabel, Allentown, Pennsylvania, every time he wants to listen-in on his radio set. In a recent letter to WGY, Schenectady, New York, Mr. Schnabel, who is the Associated Press operator for the "Chronicle and News," says that he uses his motorcycle battery to furnish current for his wireless outfit and the battery generally lasts one evening. He recharges on his trip to and from work, but this isn't sufficient for the night's fun at the radio receiver, so he takes a long spin after supper to get enough "juice" for the set. He is now planning to take his set along with him in his side car, put up a temporary aerial and ground, and listen in. In this way he can start up the motorcycle every time the set is needed.

STANDARD HEADSET
2,500 OHM

Guaranteed to be equal of any phone on the market listing at \$8.00 **\$5.75**

Dealers and jobbers write.

Standard Electric Sales Co.
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The "COPPER GIANT" "B" Battery IS GUARANTEED FOR TWO YEARS

In ANY receiving set, because it does not deteriorate while standing idle. This is a very large battery designed for stationary or semi-portable installations where absolute reliability over a period of years is the first consideration. Standard voltages—22, 50 and 100. Any voltage made to order. Write for illustrations.

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CRYSTAL SET \$4

"THE LITTLE WONDER"
\$2.50 UNMOUNTED

Wonder in name and a wonder in performance. Cannot be equalled for the price. Catches distinctly everything within 25 miles.

Send for FREE catalog, describing our "Little Wonder" set and listing radio supplies.

Radi-O-Plate Panels. All sizes cut to order.

HOLLOWAY
ELECTRIC SUPPLY CO.
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Radio Supplies

Variocouplers, Variometers, Headsets, Transformers, Sockets, Rheostats, Etc.

Guaranteed 25-Mile Crystal Set **\$4**
Or Money Refunded PRICE.

Send fifty cents for 20 efficient blue-print hook-ups.

Any Radio Set Made to Order or Repaired

Sunbeam Electric Co.
71 THIRD AVE. NEW YORK

NOVO "B" BATTERIES FOR RADIO

22½ - 45 & 105 VOLTS

NOISELESS DEPENDABLE GUARANTEED

ASK YOUR DEALER

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Must sacrifice established WHOLESALE RADIO business. Controls exclusive sales agencies. Write Mr. Clay, 920 Chapman Bldg., Los Angeles, Cal.

Otherwise, Nothing Happened!

EDITOR RADIO WORLD: Being a "bug" interested in your "ideal" magazine, I take the liberty to forward you this "Hash Comic Story." I met my girl the other "nite," and as I was walking down to "receiver," her face "sparkled" with the "air" of joy, but I missed my "balance" and hit the "ground" and "2nd step." 'Twas some fall to "meter." As I fell, I heard the "crystal" of my "watch" break as I "tapped" it on the "dial." While I felt my "aerial" for bumps, who did "I-C" wandering down the avenue, a motor-car "buzzing" behind him, but "Cur-Rent" the villian. It was he who put the "damper" on my "radiation" with his sister Miss "Galena."

As he passed I "gapped" as to not "c q" was passing, my lady friend was telling me how "delightful" she was over the "vacuum" sweeper I gave her for her birthday.

Arriving at her home, her dad asked me to listen in on new set he had "resent"ly bought for "73" smackers. I did and was overjoyed.

Just then the clock "registered" three o'clock "am (p) here." It was the "signal" for me to "sign off" for the "nite." As "I-C"-was "going out" I realized that Mr. "Cur-Rent" was awaiting me with an "insulated" piece of "lead" in his "fist." I "howled" like a "squeak box" and the "copper" on his "feed-back circuit" asked me, "How do you come over." He did not know my "location." The cop said he would "charge" me with vagrancy. I told him I'd put the "Ohm's Law" on him.

He let me "pickup" my hat and told me to go "straight" home. So I took his advice and "dashed" "ohm" to my mother.—Doug Tremper, Brooklyn, N. Y.

Radio World: 1 year (52 numbers), \$6.

A B C Standardized Radio

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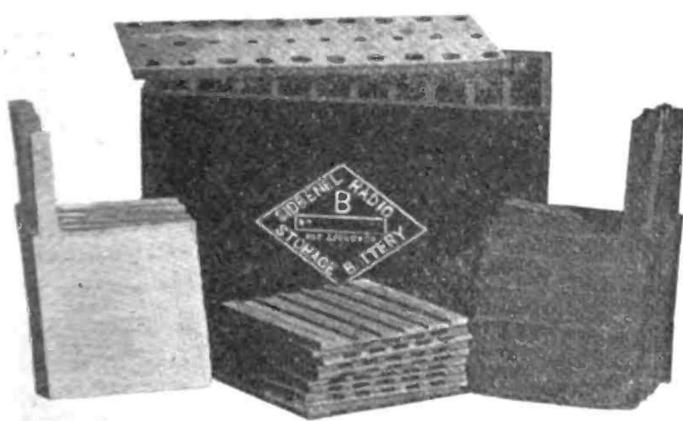
Made for All phones

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Radio Mica Products Co.,
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Pictures and Facts About Armstrong Amplifier

Radio World has published a number of pictures, diagrams and descriptive articles regarding the New Armstrong Super-Regenerative Amplifier. The numbers containing this material are dated June 24, July 8, July 15, August 5 and September 16. They will be sent postpaid on receipt of 15 cents each, the five copies complete for 75 cents. Or you can subscribe, \$6.00 year; \$3.00, six months, and have your subscription start with the number dated June 24. RADIO WORLD CO., 1493 Broadway, New York.



22 to 500 Volt "B" Batteries

Lasts Five Years

Recharged From Any Lamp Socket

The Sidbenel is a Storage "B" Battery that will last five years of constant use without replacing parts.

It will give continuous service for at least six months before it becomes necessary for recharging. It can then be recharged in a few hours to its original capacity, all ready for another six months use.

A Sidbenel Storage "B" is something every radioist needs. Think of the money saved by not using dry "B" batteries, which are of no use after they once become discharged.

The Sidbenel pays for itself in six months. It is so ruggedly constructed that rough usage will not harm it. The container is one which is of genuine hard rubber, molded into ten compartments. Size 2½" by 3" by 4½". Every inch of Sidbenel "B" is constructed under our own patents. The plates are especially treated with a newly discovered chemical that eliminates howling and screeching, so commonly found in any other "B" battery.

The Sidbenel "B" is shipped to you partly assembled—all you need to do is connect the plates together, and this takes but ten minutes and is most simple, as instructions are furnished with each battery.

Guarantee:—A two-year written guarantee is given with each Sidbenel Storage "B" Battery. This is your complete protection.

For recharging we furnish a rectifier for AC which costs \$0.25 extra. DC current requires none. Complete with directions:

One Unit, 23 volts.....	\$3.85
Two Units, 44 volts.....	\$7.50
Five Units, 115 volts.....	\$17.50
Eleven Units, 250 volts.....	\$36.50
Twenty-two Units, 500 volts.....	\$65.00

Send for free catalogue on parts, and complete sets, and prices for repairing vacuum tubes.

SIDBENEL RADIO EQUIPMENT MFG. CO.

DO YOU WANT TO BUY, SELL OR EXCHANGE RADIO OR OTHER GOODS? TRY THIS DEPARTMENT AT 5¢ A WORD

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS

This department is intended for everybody who wants quick action on short announcements covering the buying, selling, exchanging or general merchandising in the radio field. Readers of RADIO WORLD will find that it pays to read these columns every week. Advertisers will get a ten-day service here—that is, copy received for this department will appear in RADIO WORLD on the news-stands ten days after copy reaches us.

The rate for this RADIO WORLD QUICK-ACTION CLASSIFIED AD. DEPT. is 5c. per word (minimum of 10 words, including address), 10% discount for 4 consecutive insertions, 15% for 13 consecutive insertions (3 months). Changes will be made in standing classified ads., if copy is received at this office ten days before publication. RADIO WORLD CO., 1493 Broadway, N. Y. C. (Phone, Bryant 6794.)

HOOKUPS: Over 100 blueprints to select from at 10c. each. Send dollar for trial order. Radio Supply Co., Box 192, Pueblo, Colo.

TO THE TRADE—Fixed Phone and Grid Condensers. Write for price list and sample. SALKEY RADIO CO., 2378 Eighth Ave., New York City.

PATENTS—Electrical cases a specialty. Pre-war charges. B. P. Fishburne, Registered Patent Lawyer, 386 McGill Bldg., Washington, D. C.

Manufacturers of Rogers Radio Receivers and Rogers Receiving Radiometers. Rogers Radio Company, 5133 Woodworth Street, Pittsburgh, Pa.

FREE with each \$15.00 Western Electric Headset, one UV 200 Detector tube. We handle everything in Radio. NEWBURGH RADIO SHOP, 236 Broadway, Newburgh, New York.

Are you familiar with all the radio symbols used in the various hook-ups published in Radio World? If not, secure a copy of Radio World No. 26, dated Sept. 23. In this issue was a complete table of all important symbols used in radio construction and testing. Send 15 cents for a copy, or \$6.00 per year, and have subscription start with that issue. RADIO WORLD, 1493 Broadway, New York City, N. Y.

SAVE 25 TO 50% ON ALL SUPPLIES. WE SELL SUPPLIES ONLY. LARGEST STOCK.
\$1.50 Round Telephone Plug, 79c.; Flat, 60c.
\$5.00 Arrow Variometer, \$3.90. Moulded black Variometer, \$4.75. Six Dollar Manhattan Telephones, \$4.40. Best Quality V. Condensers with Dial, \$2.35. MONEY BACK Guarantee. Include postage.
AMALGAMATED RADIO SUPPLY COMPANY,
193A WILLIAM STREET, NEW YORK CITY

Navy Radio Sets Bring Bid of \$206

THE opening of bids by the United States Navy revealed the fact that forty-seven firms and individuals were interested in the 395 radio sets offered for sale recently. The highest bid received was on September 28.

It was \$206 per set, but the awards were not made until late in the week.

Any single copy of Radio World, beginning with No. 1, mailed on receipt of 15 cents postpaid. Any seven issues for \$1.00. Or send \$3.00 for 6 months (26 numbers) or \$6.00 for 1 year (52 numbers) and have your subscription start from No. 1. Radio World, 1493 Broadway, New York.

PATENTS

Protect your invention today. Write for 1922 Illustrated Book Free. Radio, Electrical, Chemical and Mechanical experts. Over 30 years' experience. A. M. Wilson, Inc. (Radio 3 ARH), 310-18 Victor Building, Washington, D. C. (Successors to business established 1891 by A. M. Wilson.)

THE LOOP'S THE THING. The coming aerial, most simple and inexpensive of all when our blue prints and specifications of the two better types are followed. Sent postpaid for \$1.00. No stamps. McGehee Development Co., Box 1337, El Paso Texas.

CASH FOR OLD GOLD, Platinum, Silver, Diamonds, Liberty Bonds, War, Thrift, Unused Postage Stamps, False Teeth, Magneto Points, Jobs, Any Valuables. Mail in today. Cash sent. return mail. Goods returned in ten days if you're not satisfied. OHIO SMELTING CO., 337 Hippodrome Bldg., Cleveland, Ohio.

FREE: Galena Crystal and Bulletin on Radio Supplies. Postage—2c. CONRAD RADIO COMPANY, 76 Boylston Street, Jamaica Plain 30, Mass.

NEWS AND GOSSIP OF THE STAGE—Send 10c. for specimen copy of NEW YORK STAR, the great illustrated theatrical weekly. \$4.00 year, \$2.00 six months, \$1.00 three months. New York Star Co., 1493 Broadway, N. Y.

BROADCASTING STATIONS: Letters and addresses of broadcasting station to-date appeared in Radio World for Oct. 7. Sent on receipt of 15c. Also a broadcasting map appeared in Radio World No. 8. Sent on receipt of 15c. Radio World, 1493 Broadway, N. Y. City, N. Y.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of Radio World, published weekly at New York, N. Y., for Oct. 1, 1922.
State of New York,
County of New York, ss.:

Before me, a Notary Public, in and for the State and County aforesaid, personally appeared Roland Burke Hennessy, who, having been duly sworn according to law, deposes and says that he is the Editor of the Radio World, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Hennessy Radio Publications Corporation, 1493 Broadway, N. Y. C.; editor, Roland Burke Hennessy, 1493 Broadway, N. Y. C.; managing editor, Robert Mackay, 1493 Broadway, N. Y. C.; business manager, Fred H. Clark, 1493 Broadway, N. Y. C.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock): Hennessy Radio Publication Corp., 1493 Broadway, N. Y. C.; Roland Burke Hennessy, 1493 Broadway, N. Y. C.; M. J. McArthur, Statler Hotel, Cleveland, Ohio.

3. That the known bondholders, mortgages, and other security holders owning or holding 1 per cent or more of

FOR SALE—Regenerative sets with detector. Complete with tube and B Battery, \$35.00. With one stage, \$50.00, complete with tubes and batteries. Satisfaction guaranteed. Edward Bittner, Schuyler, Nebraska.

Exchange jolly interesting letters through our Club! Stamp appreciated. Betty Lee, Inc., 425 Broadway, New York City.

ISSUES OF RADIO WORLD from April 1 to Oct. 7 (27 numbers) for 15c a copy, or the whole lot for \$3.15. Or send us \$6.00 for one year and start with the first number. RADIO WORLD, 1493 Broadway, New York.

DO YOU USE A CRYSTAL DETECTOR? ARE YOU MAKING A CRYSTAL RECEIVER? Increase the efficiency of your crystal detector 1,000 per cent by using a "PT" Ultra-Sensitive Contact. Of special gauge and alloy. Makes and holds a quick, ultra-sensitive, stable adjustment. Using galena, you may pound panel or table without disturbing sensitivity in slightest. Proved practical on shipboard by an old-time Marconi operator. Using a "PT" Contact on galena, Arlington (NAA) was brought in clear at 3,300 miles (below the Equator); and Arlington came in loud at 2,200 miles (off Dutch Guiana). In both instances, nearby ships using vacuum tubes were unable even to hear NAA. As to stability, Cape May (WCY) was worked over 1,000 miles, sending right through crystal with 2 KW spark, without affecting detector's adjustment. Replace your old insensitive unstable contact with one which will hold its adjustment in addition to giving louder signals and music. Indispensable for pocket sets and crystal detector-bulb amplifier outfits. A novice can install. "PT" Ultra-Sensitive Detector Contact, with instructions, twenty-five cents coin or M. O. "PT" CRYSTAL CONTACT CO., Box 1641, Boston 8, Massachusetts.

total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear on the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear on the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bond, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date above shown is.....weekly. (This information is required from daily publications only.)

BOLAND BURKE HENNESSY,
Editor.

(Sworn to and subscribed before me this 29th day of September, 1922.)

KARL H. GOTTFRIED,
Notary Public, New York County, New York County Clerk's No. 304. New York Register's No. 4328. Commission expires March 30, 1924.

Note.—This statement must be made in duplicate and both copies delivered by the publisher to the postmaster, who shall send one copy to the Third Assistant Postmaster General (Division of Classification), Washington, D. C., and retain the other in the files of the post office. The publisher must publish a copy of this statement in the second issue printed next after its filing.

YOUR PHOTO IN THIS PAPER ATTENTION AMATEURS!

Have you built your own receiver?

Are you experimenting with any particular hook-up?

Are you improving your set?

Are you doing any interesting constructive work in radio?

Why not share this knowledge with your thousands of brother fans who read RADIO WORLD every week?

We want pictures of receiving sets with descriptions of how you overcame some difficulty, or of any additional part or unit that you have added to obtain better results. These are the things that, probably, the other fellow is looking for. Send in your information; pictures or whatever you have done to improve the art.

Remember the beginner is looking for them.

We intend to print in this paper, each week, pictured information and description of value to radio amateurs. If you have found a newer or better way of doing anything, don't keep the secret but tell it to your thousands of brother fans.

Send in a photograph of your set with or without accompanying diagrams and measurement. State whether you figure in the picture yourself, or not, and without any expense whatsoever to you we will make an engraving and publish it. Be sure to write your name and address plainly on photograph.

Send in your picture at once, or if you have not made a set or done anything else in making radio material, tell the boy next door all about this offer.

Address Technical Editor

RADIO WORLD, 1493 Broadway, New York City, N. Y.

Broadcasting Suffering in Germany

BROADCASTING in Germany seems to be suffering from an overdose of "verboten," according to reports reaching the United States Department of Commerce from Vice-Consul Nathaniel B. Davis, at Berlin, says an International News Service dispatch from Washington. With apparatus costing a great deal of money, and with Government restrictions weighing heavily, the amateur does not enjoy anything like the freedom of activity that obtains in this country.

The German Post Office Department, which is in charge of all radio communication, permits private companies and individuals to build their own plants only on payment of a license fee. Ordinarily, the department itself installs the plants; it also rents receiving sets for 2,500 marks a month.

Orange Label Tea

Special 10¢ Tins

So good,
you ask
for more!



Enjoy a cup of *good* tea—let it greet you at breakfast, cheer you at luncheon, revive you at dinner and promote refreshing sleep.

Also sold in 1 lb., 1/2 lb. and 1/4 lb. TINS

A Generous Sample will be sent on request. Address: Ridgways, Inc.,
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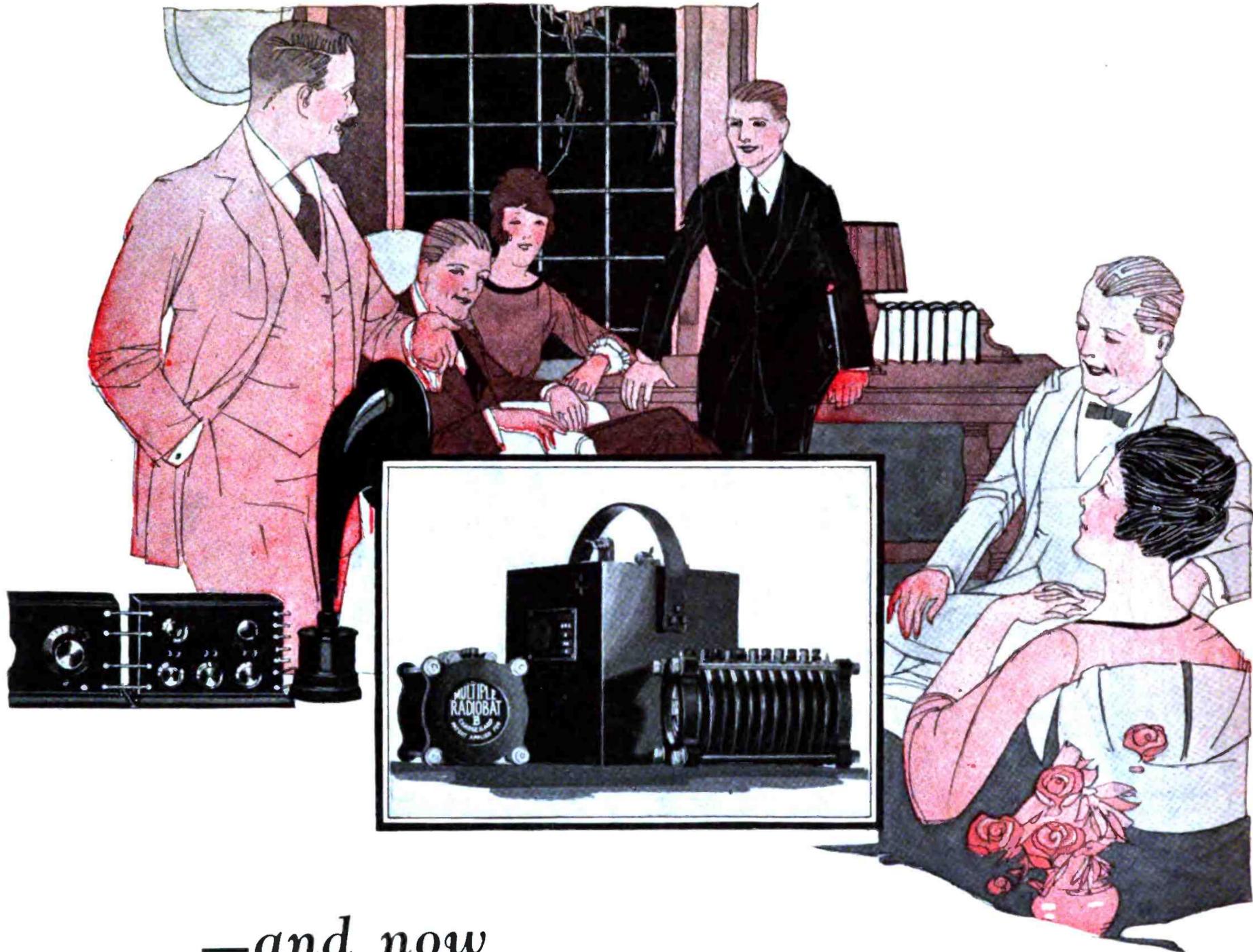
Ridgways Tea



GOLD MEDAL San Francisco 1915



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—and now
harmony replaces discord!

MUSIC—clear as a bell; speech—so that every word is marvelously distinct; jazz—in uninterrupted syncopation; opera—with that transcending, full-toned quality which brings its remarkable beauty into strong relief.

This sort of radio reception *is* a matter of *batteries*. Elimination of most *noises* is a matter of batteries, rather than static or other interference.

These noises are caused by the *irregular* voltage output, natural in ordinary "B" batteries. Where the current output becomes unvarying, these noises cease—and this marvelously clear and life-like reception results.

And it is because RADIOBATS "A" and "B" are the only batteries which act as radio batteries *should*, that we urge you to listen to a demonstration at your dealer's.

Until you have actually heard reception through RADIOBATS "A" and "B" you cannot imagine how wonderful radio can be—and there *is no way* to hear it, till these epoch-making, new-principle batteries are hooked in.

RADIOBATS "B"—as well as "A"—are *leak-proof* because they have the only *solid electrolyte*; and they are more economical, because, like "A" Batteries, they are indefinitely *rechargeable at home*.

Send now for the intensely instructive booklet "The permanent Power Unit for Radio" and send your dealer's name and address so that we may arrange an immediate demonstration. There is absolutely no obligation.

MULTIPLE STORAGE BATTERY CORPORATION
 350-A Madison Avenue, New York



"A"
 and
 "B" **RADIOBATS**
The Permanent Radio Power-UNIT

