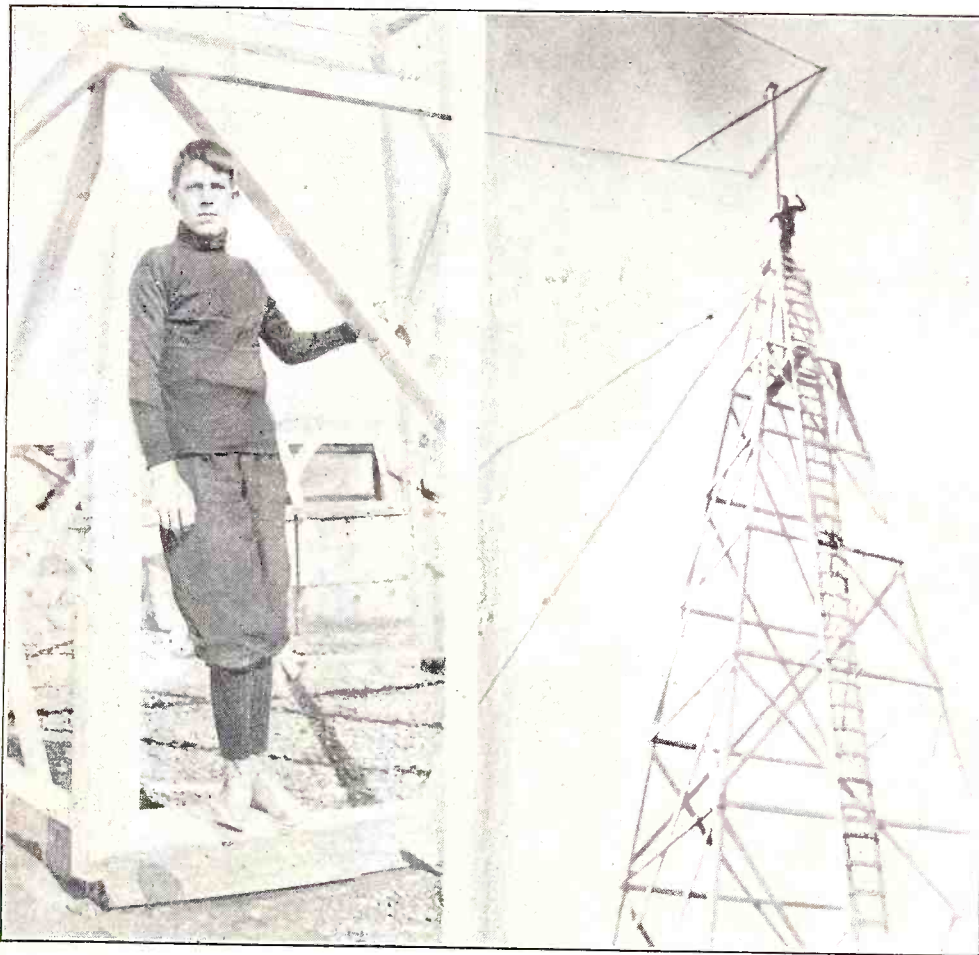


RADIO WORLD

(Trade Mark)

ILLUSTRATED. WEEKLY

Radio Achievement of 15-Year-Old Radioist



AT the left, Peter Black, Jr., of Prince Rupert, British Columbia, stands beside the base of his radiophone aerial tower. At the right, he poses at the top of the 120-foot wooden structure to show his nerve.

The tower, which the fifteen-year-old boy built himself, stands upon the roof of his father's hotel in British Columbia. So powerful is his set that he frequently hears Honolulu, also Seattle 500 miles away, and even San Francisco, 1,300 miles away. This is his regular evening diversion.

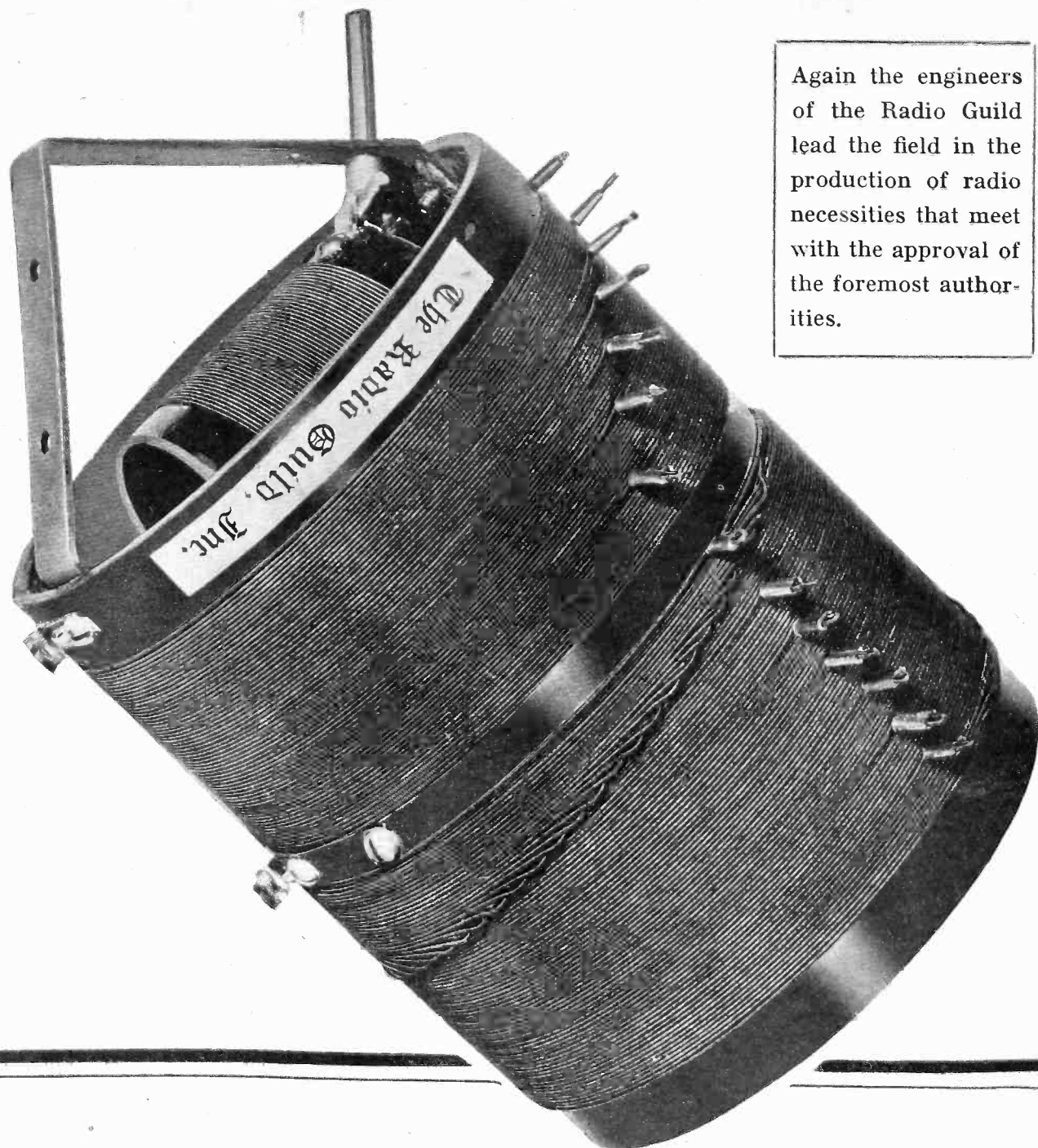
His apparatus consists of one De Forest long-wave tuner, one Tuska short regenerative-outfit, one detector, three stages of audio frequency, a 50-watt C-W transmitter, and one Magnavox amplifier.

Peter Black, jr., has been a radio fan since the age of six. The tower as well as every detail of installation is all his own.

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

**National Radio Week—December 23 to 30 (inclusive)
Be a National Radio Week Booster!**

**DETECTORS—AND HOW THEY WORK—See Page 4
Wave Meter for Amateur Operators Required by Law 6. 2**



Again the engineers of the Radio Guild lead the field in the production of radio necessities that meet with the approval of the foremost authorities.



“Multi-Range” (Bank Wound Coupler)

Passed the strict requirements of the RADIO NEWS LABORATORIES and awarded their Certificate of Merit.

Pronounced by the “N. Y. Evening Mail” Laboratories as “the finest bank wound coupler produced” and awarded their Certificate of Excellence.

Scientifically designed by experts, the “MULTI-RANGE” Coupler permits the easy construction of an efficient short and medium wave receiver at low cost. Wave-length Range 150 to 3,400 meters.

Specifications

Bakelite Tubing; green double silk covered wire, wound by hand and moisture proofed; heavy nickel-plated metal parts; convenient solder taps; 180° coupling; Litz wire rotor leads.

List Price, \$11.00

DEALERS: The “Multi-Range” Coupler is widely advertised. Write for special discounts.

The Radio Guild, Inc.

256 W. 34th Street

RADIO-FREQUENCY SPECIALISTS
Designers and manufacturers of the VOX
HUMANA, the Receiver with the Living Voice.

New York, N. Y.

VOLUME TWO

RADIO WORLD

[Entered as second-class matter, March 28, 1922, at the Post Office at New York, N. Y., under the act of March 3, 1879.]

A Weekly Journal, Published Every Wednesday and Dated Saturday, by Hennessy Radio Publications Corporation from Publication Office, 1493 Broadway, New York, N. Y. Telephone: Bryant 4796.

Vol. II, No. 6. Whole No. 32

November 4, 1922

15c. per copy, \$6.00 a year

Radio Frequency Set Operates in Interior of Automobile

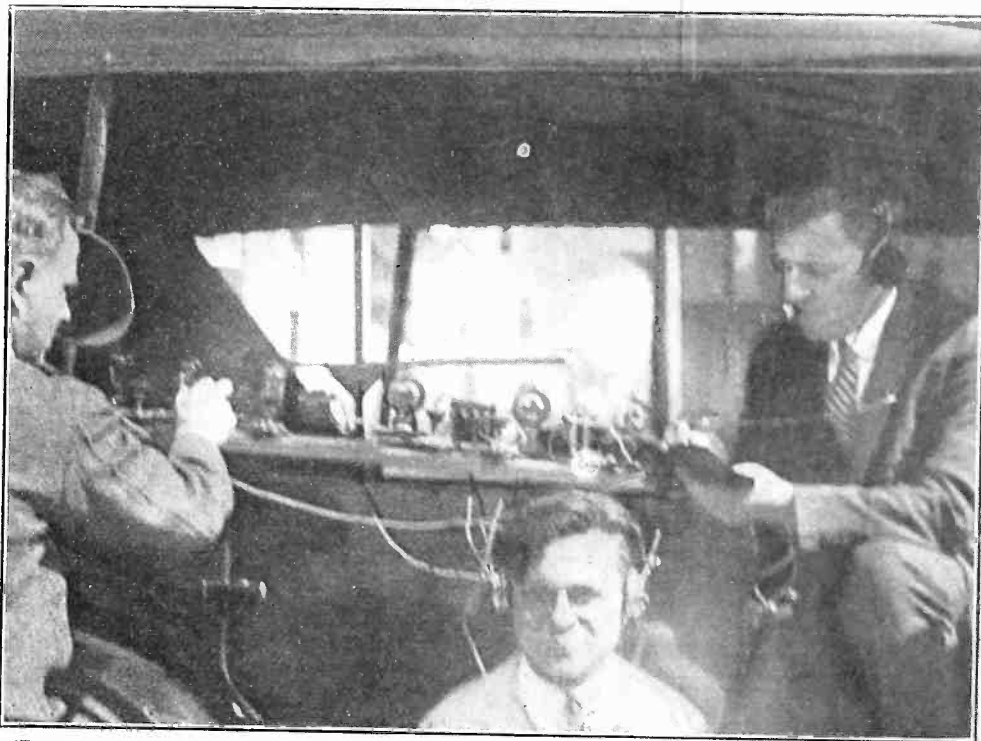
THE day may arrive when the radio sets capable of receiving music clearly from distant points, will be reduced to the simplicity of one knob for tuning; for the present, however, simplicity exists only in the inexpensive receiving sets for the reception of radiotelephone and radiotelegraph signals, at short range. When it comes to receiving sets for long range, satisfactory results may be obtained only from elaborate equipment; and the more elaborate the apparatus the greater the care and skill required for its successful operation. Take the simple receiving sets, for example; there is little or nothing to master in the way of operation. Such sets generally have a multipoint switch to control the wave length and detector. If a crystal detector is used, it must be accurately adjusted for the utmost sensitiveness and this necessitates care. Of course, there are the tubes with audio-frequency and radio-frequency hook-ups. The radio-frequency type of receiver employing vacuum tubes is coming into general use among experienced amateurs for long-range reception. The loop aerial comes in connection with such a set. In the case of audio-frequency amplification, the amplifying is done after the signals have been passed through the detector and rectified so as to produce audio-frequency currents, while the radio-frequency amplification of the waves are amplified before they are passed to the detector.

The advantage of the radio-frequency amplifier lies in the fact that it amplifies only the wave and not the many little irregularities and imperfections which exist in the usual receiver and amplifier equipments.

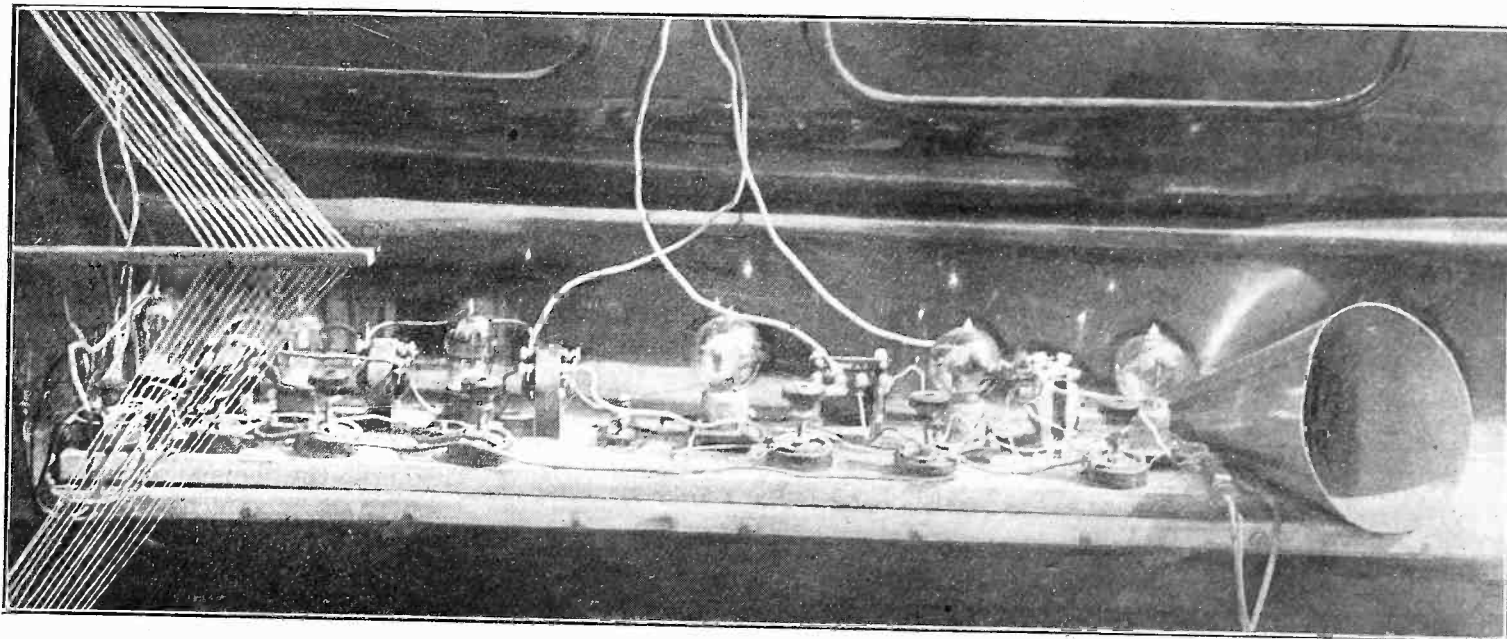
The upper photograph shows a radio-frequency set made by Peter Smaney, a Newark amateur, to operate in an automobile owned in Lavalette, New Jersey, a town claimed by experts as "dead"

to all radio signals. Although expensive sets with big aeriels had failed to get a signal, this small portable outfit using an 18-inch loop for an aerial brought in Newark and Pittsburgh so clearly that music could be heard by persons twenty feet from the head sets. The complete set is shown in the lower picture. It utilizes three

stages of radio-frequency with a detector and three steps of audio-frequency for amplification. The loop aerial may be seen with the layout and home-made horn for loud signals. This set has been carried in this car for some time. With it the most satisfactory results have been obtained by using radio-frequency as a means of amplifying.



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



One of the Most Delicate Parts of a Receiver

By George W. May, R. E.

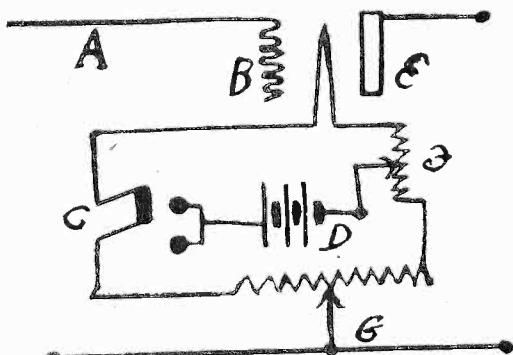


Figure 1—Schematic hook-up of the vernier rheostat. A is the grid circuit. B the grid of the tube. E the plate of the tube, C the switch. D the A battery. F the rheostat. G the potentiometer and arm.

THE detector tubes now on the market require careful attention and correct adjustment of the plate battery for satisfactory results. As a matter of fact, here are no two tubes possessing the same characteristics either in filament current or plate voltage. It is very easy to make adjustments on the filament, since the rheostat gives very fine control of the current. Vernier rheostats may be purchased. These vernier rheostats have an extra arm built on the same shaft as the regular arm, and it travels over a single fine wire tightened around the body of the instrument. This is very practical as it enables the operator to regulate the filament temperature *very* closely which, sometimes, is very desirable.

The high-voltage batteries may be purchased tapped; the battery should, in fact, be tapped. Changing the number of cells in a B battery would change

the positive potential on the plate. If the positive potential on the plate became greater, it would have a greater attraction for the flying electrons in the tube; hence, in a given time, more electrons would arrive at the plate and be pumped around the circuit by the battery. Such B batteries as are used for this change of high potential are of the high-voltage type, as previously explained. They have five or more brass strips on binding posts secured into the sealing compound. Each one of these cells is connected to a cell in the battery. So by connecting with the different posts, different values of voltages may be obtained.

Jumping from one post to another on the battery may be done by employing a clip; but it is much more convenient and easier to put five contact points and a switch arm on the panel of the receiver and so be able to vary voltage by simply turning the switch arm. Of course, this necessitates a little hard work, but it is compensated for by the ease and rapidity with which tubes may be tested to determine the relative efficiency of different makes.

The connections are shown herewith. Each strip on the battery is connected to a contact point on the panel, while the switch goes in the rest of the hook-up, as indicated. There is one interesting point here which must be noticed. If the switch arm is so wide, or the contact points so close together that the end of the blade touches two posts at the same time, the cell between these two posts will be short circuited. In other words, if the switch is kept in

this position for more than a few minutes, the cell will be ruined and it may be necessary to purchase a new battery. To overcome this it would be a wise stunt to insert an extra switch point in between the five regular ones; the extra ones will not be connected with anything. These will simply act as spacers and be dead.

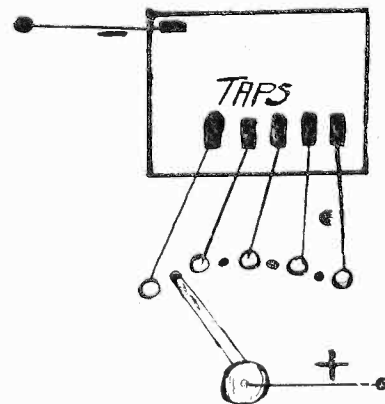
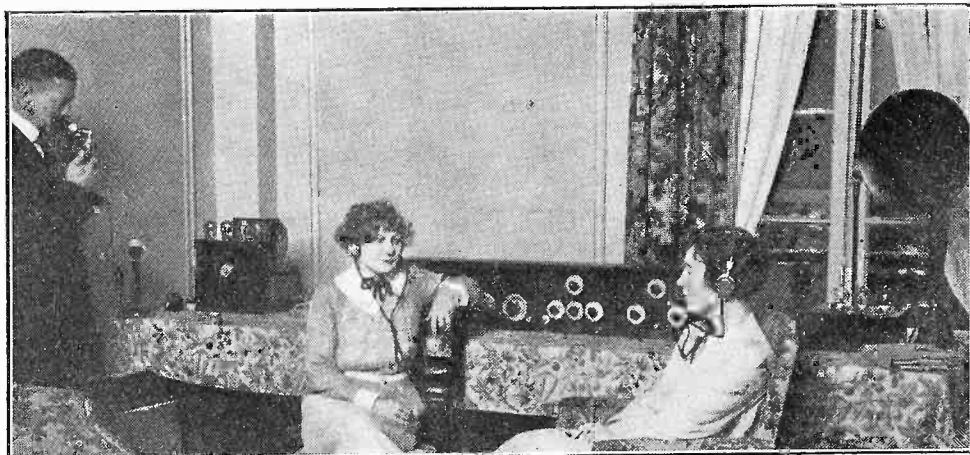


Figure 2—The tapped B-battery with control of voltage utilizing a switch arm.

As an added instrument, an A battery potentiometer may be used. This gives extra-fine adjustment of the tube; but it really is not necessary except in radio-frequency amplifiers. The correct method is shown in the accompanying sketches. The ends of the winding go directly across the 6-volt battery, while the arm is the common terminal for the input and output circuits of the tube. It will be noticed that the potentiometer, notwithstanding its high resistance, acts as a drain on the battery in order to do away with this loss and to have the instrument connected only when the set is used. It is suggested that a double-throw switch be used. This cuts off the filament as well the potentiometer at the same time.

The use of this device is simple. Before making any other adjustments, set the arm at the middle of the winding. Now proceed to experiment with the values of the other elements of the tube control, get what you think are the correct amounts, and then listen in. While doing so, move the potentiometer arm slowly either way until signal strength is secured. Remember that the action of the B battery may be compared to a pump. When it forms part of a circuit, it pumps electrons out of its negative terminal and into its positive terminal. The flow of electrons is around the circuit. This flow is a current of electricity. It may be measured by an ammeter placed at any convenient point in the circuit.

Yes, Radio Is Quite au fait!



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

The leading hotels of America now have their radio rooms, and guests hear the finest concerts. This photograph was taken in the "Radio Room" of the Greenbrier Hotel, White Sulphur Springs, West Virginia. Harry Sadenwater, radio engineer of the General Electric Company, New York, is announcing the next number on the program; Mrs. Charles F. Thompson of Washington, D. C., and Mrs. A. N. Fay of Pittsburgh listening in.

National Radio Week Has Been Set for December 23 to 30 (inclusive)

Major J. Andrew White Appointed Chairman of Executive Committee. Preparations and Programs to Be Planned At Once

NATIONAL RADIO WEEK has been definitely set to take place from December 23 to December 30 (inclusive). This was decided unanimously at the meeting of radio magazine editors, publishers, and representatives of the radio trade, the National Radio Board of Trade, and the American Radio Exposition, held at the Bankers Club, New York, on October 24.

So the idea suggested by Radio World, in its issue of October 21, becomes an assured fact. Radio World is pleased—happy beyond expression—that National Radio Week is not to be confined to its efforts alone, but is to be—as it should be—a big, broad, national affair in which every radioist—man, woman and child—may not only take active part but feel that he is an integral factor in its success.

The meeting at the Bankers Club—preceded by a luncheon at which the greatest optimism in the future of radio was expressed—was presided over by L. S. Byers. Among those present were: Frank Hitchcock, Postmaster General under President Roosevelt; H. Gernsback, Editor of "Radio News"; Lawrence A. Nixon, managing editor, "Radio Dealer"; Amedee J. Casey, "American Radio Journal"; John Gillette, "Electrical Merchandising"; Austin C. Lescarboua, "Scientific American"; Mr. Crosby, "Modulator"; Mr. MacAttammany, "Radio Retailer and Jobber"; Mr. Wardrop, "Radio Merchandising"; Arthur H. Lynch, "Radio Broadcast"; Kenneth B. Warner, "Q. S. T."; Mr. Henderson, "Talking Machine Journal"; Mr. Robertsen, "Talking Machine World"; Mr. Miller, "Radio Digest"; Mr. Callahan, "Radio Topics"; Kenneth Payne, "Popular Science Monthly"; Roland Burke Hennessey, editor, "Radio World"; Walter Gordon Clark, Harold Bolster, George Brokaw Compton, Chester D. Humphrey, and Messrs. Davis and Hunter, of the National Radio Chamber of Commerce.

Major White was appointed chairman of an executive committee to take charge of the details of preparations for National Radio Week.

A supplementary committee of one hundred will be appointed. The members of this committee will be published in the next issue of Radio World.

So National Radio Week takes definite shape and form! The week (December 23 to 30 inclusive) was chosen not only because this is to be actually "A Radio Christmas," but because it will give wider scope for broadcasting and for amateur transmitting. It is a week when the younger element—whose interest in radio is as keen as that of the grown-ups—

will have ample time to join in the many festivities that will be planned and carried out.

National Radio Week, remember, is not a local affair. It extends to every hamlet in the country. Every fan and amateur is expected to take part—and particularly, for the future of radio, to interest his friends in the new science; to bring strangers into the evergrowing radio field.

Watch Radio World for National Radio Week news. And let us hear from you if you have any practical suggestions that will help to make the week a history-making one.

"What would you do to make National Radio Week a success?"

Let us have your answer to this question.

Letters commending National Radio Week continue to pour into the office of RADIO WORLD. Here are just a few of the many received. They show the trend of opinion:

O. H. Caldwell, editor of "Electrical Merchandising," will give his publication's aid:

Congratulations on your plan for a National Radio Week! "Electrical Merchandising" will publish an announcement in its next issue regarding this idea. It opens up interesting opportunities. Please keep us in touch with any developments that take place in your program.

Major General George O. Squier, Chief Signal Officer, U. S. A., will cooperate:

I believe it is a very good idea. Anything that will help to stimulate an interest in the radio art and bring about a wider diffusion of the knowledge of the art is worthy of every effort. I have no specific suggestion to offer; but I shall be glad, in a general way, to cooperate in any way I can to help towards the success of this enterprise.

Major J. D. Felsenheld, Radio editor, "The Jerseyman," Morristown, N. J., is in line:

This department will be glad to cooperate with you to the fullest extent in putting over a big National Radio Week. If you can go through with it, the stadium stunt will suffer a total eclipse. Let us know if we can be of any assistance.

Glenn Howell, Lieutenant-Commander United States Navy, says N. R. W. should accomplish results:

Your suggestion for National Radio Week is believed to be very appropriate and, no doubt, should accomplish results which would be beneficial to the radio business and science as a whole. Should it be desirable for the Navy to take an active part in such a celebration, it would be necessary to consult the Secretary of the Navy. You have my best wishes for the success of this venture.

Be a National Radio Week Booster

Last-Minute Radio News

WIRED RADIO is the latest corporation to file its charter in Wilmington, Delaware. Its purpose is to develop systems. The capital stock is \$10,000,000. The holding company is the Corporation Trust Company of America.

Recent modification of the rigid laws governing the installation of radio telephone and telegraph stations have made possible the installation of radio broadcasting, according to Vice-Consul Edwin B. Montgomery of Montevideo. Applications are now pending which, if granted, should mean the opening of a splendid market for radiotelephone receiving apparatus in Uruguay.

Application for Government sanction to establish a radiotelephone system has been made by the Daido Electric Power Company, of Nagoya, Japan, according to advices received by the Department of Commerce. The company proposes to operate this system primarily for its own convenience in connecting the various stations with its electric light and power system, but its

use may be extended to the general public. As at present planned the wireless system will start from Okuwa in Nagano Prefecture on the Central Japan Railway Line, from which point communication will be established through Nagoya and as far as Osaka, a distance of about 150 miles. American firms interested in the possibilities of supplying equipment may obtain the name of the purchasing agents for the Daido Company in the United States from the Electrical Equipment Division, Bureau of Foreign and Domestic Commerce.

More About the Telephone Mystery

Editor, RADIO WORLD:

In your issue No. 28, dated October 7, I read the letter from Albert Lundberg, Fairdale, North Dakota, in regard to re-

ceiving telephone messages from a near-by telephone line.

I had a similar experience. Sometime back, a friend and myself, while experimenting with standard regenerative receiver-circuits, put in a short ground line house-telephone system so that we could compare notes on our work. By accident we discovered that we could talk to each other through the transmitter of the house phones and receive through the radiophones. Further experiments convinced us that a standard ground-telephone system would radiate sufficient induction to be received by a radio receiver (regenerative) as far as 50 feet from the receiving instrument. This experience may afford some one a chance to do some work along this line.—R. O. Nemeyer, 497 Winona Avenue, Pasadena, Calif.

Radio-Equipped Polar Weather-Stations Sought

By Washington R. Service

WITH the perfection of radio communication, great progress has been made in another science which is, perhaps, of equal value to the world at large, particularly the seafaring and agricultural nations. Meteorology has advanced with leaps and bounds during the past few years. Due chiefly to radio, the outposts of meteorological knowledge have been pushed far afield into distant and unpopulated wilds where, previously, lack of communication has withheld local weather conditions from the world.

Last winter, an American engineer, Hagbard D. I. Ekerold, spent months on a barren rock 400 miles north of Iceland, in the Arctic Ocean, as the leader of a meteorological expedition backed by the Bergen Geophysical Institute. His observations were believed so important to the rest of the world that an observatory was established by the Norwegian Government at Jan Mayn, this lonely spot of rock in the Arctic sea.

This new northern observatory has a wireless station, so that weather observations may be broadcast as fast as noted. Scientists hold that this, the station farthest north, is the beginning of a new epoch in the history of science, admitting that credit is due to radio.

Meteorology is fast becoming an international study, for the storms and weather of one country soon affects the situation in another, and, to-day, the immense area covering the whole of Europe, Northern Africa, and the Near East, as well as the United States and Canada, is combed with great care by weather observers and their reports received at central points, abstracted and broadcast by radio daily from Washington, Paris, and a few substations. Thus it has become possible for meteorologists to obtain within twelve hours of the taking of the observations, a representative meteorological situation over the greater part of the Northern Hemisphere, extending from the Pacific Coast of America to Russia and Egypt.

Professor Bjerknæs, of Norway, who has done much to advance our knowledge of cyclones forming in the temperate zones, holds that weather conditions there depend chiefly on the conflict between two streams of air—a cold current flowing southward from the north Polar regions and a warm current drifting northward from equatorial sources already well known. These air streams, he believes, meet along a wavering front in the temperate zone, and in their intermingling create those mysterious swirls in the

atmosphere which are called cyclones. To study these possibilities, he desires to establish a chain of radio-equipped observation stations near the Pole, from the records of which the tracks followed by the Polar current southward and the centers of conflict with the warm currents may be definitely determined. Such a series of circumpolar meteorological posts will have more than theoretical importance when regular forecasts for the North Atlantic are required in connection with daily air flights between Europe and America, he says.

This Observatory at Jan Mayn, which transmits by radio observations six times daily, constitutes the first link in the chain with Spitzbergen. Mr. Ekerold has made a proposition to England, the United States, and Canada, to establish a third link in the Arctic chain at Baffin Island, on Davis Strait near Western Greenland, over a thousand miles from Jan Mayn, Iceland, and Newfoundland. This third radio station would aid materially in studying the weather in the Far North which is practically unknown. From these stations observations aiding in establishing forecasts for the Northern hemisphere and the North Atlantic trade and air routes would emanate.



(Cartoon by Lawrence B. Hinekley)

TOO DEEP FOR DAD

Young Amateur: "Say, father, if I hook up a five-thousandth-microfarad condenser on the antenna circuit, and a variometer in the plate circuit of the electron-relay, do you think my set will oscillate?"

19 More Broadcasters Are Licensed

TWELVE licenses were issued by the Department of Commerce to 360-meter broadcasters and seven to Class B Stations operating on 400 meters, as follows:

Limited Commercial or Broadcasting Stations for 360 Meters, Licensed Between October 14 and 21, 1922.

WMAY—Kingshighway, Presbyterian Church, St. Louis.

WNAT—Lennig Bros. Co., Philadelphia.

WNAH—Manhattan Radio Supply Co., Manhattan, Kansas.

WOAV—Pennsylvania National Guard, Erie, Pa.

WMAW—Wahpeton Electric Co., Wahpeton, N. D.

WTAW—Agricultural & Mechanical College of Texas, College Station, Texas.

WPAA—Anderson & Webster Electric Co., Waco, Nebraska.

WNAJ—Benson Co., Chicago.

WMAN—Broad Street Baptist Church, Columbus, O.

KFBV—Clarence O. Ford, Colorado Springs, Colo.

WMAX—K. & K. Radio Supply Co., Ann Arbor, Mich.

WSAV—Clifford W. Vick, Radio Construction Co., Houston, Texas.

Class B Station to Operate on Wave Lengths of 400 Meters, Licensed Between October 14 and 21, 1922.

WDAF—Kansas City Star, Kansas City, Mo.

WOC—Palmer School of Chiropractic, Davenport, Iowa.

WHB—Sweeney School Co., Kansas City, Mo.

KDKA—Westinghouse Electric & Manufacturing Co., East Pittsburgh.

WSB—Atlanta Journal Co., Atlanta, Ga.

WFI—Strawbridge & Clothier, Philadelphia, Pa.

WBAP—Wortham-Carter Publishing Co., The Star Telegram, Fort Worth, Texas.

"My short experience with radio convinces me that future generations have something to live for."

—Sir Thomas Lipton.

Keep Your Clocks Right by Radio

By Carl H. Butman

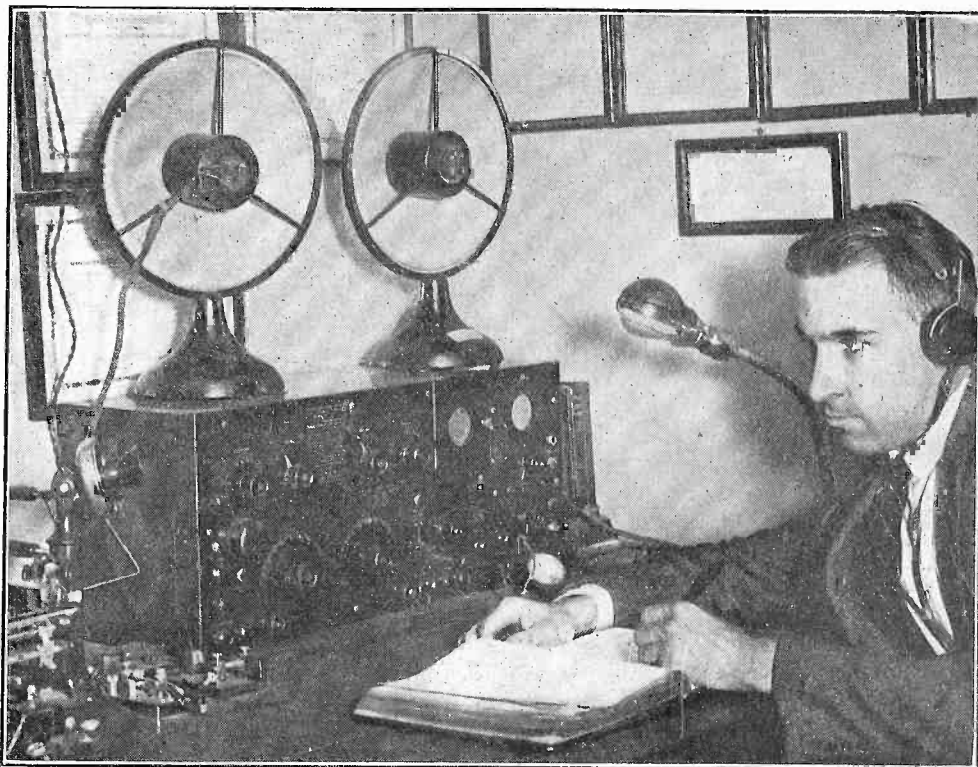
WASHINGTON, D. C. — Through Naval Radio broadcasts, it is now possible to set clocks and watches to standard time twice daily. At noon, and at 10 o'clock every night, the Naval radio stations at Arlington, Annapolis and Key West transmit radio signals, indicating the exact time for the 75th meridian or standard eastern time.

The actual time is kept at and sent from the Naval Observatory in Washington, the source of standard time for the territory east of the Rocky Mountains, the chronometer and time office at the Naval Station at Mare Island, California, serving the western territory and ships off the Pacific Coast.

In a deep, even-temperature vault at the Naval Observatory three Riefler clocks keep sidereal, or star time, and although they are not quite correct, it doesn't matter. They are checked by the observation of certain stars as they cross the meridian, and their exact error and rates of error calculated. Having obtained the exact Washington sidereal time, a correction for the difference in longitude of Washington and the 75th meridian—which is 8 minutes and about 15 seconds—is made to secure Eastern Standard time. This is kept on two transmitting clocks, one of which sends out the time signal to the three radio transmitting-stations by means of a relay.

Previously to sending the time signals, the sending clock is checked with one of the standard Riefler clocks by comparing their ticks which are recorded on a chronograph, wavy pen lines indicating the separate ticks. These are measured by a finely divided scale and compared. Determining the error, the sending clock is speeded up or slowed electrically until its ticks correspond exactly with the standard clock.

The ticks of the transmitting clock are sent to the three transmitting stations by closing a switch at the observatory, but they are broadcast by radio from the three stations. Five minutes is required to send a complete time-signal, starting at 11:55 and running to noon, and from 9:55 to 10 p. m. The time signals consist of telegraphic dashes every second except the 29 of each minute, the 55th to 59th seconds of the first four minutes, and the 50th to 59th seconds inclusive of the last



(C. Kadel & Herbert)

Radio fans wonder how WJZ, Newark, New Jersey, retransmits the Arlington, Virginia, time signals every day. The time signals are received from Arlington on this heterodyne receiver, after which they go through the amplifiers to the aerials. This heterodyne receiver operates on from 250 to 2500 meters. The photograph shows Raymond F. Guy, well known to radio audiences as "O.G.N.," retransmitting the Arlington time signals.

minute before the hour. Each of these blanks is caused by a missing tooth on an otherwise complete gear-wheel. Following the 59th second of the last minute, there is a long dash commencing at the beginning of the new hour. Listen in for NAA on 2650 meters and set your clocks then.

By means of a radio receiving set at the observatory the message of ticks may be caught and recorded

on a chronograph for comparison with the sending clock's record to determine the loss in transmission. It average about .09 of a second. The time signals sent from Annapolis on a wave length of 16,900 meters have been heard in Australia, while in the Antipodes time signals have been heard coming around the world both ways. With a receiving set it is now no excuse to say "my clock was wrong."

Better Radio for Infantry Units

SIGNAL Corps radio engineers are perfecting a better field-radio set for army infantry units. The present spark set, SCR 105, developed during the World War, has become practically obsolete and continuous-wave sets are desired.

A board of Signal Corps officers, which met at Camp Vail, New Jersey, recently, has recommended that surplus sets such as SCR 79-A, 127 or 130 be issued to infantry regiments for training purposes until continuous-wave sets can be developed and distributed to replace the old 105s. Recently the continuous-wave sets were adopted for all Army radio communication.

The old 150 sets are quenched-spark sets used for transmitting and receiving between headquarters, usually not more than five miles apart, but if an amplifier was employed by receiving stations it was useful up to about thirteen miles.

The SCR 79-A, one of the sets recommended by the board as a temporary

substitute, is a vacuum-tube set designed for transmitting undamped waves and for receiving either damped or undamped signals. The transmitter delivers about ten watts to the antenna, and the messages will carry about twenty miles on waves between 500 to 1100 meters. This set was designed for use at command posts, or at headquarters, where transportation is available.

Details of the new sets are not completed, but it is understood that they have a range of about ten miles, and will be used between regiments and brigade headquarters.

Radio Don'ts

Don't attach ends of antenna to power or telephone poles.

Don't connect a radio set direct to the electric light circuit.

Don't forget that tickler coils are not used with crystal detector sets.

The Radio Primer

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

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

By Lynn Brooks

What is a variable condenser?

A VARIABLE condenser consists of a number of semicircular metal plates arranged in two sets. One set is stationary; the other may be moved on a pivot so that both enter between the stationary plates but without touching them. All the stationary plates are connected and, likewise, the rotating plates. The plates may be of aluminum, brass, or any other metal that retains its shape.

* * *

What is the function of the variable condenser?

The variable condenser supplies an electrical quantity known as capacity. Radio circuits are made up of inductance and capacity. Tuning coils supply much of the inductance while condensers are depended on to supply the capacity. Perhaps a clearer idea of capacity would be gathered if a condenser were to be considered as a miniature storage-battery which catches and holds the minute electrical impulses until there are sufficient to make an impression on the head phones.

* * *

How does a variable condenser store up these impulses?

Strange as it may seem, it is not the metal plates in a condenser that hold the impulses, but rather the air between the plates. The impulses come in from the aerial and are transferred to the detector circuit by simple tuner, loose coupler, variometer, or vario-coupler. The sounds are made up of little trains

of waves. These trains come into the metal plates of the condenser and cannot jump from one set of plates to the other. Thwarted, they are still able to strain or twist the air between the plates. This action is the same as when a piece of soft rubber is twisted in one's hands. So long as the pressure is maintained, the twist will remain; but if one hand is removed, the rubber returns to its former shape and size. In the condenser, the waves strain the air and the air holds the strain until it has stood all it possibly can. Then it "back fires," to use a common term.

* * *

Are other than variable condensers used in radiophone sets?

Yes. There are grid condensers, fixed condensers and the by-pass condenser. These are used in receiving sets.

* * *

What is the grid condenser?

When a train of waves enters from the aerial through the secondary of the loose coupler or vario-coupler, the grid is affected with an alternation of positive and negative waves. As previously described, the flow of electrons from the filament is helped when the grid is positive, and hindered when the grid is negative.

* * *

What is a grid condenser made of?

A few square inches of tin foil separated by a good grade of waxed paper, both materials being folded several times to conserve space.

Radio Terms That Puzzle Beginners

NEW radio fans seem to have difficulty in understanding many of the technical terms connected with the art. In many cases, incorrect definitions are published. These frequently cause confusion, and poor results when applied to the operation of radio instruments. A few of the more important terms are herewith defined:

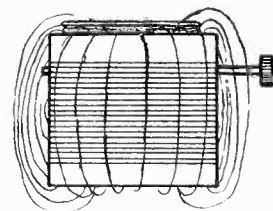
Crystal Set.—This type of receiver derives its name from the form of detector used with it. A detector of this sort depends for its rectifying qualities on a little crystal

of one of the number of crystals, such as galena, silicon, carborundum and others. The disadvantage of the crystal is the range which it offers. It is satisfactory in a range from 15 to 20 miles. Its advantage is due to the fact that its upkeep is low—comparatively inexpensive. For short-distance work, it gives satisfaction.

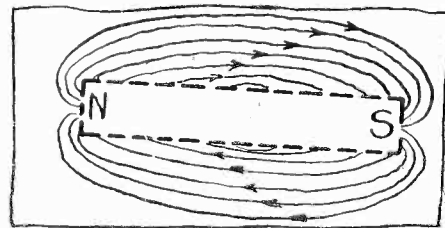
Regenerative. Set.—This is the vacuum-tube set; for crystals cannot regenerate. The regenerative action depends on feeding part of the current flowing through the plate circuit back into the grid cir-

cuit, thus increasing the grid current and, likewise, the current in the phones. This feed-back is accomplished by either tuning the plate circuit, or by using a tickler coil or a coupler condenser.

Lines of Force.—Those invisible streams of magnetism that surround a coil of wire, such as tuning coil, loose coupler, or vario-coupler. It is these lines of force that transfer the electrical energy from the primary coil of a tuning device to the secondary coil. That these lines actually exist can be proved easily by laying a piece of paper on which fine iron filings have been strewn. The filings will assume positions along curved lines which lead



How lines of force act in a radio loose-coupler



How the lines of force would affect iron filings if the metal particles were spread on a sheet of paper over a bar magnet.

from one end of the magnetized strip to the other. Although there is no metal around tuning coils except the copper wire—which is nonmagnetic—these lines of force exist. They pass out of the individual turns of the coil down through the center and around to the other side.

Non-magnetic.—The term applied to some common metals which are not attracted, or repulsed, by a magnet. Copper, brass, carbon, and gold are nonmagnetic metals.

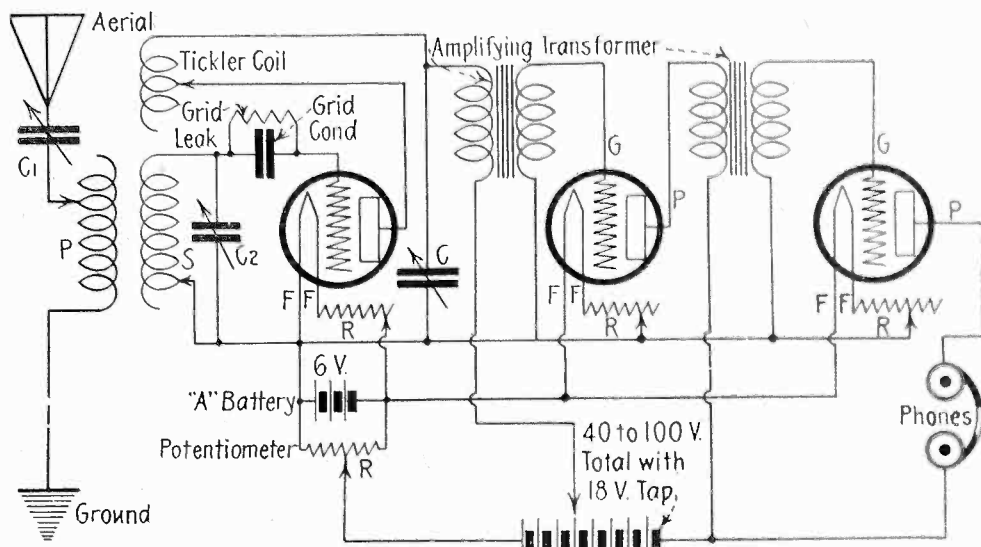
Radio Notes

SOMETIMES it is difficult to find a sensitive spot on your crystal. Try the following plan: Take a discarded crystal, and pulverize it, but not very finely. Put some of this inside a metal casing and screw it into the cup of your detector. You will be surprised to note how quickly you can find a good spot.

The receiver is capable of all sorts of refinement. The best way to perfect one is not to hurry the job. Some amateurs take months to build their sets; but when the sets are finished, they are real ones. *The secret of radio construction is patience.* Even after the set is completed it is well to try making a few changes in the wiring provided this seems necessary.

Receiver for Amplifying Weak Signals

By Horace Beers



Complete schematic diagram of a detector and two-stage amplifier as described in the accompanying article.

THE regenerative type of receiver has come into very common use in the reception of both radio-
phone and radiotelegraph communication, and the added increase in strength of signals makes it possible for this type of receiver to catch the very weak signals from exceedingly long distances whereas with other types of receivers amplifying transformers are employed for loud signals.

It is my idea that we employ the amplifying transformers in connection with a receiver of the regenerative type. This would in turn give very satis-

factory results, especially to those interested in listening to the broadcasting stations. The accompanying illustrates a detector and a two-stage amplifier of the regenerative type. This form of receiver is unusually selective in its tuning, and requires critical adjustment in order to get the best results. The amplifier acts as a magnifier of the signals received by the detector. With each stage of amplification, the incoming signals are magnified many times.

With this regenerative receiver, distant stations may be brought in and the fan will experience for the first time

the complete satisfying thrill of hearing a faint voice announce, "This is broadcasting station WOC, Davenport, Iowa," or "this is 'Atlanta Journal' station WSB." True enough, the signals will be weak and they'll fade in and out as is customary with all distant transmitters, but they are *there!*

Most every listener is gifted with patience beyond the ordinary; for it requires considerable practice before the operator is sufficiently skilled to tune in these faraway stations. It is usually necessary to become somewhat of a "night" owl as these long-distance stations cannot be picked up with just a turn of the knob. However, until WJZ and WOR "sine off" for the night, the local interference is apt to make such an attempt hopeless.

In using a regeneration set, especially those who are not familiar with oscillation, a rushing sound like that of falling water is heard just at the point where the secondary and primary are tuned to the same wave-length. The broadcasting wave will make known its presence by a squeal, or whistle, the pitch of which may be varied at will. When this is tuned in, the primary circuit should be varied until it is as loud as it possibly can be made, then the plate and secondary circuit-condensers should be readjusted sufficiently to eliminate the whistle and bring in the broadcasting clearly.

Radiomen at WJZ We Hear But Never See



(C. Kadel & Herbert)

THOMAS H. COWAN, "A.C.N."

Mr. Cowan is concert manager at WJZ and one of the pioneer announcers. He has the distinction of having announced the first radio concert ever given and the first World's Series baseball games. He is 25 years old, single, and formerly was connected with the Metropolitan Opera Company.

RAYMOND F. GUY, "O.G.N."

Mr. Guy, who is 24 years old, and married, has been with WJZ since December 1, 1921. He is one of the best known operators in the country—for WJZ, Newark, N. J., is widely heard. The initials are arranged to read, if one wants to know: (O) operator, (G) Guy, (N) Newark. In the instances of Messrs. Cowan and Watt, (A) is for announcer.

JOSEPH L. WATT, "A.W.N."

Mr. Watt is in his 30th year, and married. His particular work is to announce the many literary features sent out by WJZ. When you hear the familiar voice saying, "A. W. N. announces this or that," then you know that Mr. Watt is speaking. His cheery voice has been heard, it is estimated, in almost every State in the Union. He is a pioneer among radio announcers.

How to Learn the Code This Winter

By Ortherus Gordon

RADIO WORLD has suggested since its beginning, that the newcomers in radio learn the Continental Code. That this was appreciated was made evident when it was necessary to republish the code for the benefit of those who were lacking a copy of it and were requesting the editor to supply it. In this article, I suggest the use of a practice outfit for learning code and offer an outfit that may be constructed by the ambitious amateur at very little cost.

If you are the only amateur in your community, owning such a set, you can command the interest of the other radio enthusiasts by inviting them over for code practice. They should bring their headsets, plug in on the buzzer, and take down the messages as you send them from your own home-made key and buzzer. Hide or muffle the buzzer so that its sound is not audible, or put it in the next room, and you will treat your friends to actual receiving conditions combined with a speed they can read and understand.

The outfit I describe is, also, ideal for radio clubs wishing to organize code classes for work during the winter. Only two instruments are needed—a key and buzzer, with a dry cell for operating them. If you own a crystal set, then you already have the buzzer; but since it is desirable to have this practice set mounted on a single board, you may want to build another. Amateurs who own regenerative outfits do not use buzzers as detector tests and, therefore, should follow the plans as they appear in this article.

While definite instructions are given, it is understood that the dimensions and other features of the drawings are not rigid by any means.

The key shown is a serviceable and yet simple affair. For its lever use a 5-inch piece of 1/4-inch solid-brass rod. This rod is drilled as

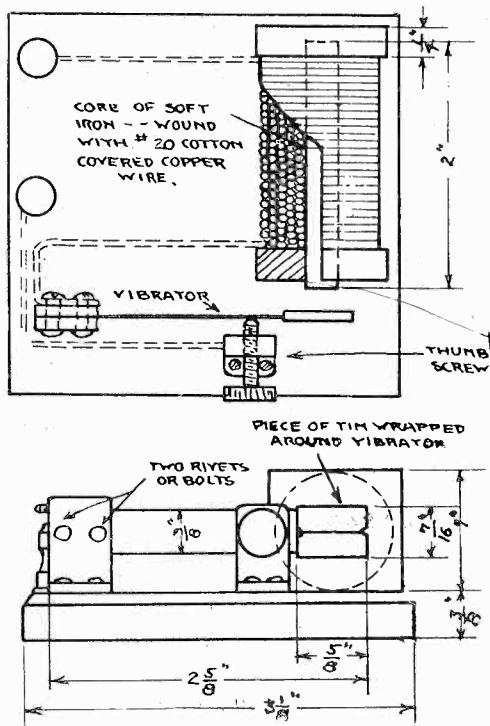


Figure 2. The buzzer. Made according to these dimensions, it will have a high, pleasant pitch.

shown in the drawing—all taps being the useful 8/32. The knob is made of wood or hard rubber.

If the amateur wants a good-looking knob, consider the tops of ink-bottle corks. I mean the two or four-ounce bottles and not the office size.

The spring is made of spring brass and may be cut to suitable dimensions. The uprights are made of brass plate or of wood, the only requirement being that they afford a rigid fulcrum for the lever. The fulcrum pin is a brass rod passed through the lever at right angles and fitted snugly into holes in the uprights.

A convenient feature of this key is the use of battery binding posts for contacts. Take the nut of any dry-cell binding post and saw it in half. This will give you the upper and lower parts of the contact. Fasten the lower part to the base of the

key and the upper to the lever, as shown, and then file them flat so that a perfect contact is made when the key is pressed. Only the principal dimensions are given.

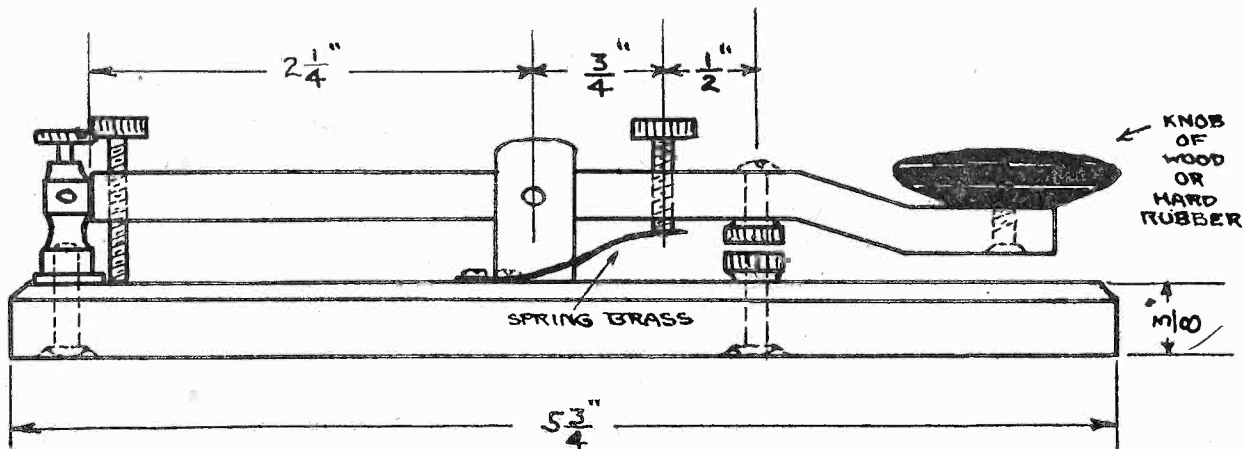
The buzzer—full plans of which are shown in Figure 2—may be explained as consisting of three parts, each part to be made separately and put together last. They are the coil, the vibrator, and the thumbscrew.

The coil has a soft-iron core. In this buzzer it is 2 inches long and 1/4-inch in diameter. This core may be either a solid piece of iron or a bundle of thin iron wires; but they must be soft iron. If steel is used, it becomes permanently magnetized and defeats the principle on which the buzzer works. The core is held firm by two wooden ends, 1 inch square and 1/4 inch thick. It is embedded in the after end, as shown, but protrudes through the forward end 1/16 of an inch. When it is rigidly set up in these supports, wind it with six or seven layers of No. 18 or 20 cotton-covered copper wire. Bring both ends out free. If you wish, give the coil a coat of shellac or cover with tape for appearance sake.

The vibrator is a strip of copper or brass 2 5/8 inches long by 3/8-inch wide. You may use spring brass if you wish, but it is not necessary. One end of the vibrator is made fast to the standard while the other end is wrapped with a piece of tin. This tin is placed directly in line with the center line of the core, as shown in the sketch. This is necessary because an electromagnet does not attract copper or brass.

The thumbscrew hardly needs explanation. It is merely an 8/32 screw fitted into a brass standard, or support, and placed so that it is just to the side of the tin plate on the vibrator and touching it.

The connections are as follows: One end of the coil goes directly to



Complete schematic diagram, giving the necessary dimensions for the construction of a transmitting key. For the lever use a 5-inch piece of 1/4-inch solid-brass rod. The knob may be of wood or hard rubber. The spring is of spring brass, and the uprights of brass plate or wood. The fulcrum rod is a large brass pin. Battery binding-posts are used for contact. Read the accompanying article carefully for further detailed instructions which the amateur builder should follow closely.

Conductive Amplifying Receiver Picks Up Long Distances

By Herbert K. Dale

DR. FRANCIS LEROY SATTERLEE, noted X-ray specialist who is now devoting himself to radio research at his laboratories, Flushing, New York, is shown in the accompanying photograph with his "inductive amplifier," a non-regenerative radio-receiver working on an entirely new principle. With it he has reached unusual distances, having heard from Ontario, as far south as Louisville, Kentucky, and over a sweep from Memphis to Denver. The apparatus has the effect of radio-frequency amplification without employing radio-frequency bulbs and transformers, the receiver using only one bulb for radio-frequency detection. The signals are then amplified by two or more steps of audio frequency in the usual manner. This is the same set

that interested Major-General George O. Squier, Chief Signal Officer, U. S. A., who said he would give fifteen minutes to see a test of this receiver, but actually gave three hours.

The novelty in Dr. Satterlee's set is the arrangement of the inductances. He uses three flat spiral-wound coils which look a great deal like a small talking-machine record. Two operate with a "butterfly" motion. The third moves through an arc between the

other two, similar to a bookmark slipped between pages of a book. Rough tuning is accomplished by a variable condenser, and thence finer tuning by the variation of the positions of the three coils.

Extreme ease of manipulation and freedom from distortion are features of this set. With a 125-foot aerial, Dr. Satterlee hears distant points.

The large set on left of the lower illustration shows the original set made by him, while the small set on the extreme right is the present-day model embodying the same principles.

(Continued from preceding page)
the binding post. The other end goes to the vibrator, while the second binding post is connected with the thumbscrew. Figure 3 shows the hook-up for the key, buzzer, and dry cell—together with the headpieces as they should be connected in order to hear the buzz of the instrument loud and clear. There is no limit to the number of headphones that may be connected to the buzzer outfit in this manner. In fact, in radio schools where the

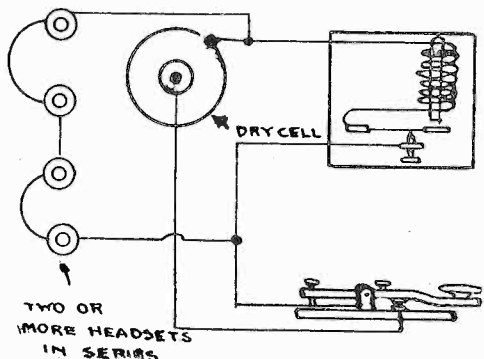
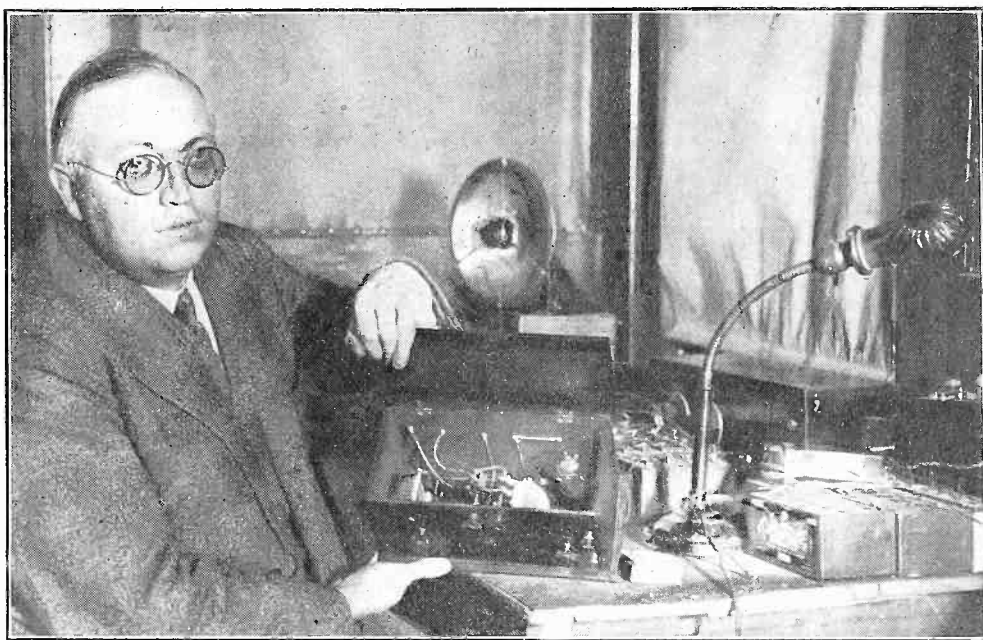


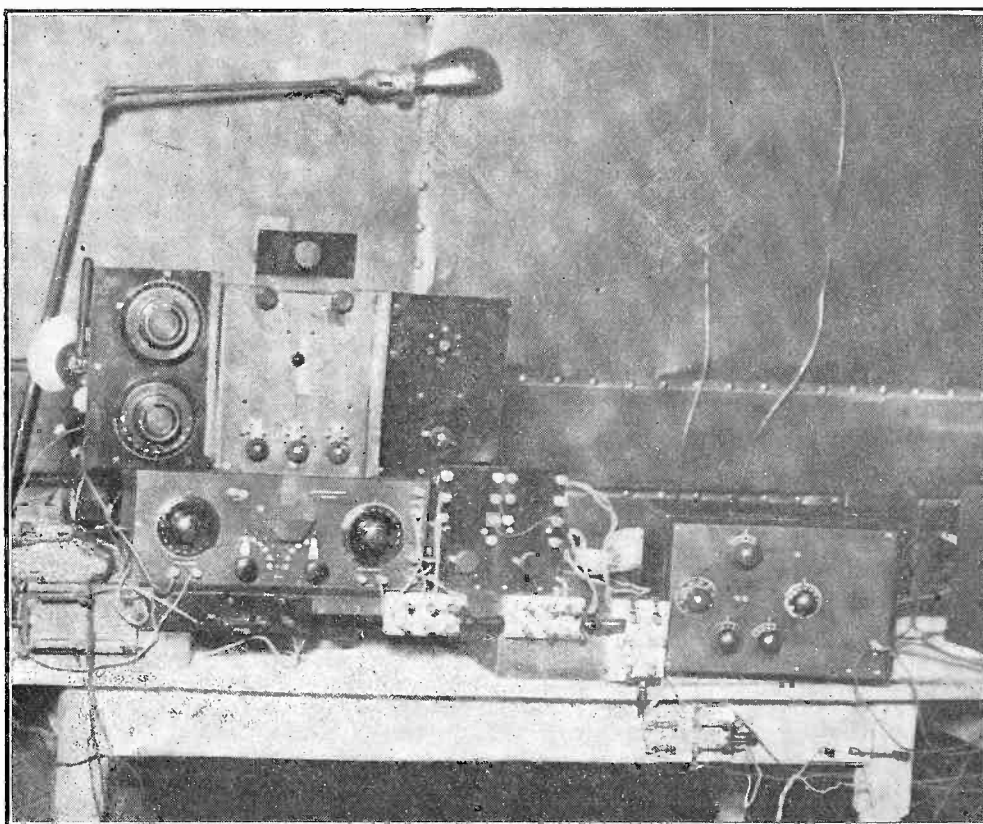
Figure 3. Hook-up for buzzer set with two or more headphones attached for code practice.

teaching of code is an important part of radio work, the headphone extension is run down the center of a long table, with jacks at every chair, so that at times as many as one hundred students are listening in on what the instructor is sending.

These instruments have been designed separately; but you can put them both on the same base and save binding posts. Such a set is invaluable to the amateur who is eager to learn code.



Both photographs (c) Kadel & Herbert.



(Above)—Dr. Satterlee and his small one-bulb set. (Below)—Original large set, and (at extreme right) his new invention.

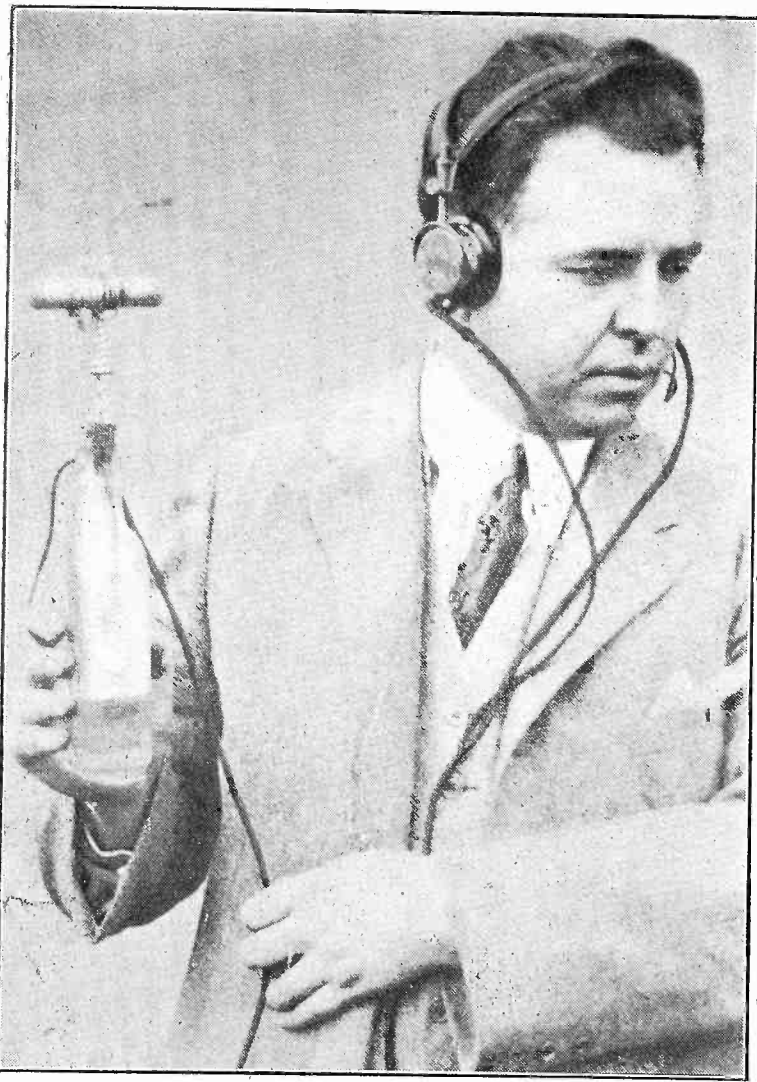
Radiograms

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

THE possibilities of the radiotelephone as a newsgathering agency were demonstrated in a dramatic manner, recently, when "The Inquirer" was the first newspaper in Philadelphia to receive word of the disastrous fire which swept the business district of Atlanta, Georgia. Through Edwin A. Hoban, a member of "The Inquirer's" local staff, a radio enthusiast, the news came into "The Inquirer" office even before the first flash from the Associated Press reached Philadelphia. The information came from station WSB, operated by the Atlanta "Journal," and located in that newspaper's building. The news, announced by the speaking voice instead of by the more conventional medium of the telegraph instrument, came floating through the air, a distance of approximately 760 miles.

The Bureau of Mines of the Department of the Interior is seriously considering the problem of equipping mines with radio apparatus for use in the event of accident. The stringing of telephone wires is impracticable, but officials state that it would be fairly simple to equip certain distant rooms, or chambers, with crystal receiving sets so that rescue parties could communicate with imprisoned miners. The real problem is to find a simple and portable transmitting set by which the miners could communi-

Corkscrew Radio May Serve to Pick Up Rum Runners



(C. Fotograms, N. Y.)

Don't throw away that corkscrew—even if the Volstead Act is in force. There still is a good reason for keeping it around the house. It can be improvised into a real radio outfit, that may do everything a radio outfit should do. This photograph shows Jack Riley with his corkscrew radio. It is not a complete outfit, but it will serve to pick up warnings for the rum fleets. Two receivers are attached to the device, which is guaranteed to pick up all radio messages within a fifteen-mile circle. It is only necessary to attach it to a light plug or charged wire in order to hear music or bed-time stories as you drink.

cate with the mouth of the mine of the outside world in the event of being injured in or imprisoned after an accident.

* * *

Several types of speaking movies, based on the principles of radio will be tried out on the New York public in the next few months. The most serious competition will be probably between the General Electric Company, which is reported to be perfecting its talking film in a studio on Long Island, and Dr. Lee de Forest, who is working with motion-picture actors and directors at a studio near this city. The General Electric talking film and the de Forest invention both consist of films in which the voice and other sounds are photographed at the edge of the motion-picture film itself. The photographed sound waves are reproduced in each case with the aid of the photographic cell. Those who have heard the Lee de Forest phono film and the General Electric talking film say they have both reached a high degree of perfection and reproduce the human voice.

* * *

Rear Admiral W. H. Bullard, U. S. N., who was in charge of the navy radio service during the world war, says that five powerful radio stations would soon be in operation in China with sufficient energy to communicate direct with San Francisco. Admiral Bullard says that radio will not supplant, but would supplement, cable lines, telegraph and telephone.

* * *

Great Britain is just beginning to regulate radio broadcasting. The British scheme is to have all broadcasting done by a single organization which will be sanctioned by the government, operated by manufacturers of receiving sets, and financed by both. Present plans call for the establishment of eight stations in the British Isles, at London, Manchester, Birmingham, Glasgow, Cardiff, Plymouth, Newcastle and Aberdeen.

* * *

The Mercantile Trust Company of San Francisco has established a broadcast station on Telegraph Hill, and will broadcast financial, industrial and general business information throughout the territory west of the Rocky Mountains.

* * *

"Ariograms" is the name given to United States Department of Agriculture radio reports.

* * *

The Los Angeles "Evening Herald" is broadcasting lessons in code fifteen minutes every week day. This is the first step in the way of definite instruction by radio. The University of California extension division, Berkeley, is supplying a correspondence course in elementary radio. California is keeping to the fore in radio enterprise.

* * *

Dr. Nicholas Murray Butler, President of Columbia University, believes that the motion picture and the radio-telephone are going to become invaluable in the educational work of the future. He lays stress, however, on the necessity for the right material being filmed or broadcast.

* * *

Here are three extraordinary transmission records. Two western correspondents, E. J. Conkelman, Enterprise, Oregon; and E. M. Bacigalupi, Hillyard, Washington, reported successful reception of the WGY concert of September 26 and, in both cases, their reports checked up accurately with the WGY station log. Hillyard is seven and one-half miles northeast of Spokane and 2,200 miles from Schenectady. The distance has been bettered by WGY but never during the early fall. Mr. Bacigalupi reported that his reception was made on detector alone with a Grebe Cr-9 and no amplification. His time of reception was 6:15 to 6:30 p. m., Pacific time.

On September 29, Private G. G. Westfall, operator at Fort Randolph, Canal Zone, Panama, 2250 miles from Schenectady, reported that he had on that date heard WGY in spite of a powerful arc set which operates twenty miles away at the Balboa station. Mr. Westfall is operator at the United States Army station. His call is WNCI. This reception is the more remarkable because of the heavy static which prevails in the warmer climate of the Isthmus of Panama.

Still another unusual reception is reported by J. C. Grindell, manager of the Rectifier Department of the Valley Electric Company, St. Louis. Mr. Grindell reports that he heard WGY's program Friday evening, September 29, on a home-made crystal set without amplification. His aerial, he explained, is one wire 65 feet long and 30 feet high. St. Louis is approximately 875 miles from Schenectady.

Radio and the Woman

By
Crystal D. Tector

I CALLED at the office of RADIO WORLD, the other day, to have a little chat with the editors about National Radio Week. Friend Husband advised me not to do so. He told me that the editors are usually so busy they become ferocious and devour people on sight—that they imagine that every woman who enters a sanctum wants to sell a poem on spring—that women talk editors to death, and all that sort of chatter. Well, I didn't heed F. H.'s warning.

* * *

I must admit that editors are just like any other type of human beings and will stand perfectly still without being hitched. They don't bite, or even bark; in fact, they seem to have all the necessary elements of kindness that one expects to find in ordinary men. When I reached home and told this to Friend Husband, he simply laughed and snickeringly asked if I hadn't got in the wrong pew! Fancy! I found the editors of RADIO WORLD not only willing to talk but very (*We modestly delete the rest of Miss Detector's flattering comment. She is entitled to her opinions; but the power of the blue pencil must be preserved—The editors.*)

* * *

Well, I left their offices convinced that National Radio Week will be about the biggest thing in the United States this winter. The date—December 23 up to and including the 30th—could not be more satisfactory, for we will have two Saturdays during the time of the year when everyone will be on the alert for fun of some sort. And as so many of us are looking to radio to provide something new in the way of pleasure, it does seem that the prevailing slogan: "This is a radio Christmas," is most appropriate.

* * *

Mother was telling me that she remembers when the automobile first came into popularity. There was such a week celebrated in her home town. It wasn't a big national affair such as our National Radio Week will be; but a purely local occasion. Although there had only been about two automobiles in the town up to the time "Automobile Week" was announced, everybody got so het up over the event, ma says, there were nearly a hundred cars in the parade—and some of them were the worst looking home-made affairs imaginable. It seems that everybody who was able produced a car for that occasion, and some folks even made their own. Ma says that she will always remember "Automobile Week" at home because an old-maid sister whom the folks thought would never marry found a willing beau.

* * *

From the stories she tells, the spirit of the people in making that week a success must have been something wonderful. And if such a spirit existed in one little town a quarter of a century ago, what must it amount to in this huge nation today? Personally, I am full to the brim with energy to make National Radio Week a success. I'm going to be the best little booster of them all. And I'm asking every one of my big family of readers to get right in and help me enthuse women all over the land.

* * *

I want you to send me suggestions. For instance: we should have an emblem, or a pin, or a hat band, or something else that can be worn that week. Who will be the first to suggest some attractive design or monogram? Who will be the first to send in an appropriate slogan? Who can think of something absolutely original for that week? Who will organize a committee to get the shopkeepers busy with window displays?

* * *

My first suggestion is that radio parties be made a bright particular feature of the occasion. They will blend most attractively with the Christmas festivities—particularly as so

many churches are interested in broadcasting and so many ministers are broadcasting their sermons. Why, I am told that thousands of poor people and cripples who never have a chance to attend church now thank God that radio can bring words of sacred cheer to them in their loneliness. Can't someone suggest something unusual for these unfortunates during National Radio Week?

* * *

And for the radio parties we will want all sorts of new radio dishes—dishes that are tasty and easy to make. Girls, haven't some of you a recipe for a radio pie? Can't some one think of a radio cake?—or a radio salad? If you will send in something along the line of edibles, I will have Friend Husband make up a radio drink. I'll promise that it will be quite in keeping with all the prevailing laws and that the recipe will be published in plenty of time for all who wish to use it.

* * *

Here in New York the spirit of National Radio Week is already apparent among radio fans. You hear it talked about already, and many plans are being made. But we want it to move westward with the sun. We want it to get so deep under the skin of every fan that he will not be content to enjoy it by himself or in the company of other fans, but will bring strangers into the vortex of things. One of its principal objects is to bring new fans into the fold. And if every radioist is responsible for at least one genuine beginner, radio will receive an impetus that will help all of us.

* * *

Friend Husband told me at dinner, the other day, that there is a fan in the office—remember, not an amateur but a fan. F. H. says that he asked the man, in a casual sort of way, if he really cared for radio. "Care for it!" the man flared up. "Why, I wouldn't be without it." Then he went on to tell of all the wonderful pleasures that his set had brought him. This man is just one of many—but there are millions more like him who do not know what a truly satisfying pleasure maker radio really is. We want these unknowns in the ranks of radio and we are going to get as many of them as possible in the ranks during the big week.

* * *

Now, don't think I am preaching or asking you to do missionary work. Far from it. We who know radio—we pioneers—want to share it with those who do not know. Why, for months I heard F. H. bawl out the man next door because he would not go to the ball games—and F. H. knows batting averages better than I know how to tune in KDKA. Finally the neighbor reluctantly consented to go with F. H. Last season you couldn't keep Mr. Neighbor away from the Polo Grounds with chains. That is the way it will be with thousands who don't know, to-day, whether radio is a science or a door mat.

* * *

I have given up largely of my space, this week, to National Radio Week. But I feel its great importance and I realize that it is going to be one big occasion. I know, too, that much depends on the women of radio to make it a success; because they are nearer to the little ones than the men are. And we all know that it was our boys who really made radio possible—who ignited its first impulse. Think what a combination of radio and Christmas mean to them!

* * *

Let me hear from you all. Start something in your town. Get the spirit. As our editors say: "Be a National Radio Week booster!" I will keep in touch with you regarding all my plans—but you must help to swing this great radio event into one of the most national joy festivals this big bustling country of ours ever knew.

How One of Our Hook-ups Worked

Editor, RADIO WORLD: In regard to the circuit on page 19 of RADIO WORLD (No. 30, dated October 21) issue, I tried it with one small change and brought in San Antonio, Texas, very clearly and fairly loud, using a one-step amplifier. The change made was the use of a variometer in place of the DL-50.

I was greatly surprised by the amount of regeneration obtainable and the ease with which regeneration was controlled by the condenser which would not appear to be in the plate circuit at all.

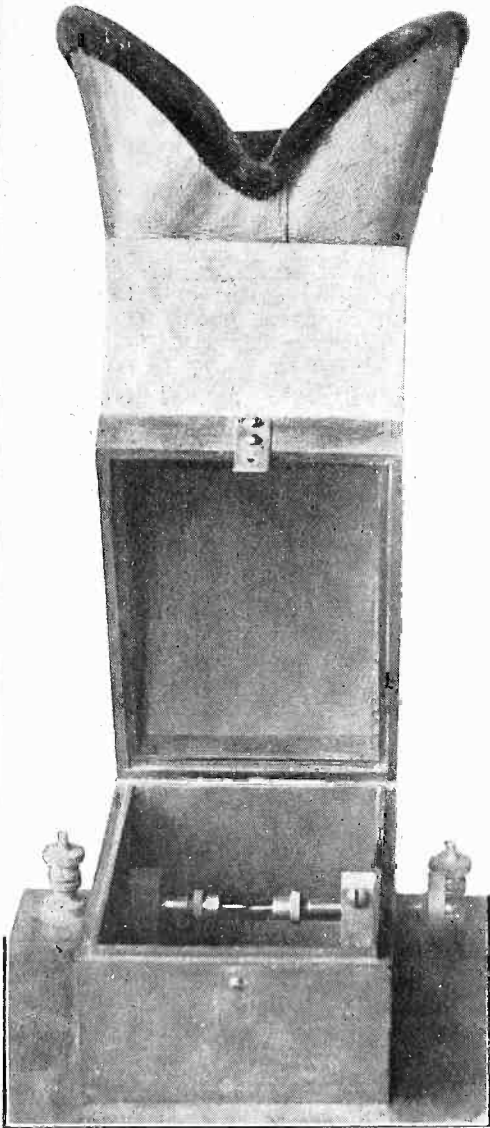
In the near future, I expect to try several long-wave hookups (1,500 to 30,000 meters) using a single coil, in the hope of finding one which will tune fairly close and give good regeneration with the use of DL coils. I shall certainly try this one with larger coils,

although I am afraid that the size of the condenser will limit the wave-length range to some extent.—L. J. Coleman, Sioux City, Iowa.

(The hook-up referred to by Mr. Coleman was sent to RADIO WORLD by Mr. W. Miller, Southern Methodist University, Dallas, Texas.—The editor.)

Complete Your File of RADIO WORLD
52 Weeks for \$6.00

Latest Radio Events Keep



(C. Kadel & Herbert)

(Above) This is the mysterious "Black Box" of Thomas A. Edison, photographed for the first time. Through this mysterious device he discovered what he termed "etheric force," and which is, in reality, the wireless spark of today as perfected by Marconi. Ether is an hypothetical medium supposed to fill all known space, even those portions occupied by fluids and solids. The functions assigned to ether, such as the transmission of transverse waves with the velocity of light and the production, when under certain strains or subjected to certain motions—of all the phenomena due to electric and magnetic fields of force—indicate properties unlike those of any known form of matter.



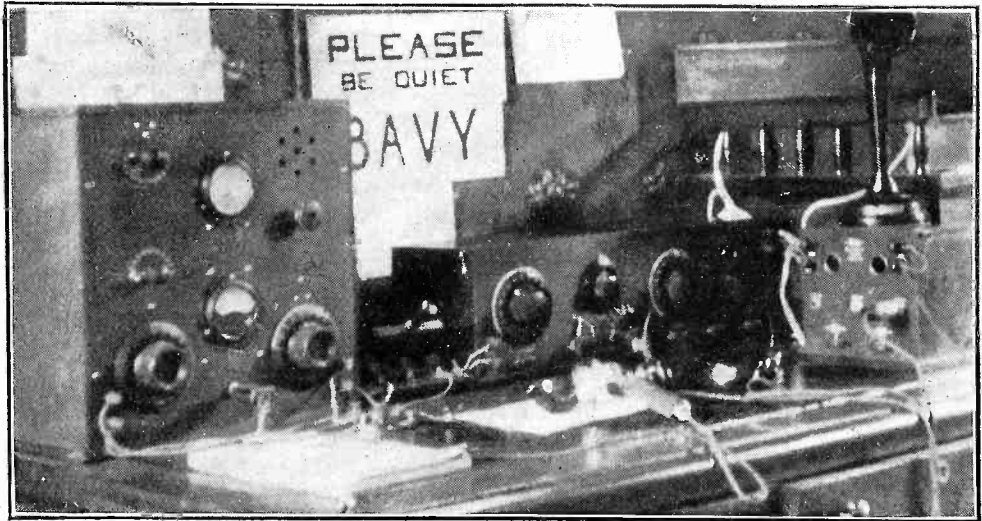
(C. Kadel & Herbert)

Eight-year-old Robert Scott holding his tiny receiving set and a 50-watt transmitting tube to make a comparison.



(C. International News Reel)

(Above) Dancini novel experience the photograph Georgia Tech by radiophone. was a huge su mission could



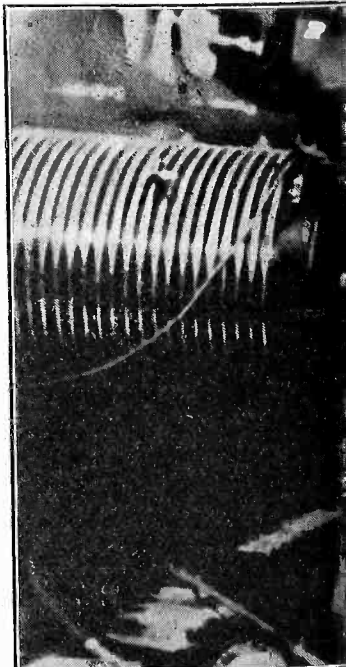
(Left) "Close-up Couch, 76 Was Miss Couch is throughout th who have pick type, with a t used which res



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

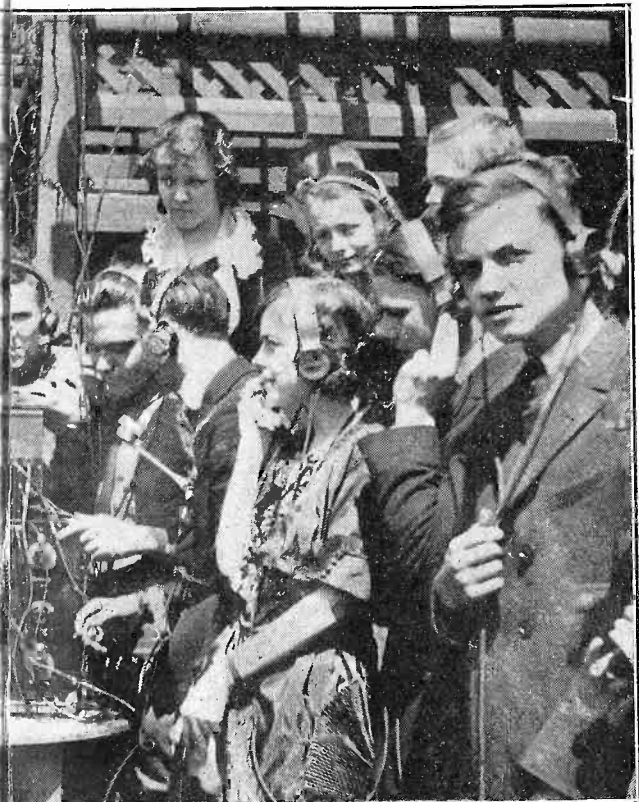
(Left) Listening to a concert by radio inside a steel passenger car traveling over sixty miles an hour. This is a photograph of the interior of the car. The experiment took place on the Broadway Limited of the Pennsylvania lines, running from New York to Chicago. An 18-inch loop, installed in seventeen minutes in an all-steel car was used. The reception was successful, broadcasting being heard during the entire trip.

(Right) The ever-smiling Mr. Fairbanks has become a radio "bug." He is talking so that many who have never heard him speak may know what the voice of this star of the silent drama sounds like.

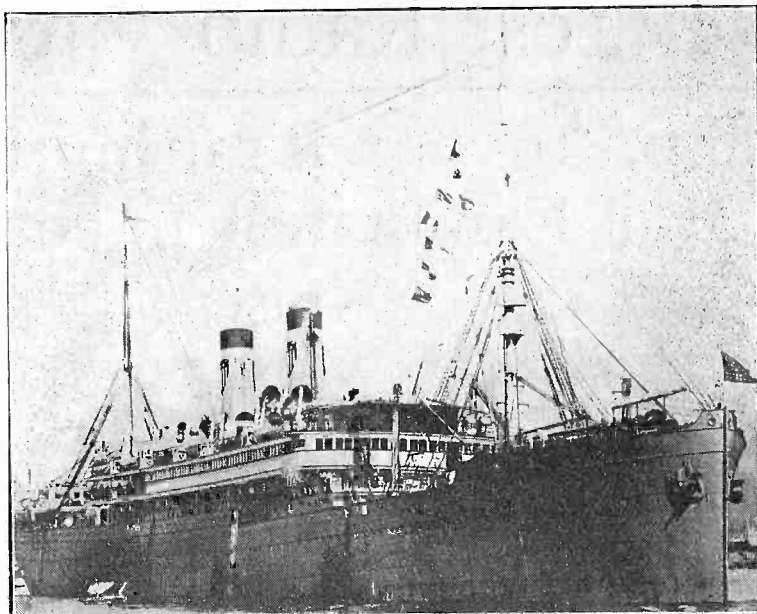


(C. Photonews, N. Y.)

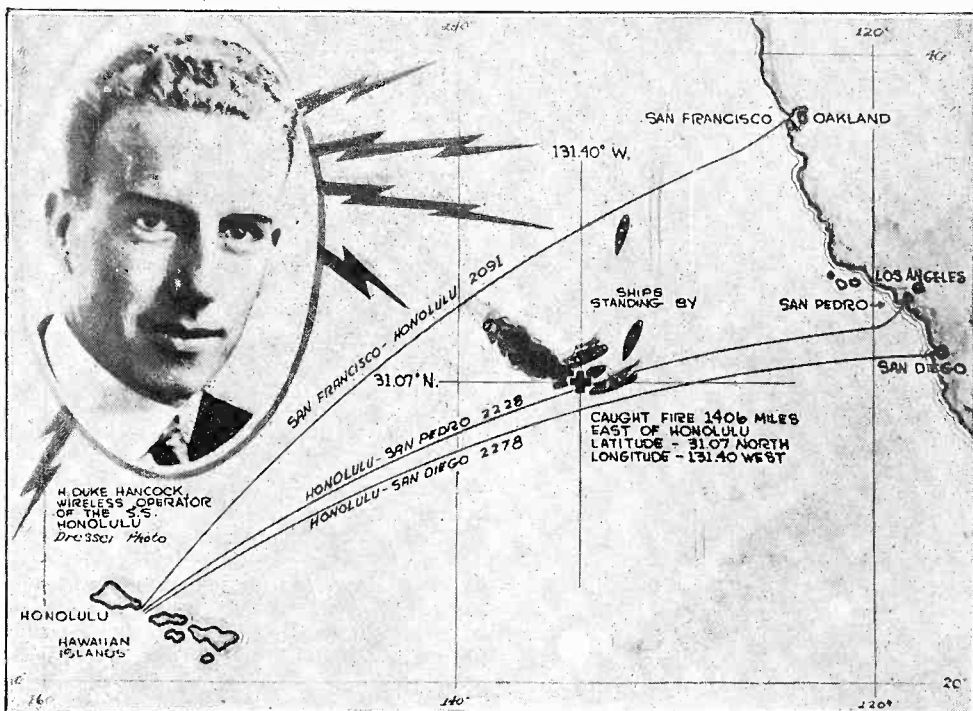
Photographers Busy



Captions
by
John
Kent



(C. Wide World Photos)



(C. International News Reel)

(Above) The upper photograph shows the "City of Honolulu," which burned to the waterline, 670 miles off San Pedro, California, on October 12. Her 217 passengers owe their safety to the prompt reply for help sent broadcast by her radio. The photograph directly underneath is an excellent chart of the scene with a good likeness of Chief Operator Hancock. This sea catastrophe made radio history. It proves that radio must be a part of the equipment of every vessel that carries human beings from one port to another. It is as necessary as steam.

(Below) The radio apparatus in this photograph is a loop aerial or direction finder—one of the most useful things now in use aboard all vessels that ply the high seas. This photograph was made in port—that is why Miss Claire Tarswell is in the picture.

music played by a band nearly two miles away was the members of the Club de Vingt of Atlanta, Ga., shown in singing to a special number. The music, played by the was transmitted to the roof of the Capital City Club by a radio station owned and operated by Miss Catherine Street, Carbondale, Pennsylvania. Her call is 8AVY. The pioneer radio amateurs of America. 8AVY is known as the Kawanna Valley and there are fans beyond the borders up. The receiver shown at the right is that of a Grebe age audio-frequency amplifier. A loud-speaker is also connected to the amplifier. The transmitter is at the extreme left.

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(C. International News Reel)

Latest Radio Patents

Edison Invents Transmitter That Will Eliminate Unnecessary Noises

No. 1,425,183. Patented, August 8, 1922. Patentee: Thomas A. Edison, East Orange, N. J.

My invention," declares Mr. Edison in a description published by the United States Patent Office, "relates to transmitters, and more particularly to microphone transmitters wherein the desired variations in current are produced by variations in electrical resistance caused by varying the pressure upon a quantity of granular conductive material, such as carbon, which is disposed between electrodes in the circuit carrying the current, preferably in a somewhat loose state, the requisite changes in pressure being effected between the electrodes and the granular material by a diaphragm, or other means, to be set into vibration by sound waves such as the human voice."

Practically all microphone transmitters of this type such as are now used are seriously and adversely affected by phenomena extraneous to the sounds they are designed to transmit, such, for example, as shocks, jars, vibrations, concussions, etc. These phenomena often

it impossible to understand or even detect the sounds which the microphone is intended to transmit.

The principal object of Mr. Edison's invention is to produce a microphone transmitter which will be extremely sensitive to very weak as well as to loud sounds and at the same time to substantially eliminate or prevent the production of extraneous sounds, making it possible to employ powerful amplifying devices, such as the audion, with the transmitter.

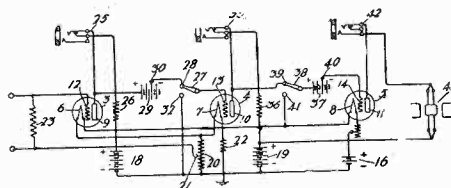
* * *

Operating Vacuum - Tube Circuits

No. 1,426,755. Patented, August 22, 1922. Patentees Robert C. Mathes, New York City, and Harry S. Read, East Orange, N. J.

THE invention on which Messrs. Mathes and Read have received letters patent, relates to vacuum-tube circuits, more particularly to multistage amplifier-circuits in which vacuum tubes are employed in the various stages.

It is well known that a vacuum tube of the three-electrode type will reproduce in amplified form in its output circuit impulses impressed upon its input terminals, and that the amplified impulses may be impressed on the input terminals of other tubes to give any desired degree of amplification. When such a multistage amplifier is employed to amplify low frequency impulses, it is generally preferable to have a direct coupling instead of an inductive coupling between stages in order that the low fre-



Schematic diagram of the Mathes-Read Vacuum-Tube Circuit

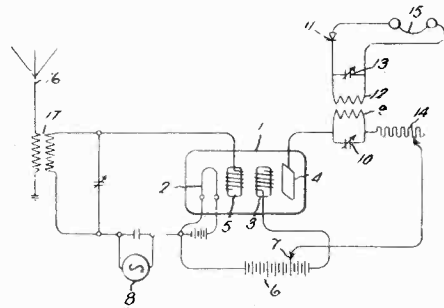
quency impulses will be accurately reproduced by the amplifiers. But when such a direct coupling is employed considerable difficulty is experienced when signals are being received from preventing the output current of one tube from so affecting the potential applied to the control electrode of a second tube that the second tube is either blocked or has its amplifying action destroyed on account of its control electrode becoming too positive or too negative.

In accordance with this invention, it has been found that the operation of such a multistage amplifier-set is considerably improved by providing adjustable sources of potential for the control electrodes of the tubes, and by providing switching means between the stages whereby the output current of each tube may be given its proper value by adjusting the normal source of potential for its control electrode independently of this influence of the output current of the preceding tube.

New Signal Receiving System

No. 1,430,833. Patented, October 3, 1922. Patentee: Burke Bradbury, Schenectady, N. Y.

MR. BRADBURY'S invention is to provide a simple and efficient means for providing an audible indication of signals transmitted by means of radio-frequency continuous currents. The receiving station is provided with a source of audio frequency current which is associated with an electron discharge device and a detector in such a way that when no signaling currents are impressed upon the system there will be no ap-



Schematic diagram of Mr. Bradbury's system.

preciable flow of audio frequency current in the detector circuit. When, however, a radio frequency signaling current is impressed upon the system this signaling current is modulated by means of the audio frequency source and the modulated radio frequency signaling current is transmitted to the detector circuit where it is rectified and the rectified current is used to produce the desired audible indication.

* * *

Will Help Voltage

No. 1,430,607. Patented, October 3, 1922. Patentee: William C. White, Schenectady, N. Y.

IT has been discovered that the current which will flow through an electron-discharge device comprising an incandescent cathode and an anode enclosed in a highly evacuated envelope will, between certain limits, vary approximately as the 3/2 power of the applied voltage. In other words, the apparent resistance of such a device varies with the voltage applied to it. In some cases, this characteristic is objectionable; for example, when such a device is included in a measuring circuit which comprises other resistance. In such a case the relation between current and voltage in the circuit will be a complex one and a calibration will be necessary to determine this relation.

The object of Mr. White's invention is to overcome this disadvantage by constructing and arranging an electron-

Fig. 1. Fig. 2

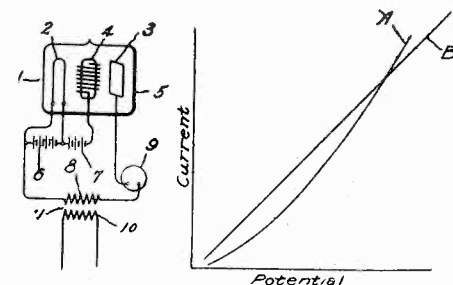


Figure 1 shows diagrammatically a circuit connection.

Figure 2 shows the current-voltage characteristics of an ordinary high-vacuum electron discharge device.

discharge device in such a way that the current will vary directly as the applied voltage between certain well defined limits.

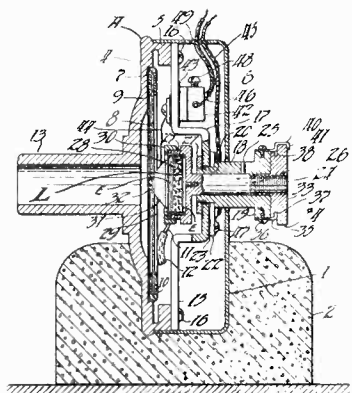


Figure 1 (above) is a vertical sectional view, partly in elevation, of a microphone transmitter constructed and mounted.

Figure 2 is a view in front elevation, partly broken away, of the structure shown in Figure 1.

create such relative movement of the conductive granules disposed between the electrodes of the microphone transmitter as to produce extraneous or foreign sounds, loud enough when amplified to practically obliterate and render

Answers to Readers

1. How far could you hear with the hook-up you have on page 7, RADIO WORLD, No. 27, dated September 30, using an aerial of four wires, each eighty feet long?

2. What size fixed-condenser do you recommend on the stopping condenser and condenser before the grid of the third tube?

3. What kind and size tubes are recommended for all three shown?

4. The lead from B battery to 2-circuit jack is about 22 volts. Am I correct?

5. To make a 45-volt B battery may I connect two 22-volt batteries in series?

6. Would the addition of my honeycomb coils help any?

7. Are the two transformers the same size?

8. Will a potentiometer help?

9. What size is the grid condenser and leak?

10. What rheostats are best—the wire type or the carbon type?—F. Bruhns, Oakland, Cal.

1. Everything depends on the way a set is constructed, also the locality, erection of antenna, etc. No exact figures can be given, but there is no reason why considerable distance cannot be received.

2. Usually about .00025 mfd., but this may be omitted from this particular place in the circuit.

3. The first tube is that of a UV-200 detector tube; the next two are the UV-201 amplifying tubes. Be sure to see that the detector tube is used in the first socket.

4. The B-battery voltage on the first tube is about 22 volts.

5. Yes. By connecting two 22½-volt B batteries in series with each other you are able to secure the necessary 45 volts.

6. No. They will not help the circuit in any manner.

7. The two transformers used are the same in size.

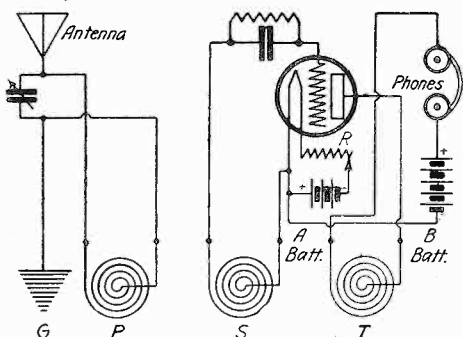
8. A potentiometer is of no use with this particular circuit.

9. The grid leak is of 2 megohms and the grid condenser of about .00025 mfd. capacity.

10. This all depends on the radioman who is building the set. Some prefer the wire rheostats, while others like the carbon. A vernier on the detector tube will be of great value.

* * *

I have a receiver using duo-lateral coils, and believe I have the wrong hook-up. Note my diagram and let me know what error I have made.—Gustav Altmock, Manchester, Pa.



Hook-up requested by Mr. Gustav Altmock, Manchester, Pa.

The accompanying diagram is the correct method by which you should wire your set. Follow each and every connection carefully and you will get the desired result.

* * *

I am building a regenerative receiver with two variometers and a vario-coupler. Can

a dry-cell tube be used with as good results?—Vincent Delapotteries, Wichita, Wis.

Certainly. Use the same circuit, merely connecting a single dry-cell to the A battery terminals.

* * *

Will you publish a diagram of a single-tube regenerative set employing three honeycomb coils?—Fred Loveland, Niagara Falls, N. Y.

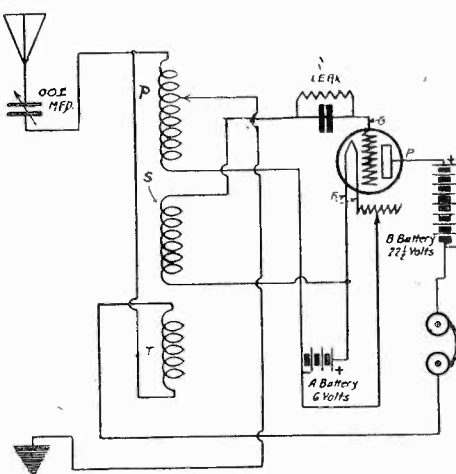


Diagram requested by Mr. Fred Loveland, Niagara Falls, N. Y.

Herewith is a schematic diagram of a three-coil regenerative circuit employing one of the coils as tickler: P is for primary, S for secondary, and T for tickler coil.

* * *

May I run my aerial from a pole to and through the gable of my house, a total distance of 100 feet, and then bring my lead from center of aerial?—Harry Alexander, Staten Island, N. Y.

Leave your aerial an inverted L. Don't run it through the house. We advise you to experiment with it for results, but the outside aerial still holds the record for long-distance reception.

* * *

Please publish a hook-up of a regenerative circuit using three tubes, used with variometers and vario-coupler.—Kenneth H. Jones, London Mills, Ill.

A hook-up of this circuit was published in RADIO WORLD, No. 27, dated September 30.

* * *

What is wrong with my set? The diagram is enclosed. The aerial is 100 feet long with a 70-foot lead-in. I am using a crystal detector.—Matthew Rasmussen, Syracuse, New York.

Your diagram is wrong. Connect aerial to the switch arm and the ground to the other. Then connect one side of the detector to one switch arm and one side of the phones to the other. Now join together the remaining posts and detector. The phones should then be shunted by the phone condenser.

* * *

I have an aerial plug, tuning coil, ground clamp, crystal detector, variometer, phones, and variable condenser. What broadcasting station should I receive with this set?—William Bruns, Boston.

Unless you have an unusual location or live within a mile or two of some broadcasting station, you are doomed to disappointment with the antenna plug. The lighting system makes a fairly good aerial for vacuum-tube sets, though for crystal sets it is practically ruined out.

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A Well-Constructed Variable Condenser

Manufactured by Caldbeck Tool & Manufacturing Co., Des Moines, Iowa.

A WELL-DESIGNED and well-constructed 23-plate variable condenser, the capacity of which was found to be, approximately, .0005 mfd. The construction of this condenser is as follows: All plates are of the best-grade even-gauge hard aluminum, and are laid out mathematically correct so that the area increases with the square of the angle.

The edges are so cut as to prevent burrs. This keeps down the leakage when using it with C-W transmitters. All of the insulating bushings used in this condenser are treated in boiling beeswax to prevent the absorption of moisture. This treatment also makes the bushings self-lubricating.

The condenser is nicely finished and when used with a set comprises a satisfactory receiver ready for panel mounting. It was tested out in all sets and found to stand up under all conditions.

"Make Your Own Variometer"

Racine Radio Parts Co., Racine, Wis.

A "Make Your Own Variometer" has been tested out after being assembled. By the instructions and illustrations that accompany, it will be found easy and interesting to assemble. The parts come complete. In one hook-up, it was placed in the aerial circuit of an oscillating receiver and found to have a wave-length range from 150 to 450 meters. It behaved well, without showing signs of being noisy. The rotor and stator are wound with cotton-covered magnet wire. In construction and appearance it is very attractive, and neatly finished for panel use.

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.)

Victo-Rad Radio Co., Wilmington, Del., manufacture radio equipment, \$500,000. (Colonial Charter Co.)

Guarantee Electric Co., Atlantic City, N. J., \$125,000; George P. Proffatt, Katherine B. Proffatt, Walter Hanstein, Atlantic City.

Precision Instrument Co., Wilmington, Del.; \$500,000. (Corporation Service Co.)

Lewis Electric Mfg. Co., Buffalo, \$100,000; J. N. Lewis, E. S. Yates, R. M. Stanley. (Attorneys, Stanley & Gidley, Buffalo.)

Capital Increases

Halsey Electric Service & Contracting Co., New York City, \$10,000 to \$25,000.

Continental Radio & Electric Corp., New York City, \$30,000 to \$60,000.

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.

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. Colwell & Korbell, Fisk Building, New York City, directors of publicity.

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

SOUTHEASTERN RADIO EXPOSITION, Auditorium Armory, Atlanta, Georgia, December 4 to 9, inclusive. Co-operative Radio Sales Assn., 295 Peachtree St.

Heard at the Radio Counter

A Conversation Between Customer and Radio Clerk
(Part III)

"FINISHING up my set the other night, I noticed that the signals came in weak at times and, at other times, the set went absolutely dead. With a move or adjustment of the condenser, or plate variometer, everything was 'jake.' Must need a rheostat—don't you think?"

"I believe your trouble lies right there."

"Do you think a vernier rheostat would help the set?"

"Absolutely."

"How do vernier rheostats come, and how do they operate?"

"Well, there are the different makes and types; and anyone will supply the need of vernier control."

"All right, then; I'll take one and try it out to-night. And, by the way, will I also need a vernier on my amplifiers?"

"No—not at all. Just use one on the tube in your detector circuit."

"Very well, then. I hope this will keep the signals in at all times—especially when giving a concert to my friends who are on the verge of buying sets."

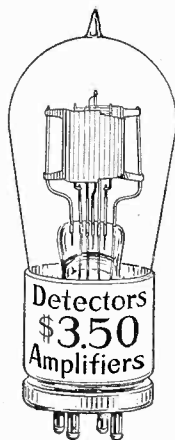
"If you are in any more trouble, Mr. Customer, with that set of yours, come in and fire away. That's what we're here for. We are here to give you advice as well as sell you merchandise."

"Thank you. Will see you shortly."

(To be continued)

THOSE BROKEN AND BURNED-OUT

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Million - Watt Vacuum Tube May Send Human Voice Across Atlantic



Lynn W. Meekins, New England district manager of the United States Bureau of Foreign and Domestic Commerce, broadcasting foreign inquiries from the Amrad Station of the American Radio and Research Corporation at Medford Hillside, Massachusetts. This is the first office of the Department of Commerce to use the Radio and the first station to send out foreign trade information. "A firm in Switzerland wants to buy thousands of electric light sockets," says radio. The next morning the bureau's office in Boston receives scores of applications from firms throughout New England for the name and address of the Swiss importer. This is the highest speed that foreign trade promotion has yet attained.

A MILLION-WATT vacuum tube has been developed in the General Electric research laboratory, Schenectady, New York, by J. H. Payne, Jr., says "The World," New York. The huge capacity tube is a magnetron, involving the principle of magnetic control as developed by Dr. Albert W. Hull of the laboratory.

The tube is expected to be of much importance both in radio work and long-distance power transmission. Its output is about forty amperes at 25,000 volts, and serves as a rectifier to change alternating to direct current, and also to change direct to alternating current of any frequency or to convert low frequency alternating current to high frequency.

It is thought that one tube will be sufficient to carry radiotelephone signals across the Atlantic. This tube consists essentially of a water-cooled cylindrical anode 30 inches long and 1 3/4 inches in diameter. In the axis of the anode is a tungsten filament four-tenths of an inch in diameter and 22 inches long. This filament is excited by a current of 1,800 amperes at 10,000 cycles, the filament excitation requiring about 20 kilowatts.

The magneto field produced by this large heating current is sufficient to "cut off" the electrical current from the cathode to the anode during a portion of each half cycle of the current passing through the cathode; this action taking the place of that of the grid in the three-electrode tube. The electron current to the cathode is thus interrupted 20,000 times per second.

By the use of properly tuned circuits this can be used for the production of high-frequency power radio or any other purpose.

Don't expect to get loud signals with a crystal detector set while using an indoor antenna.

Non-liquid Storage A- and B-Batteries

THERE are now on the market A- and B-storage radiobats which incorporate a number of revolutionary new features of considerable interest to every radio fan. Both A and B types of these new principle-batteries contain a solid electrolyte which makes them absolutely nonspill. This feature will be appreciated by every radioist who has ever spilled acid from his battery on his carpet or clothes.

Another interesting feature is the total absence of separators which reduces internal resistance to a minimum. The radiobat grid (the metal mesh into which is pressed the "active material," forming the "plate") has a double reinforced construction. This construction adds from 25 to 30 per cent. more actual metal per square inch. The plate is, consequently, just that much more rugged and does not buckle. This reinforced strength plus the solid electrolyte makes the use of separators unnecessary. Due to the fact however, that the secondary reinforcing mesh in the grid does not come to the surface of the plate, there is actually more active surface per square inch of plate area. In the case of the radiobat A, this results in a battery from 25 to 30 per cent. smaller and, consequently, easier to handle than any other A battery of equal rating. The radiobat storage B is even more unusual and interesting. It is compact—only four inches square by seven inches long—scarcely larger than a large-size dry-cell B. It has no glass jars to break, no liquid to leak. The most notable feature is its utter noiselessness of operation.

It substitutes the steady, sustained voltage characteristic of a storage battery in place of the irregular constantly dropping voltage of a dry cell, thus eliminating all hissing and crackling noises with which all radio operators are familiar. Changing voltage in the plate circuit is the direct cause of most tube noises and most of what is blamed on static. Sustained voltage does away with this and results in a marvelously clear true-tone reproduction of each word and note.

The Radiobat Storage B is economical as well. It is easily rechargeable at home from either AC or DC and outlasts its value in dry cell Bs on each home charge.

Honeycomb Coils Suggested for Usual Wave Length Ranges

By Harold Day

| Type of Service | WaveLength Range (Meters) | Primary Coil Cat. No. | Secondary Coil Cat. No. | Tickler Coil Cat. No. | Condenser |
|-------------------|---------------------------|-----------------------|-------------------------|-----------------------|-----------|
| Amateur | 145-350 | DL-35 | DL-25 | DL-35 | Series |
| Special Amateur | 305-710 | DL-75 | DL-50 | DL-35 | Series |
| Commercial | 635-1660 | DL-150 | DL-100 | DL-75 | Series |
| Navy Calling | 845-1970 | DL-200 | DL-150 | DL-100 | Series |
| Arlington Time | 1420-2850 | DL-300 | DL-250 | DL-150 | Series |
| Navy Ship Arcs | 2550-4250 | DL-200 | DL-300 | DL-150 | Parallel |
| Navy Station Arcs | 4200-6300 | DL-500 | DL-400 | DL-200 | Parallel |
| Foreign and Press | 6250-14500 | DL-1250 | DL-750 | DL-400 | Series |
| Foreign and Press | 13600-21000 | DL-750 | DL-1250 | DL-400 | Parallel |



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TANGLEY CO., 187 Main, Muscatine, Iowa

No Experience Necessary

Full or Spare Time at Home

PATENT
Your Radio Ideas.
Call or Write
FREE ADVICE



Wave Meter for Amateur Operators

(Continued from page 21)

cuit as will be used in measuring frequencies. An inexpensive indicating device and one which is satisfactory when the power output of the generating circuit is large enough, is a miniature lamp, such as a flashlight lamp, inserted directly in the wave meter circuit. To avoid any possibility of changing the calibration of the wave meter, the lamp should not be changed if it can be avoided. If it must be changed, it should be replaced by one of identically the same kind. The sensitiveness of this device can be greatly increased by having a dry cell and a rheostat in parallel with the lamp in the wave meter circuit. By ad-

justing the rheostat until the temperature of the lamp filament is raised almost to the point of illumination, it is possible to have the lamp lighted by induced currents much smaller than would otherwise be required. However, changes in the battery and rheostat will be likely to change the characteristics of the circuit and hence the calibration of the wave meter. This device, therefore, should be used with caution.

The wave meter may be excited by impact, that is by a source of highly damped waves having only a very few waves in a train. The wave meter can then be used as a source of damped waves to determine the frequency to which a receiving set is tuned. The buzzer, in series with the battery, is connected across the condenser terminals, completing its circuit—when the contact is closed—through the inductance coil of the wave meter. Not more than four volts should be used to operate the buzzer. The buzzer will add to the capacity of the circuit, thereby decreasing its frequency. This decrease will be especially noticeable at the lower part of the condenser scale, where it may amount to several per cent. of the frequency. It can be reduced by having short, widely spaced leads to battery and buzzer. If the wave meter is equipped with both a buzzer and an ammeter, or current-square meter, the ammeter must be so connected in the circuit that the current from the buzzer battery cannot pass through the ammeter. If this is not done the ammeter or current-square meter may be burned out by the current caused to pass through it by the buzzer battery.

The assembling of the parts of the wave meter must be such that each part is rigidly joined to the rest of the circuit. Mounting in a box is as good a means to this end as any from the standpoint of rigidity and is superior to any in portability and in the protection afforded to the parts. A convenient box mounting is shown in Figure 1.

The over all dimensions are left to the constructor since the size of the component parts will vary. The box should be substantially constructed so that it will stand considerable handling. The component parts are all mounted on a panel of rigid electrical insulating material which will not absorb moisture. This panel is, in turn, secured to the supporting box. It is possible to use a panel of thoroughly dried and seasoned hard wood thoroughly varnished with an extra grade of insulating varnish.

Figure 1 shows one possible distribution of the component parts. Attention should be given to the convenience of operation and advantageous wiring of the circuit to keep distributed capacities at a low value. The most advantageous arrangement of the instruments on the panel will depend in part on the particular instruments used, and the constructor should work out the best arrangement in each case.

Figure 2 gives a circuit diagram showing the connections as they should appear underneath the panel. These connections should be made of No. 12 solid copper wire soldered into lugs. Where bending is necessary, sharp right angle bends are used. If it is desired to make a short-wave portable receiving set, terminals for antenna and ground connections can be supplied without decreasing the value as a wave meter in any way, provided suitable care is used in handling the instrument. A wave meter should be handled more carefully than an ordinary receiving set. If it is desired to shield the wave meter, a copper, or brass, sheet may be permanently fixed on the under side of the panel and spaces cut in it to allow for the terminals and supports of the various units. There should be at least 1/8 of an inch clearance for the terminals.

Figure 3 gives the dimensions and construction of the inductance coils.

The forms are turned in a lathe from thoroughly seasoned wood. Several coats of extra grade insulating varnish applied to this form will be desirable in keeping low the absorption of moisture. The proper number of turns of the correct size of wire is wound in a single layer in the recess provided for this purpose. A light coat of extra grade insulating varnish is applied to the wire to keep it in place and to prevent moisture from changing the distributed capacity of the coil. The terminals of the inductance coil are brought out through the wood form and soldered to the supporting brass terminals. The wood screws holding the coil form to the brass supports should be of brass rather than a magnetic material.

It is desirable that the box be provided with a protecting cover and a carrying handle.

After the wave meter has been constructed it must be calibrated. Consideration has been given to the transmission of standard wave length signals from laboratories equipped with precision measuring apparatus. This would make it possible to determine accurately several points on the calibration curve of a wave meter without sending it to a standardizing laboratory. The carrier waves of some radio-telephone broadcasting stations may be adjusted to some particular wave, such as 360 meters, and one point on a wave length calibration can thus be determined. A wave meter transported for standardization should be packed in a wooden box large enough to give room for three inches of excelsior.

ALADDIN ELECTRIC COMPANY, INC.

COMPLETE RADIO SETS

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Variable Condenser Built Right

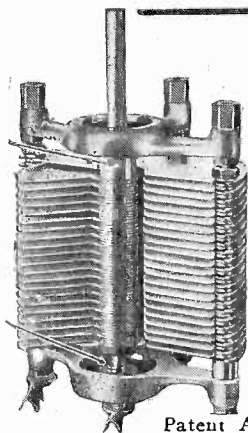
Furnished either regular or vernier

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Patent Applied For

For CORRECT RADIO MAILING LISTS Use THE POCKET LIST

of Radio Manufacturers, Jobbers and Dealers in the United States and Canada. Issued Quarterly—January, April, July and October. October, 1922, issue corrected to September 15th, 1922. Classified under three different headings—Manufacturers, Jobbers and Dealers—and alphabetically arranged by states, cities and towns and names of firms. Containing approximately 15,000 names and addresses.

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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Asked for by name, sold by reputation.

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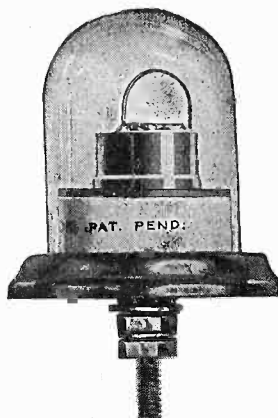
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(The Iron with the Platinum Heating Unit). Removable Soldering Tip



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VARIABLE CONDENSERS—
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ANNOUNCES THEIR "B-I" SET (Patent Applied For)

NEEDS NO AERIAL

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Complete Except "A" Battery, \$52.00

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CRYSTAL RECTIFIER
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A synthetic CRYSTAL DETECTOR sensitive over its entire surface. Eliminates all detector troubles. 50% increase in clearness and volume. Endorsed by Radio experts and press. Awarded certificates of excellency. Sets a new standard of efficiency.

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| 3 Plate Variable Condensers..... | \$1.50 |
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"B" BATTERIES FOR RADIO

22½-45 & 105 VOLTS



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Radio Services Are Deeply Appreciated

RELIGIOUS services at 10:30 a. m. and 4:30 p. m. every Sunday have become a regular feature of the broadcasting program of WGY, the General Electric Company's radio broadcasting station at Schenectady, N. Y. The morning service, in every case, will consist of the entire service of one of Schenectady's churches, which will be conducted with the transmitting equipment of the big radio station by telephone wire. The afternoon or vesper service will be conducted in the station studio.

The expansion of WGY's program to include Sunday has come as a result of thousands of letters from radio listeners within the station's transmitting radius. A great many of the letters were from aged people, too feeble longer to go to their churches but earnest in their desire for spiritual uplift. Among the letters were also a great many pathetic appeals from invalids, some of whom must spend their life in a single room. To such as these the deep swelling tones of the organ, the singing of hymns, the responsive readings, and the sermon are a real inspiration—a boon that lifts them out of the monotony of their existence and gives them a share in the activities which have failed to touch them.

Another class, and probably the most numerous, that has requested radio church-services are residents of country districts too remote from churches, or of localities where churches are closed because of the scarcity or expense of a regular pastor. In one case, it is known that a little group of neighboring farmers has gathered at the home of one of their number who had a powerful receiving set with loud speaker, and listened in, following the scripture reading in their own Bibles, making the responses in the psalter reading and joining in the congregational singing.

The first service sent out by WGY was from the First Methodist Episcopal Church, the Reverend Philip Frick, pastor. Three microphones were placed in the church, one located near the singers and the organ, the second at the pastor's reading desk, and the third in an ante-room for the announcer. Controlling switches brought any of these three microphones into the circuit.

While wandering from one radiophone to another we often wonder what it is all about—whether anything really matters after all, and, if it does matter, what are we going to do about it. Perhaps we are getting to be a radiofanatic.—"The Sun," New York.

Radio

Inland so deep all roaring waves are still;
So far at sea that dock lights long have died
And there's no sound of any train or mill;
Across the mountains high and deserts wild;
Where arc lights flare, or candles softly glow;
Past harbors where ships lie with canvas furled;
From sunrise to the twilight's afterglow
Man's puny voice is heard around the world.


—Walter Trumbull, in "The Herald," New York.

Although the domestic demand is light, numerous firms in and about Berlin manufacture radio apparatus. Curiously, vacuum tubes are "almost unavailable," says Vice-Consul Davis.

Fifty-two issues for \$6.00. Sub. Department, Radio World, 1493 Broadway, N. Y. C.

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CORACO RADIO CONCERT
Daily, 9 A. M. to 5 P. M. 18th Floor, 220 W. 42nd St., next to Amsterdam Theatre
The Coraco Super-Radiophone is the latest and greatest improvement in radio. It has no outside connections—no installations expense—is as simple to operate as a phonograph. If you cannot call, write for full information.
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Complete 50c. instruction book for 20c. only on radio reception and how to make eight classes of crystal and vacuum tube receiving sets. Wonderful information makes you understand radio. 20c
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We have only a few left and they are going fast, but while they last we will continue to sell them at the reduced price.

VT 1 Detector and Amplifier.....\$7.50
VT 2 Detector and Amplifier.....\$8.00

The above tubes are the genuine army J's and E's, respectively.

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YOUR RADIO BATTERY for a Nickel



ENJOYABLE Radio Concerts and Maximum Receiving Range are obtained only when your battery is fully charged. The
RADIO HOMCHARGER DE LUXE
charges your "A" or "B" battery over night. Silent and clean in operation—requires no watching—may be used right in your living room.
Connects to any lamp socket. Self-polarizing—fully automatic—cannot overcharge or injure the battery.
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Beautifully finished in Mahogany and Gold—the most efficient and handsome rectifier ever produced. Bulletin 537 proves it—send for your copy today—IT'S FREE. Sold by all good dealers or shipped prepaid for \$18.50, complete.
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| Unit Audion Control Panels (Detector) | \$ 6.50 | \$5.00 |
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RADIO PRODUCTS
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JERSEY CITY, N. J.

Broadcast Bill's Radiolays

By William E. Douglass

(Copyright, 1922, Westinghouse Electric & Manufacturing Company.)

I'VE been to lots of parties, but the best I've ever seen wuz one we had at our place, in the barn, on Hallowe'en. I had the haymow all fixed up with punkins an' with corn an' them there fancy lanterns; when I's through you would a sworn the place wuz built fer parties. I had apples hung on strings an' some others to be bobbed fer, an' a lot of crazy things. When the folks begun arrivin', I got dressed up in a sheet—one that covered me all over, couldn't even see my feet. Then I met 'em at the doorway 'fore they climbed up in the mow, pointed out how they could get their, givin'



"It don't seem to faze her—boys; I'll tell you, she's a bear."

each a little bow. Abe an' Milly were the last ones, they drove up in their new flivver, an' I guess I musta scared it; when Abe stopped I saw it shiver. Well, us three went up together fer the party had begun. They were workin' on those apples an' in general havin' fun; we had cider an' some doughnuts, an' a lot of things to eat; an' those punkin pies that Min makes, let me tell you, can't be beat. We played a lot of games an' then I walked right out in front an' sez, "Each person present has to do a little stunt. If you can't sing a song, you'll have to hand us out a joke. Abe Jenkins, you kin start it off, then we kin watch your smoke." Well, everything wuz goin' smooth until Rebecca Vance sed if she had some music, she'd put on a ballet dance. Now Becky's eddicated—been away to school a heap, an' she kin do them dances, almost does 'em in her sleep. The stunt that I had planned to pull wuz with my Radio an' I wuz waitin' so I'd be the headline of the show. But, when Rebecca wouldn't do her dance without a tune, I 'lowed as how my act would slip fer I would just as soon pick up some real jazz music so that she could do her bit. I thought that she wuz stallin' an' that she would throw a fit when she found out that I could get the "music in the air." It didn't seem to faze her—boys, I'll tell you she's a bear. The first piece I tuned in wuz "Stumbling," which you've heard before an' so she stumbled in her dance—you ought to heard 'em roar. She'd taken several encores, an' an' we'd all quit clappin' when the chap announced the band would play that tune, "Do it Again."

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List \$6.50—Special Price \$3.50
3000 ohms

Amateurs: We pay postage

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VARIOMETERS, Perfect, \$1.25 Net
ACT AT ONCE!

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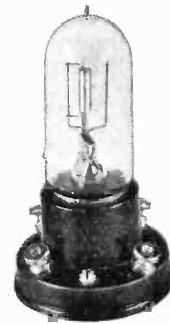
When we say that our exclusive Variometers and Variocouplers, which are specially wound for close tuning and hooked up according to our diagram, will listen in from New York to Kansas City.

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At Our Expense

Fair enough? What do you say?

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Special
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Designed especially for the new tube of the Radio Corporation which is operated by a single dry cell. Special clips of phosphor bronze with slide wipe and strong gripping action on contact pins. Nickel plated binding screws. Highest quality throughout. Moulded from Condensite.

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PATENT PENDING
Loud Speaker
Complete with Unit
The First High Grade Low Priced Loud Speaker Remains Supreme.

Unequaled for Pure Natural Tone
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Beautiful cabinet type, hand rubbed mahogany or dark oak finish, bronzed throat, complete with cord—no extras to buy,
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A Broadcasting Record

WHAT is believed a record-distance for daylight broadcasting was made by WGY, the General Electric Company, broadcasting station, in reporting the recent World Series. Baseball fans in Havana, Cuba, 1500 miles from Schenectady, reported distinct reception of the game of Thursday, October 4.

The series was reported, play by play, by W. O. McGeehan, sporting editor of the New York "Herald." A leased wire carried the story of the game from the press box in the Polo Grounds, New York, to the transmitting apparatus of WGY, 150 miles away. From WGY, the story traveled on Hertzian waves to listeners within hundreds of miles. Many letters and telegrams were received expressing appreciation for the prompt baseball service. Fans were able to follow every play and actually visualize the game.

The following cablegram was received from Havana:

"Havana Life" published a front-page story which in part, states: "The broadcasting of the World Series games by the New York Herald and WGY has made a great hit in Cuba. It was heard distinctly throughout the republic, according to reports received by 'Havana Life.' Our managing editor, Fred M. de Stefano, heard the report from the receiving station of Cecil J. Dale at Marianao, near the Oriental Park Race Track. F. W. Borton, president of the Electrical Equipment Co., of Cuba, leading radio fan, pays a great compliment on the clearness with which the report was received here."

A Radio Newspaper

A PARIS newspaper has ceased to be printed and is published orally. The subscribers meet in a hall and listen to the editors and reporters. The editorial staff has specialists who address the subscribers on topics of the day. So far the experiment has proved profitable. It saves the mechanical cost of publication and the white paper, says "The Globe," New York.

Here is an idea that might be adopted by one of the radio stations. The main cost of a daily newspaper is not the pay of the reporters, copyreaders and editors; but the cost of the mechanical departments and the white paper. By substituting radio broadcasting all the typesetting, stereotyping, and printing-press machinery would be dispensed with. There would be no expensive system of distribution, such as wagons and trucks. The hundreds of tons of white paper could be left to grow into spruce trees in the forest.

This may come some day; but the difficulty at present would be in collecting from the subscribers and in preventing anybody with a receiving apparatus from getting his daily news and editorials without paying for them. The subscribers would also have to go without cartoons and illustrations, unless they installed the more expensive and complicated apparatus recently invented, by means of which pictures can be electrically transmitted.

May—What did Noah do for laughs on his voyage in the ark with no radio to tune in on jokes from ABC and XYZ?

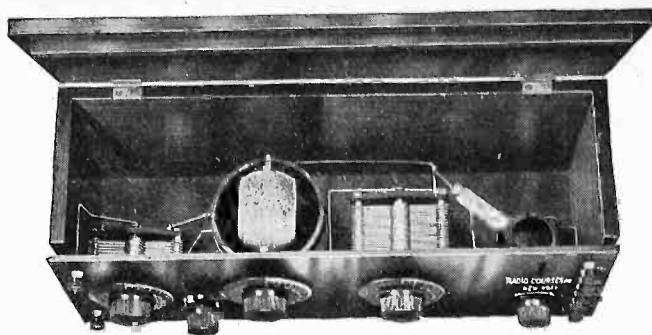
Ray—You recall that he took two of every animal known?

May—Yes.

Ray—Well, the hyenas were the laughing stock of the ark.

—"Topics of the Day" Films.

Fifty-two issues for \$6.00. Sub. Department, Radio World, 1493 Broadway, N. Y. C.



The Assembly \$27.50 Detector and Tuning Unit

A high-grade tube set that costs less than price of parts used. Super-sharp tuning through double circuit and Litz-wound rotor. A real tube set for the price of a good crystal set. All the fun of assembling—but correct assembling made absolutely certain and easy. Supplied in knock-down form, panel drilled and engraved, all parts packed inside cabinet, including connecting wires cut and bent ready for soldering. If your dealer can't supply you, send check or money order.

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MASTER BALDWIN PHONES

AN IMPROVEMENT ON WHAT WAS CONSIDERED THE BEST

Those who know, in the radio world, have always used the Baldwin Phone. It has been ever-present where exacting work was to be done. It was conceded to be eight times more sensitive than any other known phone.

Not satisfied with even such a meritorious article as this, the manufacturers have now produced the Master Baldwin Phone. A 40% improvement in refinement and workmanship. Going still further, they have designed the Clarophone, the most marvelous speaker yet produced. Prices:

Singles, \$9.00 Headset, \$16.00 Clarophone Loud Speaker, \$22.50

THE MOST SENSATIONAL

radio development since the Vacuum Tube. After years of experiment and proof, this genuine fixed Radio detector is now available to amateur and professional operators. Its introduction marks the third GREAT step in the progress of Radio—first the crystal then the vacuum tube and now the wonderful Phonaphone. Price, \$3.50, sent postpaid.

Direct or at your dealers.

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| | |
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| UV200 | \$4.00 |
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| WD11 1½ Volt | 6.90 |
| Meyers | 3.75 |

VARIABLE CONDENSERS KOEHLER HIGH GRADE MOULDED ENDS

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| 3-Plate | \$0.95 |
| 11-Plate | 1.35 |
| 21-Plate | 1.75 |
| 43-Plate | 2.15 |

HEAD SETS

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|------------------------|--------|---------------------------------|--------|
| \$6.00 Murdock's | \$4.95 | \$10.00 Stromberg-Carlson | \$5.75 |
| 8.00 Brandes' | 6.90 | 16.00 Baldwin Master | 12.75 |
| 22.00 Brown's | 14.00 | 9.00 Baldwin Single | 7.75 |
| 6.50 Turney's | 2.95 | 8.00 Federal's | 6.45 |

WESTERN ELECTRIC HEAD SETS, THE SUPERSENSITIVE PHONE USED BY THE SIGNAL CORPS AND NAVY. BOUGHT FROM THE U. S. GOVERNMENT. TYPE 194W (THE BEST MADE).....\$8.90

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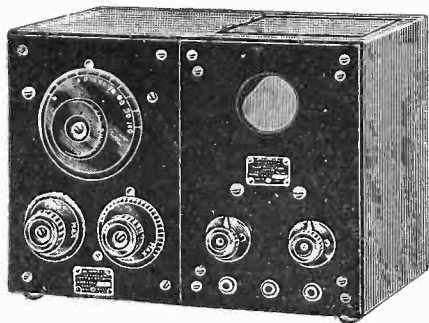
LIBERTY RADIO COMPANY

106 LIBERTY STREET, N. Y. CITY

Reference: Bradstreet's and Bank of The Manhattan Co., Rockaway Park, N. Y.

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**Aerial Equipment or
Dust-Proof Crystal Detector
with \$10.00 Purchase**



**IT WILL PAY YOU TO BUY NOW
SAVE \$40.00**

Special at..... \$92.50
List price..... \$132.50

The above is the popular and widely known R. C. Model Set. It is a highly sensitive long distance RECEIVER—a set you will be proud of—Regenerative, with TUNER, DETECTOR, and TWO-STAGE AMPLIFIER. Only a limited quantity at this price.

ACCESSORIES TO GO WITH THE ABOVE SET (less Storage Battery), \$19.20, and your option of a Magnavox or Head Set at price listed below:

| | |
|--|---------|
| LOUD SPEAKERS | |
| MAGNAVOX..... | \$33.00 |
| PHONOTONE, slightly shop worn..... | 17.00 |
| HEAD SETS | |
| FEDERAL..... | \$5.00 |
| Western Electric..... | 9.00 |
| Selbt, Imported Set..... | 8.00 |
| Kellogg..... | 8.00 |
| Error in our last advertisement for Kellogg Phones. Should have been \$8.00 instead of \$5.00. | |
| VACUUM TUBES | |
| Guaranteed U. V. 200..... | \$3.35 |
| Guaranteed U. V. 201..... | 4.35 |
| B BATTERIES | |
| 22½ Volt..... | \$0.65 |
| 45 Volt..... | 2.25 |
| 22½ Volt, Large Size..... | 1.85 |
| STORAGE BATTERIES | |
| 6 Volt, 80 Amp., Exide, Guaranteed..... | \$14.95 |
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| BATTERY CHARGERS | |
| F. F. Battery Booster..... | \$11.40 |
| G. E. Tungar Rectifier..... | 14.00 |
| LOUD SPEAKER HORNS | |
| Just attach one phone..... | \$3.00 |
| Just attach your head set..... | 6.00 |
| PHONOGRAPH ATTACHMENTS | |
| Fits any Phonograph and Phone..... | \$0.75 |
| SPECIAL VARIOMETER | |
| Guaranteed perfect..... | \$2.00 |
| DUO LATERAL COILS | |
| DL 25, 35 and 50.....ea. | \$0.35 |
| DL 75, 100 and 200.....ea. | .50 |
| DL 250..... | .65 |
| DL 1250..... | 1.35 |
| DL 1500..... | 1.48 |
| DL COIL PLUGS | |
| Complete with strap..... | \$0.50 |
| TRIPLE COIL MOUNTINGS | |
| Complete with Leads..... | \$2.50 |
| SIGNAL CORPS VT. I VACUUM TUBES | |
| Guaranteed originals..... | \$5.45 |
| NEW 1½ VOLT DRY CELL TUBE | |
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| MAGNET WIRE—Write your inquiries. | |
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STANDARD MAKE DETECTOR AND TWO-STAGE Samples which are out of their boxes, but have not been used, values that were as high in price as \$75—a few at..... \$39.00

Add postage, deliveries made daily.

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Broadway-7th Avenue Subway
6th or 9th Avenue L

John Bull's Radio Exchange

WHAT is said to be the first radio-
phone exchange in the world was
recently opened at Croydon, England, the
point from which the air lines to the
European Continent take their departure,
according to Consul Linnell.

The chief use made of this exchange
is to connect the serial-traffic controller,
who has his headquarters in a control
tower at Charing Cross, London, with
the pilots of the air express flying be-
tween Croydon and the Continent.

This wireless exchange can also con-
nect the phones of the airships and air-
planes while in flight with any office at
the aerodrome at Croydon, making direct
telephone conversation possible.

The pilot of each aerial transport is
now required to report his position to
the traffic controller every fifteen min-
utes, so that the progress and position
of each plane is known throughout its
journey. The controller is of particular
value in directing the course of the air-
craft in cases of fog, and in giving them
special directions for landing.

The Radio Bug

I WAS sitting one day at my office
desk,
Writing of boys and men,
When a radio bug crawled out of a crack
And perched on the tip of my pen.

He scratched his neck with a wiry paw
And gazed at my half-writ poem,
Then settled back with a sleepy air
And ohmed an indolent ohm.

"Your room is chilly," said he to me,
As he shivered his aerial wire;
"If I were you I know what I'd do—
I'd build me an ampli-fire."

Then, tipping back 'till the pen point
cracked,
He ohmed again and said,
"I swallowed a couple of codes to-day
Any they gave me a pain in the head."

I asked him about his sister Ann,
And Galea so crystal fair,
"Oh, Gale is tickling the cat," said he,
"And Antenna is up in the air."

"I think that Ann's getting sour because
Of the unripe currents she ate,
For when I come with 'the weather' she
scolds,
'Now, wi-re you in-su-late?'"

He kicked his foot in a drop of ink,
Then slid from my pen with a snap—
Gave a switch to his tail and disappeared
Where the spark had begun to gap.
—Le Roy W. Snell in "The American
Boy."

"If I buy a radio apparatus, is there
any danger of getting a shock?"
"Only when the dealer tells you the
price."
—James Madison's Comedy Service.

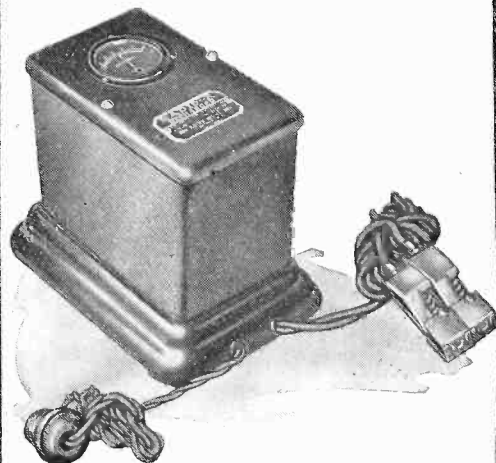


**NA-ALD
DE LUXE
V. T. SOCKET**

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

Reliable and Beautiful RADIO-A RE-CHARGER



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

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

Price, \$18.50

Dealers and Distributors

Here's a Winner! Write
us for full particulars.

Simply screw into any 110 volt lamp
socket and connect the terminals to your
battery. Impossible to hook-up wrong—
RADIO-A charges either way.



A compact portable Re-charging Unit
that will fully charge a 100 A. H. Bat-
tery overnight, for from 5c to 10c, ac-
cording to prevailing rates.

LAST A LIFETIME

King Electric Mfg. Co., Inc.
1681 FILLMORE AVENUE
BUFFALO, N. Y.

Cavite to Washington, by Radio, in Four Minutes

THE transmission of a routine radio-message from the Naval Station at Cavite, Philippine Islands to Washington, D. C., was accomplished recently by the Naval Communications Service within four minutes. The total distance is 11,500 miles, establishing a new record for long-distance land and transpacific communication.

Ordinarily, with the delay on account of schedules, a message from Cavite to the Navy Department would not be delivered in less than several hours, and sometimes a whole day is required in the transmission, due to relaying and other causes.

Of course, the message was relayed at San Francisco, where it was received from Cavite, but as the radio circuit to Washington was "set up" the message was relayed immediately. Within four minutes after the sixteen-word dispatch left Cavite, it was received on the aerials on top of the Navy Building in Washington and read in the receiving room below. Radio communication is said to be instantaneous, and a signal is instantaneous; but a message is slower due to

the fact that time is required to transmit it, record it, retransmit and again record. Westward, transpacific radio messages are relayed to Guam and Cavite through Honolulu. Recently through the operation of the Fanning electrical relay at Honolulu, 184 words were automatically relayed to Guam from San Francisco without being transcribed or retransmitted, thus saving considerable time in their dispatch.

Radio Jokes

Jay—How is your new Radio set?
 Ray—Great, but my wife is kind of jealous of it!
 Jay—Howzzat?
 Ray—I have a loud speaker.
 —"Topics of the Day" Films.
 "The Radiophone has wonderful possibilities."
 "Yeah. When they get it perfected we can visit with relatives without having to feed 'em."
 Spinkus—Old Henpeck doesn't look as downhearted as he used to.
 Spunkus—No, he doesn't have to listen to his wife talk any more. He has a

radio set and wears receivers around the house all the time.
 —New York Globe.

INSU-LITE

PANELS
 1/8" —.01 per sq. in.
 3/16" —.015 per sq. in.
 1/4" —.02 per sq. in.
 DEALERS: Write for discounts.
 General Merchandise Co.
 142 Market Street, Newark, N. J.



NA-ALD SMALL SPACE V. T. SOCKET

35c each, 3 for \$1.00. Moulded genuine Condensite. Requires but small space for mounting. Readily accessible blading ports. No excess metal to interfere with efficiency. Unaffected by heat of bulbs or soldering iron. Phosphor bronze contacts. Nickel plated brass blading screws. Slash out slot. Price possible because of large production.
 Special proposition for dealers and jobbers.
ALDEN-NAPIER CO.
 Dept. L.
 52 Willow St. Springfield, Mass.

Hearing Atlanta in Des Moines

EDITOR, RADIO WORLD: I noticed in RADIO WORLD (No. 29, dated October 14) that a Des Moines, Iowa, man heard Atlanta, Georgia. We pick up Atlanta every time they are on—and they come in perfectly. We also pick up the Norton Laboratories, Lockport, New York; also Schenectady, New York, and both come in loud and clear—just as natural as if in the same room. Our outfit is only a single detector-bulb regenerative set, but it works fine! —Newby Auto Electric, Milford, Iowa.

Clever Lawyer—Now, if you will let me have some of his love letters—
 Breach-of-promise Gertie—I haven't any. We both had radio sets.
 —"Topics of the Day" Films.

FRS

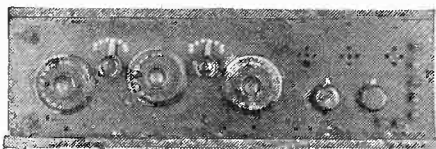
ALL MOLDED UNIVERSAL COMBINATIONS
 5 Units in 3

- F. R. S. Molded Variometers..... \$6.00
- F. R. S. Molded Variocouplers..... \$5.00
- F. R. S. Molded Bank Windings... \$5.00

Bank Windings are interchangeable for direct mounting on either Variometer or Variocoupler.

Universal—Accurate—Interchangeable

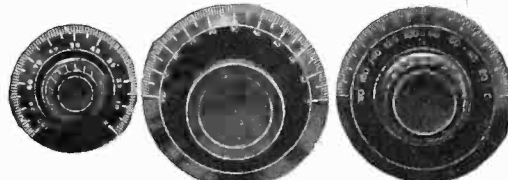
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 A Complete
 Two-Stage Long Range Receiver



Set includes two Federal Transformers, Condenser, two-molded variometers, molded variocoupler, three V. T. sockets, filament rheostats, dials. Read 'Em binding posts, switch points; in attractive cabinet and drilled panel: complete, ready to hook up. **\$40**
 A \$125 Radio for.....

F. R. S. Radio Corporation
 409 East Fort St. Detroit, Mich.

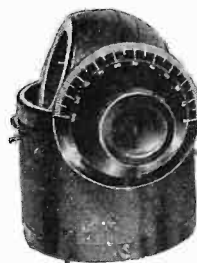
DIALS



2"—20c. 2 3/4"—25c. 3"—27c.

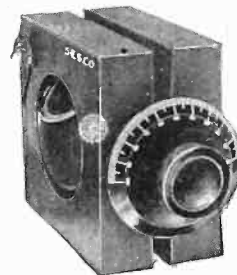
with brass insert and set screw. Specify 3/16th or 1/4" insert.

\$1.75



Sesco Variocoupler, 600 meters.

\$2.50



Sesco Variometer.

One-half with order. Balance C. O. D.

Standard Model 8 Phones 2500 ohms, \$5.75

Standard Electric Sales Company

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NEWARK, N. J.

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RADIO WORLD

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- Six Months3.00
- One Year (52 Issues)..... 6.00
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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 advs., if copy is received at this office ten days before publication, RADIO WORLD CO., 1493 Broadway, N. Y. C. (Phone, Bryant 4796.)

FOR QUICK SALE—Westinghouse R C at best offer. Daryl McClung, 1221 9th Avenue, Huntington, W. Va.

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RADIO ENTHUSIASTS: For Sale—A Complete Colin B. Kennedy Universal Receiving Set, almost new and in excellent condition. Remarkable long distance set, giving range of wave lengths from 175 to 25,000 meters. Have continually heard European stations. Owner is in a position where he can not use set. All communications may be addressed to Frederic W. Proctor, The Ambassador Hotel, Park Ave. and 51st St., New York City.

ADAPT your socket for Westinghouse dry cell tubes—no changing of connections needed. The Suneco adapter costs only \$1.50. Sent postpaid on receipt of price. Clark & Tilson, 1 E. 42nd St., New York City.

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Details, Cabinet, 2 Condensers, 2 Honeycomb Coils, Coil Mountings, Socket, 1 Tusko Dial Bevel, Formica Panel, Grid Condenser and leak, Bradley Stat. Price \$16.00. Frost Phones, \$4.25. Also, Phones rewound.

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| 7.00 U. V. 712 and Freq. Trans. (Radio Corp.) | 5.60 |
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| .70 Jacks single open or closed (Firth)..... | .35 |
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| Arrow Variometer..... | 2.25 |
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Send Money Order, but do not add postage for mailing. Pkg. will come Parcel Post Collect.

MURDOCK PHONES—type 56, 3000 ohms... \$5.50
MURDOCK PHONES—type 56, 2000 ohms... \$4.50
 U. V. 200 (Detector tube)..... \$4.50
 U. V. 201 (Amplifying tube)..... \$5.85
 Postpaid in U. S.
 Send 25c for 208-page radio manual and catalogue. A. V. Gregory, 42 Broad St., Red Bank, N. J.

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.

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.

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

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

PATENTS—Send for form "Evidence of Conception" to be signed and witnessed. Form, fee Schedule, information, free. Lancaster and Allwine, Patent Attorneys, 259 Ouray Bldg., Washington, D. C.

FRENCH TUBES, genuine (no bootleg with French name), most sensitive and economic. (Good for detectors, amplifiers, and especially for radio frequency. Will work very good on two dry cells.) Price \$3.25. ATLANTIC & PACIFIC RADIO CO., 131 W. 37th St., near Bay, New York.

Exchange jolly interesting letters through our Club! Stamp appreciated. Betty Lee, Inc., 4254 Broadway, New York City.

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.

RADIO MAN, eleven years' experience in all sides of the game, capable of constructing, installing, operating broadcasting station of any power, desires permanent connection. Go anywhere. What can you offer? Evans, Momus Pier 48, N. R., N. Y. C.

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EARN \$110 to \$250 Monthly, expenses paid, as Railway Traffic Inspector. Position guaranteed after 3 months' spare time study or money refunded. Excellent opportunities. Write for Free Booklet G-151. Stand. Business Training Inst., Buffalo, N. Y.

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. Endorsed by RADIO WORLD. Using galena, you may pound panel or table without disturbing sensitivity in slightest. Proved practical on shipboard by an oldtime 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 insensitive unstable spring or catwhisker with a Contact which will hold its adjustment in addition to giving louder signals and music. Indispensable for use in your crystal set, regardless of make. 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.

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.

A Vacuum Tube Dry-Cell Set

But has a wave-length of 150 to 1000 meters. Dealers and Jobbers Write to

LINCOLN RADIO CORP.

Manufacturers

116 West 65th Street New York, N. Y.

What Is It?

THE State Music Dealers' Association, of Iowa, met a few days ago and discussed the radio situation, says "The Mail," New York. Whether a radio set is a musical instrument or a scientific commercial device was one of the "big" questions that occupied the attention of the members. The delegates decided that should they class the radio receiver as a musical instrument the various members would lend support in exploiting radio.

This was an odd discussion. That it should occupy the attention of a business-getting organization is one of those things that cannot be understood. In the first place, whether the radio instrument is a musical device or another class of utility, is of no importance. Is the phonograph a musical device? Not essentially, although 95 per cent of the records we have are of a musical nature.

Attention! Fans and 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.

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Variometers **\$3.95**
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REGULAR PRICE \$6.00
 These are standard MOULDED instruments which is all that is necessary to say.

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Radio dealers since 1918

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Genuine Condensite Dial
 The dial that runs true.
 Numerals engraved on bevel and knob so shaped that fingers do not hide them. Thin edge with clear graduation to make accurate reading easy.

Concealed set screw in metal insert. Will not warp or chip. Finish and enamel permanent.

3-inch dial 35c
 2-inch dial for rheostat potentiometer use... 35c
 3 3/4-inch dial 75c

Send stamps for literature.

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Antenella

No Antenna or Aerial Needed



Does away entirely with antenna and all outside wiring, lightning arresters, switches and all other inconveniences.

ANTENELLA enables you to enjoy Radio pleasures in any room in your house. Place your receiving set anywhere and merely attach Antenella to any electric light socket. No current consumed.

At your dealer's—\$2.00

If he can't supply you send purchase price and you will be supplied promptly without further charge.

Chas. Freshman Co., Inc.
 97 Beekman St. New York City

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 FRED S. CLARK, Manager,
 1493 Broadway, New York

ASSOCIATE EDITORS:

Robert Mackay Fred. Chas. Ehlert

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Since Railroads Took to Radio

ELDERLY Lady: "Can you tell me whether this train plays 'Silver Threads Among the Gold?'"
 Train Caller: "No, ma'am. Take the WJZ local for that number."
 * * *

Beautiful Young Lady: "Can you show me what train to take to hear 'Kiss Me Again,' 'Love's Sweet Song,' 'I'm Crazy Over You?'"
 Train Caller (very embarrassed): "I certainly can. Step this way, please!"
 * * *

Indignant Commercial Traveller: "My train is two hours late again. What-zamatah?"
 Station Master: "It ran out of violin solos at Pittsburgh."
 * * *

Wild Business Man: "Say, looka here! What's the trouble with the 2.15 express?"
 Station Master: "Three hours behind time. It had to stop at Gopher Prairie for a new crystal set."
 * * *

Railroads may shortly announce the suspension of certain trains because of unfavorable static conditions.
 * * *

Travel Note: Mr. and Mrs. O. Howe Dumm, accompanied by Mr. and Mrs. A. Lott Dummer and radio sets, left today on the 12.20 for an extended railroad trip.—W. I. Phillips, in "The Globe," New York.

B Batteries That Last For 5 Years

22—500 VOLTS

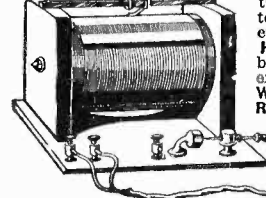
Send for interesting circular Dept. B.
Sidbenel Radio Equipment Mfg. Co.
 1663 Jerome Ave. New York City

DOUBLE HEAD PHONES



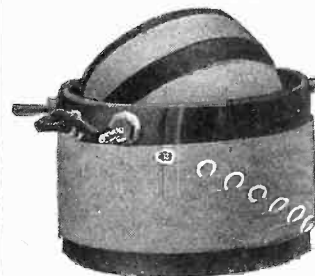
BOYS! A REAL RADIO SET ABSOLUTELY FREE

RUSH your name and address and we will tell you HOW you can get this RADIO SET ABSOLUTELY FREE. RADIO SET comes to you complete, with single slide tuning coil, crystal detector and phone condenser, AND DOUBLE HEAD PHONES. No batteries required; no experience.
 Write To-day for Free Radio Plan.



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VARIO COUPLERS



GEM \$1.25 List

We also make 6 other styles That List \$2.50 up

Jobbers—Dealers—Agents

Write for Discounts

Jewell Radio Sales Co.
 90 West St. New York City
 Phone Rector 1035



ALWAYS FOREMOST IN THE FIELD

Announces the New Duplex Cabinet

LOUD SPEAKER USING YOUR OWN HEADSET

Two complete loud speakers in one—one for each phone—eliminates the interference between phones of the usual type, giving much greater volume. Each tone chamber is two feet long but the SPIRAL construction allows a very compact instrument besides absolutely eliminating metallic distortion—REALLY GIVES A PERFECTLY NATURAL TONE.

Beautiful hand rubbed mahogany or dark oak finish, bronzed throat and fittings... \$4.85
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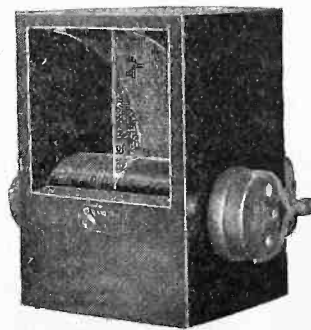
At dealers or postpaid (C. O. D. if preferred). MONEY-BACK GUARANTEE.

For those who own a Baldwin or other

LOUD SPEAKER UNIT

we make a single type SPIROLA with special clamp. Same prices as above.

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