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FEBRUARY 23

1924

RADIO

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WORLD



President Calvin Coolidge's Lincoln Day address at the Waldorf-Astoria, New York City, was radioed by Stations WEAF, WCAP, WJAR, WJZ and WGY to 5,000,000 people, the largest audience ever reached by man.—(Photo by Int. Newsreel.)

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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. Phones: Lackawanna 6976 & 2063.

Vol. IV, No. 22. Whole No. 100

February 23, 1924

15c. per copy, \$6.00 a year

A Two Tube Set with a "Kick"

Variometer Outfit Remade Into a Real Reflex Receiver

By Brainard Foote

WHILE the old double variometer regenerative outfit has served its purposes, has achieved its DX receiving records, and has shattered nerves here and there by its hand capacity effects and its complexity of adjustment, the time has come for the advance into the field of more satisfactory equipment—more satisfactory from the standpoint of volume, of clarity, of simplicity of tuning and more satisfactory from the hand capacity angle, and more satisfactory as regards interference with other listeners-in.

It need not be imagined that a change to a circuit of this nature must involve the expenditure of \$40 or \$50 and the reconstruction of the whole receiving set. Far from it, as a glance at the accompanying illustration will reveal. In fact, instead of adding tuning equipment, we remove some of it! And we gain at the same time. Surely this is worth while.

The wiring diagram herewith shows the new arrangement in detail, and little trouble should be experienced in hooking it up even though some of the binding posts are not placed exactly as they are depicted. The variable condenser is connected in series with the first variometer at the left, and the second variometer is inserted in the plate circuit of the first

tube—the added tube, by the way. The detection is done by the crystal, and the detecting circuit is tapped across the plate or R.F. variometer. The audio-frequency current released by the crystal is then fed back through transformer T-1 to the first tube again. The second tube is a straight audio amplifier.

This type of reflex should not be confused with the untuned transformer type which is somewhat difficult to operate as it has a persistent tendency to howl when pushed to the sensitive point. The circuit herein suggested can be made to howl if one so desires, but after trying this stunt once or twice, the probability is that it won't be repeated. Plenty of DX can be heard without forcing the adjustments to the oscillating point, and there is a reliable method of bringing the set near the oscillating point without allowing it to actually get there and thus interfere with other listeners.

To transfer the old variometer and variocoupler outfit to the new reflex tuned radio-frequency system, it is only necessary to remove the variocoupler and all its switches and taps. Then the socket for the extra tube is inserted in its place. The parts designated by various symbols on the circuit diagram are as follows: A, antenna binding post; G, ground binding post; C,

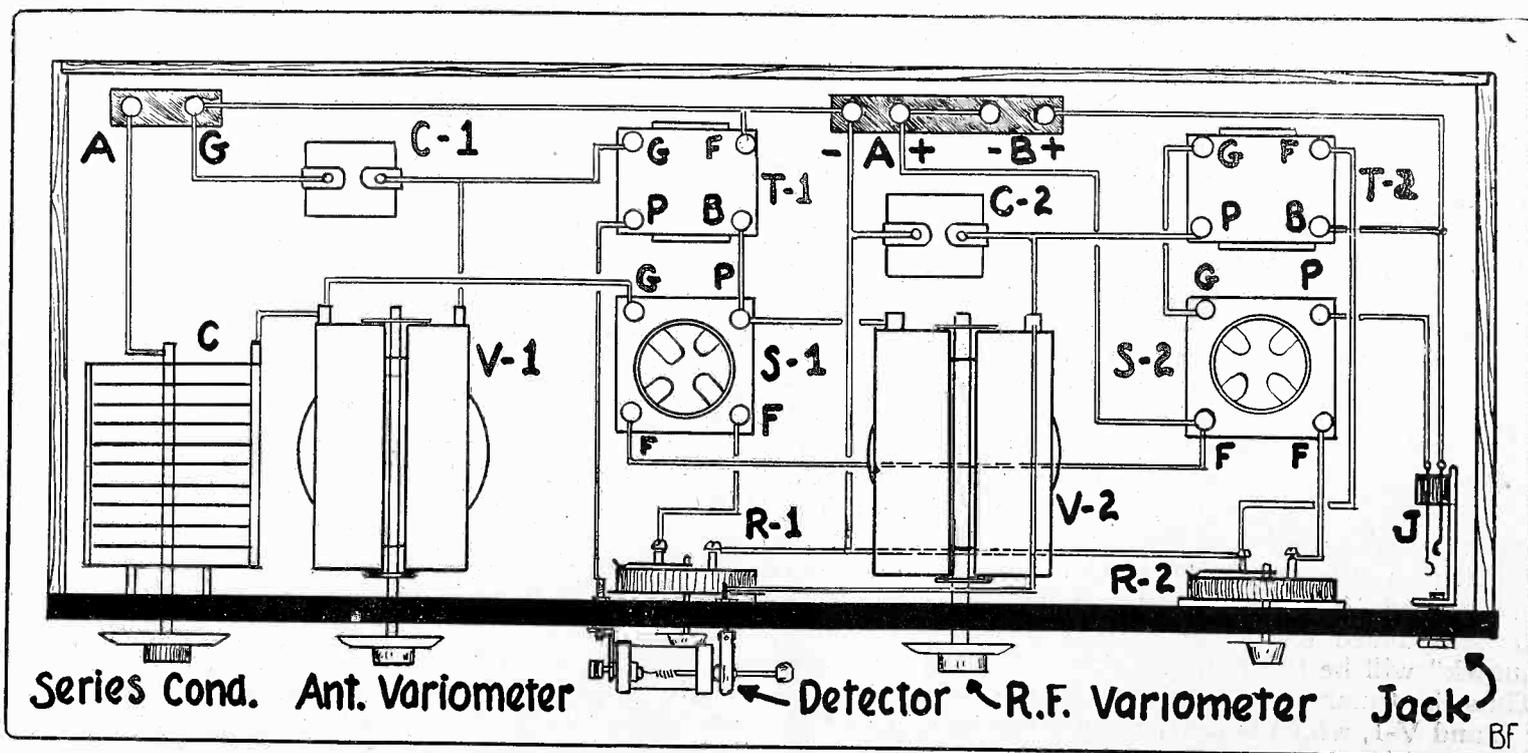


Fig. 1—Wiring plan of a practical tuned radio-frequency adaptation of the standard regenerative receiver which will pump plenty of "pep" into the loud speaker. Clarity is assured by the crystal, volume and DX by the reflexed and straight audio tubes.

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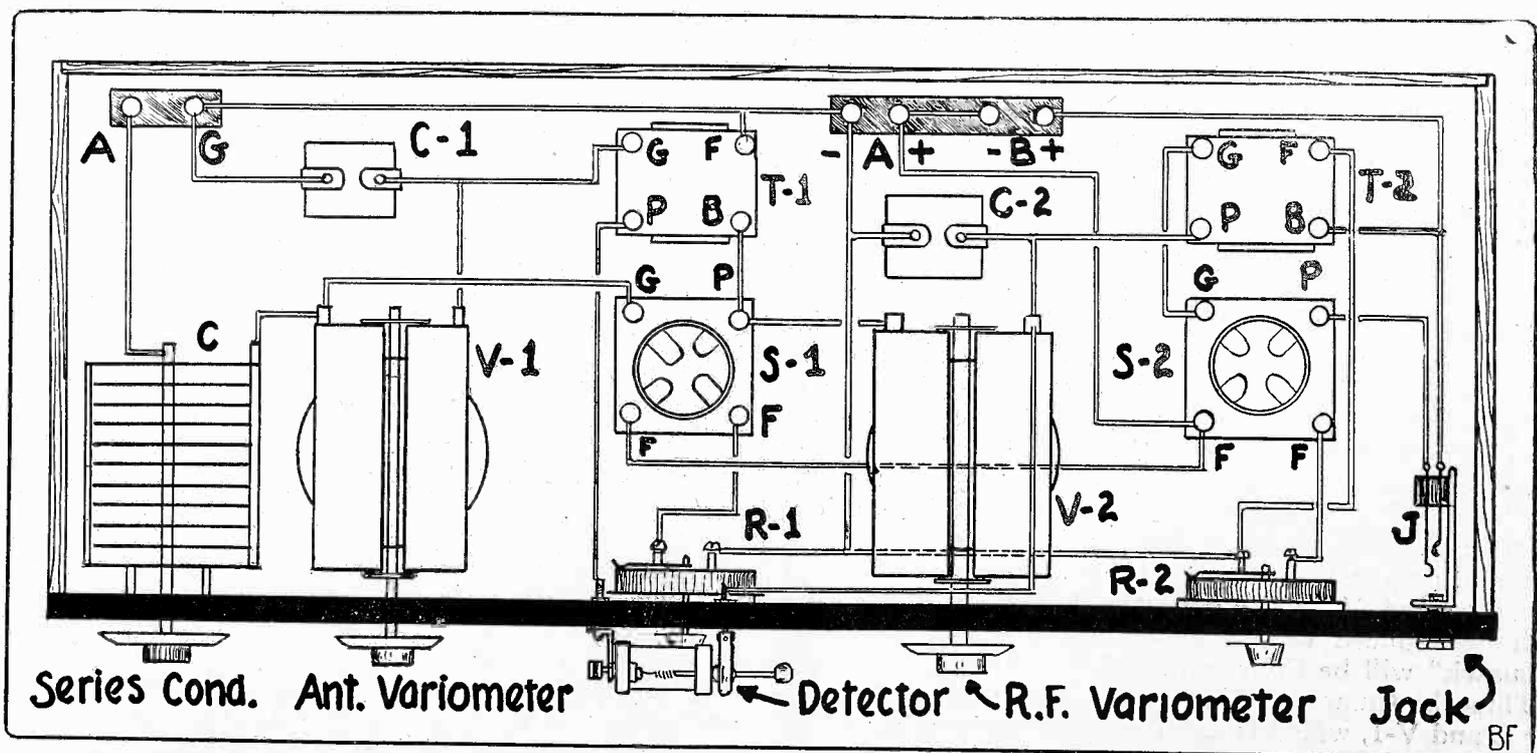
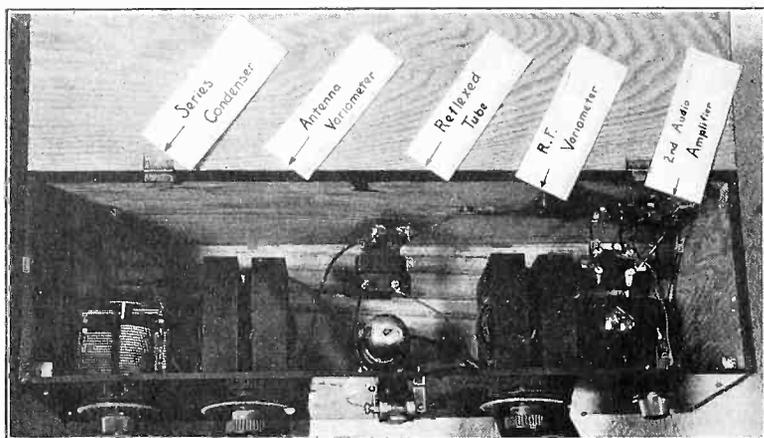


Fig. 1—Wiring plan of a practical tuned radio-frequency adaptation of the standard regenerative receiver which will pump plenty of "p-p" into the loud speaker. Clarity is assured by the crystal, volume and DX by the reflexed and straight audio tubes.

variable condenser, 23 or 43 plates; C-1, fixed condenser, .001; T-1, audio transformer, no higher than 6 to 1; C-2, fixed condenser, .002; T-2, audio transformer, no higher than 4 to 1; V-1, variometer used to tune antenna circuit; S-1, socket for reflexed tube (201-A or 301-A; V-2, variometer used as R.F. auto-transformer; S-2, audio amplifier (formerly detector) socket; J, phone jack; R-1, rheostat for reflexed tube; R-2, rheostat for audio amplifier (formerly detector).

It is recommended that the battery and antenna connections be made as indicated in order to keep unsightly wires away from the front of the cabinet. The posts should not, however, be placed on the cabinet directly, but should be mounted on small strips of insulating panel material, which can then be screwed to the baseboard. The holes left in the panel by the removal of the switch points will not be very prominent, and the hole used for the variocoupler shaft will probably do for the shaft of the rheostat. The glass-enclosed crystal detector, fitted with iron pyrites or a crystal made especially for reflex circuits, is mounted near the top of the panel, above the R.F. tube's rheostat.



Complete set as built by the writer. The cards indicate the position of the various units. (Photo by Foote.)

The purchaser of good audio transformers will be rewarded with a surprising amount of volume upon the completion of the set, and will find that the circuit will function even on an indoor antenna 20' or 30' in length. The tuning is not tricky at all, although there is a knack to be learned about controlling the sensitivity of the set. This lies in the relationship between the series condenser and the antenna variometer, both of which tune the antenna circuit. A certain station may be tuned in with a high setting on C, but a low setting of V-1. And the same station may be tuned in again with a lower setting of C and a higher setting of V-1. There are thus any number of combinations between C and V-1 where a certain wave length may be tuned in.

Now, with a high value of C, the capacity of the antenna will absorb a great deal of energy from the variometer V-1, so much that the set is very far from the oscillating point. But, as the C is decreased and V-1 proportionately increased, the operator will note a gradual increase in volume from a certain station. Variometer V-2 need not be changed once it is set to the station's wave length. If C is made too low in capacity and V-1 too high, the antenna's absorption will be reduced to the oscillating point, and a loud "squawk" will be the result.

Thus the tuner should strive to obtain an adjustment for C and V-1, which is sensitive yet not howling when the two variometers are in perfect tune. In fact, for all local stations, condenser C may be set at a fixed value, and the tuning done by the variometers alone. Should there be interference between, let us say, WJZ

and WEA, the first two controls should be moved to a position nearer to the oscillating point, and the volume of the station desired will be boosted sufficiently to tune out the other station.

For a faint DX station, a low setting of C will be required, in order to bring the set close to the oscillating or regenerating point, where the volume will be best. Stations like KDKA and WDAP may be brought in without annoyance from the local stations on waves above 380 meters in this manner. Should the listener desire to employ the head receivers extensively, he should insert a double circuit phone jack as follows:

Break the connections shown on the diagram between the right hand terminal of the R.F. variometer and the "B" battery. Connect one long spring of the jack to this terminal and the other long spring to the "B" battery. The inside shorter springs then go to the "P" and "B" terminals of transformer T-2. Finally, the right hand terminal of C-2 is connected to the right hand terminal of variometer V-2, as before. Without this extra jack, the volume from local stations would be quite seriously uncomfortable, and the circuit as suggested originally is intended for the loud speaker alone. When using an ordinary phone as the loud speaker unit, a reversal of the phone tips must be tried, as a wrong connection will gradually demagnetize the ~~unit~~. The position of clearest and loudest reproduction should be used permanently.

A condenser having a vernier attachment is quite desirable for DX work—for the vernier might be attached to the dial of the variometer V-1. UV201A or C201A tubes are preferred, although a power tube will be just a bit better than either of these for socket S-2. However, the writer has tried WD11 and WD12 tubes in the illustrated outfit, and finds that the loud speaker may be operated with about one-half to two-thirds the volume obtained with storage battery and suitable 6-volt tubes.

Using a 100' antenna, the writer has received many DX stations clearly on the loud speaker, among them being KSD, KYW, KDKA, WGY, and others within 400 miles very satisfactorily. The proper "balance" between the series condenser and the antenna variometer must be obtained for each of these distant broadcasters, but it is not necessary to permit the set to "howl" in order to secure the sensitive condition. Very little practice is necessary before the increase in volume of the "generator hum" of the carrier wave is the warning signal that oscillation will start if the condenser's capacity is reduced much further.

For local work, it is well to note down the setting of condenser C at which oscillation cannot occur however the two variometers are turned, and to leave C at that figure during reception of local programs. When left at this point, the adjustment of the set is absurdly simple, and the uninitiated members of the family can "plug in" and enjoy the music from nearby stations to their hearts' content.

Danish Ferry Boats Carry Radio

DANISH ferryboats plying between ports of the Baltic carry radio now and have agreed to transmit radiograms for the patrons of the line. German ferryboats on the Gedser-Warnemunde run have not as yet started transmitting.

This application of radio on inland-water routes is surprising in Denmark, since a recent census lists only 3,200 receiving fans out of a population of about 3¼ millions. Among the classes chiefly interested are recorded 602 students and pupils, 334 electricians, 341 craftsmen, 320 retired persons and 52 farmers.

A One Control Reflex Set

By Byrt C. Caldwell

SEVERAL weeks ago, the writer described the construction of a one control set of the regenerative type, which is sensitive enough to bring in the distant stations, and at the same time, due to its one control, is very easy to operate.

I now describe another set, which is another step on the road toward the ideal receiver. This is of the reflex type. It is extremely sensitive, bringing in the most distant stations, and it brings in the local stations sufficiently strong to operate a loud speaker, and this on only a loop antenna, if no outside antenna is available. If reasonable care is used in the construction of the set, no difficulty should be encountered. It is

and power tubes only. Of course the more B battery voltage used the better, within certain limits. The .002 fixed condenser which is placed around the B battery must be of the mica dielectric type.

When assembling, mount all the apparatus as shown and then, using bus wire and a soldering outfit, wire the set. Make short, straight leads, and solder every connection. Where two wires cross close to each other, slip a piece of spaghetti tubing over the wire. Maximum results are seldom obtained in any set if the connections are not soldered, and in the reflex set, this is especially true. Remember also, the larger the wire the better.

To operate this set, connect the batteries, the antenna and ground, and light the filament. All the tuning that is then necessary is to turn the condenser dial. Tuning is very sharp, and a vernier attachment can, therefore, be added to the dial.

If this set has been made up carefully, according to directions, and out of good, standard apparatus, and good results are not obtained, there are only three things to look for. The first is the crystal. Try several different kinds. Some are useless in the reflex set, and some give better results than others. The next

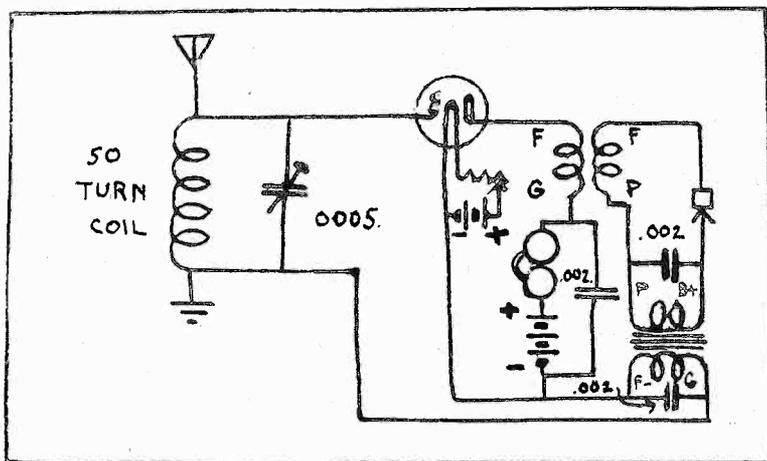


Fig. 1. Diagram of the single-tube, single-control reflex as described by Byrt C. Caldwell. If carefully constructed, it will work a loud speaker on local and nearby stations.

the simplest reflex hook-up that I have seen yet, and although it is not "fool-proof," it is so easy to construct, that I believe no trouble will be had.

One diagram shows the lay-out of the apparatus which is best for short, straight connections. The other diagram shows the hook-up, the only variable element of which is the condenser. The front of the panel is laid out in exactly the same manner as the panel in the one control regenerative set which I described in RADIO WORLD for August 11, 1923. If you have already constructed this, it can be easily changed over to the reflex set.

The antenna and ground connections are at the top of the panel, which is 6"x8" in dimensions. The inductance can be a 50 or 75 turn honeycomb coil, or a spiderweb coil of the same number of turns. If you wish, you can wind a single layer coil on a radion or cardboard tube. Although this does not present the neat appearance of the other inductances, the results obtained are equally good, if the coil is well made. In some cases, with the short broadcast wave lengths, the results are slightly better. The condenser, which has a capacity of .0005 mfd., is mounted beneath the inductance. The tube is mounted on the base, in the center, and near the panel. The tube may be a UV201, 201A, 216A, or in fact any good hard tube. In no case should a soft tube be used. The crystal detector, which should be fixed, is mounted to the right of the radio-frequency transformer. The audio-frequency transformer is to the right of the detector. A .002 fixed condenser is shunted across the primary, and one across the secondary of this transformer. A 6-ohm rheostat is used, as hard tubes are not critical. A potentiometer is not necessary in this hook-up. The B battery should be of a value from 80 to 150 volts, the 150 for 201A

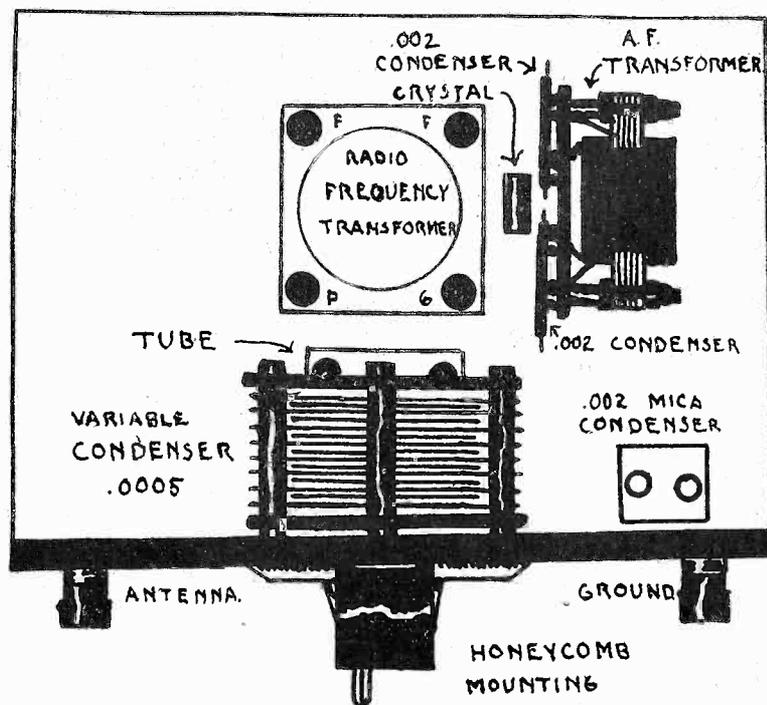


Fig. 2. Suggested layout of the apparatus as designed by the author. A combination socket-rheostat is a space-saver in a layout of this type.

thing is the grid bias. Try a battery of from one to 10 volts connected in the grid circuit, with the negative towards the grid.

In soldering the connections, some of the flux may have caused a high resistance leak between two of the connections. Take a soft cloth and carefully wipe off all of the flux that may have spattered around.

The reflex circuit is not so difficult to operate properly as is generally supposed, and it is well worth any little trouble that you may meet with.

The set is equal to the standard three-tube set, and can, therefore, be used satisfactorily with a loop, which consists of about 120' of wire on a 2½' or 3' square loop. If it is desired to use a loop, a jack is inserted, so that the inductance coil is cut out when the loop is used.

Radio as a Guide to Navigators

By *Kenneth M. Swezey*

FROM the time primitive man first set forth to conquer the seas, the chief difficulty was that of orientation, the sense of position and direction. On the vast open stretches, the early mariners guided their ships by the sun by day and the stars by night. It was in this manner that the Greeks and the Romans steered their galleys of war through the Mediterranean, and the Vikings through the northern waters. The Chinese, then in the height of their learning and glory, went them one better and used a freely suspended lodestone, which was the crude but serviceable forerunner of our present magnetic compass. As good as both of these methods might have been for the great expanses, their comparative inaccuracy made them almost worthless for the close at hand work, such as entering harbors and navigating channels. Furthermore, the stars and the sun could not be seen except in favorable weather, and the crude compass of those days was rendered almost inoperative in stormy or rough weather. A fog and storm in the neighborhood of land meant almost certain destruction.

One of the first safety measures taken for harbor guidance was the lighthouse. It is said that several hundred years before the Christian Era, a Milesian or a Pergamian sailor could look with welcome eye toward the light held by the colossal statue of Apollo at Rhodes, and navigate his ship through the southern Aegean with that as a guiding beacon. A sea-swept guide that is still in existence is the beautiful lighthouse on the coast of France, Phare de Cordouan, which was built in 1611. Undoubtedly, in its three hundred years of existence, it has saved many a threatened ship from a watery grave.

A traveler of the ocean very well knows that our coast is lined with these lights; and on many of the important approaches, the arcs of visibility are made to overlap. All very well and good, you say, but what must the seaman do in foggy weather? Under such conditions resort had to be made to sirens, horns, bell buoys and fog bells. But their range is very limited.

Within the past quarter century radio has come to the aid of the mariner, and has become one of the most important deciding factors that have made the sea practically as safe as the land. At first, its use was limited to that of sending ship to ship, and ship to shore messages. After it had proved its great value, by saving a number of ships, the governments of the world got together in a convention, and laid down rules requiring that all ships within certain specifications be provided with radio (wireless, as it was called at the time) apparatus. It was then that the CQD became famous—later, the SOS.

The next advance came when the directional qualities of the loop aerial in receiving were discovered. A number of ships were provided with a pair of rotatable loops and other necessary apparatus; and by making certain adjustments when tuning in a definite land station whose position was known, they could tell with a fair degree of accuracy their own position. They could also tell the position of another radio equipped ship, and their relation to it. However, this system was not very practical because it required a separate installation of expensive apparatus on each ship. Furthermore, the average ship operator's ability in making fine and complicated adjustments is sometimes to be questioned, and even a slight error in this case might menace or destroy the ship.

A much simpler and more accurate means of giving a ship's location is found in what is now used, the radio compass. Here, instead of having the direction finding apparatus installed on the ship, it is installed in a number of land receiving stations, called compass stations. At this time almost every important harbor in the United States is protected in this manner by groups of three of these stations, which are operated by the Navy Department.

Down in a little office over the old ferry building at South and Whitehall Streets, New York City, you will find the heart of the compass system which is designed for ships entering and leaving this harbor. In the group are three stations which form a triangle. The northeast point is the station at Fire Island; the western point is the station at Sandy Hook, and the southern point is at Manasquan, N. J. Each of these stations is connected by a telegraph line to the "central" at Whitehall Street. Ships within 140 miles can be given their position with accuracy.

As soon as a ship asks for its position by giving the QTE signal, the three stations in the group each train their loops on her. It has been found that the finding of the minimum intensity position was the more accurate method than by finding the maximum, so this is the method resorted to. When the signals are of minimum intensity, the pointer on the scale will indicate in degrees the direction of the ship from that particular station. The operator then telegraphs this in to the central, and the operator at central draws a string that is centered in this station on a map, across the correct scale reading. The second and third stations telegraph in their readings, in the same manner, and strings are drawn for these also. And the place where the strings intersect is the exact location of the ship. The position in degrees can be read directly from the map. When this is ascertained, the operator at central, through remote control, sends the bearings to the ship through either the station at Fire Island or the one at the Brooklyn Navy Yard. In any questionable cases, the station at Amagansett, Long Island, is called by radio, and its readings are also taken, in addition to the other three. This Amagansett station is a part of a New England group.

Let us suppose that a ship is coming in from Europe in the evening. The Montauk Point light, at the end of Long Island, is first sighted. Steaming down the coast, the Shinnecock light next comes into view. Next comes the flash of the Fire Island lighthouse on the starboard, and the fixed light of the Fire Island lightship on the port. Then a heavy fog settles, which envelops the ship, blanketing it and cutting off the view of the lights entirely. The ship is light, and is buffeted about like a cork on the now tumultuous sea. Thus cut off from a visible guidance, and having every possible chance of running aground, what can the captain do? Formerly, he could just take a chance and rely upon his compass, log, and chronometer; but in this day he has but to instruct his radio man to send out the QTE at intervals, and in that way "feel" his way to safety.

The number of calls for position reports that come in each day depends a great deal upon the season and the weather conditions. There are some days when there are only two or three calls—and even some when there are no calls at all. Then at other times they number six hundred or more per day. These reports are especially valuable to foreign ships who have naviga-

tors that are not very well acquainted with our coast line.

It is a well known fact that radio waves are like light waves in that they can be reflected by suitable "mirrors." Senatore Marconi demonstrated some experiments with short reflected waves at his recent lecture before the Institute of Radio Engineers. The waves thus sent out are somewhat similar to the beam from a searchlight. Although, of course, a part of the wave energy goes astray, the greater part is concentrated in the beam, and stations within the beam area may record the effects as having a tremendously greater intensity than the space to either side of it. To what practical use may this be put? It means that in time we will have radio lighthouses to guard our coasts, instead of the sometimes ineffective lights and sound warning apparatus. The radio beacon is good in light or darkness, in storm and calm. Its warning never fails, and a ship equipped with radio apparatus ought never to go astray.

Another way in which the radio beam may be used is in the location of other ships. When directed toward a metal hull, the waves are reflected, and suitable receiving apparatus could be arranged so that the direction of the beam, and the intensity of the response, would tell quite accurately the position of the other ship and its distance.

It may be mentioned that a radio lighthouse is in use today off the coast of Scotland, and ships that are passing in foggy weather can tell within a quarter of a degree their position in relation to the beacon. The Bureau of Standards at Washington has been recently conducting experiments with short reflected waves, and the near future holds some surprises in store. With the coming radio beacons, and the present compass stations, the sea will be made as safe as the land, and ships will be able to follow courses as well marked out by invisible waves, as automobiles now follow the roads.

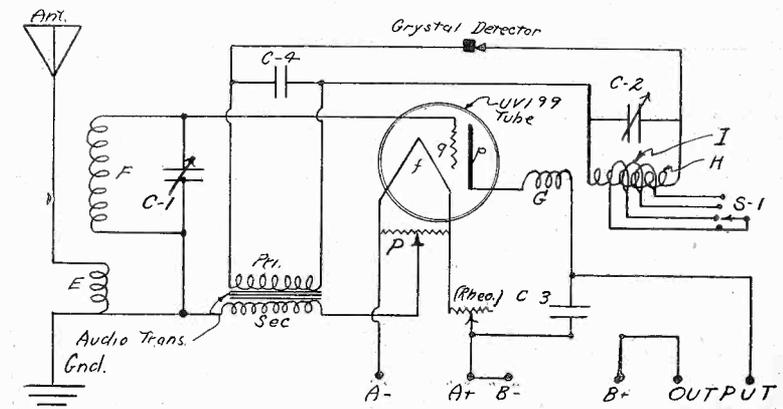
A Practical Reflex Circuit with Tuned Impedance

By C. White, Consulting Engineer

THERE are many types of reflex circuits, and in general it can be stated that they all possess definite merit. The reflex style of circuit has been a gradual development and its present commercial forms represent many months of actual experimentation. Yet there are certain factors about a reflex circuit that are still not fully understood. One factor is the apparent disintegration of the circuit. Some users of reflex circuits obtain very excellent results while their receiver is just a few days old; then the circuit seems to lose its sensitivity and volume, and there is also a marked tendency for the tuning to become excessively broad. Although there have been many theories advanced to explain this condition, I do not believe that the cure for these evils is commonly known.

As we all no doubt know, a reflex circuit is a circuit that first uses a tube to amplify the high radio-frequencies and then after rectification the signal is passed back through the same tube or tubes for low or audio-frequency amplification, thereby deriving a double use from one tube. Theoretically, a reflex receiver should be twice as efficient as the ordinary type of radio and audio-frequency amplifying receiver. But such is not the case, since there are certain losses that occur in a reflex circuit which do not occur in the straight amplifying circuit, thus greatly cutting down its theoretical gain in efficiency. The success of a reflex receiver is solely dependent upon the selection of the proper audio-frequency transformer. A poor or improper ratio audio-transformer will spell doom for the circuit although at first fairly good results may be secured. The author has done quite a bit of study on the design of a reflex transformer and finds that certain inherent qualities must be present in the design if permanency of results is to be maintained.

Certain designs of audio-frequency transformers are extremely sensitive to some particular frequency which may be between audio and radio-frequency limits. Since a good audio-frequency transformer is not selective within the audible frequencies its natural period will exist amongst the lower radio-frequencies. Now if this natural period of oscillation be established in the transformer circuit, even for a fraction of a second, a high voltage surge will be



A single tube reflex which is somewhat different from all others in that the tuned impedance coil in the circuit has a third coil wound over it to allow greater freedom in operation by slightly broadening the tuning. A thoroughly practical circuit which does not require much apparatus.

generated. But, owing to the fact that the circuit as a whole is not tuned to this frequency, it will soon be damped out. Yet, even though the surge is of short duration, the high voltage obtained severely stresses the insulation of the transformer, and after several stresses a breakdown will most likely occur at the weakest point. This breakdown gradually spreads until several turns of the transformer are virtually short-circuited, thus cutting down amplification and making the receiver rather noisy at times, owing to the irregular resistance of the shorted turns. Of course, this surge can be started only by a very strong signal such as a local signal. Many times this surge is the cause of the rapid deterioration of crystals used in reflex circuits. Therefore it is obvious that the audio-frequency transformer plays an all important part in the proper functioning of the receiver.

Most reflex circuits employ a radio-frequency transformer instead of a tuned impedance type of transformer. But in the receiver here outlined a tuned impedance is used instead. To secure the proper amount of broadening a coil I is wound right over the main tuning coil H, and by means of taps just the right degree of broadening may be secured. If extremely sharp tuning is desired the switch

arm S-1 can be so placed that no turns on L are shorted and the tuning will be very sharp. There are several meritorious styles of fixed and semi-fixed crystals that are ideal for a one-tube circuit of this nature. It is imperative that the unit E-F be placed at right angles to the axis of the unit G-H-I in order to prevent serious inductive coupling. The wiring should be made as compact as possible and all wires must be well soldered and insulated with spaghetti tubing. The UV199 or C299 is the ideal tube to use in this circuit owing to the fact that they are very good radio-frequency amplifiers. But in order to derive full benefit from its unique design that renders it particularly efficient as an RF amplifier it must be used in a 199 socket and not a standard socket with an adapter. If additional amplification is wanted to operate a loud speaker the output can be fed directly into the input of a one-stage amplifier. If such be done I would advise that a separate set of "A" and "B" batteries be used. A relatively high plate voltage must be applied to the reflex tube to secure the proper amount of amplification.

The constants for the circuit are as follows: The condensers C-1 and C-2 are each 11 plate variables, while C-3 is a .0025 mfd. mica condenser and C-4 is a .001 mica condenser. The potentiometer P has a resistance of 200 ohms or more and is used to stabilize the circuit and secure the right amount of radio-frequency amplification. The resistance of the filament rheostat must be at least 30 ohms in order to properly control the action of the tube. The unit E-F is wound on one tube, and the coil G is similar to E, and F is similar to H. All the coils are wound with No. 22DCC magnet wire on 3½" radion tubing. The

coil E has 15 turns of wire and F has 60 turns. Figuring on 30 turns of wire per inch of length, marginal space of ⅜" at the ends, and ¼" space between E and F; then 3½" length of tube will be required for each unit, or a total of 7" for both units (i. e., E-F and G-H-I).

As previously stated, E-F is exactly identical with G-H in every respect. The only addition to G-H being the coil I, which is wound directly over the coil H. The coil I has 12 turns in all, with taps for switchpoints at the 0, 4th, 8th and 12th turn. The switch arm S-1 allows the operator to quickly choose the desired amount of selectivity which is best for a given signal.

It is almost next to impossible to predict success or failure when building a reflex receiver. Such a type of receiver depends upon the careful balancing of constants and will not work at all if carelessly thrown together. Very often the condenser C-4 will have to be changed or possibly removed from the circuit in order to get the proper results with certain transformers. If you fail to secure a strong hum when the crystal detector is removed from the circuit try reversing the secondary leads of the audio-amplifying transformer. And, if possible, try several makes of transformers and observe the difference in results. Connect the movable plates of C-1 to the ground side of the circuit and in this way cut down body capacity to a minimum without shielding. The good, pure tones obtained from reflex amplification are well worth the care required in construction. Then again, you will greatly enjoy operating this receiver when most critical selectivity is demanded owing to its ability to tune sharply or broadly as desired.

Florida Fan Wants Radio Hooverized

By Washington R. Service

COMPLAINTS relating to radio interference are received daily by Secretary of Commerce Hoover, who has become a sort of "Foster Father" of the art, now regulated under the 1912 law by his Bureau of Navigation. A recent and unique communication from a fan located on the Florida peninsula, where ship traffic is heard almost constantly, has caused amusement in high official circles. The letter which follows voices a pathetic appeal from an apostle of Hooverism, and demonstrates the need for definite regulatory laws:

"Help! ! ! ! !

"When you called upon me to conserve, I conserved. When you asked me to sweeten my food with the milk of human kindness, I got indigestion using Florida cane syrup in my coffee. When you asked me to come across, I stepped on the gas. When you asked for help for Near East, I went the limit. When you asked for help for Russia, I sent over a few safety razors and barber shears.

"I have been for you in your every endeavor. I have Hooverized until I didn't know hover who.

"Now I want RELIEF.

"I have seven hundred dollars invested in a radio set. It functions perfectly but every program is deadened or the fine passages lost by the damnable interference.

"And this not for one night but every night for a year back, and from any time in the day until I quit in disgust.

"Night after night I try until my patience is exhausted to get decent reception—and maybe for a minute, sometimes two minutes—a song or music comes in as clear as a bell, and then some deep throated sparks begin to shatter the atmosphere and the amplifier takes it up and another station

is lost. Some damphool is playing with the keys of his transmitter—or telling some buddy or some other rum-runner that he has a date when on shore.

"There must be some relief. Were there periods of ten minutes even when one could listen in to lectures, songs or music without interference I would have no complaint. But it is incessant.

"Even when our President spoke his eulogy of Mr. Harding the code kept jamming the atmosphere and I lost part of the beautiful message. Surely there can be some measure to protect three million radio fans from this insistent interference on every wave length—fellows using old time sets with a spark as wide as Cumberland Gap that no wave trap can still nor any point on variocouplers, three condensers and four rheostats tune out.

"Dante's Inferno can be no worse than the noises that come to us here in the peninsula of Florida.

"In relief work, in drives, in everything, you have accomplished the seemingly impossible—for God's sake let us have relief!"

Mr. Hoover's answer has not been made known, but it is understood that he realizes keenly the need for more authority to regulate radio, both ashore and afloat, even though the voluntary agreement laid down by past radio conferences has modified the radio interference. Legislation defining his duties and setting forth rules and regulations as to amateur, commercial, private and other forms of radio communication is urgently desired by the Secretary, as well as additional appropriations and personnel for better and more frequent inspection of stations causing interference.

The Radio Inspector's Life Is Strenuous

THE lives of government radio supervisors and inspectors in the nine districts of the country are strenuous, exhausting and expensive. Most of these officials, who strive to make ships, land stations, amateurs and broadcasters live up to regulations, have of necessity become "night owls." They are a cross between detectives and mind readers. The varied problems coming up for solution every day, and the medley of technical questions they are asked by amateurs and fans, require the combined wisdom of Sherlock Holmes and Guglielmo Marconi.

Not alone do they inspect all transmitting stations, and examine commercial and amateur operators; they see to it that stations remain on assigned wave lengths, power and time schedules; they try to locate interference from every source to keep the ether clear for commerce and the listeners-in. This requires late hours, since most interference is reported to occur at night, and they are usually on watch until midnight in most districts. First-hand information is of the greatest value to them, enabling them to act immediately and not spend time running down rumors and incorrect or inadequate interference reports, which they receive by the hundreds.

Present government appropriations, strange as it may seem, do not provide receiving sets for the governmental radio policing force; consequently all of the men have to purchase or build their own sets.



(C. Underwood and Underwood)

Miss Lenore Ulric, the star of "Kiki," that proved such a wonderful Broadway success, listening in to a radio concert, in her dressing room in Chicago after a hard day's work, on a one-tube radio set presented to her by Johnnie Hagerman, a Chicago radio enthusiast and expert. Miss Ulric is an ardent fan, having an up-to-date console model receiver in the drawing room in her New York home.



(C. International Newsreel Photo)

Dr. S. Parkes Cadman, whose sermons are now a weekly feature, in front of the microphone of the Brooklyn Y. M. C. A., from whence his talks are broadcast. Dr. Cadman has a very large following over the air, and it is gradually growing, due to the fact that Station WEAJ has increased its power.

Good sets are, of course, necessary, and one supervisor is known to have spent seven hundred dollars in equipment for his main office out of his own pocket, but believed necessary for efficient and effective service in his district. Many other supervisors and inspectors have spent between four and five hundred dollars each in radio equipment. The government can only provide its field force with testing and measuring instruments, such as decimeters, wattmeters, ammeters, voltmeters and hydrometers. They cannot listen in with these instruments. In Baltimore, the supervisor maintains his own automobile, found essential in running down or locating unidentified stations and radiating receiving sets in the outskirts of his district.

With the advent of the new appropriation bill, it is hoped that increased funds will be forthcoming, so that the field force of the radio section of the Bureau of Navigation can be provided with sufficient radio apparatus of the latest type to cope with the increase of radio traffic in both code and voice. Incidentally the bureau needs additional inspectors and more funds for transportation of its operatives, some of whom travel thousands of miles a month, covering their territory.

Radio Amateurs Act When Storm Cuts Off News

CHICAGO, ILL.—When all press and commercial telegraph wires connecting this city with the rest of the world, except those leading to the north through Canada, were put out of commission by the most terrific sleet storm of the winter, representatives of two press associations depended on radio and the

American Radio Relay League to get press through the world's largest news relay point.

One of the several important stories handled was a bulletin on the mine disaster at Crosby, Minn., giving a list of the dead, which the newspaper correspondent addressed to an office in New York City. D. H. Hiebert, operator of amateur station 9BQQ at Minneapolis, who handled this message, stuck by his set with only three hours' sleep in as many nights transmitting both news and private messages.

While the regular commercial telegraph operators were trying frantically to get their eastern news through Canada to Winnipeg and St. Paul and the western dispatches by way of Seattle and St. Paul, Don. C. Wallace, operator of amateur station 9ZT at Minneapolis and assistant division manager of the A. R. R. L. acted as a radio "Paul Revere" calling amateur minute men to fill the breach.

By the time that the storm was in full swing, scores of amateurs in the vicinity of Chicago and Minneapolis were accepting and relaying hundreds of messages of all descriptions. Although their territory was not immediately affected to the same extent by the driving sleet, radio men in other districts, hearing the storm reports and "urgent" calls, swung their own stations into line for relaying traffic to distant points. Until telegraph wire connection was again resumed emergency messages were transmitted in an ever widening circle that kept things going.



(C. Western Electric)

Harold Shaver, 164 Bergen Avenue, Jersey City, N. J., who has turned out to be quite an artist, thanks to the instruction broadcast by Jolly Bill Steineke from Station WOR, Newark, N. J. The illustration shows Harold in the midst of a picture with his eyes glued on the speaker, and his hand following the instructions of "Bill" and his "dog." Bill is going to have a lot to account for, turning all these embryo artists loose on us.

Army Radio Station WYD Cooperates with Airplanes

By Carl H. Butman

TESTS of new radio equipment at the Army Air Service radio station at Wilbur Wright Field, Fairfield, Ohio, show the practicability of co-operating with Air Mail and Air Service planes, especially in disseminating meteorological information and in keeping track of transcontinental flights over distances up to 1,000 miles. Station WYD, part of the army radio net for some time, has also aided airplane flights, but a complete central weather forecasting and broadcasting station has now been incorporated for the transcontinental airways.

Two steel antenna masts 165' high are set directionally with Washington, D. C. Suspended between these masts is a 5-wire antenna stretching 475'. From the center of this antenna a 5-wire "lead in" drops vertically to the radio hut, which is the center of a ground system consisting of copper bands $\frac{1}{8}$ " thick and 8" wide laid on edge in three concentric circles. The outer circle has a radius of 250', and the center a radius of 125', closely surrounding the radio hut. The circles are joined radially at 19 points, the whole being bonded and buried approximately 36" in the ground. From the center circle copper tubes lead up through the hut for the ground connection.

The set is a six-tube regenerative standard Signal Corps type, manufactured by the General Electric Company. Plate current at about 1,500 volts is furnished by a two-kilowatt direct current generator driven by an alternating current motor. The normal radiation is 10 amperes, but it has an emergency capacity double that amount. Its commercial effectiveness is considered to be about 1,000 miles.

The major duty of this station will be to receive,

coordinate and broadcast meteorological information to and from various Air Service airdromes on the Model Airways. At present, a regular flying schedule is maintained over the Airways between Mitchel Field, N. Y.; Bolling Field, Washington, D. C.; Langley Field, Va.; Langin Field, West Va.; Wilbur Wright Field, Ohio; McCook Field, Ohio; Chanute Field, Ill.; Selfridge Field, Mich.; and Scott Field, Ill. Weather reports from each of these stations are received daily at 7:50 a. m. and every two hours thereafter until late in the afternoon. These reports are consolidated and the summary immediately broadcast to all airdromes, where the information is posted on bulletin boards, so that all pilots may have first hand information as to weather conditions over all the routes. In addition, special items as to local storms and conditions will be relayed to the central station. Arrival and departure of all pilots is broadcast to Airways Headquarters at Bolling Field, together with such information as may be pertinent. Thus the location of all pilots can be plotted and their arrival anticipated.

Cooperation is maintained with the Air Mail Service, information from the Air Mail of value to the Air Service being radioed to service stations, while the Air Mail receives the general broadcast.

Broadcasting from this station will ordinarily be in code on a 1,500 meter wave length. As the equipment permits of radiophone broadcasting, it is possible that programs of various kinds may be broadcast later. An emergency set, having a range of 3,000 miles and similar to that now in use by the Shipping Board for communication with the fleet will also be installed as a precautionary measure.

Interference Problems Being Gradually Solved

By S. Kruse

INTERFERENCE is a part of the radio game. There have been interference problems ever since the second sending set went into action—and all these problems have been solved. This has been done without shutting down any class of stations, in fact all classes of service have steadily increased.

The amateur can show that he has good intentions for he first invented the "quiet hours" and observed them tolerably well in many places. The majority of them are today engaged in "riding" the man who still uses a spark set. So effectively have the sparks been "razzed" that today they form a disappearing minority—although they were used in all amateur sets a few years ago. On this count the amateur has gone far beyond the commercial firms, partly because his fellows will so unmercifully denounce him for using a spark, partly because he can afford to change equipment better than can a station that must generate dividends.

Amateur interference is decreasing in the country at large, partly because the amateur station is improving, partly because the radiophone listener's receiving set is improving.

Interference elimination does not depend on the number of tubes in the set, and it doesn't depend on the fancy cabinet. It does depend on the goodness of the coils and condensers, provided only that one will avoid the use of a single-circuit tuner which is peculiarly vulnerable to some classes of interference—especially nearby stations and sparks. It is quite possible to build low-priced and simple sets that are very selective at little expenditure and then again it is quite possible to build high-priced sets that are simply unmentionable.

Speaking of the law—no one can be less pleased with the ancient radio law (it was born in 1912) than the amateur. The Radio Corporation isn't pleased with the law, the broadcast interests are not pleased, the government isn't and the amateur is least pleased of all. Amateurs sat on Secretary Hoover's conference board and determined the present regulations of the department, and they rooted for the passage of the White Bill—but Congress never got to that. The amateur will be the listener's ally in bringing the law up to date and he will do it through the American Radio Relay League as far as possible.

Radio-Frequency Amplification with a Reinartz Tuner

By Leroy Western

THE Reinartz tuner used by quite a number of amateurs and broadcast listeners is one of the worst offenders among radiating receivers. It is a persistent oscillator and for this reason gives excellent results in C. W. work. However, when it is used for broadcast reception, stations are usually tuned in "on the whistle" and then cleared up. When the set is used in this way, oscillations take place in the circuit which are radiated into the antenna and the set becomes a miniature transmitter. This is bad, but the trouble can be eliminated by adding radio-frequency amplification in front of the tuner. Many amateurs have been having trouble with additional radio-frequency on this set as the hook-up of the tuner proper is rather unusual. The usual procedure for adding radio-frequency amplification in front of the tuner cannot be followed successfully in connection with the Reinartz and, therefore, a special system has to be used.

The circuit diagram herewith shows only one stage of R. F. added to the Reinartz, but, if desired, the second stage may be added between coil L and the first tube; in this case a standard radio-frequency amplifying transformer should be used for coupling the two amplifying tubes together.

There have been published several different sets of characteristics for Reinartz tuners, but the writer has found the following to be about the best. Coils L-1 and L-2 are both to be wound on the same tube which should be 3" in diameter. L-1 should consist of a total of 40 turns. The first 10 are tapped every turn and the tenth tap connected to the positive side of the "A" battery. Taps are then taken off at the 20th, 30th, and 40th turns connecting them to switch points and the switch to the grid leak and condenser. On the same tube with this coil, but separated by $\frac{1}{4}$ " is wound coil L-2. This consists of 40 turns of No. 22 DCC wire tapped at the 1st, 10th, 20th, 30th and 40th turns. These taps are likewise connected to switch points and the arm to the plate of the detector tube. The end of coil L-2 nearest to L-1 is connected to a .0005 mfd. variable condenser which in turn is connected to the units switch of coil L-1. It will be noted that the usual antenna connection used with a Reinartz tuner is not used at all when R. F. amplification is added.

Coil L-1 may either be variable or fixed for use in tuning the antenna circuit. It should consist of 45 turns of No. 22 DCC wire on a 3" tube and should be placed in non-inductive relation to coils L-1 and L-2. If they cannot be separated far enough to prevent interaction, they should be placed at right-angles to each other. The variable condenser shown in series with the antenna may be placed either in this position or in parallel with coil L as may be found best by experiment.

In connection with this two-tube circuit shown herewith, it is necessary to use separate "B" batteries. However, it is usually found that 45 volts will be sufficient for the plate of the amplifying tube, while from 18 to 22½ volts gives good results on the detector. Therefore, only three block "B" batteries will be necessary to obtain good results.

When using this set it will be found that oscillations can be produced in the detector circuit and consequent-

ly C. W. signals can be received readily without producing radiation from the set. This tuner gives very loud signals by means of regeneration and for ordinary "DX" reception with a pair of phones, no audio-frequency amplification will be necessary. However, if greater volume is desired, such as when a loud speaker is to be used, two stages of audio-frequency amplification may be added.

Those having a Reinartz receiver already constructed, need not change their sets or follow the directions given herewith for winding coils L-1 and L-2 as any of those in existence which give good results as straight tuners can be used in this circuit. The only difference which will be found is in one connection. That is the

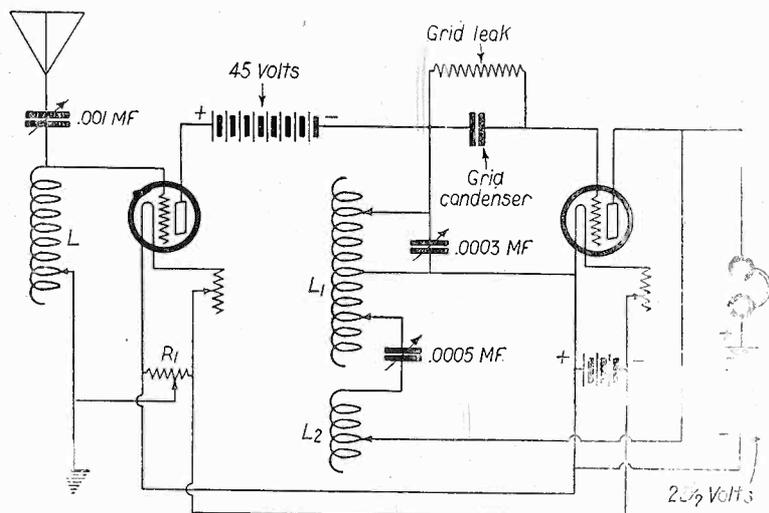


Diagram showing how the Reinartz receiver can be made a quiet, well behaved receiver. The first tube acts as a choke, and stops the oscillations from reaching the antenna circuit. It also has the added attraction of adding a stage of radio-frequency, with a corresponding increase in distance.

connection from the antenna to coil L-1 at the switch arm which goes to the .0005 mfd. condenser. The ground connection is also removed from the tuner if it is placed on coil L.

The potentiometer R-1 is necessary for the correct operation of this circuit as otherwise the radio-frequency amplifying tube will tend to oscillate.

If it is found after connecting up this set that radiation still continues because of the oscillation of the radio-frequency tube, it can still further be reduced by using a two-circuit tuner in the antenna. This is done by substituting the rotor of a variocoupler for coil L and connecting the antenna and ground to the stator. A .0005 mfd. variable condenser should then be connected across the rotors.

American Radio Association Formed

THE American Radio Association, which will coordinate and develop public interest in radio broadcasting and reception distinct from the existing technical and industrial organizations, is being formed, according to an announcement by Arthur H. Lynch, editor of "Radio Broadcast." Mr. Lynch, who has accepted the chairmanship of the executive committee of the new association, said the organization would occupy a place in radio similar to that occupied by the American Automobile Association in the automobile field.

The White Radiation Killer Also Increases the Range and Sharpens the Tuning of a Receiver

By Robert L. Dougherty

ISSUE-89

THE howls, screeches, whistlings and catcalls generated in receiving sets by interfering radiation can be stopped and, if everyone cooperates, soon will cease. C. White, in his article in RADIO WORLD for December 8, 1923, refers to these noises as "the unwanted pests of radio." This article, "How to Stop Re-radiation in Single-Circuit Receivers," has created a great deal of interest. However, some questions have arisen regarding the curative device he described and the proper method of installing it on a regular single-circuit receiver. To answer these questions a more detailed explanation has been prepared by the present writer.

To build this unit it will be necessary to have these parts: One vacuum tube (preferably UV199); one socket, one 23-plate condenser, one rheostat and potentiometer, two pieces of radion tubing, 4" in diameter, by 3" long, one small panel 7" x 7", 1/4 pound of No. 22 SSC wire, one A and one B battery for choke tube circuit. No particular makes of apparatus have been specified, but by careful shopping the average fan should be able to get the apparatus mentioned for not exceeding \$15.00. This is both practical and possible, and if one has some of the parts at home, they can be used and lower the cost still further. If one is not willing to spend this much to give himself and his neighbor peace, he ought not to own a radio receiver.

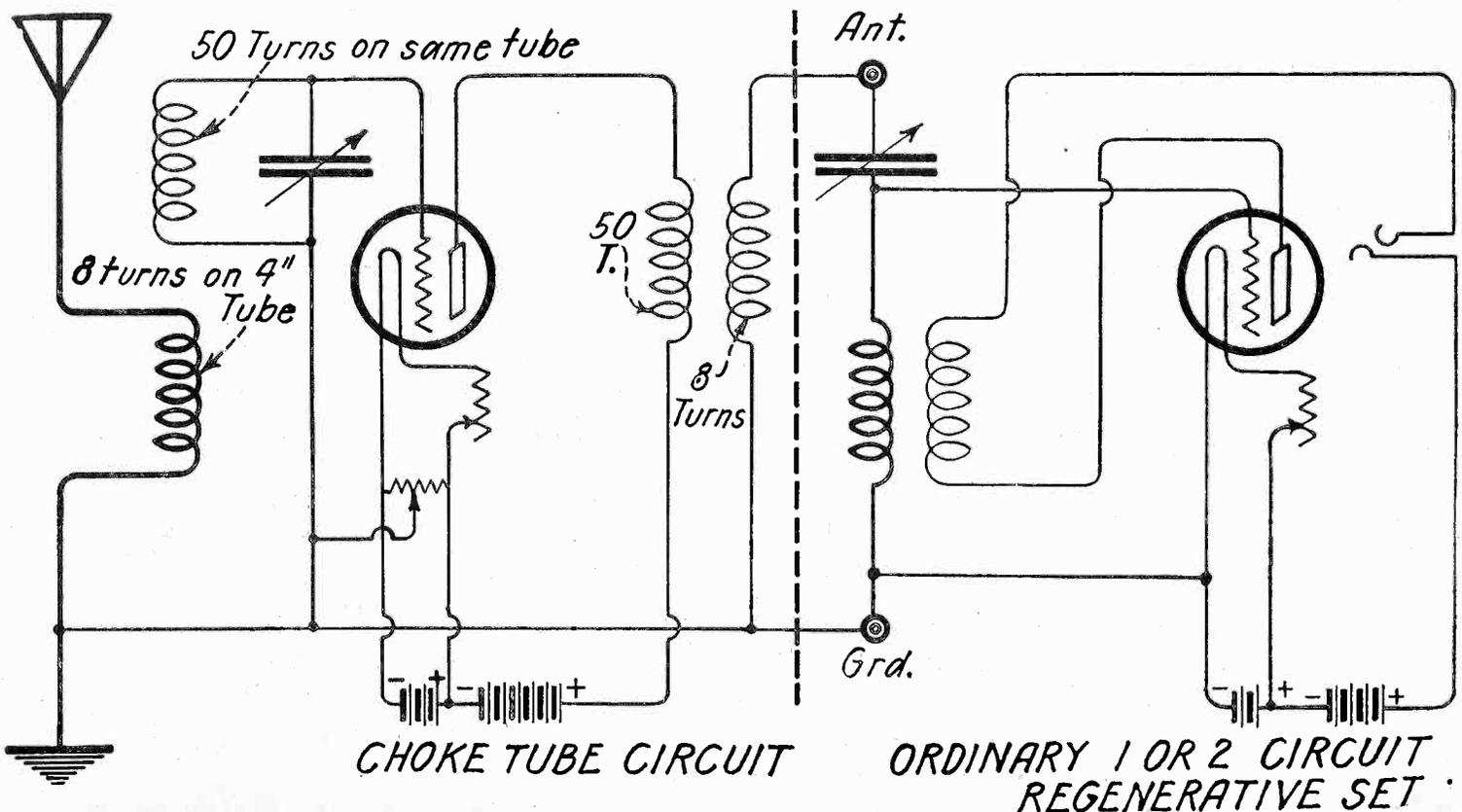
In the first place, it will be necessary to wind the coils. Take one of the sections of radion tubing and wind on 50 turns in clockwise fashion, the beginning

of the coil facing you. When 50 turns are wound, fasten them securely and leave a lead for connection. Then commence the second winding of eight turns on the same tube, but about 1/4" below. If you desire a real neat job, bring the ends of the both coils to midget binding posts. This will complete the antenna coil.

The second coil is wound the same way, with the exception that both windings are reversed, or wound counter clockwise. When both tubes have been wound, the next thing is the hooking up of the circuit.

Connect the antenna to the first turn of the eight turn section of the first coil. This is the wire nearest the 50 turn coil. Connect the other end to the ground. Shunt the winding of the larger coil with the 23-plate condenser, and bring the wire from the last turn of the 50 turn coil to the ground wire of the first coil. From there run a wire to the ground post of the receiving set, and another wire to the potentiometer of the first tube. From the other side of the condenser run a wire to the grid of the tube. From the plate of the tube, run a wire to the last turn of the second coil and bring the beginning of the coil to the plus side of the extra B battery. Connect the filament as shown in the diagram herewith.

Now we are ready for the last coil. Connect the far end, or the last turn of the small winding, to the antenna binding post of the receiver, and the first turn to the ground post. If your receiver is of the single-circuit type it will most naturally have a condenser in series with the inductance. If it has not, it is best



The original C. White Radiation Killer hooked up to an ordinary single circuit receiver. Note the fact that the coupling on both sets of coils is fixed, and that there is only one additional control, the condenser. The potentiometer setting is not critical in adjustment.

to place a small fixed condenser in series with the antenna binding post and the last turn of the coil. This is shown in the diagram.

If directions have been carried out, the set is now ready for use. Turn the tubes up to normal brilliance, and tune the original receiver for signals the same as usual. There is always some pet setting that each fan has for a station, so you may set your receiver for this and leave it alone. Then carefully vary the condenser of the choke tube circuit, at the same time varying the potentiometer. When the signal is picked up, it can be brought in louder by re-tuning the original receiver.

This radiation killer is of no use unless it is operated from A and B batteries separate from those used on the set. For this reason, the UV199 tube was specified as it requires no great outlay for batteries and is economical in its consumption of current.

Now a few words as to the effect of this extra tube. Do not deceive yourself by thinking that you are only placing a choke on your set. You are doing far more

than that. You are increasing the range of your receiver by placing a stage of tuned radio-frequency ahead of it. This single tube will, therefore, increase the range. It also makes the tuning much sharper, and acts as a sharply tuned and effective wave trap, in this respect taking out the unwanted signals. Code will be heard but very faintly even on the 492 and 540 meter waves, so that it is almost inaudible when the station is operating. It makes much quieter operation of the receiver possible. There will be no popping or scratching, and the induction from nearby power lines will also be partly eliminated.

It is thus seen that the device described is multi-fold in its uses, but mainly *it stops your set from howling in your neighbor's speaker*, and this is what is needed. Build one for yourself, bring your neighbors in and show them what you have done, and get them to build units for themselves. When they find the device is for their own good as well as yours and a score of others, they won't hesitate, especially when its multifold advantages are explained.

New York City Board of Education Adopts Radio Broadcasting

FOR the first time in the history of education active use of radio broadcasting on an extensive and permanent basis as an educational aid was inaugurated on February 18th, when the Board of Education of the City of New York, acting in co-operation with the Radio Corporation of America, broadcast through station WJZ the first of the daily educational radio programs which have just been scheduled. These programs, arranged by the newly created Radio Committee of the Board of Education, will be broadcast from 2 to 2:30 o'clock every school-day. A special and permanent broadcasting apparatus has been installed in the office of Dr. William L. Ettinger, Superintendent of Schools, and the programs on every Tuesday afternoon will be broadcast by WJZ directly from there. On all other school days the programs will be given at the studio of station WJZ at Broadcast Central, Aeolian Building.

The programs are designed primarily to acquaint the people with the work of the schools, to educate the public as to education. Superintendents of each department of the Board of Education will in turn explain exactly what is done in his department, and to what purpose. In addition, the pupils of each school will take part in the later programs with regular recitations, music lessons, glee club and school orchestra concerts, spelling bees, and special exercises for holidays.

The first Radio Committee of any municipal Board of Education in the world has been created, with Frank A. Rexford as chairman, and the following members representing every borough: George Gartlan, Director of Music; Dr. John T. Nicholson, District Superintendent for Upper Manhattan; Dr. Cecil A. Kidd, District Superintendent for Lower Manhattan; Dr. Benjamin Veit, District Superintendent for Brooklyn; Dr. Stephen Bayne, District Superintendent for Queens; Dr. Cornelius Fleming, District Superintendent for Richmond, and Dr. Joseph H. Wade, District Superintendent for the Bronx.

New York City is thus the first city in the world to recognize and utilize the value of radiophone broadcasting in education, and the arrangements already consummated call for the largest municipal broadcasting program which has ever been scheduled. Dr.

William L. Ettinger, Superintendent of Schools of the City of New York, states clearly in the following letter his appreciation of the value of the broadcast activities, and places the New York School Department in the lead of progressive educators:

"To Superintendents, Principals and All Other Supervisory Heads.

"Ladies and Gentlemen:

"Through the courtesy and co-operation of the Radio Corporation of America we have been invited to broadcast short educational talks or features each school day, beginning Monday, February 18, at 2 p. m.

"We may have the exclusive use of the air at this time each day as long as we supply the public with interesting and valuable educational information.

"I see through this radio service so generously tendered a wonderful opportunity to bring the actual work of the school system into closer relation with the home. I particularly need and desire the help and advice of every member of the school system in arranging for the public such a series of talks and educational entertainments as will make our educational series the subject of table-talk in every home. In other words I am desirous of giving the public over radio a cross-section view of the school system.

"A number of department heads will be requested to give brief talks on the manner in which the work of their several departments is conducted. I am sure that I may count on such co-operation.

"The nature of the entertainment offered by the schools might very well include short talks on special phases of education, music lessons, songs, glee clubs, music appreciation, orchestras, recitations in reading English, history, civics, geography, arithmetic, nature study, science, and the like, spelling lessons, and exercises for special holidays.

(Signed) "WILLIAM L. ETTINGER,
"Superintendent of Schools."

It is expected that the Boards of Education of other large cities may follow the example of New York in utilizing radio in educational work, creating what may possibly become a nation-wide radio educational service by municipal co-operation with local broadcasting stations.

U. S. Brazilian Expedition to Carry Radio

By Carl H. Butman

FROM the Arctic radio is keeping MacMillan in touch with the world. The "Shenandoah" will carry radio to the pole itself. Now comes Dr. A. Hamilton Rice, who plans a radio-equipped expedition into the Brazilian tropics under the equator. Perils of the cold northern night and interference of aurora will be offset in the unexplored wilds of South America, by savages, animals and insects, and the terrific static found under the equator. John H. Swanson, the radio aide, however, expects to conquer all difficulties and maintain radio communication with the world from deep within the hot primeval jungles.

Although all radio permits must be secured from the Brazilian authorities, the Department of Commerce has given the expedition a temporary mobile call for identifying its base and portable stations. It is "WJS." Curiously, by transposing the first two letters of the call, the initials of the radio expert—J. W. Swanson—are formed.

Carrying several complete sets of radio transmitting and receiving apparatus, this party of American explorers including 10 white men and one woman will leave New York late in March for the headwaters of the Amazon River. Primarily the exploration is geographical and geodetic, but extensive experiments in radio in the jungles of Brazil will play an important part each day, serving a dual role; bringing in standard time signals for use in longitudinal determinations, as well as current news and entertainment, and sending out brief descriptions of progress and discoveries. Approximately \$12,000 worth of radio equipment will be carried up the far reaches of the tributaries of the great Amazon. All radio equipment is of the latest type and much of the apparatus is specially built.

The party is headed by Dr. Rice, of New York, a scientist who has previously explored in Brazil and is in the interest of the American and Royal Geographic Societies. His wife, formerly Mrs. Widener of Philadelphia, will accompany him, foregoing her social activities and braving the heat, pests and dangers of the tropics, among a tribe of savages.

Radio work is to be under the direction of former inspector John W. Swanson, of New York, on a year's leave from the Department of Commerce, who has already served on two trips in South America. Mr. Swanson will be assisted by Thomas McCaleb, a radio expert from Norfolk, Va. The party, including Dr. Rice, who served in the war as a commander in the navy, are all ex-service men. Lt. Walter Hinton, formerly pilot of the famous Navy NC-4 which crossed the Atlantic and who later flew to Brazil from the United States, will be aviation expert. In his charge

will be a modern seaplane which will be used for scouting and will be radio-equipped. The party will travel to Para, at the mouth of the Amazon, by a liner. From there up to Manaus, about 2,200 miles westward, the Amazon will be traversed in a chartered steamer. From Manaus, at the mouth of the Rio Negro, this tributary will then be followed to the mouth of the Rio Branco. Farther up the Branco at a small place named Boa Vista, the party will establish a semi-permanent base. They will explore the wildest parts of Brazil, inhabited by Guaribos head-hunters.

At Boa Vista the largest radio transmitter and a good receiving set will be installed. It is from this base that Mr. Swanson hopes to keep in touch with the Brazilian stations and the outside world. In 1915, with heavy and now antique radio equipment, he was able to copy Arlington's time signal daily, despite static and other difficulties. The set is a $\frac{3}{4}$ -KW tube transmitter, which can be used for both radio, telegraph and telephone. Conditions in the Brazilian forests may prevent the erection of a good antenna for long-wave transmission, but Swanson hopes to use as high as 2,100 meters and be able to change over to short wave lengths for communicating with the seaplane and portable field sets. A launch and several motorized canoes will go up the Rio Branco; in each there will be 20-watt portable sets, which together with receivers, batteries, and dynamometers will weigh about 50 lbs.

In his seaplane, Lt. Hinton will also have an efficient two-way set. Through the courtesy of the Army Signal Corps a SCR 134, 50-watt phone set has been loaned to Mr. Swanson. Operation will be possible from the air and when the plane is lying on the water. The seaplane will scout for the whole party, flying aloft over the River Branco, advising the canoe parties when necessary by radiophone.

Most of the apparatus, spares and a Delco set will be carried on the launch, which will be a portable floating base. A special receiving set designed by Mr. Swanson with a loop antenna will be used for picking up U. S. naval time signals and press reports. A short wave set will receive broadcasts from both U. S. and foreign stations, for entertainment and perhaps to demonstrate the white man's modern magic to the savages encountered. Great difficulties are expected by Swanson in both transmission and reception, but he has been there before and knows how to overcome most of them, as well as the attacks of insects, wild animals and the natives themselves, who are said to be especially treacherous. Each man of the party will carry a rifle, a shot gun and heavy sidearms.

New Directive Type of Radio Beacon

RECENTLY an airplane flew to Dayton from a point a hundred miles away, the pilot depending for guidance entirely upon the signals received from a new type of radio beacon. In his receiver he heard the letters A and T (.— —) repeated over and over. As long as he flew along the correct course both letters were equally loud, but the moment he got off the course to one side or the other one letter became noticeably louder than the other and showed him which way to turn to get back. An ordinary airplane receiving set was used.

This beacon, which was developed by the Bureau of Standards, Department of Commerce, in cooperation with the U. S. Signal Corps and the Army Air Service, consists of two coil antennas placed so as to cross each other at an angle of 135 degrees. Each consists of a single turn of wire 100' long and

50' high. The transmitting set is automatically connected first to one and then to the other, one letter of the signal being sent over each. The signal from an antenna of this type varies from a maximum in the plane of the coil to almost zero at right angles. A receiving set located along the line bisecting the angle between the coils will therefore receive signals of equal intensity from both, and the ship or airplane carrying the receiving set can thus be guided along this line in either direction, and without regard to conditions of visibility.

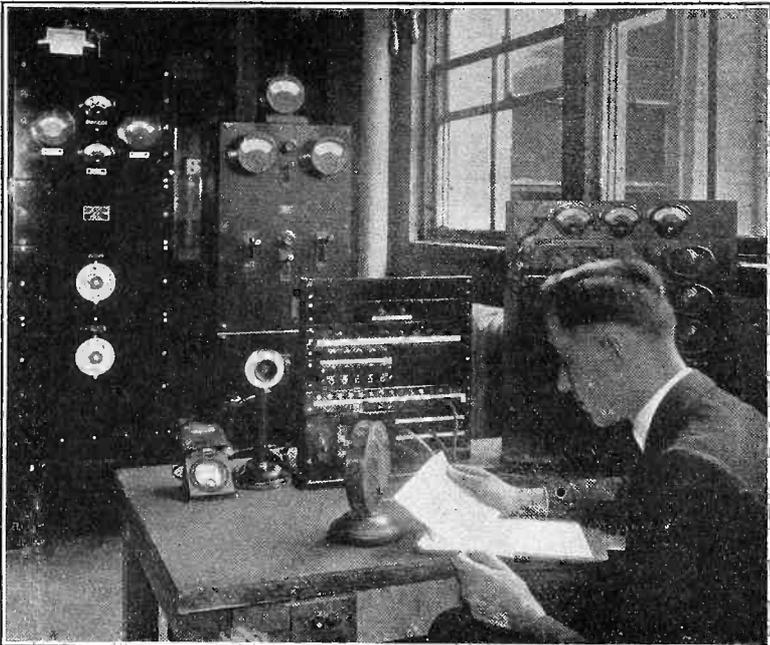
The new beacon, and the tests made upon it, are described in Scientific Paper No. 480 of the Bureau of Standards, entitled "A Directive Type of Radio Beacon and its Application to Navigation," by F. H. Engel and F. W. Dunmore. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price is five cents, cash.

Broadcasting Stations for Daily Newspapers

By Corley W. Kirby

Radio Editor, "The Detroit News"

OF what value is a radio broadcasting station to a newspaper? This is a question which has puzzled the business managers of many newspapers in the United States and at the same time perplexed the general public. At best the benefit derived by a newspaper is intangible.



Control room of Station WWJ, the broadcasting station of "The Detroit News." The tuning panel and power control panel are in the rear, while on the operator's desk is the switchboard for the various programs and the power speech amplifier back of the operator. Walter Hoffman seated before "mike" broadcasting interesting daily news events.

"The Detroit News" was one of the pioneers in radio broadcasting. Its first set was placed in operation August 30, 1920. A few months later its original broadcasting equipment was discarded for the more powerful and more efficient 500-watt set now in operation. The paper and the call letters WWJ, assigned to its station, have become known in every state in the union and in countries within 4,500 miles of Detroit through its broadcasting service.

Goodwill, that indefinite asset in business, is about the only thing that can be claimed as a result of operating a broadcasting station such as the one known as "The Detroit News, Station WWJ." From the circulation department comes the positive statement that no increase in circulation can be attributed to the paper in the radio field. Likewise from the advertising department there comes the same statement.

"The Detroit News" maintains its broadcasting station as part of its public service. The expense of operating is borne entirely by the paper. In addition to the actual broadcasting of entertainment and information of general interest to the public a staff of trained radio operators and experts is placed at the disposal of all of those who desire information about radio receiving sets and equipment.

It has always been the aim of the staff in the radio department to keep the station among the leaders in the broadcasting field. New ventures have been taken in almost every line and now and then there is an addition made to the service sent out by the station. In the

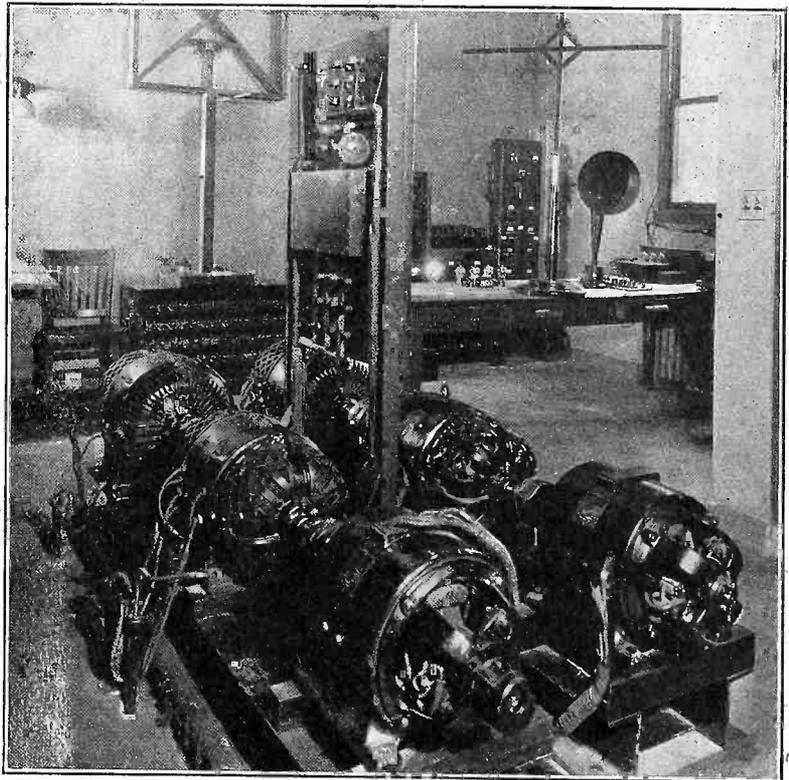
field of sport, public service and entertainment the best obtainable has been offered consistently by the station.

Broadcasting in Detroit has been handicapped to a considerable extent through the lack of co-operation from theatre managers. Vaudeville and other theatrical talent is denied WWJ through an ironclad agreement between theatre managers. Highly beneficial arrangements have been reached between the leading musical institutions and the Federation of Musicians, making it possible to supplement the programs offered by "The Detroit News" Orchestra with other types of music.

The News Orchestra is of course a part of the staff of the department and represents one of the bold steps made by the station. It consists of eight men, all of them members of the Detroit Symphony Orchestra, trained to play the best there is in music. This orchestra was organized in May, 1922, and probably has played for a larger number of people in that time than any other orchestra in the world. It gives two concerts a day from the station.

The Radio Woman on Interference

Talking about interference, I visited a friend of mine in the city, and he is having all kinds of trouble with his set due to the howls and squeals of the neighbors.



One corner of the power plant of Station WWJ showing the motor-generators, charging apparatus and in the right hand corner, part of the experimental laboratory where "The Detroit News" tests out circuits and "shoots trouble."

He has a five-tube neutrodyne, and no matter how he tries to listen in, that set will pick up the squeal of someone's re-radiating carrier heterodyning the carrier of another neighboring receiver or that of the station. I don't blame him myself, and welcome the day when the "squeal box" boys will be taught how to correctly operate a receiver.

The Radio University

A Question and Answer Department conducted by the Technical Staff of RADIO WORLD for the information and instruction of its subscribers. A "trouble shooter" is always ready here to help new radio fans.

What is the best size wire to use in winding the coils of the Ultradyne? What size forms should be used? What is the name of the company supplying the coils and parts for this circuit? Can the Sodian S-13 tube be used as a detector in this circuit? What changes will be necessary?—R. A. Boyle, Woodward, Oklahoma.

There is a supplement to the article printed in the last issue giving all details for this receiver. As to the Sodian tube you mention, we have in preparation a series of circuits that incorporate this new and popular detector tube and will be published in a future issue, giving all necessary details. It will be more explicit than any answer in these columns could possibly be.

In the issue of RADIO WORLD describing the Autoplex mention was made that the UV201A tubes gave the best results. However, in the next paragraph the author tells of a number of tubes that may be used. I am at a loss to understand this, and at the same time want to construct it right. May I use a UV200 tube?—Ed. Hogan, Amery Oil Co., Amery, Wis.

You cannot use a UV200. A hard tube is necessary, not a detector. The UV201A is a good tube, but better results will be had by the use of a 5-watt transmitting tube (216A WE) with about 100 volts on the plate.

I have a receiver but cannot tune in the lower wave lengths with it. I have a 43-plate condenser. Can I place this in my antenna or ground circuit to cut down the wave length?—Henry A. Westermeyer, Cleveland, Ohio.

You should place the condenser in either the ground or antenna lead of the receiver.

Please tell me if the Superdyne receiver, published in RADIO WORLD for December 15, 22, 29, is a good receiver to use with WD12 tubes? You specify UV199, but I cannot use them.—K. Carroll, New York City.

You cannot use these tubes with the set. Use either the UV201A or UV199 tubes as suggested. This receiver is very critical, and should be constructed very carefully.

In your issue of January 26, you published a wave trap which I built. I have not been able to cut all the interference out with it. I enclose a sketch of how it is hooked to my set. Is this correct.—C. E. Labodie, 213 West 105th Street, New York City.

The sketch is perfectly correct, and if you are near to a broadcasting station, or if your set is not capable of tuning sharp, you will be troubled with this interference. It will stop interference on a sharp tuned set but will not aid a set that cannot tune sharply very much. We have stopped publishing regenerative circuits or articles.

What is the cause of a low hum every time I touch the electric light when I am operating my receiver?—M. Latimer, K Street, N. W., Washington, D. C.

This is induction from the electric light circuit. Do not run your ground or antenna wires near the wires, and you will not be bothered with this annoyance.

A few weeks ago you had an article in RADIO WORLD about the Ultradyne receiver. How are the D coils in this receiver wound? What size is the tube that you wind them on? Would a three-inch tube be enough?—Joseph Schwartz, 428 Lenox Avenue, Detroit, Mich.

A description of these coils, how to wind them, and some troubles that would likely be experienced with them was published in RADIO WORLD for the 16th. Care must be taken in its construction if it is expected to work.

In RADIO WORLD for Jan 26, you stated in your report on the interference conference meeting that there was a blocking tube that could be placed ahead of the receiver which would effectively cut out radiated interference. What is it? Where can it be obtained?—Fred Pfeiffer, 609 Logan Street, Helena, Mont.

The particular matter you referred to is being prepared for publication, and will be available for our readers in a short time. Another blocking tube circuit described by C. White was published in our issue of Feb. 9 and is quite effective in this type of work. A blocking tube circuit is one that stops the radiated interfering wave, created by a receiver, from entering the antenna circuit. It is a by-pass tube that permits the passing of energy in one direction only, from the antenna through the coils to the set, and not from the set to the antenna.

Will you please advise me where the glass knobs and dials shown in RADIO WORLD for Nov. 3, on page 23, can be obtained? What size and type of antenna are necessary for a good receiver? How can you tell when the receiver is working at its best?—J. R. Bayes, Wildwood, N. J.

These knobs are being manufactured by Peterson & Hoffman, Millville, N. J. They are on sale at some of the radio stores in New York and Newark. A single wire 75' in length will be sufficient. When a receiver is at its best the signals are the loudest.

Enclosed is a hookup of a two-tube receiver I am using. Can I add a stage of tuned radio frequency ahead of this set without disturbing the wiring? Will this give increased volume? Will it add to the selectivity? Will it add to the distance? Is it better to use a variometer or a coil and variable condenser for such a unit? Is a Shamrock a good variometer? Should I use a piece of sheet copper to shield the entire panel or will small pieces for each instrument suffice? Is it worth while to add a C battery to the second tube?—F. E. Fisher, Room 742, 30 Church Street, New York City.

You will find such a circuit in this issue. The one illustrated accomplishes two things—it stops the receiver you are now using from creating howls and squeals, and it also makes possible the use of radio frequency with its advantages ahead of a regenerative detector. It will increase your volume on distant signals. It will add greatly to the selectivity. It will add greatly to the distance. Use the coils specified in the article—they are home-made and simple. A Shamrock is a good variometer. Shield as little as possible. Therefore shield only each part. It will most certainly help your set to add a C battery.

Where can I obtain the coils for the Ultradyne receiver? Would it be advisable to use UV201A tubes in this receiver?—C. R. Straube, Schoolcraft, Mich.

The coils may be obtained from the Biltmore Radio Co., 237 Lamartine Street, Boston 30, Mass. You may use these tubes.

I constructed the Superdyne receiver as outlined in your issue of Dec. 15, 22, 29, and it works wonderful, with two exceptions. At times it is very critical, and the movement of your hand disturbs it. At other times it will be as broad as a house, not tuning out a station 35 miles away to complete satisfaction. The other trouble is the terrible squeals on the speaker when I operate it with the rotor turned at right angles to the coil. What is my trouble? I am using two 43-plate condensers made by myself from parts obtained at the five and ten-cent store, and they worked fine on the other set. Also, I shellacked my coils, as I used cereal boxes for the windings. What is my trouble?—Henry J. Deal, 1411 Grand Concourse, New York City.

Your trouble may be diagnosed in five words. You are using cheap apparatus. Rebuild your set, using bakelite tubing, the exact coils specified and good condensers with solid endplates. Also do not use shellac on the coils. This receiver must have the very best of parts, otherwise it will not work.

I recently bought a table talker, loud speaker. In order to remove some small matter that fell down the horn, I removed the cap and the horn. Two small washers fell out when the cap was taken off, and after replacing everything, the speaker has only about one-half the volume that it had first. What can I do to repair it?—Maynard Kerr, Milltown, Canada.

You have put the unit out of adjustment. Your solution lies in taking the speaker back to where you bought it, and having it adjusted, or else exchanging it for a new one, and paying the difference for your carelessness.

In RADIO WORLD for Jan. 26, 1924, on page 20, you show a three-coil honeycomb set. Will you show me how to load the primary and tickler coils of this circuit so that I can cover the broadcast

wave lengths. I have .001, .0005, and .00025 mfd. variable condensers on hand. Can I use a potentiometer in this circuit?—Jay Thompson, Holliday's Cove, W. Va.

This circuit does not need loading if the proper coils are used. It is for this reason that the honeycomb coil circuit is popular as it can cover from 150 to 20,000 meters without changing the set. It is only necessary to use the right coils, and condensers. If you use the .001 condenser in the antenna (in parallel) and the .0005 condenser across the secondary, and the proper size coils (determined by experiment) you will be enabled to hear all the broadcast stations operating on wave lengths from 150 to 545 and upwards. No, it is not necessary.

I have built the Autoplex receiver and find that while it is easy to control that it is extremely noisy. My neighbors tell me that they can hear me the moment I turn up my tube and start to tune. How can I stop this interference?—Max Jalineko, 43 Main Street, Port Washington, Long Island, N. Y.

You cannot make this receiver stop radiating. It will create howls and squeals all the time it is working. That is one of the reasons that it is not popular. The solution is to stop using it.

What is the correct value of the potentiometer used in the three-tube circuit described by Leroy Western on page 5 of RADIO WORLD for Jan. 19 issue? Will an Erla Reflex transformer give good results with this receiver?—Ernest L. Brudos, Lake City, S. D.

A potentiometer of 400 ohms resistance should prove sufficient in this receiver. You may use the transformer you mention.

Can you advise me where it is possible to get a circuit diagram of a one tube Neutrodyne receiver? Do you furnish plans for receivers as outlined in your magazine?—R. C. Weatherford, P. O. Box 228, Memphis, Tenn.

There is no such thing as a one tube Neutrodyne receiver. You evidently have it confused with some other receiver. A Neutrodyne may be a three-tube receiver, which is two stages of tuned radio frequency and detector, or a four or five-tube receiver which is with audio frequency, but it cannot be a single tube set. We do not furnish plans, other than are printed in the magazine.

I have a one tube receiver which I wish to use a storage battery with, as I heard that the storage battery makes the set much more sensitive. The set is the Apsco, one tube regenerative, WD11 receiver. How do I put the storage battery on? Do I have to change the set? Is there any use of trying to operate a Magnavox on the set after I put the storage battery in?—Harry Volmer, 19 1/2 Chestnut Street, Philadelphia, Pa.

You cannot use a storage battery with a WD11, unless you get a 2-volt battery. It is better to use two dry cells hooked in parallel, as they give just as good use. A storage battery does not increase the volume. You cannot operate a Magnavox on a one tube set.

I have made a S. P. 41 receiver, according to the enclosed diagram which I clipped from a paper. I cannot even get a peep out of it at all, although I have checked and rechecked the diagram and the set a dozen times. What can the trouble be?—R. M. Strauss, Millvale, N. Y.

The diagram is correct, and if you follow it you should be able to get good results. It is a two-tube reflex with crystal detector. Pay special attention to the leads of the transformers, seeing that they are not reversed. Also see that none of the transformers are burnt out. You state on the footnote that you are using but 22 volts on the plate. Increase it to 90 volts, as the tubes are amplifiers.

I have constructed the Superdyne receiver according to the diagram, but using WD12 tubes instead of the UV199. I get the same volume I did on my regenerative set and find that if I turn off the rheostat of the radio frequency tube that the set operates just as well. Also there is an entire absence of tube noise except when the set is just in resonance when the set howls like a cat when I take my hands away.—M. McKay, Fort Lee, N. J.

The tubes you are using are not suited to the purpose. Use the tubes specified, or the UV201A tubes. When the set is in resonance there will be the noise of the generator, the station noises, and the voice or music. There should be no other noise. Change your condensers around so that the rotor of the first one is on the minus filament side, and that of the second is on the plate side. This will cure your trouble.

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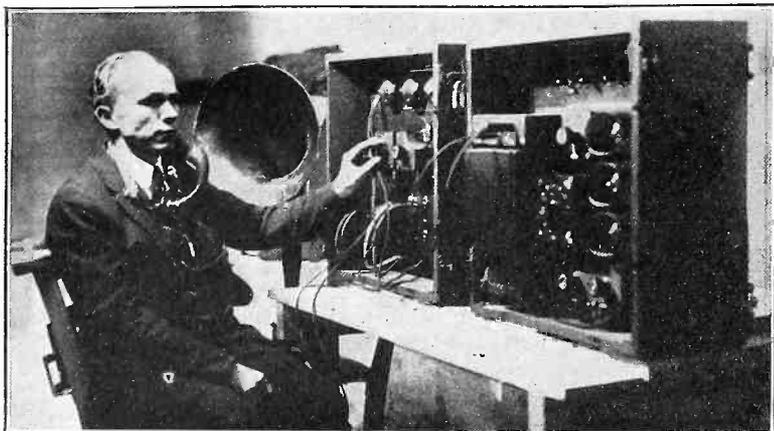
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RADIOGRAMS

WORLD NEWS HAPPENINGS BRIEFLY
PHRASED FOR OUR BUSY READERS



(C. Kadel and Herbert)

The radio power amplifier and pick-up device used in the crypt below Bethlehem Chapel of the Washington Cathedral, making it possible for millions of grief-stricken admirers of ex-President Wilson to hear the services broadcast. The services were most impressive, and many a member of the "stronger sex" listening to the radio services unashamedly wiped a tear from his eye while the former President was being laid to rest.

Station WGY announces receipt of a letter containing the log of a radio program which was broadcast from Schenectady, N. Y., January 4, and received at Cape Town, South Africa. Every number contained in the log checked with the program as broadcast. The air line distance from Schenectady to Cape Town is 7,880 miles.

* * *

With every change in habits people spring additions to their vocabulary. The other day in a more or less serious essay was the word "weaf." Centuries from now some zealous etymologist will remark concerning the origin of the expression "to weaf": "This verb, which means 'to make known far and wide,' originated because a wireless broadcasting station had the call letters WEAF." Weaf is one of the few calls that can be pronounced; only a Russian can do most of them—and he'd have to catch hay fever to do it right.—Waukesha, Wis., Freeman.

* * *

Thomas Alva Edison celebrated his seventy-seventh birthday on February 11. As usual, he was at his office in the laboratory early and had knocked off a good day's work when the Edison Pioneers, composed of his former associates, called for him at one o'clock to take him to their regular annual dinner. To visiting newspaper men he expressed the belief that radio would never supplant the wire telephone, that radio broadcasting would never take the place of newspapers and that air travel would never supersede old-fashioned trains and ships. He had no belief, he said, in the possibility of future communication between the earth and any of the other planets.



(C. Photonews)

A few of the members of the Radio Association of Greater New York, trying for foreign stations on their newly built neotrodyne receiver, which they are working on a loop antenna. This radio club is the largest independent organization in Greater New York.



(C. Wide World Photos)

Wendelin Luckner, eleven-year-old Bridgeport amateur, who holds the distinction of being the youngest licensed first-grade amateur radio operator in the country. He also holds the distinction of being one of the few fans who received the European stations during the recent tests. Contrary to general belief, there is no age limit to a radio amateur license, and any American from one to one hundred years old can be licensed.

The Danish aviator, J. P. Hansen, was killed recently when his airplane collided with the antenna of the naval wireless station on the river front at Buenos Aires. The accident occurred while Hansen was carrying out "stunts" in a bombing manouever.

* * *

13,000,000 people have listened in on radio talks on how to prevent tuberculosis and to promote effective care of the tubercular, was reported at the annual meeting of the New York Tuberculosis Association held last week. The radio talks numbered fifty and were broadcast in the association's health education campaign to 700,000 receiving radio sets in New York City and within a radius of several hundred miles.

* * *

The Canadian Government has received, and is considering, a suggestion that principal speeches made in debate in Parliament at Ottawa on questions of great interest to the people be broadcast by radio. It is planned to install radio equipment in the House, and it is probable, Parliamentary humorists say, that a "Radio Master" office may be created to prevent enthusiastic members from "hogging the 'mike.'"

* * *

General John J. Carty, vice-president of the American Telephone & Telegraph Company, has received the honorary degree of Doctor of Laws from the Moore School of Electrical Engineering at the University of Pennsylvania. The Moore school was made possible by a bequest of \$1,500,000 by the late Alfred F. Moore, of Philadelphia, a wealthy insulated wire manufacturer, who made the first covered wire in the United States.



(C. International Newsreel)

Lieut. C. V. Nation, Adjutant 132nd Inf., Herrin, Ill., receiving a call to arms via radio. This is the first time that radio has been used for this purpose. It was carried out as a test, proving highly successful. A regulation Signal Corps tube receiver was used in the tests.

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FEBRUARY 23, 1924

Legislation Will Not Stop Interfering Radiation

AT the recent Interfering Radiation Conference held under the auspices of RADIO WORLD at the Engineers' Club, New York City, it was the consensus of opinion of those present that the so-called "re-radiation" evil could not be controlled by legislation. Therefore, it was decided unanimously that a campaign of education was the logical corrective. A committee of radio engineers, under the chairmanship of Prof. L. A. Hazeltine, was formed to prepare a series of articles of an educational character which are to be distributed to the press and to broadcasting stations by a publicity committee appointed at the same time. Prof. Hazeltine's committee has been at work for several weeks and it is expected that the results of their efforts will be available in the very near future.

In the meantime, the radio editors of several daily newspapers have been advocating legislation on the subject. Their attitude is not to be commended as it savors too

much of the sensational and, besides, is not practical. It was demonstrated at the conference that regulatory laws had been a failure in Great Britain and, in certain instances, have not been completely successful in this country.

We are gratified now to learn that the Radio Trade Association, of New York City, is in accord with the policy of the conference and agrees that the education of radiating set owners is the probable solution of the problem.

In the meantime, a number of radio manufacturers are at work on devices which may be added to existing receiving sets at a comparatively small expense which will prevent them from radiating.

It requires little imagination to picture the time in the near future when the person who operates a radiating receiver will be regarded as a radio "scofflaw."

Ship Radio vs. Broadcasting

UNDER this title Chas. J. Pannill, vice-president of the Independent Wireless Telegraph Company, has an article in the current issue of "The Marine Review" in which he complains that radio broadcasting is steadily intruding upon the wave length areas available for the transmission of commercial radio traffic from and to ships at sea. After admitting that radio broadcasting has several million devotees, he asserts that "today ship radio is anathematized and lambasted until this golden-haired child of a few years ago is now a miserable interloper."

However, the case is not entirely without hope for this important function of radio, as Mr. Pannill tacitly admits when he proceeds to propound the cure by suggesting that commercial radio stations be assigned new wave lengths. He elaborates his idea as follows:

"At present the ship radiophone is assigned wave lengths of 800 to 952 meters. This assignment could easily be cancelled and without causing any difficulty because ship radiophone is a limited quantity. The 800 meter wave length is assigned for navy compass signals and the 1,000 meter wave length is assigned for the Department of Commerce radio compass signals and these could be reassigned to new wave lengths over 1,000 meters so that with the elimination of the ship radiophone a wave band of 600 to 1,000 meters could be assigned for exclusive commercial radio use, leaving the broadcasting field in undisputed possession of 200 to 600

meter wave lengths. The higher wave lengths would require some minor changes in ship equipment but their availability for use day and night would enable the better handling of commercial radio traffic and the complete elimination of complaints from broadcasting enthusiasts of 'code' interference."

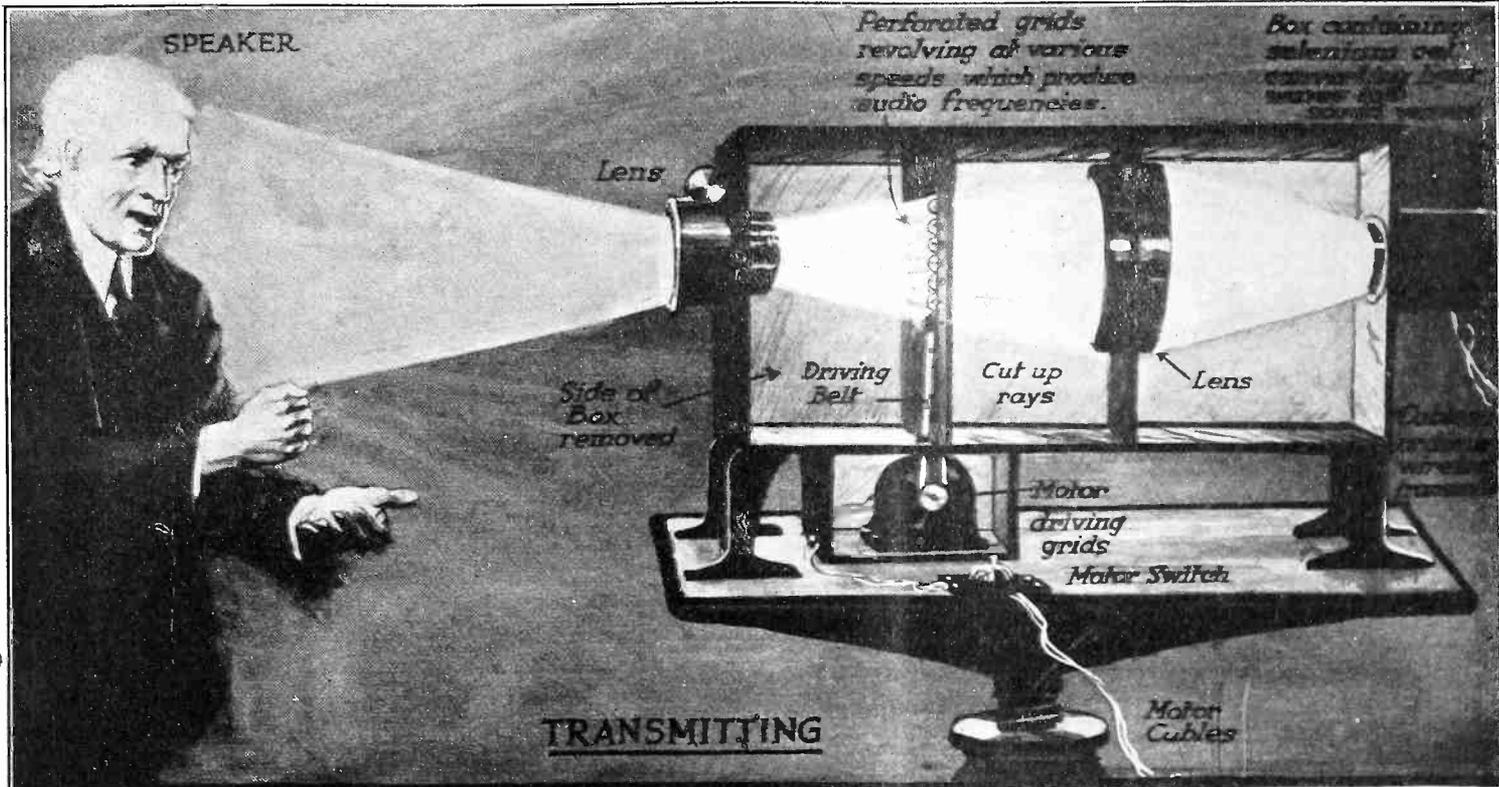
And there you are. Which leads one to inquire mildly and with due deference, "What's all the shootin' fer?"

PAUL S. WEIL, chairman of the committee on advertising for National Radio Week, in the course of his report to the Radio Trade Association makes the interesting suggestion that next year's celebration be called "International Radio Week for the Promotion of Peace." He also proposes that internationally known personages be invited to broadcast suitable messages from the four quarters of the globe during the week selected. This idea appeals to RADIO WORLD as being an excellent one and we hope it will be found possible to carry it out.

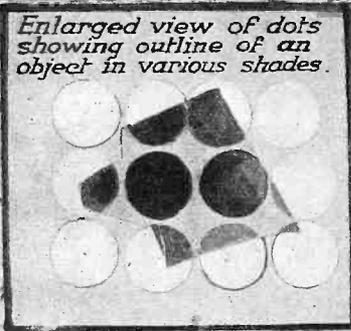
COMMANDERS of British steamships recently have been complaining of the abnormal number of SOS calls received by their wireless operators. In the past this signal has been used only when a vessel was in danger of sinking, but one skipper reports that frequently of late the call has been sent out when minor engine troubles were holding up a vessel. This is a matter which should promptly be corrected, as the vital importance of the SOS has earned for it a respect which nothing should be permitted to lessen. The very shipmasters who now are making too free use of the signal doubtless would be the first to complain of delay reaching them in a real emergency.

THE White Radio Bill soon will be presented to Congress and we trust that it will be carefully read and studied by the readers of RADIO WORLD so that they can appeal for the support of their congressmen and senators with understanding and knowledge. The radio audience is sufficiently large and important politically to carry great influence and we hope the listener in will exercise his or her privilege as well as those more directly concerned with the technical and commercial aspects of radio. The average representative in Congress is always interested to receive the views of his constituents on any matter of public importance and this is certainly one of them.

A Long Step Toward Seeing by Radio



Transmitting Station

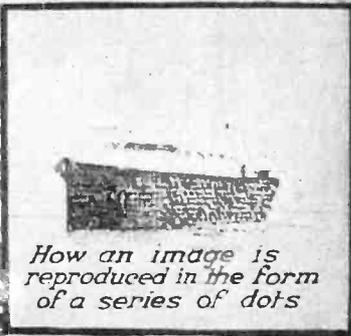


Enlarged view of dots showing outline of an object in various shades.



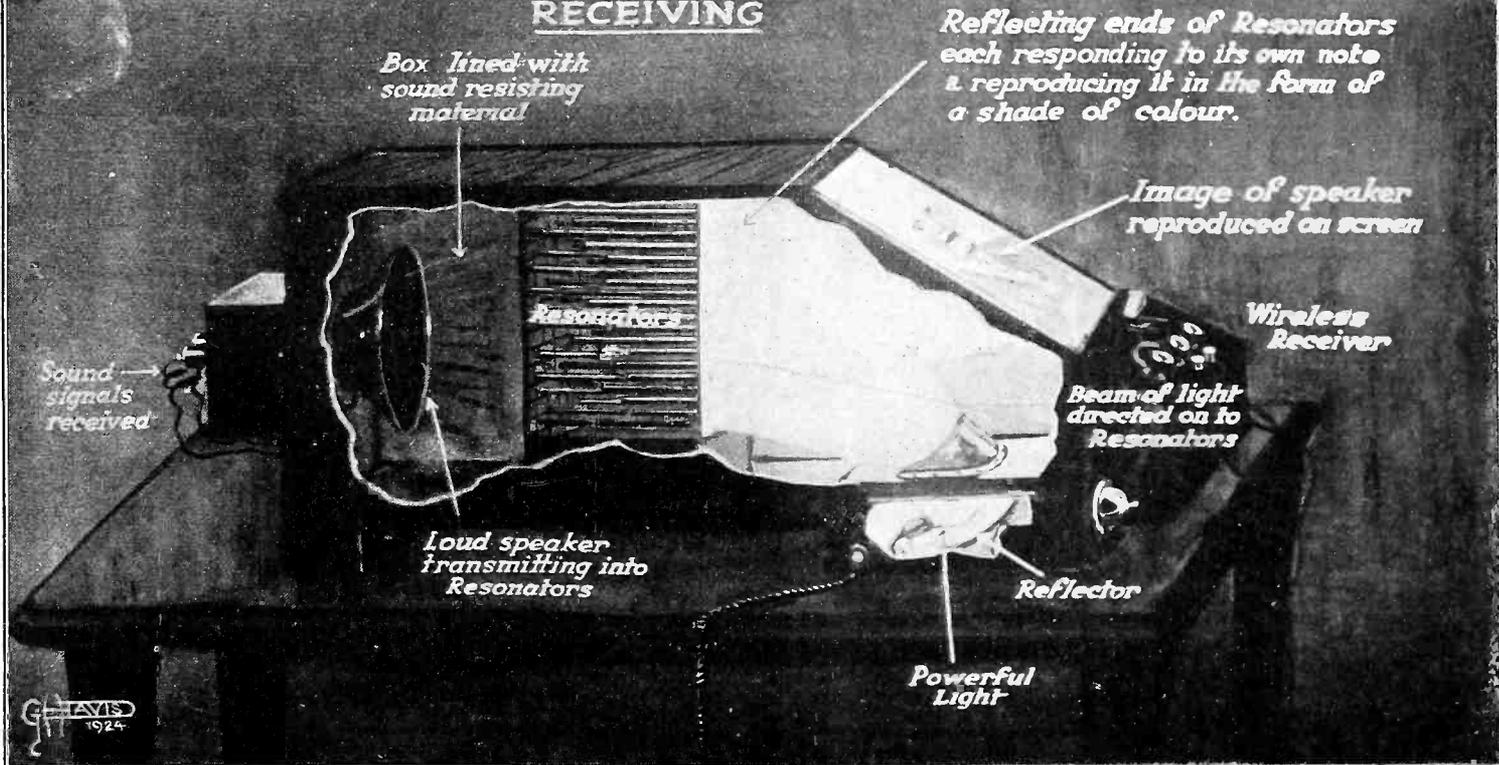
The sound waves are sent out in the ordinary way.

received as in everyday wireless



How an image is reproduced in the form of a series of dots

RECEIVING



1924

Graphic representation of the invention of Dr. Fournier d'Albe which makes the transmission of radio pictures possible. The light rays are transmuted into sound waves by special light-projecting apparatus, focussed on a bank of selenium cells. These are transmitted like telephone signals and present themselves in a series of tones. The sound is passed through a loud speaker in a sound box containing tubes called resonators. Each one of these responds to one tone only, and by a special arrangement they reflect light when in resonance. (C. Wide World.)

Here Are Good Broadcast Programs

Station WEF, New York City

492 Meters (610 Kcys.) E. S. T. Feb. 22.—10:30 A. M.—12:00 Noon—Meeting of Sons of American Revolution with musical program and speeches direct from Carnegie Hall, New York City. 4:00 5:30 P. M.—Dance program by the Blue Horse Trio, playing at the Blue Horse Inn. Children's hour with stories and songs. 7:30-10:00 P. M.—United Cigar Stores daily sport talk by Thornton Fisher. Battery instruction talk by George C. Furness, head of Radio Division, the National Carbon Company; "The Happiness Boys," Billy Jones and Ernest Hare; Isadore Geffen, cellist, accompanied by Mme. Applebloom Arnold; B. Fischer & Company's Astor Coffee Dance Orchestra. 10:00 P. M.—"Washington's Birthday" address by Calvin Coolidge, President of the United States, direct from Washington, D. C.

Feb. 23.—4:00-5:30 P. M.—Bob Fridkin's Coronado Orchestra, and Kitty Borchman, lyric soprano, and Edna Reister, mezzo soprano. 7:30-12:00 P. M.—Sara Sharkey, mezzo soprano, accompanied by Estelle Ashton Sparks; the "Chicklet Quartette," assisted by the Chiclet Trio of the American Chiclet Company. Talk by the Orange County Chamber of Commerce, of Orlando, Florida; Rata Present, pianist; Health talk under the auspices of the New York Tuberculosis Association; Marie A. Kiraly, pianist; James McKinley Rose, tenor; Fan O'Brien, soprano. Program by Gimbel Brothers, New York City—Vincent Lopez and his orchestra direct from the Grill Room of the Hotel Pennsylvania.

Station WGI, Medford, Mass.

360 Meters (830 Kcys.) E. S. T. Feb. 22.—12 M.—Selection on the Ampico in the Chickerling; Amrad Round Table; selections on the Brunswick. 12:40 P. M.—New England weather forecast. 12:45 P. M.—Farmers' produce market report. 3 P. M.—Talk by Miss Dorothy H. Goodwin; musicale by the Brunswick Console. 3:30 P. M.—Miss Dorothy Dean, Girl Scouts. 5:30 P. M.—Closing stock market reports; live stock market reports. 6:15 P. M.—Code practice, lesson No. 238. 6:30 P. M.—Meeting of the Big Brother Amrad Club. 7 P. M.—Boston police reports. 7:30 P. M.—Selected verses by Mr. Charles L. H. Wagner, radio poet; Red Cross health talk by Henry Copley Green; musicale.

Feb. 25.—6:30 P. M.—Meeting of the Big Brother Amrad Club. 6:45 P. M.—Code practice, lesson No. 239. 7:05 P. M.—New England weather forecast; New England crop notes. 7:30 P. M.—Talks on New England business industry by Arthur R. Curnick; Arthur Murray's course in ball room dancing; musicale.

Feb. 24—4 P. M.—"Adventure Hour," conducted by the Youth's Companion; musicale by Miss Corine Schlagel, contralto, and Miss Jacquelyn Bickford, soprano. 8:30 P. M.—Talk on "World Unity" under the auspices of the Greater Boston Federation of Churches; musicale.

Station WFAA, Dallas, Texas

476 Meters (630 Kcys.) C. S. T. Feb. 22.—12:30-1:00 P. M.—Address, Dr. Robert Stewart Hyer, Southern Methodist University, on the Sunday School lesson, "Period of the Judges." 8:30-9:30—Miss Jessie McKee's Orchestra.

Feb. 23—12:30-1:00 P. M.—Address, Ben B. Linskie, labor leader, on "Labor Organizing for Co-ordination and Co-operation." 8:30-9:30 P. M.—Piano recital and varied features in a program that will present a pianist from the ten who will give massed recital at the Coliseum in Dallas in April. 11-12 P. M.—Music of the Adolphus Hotel Orchestra, broadcast from the Junior Ballroom of the hotel.

Feb. 24—6-7 P. M.—Radio Bible Class, Dr. William M. Anderson, Jr., pastor of the First Presbyterian Church, teacher; half-hour Bible study, half-hour Gospel songs. 9:30-10 P. M.—Religious address, Dr. Paul B. Kern, dean Department of Theology, Southern Methodist University, on "Christianity and Modern Education." 10-11 P. M.—Lee's Fox Trotters' Orchestra in popular music.

Station KGW, Portland, Oregon

492 Meters (610 Kcys.) P. T. Feb. 22.—11:30 A. M.—Weather forecast. 3:30 P. M.—Lecture for women. 7:30 P. M.—Weather forecast and market reports. 8 P. M.—Accordion solos by John Sylvester. 8:15 P. M.—Dance music by George Olsen's Metropolitan Orchestra of the Hotel Portland, directed by Herman Kenin. 9 P. M.—University of Oregon extension lecture by Prof. Frederick S. Dunn, head of Department of Latin, on "Portraits of Washington." 10:30 P. M.—Hoot Owls with Pantages Frolic.

Feb. 23—11:30 A. M.—Weather forecast. 3:30 P. M.—Children's program. Story by Aunt Nell. 10 P. M.—Weather forecast and dance music by George Olsen's Metropolitan Orchestra of the Hotel Portland (2 hours).

Station WJY, New York City

405 Meters (740 Kcys.) E. S. T. Feb. 22.—7:30 P. M.—Frank Shevitt, "Income Taxes." 8 P. M.—Hon. Julius Berg, "The Work of the New York Assembly." 8:30 P. M.—Recital by Hilda Besznak, soprano, accompanied by Creighton Allen. 8:45 P. M.—"The Vegetable Garden" by Peter Henderson. 9:15 P. M.—Mayor Hylan's Peoples Concert; Hon. Geo. R. Lunn, Lieut. Gov. of State of New York. 10 P. M.—Breau & Tobias. 10:30 P. M.—Pennsylvania Duo.

Feb. 24—2:30-5 P. M. 8-10:30 P. M.

Station WOC, Davenport, Iowa

484 Meters (620 Kcys.) C. S. T. Feb. 22.—10 A. M.—Opening Market quotations and Household Hints. 10:58 A. M.—Time signals. 11 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12 M.—Chimes concert. 2 P. M.—Closing stocks and markets. 3:30 P. M.—Musical numbers to be announced. R. G. Maybach, P. S. C. Dept. of Anatomy on "Structure of the Hair, Skin and Nails." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 7:20 P. M.—Sunday School lesson, International lesson for next Sunday discussed by Dr. Frank Willard Court, pastor St. John's Methodist Episcopal Church, Davenport, Iowa. 8 P. M.—Musical program (1 hour)—Erwin Swindell, musical director. Program furnished by the Chamber of Commerce of Rock Island, Illinois.

Feb. 23.—10 A. M.—Opening market quotations and household Hints. 10:55 A. M.—Time signals. 11 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12 M.—Chimes concert. 12:30 P. M.—Closing stocks and markets. 3:30 P. M.—Musical numbers to be announced. C. C. Hall, P. S. C. Dept. of Chemistry on "Soap Making." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 7 P. M.—Educational lecture, under the auspices of the Masonic Service Association, subject: "George Washington," by J. W. Gannaway, Professor of Political Science, Grinnell College, Grinnell, Iowa. 9 P. M.—Orchestra program (1 hour), P. S. C. Orchestra. Gerald M. Barrow, director. (Popular selections released through the National Association of Broadcasters, of which WOC is a member). V. B. Rochte, baritone soloist.

Station WOR, Newark, N. J.

405 Meters (740 Kcys.) E. S. T. Feb. 22.—2:30-4:00 P. M.—George Washington's Birthday program: Andrew B. Humphrey, secretary of the Sulgrave Institution, speaking on "Washington." Mrs. Alton B. Parker, chairman of the Woman's Committee of the Sulgrave Institution. Major General Adams, President-General of the Sons of the American Revolution. Tenor solos by Mario Cutayer. Harp solos by Edith Connor. 6:15 P. M.—Guy Hunter, blind entertainer, in songs and stories. 6:30-7:00 P. M.—"Man in the Moon Stories for the Children." 7:00-7:30 P. M.—Guy Hunter, blind entertainer, in songs and stories.

Feb. 23.—2:30 P. M.—Tom Cooper's Country Club Orchestra. 3:00 P. M.—Talk by Fannie Hurst, authoress. 3:15-4:00 P. M.—Tom Cooper's Country Club Orchestra. 6:15-7:15 P. M.—"Music While You Dine," by Julie Wintz's Jersey Collegians. 7:15 P. M.—Fred J. Bende, "Sporting News Up-to-the-Minute." 8:00-9:00 P. M.—Gene Ingraham's Bell Record Orchestra. 9:00 P. M.—The Law and Income Tax, by John Armstrong. 9:15 P. M.—Howard Pascal, tenor of WOR, and Joseph M. Barnett, baritone of WOR; violin obligatos by Margaret Waite. 9:40 P. M.—Hon. James W. Girard, Ex-Ambassador to Germany, on "Woodrow Wilson." 9:55 P. M.—Howard Pascal, tenor of WOR, and Joseph M. Barnett, baritone of WOR; violin obligatos by Margaret Waite. 10:15-11:00 P. M.—Billy Crippis' Entertainers. Smith Sisters. Rose Schall. Max Hitrig.

Station KHJ, Los Angeles, Calif.

395 Meters (760 Kcys.) P. T. Feb. 22.—12:30-1:15 P. M.—Studebaker Six of Long Beach, Glen E. Thomas arranging. 2:30-3:30 P. M.—Matinee musicale by Studebaker Six of Long Beach. 6:25 P. M.—Live-stock and vegetable reports. 6:30-7:00 P. M.—Children's program presenting Richard Headrick, screen juvenile. Bedtime story by "Uncle John." 7:00-7:30 P. M.—Organ recital from First Methodist Episcopal Church, Arthur Blakeley, organist. 8:00-10:00 P. M.—Program presented by Long Beach Municipal Band, Herbert L. Clarke, director. E. A. Brininstool in a talk about George Washington. 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra by line telephony from the Los Angeles Biltmore Hotel.

Feb. 23.—12:30-1:15 P. M.—News items; music. 2:30-3:30 P. M.—Matinee musicale. 6:40 P. M.—Live-stock and vegetable reports. 6:45-7:30 P. M.—Children's program presenting Dick Winslow Johnson and the Johnson family. Bedtime story by "Uncle John." 8:00-10:00 P. M.—Program arranged by Barker Brothers. 10:00-12:00 P. M.—Broadcasting by line telephony from the Los Angeles Biltmore Hotel.

Station WOAW, Omaha, Neb.

526 Meters (570 Kcys.) C. S. T. Feb. 22.—6 P. M.—Dinner program presented by Page County Farmer Band of Clarinda, Iowa, Major J. W. Landers, director. 9 P. M.—Regular monthly meeting of World Radio Camp, E. E. May, consul commander, auspices Woodmen of the World. Social entertainment, musical program by May Seed and Nursery Copany of Shenandoah, Iowa.

Feb. 23.—6:30 P. M.—Dinner program presented by Harmo Jazz Orchestra, William Foral, manager. 9 P. M.—Program under auspices of Omaha Printing Company. Arranged by Harry B. Cockrell.

Feb. 24—9 A. M.—Radio Chapel Service directed by Rev. R. R. Brown. This service is by courtesy of Swedish Evangelical Mission Church, Rev. Thure A. Jacobson, pastor. 6 P. M.—Bible study hour, under personal direction of Mrs. Carl R. Gray. 9 P. M.—Musical chapel service presented by Rev. R. R. Brown, minister of the Sunday Morning Radio Congregation and his associates.

Station KYW, Chicago, Ill.

536 Meters (560 Kcys.) C. S. T. Feb. 22.—9:30 A. M.—Late news and comment of the financial and commercial markets. (This service is broadcast from KYW every half hour during the twenty-four.) 11:35 A. M.—Table talk by Mrs. Anna J. Peterson. 1:30 P. M.—"The Progress of the World," by Review of Reviews. 6:30 P. M.—News, financial and final market. 6:50 P. M.—Children's bedtime story. 7:00-7:30 P. M.—Dinner concert broadcast from the Congress Hotel. 10:00 P. M.—2:00 A. M.—Midnight revue—Artists and program will be announced by radiophone.

Feb. 23.—9:30 A. M.—Late news and comment of the financial and commercial markets. (This service is broadcast every half hour during the twenty-four.) 10:30 A. M.—Farm and Home service. 11:35 A. M.—Table talk by Mrs. Anna J. Peterson. 6:30 P. M.—News, financial and final market and sport summary. 6:50 P. M.—Children's bedtime story. 7:00-7:30 P. M.—Dinner concert broadcast from the Congress Hotel. 8:00-8:58 P. M.—Musical program, including Roney's Masonic Quartet. 9:05 P. M.—"Safety First," by Chicago Motor Club. 9:15 P. M.—"Under the Evening Lamp," furnished by Youth's Companion. 10:00-12:00 P. M.—Midnight revue broadcast from the Congress Hotel studio.

Feb. 24.—11:00 A. M.—Central Church service from Orchestra Hall, Chicago. Dr. F. F. Shanon, pastor. Musical program under the direction of Daniel Protheroe. 7:00 P. M.—Chicago Sunday Evening Club service from Orchestra Hall, Chicago. Musical program direction Edgar Nelson. Speaker of the evening, President W. H. P. Faunce.

Station KDKA, East Pittsburgh, Pa.

326 Meters (920 Kcys.) E. S. T. Feb. 22.—9:45 A. M.—Union live stock market reports. 11:55 A. M.—Arlington time signals. 12:00 Noon—Weather forecast; United States Bureau of Market Reports. 6:15 P. M.—Organ recital by Lucile Hale, from Cameo Motion Picture Theatre, Pittsburgh, Pa. 7:15 P. M.—Radio Boy Scout meeting. 7:45 P. M.—The children's period. 8:00 P. M.—Market reports. 8:15 P. M.—"The Long Struggle with Idolatry," the Sunday School lesson for February 24, presented by Dr. R. L. Lanning. 8:30 P. M.—Concert by the Pittsburgh Male Sextet. 9:55 P. M.—Arlington time signals; weather forecast.

Feb. 23.—9:45 A. M.—Union live stock market reports. 11:55 A. M.—Arlington time signals. 12:00 Noon—Weather forecast; United States Bureau of Market Reports. 6:15 P. M.—Dinner concert by the Westinghouse Band, T. J. Vastine, conductor. 7:30 P. M.—"Bringing the World to America," prepared by "Our World." 7:45 P. M.—The children's period. 8:00 P. M.—Feature. 8:15 P. M.—"Buying a Home," Robert W. Semenov, University of Pittsburgh. 8:30 P. M.—Concert by the Westinghouse Band, T. J. Vastine, conductor. 9:55 P. M.—Arlington time signals; weather forecast.

Station WBZ, Springfield, Mass.

337 Meters (890 Kcys.) E. S. T. Feb. 22.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield market reports. 6 P. M.—Dinner concert by the WBZ Orchestra. 7 P. M.—"Just Plain Joy Riders," prepared by the Youth's Companion. 7:30 P. M.—Bedtime story for the Kiddies. Current Book Review by R. A. MacDonald. Story for Grown-ups by Orison S. Marden. 9:55 P. M.—Arlington time signals. 11 P. M.—Program of chamber music by the WBZ Orchestra, and Mrs. Dorothea Abbey Waite, contralto; Mr. A. E. Waite, accompanist.

Feb. 23.—11:55 A. M.—Arlington time signals; weather reports; Boston market report. 7:00 P. M.—Dinner concert by the Hotel Kimball Trio, transmitted from the Hotel Kimball Dining Room; Jan Goerts director. 7:30 P. M.—Bedtime story for the kiddies. "Bringing the World to America," prepared by "Our World Magazine." 8:00 P. M.—Concert by Mrs. Nora Gladden Winton, soprano; Mrs. Miriam Munyan Thomson, accompanist; Gustav LaZazzera, cellist. 9:00 P. M.—Bedtime story for grown-ups by Orison S. Marden. 9:55 P. M.—Arlington time signals.

Station KFI, Los Angeles, Calif.

469 Meters (640 Kcys.) P. T. Feb. 24.—10:00-10:45 A. M.—L. A. Church Federation service. 4:00-5:00 P. M.—Federated Church Musicians Vesper service. 6:45-7:30 P. M.—Bedtime story and concert. 8:00-9:00 P. M.—Ambassador Hotel concert. 9:00-10:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Theron Bennett's Packard Six.

Feb. 25.—4:45-5:15 P. M.—Evening Herald news bulletins. 5:15-5:45 P. M.—Examiner news bulletins. 8:00-9:00 P. M.—Evening Herald concert. 9:00-10:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Ambassador-Lyman's Coconut Grove Orchestra.

Feb. 25.—7:30-8:30 P. M.—Program by the Christian College of Thorp Springs, Texas. 9:30-10:45 P. M.—Concert by the Chamber of Commerce of Marlin, Texas.

Station WBAP, Fort Worth, Texas.

476 Meters (620 Kcys.) C. S. T. Feb. 24.—11:00 A. M.—12:15 P. M.—Services of the First Presbyterian Church; the Rev. J. K. Thompson, pastor. 4:00-5:00 P. M.—Organ concert. 5:00-6:00 P. M.—Address by the Rev. J. Frank Norris, pastor of the First Baptist Church. 11:00-12:00 P. M.—Concert by Fred Cahoon's WBAP Southern Sereaders' Orchestra.

Station WHAS, Louisville, Ky.

400 Meters (750 Kcys.). C. S. T. Feb. 22.—4:00-5:00 P. M.—Selections by the Strand Theatre Orchestra, Harry S. Currie conductor. Late important news bulletins. Police bulletins. Weather forecast. "Just Among Home Folks," a daily column appearing in the Courier-Journal. 4:50 P. M.—Local livestock, produce and grain market reports. 5:00 P. M.—Official Central Standard time announced. 7:30-9:00 P. M.—Concert under the auspices of Annette Wearan Music Studio, Scottsburg, Ind. Late important news bulletins. Official Central Standard time announced at 9 o'clock.

Feb. 23.—4:00-5:00 P. M.—Selections by the Strand Theatre Orchestra, Harry S. Currie, conductor. Police bulletins. Weather forecast. "Just Among Home Folks," a daily column appearing in the Courier Journal. Late important news bulletins. Selections played on the Alamo Theatre organ. 4:50 P. M.—Local livestock, produce and grain market reports. 5:00 P. M.—Official Central Standard time announced. 7:30-9:00 P. M.—Concert by the Concordia Singing Society, Prof. D. Dentinger, director. Late important news bulletins. Official Central Standard time announced at 9 o'clock.

Station WOO, Philadelphia, Pa.

509 Meters (590 Kcys.) E. S. T. Feb. 22.—11:00 A. M.—Grand organ. 11:30 A. M.—Weather forecast. 11:55 A. M.—Naval Observatory time signal. 12:00 M.—Luncheon music by the Tea Room Orchestra. 4:45 P. M.—Grand organ and trumpets. 5:00 P. M.—Sports results and police reports. 7:30 P. M.—Dinner music from Hotel Adelphia Concert Orchestra, A. Candelori, director. 8:00 P. M.—R. C. O. Band, J. Lawrence Grinnell, director. 8:30 P. M.—Special program from the Fox Theatre studio. 9:15 P. M.—Warren M. Robbins, baritone; Alfred J. Fregans, pianist. 9:30 P. M.—Grand organ recital—Mary E. Vogt. 9:55 P. M.—Naval Observatory time signal. 10:02 P. M.—Weather forecast. 10:03 P. M.—The Kentucky Kernels Dance Orchestra from the Hotel Adelphia.

Feb. 23.—11:00 A. M.—Grand organ. 11:30 A. M.—Weather forecast. 11:55 A. M.—Naval Observatory time signal. 12:00 M.—Luncheon music by the Tea Room Orchestra. 4:45 P. M.—Grand organ and trumpets. 5:00 P. M.—Sports results and police reports. 9:55 P. M.—Naval Observatory time signal. 10:02 P. M.—Weather forecast.

Station WJAR, Philadelphia, Pa.

395 Meters (760 Kcys.). E. S. T. Feb. 22.—11:45 A. M.—Daily almanac. 12:02 P. M.—Organ recital from the Stanley Theatre; features from the studio; Arcadia Concert Orchestra, Feri Sarkozi, director. 2:00-3:00 P. M.—Arcadia Concert Orchestra—artist recital. 4:30 P. M.—Program of dance music. 7:30 P. M.—Bedtime stories. 7:50 P. M.—Poets' and authors' corner. 8:10 P. M.—Book review. Playlet, WJAR Walter Greenough Players. Special program, under the auspices of the American Legion. Prominent speakers, vocal selections, etc. 10:10 P. M.—Howard Lanin's Dance Orchestra from the Arcadia Cafe. Special features from the studio during the intermission of the orchestra.

Feb. 23.—11:45 A. M.—Daily almanac. 12:02 P. M.—Organ recital from the Stanley Theatre; features from the studio; Arcadia Concert Orchestra, Feri Sarkozi, director. 2:00-3:00 P. M.—Arcadia Concert Orchestra, recital from the studio. 4:30 P. M.—Program of popular dance music. 7:30 P. M.—Bedtime stories by Uncle Jim.

Station KPO, San Francisco, Calif.

423 Meters (770 Kcys.). P. T. Feb. 22.—12 noon—Time signals. Reading of the Scriptures. 1:00-2:00 P. M.—Rudy Seiger's Fairmont Hotel Orchestra, by wire telephony. 2:30-3:30 P. M.—Theodore J. Irwin, organist. 4:30-5:30 P. M.—Rudy Seiger's Fairmont Hotel Orchestra.

Feb. 23.—12 noon—Time signals. Reading of the Scriptures. 1:00-2:00 P. M.—Rudy Seiger's Fairmont Hotel Orchestra, by wire telephony. 2:30-3:30 P. M.—Varied program. 3:30-5:30 P. M.—E. Max Bradfield's band, in the Rose Room Bowl of the Palace Hotel. 8:00 P. M. to midnight—Art Weidner and his popular dance orchestra, broadcast by wire telephony.

Station WGY, Schenectady, N. Y.

380 Meters (790 Kcys.). E. S. T. Feb. 22.—6:30 P. M.—Children's program. 7:35 P. M.—Health talk, N. Y. State Department of Health. 7:45 P. M.—Radio drama, "The Gamblers," by Charles Klein, presented by WGY Players. 10:30 P. M.—Dance music by Blue Bird Orchestra. Monologue by Dr. W. J. Brennan of Plattsburgh, N. Y.

Feb. 23.—11:55 A. M.—U. S. Naval Observatory time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 9:30 P. M.—Dance music by Romano's Orchestra, New Kenmore Hotel, Albany, N. Y.

Station WNAC, Boston, Mass.

278 Meters (1080 Kcys.). E. S. T. Feb. 22.—6:30 P. M.—WNAC dinner dance broadcast from Hotel Westminster. 8:00 P. M.—Army night, 13th Infantry Band and assisting artists.

Feb. 23.—1:00 P. M.—Shepard Colonial Orchestra. 4:00 P. M.—Tea dance—broadcast from Copley Plaza Hotel. 6:30 P. M.—WNAC dinner dance—broadcast from Hotel Westminster. 8:15-9:00 P. M.—Hockey game—broadcast from Boston Arena. 9:45 P. M.—Dance music, State Ballroom Orchestra—broadcast from State Ballroom; Copley Plaza Orchestra—broadcast from Copley Plaza Hotel.

Station WJZ, New York City

455 Meters (660 Kcys.) E. S. T. Feb. 22.—12:15 P. M.—Noon hour of music from the Brick Presbyterian Church. 3 P. M.—Organ recital by Leo Riggs on the Hotel Astor organ. 4 P. M.—Joint recital by Ruth Bruns, violinist, and Florence Dittjen, pianist. 5 P. M.—"The Larger Aspect of World Affairs" by the International Interpreter. 5:15 P. M.—Mrs. Henry Clay Wright (80 years old) of Texas. 5:30 P. M.—Closing reports of the New York State Department of Farms and Markets; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; "The Condition of the Leading Businesses" by the Magazine of Wall Street; Evening Post news. 7 P. M.—Thornton Burgess "Bedtime Stories." 7:10 P. M.—Songs for children by a little girl, Lily Renouf Slade. 7:30 P. M.—Burr McIntosh, the Cheerful Philosopher. 7:50 P. M.—Jascha Gurewicz, saxophone. 8:05 P. M.—Looseleaf current topics. 8:20 P. M.—Jascha Gurewicz, saxophone. 8:45 P. M.—General Chas. H. Sherrill. 9 P. M.—Wireless Age program. 9:55 P. M.—Time signals and weather forecast retransmitted from the government station NAA. 10 P. M.—Recital by Edith Herlick, contralto, accompanied by Creighton Allen. 10:15 P. M.—"Home Building" by William Harmon Beers. 10:30 P. M.—Dance program by Paul Specht's Alamac Hotel Orchestra, direct from the Congo Room of the Alamac Hotel.

Feb. 23.—3 P. M.—Ayy La Skere, double voiced entertainer. 3:30 P. M.—Edgar Dowell's popular program. 3:30 P. M.—Ayy La Skere, double voiced entertainer. 4 P. M.—Tea concert by the Hotel Belmont Stringed Ensemble, Harry Lerner, leader; direct from the balcony of the Tea Room of the Hotel Belmont. 5 P. M.—Famous Fain Orchestra. 5:30 P. M.—Closing reports of the New York State Department of Farms and Markets; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Bradstreet's financial report; Evening Post News. 7 P. M.—"Uncle Wiggily Stories" by Howard Garis. 8 P. M.—Harper & Bros. "Literary Moments." 8:15 P. M.—Darl Bethman, high baritone. 8:30 P. M.—Hon. Fiarello H. La Guardia, House of Representatives, Washington, D. C. 8:45 P. M.—Darl Bethman, high baritone. 9:15 P. M.—Rheingold Quartet concert. 9:45 P. M.—Rheingold Quartet concert. 9:55 P. M.—Time signals and weather forecast retransmitted from the government station NAA. 10 P. M.—Recital by Antoinette Halstead, contralto, accompanied by Creighton Allen. 10:30 P. M.—Harold Stern, and his Hotel Majestic Orchestra, direct from the Hotel Majestic.

Station WRC, Washington, D. C.

469 Meters (640 Kcys.) E. S. T. Feb. 22.—3:00 P. M.—Fashion developments of the moment. 3:10 P. M.—Song recital. 3:25 P. M.—Current events by the editor of "The Review of Reviews." 3:35 P. M.—Piano concert. 4:00 P. M.—The Magazine of Wall Street. 5:15 P. M.—Instruction in International code. 6:00 P. M.—Stories for children by Peggy Albion. 6:20 P. M.—"The Question Box" by arrangement with The Pathfinder Publishing Company.

Feb. 23.—5:15 P. M.—Instruction in International code. 6:00 P. M.—Stories for children by Peggy Albion. 7:45 P. M.—Bible story. 8:00 P. M.—Song recital. 8:15 P. M.—Dance program. 8:45 P. M.—Piano recital. 9:00 P. M.—Song recital. 9:55 P. M.—Retransmission of time signals and weather forecasts. 10:00 P. M.—Concert by the Harmonious Quartet.

Station KSD, St. Louis, Mo.

546 Meters (550 Kcys.) C. S. T. Feb. 22.—8:00 P. M.—Broadcasting the pageant, "The Dreamer Awakes," by the Rev. Father Daniel A. Lord, S.J., by the Inter-unit Organization of the Catholic Students Mission Crusade. Address by the Most Rev. Archbishop John J. Glennon.

Feb. 23.—9:00 P. M.—Orchestra concert, organ recital, vocal and instrumental specialties broadcast direct from the Missouri Theatre.

Station WWJ, Detroit, Mich.

517 Meters (580 Kcys.). E. S. T. Feb. 22.—9:30 A. M.—"Tonight's Dinner" and a special talk by the Woman's Editor. 9:45 A. M.—Public Health Service bulletins and talks on subjects of general interest. 10:25 A. M.—Official weather forecast. 11:55 A. M.—Arlington time relayed by the Western Union. 12:00 P. M.—Dance music by Jean Goldkette's Orchestra, broadcast from the Graystone Ballroom. 3:00 P. M.—The Detroit News Orchestra. 3:30 P. M.—Official weather forecast. 3:35 P. M.—Market reports. 7:00 P. M.—The Detroit News Orchestra; Anne Campbell, Detroit News poet; Victor L. LeBlanc, tenor.

Feb. 23.—9:30 A. M.—"Tonight's Dinner," and a special talk by the Woman's Editor. 9:45 A. M.—Public Health Service bulletins and talks on subjects of general interest. 10:25 A. M.—Official weather forecast. 11:55 A. M.—Arlington time relayed by the Western Union. 3:00 P. M.—The Detroit News Orchestra. 3:30 P. M.—Official weather forecast. 3:35 P. M.—Market reports. 7:30 P. M.—The Detroit News Orchestra.

Station WJAX, Cleveland, Ohio

390 Meters (770 Kcys.). E. S. T. Feb. 26.—Program of music and other entertainment lasting from 7:30 P. M. until the wee sma' hours of the morning will be the Cleveland News contribution to the celebration of the opening of the new WJAX station in the new twenty-story bank and office building of the Union Trust Company. Talks by bank officials and other numbers will be contributed by the Union Trust Company, so that it will be a combined Cleveland News and Union Trust evening.

Feb. 28.—8:00 P. M.—Prof. Gabriel Fenyves, Hungarian pianist, and Prof. Charles Mareau, baritone, both members of the faculty of the Conservatory of Music, Wooster College, Wooster, Ohio. 10:00 P. M.—Organ recital by Vincent H. Percy, broadcast direct from the Public Hall, which boasts an organ with the largest volume in the world.

Station KFI, Los Angeles, Calif.

469 Meters (630 Kcys.) P. T. Feb. 22.—4:45-5:15 P. M.—Evening Herald news bulletins. 5:15-5:45 P. M.—Examiner news bulletins. 6:45-7:30 P. M.—Special Washington's Birthday bill. 8:00-9:00 P. M.—Evening Herald concert. 9:00-10:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Myra Belle Vickers, concert. 11:00-12:00 P. M.—Ambassador-Lyman's Coconut Grove Orchestra.

Feb. 23.—4:45-5:15 P. M.—Evening Herald news bulletins. 5:15-5:45 P. M.—Examiner news bulletins. 6:45-7:30 P. M.—Bedtime story and concert. 8:00-9:00 P. M.—Maude Reeves-Barnard. 9:00-10:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Vocal and instrumental concert. 11:00-12:00 P. M.—Ambassador-Lyman's Coconut Grove Orchestra.

Station WOS, Jefferson City, Mo.

441 Meters (680 Kcys.). C. S. T. Feb. 22.—8:00 P. M.—Washington's Birthday program under direction of E. S. Emerson, director of the Miller Theatre Orchestra by line telephony from the Miller Theatre.

Feb. 24.—7:30 P. M.—Service of the Central Evangelical Church, Jefferson City, Rev. E. W. Berlekamp, pastor; Professor F. J. Ziesberg, organist, by direct wire from the church.

Feb. 25.—8:00 P. M.—Program by band of the Missouri State Prison, Virgil W. Combs, bandmaster; J. C. Crawford, warden; Walter E. Slat, secretary.

Station WLW, Cincinnati, Ohio

309 Meters (870 Kcys.). C. S. T. Feb. 22.—10:30 A. M.—Weather forecast and business reports. 1:30 P. M.—Market reports. 3:00 P. M.—Stock quotations. 4:00 P. M.—Half hour lecture recital.

Feb. 23.—10:30 A. M.—Weather forecast and

Station KGO, Oakland, Calif.

312 Meters (960 Kcys.). P. T. Feb. 21.—8:00 P. M.—Musical program. Feb. 23.—8:00 P. M.—Musical program.

Who Is America's Most Popular Radio Entertainer?

Everybody is interested in this query: Who is America's most popular radio entertainer? You have your favorite. Who is she or he? Let us know your choice, whether a comedian, an opera singer, a jazz band, or a story-teller.

RADIO WORLD wants to be able to tell the world the name of the entertainer who stands highest in the regard of listeners-in.

Use the accompanying blank and mail to Broadcasting Manager, RADIO WORLD. Cut off. Fill out. Mail today.

BROADCASTING MANAGER, RADIO WORLD,
1493 Broadway, New York City.

Dear Sir:

My favorite entertainer is..... Station.....

Name.....

Street Address.....

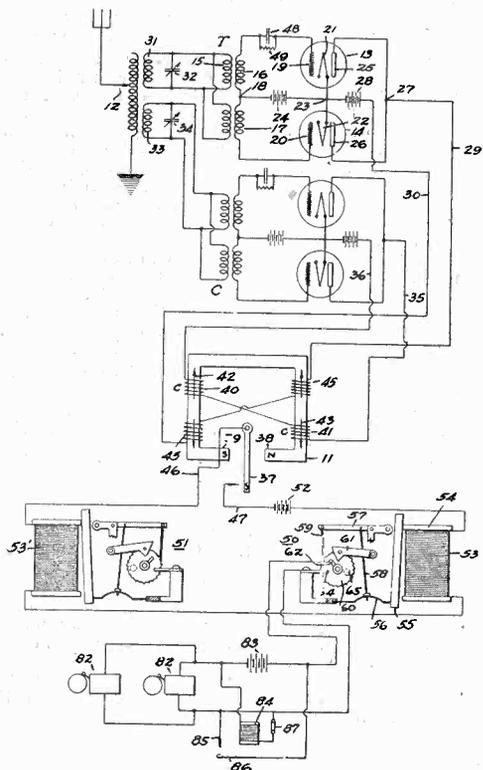
City and State.....

Latest Radio Patents

Radio System

No. 1,482,122: Patented January 29, 1924. Patentee: W. N. Fanning, Vallejo, Calif.

My invention relates to a system of radio communication, and more particularly to a receiving system controlled from a distant source of radiations.



Method and means for transmitting a given signal automatically. This is especially developed for the use of ship stations or stations located at a distant point.

One of the important adaptations of my invention comprises a system adapted to be placed on board ship and arranged to operate a signal, an alarm, or any other

Signaling System

No. 1,480,659: Patented January 15, 1924. Patentee: Q. A. Brackett, Pittsburgh, Pa.

My invention relates to wireless-telegraph-transmission systems and it has particular relation to systems of control that are adapted to control the radiation of energy from arc systems.

The object of my invention is to provide a control system for arc generators that shall be simple in construction and reliable in operation.

Hitherto, in wireless transmission stations, the energy radiated from arc systems has been controlled by means of the compensation-wave method and the absorption method.

In the compensation-wave method of control, the period of the antenna circuit or, in other words, the length of the radiated wave, is controlled by varying the effective inductance of the antenna circuit. This method of control has the disadvantage of causing the radiation of energy at two wave lengths.

In the absorption-circuit method of control, the oscillating current produced by the arc is caused to oscillate either in the antenna circuit or in the absorption circuit, depending on the energy-loss in the one or the other circuit being the greater. In order to effect the transfer of energy, readily, from one circuit to the other, the periods

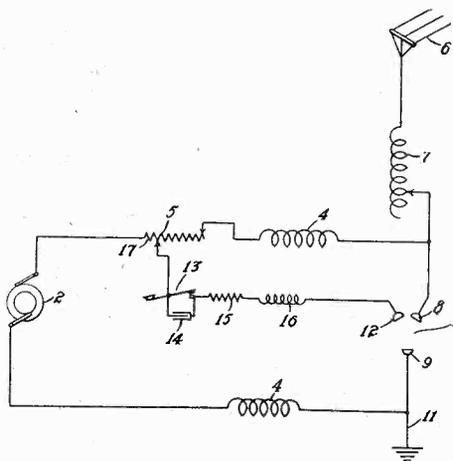
device only upon the receipt of a certain definite call by radio. Thus the device may be arranged to respond only to the distress call SOS, or several devices may be used, each arranged to respond to a different lighthouse or lightship call. The latter arrangement is particularly useful when, for example, vessels engaged in coastwise trade use substantially identical routes again and again. With such an arrangement, it is possible, by proper adjustment of the receiving apparatus, to pick up a lighthouse or lightship signal when the vessel is at a predetermined distance from the lighthouse or lightship. In this way it is easy to obtain a definite idea of the ship's bearing.

My invention may be used as a distress calling system either alone or in combination with other calling systems such as the usual ship's call, or the lighthouse calls mentioned hereinbefore. Under any circumstance, however, the automatic operation of the local alarm circuit obviates the necessity of having a radio operator on duty at all times. For this purpose the alarm bell or other signal would be placed near the operator's bunk. The circuit, however, can be conveniently used to control any number of alarms, so that they may be distributed on board ship at the places where the persons interested may become aware of the receipt of the signal.

It is thus one of the objects of my invention to make it possible to call a station selectively by radio; that is, a definite order of dots and dashes and only that order, will operate a local signal circuit.

Another possible application of my invention is to the control of distant objects, such as torpedoes or airplanes, by radio. Any number of selective circuits may be used, each for controlling the body in a certain manner, and the control is effected only upon the receipt of a definite order of dots and dashes.

of the two circuits must be very nearly equal. The result is that forced oscillations are induced in the antenna circuit while the absorbing circuit is functioning, thereby



Controlling a transmitter so that energy will be transmitted on one wave length, doing away with radiation by forced oscillations.

causing a certain amount of energy to be radiated.

According to my invention, I employ a system of control which permits of the radiation of energy at one wave length and

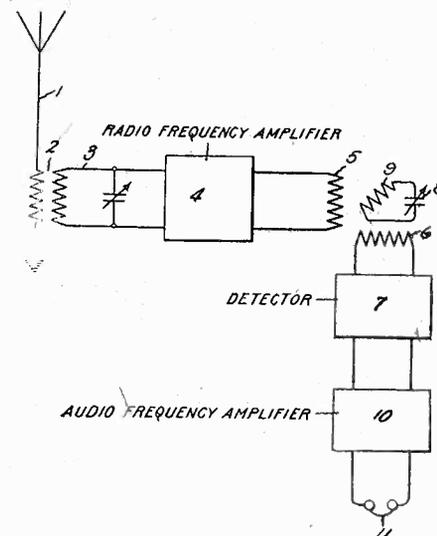
effectively prevents radiation by forced oscillations.

The desired result is accomplished by employing a system of control whereby an arc is swung from an anode connected to a radiating circuit to a second anode connected to a non-radiating circuit. The non-radiating circuit may be either of the oscillating type or of the non-oscillating type. In the operation of my invention, I employ a circuit of the latter type.

High-Frequency Receiving System

No. 1,480,891: Patented January 15, 1924. Patentee: H. I. Becker, Schenectady, N. Y.

My present invention relates to means for receiving high frequency signals, and more particularly to a system in which vacuum tube amplifiers are employed for the ampli-



Receiving system using radio frequency amplification and designed to eliminate disturbing factors, such as noises and undesired signals.

fication of the high frequency signaling currents which are impressed upon the apparatus at a receiving station.

The object of my invention is to provide an efficient and simple means whereby disturbing currents of low frequency which may be set up in the amplifying system are prevented from being transmitted to the apparatus which is employed for detecting the signals that are being received.

It is well known that in the operation of vacuum tube systems for high frequency amplification disturbing currents of low frequency may be introduced into the system by reason of certain internal irregularities in the operation of the vacuum tubes. Where several vacuum tubes are employed in cascade these disturbing currents are amplified along with the high frequency currents, and if transmitted to the detecting apparatus will affect that apparatus to such an extent as to interfere with the detection of the desired signals.

In order to overcome this disadvantage I provide between the apparatus which is employed for amplifying the high frequency currents and the detecting apparatus a link circuit which is so arranged as to effectively transmit to the detecting apparatus the high frequency signaling currents.

In carrying my invention into effect I preferably arrange the output coil of the amplifying apparatus in non-inductive relation to the input of the detecting apparatus. One form of link circuit which may be employed to advantage is made up of an inductance and capacity, the inductance being coupled to both the output coil of the amplifying apparatus and the input coil of the detecting apparatus. If this link circuit is tuned for the frequency of the high frequency signaling currents to be detected it will efficiently transfer such currents to the transmitting apparatus.

Busy DX Nite Owls Keep Sending Them In

DX Nite Owls, Attention!

THE DX season is now upon us.

All faithful DXers are requested to get ready for the fray and prepare themselves for the night vigil.

Send your records to the DX Editor of RADIO WORLD.

Write only on one side of the paper and write clearly.

Give full particulars of your location, your set, your aerials and other items of interest.

One Less Than Three Score

From P. E. R., 1216 Highland Street, Columbus, Ohio.

I have a three circuit variometer-varicoupler set I made one and one-half years ago. Since Sept. 25, 1923, I have heard nearly 200 stations, all fine. On Dec. 14 I heard the following 59 stations: KOP, Detroit, Mich.; WPAL, Columbus, O.; KDKA, E. Pittsburgh, Pa.; WWJ, Detroit, Mich.; WBBA, Newark, O.; WOAI, San Antonio, Tex.; WOC, Davenport, Iowa; WEA, New York, N. Y.; WOR, Newark, N. J.; CFCF, Montreal, Can.; WDAF, Kansas City, Mo.; WLAG, Minneapolis, Minn.; WGY, Schenectady, N. Y.; WTAO, Milwaukee, Wis.; WRC, Washington, D. C.; WDAP, Chicago, Ill.; WFAA, Dallas, Tex.; WJAR, Providence, R. I.; WCK, St. Louis, Mo.; WNAC, Boston; WBAH, Minneapolis, Minn.; WLW, Cincinnati, O.; KFKB, Melford, Kans.; WSAB, Cape Cardia, Mo.; WHAM, Rochester, N. Y.; WOA, Erie, Pa.; WMAQ, Chicago, Ill.; WDA, Philadelphia, Pa.; WHAS, Louisville, Ky.; CFC, Toronto, Can.; WHB, Kansas City, Mo.; WCAE, Pittsburgh, Pa.; WBAV, Columbus, O.; WSB, Atlanta, Ga.; WOS, Jefferson City, Mo.; WCB, Zion City, Ill.; WAAW, Omaha, Neb.; WTAS, Elgin, Ill.; WBL, Anthony, Kans.; WMC, Memphis, Tenn.; WOO, Philadelphia, Pa.; KFGC, Baton Rouge, La.; WMAH, Lincoln, Neb.; WBAP, Fort Worth, Tex.; KFEL, Denver, Col.; CFRC, Canada; WHN, New York, N. Y.; WJAZ, Chicago, Ill.; KHJ, Los Angeles, Cal.; WSAI, Cincinnati, O.; WSY, Birmingham, Ala.; 9EBO, Colterville, Ill.; WBZ, Springfield, Mass.; KFI, Los Angeles, Cal.; 2BA, Mont Jolie, Can.; KGW, Portland, Ore.

My distance work is: Los Angeles, 3; San Francisco, 1; Portland, Ore., 1; Mexico City, Mex., 1; Calgary, Can., 1; Edmonton, Can., 1; Regina, Can., 1; Havana, Cuba, 1; Tunvica, Cuba, 1.

Coming Along Nicely, Thanx

From O. Bell, 73 Haring Street, Bergenfield, N. J. Having noticed that you have revived your DX columns for the coming DX season I wish to contribute my list of stations—received on a one bulb Reinartz receiver, outside of 14 local stations my DX stations are:

WWJ, WDAP, WBZ, WOC, WGY, WIP, WHAZ, KDKA, WSB, WLAG, WOS, FI, KSD, WDA, WPAL, WLW, WBT, WHAS, KYW, WCAE, WJAZ, WNAC, WCX, WLAK, WJAX, WGR, WDAJ, WMAK, WOO, WBAK, WRC, WMAQ, WCAP, WOAW, WCB, WSAI, WJAR, WMAF, WGI, 6KW, WCAU, WHAM, WEAN, WTAS, WNAV, PWX, WSA, WGA, WQAN, WRK, WTAM, WJAS, WBAV, WOI, WOAY, WFAB, WMC, WPA, WDAF, CKAC, WSAY, 9CE, WFAA, WHB, WOAI, KOP, CFCN, WBAP, WDBC, WPAB, WBBA, a total of 85 stations, the furthest being CFCN at Calgary, Alberta, Canada.

My record reception for one night was 44 stations received from 7:30 P. M. to 12 P. M. Although there are many better records for one club sets I am very much satisfied with mine.

This Scout Should Start a Directory

From Curtis E. Schoonmacher, Great Kills, N. Y.

Enclosed please find a list of stations I have received on my single tube ultra-audion in the past two months with an indoor antenna. I have two sets of phones and use a De Forest DV6 tube.

WDAK, Hartford, Conn., 40 mi.; WRC, Washington, D. C., 210 mi.; WCAP, Washington, D. C., 210 mi.; WDAP, Chicago, Ill., 705 mi.; WJAZ, Chicago, Ill., 705 mi.; KYW, Chicago, Ill., 705 mi.; WTAS, Elgin, Ill., 725 mi.; WCB, Zion City, Ill., 705 mi.; WGAZ, South Bend, Ind., 620 mi.; WOC, Davenport, Iowa, 810 mi.; WHAS, Louisville, Ky., 630 mi.; WBZ, Springfield, Mass., 90 mi.; WCX, Detroit, Mich.; 465 mi.; WWJ, De-

troit, Mich., 465 mi.; KOP, Detroit, Mich., 465 mi.; WCAL, Northfield, Minn., 1,000 mi.; WOS, Jefferson City, Mo., 960 mi.; KSD, St. Louis, Mo., 860 mi.; WOAW, Omaha, Neb., 1,130 mi.; WOR, Newark, N. J., 3 mi.; WBS, Newark, N. J., 3 mi.; WAAM, Newark, N. J., 3 mi.; WGR, Buffalo, N. Y., 296 mi.; WEAL, Ithaca, N. Y., 185 mi.; WMAK, Lockport, N. Y., 300 mi.; WEA, New York; WHN, New York; WJZ, New York; WGY, Schenectady, N. Y., 160 mi.; WHAZ, Troy, N. Y., 160 mi.; WLW, Cincinnati, O., 565 mi.; WSAI, Cincinnati, O., 565 mi.; WJAX, Cleveland, O., 400 mi.; WTAM, Cleveland, O., 400 mi.; WCAH, Columbus, O., 445 mi.; WSAZ, Pomeroy, O., 425 mi.; WDA, Philadelphia, Pa., 90 mi.; WIP, Philadelphia, Pa., 90 mi.; WFT, Philadelphia, Pa., 90 mi.; WOO, Philadelphia, Pa., 90 mi.; WCAE, East Pittsburgh, Pa., 380 mi.; KDKA, Pittsburgh, Pa., 380 mi.; WJAR, Providence, R. I., 150 mi.; WMC, Memphis, Tenn., 940 mi.; WPAH, Waupaca, Wis., 895 mi.; CHYC, Montreal, Can., 345 mi. Totals, 47 stations, 21 cities, 18 states and 1 province. 14,688 miles.

This DXer Worked Hard

From Frank Turlip, Frontenac, Kan.

Being a reader of the RADIO WORLD and interested in your DX records, I got busy and made this record on a noc-tube regenerative set. I started this record on December 13, and ended January 7. On the night of December 13 I heard 23 different stations. I think this is a record hard to beat for the one-tube regenerative set—61 stations so far.

KDKA, Pittsburgh, Pa.; KFAF, Denver, Colo.; KFI, Los Angeles, Cal.; KHJ, Los Angeles, Cal.; KLZ, Denver, Colo.; KFKX, Hasting, Neb.; PWX, Havana, Cuba; WWJ, Detroit, Mich.; CKY, Winnipeg, Can.; CLY, Mexico City, Mex.; WFAH, Port Arthur, Tex.; WIAB, Rockford, Ill.; WMAW, Wakepton, N. D.; WEA, New York City, N. Y.; KSD, St. Louis, Mo.; KYW, Chicago, Ill.; WBAH, Minneapolis, Minn.; WBAP, Fort Worth, Tex.; WLW, Cincinnati, O.; WMAJ, Kansas City, Mo.; WOAI, San Antonio, Tex.; WOA, Stanford, Tex.; WOG, Kansas City, Mo.; KFIX, Independence, Mo.; KFKO, Conway, Ark.; KFJF, Oklahoma City, Okla.; KFKB, Milford, Kan.; WAAP, Wichita, Kan.; WBL, Anthony, Kan.; WCAL, Northfield, Minn.; WCAS, Minneapolis, Minn.; KFID, Iola, Kan.; WNAR, Butler, Mo.; WNAV, Knoxville, Tenn.; WPAL, Columbus, O.; WTAO, Osseo, Wis.; WABV, Nashville, Tenn.; WDAS, Worcester, Mass.; WSB, Atlanta, Ga.; WTAL, Toledo, O.; WTAS, Elgin, Ill.; WOS, Jefferson City, Mo.; WGR, Buffalo, N. Y.; WCB, Zion, Ill.; WCX, Detroit, Mich.; WDAF, Kansas City, Mo.; WFAA, Dallas, Tex.; WGY, Schenectady, N. Y.; WHA, Madison, Wis.; WJAX, Cleveland, O.; WHAH, Joplin, Mo.; WFAQ, Cameron, Mo.; WHAS, Louisville, Ky.; WHB, Kansas City, Mo.; WOAW, Omaha, Neb.

This One Is for the Six Tube Fans

From H. R. Wunder, P. O. Box 876, Cincinnati, Ohio

Have been testing the "Antenella" recently. I have heard that distances up to 1,000 miles have been received on phone signals using this device. Have picked up KFI, Los Angeles, twice with sufficient volume to copy part of program, using regenerative receiver (1 tube) and 1 stage audio amplification. I haven't my map or log book at the office here, but I believe this distance about 2,000 miles. Is this a DX record? I am using regular water pipe ground and both wires of "Antenella" as antenna.

Look at This

From J. Cardwell, 933 Fawcett Avenue, McKeesport, Pa.

I am located in McKeesport, 9 miles from KDKA and sometimes have to tune in some of the distant stations while they are operating. I am using a single WD11 home made set Westinghouse Senior hookup.

KDKA, WCAE, KOV, WJAS, WBZ, WNAC, WEA, WJY, WJZ, WWJ, WBAP, WGM, WSY, WLW, WMAQ, WOC, KYW, KSD, WLAG, WHB, WDAP, WFAA, WDAF, WOR, WHAS, WMC, WRC, WTAS, WKAQ, CHYC, WOAI, WGY, WSB, WCX, WAAP, WJAX, PWX, WOS, WOAW, WHAZ, WCAP, WCB, WJAZ, WSAI, WIP, WDA, WJAR, WGR, WTAM, KHJ, WPA, WBT, KFKX, WFAB, WPAH, WOO, TKW.

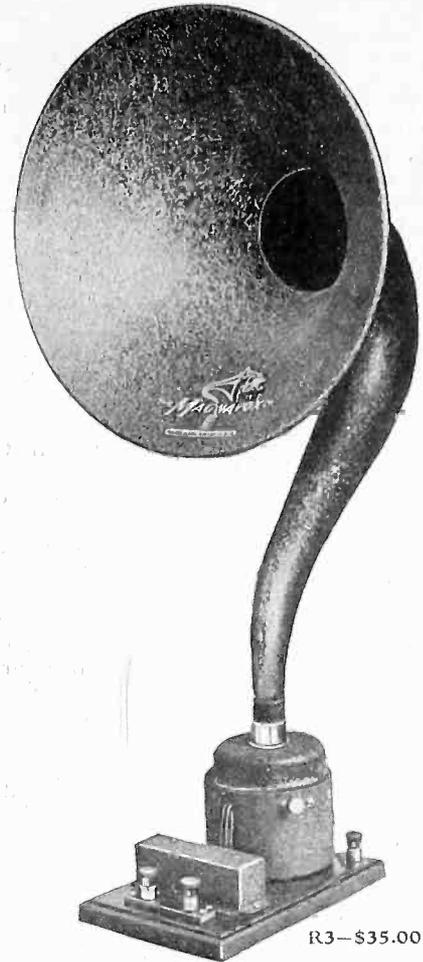
Back Again

From J. E. Bradley, Justin, Texas

Have picked up the following broadcasting stations over 1,000 miles away: KHJ, KFI, KFCL, KPO, KLS, KLX, KGO, 6XAD, WCAP, WRC, WWJ, WCX, KOP, WLAQ, KFAP, KDYS, KFBB, WOR, WEA, WHAZ, WGY, WGR, WMAK, 2XB, WBT, WLAC, WPAK, KFIM, KGW, WBAK, WCAE, KDKA, WOO, WFI, KFAE, KFCF

Foreign stations received: CHBC, CFCN, CFAC, CBY, CJA, CJCE, CKCK, PWX, 6KW, CYL, CYB, CYR.

MAGNAVOX Radio Products



R3—\$35.00

THE Magnavox Reproducer illustrated above is the most popular and largest selling Radio Reproducer. R3 has the famous electro-dynamic construction which insures recreation of programs according to the original pitch, quality and volume.

Magnavox Reproducers

- R2 with 18-inch curvex horn \$60.00
- R3 with 14-inch curvex horn \$35.00
- M1 with 14-in. curvex horn. Requires no battery for the field. \$35.00

Magnavox Combination Sets

- A1-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 1 stage of amplification \$59.00
- A2-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 2 stages of amplification \$85.00

Magnavox Power Amplifiers

- A1—new 1-stage Power Amplifier \$27.50
- AC-2-C—2-stage Power Amplifier \$55.00
- AC-3-C—3-stage Power Amplifier \$75.00

Magnavox products can be had at Registered Magnavox Dealers everywhere. Write for new 32-page catalogue.

The Magnavox Company
Oakland, California

New York Office: 370 Seventh Avenue

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BUSINESS NEWS OF THE INDUSTRY

The Compensating Condenser

REGENERATION has always been the bugaboo with radio-frequency amplifiers, and the potentiometer hasn't always been successful in its control of this undesirable feature. Moreover, the potentiometer merely inserted resistance in the grid circuit and did not enable the tube to operate at its possible point of maximum amplification.

Something distinctly novel in this line has appeared in the Amsco compensating condenser. With the connections given with the instrument, it is possible to eliminate the potentiometer altogether, and to use the full negative bias on the amplifier grids. The condenser is used in such a way that the feed-back of energy takes place not only through the tube capacity but also through the compensator, but in the latter case, with its polarity reversed. Thus, the charges arrive at the grid with equal force, but with opposite voltage, and are nullified.

The compensator is useful for tuned, untuned and resistance-coupled R. F., so that its field is not limited to any one circuit. In order that its work may be done efficiently regardless of its connections in any particular case, insulation of unusually high quality was found necessary. The slightest leakage rendered the device practically useless, and any possibility of moisture absorption had to be obviated.

To meet these requirements, radion was chosen as most suitable. Radion discs carry the small plates of the compensator and hold the separation constant. Its clean-cut appearance makes the instrument attractive, and its permanent characteristics insure long life and smooth operation. Radion's high resistivity is especially important in an instrument where but a small span of insulating material separates conductors joined to the grid and plate of an amplifier tube.



The compensating condenser, a new departure in R.F. amplification.

Hazeltine Corporation Stock Over Subscribed

AS noted in last week's RADIO WORLD, the Hazeltine Corporation has been organized under the Delaware laws to control the patents and inventions of Prof. L. A. Hazeltine, inventor of the neutrodyne circuit. The capital is 200,000 shares of no par or nominal value. Brokers interested advertised that 140,000 of these shares had been placed at \$10 per share and that subscriptions had been received in excess of the amount offered.

The new corporation will be the sole, exclusive owner of the trade-marks "Neutrodyne," "Neutrodon" and "Neutroformer" and of United States letters patent covering Prof. Hazeltine's well-known circuit.

The Independent Radio Manufacturers,

Inc. (I. R. M.) have acquired exclusive rights to manufacture and to sub-license their stockholder members to manufacture and sell "Neutrodyne" receivers, "Neutrodon" condensers, and "Neutroformer" coils, and will pay royalty to the Hazeltine Corporation when its organization is completed based on a fixed percentage of their net sales value of equipment so produced. It is understood that about 14 firms are now manufacturing under I. R. M. licenses.

The Independent Radio Manufacturers undertake to prosecute and defend actions in which the "Neutrodyne" receiver may be involved. The trade-marks "Neutrodyne," "Neutrodon" and "Neutroformer" are registered and cannot be used by any excepting authorized licensees.

Broadcasting Equipment Wanted

A SUBSCRIBER of RADIO WORLD is in the market to purchase a second hand broadcasting station, from 100 to 250 watts capacity, which has been discarded on account of installing higher power. Any one having such equipment for sale is requested to communicate with RADIO WORLD giving details of capacity, hook-up, motor-generator set, filtering equipment, condensers, etc., and other data.

Turn-It Radio Sales Co.

THE TURN-IT RADIO SALES CO., Inc., with offices at 30 Church Street, New York City, has been organized to take over the sole distribution of Turn-It adjustable grid leaks, manufactured by Chas. F. Bonine, the well-known consulting engineer. Officers of the new corporation are: H. Van Cott Holland, president; Ellwood Clark, vice-president; Daryl B. Tilson, treasurer; Owen Monaghan, secretary.

Something New for Experimenters

THE Porter Manufacturing Co., Detroit, Mich., have placed on the market a strip connector for radio sets that bids fair to capture the interest of the radio experimenting world. It consists of a flat strip of copper, 5/16" wide, and perforated every 1/4" with 3/16" holes. This makes it possible to wire up a set without the aid of a soldering iron, by the following method: The strip is measured off, and then with a pair of flat pliers it is bent in half, so that all the perforations except the two used for the connections are bent in half. The strip is then solid and offers about three times the surface of the common bus wire of No. 14 gauge. Being very thin, it can also be placed in narrow spaces with more ease than wire.

Coming Event

FIRST ANNUAL RADIO SHOW, Convention Hall, Washington, D. C., March 19-26, 1924.

Radio Literature Wanted

Manufacturers of and dealers in radio apparatus and accessories are notified that literature and catalogues describing their products have been requested, through the Service Editor of RADIO WORLD, by the following:

Byron J. Turner, R. F. D. 20, Monmouth, Me.
Gerald O. Frost, R. F. D. 20, Monmouth, Me.
J. E. Harris, R. R. No. 1, St. Clairsville, Ohio.
John Dresler, Jr., R. D. No. 2, Box 78, Godfrey, Ill.
Radio Hospital, 114 Third street, Waterford, N. Y. (Build, install, repair sets).
Luther Dalles Hatfield, P. O. Box 4, Logan, W. Va.
S. S. Miguel A. Ramirez, Mechanico Electricista, Giba Oriente, Cuba.
Gale Venghans, 928 State St., Quincy, Ill. (Dealer.)
Clifford R. Dallas, P. R. No. 3, Muscatine, Iowa.
E. D. Newell, 1827 West 45th St., Cleveland, Ohio.
W. H. Coffey, Box 115, High Point, N. C.

New Radio and Electrical Firms

Wireless Products Corp., New York City, 100 shares common stock, no par value; I. Skutch, J. P. H. Rieper, T. F. Thornton. (Attorneys, Feiner, Maass & Skutch, 22 Exchange Place.)

Hy-Wall Radio Co., New York City, \$10,000; C. Hyman, H. Wallach. (Attorney, H. Schapiro, 261 Broadway.)

Sabin Electrical Products Corp., New York, manufacture radio devices, \$550,000. (U. S. Corporation Co.)

Laube Electric Corp., Rochester, N. Y., \$300,000; G. F. Laube, W. J. Bell, A. Schuman. (Attorney, G. Y. Webster, Rochester.)

New York Edison

Company Radio Exhibit

AN exhibit of radio equipment is being arranged by The New York Edison Company, to be held in Edison Showroom, Irving Place and Fifteenth Street, New York City, during the week of March 22 to 29. This is one of a series of specialized electrical shows held every year by the Edison Company, but it is the first time that radio has had a place on the program. Leading manufacturers and dealers in the New York territory have been invited to exhibit, and according to H. V. Hartman, under whose supervision the arrangements are being made, it will be a most comprehensive radio display.

Radio and Electrical Business Opportunities

Rate: 40c a line. Minimum, 3 lines.

PHONOGRAPH, MUSIC AND RADIO STORE, best transient section Bronx, with different well-known agencies; excellent accounts; wonderful profits; will sell outright or consider live wire partner. More information call personally. Leibow-Schorr, 354 East 149th St.

PATENTED RADIO PUZZLE; want manufactured and marketed on royalty basis. Clark, 54 North 17th St., East Orange, N. J.

RADIO—Will assist financing electrician, radio engineer desiring opening store. BB, Radio World.

EXCELLENT RADIO AND HARDWARE business, gas station and garage, Westchester County; immediate disposal; reason dissolution partnership. CC, Radio World.

RADIO, AUTOMOTIVE and other complete articles, parts; any metals; accurately manufactured, assembled, shipped; let us estimate. DD, Radio World.

INVESTORS—Have your models made at Herman's, 64 Lafayette St., N. Y. C.; confidential, quick.

Earn \$5⁰⁰ to \$20⁰⁰a Day in RADIO

You can! Hundreds of ambitious men are already earning thousands of dollars in this wonderful new industry—many working only in their spare time. Mail coupon below for Free Book which describes fully the amazing money making opportunities in Radio and tells how YOU can earn from \$500 to over \$10,000 a year!

The astounding growth of Radio has created thousands of big money opportunities. Millions of dollars were spent during the past year on Radio—and thousands of young men are needed right now to meet the ever increasing demand of work. Never before has there existed so many and such remarkable opportunities for making money in this wonderful new field.

Men are needed to build, sell and install radio sets—to design, test, repair—as radio engineers and executives—as operators at land stations and on ships traveling the world over—as operators at the hundreds of broadcasting stations. And these are just a few of the wonderful opportunities!



Easy to Learn Radio At Home in Spare Time

No matter if you know *nothing* about Radio now, you can quickly become a radio expert, by our marvelous new method of practical instruction—instruction which includes all the material for building the latest up-to-date radio apparatus.

Scores of young men who have taken our course are already earning from \$75 to over \$200 a week. Merle Wetzel of Chicago Heights, Ill., advanced from lineman to Radio Engineer, increasing his salary 100% *even while taking our course!* Emmett Welch right after finishing his training started earning \$300 a month and expenses. Another graduate is now an operator of a broadcasting station PWX of Havana, Cuba, and earns \$250 a month. Still another graduate, only 16 years old, is averaging \$70 a week in a radio store.

Wonderful Opportunities

Hardly a week goes by without our receiving urgent calls for our graduates. "We need the services of a competent Radio Engineer"—"We want men with executive ability in addition to radio knowledge to become our local managers"—"We require the services of several resident demonstrators"—these are just a few small indications of the great variety of opportunities open to our graduates.

Take advantage of our practical training and the unusual conditions in Radio to step into a big paying position in this wonderful new field. Radio offers you more money than you probably ever dreamed possible—fascinating, easy work—a chance to travel and see the world if you care to or to take any one of the many radio positions all around you at home. And Radio offers you a glorious future!

Send for FREE BOOK

Learn more about this tremendous new field and its remarkable opportunities. Learn how you can quickly become a radio expert and make big money in Radio. Find out what remarkable successes our graduates have had—even a few weeks after their training finished.

We have just prepared a new 32-page booklet, which gives a thorough outline of the field of Radio—and describes our amazing, practical training in detail. This Free Book, "Rich Rewards in Radio," will be sent to you without the slightest obligation. Mail coupon for it now!



NATIONAL RADIO INSTITUTE

Dept. 78BA Washington, D. C.

NATIONAL RADIO INSTITUTE,
Dept. 78BA, Washington, D. C.

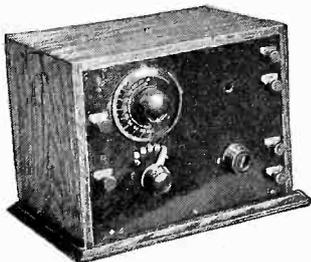
Please send me without the slightest obligation your Free Book, "Rich Rewards in Radio" and full details of your special Free Employment Service. Please write plainly.

Name Age

Address

RADIO FIRMS! Secure practical Radio Experts among our graduates. Write us today.

1000 Mile Radio Set



FREE

In order to complete your practical instruction at home, learning by actual experience, this splendid regenerative receiving set is now included without the slightest additional cost.

The Ultimate Radio Receiver
THE FLEX-O-DYNE CO.
 1674 Broadway (At 52nd St.)
 New York, N. Y.
 Circle 4569

Radio Breaks Into the Movies

A PRAISWORTHY bit of cooperation with the radio industry has just been released by Kinograms news weekly in the shape of "Behind the Scenes of a Broadcasting Station."

E. F. McDonald, Jr., of the Zenith-Edgewater Beach Hotel Broadcasting Station WJAZ, and Ray L. Hall, head of the Kinograms news weekly, chanced to meet one day on the stage of the Selwyn Theatre in New York City.

"Radio speaking, I am rather well acquainted with WJAZ," said Mr. Hall. "It has often entertained me in my home in New York state. I have never seen the station, however. Often wondered what it looked like."

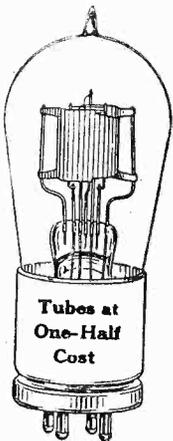
Said Mr. McDonald, "I shall be glad to arrange that not only you see it, but all of your big family of Kinogram fans the country over."

That was the starter of the film.

Next to seeing the station with one's own eyes, the picture is the closest to a full realization of the beauty of the Crystal Studio; the complexities of the operating and motor rooms; the gaiety of the guests in the Marine Dining Room; the eager faces of the famous Oriole Orchestra; and all that happens when the artist stands in front of the microphone and sings to his eight million or more WJAZ listeners.

It is the first glimpse most radio fans have had of a broadcasting station. Announcements of the film were made over Station WJAZ, and movie houses everywhere have been stormed with inquiries as to when the film would be shown by them. Ascher Brothers of Chicago were the first to show the film in their sixteen moving picture theatres.

This picture is probably the first of a series which will be made to take the moving picture audiences behind scenes of all our large broadcasting stations.



Save
1/2 Price
 of
New Tubes
 Burned out or broken tubes repaired and guaranteed equal to new.

Harvard Radio Laboratories
 200 Old Colony Ave.
 South Boston, Mass.

For Maximum Amplification Without Distortion and Tube Noises use the well known

Como Duplex Transformers

Push-Pull
 Send for literature

COMO APPARATUS COMPANY
 446 Tremont St. Boston, Mass.

RADIO

SEND FOR OUR COMPLETE MONEY SAVING CATALOG
TIMES SQ. AUTO SUPPLY CO. INC.
MAIL ORDER DEPT.
 1745 BROADWAY AT 56th STREET
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FORMICA
 A Laminated Phenolic Condensation Product
SHEETS TUBES RODS

PANELS CUT-DRILLED
 Neatly—Lowest Prices

For quick service and high class work see us.
TRIPLE PANEL MOUNTING SOCKETS
 This scarce item ready for instant delivery.

The Best Made—BACK MOUNTING INDUCTANCE SWITCH—See Them
UNITED RADIO MFG. CO.
 Phone Cort. 4885 Dept. R. W.
 191 GREENWICH STREET, N. Y. CITY

An Absolute Guarantee
 with every instrument
 made them famous!

SHAMROCK
 (FOR SELECTIVE TUNING)

180°

Vario-Coupler
 list price
\$3⁵⁰ each



DOUBLE DUTY PIG-TAIL

Variometer



SHAMROCK MFG. CO.
 316 W. Market St. — Newark N. J.

CROSLEY
RADIO CATALOG FREE
 Describes fully the complete line of radio frequency sets, regenerative sets (licensed under Armstrong U. S. Patent No. 1,113,149) and parts.
 Write for Catalog Today
THE CROSLEY RADIO CORPORATION
 POWEL CROSLEY Jr., President
 2402 Alfred Street Cincinnati, Ohio

THAT SUPERDYNE RECEIVER!

The receiver every fan has been looking for. The Four-Tube Receiver that is more powerful than a six-tube Naval Receiver. The Receiver which does not require a laboratory expert to build or operate. The Receiver that accomplishes anything any other will—and then more.

SEE RADIO WORLD

for Dec. 15, 22 and 29, and get all the details which will enable you to build this marvelous four-tube wonder. The 3 copies for 45c, or sent free if you send \$6.00 for yearly subscription. NOW!

BUILD a "S-U-P-E-R-D-Y-N-E"

RADIO WORLD, 1493 Broadway, N. Y. C.

FILL OUT AND MAIL NOW
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Please send me RADIO WORLD for.....months, for which

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FOR RELIABLE UP-TO-DATE RADIO MAILING LISTS

Use Our Card Catalog Directory in use now with over 200 Radio Manufacturers and Jobbers
 Your ENVELOPES ADDRESSED
At \$2.50 per 1,000

Write for Particulars

Sydell's Radio Trade Directory
 410 W. 31st St., New York. Chickering 9840

Legion Post to Broadcast Its Own Programs

ARGONNE Post of the American Legion, of Galveston, Texas has undertaken to send out two radio programs weekly through the broadcasting station of the Clark W. Thompson Company, a Galveston department store. The owner of the store, as a testimonial to the Legion, has agreed to maintain the set, furnish all equipment and supply an operator and studio. This station, WHAB, broadcasts on a 360-meter wave every Tuesday and Friday evening from nine to eleven. Argonne Post has arranged to give special programs for the Rotary, Lions and Kiwanis clubs, the Elks and other organizations as a part of its schedule.

Our Radio Exports Grow

RADIO exports for the year 1923 totalled \$3,448,112, compared with \$2,897,799 for 1922, according to Department of Commerce statistics. While the shipment of radio apparatus form only about five per cent. of the total value of all electrical exports, which in 1923 passed the \$72,000,000 mark, radio exports increased about seven per cent. out of a total gain of \$9,000,000. December radio exports totalled \$335,308, compared with \$381,827 for November and \$270,061 in October. In November the bulk of American radio apparatus sent out of the country went to Argentina, Quebec, Ontario, Australia, Panama, Mexico and England. Twenty-four countries purchased apparatus valued at over \$1,000 from American exporters.

Nath. Baldwin Phones with

SHELVINE
LOUD SPEAKER

COMPLETE \$10.00

Postpaid. Use your brass set for 2 purposes—Exceptional combination value—Every pair of phones tested—Guaranteed to give results.

WALTER SCOTT
1157 B. Broad St.
Newark, N. J.



Lattice Coil Specialties



Variometers
Variocouplers
RF Transformers
Micro-Mike
Condensers
Plain Coils
Tapped Coils

ESTRU LATTICE COIL PRODUCTS have been designed so as to produce as nearly as possible IDEAL INDUCTANCE in various forms. It was not the intention in designing, to produce Miniature Apparatus, the small size being the result of careful electrical design with no UNNECESSARY Mechanical parts which would detract from the electrical efficiency.

YOU will appreciate these facts as set forth in our COMPLETE DESCRIPTIVE LITERATURE, which will be sent on request and in reading our GUARANTEE which goes with all ESTRU PRODUCTS.

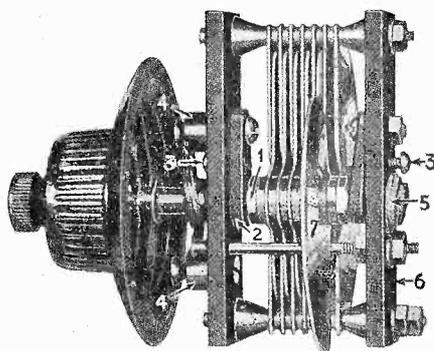


2905 WEST MADISON STREET

CONDENSERS?

Just Say

OHIO



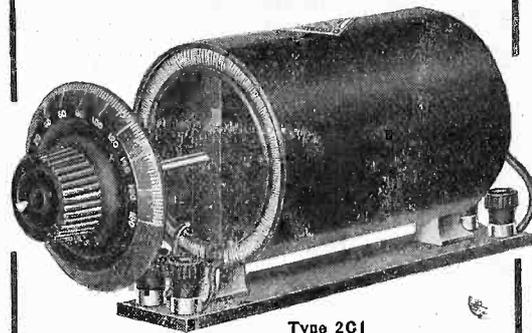
Made in a factory devoted to the construction of condensers exclusively, Ohio instruments are designed to give absolute precision. Notice the cone-shaped adjustable bearings that insure smooth running. Mounting lugs are insulated permitting shielded mounting without any losses. Rotor is double bonded for perfect conductivity.

The Ohio Condenser is a quality condenser and is fully guaranteed. Dealers, jobbers and distributors, write for our proposition if you want your customers to have the best.

HARVEY and WALTON
MFG. CO.

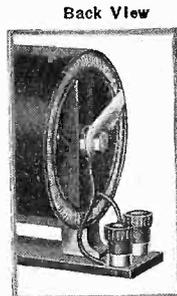
32 E. Front St. Cincinnati, Ohio

The Star Is Here



Type 261

**A SINGLE
SLIDE COUPLER
FOR BETTER,
CLEARER
TUNING**



NO BODY CAPACITY
EXTRA KNOBS

NO SOLDERING
DUSTY PARTS

A coupler coil designed to vary inductance instead of capacity, so as to give volume and selective tuning without distortion or noise. A coupler coil designed to eliminate extra knobs, extra work and soldering entirely. Fully tested and guaranteed.

4 TYPES RANGING IN PRICE FROM \$7.50 TO \$10.00 MADE TO USE ON NEARLY EVERY CIRCUIT.

SHIPPED \$9.00
DIRECT

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PREPAID

We pay postage and insurance on all shipments. This offer stands until a distributor or dealer has been appointed in your territory.

FREE—With every order 2 prints of tested and approved Circuits—FREE.

OUR GUARANTEE

STAR Products are guaranteed to give satisfaction, to be of the best material and workmanship obtainable. Guaranteed to be complete and ready for easy, quick attachment.

Dealers—Distributors

Write or wire to-day for territory, illustrated literature, etc.

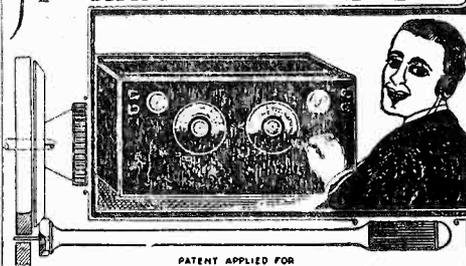
STAR
RADIO PRODUCTS CO.

711 South
Dearborn St.

CHICAGO,
ILL.



HUNT'S UNIVERSAL HAIR-LINE RADIO TUNING DEVICE



ONE VERNIER FOR ALL DIALS

Gives micrometric adjustment outside the field of inductivity.

Tested and approved by amateurs and experts. Enables you to tune distant stations easier and more accurately. Simple as A B C. Installed from outside, no dismantling of your set necessary. Adjustments are more natural or less disturbed by the fine adjustments obtained. One Hunt's device handles all dials on set or several sets. Costs only one dollar or guarantee of money returned if not satisfied. Ask your dealer or write direct from Hunt Co., 186 North Main Street, Memphis, Tenn.

CRAM'S MAP, the most up-to-date radio map published. Columbia Print, 1493 Broadway, New York City. 35c. per copy.

SUBSCRIBE NOW AND TAKE THE WORRY OFF YOUR MIND. RADIO WORLD, 1493 Broadway, New York City.

Coast to Coast on One Tube and No Body Capacity

These popular hook-ups use UV-199, WD-11 or WD-12 Tubes. One hook-up gives selectivity and 1,500 miles with absolutely no body capacity, while the other gives the remarkable distance of coast to coast. Both prints postpaid for 50 cents or any of the above tubes postpaid \$4.95. No stamps accepted.

Radio Outfitting & Supply Co.
Box 1107 LANCASTER, PA.

Workman Radio Service

"THE ACCENT IS ON SERVICE"

14-16 Vesey St. NEW YORK

VARIOCOUPERS	
\$3.50 Workrite 180° Silk Wound	\$2.95
3.50 Fisher, Large, 90°	2.75
2.75 Fisher, 180°	2.25
VARIOMETERS	
\$3.50 Workrite	\$2.95
5.00 Pathé Moulded	2.25
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CONDENSERS	
\$2.00 R. C. 11 plate	\$1.05
2.35 R. C. 23 plate	1.35
2.75 R. C. 43 plate	1.65
VERNIER CONDENSERS	
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5.00 R. C. 43 plate	2.95

PHONES	
\$18.00 DR. SEIBT IMPORTED "SUPER HEADSET"	\$5.90
\$12.00 N. & K., Imported	\$5.90

We specialize in the FAMOUS AMBASSADOR LONG DISTANCE CIRCUIT. Write for list of parts for this set. Either single or three tube set. Price of parts for single tube set... \$15.60 Price of parts for THREE TUBE SET... 28.90 Mail orders promptly attended to. All orders amounting to \$5.00 or more will be shipped prepaid. Will ship C. O. D. unless remittance accompanies order.

The above items are just a few of our numerous attractive priced articles, which are contained in our BULLETIN OF RADIO PARTS. Gladly sent to you upon request.

RADIO SHOW and CONVENTION

MARCH 3d to 7th
Executive Radio Council, 2nd District
Grand Ballroom,
HOTEL PENNSYLVANIA
Adm. 55c (inc. tax) : 7th Ave. and 32d St.

Porter Flat Copper Connectors

Do Away with the Muss and Bother of Soldering. Much Quicker, of greater efficiency and durability. All you need to assemble a set mailed on receipt of 25c.

PORTER MANUFACTURING CO.
123 E. Jefferson Avenue Detroit, Michigan

SPECIAL \$ SAVERS

<i>Satisfaction or money back</i>	
\$65.00 Set "Fada" Neutrodyne parts	\$48.85
25.00 Set "Fada" Neutrodyne parts	18.66
4.50 Thordarson Transf. 3 1/4-1 (new type)	2.95
6.00 Supertran Transf. 6-1	3.85
12.00 "All American" Push Pull (per set)	9.77
3.00 Set of Reflex Coils	2.15
3.50 23 Plate "Signal" Cond.	1.95
4.50 43 Plate "Signal" Cond.	2.25
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2.00 Spring Aerial	1.48
5.00 Turney 3000 ohm Phones	2.85
6.00 Brandes Superior	4.45
12.00 Baldwin Type C Phones	7.90
6.00 Little Tattler Phones	2.69
10.00 Brandes Table Talker	8.65
18.50 Tungar or Rectigon Charger	14.95
20.00 Crosley V	14.75
20.00 Crosley Two Stage Amplifier	14.75

Everything guaranteed as firsts. Don't delay getting price list No. 9.
RADIO SUPPLY STORES
254 W. Stiegel St. Manhelm, Pa.

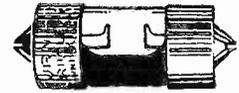
Before you forget it, send that check or money order for \$6.00 in to RADIO WORLD, 1493 Broadway, New York City, for your year's sub!

New Radio and Electric Firms

American Wireless Corp., New York City, \$20,000; L. H. Baer, E. I. Wechsler, H. Z. Wang. (Attorneys, J. and S. M. Sapinsky, 276 5th Av.)

Consolidated Radio Service Corp., New York City, \$25,000; B. Miller, W. M. Schlesinger, I. Memis. (Attorney, K. M. Marcus, 131 Park Row.)

Universal Electric Sales Corp., New York City, \$10,000; H. W. Paprocki, H. B. Holland, F. C. Taylor. (Attorney, F. J. Knorr, Albany.)



To add miles just "turn it"

—"turn it" is the grid leak of a thousand adjustments.

—no sliding contacts

—easy to adjust

—QUIET in operation

\$1.00

At your dealer or direct upon receipt of price

DEALERS WRITE FOR DISCOUNTS

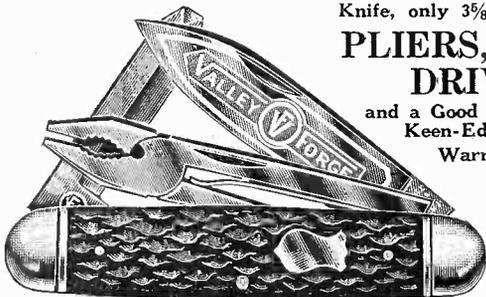
TURN-IT

RADIO SALES, Inc.

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THE RADIO POCKET KNIFE

The Compact pocket size outfit that fits all requirements. Folds up to the size of an ordinary Knife, only 3 3/8 inches over-all.



PLIERS, WIRE CUTTER, SCREW DRIVER, WIRE SCRAPER and a Good Sturdy, Keen-Edged CUTTING BLADE

Warranted Finest Cutlery Steel, Guaranteed American Workmanship and Beautifully Finished.

\$2.50 each, Post Prepaid

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Dealers Write for Attractive Proposition

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(More than 2500 miles)

ON ONE MYERS TUBE

Remarkable radio reception is an everyday result with MYERS TUBES. Mr. W. E. Gerrard, 73 Pine Avenue, St. Lambert, Montreal, Canada, with a set designed and constructed by himself, and using only one MYERS TUBE, hears KDZB, Bakersfield, California.

Get distance with clarity. MYERS are the only tubes correctly designed for radio without bunched leads. Two types—for dry or storage battery. Insist on MYERS at your dealer's—otherwise send purchase price and be supplied postpaid. Write for free circuit diagrams.

\$ 5 EACH, complete with mounting clips ready to mount on your set; no sockets or extra equipment necessary.

F. B. Myers Co. Ltd.
Radio Vacuum Tubes

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One More Chance to Secure Radio World and Popular Radio for the Price of One

Popular Radio has increased its subscription price from \$2.00 to \$3.00. Radio World has made arrangements by which it is able to offer Radio World and Popular Radio for one year for the price of Radio World alone. Use the accompanying subscription blank. If already a subscriber, send \$6.00 for another year. This offer is not retroactive.

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Send Radio World beginning.....
.....and Popular Radio for one year beginning.....
for the price of Radio World alone, for which I send \$6.00 herewith.

Name.....
Address.....
City and State.....

This offer good only until March 10, 1924

Popular Lectures on Radio

FOR 30 years the New York City Board of Education has maintained courses of free public lectures for adults on literature, travel, music, science, art, and current affairs. These are known as "The University of the People." The lectures on current events come under the general subject "The Trend of the Times." The lecturers are college professors, social workers, newspaper men and students of public affairs.

Last week, responding to the popular interest in radio and the demand for accurate information about it, Dr. Ernest L. Crandall, Director of the Lecture Bureau, assigned to all "The Trend of the Times" lecturers the topic, "The Influence of Radio on American Life." The lecturers who discussed this subject at various lecture centers of the Board in the five boroughs of Greater New York were: Arthur D. Rees, Prof. Wm. B. Otis, Prof. Nelson P. Mead, Dr. Sydney N. Ussher, Dr. Hubert H. Harrison, Mrs. Mary Elizabeth Lease, Miss Jennie M. Davis, and George A. Hastings.

At one of the centers, the lecture was supplemented by a demonstration of the reflex type of receiving set by Percy W. Mack, vice-president of the Acme Apparatus Company.

Mr. Hastings, one of the lecturers, in his discourse at the Wadleigh High School, said that in time radio would affect American life as profoundly as the telephone, phonograph and automobile. He particularly stressed the educational possibilities of the new art of communication. He praised the high plane on which radio programs and the radio industry are being conducted and paid a tribute to the newspapers for their part in maintaining high standards. The maintenance of such standards by the industry itself and by public sentiment, he said was far preferable to the system of a dictator called in, as in the case of some other forms of popular entertainment, to correct low standards which had offended public taste.

Mr. Hastings also said it was significant that the great majority of the 2,000,000 radio receiving sets in use in the United States today were home-made.

"Radio," he declared, "is reviving the pioneer spirit. The amateur who builds his own set exemplifies, in a new field, the old American characteristics."

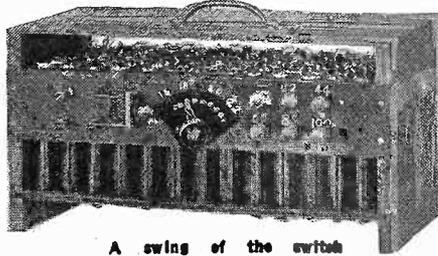
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Powerful—Durable—Rechargeable



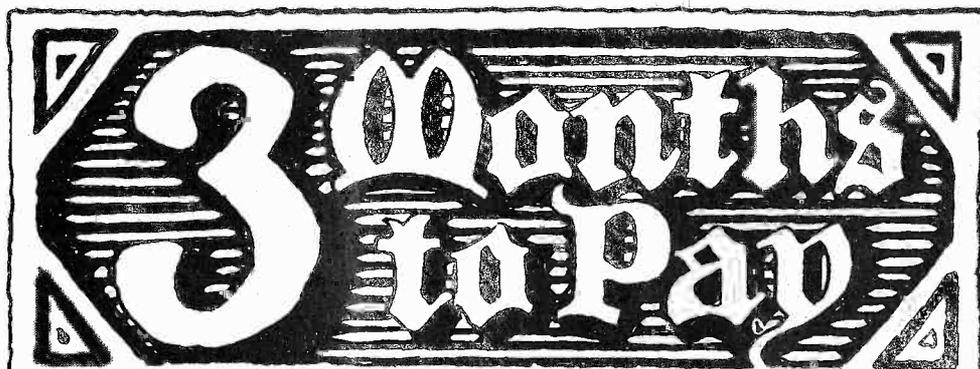
A swing of the switch lever gives instant voltage.

BATTERY SATISFACTION AT LAST. Hundreds of enthusiastic owners of Roberts "B" Batteries tell us: "Positively the best battery on the market—I have tried them all." "All my battery troubles are over!"

W. ROBERTS STORAGE "B" BATTERY COMPANY

1120 MYRTLE AVENUE, NEAR BROADWAY, BROOKLYN, N. Y.

Telephone Bushwick 6753 Open Till 9 P. M. Daily
Batteries can be obtained from the following dealers: Brooklyn Radio Service, 573 Myrtle Avenue; Smith and Livingston Streets, Brooklyn; 17 John Street, New York City. Brooklyn Radio Supply, Broadway and Field Avenue, Brooklyn. 20th Century Radio Co., Brooklyn, N. Y. Romeo Storage Battery, 146 West 68th Street, New York City. Conroy Storage Battery Co., 147 East 76th Street. Stephan Radio, 6 Nassau Street, Roosevelt, L. I. Autoelectric Storage Battery & Supply Co., 201 Paterson Street, Paterson, N. J. Liberty Radio, N. Y. City (4 Stores). Cortlandt Radio, N. Y. City (2 Stores).
DEALERS WRITE FOR TERMS.



Greetings!

KNOW ALL RADIO MEN: At last you can buy radio parts and supplies by mail—on credit! This institution is ready to serve you regardless of amount of credit asked, or your location. Simply send your money order or check to us for half of the prices listed below with enough postage to cover shipment. We ship immediately and allow you 3 Months in which to pay the balance! No interest! No red tape! We trust you! Order what you want now! Tell your friends!

GOLDEN RULE RADIO CO.

Loud Speakers

- Manhattan L. Speaker..\$25.00
- Perfectone L. Speaker.. 15.00
- Morrison L. Speaker unit 10.00
will fit any phonograph or horn.
- Perfection L. Speaker, a
quality product..... \$9.50
- Herald Loud Speaker.. 30.00
- WESTINGHOUSE..... 13.00

Phones

- Manhattan..... \$8.00
- BALDWIN, Nathaniel.. 12.00
- POTTER PRECISION. 4.90
- FROST 2000 Ohms..... 4.00
- FROST 4000 Ohms..... 5.00

Exide Storage Batteries

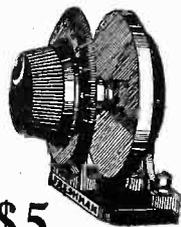
- 100 Ampere hour.....\$23.00
- 150 Ampere hour..... 30.00

Thousands of Other Items in Stock. Write for Prices.



"FRESHMAN SELECTIVE"

Mercury Variable Condenser



For
Transmission
or
Reception

\$5

It is the only variable condenser the plates of which vary in area—AN ENGINEERING FEAT NEVER ACCOMPLISHED BEFORE—making it most efficient for fine adjustment and selective tuning.

No Leakage.

Absolutely Quiet.

No Plate Vibration.

Cannot Short Circuit.

Will Stand 5,000 Volts.

- .0003 MF (Equiv. to 17 pl.)
- .0005 MF (Equiv. to 23 pl.)
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\$5 each

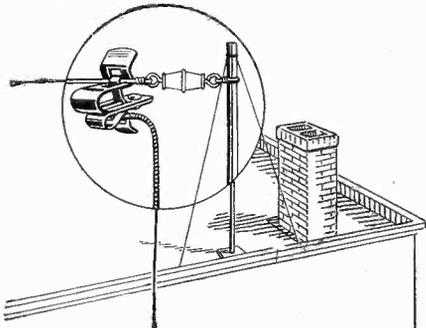
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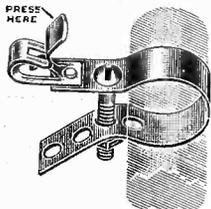
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OUT OF THE ETHER
Chats About Broadcasting Stations

By Hirsch M. Kaplan

Gee! the programs rendered by Paul Specht and his Hotel Alamac Orchestra are great stuff these days. It seems to us that the numbers by unknown writers, that is the writers who are unknown to the radio listener, provide material that is the best in its class. The offerings are very enjoyable and we only hope that Paul and his boys keep it up forever. This popular combination plays at stations WJZ or WJY, every other night.

We heard a novelty feature the other evening from station WSAD—Mr. Mance and his five-string violin. His program

consisted of both classical and popular numbers.

The Pullman Porter Quartet (colored) through station WSB entertained with a splendid program of classical, popular and old fashioned darky melody numbers. Besides, the individual members rendered several selections and helped round out a swell performance.

That Jascha Guerwich, the man who brought the saxophone to this country, is a master of that instrument was proven to us the other evening when he offered to the listeners in on station WEAFA a very splendid program consisting of popular selections. Oh boy! he sure did have us steppin'! We wish that some day we may have the opportunity of hearing him again.

Many people have a habit of following their favorite entertainer from place to place and so it is with us. We followed Wendall Hall, KYW's Red Headed music maker, from KYW to WMAQ, WEAFA,

(Concluded on next page)

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Out of the Ether

(Concluded from preceding page)
 WJAR and lastly to WFI. Now we are waiting to see where he will appear next. His programs are jim-dandies and there is no getting away from it.

No doubt many of you failed to tune in some of the familiar stations last Sunday. Well, let me enlighten you. Owing to the death of ex-President Wilson many stations in memory to the departed remained silent during part or the entire period of their allotted time. This was especially noticed of stations WCAP, WJAR, WEAJ and WJAZ.

Robert Maun at station WGR was tuned in while rendering a delightful program of classical numbers upon the organ. We have been told by those living in Buffalo that stations in or near this locality somehow don't come through the

way most stations do but WGR comes through in our locality as well as any of the other so called dx'ers. This was especially so during the period that Mr. Maun was on the air. Can any one explain this situation?

Operating on the low wave we tuned in station WNAC as they were offering the former Broadway hit entitled, "Clinging Vine." This show was presented by Henry Savage and is a musical comedy. The music was great and many of the numbers are still ringing in our ears.

One evening early we tuned in station WLAG while George Barton was giving

a sport review. These western stations may have the upper hand as far as regular entertainment goes but when it comes to such a feature as sport reviewing there is nothing that we know that comes up to the standard set by those who give this service through our eastern stations.

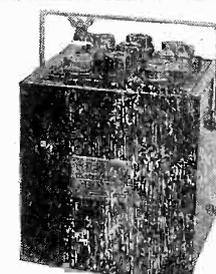
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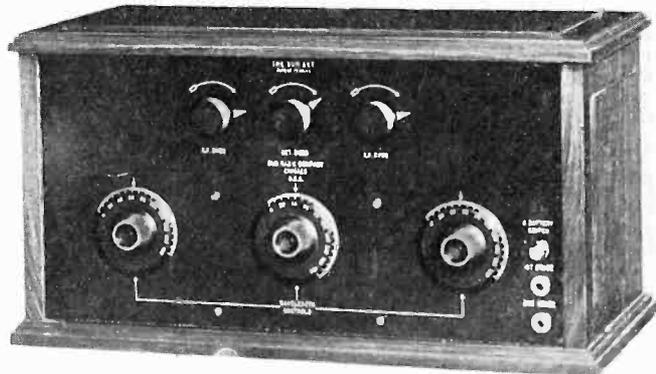
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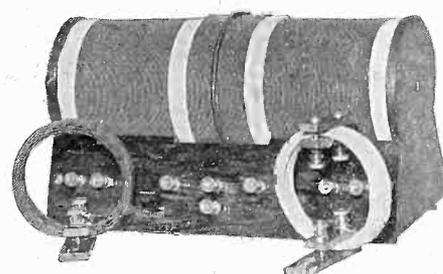
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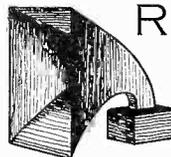
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state they have endeavored to make as accurate as possible. Technical terminology has been avoided as far as circumstances permit and clarity has been achieved by means of analogy wherever possible. In passing, the authors are reminded that Dr. Elihu Thomson does not like to have his name spelled with a "p." No mention is made of Tesla's high frequency experiments. The price of the book is \$3.00.



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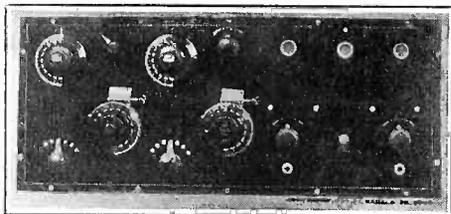
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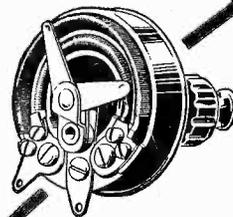
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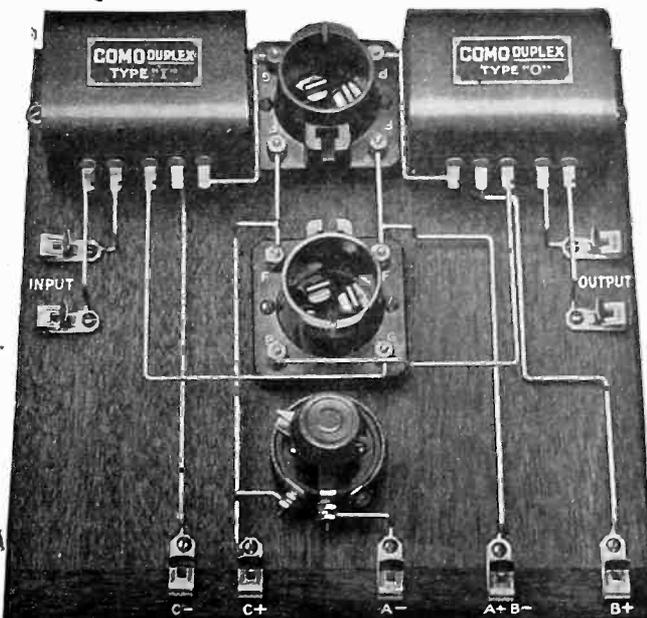
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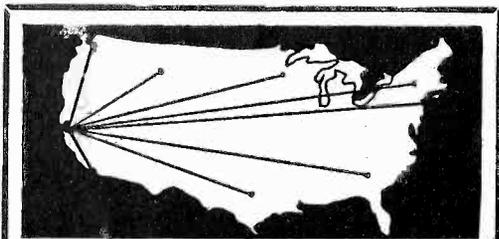
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Milwaukee Radio Amateurs' Club

THE Milwaukee, Wis., Radio Amateurs' Club has been especially honored by having two of its members selected by the American Radio Relay League to fill high positions in the League's operating department for Wisconsin. Clarence N. Crapo, 9VD, for some time past a local operating department officer, was appointed Assistant Division Manager in charge of the state, and Mark H. Doll, 9ALR, former West Allis City Manager, was selected as District Superintendent for Milwaukee County, the smallest League traffic section in the state but probably the most active one.

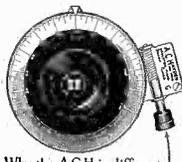
Meetings continue to be held weekly at 8:00 P. M., Thursdays, in the Trustees' Room of the Milwaukee Public Museum, and technical committee reports as usual are principal features on the program. G. Forest Metcalf, 9CKW, well-known Wauwatosa amateur, is now chairman of that committee, and his own reports, having such themes as a description of the transmitter at IQP and 1XAM and the construction of plate voltage transformers, are of the greatest interest. Re-

ports by other members of this committee are frequent and include such topics as a description of 9ELV given by J. W. Blauert and accompanied with stereopticon slides; the prevention of regeneration in radio-frequency amplification circuits given by M. F. Szukalski, Jr., 9AAP; and lastly a very important paper describing a new method of measuring antenna resistance given by Edward T. Howell, Sc.M., 9CVI, who has taken a well-known method for measuring the resistance of closed oscillatory circuits and perfected and adapted it for use with amateur aerials.

The program committee arranged for a very instructive talk entitled "100 Meter Amateur Radio Transmission" which was given by Ben J. Chromy, 9CJO, a Minneapolis amateur who did some pioneer work in this field. Push-pull amplifying circuits were the subject of a report by J. A. Rose, publications committee chairman, and one meeting was entirely devoted to discussions of improvised apparatus members had pressed into service at various times.

In the last membership drive, which brought the total number of members well over a hundred, all individual records were broken by Business Manager L. S. Hillegas-Baird, who brought in sixteen and for each five was awarded an A. R. R. L. emblem. E. G. Nickle, 9ATO, and F. W. Catel, 9DTK, were also awarded pins for getting five members each.

All local complaints of amateur interference reaching the Supervisor of Radio, Chicago, are being turned over to the club, and B. C. L.'s are requested to send them direct to the club's office, 601 Enterprise Bldg., Milwaukee, Wis., where they will be given attention by the City Manager and the traffic committee. The local electric light and power company has promised co-operation in the matter of interference from defective power equipment.



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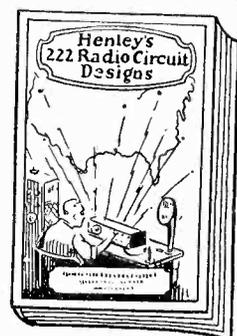
RADIO WORLD from January 6, 1923, to December 29 complete, with the exception of January 13, January 20, January 27, February 24 and March 12, will be sent postpaid for \$5.00.

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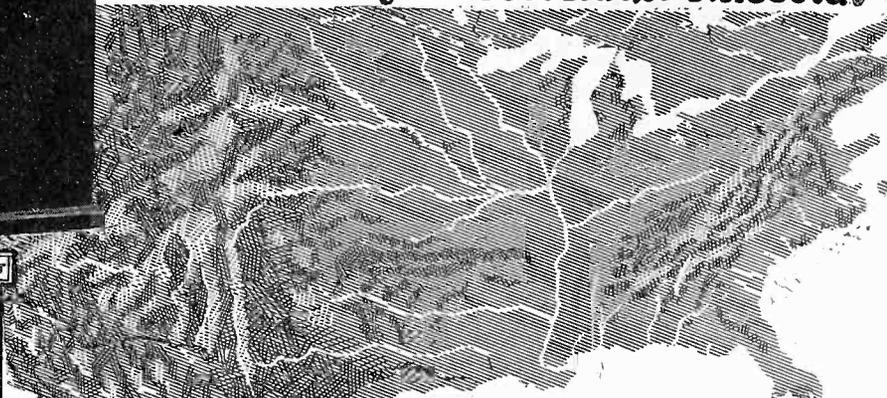
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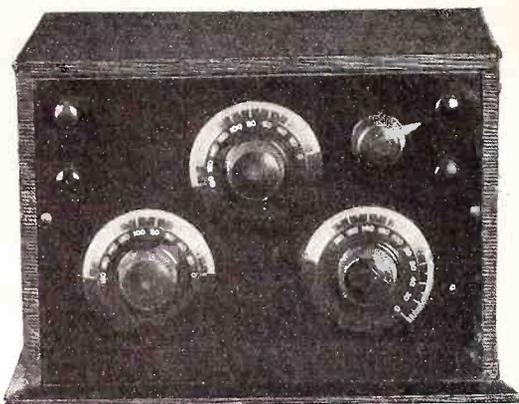
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