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December 29

1923

RADIO WORLD

Title Reg. U. S. Pat. Off.

ILLUSTRATED *EVERY WEEK*

GENERAL BUTLER'S HUSKY MARINES ENJOY RADIO IN CAMP

(C. P. & A. Photo)

Showing a group of marines, under command of Brigadier General Smedley D. Butler, U. S. M. C., enjoying a radio program in camp just before a sham battle. Many good radio men are found in the Marine Corps.

THE "SUPERDYNE" FOUR-TUBE RECEIVER—(See Page 3)

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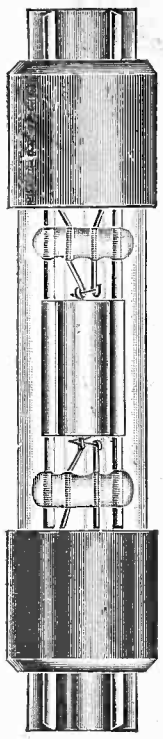

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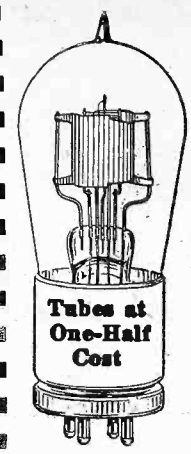

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Dial Reading with Kennedy Tuner

	Meters
8—KSD, St. Louis, Mo	546
10—KYW, Chicago, Ill	536
20—WOAW, Omaha, Neb	526
28—WCX and WWJ, Detroit, Mich.	517
30—WIP and WOO, Philadelphia, Pa.	509
34—WMC, Memphis, Tenn	500
40—WEAF, N. Y. City	492
44—WOC, Davenport, Ia	484
46—WBAP and WFAA, Texas	476
48—WRC and WCAP, Wash., D. C.	469
50—WCAE, Pittsburg, Pa	462
54—WJZ, N. Y. City	455
64—WJAZ and WMAQ, Chicago, Ill.	448
68—WOS, Jefferson City, Mo	441
72—WSB, Atlanta, Ga	429
78—WLAG, Minneapolis, Minn	417
82—WHB and WDAF, Kansas City, Mo.	411
90—WOR, Newark, N. J	405
90—WJY, N. Y. City	405
98—WBAK, Harrisburg, Pa	400
100—WHAS, Louisville, Ky	400
104—KHJ, Los Angeles, Cal	395
108—WDAR and WFI, Philadelphia, Pa.	395
110—WTAM and WJAX, Cleveland, O.	390
112—WGY and WHAZ, Schenectady and Troy, N. Y	380
118—KLZ, Denver, Colo	360
120—WPAH, Waupun, Wis	360
120—WHN, N. Y. City	360
122—WDAP, Chicago, Ill	360
130—WCBD, Zion, Ill	345
134—WBZ, Springfield, Mass	337
140—KDKA, Pittsburg, Pa	326
144—WGR, Buffalo, N. Y	317
148—WLW and WSAI, Cincinnati Ohio	309
158—KOP, Detroit, Mich	286
162—WNAC, Boston, Mass	278
164—WTAS, Elgin, Ill	275
172—WAAM, Newark, N. J	263

The above dial readings were recorded from nightly demonstrations to hundreds of New Yorkers who were convinced with their **OWN EARS.**

With Kennedy Tuner all unnecessary taps, switches, and useless noises are not needed.

KENNEDY TUNER and DIAGRAM, $5.00 F. O. B. N. Y. City. Diagram without Tuner, $1.00.

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Kennedy Tuner is used in place of Variocoupler, Variometer and Honeycomb Coils, saving the cost of over $9.00 ***worth of*** *unnecessary junk that is in most present receiving sets.*

VOLUME FOUR OF

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.

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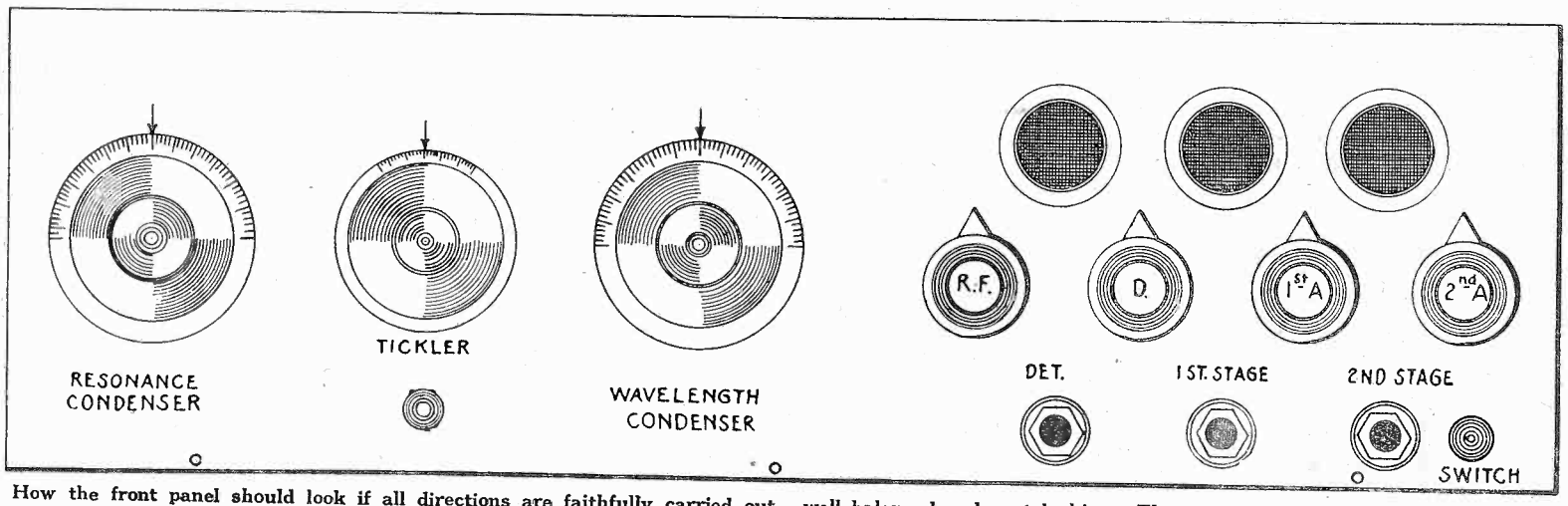
The New "Superdyne" Four-Tube Receiver—Part III

Operation, and Location of Minor Troubles

By R. L. Dougherty

WE will now consider that the fan has completed the receiver and is ready to use it. The finished product should look like the accompanying drawing, if the plans and measurements have been faithfully carried out. Some fans may ask why there is a rheostat for every tube. Of course, if necessary, both stages of audio could have been controlled from one rheostat, but due to the fact that the volume in the last stage is tremendous at times, it is advisable to have some means of controlling it, so therefore the four controls are used.

Connect the antenna lead to post one, the ground to post two. The minus A battery goes on three, the plus on four. Then the minus of the first 45 volt battery goes to five, the tap-off on 22½ volts to six. The B plus tap of the first 45 to seven. Connect the minus of the last 45 volt battery on the same lead and connect the plus of it to eight. We are now ready to tune in signals.



How the front panel should look if all directions are faithfully carried out —well balanced and neat looking. The wave change switch is located under the tickler (negative feedback control).

The little push button double-pole double-throw switch should have been arranged so that both poles were on the high points when it is pulled out, and on the lower points when thrown in. We will say that we want to listen to a station operating on 400 meters. Pull the switch out and turn the tickler to zero. Turn the first three tubes up and insert the plug in the first stage jack. Upon bringing the right-hand condenser around, a rushing sound and probably a very high squeal will be present. Turn the first tube (radio-frequency tube) down until this just stops. Then move the left-hand condenser around slowly, at the same time bringing the tickler (negative feedback) into play. If there are any stations operating on the wave length you desire, they will come in smoothly, providing the negative feedback is correct. If not, the signals will be the same as an ordinary regenerative circuit, only with more squeal and considerably more distortion. If this is so, reverse the leads, and try it again. Then when the signals are in clear, increase the filament current in the first tube, and bring the negative feedback again into use, and clear it up. When this is done, the signals should be very loud. If the circuits are not all in resonance, especially the third or extreme right-hand control, there is apt to be a hollowness to the signals. This easily can be eliminated by moving the condenser back or forth a few degrees either way. Then when a loud speaker is to be used, plug it in on the third jack, and turn up the last tube to normal brilliancy.

The actual tuning in of the set may prove a little harder than outlined, but the knack once found, the set can be tuned as easily as an ordinary regenerative set, and the negative feedback will not have much to do with it, outside of occasionally being turned to clear up the signals. It is of course needless to say that the more you play with the set the better you get at tuning it, and the less chance of squeals and howls.

Tuning in can be accomplished by the "beat note"

method, just the same as with a regular regenerative, but it is not to be recommended, unless you live in the Mojave Desert, and the nearest neighbor is over a mile away—so it is not to be tried. Always turn your first tube down, when you are tuning in a station, and then turn it up when you have it. Sometimes the station, even though a medium or a local station, will come in very faint and weak, until you finally get the first tube turned up, but when the controls are all in resonance and the first tube is turned back to its regular brilliance, it will virtually pound in like the "Hammers of Hades."

If you did not get the tickler leads right when constructing the receiver, it is of course necessary to reverse them. To prove that you have them right, you should be able to touch the ground post of the receiver without causing the set to howl. When this is done, you have the right connections. Try them out both ways, however, to assure yourself that you are correct.

If after the set is tuned, the voice has a broken quality, there is either too little or too much B battery on the detector. Therefore, after the set is working, vary the B battery on the detector, from 16½ to 30 volts to see if you have the correct amount of current flowing in that circuit.

If after testing the leads of the feedback and the voltage on the B battery, the set does not function correctly, go over the battery with a voltmeter, seeing that each cell is full of life. If there is but one partially dead cell in the battery, it will introduce resistance in the plate circuit of the first tube and it will be erratic in its work. It is not so important on the audio-frequency side, so use the best battery on the first two tubes.

Do not allow the B batteries to stand on the floor, and bring long leads to the set. The leads were intentionally brought out of the back of the set, so that the B batteries could be placed directly in back of the receiver and short leads employed.

Do not try to get loud speaker intensity on the first two tubes. Powerful stations will in all probability have enough volume to operate the loud speaker on the first stage, without any antenna at all, but the tuning in that case is very hard, and should not be attempted without first learning the set. When the set is understood, distance may be brought in on the loud speaker, without any antenna, the ground lead sufficing. Before attempting this, however, as said before, learn to operate the receiver.

Do not think you can operate the receiver correctly the first time you sit down to it. It cannot be done, as the correct tuning has to be learned step by step, and if the proper way is not learned, the receiver is apt to be a bit too noisy to please the family.

Never use more filament current on the first two tubes than is necessary to bring in the signals clear. The moment the set starts to whistle and howl, the tubes are giving notification that they are turned up too high.

If after trying every means of stopping the howls, and they still persist, look at the plate and grid leads of the first two tubes. Do they run parallel? Do they cross at anything but right angles? Are they separated sufficiently? If not, correct them and then retune the receiver.

Never try to get stations lower than the wave length switch calls for. When the double-pole double-throw switch is on the 20 and 25 turn taps, respectively, signals from 200 to 360 will come in. When it is on the 42 and 46 point taps, the stations from 360 to 600 will be tuned in. When operating properly, the receiver should tune extremely sharp on the first two controls, with a little flexibility on the third, which after it is fixed, the second can be increased, and the signals as stated before will pound in.

Take your time in tuning—do not jump around from control to control, but do things systematically. It may take you an hour to tune in your first stations correctly, but after the set is known and understood the tuning can be done by "feel." Many times when hunting for distant stations, with the first tube turned down, you will not hear it, but will just get a faint suggestion, or idea, that a station is there, but when the circuits are in balance and the tube turned up it will be clear and loud.

You will in all probability be able to tune in stations by dial settings, once the method is learned, and the stations logged properly. One point of interest is this: When on the low waves, the first condenser will be active from about 10° to 70°, and not much below or above those points. The upper wave switch will make the condenser active from zero to about 80° or 90°.

If, after using the set some time, and the volume of the signals falls off, or the set gets rambunctious and starts howling, the first thing to look to is your B batteries. For this reason it is handy to use a storage B battery on the set, but as stated before it is not absolutely necessary. The only advantage lies in the fact that the batteries can be constantly charged, and there is nothing like a dead cell possible.

Radio in the 28th U. S. Infantry

By Harold Austin, Associate A. I. E. E.

THE United States Army has always been known to have the latest radio equipment and the best operators in the world, but the 28th Infantry, with headquarters at old historic Fort Niagara, N. Y., boasts of having the best radio equipment and operators in the army.

This is made possible by constant training of the personnel of the Headquarters Company. This company devotes its entire time to the training of men to become operators and also some telephone work is taken up.

Capt. E. L. Rice, who made this possible, is a graduate of the U. S. Signal School, Camp Vail. He understands both the radio and telephone training and this makes him one of the best company commanders in the army. This organization has a school with the best equipment possible for the training of men. Every man in this organization gets radio training, such as installing, repairing and operating stations.

From 9 o'clock to 11:30 and from 1 to 3:30 there is constant work on different types of sets. These hours are divided into different periods as follows: from 9 to 10, code practice, receiving and sending; 10 to 11:30, radio theory; 1 to 2, lectures on practical electricity; 2 to 3:30, operating stations.

In case of another war these men will be capable of training men for this work, and they will be the most valuable men in the army, as radio will play a big part in the next war. Beside that, the training these men receive will be valuable to them in civilian life, as such training would be almost impossible to get for men who have to work for a living.

The whole 28th Infantry is proud of their radio communication and personnel. This organization receives a number of radio magazines, and RADIO WORLD always draws more interest than any other received.

How to Make a Neutralizing Condenser

By Walt. S. Thompson, Jr., E. E.

IN all circuits which incorporate a neutralizing or compensating condenser, it is advisable to design this condenser so that its capacitance can be easily adjusted. This not only aids in making the initial adjustment to completely neutralize any inter-tube capacitance, but also makes possible a very fine control of regeneration by slightly unbalancing the condenser. Such a condenser is described herewith.

The parts necessary are listed below, each with a letter corresponding to the letters in Fig 1 and 2. A—radion base, 2″ x ¾″; B—brass sleeve, 1″ x ¼″ diameter; C—insulating sleeve, 1″ x 3/16″ diameter; D—brass machine bolt, 1½″ x ⅛″ diameter; E—two binding posts; F—two soldering lugs; G—brass nut for ⅛″ bolt; H—binding post knob.

The parts have been purposely selected so that most any fan can make this condenser from materials which can be found in his junk box. The exact dimensions regarding the sleeve diameters are not essential, but they should be followed approximately and should be such that the brass bolt, insulating sleeve and brass sleeve telescope nicely without any excessive play or without binding. The writer used parts from an old plug for this purpose. The brass machine bolt should be threaded from end to end.

The figures show how the brass sleeve is soldered to one soldering lug which is held by one binding post and how the brass nut G, is soldered to the other lug and held by the other binding post. The lug should be bent to hold the sleeve and the nut about ⅛″ above the base as indicated.

In mounting this condenser, it will be found very convenient to have the knob project through a hole in the panel, so that adjustment can be made whenever necessary.

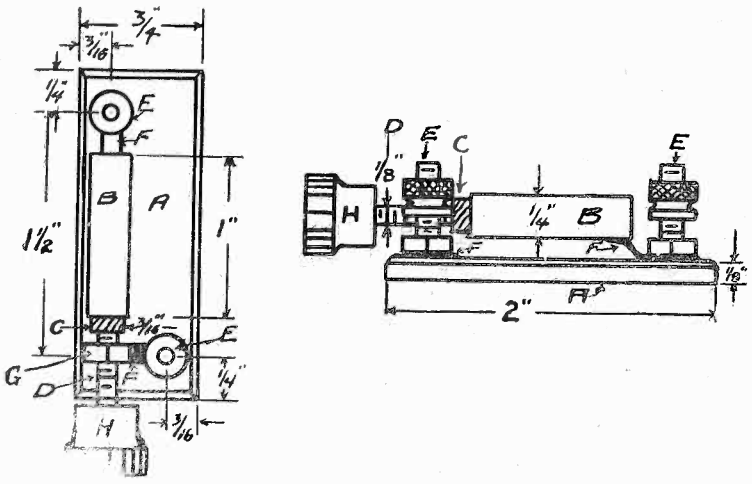


Fig. 1. Constructional details for making a neutralizing condenser. Parts are lettered according to the explanation in the text.

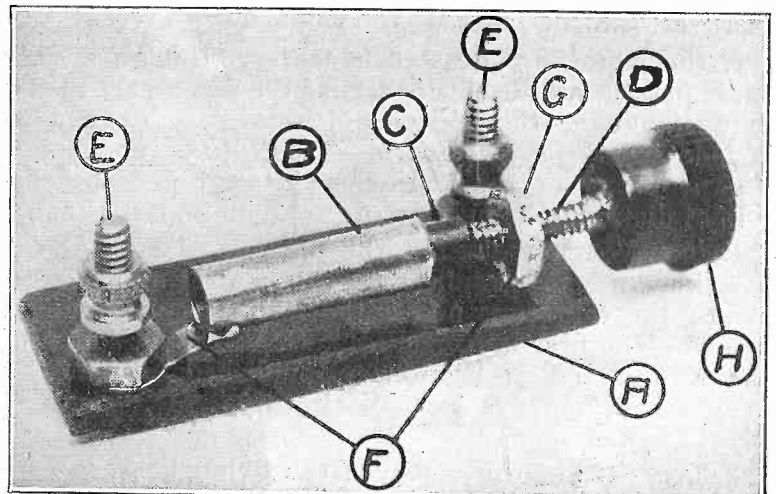


Fig. 2. Photograph of the completed instrument. It is made from odd parts found in the experimenter's "junk box."

Radio Reviewed in Commerce Year Book

RADIO, with other forms of communication, is included in a general survey of the economic situation of the world, just issued by the Department of Commerce. This review which is known as "The Commerce Year Book," and is available from the Superintendent of Documents, was prepared under the direction of D. J. Reagan, of the department. Concerning radio it states:

"The principal developments in international radio during the year 1922 were in the form of concessions secured, plans made, and work prosecuted on various stations designed for international traffic. The station at Monte Grande near Buenos Aires, of which the Radio Corporation of America is part owner, was taken over from the German company which had started its construction, and the plans were altered to provide direct communication with the United States, as well as with Europe. The concession was secured for a similar high-power station in China, with smaller stations to act as feeders. This latter concession was issued in the name of the Federal Telegraph Co., which made arrangements to work with the Radio Corporation of America. The Radio Corporation secured the contract for the construction of a high-power station in Sweden, and proceeded with the construction of the station at Warsaw for the Polish Government. These two stations furnish additional radio circuits direct to New York.

"In Central America and on the Caribbean coast of South America, the Tropical Radio Telegraph Company developed a general plan for a radio network to cover the countries bordering on the Gulf of Mexico and the Caribbean Sea. A new station was erected at Tegucigalpa, and the power of the New Orleans station was increased. A station was also opened at Santa Marta, Colombia, and arrangements were made for the leasing of the navy radio station at Miami, Fla.

"International radio communication during 1922 showed a large increase in receipts from transoceanic traffic, the Radio Corporation of America reporting gross receipts of $2,914,000 as compared with $2,138,000 in 1921. It is evident from these figures that radio has taken its place beside the ocean cable as a reliable means of international communication. They indicate the possibility of operating high-power radio circuits at an actual profit —something that has never been accomplished before.

"The gross income from the marine service of the same company showed a healthy increase also, being $630,084 as compared with $553,298 for 1921. This includes the operation of shore stations and the furnishing of radio service on board American ships.

"The most remarkable development in radio, however, was the great increase in the number of radio telephone broadcasting stations and in the number of receiving sets in use by the public."

Let's Stop Using "Broadcasted"!

First Thing We Know It'll Be in the Dictionary

MANY writers on radio subjects, some otherwise well-informed announcers at broadcasting stations, a considerable number of preparers of publicity for the radio press and thousands using the spoken word have been in the habit of saying "broadcasted" when they meant "broadcast." Standardization is the order of the day and is making rapid strides in many departments of the radio industry. Why not begin right now to standardize the nomenclature of the art and what better beginning can be made than with the one word, except "radio," which is more often used than any other?

The man who uses "broadcasted" would not think of saying "The horse casted a shoe." The modern tendency in the use of language is to choose the shortest form. Therefore, even if "broadcasted" were correct, the shorter "broadcast" would be preferred.

If the word "broadcasted," incorrect though it may be, is persistently used so that it becomes a part of the living language the lexicographers will be obliged to include it in the dictionaries. They have no choice. The people make the language by usage and the editors of dictionaries must record with an impartial hand.

RADIO WORLD requested the opinion of two of the best known lexicographers on this matter and has received the courteous and authoritative replies quoted below. The first is from Frank H. Vizetelly, editor of the New Standard Dictionary, published by Funk & Wagnalls Company, New York City. Mr. Vizetelly says:

"There is no form *casted* in the living language today as the past participle or the past tense of the verb *cast*. This participle and past tense were originally rendered *cast* away back in 1300, and this was sometimes spelled *caste* and occasionally *kast*. The form *casten* I find was used in 1375 (see 'Joseph of Arimathea,' page 703). Shakespeare used 'With *casted* slough and fresh legeritie' in 'Henry V.,' act iv, scene i, line 23, but from that time to this the form *cast* has prevailed.

"The first example that we have of the use of the word *broadcast,* to scatter or disseminate widely, dates from 1829 and was used by Isaac Taylor in his 'Natural History of Enthusiasm,' chapter 4, page 270: 'The doctrine of missionary zeal has been *broadcast* over Christendom.' The use of *broadcasted* by the daily papers and by some writers of radio copy has brought it into prominence. It is not a regular philological form, but if it prevails, it will be the duty of lexicographers to record it."

And there you are—a definition of the correct form of the word, with quoted authorities, and the warning that if the incorrect form is persistently used so as to force it into the language, the dictionary makers will be compelled to recognize it.

The other letter is from A. G. Baker, president of G. & C. Merriam, Springfield, Mass., publishers of Webster's Dictionary since 1843. Mr. Baker says:

"The question as to the preterit of *broadcast,* that is, whether it shall follow the analogy of the simple word *cast* or be broadcast*ed,* is, we believe, one that usage alone can determine.

"Our editors favor *broadcast,* and, likewise, *forecast,* but in each instance allow the alternative broadcast*ed* and forecast*ed.*

"From the evidence in our hands we think that the papers and magazines, where, apparently, the most care is taken to write good English, use *broadcast,* and that this form is more prevalent in the literature of a general character than it is in technical papers. Of course, *broadcast* is merely a compound and one should expect that the rule which governs the simple word *cast* would also govern the compound *broadcast.* There is, however, the tendency in English to 'regularize' verbs and in this instance this tendency is very marked, so that when we find broadcast*ed* in Government publications like the Experiment Station Record (used of plants), the Topeka, Kansas, *Capital,* the *World's Work* (where sometimes it is placed in quotations and sometimes not), the Manchester *Guardian,* and even the *Nation* (where, likewise, it is sometimes enclosed in quotation marks and sometimes not), it is evident that *careful* writers have been affected by the 'regularizing' tendency.

"We are glad that your influence is being thrown in favor of the logical form. Many papers, as the Detroit *News* and the New York *Tribune* have printed articles favoring broad*cast,* and these articles are sure to have a good deal of influence."

And that's that. Mr. Baker agrees in principle with Mr. Vizetelly. So now, let's all forsake that little *ed* thing and leave it on the doorsteps of the past. RADIO WORLD will be a constant reminder to its readers by following its already established rule of *broadcast* and hopes to make enough new disciples to keep the longer and uglier word out of the dictionaries.

Radio in Brazil

OPERATING in the Federal District of Rio de Janeiro, Brazil, there are about 8800 radio telephone receiving sets, according to Trade Commissioner Romer.

Broadcasting of music and entertainment is taking place regularly from the Government station at Praia Vermelha and the Radio Sociedade de Rio de Janeiro. A line is being put up to connect the former station with the Instituto de Musica to permit the broadcasting of concerts.

Few licenses have been issued outside the Federal District. The first radio receiving set to be installed in the interior of Brazil was set up recently by employees of the Araraquara Railway. It is located at Araraquara, in the state of Sao Paulo, but picks up broadcasting from Rio de Janeiro and Buenos Aires.

Wireless for Greece

Wireless telegraph communication throughout Greece will be established by the British Marconi Company under an agreement which has just been signed with the Greek University of Communications. It is proposed to erect wireless stations in the principal Greek cities.

Radio Relayed from France to WNP

AN amateur radio message from France to the North Pole has covered the farthest distance ever traversed by an amateur relay, arriving safely in the ice-bound cabin of Captain Donald B. MacMillan's schooner "Bowdoin" after a 9,565 miles journey across the Atlantic and the territory of four nations.

The same night after Monsieur Leon Deloy at Nice, France, transmitted a message to the Arctic explorer, a repetition of the dots and dashes came in on the headphones of Donald Mix, radio operator for MacMillan, 11 degrees from the pole and inside the aurora.

In order to reach Refuge Harbor, Greenland, the message took a roundabout course across the Atlantic to South Manchester, Conn., where it was received by John L. Reinartz, operating amateur station 1XAM. Reinartz gave the message by telephone to Boyd Phelps of Hartford, operator of 1HX, who relayed it to 6XAD at Avalon, Catalina Island, off the coast of California. From thence it was sent to Jack Barnsley of 9BP, Prince Rupert, British Columbia, who finished the relay.

The distance covered by each relay was: Nice to Hartford, 3,500 miles; Hartford to Catalina Island, 2,500 miles; Catalina to Prince Rupert, 1,305 miles and Prince Rupert to Refuge Harbor, 2,260 miles, making the greatest amateur relay mileage.

In this remarkable record the French amateur used two foreign model tubes with a 25 cycle plate supply and an input of about 400 watts. The receiving set used by Reinartz was home-made with his own type of circuit. Phelps' set was a Tuska 220 receiver. Mr. Mott of 6XAD used a Grebe CR 13 for receiving and a quarter kilowatt tube for transmitting. Canadian 9BP used one 50 watt tube for sending.

"Radio World" Writer Gets England

"YANKEE DOODLE" and other pieces sent through Station 2LO, England, were pulled out of the ether by Charles H. M. White, former instructor at Massachusetts Institute of Technology and a well known radio engineer and writer for RADIO WORLD. The programs were part of trans-Atlantic testing by British stations. Mr. White heard quite plainly on an ordinary three-circuit tuner, using a Trinity loud speaker working in conjunction with a pair of Como duplex transformers.

(C. Keystone Views)
George E. Putnam, supervisor of the Lighthouse Service, Department of Commerce, who is responsible for the general efficiency of the service that yearly saves thousands of lives and millions of dollars, is also a strong supporter of radio. He is only too well acquainted with the loneliness of the lighthouse keepers' lives and fully realizes the great relief that radio has brought them.

(C. Fotograms)
Congo, the head hunter from the wilds of Africa, who at present is gracing the Congo Room of the Hotel Alamac, New York City, enjoying a few minutes of radio music, and giving a "devil-devil" dance in a sort of celebration of the event.

(C. Underwood & Underwood)
Mme. Louise Faure-Favier, famous aviatrix, who broadcast from a giant Goliath plane while soaring a mile above Paris. She is seated in the commodious compartment in the plane, talking to the multitude below via radio.

D. B. Carson on Amateur Radio Activities

WASHINGTON, D. C.—In commenting upon radio communication in the annual report of Secretary Herbert Hoover, D. B. Carson, commissioner of navigation, emphasizes the service to their community that radio operators may give in times of stress and public disaster. In his opinion, the radio relay traffic system of the American Radio Relay League by which private messages may be dispatched to any point in North America is no less than an "auxiliary communication system" that can be relied upon when wire systems are out of commission.

This statement has been proved many times in the past year when storms, floods and other disasters have torn down telephone and telegraph wires in such states as Colorado, Wyoming, Oklahoma and Vermont. During the telephone strike in New England amateurs were of service. While such stations are operated primarily for the amusement of their owners, they can be a great public help on short notice.

"Few realize the importance of our amateur auxiliary communication system," declared Mr. Carson, "which can be put into immediate operation and temporarily provide a means for dispatching trains, giving flood warnings, and transmitting emergency messages to and from sections temporarily deprived of wire facilities.

"There is no abatement in amateur activity. The number of licensed amateur transmitting stations has increased from 15,504 in 1902 to 16,570 on June 30, 1923. Serious effort is being made by the amateurs to improve their apparatus so as to reduce interference and increase the efficiency of their stations. Annually these experimenters conduct transatlantic tests with European amateurs."

Wants Radio Station in New York Park

FORMAL application for permission to install a $50,000 radio broadcasting station in Central Park, New York City, has been sent to Park Commissioner Francis D. Gallatin by Grover A. Whalen, Commissioner of Plant and Structures. Commissioner Whalen asks the right to erect the radio station on top of the workshops in the rear of the reservoir at Eighty-sixth Street. Commissioner Whalen already has asked the Board of Estimate for authority to make the contracts for the expenditure of $50,000 for material and installation.

Government Plans Radio Regulation

By Washington R. Service

RADIO, which for the first time carried to the continent at large and perhaps Europe and Central America, the President's message, also carried his recommendations for remedial legislation on radio. Echoing Secretary Hoover's request that the laws affecting radio administration enacted in 1912 be revised, the President personally told Congress that new legislation regulating radio interference is needed. At present, Secretary Hoover is operating under a sort of "gentlemen's agreement" between commercial, governmental, private and amateur interests, reached last spring during the Second National Radio Conference.

Secretary Hoover stated recently that Representative White, who fathered the bill which bore his name last session, will introduce a simplified radio bill this session. The old bill, it is understood, has been reduced to first terms so as to permit of proper interpretation with the development of the art and to give the Secretary of Commerce and his advisory committee liberal and more or less elastic authority over the control of national radio problems. A recent conference between representatives of the government departments was successful in eliminating such points of disagreement as existed heretofore.

According to Secretary Hoover, the radio interference situation today is far better than it was at the time the original White bill passed the House last year, due chiefly to the elimination of interference through the voluntary cooperation of the several interests. There is now little interference between the existing broadcasting stations, which are decreasing in numbers.

In general, the President also indorsed the enactment into law of the approved plan of the joint committee on the re-organization of the government departments, which places radio under the direction of an Assistant Secretary of Communications, who would have charge of telephones and telegraphs. The Post Office and the radio section of the Bureau of Navigation of the Department of Commerce would become a part of the Department of Communications, according to the present plan of the joint committee.

Before the reorganization is effected, however, all phases of the radio question will probably have been threshed out, and its administration may or may not be taken away from the Department of Commerce. The proposed bill, it is understood, carries no suggestion of a transfer of radio to the new Communication Department.

Amateur Radio Explores Etheric Space

TO the radio amateur the letters DX call up a vision of immeasurable distance that would have made our ox cart pioneers and forefathers blink in amazement, but is now easily obliterated with the pressure of one's fingers on a brass key. This business of "packing up the old kit bag" for the sake of the wanderlust that is in all of us now has, through radio, a modern version that does not require the lifting of a foot over one's doorstep. That is the major fascination in the wonderful game of amateur radio, the thrill that comes with each new conquest over space and time—ability to reach the ends of the world.

You read on every hand how the possession of a receiving set, from the simple single circuit tuner to the latest model superheterodyne, brings "the world into the home," but seldom have you read how easily a radio transmitter can take you *out into the world.* From the time that such men as Daniel Boone lifted rifles over their shoulders and hit the trail into the wilderness, there has lurked in all of us the strong desire to go beyond our immediate ken. It is the same ambition that led early explorers to this country and made possible the pioneer days that eventually developed in the building of the West.

For a little more than the same amount of effort that it would take you to equip your home with a radio receiving set, you can install a telegraph code transmitter which is equivalent to a pair of seven league boots, a railroad pass, or a passport to distant countries. Sixteen thousand young men have done that in this country. It all started with the neighborhood line telegraph, but it has ended in this year, 1923, by making amateurs of the world neighbors.

It is remarkable when one realizes the odds that have been encountered and the technical obstacles that have been overcome by a comparatively small group of experimenters in this modern winning over of space. Just as surely as undiscovered territory was won over by the pioneers, so is the art of amateur radio making international citizen radio a reality.

In the interval of a few years since members of the Radio Club of Hartford, Conn., were considering as a great triumph code transmissions over a distance of thirty miles, these same amateurs have communicated direct with amateurs on the West Coast and their transmitters are heard frequently in Europe. Interest in amateur radio is keen in New Zealand, Australia, and some parts of the South American and African continents giving promise of the day when amateur radio will have put its foot on every natural barrier.

With American amateurs on the eve of participating in new transoceanic tests, two-way communication across the Atlantic ocean has been accomplished and it would be ridiculous for anyone to predict DX values for the future. The prophets of the past have too often fallen short of the mark. The world is growing smaller and smaller out of all proportion to their vision. One can only say that amateurs in those countries where radio is already taking a strong hold are on the verge of an era when communication among citizens of those countries will be as common as communication among amateurs in the several states of our own country was six years ago.

There is no such thing as East and West, and North and South are as one while such DX men send their signals around the globe. Canadian amateurs are sending messages across the continent. The Australians have rubbed elbows with California. The island of New Zealand is one of the latest entrants into the world amateur fellowship without legal bonds and tugging for greater contact, a louder CW twang and a whole lot more punch to the DX. The American Radio Relay League is bringing together amateur transmitters all over the world.

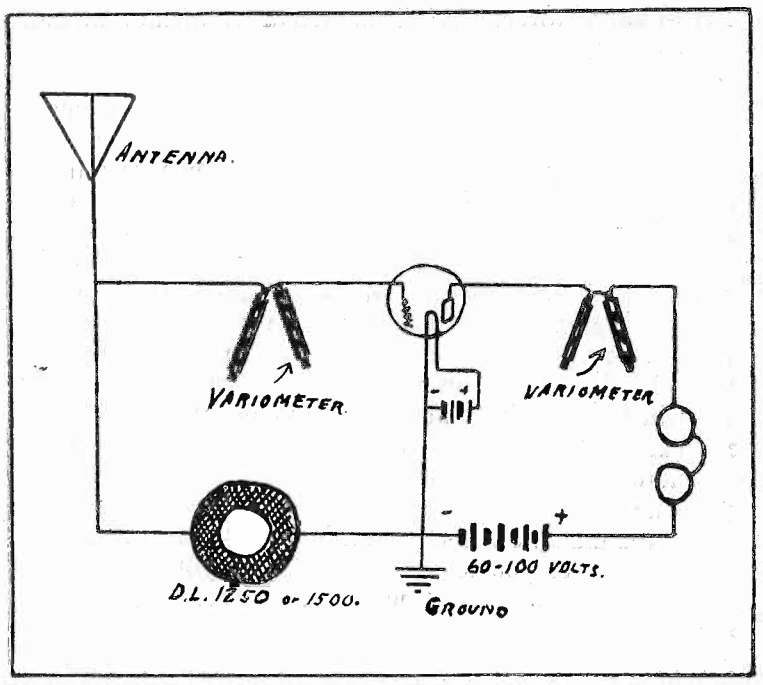
The New Autoplex Circuit

By Byrt C. Caldwell

EVERY time we pick up a radio magazine we read about a new circuit which is going to revolutionize radio, according to the claims of the inventor. Some of these are good, and some are poor. The average, though, seems to place the new hook-ups on about the same plane of efficiency as the old reliable regenerative hook-ups. However, sometimes a circuit comes out which stands out far above the rest, as a circuit which will really accomplish results—wonderful results. The Autoplex, designed by M. L. Muhleman, is such a receiver, and is much more efficient than even the famous Flewelling circuit.

Since Major Armstrong first announced his epoch-making discovery of the super-regenerative principle, the writer has been of the opinion that the super-regenerative set would be the set of the future. The invention of the popular Flewelling and Bishop circuits, and now the invention of the Autoplex, seems to bear out this belief.

The Autoplex is one of the simplest receivers yet designed. It is simpler than the single circuit regenerative set. The only apparatus required is two variometers, a large inductance coil, a tube, phones, and batteries. No ground is required and only a small antenna. In fact, with

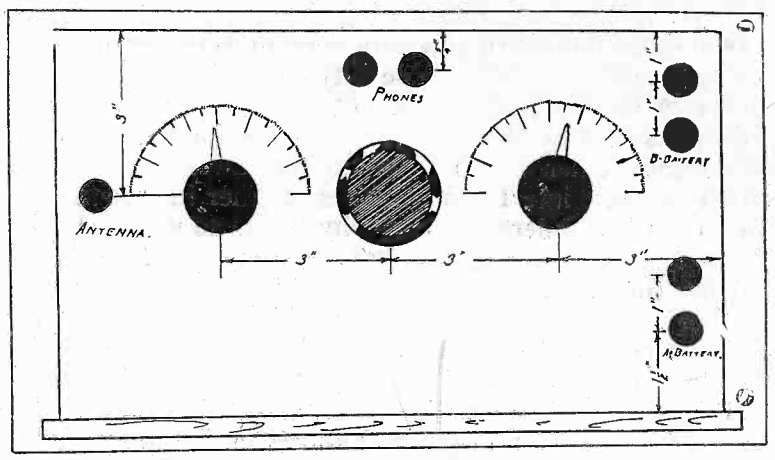


The autoplex circuit using special spiderweb variometers, giving finer and easier control of the receiver.

stations which are only a short distance away, the antenna must be decreased in size. It is easy to build and its operation is extremely simple. The usual difficulties met with in the construction of a super-regenerative set by the novice are absent. If the proper apparatus is used, and is assembled according to instructions, it will operate a loud speaker on distances up to a hundred miles, or in some cases even better, while for distance it is equal to the average multi-tube set.

The set as described in this article is made on a 7″ x 12″ panel. It is laid out and drilled according to the diagram. It will be noticed that there are but two controls. The rheostat is unnecessary with hard tubes, and the usual variable condenser is eliminated. The grid leak has also been taken away. There are two variometers used. It will be noticed that they are flat wound. These are much superior to the ball variometers, and should be used in this set if best results are to be had.

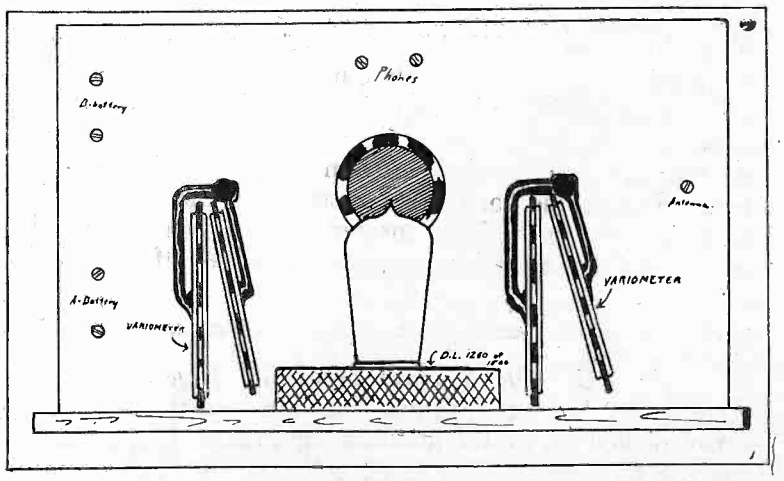
The variometers are the most important factors in the proper operation of the set, and so especial care should be used in their selection. The type used in this set is now on the market. The large inductance coil should preferably be a D. L. 1,250, although the 1,500 turn coil will do. Do not attempt to wind your own coil. It may work, and it may not. At any rate, it will fail to give the results of which duo-lateral coils are capable. The tube must be a hard tube. The five-watt power tubes gives the best results, and the UV201A tubes give almost as good results. If you wish to use a loud talker, you should not use any tubes smaller than these. Of course, this does not exclude



Front view of the set as designed by the author.

the small tubes, such as the UV199, but they will, of course, fail to give the same volume as the other tubes. If one of the compact sockets now on the market is used, the tube may be mounted inside the hole of the inductance coil. Otherwise, mount it on top, or between the coil and the panel. The B battery must have a high voltage—60 to 100 volts, according to the tube, is the correct value. For the dry cell tubes, 45 to 60 volts may be used. When the instruments are all mounted, solder all wiring carefully, using bare bus-wire, and making short, straight connections between instruments.

To operate the set, connect all the batteries, the phones, and the antenna, and if a ground is used, connect it to the point shown in the hook-up. Light the filament and then carefully tune the variometers. It is best to operate this set with both hands, following up one movement of one variometer with a corresponding movement of the other. There are certain points when the two are in resonance. There is a loud whirring noise in the phones when these



Rear view showing the placement of the apparatus.

points are reached. It is then that the stations are picked up. When a station is found, tune the set carefully until the maximum volume is obtained. If the station is local and it is not coming in very loud, cut down the size of the

(*Concluded on next page*)

How Your Receiving Tuner Works

By John V. L. Hogan

IN the fifth of his series of radio talks delivered through Station WEAF, New York City, John V. L. Hogan, consulting engineer and former president of the Institute of Radio Engineers, discussed the subject of "How Your Receiving Tuner Works." His lectures have been given most enthusiastic response because of his clear and simple presentation. In the course of his remarks Mr. Hogan said:

"The interval that interests us most is from 550 to 1,040 kilocycles, for the stations using the wave frequencies between those limits are powerful enough to be heard a good many hundred miles. The fifty individual wave frequencies in this range were chosen at separations of 10 kilocycles because any two waves whose frequencies differ from each other by that amount should not overlap or produce direct interference with each other in a good radio receiver. To understand just why this is so we must think for a few moments about what goes on inside a radio receiving tuner.

"Let us begin by noting that at this very moment there are two powerful broadcasting stations in New York City sending out streams of radio waves. One of these is WEAF, where I am talking, and the other is WJZ. The waves from WEAF are of 610 kilocycles frequency; when they reach your receiving aerial, a tiny fraction of a second after they leave here, they generate electromotive forces of 610 kilocycles frequency on your receiving aerial wires. Those electromotive forces, as you would have guessed from their name if you did not already know, are simply forces that tend to move electrons (or electric current) in the circuit where they are generated. Thus, wherever WEAF is sending, its radio waves are doing their best to produce electric currents of 610 kilocycles frequency in your receiving antenna system. In the same way, the waves from station WJZ are trying to generate electric currents of 660 kilocycle frequency in your receiver, for 660 kilocycles is the wave frequency of that station.

"Now suppose that you are anxious to hear the transmission from this station, WEAF, without hearing anything whatever from WJZ. What must you do? The answer is perfectly simple; it is only necessary for you to permit the WEAF waves to produce a strong 610 kilocycle current in your receiver while at the same time preventing the WJZ waves from generating any appreciable current in your set. To hear WJZ without interference from WEAF you would do the opposite of that, or develop the greatest 660 kilocycle current you could while suppressing the 610 kilocycle currents.

"Of course, this raises another question. How can you encourage waves of one frequency to generate strong currents in your aerial-to-ground or your loop-antenna circuit and at the same time discourage the waves of all other frequencies? The answer to that lies in electrical tuning, and our next job is to get some idea of how tuning is done.

"You know that practically all receiving sets contain condensers and coils of wire. Sometimes the condensers are of a certain fixed size, and sometimes they are variable, but without some sort of condenser a radio receiving set won't do much in the way of tuning or selecting between waves of different frequencies. So, too, with the coils of wire. These are generally called inductances, or (to speak correctly) inductors. Sometimes the inductors are fixed in size and position; sometimes they are variable by means of switches or as in variometers, so that their effective values may be changed at will.

"Did you ever wonder why these condensers and inductors are used in radio receivers? It is because an electrical circuit that is made up of such a coil and a condenser is capable of being tuned to resonate to or select alternating currents of any particular frequency one may desire. Electric condensers possess the electrical property called capacitance; inductors have the electrical property called inductance. An electrical circuit that contains both capacitance and inductance always is capable of passing more electric current of some one frequency than of any other frequency, for the same amount of generating or electro-motive force. What particular frequency in cycles or in kilocycles per second, gets through best depends upon the amount of capacitance and inductance in the circuit. Thus, by changing the amount of capacitance (as you can do by means of a variable condenser) or the amount of inductance (as you can with a tapped coil or a variometer) you can change the frequency to which the circuit is most responsible.

"Perhaps this will be still clearer to you if we consider for a moment how very much radio tuning is like musical tuning. A piano string has a certain mass, which in mechanics is very much like inductance in electricity. The string also has a certain flexibility or flimsiness or looseness, which is mechanically the analogue of capacitance in electrical circuits. If we vary the mass or the flexibility of a piano string, we change its pitch of vibration. In a piano, the mass of each piano string is fixed when the instrument is made, but the tension of each one can be varied at any time. If you look inside a piano you will see that the heaviest strings are tuned to the lowest notes and the tightest strings (of any certain size) the highest frequencies. So it is in radio; among circuits of the same capacitance, those that have the most inductance will respond to the lowest frequencies. If the inductance remains constant, the circuits that have the least capacitance will be tuned to the highest frequencies. Piano tuning is nothing but tightening and loosening the strings until their pitches of frequencies are correctly spaced along the musical scale. Radio tuning is nothing but adjusting the condensers or inductors of a circuit until its best electrical vibration frequency is correctly in agreement with the frequency of the particular wave (in the scale of radio frequencies) that it is desired to receive."

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antenna. It has been found that the less the amount of energy picked up by the antenna the greater is the volume. It is for this reason that large collectors are not desirable with this set.

The action, as explained by the inventor, is somewhat different from Major Armstrong's original explanation of the super-regenerator. In an ordinary regenerative set, the zero beat method of reception of phone signals is impossible, due to the fact that some slight change in the frequency of either the carrier wave, or the locally produced oscillations, will cause a beat note in the phones. In this set, the variation frequency prevents the formation of this beat note, and so makes the zero beat method of reception possible. In addition, the incoming signals are superimposed on the audible variation frequency, and fed back to the grid of the tube. There is therefore audio, as well as radio-frequency amplification, going on.

Just look at the simple hook-up of this circuit, and it's a pretty sure thing you will soon want to make an Autoplex. By all means, do it. You will not be disappointed if you follow directions.

An Efficient Low Cost Receiver

By C. White, Consulting Engineer

REMARKABLE results are now possible with a loop receiver using one stage of radio-frequency amplification. The great clarity of the received signal makes it possible to use a greater amount of audio-frequency amplification than is feasible with the ordinary type of receiver. The use of a tapped loop as set forth in this article is recommended, owing to the fact that a small outdoor antenna may be used to supplement the loop when an increase in volume is wanted.

It will be found that the loop can not only be used to advantage as a tuning inductance but will increase the directional effect of the outside antenna. This is a desirable feature especially when it is necessary to minimize interference coming from another direction. A short antenna must be used, not a long one, since a long aerial would alter the wave length range of the tuner to such an extent as to make it impossible to get the shorter wave lengths. The simplicity of tuning and flexibility of control make this receiver desirable for those who want radio-frequency efficiency with simplicity of control. A large part of this simplicity is due to the use of a transformer in the radio-frequency circuit instead of a tuned impedance coil thus eliminating the tuning condenser that would be necessary.

The construction of the loop plays a great part in the efficiency of this receiver and great care should be taken to see that it is properly made. The loop should be wound with Litzendraght wire or stranded copper ribbon such as is used for indoor antenna. The wires forming the loop should rest on radion or bakelite strips which are attached to the ends of the cross-arms for support. Care should be exercised in this detail in order to prevent serious leakage. Small grooves in the radion strips will effectively prevent the wires slipping. The outside edge of one side of the loop should measure about 30″ and the wires of successive turns must be spaced ½″ apart. There are 15 turns of wire in all and there are five taps, one at the beginning of the first turn of the loop and one at the end of the 12th turn with intermediate taps at every third turn. These taps should be brought to switch-points mounted on a small radion panel attached to the base of the loop, keeping the tap connections as short as possible. The entire loop should be mounted on the top or side of the set cabinet in such a way as to allow the whole affair to be turned in any direction. The three wires running from the loop should be insulated with spaghetti tubing and kept as far apart as possible in order to cut down capacity or leakage.

The condenser C-1 should be a good 11 plate variable with some type of vernier control such as a separate small condenser (two or three plates) placed in parallel with it or some sort of sharp tuning device. If a separate vernier condenser be employed the movable plates of the vernier are to be connected to the movable plates of the main 11 plate variable, and the movable plates of both should be attached to the filament or ground side of the circuit. The switches S-1 and S-2 allow the loop to be used without antenna or ground—with ground, with antenna, or in conjunction with both outside antenna and ground. A 600 ohm potentiometer P affords ample radio-frequency amplification control and allows the amplifying tube No. 1 to be worked at its most efficient point. Many fans are of the opinion that any filament rheostat will work satisfactorily with any of the modern styles of tubes, but this is not so because the UV199 tubes require a 30 ohm rheostat while a UV201A requires only a 20 ohm rheostat. With this circuit either the UV201A or UV199 will work satisfactorily. In fact, the UV199 performs a little better than the UV201A since it is better for radio-frequency amplification.

If you want to use audio-frequency amplification with this receiver you will profit well to make this combination: UV199 tubes for radio-frequency amplifier and detector with one set of "A" and "B" batteries in common, and UV201A tubes in the audio-frequency stages employing separate "A" and "B" batteries. Remarkably clear amplification is so obtained, and since the UV199 is a dry cell tube, there will be very little more expense entailed by this method of operation. Although an extra set of "B" batteries is required it will be noted that the life of each set of batteries will be materially increased since the audio-frequency amplifying tubes will draw quite a bit on their "B" batteries alone.

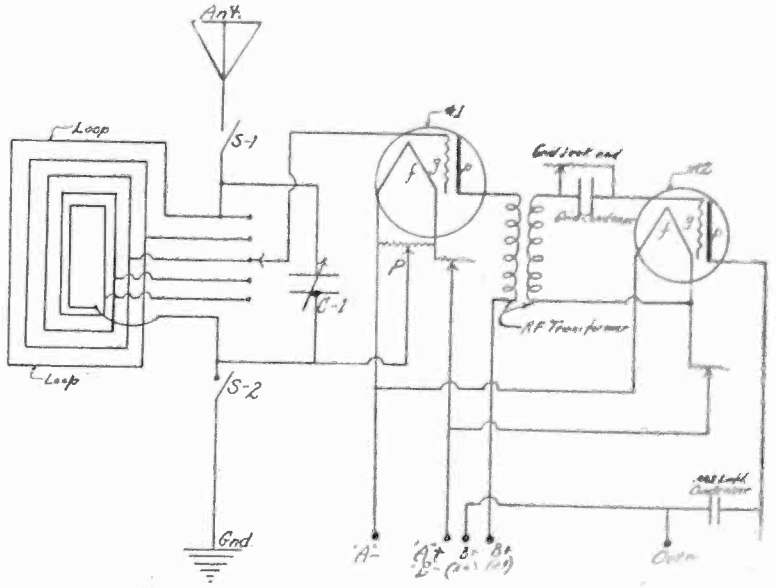


Diagram of a receiver that can be used with either loop, loop and antenna or antenna and ground alone, using the loop in the latter case as the tuning inductance. It is a sensitive and selective receiver and because of its great latitude of adjustments will allow the tuning out of almost any local interference

A panel mount style of variable grid leak will aid in securing quiet detection for all types of tubes. A radio-frequency amplifying transformer (Federal No. 35, made by Federal Tel. & Tel. Co.) is one of the important items of the outfit. Vacuum shields will also materially aid the operation of this receiver and cut down intertube electrostatic coupling.

Remember in setting up a radio-frequency receiver to insulate all wires and be sure to keep the grid leads as short as possible. Many radio-frequency sets are hard to tune and adjust because care has not been taken in their construction. Still, when properly built a radio-frequency receiver is in the end most efficient and can be very readily operated under the most trying interference. If you have never operated a loop receiver you have a treat in store when you first hear the quiet and smooth reception possible, also the fact that the directional qualities of the loop aids in sharper tuning and greater selectivity between stations.

RADIOGRAMS

WORLD NEWS HAPPENINGS BRIEFLY PHRASED FOR OUR BUSY READERS

Old Father Time had better hire a few more stenographers if he intends to record all the radio history that is being made these days.—Station WOC.

* * *

Dr. Lee De Forest, inventor of the audion, received the 1922 Medal of Honor of the Institute of Radio Engineers at a meeting in the Engineering Societies Building, New York City, on December 12.

* * *

Have you made up your mind yet whether to get a radio set or a mah jongg outfit? If the craze continues to grow, we expect to see some people mortgaging their automobiles in order to have both.—Lowell Courier-Citizen.

* * *

President Coolidge's message to Congress was so clearly broadcast by radio through half of the nation that while he was speaking Station KSD, St. Louis, telephoned to the Capitol and asked: "What's that grating noise?" and the transmission experts at the Capitol promptly replied: "That's the rustling of the paper as he turns the pages of his message."

* * *

Jack Binns, radio editor of the New York Tribune, in commenting on a review of his new book, "The Flying Buccaneer," says: "The book is not put forward as a gem of literature. Its theme does not lend itself to such treatment. It is a plain, straightforward story of adventure in the air showing the possibilities of the immediate future, the details of which are not at all exaggerated in view of our present knowledge and experience."

* * *

Pleasantville, the largest mainland town directly opposite Atlantic City, N. J., has lost the fame that once was hers, in the disappearance of her checker players. Once every corner store held its champions and the back rooms of cigar shops could be counted upon to furnish the excitement of contests, but no more. And it is all blamed upon the advent of radio. The pow-pow over checker games cannot be heard, the boards are lying in dusty disuse, and the shops are often deserted. Everybody who can get near enough to hear a radio set is absent.

(C. Underwood and Underwood)

Mrs. Frank B. Chambers, of Philadelphia, Pa., the first woman in Philadelphia to receive a commercial radio license, shown at her apparatus in her station. She is also an instructor in a radio school and when not busy at either of the foregoing, dabbles in an experimental laboratory, building and testing circuits and apparatus.

Colonel Samuel Reber, U. S. A. (retired), who has been representing the Radio Corporation of America in Japan, has been decorated with the Order of the Rising Sun, fourth class, in recognition of his services during the earthquake. Colonel Reber is on his way to the United States.

* * *

Some time ago a complete performance of the musical comedy, "Battling Buttler," which has been running for weeks at the Bijou Theatre in New York, was given by radio and was much enjoyed. Requests that it be repeated have been coming into the Selwyns and George Choos, the producer. Mr. Choos has promised that "Battling Buttler" will soon again be heard and directly from the theatre through Station WJZ.

* * *

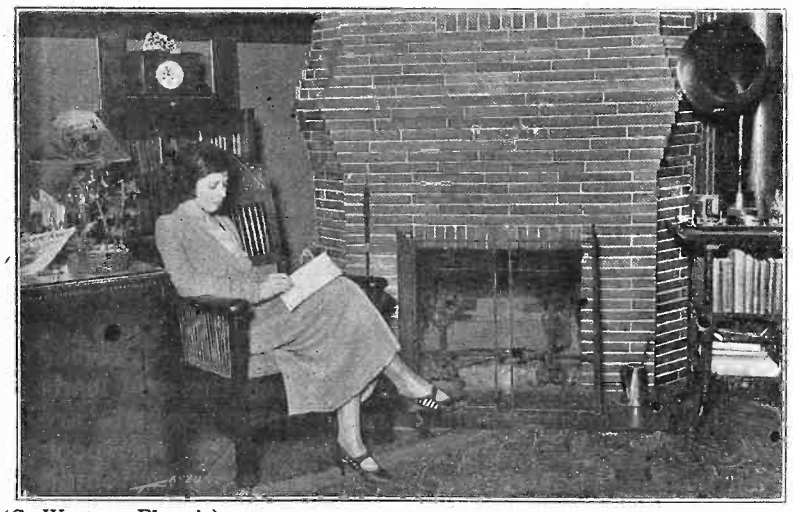
The Hotel Alamac, Broadway and Seventy-fist Street, New York City, has over fifty long range receiving sets. Their owners are persons of importance in the theatrical and business world. The chef, Adam Wozniak, has a set installed in the kitchen. The hotel has a special wire from Station WJZ where bi-weekly the strains of Paul Specht's orchestra are sent forth.

* * *

One of the outstanding features of the present Mexican revolution as compared with those that have gone before is the ease of communication between the rebel factions. In the present instance wireless communication has been maintained between the headquarters of Adolfo de la Huerta and Gen. Enrique Estrada in the State of Jalisco continuously since the de la Huerta forces took over Vera Cruz.

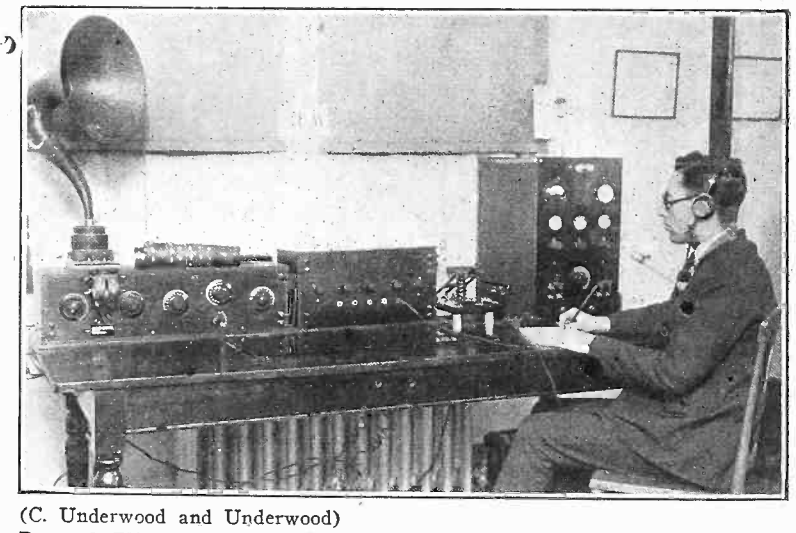
* * *

William Marconi is reported as being enthusiastic over the recent trans-Atlantic radio tests. He was quoted in London as saying: "The results achieved mean that some day we shall be able to hear without effort a speech by the President of the United States and that America will be able to listen to our King or our Premier. When I listened to America it thrilled me almost as much as when in Newfoundland I first heard the Morse signals across the Atlantic."



(C. Western Electric)

Miss Helen Kearns, of Newark, N. J., who is employed in the Kearney, N. J., works of the Western Electric Co., established and keeps her speed in dictation by copying down speeches and talks over her radio receiver. It is better practice than one will get in a school, because no two speakers talk at the same speed or in the same manner, and it is a better way of "getting up speed" and accuracy.



(C. Underwood and Underwood)

Bernard Elfman, operator of 3CW, Philadelphia, Pa., who made what is purported to be a record when he transmitted to and received replies from Alaskan amateurs, using low power CW. The entire transmitter is on the right of the table, the rest of the table being taken up by the receivers and receiving equipment. Operation on either phone or CW is possible, but the distance record was made on unmodulated CW.

A Spark Coil CW Transmitter

By Leroy Western

GREAT is the fascination of transmission among amateurs, but usually still greater is the loathing to part with the necessary cash to purchase the required batteries or apparatus for producing the high voltage used on the plate of the transmitting tube or tubes. However, a small installation capable of transmitting over a considerable distance, may be put together without any appreciable expenditure for the high voltage source. This is accomplished by using for this purpose a step-up transformer on the order of a spark coil.

First comes the CW oscillation transformer or antenna tuner. This is of the conductively coupled type and the same coil described in the transmission article by the author appearing in the December 15, 1923, issue of RADIO WORLD may be used if desired or if it is at hand. In this case, it should be provided with a center tap as well as variable taps for the antenna.

If, however, the constructor desires to make a coil more suitable for this set he may obtain a radion or strong cardboard tube 3½" in diameter. If the latter is used, it must be thoroughly shellaced and dried before winding. Next wind thereon 40 turns of No. 18 DCC wire, taking a tap off at the 20th turn. Taps should also be taken off at various points along the coil so that a variation of one turn may be made by the antenna connection.

A variable condenser with a capacity of .0005 mfd. is to be shunted across the entire transmitting coil and should be, as is usual in transmission, of the best possible type.

The grid leak and condenser should be of the type made especially for use in five or ten watt transmitters and the condenser should have a capacity of .0005 mfd. The leak value must be experimented with and it is advisable to obtain resistances of from 50,000 ohms to four or five megohms. These can be substituted one for the other until the best results are obtained.

We next come to the step-up transformer to which the builder should pay particular attention. Of course, an old ½" spark coil or a Ford coil can be used if desired, but such is not the best policy. It is advisable to build a special coil, the dimensions of which are given herewith. Obtain a quantity of iron wire, about No. 22 B & S gauge, and cut it into 4" lengths. Cut enough strips to form a bundle ⅝" in diameter and bind the same firmly with Empire cloth or paper. This latter should be shellaced so as to hold it rigidly in place and to keep the core from moving. Over the insulation wind 400 turns of No. 24 DCC wire, winding each layer evenly over the other. Bring out leads from each end of the winding and cover the latter with four layers of Empire cloth.

The secondary is next wound and consists of 5,000 turns of No. 30 DCC wire. Fairly strong flexible leads should be soldered to each end of the winding so as to form substantial connections. Ends should, of course, be constructed for this coil and after completion the entire unit should be immersed in molten paraffin until it is saturated.

A vibrator of the ordinary spark coil type may be mounted at the end of this core and the contact should be of sufficient size to make and break a circuit carrying 1½ amperes at six volts without an excess of sparking. A condenser with a capacity of ¼ microfarad must be shunted across this vibrator, as indicated in the diagram, so as to prevent sparking at the contact points. If one can obtain a buzzer capable of passing the desired current, it may be connected in series with the primary, whereupon no vibrator will be necessary. In this case, the fixed condenser should be connected across the contact points of the buzzer.

The reason for making a special coil such as that mentioned above is that the average small spark coils give entirely too high a voltage on the secondary for use on a tube of the type used in this set.

Now, in order to prevent sparking between the elements of the tubes when the transmitter is in operation, we must connect a capacity across the secondary. This should be a condenser of the glass plate type and may be constructed as follows: Obtain 18 photographic plates, 8x10" in size. With boiling hot water and a dull knife, scrape off all the emulsion from the surface of the plates. Pile these plates up, placing between each plate a sheet of heavy tinfoil 6x8", placing it in the exact center. Bring out a flat brass contact strip from each metallic plate. These should be brought out on alternate sides so that the connection from the bottom metal plate will be, for instance, on the right

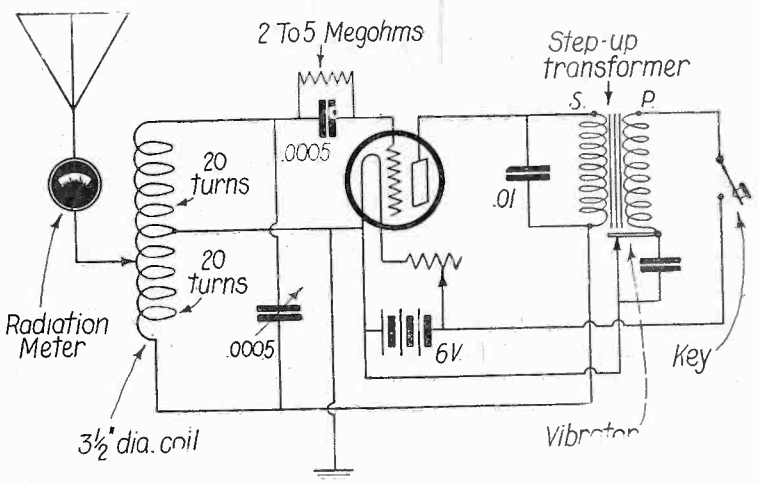


Diagram of a CW transmitter using one six-volt storage battery with a special step-up transformer to furnish the high voltage necessary for the plate. This transmitter is both economical in operation and low in first cost.

and that from the second on the left. That of the third will then be on the right and the fourth on the left. After all the glass plates have been used, the entire unit may be bound together with a few turns of tape and all the leads on one side connected together and to one side of the secondary. All the leads on the other side are then connected together and to the other side of the secondary. It is advisable after constructing the condenser, to dip the edges into melted paraffin so as to reduce losses. This particular size of condenser will give excellent results when used in this set and the builder is advised to make this type instead of using any other capacity of glass plate condenser which he may have on hand as the elements of his tube may be ruined.

After all the apparatus is collected together they should be connected as indicated and put into operation as follows: Adjust the filament to about normal brilliancy and close the key. Disconnect the antenna and listen in on a wave meter or another receiving set, tuned to approximately the wave length of the wave to be emitted, and adjust the tuning condenser on the transmitter until signals are heard at maximum intensity, either on the wave meter or on the receiving set, according to which is used. When this point of

(*Concluded on next page*)

Seven New Class "A" Stations

SUPPLEMENTAL list of limited commercial or broadcasting stations licensed during the week ended December 8:

Call	Station	Frequency Kcys.	Wave Length Meters	Power Watts
KFLZ	Atlantic Automobile Co., Atlantic, Iowa	1100	273	10
WABV	John H. DeWitt, Jr., Nashville, Tenn.	1140	263	20
WABT	Holliday-Hall, Radio Engineers, Washington, Pa.	1190	252	100
WOAR	Henry P. Lundskow, Kenosha, Wis.	1310	229	50
WWAO	Michigan College of Mines, Houghton, Mich.	1230	244	250
KFMQ	University of Arkansas, Fayetteville, Ark.	1140	263	100
WABU	Victor Talking Machine Co., Camden, N. J.	1330	226	100
	Transfers From Class C to Class A			
KFDZ	Harry O. Iverson, Minneapolis, Minn.	1300	231	5
WPAB	Pennsylvania State College, State College, Pa.	1060	283	500

More Standard Broadcasters

BESIDES broadcasters WGY and KDKA, announced some time ago as standard frequency stations, WWJ, The Detroit News; WCAP, Chesapeake & Potomac Telephone Co., Washington; WOS, Marketing Bureau, Jefferson City, Mo., and WSB, Atlanta Journal, have been designated by the Department of Commerce as reliable stations for calibrating radio sets and apparatus.

These stations have been tested as to accuracy of assigned frequencies transmitted, and found to be sufficiently constant to serve as standards for the setting of receiving apparatus and wave meters.

Station	Owner	Location	Fre-q'ncy kcys	Average deviation
WWJ	Detroit News	Detroit, Mich.	580	.1
WCAP	Chesapeake & Potomac Telephone Co.	Washington, D. C.	640	.1
WOS	Marketing Bureau	Jefferson City, Mo.	680	.0
WSB	The Atlanta Journal	Atlanta, Ga.	700	.2
WGY	G. E. Co.	Schenectady, N. Y.	790	.1
KDKA	Westinghouse	Pittsburgh, Pa.	920	.1

New Broadcasters

Call	Station	Frequency Kcys.	Wave Length Meters	Power Watts
KFMR	Morningside College, Sioux City, Iowa	1150	261	10
WBR	Pennsylvania State Police, Butler, Pa.	1050	286	250
	Transferred From Class C to Class A			
WHAH	Hafner Supply Co., Joplin, Mo.	1060	283	250

Thirty-three Broadcasters Quit

FOLLOWING is a list of limited commercial broadcasting stations deleted during the month of November, 1923:

Call	Class A and C Stations
WRAU	Amarillo Daily News, Amarillo, Texas.
WDAD	Central Kansas Radio Supply, Lindsborg, Kansas.
KFGP	Cheney Radio Co., Cheney, Kansas.
WBU	City of Chicago, Chicago, Ill.
WOAK	Collins Hardware Co., Frankfort, Ky.
WAAH	Commonwealth Electric Co., St. Paul, Minn.
WSAK	Daily News, The, Middleport, Ohio.
WWB	Daily News Printing Co., Canton, Ohio.
KFFP	First Baptist Church, Moberly, Mo.
WQAZ	Greensboro Daily News, Greensboro, N. C.
KFDP	Hawkeye Radio & Supply Co., Des Moines, Iowa.
WDAI	Hughes Radio Corp., Syracuse, N. Y.
WCBB	K & K Radio Supply Co., Greenville, Ohio.
WHAL	Lansing Capitol News, Lansing, Mich.
WGAU	Limb, Marcus G., Wooster, Ohio.
KFCL	Los Angeles Union Stock Yards, San Antonio, Calif.
WKAX	Macfarlane, W. A., Bridgeport, Conn.
WEAG	Nichols Hineline Bassett Lab., Ridgewood, R. I.
WLAC	North Carolina State College, Raleigh, N. C.
WOAZ	Penick Hughes Co., Stamford, Texas.
WDBF	Phillips, Robert G., Youngstown, Ohio.
KNJ	Roswell Public Service Co., Roswell, N. M.
WHAQ	Semmes Motor Co., Washington, D. C.
KFFA	Shelton, Dr. R. O., San Diego, Calif.
WGAR	Southwest American, Fort Smith, Ark.
WQAB	Southwest Missouri State Teachers College, Springfield, Mo.
WEAB	Standard Radio Equipment Co., Fort Dodge, Iowa.
WBBC	Sterling Radio Equipment Co., Sterling, Ill.
WWZ	Wanamaker, John, New York, N. Y.
WHD	West Virginia University, Morgantown, W. Va.
WRAP	Winter Park Elect. Const. Co., Winter Park, Fla.
WWAX	Wormser Bros., Laredo, Texas.
WKC	Zamoiski, Jos. M., Co., Baltimore, Md.

It's a "Losser"

MANY letters come to RADIO WORLD stating that upon the writers placing potentiometers in their circuits they noted a decrease in the volume. Unless radio-frequency is employed, there is no decided advantage in employing these "lossers" in the circuit, and even with the radio-frequency circuits it is best to be sparing in their use. Some have to be used, of course, to get proper balance, but one in every tube is foolish, unless the writer states that it will not work without it.

(Concluded from preceding page)

maximum strength is found, connect the antenna to the transmitting inductance and adjust until the radiation meter shows the highest reading.

The tone of the vibrator or buzzer should also be watched carefully, a smooth even tone carrying much better than a rough or squeaking tone.

The radiation from a set of this type when using a five watt transmitting tube should be in the neighborhood of .5 amperes. This set has given excellent results on an antenna 65′ long by 35′ high. One amateur who has used a set of this type has had his signals reported QSA at a distance of 400 miles from his station.

The Radio University

A Question and Answer Department conducted by the Technical Staff of RADIO WORLD for the information and instruction of its subscribers.

I have constructed the neutrodyne receiver from plans furnished by one of the manufacturers. It seems to work all right, getting some good distant stations. It is stated that the receiver does not oscillate or produce any squeals. How is it then that I pick up squeals just the same as with my three tube regenerative receiver? I can be listening in on a station, and without going near the set, it will squeal just like the regenerative circuit did, when looking for the carrier.—Carl Bier, Albany, New York.

If you have neutralized the receiver properly, there should be no squeals when tuning in. However, squeals can be produced even in crystal sets by an improperly tuned regenerative receiver in the neighborhood tuning in by the "beat" method. If your receiver is working properly, you will pick these up, but it is not the fault of the receiver, but the fault of an operator of a regenerative receiver, allowing his set to oscillate.

You recently published a diagram of a super-regenerator receiver which I constructed. I can get it to work on one side of the loop with fair results, but on connecting both sides, it howls or has a high pitched whistle. Is the diagram correct? Is it possible that the placing of the apparatus is wrong? I was told that each part had to be so placed that it had no coupling, or a certain degree of coupling with other parts. Is this so? Will the fact that I am using UV201A tubes cause me to get weak signals? Should it operate a loud speaker? What is its distance if constructed right?—John McGrune, 728 Franklin Avenue, Brooklyn, N. Y.; Arthur Kessler, 1470 Park Avenue, Bronx, N. Y.; K. L. Mannheimer, Ludlow Street and Broadway, Yonkers, N. Y.; S. P. Gunther, Adams Street, Cincinnati, Ohio; Clarence West, Metro Studios, Los Angeles, Calif.

The whistle noted should be present when the set is working right. It is what is known as the "variation frequency" and is the cause of the very loud signals coming through as they do. This frequency whistle can be made so high that it is almost inaudible, and it will not bother one. The diagram is correct. The placing of the apparatus might be wrong. You can get a fairly good idea of the placing of the apparatus from the photograph of the receiver. The placing of the coils has a great deal to do with the correct operation of the receiver. UV201A tubes are not suited for this work. The best tube to use is the 216A or five-watt power amplifier tubes. The set should operate a loud speaker very easily. As a matter of fact, that is what it is meant for—not for headphones, as the scream or whistle when using the phones might injure the eardrums when it is slightly de-tuned and becomes audible. The distance any receiver will work is a matter of conjecture. It depends upon too many factors to make even a guess. A set that works perfectly in one place will fall down in another and not even be able to pick up the medium local stations. Go over the diagram very carefully and check up. Mr. Caldwell's address is in care of RADIO WORLD.

You published a diagram of the Reinartz circuit tuner in your issue of October 6. What are the dimensions and constants for winding the coil? I have all back issues on file.—Lloyd R. Virgin, 270 North State Street, Concord, N. H.

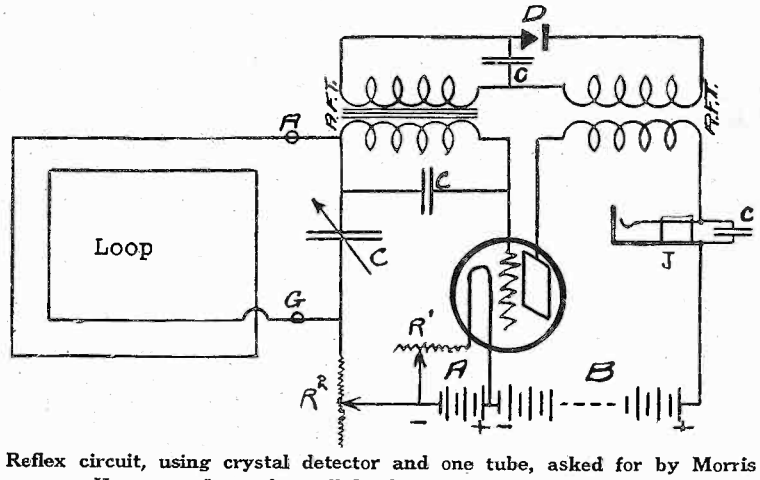
The directions for making of the coil are as follows: The spiderweb has a core diameter of 2½" and has 9 spokes. Wind on 45 turns, skipping every other spoke (winding the coil around every two spokes). Tap it at the fifteenth, thirtieth, and forty-fifth turn. Then break the winding and leave a lead of about 4" for connection. Commence the second winding directly over the first and wind on 40 more turns, tapping at the second, fourth, fifth, sixth, seventh, eighth, ninth, tenth, twenty-sixth, thirty-third, and last turns. The winding, when this is finished, should have a diameter of approximately 5". The wire should be No. 24 or 26 DCS. Do not use shellac or any binder. Complete details for this coil and the receiver appeared in RADIO WORLD for January 13, page 23.

In RADIO WORLD for September 15, you published a circuit diagram of H. S. Potter. I desire to add amplification. Will you please give me the circuit diagram for this?—F. A. Scholl, 349 Jackson Avenue, Long Island City, N. Y.

In RADIO WORLD for November 10, page 19, there appeared the circuit you request in answer to a question on the subject by E. R. Siebert.

Is it possible to operate a single tube reflex set on a loop, and get enough volume for local stations? If so will you kindly furnish a diagram for such. What apparatus will be necessary? What type of tube is best for such work?—Morris Krueger, New York City.

It is possible to operate a single tube reflex set on a loop for local, or even medium distance stations. The diagram of such a receiver is given herewith. The apparatus necessary is: One audio-frequency transformer; one good synthetic crystal detector; one radio-frequency transformer; one



Reflex circuit, using crystal detector and one tube, asked for by Morris Krueger. It works well by local stations using a loop.

hard tube and socket; one rheostat; one variable condenser (.0005); two fixed condensers (.0006); one potentiometer (400 ohms); one jack; one loop for receiver (see back issues of RADIO WORLD for constructional details); one A battery and one B battery (45 volts). The best tube to use in this case is a UV201A or C301A or some similar hard tube.

I have a receiver (diagram enclosed) which I constructed. The rotor (tickler) consists of 58 turns of No. 26 DCC wire and the stator of 145 turns of the same size wire. My antenna is 100 feet long, and consists of three wires, a foot apart. My first trouble is that the 43 plate condenser is only active over 10 degrees. When I get past that, the signals all disappear. Another and more bothersome trouble is that the tube "slops" over into oscillations each time the signals are tuned in. I have tried every way to stop this but cannot, as if the tube (WD11) is turned down, it causes the signals to fade out. Will you diagnose my trouble for me?—E. H. Klingel, 523 Centre Street, Freeland, Pa.

From your diagram, your first trouble is this: You have the last tap of your coil connected to the ground circuit. This is wrong. Disconnect it and make your variation by means of the tap and the condenser. This will make your condenser active over a greater range. Also remove the first 25 turns from the primary, and make the beginning of the tapped part the antenna connection. Next, rewind your rotor with 26 turns of heavier wire (No. 20 or 22 DSC or SSC, 13 turns on a side). This will help you control the feedback. Change your filament circuit. Put your rheostat in the minus lead of the battery, and make your plate battery return come to the plus side of the filament circuit. When this is done, you will find that the circuit probably will work correctly. Also, when wiring, see that the leads are not bunched.

I have a four tube set (one stage tuned radio-frequency, detector and two stages of single tube power amplification, Crosley set). How long should two new B batteries (45 volts each) last on such a set, operating about two and a half to three hours per night on all four tubes? I bought two new ones about three weeks ago, and after using them about two weeks and a half I found that they registered around 20 volts apiece. Is this right?—Pietro Alvarez, Num. 18 Cacheto, Mexico City, Mexico, D-F.

The batteries should last much longer than what you state. Unless they were old when bought they should last at least three months before they show any such drop as you state. Test your plate circuit to see if there is not some unknown short circuit. Look at the shelf date on the batteries and see how long they were guaranteed.

At present I have a three circuit set using UV199 detector and UV210A as amplifiers. Can I convert a two-stage audio-frequency amplifier into a radio-frequency amplifier using the transformers that come with it for resistance coupling? Will UV199 tubes act as good radio-frequency amplifiers?—Ernest R. Smith, 1706 Des Erables Avenue, Montreal, P. Q., Canada.

You can use the sockets, rheostats and the cabinet, but you will have to rewire it completely. Resistance coupling should not be used. It is not efficient and the gain in two stages of radio-frequency amplification will not compensate for your trouble. Resistance coupling is O. K. on high wave lengths, but not on the lower waves. Use either tuned impedance or transformer coupling. You cannot use audio-frequency transformers for radio-frequency. UV199 tubes are good radio-frequency tubes. In resistance coupling, it is a general rule to use either high resistance carbon rods or else some other non-inductive resistance, but the loss in sensitivity is so great that it is not used any more except where space is the governing feature.

As a general rule is it good practice to use copper clad steel wire for antenna? Could automobile cable be used for a loop? Is it possible to utilize a steel fire escape for an antenna?—Bert M. Dolan, Chicago, Ill.

Copper clad wire is practicable for this use. The copper coating should be quite heavy, though. This type of wire is being used a great deal because of its great tensile strength. You may use the automobile cable, but why go to all that trouble and expense when annunciator or single covered soft drawn-copper will suffice? While it is possible to do as you suggest it is not at all practical, because there are so many places that a fire escape may be grounded. The antenna is the collector of the minute energy and should be the most carefully insulated part of the radio set. Local stations will be received on the steel frame, but it is questionable if as strong or clear reception will be noted as on a regulation loop or outside antenna.

I intend running a line from my receiver to my study, a distance of approximately 60'. Will running a single wire to a jack, and using the gas pipe or the steam pipe do, or should I run a double wire in from the set? What kind of wire should be used? Should I use an amplifier on the other end to overcome the line resistance?—Frank Smyth, Bronxville, N. Y.

Run a double wire—do not use any conductor that is liable to lose the energy due to bad joints, such as the steam lines or the gas lines. A double telephone or light wire will do. Preferably the latter, as it has greater surface and therefore less resistance. It will not be necessary to use another amplifier unless the resistance of the line is so great that it overcomes the current flowing in the immediate phone circuit.

I am using a Radiola R-C receiver. I enclose a list of the stations that I have heard in the past two months, using a 35' antenna with a lead-in of 60' and a ground lead of 15'. Is this an ordinary or extraordinary record? Letter unsigned.—291 Broadway, c/o B. P. Lientz Oil Furnace Co., New York City.

The record you submit is, with the exception of PWX (weak and fading), an ordinary record for a regenerative detector and one stage. From New York, the western range generally runs to about KSD and south to PWX, which is accomplished under good conditions every day with the receiver you mention.

I have been informed that I cannot operate a loop receiver in my apartment because of the fact that it is steel fireproof construction. Is this so? —L. M. Klundman, Hotel Pennsylvania, New York City.

The steel construction may cut down on your distance a little, but it will not prevent you receiving signals. One of the first reports to come in on the recent transatlantic tests was made by a man using a four-tube reflex set on a single 60' wire strung around the moulding in his rooms on the second floor of a fireproof apartment building. If the set is efficient and you know how to tune it, you can get good reception.

RADIO WORLD

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IMPORTANT NOTICE

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

DECEMBER 29, 1923

Clever Publicity

A RECENT issue of "The Saturday Evening Post" contained a page advertisement rather remarkable in several aspects, even in these days of super-intense publicity. It was printed in two colors, was illustrated with exquisite taste and dignified force, and was typographically excellent. It was a Christmas advertisement and the "eye-catcher" in the drawing was a radio set and loud speaker. The burden of the well-expressed argument was the great advantage of the radio receiving set as a Christmas present. It very convincingly sold the idea of home radio. The advertisement was published by one of the largest makers of dry batteries, and the only reference to its product was made in exactly fourteen words at the very end. The vision that conceived, the broad-minded judgment which sanctioned and the restraint with which the object attempted was achieved stamp this as an outstanding example of clever, dignified, altruistic advertising.

Say "Broadcast!"

ON another page RADIO WORLD publishes an article explaining why the word "broadcast" is to be preferred to "broadcasted." The rule of our office always has been to use the shorter word, primarily because it is the correct word, and secondly, because it is the shorter of the two. Eminent and final authorities are quoted in the article to substantiate the claim for the correctness of "broadcast." Precision of language is vitally important in a technical industry and while the word in question is not strictly a technical term, its correct usage will tend by example to the employment of good English by radio business men and writers. Many a patent has hinged on the meaning of a word and its proper use. In these days of rapid business good English does much to smooth the path of the busy man. Let's all abandon "broadcasted."

The Right Man Chosen

THE selection of Owen D. Young, chairman of the board of directors of the General Electric Company, by the Allied Reparation Commission as one of two members of a committee of experts to investigate German finances, is indeed a wise one. The other American member is Gen. Charles G. Dawes, who organized and put into effect the Federal budget system. Here are two live, energetic, competent, broad-visioned Americans with experiences and ideas which should, and doubtless will, have a pronounced effect on world peace. Mr. Young's record throughout his long service with the greatest electrical manufacturing company in the world guarantees that his advice will be practical and worth heeding. He has a great opportunity for service and he will, in our opinion, utilize it well.

Salvaging the Past

THE belief has been expressed by scientists of repute that radio waves, once set in motion, keep on traveling to infinity. In other words, all etheric disturbances of a radio nature, whether caused intentionally by experimenters or whether inaugurated by laboratory workers engaged on other problems and unknowingly propagated, are still on their way in some definite direction. Whether this direction is away from the center of the earth or whether it is parallel to the earth's surface has not been announced. However this may be, a report comes from Paris that a group of wireless experts is endeavoring to develop extremely sensitive apparatus which will record radio messages transmitted in the past. That bald statement should be enough to hold the average reader for awhile.

Simplification

WHEN considering the advances that radio has made in the past ten years, it must be conceded that marvellous things have been accomplished. Whereas a decade ago radio was a science for the master electrician and physicist, today it is a "game" for every one. However, all things considered, no great advance has been made in the simplification of the apparatus used. As a matter of plain fact, it has not been simplified at all.

In the opinion of RADIO WORLD the greatest advance that will be made in radio is the elimination of controls necessary to successfully operate a receiver. People of today turn a number of dials because they know they must do so in order to hear programs, but just why they have to do it, few people really understand.

Why cannot an inductance, say, be evolved which will eliminate those now necessary condensers, and at the same time give a range of tuning and selectivity that would care for all things? Up to the present time, most inductances have the form of a hollow tube, and little experimenting has been done with other forms. Why? Is that the only form of inductance that will efficiently take care of the electrical currents and provide the necessary means of varying the frequency of a receiver? It is simply that it is the easiest form to construct, as its mechanical requirements are simple. Even at that, it is not efficient, as any radio engineer will tell you. It has losses that can be overcome, habits that should not exist, and produces effects that are unwanted, but which cannot be removed in that type.

It is well known that a capacity exists in every coil. Cannot that capacity be used to advantage, to the exclusion of the present day variable condensers, thereby taking care of two operations at once, and eliminating a now necessary yet expensive piece of apparatus?

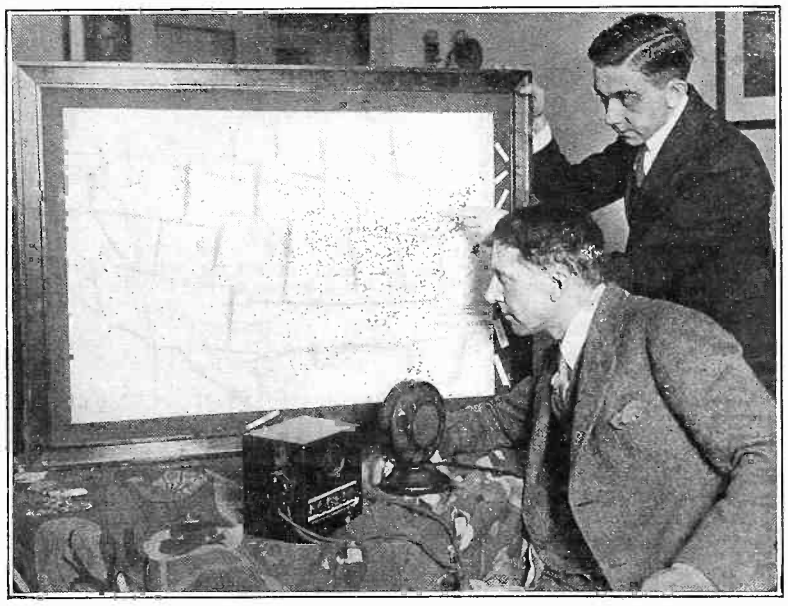
Inventory Time

"THE melancholy days have come, the saddest of the year"—when the radio retailer has to take inventory. This is a dreaded task, but one of those things that simply have to be done. We understand that the Radio Trade Association of New York City, through its Cost Finding Committee, has devised a perpetual inventory system which enables the dealer to keep up with his inventory all through the year and avoids the rush and overtime work incident to the final check-up at the close of the season. Such a system should prove especially advantageous and doubtless will be investigated by retail dealers who have not made it a part of their record keeping.

Here's Variety in Radio News Pictures

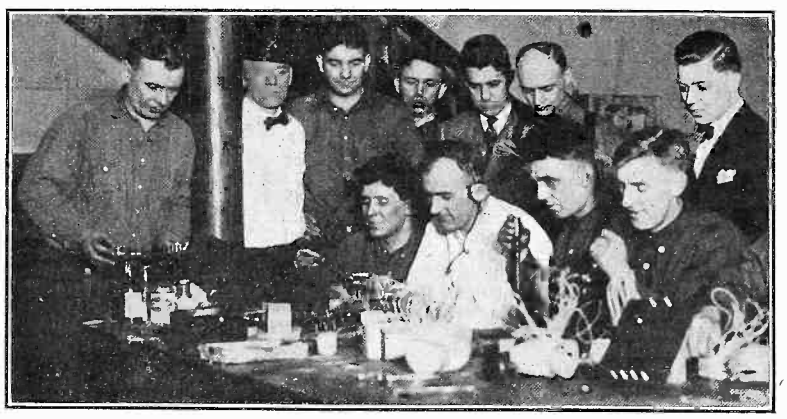
(C. Kadel and Herbert)

A close-up of the speech control apparatus placed in the gallery of the House of Representatives when President Coolidge delivered his message to Congress. George A. Wick, who controlled the microphones, is seen operating the device. This machine only switches the different microphones, the real amplifying devices being down in the cellar underneath the capitol. The listener is able to tell by means of the phones just which is the correct microphone for the work, and by pushing a button—presto, it is connected.



(C. Kadel and Herbert)

Tom Terris, who was with the Carnarvon expedition to King Tut's Tomb, examining the map at WOR, seeing the places where he had been heard when he talked. From each place where there is a pin one or more replies have been received. This is interesting, as it shows the range of this powerful station.

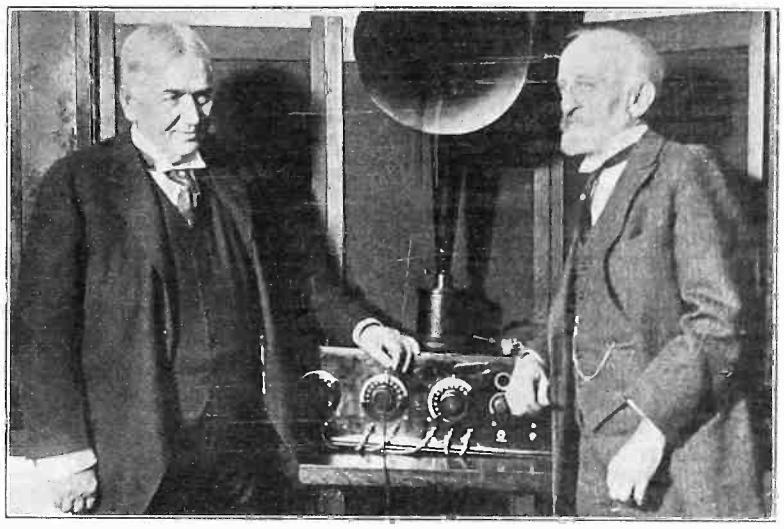


(C. Underwood and Underwood)

Engine Company No. 40, of Chicago, busy making their receivers in between calls. No more do they sit around waiting for something to happen, but vie with each other as to who can turn out the best working set.

(C. Underwood and Underwood)

Although confined to his bed by illness, the Rev. J. L. Zengirth, of the First Presbyterian Church, Chestnut Hill, Philadelphia, Pa., did not neglect his congregation. With the aid of a microphone and his bible, the sermon was given through a power speech amplifier and several loud speaker horns which were installed in the church.



(C. Fotograms)

Arthur Williams, chairman of the New York Division of the Harding Memorial Association, and Oscar Straus, chairman of the Manhattan Division, listening to the President's speech over radio, upon the installation of a receiver in their headquarters. The receiver was installed especially for the purpose of opening the Harding Memorial campaign.

(C. Fotograms)

It is not necessary to listen to the ceaseless patter of the talkative tonsorial artists, at least not in the modern up-to-the-minute radio barber shop. Now all that is necessary is to say, "See if WHO is on willyer?"

Here Are Good Broadcast Programs

Station KYW, Chicago

536 Meters (560 Kilocycles). Central Standard Time. December 28.—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.) 11:35 A. M.—Table talk by Mrs. Anna J. Peterson of People's Gas Company. 12:30 P. M.—"The Progress of the World," by Review of Reviews. 6:50 P. M.—Children's bedtime story. 10:00-12:30 A. M.—Midnight revue: Artists and program will be announced by radiophone. Ronald Tomlinson, baritone, will sing four selections. Wendell W. Hall, KYW's music maker, will entertain. Herbie Mintz, pianist, will render popular selections.

KWY, "The World Crier Station," will broadcast the latest news of the world every half hour, day and night.

December 29.—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 of Peoples Gas Company. 6:50 P. M.—Children's bedtime story. 8:00-8:58 P. M.—Musical program. 9:05-9:25 P. M.—Under the Evening Lamp service, including stories, articles and humorous sketches, furnished by the Youth's Companion.

December 30.—11:00 A. M.—Central Church service broadcast from Orchestra Hall, Chicago. Dr. F. F. Shannon, pastor. Musical program under the direction of Daniel Protheros. 6:30 P. M.—Excerpts from the New Testament—An American Translation by Prof. Edgar J. Goodspeed, read by William Ziegler Nourse. 7:00 P. M.—Chicago Sunday Evening Club service, broadcast from Orchestra Hall, Chicago. Musical program under the direction of Edgar Nelson. Speaker will be announced by radiophone.

Station WGY, Schenectady, N. Y.

380 Meters (790 Kilocycles). Eastern Standard Time. December 27.—11:55 A. M.—Time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 12:45 P. M.—Weather report. 2:00 P. M.—Music and address, "The Kindergarten as a Moral Force," Miss Lillian Goetz, president of the Schenectady Kindergarten Association. 6:00 P. M.—Produce and stock market quotations; news bulletins. 6:15 P. M.—Weekly report on conditions of roads in New York State. 7:45 P. M.—Musical program by the Fort Orange Society Orchestra.

December 28.—11::55 A. M.—Time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 12:45 P. M.—Weather forecast. 2:00 P. M.—Music and household talk, "The January Bargain Sales." 6:00 P. M.—Produce and stock market quotations; news bulletins. 6:30 P. M.—Children's program. 7:35 P. M.—Health talk, N. Y. State Department of Health. 7:45 P. M.—Piano and organ recital. 10:30 P. M.—Concert program.

December 29.—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 Jack Symonds' Orchestra, Hampton Hotel, Albany, N. Y.

Station WRC, Washington, D. C.

469 Meters (640 Kilocycles). Eastern Standard Time. December 28.—5:15 P. M.—Instruction in code practice. 6:00 P. M.—Children's Hour by Peggy Albion. Army Night—8:00 P. M.—A talk on radio by Dr. J. H. Dellinger, Chief of the Radio Division of the Bureau of Standards. 8:15 P. M.—Song recital by Elsa Jorss, soprano. 8:30 P. M.—Piano recital by Katherine Wordsworth. 8:45 P. M.—Violin recital by Henry Small. 9:00 P. M.—A talk on the Army by General Amos Fries. 9:10 P. M.—Concert by the United States Army Band. 9:55 P. M.—Retransmission of time signals and weather forecasts.

December 29.—3:00 P. M.—Fashion developments of the moment by Eleanor Glynn. 3:10 P. M.—Farm and home reports. 3:15 P. M.—Song recital by Barton Johns. 3:30 P. M.—Current events by The Review of Reviews. 3:40 P. M.—Piano recital by Edna Glass. 4:00 P. M.—The Magazine of Wall Street. 5:15 P. M.—Instruction in code practice. 6:00 P. M.—Children's Hour by Peggy Albion.

Station WJAX, Cleveland, Ohio

390 Meters (770 Kilocycles) Central Standard Time.

Condensed program: 9:00 to 9:45 A. M., bond gossip, financial news and grain markets; 10:00 to 10:45 A. M., quotations upon foreign exchange, live stock, grain, bonds and stocks; financial news bulletins and weather reports; 2:00 to 2:45 P. M., quotations upon grain, stock, butter, eggs and poultry, foreign exchange and bonds; financial news bulletins and weather reports. 3:00 to 3:45 P. M., quotations upon fruits and vegetables, butter, eggs and poultry, live stock, hay and grain, flour and feed, foreign exchange, bonds and stocks; weather reports. This is for Monday, Tuesday, Wednesday, Thursday and Friday each week. First half holds for Saturday morning, Saturday afternoon and Sunday, no broadcasting from WJAX.

Station WBZ, Springfield, Mass.

337 Meters (890 Kilocycles). Eastern Standard Time. December 28.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield market reports. 6:00 P. M.—Dinner concert by the WBZ uintet. 7:00 P. M.—"The Strange Cargo of the Little Muldoon," a dramatized story prepared by the Youth's Companion. 7:30 P. M.—Twilight tales for the kiddies. Current book review by R. A. MacDonald of the Court Square Book Store. Farmers' period—"A Better New Year," by Howard W. Selbey, general manager of the Eastern States Farmers' Exchange. 11:00 P. M.—Program of chamber music by the WBZ Quintet.

December 29.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield market reports. 7:00 P. M.—Dinner concert by the Hotel Kimball Trio direct from the Hotel Kimball dining room. 7:30 P. M.—Twilight tales for the kiddies. "Bringing the World to America," prepared by "Our World Magazine." 8:00 P. M.—Concert. 9:00 P. M.—Bedtime story for grownups by Orison S. Marden. 9:55 P. M.—Arlington time signals.

A cartoonist's impression of Jacques N. Cartier, director and bilingual announcer of Station CKAC, Montreal, following his appointment as First Lieutenant in the Royal Canadian Naval Reserve. Mr. Cartier will remain at the microphone, unless, of course, war duties should call him to sea.

Station KDKA, East Pittsburgh, Pa.

326 Meters (920 Kilocycles). Eastern Standard Time. December 27.—9:45 A. M.—Union Live Stock Market reports. 11:55 A. M.—Arlington time signals. 12:00 Noon—United States Bureau of Markets reports. 12:10 P. M.—Noonday concert. 6:15 P. M.—Dinner concert from the Ritz Theatre, Pittsburgh, Pa. 7:00 P. M.—Weekly chat with the farmers by Frank E. Mullen, radio editor of the National Stockman and Farmer. 7:15 P. M.—Market reports. 7:30 P. M.—Feature of interest to farmers. 7:45 P. M.—The children's period. 8:00 P. M.—Chamber of Commerce Father and Sons Banquet. 11:30 P. M.—Special late evening concert by KDKA Little Symphony Orchestra and assisting artists.

December 28.—9:45 A. M.—Union Live Stock Market reports. 11:55 A. M.—Arlington time signals. 12:00 Noon—United States Bureau of Markets reports. 12:10 P. M.—Noonday concert. 6:15 P. M.—Organ recital by Lucile Hale. 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.—Sunday school lesson, "The World for Christ," for December 30, presented by Dr. R. L. Lanning. 8:30 P. M.—Concert. Soprano and contralto solos to be announced by radio. 9:55 P. M.—Arlington time signals; weather forecast.

December 29.—9:45 A. M.—Union Live Stock Market reports from the National Stockman and Farmer. 11:55 A. M.—Arlington time signals. 12:00 Noon—United States Bureau of Markets reports furnished by the National Stockman and Farmer. 1:30 P. M.—Lunch concert by Dougherty's Orchestra from McCreery's dining room, Pittsburgh, Pa. 6:15 P. M.—Dinner concert by the Westinghouse Band under the direction of T. J. Vastine. 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. 8:30 P. M.—Concert by Westinghouse Band, T. J. Vastine, director. 9:55 P. M.—Arlington time signals. Weather forecast.

Station WOC, Davenport, Iowa

484 Meters (620 Kilocycles). Central Standard Time. December 28.—10:00 A. M.—Opening market quotations. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 2:00 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program—(Musical numbers to be announced). Lecture by C. A. Russell, "Radium and Radio Activity." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 7:00 P. M.—Educational lecture—"Manufacture and Uses of Aluminum," by Dr. C. C. Hall, member of The Palmer School Faculty. 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. 8:00 P. M.—Musical program (1 hour) Erwin Swindell, musical director.

December 29.—10:00 A. M.—Opening market quotations. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 12:30 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program—(Musical numbers to be announced.) Lecture by C. C. Hall, "The Products of Corn." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 9:00 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.)

Station WGI, Medford, Mass.

360 Meters (830 Kilocycles). Eastern Standard Time. December 28.—12:00 Noon—Noonday program. 12:40 P. M.—New England weather forecast. 12:45 P. M.—Closing report on farmers' produce market. 3:00 P. M.—Amrad Women's Club program. 5:30 P. M.—Closing stock market reports; Government reports; live stock markets reports. 6:15 P. M.—Code practice, lesson No. 200. 6:40 P. M.—Boston police reports. 7:30 P. M.—Evening program—Selected verses by Mr. Charles L. H. Wagner, radio poet; Red Cross health talk by Henry Copeley Green, "The Sliding Scale of Health." 10:00 P. M.—Newspaper men's night—A representative from each of the Boston newspapers will give a short talk on his particular hobby.

December 29.—6:45 P. M.—Code practice, lesson No. 201. 7:05 P. M.—New England weather forecast; New England crop notes. 7:30 P. M.—Evening program—Thirty-ninth of a series of talks on New England Business Problems by Arthur R. Curnick; Arthur Murray's course in dancing by radiophone; concert by the M-A-U-R-I-C-K Quartette.

December 30.—4:00 P. M.—Twilight program—"Adventure Hour," conducted by the Youth's Companion; talk by Mr. W. A. Roberts; musicale. 8:30 P. M.—Evening program—Talk on "World Unity," under the auspices of the Greater Boston Federation of Churches, by Mr. Whitman, "The Church and Publicity"; religious drama, "Amos, the Shepherd," by Eleanor Wood Whitman.

Station WFAA, Dallas, Texas

476 Meters (630 Kilocycles). Central Standard Time. December 28.—12:30-1:00 P. M.—Address, Dr. Robert Stewart Hyer, Southern Methodist University, on the Sunday school lesson, "The World for Christ." 8:30-9:30 P. M.—Recital by faculty State Teachers' College, Denton, Texas.

December 29.—12:30-1:00 P. M.—Address, L. F. McKay, for the Texas branch of the American Cotton Association. 9:30-10:30 P. M.—Music of the orchestra, Don Albert conducting, and the organ, Emil Velaszco playing, broadcast from the Palace Theatre. 11:00-12:00 P. M.—W. A. Green Company's Choral Club, Earle D. Behrends, director.

December 30.—6:00-7:00 P. M.—Radio Bible Class, Dr. William M. Anderson, Jr., pastor First Presbyterian Church, teacher; half-hour of Bible study and half-hour of Gospel song. 9:30-10:00 P. M.—Dr. Robert A. Hunt, pastor of the First Methodist Episcopal Church. 10:00-11:00 P. M.—Britling's orchestra in recital.

Station WJY, New York City

405 Meters (740 Kilocycles). Eastern Standard Time. December 28.—7:30 P. M.—"Income Taxes" by Frank Shevit. 7:45 P. M.—Recital by E. V. Goodwin, baritone. 8:00 P. M.—Lillian Wagner, violin; Pauline Sternlicht, piano. 8:15 P. M.—Recital by E. V. Goodwin, baritone. 8:30 P. M.—Lillian Wagner, violin; Pauline Sternlicht, piano. 9:00 P. M.—"Wills and Trusts," by William P. Malburn, of the American Exchange National Bank. 9:15 P. M.—Recital by Pearl Miller, colortura soprano. 10:15-11:00 P. M.—Popular songs by Breau and Tobias.

Sundays—2:30-5:00 P. M. 8:00-10:30 P. M.

Station WTAM, Cleveland, Ohio

390 Meters (770 Kilocycles). Eastern Standard Time. December 29.—9:00 P. M.—Dance program by WTAM Orchestra. Vocal numbers by Amphion Male Quartet.

More Good Broadcast Programs

Station WJZ, New York City

455 Meters (660 Kilocycles). Eastern Standard Time. December 28.—3:00 P. M.—Organ recital by Leo Riggs on the Hotel Astor organ, direct from the Hotel Astor. 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." 7:00 P. M.—The Operetta "Little Red Riding Hood" given by the original cast. 7:30 P. M.—Burr McIntosh, the cheerful philosopher. 7:50 P. M.—Piano recital by Adelaide Zeigler. 8:00 P. M.—Looseleaf Current Topics. 8:15 P. M.—Piano recital by Adelaide Zeigler. 8:30 P. M.—Concert by Richard Von Calio, marimbaphone; F. Fowler, bass, and C. Matthewson, cornet. 9:15 P. M.—"The Nature of Animal Intelligence" by Dr. W. Reid Blair of the New York Zooligical Park. 9:55 P. M.—Time signals and weather forecast retransmitted from the Government station NAA at Arlington. 10:30 P. M.—Dance program by Paul Specht and his Alamac Hotel Orchestra direct from the Congo Room of the Alamac Hotel.

December 29.—3:45 P. M.—"Poems" by Mary Gleason. 4:00 P. M.—Tea concert by the Hotel Belmont Stringed Ensemble, Harry Lerner, leader, direct from the Hotel Belmont. 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. 7:00 P. M.—"Uncle Wiggily Stories" by Howard Garis. 7:30 P. M.—Concert by the Lily Choristers (10 male voices). 7:45 P. M.—"Congress and the House of Representatives" by the Honorable Fiorello H. La Guardia of the House of Representatives, Washington, D. C. 8:05 P. M.—Concert by the Lily Choristers. 8:30 P. M.—Musical score of "Under the Red Robe" by Fred Peters, played by Victor Herbert's Cosmopolitan Theatre Orchestra, by direct wire from the Cosmopolitan Theatre. 9:55 P. M.—Time signals and weather forecast retransmitted from the Government station NAA at Arlington. 10:00 P. M.—Recital by Miss Margaret Manniere, noted soprano. 10:30 P. M.—Dance program by Harold Stern and his Hotel Majestic Orchestra.

Sundays—11:00 A. M.-1:00 P. M. 7:00 P. M.-10:30 P. M.

Station WLW, Cincinnati, Ohio

309 Meters (970 Kilocycles). Central Standard Time. December 28.—10:30 A. M.—Weather forecast and business reports. 1:30 P. M.—Market reports. 3:00 P. M.—Business reports. 4:00 P. M.—Lecture recital by Mildred Templeton Williams of the Cincinnati Conservatory of Music.

December 29.—10:30 A. M.—Weather forecast and business reports. 1:30 P. M.—Stock exchange and business reports.

December 30.—9:30 A. M.—Sunday school service conducted by the Editorial Staff of Sunday School Publications, Methodist Book Concern. 11:00 A. M.—Services of the Church of the Covenant, the Rev. Frank Stevenson, minister.

December 31.—10:30 A. M.—Weather forecast and business reports. 1:30 P. M.—Business reports. 3:00 P. M.—Market reports. 4:00 P. M.—Babson reports. 8:00 P. M.—Program presented by the Editorial Staff of the Methodist Book Concern. Musical program by the Cincinnati String Quartet. 9:00 P. M.—Popular entertainment by the Elmer Aichele Dance Orchestra playing numbers distributed by the National Association of Broadcasters, New York City.

Station WOAW, Omaha, Nebraska

562 Meters (560 Kilocycles) Central Standard Time. December 28.—6:30 P. M.—Dinner program presented by Seventeenth U. S. Infantry Band, Herman Webel, bandmaster. 9:00 P. M.—Musical program including vocal solos by Mrs. Margaret Burns; banjo solos by R. D. Denham, Cedar Creek, Nebr. 10:00 P. M.—WOWL dance program, presented by Randall's Royal Orchestra, transmitted from Italian Renaissance Room, Brandeis Store Restaurants.

December 29.—6:00 P. M.—Dinner program presented by the Goldenrod Orchestra. Wallace Johnstone, manager. 9:00 P. M.—Program under auspices of Omaha Printing Company.

December 30.—9:00 A. M.—Radio Chapel Service conducted by Rev. R. R. Brown of the Omaha Gospel Tabernacle and Minister of the Sunday Morning Radio Congregation. 9:00 P. M.—Radio Chapel service by courtesy of the Wales, Iowa, Presbyterian Church. Rev. E. W. Griffiths, pastor; Mrs. Dale Petty, accompanist. Auspices Woodmen of the World.

Station WJAZ, Chicago

448 Meters (660 Kilocycles) Central Standard Time. Standard Program—Including a special "North Pole" Wednesday night program, WJAZ is "on the air" from 10:00 P. M. to 2:00 A. M. Tuesday, Wednesday, Thursday, Friday and Saturday; and 6:00 to 10:30 P. M. on Sunday.

Station KHJ, Los Angeles, Calif.

395 Meters (760 Kilocycles). Pacific Time. December 28.—12:30-1:15 P. M.—Program presenting Florence Colver, violinist. 2:30-3:30 P. M.—Matinee musicale presenting Florence Colver, violinist. 6:45-7:00 P. M.—Children's program presenting Richard Headrick, screen juvenile. 7:00-7:30 P. M.—Organ recital from First Methodist Episcopal Church, Arthur Blakeley, organist. 8:00-10:00 P. M.—De luxe program. 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra, by line telephony, from the Los Angeles Biltmore Hotel.

December 29.—12:30-1:15 P. M.—News items; music. 2:30-3:30 P. M.—Matinee musicale. 6:45-7:30 P. M.—Children's program presenting Helene Pirie, screen juvenile. 8:00-10:00 P. M.—Program presenting Maude Darling Weaver, contralto. 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra, by line telephony, from the Los Angeles Biltmore Hotel.

Station WOR, Newark, N. J.

405 Meters (740 Kilocycles) Eastern Standard Time. December 28.—2:30-3:00 P. M.—Evelyn Tobey, of Teachers' College, "What's the Matter with Our Homes." 3:00 P. M.—Isabel Tarrago, soprano. 3:15 P. M.—"Health Hints," Dr. Harriet Van Buren Peckham. 3:30-3:50 P. M.—Rose Falls Bress, authoress. 3:50 P. M.—Soprano solos by Isabel Tarrago. 6:15-6:30 P. M.—Edith Oldfield on "Sealing Wax Art Craft." 6:30-7:00 P. M.—"Man in the Moon Stories for the Children." 7:00-7:30 P. M.—David Elder, tenor.

December 29.—2:30 P. M.—Soprano solos by Jean Anderson. 2:45-3:15 P. M.—Dr. Esther Lovejoy, talk on her personal experiences while traveling to Europe in steerage. 3:15-3:30 P. M.—Soprano solos by Jean Anderson. 3:30-4:00 P. M.—John Patten, basso. 6:15-7:15 P. M.—"Music While You Dine," Green Brothers' Orchestra. 7:15 P. M.—Fred J. Bendel on "Sporting News Up-to-the-Minute." 8:00-9:00 P. M.—Concert by Gene Ingraham and his Hotel Berwick Club Orchestra. 9:00 P. M.—Carlyle F. Straub, in original poems. 9:15-9:45 P. M.—Charles Robb, Head of the American Bankers' Association for Burns Agency, will speak on "Forgers and Forgery." 9:45 P. M.—Carlyle F. Straub in original poems. 10:00-11:00 P. M.—Jimmie Clarke and his Whiteway Entertainers.

Station WDAP, Chicago

360 Meters (830 Kilocycles). Central Standard Time. Standard Program.—Market reports daily, except Sunday, at 9:35, 10:01, 10:31, 11:01, 11:31 A. M.; 12:01, 12:31, 1:01, 1:25, 6:00, 10:30 P. M. Concert periods—1:35 P. M.—Luncheon concert daily, except Sunday. 7:00 P. M.—Dinner concert daily, except Sunday and Monday. 9:15 P. M.—Sunday only. 10:00 P. M.—Dance program and popular concert daily, except Sunday and Monday.

Voices Across the Sea

HOW long can we continue to think ourselves isolated from Europe, asks an editorial writer in the "New York Times," when we can actually hear voices across the sea? The first faint sounds of music and of words that came through the night of Sunday from Liverpool and Glasgow and Cardiff, and that were caught out of the air by instruments along our coast in New York and Massachusetts, were but a premonition of the development of mysterious and wide-reaching agencies placed by science at the command of man. "Beginning doubtedly and far away," as the organist in Lowell's story of the Holy Grail, who built a bridge of music "along the wavering vista of his dream," the electro-physicist has done a more marvelous thing than ever poet dreamed, artist pictured or engineer constructed, in building a bridge of music and of speech across the ocean.

What the perfection of this means of communication is to bring it is impossible to forecast. We are on the edge of a new age of experience, when the people of the planet will be within the reach of one voice as the people of one country now are. The telephone and the phonograph were at first regarded as mere toys, but the uses to which they have been put have affected the social, industrial and political life of the whole civilized world. It is conceivable that the wireless radio, which has now the novelty of a new toy, will carry mankind even further toward a spiritual oneness and an inevitable internationalism.

Before the confusion of tongues at Babel, "the whole earth was of one language and one speech." If wireless telephony progresses toward what now seems its certain goal, it will hasten the day when the whole earth will truly be of one language and speech; at any rate, when every man will be able to hear others speak each in his own language, in a new Pentecost whose electric waves will "gird" with one voice "the countless host."

For Nocturnal Dial Twisters

(Paste this on your table for reference)

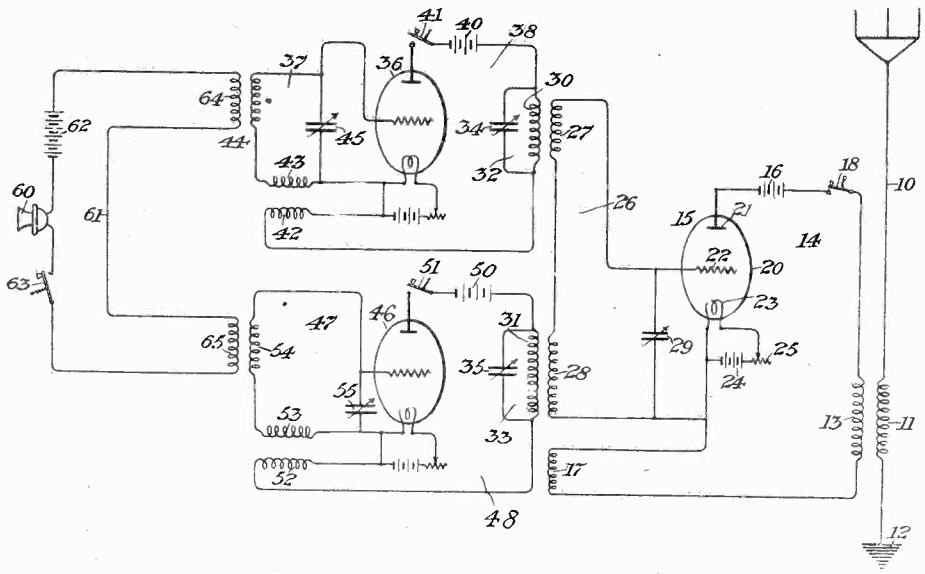
Station		Wave Length	Frequency Kcys	On the air during the week, except Sunday.
WDAP	Chicago, Ill.....	360	830	7:00-2:00 Tuesday to Saturday.
KSD	St. Louis, Mo.....	546	550	9:00-11:00 Except Wednesday.
WGY	Schenectady, N. Y.	380	790	7:50-11:00 Mon. Tues.-Thurs.-Fri.
WHB	Kansas City, Mo..	411	730	9:00-11:00 Tuesday-Thursday.
WOC	Davenport, Iowa..	484	620	8:00-9:30 Monday-Thursday-Friday.
				11:00-12M. Wednesday.
				10:30-11:00 Saturday.
WLW	Cincinnati, O.....	309	970	8:00-10:00 Monday-Wednesday.
				10:00-12M. Tuesday-Thursday.
WSB	Atlanta, Ga.....	429	700	9:00-1:00 Monday-Tuesday - Wednesday - Thursday - Friday-Saturday.
WOAW	Omaha, Neb.....	526	570	10:00-11:00 Every night but Wednesday
PWX	Havana, Cuba.....	400	750	9:00-11:30 Wednesday-Saturday.
WBAP	Ft. Worth, Tex....	476	630	10:30-11:30 Monday to Friday.
KFI	Los Angeles, Calif.	469	640	9:45-2:00 Every night.
KHJ	Los Angeles, Calif.	395	760	9:45-1:00 Every night.
KYW	Chicago, Ill.....	345	870	8:00-10:00 Tuesday to Saturday.. .
WFAA	Dallas, Tex.....	476	630	9:30-10:30 Except Wednesday.
WJAZ	Chicago, Ill.....	448	670	10:00-2:00 Tuesday to Saturday.
WJAX	Cleveland, O.....	390	770	7:00-9:30 Tuesday and Thursday.
WMC	Memphis, Tenn....	500	600	9:00-10:30 Monday - Thursday - Saturday.
				9:00-1:00 Tuesday-Thursday.
WCX	Detroit, Mich.....	517	580	8:30-10:00 Monday - Wednesday - Thursday-Friday.
				8:30-1:00 Tuesday.

Latest Radio Patents

Transmission and Receiving System

No. 1,472,218: Patented October 30, 1923. Patentee: J. H. Hammond, Gloucester, Mass.

Some of the objects of the present invention are to provide a method and apparatus for transmitting and receiving messages; to provide means for impressing upon a series of emitted waves a plurality of series of periodic modifications of different frequencies respectively and impressing on said waves and modifications a series of irregular modifications corresponding to a message; to provide means for selecting from a series of received waves a predetermined series of periodic modifications; to provide means for transmitting and receiving telephonic and telegraphic messages through the medium of irregular modifications impressed upon a plurality of series of periodic modifications of different frequencies respectively; and to provide other improvements as will hereinafter appear.



New method used in the transmission of modulated waves which claims several important improvements.

Secret Communication System

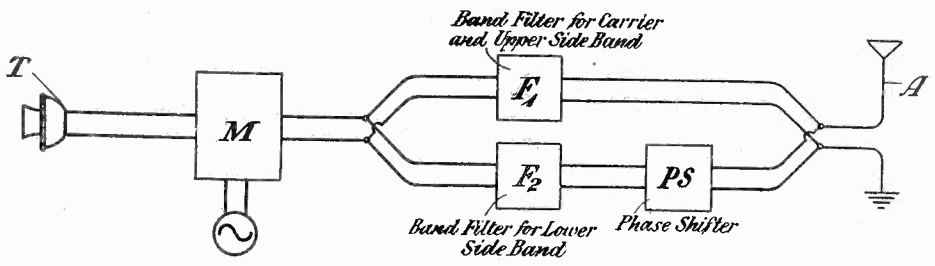
No. 1,474,426: Patented November 20, 1923. Patentee: H. A. Affel, Brooklyn, N. Y.

This invention relates to communication systems and more particularly to arrangements for providing for secrecy in the transmission of messages over such systems.

The arrangements of the invention are particularly applicable to many of the well known types of radio or carrier telephone and telegraph systems and cause such systems to so operate that listening in will not be possible with many of the relatively simple types of receiving circuits now in use. The operation of the arrangements of the invention is based on a manipulation of the phase relations of the two side bands produced in the transmitting circuit by modulation and on the provision for the necessary de-phasing action by the cooperating receiving station to restore intelligibility.

In radio or carrier systems the natural action of modulation at the transmitting station is to provide at the output of the modulator circuit a carrier frequency and two side-band frequencies, in addition to other non-useful frequency components. While it may be desirable in certain types of carrier systems to suppress, by suitable circuits or filters, the carrier frequency or one of the side bands, nevertheless in the ordinary type of radio systems, as a rule, both side bands, as well as a large proportion of the carrier current, is transmitted. At the receiving station of such a system, the action of the two side-bands and the carrier, preserved from the standpoint of phase and amplitude in substantially the same relations as at the ouput of the modulator circuit, provides for the production of the restored voice or signal current. The magnitude of the restored voice or signal current at the receiving station, is a function of the phase relations between the three frequency components involved, due to the fact that the restored current is obtained from a combination of two independent actions; first, the action of the upper side band and the carrier; second, the action of the lower side band and the carrier. The resultants of both actions must, of course, be combined in the proper phase to produce the best result, and if the two components are of substantially equal amplitude and opposite phase, the net resultant will be nil. Accordingly, the arrangements of this invention provide means whereby a definite de-phasing action, or change in the normal phase relation, may be introduced at the transmitting end of a radio or carrier system to so disturb the normal relations between the carrier and side band, that unless means are also provided at the receiving station for restoring the proper phase the volume will be greatly reduced and the message rendered unintelligible. Such an arrangement would prevent listening in and reception of the signals by the relatively simple types of receiving sets now in use as such sets would ordinarily not be provided with the phase restoring apparatus, nor would they ordinarily provide means of sufficient selectivity for eliminating one of the side bands and thus restoring intelligibility of the signal. The arrangements of this invention also provide means at the receiving station for restoring the original phase relation between the frequency components to provide an intelligible signal.

It is also within the intention of this invention to shift the phase of one side band to such an extent that the currents transmitted in it will represent substantially different elements of the original voice or signal impulses than are transmitted simultaneously by the other side band, so that the quality will be distorted and rendered unintelligible if both side bands are demodulated together in a receiver.



Means of transmitting signals which will be indistinguishable except to receiving systems havng a means of separating the interfering side band. The transmitting is done by means of a double filter and a phase shifter.

Detector for Wireless Signals

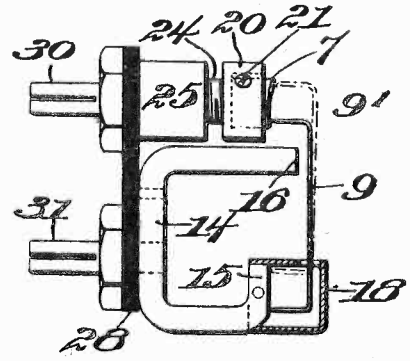
No. 1.475,027: Patented November 20, 1923. Patentee: E. F. Randall, Medford, Mass.

The present invention relates to detectors for wireless signals and more particularly to the type of detector involving the rectifying property of a sensitive crystal.

The object of the present invention is to provide an improved form of detector apparatus of the crystal type employing a magnetic field for maintaining the desired pressure engagement between the detector member and co-operating contact member.

With this object in view one feature of the invention contemplates the employment of a conducting member of magnetic material having a freely slidable engagement at one end with a smooth supporting surface and engaged in small area contact at its opposite end with a sensitive detector member and a magnetic pole located between the opposite ends of the conducting member and designed to maintain the conducting member in engagement with the detector member through the attraction exerted by the magnetic field. In the simplest and most efficient form of the invention which has not been devised a sensitive detector is located in proximity to a substantially U-shaped magnet in such a position that a conducting member may be supported at one end on one of the poles of the magnet and at its opposite end upon the detector member, the second pole of the magnet being arranged to maintain the engagement between the conductor member and the detector member through magnetic force.

This form of detector has been found to possess the advantage of a high degree of stability; that is, it is not easily shaken out of sensitive adjustment by the action of shocks and jars.



Crystal detector embodying several new and superior points, one being stability under heavy pressure without loss of sensitiveness.

DX Record Makers Are Getting Into Line

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.

From 'Way Down in Dixie'

From R. W. Grier, 808 Peachtree Street, Atlanta, Ga.

I enjoy reading the DX records, so decided to send mine in. My set consists of two stages of tuned radio-frequency using Crosley tuners, tube detector and two stages audio-frequency. UV199 tubes are used as radio amplifiers and WD11s for audio amplification and detector. My aerial is seventy feet long over all. It is well in the open and about twenty-five feet high.

This set was very difficult to tune at first, but after two weeks practice it came pretty easily. The volume of this set is not equal to a regenerative set, but it gets distance consistently. The following is my record since July 1:

KHJ, KFI, KPO, KFCL, KGW, KFEL, KSD, KDKA, KYW, CFCN, CHBC, KFKB, 6KW, PWX, WEAY, WHAS, WBAP, WHB, WDAF, WFAA, WOC, WJAX, WGY, WOS, WLW, WLAG, WBT, WOR, WOAI, WDAP, WMC, WGR, WOAW, WDAR, WSAI, WNAV, WFAZ, WPAL, WOQ, WJAZ, WDAL, WMAF, WCBD, WCX, WHAZ, WOO, WWJ, WDAI, WCAP, WRC, WFI, WNAC, WBZ, WBAV, WTAS, WTAM, WCAE, WMAQ, WIP, WJAR, WRK, WJZ, WEAF, WPAD, WBAD, WSAC, WKV.

The following have been heard in the afternoons between three and five P. M.: WGY, KDKA, WMAQ, WLW, WSAC, WSAI, WEAF, WSY, WHAS.

Most of these were heard consistently through the summer including KHJ and KPO.

Here Is One From the Golden West

From R. C. Anderson, 121 Pine Avenue, Long Beach, California.

For the DX Nite Owl column, append the following list of stations heard here on the evening of November 16. Receiver is three circuit Armstrong, of my own construction, and one step amplifier. Aerial is one wire 175 ft. long and 35 ft. high. Tubes, an old Moorhead pickle tube, and VT for amplifier. We have lots of spark QRM to contend with, not to mention the two broadcasters in Los Angeles.

WJAZ, KYW and WDAP, all of Chicago; KSD, St. Louis; WDAF, Kansas City; WOAW, Omaha; KDKA, Pittsburgh, including his relay of time signals; PYR, Mazatlan, Mexico; WBAP, Ft. Worth; KRE, Berkeley, Calif.; KPO, San Francisco; KGW, Portland; WMC, Memphis; KDYL, Salt Lake—14 distant stations in one evening. In addition, there were three other distant stations I could not log for QRM.

Copied KDKA three late afternoons this week in daylight (5:15) here. My log over the past week include these additional distant stations: WWJ, Detroit; WTAM, Cleveland; WHAZ, Troy, N. Y.; WOC, Davenport; WHB, Kansas City, and others.

There is nothing unusual about my set, which employs two variometers, vario coupler, and tuned plate circuit. I have found this set superior to many of the new circuits.

Here Is a New Idea—Daytime DX

From Gene Ullemeyer, Rock Island, Ill.

Just to have something new in the contest line why not have a daytime DX contest to end at 5 P. M.

Just to start the contest: WOI, 175 mi.; WMAQ, 175 mi.; WJZ, 900 mi.; WOAW, 225 mi.; KSD, 225 mi.; WOO, 850 mi.; KVW, 175 mi.; WJAZ, 175 mi.; WCBD, 175 mi.; WDAP, 175 mi.; WHAS, 375 mi.; 9EFO, 50 mi.; WOC, 5 mi.; WWJ, 400 mi.; 9ANR, 5 mi.; WHB, 225 mi.; WLAG, 275 mi.; 9ET, 75 mi.; WHA, 125 mi.; WFAA, 775 mi.; WCK, 225 mi.; WRAO, 225 mi.; WDAF, 225 mi.; WBAK, 775 mi.; WJAN, 100 mi.; WRC, 800 mi.; WOS, 275 mi.; WEAF, 900 mi.; WRM, 200 mi.; WSB, 700 mi.

Who Says It Can't Be Done?

From Cowan A. McFarland, Staff Sergt., Medical Dept., Fitzsimons General Hospital, U. S. Army, Denver, Colo.

The list given below of 155 stations is my DX record for the period from September 1 to November 14, 1923.

My receiving set is a home made one, and is a single circuit regenerative with one stage of tuned radio frequency. In addition I have a two stage audio amplifier, but it was not necessary to use it on 90 per cent. of the stations mentioned unless it was desired to operate a loud speaker. Should any one desire to try the detector circuit they will find it on page 1966 of the May, 1923, Radio News. In my opinion this circuit is a real go-getter, and once you land your station it rolls in with lots of pep.

KDKA, KDYL, KDYM, KDYS, KDZE, KDZT, KFAD, KFAE, KFAJ, KFAU, KFBB, KFBK, KFCF, KFCK, KFCL, KFCY, KFDJ, KFDP, KFDY, KFEC, KFEV, KFEX, KFFQ, KFFZ, KFHC, KFHX, KFI, KFIL, KFIX, KFJB, KFJD, KFJL, KFJM, KFJW, KGB, KGG, KGN, KGW, KHJ, KJQ, KJS, KLS, KLX, KOB, KOP, KPO, KQI, KRE, KSD, KUO, KWG, KWH, KYW, KZM, KZN, KFLQ, WAAP, WAAW, WBAD, WBAH, WBAP, WBAV, WBL, WBZ, WCAE, WCAH, WCAJ, WCAL, WCAP, WCAR, WCAS, WCBD, WCK, WCX, WDAF, WDAO, WDAP, WDAY, WDZ, WEAF, WEAH, WEAY, WEB, WFAA, WFAN, WFAT, WGR, WGY, WHA, WHAS, WHAD, WHAH, WHAB, WHAZ, WHB, WIAS, WJAD, WJAG, WJAM, WJAN, WJAP, WJAX, WJAZ, WKY, WLAG, WLAL, WLW, WMAJ, WMAQ, WMAY, WMC, WNAD, WOAI, WOAW, WOC, WOI, WOQ, WOR, WOS, WPAD, WPAH, WPAK, WPAL, WPAM, WQAQ, WRAD, WRAL, WRK, WRM, WRR, WSAI, WSAT, WSB, WSY, WTAH, WTAS, WWAC, WWJ, WTAM.

Canadian: CFAC, CFCK, CFCL, CFCN, CFQC, CHBC, CHCE, CJCA, CKCD, CKZC, CKCK. Cuba: PWX. Amateur voice: 9AVZ, 9XW, 9CLS.

This list does not contain any local stations.

Here Is One on Reinartz

From Wm. Thos. Robinson, 19 Claremont Court, Burnell St., Winnipeg, Man., Canada.

I am a constant reader of RADIO WORLD and take great pleasure in reading your DX column. My hookup is a Reinartz, built by myself, a detector and two stages. I am using the 3½" coil with three switches, one 11-plate condenser on plate, and a 23-plate condenser with 3-plate vernier on grid. My aerial is 35' high, 2 strands of wire 60' long. I have received 140 stations in Canada and U. S. A., and those stations are in 22 states in U. S. A. and 4 provinces in Canada. Eighteen of the stations are over 1,000 miles and my furthest station is 3,000 miles. My record for Saturday night, December 1, is as follows:

WDAF, Kansas; WLAG, Minnesota; WOC, Davenport, Iowa; WOAW, Omaha, Neb.; KDKA, Pittsburgh, Pa.; WDAP, Chicago; WMAQ, Chicago; PWX, Havana, Cuba; WTAM, Cleveland, Ohio; WOQ, Kansas; WFAA, Dallas, Texas; WGY, Schenectady, N. Y.; KHJ, Los Angeles; WJAZ, Chicago; KPO, San Francisco; CFCN, Calgary, Alberta, Canada; KSD, St. Louis; KYW, Chicago.

The First from Jersey

From P. H. Ames, Brookside, N. J.

I have read with interest the many DX lists which have appeared in RADIO WORLD, and I think mine may measure up to the rest of them.

My set is a single circuit, regenerative, and usese no amplification. The tube is a UV201A operating on 3 dry cells, and 22½ volts on the plate. I have heard eighty-four (84) stations since July, the most distant of which are:

WDAF, Kansas City, 1,100 mi.; WHB, Kansas City, 1,100 mi.; PWX, Havana, Cuba, 1,500 mi.; WBAP, Fort Worth, 1,475 mi.; WFAA, Dallas, 1,425 mi.; WOAW, Omaha, 1,150 mi.; WLAG, Minneapolis, 1,050 mi.; WOS, Jefferson City, 950 mi.; WOC, Davenport, 900 mi.; WMC, Memphis, 950 mi.; KSD, St. Louis, 900 mi.; WPAH, Waupaca, Wis., 900 mi.; WTAS, Elgin, Ill., 825 mi.; WSB, Atlanta, Ga., 725 mi., and five stations in Canada.

Startin' Off Small—End Up Big!

From K. Osbun, West Sixth Street, Auburn, Indiana.

I am sending you my list of DX stations I have received on my set. I have a regenerative set with two steps. I am just giving you the real DX ones:

WOAW, Omaha; KFI, Los Angeles; WSB, Atlanta; WFAA, Dallas; WOR, Newark, N. J.; WOS, Jefferson City, Mo.; KDKA, Pittsburgh, and WHAZ, Troy, N. Y.

MAGNAVOX
Radio Products

A1-R—$59.00

THIS combination of electro-dynamic Reproducer and one-stage Power Amplifier gives the user the utmost in adaptability, convenience and efficiency.

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 battey 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
Canadian Distributors
Perkins Electric Co., Ltd., Montreal

Radio Merchandising

Advertising Rates: Display, $5.00 an inch, $150.00 a page. Classified Quick-Action Advertising, 5 cents a word. Phones: Lackawanna 6976 and 2063

"The Radio Limited"

A TEN-CAR special train for radio manufacturers and jobbers, under the direction of James F. Kerr, general manager of the recent Chicago Radio Show, will leave Chicago January 27 at 6 P. M., arriving in Los Angeles February 4 at 7 A. M., one day ahead of the opening of the Biltmore Radio Show, which is being conducted by the American Radio Exposition Company. One day will be spent in Omaha; one in Denver and one in Salt Lake City, permitting the trade in each section to visit the radio manufacturers and jobbers in their compartments and exhibit cars.

This train will be preceded by three advance agents, the first fourteen days ahead who will round up the dealers and jobbers of the district and concentrate all radio interest on the day the train visits the city. The second man will leave ten days ahead and will do the billing and advertising of the big event. The third man will be four days ahead and will consummate all arrangements with local interests for the reception of "The Radio Limited."

The special fare on "The Radio Limited" is $475.00. This includes sleeping quarters, three meals per day while traveling, sleeping accommodations and breakfast each day during the Los Angeles' stay. It is necessary, however, that the sleeping accommodations be paid for in Los Angeles, whether utilized or not, in order that the special equipment may be retained for the return trip.

There will be two cars fitted for exhibit space. All booths will be the same size and will cost $200 each for the trip. Booth space is extra.

New Radio and Electrical Firms

Radiodyne Sales Corp., New York City, radio outfits, $5,000; J. A. Straley, A. F. Arnold, P. H. Culkin. (Attorney, A. Rubin, 174 Monroe St.)

R-C Mills Radio Corp., New York City, 1,000 shares common stock, no par value; D. and L. and R. Coen. (Attorney, J. Z. Stein, 67 Wall St.)

Paramount Radio Corp., Wilmington, Del., manufacture radio apparatus, $2,500,000. (Corporation Service Co.)

Goll Stores, New York City, radio and electrical supplies, $25,000; E. A. Weigand, J. K. Bolton, A. Goll. (Attorney, B. H. Noden, 115 Broadway).

Surplus Sales Corp., Bronx, New York City, radio and auto accessories, $20,000; B. S. Nathanson, H. Koltz. (Attorney, R. S. Mullen, 149th St. and 3d Ave., Bronx).

Tri Square Radio Co., New York City, $2,500; S. Miller, M. Atkins, J. Kotch. (Attorney, H. S. Budner, 11 Broadway.)

Bunnell Radio Corp., New York City, 500 shares preferred stock, $100 each; 1,000 common, no par value; R. D. Bunnell, P. T. Smith, W. J. Oliver. (Attorney, F. J. Knorr, Albany, N. Y.)

Raymond Electric Appliance Co., Rochester, N. Y., $10,000; S. H. Savage, I. B. Virkus, L. Guistino.

First Bell Rung by Magnet Heard from WHAZ

THE first bell ever rung in response to the electric magnet, invented in 1831 by Prof. Joseph Henry while an instructor at the Albany Academy, was rung again on the evening of December 17, over the WHAZ radiophone at the Rensselaer Polytechnic Institute, in Troy, N .Y., for the benefit of the radio audience. The occasion was an observance of the anniversary of Joseph Henry in which the entire electrical world will be deeply interested, as the invention of the electromagnet was a basic discovery to which the telegraph, telephone, radio and other means of electrical communication beside many other modern electrical devices are much indebted. The remarkable feature of the demonstration was that the original bell of 1831 has been preserved and is now a prized exhibit at the New York State

Prof. Henry's historic bell rings over the air.

Museum from which it was brought by a trusted caretaker to the WHAZ broadcasting station to be rung again in 1923.

It was first rung from this station about 10 o'clock, Eastern Standard Time, during an address by Dr. John M. Clarke, director of the New York State Museum, on "Joseph Henry's Boyhood Days and Early Discoveries." The bell was rung several times during the program, and there was a special demonstration at midnight for the benefit of listeners on the Pacific Coast. The "Illustrated London News," taking cognizance of the fact that the Troy station is heard in the British Isles every Monday night, had already announced the coming demonstration. Many notables throughout this country had expressed interest in the proposed observance and the State Museum last week received a letter from Assistant Secretary of the Navy Theodore Roosevelt expressing hearty approval of the movement to honor the memory of Joseph Henry.

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:

Arthur Mideke, R. F. D. 2, Hugo, Colorado.
Bolivar Trading Co., Bolivar, Pa. (Retailer.)
K. Tracy, 2429 Banks, Superior, Wis.
Harry Gilmore, 247 N. State St., Marion, Ohio.
A. G. Ward, Ave. A, Rome, Ga.

Radio Trade Notes

William R. Bayes has been appointed receiver, under a $50,000 bond, of the Multiple Storage Battery Corporation, Queens, Long Island, N. Y.

Ralph J. Golsen, Argyle Building, 1128 Argyle Street, Chicago, has recently added radio products to his line.

New Radio Station for New York City

THE New York City Board of Aldermen last week gave Commissioner Whalen of the Department of Plant and Structures permission to spend $50,000 without public letting for the purchase and installation of equipment and the construction of a radio-telephone broadcasting station in Central Park.

Electric Show in Melbourne

RADIO will be featured at the electrical exposition in the Australian capital next September. The electrical exhibition, under the auspices of the Victoria Electrical Federation will be held in Melbourne. It is planned to cover every phase of the electrical industry, showing actual working models of the various types of apparatus from toys to machinery. Both wireless telegraphy and telephony will have prominent places in the exhibition.

Secretary Mellon Says Trade Outlook Is Good

SECRETARY OF THE TREASURY MELLON expressed the opinion last week, when asked about the industrial and business outlook, that recent developments apparently have given support to the statement made in his annual report that "the factors which have been most influential in the revival that has taken place are likely to remain effective, at least in a considerable degree."

Radio and Electrical Business Opportunities

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

BATTERY and ignition business; long established; $3,000. Address Battery, RADIO WORLD.

MANUFACTURER is open for new radio items of merit; organization is equipped to finance and market with national distribution; give fullest details first letter. Z, RADIO, WORLD.

RADIO INVESTMENT
$5,000-$10,000 for expansion of radio manufacturing business; prefer electrical engineer or man experienced in manufacturing radio or other electrical devices, with or without services; references exchanged. Box 14, RADIO WORLD.

Important Notice to Subscribers:

Changes of address must be sent in two weeks before date of publication. Always give the old as well as the new address.

When subscribing please always state whether the subscription is a new one or a renewal.

Some "Radio World" Beats

First in the Field with Pictures and Radio News Stories

RADIO WORLD has printed more beats and exclusive articles than any other radio publication. Proof of this statement is to be found in a file of our back numbers.

Here are some pictorial, news and technical beats that first reached public attention through the columns of RADIO WORLD:

First Report of the New Donle Tube, January 13, 1923.

How Radio is Handled in the Atlantic Fleet of Uncle Sam's Navy, by Robert Bachmann, Commander, U. S. N., January 20, 1923.

Canada's Largest Radio Station Broadcasts in Both French and English, by Pierre D'Orsay, February 17, 1923.

Receiver Operates Under New Principle, invention of Professor Hazeltine, March 10, 1923.

Lee De Forest Demonstrates His Talking Picture Machine, March 24, 1923.

More About the Hazeltine Neutrodyne, March 24, 1923.

Newark Apartment House First Building to Give Tenants Radio Service, March 31, 1923.

A Working Explanation of the Neutrodyne, by K. H. Stark, Chief Engineer, F. A. D. Andrea, Inc., March 31, 1923.

Will the Freeman Tube Revolutionize Radio? by A. S. Gordon, April 28, 1923.

Navy Electrician Designs Efficient Four Tube Transmitter, May 5, 1923.

How to Make a Super Amplifier, by C. White, Consulting Engineer, June 9, 1923.

Pitfalls of the Radio Investigator and Inventor, by E. N. Curtis, June 23 and 30, 1923.

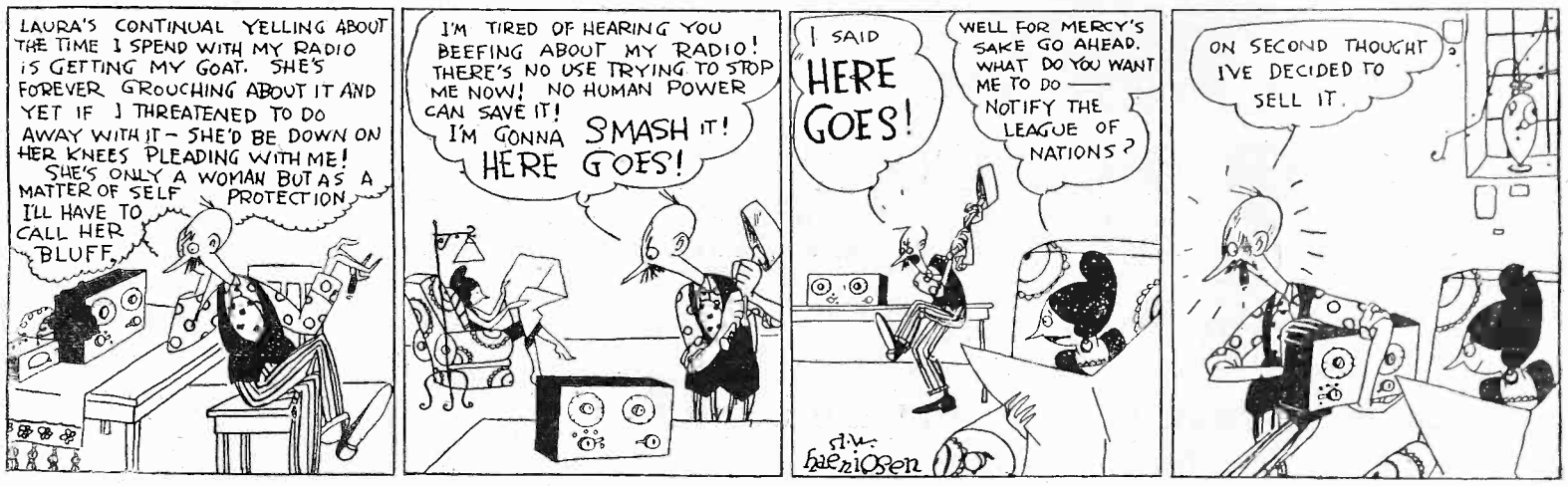
Practical Wired Wireless Demonstrated, September 8, 1923.

The Radio Controlled Watch Which Automatically Corrects Itself Twice a Day, October 6, 1923.

Transatlantic Tests on the Origin of Atmospherics, by Dr. Gradenwitz, November 10, 1923.

How I Radioed the First Japanese Earthquake News to the World, by Kaichiro Yonemura, December 1, 1923.

Simeon Batts Has Two Thoughts



Courtesy New York Evening Mail Radio Review

A Complete Broadcasting Station and Program Service for Radio World Readers

RADIO WORLD has published from time to time lists of Radio Broadcasting Stations and Broadcasting Programs. RADIO WORLD will give, beginning with the next issue, a complete service. RADIO WORLD, in other words, will give its readers the most complete and authoritative service it is possible to give in this department.

Get next week's RADIO WORLD and see just what we mean.—The Editor.

Radio Sets in Denmark

DENMARK now has officially licensed 3,109 private radio receiving sets, Charge d'Affaires Harriman, at Copenhagen, reports. School pupils rank first with 473 sets; commerce, shipping, and industry second with 448; office and store employees have 354; artisans, 341; electrical contractors, 334; and laborers, 324.

Coming Events

SECOND ANNUAL RADIO SHOW, Biltmore Hotel, Los Angeles, Calif., February 5 to 10, 1924.

AMERICAN RADIO RELAY LEAGUE, Fourth Radio District and East Gulf Division Convention, Atlanta, Ga., December 27-29, 1923.

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 the Broadcasting Editor, RADIO WORLD.

Cut off. Fill out. Mail today.

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

Dear Sir:

My favorite entertainer is.....

My second choice is.....

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

Col. Saltzman Succeeds Gen. Squier as Chief Signal Officer

CONCERNING the retirement of General Squier, as noted in RADIO WORLD last week, Secretary of War Weeks states: "General George O. Squier, Chief Signal Officer, is retiring at his own request and not resigning. He is greatly interested in technical questions, so doubtless finds his present duties irksome and wishes to devote his time and energy to the work in which he has demonstrated brilliant ability."

The Secretary also announced that he would recommend Colonel Charles McK. Saltzman, the senior colonel of the Signal Corps, to succeed Major General Squier as Chief Signal Officer upon the latter's retirement, after more than forty years' service, on December 31, 1923.

Colonel Saltzman was born in Iowa, October 18, 1871, and was graduated from the Military Academy in 1896. During the World War, he was a Brigadier General in the Signal Corps, serving as Assistant to the Chief Signal Officer of the Army in Washington.

Colonel Saltzman has long been interested in radio and all methods of signaling. Among his many important assignments are the following: Chief Signal Officer of the Philippine Division, in charge of Electrical Division, Office Chief Signal Officer; delegate from the United States to the International Radio Conference in London, 1912; member of Interdepartmental Board on Radio Telegraphy in Washington, 1912-13, and member of Interdepartmental Committee on Radio Telegraphy in connection with the International Conference on Safety at Sea, 1913.

ON APPROVAL FOR 30 ¢
ZOBEL-STEIN LABORATORIES
322 9TH ST. BROOKLYN, N.Y. SOUTH 2650

New Film to Be Boosted By Radio

IN conjunction with the release of "The Shooting of Dan McGrew," a Sawyer-Lubin special film, which will soon enter production at the Metro studios, arrangements have been made whereby the famous Robert W. Service poem will reach millions of movie fans throughout the country by means of radio broadcasting. Just before the release of this film, a crew of trained elocutionists will tour the country and visit each important broadcasting station, from which the poem will be put on the air.

SOLID COMFORT
Comes With The Use Of The

TRADE MARK
AUDIOPHONE
REG. U. S. PAT. OFFICE

because nothing is lost from the original broadcasting.

Not only is it easily possible to distinguish the words of the speaker, but also the minute graduations in pitch, timbre and quality of overtones which distinguish individual voices. The Audiophone is complete and self-contained—needs no separate battery or other accessories—goes to you ready for use on connecting to your receiving set. It will prove a source of lasting pride and pleasure.

Senior Audiophone....Price $32.50
Junior Audiophone....Price $22.50
Baby Audiophone.....Price $12.50

Senior Audiophone

Bristol One Stage Power Amplifier

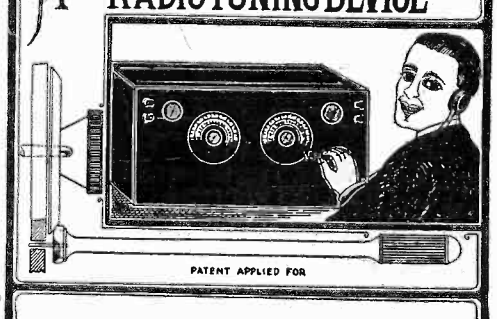
If greater volume is desired, over what you already obtain, use the Bristol One Stage Power Amplifier. No C Battery required.....Price $25.00

One Stage Power Amplifier

THE BRISTOL COMPANY
WATERBURY, CONN.

BRANCH OFFICES:
Boston New York Philadelphia
Pittsburgh Detroit Chicago
St. Louis San Francisco

HUNT'S UNIVERSAL HAIR-LINE RADIO TUNING DEVICE



OVERCOMES BODY CAPACITY

Gives micrometric adjustment outside the field of inductivity.

Tested and approved by amateurs and experts. Enables you to tune *distant stations easier and more clearly.* Simple as A B C. Installed from outside, no dismantling of your set necessary. *Audibility* made *more natural* or *less distorted* by the fine adjustments obtained. One Hunt's Device handles all dials on set or several sets. Costs only one dollar on guarantee of money refunded if not satisfied. Ask your dealer or order direct from *Hunt Co., 486 Shrine Bldg., Memphis, Tenn.*

Book of
7 COMPLETE PLANS 50c
Reinartz Tuner
One Tube Reflex
Honeycomb Receiver
Long Distance Receiver
Short Wave Regenerative
Two Stage R. F. Amplifier
WD-11 Hookup.

FULL SIZE TEMPLATES
list of parts, diagrams, and directions

AT DEALERS OR DIRECT FROM

S. Newman Publisher — THE RADIO CONSTRUCTOR — 74 Dey Street, New York

Prominent Speakers at Radio Meeting

BEDFORD BRANCH Y. M. C. A., Brooklyn, N. Y., held a session of its radio class open to the general public on the evening of December 17.

C. B. Cooper, president of the C. B. Cooper Co., member Hoover's Committee on Broadcasting, treasurer of the National Radio Chamber of Commerce, and vice-president of the Radio Trade Association, spoke on "Radio and Its Opportunities." Mr. Cooper has been actively engaged in radio work for the past twenty years.

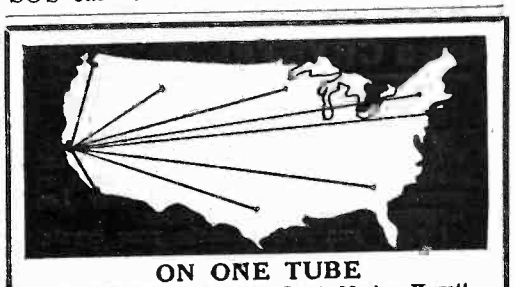
Following Mr. Cooper's talk was an address by J. G. Truesdell, on "Radio Broadcasting." Mr. Truesdell is plant manager of the American Telephone & Telegraph Company, which operates station WEAF. Mr. Truesdell told of the rapid development in broadcasting and of some of the experiences his company has had.

After Mr. Truesdell spoke, the audience was given a sample lesson on radio as taught to the radio classes at Bedford Branch.

Broadcasters Must Also Listen In

OUT of thousands who listen in on WRC, few know that WRC, as well as all broadcasters near the coasts, also listens in constantly, not on its own "stuff," speaking informally, but for ships. As the law requires every hour of the day while the big Class B station of the Radio Corporation in Washington is on the air, one operator is listening in on 600 meters, the ship emergency wave, for SOS calls. When one comes in, broadcasting is shut down until the air is cleared, usually by some coastal naval station.

One night recently during the midnight show the operator on watch at WRC heard an SOS from a ship off the coast of New York and immediately pulled the switch cutting off the power in the midst of a number by a local orchestra. Later, when NAH and NAO, naval stations at New York and Charleston, reported "all O. K.," WRC went on with the show. This was the third SOS call heard while the station was broadcasting, and shows the necessity of keeping a watch on the 600-meter wave. If broadcasting kept up during the transmission of distress calls, it is doubtful if the calls would get through or whether aid would be brought to the ship; the law requires, however, that coastal stations cease operation when an SOS call is heard.



ON ONE TUBE

Broadcasting from Atlantic Coast, Mexico, Hawaii, Canada and Cuba heard in California by users of CROSS COUNTRY CIRCUIT. Range due to simplicity of set and only one tuning control. Easily and cheaply built by any novice. Dry cell tubes may be used. All instructions, blueprint panel layout, assembly photo, etc. Postpaid 25c. Stamps accepted.
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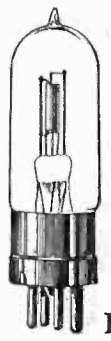

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—that help the game

Oh, what we know about jacks! If we were to romp through our records I should venture to say we have sold jacks enough to make the side of the Court House look like a radiator hood on a Flivver. Yes! We have built hundreds of thousands of jacks for the most critical telephone work for years. If you need jacks and want to be absolutely sure they will deliver, just put "Kellogg Jacks" down on your order list. You can't go wrong.

A thoroughly efficient, snug little job at $1.10 apiece for 4 conductor Jacks.

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$25.00

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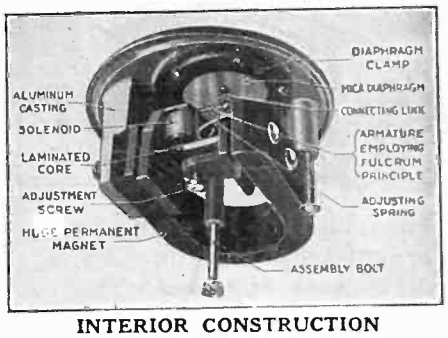

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An ear phone is an ear phone no matter how fancy the horn that covers it may be, and, due to the delicate construction of an ear phone it is utterly incapable of giving true tone reproduction, especially when relatively large currents are passed thru its coils, such as the output of a two-stage or power amplifier.

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One Year, 52 Issues..... 6.00
Add $1.00 a Year to Foreign Postage; 50c for Canadian Postage.

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Up to date, just off the press. Shows call letters, location, wave length, and kilocycles of all radio broadcasting stations, also American Relay divisions and radio districts. Complete with scale for measuring distances. Size 28x34 inches, printed in three colors. Postpaid for a dime.

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TUBES SENT PARCEL POST, C. O. D.

OUT OF THE ETHER

Chats About Broadcasting Stations

By Hirsch M. Kaplan

I suppose Paul Specht must have thought my suggestion of last week a good one, for the program as rendered this week by his Hotel Alamac Orchestra came over in great fashion.

The Big Bethel Choir No. 2 from Station WSB helped us enjoy a very pleasant hour with their splendid program of darky songs.

No getting around it, there is nothing quite so good as colored folks' songs.

WJY is now on the air regularly every Sunday with the Waldorf-Astoria Symphonic Orchestra, of which Joseph Knecht is director. This orchestra, which is already known to many of you, is the only hotel orchestra which even approaches symphonic proportions.

Henry Ford, our great national character, philanthropist, historian, and democratic employer, was tuned in while making his address from Station WWI in connection with the transatlantic tests.

Maybe someone can explain why, during the international tests, the program rendered both on this side and the other came through in the usual clarity, while that which the announcer said came through very mushy. This was especially noted of Stations WGR, WGY, WWI, 2 LO.

WFI was tuned in broadcasting the one-act playlet, entitled "Blackmail." After this Regina Marsh and Harold Simmonds rendered several numbers which were greatly enjoyed and which helped in rounding out a splendid evening of entertainment.

Los Angeles to Chicago on a CRYSTAL Detector

CRYSTALS ARE THE BEST YET! KEEP YOURS

At Los Angeles I receive WJAZ, Chicago; WOC, Davenport, and many other distant stations on mine—you can do the same on yours. Folks come from all over Los Angeles to hear the one I made.

I show you how to make your crystal set into the best receiver you could hope to own. Send $1.00 for detailed instructions and 2-color wiring chart or send stamped envelope for further information.

I have no parts or sets to sell. **LOREN E. TAYLOR**, 2497-C Beachwood Drive, Los Angeles, Calif.

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DX-ALENA, the Sensational, Synthetic, Guaranteed Radio Crystal. Each Crystal tested on Broadcasting 50 miles distant. Fifty cents postpaid. Dealers should get our attractive proposition.

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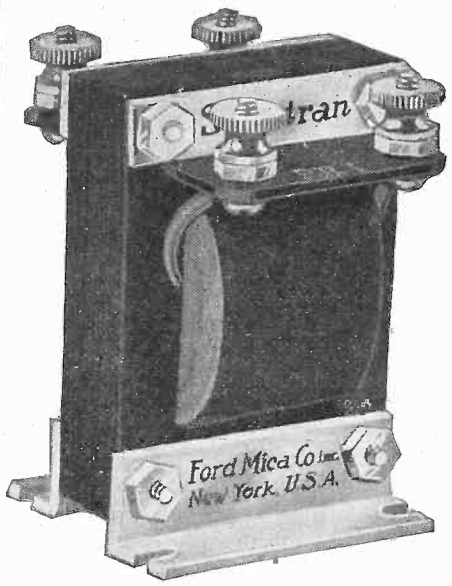
SUPERTRAN

The Audio-Frequency Transformer that does more than meet requirements.



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Roberts Rechargeable "B" Battery

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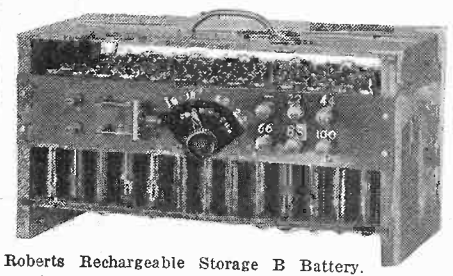

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No change of wiring necessary. Only three (3) main terminals to connect.

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or direct from
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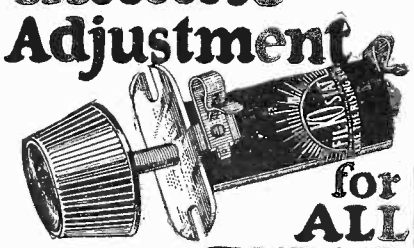

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Sole International Distributors

Farmers Slow to Adopt Radio

CONTRARY to the general impression, the American farmer has not yet fallen very hard for radio. Compared with the number of farmers in the United States, the number of radio sets in use on farms is small.

One-fourth of the people engaged in gainful occupation in this country are farmers; there are 6,500,000 farms in the United States. But so far as available figures indicate, the farmer is just beginning to come into the market for radio on any scale commensurate with the number of farmers who are potential buyers.

"This phenomenon of the development of radio," according to E. B. Dallin, research engineer of the Acme Apparatus Company, "has somewhat puzzled manufacturers, for if anybody could make practical use of radio it is the farmer. It would be useful and entertaining to him at all times of the year, and his dull time, the winter season, is the best time of the year for the most satisfactory reception of radio.

"Radio is always a source of news. It brings to the farm daily weather reports and forecasts which are invaluable in the handling of crops. It furnishes stock quotations daily, including quotations on crops and commodities as well as securities. Government crop reports are broadcast at frequent intervals. To the farmer and his family who live at a distance from church, radio brings the sermons and services of city churches. In addition, the wide range of entertainment and educational programs broadcast daily are as available to the farmer as to anyone else anywhere, provided he has a good set.

"Perhaps one reason why the farmer until recently has been slow in taking up radio is that he has not known what set to buy, or has not known how easy it is for him to build his own set. He has been puzzled as to which set to buy because of conflicting reports on the efficiency of various types of circuits, all of which are more or less Greek to him. He has hesitated to try to build his own, owing to the fact that diagrams of circuits have until recently appeared intricate and hard to follow.

"One manufacturer has recently issued a booklet with diagrams showing the apparatus connected into sets of various kinds so simply that it is only a question of placing the parts on a board and connecting piece to piece as shown in the dummy. Other manufacturers are following along the same line, and the farmer no longer needs to feel that he must have an engineer on hand before he can get a set working.

"Radio is sure to make a place for itself on the American farm, and on a large scale. Signs of this are already evident."

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THE RECEIVER YOU WILL EVENTUALLY BUY

Conceded To Be The Set Without A Peer

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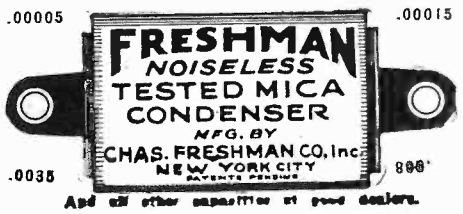

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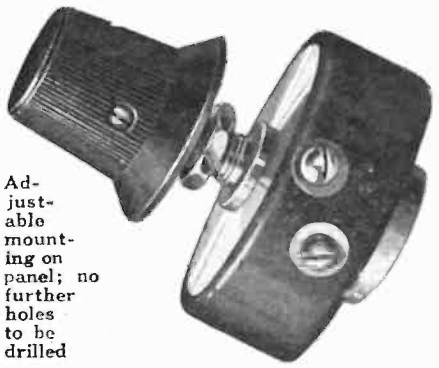

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Control, 1 Amp. 0 to 75 Ohms

Suitable for any make of tube operating on 1½ to 6 volts.

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Designed for use with several tubes or for use with power amplifiers and vacuum tube transmitters.

ERMCO-STATS give zero resistance when in full position and are entirely open at full off.

ERMCO-STATS give infinite variation of control and will operate any type of tube.

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April 22, 1922	October 28, 1922
April 29, 1922	January 13, 1923
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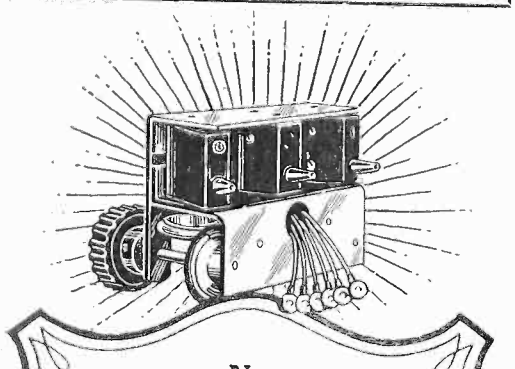
June 24, 1922	January 27, 1923
August 5, 1922	February 24, 1923
October 21, 1922	May 12, 1923

If you can supply these back numbers, mail them to this office and we will send you current issues for them.
RADIO WORLD
1493 Broadway New York City



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This sturdy, well-made coil mounting allows you to conceal bulky coils behind the panel. Only knob and pointer can be seen. Friction gears, aligned to a tiny fraction of an inch, insure quick, smooth, precise "vernier" adjustments. Like all other Columbia products, this Inside Coil Mounting is a distinctly good value at its price of $6.00.

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Tinklings Across the Sea

A PIANIST in Bournemouth, England, sat down to play very early the other morning by English time or late the preceding night by American time, says an editorial writer in the "New York Herald." His piano was in front of a radio transmitting instrument. An almost imperceptible fraction of a second later radio receiving stations in the United States heard him. If San Antonio, Texas, and Chicago, Illinois, with characteristic Western impetuosity, hadn't broken in shortly afterward the whole of a considerable program arranged in England for our benefit might have been heard here.

Trust the radio fans and inventors to prevent such interruptions next time. Before long any one anywhere in the world will be able to make himself heard, by voice, bass drum, violin, piano, jewsharp, cornet, xylophone, tuba, mouth organ, cello, bass horn, saxophone, French horn, trombone, harp, police whistle, cow bell, tin pan, calliope, flute, piccolo, banjo, tomtom, oboe, automobile horn, or any other instrument of brass, reeds, or strings, or any instrument to be blown upon, plucked, pounded, scraped or otherwise maltreated, or any instrument yet to be invented, anywhere else in the world. All the bars of stillness are down, all the veils of silence are rent. The morning stars may sing together if they like, but from now on they run no chance of being heard.

But if we are to escape pandemonium we may expect some sorting out and censoring of the multitude of noises which it is now possible to spread abroad on the wings of the morning, afternoon, evening and night. Who will want to hear a second rate pianist, violinist or speaker when by turning a few screws he can hear the best in the world? We are approaching a time when the whole of humanity will be one vast audience before which will pass, one at a time, the few supreme artists in the production of sound.

Let those who jeer at the radio consider from what depths of pitiful mediocrity this invention may deliver us. And—which is not gratifying—how it will standardize our tastes, so that every one all over the world will be whistling and humming the same tune at the same time, and thinking the same thought.

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PATENT APPLIED FOR

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Accommodates Head Set and Loud Speaker or Two Head Sets — permitting *instant* choice of Five Circuits without removing plug or changing tips.

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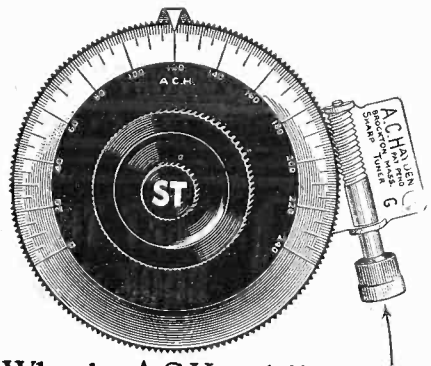

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Rough tuning with dial or one thousandth of an inch in either direction.

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Regular fitting 5-16" hole, ¼" and 3-16". Bushings, 5c. each extra. 10c. for all.

"Kindly accept my thanks for ACH Dial. The shield does away with body capacity, that I have been troubled with before. I only wish I had purchased one months ago." G. E. Allen, Hazardville, Conn.

"Please send me 6 more dials, I am enclosing $2.00, balance C.O.D. I have had excellent results with the ACH on my set." R. N. Harrah, Rainage, W. Virginia.

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The ACH will improve any set.
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High Dielectric Resistance. Three sizes only.

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12"x24"	1..... 1.75	2.....	3.00

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are always sure with
Fahnestock Patent Wire Terminal
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Eliminates Vibrations
Easily Attached—No Soldering
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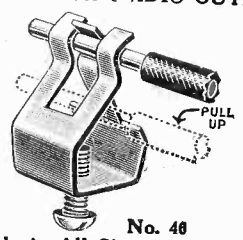

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A ONE HUNDRED-MILE broadcast line will tie up the new Boston studio of Station WBZ in Springfield, Mass., when arrangements by the Westinghouse Electric Company and the Boston Traveler-Herald are completed.

This line, which will be the longest span connecting studio and station in the country, has been specially designed for broadcasting, and will be used solely for that purpose. It will be built by the Western Union Company, on the poles on the Boston & Albany Railroad right of way. To eliminate line noises, the wires will be transposed at frequent intervals, and every precaution will be taken to make it a line as good as similar lines connecting studios and stations only a few miles away.

The Boston studio will be located on the Brunswick Hotel, and will be specially built for broadcasting. It will be acoustically as well as artistically perfect. As Boston is the acknowledged center of culture, as well as one of the best musical communities in the country, the location is ideal. The line from Springfield to Boston will also connect with a number of places in that city. The pick-up system around Boston will be as elaborate as a telephone exchange. This will give Station WBZ the advantage of a greatly varied program.

Although Station WBZ has been heard in England, Cuba, and on the Pacific Coast, changes in the transmission apparatus are contemplated which will again increase the range of the station. All of these improvements will make of Station WBZ one of the best in the country, and will greatly increase its utility and value.

Wife Questions Sanity of Radio Fan

LOUIS VONDERPUYL, Ridgefield Park, N. J., had Audley Walsh, a near neighbor, arrested three months ago because the latter's radio outfit made too much noise. It was a nuisance, according to Vonderpuyl, and he wanted it taken out, but the court decided it was all right for Walsh to enjoy the instrument.

A month ago Vonderpuyl himself became a radio fan and had an outfit installed in his own home. He got so enthusiastic that he lost five jobs because he could not stay up all night listening to radio programs and work the next day. Last week Judge Johnson committed him to the Hackensack jail for observation as to his sanity. The complainant was his wife.

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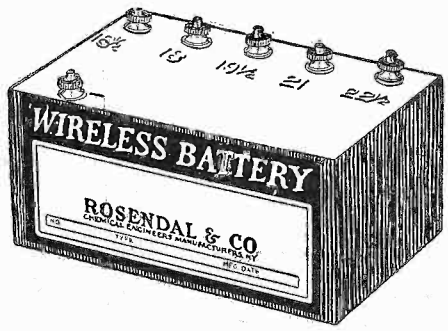

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Orders Theatre Seats by Radio

THE electrician of the 39th Street Theater, New York City, has a pet radio receiving set. While listening in one afternoon recently he was surprised to hear a request, twice repeated, for seats for the Thursday matinee of "Time," the delightful comedy of home life produced by Stuart Walker.

"I am A. H. Webster, of Rutland, Vermont," said the voice. "I'll be in New York soon and want to see 'Time.' Save me two seats for the matinee."

The electrician carried the request to Manager Finestone, who was finally convinced that the boys were not playing a joke.

"Well," he decided, "we don't reserve seats over the telephone but I'll take a chance on our first order by radio."

There was considerable suppressed excitement in the box office the next afternoon when a tall, gray-haired man with a real New England accent asked for seats reserved for A. H. Webster.

Mr. Webster seemed to take it as a matter of course that his order had been received. He said he happened to be reading about "Time" and figured it was a show he could take the home folks to, and that he had an opportunity to broadcast his request through a friend who was a radio expert.

College Presidents, School Superintendents, Principals—!

The Haaren School, New York City, completed a series of tests on the advisability of installing radio and speech amplifying devices in the school in order to promote education. How it was done and the success it has achieved is clearly told in RADIO WORLD for April 21, 1923. 15 cents a copy, or start your year's subscription with this number. RADIO WORLD, 1493 Broadway, New York City.

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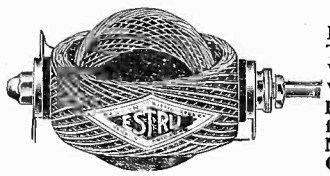

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The Ideal Radio Announcer

By FRED SMITH

Studio Director, WLW Station

MY ideal radio announcer would be not only invisible, but inaudible as well. He would simply fade out of the air after the manner of the announcer on the phonograph records. I have mentioned this to many radio fans and they are unanimous in declaring that I am crazy. They say that the majority of radio listeners hesitate on one wave length just long enough to get the call letters, and then they're on the wing again.

Very well. It is always a human characteristic to shout the impossibility of dispensing with an existing system when nothing tangible appears to take its place. But I am of the opinion that radio programs have a big evolution ahead of them, and that they will not remain in their present fragmentary sandwiching for a great length of time. The very fact that operas and plays are successfully broadcast shows conclusively that it is not a positive requisite for the well being of the program that the announcer waltz up to the microphone every four minutes with a mouthful of stereotyped phrases.

Now, what's the solution? In the first place, a lot of work. So much work, in fact, that no one mixed up with the present whirlwind of radio broadcasting has time for it. A radio program should be worked out a long time in advance. It should be rehearsed. It should be a perfect production. It should be so radio programmishly arranged that the call letters of the station, or some signal of similar significance, would fall in at proper intervals without destroying the continuity of the performance.

The name of any station that relies upon curiosity or distance to attract unto itself a large audience is Dennis. The radio audience of today is much more discriminating than it was a year ago. The ratio of its critical attitude of demanding good entertainment to long distance reception is pretty apt to constantly increase. And of all forms of public entertainment that ever existed, radio is most at the mercy of public opinion. The stations that venture upon a path which the public does not approve will be called back into line. Those who lag behind will be invited to get out of the way. Eventually, in all probability, the announcer will be invited to get out of the way. And the ideal announcer will be he that slips gracefully out of the way.

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Made in the full capacity. Mail orders filled.

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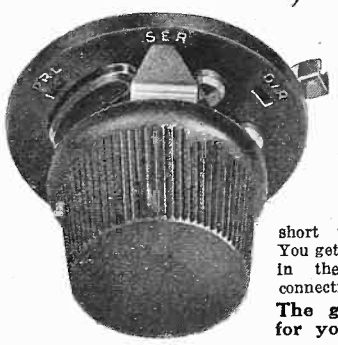

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