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December 23

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52 Numbers

RADIO

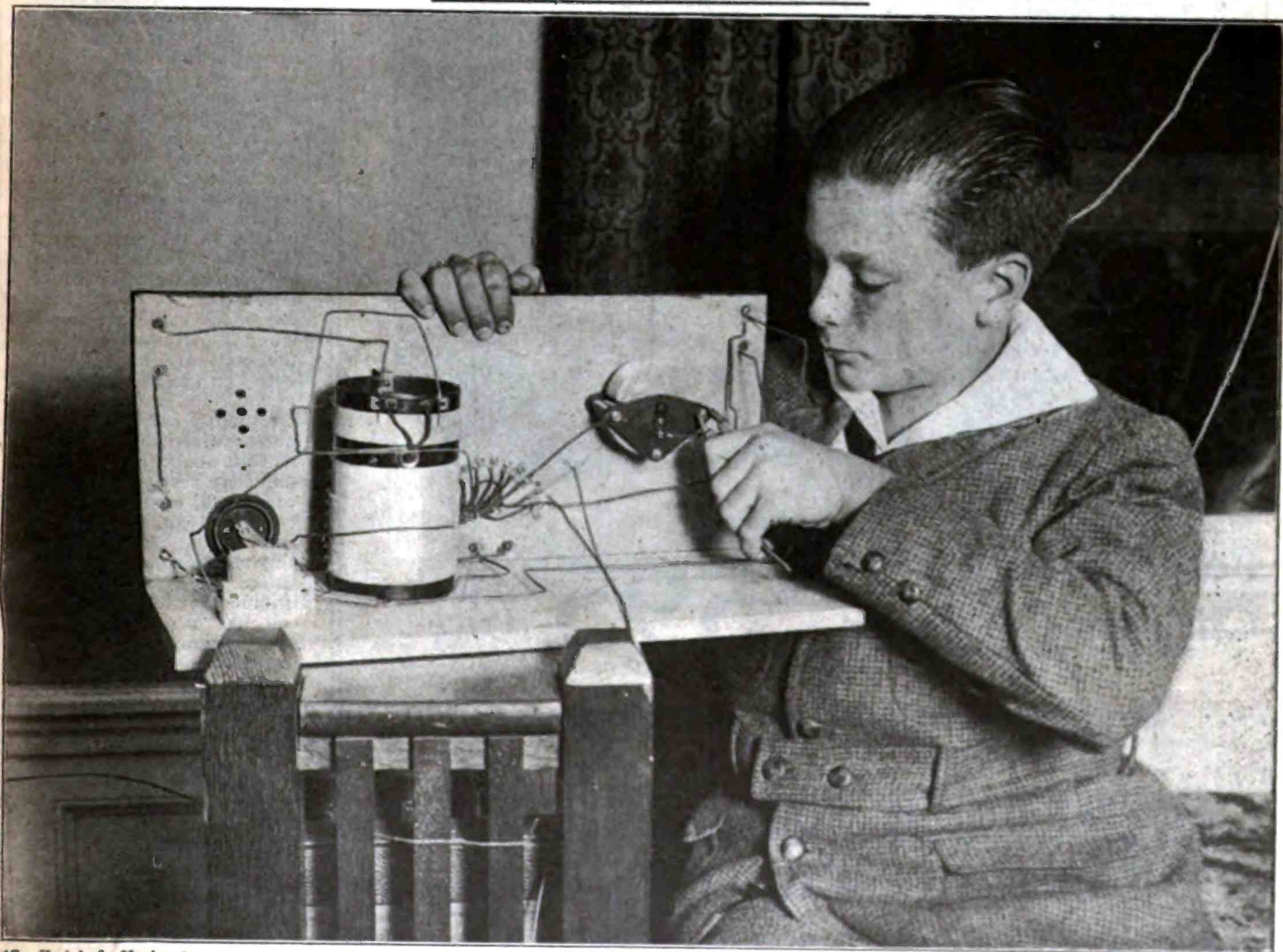
(Trade Mark)

WORLD

ILLUSTRATED

WEEKLY

Be a Radio Booster! Tell Another the Joys of Radio!
Make a New Radio Fan This Week!



(C. Kadel & Herbert)

David Orgain, thirteen years old, and the prize regenerative set he built at little cost (See Inside for Details)

How Radio Advanced During the Year 1922—See page 4

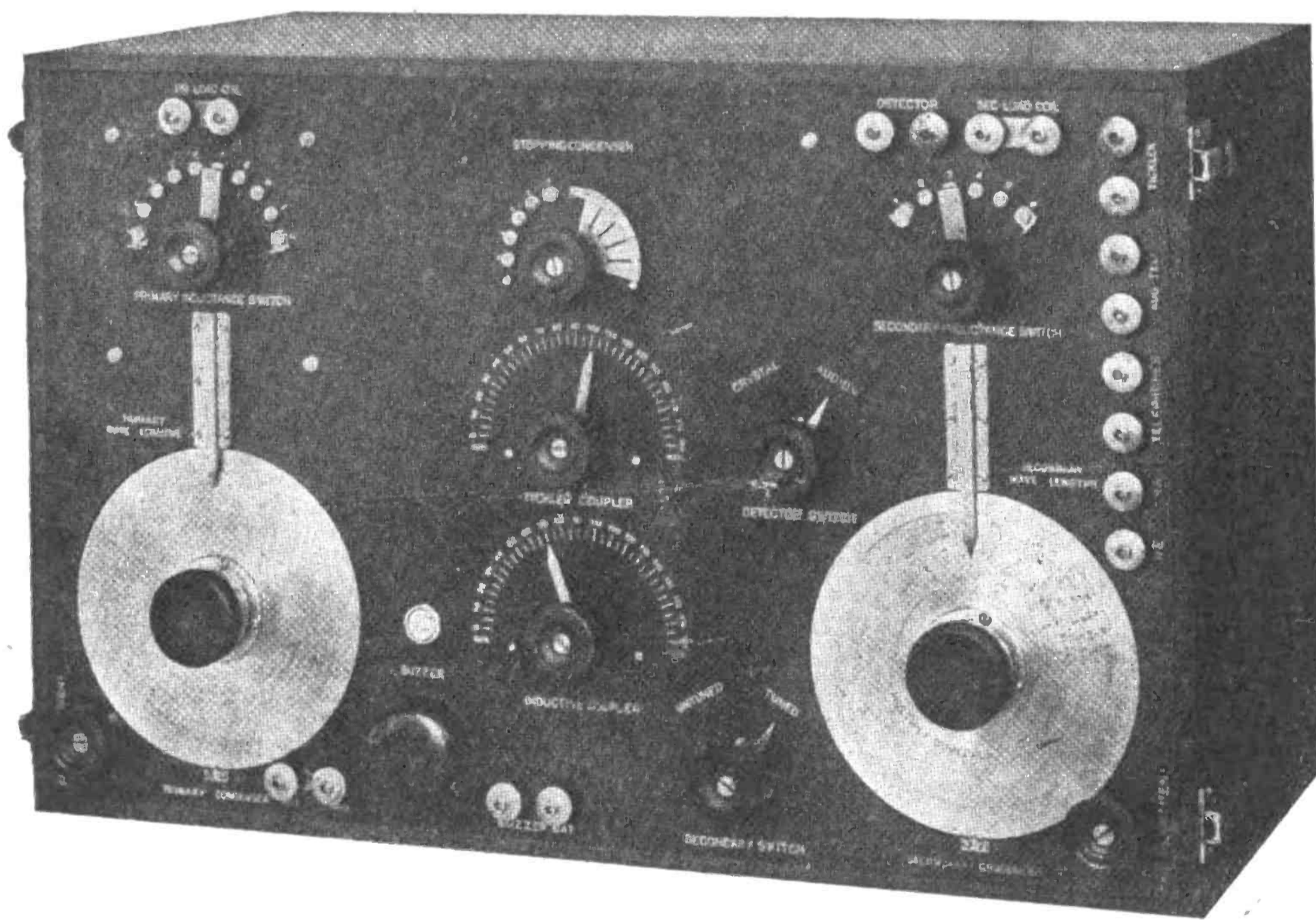
***** This Is a Radio Christmas *****

THE DE LUXE U. S. NAVY TYPE RADIO RECEIVER

*Is The Rolls-Royce of Radio
Gives Exact Tuning to Any Distance*

KNOW THE REAL JOY OF RADIO

This De Luxe U. S. Navy Type Radio Receiver must not be confused with instruments selling for from \$200 to \$300. Highly selective. Will pick up messages, music, lectures, etc., that lower-priced instruments will not hear.



Detail Description

THIS receiver is equipped with binding posts which are normally short circuited for 300 to 6800 meters by which wave lengths up to 23,000 meters may be received by the attachment of loading coils. Capacities of proper loading coils for above are: Primary 50; Secondary 50; Tickler 30 millihenries. While the receiver is provided with a "standby" or untuned circuit, it also has an unusual degree of selectivity. Although primarily designed for the more advanced fields of Radio work, or the laboratory, the simplicity of arrangement and beauty of finish make it unusually desirable for the radio club or for the individual who desires the finest equipment obtainable for his home or office. In the receiver, Bakelite tubes, threaded, provide the forms on which inductance coils of high frequency cable are bank-wound. After assembling, the coils are impregnated with an insulating compound, in vacuum, and thoroughly baked. The inductance switch controls a mechanism whereby the different sections may be connected, completely disconnected and opened, or completely disconnected and individually short circuited. This arrangement is important for, by it, each coil has a natural period when connected which is less than the shortest wave length in the receiver's range. The reception of parasitic signals is overcome, the absorption of desired signals by the coils is minimized, more energy is forced to the detector and on all wave lengths the interference is reduced.

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VOLUME TWO 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.]

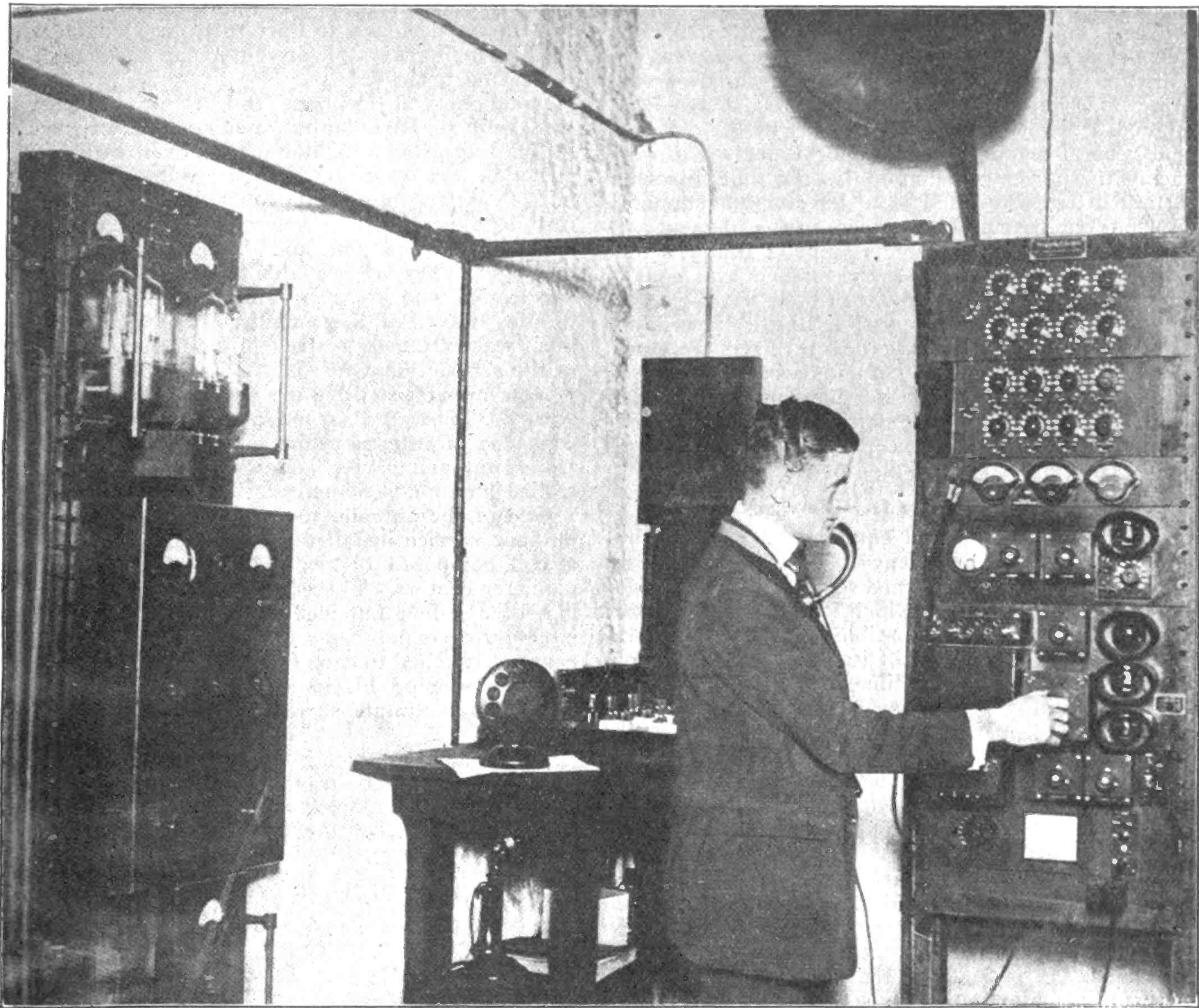
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Vol. II, No. 13. Whole No. 39

December 23, 1922

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To Catch Every Whisper in Congress



(C. World Wide Photos)

Sound-proof room in basement of the Capitol, Washington, D. C., in which is located the most remarkable speech-amplifier in the world. The room is free from all outside noises—but no syllable of the legislative speakers can possibly escape it.

THE public-address amplifier-control-room in the United States Capitol, Washington, D. C. A startling title! It is in this room that all the speeches in the various committee rooms and clerks' offices are amplified and are carried over wires to any part of the capitol and through outside lines to any part of the country—perhaps, all over the world! On the right-hand side of the room are the power-speech amplifying tubes and controls, with the loud-speaker above, so that the man in charge of the

apparatus may tell if the spoken words are going out without interference. This is the most complete speech-amplifying apparatus ever installed. Up above, on a level with the operator's head, are the complicated resistances used to prevent the least distortion of speech. On the other side of the room are the tubes and controls for broadcasting through the agency of the radio station at Anacostia. In order to prevent any mistakes the circuit over which the speech is amplified can either be used to talk to or from

any of the rooms. If you will glance at the tubes used on the speech-amplifier you will notice that they are completely shielded to prevent outside interference. The meters directly over the tubes permit the operator to tell at a glance the conditions along the entire line of wires and apparatus used. By use of anti-capacity switches and jacks he can immediately switch from a faulty microphone to a reserve microphone without as much as losing a single syllable of "Man of the Peepul" who is doing the talking

How Radio Advanced

A Record of Progress

IMPORTANT progress was made during 1922 in the design and manufacture of radiotelephone and radiotelegraph apparatus both for commercial and amateur purposes. The sale of amateur equipment made a spectacular increase, due to the sudden aroused interest of the public in the new application of radio to broadcasting.

The line of standardized component parts which had been originally designed for commercial purposes was later produced for the amateur. Broadcast receivers were built, making use of these parts and a line of sectional units, such as the tuning unit, the 3-stage radio-frequency amplifier-unit and the detector-amplifier unit were developed. The main idea in these sets was the production of receivers, each of which would serve a definite function separately, and could also be easily combined.

The general tendency in receiving tubes was toward reducing the power consumption in the tube filaments. The first attempt resulted in a detector and amplifier tube using one-fourth of an ampere in the filament; superseding one previously using 1 ampere. Later, a tube using only 60 milliamperes for the filament was equally successful.

These new tubes made it possible to use dry cells for the filament excitation and two new receivers were produced. One, a portable set, contains a sensitive tuning system, a detector and single-stage audio-frequency amplifier. The other set is similar in its electrical characteristics to the first one, except that it has two stages of audio-frequency amplification instead of one.

New Sets That Receive from Foreign Lands

In the line of commercial equipments, new requirements were met, due in many cases to broadcasting. In one case, a power company sought a duplex radio telephone installation with which it could provide during times of storm against possible interruption of communication between several of its stations seventy-five miles apart. At the same time, signals from nearby broadcasting stations operating on 360 meters were not to interfere with operation of this station on the only available wave length of 400 meters. The set was to be operated through remote control from a desk-stand by the regular powerhouse switchboard operators and to require no attention except that usually given to such moving parts as motors and generators. This set was installed and is operating successfully.

For the use of amateurs and for installation on small boats and yachts, there was produced a small radiotelephone transmitter having an output of 20 watts in the antenna. It is built so that it may be operated either from a motor generator set or from a kenotron rectifier which was designed for this equipment. It also may be used on a telegraph transmitter, either continuous wave or interrupter continuous-wave.

A new tube attachment for converting spark transmitters into vacuum-tube continuous-wave transmitter makes it possible for owners of spark sets to realize the advantages of continuous-wave transmission at a minimum cost. It has an output in the antenna of approximately $\frac{1}{2}$ kilowatt continuous-wave and a wavelength range from 200 to 2,400 meters. It utilizes the power equipment and high-potential transformer of the spark transmitter and includes necessary switching apparatus so that communication can be transferred from the spark set to the tube attachment.

This equipment makes it possible not only to carry on communication with stations now listening in on

2,200 meters, but to carry on communication over much greater ranges with a 2-kilowatt spark transmitter. During actual service tests conducted with one of these transmitters, a range of 1,500 miles daylight, over water, was realized.

An aircraft transmitter was constructed for telegraph communication only with a continuous wave output in the antenna of 300 watts. Provision was also made for interrupted continuous-wave telegraphy. The transmitter was designed to operate from a double current stream line generator driven by an automatic speed regulating propeller.

A number of telephone and telegraph transmitters were built for installation on submarines of the United States Navy which include many novel features of construction and operation. They are designed for transmitting either on the flat-top antenna or a loop, and include a break-in system whereby the operator can listen-in between dots and dashes of the transmitted message. They are available for three methods of communication and have an output of 600 meters, continuous wave, in the antenna. The complete equipment was extremely restricted in dimensions on account of the service for which it was built.

New apparatus designed and manufactured for use with 200-kilowatt Alexanderson alternator equipments consisted of antenna-tuning inductances, remotely controlled antenna wave-change switches and remotely controlled antenna-variometers.

One of the antenna tuning-inductances designed for outdoor service installed at Radio Central Station has a coil composed of ten vertical supports on 82-foot diameter centers. These supports are of porcelain tubing, of $3\frac{1}{2}$ feet outside diameter and are held semi-rigidly by copper rings on the inside of the vertical tubes. Attached to each of the ten vertical supports are fourteen spacing blocks which are so designed as to provide a maximum surface-creepage-distance between turns.

The conductor which is wound in grooves of the spacing blocks is of 686 strands of ten mil-diameter copper wire, each strand insulated with enamel. Varnished cambric and treated braid on the outside provide insulation and protect the conductor from the weather. The total inductance is 19 millihenries.

Ten of these coils were furnished with two 200-kilowatt alternator equipments for the new radio station near Warsaw, Poland, which is being built by the Radio Corporation of America.

Material for four coils of the same general design, except that six vertical supports on 65-inch diameter centers are used, is being furnished for the Radio Corporation's station near Bolinas, California.

Remotely controlled antenna wave-change switches are to be mounted adjacent to the tuning inductances described above, and will be used to change the number of active turns in the inductances.

Ten of these switches were furnished with the two alternator equipments for the Polish station. They will be located at various distances up to more than a mile from the generating station, the point from which they are to be controlled.

In the operation of remote controlled antenna variometers for indoor service, means for remote control from switchboard and hand control at the variometer were provided.

During the Year 1922

By *John Liston*

General Electric Company

These variometers are connected in series with 200-kilowatt Alexanderson alternator, feeding energy to multiple tuned antennae. They are used to maintain close adjustment of antenna tuning, particularly when antenna capacity is varied by wind and sleet. Porcelain supports are used throughout for all parts connected in circuit and the conductor is composed of 4,270 strands of five-mil copper wire, each strand insulated with enamel. Varnished cambric and treated braid form the outside insulation.

Due to the high-intensity high-frequency electromagnetic field produced by the windings, no metals of any kind are used inside the windings. The top supports of the framework are of brass. Iron pipes attained high temperatures at fractional load in the windings. Closed circuits in the pipe framework are broken up by suitable insulators to prevent circulating currents.

The stationary and movable windings may be connected in series or parallel. The average range of inductances in series connection is .19 to 1.1 millihenries. Maximum coupling averages 50 per cent.

A new method of recording and reproducing sound was developed, which is a distinct improvement in many ways over all previous methods used and opens up several entirely new fields of application. It is known as the pallophotophone.

There are two distinct devices in the pallophotophone—one for recording and one for reproducing the sound—and either may be used independently. The

recording device consists essentially of a tiny mirror on which is reflected a beam of light. This mirror is attached to a delicately vibrating diaphragm and when sound waves cause the diaphragm to vibrate, the mirror oscillates and the ray of light causes projection of corresponding oscillations upon a strip of photographic film which passes in front of the mirror in a continuous motion.

The film is then developed in the usual way and shows a succession of delicate dark markings which constitute the sound record.

In the reproduced device, the film passes in front of an arrangement of vacuum tubes which are sensitive to light so that the variations in the light falling on them caused by the lines recorded on the film produce electromotive force variations in the circuit in which they are connected. Therefore, as the film is moved in this device the electric current is actuated, which corresponds with great accuracy to the original sound wave. This electric current can be made to actuate a telephone loud speaker or to operate radio broadcasting apparatus directly.

The Largest Vacuum Tube and Its Wonders

Many interesting applications of this new device have already been made and a few possibilities can be briefly outlined as follows: It makes possible the talking motion picture, for on a film of the normal width both sound and action can be recorded simultaneously and projected with absolute synchronism. It is practically unlimited as to the length of record it can make and reproduce and is, therefore, suitable for recording speeches, debates, concert programs, in the taking of evidence and for any purpose where a lengthy record of sound is required. It can be duplicated and used as a film photograph and applied in radiotelegraphy in producing wireless signals and for audio-amplification. It has already been successfully applied in broadcasting.

The largest vacuum tube ever made consists essentially of a water-cooled cylindrical anode 30 inches long and $1\frac{3}{4}$ inches in diameter. In the axis of the anode is a tungsten filament 0.4 inch in diameter and 22 inches long. This filament is excited by a current of 1,800 amperes at 10,000 cycles, the filament excitation requiring about 20 kilowatts. The magnetic field produced by this large heating-current is sufficient to cut off the electric current from the cathode to the anode during a portion of each cycle of the current passing through the cathode, this action taking the place of that of the grid in a 3-electrode tube. The electron current to the cathode is thus interrupted 20,000 times every second. By the use of properly tuned circuits, this may be used for the production of high-frequency power for radio or any other purpose.

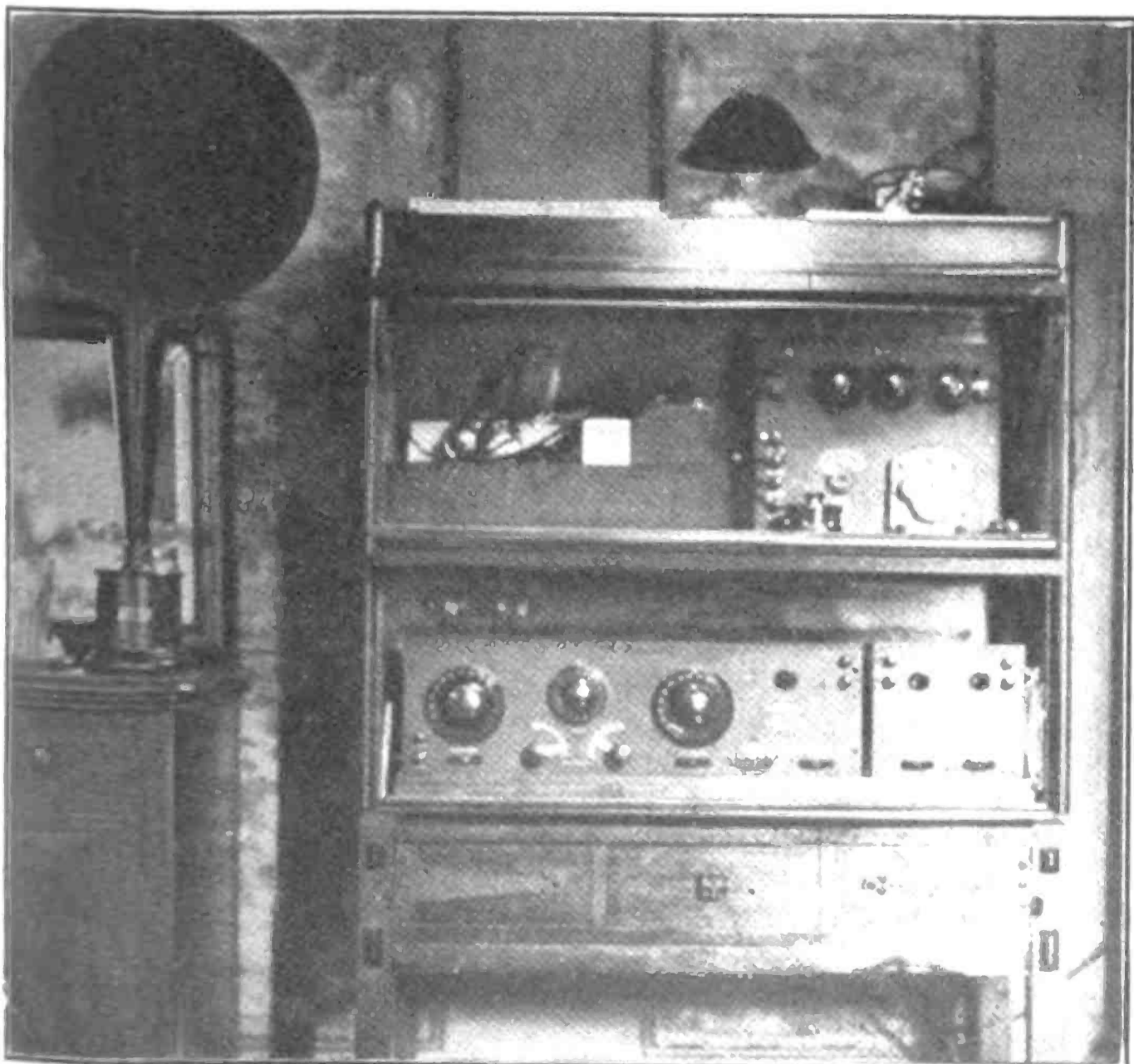
This particular type of tube, which is called the magnetron, will supply 1,000 kilowatts of 20,000 cycle power at an efficiency of 70 per cent., operating with an anode voltage of 20,000 volts direct current.

Complete carrier current equipment of telephone communication over the high tension transmission lines of power companies was developed and a number of tests were installed. The transmitter has an output of 50 watts and is rated at 75 miles, provided there are not a great number of "tie-ins" or transformer stations in this distance. The equipment includes a calling system whereby a bell is rung at the station called when the station calling actuates a push-button on the desk-stand forming part of the equipment.

Book Case for Receiving Set

By *J. R. W., Louisville, Kentucky*

I AM sending you what I consider an ideal arrangement for a receiving-set in the home. Sectional bookcases with glass doors keep the set dust proof and give a neat appearance. Many of my radio friends like the idea and, so far as I am aware, this arrangement is original. The large A batteries, battery charger, etc., are in the compartment below—out of the way.



Bookcase Made to Hold Receiving Set, as Described by J. R. W.

National Radio Week to Be a Big Celebration Over All America

THE tremendous contribution of radio broadcasting to the educational life of the country is to be especially emphasized during National Radio Week, to be held this coming week, from December 23 to 30 inclusive.

Broadcasting has assumed many roles since its inception, but none has received such whole-hearted and enthusiastic support from the nation's leaders as when it dons the toga of the educator.

Sending of operatic arias on the air has become frequent within the past few months. All the progress thus far made in that field, together with a wealth of new material and ideas, is to be assembled during National Radio Week for a grand display.

Announcement to this effect has been made by J. Andrew White, chairman of the executive committee of National Radio Week. Mr. White and the committee feel that the broadcasting of the highest type of music not only has recreational value, but is inspirational in home circles as well, and there is tremendous economic benefit to be gained

in educating the American people, through radio, to an appreciation of the higher forms of culture.

Radio's use in the church and school are also to be demonstrated in special nation-wide programs from scores of stations.

National Radio Week is an unselfish, co-operative effort on the part of every one in radio, from listener to manufacturer, to demonstrate what the new science and industry has accomplished thus far in the brief span of one year of general popularity and to give the listener an insight into the yet unrealized possibilities of the near future. It is an organized effort to add to the ranks of listeners—to double this number, in fact.

The biggest thing the amateur or fan can do is to create another amateur or fan. Building up the already growing army of radio enthusiasts will have a vital effect on the advance of radio throughout the country.

Here are a few final suggestions that may be carried out easily to make the big week a smashing success:

Humanity Night. In a dramatic way you can allow the Salvation Army, American Red Cross, or any other organization explain the purposes of its movement. This has been done effectively by the playing of music or singing of songs very softly as a background for the speaker. A series of war songs, for instance, played softly by a stringed orchestra would work an appropriate background for a Red Cross appeal. If an appeal was given for the Near East Relief Committee the music would have an Oriental flavor.

Christmas Eve. A complete Christmas Eve program would include the singing of carols by boy choirs and soloists, who are available usually in every community; stories by representatives of as many foreign nations as you can get, explaining how Christmas Eve is celebrated in their countries; a speech by Santa Claus earlier in the evening for the children; messages of welcome to the home town by one or two men or women of representation who have come back to their home town to spend the holidays.

Contest Night. One splendid contest could be a guessing contest. Gather together some fifteen or twenty prominent people in your city and have them make short talks, but do not introduce them except by number, then have the radio audience send in their guesses as to the names of the speakers to see whether the people recognize their most prominent men or women by voice.

Theatrical night, of course, will be a big one. Talent which is appearing at the local theatre should be invited to appear at your station, and not just formally sing a song or two, but to give a "chummy" sort of program for the listeners.

Special attention should be paid to children at least two nights during the week.

Kolin Hager, of the General Electric Broadcasting Station, WGY, at Schenectady, New York, has been made chairman of the broadcasting managers' committee of National Radio Week.

The executive committee, which has charge of all details to "put over" the big radio event, is composed of the following:

J. Andrew White, chairman, editor, *The Wireless Age*; H. Gernsback, editor, *Radio News*; Arthur H. Halloran, editor, *Radio*; Roland B. Hennessy, editor, *RADIO WORLD*; Laurence Nixon, editor, *Radio Dealer*; Arthur H. Lynch, treasurer, editor, *Radio Broadcast*.

Remember!—

The movement will not die on the night of December 30. National Radio Week is to be a permanent national affair.

Eminent Radioists Send Their Greetings Through Radio World

Around the World in Five Minutes

By Edwin Denby

Secretary of the United States Navy

THE wonderful development of radio has brought pleasure to millions of people. Radio has developed into a great commercial and departmental agency. Christmas greetings may be sent around the world by radio in five minutes.

A Veritable Public Service

By John V. L. Hogan

Eminent Radio Engineer and Inventor

NATIONAL RADIO WEEK will give alert dealers their opportunity to demonstrate to the public that radio broadcasting is not a noisy fad for using squawking loud-speakers, but, instead, a veritable public service, capable of placing in the home finer music than can the phonograph or reproducing piano.

One of the Greatest Gifts of the Age

By General John G. Harbord

President, Radio Corporation of America

CHRISTMAS is a season of gift-giving and of remembering only the good in life. Radio is one of the greatest gifts to this age, blessing mankind with its achievements and practically marking a new era in the way of entertainment, communication, and education.

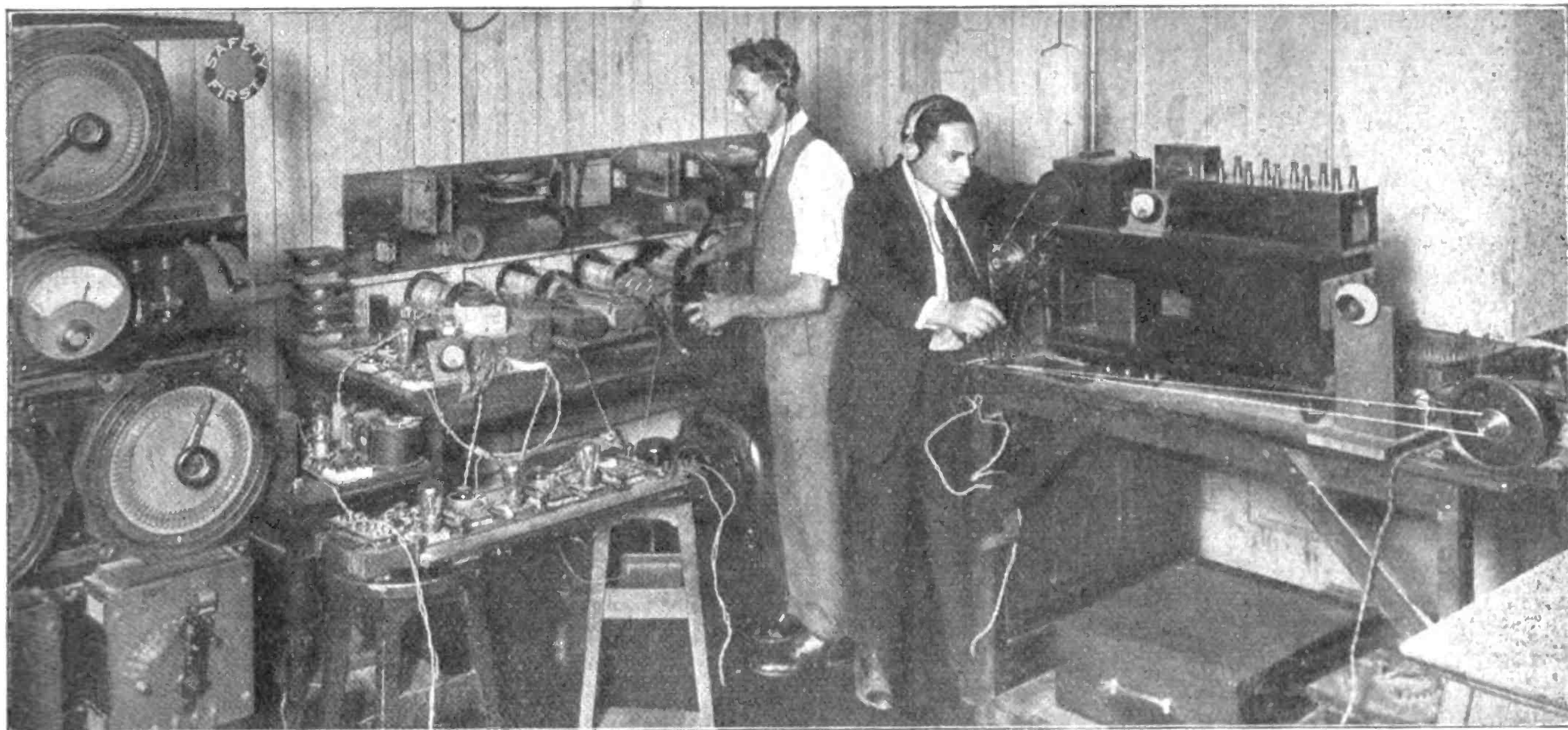
How Season's Indications Point

By Paul F. Godley

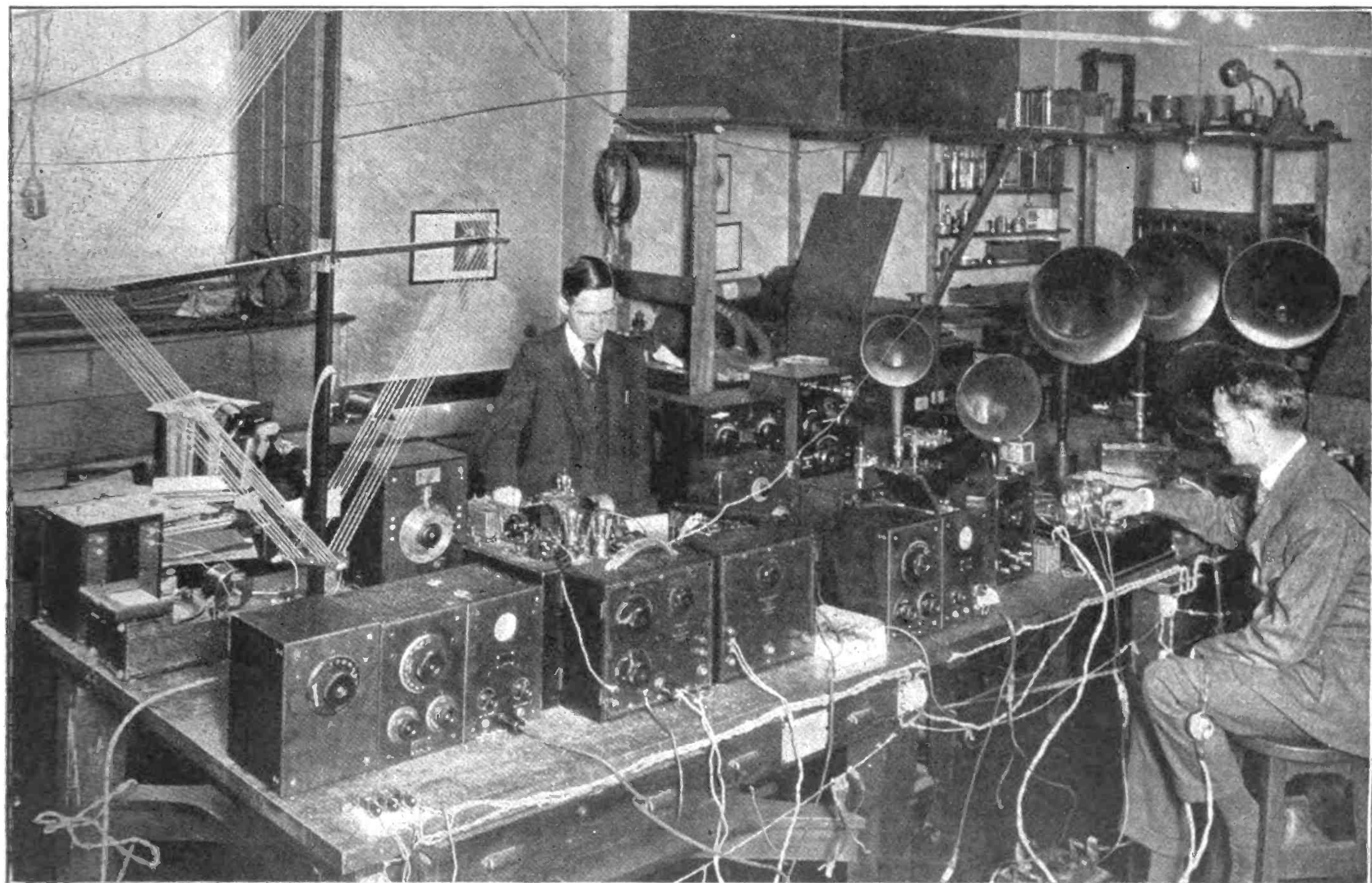
Radio Engineer, Adams Morgan Company, Montclair, N. J.

THERE is no doubt, that the large bulk of business which is bound to put in an appearance around Christmas time will more than restore the full confidence of the industry in the future of radio. There still seem to be some people who think that radio has no future. The indications now point to a larger radio business during the coming holiday season than during last year, and instead of verging on hysteria, it will be business placed by business men who know exactly just what the market demands.

Receives Radio Messages at Over 1200 Words a Minute



(Both photographs C. Kadel & Herbert)



The upper photograph shows a busy corner of the research department of the Radio Corporation of America where investigations are being made regarding the operation of a high-speed receiver capable of copying messages at a speed of 1200 words a minute. When signals are sent at this speed the listener, unless he is equipped with a machine similar to this, will hear nothing but a steady hum or dash, as at this terrific speed there are, approximately, 6000 "breaks and makes" of the key every minute, approximately 100 every second. This is a rate of speed much faster than the human ear is capable of catching.

The lower photograph shows another part of the extensive research

department of Radio Corporation. Here they test out circuits, loud-speakers, and other instruments before they are marketed. The illustration shows actually the testing out of five different loud-speaking horns in connection with a power amplifier in order to prove which responds with the least distortion. This department not only tests materials of Radio Corporation, but any others that seem of particular importance. Thousands of amateurs and experimenters would give a lot to possess such machinery and test out apparatus and circuits to their heart's desire. The man in the dark suit, facing, is testing out the wave length of various apparatus in order to correctly calibrate and chart them.

Vast Army of Goods Baptized "Radio"

By *Washington R. Service*

WITH nearly every new development that attains great popular interest, there comes an era of using the new name for, practically, anything else that bids for public support.

Hundreds of articles have been christened "Radio." Some products are aptly named, but many have nothing to do with the art or practice of radiotelegraphy or radiotelephony.

Twenty-four articles now use the word "Radio" as a trade-mark, according to the Patent Office records, and still more applications are on file. The first use appears to have been in connection with a chemical compound registered by John B. Daniels, August 23, 1904, about six years before the United States Navy adapted the word to wireless telegraphy.

In 1911, the word, "Radio," was registered as a trade-mark for a make of hot-air fans and, also, a brand of varnish and paint. The

type and design of the letters in the word were, of course, different, and sometimes the background varied. In 1913 and 1914, "Radio" was employed to designate certain forms of chemicals, medicines, insecticides, leather, threads, yarns, and furniture polish.

What was probably the first registration of this trade word for an electrical contrivance was taken out for batteries and apparatus early in 1915. A little later, came a type of "Radio" ball-bearing, and, in 1918, the "Radio" golf-ball was trade-marked. A non-intoxicating beverage took on the name in 1918. During the next two years, it was used to designate certain flower and garden seeds, auto lenses, phonographs, tires, and a brand of canned fish. The past two years saw "Radio" applied to watch chains, writing paper, skirt braid, playing cards, cigarettes, and dyes. It was March 14, 1922, before a piece of wireless apparatus was trade-marked

"Radio," although before then it had been combined with other words to designate many things. Silks, pens, tonics, a magazine, and tea had been branded with the mystic letters. Both "radiofone" and "radiophone" were used in 1920. In 1922, came the terms "super-Radio" and "Radio Rex."

Many articles bear the name which seem not to be trade-marked, among them the recently advertised "Radio Boot"—"on and off in a flash." The radio overcoat, with weather-resisting qualities, has also appeared. The other day, the name was assigned to a ship which, curiously, carries no wireless apparatus. In the field of sport, the name has been appended to a race horse. "Wireless," another horse, is also pretty well known. Apparently "Radio" is a popular name, taken by and large, for use in any field; but there are those who would like to see it confined to matters connected solely with the art.

Back-Wound Coils

By *R. L. Dougherty*

DURING the past few months the bank-wound coupler and inductance coil have come into general use in receiving circuits. Many amateurs have tried to wind their own coils and have had to give up in disgust after the first attempts.

In the first place, bank winding will permit the amateur to wind from three to five times as much wire in a given space as would single-layer windings. Before starting to wind a coil the tube on which the coil is to be wound should be slightly roughened with semi-coarse sandpaper. Some firms making bank-wound coils use a base of sandpaper on which to wind the coil; but this should not be employed by the amateur as he is likely to run into difficulties and experience a short circuit due to the insulation being scraped off the wire.

In Figure 1, I show two types of bank winding. A is a double-bank and B is a triple-bank winding. In A you wind four turns on the tube, being sure to keep a good tension on the wire so as not to have it slip when you wind Nos. 5 and 6, which (see illustration) are wound on top between turns Nos. 2 and 3. After winding four turns on the tube proper, make a bend in the wire and

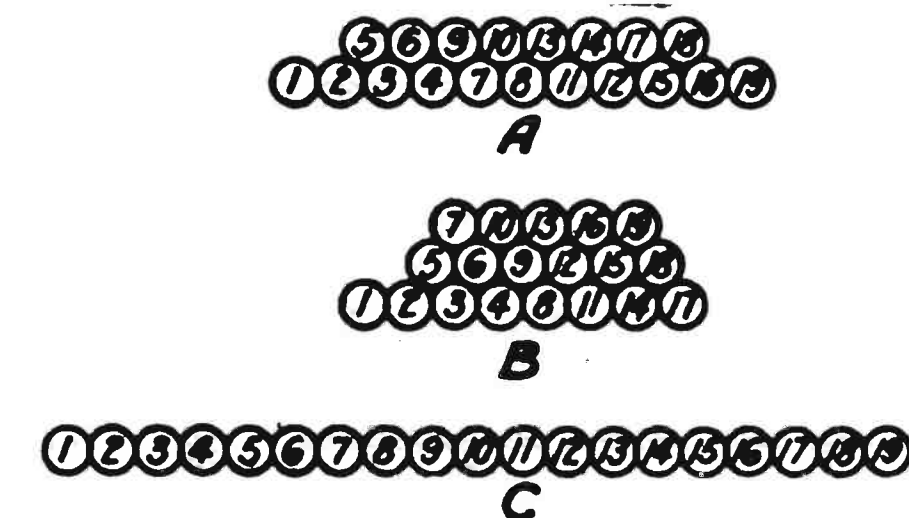


Figure 1—How a bank-wound coil would appear if the coil were cut in half. This gives also a comprehensive idea of the correct method of winding two different types of coils. A is an illustration of double-bank winding. B of triple-bank winding. C is the single layer, 20 turns.

wind No. 5 between and on top of 2 and 3; then No. 6 on top of 3 and 4. Then bring Nos. 7 and 8 down and wind them on the tube, and wind Nos. 9 and 10 as you did Nos. 5 and 6. If you wish to tap off at, say, every fifteenth turn, bring No. 15 down to the tube and make a loop in the wire. Next start in winding as you did before, using No. 15 as No. 1 in the first winding.

In illustration B, you see a triple bank-coil. Greater care must be used in winding these as there is more liability of the top turns slipping off due to the tension on the wire. The same method should be employed as in A, except to add one extra layer on top. The taps can be taken off in the same manner.

Before attempting to wind the coil for use in your set, practice winding

Damped Waves

By *George W. May, R.E.*

THE radiophone of to-day cannot use the so-called damp wave. The wave trains which quickly die out are available for use in sending signals only and correspondingly to the action of the waves in water which quickly subside after a stone is dropped; or they may be compared to the sound from the piano wire which, also, quickly dies out.

them with some spare wire in order to get the knack of the thing.

For the man who wants to know facts, I am giving the inductance values of the two bank windings as compared with a single-layer coil. The constants were taken with coils wound with twenty turns of No. 18 wire wound on a 4-inch core.

The diagram is as follows:

A—Double bank, 20 turns, 50 per cent. space, 120 per cent. inductance.

B—Triple bank, 20 turns, 40 per cent. space, 135 per cent. inductance.

C—Single layer, 20 turns, 100 per cent. space, 100 per cent. inductance.

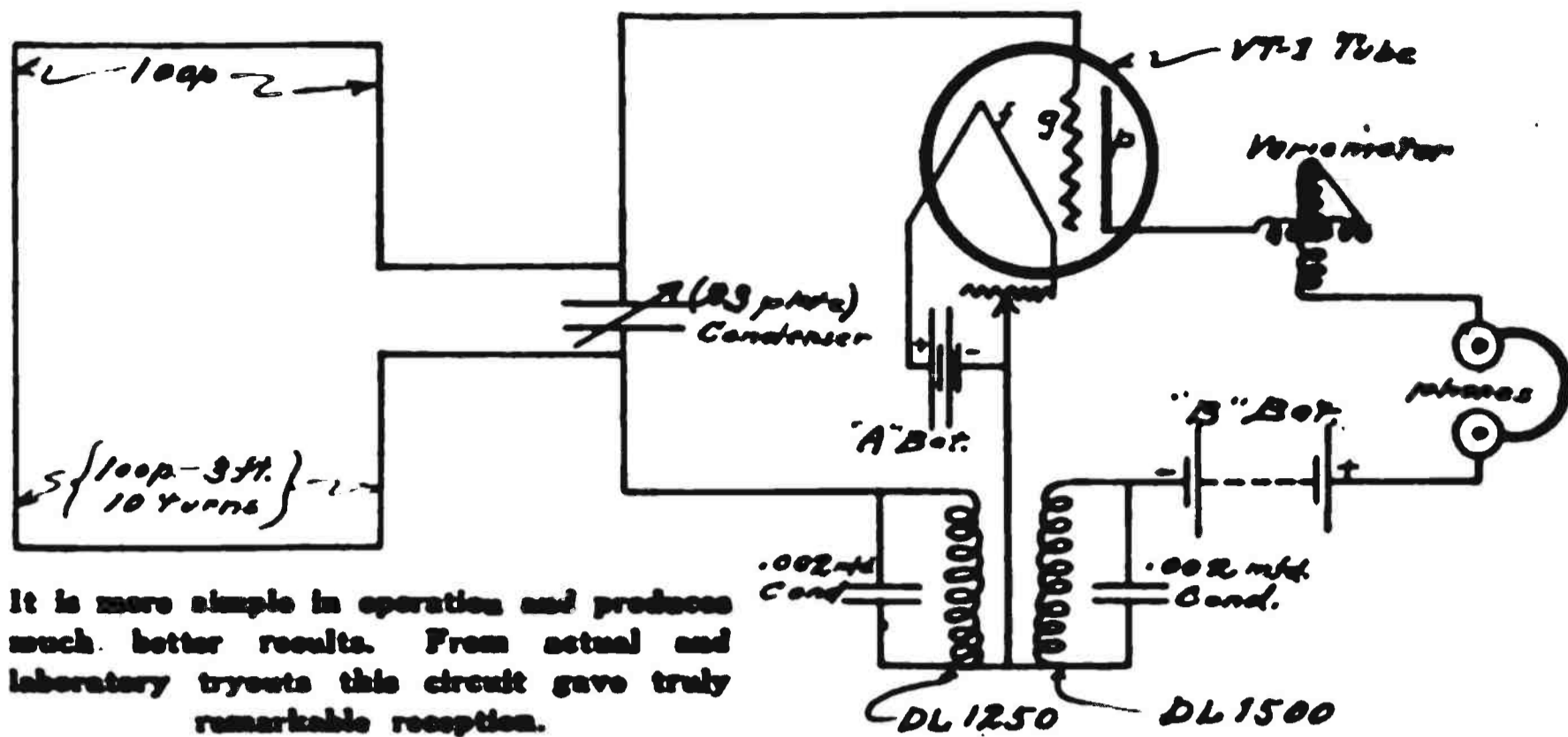
Latest broadcasting map 15c. That is, a complete broadcasting map appeared in Radio World, No. 8, dated May 20. Mailed on receipt of 15c. Radio World Company, 1493 Broadway, N. Y. C. (Adv.)

My Simple Inexpensive Receiver

By C. White, Consulting Engineer

EVERY field of commercial endeavor is rigidly governed by two considerations: first, the desire to reach the pinnacle of scientific perfection; second, the desire to meet the capabilities of the average pocket-book. In other words, science and economy form both limits. If we make a certain article too cheap it will utterly fail to come up to the popular scientific standard; if we make it so perfect that its selling price must be high, we challenge the purchasing power of the average man, and cut down the market. In radio, as well as elsewhere, these are facts. We actually know of certain circuits that are much superior to anything on the amateur market, yet it would be next to impossible to place them before the public at a reasonable cost. Recently, I have been working out various simple circuits in an effort to produce something that will be very inexpensive, simple to operate, and have definite scientific merit. The new method I recently developed to try out new circuits has greatly aided me in getting a good relative value of performance within the narrow confines of a laboratory. I briefly outlined this method in RADIO WORLD, No. 34, dated November 18.

The circuit illustrated herewith in Figure I is generally known as a "one-tube superregenerative," or "ultraregenerative" receivers. The circuit is a modification of the common type of single-tube "supers" in that it uses the inductance of the loop as a tuning element. A variometer in the plate circuit enables much finer adjustment than the ordinary type that employs a rotor of a vario-coupler to obtain the same results. The coupling between the two D-L coils should be variable. Since the loop performs the double function as an antennae and a tuning coil, it is quite necessary that it be made the proper size. From experimentation, I found that a loop about 3 feet square, having 10 turns, gave much better results than any of the other sizes tried. A 23-plate air variable is shunted across the terminals of the loop; it is recommended, although it is not absolutely necessary, to use a vernier attachment of some sort with this condenser if it is desirable to get the maximum results from long-distance telephone reception. A Western Electric V-T 1 tube is recommended for this cir-



It is more simple in operation and produces much better results. From actual and laboratory tryouts this circuit gave truly remarkable reception.

cuit. In the actual tryout it was the only tube using a low-plate potential that gave fully satisfactory results. This tube requires 4 volts on the filament and 22½ on the plate; the normal filament current is around 1 ampere. A Bradleystat, or any other type of fine, or vernier-adjustment rheostat, should be used, since this circuit must operate the tube at a critical and efficient point on the characteristic curve. In the actual construction, I advise the amateur to carefully shield the panel against body-capacity effects which virtually result in cutting down the range of reception by making it next to impossible to selectively tune.

I would like to call particular emphasis to the fact that this outfit is extremely cheap. It is also equally efficient; because with quite unfavorable conditions in a steel

building in New England, I was able to hear Chicago. Of course, it is not the most efficient set to operate. No single-tube receiver can dare claim such distinction; but, with the man who exercises care in his work, it is surely a set that brings in the distant stations with volume. The only point that would most likely give the average amateur a little trouble is the coupling between the two D-L coils which must be carefully adjusted. A good mounting for these coils will materially aid in operation. After a few trials, it may be observed clearly that there are certain values and settings that give much better results than others. Learn to tune your receiver carefully and in a systematic, scientific manner. Don't simply turn the dials until something happens. Study conditions, settings and results.

New Broadcasters Licensed

- ELEVEN limited commercial stations licensed by the Department of Commerce during week ending December 8.
- WQAK—Appel-Higley Electric Co., Dubuque, Iowa.
 - WOAS—Bailey's Radio Shop, Middletown, Conn.
 - WRAN—Black Hawk Electric Co., Waterloo, Iowa.
 - WPAJ—Doolittle Radio Corp., New Haven, Conn.
 - WOAT—Boyd Martell Hamp, Wilmington, Del.
 - KFDL—Knight-Campbell Music Co., Denver, Colo.
 - KFDJ—Oregon Agriculture College, Corvallis, Ore.
 - WQAB—Southwest Missouri State Teachers College, Springfield, Mo.
 - WOAU—Sowder Bolling Piano Co., Evansville, Ind.
 - WPAR—R. A. Ward, Beloit, Kans.
 - WOAX—Wolff, Franklyn J., Trenton, N. J.

Three limited commercial class-B stations broadcasting on 400 meters were transferred from the A list during week, as follows:

- WHAS—"Courier Journal" and Louisville "Times," Louisville, Ky.
- WLAG—Cutting & Washington Radio Corp., Minneapolis, Minn.
- KGW—Portland "Oregonian," Portland, Oregon.

Six New Canadian Stations

With the primary object of keeping federal officials in touch with one another six new radio stations are proposed to be erected by the government of Canada. The following sites are mentioned: Fort Smith, Fort Resolution, Fort Simpson, Fort Norman, Fort Macpherson (all on the Mackenzie River) and Dawson City, Yukon.

At any rate, radio seems to be the eighth wonder of the world.

—Sir Arthur Conan Doyle.

The Radio Primer

For Thousands of Beginners Who Are Coming into Radio Circles

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

By Lynn Brooks

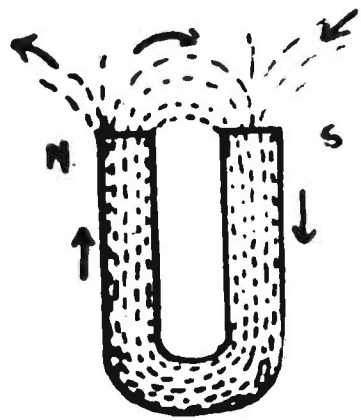


Figure 1—Schematic diagram showing the invisible lines of force surrounding horseshoe magnet.

DESCRIBE an electromagnet? If we take a bundle of soft iron-wires, or a soft iron-bar, wind it with concentric layers of wire, and then pass an electric current through it, we will find that we have a magnet. An electromagnet, therefore, is a magnet only when an electric current is flowing through the wires, whereby it differs from a permanent magnet.

* * *

What is a solenoid?

A solenoid is a hollow metal tube wound in the same manner as an electro magnet. When a current is run through the tube the wires will, through the agency of magnetism, have a sucking effect on a piece of iron or steel, and will tend to draw them into the middle of the tube so wound.

* * *

What is the difference between the lines of force in a permanent horseshoe magnet and an electromagnet?

In Figure 1a we see the lines of force in a permanent horseshoe magnet, which take the direction shown. In 1b, we see the lines of force in an electro magnet.

* * *

On what does the strength of an electromagnet depend?

The strength (attractive power) of an electromagnet depends on two

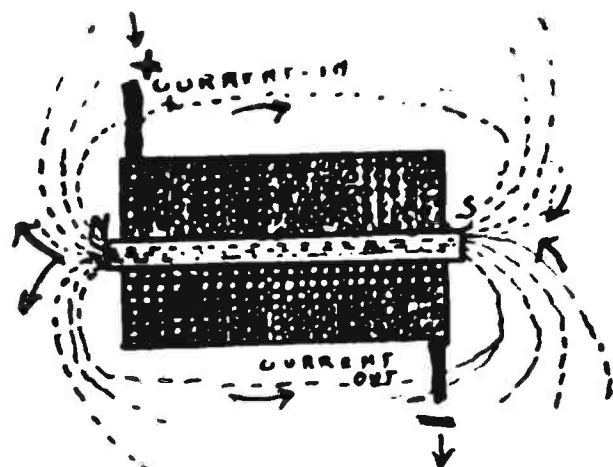


Figure 1-B—Schematic diagram showing the invisible lines of force surrounding an electromagnet.

main factors: 1—The number of turns of wire wound on the electro magnet. 2—The current sent through

the wire. The more turns of wire wound on the magnet the more attractive power it has and the more current sent through the windings the greater the attractive power. Therefore, if a magnet has 250 turns of wire and 5 volts is sent through it has more attractive power than a magnet of 100 turns of wire with the same voltage being sent through it.

* * *

What is meant by electromagnetic induction?

If we take a coil of wire and place it within the electromagnetic field of an active-electromagnet, and then rapidly break and make the current running through the magnet, or pass the coil of wire in and out of the magnetic

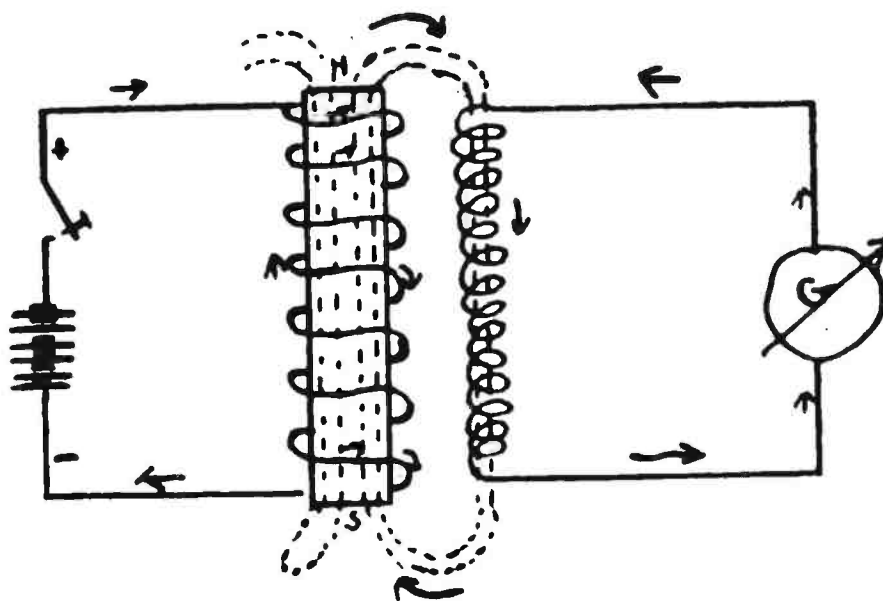


Figure 2—Diagram showing how an electric current is induced in a coil by the principle of electromagnetic induction. The two coils are not connected.

field at right angles, a current of electricity will be found to flow in the second coil. We therefore find that by cutting a coil of wire in a magnetic field we can induce a second current in the wire that is not connected in the original circuit, as shown in diagram No. 3.

* * *

Show how the lines of force may be determined in a single conductor-

current if the direction of the current flowing in the conductor is known?

The answer is fully explained in Figure 3.



Figure 3—If you grasp the wire with your thumb pointing in the direction of the flow of the current, your fingers will follow the direction taken by the lines of force surrounding the wire.

What is the effect of reversing the current in a single conductor as applied to the lines of force?

When the current in a conductor is reversed, the lines of force take the directly opposite direction. As in illustration No. 4, when the current is flowing to the north the lines of force flow downward toward the West up and around to the East. Reverse the current and the lines of force are reversed in direction.

* * *

What is the most important commercial use that electromagnetic induction is put to?

If it were not for electromagnetic induction, electricity, as we have it today, would not be so common. This agency when applied to a generator creates electricity.

* * *

Describe briefly the fundamental principle of a generator dynamo?

Whenever a coil of wire rotates through a magnetic field of uniform strength in a manner so as a number of lines of force enclosed by the coil increase or diminish uniformly, a current of electricity will be induced in the coil, the strength of which, at any time, is proportional with the number of lines of force that are cut by the coil and the speed with which this action takes place.

* * *

What are the main essentials of a dynamo?

The essentials of a dynamo are briefly: 1—A magnetic field of constant strength. 2—A number of coils mounted so that they can be rotated in such a way as to cut through a magnetic field. 3—Means for conducting the current induced in the rotor (rotating coils) to an outside conductor.

Why the Radio Primer Is Appreciated

Extract from a Letter to the Editor of Radio World from E. F. Stettler, Twin Falls, Idaho

FOR almost a year, I have been buying at the local newsstands your very fine publication and reading and studying every issue with a great deal of interest. When I first started reading RADIO WORLD I knew absolutely nothing about radio; and although it would be egotistical to say I know a great deal now, yet I do feel as if I had a fair knowledge of the fundamentals—thanks to RADIO WORLD."

A New Application of the Power Amplifier

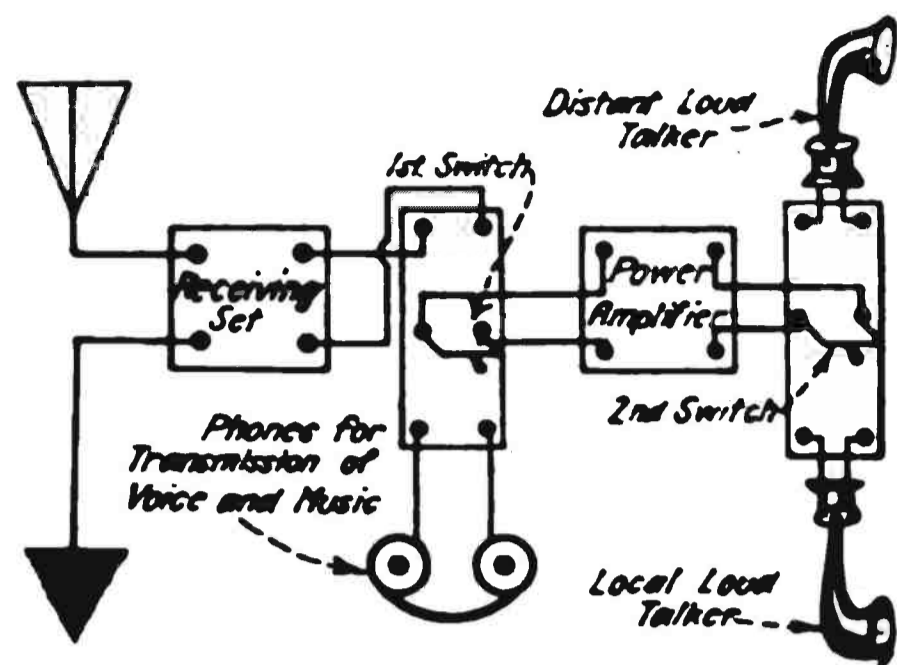
By Frederic W. Procter

THE interest taken by amateurs in perfecting their transmitting and receiving apparatus has led me to believe that the plan I shall outline herewith will interest more than a few as it lays open a varied field for experimental work. This plan has been put into practice with most satisfactory results and has added greatly to the interest and pleasure to be obtained from receiving.

Quite frequently the amateur station is located in a study and broadcast reception is desired in the bedroom or some other part of the house; or the amateur may desire to transmit his own voice, or phonograph music, from one part of the house to the other. Also, by this plan, the amateur can give his family the pleasure of listening to broadcasting concerts in the living room of his house without necessitating the extreme annoyance of placing his receiver there. While, in the latter case, the power amplifier is doing no more than executing its normal duties it can also be used to transmit audio-frequency impulses other than radio signals as previously mentioned, it being necessary only to connect a pair of headphones to the input, and the distant loud-speaker to the output. The amateur should speak clearly and distinctly into one of the phones, taking pains not to moisten the diaphragm of the phone more than is possible. The actual wiring is very simple. The following only is necessary:

Purchase double-twisted insulated wire that will give the two connections needed, and run it under the carpets and doorsills to the point in the house where the loud-speaker is desired, keeping the wires well concealed, and connect them to the two terminals of the instrument. The output of the receiver is connected to two of the poles of a double-throw double-pole knife-switch, the other two poles being connected to the headphones for voice transmission, the blades being connected with the input of the power amplifier. The output of the power amplifier is connected to the blades of another similar switch, the two loud-speakers being wired to the four poles as shown in the accompanying hook-up.

The principle involved in voice



Schematic diagram showing how the power amplifier can be adapted so as to hear music and signals in any part of a house.

transmission by means of a headphone is as follows:

The telephone consists of a winding about the poles of a permanent magnet, forming a magnetic field which not only includes the pole pieces and magnet but the diaphragm as well. This leaves two air-gaps in the magnetic circuit, both of which are varied in length by any movement of the diaphragm. Therefore, when sound waves strike the

disc, the reluctance of the magnetic circuit is changed and corresponding variations of current are produced in the windings when the circuit is closed. Thus it is possible to use the headphone in conjunction with the power amplifier in order to transmit sound over wires to a distant point. It has been found very satisfactory to detach one phone and place it in the small end of a megaphone, supporting the megaphone on a tripod, or some similar standard, so it may be placed before a phonograph should the transmission of music from that instrument be desired. The megaphone permits very few sound waves to escape.

An ingenious amateur should be able to do not only some interesting experimental work with this hook-up. The author would appreciate a letter, sent in care of RADIO WORLD, from any amateur who considered the plan worth trying or made any experiments with the accompanying diagram.

Loose-Coupler Set of 14-Year-Old Boy



(C. Kadel & Herbert)

The accompanying photograph shows Edmund C. Kann, fourteen-year-old radio enthusiast and the loose-coupler crystal receiving-set he has constructed and with which he has heard phone stations over 175 miles. If you will study the loose coupler closely, you will note that he has even used wooden rods instead of the usual brass ones. This goes to show how money can be saved by young builders. Also note the G-plate condenser mounted in a pasteboard box. No panel for this young builder! His motto was, "As cheap as possible." Master Edmund is here shown trying to tune in Schenectady for the benefit of the photographer and by the frown of annoyance on his face, must be running into difficulties with WJZ. It is worthy of note that young enthusiasts are quite careful in their construction. The loose-coupler, while not a prize winner for beauty, will probably give him satisfactory results. Then he also can say with pride, "I built it myself;" and that counts a lot.

Radio Legislation Urgently Needed, Says Secretary Hoover

Growth of Radio in Past Year, Beyond Expectation. 5999
Amateurs Added in Seventeen Months

WASHINGTON, D. C.—Extension of the regulatory powers of the Department of Commerce over radio seems imperative. This is the belief of Herbert R. Hoover, Secretary of Commerce, who has become a sort of foster-father to radio, and he emphasizes that belief pretty thoroughly in his annual report. The development of the radio art will be greatly retarded, he explains, if his department does not take a hand. The sudden increase of radiotelephone broadcasting during the past seven months of the fiscal year, from 5 to 382 transmitting stations, and the increase from about 200,000 to 1,500,000 receiving stations, resulted in so much "interference" between sending stations, the Secretary of Commerce reports, that the destruction of the usefulness of this very important invention was threatened. A conference of experts, manufacturers, and government, public and amateur representatives, which was called by Mr. Hoover in February, unanimously recommended the immediate extension of the regulatory powers of the Government and drafted a set of technical provisions for submission to Congress.

What Ails the White and Kellogg Bills?

Identical radio bills were introduced in the two houses of Congress, last session, by Senator Kellogg and Representative White, but apparently they are pigeon-holed, awaiting, perhaps, the demand of the radio public itself before any action will be taken. Department of Commerce officials handling radio matters have cherished the hope that early action would be forthcoming for some time and continued to license all broadcasters every three months, while awaiting a definite law. New legislation would aid the Secretary of Commerce in enforcing the laws and bring about a more satisfactory condition for both operators and "fans," they point out. Authority for the appointment of the advisory committee of six governmental and six outside civilian members, would assist Secretary Hoover in reassigning definite wave-lengths and in the allotment of more bands for commercial and private uses. Congressman White's

By Carl H. Butman

bill, it is expected, will be pushed, but action is not assured this session of Congress.

Hope for Discretionary Assignment of Waves

Recommendations of the radio conference were for one exclusive governmental broadcasting wave-band, two bands for private and toll broadcasting, and four for use by both governmental and private broadcasters, which would give such transmitting stations broader scope and prevent interference to a great degree. To-day, only two public broadcasting waves are available—360 and 400 meters—while the government wave is 485 meters, confining a very large amount of matter broadcast by many stations to only three wave-lengths and necessitating time schedules and silent periods. The assignment of waves under these recommendations, as well as other technical problems, would devolve upon the advisory committee. It is very likely that Secretary Hoover would secure the aid of the present Interdepartmental Radio Committee, or at least six of these technical experts as the governmental representatives on his new committee.

Another feature planned if new legislation is secured is to make the wave band between 600 and 1,600 meters, now assigned for governmental use, available to commercial and public stations. Details such as these, however, it is expected, will be left to the discretion of Secretary Hoover. The art of radio is developing so rapidly as to demand constant changes and the permanent or specific designation of every wave or band of waves by law would be a hindrance.

Situation Worse To-day Than on June 30

Interference is actually far worse to-day than it was five months ago, when Mr. Hoover's report closed at the end of the fiscal year, June 30, 1922. Instead of there being 382 broadcasting stations on 360 and 400 meters, there were actually 565 such stations in operation on December 1, or 179 more than existed on June 30. During the fiscal year, seven commercial transatlantic stations

were placed in operation, providing for better communication with Great Britain, France, Italy, Japan, Norway, Poland, and Germany. Another commercial station opened for business with Central America, and plans for circuits to South America and China were also under way. In the fiscal year, commercial land stations, excluding broadcasters, increased from 161 to 345.

Value of the Amateur to the Country

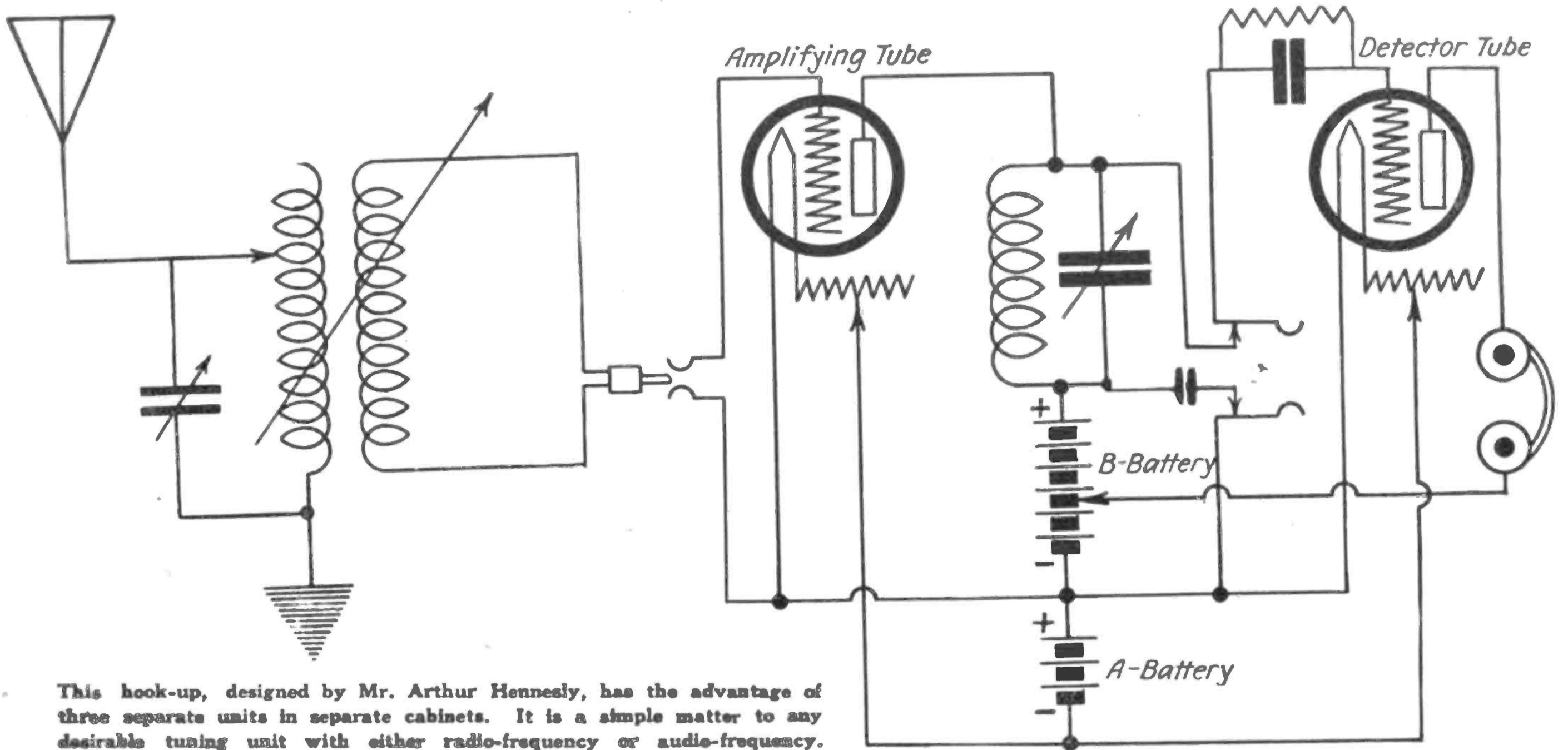
Amateur-station licenses increased from 10,809 to 15,504 between June 30, 1921 and June 30, 1922. In the past five months, however, 1,304 more stations have been licensed, bringing the total amateur sending-stations to 16,888 on December 1. The increase in amateur interest by 5,999 is gratifying to the officials of the government; for, they say, these young men constitute a reserve of trained operators some of whom have already contributed to radio art. During the World War, many amateurs were found to be superior to the average commercial operator in resourcefulness and technical knowledge.

The necessity of an international conference on radio communication for the adjustment of international radio wave-lengths, especially those used between ship and shore stations, is pointed out by Secretary Hoover in his report, attention being called to the fact that the last conference was held in 1912 when the United States had but one transoceanic station in operation. This matter, however, has the attention of the State Department, which is now organizing the personnel of a representative governmental committee to draw up agenda for the next international convention on electrical communication, to be held at Paris next spring.

In summing up Mr. Hoover says: "To close an efficient administration of the radio service is imperative if we are to maintain its efficiency as a life-saving agency on shipboard, a means of commercial communication, and of instruction and entertainment for our people. To perform this work we must have an experienced and expert personnel. To secure and retain such men the service must be provided with adequate funds.

Simple Hook-up Keeps Table Clean

By Arthur Hennesly and John Kent



This hook-up, designed by Mr. Arthur Hennesly, has the advantage of three separate units in separate cabinets. It is a simple matter to any desirable tuning unit with either radio-frequency or audio-frequency.

A LETTER from one of our readers, Mr. Arthur Hennesly, Kansas City, Missouri, contains the accompanying hook-up and an idea that, to us, seems of considerable merit. Mr. Hennesly says:

"I have noticed that there are a lot of amateurs who like to try out new hook-ups, and whenever you visit them you invariably will find a lot of apparatus scattered indiscriminately over the table. This looks very messy; besides it is not efficient.

"I like to experiment with new

hook-ups and have solved the problem in this way: I make up the tuning unit, detector unit, radio-frequency amplifying unit, and audio-frequency units in separate cabinets, with all the connections brought to outside binding posts that can be conveniently bridged with small pieces of copper wire. For the main connections I use jacks and plugs. It is a simple matter, therefore, to hook up any desirable tuning unit with either radio-frequency or audio-frequency and the table always looks neat and businesslike.

"Another advantage is that after having built a radio-frequency unit, or a detector unit, and tried it out you know that it works and how it works, so that when you hook it up you know just what results to expect. I am enclosing a hook-up to show how it is done—in Missouri where you have to show **us**."

This is a practical idea. Besides its neatness, it is an instance which proves that the everyday amateur is getting down to the serious business of real work and is not playing with a lot of radio apparatus just to pass the time.

Why Is It—

THAT every time you have company at the house someone who knows nothing about radio will always ask some question you can't answer and make you feel like a quince the rest of the evening?

That every time you buy a bulb, and your friend is with you and he buys one, he always gets the better bulb, while you generally get a "cluck"?

That every time you want to put up a good aerial, and you have all the inclination and time in the world to do it, it rains?

That the set worked like a charm in the store and you can't even get a chirp out of it, and everybody in your family gives his or her advice as to just what the trouble is, and you don't even get a chance at it till everybody else is disgusted with "that fool thing"?

That people insist on thinking of radio and wireless as two different and distinct things?

That everybody who has made his own set thinks he has evolved an original idea which he must keep a deep, dark, dank secret?

Don't Miss Him!

Santa Claus Will Be at WGY During National Radio Week

HELLO up there! Is this Mr. Santa Claus? How do you do, sir! This is radio station, WGY, speaking. Suppose you're awfully busy just now? Too busy to talk to the thousands of little people here in the U. S. A., who will be counting on you on Christmas Eve? Yes, sir, actually talk to them . . . all of them at once, too! What's that, you say? Never got such an invitation before? Wouldn't miss a chance like this? That's fine, Mr. Santa Claus! Then let us tell you what we've got in mind."

Yes, boys and girls—big and little, young and old—that is part of a conversation that took place the other day over the private wireless-telephone of WGY, the General Electric radio station at Schenectady, New York, with Santa Claus himself as the other speaker!

And here's what came of it! Santa Claus is actually going to talk to you by radio! To all of you—that is, to all who are able to listen in! And not only one

night, but every night for a whole week, from December 18 to 25 inclusive! Think of that!

And here's an even bigger surprise!—It's for the same week! Santa Claus is going to introduce all of you to another member of his household, someone who hasn't ever been heard from before! It's the vivacious, jolly little step-daughter of the whiskered saint—it's Mary Christmas!

And Mary Christmas is also going to talk by radio to all youngsters on the three last nights of the same week, December 22, 23, and 24. She's promised to tell just what she does in Santa Claus House—how long she's lived there and what she thinks about Santa Claus and, especially, about boys and girls! A special program will be given by WGY on Christmas Eve, December 24.

There's a particular reason why Santa Claus and Mary Christmas will give talks by radio during the week of December 18, to 25. Of course it's Christmas week. But it's also National Radio Week, when for eight nights steadily more than five hundred radio broadcasting stations all over the United States will give special programs of novel features.

Radiograms

The Latest Important Radio News Briefly Told for the Growing Army of Radio Fans

WGY, broadcasting station of the General Electric Company, Schenectady, New York, has been heard in every State in the Union. Although programs have been regularly sent from this station for the last nine months, two states—Idaho and Nevada—had not been heard from until a few days ago. Because of the great confusion caused by so many stations operating simultaneously, only such replies naming artists and the time heard which accurately check with the WGY log, are considered. The greatest points reached in all directions are:

West.—Oakland, California, 2550 miles; Kingman, Arizona, 2175 miles; Enterprise, Oregon, 2170 miles; Hillyard, Washington, 2150 miles; Midas, Nevada, 2200 miles. In a special test, WGY operating on its experimental license 2X1, has been heard at Hilo, Territory of Hawaii.

North.—St. Johns, Newfoundland, 1075 miles; Calgary, Alberta, Canada, 1950 miles.

East.—By a steamer, 2017 miles in the Atlantic ocean.

South.—By steamer "Luckenbach," 150 miles south of the Panama Canal, or a distance of 2450 miles; Mexico City, 2150 miles; San Juan, Porto Rico, 1700 miles; Pela, Honduras, Central America, 2000 miles.

* * *

Arrangements to establish a university extension course for the people were made between the Society of Radio Artists and Audiences and the Lecture Bureau of the New York Board of Education whereby selected lecturers broadcast tabloid lectures from the WHN station, Ridgewood, Brooklyn, New York.

Another chance for DX fans! Daily transmissions of telephony from Konigswusterhausen, Berlin, are on a wave length of 2,800 meters, and the times are 6 to 7 a. m., 11 a. m. to 12:30 noon and 4 to 5:30 p. m., middle European time.

* * *

Disabled men will get radio for Christmas. Members of the auxiliary of the Bill Brown Post at Sheepshead Bay, New York, are devoting considerable time to the welfare of the disabled veterans in the Manhattan State Hospital on Ward's Island. Through the efforts of this auxiliary the men will be presented with a radio set on Christmas Day. Mrs. Mary E. Hartt, president of the auxiliary, arranged with several of the members to conduct card parties and social functions for the purpose of raising the money necessary for the purchase of the set. The complete outfit will cost \$450.

* * *

Former Postmaster General Frank H. Hitchcock, who is devoting much of his energy to the wonders of radio these days, was the guest of honor at a luncheon at the Bankers' Club, New York, to some of his old friends connected with New York newspapers, a number of whom are now writing on radio subjects. Others who edit the wireless departments of papers

met him for the first time. The luncheon was given by L. S. Byers, executive secretary of the American Radio Exposition, of which Mr. Hitchcock is president.

* * *

One of the radio subjects recently discussed in Chicago and Minneapolis was a broadcasting policy designed to initiate and support broadcasting programs of the highest type. In this connection it is proposed to enlist the active cooperation of the public press, educational institutions, boards of trade, churches and, what is of utmost importance, to obtain the active cooperation and assistance of the users of listening apparatus, whose rapidly growing investment in radio equipment makes them greatly concerned with the proper maintenance of broadcasting.

* * *

Mr. and Mrs. Samuel Franklin, of Lansdale, Pa., Mr. and Mrs. H. L. Shellenberger and daughter, Miss Ethel Shellenberger, recently heard the voice of their son and brother transfitted through the air from a distance of 1,500 miles. The singer is Charles Shellenberger, former baseball pitcher at Ursinus College. He is now boys' secretary at the Denver Y. M. C. A. He sang at a radio concert in Denver. When Mr. Shellenberger, Sr., who is assistant cashier of the First National Bank, received a letter from his son, stating that his solo would be broadcast from Denver, the father made arrangements to "listen in." The singer's voice was heard as if it came from an adjoining room.

* * *

A marriage performed by radio is illegal, according to a construction of the Domestic Relations Law by Attorney General Newton, in New York State. The words, "in the presence," in the law mean an actual and not a constructive presence, the Attorney General held. The question was raised by the proposal to have a San Francisco clergyman broadcast the ritual to contracting parties in Grand Central Palace, New York City, the bride and groom broadcasting their responses.

* * *

The sixteenth radio station for the Air Mail-Service has been put in operation by the United States Post Office Department.

* * *

It is nothing new for the Boy Scouts to use radio apparatus. Various troops long ago made and purchased receiving instruments, and even before the advent of broadcasting the scouts numbered among them some well-known radio amateurs. Now that broadcasting is here, however, they are finding new fields for the use of the radio. Instead of using it only for their own instruction and recreation, as they virtually were compelled to do in the days when only code could be heard, now they are placing it before others who need to enjoy the radiotelephone but for obvious reasons are unable to do so.

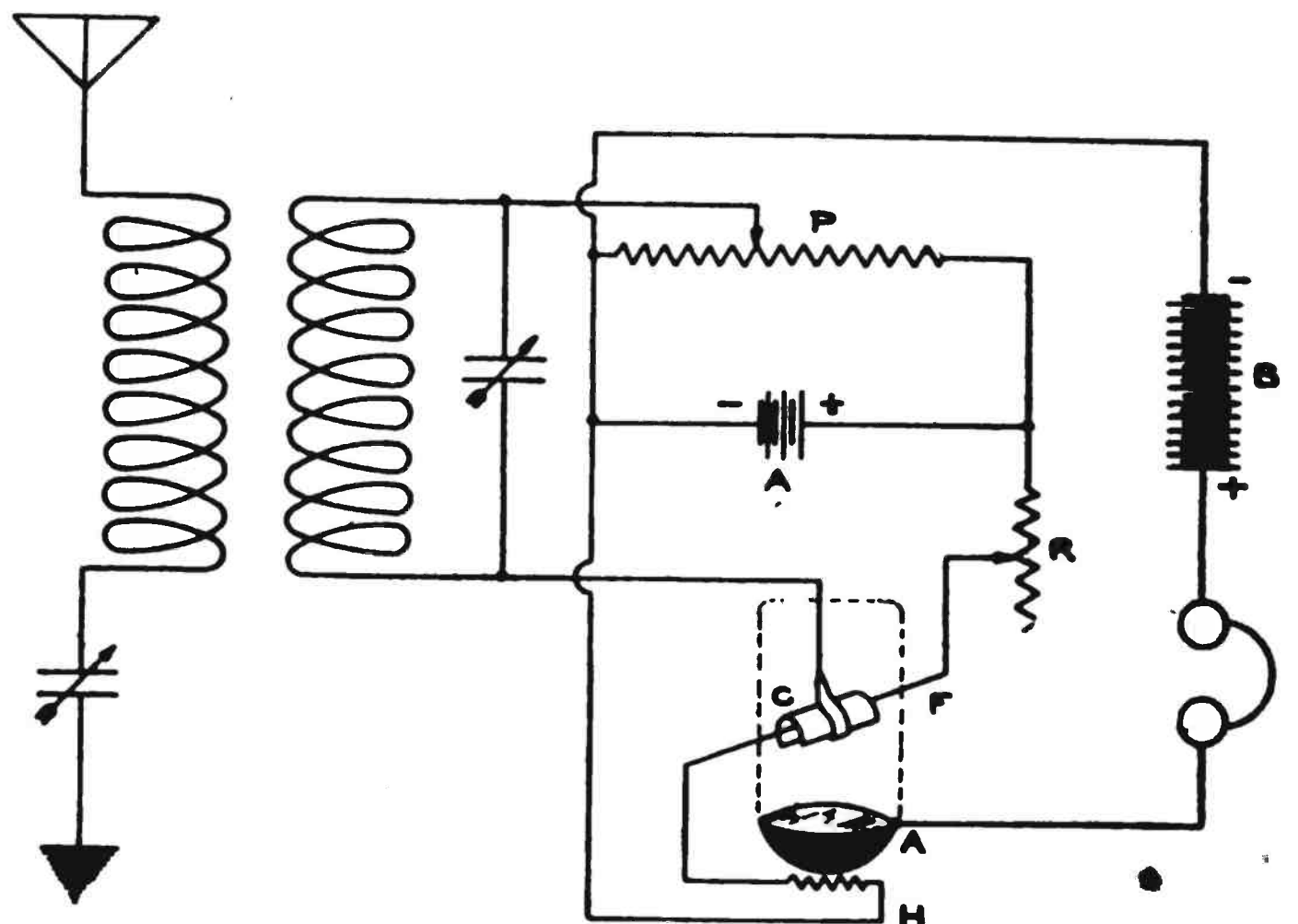
New Noninterfering Detector by H. P. Donle

H. P. DONLE, radio inventor and experimenter, after years of research and the building and study of thousands of bulbs, has developed a new vacuum tube. This tube is an exceedingly sensitive detector. Without regeneration, Mr. Donle claims it gives responses as loud as a good regenerator using the usual grid form of tube. Used in a plain circuit, it cannot produce interfering oscillations; it consequently should be strongly welcomed in broadcasting circles.

Mr. Donle's tube is known as an intensifying detector. It contains no grid. One form uses a short straight filament above which is supported a trough-shaped collector electrode. Under the filament is a main anode consisting of a piece of metallic sodium. The best circuit is shown in the diagram reproduced herewith. The action of the tube involves controlled ionization and a peculiar construction which gives not only extreme sensitiveness, but stability of adjustment.

This tube has been tried out. Its sensitiveness in a plain receiver, if anything, is claimed to be a little higher than that of a good U-V 201 in a high-grade regenerator. It is also claimed that they are incapable of radiating so as to produce interference.

At the meeting of the Institute of Radio Engineers, held at the Engineering Societies Building, 29 West 39th street, New York City, on December 20, Mr. Donle described the new tubes and showed them in operation.



Schematic diagram of Mr. Donle's new tube, showing trough-shaped collector electrode.

Radio and the Woman

Crystal D. Tector Tunes in with a Variety of Radio Topics on Matters of Interest to the Gentler Sex

D ID it ever occur to any of the young women reading this department that a number of you who are talented could apply to the broadcasting station in your vicinity and be heard over the air? Just imagine what your friends will say when they hear something like the following being broadcast from station XXZ: "Miss So and So will now render a selection from 'Traviata'?" Miss So and So is one of the growing number of women radioists." Wouldn't they just die of envy? And look at the publicity you would get at the next meeting of the Neighborhood Sewing Association.

I WONDER why the Hairdressers' Association doesn't put up a resolution to change the term, "permanent wave," to the up-to-date radio term, "continuous wave." Imagine their advertisements then—something like this: "Continuous wave. Guaranteed by the latest methods. Only \$50.00."

I SEE where those French hussies are trying to get their names in the paper all the time! Their latest fad is to carry a parasol with a receiving set in the handle. Well, we'll have to go them one better. What modiste is going to be the first to name the "Chapeau Radio"? Then we could listen to the broadcasting while shopping with one of the latest creations on our heads.

FRIEND HUSBAND tried to pick a quarrel with me the other morning—in an entirely new and original way. He said that I forgot to turn off the filament current on the set! Imagine that, when I *distinctly* remember that he was the last one to listen in.

AT last the neighbors have stopped borrowing my phones. I designed a plug that won't fit their set, and they can't use them any more.

AND I have also hit on the ideal way to make the wash-woman hurry up. Mine happens to be colored; and, like many colored folks, she is slow. I took my loud-speaker and

put it near the kitchen door, turned it on, and, as luck would have it, WGI was broadcasting a particularly lively jazz. It worked fine. She had the wash done almost an hour and a quarter earlier, and remarked when leaving: "Dem dare radios sure do put lots of pep into a pusson, missy."

I'VE a surprise for you. Of course, you mustn't tell anybody that I told you this, but there is a big hairdressing establishment in this city that is going to have a radio set in it with a loud-speaker in every booth so that everybody (men included) who ask to have their permanent wave developed may have something to listen to besides a lot of shop talk about hirsute adornment. I know this will be a treat; because, from my experience, I am fully convinced that I know more about the care of the hair than any four hairdressers put together.

I WENT radio bargain-hunting with a friend the other day. Just as I was entering the radio department my friend spied some imported lacey house-dresses at a really astounding price. Well, Friend Husband will have to wait for those vernier rheostats until next week. It really would have been a shame to let that opportunity go—don't you think?

AN anxious mother writes me that since a certain little boy—"Johnnie"—acquired a new set as a birthday present she has trouble getting him to bed at night, and that his excuse is that all the long-distance stations don't come on until after the local broadcasters have closed up. She wants to know if this is so and if I will advise some remedy. Well, I am not sure; but, as the young man seems to have acquired the habits generally attributed to "night owls," the only remedy I can suggest is to let him sleep all day so that he can listen all night. As you probably know, a "night owl" is generally incurable, and it is but wasted time on the part of certain physicians to insist that every one needs at least eight hours' sleep each night. A "night owl's" inherent determination recognizes no doctor—only his own desire to get the most distant points possible. And, of course, from what I have heard, this is most probable in the "wee sma' hours."

QRM Preventers

By Patrick Nichols

Quizzes and Queer Remarks a Ham MUST Hear!

WHAT does that thingamajig do?"

"Can't you get an opera on?"

"Why isn't PJX on to-night?"

"I came over especially to hear Havana."

"Why is a spark station?"

"Won't you teach little Willie the code. He's such a bright boy, I'm sure he will learn quickly?"

"Say Bill, let's try this hook-up, Willya?"

"Why ain't it working?"

"Can you show me how to do it?"

"I've got a friend out in California. Can you connect me with him?"

"Is a wireless wave anything like a permanent wave?"

"Can't you make it any louder?"

"Surely, you didn't make it all yourself. I can't believe it."

"Does it come through the air?"

Radio Hams We Meet

THE fellow who goes "up in the air" when you sit down to his set and disturb the pet adjustment that took him all of one-tenth of a second to make, and

then goes around threatening to lock up his set so that no one can touch it. Augh! The first hundred years are the hardest! You get used to them by that time!

Signing Off!

IF the rheostat offers resistance will the lightning arrester?

If the battery gets "charged" will the crystal detector?

How can I stop WJZ from coming in so loud.

If we'll all have to learn to talk French when we get in daily communication with Parisian amateurs, or if they will have to learn English?

Famous Sayings of Radioists

I'LL get this thing fixed to-night or bust it so no one else'll ever fix it."

"I'm not kiddin' you! Fact, I heard him say PWX as plain as I hear you—and on the loud-speaker, too."

"I don't know—it never did this before."

"Oh! I haven't any time for girls now; I'm building a new set."

"And the funny part of it is, I didn't have the aerial connected."

"Say, did you every try—?"

"Oh, say, have you just discovered that?"

I used to do that back in 1913, with a crystal set."

Has It Ever Happened to You?

THE night was cool, the moon was full, not a cloud was in the sky;

The folks sat round the radio set—to get signals, he did try!

The folks had come from out of town—best type of country cousin;

But the dad-blamed-onery-junk—he couldn't even get it buzzin'!

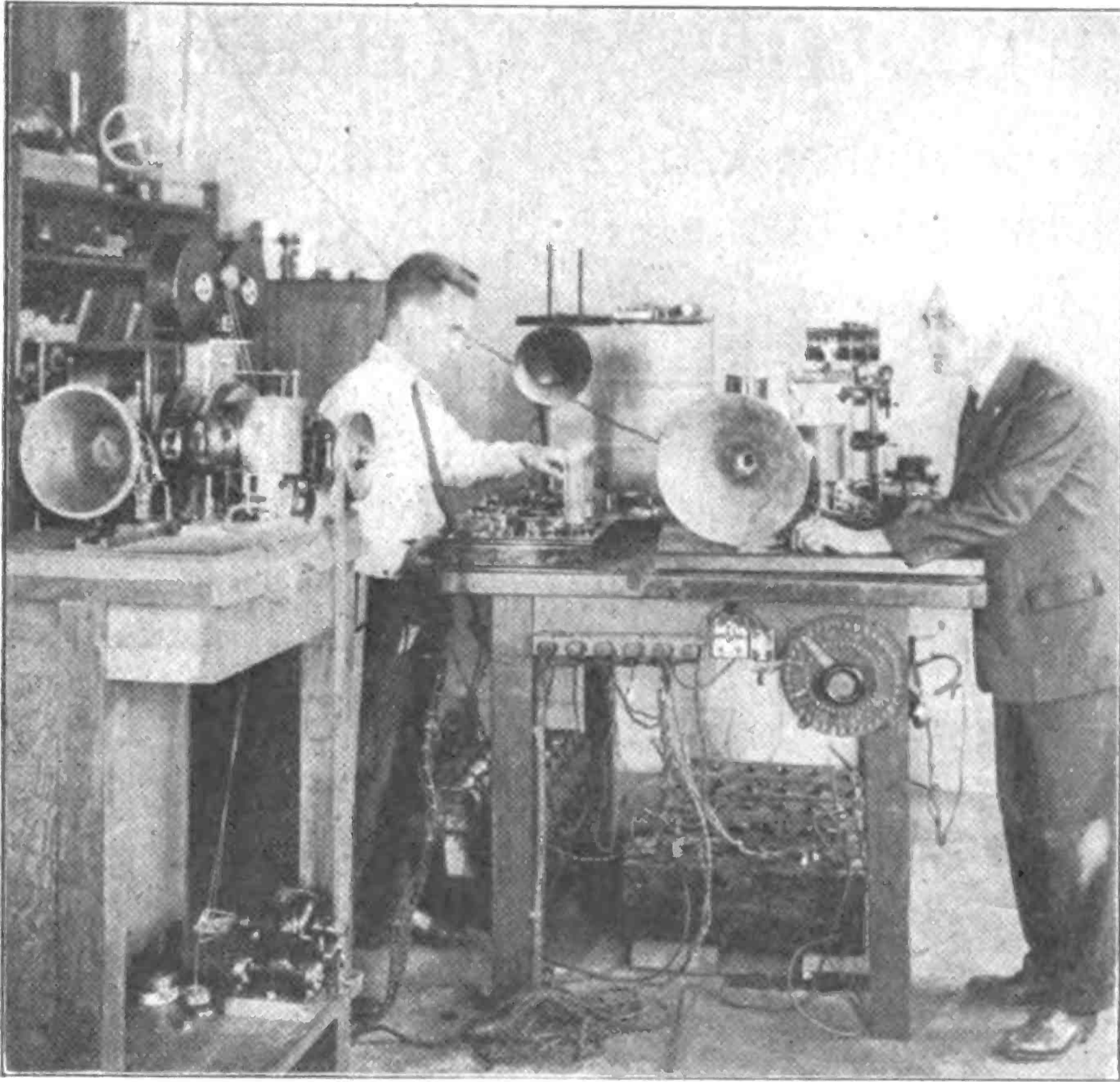
And needless to say that inside of an hour he had every piece of apparatus out and back again, and couldn't locate the trouble until the morning sun showed his aerial grounded.

A Boy's Work

Description of Regenerative Receiver on Radio World Front Cover, This Week

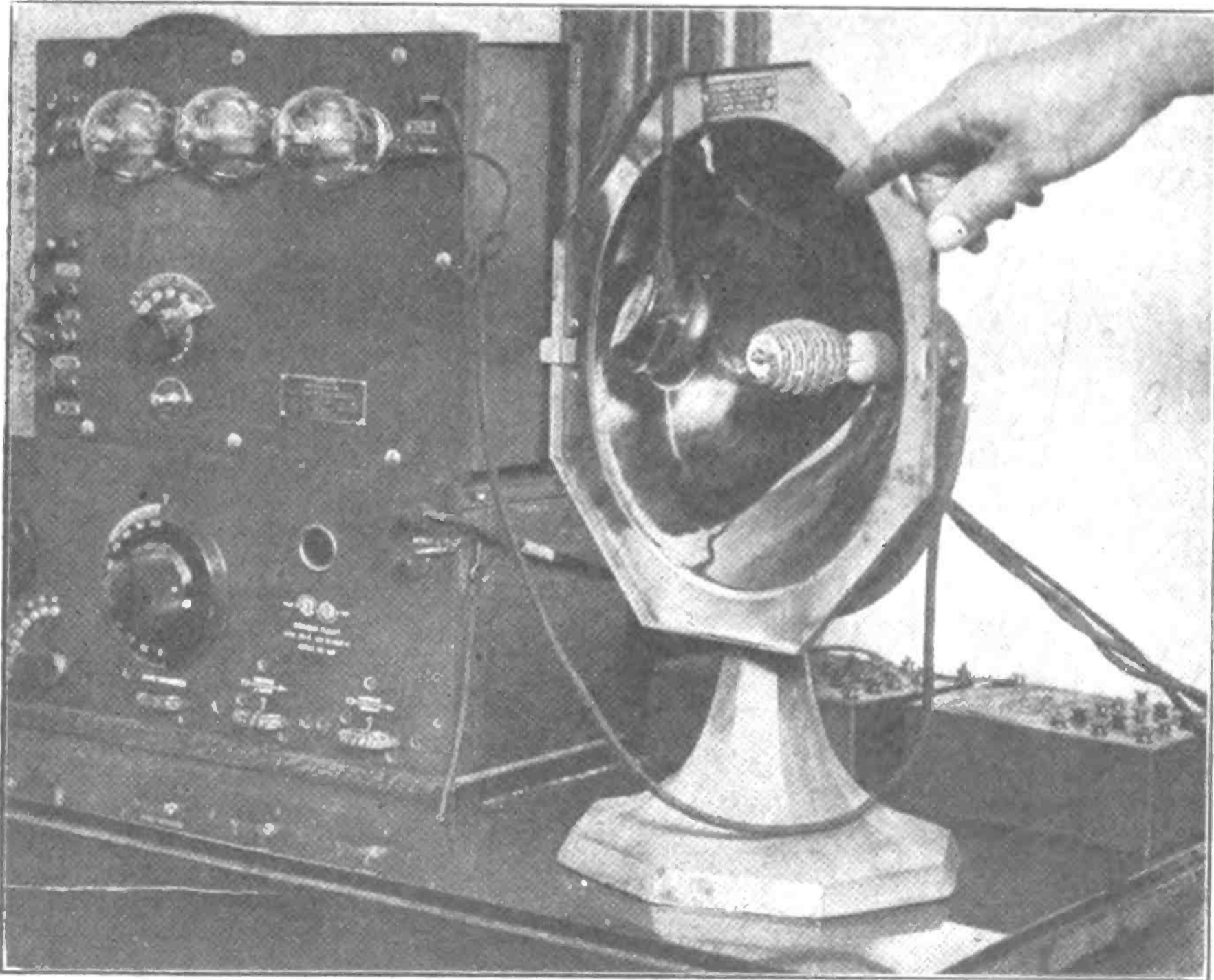
THE photograph on the front cover of this issue of RADIO WORLD shows how Young America is taking up radio. David Orgain, a youngster of thirteen summers, is photographed putting the finishing touches on a single-circuit regenerative receiver of his own construction. You will notice that he is using the familiar hook-up in which the rotor of the coupler—which, by the way, is bank wound for reception up to 3,000 meters—acts as the tickler. While the panel is made of wood, and there is nothing elaborate about the set, it is certain that when it was finished some good DX work was done on it.

Late Novelties Radio Week the Photo



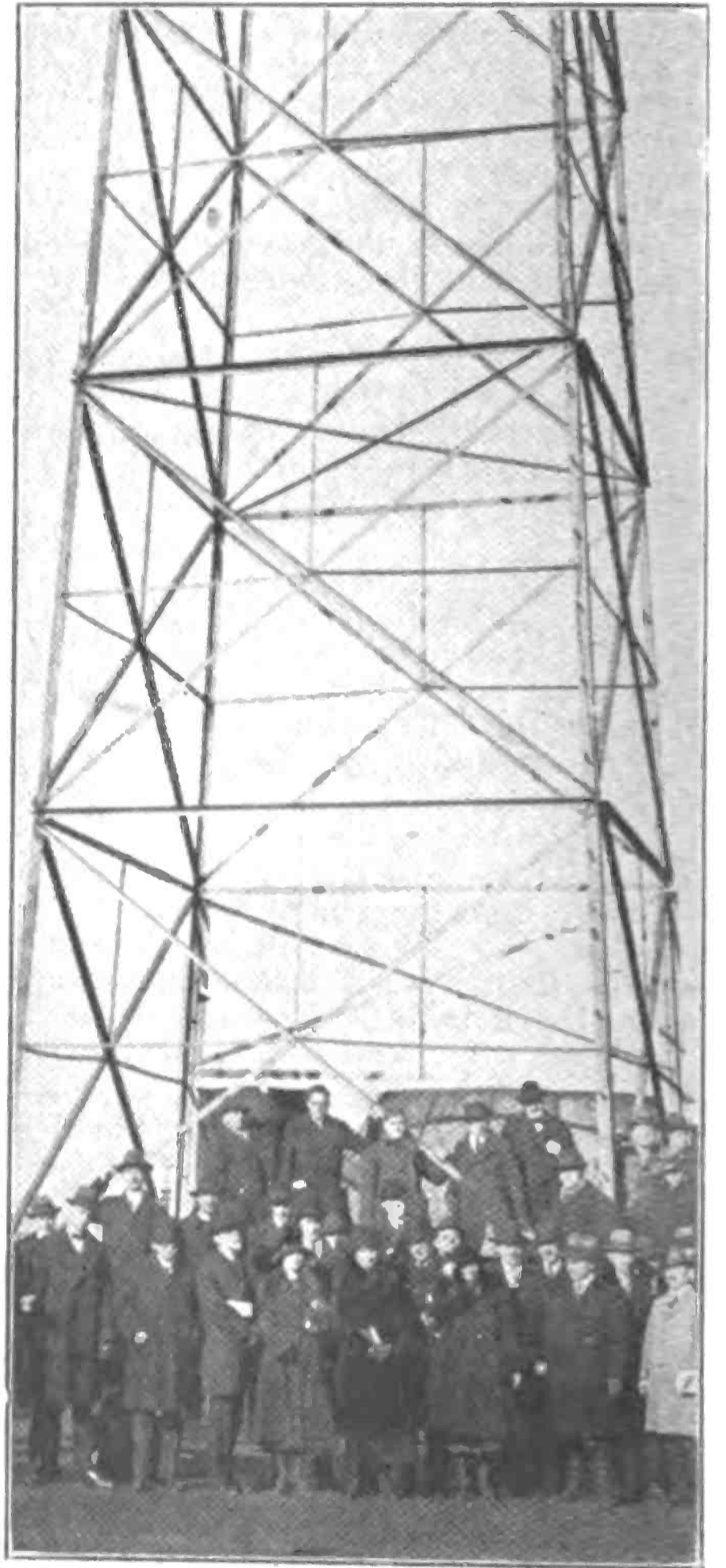
(C. "P. & A. Photos")

(Above) The human voice photographed. A new device known as the pello-photophone has been perfected by Charles A. Hoxie of the General Electric Company. It permits the photographing of the human voice and reproducing it, not as a picture but as the actual sound of the voice itself. A reproduction from the Hoxie machine was declared perfect after several experiments. It is regarded as the apparatus which will make talking movies a successful reality and has introduced into radio broadcasting an entirely new element—the possibility of making a master record from which copies can be made and reproduced in the four corners of the world. Mr. Hoxie (at right) is shown demonstrating the machine and incidentally taking an indelible lasting record of the voice of the man standing before the reproducer.



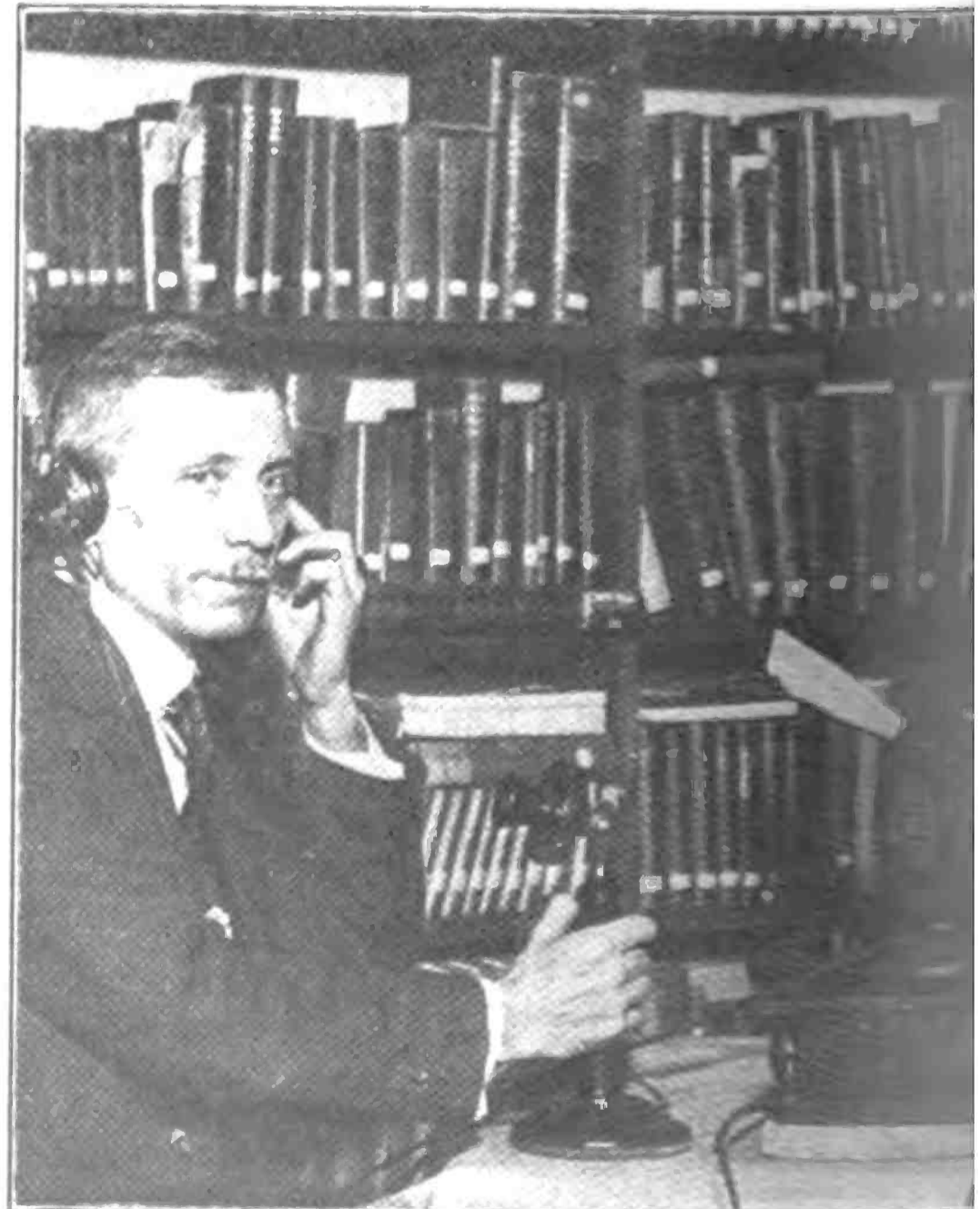
(C. Kadel & Herbert)

(Above) A loud-speaker with the aid of your electric heater. Try this and see if it doesn't make a fine loud-speaker. Take your electric heater and place your receiver as shown in the photograph. You will be surprised at the results. It may be carried out with an old dishpan or any parabolic metallic object large enough to throw the sound. If you desire to use the heater, be sure that you don't turn on the heat, or disastrous results may ensue. You will have to do a little experimenting to find the best location to hang the phone so that it will throw the sound, as simply hanging it before the heater will not do. It is best, perhaps, if hung six inches from the heater or when placed almost before its center. Only experimenting can tell, as in the matter of all heaters and dishpans you have to take into consideration different thicknesses of the metal used.



(C. Wide World Photos)

(Left) ...
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(C. Wide World Photos)

(Above) Room above the Great Hall of the College of the ...
concert given by the Philharmonic Orchestra was transmitte
of the American Tel. and Tel. Company. Left to right: Cal
erick D. Robinson, director in charge

s for National Recorded by ographers

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(International Reel Photos)

(Above) The new radio broadcasting station in the basement of the Capitol of the United States, Washington, D. C., which broadcast the President's speech before Congress recently. This is the first time in history that the general public has been able to hear a President addressing Congress. This is one of the most important improvements that has been made in the radio field lately, as it practically puts the Executive of this great nation in personal touch with all the people.



... of New York, from which the
... the radio broadcasting station
... electrician and Professor Fred-
... concerts.

(Right) J. H. Ridley, chief test room operator of Burn-dept, Ltd., Blackheath, radio engineers of London, England, who while listening in on his receiver heard no fewer than nine American wireless amateur stations talking to one another, and also a broadcast concert in America. This is the first time on record that a wireless concert in America has been heard in England. Photograph shows Operator Ridley at his instruments.



(C. Kadel & Herbert)

(Above) Radio music while speeding sixty miles an hour. Many of us think that radio on a fast-going train needs little equipment but here's an example of how many batteries are used on a D. L. & W. Buffalo special that brings in radio music for the passengers.



(Above) Ed Wynn, known to all theatergoers as "The Perfect Fool" is a pioneer radio fan. This is his own motor-car radio equipped. Note the spiral aerial!



(C. Wide World Photos)

With the DX Night Owls

Who Can Beat This?

EDITOR, RADIO WORLD: I am not claiming a record, but I have all those beat that I have seen. I have a home-made regenerative set, with two-stage amplifier, using honeycomb coils. Can't be beat! I hear WGR, Buffalo, New York; KDKA, Pittsburgh; WSB, Atlanta; WMAT, Duluth, Minnesota; WOC, Davenport, Iowa; KSD, St. Louis; WFAA, Dallas, Texas; WBAP, Fort Worth, Texas; WEAY, Houston, Texas; KDYX, Honolulu, Hawaii, and enough stations in mountain and Pacific time districts and in Canada to run my list to over a hundred stations broadcasting concerts. Let's hear from some one who has this beat.—N. E. Parr, Albany, Oregon.

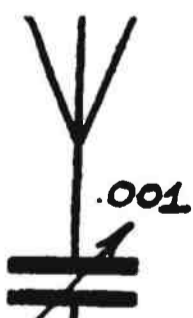
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Get Your Knees Wet

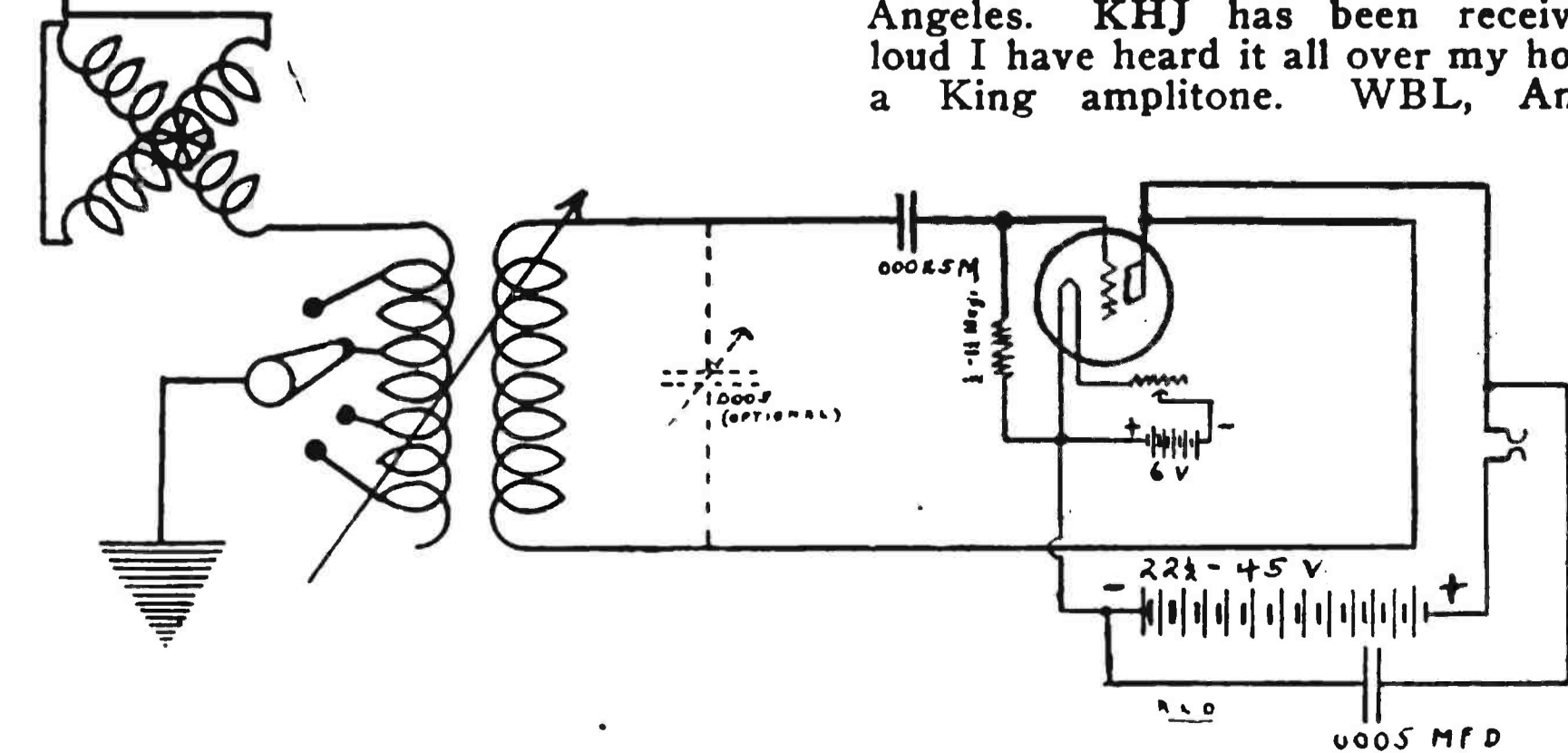
EDITOR, RADIO WORLD:—With the diagram of connection I enclose, I have done some remarkable work. I can get Newark (WJZ) almost every night. Out here we have some very funny weather at times—that is, so far as radio goes. Sometimes everything will breeze along fine. Then, the same day, you won't be able to get anything worth talking about. They don't seem to fade; they just don't come in. At first, I thought it was my set; but by comparing notes with a couple of other amateurs around town, I find that they have the same trouble.

I have put a variometer in series with my coupler. Although it is not absolutely necessary to the circuit, I find that it gives me much sharper tuning. I am using a home-made coupler modeled after the all-wave, and I'll say that bank winding is no cinch.

This hook-up is very selective and you have to get used to the tricks of it before you can get any definite results. With this circuit working properly and a good clear night, remarkable work has been done by a number of fellows out this way. In tuning this set, you have to get used to using the rotor of this coupler as a regenerator. On some stations, this is rather tricky because where you may get one station at 10 degrees another on the same wave length may come in around 160 degrees. I have overcome this to some extent by the use of the variometer and the variable condenser in the



Schematic design of Mr. Jack Lyons, Tucson, Arizona, who signs himself "Grand-daddy of Night Owls," and described in his letter.



The Editors of RADIO WORLD will be pleased to receive sketches of hook-ups of the various "DX Night Owls" sending in records, with a view of publishing them.

Other letters from the DX "bugs" will be published from week to week.—The Editor.

secondary circuit. I find that it works well without the secondary condenser; but, as the variometer, it all tends to make the tuning more selective.

With this hook-up and a fairly soft tube with variable B-voltage (which, by the way, is very necessary) I have no trouble in bringing in WJZ, WGM, and a score of others.

"Step up and get your knees wet with this one!" is my motto. Come on you DX boys.—Jack Lyons, Tucson, Arizona, "Granddaddy of Night Owls."

* * *

An Idaho Record

EDITOR, RADIO WORLD: Having noticed in a recent issue of RADIO WORLD that a radioist in Chicago had been getting unusual results I wish to submit my report. When using but one old-type Cunningham audiotron with an inverted-L aerial 45 feet high and 110 feet long, directed to the east, I have heard the following stations:

KFAF, Denver; KDYL, KZN, Salt Lake; KFI, KWH, Los Angeles (KFI every night for a week); KLP, Los Altos, California; WBAP, Fort Worth, Texas (very clear music at about 7 p. m.); KFV, Yaking, Washington; KFZ, Spokane, Washington; KGO, Portland, Oregon; WHB, Kansas City, Missouri, and Calgary, Canada.

Close tuning is done with an aerial conductor and a grid conductor.—Kenneth Jones, Blackfoot, Idaho.

* * *

Connections Not Soldered

EDITOR, RADIO WORLD: I am sending my receiving record of the past month. I am using a home-made set built by a friend and myself. None of its connections is soldered. It consists of a vario-coupler, variometer, 43-plate variable condenser, and two stages of amplification.

The first record I want to mention I received on my inside aerial which is 32 feet long. On this aerial I received WOC, Davenport, Iowa; KBAP, Fort Worth, Texas; WHB, Kansas City, Missouri, very plainly. The stations that I have received on my outside aerial, which is 100 feet long and 25 feet high are as follows: KZN, Salt Lake City, Utah; KWH, KFI and KHJ, Los Angeles. KHJ has been received so loud I have heard it all over my house on a King amplitone. WBL, Anthony,

Kansas, also very clear. WHB and WDAF, Kansas City, Missouri; KFBB, Havre, Montana; KFAA, Dallas, Texas; WOI, Ames, Iowa; 6XB, San Francisco, and KSD, St. Louis. I have received also the following stations in Canada: CFAC, Calgary (very plainly); also CSCN, Calgary; CJSC and CJCD, Toronto; and CJCG, Winnipeg.

Here's hoping I soon hear KDKA and WJZ, and then I will be very much satisfied with my set.—George C. Franz, 268 South Clarkson Street, Denver, Colorado.

* * *

From Troy, New York

EDITOR, RADIO WORLD: I am using honeycomb coils and three tubes with jacks. I noticed the records in RADIO WORLD. Here is mine:

WNAC, WDAP, WOS, WDAF, WSO, WLB, WHAS, WGR, WAAH, WIN, WEP, NOF, WJAX, WHB, KSD, WGM, 9XN (9XJ, WRM), WSB, WDAF, WWJ, WOC, WOH, KYW, KDKA, WLW, WBR, WEAK, WPO, WRB, WRS, WUR, WAAP, WNAO, WHAG, WWI, WMAM, WSP, WNG, WSC, KYS, KOW, KDOC, KDOS, KDOW, KDKC, KDBC, KDA, WDOD, NNE, NNK, NOM, WHAL, WBA, WAR, KWZ, WBAK, POZ, WBAD, and WDAP on November 9, 16, 19, 28, and December 4.

I have a large number of other nearby and distant stations including amateur.

The ARRL call, November 30, was heard at noon. No call number was received.

Wireless on ships and land at a distance of 1,500 miles have been heard.—E. B. Messenger, Route 3, Troy, N. Y.

* * *

Doesn't Claim a Record

EDITOR, RADIO WORLD: Having read the various records set up by different radio "bugs," I thought I would send in mine. I don't claim a record as I have pals here doing the same thing every night, but I do think I have Mr. Merklein beat a little, as I am 75 or 100 miles farther northeast. I hear the following station with a home set:

WOC, Davenport, Iowa; KSD, St. Louis; WHB, Kansas City, Missouri; WOS, Jefferson City, Missouri; KYW, Chicago; WGAS, Chicago; WDAP, Chicago; WMAQ, Chicago; WLK, Indianapolis; WHAS, Louisville, Kentucky; WWJ, Detroit; WJAX, Cleveland; WDAJ, College Park, Georgia; WSB, Atlanta; WGM, Atlanta; PWX, Havana, Cuba; CKAC, Montreal, Canada; WGR, Buffalo; WHAZ, Troy; WHAM, Rochester, New York; WLW, Cincinnati; WNAC, Boston; WGI, Medford Hillside, Massachusetts; WBZ, Springfield, Massachusetts; WGY and QXI, Schenectady, New York, and a great number in Philadelphia, Washington, New Jersey, Pennsylvania and other New York stations.—Herbert L. Wheeler, 10 Lincoln avenue, Milford, Conn. Station 1 BUW.

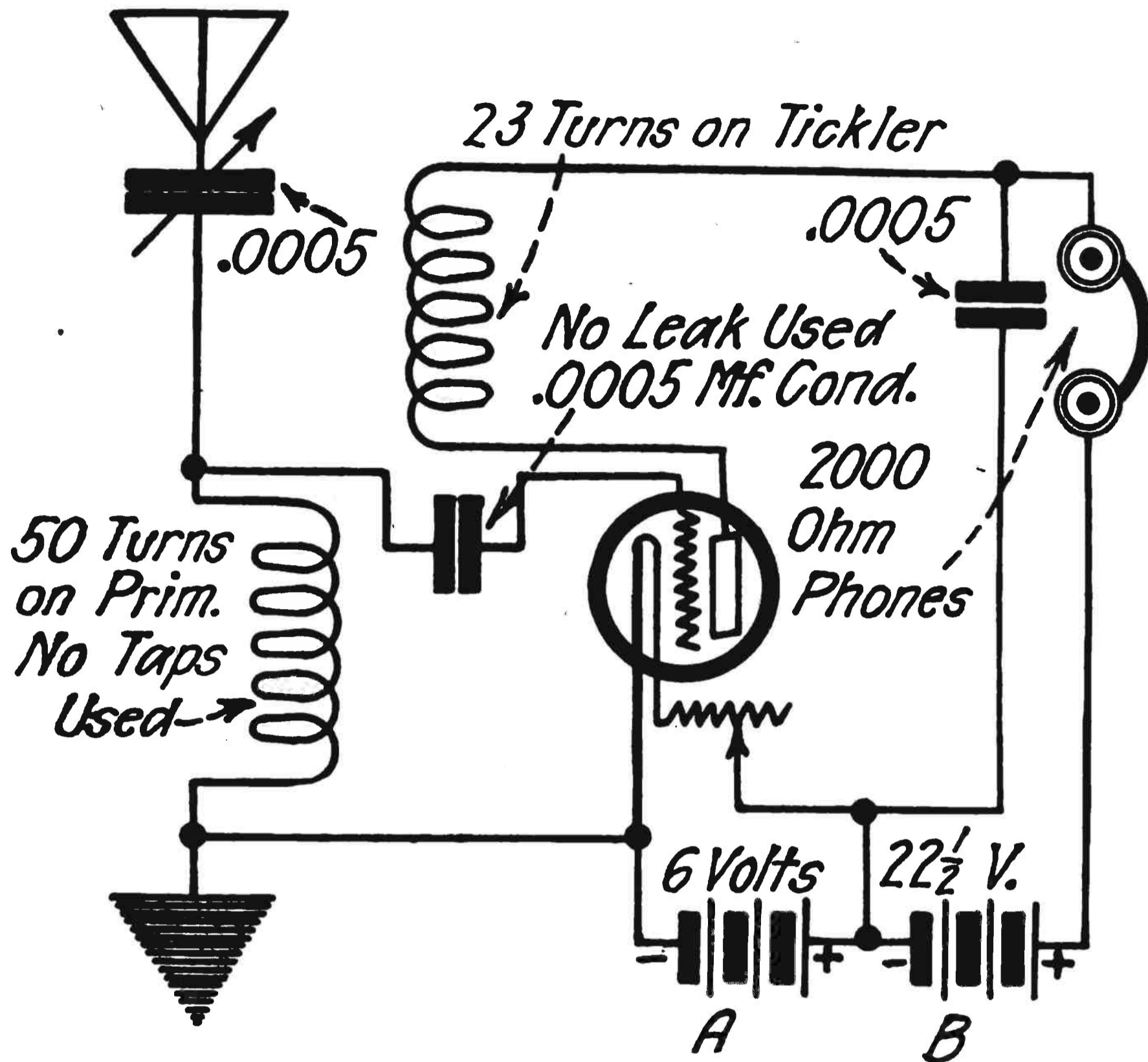
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32 Stations in 2 Hrs., 45 Min.

EDITOR, RADIO WORLD: December 4th, beginning at 8 o'clock p. m., I started in to see how many phone stations I could get on my home-made regenerative set, using only one bulb. At exactly 10:45 o'clock, I had heard and listed 32 stations. I listed them as I received them. It must be remembered

With the DX Night Owls

(Continued from preceding page)



Schematic design of Mr. Earl A. Wright's hookup. A Workrite coupler is used. The tickler turns 90 degrees. The primary condenser is very critical. A vernier may be used to advantage. The tuning is done with tickler between maximum and minimum. All tuning is done with primary condenser.

that this was accomplished in only 2 hours and 45 minutes.

Other stations were still coming in when I quit. No doubt this number would have been increased from 5 to 10 more, if I had set up later. I had a list of 125 phone stations that I had heard at different times. It has been almost two months since I last listed in it. I was getting so many stations I did not

take time to make a record of them all.

Listing the 32 stations was not difficult. I have received stations from almost every State in the United States, also Cuba. My hook-up is my own, so far as I know. I am giving it here for other owls to try out. The closest station received on December 4 was 90 miles. Come on and wade in, DX.—Earl A. Wright, Cole Camp, Missouri.

* * *

Good for Dry-Cell Set

EDITOR RADIO WORLD: I have a "peanut-tube" regenerative set with no amplification. Since November 25 I have heard distinctly Minneapolis, Chicago, Atlanta, St. Louis, Kansas City and Denver. I consider this very good for a dry-cell set. My set is something like Mr. William A. Bruno's set in RADIO WORLD, No. 30, dated October 21. I also use the 22 1/2-volt B battery. I use a vario-coupler bank wound with 150 turns, 11-plate variable condenser, vernier-filament rheostat, grid condenser, grid leak, and W-D 11 aeriotron tube. I intend to add one stage of amplification and note the results that follow.—J. E. Bradley, Justin, Texas.

* * *

6BNQ Tunes In

EDITOR, RADIO WORLD: In RADIO WORLD, No. 36, dated December 2, Mr. E. Sherow, New York, claims the record for 1-tube DX reception. I think I have him beat. Here is my list to date:

WBAY, New York City, good; WGY, Schenectady, New York, faint; KDKA, Pittsburgh, good; KOV, Pittsburgh, good; WSB, Atlanta, Georgia, good; WOC, Davenport, Iowa, loud; WOI, Ames, Iowa, good; WHB, Kansas City,

Missouri, good; WBAP, Fort Worth, Texas, good; KLZ, Denver, Colorado, good; KFAF, Denver, Colorado, good; WFAA, Dallas, Texas, good; KOB, State College, New Mexico, good; KZN, Salt Lake, loud; KDYL, Salt Lake, loud; KFBB, Butte, Montana, good; KDYS, Great Falls, Montana, good; KFBJ, Boise, Idaho, good; KGG, Portland, Oregon, loud; KGW, Portland, Oregon, good; WOAI, San Antonio, Texas, good.

This is not the complete list—only stations over 400 miles away. My receiver is a home-made Grebe CR-5 with detector only. The aerial is 35 feet high and 50 feet long, 3-wire inverted L. Please publish this and give other "bugs" something to think about.—Merle Schilling, Opr. 6BNQ, Box 297, Beaumont, California.

Timely N. R. W. Hint

EDITOR, RADIO WORLD:—Could not the broadcasting and amateur stations be pressed into service to advertise National Radio Week? May I suggest that you mail a few letters along this line to start things going. I am for National Radio Week and do not want to overlook anything that will help the good cause.—R. C. Connor, 931 North Fourth Street, Camden, New Jersey.

Why Magnavox is the Reproducer Supreme

OFFICIAL tests with the oscillograph prove that the Magnavox electro-dynamic receiver reproduces incoming wave forms with maximum accuracy.

The Magnavox can be used with any receiving set—the better the set, the more Magnavox can do for you.

When you purchase a Magnavox you possess an instrument of the very highest quality and efficiency.



R-2 Magnavox Radio with 18-inch horn

(as illustrated)

This instrument is intended for those who wish the utmost in amplifying power; for clubs, hotels, dance halls, large audiences, etc. It requires only .6 of an ampere for the field.

Price \$85.00

R-3 Magnavox Radio with 14-inch horn

The ideal instrument for use in homes, offices, amateur stations, etc. Same in principle and construction as Type R-2.

Price \$45.00

Model C Magnavox Power Amplifier

For use with the Magnavox Radio and insures getting the largest possible power input.

2-stage \$ 80.00
3-stage 110.00

Magnavox products can be had of good dealers everywhere.

THE MAGNAVOX CO.
Oakland, California

N. Y. Office: 370 Seventh Ave.

Latest Radio Patents

To Detect Minute Values of Energy

Earl C. Hanson and Wendell L. Carlson Put Heterodyning to Important Use

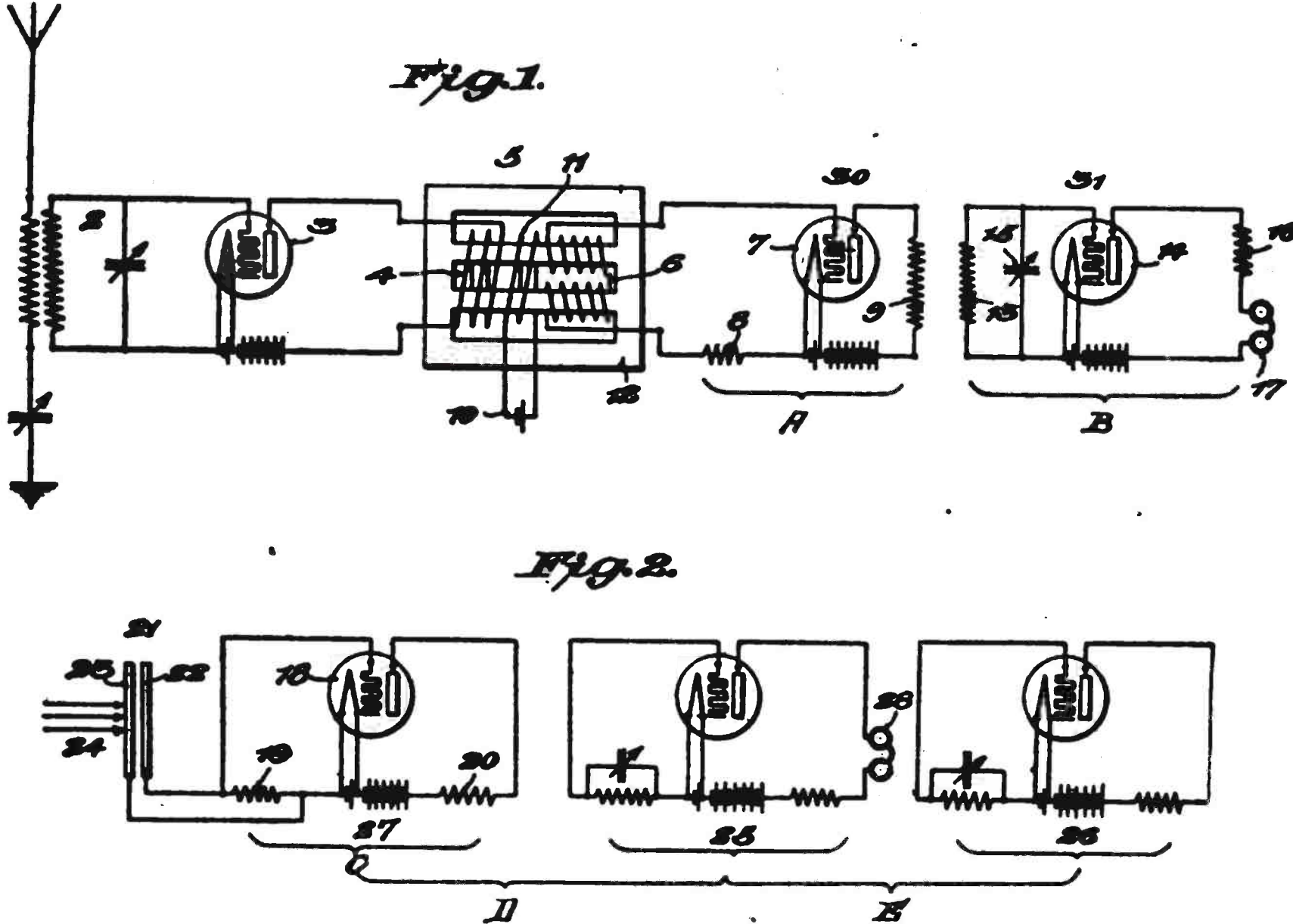


Figure 1 shows diagrammatically the invention utilized for the reception of radio signals. Figure 2 shows the invention adapted for measuring the luminosity of a source of light

No. 1,437,246, Patented November 28, 1922. Patentees: Earl C. Hanson and Wendell L. Carlson, New York City

TWO of the foremost radio experimenters in the United States have been granted letters of patent on what seems to be an entirely new method of detecting and amplification of radio currents—an invention to provide suitable apparatus for detecting slight variations

in the frequency of an oscillating current. The fundamental principle on which this invention is based is the "heterodyning" of two or more oscillating electric currents to produce a beat, the frequency of which will be determined by the natural constants of the circuits and the external influence of an interference acting upon one of the circuits.

Kills Undesired Oscillations

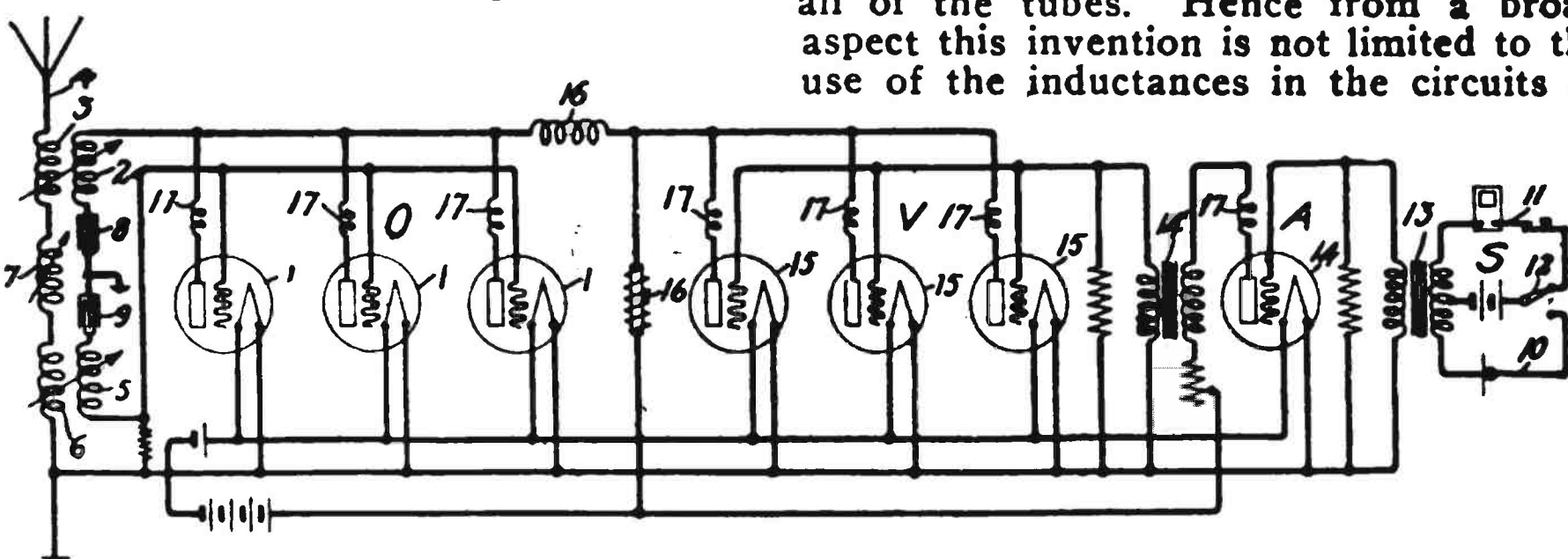
No. 1,437,821, Patented November 28, 1922. Patentees: John C. Schelleng, East Orange, N. J.

AN invention to prevent vacuum tube systems from generating undesired oscillations. It is particularly applicable in the case of radio-transmission systems utilizing electron discharge devices having plate, grid, and filament electrodes for transmitting electromagnetic waves of high power.

In such vacuum tube systems, especially systems comprising a plurality of high power tubes in parallel, troublesome oscillations of undesired frequencies often occur. In many instances these oscillations are of a frequency much higher than the frequencies normally used in signaling. These undesired oscillations often result in failures to operate at the

proper frequency, or in the capricious alternation of the frequency from one value to another, particularly during modulation. In some cases, these exceedingly high-frequency oscillations manifest themselves by periodic or irregular variations or phenomena which occur at lower frequencies or irregular periods respectively. In certain cases, waves or impulses occur of such frequencies as to produce audible sounds which are especially objectionable. These high-frequency waves may cause excessive differences of potential between certain closely placed parts of the apparatus.

Where undesired oscillations occur as a result of a cyclic transfer of energy through several tubes, it may be possible to prevent these by including inductances in the circuits of one or more but not of all of the tubes. Hence from a broad aspect this invention is not limited to the use of the inductances in the circuits of



In Figure 1. Reference character 1 designates a tuned radio-frequency antenna-circuit, which is coupled magnetically to the resonant circuit 2. The thermionic vacuum-tube amplifier 3 has its input connected to a circuit 2 and its output connected to the input winding 4 of the well-known magnetic amplifier 5

every tube of a parallel group. The use of the words, "plate, grid, and filament" in describing the elements of discharge devices are to be understood in their generic sense as referring to anode, control, and cathode electrodes of any form and construction.

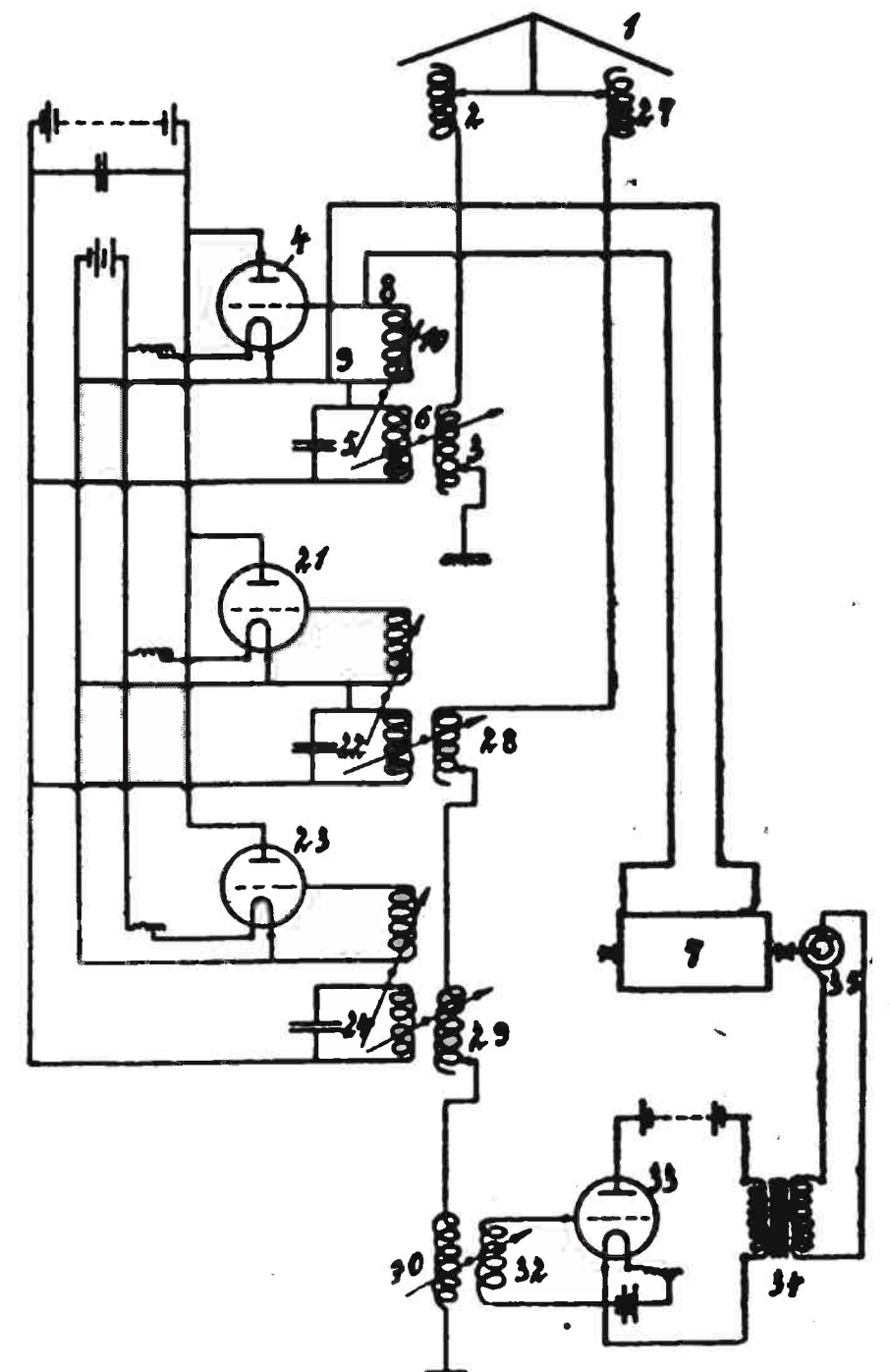
It is to be hoped that if this system of Mr. Schelleng's comes into general use; it will allow more powerful stations to operate at a closer wave-length range without causing the interference that is now so noticeable.

* * *

Pictures by Radio

No. 1,436,676. Patented, November 28, 1922. Patentees: Magne Hermod Petersen, Christiansa, Norway

MR. PETERSEN'S invention is intended for the transmission by radio of pictures, writings, or other similar matter. In this device, part of the current circuit of an alternating current generator connected to the transmission leads is short-circuited by means of a contact arrangement, which is so actuated by means of the writing at the



Diagrammatic illustration of a form of Mr. Petersen's invention, located in the sending station.

sending station, that the short circuiting is started or interrupted by means of a contact needle passing over the written lines. His method is also adapted for solving the wireless synchronizing problem. The inventor claims that by his method of transmitting photographs by radio, perfect detail is maintained and that, according to the advance in radio-photography it has been the most difficult phase of development in the new science. to perfect.

How to Buy

WHEN you decide to buy an automobile, you don't just go out and buy the first one you come across. You look at a number of them and then decide on the one you think will give you the best service for the money you spend. Then, why do you buy radio goods and sets just the opposite? Don't take the first thing that the salesman offers you and then be dissatisfied and grumble about getting "stuck." Buy radio goods as if you were buying a motor-car. Determine just how much money you can afford to spend—and then get the best set you can within your price.

Hoover May "Control the Air"

He Asks for That Power in Appeal from United States Courts Order to License New York Radio Company

ON another page of this issue of RADIO WORLD, Mr. Carl H. Butman, our Washington correspondent, contributes a timely article based on the suggestion of Herbert C. Hoover, Secretary of Commerce, that radio legislation is urgently needed in the United States. This action may be stimulated by a suit just filed in the United States Court of Appeals, Washington, D. C. It seems that after having its hands tied for over a year, so far as the regulation and the control of radio communication between the several States and foreign countries are concerned, the United States Government has begun a fight in the Court of Appeals of the District of Columbia for a decision which will place Secretary Hoover in "control of the air."

On behalf of Secretary Hoover, District Attorney Peyton Gordon and Assistant Dis-

trict Attorney Vernon West argued that Justice Wendell P. Stafford of the District of Columbia Supreme Court had erred in compelling Mr. Hoover to renew the license of the Inter-City Radio Company, Inc., to operate a high-powered commercial wireless station at 110 West Fortieth Street, New York City, and also to fix a wave length at which the company might operate without interfering with messages from nearby stations.

The license of the Inter-City Company expired on September 22, 1921, and Mr. Hoover refused to renew it, acting on the theory that the law vested him with discretionary power in that respect. Complaints had been made by the radio communication services of the Government and others that it was impossible for their stations to send or receive messages while the Inter-City plant was working.

The appellate court took the case under advisement.

Radio Compass Uses

Should There Be Another War, It Will Play an Important Part

RADIO compass receivers, it is claimed, will be instruments of great importance in warfare. Any radio transmission of the enemy's fleet, for example, is subject to reception; and if so received, the direction from which it comes can be determined and the approximate location of the fleet, or ship, determined. For this reason it is practical, in war time, to keep the amount of radio traffic at an absolute minimum, using it only when absolutely necessary and then restricting the power used to that required for the communication carried on. The radio compass may be used also for locating hidden radio-transmitting stations on land.

As in other branches of science and engineering, the practical application of radio compasses has been accompanied by a number of difficulties and has required an enormous amount of research and development work to perfect a working system. This work has centered mostly on determining the type of transmitted signals which lends itself best to accurate bearings and to means for improving the calibration of the compass receivers. It has been found, for example, that the calibration, even of a fixed station with no moving objects nearby, is not permanent and must be corrected from time to time.

The compass receiver usually has more amplification than the receiver operating on a flat-top antenna, since the voltage generated in a loop is usually less than in an antenna.

The directive properties of a loop, are applicable to forms of reception other than compass work, and are frequently used for ordinary radio-reception work in vicinities where there are a number of transmitting stations. Rotating the loop makes it possible to secure maximum signal-strength from any one of a number of stations, provided they are not on the same line.

That Armstrong Circuit

So much interest has been displayed in the special article, "TESTED INVENTION OF MAJOR ARMSTRONG AMPLIFIER SET 100,000 TIMES," by John Kent, that appeared in RADIO WORLD No. 13, dated June 24, 1922, the publisher decided to put aside a number of copies for those who were not able to get this issue when published. Copies will be sent, postpaid, on receipt of 15c, or send in your subscription, \$5.00, for one year (\$2 issues), \$3.00 six months, or \$1.50 three months, and subscription will be started with the issue containing the article about Major Armstrong's Amplifier.—RADIO WORLD, 1493 Broadway.

B C M BROADCAST RADIO RECEIVER

Many people live in locations where a aerial is impossible. Others object to their premises being disfigured by poles and wires, and many doubt their ability to operate sets with such complications. Eliminate these features by using B C M Radio Frequency Broadcast receivers an inside aerial.

Dealers should write

B C M RADIO COMPANY
YPSILANTI, MICH.

Quality, Design + Workmanship + Material = RELIABILITY



Simple to Use

Just plug in any 110 v. A. lamp socket—attach clips to battery—turn on current and you have your own charging plant.

A compact portable Recharging unit that will fully charge a 200 AH battery overnight for 5c. to 10c.

At your dealers or write

King Electric Mfg. Co., Inc.
1021 Fillmore Avenue Buffalo, N. Y.

Don't overcharge your battery. That is as bad as letting it stand without charging.

DELICATE SOLDERING

Both the manufacturers' and amateurs' problem on all fine work is readily solved by the instrument constructed for this particular purpose.

THE POST SOLDERING IRON

Platinum Heating Unit—Interchangeable Tip—Universal Current



One Half Actual Size

\$6.00

From Your Dealer or Write

Awarded Certificate of Excellency, N. Y. Evening Mail Radio Institute

POST ELECTRIC COMPANY, (Div. 500) 30 E. 42nd St., New York

THE ONLY GENUINE AND GUARANTEED

"All Wave" Coupler

TRADE MARK FLAT AND BANK WOUND

Wave Length, 150 to 3,000 Meters

Eliminates the use of all Variometers, Variocouplers and Loading Coils, inasmuch as it performs in one compact unit the functions of all of these devices combined.

For the Novice—The six efficient hook-ups given free with each "All Wave" Coupler enables the greenest novice to obtain the same results attained by the expert in building the simplest, most compact and most efficient radio receiving set possible.

Be Prepared—For the higher wave lengths that have been and will be allotted to broadcasting stations because of their ever-increasing number. BUILD a set that cannot become obsolete.

Unusual Results Attained—Individual users of the "All Wave" Coupler have unusual to bring in stations as far south as Havana, Cuba; while in Mobile, Alabama, Newark, N. J., is brought in daily.

Beware of Imitations—of the "All Wave" Coupler, which is guaranteed with a money back to operate as advertised. Look for the trademark, "All Wave," on the rotor, also the six efficient hook-ups in the box.

\$9.00 Six efficient hook-ups sent upon receipt of 10c. stamps or Free with each "All Wave" Coupler

GUARANTEED WITH AN ABSOLUTE MONEY-BACK GUARANTEE
THOUSANDS OF SATISFIED USERS

Capitol Phonolier Corporation



Patents Granted and Pending

60 Lafayette Street
New York City

SEND FOR THE NAME

OF YOUR RADIO CLUB

Also the names of your president and other officers. We want to add these to a list of radio clubs and officers we are preparing for publication in an early issue. RADIO WORLD, 1493 Broadway, New York.

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

Radio Merchandising

Classified Quick-Action Advertising, 5 cents per word

Telephone Bryant 4796

Sustain Radio Injunction

Superior Court Reaffirms Decision to Stop "Bad-Faith" Radio Advertising

THE Appellate Division of the Supreme Court of the State of New York has confirmed the lower court's decision granting an injunction to the Freed-Eisemann Radio Corporation in its suit against the Wireless Specialty Apparatus Company. The injunction was sought to prevent the Wireless Specialty Apparatus Company from advertising and circularizing certain statements made in regard to radio patents.

This decision has a very important bearing, and is the first step in the solution of a great many patent tangles resulting from the sudden growth of radio.

Interesting developments are expected as a result of this decision in connection with the claim of the Freed-Eisemann Radio Corporation for \$150,000 damages, alleged to have been suffered by them as a result of the patent warning advertisements inserted in various papers, and in restraint of which the injunction was granted.

Business Is Fine

RADIO business is quite normal. It is the large number of retailers, manufacturers and jobbers that make conditions bad, says "The Mail," New York. The situation may be compared to the large number of thirty men standing about a good sized pail of water. Although the pail is large enough for ordinary purposes, there is not enough water in it to go around. As a result some of the thirsty ones remain thirsty. As the sifting down process of the radio industry continues the time will come shortly when there will be plenty of business for those who are able to last. The industry is simply adjusting itself. Although the retail trade is picking up splendidly, the good effects have not yet been felt by the jobber and the manufacturer to any great extent. After the Christmas period perhaps the manufacturers will get their share.

A Condenser for Superaccurate Tuning

THE Hammarlund Vernier Condenser was designed by experts and is manufactured by a concern twelve years in the business. The patented vernier-control moves the rotor plates by as little as 1-50th of a degree on the condenser scale, and is arranged to eliminate all interference due to body capacity. It is therefore possible to get on the exact wave necessary to receive at maximum efficiency, without the least interference from other stations broadcasting on the same wave length at the same time.

Its construction is so rugged that capacities at given settings always remain constant, making it impossible for it to get out of calibration, even though abused. The plates are the Bureau of Standards straight-line wave-length type, most suitable for wave-meter work. The capacity increases at a uniform rate and makes the most critical adjustments possible. The plates will withstand the high voltage used in transmission work and cannot become short-circuited.

The Electrical Testing Laboratory certifies an insulation resistance of 15,000 megohms, minimizing leakage and power loss; a phase difference of less than .01 at 750,000 cycles; and a zero capacity almost too small to be measured.

Fifty-two issues for \$6.00. Sub. Department Radio World 1491 Broadway

New Firms and Corporations

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

Hause Battery and Auto Electric Corporation, Jamestown, \$20,000; F. E. Roth, F. E. Hause, G. H. Zillig, Jr. (Attorney, W. B. Grandison, Jamestown, N. Y.)

Alcon Electrical Supply Company, Manhattan, \$7,100; J. H. Lyons, E. Dimin, M. Driscoll. (Attorney, S. B. Cardozo, 30 East 42d St., New York.)

Westchester Radio Distributing Corporation, Mamaroneck, N. Y.

E. R. Lemanquais Company, Plainfield, N. J., electrical engineers; K. N. Lemanquais, Harold Lemanquais, E. Ross Lemanquais, Plainfield, N. J.

General Electrical Protection, Brooklyn, burglar alarms, systems, \$5,000; E. S. Depasquale, H. Alexander. (Attorney, P. L. F. Sablatino, 291 Broadway, New York.)

Oranola Radio Corporation, Wilmington, Del., manufacture talking machines, \$1,000,000. (Corporation Service Co.)

G. & G. Electrical Corporation, Glens Falls, contractors, \$10,000; S. and W. L. Ginsburg, A. A. Goracoff. (Attorney, J. McPhillips, Glens Falls, N. Y.)

Bajon Electric Corporation, Wilmington, Del., mechanical and electrical apparatus, \$500,000. (Corporation Trust Co. of America.)

Crowther Electric Company, 310 Main Ave., San Antonio, Tex.

Electric Fixture & Radio Corporation, 234 Sixth Ave., North Nashville, Tenn. Incorporators: A. F. Anderson, Tom C. Sharp, E. M. Hudgins.

Clartone Radio Supply Company, 5 Laura St., Providence, R. I. Albert E. Proffitt, prop.

States Radio Corporation, Wilmington, Del., manufacture radio, \$30,000. (Corporation Service Co.)

Realstuff Radio Company, 8815 Lane Avenue, Detroit, Mich.

Weld Square Radio Shop, 46 Weld Square, New Bedford, Mass. Frank S. Sousa and R. M. Russell.

Edison Electric Appliance Company, Inc., 412 1/2 Stark Street, Portland, Ore. S. G. Stuart, proprietor.

CHANGE OF NAME

The Etna Radio Company, New York, has changed its name to Herald Laboratories.

CAPITAL INCREASE

Electric Specialty Company, Fairfield, Conn., \$25,000 to \$250,000.

Coming Events

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

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

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

AMERICAN RADIO EXPOSITION, Grand Central Palace, New York City, December 21 to 31. Colwell & Korbell, Fisk Building, New York City, directors of publicity.

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

FIRST UNIVERSAL EXPOSITION OF INVENTIONS AND PATENTS, Grand Central Pal-

Heard at Radio Counter

A Conversation Between Customer and Radio Clerk

(Part VII)

"I HAVE a crystal receiving-set and am anxious to know if I can convert this receiver into a set employing a vacuum tube as a detector."

"Yes, sir. You certainly can do so. But tell me what method of inductance you are using; namely, tuning coil, loose-coupler, or vario coupler."

"Well, I believe I am using the loose-coupler, as it has a primary and secondary. The secondary operating in and out of the primary on a brass shaft."

"You are correct in your assumption that it is a loose-coupler. With this loose-coupler you can connect up a vacuum tube very nicely."

"Just what tube would you recommend with this loose-coupler?"

"That is a hard question to answer. Let me ask you just what vacuum tube you prefer to install. You know there are two kinds: the six-volt storage battery tube and the one and one-half-volt dry-cell tube."

"What is the difference between these tubes?"

"The difference is this: One tube operates on six volts supplied from a storage battery; the other tube operates from a single dry-cell battery."

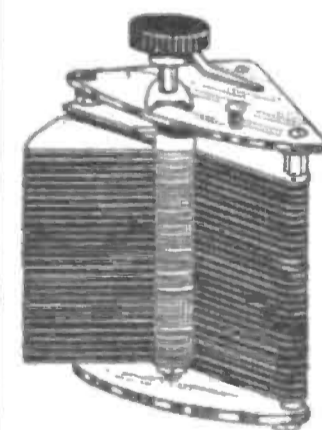
"What is the effect on each tube so far as the reception of signals is concerned?"

"Wonderful results have been obtained with either of these tubes, the difference being the elimination of the troublesome storage-battery necessary for the six-volt tube."

"Well, on that advice, I guess I'll take the dry-cell tube."

"Very well, sir. Here you are."

(To be continued)



VARIABLE CONDENSER

23 plate Variable Condensers. Genuine brown Bakelite ends. Heavy Aluminum Plates. All brass parts nickel plated.

Complete with Knob Dial and Pointer, \$1.75 Cash with order.

E. J. ROBE

620 W. Monroe St. CHICAGO, ILL.

AETACO

German set, complete with WD-11 tube and A & B battery. A special at..\$15.00
Federal Phones\$4.75
Standard Variometers\$1.50
"B" Batteries, 22 1/2 volts......00c

A complete line of Charles Freshman Co. products always in stock. Variable Grid-leak and Condenser. Formion panels cut and drilled to order at lowest prices.

American Electro Technical Appliance Co.

225 Fulton Street (mail orders)
1027 Broadway New York City

Answers to Readers

RECENTLY I constructed a one-stage radio-frequency and detector set, but cannot get as good results or as loud signals as when I used a detector and one-step (audio). I am not using audio now. What is the matter?—J. Shack, Brewster Corners, New York.

You do not enclose any data as to just what you are using; but you will not get any appreciable amount of amplification, if any at all, from one step of radio. The ideal radio-frequency is a tuned two-step radio-frequency detector and from one to three steps of audio. Radio-frequency makes distance possible mainly by clearing the signals up before they are detected.

What is the best type of storage B battery for use in a receiving set (Grebe regenerative)? Where can it be purchased?—O. Christensen, Philadelphia.

We cannot recommend any specific type of storage battery, but suggest that you write to storage-battery manufacturers for their literature.

What are the W-D 11 tubes? Are they as good as the regular radiotrons? Can I use these in my set (Portaloop; 3-step radio-frequency, 2 audio)?—Charles Boukes, Muncie, Indiana.

The W-D 11 are now known as the 1½-volt tubes. They do not require a storage battery for their operation, a single dry-cell being sufficient. They are exceptional detectors and good audio-frequency amplifiers. They cannot be used as radio-frequency amplifiers; so, if you intend to utilize them in your set you must rewire the filament circuits or else put sufficient resistance in the line for detector and amplifier so that not more than 1½ volts would flow through the circuit.

Give me a diagram showing how to hook up the following apparatus: Vario-coupler, variometer, 43-plate condenser, 3 tubes, 2 transformers, A and B batteries.—Edwin O. Uhlig, Richmond Hill, N. Y.

If you will refer to the hook-up in RADIO WORLD, No. 32, dated November 4, in "Receiver for Amplifying Weak Signals," by Horace Beers, you will find a diagram suited to your purposes. It will be necessary only to place the variometer in the position of the coil marked "Tickler," in order to accommodate your apparatus. It is not necessary to have three separate B batteries. You can connect them together and tap off at 22½ volts for the detector, the other lead of the remaining 45 going to your amplifiers.

I am building the superregenerative set, by H. S. Potter, described in RADIO WORLD, No. 31, dated October 28. What are the best tubes to use in this circuit? Should I use a detector and amplifier, or two amplifiers?—D. Wilkes, Washington, D. C.

The regular U-V radiotrons are the best tubes to use in this circuit, as it is rather critical. A detector and amplifier are sufficient.

I have a 180-degree coupler, primary wound with 60 turns of 22 S. C. C., on the rotor. Could I incorporate this in the 2-tube superregenerative described by H. S. Potter in RADIO WORLD, No. 31, dated October 28. Will an 18-inch loop work with this set and how many turns will be necessary? Will this loop be directional?—M. W. Rowell, East Orange, N. J.

As this circuit is very critical, it is not

advisable to change any of the windings to anything except explained by Mr. Potter in his article. It will be necessary for you to rewind the rotor and stator of your coupler. Make sure that the outside diameters of both are the same as that stated in the article otherwise you will not get the results that can be had with a set of this type. The 96 turns are on the rotor. It is very important that all instructions regarding the construction of any part be followed to the minutest degree. If you wind about 10 turns of wire on this loop, it will work satisfactorily. It will probably work on a smaller loop; but this is not advisable, as then the tuning is sharpened too much. When the loop is pointed in a direction, the signals will be received best from stations directly in the plane of the loop.

Is it necessary to use batteries in conjunction with an Aeriola, Jr., crystal set? I can't tune between WJZ and WEAJ when they are on together, like other sets I have heard, but hear both at the same time.—"Radio," Brooklyn, N. Y.

A battery would be of no help in a crystal set. Your trouble is characteristic of all crystal sets. A crystal set cannot tune as sharp as a bulb set and, therefore, you are able to hear both stations though there is a difference in the wave length.

I intend to construct a small regenerative coupler-set. I understand that I must use bakelite tubing, on which to wind my coils, for best results. Is this so? I have received satisfactory results from my tuner wound on a cardboard oatmeal box.—Jerry Hecht, New York.

While bakelite is a much better insulator than cardboard, it is not necessary to wind your coils on bakelite. Ordinarily, cardboard tubing shellaced and left to dry so that it will not warp or shrink, is sufficient.

RADIO MAILING LISTS		
12,400 Radio Dealers, covering U. S. by States.....	per list,	\$7.50
1,614 Radio Mfrs. covering U. S. by States.....	per list,	15.00
1,757 Radio Supply Jobbers, covering U. S. by States.....	per list,	15.00
260 Radio Stations.....	per list,	4.00
257 Mfrs. who make and assemble complete Radio Sets.....	per list,	4.00
25,000 Radio Amateurs and Managers of Radio Stations.....	per list,	7.50
Ask for price lists for Canada, England, other lists.		
TRADE CIRCULAR ADDRESSING CO.		
166 W. ADAMS STREET CHICAGO, ILL.		

A good article is always imitated!

Be sure you receive the

FRESHMAN

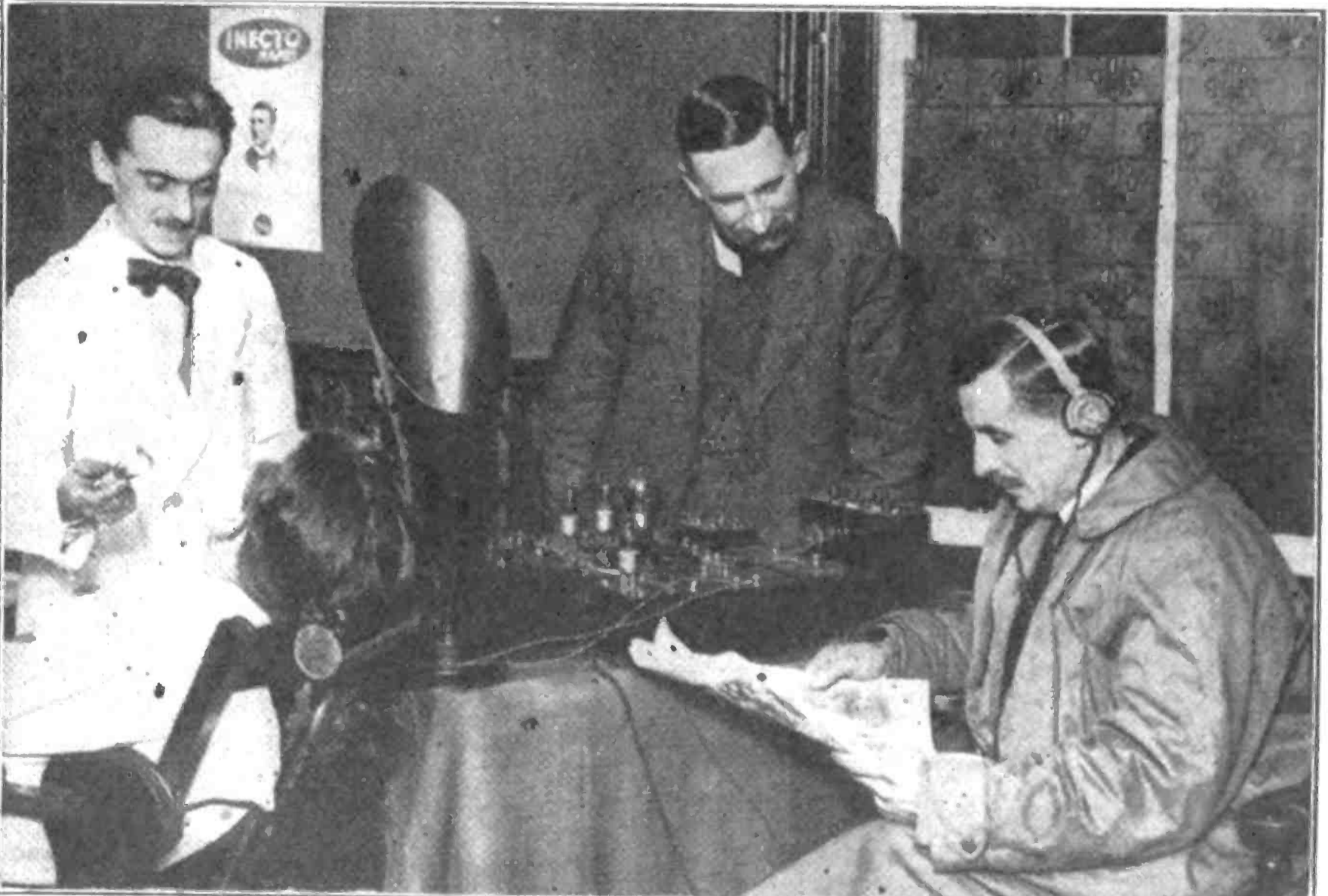
Variable Grid Leak and Micon Condenser Combined



- Price only \$1.00
- ### 3 Points to Remember
1. It is hermetically sealed in a mould to prevent moisture from affecting the grid resistance.
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 3. It contains a tested Micon Condenser of .00025 M. F.
- At your dealers—otherwise send purchase price and you will be supplied without further charge.

Manufactured by
CHAS. FRESHMAN COMPANY, Inc.
 97 Beekman St., New York City

Radio Silences the Chattering Barber



(C. Wide World Photos)
 London has "gone one better!" Several barber shops in the British metropolis have installed radio so that their customers may hear what is going on in the outside world, instead of having to listen to the chatter of the "tonorial artist." Here is a photograph showing how a set is placed. Radio has doused the talkative barber, it appears!



Agents

LARGE MANUFACTURERS OF SHIRTS wants Agents to sell complete line of shirts direct to wearer. Exclusive patterns. Big values. No capital or experience required. Write for free samples.

MADISON SHIRT MILLS
507 Broadway New York, N. Y.

Do You Like Clear Tone—Sharp and Distinct? If so try

MARSH'S

Vernier Variable Condenser AT LAST

Made in Three Styles. Dial Knob and Screws Complete. Fully Guaranteed.

27-Plate	● \$5.50
22-Plate	● \$4.75
11-Plate	● \$4.25

Mall orders promptly filled.

F. P. Marsh, 145 Nicoll St.
NEW HAVEN, CONN.

FOR CHRISTMAS

"The Little Wonder"
CRYSTAL SET \$4

\$2.50 UNMOUNTED

Just the gift for your boy or girl. Sent prepaid. Free catalog on request.

GUARANTEED, Galena and
TESTED CRYSTALS Radiocite.... **20c.**

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

Holloway Electric Supply Co., Inc.
238 Third Avenue New York City



Made for All Phones Ask Your Dealer

THEY ARE GOOD PUT THEM ON YOUR PHONES

Slip out the metal disc and slip in the MICA-PHONE. Result—Clearer, better tone, all noises eliminated. Write for circular. Discounts to dealers and jobbers. MICA-PHONES sell fast.

Radio Mica Products Co., 156 E. 43d St., New York

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Newell Pharmacal Co., Dept. 971, St. Louis, Mo.

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on a postal card. We would like to get the name of every RADIO WORLD reader, as we expect to send out a special message to our readers. It will interest you. Be sure to send us your name on a postal card and address it GIFT DEPT., RADIO WORLD, 1493 Broadway, N. Y.

RADIO WORLD

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Robert Mackay Robert L. Dougherty

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

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The Great Silent Audience
By Rev. Claude J. Perrin, S. J.
Loyola University, Chicago

THE radio broadcaster who has had previous platform experience must change his whole mental outlook. He has been accustomed to "feel out" his audience. It may be cold, he must rouse it; it may be critical, he must ingratiate himself; it may be turbulent, he must calm it! it may be sympathetic and "go along" with him from the first applause. Talking into a microphone is a good deal like making an impassioned appeal to a wooden Indian—the expended energy is all on one side. I imagine that as the broadcaster gradually builds up a new technique, he will draw powerfully on his imagination—and his success will be in proportion to his power to visualize, just as the success of the speaker today lies largely in ability to "sense" his audience. He will stand in front of that steel transmitter in the solitude and tense silence of the KYW studio and a greater audience than ever gathered in the Athenian theatre of Dionysius or in the Roman Colosseum or on the hill of Tara will form in the prospect of his "mind's eye." He will visualize the dwellers in the city apartment, the street crowd that has drifted into the retailers shop, the farmer and his family gathered around the evening kerosene lamp in the living room, the lonely rancher on the western plain, the camping party with their outfit set up in the pine forests of Canada—did ever the human voice since man communicated his ideas to man have such an audience as this?

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Your Radio Ideas. Call or Write
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320 FIFTH AV.
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PANELS

1/8" —.01	per sq. in.
3/16" —.015	per sq. in.
1/4" —.02	per sq. in.

DEALERS: Write for discount.

General Merchandise Co.
140 Market Street, Newark, N. J.

VARIO COUPLERS



GEM
\$1.25
List

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

Jobbers—Dealers—Agents
Write for Discounts

Jewell Radio Sales Co.

90 West St. New York City
Phone Rector 1035

GITHENS TRUTONE RADIO HORN—LOUD SPEAKER

First one to sell on ten day trial Money back Guarantee



Retail Price \$21.00
Includes Loud Speaker

Trutone has been pronounced the best on the market by experts. It has a clear, true tone. Every radio fan should try Trutone and compare it with others. If YOU don't find Trutone the best, your money will be refunded. It is sold on a ten-day trial money-back guarantee. If not carried by your dealer write us.

Distributors and Dealers, write!

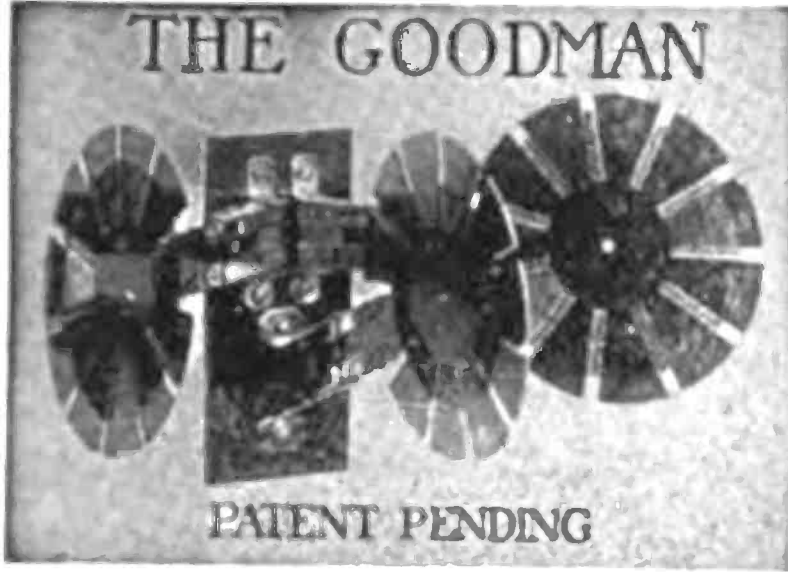
AUTO PARTS MFG. CO.

1815 Trembley Ave. Detroit, Mich.

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

Subscribe to RADIO WORLD. \$6.00 a year, \$1.50 three months.

Jump your common detector spring or cathode and
INCREASE YOUR CRYSTAL RANGE
 BY USING A "PT" ULTRA-SENSITIVE
 CONTACT IN YOUR CRYSTAL DETECTOR
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 Price, with instructions, twenty-five cents.
"PT" CRYSTAL CONTACT COMPANY
 Box 1641 BOSTON 6, MASS.



The Niftiest Short Wave Tuner on the Market
 Only \$6.00 & PP on 1 lb. Send for pamphlet.
L. W. GOODMAN
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Major _____, Halifax, N. S., writes: Delighted.
 Received Schenectady clearly on one tube first time
 I tried the GOODMAN. Would have saved trouble and
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Everyone is Because
WE REPAIR

Broken and Burned-Out
**VACUUM
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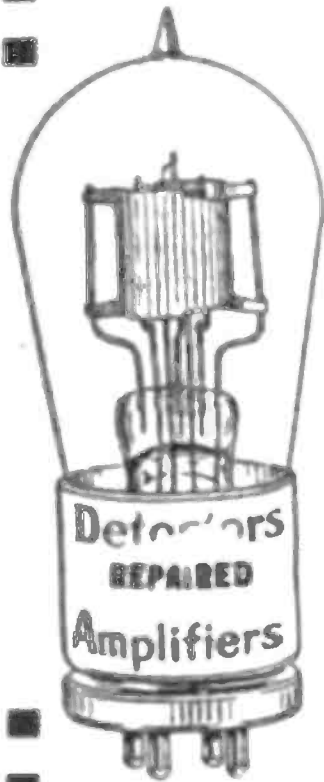
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 LABORATORIES**

Boston 9, Mass.

Tubes returned Parcel Post C.O.D.



Broadcast Bill's Radiolays
 By William E. Douglass

OUR neighbor's son—I call him "Bub"—
 —is only five years old, but sharp
 as tacks an' curious too, 'bout some
 things he's been told. Fer instance, he's
 had doubts of late regardin' Santa Claus,
 an' to his way of figgerin' our stories
 have some flaws. "He can't come down
 the chimney," Bub sez, "fer it's heaps
 too small; so if there is a Santa Claus he
 comes in the door, that's all." "How can
 Santa visit all the children everywhere?"
 I told him that wuz easy 'cause he travels
 through the air. "I wish that I could
 talk to him," Bub sez to me one night;
 an' then I sez, "I reckon we kin fix that
 up all right. "You know he lives away
 up North but maybe I kin get old Santa
 Claus to talk to you through this here
 wireless set." I told Bub to come over
 to our house on Saturday. "If we kin
 make connections we'll hear what he has



"I put the earmuffs on the lad and then
 I made a show of fussin' with the set."

to say." I'd noticed in the papers where
 they said that he would speak to all the
 children everywhere by radio this week.

Next day when Bub came over he sed
 he would like to hear what Santa (if
 there wuz one) had laid out fer him this
 year. I put the earmuffs on the lad an'
 then I made a show of fussin' with the
 set a bit to make it seem as though I
 really had "tuned in" that place that
 nobody kin see where Santa makes all
 his toys—The North Pole Factory.
 When every thing wuz ready an' Bub
 lis'nin' by the set, Saint Nick begun by
 askin' him what all he'd like to get.

But 'fore young Bub could answer he
 sed "how'd you like to have a sled or
 would you rather have me bring a 'lectric
 train instead? To every boy who believes
 in me an' tries to mind his dad, I'll bring
 a lot of presents; but fer any boy that's
 bad, who doesn't help to do the chores
 an' carry in the wood, I'll take his share
 of toys to the ones that have been good."

When Santa Claus quit talkin' Buz wuz
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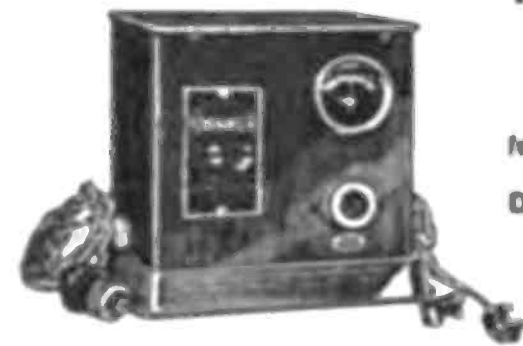
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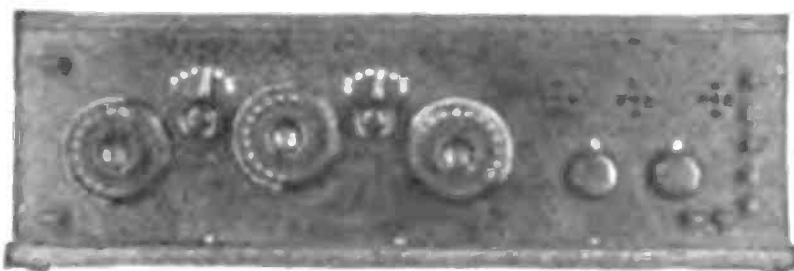
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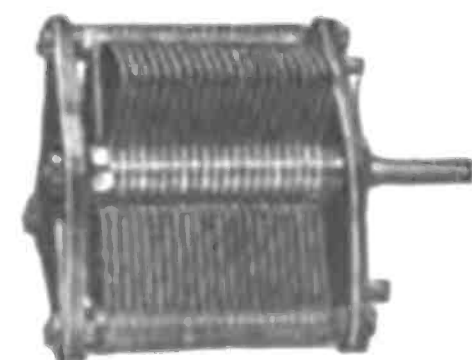
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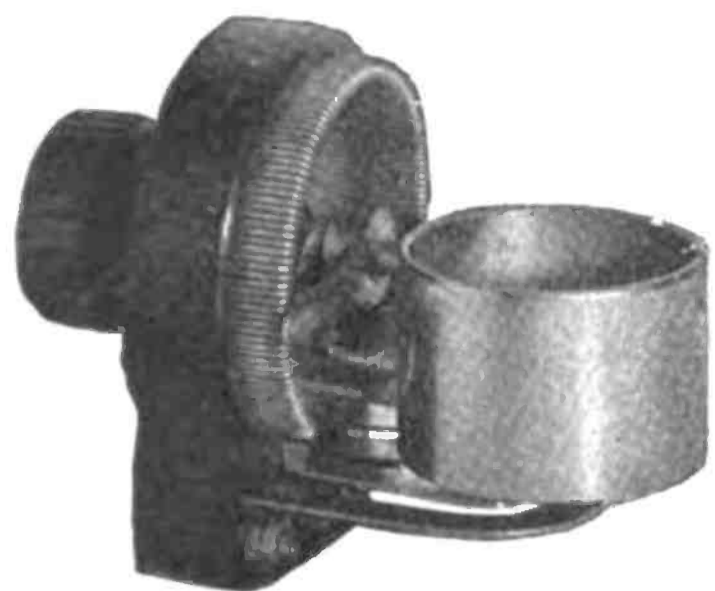
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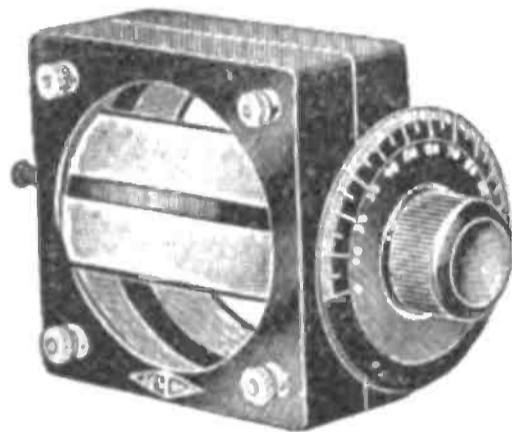
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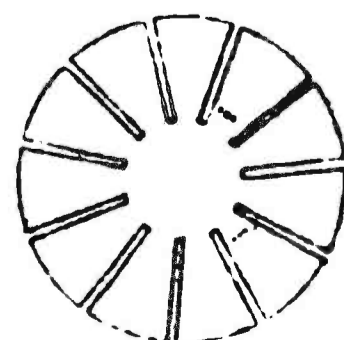
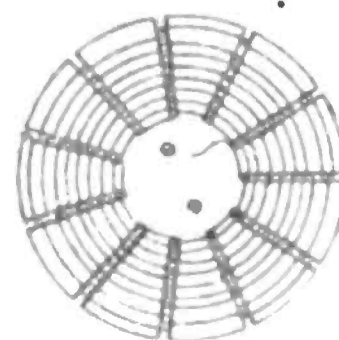
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Radio Makes Flying Safer

Bureau of Standards Developing New Type of Altimeter to Be Used in Conjunction With Radio

A MODERN airplane is fairly safe so long as the pilot can see the ground; but with the ground hidden by mist it is in a very dangerous predic-

ament, the Department of Commerce points out in relation to a new airplane altimeter being developed by the Bureau of Standards.

It cannot stay up in the air indefinitely, and when it tries to land it is quite likely to come in sight of the ground so quickly that there is no time to turn. Moreover, the pilot, out of sight of earth, has no way of telling where he is. He knows his own speed with relation to the air, but cannot tell the direction or velocity of the wind which may be an appreciable fraction of his own speed.

Recent inventions have done much to eliminate this hazard. Pilots of the United States Mail Service now make regular trips in all sorts of weather and land safely at their destinations.

Chief of these is the radio compass. With this device it is possible for the pilot to tell the direction of any station sending signals and to steer towards it. He has thus eliminated the danger of getting lost; and so long as there is a space of clear air under the clouds, he can get down safely. However, when the earth is blanketed in fog, the pilot must know not only his direction but also his altitude relative to the landing field. For these he must rely on his altimeter. Now, an altimeter is nothing more than an aneroid barometer with a scale in altitudes. Like any other barometer, it changes not only with the altitude but with the weather as well, and it gets these elements inextricably mixed. A change in weather may change its readings by an amount corresponding to a hundred feet or more in altitude.

This difficulty is largely eliminated in airplanes equipped with radio by a new altimeter being developed at the Bureau of Standards. This instrument has the usual fixed scale, and it also has a movable scale, the zero of which can be set at any point of the fixed scale. In approaching a landing field, the pilot gets, by radio the barometer reading at the field and sets the zero on his movable scale to that reading on the fixed scale. His altimeter will then tell him accurately how high he is above the landing field and will enable him to get down safely even in a fairly thick fog.

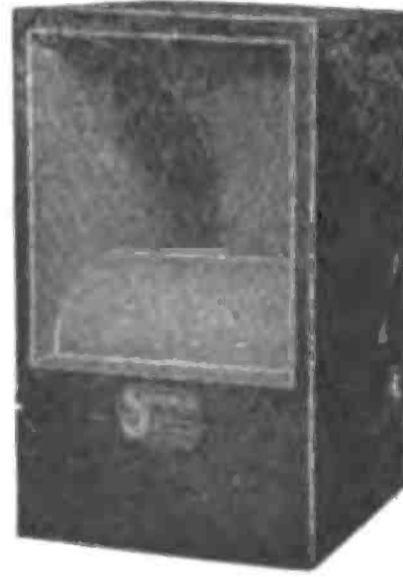
When airplanes become more numerous, it will not even be necessary for the pilot to have a radio-sending station on board in order to take advantage of these inventions. The radio compass itself is merely a special form of receiving set but little heavier than an amateur set; and this can be used for getting the barometer reading which could be broadcast at regular intervals.

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Radio World Reader Tries Out Every Hook-Up Published in These Pages

EDITOR, RADIO WORLD:—I have experimented with the hook-up published in RADIO WORLD No. 35, dated November 25, under the heading, "DX Hook-ups for the Novice," and have had wonderful success with it, bringing in stations that I could not get with a three-circuit regenerative set. I had some trouble at first to make it oscillate; but, by mistake, I put a 23-plate condenser in the antennae circuit and was surprised how easily it then oscillated over the entire range of the variometer. I always try out every hook-up published in RADIO WORLD, as I have found, from experience, that they are all hook-ups that work. Therefore, it is more fun to know that you are going to get results from them.

Yours for a DX Christmas.—William Buxton, Laredo, Texas.

P. S.—Maybe this will help out some of the fellows that have had the same trouble as I did with the above circuit.—W. B.

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One of the ways to save some money when building a set is not to use a bakelite panel. If it is not necessary that the panel be black and shiny, use a piece of good dry hardwood which has been soaked in boiling paraffin.

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At Your Service!

There appeared in RADIO WORLD, dated April 1, 15, and 29, the following articles:
April 1—A 500-Mile Radiophone Employing a 5-Watt Tube, by Frank A. Hahnel. "Tell Me, Please, How Will This Set Receive?" by E. L. Bragdon. Short Cuts in Receiver-Circuit Design, by O. C. Ross. Making a Short-circuit Regenerator, by Fred. Chas. Ehler.
April 15—First Principles of Electricity, as Applied to Radio, by John P. Miles. Your Storage Battery, by E. L. Bragdon. What Makes Radio Possible, by Edward Linwood. Ground Connection as Vital as Antenna, by Fred. Chas. Ehler.
April 29—Valuable Pointers on Aerial Construction, by Edward Linwood. What is Meant by Tuning, by E. L. Bragdon. Radio-Frequency Amplification and Regeneration, by Frank Armstrong. Honey-Comb Coils and Condensers, by Edward Linwood. Charging the Storage Battery, by E. L. Bragdon. How to Construct the Variocoupler, by Frederick L. Rumford.
Each copy sent on receipt of 15c. per copy, or the three copies for 45c.; or better still, send your subscription beginning with any one of these numbers, and we will send this paper for \$2 issue, and you will then have a complete file for ready and constant reference. RADIO WORLD, 1493 Broadway, New York.

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Remember the beginner is looking for them.

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

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

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Address Technical Editor

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The rate for this RADIO WORLD QUICK-ACTION CLASSIFIED AD. DEPT. is 5c. per word (minimum of 10 words, including address), 10% discount for 4 consecutive insertions, 15% for 13 consecutive insertions (3 months). Changes will be made in standing classified ads. if copy is received at this office ten days before publication. RADIO WORLD CO., 1493 Broadway, N. Y. C. (Phone, Bryant 4796).

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RADIO FANS: Have you read of the wonderful new all-wave Radio Frequency Amplifier invented by Doctor Miller of the Naval Radio Research Laboratory, Bureau of Standards, Washington, D. C.? We manufacture this device under license. May be added to your present set, giving wonderful results on distant stations, or may be made up into loop receiver sets with extreme range and beautifully clear reception, for home or automobile use. Besides being the best amplifier on the market, the Miller covers all waves at equal efficiency. Price, \$6.90 per unit. Details free. Coast Radio, Inc., El Monte, Los Angeles, Calif.

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RADIO saved Atlanta from destruction," declares William B. Cody, chief of the Fire Department of Atlanta, Georgia, commenting on the latest accomplishment of radio in rising to an important emergency.

Fire broke out in a block of retail stores in the city's chief shopping district, a few hundred yards from the Atlanta "Journal" building. It gained great headway before it was discovered, and threatened the entire business section of the city.

Lambdin Kay, radio director for the "Journal," was conducting the paper's regular late-evening program. He sent out a bulletin on the fire and followed with other announcements of its progress.

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A WORD TO THE WISE
RADIO WORLD No. 30, dated Oct. 21, published my hook-up, and amateurs were astonished as to results obtained. Those using this hook-up cannot afford to be without its latest improvements. Those desiring a set SECOND TO NONE and one having unlimited receiving range should not overlook this opportunity. Hundreds report hearing stations over 1,500 miles distant on single tube. COMPLETE INFORMATION AND BLUE PRINT, \$.60 (no stamps). Write W. Miller, Box 222, Southern Methodist University, Dallas, Texas.

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TWO PAGES of 11 hook-ups of great value to RADIO WORLD readers appeared in our issues of Oct. 21 and 28. Both copies sent on receipt of 30c. in stamps or coin, or start your subscription with Oct. 21 number. RADIO WORLD, 1493 Broadway, New York.

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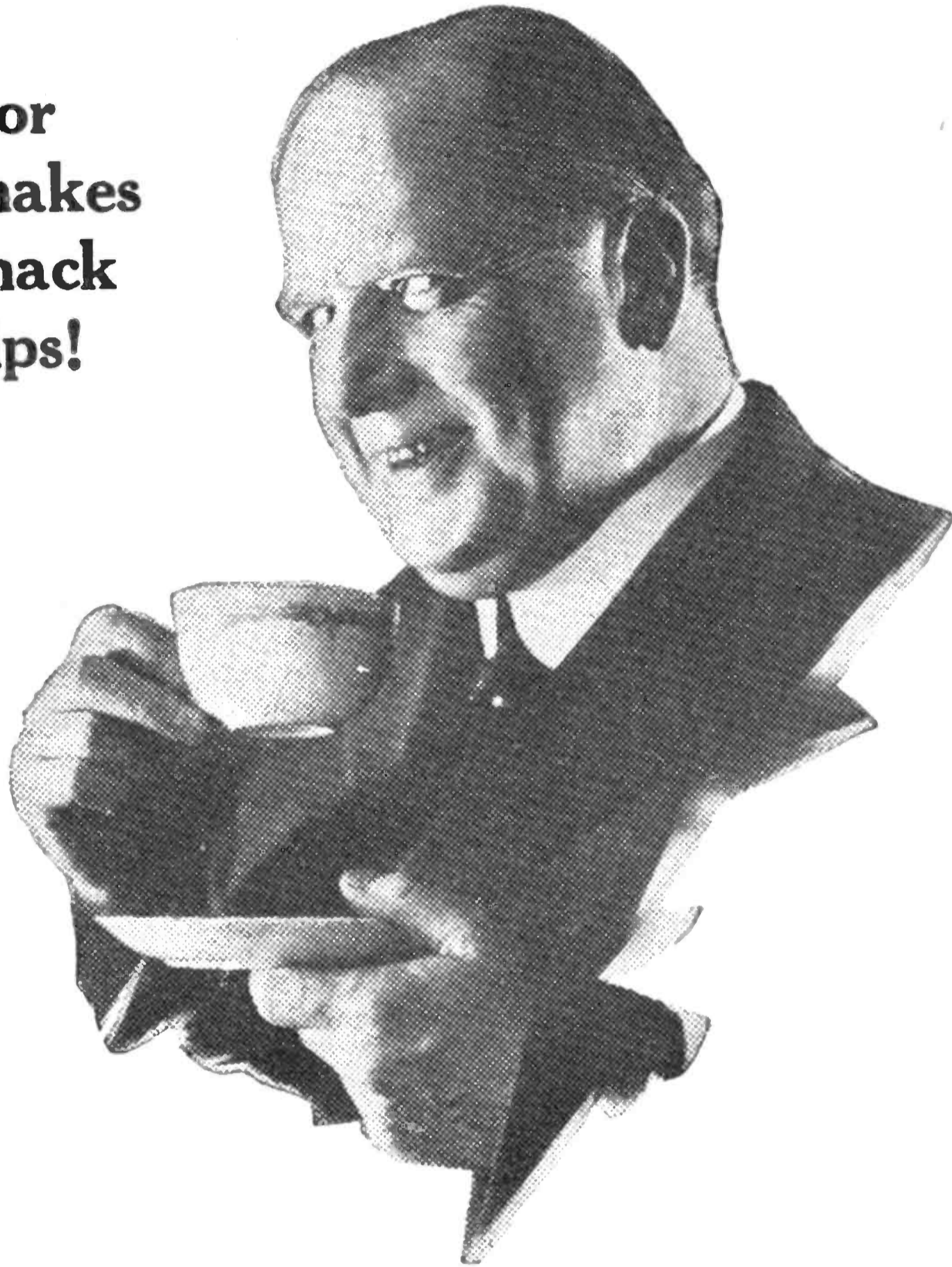
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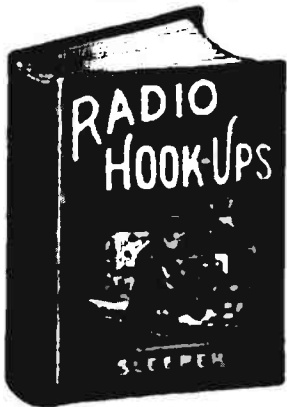


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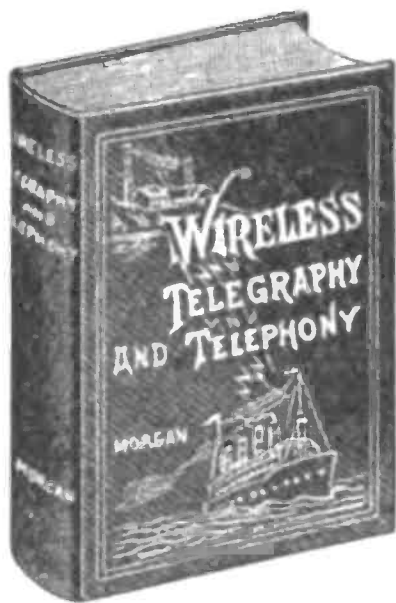
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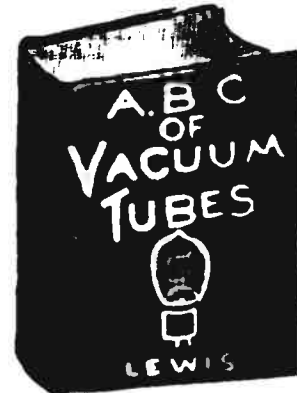
The man who wants to feel the real thrill of accomplishment, and who is not satisfied in the merely making use of what others have done for him, builds his own radio apparatus. Radio men can follow the data in "Radio Phone and Telegraph Receivers" with full confidence, because each piece of apparatus described was first made, tested and found efficient before the final design was accepted. Special receivers, both crystal and audion, are shown in detail. Regenerative circuits as well as audio and radio frequency amplifiers are described with clear photos, diagrams, and working drawings prepared especially for the novice and the man who wants to receive the radio telephone broadcast. A special feature is the phonograph type radio set and the loud speaker. Fully illustrated.....**PRICE 75c.**



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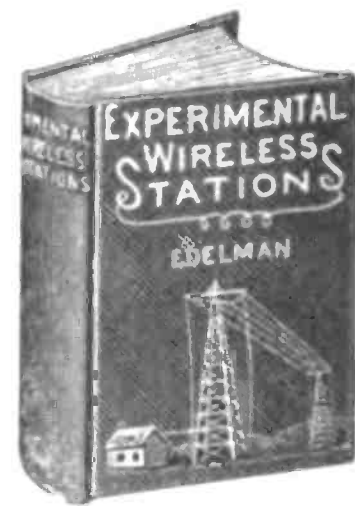
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