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RADIO WORLD

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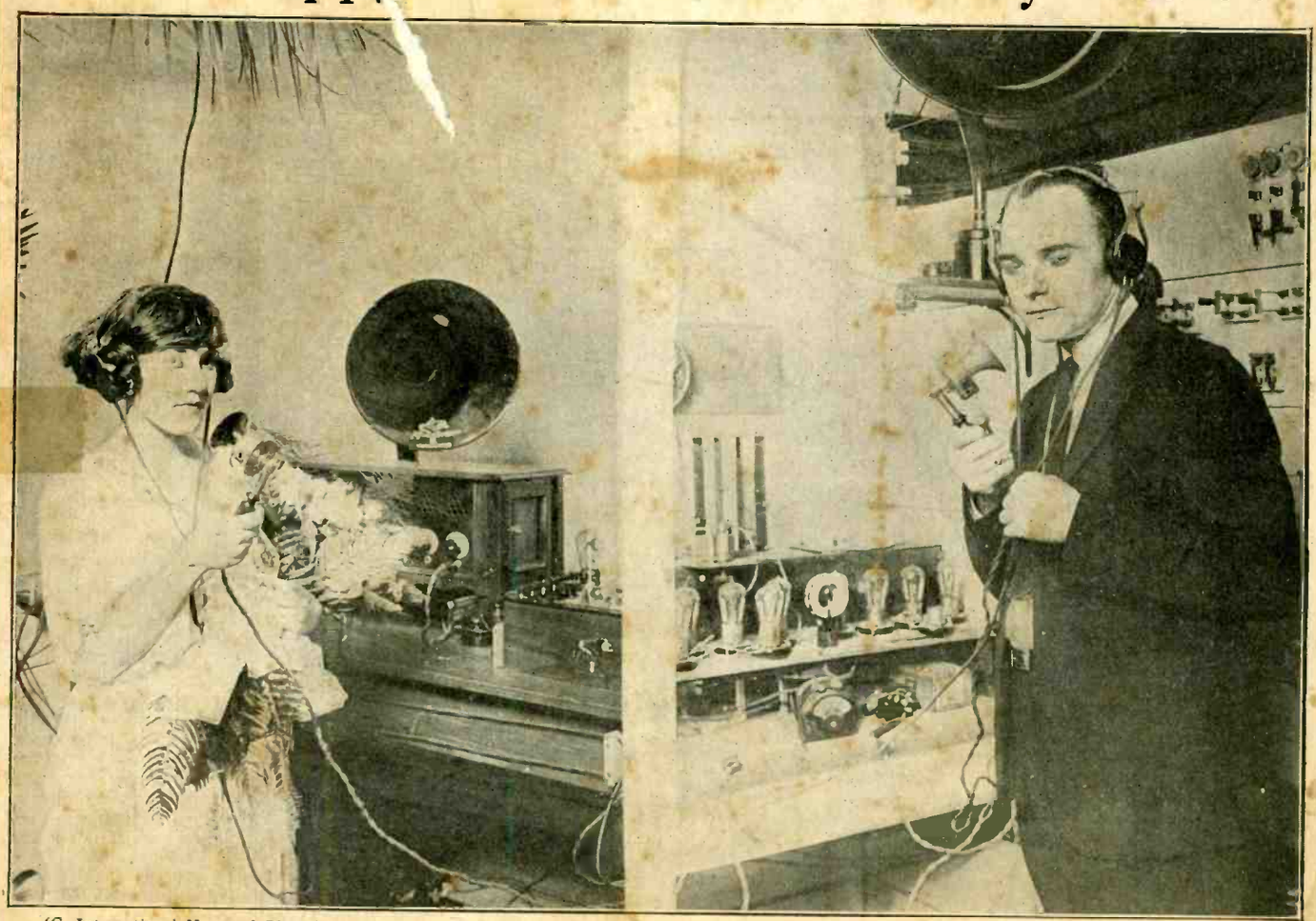
ILLUSTRATED

Two Happy Hearts Are United by Radio!



(C. International Newsreel Photo)

At the left, Miss Mable Brady, the bride; at the right, John H. Stone, the groom. They were married by radio at different stations in Dallas, Texas. The minister who performed the ceremony was at a third station. The marriage vows were spoken by the minister and repeated by the marital pair by radio.

How to Construct and Operate the Armstrong Circuit (Page 4)

Just a Few of the Marvels of Broadcasting

THE inside of a broadcasting station of the larger sort is highly interesting. It might aptly be termed a Wizard's Magic Box. The audion-tube, to be sure, is somewhat more complicated than the wand of the fairy story, but, at the same time, a thing relatively simple, being no more than a glass bulb from which the air has been pumped, in which a little wire and a small sheet of thin metal handle infinite numbers of electrons at the bidding of the Wizard, who controls this wand of an audion-tube merely by the manipulation of an electric switch.

The building which houses the WJZ broadcasting station at Newark is only a very ordinary, red-brick factory structure. It is in that part of Newark known as the Lackawanna Depot section, and the only tell-tale thing about it is the large aerial which surmounts it and which can be seen from pretty nearly any quarter of Newark.

When there is no static worth speaking of, this aerial sometimes reaches as far as California to the West, and half way across the Atlantic to the East. It has been "caught" away back in the northern part of the great Canadian forest, and as well looking to the South, in the lower reaches of the Caribbean Sea and Central America.

Passing through a commonplace factory entrance, one finds the watchful eye of an attendant peering at you through a tiny window at the end of a vestibule. If you are among the elect, he informs you that a Mr. Popenœ, who presides over the Wizard's Box, will soon see you. Then you are escorted into a diminutive waiting room. Finally you find yourself in a large chamber. The one end is a luxurious parlor, with upholstered chairs and sofas, while the other part boasts only a grand piano, a Victrola and the microphone. Dropping from the ceiling to the depth of three feet, and encircling the top of the room, is a heavy drapery, which serves as an acoustic curtain. Without this the tones of the piano would be sharp and rasping, and the voice of the singer would blurr and be followed by an uncouth echo.

The one microphone, used by the announcer and speakers, is suspended in the middle of the apartment, while the other, attached to the end of a large and old-fashioned phonograph horn, hangs in a corner. The latter is designed primarily for transmitting concerts.

The microphone is somewhat similar to a telephone transmitter, but only so far as the delicate diaphragm is concerned. This, in the case of the microphone, is a very thin disk of metal. It is one unit of a system consisting of a single turn of wire wound around the inductance of the antenna circuit, with the microphone connected in series with the voltage induced in the turn of wire and single loop of wire.

As the sound waves, produced by the singer, speaker or orchestra, strike this delicate microphone disk, it is set vibrating. Immediately the high current of electricity, which is passing through it, flashes along to the oscillators and modulators, which are vacuum tubes, and thence to the audion bulbs. Here the magic of it all is performed; the sound waves are transformed into ether waves and sent hurtling through space to be picked up here, there and everywhere by the listening radio fans.

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.

If you did not get copies of Radio World No. 1 to No. 16 send us $2.20 or we will send you this paper for one year, ($6.00 for 52 issues) and start it with our first issue, which will be mailed you as soon as possible after receipt of order.

RADIO WORLD

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Vol. 1, No. 19 **August 5, 1922** **15c. per copy, $6.00 a year**

Tuning in on a Fifth Avenue Bus

(C. Central News Photo Service)

With a small aerial erected on the roof of the bus, the receiving set—as shown photographed inside—picked up concert music in fine style as the bus was being driven along Riverside Drive. Just another proof of what may be expected of radio

United States Navy Will Take Radio to Brazil

IN the fall, when the U. S. S. "Nevada" and, perhaps, another of our modern battleships, steam southward to Brazil with a delegation of representative American officials, she will also carry the navy's first contribution in the way of modern radio-equipment to an internation exposition.

Packed carefully in her hold the "Nevada" will transport several very interesting pieces of radio apparatus, one of which will bring cheers from all radio fans. It is a five-by-six-foot model of New York harbor, with all the lighthouses, lightships, radio stations and compass stations located, named and illuminated—with miniature ships which will pass in and out of Ambrose Channel guided by an electric magnet, unseen beneath the glass top, which passes over a safe route through the channel. The magnetic attachment is to illustrate the operation of the radio-piloting cable running into the harbor to Fort Wadsworth from two hundred yards south of the Ambrose Channel Light Vessel.

When operating, the model will show a vessel approaching New York in a thick fog, the shore stations and even the light ship and buoys not being visible. The tiny ship hesitates and can well be imagined asking the radio-compass stations at Amagansett and Fire Island on Long Island, or Sandy Hook and Mantoloking, for her position. The lights on the short stations blink fitfully, indicating the transmission of the bearings, and, directed by them, she proceeds to the Ambrose Channel Light Vessel where her sound-detecting devices on either side of her hull pick up the submarine radio signal "NAVY" emitted constantly from the pilot cable. From there on it is almost simple in reality as it appears during the operation of the model actuated by the electrical magnet under the glass. The ship steams slowly but deliberately up the channel to quarantine, and, in the case of the model, returns to the Atlantic so the vessel may repeat the performance for new observers.

Other naval exhibits will include a set of radio-compass equipment in operation, the head phones being available for the visitor so that he can hear the incoming calls and locate the station calling by compass direction. A 2-kw. arc transmitting set such as is used by vessels of the shipping board and the navy, will also be in operation.

How to Construct and Operate the Armstrong Superregenerative Circuit

By John Kent

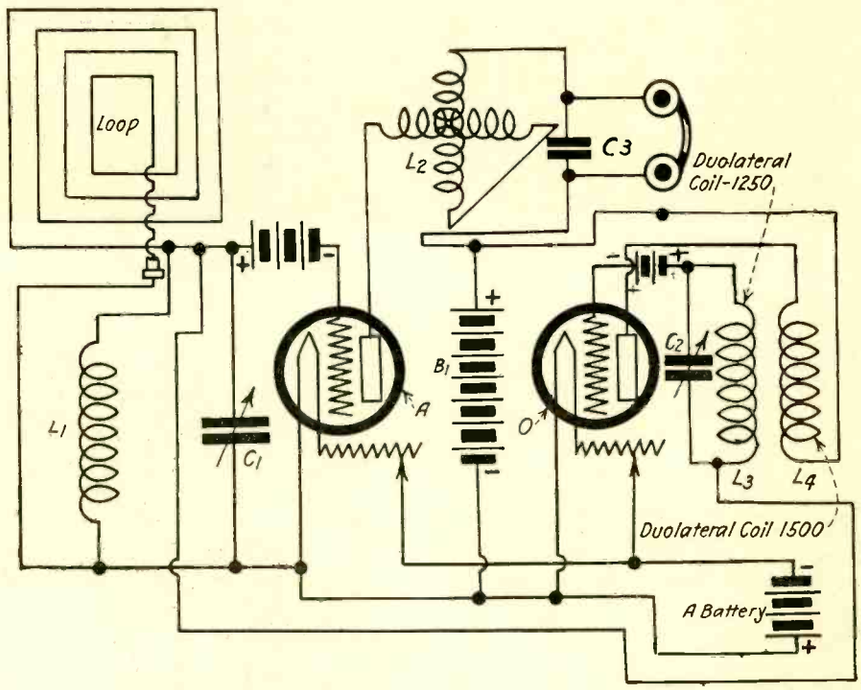
AN epoch-making invention, which will completely revolutionize broadcasting was described by RADIO WORLD in its issues No. 13, dated June 24, and No. 15, dated July 8. So important is this system that a survey of the results already obtained by the writer leaves one astounded. Its possibilities are almost unbelievable. This invention is the work of Major Edwin H. Armstrong, one of the leading radio experimenters of the United States. It is known as a superregenerative set.

What confuses many amateurs as well as experts in regard to it is the different hook-ups published in various newspapers and other periodicals. So many queries have been received by RADIO WORLD asking for explicit directions concerning the circuit, that I will endeavor to explain fully and simply the complete circuits of Major Armstrong's invention. There are two circuits which are authentic and officially correct.

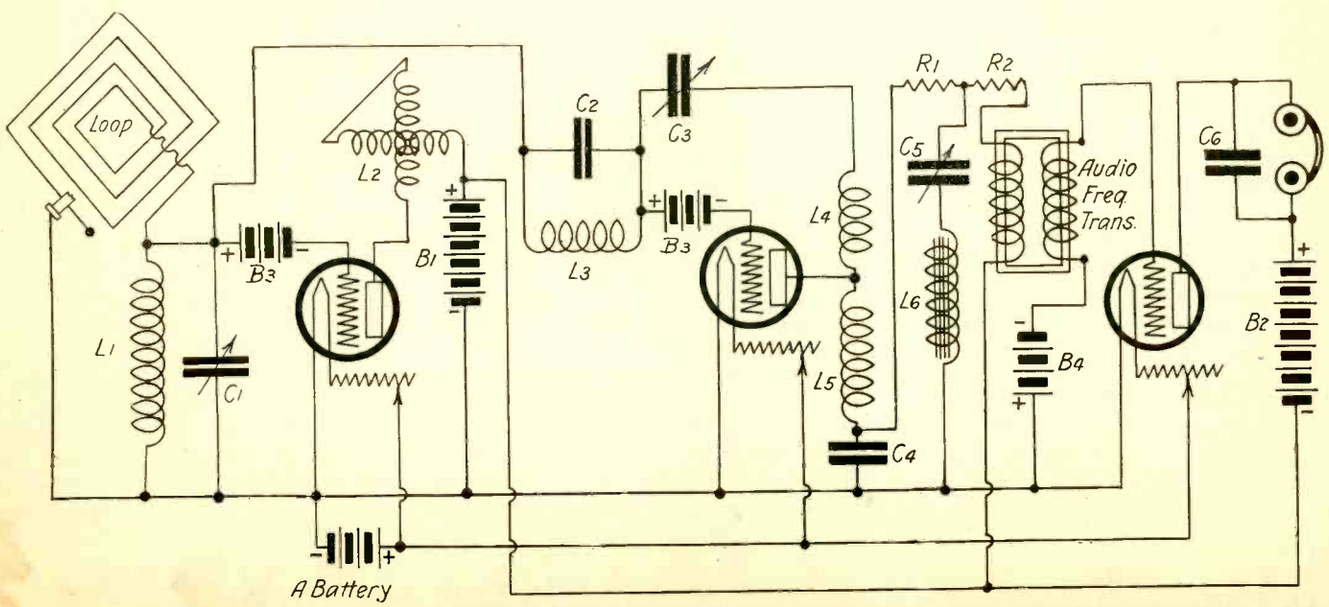
It may be said that, in one move, the new system opens up the unexplored territory in wave lengths below 100 meters and sweeps from broadcasting all need for outdoor aerials or other wires, making it possible to reproduce music to the same degree of loudness—regardless of whatever amount of steel there may be in the framework of the building—as a talking machine. It further cleans the slate by eliminating that hoodoo of broadcasting—interference—caused by spark signals from wireless sets, and destroys over 50 per cent of troublesome static.

Figure 1 shows the basic principle of Major Armstrong's circuit. Figure 2 shows the same circuit, but with the addition of one stage of amplification. This difference is what confused everyone. Either circuit may be used, but each circuit should be studied before one attempts to experiment with either.

Figure 2 is the same as Figure 1,

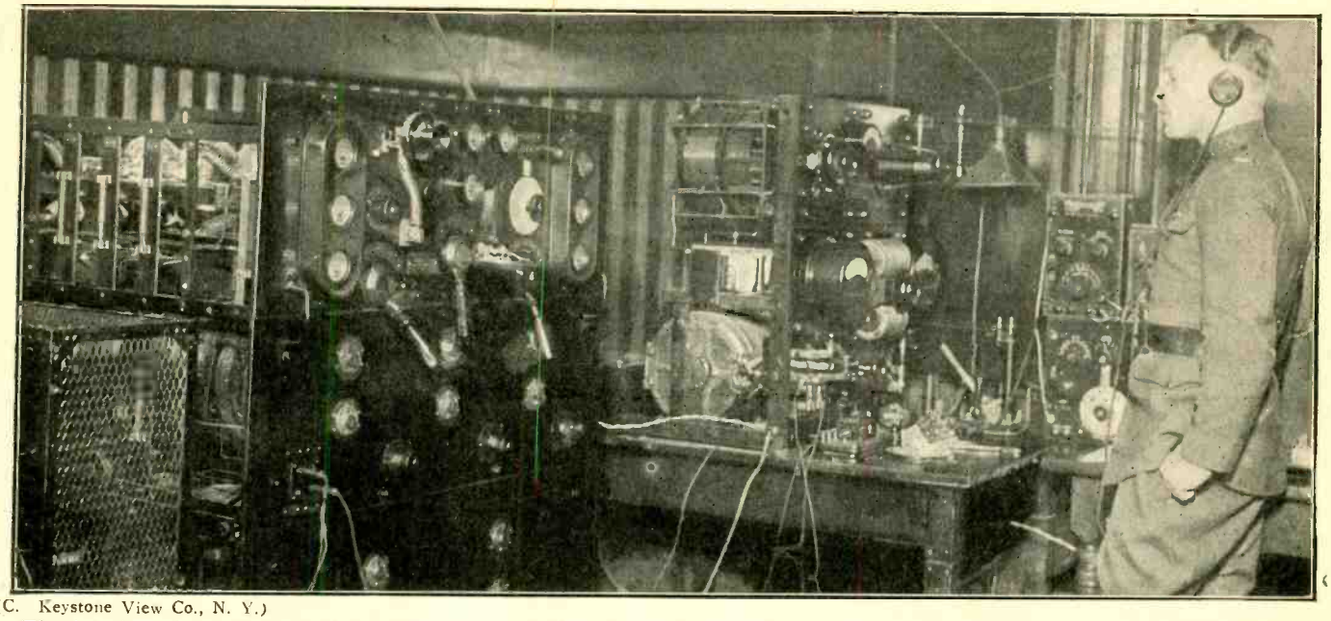


Schematic diagram showing Major Edwin H. Armstrong's revolutionary circuit. This is the basic principle of his idea in which he employs only two tubes. One tube is used as an amplifier, the other as an oscillator. Suggested by John Kent. Drawn by S. Newman & Co.



Complete schematic diagram showing the same circuit as in the smaller diagram except that three tubes are employed. The third, or last tube, is used as a stage of amplification in which the signals are amplified over 100,000 times. Suggested by John Kent. Drawn by S. Newman & Co.

Gotham's Busy Broadcasting Station



(C. Keystone View Co., N. Y.)

The interior of the broadcasting station at Bedloe's Island, New York. Lieutenant H. S. Paddock, U. S. A., who is shown in the photograph, is in charge. This is one of the best-equipped broadcasters in the United States. It is operated by the United States Army. It is familiar to many hundreds of radio fans by its call letters—WVP. It operates on a wave length of 1,450 meters—one that is particularly free and clear and permits of very little "jamming." The photograph gives a splendid idea of the important radio details of an up-to-date station. At the extreme left of the photograph is the large transmitter, which sends music and the human voice over the ether. WVP has been picked up on all parts of the Western Continent and far out on the Atlantic. Note particularly the mouthpiece on the panel with its many switches and meters, which indicate the various wave lengths and the degree to which the matter being transmitted may be modulated. This station has every possible modern radio device. It is the only station in America where the phonotron—commonly known as a "soup plate"—is used in transmitting. This device is used exclusively by the United States Government. Not only does the phonotron record, but it picks up every small particle of energy in the transmitting room and sends it into the room shown in this photograph to be broadcast. On the table at the right of the photograph is a half-kilowatt transmitter, in which capacity it is used by the operator for relaying messages when operating on a wave length of 200 or 240 meters. This transmitter, being of the damped-wave type, can be heard at most any amateur station within a range of some hundred miles. This is done to keep in touch with the so-called amateur reserve of the United States Army. Code practice, as well as straight-letter language, are sent, enabling the amateur to become familiar with the different methods in which signals may be received.

(*Continued from preceding page*)

with the exception that it contains one stage of amplification. The loop aerial consists of 12 turns of No. 18 bell-wire, the turns being spaced about ¼ of an inch apart and wound on a 3-foot frame, spiral type.

L1 represents the primary of the variocoupler used in the primary circuit.

L2 represents the secondary of the coupler, here shown as a variometer. If secondary of coupler is used, omit the variometer; but if variometer is used, then the primary coupler is all that will be needed. The primary of the coupler should have a range of from 150 to 600 meters, while the secondary, or tickler coil, should have the number of turns rewound twice.

L3 is a duolateral coil having 1250 turns of wire on it.

L4 is an open core-choke of about 5 or 10 millihenries inductance.

L5 is another duolateral coil of 1500 turns.

L6 is an iron core-choke coil of 100 millihenries of inductance.

C1 is a variable condenser of .001 mfd., capacity.

C2 is a fixed condenser of .00025 mfd., capacity.

C3 is a variable condenser, .001 mfd., capacity.

C4 is a fixed condenser, .005 mfd., capacity.

C5 is a variable condenser of .001 mfd., capacity.

The first tube in the circuit is made to act as a regenerator, with the second tube as the oscillator. The third tube is an audio-frequency amplifier and connected in the regular way. The last tube may be left out if desired; but in that case it will be difficult for experimenters to tune the set, which will be very critical in adjustment. This is not recommended, but if the experimenter wishes to try it out then he will have to apply Figure 1 circuit to the set. R1 and R2 are Lavite resistances 12,000 ohms fixed value

These resistances help to make up part of the filter system which filters out the high pitched note caused by high 20,000-cycle frequency which the oscillator tube oscillates. In constructing the three-tube set, hard tubes—that is amplifier tubes—should be used throughout the circuit. In actual demonstrations, Western Electric tubes, type L, were used by Major Armstrong. Radiotrons UV-201 are very serviceable for the set. So is any other tube with a high vacuum which will withstand high voltages without ionizing.

An audio-frequency transformer of the ordinary type or design is used. A battery is the filament battery and may be used by merely connecting the filament and rheostats in parallel such as in any ordinary amplifier. The use of individual batteries is recommended. B1 is a battery of 90 volts, B2 is about 110 volts, while B3 is a biasing battery of from 1 to 5 volts. Two flashlight batteries on series will answer for this battery. B4 is a battery of 22 volts. The only coils that must be placed in inductive relation with each other are the coils of the variocoupler. If this hook-up is wired correctly, there should be no body effects.

While the superregenerative receiver does everything that is claimed for it, it is now in a stage of development.

When Radio-Controlled Warships Go to War without Men

By Carl H. Butman

WASHINGTON, D. C.—The days of Naval heroes are numbered; no more will there be a call for volunteers to sink a ship in a narrow channel with the hope of "bottling up" a fleet, as did Hobson at Santiago Harbor. The call of the future will be for radio operators. Dynamite-laden colliers will not be run into harbor mouths, under fire, and sunk by gallant crews, nor will such marine maneuvers as the Allied attack on Heligoland be undertaken by manned ships of war. These hazardous and almost hopeless tasks will be left to radio-controlled vessels, if all that is expected of radio comes true.

A year ago, the battleship "Iowa," a relic of the Spanish War, but controlled and maneuvered by modern radio from the Ohio over five miles away, was bombed by an aerial fleet of planes, which registered some hits. Nearly every one was excited about the progressive conquest of the sea by the air forces, especially when aerial bombs demonstrated that German war-craft could actually be sunk; but no one was particularly elated over the performance of the gigantic Iowa, the real marvel of that historical occasion. For the first time in history, practical demonstration of remote control by radio was seen. John Hays Hammond, Jr., invented and perfected the radio control of a small craft before the war but most witnesses foresaw only a new mechanical, or electrical, toy. His invention applied to a seagoing battleship should have indicated astounding future developments to the witnesses of the "Iowa's" remarkable performance off the capes in Maryland and Virginia, last June and July, but it didn't.

Without a soul aboard, this great hulk of a fighting ship was maneuvered by radio, for hours and for miles, at half speed, at full speed—which was only eight knots, but could have easily been increased with more boilers in operation. She plowed the sea, turning to port or starboard at the will, not of the man at the helm, but the radio officer aboard the "Ohio," several miles astern. And this man could have operated as well a hundred miles astern.

To-day, expert electrical engineers and Naval officers say the old "Iowa" is the first of a fleet of radio-controlled ships of war; crewless ships which will go into battle against an enemy fleet or enter an alien harbor in response to an invisible master-mind, miles away, guiding them by means of radio signals. These ships, like the "Iowa," would not be operated by power sent by radio, but would be self-propelled ships with standard engines, oil-burning boilers with mechanically aimed and fired guns—all directed by radio. Farsighted Naval engineers have prophesied radio-controlled barrages of air and water torpedoes, fleet movements, gunfire, mine explosion, airplanes, tanks, dynamite ships and mine sweepers—unmanned, but operated by radio and sent on errands of destruction.

To the skeptics who exclaim, "Impossible!" they ask, "Why not?" and point to the successful operations of the "Iowa," the radio-controlled automobile of E. D. Glavin, and the tank of Captain Vaughan, which not only was maneuvered at will but made to fire a pistol and do all manner of tricks within a fraction of a second.

The Bureau of Engineering of the Navy is not standing still; some of the more advanced problems have been solved already, others are under way, and even the conservative experts admit that, within five years, we may have an auxiliary fleet of unmanned war vessels controlled by radio.

Naval engineers will not reveal the technical details of her "innards" but explain the operation of the "Iowa," generally, as follows:

A crew of men, after starting the oil burners and the engines, abandon ship. The control ship takes charge. A signal from her aerials is picked up by the antenna on the radio ship and transmitted below. There it is amplified and made to operate a very sensitive relay which manipulates a larger relay. The main relay controls an electric circuit which governs a pneumatic valve. This opens and closes the throttle of the main engines mechanically by compressed air, at the will of the radio operator. The main relay also manipulates a sort of commutator which is the key to a standard steam steering system controlled by electrical motors. Maneuvering is also effected automatically in this radio ship by means of a gyrocompass, likewise connected to the master commutator, enabling the operator to "set the wheel," so to speak, on a given course.

All sorts of devices are installed for carrying out the details of operation, such as controlling water and fuel-oil feeds; but the "mechanical brain" of this radio monster is the commutator which literally interprets the radio signals and executes "orders," all within a second. A time-clock device is provided to keep the craft from running away should the control-ship's radio apparatus cease to function properly. If radio signals are not received after a certain lapse of time, the clock takes charge of the crewless ship and shuts down everything. All the apparatus, except Mr. Hammond's special relays for the conversion of the radio signals into currents sufficiently strong to operate devices, was developed by radio engineers of the Bureau of Engineering of the General Electric Company. The scheme is entirely American and is a carefully guarded secret.

The first radio-controlled battleship is not through by any means; she is still in special commission at the Hampton Roads Operating Base, where she is in charge of a trained crew of mechanics and electricians, awaiting the fall maneuvers of the Atlantic Fleet, when she will again become a target ship, this time for gunfire practice. But she will not be destroyed. Her future is assured, for she is far too valuable to be sunk with all her special equipment, while there remains so many experiments yet to be tried before her successors are developed. However, she will serve as the first radio-controlled moving target for the fall practice of the fleet—an event postponed from the summer maneuvers at Guantanamo Bay, Cuba, due to lack of funds and fuel. Special shells are being cast for the several types of naval guns which will be aimed at her this fall; shells which will not be armor piercing or explosive, but which, nevertheless, will indicate hits. They may carry away a smokestack or a pilot house—damage of little consequence to this craft, the progress of which would be undisturbed unless her vital aerials were shot away.

The "Iowa" bears watching, and the next few years will tell whether naval prophets are right about the practicability of radio-controlled fleets.

I wouldn't give radio five minutes of my very valuable time if I didn't fully believe in its importance to the world.—Lee de Forest.

Radio News from Europe

A SYSTEM of wireless telephony now connects the Turks Islands and the Caicos Islands in the West Indies, the same installations being used also for wireless telegraphy and for communication with ships. The distance covered by the radiotelephone circuit is about 12 miles.

Recent advices received at the Department of Commerce, Washington, D. C., from Trade Commissioner Young, at Riga, Russia, state that, during May, a new wireless telephone broadcasting station, located on the Kursk Railway station in Moscow, was opened by the People's Commissariat of Post and Telegraphs. The station was built by the Nizhni-Novgorod laboratory of the Government, and is designed to broadcast messages and wireless press sent out by the government.

The wireless traffic between England and Spain, which has been handled for some time by land wires to the Poldhu station and thence by radio, has been greatly improved by the substitution of the new Marconi station at Ongar as the transmitting agency. This station is worked by distant control from London, so that messages filed in that city are sent direct by radio without any retransmission. The same station is now working on schedule with three other continental wireless stations.

Poldhu, located in Cornwall, is one of the oldest and probably the best known of the European high-power radio stations. At the present time it is not being actively used and its eventual disposition is uncertain, although there has been some discussion of a plan to convert it into a radiotelephone broadcasting station.

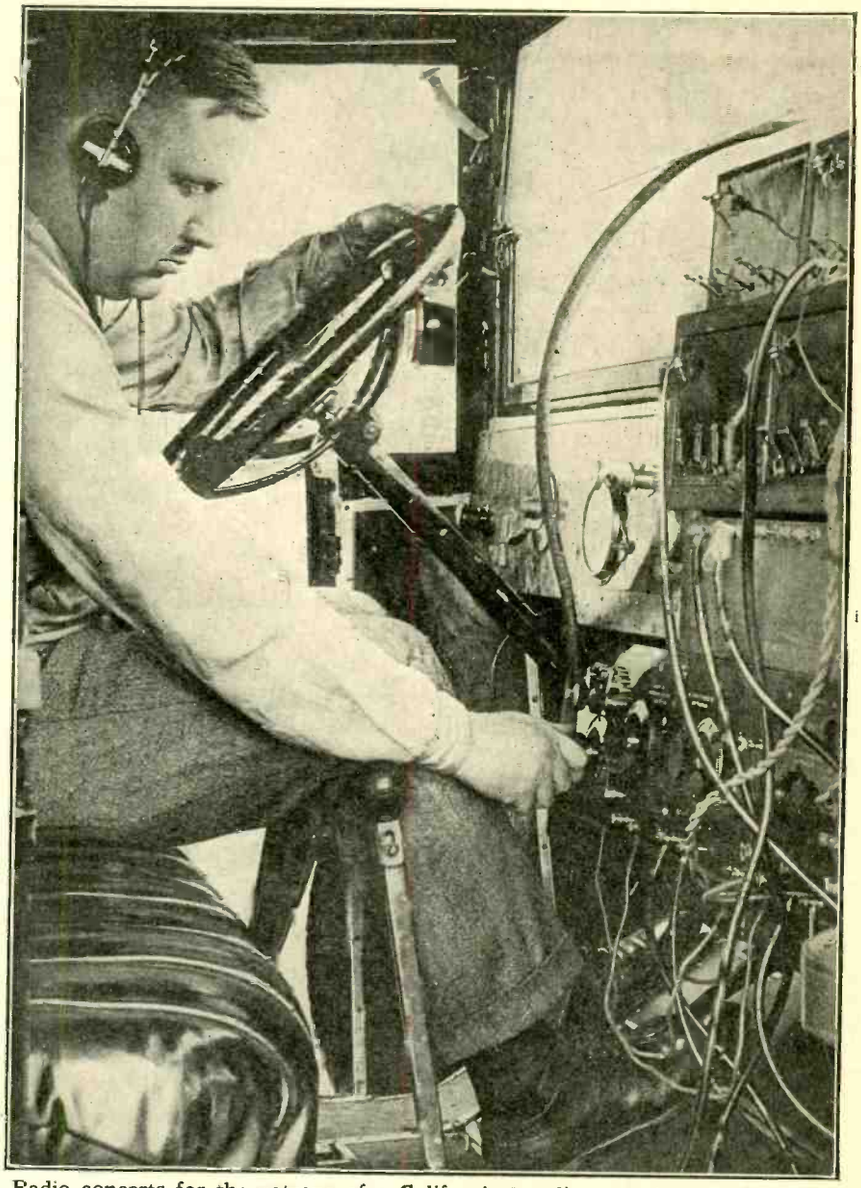
The Egyptian Department of State Railways, Telegraph and Telephones has announced that commercial wireless-service is open to the public from the station at Abou Zabal, according to a report received at the Department of Commerce from Consul Maynard, Alexandria. Since 1914, when the station was completed, it has been used only for government messages, but will now handle commercial traffic through the State offices. Wireless messages to Great Britain and Ireland will be accepted subject to the same rules as ordinary telegrams.

(*Continued from preceding page*)

UV-201, another amplifying tube which receives the charge from the secondary winding of the audio-frequency transformer. Entering this tube, it is amplified many times before it is sent through the telephones.

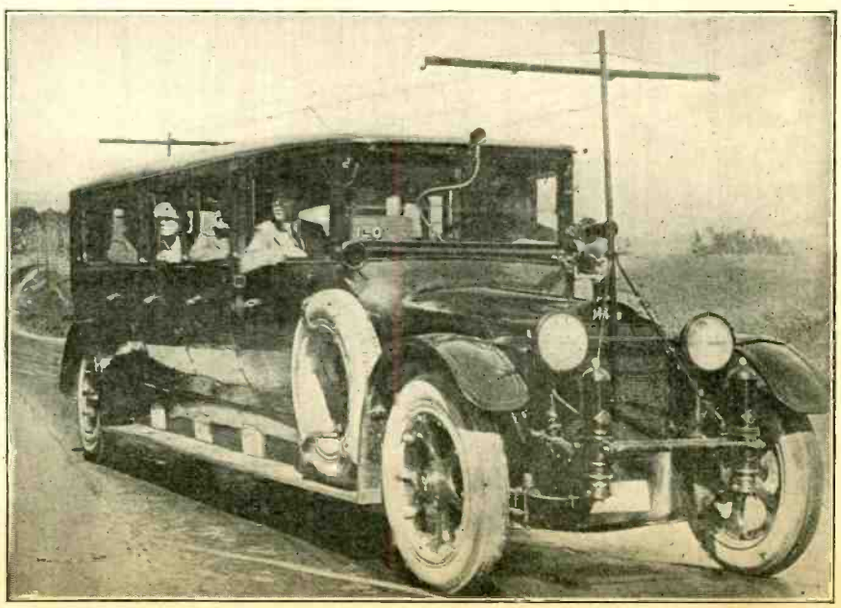
If the radioist wishes to add a few more steps of radio frequency, or audio frequency, he may easily do so. Figure 2 shows a sketch of a single step of radio-frequency amplification, utilizing a radio-frequency transformer, then sending it through the ordinary detector for rectification. The transformer is connected between the plate of the amplifying tube and the detector, or second tube. The aerial used with both these circuits is of the loop type. Signals were received wonderfully—better than by using all audio-frequency transformers in circuit.

Radio Music for Bus Patrons



Radio concerts for the patrons of a California bus line are the very latest development in the radio field. With only a two-step radio-receiving outfit and handicapped by a low antenna, the reception proved successful.

(Both photographs copyrighted by Kadel & Herbert News Service)



Things Every Radio Fan Must Know

By E. E. Hawley

THERE are two chief methods of installing a double-circuit receiver. The first is by the use of a loose coupler, which is now more or less discarded, and the other is by means of the variocoupler.

The loose coupler consists of a primary inductance, which is a wire wound about an insulated tube in such a way that we have a certain number of turns on the tube. The more turns of wire there are on the tube, the longer is the wave length to which it will respond.

The secondary of a loose coupler consists of a winding on another tube, which is so arranged that it will slide in and out of the primary tube. In fact, it will come completely out of the tube, and may be pulled quite a few inches clear of the primary tube. In this manner we have three possible adjustments. First, the number of turns on the primary that we can bring into play in the primary circuit; second, the number of turns that we are bringing into the secondary circuit, and finally the inductive relationship between the two coils themselves, which is known as "close" or "loose" coupling.

The object of this loose coupling is to eliminate the effect of interference by loosening the coupling between the two coils. It has been found in practice that when the primary and secondary circuits are in resonance with each other the two coils can be separated quite a distance and signals still be recorded in the telephone receivers, whereas signals that are not in resonance with the circuits will be eliminated by widening the coupling between the two coils.

The tickler is the coil of wire that is placed in an inductive relationship to the primary and secondary circuits of the receiving set. The tickler itself is in the plate circuit of the vacuum tube and affords a feed-back system that gives regeneration. The function of the tickler coil is best explained by pointing out what happens when you take the receiver off the telephone hook during the time that your bell is ringing and then place the receiver up to the mouth of the telephone transmitter.

The receiver is recording the ringing of the bell; it transfers this to the transmitter and the transmitter takes the sound, transfers it into electrical energy and passes it along the line again into the receiver, which in turn again puts it on the transmitter.

This operation is continued, each time louder, until a certain maximum is reached, which results in a terrific howl that can be heard all over the room. This is regeneration, and in a radio circuit the tickler coil does just exactly the same thing.

There is nothing mysterious about the rheostat. Many amateurs seem to shy at the sound of the word. It consists of special metal-wire wound in spiral form around a suitable frame. This metal has a certain definite quality by which it offers a definite degree of resistance to the passage of an electric current. The more of this wire there is in the circuit the more resistance will be offered to the flow of current—and that is the reason the resistance is made variable, so that one may control the current flowing through the filaments of the vacuum tube.

This degree of control can be further increased by the addition of a vernier rheostat. This is a smaller rheostat, of about one ohm resistance, placed in series with the other larger rheostat. The vernier should be so constructed that it has smaller turns in order that closer adjustment can be made.

In connection with the filament circuit of the receiver, it will be observed that some sets have a potentiometer across the storage battery.

It is not an easy matter to wind a bank-wound coil. For such a coil, having a wave-length range up to 2,600 meters, it will be necessary to take a tube 3½ inches in diameter and 4½ inches long, winding it with No. 24 S. C., wire in three banks. One must take at least eight taps from this coil. It will be necessary to have a special winding device, consisting of two end-pieces for the tube, with a shaft and a handle. Practice only can make perfect this type of winding. First of all, wind three complete turns around the tube, keeping the wire as tight as possible.

At the end of the third turn bring the wire up between the second and the third turns and wind once around. Then another turn between the first and the second. At the end of the fifth turn, jump up between the fourth and fifth and wind one turn. The result should be a pyramid of three turns, then two turns, then one. When the sixth turn has been completed, bring the wire down to the tube and put on the seventh turn, the eighth on the seventh and the ninth on the eighth. Turn to the tube again and repeat the process.

To take off taps when the tapping point is reached, bend the wire sharply to one side and wind a single turn around the part of the coil already wound. Bring the end of that turn back to where it was started and continue the winding. After the coil has been completed and varnished cut the tapping turns and take off the taps. This method keeps the winding tight and the taps out of the way. The object of winding a coil in this way is to eliminate or reduce to a minimum the capacity effect between the windings of the coil itself.

The Vernier adjustment has reference to the small variable-condenser placed in parallel with the condenser across the secondary of an oscillating circuit. There are cases in which it would refer to the small Vernier variometer used in variometer circuits.

This adjustment is placed there in order to get very minute tuning for continuous wave-reception. This system of wireless transmission is very sharp and only by the most careful adjustment can it be properly recorded on a receiving apparatus. As radiotelephony is conducted by means of continuous waves, the Vernier adjustment is a very important element. The best point to have this Vernier adjustment is in the midway position, between the two hissing points of your set.

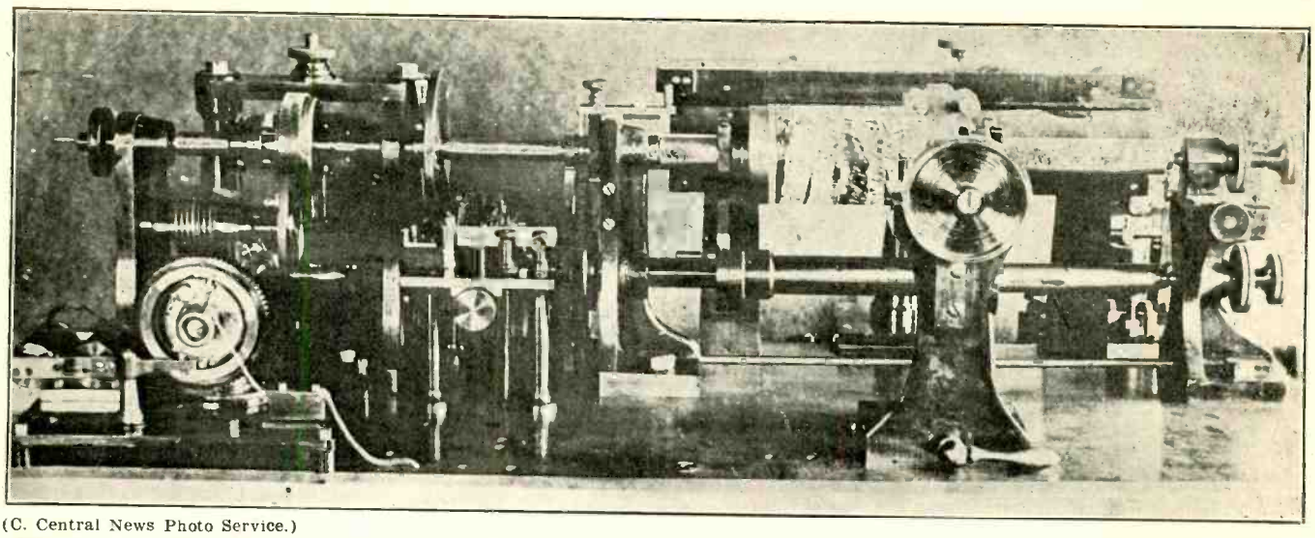
If you vary the Vernier adjustment carefully you will find that your set will begin to hiss low down on the scale and then ascend to the highest pitch, until it reaches a point where the hissing ceases. That is the point at which the adjustment should be. If you carry the adjustment further you will find that the hissing starts again from a high pitch and then descends down the scale.

Detecting Amplifiers

WE have often heard the terms "Hard" and "Soft" used in reference to vacuum tubes. This means that there is what is known as high vacuum and low vacuum in a bulb or tube. Hard bulbs will not ionize at very high voltages. Soft bulbs will ionize at low voltages. The soft bulbs act as detectors, while hard bulbs are preferable for amplifiers and oscillators. The output of soft bulbs is limited so far as oscillations are concerned. Soft bulbs as a rule will give better response as oscillation detectors than hard tubes. The experimenter will have to make a few trial tests in order to obtain good signals with soft tubes. If a tube, when being brought to brilliancy, becomes blue in color, this proves that it is a soft tube or detector; but if no signs of the blue glow are seen then it is an amplifier and should be used as such.

Photos by Radio! New Belin Device

By A. N. Mirzaoff



(C. Central News Photo Service.)

First photograph published in America of the perfected invention of Edouard Belin, of France, for transmitting photographs both by wire and radio.

THE brilliant French inventor, Edouard Belin, who has been engaged in the problem of transmitting pictures by electricity for over fifteen years, announces several improvements in his apparatus. His first success was recorded when he reproduced a message sent from Paris to Antwerp, April 14, 1920. In October, 1921, messages were successfully transmitted in the same manner between France and the United States.

M. Belin's apparatus consists of a copper cylinder, not unlike one used in the early Edison phonographs. This cylinder is made to revolve while, at the same time, a microphone diaphragm (somewhat resembling the sound box of a phonograph and a recording stylus) pass slowly along it in a lengthwise direction. The picture is placed face downward on the copper cylinder after the latter has been covered with shellac. The cylinder is then placed in hot water so that the paper may be removed while the gelatine film of the print is left on the cylinder.

It is true that some of the gelatine is also dissolved, but this solution is proportional to the lights and shadows of the picture. Because of this, the picture forms a bas-relief on the cylinder with the darker portions higher than the lighter ones, since the darker parts are more resistant to the action of the water. The cylinder is then placed in the machine and the apparatus set in motion. The stylus of the microphone presses against the surface of the picture, covering every part of it point by point, thus causing the microphone diaphragm to vibrate to a greater or less extent according to the height of any given portion of the bas-relief.

Since this diaphragm is exactly like the transmitter of a telephone, except that it is moved by the stylus instead of by sound waves, it sends impulses of electricity over the wire to the receiving end. The path made by the stylus over the revolving cylinder is spiral in form. At the end of the wire is the receiving apparatus. This comprises a cylinder which moves at exactly the same rate of speed as that of the sending apparatus; but instead of the metal needle which formed the transmitting stylus, or "translator" as it is commonly called, the stylus here, whose function it is to impress the sensitive film upon the cylinder is a fine thread of light.

The electrical impulses which are sent over the wire from the gelatine film in the manner just described, set in motion an extremely sensitive galvanometer, in which there is a delicate quartz thread bearing a very small mirror. This mirror is twisted slightly in one direction or the other in precise accordance with the movements imparted by the stylus to the microphone at the transmitting end. At one side of the mirror is a lamp whose rays are focussed upon it. This pencil of light shifts its position in accordance with the twisting of the mirror; but a lens catches it and always bends it back to the same focussing point. Another special feature of the apparatus is a screen placed between the lens and the mirror. This screen varies in color, being transparent at one end, but gradually shading to a very dark tone at the opposite end. Since the pencil of light must pass through this screen, the amount of light focussed on the revolving cylinder at any given point is in this way made to vary exactly in accordance with the vibrations of the diaphragm of the sending apparatus.

When the pencil of light finally reaches the sensitive film spread upon the revolving cylinder, it impresses the latter, making a delicate photographic line upon it, whose degree of lightness or darkness varies to correspond with the motion of the mirror. Since the cylinder is not only revolving, but moving forward at the same time, this shaded line of light forms a continuous spiral about the cylinder so that it gradually reproduces upon the latter the lights and shadows of the original picture. Since the film at the receiving end has, of course, never been previously exposed, it must be protected from outside light, and for this purpose a special frame, or hood, is employed, provided with a very small aperture through which the printing pencil of light passes. To prevent any distortion of the picture, the sending and receiving cylinders must revolve synchronously.

We will be talking by radio, dancing by radio, doing business by radio—perhaps dining by radio—in another few years—who knows?—Prof. Jacques Le Porte, of France.

The Radio Primer

The beginner who follows regularly this department in RADIO WORLD will secure a liberal education in the applied principles of radio science

Radio World's Revised Radio Dictionary

By Fred. Chas. Ehlert

Molecule.—The smallest group of atoms of an element, or compound, which exist by themselves.

Motor (Electric).—A device for converting electric energy into mechanical energy.

Motor - generator. — Two machines coupled together. Mechanically changing one form of electricity to another.

Mutual induction.—The production of an electric pressure in one circuit to another circuit in close proximity.

Natural Frequency—The natural wave length of an aerial without the introduction of other elements.

Non-Synchronous—When two or more things are not in a similar condition or position at the same time.

Ohm—The unit of resistance. A circuit is said to have one-ohm resistance when a pressure of one volt is required to send a current of one ampere through it.

Ohm's Law—The law of electricity. It states that the pressure of volts in a circuit is equal to the amperes flowing through a circuit divided by the resistance in ohms.

Oscillations—Electrical oscillations are alternating currents of high frequency. Usually ten thousand to a million per second.

Oscillatory Circuit—One which allows the free flow of electric oscillations.

Oscillation Transformer—One or two coils of wire arranged so that one of them transfers the energy from one to the other, or from the closed to the open circuit.

Phosphor Bronze—An alloy of copper and tin. It has great strength and is used for aerials in radio work.

Pliotron—An amplifier with three elements, used for high-power transmission. Usually contains a very high vacuum.

Polarization—The changing of the polarity of a cell.

Rheostat — A resistance coil usually provided with a means of varying the amount of resistance it is considered necessary to use.

Potentiometer—To enable fine variations of voltage to be obtained by means of a sliding contact which plays over a fixed resistance through which a constant current flows and which has a certain definite resistance. A clear picture of the potentiometer can be made by considering two circuits, an input and an output, going to and coming from the resistance. The input, which may be any source of E.M.F., goes to the ends of the resistance, and the output is taken from one end and the sliding contact. The reason for this operation, and the mathematics of the potentiometer are very easily understood. Ohm's law tells us that E=IR (Voltage=Current x Resistance) and, since the input circuit is through the whole resistance, I is constant. But the portion of the resistance between the variable contact and the end from which the output circuit is taken is variable, and hence, since I is constant, in order to maintain the equality of the equation E=IR, if R changes, E must change in the same direction by a proportional amount.

The Beginner's Catechism

By Edward Linwood

HOW can one determine a detector tube from an amplifying tube, provided the tube has no markings on it?

This may be determined only by experiment. Place the tube in the amplifying tube-socket and use between 45 and 60 volts of plate potential. Turn on the filament current and pay close attention to the results. If the tube should happen to turn blue, turn off the current immediately. This test proves that this tube would be a soft tube, making it a detector tube to be used for detecting purposes only. In case the blue glow is not present it is a sure sign that this tube is an amplifier of the hard-tube class.

* * *

Should B batteries be fixed or variable in order to regulate the flow of current to the plate?

As each tube has its own characteristics, the plate circuit of the detector tube should be variable; that is, whenever a soft tube is employed as a detector. The detector tube being a soft tube of the gas-content type, it is extremely critical in its operation. The variable B battery is essential in order to have correct plate-voltages. For the amplifying tubes, a variable battery is not necessary as these tubes are steady in their operation.

* * *

Which is preferable, a loose coupler or a two-slide tuning coil for use with a vacuum tube?

As a matter of fact, a loose coupler is better than a two-slide tuning coil, because the loose coupler employs two coils of the inductive type while the two-slide tuning coil has only one coil of the conductive type. Better selective tuning is observed by the inductive couplers, as a large percentage of interference can be eliminated.

* * *

Is a grid leak and condenser necessary when using a tube set?

It is most essential that a grid leak and condenser be used. The grid leak and condenser should be placed in the grid circuit of the detector tube only.

* * *

In using a potentiometer across the A battery, what does it actuate in the circuit?

The potentiometer is placed across the A battery to give better control of the circuit. It helps to eliminate local noises caused by the batteries. Whenever this potentiometer is used in the circuit, the negative lead of the B battery is connected to the sliding contact or the variable portion of the potentiometer. By varying the potentiometer the best contact point may be secured for loud signals.

* * *

What is the function of the grid leak in a circuit?

When placed around the grid condenser, it allows the negative charges stored up in the grid condenser to leak off after the passage of a train of oscillations.

* * *

How may the crystal be tested for good contact without depending upon the reception of outside signals?

By employing the buzzer circuit.

* * *

What does the buzzer circuit consist of?

The buzzer circuit consists of a battery, buzzer, and a push-button switch, all in series. From one terminal of the buzzer a coil of 12 turns of No. 16 wire is wound around the antenna lead. The buzzer is thus capacitively coupled to the antenna and the shock excites the antenna circuit into oscillations at its own period. The buzzer is intended to test the adjustment of the crystal and may be used to indicate whether the audion is oscillating. A low hissing sound will be heard in the phones if the buzzer is operated while the bulb or tube is oscillating.

Opera Audiences of To-Morrow

America to Become a Music-loving Nation Through Radio Broadcasting

By Lee de Forest, Ph.D., D.Sc.

OUR recent national awakening to the art of radio and to the possibilities of transmitting music on the Hertzian waves, brings the subject of radio broadcasting very close to the music lovers of America. Certainly, notwithstanding very crude attempts in broadcasting Broadway jazz, the time has come when we may give immediate concern to the opportunity offered by radio in making known the beauties of orchestral and grand-opera music.

We Americans are by no means a musical people—that is, in such measure as are most of the European nations. Familiarity with and liking for operatic music unfortunately is limited to a very small percentage of Americans. Every effort heretofore attempted to make opera at popular prices self-sustaining has met with failure in almost every instance. Excellent organizations, like the Gallo Grand Opera Company, fail to draw even fair houses for longer than a few weeks in any city.

To turn Americans into an opera-loving people, notwithstanding the yearly influx from Europe, would, in the natural course of events, require decades, perhaps centuries. Not that we cannot quickly learn to appreciate good music; but to induce the audiences to go first to hear, and then again to hear, then to appreciate, to understand, to love good music is the great difficulty.

So, to one whose greatest joy and relaxation was to hear good opera, this ability of the radiophone to bring into every home—not second-class opera; not phonographic reproductions—but the actual voices of the highest-salaried artists of the Metropolitan and Chicago Opera companies, appealed to me with strange fascination and aroused a faith which today is as keen, as strong, as when the idea was born.

When, in 1907, I first prophesied the era of radio broadcasting, I laid prime stress on what it would mean to the public generally, and to producers of grand opera especially, to send this form of inspiring music to every corner of the land.

Opera impressarios and directors do not, should not, fear that if their productions are heard in every home in New York or Chicago their box office receipts will suffer one whit. For every twenty who thus hear the arias and more or less fragmentary gems at home, without seeing the gorgeous stage pictures which accompany them, one, at least, who would never otherwise know what beauty he is missing, will be constrained to go to grand opera. Thus the number of opera goers and lovers will be greatly increased. Nationwide education in the best of opera, repeated familiarity with the actual voices of the best artists, can not immensely benefit opera.

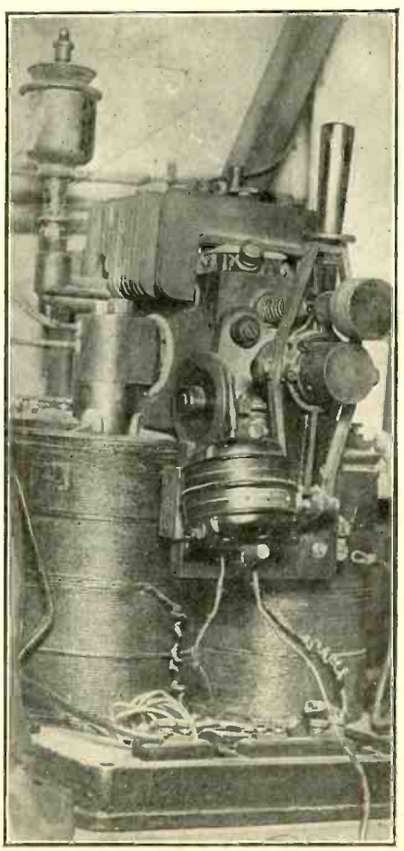
I am certain therefore, that, when the time arrives, opera directors will be ready to co-operate to their utmost to place in the wings and in the orchestra pits the properly designed sound-collectors which will convert the music into perfectly modulated telephone-currents, to be transmitted by wire to the distant high-power radiophone transmitter; say, to four or five scattered throughout the United States. The United States should set aside a special zone of wave lengths—reserved exclusively for opera and symphony orchestras—so that, on every night of the musical season, a listener may tune in to the Metropolitan or Chicago operas, or to the Boston, Philadelphia, New York, Philharmonic, Kansas City, or San Francisco symphony programs—and, at his own fireside, drink in the very best of the world's music.

If this were the only application of the radiophone, its ability to educate the people in good music, that alone would amply justify the Government, or our musical societies, in endowing and maintaining such a service as I have just described.

In this field of opera and symphony, of high-class concert and chamber music, secrecy of radiophone transmission is quite unthinkable. The better the music, the more general its value, the more the necessity for making the service quite free to all who can hear. The musical organizations which give freely of their product will suffer no loss; on the contrary, they will earn the grateful interest of multitudes who would otherwise never learn of this superb art. And from these new ranks will flock new patrons, new recruits, new lovers of music who will next seek to hear and to know their new found friends face to face.

What will this exquisite musical service mean to the American people, hitherto strangers for the most part, to that fine element in life and education? Maintain this service for ten years and we shall see a national musical awakening the like of which history cannot record! Then, and not until then, will we see a genuine American opera—one worthy to rank with those of Verdi, Bizet, or Puccini—one destined to live!

Once the Boss!



(C. Central News Photo Service.)

The Poulsen arc, formerly used almost exclusively for radiotelegraphy but being rapidly displaced by the vacuum tube. It requires pure alcohol for its operation.

Radiograms

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

IT is estimated that a radio audience of over 400,000 listens in nightly in the vicinity of New York City only. If one could scan any residential section of New York from the top of a lofty building one would be astonished at the myriad aerials that span the roofs of apartment houses. Besides those who go to the trouble to set up an aerial there are thousands who attach their receiving sets to a bedspring, a fire escape, a telephone wire, or for that matter to such an accessible and commonplace thing as an electric-light socket.

* * *

Over 50,000 residents of Paris now own radio receiving-sets. A society has been formed in the French capital for the purpose of broadcasting, at least three times a day, all news matter dear to the native Frenchman. At 5 p. m., a special communique will be sent out for the benefit of American tourists.

* * *

Radio has led to another arrest. A message from Tarboro, North Carolina, to Suffolk, Virginia, flashed by irate parents of the bride-to-be, landed a pair of elopers in the lock-up. William Barfield, sixty years of age, and Sadie May Hale, fifteen years old, were the runaways, according to a telegram to "The World," New York. Her father and mother refused to permit the girl to wed her elderly cavalier, so the couple decided on an elopement. They left their homes one day, declaring they were going to a picnic. When the parents of the girl learned that neither had appeared at the picnic, they appealed to a youth who operates a radio outfit near their home. He broadcast a warning to be on the lookout, and the couple were caught as they were searching for a minister.

* * *

The formal opening of the new equipment of WOR broadcasting station, atop the Bamberger & Co. store in Newark, was a big event. A great amount of interest is being taken in the new sending apparatus.

* * *

Two new uses for radio on record. In a dentist's office a pair of receivers on the ears replace the old gas-mask. The patient is so interested in the radio music that he forgets about the dentist and the pain. Even those who have been forced to suffer in silence or mild acquiescence the rambling gossip and advice of the barber may soon find relief in radio. Already one barber has installed a receiver in his shop and the baseball fans will be able to get the scores up to date while being shaved.

* * *

Two new radio stations will be constructed in Manitoba, Canada, for the purpose of facilitating forest fire control. These stations will communicate with the airplanes patrolling the forests in the eastern part of Manitoba and make possible the swiftest notification of the district inspector of forestry at Winnipeg in case of emergency.

* * *

The Holland government has been broadcasting weather reports by wireless telegraph. It is now planning to send this service by radiotelephone so that farmers who do not understand code will be able to avail themselves of the service. The Amsterdam Stock Exchange sends out bulletins every fifteen minutes by wireless telephone, and after the close of the exchange the station is used for the broadcasting of foreign and domestic news and foreign exchange and stock quotations in code.

* * *

Powerful radio-receiving outfits each costing approximately $1,000 to install, are fast becoming the playthings of the wealthy campers in the exclusive camp sections of the Adirondack Mountains, New York. As a result, daily reports of the doings of the outside world are received with renewed interest in the seclusion of the Adirondack forests. Experts from New York have just completed installation of such a radio outfit at White Pine Camp, the summer place of Irving W. Kirkwood, of Kansas City, on Osgood Lake at Paul Smith's. Mr. Kirkwood, who is owner and publisher of the Kansas City "Star and Times," is hopeful, in addition to receiving the matter broadcast from all the principal stations, of receiving messages from Kansas City.

* * *

Fourteen out of fifteen broadcasting stations in the metropolitan district (New York City), have agreed to revise their schedules to prevent confusion in the air. Conferences were held May 11 and July 15, when efforts were made to persuade "one recalcitrant member" to agree to a revision of broadcasting periods. A resolution was passed, to which all the broadcasters except the disturber agreed, that the (new) schedule would be put into operation on Monday, July 24, and would be operated continuously thereafter. A copy of this resolution was sent to Secretary of Commerce Hoover and to the Radio Inspector for the Second District (metropolitan area) and to the offending member, with the result that the secretary of the association has received a very cordial letter from Mr. Hoover, authorizing operation under the schedule as agreed upon. It is hoped that it will not be necessary for the Radio Broadcasting Society of America to publish the name of this station that so flagrantly and selfishly ignores the request of the Secretary of Commerce, to the annoyance of most of the listeners in the metropolitan area.

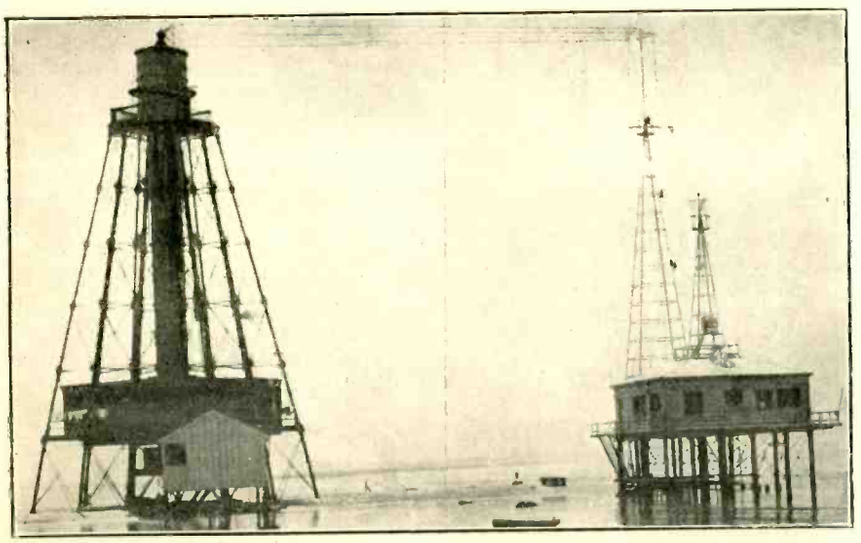
* * *

An enterprising bootblack in Oakland, California, lately installed a receiver and now gives free concerts to his patrons. One customer had three shines in succession while he listened.

* * *

Los Angeles will have radio in twenty of its public schools before the fall sessions begin. The problem of having material broadcast that will meet the standards of the local pedagogues is a worrisome one.

The Light that Never Fails



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

Sandy Key Light House, the radio-equipped sentinel of the Atlantic Ocean, situated off the Florida Coast. This light house has saved many a ship from disaster. At one time the beach-combers along Key West made a profitable living from the ships that went ashore at Sandy Key; but that was before this light house was erected. And this particular light house is a broadcasting, as well as a transmitting, station. The building at the right was erected for the sole use of the radio operators and to house the equipment. The aerials, as will be seen, are strung from the peak of the beacon to a specially built mast. This station is in constant operation day and night. It is used to broadcast warnings to passing vessels, to inform them of their exact location, to send reports of wind and weather, to give out information in regard to all ports along the Atlantic Coast. In more ways than one has radio proven to be the friend of the seafaring man, and the day will come when it will prove the most valuable element—next to wind and steam—of which ocean traffic can boast.

Radio and the Woman

By Crystal D. Tector

THERE is so much to write about this week, that I scarcely know where to begin. My set is working splendidly up here in the bungalow colony of Lake Hopatcong. Every evening we are entertaining neighbors, and, Saturday night, we have planned a dance—a radio dance—and some twenty couples are so anxious to attend that I fear they will want the music to begin about the middle of the afternoon.

* * *

I have told my guests that they must try and represent some radio element; that is, each young woman is to give herself a radio name and each man do likewise. The partners for the first dance will be those couples with similar names. I realize that a number will take the same word; but leave it to me to straighten out matters so that all will have a good time. Friend Husband says that I should have studied for the diplomatic corps.

* * *

I'm going to serve a radio punch—a mild but refreshing concoction that will not bring the blush of shame even to the cheek of Mr. Volstead himself. I make it of iced tea, ginger ale, and grape juice—one third each. Of course, it has about as much to do with radio as a last Easter's hat; but it's the name that counts in such affairs. Gets everybody good natured. And it tastes good. Then I'm going to have static sandwiches and loose-coupler salad. Friend Husband is busy cutting up chicken for the latter. Says he can't see why I should call it by such a name unless the chicken was so old that all its joints were worn loose. Far fetched, but pretty good for a man.

* * *

We picked up Bedloe's Island the other night. I didn't hear the announcer—wasn't in time—but the song that came over the waves was beautifully rendered. Of course, Newark is right at our door but it doesn't monopolize the reception. If I were to stay any length of time in this charming spot, I would certainly put in a transmitter and take out a license to broadcast.

* * *

I can imagine no more wonderfully fascinating sport than living in this entrancing wilderness and conversing by radio with strangers all over this broad land. It would be wonderful. Fancy the mystery of it all—the wonder—the suspense! Think of getting up in the dead of night—and Hopatcong is blessed with the nightly stillness of death—and hearing from some ship far out at sea! There is romance for you! Think of tuning in on some fellow radio-fan in the Far West! Think of picking up the message of another vacationist in the wilds of Canada! Think of—but better sign off! F. H., says that when I get raving like this I don't know when to stop!

* * *

Our colony found three new enthusiasts during the past week. Two hied themselves to New York to buy sets and the third—one of those determined American youths—is building his own set. He is at it from morn till night. He is so anxious to get it finished that his mother cannot even drive him to the dinner table. But can't you imagine how that boy will just bulge with pride when he hears his first message?

* * *

I want to comment on a letter I received this week. It may be a bit personal, but I'm not writing this department for the Antiquated Order of Hasbeens. My correspondent is a Mrs. H. L. O., of Billings, Montana. She wants to know if I can suggest someone who will broadcast information about the husband who has deserted her. I read between the lines of her letter that she would like me to tell all about the recalcitrant person in RADIO WORLD; but as the editors cautioned me to remember always that I am writing for a **radio** publication, I must sidestep her wishes. RADIO WORLD is not a husband finder. All that I can say to Mrs. O. is to take up her case with some firm in her own vicinity, that has a broadcaster. If they choose to help her, then radio has done one more goodly service.

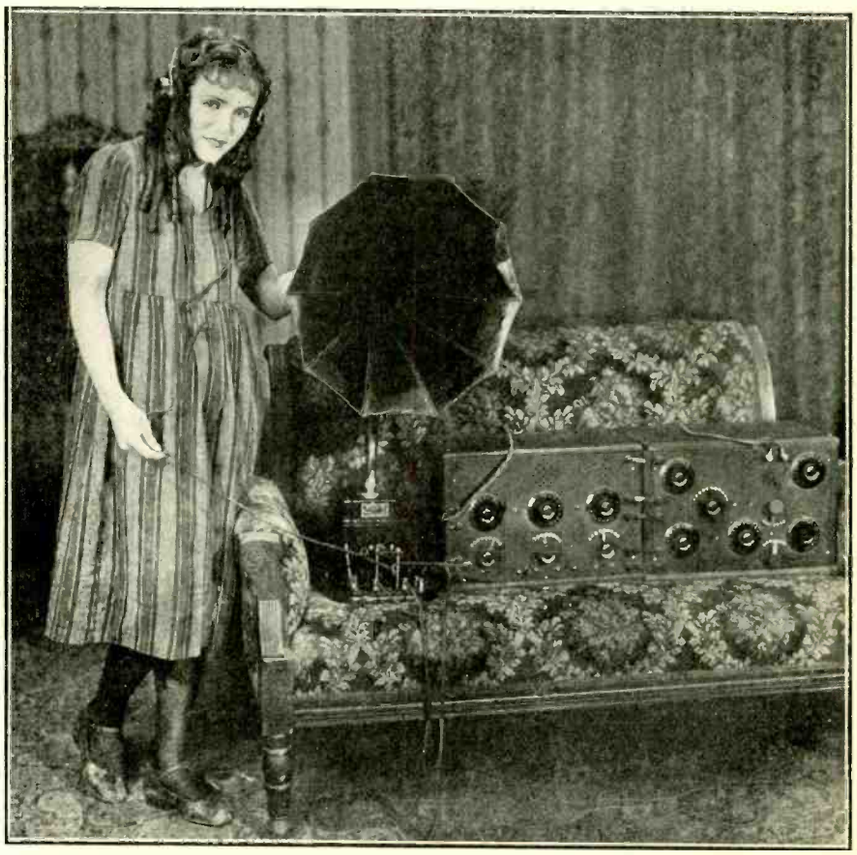
But the burden of my song is this. Women are taking a deeper interest in radio every day. They find that it possesses elements of service that no other thing in this world can boast of. Grasping its bigger side, they are keen to become familiar with it. That is woman's method of working. I believe the day will come when women, placed in the same predicament as Mrs. O., wil turn to radio more quickly than they will turn to the police. But they must understand that the appeal must be made to the right persons or organizations. There are many poor women in this country to whom radio will yet prove a blessing—if the statistics regarding desertion by husbands is true.

I would like to hear from my readers on this subject.

* * *

There! Friend Husband has gone and cut his finger—and if I don't hurry that radio salad will be spoiled!

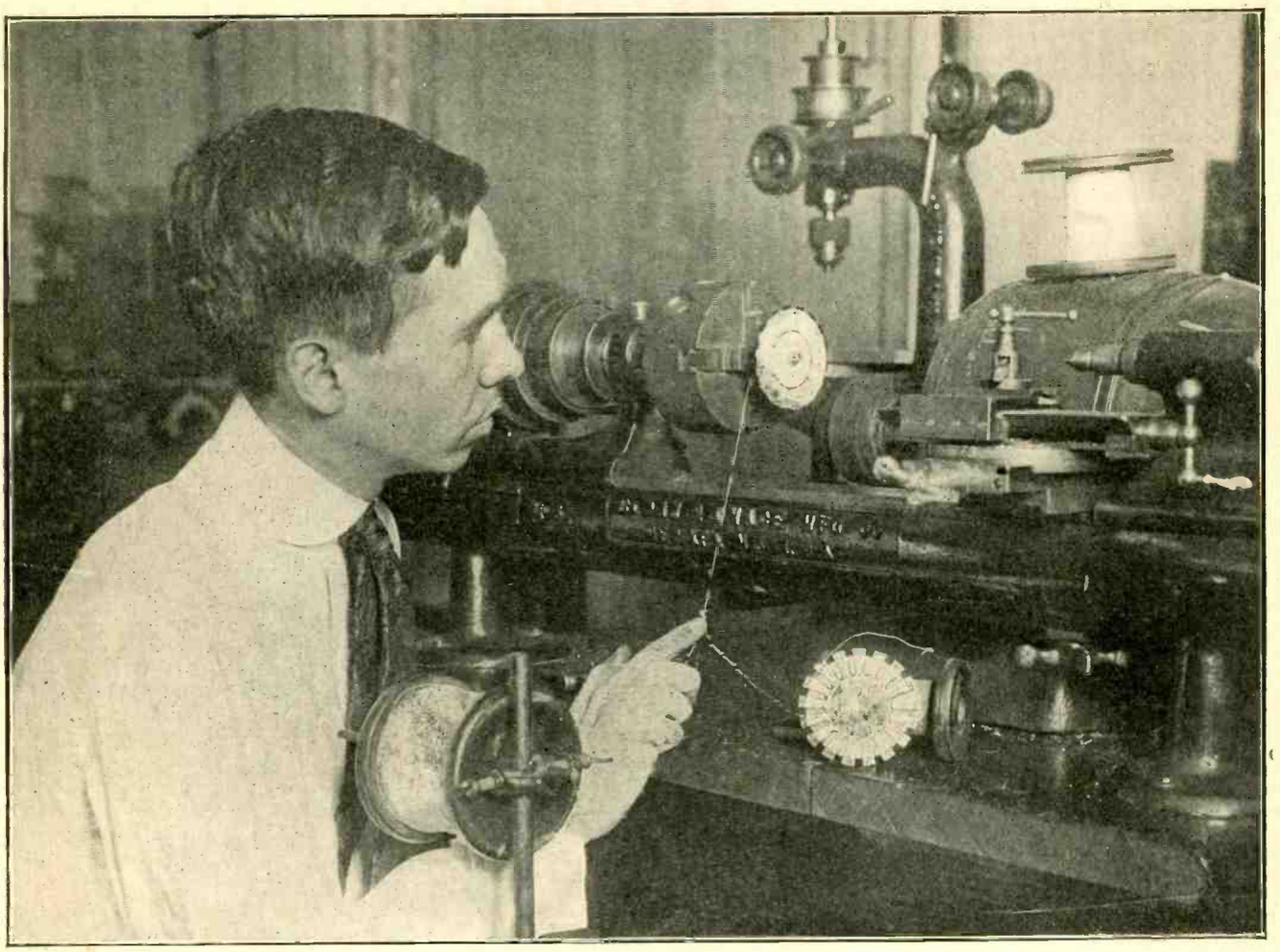
Radio Puts Pep in Her Work



(C. Kadel & Herbert News Service.)

Gladys Walton is a movie actress. She works hard in her chosen calling, and, at times, it is necessary for her to seek recreation. She tried many things to bring diversity into her life—she even went in for athletics—but nothing gave her the fullness of the relaxation she sought until, after the suggestion of a friend, she took up radio. The variety of the programs offered, she says, the suspense in picking up faraway stations and hearing the unexpected has provided a full quota of much needed recreation. Radio has found many ardent advocates among members of the moving-picture fraternity. Out in Hollywood, California, where so many of the big pictures are made, nearly every studio has its receiving set and a number of the more successful stars have sets installed in their homes. Miss Walton's set was temporarily placed in her dressing room.

Photographs that Prove How Radio

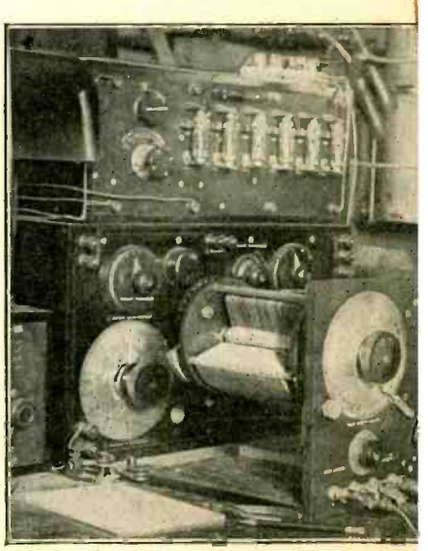


(C. Kadel & Herbert News Service.)

When attempting to build a receiving set, so one can listen to the broadcasting, a problem which seems to confuse many radio enthusiasts is what type of coupler or inductance coils shall be used. "Can I build them myself; or, if so, what material will I need to make such coils?" is asked. Usually spider-web coils are made by the amateur. The above photograph shows the process of manufacturing spider-web coils under the guidance of Edward T. Hickey. He is showing how simple it is to wind such coils with the aid of a lathe. The spider-web coil on the table, at the base of the lathe, shows a complete coil. With the use of such coils in a set, with the necessary equipment, music is heard distinctly.

(C. Fotograms, N. Y.)

C. A. Bauer, of the United States Post Office Radio Station, Washington, D. C., who broadcasts information to farmers. He is popularly known as the "farmers' friend." When you want to hear him, just wait for WWX. You will get some interesting information on tilling the soil as well as considerable valuable information on crops, the weather, and market reports.



(C. Kadel & Herbert News Service.)

It is erroneous to characterize the entir
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as amateurs in the radio field are, in fa
experimentation in radio not only an in
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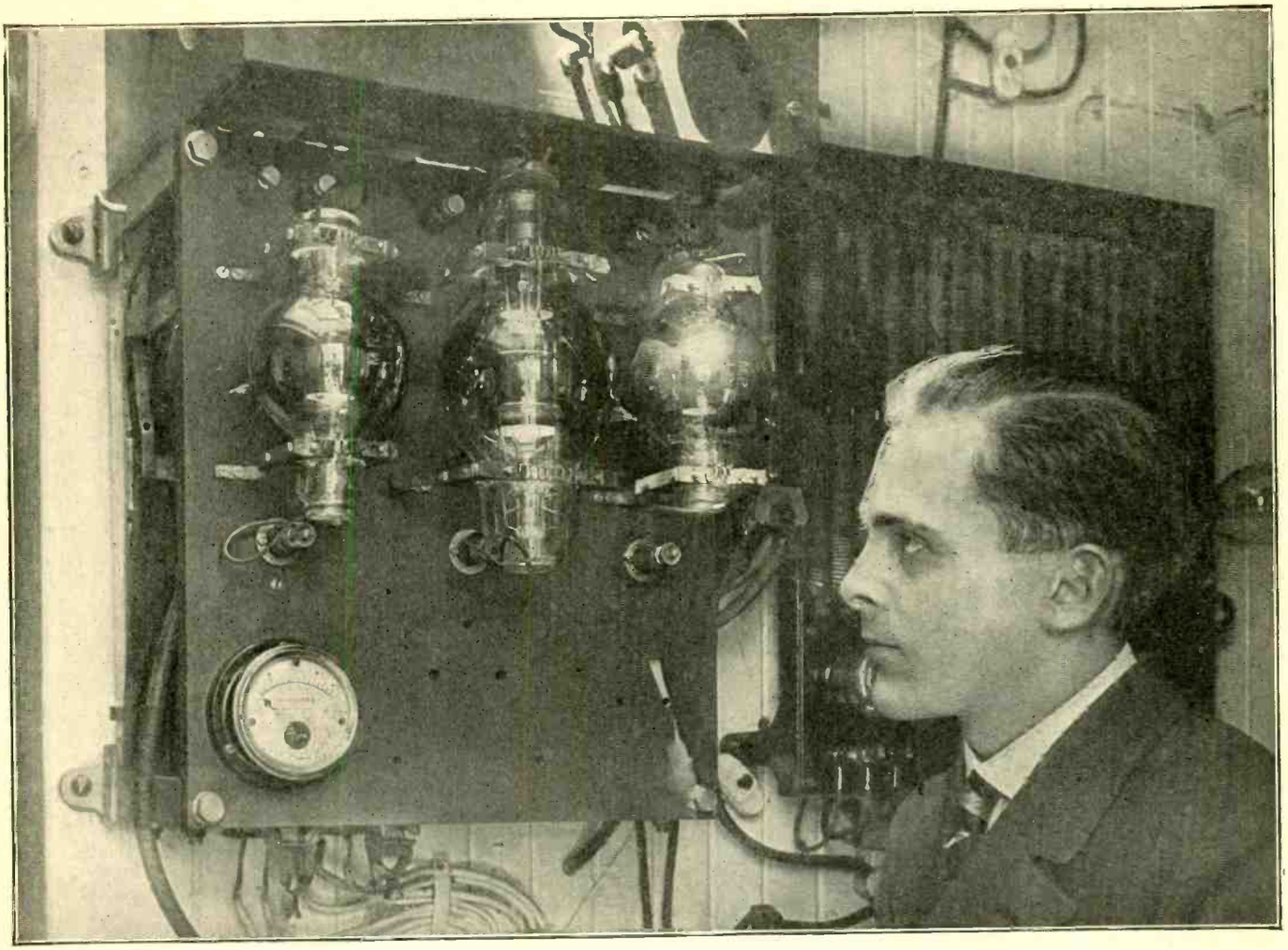
Is Advancing from Week to Week



(C. Ewing Galloway, N. Y.)

Here is a transmitter which broadcasts messages 1,500 miles with only 1½ kilowatts of power. This up-to-the-minute transmitter enables steamers crossing the Atlantic Ocean to communicate with America or Europe immediately. The capacity of such an instrument with so small an amount of current is accounted for by a very accurately adjusted aerial. This photograph was taken aboard the Atlantic liner "Vauban," in the Hamburg-New York service. This steamer boasts one of the most perfect radio outfits of any steamer in the world. Her main receiving instrument registered distinctly messages from the Conte Radio Station in the Philippine Islands, a distance of 11,500 miles—nearly half the distance around the world.

e army of American radio experimenters
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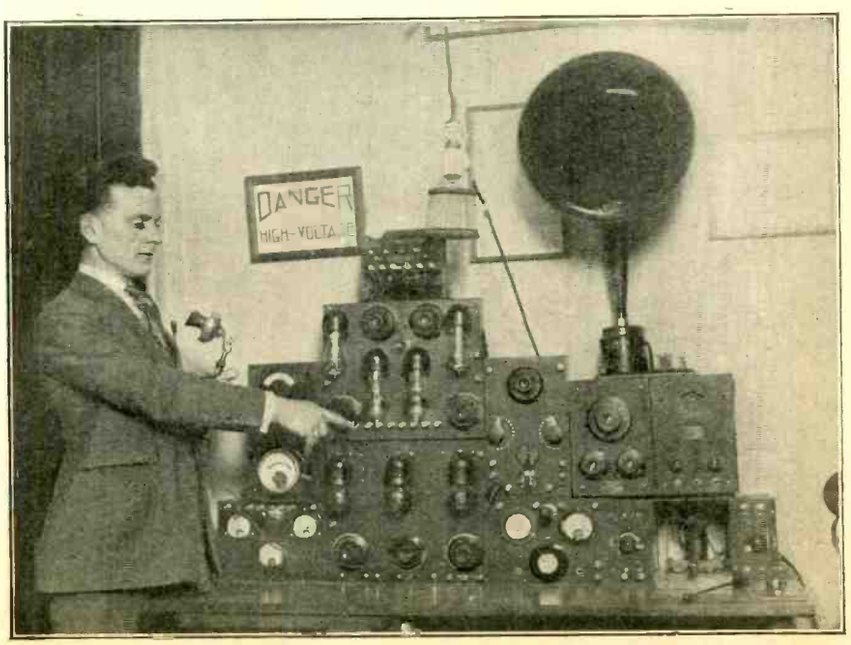
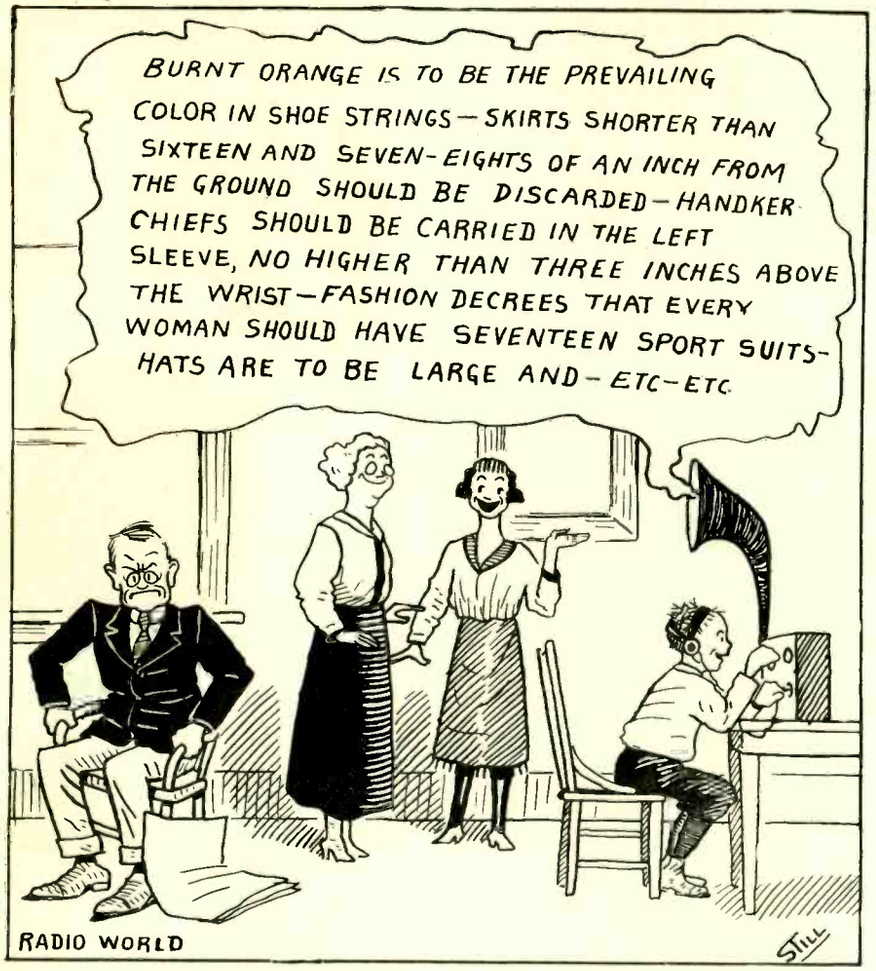


(C. Kadel & Herbert News Service.)

2WG, the fine home-made set of Walter J. Garvey, New York. It has a range of 800 miles. A number of the parts of this remarkable set was made by Mr. Garvey. It has several unusual features; one in particular: no motor generator is used. Mr. Garvey is pointing to the transmitters that make motors unnecessary.

When Dad Prayed for Static



Cartoon drawn specially for Radio World by Harry B. Stillman.

Answers to Readers

WHAT are the best records for receiving Continental Code?—Mary Mathews, Montreal, Canada.

56 1-2 words a minute. Made by L. R. McElroy, of Boston, at the 71st Regiment Armory Radio Show, in New York, in May. This is the fastest on record.

49 1-2 words a minute. Made by Jose Seron, of New York.

48 3-5 words a minute. Made by B. G. Seutter, of New York.

* * *

How do airplanes and moving motor cars get ground for their radio sets?—Arthur Grant, San Francisco.

They use a counterpoise instead of a ground. The counterpoise of an airplane consists of a wire hung below the machine. In motor cars, the apparatus is grounded on the chassis and engine. The same type of apparatus is used when making a regular ground.

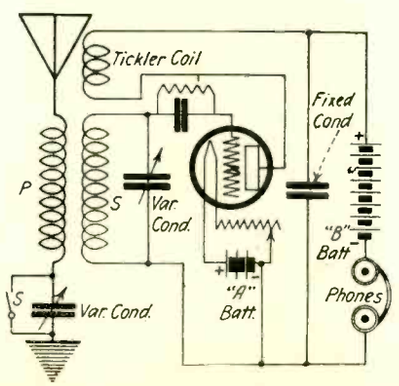
* * *

I am located about a hundred miles from the nearest broadcasting station and all I seem to hear is code signals from other radio stations. I have a regenerative set using only one tube as detector.—George Makfield, Crisfield, Md.

If you hear code signals it is a sure sign that your set is in working condition. For this distance secure a two-stage amplifier and connect it up with your detector set. This would enable you to cover a wider distance and give you louder signal strength.

Show a circuit of a regenerative set using a tickler coil. Show position of tickler, also two variable condensers and variocoupler.—Marshall Van Deusen, Tonawanda, N. Y.

The accompanying diagram shows the circuit you want, study each connection carefully.



Regenerative diagram employing a tickler coil in the plate circuit.

* * *

I would like to know if I can get the working drawings of a Grebe set published in Radio World No. 13, dated June 24? Where can I purchase brass tubing for the manufacture of tube sockets?—C. C. Powers, Richmond, Va.

The photographs shown in the number of Radio World to which you refer pertained only to the manufacture of equipment. For blue prints, communicate with A. H. Grebe & Co., Richmond Hill, N. Y.

* * *

I am thinking of purchasing a radio set to cost between $100 and $200. What kind of a set would you recommend?—Radio Nuts, Plymouth, Indiana.

For this amount of money you should get a regenerative set with two steps of amplification.

* * *

Where can I get a blue print or drawing of the following circuits: radio-frequency and audio-frequency receiver; also, the new Armstrong circuit?—Alec Ryschik, Springfield, Vermont.

These diagrams happen to be published in this issue of Radio World.

* * *

Is No. 22 wire O K for a variometer? Should the stator and rotor carry the same amount of wire?—Louis Hansen, Los Angeles.

This size wire is advisable, but No. 24 would be more suitable. There must be just as many turns on the stator as the rotor.

* * *

I was interested in an article on radio frequency by George W. May, in Radio World, No. 6, dated May 6. What is the name of the company that makes the transformer he describes?—Arthur Hendrickson, Duncan, Oklahoma.

The radio-frequency transformer used by Mr. May is made by the Radio Instrument Company, Washington, D. C.

Radio Not to Blame

LIGHTNING exhibited its erratic nature during a heavy electric storm, last week, be setting fire to an amateur radio station on the top floor of a New York apartment house, says "The Times," New York. The lead-in wire from the antenna connected with a lightning arrester and the ground wire, about twenty feet in length, was clapped securely to the water pipe in the bathroom. The insulation was burned off the lead-in from the lightning arrester to the set. The audions were burned out, the "B" battery insulating material fused, and the cords and woven portion of the headband of the receivers were burned off. The window glass was shattered.

The radio apparatus was installed in accordance with the Fire Underwriters regulations and had nothing to do with attracting the lightning. The peculiar position of the lead in wire in relation to the window and a radiator caused the heavy static to start the fire. The lead-in extended down from the antenna to the lightning arrester placed on the window sill. On the opposite side of the window was a radiator and a little to the left of it a table holding the radio instruments. The lead-in, glass window and radiator formed a condenser. The static charge became so great on the lead-in that it discharged through the window glass to the radiator which offered the path of least resistance and shortest route to the ground. The shattered window glass looked exactly like the plate of a punctured condenser.

The same thing might have happened if an ordinary telephone wire or gutter pipe ran past the window. The radio instruments were in no way responsible for the fire.

A. S. C. A. P., Instructs Music Publishers as to Broadcasting

Permission Is Not to Be Given Any Radio Station without Authority of Society

IN accordance with plans made at a recent meeting of the American Society of Composers, Authors and Publishers, says "The Clipper," New York, and the resolution adopted by the society, all professional, branch office, and traveling staffs of publishers who are members of the A. S. C. A. P., have been informed fully concerning the policy adopted by the society relative to the copyrights owned by members and the same being publicly performed through radio broadcasting. The resolution adopted by the society provides that no permission should be given for a radio station to broadcast a piece of copyrighted music without authority first having been received from the society. This, of course, applies only to such music the copyright of which is owned by members of the society.

The chief purpose of the society's reason for informing the different members of the publisher's staffs of the method adopted to have the radio stations get permission to broadcast copyrighted music is to establish the rights of copyright owners pending the arrangements that are now being made between the society and radio stations so that suitable revenue may be paid the owner whose music is being broadcast for profit, should the radio in time prove to be a means of depriving the owner of revenues from the sale of sheet music or rolls and records, which sales are expected to be considerably lessened by the wireless concerts, in time.

Members of the staff were informed by letter which read in part:

". . . When the opportunity occurs to secure a so-called 'plug' through radio broadcasting, and in the opinion of the professional or branch office manager the permission should be granted, a telegram along the following lines should be sent to this office:

"'Authority requested to broadcast our compositions from WJZ July fifth.'

"Immediately upon receipt of such a telegram the society will grant the permission, subject to the following conditions:

"That immediately preceding the broadcasting of each such copyrighted composition a spoken announcement be made, as follows: 'This copyrighted composition is publicly broadcast by permission of the American Society of Composers, Authors and Publishers.'

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"Each permission covers the one date of broadcasting, and the station referred to, only, and is not a continuing permission. A new request should be made by telegraph covering each booking for broadcasting, whether from the same or some other station. . . .

"Its effect upon our business, or upon the roll and record business, is as yet problematical, but now is the time for us to establish our rights. . . . or derive from its operation a sufficient revenue to replace that of which we may later be deprived.

"Then, there is another angle which in justice to authors, composers, and publishers, merits our consideration. The industry of 'radio' has come to represent an investment of millions of dollars. Hundreds of manufacturers, and thousands of dealers, are making substantial profits from the manufacture and sale of radio-receiving apparatus.

"There would be comparatively no market for this product, no profit possible from its exploitation, were it not for the availability of music for broadcasting, as a part of the entertaining service rendered.

"If our product, therefore, through its use by broadcasting stations, makes possible the profitable operation of such a huge industry, we are entitled, as a matter of equity and right, to share in the profits flowing therefrom.

"As a matter of law we have an absolute right to control the public performance, for profit, of our copyrighted compositions.

"It may be said to you that the broadcasting stations do not charge anything for their services, and that they do not, therefore, operate for profit. But, except as to schools, universities, municipalities, and public institutions, this argument is not sound.

"Broadcasting stations as commercial propositions, are operated to maintain and increase the interest in the purchase of receiving sets. Though the receiving sets may be sold by firms entirely separate from those which operate the broadcasting stations, nevertheless, practically all of this apparatus is manufactured under a limited number of patents, owned and controlled by the same general interests as own and operate most of the broadcasting stations.

"If broadcasting did not pay commercially, no business firm would undertake the expense of continuing it. If it pays, it pays because in part, music is used and if it pays we are entitled, as proprietors of copyright in such music of ours as is used, to participate in the profits. . . ."

More Graft Started

CLEVELAND and Chicago have followed Newark in attempting to establish an inspection and license collecting department in connection with radio. If there is a way for graft, the politicians will find it out.

Although the small fee recommended for a license sounds rather insignificant offhand, it doesn't take much calculation to see that it would amount to a very substantial sum in the course of one year.

If the collection of this fee would do anything to advance the radio art in general, no one would protest; but when it is used solely for the purpose of fattening some politician's pockets, the matter becomes serious and disgusting.

Should these political buccaneers have their way, every owner of a $15 receiver would have to pay an installation license. The necessity for this cannot be explained. Ideas of this nature are dangerous. They spread from one city to another rapidly, and with Chicago, Cleveland and Newark as starting points, the new graft may reach New York ere long. If it does, let's prepare ourselves for one mighty battle.—"The Mail," New York.

WHAX—Holyoke Street Railway Co., Holyoke, Mass.

[illegible] Radio World, 1493 Broadway, N. Y. C.

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

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS

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

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

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

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

SALESMEN—To call on Radio Dealers. Splendid opportunity. Liberal commission. Write EDW. J. GOETZ CO., Distributors, Cambridge Bldg., Cincinnati, Ohio.

High Grade Antenna Wire. Best quality 7 strand No. 22, tinned copper, non-corrosive antenna wire. Only 1c. per foot. The Kehler Radio Laboratories, Dept. W., Abilene, Kans.

ATTENTION RADIO DEALERS and AMATEURS Why pay $0.75 or $1.00 for **HEAD PHONE CORDS**? Send us 40c. in coin and we will send you a finely braided complete **HEAD PHONE CORD**, Postpaid. All orders filled in turn. New England Braiding Co., Calendar St., Providence, R. I.

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

ARMSTRONG SUPER-REGENERATIVE CIRCUITS. Wonderful results in R.F. amplification from only two tubes, instead of six or eight. These circuits will not work unless you know constants and all apparatus used. Complete tested diagrams containing all hitherto unpublished constants and full instructions for fifty cents. R. I. Co., Red Bank, N. J.

TESTED Galena crystals, 25c.; Phone Condensers, .001 MFD, 17c.; Grid Leak and Grid Condensers, .0005 MFD, 25c. BUSCH-MURPHY, 105 Mason St., Rochester, N. Y.

CRYSTAL DETECTOR SET, from aerial to phones, complete. Big bargain. Send for circular. Salkey Radio Co., 2378 Eighth Ave., New York City.

LOOK—Single Tube Receiver, mounted on panel, ready to wire, $18. J. N. RISTEY, Spring Grove, Minn.

FOR SALE—Immediate Delivery! 750 Sheets Aluminum, size 0.24-11-72. LOGAN MACHINE CO., 222 S. Clinton St., Chicago, Ill.

SPECIAL—High Grade Variometers, $4.65 and $5.20; Variocouplers, $4.65 and $4.95; Composition Dials, 75c.; Headphones, $4.90; Rheostats, $1.18; Switch Levers, 45c and 60c.; Switch Points, 3c; Binding Posts, 6c and 9c; Condensers, 11 Plate, $2.85, 23 Plate, $3.80; Bakelite Sockets, 72c; Best Composition Insulators, 22c; Lightning Arresters, $3. Include postage with order. J. N. RISTEY, Spring Grove, Minn.

AMATEURS, ATTENTION! USED APPARATUS!—Audion, complete with bulb and battery, $10.00; Adams Morgan Variable Condenser, wood case, $2.50; Murdock Variable Condenser, .001 mfd., $3.00; Arnold Loose-Coupler, $10.00; Short Wave Receiver, 200 to 800 meters, fitted for audion bulb, etc., $15.00; Klitzen Rotary Gap, $15.00; Half K. W. Packard Transformer, unmounted, $10.00; Holtzer-Cabot Headset, 2,200 ohm. (new), $6.00; Swedish-American Headset, 2,200 ohm. (new), $6.00; 2-inch Spark Coil, $5.00; Stationary Gap, 50c; Regenerative Tuner, consisting of two variometers and vario-coupler, mounted on handsome brown hard rubber panel in walnut finished case, hand rubbed. This tuner is a beauty in appearance and performance. $25.00. First money order takes them. Do not delay! L. M. SMITH, Box 66, Salem, Wis.

43 PLATE CONDENSERS, $3.95; Rheostats, 95c; 7-Strand No. 22 Tinned Antenna Wire, 90c per 100 ft.; Manhattan Head Phones, $6.00; Tested Galena, 20c, mounted, 30c; Contact Points, 30c per dozen; Complete Crystal Sets, with Aerial Equipment and Manhattan Head Phones, $12.50. Postage paid to second zone. Write for prices on parts not listed. COLUMBIA RADIO COMPANY, P. O. Box 1720, Washington, D. C.

RADIOISTS—Send for literature describing Vosco Tunette. Compact, simple, efficient tuner for radiophone reception. Broadcasts heard hundreds of miles. Panel or table mounting. Price, $5.00. VOSCO RADIO LABORATORIES, Troy, Penna.

AUGUST SPECIAL

AUDION RECEIVERS, regular price, $32.50, reduced to $25.00 for short time. Wave Length, 200 to 800 meters, Variable Condenser, two Ten Point Switches, Socket, Dials, etc. Mounted on Mahoganite Panel in 8 x 9 x 6 Mahogany Finished Cabinet. Shipped prepaid upon receipt of money order. Every set guaranteed. Stamp for descriptive circular. GIBSON & COLLINS, 515 Evergreen Avenue, Brooklyn, N. Y.

SALE OR EXCHANGE—New Clapp-Eastham Loose Coupler. Retails $14.00. Best offer gets it. FRANKLIN CAMPBELL, E. Wakefield, N. H.

TWIN S CRYSTALS—The Super-Sensitive Crystal. Sold with a money back guarantee. Pair, 25c. 500-mile Regenerative Plan Free. NELSON MFG. CO., Interurban Bldg., Dallas, Texas.

RADIO ONE-STAGE RECEIVER—Not wired, 6/21 Cabinet and Formica Panel with holes drilled. Only $29.50. You save half. MIDWEST RADIO CO., 1110 Washington, St. Louis.

PRICES SLASHED on Standard Headsets and Supplies. Radiotron Detectors, $4.48; Amplifiers, $5.88. Variable Condensers, 23-Plate, $1.75; 43, $2.35. Transformers, $3.75. State wants. Stamp Please. WAGNER NOVELTY CO., Delphos, O.

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BUILD A 500-MILE REGENERATIVE RECEIVER FOR $15.00. Plans 10c with catalogue of Radio parts. NELSON MFG. CO., Interurban Bldg., Dallas, Texas.

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A BROADCASTING MAP of the leading broadcasting stations of the country was published on the center page of RADIO WORLD dated May 20. Mailed on receipt of 15c., or send $3.00 for six months, or $6.00 for a year, and start your subscription with May 20 issue. RADIO WORLD, 1493 Broadway, New York City.

Functions of Reception

MOST radio enthusiasts know that there are various types of apparatus for the reception of radio broadcasting. Some of these sets are more sensitive than others. Sensitivity, in the sense we apply it to receiving sets, is a quality analogous to power in transmitting apparatus. Most receiving sets have five distinct functions: intercepting, detecting, tuning, amplifying and reproducing. It will be helpful to us later when we consider receiving sets as complete units, if these functions are understood.

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RADIO WORLD

RADIO WORLD CO.,
1493 Broadway, New York City.

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Three Months	1.50
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Radio Patents
RECENTLY ISSUED

To Keep a Vacuum Tube in Sensitive Condition

No. 1,420,189. Patented June 20, 1922. Patentee: Aubrey R. Goodwin, Melrose, Mass.

IN radio communication, the vacuum tube is universally used to receive, amplify, and generate oscillations. This vacuum tube consists of an evacuated glass-bulb containing three elements known as the filament, grid, and plate.

Metallic bodies when heated to a dull red glow, or higher temperature, throw off negative electrons. When both the plate and grid are at zero potential these negative electrons are propagated by the filament in all directions. If, however, the plate becomes positively electrified the negative electrons are attracted to it and flow in a concentrated

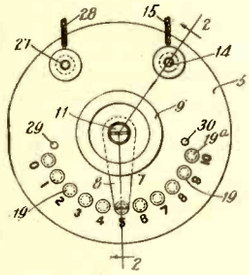

Fig. 1.

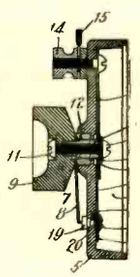

Fig. 2.

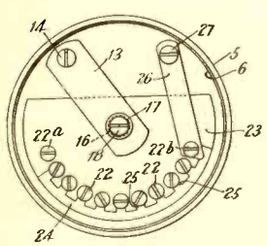

Fig 3

Schematic diagrams, showing the principles of the Goodwin improvements for vacuum tubes.

stream which is called an electron current. The grid is the controlling member of this stream and is placed between the filament and the plate. If the grid is positively electrified, it aids the passage of the electrons from the filament to the plate, increasing the value of the electron stream. If the grid becomes negatively electrified, it repels the negative electrons, reducing the value of the electron stream, and if the grid becomes sufficiently charged to a negative potential, it may stop the flow of electrons to the plate entirely.

In radio communication also, the circuits are so arranged that the incoming oscillations from the antenna act upon the grid, which alternately becomes positively and negatively charged. During the positive charge, however, all of the negative electrons are not removed from the grid, hence the grid during the many succeeding oscillations accumulates a negative charge which is not removed during the postitive half of the cycle and materially reduces the flow of the electron stream. It then becomes necessary to use some auxiliary means to remove this excess negative potential, hence the use of the grid resistance, which if of the proper value allows the extra negative charge of the grid to leak off and keeps the vacuum tube in its most sensitive operating condition.

The amount of this negative accumulation on the grid varies with the incandescence of the filament, the positive potential on the plate, the degree of evacuation of the tube and the gas content of the tube. If the tube contains a considerable amount of gas, part of the excess negative charge on the grid will leak to the filament through the gas itself. In very highly evacuated tubes no such leakage can take place and a grid resistance must be employed. To meet these changing conditions in a tube and the different characteristics of different tubes, a fixed value of grid resistance is insufficient to maintain the tube at its proper operating characteristic. For this purpose Mr. Aubrey R. Goodwin has devised a variable grid resistance, which allows the introduction of the proper leak resistance at will, and, also, an immediate and accurate control of the grid potential and the means for always maintaining the vacuum tube at its proper operating characteristic.

The object of Mr. Goodwin's invention is to provide a device by means of which a vacuum tube may always be kept at its most sensitive operating condition.

How Radio Is Saving Money for Uncle Sam

DURING the month of June, the United States Signal Corps handled by radio 6,102 messages, totalling 218,117 words, which at Government rates for wired telegraph messages would have cost the country $3,742.47; whereas, the total operating-costs of the Army net was only $1,923.67. The total net saving for the month, by using radio, was $1,818.80. As the traffic curve is steadily going up, the annual saving will approach $30,000.

Other Government departments, including the Navy, Shipping Board, and Post Office, are finding that radio is not only fast but inexpensive for official communication. The Post Office Department is constantly reducing its telegraph tolls by use of radio. Besides using 15 radio stations between New York and San Francisco to keep in immediate touch with the progress of its air mail-planes across the country, the department is also using radio for official orders and reports. The cost per word by radio service is less than one-eighth of one cent, according to the Post Office.

In the Navy, radio communication is well known as a money saver; but the operation of the Navy's Radio Piloting Cable in New York Harbor, which is said to save ship operators from $500 to $4,000 an hour, depending on the size of the vessel, is not so well known. Since its installation, this cable—enabling ships to enter port in spite of heavy fogs which occur practically ten days a month, delaying ships a day or more—has saved many thousands of dollars to ship owners and operators.

A Silly Question Answered

IN reply to the question whether the large number of thunderstorms which occurred last month were in any way due to radio, James K. Kimball, meteorologist of the United States Weather Bureau of the Department of Agriculture, replied: "There is no more connection between them than there is between the weather and the cigarette which a man in the street happens to smoke."

The Radio "Colyum"

McSMITH: How's broadcasting these days, Old Top?

McJONES: Pretty slow. Haven't heard anything in a week.

McSMITH: What's the matter? Picked up too much static?

McJONES: N-o-o. Needed twenty dollars pretty badly, so I broadcasted the information.

* * *

William Jennings Bryan, who has been broadcasting his speeches, says we get them all with most appropriate gestures. Even though he is not speaking before an audience, he feels the necessity of punctuating his chatter with emphatic gesticulations which enables him to "put over" what he has to say with a bigger punch.

* * *

AMBITIOUS LAWYER: "Why did you break your lease?"

NERVOUS WITNESS: There was a trombone student overhead, a phonograph next door, and a radio set underneath."

THE COURT (*interrupting*): Case dismissed!

* * *

A Bit from "Life"

Where the radio has it all over the stage is that it enables five or ten million persons to be bored all at the same time.

* * *

Disciple of bucolic regions in Northern Maine says funny papers won't be worth reading soon unless one understands radio.

* * *

IF

(With Apologies to Rudyard Kipling.)

If when everything received is only static—
When "cat calls" drown the music you would hear,
When the "frying" comes in volume unmolested,
When "tube noises" only greet your tired ear.
When your voltage seems to be an awful muddle
And reception sounds like beating on a can—
You can calmly smile and say, "It's too much current."
Then I'll know, my son, you really are a man!

* * *

"I come from a country where the women are so fascinating that beauty talks by radio are absolutely unnecessary!" howls a Kentucky candidate seeking feminine patronage.

* * *

Our Own Broadcasting Station

OUCH for week beginning August 7, 1922

7:01—Hammock Stories, by members of the Flappers' Union. (N. B.—During the remaining weeks of summer, the Bedtime Stories will be discontinued. We believe that what we shall substitute will be just as interesting.)

7:22—Business Talk: "How to Make a Pretzel Factory Pay in Patagonia."

7:47—Anvil Chorus from "The Baldwin Locomotive Works."

8:10—Very Sentimental Ballads (No. 3): "The Darkest Hour Is Just Before the Pawn."

8:30—Historical Reading: "The American People Before Their Liberties Were Destroyed by the Anti-Saloon League."

9:00—Some things we hope radio will soon explain: "Why the nose always itches when the arms are filled with bundles."

9:26—Annual midsummer dance by the Disturbance Sisters—Coal Strike and Railroad Strike.

9:32—Jess Willard angling for a comeback.

9:51—That Coney Island Lullaby: "Just Hit Me With a Hot Dog and Let Me Die in Peace."

10:00—Correct time from the Rahway Rubber Watch Factory.

ROBERT MACKAY.

RADIO WORLD

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ROLAND BURKE HENNESSY, Editor and Publisher, 1493 Broadway, New York.
FRED S. CLARK, Manager, 1493 Broadway, New York.

ASSOCIATE EDITORS:
Robert Mackay Fred. Chas. Ehlert

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Sounding the Sea By Radio Apparatus

THE word "triode" is so new that it has scarcely broken into the news columns. It is the semi-official name of a marvelous little instrument which is the heart and soul of the radio apparatus, and which has come to be more or less familiar to the laymen under the name of "vacuum tube." The triode is so called because it has three electrodes, says Henry Smith Williams, in "The American," New York. The first carrying a looped filament that becomes incandescent, like any electric light bulb; the second, called a "plate," which connects, in the radio apparatus with the telephone ear pieces, and the third, called a "grid," the introduction of which by Dr. Lee DeForest perfected the "electron tube" and made it the wonderful instrument that it is.

These new names are rather confusing, but they are worth memorizing because they refer to the essential parts of what is perhaps the most sensitive energy trap ever devised—an instrument that we shall all hear more about from day to day. As ordinarily used in the radio apparatus it "detects" the absurdly feeble current that comes to the antenna and magnifies it to the range of audibility.

We are told that a single triode can detect a current of ten microamperes—that is to say ten-millionths of an ampere. And an ampere is the unit quantity of electricity, representing a current conveniently small for most calculations outside the radio field. Special combinations of triodes are estimated to be a hundred thousand times or even a million times more sensitive.

All this by way of preliminary, to make intelligible a report that has recently come from Washington to the effect that tests have been made in which a specially devised radio receiving apparatus on a ship has been able to detect and amplify to audibility the infinitely minute waves of sound sent down from the ship to the sea bottom, and reflected thence to the surface precisely as an echo comes back through the air from a mountain-side.

When it is recorded that the sound-signal sent down into the water from the ship may pass to a depth of two or three miles before reaching the sea bottom from which it echoed back, the delicacy of the instrument that can detect the echo will be appreciated.

Merely a scientific experiment, this would have great interest. But the importance of the test does not stop at that. Sound travels through water at a uniform rate of speed (about seven-tenths of a mile per second), and so the time that elapses between signal and echo is a measure of the depth of the water. So a ship equipped with this apparatus may sound the ocean at any time and place. Tests may be made while the vessel is moving at fair speed.

Mr. de Forest's Startling Radio Prediction

DR. LEE DEFOREST, one of America's real pioneers in radiotelephony, has made the startling prediction that there would be 20,000,000 receiving sets in operation in 1927.

Dr. DeForest, a conservative scientist and business man, must undoubtedly have realized the implications of his predictions, says "The Globe," New York. He was probably aware that there are only about 14,000,000 wire telephones in operation, according to the latest available American Telephone and Telegraph Company's statistics, and that the radio sets in 1927 would thus exceed the telephones in use.

Assuming, therefore, that there is a good deal of sound reason behind this startling prediction, as we fairly may, it is interesting to speculate on the situation five years hence. Undoubtedly, Dr. DeForest believes that every family in the United States will, by that time, own and constantly use a receiving set. Consequently, we may believe that by that time broadcasting will have taken over so many every-day functions and perform them so efficiently that it will be considered as indispensable in its way as the wire telephone. All the experiments now being made will apparently be adopted permanently, such as the weather forecasts, market reports, health and beauty talks, public speechs and the countless others.

Radio Most Democratic

RADIO is the most democratic of all forms of entertainment. Tenement dwellers along with scions of wealth enjoy the "music in the air." The man on the farm, the remote camper, the poor boy who has built his own set, the frequenter of the big city's crowded streets, the sailor at sea, the millionaire sitting before his expensive set—all enjoy the same wonderful wizardry of broadcasting's vast domain.

COMPLETE YOUR FILE—You can get all back numbers of RADIO WORLD to date (17 in all) at 15 cents a copy, or the whole 18 for $2.65. Or subscribe at $6.00 a year, $3.00 six months, and we will start subscription with first issue. RADIO WORLD, 1493 Broadway, New York City.

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.

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

Radio Merchandising

Classified Quick-Action Advertisements, 5 cents per word

Telephone Bryant 4796

After the Showdown

THE great "buyers' strike" of 1920-21, a never-to-be-forgotten event in the economic history of this country, proved a point which must henceforth be recognized as basic and incontrovertible.

It was discovered by merchants and jobbers everywhere, in practically every line of merchandise, that it was the trademarked and adequately advertised brands of goods that got the lion's share of the business there was to get, while the preponderant loss of sales fell on the unbranded and unadvertised goods.

This was a great "showdown" for Advertising. Its position as a factor in economic life was on trial. Had it really done what had always been claimed for it? Had it created consumer preference that would hold against the keen competition of a sacrifice price on unmarked goods?

The verdict of the buying public was unqualified. It was not a straw vote to determine popularity. It was the final test of willingness to buy. The ballots were dollars. And the preponderant majority voted with their dollars that they preferred to keep right on buying advertised goods.

With the whole country on a reduced schedule of production and sales, the factories that were able to keep on producing, in anything like normal quantities, were invariably those making trademarked and nationally advertised goods.

All over the country today manufacturers, jobbers, and merchants are giving serious consideration to this important and conspicuously demonstrated fact; the public prefer to buy nationally advertised brands of merchandise. And public demand is the last word in all economic situations. No one can go against it and long endure.

This will mean, then, that more and more manufacturers will seek out ways to make their products worthy of a distinctive trademark and a sustained plan of advertising. It will mean that merchants will more and more give perference in their stocks to advertised brands. It will mean that the jobbers will more and more arrange to supply the merchant with advertised brands.

But new advertisers, manufacturers who are finally convinced that their future lies in the direction of an advertised product, will discover that the magic power of advertising cannot be applied overnight. It may require sustained effort to attain a position of equality with competitors who have been advertising for many years. This will be an unwelcome discovery. But it will be found to be the truth, and will be their only hope of gaining a substantial foothold in what, from now on, must continue to be a more keenly competitive market than we have known for a generation.

Published by RADIO WORLD in co-operation with
The American Association of Advertising Agencies

Improves Audibility of Head Sets

The Radio Mica Products Company, 156 East 43d Street, New York City, is the manufacturer of Mica Diaphrams which they claim, when inserted in head sets instead of the ordinary tin discs, greatly increases the audibility. Mica is a mineral imported from India. It is very resilient and elastic, and gives great amplitude of vibration and, therefore, more volume.

A Correction

Through an error RADIO WORLD neglected to state in the advertisement of the Pioneer Radio Products Company that its French Brunet Head Sets has an ohmage of 4,000. These phones were tested by "The New York Mail" and the New York Edison Company, and were found to be over 4,000 ohms. The Pioneer Radio Products Company is located at 329 East 29th Street, New York, and Mr. Arthur Pudlin is general sales manager.

New Firms and Corporations

Notices in this department are considered as purely interesting trade news and published without compensation to us. We welcome trade news of this nature. All notices having an advertising angle are referred to our Advertising Department, and are placed under Classified Advertising at 5 cents a word, or as Display Advertising at $5 an inch.

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

Melville Boyd for Bailey Electrical Supply Co., 26 Warren St., New York, with bond of $20,000.

Triangle Radio Equipment Co., manufacture machinery, $300,000, Wilmington, Del. (Attorney, Corporation Service Co.)

American Radio Exposition Co., Del., 2,000 shares preferred stock, $100 each; $10,000 common, no par value; Representative, H. Bolster, 120 Broadway, New York, N. Y.

Harlem Valley Electric Corp., to operate in Dutchess and Putnam Counties, $100,000; J. G. Deane, W. Cook, Jr., R. Maiden. (Attorney, Deane & Cook, 15 Park Row, New York.)

Coraco Co., Wilmington, radio, $500,000. (Colonial Charter Co.)

The Niagara Falls Radio Co., 1026 Cleveland Ave., Niagara Falls, N. Y.

Mercury Radio Products Co., $100,000; Edmund B. Osborne, Baynard D. Browne, Myron S. Shields, Montclair, N. J.

Eastern Radio and Electric Co., $100,000; Wilmington, Del. (Attorney, Delaware Charter Co.)

Standard Appliance Mfg. Corp., Manhattan, make radio supplies, $50,000; A. P. Link, A. Hopp, E. Konzelman. (Attorney, R. L. Scott, Jr., 63 Nassau St., New York.)

Picardo Radio Corp., Manhattan, $300,000; M. Halsted, W. T. Little, C. B. Pechtle. (Attorney, W. F. Carell, 16 Exchange Place, New York.)

Radio Leather Goods Co., Manhattan, $5,000; J. Tabashnik, V. Baris, N. Brevda. (Attorney, L. Dinkelspiel, 5 Beekman Street, New York.)

Unsurpassed Credit

IN SPITE of the coal strike and the threat of railway troubles, confidence in the American business outlook remains strong. Conditions have been steadily improving, and the expectation of the shrewdest observers of our economic life is that the betterment will continue and be enlarged. One evident basis for this optimism is the splendid credit which the United States Government is now enjoying. Nowhere in the world is it equaled.

All the Liberty bonds are now selling virtually at par. Few stop to realize the enormous financial transactions of the Government during the past five years. It issued bonds to the extent of nearly $30,000,000,000 and even after the redemptions that have been made, the total gross debt of the United States on June 30, 1922, was almost $23,000,000,000. Those who did not believe that the Government bonds would be worth their face value, and sold them at a sacrifice, now see their mistake. It still remains safe to "bet on the United States."

It is true that the present high price of Government and other bonds indicates an abundance of unused funds, flowing into investments.

Last-Minute Radio News

W. H. Davis, of Pennie, Davis, Marvin & Edmunds, New York, was elected president of the temporary organization of the National Radio Chamber of Commerce at its first convention, held in Washington, D. C., July 26. Dr. L. du Plessus Clements, speaking for Secretary of Commerce Hoover, said: "We have the opportunity to become the leaders of the radio industry throughout the world. It is up to this convention to fulfill the important task of creating a National Radio Chamber of Commerce, so powerful and progressive that the radio industry of this country can introduce American standard supplies throughout the world at American prices. Radio is a coming public utility, even more important than the telegraph and telephone."

* * *

The United States Patent Office announced that it has already issued a thousand radio patents and has nearly three thousand more pending.

* * *

Quite a furore has been raised in Austria by the action of the government in granting a wireless concession to the British Marconi Company instead of to a German firm which offered the same terms. The Socialist press has made this concession a new ground for attack on the government.

* * *

The threatened radio war between two broadcasting stations in Newark, N. J., has been happily averted by one station closing down while the other is operating. The department store of L. Bamberger & Co. (WOR) opened a broadcasting station, but as its operation simultaneously with the high power station of the Radio Corporation of America and the Westinghouse Company would have created confusion, the new station appealed for an hour for its program, but there was no intimation that the other station, WJZ, would close up during that hour. WJZ agreed not to interfere while WOR is broadcasting.

Subscribe for RADIO WORLD. $6.00 a year, $3.00 six months, $1.50 three months.

The Result of Radioed Optimism

THE first radio speech by a person who couldn't deliver it in person was sent out from WJZ, Newark, about two weeks ago. The letters responding to it are still coming in and they are addressed to Nellie Revell.

And those letters break the record for WJZ's responses. Bushel baskets hold them.

You see a clever young woman had thought of broadcasting Mrs. Revell's cheery optimism, but doing it in the second person, so to speak, because Mrs. Revell, tied to her bed for three years now, couldn't stir from the hospital. The rulers of WJZ had objected to the idea at first, fearing all personality would be lost in the vicarious transmittal of the Nellie Revellisms.

They have been converted now and Mrs. Revell has promised that about the first thing she does after she gets up will be to go to WJZ and talk to the farflung radio receivers that nightly, in cottage and apartment, open their ears to the mysterious words from the air.

Whistling Beats Broadcasting

AMERICAN manufacturers of radio broadcasting and receiving devices might just as well pass up the Canary Islands as a market for their instruments, is the opinion of American Consul F. A. Henry, at Teneriffe. There is not a chance, says the consul, particularly on the remote island of Gomera, to compete with the "whistling language" of the natives. The inhabitants of this island, by use of a system of whistling signals, can convey news and information over considerable distances with great rapidity. The system dates back hundreds of years, says the consul's report, consequently radiotelephony is practically unknown.

Common Sense Facts in Regard to Lightning

LIGHTNING is the result of a discharge of electricity between a cloud and the earth. This discharge often amounts to millions of volts, which sounds very dangerous, but isn't, if it strikes somewheres else. Be assured, that lightning is not going to follow you around and seek you out for a little light diversion. It seeks the fastest way out and the shortest way down. If your aerial is properly erected and grounded, it will tend to equalize the electrical strain between the charged clouds over your roof and the earth beneath you, in very much the same way as a lightning protector, or lightning rod.

In other words, a properly erected aerial is a lightning protector and is, therefore, a safeguard, if anything, against lightning. The possibilities of a single-wire aerial as an equalizer between the charged cloud and the charged earth, may not be very great; but it certainly can not, by any stretch of the imigination, be termed an attraction to lightning.

Assume that the electrical energy in a cloud decides to come to earth. A single, No. 14 wire, strung as an aerial over your roof is not going to affect the going or coming of the lightning flash in the least. The entire mass of wire in your aerial won't move a million-volt lightning flash one iota of an inch. It is like trying to use a one-inch horseshoe magnet to draw a locomotive from its rails when it is speeding at sixty miles an hour.

Lightning arresters are of value mainly to protect instruments from the extra heavy current charges caused by excessive static and from high-potential current induced by lightning discharges taking place at a distance. But they offer no protection from a direct bolt of lightning—at least, no more protection than the mistaken idea that an aerial offers attraction.

The similarity between an aerial, properly grounded, and a lightning rod, is sufficient to cause the statement that a good aerial, well erected and well grounded offers the same protection against lightning that a lightning rod does. And this is effected, by the fact that the aerial and the lightning rod both tend to equalize the electrical potentials between the earth and the clouds above, thus preventing, to some degree, the lightning flash caused by the difference in potential between the earth and the clouds immediately above.

A. M. S., Does Good Work

THE Air Mail Service is doing some wonderful pioneer work, despite the fact that Congress has been extremely niggardly in allotting appropriations to that important radio branch. It is laying the foundation for the future commercial air transport that will revolutionize physical communication in this country. In addition to this, however, it is also developing the most modern form of instantaneous communication which will materially aid in removing the last remaining preventable cause of aircraft danger.

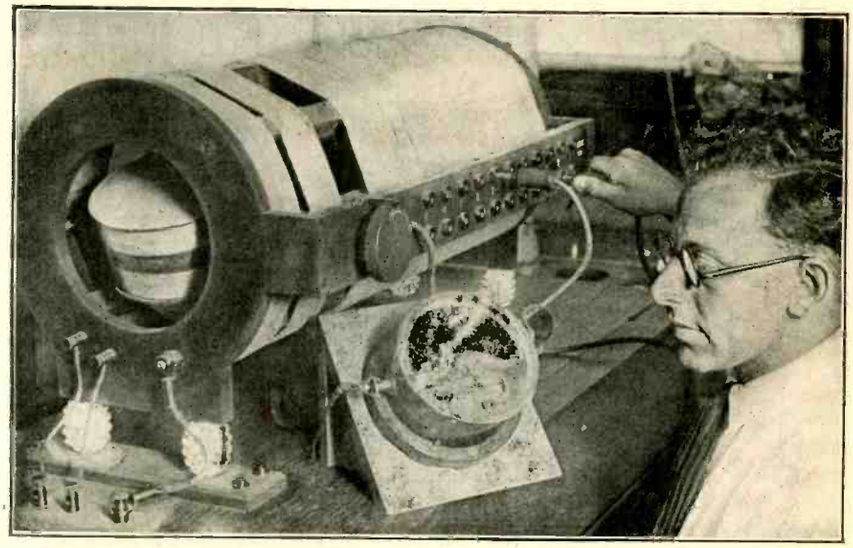
Radio's Great Field

RADIO communication and the radio transmission of power offer a great field for experiment. The ether holds a secret which is yet in profound darkness. Some even say that there is no ether. What is it, then, that carries these extremely useful impulses that we call waves? The solution of this problem may unlock material that will enable all the present difficulties to be understood and surmounted. Let us work to this end.—Kenneth M. Swezy in The Globe, New York.

THAT ARMSTRONG AMPLIFIER

So much interest has been displayed in the special article, "TESTED INVENTION OF MAJOR ARMSTRONG AMPLIFIES 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, $6.00, for one year (52 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, New York.

C. C. of N. Y.'s Big Tuning-Coil



(C. Kadel & Herbert News Photos.)

This is the enormous tuning coil in use at the College of the City of New York. Mr. S. C. Miller is securing the highest output from the aerials.

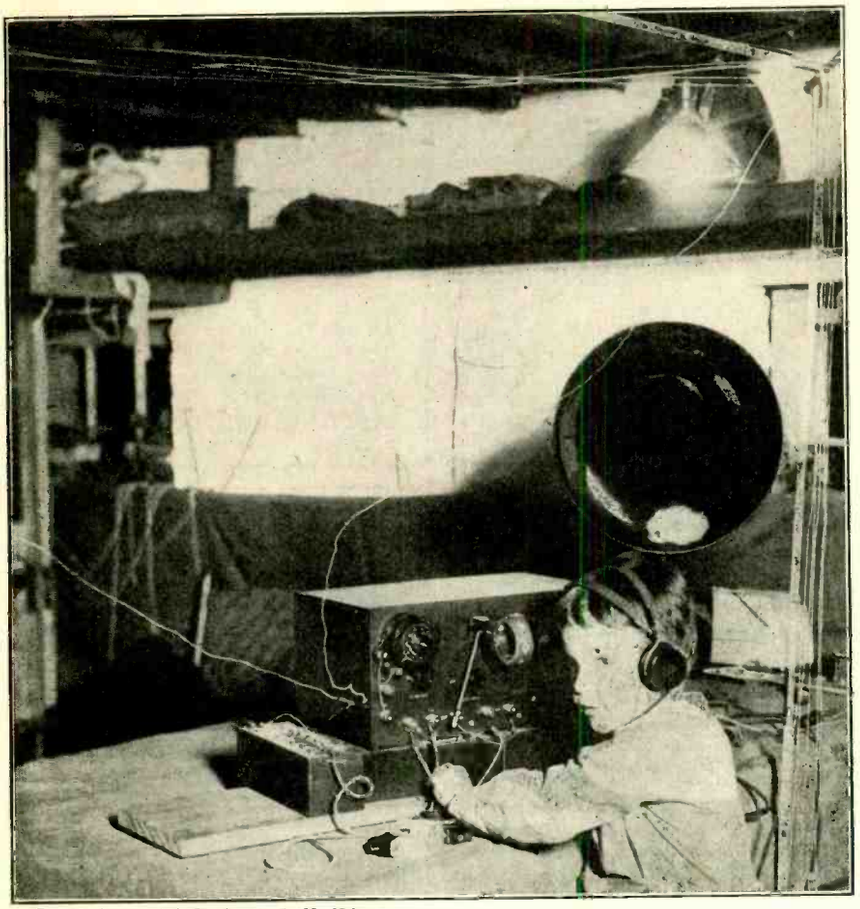
A New "S. O. S."

IT is probable that, in the near future, the "S. O. S." will cease to be the universal distress signal for ships at sea. The Marconi Company is experimenting with a mechanical apparatus for an automatic alarm signal. The "automatic alarm" is operated by four dashes of one second, each repeated three times, which, when received by a special electrical apparatus, will ring alarm bells on the ship. The apparatus allows a margin of error of half a second either way, so that, if the four dashes are sent in three and a half or four and a half seconds, the alarm bells will still be actuated. Successful results have been achieved already to a range of over 100 miles, which, in the case of the cargo steamers for which the new alarm is particularly intended, represents about eight hours' steaming. Ten ships fitted with the new apparatus are at sea, and the apparatus has been installed in one vessel in each of twenty-five steamship lines. The British General Post Office is joining in the experimental tests. The demand for a new distress signal has come chiefly from cargo steamers. At home, all vessels of over 1,600 tons, and some under, are by law required to be fitted with wireless. These include an enormous number of cargo vessels, and, although in the case of large liners the wireless traffic is sufficient to employ three operators working during the twenty-four hours, in the case of cargo boats one operator is often sufficient to deal with ordinary routine wireless messages. It is to eliminate the wastefulness of employing special "watchers" to receive a possible distress signals that the Marconi Company has been working at the new automatic alarm.—"Ship and Engineering."

Radio Men Eat Fresh Meat

THE life of the personnel of the Naval radio-compass stations is often slow and monotonous; but during the week of July 3, the radiomen at Folly Island, NZV, led a strenuous life. Due to their own prowess, they were provided with fresh meat for a week, according to a report received by the Navy Dpartment. A number of the men stationed on this island, about 8 miles off North Carolina, indulged in a rare sport of landing a 410-pound turtle which contained over 300 eggs. At the same time, other radio fishermen caught sixty-five pounds of game bass, which obviated the necessity of eating "canned willie" and "gold fish" that week.

Even Little Boys Listen In



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

This is not an unusual photograph. It was the little fellows who first made radio popular. They take to it with a particularly natural fervor. This youngster, only five years old, can tune it—just as well as his dad.

May Broadcast Niagara

THE falls of Niagara can be heard only ten miles away under atmospheric conditions favorable for the transmission of sound, while the Hertzian waves of the wireless extend completely around the earth and on into the infinite. In 1896, just at the time Marconi was making his first attempts to span the Atlantic with wireless, the roar of Niagara was transmitted to an electrical exposition in New York by the telephone. The event was heralded as one of the greatest achievements of the time. Twenty-six years have passed and it is safe to say that it soon will be possible to broadcast "The Thunder of Mighty Waters" by radio so that it can be heard in any city in Europe or in the Orient at the same time the deep rumble is heard in the gorge at Niagara.—"The Times," N. Y.

Little Tube Does Big Work

IT is not always the big machine that performs most efficiently. The great Alexanderson alternators used in the transoceanic radio-stations are marvels of workmanship and masterpieces of engineering design. They stir into being the great ether impulses that swing out across the watery wastes in the twinkling of an eye. Their ponderous rotors whirl about with appalling speed, and one can scarcely think in their presence. The tiny glass-incased vacuum tube can do all of the tricks of the big alternators. Silently, yet with marvelous efficiency, the little vacuum-tube can generate the rapidly alternating currents that are necessary for wave propagation. Only one thing has prevented the vacuum tube from taking the place of the Alexanderson alternators—ability to handle sufficient current. Now Langmuir of the General Electric Company's laboratories, who knows more about the actual physics of the vacuum tube than any other man living, announces the invention of a new tube that will allow great volumes of current to pass. This tube has numbered the days of the big alternators. In the near future twenty little glass bulbs on a shelf will do the work that is now done by twenty tons of steel and wire.—"The Evening Mail Radio Review."

Radio Train Records

EDITOR, RADIO WORLD: Referring to the article appearing in your publication No. 16, dated July 15, "Fast Frisco Train Makes Radio Record," by Robert M. Reed, Radio editor, "Daily Oklahomian," I quote the following paragraph:

"The most remarkable thing about the tests made on the Frisco is that they were received for more than ninety miles from a broadcasting station with only a 20-watt set, while the Lackawanna in an earlier test used a 100-watt set and received only from twenty-five miles distance from the broadcasting station. So clear were the signals received on the Frisco trains, with only two stages of amplification, that it was almost impossible to remain comfortable in the car."

For your information, a 15-watt transmitting set (instead of 100-watt outfit), was used on the Cornell Special, April 5, 1922, with antenna only 14 to 18 inches from the roof of the car. As to the distance broadcasting was and is being received from transmitting stations, WGY at Schenectady, New York, was heard so loud just outside of Ithaca, New York, on a Magnavox loud-speaker, April 5, a distance of approximately 140 miles by "air" line, that it was necessary to shut down the instrument in order to be heard comfortably.

At the present time, when late concerts are broadcasted from WGY at Schenectady, same are heard from Delaware Water Gap, Pennsylvania, a distance of about 100 miles in a straight line from Schenectady, and Anacosta Station, District of Columbia, is heard frequently on regular equipment now being used on Lackawanna Train No. 12, from Mt. Morris, New York, which is a distance of approximately 200 or more miles in a straight line.

Further, in 1914, wireless 'phone conversations were conducted between the Lackawanna Limited at Scranton, Pennsylvania, and a receiving station at Binghamton, New York, a distance of 60 miles.

These distances can and will undoubtedly be bettered, according to transmitting set used by broadcasting stations in the future; but I am merely giving this to you for your information, as I have been on the stations.—A. J. Rubin, Boonton, New Jersey.

News May Be Radioed to Country Newspapers

ONE very practical use to which radio will probably be put shortly, says "The Globe," New York, is the dissemination of news among country newspapers. One of the most serious problems which many of the journals in the smaller towns have to face is the purchase of outside news by wire, which is frequently beyond their means, or to secure the same news through delayed channels, putting their readers many hours behind more fortunate sections of the population.

This difficulty could be readily overcome by the translation of the news bulletins by wire to central points all over the country, whence they could be brodacast over their respective areas and put into print almost simultaneously with the metropolitan journals.

News sent out in this way would, furthermore, not conflict with the ordinary broadcasts since they could be sent out on high wave lengths, and the bulk of it would undoubtedly travel during hours when the air is comparatively free, from 12 P. M. to 12 M.

The psychology of the reaction of a large body of people to public events is a subtle thing, and by no means completely understood as yet, but it is fairly certain that in so large a population as ours immediate access to the same news sources is highly desirable if public opinion is to be made free from sectional prejudice. Inadequate and delayed information has frequently been a harmful weapon in the hands of the demagogue.

Telegraph Supplements Radio in Army Net

PROBABLY for the first time since the advent of radio as a practical means of communication, line telegraphy is literally taking a back seat, aiding the Signal Corps Radio Communication Service only from main centers to its outlying stations.

To-day, when a message for an Army post or station is filed at the message center in Washington, it goes by radio and saves the Government money; but some of the smaller posts are not yet equipped with radio and, for that reason, messages for those points are relayed by line wires.

If for any reason a radio station is out of commission, or static interferes, the telegraph again takes up the communication and forwards it to its destination.

13 New Broadcasters

THIRTEEN limited commercial broadcasting stations were licensed during the week, July 17 to 22 inclusive. They are as follows:

WIAB—Joslyn Automobile Co., Rockford, Ill.

KFBC—W. K. Azbill, San Diego, Calif.

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

WIAK—The Stockman Journal, Omaha, Nebr.

KFAU—Independent School District, Boise City, Idaho.

WHAT—Yale Democrat, and Yale Telephone Co., Yale, Okla.

KFAT—Dr. S. T. Donohue, Eugene, Oregon.

KDPM—Westinghouse Electric and Manufacturing Co., Cleveland.

WIAJ—Fox River Valley Radio Supply Co., Neenah, Wisc.

WIAI—Heers Stores Co., Springfield, Mo.

WIAH—Continental Radio Manufacturing Co., Newton, Iowa.

WHAY—Huntington Press, Huntington, Indiana.

WHAX—Holyoke Street Railway Co., Holyoke, Mass.

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

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS

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

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

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

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

SALESMEN—To call on Radio Dealers. Splendid opportunity. Liberal commission. Write EDW. J. GOETZ CO., Distributors, Cambridge Bldg., Cincinnati, Ohio.

High Grade Antenna Wire. Best quality 7 strand No. 22, tinned copper, non-corrosive antenna wire. Only 1c. per foot. The Kehler Radio Laboratories, Dept. W., Abilene, Kans.

ATTENTION RADIO DEALERS and AMATEURS Why pay $0.75 or $1.00 for HEAD PHONE CORDS? Send us 40c. in coin and we will send you a finely braided complete HEAD PHONE CORD, Postpaid. All orders filled in turn. New England Braiding Co., Calendar St., Providence, R. I.

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

ARMSTRONG SUPER-REGENERATIVE CIRCUITS. Wonderful results in R.F. amplification from only two tubes, instead of six or eight. These circuits will not work unless you know constants and all apparatus used. Complete tested diagrams containing all hitherto unpublished constants and full instructions for fifty cents. R. I. Co., Red Bank, N. J.

TESTED Galena crystals, 25c.; Phone Condensers, .001 MFD, 17c.; Grid Leak and Grid Condensers, .0005 MFD, 25c. BUSCH-MURPHY, 105 Mason St., Rochester, N. Y.

CRYSTAL DETECTOR SET, from aerial to phones, complete. Big bargain. Send for circular. Salkey Radio Co., 2378 Eighth Ave., New York City.

LOOK—Single Tube Receiver, mounted on panel, ready to wire, $18. J. N. RISTEY, Spring Grove, Minn.

FOR SALE—Immediate Delivery! 750 Sheets Aluminum, size 0.24-11-72. LOGAN MACHINE CO., 222 S. Clinton St., Chicago, Ill.

SPECIAL—High Grade Variometers, $4.65 and $5.20; Variocouplers, $4.65 and $4.95; Composition Dials, 75c.; Headphones, $4.90; Rheostats, $1.18; Switch Levers, 45c and 60c.; Switch Points, 3c; Binding Posts, 6c and 9c; Condensers, 11 Plate, $2.85, 23 Plate, $3.80; Bakelite Sockets, 72c; Best Composition Insulators, 22c; Lightning Arresters, $3. Include postage with order. J. N. RISTEY, Spring Grove, Minn.

AMATEURS, ATTENTION! USED APPARATUS!—Audion, complete with bulb and battery, $10.00; Adams Morgan Variable Condenser, wood case, $2.50; Murdock Variable Condenser, .001 mfd., $3.00; Arnold Loose-Coupler, $10.00; Short Wave Receiver, 200 to 800 meters, fitted for audion bulb, etc., $15.00; Klitzen Rotary Gap, $15.00; Half K. W. Packard Transformer, unmounted, $10.00; Holtzer-Cabot Headset, 2,200 ohm. (new), $6.00; Swedish-American Headset, 2,200 ohm. (new), $6.00; 2-inch Spark Coil, $5.00; Stationary Gap, 50c; Regenerative Tuner, consisting of two variometers and vario-coupler, mounted on handsome brown hard rubber panel in walnut finished case, hand rubbed. This tuner is a beauty in appearance and performance. $25.00. First money order takes them. Do not delay! L. M. SMITH, Box 66, Salem, Wis.

43 PLATE CONDENSERS, $3.95; Rheostats, 95c; 7-Strand No. 22 Tinned Antenna Wire, 90c per 100 ft.; Manhattan Head Phones, $6.00; Tested Galena, 20c, mounted, 30c; Contact Points, 30c per dozen; Complete Crystal Sets, with Aerial Equipment and Manhattan Head Phones, $12.50. Postage paid to second zone. Write for prices on parts not listed. COLUMBIA RADIO COMPANY, P. O. Box 1720, Washington, D. C.

RADIOISTS—Send for literature describing Vosco Tunette. Compact, simple, efficient tuner for radiophone reception. Broadcasts heard hundreds of miles. Panel or table mounting. Price, $5.00. VOSCO RADIO LABORATORIES, Troy, Penna.

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AUDION RECEIVERS, regular price, $32.50, reduced to $25.00 for short time. Wave Length, 200 to 800 meters, Variable Condenser, two Ten Point Switches, Socket, Dials, etc. Mounted on Mahoganite Panel in 8 x 9 x 6 Mahogany Finished Cabinet. Shipped prepaid upon receipt of money order. Every set guaranteed. Stamp for descriptive circular. GIBSON & COLLINS, 515 Evergreen Avenue, Brooklyn, N. Y.

SALE OR EXCHANGE—New Clapp-Eastham Loose Coupler. Retails $14.00. Best offer gets it. FRANKLIN CAMPBELL, E. Wakefield, N. H.

TWIN S CRYSTALS—The Super-Sensitive Crystal. Sold with a money back guarantee. Pair, 25c. 500-mile Regenerative Plan Free. NELSON MFG. CO., Interurban Bldg., Dallas, Texas.

RADIO ONE-STAGE RECEIVER—Not wired, 6/21 Cabinet and Formica Panel with holes drilled. Only $29.50. You save half. MIDWEST RADIO CO., 1110 Washington, St. Louis.

PRICES SLASHED on Standard Headsets and Supplies. Radiotron Detectors, $4.48; Amplifiers, $5.88. Variable Condensers, 23-Plate, $1.75; 43, $2.35. Transformers, $3.75. State wants. Stamp Please. WAGNER NOVELTY CO., Delphos, O.

EXTRA SELECT GALENA CRYSTALS—Two ounces for fifty cents. Enough to make fifteen crystals. Direct from Kentucky mines. Order today from CASSADY & CASSADY, Marion, Ky. Dealers, write!

WANTED—Men over 17. $135-$195 month. Railway Mail Clerks. List positions free. FRANKLIN INSTITUTE, Dept. H-151, Rochester, N. Y.

REGENERATIVE RECEIVER, $25.00. JOHN HAMMOCK, 3743½ Nicollet Avenue, Minneapolis, Minn.

BUILD A 500-MILE REGENERATIVE RECEIVER FOR $15.00. Plans 10c with catalogue of Radio parts. NELSON MFG. CO., Interurban Bldg., Dallas, Texas.

PUT PEP INTO YOUR RECEIVING SET with my Newtype Fixed Condenser. Used by 10,000 amateurs in Detroit. Price, in wood container, 35 cents. Taped only, 20 cents. Big discount to jobbers and dealers. KORREK RADIO CONDENSER CO., 3389 Warren Avenue, East Detroit, Mich.

A BROADCASTING MAP of the leading broadcasting stations of the country was published on the center page of RADIO WORLD dated May 20. Mailed on receipt of 15c., or send $3.00 for six months, or $6.00 for a year, and start your subscription with May 20 issue. RADIO WORLD, 1493 Broadway, New York City.

Functions of Reception

MOST radio enthusiasts know that there are various types of apparatus for the reception of radio broadcasting. Some of these sets are more sensitive than others. Sensitivity, in the sense we apply it to receiving sets, is a quality analogous to power in transmitting apparatus. Most receiving sets have five distinct functions: intercepting, detecting, tuning, amplifying and reproducing. It will be helpful to us later when we consider receiving sets as complete units, if these functions are understood.

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Double Radio Service for New Apartment House

A CHOICE of "listening in" to either of two programs being sent out by the big broadcasting stations will be a feature of a unique radio-system being installed in a seventy-two-family apartment house in Newark, New Jersey, by the Davis Electric Company. Two complete receiving sets will be installed, each with a large loop, or directional aerial.

A special radio-room in charge of a licensed operator will house the equipment. From this room will emanate two complete circuits connected to each of the seventy-two apartments and so arranged that the tenant may plug in his receiving set to whichever of two programs he may prefer. The apartment operator will tune in each evening to the two stations that offers the best programs or are heard the clearest. In this way, the tenants will be able to enjoy the best in the ether each night with the least trouble.

Two complete G-E receiving sets, of the type furnished by the Radio Corporation of America, each equipped with a detector tube, two stages of audio and two steps of radio frequency, will be installed.

A Vote for Phonograph Dealers

EDITOR, RADIO WORLD: In reference to your "Service Will Decide" question, page 22, RADIO WORLD, No. 116, dated July 15, I would certainly second the motion of the editorial in "The Evening Mail," in regard to phonograph dealers handling the bulk of the radio business in the near future. First of all, as young as the radio game is, you will notice that some of the high-class sets have, to all outward appearances, a phonographic appearance in regard to case, etc. It is only a question of time when most every radio will be twin to a phonograph.

Phonograph on one side and radio outfit on the other—or an upright machine some space that is now used for records. There is no question that radio and the phone yet go hand in hand.—JACK COGGIN, Brooklyn, N. Y.

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.

ANNUAL SHOW OF THE ST. LOUIS RADIO ASSOCIATION, St. Louis, Mo., October 4 to 7, inclusive.

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

INTERNATIONAL RADIO EXPOSITION, Grand Central Palace, New York, December 21 to 30.

KANSAS RADIO EXPOSITION will be held at the Kansas State Fair, Hutchinson, Kansas, September 16 to 22 inclusive. A. L. Sponsler, Secretary.

MERCHANTS' COOPERATIVE ADVERTISING AGENCY RADIO SHOW, Robert Treat Hotel, Newark, N. J., October 4 to 7, inclusive.

"RADIO DAY," Pittsburgh, Westview Park, August 24. Under auspices of Radio Engineering Society. C. E. Urban, secretary.

RADIO CLUB OF AMERICA. First autumn meeting will be held the last Friday in September. Renville H. McCann, secretary, Columbia University, New York.

CLEVELAND RADIO AND ELECTRICAL EXPOSITION, Cleveland Public Auditorium, Cleveland, O., August 26 to September 4, inclusive.

CINCINNATI RADIO-AND-ELECTRICAL EXPOSITION, Music Hall, Cincinnati, O., October 2 to 7, inclusive.

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What It Is and How to Control It

CONSTRUCTION OF SUPER-REGENERATIVE RECEIVERS

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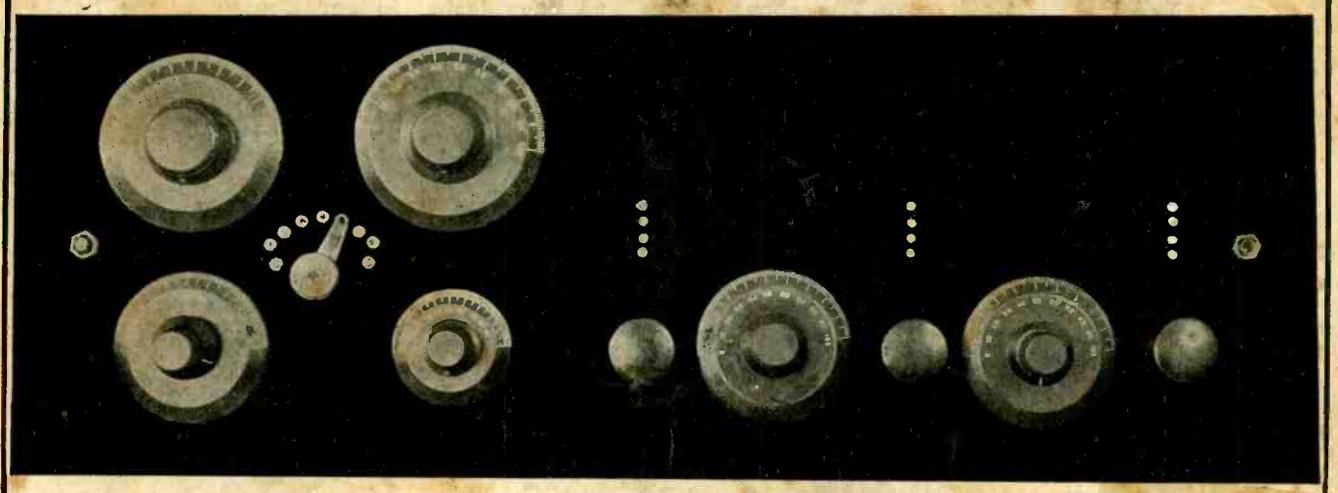

Front view of the second set constructed. This receiver employs three tubes and gives very high amplification.

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All parts, for three tube set, including Bakelite panel, necessary for assembling the above, packed in a neat box with complete and detailed instructions.

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