RADIO FIRST TO REPORT JAPANESE DISASTER (See Inside)

15c. a Copy September 15 $6.00 a Year

RADIO WORLD

Title Reg. U. S. Pat Off.

ILLUSTRATED EVERY WEEK

COMMISSIONER OF NAVIGATION IS ALSO CZAR OF THE ETHER

(C. Keystone View Co.)

D. B. Carson, Commissioner of Navigation and director of the United States radio service, who might be known as the radio detective. He supervises all radio sets in this country, except those used for receiving. He has full control of all transmitting stations. His job is a big one, and is growing bigger and more important every day.

PLANS FOR WORLD RADIO EXPANSION (See Inside)

This Summer Has Shown That Radio Is Not Seasonal

THIS summer has demonstrated that radio is not a seasonal interest and pleasure. It has been commonly supposed that warm weather seriously interfered with reception and this belief has, in the past, lead many to hang up their headphones from May to October.

It is true that static sometimes interferes and that long distance records are not as frequent in summer, but successful reception can be obtained from stations within 500 miles on all but a very few evenings.

Letters received by WGY, the Schenectady, N. Y., broadcasting station of the General Electric Company, indicate that the programs have given real pleasure to vacationists at the shore and in the mountains. The radio public has made the radio set a necessary part of its vacation equipment. It is not unusual, on camp sites, to see the tourist rig up his receiving set soon after the tent is erected for the night. The evening campfire becomes more attractive under the sway of music provided by some distant station. Summer hotels have included radio sets among their attractions and many dances are held to radio music.

Sixty-five Boy Scouts, camping at Stewiacke, Nova Scotia, heard WGY during their two weeks camp, according to a letter recently received at the station. "We are using a homemade set," wrote the camp radio operator, "with two stages of amplification and a loud speaker with no power amplifier. Using this set we are all able to hear, in fact the music may usually be heard a hundred yards around the radio tent. Modulation is extremely good."

Ivan H. Walker, of Ottawa, Canada, wrote WGY complimenting the station on the broadcasting of the play "The Royal Mounted," which came through "clear and distinct." Mr. Walker explained that he was camping with a party. "We have our set with us and are getting excellent results with no interference from others tuning in. All one has to do is to get tuned in and then sit back and enjoy everything."

John P. Badger, a Malone, N. Y., attorney, informs WGY that he moved his radio set to his camp in the Adirondacks, eight miles south of Malone, expecting that he would have trouble in receiving. "However," he explains, "although the aerial is strung among the trees and the ground is full of minerals, your station comes through the loud speaker as clear as a bell."

Italian Broadcasting Soon

AN agreement between a number of Italian radio manufacturers whereby a broadcasting station is to be constructed and put in operation has been announced. Up to the end of July there had not been any regular broadcasting in Italy.

VOLUME THREE OF

RADIO WORLD

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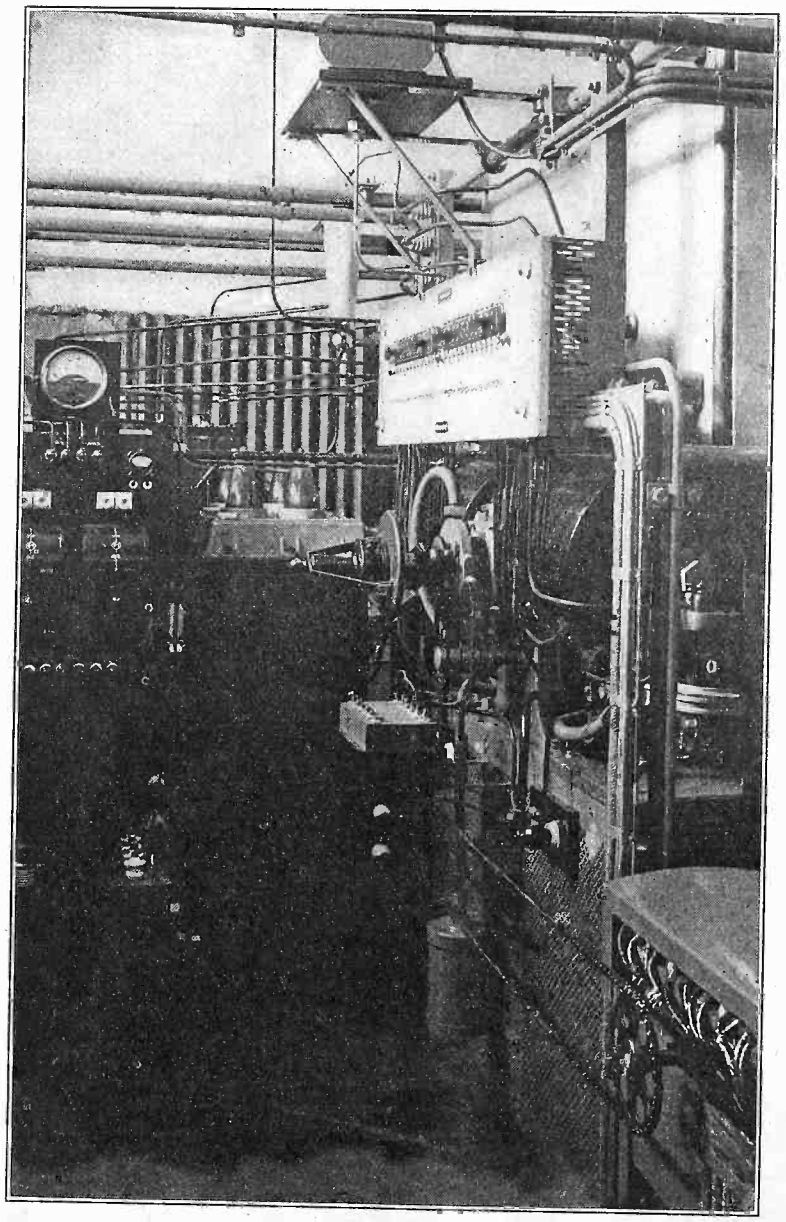
A 10 KW Lorenz-Poulsen Arc Transmitting Station

By Dr. Alfred Gradenwitz

AFTER recently undergoing a number of important improvements, the Königswusterhausen Wireless Station, formerly used for military purposes, has been converted into a big commercial station, operated by the German Postal Department. Of its two Lorenz-Poulsen arc transmitters of 10 KW and 32 KW respectively, it is intended here to describe the former, which may be considered a model installation of its kind, and which under economic conditions enables a thoroughly efficient and reliable permanent service to be maintained. Before proceeding to describe this installation, the fundamental characteristics of an electric arc wave generator may be summed up as follows:

The conversion of continuous current energy into high-frequency current energy is greatly assisted by the electric arc being produced in an atmosphere of hydrogen or some gas containing hydrogen, the great ionic speed of which causes the voltage along the arc to be altered and thus the cathode fall used for heating the negative crater to be reduced. On the other hand, a magnetic field at right angles to the current (or a "magnetic blower" as it is termed) is caused to act on the electric arc, which then constitutes a shifting conductor in a magnetic field of force, the arc being deflected or even blown out entirely. Provision is also made for the electrodes slowly to rotate round their axes, thus enabling fresh portions of these electrodes to be burnt and insuring a uniform consumption of carbons, as well as a constant length of arc.

Inasmuch as the arc current and the magnetic field arranged in series are dependent on one another, arc regulation takes places quite automatically, fluctuations in the electric arc being reduced to a minimum.



Rear view of Lorenz-Poulsen 10 K.W. Transmitter.

Special features adopted in connection with the Königswusterhausen transmitter comprise:

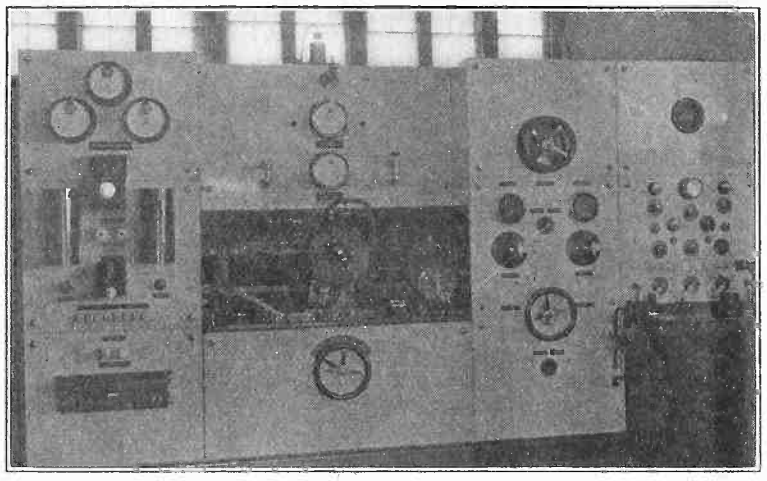
Separate excitation has been adopted side by side with the self-excitation of the magnet coils, thus avoiding any disturbing noises in the arc. Moreover, the positive electrode is a rapidly rotating copper electrode cooled by flowing water, the negative carbon electrode rotating at a slower rate in an opposite direction. A reliable intermediary circuit was inserted with a view to improving the tuning capacity of the transmitter and eliminating upper harmonics. A new wireless telephone method was finally adopted.

The new 10 KW Lorenz-Poulsen transmitter is worked within a wave range of 2,600-9,000 meters at a primary tension of 650 to 800 volts and is connected up to 3,000 c/m. antenna in the case of the shorter waves, and to an 8,000 c/m. antenna in the case of the longer waves. The maximum load on the generator in waves, and to an 8,000 c/m. antenna in the case of the longer

waves. The maximum load on the generator in permanent operation is 50 amperes direct current.

The wave generator, the direct current and high-frequency switches as well as the telephone apparatus are installed on an iron tube frame, comprising four panels.

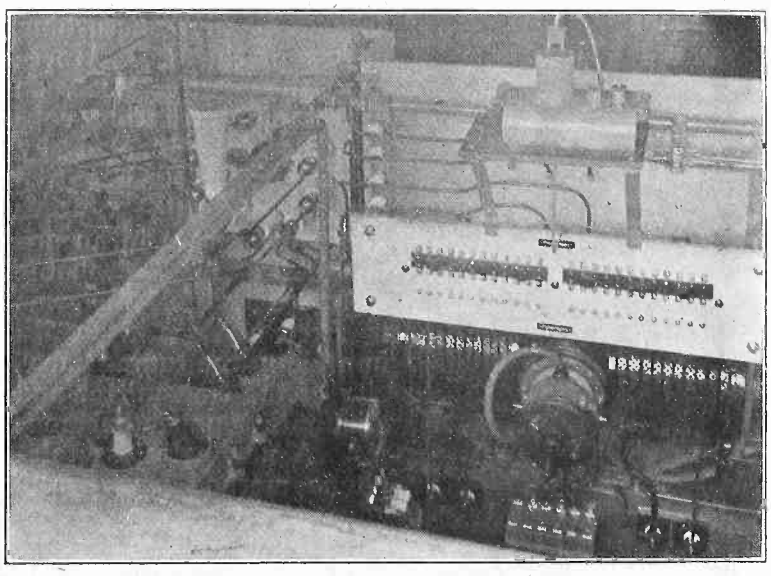
The direct current panel, which in turn consists of



10 K.W. Lorenz-Poulsen telegraph-telephone transmitter.

three marble switchboards, carries on the top the ammeter for the separate excitation of the magnetic field, as well as an ammeter and voltmeter for the current feeding the generator. The central switchboard comprises the block relays, a double-pole switch-out for high tension, and one for low tension, as well as several fuses and rotary switches.

The generator panel is arranged between two marble switchboards, the top one carrying to the left the water-flow controller, and to the right an alcohol controller, as well as two ammeters controlling the intermediary and antenna circuits respectively. A regulating resistance consisting of a resistive band kept together by an asbestos fabric is varied by degrees by



Back of central part and left side of 10 K.W. Lorenz-Poulsen telegraph-telephone transmitter.

means of a large handwheel, and enables the current intensity in the electric arc, and accordingly, the radiated energy, to be altered between its normal figure and one-third its normal figure.

The high-frequency switches are arranged on a similar three-sectioned switchboard, the upper marble switchboard carrying the handwheel for operating the antenna step switch, while the central switchboard comprises tuning apparatus for the antenna and intermediary circuits. A switch enabling a variable coupling to be obtained between the intermediary circuit and the antenna as well as the switch for transmitting with or without the intermediary circuit are provided on the central switchboard. A selective switch for passing from telegraph to telephone operation and vice versa is arranged on the lower switchboard.

The fourth panel likewise comprises three sections, the top one carrying the oscillation controller and the central one the various instruments and handles for operating the telephone apparatus, while a small table carrying on the left the wave controller, is installed immediately in front of the lowermost section.

The Lorenz-Poulsen generator comprises a flame compartment, 12 magnet coils, an alcohol dropper, the cooling device and the ignition. The flame compartment containing the wave generator proper is a metal casing in which the electric arc is burning between two electrodes.

A double-walled water-cooled sleeve disposes of the considerable heat thus produced. The carbon electrode is kept by a carbon-holder surrounded by a sleeve and carried along in its rotation by friction. The magnetic field in the midst of which the electric arc is burning is produced between two iron cores penetrating sideways into the flame compartment. The north pole will be found to be to the right, and the south pole to the left of the looker-on, the current thus flowing away from him, while the electric arc, being a current-carry-

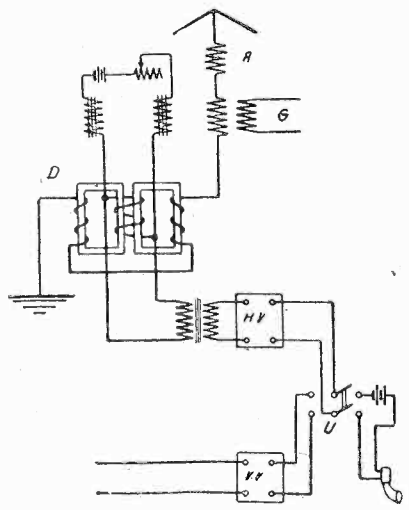


Diagram of Connections Used in Radio Telephony — G, Poulsen high-frequency generator; A, antenna system; D, choking coil referred to in the text and comprising separate iron cores; Hv, two-valve main amplifier which in the case of speech or music immediately striking the microphone is quite sufficent; VV, a one-valve preliminary amplifier inserted in the case of remote action on the microphone; U, a switch for passing from one service to the other.

ing conductor, is blown upward. The cores are made of Swedish ingot iron and are closed magnetically by an iron bow below the flame compartment. Six magnet coils are provided on each of the iron cores. The alcohol dropper supplies the alcohol required for forming a hydrogen atmosphere through an apparatus where the liquid owing to very high temperature is evaporated. The water required for cooling the flame compartment is derived from the water supply.

The electric arc is lighted by pressing the front carbon electrode with the hand against the back one, thus short-circuiting the electrodes. A spring on the carbon holder immediately throws the front electrode back again, thus allowing the electric arc to form. Immediately after lighting the arc, the short-circuit relay for short-circuiting the series resistance of the arc is operated.

The variometers, in conjunction with the transmitter coils, are used for continually bridging the stages provided by the sub-division of the transmitter plant in passing from one wave to the other, and in obtaining an accurate tuning. They are made up of two cylinders rotating within one another, the coils of which are arranged in series, and are placed in an oil bath, to prevent excessive heating.

The transmitter coils (two for the antenna and two for the intermediate circuit) in conjunction with the

(*Concluded on next page*)

Electrical Imp Plays with Radio Aerials

HARTFORD, Conn.—Electrical imps play strange pranks with the ether, but engineers connected with the local lighting plant have just about given up their search for a particularly vicious specimen which has been annoying broadcast listeners whose aerials are adjacent to a five-mile series lighting line.

A weird sound, described in electrical terms as a "60 cycle roar," pounds into their receivers at the most unfortunate times and even the programs from nearby broadcast stations are tangled up in a boiler factory medley that drives them from the phones. And there is no let-up to the racket.

After complaining to local dealers that their receiving sets were no good, and being assured that they were in first class condition, scores throughout this section appealed to the American Radio Relay League and the local electric light company.

A tiny loop set, operated by officers of the League, revealed the interference as coming from the power line. When the generators were shut down for a few minutes as a test measure, the roaring noise vanished, proving conclusively the source of the trouble.

An examination of the transformers showed them to be in perfect working order and a night investigation revealed no sparking. The "best line in the system" was what the engineers reported, but those who try to hear KDKA through the electrical brass band are not so easily appeased and threaten all sorts of things. A freak line, sure enough, say the listeners while the imp continues to disport with their antennae.

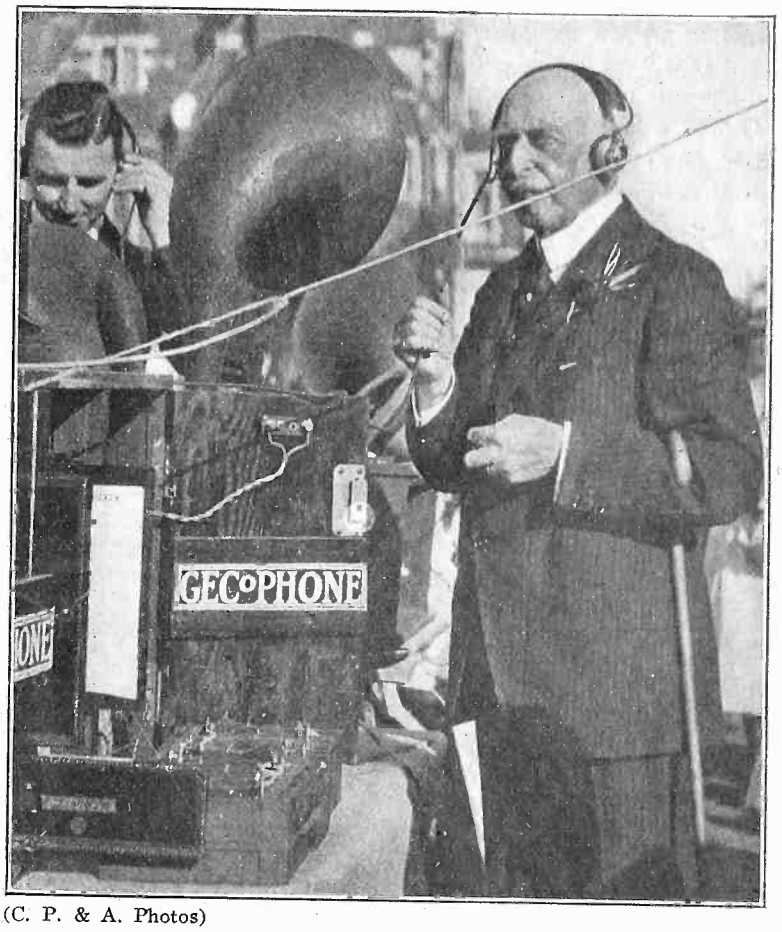
Royalty Listens In

RADIO has been very slow in taking hold, in England, mainly because of the fact that the British Government has put restrictions on it as to what type of receiver should be used, and the conditions under which it could be used.

For that reason, radio has not been as popular in the British domain as it might have been. Even at that, restricted as it is, it has struggled and struggled to the fore until at the present time the British Government has allowed broadcasting stations to be opened and has looked in a more kindly light than formerly upon the "radio listener."

The illustration opposite shows the Duke of Connaught, one of England's royal family, listening in on a Gecophone, an English set, at Bagshot Park, his Surrey home. The set was installed and radio heard for the first time at that particular place. It is not known whether the installation was permanent or not, but if the English "radio bug" bites with the same infective spirit on that side of the water as he does on this, a safe supposition would be that if the installation was merely a demonstration, that it would soon be a permanent one.

Handicapped as our English brothers are in radio, they are making rapid strides. And as they seem to be taking hold in good style, it is hoped that we may soon be able to hear of some revolutionary experiments that have been worked out, as a result of their restrictions.



(C. P. & A. Photos)
The Duke of Connaught listens in through a British receiver.

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variometers, serve to adjust the wave length, and are connected up in series with the variometers, any wave length betwen 2,600 and 9,000 meters being readily adjusted for by means of convenient sub-divisions.

The radio telephone apparatus is worked on the Pungs-Gerth system of magnetic control of the high-frequency current, which can be used in connection with any continuous wave transmitting scheme. It is based on the following principles: As a coil comprising even a finely-subdivided iron core is traversed by high-frequency current, the amplitude of the latter, on account of losses by hysteresis and eddy currents, is practically reduced to zero, the choke acting like a high resistance inserted into the high-frequency circuit. This damping effect of the iron can be compensated more or less by superimposing a direct current saturating the iron more or less and thus making it less effective magnetically. The high-frequency current can thus be altered within very wide limits by altering the direct current magnetization.

This arrangement enables a very considerable relay effect to be produced, great amounts of high-frequency energy being controlled by comparatively small amounts of direct current energy. The choking coils consists of two cores closed through iron and carrying a common direct current coil as well as two separate high-frequency coils, which are so arranged as not to produce any high-frequency tension in the direct current coil. A standard postoffice microphone responding to 1/100 KW is used, a two-valve or three-valve amplifier being inserted between it and the antenna, to control a nearly one million times higher amount of energy. This arrangement enables both speech and music to be rendered with practically absolute faithfulness, producing the illusion of immediate hearing.

Radio First to Report the Awful Japanese Catastrophe

By J. L. Bernard

RADIO gave the first news to a shocked world of the appalling destruction by earthquake and fire in Tokio and Yokahama and other Japanese cities, which began on September 1, and continued for several days.

As an island empire Japan had depended, principally until very recently, on cable communication for quick connection with the outside world. The repeated earthquake shocks, which launched one of the greatest catastrophes in history, not only destroyed the shore ends of several cables with their receiving instruments, but also through the upheaval of the ocean floor, probably severed the cables.

Thus was the disaster-stricken territory cut off from informing the world of its frightful plight—except for one means of communication.

By an act of Divine Providence the big radio station, its masts and equipment at Tamioka, 144 miles from Tokio, was spared intact.

The operator on duty at the Tamioka station, whose name is given in press dispatches as T. Yonemura, saw the fleeing refugees pouring past his post several hours after the first earthquake shock. Quick inquiry developed the startling news from the panic-stricken people and then Yonemura put a message on the air which was to startle and stun the world.

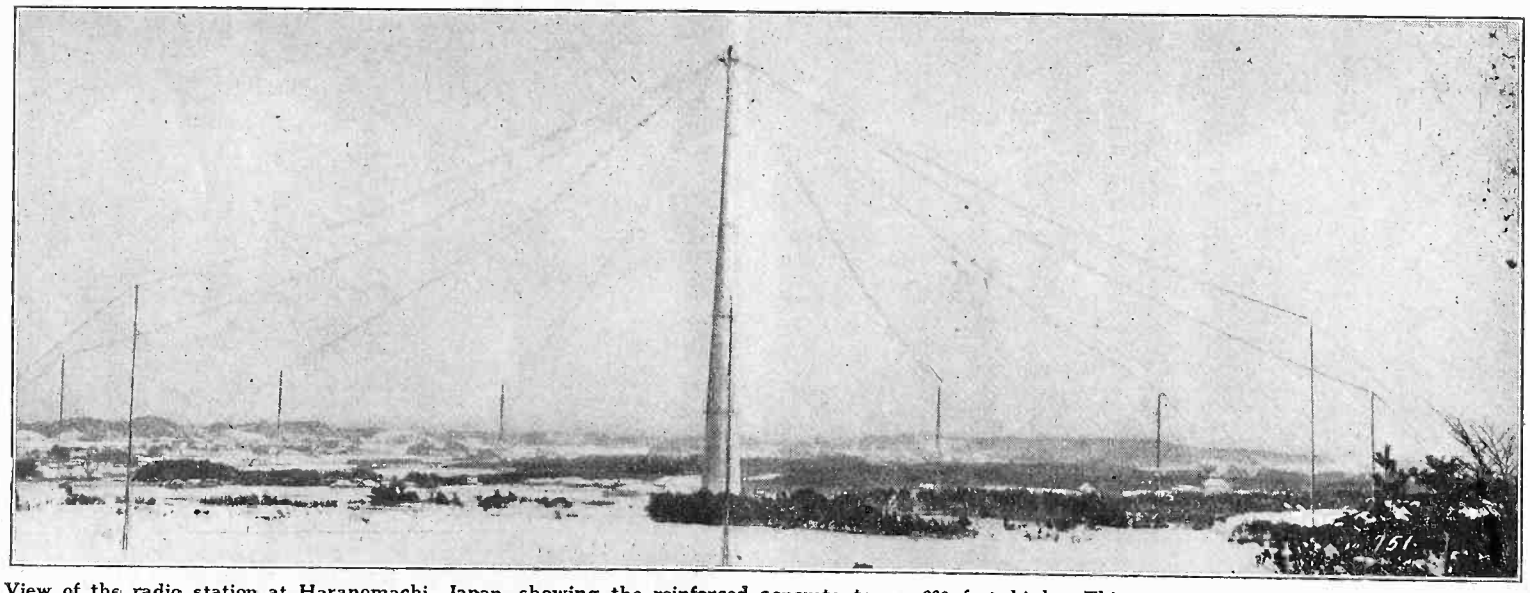
The San Francisco station of the Radio Corporation of America picked up the message first, relayed it instantly to the Associated Press which gave it universal currency through the daily newspapers.

Thus did radio play its vital part in giving the world news which necessitated relief measures on a tremendous scale which might otherwise have been delayed for days.

Locally, in Japan, radio stations have since been the only means of communication with the stricken cities. A number of naval vessels and merchant ships have been assigned posts at various ports to act as relay stations in getting radio messages to and from the disaster-stricken area.

The President of the United States has turned loose every government agency to aid in relief work, all red tape has been cut, the American Red Cross is raising a fund of $5,000,000 to aid the homeless and the hurt, and foreign governments are cooperating in all measures.

The lives that have been saved by radio in this one instance can never be counted, but they must number many thousands.—Editor RADIO WORLD.



View of the radio station at Haranomachi, Japan, showing the reinforced concrete tower 660 feet high. This is surrounded by a ring of 36 250-foot wooden masts on a radius of 1,300 feet from the concrete tower which is 60 feet in diameter at the base and 14 feet in diameter at the top. The station buildings are just to the left of the tower. This is the receiving unit, the transmitting unit being at Tamioka, which is remotely controlled by the operators at Haranomachi. The Japanese consider both these units as one station, known as the Iwaki radio plant. Neither station was affected by the earthquakes.

RADIO communication once again has demonstrated in the eyes of the world how indispensable an institution it has become in serving mankind during great emergencies.

It was radio that flashed across the Pacific first news of the horrible disaster visited upon the people of Japan when earthquake and fire laid ruin two of the principal cities—Tokio and Yokohama.

When the first shock was felt and fires set the cities ablaze the powerful transmitting station at Haranomachi established communication with the high power station of the Radio Corporation of America at San Francisco and at six ten A. M. Saturday the meager details of the catastrophe, as they were received at the corporation station, were delivered at once to the Associated, International and United Press. The violence of the earthquake soon after crippled the telegraph lines which link Tokio and Yokohama. Thus, the only channels of direct communication with San Francisco, the radio system, was isolated from the scene of the disaster until a swift courier system could be established. During these most severe disturbances in Tokio and Yokohama, however, the radio link between the two mighty stations separated by the vast expanse of the Pacific maintained constant communication with each other. Respecting neither the tremendous quaking of the earth, the swelling of the seas which swallowed many of the vessels in Japanese waters or the raging fires that consumed thousands of dwellings, radio waves laden with precious messages continued on their ethereal path.

(*Continued on next page*)

The Radio Woman

FRIEND HUSBAND (who is always very useful around the first of the month for paying the bills) took a notion into his head last week to look over the receipted bills for the electric light for the past year. I had already done that several times, and noted the increase over what we had been paying. "Look here," he said after about a half hour's perusal of said bills. "Last year at this time our bills for light were just about one-third of what we are paying now. How come, lady? We haven't had nearly as many parties as we used to have." "Well," I retorted, "you insist on staying up till all hours of the morning listening in, and keeping the lights going. And then there is also that charger that you keep going three nights a week. But at the same time contrast the expenses you used to have for theatre and suppers and the money you lost playing bridge." I took my life in my hands when I made the last remark, because he is very touchy about his bridge playing. "Well, I guess you are right. Theatre tickets every week do amount to a little bit at the end of the month, especially when contrasted with a measly raise of $5 for lights." I would like to make a graph of the raise in lighting bills of those who have radio sets and compare it with a similar graph of the money that they saved by having a radio set. I think it would make interesting data for all persons concerned, don't you?

* * *

A friend of ours who has a wonderful house way out in north Jersey recently dropped in to see us, and, of course, we talked over old times. Naturally we drifted around to the present day radio craze. "Oh, my goodness, I do not know what I would do without radio! It really is too far to go to the country club every evening and the usual rounds of house to house parties are so tiresome. We are so far from town that whenever we decide to come down we decide to make a week end of it. With radio, we can keep right up to the second in everything and besides I think that Joe has shown me more attention evenings since we put it in." Well, that is what they all say, and I know that if broadcasting was to stop tomorrow that it would hurt more people than you could shake a stick at, because people have come to rely upon radio so much for entertainment and relaxation after a hard day that the world would seem to be an empty place without it.

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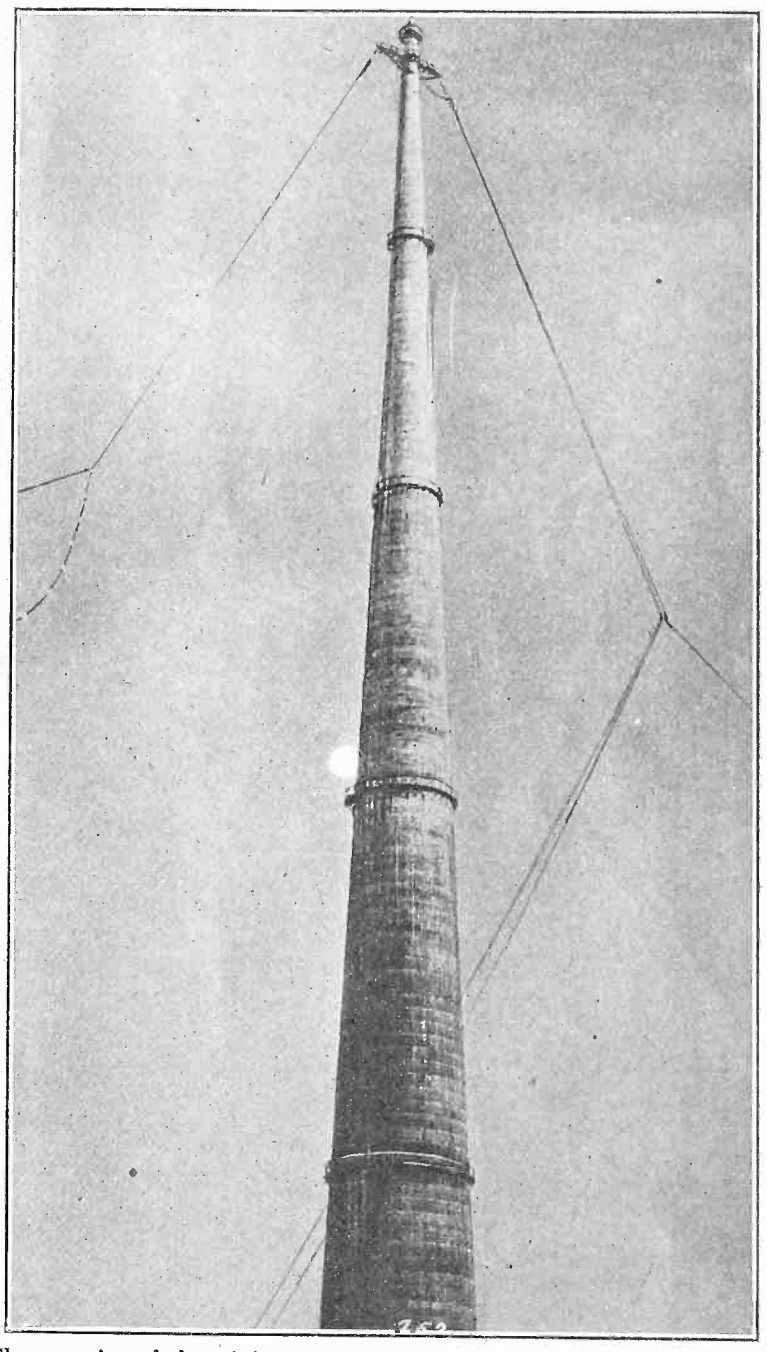
From the very beginning the superintendent of the Japanese radio station, Yonemura, and the operating staff under him labored heroically in dispatching with the utmost speed all messages that reached the station from the station in the interior. Yonemura not only supervised the operators at his station, but was unexpectedly called into service as a translator of the messages which were sent over the radio circuit to and from Japan.

It was perhaps by some strange freak that the Japanese radio station did not suffer damage. Fear was expressed that the giant concrete mast rising to 660 feet and which supports the antenna at the station, might be rocked by the earthquake and shattered into bits. Fortunately, however, it weathered the test, perhaps due to its exceptional construction, which combines both steel and concrete.

Although the telegraphic facilities from the Japanese radio station to Tokio and Yokohama have been completely wiped out, service to other points inland is still intact. It is highly probable that Japanese engineers are sparing no effort to restore the more important telegraph lines feeding inland from the radio plant.

Since the military branch of the Japanese government is actively promoting internal radio telegraphic service, it is quite possible that an emergency radio relay system will be set up in the devastated regions for communication with the big station near the coast.

The largest radio station in Japan which communicates with the United States consists of a receiving unit at Tomioka and a transmitting set at Haranomachi. The distances betwen Tokio, Tomioka and Haranomachi are 155 and 178 miles respectively. The equipment used at the Japanese receiving station is essentially the same as that used at Riverhead, Long Island, by the Radio Corporation of America, and was



Close-up view of the reinforced concrete tower at the Haranomachi, Japan, radio station, pictured on the preceding page. This station is 178 miles from Tokio. It was probably outside the sphere of influence of the earthquakes, which accounts for its survival intact.

supplied by that company to the Japanese Government. The well known "wave" antenna, which is nine miles in length, is employed for reception on 16,300 meters. The transmitting station utilizes a 500 kilowatt arc set for communication on 14,350 meters. It was erected in 1921 and surpasses in power all radio stations on the island. This transmitter is controlled from the receiving station at Tomioka by a system of land wires which were not severed by the earthquake. The Japanese radio authorities consider both the transmitting and receiving set as a unit which is known as the Iwaki plant.

Plans for World Radio Expansion

An Interview with General James G. Harbord

JUST returned from a trip to Europe, where he attended the consortium of international radio companies, General James G. Harbord, President of the Radio Corporation of America has authorized RADIO WORLD to publish the following interview dealing with various world radio projects.

The countries represented at this conference in London last month were the United States, Great Britain, France and Germany, and the chief object of the sessions was to complete plans for a projected radio communication service connecting both the United States and Europe directly with South America.

"These plans," said General Harbord, "previously conceived to link the United States and European countries directly with Brazil and the Argentine were enlarged upon at the recent conference. Circuits will extend from the high power station at St. Asise, France; Nauen, Germany, and Carnavon, Wales, direct to Buenos Aires, while the other will bridge the gap between New York City and Buenos Aires through the intermediary of Radio Central, the Radio Corporation of America station on Long Island. The definite intentions manifested by the American, English, French and German radio interests (better known as the AEFG group) at the recent meetings to go forward with the plans which were agreed upon are sufficient proof that the huge program will be brought to a speedy conclusion.

"Reception in Argentina from France and the United States has already been established and the receiving apparatus has been in test operation at Buenos Aires for a number of months. A notable test of this 6,000-mile circuit occurred when the returns of the recent Firpo-Willard boxing contest were transmitted from the giant station at Rocky Point, Long Island, direct to the receiving station at Buenos Aires from which they were subsequently broadcast by radio telephone on a short wave length. Having thus accomplished reception in the Argentine," continued General Harbord, "we are now finishing the erection of a high power transmitting station at that point, which, when completed, will enable us to carry on two-way communications. It is expected that the new service will be ready for commercial use some time this fall.

"It should be of interest to American business to know that a keen sense of appreciation is being evidenced in these developments by business men in South America whose trade intercourse with the United States and foreign countries will be materially enhanced by the establishment of this direct and swift communication service."

When asked about the status of radio broadcasting across the seas, General Harbord had this to say:

"I feel that Americans generally do not appreciate the great strides we have made in radio broadcasting in this country. Certainly the initiative and enterprise which American manufacturers have shown so far have placed this country far in advance of others in this new art. And the great privilege of free broadcasting exists nowhere as we know it in the United States.

"During my visit in France I had the opportunity to manipulate a French broadcast receiver and listen-in to a program broadcast from the Eiffel Tower. The complicated apparatus used for this reception was a striking contrast to the efficient receivers of simplified control that we have in this country at present.

"It will be of interest to note, however, that France is using her high power radio station at Bordeaux to broadcast daily telegraphic press reports which are received by telegraphers at many distant points. So effective is this transmission that press of the day is frequently picked up by a station at Saigon, in Indo-China, some 6,000 miles distant, as well as at Buenos Aires, over 8,000 miles from Bordeaux."

When asked if he wished to interpret the recent radio developments between his company and the Chinese Government in the light of their meaning to America, General Harbord said: "Perhaps we had better begin at the start of these negotiations back in 1921, when the Chinese Government granted the Federal Telegraph Company an independent contract to erect five radio stations in various provinces of China for communication with America. Since that time, the Federal Telegraph Company of Delaware has been formed which incorporates the Chinese radio interests of the Federal Telegraph Company and the Radio Corporation of America, and in which the two American companies will participate jointly under the assignment of the 1921 contract recently approved by China.

"This undertaking calls for the erection of five powerful stations in China, the principal one to be located at Shanghai. This station will engage in direct communication with the RCA stations at Hawaii and even San Francisco, over 5,000 miles distant. Shanghai will also operate a station of lesser power for communication with similar smaller stations to be located at Pekin, Canton and Harbin, each of which cities are separated by approximately 800 miles. In this way the central station of Shanghai will have 'feeder' stations in the principal provinces, through which traffic from these several territories will be routed to the giant station at Shanghai, for transmission to the western hemisphere. Conversely, Shanghai will be the gateway through which communications from points East will pass to the Chinese interior. These stations will be operated jointly by the Federal Telegraph Company of Delaware and the Chinese Government, thus placing the project under Chinese-American administration.

"The confidence of the Chinese Government, in entering into active participation in this program was enhanced largely as a result of the limitation of armament conference held at Washington, D. C., in the fall of 1921.

"There are no exclusive or monopolistic features in this contract," continued the General, "and from the very inception of negotiations the project has had the wholehearted support of the State Department at Washington, who view the recent completion of plans as a signal accomplishment in international diplomacy.

"American business men will be quick to appreciate the commercial significance of this comprehensive plan, inasmuch as there is today only one cable crossing the Pacific to China. And this new, strong link of friendship cannot help but play its own important part in the cause of better understanding between these two countries, and indirectly the peoples of the world."

General Harbord was recently elected President of the China Society, an institution for the promotion of Chinese interests in this country. For this reason, he has a special interest in the contract, from the standpoint of the far reaching business and social influence of the Society.

Work on the stations will begin this fall, and the inauguration of service is expected during the latter part of 1925, although the plan may reach maturity before the time. Test signals will span the Pacific from China well in advance of the official opening, however. A moment spent in glancing at a map of the world reveals that today, although commercial radio is scarcely three years old, we are enveloping the entire globe with radio waves. A further calculation shows that the actual daily transmission range of the high power radio circuits which terminate in the United States totals over 41,000 miles.

A Selective Tuner at a Reasonable Cost

By C. White, Consulting Engineer

THE daily cry is for more selectivity. With the carefully designed modern receivers distance can be easily covered but it is often quite hard to master interference under all conditions. Many amateurs who have built their own single circuit tuners are troubled quite a good deal by interference and jamming. This jamming is noticeable as whistles, groans, and a most varied assortment of howls accompany distant reception. We are apt to blame a good deal of this noise on our neighbors, who operate similar sets and are not well acquainted with tuning to prevent their set from oscillating and awakening the so-called "birdies." To those who already operate a single circuit tuner and do not wish to go to any great expense to change the same I would recommend that they purchase a variable grid leak and a good wave-trap.

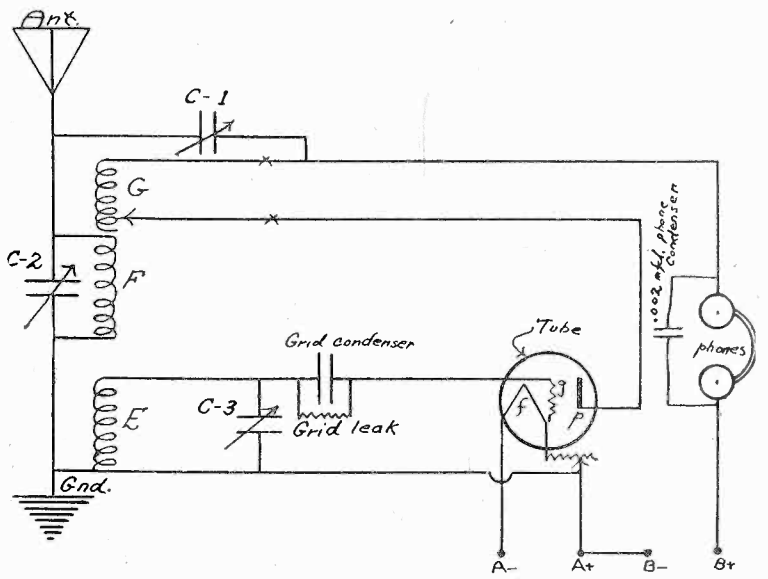
Critical and sharp tuning is quite easily accomplished with this new style of tuner, and still the chief disadvantage of some of the present selective regenerative tuners is completely removed. It is most desirable in tuning in that a receiver should tune rather broad to let you get the range of the station and then be capable of getting more critical adjustment afterwards. With most variable coupling tuners this is readily accomplished by the expert tuner but rather difficult for the average fan to use with success.

Therefore, in this new receiver I have made the coupling fixed and by correct prescribed manipulation of the three variable condensers any degree of regeneration and sharpness of tuning can be had. For instance, let us assume you are endeavoring to pick up a certain station but you do not know exactly where it comes in on the dials. Then you would set the condensers C-1 and C-2 so that they would have a minimum amount of capacity, that is, the dials should read zero if they are correctly set on the condenser shafts. Now the station can be picked up if its signal is of fair strength by adjusting the secondary tuning condenser C-3. If no results are obtained then C-1 can be given greater capacity which will allow more regeneration and the tuning of C-3 can be repeated. It is generally possible to use the condenser C-1 to hold the tube on the point of oscillating by manipulating C-3 and C-1 at the same time.

After the signal has been picked up then the condenser C-2 will come into play. This condenser is used to make the signals much sharper. But as C-2 is tuned in then the capacity of the condenser C-1 will have to be reduced in order to prevent the tube from "spilling over." This is necessary because as the circuit formed by the coil F and the condenser C-2 become tuned to the same wavelength as the circuit E and C-3 the electrical coupling between the coils E and G will be increased very strongly, which means more feed-back action or regeneration. The taps on the coil G will also afford another method to control this amount of regeneration both in the preliminary and final tuning methods. It is plain to see that there are many ways of tuning in this outfit, hence affording plenty of room for experimentation. I personally would not have a receiver that would not allow flexibility in tuning, because you can always have an alternative when the signal is weak with one adjustment to try one of the other combinations of controls.

The constants for the receiver are as follows: The condensers C-1, C-2, and C-3 are each 11 plate variable condensers, although it is preferable to have some sort of vernier adjustment on the condenser C-3 to get exceeding fine adjustment on all wavelengths. The grid leak and the grid leak condenser should be of the correct size recommended by the tube manufacturer, but it is being proven that a variable grid leak resistance is just the thing to use since it affords many critical adjustments. If you are just building your first receiver it would not be a bad idea to purchase a variable leak having the correct ranges and a fixed grid leak. Try both and note the difference between the variable leak adjusted to a certain value and the fixed leak.

A grid leak costs very little at the most compared to the total cost of the receiver, so you might as well get the very best to start with and avoid much of the trouble a bad unit will cause. The next step is to purchase about ten inches of good insulation tubing having a diameter of three and a half inches or thereabouts. All the inductance coils are to be wound with No. 22 S. C. C. magnet wire. The coils E and F each have 60 turns of wire untapped while the coil G has 60 turns tapped for switchpoints at every



A selective tuner easily constructed at home, and at a reasonable cost. Follow the diagram and description exactly in every detail if success is wanted.

fifteenth turn. All the coils should be wound on the same tubing turning the wire in the same direction of rotation, and arranging the sequence of end turn terminals and taps as illustrated. After the tube has been prepared so as to form the complete unit E, F and G, then the surface of the windings can be thinly coated with cement so as to weather proof them and hold them firm. If you cannot obtain cement hot paraffine will serve just as well, but you must take care to scrape off all the excess paraffine.

Of course the general rule of cleanliness in workmanship is paramount in assembling this receiver. Plan your panel layout with precision and care, and make it a point to avoid unusually long connecting wires. After you have built the set try reversing the terminals to the coil G at the points marked X X and note which connection gives you the maximum volume both in the final and the preliminary tuning adjustments. There is one connection that is decidedly better than the other, so you will experience no difficulty in hastily arriving at the correct conclusion. You do not have to shield this receiver unless you care to as an extra refinement. If you do, do not place shielding other than around the vicinity of the three condensers. In order to cut down body capacity see to it that you have the variable condensers connected as recommended. The movable plates or rotors of the condensers C-2 and C-3 should be connected up to the ground side of the circuit while the rotor of C-1 should be connected to the Ant. This receiver will operate well with the new UV199 or C299 tube, affording the correct amount of regenerative control so necessary with a high vacuum tube.

Adding Audio-Frequency Amplification to the Nite Owl Specials

By J. E. Anderson, M. A.

THE circuits published in RADIO WORLD for July 7 and 21 under the title of Nite Owl Specials have aroused considerable interest, if the number of favorable reports and requests for extensions that have been received are to be taken as an indication. Some trouble with the circuits has also been reported from a number of experimenters, but fortunately the trouble reported by one has just contradicted that reported by another, showing that the difficulty does not reside in the principle of the circuit, but rather with the individual application of it. Some say that the circuit will not oscillate at all, and others that it is impossible to prevent oscillations. A warning was sounded in the original article against trouble of this nature and a remedy suggested. Other suggestions will be given below in connection with the circuits having audio-frequency extensions.

Requests have been made for circuit diagrams showing the addition of two stages of audio-frequency amplification to the direct circuit which appeared in RADIO WORLD July 7, and diagrams showing the addition of one stage of audio-frequency amplification to the reflex circuit that appeared July 21. Accordingly, herewith are given the requested circuits, Fig. 1 referring to the direct and Fig. 2 to the reflex.

These two circuits give approximately the same quantity of output, but differ greatly in selectivity. The single circuit, of course, gives greater volume but is not nearly so selective as the other. If desired, the single circuit may be made the reflex and vice versa.

In order to help prospective constructors, all the electrical constants of the various component parts are given. The design of the circuit has been made especially for use with UV201A tubes as amplifiers and either a UV201A or a UV200 tube as detector. If a UV200 tube is used the potentiometer should be connected as shown; if a UV201A is used the lower end of the grid leak may be connected permanently to the positive side of the "A" battery and the potentiometer either dispensed with or used as a stabilizer in the grid circuit of the first, or radio-frequency amplifier, tube. In that case the positive side of the first grid battery should be connected to the sliding contact of the potentiometer instead of to the negative side of the "A" battery. For the UV201A tubes the filament rheostat may be any six ohm rheostat on the market, but for the UV200 it should either be a carbon pile rheostat, or one furnished with vernier adjustment. The grid condenser of the detector is given as .00025 mfd., but it may have any value down to .0001 mfd. It is essential, however, that its insulation be of the highest. Either air or mica dielectric is recommended.

The symbols J_1 and J_2 represent double circuit jacks. These are rather unconventional, but are drawn that way for convenience. J_3 is a single circuit jack for the telephone or the loud speaker. T_1 and T_2 are the telephone terminals of the original circuits. The dotted lines represent the necessary leads to the added audio-frequency amplifier. If the original circuits and the amplifier are built in separate units, the dotted lines would represent the connecting straps from one cabinet to the other.

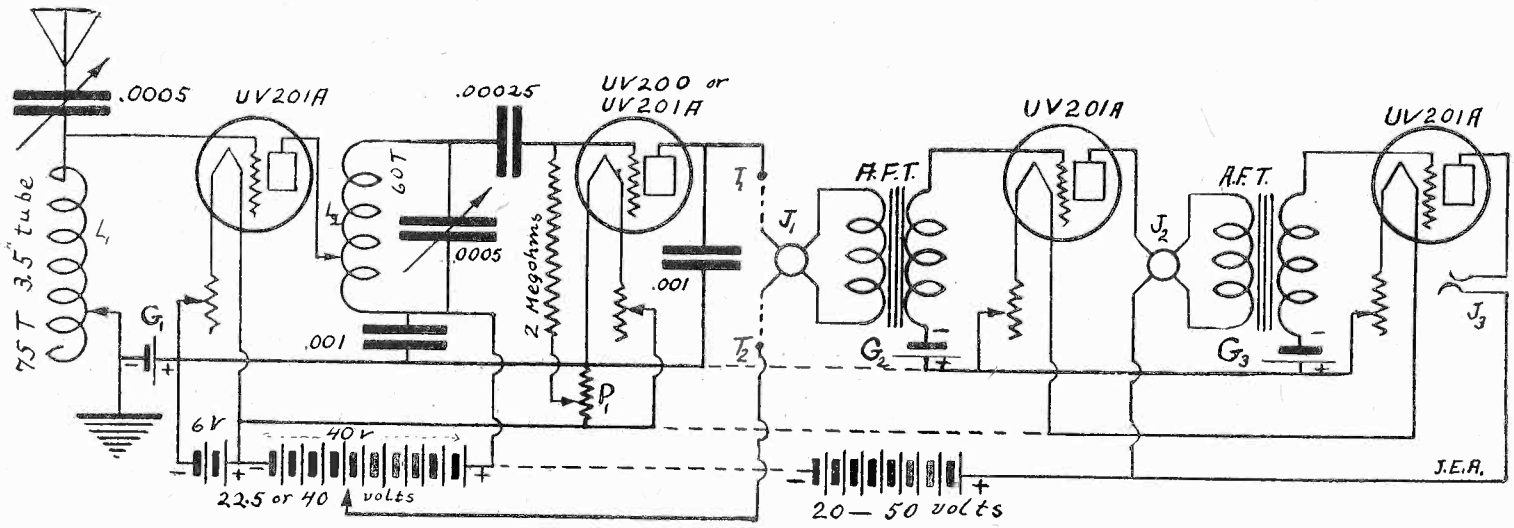


Fig. 1—The original Nite Owl Special with the addition of two stages of audio-frequency. Note the "C" batteries and their position.

The "B" battery voltage on the UV200 detector tube may be any value from 16.5 to 22.5 volts. The correct, or optimum, value can best be found experimentally. If a UV201A is used as a detector the plate potential should be 40 volts. The plate voltage on the radio-frequency amplifier tube in Fig. 1 should also be about 40 volts. In Fig. 2 it would be better to use 60 volts on the first tube, although only 40 is shown, in order to prevent distortion of the audio-frequency load on that tube. For the same reason the plate voltage on the other audio-frequency amplifier tubes should not be less than 60 volts and may be as high as 90. Good quality cannot be expected for low plate voltages if the volume of the signal is sufficient to operate a loud speaker.

The proper grid biasing batteries G_1, G_2, G_3 depends entirely on the plate potential. If the plate potential is 40 volts, the proper value of the grid biasing voltage is about 1.5; if the plate potential is 60, the proper grid bias is about three volts; if it is 90, the grid bias is either 4.5 or six. On the first tube in Fig. 1 the question of grid bias is not of much importance, as a deviation from the correct amount merely reduces the amplification; but on the audio-frequency amplifiers it is important, as a deviation not only reduces the amplification, but increases distortion.

Although these circuits have been designed for use with UV201A, other tubes may be used. UV201 may be used to good advantage if the necessary storage battery for heating the filament is available. Even the dry cell tubes, such as WD11 and UV199, may be used if the output is limited to that which one may listen to with comfort with an ordinary headset. No particular changes need be made in the circuit except in the voltage of the "A" battery. If UV199 tubes are used the voltage of the filament battery should not be greater than three volts. The customary voltage of 4.5 for these tubes requires 30 ohm rheostats, whereas the rheostats in these circuits have only six ohms. However, a resistance of from 10 to 20 ohms may be inserted in series with the battery somewhere in order to get around this difficulty.

If either UV201A or WD11 are used throughout, the total current consumption will be one ampere; if UV199 tubes are used throughout, the current will only be .24; but if UV201 and UV200 are used, the total current will be four amperes. Hence for the latter tubes storage batteries will be required, while for all the others it is possible to use only dry cells. For the UV201A and WD11 there should be as many dry cells in parallel as there are tubes in parallel, since the normal discharge current of a dry cell is one-fourth ampere. If a UV200 detector tube is used together with three UV201A the total current will be 1.75 amperes. Hence a storage battery will be required for this combination. The extra volume obtained by virtue of the greater sensitivity as a detector of the UV200 than the UV201A is not worth while in view of the great increase in the heating current.

If oscillations cannot be prevented by means already discussed, it will be necessary to use resistance. The use of the potentiometer has already been suggested for this purpose. A plain resistance of from 100 to 500 ohms may be inserted in series with the grid or plate circuits. If in the grid circuit it should be put near the "A" battery; that is, between the negative of the "A" and the positive of the "C," or grid battery G_1. If in the plate circuit it may be put in series with the plate lead. This, however, is not so good as the other connection. The oscillations may also be stopped by reducing the plate potential or the filament current, or by changing the grid potential of the tube. But these methods are not practical for any of the tubes carrying audio-frequency currents. The use of a potentiometer of about 400 ohms is probably the best for both the circuits given herewith.

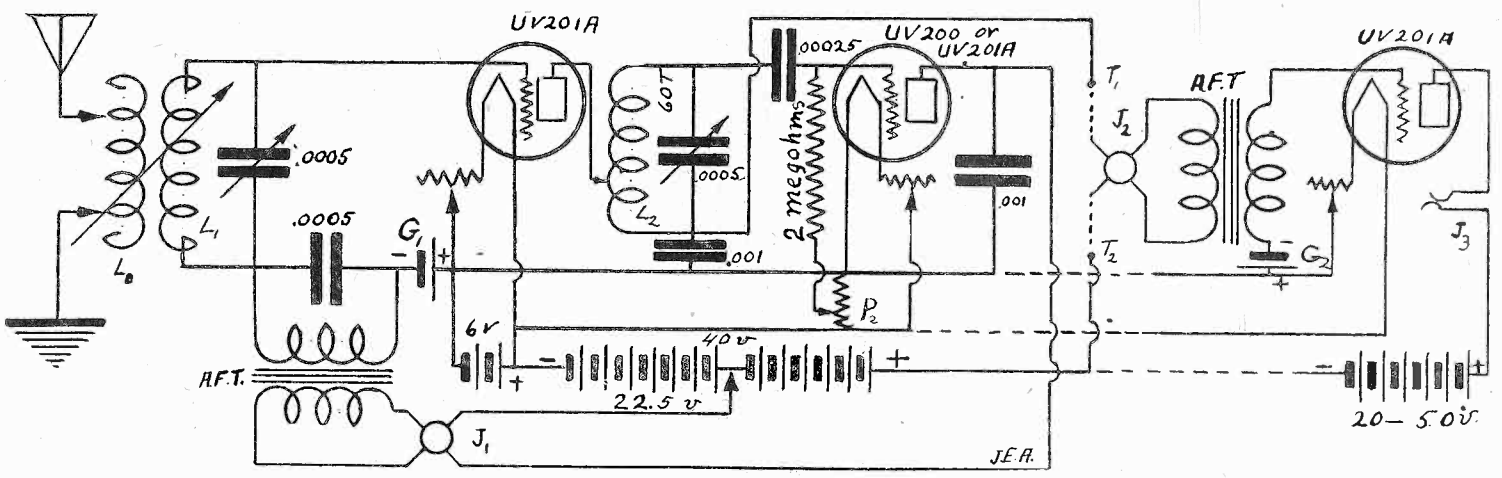


Fig. 2—Improved Nite Owl reflex with the addition of audio-frequency. Extreme care should be taken in the wiring to prevent howling due to intercoupling.

Changes in Broadcasters

ONE new limited commercial broadcasting station was licensed last week:

Call	Station	Class	Frequency Kcys	Wave Length Meters	Power Watts
KUY	Coast Radio Co., El Monte, Cal....	A	1170	256	50

The following limited commercial broadcasting, Class A station, was licensed on June 2, 1923, but was omitted from the weekly list:

KFJB	Marshall Electric Co., Inc., Marshalltown, Iowa..	1210	248	10

Eleven limited commercial broadcasting stations deleted during the month of August, 1923, were as follows:

Call	
	Class "A"
WEAD	Henry Radio & Elect. Supply, Atwood, Kans.
WSAQ	Round Hills Radio Corp., Dartmouth, Mass.
KFIJ	Therean, Sidney I., Platte, S. D.
	Class "B"
WGM	Atlanta Constitution, Atlanta, Ga.
	Class "C"
KGO	Altadena Radio Laboratory, Altadena, Calif.
WRP	Federal Institute of Radio Telegraphy, Camden, N. J.
WJAP	Kelly-Duluth Co., Duluth, Minn.
KGB	Mullin's Elect. Co., Wm. A., Tacoma, Wash.
WLAY	Northern Commercial Co. of Alaska, Fairbanks, Alaska.
WJAK	White Radio Laboratory, Stockdale, Ohio.
WQAY	Gaston Music & Furniture Co., Hastings, Neb.

Use Standard Goods

MANY amateur builders when considering the making of a new set think first of the cut-rate shops where lots of cheap goods can be purchased. They do not consider the protection afforded by a standardized label or carton on the goods they buy. If they would only think of the protection a standard piece of goods made in a large factory, tested and sold at a standard price affords them, they would not buy the cheap apparatus that has no name, or else some funny name closely approximating the real goods.

RADIO PRIMER—For the New Army of Radio Beginners

By Lynn Brooks

PREPARATION FOR FALL RESUMPTION:—Now that the summer season is practically over and the fans are paying more attention to radio than they did, certain little details will be attended to by the amateur who knows and who expects to get maximum results out of his set.

First and foremost, examine the antenna. Take it down and clean the insulators thoroughly with good soap and water to remove any dust or dirt that may have accumulated through the hot weather. Examine the connections, especially the lead-in, and make sure that it is still making good contact. If there are any splices made in the wire, make sure that they are clean and making perfect electrical contact. If you have not soldered your antenna connections before, now is the time to do it. Scrap the wire and make a sure soldered connection.

Then examine the ground lead and see that it is perfect. Make a thorough job of the inspection and do not simply glance at it. If the ground clamp is fastened to the water pipe it is best to remove the clamp and re-scrape the pipe and the clamp.

The next thing of importance is the renewal of the batteries. Renew your B batteries. On their face they do not show their condition and there is no way they can be tested except by the use of a voltmeter. A 22½ volt battery should not be used when its voltage drops below 15 and a 45 should not be used when its voltage drops below 30. Do not make the mistake of connecting new batteries in the circuit with old ones. The old ones will act as a drag on the new ones, absorb the current from them and seriously hurt their life. Therefore get new ones that have their shelf life marked in plain figures on the side. If storage batteries are used to furnish the current for the plate circuit, keep them thoroughly charged and their plates covered with the solution.

In the case of the storage batteries used for filament current see that the connectors are clean and that a small amount of vaseline is spread lightly over the surface. If the storage battery has been in use more than a year, take it to a service station and have it looked over to determine if it needs cleaning. It probably will and should be cleaned by an expert. Do not attempt it yourself unless you understand storage batteries thoroughly.

The next important thing is cleaning the set itself. Remove the tubes from the sockets, remove all the connections and take the set where there is a good light. Then with a fine brush and a rubber tube blow and brush all the dust out of the corners and rub all the dust off the surface of the apparatus, not forgetting the corners. Do not go about it vigorously, but take it easy and at the same time make sure that you get all the dust and dirt out. Even though the top may be closed all year round, a lot of dust and dirt will accumulate in corners, between wires, and in fact every place in the set that it can. It should be cleaned thoroughly.

The next thing of importance is to see that all your switch arms are making good contact. The points will generally corrode a bit. Go over them with a little wood alcohol on a rag and wipe the surface of all moving contacts with it. Make sure that none gets on any of the apparatus.

Then examine the lugs of your tubes. The little lead nipples should be brightened by lightly passing a piece of emery paper or emery cloth over them. Then examine the contacts on the tube socket and see that they have not lost any of their tension and still press against the tubes.

When you are sure that you have chased all the dirt out of your set, re-hook the batteries, making sure of the connections, and your set is again ready for another winter of DX. This fall house cleaning is important and should be attended to before you have trouble and go hunting. A little care now will save lots of time and trouble later.

DX on Crystal Receivers

By Paul Thorne

THE letter of Philip Keansby, in RADIO WORLD for August 25, again brings up the subject of DX on crystal receivers. Let me settle this question, which seems to rage pro and con without end.

A neighbor and myself conducted experiments along this line recently. He operated a three-tube set, while I used a very good crystal set which I keep as a sort of "life boat" for emergencies. This set has never been able to pick up anything outside of Chicago except WCBD at Zion, which came in very faint.

During this experiment, by pre-arrangement, he would pick up certain distant stations, and I would tune my crystal to that wave length. He picked up a number of stations, the most distant being Troy, N. Y. In every case I heard the concert distinct and loud while he held it tuned in. When he tuned out, I lost all signals.

During this test I particularly noted that I could hear every move he made, my crystal set responding to his tube set just as if my phones had been connected direct to his set. I also noticed that I got the best results when I was tuned to the exact wave length of the station he held.

I consider that this test absolutely settles the whole question. When a crystal owner gets DX, let him inquire among his tube set neighbors, and he will find some one who had the station at the exact moment.

There were many interesting details connected with this test, but I am taking space only to give the results. As we are both well out of the amateur stage and thoroughly understand what we are doing, we are convinced that we have definitely settled this question of whether or not a crystal can get DX and whether or not a tube set transmits to a nearby crystal receiver.

A Remarkable DX Circuit

By H. S. Potter

THIS seems to be a day and age of new circuits, and everywhere we turn we are stared in the face by radio publications telling, in glaring headlines, of some present-day Marconi who has revolutionized radio by discovering some new principle, which he does not intend to patent, but will give to the world.

I do not claim that the circuit which I am showing here will enable any person who has no knowledge of radio to hear the English broadcasting stations on one bulb, or to fill a room with music from the stations on the West Coast. It is a regenerative circuit and a very good one, the best I have tried for broadcast receptions, as well as being a whiz on short wave C. W.

I hit upon this hook-up while I was experimenting with some of the old favorites. As it was remarkably good, I felt that it was worthy of public attention.

My claims for this circuit are remarkable sensitivity, fine tuning, and entire lack of distortion. As in all regenerative circuits, it is necessary to add two steps of audio-frequency amplification if sufficient volume for a loud speaker is required. On one tube I have found the volume to be slightly greater than on the standard two-variometer and variocoupler set.

I will give all information necessary for building a set from this hook-up, but will omit panel dimensions and layout, as every fan has ideas of his own as to the proper arrangement of his apparatus, and will adapt his panel dimensions to the available location for his set, or to a cabinet easily procurable. As a hit, I would suggest a standard 7″x18″x3/16″ Formica panel.

In the sketch, L-1 and L-2 are the primary and secondary, respectively, of a variocoupler. This may be of any good make, having a tapped primary. In selecting a coupler, pick one which is wound with fairly heavy wire, about No. 22 or No. 24, not the ultra compact ones using very fine wire, about No. 28 or No. 30. See that the windings are not thickly coated with shellac or varnish, as this greatly lowers the efficiency of the instrument, due to creating a high distributed capacity. Some gain in efficiency is also obtained by using an instrument having very thin walls to the winding form, but this feature should not be carried out at a sacrifice of rigidity.

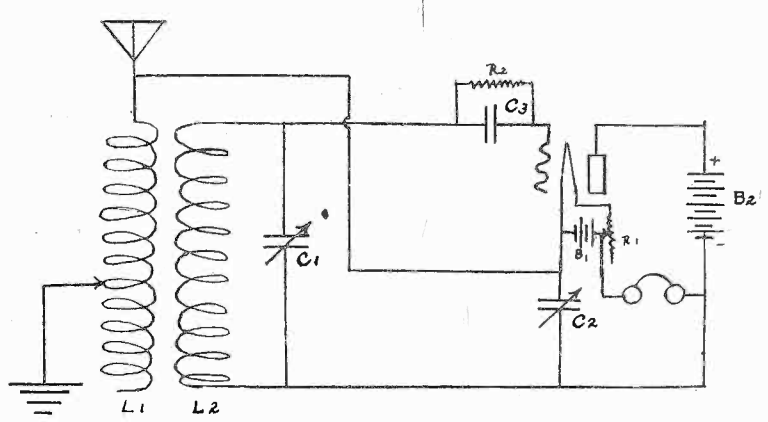
The secondary circuit is tuned by a variable condenser, C-1. This has a maximum capacity of .0005 mfd., which usually means 23 plates, and should be of the built-in vernier type, as the tuning is very sharp.

Condenser C-2 controls regeneration. It is of .001 mfd. capacity, and has about 43 plates. No vernier is required, but a vernier condenser may be used if the builder so desires, and will perhaps help a bit on distant reception.

Right here a word on the selection of variable condensers might be in order. Do not waste time and money on the cheap, worthless pieces of junk sold for 75c to a dollar. A good condenser should have rigidly spaced plates and pigtail connections to the movable plates. There should be enough clearance between plates so that a slight jar will not cause the plates to touch, causing a short circuit. Do not buy a condenser with end plates of moulded "mud," or of dull, cardboard-like fibre, as these compounds usually allow a high leakage. Bakelite, Formica, or Condensite end plates are best, provided metal bearings are provided for the shaft to run in. Be sure the shaft is of standard diameter, as many of the cheap condensers now on the market will not take a dial of standard ¼″ bore. As a matter of neatness, it is well to pick condensers whose mounting screws will go under the dial, on the face of the panel. Most of them are built this way at the present time, so this feature should not cause much delay in selecting your instruments.

Little need be said of the grid condenser, C-3, and the leak, R-2. They will have a value of about .0005 mfd. and one megohm, respectively, but this may vary with the type of tube used. R-2 may be made adjustable to advantage. Do not use one of the paper grid condensers, sold for a dime, in position C-3. The only type which is worth while is the mica type, and these are cheap enough to make their use well worth while.

The resistance of the rheostat, R-1, will vary with the type of tube used, as will the voltage of the battery, B-1. The battery, B-2, will be of about 22½ volts for most of the detector tubes now on the market, although it is well to use a tapped B battery, so that the proper voltages may be obtained. On some tubes an even



Circuit diagram of a remarkably selective receiver which is easily controlled and reasonable to construct.

higher voltage than 22½ is an advantage, but this may be determined by experiment on the individual tube in question.

We have, at the present time, a great variety of tubes to choose from. Do not be foolish, and waste time on any of the many unlicensed tubes, or "bootlegs," now on the market, as they are entirely worthless. This includes the many "French" and "Dutch" tubes, most of which are fakes.

Of the good, licensed tubes we have, first of all, the old reliable UV200 or C300. This fits in a standard base, and operates from a six-volt storage battery for filament lighting, with a six-ohm rheostat in series. The main objection to this tube for broadcast reception is the necessity of a bulky storage battery.

Of the dry cell type of tubes, we have the WD11, the WD12, and the UV199. Of these, the first two named have the same electrical characteristics. They operate on one dry cell for filament lighting, and draw .25 ampere. The WD12 is somewhat more desirable, as it fits in a standard six-volt tube socket, while the WD11 requires a special one.

The type UV199 is also a good detector. It has a special base, is the smallest radiotron tube, and is well suited to use in a portable set. This tube operates on three dry cells in series with a 30-ohm rheostat. The voltage drop across the filament is three volts, and the filament current is .06 amperes. Due to its low filament current, a UV199 can be operated from a large three-

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How the Drama Readily Lends Itself to Radio Broadcasting

By Martin P. Rice

Director of Broadcasting, General Electric Company

DRAMA, as a literary form, lends itself at once to radio broadcasting. The actor's finest interpretation of a part is faithfully transmitted to the ears of a great audience without the loss of a syllable or the blurring of an inflection, and under conditions that enable the listeners to concentrate their entire attention on the spoken lines.

Drama, however, carries the inherent suggestion of action, and the question, "How can action be broadcast?" is promptly presented. Before attempting to answer it, we should consider the essentials of dramatic art.

In common with all other fine arts, the drama consists not in a mere reproduction of nature but in an orderly arrangement of certain factors chosen because of their pleasing or appealing qualities. Supplementing these elements in the presentation of dramatic art, stage settings in the modern theatre appear to have reached their maximum development. In fact, it is a question whether they have not in some cases been so heavily emphasized that they overshadow the dramatic interest rather than contribute to it.

The early drama was produced with little or no scenery and without the present-day wealth of costume. The addition of scenery limits the action and at the same time restricts the imagination by confronting it with rigidly defined forms. Perhaps it is on this account that one derives more pleasure from the reading of a Shakespearean drama than from an indifferent performance with elaborate scenery.

In the absence of such conventional forms, the play of the imagination meets no barriers save those erected by the individual's own personality—his own power to comprehend and appreciate. His imagination is capable of unlimited expansion; it envisages the finest subtlety, the deepest sadness, or the highest joy. This fact is recognized by authors who instead of describing a scene or an action in every detail, leave it to be completed by the imagination. Here radio broadcasting enters a dramatic field in which it can attain unique prominence.

Radio drama has the subtle power of staging or suggesting action without being under the necessity of actually reproducing it. So long as there is an ear to hear and an imagination to construct and color, there are no scenic limitations to the radio play and very few as to action. Deftly written lines can carry the listener across the wilderness and overseas, through torrential rains and to the frozen North, into deep mines and on the wings of speeding aircraft. Every mechanical device for imitating sounds is at the disposal of the radio dramatist—the midnight stroke of a great clock, the roar of a waterfall, the moan of wind, and a stealthy step in the dark. Situations impossible of presentation on an actual stage are conjured before the listener's mind in a single phrase.

Small wonder then, that radio is developing an entirely new type of play, almost as free of limitations as is life itself! Small wonder if a new type of actor finds in it opportunity for new forms of artistic expression! Swept of conventional properties and scenery, the radio stage is as wide as the world, as free in its permitted action as the whole range of human experience. If it makes no appeal to the eye, it falls the more intimately on the finer perception of the mind; if it must enlist the imagination, it carries an emotional thrill to which only the imagination can respond.

In all these aspects, the radio drama is a direct contrast to the motion picture, which makes its chief appeal to the eye. The "screened drama" is, of course, devoid of literary form. It is, in essence, merely a sequence of events. While it is capable of reproducing dramatic action very much as the pantomime reproduced it in years gone by, it is in favor today chiefly as a means of visualizing novels or producing plays that have achieved greatness in some other form—of showing events which dramatic art has formerly clothed in literary garb or produced on the stage of the theatre.

We are present at the birth of a new form of literary expression. The radio dramatist, unhampered by the restrictions of the theatre and with an immense audience of sympathetic and attentive listeners, has only to enter his kingdom. The possibilities which have been outlined are alike his opportunity and his inspiration. In the adaptation of existing plays to radio at WGY, the General Electric Company's broadcasting station at Schenectady, N. Y., a torch has been lighted over this new path of literary creation. Here a little company of earnest men and women, wise in stagecraft, are shaping the expression of the new art and establishing its technique. The possibilities of drama and of comedy are being weighed and the results broadcast to the world.

We are only at the beginning of these things, but that beginning is rich in promise—the promise of an art that shall contribute mightily to the cause of culture and more especially to the appreciation of fine dramatic expression.

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cell flashlight battery, if weight and bulk must be reduced, but this is not desirable, as these batteries will not stand up long on continuous duty.

Many an otherwise good tube is a failure, due to the use of a cheap and entirely worthless tube base. All of the very cheap ones have either poor contacts or high leakage between terminals. Get one whose insulating material is Bakelite or Formica, and not of some cheap moulded material, or of low grade fibre.

I am quite sure that any experimenter who tries out this circuit will be well pleased, if he observes a few simple precautions, as mentioned above. Do not use inferior parts, and then blame the circuit if you are disappointed.

Now a word to you fellows who try this circuit: If your results are exceptionally good, won't you help the game along by letting the gang know of it, through the columns of RADIO WORLD? Go to it, men, and the best of luck!

An Easily Built Super-Regenerative Set

By Byrt C. Caldwell

THE great majority of the radio public has kept away from the super-regenerative circuit as though it was a circuit for only Marconis and Armstrongs to experiment with. No impression could be further from the truth. Amateurs and broadcast fans by the hundreds have proven that if reasonable care and judgment is used in the selection of instruments, and in the building of the set, little trouble will be encountered. The super-regenerative set should really be adopted by

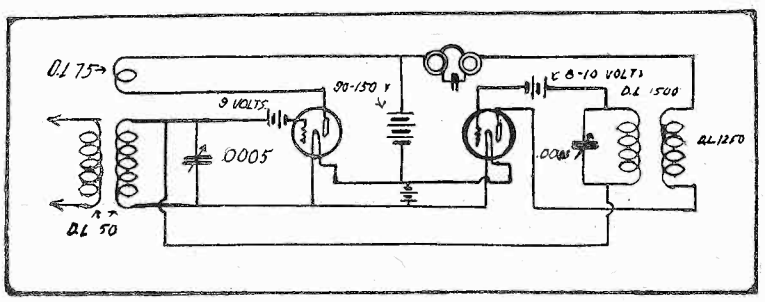


Fig. 1. Circuit diagram of an easily constructed super-regenerative set.

more. It is the nearest towards the ideal that any circuit has reached, with the possible exception of the reflex. The super is easier to construct and adjust than is the reflex, and more miles per dollar are obtained with this circuit than with any other. When this set is used with a loop, results equaling a multi-tube regenerative set which uses an outdoor antenna, are obtained and for the reason that a loop is used, radiation is reduced to a minimum.

The diagrams illustrate a two-tube super-regenerative set that was built by the writer. There is less work required to make this set than there is to make a plain regenerative set with one step of amplification.

The diagram shows the arrangement of the instruments. In making this set, all that is required besides the single tube plain regenerative apparatus, is an extra tube, grid batteries, a variable condenser, and the two large inductances. In looking over the diagram, you will see that the set is really very simple.

Honeycomb or duo-lateral coils were used throughout for inductance. The primary is a 50 turn coil, the secondary 50, and the tickler 75. The grid coil is 1500 turns, and the plate coil contains 1250. They are arranged at opposite ends of the base and at right angles to each other. The variable condensers were of the two plate mica-dielectric type. One of them is inverted so as to make room for the tubes, which are placed between them, with the plate of one tube at right angles to the plate of the other. They must both be hard tubes. The new 201A tubes are as good as can be obtained. The grid batteries consist of several three volt flashlight batteries connected in series, the voltage for the first tube being 9, and for the second, 8 to 10. They should be placed on the base as close to the tubes as possible.

The plate battery, for successful operation, must have a high voltage, 90 to 150 being about right. The higher the voltage, the better the results, within certain limits.

The arrangement of the apparatus shown is the best possible for maximum results.

In wiring the set, use bus wire, or other large copper wire, and be sure to solder every connection thoroughly.

No rheostats are used, and this obviously lowers the number of controls and simplifies the operation of the set.

The operation of the receiver seems to have been the reason that the super-regenerative was not taken up. It is really an extremely simple matter to tune the set if you use a little common sense. You will never get results by just twirling the dials aimlessly. The proper method is as follows: After the filaments are lit, there should be a whistle audible in the phones. If this is not present, vary the grid battery of the second tube, and the second condenser, until this whistle is heard. This shows that the second tube is oscillating. After the whistle is heard, adjust the tickler coil and the first condenser to make the first tube oscillate. You can tell when this occurs, by touching the antenna binding post. A loud click will be heard if the tube is oscillating. After both tubes are oscillating, tune the stations in with the first condenser, and

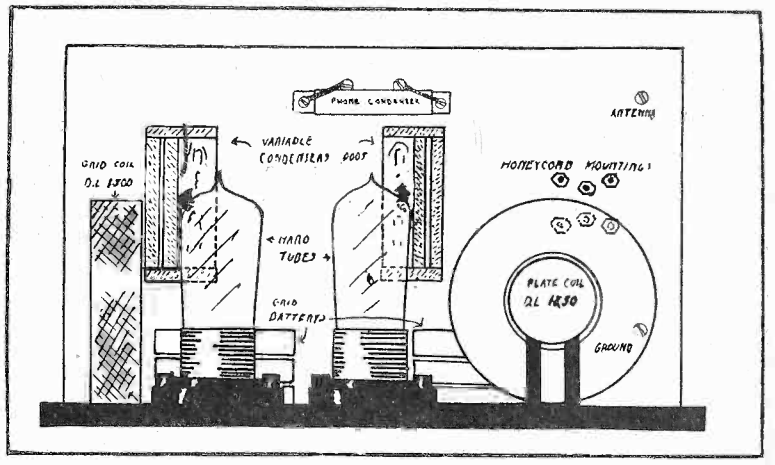


Fig. 2. Suggested location of instruments for efficiency in wiring.

with the honeycomb coils. Then vary the second condenser until maximum amplification without the whistle is obtained.

If a loop is used, it should consist of about 100′ of insulated wire spaced ¼″ between turns and wound on 2′ or 3′ loop.

This receiver will give wonderful results and for the person who is looking for the greatest distance this set is just the thing.

Radio Progress in France

WIRELESS telephony is making marked progress in western France where, through the efforts of dealers, the demand for installations is increasing every month, Consul Fisher reports from Nantes.

Evening concerts are given in Paris by two radio companies and the latest commercial, financial and sporting news is broadcast for interested fans. Cafes, hotels and country homes outside the city limits are said to be especially interested in securing receiving sets.

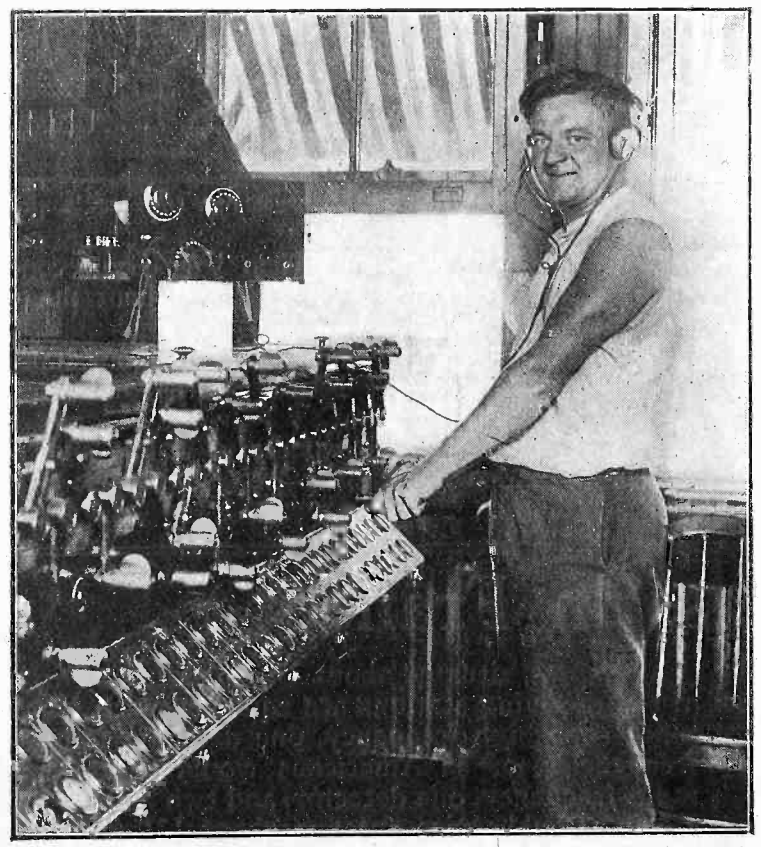
At Nantes, situated about 250 miles from Paris, most of the receiving stations are equipped with four to six tubes—one high frequency, one detector and two low frequencies, or as Americans would describe it, one radio-frequency, one detector, and two audio-frequency tubes. Double wire antenna about 131 feet long and raised about 23 feet from the ground are popular. Most of the apparatus is of French manufacture, the cost averaging 1,600 francs or approximately $150.

Government taxes on transmitting stations run from 100 francs per year up.

Radio News Pictures Come Piling In—H

(C. Gilliams Service)

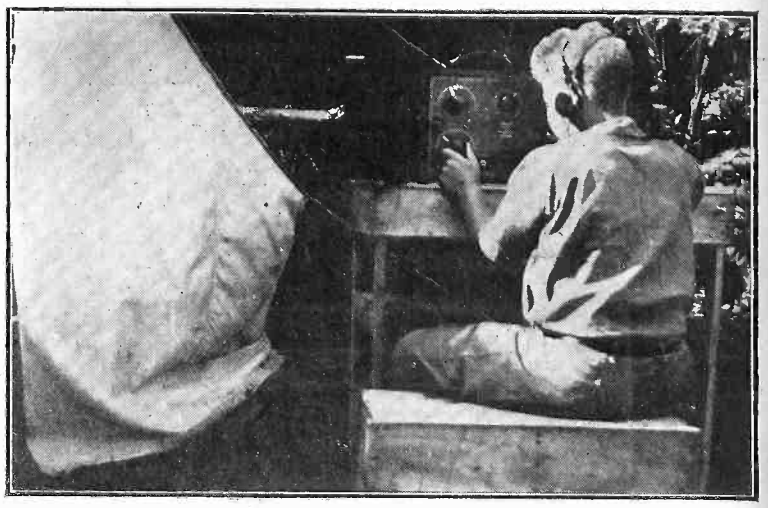
Making hay while the sun shines is not a rite for the farmer alone these days. Mrs. Holt Ramsey, while on her vacation, thought it would be great fun to rake hay if it were not so lonesome. So the farmer's son hooked up a "rustic radio," and now Mrs. Ramsey can make hay while listening to the radio play.



(C. Kadel and Herbert)

Edward Joackin, signal tower man at the 179th Street elevated station, New York City, has installed the radio set seen over the switchboard and listens in while switching the trains around the tracks. He claims that there is no interference at all due to the trains and high voltage lines, and during the wee hours of the morning when the trains run on half-hour schedule he just clamps on the old "ear muffs" and pulls 'em to the distraction of his mates, who have to while away the weary hours "lookin' sharp."

Most Popular Scout in Camp



(C. Kadel and Herbert)

OF course every Boy Scout camp this summer had at least one radio receiver, and the owner of such apparatus was sure to be the most popular scout, especially when there was a good program on. As the camps were scattered far from the touch of daily newspapers, where the baseball scores and other big games were held, it was always possible to keep right in touch with the sport through the daily broadcasting of the scores.

The illustration shows one of the lucky ones tuning in on his Radiola. Portable sets of this type have probably done more to keep the interest of the average broadcast listener alive during the summer months than any other agency. The fact that they operate on dry cells, take up small space and do not weigh much make it possible to take them anywhere you go. They are rugged and stand traveling well.

The portable sets function just as well as the old-time, cumbersome, storage battery sets, and you have the advantage of knowing that you can always have your radio set with you. The "old timers" will remember the sets in vogue six or eight years ago when the amateur who had the most "junk" spread over the largest amount of table space and the most complicated switching devices was always considered to be the "real experimenter." Contrast it with the three and five tube sets of today, that copy anything from New York to San Francisco and yet can easily be carried any place you go.

(C. Kadel and Herbert)

Up to the present time radio has never been considered as an instrument of beauty, but rather as a useful instrument to while away the weary hours, or words to that effect. Now along comes Miss Jean Tolley, who has decked out her receiver in ribbons of bright hue and carefully plaited them around her loud speaker, so that they will harmonize with her negligees and boudoir.

ere's A Fresh Lot

Broadcasting Broadway Hits

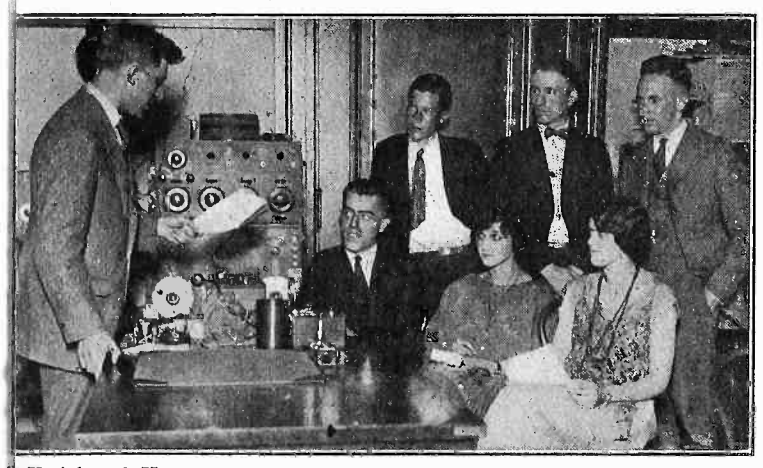
AFTER a few experiments in the broadcasting of popular hits the producers of plays and the broadcasters found such a demand for this type of entertainment that it is done whenever possible.

Of course, the listeners have to have a good imagination to even get a faint idea of what is transpiring at he studio, so, therefore, we are going to let you have peek "behind the scenes" at a broadcasting station luring the performance.

The illustration shows the entertainers of Will Morissey's "Newcomers," recently broadcast from Station WOR. Because of the fact that local "color" is nly necessary on such occasions, it is not necessary to dress up" unless the actress is extremely temperamental and cannot go through her lines without being n costume.

Even at that, it is impossible to get a thrill out f being told that a certain party is a wonderful dancer. Maybe when we have Wireless Movies—don't laugh —they laughed at the Wright brothers—we may be ble to get a peek at the "Premier Danseuse," but until hat time we will have to be content with hearing the ongs and lines. Even at that, what can be nicer than earing a show broadcast while sitting home in your omfy chair with the old briar going strong and a nice ool pair of house slippers on—and the ice box near or a "midnight lunch"?

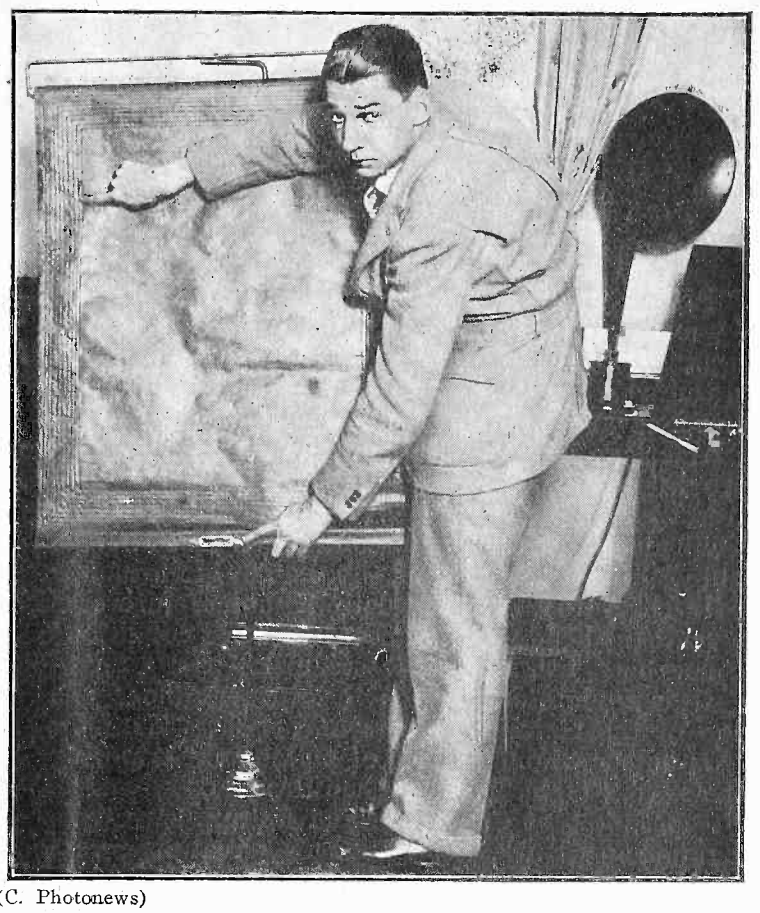
(C. Kadel and Herbert)



(Kadel and Herbert)

Aer the amateur successfully passes the test, he has to go in and listen t a talk on how a set should be operated and when and where to keep qet. The photo shows J. W. Swanson, radio inspector, giving a group of fi amateurs (yes, the two ladies want to be classed as amateurs, or OW.'s on the air), a little talk on the secrecy of messages and the operation of the station during the quiet hours.

Captions by Robert L. Dougherty

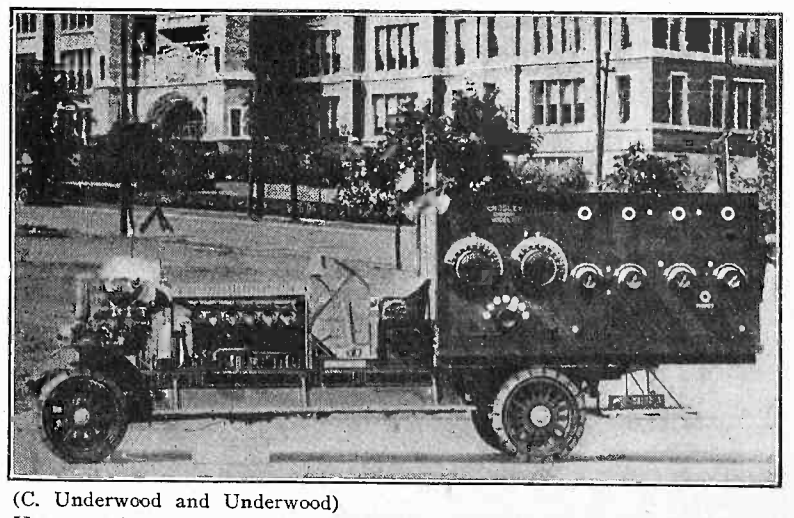


(C. Photonews)

W. H. Bullock, a New York radio engineer of note, has invented a novel indoor antenna. Using an ordinary window shade the wires are sewn around the edge. A loop effect is gotten very easily, and it can be tuned by raising or lowering the shade itself.

(C. Kadel and Herbert)

Leo and Helen Eisemann heard daddy talk about "birdies" in sets, so while dad and ma were out for the afternoon they started in to look for the "chippies," and even though they didn't find any, a good time was had by all—until daddy happened to see them and the remains on the lawn. And there was a fight being broadcast that night, which didn't make it any harder for dad to do his duty.



(C. Underwood and Underwood)

Huge receiver mounted on an Ahrens-Fox fire engine chassis, which formed one of the most interesting displays and floats in the Fall Festival parade recently held in Cincinnati. Music was received by means of the small receiver located on the back step under the big set, and the big horn was located in the large model. Music was received from Crosley Station WLW, and broadcast by means of a large horn inside.

Radio Will Guide German-Built Zeppelin to America

By Carl H. Butman

(*Copyright*, 1923)

WASHINGTON, D. C.—Early in November it is expected that the Zeppelin Company will point the nose of the great German-built ZR-3 toward the west and the long over-seas journey of the navy's second airship will begin. On her maiden trip to her American home at Lakehurst, N. J., a distance of approximately 3,600 nautical miles, radio will guide this latest zeppelin.

She will not be under radio-control, as was the old battleship "Iowa" when sunk by naval gunfire, but radio will carry to her twice daily complete forecasts of the weather ahead and the meteorological conditions on the southern trans-Atlantic steamship route along which, it is understood, she will proceed under the direction of the German officers and crew. The only American officer who is certain of making the trip over is Capt. G. W. Steele, U. S. N., her future commander, but it is possible that Cmdr. Garland Fulton, Lt.-Cmdr. S. N. Kraus and Lieut. R. G. Pennoyer, naval observers now at Friedrichshafen, may also be among the passengers.

Briefly the characteristics of the new aerial passenger cruiser (she is not a war craft, at least not yet) are: length 660 feet, slightly less than the American-built ZR-1; diameter, 90 feet; power, four 400-HP Maybach engines, giving a speed of approximately 80 miles per hour. In one sentence, she is the last word in old-world airships and it will be interesting to witness a comparison and test with the new world's ZR-1, with which ship she will share the gigantic double hangar at the Lakehurst Naval Air Station.

Although the United States has no control over this craft during her flight over the Atlantic, nor, in fact, until she is officially delivered to the navy as a reparation ship, the government is to co-operate in "paving the way" on her first cruise. Through arrangements between the Weather Bureau, Navy, Shipping Board vessels and certain other North Atlantic ships, meteorological data from all along her route will be compiled and radioed twice a day to a station ship in mid-Atlantic. This vessel will have a powerful radio set and will transmit to NAA, Arlington, Va., bulletins for broadcasting to the ZR-3, both before and during her flight.

All details have been arranged between the Navy and the Weather Bureau. The plan includes the receipt of storm warnings, forecasts and statements of weather both at sea and ashore which might in any way affect the passage of the great airship. Observations will start a full week before the craft leaves Germany, and the reports will be on the air until she is housed in her hangar.

Little is known of the radio equipment of the ZR-3, but it is said that it is also of the latest German radio design, and that transmission and reception is assured all the way across the Atlantic, although half that range would be sufficient due to the co-operation of the station ship and station NAA.

RADIOGRAMS

WORLD NEWS HAPPENINGS BRIEFLY PHRASED FOR OUR BUSY READERS

What do you radio, good cheer or the reverse?—Forbes Magazine.

* * *

The new radio station at Coltano, Italy, has been assigned the call ICC and operates on 10,750 meters. Station PCG is the call for the new station at The Hague, Holland, which uses a wave length of 12,500 meters.

* * *

Eastern radio fans have been invited to the World's Dairy Congress, by H. E. Van Norman, president of the congress, who spoke from the Westinghouse transmitting station, KDKA, Pittsburgh, Pa. The congress will hold sessions at Washington, D. C., on October 2 and 3; at Philadelphia, Pa., on October 4; and at Syracuse, N. Y.

* * *

Radio was enlisted last week in the search for William P. Massing, of Washington, D. C., whose father and mother were killed when a train struck their automobile at Crawfordsville, Ind., their home. Massing left Washington two weeks ago to travel through New England in an automobile on a vacation trip and had not heard of the accident.

* * *

The latest discovery reported from the research laboratories of the Western Electric Company is a solution of the mystery of singing oscillations noticed in radio receivers. One of the engineers by chance dissected a worn out "B" battery and found the cells wrapped in scrap sheet music. He claims that the notes so jazzed the electrons as to make them sing. He'd better destroy all evidence at once—the American Society of Music, etc., will be after him for back royalties.

E. F. W. Alexanderson, chief engineer of the Radio Corporation of America, is enjoying a trip in Europe and will return about October 15.

* * *

The General Electric Company has representatives at Caracas, Mexico, who are preparing a contract for the construction of a large radio transmitting station there, it is understood.

* * *

The naval radio station at Point Isabel, Texas, is being removed to Fort Brown, Brownsville, Texas, and combined with the army radio station there. Naval personnel will operate the station, using high and medium power tube sets.

* * *

Delicate electrical recording instruments are being shipped from the General Electric Company plant at Schenectady, N. Y., to be used in determining the nature and the strength of the electric current generated by the recently acquired electric eel at the Bronx Zoo, New York City. Preliminary rough tests show that the 5½-foot eel generates 15 volts. This was enough to knock down Keeper John Toomey twice when he was transferring the eel from one tank to another.

* * *

The medal of the Institute of Radio Engineers has been awarded to John Stone Stone for his pioneer work in radio. The presentation took place recently at the Engineers' Club, San Francisco, and was made by Col. J. F. Dillon, supervisor of the sixth radio district, in the presence of a distinguished assemblage. Mr. Stone is now living in San Diego, Cal., where he is engaged in research work as a member of the engineering staff of the American Telephone & Telegraph Company.

Answers to Readers of Radio World

I am submitting a diagram of my six-tube receiver comprising three stages radio-frequency, detector, and two stages of audio, using parts as shown in diagram. Is it correct? Have you any changes to suggest? Do you think it advisable to incorporate a 23-plate condenser in the plate circuit of the detector tube? Will a condenser in the antenna or ground circuit be of any use? If so, what capacity? Will the circuit bring in DX stations?—Howard B. Dale, 103 *Decatur Street, Brooklyn, N. Y.*

The diagram is correct, except for some minor changes that can very easily be made. Remove the variometer from the grid lead of the first tube. If regeneration is wanted place it in the plate circuit of the detector tube, but with a circuit such as this, it is not advisable to use regeneration. Much better results will be had if it is not used. Also remove the 23-plate condenser from the plate circuit of the detector circuit and grid of the first tube. If neutrodyne reception is wanted with condensers, use separate neutrodons for each tube instead of the method you use. A 23-plate condenser in the antenna or ground lead will cut down on your wave length. It is advisable to use as few condensers (series) in the antenna circuit as necessary and do all the tuning with inductance. Should your set not tune low enough, however, use the condenser in the antenna circuit, and arrange a switch whereby it can be shorted when necessary. A 23-plate condenser will do. The circuit should bring in all the DX stations, weather, of course, permitting and careful tuning being used.

* * *

Does the DeForest set described in RADIO WORLD, *June 23rd, need shielding? If so, where is it grounded when a loop is used? Would an all-wave coupler or any other bank-wound coupler be more efficient than the regular type coupler in this circuit? Would you advise the UV*201A *tubes in place of the UV*201 *tubes? Does not the circuit as described need a grid leak?—D. J. Smith, Blackfoot, Idaho.*

If this circuit is carefully constructed and the parts placed with regard to inter-coupling effects, no shielding is necessary. Would not suggest the use of the bank-wound couplers, because of the fact that most radio-frequency transformers are made to work over a comparatively small band of wave lengths and by using an all-wave coupler you would not gain anything, but would not be able to use it at all. Use a coupler with a range of 200-600 meters. You may use the UV201A tubes very well in this circuit. No grid leak is necessary due to the fact that a crystal detector is used.

* * *

*Can I use the UV*199 *tubes in the circuit described on page* 9 *of* RADIO WORLD, *June* 23? *Can audio-frequency amplification be added to this circuit? In what position should the three coils be mounted on the panel? Should they be stationary or movable?—C. J. Minder, Muscatine, Ia.*

You may use the UV199 in this circuit. A suitable diagram for additional audio-frequency amplification appeared in RADIO WORLD, August 18, in the Answers to Readers department. Use the regular honeycomb coil mounting, which has one stationary coil in the center and two outer ones movable over a 90° arc. You can place the mounting in the most convenient position on the panel.

* * *

*Kindly publish a circuit using three UV*199 *tubes. I have heard that these tubes need special circuits. Is this so? Are they good amplifiers ? Can they be used in reflex circuits? Where may I find a good reflex circuit using two tubes and a crystal for rectification?—George Haneburger, Pittsburgh, Pa. Chas. E. Fisler, E.E., Engineering Department, Adirondack Power and Light Corp., Schnectady, N. Y.*

You will find a circuit for three tubes in RADIO WORLD for September 1, 1923. The tubes do not need special circuits if directions are carried out and proper resistances are used. They are good amplifiers when used with a C battery, or some means of placing a negative charge on the grid. They can be used in reflex circuits.

For a reflex circuit using two tubes and a crystal refer to RADIO WORLD, March 3, page 4, where you will find the diagram you wish. (Fig. 1, using a loop). Honeycomb coils may be used in place of the loop by substituting antenna and ground for the loop and connecting the two honeycomb coils the same as a coupler, using one as a primary and the other as secondary.

* * *

I have a DeForest D7A receiver and would like to use 1½ *volt tubes with the set. Is it possible? How should I do it and what changes will be necessary?—Geo. C. Boyer, Reno, Nevada.*

You can use the 1½ volt tubes without changing the set at all. Get the WD12 tubes and plug them in the same as the regular tubes, substituting three dry cells hooked in parallel instead of the storage battery. Or use the WD11 tubes with adapters, using the same three dry cells. No other change will be necessary.

* * *

*I intend to use a storage battery with the UV*199 *tubes. Where can I purchase a* 60 *ohm rheostat? Will a Bradleystat work? Can I use a* 30 *ohm rheostat and add one of the* 25 *ohm resistances to it in series?—Charles Cosman,* 22 *West Street, Fort Plain, N. Y.*

We do not advise you to use a storage battery with these tubes. They are not meant for use with a storage battery and rheostats will only cause you trouble. Substitute the dry cells as specified. Were these tubes designed for use with storage batteries the manufacturers would so state. For a 60 ohm rheostat use the regulation 30 ohm rheostat with additional resistance in the circuit. A Bradleystat will work as the controlling factor as stated above. Yes.

* * *

Will you kindly publish in your Answer to Readers' column a two variometer, variocoupler circuit with amplification? Must be able to bring in the DX stations and have jacks for the amplifiers.—S. Horton, 1314 *W. Grant Street, Plainfield, N. J.*

Refer to page 12, RADIO WORLD, June 30. Mr. A. E. Herman has written a very excellent article regarding the construction and operation of this type of circuit, giving panel layouts and diagrams that will aid you.

* * *

Kindly advise me where I can obtain blue prints of a set using a loop. I cannot use the outside antenna and ground. Can you also furnish plans for the panel?—E. Lucas, 47 *West Market Street, Akron, Ohio.*

We do not carry blue prints or panel layouts. Should you need them apply to S. Newman & Co., 74 Dey Street, New York City, who handle matters of this sort and can supply you if you give your specifications.

* * *

How may I increase the wave length of a Coast coupler? Can I use honeycomb coils for the purpose? How should I do it?—R. L. Hilton, 2 *Lawrence Street, Waterville, Me.*

The wave length of this coupler may be increased by putting a honeycomb coil in series with the antenna and stator and another one in series with the grid and rotor. By so doing, any wave length may be conveniently reached by the use of the proper size coils.

* * *

I would like the most selective sensitive long distance receiver known. It must use two variometers and a variocoupler. Will the addition of a variable condenser and a tapped honeycomb coil make possible higher wave lengths and closer, finer tuning? Will it be of any advantage whatsoever? Will the circuit enable me to receive from coast to coast? How many amplifiers should I use to get best results? Should they be audio-frequency or radio-frequency? Will the Hartman spider web rotor variocoupler give better results than the optional coupler using a ball rotor and tapped bank wound stator? Is there any circuit known which is more selective and which will cover longer distances than this one? Where may I get the circuit diagram of the most selective and sensitive Cockaday four-circuit receiver? Can a coupler be substituted for the two 1,000*-turn coils in the Leslie Libby circuit published in May* 26 RADIO WORLD, *front inside cover? Can any substitution be made for the three* 25*-turn coils used in the same circuit? What in your opinion is absolutely the best circuit yet discovered for my requirements?—George Allen Gerber, Burlington, Route* 6, *Wisconsin.*

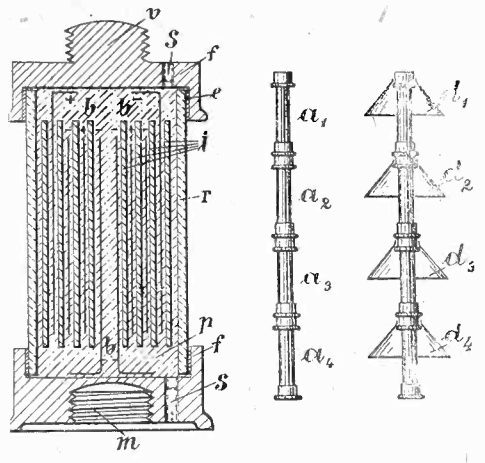
The Armstrong three circuit receiver (two variometer, coupler) is standardized and should be constructed as shown in any of a number of diagrams. A circuit was published in RADIO WORLD, June 30, explaining this circuit using two stages of audio-frequency amplification. It is not advisable to add radio-frequency to a circuit of this type as far as efficiency goes. Do not incorporate any additional condensers or inductances as they rob the circuit of efficiency rather than adding to it. Condensers are not used to tune the circuit and even the condenser in the ground circuit is unnecessary if the coupler is capable of fine tuning with taps. Receiving from coast to coast is a pretty large order, and while 2,000 miles has been covered with the receiver it is doubtful if it is a regular thing. Detector and two stages should prove sufficient for all ordinary purposes. Suggest you use the spider web coupler as it is more efficient as regards distributed capacity. The Armstrong circuit is extremely selective if properly handled, and is the favorite with thousands of fans who know how to operate it. Do not fool around with trick circuits if you wish success. As to a circuit that is better, there are any number that are as good, but we hesitate to prescribe any that are better, as that is almost impossible. Among the principal ones on a par with the circuit are the Hazletine neutrodyne, the Cockaday, the Reinartz, all of which are dependent upon the manner in which the set is constructed and tuned. You cannot use a coupler in place of the coils mentioned in the Leslie Libby article. Do not try to change any of the circuits to please your fancy, but stick to the original diagrams closely. The best circuits for the reception of extremely distant signals are the multi-tube superheterodyne circuits, but they are far too complicated and hard to tune to advise the amateur builder to construct them. Stick to the standard popular circuits and be assured of success. Furthermore, as to the distance any receiver will work satisfactorily over it is impossible to even give a guess. Too many exterior conditions govern the case, and receivers that will not work in one place perform wonders in other places.

Latest Radio Patents

High Tension Condenser

No. 1,461,287: Patented July 10, 1923. Patentee: Emil Pfiffner, Frybourg, Switzerland.

The high tension condensers used hitherto for the purpose of protection from excess voltage for building up electric oscillation circuits and the like show various defects, which reside in their inadequate electric strength, both with regard to the puncturing of the dielectric between coatings of the condenser and with regard to the discharge at the leading in places.



Construction of condensers allowing flexibility and combining several new features of interest.

The high tension condenser described below avoids these drawbacks by subdividing the fall of potential at the terminals of the condenser into a number of partial falls and thus builds up the condenser from a number of partial condensers connected in series. By this means a far greater degree of safeness is obtained as regards the puncturing of the dielectric, as each partial condenser is capable of sustaining many times the partial fall of potential apportioned to it and even in the case of the puncturing of a partial condenser the remaining partial condensers still have sufficient electric strength to withstand the terminal voltage.

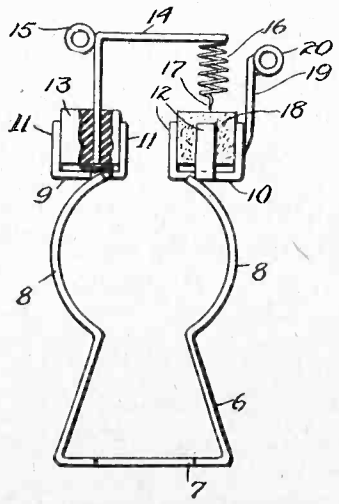
The condenser according to the invention is thus built on the principle of the socalled chain insulators, both as regards the dielectric between the coatings of the condenser and as regards the distribution of potential on the outer surface of the condenser, which is in communication with the atmosphere, while, in contradistinction to the ordinary chain insulators, the distribution of potential is an approximately fully uniform one, for the sake of greater capacity from member to member.

Besides the excellent electrical properties, this construction has the advantage, just as is the case with chain insulators, that condensers may be put together for voltages of any height, by connecting up a number of similar elements in series, each element of which is built for a relatively low voltage, an advantage which is of special importance from the point of view of manufacture.

Wireless Detector

No. 1,460,734: Patented July 3, 1923. Patentee: W. H. Ruf, Roselle Park, N. J.

My invention relates to wireless detectors, my more particular purpose being to give the detector such form that during its active use it may be readily carried around upon the person without causing inconvenience to the individual carrying it, and also to confer upon the detector a high degree of sensitiveness and to give the operator a special and immediate control over its sensitiveness, not generally attained in the use of a wireless detector.



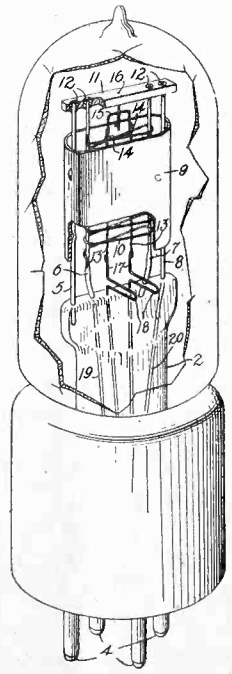
New detector for receiving sets.

Reference is made to the accompanying drawing forming a part of this specification, and in which like reference characters indicate like parts throughout the several figures.

Knoof's Electric Discharge Device

No. 1,456,505: Patented May 29, 1923. Patentees: W. A. Knoof, Brooklyn, N. Y. and P. P. Cioffi, New York, N. Y.

The invention relates to electric discharge devices and a method of manufacturing the same. It has for an object the provision of an electric discharge device in which the need for a glass support for the electrodes in the form of a cane or arbor is eliminated.



Constructional details of Knoof's tube, embodying several new features.

A further object is the provision of such a caneless or arborless electrode mounting as shall provide a rigid and compact electrode unit.

The invention in general comprises a plurality of electrodes which are mounted on a rigid wire frame which is connected to the usual press or squash and are by means of the arrangement of the frame rigidly spaced thereon from each other and the walls of the tube.

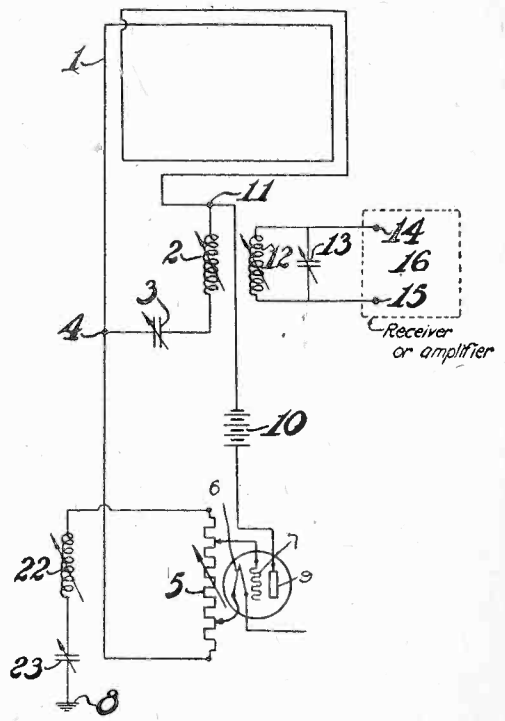
While in the preferred form of our invention, rigid wires are used as frame members, nevertheless a rigid frame providing the same degree of compactness and rigidity may be provided by the use of glass or other members in place of the wire members.

The invention is illustrated in the drawing which represents in a part elevation, part section view, a preferred form of tube embodying our invention.

Directional Radio Receiving System

No. 1,460,801: Patented July 3, 1923. Patentee: R. H. Marriott, Bremerton, Washington.

This application is filed under the provisions of the act of March 3, 1883, and applicant hereby consents that the invention disclosed herein may, if and when patented, be used by the Government or any of its officers or employees in the prosecution of work for the Government, or by any other person in the United States, without the payment to him of any royalty thereon.



System for the reception of unidirectional signals.

My invention relates to radio systems having for its object the unidirectional control of the receipt of signals. To get a unidirectional receiving arrangement, I combine the two-directional characteristics of a periodic loop antenna with the four-direction characteristics of the loop to ground, in the loop circuit via a thermiomic repeater, to neutralize one of the two-directional characteristics of the loop.

This arrangement eliminates the separate open antenna which have been used with periodic loops for unidirectional effects and is less critical for adjustment. Also this arrangement permits of the use of the periodic loop in place of the less efficient aperiodic loop and loop to ground which has been described for unidirectional effects by E. F. W. Alexanderson in Patent No. 1,375,992.

New Applications of the Vacuum Tube

MOST of us are familiar with the ordinary applications of the three-electrode vacuum tube. The function of the tube as an oscillator and modulator, as a detector of high frequency currents and as an amplifier of both radio and audio frequency voltage is too well known by this time to warrant a repetition. Besides these two common uses there are a number of other applications to which the tube can be put, says a writer in the New York Tribune.

It is not a matter of common knowledge that the tube can be used as a voltmeter, measuring both alternating and direct voltages. For the measurement of alternating voltages three properties of the tube are made use of. These are the uni-lateral conductivity, the ability to amplify and the property of its being a voltage operated device. The last named property is very desirable, since it means that the tube requires but a small amount of power in the input circuit for its operation.

The circuit for measuring small a. c. voltages by electrostatic means includes an adjustable grid battery. The output circuit includes a plate battery and a direct current measuring instrument. In operation the plate and grid batteries are adjusted so the tube is being worked at the lower end of the characteristic curve, in which case the plate current will be reduced to exactly zero. If, now, an a. c. voltage is applied to the grid circuit, during a portion of the cycle, the grid potential will become more negative than the potential of the grid battery and during the other half of the cycle will become less negative. In the first case, the plate current will still remain zero, but in the second instance a current impulse will flow in the plate circuit and is measured by the plate meter. In order to return the plate current to zero the grid potential must be increased in the negative direction, and this increase is a measure of the peak value of the alternating voltage on the grid.

In measuring high tension voltages the potential is applied between the filament and plate of the tube. A specially designed tube with a high amplification factor is used. By means of a grid battery potentiometer the grid voltage is adjusted until the current in the plate circuit just falls to zero. Then by a simple mathematical equation the unknown voltage is calculated. To prevent arcing across the internal elements of the tube, the plate and grid are brought out at opposite ends of the tube.

As a power limiting device the vacuum tube finds a wide application. It can be used as a voltage and as a current regulator controlling the output of a generator. The tube in this case is connected in series with the field winding, the grid going to the moving arm of a variable resistance, across the field coils. When the terminal voltage of the machine tends to rise there is an increase of current through the resistance around the field coils. In accordance with Ohm's law, the potential across the resistance rises and in turn the grid becomes more negative and increases the resistance of the tube itself. The increase of the tube resistance cuts down the current through the tube, and hence through the field winding, since it is in series with the tube. When the terminal voltage tends to drop the same process goes on, but the grid in that case becomes positive in value. In controlling the current of a generator the tube is placed in parallel with the field winding.

Another very important use of the tube is in the ionization manometer, an instrument which measures exceedingly low gaseous pressures. It has been found that the gas pressure in a tube is proportional to the number of positive ions formed by the collision of the electrons with the few remaining gas molecules. This is only true, however, if the mean free path of the electrons in the gas is large as compared to the distance between the electrodes of the tube, which occurs at relatively low pressures.

In use the manometer is connected to the vessel containing the unknown pressure, which may be a high power vacuum tube. The grid of the manometer is kept at a positive potential, and the plate at a negative potential, both with respect to the negative end of the filament. The electrons emitted from the filament are attracted to the positively charged grid, some being caught and some slipping through the mesh of the grid and falling toward the plate. Since the plate is negative with respect to filament it is impossible for any of the electrons from the filament to ever reach the plate. They gather an increasing momentum while under the attraction of the grid and attain their greatest velocity in its immediate vicinity. Those that do manage to go through the grid mesh are subjected to two forces, which finally return them to the grid. One of these forces is the repulsion, due to the negative plate, and the other the attraction of the positive grid that the electrons had just passed through, now acting to pull the electrons back to the grid.

Suppose now that gas molecules exist in the surrounding space. Positive ions will be formed by collision if the speed of the electrons is sufficiently great. These positive ions formed between the filament and the grid go to the filament and those that are formed between the filament and plate are attracted by the negative plate and their flow can be measured by an ammeter in the plate circuit, which current flow is a measure of the number of positive ions formed. In the grid circuit is another meter which measures the electron flow to the grid, it being necessary to keep this flow constant.

Such a device indicates rapid changes in pressure because the reading of the plate meter is a direct indication of the amount of gas pressure in the surrounding space. Pressures as low as one billionth of a millimeter of mercury can be easily measured with the vacuum tube manometer.

We have only just begun to realize the vast possibilities of the three-electrode tube, and the above-mentioned uses are but a few striking examples of what the researcher has learned to do with electrons.

WGY Is Heard in Iceland

WGY is the first American radio broadcasting station to be heard in Iceland. In May, Snorri P. B. Arnar, chief radio operator at Reykjavik, 2,600 miles from Schenectady, N. Y., picked up the General Electric Company station regularly, sometimes strong enough to operate a loud speaker. The Schenectady station has been heard at greater distances than Iceland but never before so far north, chiefly because of the limited number of stations in the thinly populated country. WGY has been heard in France, in Chile and in Hawaii. In his letter to the General Electric Company, Mr. Arnar writes:

"Allow me to call your attention to the fact that your wireless broadcasting station WGY, has been heard at this station, being the first American broadcasting station heard here. In May we heard it regularly when atmospheric conditions were favorable, sometimes strong enough to operate the loud speaker. Although other stations were heard, WGY was the strongest and only one I could get the call signal from. I thought this might be of interest to you, as this is the first report from Iceland of a station hearing an American station."

"Saving money by NOT advertising gives the sheriff and auctioneer most of their business."—F. S. C.

Radio Merchandising

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

$8,710,000,000 Crop Returns Make Farmers Rich Radio Prospects

THE campaign just inaugurated by the National Radio Chamber of Commerce to educate the farmers of the country in the practical every day value of radio, as announced in RADIO WORLD last week, comes at an opportune time.

The cash income of American farmers from sales of this year's crop will be about $200,000,000 greater than last year despite the slump in wheat prices, the Department of Research of the American Farm Bureau Federation has estimated, after a study of production reports and markets.

The increase, according to the report, is accounted for by a probable raise in the value of the cotton crop and of the dairy and poultry output.

Corn, the bureau estimated, will bring more than last year, but hogs may bring less, while it was estimated that cattle and tobacco will yield about the same as last year and wheat will bring considerably less.

The forecast for this crop year is $8,710,000,000.

Putting Radio on the Map of the World

IN its seventh of a series of circular letters addressed to government officials in charge of wireless telegraphy and radio telephony the world over, P. C. Kullman & Co., 110 Nassau Street, New York City, known as the wireless brokerage house, makes these statements:

"Can you, as an official, in charge of and controlling wireless telegraphy and radio telephony in your country, and having at your disposal abundant government funds for the advancement of industry and science, the education of your fellow-citizens, the entertainment and enjoyment of your people, remain inactive and silent in the face of this modern progress?

"Do you know that radio telephony affords employment to a million people in the United States of America?

"Do you appreciate that radio broadcasting is listened to by five million persons in the United States, night after night?"

The circular also carries extensive quotations from RADIO WORLD.

Who Are the Best Distributors?

MANUFACTURERS often ask us this question. F. A. D. Andrea, Inc., is one of the oldest and most successful manufacturers with its plant in New York City, so its judgment may be of value to others in the selection of distributors for Greater New York.

Following are the six well established concerns recently appointed by F A D A as its exclusive distributors in the New York metropolitan district:

North American Radio & Supply Company, 5 Columbus Circle, New York City; North Ward Radio Company, 236 Halsey street, Newark, N. J.; Radio Stores Corporation, 218 West 34th street, New York City; Triangle Radio Supply Company, 122 East 23d street, New York City; Victory Electric Company, 1403 Bedford avenue, Brooklyn, N. Y.; National Light & Electric Company, 289 Market street, Newark, N. J.

A New Honeycomb Adapter

A NEWLY patented honeycomb coil adapter, perfected by the F. P. Hall Co., 30 Church Street, New York City, is one of the neatest adapters yet evolved. Due to the fact that a different type of adjustment is provided the range of coupling is practically unlimited as to fineness.

The device itself consists of an angular steel brace fitting against the panel, with the stationary coil at an angle of 45° below horizontal. The movable coil is arranged on a right angled piece well braced, with a screw adjustment which ends in a large knob on the front of the panel. The close coupling is absolute and the loose coupling separates the coils a distance of three inches which is sufficient for all purposes. To illustrate the fine control of the coupling it might be said that it takes 20 complete turns of the knob to separate the coils the full distance.

Aside from the fineness of adjustment the wide range of adaptability is another good point. It is so arranged that the builder may use two honeycomb coils as a variometer or anything his mind might suggest. It can even be used to provide tuned radio-frequency transformers, using two coils as the transformer, and accomplishing tuning by the use of the coupling. It is sturdily made, and needs only two holes to accommodate it to any panel.

Features of WLW's Program

STATION WLW, Crosley Manufacturing Company, Cincinnati, operating on 309 meters, will include in its program for September 17 a number of special Odd Fellows' features in connection with the Odd Fellows' Convention at Cincinnati.

On September 18 a special Atonement program arranged by the Avondale Synagogue will be featured.

TELEPHONE NUMBER CHANGED

The telephone number of RADIO WORLD has been changed to LACKAWANNA 6976

Radio Literature Wanted

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

E. G. Voell, 435 Cattell St., Easton, Pa.
R. E. Bowman, 1215 West Eighth St., Wilmington, Del. (Interested in parts and a simple DX set.)
L. E. Eaton, Duncan, Okla.
Rafael Gabaldon, Bocono, Venezuela. (Wants correspondence with manufacturers with view to becoming distributor and retailer.)
Emeral White, Exton Ave., White Horse, Trenton, N. J.
F. Willard Halstead, 167 Park St., Waterloo, Iowa. (Manufacturer and retailer.)
N. W. Andrews, 518 Colo Ave., Walesburg, Colo.
Maurice & Co., Langton News, Delacourt Road, Blackheath, S. E. 3, England.
Nevada Electrical Engineering Co., F. W. Humrich, manager, Nevada, Iowa. (Retailer.)
William Bodley, 4915 Forsyth Ave., East Chicago, Indiana. (Interested in transmitting apparatus.)
George A. Muir, 292 Madison St., Memphis, Tenn. (Will open retail radio store shortly.)
Julius Joseph, Jr., 1114 Seaview Ave., Far Rockaway, N. Y.
Henry Du Bois, 171 Westminster Place, Lodi, N. J.
Geo. W. Blatchley, Jr., R. D. 6, Freehold, N. J. (Will build some new apparatus soon.)
R. G. Phillips, 63 East 36th Place, Chicago, Ill.
Vernon Jaynes, Box 25, Parkersburg, Iowa.
Albert Poivier, 1 Athletic Ave., Cote des Neiges, Montreal, Canada.
Leslie J. Voorhees, 27 Charles Street, Pittsfield, Mass.
Jerome Karmiol, 1526 39th street, Brooklyn, N. Y.
E. C. King, 836 N. Robberson Ave., Springfield, Missouri. (Will buy factory made set.)
Don Smith, Box 107, R. F. D. No. 2, Augusta, Kansas.
Arthur Beach, Beacon Falls, Conn.
John S. Welch, 316 East Twelfth St., New Albany, Ind.
W. N. Anderson, 2824 Euclid Ave., Kansas City, Mo. (Interested in home-made tube set.)
Mott Souders, Jr., 206 North Broadway, Red Lodge, Montana.

Station WOR Backs Down in the Music Fight

STATION WOR, operated by L. Bamberger & Co., Newark, N. J., has abandoned its appeal to the Supreme Court in the music copyright fight and has applied for and been granted a license to broadcast copyrighted music controlled by the American Society of Composers, Authors and Publishers, according to a circular issued by the latter.

The circular gloatingly concludes: "More than ample radio 'plugging' opportunities are now available to our members."

New Radio and Electrical Firms

The Audio Laboratories, New York City, has increased its capital stock from $5,000 to $20,000.

Kelly Electric Co., 523 Elm Street, Cincinnati, has been incorporated with a capital stock of $10,000.

S. Davis Electrical Co., New York City, $10,000; N. H. Streimer, B. B. Kalman, M. L. Margoshes. (Attorney, H. Margoshes, 302 Broadway.)

Milwaukee Radio Amateurs' Club Resumes Meeting

THE first meeting of the Milwaukee Radio Amateurs' Club, Inc., following the annual summer recess will be held on September 20, at 8:00 p. m., in the Trustees' Room of the Milwaukee Public Museum. One week later the society, which is over six and a half years old and is now a non-stock corporation, will hold its annual corporate meeting at which there will be an election of members of the board of directors. The newly selected directors will then appoint the five general officers and the committee chairmen.

At the several mid-summer meetings of the present directors extensive plans were formulated for a fall membership campaign. Not only radio amateurs living in the city of Milwaukee will be invited to join the club, but all those residing in the city's suburbs and surrounding county. The society has long been affiliated with the American Radio League and in reality is a local section of it; therefore all of the A. R. R. L.'s local members will be solicited as well as licensed radio amateurs. The club is primarily one for amateurs, but membership is open to others interested in radio, particularly to technically inclined broadcast listeners.

A lecture program is being arranged. The committee in charge promises to present during the season some of the best known amateurs in the country as well as several high league officials and men in the commercial side of the radio field who have a known reputation as designers and manufacturers. Traffic discussions and means to reduce any local interference that there may be will receive the attention of some gatherings of the members.

General co-operation with all other interests in the radio field will constitute the policy of the Milwaukee club. No great financial obligations are assumed by joining, and with 100 per cent. of the amateurs represented the association can act as one for all amateurs in any question involving their rights. The club's mail address is 601 Enterprise Bldg., Milwaukee, Wis.

Radio Dealers in Mexico

THE Radio Trade Association, 1133 Broadway, New York City, has supplied to its manufacturer members a list of electrical dealers in Mexico with street addresses and other pertinent information. The importation of American radio apparatus into Mexico is duty free.

Radio Show Will Start Season With a Boom

THE second annual American Radio Exposition, which will be held at the Grand Central Palace, New York City, from October 6 to 13, is expected to inaugurate the biggest and best season yet enjoyed by the radio industry.

Over 60 exhibitors already have contracted for more than 100 booths and it is certain that when the doors are opened to the public every inch of exhibition space will be occupied.

A number of new features will be shown, all of special interest to people who are not now owners of receiving sets.

J. C. Johnson is general manager of the exposition. He may be addressed at the Grand Central Palace, New York City, for particulars regarding this important event.

Radio Protection for Nantucket Shoals

A NEW lightship, equipped with a radio fog signal, has been put into service on Nantucket Shoals, Secretary of Commerce Hoover announced recently.

The new vessel will have the first radio fog signal, an automatic apparatus sending during fog a group of four dashes every 30 seconds, enabling vessels with radio direction finders or compasses to obtain an accurate bearing from a distance of 30 miles or more in any weather, and to steer for and "make" the lightship. The light vessel will also have two other fog signals, a powerful steam whistle, and a submarine bell; a little later a submarine oscillator will be substituted for the bell. The electric signal light of 3,000 candle-power will show at the masthead. There is radio equipment for communication, with a radio operator in attendance, reporting vessels in distress, as well as for the maintenance of the light vessel itself.

Broadcasting in Sweden

THE status of broadcasting in Sweden is a curious one. The Government has now decided that transmitting stations will be constructed by the state, but will be leased to operating companies. Receiving stations may be established by private persons upon obtaining a license from the Government, Commercial Attache H. Sorensen at Copenhagen reports.

Radio Trade Notes

Maurice & Co., radio engineers, Langton Mews, Delacourt Road, Blackheath, S. E. 3, England, inform Radio World that they are desirous of importing American radio goods. Address Mr. E. N. Gill.

* * *

George A. Muir, 292 Madison street, Memphis, Tenn., will shortly open a retail radio store. He wants information on radio parts, cabinets and panels.

* * *

E. C. King, 836 North Robberson avenue, Springfield, Mo., writes to RADIO WORLD that he will be in the market in ninety days for a factory-made receiving set. He also is interested in sets having detector only and with one and two steps of audio-amplification.

* * *

L. H. Hardy & Sons, Inc., have opened a retail radio store at 528 Sixth Avenue, New York City.

Sunday Program from Station WGI

ON Sunday, September 16, Station WGI, Medford Hillside, Mass., will broadcast the following program:

4:00 P. M.—Twilight Program.

1. "Adventure Hour," conducted by the Youth's Companion.
2. Stories by Arturo.
3. Concert Program by the Edison Laboratory Phonograph, courtesy of Vocalion Hall.

8:30 P. M.—Evening Program.

1. Twelfth of a series of talks on "World Unity," conducted by the Federation of Churches.
2. Musical concert arranged by Miss Alice McLaughlin, soprano.
3. Musical concert arranged by Frederick K. Hall, violinist and pianist.

Coming Events

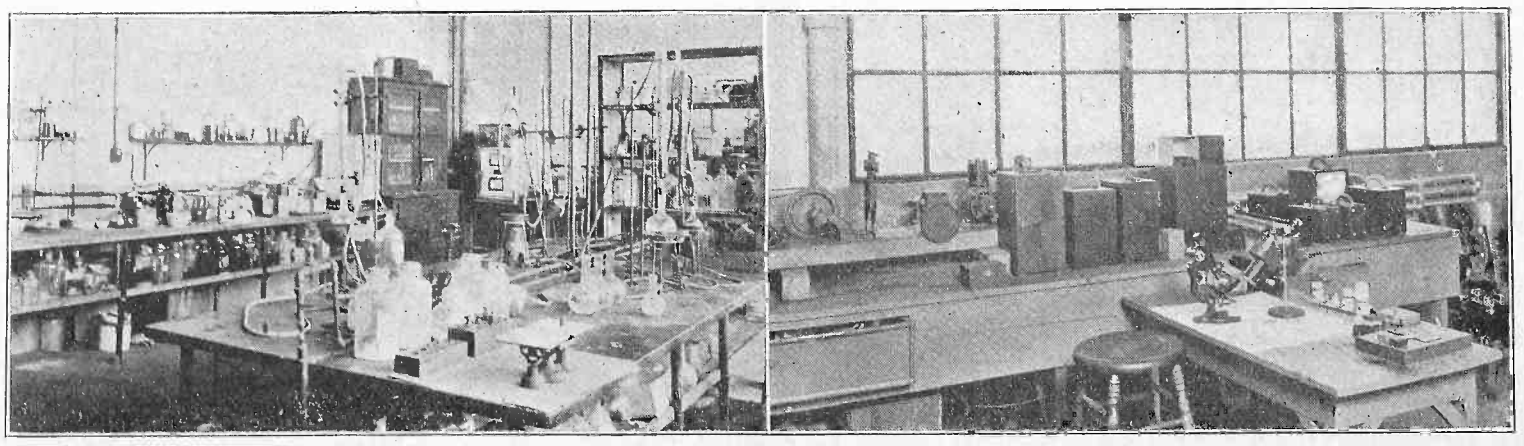
NATIONAL RADIO WEEK, November 25 to December 1, 1923.

AMERICAN RADIO EXPOSITION, Grand Central Palace, New York City, October 6 to 13, 1923. J. C. Johnson, general manager.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, Pacific Coast convention, Del Monte, Cal., Oct. 2-5. F. L. Hutchinson, 33 West 39th Street, New York.

AMERICAN RADIO RELAY LEAGUE, second national convention, Chicago, Ill., September 12-15, 1923. Chicago Radio Traffic Association, 959 The Rookery, Chicago, Ill.

Where Bakelite Is Tested Electrically and Chemically



Two views in the extensive and completely equipped laboratories where the insulating material "bakelite," familiar to all radio fans is tested for mechanical strength and insulating qualities.

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WGY Is Easy to Get

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He Used Radio Bait

A FISHERMAN who was having wonderful success while his friends were coming home with only empty creels and appetites was asked by one of them to what he attributed his exceptional luck.

"Luck?" he snorted, "that isn't luck! I just cater to the fish."

"Cater to the fish? What do you mean?" queried the mystified friend.

"Well, I take my radio set along and drop the ground wire down along side of my hook. Then I tune in station WORM," he said—and started to run.

Strong Praise—Thanks!

EDITOR, RADIO WORLD:

I buy RADIO WORLD regularly because it has more real meat for the "radio bug" than any other publication—and I read them *all*.

Yours truly

PAUL THORNE.

927 Buena Park Terrace,
Chicago.

More Prizes for Radio Drama

THE announcement by WGY, the General Electric Company radio broadcasting station, of a prize offer of $500 for the best radio drama submitted during the three months period ending November 30, has brought hundreds of letters of inquiry and there is every evidence that many contributions will be made.

Additional prizes in varying sums up to $100 will be awarded for other plays deemed suitable for radio production. The offer of the General Electric Company is made for the purpose of stimulating interest in the writing and development of a new form of drama, a play which reaches its fullest appreciation through the ear, the mind and the imagination.

Plays will be considered that fall under any of the following classes: Drama, melodrama, comedy-drama, comedy and farce-comedy. Manuscripts must be original and must be accompanied by written permission of author (or, if copyrighted, by the person or persons controlling the copyright) giving the General Electric Company exclusive right to produce the play by radio. Rights for use other than radio may be reserved by the author. Two copies of each play must be forwarded and should be sent by registered mail. The author should retain a complete copy.

The author's name must not appear on any manuscript offered in competition. Instead, the manuscript should be signed with a *nom de plume,* which must also be written on a sealed envelope containing the contestant's real name, address and permission granting exclusive right to produce the play by radio. This envelope should be enclosed with the manuscript and will not be opened until the award has been made. A synopsis of the play must be attached to each manuscript.

A play requiring one and a half hours for performance is desirable; in any case the time should not exceed two hours. Small cast plays, employing five or six characters are best adapted to radio, as they permit quick comprehension of the plot and give rise to no confusion in distinguishing characters. Plots must be clean with no attempt at questionable situations.

Jewish Religious Services to Be Broadcast

RADIO as a vehicle for overcoming religious misunderstanding is to be utilized by the United Synagogue of America, according to an announcement issued last week by Rabbi Samuel M. Cohen, executive director of that organization, which comprises the 175 leading conservative Jewish congregations of the United States. Arrangements for broadcasting complete programs of religious services preceding all the Jewish festivals have been made by Rabbi Cohen with the American Telephone & Telegraph Company. The programs will be sent out from WEAF and WMAF.

San Francisco-Cavite by Radio Twice Daily

THE United States Navy Radio station at San Francisco now receives messages direct from the station at Cavite in Manila Bay twice daily as a result of improvements just completed.

The two schedules of filing are at 2 A. M. and 2 P. M. Previous to the recent improvements the only filing schedule was at 2 A. M.

The distance by great circles from Cavite to San Francisco is 6,221 miles, and so far as known is the longest one way radio circuit in the world actually handling traffic.

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Chicago.

More Prizes for Radio Drama

THE announcement by WGY, the General Electric Company radio broadcasting station, of a prize offer of $500 for the best radio drama submitted during the three months period ending November 30, has brought hundreds of letters of inquiry and there is every evidence that many contributions will be made.

Additional prizes in varying sums up to $100 will be awarded for other plays deemed suitable for radio production. The offer of the General Electric Company is made for the purpose of stimulating interest in the writing and development of a new form of drama, a play which reaches its fullest appreciation through the ear, the mind and the imagination.

Plays will be considered that fall under any of the following classes: Drama, melodrama, comedy-drama, comedy and farce-comedy. Manuscripts must be original and must be accompanied by written permission of author (or, if copyrighted, by the person or persons controlling the copyright) giving the General Electric Company exclusive right to produce the play by radio. Rights for use other than radio may be reserved by the author. Two copies of each play must be forwarded and should be sent by registered mail. The author should retain a complete copy.

The author's name must not appear on any manuscript offered in competition. Instead, the manuscript should be signed with a *nom de plume,* which must also be written on a sealed envelope containing the contestant's real name, address and permission granting exclusive right to produce the play by radio. This envelope should be enclosed with the manuscript and will not be opened until the award has been made. A synopsis of the play must be attached to each manuscript.

A play requiring one and a half hours for performance is desirable; in any case the time should not exceed two hours. Small cast plays, employing five or six characters are best adapted to radio, as they permit quick comprehension of the plot and give rise to no confusion in distinguishing characters. Plots must be clean with no attempt at questionable situations.

Jewish Religious Services to Be Broadcast

RADIO as a vehicle for overcoming religious misunderstanding is to be utilized by the United Synagogue of America, according to an announcement issued last week by Rabbi Samuel M. Cohen, executive director of that organization, which comprises the 175 leading conservative Jewish congregations of the United States. Arrangements for broadcasting complete programs of religious services preceding all the Jewish festivals have been made by Rabbi Cohen with the American Telephone & Telegraph Company. The programs will be sent out from WEAF and WMAF.

San Francisco-Cavite by Radio Twice Daily

THE United States Navy Radio station at San Francisco now receives messages direct from the station at Cavite in Manila Bay twice daily as a result of improvements just completed.

The two schedules of filing are at 2 A. M. and 2 P. M. Previous to the recent improvements the only filing schedule was at 2 A. M.

The distance by great circles from Cavite to San Francisco is 6,221 miles, and so far as known is the longest one way radio circuit in the world actually handling traffic.

The Wireless Oracle

By Hirsch M. Kaplan

Say, did you hear the Zimbler Trio? You didn't, and they were on the air twice? Well, you must be asleep!

WFI gave us an afternoon program by the Bellevue-Stratford Orchestra. They're the berries.

I think in the near future we'll conduct a contest for the most popular orchestra that plays or has played over the radio. What do you say?

For you fans who would like to continue dancing after the Lucky Strike Orchestra has done their bit, I suggest tuning in Meyer Hoffbrau's Orchestra at Station WGY.

Lillyan May Challenger is still making herself a favorite with the radio audience.

WHAZ makes me think that they are a local station by the way that they come through. They had some good vocal selections to offer.

WDT, you made an attempt at improving your station, but aren't you going through with your plans?

Again we see that this column must do some good, for again we've had the celebrated violinist Illumento Miserando over the air. Fine stuff, Illumento.

WNAC helped us to pass a pleasant half hour by offering the Cherub Trio.

"Jolly Bill Steinke," the popular artist, was with us once more. He had his dog with him or I'll say that he gave a fine imitation of one. Excuse me for giving your secrets away, Bill.

Just let me give you readers who have no radio sets at present a bit of advice. The programs are getting better and better each day. There is no doubt that when the cold weather arrives and we don't wish to leave the house, the programs then offered will make us forget that the cold weather has arrived. So, you'd better get your set now and not miss anything.

Station KLK, the Oakland "Tribune's" station at Oakland, Cal., is now sporting a slogan. If you should hear "Where Rail and Water Meet" some evening or morning, you'll know where it comes from. Little danger now, though.

Where do all these swell orchestras come from? This time it's the Blue Ribbon Syncopators. They're some jazz babies.

Yes, Roxy and his clique were on the air again and they were better than ever.

Well, I suppose you danced to the music of the Hotel Astor String Ensemble and Orchestra, What! You didn't? What's the matter—got two left feet?

The Four Aces Male Quartet from WMAF had a splendid program.

Would appreciate hearing from you folks as to how you like this column. Any suggestions or criticisms would be gladly welcomed. Thank you.

Heard at the Radio Counter

Part XXII

SAY, Brown, have you noticed that there was not such a slack summer this year as last?"

"Have I? Now you're talking foolish. Didn't I lose a week of my vacation just because of it?"

"Well, you should worry, look at the extra commissions that you will get—maybe."

"Well, that's O. K., but you know that I think that the reason for the whole thing is that last year the amateurs were sceptical about summer receiving, simply because they had heard of the bug-bear of static, and this summer they realized that it was not such a terrible thing because of the explaining done in various magazine articles."

"Guess you're right there, old man. Wonder what this fellow wants? He has been looking in the window for the past half hour and finally seems to have picked up enough courage to come in. Guess I will take him, and then go out to lunch. Wait for me, will you?"

"I beg your pardon, but I wonder if I might ask you for some information regarding an inexpensive receiving do-dad for my nephew?"

"Surely, about how much did you want to expend in the purchase of a set? We have them at all prices."

"Well, I understand that those that have lamps are pretty expensive, but I am willing to spend $50.00 if that will get a complete machine."

"Well, we can sell you this one over here for $48.50 complete this week, from antenna to ground. It is a special sale, and a very fine instrument made by a Western concern. Would you care to see it demonstrated? Kindly step over into this booth, and I will connect it for you."

"Why, that is fine, it seems so loud and clear. What station is that talking now?"

"That is WOR, Newark, New Jersey, giving baseball scores."

"Really, do they give out the scores by, er, radio?"

"Surely, and that is not all. The latest sport news as well. I take it you are interested in baseball?"

"Well, I never did care for nothin' in the way of sports except the game. Wonder if I could take that now? Do you have them done up, or do you have to send them?"

"We have them all packed in export cartons. Be careful to follow the diagram in connecting the batteries and unpacking the tube—do not call it a lamp."

"Well, here is your money. I want to thank you, and I will drop in if I have any trouble."

"Perfect. Good day, sir."

WOC Resumes Full Schedule

STATION WOC at Davenport, Iowa, announces that it will resume its full winter schedule on Sunday, September 16. This schedule comprises a musical program every night in the week, except Tuesday, and a more extensive program on Sunday evening than heretofore. Details of the new programs will be released through the various publications and will be announced by radio, so that all may acquaint themselves with the changes being made.

Back numbers of Radio World supplied at regular price of 15c. a copy. Any 7 copies for $1.00. Radio World, 1493 Broadway, New York.

Propose a Broadcasting Monopoly for Sweden

A NOVEL plan for organizing radiophone broadcasting in Sweden, designed partly after studying experiences in other countries, especially the United States, and following the lines previously drawn up by the Swedish Government Department of Telegraphs, has been submitted to the Government by a corporation now being formed. This company seeks a joint monopoly with the Government on radiophone broadcasting in Sweden. Among the founders of the new corporation are the L. M. Ericsson Telephone Company and leading manufacturers of electrical and radio apparatus.

The plan provides for extensive co-operation with the Government, which is to erect the sending stations successively. These stations will be at the disposal of the new operating company at least five hours a day for an annual fee corresponding to 6 per cent. of the cost of construction of each station. In addition the company must pay for the power as well as for the bulbs used.

It is suggested that individual owners of receiving sets be required to pay an annual license fee of 20 kroner, or about $5.40, and that societies, places of entertainment, etc., pay a maximum fee of $1,000 kroner. Any make of receiving set may be used. The operating company agrees to provide in its constitution that the annual dividend shall not exceed 7½ per cent. cumulative. The period of the company's concession is for ten years ending in 1934, after which the Government is to have first option on taking over the complete monopoly upon the payment for the equipment.

One of the clauses in the proposal provides that whenever the state has some urgent report to broadcast during the company's allotted period of five hours, such report shall be sent broadcast without a charge to the state. The radio entertainment program includes general news, economic reports, weather reports, lectures, etc. On Sundays religious programs will be given. It is planned also to have special programs for children during the week.

Regarding the broadcasting of advertising matter the new company endorses the government's recommendation that this be limited. It proposes that such material be of the type usually run in newspapers as reading notices. The danger of unfair competition with newspapers in the distribution of news will be avoided through an arrangement with the Central Co-operative News Agency of the Swedish Press, which will select and edit all the news.

$7,000,000 for Ford Advertising Next Year

YOU'D think that if there was one thing in the world that didn't need advertising, it would be the Ford car. Henry Ford doesn't think so, however. In spite of all the free publicity the car gets, in spite of the fact that at present the production is behind the demand, Mr. Ford has announced that his company will spend $7,000,000 in newspaper and magazine advertising in 1924. Any business man in the radio field can afford to follow Henry Ford's ideas—he's proved their worth.

Italy May Get Radio Station from Germany

Writing from Rome, Italy, Commander A. Tosi informs the New York Tribune that a question which is interesting to radio as well as governmental circles just now is: "Should the Italian government accept as part of the reparations a complete radio station which it is believed the German government is willing to send to Italy?"

From my own point of view I think that in the light of the new discoveries which Senator Marconi has just made (and complete details are known to only a few) it would be a great mistake. By accepting this complete installation Italy may be getting something which in a few months will be absolutely obsolete. When it is clearly seen how Marconi's new discoveries affect the present wireless system, then only should such a decisive step be taken.

With the settlement regarding cable concessions Italy has had a setback which will delay her reaching a state of perfection in her radio service which she had hoped to attain by now.

The Italo-South America cable will link up two continents. The Italian station will be at Fiumicino, seventeen miles from Rome. The line will pass from Italy to Malaga, the Azores, then to Rio de Janeiro before reaching the other terminus, which is Buenos Ayres. The length of the cable will be nearly 7,300 sea miles. The other cable (which will link up Italy and North America) is called the Italo-Azores and consists of a new cable from Italy to the Azores joining there to the old German cable, which was given to Italy as war reparations by Germany.

Though the thought of linking up Italy and North and South America by cable has been pleasing Italians in both continents, in reality Italy has been for the past five months connected by radio, as the new Coltano station near Pisa is in constant communication with the South American radio stations.

Few except radio experts realize that Italy has a wireless station under control of the navy which is second to none, in installation and service, in the world. The Italo-Azores Company will lay the cable at its own expense without any material help from the Italian government. As the cost of installing wireless is less than that of laying a cable it is possible that the Coltano station could cut the price of transmission so that the cable company could not make expenses, or on the other hand the cable company might cut rates to such an extent that Coltano would be the sufferer.

It is well to remember that though this company has no subsidy or guaranty, its officials must have some verbal assurance that there will be sufficient business to keep the cable from dying as soon as it is born. It would be foolhardy for any company to erect a station and lay a cable without exactly knowing how business is going to run.

Evidently the Italian government has assured this company that the Coltano station will not cut prices to their disadvantage. If so this arrangement will certainly paralyze Coltano when the cable is in good working order.

In the light of the new Marconi experiments the expense of laying cables seems preposterous when one thinks of Senator Marconi's predictions after his recent experiments. He promises that once the radio stations between North and South America have been erected a message by wireless can be sent at a cost of about seventy centimes to North America and one lira and a half to South America, thus representing about one-tenth of the amount at which the cable tariffs have been fixed.

When motor cars were first invented opposition was made to them, and the same is true with every new invention. Progress cannot be kept back. Even the most pessimistically inclined against radio must realize that the day will come when Italy, too, must have her perfect system.

Radio World is $6.00 (52 issues), $3.00 six months, $1.50 three months, 15c. single copy. Radio World, 1493 Broadway, New York City.

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 and other fields. Readers of RADIO WORLD will find that it pays to read these columns every week. Advertisers will get an eight-day service here—that is, copy received for this department will appear in RADIO WORLD on the news-stands eight 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 ads. if copy is received at this office eight days before publication. RADIO WORLD, 1493 Broadway, N. Y. C. (Phone, Bryant 4796).

SAVE $20.00—Our unwired regenerative receiver contains the best of material mounted on panel in handsome oak cabinet. Value that will surprise you, and the price is only $14.00, prepaid. C. E. Janson, 28 Bellevue St., Lowell, Mass.

STOP EXPERIMENTING—GET RESULTS with circuit used in leading WD11 tube set on market. Paragon of simplicity in design and construction. Circuit and specifications, 50c. OKAYED SUPPLIES CO., ELWOOD, IND.

FRENCH COLONIES FREE—Beautiful picture set, including Native Chiefs, Tigers, Pictorials; 2c postage. Empire Stamp Company, 351 Lippincott St., Toronto, Canada.

WESTINGHOUSE R. C. 3 tube set, like new, for sale cheap. O. Lyshang, 6 Althea St., Dorchester, Mass.

EXCHANGE JOLLY, INTERESTING LETTERS THROUGH OUR CLUB. Betty Lee, Inc., 4254 Broadway, New York City. Stamp appreciated.

LONESOME! MAKE NEW AND TRUE FRIENDS. Confidential. Write DOLLY GRAY AGENCY, Box 186B, Denver, Colo.

SECOND-HAND Westinghouse R. C. Regenerative receiver, consisting of detector and two-step amplifier, $65.00. Three Erla Radio Frequency Transformers, $6.00; Crosley two-step amplifier, $14.00. All of the above is good as new and will work with all standard bulbs. Address Randolph Whitehand, Albany, Georgia.

EVERY RADIO FAN should have these two books, "101 Receiving Circuits" and "Six Successful Receiving Sets." By M. B. Sleeper. They are the most up-to-date radio books for the fan who likes to make his own, and will help you out and save you many times their cost. Both books are full of illustrations. Price, 50c. each, with 10c. extra for postage, or both for $1.00 sent postpaid. COLUMBIA PRINT, 1493 Broadway, New York City.

SUPER-SIMPLICITY CIRCUIT—1,000 to 1,500 miles on one tube, one control, 150 to 25,000 meters. No rheostat, storage battery, vario coupler, variometer, 3-coil mounting, variable inductance, tape or radio frequency. Nothing to guess about. Complete hook-up and particulars, $1.00. No checks. Build your own. Save 50% and get better results. RADIO EXPERIMENTAL LABORATORY, Box 194A, Berkeley, Calif.

CHEAPEST TO BUILD—Easiest to tune. Get particulars Rokay Single Control Hook-up. Describe your set. Rokay Electric Company, Ingomar, Ohio.

WANTED—Paragon RA-10 Receiver and DA-2 Amplifier. State best offer. Ted Boston, Marion, Ky.

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FOR SALE—De Forest Portable Radiophone Transmitter. 5-watt bulbs; new, $100 net F. O. B. P. O. Box 33, Red Bank, N. J.

60,000 MILES ON A HOME-MADE RECEIVER. 2,600-mile range. 100 station log and hook-up for the asking. Maitland Roach, 2908 Columbia Ave., Philadelphia, Penn.

RADIO SET—Extremely sensitive tuner and one step in 8x18 walnut cabinet. I hear Kansas City Star; Omaha, Neb., etc. Atwater Kent parts. Complete with two WD11 tubes and phones, $70 postpaid. Address, Garth Showers, Tannersville, N. Y.

DETECTIVES NEEDED EVERYWHERE—Work home or travel. Experience unnecessary. Write, American Detective System, 1968A Broadway, N. Y.

WIRING A HOUSE. By Herbert Pratt. Shows a house already built; tells just how to start about wiring it; where to begin; what wire to use; how to run it according to insurance rules; in fact, just the information you need.. Directions apply equally to a shop. Sixth edition. COLUMBIA PRINT, 1493 Broadway, N. Y. C. Price, 35 cents.

WOULD YOU LIKE TO RECEIVE RADIO LITERATURE? Are you in the market for radio goods of any kind, either as a consumer, a distributor or a retailer? If so, send us your name and address on a post card and we will see that your name reaches the right people so that you will receive pamphlets, circulars, etc., regarding the goods you want. Address SERVICE EDITOR, RADIO WORLD, 1493 Broadway, New York City.

RAND-McNALLY RADIO MAP OF UNITED STATES—Is 28 x 30 inches in size. The locations of broadcasting stations are shown by distinctive symbols. The call letters of each station are given, also the wave lengths of each. The Radio Districts with numbers are shown in red and the Radio Relay Divisions are in blue. Time zones are included. Alphabetical lists of stations and alphabetical lists of call letters are in the margins. Convenient pocket form with cover. Price, 35c. The Columbia Print, 1493 Broadway,

WANTED—One K. W. used Navy Quenched Spark Gap. Also Price wanted. Harvard Radio Laboratories, P. O. Box 1781, Boston, Mass.

FOR SALE—Three Radio Corporation, 200 to 5000 meter radio frequency transformers, like new, fine for superhetroydne, $5.00 each. Fine Phonograph attachments, needle operating kind. Guaranteed good as Magnavox, $10.00 each. Any of above sent post paid, collect, on receipt of $1.00. Everything sold on money-back guarantee. RAYMOND MOORE, Box 404, Lakeside, Ohio.

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RADIO WORLD, 1493 Broadway, New York City

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It had page after page of interesting and practical ideas and hook-ups for people who are going camping, canoeing, yachting, or just vacationing up in the mountains. You really can't afford to be without it. If you intend leaving the city behind this summer and want to take your radio with you. Dated June 2. Mailed for 15c.

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When the static is too great for radio reception your AUDIOPHONE Loud Speaker can be used with the Bristol Phonograph Record Reproducer on your phonograph. Then you may have concert or dance program without interruption.

Attached instantly without mutilating the instrument in any way—the Bristol Phonograph Record Reproducer can be used with any make of phonograph. Equipped with such an outfit there are no disappointments—it is always ready—never fails. For dance music you have the equivalent of an orchestra, but without the expense.

The tone of the phonograph thus amplified thru the AUDIOPHONE has volume enough to fill large rooms and the quality is round—smooth—and beautiful—entirely free from mechanical noises.

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