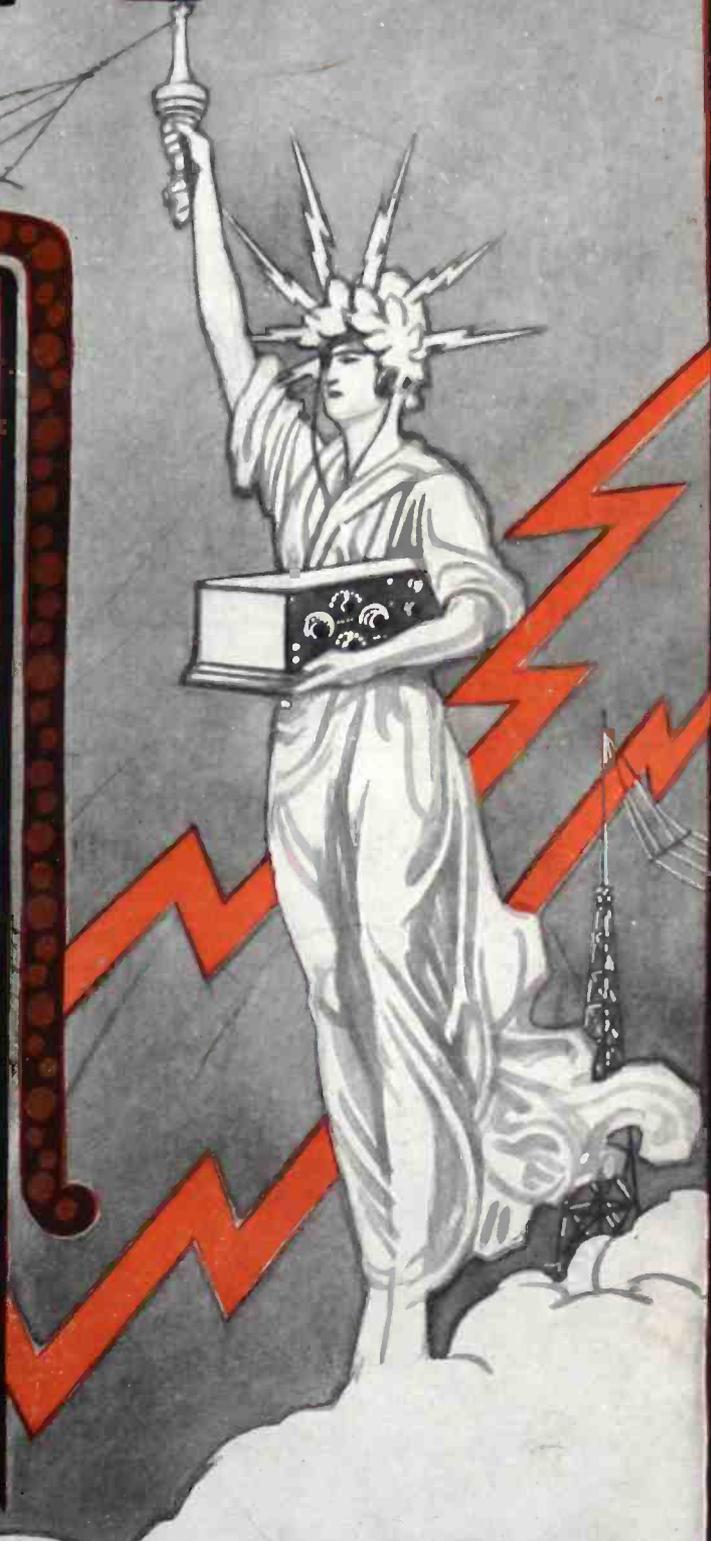


Radio Topics

October, 1923



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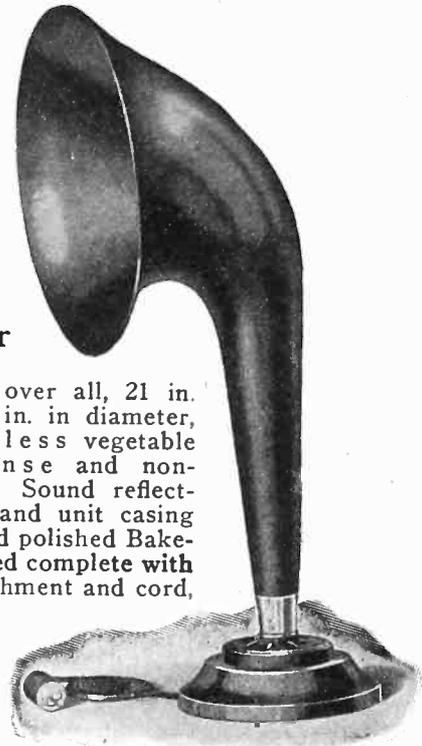


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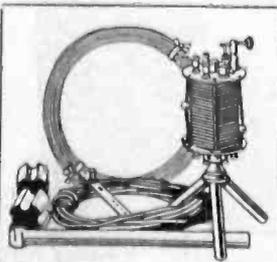
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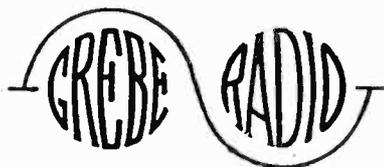
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Radio Topics

An Illustrated Monthly Devoted to Radio

Volume III

October, 1923

Number 9



Here's a giant Crosley receiver, Model XJ, said to be the largest in the world, mounted on an Ahrens-Fox fire truck, which was used in the Fall Festival parade, Cincinnati, O., which replaced all of the marching bands. It received music broadcast from WLW, and the loud speaker used was carried on another truck. Photo is by A. R. Phough, Cincinnati.

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PUBLISHED MONTHLY BY RADIO TOPICS

Entered as second-class matter at the Postoffice at Oak Park, Ill., February 25, 1922,
under the Act of Congress of March 3, 1879.

Business and Editorial Office at 1112 North Blvd., Oak Park, Ill.

Chicago Phone: Austin 9300.

New York Office, 240 Broadway

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RADIO TOPICS

The National Radio Monthly



FOUNDED 1921

PUBLISHED EVERY MONTH BY
RADIO TOPICS, PUBLISHERS

1112 North Blvd.

OAK PARK, ILLINOIS, U. S. A.

J. RAY MURRAY, EDITOR
NANKO C. BOS, Managing Editor
WILL M. HIGHT, Business Manager

PUBLISHING AND EDITORIAL OFFICES

Chicago Phone: Austin 9300 Oak Park Phone: Oak Park 3200

Twenty Cents the Copy From All Newsdealers. By Subscription:
To the United States and Possessions, Cuba and Mexico, \$2.00 the
Year. Remit by U. S. Money Order, Express Money Order, Check or
by Draft, payable in U. S. Funds.

To Canada—By Subscription, \$3.00 the Year. Single Copies 25
Cents—Canadian or U. S. Funds.

RADIO TOPICS is on sale the 10th of preceding month.
Text and advertising forms close the 22nd of second
month preceding issue.

Vol. III

October, 1923

No. 9

Japan's "Jack Binns"

ON January 23, 1909, when the S. S. Florida rammed the Republic, Jack Binns became a hero by sticking to his post and sending out "S. O. S." calls until help arrived and saved all on board.

Now, Taki Yonemura, operator in charge of the Japanese radio station at Tomioka, 144 miles from Yokohama, takes his place beside that of Binns. He was the only man at Tomioka station with a knowledge of English, but for several days, without rest or sleep, he flashed messages to the anxious outside world of the world's greatest tragedy.

Radio was the only source of information, as Tokio was destroyed, the cables were cut and useless, and all telegraph lines were down. Thus again has radio demonstrated its great usefulness.

That Newark Decision

THE recent decision of a judge of the United States Court in the case of the American Society of Composers, Authors and Publishers against L. Bamberger & Co., who operate station WOR, Newark, N. J.,

has not resulted in a grand rush of other broadcasting stations to pay a license fee for popularizing the society's music, even though WOR was whipped into line. On the contrary, applications continue to pour into the National Association of Broadcasters' headquarters, New York, asking for membership, and almost daily new numbers are being added to programs throughout the country, furnished by members of the Broadcasters' Association.

It is highly important that all broadcasting stations get together under this mutual banner, for protection if for nothing else.

Radio Relay League Meets

A MATEUR radio telegraph transmitting stations all over the United States were represented at the 1923 convention of the A. R. R. L., held September 11 to 15 at the Edgewater Beach Hotel, Chicago, and friendships made through the ether were cemented with hearty handclasps on the floor of the convention hall and in the lobbies of the big hotel.

Many instructive papers were read and interesting discussions indulged in during the four days the boys were in session, and, as President Hiram Percy Maxim stated, "It was without question the most important event of the year in radio circles."

Editorial of the Month

The Radio in the Country

Chicago Daily Journal

The farmer, remote from what some persons regard as civilization, otherwise the surging crowd, has now plunged into the midst of life after sundown via the radio. He was quick to secure the comfort and convenience of rural free delivery, the telephone and the automobile; but now the country skyline is becoming streaked with aerials, and the night that once was lonely is made gay with the bedtime story.

The farmers are even having their clocks set by wireless from Washington, and the goosebone and the sweating rock under the corner of the barn are no longer relied upon for tips on the weather. They used to buy subscription volumes of the sermons of Henry Ward Beecher and the speeches of Robert Ingersoll; now they sit in the parlor and hear famous preachers broadcast the gospel. It happens there is no Ingersoll just now.

Perhaps it will not be many years before the farmer will funnel a pint of gas into the airplane and soar away to town. He will do it as quickly as the best of them, if the tariff doesn't make a pauper of him.

Second Annual Convention of A. R. R. L.

Radio League Holds Interesting Sessions in Chicago—Many Famous Radio Men in Attendance

ONE of the most interesting conventions ever held in this country came to a close on September 15 at the Edgewater Beach Hotel, when the five days' session of the American Relay League was concluded with the initiation services of the Royal Order of the Wouff-Hong and a "night of mystery."

Dr. Lee De Forest sent a message to the delegates via radio from the S.S. Leviathan, upon which he was a passenger, and predicted a radio audience of no less than 20,000,000 within the next five years. The radiogram was read at the banquet held at the Hotel La Salle by R. H. G. Mathews, district manager of the league located at Chicago, who acted as toastmaster.

Dr. De Forest's message was as follows: "Please convey my fraternal greetings to convention delegates. Anybody who has a direct interest in radio, whether scientific or business, is to be congratulated. I look at radio as a proud father looks at his thriving infant, for I have worked on it almost a score of years before the public realized it was a science, to say nothing of a business. Radio will have a continually expanding influence on the welfare of the world. It will make people happier through its entertainment utility, healthier by its spread of information, better through its power to promote understanding. In five years or less there will be a radio audience of 20,000,000 in the United States alone."

Activities of Amateurs Increase

Irving Herttiott, chairman of the Chicago Radio Traffic Association, one of the speakers at the banquet September 12, was of the opinion that as the radio audiences increase, the amateurs with their small transmitting sets, tuned down to avoid interference with broadcasting stations, will be an increasing factor in world peace.

"The ability to communicate easily between individuals is the goal toward which we must work," Mr. Herttiott said, "and soon we shall accomplish between countries what has been accomplished between sections of this country where radio has linked cities and made them more than mere names of the people of other towns miles away."

"The ability of amateurs to talk across international boundaries will promote a friendliness between nations which will do much toward promoting world peace," the speaker predicted.

Universal Code Needed

W. D. Terrell, chief supervisor of radio of the department of commerce, stated a universal code was needed to facilitate international communication between amateurs of all nations. Mr. Ter-

rell told of the great increase in the number of amateur stations, each of whom is a potential radio inventor, from 1,296 in 1913 to nearly 18,000 in 1923.

Technical sessions of the Relay League were held in the Nicholas Senn High School on September 13 and 14, to which the public was invited. Many leaders in radio manufacture and experimental work spoke at these sessions.

One of the most interesting visitors and speakers at the convention was Leon Deloy, who came from Nice, France, to attend the sessions. M. Deloy operates the only French amateur station heard in this country during the trans-Atlantic tests recently held. He is making plans to participate in further tests in December and hopes to establish two-way direct traffic between his station and United States amateurs.



A RADIO CHURCH THAT TRAVELS

The newest novelty of an ecclesiastical nature recently made its appearance on the streets of Boston. It was a real church on wheels, with illuminated cross and a complete radio outfit. William H. Morgan, a lay preacher and painter by trade, built the church, and his wife assists him in conducting services. The inside of the church is used for personal interviews with new converts. The loud speaker has entertained 2,000 persons of an evening. (Photo by International Newsreel.)

MacMillan's Trip to the Arctic

By E. F. McDONALD, Jr.

THE elaborate preparations for Captain Donald B. MacMillan's trip back to the Arctic reached its culmination June 23rd, when the Bowdoin, arrayed with international code flags shoved off from Wiscasset, Maine. On board were Doctor Donald B. MacMillan, his crew of six men, a handful of guests including the two ex-Arctic Explorers, General A. W. Greeley and Langdon Gibson.

Every man, woman and child of the town was at the dock to wish us Godspeed. The wireless operator on board the Bowdoin kept up constant communication after we were out of sight with Messrs. Maxim, Warner and Schnell of the American Radio Relay League, who had erected temporarily a Zenith radio receiving apparatus on the pier, and used that not only for receiving but for sending messages over the short distance to the Bowdoin. This sending of messages with a receiving set was accomplished by making the receiving set oscillate and then when the antenna switch was touched with the moistened finger it produced signals so that messages in continental code were readable aboard the ship.

Boothbay was the first stop where all visitors, including General Greeley and his daughter, took leave of us. At Monhegan Island we were cordially received and dined by the inhabitants. The moving picture photographer bade us goodbye here. Clouds of fog enveloped us practically all the way from Monhegan to Sidney, Nova Scotia, but notwithstanding the impenetrable mist, we crossed the Bay of Fundy, passed Cape Sable and the graveyard of the Atlantic, without mishap.

* * *

Full-fledged sea discipline was in operation on the Bowdoin from the moment the last visitor stepped off the gang plank at Boothbay. The day and night was divided into four watches; six hours on, and six hours off. I had the good fortune to be in the watch in charge of Captain MacMillan and the Chief Assistant, Ralph Robinson. The other watch was in charge of the mate, Thomas McCue. Breakfast at six, dinner at noon, supper at six, with a "mug up" at midnight.

I have been frequently asked for

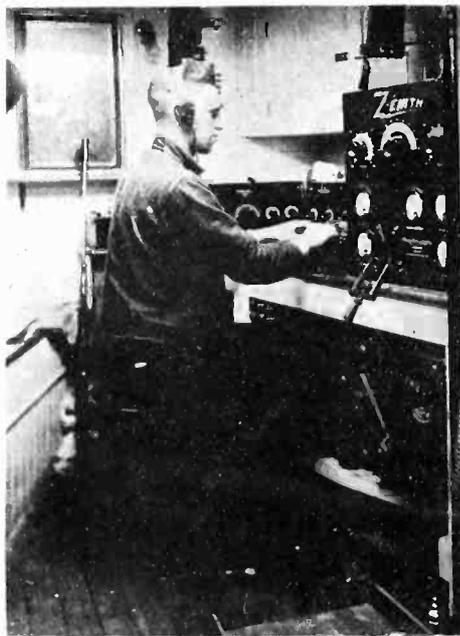
a description of a layout of the Bowdoin. Not only is every available inch of space below decks used, but the main deck is crowded with barrels and barrels of fuel and lubricating oil, and miscellaneous provisions enough to last a year of an imperishable nature. The ship is not more than eighty-nine feet over all. The forecabin, galley, and radio room make up the forward end of the ship. It is said to be the smallest ship that ever ventured an Arctic expedition.

The hold or storage space is amidships; back of this, the engine room; the captain's quarters, aft. The largest compartment is the forecabin, comprising the radio room, living and sleeping quarters of the crew, and the galley. The radio room is in the peak of the forecabin, and the berths for six men along the sides, the mess table in the center, and the galley in the after end of the forecabin.

When the radio starts sending, as it usually does between midnight and 3 a. m., it makes as much noise as a locomotive.

* * *

The hold is loaded so full of provisions, it was with difficulty that the hatch was battened down. The



DONALD MIX AT HIS RECEIVER

This is the operator who accompanied Capt. Donald MacMillan on his Arctic expedition, and by means of radio they will be in touch with the U. S. A. every day. (Gilliams' Service photo.)

engine room is a solid mass of machinery, every inch of space being utilized. Its four walls are enormous fuel tanks of kerosene which give this ship the greatest cruising range of any small ship in the world. The enormous fuel supply is needed when one considers that for days and days with the engine running full speed, the ship, which normally makes nine knots per hour, makes less than nine knots per day, trying to forge ahead while pushing against ice. In the forward end of the engine room are two $\frac{3}{4}$ k.w. Delco generators and two complete sets of thirty-two volt storage batteries. At present one generator and set of batteries is being used to light the ship and the other generator and batteries for the radio. Tremendous power is consumed by the radio in hurling forth its wireless messages back to civilization.

The captain's quarters are heated only by a small oil stove, which does nothing in the extreme cold but raise the temperature slightly. The forward end of the ship is heated by the galley shipmate range, which burns coal, but as soon as the supply is exhausted will be equipped with oxo-gas burners, to utilize the kerosene fuel intended for the engine.

* * *

Sydney was the next stopping place. Anchor was dropped at North Sydney the first night because of the heavy fog. Next day found the Bowdoin gracefully gliding into Sydney amid the roar of salutes from the French gunboat, Regulus, anchored in the harbor.

Leaving Sydney we headed northeast through a dense fog and caught only a glimpse of Newfoundland as we passed by. This was Port-Aux-Basques. Our first stop in Labrador was in back of Greeneley Island, at night and under cover of fog. Next morning when the sun rose, about 3 o'clock, we found ourselves within 100 yards of shore. Were it not for the wonderful navigating of Dr. MacMillan, we would many times have been piled on the rocks along that formidable Labrador shore. Dr. MacMillan made this stop to visit and examine Paraquet Island, which is a rookery of the puffin. These puffins are known as the

(Continued on page 33)

Radio Flashed First News of Japanese Catastrophe

When Earthquake and Fire Laid Tokio in Ruins it Was Sole Link With Outside World

RADIO communication again 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 to two of the principal cities of the island, Tokio and Yokohama.

When the first shock was felt and fires set the cities ablaze the powerful transmitting station at Haranomochi established communication with the high power station of the Radio Corporation of America at San Francisco and meager details of the catastrophe, as they were received at the corporation's station, were delivered at once to the Associated, International and United Press.

The First Message

The first message received by the radio station at San Francisco reads as follows: "Conflagration subsequent to severe earthquake at Yokohama at noon today; whole city practically ablaze with numerous casualties; all traffic stopped."

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, were isolated from the scene of the disaster until a swift courier system could be established.

Brief bits of news continued to reach the radio station in Japan from press correspondents in Tokio and Yokohama by whatever routes that were spared. Some of the messages were written in Japanese, which necessitated translation into English by the radio station staff before transmission.

At the same time messages began to pour in from the San Francisco radio station for immediate delivery to Tokio and Yokohama, many of them for other parts of

the island. Since the earthquake centered around Tokio and Yokohama, and it is quite doubtful whether the actual telegraph wires were damaged along their entire length. Short sections of the line could be repaired in a short time, but the telegraph building, in which most of the wires radiating to all parts of the island terminated, was completely demolished, leaving the telegraph system in a hopeless condition.

Radio Linked Stations

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 tremen-



Following the great Japanese disaster, this radio station gave the first news to the outside world. The Radio Corporation of America maintains a station at Tomioka, through which communication was carried on during the earthquake. The engineer in charge is T. Wakamatsu, at the Haranomack branch. (Photo by International Newsreel.)

Japanese Hero

For several days following the greatest disaster in history, Taki Yonemura, operator in charge of the government wireless station at Tomioka, labored heroically to dispatch at once all messages reaching his station from the interior.

Through some strange freak the station at Tomioka, only 144 miles from Yokohama, was not damaged, nor the giant concrete mast which stands 660 feet in the air and supports the antenna, was not rocked by the earthquake and shattered.

Through it all Taki Yonemura stuck to his post and his messages were picked up by the receiving station of the Radio Corporation of America, San Francisco and in turn flashed to all parts of the world. Yonemura translated and sent some 5,000 words in continental code and his task can be better understood when it is known that the code is not ordinarily used by Japanese operators.

dous 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.

From the very beginning the superintendent of the Japanese radio station, Taki Yonemura and his operating staff labored heroically in dispatching with the utmost speed all messages that reached the station from 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 from Japan.

It was perhaps by some strange freak that the Japanese radio sta-

tion 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.

Service Still Intact

Although the telegraphic facilities from the Japanese radio station at Tokio and Yokohama have been completely wiped out, service to other points inland is still intact. There is no question but 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 distance between Tokio, Tomioka and Haranomachi is 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 supplied by that company to the Japanese Government last year. 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.

The radio station of the Radio Corporation of America at San Francisco, which forms the United States terminal of the trans-Pacific circuit, is made up of a 200kw. Alexanderson Alternator and its associated control apparatus situated at Bolinas, Calif., 28 miles northwest of San Francisco. The receiving unit is located 55 miles from San Francisco in the same direction. Both receiving and transmitting stations are controlled from the central office in the business section of the city.

Rock Island Tests Train Radio

The possibility of directing fast trains by radio without interrupting their speed will be demonstrated on the Rock Island's Rocky Mountain Limited train by seventy-five experts from the big roads of the country. Riding in special coaches, with their radio apparatus, they expect to keep in constant touch with stations in Chicago, WOC at Davenport and WOAW at Omaha, and later with Denver stations.

Donnelley Withdraws From WDAP

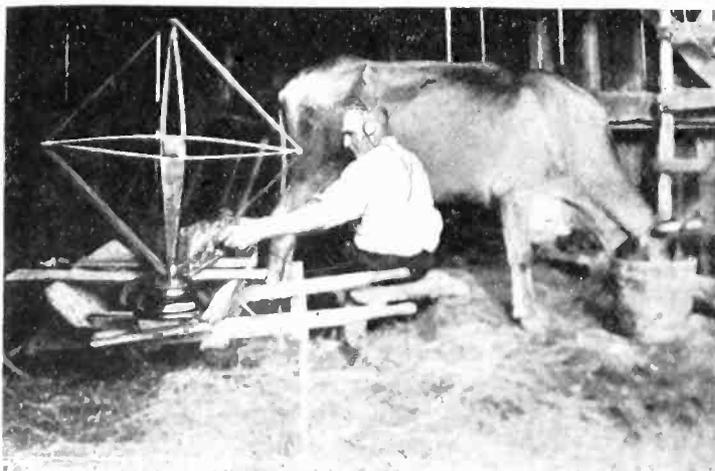
Thorne Donnelley, who, with J. Elliott Jenkins, established Chicago's popular station WDAP, has withdrawn from active management of the station to devote his entire time to the printing business.

Mr. Donnelley is one of the pioneers in the radio field and his first interest was experimental work carried on at his home. He soon became interested to the extent that he with Mr. Jenkins built station WDAP in the tower of the Wrigley Building. Later it was moved to the Drake Hotel, where it soon gained wide publicity.

About a year ago the Chicago Board of Trade commenced negotiations to take over the station to broadcast market reports for the benefit of the agricultural districts, and only recently the station passed into complete control of the Board of Trade. Mr. Jenkins is managing engineer of WDAP, Jack Nelson is program director and M. E. Stahl business manager.

Canada's Radio Aid

Government aid to the extent of \$55,000 has been extended in Canada for the purpose of establishing radio stations at McMurray, at the end of the railroad in Northern Alberta, Fort Simpson, on the MacKenzie River, and Dawson, in the Yukon, according to reports just received at the Department of Commerce. The new stations will displace the land lines at present in use from McMurray northward, for which the Canadian Government has appropriated from \$275,000 to \$300,000 annually for the past 23 years.



RADIO DOWN ON THE FARM

Left—George Botts, on his farm near Boonton, N. J. Radio is doing more than anything else to keep 'em down on the farm, for it provides them with music, news, weather reports and the latest market reports. Mr. Botts is doing his evening milking by radio. Right—Mrs. Holt Ramsey, a Newark, N. J., woman who listens to her radio while assisting the haying at Butler, N. J. The receiver was rigged up by the farmer's twelve-year-old son. (Photos copyrighted by Western Electric Co.) (G illiams' Service, N. Y.)

General Harbord Discusses World Radio Affairs

HAVING just returned from a trip to Europe, where he attended a meeting of the consortium of international radio companies, General James G. Harbord, President of the Radio Corporation of America, gives the following interesting facts concerning various world radio projects.

The countries represented at this conference, which convened 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 Carnavan, 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 AEF 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



General James G. Harbord, Pres. Radio Corporation of America.

which they were subsequently broadcast by radio telephone on a short wavelength. 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."

Status of Radio Abroad

When asked about the status of radio broadcasting across the seas, General Harbord said:

"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 efficient receivers of simplified control that we have in this country at present.

"France has relatively few broadcasting stations; in fact, I believe there are but four that are broadcasting on a regular program—the Eiffel Tower and the Radiola station at Paris, the Post Office school and the Nice station.

"It will be of interest to note, however, that France is using her high power radio stations 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."

China to Have Five Stations

As regards 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 assign-



BIG CHIEF BUYS A RADIO SET

Chief John Snow, of Passamaquoddy tribe of Indians of Maine, recently became a radio bug, but couldn't get the darn thing to work, so he took it to the Navy Radio Station, Outer Cliffs, near Bar Harbor, and one of Uncle Sam's experts "fix 'em plenty." (International Newsreel photo.)

ment 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 five thousand miles distant. Shanghai will also operate a station of lesser power for communication with similar smaller stations to be located at Peking, 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 whole-hearted support of the State Department at Washington, which views 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 that time. Test signals will span the Pacific from China well in ad-

vance 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.

Improving Station KYW

KYW, Chicago, will again broadcast Grand Opera this winter and improvements in the Westinghouse station are being rapidly made. It will soon be one of the most powerful broadcasting stations in the country.

New equipment is being installed under the direction of Walter C. Evans, chief engineer, and it is hoped to have the station operating efficiently when the football season opens.

Extensive plans for improving the programs are being formulated by Director Wilson J. Wetherbee of KYW and when other difficulties of broadcasting have been overcome this station will again boom out its messages nightly to the many fans within its range.

No Static Interference With WGY

An interesting record of radio reception was recently reported by M. S. Shapleigh, a Waynesboro, Pa., radio fan who has been in the air nightly since February 20, 1923. His log shows that up to July 31 he listened in 151 nights and during that time picked up WGY, for the whole or part of the program, 82 nights. Inasmuch as WGY was not in the air forty nights during the period observed, the Waynesboro man missed the General Electric Company station only 29 nights.

In his report Mr. Shapleigh writes: "WGY tunes in easier and with less interferences than any of the 65 stations we have listened to since we got our set."

Waynesboro is approximately 260 miles from Schenectady, N. Y. Part of the period noted by Mr. Shapleigh was during the heavy static months of June and July, when it is generally believed radio reception is uncertain and difficult, especially at distances greater than a hundred miles.

Read What the Farm Boys Are Doing

Farm Radio Clubs Growing

By J. FARRELL

THE pig club and the calf club have an established niche in the life of farm boys and girls, but in growing popularity none surpasses the radio club. These farm boys and girls radio clubs now dot the country everywhere and are playing an important part in promoting the use of radio on American farms.

The first "Farmrad" club was organized by a group of farm boys at Toms River, N. J., in 1920, for the purpose of disseminating among rural people in the surrounding country the market news and other information and entertainment received by radio. Few people near Toms River then knew anything about radio and regarded it as "something for the boys to play with." The work of the Ocean County Wireless Club has been so effective that in many farm homes in the county a radio receiving set is now regarded as indispensable.

The club was particularly concerned with achieving accuracy in the reception of telegraph code messages. Each member operated individual receiving equipment in his own home and when the agricultural reports came in, figures and prices were compared. The news was then placed on file with the local telephone office for dissemination over rural telephone lines, and distributed in other ways, by messenger, and posting on bulletin boards around town.

Attracts Government's Attention

The success of the work drew the attention of the United States Department of Agriculture and plans were made by the Department to encourage the formation of farmrad clubs in other parts of the country. Leaders in farm boys and girls club work in the various states added the radio club to their activities and dozens of such clubs were soon functioning. The number of clubs has grown rapidly until now there is hardly a place in the country where farm boys and girls are not

banded together for radio work. The Department points with pardonable pride, particularly to clubs in New Jersey, Colorado, Washington, Tennessee, South Dakota, Missouri, Iowa and Kansas.

Out in Boulder County, Colorado, there are five clubs with a combined membership of 70 boys and girls. Each club member has a radio set, and the radio demonstrations frequently put on by the clubs have induced more than 400 farmers throughout the county to purchase equipment. The first demonstration was given at Longmont in dead winter. Despite a hard blizzard more than 150 people attended and were unanimously convinced that radio was "the thing."

"Library tables in Boulder County no longer hold books and family portraits," says Miss Josephine Lee Ferguson, the County Club Agent who organized the clubs. "The space is filled with a radio set. Front windows once sacred to a fern, a vase, or a piano lamp are now blocked by an oblong box with wires leading in and out. The information brought by radio is timely and helpful to the farmers, but better than that,

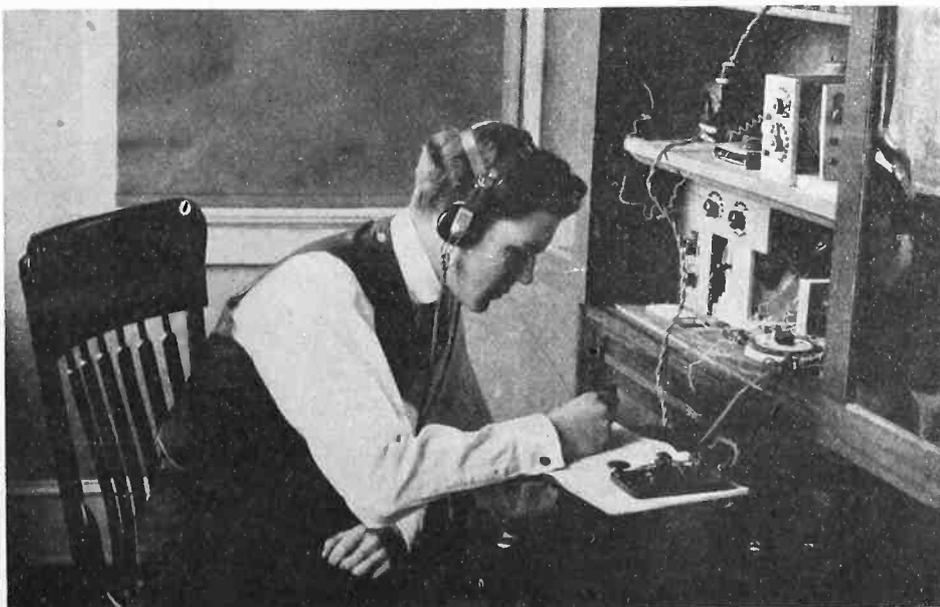
the radio keeps the boys home at night."

Great Socializing Device

The same story is essentially true where other farm boys and girls radio clubs have been formed. County Club Agent William J. Green in Spokane County, Washington, has organized nine boys and three girls into a club.

Mr. Green says that the radio "has proved a socializing device chiefly, and that as such the club has been an unqualified success." A club in Clarke County, South Dakota, has 17 members; County Agricultural Agent Arthur A. Kroll of Grand County, Colorado, has organized a club at Hot Sulphur Springs; Ethridge, Tennessee, boasts a successful club; the county agents at Linn County, Missouri; Cedar County, Iowa; Wilson County, Kansas, and Fremont County, Iowa, have installed sets in their offices and interested the farm youngsters in radio.

A good example of the value of radio to rural communities is at Athboy, South Dakota, located about 26 miles from Thunder Hawk, the nearest railroad town. Some of the farmers south of Athboy post office are 30 miles from Thunder Hawk. Telephone serv-



Here is a farmer boy operating a home-made set installed in a bookcase. The country youth is not far behind the "city feller" when it comes to efficient sending and receiving outfits.



Radio brings the world to his kitchen and though the farmer may bathe in a tin pail and sit on horsehair chairs, he won't be without his radio set.

ice is financially beyond the reach of the people and until radio came the populace was literally cut off from the outside world. What news they received was frequently a month old. The County Agricultural Agent suggested the installation of a community radio set and now the Athboy people are kept in daily touch with national and world happenings.

County Club Agents and Leaders report that hundreds of other farm boys and girls radio clubs are in existence throughout the country, and are performing a constructive work in bringing the news of the day to people in isolated places. No record of the number of receiving sets in rural districts is available, but according to public agricultural officials, virtually every crossroads has a radio set, and radio is rapidly breaking down the barriers of isolation that surround people in remote districts.

Another Large Club

The Ocean County club in New Jersey now boasts 56 members, and serves farmers in 11 different communities with market and other news received by radio. The club has three transmitters in addition to receivers, and the sets have been heard at a distance of 1,650 miles off the New England coast. One of the leaders of the club is Richard Huggard, Station 2 AAB, Lakewood, New Jersey. Huggard's transmitter is a 5-watt tube CW operating on alternating current at 350 volts. The station has been reported by ship operators at Haiti. Huggard recently installed a 50-watt set to work through heavy interference.

Another member of the club,

Bartlett Havens of Toms River, New Jersey, has a 5-watt CW transmitter. He uses one tube and gets 1.7 amperes radiation. To receive messages he uses a regenerative receiver and detector and 2-step amplifier. Using a Tresco tuner he gets all long wave CW stations in the United States and Europe.

From time to time the club members have been employed to give public demonstrations at County Fairs at Trenton and Toms River. At one demonstration at Toms River signals and music were heard all over town, and amateurs in Canada were heard half a mile from the receiving set.

Detailed instructions for organizing clubs have been prepared by the Department of Agriculture at Washington, D. C., and are available upon request. Types of transmitting and receiving sets are discussed in connection with a statement of fundamental radio principles. A list of monthly publications in which RADIO TOPICS occupies a prominent place, is also recommended for regular reading. There is also a bibliography of text books for both the beginner and advanced radio student.

Valuable for Farmer

In a recent message to County Agricultural Agents and Club Leaders all over the country, the Department of Agriculture said:

"The farmers of every community have long been in need of accurate and current information on weather forecasts, crop conditions and market quotations to guide them in their daily farm operations. Radio reduces to a minimum the time of receiving such

news. This opens a splendid opportunity to the county extension agents to conduct radio demonstrations through boys and girls radio clubs.

"Such clubs receive and disseminate daily reports. By disseminating the information received to other farms by telephone or through notices, the radio club member serves his community and adds to the desirability of farm life. These facts are already established by the experiences of boys and girls radio clubs during the past two years."

Wireless Station in Balkans

Work has been started on a new 100 kilowatt radio station at Rakovica, about four kilometers from Belgrade and on a receiving station at Laudon Trench, a suburb of that city. The station is being built by the French Wireless Telegraph Company and the total expense is estimated at 38,000,000 dinars (\$402,800 at rate of exchange of September 1). On its completion, the entire installation will be taken over by the state and the operating personnel will become employes of the Department of Posts and Telegraphs, the Company maintaining one engineer as a technical adviser.

This particular station will be the first highpower radio installation in the Balkans and because of the greatly increased facilities which it will afford for the dissemination of news and the rapid dispatch of information, it should soon become well known internationally, says Consul K. S. Patton in a report to the Department of Commerce.

Health Hints

During the month of September the Crosley radio station, WLW Cincinnati, added a new and interesting feature to its program each Friday afternoon at four o'clock. May Cornell Stoiber, whose work in psychological research has won the highest admiration, spoke on the following subjects: September 7, "You"; September 14, "Your Health"; September 21, "Your Happiness," and September 28, "Your Success." Piano selections on these programs were given by Margaret Niesel, a talented girl of the favorite students at the College of Music of Cincinnati.



Richard Huggard, one of the leaders of Ocean County Farm Boys' Wireless Club, which serves farmers in eleven New Jersey communities daily with market reports.

Practical Hints on Designing of Regenerative Receivers

By PAUL A. PERRY

PART 5. THE REINARTZ REGENERATIVE CIRCUIT

ONE of the most recent developments of the regenerative type of circuit that has proven to be extremely successful, especially in long distant reception and in selectivity, is that known as the Reinartz circuit.

This circuit was invented by John L. Reinartz of South Manchester, Connecticut, who had been troubled for some time by the interference, especially that created by "spark" transmitters, at his amateur station whenever long distance reception was attempted. Accordingly, through necessity, he built a circuit which is very sensitive to undamped oscillations and at the same time very selective. Added to these features, is that of completely controlled regeneration.

Like all successful and popular circuits, the Reinartz has not been exempt from many misconceptions by those new in radio. At the first glance, the diagram gives one the impression of a very complicated circuit, but when studied a little, it will be seen to be very simple and that each unit, with its control, is very logically placed in that position where it will aid the most to the efficiency of the whole circuit.

Unlike most receiving circuits, each component circuit, namely, the antenna-ground, the grid-filament, and the plate-filament, is individually tuned to the incoming wave and must be in resonance with it before the signal is heard in the head-phones.

The antenna-ground circuit is tuned only by means of a switch and a closely tapped inductance. Since the antenna-ground is a separate unit from the grid-filament circuit, only being connected together as an auto-transformer for the transference of the energy picked up by the antenna into the grid, only a very small tuning inductance is needed. It will also be noticed that there is no tuning capacity in the antenna-ground

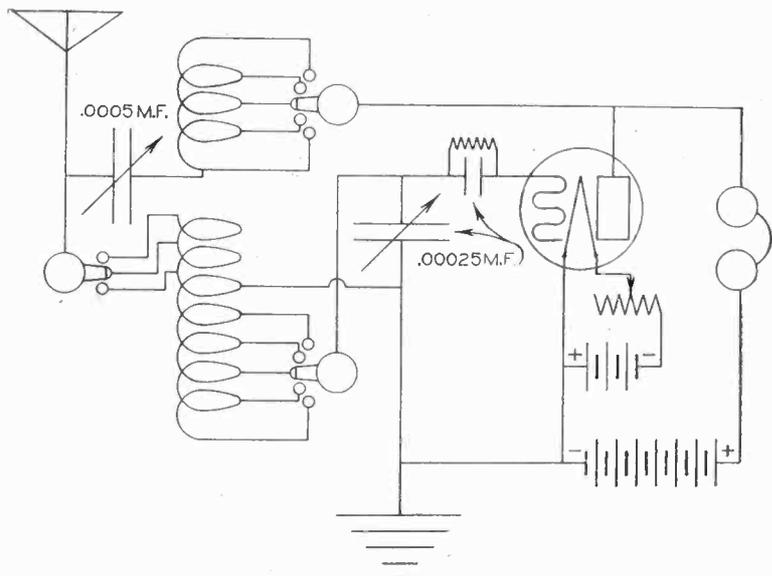
circuit. The absence of this capacity, together with that of a large tuning inductance and its inherent "dead-end" losses, has much to do with the extraordinary efficiency of the whole circuit.

* * *

The grid-filament circuit is tuned by means of a tapped inductance and a .00025 M. F. (11 plate) variable condenser connected in shunt or across it. This combination enables the grid to

condenser placed in series with the antenna. This condenser also acts as a valve which regulates the amount of radio-frequency current, from the plate, flowing into the antenna circuit. In this manner, the plate circuit can be tuned absolutely to the signal wanted and at the same time obtaining the maximum regenerative amplification for each.

One feature which has added considerable to the efficiency of this regenerative system, is the



Here is the hook-up of a real selective and long distance getter.

be tuned very accurately to the antenna. The shunted variable condenser makes possible the tuning of the grid circuit to a wavelength which would otherwise fall between the taps of the inductance.

The regeneration system may be called a modification and combination of both the Ultra-Audion and Tickler types. The plate coil is placed in inductive relation with the antenna and grid coils and at the same time the radio-frequency currents, generated by the plate, are forced to flow through the antenna coil (in order to complete the plate circuit). The plate inductance is tuned to the incoming wave by a switch and a .0005 M. F. (23 plate) variable

placing of the head-phones in the plate circuit. As will be noted, they are not in the plate oscillatory circuit but are placed in the high voltage lead which feeds the plate current. If the head-phones were placed in the plate oscillatory circuit, as is usually practiced, their high resistance and impedance would act as a radio-frequency choke coil and tend to make it an impossibility to tune the plate circuit or to obtain efficient regeneration. However, being placed as they are in the Reinartz circuit, only their direct current resistance is effective.

The construction of the Reinartz circuit is very simple. Many have been led to believe that only one type of inductance, namely,

the Spiderweb or Basketweave coil, will function properly in this circuit. In tests conducted by the author and others, it has been found that this type of inductance functions no better than a properly constructed coil of the common solenoid type, in fact, bank wound solenoids have been used very successfully. Of course, when space is an important factor, the spiderweb type of inductance is very good. However, space, to the average experimenter, is very immaterial, and accordingly, the following instructions are for the solenoid type of inductance.

* * *

All coils are wound on a tube $3\frac{1}{2}$ inches in diameter and about 3 or $3\frac{1}{2}$ inches long, the length depending upon the size and insulation of the wire. These lengths will allow about $\frac{1}{4}$ inch at each end of the coil for mounting screws.

The plate coil, consisting of 48 turns of number 24 single silk covered wire, tapped every eighth turn, is wound first into place. The tuning, or antenna-ground and grid-filament, inductances are wound right next to the plate coil and in the same direction, that is, as if the plate and tuning inductances were in one continuous winding.

These two inductances are wound as one and consist of 55 turns of the same sized wire as that used on the plate coil. On this inductance, taps are taken off every turn for 10 turns, after which they are only taken off every ninth turn. The first part of the coil is the antenna-ground inductance with the ground connected to the last part is the grid-filament inductance.

For those who do not wish to use switches, the coils need not be tapped, but left at their maximum values and the whole circuit tuned only with the variable condensers. This modification very materially simplifies the tuning without any noticeable losses in reception.

The circuit is connected as shown in the diagram. Care must be exercised to keep all connecting wires, especially those in the plate circuit, as short as possible and at the same time the units well spaced in order to avoid any stray magnetic fields about the wires and units which might later cause some trouble. The .00025 M. F. (11 plate) variable condenser is at times very critical in adjustment and should be equipped with a vernier, although not of a necessity.

With this type of circuit, it is best that an adjustable grid-leak

be used. When first tried, the tube usually has a tendency to block, but this may be overcome by an adjustment of the grid-leak.

As no two tubes made have the same characteristics, it is impossible to give the correct value of the grid-leak and therefore must be tried out by the user.

In tuning, it will be found that this circuit is exceptionally free from the squeals and squeaks that is usual with regenerative types of receivers. When the sound of a heterodyning carrier wave is heard in the head-phones, it can always be considered as a warning that the adjustments are almost correct for the reception of that station and that further tuning must be very carefully done.

"Good Reading" Talks Resumed

Rev. Claude J. Pernin, S. J., has resumed his regular Thursday night "Twenty Minutes of Good Reading" from Westinghouse Station KYW. This feature was discontinued for a few weeks while Rev. Pernin was out of the city.

This feature consists of dramatic interpretation of short stories, poems, passages from recent books and other literary selections.

Rev. Claude J. Pernin, S. J., is professor of English literature of Loyola University, Chicago, and has conducted courses in English for this university for the past five years. He has given courses in the art of the Short Story, Shakespeare, Tennyson and Browning and the novel, as well as courses in public speaking.

Because of his elocutionary abilities selective readings from the finest works of prose and poetry are now tuned in by thousands of radio fans throughout the country, and he has, through his unceasing effort, developed the feature far beyond the expectations of the station directors.

Radio in Every Room

Detroit's new \$15,000,000 Book-Cadillac Hotel will have a complete radio installation. Though the construction of the hotel has just been started, the finish is looked forward to with great interest, both for the fact that it will be the tallest commercial hotel and because here will be a central radio set which will supply every room.

If a guest wishes a program, it will be only necessary to call the operator and it will be given to him. A broadcasting station will be installed in the hotel and special attention will be given to the broadcasting of all convention proceedings.



"LISTEN TO MY RADIO"

Says Johnny Hines to Hope Hampton, the Warner Brothers film company star. Johnny has a FADA "One-sixty" receiver, and during his spare moments enjoys Los Angeles broadcasting stations. The flowers are just for atmosphere—someone is playing "Hearts and Flowers"—and Hines is a stickler for proper atmosphere.

Radio Fans— Meet McDonald

ONE and the same individual is pictured in the illustration herewith.

One is E. F. McDonald, Jr., when he is not on board ship, and the other is E. F. McDonald, Jr., when he is not at the club or at the office. He was pilot part time of the Bowdoin when he accompanied Dr. MacMillan from Wiscasset, Me., June 23, as far north as Bar Harbor.

E. F. McDonald, Jr., is president of the Zenith Radio Corporation. He has had a remarkable career in his so far short period of activity in radio. While he was in the war, the wonderful manifestations of radio decided him in his avocation after the war.

On the north side, in Chicago, young R. H. G. Matthews and K. E. Hassel were operating the Chicago Radio Laboratory. They were making a very fine radio set. The business had grown over their heads, and it was impossible for them to keep up with orders. They were virtually attempting the impossible in a factory of small capacity—yet the largest factory of its kind in the country. One day Mr. McDonald crossed the threshold of their laboratory and then followed a series of conferences which, before long, ended in the removal of the Chicago Radio Laboratory to 4829 South Kedzie, where the capacity is 500 sets per day.

* * *

Mr. McDonald's genius has given Zenith the Midas touch. It was he who featured the Zenith in the famous test when a passenger on board the "Berengaria," on a pre-arranged schedule, heard the Drake Hotel, Chicago, broadcasting for four days handrunning while the liner plowed the sea at the rate of 600 miles a day. This event made history for both the Zenith and WDAP, the Drake Hotel station.

It was he who conceived the idea of the Zenith-Edgewater Beach Hotel broadcasting station, and he, too, has made it one of the finest and the best stations in existence. Mr. McDonald it was who engendered the idea in Dr. Donald B. MacMillan, the explorer, to equip the Bowdoin, now on the way to the North Pole, with radio. The first radio set is nearing Eskimo land. It is a Zenith. And Mr. McDonald it was who welded together the broadcasters of the country into a national organization; and he is helping it to function so splendidly.



E. F. McDONALD, JR.
President, Zenith Radio Corporation

The story which Mr. McDonald has written of the trip with Dr. MacMillan as far north as Battle Harbor, Nova Scotia, is unusually absorbing. In short, Mr. McDonald's influence has grown to be a distinct factor in the radio domain as a whole.

One of his associates was asked about Mr. McDonald. Said he: "You want to know the reason for his success? Work. He is a fiend for work. Many a time the night watchman has had to route him out of the office at 1 o'clock in the morning. He knows no let-up."

"My work is much like that of the missionary," said Mr. McDonald. "Of course, I am preaching a different gospel—the gospel of radio to the hundreds of millions of people who know little or nothing about it. I always feel a thrill of delight when I open the eyes of a man to the source of pleasure and information of radio. There is considerable work ahead. It took twenty-five years to get 80 per cent of the American homes acquainted with the talking machine. This is only the second year of commercial radio."

Milwaukee's Radio Show

IN connection with the fifth annual food, household and electrical show at Milwaukee Auditorium, Milwaukee, October 15-21, 1923, a radio exposition will also be held under the auspices of the Wisconsin Radio Association.

The Radio Association, through the courtesy of the Milwaukee Journal, has eight booths to devote to the radio show in the electrical section.

The exhibit will consist of broadcasting station, giving daily programs, a large broadcasting map, twenty-five feet-wide, indicating by lamps the various broadcasting stations; a series of tableaus suggesting the uses of radio, and an information booth.

The exhibit will be conducted on an educational basis, keeping the actual makes of radio sets in the background and bringing out strongly the idea of radio and its desirability. Nothing will be sold at the exposition and commercial exhibits of radio apparatus will be excluded. The Milwaukee market has never been properly sold on radio, and this exhibit, it is hoped, will be a big step toward that end.

The Farmers Need — Radio

THE National Radio Chamber of Commerce, assisted by the manufacturers and distributors of radio, has begun a campaign for the purpose of educating the farmers in the practical everyday value of radio on the farm.

The importance of this movement to the radio industry may be judged by these facts:

1. The population of the United States is one-third farmer. But, economically, the farmer is more important than is his voting power. He possesses one-half the country's buying power.

2. Because of his daily need of weather, crop and market reports, and because of his need for the recreation and educational means furnished by radio, the farmer is, potentially, the nation's biggest user of radio.

3. The National Radio Chamber of Commerce has first hand information in the form of letters and telegrams from hundreds of farmers' organizations in New York, New Jersey, Pennsylvania, Ohio and other states, and from the national organizations, which

indicate that the leaders among the farmers are keenly interested in radio as a practical utility.

4. The National Radio Chamber of Commerce has been assured by these leaders of their cooperation in such a program.

5. The manufacturers and distributors of radio equipment are entering into the plan and are sending out demonstration parties with receivers and loud speakers, the Chamber securing for them also the privilege of exhibiting their lines and taking orders.

6. The demonstrations have so far been chiefly confined to "County Picnics." Those in New York state occurring in August have an estimated attendance of more than 160,000, more than half of which will be covered by demonstration. Following these picnics, the county fairs furnish the next opportunity to reach the farmers in large number. These are beginning now and extend well into the fall and offer ideal opportunities for educational work of this sort.

The National Radio Chamber of Commerce calls upon all manufacturers and distributors of radio equipment, regardless of affiliation, and all manufacturers' and distributors' organizations to assist in this movement, co-operatively if possible, independently if they must. It is "seed sown upon good ground."

Prizes for Amateurs

THE second annual Radio Show which will be held in Chicago, November 20 to 25, in the Coliseum, will undoubtedly be the biggest ever held, according to Business Manager James F. Kerr.

Prizes of considerable value will be offered amateurs for the best home-made receiving sets of various types and the prize-winning sets will be exhibited in special booths.

The builder of the most novel set is to be rewarded with a \$50 prize, whether his set be a crystal or a tube outfit. A second prize of \$34 and a third of \$25, are also offered. This contest is limited to public or parochial school pupils.

Another contest open to all amateurs is for the best receiving set. Prizes of \$100, \$75 and \$50 will be given. The judges of the contest will be leading radio engineers in attendance at the show. Space is going rapidly it is announced.



MARCONI'S FIRST PHOTO "LISTENING IN"

An auto equipped with a receiver was used to listen to the wireless station which these three gentlemen were about to visit at Chelmsford, England. Photo shows (left to right) Godfrey Isaacs, Signor Marconi and Gratton Doyl, M. P., who were part of a hundred members of England's parliament who visited Omgar and Chelmsford radio stations. (Photo by International Newsreel.)

Department of RADIO ENGINEERING

Radio Topics Institute

Nanko C. Bos, Chairman Advisory Board



Look for the Approval Seal

Such as the one just above which are furnished manufacturers whose radio merchandise has been tested and approved by the Institute Laboratory. We urge you to purchase only such apparatus, for it carries the guarantee of our organization.

Send all inquiries and material for test, calibration, or reconstruction to RADIO TOPICS INSTITUTE, Oak Park, Ill.

Here Is the Single Dry Cell Hook-Up

How to Build a Distance Getter

By W. F. KUSTER

IN the September issue of RADIO TOPICS, under the title "That Single Dry Cell Set," a good outline of the general construction of the Areola, Sr., appeared. Details of the construction of the tuner, together with the assembly of the set with one stage of audio-frequency amplification follow, for those who wish to build a real distance wrecker at a minimum of expense.

Parts required for the construction of the tuner are as follows:

One bakelite, or shellaced paper tube, $3\frac{1}{4}$ inches outside diameter, 6 inches long; 2 tubes, $2\frac{3}{4}$ inches outside dimension, $1\frac{1}{8}$ inches long; 2 pieces hollow brass tubing $4\frac{5}{8}$ inches long, $\frac{1}{4}$ inch thick; 4 pieces flexible insulated wire 7 inches long; 6 quarter-inch brass bolts and nuts, 150 feet No. 26 S. C. C. wire; some shellac.

Draw a line along the side of the 6-inch tube, at right angles to the edges. Drill holes of the sizes

and at the points indicated in diagram, Figure 1, along the line. Drill $\frac{1}{4}$ inch holes on the opposite side of the tube, exactly opposite holes "C" and "H," these acting as the bearings for the two rotor shafts. Fasten the 6 brass bolts, in the inch holes, A, D, E, F, 789 in the $\frac{1}{8}$ -inch holes, A, D, E, F, J and K. You are now ready to begin winding the large tube.

How to Wind Stator

Attach the end of your No. 26

wire to bolt J and begin winding $\frac{1}{2}$ inch from left edge, in the direction of a clock. Make 6 turns, shellac same, allowing the shellac to dry sufficiently to hold the wire. Bend the wire at right angles to the turns just made, fastening it to the tube with a strip of court plaster $1\frac{3}{4}$ inches long, shellacing same immediately.

Continue winding 6 more turns, which should begin $2\frac{3}{8}$ inches

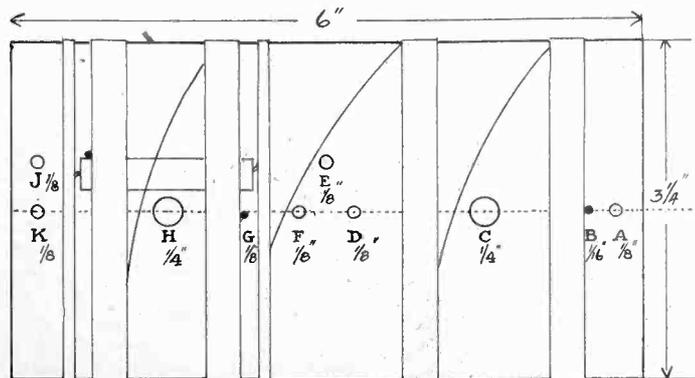


Figure 1

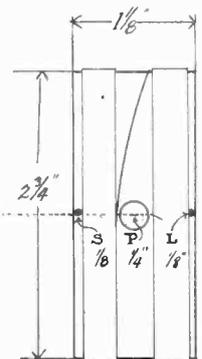
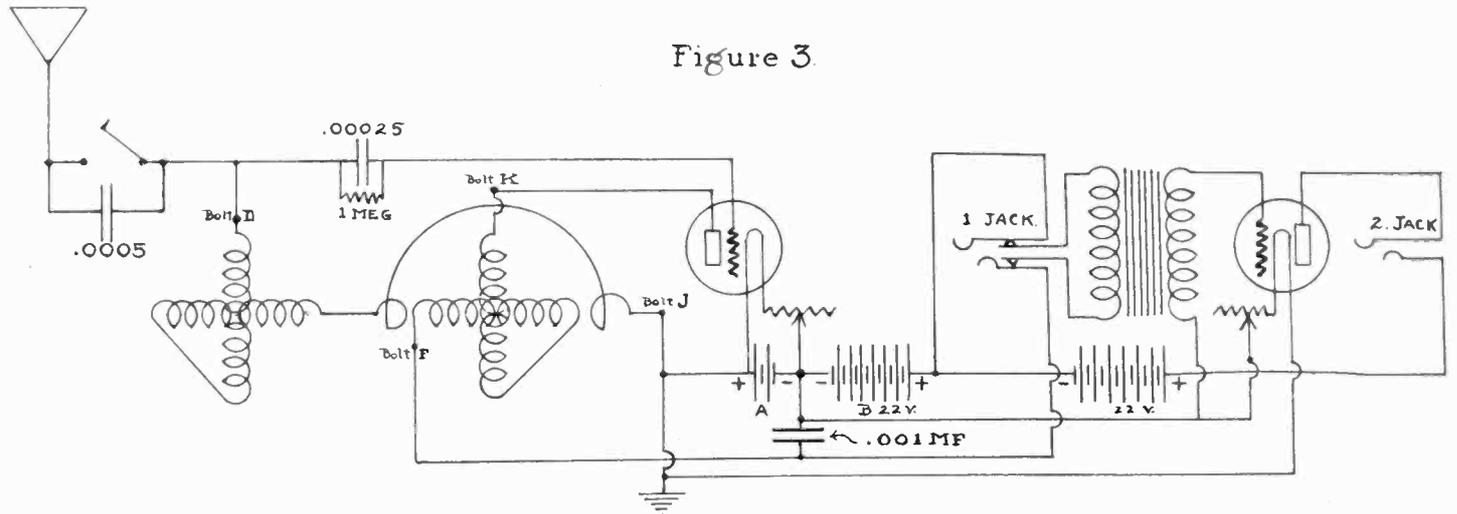


Figure 2.



from left edge of tube. After shellacking these turns, carry the wire in a forward diagonal direction, beginning 20 more turns at a point $2\frac{1}{4}$ inches from right edge of tube. At the end of 20 turns use shellac and bring the wire in a forward diagonal direction, winding 20 more turns beginning at a point $\frac{7}{8}$ inch from the right edge. This should bring the end of the wire up to hole "B." Insert the wire in hole "B" and bring it through the tube, fastening it to bolt "A" on the inside of the tube.

You have now completed winding the stator of the aerial inductance, and are ready to wind the stator of the tickler.

Insert the end of the wire in hole "I," fastening the end to bolt "K." Then proceed to wind 20 turns, shellacking them and carrying the wire forward diagonally, and wind another 20 turns, after leaving a space of $\frac{3}{4}$ inches, measuring from the preceding 20 turns.

Having completed these last 20 turns, reel off about 3 inches of

wire and cut it off, passing the end through hole "G" and fastening it to bolt "E." This completes the large tube windings. Shellac carefully to prevent wires from shifting.

Making the Rotors

You are now ready to prepare the two rotors, which are both made alike. Drill holes as per diagram, Figure 2. Drill a hole exactly opposite "P" on the other side of the tube, these being made to allow the shafts to pass through. Fasten the wire through hole "S," and make 20 turns, skipping a space of a full $\frac{1}{4}$ inch, carrying the wire forward diagonally and wind 20 more turns, passing the wire through hole "L." Prepare the other rotor in the same manner.

Next take the two pieces of hollow brass tube, and drill an $\frac{1}{8}$ inch hole through it, $1\frac{3}{4}$ inches from the end. Then insert two of the 7-inch flexible insulated wires through these center holes, passing them out at the end nearest ($1\frac{3}{4}$ inches), after having in-

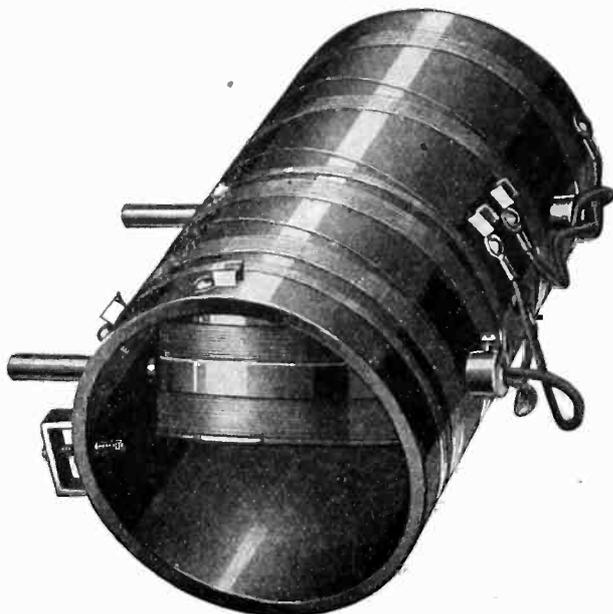
serted the hollow tubes, or shafts, through the rotors, hole "P," and the holes "C" and "H" of the large tube. Next, solder the ends of the flexible wires inside the rotors to the two wires ending at holes "S" and "L."

You now have the tuning coil complete, with the exception of the four flexible wires protruding from the rotor shafts. Fasten one of the flexible wires protruding from shaft at hole "H" to bolt "E," the other to bolt "F." The two flexible wires protruding from the shaft at hole "C" are fastened to bolts "D" and "A." Washers can be slipped over the shafts and soldered to them, at the bearing points, to hold the rotors firmly in the center of the large tube. You have now completed the tuning unit ready to connect up in your set.

Figure 3 shows the wiring diagram for the set, with one stage of audio-frequency amplification. Two binding posts may be placed where the first stage jack is shown, and the amplification omitted if desired. Amplification is recommended, however, if stations at a great distance are to be brought in with considerable volume.

If difficulty is experienced in securing the necessary parts for the construction of the tuner, or if the builder lacks time or mechanical skill, this tuner can be purchased, ready to hook up, for a nominal price at most dealers, thus assuring perfect operation.

If dry cell tubes are to be used, or the 6 volt U. V. 200 detector, any good 6 ohm rheostat will give satisfactory results, as the circuit is not critical. Where the 201-A tube is used as a detector, a 30-ohm vernier rheostat should be employed.



General view of stator and rotor described by W. F. Kuster

CORRESPONDENCE WITH THE INSTITUTE

THIS department is conducted by Paul A. Perry, Technical Editor, RADIO TOPICS. Any inquiries addressed to him will be answered promptly, provided stamped and self-addressed envelope is enclosed with inquiry.

Please make your questions as concise or brief as possible.

This is your department. Use it freely.

TECHNICAL EDITOR, RADIO TOPICS,
1114 North Boulevard, Oak Park, Ill.

Am a reader of your valuable RADIO TOPICS and will thank you very much for some information about the enclosed circuit. Have arranged the questions on the paper with the circuit so it will save you time. Make reply on this paper if you wish.

1. Will a 23 or 43 plate condenser give best results with this circuit?
2. Will condenser in aerial or ground give best results?
3. Will phone condenser give best results across phones alone or across the phone and the B. battery together?
4. What should be the arrangements of piece parts on the panel with reference to each other, for best results?
5. What size wire should be on the stator of vario-coupler and how many turns?
6. How many taps should be taken off of the stator and what should be their arrangements as to turns?
7. Will two sets of switches and taps give better tuning than one set?
8. What size wire and how many turns should be on the rotar of coupler?
9. Will a vario-coupler give better results when the rotar is mounted inside the stator than it will if the rotar is mounted at one end of the stator winding as they are generally made?
10. What will be the results on the above circuit if a variometer is placed in the grid return at the place marked X?
11. What length single wire aerial best suited for this circuit?
12. What length two-wire aerial best suited for this circuit?

Please make pencil sketch of 2-step amplifier circuit best suited to the above circuit.—F. E. D. Olney, Ill.

ANSWER: In reply to your last inquiry, we are mailing you diagram of two-step audio frequency amplifier, as requested. The answers to above questions follow: (1) 23 plate. (2) Aerial. (3) Across phones. (4) Condenser on extreme left, coupler, detector two amplifiers. (5) About 40 turns No. 18 wire. (6) Six or more taps top to bottom stepped down. (7) Yes. (8) 30 turns No. 24 wire. (9) Yes, signals will be slightly louder. (10) Increase in wavelength. (11) 75 to 100 feet. (12) 75 feet.

I have a one coupler, two variometer set, one WD-11 tube, and I want to improve it. What should I add, one stage

audio frequency or change it into a reflex circuit? What is the best circuit? Can amplification be added to a reflex later on?

By adding a radio frequency transformer and a crystal detector to my above set, will it work any better? What do you think of this "kink"?

Can I use the UV-199 tube for audio frequency? Could I use a loud speaker with one stage in Philadelphia for local stations?—W. B. A., Charlestown, Md.

ANSWER: In response to your inquiry we suggest adding the one stage of audio which can be used with the UV-199 and which will enable you to hear the local broadcasters on the loud speaker fairly well.

We would not suggest the reflex as the machine you now have is very stable and a sharp tuner. There is not, to our knowledge, any "best" reflex circuits, some getting good results with one and some with another. We find that the method in most cases seems to be starting with nearly any reflex circuit and then changing condenser values, etc., until results are obtained. In some cases where this is done it does equal one stage of audio and we know of some radioists hearing a thousand miles with a loop with one, but this had three tubes and a crystal. We have our eyes on one particularly good one at present and will try to publish the circuit of this in the near future.

Amplification can be added to the reflex later on if desired, however, it is not as simple a job as adding it to ordinary regenerative circuits.

We are afraid your "kink" will not work out very well, as you are putting a crystal in a part of the circuit which is already putting out rectified signals.

As a reader and subscriber of your magazine, would it be possible for you to send me a hook-up using the following apparatus which I already have. One Dayton variocoupler; two Dayton variometers; one 23-plate Kellogg vernier condenser; one All-American audio frequency amplifying transformer, ratio 3 to 1; one All-American audio frequency amplifying transformer, ratio 10 to 1; one C. R. L. adjustable grid leak with condenser; one potentiometer, 400 ohms (General Radio Co.); one detector tube UV-200; one amplifier tube, UV-201-A; two amplifier tube, UV-201;

four Cutler-Hammer rheostats; two 45-volt Burgess "B" batteries; three jacks for detector and two stages, without filament control; inductance switches and binding posts; four Kellogg sockets.

I have \$130 invested in this apparatus, and in the hook-up I am at present using, I am just about only able to get local stations. I believe it is a tuned radio, detector and two stages of audio frequency hook-up.

This set was made for me and I am not familiar with the hook-up, but feel that if I secure a legibly marked hook-up I would be able to rewire it and perhaps make a good job of it. If it would be advisable to discard any of the apparatus for better instruments would be willing to do so.—G. A. S., 5844 Indiana ave., Chicago.

ANSWER: Sorry to hear of your hard luck with the receiving set. In our estimation you are hearing local stations in spite of the radio frequency and not because of it. We advise you to wire it up according to the diagram we are sending you, which cuts out the audio frequency and which you can add on at a time after you get familiar with the handling and tuning of the set.

With the circuit all wired correctly you should be able to hear California stations this winter and if that is not enough try experimenting with the radio frequency but stick to the tuned impedance type.

If you have any trouble making out the different symbols in the diagrams, do not hesitate to write for further information.

I have a receiving set composed of single circuit tuner, detector and two stages of audio amplification. I have also the accessories for one stage radio frequency of amplification. Would you kindly inform me how I may hook the RF to the tuner without making a direct circuit out of it?

Is it possible to have the RF unit separate and connect the output of the RF transformer to the aerial and ground terminals of the single circuit tuner? (Including the var. cond. in the aerial circuit.) Is it proper to use a tapped coil shunted with a condenser in the aerial circuit of the RF unit to tune with? Further, can this unit be operated with the same set of batteries or are separate sets desired? I am using the Type 1 Erla RF Transformers.—G. A. E., Finley, N. Dak.

ANSWER: We have mailed circuit you want. Yes, it is possible to keep the radio frequency set separate from the audio and the output may be attached to the aerial and ground posts.

Another method of coupling this would be to connect the aerial to the ground on your regular set and connect the output of the radio frequency to the aerial and ground thus using the condenser in the aerial of your detector and tuner shunted across the same as in the diagram.

However, to avoid that you can hook two aerial binding posts in the set as shown by the dotted lines in the diagram.

One "A" battery for both sets is all right but separate "B" batteries would be desirable.

This is a better form of radio frequency than the type coupled with transformers.

Willard Station WTAM Opens

THE most powerful radio broadcasting station in the world relying exclusively upon storage battery power puts its opening program into the air on Wednesday evening, September 26, when WTAM, the large new broadcasting station of the Willard Storage Battery Company of Cleveland joined the ever-growing ranks of radio transmitting stations.

On a wavelength of 390 meters this company, one of the largest and best known manufacturers of automobile and radio batteries in the country, will broadcast its opening program from one of the most powerful stations yet built.

WTAM has installed a 1,000-watt transmitter, making it one of a very few with such high wattage. WGY at Schenectady, heard all the way around the world, is transmitting with 1,000 watts.

The new station has been erected on a large lot adjoining the immense Willard plant. A substantial building to house the station provides separate rooms for the transmitting equipment, storage

batteries, reception parlor and studio, with commodious dressing rooms for the artists who will entertain the invisible audiences.

The outstanding and unique feature of the Willard station is that it not only has 1,000 watts for transmitting but that storage batteries, which have for some time been recognized as the ideal source of power for clear and steady transmission, are being used exclusively. Huge racks of storage cells provide the 2,500 volts required by the 1,000 watt transmitter.

The station has been so planned and built that no moving machinery is in or near the station. Even the machinery for control of ventilation and heating is remotely situated from the building.

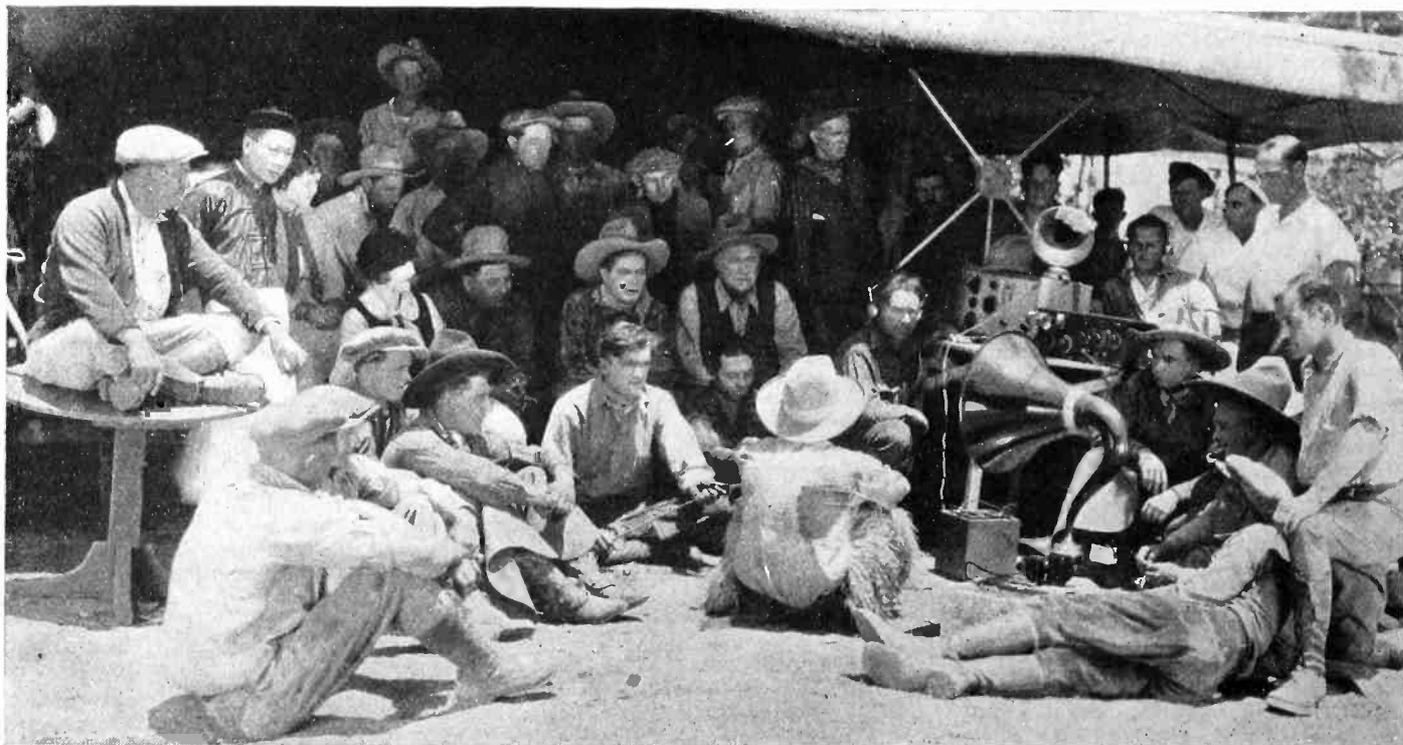
An unusual form of aerial is employed, specially designed to eliminate static interference. The antenna consists of 12 wires in a double cage of 6 wires each. This aerial has a span of 100 feet, with a weight of approximately 300 pounds. It is suspended at a height of about 138 feet between

the two 100-foot towers. The giant towers are constructed of four inch angle iron to a height of 112 feet, the remaining distance being covered by 38 foot masts of wood. Stranded steel guys, with numerous strain insulators, are set into concrete piers for back bracing, and the legs of the towers are deeply seated in more massive piers of concrete.

* * *

A counterpoise, 60 feet wide and 250 feet long, is supported by 12 inch I beams 12 feet tall immediately beneath the spread of the aerial. This counterpoise is composed of twelve 250 foot lengths of antenna wire spaced 5 feet apart.

The station is ideally located for perfect transmission. Eight miles from the business center of Cleveland and one-half mile from Lake Erie, there is no disturbing element to mar its transmission. It is more than a quarter of a mile from the nearest electric car line, minimizing a factor which is often troublesome to broadcasting stations.



MOVIE ACTORS ENJOY RADIO IN THE MOUNTAINS

This is when radio is really appreciated. The Universal Pictures Corporation recently sent a company of actors up into the Sierra Mountains to make scenes for a picture called "The Ramblin' Kid," with Hoot Gibson as the star. A complete receiving outfit was part of the equipment, and, needless to say, was greatly enjoyed by the entire company. Gibson is seated in the center of the group, wearing a plaid shirt. His leading lady, Laura LaPlante, is just back of him, and Edward Sedgwick, the director of the picture, sits between them.

Leviathan's Radio Most Complete

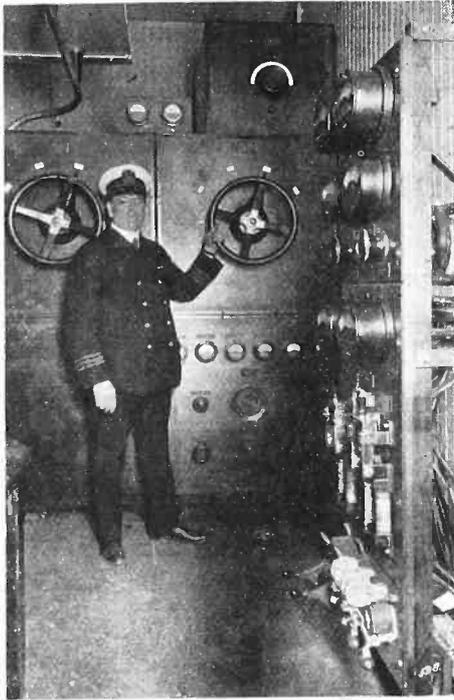
MOST everyone who travels to Europe these days tries to sail on the Leviathan. It is the world's largest ship and contains the most powerful radio apparatus on any ship afloat.

It has two antennae, 500 feet long, and there is a 750-watt transmitter on board that makes this ship a veritable floating broadcasting station equal to any on the land.

There are three separate transmitters on the Leviathan and three receiving sets. The antennae that are strung in various directions over the ship are so arranged and the apparatus connected to them so tuned that it is possible to operate two transmitters and two receiving sets simultaneously without interference. The ship can talk by radio telephone with the shore on the duplex system and at the same time be carrying on radio telegraph traffic in both directions with another ship or shore station. Although the Leviathan is the largest ship afloat, the space available for radio purposes is necessarily but a fraction of that used by shore stations for carrying out exactly similar operations, it will be seen that the ship's installation represents an engineering triumph.

* * *

The most powerful transmitter is rated at 6 kw., an instrument using water-cooled tubes, and



A general view of the high power tube transmitter and the Chief Radio Engineer of the S.S. Leviathan changing wavelength.

used for modulated CW transmission. Power is supplied from a 10 kw. Crocker-Wheeler motor generator. This set gives the world's largest boat a consistent range of some 6,000 miles, enabling it to keep in easy communication with both sides of the Atlantic Ocean continually during its voyages and also to reach ships far to the south. The transmitter puts 30 amperes into the antenna when working on 1,800 meters, 31 amperes on 2,100 meters, 29.5 am-

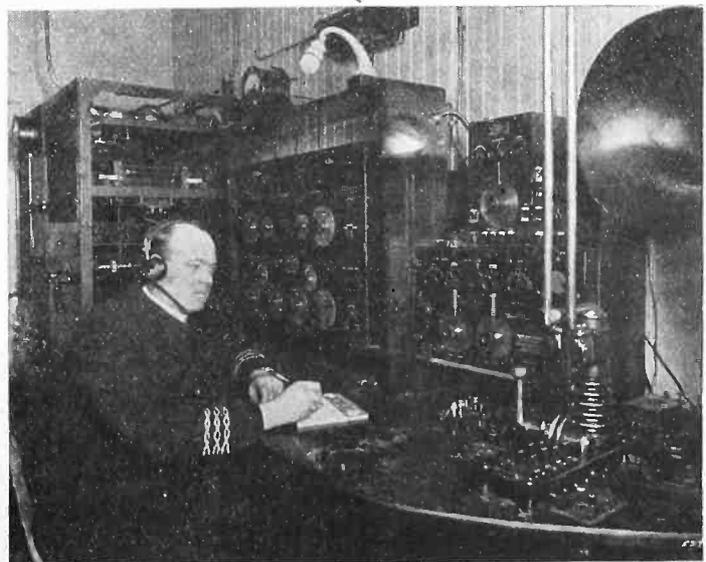
peres on 2,400 meters and 29 amperes on 2,500 meters. The antenna is 600 feet long and is a ten-inch cage at the top of the masts.

For duplex radio telephone work with other ships and with the shore, there is a 750-watt transmitter connected to a separate antenna 500 feet long. By the use of this transmitter and corresponding transmitting and receiving equipment on the shore or on another ship, it is possible for passengers on the Leviathan to use a telephone and talk through space with persons ashore and afloat, just as if they were using a land wire telephone. The receiving apparatus for this duplex telephone set uses an independent antenna running forward from one of the masts. A similar antenna running aft is used for receiving on long waves and is associated with the traffic handled by the 6 kw. set.

The third transmitter is a Navy Spark Type SE-1203 rated at 2 kw. It is not provided with a separate antenna, as this installation is designed to be somewhat of an emergency nature. When it is necessary to use it, it will be connected to the antenna normally used for the duplex telephone set. It is expected that practically the entire radio business handled by the Leviathan will go on either CW or ICW, using the two-tube transmitters.



Chief Radio Officer aboard the S.S. Leviathan speaking over radio telephone (Duplex System) installed by Radio Corporation of America.



Another view of the very complete radio apparatus aboard the S.S. Leviathan and the chief radio officer receiving his first message.

Church Resumes KYW Services

The power supply to this elaborate equipment is necessarily extensive and includes no less than three motor generators. There is also a special Exide storage battery, 125 volts, 240-ampere hours, which is maintained fully charged at all times for emergency work should the ship's dynamos be unable to supply the necessary power. This battery would make it possible for transmission to be carried on for four hours.

* * *

The installation of this remarkable radio equipment was completed by Radio Corporation engineers shortly before the ship made its trial voyage. During the trial trip, which lasted five days, a record volume of business was handled, a large proportion of this being press messages to newspapers and news associations, the public interest being great. In order to handle this volume of traffic it is necessary to use two transmitters and two receivers practically continuously. The radio operators, in fact, were about "done in" when the trial trip ended, each of them having averaged only four hours of sleep during the five days. During the trial run from Boston to Cuban waters and back to New York the ship had no difficulty whatsoever in working continually with Marion, Mass., the Marine Radio Central of the Radio Corporation of America, and with WNY, the Radio Corporation's station at Bush Terminal, New York. E. N. Pickcrill is chief operator of the Leviathan, and his assistants are A. C. Tamburino, R. J. Green, H. F. Bollendonk, E. Engelder and C. R. Underhill.

In addition to handling traffic to and from passengers on the Leviathan and service messages connected with the operation of the ship, the radio operators are also relaying messages for other ships not possessed of sufficiently powerful radio apparatus to put them in communication with stations with which they desire to correspond. The great power of the Leviathan transmitter and sensitiveness of its receiving equipment make it possible for it to take traffic from ships at considerable distance in the north and south Atlantic and transfer the messages directly to other ships or to shore stations.

THOUSANDS of people residing in every part of the country welcomed the regular Sunday services of Central Church, Chicago, on Sunday, September 16. These services, which were broadcast up to the beginning of summer this year by station KYW, were heard with great audibility in every state in the Union, in all the Dominions of Canada, Cuba and Central America and by many ships at sea. They were especially appreciated by those persons living in the more isolated localities, who were unable to attend church every Sunday, as well as those persons of the invisible audience who were shut-ins and otherwise incapable of attending the services of their neighboring churches.

When station KYW first commenced broadcasting, the program managers foresaw the great possibilities of transmitting the services of the large religious meetings held in Chicago and arranged with the trustees of the Central Church to broadcast the programs of this non-sectarian organization.

This feature was warmly received, as evidenced by the hundreds of letters received by the Westinghouse station, and as another proof of its popularity, when the services were discontinued during the summer months, many inquiries were made requesting these services be resumed.

The services of Central Church will be broadcast every Sunday morning at 11 o'clock from Orchestra Hall, Chicago, which was made possible by the installation of a special sealed telephone wire connecting Orchestra Hall with Station KYW, which is located on the roof of the Commonwealth Edison Building.

The program will include the address of Dr. Frederick F. Shannon; organ recitals by R. W. Ermeling, one of the leading organists of America, and the music furnished by the choir of eighty-

five voices will again be under the direction of Daniel L. Protheroe.

Cabinet Holds Accessories

Does your radio receiving set look like an experimenter's laboratory with batteries and wires strewn about the table? Most radio sets in homes do look that way. That is the reason the artists of the Crosley Manufacturing Company, in co-operation with the radio engineers, designed the new battery cabinet. This cabinet is an attractive piece of furniture and makes a welcome addition to the home. It overcomes the objections of the fastidious woman who is proud of the appearance of her home. The cabinet is made of solid mahogany and hand finished with a natural brown, matching the finish of the Crosley Model XJ and X. The cabinet is equipped with two doors in the front, hinged on the side, so that the batteries can readily be inspected and the remainder of the compartment used as a depository for head phones and other accessories. The straight lines are broken by molding at the bottom of the cabinet, and neat feet with rubber buttons protect the table on which it may be placed.

The increasing popularity of the dry-cell batteries for lighting the filament of the tubes makes this new cabinet a handy thing for concealing them, and the connections are made through the opening at the rear of the top of the cabinet to the receiving set, which is equipped with holes for the wires to come from the rear. The lead-in antenna wire may be a handsome piece of silk-covered lamp cord to harmonize with the furnishings of the room. The overall dimensions of this cabinet are 7 $\frac{5}{8}$ inches high, 23 $\frac{5}{8}$ inches long and 9 inches deep. The inside dimensions are 7 inches high, 15 $\frac{5}{8}$ inches long and 7 $\frac{1}{4}$ inches deep.

Argentine Folks Get Radio of Dempsey-Firpo Bout

THE 85,000 spectators at the Polo Grounds, New York City, Friday evening, September 14, who saw Jack Dempsey knock Angel Firpo to the canvas for the count of ten, constituted an infinitesimal part of the audience that enjoyed one of the liveliest clashes in a twenty foot ring. Neither the radio listeners within a one hundred mile radius of station WJZ, nor those within a thousand mile radius of this station were the only persons who were on the air to get a word picture of this great bout.

Far from the scene of the battle, to be specific, more than six thousand miles from the ringside in New York, some of the most eager fight fans listened tensely to a blow by blow description of the supreme fistic engagement of the year. And this invisible audience was Firpo's own, those who inspired him to enter the ring against Dempsey, confident in the belief that their giant brother would trot back to the Pampas with the world's heavyweight championship title. Disappointed as they are, nevertheless theirs is the satisfaction of knowing that the challenger fought bravely although defeated, and this fact was made known to them by radio over their receiving sets through the intermediary of the most powerful radio station in the world, Radio Central, located at Rocky Point, Long Island.

The manner in which the transmission of this precious information was carried out during the many stages of its progress over telephone wires, telegraph circuits, and the many transformations of voice and telegraph signals, is represented schematically in the accompanying drawing.

The Dempsey-Firpo clash in the ring is shown at "A." While the battle ranged J. Andrew White, the announcer at the ringside at "B," described the mighty left and right blows exchanged between the champion and the challenger. Each movement within the ring is translated into a word picture by White, which is transmitted over the line through

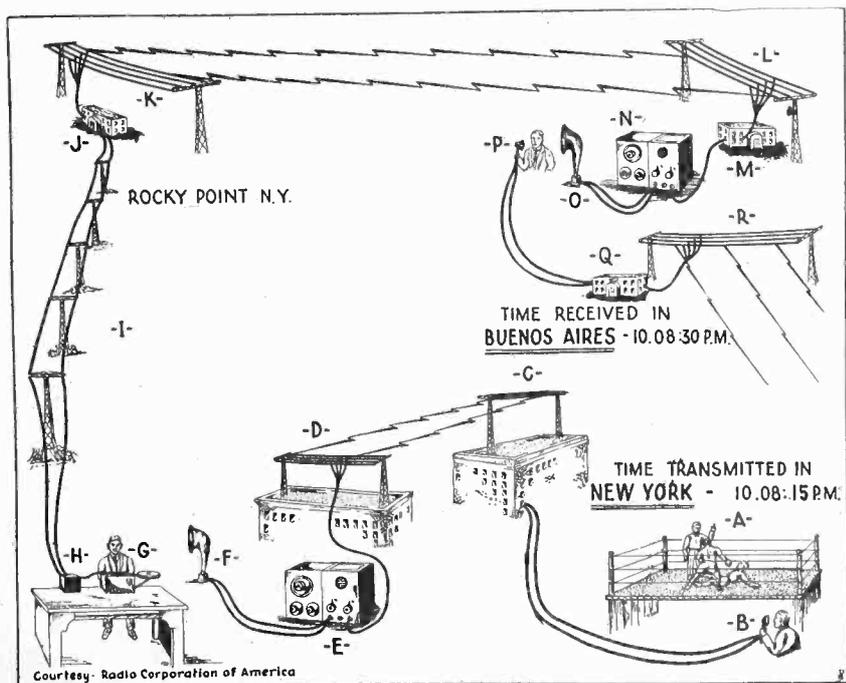
the microphone at "B." This land line connects with the Radio Corporation station WJZ located several miles from the scene of the engagement within the Polo Grounds.

From the antenna of WJZ, shown at "C," radio waves laden with the precious information given by White are hurled outward with the speed of light to be intercepted by thousands of receiving antennas scattered throughout the United States.

A few miles from WJZ, the antenna shown at "D" receives a minute portion of the energy from "C," which is received by the broadcast receiving apparatus "E." After sufficient amplification at this point the blow by blow description of the bout is projected into the transmitting room of the Radio Corporation Central Radio Office by means of the loud speaker "F." An operator intercepts White's word messages and transcribes the words received into dot-dash language, which is recorded upon a tape by means of the perforating machine "G." The tape is then instantly fed into an automatic high speed transmitting machine connected directly in the control line extending to the giant radio telegraph

transmitting station at Rocky Point, Long Island. This line, represented at "I," links New York City with the three mile multiple-tuned antenna and two Alexanderson Alternators which deliver 700 amperes to the antenna "K." Thus White's voice message is converted into telegraph characters and the waves radiating from "K" on 17,500 meters are an amplified repetition of the short wavelength energy broadcast from the antenna "C" at WJZ.

The system made up of the waves the radio generators at "J," and the antenna at "K" elevated 750 feet above the earth on twelve steel towers forms one New York terminal of the RCA trans-Atlantic radio system. During the period of the bout, however, its signals are intended for the high power receiving station at Buenos Aires. Thus, 6,000 miles away, the powerful wave energy flung from the antenna "R" registers at the receiving set "N" through the Monte Grande antenna represented at "L." Over great expanses of water and long stretches of land the progress of the big bout described by White journeys to the native land of Firpo. But the circuit is not yet complete. The telegraph signals issuing from the loud speaker at "O" must be converted back from that staccato language into the very words which White delivered to his microphone. This is carried out



This sketch shows how the Dempsey-Firpo fight returns were sent from the ringside, Polo Grounds, New York, to Firpo's home in Buenos Aires in fifteen seconds.

by a telegraph operator-announcer. He is stationed in the studio of the RCA broadcasting station shown at "O" where he translates dots and dashes into a word description. The antenna at "R" flashes his announcements to eager listeners sitting beside their short wave receiving sets.

The range of this station is sufficient to carry the news of the battle at New York not only to radio fans in the Argentine, but to Chile, Paraguay and Uruguay.

From the moment the referee reached his tenth count while Firpo lay upon the canvas after a blow delivered by his opponent, only 15 seconds were consumed in transferring the news from New York City to the countries in South America first mentioned.

New United Product

THE new United Radio Frequency Amplifier Unit is a distinct advancement in the design of radio parts. Its upper portion constitutes an improved type of standard socket and the lower part contains the radio-frequency amplifying transformer with the primary connections on one side and the secondary on the other. The entire amplifier unit is handsomely finished in black and polished nickel and it is only $2\frac{1}{4}$ inches square. Two stages of amplification, with this new unit, can be constructed into a space smaller than that of a single stage by the old method.

Radio-frequency amplification can make clearly audible a signal from a distant station, which without such amplification is entirely inaudible. It is conceded that transformer coupling is the most desirable.

The prime requisite of all radio-frequency amplifying circuits is to keep all capacities as low as possible because even a very small capacity is a good conductor of high-frequency current and the reduction of capacity will reduce the losses in the amplifier.

There is a minimum of capacity in and between windings in the united radio transformer. It is also very necessary to have all connecting leads as short as possible. In the united unit no leads need be longer than one inch. The leads are also well separated so that there is no chance of capacity existing between the plate and grid other than in the tube itself, which would tend to feed back the high-frequency emf in opposite phase into the grid and thereby reduce the amplification.

Inasmuch as the transformer windings in the united unit are in a horizontal position, the units for succeeding stages may be placed close together without any inductive feeding back to cause instability.

Hundreds of Fans Writing Plays

THE announcement by Station WGY, Schenectady, N. Y., of a prize 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 the 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 the written permission of the 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.



Manhattan Electric's New Loud Speaker
"Concert Modulator."

New Loud Speaker

The loud speaker with the "Concert Modulator" is the description given the new Manhattan loud speaker, made by the Manhattan Electrical Supply Co.

By means of this concert modulator, the instrument can be accommodated to all conditions and to every circuit, tube or battery with which it may be operated, it is said. No batteries are required for its use. The diaphragm is positively locked in the extra heavy lead-compound reproducing unit, precluding all vibrations except in the diaphragm itself.

The instrument stands 25 inches high, the bell of the wood fibre horn 10 inches in diameter. It is finished in sparkling crystalline varnish of a rich mahogany color.

The tone is not pitched so high as to be thin, nor so low as to lose definition, but is full, musical and not metallic in timbre.

Eliminates Squeaks

Don't blame the broadcasting station if your loud speaker emits a squeak on high notes. Your amplifier is likely to be in need of a "C" battery.

Direct Radio Service to Italy and Holland

FOR the first time in the history of international communication, direct radio telegraphic service between the United States and The Hague, Holland, and between the United States and Caltano, Italy, was established on August 18, according to an announcement made by the Radio Corporation of America.

The opening of these services raises the total number of direct radio circuits radiating to European countries from New York City from six to eight circuits and affects not only Holland and Italy, but provides more direct routes between the adjoining countries and the United States.

The addition of these new circuits to the already existing channels of radio communication to many parts of the world materially advances the status of plans which are now being worked out by the Radio Corporation to make the United States the center of a world-wide radio communication network. Because of the centralized location of the United States, with Europe to the east, South America to the south and the Orient to the west, this country enjoys a natural advantage which helps to make it possible to link the principal nations of the world by radio around New York as the pivotal center. This plan is rapidly nearing completion, there being at present eight connections across the Atlantic and one bridging the Pacific.

Longest Circuit to Italy

The circuit to Italy is one of the longest in existence. The distance which the radio waves travel in connecting the two points in communication is over 4,500 miles, or one-sixth of the way around the globe. In bridging this distance, however, the element of time is a negligible factor, it requiring but one-fortieth of a second for the signal flashed in New York to reach Italy. The distance traveled by radio waves between the United States and Holland is 3,500 miles.

The Italian Government has for many years expressed a desire

to have direct radio service with the United States. Not only will it be highly beneficial to that country, but Italy will now be in a position to render an effective service to neighboring countries by placing the use of her radio station at the disposal of Sicily, Hungary, Serbia, Greece and other neighboring countries and thus provide more rapid and direct contact between these countries and the United States. The more intimate relationship created by the new radio service will greatly enhance the trade interests between all the countries affected.

The geographical location of Holland with respect to Belgium, Finland and Denmark gives to Holland a similar advantageous position whereby she may handle communication to and from these countries with maximum dispatch. Thus these two new radio stations provide an outlet for business and social traffic between many European countries and the United States, according this nation a unique and powerful position of commercial and political

prestige in the affairs of foreign nations.

A Long-Felt Want

In commenting upon the new service, General Harbord, president of the company, said: "Direct communication between the United States and Holland and between the United States and Italy has long been the dream of our friends across the sea.

"The opening of this remarkable service will link in a more perfect bond the business and social friendship of these peoples and will assist in bringing about the stabilization of trade conditions which depends so largely upon swift, reliable and direct communication. This achievement is a monument to the skill of the Holland and Italian government engineers, with whom our engineers have been closely co-operating for several months in an endeavor to perfect methods for annihilating space and time in the exchange of intelligence."

The transmitting station which engages in communication with the two stations abroad is situated at Rocky Point, Long Island,



WEDDING "GUESTS" SEND LETTERS

Rev. Frederick Nelson McMillan, First Presbyterian Church, Walnut Mills, Ohio; Sam Heed, vice president of Cincinnati Electric Club, and Alvin Richard Plough, radio committee of fall festival, Cincinnati, sorting the thousands of letters received from all over the country from those who "listened-in" to the radio wedding broadcast by WLW of the Crosley Manufacturing Company.

seventy miles from Manhattan. The antenna system of this central station is so large that a plot of 6,400 acres was required on which to erect the towers.

A system of private telegraph lines joins the control apparatus of this station with the operators at the Broad Street office of the Radio Corporation where the actual telegraphing is performed. The receiving station is located at Riverhead, seven miles east of Rocky Point, and in a similar manner the receiving operator at Broad Street receives the signals intercepted at Riverhead and transcribes the dots and dashes as they are received by him. This system of remote control of high power radio circuits is a strictly American innovation which obviates all the disadvantages of a station located in a city where various atmospheric disturbances seriously interfere with its efficient operation.

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ANDRAE In Business Since 1860

A Great Radio Summer

THIS past summer 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, led 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 five hundred 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, in camp sites, to see the tourist rig up his receiving set soon after the tent is up 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 loudspeaker 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 trees and the ground is full of minerals, your station comes through the loud speaker as clear as a bell."



Photo of the studio at Station KDKA, Pittsburgh, Pa., of the Westinghouse Electric & Manufacturing Co.

WBZ to Teach Short Story Writing

BELIEVING that a great proportion of the public either write or think that they can write as well as some of the stories they see in the current magazines, Westinghouse Radio Station WBZ, Springfield, Mass., has arranged with Dr. J. Berg Esenwein, a widely known short-story critic, to give a course of short-story writing in ten lectures via radio. The course will cover the elements of writing with lectures on plot interest, climaxes, etc.

At the end of the course each of the persons listening in will be allowed to submit a short story, and the best story will be awarded a prize of \$25. Second and third prizes of \$15 and \$10 will be given for the next best stories.

In his course Dr. Esenwein will outline the specifications for the contest and entrants will have to listen closely to each talk, as the stories will naturally be written so as to follow the rules laid down. In fact, the best story will be judged first from the point of view of correct story writing.

The course commenced on Thursday, September 13, at 7:40 p. m., and the succeeding nine lectures will be given on Thursday of each week at the same time.

The introduction of this course of study from Station WBZ marks a new departure in the broadcasting from the station. Heretofore, miscellaneous talks have been given with more or less interest by the radio fan. It is the belief of the station that this character of addresses has served its purpose and the time has come when more definite things should be done by the station. Therefore, for the fall and winter, it has been planned to make every broadcast have a definite purpose in view.

In selecting Dr. Esenwein for the Short-Story course, Station WBZ has obtained the best person in the country.

Dr. Esenwein holds degrees from Albright, Lafayette, and Richmond Colleges and the University of Omaha. Most of his

life has been given to educational and literary work, the former as president of Albright, the head of the department of English in the Pennsylvania Military College, professor of public speaking in Springfield College and in the Springfield Branch of North Eastern University, and for the last thirteen years head of the Literary Department of the Home Correspondence School of Springfield, Massachusetts.

As a literary man Dr. Esenwein is even better known, having managed the old Booklover's Magazine, been for ten years editor of Lippincott's, and founded the Writer's Monthly, of which he is now editor.

Dr. Esenwein is the author of more than a dozen successful books, the best known of which is "Writing the Short Story," which has gone into sixteen large editions. He is an enthusiastic worker in public movements, being a director of the Springfield Chamber of Commerce, a former director of the Periodical Publishers' Association of America, a Fellow of the Royal Society of Arts, London, a past president of the Kiwanis Club, a past Master of Franklin Lodge, 134, Philadelphia, Orator of the Springfield Chapter of Rose Croix, and active in many organizations of a literary, uplift and athletic character. He has traveled extensively in more than twenty countries and as a lecturer his services are limited only by his active work as a critic of an instructor in the art of the short-story.

He is of an old Philadelphia family, his great-great grandfather having fought under Washington in the Revolutionary War, and his father, the late Dr. Augustus Esenwein, having been a subaltern in the United States Navy with Dewey and Watson, and as Fleet Paymaster under Farragut, having been attached to the flagship when the fleet ran the forts on the lower Mississippi."

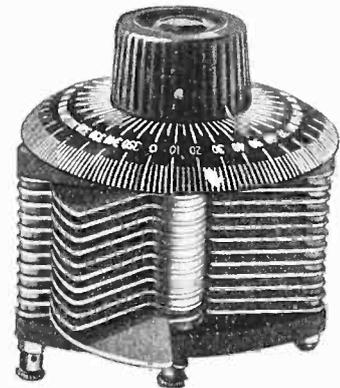
A New Condenser

ON the first glance at the cut below it might appear that this is just a picture of an ordinary condenser. However, for those readers who are interested in something that will further the art of radio, the following explanation of a One Knob Vernier Condenser that will give an accurate log reading, will be of interest.

It will be seen that there are two scales on one dial and a pointer on the knob.

In the ordinary two-knob Vernier condenser the small knob operates the Vernier plate, and when setting the group plates its position is never known unless it is set by an index mark, which requires an extra operation.

As an illustration, when setting the group plates of a condenser that has ten rotor plates, the vernier being one of these ten plates, it will be seen that there will be one-tenth more or less capacity when the plates are all in, involving possible maximum dial error for this setting of ten per cent,



Cruver Mfg. Co. New Condenser

but if the condenser is used at only a small fractional amount of its maximum capacity the dial error can be any amount and may increase to over fifty per cent if the condenser is used at one-fifth capacity. In other words, the dial reading is worthless.

With the Proudfoot One-Knob Vernier Condenser, invented by G. M. Proudfoot, manufactured by the Cruver Manufacturing Company of Chicago, the vernier plate lines up with the rotor plate as the knob is turned to the right so that the position of the vernier is always known when setting the position of the main plates, and this is indicated by the large scale. The fine adjustment is obtained by turning the knob to the left, which allows only the vernier plate to move and the position is indicated on the inner scale, therefore by the two readings an accurate log can be obtained.

When using some circuits the movement of the vernier indicator one division will tune in or out a station so it will readily be seen how indispensable this very simple improvement of the condenser will be to the radio industry as a means of facilitating the reception of the station desired.

Radio Equipment on Easy Terms

The latest method of marketing condensers, sockets, tubes and other parts of radio outfits, as well as complete receiving outfits, is on the easy payment plan. This method of selling radio merchandise was recently inaugurated by the Iodar Sales Co., Oak Park, Ill.



More Money For You in **RADIO**

THE amazing expansion of Radio has opened up hundreds of wonderful new positions on land and sea. Big salaries, fascinating easy work, short hours, and a wonderful future are offered to ambitious men who get into Radio now.

Radio offers you an opportunity to travel and see the world, with all expenses paid, and a fine salary besides. Or you can stay at home and work up to a position paying up to \$10,000 a year.

Easy to Learn Radio at Home

Thousands of Certified Radio-tricians are wanted to design Radio sets, to make new Radio improvements; to manufacture Radio equipment and to install it; to maintain and operate great broadcasting stations and home Radio sets; to repair and sell Radio apparatus to go into business for themselves; to operate aboard ship and at land stations.

You can easily and quickly qualify in your spare time at home through the help of the National Radio Institute. Prominent Radio experts will help you. Four wonderful instruments are furnished free, making the work thoroughly practical. The same plan that has already helped hundreds of our graduates to real success and real money in Radio is open to you.

Big Book Free

No other field today offers such great opportunities as Radio. Read about the opportunities open now—the different kinds of work—the salaries paid. Write today for the free 44-page book that tells how America's first and biggest Radio school can teach you to become a Certified Radio-trician in your spare time.

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Name Age.....

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City State.....

This concern has adopted a deferred payment plan for the purchase of radio apparatus and do not limit purchases to any particular make of equipment. They offer "any piece of any make" of radio apparatus and arrange terms of one-fourth down, balance in convenient payments for six months.

The company is constructing a broadcasting station, which will

be opened about October 6, on the top of their building. The Iodar Bulletin is also being published by this live-wire concern and mailed free to its customers. It contains much valuable information for the radio enthusiast. Charles P. Brushingham and J. D. Vandercook are sole owners of the company and have assured financial backing to secure high grade equipment.

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DEPARTMENT OF
PHILOSOPHY AND PSYCHOLOGY

Editor, Radio Topics
1112 North Boulevard
Oak Park, Ill.

Dear Sir

I want you to know that your magazine has proved itself very much worth while in furnishing to the non-technical radio "fan" the latest news concerning the development of the industry as well as items on the improvement of circuits, parts of apparatus, and service. On the whole I find your periodical very readable and instructive. For one who has not very much time to spend on the details and intricacies of radio your articles are particularly clear and concise.

There is a real need for a magazine of this type: authoritative, not too bulky, and not too expensive.

Yours truly,

Christian A. Ruckmick

Christian A. Ruckmick
Assoc. Professor of
Psychology



New and Novel Radio Patents



FILAMENT SUPPORT

(Patent No. 1,461,232, issued to Sigurd Thornsen, Chicago, Ill., under date of July 10, 1923.)

This invention relates to electron discharge devices and has for its object to provide a means whereby the filament therein may at all times be kept under the proper degree of tension to prevent vibration thereof. This invention is particularly applicable to electron discharge devices of the audion type where other parts, closely related to the filament, are contained within the evacuated space, and where absence of vibration is necessary not only to lengthen the life of the filament but as well to maintain the space relation between the filament and the other electrodes, upon the maintenance of which depends the proper functioning of the device.

The invention is illustrated in the drawing which represents an electron discharge device employing my invention.

As shown, the device comprises a base portion 1 adapted to be inserted in a suitable socket, not shown. To this is attached an evacuated glass container 2. The usual glass press or electrode support 3 is shown, from which leading-in wires extend to the various parts. Plate electrodes 4, 5 are shown, the top portions of which are connected and adapted to retain a block 6 of suitable insulating material.

Grids 7 and 8 of suitable mesh are shown and are supported by wires 9 and 10 extend-

ing from the insulating block 6. A filament 11 is shown of any suitable material and is supported at its upper end by a wire 12 extending from the under part of the junction between the upper ends of plate electrodes 4 and 5. The lower ends of the filament 11 are connected to leading-in wires 13 and 14 of any suitable material. These wires are bent into suitable shape and form a spring means whereby the tension of the filament is maintained at the proper degree under all conditions of temperature. The planes of plates, grids, filament and filament spring supports 13 and 16 are parallel.

Looking at the tube from the right of the figure it will be seen that the left-hand leading-in wire, 14, which extends from the glass portion 3 nearer to the left-hand lower end of filament 11, is bent further to the left in the form of a curved bow and then extends to the right and at its other end is connected to the right-hand lower end of the filament. Similarly, the right-hand leading-in wire 13, which extends from the glass portion 3 nearer to the right-hand lower end of filament 11, is bent further to the right in the form of a curved bow and then extends to the left and at its other end is connected to the left-hand lower end of the filament. The bowed portion of the leading-in wires provides spring tension and the long arm of the wire extending from the bowed portion to the lower end of the filament provides a lever arm sufficient to keep the filament taut under all degrees of expansion and contraction thereof.

It is therefore evident that the life of the filament is considerably lengthened due to absence of short-circuiting with other electrodes which might be produced by vibration, and that the device functions properly because the space relations, upon which its proper operation depends, are maintained constant.

HIGH TENSION CONDENSER

(Patent No. 1,461,287, issued to Emil Pfiffner, Frybourg, Switzerland, under date July 10, 1923.)

The condenser according to the invention is built on the principle of the so-called 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.

If the partial condenser is made with a suitable rain cover, the condenser provided with such rain covers is specially adapted for use in the open air, owing to its character as a chain insulator.

The metal connecting pieces of the partial insulators may be made so heavy that they are capable of giving off the heat occurring in the condenser through dielectric hysteresis losses by heat conduction to the atmosphere.

The conducting pieces can also be constructed so that they can be conveniently connected together by screw threads, bayonet catches, springs or the like.

Fig. 1 of the drawing shows a section of the partial condenser, which differs externally in no way from an ordinary support insulator.

Fig. 2 is an elevation of a four-part condenser built up from elements of the type illustrated in Fig. 1.

Fig. 3 is an elevation similar to Fig. 2 showing protecting coverings applied to the several elements.

Fig. 4. Is a sectional view of a modification of the invention.

Referring to the drawing in detail:

The parts *f* are the connectors with the threaded stud *v* and the corresponding female thread *m*. The connecting pieces are cemented at both ends on to the insulating tube *r* by the cemented joints *e*.

Fig. 1

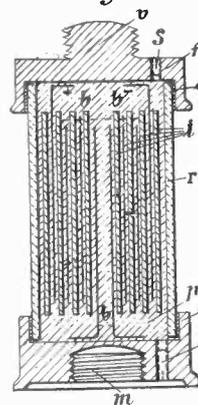


Fig. 2



Fig. 3

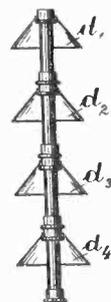
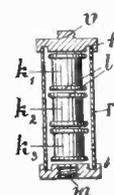


Fig. 4



High Tension Condenser

Conductively connected to the two connecting pieces are the two coatings *b-b*, which are separated by the dielectric *i*. The coatings *b* are assumed to be wound cylindrically together with the insulating layers *i*. The remaining intermediate spaces are filled by the insulating material *p*, which is poured in through the opening for the filling screws *s*.

Fig. 2 shows a four part condenser built up from the elements *a-1*, *a-2*, *a-3*, *a-4*, according to Fig. 1.

Fig. 3 shows the condenser according to Fig. 2, provided with metal or insulating rain covers *d-1-4*, for use in open air.

ELECTRODE AND ITS CONSTRUCTION

(Patent No. 1,465,381, issued to Russell F. Trimble, Elizabeth, N. J., August 21, 1923.)

The invention relates to electrode structures which may be employed in an electrical discharge device such as a thermionic device of the audion type.

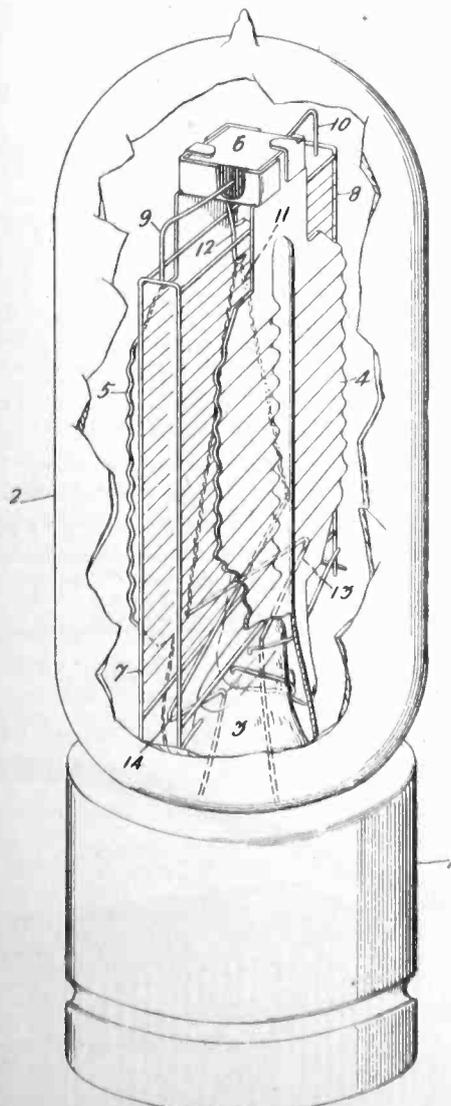
One type of audion employs a filamentary cathode, a grid at each side of the cathode and a plate or anode surface adjacent each grid. The two grid electrodes, and the same is true of the two plate electrodes, are electrically connected together inside or outside of the evacuated container. A stronger and more compact arrangement of the double electrodes is provided according to the present invention, wherein the double electrode is provided in the form of a unitary structure. This has been applied to the manufacture of the grid or screen electrode which specifically is composed of two parallel U shaped side wires, parallel cross wires extending from one U to the other and at right angles thereto.

Referring to the drawings Fig. 1 discloses in perspective a jig that may be employed in the manufacture of the electrode.

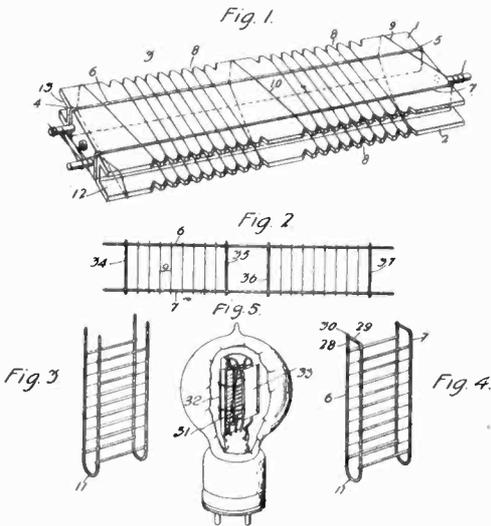
Figs. 2, 3 and 4 illustrate a grid electrode in various stages of its manufacture.

Fig. 5 illustrates a vacuum tube device in which the electrode shown in Fig. 4 may be employed.

The top face 1 and the bottom face 2 of the jig 3, illustrated in Fig. 1, are constructed the same, the top face being provided with notches 4 and 5 that receive the longitudinal extending wire 6, which is to form one of the side wires in the grid. This wire 6 is continued across the face 2 as illustrated in dotted lines. A similar side wire 7 is also provided and is continued across both faces



Filament Support



R. F. Trimble's Electrode

of the jig. The wires 6 and 7 may be held in the position shown by having their ends twisted or in any other suitable manner. Each edge of each face of the jig is provided with grooves 8 which are adapted to receive the wire 9 which is wound around the jig and across both faces thereof to provide the cross-wires of the grid. The winding process may be performed by hand or preferably the jig is supported in a lathe in order that it may be rotated while the wire 9 is wound thereupon.

DEVICE FOR ELIMINATING BODY CAPACITY

(Patent No. 1,464,708, issued to Thomas M. Harrigan, of Woodstock, Vt., August 14, 1923.)

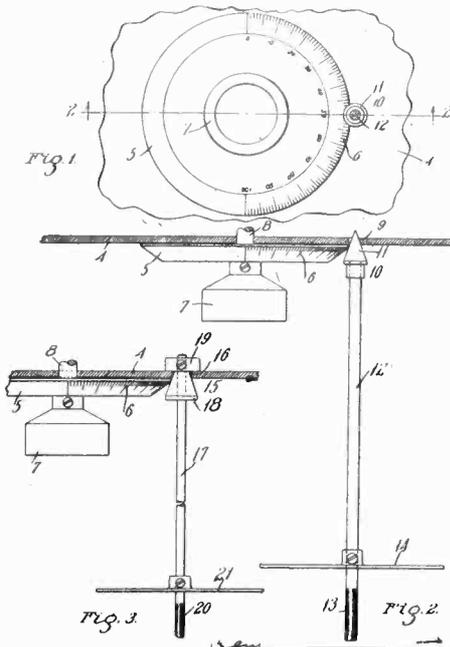
This invention relates to a device for eliminating body capacity effects in radio instruments. Its object is to provide a device through the medium of which certain dials employed for adjusting portions of a radio instrument, particularly the condenser, may be rotated while tuning the instrument without the body of the operator influencing the instrument and thereby rendering it difficult to properly tune the same.

Another object of the invention is to provide a device which may be employed in a manner to obtain a much more delicate adjustment of the dial and portion of the instrument associated therewith than is possible through the medium of the usual handle provided for the dial.

Figure 1 represents a front elevation of a dial for a radio condenser, a portion of the device embodying the invention being illustrated associated therewith.

Fig. 2 is a horizontal sectional elevation as taken on the line 2-2 of Fig. 1.

Fig. 3 is a view similar to Fig. 2 but illustrating a modified embodiment of the invention.



Eliminates Body Capacity.

Like numerals refer to like parts throughout the several views of the drawings.

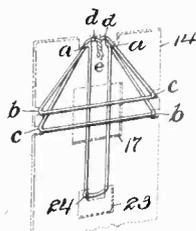
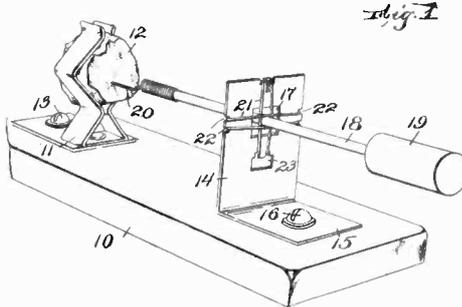
In the drawings, referring particularly to Figs. 1 and 2, 4 represents a portion of a front panel of a cabinet in which a radio apparatus of any desired construction is located and mounted. A dial 5 provided with graduations 6 and also having the usual handle 7, through the medium of which the dial is usually rotated, is located upon the exterior of the panel 4, being fast to a shaft 8 which connects with a condenser well known to those skilled in the art.

This invention is for the purpose of rotating the dial 5 without being obliged to touch the handle 7 and is as follows:—Provided in the panel 4 adjacent to the periphery of the dial 5 is an opening 9 into which may be inserted a friction member 10, preferably constructed of rubber or some other suitable flexible insulating material. A portion 11 of the friction member 10 is conical-shaped and the periphery of said conical-shaped portion engages the periphery of the dial 6 while the apex portion thereof projects through the opening 9 thereby providing means for positioning the friction member relatively to the dial 5. The friction member 10 is rotated through the medium of a rod 12 preferably constructed of insulating material at the outer end of which is located a handle portion 13. The rod 12 is sufficiently long for the operator to grasp the handle 13 thereof without the hand of the operator being sufficiently close to influence the instrument. A shield 14 constructed of suitable insulating material is mounted upon the rod 12 adjacent to the handle portion 13 thereof and said shield also acts to prevent the hand of the operator from influencing the tuning of the instrument.

NEW MOUNTING FOR CRYSTAL DETECTOR

(Patent No. 1,463,554, issued to Alexander N. Pierman, of Newark, N. J., July 31, 1923.)

This invention relates to a mounting for the stems of crystal detectors, which stems require a limited degree of adjustment, but which adjustment should be freely possible both in tilting the stem to various angular positions, and also to permit free rotation of the stem.



Mounting for Crystal Detector

The invention is illustrated in the accompanying drawing, in which Figure 1 is a perspective view of a crystal detector made according to my invention, and Figure 2 is a perspective view, on an enlarged scale, of the upper end of the support to more clearly show one manner of arranging the supporting wire.

The device can be fastened directly to the casing or any other part of a radio receiving set, but I illustrate it as being mounted on a base 10, on one end of which is any suitable form of crystal support 11, into which the crystal 12 is held, these crystals being made of galena, silicon and other attachable material.

The support for the crystal detector is made of substantially flat metal, the support 14 being preferably made with a foot 15 by means of which it is secured, the screw 16 acting to secure the foot 15 to the base, and also acting as a terminal or binding post.

The support has an opening 17, through which the stem 18 of the detector passes, the stem having a suitable handle 19 and having what is known as a whisker 20 at the end, which whisker is used for securing spring contact on the crystal 12.



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MacMillan's Trip to the Arctic

(Continued from page 8)

"parrots of the Arctic," are wonderfully colored, have the characteristic parrot bill, but feed on fish. Millions of them swarm the island which is no more than one mile square.

As we pass north along the coast of Labrador, it was seldom that the fog permitted us to see land. The curtain was accommodatingly raised as we passed Point Amour, where we were given an opportunity to take pictures of the wreck of the Battleship Raleigh, once the pride of the British navy, but now piled up high and dry on the rocks.

Snow everywhere on the mountain tops and enormous balls of ice on the shore. At one point we counted 89 icebergs visible from our crow's nest. One of those icebergs was in the form of an arch, so high that had we been sure the water was clear below we could have sailed our ship through.

* * *

On this last trip north Dr. MacMillan showed the natives moving pictures. Strange to say they do not consider the radio a mechanical or electrical device. When they saw the moving pictures they believed it was Dr. MacMillan's ability to make the spirits move on the screen. As for radio, they believe that in the year Dr. MacMillan has been back, he has learned how to make the spirits talk.

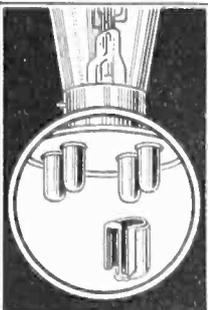
On July 4th the icebergs completely surrounding us, we received the returns of the Dempsey fight, and the pool which was started on board for him who guessed the number of rounds the fight would last was won by Jaynes, the engineer, and paid to him when the twelfth round was reached, that being the number he selected. But the money was promptly taken away from him when the fight went fifteen rounds.

In Battle Harbor where I left the expedition we were met at the dock by the doctors and nurses of one of those wonderful institutions the Grenfell Mission, where self-sacrificing men and women give of their time and energy without remuneration, caring for the sick and injured that are brought to them from miles around.

Being an old yachtsman I may have taken too many things for granted in omitting much which to me is commonplace, but perhaps in-

PROTECT

THE HEART OF YOUR RADIO SET



Vacuum Tubes are costly and extremely delicate. B battery or any other excessive current applied for only the fraction of a second to the filament leads will burn out your tubes. You have probably already had this experience and it is apt to happen again at any time. A burnt out tube means money lost—the set out of commission—inconvenience to you.

WHY TAKE THESE CHANCES WHEN RADECO SAFETY FUSES

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Dept. 4

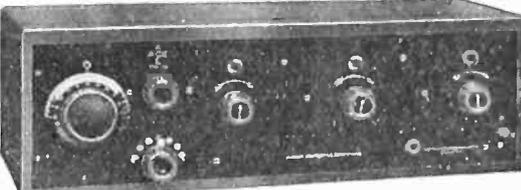
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Distributors of many other successful Radio Specialties. Dealers:—Write for our proposition and full details.

THE NEW ACE 3B

FOR USE WITH STORAGE BATTERIES OR DRY CELL TUBES



\$50.00

Manufactured under Armstrong U. S. Pat. No. 1,113,149

This New Ace Type 3B Armstrong Regenerative Radio Receiver combines detector and two stages of Audio frequency amplification. The lowest priced quality receiver ever offered. When you tune in with this set distant stations come in as though they were only a few miles off. The two stages make the use of a loud speaker possible—this is a desirable feature. Its efficiency has passed every test.

One of the few sets that functions perfectly with all makes of tubes. Has filament switch which eliminates necessity of turning out the rheostats when set is not in use. With

this switch you can turn off set and come back later to same concert without retuning. The telephone jack makes it possible to use head phones. When head phone plug is inserted it automatically eliminates loud speaker, but does not affect the filament current. Has genuine mahogany cabinet with beautifully engraved panel.

If your dealer cannot supply you, order direct, mentioning his name. Ask for "Simplicity of Radio" your copy is FREE. DEALERS: write on your letterhead for attractive sales proposition.

THE PRECISION EQUIPMENT COMPANY

923 Vandalia Ave. *Paul Crowley Jr.* PRES. CINCINNATI, OHIO

teresting to others. In describing the trip sketchily, I tried to be brief without neglecting the more important phases.

One thing remains to be said, however, and that has to do with Mr. Donald B. MacMillan himself. What I enjoyed as much if not more than anything of all the trip was the opportunity to study and know in close quarters that wonderful optimist Dr. Donald B. MacMillan. It might not savor of good taste to speak of him as a friend, as a man, as a captain, because it

would probably offend his sensitive nature to have me praise him thus openly, but I may without danger of indelicacy to him refer to his optimism which to me is unparalleled. If it rains, it rains. If it is cold, it is cold. If there is a mishap of any kind, it is accepted by Dr. MacMillan in contented spirit, and in full confidence that no matter what occurs, it is for the best. He never looks backward, always forward. He sees a bright side to every situation, every occurrence. He is a real optimist.

**RADIO ON THE FARM
THE DAILY
MARKET REPORTS**

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AUDIOPHONE**

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THE FARM**

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Market reports through the **AUDIOPHONE** can be depended upon because nothing is lost from the original broadcasting.

Not only is it easily possible to distinguish the words of a speaker, but also the minute graduations in pitch, timbre and quality of overtones, which distinguish individual voices.

The same qualities that make the **AUDIOPHONE** a source of profit by day, gives pleasure in the evening to the entire household, furnishing entertainment and education of a varied

nature because it is equally efficient in reproducing the speaking voice, singing voice and all musical instruments.

The **AUDIOPHONE** is complete and self-contained—needs no separate battery or other accessories—goes to you ready for use in connecting to your receiving set. It will prove a source of lasting pride and pleasure.

Audiophone, Sr.\$32.50
Audiophone, Jr. 22.50
**Bristol One - Stage
 Power Amplifier..... 25.00**

Send your name and address to receive copy of Bulletin No. 3006-P.

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Amrad Appoints Sales Manager

C. E. Dunbar, for the past fifteen years in the office appliance field, has been appointed general sales manager of the American Radio and Research Corporation, with headquarters at Boston.

Mr. Dunbar takes over charge of sales while the corporation is changing its entire selling plan and building a large national organization to merchandise Amrad Radio direct to the consumer. The company is being divided into territorial divisions with division headquarters, from which sub-branches will be directed. Twelve offices have already been opened.

Previously Mr. Dunbar was con-

nected with the Royal and Underwood Typewriter companies, as well as the Dalton Adding Machine Company. For the past four or five years he was general sales manager of the Noiseless Typewriter Company.

A Tube Saver

THE Radio Equipment Company has perfected a device which has considerable merit as a radio device. This is a fuse which fits over one of the filament terminals of a vacuum tube and absolutely prevents "blowing out" from any excess current such as "B" battery, etc.



An Efficient Switch

New On and Off Switch

WITH the advent of the latest forms of tubes, the filaments of which operate at such a low temperature that the illumination is hardly noticeable, the advantages of using a convenient dependable switch for connecting and disconnecting the "A" battery from everything on the set are greater than ever before.

The new C-H Radio Switch, recently placed on the market by the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., is designed for this purpose. Pull the switch knob out and the set is connected. Push it in and the current is entirely disconnected from the set. As the knob sticks out when the current is on, it acts as a reminder to turn the current off when the set is not in use.

According to the maker, the new switch has a positive wiping contact that assures full battery voltage and that can never become a source of disturbing noises. The switch is easily mounted on the panel by boring a single hole 13/16" in diameter, inserting the switch from the back of the panel, and tightening the nickel nut on the front. Two special cup washers hold the wire terminals securely.

Such "on and off" switches are a real convenience on any set. They make it possible to disconnect the set temporarily without changing the instrument settings and then start up again without losing the station for which the set was previously adjusted. They make it easy to disconnect the set at any time and thus reduce the possibility of draining the battery unnecessarily or shortening the life of the tubes. They save time in shutting down and starting up.

A 33-Ohm Rheostat for UV-199 Tubes

The Marquette rheostat shown herewith is a recent development in radio. This article is manufactured by the Marquette Radio Corporation of Chicago. Several tests have proven that this rheostat is a perfect arrangement for vacuum tube filament temperature control which is necessary at all times for smooth tuning. They are made in 25 and 33 ohms.

The 33 ohm rheostat is especially adapted to the usage of the UV-199 tube and also the 201-A and 301-A tubes. It is noted that this article also has an off and on switch which serves as a locking device.

The Marquette Radio Corporation is using these rheostats exclusively on their regenerative receiver, which has been bringing forth considerable praise from the radio trade. The regenerative receiver is made up in two units with an attachable top and base, so that either the detector unit or the two stage amplifier may be purchased separately.

New Radio Lists Out in October

Lists of broadcasting, amateur, government and ship and land commercial stations have been prepared and transmitted to the government printer for use in the forthcoming directory of stations, which will be available this month.

These lists are issued annually, giving all stations in service at the beginning of the fiscal year on July 1. Two books are issued, one covering commercial, government and broadcasting stations, and the other amateur and special stations. Each station is listed twice, by the name of owner and by call, and the lists are arranged by districts, in the case of amateur and special stations, and alphabetically in the case of other stations.

Radio Reaches 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's station regularly, sometimes strong enough to operate a loud speaker.

Sweeping the Nation!

This is the 20th month of **1000 Mile Reception** unstinted expense and research by experts to produce the Lytton line of radio masterpieces, now being demonstrated by a number of unsolicited dealers.

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and up



Line of Remarkable Value

Mark us! When our broad campaign is announced in a short time, it will start a new era in radio.

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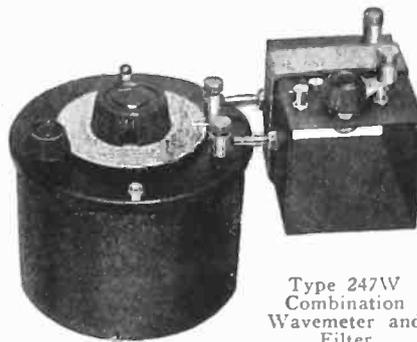


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\$35.00



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Have you a broadcasting station you would like to eliminate? You can do it with our Type 247W Combination Wavemeter and Filter.

This combination, consisting of our Type 247 low loss condenser and a special coil, will enable you to cut out objectionable broadcasting and similar annoyances. The wavelength scale is read directly on the condenser dial. Range 150 to 500 meters. Simple and efficient.

Price, \$10.00
Send for Bulletin 916T

For those who desire a completely enclosed instrument we offer our Type 305 Filter. This instrument is similar to the Type 257W Filter in its general characteristics. It has in addition a special series parallel selector switch, enabling the filter to be used as an acceptor or rejector without changing the external connections. It is enclosed in a walnut cabinet fitted with Bakelite panel.

Type 305 Filter and Wavemeter, \$25.00

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in the class with the one illustrated above

ARE JUSTLY HIGH PRICED

To Many Radio Enthusiasts this means that they must either take a lower priced set, something not so satisfactory, or wait until such time as they are able to make the large outlay of cash required for the purchase and installation of one of these high-grade sets. This is no longer the fact, as through the use of

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R. C. A. Brings Action Against F. A. D. A.

EARLY in 1923 A. H. Grebe & Co. announced "a new spring suit," bearing reference to litigation instigated by the Radio Corporation of America, and now "a new fall suit" has been filed by the Radio Corporation of America against F. A. D. Andrea, Inc., the substance of which is alleged infringement of the Rice & Hartley patents Nos. 1,334,118 and 1,183,875, respective-

ly, through the manufacture and sale of radio receivers embodying the Hazeltine Neutrodyne circuit, in accordance with the patents and pending applications of Hazeltine.

This action affords opportunity for early adjudication of the validity and scope of the Rice & Hartley patents and the alleged infringement of these patents by apparatus manufactured and sold under the Hazeltine patents and pending application.

This "new fall suit" will be de-

fended by F. A. D. Andrea, Inc., with the co-operation and support of the Independent Radio Manufacturers, Inc., of which organization F. A. D. Andrea, Inc., is a member.

The Independent Radio Manufacturers, Inc., is a group of radio manufacturing companies who are prominent factors in the radio industry and whose interests are pooled as regards the use of certain patented inventions and the prosecution and defence thereof.

Many no doubt will recall the work of this organization last year in connection with the crystal patent litigation, instituted by the Radio Corporation's associate, the Wireless Specialty Apparatus Company, and the commendable action taken by the organization, both as regards the defense and the prosecution of its rights in this situation.

The Independent Radio Manufacturers, Inc., are represented in patent matters by the firm of Penny, Davis, Marvin & Edmonds. They advise that there is a good and valid defense to the suit started by the Radio Corporation of America on the Rice & Hartley patents.

F. A. D. Andrea, Inc., feel that the defense of the "new fall suit" will result in no change in activities in connection with the Hazeltine Neutrodyne receivers, and that both at present and in the future the manufacture and sale of this receiver will continue unabated.

Hiram Jones Resolves to Study

By C. M. BUCHANAN

THE other night I tried to get some classy dancing tune, but every time I tuned my set, sad music filled the room. I turned and twisted at the dials—they didn't seem to care—the only answer for my trials was a most solemn prayer. And then again I've sought in vain, when I was in the mood, to tune into some sombre strain to soothe my solitude. But did I get it? I did not! Instead of sweet refrains, the only music that I caught was blaring, jazzy strains. And so I'm going to take a course at correspondence school and learn just how to use this force, and make it work by rule. This thing of never "knowing how"—of working "hit or miss"—is rather foolish, you'll allow; now I'll get down to biz. I'm going to learn just what to do, and trust no more to luck, and when my lessons are all through I'll sure be glad I stuck.

HIRAM JONES.

Gets Fight Returns

Returns of the Dempsey-Firpo fight, on the night of September 14, were received by wireless, round by round, by Andrew J. Allen and family at 3530 Salem street, Indianapolis, Ind., where a neighborhood party listened, at a distance of approximately 1,200 miles. A powerful sending station installed at the Polo Grounds in New York City, transmitted every action of the fighters, both in the preliminaries and during the big fight.

Mr. Allen says, "Every move of the fighters, and their mental and physical state and appearance, was announced as they exchanged blows and the count was heard as the fighters were alternately floored. The ring of the gong for the beginning and ending of each round could also be heard, as well as the yells of the crowd as the various favorites showed good form. The very second that Firpo was knocked out, the result was announced by wireless, and the cheers of the crowd swelled into a riotous demonstration that became deafening to the ears. 'Ladies and gentlemen, sit still for safety's sake,' was the warning cried out several times by the ringside attendants.

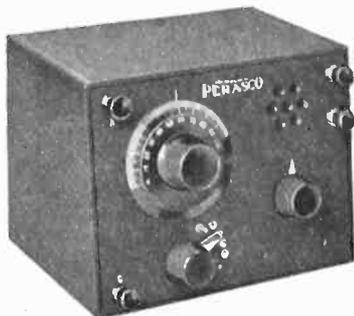
"My family and some neighbors received the returns over a circuit hook-up of my own design and the announcer's voice could be heard all over my house through a loud speaking horn attachment. I tuned in the New York station about 7 o'clock and listened to the preliminary bouts until 8 p. m., our time, when the big fight began. It was as exciting as if we had been at the ringside, but it was disappointingly brief. Following Firpo's knock-out other matches were put on and those returns also came in loud and clear via wireless."

Mr. Allen's aerial consists of a length of about 90 feet of braided copper wire strung in the attic of his residence.

Mr. Allen says he has received all the principal broadcastings from Denver and Omaha on the west to the entire Atlantic Seaboard including Cuba, and from the Canadian stations on the north to Dallas, Ft. Worth and other southern stations. On some occasions he has received stations on the Pacific coast, but states "these have been infrequent because I do not stay up late enough. To get the extreme west stations, owing to the difference in time means that I would have to 'burn midnight' oil into the wee morning hours."

"THE BETTER RADIO" PIERAGICO

The Perasco Kewpie



Ideal for vacation or home use. Its special circuit makes possible the reception of stations without an aerial of any description. Any tube may be used with equal efficiency. Range 1,000 miles.

Perasco Kewpie\$25

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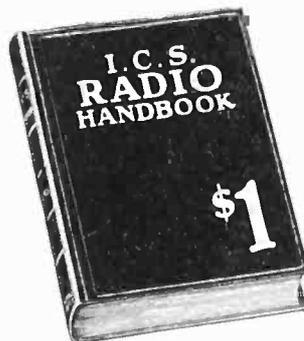
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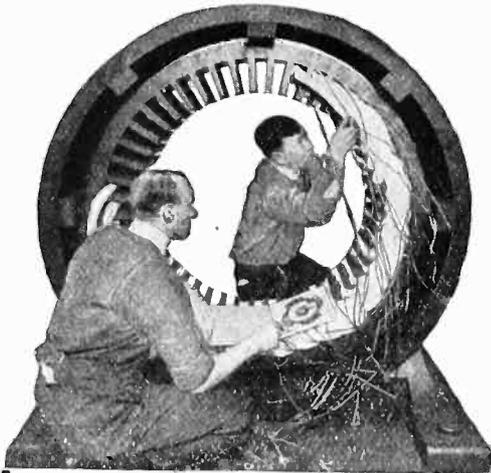
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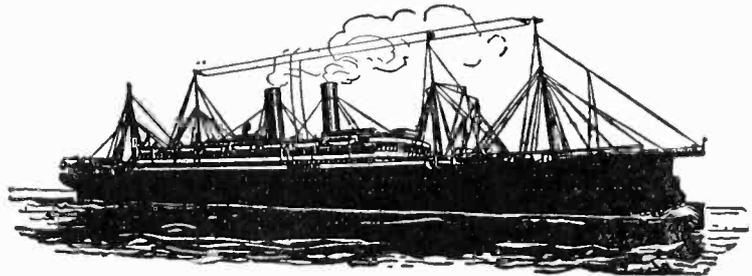
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New Manhattan Headset

"A headset designed not for a high rating in ohms but to produce maximum results," is the description of the new "Red Seal" head set of the Manhattan Electrical Supply Company, Inc. Ohms were entirely neglected, but the impedance, matching that of the vacuum tube, is approximately 25,000 ohms at 1,000 cycles.

In addition to responding unusually well to weak signals, the



A New Head Set

Red Seal gives clear, distinct response to strong ones, it is said. "No chattering" is possible, while the diaphragm is entirely free from "period."

The case and caps are of red bakelite. The headbands are covered with red moulded rubber, making the instrument very comfortable and easy to adjust. The Red Seal is a quality instrument and very handsome in appearance.

Arctic-Bound Ship Sends Greetings

It took just ten minutes to send a radio message from Donald H. MacMillan's Arctic-bound schooner, Bowdoin, to Bristol, Conn., via a local amateur station and the relaying of a reply back to the ship, which is somewhere northeast of Labrador, on the way to Greenland.

The prophecy that the radio installation on the Bowdoin could be utilized by members of the crew to communicate constantly with friends and relatives at home, thereby relieving the tedium of Arctic loneliness, has proved true, the feat demonstrating the efficiency of the American amateur traffic system.

The Receiver

famous thru Performance

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Type B-R Receiver

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EASE OF OPERATION enabling the novice to secure satisfactory results.

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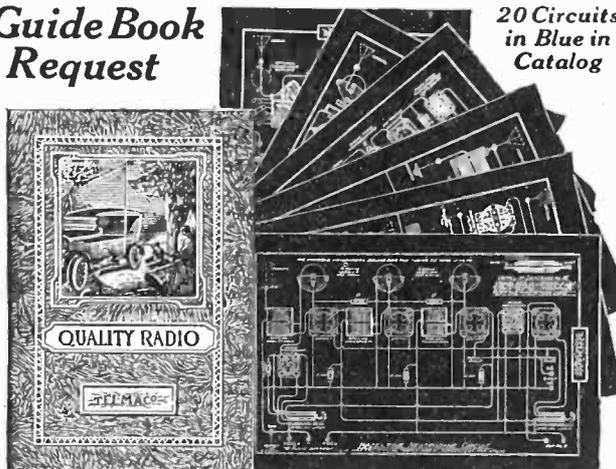
Tri-City Radio Electric Supply Co., licensed under Armstrong U. S. Patent No. 1113149, Oct. 6, 1914.

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—The Oldest Mail Order House is Today the Most Progressive—



Trading Posts to Enjoy Concerts

THOUGH ice-bound, and in darkness through the long winter months of the North Pole, trading posts in the Arctic zone will not be entirely isolated from civilization and life. According to plans made by the Hudson Bay Company, lonely posts will be provided with radio receiving sets so as to secure entertainment at any time. Two North-bound ships, the S. S. Bayeskimo and the S. S. Nascopic, are carrying Westinghouse radio receiving sets to six of the posts above the Arctic Circle.

In order to determine whether or not these posts will be able to hear the concerts from the United States next winter, the ships are listening-in on their way North to the broadcasts as they steam to the frigid zone. Several nights ago the Westinghouse Station WBZ in Springfield, Mass., gave a special concert at 11 p. m., and radiograms received from the Bayeskimo state that the music has been heard with great success,

There are hundreds of posts spread throughout Canada and North America, from above the Arctic Circle into James Bay. The ships have left for these trading posts and the factors will have their sets for next winter. Although the reports received so far from the ships are very encouraging, complete information on the results will be obtained upon their return.

The posts are so far removed from civilization that no news will be received until spring. The lanes of travel to these posts are entirely blocked on account of the heavy ice which accumulates.

When you and I were young, Maggie,
There were no autos then;
We took the old gray mare, Maggie,
Yes, time and time again.

We took the old gray mare, Maggie,
And drove across the hills,
And now we're old and gray, Maggie,
But still the mem'ry thrills.

We do not mind the change, Maggie,
We're not so awful slow,
We have our own good times, Mag-
gie,
With our new radio.

RECEPTION—
COAST TO
COAST



Post Paid

6.00

This Peerless Double Range Tuning Coil is described by Mr. W. F. Kuster in this issue of Radio Topics.

For sure results, use this mechanical masterpiece, technically perfect, ready to mount on your panel.

The Peerless Coil has smashed all single tube records for low priced, easily constructed sets. Order one today. Sent postpaid on receipt of \$6.00—our introductory price.

RADIO INSTRUMENTS COMPANY
of CHICAGO
17 N. Wabash Ave., Chicago

PATENTS

To the Man with an Idea

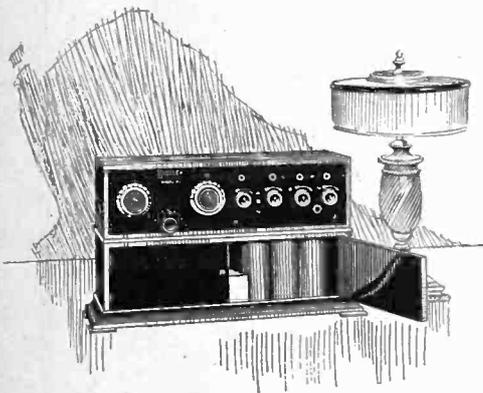
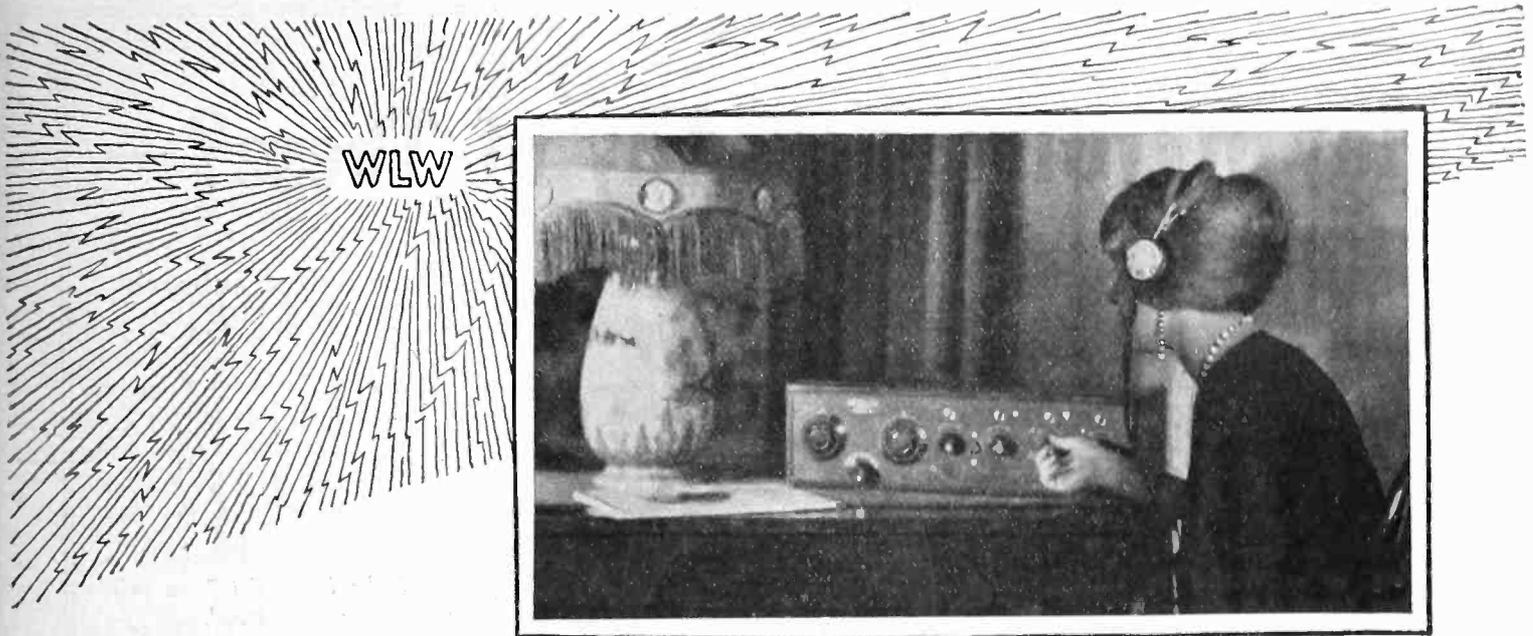
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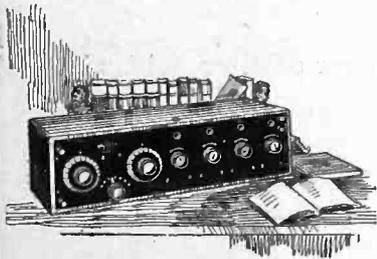
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CROSLLEY MODEL X-J
With Battery Cabinet

This combination makes the set completely self-contained. The batteries are housed in this handsome mahogany, wax finished cabinet. Price of cabinet alone — \$16.00.



CROSLLEY MODEL X

This remarkable receiver — still priced at \$55.00 — contains many new features such as the R. F. T. A. Coil and the Multistat. The battery cabinet, illustrated above, may be fitted to it, thus adding to its present beauty.

Announcing -
THE NEW CROSLLEY MODEL X-J
PRICE \$ 65 00

The Crosley Model X has in just a year's time established itself as the most popular and successful receiver ever marketed. Hundreds of unsolicited endorsements like the following constantly come to us. A man writing from Belleville, Kansas, says:

"I have found the Crosley Model X to be the best radio receiving set I have used, and permit me to say that I have been interested and using radio sets since spring of 1922, including all standard makes."

Now comes a companion, the new Crosley Model X-J, embodying all the good points of the Model X, together with greater refinement of detail. Some of the new features of this wonderful receiver which make for greater distinction and beauty are:

1. **KNOBS AND DIALS**—Larger, easier to control and better looking.
2. **FILAMENT CONTROL SWITCH**—Snaps filaments on and off.
3. **JACK**—Allows you to plug in with head phones on three tubes. When tuned in just pull the plug and you are switched to the loud speaker.
4. **ELIMINATION OF BINDING POSTS ON FRONT PANEL.** By removing the binding posts to the rear, the beauty of the set is greatly enhanced.
5. **SOCKETS**—Porcelain sockets are replaced with black compound sockets, which are just as efficient and better looking.
6. **CONDENSER**—The New Molded Crosley Condenser, made of specially prepared compound, will out-perform any condenser on the market.
7. **MULTISTAT**—Allows the use of all makes of tubes. (Now a feature of the standard Model X.)
8. **RFTA COIL**—New low resistance coil permits sharper tuning.

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A well built variocoupler, complete with dial, which sells for \$6.50, will be mailed to you postpaid for 3 one-year subscriptions.



Manhattan 2,000 ohm phones sell for \$6.00. You may have a pair postpaid for 3 one-year subscriptions at \$2.00; total \$6.00.

A variometer, complete with dial, is also yours for 3 one-year subscriptions to RADIO TOPICS.

You may also have a full set, consisting of a variocoupler and two variometers, with dials, whose value is about \$18.00, for only 8 one-year subscriptions.

Just send us subscriptions, either renewals, new ones or your own, whose total at our rate of \$2.00 per year equals the price of the item you want, and we'll send it immediately prepaid.

All of the items listed on this page are fully guaranteed.

If there is something you want not listed, we'll arrange to get it.

A WorkRite splendid loudspeaker made of a composition and having a receiver in the base with extension cord. It costs \$12.00, and is yours for 6 one-year subscriptions.

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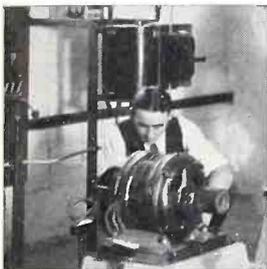
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Harold Hastings of Somers, Mass., says: "The profit on my electrical business amounts to \$475.00 a month. My success is due entirely to your instruction. You make your men just what you say—Electrical Experts. No man will ever make a mistake enrolling for your course."



Dickerson Gets \$7500 a Year

"I earned \$30 a week when I started with you—\$50 a week when half through your course. Now I clean up at the rate of \$7500 a year. Thank you a thousand times for what you did for me. Electricity pays big on the farm." Herbert M. Dickerson, Warrentown, Va.



\$20.00 a Day for Schreck

"Use my name as a reference and depend on me as a booster. The biggest thing I ever did was answer your advertisement. I am averaging better than \$500 a month from my own business now. I used to make \$18.00 a week." A. Schreck, Phoenix, Ariz.



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W. E. Pence, Chelalis, Wash., says: "Your course put me where I am today, Mr. Cooke—making \$750 a month doing automobile electrical work—think of it—\$9000 a year. Besides that I am my own boss. My wife joins me in thanking you for what you did for us."



\$30 to \$50 a Day for J. R. Morgan

"When I started on your course I was a carpenter's helper, earning around \$5.00 a day. Now I make from \$30 to \$50 a day and am busy all the time. Use this letter if you want to—I stand behind it." J. R. Morgan, Delaware, Ohio.



Spare Time Work Pays Stewart \$100 a Month

"Your course has already obtained a substantial increase in pay for me and made it possible for me to make at least \$100 a month in spare time work. You can shout this at the weak fellows who haven't made up their minds to do something yet." Earl Stewart, Corona, Calif.

in the Big Pay Field of **ELECTRICITY**

It's your own fault if you don't earn more. Blame yourself if you stick to your small pay job when I have made it so easy for you to earn \$3500 to \$10,000 a year as an electrical expert. **Electrical Experts** are badly needed. Thousands of men must be trained at once. One billion dollars a year is being spent for electrical expansion and everything is ready but the men. Will you answer the call of this big pay field? Will you get ready now for the big job I will help you get? The biggest money of your life is waiting for you.

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I will train you just like I trained the six men whose pictures you see here. Just like I have trained thousands of other men—ordinary, everyday sort of fellows—pulling them out of the depths of starvation wages into jobs that pay \$12.00 to \$30.00 a day. Electricity offers you more opportunities—bigger opportunities—than any other line and with my easily learned, spare time course, I can fit you for one of the biggest jobs in a few short months' time.

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Don't let any doubt about your being able to do what these other men have done rob you of your just success. Pence and Morgan and these other fellows didn't have a thing on you when they started. You can easily duplicate their success. Age, lack of experience or lack of education makes no difference. Start just as you are and I will guarantee the result with a **signed money back guarantee bond**. If you are not 100% satisfied with my course it won't cost you a cent.

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In addition to giving my students free employment service and free consultation service, I give them also a complete working outfit. This includes tools, measuring instruments, material and a real electric motor—the finest beginners' outfit ever gotten together. You do practical work right from the start. After the first few lessons it enables you to make extra money every week doing odd electrical jobs in your spare time. Some students make as high as \$25 to \$35 a week in spare time work while learning. This outfit is all FREE.

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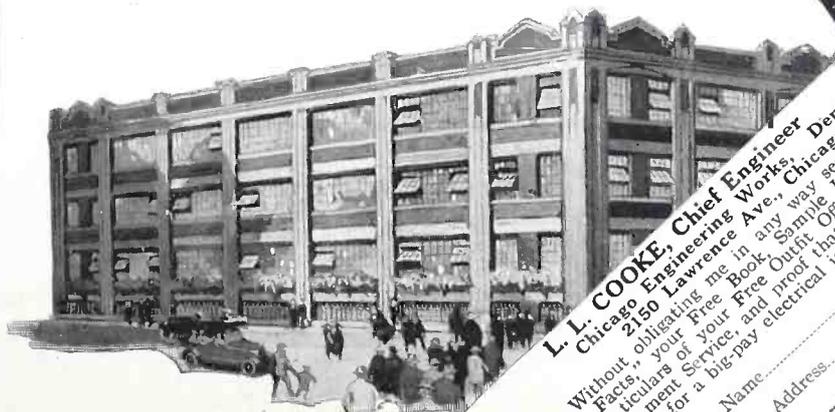
The coupon below will bring you my big free electrical book—over 100 interesting pictures. The real dope about your opportunities in electricity—positive proof that you, too, can earn \$3500 to \$10,000 a year. Send for it now. Along with the book I will send you a sample lesson, a credit check allowing you a \$45.50 reduction, my guarantee bond and particulars of the most wonderful pay-raising course in the world. Send the coupon now—this very second may be the turning point in your life. Send it while the desire for a better job and more money is upon you, to

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\$2.00



This aircore Transformer has been perfected for use in the Neutrodyne method of receiving. It should be used with .0004 mfd. variable condenser for tuning to all broadcasting wavelengths. It can also be used as a transformer for tuned radio frequency reception, or fixed coupler with condenser across secondary. It is made with tubes of moulded Bakelite and wound with green silk wire. Extreme care has been taken to see that the tubes are properly spaced and just the right number of turns of wire are used, insuring maximum efficiency. Like all WorkRite products, it has been thoroughly tested by other laboratories as well as our own before being put on the market. It will measure up to the "WorkRite" standard of quality and efficiency.

Watch for the WorkRite Variable Condenser

WorkRite Super Vernier Rheostat



This improved WorkRite Vernier Rheostat is just the instrument you have been looking for, 50,000 possible adjustments. A turn of 1-32" will separate two stations or clear up one. Made in three different resistances so that there is a WorkRite Vernier Rheostat for every tube now on the market. 6 ohms, \$1.00; 15 ohms, \$1.15; 30 ohms.....\$1.25

WorkRite E-Z-Tune Dial
Snappiest Dial on the market. Has a knurled flange on the rim for delicate leverage. Price75c

WorkRite Resistance Cartridge

Raises the resistance of your 5 or 6 ohm Rheostat to the 15 or 30 ohms required for UV 199, and similar tubes. Price, either 15 or 25 ohms.....40c

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Neat, compact and very efficient. This instrument has a glass insulation on the outside which greatly expedites neutralizing the set. Price each, 25c.

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Tunes out local stations and gets the one you want. This famous Tuner Team is made up of two WorkRite Super Variometers and one WorkRite 180° Super Variocoupler. Variometer is made from polished mahogany. Variocoupler made from moulded Bakelite and wound with green silk wire. Range 150 to 705 meters. Shaft 3-16".

WorkRite Super Variometer, each.....\$3.50
WorkRite 180° Super Variocoupler, each.....\$3.50



WorkRite 180° Super Variocoupler

WorkRite Nonmicrophonic Socket



Here is the right Socket for use with your UV 199 and C 299 Tubes. It is moulded with a sponge rubber base in one piece which is even better than the soft rubber recommended for use with these tubes. Very neat and attractive. Price60c

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You need one for your storage "A" battery. Full instructions with each instrument. Price75c

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Very Sensitive. Light and sanitary. Try one and see. Price\$6.00

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Just what you want. Use the block for drilling panel. Arms and points made to work together. Price50c

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