

Radio Digest

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Illustrated

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No. 1

DETECTIVE BURNS TALKS



"Pretty Nelly Kelly," otherwise Miss Elizabeth Hines, of "The O'Brien Girl" fame, recently bewitched the Radiophans by broadcasting some of her song hits from the WOR Station, Newark, N. J. After starring in the last named Cohan success as the singing and dancing ingenue—a Cinderella-like character—she now heads the cast of the same producer's "Pretty Nelly Kelly." Critics of Gotham and Chicago are unanimous in praising her lovely, unassuming manner and her notably graceful, mobile face. One Chicago critic said of her that "she is not too proud of her light singing voice" and "altogether her personal charm is irresistible"

RADIO CORPORATION HURLS BOOMERANG

REQUIRED TO SHED LIGHT ON TUBES IT MADE

Grebe May Win R. C. A. Suit When "Radio Group" Figures Are Aired in Court

(Special to RADIO DIGEST)
NEW YORK.—If Edison when he invented the incandescent light were to have said, "Now that I own the patent on the incandescent light, you other fellows have no right to manufacture fixtures, sockets, or generators built for the express use of my incandescent light," the famous inventor would merely be duplicating the present effort of the Radio Corporation of America in its "Spring" suit against the A. H. Grebe Company. For the "Radio Group," as the combine of companies making up the Radio Corporation is known, is attempting to show in this suit, in view of the fact that they own certain patents (several almost expired) on the vacuum tube, that no manufacturer or individual has the right to make apparatus which is useful only with their tubes.

But on this subject, the R.C.A. has opened itself up to some very pertinent questions. The answers to these, it is believed by many attorneys and engineers well informed on the situation, will decide the suit against the Radio Corporation, and, in that event, to the complete vindication of the Grebe company.

The All-Important Question
The question the "Radio Group" will be required to answer to the court and, it is said, much to their distaste, will be: "Approximately how many vacuum

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ON RADIO AS AIR NET FOR CRIME FIGHT

Plans Broadcasting Bureau to Furnish Information to All Police

Would Broadcast Hourly

Washington to Put Entire Nation on Lookout for Fugitives by Ether Descriptions

By L. M. Lamm

WASHINGTON, D. C.—A gigantic plan is being perfected for the catching of criminals by use of a Radio crime net, says William J. Burns, the foremost detective in the United States, formerly directing head of the William J. Burns International Detective Agency and now Director of the Bureau of Investigation of the Department of Justice. Mr. Burns, when interviewed by a representative of Radio Digest, said that he is much interested in the development of the use of Radio in connection with his work.

One of Mr. Burn's pet hobbies at this time is the organization of the bureau of

(Continued on page 5)

Noted Parisian actress, Mlle. Gabrielle Ravine, who has delighted listeners in on WOR Station (L. Bamberger Co.), Newark, N. J., by her English and French songs. Among her renditions are "The Battle of Yser," "La Marsellaise," "Puisque j'ai mis ma levre," and others



IONIZATION WRONG; SUN CROWDS RADIO

REACH LONGER DISTANCES DURING DARKNESS

Scientists Make Interesting Observation on Radio during Solar Eclipse

LOS ANGELES.—Interesting data concerning Radio reception during the recent total eclipse of the sun were obtained at astronomical observation stations in Southern California. Virtually all the observers were equipped with Radio sets for the purpose of receiving the valuable data broadcast from Station KHJ, Los Angeles Times here, for their benefit, and hence were able to note the effect which the darkness during the eclipse had upon Radio transmission and reception.

Charles Cole and A. J. Champreux, engineers of the Pacific Telephone and Telegraph Company, who were with Prof. A. O. Leuschner at Avalon, reported increased audibility during the period of totality.

A. G. Gerfin and Raleigh Wiston, Radio men with the Lowell Observatory party in Mexico, reported an increase in the signal intensity from KHJ during the eclipse.

The most interesting report is that rendered by Frank Creswell and Allen Case, who were stationed at a point fifty-eight miles south of Tijuana. An audibility meter was used to obtain accurate data on the variation in signal strength and the amount of static present was also noted for each reading.

Audibility Figures

The normal daylight audibility of KHJ, as measured during the 9 o'clock (Pacific time) transmission, was 32 and very strong static was present. From 12:15 p. m., throughout the partial phases of the eclipse, the audibility rapidly increased, reaching 490 at 12:58 p. m. This rapid increase in signal strength was accompanied by an equally rapid decrease in the static strength.

At 12:59 p. m., as the shadow of the moon passed over the receiving station in the total phase of the eclipse, an audibility of 780 was recorded. At this time static was nil. Three minutes later audibility rapidly fell off to 310, and continued to drop until finally the normal value was again reached.

From these reports it would appear that the results obtained during the darkness of the eclipse approximated the normal night reception. During the few minutes that the strong light waves from the sun were not present, the Radio waves traveled as freely and retained their energy as well as during normal night conditions.

Effect of Light

These facts shed some light upon the theoretical consideration of the great variation between day and night transmission. This variation or difference is very pronounced. In the case of KHJ, for example, the normal daylight range with the present types of receivers is perhaps 250 miles; whereas during the dark hours the station is heard at distances over 2,500 miles. There are several theories advanced to account for this great hindrance which Radio vibrations encounter during daylight.

The important point established by the tests is that the audibility of received signals increased with the same great rapidity as the reduction of light intensity. The fact that the audibility jumped up as darkness swooped down, only to fall away again a few moments later as the first brilliant rays of light returned, renders untenable any theory which requires a gradual change in the atmosphere, such as the ionization theory.

Broadcast Luncheon Speeches

CHICAGO.—The Wednesday luncheon speeches of the Chicago Association of Commerce will be broadcast each week from Station WMAQ here. Speeches at several of the luncheons already have been sent out and have met with such popularity among fans that it was decided to make the Wednesday noon broadcasts a regular WMAQ feature.

KIN OF WASHINGTON REVIVES WAR SONG

F.T. WORTH, TEXAS.—A song without (printed) words, sounded in all of the great battles of the Civil War—"The Cottage by the Sea"—featured a recent program here of Station WBAP as part of the campaign for \$50,000 for a monument to women of the South. The song was sung by Captain Norborn E. Sutton, lineal descendant of George Washington.

FOOTSTEPS OF LITTLE FLY HEARD AT WCAE

PITTSBURGH, PA.—The footsteps of a fly, the whistle of a distant traffic policeman, the beats of a human heart, the fall of a pin fifteen feet away, all these were sounded distinctly, it was reported, during a recent test of a new device—the supersensitive Western Electric microphone—in the operating room of Station WCAE. The tests were said to have marked one of Radio's greatest advances.

TAKES AIRPHONE "DAILY DOZEN"



Agnes Ayres, charming screen star, is a convert to the habit of taking her "daily dozen" via the ether route. Many stations are now including setting-up exercises as a part of their regular early morning programs, and Miss Ayres believes in keeping fit to the commands of the athletic directors before the various microphones

NAVY WRECK GIVES AIR COMPASS BOOST

SECRETARY DENBY ORDERS STUDY OF USE

Point Arguello Groundings Make Navigators Realize True Value of Ether Bearings

By Carl H. Butman

WASHINGTON.—Public attention was recently directed forcibly to the use of Radio as an aid to navigation, when seven destroyers cruising in a thick fog went on the rocks off Point Arguello, Calif. The squadron commander did not accept as correct the Radio compass bearings sent him from a naval compass station on shore.

The Radio compass service is fairly new and some skippers have not heretofore placed enough confidence in the bearings furnished them. To be sure, the bearings are not always exact, varying some two degrees and being subject to local conditions, but after the Point Arguello disaster, when twenty-three lives were lost and over \$9,000,000 worth of Naval property destroyed, much more confidence will undoubtedly be placed in Radio bearings.

Denby Orders Study Made

Naval commanders and navigators will certainly proceed with more caution in the future when the bearings furnished by Radio stations do not agree with their own reckonings. They will undoubtedly ask for further bearings, especially when a single station only is available. Secretary of the Navy Denby has ordered a special study made of Radio compass bearings.

There are two methods of securing Radio bearings. The system followed at the fifty-two naval Radio compass stations, is for ships to call the station asking for their bearings, which are then given in relation to the station. Usually two or three stations are called and the lines representing their directions from the vessel are plotted on a chart. The point of intersection indicates the position of the ship, subject to certain corrections.

The other method, used in the American Lighthouse service and by many merchant vessels, requires that a Radio compass be possessed by each ship, the skipper ascertaining his own bearing from the stations called and plotting his own position. The shore stations simply emit a Radio wave for him to observe and to measure its direction with his Radio compass.

SHOW LISTS PRIZES FOR AMATEUR SETS

Chicago Exposition Management Offers Rewards to School Pupils, Too

CHICAGO.—Competition for prizes for the best receiving set built by any amateur and for the most unique set built by any school pupil in Cook county will be features of the second annual Chicago Radio show which opens November 20 in the Coliseum here. The conditions for the contests were announced recently by Manager James F. Kerr.

For the best home-made receiving set a prize of \$100 will be awarded by a committee of judges who are noted Radio engineers. There will be a second prize of \$75 and a third prize of \$50. Any hook-up may be used.

In the contest for students in the public and parochial schools of Cook County a first prize of \$50 will be awarded for the most unique set, using either crystal or single tube hook-up. There will be a second prize of \$35 and a third of \$25.

All of the sets must be brought to the Coliseum for exhibition if so ordered by the management. Details of the contests may be obtained from the office of the Radio show at 127 North Dearborn Street, Chicago.

WOR Fans Spend a Night with "Jolly Roger" Pirates

NEWARK, N. J.—The romantic comedy "The Jolly Roger," was the principal feature of a recent program broadcast by Station WOR of this city. The story as its title indicates is based on the life of pirates. The play was written by A. E. Thomas, Pedro de Cordoba and Carroll

McComas assumed the principal roles. The former was one of the stars of "When Knighthood Was in Flower." The latter played "Maria" in "The School for Scandal."

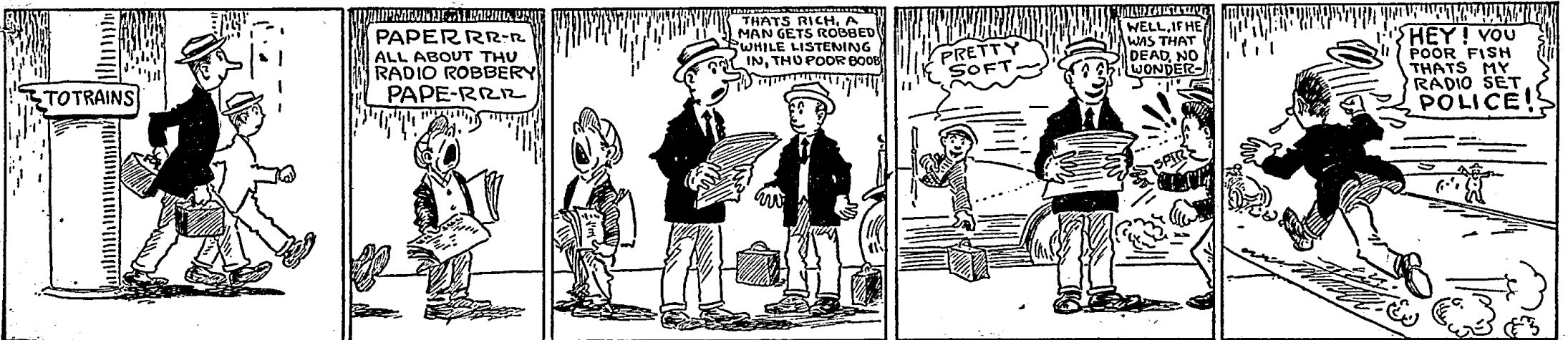
Britons Dance at Sea by Radio

BRIGHTON, ENGLAND.—Dances are being held in steamers off shore, the music being supplied by London and Manchester broadcasters.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Disadvantages of Portable Sets



G. E. PLANS GREAT STATION IN DENVER

WILL BE THIRD LINK OF NATIONAL CHAIN

New Plant Intended to Serve Territory between Rockies and Mississippi River

DENVER, COLO.—One of the most important local developments in Radio comes with the announcement that this city has been selected for the site of a new gigantic broadcasting station to be constructed and operated by the General Electric company, according to reports verified by the Hendrie and Bolthoff Manufacturing and Supply company, local distributors for the General Electric Company.

The station will be the third unit of the General Electric company's system of three broadcasting stations designed to serve the entire country. At present the concern operates a station at the factory in Schenectady, New York. The second station is nearing completion in Oakland, Calif. It is expected to serve the Pacific coast region as far east as the Rocky mountains. The Denver station will serve that part of the country between the mountains and the Mississippi river.

Project to Cost \$175,000

For the erection of the Denver station an appropriation of \$175,000 has been made. A like sum for maintenance will be appropriated each year.

The selection of Denver as the location of the third station is the more striking because of the keen rivalry between cities of the middle west. Among these were Dallas, Fort Worth, Minneapolis, St. Louis and Kansas City.

From the Denver station crop and market reports, and concerts will be broadcast. It will be possible for Radiophans in all parts of the United States to hear the Denver station.

R.C.A. HAS BOOMERANG

(Continued from page 1)

tubes have been sold by the R.C.A. during the period from July 1, 1920, to the date of the filing of the suit and what number of these tubes were necessary to operate the vacuum tube sets sold by the Radio Corporation?"

This question, when properly answered, it is said will prove beyond the shadow of a doubt that the "Radio Group" sold tubes with the intention that other manufacturers might use them in their sets, or at least with the idea that the public would buy R.C.A. tubes and employ them as it saw fit, either in apparatus constructed by the individual, or in apparatus purchased by him from other than the R.C.A. and its various sales outlets.

Aside from the tube question, the Radio Corporation will be required to disclose how much capital of its stock, both common and preferred, is directly or indirectly owned or controlled by each one of the companies the General Electric, American Telephone and Telegraph, and Westinghouse.

It is said that the latter disclosure is not desirable for the R.C.A. inasmuch as the close-knit control and operation of the "Radio Group" would be open to the eyes of the public.

Heads Marine Radio Show

NEW YORK.—E. B. Mallory has accepted an invitation to be chairman of the Radio communication committee of the American marine congress, which will be held here November 5-10 in connection with the American marine exposition. Mr. Mallory is now chairman of the Radio section of the Associated Manufacturers of Electrical Apparatus.

L-ROAD SIGNAL MAN'S SET OPERATES WELL



Edward Joakin, signal man on a New York City elevated road, finds the set he has installed in his tower works very well and with little interference from the structure. That he enjoys listening in goes without saying.
© K. & H.

Fans Depend upon WOR for at Least 2 Dances Weekly

NEWARK, N. J.—Lovers of the dance welcome the recent engagement by Station WOR here of Tom Cooper's Country Club orchestra. An extensive program of popular dance music was presented to hundreds of private dance parties. Letters to the management of the station showed that many dancers depended on the music broadcast by Station WOR for at least two dances each week.

CARTER "TU-WAY" PLUG



One to four sets of phone connections can be made at one time.

Tipped or plain cord ends can quickly be connected to the Carter "Tu-Way" plug. Can be used with any standard radio Jack. No short circuits, as plug is properly insulated; sturdily built, and will stand constant use. Insulation between tip and sleeve is undercut, preventing particles of brass from collecting on insulation and causing short circuiting.

Carter "Tu-Way" plug has become standard equipment with the leading manufacturers after severe competitive tests under all conditions.

Price \$1.00

Ask your dealer. Catalog of other Carter high-grade radio products on request

Carter Radio Co.
205 S. STATE STREET
CHICAGO

4,600 Volts Bring Death to Fan Adjusting Aerial

Never Regains Consciousness in Spite of Lungmotor Aid

DETROIT.—Coming in contact with an electric current of 4,600 volts, while adjusting an outdoor aerial, Lloyd Kridler of Ferndale, near here, was killed almost instantly recently.

Kridler's aerial wire came in contact with a high tension loop of the Detroit Edison company. He was felled by the high voltage. Ross Callahan and Richard Porter, in charge of a lungmotor equipment of the Detroit City Gas company, were summoned and worked three-fourths of an hour in an attempt to revive the victim. Although he was alive when first aid was attempted, he never regained consciousness.

The vessel on duty in the north Atlantic ice fields—its call letters are KFOG—transmits ice information on a 600 meter wave length at 6:00 a. m. and 6:00 p. m., and on 2,300 meters at 8:30 p. m., eastern standard time.

VOICE BRINGS FAME TO FRANCE'S ANNOUNCER

M. Radiolo Called Best Known Man in Country

PARIS.—The best known man in France today, not excluding President Millerand, is M. Radiolo, the official announcer of France's single broadcasting firm. Six months ago he was discovered working in a railroad accountant's office. Manufacturers of an apparatus offered him a contract at a salary of 1,000 francs a week to talk into the transmitter for three hours daily. His voice is considered to have a greater resonance than that of either Caruso or Jean de Reszke at the height of their careers.

But Radiolo is finding his fame irksome, as he can no longer attend theaters without having the audience rise.

The performance at a suburban theater was stopped in the middle of the first act last week until Radiolo, who had entered, satisfied the Radio fans by repeating without a smile the phrase which introduces all French wireless programs "Bon soir, mesdames; bon soir, messieurs."

DEALERS
PROMPT SHIPMENTS
LIBERAL DISCOUNTS

ERLA REFLEX CRYSTAL
ALL PARTS IN STOCK

Note!!
We are the largest exclusive Radio Jobbers in the Middle West

HUDSON-ROSS
123 W. Madison St. Chicago

FORMICA
A Laminated Phenolic Condensation Product
SHEETS TUBES RODS

RADIO PANELS
POLISHED BLACK FINISH

CUT PERFECTLY SQUARE TO ANY SIZE

1/32" THICK	5 1/2¢	PER SQ. INCH
1/16" THICK	3/4¢	PER SQ. INCH
3/32" THICK	1¢	PER SQ. INCH
1/8" THICK	1 1/2¢	PER SQ. INCH
3/16" THICK	2¢	PER SQ. INCH
1/4" THICK	2 1/2¢	PER SQ. INCH
3/8" THICK	4¢	PER SQ. INCH
1/2" THICK	5 1/4¢	PER SQ. INCH

SEND FOR COMPLETE PRICE LIST
PROMPT ATTENTION TO MAIL ORDERS
DEALERS PRICES ON APPLICATION

STARRETT MFG. CO.
519 SOUTH GREEN ST. CHICAGO

IF it's the outdoor antenna that's been holding you off, you want D-7-A or D-10 Portable the De Forest Radiophones that use an indoor loop aerial the size of a small picture frame—and bring in the broadcast of half the American Continent.

Authorized agents everywhere.



DE FOREST RADIO TEL. & TEL. CO.
Dept. R. D. 2 JERSEY CITY, N. J.

If Located West of Pennsylvania, Address
DE FOREST RADIO TEL. & TEL. CO.
Western Sales Division
Dept. R. D. 2 5680 12th St., DETROIT, MICH.

No Unsightly Wires—

The 20-foot silk-covered wire, readily concealed behind the picture moulding is the only antenna required with

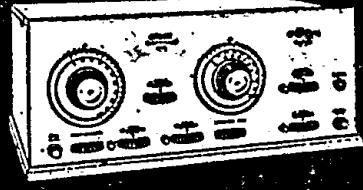
The New **GREBE** Broadcast Receiver

This Instrument is contained in an attractively finished walnut cabinet that has compartments for all necessary batteries.

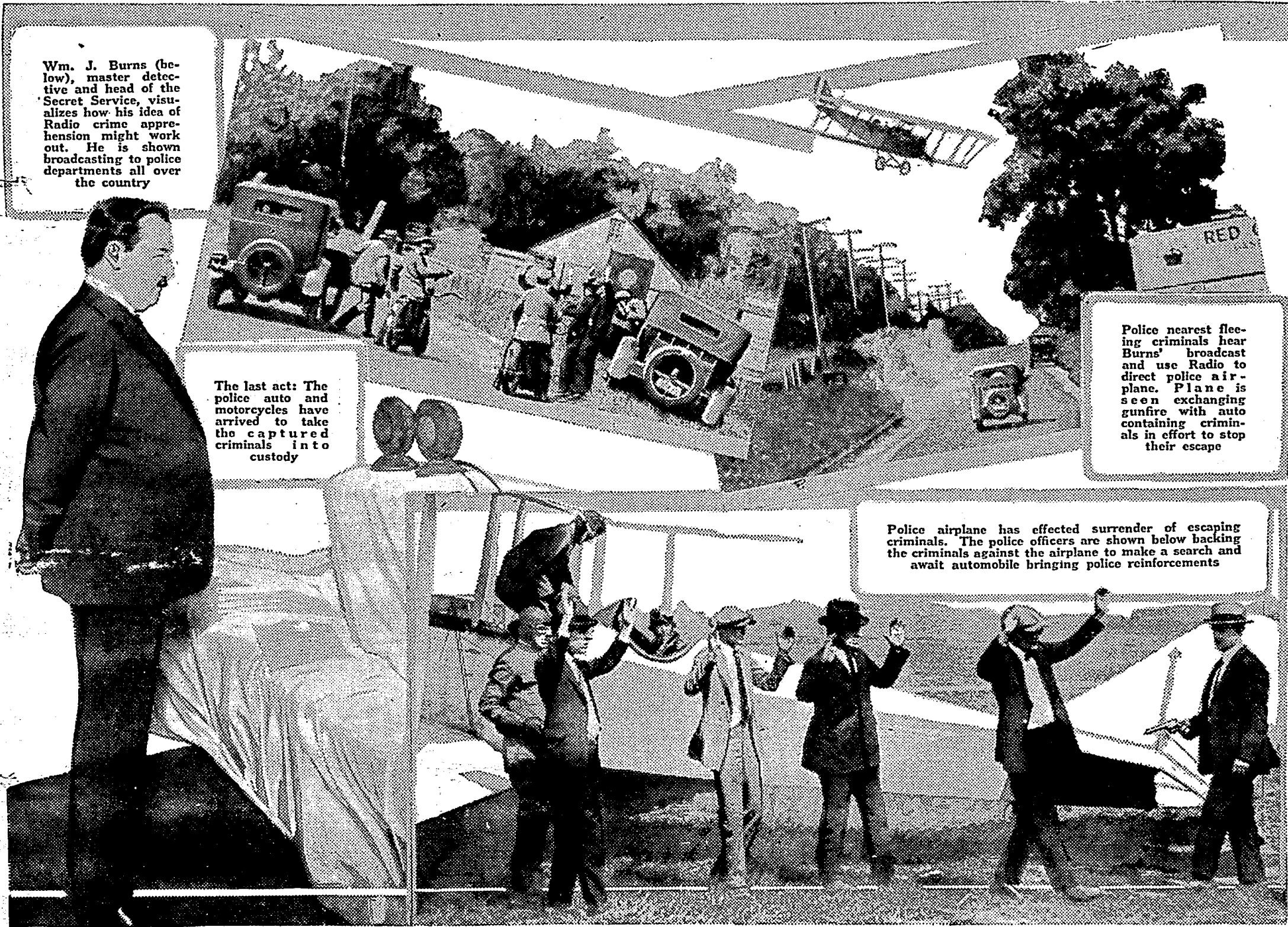
Write for "Grebe Radio in the Well-Appointed Home."

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

A. H. GREBE & CO., Inc.
Richmond Hill, N.Y.



FAMOUS SLEUTH SEES RADIO AS AID



Wm. J. Burns (below), master detective and head of the Secret Service, visualizes how his idea of Radio crime apprehension might work out. He is shown broadcasting to police departments all over the country

The last act: The police auto and motorcycles have arrived to take the captured criminals into custody

Police nearest fleeing criminals hear Burns' broadcast and use Radio to direct police airplane. Plane is seen exchanging gunfire with auto containing criminals in effort to stop their escape

Police airplane has effected surrender of escaping criminals. The police officers are shown below backing the criminals against the airplane to make a search and await automobile bringing police reinforcements

REVIVE MEMORIES OF WORLD'S FAIR

Leaders in Chicago Exposition 30 Years Ago Tell Its Influence Upon City

CHICAGO.—Memories of the world's fair in Chicago 30 years ago, the famed Columbian exposition, were revived here recently by means of Radio. Station WMAQ, The Daily News, broadcast a program of reviews of the historic events of the great exhibition. Those who took part in the resumé were, in the main, participants in the administration of or largely responsible for the world's fair.

Ferdinand W. Peck, first vice president of the exposition, spoke through the microphone of various preliminary phases. How the great show influenced the movement to make Chicago a "city beautiful" was told by Charles H. Wacker, chief of the Chicago Plan commission.

That the famed Art Institute of this city was one of the results of the world's fair was emphasized by Charles L. Hutchinson, president of the institute. The influence of the exposition on the growth of Chicago was cited by Clarence A. Burley, president of the Chicago Historical Society, which organization had established in a department store a miniature exhibit of the salients of the fair and their effects on this city.

Women's clubs, political organizations and the Association of Commerce took part in the celebration. The music which characterized the fair was repeated by means of Radio. Mayor Dever of this city explained its motto—"I WILL."

Scores on U. of C. Grid to Be Broadcast Over KYW

CHICAGO.—Arrangements have been made by Westinghouse Station KYW here to broadcast the running stories of the games of the world series and the city series in baseball, and to broadcast from Stagg Field, University of Chicago, all of the big football contests staged there, together with the results of all important games played.

William J. Burns Thinks Airphone Is Big Reinforcement for Law and Order

(Continued from page 1)

identification and information within his own bureau, and it is in connection with this bureau that he hopes to fully utilize Radio. In this new bureau Mr. Burns will assemble and have on file every book, pamphlet and paper that has ever been written on crime, and where students of criminology and others may turn for authentic information. This will be the only statistical bureau on crime in the United States. On file in this bureau will be the history and record, photograph and finger prints of every known criminal.

To Connect with Police Chiefs

When this new bureau is established fully it will be in Radio communication with every police chief in the country and information will be broadcast daily and hourly regarding criminals.

In the interview Mr. Burns expressed the greatest interest in the good that can be accomplished by Radio in his work. He said that in Detroit a broadcasting station is maintained by the police headquarters. Every day the police there broadcast the crimes committed during the preceding twenty-four hours with such descriptions of the criminals as can be obtained. Davenport, Iowa, Station WOC, and several other cities are using similar plans. At present Mr. Burns is using the navy Radio plant at Arlington, call NAA, for messages he wishes sent out, but he has hopes that in the near future his own bureau will be equipped with a powerful plant for its exclusive use.

Says Broadcaster to Be Installed

"There will be installed in connection with our Bureau of Identification and Information," said Mr. Burns, "a Radio equipment through which we will be able to broadcast a warning to all the various officials throughout the country, giving the location and activities of criminals." As an illustration of the effectiveness of Radio in his work Mr. Burns related an interesting story, as follows

"Not long ago in one of the middle western states a well dressed young man, wanting a Radio outfit and not having the

purchase price, called on one of the large dealers, stated he had been commissioned by a certain public school to obtain an outfit. The same was delivered to him. Subsequently the dealers discovered they had been duped and immediately placed the matter in the hands of the Burns Agency for investigation. Knowing the young man would be constantly using his outfit the Burns Agency broadcast the following warning:

Broadcast Catches Youth

"Look out for young man who fraudulently obtained an expensive Radio outfit and whose description is as follows: age, about twenty-four, height about five feet, eight inches, ruddy complexion, blue eyes, light curly hair, scar on left cheek, wearing a blue serge suit, tan shoes and light Fedora hat."

"It so happened that on this particular night the young man was entertaining a number of friends. You can imagine his confusion and embarrassment when they listened to this warning. He laughed heartily as he explained to his friends that a chum was sending that as a joke. But the following day his mother called and paid for the outfit."

Mr. Burns continued:

"You can readily imagine the effectiveness of Radio as an aid in the prevention of crime. If a local police department Radios to Washington the details of a crime, together with a description and name of the suspect, or asks for data on a man in the Rogues' Gallery, it would be disconcerting for the fugitive from justice to know that a few minutes later his whole history would be broadcast throughout the United States. He would be watched for at every possible point of departure within an hour after the commission of the crime. This, indeed, would restrain to a very great extent the activities of criminals."

An amateur of Sydney, Australia, broadcasts programs every Sunday on 1465 meters, and is heard in all the distant parts of that country.

AIR TO LIVEN DULL HUDSON BAY POSTS

Arctic Trading Company Sends Radio Receiving Sets to Lonely Factors

SPRINGFIELD, MASS.—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. According to plans made by the Hudson Bay company, lonely posts will be provided with Radio receiving sets so as to afford entertainment and information. Two north-bound ships, the Bayeskimo and the Nascope, are carrying Radio receiving sets to six of the posts above the Arctic circle.

In order to determine whether or not the posts will be able to hear the concerts from the United States next winter, the ships are listening in to the broadcasts on their way north. Several night ago, Westinghouse station, WBZ, Springfield, Mass., gave a special concert at 11 o'clock. Radiograms received from the Bayeskimo said that the music was heard distinctly.

Although the reports received so far from the ships are very encouraging—complete information as to the results in relation to reception will be obtained on their return. The trading posts are so far removed from civilization that the present reports will be the last from the outposts until spring. The lanes of travel to the posts are blocked by ice.

Chicago Has Night Classes

CHICAGO.—Evening classes in Radio have been opened at Crane Technical high school here. Four classes are held each week on Monday, Tuesday, Wednesday and Thursday evenings between 7 and 9 o'clock. Not only will the theory of Radio transmission and reception be taught but the members of the class will be given an opportunity to construct sets.

Radio sets attached to guide books, for the reception of bulletins on the state of the roads, was a suggestion made at a recent meeting of the British Automobile Association.

WSB OPENS FIRST FREE RADIO CLASS

HUNDREDS OF FANS GET PRIMARY LESSONS

Prepare Students for Emergencies in Catastrophes, or for Commercial Pursuits

ATLANTA, GA.—What was said to have been the first free public Radio school was that opened here recently by the Atlanta Journal, Station WSB, under the auspices of the Atlanta Radio club.

Hundreds of Radiophans received primary instruction in the telegraphic code from Captain Walter Van Ostrand, federal Radio supervisor for this district. Interest in the lesson was heightened by an informal address as to the technical phases of Radio by Dr. McIntosh Burns, president of the Radio club.

Dots and dashes of the code were taught by means of a buzzer operated by Van Ostrand and Burns. What the Radiophans learn in the school may be utilized by them, it was said, in such emergencies as war, flood, fire or other catastrophe, or applied to commercial pursuits.

Instruction afforded by the school includes the principles of transmission and reception and the building of transmitters and receivers. Classes are open to all. Pupils who miss one lesson may study it the day after by means of charts published in the Atlanta Journal. One of the features of the Radio school is the reception of conversation between various amateur stations in this city and vicinity.

THE GUY WITH THE "CANS" ON



Johnny Hines, well-known movie comedian, is that guy, and his partner in enjoying the air music is Hope Hampton, also of movie fame. The fact that telephone receivers are often spoken of as "cans" by commercial operators, prompted Johnny to "register" this picture

Dentists Install Plant but Bar "Tooth Talks"

New Orleans Syndicate Draws Line at "Painless Publicity"

NEW ORLEANS, LA.—Possibly the only broadcasting station owned by a dentist is that of the Union Dental Company, a New Orleans syndicate of tooth experts at 930 Canal street. Yes, they do not broadcast the silence of patients to advertise painless methods.

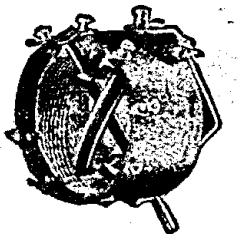
The station is known as WTAF, and is not in the studio proper. It has no receiving station to beguile patients while under dental treatment, although that may be a later development. Programs consist entirely of high grade musical numbers, instrumental and vocal. While the dentists say they installed the station partly for advertisement, they are satisfied to use regular advertising channels, and seek merely to keep the programs up to the standard liked by genuine music lovers. No effort is made to seize an audience listening in and give them an instructive talk on acquiring, by means of better teeth, a "smile you love to see."

B-T VERNIER TUNER

ADOPTED—RECOMMENDED

By 40 Largest Jobbers

Within the last thirty days forty leading radio jobbers with credit ratings of \$100,000 or more, seventeen of them with ratings of \$1,000,000, have rushed the Bremer-Tully Vernier Tuner into their catalogs at the last moment.



They recommend and catalog only the best radio equipment.

Here's why they catalog B-T Vernier Tuners:

1. It's the best Reinartz Tuner available.
 2. It gives better control and maximum results on any single circuit regenerative, any of the ultra-audions or practically any of the reflex circuits, including Hazlettine.
 3. It's easy to change—ideal for "try-outs." Liberal discounts to jobbers and their dealers. Price \$5.00 Postpaid. (But ask your dealer first.)
- Send for one today. Hook it up and you'll understand.

BREMER-TULLY MFG. CO.
532 South Canal Street, CHICAGO, ILL.

FLEWELLING ANSWERS TO QUERIES

By E. T. Flewelling

(Editor's Note.—This department is written by Mr. Flewelling, the inventor of the famous super circuit. From the questions sent him each week care of Radio Digest, he picks the one considered most informative for all and answers it in this column.)

Flewelling with Loop Aerial

(Submitted by J. G., Brooklyn, N. Y.)

Question. I have built a Flewelling super with loop aerial submitted by A. D. Trumbull, Sidney, N. S., in the Digest, issue of July 7. When I turn the set to oscillating point it actually roars. By roaring, I mean I get that loud whistle which practically deafens my ears. Try how I will, I cannot get any broadcasting even though I come away down with the whistle. Should I make a change in condensers or add other parts to bring in the stations?

Answer. Your question really centers about the use of a variometer in the plate circuit. I personally have been backward about publishing diagrams showing such a combination for the following reason: If we use a tickler coil in a regenerative circuit, regeneration will be constant over a greater range of wave length than it would be were we to use a variometer.

In the Flewelling circuit, we have, besides the regenerative action, the blocking and freeing of the tube and charging and discharging of the .006 condenser; in other words, we have several more actions to take care of than in a plain regenerative circuit. If you will bear this in mind, and then remember that in tuning a regenerative circuit with a variometer, it is necessary when we change one control to balance all the others with it. This means that not one person in a hundred in tuning a variometer set will secure the maximum results from it, because, frankly speaking, they have not had enough experience with Radio to be able to properly balance one control with the other. I make no secret of it myself that with a set that is unfamiliar to me, I have to stop and think when

I am tuning it, in order to get the maximum results.

The above will show you that I am making a strong plea for the use of a regenerative circuit that uses a tickler coil in the plate circuit instead of a variometer, simply because it is not so necessary to use much backward and forward balancing of the controls.

Now, if you use a tickler coil on a set that is operating on a loop, you should use a coil for the grid circuit with which to tune in conjunction with the loop and thus give yourself an opportunity to secure the feedback coup-

ling that is necessary. This same question has been brought to us so many times that I feel it should be settled once and for all, as I have tried to do in this answer to your very kind question, and I hope that it will solve your troubles.

Edmonton Plant on 2 Lengths

EDMONTON, ALTA.—CJCA, the Radio broadcasting station of The Edmonton Journal, after its regular evening program which concludes at 9 o'clock, Mountain Standard Time, goes on the air on a different wave length to ascertain how signals are picked up at varying wave lengths. The regular wave length for CJCA is 450 meters. In its after-hours test it ranges all the way from 300 to 500 meters.

Positive Radio Helps

For Storage Battery Tubes Use *Eveready Storage "A" Batteries.*

For Dry Cell Tubes Use *Eveready Dry Cell Radio "A" Batteries.*

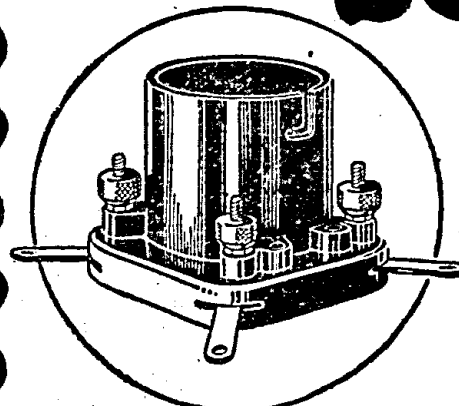
For all Vacuum Tubes Use *Eveready "B" Batteries.*

EVEREADY Radio Batteries

—they last longer

Announcing

E. T. Flewelling Sockets



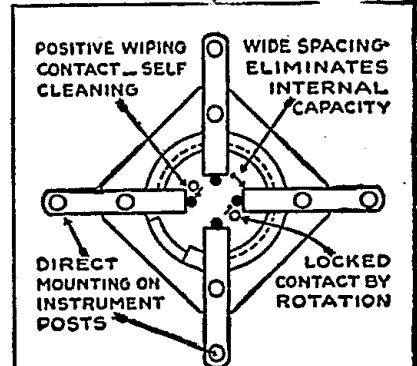
Standard Tube Socket \$1.00. At your dealer or, until he is supplied, post paid upon receipt of price.

The first of a series of parts designed by Mr. E. T. Flewelling, inventor of the "Flivver Circuit," which will assemble into a really capable set is the Flewelling Socket. This socket has terminals so designed that they practically assemble the set by mounting on tuner, rheostat and transformers direct.

Internal capacity has been whipped by so spacing a new type contact terminal that ideal conditions for radio frequency and reflex work are established. Further—good, clean contact against the base part of the tube terminals, with an easily inserted, firmly held tube, results in eliminating doubt as to good electrical contacts.

E. T. Flewelling says:
"Stray or internal capacity effects must be eliminated if we are to secure maximum results."

Watch this space in our advertisements for a series of helpful hints that will enable the Radiophan to build a better set than has heretofore been deemed possible.



BUELL MANUFACTURING COMPANY
2977 Cottage Grove Avenue
CHICAGO

In the Times Building, New York City

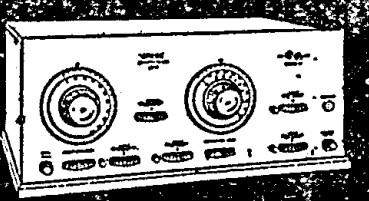
a steel structure, surrounded by others—

The New GREBE Broadcast Receiver

works well with its 20-foot indoor wire. You can "tune-out" WJZ—less than 1,000 feet away—and bring in WOR, Newark, N. J., sharp and clear.

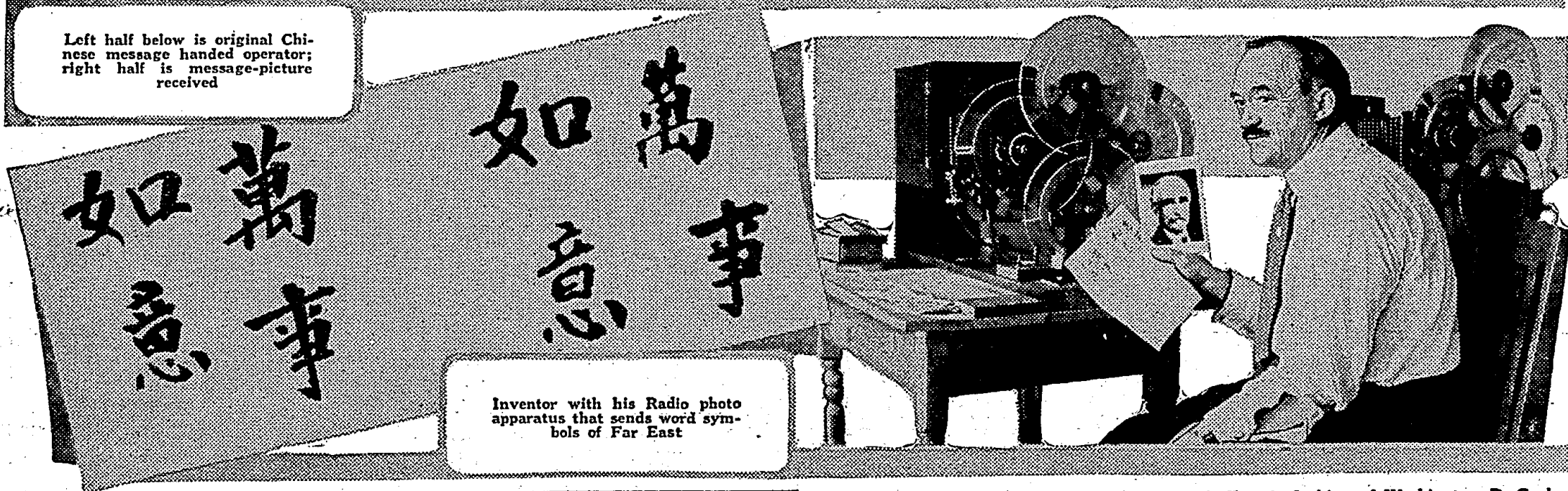
Ask your Dealer about its Seven Points of Satisfaction

Licensed under Armstrong U.S. Pat. No. 1,113,149 **A. H. GREBE & CO., Inc.** Richmond Hill, N.Y.



AIR CARRIES FAR-EAST WORD PICTURES

Left half below is original Chinese message handed operator; right half is message-picture received



Inventor with his Radio photo apparatus that sends word symbols of Far East

WTAM Makes Debut at Cleveland as "The Voice from the Storage Battery"

Six-acre Lot Utilized by Willard Company for Powerful Class B Station—Cottage Near Lake Erie Houses Equipment, Studio—Program Every Wednesday Night

By P. A. Price

CLEVELAND, O.—There was a new station on the air recently when the Willard Storage Battery Company turned on the current for its initial program, broadcast on a wave length of 390 meters, from the company's manufacturing plant at Cleveland, Ohio. The Willard Storage Battery Company is one of the country's largest manufacturers of storage batteries for Radio and automobile use.

WTAM is the call signal assigned to this station, which is one of the most powerful Class B stations in the United States, and the Willard Company has spared no expense in providing the last word in transmitting equipment.

The company has utilized a six-acre lot adjacent to their immense plant and have erected a substantial building of cottage type to house the station. Separate rooms are provided for the transmitting equipment, storage batteries, reception hall, and studio with commodious dressing rooms for the men and women artists who will contribute to the entertainment of the unseen audiences.

No Moving Machinery Used

The transmitting equipment is of composite type, built by the Willard Storage Battery Company. The installation is unique in that no moving machinery will be in the station; an immense bank of storage cells supplying the 2,500 volts required for the 1,000-watt transmitter. The absence of moving machinery is carried to the point of providing remote control for the ventilation of the battery room and the entire building.

A T-type aerial is employed; the antenna consisting of twelve wires in a double cage formation of six wires each. The aerial has a span of almost 250 feet, with a weight of approximately 400 pounds, and is suspended at a height of about 138 feet between two 140-foot towers. The towers are constructed of four-inch angle iron to a height of 112 feet, the remaining distance being covered by thirty-eight-foot masts of wood. These masts are eight inches in diameter. This form of construction insures a maximum value of insulation combined with strength sufficient to withstand ice and wind stress.

By means of a "Radio camera" of his invention, C. Francis Jenkins, of Washington, D. C., has rendered much easier all communications with Oriental countries that use word symbols. The instrument can send the entire message, written in Japanese or Chinese characters, through the air on Radio waves. Arrived at their destination, these waves, through the receiving apparatus, are made to strike a special sensitized photographic paper—and in the twinkling of an eye there appears an exact reproduction of the original Radiogram. Heretofore it has been necessary to translate such communications into the English language before sending them by Radio or cable © P. & A.

on the aerial. Stranded steel guys, with numerous strain insulators, are anchored to concrete piers for back bracing, and the legs of the towers are more deeply seated in more massive piers of the same material.

Is Quality Station

A counterpoise, sixty feet wide and 250 feet long, is supported by a six-inch I-beams, twelve feet above the ground, and immediately beneath the spread of the aerial. The counterpoise is made up of twelve 250-foot lengths of antenna wire spaced five feet apart. The antenna is brought into the roof of the building and separate outlets are provided for the lead to the counterpoise and lightning arrestor ground.

WTAM is to be a quality station in every sense of the word. The best of Cleveland's local talent will be drawn

upon for entertainers, and their offerings will be supplemented by artists from other localities, especially engaged for this station. Programs will be broadcast on Wednesday evening of each week, with the probability of using Saturday evening later in the season. The programs will start at 8:00 p. m., Eastern standard time.

Ideal Location

The location of WTAM makes for ideal transmission. The station is eight miles from the business center of Cleveland, one-half mile from Lake Erie, and about one-quarter mile from the nearest electric car line, this last feature securing a minimum of disturbance from a sometimes troublesome source.

Particular attention was given to the

(Continued on page 9)

THE TRUTH ABOUT "ALL-AMERICAN" TRANSFORMERS

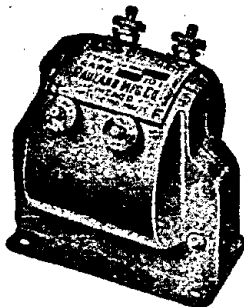
Read what Mr. Gehlert of Benton Harbor, Michigan, says about them.

"I have tried a number of transformers but I have never been able to get as good results on other transformers as I do when I use "All-American"; consequently I am not using any other make.

I hooked up a two-stage radio detector and a two-stage audio frequency set using "All-American" transformers on both sides with first class results. The two radio transformers I used were both identical. Hearing so much about it being better to have radio frequency transformers that were made special for first, second and third stages, I obtained a set of these of another make but the three special radios did not come anywhere near bringing in the results that two "All-American" radio frequency transformers produced.

I do not hesitate to write this to you because the results of your product have been so noticeable to me in comparison with others that I feel this compliment is due you."

The thousands of users of "All-American" Transformers are our boosters. Ask any of them.



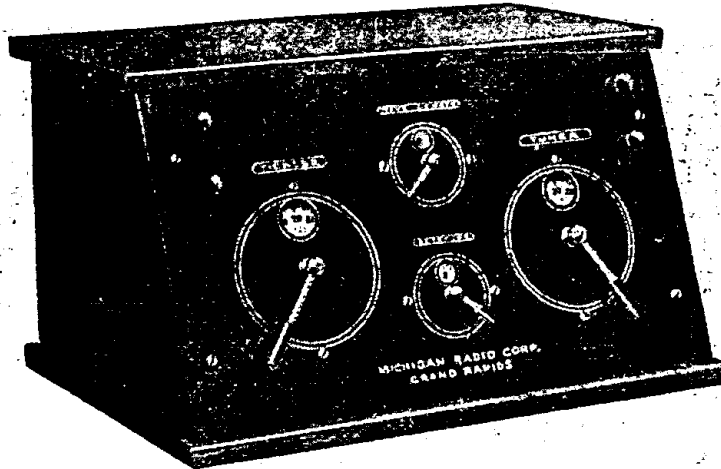
Audio Frequency Transformer



Radio Frequency Transformer

RAULAND MFG. CO.
200 No. Jefferson St., Chicago, Ill.

Write for our free book of hook-ups, enclosing two-cent stamp to cover postage.



Make Pennies Do What Dollars Did Before

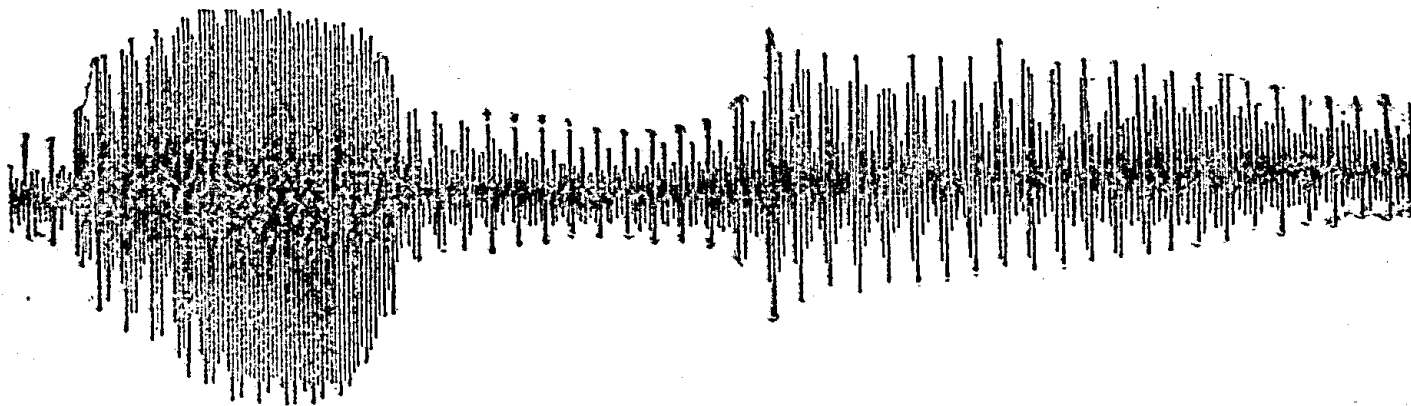
Never before in the history of Radio have pennies done so much. The Michigan "Midget" gives you everything that any set you could pay dollars for will give you—and yet the price is small.

- Long distance** The Michigan "Midget" gives it to you.
- Selectiveness** The "Midget" cuts out local stations and brings in out of town stations.
- Ease of Adjustment** Any ten-year-old boy or girl can operate a "Midget."
- Sharpness of Tuning** A slight movement of the controls brings in other stations.
- Portability** Weighing but 6 lbs. it is ideal for home use or for camping, touring and resort use. You can always take your "Midget" with you.
- Operations** It operates on all makes of 6-volt and equally as well with all dry-cell tubes. It can be used with one or more headphones or can be used with any one or two stage amplifier for loud speaker reception.
- Price** \$27.00, without tubes or accessories

And so we say we have made pennies do what dollars did before. Go to your dealer, ask him to show you a Michigan "Midget"—test it out for yourself. Also ask about the Michigan "Midget" Two Stage Amplifier and our exclusive line of Condensers, Variocouplers, Variometers, Rheostats, etc. When you send for circular, give us the name of your favorite radio dealer.

MICHIGAN RADIO CORPORATION
GRAND RAPIDS, MICHIGAN

"HELLO" SAYS THIS GROUP OF ZIGZAG LINES



The accompanying illustration was reproduced from a motion picture film, but not of the ordinary movie theater variety, however. A device known as an oscillograph created this very complex series of zigzag curves. Upon close examination it will be found that the individual vertical streaks blend with each other in systematic progression from left to right. It will be further disclosed that, if the line is traced with the point of a pencil, the pencil will advance from one side of the figure to the other, as it goes up and down in the innumerable peaks and crests.

After completing this process, one will conclude that this puzzle of lines represents some form of wave motion. However, that is but the first step toward the solution of the problem. We will complete the answer by stating that it is a graphical reproduction of the sound waves uttered by the human voice. It is, however, a snapshot of a real, living voice wave. The entire, actual voice movie, as it appears on the screen of the oscillograph at Station WJZ, New York, obviously could not be presented in its entirety, so one "scene" only is shown in the picture.

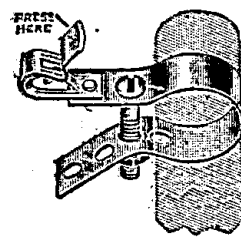
What Chart Means at Station
The Radio movie man who stands watch

over the diminutive screen of the oscillograph, upon which a beam of light traces an outline of a speaker's voice, consented to allow a "still" photographer to perch his camera near the screen and snap a photo just as an artist was saying "Hello" near the microphone in an adjoining studio. The drawing shows what he got.

Connections to the oscillograph are made at the beginning of the long path over which the sound must travel before being shot out from the antenna as Radio waves to listeners. Consequently, if the device is able to produce a visual record of the vibrations at this point, it may be compared with the final inspection of the finished product of a manufacturing plant, in which an article having passed through stages of development and refinement is thoroughly scanned for defects before being shipped away. Similar in its function of inspecting the quality of transmission, the oscillograph is employed as a check-up instrument at WJZ. By its use, engineers at the station are greatly aided in their efforts to provide perfect modulation and consequent clear reception by the listeners in.

The oscillograph, while old in principle, is comparatively new in its application to the broadcast station, and makes perfect transmission more easily attainable.

Improved Ground Clamp



Equipped with Fahnestock Patent Wire Connectors
Easily Attached
No Soldering. For Radio Use Only
At Your Dealers

Fahnestock Electric Co.
Long Island City, N. Y.

What About It?

Isn't it about time to stop experimenting with multiple control circuits and build one that, combining ease of assembly and operation, loudness, clarity and selectivity of signals, as well as beautiful appearance, is excelled by none?

THE ELGIN SUPER-REINARTZ RADIO RECEIVING SET

Embodies all the advantages of the well known Elgin Reinartz (the set which was largely responsible for the popularity of this wonderful circuit) and many others. It is much louder, more selective, requires no storage battery, and can be used with excellent results on a short or loop aerial. It has brought in California stations two thousand miles from Elgin, clearly and without interference on a loud speaker with only one tube, and that while our powerful local station was broadcasting three miles away.

Could you ask for more?
Write for circular giving one, two and three bulb hook-ups of this remarkable circuit. IT IS FREE.

ELGIN RADIO SUPPLY CO.
207 East Chicago Street ELGIN, ILLINOIS

POSITIVE RESULTS

are being obtained by thousands of satisfied users of the

EASTERN COIL SETS

for the COCKADAY CIRCUIT

The remarkable features which are making this circuit (4 circuit tuner) more popular each day are its simplicity of construction and control—wonderful selectivity—distance records—clearness and loudness of reception, and the fact that all capacity squealing, interference, etc., are eliminated.

Made as per specifications of Mr. Cockaday, using No. 18 wire with D coil bank-wound.

COMPLETE ASSEMBLED SET OF B, C AND D COILS. **\$275**
PRICE

Hook-up, directions and material list furnished FREE with each set of coils.

Mail Orders Filled. Dealers Communicate

EASTERN RADIO MFG. CO.
22 Warren Street, Dept. R. D., NEW YORK, N. Y.

TWO SUPERSENSITIVE CIRCUITS

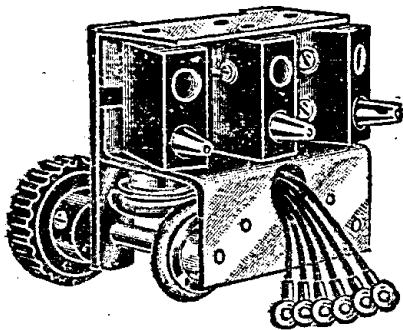
(Both Copyrighted)
My Highly Improved Reinartz brings in all important stations on both coasts and Mexican border, loud, clear and without distortion. We dance to music from Atlanta received on one loud Baldwin unit. Build one of these wonderful sets from my blueprints and specifications, price 50c. or with a perfect and complete double wound spiderweb coil, \$3.00 by mail. No other windings used. Photo of my set on a glass panel with every order.
This copyrighted circuit is the most successful of any Reinartz modification yet produced, and is imitated the most. Thousands are in use.
My W. D. II Circuit is especially designed for use with the "Pickle" tube and brings out the full value of that little tube as no other circuit can. Stations 1000 miles away come in clearly on one tube. This set is small, complete, portable. For the man who wishes the highest efficiency, this is the set to build. Price of blueprint and specifications, 50c. or with complete and perfect windings, \$3.00. Photo of set with every order.
Sets built from these plans will receive all broadcasting stations operating under the new laws. Their wave length range is from 170 to 300 meters.

AUXILIARY TUNER

This new instrument connected to your present receiving set with one wire enables you to easily bring in both the long and short wave stations which you cannot get with your present equipment. It also enables you to eliminate that local interference so you may listen to distant stations.
Copyrighted diagram and complete instructions for building and operating this instrument, 50c. or with all parts, including Condenser, Coils, Switches, and Panel, \$8.50. Complete instrument, \$15. All goods prepaid.
These instruments are easy to build, easy to operate. Everything clearly shown.

S. A. TWITCHELL
1025 Western Avenue, Minneapolis, Minn.

Another Columbia Scoop

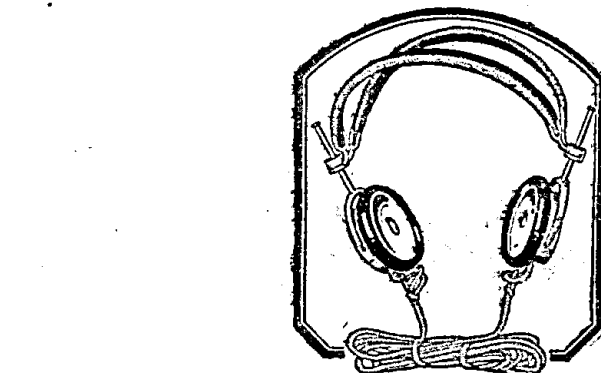


A completely moulded Bakelite Variometer. Green silk pig-tails and wire used throughout. 1/2" shaft—no metal bearings used. Design provides for split stators if you need it, permitting any hook-up.

A real efficient radio instrument. Complete instructions and hook-ups in each box.

Ask your dealer for it.
All good dealers stock it.
PRICE \$5.50

COLUMBIA RADIO CORP.
157 NO. UNION ST. CHICAGO



Federal Standard Head Sets will make your receiver more efficient

THE perfected result of a quarter of a century in the making of communication apparatus of precision, Federal Standard Head Sets are noted among radio experts for their high efficiency, great distance—range and perfect clearness.

One of the most practical of their many unique features is that the wire connections are through the edge, instead of through contact points on the back, which might be short-circuited by a moist hand. Magnets, coils and diaphragms are carefully inspected; and all parts are of specially selected materials accurately machined to Federal Standard.

Ask your dealer for Federal Standard Head Sets—and accept no substitute.

130 Federal Standard Radio parts offer the radio enthusiast a complete line of guaranteed parts of one quality—the best.



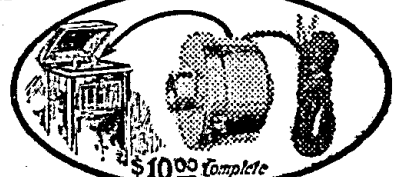
Federal Radio Equipment

Federal Telephone and Telegraph Company
Factory: Buffalo, N. Y.

Boston New York Philadelphia Chicago
San Francisco Pittsburgh London, England
Bridgeburg, Canada

"MAKE PERFECTION YOUR SELECTION"

Morrison



Loud Speaker

Renowned for Sound. Sold on a 10-day trial. If not satisfied, money will be refunded.

NATHANIEL BALDWIN
Genuine Phones. Pair with cord and bands. **\$9.45**

REINARTZ
We have the new Reinartz coil, as approved by Mr. Reinartz. Complete parts for three-tube set. **\$35.00**



LIST PRICE.....\$8.00

These Phones are an exceptional value at this low price. Sold on an absolute money back guarantee.

LOUD SPEAKERS	
Morrison	\$10.00
Pathé	16.50
Music Master	25.75
Magnavox M1	35.00
Woodenhorn	6.50

Perfection Radio Corporation 59 CORTLAND STREET NEW YORK CITY

Six New York Retail Stores Add Parcel Post Do Not Send Stamps
208 page complete Radio catalogue free with orders of \$5.00 on request. Otherwise prepaid for 25 cents.

AN EVENING AT HOME WITH THE LISTENER IN

(SEE INSTRUCTIONS FOR USE BELOW)

Table with columns: Station and City, Met, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday. Lists broadcast times for various stations like CFCN, KDKA, WABC, etc.

Instructions for Use.—All the hours above are given in Central Standard Time. If your city uses Eastern Time, add one hour to each of the periods stated; if your city uses Mountain Time, subtract one hour; if your city uses Pacific Time, subtract two hours. This table includes only the evening broadcasts, and on Sunday, the late afternoon program.

AIRPHONE DISPELS DARKNESS



Blinded in the discharge of duty, Pat O'Keefe, of the New York City police force, beguiles the long hours listening in to ether entertainments of every kind. With his faithful "cutty" as an additional consolation, he seems quite serene and content.

Engineer for the company. Mr. Leonard will, for the present, operate the station. L. G. Baldwin, Radio Sales Manager of the company, is in charge of the station's public relations. A. R. Herske is the announcer. Mr. Herske has a pleasing voice and has received favorable notice in dramatic productions. L. W. Zimmerman will be "master of ceremonies."

Tourists Say WBAP Best Known FORT WORTH, TEX.—Station WBAP, the Star-Telegram here, is one of the best known broadcasters in the country, according to Robert L. and Harry O. Leuschner of Waco, Texas, who have just returned from an 8,000-mile tour of Canada and middle western states.

The Director of Telegraphs at Venezuela has announced that bids will be asked for the erection of a new high power Radio station at Caracas in the near future.

Broadcasts on Light Wires Prove Success

Aerials Not Needed; Receivers Plugged Into Lamp Socket

NEW YORK.—The North American Company announces it has completed the installation of the first commercial wired Radio plant in the world on Staten Island. In co-operation with the Richmond Light & Railroad Co., regular transmission service of entertaining and serviceable material over electric wires was recently begun. The company is now a part of the Staten Island Edison Company.

STATION WTAM OPENS

(Continued from page 7)

furnishings of the studio; the walls and ceilings being felt-lined beneath a heavy thickness of monk's cloth, and the floor covered with a three-inch layer of hair felt. There is no direct passage between the studio and the operating room.

The Willard Storage Battery Company has its own six-piece orchestra, all members of which, except the pianist, are associated with the Cleveland Symphony Orchestra. This Symphony Orchestra is acknowledged to be one of the finest

musical organizations in the country, and the Willard Company is to be congratulated upon securing artists of such recognized ability.

Staff of WTAM

All equipment of the station, with exception of the transmitting apparatus, was made by the Willard Storage Battery Company from plans and specifications prepared by S. E. Leonard, Chief Radio



Distributors for:

- Radio Corporation of America
Grebe
Kennedy
Magnavox
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Nath. Baldwin
Burgess
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Remler
Dubilier
Gould
Signal
Cutler-Hammer
Frost
Pacent

and other manufacturers of high standing.

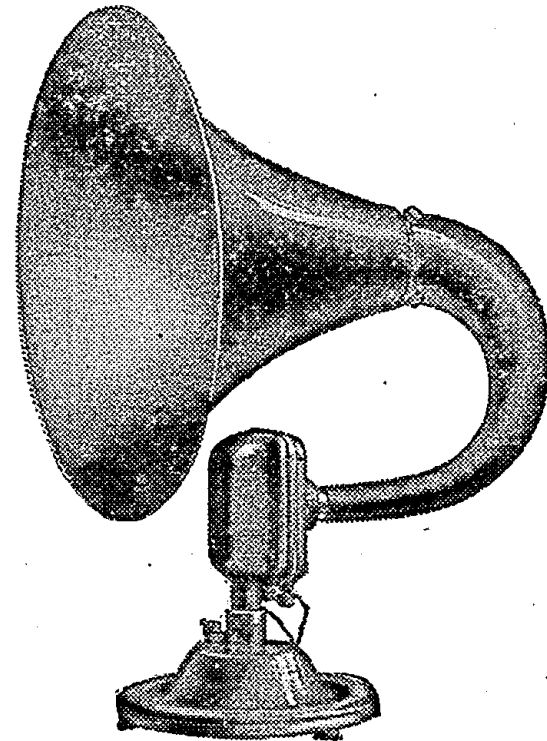
FREE CATALOG Illustrated, Sent on Request

Dealers: Buy reliable equipment from a house of established reputation. Send for catalog of tested and approved apparatus and our discount sheet.

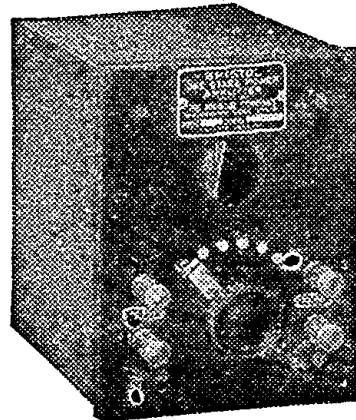
JULIUS ANDRAE & SONS COMPANY 113 Michigan Street, Milwaukee, Wis.

THE AUDIOPHONE

Quality of reproduction such as only the original itself can equal. Speech that is so distinct that the voice heard is the actual voice of the speaker.



Bristol's Single Stage Power Amplifier



gives additional VOLUME with any two stage amplifier. No separate batteries required. It provides the additional volume necessary to bring in very distant stations on the loud speaker.

Write for bulletin and address of the nearest dealer handling our instruments

THE BRISTOL COMPANY WATERBURY, CONN.

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

KELLOGG RECEIVERS



Very light! flexible and easily adjusted

Mother, granny and little Willie who hangs on to his end until he is gently guided to bed by the ear—even Dad himself stays until the furnace fire is low and the house is as silent as a morgue—they all appreciate this dandy little head set with wide receiving range and unusual sensitiveness because it is so light and easy on the ears.

Use—Is the Test

KELLOGG SWITCHBOARD & SUPPLY COMPANY CHICAGO

Further Details of the Famous Miloplex Hook-Up

Part III—Considering King Miloplex II Again

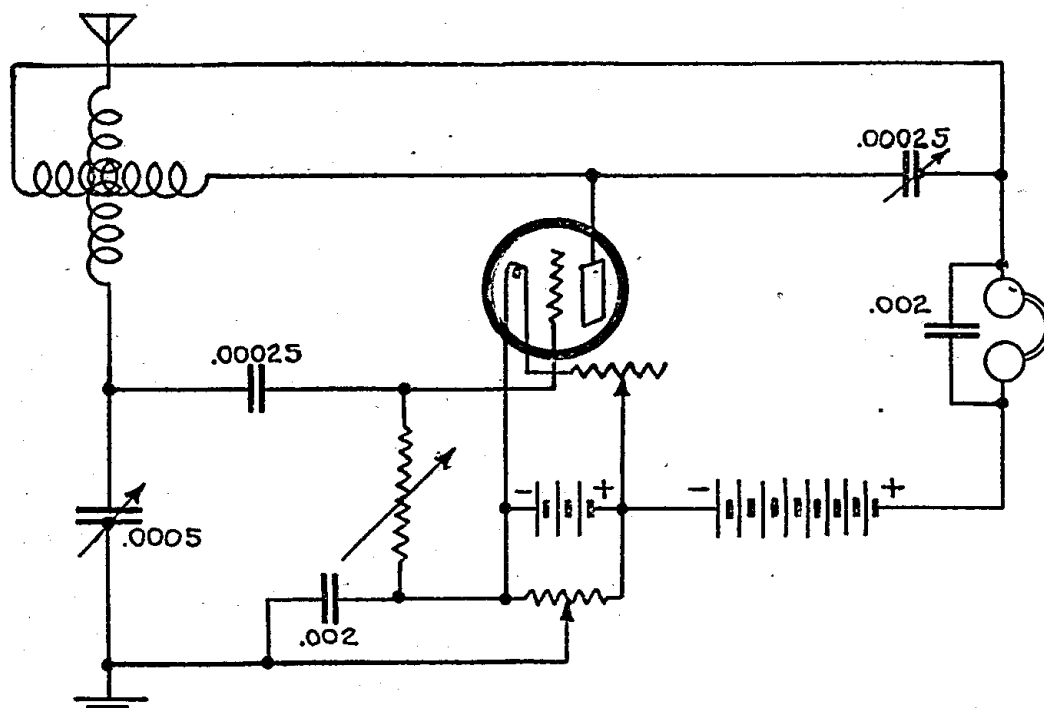
By the Mystery Man

IT HAS been the author's desire to avoid, if possible, technical reference or discussion relative to the Miloplex in an effort to make each article as simple and easily understood to the layman building his first receiving set as is possible without sacrificing or omitting essentials.

This is not done, however, with any thought of denying to the advanced experimenter technical elaboration covering fundamentals which from time to time may appear while the circuit passes through its several modifications to completion, as I quite appreciate that much added knowledge together with greater refinements will come from the army of experimenters that are never content with but always advancing the science—the amateurs. Further, I have no ambition or desire to enter the sacred realms of those who are Radio engineers by virtue of having disagreed with all or most of the recognized authorities.

It can only follow, then, that should I appear to be going up the "blind alley" of technicalities to the layman's mind, it is only for a short way in order to better establish or nail down that which is not quite debatable.

Radio Digest enjoys the services of a most excellent engineer whom I am very certain delights in lifting the veil of technical "What's What" to all questioners, making the subject so precisely clear as to eliminate any fog of misunderstanding. Write to him, then, if any statement appears to muddle your mind. He knows the inside story of Miloplex from the first binding post to the point where the last electron "flows merrily on"—to the plate. Living as he does as far from me as one can throw a ripe tomato, he naturally was led over to my "excuse me" apartment where I let him talk theory and hold the soldering iron while I tried to understand him and make the little circuit talk English. So ask him—mercy that's what a technical editor is for, anyway, "hain't it?" Certainly. You know I never could quite secure a concise description covering



the specifications of a technical editor. Trying to get it is a good deal like Mahoney's specification of a cook, viz., "a cook usually is a woman, who can stand a temperature of 175 degrees and bawl out the ice man for his generosity in giving away ice in the winter time." Now you know what a cook is; neither do I, and to my mind a technical editor is one thoroughly capable of thinking in terms of calculus, but compelled to write not above the sixes in the multiplication table.

Now, that you have promised to send him your inquiries, let's travel on, as the purpose of this article is to give you a real surprise—a story—that will cause

those who have not built the Miloplex (because it was so simple) to do so now, while to those who have, it offers something to look forward to. Remember, in my first article I cautioned all-of you not to "peek" and say old stuff.

So to those who have built it—greetings; to those who have not—get busy, because . . . listen, the last circuit, the "King Miloplex" is going to beat 'em all, and we are going to make it do this trick through merely changing a couple of

wires. Now watch someone searching for the first diagram; yes the "Flex" is going to do DX, and do so without a lot of fuss or complaint.

Will you have to rebuild your panel layout or add additional parts? No! No! All we will do is get out the hot iron and change a couple of wires when—bang!—she will start hitting, and it seems to me you will feel well repaid for the few 10-cents-per you invested, and like Radio Digest the better.

Then, just to cap the climax, just to give you an extra ear of corn in the dozen, we will start amplifying it. You may make a mistake, but don't worry, always remember that if people were not continually making mistakes they wouldn't put erasers on lead pencils. Besides, the technical editor will save your life. Maggie, the cook, just passed, and in passing I solicited information as to whether dinner was ready? "Certainly!" Try and get it," was her retort complete. Let's eat!

(TO BE CONTINUED.)

Triple Plate Voltage

When using resistance coupled amplifiers the plate voltage should be about three times the value normally employed in order to overcome the loss in voltage through the resistance.

Reinartz Coil \$1.85

The Improved Basket Weave, Covering All Broadcasting Wave Lengths

With each coil we send FREE two large blue-prints, picture hookup and panel layout, list of materials, and fully illustrated instructions for construction and operation.

Buy before the fall rush sets in

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with ONE TUBE. Broadcasting from Atlantic Coast and Cuba heard in California by users of the CROSS COUNTRY CIRCUIT. This range is due to simplicity of set and operation as only one control is used for tuning. Easily and cheaply built. Dry cell tubes may be used. Complete instructions, with panel layout, assembly views, etc., postpaid for 25c. Or further information for red stamp. VESCO RADIO SHOP, Ex. 117, Oakland, Cal.



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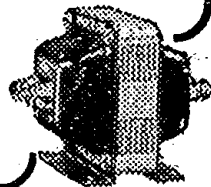
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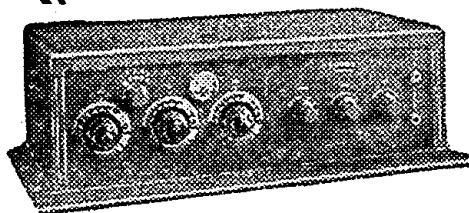
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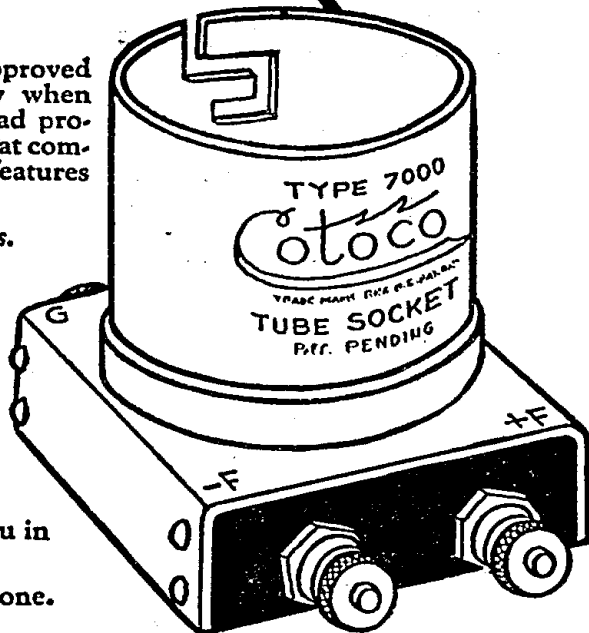
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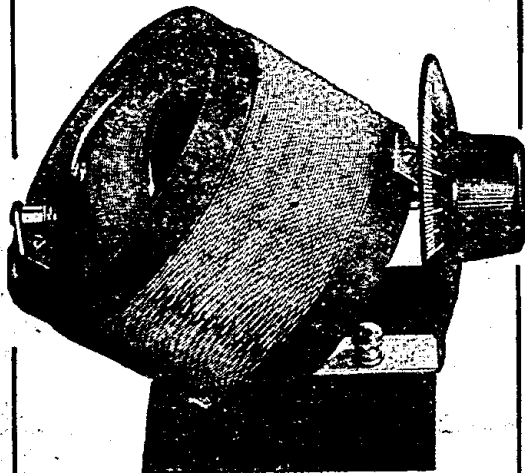
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Webster Variocoupler with List Our Price dial, Type 1A.....\$4.50	\$2.19
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Moulded Bakelite Variocoupler.....	6.00
All-Meter Variocoupler, 150-2600 meters	7.00

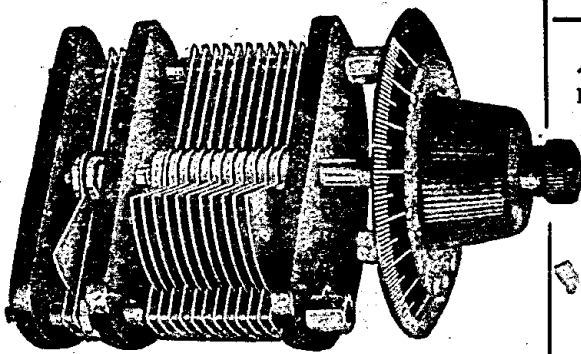
WIRE

All kinds of wire put up in 1/4 pound spools, No. 18 to No. 28, silk, cotton and enamel, double or single.....45 cents a spool
Same wire as above on 1/2 pound spools75 cents a spool
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6x18x6—Stained	\$3.00
9x14x6—Stained	3.25
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Bakelite, 7/8, cut any size; per square inch01 1/2

VARIABLE CONDENSER



Variable Condenser, .0005 (Same as 23 plate).....	\$5.50	Our List Price \$3.00
Variable Condenser with Vernier, .0005 (Same as 23 plate).....	6.50	4.50
Variable Condenser, .001 (Same as 45 plate).....	6.00	3.50
Variable Condenser, with Vernier, .001	7.50	5.00
Walvert Variable Condenser, .00025	1.75	

WEBSTER RADIO APPARATUS

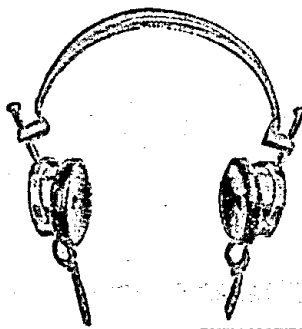
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(NOTE: One stage of Webster Radio frequency amplification is almost equal to the results obtained with a regenerative circuit; two stages can be said to be much superior, while three stages will bring in stations too far away to be received with any regenerative set. More stages can be used with still better results.)



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Webster Double Head Phone Receivers, 2500 ohms	List Price \$7.00	Our Price \$3.49
Double Phone Cord.....	1.00	.75
Baldwin Type C Unit.....	6.00	3.49
Baldwin Type C Double.....	12.00	6.95

UNITS

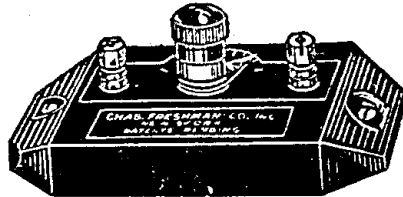
All these Units are enclosed in substantial beautiful mahogany cabinets that will grace any home.

WEBSTER 1-A Tuner Unit	List Price \$35.00	Our Price \$17.50
WEBSTER 2-A Detector Unit	15.00	7.50
WEBSTER 3-A Audio Frequency Amplifier Unit.....	17.50	8.50
WEBSTER 4-A Radio Frequency Amplifying Unit.....	17.00	7.50
WEBSTER 3-B Audio Frequency Amplifier Unit.....	27.50	17.00

This unit especially designed as an effective amplifier for the 2-A Receiving set. It consists of two stages of audio amplification having 4 to 1 ratio. The two vacuum tubes are controlled by one rheostat which makes for simplicity in operation. The unit is equipped with the following apparatus: 7 1A Binding Posts, 1 1C Socket, 1 1E Rheostat, 2 3B Transformers.

AUDIOPHONE LOUD SPEAKER (Large Size) \$22.50
Loud Speaker Cord, 20 feet, 4 tips, list \$1.25, our price..... .75

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Freshman Grid-Leak with Condenser	\$1.00	\$.79
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Switch Lever, 1-A, 1 1/2" Ra- dius, 1 3/8 Knob, 7/8 Shaft..	\$.75	\$.35
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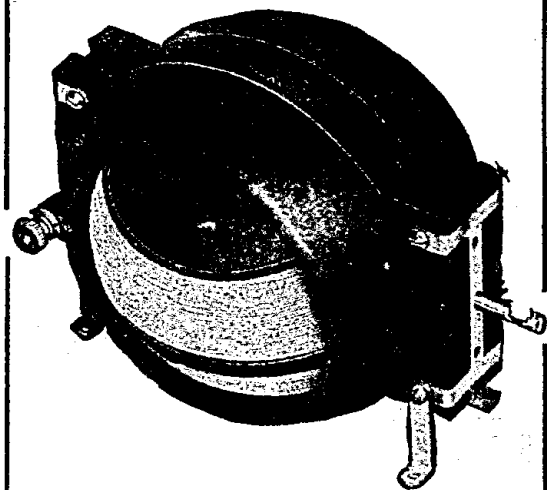
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Moulded Variometer	List \$6.00	Our Price \$4.39
Variometer, All Circuit.....		5.50

B. BATTERIES

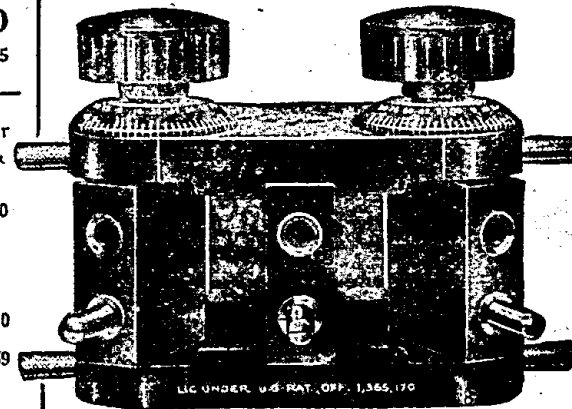
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Hipco B Batteries, 45 volts.....	4.50	3.50

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De Forest Tube, D V 6.....	\$6.50	\$5.00
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W D-11	6.50	5.45
C-299	6.50	5.75
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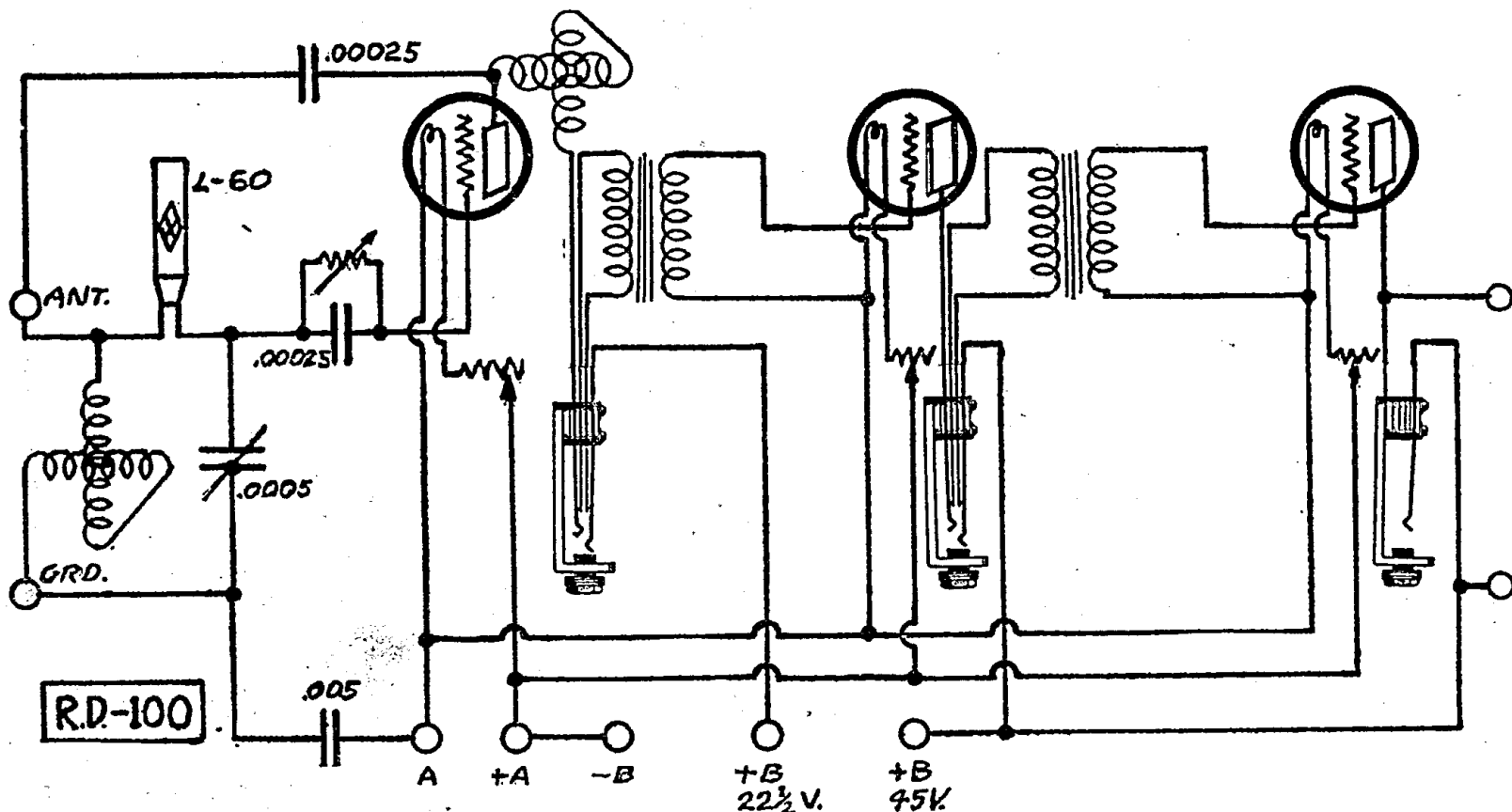
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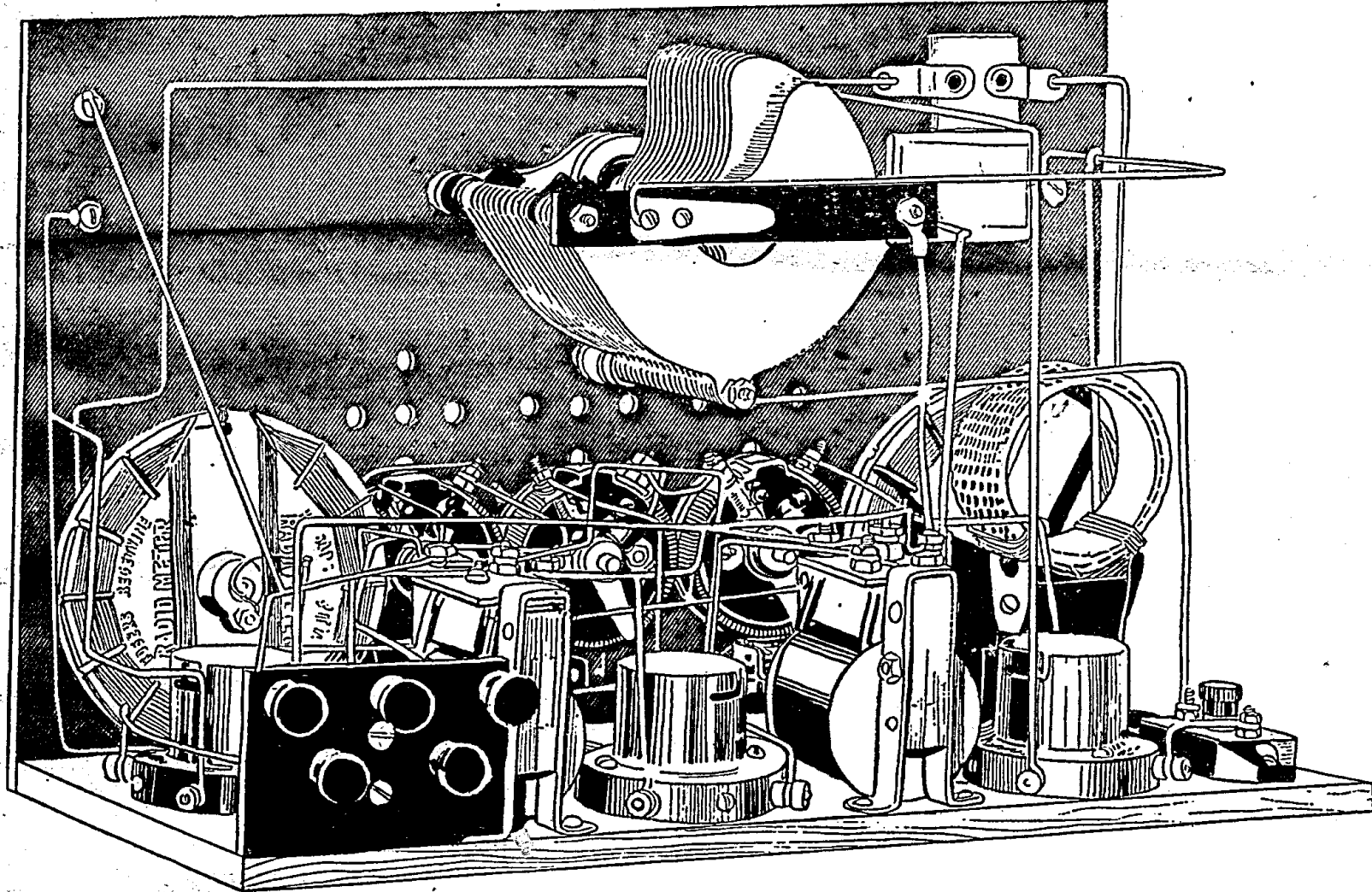


THE circuit shown is another of the selected receivers, and is presented to the fan because of its unusual efficiency and moderate cost of construction. While the circuit is a little advanced for the beginner, it will appeal to the fan

5 to 1), two double circuit jacks, one single open circuit jack, one panel 9 by 14 by 1/8, one baseboard 9 by 8 by 1/2, and nine binding posts. The circuit is of the regenerative type, and has unusual selectivity. A single wire

turn coil from which 15 turns have been unwound. The variometers are of the flat disc type, with a figure 8 winding. This type is very selective, efficient and of low internal capacity.

The variable grid leak adjustment is



that has already become somewhat acquainted with Radio receiving sets and who is looking for a good three tube receiving set for use at home.

The apparatus required is two variometers, one honeycomb coil and single coil mount, one variable condenser with vernier .0005 mfd., one grid condenser and variable grid leak, one .00025 mfd. fixed condenser, one .005 mfd. fixed condenser, three tube sockets, three rheostats, two amplifier tubes, one detector tube, two audio frequency transformers (ratio about

aerial, 60 to 80 feet long, will give very good results for both local and long distance reception.

Either dry or storage cell tubes can be used. The plate battery voltages can be varied by experimentation for clearest reception and maximum volume.

The use of jacks permits two stages of audio frequency amplification as desired. The lighting of the tube filaments is controlled by the individual rheostats.

The honeycomb coil consists of a 75

not very critical, but varies slightly with different tubes. The combination of va-

New tubes at cut prices, repairs free. Vacuum Electric Works, Toledo, Ohio.

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riometer and condenser permits very selective tuning control over a wide wave length range.

CURRENT PROGRAMS

(Continued from page 13)

- Illwen, conductor; 8:00, Church Service, All Souls Unitarian Church, Ernest Caldecott, pastor.
- WHAS, Cincinnati, Ohio (Central, 400), 9:57 a. m., Organ music; 10:00, Church services, Broadway Baptist Church; Rev. Dr. Russell Johnson Pirkey, pastor; 4:00-5:00 p. m., Concert, auspices Edna Boon.
- WHK, Cleveland, Ohio (Eastern, 360), 8:00 p. m., Concert program by the WLIK Orchestra; Vocal solo numbers by popular entertainers.
- WJAZ, Chicago, Ill. (Central, 447.7), 6:00-9:00 p. m., Oriole Orchestra; "Songs My Mother Taught Me," "Boot and Saddle," Russel Longmeyer; "Conzonetta," "Musette," Nathalie Parker, violinist; Oriole Orchestra; Soprano solos, Mrs. Ernst Von Ammon; "Serenade," "Almuet," Nathalie Parker; Oriole Orchestra; "Look Down Dear Eyes," "Give a Man a Horse Ho Can Ride," Russel Longmeyer; Piano solos, Margaret McAdam; Baritone solos, George H. Beryle; Oriole Orchestra.
- WOAW, Omaha, Nebraska (Central, 526), 9:00 a. m., Radio Chapel Service, Rev. R. H. Brown; 9:00-11:00 p. m., Musical chapel service, Trinity Methodist-Episcopal Church.

Monday, October 15

- CFCN, Calgary, Alta. (Mountain Standard, 440), 11:00-12:00 p. m., Special musical program by Calgary talent; Announcements; Test program after midnight.
- WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Fort Worth artists; 9:30-10:45, John Tarlton College, Stephenville.
- WDAR, Philadelphia, Pa. (Eastern, 395), 12:00-12:54 p. m., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00, Concert, Arcadia Cafe Orchestra; 4:30-5:55, Song recital; short talks; 7:30-7:45, Dream Daddy with boys and girls; 7:45, Motion picture review; 8:00, Song recital; Short talks; Dance music, Howard Lanin's Arcadia Cafe Orchestra.
- WFI, Philadelphia, Pa. (Eastern, 395), 1:00-1:50 p. m., Dinner music, Bellevue Stratford Concert Orchestra; 3:00, Tenor solos, Ednyfed Lewis, Loretta Kerk, piano accompanist; 6:30, Dinner music, Bellevue Stratford Concert Orchestra; 7:00-7:30, Bedtime stories by Cousin Sue.
- WGR, Buffalo, N. Y. (Eastern, 360), 12:30-1:00 p. m., George Albert Bouchard, organist; 6:30-7:00, George Albert Bouchard, organist; 7:00, Digest of the day's news.
- WGV, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., Music and Fashion Talk, P. A. Brown; 7:45, Musical Program; "Prelude, A Flat Major," "Prelude, No. 7," "Les Oiseaux," "Largo," "To a Water Lily," "To a Wild Rose," "Rigaudon," Mildred J. Coughtry; pianist; "A Son of the Desert am I," "Prosit," "For You," Daniel Gilmore, baritone; Marian Barry, accompanist; Readings, "Old Betsey," "Nothing to do but go," "The Story of Patsy Barnes," "Jimmy Brown's Sister's Wedding," Genevieve M. Liddane.
- WHAS, Cincinnati, Ohio (Central, 400), 4:00-5:00 p. m., Selections, Strand Theater Orchestra; "Just Among Home Folks"; Selections, Alamo Theater organ.
- WHAZ, Troy, New York (Eastern, 380), 9:00 p. m., Entertainment, Highland Community Association of Troy; Address, "Community Co-operation."
- WIP, Philadelphia, Pa. (Eastern, 599), 3:00 p. m., Concert; 6:02, Dinner music; 7:00-7:30, Bedtime stories by Uncle Wip.

(Continued on page 20)

BLUE PRINTS

How to Make a

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Blue Prints for the construction of a Reinartz Receiving Unit and two step amplifier.

Description of apparatus and details of tuning.

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First Steps for Beginners in Radio

Chapter XX—Useful Information and Formulas

By Thomas W. Benson, A. M. I. R. E.

IN THE last chapter of the series will be mentioned a few of the tricks of the trade that cannot be classified under any other heading. There are a number of little kinks, not too well known, that may assist the Radio beginner.

Often a set will be noisy, for no particular reason beyond, perhaps, noisy tubes. To overcome this it is necessary to use a form of electrical filter to get rid of the unwanted sounds. For the purpose use is made of three .01 megohm grid leaks connected in series in the plate circuit of the first amplifying tube, as shown in Figure 65. The connecting of the two .002 mfd. fixed condensers is also shown. The resistance acts to stabilize the circuit, and the condensers by-pass the undesired noises, reducing them greatly. This will cut the signal strength to a certain extent, but the music will be much clearer. A similar arrangement may be used when audio frequency amplification is added to the Armstrong filter circuits, but larger condensers may be found necessary. By experimenting with leaks and condensers of different sizes, it is possible to filter out the greater part of the whistle always present in the Armstrong super-circuits.

method is to install a pole changing switch, so the condenser can be connected in series or parallel with the aerial inductance, for better tuning.

Loading Circuits

With double circuit tuners both circuits must be loaded. Either of the above methods may be employed in the primary

Winding and Tapping Inductances

A few suggestions as to the winding and tapping of single layer inductances are not out of place. As an aid in designing the windings, the following table, which gives the number of turns per linear inch, will be valuable.

With this table one can readily deter-

mine the size and other details necessary to wind any given inductance.

length for each tap at the beginning of the winding and smaller jumps at the end. This is due to fact that the wave length does not vary directly as the number of turns but is equal to a constant multiplied by the square root of the product of the inductance and capacity. In order that the wave length of a circuit may increase regularly with the number of taps, the tapping of the coil should be done in the following manner:

First we must determine some desirable percentage of increase. Then, from the following table select the proper constant for that particular increase.

Percent	Factor
4	1.057
6	1.087
8	1.116
10	1.147
12	1.178
15	1.226
20	1.308
25	1.394
30	1.483

The first tap is selected roughly, say 1/4 inch from the beginning of the winding.

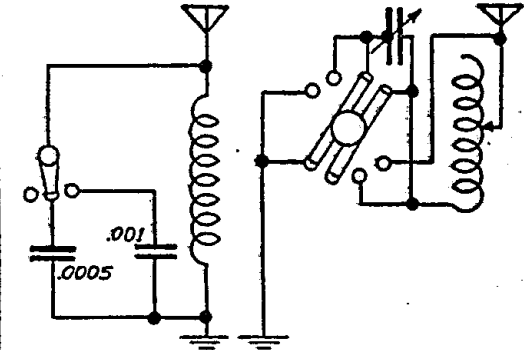


Figure 67—Two methods of loading tuners with condensers

Then, say, a 20 percent increase of wave length is wanted with each tap. The dis-

(Continued on page 18)

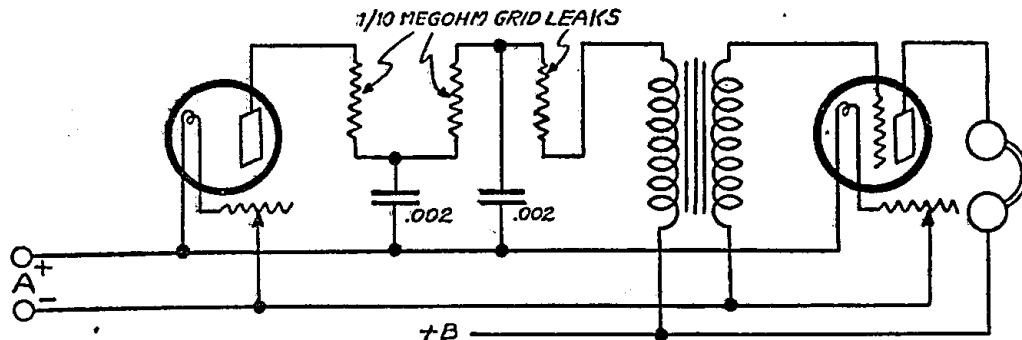


Figure 65—Filter for cutting out tube noises

mining the size and other details necessary to wind any given inductance.

mining the size and other details necessary to wind any given inductance.

Turns per Linear Inch

Size B. & Gauge	Enameled	Single Cotton	Double Cotton	Single Silk	Double Silk
20	29	25	23	27	26
22	36	31	28	34	32
24	45	37	33	42	39
26	56	45	39	52	46
28	71	54	45	63	56
30	88	64	57	77	67
32	112	75	60	93	78
34	140	87	68	112	91
36	173	101	78	130	104
38	225	115	89	151	117
40	288	130	102	178	129

It is a rare thing indeed to see a properly tapped coil; the usual practice of dividing a coil into taps having an equal number of turns results in large jumps in wave

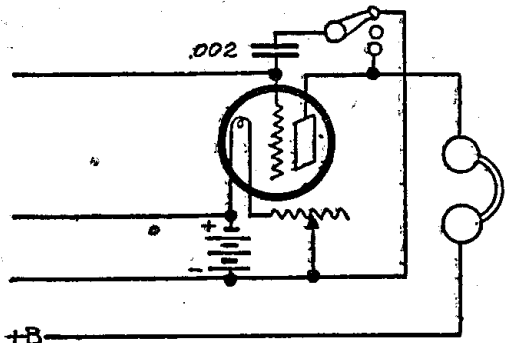


Figure 66—Condenser for modulating loud talker

The filter is connected in the plate circuit of the first audio tube, and the secondary audio amplifier will be but little affected by the whistle.

Improving Quality of Loud Speaker

The quality of music from a loud speaker can often be improved by the addition of the condenser and switching device shown in Figure 66. A .002 fixed condenser and three-point switch are connected into the last audio frequency amplifier tube circuit as shown. By adjusting the switch, much of the harshness of the music is removed, and the tones are reproduced much more clearly and sweetly. The effect is not so pronounced when headphones alone are used on a Radio set, but on a loud talker the effect is very noticeable.

The changes in wave lengths made necessary the loading of many receiving sets to enable them to reach the greater lengths. To overcome this condition there are two methods, either to shunt the inductances with a fixed condenser or to add inductance in series in the different circuits. With a single circuit tuner it is very simple. A coil of 50 turns of wire on a 3-inch tube, tapped every 10 turns, connected in series with the aerial lead, is all that is necessary. The alternative method is to connect a .0005 and a .001 fixed condenser with a three pole switch as shown in Figure 67, so that either condenser may be shunted across the inductance, as desirable. In sets using a variable condenser in the aerial circuit the better

15c Lettered binding posts, complete, set eight, 60c; two sets, \$1.00. Prepaid, same day. Stamps accepted. Everything in Radio. Ask for quotations. List for stamp. Kladag Radio Laboratories, Kent, Ohio.

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CHICAGO SALVAGE STOCK STORE, 509 SOUTH STATE ST. CHICAGO ILL.

BUY ONE 10000 WESTERN ELECTRIC TYPE CW-931 TUBES 'THEY ARE THE ORIGINAL VT-2 FROM THE U S NAVY' LETTER FOLLOWS

CHARLES IZENSTARK

WASHINGTON, SEPT. 8, 1923

\$7.45

10,000 Western Electric 5 Watt "E" Tubes, Type CW-931 or VT-2 Tubes!

Read that telegram again and be convinced of the good news it brings to you! 10,000 brand new Genuine Western Electric VT-2 Tubes built specially for the U. S. Signal Corps. Our purchase makes it possible for you to get a genuine VT-2 tube for \$7.45. Don't wait! Write for your tubes today—even though there's 10,000 of 'em they won't last long at that price!

These Genuine Western Electric 5-Watt "E" Tubes, Type CW-931 or commonly known as VT-2 tubes, were designed and built specially to conform to the specifications of the U. S. Signal Corps. They are built to be used both for Radio and Audio Frequency Amplification and for C. W. and Phone Transmitting.

One of the outstanding features of these tubes is the fact that they have a higher amplifying factor than any other tube made.

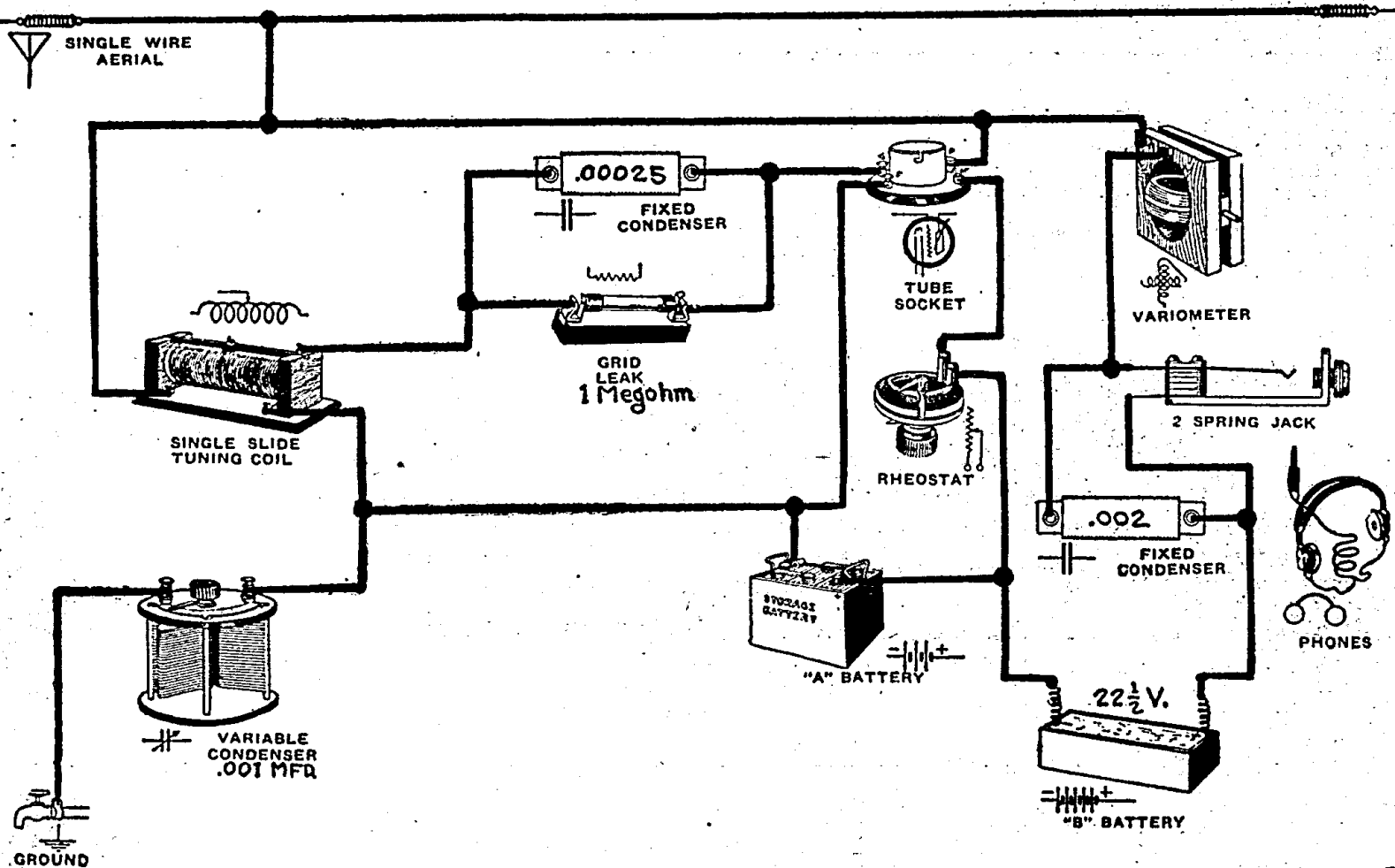
The characteristics of the tube are as follows: Filament: 5.5 to 7 volts. Plate Voltage: 45 to 350 volts. Power Output: 5 watts. Equipped with standard base to fit standard socket. Filament is of pure platinum.

All merchandise GUARANTEED by us to be of HIGHEST QUALITY All mail orders shipped to you PROMPTLY



"The largest Radio Store in America" 509 S. State St. Dept. RD-1113 Chicago, Ill.

SLIDE TUNER HOOK-UP IN SIMPLEX DIAGRAM



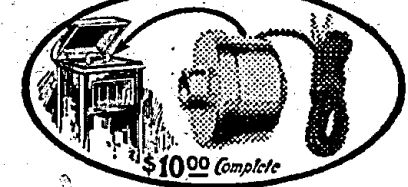
A SINGLE-SLIDE tuning coil is an inexpensive piece of apparatus and very easily operated. To the old amateurs it is a very familiar instrument. Strange to state, it is by no means inefficient, but in the rush for elaborate sets, especially the inductively coupled type, the slide tuner, has been pushed into the background.

To the fan who has one, or because of its simplicity would like to build one, the illustrated simplex diagram is presented. The circuit is efficient and selective, and yet not too expensive. It is regenerative because of the direct connection between the plate and the antenna and the variometer in the plate circuit.

Wave length tuning is effective through the slider and the variable condenser. The slider controls the secondary or grid circuit, and the condenser tunes the antenna circuit. Either dry cell or storage battery tubes can be used, the rheostat resistance conforming to the requirements of the tube. The plate voltage of 22½ can be increased if necessary for most efficient tube operation.

GENUINE EDISON ELEMENTS (new) for making "B" Batteries, obtained from U. S. Government. A positive and negative element—6c; glass tube—3c; all other parts at reasonable prices. Postage, etc., 50c extra per order. Free instructions. TODD ELECTRIC COMPANY, 109 West 23rd Street, New York.

Morrison



Loud Speaker

Radio Satisfaction

TRUE enjoyment of Radio begins when you and your family can sit comfortably in your living room and listen to all broadcasting reproduced in Clear, Full Volume. No annoying rattles, no harsh vibrations, no need for constant adjusting and fussing.

Morrison Loud Speaker gives you that kind of Radio satisfaction and pleasure when attached to either your PHONOGRAPH OR HORN. Attach the Morrison Loud Speaker to the tone arm of your phonograph—takes only a moment—and you have the benefit of the excellent phonograph sound box. Or attach it to any horn.

A little dial on the back of the Morrison Loud Speaker adjusts the tone from soft, mellow notes to full-volume, clear notes. There is nothing to get out of order. Any one can use this wonderful radio unit with the same perfect results as an expert.

Satisfaction guaranteed—or your money back. Price complete with 5-foot cord: Nickel Plated Model..... \$10.00 Gold Plated Model..... \$15.00 Order from your dealer, or send direct to us if your dealer cannot supply you.

DEALERS: If you are interested in one of the fastest-selling Radio units on the market, write or wire for our proposition—it is interesting.

MORRISON LABORATORIES, Inc. 343 Jefferson Avenue, East, Detroit, Mich.

FIRST STEPS IN RADIO

(Continued from page 17) tance, ¼ inch, is multiplied by the constant 1.308, and the product will be the distance of the second tap from the beginning of the winding. For the third tap the process is repeated. Multiply the distance to tap 2 by the constant, and the product will be the distance of the third tap from the beginning of the winding. The process is repeated till all the taps are obtained. By referring to the table giving turns per inch, the turns between each tap for the size wire can be readily determined. It should be remembered that the product in each case is the distance from the beginning of the winding. This is the final chapter of the series, and if the information given has assisted any fan to a better realization of the underlying principles of the Radio, it has served its purpose.

(THE END)

When Wave Lengths Vary

When a Radio transmitting station increases its wave lengths and the usual signals disappear at the receiver, they can be brought back in most cases with inserting a 50-turn honeycomb coil in series with the antenna. A switch should be provided to short circuit this loading coil

PATENT ATTORNEYS

PATENTS. Booklet free. Highest references. Best results. WATSON E. COLEMAN, Patent Lawyer, 624 F Street, Washington, D. C.

WE REPAIR THE FOLLOWING RADIO TUBES

Dealers and Agents write for Special Discount Mail Orders Solicited and Promptly Attended to

WD-11	OUR SPECIALTIES	5 WATT TRANSMITTERS
UV-199	\$3.50
UV-200	2.75
UV-201	3.00
UV-201A	3.50
WD-11	3.50
DV-6	3.00
UV-202	4.00
UV-299	3.50
C-299	\$3.50
C-300	2.75
C-301	3.00
C-301A	3.50
WD-12	3.50
DV-6A	3.50
C-302	4.00

H. & H. RADIO COMPANY
P. O. Box 22-A
Clinton Hill Station NEWARK, N. J.

when the operator tunes for lower wave lengths. If a station lowers its wave length and is inaudible, it can usually be restored at the receiver by inserting a variable condenser in series with the antenna or ground.

Frank D. Fearn RADIO AUTHORITY Says — "the only reliable way to determine if "B" Batteries are still capable of service is by testing with a Voltmeter." Thousands of radio fans are using the

INDIAN HEAD POCKET VOLTMETER \$1.49

Every radio fan needs this Pocket Voltmeter. Tests "B" Batteries up to 45 Volts. Guaranteed accurate. Sent anywhere in U. S. or Canada. Parcel Post Prepaid, on receipt of money order for \$1.49. Indian Head Pocket Ammeter at same price. Fans send 2c stamp for our list of Radio Bargains.

INDIAN HEAD COMPANIES
Dept. A, 417 S. Dearborn Street, Chicago, Illinois

IF YOU CAN'T BUY THEM AT YOUR DEALER'S SEND DIRECT TO US

"Red-Heads" are guaranteed radio phones. You run no risk when you buy them. Money back if, after 7 days' trial, you're not satisfied that they're the best receivers on the market at the price. Why not act right now and get a pair? It'll mean getting the maximum from broadcasting from the day you put them into use.

RED-HEAD RADIO RECEIVERS

These remarkable head-sets are made by The Newman-Stern Co., one of the pioneer radio manufacturing houses in America.

JUST OUT

The new 1924 Model F "Red-Head" Jr. \$6.50 PER PAIR Complete

The new 1924 "Red-Head" Jr. \$5.00 PER PAIR Complete

This is the standard 3,000 ohm "Red-Head." The 1924 Model F has eleven improved features. Sensitive and fine-tuned; aluminum case; famous brown-red ear caps; military headband; high-grade cord.

The Junior Model has most of the quality features of the standard Model F here described. The resistance is 2,000 ohms per set instead of 3,000 ohms. A remarkable value.

"Red-Heads" sent prepaid on receipt of price if you are unable to get them at your dealer's.

THE NEWMAN-STERN COMPANY
Dept. RD Newman-Stern Bldg. Cleveland

Amateur Builders of Radio Receiving Sets

The Second Annual CHICAGO RADIO SHOW, to be held in the Coliseum from Nov. 20 to 25, inclusive, will award the following prizes in two contests open to amateur builders of radio receiving sets.

For the most unique crystal or one-tube receiving set built by any student in any public or parochial school in Cook County, Ill.;

- First Prize \$25.00
- Second Prize 20.00
- Third Prize 15.00
- Fourth Prize 10.00
- Fifth Prize 5.00

For the best home-made receiving set built by any amateur in the United States, using any hook-up:

- First Prize \$75.00
- Second Prize 50.00
- Third Prize 25.00

All sets entered in these contests to be exhibited in the show. For further details and Entry Blanks write to Contest Dept., Chicago Radio Show, 127 North Dearborn Street, Chicago, Ill.

The amateur exhibit will be in addition to the exhibits of all the leading radio manufacturers. Manufacturers who have not as yet obtained their allotment of space are advised to get into immediate communication with the management of the SHOW.

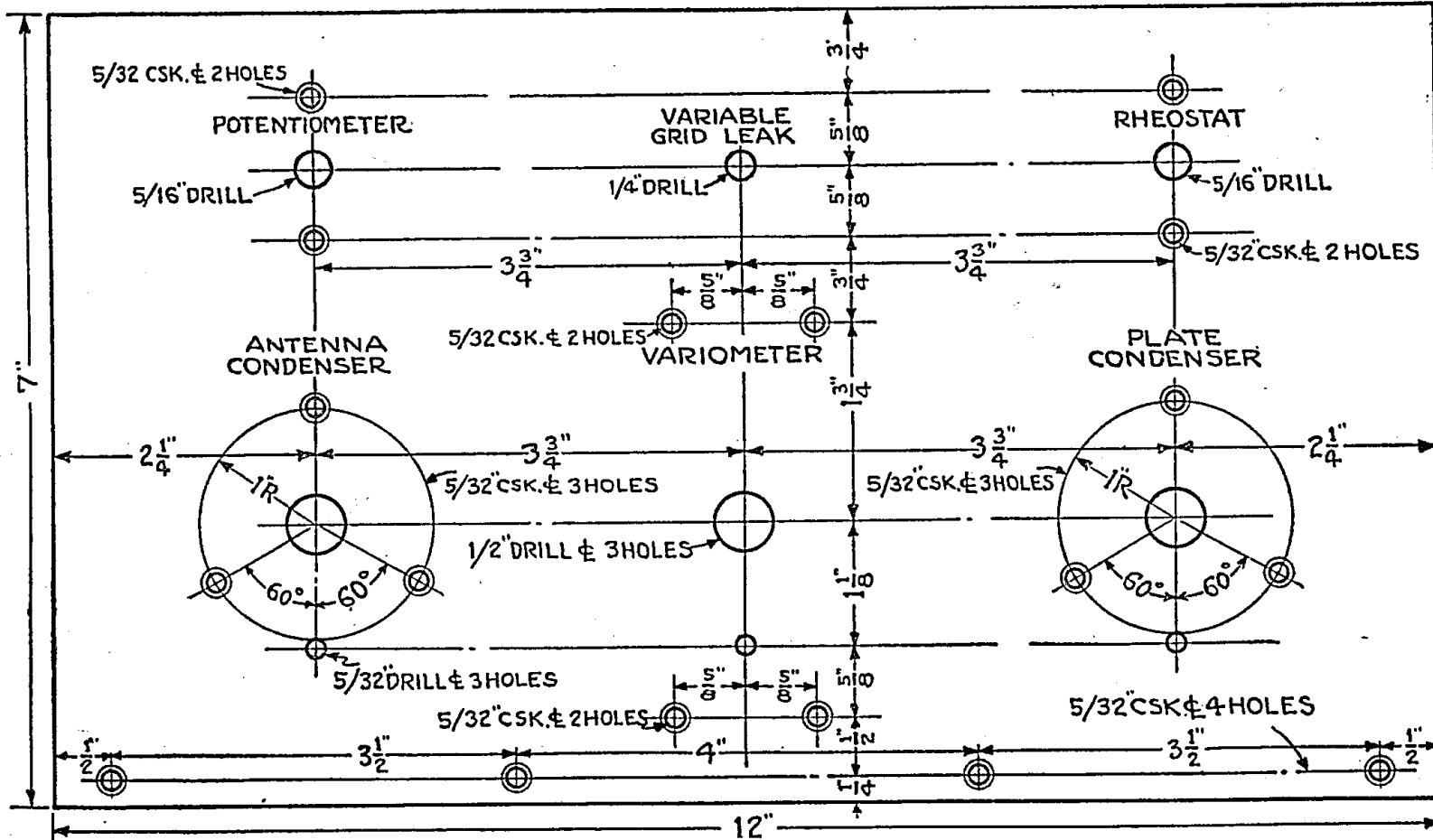
OFFICE: SUITE 520
127 No. Dearborn Street

James F. Kerr,
Manager
Telephone State 4161

How to Make the King Miloplex I Receiving Set

Panel Layout and Instructions for Assembly

By H. J. Marx



WITH super-heterodyne circuits featuring all the nightly dreams, now the Miloplex comes crashing in—not only one, but three different circuits, which means making up each one. Yet some people say Radio is only a season proposition—did you ever hear of an editor getting a vacation?

Before describing the set, it might be wise to state that it was finished at 1:30 in the morning and at 2 a. m., Kansas City Nite Hawks were merrily operating a pair of Baldies so that it was audible in the next room. All this on one tube, a radiator ground and a 25-foot length of wire as an aerial, stretched back and forth three times on a second-story back porch. All this took place in Chicago and no interference from other stations. Static was hardly noticeable.

Don't expect to analyze the theory of operation, for that will work in better when details of the final circuit are presented. The initial circuit is given so that the fan may gradually become accustomed to the method of operation. In this way the path is cleared for maximum results on the final circuit. Just because this circuit doesn't look new enough, don't let that bother you; it's the little simple circuits that have earned the most popularity, for example, the Ultra-Audion.

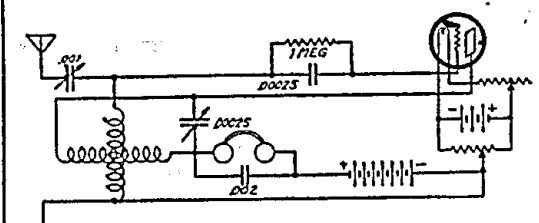
Apparatus Required

The parts required are one .001 mfd. variable condenser, one .00025 mfd. variable condenser, one variometer, one potentiometer, one rheostat, one socket, one variable grid leak and .00025 mfd. fixed

condenser, one .002 mfd. phone condenser, one 7 by 12-inch panel, one 12 by 8 by 1/2-inch baseboard, 8 binding posts, 1 panel strip, 1 by 8-inch, for binding posts.

The accessories include the tube, A battery, B battery and receivers.

In the later Miloplex circuits a .0005 condenser is called for, but either of the two sizes are interchangeable, the effective change in wave length range not being very great. The variometer should be of the type with low distributed capacity, and easily altered for separate rotor and stator connections. Where dry cell tubes are used, the potentiometer resistance



should be as high as possible. The resistance of the rheostat is dependent on the type of tubes used.

In all circuits of this type, good quality apparatus is essential. The use of junk parts rarely is accompanied with successful results.

Panel Layout

The layout of the panel of the set, which is displayed at the New York Radio Show, is shown. Naturally, for different localities different apparatus is available

so only the centerlines should be followed. The holes for mounting screens should be altered to conform to the apparatus used.

The arrangement of apparatus as shown was found to be most effective. For long distance work and with poor aerial and ground, there were slight body capacity effects. If desired, the panel can be shielded to eliminate this.

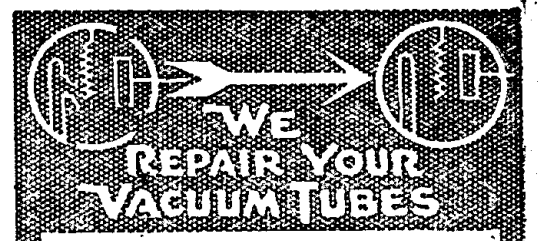
All binding posts for connections were mounted on the panel strip in the rear of the set. Wiring should be carefully and neatly done, but interference is not noticeable.

The condenser and variometer adjustments are very critical; so some form of vernier controls and the dials are recommended. Vernier plate condensers may be used.

The potentiometer control will be found very effective, but its operation affects slightly the variometer adjustment. The two condensers also depend on each other for proper setting.

Tubes Used

If a detector tube is used, the plate battery voltage need not be greater than (Continued on page 20)



WD-11-12, UV-199, UV-201-A
C-301-A\$3.50 each
UV-200, C-300, AP Detectors.. 2.75 each
UV-201, C-301, AP Amplifiers. 3.00 each
DV-6, DV-6-A 3.50 each
And Guarantee Them Equal to New

OUR NEW 6V 1/4 AMP. DETECTOR AND AMPLIFIER \$4.10
This Tube Is a Revelation—Fully Guaranteed.

QUICK SERVICE—Include with your order remittance to cover repair plus parcel postage for one pound per tube. All orders shipped C. O. D. unless accompanied by remittance plus postage. If preferred, tubes will be returned C. O. D. repair charges.

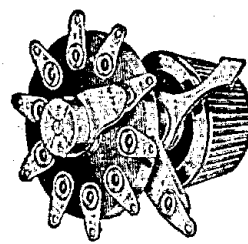
SPECIAL

LOUD SPEAKER, nickel-plated—21" high. Undistorted reproduction. Regular Price \$ 15.00
Our Price 9.50

Shipped prepaid.

ABALENE RADIO, 14 Vesey St., New York, N. Y.

WALNART INDUCTANCE SWITCH



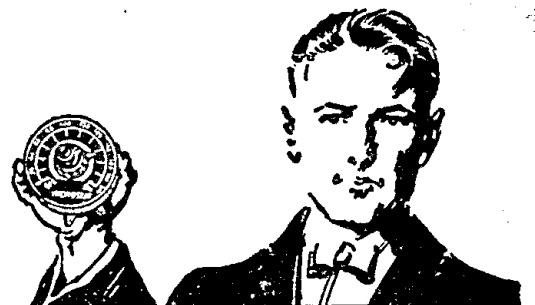
Why drill ten holes in your panel—not only a difficult thing to do, but if you ever make a change in your hook-up, your panel is marred—when by drilling only one hole you can use a Walnut Inductance Switch.

Positive contact; attractive Bakelite knob and pointer make a much more attractive panel, and simpler adjustment. And the price is no more than switch points with pointer lever would cost.

Ask your dealer for Walnut Inductance Switch; if he cannot supply, write us. Catalog of Walnut radio accessories and parts on request.

WALNART ELECTRIC MFG. CO.

Dept. 404, 1251 W. Van Buren St., CHICAGO, ILL.



Have your Dealer show you a "MICROSTAT"

A SUPER VERNIER RHEOSTAT \$3.00—and worth it

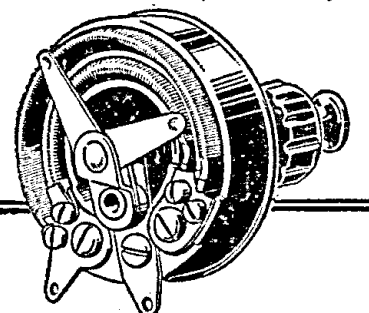
Premier "MICROSTAT" represents the highest state of development yet obtained in the Radio Rheostat field and operates or functions quite differently from other Rheostats in that its two resistance units—one low (6 ohms) and one high (40 ohms)—are connected in parallel (not in series) and the vernier adjustment is done on the high resistance while the current flows without interruption thru the low resistance unit.

To grasp and understand this principle of the "MICROSTAT'S" method of functioning is to concede its unsurpassed efficiency in adjusting and controlling, to the smallest quantity, the current flow thru the filament of the tube—a great and important essential in selective tuning.

While accomplishing this prime and essential feature an absolutely quiet and noiseless adjustment automatically results for current flow is not—nor never can be—interrupted, which, sooner or later, results in all Rheostats operating a Vernier in series with a low resistance Rheostat unit and which interruptions produce noises which defeat the true function of a Vernier for accurate selective tuning.

"Microstats" Exclusive Features Universal in Operation—Controls any tube 1 1/2 to 6 volts from 6-volt battery. Stays Put—Not affected by vibration. Full on—All Resistance cut out. Resistance Units—Genuine "Ni-Chrome" wire—6 ohms low—40 ohms high—connected in parallel—total safe carrying capacity, 3 amperes. Main Body or Base—Bakelite moulded. Dial—Silver etched on black background. Knobs—Moulded—Thermoplastic. Mounting—One hole only in panel. No Mounting Screws. Write for Bulletin No. 92

Premier Electric Company 3810 Ravenswood Avenue, CHICAGO, U. S. A.



RADIO AT N.Y. PRICES
Daily Parcel Post

<p>Dietzen Vernier Condenser</p> <p>14 Plate \$2.65 24 Plate \$2.95 46 Plate \$3.45</p>	<p>DIETZEN Midget Tube</p> <p>1 1/2 Volt, Operates on one dry cell, either with or without B battery. Wiring diagram Free with each tube.</p> <p>\$1.00 Socket 40c</p>	<p>AMPLETONE Horn—Nickel</p> <p>18 inches high \$3.95 List \$12</p>	<p>DIETZEN Loop Aerial</p> <p>Set up in 5 minutes. All parts complete \$1 00</p>
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Variable condenser, 43 pl. (bakelite end) \$1.95
7 Strand aerial wire, 100 feet. .65
Argus lightning arrester .95
Reinartz coils 1.45
Dietzen moulded variometer or coupler.. 5.95
Brandes or Dictograph phones. 5.45
Dietzen phones (3000 ohms)..... 3.75
We Pay Parcel Post Charges on All Orders. Money Order or Personal Check Accepted. Money Refunded If Not Satisfactory.

Modells 71 Cortlandt Street Dept. F-35, NEW YORK
ESTABLISHED 1889 America's Greatest Radio Mail Order House

RADIO FOR EVERYBODY

(Continued from page 11)

alternating current comes down the wire into the top crystal and travels straight through to the metal support, then, on the reversal of current, passes from the support, through the crystal to the contact wire and out. There is no opposition

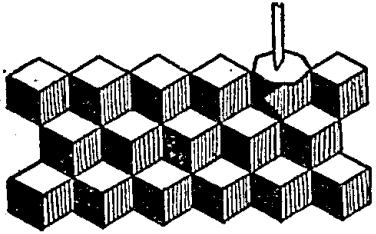


Figure 11—Cross section of a piece of mineral showing the presence of a single crystal, not symmetrical and therefore capable of refracting the Radio current from one direction

to the current going in either direction. In Figure 11, however, the current can pass from the metal in which the mineral is mounted, through the mineral and up the contact wire, but when it reverses and comes down the wire, it goes in all directions out into the mineral and is dissipated or lost. It does not go straight through the irregular crystal and into the one beneath. The ideal mineral, then, is a synthetic one in which the surface is composed of unsymmetrical crystals in close permanent union with the symmetrical, regularly shaped crystals forming the body of the piece of mineral. In galena we find these irregular crystals located here and there on the surface, and it is necessary to search for them. This is the case with most of the minerals now on the market, but with suitable inductance and capacity in the circuit, broadcast programs can be received dependably over distances of 25 to 40 miles.

"Threshold" Value

You at once say, "But I know people that hear programs from stations hundreds of miles away. Do they use a crystal detector, and if they do not, why not?" Which brings us to the term "threshold value." If a broadcasting station is nearby, its signals will be very strong with an intensity of, let us say, 6. Another station is six times as far away, and its signals when they reach our antenna will be but one-sixth as strong, or have an intensity of 1. One thing that has been definitely learned about detectors is that a certain minimum strength of signal is necessary or they will not function. If a crystal will function on a very weak signal we say it is unusually sensitive and that the "threshold" or "incoming" value can be very low.

Range

Our piece of galena has, we will say, a "threshold value" of 2; in other words, signals whose intensity is 2 or more will be heard. To go back to our two broadcasting stations—the nearby one will be heard clearly and loudly, the one which is far away will not get through the crystal. If the distant station were to increase its power to double the original amount, it would be faintly heard; if it increased its power to four times the original strength it would come through nicely, but not as strongly as the nearby station. Thus, where signals are led from the antenna, through tuning units and then directly to the detector, the broadcast listener is

limited in the matter of distance by the "threshold value" or sensitivity of the detector, and the crystal detector, requiring a very high "threshold value" of signal strength, provides but a limited range of reception.

The Tube Detector

The vacuum tube, or audion as it was called when brought out by its inventor, is one of the most interesting and flexible instruments developed during the progress of Radio. It is easily the most sensitive device in the science and is comparatively very frail in construction; yet, little more than an elementary knowledge of it is necessary to use the tube in reception.

The vacuum tube consists of a glass bulb somewhat similar in shape to an electric lamp, evacuated to a high degree and containing three elements: the filament, the grid and the plate (See Figure 12). In this sketch A is the filament or inner member, made of tungsten wire; B is the grid, made of fine wire secured in the shape of a coil around the filament, and C is the plate, which is made of very thin sheet metal and surrounds, but does not touch, the filament and grid. In the base of the tube are four pins for making contact with corresponding springs in a socket. The two ends of the filament connect to two of these pins, the grid is secured to the third and the plate to the fourth.

Electron, Positive and Negative

We must now consider the terms, "electron," "positive" and "negative." The electron is an inconceivably small body of matter carrying what is called a negative charge of electricity. When there is no voltage or pressure in an electrical circuit, these electrons are at rest and no current flows. When a source of pressure or voltage is connected in circuit, these electrons are all pushed to one end of the circuit, which end thus has an abnormal

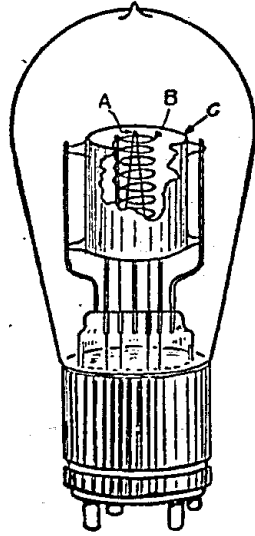


Figure 12—The three-element vacuum tube, with plate broken away to show the arrangement of filament, grid and plate

number of negative charges, and is said to be negative. It is negative, however, only in the sense that while it is overloaded with negative charges the other end has been depleted of electrons and is said to be positive. The terms are relative and something cannot be negative without something else being positive; a difference of pressure must exist. (TO BE CONTINUED)

MILOPLEX I PANEL

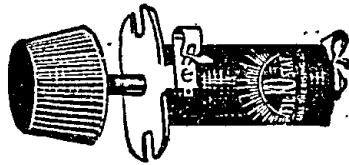
(Continued from page 19)

22½, and often less. The use of a soft tube gives slightly greater selectivity but not as much volume.

An amplifier tube increases the volume, with a slight decrease in selectivity. When it is used, the plate battery can be increased to 45 volts.

Turn on the rheostat, set the variometer so the stator and rotor are at right angles, and set the potentiometer at about center, then rotate the two condenser dials in conjunction. When a whistle is heard, adjust both for best point, then carefully adjust variometer and potentiometer in conjunction with each other. The grid leak can then be properly adjusted.

The set may go into continued violent oscillation, due to too many turns on the rotor or too great a plate condenser capacity. Improper adjustment of the grid leak or potentiometer will cause trouble. A lack of voltage in the A battery will be noticeable by the inactivity of the tube and no reception in the receivers. Shorted condensers are indicated by jerky reception as the dials are turned. A defective potentiometer will make its adjustment valueless. There should be a distinct effect as the knob is turned.



MISSING WHAT YOU GET

YOUR set is probably bringing in DX stations you never hear because your rheostat cannot control your filament action. The Fil-Ko-Stat gives infinite adjustment and enables you to magnify the weak stations and bring them in strong and clear.

Full resistance 30 Ohms, adjusted to ALL TUBES. \$2 At All Dealers in High Grade RADIO SUPPLIES

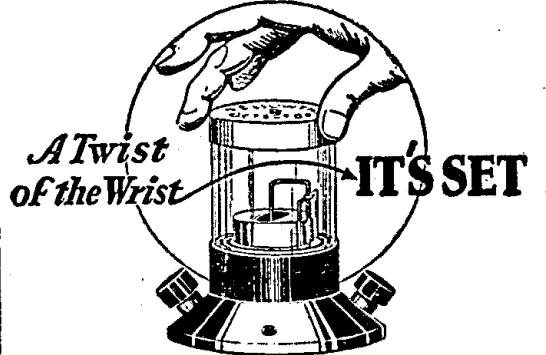
FIL-KO-STAT

Made and Guaranteed by Dr Instrument Co., Harrisburg, Pa. Sole International Distributors. Radio Stores Corp., 218 W. 34, N. Y. City

CURRENT PROGRAMS

(Continued from page 15)

WLW, Cincinnati, Ohio (Central, 309), 3:00 p. m., Special music, Jennie Kehrt; 8:00, Program, Editorial Staff of Sunday School Publications, Methodist Book Concern; Musical number, Cincinnati String Quartet, Ernst Paek, first violin; Herbert Silbersack, second violin; Gordon Kahn, viola; Karl Tople, cello; "Ganzonette," The Cincinnati String Quartet; The Religious Significance of Current Events, Rev. A. D. Moore; "Minuet," Cincinnati String Quartet; "Pioneer," Rev. A. D. Moore; "Old Black Joe," Cincinnati String Quartet; "The Common Work of the Churches," Rev. Henry P. Atkins; "Serenade," "Molly on the Shore," Cincinnati String Quartet; 9:30, Entertainment, Roger Hill Dance Orchestra; 9:30, Reviews of the leading productions at the Cincinnati Theaters. WOAW, Omaha, Nebraska (Central, 526), 9:00-11:00 p. m., Program, pupils of Cecil Berryman, auspices Stock Yards National Bank. WOO, Philadelphia, Pa. (Eastern, 509), 11:00-11:30 a. m., Organ recital, Mary E. Vogt; 12:00-12:54 p. m., Dinner music, Wanamaker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt; 7:45, Dinner music; 8:30, Song recital; 9:00, Organ recital; 11:10, Dance music. WOS, Jefferson City, Mo. (Central, 440.9), 8:00-9:30 p. m., Program of popular dance numbers, Missouri State Prison Dance Orchestra, Hugh C. French, director.



YELLOWTIP
MICROMETER ADJUSTING
CRYSTAL DETECTOR

The every-purpose detector—fixed or changeable adjustment. Just as you wish. Tune with the YELLOWTIP. No hunting or looking for a sensitive spot, just "A Twist of the Wrist—It's Set." Micrometer adjustment in a moment, fixed indefinitely. Ideal for reflex and other circuits. \$2

Write for folder and name of your nearest dealer.

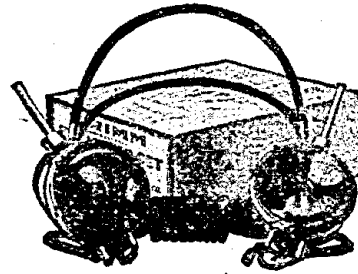
WHOLESALE RADIO EQUIPMENT CO.

Exclusive Factory Representatives
35 WILLIAM ST., NEWARK, N. J.

Dealers and Jobbers write for attractive proposition.

Radio Veterans Demand

\$7.65
"Professional"



The finest instrument of its kind that money and science can produce. Moulded Bakelite cases and ear caps; single bar Tungsten steel magnets; light weight; exceptional tone and volume.

A \$12.00 quality for \$7.65.

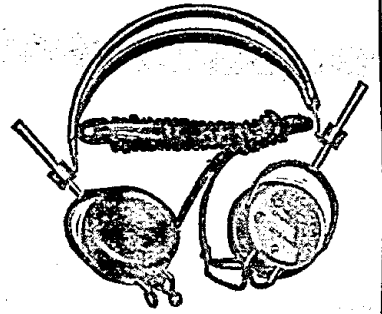
TRIMM
Head Sets

Positively the only headset on the market sold with a life-time guarantee that covers every detail of materials and workmanship excepting only cords and shells which cannot be guaranteed against breakage if dropped.

Absolutely no charge at any time for repairs, replacements or for remagnetizing.

The head sets to buy; the head sets to sell.

\$5.00
Dependable



Standard bi-polar construction. Aluminum case. Splendid finish; beautiful appearance. Wonderful volume and clarity of tone. Compare the Trimm "DEPENDABLE" with any \$6.50 to \$8.00 headset on the market.

Money back if not satisfied with any TRIMM product

SEE! HEAR! THE

Trimm Loud Talkers

\$10.00
Acousticola
Phonograph Attachment

\$22.50
Acousticola
Composition Horn

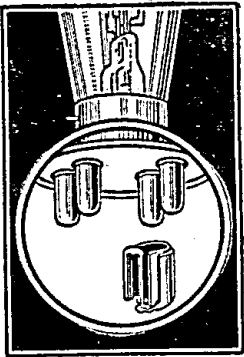
\$35.00
Acousticola Grand
with Cast Aluminum Horn

All fitted with Special TRIMM jumbo size loud Talker Unit. Write for folder. Or order samples with privilege of return after 5 days' examination and test.

Trimm Radio Mfg. Co., Dept. 48, 24-30 S. Clinton St., Chicago, Ill.

GAMBLING?

YOU ARE IF YOUR RADIO TUBES ARE UNPROTECTED



Your Vacuum Tubes are the most delicate parts of your Radio Set.

They are easily blown out—you have probably already had this exasperating experience—it is apt to happen at any time.

"B" Battery wires accidentally crossed for only an instant with the filament leads or sudden excess current from the "A" Battery will do it.

You can prevent this and save yourself money and inconvenience and relieve your mind at a trifling cost.

INSTALL RADECO SAFETY FUSES

on all your tubes. Applied in an instant to one of the filament terminals. Will fit any standard tube going in any standard socket.

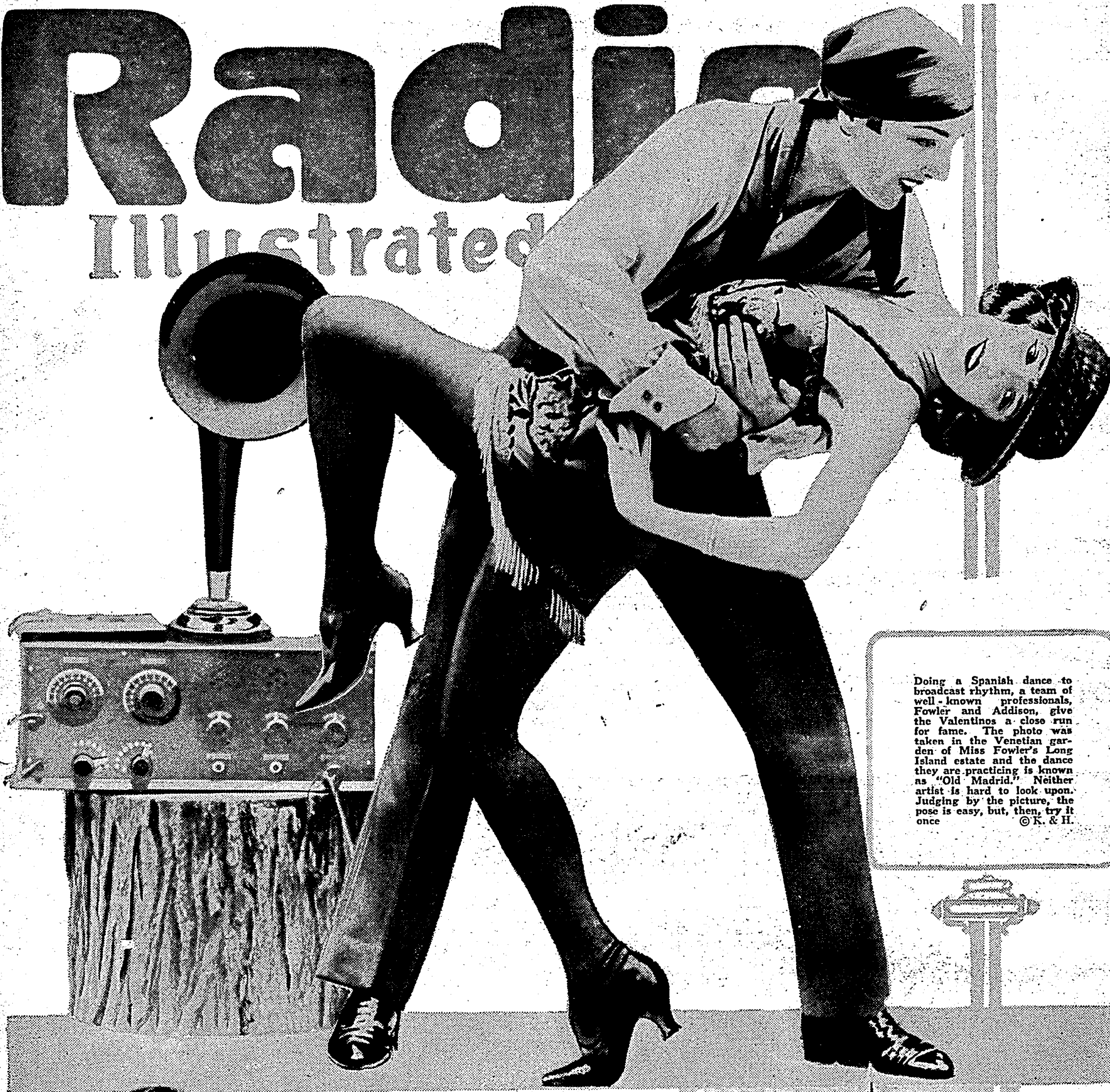
Price 50 cents each, sent postpaid and fully guaranteed. Do not delay. Order now. Specify type of tube used.

DEPT. 6

RADIO EQUIPMENT COMPANY

Manufacturers and Distributors of Standard Radio Equipment
630 WASHINGTON STREET BOSTON, MASS.
New England's Oldest Exclusive Radio House
Dealers—Write for our proposition

Radio Illustrated



Doing a Spanish dance to broadcast rhythm, a team of well-known professionals, Fowler and Addison, give the Valentinos a close run for fame. The photo was taken in the Venetian garden of Miss Fowler's Long Island estate and the dance they are practicing is known as "Old Madrid." Neither artist is hard to look upon. Judging by the picture, the pose is easy, but, then, try it once
© K. & H.

Below: Miss Clara Cooper, herself once deaf and dumb and taught to speak by the same method, is using a powerful set to cure the affliction of a young lad in a Cincinnati public school.
© Fotograms

Right: One of the units used by the city of Detroit to furnish music to three different parks, the original music coming from a band on Belle Isle and being broadcast by WWJ, the Detroit News

