

Radio Digest

EVERY WEEK

Illustrated

TEN CENTS

REG. U. S. PAT. OFF. & DOM. OF CANADA

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'HOT ROASTED PEANUTS'



England Hears Old-Time Songs Sent Out from Troy

Entire Program Picked Up Clearly—in Spite of Static

TROY, N. Y.—Practically the entire Radio program of old-time songs, one of the most popular broadcast from Station WHAZ at the Rensselaer Polytechnic Institute here, was received in Liverpool, England, between the hours of 3 and 4:30 a. m., August 28, according to a letter just received from Arnold P. Hill, B. Eng., of Mayfield Road, Wallasey, Liverpool.

"Despite the fact that the static was fearful all through the night and that it began to get daylight soon after 4 a. m. the program was clear in the headphones throughout and at times was almost up to loud talker strength," according to the correspondent. "The program for strength, purity and consistency makes the finest reception I have yet had of telephony from U. S. A."

POPULAR SONG HAS BIG SALE WHEN BROADCAST

Test Proves Use of Music by Stations Makes Hits—Broadcasters Should Not Pay

By Marvin W. Thompson

NEW YORK.—Does Radio broadcasting help or hinder the sale of popular music? *It helps!* Doubters can no longer say that sales are hurt by ether publicity, when the fair test given here recently is considered. Composers of music, and particularly the Society of Authors, Composers and Music Publishers may well look up to the advantages of getting their compositions on the air!

Rather than attempt to collect a fee from broadcasters for the use of their music, the latter society some day may even be charged a fee for the privilege of having its pieces played or sung before the microphone. But, of course, broadcasters cannot accept payment now for such publicity, as the latter would then become direct advertising, which, under the existing Radio laws, is prohibited on the air. But should broadcasters pay? The test song answers, "No."

Write Test Song to Prove Argument

It has been the contention of the Society of Authors, Composers and Music Publishers that broadcasting of popular song hits would ruin the sale of sheet music. The broadcasters have maintained that instead of hurting the sales, broadcasting was the greatest publicity medium and force for popularizing song hits that has ever been offered the publishers.

Early in August a verbal battle raged one night in a New York restaurant over this question. Louis Breau and Charles Tobias, writers and publishers of many song hits, felt from their experience that the broadcasters were right. They had in mind a

(Continued on page 5)

R. C. A. PUTS OUT NEW SUIT FOR FALL

Latest Court Action Based upon Charge of Patent Infringement by Fada

NEW YORK.—Recent developments in the Radio industry in this city indicate that clothing is likely to be a "side line." Early in 1923 A. H. Grebe and Company announced a new spring suit brought to its attention in relation to litigation instituted by the Radio Corporation of America. Now comes F. A. D. Andrea, Inc., with the announcement that a new fall suit has been presented it by the same plaintiff.

The latter suit charges infringements of the Rice and Hartley patents through the manufacture and sale of Radio receivers embodying the Hazeltine Neutrodyne circuit.

The defendant is to be aided by the Independent Radio Manufacturers, Inc., of which the Andrea concern is a member, which organization took part in the litigation last year involving the crystal patent.

FLAPPERS AND MONEY FLOCK TO THIS BANK

WHITEHOUSE, N. J.—Hear ye bankers! The First National Bank here has found a new attraction to bring the fair sex and their money to its vaults. A Radio receiving set and loud speaker were installed in a new, comfortably furnished ladies' reception room. The ladies were then invited. Results show the loud speaker was irresistible.



The Fleming Trio (left at top) was featured on the opening program of the new studio of Station WEF, New York, and has appeared before the microphone there several times since. Not alone do they excel on the cello, piano and violin, but they are very easy on the eyes. Miss Louise Kelly (circle) is a lyric soprano often heard over WEF and other metropolitan area broadcasters. At the right is Dorothy Bell, a well-known harpist who delights KYW, Westinghouse, Chicago listeners with her solos. Miss Bell's harp registers very cleanly on the microphone. She was a pupil of Tramonti, the famous harpist of the Chicago Symphony, and is a member of the Chicago Civic orchestra



NEW "ROLLS ROYCE" SET RANKED FINEST

CAPABLE OF TUNING FROM 200-700 METERS

Sam Curtis, Ex-Operator at WNAC, Completes His Outfit De Luxe

BOSTON, MASS.—Sam Curtis, Radio expert of the C. C. Harvey Co., former announcer and Radio operator of the WNAC broadcasting station, has built a receiving set of the "Rolls-Royce" type, meaning a set de luxe, using seven dry cell tubes, with a loop, and embodying all the principles of the super-heterodyne and neutrodyne combined.

With his experience at WNAC, and with the Radio Corporation and in various naval Radio positions, Curtis has been able to design what is perhaps the finest receiving set obtainable at the present time.

It is capable of tuning from 200 to 700 meters, and has an intermediate frequency of 48,000 cycles. The principal features are the combination of all batteries inside the cabinet which is of American walnut, polished and made five-sided, like the official French naval receivers.

Parts and Construction of Set

One rheostat controls the seven UV-199 tubes, which are used in the following order: 1, oscillator; 2, first detector; 3, 4 and 5, intermediate frequency amplifiers; 6, second detector, and 7, states of audio frequency. Three long wave transformers have been supplied for the Radio frequency amplification. The set of tubes is mounted on a strip having rubber cushion supports, the sockets laid flush with the wood. These supports are encased in a holder of solid brass, while the cabinet and panel are lined with sheet copper.

A high efficiency is obtained by the use of two .001 mfd. low loss variable condensers, these constituting the only two adjustments except for one filament rheostat.

Differences in Hook-Up

In the following details, the circuit differs from the general super-heterodyne circuit: single control for all tube filaments; batteries all located inside the cabinet; embodiment of the neutrodyne principle in stabilizing; use of a loop with the center of its winding grounded, thus minimizing the antenna effect and allowing for much sharper directional tuning.

Mr. Curtis spent two months designing and constructing this set, which also includes plate volt meters inlaid into the panel and filament meter, showing at all times the exact amount of plate and filament voltage in the batteries. With a two foot loop, Curtis and Henry Clapp, who assisted him in the construction, picked up twenty-two broadcasting stations in one evening, including WBZ, WEA, WSAI, KOP, WWJ, KDKA, WEAN, WLAG, PWX, WJAR and WJAZ. There was very little static noticed.

"BUGS" AID OFFICIALS RELAYING MESSAGES

Springfield, Mass., Amateurs Give Services Voluntarily

SPRINGFIELD, MASS.—Radio amateurs residing in this city are giving their services voluntarily in the first naval district by relaying official messages, requiring prompt attention, between the reserve division here and the brigade headquarters at Boston. Commander J. T. Nelson in a recent letter addressed to Ensign H. F. Johnson of Springfield commended this work in these terms:

"The work of your division in training men for Radio operators is greatly appreciated and your division is the only unit where training of this nature is being carried on. It is the brigade commander's wish that you continue this work and expand this Radio department if it can be done without detracting from the general training of your division."

RADIO AS TRAIN GUIDE ATTEMPT BY EXPERTS

CHICAGO.—The possibility of directing fast trains by Radio without interrupting their speed will be demonstrated soon on the Rock Island's Rocky Mountain Limited train by experts from all the big roads of the country. Riding in special coaches, they expect to keep in constant touch with stations here, WOC at Davenport and WOA at Omaha, and later with Denver stations.

WCAE FINDS ROAMING LAD 30 MILES AWAY

PITTSBURGH, PA.—WCAE, Pittsburgh Press, probably broke the record recently as an air sleuth. The mother of Tommy Moran, 14, reported to WCAE that the police had failed to find her son who had been lost for twenty-four hours. Twenty-one minutes after the report was broadcast the boy was found by a policeman who had heard WCAE, thirty miles away, announce the quest.

AIR COMPASS CITED AS MARINE SAVIOR

NAVY VESSELS DISREGARD BEARINGS AND GROUND

New Englander Declares Cable in New York Harbor Would Have Averted Destroyer Disaster

SAN DIEGO, CALIF.—Disregard of the course indicated unerringly by the Radio compass at Point Arguello station, on the California coast, was the direct cause of the recent loss of twenty-three enlisted men and the destruction of seven destroyers, valued at \$10,000,000, when they ran on the rocks off Point Honda during a fog. This was the gist of the evidence presented to the naval court of inquiry here.

Had the commander of the squadron and the navigating officers of each destroyer heeded the warnings of the Radio signals, had they believed that Radio was efficient, the wreck could have been avoided. According to the statement of E. C. Hanson, of Reading, Mass., inventor of the Radio pilot cable, the latter device also, if installed, would have prevented the wreck.

Cable Sixteen Miles Long

As an instance of the reliability of the Radio pilot cable, Mr. Hanson cited its achievements in Ambrose channel, New York harbor. The cable, as operated by the Navy department, has guided hundreds of vessels to safety. It is sixteen miles long, energized by a 500-cycle low frequency current from the shore. The current establishes a powerful magnetic field whose characteristics are readily recognized by an observer aboard ship.

A vessel equipped in accordance with the requirements of the Radio pilot system bears on each side "pickup" coils which are affected by or sensitized to the magnetic field. When the ship passes directly over the cable the coils are affected equally, that is, cause like response in any pair of earphones worn by the watch aboard the ship. The coils are connected with the earphones by an ordinary two-step amplifier.

Sound Intensities Guide Ship

When the craft deviates from the course set by the cable a dissimilar response is registered by the earphones. The side of the ship nearer the cable produces the louder sound or response in the earphones. The navigating officer thus is enabled to right his course. He is also assisted by a mechanical visible indicator which forms part of the steering apparatus.

In the opinion of Mr. Hanson, the Atlantic coast from Maine to Florida and the Pacific littoral from Canada to Mexico, when equipped with his Radio pilot, would be virtually free from shipwrecks caused by fogs. The cost of operating the Radio pilot, he said, is about ten cents an hour.

Picks Up Broadcasts Deep in Grand Canyon

Prediction of Experts Prove to Be Incorrect

DENVER, COL.—The Geological Survey party carrying a Radio set on a trip through the Grand Canyon of the Colorado, has arrived safely at Bright Angel trail. Notwithstanding the predictions of experts that it would be impossible to receive Radio messages while in the bottom of Grand Canyon, Colonel Birdseye reports that he is in daily receipt of messages broadcast from Los Angeles, Salt Lake, and Chicago. He received the news of President Harding's death within forty-five minutes after it occurred. Reports of his progress will be sent out for broadcasting when he reached Basstrail about September 10, Supai Creek, September 20, and Diamond Creek, October 15.

It is a violation of a city ordinance of Newark, N. J., to erect an antenna without a permit.

YOUNG FAN HAS SET LIKE BOOK



Little Miss Stella Pogany of Philadelphia listening in on the unusual booklike receiving set her father has made for her. Another view of the instrument is given on the back page. The "book" is entitled "My Set"

KGB Broadcasts Twenty Voice Open Meeting of Trade Chiefs at Gotham Palace

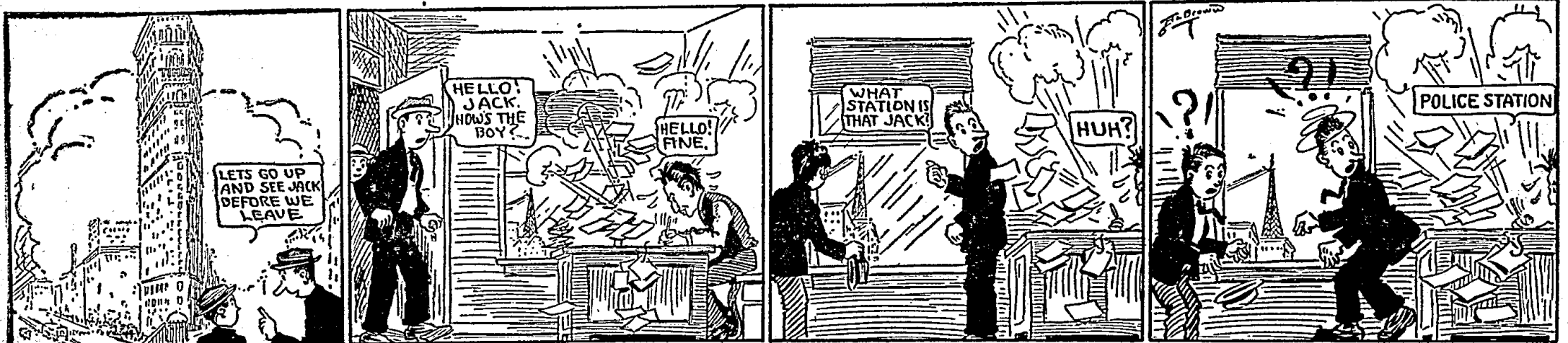
TACOMA, WASH.—An entire operetta in two acts, with the original cast of twenty voices, was presented recently at KGB, The Tacoma Ledger station here. The operetta was "The Pennant," a tuneful college comedy, which met with much favor. It took two hours to broadcast.

NEW YORK.—L. A. Nixon, secretary of the Radio Trade Association, has announced an open meeting for the Radio trade conducted under the auspices of this association for October 9 at 3:00 p. m. at Grand Central Palace in this city.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Note: Jack Sells Ads in N. Y.



GERMAN RADIO HEAD DENIES 'FEAT' TALES

BRANDS MAGNETO STORIES "PURELY MYTHICAL"

Discredits Report That Planes, Autos Were Halted and Wrecked—Not Even Possible

By Carl H. Butman

WASHINGTON.—Public antipathy against Germany's war plans of the future should not be increased by the report from Berlin that the German Government can stop and render powerless automobiles, airplanes or other motor vehicles by Radio. Herr Prostrat Hermann Thurn, an administrative head of the German Radio service, dismissed the stories as "so much nonsense," in a recent interview sent officially to Washington.

Radio Digest, it will be remembered, some time ago interviewed German engineers and was first to brand the story as false.

Herr Thurn further stated that the correspondent who sent dispatches to papers in the United States to the effect that in June, a number of automobiles en route to Hamburg were halted when their magnetos were stopped by powerful Radio waves from Nauen, was the victim of unscrupulous persons. "No such achievement has yet been anywhere reached," the German engineer asserted, adding that even if it had been attained by Germany, "it would have most certainly been kept a secret and not bruted about by anybody connected with Nauen."

Denies Plane Crippling Stories

This official information also discredits the stories that airplanes of France flying over Bavaria were stopped and forced down by Radio waves from German stations.

Both stories of Radio magneto control are impossible, according to the German expert, who pointed out that:

Magnetos are enclosed in iron or steel jackets and could not be influenced by Radio waves; no matter how powerful, Radio waves cannot be directed with precision so as to affect the magneto of a vehicle or vessel at any distance from the directing station, particularly when the vehicle is in motion; and that as definite or precise directing cannot be achieved, every vehicle or vessel within the zone of influence of the electrical wave would be similarly affected. This would stop, bring down or sink the vehicles or ships of the operating agency as well as those of the enemy.

Some skeptics may believe that the Herr Administrator would have denied the statements in an effort to protect Germany's secret Radio control, but the official forwarding the dispatches believes implicitly in this Radio engineer whom he knows personally and professionally, and, he feels that his negations and criticisms should be taken without reservation.

"Stories of a Reporter" at WJZ

NEW YORK.—A feature which has already proved more than popular with WJZ audiences here has become a weekly event on the program, for William H. Crawford, the noted journalist, author, war correspondent, and reporter, has agreed to give one of his delightful "Reminiscences of a Reporter" every Sunday evening for an indefinite period. A naturally charming speaker, Mr. Crawford has so many interesting anecdotes about the famous men of this country and Europe that his talks are a veritable revelation of the characters of those personages in a peculiarly fascinating manner.

BIRTH OF THIS BABY AIDED BY BROADCAST



"The Radio Baby of WLAG" is learning to walk. It is nearly a year since she was born during a Caesarian operation while her mother listened to the special program broadcast from WLAG in lieu of an anesthetic. The baby is Lucille Eleanor Cartwright, daughter of Mr. and Mrs. Guy A. Cartwright, 4105 Elliot Ave., Minneapolis, and scarcely a day passes that she does not listen in to the Twin City Station

Safety Congress Hears Broadcast Addresses

Experts Give Air Talks on Radio Hazards

BUFFALO, N. Y.—One of the biggest broadcasting demonstrations ever staged for a convention was to be put on by Station WGR during the week beginning October 1 when the National Safety Council was to hold its twelfth annual congress here. Three thousand delegates of the various sections of the council met to make America safe for Americans. Because of the great general interest in the subject of safety this convention was to be put on the air on a large scale.

Of direct interest to fans were two addresses applying particularly to Radio. One was an address by H. J. Burton of the Consumers' Power Company, Jackson, Mich., on "Hazards of Improper Radio Installation," and the other was "Safety in Playing the Public's New Scientific Game—Radio." The latter was given by S. E. Whiting, chairman of the Radio Hazards Committee, Public Safety Section, National Safety Council.

Akron Youths Form Society

AKRON, O.—A new Radio club having for members young men interested in the popular science was recently organized in South Akron and has held several meetings at members' homes. The officers for the new club are Lloyd Miller president, E. W. Heister secretary, and Ivan Stripe treasurer. Communications should be directed to Mr. Miller at 663 Yale Street or to the secretary Mr. E. W. Heister, 700 May Street.

TRADE COMMISSION FINISHES INQUIRY

Next Congress to Act on Anti-Trust Investigation of Radio Industries

WASHINGTON, D. C.—The field work in connection with the Radio investigation which is being made by the Federal Trade Commission in response to House Resolution 548 is practically complete, according to officials of the Federal Trade Commission. No details of the investigation will be made public until the report is made to Congress, which report will be prepared in the very near future, so that it can be submitted to Congress when it convenes early in December.

The investigation in accordance with the resolution passed by the House of Representatives includes a report on the ownership of patents covering Radio apparatus, the contracts and leases, together with the manufacture, sale and resale of Radio apparatus. The purpose of the resolution is to "aid the House of Representatives in determining whether there has been a violation of the anti-trust statutes."

AIR SIGNALS GREATLY AID MILITARY FLYING

Applications Much Diversified and Increased at Canal Zone

WASHINGTON.—Radio, the latest "wonder of the world," is materially aiding the development and efficiency of military and naval aviation. War time flying in its many phases would little avail the commanders in chief if instantaneous communication between the bases and the air fleets was not constant. Radio telegraphy and telephony establishes direct liaison between the air and the ground or sea, thus combining these arms of the service.

Peace time tests and maneuvers between the aerial forces and those of the land and sea, aided by Radio, are carried on regularly by both the Army and Navy; their scope and frequency are being extended each year.

A recent Army Air Service report from France Field, Canal Zone, states that during the past fiscal year 261 Radio flights,

embracing aerial Radio tests, voice-controlled formations, Coast and Field Artillery reglages or gun-fire observations, tactical maneuvers, reconnaissances and coast patrol work. This was an average of a Radio flight each working day. The diversity as well as the volume of Radio communication accomplished in the Canal Zone was in excess of any previous year but will be extended next year, the report states. France Field pilots had never before attempted tactical maneuvers, coast patrol, field artillery spotting or voice control formation flying, yet the report indicates successful results in all lines where Radio was used.

France to Build Plants for Soviets

WASHINGTON, D. C.—The Russian authorities have ratified a five year contract between the French Compagnie Générale de Telegraphie sans Fil and the Russian Trust Radio Electric for the installation of stations and the manufacture of apparatus in Russia. This is the first concession accorded by the Soviet government to any French company.

A license is necessary to operate regenerative receiving sets in England.

FORMICA

RADIO PANELS POLISHED BLACK FINISH

| CUT PERFECTLY SQUARE TO ANY SIZE. | |
|-----------------------------------|---------------------|
| 1/32" THICK | 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

WELL worth listening to, those programs that are coming in by radio! Great music, lectures, news of the minute, stories—to make your home alive instead of dead. Use only De Forest Radiophones, and get the joys of radio at its best. Go see that De Forest agent today.

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.



The New Grebe Broadcast Receiver

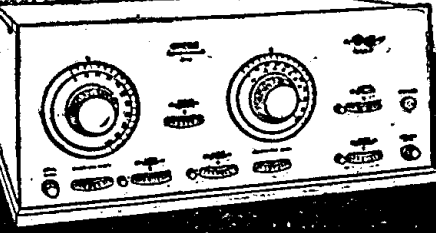
Point No. 6 This Receiver may be set up in a moment, and successfully operated anywhere—by anyone.

Just One of its Seven Points of Satisfaction

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

Ask Your Dealer

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



PROOF OF ETHER "PLUG" IN SALES



Musical score for "Hot Roasted Peanuts" by Louis Breau, Charles Tobias, and Harry Tobias. The score includes a title, tempo marking, and lyrics such as 'Joe Du-ran-da got a stand-a fight around our way, ev'ry-thing he saves...'.

Louis Breau (left) and Charles Tobias, composers of "Hot Roasted Peanuts," the sale of which, following its broadcast at several stations, has proved the Radiophone is a real service for music publishers.

New Song Has No Other Publicity Yet Rivals "Bananas" in Popularity

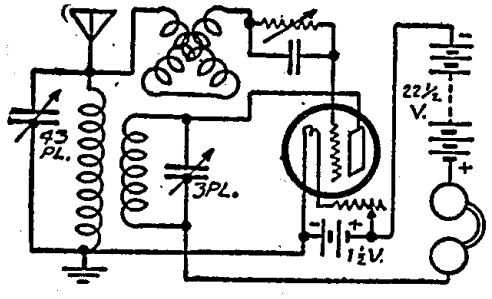
(Continued from page 1) "nut" song which is the type of popular music now in demand and they decided to experiment with it. When sure their song was right and contained all the elements to make for suc-

RECEIVING RECORDS? SEND 'EM IN—

(The following items are based on letters from Radiophans, who have been doing good distance work. Readers submitting letters for publication must diagram their sets.—DX Record Editor.)

Coast to Coast on One Tube

Coast to coast on one tube is the record established by "E. S. S.," 117 West Alexandrine, Detroit, Mich. His results are attributed by him to the efficient hook-up he used in making his set. As is shown herewith, the set uses a variocoupler for a tuning unit, the primary tuning the antenna circuit, and the secondary serving as a tuned tickler coil feedback. Additional control over the regeneration is pro-



vided in the grid circuit by a variometer. The use of a variable grid leak helps to bring in the distant stations clearly. WWJ and WCX of Detroit can be tuned out and WGY heard while the former are on the air, the builder of the set declares. He adds that his aerial is 100 feet long and 35 feet high with a 10-foot lead-in. A gas pipe serves as a ground. The WD-12 tube, used in the set, is lighted with a dry cell and controlled by a 30-ohm rheostat.

cess, they approached Station WJZ, the Radio Corporation plant here, and made arrangements to sing not only their new number, "Hot Roasted Peanuts," but also some of their other successes, "Grand Daddy" and "Underneath the Mulberry Tree." They put all they had into their renditions because they were gambling with the cost of publishing 2,000 copies of the song.

WJZ's phones began to ring immediately with requests for the boys to repeat "Hot Roasted Peanuts," so they gave an encore. The following night they appeared at WHN and put over the same numbers with even greater success, two encores being necessary.

Radio Alone Sells Out Song

Within a week, without any other publicity or advertising than that given "Hot Roasted Peanuts" by Radio, the 2,000 copies were sold and the printers were running off 10,000 more. Already 35,000 copies have been sold and peanuts are vieing with bananas for popularity. The song has been made on both records and piano rolls and is selling fast.

Breaud and Tobias have been broadcasting since 1921 and Radio is now well repaying

Fans Hear Church Wedding

FORT WORTH, TEX.—Radiophans who tuned in to WBAP at high noon recently were treated to a surprise program in the form of a Radio wedding, the contracting parties being Miss Mary Rose Foster, sister of Will Foster, popular microphone artist and organist of the church in which the wedding took place, and C. G. Hutchings of Winston-Salem, N. C. The ceremony took place in the First Methodist Church and the microphones in the auditorium picked up every word of the ceremony. The ritual as voiced by the minister, with the replies by the bride and groom, were distinctly audible.

A four-year course in Radio has been established at the Massachusetts Institute of Technology.

them for their frequent efforts to entertain and amuse the listening in public. However, the Society of Authors, Composers and Music Publishers have not yet admitted defeat, or that they are convinced by this time that Radio can be their greatest aid and that their attitude toward broadcasting has been all wrong.

AN EVENING AT HOME WITH THE LISTENER IN

A large table listing broadcast schedules for various stations across different days of the week (Monday through Sunday) and cities. Columns include Station and City, Met. (Meters), and time slots for each day.

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.

FIRPO-LAND HEARS FIGHT BY AIRPHONE

GETS BLOW-BY-BLOW STORY IN 15 SECONDS

Argentine Boxing Fans, 6,000 Miles from Ring, Get Detailed Account from Broadcaster

NEW YORK.—The 85,000 spectators at the ringside who saw Dempsey knock Firpo to the canvas for ten counts, constituted an infinitesimal part of the audience that enjoyed one of the liveliest clashes in a twenty-foot ring. Far from the scene of the battle, to be specific, more than 6,000 miles from the ringside in New York, some of the most eager fight fans listened tensely to a blow-by-blow description of the supreme fistic engagement of the year.

And this invisible audience was Firpo's own, those who had inspired him to enter the ring against Dempsey, confident that their giant brother would trot back to the Pampas with the world's heavyweight championship title. Disappointed as they are, nevertheless theirs is the satisfaction of knowing that the challenger fought bravely although defeated, and this fact was made known to them by Radio over their receiving sets through the intermediary of the most powerful station in the world, Radio Central, located at Rocky Point, Long Island.

Chart Shows Scheme Used

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

Moffett Follows ZR-1 Test Flight by Radio

Giant Zeppelin's Transmitting Set Works Perfectly

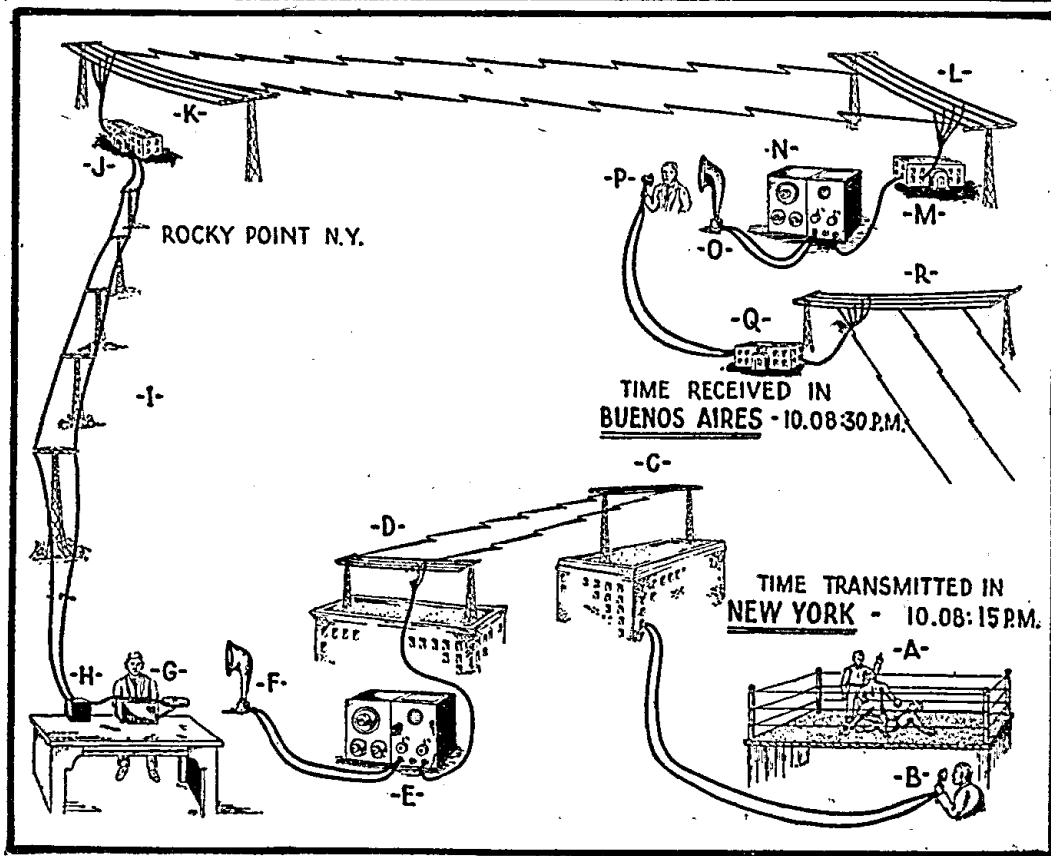
WASHINGTON.—The chief purpose of the American-built ZR-1 as an aerial naval scout was demonstrated during the recent test flights. Practically every move of the giant Zeppelin was sent to Admiral Moffett by Radio. This great helium airship is to be used for scouting and reporting to her base what she sees, a naval expert explained recently, adding that her Radio installation worked perfectly for both short and long distances.

On the day of the initial flight over her home at Lakehurst, Commander McCrary sent the first Radio message to Admiral Moffett, chief of naval aeronautics, who was on the ground far below the great airship. The message was picked up in the field station and delivered to the admiral within a few moments. On the recent trip to New York and return, Admiral Moffett, then at his desk in the navy building in Washington, was advised periodically by Radio of her progress.

"It is of special interest," Secretary Denby said in an interview, "that the Navy Department was in constant communication with the ZR-1 by Radio." Her position was accurately reported at frequent intervals and full information was given of operating conditions aboard.

In this connection, it is of further interest to realize what this will mean when she journeys farther afield on exploration work. Admiral Moffett has reiterated the program planned after her trials are completed, including a flight to the North Pole, if practical. This it is now hoped can be undertaken by next spring.

HOW BUENOS AIRES HEARD FIGHT



seconds was consumed in the entire relaying operation.

In this chart, Dempsey and Firpo clash in the ring shown at A. While the battle rages, J. A. White, the announcer stationed at the ringside at B, describes the blows exchanged. Each movement within the ring is translated into a word picture by White which is transmitted over the line through the microphone at B.

This land line connects with the Radio Corporation Station WJZ, located several miles from the scene of the engagement within the Polo Grounds. From the antenna of Station WJZ, shown at C, Radio waves are hurled outward at the speed of light to be picked up by thousands of receiving sets scattered throughout the United States.

Turns Words into Code

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

This line, represented at I, links New York City with the three-mile multiple-tuned antenna and two Alexanderson alternators which deliver 700 amperes to the antenna K. Thus White's voice messages are converted into telegraph characters, and the waves radiating from K on 17,500 meters are an amplified telegraphic repetition of the short wave length Radiophone broadcast from the antenna C at WJZ.

Translated Again at Buenos Aires

At Buenos Aires, 6,000 miles away, the powerful wave energy flung from the antenna R registers at the receiving set N through the Monte Grande antenna represented at L. Over great expanses of water and long stretches of land, the

news of the big bout journeys to the native land of Firpo.

But the circuit is not yet complete. The telegraph signals issuing from the loud speaker at O must be converted back from that staccato language into the very words originally delivered to the microphone at the ringside. This is carried out by a telegraph operator-announcer. He is stationed in the studio of the Radio Corporation broadcasting station in Buenos Aires shown at O, where he translates dots and dashes into a word description. The antenna at R flashes his announcements to eager South American listeners sitting beside their short wave receiving sets.

But the wonder of it all is that from the moment the referee reached his tenth count while Firpo lay upon the canvas after a blow delivered by his opponent, only fifteen seconds were consumed in transferring the news from New York City to the countries in South America.

JUGO-SLAVIA BUILDING LARGE RADIO STATION

Will Be First High Power Plant in Balkans

BELGRADE, JUGO-SLAVIA.—Work has been started on a new 100-kilowatt station at Rakovica about 2½ miles from here and on a receiving station at Laudon Trench, a suburb. The station is being built by the French Wireless Telegraph Company and the total expense is estimated at \$400,000. On its completion the entire installation will be taken over by the state and the operating personnel will become employees of the Department of Posts and Telegraphs, the company maintaining one engineer as a technical adviser.

This particular station will be the first high power Radio installation in the Balkans. Because of the greatly increased facilities it will afford for the dissemination of news and the rapid dispatch of information, it should soon become well known internationally.

An amateur operator's license costs \$10 a year in Australia.

Positive Radio Helps

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

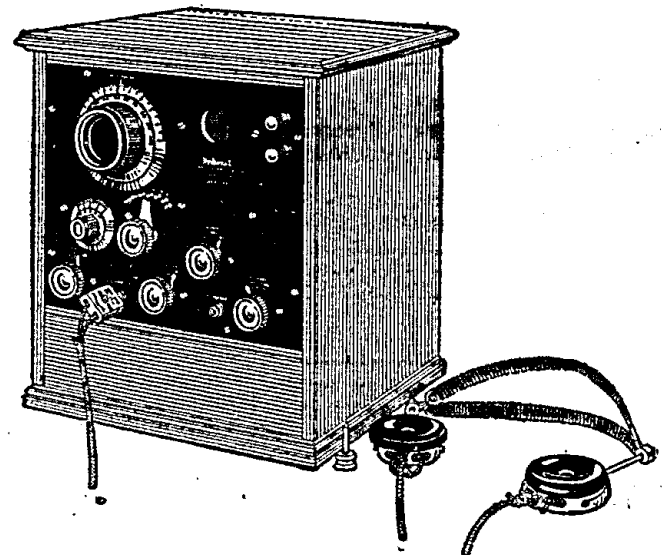
For Dry Cell Tubes Use *Eveready Dry Cell Radio "A" Batteries.*

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

EVEREADY Radio Batteries

—they last longer

Tune Out Interference and Bring in DX Stations



HERE is a new DX dry cell receiving set that will bring in local stations clear and strong and tune out interference when you want to receive DX.

Tampa, Florida, is easily tuned in at New York City, in spite of powerful local stations.

This set, using Radio and Audio Frequency, equipped with Federal standard headphones, is reasonably priced at \$87.00, without tubes or batteries—a value made possible only by the tremendous volume of Federal production.

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

The New Grebe Broadcast Receiver

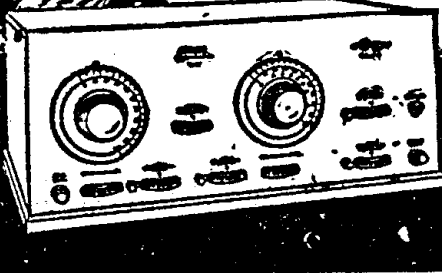
MR. R. H. STEWART, of Battle Creek, Mich., reports excellent results with his Grebe Broadcast Receiver. He enjoys programs from stations as far as Texas through a loud speaker.

Ask Your Dealer Today

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

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

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



A YOUNG ARMY OF WGY ANNOUNCERS



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.)

Purpose of Special Plate Lead

(Submitted by R. W. C., Fort Worth, Tex.)

Question. Is there any method by which I can reduce the terrific capacity effects present in the Flewelling circuit?

Answer. Body capacity effects with the Flewelling super seem to be quite a "bugbear" to a great many of the fans, and I often wonder if they take the same precautions to prevent body capacity effects with the Flewelling

it has even less. A method that will greatly reduce the capacity effects without any other change in the circuit is to connect an audio frequency transformer in place of the phones and then connect the phones to the other side of the audio frequency transformer. Sometimes it is best to connect the phones to the secondary of the transformer, and at other times it is best to reverse the usual condition and connect the secondary of the transformer to the super circuit and the phones to the primary circuit.

The diagram herewith has been published several times but is repeated here for the benefit of those who have not seen it.

I myself prefer to handle body capacity effects by the use of apparatus so designed that

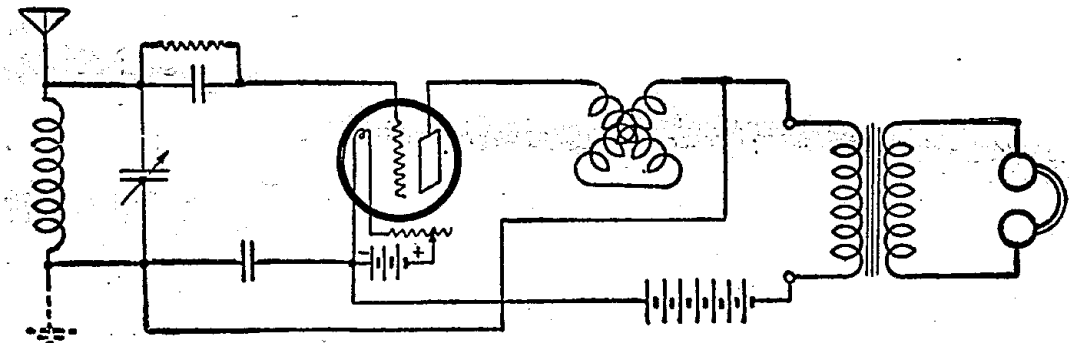
mounted back from the panel out of the way. It is very much worth while to go to some little trouble in order to secure the elimination of capacity effects because no real long distance work or sharp tuning can be done while these effects are present, and this, too, applies to any type of set.

Boasts Best Harbor Radio

SEATTLE, WASH.—The harbor department of the city of Seattle has recently installed apparatus which makes its Radio outfit one of the most complete in the harbor service anywhere in the United States. The new equipment consists of two two-kilowatt navy standard spark sets with aerials 750 feet long, suspended on masts 165 feet above the level of Puget Sound. The range is about 4,500 miles.

News of Harding's Demise Heard at Bottom of Canyon

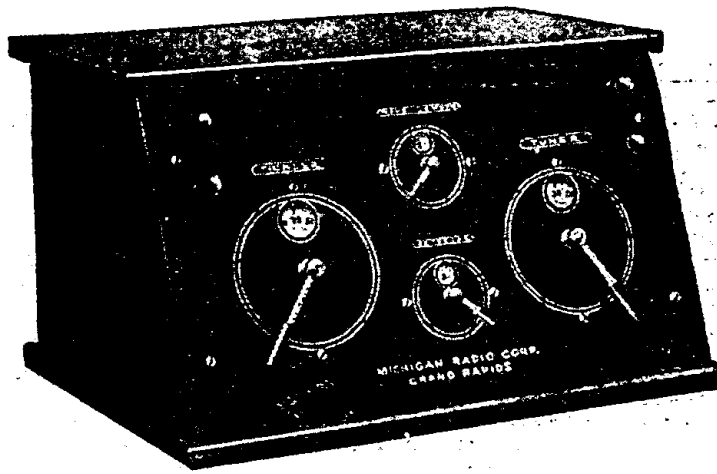
SALT LAKE CITY, UTAH.—The wonders of Radio were never better illustrated than in a letter just received from tourists at the Utah State Capitol. The party, according to the writer, was camped on the Lower Grand Canyon of the Colorado where they set up their receiving set during president Harding's illness, and were advised the same night of his death long before newspapers penetrated to their camp. They learned of the President's death, in fact, forty-five minutes after it occurred. When the funeral cortège left San Francisco, they were also advised by Radio.



set that they do with the average Radio set, such as shielding the panel, properly connecting the plates of the tuning condenser, etc. The Flewelling set properly constructed has no more body capacity effect than any other circuit; in fact, it can be so constructed simply by the use of up-to-date instruments that

such effects are automatically wiped out, without the use of any panel shielding or transformer. If your coils are so mounted that your hand will readily come in close touch with them, then you will get body capacity effects regardless of the type of set you use; therefore, these coils should preferably be

THE 1923 RADIO SENSATION



Never before in the history of Radio has a set of the quality and performance of the Michigan Midget been offered at anything like the price.

No longer is it necessary to buy parts and build your own set and save money. Michigan "Midget" has done that for you. It puts a long range, high-grade radio receiving set within the reach of everybody's pocketbook.

It is extremely selective—easy to adjust—tunes sharply, receiving all broadcasting wave lengths up to 600 meters. Works equally as well with dry cell tubes as with standard six volt tubes. Its light weight (weighs only 6 pounds) makes it ideal for touring, camping, etc.

The cabinet is mahogany finish, made in Grand Rapids, the world's greatest furniture center.

PRICE \$27.00

Also ask about the Michigan "Midget" Two Stage Amplifier \$30.00 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

PACIFIC COAST BRANCH:
329 Union League Bldg.
LOS ANGELES

The Superlative Inductance
Four years of careful attention to the details of manufacture of this type of inductance unit has yielded a product of unquestioned superiority. And with increased efficiency in manufacturing methods, moderate prices prevail for all sizes
Ask Your Dealer
Coto-Coil
"Built First to Last"

COTO-COIL CO. PROVIDENCE

FIRST SALES STUDIO OPENS IN CHICAGO

DEMONSTRATION IN STORE INCREASES CUSTOMERS

Shop Owner Disproves Theory That Steel Structures Interfere with Clarity of Reception

CHICAGO.—What was said to be the first studio in the United States for the public demonstration of standard Radio receiving sets was opened here recently in the downtown district by the Electric Service products company of Chicago, of which P. C. Moore is president.

Unlike other Radio studios it is operated primarily to stimulate interest on the part of the consumer in the ready-made set. A survey under the direction of Mr. Moore had shown, he said, that only five to eight percent of the sets sold in Chicago last year were the product of manufacturers; the others were assembled by buyers of devices.

"Since the opening of the studio our sales have been doubled," said Mr. Moore.

Studio on Balcony

On a balcony in the rear of the sales room a number of popular receiving sets are displayed. For the comfort of audiences there are divans and easy chairs. The other appointments are in keeping with the purpose of the studio.

"From eight o'clock in the morning until 9:30 o'clock at night we keep 'open house,'" Mr. Moore said. "When the programs of the various broadcasting stations are put on the air we tune in, using loud speakers. In a few minutes the studio is crowded by persons attracted from the street. Almost every one is a Radiophan. Twenty-five of every 100 thus drawn are potential buyers of receiving sets."

Steel Buildings Do Not Interfere

Perhaps the most important phase of the Radio studio in relation to the technique of operation is its dissipation of the theory that tall buildings of steel construction elevated train structures and other placements of metal necessarily offer interference to selection or reception. "By exercising care and patience we have overcome the usual obstacles to clear reception," Mr. Moore declared. "We received distinctly the returns of the recent Dempsey-Firpo bout. Stations in Jefferson City, Troy, N. Y., Detroit, Davenport, Ia., Omaha and Minneapolis are heard by our studio audiences almost every night."

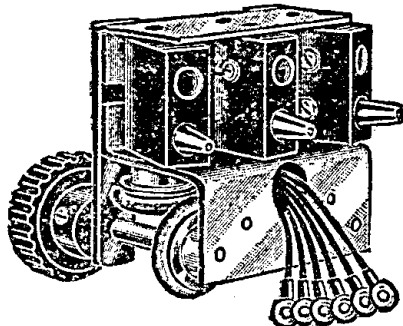
The aerial which serves the studio is stretched the length of the sales room to the glass front where it emerges at the top and is strung to the top of the building and is attached to a water tank. A four-foot spreader is used to swing the aerial away from the building. The length of the aerial is about 100 feet.

Mormon Messages to Reach Ends of World, Smoot Says

SALT LAKE CITY, UTAH.—"The time is not far distant when leading men of this church will be able to stand in this pulpit and by means of Radio have their message carried to the ends of the earth," declared U. S. Senator Reed Smoot in an address in the Mormon Tabernacle here on Sunday afternoon. It was the greatest tribute to the possibilities ever paid here by a man of national prominence. When at home Senator Smoot is an apostle of the Mormon or Latter-day Saint Church.

The Radio filter problem of separating the signals of one station from those of other stations is being studied by a University of Wisconsin professor.

Another Columbia Scoop



A Geared Coil Mounting for Inside Panel Mounting, made of moulded Bakelite and mirror nicked brass—for those who prefer their bulky coils on the inside of the cabinet hidden from view.

Ask your dealer for it. All good dealers stock it.

Price \$6.00

COLUMBIA RADIO CORP. 157 NO. UNION ST. CHICAGO

DAVID GRIMES PAID BIG PRICE FOR IDEA.

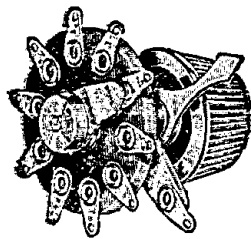


David Grimes, twenty-six years old, blond and rather shy, is the inventor of the Inverse Duplex set for which he has been paid a record price. The exact amount is not yet disclosed. The idea was conceived by Grimes in 1917 when a lieutenant in the United States Air Service

Bandit Hunters Are Mised by Tangled Air Message

CHICAGO.—Radio failed as a thief catcher recently when several bandits, driving a gray touring car, held up the Purple Grackle, a roadhouse east of Elgin, owned by Attorney Charles E. Erbstein. The alarm was broadcast by Mr. Erbstein's Radio station, WTAS, was caught at Hinsdale, and relayed in such manner as to give police authorities an impression a Hinsdale bank had been robbed. So they watched the roads from Hinsdale instead of from Elgin.

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 Walnart 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 Walnart Inductance Switch; if he cannot supply, write us. Catalog of Walnart radio accessories and parts on request.

WALNART ELECTRIC MFG. CO.

Dept. 403, 1251 W. Van Buren St., CHICAGO, ILL.

Review of Books

An Introduction to Radio. A real book for the amateur. This treatise comes in two volumes. 96 pages in each volume, fully illustrated with flexible leather covers. Price two volumes, \$1.

How to Retail Radio. A new book telling of tested plans and methods and policies for the dealer in Radio. Financing, location, store equipment and arrangement. Price, \$2.00.

Vacuum Tube Receivers. By O. F. Hessler. A book that tells how to make a simple set. How to make the cabinet. It includes a 27 by 36-inch layout blueprint. Price, 75 cents.

The Armstrong Super-Regenerative Circuit. By George J. Eltz, Jr., E. E. This is a De Luxe edition of this famous circuit. Profusely illustrated and fully explained. Fifty-two pages. Price, \$1.00.

Home Radio—How to Make It. By A. Hyatt Verrill. This book is particularly adapted for the amateur who desires to know how to make Radiophones. Twelve full page illustrations and diagrams. Price, 75 cents.

Elements of Radiotelegraphy. By Elery W. Stone. The text was written for the guidance and instruction of Radio students in the communication service of the Navy. It is an instruction book for Radio schools. Price, \$2.50.

Radio Reception. By Harry J. Marx, Technical Editor Radio Digest Illustrated, and Adrian Van Muffling. A simple treatise on Radio reception. Beginning with the elementary principles of electricity it carries the reader on into the essentials of Radio telephony. The most successful methods of Radio reception are explained and special reference given to practical tuning. Price, \$2.00.

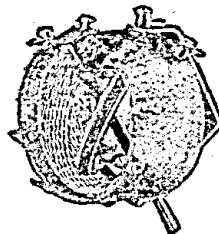
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B-T VERNIER TUNER

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.)

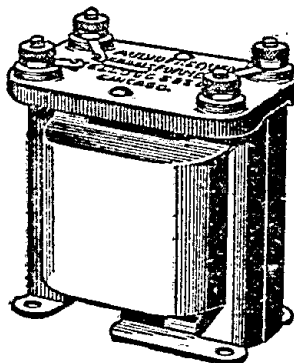
Send for one today. Hook it up and you'll understand.

BREMER-TULLY MFG. CO.

332 South Canal Street, CHICAGO, ILL.

Kellogg Radio Equipment For Better Results

Transformers



Kellogg transformers are designed to overcome defects of existing types and to furnish distortionless amplification of all audio frequencies. Built complete by the

Kellogg Company, using highest grade wire, maroon enameled metal case, and molded Bakelite top. The primary and secondary binding posts are accessibly placed on top of the transformer.

These binding posts are plainly marked, so that there need be no error in assembling. Every Kellogg transformer is thoroughly tested before leaving the plant, and we guarantee the purchaser a product of exceptional efficiency.

No. 501 Ratio 4 1/2 to 1.....\$4.50
No. 502 Ratio 3 to 1.....4.50

KELLOGG SWITCHBOARD & SUPPLY COMPANY

1066 West Adams Street, Chicago, Illinois

The Reader's View

Purpose of the Variocoupler
Just a few lines to let you know that I have read your latest Radio Digest and am writing this letter as a flare-back to that of C. S. Wymore, Nebraska, under variocoupler winding.

I wish to say for his benefit and others like him who read and misinterpret articles that they want to be sure they are right before they "holler."

In 1921, I was one of many interested but "dumb" Radiophans. Then I took Radio Digest.

At present, after 1 year and 6 months, by following the advice of the editor and his staff I can build and have built most all the circuits published in Radio Digest.

Perhaps Mr. Wymore does not really know the purpose of the variocoupler. He would not mention the Flewelling and 3 circuit in the same breath if he did.—Joseph G. Gormley, Philadelphia.

Experience with Nacireman

E. P. Parker's article on the Nacireman hook-up in Radio Digest, August 11, was read with interest. I will give you my experience with the hook-up, using a variocoupler with 48 turns on the stator, tapped every 8 turns, 52 turns on the rotor, a Cunningham 301-A tube with 67 1/2 volts on the plate, aerial 100 feet total with lead-in. (I live 30 miles east of St. Louis.)

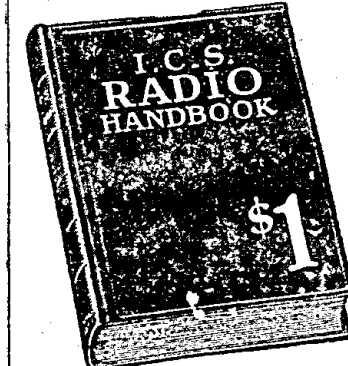
The first station tuned in was WGY, 820 miles away; it came in as strong as the smaller St. Louis station. Next came WPAD, WHAS, WLAG, WSB, WWAY, WSAI, WWJ, WMC, WDAF, WFAA, WOAW, WBAP, WJAZ and WDAF; all were heard in one evening.

The secondary variable condenser plays a very important part in DX work. However, local stations may be tuned in without it.—Otto Steffens, Trenton, Ill.

Radiophone installation and use are taught by correspondence by the University of Wisconsin Extension division.

Every Question ANSWERED for only \$1

At last you have under one cover a Complete Radio Handbook



JUST OUT 562 PAGES

Compiled by HARRY F. DART, B.S.E.E.

Formerly with the Western Electric Co., and U. S. Army Instructor of Radio.

Technically Edited by F. H. DOANE

NO more need you turn from book to book, hoping to find what you want. It is all here, in 562 pages crammed full of every possible radio detail. Written in plain language, by engineers for laymen. Clears up the mysteries, tells you what you want to know. A complete index puts everything within your reach in a few seconds.

IT EXPLAINS: Electrical terms and circuits, antennas, batteries, generators and motors, electron (vacuum) tubes, every receiving hook-up, radio and audio frequency amplification, broadcast and commercial transmitters and receivers, super-regeneration, codes, license rules. Many other features.

Under one cover. Yes, it is all in one volume of 562 pages of clear type with hundreds of diagrams and illustrations. Takes the place of eleven or more specialized texts, each costing from two to ten times the dollar you pay for this single book. Belongs in every radio-equipped home, on every amateur's table.

Send \$1 to-day and get this 562-page I. C. S. Radio Handbook—the biggest value in radio to-day. Money back if not satisfied.

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I enclose One Dollar. Please send me—postpaid—the 562-page I. C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return this book within five days and you will refund my money.

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MAPS NEW LEADER IN HOTEL STATIONS

CLEVELAND FIRM SEEKS "SOMETHING UNUSUAL"

Hollenden Hostelry to Make Definite Steps toward Establishing Set Soon

CLEVELAND.—Convinced that Radio is not only an educator of the widest scope but conducive to commercial welfare, Herman Mack, head of the company which recently assumed control of the Hollenden hotel of this city, head of the concern which operates the Lexington hotel in Chicago, said here recently that plans were under consideration for the establishment of a broadcasting station in the Hollenden. Decisive steps are expected soon.

"We have discussed the necessity of such a station," Mr. Mack said, "in relation to the operation of a first class hotel. We have seen that many if not most of the finest hostelryes in the United States are thus equipped."

Must Be Different

But the ordinary transmitting set, rather the usual program, will not conform with Mr. Mack's purpose. "The Hollenden plant," he declared, "when it is established, will lead all other hotel sets. And the Hollenden programs must be new and unusual else we will not operate. We are determined to make our broadcasting so interesting that people all over the country will remain awake until late at night to hear the Hollenden."

The Hollenden is one of the best hotels in Cleveland. It is among the widest known in the central west.

Cuban Amateurs Recognized by President of the Island

HAVANA, CUBA.—A presidential decree now allots amateurs here a wave length of twenty meters and a power of one-half kilowatt. This decree will continue in effect, pending passage of a law to cover the use of Radio.

If this gives the expected impetus to amateur Radio, it should not be long before Cuban operators will communicate regularly with amateurs in this country.

The first Cuban amateur station heard in this country is 6XJ at Tuinucu, operated by Frank H. Jones, member of the America Radio Relay League.

Jewish New Year Observers Hear Broadcast in Hebrew

BOSTON, MASS.—The first Hebrew musical service to be sent by Radio from Boston was broadcast by Station WNAC recently. It consisted of solos by Cantor I. G. Glickstein and choir of Temple Mishkan Tefila of Roxbury, Mass. There was also a short address by Rabbi H. Rubino-vitz of the Temple. This service was in keeping with the Jewish New Year being observed at the time, and was for the benefit of the many Radiophans of Jewish faith who listen in on WNAC.



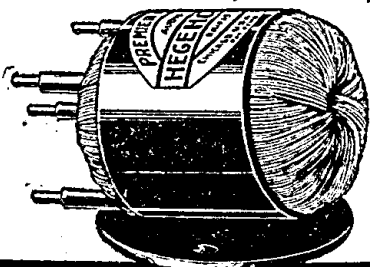
Ask your Dealer about "HEGEHOG"

(Trade Mark)

AUDIO TRANSFORMER \$3.50

This little wonder is the surprise and talk of Radio Engineers everywhere. Fix in your mind's eye an AUDIO Transformer about the size of an English walnut and you have the "HEGEHOG" for size. Then recall the best Radio amplification you ever heard, and you have the "HEGEHOG" for volume and tone quality. Our new patented design and construction (100% shielded) makes this possible. It's a real bit of engineering, and we would like to have YOU try one. Ratios 1 to 3, 1 to 4 and 1 to 5.....\$3.50
1 to 10.....4.50

Premier Electric Company
3810 Ravenswood Avenue, CHICAGO, ILL.



MRS., THE CAUSE AND MR. L. BOLLING WELLER



L. Bolling Weller, until recently announcer for WGR (Buffalo), and recipient of hundreds of "mash" notes from women who literally fell in love with his nearly perfect "Radioly" modulated voice, is married. The bride was Miss Myrtle Thompson, a pianist and vocalist of North Tonawanda. The twain met last spring at the WGR Station. She came, she broadcast and she conquered—"Sam" Weller as well as her invisible audiences. They were married last month and are now honeymooning in an automobile bound for Los Angeles

MAYOR ADVOCATES MUNICIPAL PLANT

Police Now Uses Private Station and Park Bands Have No Radio Outlet

PHILADELPHIA.—That activities of a municipal Radio broadcasting station for this city need not be confined to the broadcasting of police reports, was pointed out by Mayor J. Hempton Moore when he referred to the concerts given by the Philadelphia Municipal Band, Philadelphia Plaza Band, Fairmount Park Band and the Fairmount Park Symphony Orchestra, made possible by appropriations from the city.

Mayor Moore stated that "a municipally owned and operated broadcasting station would appear to be a future requirement of every large city."

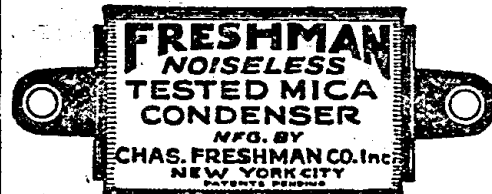
"The Radio of the future," he said, "will unquestionably enter into the official municipal activity, and will no doubt in a relatively short time take its place among all progressive discoveries and inventions in its service to the citizen."

There are many indications, from present discussions, that this city will soon

have a municipal broadcasting station, as the city hall is now equipped with receiving stations, and many of the officials are vitally interested in Radio. Police reports at this time are broadcast from Station WOO, and reports of missing persons are broadcast from practically all the 500-watt stations in this city.

There are approximately 25,000 receiving sets in Argentina, as compared with 100 a year ago.

The Condenser Sensation of Modern Radio



Through the accuracy and dependability of Freshman Condensers, hook-ups and circuits have been perfected which have completely revolutionized the art of Radio Reception.

These little Storers of energy and rectifiers of Radio Current are the very heart of a well-built radio set.

The proper fixed condenser will make all the difference in the world in the reception, clarity and selectivity your set affords.

| Capacity | Each | Capacity | Each |
|----------|-------|----------|-------|
| .0001 | \$.35 | .002 | \$.40 |
| .00015 | .35 | .0025 | .50 |
| .00025 | .35 | .003 | .60 |
| .0002 | .35 | .004 | .75 |
| .0003 | .35 | .005 | .75 |
| .00035 | .35 | .006 | .75 |
| .0005 | .35 | .008 | 1.00 |
| .0006 | .40 | .01 | 1.00 |
| .0008 | .40 | .015 | 1.50 |
| .001 | .40 | .02 | 2.00 |
| .0015 | .40 | .025 | 2.50 |

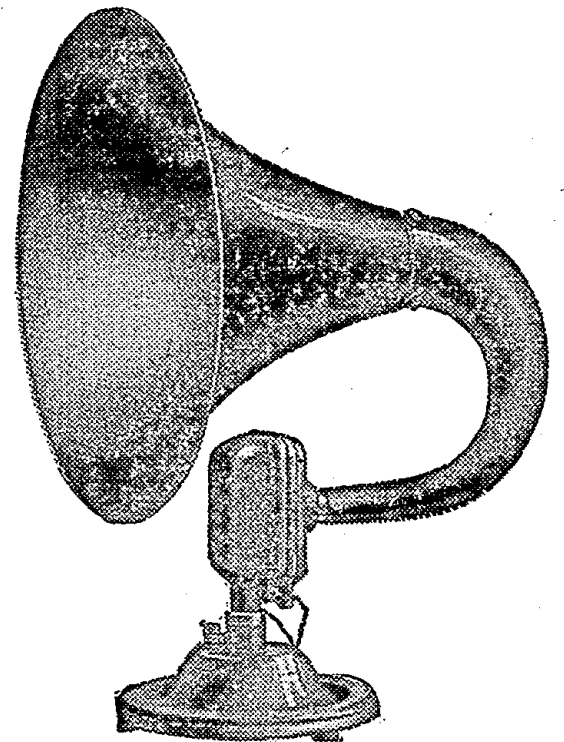
The FRESHMAN is so designed that constant equal pressure is exerted on the condenser plates over the entire area. They are the only condensers that do this and therefore the only condensers that avoid noises, which are due to variable pressure on the plates.

At your dealers, otherwise send purchase price and you will be supplied without further charge.

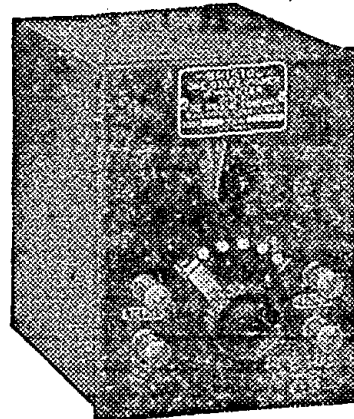
Chas. Freshman Co. Inc.
Radio Condenser Products
106 Seventh Avenue New York

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. Music that requires no tolerant imagination to be recognized as music of the finest type.



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

Further Details of the Famous Miloplex Hook-Up

Part II—Introducing King Miloplex II

By the Mystery Man

WE INTRODUCED you to the Miloplex last week. How many have tried out this simple, economical, and efficient circuit? If you've built it, don't quit reading the series. There are several tricks to be told. However, the improvements will not mean junking the old apparatus. All the old and a few new parts will be used.

BEFORE I start smoothing up a few of the sore ear drums the Miloplex passed you on its initial bow, let me put you "hep" to a secret.

When an editor wants to fire his crack office boy he mails him a blue envelope, when he needs a new star reporter, well when he needs one—I don't know the dope—but I do know that I recently purchased a new "Now I lay me down to sleep." One of those dollar down, balance as you sleep; and I figure I don't owe a cent on it, certainly I don't sleep. Clever fellow (the editor) bought me a cover charge lunch and said, "Why all you will have to do is just give us a rough sketch of your circuit with a short synopsis and we'll do the rest. Sounds easy, eh! He'll do the rest. Do you know what he meant; well, listen, he really truly meant that he would see that I was busier than a one arm man with the prickly heat. I'm sore, my wife is sore, and his office boy confidentially told me his grandma was going to stop carrying letters to me for a day, and rest up. Still, while it's true that I built the "Plexy" in 30 minutes, yet it took nine long experimental months to get ready, so why kick about writing 40 or 50,000 words about it. Here goes—yet let me first truly thank the many who have said so many nice things about the "Plex." Naturally one cannot answer all in person, nor the specific questions asked. Yet as the articles continue, I am hoping the final one will have produced for you a three tube receiver that you will prize, as I shall then have been well repaid for your patience.

The most asked or inferred question is "Where is the trick?" "Will it amplify?" "Can I build it so and so?"

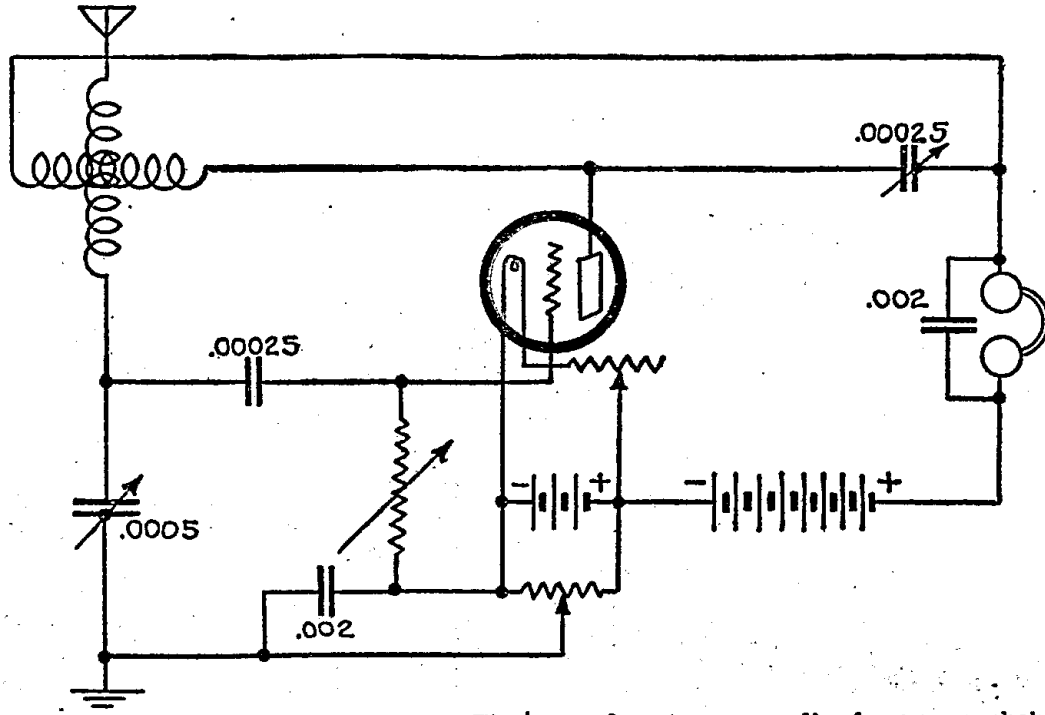
As to "where is the trick," the answer is "There hain't none." As a bundle of parts it's nothing; properly built it works and works wonderfully well. You know it's a good deal like the small boy's father who wasn't worth a cent, but in Colorado he was worth \$10,000—dead or alive.

The inside story of it is really two stories, one based upon the fact that, after all is said and done, there is nothing more to any finished receiving set than a combination of capacity and inductance as the dominating factors.

He who can best make these two factors each subservient to the whims of the other profits most. I didn't think I could say the above and make it mean much, but friend wife marked it 93 percent.

Further . . . now close your eyes and think. The manufacturers of tubes tell you they possess capacity, also mutual inductance; all right, but is it not also true that it has within itself more than one capacity. The cross sectional area capacity between filament and grid surely is less than that of filament and plate. Look at the plate area and answer "YES." But just a minute, we're getting technical; let's back up and get out of this traffic jam by leaving you to think what would happen if one could reconcile these varied capacities.

In other words, the Miloplex as you have seen it must be the beginning—the



foundation for possible betterness. The first step for marked efficiency, naturally falls to the tuning unit, and while no elaboration was made upon "dead end" losses from tapped coils, yet we touched a couple of its high spots just to prove to you that we did not care to dissipate any voltage secured or have a section of our primary crying just at the time the wedding bells were ringing . . . but more on this later.

One very sincere experimenter in Snaky, Ariz., (sure that's the snake capital) wrote me he had the secret; that all I had was an untuned primary, while the rotor with the condenser across it was nothing more than a wave trap, and I'm not so cocksure but that he is right. Think it over in the morning between coffee and "donots." Then another fellow writes "the impedance of your phones in the plate, not being by-

passed, act as a radio frequency choke, thus establishing a varying frequency or super-effect." Not so good. Another chap (and he knows his C.W.) tells me I don't need the potentiometer; all right, Bill, but they won't let me return it, so let's leave it there, it may come in handy.

What do you know about head telephones? So do I, but most manufacturers tell me that the positive tip should go to positive B, and generally this tip cord has a re-marking; try this, do this, you'll get better results.

One more word about tubes. Strange how many fellows slap 22 volts on a de-

tor and kiss it goodbye, yet every tube I have talked with, very frankly told me it worked best on from 14 to 22. If you haven't done so, make it your next big job to try out different voltage taps on the B with the tube in the "Flex"; it's a big help and gives the set a chance. Whether you can do this will be answered later; also it is quite possible that we will add a stage or two just for fun. Yes, we may even go so far as to show the little fellow with a wire or two changed. Anyway it is strictly up to you fellows; tell the editor you want more and what you want. As I said in the beginning, "He'll do the rest—and I the work. (Let's make him work!—Ed.)

(TO BE CONTINUED.)

Plans are on foot to form a British Radio Relay League. In the formation of such a club the approval of the Post-office Department is necessary, and as this has been secured, British amateurs are sincerely hoping for the league's success.

WATCH FOR OUR ANNOUNCEMENT

To those Radiophans who appreciate high-grade, standardized Radio apparatus we will offer parts designed by our Radio Engineer—

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(Inventor of the Filter Circuit)

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No. 322B—22½ volt variable—regularly \$2.25—our price \$1.98
No. 322A—22½ volt variable—regularly \$3.00—our price \$2.65
No. 345A—45 volt—8 taps—regularly \$6.00—our price \$3.98

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At your dealer or postpaid on receipt of purchase price.

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|-----------------|--------|---------------------|--------|
| UV-199 | \$3.50 | C-299 | \$3.50 |
| UV-200 | 2.75 | C-300 | 2.75 |
| UV-201 | 3.00 | C-301 | 3.00 |
| UV-201A | 3.50 | C-301A | 3.50 |
| WD-11 | 3.50 | WD-12 | 3.50 |
| DV-6 | 3.00 | DV-6A | 3.50 |
| UV-202 | 4.00 | C-302 | 4.00 |
| UV-299 | 3.50 | | |

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\$1.50 EACH

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Over 10,000 ordered by local dealers before one delivery is your guarantee that Sta-Fix Detector is the find of the season.

Price, \$1.25

Guaranteed 600 Meter Four Circuit **COCKADAY** Mounted Tuning Coil **\$2.50**

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COMPLETE PARTS FOR THE MILOPLEX

| | | | | |
|---------------------------------|----------------------------|------------------------------|---------------------------------|--------------------------|
| 1—.0005 Variable Condenser..... | 1—.002 Phone Condenser.... | 1—Socket, Bakelite base.... | 3—Dry Cells..... | } ONLY \$28.50 |
| 1—Estru Variometer..... | 3—3 1/2 inch Dials..... | 1—Bakelite Panel, 9x14x1/8.. | 1—Cabinet, 9x14..... | |
| 1—.00025 Variable Condenser.... | 1—Potentiometer | 1—De Forest D. V.-6 Tube.. | 12 feet square, brass, bus wire | |
| 1—Variable Grid Leak and Cond.. | 1—Rheostat, 6 ohms..... | 1—B Battery, 22 1/2 volt.... | 1—Set Readem Binding Posts. | |

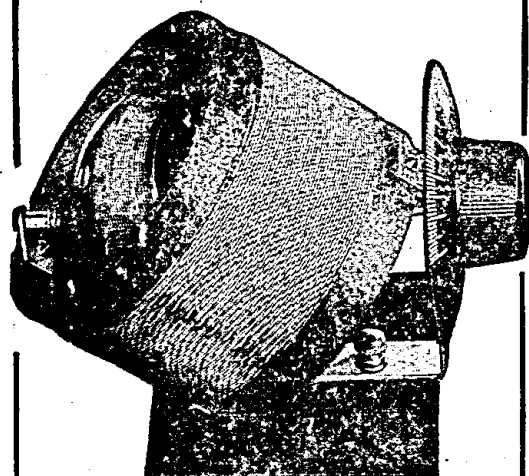
ALL THE PARTS R. D.-99 LONG DISTANCE RECEIVER

(See September 29th issue Radio Digest)

3 sockets; 3 Rheostats; 2 A. F. Transformers; 2 Double Circuit Jacks; 1 Open Circuit Jack; 1 Radiometer; 1 Variable Grid Leak and Condenser; 1 .0005 Variable Condenser; 1 .005 Fixed Condenser; 1 75 Turn Honeycomb Coil, Mounted; 1 Single Coil Mounting; 1 Set Readem Binding Posts; 1 Bakelite Panel, 7x16x1/8; 1 Cabinet, 7x16, fine mahogany finish.....

OUR PRICE
\$30.25

VARIOCOUPLERS



Webster Variocoupler with List Our Price
dial, Type 1A.....\$4.50 **\$2.19**

Moulded Coupler 5.50 **4.19**

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

Hook-up Wire, No. 14 square brass, cut in 10 foot lengths.....15c

CABINETS

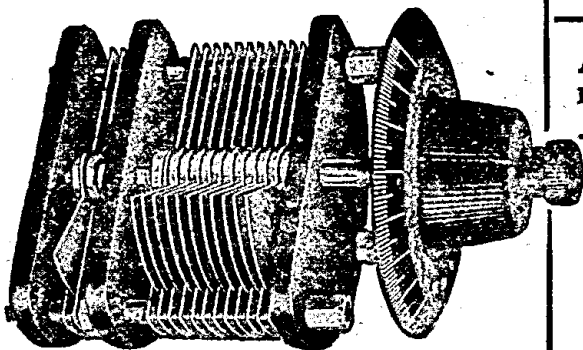
6x18x6—Stained\$3.00

9x14x6—Stained 3.25

7x9x6—Stained 2.25

Bakelite, 1/8, cut any size; per square inch01 1/2

VARIABLE CONDENSER



| | | |
|--|------------|-----------|
| | List Price | Our Price |
| Variable Condenser, .0005 (Same as 23 plate)..... | \$5.50 | \$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 |
| Walnut Variable Condenser, .00025 | 1.75 | |

WEBSTER RADIO APPARATUS

SPECIAL

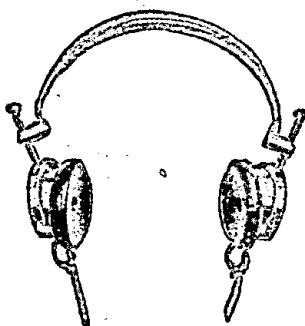
Single Tube WEBSTER RECEIVING SET (Non-Regenerative Type), without head set and tube, in beautiful mahogany cabinet; list price, \$30. Our price, while they last, ONLY..... **\$20.00**

The above WEBSTER RECEIVING SET complete with Baldwin Phones, B Battery, Dry Cells and Tube; list price, \$41.30. Our special price as long as we have them..... **\$32.50**

TRANSFORMERS

Webster Radio Frequency, 5 A-1, wave length 200 to 500; 5 A-2, wave length 300 to 1200; 5 A-3, wave length 500 to 2,000; \$4.00..... **\$3.19**

(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.)



DOUBLE HEAD PHONE RECEIVERS

| | | |
|--|------------|-----------|
| | List Price | Our Price |
| Webster Double Head Phone Receivers, 2500 ohms | \$7.00 | \$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.

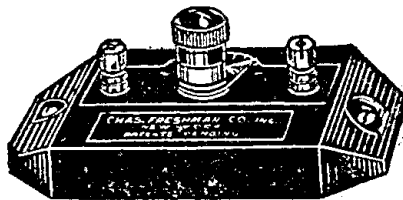
| | | |
|--|------------|-----------|
| | List Price | Our Price |
| WEBSTER 1-A Tuner Unit | \$35.00 | \$17.50 |
| WEBSTER 2-A Detector Unit | 15.00 | 7.50 |
| WEBSTER 3-A Audio Frequency Amplifier Unit..... | 17.50 | 8.50 |
| WEBSTER 4-A Radio Frequency Amplifying Unit..... | 17.00 | 7.50 |
| WEBSTER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

GRID-LEAKS



Freshman Grid-Leak with Condenser\$1.00 \$.79

Freshman Grid-Leak75 .59

C. R. L. Variable Grid-Leak with Condenser 1.59

SWITCH LEVER

Switch Lever, 1-A, 1 1/2" Radius, 1 1/2" Knob, 1/8" Shaft..\$.75 \$.35

Hydrometer Perfect85 .65

PRESTO AERIAL SUPER-SEDER ADJUSTABLE, List Price can be attached to electric light socket or telephone. 3.00 2.00

ROGERS RECEIVING RADIOMETER, can be used like Radio Frequency Transformers 3.00

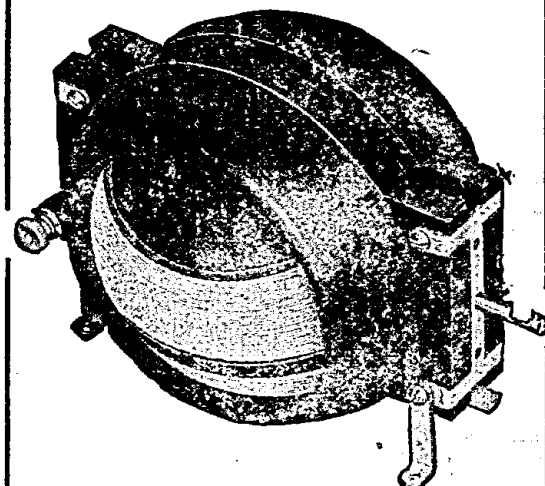
Rheostat, 6 or 25 ohms..... .90 .59

Combination Socket and Rheostat with Vernier... 3.00 2.29

B Metal Ever-Ready Tube Detector, Type B..... 1.50

Erla Reflex Crystal..... .89

VARIOMETERS



| | | |
|------------------------------|------------|-----------|
| | List Price | Our Price |
| Moulded Variometer | \$6.00 | \$4.39 |
| Variometer, All Circuit..... | | 5.50 |

B BATTERIES

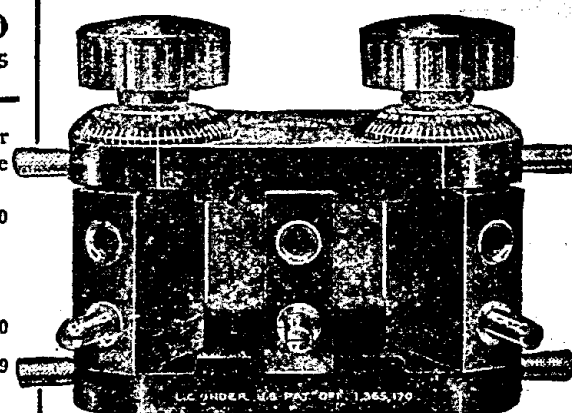
| | | |
|--------------------------------------|------------|-----------|
| | List Price | Our Price |
| Hipco B Batteries, 22 1/2 volts..... | \$2.25 | \$1.75 |
| Hipco B Batteries, 45 volts..... | 4.50 | 3.50 |

TUBES

| | | |
|------------------------------------|--------|--------|
| De Forest Tube, D V 6..... | \$6.50 | \$5.00 |
| W D-12 or C-12..... | 6.50 | 5.45 |
| W D-11 | 6.50 | 5.45 |
| C-299 | 6.50 | 5.75 |
| Cunningham 301 A..... | 6.50 | 5.75 |
| U. V. 200 Radiotron..... | 5.00 | 4.35 |
| Clearstone, Detector or Amplifier. | 7.00 | 4.00 |

READEM BINDING POSTS. Set composed of 1 antenna, 1 ground, 1 A Battery+, 1 A Battery-, 2 telephones, 1 B Battery+, 1 B Battery-..... \$.75

H. C. COIL MOUNTING



| | | |
|------------------------------------|------------|-----------|
| | List Price | Our Price |
| Three Coil Mounting with Dial..... | \$5.00 | \$3.85 |
| Geared Three Coil Mounting..... | | 5.00 |

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Reflex Circuit Works on Loop or Aerial

Aerial Hook-Up Is Combination of Several Types

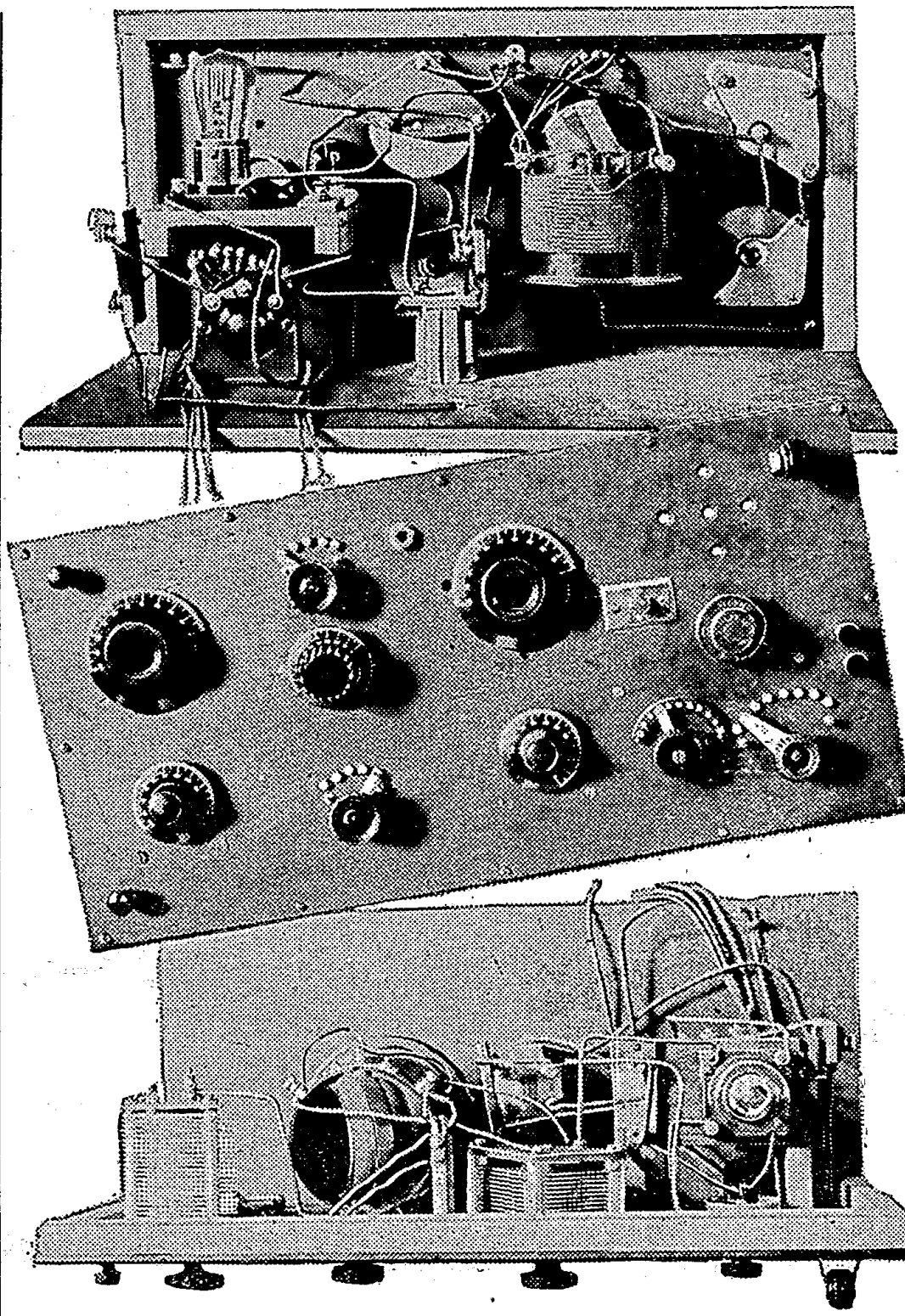
By Dr. S. L. Kalinowski

OUT of the many different types of receiving sets the writer selected the reflex circuit for experimentation. After almost a month of this work the following hook-up was found to give best results:

Beginning with the aerial, there is a 43 plate vernier condenser, A, of .001 mfd. capacity in series with the aerial and the primary of the variocoupler, M, the latter being of the ordinary type, having five taps of units to the aerial and five taps of tens to the ground. Across the secondary, or the rotor of the variocoupler, is a 23 plate vernier condenser, B, of .0005 mfd. capacity. Between the secondary of the variocoupler and the 23 plate condenser a double circuit jack, J, is placed for the use of a loop aerial, the plugging in of which cuts out the large or outdoor aerial, the 43 plate condenser, variocoupler and ground. By using the outdoor aerial, the writer has obtained better results than with the loop, which was of the 3 foot square type with 13 turns wound solenoid fashion. The fixed condensers, C, .002 mfd.; D, .001 mfd., and E, .001 mfd., are mica type and must have correctly fixed and tested capacities, as they are very important, being the means of properly balancing the circuit, remembering that both Radio and audio frequencies are present. Also make sure that the 43 plate and 23 plate variable condensers have the proper capacities, as often they do not come up to their rating. The vernier condensers are also used separately. Several transformers were tried in the Radio frequency circuit, and nearly all of them worked well.

Transformer, Amplifier and Wiring

The Radio transformer in the diagram is marked G. Any good transformer will do well, and if the reader has one at hand and intends to build a reflex set, it will be best for him to try the one he has on hand. In the audio frequency, H, a ratio of three to one or four to one works best. Higher ratio transformers were tried, but the lower ratios proved better. The filament rheostat has a vernier, and is of the 6 ohm resistance type, to which a 25 ohm radio resistance unit is attached for the purpose of controlling the 1/4 ampere vacuum tubes if used. The filament rheostat, L, and its vernier are very important in the control of the filament current, as proper filament control not only adds to the life of the tube, but also aids greatly in tuning. It is not necessary to do away with the rheostat that one may have of the 6 ohm type if the 1/4 ampere tube is to be used, because a 25 ohm resistance unit may be attached to it to increase the resistance to about 30 ohms. The vacuum tube, K, is an amplifier. Any amplifying tube taking a voltage from 45 to 67 1/2 or more on the plate will do. When the set is not in use, the current from the six volt battery is cut off by means of a switch, Q, while the plate voltage is controlled by means of switch points and lever, one of the points being dead and serving to cut off the B battery voltage. The minus binding posts on the B battery are connected to the contact points,



Tuning In with Loop and Outdoor Aerials

Tuning is not as difficult as some writers say it is. The outfit is critical and very sensitive, as has been found during experimentation and even more so when the set is completed. When the large or outdoor aerial is used, tuning is done by

comes in, adjust by means of the variocoupler rotor, verniers, rheostat, potentiometer and B battery. When a small loop or indoor aerial is used it is plugged in by means of a plug into the jack, J,

thus cutting out the variocoupler, 43 plate condenser and large aerial and ground. Tuning is done by rotating the loop aerial into proper position, and by means of the 23 plate condenser. Clearing up for loudness and clearness is accomplished the same way as before.

Distance, Clearness and Sharpness

There are no claims as to originality or any great improvement for this outfit as it is merely something that other men have done, but I may say that of all the different hook-ups I have tried the reflex circuit is my first choice. For instance, clearness and sharpness is of the first order. On it Atlanta, Davenport, Chicago, Schenectady and other stations have been received.

In combination with a Magnavox and a one tube power amplifier this one tube reflex is heard all over a three story building as clear as a bell, without hums, hisses or knocks. A hook-up of the outfit accompanies this article and anybody wishing to construct one like it will surely feel well paid for his trouble. Try it and judge for yourself.

A beginner should learn the operation of a simple Radio set first before attempting complicated hook-ups.

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.

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One of Chicago's oldest and largest exclusive radio stores sold more Mu-Rad Receiving Sets in 1922-23 than all other types of Receivers combined!

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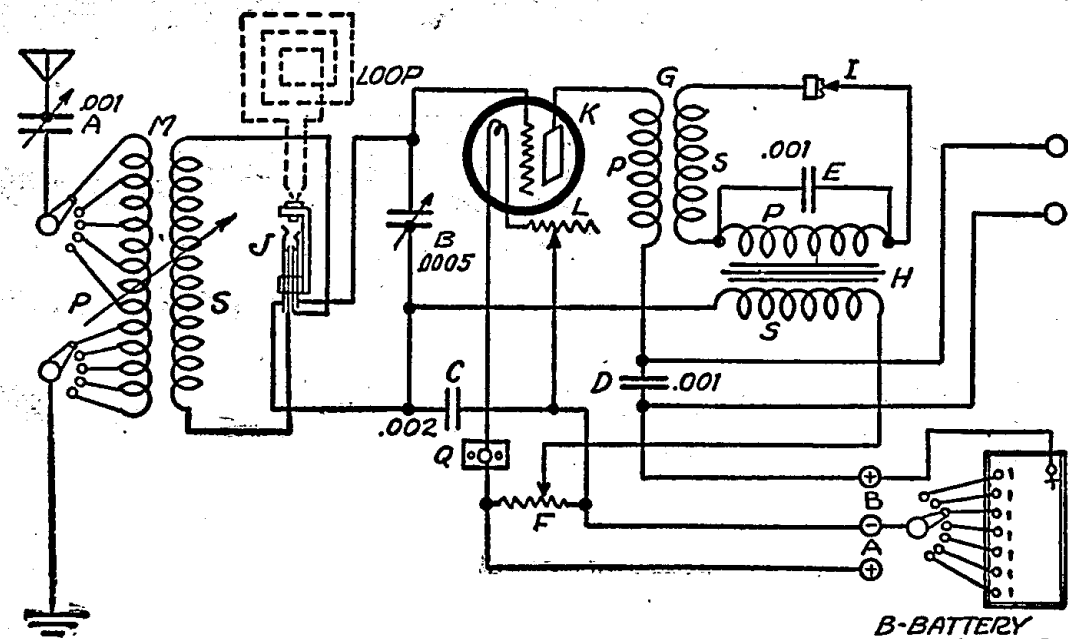
That fact has been repeatedly verified by our many other Mu-Rad dealers in the middle-west. Why not join them? Why not enjoy as they do the ASSURED PROFITS of good radio merchandise well advertised?

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To get complete details of our special Mu-Rad proposition will not obligate you. Write also for a copy of our handbook catalog of other profitable Radio merchandise. Write today before someone else in your neighborhood gets exclusive Mu-Rad privileges.

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CHICAGO



while the lever which sweeps over these points is connected to the minus post of the A battery. The plus binding post on the B battery leads to the phones or loud speaker. The A and B batteries and their outputs are also controlled by a potentiometer, F, having a resistance of 200 ohms. Any crystal detector, I, will serve its purpose in this circuit. No advantage is gained by using a vacuum tube as a detector, at least none were noticed. All the wiring is bus bar insulated by tubing and as short as possible. The panel is 10 by 20 by 3/16 inch of hard fiber. (The writer uses all hard fiber panels in his experimental work prior to mounting a definitely decided hook-up on bakelite.)

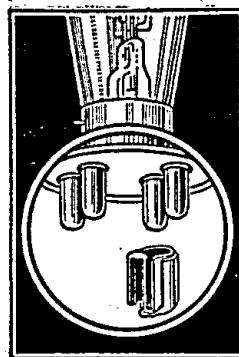
means of the variocoupler and the 43 plate and 23 plate condensers. The crystal detector is adjusted to a very sensitive spot, and when the signal or broadcast

You Don't Need Tubes

to get out of town. If you want new stations on your crystal set WRITE ME TODAY. Mine works 400 to 1,000 miles without tubes or batteries! Thousands have bought my plans and now get results like mine. CHANGES OFTEN COST LESS THAN A DOLLAR. Send self-addressed envelope for further information. Leon Lambert, 501 South Volusia, Wichita, Kansas.

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

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Vol. VI Chicago, Saturday, October 6, 1923 No. 13

Oratory Before the Microphone

Appearance Accounts for Nothing, Speech Is All
THE Radio orator need not worry about facing his audience or directing his voice to all parts of the hall. The nervous Radio speaker can rely on no prompter, because the microphone picks up the faintest whisper and sends it out through space. After he has been introduced, he must begin immediately. If he falters or coughs, nervously impatient listeners will tune to another station. The attention of the unseen audience is held by words, and words alone.

Deprived of elocutionary gestures and tricks, Radio speakers must depend upon their speech. There are no friendly smiles or applause to indicate success, nor the shuffle of feet or restless moving about to tell of failure.

The Radio speaker is likely to be embarrassed as his last word strikes the microphone. Silence reigns in the studio. When he turns away and sees the announcer near, he feels like a person caught talking to himself.

The studio is a place of suspense. The broadcasting novice would like to run away after he has finished his first talk. In the reception room adjoining, he sees others scheduled for the program waiting their turn. The scene reminds one of a doctor's anteroom, because a general tension and silence prevail. The atmosphere is of nervous portent.

Underground Communication

Longer Wave Lengths Seem to Penetrate Earth Better
IN CONNECTION with its efforts to keep pace with all safety and rescue developments, the bureau of mines of the department of the interior, is planning to continue its investigations as to Radio communication underground. The development of Radio has been rapid and officials of the bureau feel that any application to mine rescue work must not be neglected.

Some months ago preliminary Radio experiments in sending and receiving underground at a mine in Pennsylvania were conducted with partial success. It was found that signals could be heard distinctly through fifty feet of coal strata but that the audibility fell off rapidly as this distance was increased. In all experiments a vertical antenna was found to give the better results. The horizontal antenna gave practically no reception. A loop of a single turn was used with fair results.

The present preliminary experiments, while unsuccessful in indicating any practicable method of using Radio waves for underground communication, nevertheless indicate clearly that electromagnetic waves may be made to travel through solid strata. The "absorption" or loss of intensity with distance is very great for the short wave lengths used in these experiments. Longer wave lengths are known to suffer less absorption and may possibly be found practically effective under certain conditions.

Results Obtained by Broadcasting

New Wave Lengths Cause Some Changes in Sets
THERE has been rapid progress in broadcasting recently. Instead of the overcrowding of all stations on the two wave lengths of 360 and 400 meters, the stations have now been assigned definite wave lengths covering the wide range of 220 to 545 meters. This has greatly increased the possibilities of broadcast reception, provided the listener can use his receiver in such a way as to pick up any desired station. Difficulty has been experienced by some in receiving the longer waves.

New stations have been established in certain localities producing very powerful signals in the receiving sets of nearby listeners and somewhat interfering with reception at more distant stations while their local station is in operation.

Then, too, a few stations have been shut down or transferred, thereby requiring the listeners to get their programs from more remote stations, which in turn involves some modifications in the receiver or in the way in which it is handled. Fortunately all of the difficulties mentioned can be overcome to a great extent by a little care and a proper attitude.

RADIO INDI-GEST

You a Lawyer? Hope You Blow 'Em All!

| | |
|--------------------|--------------------|
| WHY DO THEY | TEACHER, |
| MAKE TUBES THAT | SO THEY SAY, |
| TAKE DIFFERENT | AND OF COURSE |
| VOLTAGES, AND | IT HELPS |
| HOW'S A LAWYER | THE TUBE BUSINESS. |
| TO KNOW THAT | ANYHOW— |
| A FOUR-VOLT | I PUT A |
| TUBE AND | FOUR-VOLT TUBE |
| A SIX-VOLT | ON A SIX-VOLT |
| TUBE ARE ENTIRELY | LIGHTING BATTERY. |
| DIFFERENT ANIMALS? | PING! WENT |
| BUT EXPERIENCE | THE TUBE, AND |
| IS THE BEST | SO I LEARNED. |

GOO GOO.

A-B-C Lessons for Indigest Beginners
Chapter XVI—Refer to Our Back Numbers for Data
BY GOSH

P IS for Patents,
That some folks try to steal,
So they can boss the ether
And make we fans all squeal.

Since Father Has a Radio

Broadcast from WOR by Charles L. H. Wager, Author
*Since father has a Radio our home is not the same,
In fact, 'tis all confusion and Radio is to blame,
No longer is the routine of daily tasks gone through,
Nor are those things attempted which we had planned to do.*

*Since father has a Radio he sits at it all day,
And mother has to do the chores and keep the kids away,
He says he's trying to tune in, he can't have any noise,
We have to tiptoe round the room, 'tis hard on healthy boys.*

*Since father has a Radio you ought to hear him talk,
"O, Boy! I'm hearing Pittsburgh," "Say Ma! I've got New York,"
And "Darn that measley naval code," "Ye Gods, just hear
that band
From "X-Y-Z" in Boston, Mass.," and "Isn't Newark grand?"*

*Since father has a Radio even mother has the bug,
To music from some distant place she sweeps the parlor rug,
She irons with the ear-phones attached upon her head,
And while she listens in at night she mixes up the bread.*

*Since father has a Radio our meals are served on trays,
We masticate in rhythm with some late symphonic craze,
We drink our coffee and our tea by sips arranged in code,
But we've got used to anything since Radio is the mode.*

*Since father has a Radio he never goes to church,
He used to be a deacon but he's left them in the lurch,
For now, when Sabbath comes around instead of in the pews
He sits at home and listens to some far-off preacher's views.*

*Since father has a Radio the neighbors now come in,
The Reeds, the Peaks, the Stones, the Pratts, with children
all a-grin,
They say, "We just dropped in to call, Hello! what have you
here?"
I swan!—a Radio—By Gosh! do you mind if we hear?"*

*Since father has a Radio our home has gone to pot,
And even to the fiver we scarcely give a thought,
But father says that Radio has been a boon to men,
I wonder—will it ever make home sweet home again?*

No, He'za Dial "Pointer"

Our Pup, He'ze fan all right,
For he listens in every night.



Looks like a Setter by his tail;
Pop says he must be "Air-dale."
Al Brown.

Heave a deep sigh
For Will Kinard—
The roof was high,
The pavement hard.

Tell It to the Phonograph

MOTHER (Listening to son's new Radio set): John,
play that same piece over again. I think it is just wonderful.
H. K. C.

A Few More Bends



IF I CAN GET THIS STRAIGHTENED OUT IT WON'T SCATTER SO, THEN I CAN HIT THAT BIG BIRD WITH OUT BRINGING THE OTHERS DOWN.

Condensed

By DIELECTRIC

A majority of the broadcasting stations have completed their operations intended to improve the quality and range of their transmission. The effect of this work has been noticeable in many instances. It yet remains, however, for Station KYW to put into effect the plans mapped out by Radio engineers whereby that station will overcome certain obstacles due to wave length and location. There are large numbers of grand opera fans who look forward to hearing the Chicago company through the courtesy of KYW, and to these the news will be welcome.

I doubt very much the basis in fact for the contention of some that broadcasting of crop reports (prices) by various stations consumes time not proportionately appreciated. Stop long enough to realize the percentage of this country's inhabitants who secure their living from the soil; consider the price fixing and marketing difficulties confronting them, then revise your conclusion. WBAP is receiving evidence of keen appreciation from cotton and grain men of their broadcasting service along this line. The farmer needs it and values it highly.

Re-broadcasting programs by one or more stations in the United States is not a new story; it is frequently accomplished and with much success. The musical program at the Capitol theater in New York City is broadcast each Sunday evening by Station WEAJ and re-broadcast by WCAP, in Washington, D. C., and WMAJ, South Dartmouth, Mass. Now turn to the Pacific coast and see what is going on there. Long distance reception during summer months is admittedly poor in the South Pacific region, yet KGU in Honolulu has been re-broadcasting programs from Station KHJ, the Los Angeles Times, and getting it nightly!

One more natal celebration is worthy of notice here, not only because it marks the third birthday of a well-known broadcasting station, but for the fact of that station being the first owned by a newspaper to come on the air. The Detroit News could only count on a radius of a hundred miles of effective transmission when it started, but that has been increased. England, Hawaii and Peru have successfully received its entertaining features, including concerts by a well organized orchestra composed of members of the news staff. Good wishes to Station WWJ.

It is not easy to erase from the mind the picture of horror and destruction which came to us from Japan a few weeks ago. It should not be easy to lose sight of the tremendous importance of Radio to thousands of earthquake sufferers on that island. Had news of the disaster been delayed forty-eight hours (as would have been the case had Yonemura failed), then the suffering and death records would today be much larger. One lone Radio station in sole touch with the outside world provided means of bringing quick aid to the stricken.

I am quite sure that the use of Radio as a means of reaching America's millions of people in behalf of any cause has a distinct advantage. A message delivered orally by Mrs. Wallace Reid from broadcasting stations, urging a more active fight against the drug evil, makes an impress not easily erased from the mind. She hopes to have the active support of broadcasting stations throughout the land, giving time to information on the appalling conditions confronting those interested in suppressing this monstrous evil. Are you with her? Get busy.

First Steps for Beginners in Radio

Chapter XIX—Locating Trouble in the Set

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

BEGINNERS will find the accompanying series by Mr. Benson very helpful in learning the rudiments of the popular science of Radiotelephony. The series will be concluded in our next issue with

Chapter XX—Useful Information and Formulas.

IN the last chapter we treated the testing of the individual instruments of the Radio set, and this chapter will take up the effect of defective apparatus in the operation of the set. It is practically impossible to cover every trouble that might develop in the operation of a set, but sufficient data will be given to enable one to eliminate the more common troubles and serve as a guide in more difficult cases.

When a set refuses to function it is advisable to tackle the problem in a systematic manner. First of all make sure the aerial and ground are connected, the phones connected up, the battery wires properly attached and the tubes in their sockets and lighted. By loosening the phone cord and tapping on the phone post a click will be heard which indicates the B batteries are connected up. If after checking the above no signals are received or the set seems dead, it will be necessary to go to the interior of the set to locate the trouble.

Testing Out Telephones

Connect the phones into the plate circuit of the detector tube. If no signals or noise are heard, it may be for any of the following causes: Batteries run down; tube not making contact in the socket properly; polarity of B battery reversed; telephone defective, phone condenser shorted, or primary circuit not tuned.

If good signals are heard in the detector circuit but when switching on the amplifiers the signals are weak, we may look for the following: Tubes not making contact; battery too low to operate amplifiers with detector on; a burned out trans-

former, or an open transformer or phone condenser shorted. If jacks are used they may be making poor contact or shorting transformer primaries.

Weak signals in the detector circuit may be due to one or more of the causes that will prevent signals entirely, and also to wrong connection on the tickler coil; grid condenser shorted; open circuit in the grid, or improper adjustment of the tube filament brilliancy and plate voltage when a soft tube is used. By checking all the above when a set refuses to work up to its maximum efficiency, the trouble will usually be located. At least the check will in all cases serve as a guide in locating it.

Locating Stray Sounds

We may now turn to the problem of locating stray sounds, such as scratching, scraping or popping. When these occur in the detector circuit with the amplifiers turned off, they are due to one or more of the following: If tuning the set changes the noise it is probably caused by excessive voltage on the plate or filament; too large a tickler inductance; irregular oscillation of the set due to poor connection to aerial or ground, and in some cases when too low a capacity is used for tuning, the aerial circuit may make it unsteady and difficult to handle. In the latter case, swaying of the aerial will often affect the set. It is advisable to use a larger condenser in the aerial circuit to stiffen it and more inductance to again obtain resonance. Popping sounds occur when the grid charge becomes too great and can be remedied by lowering the resistance of the grid leak.

When the noises are not affected by tuning, the trouble may be due to any of the causes listed in the last paragraph or

to poor connections in and between instruments. Look for loose connections on the instruments, make sure the rheostat is making good contact; that variable condensers are not shorted by dust or warped plates, and that aerial and ground are tightly connected. We must include under this head static, but one can usually tell this after a little experience. There are many types of static, but if the sounds come and go when the set is not touched and are very irregular in occurrence, the trouble can usually be laid to static.

Occasionally the knocking or ticking sounds are heard when the amplifiers are switched on and not in the detector circuit. Switch off the detector, and if the

sounds continue they are in the amplifier units and may be due to poor connections between instruments, poor contact at rheostats or batteries, or to defective transformers.

Howling and Whistling

More general are howling and whistling. When they occur in tuning and encountered in the detector circuit with the amplifiers off, excessive feedback, often

(Continued on page 20)

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REINARTZ CIRCUIT EVERY PART COMPLETE
1 Reinartz wound coil, 1 tube socket, 1 rheostat, 1 23-plate .0005 MFD. variable condenser, 1 13-plate .00025 MFD. variable condenser, 3 inductance switches, 16 switch points and nuts, 4 switch stops and nuts, 8 binding posts, 2 3" dials, 1 variable grid leak, 1 .002 MFD. phone condenser, 23 feet bus bar wire, 1 high-grade panel ALREADY DRILLED AS PER DIAGRAM and complete instructions.....\$10.95

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Two-Stage Audio Frequency Amplifier \$11.00
Parts complete for either of the above circuits.....\$11.00

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- 43 Plate VERNIER; value, \$6.50.....4.25

Honeycomb Coils, 50 turns mounted..\$.95
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VARIOCOUPLER—Celeron Condensite and Litz Wire Wound Secondary; Value \$4.50. Special.....\$2.05

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TELEPHONE PLUGS60

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Filament Rheostat, 6 ohm......65
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Filament Rheostat, 50 ohm......90
With 2" Dial, 15c extra.

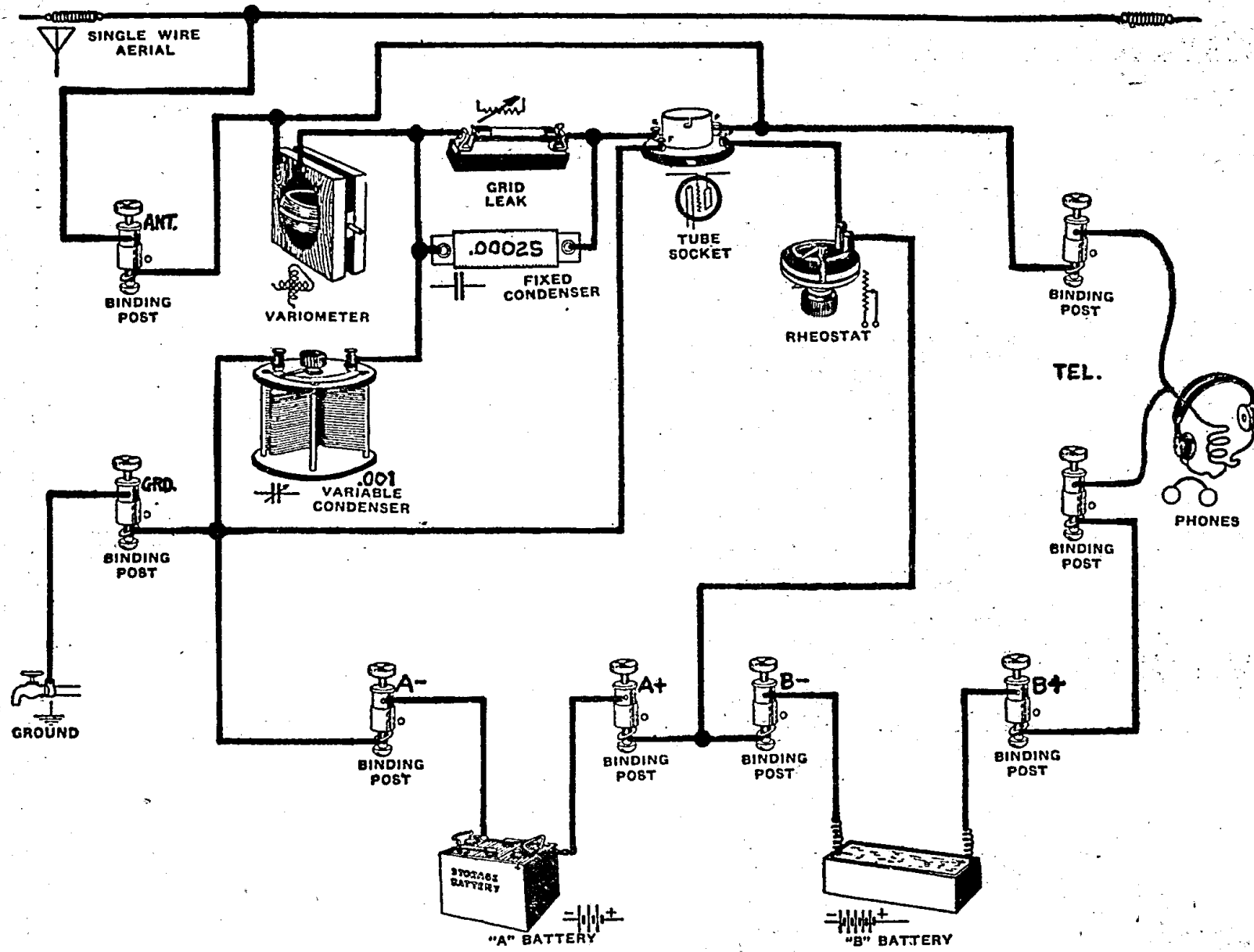
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FRESHMAN VARIABLE RESISTANCE LEAK and MICA CONDENSER Combined. .75

Half the pleasure of Radio is in building your own sets. Many pleasurable and profitable hours can be passed in this way. Our service department will be glad to give you any information you need. Just drop us a line.

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AN ULTRA AUDION SIMPLEX DIAGRAM



THE circuit shown in the above diagram is by no means a new one but it has numerous good points that make it especially attractive for the new fan. Not only is it an extremely efficient form of circuit, but its simplicity and low cost make it an ideal receiver. A

apparatus required is one tube socket, one rheostat, one variable condenser (.001 mfd.) preferably with vernier, a variable grid leak and grid condenser (panel mount unit was used) on variometer, and eight binding posts. A dry cell tube can be used if desired;

as a single wire not over 60 feet long is sufficient. If a longer aerial is used the condenser capacity may have to be reduced to .0005 microfarads.

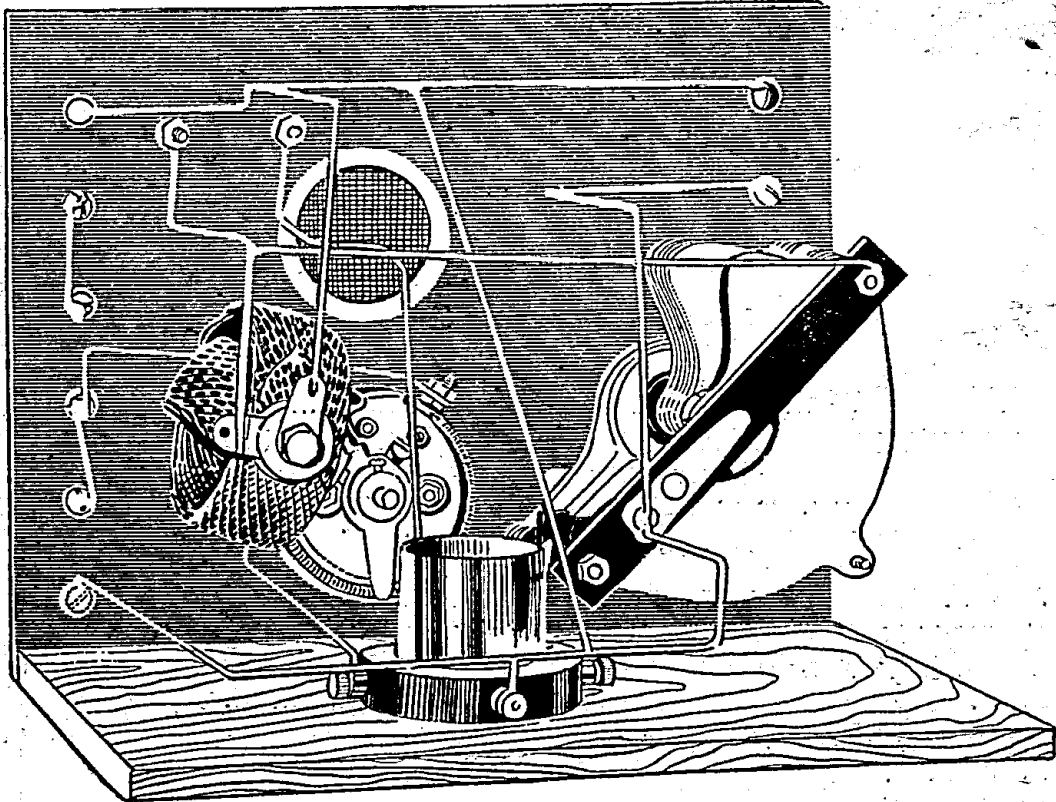
Get Advice Before Purchasing

Anyone having little technical knowledge on the subject of radio should take some experienced friend's advice before buying any piece of apparatus. If this is not possible, he should purchase articles made by companies having a recognized standing in the field and whose engineers are capable of giving the best in design.

TUBES \$5.30

UV-199, UV-201A, WD-11, WD-12, DV-6
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two stage audio frequency amplifier is easily attached.

The other illustration shows an assembled set, mounted on a 7 by 9 inch panel with a 5 by 7 inch baseboard. The

the B battery is 22½ volt recommended, but this can be increased if UV-99 or C-299 tubes are used. As the diagram indicates, the wiring is very simple.

The aerial need not be a very long one

Lettering Bakelite Panel

To letter a bakelite panel, clean the surface with wood alcohol to remove any greasy film, then write what you want on the panel with a sharp, stiff steel pen and draftsman's white ink, such as is used on blueprints. When the writing is perfectly dry, cover it with transparent varnish to protect it, using a fine, soft hair brush.

If at any future time you want to remove it, dampen a rag with wood alcohol and wash it off; the wood alcohol dissolves the varnish.—James E. Murray, New York city.

Pour the acid (a few drops at a time) into the water when mixing electrolyte for a lead storage cell. Never pour the water into the acid.

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Buy the wonderful "Dutch Radio Valve" for your receiving set. They are guaranteed.

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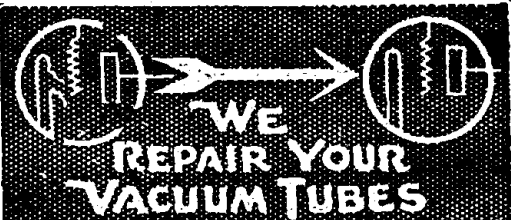
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Embodies all the advantages of the well known Elgin Reinartz (the set which was largely responsible for the popularity of this wonderful circuit) and many others. It is much louder, more selective, requires no storage battery, and can be used with 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.

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

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Determination of Resistance Values for Rheostats

Relations of Resistance, Voltage and Amperage for Various Tubes

By H. J. Marx

THERE has been created a decided confusion in the minds of the Radiophans in regard to the proper resistance in rheostats to be used for the various tubes now on the market.

The immediate result has been the flooding of the market with a series of rheostats of a resistance range running from one ohm for a power rheostat (controlling two or more tubes) to 50 ohms for the UV-199 and C-299 tubes.

Fans are using dry cells connected in series and some in parallel, or storage batteries with single, double and three cells. Each change in current source, and also in tubes used necessitates a consideration of the proper rheostat required. Apparently this has been extremely puzzling to fans but can easily be remedied by an application of Ohm's Law.

Direct Current Circuit

This part of the vacuum tube circuit, which pertains to the filament lighting, is a simple direct current circuit. As such, it follows Ohm's law:

$$I = \frac{E}{R}$$

The proper application of this formula will solve all problems covering the proper selection of rheostats.

Function of the Rheostat

For example, the familiar UV-200 and C-300 operate at 3 volts' potential and draws approximately 1 ampere. The average source of current supply is the 6 volt storage battery. By introducing a variable resistance, such as a rheostat, the voltage across the filament can be varied from about 3 volts to 6 volts. Then if the tube operates even better at 4.5 volts than at five, this can be taken care of by means of the rheostat. Obviously, by increasing the rheostat resistance, the range of variation also can be increased, from even lower values to the maximum 6 volts of the battery.

Since the tube does not begin functioning until about 4 volts are applied to the filament, there is no gain in the surplus control range. In selecting the rheostat for any combination of tube and battery, the resistance should be such as to furnish a voltage range covering that of the operating range of the tube.

Filament Resistance

Going back to the tube mentioned, if the operating voltage is five and the current consumption at that potential 1 ampere, the filament resistance can be computed by applying Ohm's law.

$$R = \frac{E}{I} = \frac{5}{1} = 5 \text{ ohms.}$$

The tube begins operating at about 3 volts on the filament. In order to find the consumption at this voltage, Ohm's law is again applied.

$$I = \frac{E}{R} = \frac{3 \text{ volts}}{5 \text{ ohms}} = .6 \text{ amperes.}$$

The filament resistance varies slightly as the heat of the filament is changed, but this can be disregarded.

The source of current, however, has a potential of 6 volts. If only .6 amperes is wanted, the required total of resistance, including filament and rheostat will be:

$$R = \frac{E}{I} = \frac{6 \text{ volts}}{.6 \text{ amperes}} = 10 \text{ ohms.}$$

The filament resistance is 5 ohms so only 5 ohms more are required in the rheostat. The average storage battery, when fully charged, is likely to have a slightly higher voltage, so the standard rheostat used was the 6 ohm type.

Power Rheostats

When rheostats are used to operate two or more tubes connected in parallel, conditions are a little less simple. The effective filament resistance is the result of the resistance of one divided by the number of tubes connected in parallel. The current consumption is that of one tube multiplied by the number of tubes. For example, where two tubes are operated by one rheostat, the required resistance becomes:

$$R = \frac{E}{I} = \frac{6 \text{ volts}}{.6 \text{ amperes} \times 2} = 5 \text{ ohms.}$$

The effective filament resistance is only half of one, or 2.5 ohms. The required resistance in the rheostat is therefore 2.5 ohms. The standard two tube power rheostat has a resistance of 3 ohms. The factor to be considered in power rheostats is whether the resistance wire has the carrying capacity for the current required; if not, the resistance wire will fuse. If an ordinary 6 ohm rheostat is used for more than one tube, this usually happens. The safe limit for the standard 6 ohm rheostat is 1.5 amperes.

Dry Cell Tubes

As previously explained, it was the development of the dry cell tube that started most of the trouble in respect to rheostats. In order to make this as clear as possible, it will be advisable to analyze the problem for the two popular types, under different battery conditions.

The UV-201A and C-301A tubes operate

on a filament voltage of five, but only consume .25 amperes of current. The filament resistance then will be 20 ohms. Assuming that the tube begins functioning at 3 volts, the current consumption will be .15 amperes.

If a 6 volt storage battery is used, the total resistance required is:

slightly, but can be used. If three dry cells in series are used, the voltage of 4.5 is not sufficient, whereas four cells give 6 volts, making the condition parallel to that of the storage battery.

UV-199 and C-299

These tubes operate at 3 volts and draw .06 amperes, thus giving a filament re-

Now if three dry cells, connected in series (two cells leave no margin) are used, the potential at the source is 4.5 volts. The required total resistance will then be:

$$R = \frac{E}{I} = \frac{4.5}{.046} = 100 \text{ ohms.}$$

The rheostat resistance required will then be 50 ohms. Sixty ohm rheostats are sometimes used.

If a two cell storage battery (4 volts) is used, the resistance of the rheostat should be about 30 ohms or more.

Suppose, however, that a 6 volt storage battery is used, the required total resistance will be:

$$R = \frac{E}{I} = \frac{6}{.046} = 130 \text{ ohms.}$$

This indicates that the rheostat resistance must be 80 ohms. Under these circumstances it is of particular importance that the voltage should not exceed 4.5 or even 4 volts. It is suggested, in this case, that a permanent resistance of 25 or 30 ohms be inserted in series, the rheostat requiring only 50 ohms. If, then, the rheostat is accidentally turned on full, there will always be the fixed resistance in series with less possibility of burning the tubes.

The use of a fixed resistance is recommended only where the voltage at the source greatly exceeds that required for operation. A small margin over the operating voltage is always necessary in order to compensate for deterioration of battery and variations in tubes.

WD-11 and 12 Tubes

When using WD-11 or 12 tubes with a single dry cell, the required rheostat resistance will be found to equal 6 ohms.

| TUBE | Battery Voltage | Operating Voltage | Current Amperes | Filament Resistance Ohms | Total Resistance Necessary | Rheostat Resistance | Detector Plate Voltage | Amplifier Plate Voltage | Grid Bias Voltage | Grid Leak Megohms | Grid Condenser Microfarads |
|-------------------|-----------------|-------------------|-----------------|--------------------------|----------------------------|---------------------|------------------------|-------------------------|--------------------|-------------------|----------------------------|
| UV-200 C-300 | 6 | 5 | 1 | 5 | 10 | 5 to 6 | 22.5 | | | 1 | .0005 |
| C-301A UV-201A | 6 | 5 | .25 | 20 | 40 | 20 to 30 | 22.5 | 45 to 80 | | 1 to 5 | .00025 |
| WD-11 WD-12 | 1½ | 1.1 | .25 | 4.4 | 10 | 5 to 6 | 22.5 | 45 60 80 100 | 0 1.5 3 4 | 2 | .00025 |
| UV-199 C-299 | 4½-6 | 3 | .06 | 50 | 90 to 130 | 30 to 75 | 22.5 | 40 60 80 100 | 0 3 4.5 6 | 1 to 5 | .00025 |
| UV-201 C-301 | 6 | 5 | 1 | 5 | 10 | 5 to 6 | 22.5 | 40 60 80 100 | 0 3 4.5 6 | 1 | .0005 |

$$R = \frac{E}{I} = \frac{6}{.15} = 40 \text{ ohms.}$$

The resistance of the filament is 20 ohms, so the rheostat resistance should be 20 ohms. Naturally, a 25 or even 30 ohm rheostat simply increases the range

of 50 ohms. They do not start functioning until a filament voltage of about 2.3 is reached.

At this voltage, the current draw is:

$$I = \frac{E}{R} = \frac{2.3}{50} = .046 \text{ amperes.}$$

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(Continued from page 11)

coil, also air core, but variable. Such a drawing is used to show either a coil from which short leads are brought out at intervals to switch points or a coil which is varied by moving a metallic slider along a rod, the slider making contact with the wires of every turn, the insulation having been removed for a distance of about 1/8 inch on every turn. Figure 4c specifies that the coil be varied by taps and a switch. In 4d we have a coil wound on an iron core and non-variable.

Capacity is another property necessary in a circuit in which Radio frequency currents are to travel. Capacity is the result of having close together two metallic surfaces or wires in which alternating or pulsating direct current is flowing. For a better understanding of this let us consider Figure 5a. Here we have a circuit consisting of a coil of wire (X) and a device consisting of two flat plates about 2 inches square and 1/8 inch apart. In this circuit, Radio frequency current is flowing and we will consider it at a moment when the current is flowing in the direction indicated. The current spreads out over plate A until the plate is full. If the plate is of the correct capacity, it will become full at just the moment when the current reaches its greatest value and begins to weaken. As plate A is full and plate B contains no electricity we have an unbalanced, unstable condition and plate A discharges or unloads its current back through the coil X and into plate B, as shown in Figure 5b. Electrical current has momentum, just as does a swinging pendulum, and the flow does not stop when both plates are equally charged, but the current piles up in plate B and then must

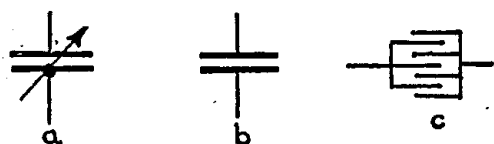


Figure 6—Three methods of showing condensers on diagrams, one variable and two fixed

again flow as in Figure 5a. This action would continue indefinitely and we would have a perpetually oscillating circuit were it not for small losses which occur and the resistance of the circuit.

The symbols used for showing capacity in the form of an instrument known as a condenser, are shown in Figure 6; 6a designates a variable condenser, that is, a condenser whose capacity may be varied from maximum to very nearly zero. The unit of measurement of capacity is the farad and its subdivision, the microfarad (.000001 farad). Condensers used in Radio work have very small capacities and are usually measured in fractions of a microfarad; 6b is the usual designation of a fixed capacity, while 6c is another less used method of showing it.

As the capacity of condensers is usually written and spoken of in decimals such as .001, .0005 and .00025, Radio men have developed the following way of speaking of them. The Radio experimenter would say "double O one," "triple O five" or "triple O two five," meaning condensers of .001 of a microfarad, .0005 of a microfarad or .00025 microfarad.

Resistance

Resistance is, as was stated before, measured in ohms. Since we frequently use resistances of from 1,000,000 to 12,000,000 ohms, the Radio fraternity has come to use the word megohm for 1,000,000

ohms and to mention 8,000,000 ohms we would say "eight megohms."

Resistances are shown on diagrams by the symbols shown in Figure 7. A resistance which cannot be varied is shown as in 7a, while a resistance that is variable (such as a rheostat) may be specified by 7b; 7c shows a particular form of resistance known as a potentiometer, which is usually connected across the filament battery of a vacuum tube. The sliding

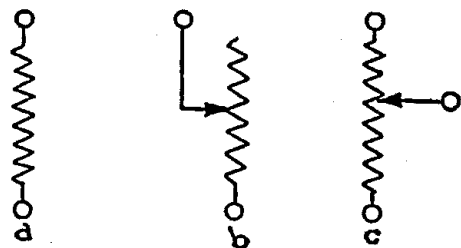


Figure 7—Resistances are shown in these drawings, one fixed, one variable, one of a special unit

contact is connected to one of the other elements of the tube (grid or plate), and moving this contact varies the difference in pressure between the filament and the second element.

(TO BE CONTINUED)

FIRST STEPS IN RADIO

(Continued from page 17)

caused by too large a tickler coil, is responsible. Also, the grid leak resistance may be too high, causing the tube to block, or the trouble may be due to a too high plate voltage or undesired feedback, caused by the closeness of the plate circuit to the grid circuit leads. Often a steady whistle is heard when a nearby regenerative set emits waves, or if two broadcasting stations are heterodyning each other. Interference of this nature will be recognized by the inability to change the note by tuning, whereas feedback effects are altered by adjusting the tuning controls.

Squealing usually is experienced when the amplifiers are switched on and is due to reaction between the plate and grid circuits of the tubes. The most common

cause is the reversal of a transformer winding, in which case it is necessary to reverse the connections to the transformers until the noise is eliminated. When transformers are close together, the squealing often is caused by the magnetic field of one reacting on the other. They should either be completely shielded, or the cores set at right angles. The wiring of amplifier units, when run too close, also will cause squealing and howling.

At times a buzzing or humming sound is encountered that is difficult to locate. Often it is due to induction from nearby power lines. It may be caused by a grid condenser made of tinfoil or paraffin paper. In one case, the panel of the set picked up the vibrations from the loud talker through the table, and the vibration was transmitted to the tubes and caused a ringing sound. A plate lead brought close to the ground lead or high voltage leaking into the aerial circuit is a frequent cause of buzzing or humming.

Unsteady and Wavering Signals

Unsteady and wavering signals are due to the unsteady operation of some part of the set. Poor contacts in the filament circuit or an aerial circuit with too low capacity in series with the primary inductance will cause them. Loose inductances will result in unsteady signals, and a leaky aerial or lightning arrester due to rain or moisture will affect the signals.

In locating trouble one should bear in mind that the broadcaster is sometimes at fault. The set can only reproduce what it receives, and before blaming the set the operator should tune in another station and see if that acts the same way. In homemade apparatus many factors enter into the operation. For instance, the shielding on the panel may result in feedback effects that cause whistling and squealing. Homemade inductances are often coated with shellac that is unfit for the purpose, sometimes containing water that causes leaks between the turns and poor tuning.

Fiber is considered a good insulator as a rule, but it should not be used as an insulator in Radio apparatus. A fiber panel will make any regenerative set noisy, if

not worthless for long distance work. Fiber washers should never be used to insulate the binding posts from the shielding on your set. Scrape the shielding away for a quarter inch around the posts or use bakelite washers.

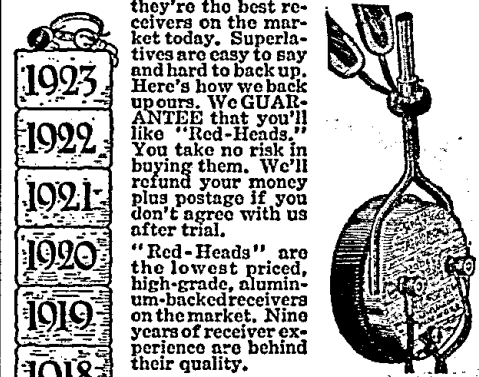
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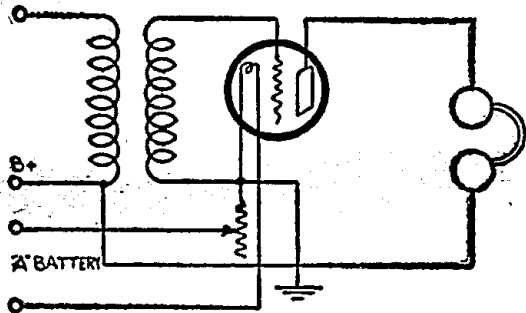
variable may be reduced all along the scale by using a small fixed condenser in series with it. Thus a .001 mfd. variable may be made into a .0005 by using in series with a .001 fixed condenser; or it may be changed to .0002 by using a .00025 fixed condenser.

This method of reducing the capacity of a variable somewhat distorts the capacity curve; i. e. reduces the upper part of the scale in greater proportion than the lower part, but this is especially desirable with condensers of the type of the Connecticut variable.

In the diagram two fixed condensers of .001 mfd. and .0005 mfd. are used with a 43-plate variable so that five different series and shunt combinations are possible, varying from a maximum capacity of .00025 mfd. when all are in series, to a maximum of .0025 mfd. when all are in shunt. Switch A is used to obtain the series combinations, switch B being left in the first position (to the left). With A in the third position, the variable only is in the circuit. The fixed condensers are shunted across it to increase its capacity by moving switch B to the second and third positions, switch B being left in the third position (to the right). It will be noted that switch B has two blades. The condensers used should be mica insulated and of guaranteed capacity.—Russell Skeeters, Des Moines, Ia.

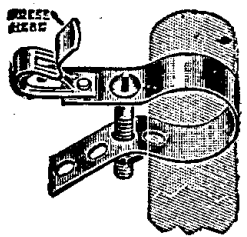
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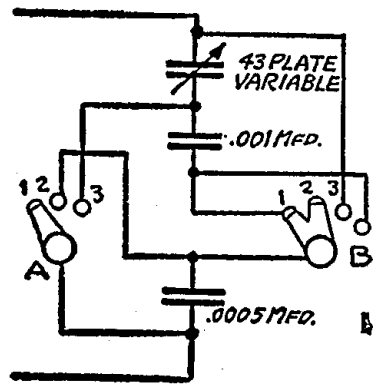


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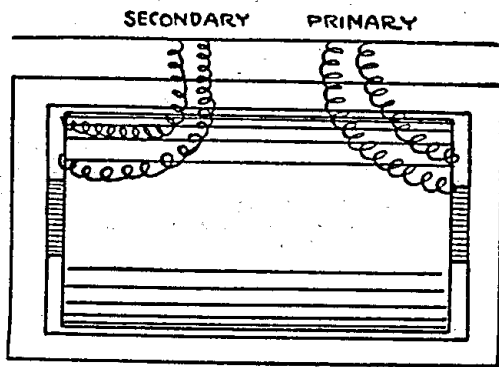
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- A₃B₁ GIVES $\frac{.001}{.001} = .001 \text{ MFD.}$
- A₃B₂ GIVES $\frac{.001}{.001} \frac{.0005}{.0005} = .0015 \text{ MFD.}$
- A₃B₃ GIVES $\frac{.001}{.001} \frac{.001}{.001} \frac{.0005}{.0005} = .0025 \text{ MFD.}$

in the transformer. If the case, binding posts, vibrator and the various equipment are still in place, save them. Many things not needed at first will become of value later.

Separate the coils to make two independent coils. Take the primary winding—the larger wire around the core—out of



both and keep the core—the bunch of annealed wire—in the center. If you want to know how many layers are on a coil count them. It's good practice. On most coils there are 35 and 37 layers. If we have a 35-layer coil and desire a 10 to 1 ratio it is necessary to have a 30 to 3 coil.

First, five layers of the coil are pulled out of the inside and the ends are brought out free. Remove 30 layers from the outside of the remaining coil and bring the ends out free. It will now be easy to place the smaller coil into the larger one. Wind enough tape around the smaller coil to make it fit snugly into the larger coil. Bring the ends from the large coil out at one end and the ends from the small

coil out at the other end and keep in mind which is which. The larger coil is the secondary and the smaller the primary. Wind the core with enough tape to fit well into the inside of the small coil.

If you want a closed core transformer, the usual kind, bend back the ends of the core as shown in the illustration; it will serve the purpose admirably. If you want an open core type leave the core as it is shown.—Edwin Rust, Phoebus, Va.

Keep Rust Out of Receivers

The diaphragms of certain types of telephone receivers sometimes become rusted after long use and even the pole pieces themselves become slightly covered with rust which will interfere with the vibration of the diaphragm. When this is noticed, remove the cap and wipe the magnets and diaphragm with a soft cloth dampened with sewing machine oil. Care should be used not to bend the circular disc.

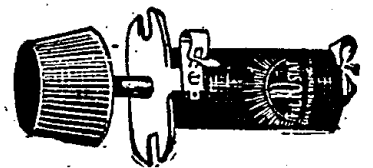
Testing Crystals

The more ambitious of experimenters will find it an interesting and instructive pastime to test out crystals of different kinds of sensitiveness. While thousands of crystals and combinations of crystals have been tried out, a new combination may accidentally be discovered that will bring results well worth the trouble.

Connecting Testing Sets That Use Vacuum Tubes

When the construction of a receiving set employing vacuum tubes either as detectors or amplifiers is complete, the filament or A battery should first be connected up to be certain that all the connections to the tubes and control rheostats are correct for filament lighting. The plate or B battery should always be connected last so as to eliminate the possibility of having the tubes burnt out through improper connection of the B battery to the filament terminals.—Peter J. M. Clute, Schenectady, N. Y.

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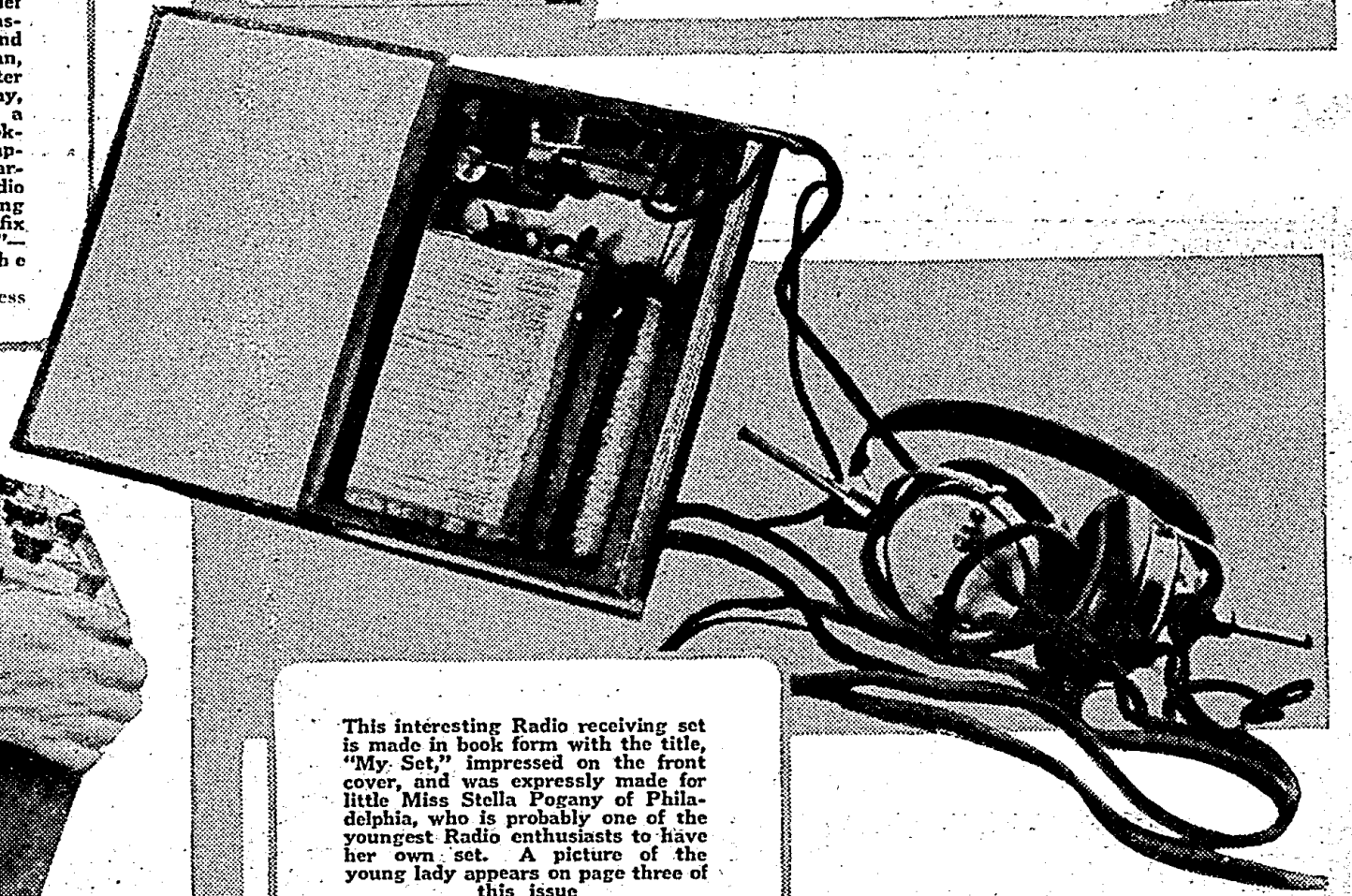
Radio Illustrated



Mary Lee, a young lady of Oak Park, Ill.—a suburb of Chicago—who recently starred in a screen picture to promote the "Own Your Home" idea in that village, is now featuring in the KYW broadcasting program of the Westinghouse Electric Co. Miss Lee is a Radiophan, and is here shown listening in on her own set. Radio played a prominent part in the film in which she appeared. Photo by Atlas Film Co.



Heap Big Chief John Snow, a Passamaquoddy and recent Radiophan, waxed wroth after listening all day, hearing only a lecture on cooking. So he appealed to a nearby U. S. Radio station, asking Uncle Sam to "fix 'um plenty"—meaning the broadcasters. © Pictorial Press



This interesting Radio receiving set is made in book form with the title, "My Set," impressed on the front cover, and was expressly made for little Miss Stella Pogany of Philadelphia, who is probably one of the youngest Radio enthusiasts to have her own set. A picture of the young lady appears on page three of this issue.