

Radio Digest

EVERY WEEK

Illustrated

TEN CENTS

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

Vol. VI

Copyright, 1923
R. D. P. Co. Inc.

SATURDAY, AUGUST 18, 1923

No. 6

PLAN RADIO RUM HUNT



AIR BEARS SCREEN STAR'S GREETINGS

WDAP CARRIES LILA LEE'S MESSAGE TO THOUSANDS

Vast Audience Hears Noted Actress Defend Hollywood and Plead for Clean Living

CHICAGO.—Thousands of listeners in heard Lila Lee, noted screen star of Hollywood, greet her friends and admirers recently through Station WDAP. While the station was broadcasting the prices of pork and wheat, the announcer interrupted the program at 6:15 o'clock to introduce Miss Lee.

Although the famed actress was extremely fatigued, due to hard work in the completion of a motion picture, she was so interested that she forgot her weariness and in calm, clear tones talked to a vast audience. "How do you do it?" she asked as she timidly faced the microphone and, woman like, caressed her tresses. Then, having been told that the broadcasting of the human voice required no more effort nor technique than speaking into a telephone, she began her address.

Chicago Her Birthplace

"My dear friends," Miss Lee said, "wherever you are, far or near, I know you will believe me when I tell you how glad I am to be able to speak to you through the courtesy of Radio Digest. The marvels of the age, the airphone and the motion picture, bring you and me together. But it seems so much

(Continued on page 2)

WASHINGTON HINTS FIGHT BY AIRPHONE

Enforcement Body Debates Use of Navy Plants in Liquor Combat

Secret Code Discussed

State Prohibition Directors Are Considering Exchange of Data Against Bootleggers

WASHINGTON, D. C.—No more will bootleggers laugh with apparent impunity at boundaries and statutes; no more will slippery rum runners ignore the three-mile and every other limit—when the United States government uses its Radio plants to make the Eighteenth Amendment stick to the constitution.

Plans so comprehensive that they would virtually convert the federal treasury department into a vastly greater land and sea police force were discussed unofficially here recently by high officers of the department of prohibition enforcement. The main idea, it was said, was the use of Radio as the best means to prevent or intercept the illegal transportation of intoxicants

(Continued on page 2)

Lila Lee (left) recently made a broadcast from WDAP. See article above. Beryl Williams (right) takes along her portable set so she can listen in when she tires of the ocean waves at Atlantic City. Radio waves versus the wet ones, as it were. Right Photo © P. & A.



PROVES RADIO LOSSES NOT MUCH IN SUMMER

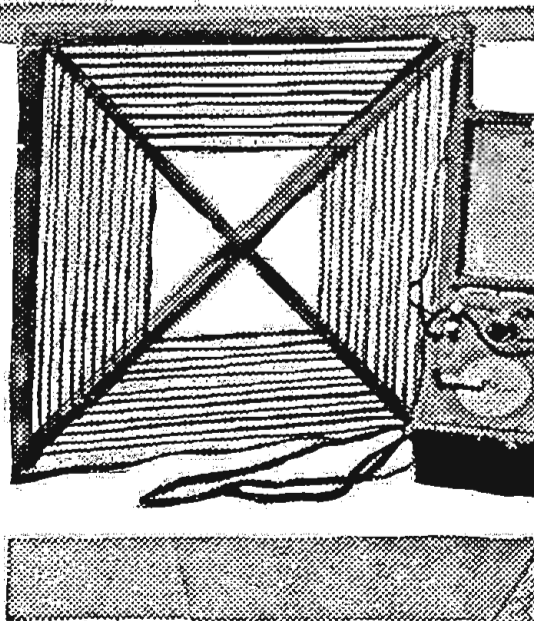
Laboratories in Columbus Hold "Party" to Prove Efficiency Is Up

COLUMBUS, O.—In order to prove that Radio reception in the summer time is almost as efficient as in the other seasons, officials of the Superior Radio and Telephone Equipment Company here recently gave a Radio party at the experimental laboratories of the company, located at Radio Hill, Worthington. The guests listened to reports of the Willard-Firpo battle at Jersey City. A blow-by-blow description of this fight was broadcast by KDKA Pittsburgh. The receiving equipment consisted of a one tube, dry cell outfit, a type designed for use by campers and vacationists, it being extremely portable.

Navy's Triple Relay in 2 1-3 Hours Wins Prize

Rear Admiral Robertson Says Efficiency Is Rapidly Growing

WASHINGTON.—Naval Radio communication efficiency is increasing daily according to Rear Admiral A. H. Robertson, assistant chief of naval operations. Recently the Battleship Oklahoma, at anchor off Bainbridge Island, Puget Sound, sent an important dispatch for the Commander of the battle fleet then at sea off California. The dispatch was relayed three times going down and the answer three times returning; but the reply was received in two hours and twenty minutes. From the Oklahoma to Radio Station Puget Sound the message went direct, being relayed to San Francisco from Puget Sound.



PARTS OFFER SPURS MECHANICAL WORK

INQUIRIES DENY CRITICISM OF SYSTEM IN SCHOOLS

Interest Shown by Youth in Constructing Sets Shows Advance Toward the Manual Arts

SPECIAL REWARD OFFER
Coupon Number 12

This Special Reward Coupon appears each issue in Radio Digest until further notice. When sent in, accompanied by necessary remittance, according to the rules governing same, apparatus can be secured. See apparatus list and rules of offer below.

Save Me—I Am Valuable

Those who rail against what they call the lack of mechanical training in the public and other schools of this country would find little with which to bolster their contentions in the answers to the special parts offer of Radio Digest.

Many if not most of the inquiries concerning the offer are from boys and girls of school age who by their interest evince marked tendencies in relation to delicate machinery. Construction of Radio sets by the youth of the United States will, it is said by observers, aid, too, the instruction of mechanical drawing.

It would be well to remember that when you send coupons to this office they should be consecutive; they need not begin with Number 1 but they should run in order. You may send as many series and as many coupons as you want. Write plainly the names of the parts you need, send the money and the coupons and we will do the rest.

Rules to Remember

One point must be emphasized to those contemplating taking advantage of the special offer; that is, that the coupons turned in for any item must be numbered consecutively, as for example, 1, 2, 3, and 4 or 3, 4, 5 and 6. The number of coupons necessary and the cash remittance, of course, depend on the item sought by the reader. There is no limit to the number of series turned in by any one reader.

Another point to remember is that cash, checks and money orders but no postage stamps will be accepted.

To make selection more simple the items have been divided into eight classes, each class depending on the number of consecutive coupons and amount of cash remittance necessary. The eight classes of items follow:

Class A Articles

For two consecutively numbered coupons and thirty cents (\$0.30) any one of the following articles will be sent: 1 Carter Imp Jack and Plug; 1 Carter 15-Ohm Resistance Unit; 1 Schindler .00025 mfd. Build-up Mica Condenser; 1 Schindler .0005 mfd. Build-up Mica Condenser; 1 Shindler .001 mfd. Build-up Mica Condenser; 1 Schindler .002 mfd. Build-up Mica Condenser; 1 Schindler .0025 mfd. Build-up Mica Condenser; 1 Martin-Copeland Sta Put Plug; Walnut Standard Tube Socket; Walnut UV-199 Socket; Ray-O-Vac Dry Battery, 1½ volts; Dubilier Micadons Type 601 (.0001, .00025, .0005, .001, .002, .0025, .003 or .004 mfd.); Premier Grid Condenser (.00025 or .0005 mfd.); Premier Variable Resistance; 1 Carter 25-ohm Resistance Unit; Standard Socket Adapter for Delta Midgat Tube; Electrad Grid Leak (1, 1.5 and 2 megohms, with clips); Amco 3-inch Dial; Amco Inductance Switch; Freshman Micon Condensers, (.00005, .00025, .00035, .0005, .001, .0015, .002, .0025, or .003 mfd.); Teleradio V. T. Socket; B-Metal Mounted Crystal; Aerovox Lightning Switch; Aerovox Series Parallel Switch; Aerovox Contact Lever; Na-Ald Small Space Socket; Se-Ar-De Vernier Adjuster; Basco Switch Lever Assembly.

Class B Articles

For four consecutively numbered coupons and sixty cents (\$0.60) any one of the following articles will be sent: 1 Carter .04 mfd. Special Fixed Condenser; 1 Carter Jack Switch; 1 Carter Hold-Tite Jack, One Spring Open Circuit; 1 Carter Hold-Tite Jack, Two Spring Closed Circuit; 1 Carter Hold-Tite Jack, Three Spring Filament Control; 1 Carter Hold-Tite Jack, Four Spring Closed Circuit; 1 Carter Hold-Tite Jack, Five Spring Filament Control; 1 Pudin Variable Grid Leak with .00025 mfd. Condenser; 1 Federal Universal Phona Plug; 1 Federal Open Circuit Jack; 1 Federal Closed Circuit Jack; 1 Federal Double Circuit Jack; 1 Martin-Copeland Shur Grip Plug; 1 Martin-Copeland WD-11 Socket; 1 Martin-Copeland WD-11 Adapter; 1 Martin-Copeland UV-199 Socket; 1 Martin-Copeland UV-199 Adapter; 1 Martin-Copeland Pull Switch; 1 Martin-Copeland 5-point Inductance Switch; 1 Martin-Copeland Variable Grid Leak; 1 Martin-Copeland SPST Knife Switch; 1 Martin-Copeland SPDT Knife Switch; 1 Martin-Copeland DPST Knife Switch; 1 Martin-Copeland DPT Knife Switch; Walnut Variable Grid Leak; Walnut Inductance Switch; Dubilier Micadons Type 600 (.0001, .00025, .0005, .001, .002, .0025, .003, .004, or .005 mfd.); Dubilier Micadons Type 610 (.001, .002, .0025, .003, .004, or .005 mfd.); Dubilier Micadon Type 601 (.006 mfd.); Dubilier By-Pass Condenser (.1, .25, or .5 mfd.); Premier Universal Tube Socket; Premier Radio Dial (3/16, ¼, or 5/16 in. black or white face); Premier Universal Radio Jack, Open Circuit; Premier Universal Radio Jack, Two-Circuit Three Spring; Premier Universal Radio Jack, Two-Circuit Four Spring; Premier Universal Radio Jack, Filament Control Three Spring; Premier Switch Lever and 10 Points; Turney Spider Web Coil (SW-10 with .038 milhenry inductance, SW-15 with .066 MH., or SW-20 with .300 MH.); Amco 6-Ohm Rheostat; Freshman Fix-O Grid Leak and Condenser; Freshman Variable Resistance Leak (with or without condenser); Freshman Micon Condensers (.006 or .005 mfd.); Teleradio 6-Ohm Rheostat; Teleradio 30-Ohm Rheostat; Teleradio Lightning Arrester; B-Metal Crystal Tube Detector Type A; B-Metal Adjustable Detector Type D; Aerovox Rheostat; Se-Ar-De Vacuum Tube Socket; Basco Crystal Detector Assembly; Basco Rheostat, 3-ohm or 6-ohm.

Class C Articles

For six consecutively numbered coupons and ninety cents (\$0.90) any one of the following articles will be sent: 1 Carter 6-Ohm Vernier Control Rheostat; 1 Carter "Tu-Way" Plug; 1 Federal Panel Mount Socket; 1

Federal 6-Ohm Rheostat; 1 Federal 3-Ohm (Power) Rheostat; 1 Amperita Automatic Filament Control (with mounting); 1 Martin-Copeland Marco Rheostat; 1 Martin-Copeland Series Parallel Switch; 1 Martin-Copeland DPT Panel Switch; 1 Martin-Copeland 7-Point Inductance Switch; 1 Martin-Copeland 9-Point Inductance Switch; 1 Martin-Copeland 11-Point Inductance Switch; Walnut Variable Grid Leak with .00025 mfd. Condenser; Walnut Variable Condenser (3-plate .00006 mfd.); Ray-O-Vac Dry Battery, 2 cells 1½ volts; Dubilier Ducon; Dubilier Micadon Type 600 (.006 mfd.); Dubilier Micadon Type 610 (.01 or .02 mfd.); Dubilier By-Pass Condenser (1 mfd.); Premier Universal Radio Jack, Filament Control Flva Spring; CRL Variable Grid Leak, without condenser; Premier No. 250 Variable Resistance, panel mounting; Thordarson Vernier Rheostat; Ritter Loop Aerial; Martin Copeland Variable Grid Leak; Amco Multipla Point Inductance Switch; Amco 20-Ohm Rheostat; Amco 50-Ohm Rheostat; Freshman Antenna; Freshman Micon Condenser, .01 mfd.; Teleradio Variable Condensers, (3-plate or 11-plate); Set "Read EM" Binding Posts (9); B-Metal Crystal Tube Detector Type B; Illinois Chushon Resilient Socket; Aerovox Antenna Plug; Aerovox Potentiometer; Aerovox Crystal Detector; Se-Ar-De Adjustable Vernier Condenser; Basco Tuning Coil; Basco Vernier Rheostat.

Class D Articles

For eight consecutively numbered coupons and one dollar and twenty cents (\$1.20) any one of the following articles will be sent: 1 Carter 20-Ohm Vernier Control Rheostat; 1 Schlindler Radio Frequency Transformer; 1 Martin-Copeland 13-Point Inductance Switch; 1 Martin-Copeland 15-Point Inductance Switch; 1 Martin-Copeland 19-Point Inductance Switch; Walnut Variable Condenser (5-Plate .0001 mfd.); Ray-O-Vac No. 4151 B Battery, 2½ volts; Ray-O-Vac Dry Battery, 3 cells 4½ volts; Electrad Variomh, with mica condenser; Dubilier By-Pass Condenser (2 mfd.); CRL Variable Grid Leak with Condenser; Resistorometer (Type A or 2A); Thordarson Variable Condenser, .00025 mfd.; Amco 300-Ohm Potentiometer; Freshman Micon Condenser, .015 mfd.; Teleradio Variable Condenser, 23-plate; Aerovox Crystal Detector and Condenser, mounted; Se-Ar-De Variable Grid Leak, with condenser mounting; Fil-Ko-Stat; R. S. C. Vernier Condenser, 3-plate; Basco Mahogany Cabinet.

Class E Articles

For ten consecutively numbered coupons and one dollar and fifty cents (\$1.50) any one of the following articles will be sent: 1 Carter 6-Ohm Automatic Control Rheostat; 1 Carter 20 Ohm Automatic Control Rheostat; 1 Demcal 3-Plate Variable Condenser; Walnut Variable Condenser (13-Plate .00025 mfd.); Ray-O-Vac Dry Battery, 4 cells 1½ volts; Dubilier Variadon (.004 or .006 mfd.); Resistorometer (Type B); Delta Midgat Tube and Socket; Thordarson Variable Condenser, .0005 mfd.; Freshman Micon Condenser, .02 mfd.; B-Metal Crystal Tube Detector Type C; Aerovox 3-Gang Socket; Aerovox Double Slide Tuning Coil; Na-Ald 3-Plate Vernier Condenser, with dial.

Class F Articles

For twelve consecutively numbered coupons and one dollar and eighty cents (\$1.80) the following will be

sent: 1 Acme Pot-Rheo (potentiometer and rheostat); Walnut Variable Condenser (23-Plate .0005 mfd.); Ray-O-Vac No. 2151 B Battery, 22½ volts; Dubilier By-Pass Condenser (3 mfd.); Premier Variable Condenser without dial (.00039 mfd.); Thordarson Variable Condenser, .001 mfd.; Amco Compensating Grid Condenser; Freshman Micon Condenser, 0.25 mfd.; Teleradio Variable Condenser, 43-plate; Se-Ar-De 3-Plate Condenser.

Class G Articles

For fourteen consecutively numbered coupons and two dollars and forty cents (\$2.40) any one of the following articles will be sent: 1 Federal 7-Plate Variable Condenser; 1 Federal 11-Plate Variable Condenser; 1 Federal 21-Plate Variable Condenser; 1 Federal Anticapacity Switch; 1 Demcal Variable Condenser 11-Plate Walnut Variable Condenser (43-Plate .001 mfd.); Dubilier Variadon (.001 mfd.); Dubilier By-Pass Condenser (4 mfd.); Premier Variable Condenser with dial (.00078 mfd.); Premier Hegehog A. F. Transformer, 4 to 1 Ratio; Thordarson A. F. Transformer, 3.5 to 1 Ratio; Thordarson Variable Condenser, with vernier, knob and dial (.0005 mfd.); Thordarson Variable Condenser, with vernier, knob and dial (.00025 mfd.); Ritter Grand Crystal Set; Amco Double H. C. Coil Mounting; Na-Ald 13-Plate Precision Condenser, with dial (.000297 mfd.); Na-Ald 23-Plate Precision Condenser, with dial (.000523 mfd.); Se-Ar-De 9-Plate Condenser; Se-Ar-De 17-Plate Condenser; R. S. C. Variable Condenser, 23-plate.

Class H Articles

For sixteen consecutively numbered coupons and three dollars (\$3.00) any one of the following articles will be sent: 1 Federal Audio Frequency Transformer No. 228 W; 1 Demcal 23-Plate Variable Condenser; 1 Acme Audio Frequency Transformer; 1 Acma Radio Frequency Transformer (R-2, R-3, or R-4); Walnut Variable Condenser (13-Plate vernier); Walnut Variable Condenser (23-Plate vernier); Ray-O-Vac No. 2301 "B" Battery 45 volts; Ray-O-Vac Dry Battery, 6 cells 1½ volts; Dubilier Duratran (R. F. transformer); Premier Micrometer Variocoupler with dial; Premier Variable Condenser with dial (.0015 mfd.); Premier Variable Condenser with vernier (.0004 mfd.); Premier Hegehog A. F. Transformer, 10 to 1 Ratio; Premier Hegehog A. F. Transformer, Tube Socket Type, 4 to 1 Ratio; Turney Spider Web Coil Mount, Type B; Thordarson A. F. Transformer, 6 to 1 Ratio; Thordarson Variable Condenser, with vernier, knob and dial (.001 mfd.); T. B. H. Radio Heat Set, 2,000 ohms; Tulip Loud Speaker, 15-inch, white; Teleradio Vernier Condenser, 23-plate; Teleradio 2,000-Ohm Head Set; Na-Ald Tuned R. F. Transformer, one stage; Na-Ald 43-Plate Precision Condenser, with dial (.001 mfd.); Se-Ar-De 35-Plate Condenser; R. S. C. Variable Condenser, 43-plate; Basco Radio Frequency Transformer.

Hears WBAP Farthest

BELLEFONTAINE, O.—Mrs. E. K. Deck of this city received the prize offered by the Young Men's Business League of Ballinger, Texas, for the listener at the greatest distance from Fort Worth who heard the program over WBAP by Ballinger talent given some weeks ago. The prize was a fine pair of head phones.

CONTENTS

Radio Digest, Illustrated, Volume VI, Number 6, published Chicago, Illinois, August 18, 1923. Published weekly by Radio Digest Publishing Company, 123 West Madison Street, Chicago, Illinois. Subscription rates, yearly, Five Dollars; Foreign, Six Dollars; single copies, Ten Cents. Entered as second-class matter at the postoffice at Chicago, Illinois, under the Act of March 3, 1879.

"All the Live News of Radio".....	1 to 9
Flewelling Answers to Queries.....	4
How KSD Broadcasts from Stage; An Evening at Home with the Listener In.....	5
Simple Two Tube Hook-Up, R.D.-92.....	6
The Week's Advance Broadcast Programs.....	7
Radiophone Broadcasting Station Directory—Part I.....	8
Editorials; Indi-Gest; Condensed by Dielectric.....	10
First Steps for Beginners in Radio, Chapter XIII—Multi-Tube Reflex Circuit Operation, by Thomas W. Benson.....	11
How to Make Vernier Variable Condenser from Hard Rubber Dial; Five Other Kinks.....	12
Difficult Tube Characteristics Explained, Part III—Test Circuits, by H. J. Marx.....	13
Picture Diagram—How to Alter Crystal Detector Set for Use of Tube; Reviews of Books.....	14
Questions and Answers.....	15
Radio Illustrated, a Page of Pictures.....	16

Looking Ahead

That New Neutrodyne Set—In the next issue there will appear the first part of the neutrodyne series telling about the latest advent in receiving sets. The articles will be written by H. J. Marx, who has made up this set and knows exactly the parts needed and how to assemble them for the best results. Follow these articles and you can make up a Radio frequency set that will bring in long distance during the hot weather.

Headsets and Loud Speakers—Several months ago we published an article by Thomas W. Benson on how to make a loud speaker. There was a great response to this article. Mr. Benson will go into detail again on loud speakers and will give valuable information about the construction and use of them, as well as of headsets.

Some Ideas for the Amateur Workman—In this article there will be told by Carl Masson various ways of doing things for the benefit of the person who cares to do his own work. How to make parts from broken apparatus, and an all-vernier condenser.

Real Two-Coil Loop Aerial Circuit—The Simplex Diagrams have proven a great success. In the next issue there will be another circuit under the above title. It is a circuit similar to the Flewelling. Make one up. It's worth while.

Single Tube Reflex Circuit—This hook-up will appear in the next issue. It is planned to be used with a good outside aerial and ground. Two honeycomb coils are used in the set.

PLAN RADIO RUM HUNT

(Continued from page 1)

and above all to effect the capture of violators of the law.

Plan Use of Naval Stations

All of the intricate mechanism of the department of prohibition enforcement, all of its expert trackers, all of its enormous financial resources having failed to blot bootlegging, the treasury department is likely soon, it was intimated, to take steps to use at first the Radio stations of the navy department for the transmission of messages in code by enforcement directors in each state to their subordinates or by the latter to their superiors. Although the story was denied by prohibition officers here it was given substantiality and credibility by the attitude of others elsewhere.

Close questioning of reluctant or reticent members of the prohibition enforcement department revealed the fact that the applicability of Radio had been seriously considered. This was said to have been the line of reasoning:

If, as an instance, a gang of bootleggers in Ohio or Illinois were to evade state and local authorities in an attempt to run a batch of goods from Cincinnati to Cleveland or from Peoria to Chicago or, as another illustration, across the Canadian border from Windsor, Canada, to Detroit, the usual detecting or arresting devices would be employed—the telephone or the telegraph. But these have been of little avail. Often the bootleggers are given information in advance as to the plans of the officers. Frequently runners are enabled to hide their illegal burdens until the danger of capture is past. And repeatedly they have eluded their pursuers by means of high-powered cars or perhaps a more intimate knowledge of the country.

Would Use Secret Code

"If we decide to use Radio," said a widely known prohibition enforcement officer, "we would establish a secret code. Thus the director of a state could apprise his subordinates or would himself be informed of bootlegging expeditions or caches. None but a few of those of his department would know his plans. If they were revealed prematurely he would be enabled to find the spy. The director of one state could apply Radio to aid the director of an adjoining or even of a distant state. The governments of Canada and the United States, perhaps of Mexico, could by means of Radio do much to bar the smuggling of 'booze.' It seems to me that the application of a secret, perhaps an international, Radio code would do much toward the eradication of bootlegging and the enforcement of prohibition laws."

Trailing Rum Convoys

In most states of this country the directors of prohibition enforcement are assisted by three or more others who usually are established at strategic points, that is, where whisky and the like have been or are made or handled in greatest quantities.

If the director in Cincinnati (following the suggestions of the department as to the use of Radio) learns that a liquor convoy is on the way to Cleveland secret word would immediately be sent either by telegraph or telephone to the nearest naval broadcasting station. The director in Cleveland, whose force would keep at all times in contact with the Radio receiver, would be informed by the naval Radio station that the bootleggers were en route to the lake port. Officers from both cities would immediately take the trail and the authorities of all nearby cities and towns would be advised as to the chase. If motor cars were used by the officers each automobile would be equipped with a Radio receiving set so as to enable the pursuers to keep constantly in close touch with the developments of the hunt.

Bootlegging on a large scale would thus be reduced, according to those who have considered the various phases of the application of Radio.

LILA LEE ON WDAP

(Continued from page 1)

more friendly to be able to speak directly to you.

"Here I am in Chicago, my birthplace, on the way from New York City to Hollywood to make the new picture—'All Must Marry'—written by George Ade, in which Thomas Meighan and I are to play the principal roles.

"Yes—all must marry"—a merry twinkle in the actress' eyes and a coy smile showed that she believed it. (She was wed a few days later to James Kirkwood, her director.) "And it is well. To my young girl and boy friends especially do I send these words—your work and your play must be clean. Your thoughts must be clean. These lead to and further happy marriages."

Defends Screen Notables

Then Miss Lee broadcast a defense of screen notables, who, she said, were no more vicious than the men and women of other walks of life. "Do not believe the stories about the orgies of Hollywood," she pleaded. "They are not true. Of course there are some among us who have been indiscreet, but as a whole we are just folks, eager for your good will."

That Miss Lee's talk was well received was shown by the many letters addressed to her from all parts of the country in care of Station WDAP. A telegram from Upper Michigan, forwarded to Hollywood, said: "Miss Lee can talk as well as she can act."

Have a Copy with You on
Your Vacation
WHEN YOU WANT

SEND IN THE BLANK TODAY

Radio Digest

YOU WANT IT!

BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

Publisher Radio Digest,
123 West Madison St.,
Chicago, Illinois.

Please send enclosed check M. O. for Five Dollars (Six, Foreign) for One Year's Subscription to Radio Digest, Illustrated.

Name

Address

City..... State.....

ROOMS WITH RADIO AT TALLEST HOTEL

GUEST CAN TAKE CHOICE OF PROGRAM DESIRED

\$15,000,000 Book-Cadillac Hostelry Also to Have Broadcast Station—Nothing Lacking in Radio

By F. L. Huntley
 DETROIT.—The new \$15,000,000 Book-Cadillac hotel, to be the tallest transient and commercial hotel building in the world and the erection of which has just been started here, will be equipped with the latest in Radio apparatus. It will have three large aeriels, one of which will be devoted entirely to broadcasting and the other two for reception. Each room will be equipped with a receiving telephone connected with a central. A guest wishing to listen in will only have to announce the fact to the hotel central and his room will be plugged in just the same as if he were using the telephone. Guests from their rooms will be able to enjoy a program of music, speaking or singing, just as they may choose, by merely ordering it from the operator.

Will Broadcast Conventions
 The hotel will also give special attention to broadcasting convention proceedings. For instance, if a state or national organization or any other assemblage, were meeting in convention, it will be possible to broadcast their proceedings to all the United States and perhaps farther. It also is planned to broadcast regular programs, the same as other large stations in other parts of the country.

This hotel, which is being erected by the Book Estate, will be twenty-nine stories high. There will be nothing lacking in it, so far as the Radio is concerned.

DAILIES GET PLANT TO GRAB UP NEWS

Canada Licenses Permanent Station for American Press

OTTAWA, ONT.—The Canadian Department of Marine has issued a license for the erection of a high powered press Radio telegraph station at St. Margaret's Bay, Nova Scotia, near Halifax, to C. F. Crandall of the British United Press, acting for the American publishers' committee. For over a year a group of American papers, including New York, Philadelphia, Chicago and other dailies, has been operating an experimental station at Dartmouth, across the bay from Halifax, for the reception of Radio press reports from London and Europe, and relaying them by land lines to the newspapers. The project will now be made permanent, a dispatch from Consul General Gunsaulus states.

PENN COLLEGE GIVES RADIO COURSE BY MAIL

Lessons Lead from Elementary to Advanced Study

STATE COLLEGE, PA.—Correspondence courses in Radio reception and transmission are being offered by the engineering extension department of the Pennsylvania State College.

The course is divided into two parts, each with its own text and assignment pamphlets. The first establishes principles and suffices for the ordinary students. It takes up common electrical phenomena, Radio circuits, the vacuum tube, amplification, sources of power, transmission circuits and applications of Radio.

The second goes more thoroughly into the theory of electricity to prepare for a detailed study of electro-magnetic waves, Radio circuits and apparatus for reception and transmission.

If you add a potentiometer to your detector set the latter will be improved.

BALL WRITERS FEAR BROADCAST SCORES

NEW YORK.—Now comes the Baseball Writers' Association with a protest against the broadcasting of baseball results. "If this is permitted," reads their complaint to Commissioner Landis and Presidents Heydler and Johnson of the National and American Leagues, "it will kill circulation of afternoon papers and in the end will result in less ball writing."

WANTA MAKE \$5000? HERE'S YOUR CHANCE

WASHINGTON, D. C.—The United States Civil Service Commission has announced examinations for Radio engineers to fill vacancies in the departmental and field services throughout the United States. The Radio engineers receive from \$4,000 to \$5,000 per annum; associate engineers from \$3,000 to \$4,000, and assistant Radio engineers from \$2,000 to \$3,000.

MANAGES STATION WDT'S STUDIO



Vaughn De Leath, the first woman in the United States, hence in the world, to broadcast vocal music, also one of the first to try to bridge the Atlantic by the human voice, has been appointed studio and program manager for Station WDT, New York, which recently was opened for general broadcasting

Water Streams Used as Aerial in French Tests

PARIS.—Interesting experiments were recently conducted by the Naval Bureau of Radio Research of the French Navy, using streams of water as transmitting aeriels.

Streams of salt water, pumped from the sea into the air, were connected to the regular transmitting apparatus of the ship and communication was possible for a distance of approximately eight miles. The water aerial is far less efficient than the wire type, but provides means of maintaining communication from a warship.

Breaks Silent Half Century

SAN FRANCISCO.—Ether waves recently brought music to the ears of an aged San Francisco woman who had not heard a sound since her early childhood. She is Miss A. Christa Peck, of 2716 California Street. Sitting in the KPO studio at Hale Bros., here, Miss Peck, with earphones on, heard accurately and distinctly a complete concert which was being broadcast by Rudy Singer's orchestra at the Fairmont Hotel.

As a matter of safety to the tube, remove it from its socket before working about or changing any wires in the set.

MARCONI CUTS DOWN EXPENSE OF SENDING

EVOLVES NEW SYSTEM OF TRANSMISSION

Inventor's Method Also Reduces Amount of Electrical Power to Minimum—Method Speedier

LONDON.—Another step in the development of Radio telegraphic transmission has been realized, says Senatore Guglielmo Marconi, who has returned to London after a two months' experimental cruise in his yacht "Electra." A system has been evolved by the Italian inventor whereby Radio messages are transmitted with a minimum of electrical power, and at very low cost.

"We have transmitted messages up to 2,250 miles, not only with a much smaller amount of power and energy but faster and more cheaply than with the ordinary system of long-distance Radio," said Senatore Marconi. "When the new system is adopted it will mean that a power station for long-distance work can be erected at much less cost than at present."

Sends Over Long Route
 "I have telegraphed on this system from Cape Verde islands, off the African coast, to London. To send messages clearly and more rapidly over those 2,500 miles took less power than a message from London to Paris by the ordinary methods."

Senatore Marconi explained that these advantages were gained by the utilization of waves that have not before been used. Given the necessary mechanical element, he said, messages could be sent clearly seven times faster than the present rate, and that the public would ultimately have the benefit of much cheaper commercial charges. His opinion is that Radio is only in its infancy, and that the future has in store greater marvels than have been revealed in the past.

Thinks Secrecy Far Off
 Commenting on recent experiments conducted by American inventors looking to privacy in Radiophone conversations, Senatore Marconi said he was afraid such an achievement was still far off.

"I do not say that telegraphy will ever be an absolutely private means of transmission, but I will say that in future it will be possible to make it much more difficult for any one to get messages not intended for them."

Senatore Marconi proposes to go on another experimental trip in a few weeks' time, and later to try the new system of long distance, low cost Radio from the coast of the United States to Europe.

LONDON POLICE MOTOR TRANSMITS AS IT RUNS

Invention of Scotland Yard Expert Enables Transmission

LONDON.—The invention of a semi-automatic aerial by A. H. Wootton, Radio expert at Scotland Yard, has provided the English police with a motor vehicle which, while traveling at high speed, can not only receive but also transmit messages.

The aerial, which can be raised or lowered from the interior of the car, consists of 5 strands of wire, each 14 feet in length, and when only raised 3 feet above the roof of the vehicle, enables telephone messages to be despatched, while with the aerial down messages can be received from a distance.

Novelist Plans Broadcaster for His Estate on Hudson

NEW YORK.—A. Stone, novelist, lecturer and founder of the A. Stone Foundation, is making preparations to establish a powerful Radio broadcasting station upon his estate at Milton-on-the-Hudson this fall. The station will be used for the purpose of broadcasting lectures on important topics of science and literature.

THE ANTENNA BROTHERS Spir L. and Lew P. Some Inside Information



TWO NEW STATIONS SET CAPITAL AGOG

WCAP AND WRC INCREASE FANS IN WASHINGTON

Marine Band and "Children's Hour" Mark Inception of Rivals of Army and Navy

By Carl H. Butman

WASHINGTON.—Radiophans in the nation's capital are agog over the two new Class B broadcasting stations WCAP and WRC. Enthusiasts even several hundred miles from Washington are beginning to listen in to the fine entertainment from a new Radio center. This has been an army and navy Radio center for some time but good private broadcasting has been scarce.

Recently WCAP, the Chesapeake and Potomac Telephone company, went on the air, broadcasting a duplicate of WEA's program in New York. The telephone company's first really local effort was the broadcasting of the U. S. marine band, which brought many enthusiastic returns. WCAP was included in the six stations which had made plans to broadcast President Harding's speech in San Francisco just before his illness and sudden death. Within a month it is understood WCAP will be sending a formal program, dividing the time with WRC on 469 meters.

"The Voice of the Capital"

Recently WRC, the new station of the Radio Corporation of America, named the "Voice of the Capital," was christened. Its programs are broadcast Tuesday, Thursday, Saturday and Sunday afternoons and Monday, Wednesday and Friday evenings, WCAP broadcasting in the alternate evenings and afternoons.

Colonel Theodore Roosevelt, assistant secretary of the navy, made a speech at the dedication of WRC. Major-General John L. Hines, deputy chief of staff of the army, also spoke. Acting Secretary of Commerce S. B. Davis talked of commercial and public interest in Radio.

The opening ceremonies of WRC included a Radio message from General Harbord, president of the corporation, who is abroad.

The initial program of WRC was not entirely devoted to talk. Musical numbers were broadcast by the U. S. marine band, Taylor Bronson leading. Celebrated artists on the program included Charles C. Tittman, bass soloist; Elias Breeskin, Russian violinist; Ruth Peter, soprano; Victor Golibart, tenor, and Clelia Fioravanti, mezzo-soprano.

WRC Duplicate of WJY-WJZ

WRC is a duplicate of the corporation's stations in New York; it is rated at 500 watts. Having two sets of apparatus, it could in an emergency put out 1,000 watts and reach every corner of the continent. Every precaution is taken to insure excellent broadcasting, from the sound and echo-proof station, where the artists perform, to the small receiving set on which the operator listens in to his own station and for distress calls from ships with which the broadcasting might interfere.

The new station is under the personal direction of S. P. Guthrie. W. L. Tesch is local engineer and Ralph Edmunds is program manager, assisted by Announcers

YOU DON'T NEED

Tubes to get out of town. Even in the summer I hear Omaha, Kansas City, Fort Worth and Davenport on my crystal set without amplification. Works over 1,000 miles in winter. Send self-addressed envelope for further information or \$1.00 for complete copyrighted drawings and instructions. Everything clearly explained. Satisfaction GUARANTEED. Leon Lambert, 501 South Volusia, Wichita, Kan.

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.)

(Submitted by W. D., Staten Island, N. Y.)

Summer Reception

Question. I built a Flewelling set in accordance with the diagram and information furnished in Radio Digest, but failed at first to make the set work. I worked with it for more than two weeks before I read in one of your articles that it might be necessary to reverse the leads to the tickler coil. When the leads were reversed the set worked exactly in accordance with the descriptions published except for distant reception. Have tried all ways for ground, loop aerial, etc., but still am unable to get any distant stations. Local stations come in wonderfully any way that I try for them. I get the roaring sound and the whistle and can adjust these sounds suitably by the grid leak as you have said, so that I know my set must be about right. Can you tell me why I get no distant stations?

Answer. You are a good deal like myself and I guess millions of others. We are all having difficulty during the summer months to equal the reception that was accomplished during the winter. I am quite sure that it will be of interest to the fans to see how this has worked in my particular case; here's a little line on it. Some time ago I went

into the open market and purchased several of the best types of Radio sets, took them home, set each one on a shelf by itself with its own phones, batteries, etc., and a quick change switch so that the same antenna might be used on any set.

The results were to say the least very illuminating. Practically all of the sets gave about the same results, which were not nearly as good as results that I have seen obtained during the winter with sets that were far inferior to those used during this test. One set in particular ranked slightly better on the distant plants. This was due entirely to the ability one had to exercise a micrometer control over the adjustment. The tuning condenser in particular was a beauty. It was of the type that I believe I have spoken of before, i. e., one that could be moved the slightest fraction of an inch as might be desired. Adjustments were so critically fine that this set really gave the best results. Now while these results, as has been said, were not as good as those obtained during the winter, they were so much inferior that they really constituted an absolute test that Radio reception is not nearly so good in the summer months as it is in the winter.

The Flewelling set while evidently giving exceptional returns of course cannot be expected to do the impossible; in view of this and the above facts, if I were you, I would rest on my laurels and wait for the "good old winter time."

Gannon and Berkeley. On opening night Announcer Cross of WJZ assisted.

A special feature of the regular WRC program will be a daily "children's hour" from 6 to 6:20 broadcast by Mrs. Edward Albion, who, experienced in the entertainment of children, will write all her "talks" and deliver them in a manner a little more personal than most broadcasters in an effort to effect closer relationship with her young audience.

Emergency Batteries Save Lives on Sinking Ship

Operator Resorts to Auxiliaries When Grounding Cuts Off Power

HALIFAX, N. S.—An example of the value of auxiliary Radio power in the form of batteries on seagoing vessels and the necessity of their frequent inspection, is found in the report on the total loss of the steamship Advance.

When the Advance went aground off Halifax recently, the operator found that his power was cut off soon after ground-

ing, as it was feared there might be a boiler explosion. This made it necessary for him to shift to his emergency batteries for transmitting SOS calls to ships and shore stations. His batteries stood up for one and a half hours, when it became necessary to abandon ship. All lives were saved though the vessel itself was lost, due to the bringing of aid by Radio.

There would undoubtedly have been a loss of life if the batteries had not been in good shape, and it is understood that just before the vessel cleared from Boston for Halifax, a government Radio inspector discovered that the old batteries were in very bad shape and condemned them. The owners immediately installed an entirely new unit of batteries, the same ones which figured in the rescue later.

PATENT ATTORNEYS

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

Reflex Fans, Wake Up!

Tuned Radio Frequency will not only increase distance, signal strength, selectivity and the flexibility of a reflex or a radio frequency outfit, it will function with remarkable simple control adjustment impossible to be had with untuned radio frequency. The present radio frequency transformers are a fixed apparatus, void of variation, untuned, so to speak. This instrument is the very heart of the circuit. Choke it and you have a non-functioning radio set. You vary every piece of apparatus on the set for perfect balance. Why not use a real tuned variable radio frequency transformer and listen to perfect radio reception, mellow, still loud, and clear. With the Jaynxon Tuned Radio Frequency Transformer added to your present outfit you will have a very agreeable surprise. Complete simple DX, Loud Speaker One Tube Hook-up with each transformer. Satisfaction guaranteed. \$8. Order yours right now.

JAYNXON LABORATORY

57 Dey Street New York City

Ohio 'U' Plant Converted to Class B, Adds to Set

Faculty, Campus Organizations to Have Hand in Programs

COLUMBUS, O.—Sanctioned by the university board of trustees and the government, the Ohio State university broadcasting station, WEO, is operating as a Class B station. As such it is one of only four such stations in Ohio.

Conversion of the station to Class B brought about some changes. Additions are being made to the equipment and the broadcasting room is being improved. In addition, M. I. McDowell, an operator of wide experience, has been employed to have charge of the electrical operation of the station. A manager of programs also will be added to the staff.

Last year WEO programs were heard from Oldtown, Me., on the East to Winnipeg and Moosejaw, Canada, on the North, and from Vancouver, B. C., and Los Angeles on the West to Houston, Texas, and Havana, Cuba, on the South. Hundreds of postcards received at the broadcasting station show the wide territory covered.

As heretofore, the station will broadcast twice daily, at 1:30 and 4:00 p. m. At these times the usual daily bulletins, including market reports, weather forecasts and items of news interest, will be put on the air. Each Thursday evening there will be a more extensive program in which members of the faculty and campus organizations will have a big share.

When you are looking for something to wind your tuning coils on be sure it is moisture proof or make it so.

CUNNINGHAM TUBES REPAIRED

C-300 or UV-200	\$2.75
C-301 or UV201	3.00
C-302 or UV-202	3.50
C-301A or UV201A	3.50
WD-11 or WD-12	3.50
Moorehead Detectors	2.75
Moorehead Amplifiers	3.00
DY-6 or DY-6A	3.00
Also the new UV-199	3.50
NEW DX 1/2 VOLT TUBES	4.00

All tubes guaranteed to work like new. Mail Orders Given Prompt Attention "24 Hour Service"

RADIO TUBE CORP. 55 Halsey Street Newark, N. J. TUBES SENT PARCEL POST, C. O. D.

Federal Standard

RECEIVER No. 58 D. X.

For Long Distance Reception

THE real joy of Radio entertainment comes from the possession of dependable apparatus, fully guaranteed, giving long distance range, fidelity of reproduction and a degree of selectivity that will enable you to choose, from all the programs offered, the one which interests you most.

The famous Federal Long Distance Receiver, Model 58 D. X. shown below, has been selected by experts, for their personal use, after critical comparative tests.

It brings in entertainment over almost unbelievable distances without interference from undesired programs.

Federal makes a remarkably complete line of Radio products—130 different complete units, each of which is guaranteed to be free from mechanical and electrical defects. All Federal products are sold at reasonable prices.



Ask your dealer to demonstrate the Federal 58 D. X. Receiver. If he hasn't it in stock he can get one quickly. Write us for the Federal Catalog.

Federal Telephone & Telegraph Co. Western District Office: 417 South Dearborn St., Chicago, Ill. BUFFALO, N. Y.

The New Grebe Broadcast Receiver

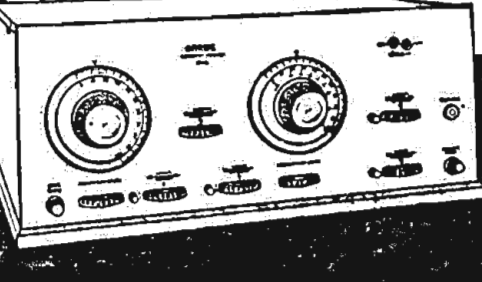


WITH the 20-foot indoor wire only two feet above the ground, programs from stations in the following cities were received with a Grebe Broadcast Receiver by Mr. Kluge, of Julius Andrae & Sons Co., in Milwaukee:—Chicago, Detroit, Davenport, St. Louis, New York, and College Park, Ga. The quality was excellent, and the volume sufficient to operate a loud speaker.

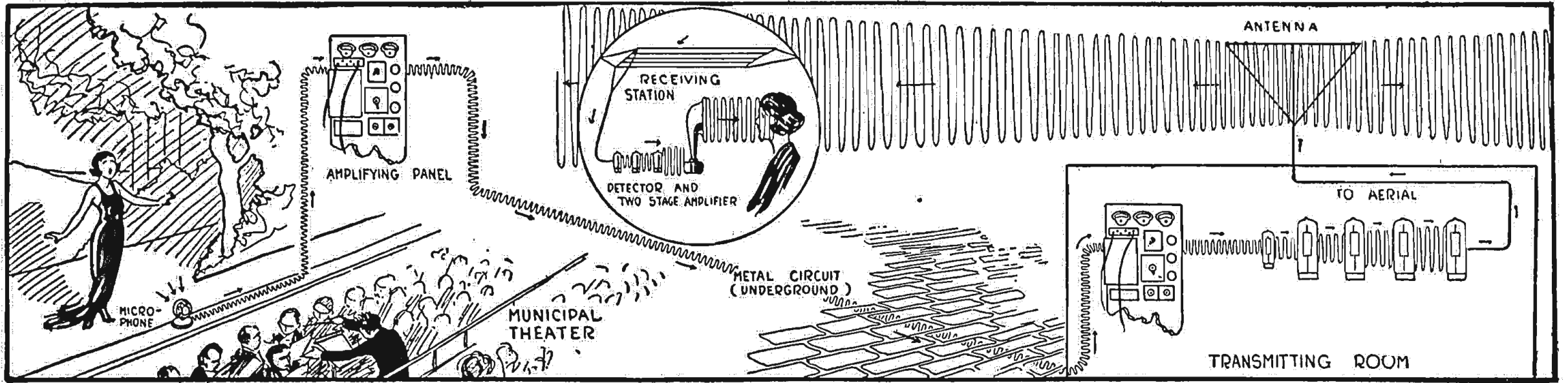
Licensed under Armstrong U. S. Pat. No. 1,113,149

Ask Your Dealer

A. H. GREBE & CO., Inc. RICHMOND HILL, N. Y.



HOW KSD BROADCASTS FROM STAGE



SHOWS METHOD OF WIRING TO THEATER

OPERATOR WHO CONTROLS PICK UPS NOT SEEN

Wire Takes Theater Program from First Line Amplifier Direct to KSD Studio

By S. C. Mahanay
 ST. LOUIS.—Of the many thousands of Radio enthusiasts who listen in to the varied programs presented by Station KSD, the Post-Dispatch here, only a very limited few are familiar with the great amount of work, plans and preparations necessary to make possible broadcasting from places other than the building housing the newspaper and the broadcasting student.

During the past winter programs have been broadcast from churches, theaters, a hotel, and from the Coliseum.

The question has arisen in the minds of many as to where the transmitting instruments are located when "broadcasting from" a certain place. The apparatus which does the actual transmitting is permanently installed in the Post-Dispatch building on which the antenna is erected, and the speech or music is conveyed to this building over a metallic circuit just as though it were a telephone conversation.

Where Announcements Are Made
 Announcements are made either from the theater or from the roof, depending on the program to be transmitted. When broadcasting from the Municipal Theater, announcements are made from the transmitting room of KSD.

The microphone, a small instrument about four inches in diameter and an inch thick, is the device which picks up sound vibrations and converts them into electrical waves, whence they travel over a three-wire circuit to the first "line amplifier." (For those who are technically inclined, it may be added that the microphone is the double-button type, and of the wires connecting it, one is neutral while each of the others is connected to one of the carbon buttons on either side of the diaphragm.)

Why First Amplified
 After passing through the first amplifying panel as shown in the diagram, the waves are conducted by wire to the transmitting room on the roof of the Post-Dispatch building. This amplification is necessary because of the "line drop" which occurs when feeble currents are conducted over wires to any great distance, and without this amplification—several million times—there would be insufficient energy to operate the transmitter.

In the transmitting room at the station they are again increased by an apparatus which is an exact duplicate of the amplifier in the theater, and it is at this point that the actual control of the volume of amplification is governed, being increased or decreased as may be necessary, depending upon the program transmitted.

Into Actual Transmitter
 From this, they pass through a fifty-watt tube which also increases their energy and then through the four 250-watt transmitting tubes—two oscillators and two modulators—and from these, to the antenna to be broadcast into infinite space.

The greatest problem is encountered when broadcasting from a theater, as many tests and experiments are necessary in order to determine the best location for the microphones. Every auditorium has different acoustical properties and these must be taken into consideration in locating the microphones.

How Microphones Are Located
 In most cases, a microphone is suspended from the balcony, for organ music, another is placed in the center of the footlights, for orchestral music, while still another is located about the center of the stage, usually cut in only for vocal num-

AN EVENING AT HOME WITH THE LISTENER IN (SEE NOTE BELOW FOR INSTRUCTIONS)

Station and City	Met.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
CFCA, Toronto, Ont.	400	6:00-7:00	6:00-7:00	6:00-7:00	6:00-7:00	6:00-7:00	6:00-7:00	6:45-7:45
CFCN, Calgary, Alta.	440	10:00-11:00				11:30-1:30	11:00-1:00	
CKAC, Montreal, Que.	430		6:00-9:00		6:00-9:00		6:00-9:00	3:00-4:30
KDKA, E. Pittsburgh, Pa.	326	5:00-9:00	5:00-9:00	5:00-9:00	5:00-9:00	5:00-9:00	5:00-9:00	6:30-7:30
KFAF, Denver, Colo.	360	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	
KFDB, San Francisco, Calif.	509	9:00-9:30	9:00-9:30	9:00-9:30	9:00-9:30	9:00-9:30	9:00-9:30	9:00-9:30
KFI, Los Angeles, Calif.	469	8:45-1:00	8:45-1:00	8:45-2:00	8:45-1:00	8:45-2:00	8:45-2:00	10:00-1:00
KGW, Portland, Ore.	492	9:30-2:00	12:00-1:00	10:00-11:00	12:00-1:00	9:00-2:00	12:00-1:00	9:00-10:00
KHJ, Los Angeles, Calif.	395	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	10:00-12:00
KPO, San Francisco, Calif.	423	10:00-12:00	10:00-12:00		10:00-12:00		10:00-2:00	10:00-12:00
KSD, St. Louis, Mo.	546	8:00-10:00	8:00-10:00	8:00-10:00		8:00-10:00	8:00-10:00	
KYW, Chicago, Ill.	345		7:00-9:00		7:00-9:00		7:00-9:00	6:00-7:00
NAA, Radio, Va.	435	5:45-7:20	6:05-7:20	6:25-8:40	5:45-7:40	7:00-7:40		
PWX, Havana, Cuba	400			8:00-10:30			8:00-10:30	
WBAP, Fort Worth, Texas	476	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	7:00-7:20	3:30-4:30
WBZ, Springfield, Mass.	337	6:30-8:00	6:30-8:00	6:30-8:00	6:30-8:00	6:30-8:00	6:30-8:00	7:00-8:00
WCA, Detroit, Mich.	517	7:00-10:00	7:00-12:00	7:00-10:00	7:00-10:00	7:00-10:00		4:00-5:00
WDAF, Kansas City, Mo.	411	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	11:45-1:00
WDAJ, College Park, Ga.	258	7:30-11:30	7:30-11:30	10:30-11:30	7:30-11:30	7:30-11:30	7:30-11:30	7:30-11:30
WDAF, Chicago, Ill.	360		9:00-1:00		9:00-1:00		9:00-1:00	8:00-11:00
WDAR, Philadelphia, Pa.	395	5:30-6:00	5:30-8:00	5:30-9:00	5:30-6:00	6:00-1:00	5:30-6:00	
WDT, New York, N. Y.	405			5:00-5:50		9:00-11:00		
WEAF, New York, N. Y.	492		5:30-6:00	5:30-8:00	5:30-8:00	5:30-6:00	5:30-8:00	
WFAA, Dallas, Tex.	478	8:30-9:30	8:30-12:00	8:30-9:30	8:30-9:30	8:30-9:30	8:30-12:00	9:30-10:30
WFI, Philadelphia, Pa.	395	5:00-5:30	5:00-7:00	5:00-9:30	5:00-7:00	5:00-5:30		5:30-6:30
WGI, Medford, Mass.	360		6:30-8:00	6:30-8:00	6:30-8:00	6:30-8:00	6:30-8:00	6:30-10:00
WGM, Atlanta, Ga.	429	9:30-10:30	9:30-10:30	12:00-1:00	9:30-10:30	9:30-10:30	9:30-10:30	7:30-8:00
WGR, Buffalo, N. Y.	319	6:00-8:00		6:00-8:00		6:00-8:00		
WGY, Schenectady, N. Y.	380	6:45-9:00	6:45-9:00		6:45-9:00			5:30-6:30
WHA, Madison, Wis.	360	7:30-8:30		7:30-8:30		7:30-8:30		
WHAS, Louisville, Ky.	400		7:30-9:00		7:30-9:00		7:30-9:00	
WHB, Troy, N. Y.	380	8:00-9:30						
WHB, Kansas City, Mo.	411		8:00-10:00		8:00-10:00			8:00-10:00
WHK, Cleveland, O.	360	5:00-5:30	5:00-5:30	7:00-8:55	5:00-5:30	5:00-5:30	5:00-5:30	7:00-8:55
WIP, Philadelphia, Pa.	509	4:00-5:30	5:00-10:00	5:00-5:30	5:00-8:30	5:00-5:30	6:00-10:00	
WJAX, Cleveland, O.	390		6:30-8:30					
WJAZ, Chicago, Ill.	448		9:00-1:00	9:00-1:00	9:00-1:00	9:00-1:00	9:00-1:00	4:00-7:00
WJY, New York, N. Y.	405			5:30-9:30	5:30-9:30	5:30-9:30		1:15-4:00
WJZ, New York, N. Y.	455	5:30-9:30	5:30-9:30	5:30-9:30	6:30-9:30	5:30-9:30	5:30-9:30	6:30-8:30
WKAQ, San Juan, P. R.	360		9:25-10:55				9:25-10:55	
WLAG, Minneapolis, Minn.	417	6:30-10:30	6:30-10:30		5:30-10:30	6:30-10:30		7:30-8:30
WLW, Cincinnati, O.	309	7:00-9:00	9:00-11:00	7:00-9:00	9:00-11:00			
WMAO, Chicago, Ill.	448		6:00-9:00	6:00-9:00	6:00-9:00	6:00-9:00	6:00-9:00	
WMC, Memphis, Tenn.	500	8:00-9:30	8:00-12:00	8:00-9:30	8:00-9:30	8:00-12:00	8:00-9:30	
WOAI, San Antonio, Texas	385		9:00-10:30		7:30-8:30			9:30-10:30
WOAY, Omaha, Neb.	528	9:00-10:00	9:00-10:00		9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00
WOC, Davenport, Ia.	484	7:00-8:30		10:00-11:00	7:00-8:30	7:00-8:30	9:30-10:30	7:00-9:00
WOO, Philadelphia, Pa.	509	5:45-9:00				5:45-9:00		
WOR, Newark, N. J.	405	6:00-10:00	5:15-6:30	6:00-9:00	5:15-6:30	5:15-6:30	6:00-9:00	
WOS, Jefferson City, Mo.	441	8:00-9:30		8:00-9:30		8:00-9:30		
WSAI, Cincinnati, O.	309		7:00-9:00		7:00-9:00		9:00-11:00	
WSB, Atlanta, Ga.	429	7:00-12:00	7:00-12:00	7:00-12:00	7:00-12:00	7:00-12:00	7:00-12:00	7:30-9:00
WSY, Birmingham, Ala.	360	8:00-8:45		8:00-8:45		8:00-8:45		7:30-8:30
WWJ, Detroit, Mich.	517	6:00-7:30	6:00-7:30	6:00-7:30	6:00-7:30	6:00-7:30		4:30-5:30

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. If in addition your city is using Daylight Saving Time, add one hour to this result.

bers. Changes from one to the other, depending on the music, to be picked up, are made by the operator at the amplifying panel back of the stage.

When announcements are to be made, a signal from the announcer notifies the operator to cut in a microphone in small sound-proof room "back-stage," constructed for the purpose, and when they are concluded, another signal notifies him to change back to the other microphone. This accounts for the "click" so often heard just before and after announcements.

Desires Stone Chippers

SCHENECTADY, N. Y.—A correspondent of Station WGY, located here, who has a beautiful faith in the efficiency of Radio in the capture of criminals recently requested the station to announce that a reward of \$50 would be paid for the arrest of the "parties" guilty of chipping words off the family grave stone.

SUMMER PHOTOGRAPHS? EARN \$\$\$\$—

SUMMERTIME means summer pictures. You and your camera can earn a dollar by sending The DIGEST out-of-doors photos involving the use of Radio in camp, the automobile, swimming, boating, canoeing, on the hike, playing golf, etc. Send such photographs with negatives and a few descriptive words, including a stamped, addressed envelope so that unsuitable pictures may be returned.

SUMMER PHOTO DEPARTMENT,
 Radio Digest,
 123 Madison St., Chicago.

AIN'T SCIENCE GRAND? RADIO BARBER SHOPS!

Mme. Whoozis Disarms Tonsorial Artist with Gift o' Gab

COLUMBUS, O.—Tired guest at Hotel Columbus: "Well, if I must go into the barber shop, I must. And I can just imagine it. A baldheaded barber who talks about the ladies, a short barber who talks about baseball, a tall barber who talks—oh, what's the use?"

He enters the barber shop, finds absolute silence, gets in chair, gives order. Barber nods silently. Sharp metallic noise in corner. Guest starts.

Barber (reassuringly): "That's all right, sir. Just Station BOWW coming in. Mme. Whoozis sings the Barcarolle from 'Gefuente Fish' today and Professor Horace Bang of Catsknuckle Institute talks on 'A plea for more general use of Cerebellum.' Excellent program today, sir."

Guest listens all the way from haircut to massage. Smilingly pays bill of \$4.45, compliments management and goes to writing room. Writes: "Dear Bill: Just met first barber who didn't talk you to death. They couldn't talk for listening to Radio. Ain't science wonderful?"

WLW Again Sends Opera

CINCINNATI, O.—Station WLW, Crosley Manufacturing Co. here, again broadcast an opera from the famous Cincinnati Zoological Gardens recently. The operas are broadcast directly from the open-air theater by means of a special apparatus and sent out from the studio at the Crosley plant some miles away.

SEA AIRPHONE TRIO PRAISED AS HEROES

MEDALS GIVEN OPERATORS BY LOS ANGELES MAYOR

Impressive Ceremonies Mark Honors to Three Who Saved 250 from Ship Fire

By Strachan McMillan
 LOS ANGELES.—Heroic gallantry, exemplified in the faithful performance of duty while facing death, received official recognition recently when Mayor George E. Cryer, of this city, publicly bestowed gold medals of honor and more substantial rewards in the form of checks for \$500 each on the three Radio operators of the steamship City of Honolulu, in the final scene of the last act of the great ocean tragedy of October 12, 1922, when the steamer was burned and abandoned at sea 700 miles from this city.

The presentation took place on the balcony of the City Hall. The recipients were W. P. Bell, chief Radio operator; H. D. Hancock, second operator, and N. C. Kumler, third operator. The presentation was at the instance of the Radio Corporation of America, employer of the operators. A. A. Isbell, Pacific Coast manager of the corporation, introduced the recipients to the mayor and served as his aid during the ceremonies.

Modestly Receive Medals
 Modest and unassuming in demeanor, the trio chatted informally with all who approached them before and after the ceremony but showed marked disinclination to discuss the exploit in which they were heroes. The young men are of medium height and build, and clean cut. Bell, since the burning of the City of Honolulu, has been operator on the steamship President Harrison but at present is awaiting a new assignment. His home is in Oakland, Calif. Hancock, resident of Venice, Calif., is now chief operator on the steamer City of Los Angeles; Kumler, who lives in this city, has just returned from the Orient as operator on the steamer West Niger; he also is disengaged. This was their first opportunity to meet in this city since last October at the same time.

Mayor Cryer's Address
 In his address Mayor Cryer said: "This is an expression of our responsiveness to American heroism, loyalty to duty and acceptance of responsibility by three young men which resulted in saving about 250 lives through the miracle of Radio which circles the world with instant communication and the power to render instant service through God's free air, between states and nations, o'er land and sea. "We marvel at the scientific achievement but we remember, too, that without the human soul these inventions would be of little value. We are here to pay slight tribute to these stalwart young Americans whose intrepidity made effective the work that science had entrusted to them."

How Passengers Were Rescued
 The City of Honolulu left Honolulu for Los Angeles on October 7, 1922, on what was to be her final trip. Fire was discovered at 5:30 a. m., October 12. It was then that Radio spread "S O S," the distress call that thrills the world when it is broadcast. Continuous Radio communication was maintained with the shore, and the vessels which were rushing to the rescue.

At 9:30 a. m. the passengers, and the crew of 250, had left the ship. Bell and Captain R. H. Lester went last. Six hours later the S. S. West Faralon rescued them all. At daylight, next morning, they were transferred to the U. S. naval transport Thomas, from which they were landed in Los Angeles harbor. Later the floating hulk of the City of Honolulu was sunk by gun fire from the U. S. S. Shawnee, because the former was a menace to navigation.

NATION-WIDE TALK HALTED BY DEATH

STOPS PRESIDENT'S TRANS-CONTINENTAL MESSAGE

Five Stations, Coast to Coast, Had Planned to Prove Radio's Great Sending Power

SAN FRANCISCO.—The unexpected sudden illness and death here of President Harding put an end to plans for what would have been the first attempt at a national broadcast to millions of Radiophans by the late chief executive. His message was to have been broadcast simultaneously by five stations located from coast to coast.

Elaborate arrangements had been made by Stations KPO, San Francisco; WOAW, Omaha; WMLAQ, Chicago; WEAJ, New York, and WCAP, Washington, D. C., to carry the words of the deceased from the Pacific to the Atlantic coast. The stations were linked by the long-distance telephone lines of the American Telephone and Telegraph company.

Work Weeks on Plan

Engineers, telephone and Radio worked several weeks to perfect the plan. Many tests were made to prevent distortion of sound caused by the great distance to be covered. Line amplifying devices of special design were applied to the apparatus in each station. At a given signal the operators of the stations were to have moved the switches which would have formed the continuous connection.

One of the greatest obstacles to the success of the scheme was the fact that there was only one wire from the microphone in the auditorium in San Francisco, where the President was to have spoken, to the central telephone station in Denver. At every other station precautions had been taken to install a system of alternate wires, which in the event of their breakdown would have transmitted the speech without interruption.

Radiophans Hear Death of Harding Broadcast

Dr. George T. Harding Hears via Ether of Brother's Death

CHICAGO.—Hundreds of thousands of Radiophans while listening in to concerts heard their favorite stations stop their programs to announce the news of President Harding's death. The programs were then discontinued in reverence of the moment. The first flash was broadcast from Station KPO, Hale Brothers, San Francisco. Then other big stations heard the news and as they put it on the air, the word travelled from West to East with lightning rapidity, scoring a beat on practically every newspaper in the country.

Dr. George T. Harding of Columbus, Ohio, received word of the sudden death of his brother, the President, through a neighbor who heard the news broadcast. The neighbor heard Station KPO a few moments after President Harding had passed away in San Francisco.

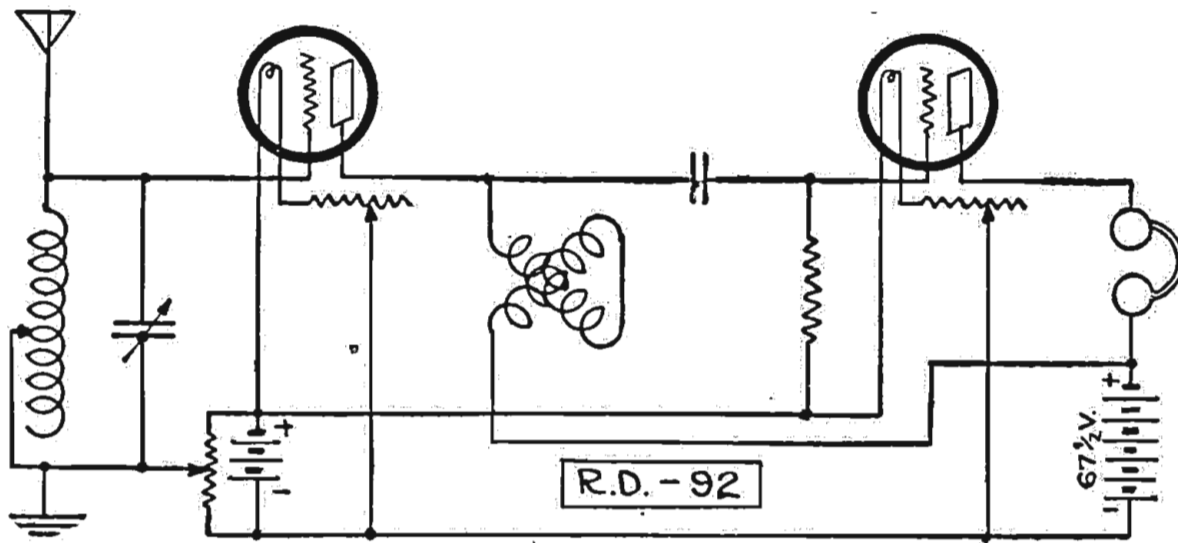
PATENTS ON RADIO

Can you secure a patent on your Radio invention? Does your apparatus or circuit infringe existing patents? These questions and others can be answered promptly by consulting my special library of Radio patents compiled to assist Radio inventors and manufacturers. Send for booklet on Radio patents.

JOHN B. BRADY

Ouray Building WASHINGTON, D. C.

SIMPLE TWO TUBE HOOK-UP R.D.92



A TWO tube hook-up requiring a minimum amount of apparatus is shown in the illustration. The circuit is designed for selectivity, clarity and distance. For additional volume audio frequency amplification should be added. The usual method of inserting the primary of the audio frequency transformer in place of the receivers is employed.

Both tubes are hard (amplifier) tubes; a plate voltage of about 67 in employed. Due to variations in tubes, it would be best to test for best taps in order to get maximum distance reception.

The tuning unit consists of a single slide tuning coil and a variable condenser (.00025 mfd.) shunted across it. In Radio frequency work it is advisable to keep all capacities as low as possible. For this reason a lattice wound type of variometer is recommended. The grid condenser has a capacity value of .00025 mfd. and the leak a resistance of two megohms. The rheostats and A battery should conform with the type required for the particular tube used.

The potentiometer for grid potential should have at least 400 ohms resistance.

DUCK DINNER GIVES MAC MILLAN HUNCH

Gets Idea of Taking Set to Arctic As He Chews Drumstick

CHICAGO.—Captain Donald MacMillan first got his idea of taking Radio on his trip northward to the pole at a "Duck Dinner" given him in this city last spring. At the dinner Captain MacMillan met E. F. McDonald, Radio engineer and manufacturer, who explained the value of a receiving set as a means of getting news, concerts and other matter from the States during the long stretches of Arctic solitude, which is the real hardship of the North.

At first the explorer explained that limited space prevented the installation of a set, but later he agreed that it would be fine for his men. As soon as he was sold on the receiving end, Mr. McDonald and a friend began to expound the greater value of a transmitting set, incidentally mentioning the possible distribution of information and stories to the world at home. The Captain finally decided he wanted a complete Radio outfit, and many persons believe that the equipment will make him the most popular arctic explorer, whether he gets to the North Pole or not.

AUXILIARY TUNER

THIS new instrument connected to your present receiving set with one wire enables you to easily bring in both the long and short wave stations which you cannot get with your present equipment. It also enables you to eliminate that local interference so you may listen to distant stations.

Copyrighted diagram and complete instructions for building and operating this instrument \$1.00, or with all parts, including Condenser, Coils, Switches, Panel and Cabinet, \$10.00. Complete instrument, \$15.00. All goods prepaid.

S. A. TWITCHELL

1925 Western Avenue, Minneapolis, Minn.

Plan to Organize Listeners

BALTIMORE, MD.—The Radio Listeners' Protective Association, with headquarters here, is endeavoring to form a national organization of Radio users. Temporary officers have been elected and a Maryland charter has been obtained. A Baltimore chapter has been started and it is proposed to found chapters in other cities as the membership grows.

Radio music picked up by wheeled carriers is now taking the place of the hurdy-gurdy in the streets of London.

Radio Equipment

EDISON Elements for making "B" Batteries, 6c per pair; tubes, 2c each. Nickel Wire, Insulators and Cabinets at reasonable prices. TODD ELECTRIC CO., 178 Lafayette St., New York City.

HAMDOM PLANNING BIG CHICAGO MEET

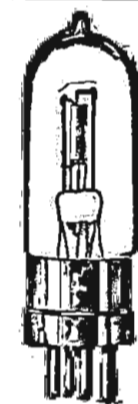
A.R.R.L. NAMES CITY FOR SECOND CONVENTION

Transmitting Amateurs from Far and Near to Attend Confab and Discuss Problems

CHICAGO.—The largest gathering of Radio amateurs in history is scheduled for this city September 12 to 15, when the second national American Radio Relay League convention will be held here under the auspices of the Chicago Radio Traffic Association. This was announced recently following receipt of information that Chicago had been selected as the scene of the convention by the A. R. R. L. board of direction at a meeting in New York.

Transmitting fans all over the country and Canada, from New York to the Golden Gate and Ontario to the Gulf, many of whom communicate with each other nightly over thousands of miles through the A. R. R. L. system, and who know each other best by their call letters, will here meet face to face for a discussion of their special problems.

There has been but one other such convention, held here in 1921, and the tremendous strides in amateur Radio since that time, and with it the growth of the amateurs' representative body, the A. R. R. L., will make the coming event one of great moment to all amateurs and to the Radio public in general.



WE REPAIR RADIO TUBES

WD-11 ...\$3.50	UV-199 ...\$3.75
WD-13 ... 3.50	UV-299 ... 3.75
UV-200 ... 2.50	UV-201-A ... 3.75
UV-201 ... 3.00	C-301-A ... 3.75
C-300 ... 2.50	UV-202 ... 4.00
C-301 ... 3.00	C-302 ... 4.00

MAIL ORDERS SOLICITED AND PROMPTLY ATTENDED TO.

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

LARGEST RADIO STORE IN AMERICA

BUILD YOUR OWN SET

ALL INSTRUCTIONS INCLUDED ALL PANELS DRILLED—READY TO MOUNT

FLEWELLING CIRCUIT COMPLETE!!

CONSISTING OF	Reg. Price	Our Price
6x14 Formica Panel	\$1.28	\$1.10
23 Plate Variable Condenser	3.30	1.45
Three .006 Mica Condensers	3.00	2.25
CRL Variable Grid Leak	1.85	1.35
Grid Leak	.40	.25
2 Coll Adjustable Honeycomb Coil Mounting with Knobs	4.00	2.65
50 Turn Honeycomb Coil	.75	.40
75 Turn Honeycomb Coil	.75	.40
2 Coll Mounts with Straps	1.20	.80
1 Bakelite Socket	1.00	.45
Vernier Rheostat	1.50	1.35
1 Bakelite 3" Dial	1.00	.25
8 Binding Posts	.80	.40
1 Baseboard for Mounting	.30	.20
1 Blueprint with Complete Instructions for Assembly and Wiring	1.00	.50

Regular Price\$22.16

Our Price
\$12⁴⁵

LONG RANGE HEAD SETS \$3⁶⁵



Made in style and design proved by use and experiment to be the best. Coil wound with about 6,500 turns of No. 40 enamel coated copper wire. Direct current resistance approximately 1,600 ohms. Impedance at average music and voice frequency (800 cycles) is 21,000 ohms.

MASTER BALOWIN PHONES
Type C with head band and cord...\$6.95
Type C unit... 3.95
Branded superior headset... 5.75
3,000 Ohm Guaranteed Headsets, \$8.50 value 3.65

HAZELTINE NEUTRODYNE CIRCUIT COMPLETE!!

ALL PARTS LICENSED UNDER HAZELTINE PATENTS

- 1 7x21x3/16 drilled formica panel
- 1 Howard rheostat
- 3 John Firth bakelite sockets
- 8 Binding posts
- 3 23 plate variable condensers
- 1 Wave control neutroformer
- 2 Radio frequency amplifying neutroformers
- 2 Grid neutralizing condensers
- 1 .00025 micron grid condenser
- 1 Marco variable grid leak
- 1 Base board for mounting
- 25 feet tinned copper bus bar wire and complete instructions for assembling and wiring.

\$28⁶⁰

ALL MDSE. GUARANTEED BY US TO BE OF FIRST QUALITY



MAIL ORDERS ADDRESS DEPT. R. D.

509 So. STATE ST.

CHICAGO, ILL.

For the Camp

Make each evening in your camp delightful—with

The New GREBE Broadcast Receiver

The 20-foot wire, supplied with this Receiver, is the only antenna necessary. The cabinet has compartments for all necessary batteries.

Ask Your Dealer about its Seven Points of Satisfaction

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

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

The Week's Advance Broadcast Programs

Tuesday, August 14

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert. Selection from "Chu Chiu Chow," Star Concert Orchestra; "Sonia," Fred Stanger, tenor; "Melodie," Manny Roth, violinist; "Laurer," Star Concert Orchestra; "Song of the Clock," Fred Stanger; "I Know of Two Bright Eyes," Star Concert Orchestra; "Legend," Manny Roth, violinist; "Air de Ballet," Star Concert Orchestra; "Moon of the Cherry Gardens," Fred Stanger; Selection of Scottish Airs, Star Concert Orchestra.

KHJ (Pacific, 395), 2:30-3:30 P. M., Matinee musical; 6:45-7:30 P. M., Children's hour; 8:00-10:00 P. M., De Luxe program, arranged by Harry James Beardley, baritone.

KDKA (Eastern, 326), 5:15 P. M., Dinner Concert, Grand Symphony Orchestra; 6:45 P. M., The Children's Period; 7:20 P. M., Concert, Mrs. D. E. Lyde, reader; Mrs. Edwin E. West, soprano; Dorothy Trounbley, cello; Mrs. Gertrude Robinson Dodds, piano; Howard Keister, trombone; Mrs. Mart Keister Kerr, accompanist.

KGW (Pacific, 492), 10:00-11:00 P. M., Dance music. George Olsen and his orchestra.

KPD (Pacific, 423), 8:00-10:00 P. M., Program arranged by Augusta Hayden.

KSD (Central, 455), 8:00 P. M., Band concert.

KYW (Central, Daylight Saving, 345), 1:35-2:00 P. M., Concert, Lyon & Healy Concert Department; 7:00-7:58 P. M., Musical program, courtesy of Giovanni Genaro School of Italian Bel Canto; Cope Harvey's Orchestra; College Inn, Sallie Menkes, pianist.

WDAR (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00, Musical Program, Arcadia Cafe Concert Orchestra; Children's Hour, talk on care of children; 4:30-5:55, Musical program, talk, "Affairs of the Heart," Betsy Logan; 7:30 P. M., Bedtime stories, Dream Daddy.

WFAA (Central, 476), 8:30-9:30 P. M., Jerome I. Wright's Male Quartet of Singers; 11:00-12:00 Watson's Lullaby-Loch Orchestra.

WF (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner dance music, Meyer Davis Bellevue Stratford Orchestra; 3:00, Song recital; 7:00-7:30, Children's own half hour, stories by Cousin Sue; 8:00, Boy Scouts Radio Corps, under supervision of Boy Scouts of America; 8:30, Song recital; 10:30, Dance music, Meyer Davis Bellevue Stratford Dance Orchestra.

WGI (Eastern, 360), 12:00 noon, Organ recital; 5:00 P. M., Twilight Tales, Eunice L. Randall; 7:00 P. M., Concert by Mrs. Nellie Bancey Gay, Contralto, Ruth T. Werthebe, Accompanist.

WGR (Eastern, Daylight Saving, 319), 12:00-12:30 P. M., Selections at the Wurlitzer, George Albert Bouchard; 4:00-5:30, Catherine Stang, violinist, Martha Gumph, harpist.

WGY (Eastern, 380), 7:45 P. M., Musical Program, "O Canada," Chorus Franco-Canadian; "Valse Chromatique," Beatrice Gerard, pianist; "L'Apostat," L. N. Marvill, bass; "Gavotte," Georgette Manny, violinist; "Les Solrees de Quebec," Chorus; "Les Anciens Canadiens," Guillaume Loiselle, reader; "O Carillon," Alphons Gerard, baritone; "Obstination," Beatrice Gerard, soprano; "Les Yeux," "Les Trois Couronnes d'or," Edward Froment, tenor; "L'Amour," Henri Pellerin, baritone; "Fantasie de Passion," Georgette Manny, violinist; "Les Chants Canadiens," chorus.

WHAS (Central, 400), 4:00-5:00 P. M., Concert by the Mary Anderson Theatre orchestra, Ollie Jones, conductor; "Just Among Home Folks"; Organ recital, Roy C. Parks; 7:30-9:00, Concert under direction of Howard Weller, Harpist.

WIP (Eastern, Daylight Saving, 509), 1:00-2:00 P. M., Organ recital, Karl Bonawitz, Germantown Theater; 3:00, Song recital, 6:00, Dinner music, WIP Little Symphony Orchestra; Dick Began, director; 7:00-7:30, Bedtime stories, Uncle Wip; 8:30, Organ recital, Karl Bonawitz, Germantown Theater.

WOO (Eastern, Daylight Saving, 509), 11:00-11:30 A. M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wanamaker Tea Room Orchestra; 4:45-5:30, Organ recital, Mary E. Vogt; 7:30, Sport results.

WJAX (Eastern, 390), 7:30 P. M., Concert furnished by Cleveland News.

WLW (Eastern, 309), 10:00 P. M., "My Heart At Thy Sweet Voice," "Sunshine Song," Gladys Helen Woerz, soprano; "Behind the Scenes," a Play in one Act; Selections, Circle Orchestra.

WMAQ (Central, Daylight Saving, 448), 4:30 P. M., Glenn Dillard Gunn School of Music; 9:00, Concert, LaSalle Roof Garden Orchestra, direction E. E. Sheets, Jr.; 9:15, Mr. & Mrs. Wm. R. Dicienson, tenor and contralto.

WVJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 3:30, News Orchestra, Schmeman's Band.

Thursday, August 16

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "The Magic Flute," orchestra; "The Mocking Fairy," Nelly Gill, soprano; "Andante," Jacques Stern, cellist; "The Blue Danube," orchestra; "Music When Soft Voices Die," Nelly Gill soprano; "Air de Ballet," orchestra; "A Dream," Jacques Stern, cellist; Intermezzo from "Nella," orchestra; "Song of the Open," Nelly Gill, soprano; "La Pere de la Victorie," orchestra.

KHJ (Pacific, 395), 2:30-3:30 P. M., Matinee Musical; 6:45-7:30 P. M., Children's Hour; 8:00-10:00, De Luxe program.

KDKA (Eastern, 326), 5:15 P. M., Dinner Concert, Grand Symphony orchestra; 7:20, Concert, Brass Quartet, Mrs. Margaret Leyda, contralto; Gladys Langfeld, soprano.

KGW (Pacific, 492), 5:00-5:00 P. M., Woman's program devoted to Child Training; 10:00-11:00 P. M., Dance music, George Olsen's orchestra.

KPD (Pacific, 423), 8:00-9:00 P. M., Organ recital; 9:00-10:00, Albert Rosenthal, cellist; Mrs. Albert Rosenthal, soprano; Evelyn Eck, pianist, and Melvin Stelmatz.

KYW (Central, Daylight Saving, 345), 1:35-2:00 P. M., Concert, Lyon & Healy Company; 7:00-7:58, Concert, Emilie Cipriani, soprano, Sallie Menkes, accompanist, Herbie Mintz, pianist; Cope Harvey's orchestra.

WBZ (Eastern, 337), 5:45 P. M., Organ recital from the Capitol theater by Elsie Robbins Gross; 7:05, Concert, Beatrice Mosher, lyric soprano, Alma Bernard, tenor, Boul Ricard, violinist; 8:20, Bedtime story for grown-ups.

WDAR (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra, Feri Sarkozi, director; 2:00-3:00, Short talks and musical program; 7:30, Bedtime stories, Dream Daddy.

WFAA (Central, 476), 8:30-9:30 P. M., Mario H. Bolack, blind pianist; Mrs. Clyde F. Magee, reader.

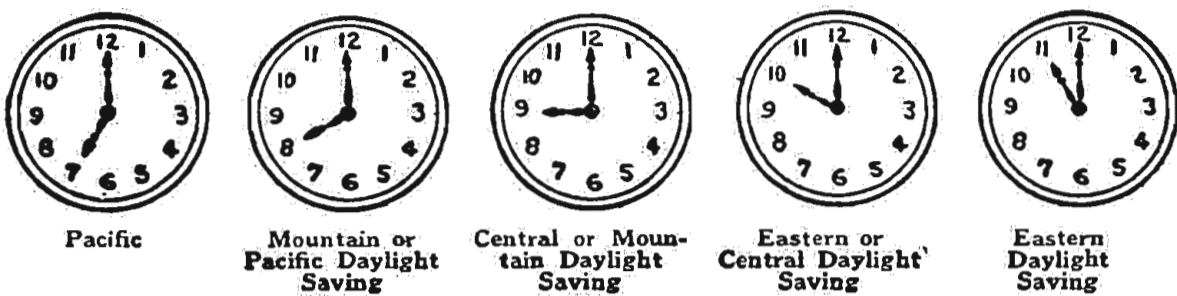
WF (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner dance music, Meyer Davis Bellevue Stratford Orchestra; 3:00, Song recital; 6:30, Dinner music, Meyer Davis Bellevue Stratford Orchestra; 8:00, Musical program.

WGI (Eastern, 360), 12:00 noon, Organ Recital; 7:30 P. M., "Squaring It With the Boss," presented by the Amrad Players; "Bits of Wisdom," by George Brinton Beale, Boston newspaper editor.

WGR (Eastern, Daylight Saving, 319), 4:00-5:30 P. M., Catherine Stang, violinist; Martha Gumph, harpist; tea-time music; 6:00-6:30, George Albert Bouchard at the Wurlitzer.

WGY (Eastern, 380), 7:45 P. M., Musical program, "The Trumpeter," Raymond Becker, baritone; Selections, Raymond J. Zwack, violinist; John M. Zwack.

What Time Is It?



THE above clock dials are shown to clear up the misunderstanding which the various time bands and the Daylight Saving plan are creating. Although each dial registers time one hour ahead or behind of its neighbor, the exact period indicated on each dial is the same as that on every other. This chart will aid in the use of the advance programs and the schedules in the Radiophone Broadcasting Station Directory, both of which give the hours stated in the particular kind of time in use at each station. Only features are listed in the advance programs below. Much additional data and such parts of station schedules as are regular features week in and week out, will be found in the station directory which appears serially continuously on page eight.

gram, Music and story by Aunt Nell: 8:00-9:00 P. M., Concert Enterprise Philharmonic Orchestra; 10:00-11:00 P. M., Dance music, George Olsen and his orchestra.

KSD (Central, 456), 8:00 P. M., Music from Fashion Show, Municipal Theatre in Forest Park.

KYW (Central, Daylight Saving, 345), 7:00-7:58 P. M., Concert, courtesy Cable Piano Company, Harry Geise, pianist; Cope Harvey's orchestra.

WBZ (Eastern, 337), 7:05 P. M., Concert Sarah K. Howes, mezzo-soprano; WEB trio; 8:30, Bedtime story for grown-ups, prepared by Orison S. Marsden.

WDAR (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater, dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00, Musical program, Arcadia Cafe Concert Orchestra, Feri Sarkozi, director; 4:30-5:30, Song recital and fashion talk; 7:30, Bedtime stories, Dream Daddy; 8:00, Song recital and dance music, Howard Lanin's Arcadia Cafe Dance orchestra.

WF (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner dance music, Meyer Davis Bellevue Stratford Orchestra; 6:30, Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 7:00-7:30, Children's Own Half Hour, Stories by Cousin Sue.

WGI (Eastern, 360), 12:00 noon Organ recital; 6:45 P. M., Girls' Hour conducted by Eunice L. Randall; 7:30 P. M., Duo piano Battle of Music; Concert by Uncle Eddie and Uncle John.

WGR (Eastern, Daylight Saving, 319), 12:00-12:30 P. M., Selections at the Wurlitzer, George Albert Bouchard; 4:00-5:30, Catherine Stang, violinist, Martha Gumph, harpist; tea-time music; 9:00-11:45 P. M., Concert Program.

WHAS (Central, 400), 4:00-5:00 P. M., Concert by

organ recital, Mary E. Vogt; 12:00-12:55, Luncheon music, Wanamaker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt; 7:30, Sports results and police reports.

WLW (Eastern, 309), 8:00 P. M., "Winter," "Spring Song," Margaret Niesel, pianist; Quartet selections, The Cincinnati Harmony Four; "Serenade," "A la bien Aimee," Margaret Niesel, pianist; Concert, The Cincinnati Harmony Four, "Drifting Back to Dreamland," Steeritz for Erin; "Dance selections, Aichele Novelty Orchestra; "Old Time Waltz Songs," The Cincinnati Harmony Four; selections Aichele Novelty Dance Orchestra; The Cincinnati Harmony Four, "Auntie Laurie," "When You and I Were Young Maggie"; Selections by Aichele Novelty Dance Orchestra.

WMAQ (Central, Daylight Saving, 448), Program by Cosmopolitan School of Music and Dramatic Art; 7:00, Georgette Faulkner, stories for children; 9:00, LaSalle Roof Garden Orchestra; 9:15, John Stamford, tenor.

WVC (Central, 484), 8:00 P. M., Pipe Organ Recital, Erwin Swindell, organist, Harold Stalk, boy soprano; 10:00 P. M., Concert "Blackhawk Hotel Orchestra."

WVJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 8:30, News Orchestra, Schmeman's Band.

WE REPAIR YOUR VACUUM TUBES

WD-11, WD-12, UV-199, UV-201-A, C-301-A.....\$3.50 each
 UV-200, C-300, AP Detectors.....\$2.75 each
 UV-201, C-301, AP Amplifiers.....3.00 each
 DV-6, DV-6-A.....3.50 each
 UV-202.....4.00 each

And Guarantees Them Equal to New

QUICK SERVICE include with your order remittance to cover repair parcel postage for one pound per tube.

Abalene Radio 14 Vesey Street New York, N.Y.

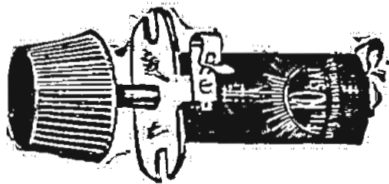
Wednesday, August 15

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "Phedra," Orchestra; "Schon Rosmarin," Harry Adaskin, violinist; "Amina," orchestra; Selections, Muriel Lomax, soprano; "Serenade," Orchestra.

GET A RITTER PORTABLE LOOP and you are assured of proper results. Ritter loops can be assembled in five minutes. Instructions with every loop. Price \$1.00. By mail, 10c extra.

RITTER RADIO CO.
230 Canal Street New York

For REAL Filament Control



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

FILKO-STAT

At dealers in high grade Radio Supplies, everywhere. **\$2**

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 wall 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
.0002	.35	.003	.60
.00025	.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	1.75
.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 postpaid.

Chas. Freshman Co. Inc.
Radio Condenser Products
106 Seventh Avenue NEW YORK

SPECIAL SALE on Type 400 MELCO RECEIVER

at distributor's price of only... **\$17.50**
Regular List Price \$35

The Melco Type 400 Radio Receiver covers all broadcasting ranges thoroughly from 165 to 600 meters and assures a great degree of selectivity on the average small outdoor aerial. The Melco is the ideal home set because it is least affected by electrical disturbances. Sold with our absolute money-back guarantee.

Shipped immediately on receipt of purchase price—F. O. B. N. Y.

WRITE FOR DESCRIPTIVE BOOKLET

AMSCO PRODUCTS, Inc.

Broome & Lafayette Street

Fairbanks Building

NEW YORK CITY

"MAKE PERFECTION YOUR SELECTION"

BRANDES
Superior Phones. **\$5.45**
\$8.00 list—Special.....

N. & K. PHONES
6000 Dnms. Made in Germany. The best Phones made. List \$16.00..... **\$6.50**

COCKADAY
Complete parts for this wonderful circuit; only best material used. Guaranteed to work properly. Special complete... **\$13.95**

REINARTZ
We specialize in the Reinartz circuit. Complete standard parts. We guarantee results..... **\$11.95**

VARIABLE CONDENSERS (Moulded Ends)

	List Price	Our Price
3 Plate	2.00	1.25
11 Plate	3.50	1.75
17 Plate	4.00	1.95
23 Plate	4.00	1.95
43 Plate	5.00	2.25
11 Plate Vernier	6.00	3.25
17 Plate Vernier	6.00	3.25
23 Plate Vernier	6.00	3.50
43 Plate Vernier	7.50	3.95

PERFECTION RADIO CORPORATION,
Six New York Retail Stores

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

NEUTRODYNE
Complete parts for 4 tube Fada Neutrodyne Set. Mostly Fada parts used. **\$35.00**

MUSIC MASTER
Loud Speaker. Supreme Quality. Clear and Loud. List \$30. Special. **\$25.75**

FLEWELLING CIRCUIT
Complete parts, including two mounted Coil Mountings. Only standard advertised parts used. Complete..... **\$13.95**

2 STEP AMPLIFIER
Completely assembled, ready to use. None better made..... **\$11.95**

PANELS—3/16" Thick

	Hard Rubber Bakelite	Hard Bakelite
7x10.....	\$1.35	7x18.....\$1.65
7x12.....	1.25	7x21.....1.85
7x14.....	1.40	7x24.....2.15
	1.95	

CABINETS
Extra fine quality—Hinged top—Mahogany finish.
7x10.....\$2.75 7x18.....\$3.50
7x12.....2.95 7x24.....3.95
7x14.....3.25 12x14.....3.95

59 Cortland St., NEW YORK CITY

ADVANCE PROGRAMS

(Continued from page 7)

WHAAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater orchestra, Ollie Jones, conductor; Organ recital, Roy C. Parks; 7:30-8:00 P. M., Concert by Stemple's Novelty orchestra.

Baseball Dope" Monte Cross, old time ball player; 7:00-7:30, Bedtime stories, Uncle Wip. WOO (Eastern, Daylight Saving, 509), 11:00-11:30 A. M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wanamaker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt; 7:30, Sports results and police reports; 7:45, Dinner dance music, Hotel Adelphi Roof Garden Dance Orchestra; 8:30, Musical program; 8:45-10:50, Dance music, Hotel Adelphi Roof Garden Orchestra, Ray Miller, director; 11:10, Continuation of dance music.

WMAQ (Central, Daylight Saving, 448), 4:30 P. M., Chimes; 7:30, Musical lecture, Mrs. Marx E. Oberndorfer; 9:00, Concert, LaSalle Roof Garden Orchestra; 9:15, Armour Jubilee Singers. WOC (Central, 484), 3:30 P. M., Educational talk by C. E. Wilent; 5:45 P. M., Chimes Concert; 6:30 P. M., Sandman's Visit. WWJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 8:30, News Orchestra, Schmeman's Band.

WGR (Eastern, Daylight Saving, 319), 12:00-12:30 P. M., George Albert Bouchard at the Wurlitzer; 4:00-5:30, Catherine Stang, violinist, Martha Gumph, harpist, tea-time music; 6:00-11:45 P. M., Concert program. WHAS (Central, 400), 4:00-5:00 P. M., Concert by 300 Mery Anderson Theater. WIP (Eastern, Daylight Saving, 509), 3:00 P. M., Short talks and song recital; 6:45, "Radio Baseball Dope", Monte Cross, old-time ball player; 7:00-7:30, Bedtime stories and roll call, Uncle Wip. WOO (Eastern, Daylight Saving, 509), 11:00-11:30 A. M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wanamaker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt; 7:30, Sports results and police reports; 7:45-8:30, Dinner dance music, Hotel Adelphi Roof Garden Orchestra; 8:30-9:30, Concert, WOO Orchestra, Robert E. Golden, director; vocal selections; 9:30, Organ recital, Mary E. Vogt. WLW (Eastern, 309), 8:00-9:00 P. M., The Zoo Opera Company, direction Ralph Lyford, artists from Metropolitan Opera Company and other leading opera companies, chorus of sixty voices; 9:00-9:30 P. M., Rogor 11111 Dance orchestra; 9:45-10:45 P. M., Continuation of the performance of the Zoo Grand Opera Company.

Saturday, August 18

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "LaBoheme" orchestra; Selections, Kathleen Cameron, soprano; "Aria", Jacques Stern, cellist; "Scenes Poetiques", orchestra; Selections, Kathleen Cameron, soprano; "Skaters Waltz", orchestra; "To a Wild Rose", Jacques Stern, cellist; "Minuet", orchestra; Selections, Kathleen Cameron, soprano; "Gavotte", orchestra. KOKA (Eastern, 326), 5:15 P. M., Dinner Concert, Westinghouse Band, direction T. J. Vastine; 7:20, Concert, Westinghouse Band, "Martha", "Tartantells, Forsoetta", "Bowl of Panicles", "Gypsy Life", "Characteristic", "Fantasia Traumbilder", "Tales from the Vienna Woods", "Heidi's Message". KGW (Pacific, 492), 3:30-4:00 P. M., Children's program, story by Aunt Nell; 10:00-11:00 P. M., Dance music, George Olsen's orchestra. KPO (Pacific, 423), 8:00-10:30 P. M., Art Weidner's Farimont Hotel Dance orchestra. KSO (Central, 546), 8:00 P. M., Orchestral concert, organ recital and specialties from the Missouri Theatre. KYW (Central, Daylight Saving, 345), 7:00-7:58 P. M., Concert, Lyon & Healy; Cope Harvey's orchestra, College Inn. WBZ (Eastern, 337), 7:05 P. M., Concert, Louis Hamel orchestra.

WFAA (Central, 476), 8:30-9:30 P. M., Old Fiddlers from Renner, Texas, in old-time favorites; 11:00-12:00, Netto Male Quartet in musical recital. WGI (Eastern, 360), 7:00 P. M., Concert, DesChamps Orchestra. WGR (Eastern, Daylight Saving, 319), 12:00-12:30 P. M., George Albert Bouchard at the Wurlitzer; 4:00-5:30 P. M., Catherine Stang, violinist, Martha Gumph, harpist, tea-time music; 6:00-6:30, George Albert Bouchard at the Wurlitzer. WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater orchestra; 7:30-9:00, Nancy Monday, soprano; Mrs. Emery Nold, contralto; Dorothy Haag, violinist; Majorie Haag, saxophonist, Mrs. Earl K. Haag, accompanist. WMAQ (Central, Daylight Saving, 448), 8:00-10:00 P. M., Concert, Ukrainian Band; Music from the Chicago Theater. WOC (Central, 484), 3:30 P. M., Educational talk, C. C. Hall; 5:45 P. M., Chimes Concert; 6:30, Sandman's Visit; 9:30, Dance program by P. S. C. Orchestra. WWJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 7:30 P. M., Concert, Schmeman's.

Monday, August 20

KPO (Pacific, 423), 8:00-9:00 P. M., Organ recital, Gladys Salisbury; 9:00-10:00, Jack Hillman, baritone, Edwin Holton, tenor, Walter Frank Wenzel, concert pianist. WDR (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00, Musical program; 4:30-5:55, Talk, "Affairs of the Heart", Betsy Logan; song recital; 7:30-8:00, Bedtime stories, Dream Daddy. WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner dance music, Meyer Davis Bellevue Stratford Orchestra; 3:00, Short talks and song recital; 3:45, tallon by players from Cycle Park Theater; 9:30-10:00, Sacred music by chorists from Inskell Avenue Baptist Church; 10:00-11:00, Hawaiian School of Hawaiian Music presents faculty recital. WGI (Eastern, 360), 4:00 P. M., Twilight program; 8:30, "The Old and the New Bible", Rev. Frederick Grant; Musicales. WGR (Eastern, Daylight Saving, 319), 12:00-12:30 P. M., George Albert Bouchard at the Wurlitzer; 3:00 violinist, Martha Gumph, harpist, tea-time music; 6:00-6:30 P. M., vespers service; 4:00-5:30, Catherine Stang; 6:00-6:30 P. M., George Albert Bouchard at the Wurlitzer. WGY (Eastern, 380), 10:00-A. M., Services, Prelude "Larghetto"; Doxology; Call to Worship; Invocation and Lord's Prayer; Responsive Reading, Psalm 66, Selection 22; Gloria; "Lead Me to Thee", Edith R. Ennis, soprano; Scripture lesson; Hymn; Prayer; Offertory, "Consider the Lilies", Edith R. Ennis, soprano; Hymn, "O Love That Will Not Let Me Go"; Sermon, George Alexander, D. D., Pastor of the First Presbyterian Church of New York City; Hymn, "O Mother Dear, Jerusalem"; Prayer and Benediction; Silent Prayer; Postlude; "Spanish Chant." WHAS (Central, 400), 9:57 A. M., Organ music; 10:00 A. M., Church service under the auspices of the Associate Reform Presbyterian Church, Rev. H. B. Blakely, pastor; Alice Linkenberg, organist; 4:00-5:00 P. M., Concert, under the auspices Mrs. Jane Webster Murrell. WHK (Eastern, 360), 8:00 P. M., Operatic selections and vocal music, WHK Trio and soloists.

ERLA DUO-REFLEX SET Complete parts for Eria Reflex Circuit. The only one tube circuit on which you can use a loud speaker. Rsg. price, \$42.25. Our price.....\$27.95 REINARTZ CIRCUIT Every part complete, including drilled panel and book of diagrams and instructions.....\$10.25 SUPERSENSITIVE REGENERATIVE RECEIVER Every part complete, including Cabinet, Panel, Diagrams, etc.....\$12.85 AMRAD TWO STAGE AMPLIFIER Complete in Mahogany Cabinet. \$40.00 value. Either Radio or Audio Frequency.....\$17.95 100 RADIO HOOK-UPS.....25c Everything guaranteed as first. Send for special price list No. 9. We pay postage. RADIO SUPPLY STORES 264 West Stiegel Street Manheim, Pa.

Friday, August 17

WFAA (Central, 476), 8:30-9:30 P. M., Old Fiddlers from Renner, Texas, in old-time favorites; 11:00-12:00, Netto Male Quartet in musical recital. WGI (Eastern, 360), 7:00 P. M., Concert, DesChamps Orchestra. WGR (Eastern, Daylight Saving, 319), 12:00-12:30 P. M., George Albert Bouchard at the Wurlitzer; 4:00-5:30 P. M., Catherine Stang, violinist, Martha Gumph, harpist, tea-time music; 6:00-6:30, George Albert Bouchard at the Wurlitzer. WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater orchestra; 7:30-9:00, Nancy Monday, soprano; Mrs. Emery Nold, contralto; Dorothy Haag, violinist; Majorie Haag, saxophonist, Mrs. Earl K. Haag, accompanist. WMAQ (Central, Daylight Saving, 448), 8:00-10:00 P. M., Concert, Ukrainian Band; Music from the Chicago Theater. WOC (Central, 484), 3:30 P. M., Educational talk, C. C. Hall; 5:45 P. M., Chimes Concert; 6:30, Sandman's Visit; 9:30, Dance program by P. S. C. Orchestra. WWJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 7:30 P. M., Concert, Schmeman's.

Sunday, August 19

KPO (Pacific, 423), 8:30-10:00 P. M., Rudy Seiger's Farimont Hotel Concert orchestra. KYW (Central, Daylight Saving, 345), 10:00 A. M., Services broadcast from St. Chrysostom's Episcopal Church, Chicago; 5:00-8:00 P. M., Classical and semi-classical selections will be furnished by the Sisson Trio. WFAA (Central, 476), 2:30-3:30 P. M., Bible class conducted by Dr. William M. Anderson, pastor of the First Presbyterian Church; 4:00, Dramatic presentation. RITTER PORTABLE LOOP The solution to all outdoor aerial worries Complete instruction with every loop. Price.....\$100 By mail 10c extra. RITTER RADIO CORP. 230 Canal Street, New York

Coast to Coast on One Tube and No Body Capacity These popular hook-ups use UV-199, WD-11 or WD-12 Tubes. One hook-up gives selectivity and 1500 miles with absolutely no body capacity, while the other gives the remarkable distance of coast to coast. Both prints postpaid for 50 cents or any of the above tubes postpaid \$5.45. Formerly operated by C. W. Kautz. We welcome his customers. Radio Outfitting & Supply Co. Box 1107 LANCASTER, PA.

POSITIVE RESULTS are being obtained by thousands of satisfied users of the EASTERN COIL SETS for the COCKADAY CIRCUIT The remarkable features which are making this circuit more popular each day are its simplicity of construction and control—wonderful selectivity—distance records—clearness and loudness of reception, and the fact that all capacity squealing, interference, etc., are eliminated. Made as per specifications of Mr. Cockaday, using No. 18 wire with D coil bank-wound. COMPLETE SET OF B, C AND D COILS—PRICE.....\$2.75 Hook-up, directions and material list furnished free with each set of coils. Mail Orders Filled, Dealers Communicate EASTERN RADIO MFG. CO. 22 Warren Street, Dept. R. D., NEW YORK, N. Y.

DONT PASS THIS-BUY World Radio Batteries SAVE YOU 50% WRITTEN 2 YR GUAR SPECIAL 2-Volt Storage Battery for WD-11 and WD-12 Tubes. Will give \$5 200 HOURS on single charge....\$5 World-Radio-Batteries Are unconditionally guaranteed Because you deal direct with a manufacturer who is responsible for the performance and quality of the Battery. 6 Volts—60 Amps., 6 Volts—100 Amps., \$10.00 \$14.50 6 Volts—80 Amps., 6 Volts—120 Amps., \$12.50 \$16.00 Full Rating Guaranteed MAIL YOUR ORDER TODAY. WE SHIP EXPRESS C. O. D. SUBJECT TO INSPECTION OR WILL ALLOW 5% FOR CASH WITH ORDER. ALL ORDERS SHIPPED SAME DAY AS RECEIVED. WORLD BATTERY COMPANY, 60 E. Roosevelt Rd., Dept. L, Chicago, Ill.

RADIO VIA PARCEL POST AT N. Y. PRICES Standard Parts Only, in Original Packing NO SALVAGED GOODS SOLD Where "Money Back Policy Prevails" MARGO \$1.00 Vacuum Tube 1 Socket 1 1/2 Volt 25c Operates on one dry cell, either with or without B battery. Wiring diagram FREE with each tube. 10c extra for parcel post insured. PHONES For Parcel Post Ine Add Dietzen 3,000 Ohm.....\$3.75 \$0.12 Brandes.....5.75 .14 Dictograph.....5.75 .14 VARIABLE CONDENSERS Dietzen 14-Plate Vernier.....2.65 .14 Dietzen 24-Plate Vernier.....2.95 .18 Dietzen 46-Plate Vernier.....3.45 .18 TRANSFORMERS (Audle Frequency) Dietzen.....3.45 .12 Sampson.....4.95 .14 Ames 4 1/2 to 1.....2.95 .12 TRANSFORMERS (Radio Frequency) Cotoco.....2.45 .12 Owl......95 .10 MISCELLANEOUS Reinartz Coils.....1.25 .08 Sta-Put Plug......40 .06 Freshman Grid Leak and Condenser Combined.....85 .12 Dietzen Single Circuit Jack......40 .06 Aerial Insulators......10 .02 Ritter Portable Loop.....1.00 .10 Argue Lightning Arrestor......95 .09 Welch Peanut Tube.....2.00 .08 Peanut Tube Socket......50 .08 Switch Lever, Fada Type......49 .06 Ammeter Testing B Battery......49 .08 Hydrometers......49 .08 Double Phonograph Attachment......95 .08 Cockaday Coil.....2.25 .14 2 Coil Honeycomb Mounts.....2.95 .12 Ware Trap.....4.95 .15 Electric Soldering Iron.....3.95 .15 100 Feet Copper Antenna Wire......39 .03 RHEOSTATS Dietzen, 6 ohm......39 .06 Dietzen, 30 ohm......45 .06 SOCKETS Bell V. T. & W. D. 11......89 .10 V. T. Bakelite......50 .10 DIALS 2-inch......25 .06 3-inch......35 .08 4-inch......49 .08 Modells ESTABLISHED 1895 191 Fulton St., Dept. F-26, New York City 9 New York Stores America's Greatest Radio Mail Order House

Rametra CORPORATION for the FALL SEASON now ready FREE for mailing Write for it RADIO & MECHANICAL TRADING CORP. 23 Warren Street NEW YORK CITY

WILLARD RADIO COMPANY 291 BROADWAY NEW YORK CITY FLEWELLING CIRCUIT Complete Parts Baseboard, two honeycomb coils, mountings and coil plugs, 3.000 condensers, .002 phone condenser, variable grid leak and condenser, grid leak 1/2 meg, 23 plate variable condenser, vernier rheostat, tube socket, 3" dial, 8 binding posts, 16 ft. bus bar, PANEL ALREADY DRILLED, TOGETHER WITH INSTRUCTIONS.....\$11.95 Parts for TWO-STAGE AUDIO FREQUENCY AMPLIFIER, for either of above circuits, with drilled panel and book of instructions.....\$11.00 ALUMINUM LOUD SPEAKING HORN, nickel plated, high polish, list \$8.00.....\$3.75 3000 OHM TELEPHONE HEADSET, list \$8.00.....3.50 all other tubes, list \$4.50.....2.75 VARIOCOUPLER, Litz wire wound secondary, 150-600 meters, list \$4.50.....2.25 Triple Coil Mounting......45 .05 Multiple Point Inductance Switch with knob and dial (5 points).....1.45 .15 Reinartz coil, increased wave length.....1.55 .25 Honeycomb coil, mounted 50 turns.....\$0.95 Honeycomb coil, mounted 75 turns.....1.00 Freshman var. grid leak and cond......75 Freshman variable grid leak......60 V. T. Socket......40 CONDENSERS 3 Plates Variable, value \$1.75.....\$1.05 13 Plate Variable, value 2.50.....1.20 23 Plates Variable, value 3.50.....1.35 43 Plate Variable, value 4.50.....1.95 13 Plate Vernier, value \$5.50.....3.75 23 Plate Vernier, value 6.00.....4.00 43 Plate Vernier, value 6.50.....4.25 REINARTZ CIRCUIT Complete Parts Baseboard, Reinartz coil increased wave length, tube socket, vernier rheostat, 23 plates and 13 plate variable condensers, 3 inductance switches, 2 3" dials, variable grid leak and condenser, .002 phone condenser, 16 ft. bus bar, 23 switch points, 29 nuts, 8 stops, 8 binding posts, PANEL ALREADY DRILLED, TOGETHER WITH DIAGRAM AND INSTRUCTIONS.....\$10.95 Every article we sell is guaranteed by the manufacturer and us—Mail orders filled immediately—Postage prepaid on all orders of \$5.00 or more, east of the Mississippi River only. All others include postage.

ATWIST OF THE WRIST—IT'S SET YELLOWTIP MICROMETER ADJUSTING CRYSTAL DETECTOR Increases the Efficiency of Your Crystal Set! \$2 Wholesale Radio Equipment Co. Exclusive Factory Representatives 35 William Street, Newark, N. J. Dealers and Jobbers Write for Attractive Proposition

Radio Digest Illustrated

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

Published by the Radio Digest Publishing Company, Inc.
123 West Madison Street
Telephone: State 4843, 4844, 4845
Chicago, Illinois

E. C. RAYNER, Publisher
Chas. F. Smisor, Editor
Evans E. Plummer, Managing Editor
Harry J. Marx, Technical Editor

Eastern Representative, Jacob Miller, Times Bldg., Times Square,
New York; Telephone Bryant 4909

Pacific Coast Representatives
E. J. Wood, 251 Kearney St., San Francisco
Telephone Kearney 1472

H. M. Morris, 417 Western Mutual Life Building, Los Angeles
Telephone 12011

Member of the Audit Bureau of Circulations

58
PUBLISHED WEEKLY

SUBSCRIPTION RATES
Yearly in U. S. and Possessions and Canada, \$5.00.
Foreign postage, \$1.00 additional. Single copies 10 cents.

Vol. VI Chicago, Saturday, August 18, 1923 No. 6

Rest Cure by Ether Waves

After Dinner Mint Substituted by Radio Music

THAT those who attach their headsets and listen in for a few minutes following their midday meal are destined to a more healthful and long life is the belief of some scientists. At least time spent in this way will give the needed rest. But if the lure of voices from a distant city means late hours and loss of sleep for the entranced fan then it will have a detrimental effect.

Woman Will Be Real Radiophan

After Set Is Installed She Will Take Up the Science EXPERIENCE is indicating that the farm woman is going to be the most enthusiastic Radiophan in the family.

The man usually is the one who studies up on it. He finally gets up courage to buy and install an outfit. But after the first few days, when the housewife has listened in and been thrilled by the news and lectures, the husband takes a back seat.

Radio is going to mean a great deal to farm women. There has been an old joke about listening in on the party telephone line to get all the news. The Radio makes such an idea real and multiplies it a thousand times.

Education While You Sleep

In the Depths of Slumber You Absorb Difficult Lessons FURTHER reports from the naval air station at Pensacola, Florida, as to the success attained in teaching Radio code to sleeping student aviators show progress. The experimental stage in the trials has been passed and the method has become standard as a means of saving students from failure.

When the test was started, twelve students were unsatisfactory in their progress in Radio code. After two nights, during which Radio code was sent to the students in their sleep, the work of only two of the students was unsatisfactory; these two men left before the experiment was finished, professing disbelief in it.

The students sleep on the tables in the Radio room where the code is taught during the regular school periods. Operators send messages at varying speeds all night. The students concentrate on the messages as they are sent until they fall asleep.

Are we coming to an age in which all will be taught while asleep? There will be no need for a teacher; just turn on the machine—the student takes on history, mathematics or whatever may be outlined for the night's lesson.

Use More Care with Microphone

Critical Attitude of Radio Audience Growing

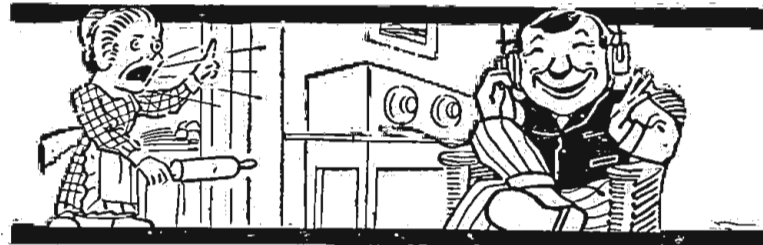
WITH the Radio audience growing more and more critical regarding the rendition of Radio programs, it has been necessary for Radio broadcasters to devote no little attention to their microphones. In the early days of broadcasting, not so long ago, considerable attention was devoted to the acoustic properties of the studio, particularly troublesome sound reflection or echo, until this phase of the new art was finally mastered.

However, it has been found that the microphone is the main link between the studio and the Radio audience. No matter how perfect the studio may be and no matter how flawless the music at the studio end, the microphone stands in the way. The usual carbon microphone is far from the ideal "pick-up" device. It misses many holes because its diaphragm, having a natural period of tone of its own, cannot be expected to vibrate over the wide range of frequencies encountered in a musical program. Furthermore its mechanism is somewhat heavy and represents considerable inertia to rapid oscillations. The question of natural period also applies to the condenser "pick-up" device, in which the vibration of a diaphragm causes a change in the capacity of the modulating circuit in accordance with the sound values.

RADIO INDI-GEST

Vindicated; or How to Be Happily Married

I WAS TALKING TO MY FRIEND JIGGS THE OTHER NIGHT WHEN HE VOLUNTEERED THE TIDINGS THAT HE TOO, LIKE MANY OTHERS, WAS A RADIOKNUT FOR FAIR AND I ASKED	WHY SUCH A SUPERIOR MAN OF HIGH INTELLIGENCE SHOULD TAKE TO SUCH A LOWBROW SPORT AS RADIO. SAID HE, "BUT YOU SEE I CAN'T HEAR MY WIFE'S CHATTER WITH THE GOOD OLD EARPHONES ON." GOO GOO.
--	---



Morals: She Didn't Have Any

Lived a maid on Walla Walla,
Wore a ham-string for a collar;
Weighed two-fifty did this dusky
Maid, who was so fat and husky
Oft she sat beneath the palms.
Wore a smile—and other charms—
Sat all day and played a "uke,"
Singing "Hi yu, Hi yu, zookie-zuke,"
The National Hymn of Walla Walla.
You should have heard her whoop and holler—
All the South Sea Shieks and Dandies
Often brought her DeMett's candies—
They would sit beside the shore
And beg her to play some more. . . .
Others oftimes gave her pay
To shut her trap so that they
Could go to sleep and rest their bones—
Around about their torrid zones.
Then Indi founded his wireless station
To broadcast songs of Walla nation.
So she sang "Hi yu, Hi yu, Zuke,"
And strummed the tune on her "uke,"
Sang the d—n song all the night,
Yea gods, it was a fright!
Sang she 'till the sun on high
Chased the stars from out the sky;
Sang until the mountain rocks
Boomed with echoes from the shocks. . . .
Sang she thus night and daily
And playing on her ukulele.

L'ENVOI

Now this maid draws big wages
Playing vodvil for Pantages—
The moral of this poem is wise,
"It often pays to advertise." —Quinch Gapp.

A-B-C Lessons for Indigest Beginners

Chapter IX—If Not Sure, We Lie About It

BY GOSH

IS for intensity,
It's never quite enough
To let you be real certain,
If it's DX sure enough.

We Haven't the Heart

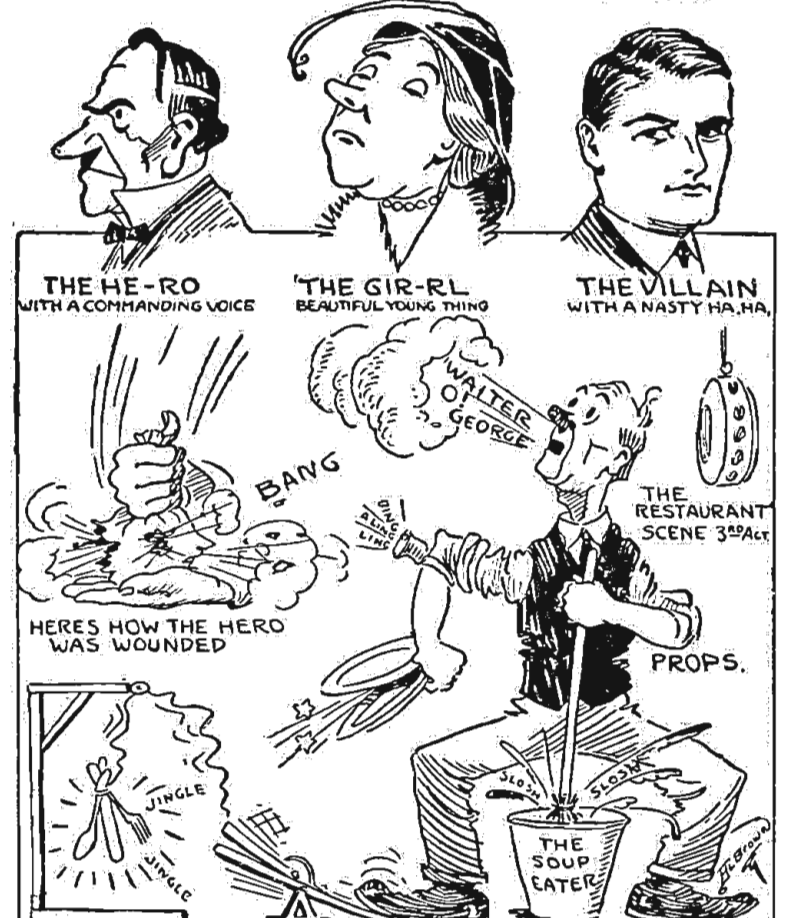
Dear Indi: Please inform me whether or not a loop aerial is an aerial manufactured in the heart of Chicago?
SPIDER WEBB.

Here lies the body
Of Jawn Paul DeVine,
Who stole copper wire
Off a high voltage line.

Reflexing Lem's Best Requires Reflexion

Dear Indigest:—Do you Publish Any other hookups besides Lem Stebbins Kind. Thousands of Fans Didnt try the Lem Stebbins. But bein of a Hankerin Mind I took a good look at the Diagram And saw the future Noisless Control system comin in.
Now I tried em all, theirs the Rhinarts, for instkance the first time I tried it I herd the Germans on the ring, Spat, Spat Spat Bluye Bluye then a Tank Fell Off in the River And the Biler blew Up. You could hear it Plain.
Then theirs the Flewelling Fliver That circuit is soly for rail purposes, it so senctive you can detect a Head on Collision By the awful rush of wind Before you hear the crash. It is class (N).
Now the armstrong Super Major armstrong Never did Invent The super, He got his Ideas Outen the old Bible a Million years Ago a Man Named Adam Had two son who Needed Regeneration And by using various Substances to Develop CainS on, He got armstrong, the same is in use the world over
Then theirs the Hazelnut circuit, the Nutredome Dynemite class The spider web type, which has no flies on it. Then theirs the Honeycomb Circuit. Keeps you Bisy changin Honey combs.
But layen all jokes aside Lem Stebbins has em all skined when it comes to distance, I site you to one of my own long distance Records:
I had the grounds hooked in at the lower left Usin 14 meg Leak on filament. No B battery two dry sell in plate circuit Usin My window screen as an arial, The music came fine but i couldent understand the language I knew I must have China, I could even here the Wooden shoes scraping the cinders the Came a fearfull thud, and all was still. On close ixamination i found two large size Grasshoppers had Desided to have a scrap right on My atena, Yor walla walla construction of antena is the one i shall try Next.
They is one or two questions ii would like to ask?? When you conect the Strainer Direct to the OutPut your ear Muffs Sweet fearfull is this the soup? Is the Book type of condenser, O K for Controllin the filament If So why? How many feet of spagetta will it take to cover 535 meter wave W M C has the spagetta Covered Coils thats why I Desire this in-famation.
If 90 volts put your filament out what will bring it back Will the Lem Stebbins stan Reflexin Please sen hookup for Relaxed super Reflex. For Ladies. Enclosed find The Dolar Four kdnK. AnO n a. MoUse.

RADIO DRAMA IN FRONT OF THE MICROPHONE



Condensed

By DIELECTRIC

When you find it impossible to curb your impatience, let go with a broadcast greeting to the approaching friend and trust to Lew P. that he will have a portable set to receive your salute. The chief of police of Los Angeles was welcomed home as he stepped into a Radio-equipped auto at the railway station in that city. Station KHJ carried the message of welcome from George K. Home, captain of detectives. I wonder if the prison inmates chimed in.

Work is still going on to perfect a device to remove our arch enemy—static—from his present fields of operation. How soon we hams will be able to make use of such a longed-for unit it is impossible to say. Anyone owning a balloon or airplane may get safely above the effective level of static's influence, if he wants. Climb until you reach an elevation of three thousand feet where, according to Ralph Upson, no interference from static exists.

The French show us the proper way in which to direct all political messages transmitted by Radiophony. "Proper," that is, if those in charge of the government at the time are to face no counter-charges. It was decided in the French cabinet recently that only such material as would meet the favor of the miustry should be broadcast. This would take away much of interest in political speeches, for most of us like to hear both sides of a question. Of course, such a decision in this country would not go far—just now.

From naval sources comes the assurance of complete success with the system of "Learn while you sleep." If errors are made in sending code, the sleeping student quickly revives or the sudden cessation of dots and dashes will bring him to complete consciousness. This will no doubt revolutionize our school system. Boys and girls may hereafter spend the day in play, then when sleep comes to them, their headsets will convey Latin, calculus and Sanskrit in proper proportions. Thus, the Radio school of the future!

Every little while a rumor appears as to the erection of the largest broadcasting station. That rumor in itself is enough to make us stop to listen in, but when such a report has connected with it the name of a well known public man then we ask for the wave length right off. Henry Ford is said to be building a super-station—and you know what that means! But you don't. It is strictly for commercial use; not to tell us how much we need him in the big station at D. C. Radio grows more necessary to large concerns.

It is hard to realize that listening to fine lectures and concerts—and jazz—has been possible for really so short a time. But the truth is brought home to us when a broadcasting station celebrates its first birthday. Station WOR, to which so many fans listen, had the pleasure of witnessing its one candle flicker during a program which was a star in every particular. With the governor, mayor and two senators addressing the large audience tuned in that evening, the station felt that it was coming of age.

No explorer with a Radio compass can claim to have grasped the North Pole, and have the claim accepted, unless he has really done so. All Radio eyes will be fixed on the trip of the ZR-1 as that naval airship begins its flight to the top of the world. Can messages come through? Will she make it? The answer will come dash-ig back to many an anxious listener at his receiving set. Here's hoping.

First Steps for Beginners in Radio

Chapter XIII—Multi-Tube Reflex Circuit Operation

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 articles yet to appear are:

- Chapter XIV—Headsets and Loud Talkers.
- Chapter XV—Filament Batteries.
- Chapter XVI—Plate Batteries.
- Chapter XVII—Using Alternating Current on Tubes.
- Chapter XVIII—Testing Radio Instruments.
- Chapter XIX—Locating Trouble in the Set.
- Chapter XX—Useful Information and Formulas.

HAVING mastered the principle of reflex circuits as applied to one tube it is not difficult to apply the same principles to two or more tubes with an increase in range and volume. Previously we found that audio frequency amplification was not usually practicable beyond two stages. Therefore two tubes in a reflex circuit permits the highest amplification

to two inches above the stator windings to obtain looser coupling and greater selectivity. This circuit could be modified to increase its selectivity and signal volume by using tuned Radio frequency coupling between the tubes instead of the transformer coupling. This adds greatly to the tuning and amount of apparatus required and for that reason is more suited to three tube reflexes.

Adding Radio Frequency

The addition of a third tube to a reflex simply adds a stage of Radio frequency amplification to the set and thereby increases the range. To obtain maximum results it is advisable to use tuned impedance coupling as it is more efficient than a transformer coupling. A circuit using three tubes with tuned coupling between the first two tubes is shown in Figure 54. It will be seen that the use of a Radio frequency coupling makes it rather difficult to feed the audio currents back into the grid of the second tube.

As in the usual tuned coupling circuit use is made of a fixed inductance of about 50 turns shunted by .0005 variable condenser. This circuit is coupled to the grid of the second tube through a small fixed condenser of .00025 mfd. capacity. It is impossible to connect the secondary of

the others described with the exception that Radio amplification is employed three times and audio but twice. This circuit is ideal for long range work, giving as it does the maximum effect of reflex operation. It will be found very selective even when

that the last tubes will be carrying the greater values of both audio and Radio currents. Thus the first stages may be working away below capacity while the last stage is working up to capacity or may not even be able to handle all the current,

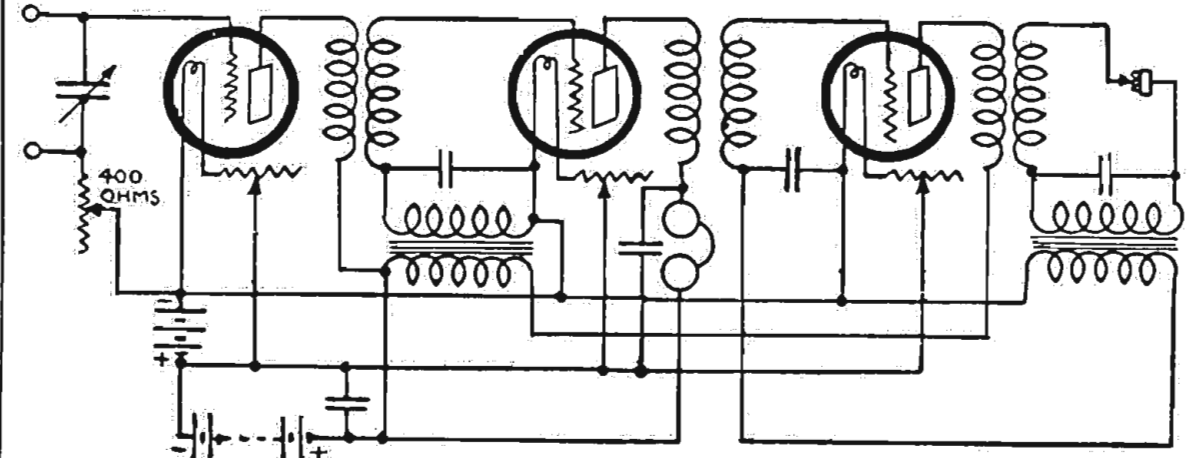


Figure 55—Inverse reflex balancing load between the tubes

used with an outdoor aerial provided a loose coupled tuner is used. This is due to the tuned coupling used for the plate circuit of the first tube and grid circuit of the second tube which are tuned to obtain full signal strength.

It is entirely practicable to couple the first and second tubes with a Radio frequency transformer and thus eliminate the tuned circuit, but on the score of selectivity and greater amplification obtained with the tuning arrangement their use is advised, for then one can receive most from the set. Selectivity is vital in sets of this type for the amplification is so marked that any interference becomes a great annoyance.

Reflex sets may be built employing four or even five tubes but in this instance the extra tubes act as Radio frequency amplifiers or one of them is used in place of the crystal detector. The latter arrangement removes one of the features of the reflex operation, namely its quietness and clearness when properly operating. A poor reflex set is made worse when a tube is used as a detector.

Grimes Inverse Reflex

So far we have considered what might be termed the straight reflex; that is, one in which amplification at Radio frequency is carried on in succession by the tubes and the audio currents returned to go through the amplification stages in the same order. It is very apparent with this arrangement

thus limiting the output. To overcome this the Grimes circuit was devised; it is termed the inverse reflex.

The inverse reflex differs from the straight reflex in that the currents at Radio frequency pass through the tubes as usual but the audio currents are amplified in reverse order. The effect of this is that the first tubes of the set carry weak Radio currents but large audio currents while the last tubes have large Radio currents and weaker audio currents. This results in a more even distribution of the load between the tubes; the limiting effect of the tube is not so noticeable.

(Continued on page 14)

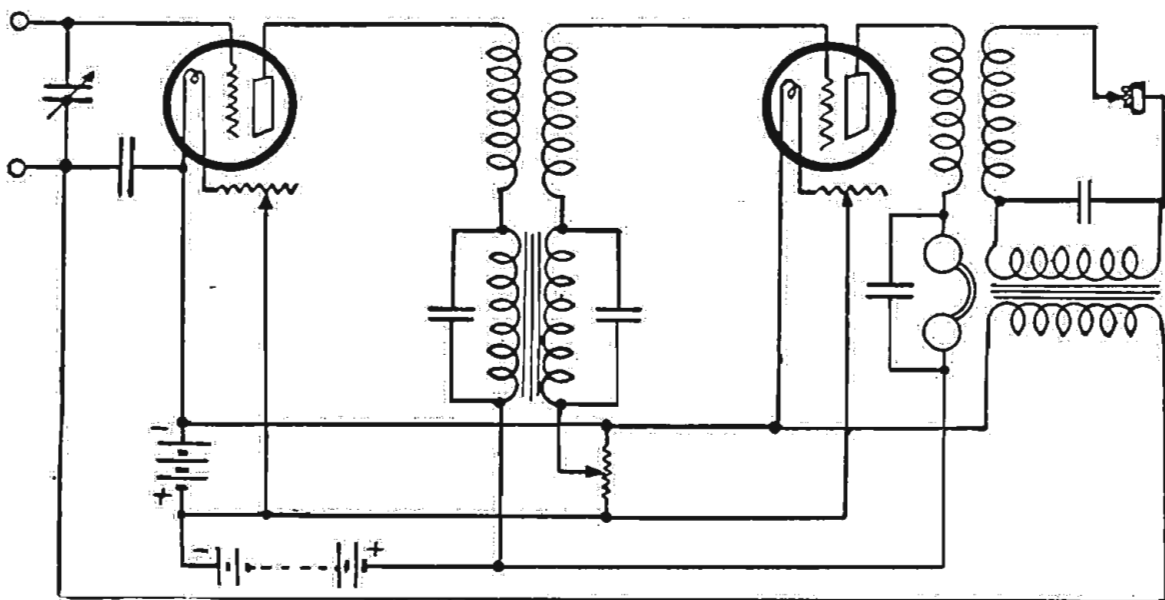


Figure 53—Two tube reflex circuit using transformers for both Radio and audio coupling

ation at audio frequencies and is practically the only circuit in which the full reflex action is obtained in all tubes.

Two Tube Reflex Circuit

In Figure 53 is shown a two tube reflex circuit giving two stages of Radio frequency amplification and two at audio. In this circuit two Radio frequency and two audio frequency transformers are used to couple the tubes and detector as shown in the diagram. As in the one tube circuit the waves are picked up on a loop aerial and amplified by the first tube and passed on at Radio frequency to be amplified by the second tube before being detected. During this operation the transformer and headphones are practically shorted out of the circuit by the condensers across them.

After the Radio currents have been detected and reduced to an audible frequency

the transformer, after the detector, directly to the grid of the second tube because it will drain off the Radio frequency currents from the grid and render the tube inactive. To overcome this, use is made of another tuned circuit consisting of a variometer and fixed condenser of .002 mfd. capacity connected between the grid and filament. The secondary of the audio transformer is shunted across this condenser with a 10 milhenry inductance in series with it.

The purpose of this inductance is to choke back any Radio currents that would have a tendency to leak through the transformer secondary. It will be noted also that two potentiometers of 400 ohms resistance are employed. One of these serve to control the potential of the grid of the first tube; the other serves in like manner

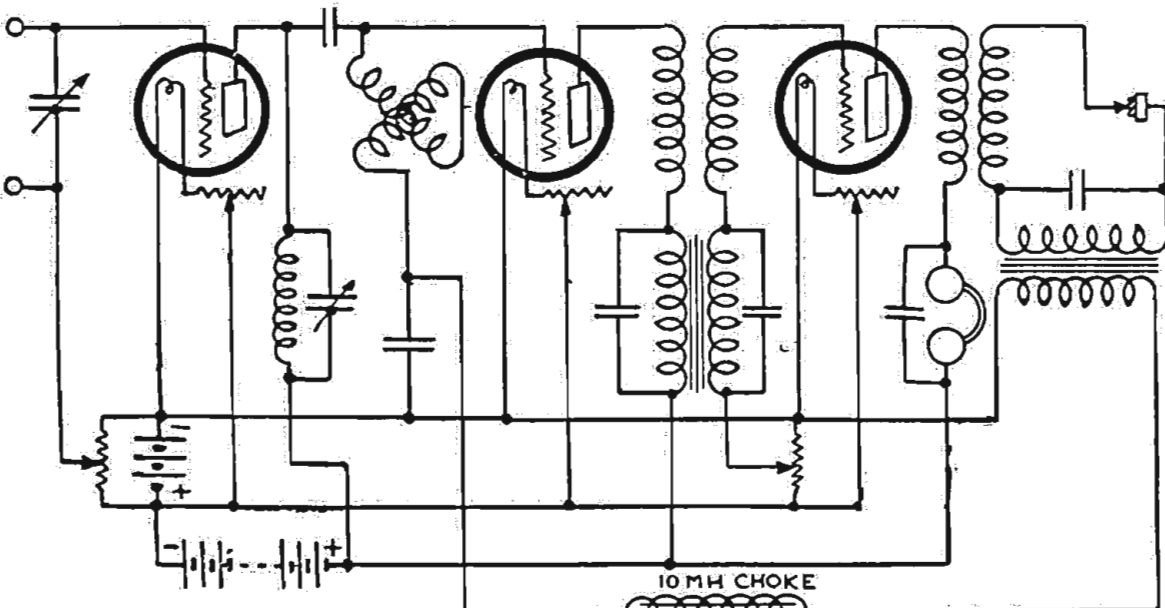


Figure 54—Three tube reflex using tuned Radio frequency amplification

the condensers no longer act as bypasses by reason of the current being of lower frequency. The audible signals are now impressed on the grid of the first tube and amplified by both tubes in the usual manner. The audio frequency currents of course flow through the Radio frequency transformers but due to the few turns on them they have little resistance and no appreciable coupling effect.

The selectivity of this circuit depends entirely on the tuning apparatus used; therefore when used with an outdoor aerial a vario-coupler or other form of loosely coupled tuner must be employed. It will be found advisable when using a vario-coupler to mount the rotor from an inch

the grid of the second tube. By means of these potentiometers maximum amplification is obtained.

Three Steps of Radio Frequency

The circuit is identical in principle with

Special Sets Made to Order

Let us quote you on any circuit. Sets made under expert supervision. We repair sets and test tubes.

FORBES RADIO CO.
127 N. Dearborn St. Chicago, Ill.



ON APPROVAL FOR 30¢
ZOBEL-STEIN LABORATORIES
322 9TH ST. BROOKLYN, N.Y. SOUTH 2650

FORMICA

A Laminated Phenolic Condensation Product

SHEETS TUBES RODS

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

Cotogrip

PACIFIC COAST BRANCH:
329 Union League Bldg.
LOS ANGELES

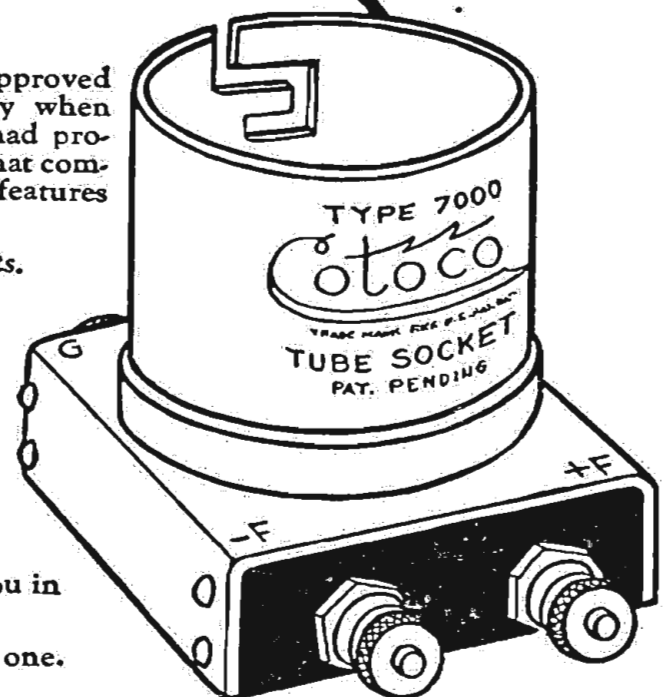
"Built First to Last"

This little beauty was approved by our engineers only when convinced that they had produced the one socket that combines all the essential features of a good socket.

1. Positive Cotogrip Contacts.
2. Hard Rubber Insulation.
3. Rugged Construction.
4. Compact Design.
5. Concealed Mounting.

It is impossible to show the unique mechanical action of Cotogrip contacts in a photograph. It is different from any other socket you have ever seen. This socket will interest you in every way.

You ought to have one. Ask Your Dealer



COTO-COIL CO. PROVIDENCE

Vernier Variable Condenser on Dial

Fine Tuning Results from Condenser Plate

A rotor plate of any condenser is glued to the back of a dial. Another plate of the same kind is obtained and cut out so that it will clear the bearing for the shaft of the dial. A bearing is put into the panel of the right size. A threaded brass

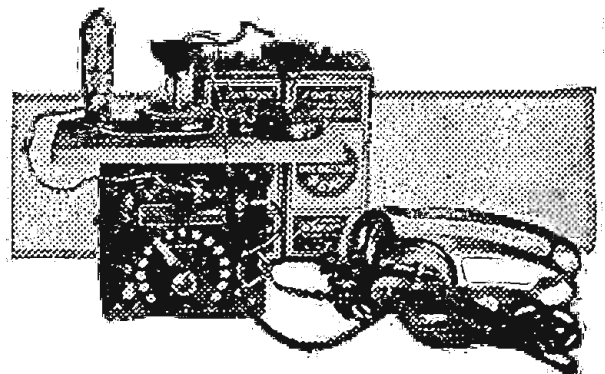
WORKSHOP KINKS? EARN A DOLLAR—

THERE are many little kinks worked out at home that would aid your fellow Radio worker if only he knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. Radio Digest is very much interested in obtaining such material. Send them in with full details, including stamped envelope, so rejected copy may be returned. The work must be entirely original, not copied.
RADIO KINKS DEPARTMENT,
Radio Digest,
123 W. Madison St., Chicago

rod, about 1/4 inch in diameter, will do for the shaft. A spring may be made by winding several turns of stiff wire around a pencil. This is put on the shaft after it has been fastened to the dial and run through the bearing. This keeps the dial close to the panel and insures smooth turning.
The nut is now turned on the shaft and the tension of the spring tested. When the right pressure has been found turn on the second nut for a locknut. The connections are made to the stator by a wire coming through the panel and to the rotor by a pigtail connection. Very fine tuning can be accomplished with such a vernier.
—William Bruening, Jr., Concordia, Mo.

Two Element Vacuum Tube Set

Everyone who builds their own Radio outfit desires to receive over a maximum distance with a minimum expenditure. The writer recently constructed a receiver which is far more sensitive than a crystal outfit but is more economical and reliable in its operation. In fact, the results have been so pleasing perhaps brother fans would like to know how to do the same thing.



Now-a-days everyone wants a vacuum tube set and yet everyone cannot afford to invest in the necessary storage battery, B battery and other accessories that go to make up receivers of this type. While shopping around recently, I came across a Fleming valve type vacuum tube which was purchased complete with all accessories for \$2.50. This is a two-element tube operating from dry cells. The receiver circuit outlined in the diagram

—Of special interest to Radio Dealers!

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!

Mu-Rad sells—and sells!

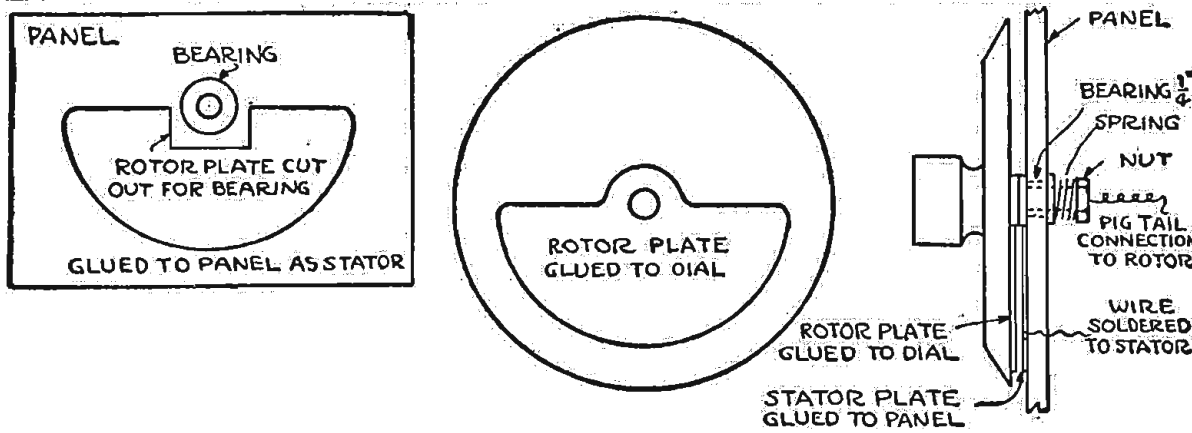
That fact has been repeatedly verified by our many other Mu-Rad dealers in the middle-west. Why not join them? Why not enjoy as they do the ASSURED PROFITS of good radio merchandise well advertised?

Write for a Mu-Rad Franchise

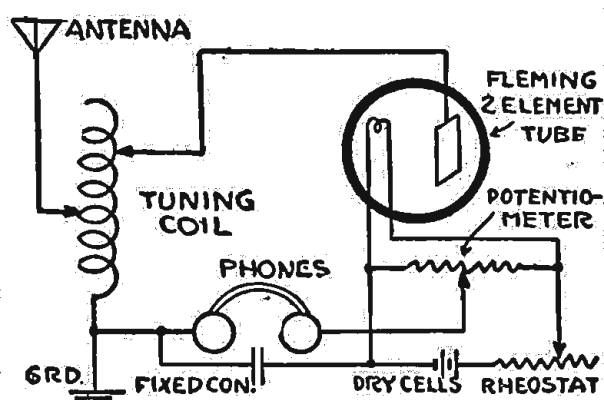
To get complete details of our special Mu-Rad proposition will not obligate you. Write also for a copy of our handbook catalog of other profitable Radio merchandise. Write today before someone else in your neighborhood gets exclusive Mu-Rad privileges.

Chicago Radio Apparatus Company
Jobbers of Good Radio Merchandise
General Offices: 407 South Dearborn
CHICAGO

DEVICE PLACED IN DIAL KNOB



was set up and perfect reception was made possible. Previous to the purchase of this vacuum tube, a crystal receiver was used. With the vacuum tube, stations that were never heard before were picked up and the quality of the reception was every bit as good as that obtainable with a good crystal set, and there was an entire absence of circuit noises and howling. In fact, one cannot make the two element tube howl, no matter how one tries.



Such good results were obtained with this vacuum tube that a friend asked me to change his crystal set over into a vacuum tube set, employing this same type of tube. It was not found necessary to completely demolish the crystal set to make the necessary changes. In fact, all of the instruments of the old crystal set with the exception of the crystal were used.

To operate the rheostat is turned until the signals are the loudest. When the rheostat is placed at the proper point, it is not necessary to adjust it further and the tube retains its same degree of sensitivity for several hours. It is evident that it would not be advisable to operate these tubes without a rheostat as that would allow too much current to pass through the filament from the battery.

The advantage of permanent adjustment of this arrangement will appeal strongly to those who have been troubled with crystal detectors. Crystal detectors are fine, but they do get out of adjustment and here is something that gives us just as good quality, greater distance and no trouble in adjustments.

In the way of experimenting a second circuit was set up, using a 200-ohm potentiometer. By the use of this arrangement the results were found to be a little bet-

ter, but those who cannot afford the addition of the potentiometer can be assured that they will get good results well worth the trouble by using the other circuit.

We crystal users are difficult to please as we are generally sticklers for quality. Here, however, the writer has found something that he can unqualifiedly endorse to those who want to bring their outfits a rung up the ladder of perfection.
—Harold B. Turner.

White Letters on Panels

To letter a bakelite panel, clean the surface you want to use with wood alcohol to remove any greasy film, then write whatever you want on the panel with a sharp, stiff steel pen and draftsman's white ink, such as are used for writing on blue prints. When the writing is perfectly dry, take a fine, soft camel's hair brush and cover it with transparent varnish to protect it. If at any future time you want to remove the writing just dampen a rag with wood alcohol and wash it off; the wood alcohol dissolves the varnish.

Use Coupling with R. F.

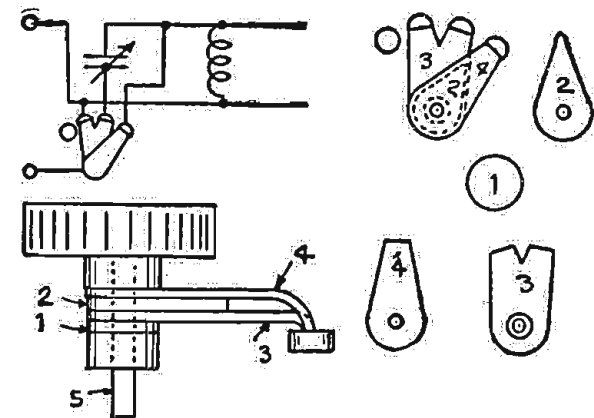
When using more than one stage of Radio frequency amplification it is always advisable to use a coupling device which will permit a wide separation between the coils; otherwise the tuning may be too broad.

Series-Parallel Switch for Primary Condenser

A series-parallel switch for the primary condenser is almost a necessity now that stations have such a wide range of wave lengths. The present type requires eight taps and a great deal of panel space.

In constructing a portable set in which the panel space was very limited, a series-parallel switch using only four taps, taking no more space than the ordinary tap switch, was made, as shown in the illustration. This switch is a very small condenser within itself but the primary condenser will offset this effect.

By making over a common switch, as shown, and using a little care the new switch can be made with little trouble. Note that the double blade is in no way connected to the rest of the instrument



but that the single blade is connected as usual. The diagram shows how to put it in the circuit.—Gilbert Earle, Berkeley, Cal.

Connecting the Condenser

In a vacuum tube receiver employing a shunt variable condenser for tuning the secondary, the rotor plates of this condenser should be connected to the filament for the purpose of reducing the effects of body capacity. For the same reason, if a antenna series variable condenser is used in the primary circuit and connected in the ground lead of the coupler, it is advisable to connect the movable plates to the ground and the fixed plates to the coupler.



The Story of Service

BEFORE beginning the "Story of Service," let us study some of the definitions of the word "Service." Among them we find "Act or means of supplying some general demand"—"That which promotes interest or happiness"—"Duty done." Our goal is to make the above definitions synonymous with the "SERVICE RADIO CO." Our "duty" is not "done" unless we supply some "general demand" and "promote interest or happiness."

The Story of Service begins next month.

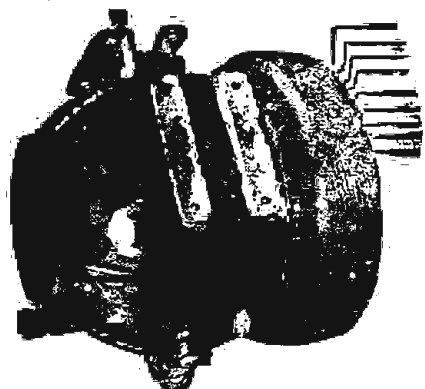
SERVICE RADIO is establishing new records in loud, clear reception from distant stations; makes summer radio more dependable; and winter radio a revelation; reception of distant stations through local stations—no outside wires. The Radio which combines beauty, ease of control, clarity of voice and music, distant reception and SERVICE. Compare with any on the market, then decide.

Dealers' list appearing soon. Write for "The Story of Service."

This is a TELEFORCE product

SERVICE RADIO COMPANY—Dept. A
4727 Montgomery Ave. Cincinnati, Ohio

Kellogg Radio Equipment For Better Results



VARIOCOUPLER

The Kellogg variocoupler is of the same standard design as our variometer, being made of molded Bakelite, with reinforced construction.

For increasing the wave length from 500 to 2,500 meters, the Kellogg standard wound induction is added to the variocoupler.

It is arranged for either panel or base mounting. No. 501 Variocoupler \$9.00

With No. 502 Diamond Wound Coil, as shown in illustration.....\$13.00

Kellogg Switchboard & Supply Company
CHICAGO

Difficult Tube Characteristics Explained

Part III—Test Circuits

By H. J. Marx

IT HAS been stated and shown that the amplification constant depends almost entirely on the structure of the grid and its position relative to the filament and plate. It is defined as the plate voltage increase divided by the grid voltage increase. The plate resistance has been described as depending on the same fac-

This then gives a mutual conductance of about 600 micro-mhos.

As to Biasing Battery

If a biasing battery is used and the value is desired for a negative potential, the plate resistance value must be corrected, as previously stated by applying the formula:

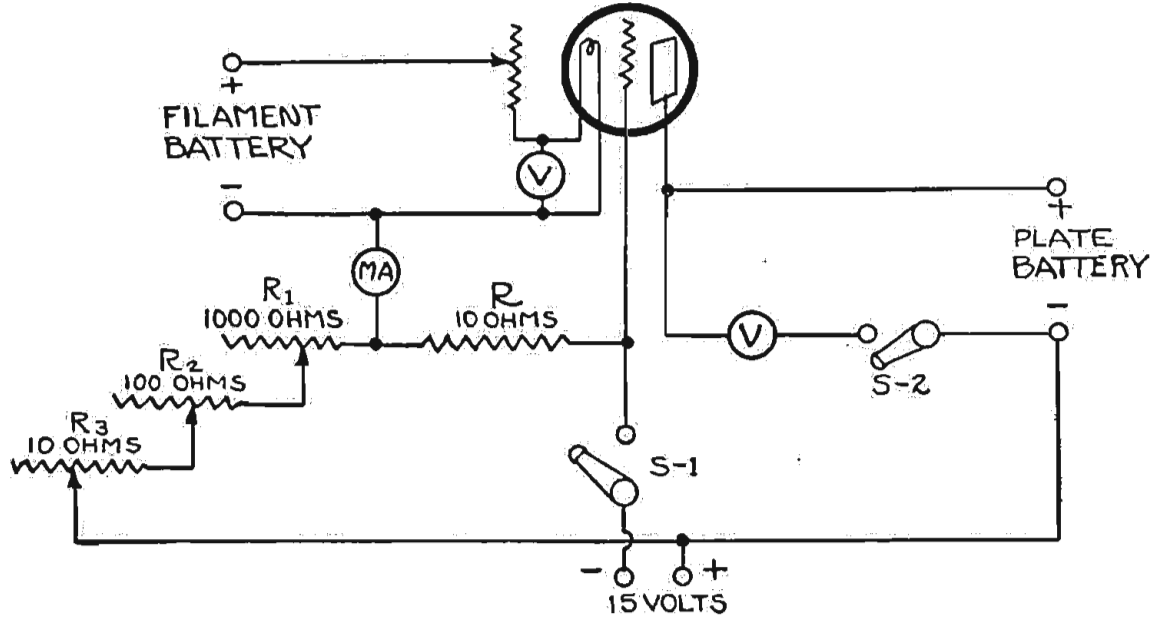


Figure 3—Test circuit No. 1

tors and in addition the surface of the plate and filament.

The mutual conductance depends on both of the two previous characteristics; it is a function of the slope of the grid voltage plate current characteristic curve. It is defined as the change in plate current divided by the change in grid voltage producing it. Inasmuch as this value changes considerably with different values of the grid potential, it should be taken at that point at which the tube is going to be worked. The grid potential values are taken with respect to the negative terminal of the filament. If the tube is to be used as an amplifier and the grid return is connected to the negative side of the filament, the values should be computed at zero grid potential. If a biasing battery is used the potential of the grid is determined by the biasing voltage.

Mutual Conductance Formula

The formula for the mutual conductance (G_m) is:

$$G_m = \frac{\mu}{R_p}$$

The amplification constant can be taken at 5.7 as previously calculated. The plate resistance value can be taken from the curve shown in Figure 2 of the latest article. For example, the average plate voltage used is 45; at this value, assuming a zero grid potential, the plate resistance is 9,400 ohms. Substituting in the formula:

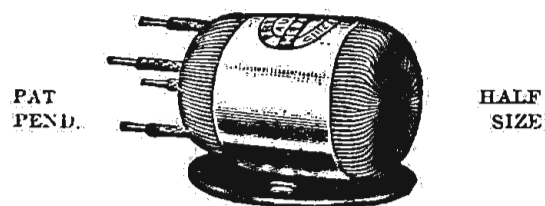
$$G_m = \frac{5.7}{9400} = .000606 \text{ mhos}$$

Mutual conductance, however, is usually expressed in "micro-mhos." The term "micro-mho," a convenient value, is simply one millionth part of a mho. (A mho is the conductance of a circuit of one ohm resistance; the name derived by taking the reciprocal of the word ohm, that is, spelled backwards.)

WANTED—FACTORY OUTPUTS

We are interested in securing Radio factory outputs. We are interested in a Chicago Branch Manager. The R-C OUTLET INTERNATIONAL DISTRIBUTORS, 303 Fourth Avenue, New York, N. Y.

PREMIER "HEGEHOG" AUDIO FREQUENCY TRANSFORMER



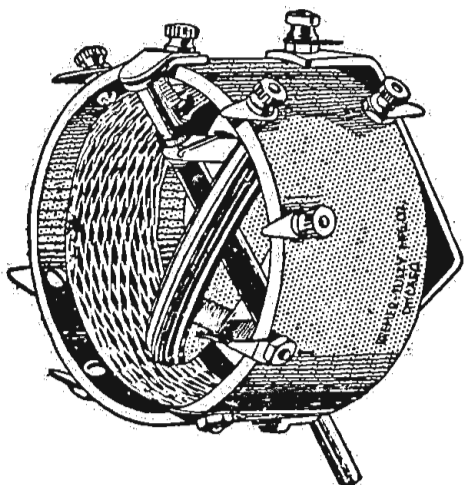
PAT. PEND. HALF SIZE

MAXIMUM VOLUME MINIMUM DISTORTION 100 PER CENT SHIELDED MOUNTS ANYWHERE

PRICE \$3.50 RATIOS—1 to 3, 1 to 4, or 1 to 5

The Most Efficient, Compact Transformer ever designed. Ask Your Dealer for the Premier "Hegehog."

Full Specifications on Request Premier Electric Company Est. 1905 3810 Ravenswood Avenue, CHICAGO, ILL.



"B-T" UNIVERSAL VERNIER TUNER

does away with tapped coils and switches on REINARTZ CIRCUITS

and improves range clearness and selectivity wonderfully. Covers new broadcasting wave lengths. Also a wonder-worker in practically all the older circuits, including reflex. Price, from your dealer or postpaid, \$5.00. Hookup diagrams free.

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

Radio "Trouble Finding" Chart 25c

It locates immediately the trouble in your Radio Set! Simple, Easy and Practical.

DEALERS: Write for Discounts BENSON MELODY CO. 190 N. State St. CHICAGO, ILL.

In test circuit No. 2, Figure 4, the ammeter has been replaced with telephone receivers; a source of alternating current is necessary instead of the direct battery current.

Test Circuit No. 2

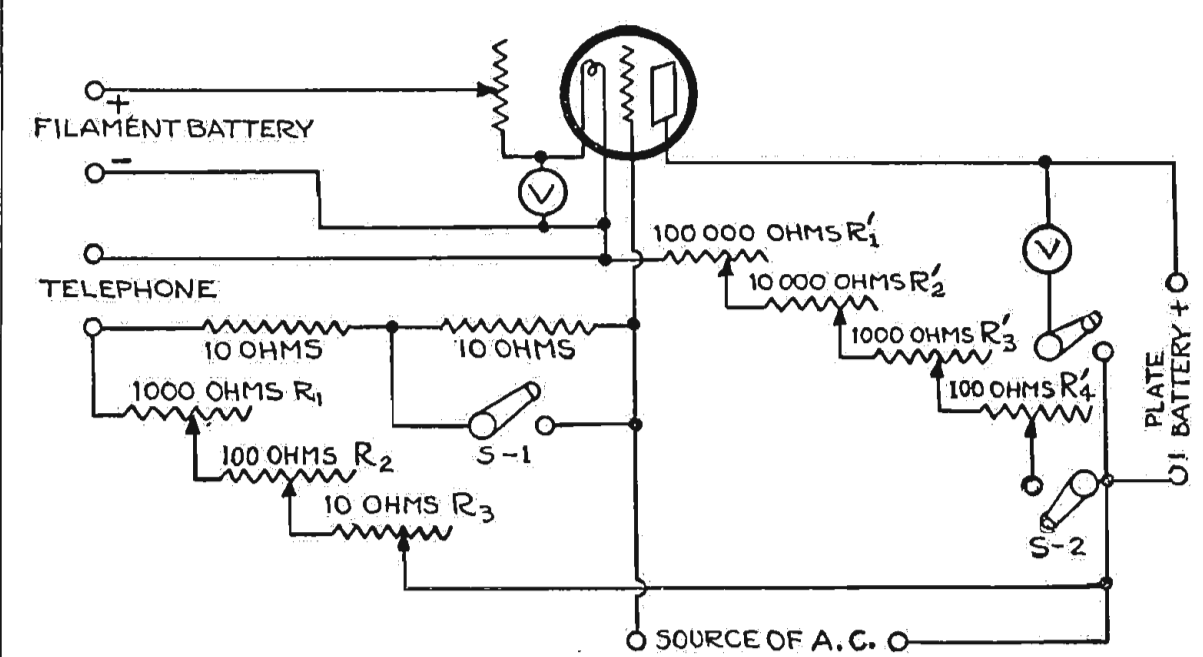


Figure 4—Test circuit No. 2

Another set of variable resistances of 100,000 ohms, 10,000 ohms, 1000 ohms and 100 ohms is added with a switch for obtaining the plate resistance values. Adjustments are made by listening to the tone of the receiver. The minimum tone in each case indicates the best adjustment. With S-1 closed and S-2 open, adjust R_1 , R_2 and R_3 for minimum tone, then

$$\mu = \frac{R_1 + R_2 + R_3}{10}$$

Keep the adjustments as made; open S-1 and close S-2; adjust R'_1 , R'_2 , R'_3 and R'_4 for minimum tone in the receivers, then

$$R_p = R'_1 + R'_2 + R'_3 + R'_4$$

Mutual conductance may be directly evaluated by test circuits but a special

amount of space; it will therefore be taken up later.

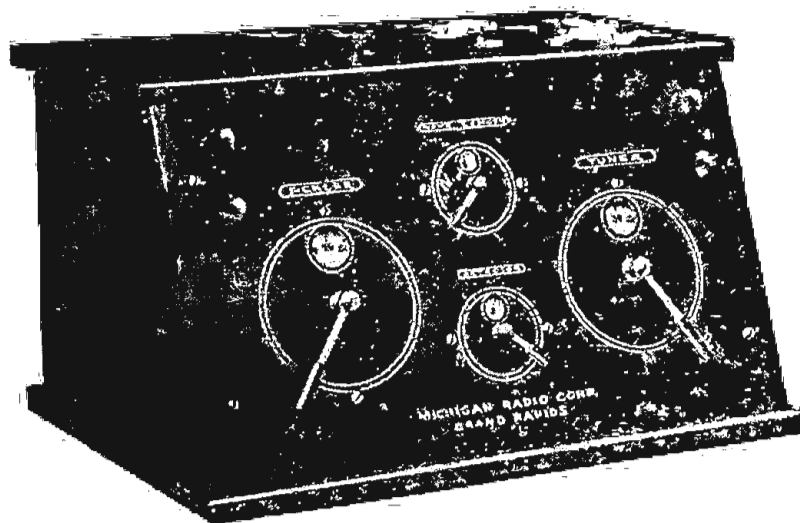
With the previous test circuits the amplification constant and plate resistance values can be obtained for a range of plate voltage; from these the mutual conductance can easily be obtained.

(THE END)

CARTER
New Inductance Switch

No sliding contacts; panel numbering eliminated; 15 good contacts; adjustable stop pin. Price \$2 including knob-dial. Ask your Dealer. Write for new free catalog. CARTER RADIO CO., 205 S. State St., CHICAGO

NOW THEY'RE TELEGRAPHING!



Dealers from all over the country are writing, wiring and long-distance phoning for immediate shipment of liberal stocks of the

Michigan "Midget" Receiver \$27.00

another "Michigan" long-distance wonder-worker.

This compact, portable set was designed especially for use by tourists and vacationists; but the remarkable results it has secured under most difficult summer static conditions has led to a vigorous demand for household installation.

An ideal set for the amateur, or for women to operate. Tuning is done by two levers—one for wave-length, the other for amplification—much easier than dial tuning, yet even more finely selective.

Full metal panel and dead-end shafts eliminate body-capacity effects. Incline of panel brings indicators into direct line of vision. Uses only dry-batteries.

Can be operated with any of the Standard 6-volt tubes, or with the new dry-cell tubes. Its wave-length range runs up to 600 meters.

Is so compact (14½ x 9½ x 7⅞ in.) that it occupies little table-room, yet has storage space for three No. 6 Dry Cells and a 22½ volt. B Battery.

Two or more headphones can be used at once. By adding amplification it becomes a powerful receiver for loudspeaker reception.

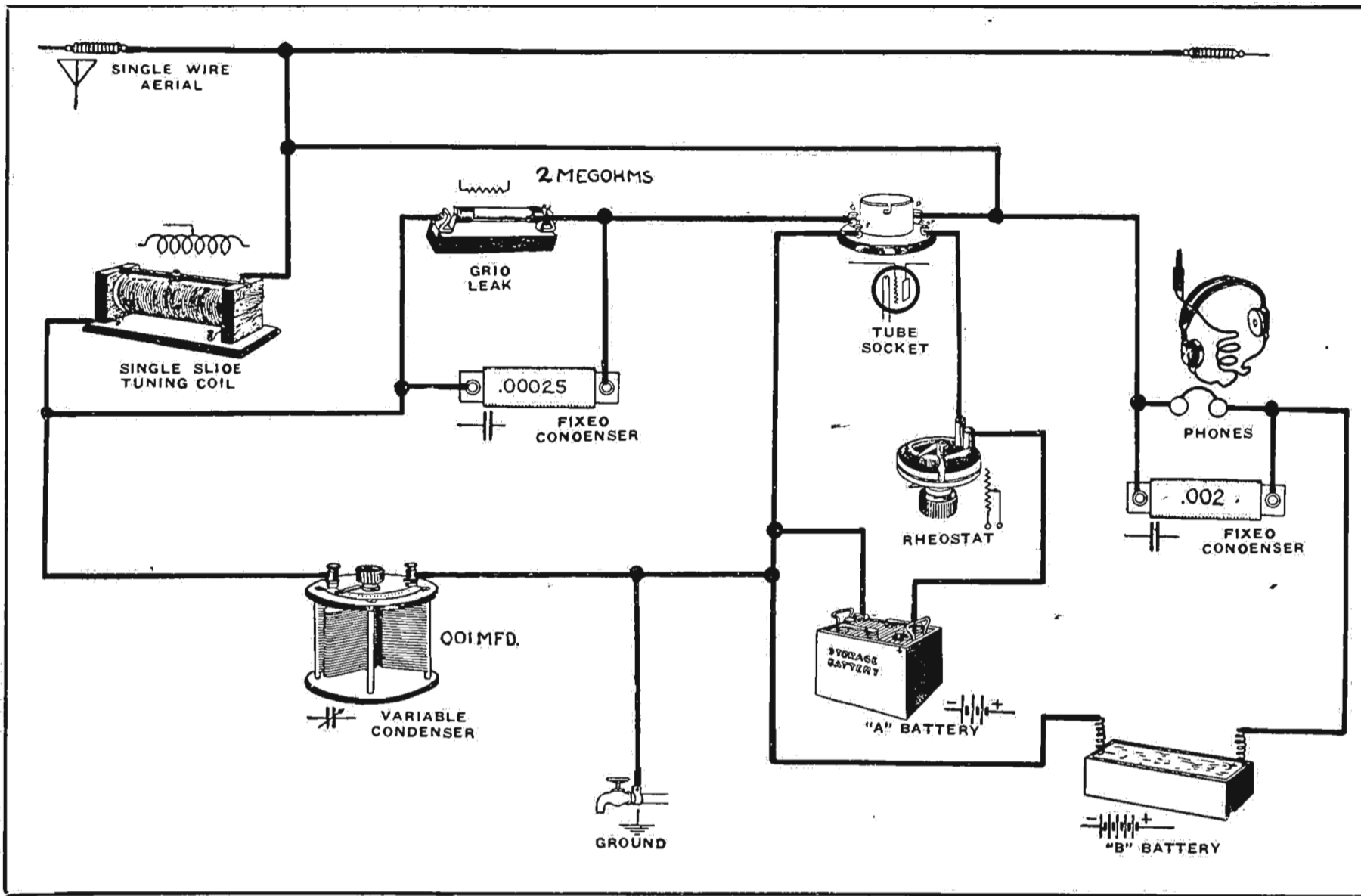
Its graceful lines and rich mahogany finish, coupled with its low price and really remarkable performance are making it a whirlwind seller.

Dealers: Write, wire or phone for discounts

MICHIGAN RADIO CORPORATION

GRAND RAPIDS, MICHIGAN

ALTER CIRCUIT TO USE OLD SLIDE TUNING COIL



THERE'S no reason why you shouldn't use the tuning coil from your old crystal set when you advance to the tube stage. Here's a simplex diagram of a circuit that enables you to change with the least expenditure of cash; yet the circuit is very efficient. Your crystal set probably included a variable condenser, too; if it has a capacity of .0005 or .001 mfd. it can

be used, although the diagram indicates only .001 mfd.
A dry cell tube can be used; the proper "A" battery and rheostat as required should be substituted. The plate battery voltage will depend on the type of tube used, ranging from 18 to 45 volts.
The phones are by-passed with a .002 mfd. phone condenser. The grid leak called

for has a resistance of 2 megohms, but with some tubes it may be advisable to change this to 1 or 1½ megohms. The grid condenser capacity should be .00025 mfd.; in some cases .0005 is used.
For good reception a good ground connection and good aerial are necessary. The aerial should be a single wire about 80 feet long.

Reviews of Books

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. Heslar. 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.

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.

Radio First Aid. Illustrated with working drawings and complete data as to the necessary equipment and cost of constructing from the simplest to the most modern Radio outfits at home. Price, \$1.

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.

Radio for the Amateur. By A. H. Packer and R. R. Haugh. The underlying principles of Radio thoroughly explained in simple language and understandable illustrations. This book will teach you how to construct and operate a receiving set successfully. Price, \$1.50.

The A B C Vacuum Tubes. By E. H. Lewis. Is a book for beginners who have no knowledge of either Radio or electricity and sets forth the elementary principles of theory and operation of the vacuum tube. No attempt has been made in this book to describe all the possible circuit arrangements, but those shown may serve as suggestions to experimenters who desire to evolve their own circuits. Price, \$1.00.

The book department of the Radio Digest is prepared to send you any of the books on Radio published, whether listed in our Book Review or not. Let us know what book you want, send us your check and we will see that the book is mailed to you. Postage stamps in payment for books not accepted. Send money order or check. Radio Book Department, Radio Digest, 123 W. Madison St., Chicago, Ill.

FIRST STEPS IN RADIO

(Continued from page 11)

In Figure 55 is shown the inverse reflex. In this circuit the currents at Radio frequency are passed from one tube to the other flowing from left to right. After detection, however, the audio currents are fed back into the grid of the third tube to be amplified. The amplified audio currents in the plate of this tube are then fed back by an audio transformer in to the grid of the second tube to be amplified again.

The phones are in the plate circuit of the second tube; so the signals are made audible after the second stage of audio frequency amplification. A 400 ohm potentiometer is connected in the grid circuit of the first tube to stabilize the circuit and prevent it from oscillating. Another feature of this circuit is the condenser by-passing the B battery thus further preventing reaction between the various frequencies. The condensers in this circuit as well as the other circuits shown are all of .002 mfd. capacity and have a mica dielectric.

There have appeared many modifications of these circuits; as a matter of fact after one has mastered their principle it is a simple matter to devise circuits; for we have at our disposal several methods of Radio frequency coupling and two of audio frequency. By introducing different methods of coupling between the various tubes a great variety of circuits may be devised. The aim has been however to keep the circuits simple and efficient.

Operation of Reflex Circuits

A few words as to the operation of reflex circuits. The filament rheostats are not very critical and verniers are not really necessary. This is due to the use of hard tubes and high voltage on the plates. The

sets are prone to howl which may be due to several things; experimenting may be necessary before they are quieted. Adjustment of the potentiometers may cure the howling or reduce the plate voltage. Poor transformers or tubes may be the cause. Try shifting the tubes around. Interference between leads or feedbacks between the transformers will often cause howling. Separate the transformers as much as possible. Try different values of bypass condensers and the insertion of resistances in the plate circuit of the tubes in an attempt to steady their operation. The results are well worth the effort for with a reflex one obtains everything possible out of the tubes in use.

(TO BE CONTINUED)

An outdoor aerial does not necessarily have to run in any particular direction to pick up a certain station. Run the wires the way that gives the most "open view."

HR=RH meaning that HUDSON ROSS is RADIO HEADQUARTERS

And by "headquarters" we mean that no other house in America carries as large and completely-assorted stock of nationally-advertised radio goods as we do. The following are some of the lines carried:

- | | |
|---------------------|-----------------|
| Atwater-Kent | Radi-Un Loops |
| Erla | Baldwin |
| United Mfg. Co. | Coto Coil |
| Murdock | Tungar Chargers |
| General Radio | Bradleystats |
| Corp. | Univernier |
| Carter | Eveready B's |
| Dubilier | and A's |
| All American | Celeron Panels |
| Howard | C. R. L. |
| Federal Tel. & Tel. | Acme |
| Brandes | Hilco |

H-R Service is prompt and intelligent. We know radio and co-operate fully with our dealers. Not a dollar's worth sold at retail.

Get the habit of asking for H-R quotations on all your radio requirements. Send for lists and discounts.

We are the largest exclusive radio jobbers in the middle west.

HUDSON-ROSS
123 W. Madison St. Chicago

RUSONITE

CRYSTAL RECTIFIER
(Patent Pending)

THE PERFECT SYNTHETIC CRYSTAL DETECTOR, SENSITIVE OVER ENTIRE SURFACE. No Hunting for "Spots." Loud and Clear. Endorsed by thousands of satisfied users. Sensitiveness Guaranteed. Price, Mounted..... 50c

14 K. GOLD SUPERSENSITIVE RUSONITE CATWHISKER. Permanent. Will Not Oxidize. Price..... 25c

RUSONITE REFLEX CRYSTAL. Manufactured Expressly for Reflex Circuits. Will Stand Up Under Heavy Plate Voltage. Guaranteed. Price, Mounted.. \$1.00

Order from your dealer or direct from RUSONITE PRODUCTS CORP., 15 Park Row New York, N. Y.

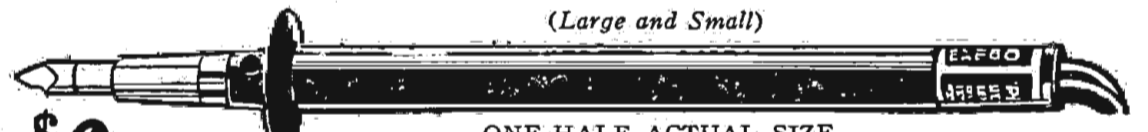
Delicate Soldering

Both the manufacturers' and amateurs' problems on all fine work are readily solved by the instrument constructed for this particular purpose.

THE POST SOLDERING IRON

Platinum Heating Unit—Interchangeable Tips—Universal Current

(Large and Small)



\$6

ONE-HALF ACTUAL SIZE
Awarded Certificate of Excellency, N. Y. Evening Mail Radio Institute
From your Dealer, or write

POST ELECTRIC COMPANY (Dept. 509), 30 E. 42nd St., New York

Money Earning Opportunity

HERE is your chance to cash in on your spare time. A special offer is being made to you for the summer.

YOU can easily earn some real money, or your choice of Radio parts needed for your receiving set.

WORK is pleasant and profitable. Just call on your friends, enrolling their names on our large family roll of readers.

WRITE at once for our proposition which is yours for the asking. Address

Circulation Manager, Radio Digest
123 W. Madison St., Chicago



Questions and Answers

Coil Winding

(4481) LJB., Kansas City, Kan.
I have begun the set described on Page 12 of the July 14 issue of Radio Digest, using No. 26 single silk-covered wire on the secondary and No. 24 single silk on the primary, but I find that I have not enough of the No. 24 wire for about 20 turns. Would it be advisable to finish with No. 26 wire? If so, should I increase or decrease the number of turns to the tap?
A.—There would be no disadvantage in completing the winding of the coil with No. 26 wire. No change in number of taps is necessary in doing so.

Neutrotons

(4486) JRL., San Antonio, Tex.
I would like to know the following:
What length of brass sleeve should I use to make neutrotons?
What size potentiometers?
What size grid condenser?
What size grid leak?
What size phone condenser?
A.—With reference to the Neutrodyne circuit we advise you that the brass sleeve for neutroton should be 2 inches in length. The usual 200 ohm potentiometer is indicated. The grid condenser is of .00025 mfd., the grid leak 2 megohms. The phone condenser is, as usual, of .001 mfd.

Nacireman Super

(4436) WHL., Kansas City, Okla.
Please send me a panel diagram of the Nacireman latest super R. D. 87 that is in Radio Digest June 30, 1923, as I want to build one and don't understand the diagram in that form. I have two 17-plate condensers. Will they work instead of

Can Radio and audio frequency transformers be made from Ford ignition coils? Briefly, how can it be done?
A.—A number of iron wires may be used as a core in the contemplated construction. Any magnetic core is more efficient when made up of laminated parts rather than the solid type.

The Question and Answer Department is purely a service department and the publishers would like to have your assistance in helping to keep it up to the highest standard, therefore when asking questions please make out your query on a separate piece of paper and write on one side only. Do not mix your questions with other material, write that on a separate piece of paper. Each one must go to a different department. Then, too, we have so many who fail to put their name and address on each sheet. Please remember this when you write your letters, and also to enclose a stamped self-addressed envelope. Unsigned letters are not answered. The Radio Digest does not consider it good business ethics to furnish hook-up diagrams of any standard manufactured receiving sets.

Audio frequency transformers may be made from Ford ignition coils but it is not advisable as the efficiency of an open core is very low. Solid iron, of course, will not respond to Radio frequency.

Honeycomb Coils

(4497) JEM., Toledo, O.
I have a standard triple honeycomb coil set with 35, 50 and 75 turn coils. I hear

lengths, although without a diagram of the circuit, etc., it is impossible to determine definitely the source of your limitation.
We are recommending coils of 50, 50 and 75 turns; if these are not effective, those of 50, 75 and 100 turns, or 50, 50 and 100 turns. The proper values are best

used. How long should be the piece of black picture binding paper tape? How much pencil marking must I use on it? Will a UV-201 do in place of a UV-201A?
A.—The grid leak may be constructed from about 1½ inches of the material named. Its resistance should be about two megohms. Pencil marking is best determined by experimentation.
A UV-201 tube will serve in place of the UV-201A specified.

Honeycomb Coils

(3753) WR., San Francisco, Cal.
I have a 3-coil honeycomb set now. Would you kindly make up a table of all the different coils to use from 120 to 25,000 meters so that I will know just what kind of coil to put in place?
A.—Answering your inquiry, we list the proper honeycomb coils for various wave lengths, as requested:

Meters	Primary	Secondary	Tickler
200-450	50	25-50	75
400-825	150	100	100
800-1850	200	150	100
1500-2750	300	200	150
2500-4200	200	300	150
4000-6350	3000	400	200
6200-14500	1250	750	400
13000-20000	750	1250	400
18000-25000	1000	1500	500

Fastening Rotors

Did you ever have your rotors work loose and cause your adjustments to change? This is a very annoying habit of some rotors. Cut one or two round pieces of soft leather, about 1 inch in diameter, with holes in the center, from the upper part of an old shoe, and slip them over the rod between the dial and the panel, then tighten to the right tension. This will hold the adjustments perfectly.—F. O. Paschall, New York City.

GHOSTS

Would appreciate our PHANTOM receiver, because it brings results. We have heard Kansas City, Davenport, Los Angeles, Chicago, Atlanta, Denver with no ground and little or no aerial. You will appreciate it for—it is inexpensive and simple to build when you use our plans and specifications. Send stamp for further information or 50c for complete plans and specifications.
Radio Equipment Co. 727 West Eighth Street Junction City, Kansas

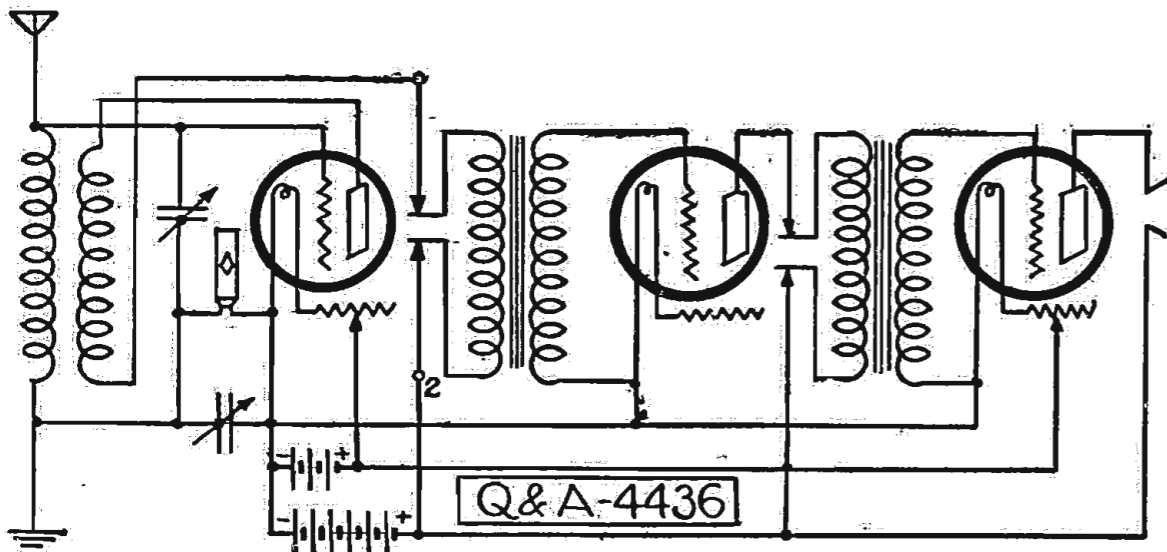
determined by experimentation. The wavelength of circuit depends on the size of the coil.

Bias Battery

(4502) AHC., Escanaba, Mich.
Will you please send me a sketch as to how to place a bias battery in the Flewelling circuit when using WD-12 tubes with 100 volts B battery? Is this bias battery the regular flashlight size or No. 6 dry cell?
A.—Answering your inquiry, we advise that a C battery is merely inserted in the grid lead with the negative toward the grid of tube. Three volts are sufficient; they may be made of two small flashlight cells.

Phantom Receiver

(4480) PRL., Louisville, Ky.
On Page 12 of the July 14 issue of Radio Digest there is an article and diagram as to the phantom receiver. The article explains how to make the grid leak



the 23-plate? Can I use a two-stage audio amplifier?
A.—We regret that we are unable at this time to furnish more data as to the Nacireman circuit other than those which have already appeared in Radio Digest.

The matter of panel construction is almost entirely for personal convenience and discrimination. It is important to keep all leads as short as possible and to space instruments suitably. A 17-plate condenser may be substituted for the 23-plate specified. Amplification may be added in the usual manner as shown in the illustration.

Transformer Cores

(4485) VB., Edgerton, Wis.
In building an apparatus for recording speech upon steel wire by means of magnetic impulses (I do not remember the name for this kind of recorder), is it possible to use a number of soft iron wires as cores for the magnets or must a single metal rod be used?

WWJ very well, but I am not able to get any other station. I have tried 25, 35 and 50 turn coils and I can't get even WWJ. Will you kindly explain how to overcome this difficulty?
A.—It is probable that the coils you are using are too small to accomplish wave-

ELECTRIC SOLDERING IRON

EVERY RADIO FAN has been looking for this iron for both radio and home use. Operates on A. C. or D. C. current.

228

GUARANTEED one year. Sent anywhere in U.S. or Canada Parcel Post prepaid on receipt of money order for \$2.28.

Send 2c stamp for our list of FANS of RADIO BARGAINS

RADIO BARGAINS

17 N. LA SALLE ST.—CHICAGO

FREE Your Choice

Of one Bound Volume, with each Annual Subscription when mailed direct to us. You have Vol. 2, 3, 4 or 5 from which to make your selection.

Supply Limited

Radio Digest Illustrated

Vol. 2, Vol. 3, Vol. 4, Volume 5

65 Numbers

Volumes 2, 3, 4, and 5 Now Ready

13 Numbers in the Bound Volume

52 Numbers in Year's Subscription

Greatest Collection of Radio Information Ever Published

Reinartz Long Distance Circuit
Ultra-Reinartz Circuit
Flewelling "Flivver" Circuit
Grimes "Inverse Duplex" Circuit
Single Tube Reflex Circuit
Armstrong "Super-Heterodyne" Circuit
Two, Three and Four Tube Reflex Circuits
A. B. C. Lessons for Radio Beginners

In addition to these features these volumes contain many instructive articles, receiving set diagrams, how to make articles, new apparatus, pictures and illustrations, hook-up diagrams, broadcasting stations, technical articles and book reviews.

Your choice of one Bound Volume is free and postpaid with your one year's subscription or renewal. This offer good only in the U. S. and possessions. One dollar additional for Canadian or foreign countries. Additional volumes are \$2.00 each, but are only available to annual subscribers. This on account of our limited supply.

Orders for these Bound Volumes must be mailed us direct with full remittance, as they can not be supplied on orders through subscription agencies or news dealers.

Remittance must be by check, money order or draft. (Stamps not accepted.)

COUPON [8-18]

PUBLISHER, RADIO DIGEST
123 W. Madison Street, Chicago, Illinois

CHECK OFFER DESIRED

One year's subscription and choice of one volume. Send Vol. _____ Check or M. O. enclosed. \$5.00

One year's subscription and choice of two volumes. Send Vols. _____ Check or M. O. enclosed. \$7.00

One year's subscription and additional Volumes Nos.

Name

Address

City..... State.....

WE SUBMIT THE PROOF



This letter is just one of hundreds received telling of the efficiency of the Wonderful B-Metal Loud Talking Crystal which enables many users to get loud talking results from ordinary crystal sets.

We are prepared to send a photostat copy of the original letter to any one requesting it.

B-Metal Refining Co.
3134 Trumbull Avenue
Detroit, Michigan

Kansas City, Mo.
May 21st, 1923.


Dear Sir: I received your goods (B-Metal Loud Talking Crystal and Tube Detector) on the 18th and have given each article a thorough test from every angle, and I hereby give you my approval that the word supreme is the nearest mark of degree that I can think of for your Tube Detector and B-Metal Loud Talking Crystal. I am keeping the crystal, as it enables me to use a horn, making a crystal loud speaker that has the volume of a phonograph when using the soft needle. Enclosed please find money order for same. Yours,
W. R. Ferguson.

Ask your dealer. He should have it. If not, send us your order and your dealer's name. Note the difference when you use a B-Metal Crystal, then tell your friends.

B-Metal Refining Company 3134 Trumbull Avenue
DETROIT, MICHIGAN

PRICE 50 CENTS

Radio Illustrated



Peggy Hopkins Joyce, famous for her beauty and divorce court activities, broadcasting the "Vanities of 1923" at WOR, L. Bambergers, Newark, N. J. All the other stars, including Joe Cook, helped put the show on the air, giving the lines as well as all the music
© Fotograms



Violet Vee (right) and Valerie Vee, the two winners of a recent six day, non-stop Radio golf contest held in Washington Heights, New York © K. & H.

Afternoons without matinees are enjoyed by the ladies from the "Passing Show," Chicago, by means of bathing beaches, hot dogs and of course a portable receiving set. The miniature life guard in the foreground also finds Radio a fine relief for bad nerve attacks
Photo by Radio Digest



Ivan Andre, well known painter in England and France, is now in this country. Already he is using a portable set
© K. & H.