

# 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, SEPTEMBER 1, 1923 No. 8

## RELEASE NEW SONG HITS

### INVENTOR SEES END TO NOISY SENDING

#### NEW DEVICE STOPS TROUBLESOME JAMMING

Use of Low Frequency Tubes Precludes Message Interference, Frenchman Declares

LONDON.—An instrument which, it is said, marks an important advance in radio telegraphy, is described by its inventor, a Frenchman named Yves Marrec, as eliminating jamming and interference and reducing the cost of messages by at least one-third.

The new device receives and prints radio messages on a tape.

M. Marrec employs a supplementary apparatus consisting of a series of low-frequency vacuum tubes, which eliminates all obtruding sounds one by one, with the result that the message for which the machine is tuned in comes out as clearly as if there were only one station operating in the world. Besides suppressing "parasitic" noises, the apparatus completely eliminates every interfering message sent out from other transmitting stations.

#### Makes Low Power Plants Practicable

In an official test for the British government recently, the French inventor submitted his machine to the most severe conditions. He received messages from the powerful station near Port Jefferson, Long Island, free of all interference or jamming. He chose for the test an ordinary office in one of the noisiest parts of London, with electric trains and motor traffic running all around and under it. Moreover he had no outside aerial. The "purified" messages were received so loudly that they were heard several yards from the earpieces.

In messages from the United States M. Marrec declares, each letter has now to be repeated three times and each word twice, after which they still require to be deciphered by a keen expert. Under the new system, according to the inventor, a message need be sent only once, and it is recorded in ink on paper.



### ASSOCIATION SECURES ITS OWN MUSIC

National Organization Determines to Continue Broadcasting Independently

#### Listeners Need Not Worry

#### U. S. Ruling Against Station WOR Doesn't Block Work of Combined Plants

(Special to RADIO DIGEST)

NEW YORK.—Many new popular song hits will be on the air soon. Jazz music will still be part of the broadcasting programs, despite the adverse decision in the music copyright fight handed down recently by Judge Lynch, of the United States District Court, in Newark, was the gist of a statement here by Paul Klugh, executive chairman of the National Association of Broadcasters. "The American public can be assured of not only popular music but better song hits than they have been receiving over the Radio. The music bureau of our association is releasing for broadcast each week many tuneful melodies that soon will be on everybody's lips throughout the country.

#### Not Worried by Court Opinion

"Not only is the National Association of Broadcasters not worried by the opinion (Continued on page 2)



The ostrich feather bedecked young lady above is Miss Hope Vernon, song artist and vaudeville star, featured often over KGB, Tacoma, Wash. Then at the left is Chief One Star, Cherokee Indian, who told WDAR, Philadelphia, listeners in about American Indian customs and the Buffalo when it roamed the Western Plains. Pearl Hossack Whitcomb (right), mezzo contralto, is well known to KPO, San Francisco, fans. She conducted the first complete opera to be broadcast from there





# JACK, CRYSTAL AND LEAK SOUGHT MOST

## ORDERS FOR PARTS SHOW THREE LEAD OTHERS

Demand in Answer to Radio Digest's Offer Causes Enlargement of Distributing Force

**SPECIAL REWARD OFFER**  
**Coupon Number 14**

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**

More requests have been received, in relation to the parts offer of the Radio Digest, for jacks, crystals and grid leaks, than for any other parts. The demand for these devices grows larger with the receipt of every mail.

So steady and insistent has been the call for parts from all sections of the country and from foreign lands that the distributing force of the Radio Digest has been enlarged. This will enable the continued prompt shipment of all parts. Just remember that when you follow the instructions printed below you will receive the parts you want without delay.

### 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 Schindler .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; Walhart Standard Tube Socket; Walhart 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; 2" Radion Dial, black; 2½" Radion Dial, black; 3" Radion Dial knob with shafts, ⅜" or ½", black; 3" Radion Dial, ribbed surface.

### 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 Puddin Variable Grid Leak with .00025 mfd. Condenser; 1 Federal Universal Phone 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 SPST Knife Switch 1 Martin-Copeland SPDT Knife Switch; 1 Martin-Copeland DPST Knife Switch; 1 Martin-Copeland DPDT Knife Switch; Walhart Variable Grid Leak; Walhart 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-Pasa 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 ME., or SW-20 with .300 ME.); 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; 3½" Radion Dial, black; 4" Radion Dial, black; 4" Radion Dial, black, ribbed surface.

### 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 (Powar) Rheostat; 1 Amperite Automatic Filament Control (with mounting); 1 Martin-Copeland Marco Rheostat; 1 Martin-Copeland Series Parallel Switch; 1 Martin-Copeland DPDT Panel Switch; 1 Martin-Copeland 7-Point Inductance Switch; 1 Martin-Copeland 9-Point Inductance Switch; 1 Martin-Copeland 11-Point Inductance Switch; Walhart Variable Grid Leak with .00025 mfd. Condenser; Walhart Variable Condenser (3-plate .00008 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-Pasa Condenser (1 mfd.); Premier Universal Radio Jack, Filament Control Fiva 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 Multiple 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 Cushion Resilient Socket; Aerovox Antenna Plug; Aerovox Potentiometer; Aerovox Crystal Detector; Se-Ar-De Adjustable Vernier Condenser; Basco Tuning Coil; Basco Vernier Rheostat; Radion Panel ⅜"x7"x9", black or mahogany; Radion Panel ⅜"x7"x12", black.

### Class D Articles

For eight consecutive 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 Schindler Radio Frequency Transformer; 1 Martin-Copeland 13-Point Inductance Switch; 1 Martin-Copeland 15-Point Inductance Switch; 1 Martin-Copeland 19-Point Inductance Switch; Walhart Variable Condenser (5-Plate .0001 mfd.); Ray-O-Vac No. 4151 B Battery, 2½ volts; Ray-O-Vac Dry Battery, 3 calls 4½ volts; Electrad Varlohm, with mica condenser; Dubilier By-Pasa Condenser (2 mfd.); CRL Variable Grid Leak with Condenser; Resistometer (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; Radion Panel ⅜"x7"x12", mahogany; Radion Panel ⅜"x7"x18", black; Radion Panel ⅜"x9"x14", black; Radion Panel ⅜"x10"x12", black.

### 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; Walhart Variable Condenser (13-Plate .00025 mfd.); Ray-O-Vac Dry Battery, 4 cells 1½ volts; Dubilier Varidion (.0004 or .0006 mfd.); Resistometer (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; Radion Panel ⅜"x7"x18" mahogany; Radion Panel ⅜"x7"x21", black.

### Class F Articles

For twelve consecutively numbered coupons and one dollar and eighty cents (\$1.80), any one of the following articles will be sent: 1 Acme Pot-Rheo (potentiometer and rheostat); Walhart Variable Condenser (23-Plate .0005 mfd.); Ray-O-Vac No. 2151 B Battery, 2½ volts; Dubilier By-Pasa Condenser (3 mfd.); Premier Variable Condenser without dial (.00639 mfd.); Thordarson Variable Condenser, .091 mfd.; Amco Compensating Grid Condenser; Freshman Micon Condenser, .25 mfd.; Teleradio Variable Condenser, 43-plate; Se-Ar-De 3-Plate Condenser; Radion Panel ⅜"x7"x21", mahogany; Radion Panel ⅜"x7"x24", black; Radion Panel ⅜"x9"x14", mahogany; Radion Panel ⅜"x10"x12", mahogany.

### 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; Walhart Variable Condenser (43-Plate .001 mfd.); Dubilier Varidion (.001 mfd.); Dubilier By-Pasa Condenser (4 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; Radion Panel ⅜"x7"x24", mahogany; Radion Panel ⅜"x10"x12", mahogany; Radion Panel ⅜"x12"x21", black; Radion Panel ⅜"x14"x18", black.

### 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; Demcal 23-Plate Variable Condenser; 1 Acme Audio Frequency Transformer; 1 Acme Radio Frequency Transformer (R-2, R-3, or R-4); Walhart Variable Condenser (13-Plate vernier); Walhart 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; Radion Panel ⅜"x12"x21" mahogany; Radion Panel ⅜"x14"x18", mahogany.

# CONTENTS

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"All the Live News of Radio".....	1 to 9
Flewelling Answers to Queries.....	4
Air Sounds War, Youth, Age, Love; An Evening at Home with the Listener In.....	5
R. D.-95, One Tube Loop Aerial Circuit.....	6
The Week's Advance Broadcast Programs.....	7
Radiophone Broadcasting Directory, Part III—Station Schedules.....	8
Editorials; Indi-Gest; Condensed by Dielectric.....	10
First Steps for Beginners in Radio, Chapter XV, Part 2—Telephones and Loud Speakers.....	11
Combination Crystal and Tube Set.....	12
Five Tube Neutrodyne Receiving Circuit.....	13
Simplex Picture Diagram—Tapped Coil Inductance.....	14
Questions and Answers.....	15
Radio Illustrated, A Page of Pictures.....	16

## Looking Ahead

**Wiring the Set in the Five Tube Neutrodyne**—H. J. Marx in the next issue gives correct wiring details on the Neutrodyne. Rear views of this popular and workable set will be shown to emphasize details of correct wiring and mounting of apparatus.

**An Inexpensive Single Tube Set for Loop Aerial Work**—Get the September 8th number and look over Diagram R. D.-96.

**Something New in a Triple Honeycomb Coil Circuit**—Sent in by a Digest reader. It will surprise you. Hit the newsstands first to be sure to get your copy next week.

**Description of Filament Lighting Batteries**—Both wet and dry batteries will be discussed by Thomas W. Benson in his fifteenth chapter of "First Steps for Beginners in Radio." Batteries are important to good reception. Better let an expert tell you how next week.

**Coming Soon—A Sensation, "The Miloplex"**—Something brand new in single tube circuits has been perfected by an old Radiophan. It's a bearcat for volume and selectivity. Get the Digest each week from now on so you will not miss this new bet.

Newsstands Don't Always Have One Left

WHEN YOU WANT

# Radio Digest

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BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

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

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

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## SEND NEW SONG HITS

(Continued from page 1)

ion of Judge Lynch that the broadcasting of popular songs is a violation of copyright laws, but the association is not even interested," Mr. Klugh asserted. The decision was the outcome of the suit, sponsored by the American Society of Composers, Authors and Publishers, of the M. Witmark Publishing Company of this city against Station WOR, the L. Bamberger department store of Newark.

"Since July 1 of this year," Mr. Klugh continued, "members of the National Association of Broadcasters have received music as good in quality and variety, in the opinion of many, as that controlled by the American Society of Composers, Authors and Publishers. The work of the broadcasters' association thus has relieved its members and the listening in public from the exactions of organized composers and publishers."

### To Encourage Song Writing

Among the objectives of the National Association of Broadcasters, which was organized last April in Chicago "to secure freedom from unjust and unlawful exactions" and "to encourage and aid the development of musical and literary genius," was the establishment and operation of a bureau of musical release.

"The bureau," Mr. Klugh continued, "has invited the writers and publishers of songs to send them to the offices of the National Association of Broadcasters (1265 Broadway, New York City).

"The invitation was extended by means of display advertisements, articles in the various periodicals read by composers and publishers, announcements by Radio, and thousands of letters. As a result, thousands of musical compositions of varying worth were received. These were subjected to thorough test. Less than ten percent were declared acceptable. When the songs indicated that they would become popular they were released by the bureau and broadcast to millions of persons.

### Independent of A. S. C.

"In this way the National Association of Broadcasters became independent of the Society of Composers, Authors and Publishers and the public was given that to which it was entitled without hindrance, without license, tax or other imposition."

Raymond Walker, widely known composer and publisher of popular songs, is in charge of the bureau of release.

In the opinion of those who have reviewed the opinion of Judge Lynch, he had in mind the Shanley-Victor case in which Justice Holmes of the United States supreme court decided that although Shanley, noted restaurateur of New York city, charged no admission to the vaudeville which featured his estab-

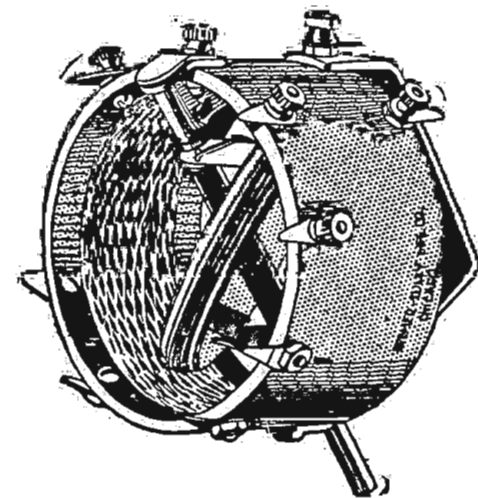
(Continued on page 8)



Guarantee an unusually uniform and steady contact. For base or panel mounting. Condensite base, high-grade resistance unit, attractive knob. Adjustable shaft to any thickness panel.

6 Ohms.....\$1.00; with dial.....\$1.25  
20 Ohms..... 1.25; with dial..... 1.50  
(For UV-201A Tubes)  
50 Ohms..... 1.30; with dial..... 1.55  
(For UV-199 Tubes)

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# NEW WAY TO WORK PROBLEMS OF WAR

## AIRPHONES SEEN AS AIDS IN THEORETICAL COMBAT

### Navy Chief Plans to Co-ordinate All Arms by Relaying Tactical Reports

WASHINGTON.—Franklin Roosevelt, assistant secretary of the navy, has a unique idea for the use of Radio in army and navy war games. He proposes the joint study and solution of a problem involving combat operations, such as an overseas expedition, by the war colleges of the army and navy simultaneously, every move being Radioed to umpires meeting in the war or navy departments near their Radio central offices.

War games are old but Colonel Roosevelt's idea is to bring the land and sea postgraduate war schools into a closer relationship during peace when they have time to solve problems involving both arms. Military and naval forces would be operated theoretically on paper, just as they would co-operate in time of war.

**Would Co-ordinate Activities**  
Since the naval war college is at Newport, R. I., and the war college of the army in the capital it would be expensive and difficult to bring all the students into one large hall. Therefore, Roosevelt suggests that the students remain in their respective class rooms where all facilities are available and, as fast as orders, plans and movements of troops or ships are made, to Radio the action to the board of judges sitting in Washington.

The army and naval officers serving as umpires would have two charts in their meeting place and plot every move made by the students at each school.

**Would Aid Both Arms of Defense**  
Upon the completion of the game, which might require a week or ten days, the umpires would decide which of the schools had solved the problem correctly or to the best advantage and announce the result by Radio to the students.

It would not be a contest between the army on one side and the navy on the other, but would involve the handling of sea and land forces. The naval class would be divided, one handling the red forces, the other the blue, while the army school would also fight the same problem, dividing against itself. Such studies, naval officials believe, would tend to familiarize the naval officers with the military end of war problems and army students with the marine phase of such conflicts, effecting closer cooperation and understanding of the combined national defense.

# AIR BETRAYS TWO ESCAPED FELONS

## Same Set Which Sends Missouri Convicts' Memorial Music Trails Them

ST. LOUIS.—Amateur Radio operators of Missouri joined recently in a hunt for two convicts.

Charles Stevens and Alva Bachelor, serving 25 and 20-year sentences, respectively, in the state prison at Jefferson City, had escaped.

The pair were members of the prison band, which was playing in a memorial to President Harding in the state capitol.

Their escape was broadcast by Radio through the middle west. During the concert the two "trusties" slipped away, obtaining civilian clothing from two women, and fled.

Over the same Radio which had broadcast the prison band music a report of the escape and a description of the convicts were sent out.

Two amateurs in St. Louis caught the message and relayed it to the police two hours before the authorities received official notice of the escape from Jefferson City.

# FIRST LAKE AIRPHONE BEACON AT DETROIT

DETROIT.—A Radio telephone, first to be installed in lake lighthouses, has been added to the equipment of the Marquette lighthouse, near here. The light stations on Manitou and Passage Islands will be similarly equipped. It is reported by the commissioner of lighthouses. A number of the keepers have had receiving sets, but this is the first time a Radiophone transmitter has been installed.

# ANTENNA 326 FEET UP MARKS PAPER PLANT

OAKLAND.—The new \$1,000,000 Oakland, Calif., Tribune tower, twenty stories in height, surmounted by a searchlight visible for 100 miles, will be complete about October 1. On the twentieth floor will be the Tribune's 500-watt Radio broadcasting station. The antenna for this station will be strung from the top of the building, 326 feet high; it will be the second highest in the United States.

# AIR PICTURE SHOWS HARDING'S FUNERAL

## STATION WJAZ PRESENTS OBSEQUIES BY RADIO

### Each Phase of Sad Procession in Nation's Capital Broadcast from Chicago to Thousands

CHICAGO.—So that the mental vision could comprehend that which the ear alone ordinarily could understand, so that millions of the people could by eulogy and melody mourn in unison, Station WJAZ of this city, by means of what was termed tonal illustration, recently reenacted at night the sad solemn events of the funeral procession in Washington of Warren Gamaliel Harding, 29th president of the United States.

The important sound phases of the cortege as it proceeded in Pennsylvania avenue to the capitol were revealed to listeners by means of an invocation, a quartet, an orchestra and chimes. All the various episodes of the sorrowful event were imaged and broadcast. The program was in fact an aerial picture.

**Tolling Bells Are Heard**  
As the procession made its way from the White House to the capitol, as it passed the grief-stricken thousands, and as it finally halted to enable loving hands to place the coffin on its catafalque in the rotunda, N. A. Fegen of Station WJAZ verbally described each momentous act.

When the procession started toward the building, draped in black, which housed the bier, the bells of St. John's Episcopal church in Washington began to toll and from Station WJAZ there came, in like manner, the awesome peals.

As the cortege passed the District of Columbia building, city hall of Washington, 3,000 wide-eyed school children, saddened by the nation's loss, sang "Nearer, My God, to Thee," one of the favorite hymns of the executive, and strewed flowers in the path. And from Station WJAZ was broadcast the strains of the sacred song.

**Repeat Songs Over WJAZ**  
Slowly the procession moved onward. As it came abreast of the Marine Band the hushed throngs heard, to the beat of muffled drums, the dolorous yet dulcet tones of "Onward, Christian Soldier." And from Station WJAZ the same inspiring song was sent.

Step by step, the measured tread of the cortege was sounded in harmony with the Funeral March (Chopin) and as the coffin was carried up the broad steps of the capitol there came to thousands far away the song, "Lead, Kindly Light," in repetition of that played by the Army band. As the group of notables under the great dome in the capitol reverently bared their heads the male quartet of Calvary Baptist church (Washington) voiced "Lead, Kindly Light." And from Station WJAZ came like chords.

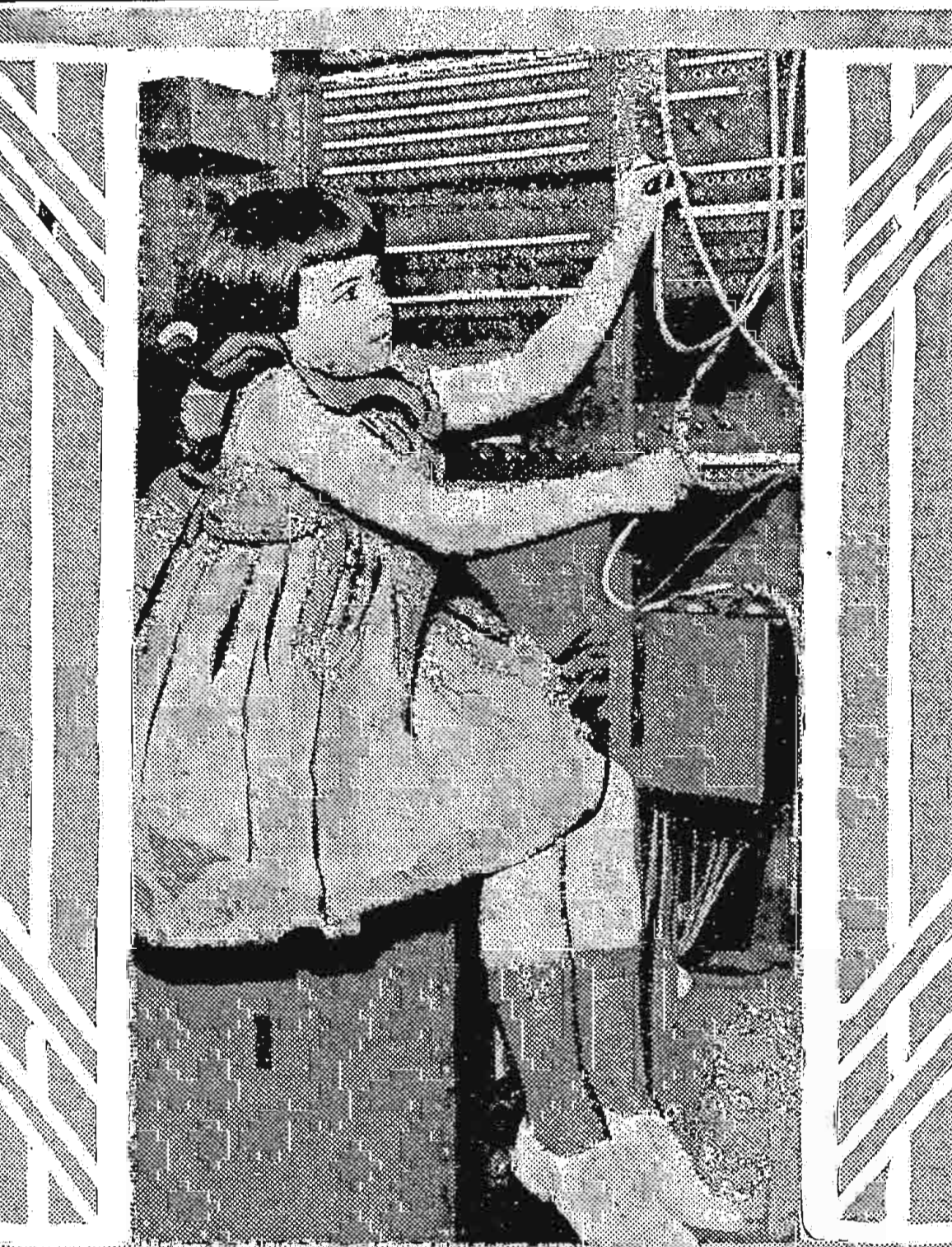
As the words of an encomium and of prayer uttered by the Reverend Freeman Anderson of Washington stirred those around the catafalque, Mr. Fegen, in Station WJAZ, delivered an invocation.

# Data Show 1,126 More Stations Than in 1922

## Department of Commerce Statistics Reveal Total of 21,967

WASHINGTON.—The end of the fiscal year shows a gain of 1,126 Radio stations of all kinds in the United States, according to the department of commerce figures just compiled. On June 30, there were 21,967 ship and land Radio stations; a year ago there was a total of 20,841. The increase represents added interest among amateurs and broadcasters who have received station licenses during the last twelve months. Amateur stations increased from 15,504 to 16,570 on June 30, showing a gain of 1,066. Broadcasting stations number 191 more today than a year ago, having increased from 382 to 573.

# BEGINNING YOUNG AT WEAF



WEAF was entirely operated by women only recently, and six-year-old Jaqueline Land, daughter of the big plant's hostess, did her bit. She is shown at the "long distance panel," connecting WEAF direct with other cities and stations, such as WNAC, Boston, and WCAP, Washington. It is through this switchboard that connections are made for simultaneous station broadcasting. ©K. & H.

# Ship Near Ceylon Hears Amateur in Galveston

## Message Sent Half-way Around Earth Breaks 5IM's Record

GALVESTON, TEX.—A ship operator about 100 miles southeast of Ceylon in the Indian ocean recently heard an amateur Radio station of this city approximately half-way around the world.

This is a new long distance amateur record, since the Texas station 5IM, operated by Edward W. Rouse, covered 11,000 air miles. Other stations as to which reception was reported, but not confirmed, are

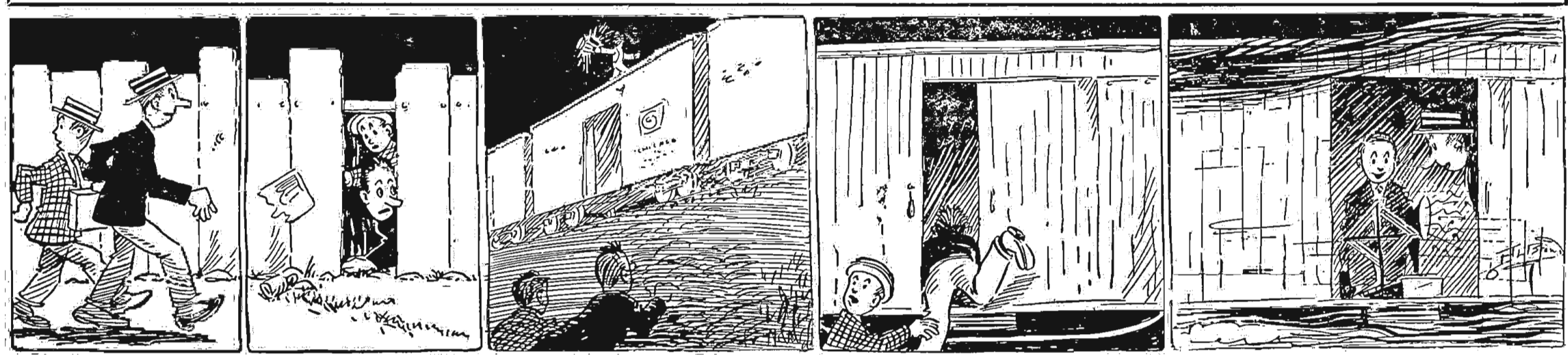
6KA, operated by Thomas E. Nikirk, Los Angeles Cal.; 6ZZ, H. L. Gooding, Douglas, Ariz.; 8ANB, C. P. Goetz, Cincinnati, Ohio, and 4EB, E. W. Cochran, Palmetto, Ga.

# House of God Now Utilizes Air to Broadcast His Word

CARTHAGE, ILL.—The Presbyterian church here is now Federal Licensed Station WTAD for Radiophone broadcasting. The plan is to broadcast at least one service each Sunday. For this purpose the people of the church are co-operating in establishing the station and installing and operating the equipment.

Chicago leads all other cities with a total of 3,729 amateur stations.

# THE ANTENNA BROTHERS Spir L. and Lew P. Aboard the Radio Rattler





# POLICE BROADCAST FINDS STOLEN CARS

## REPORT OF STATION KOP AIDS MICHIGAN TROOPERS

Highway Officer, Warned by Detroit, Nabs Fugitive as He Passes Receiving Set

By F. L. Huntley

DETROIT.—The Detroit police department, KOP, has proved the value of Radio broadcasting. One of its most interesting reports comes from South Rockwood, Mich., where a local post of the Michigan state police is stationed.

While the state troopers there were recently installing a new receiving set and completing the wiring a policeman started to tune the set. The first station he brought in was KOP, at a time when a report of stolen cars was being broadcast.

The trooper noted the numbers of the cars as they came over the Radio. A few moments later, as he stepped onto the road, he was surprised by a car bearing the license number of one that had been reported, during the police broadcasting, as stolen.

### Driver of Stolen Car Arrested

The driver was immediately arrested and with the car given into the custody of the Detroit police.

Another instance of the efficiency of the police Radio was that which involved two boys who had escaped by means of an automobile from the industrial school in Lansing. A resident of Washington, Mich., about ninety miles east of the state's capital, had received from KOP reports as to stolen cars. As he left his home recently he saw in a nearby ditch a wrecked automobile bearing one of the license numbers he had noted. The car was that in which the boys had fled.

Inspector H. G. Parker, in charge of the automobile recovery squad, Detroit police, declared recently that the work of KOP is of inestimable value and predicted that as the use of Radio becomes general many more cars and other kinds of stolen property will be recovered. Great advantages are claimed for the system of locating cars, and Inspector Parker soon hopes to see all cities' police departments similarly equipped with Radio.

## WBAP Preacher Now Member of WDAF Nighthawk Club

FORT WORTH, TEX.—The Rev. John W. Bergin, First Methodist church, whose Sunday sermons are broadcast regularly by WBAP Star-Telegram station here, has been dubbed an "enemy of sleep" and given life membership in the Nighthawk Club of the Kansas City Star, station, WDAF.

"Every preacher ought to be able to wake 'em up, but folks don't always give you a medal for it," was the distinguished minister's comment on receiving the badge of membership. The Rev. Mr. Bergin has received notices from hearers in all parts of the United States, Mexico, Canada, South America and from aboard ships. Indications that collection boxes have been passed, also come in.

## 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.)

### Finding the Whistle

(Submitted by E. L. F., Phoenix, Ariz.)

Question. I have built a Flewelling super set, and have followed your various articles and instructions very carefully. I am sure that my set is wired correctly and according to the specifications published, yet I cannot get the whistle or rushing sound that is referred to. Will you tell me why?

Answer. If everything in your set is correct even to having the tickler coil working in the right direction then with one exception you should have no trouble in securing the proper action. The one exception is a point that I should like to call to the attention of all Flewelling fans as it has a very great influence on

the action of the hook-up. The grid condenser that has the leak connected around it has always been specified as of .00025 mfd. capacity. While this has been, in most cases, the correct value, we have recently found that superior results are often (now don't mistake me) secured by the use of a large sized condenser at this point. At present the writer is using a super set in which the grid condenser is one of the usual fixed types using a mica dielectric and having a capacity of .001 mfd., certainly a large size for a grid condenser. This set gives good results on all sizes of grid condensers from .001 mfd. up to .012 mfd. but does not seem to function at its best on the lower values. My advice to the fans in general is to try various sizes for the grid condenser and larger sizes perhaps in the place of the .006 mfd. condenser in the filament side of the inductance. Neither of them is critical in value but both seem to work better on the larger sizes than on the smaller.

## ISOBARS DETERMINE AIR WAVE THEORY

Experimenter in Minneapolis Declares Barometric Pressure Affects Transmission

MINNEAPOLIS.—Radiophans may have to add a barometer to their equipment so as to study maps issued by the weather bureau to determine their range of transmission or reception if the theory that Radio waves tend to follow isobars, or lines of equal pressure area, advanced by Donald C. Wallace, assistant division manager of the American Radio Relay League, is correct. From experiments made recently at his amateur station in this city, Mr. Wallace is convinced that Radio reception may be foretold with a fair degree of reliability.

The subject is comparatively new. The most that can be said for it is that it makes a start at explaining why reception is poor at certain times and why stations at various points of the compass are heard with changing strength regardless of their actual distance.

### Beloit on Air in Fall

BELOIT, WIS.—Failure of concerns that manufacture Radio equipment to make deliveries to Beloit college for the new broadcasting station to be erected here in conjunction with Fairbanks Morse & Company, has caused the formal opening of the new station to be postponed until fall. The equipment will be received and assembled soon for the opening of school in September. The call letters are unassigned.

## Broadcasting Station For Sale

Station is a 1,000-watt transmitter, composite type, built by our own engineers. The station, located in Chicago, is now broadcasting daily programs.

Box 200, RADIO DIGEST  
123 W. Madison Street, Chicago

## OLDEST SOLOIST, 85, ON WHAZ'S PROGRAM

Widely Known Baritone Grants Encore to Eager Listeners

TROY, N. Y.—Probably the oldest singer ever heard by Radio, Calvin Dater of this city, eighty-five year old baritone, sang three numbers from the studio of Station WHAZ at the Rensselaer Polytechnic Institute here recently. Mr. Dater, who was for many years a well-known soloist and chorister, expressed a desire to be heard over the broadcasting medium. He recalled the days before most of the modern means of communication, telephone, telegraph, railroads, electric apparatus, automobiles, airplanes, and the like were in existence. Mr. Dater's voice was strong and remarkably firm and steady; after he sang "Madeline" and "Silver Threads Among the Gold," so many telephone and telegraph requests came to the studio for an encore that he sang the more dramatic solo, "The White Squaw."

## VACUUM TUBES REPAIRED

WD11, WD12, UV201A, UV199 and others for \$3.00

Quick service. All tubes repaired by us guaranteed to work as good as new.

Send remittance when you send the tube. We prepay parcel post back to you.

THOMAS BROWN COMPANY  
511-519 Orange St. NEWARK, N. J.

## Bunch Your Orders Don't Scatter Them

Dealers who form the good habit of "putting all their eggs in the H-R basket" WIN OUT—save a lot of time, worry, mistakes, delays and money.

We are distributors of the largest and most responsible manufacturers of nationally advertised radio equipment in the U. S. and carry complete stocks, for immediate shipment in any quantity. We have abolished mistakes and delays by our double-check, time-stamp system of handling orders. We represent:

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|---------------------|------------------|
| Atwater-Kent        | Radi-Un Loops    |
| Era                 | Baldwin          |
| United Mfg. Co.     | Coto Coll        |
| Murdock             | Tungar Chargers  |
| General Radio Corp. | Bradleystats     |
| Carter              | Univernier       |
| Dubilier            | Eveready B's and |
| All American        | A's              |
| Howard              | Celetron Panels  |
| Federal Tel. & Tel. | C. R. L.         |
| Brandes             | Acme             |
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Send for literature and discounts, stating lines on which you wish immediate quotations.

We are the largest exclusive Radio Jobbers in the middle west.

**HUDSON-ROSS**  
123 W. Madison St. Chicago

# NEXT RADIO SHOW AT CHICAGO NOV. 20

## SECOND ANNUAL EXPOSITION FOR FANS, TOO

Exhibition Although Primarily for Manufacturers Will Hold Contests for Amateur Makers

CHICAGO.—The second annual Chicago Radio show will be held in the Coliseum beginning Tuesday, November 20 and closing at 11 o'clock the following Sunday evening, according to U. J. Herrmann, managing director. James F. Kerr will again be manager.

Plans for the second show are elaborate. The principal change in policy from last year's show will be the throwing open of the exhibit space to distributors, jobbers and retailers, although the show will continue to be primarily for manufacturers.

### To Hold Contests

The basic program for the show as already outlined will include talks by well-known Radio engineers. Leading hook-ups will be explained by their inventors; master models will be shown. This plan is expected to bring many amateurs.

Contests for unusual sets, smallest sets etc., are being arranged. These contests will be divided into classes which will carry prizes for high school students, amateurs in general and perhaps manufacturers.

Demonstration stages will be erected at both the north and south ends of the great building and the broadcasting studio will be on an elevated platform in the center.

French speaking residents of Canada are learning English by listening to United States broadcasting stations.

## WD-11 and WD-12 TUBES REPAIRED

WD-11 or WD-12.....	\$3.50
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
Moorehead Detectors.....	2.75
Moorehead Amplifiers.....	3.00
DV-6 or DV-6A.....	3.00
Also the new UV-199.....	3.50
NEW DX 1 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.

## The Condenser Sensation of Modern Radio



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

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

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

Capacity	Each	Capacity	Each
.0001.....	\$0.35	.002.....	\$0.40
.00015.....	.35	.0025.....	.50
.00025.....	.35	.003.....	.60
.0002.....	.35	.004.....	.75
.0003.....	.35	.005.....	.75
.00035.....	.35	.006.....	.75
.0005.....	.35	.008.....	1.00
.0006.....	.40	.01.....	1.00
.0008.....	.40	.015.....	1.50
.001.....	.40	.02.....	2.00
.0015.....	.40	.025.....	2.50

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

At your dealers, otherwise send purchase price and you will be supplied postpaid.

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For the Lawn Party  
THE modern hostess entertains her guests with up-to-the-minute dance numbers with  
**The New GREBE Broadcast Receiver**  
The ideal Radio Instrument for the home. You may set up the 20-foot antenna wire anywhere, in a few seconds. Anyone may master its two simple tuning adjustments in a moment.  
Licensed under Armstrong U.S. Pat. No. 1,113,149  
Ask Your Dealer  
A. H. GREBE & CO., Inc., Richmond Hill, N. Y.



# AIR SOUNDS WAR, YOUTH, AGE, LOVE



Cornelius Cole, Los Angeles, age 101, conferee of Lincoln, formerly U. S. senator and abolitionist, told, on Gettysburg Day, his experiences as Richard Headrick, six, film star, sat on his knee before an enthralled audience of KHJ



WOR will not sound again the gentle voice of the woman who made the station famous, for she has taken a life contract and has resigned her position as announcer and director. Who was the lucky man second party in the contract with the former Miss Jessie Koewing? Above right at the left of her—B. Carlton Brown, formerly of Gloucester, Mass., now of New York City

## Dancers Now Hear Music of Spheres

WSB, Atlanta, Broadcasts Instructions Through Teachers in 1,000 Cities All Over the World

ATLANTA, GA.—The newest dance-steps of 1933, including the latest furore, "The Prince of Wales" fox trot, are now being demonstrated in a practical understandable fashion in a series of Radio lessons prepared for WSB's circle by Arthur Murray, founder of the famous Atlanta social organization, the Club de Vingt, now head of the National Institute of Social Dancing, New York city.

Mr. Murray is teaching dancing via broadcast from the Atlanta Journal plant, WSB, in a simplified series of six lessons that the veriest beginner will have no difficulty in following. The great dancing master employs methods similar to those he has in force in conducting the biggest correspondence institution of its kind in the world.

### Illustrate Lessons

WSB's dancing lessons, arranged by Mr. Murray, are illustrated by special sketches published in the Radio columns and accompanied by published directions.

Through the use of loud speakers or by attention to the instruction received through headphones, would-be dancers may learn the newest steps simultaneously with their release through dancing teachers in more than a thousand cities of America, England, Scotland, Ireland, China, Alaska, Australia and other foreign lands.

## WIFE HUSTLES WJZ BASEBALL SCORES

Helpmeet Threatens While Spouse Loiters Over Set; Station Saves Both

NEW YORK.—Station WJZ averted a serious domestic crisis a few days ago. The time was 6:20. The bedtime story had been on the air for fifteen minutes, when the telephone at the studio rang wildly. A feminine voice choked with rage demanded:

"Will you please hurry up that story and broadcast the baseball finals? My husband refuses to eat his dinner until he hears how the Yankees made out, and if he doesn't sit down in five minutes both he and the Radio set are going on a long, long journey."

Action was imperative and the storyteller hastened through the last few paragraphs with such speed that the result of the Yankee game was on the air in three minutes. Two days later a letter was received, which read as follows:

## AN EVENING AT HOME WITH THE LISTENER IN

Station and City	Met.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
CFCN 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	.....	.....	.....	.....	.....	.....
CKAC, Montreal, Que.	430	.....	6:00-9:00	.....	6:00-9:00	.....	6:00-9:00	3:00-4:30
KDKA, E. Pittsburgh, Pa.	328	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	.....
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	.....	.....
PWA, 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	7:00-7:30	7:30-8:00
WBZ, Springfield, Mass.	337	5:00-8:00	6:30-8:00	5:00-8:00	6:30-8:00	5:00-8:00	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
WDAP, 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	.....	.....	9:00-5:50	.....	9:00-10:00	.....	.....
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.	476	8:30-9:30	8:30-12:00	.....	8:30-9:30	8:30-9:30	8:30-12:00	9:30-11:00
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
WGL, 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	6:45-11:00	.....	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	7:30-9:00	7:30-9:00	.....
WHAZ, 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	5:00-8:00	5:00-5:30	6:00-10:00	.....
WJAZ, Cleveland, O.	390	.....	6:30-8:30	.....	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	5:00-8:00
WJY, New York, N. Y.	405	.....	.....	.....	.....	.....	.....	1:15-4:00
WJZ, New York, N. Y.	455	5:30-9:30	5:30-9:30	5:30-9:30	5:30-9:30	5:30-9:30	5:30-9:30	6:30-8:30
WKAG, San Juan, P. R.	360	.....	9:25-10:55	.....	9:25-10:55	.....	9:25-10:55	.....
WLAG, Minneapolis, Minn.	417	6:30-10:30	6:30-10:30	.....	6:30-10:30	6:30-10:30	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	.....	.....	.....
WMAQ, 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	8:00-12:00	8:00-9:30	.....
WMAI, San Antonio, Texas	385	.....	9:30-10:30	.....	9:30-10:30	.....	.....	9:30-10:30
WOW, Omaha, Neb.	526	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	9:00-10:30	7:00-9:00
WOO, Philadelphia, Pa.	509	5:45-9:00	.....	.....	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	8:00-12:00	8:00-12:00	8:00-12:00	8:00-12:00	8:00-12:00	8:00-12:00	7:30-9:15
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.

"Thank you for your prompt response to my S. O. S. on the baseball scores the other evening. My wife has decided that if you can be so obliging she can time her dinners to fit your schedule, and both myself and the Radio set are once more firmly ensconced in the family circle."

## A. E. F. Radio Operators Plan Meeting Labor Day

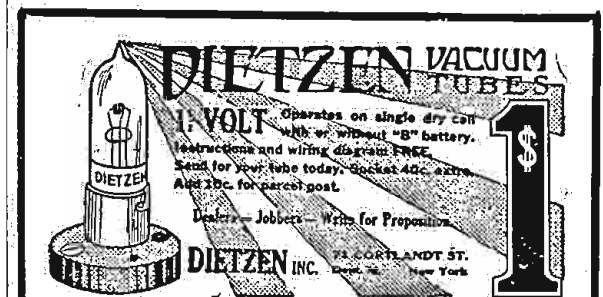
NEW YORK.—Former members of the Radio and Radio intelligence service attached to general headquarters, A. E. F., during the world war, are to convene at

Camp Alfred Vail, Little Silver, N. J., on September 1, 2 and 3.

## Mexico Adopts Continuous Wave for World Contact

MEXICO CITY.—The Mexican government intends to change the apparatus used in its Radio stations from spark to continuous wave. With the present spark sets the Mexican stations can communicate only with two European stations, one at Nauen, Germany, and the other, Lafayette, at Bordeaux, France. Equipment for four modern transmitting stations of the continuous wave type has been or-

dered from Germany at a cost of \$200,000. This will be installed at Mexico City, Merida, Veru Cruz and Tampico. The old spark stations will be transferred to the Islas Marias, Lapaz, Lower California, Guadalajara, Jaliasco and Acapulco, Guerro.



**RADIO VIA PARCEL POST AT N. Y. PRICES**  
Standard Parts Only, in Original Packing  
NO SALVAGED GOODS SOLD  
Where "Money Back Policy Prevails"

PHONES	For Parcel Post	Ins. 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	.16
Dietzen 46-Plate Vernier	3.45	.18
TRANSFORMERS (Audio Frequency)		
Dietzen	3.45	.12
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 & Cond. combined	.85	.12
Dietzen Single Circuit Jack	.40	.06
Aerial Insulators	.10	.02
Ritter Portable Loop	1.00	.10
Argus Lightning Arrester	.95	.09
Welsh Peanut Tube	2.00	.08
Peanut Tube Socket	.50	.03
Switch Lever, Fada Type	.19	.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
Wave Trap	4.95	.15
Electric Soldering Iron	3.95	.15
100 Feet Copper Antenna Wire	.39	.08
RHEOSTATS		
Dietzen, 6 ohm	.39	.06
Dietzen, 30 ohm	.45	.06
SOCKETS		
Bell V. T. & W. D. II.	.89	.10
V. T. Bakelite	.50	.10
DIALS		
2-inch	.25	.06
3-inch	.35	.08
4-inch	.49	.08

**Modell's**  
ESTABLISHED 1889

191 Fulton St., Dept. F-28, New York City  
9 New York Stores  
America's Greatest Radio Mail Order House



# ALKALI SALT TRIODE SENSITIVE DETECTOR

## SUPLANTS NEED FOR AMPLIFIER, REPORT

C. T. Knipp, University of Illinois Professor, Introduces Tube with Low Rate Voltage

URBANA, ILL.—The latest kind of what is termed the "alkali vapor tube," has been brought out by Hugh A. Brown, associate of the department of electrical engineering, and Charles T. Knipp, head of the physics department of the University of Illinois. It is a detector tube made so sensitive as practically to obviate the necessity of using amplifying tubes.

The injection of a potassium sodium alloy into the tube during the process of evacuation is said to be the whole principle on which its construction is based. It is a complicated and extremely delicate process, however, and therefore costly.

### Some Advantages

According to its inventors, the tube has the following characteristics and advantages:

It acts as a sensitive detector at any plate voltage up to 60 volts, although it produces best results between 8 and 10 volts.

It is more than three times as sensitive as the ordinary detector tube.

Adjustment is less critical, therefore much easier, than on an ordinary tube.

Besides being more selective in wave length, and steady, the tube is said to give "absolutely distortionless reception." This has long been one of the bugaboos of Radio reception, the correction of which will be received with glee by every Radio-phan.

The voltage is higher than on the ordinary tube, to raise the temperature of the filament to a point at which the potassium sodium alloy vapor can become active.

### Result of Recent Test

When the new tube was tested recently in the vicinity of Urbana and Champaign, Ill., the receiving fans who used the tube in their sets reported having heard Kansas City, Atlanta, Schenectady and Pittsburgh on an ordinary regenerative hook-up with no amplifier, with the antenna 12 feet above ground and 40 feet long.

By raising the antenna to a height of 40 feet, broadcasting stations as far away as Los Angeles could be heard. These stations, the inventors reported, could have been heard even without a B battery and with the plate circuit return connected to the negative filament lead.

## AIR COMPASS POINTS TROUBLE TO AMATEUR

### Commerce Department Finds Operator Breaking Rules

BOSTON.—As a result of operating his amateur transmitting station in violation of a department of commerce Radio regulation, Waldo J. Kelley, of 26 Windsor street, Watertown, Mass., is in trouble.

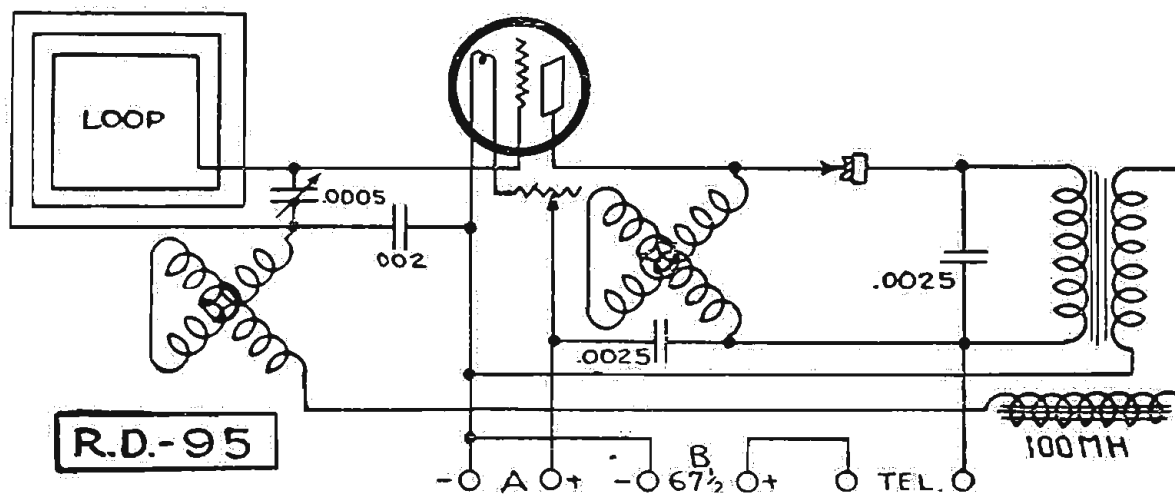
Recently many letters have been received at the office of Charles C. Kolster, government supervisor of Radio for the first Radio district, complaining of repeated interference (telegraph signals) from a station in Watertown.

Under the direction of Supervisor Kolster two assistants from his office went to

### PATENT ATTORNEYS

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

## ONE TUBE LOOP AERIAL CIRCUIT



ANOTHER form of single tube reflex well adapted to loop aerial reception is presented in the diagram R.D.-95. This circuit is exceptionally selective and is well suited to those localities where broadcasting stations are numerous and high degree of selectivity is necessary. Because of its unusual selectivity very good distance work is possible.

There are four adjustable controls, two of which control wavelength tuning, one for the filament, and the other permits accurate tube control.

A .0005 mfd. variable condenser, preferably with vernier, tunes the grid circuit of the first tube. The plate variometer tunes the coupling between the tube and the crystal detector. The rheostat controls the filament current; its resistance is dependent on the type of tube and the A battery used.

The 100 milhenries choke coil acts as a check valve to stray Radio frequency currents from the grid circuit of the first

Watertown with Radio direction finders and spent the evening recording interfering signals during the period in which all amateurs are instructed to remain silent. Many data were collected regarding the station under observation.

Another trip was made to the vicinity. This time the inspectors with an automobile equipped with a Radio compass drove to a point one block from Station 1-CPI, where they stopped and recorded signals for nearly an hour. At 10:15, local standard time, Kolster left the other inspectors in the car and went to the door at 26 Windsor street. At this time, it was said, Kelley was operating his Radio telephone transmitter, which was picked up with such audibility that when Kolster rang the doorbell he distinctly heard the loud-speaker.

tube. The other variometer controls the reflexing of the transformed audio frequency currents to the grid of the first tube.

The B battery should consist of at least three 22½-volt units or their equivalent.

Any standard audio frequency transformer will do, but higher ratios than 5 to 1 are not recommended.

Three by-pass condensers, mica dielectric type, are necessary, one of .002 mfd. capacity and two of .0025 mfd.

A hard or amplifier tube must be used. The set requires no shielding, as no body capacity effects are noticeable.

WD-11-12, UV-199, UV-201-A, C-301-A ..... \$3.50 each  
 UV-200, C-300, AP Detectors ..... 2.75 each  
 UV-201, C-301, AP Amplifiers ..... 3.00 each  
 DV-6, DV-9-A ..... 3.50 each  
 UV-202 ..... 4.00 each

And Guarantee Them Equal to New  
**QUICK SERVICE**—Include with your order remittance to cover repair plus parcel postage for one pound per tube. If preferred, tubes will be returned C. O. D. repair charges.  
**ABALENE RADIO**, 14 Vesey St., New York, N. Y.

PREMIER  
**"HEGEHOG"**  
 TRADE MARK  
 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.

**CARTER**  
 NEW  
 15 POINT  
**Inductance Switch**

Self-contained. Only one panel hole. Easy to install. Pig-tail connection eliminates sliding contacts. Westinghouse Micarta insulation prevents leakage. Solder terminal and contact one piece. Adjustable stop pin. New type dial knob eliminates panel numbering. Can be used as "B" battery tap switch.

**Price: \$2.00**

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**COMPENSATING CONDENSER**

is a special three-electrode condenser for balancing the grid charge on the amplifying tubes. Stops all local oscillations without detuning the amplifier. Shielded against hand capacity disturbance.

**\$3.00 Complete**

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 Broome & Lafayette Sts., New York City

**CHEAPER THAN BUILDING YOUR OWN—AND BETTER**

**The Michigan Midget Receiver \$27.00**

**A Long-Distance Wonder Worker**

We get stations from coast to coast, including all the new wave-lengths up to 600 meters, with the "Midget," and they come in clear and strong.

Use standard 6-volt tube or any of the new low-voltage dry cell tubes.

Tho the handsome mahogany-finish cabinet is only 14½ in. long, it holds three No. 6 dry cells and one 22½ volt B battery.

Sloping front panel, with lever-tuning, is a great improvement on straight panel and knob-and-dial tuning. Easier, more accurate.

Receives through one or more head phones.  
 Add our two-stage amplifier for loud speaker reception.  
 Send for the Midget circular. Give name and address of your favorite radio dealer.

**DEALERS.** The Midget is a quick-turnover seller and every sale creates others—a wonderful endless-chain of satisfaction.

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 GRAND RAPIDS, MICHIGAN

**The New Grebe Broadcast Receiver**

**Point No. 1** A SILK-COVERED WIRE but 20 feet long, supplied with this Receiver, does the work of the unsightly outdoor antenna, or loop. This wire may be concealed behind the picture moulding or run along the baseboard.

**Just one of its seven points of satisfaction**

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

**Ask Your Dealer Today!**

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



# The Week's Advance Broadcast Programs

## Tuesday, August 28

**CFCA (Eastern, 400), 8:00-9:00 P. M.,** Selections, "The Tales of Hoffman," "España," "Serenade," "La Zarzuela," "Foguet-Me-Not," Star Concert Orchestra; "Roadways," "A Baroque at Midnight," "Where the Abana Flows," Florence Moore, contralto; "Hungarian Dances," "Serenade," Mamie Roth, violinist.

**KDKA (Eastern, 326), 11:30 A. M.,** Music, Victoria S. Hamilton Co.; 5:15 P. M. Dinner concert, Grand Symphony Orchestra; 6:45, The children's period; 7:20, Concert, Mrs. Geo. Regensburger, soprano; Chester A. Gerst, baritone; Hymen Diamond, violinist.

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

**KHJ (Pacific, 395), 2:30-3:30 P. M.,** Matinee musicale; 6:45-7:30, Children's program, bedtime story, Uncle John; 8:00-10:00, De Luxe program, Flourmoy's Californiaans; Naomi Sweeney Brown, whistler.

**KPO (Pacific, 423), 8:00-10:00 P. M.,** Program arranged by Wiley B. Allen Company.

**KSO (Central, 546), 8:00 P. M.,** Orchestral concert, organ recital, vocal and instrumental specialties, Missouri Theater.

**KYW (Central, Daylight Saving, 345), 1:35-2:00 P. M.,** Afternoon musicale, Lyon and Healy Concert Dept.; 5:50, Children's bedtime story; 7:00-7:58, Musical program; Frances Dwyer, soprano; Elise Colgram Mellus, contralto; Theo. S. Berney, baritone; Ewald Winters, tenor; Edva Sprague, pianist; Cope Harvey's College Inn Orchestra.

**WBZ (Eastern, Daylight Saving, 337), 6:45 P. M.,** Organ recital, Elsie Robbins-Gross, organist; 8:00, Musical concert, Mme. Alfred Duquette, mezzo-soprano; Frederick Roy, tenor; Esther Forristall, pianist and accompanist.

**WJAR (Eastern, Daylight Saving, 395), 12:00-12:45 P. M.,** Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00, Children's hour, talk on "Care of Children"; 4:30-5:55, Musical features; Betsy Logan will talk on "Affairs of the Heart."

**WOT (Eastern, Daylight Saving, 405), 12:10-12:55 P. M.,** "Ten Ten Tennessee," "Pickles," Billy Newsome, soloist; Jimmy Clark, accompanist; "My Sweetie Went Away," "Harlem Street," Tom Waller pianist; "That Old Gang of Mine," "You Know You Belong to Somebody Else," Joe Griffith, soloist; Jimmy Clark, pianist; "Am I To Blame?," "Wet Your Thumb," Tom Waller, pianist; "Love, My Heart Is Calling You," "When You Walked Out Someone Else Walked Right In," Billy Newsome and Joe Griffith, soloists; piano medley, Jimmy Clark; "Indiana Moon," Billy Newsome and Joe Griffith, soloists; "Classico Piano Raposo," Tom Waller, pianist.

**WFAA (Central, 476), 12:30-1:00 P. M.,** Address, Will H. Evans; 8:30-9:30, Musical program, conducted by W. H. Evans, presenting Wesley Male Quartet, pianist, saxophonist and vocalists; 11:00-12:00, Gibson Mandolin and Guitar Club.

**WFI (Eastern, Daylight Saving, 395), 1:00 P. M.,** Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00 P. M. Concert, 6:30, Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 7:00-7:30, Children's own half hour, stories by Cousin Sue; 8:00, Boy Scouts Radio Corps, special program; 8:30, Song recital; 10:30, Dance music, Meyer Davis Bellevue Stratford Dance Orchestra.

**WGR (Eastern, Daylight Saving, 319), 11:45 A. M.,** Special weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30, George Albert Bouchard, organist; 12:35-3:30, Produce and live stock market reports, Chicago Board of Trade, New York Stock Exchange; 6:30-7:00, George Albert Bouchard, organist; 7:00-8:45, Digest of the day's news, topics of scientific interest; 11:45, weather.

**WGY (Eastern, 380), 1:00 P. M.,** Music and reading, "Out of Doors," Margaret Tucker; 7:45, Musical, "Sunbeams," Mrs. Edwin Newkirk, contralto; Mrs. Alfred Heller, accompanist; "Forgotten," Mary Burns, pianist; "Love, Little Cottage," Mae MacCarroll, soprano; "With You," "The Morning Wind," Mrs. Edwin Newkirk, contralto; "Afterwhiles," Mary Burns, pianist; "Sleep, Why Dost Thou Leave Me?," Mae MacCarroll, soprano; "The Bird Census," address, "Morning," "Sonny Boy," Mrs. Edwin Newkirk, contralto; "Herald of Spring," "Nocturne," Mary Burns, pianist; "Carmena," Mae MacCarroll, soprano.

**WHAS (Central, 400), 4:00-5:00 P. M.,** Concert by the Mary Anderson Theater Orchestra; Ollie Jones, conductor; 7:30-9:00, Mrs. Carl D. Jones, soprano; concert, Sylvian Trio; Fannie Elizabeth Stoll, violinist; Myrl Chrisman, flutist; Evelyn Kaiser, pianist; reading, "An Interesting Historical Episode."

**WJAX (Eastern, 390), 7:30 P. M.,** Dance orchestra and musical specialties, arranged by the Cleveland News-Leader.

**WJAZ (Central, Daylight Saving, 447.7), 10:00 P. M.,** 2:00 A. M., Orchestra selections; "Song of Steel," "Danny Boy," R. G. Ball, baritone; Solos, Lucille Gutelius, soprano; "The Prison," "Sea Shade," Irma Lloyd, contralto; "Major Concerto," Sylvia Weinstein, pianist; "On the Road to Mandalay," "The Eagle," B. G. Ball; orchestra selections, "Ina Dance," Sylvia Weinstein; "Trade Winds," "Firma of Many Ships," "Hear Me Ye Winds and Waves," R. G. Ball.

**WLW (Eastern, 309), 10:00 P. M.,** Selections, "Sun-Kist Rose," "Dream Daddy," "Somebody Else," Circle Orchestra; Solo, Howard Hafford, tenor; Billy Waterworth, accompanist; "Jeanne d'Arc," "April Morn," Gladys Helen Voerz, soprano; "Steering for Erin," Howard Hafford, tenor.

**WMAQ (Central, Daylight Saving, 447), 9:00-9:15 P. M.,** Music, Hotel La Salle Roof Garden Orchestra; E. E. Sheetz, director; Carl Crave, tenor.

**WOC (Central, 484), 3:30 P. M.,** Educational program, A. G. Heinrichs; 5:45, Chimes concert.

**WJ (Eastern, 517), 12:05 P. M.,** Concert, Detroit News Orchestra; 3:00, Concert, Schmemman's Band; 8:30, Concert, Schmemman's Concert Band; Concert, Detroit News Orchestra.

Stock Exchange and Chicago Board of Trade; 6:30-7:00, George Albert Bouchard, organist; 7:00-8:45, Digest of the day's news; 9:00-11:30, Concert, direction of J. P. Quinn; 11:45, Weather.

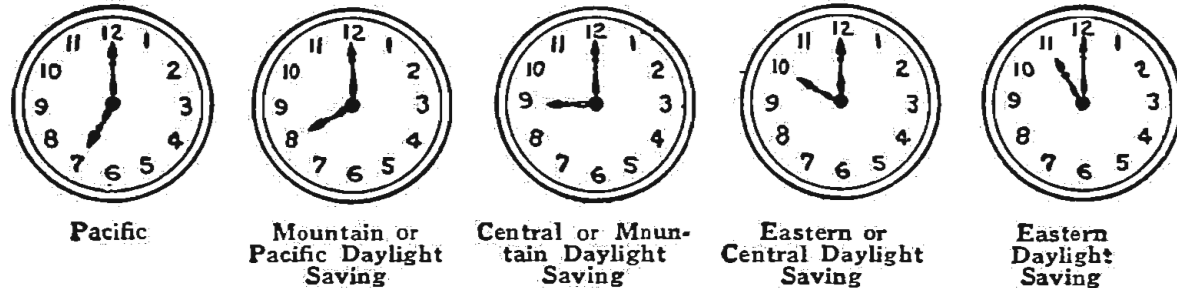
**WHAS (Central, 400), 4:00-5:00 P. M.,** Concert by the Mary Anderson Theater Orchestra; Ollie Jones, conductor; Organ Selections, Roy C. Parks; 7:30-9:00, Concert by Mrs. Jane Webster Murrell; Reading, "An Interesting Historical Episode."

**WHK (Eastern, 360), 8:00 P. M.,** Musical selections by WJLK Trio; Babson's Radio release; Automobile Road Report.

## Wednesday, August 29

**CFCA (Eastern, 400), 8:00-9:00 P. M.,** Selections, "The Magic Flute," "Serenade for Strings," "Entrance of the

## 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.

the Boyers," "Amina," Star Concert Orchestra; "From the Land of the Sky-Blue Waters," "Pale Moon," "I Heard a Thrush at Eve," Neva Deeton, soprano; "Chant of the Minstrel," "Rondo," Jacques Sterin, cellist.

**KDKA (Eastern, 326), 5:15 P. M.,** Dinner concert, KDKA Little Symphony Orchestra; 6:45, The Children's Period; 7:20, Concert, KDKA Little Symphony Orchestra, under direction of Victor Saudek; W. O. Williams, tenor; Prof. E. E. Drake, accompanist.

**KHJ (Pacific, 395), 12:30-1:15 P. M.,** Concert, presenting Dr. J. W. Wallace, baritone; 2:30-3:30, Matinee musicale; 6:45-7:30, Children's Hour, "Uncle John"; 8:00-10:00, De Luxe program.

**KGW (Pacific, 492), 3:00-4:00 P. M.,** Children's program, music and story by Aunt Nell; 8:00-9:00, Concert by Columbia Theater All-Artist Orchestra; Harry Linden, director; 10:00-11:00, Dance music by George Olsen and his orchestra.

**KSD (Central, 546), 8:00 P. M.,** Mrs. William Robinson, soprano, Sarah Kline, soprano; Dorothy Pickert, violinist.

**KYW (Central, Daylight Saving, 345), 5:50 P. M.,** Children's bedtime story; 7:00-7:58, Musical program; La Gourque Quartet; Lucille DeMert, soprano; C. Lagourque, tenor; Ethel Murray, contralto; Louis DeMert, bass; Cope Harvey's orchestra, College Inn.

**WBZ (Eastern, Daylight Saving, 337), 6:00 P. M.,** Dinner concert, WBZ Trio; 8:00, Musical Program; Alwyn B. W. Bach, baritone, assisted by the WBZ Trio.

**WJAR (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 selections; Arcadia Cafe Concert Orchestra; 4:30-5:55, Short talks; 7:30, Bedtime stories, Dream Daddy; 8:00, Special musical features.

**WDT (Eastern, Daylight Saving, 405), 12:50-12:50 P. M.,** "Do You," "Laughing Saxophone," Gladys Taylor, composer-pianist; "Barber of Seville," William Struber, baritone; "I Know a Dewey Garden," "In Pony Fields," Gladys Taylor and Vaughn De Leath, songs by William Struber, baritone; "Where the Sacramento River Flows," "Susan," "Cause It's You," Gladys Taylor, pianist; 7:00-7:50, "Balade in C Minor," "Polonaise in A Flat Major," "Valse in A Flat Major," Jasha Samoos, pianist; "The Two Grenadiers," "At the Mill," "The Volga Boat Song," H. Kotlyansky, baritone; "Love Is a Song," "Arcadia," Elsie De Groode, violinist; Piano recital, by J. Samoos.

**WFAA (Central, 476), 12:00-1:00 P. M.,** "Fancied Trips and Real Ones," William G. Lex.

**WFI (Eastern, Daylight Saving, 395), 1:00 P. M.,** Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Song and piano recital; 6:30, Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra.

**WGR (Eastern, Daylight Saving, 319), 11:45 A. M.,** Special weather forecasts for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 12:35-3:30, Produce and live stock market reports, New York

**WIP (Eastern, Daylight Saving, 509), 3:00 P. M.,** Artist recital; 6:00-6:30, Dinner music, Dick Regan's WIP Concert Orchestra, final baseball scores; 7:00, Bedtime stories, Uncle Wip; 8:00, Short talk; 8:15 P. M., Musical selections; 9:00, Artist recital.

**WJAZ (Central, Daylight Saving, 447.7), 10:00 P. M.,** 2:00 A. M., Orchestra selections; "A Dream," "I Love You Truly," R. F. Elliott, tenor; "Nina," "Non so piu cosa son," Clara Louise Becken, soprano; Orchestra selections; "The Bridesmaid Rose," "At the Winds Direction," R. F. Elliott, tenor; "Adagio," "Monnet," Gladys Welse, violinist; "Whither," "Hedge Roses," Clara Louise Becken, soprano; "Joy in Summer," "My Heart Is a Lute," Merleta Davis, soprano; Orchestra selections.

**WMAQ (Central, Daylight Saving, 447), 9:00-9:15 P. M.,** Music, La Salle Roof Garden orchestra; H. P. Dahlquist, baritone.

**WLW (Eastern, 309), 8:00 P. M.,** Selections, The Aichele Novelty Dance Orchestra; "Wanda," "She's Got That Too," "Somebody Else," Mary Elizabeth Green, Louise Rasch, accompanist; Radio Wedding From Music Hall, The Bride, Alice Hazenfeldt, Bridegroom, William F. Maine, Lillian Plogstedt, organist.

**WOC (Central, 484), 3:30 P. M.,** Educational Program, Clyde G. Kern; 6:30, Sandman's Visit; 8:00, Pipe Organ Recital, Erwin Swindell, organist; 10:00, Musical, John McCreery, baritone; Mrs. John McCreery, contralto; Allenez Council, K. of C. quartette; Edna Sonnevile, pianist and soprano; "Tourists' Road Report."

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

**WJ (Eastern, 517), 12:05 P. M.,** Concert, The Detroit News Orchestra; 3:00, Concert, Schmemman's Band; 8:30, Concert, Schmemman's Concert Band; Concert, The Detroit News Orchestra.

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 224 North Wells Street, CHICAGO, ILL.

## Thursday, August 30

**CFCA (Eastern, 400), 8:00-9:00 P. M.,** Selections, "Algon," "Alnuel," "Amina," "Moment Musical," "Blue Danube," Star Concert Orchestra; "Selected," Florence Walzman, soprano; "Indian Lament," "Tambourin Chinois," Harry Adaskin, violinist.

**KIKA (Eastern, 326), 5:15 P. M.,** Dinner Concert, Grand Symphony Orchestra; 6:45, The Children's Period; 7:20, Concert, KDKA Little Symphony Orchestra.

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

**KHJ (Pacific, 395), 12:30-1:15 P. M.,** Concert; 2:30-3:30, Matinee musicale; 6:45-7:30, Children's Hour, "Uncle John"; 8:00-10:00, De Luxe Program.

**KPO (Pacific, 423), 8:00-10:00 P. M.,** Organ recital, Gladys Salsbury, Sequola Trio.

**KYW (Central, Daylight Saving, 345), 1:35-2:00 P. M.,** Afternoon concert, Lyon and Healy Concert Dept.; 7:00-7:58, Musical Program, Lyon & Healy concert and artist dept., Cope Harvey's orchestra.

**WBZ (Eastern, Daylight Saving, 337), 6:45 P. M.,** Organ Recital, Elsie Robbins-Gross, organist; 8:00, Musical concert; Marion E. Woodward, violinist, Ruth Dickinson, accompanist.

**WJAR (Eastern, Daylight Saving, 395), 12:00-12:54 P. M.,** Organ recital from Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00, popular dance music; 4:30-5:55, Short talks and musical program.

**WDT (Eastern, Daylight Saving, 405), 12:00-1:00 P. M.,** Program through the courtesy of Mr. Widmer of the Lyceum Theatre (Bayonne, New Jersey); selections to be announced by Radio.

**WFAA (Central, 476), 12:30-1:00 P. M.,** "Why Education Helps a Career," Dr. J. P. Kimball; 8:30-9:30, Hazel Sparks, mezzo-soprano, George E. Wilkins, Tenor-baritone.

**WFI (Eastern, Daylight Saving, 395), 1:00 P. M.,** Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Piano recital, Loretta Kerk; 6:30, Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 7:00, Children's Own Half Hour, stories by Cousin Sue; 8:00, Song recital; 8:30, Dance music.

**WGR (Eastern, Daylight Saving, 319), 11:45 A. M.,** Special weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 12:35-3:30, Produce and live stock market reports, Chicago Board of Trade, New York Stock Exchange; 6:30-7:00, George Albert Bouchard, organist; 7:00-8:45, Digest of the day's news; Boy Scout Radiograms, Employment Bulletin; Evening (time indefinite), Ball room music and festivities of the grand ball, convention of International Association of Printing House Craftsmen, Hotel Statler; 11:45, Weather.

**WGY (Eastern, 380), 1:00 P. M.,** Music and address, "Making Over the Children," Modern Priscilla; 7:45, Musical, "Tillie," Orchestra; "Drifting Back to Dreamland," Arthur Gunn, baritone; "Why Don't My Dreams Come True?," Orchestra; "Grand Daddy," "Take a Look at Molly," "Sun Kist Rose," "Sometime," "I'd Rather For Trot Than Waltz," "Oh! You Little Sun-er-Gun," Orchestra; "Climb on Top of Your Trouble," "Sunset Alley," Arthur Gunn, baritone.

**WHAS (Central, 400), 4:00-5:00 P. M.,** Concert by the Mary Anderson Theater Orchestra; Ollie Jones, conductor; Organ Selections, Roy C. Parks; 7:30-9:00, Concert by Henrietta Everett and Elwynne Griffith, of Scottsburg, Indiana.

## Saturday, August 25

**WIP (Eastern, Daylight Saving, 509), 3:00 P. M.,** Piano and violin recital; 6:00, Final baseball scores; 7:00, Bedtime stories, Uncle Wip; 8:00, Short talk; (Continued on page 8)

**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. No stamps accepted.

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**FLEWELLING CIRCUIT Complete Parts**  
 Baseboard, two honeycomb coils, mountings and coil plugs, 3 .006 condensers, .002 phone condenser, variable grid leak and condenser, grid leak 1/2 meg, 23 plate variable condenser, vernier rheostat, tube socket, 3" dial, A 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

**REINARTZ CIRCUIT Complete Parts**  
 Baseboard, Reinartz coil increased wave length, tube socket, vernier rheostat, 23 plate 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, 6 stops, 8 binding posts, PANEL ALREADY DRILLED, TOGETHER WITH DIAGRAM AND INSTRUCTIONS..... \$10.95  
 Parts for TWO-STAGE AUDIO FREQUENCY AMPLIFIER, for either of above circuits, with drilled panel and book of instructions..... \$11.00

**CONDENSERS**  
 3 Plate Variable, value 1.75..... \$1.05  
 13 Plate Variable, value 2.50..... 1.20  
 23 Plate 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 8.00..... 4.00  
 43 Plate Vernier, value 6.50..... 4.25

Aluminum loud speaking horn, nickel plated, high polish, list \$8.00..... \$3.75  
 3660 OHM TELEPHONE HEADSET, list \$8.00..... 3.50  
 AUDIO-FREQUENCY TRANSFORMER, designed for use with W. D. 11 tube, also excellent for all other tubes, list \$4.50..... 2.75  
 VARIOCOUPLER, Litz wire wound secondary, 150-600 meters, list \$4.50..... 2.25  
 Triple Coil Mounting..... \$3.35  
 Multiple Point Inductance Switch with knob and dial (15 points)..... 1.45  
 Reinartz coil, increased wave length..... 1.55

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

Ball bearing inductance switch..... .25  
 Single circuit Jack, list 65c..... .30  
 Double circuit Jack, list 90c..... .45  
 Lightning arrester, approved by underwriters..... .90  
 3" dials, high finish, heat resisting..... .30  
 2" dials, high finish, at..... .25  
 Filament rheostat, 6 ohms..... .65  
 Filament rheostat, 20 ohms..... .80  
 Filament rheostat, 50 ohms..... .90  
 Rheostats with 2" dial, 150 extra

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.

**If You Enjoy Fishing**

for live points on any crystal, B-Metal loud Talking Crystals, price 50c, will save your patience. It is the best crystal to be had at any price, but if you want the best detector in existence, one that is always set, one that makes the broadcaster seem but a few feet away, improving any good crystal set several hundred percent, then order a B-Metal type "C" crystal tube detector, price \$2.50, from your dealer or from us if he cannot supply you.

It needs no batteries or rheostat, is always on the right spot, never wears or burns out, and is guaranteed for six months, although it will last for years.

Read these letters and try one yourself. You cannot lose anything but the postage sending it back.

B-Metal Refining Co., Detroit, Michigan  
 Gentlemen—Let me say that your product is exceeded in merit only by your liberal policy of distribution. For your further information I want to add that I am using the detector in the Erla hook-up and have compared it with (mentions two well known makes) and other less well known types and have found yours superior in each instance. Herewith my check for \$2.50.  
 Yours truly, E. G. PETERSON.  
 Chicago, Ill., June 23rd, 1933.

B-Metal Refining Co., Concord, N. H.  
 Gentlemen—I have used your type "C" detector on my 3-tube Reflex and am satisfied that it is the best thing out. It is far superior to my (mentions a well known make) and galena detectors in every way.  
 Sincerely, ROBT. A. GEORGE.

Order from your dealer today, or if he cannot supply you, send \$2.50 for ten-day trial. We refund the price the day we get the detector back if not entirely satisfied, and ask no questions.

You are to be the judge and jury. Why not have the best there is? and now—  
 Send us 2 cents in stamps for card of 8 good crystal hook-ups and symbols.

Send the Coupon

Type "C" \$2.50

**B-Metal Refining Co.**  
 3134 Trumbull Avenue  
 DETROIT, MICH.

B-Metal Refining Co., 3134 Trumbull Ave., Detroit, Michigan.  
 Send me one type "C" Detector—enclosed find \$2.50—on ten days' trial. My \$2.50 to be refunded the day I return the Detector if I am not completely satisfied with the work.  
 NAME.....  
 ADDRESS.....



# Radiophone Broadcasting Stations

## Corrected Every Week—Part III

(Note.—The third part of the schedule list appears and is completed below. The fourth part consists of the state, city-station index and will appear next week.)

WID, Granville, O. 229 meters. 100 mi. Denison Univ. Fri, Sat, 5-6 pm, music, educational lectures. Central.

WJH, Washington, D. C. 263 meters. 200 mi. White & Boyer Co. Daily ex Sun, 11:30 am, reports; 1-2 pm, music. Tues, 7:45-10 pm, concert; 8 pm, church services. Eastern.

WJK, New York, N. Y. 360 meters. De Forest Radio Telephone & Telegraph Co. Daily ex Sun, 4-6 pm, entertainment. Tues, Thurs, Fri, 7:30-11:30 pm, concert. Sun, 2:30-5 pm, 6-6:30. Eastern Daylight Saving.

WJZ, New York City, 455 meters. 1500 mi. R. C. A. Daily ex Sun, 3-6:30 pm, entertainment; 7:30-11 pm, special program. Sun, 10:30 am-1 pm, church service; 8:30-10:30 pm, Eastern Daylight Saving.

WKAA, Cedar Rapids, Ia. 360 meters. 200 mi. H. F. Paar. Daily ex Sun, 12:45 pm, reports; 5:30, reports, ariograms; 6-7, music. Thur, 11-12 pm, music. Sun, 4-5 pm, church service. Central.

WKAC, Lincoln, Neb. 275 meters. 400 mi. The Lincoln Star. Tues, Fri, 8-9:30 pm, concert, entertainment. Central.

WKAD, East Providence, R. I. 240 meters. Charles Loof. Central.

WKAJ, Wichita Falls, Tex. 360 meters. W. S. Radio Supply Co. Mon, Wed, Fri, 6:30-7 pm, music, news. Central.

WKAN, Montgomery, Ala. 226 meters. 200 mi. United Battery Service Co. Mon, Wed, Fri, 6:30-7 pm, music, news. Central.

WKAQ, Grandston, R. I. 360 meters. Wilcox Flint. WKAR, San Juan, Porto Rico. 360 meters. 1,500 mi. Radio Corp. of Porto Rico. Tues, Sat, 11 pm-12:30 am, entertainment. Intercolumbia.

WKAR, East Lansing, Mich. 280 meters. Mich. Agri. College. Central.

WKAS, Springfield, Mo. 360 meters. 100 mi. L. E. Lines Music Co. Slogan, "Queen City of the Ozarks." Mon, Fri, Sat, 8-9:15 pm, music. Central.

WKAJ, Laconia, N. H. 360 meters. Laconia Radio Club. Central.

WKAJ, Beloit, Wis. 242 meters. 100 mi. Turner Cycle Co. Daily 12-12:15 pm. 7-7:30, concert. Central.

WKAJ, Bridgeport, Conn. 231 meters. 75 mi. Wm. A. Macfarlane. Central.

WKAJ, Gainesville, Ga. 360 meters. 100 mi. Brenau College. No definite schedule. College activities. Thurs, 8:30 pm, concert. Eastern.

WKC, Baltimore, Md. 360 meters. 100 mi. Jos. M. Zamolski Co. Tues, Thurs, Sat, 7:30-9:30 pm. Eastern Daylight Saving.

WKY, Oklahoma City, Okla. 360 meters. 500 mi. WKY Radio Shop. Daily ex Sun, 7:30 pm, sports; 9-11:30 pm, "Raven Frolic." Central.

WL, Fairfield, O. 360 meters. U. S. Army. WLAC, Raleigh, N. C. 360 meters. N. C. State College. Central.

WLAG, Minneapolis, Minn. 417 meters. 1,000 mi. Cutting & Wash. Radio Corp. Slogan, "The Call of the North." Club, "Tooth Brush." Daily ex Sun, 8:30, 9, 9:30 am, 10, 10:30, 12:30, 1:30, 3:30 pm, reports; 7 pm, children's hour; 7:30-8:30, lecture. Daily ex Wed, Sun, 8:30-10 pm, concert. Sun, 10 am, church services; 4 pm, concert; 5, children's hour; 7:30 services. Central.

WLAH, Syracuse, N. Y. 234 meters. 900 mi. Samuel Woodworth. No regular schedule.

WLAI, Waco, Tex. 360 meters. 1,000 mi. Waco Elec. Supply Co. Daily ex Sun, 9:30 am, 10:30, 2:30 pm, music, reports. Tues, Thurs, 7:45-8:45 pm, music. Sun, 3 pm, church service. Central.

WLAK, Bellows Falls, Vt. 360 meters. Vermont Farm Machine Co. Central.

WLAL, Tulsa Radio Co. 360 meters. Tulsa, Okla. WLAN, Houlton, Me. 283 meters. Putnam Hdwa. Co. WLAP, Louisville, Ky. 360 meters. W. V. Jordan. WLQA, Kalamazoo, Mich. 244 meters. 100 mi. A. E. Schilling. No regular program. Central.

WLAT, Burlington, Ia. 360 meters. Radio and Specialty Co. Central.

WLAV, Pensacola, Fla. 360 meters. 200 mi. Elec. Shop, Inc. Daily ex Sun, 8-9 pm, music, entertainment. Central.

WLAW, New York, N. Y. 360 meters. New York Police Dept. Central.

WLAX, Greencastle, Ind. 231 meters. Greencastle Community Broadcasting Station. (Putnam Elec. Co.) WLAY, Fairbanks, Alaska. 360 meters. Northern Commercial Co. Central.

WLAZ, Warren, O. 100 mi. 248 meters. Hutton & Jones Elec. Co. Wed, 8-9:15 pm, classical concert. Sat, 10:30-11:30 pm, music, sports. Sun, 7:30-9 pm, church services. Eastern.

WLW, Cincinnati, O. 2,000 mi. 309 meters. Crosley Mfg. Co. Slogan, "WLW, In the Queen City of the West." Daily ex Sun, 10:30 am, 1:30 pm, 3, 4, reports. Mon, Wed, 8-10 pm, entertainment. Tues, Thurs, 10-12 pm, music. Sat, 2 pm, special. Sun, 9:30-11 am, church services. Central Daylight Saving.

WMAJ, Cazenovia, N. Y. 261 meters. 500 mi. C. B. Meredith. No definite schedule.

WMAF, Dartmouth, Mass. 360 meters. Round Hills Radio Corp. Slogan, "From the Land of the Pilgrim Fathers." Central.

WMAH, Lincoln, Neb. 254 meters. 500 mi. General Supply Co. Slogan, "A Call from the Western Plains." Club, "Lincoln Hoot Owls." Daily, 2:15-3 pm, music; 8 pm, entertainment. Sun, 10 am, church services; 8:30-4:30, concert. 8, sermon. Central.

WMAJ, Kansas City, Mo. 275 meters. 600 mi. Kansas City Daily Drivers Telegram. Daily ex Sun, 8:15 am, 9:15, 10:15, 11:15, 12:15 pm, 1:15, 2:15, weather, markets, news. Central.

WMAK, Lockport, N. Y. 360 meters. 1,500 mi. Norton Labs. Tues, 8-9:30 pm, music. Sat, 7:30-8 pm, story; 10:30-11:30 pm, music. Eastern.

WMAI, Trenton, N. J. 256 meters. 100 mi. Trenton Hdwa. Co. Slogan, "The Home of Good Music." Mon, Thur, 7:30-9 pm, music, lecture. Eastern Daylight Saving.

WMAJ, Beaumont, Tex. 360 meters. Beaumont Radio Equipment Co. Central.

WMAN, Columbus, O. 286 meters. 50 mi. First Baptist Church. Sun, 10:30-12 m, 7:30-9 pm, church services. Central.

WMAJ, Easton, Pa. 246 meters. 400 mi. Utility Battery Service Co. Daily ex Sun, 4-5 pm, 6-6:45. Wed, 8-9:55 pm, entertainment. Eastern.

WMAJ, Chicago, Ill. 448 meters. 1,500 mi. The Chicago Daily News. Daily ex Sun, Mon, 7-8 pm, 9:15-

10. Daily ex Sat, Sun, 4:30-5 pm. Central Daylight Saving.

WMAJ, Duluth, Minn. 266 meters. 500 mi. Paramount Radio Corp. Daily ex Sun, 11:20 am, 4:20 pm, weather; 6:15-7:30 pm, markets. Tues, Fri, 8-9:30 pm, concert. Central.

WMAV, Auburn, Ala. 250 meters. Ala. Polytechnic Institute. Daily ex Sun, 10 am, 12, weather, markets. Tues, Thurs, Sat, 7:30-8:30 pm, music. Central.

WMAJ, St. Louis, Mo. 230 meters. 1,000 mi. Kingshighway Presbyterian Church. Slogan, "May Every Way Hear Kingshighway." Sun, 11 am, 8 pm, Tues, 7-8 pm, church services. Central.

WMAZ, Macon, Ga. 265 meters. 250 mi. Mercer University. Daily ex Sun, 5:30-6 pm, 7-7:30, 8:30-9:30. music. Tues, Wed, Thur, 10:30-11 am, chapel. Eastern.

WMC, Memphis, Tenn. 500 meters. 2,000 mi. The Commercial Appeal. Slogan, "Station WMC Memphis. 'Down in Dixie.' Club, 'Midnight Frolic.' Daily ex Sun, 9:30 am, 12 m, 3 pm, weather, markets; 12:30-2 pm, concert; 8, music. Wed night silent. Tues, Fri, 11 pm, Midnight Frolic. Central.

WMMH, Cincinnati, O. 248 meters. Precision Equipment Co. Temporarily discontinued.

WMU, Washington, D. C. 261 meters. 100 mi. Doubleday-Hill Elec. Co. Daily, 5:30 pm, concert, sports. Thurs, 8-9, concert. Eastern.

WNAJ, Boston, Mass. 278 meters. 200 mi. Shepard Stores. Daily ex Sun, 4-5 pm, dance music. Mon, Tues, Fri, 6:30-7 pm, Thurs, Fri, 8-10 pm, Wed, Sat, 9-11 pm, Sun, 11-12 am, 2:30-4 pm, 6:30-8:30 pm, church services. Eastern.

WNAJ, Norman, Okla. 360 meters. 300 mi. Okla. Radio Engineering Co. (Univ. of Okla.) Daily ex Sun, 10-10:30 pm, news. Central.

WNAJ, Syracuse, N. Y. 286 meters. 1,000 mi. Syracuse Radio Tel. Co. Mon, Wed, Sat, 7:30 pm, concert, ariograms, etc. Eastern.

WNAJ, Charleston, S. C. 360 meters. Charleston Radio Elec. Co. Central.

WNAJ, Springfield, O. 360 meters. 200 mi. Wittenberg College. Central.

WNAJ, Butler, Mo. 360 meters. C. C. Rhodes. WNAJ, Austin, Tex. Tex. Radio Corp. (Austin Statesman.)

WNAJ, Philadelphia, Pa. 360 meters. 500 mi. Lennig Bros. Co. Wed, Sat, 7:30-9:30 pm, Sun, 2:30 pm, 4:30, church services. Eastern Daylight Saving.

WNAJ, Knoxville, Tenn. 360 meters. 1,000 mi. People's Tel & Telg Co. Tues, Thurs, Sat, 9-11:30 pm, concert. Sun, 10:30-12 am; 7:30-8:30 pm. Central.

WNAJ, Fortress Monroe, Va. 360 meters. Henry Kunzmann. Central.

WNAJ, Yankton, S. D. 244 meters. Dakota Radio Apparatus Co. Daily, 10 am, reports. Wed, Sat, 9:30 pm, music. Central.

WNAJ, Baltimore, Md. 360 meters. Shipowners Radio Service. Central.

WNAJ, Albany, N. Y. 360 meters. 60 mi. Shotton Radio Mfg. Co., Inc. Daily ex Sun, 10-10:15 am, market reports. Wed, 8:15 pm, concert. Eastern.

WNAJ, Ardmore, Okla. 360 meters. Dr. Walter Hardy. WNAJ, Grand Forks, N. Dak. 280 meters. 50 mi. Valley Radio. Daily ex Sun, 10-11 am, 2-2:30 pm, entertainment. Reports. Sun, 3-4 pm, music, church service. Central.

WNAJ, Lima, O. 266 meters. Maus Radio Co. WNAJ, Sigourney, Ia. 360 meters. Friday Battery & Elec. Co. WNAJ, Fremont, Nebr. 360 meters. Medland College. WNAJ, Tyler, Tex. 360 meters. 50 mi. The Tyler Commercial College. Daily ex Sat & Sun, 12 m, weather, markets; 7 pm, weather, codes; 10:15, U. S. Navy press. Sun, 11 am, 7:30 pm, church service. Central.

WNAJ, Belvidere, Ill. 224 meters. Apollo Theatre. WNAJ, Charleston, S. C. 360 meters. 200 mi. Palmetto Radio Corp. Mon, Thur, Sat, Sun, 10 pm-1 am, music. Eastern.

WNAJ, San Antonio, Tex. 385 meters. 1,800 mi. Southern Equip. Co. (Evening News-Express.) Daily ex Sun, 10:30 am, 12:15 pm, 3, 7, news, markets. Tues, Sat, 9:30-10:30 pm, concert. Thurs, 7:30-8:30 pm, concert. Sun, 11 am, church services; 5-6 pm, concert. Central.

WNAJ, Parsons, Kans. 258 meters. 50 mi. C. E. Ervin. Slogan, "Queen City of the Plains." Thurs, 7-8 pm, music, lectures, news. Sun, 3-4:30 pm, Sermon, music, news. Central.

WNAJ, Frankfort, Ky. 240 meters. Collins Hardware Co. Central.

WNAJ, Webster Groves, Mo. 360 meters. 300 mi. W. E. Woods. Sun, 3-5 pm. Central.

WNAJ, Lawrenceburg, Tenn. 360 meters. 1,000 mi. James D. Vaughan. Temporarily discontinued.

WNAJ, Mishawaka, Ind. 360 meters. 200 mi. Lyradion Mfg. Co. Central.

WNAJ, Kalamazoo, Mich. 360 meters. Kalamazoo College. Mon, Wed, Fri, 6:30-7:30 pm. Eastern.

WNAJ, Portsmouth, Va. 360 meters. Portsmouth Kiwanis Club. Central.

WNAJ, Kenosha, Wis. 360 meters. H. P. Lundskow. WNAJ, Wilmington, Del. 360 meters. Boyd Martell Hamp. Central.

WNAJ, Erie, Pa. 242 meters. 600 mi. Penna. Nat'l Guard. Tues, Wed, 8:30-10 pm, music. Fri, 9:15-10:45 pm, music. Sun, 7:45 pm, church services. Eastern.

WNAJ, Omaha, Nebr. 526 meters. 1,000 mi. Woodmen of the World. Slogan, "Gateway to the East and West." Mon, Tues, Thurs, Fri, Sat, 9 pm, concert. Sun, 9:30 am, 9 pm, church services. Central.

WNAJ, Trenton, N. J. 240 meters. 300 mi. F. J. Wolff. Intermittent schedule.

WNAJ, Stanford, Tex. 360 meters. Penlek Hughes Co. WNAJ, Davenport, Ia. 484 meters. 1,000 mi. Palmer School of Chiropractic. Slogan, "Where the West Begins and in the State Where the Tall Corn Grows." Daily ex Sun, Tues night, 10:55 am, time; 11, weather; 12 m, chimes; 2 pm, markets; 3:30, talk; 5:45 chimes, ex Wed; 6:30, Sandman, sports; 7, concert; 10 pm, concert, Wed only; 9:30 pm, concert, Sat only. Sun, 9 am, chimes; 6 pm, concert; 7, church services; 8, concert. Central.

WNAJ, Ames, Ia. 360 meters. 200 mi. Iowa State College. Daily ex Sun, 9:30 am, 12:45 pm, 9:30, music, weather. Central.

WNAJ, Pine Bluff, Ark. 360 meters. 500 mi. Ark. Light & Power Co. Tues, Fri, 9-10 pm, concert. Central.

WNAJ, Philadelphia, Pa. 509 meters. 500 mi. John Wanamaker. Daily ex Sun, 11 am, organ recital; 11:30, weather; 12-1 pm, concert; 4:45 pm, organ

recital; 10:55, time; 11:02, weather. Mon, Fri, 7:45-11 pm, music, concert. Eastern, Daylight Saving.

WNAJ, Kansas City, Mo. 360 meters. 1,000 mi. Western Radio Co. Mon, Tues, Wed, Thurs, 9:45 am, 10:55, 11:30, 12:30 pm, 2, 7:30, time signals, reports, etc. Sat, 8 pm, concert. Sun, 7 pm, concert.

WNAJ, Newark, N. J. 405 meters. 2,000 mi. L. Bamberger & Co. Daily ex Sun, 2:30-4 pm, 6:15-7:30, music, talks. Mon, Wed, Sat, 8-11 pm, music, entertainment, lectures. Eastern Daylight Saving.

WNAJ, Jefferson City, Mo. 441 meters. 1,500 mi. Missouri State Marketing Bureau. Slogan, "Watch Our State." Daily ex Sun, first 15 min. of every hour from 8 am-2 pm, markets. Daily, 5 pm, music, markets. Mon, Wed, Fri, 8-9:30 pm, concert. Central.

WNAJ, State College, Pa. 360 meters. Pa. State College. Central.

WNAJ, Okmulgee, Okla. 360 meters. Donaldson Radio Co. Central.

WNAJ, Chicago, Ill. 360 meters. 500 mi. W. A. Wleboldt & Co. Daily ex Sun, 12:30-1:30 pm, music. Mon, 6:30-7 pm. Tues, Thurs, 8-9 pm, concert. Wed, Thurs, 9-10 pm, concert. Sun, 2:30-3:30 pm. Central Daylight Saving.

WNAJ, Council Bluffs, Ia. 360 meters. Peterson's Radio Co. Central.

WNAJ, Independence, Mo. 360 meters. Central Radio Co., Inc. Central.

WNAJ, Waupaca, Wis. 360 meters. 3,000 mi. Wisconsin Dept. of Markets. Daily ex Sun, 9:30 am, 10:30, 11:30, 12:30 pm, 2:30, 4:30, markets, weather, news, etc. Central.

WNAJ, New Haven, Conn. 268 meters. Doolittle Radio Corp. Central.

WNAJ, Fargo, N. D. 360 meters. North Dakota Agricultural College. Central.

WNAJ, Columbus, O. 286 meters. Superior Radio & Tel. Equip. Co. Central.

WNAJ, Topeka, Kans. 360 meters. Awerbach & Guet. WNAJ, Frostburg, Md. 360 meters. General Sales & Engineering Co. Central.

WNAJ, Beloit, Kans. 50 mi. 360 meters. R. A. Ward. Fri, 8 pm, entertainment. Sun, 11 am, 8 pm, church services; 3 pm, music, talk. Central.

WNAJ, El Paso, Tex. 360 meters. Saint Patrick's Cathedral. Central.

WNAJ, Moorhead, Minn. 360 meters. Concordia College. Central.

WNAJ, Charleston, W. Va. 273 meters. Dr. John R. Koch. Central.

WNAJ, New Lebanon, O. 360 meters. 1,500 mi. Nushawg Poultry Farm. Slogan, "The Pulse of Miami Valley." Daily ex Sun, 12-12:15, news; 6-6:30 pm, markets. Mon, Fri, 8-9:45 pm, music, farm program. Central.

WNAJ, Parkersburg, Pa. 360 meters. 1,500 mi. Horace A. Beale, Jr. Daily, 10:30 pm. Eastern.

WNAJ, Springfield, Mo. 236 meters. Southwest Missouri State Teachers College. Central.

WNAJ, Amarillo, Tex. 360 meters. 200 mi. E. B. Gish. Central.

WNAJ, Waterbury, Conn. 242 meters. 30 mi. The Whittall Elec. Co. Mon, Wed, Fri, 5:30-6:45 pm, music, Boy Scout news. Eastern.

WNAJ, Springfield, Vt. 275 meters. 300 mi. Moore Radio News Station. Slogan, "Among the Green Hills of Vermont." Daily, 7-7:30 pm. Sun, 2:30-4:30 pm. Eastern.

WNAJ, Sandusky, O. 240 meters. Sandusky Register. WNAJ, Lexington, Ky. 254 meters. Brock-Anderson Elect. Eng. Co. Central.

WNAJ, Mattong, Ill. 258 meters. 100 mi. Coles County Tel & Telg. Co. Slogan, "The Buckle on the Corn Belt." Tues, Thurs, 9-11 pm, music, lectures. Central.

WNAJ, Miami, Fla. 360 meters. 500 mi. Electrical Equip. Co. Slogan, "It is Always June in Miami." Tues, Thurs, 8 pm, music. Sun, 9-11 pm, music. Eastern.

WNAJ, Scranton, Pa. 280 meters. 300 mi. Scranton Times. Slogan, "The Voice of the Anthracite." Daily ex Sun, 12:30-1:30 pm, 4:30-5:30, 7:30-8:30, news, reports, music. Tues, Fri, 8 pm, entertainment. Eastern.

WNAJ, New York City, N. Y. 360 meters. 300 mi. Calvary Baptist Church. Sun, 8 pm, church services. Eastern Daylight Saving.

WNAJ, Lincoln, Neb. 360 meters. Am. Radio Co. WNAJ, Abilene, Tex. 360 meters. 300 mi. Abilene Daily Reporter. Slogan, "The Capital of West Texas." Tues, Thurs, Fri, 8-9 pm. Sun, am, pm, church services. Central.

WNAJ, Lowell, Mass. 266 meters. 100 mi. Prince-Walter Co. Daily ex Sun, 10:45-11 am, 2:30-3 pm, music. Mon, Wed, Fri, 6-7 pm, news, concert. Thurs, silent. Eastern.

WNAJ, Greenville, S. C. 258 meters. 75 mi. Huntington & Gurry, Inc. Slogan, "The Textile Center of the South." Tues, Thurs, 8-9 pm, music. Sat, 8-8:30 pm, music. Eastern.

WNAJ, Washington, D. C. 236 meters. Catholic University of America. Central.

WNAJ, Peoria, Ill. 360 meters. Radio Equipment Co. WNAJ, Greensboro, N. C. 360 meters. Greensboro Daily News. Central.

WNAJ, Houston, Tex. 360 meters. 400 mi. Rice Institute. Mon, 8-9 pm, concert, college activities. Sun, 4:30 pm, extension lectures. Central.

WNAJ, Savannah, Ga. 360 meters. Savannah Board of Public Education. Central.

WNAJ, Marion, Kans. 248 meters. Taylor Radio Shop. Daily, 12-12:45 pm, 5:15-5:45, markets, weather. Mon, Thurs, 8 pm, concert. Sun, 5-6 pm. Central.

WNAJ, La Porte, Ind. 224 meters. Radio Club, Inc. WNAJ, Providence, R. I. 360 meters. Stanley N. Read. Central.

WNAJ, St. Croix Falls, Wis. 248 meters. Northern States Power Co. Central.

WNAJ, St. Louis, Mo. 360 meters. St. Louis Radio Service Co. Daily ex Sun, 4:15-5 pm, music, sports. Sun, 3:30-5 pm, music, sports. Central.

WNAJ, David City, Neb. 226 meters. 100 mi. Jacob C. Thomas. Daily, 6:30-7:30 pm. Tues, Fri, 7-9 pm. Central.

WNAJ, McLeansboro, Ill. 360 meters. Radio Supply Co. Central.

WNAJ, Amarillo, Tex. 360 meters. 50 mi. Amarillo Daily News. Tues, Thurs, 8:00-9:00 pm, music. Central.

WNAJ, Yellow Spring, O. 360 meters. Antioch College. Central.

WNAJ, Reading, Pa. 238 meters. Horace D. Good. WNAJ, Gloucester City, N. J. 268 meters. Flexon's Garage. Central.

WRAY, Scranton, Pa. 280 meters. 100 mi. Radio Sales Corp. Daily ex Sun, 11 am, music; 12 m, reports; 3:30-5:30 pm, reports, music; 7, bedtime stories, music. Wed, 8:15-9:45 pm, music. Sat, 8:15-11:30 pm, music. Sun, 4 pm, chapel. Eastern.

WRAX, Newark, N. J. 233 meters. Radio Shop of Newark. Central.

WRC, Washington, D. C. 469 meters. Radio Corp'n of America. Central.

WRK, Hamilton, O. 360 meters. 1,000 mi. Doron Bros. Elec. Co. Slogan, "The Oldest Station in Existence." Fri, 8:30 pm, music, lecture. Sun, 2:30 pm, music. Central.

WRL, Schenectady, N. Y. 360 meters. Union College Radio Club. Central.

WRM, Urbana, Ill. 360 meters. 300 mi. Univ. of Illinois. Mon, Thurs, 8:30-8:50 pm, 9-9:30, Univ. news, talks, music. Central.

WRP, Camden, N. J. 360 meters. 250 mi. Federal Inst. of Radio Teleg. Temporarily discontinued.

WRR, Dallas, Tex. 360 meters. 200 mi. City of Dallas. Daily ex Sun, 12-12:30 pm, weather; 3:30, sports, markets, news; 7-7:15, police news; 8-8:30, music. Sun, 11 am, church service; 7-8 pm, police news, church service. Central.

WRT, Tarrytown, N. Y. 273 meters. 1,000 mi. Tarrytown Radio & Research Laboratory. Slogan, "Everything in Radio." Mon, Wed, Fri, 7:30-11 pm. Sun, 7:30-9:30 pm. Eastern Daylight Saving.

WSAB, Cape Girardeau, Mo. 360 meters. Southeast Mo. State Teachers College. Central.

WSAC, Clemson College, S. C. 360 meters. Clemson Agri. College. Central.

WSAD, Providence, R. I. 261 meters. J. A. Foster Co. Central.

WSAG, St. Petersburg, Fla. 244 meters. Loran V. Davis. Central.

WSAH, Chicago, Ill. 248 meters. A. G. Leonard, Jr. Daily ex Sun, 5:30-6:30 pm. Fri, 8:45-10, Central Daylight Saving.

WSAI, Cincinnati, O. 309 meters. United States Playing Card Co. Tues, Thurs, 8-10 pm. Sat, 10-12 pm. Eastern.

WSA, Grove City, Pa. 360 meters. 700 mi. Grove City College. College activities. No definite schedule.

WSAK, Newport, 258 meters. The Daily News. WSAJ, Brookville, Ind. 246 meters. Franklin Elec. Co. Central.

WSAN, Allentown, Pa. 229 meters. Allentown Radio Club. Central.

WSAP, New York, N. Y. 263 meters. Seventh Day Adventist Church. Sat, 10:45-12:45 am. Sun, 7:30-9:30 pm. Eastern Daylight Saving.

WSAQ, Dartmouth, Mass. 280 meters. Round Hills Radio Corp. Central.

WSAR, Fall River, Mass. 254 meters. Doughty & Welch Elec. Co. Central.

WSAT, Plainview, Tex. 263 meters. Plainview Elect. Co. Central.

WSAU, Chesham, N. H. 229 meters. Camp Marienfield. Central.

WSAW, Canandaigua, N. Y. 275 meters. Curfice & McElwee. Central.

WSAX, Chicago, Ill. 268 meters. Chicago Radio Laboratory. Central.

WSB, Atlanta, Ga. 429 meters. 1,500 mi. Atlanta Journal. Slogan, "The Voice of the South." Daily ex Sun, 12-1 pm, music, weather; 2:30, reports; 4-6, baseball; 8-9, concert; 10:45-12, concert. Sun, 10:55-12:15 pm, 5-6 pm, 7:30-9:15, church services. Central.

WSL, Utica, N. Y. 273 meters. 500 mi. J. & M. Elec. Co. Daily ex Sat, Sun, 11-11:30 am, 2-2:30 pm, 3-3:30, 4-4:30, 5-5:30, music, news. Mon, Wed, 8-9 pm. Sat, 11-11:30 am, 5-6 pm, 8-9. Sun, 10:30-12 m, 7:30-9 pm. Eastern.

WSY, Birmingham, Ala. 360 meters. 2,000 mi. Alabama Power Co. Daily ex Sun, 9:30 am, 3 pm, 3:30, news, weather. Mon, Wed, Fri, 8 pm, music. Sun, 11 am, 7:30 pm, church services. Central.

WTAB, Fall River, Mass. 248 meters. Fall River Daily Herald. Central.

WTAC, Johnston, Pa. 360 meters. Penn Traffic Co. Daily ex Sun, 10:15 am, 2:15 pm. Tues, Thurs, 7:30 pm. Eastern.

WTAD, Carthage, Ill. 229 meters. Robt. E. Compton. WTAF, New Orleans, La. 242 meters. Louis J. Gallo. WTAG, Providence, R. I. 258 meters. Kern Music Co. Central.

WTAK, Steubenville, O. 266 meters. The Swan-Bowes Co. Central.

WTAL, Elgin, Ill. 275 meters. Chas. E. Erbstein. WTAM, Columbus, Neb. 360 meters. Ruegy Battery & Elec. Co. Central.

WTAW, College Station, Tex. 254 meters. 200 mi. Agricultural and Mechanical College of Tex. No regular schedule. Central.

WTG, Manhattan, Kan. 360 meters. 75 mi. Kan. State Agri. College. Daily ex Sun, 9:55 am, weather (code). Central.

WWAC, Waco, Tex. 360 meters. 1,500 mi. Sanger Bros. Daily ex Sun, 11 am, weather; 1:30 pm, entertainment. Wed, Sat, 8 pm, music, entertainment. Central.

WWAD, Philadelphia, Pa. 360 meters. Wright & Wright, Inc. Central.

WWAX, Laredo, Tex. 360 meters. 150 mi. Wormser Bros. Daily ex Sun, 4:30-5:30 pm, music. Mon, Sat, 8-9 pm, music. Central.

WWB, Canton, O. 268 meters. 300 mi. Daily News Printing Co. Tues, Thurs, 8-9 pm. Eastern.

WWI, Dearborn, Mich. 273 meters. 200 mi. Ford Motor Co. Wed, 8-10 pm, music, lectures. Eastern.

WWJ, Detroit, Mich. 517 meters. 1,500 mi. The Detroit News. Daily ex Sun, 9:30-9:45 am, household hints; 9:45-10:25, health talks; 10:25-10:30, weather; 11:55-12, time; 12:05-12:45 pm, music; 3:30-3:35, weather; 3:35-4:15, markets; 5-6, sports. April 22, and every other week, 8:30-10 pm, concert. Thurs, 11-12 pm, "midnight special." Sun, 2 pm, 7:30, church services. Fill in weeks, 7-8:30 pm, concert; Sun, 11 am, 5:30, church services. Eastern.

WWL, New Orleans, La. 280 meters. Loyola Univ. WYG, San Antonio, Tex. 1,500 mi. U. S. Army. Kelly Field. No regular schedule.

6KW, Tunnicliffe, Cuba. 315 meters. 1,500 mi. Frank H. Jones. Slogan, "If you hear the koo of the cuckoo you are in tune with Tunnicliffe." Mon, Tues, Thurs, Sun, 9 pm, music. Central.

(Note.—This completes the station schedule list. The fourth part of the directory consists of the state, city-station index, and will appear next week.)

### SEND NEW SONG HITS

(Continued from page 2)

ishment, the cost of the entertainment was obviously included in the price for meals and that patrons therefore paid for the vaudeville.

#### Broadcasters to Fight Case

But, in the opinion of many broadcasters, the contention of Judge Lynch that the "broadcasting of the defendant (Station WOR) was public for profit within the meaning of the copyright act and its interpretation by the United States supreme court," is not supportable. "Many broadcasters," concluded Mr. Klugh, "will experience difficulty in trying to reconcile the court's decision in relation to Station WOR, which, according to its defense, is not operating for pecuniary profit."

So that the public may be protected in this and like contentions the National Association of Broadcasters proposes to further its efforts more toward the revision of the copyright act than to con-

test it in its present ambiguous state, toward making known the increase in value given musical and similar compositions by broadcasting and the injustice on the part of composers and publishers of demanding payment for broadcasting, toward making known that the number of such compositions controlled by their organization is very small as compared with the total number under copyright and that therefore the society is not in a justifiable nor tenable position to make concerted demands for pay, and that the bureau of release of the National Association of Broadcasters' supplies weekly to its members good, new, popular, copyright musical compositions without the payment of fee or tax.

#### Cutting Off Brass Screws

It becomes necessary at times to cut off a small brass screw with a pair of snips. This batters the threads so that the nut will not run on easily. If the nut is screwed on first and the screw cut off

below the nut, then the nut taken off, the thread will be found to be in much better shape, as the nut in coming off removes the burr left by the cut.—Thomas E. Wyatt, Coconut Grove, Fla.

### ADVANCE PROGRAMS

(Continued from page 7)

"Where to Go and How to Get There," by Eugene E. Hogle; secretary of the Automobile Club of Philadelphia; 8:20, Dance music, Ace Brigade's Ten Virginians from Walton Roof Garden; 9:00, Song recital; 10:00, Dance music.

WJAX (Eastern, 390), 8:00 P. M., An all-solo program of the Singers' Club; "Love Sends a Gift of Roses," saxophone solo. Rudolph Adler. "There's a Lark in My Heart," vocal solo, Theresa Brautigam. Allegretto from "Sonata in A for Violin and Piano," violin, Sara Watson; piano, Emily Watson. "Under the Roof where the Laughter Reigns," baritone solo, Harry Dunham. Selections from "The Holberg Suite," piano, Mrs. Lester L. Askue. Vocal solos by Thomas George and Herbert Arnold Smith. Vocal duet by Thomas George and Herbert Arnold Smith. "Beelde a Babbling Brook," saxophone solo, Rudolph Adler. "Love's on the High Road," vocal solo, Theresa Brautigam. "Cavatina," violin solo, Sara Watson. "The World Is Waiting for the Sunrise," Harry Dunham, baritone. "Reflections in the Water,"

piano solo, Mrs. Lester L. Askue. "Land of the Heart" (sung in Welsh), Thomas George, bass. "No One Had Told You," Herbert Arnold Smith, tenor.

WJAZ (Central, Daylight Saving, 447), 10:00 P. M., 2:00 A. M., Oriole orchestra; "Minuet de l'Arlesienne," Grace Welsh, pianist; "If I Were King," "The Sunflower," Richard B. DeYoung, baritone; "Songs My Mother Taught Me," Harriet Hertz, soprano; "Romance," (Rachmaninoff), "Plein Vents," Grace Welsh, pianist, piano parts, Aletta Tennold; "The Truant Lover," "Four Leaf Clover," Harriet Hertz, soprano; Orchestra selections.

WLW (Eastern, 309), 10:00 P. M., Piano solo, Anna Canova; "The Requiem," Leo Canova, baritone; L. & N. Quartet, Maud Davis, soprano, Norma Hetsch, alto, A. C. Kessen, tenor, Fred Otte, bass, "Hunting Song," "Trees," "O Golden Sun," "Open Thy Blue Eyes," "Were My Songs with Wings Provided," Norma Richter, Eugene Eckert, accompanist; "A Medley from the South," L. & N. Quartet; Nylophone solo, Medley of Southern Airs, Anna Canova; "The Mocking Bird," Leo Canova, Whistling; "Salvatore," a race-horse story, Olive Yall; Duet, Anna Canova and Leo Canova, Mrs. J. E. Canova, accompanist; "Good-Night Quartet from Martha," The L. & N. Quartet.

WMAJ (Central, Daylight Saving, 447), 9:00-9:15 P. M., Music, La Salle Roof Garden, Orchestra; Harriet Hertz, soprano, Sherman, contralto, Erna Blythe Athey, accompanist.

WOC (Central, 484), 3:30 P. M., Educational Program, Karl G. Stephan; 5:45, Chimes concert; 6:30, Sandman's visit; 8:00, Mrs. S. J. Burich, pianist; Address, "Vision or Illusion," B. J. Palmer.

(Continued on page 9)



ADVANCE PROGRAMS

(Continued from page 8)

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

Friday, August 31

CFCFA (Eastern, 400), 8:00-9:00 P. M., Selections, "Marche Militaire," "Intermezzo Pictorescque," "Suito Melodique," "Air de Ballet," "Sweethearts," Star Concert Orchestra; "Selected," Kate Jackson, contralto; "Chanson Triste," "To a Wild Rose," Jacques Stern, cellist.

Inade), Hilda Farr; "There's a Beautiful Land on High," "A Dream," Howard Nielsen; Orchestra selections.

Saturday, September 1

CFCFA (Eastern, 400), 8:00-9:00 P. M., Selections, "In a Tavern," "Pulcinello," "Entrance of the Boys," "Pleading," "Shadowland," Star Concert Orchestra; "Selected," Ernest Morgan, baritone; "Hejre Kat," "Serenade," Marnie Roth.

from Alceste," "Romance," Ruth Alexander Tracy, pianist; Contralto solos, Ruth Alexander Tracy; Orchestra selections; "Sonata in A Major," Nathlho Parker, violinist; Contralto solos, Elaine De Sellum; Orchestra selections; "Concerto in G Minor," Hazei Sims, pianist; "Hicar No. Xc Winds and Waves," Elaine De Sellum; Orchestra selections; "Sarabande," "Minuet," "Fairy Salling," Nathlho Parker; Orchestra selections.

Sunday, September 2

KHJ (Pacific, 395), 10:30-11:00 A. M., Organ recital from First Methodist Episcopal Church, Prof. Arthur Blakeley, organist; 7:00-7:30 P. M., Organ recital from the First Methodist Episcopal Church, Prof. Arthur Blakeley, organist.

WJAZ (Central, Daylight Saving, 447.7), 0:00-9:00 P. M., Selections, Oriole Orchestra; "Joy," "Indian Spring Bird," "The Nightingale," Jewel Martin Lavejoy, soprano; "Pollehinelle," "Overture to William Tell," Helen Rank, pianist; "Ave Maria" (Schubert), "Oh Love That Will Not Let Me Go," J. Lester Iobercorn, tenor; "Concerto for violin," Roul Kantrou, violinist; Orchestra selections, "Until," "On the Road to Mandalay," J. Lester Iobercorn, tenor; "Londonberry Air," Roul Kantrou; Orchestra selections, "At Dawning," "I Hear You Calling Me," Dorothy Davies Dillow; "La Citana," "Thais Meditation," Raul Kantrou; Orchestra selections.

Monday, September 3

WGR (Eastern, Daylight Saving, 319), 11:45 A. M., Special weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 and 6:30-7:00 P. M., George Albert Bouchard, organist; 7:00-8:45, Digest of the day's news; 11:45, weather.

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The scraping of dials on the panel of a Radio set can be corrected by placing a thin piece of felt on the back of the dials. They will then work smoothly without noise.

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## U. S. Leads in Radio Science

We Have the Largest Number of Broadcasting Stations  
AMERICAN ingenuity, initiative and capacity for exploring uncharted domains with supreme confidence have placed this country far beyond all others in another scientific field—Radio. The number of stations in actual use in the United States is greater than that in all the rest of the world.

The reason we have gone ahead so fast is because we are willing to experiment, to try things out, and then correct our mistakes. One hindrance to development in foreign countries are the rigid laws as to Radio. In England, Radio broadcasting is practically a monopoly. The six stations there are organized in one corporation, and fees are charged for service, just as for telephone service here. It is purely a commercial enterprise. In Germany it is the same. It may come to a commercial basis here later but right now we are quite satisfied with the present system.

## Bribes Should Not Be Accepted

Keep Unworthy Practices Out of Broadcasting  
IT IS quite unfortunate that some broadcasting stations in the United States have adopted a policy of receiving fees for permitting the broadcasting of talks, lectures and speeches, sometimes music. It is very good for the industry as a whole and the great multitude of Radiophans that the practice is not general.

Broadcasting is not greatly different in effect from the pages of newspapers, periodicals and magazines. Those publications which are guided by fearless editors who print only that which they believe to be correct, right and fair, are the publications which have the respect and loyalty of their readers. This has proved to be the case in the past. The greatest American magazines and newspapers in existence today are those which have not prostituted the pages of their publications for the benefit of any kind of interest.

It seems a pity that with such laudable instances of untrammelled freedom of the press there should creep into the broadcasting of Radio the meanness and littleness of accepting money for the privilege of transmitting to the public information of any kind.

The broadcasting director is very much like the editor; it is left to his discretion as to what sort of material will interest, instruct and amuse his audience. It is not possible to see how he can exercise his freedom of judgment for a fee.

If honesty cannot stop the spread of such a practice it would seem that the law should be invoked. The broadcasting station has a large expense but the acceptance of bribes is certainly not the honorable way to meet the expense.

## Quality of Programs Improved

Increased Number of Stations Gives Listener Choice  
WHILE the increase in the number of broadcasting stations in operation is an important factor in the Radio situation this year, a more valuable feature from the viewpoint of the listener is a very notable improvement in the quality of programs and other features of operation. There are now about thirty Class B broadcasting stations operating on individually assigned frequencies between 1000 and 550 kilocycles (300 and 545 meters). These stations furnish programs of high quality and employ transmitting sets of 500 to 1000 watts power to obtain the privilege of frequency assignment in this band.

The large number of Class A broadcasting stations are also distributed over a range of frequencies of 1350 to 1050 kilocycles (222 to 286 meters). A number of these stations as well as some of the Class C stations operating on 833 kilocycles (360 meters) have well designed transmitting sets and carefully selected programs. The assignment of broadcasting stations to frequencies differing at least 10 kilocycles, in accordance with the recommendations of the second national Radio conference, has resulted in a decrease in interference and an improvement in the quality of broadcast service which is obtainable by the ordinary listener.

## RADIO INDI-GEST

### Fun on the Air

RADIO SETS WITH THE SET,  
ARE MUCH BUT NO  
LIKE SPOILED NOTHING DOING  
CHILDREN. NOT A PEEP.  
THE WIFE AFTER WHICH  
AND I THE GUESTS  
HAD FRIENDS LEFT AND I  
VISITING STILL TINKERING  
THE OTHER WITH THE SET  
EVENING AND GOT NEW YORK  
IN THE COURSE AND SAN FRANCISCO  
OF EVENTS WHICH THEREFORE  
I THOUGHT PROVES THAT  
WE WOULD RADIO SETS  
ENTERTAIN ARE MUCH LIKE  
A BIT SPOILED CHILDREN.  
GOO GOO.

### The Tuning Troubles of Messrs. Gallagher and Shean



Oh Mister Gallagher, Oh Mister Gallagher,  
I was listening on the Radio last night,  
But an amateur quite near seemed to like to interfere,  
So I'm going to kick and have him closed up tight.

Oh Mister Shean, Oh Mister Shean,  
In the Radio game I see you're pretty green;  
As they say in gay Paree, what an animal you'd be,  
What, an air-hog, Mister Gallagher? No, a jackass, Mister Shean!

Oh Mister Gallagher, Oh Mister Gallagher,  
Interference is no more I hear them boast,  
'Cause a guy named Schell has said that the old sinc spark  
is dead  
When the tube came in the spark gave up the ghost.

Oh Mister Shean, Oh Mister Shean,  
I can't get the situation through my bean,  
I must ask Sir Conan Doyle for when I burn the midnight oil,  
You hear spirits, Mister Gallagher?  
No—spark sets, Mister Shean!

Oh Mister Gallagher, Oh Mister Gallagher,  
Now I don't see why you put the blame on me,  
Everywhere I turn my knob I can hear the noisy slob,  
So it's not my fault at all as you can see.

Oh Mister Shean, Oh Mister Shean,  
You are up against a problem what I mean,  
But there's something you can get that will cut him out you bet,  
An injunction, Mister Gallagher?  
No, a tuner, Mister Shean!

Pittsburgh Post

## A-B-C Lessons for Indigest Beginners

### Chapter XI—But You Really Shouldn't

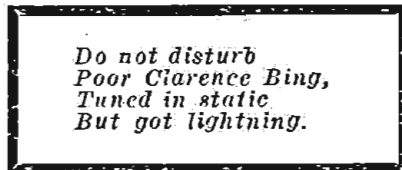
BY GOSH

**K** IS for Kurses,  
That you hurl with all your might,  
When all you get to hear is,  
"Signing off—Good-night."

### Some Would Call It a Miracle

Teacher: "Johnnie, explain the meaning of the expression, 'multitudinous accomplishments.'"

Johnnie: "Building your own set, getting it to work and then selling it for more than it cost you and havin' the fella tell his friends what a great bargain he got."  
SPIDER WEBB.

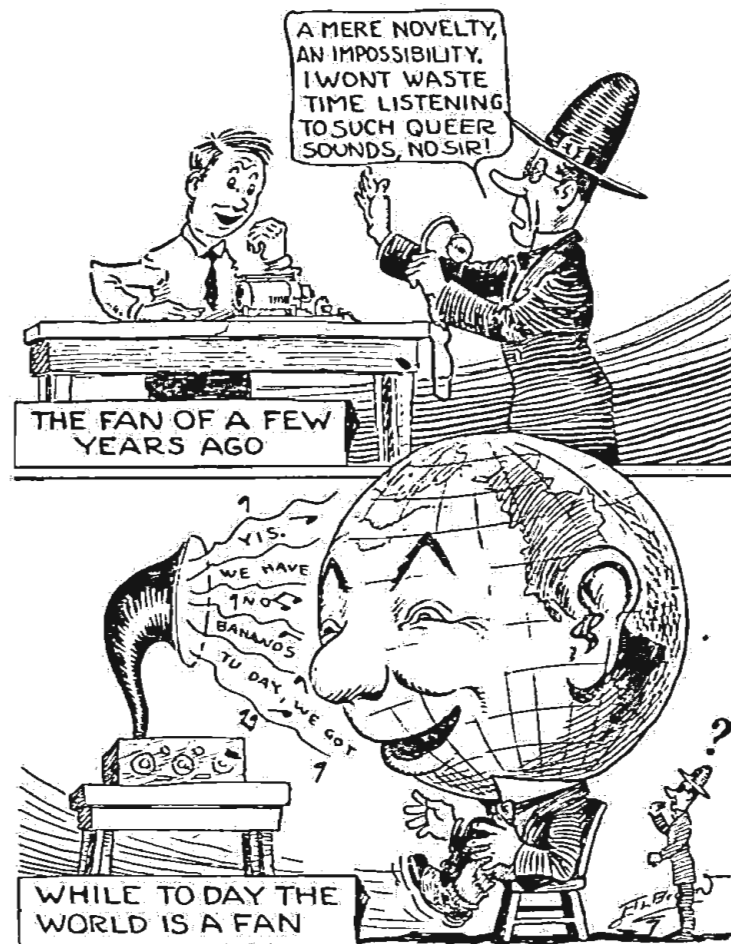


### Sure, We Hide from Him

Dear Indi: Have you noticed that the old-fashioned man who used to grab you by the coat lapels and tell you all the latest bright sayings of his offspring, is still grabbing you by the coat lapels but is telling you all the long distance stations he managed to tune in the night before?  
POLLY W.

All of which reminds us that some months ago we left Bramdin Bray, Wattle Knees, Izzy and Ikey and all Station BLAH'S broadcasting equipment stranded on the great little south sea isle, Walla Walla. Rumors are current that they will be heard from again. Watch this "colyum."  
—Indi.

## The Same Set but a Different World



## Condensed

By DIELECTRIC

Whatever happens of general interest in the nation's capital may now be broadcast directly to a large part of the Radio audience in this country, since there are two stations capable of reaching them. Station WCAP was first to enter the field; WRC more recently began operations. Both may be linked by wire with two powerful stations in New York city and their programs spread over an even wider radius: WCAP with WEAJ; WRC with WJZ.

Public interest in broadcast reception in France is increasing, though not on a par with the tremendous impetus Radiophony has received in the United States. That is to be expected under the varying conditions in the two countries. It may well be that when General Gouraud returns to France, after listening in to concerts received aboard his private car en tour, he urge a more liberal governmental policy. For the sake of French fans, we hope so.

When Signor Marconi goes aboard his yacht for a cruise it is usually safe to predict that his return will bring news of some discovery in the realm of Radio telegraphy. Returning to London recently after a two months' cruise, the great pioneer Radioist assured the world that a way had been found to transmit messages at less expense and with greater rapidity than with the system now in use. By the adoption of his new system power stations for long-distance work will cost less to build. There remains much to learn, but we are progressing.

For an adult to address children in a way to keep their interest requires special thought, something not always noticeable in the broadcast of bedtime stories. Station WRC, in Washington, has arranged to have an experienced woman in charge of this feature, one who will talk to the kiddies each evening in such manner as to maintain a feeling of intimacy. I am of the opinion that no other feature in Radio broadcasting receives so consistent attention from a large body of listeners in as do the children's stories.

That broadcast reception has come to be regarded as part of the service a hotel guest demands is evidenced in the planning of modern hostleries for Radio equipment. When the new hotel in Detroit is complete it will provide means of listening in to concerts for all of its guests; choice of programs will be honored by the one in charge of the Radio room. Two aeriols for reception and one for transmission will cover all the requirements for making this a really up-to-date affair. Should conventions be held in this hotel the entire proceedings could be broadcast to the country from its own studio.

Many a man has been forced to gain an education, beyond that obtained in public schools, by means of the correspondence courses offered by various colleges. To the one sincere in his effort this may wholly compensate for enforced absence from the class room. There are undoubtedly many who would take advantage of courses in Radio, if they knew where they could be obtained. Pennsylvania State College is offering courses by correspondence in Radio reception and transmission, one for the ordinary student and one for advanced work.

First the musical composers raised their voices in protest against allowing broadcasting stations to use their music for eutertaining Radio audiences; now the Baseball Writers' association raises a howl about broadcasting baseball results. Next we will be urged to forego hearing the "blow by blow" accounts of boxing contests and soon or late the market reports—farmers profit by getting these. Are we listeners in to be limited to police reports?



# First Steps for Beginners in Radio

## Chapter XIV, Part II—Telephones and Loud Speakers

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 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.

**T**HE telephone headset is intended primarily for long-distance work or where the signals are rather weak. On short-range work, where the signals are loud, it is desirable to use a form of reproducing device that will permit the music being heard over a large area. To this end use is made of loud speakers. The telephone is limited in design by reason of its having to be light and compact, whereas in the loud speaker weight or size is not a limitation and great latitude in design is possible.

The simplest form of loud speaker is made by mounting a telephone receiver in the throat of a horn, thus throwing the loud signals for quite a distance. The best results are obtained from a receiver hav-

which shows the cross section of the coil winding. The arrangement is rather difficult to explain, but an examination of the illustration will show that the fine winding has positioned at each end two poles of opposite polarity. The poles at

is ideal for the purpose. By soldering the armature extension to the center of the diaphragm we have a structure that will work excellently as a loud speaker and prevent much of the chattering on loud signals.

parts are much larger. These speakers function very well and are reasonable in price. Their chief advantage lies in the fact that they require no storage battery and therefore are less costly to operate than the dynamic type of speaker.

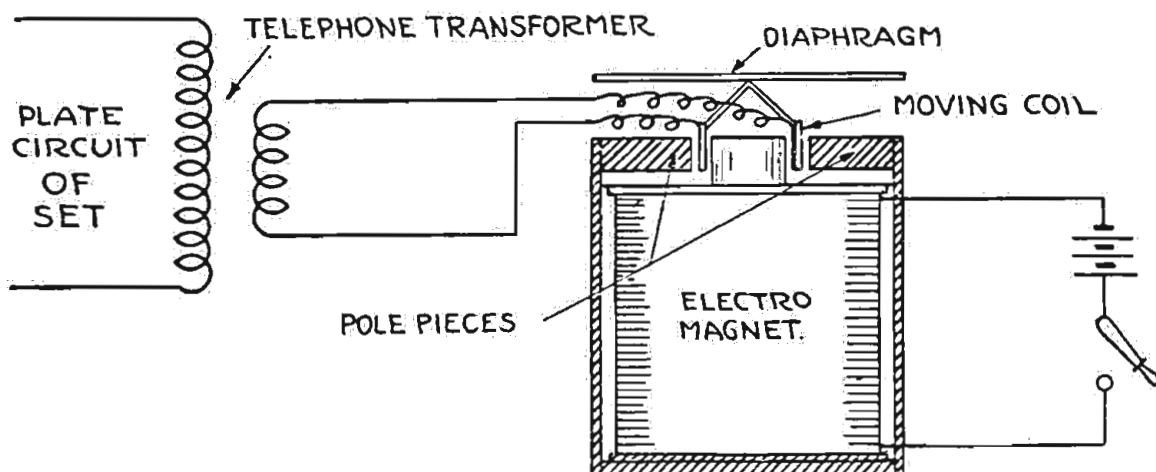


Figure 57—Cross section of dynamic loud speaker showing relation of various parts

the top are of like polarity and those at the bottom are alike. Pivoted at the center of the coil is a tiny soft iron armature that normally is not attracted by either set of poles because the lines of force pass through the ends of the armature. The armature is linked to the mica diaphragm with tiny washers soldered in place on the end.

The operation is as follows: consider the polarity of the poles as shown. Should an electric current flow in the coil the armature will be magnetized; say the right end is made north and the left end south. The right end will then be repelled by the upper north pole and attracted by the lower south, while at the opposite end the upper pole will attract and the lower repel. This action results in the diaphragm being drawn down. A reversal of the current in the winding will give the opposite effect with the diaphragm being raised. The fourfold action makes the receiver very sensitive; the light mica diaphragm permits pure reproduction at all frequencies.

### Attaching Receiver to Horn

The attachment of the receiver to a horn or to the phonograph sound box presents no difficulties, for attachments are manufactured for this purpose. A point worthy of note at this time is that when two Baldwin phones are attached to a horn a very weak sound will sometimes be emitted. This is due to the fact that the diaphragm of one phone is drawn in when the other is forced out. The two phones then neutralize each other and no sound is emitted. The remedy is to reverse the leads to one receiver when they will be found to work together satisfactorily.

It is not necessary to connect the leads from Baldwin receivers in any particular way with respect to polarity, for the magnetic field of the coil being at right angles to the permanent field does not tend to neutralize the permanent magnet.

It will be found that the armature will strike the pole pieces when very strong signals are received, which gives rise to a chattering sound that destroys the music or words. There is no way to overcome this except by changing the diaphragm, replacing the mica diaphragm with one made of metal. It need not be of iron; in fact one of thin phosphor bronze

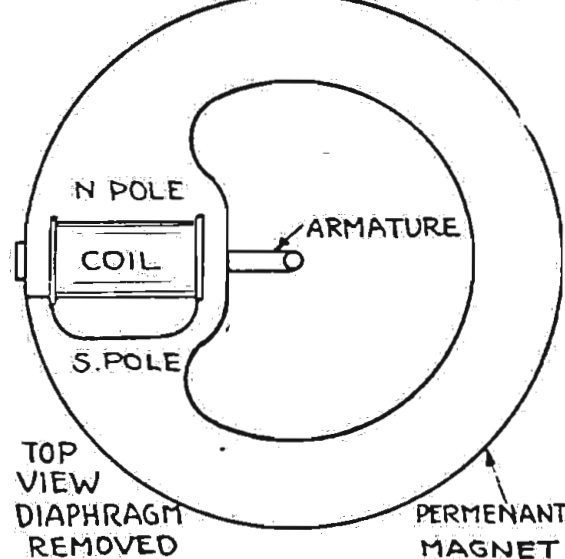
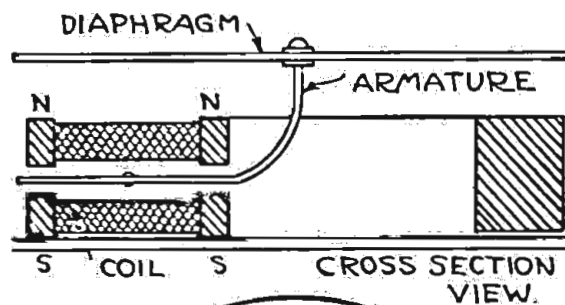


Figure 56—Construction details of Baldwin Type receiver

ing a large diaphragm deflection. In the usual type of headset there is very little deflection possible because the diaphragm is located close to the magnets. The use of a mica diaphragm permits large deflection without the danger of bending; for that reason the Baldwin type phone is usually employed in what we may term telephone speakers.

### Operation of Telephone Unit Speakers

The operation of the Baldwin receiver differs greatly from the standard type; for the benefit of those not fully acquainted with the action it will be covered briefly. Around the inside of the shell is mounted a circular permanent magnet made of steel and strongly magnetized. The ends of the magnet are twisted and flattened to form four pole pieces, as shown in Figure 56,

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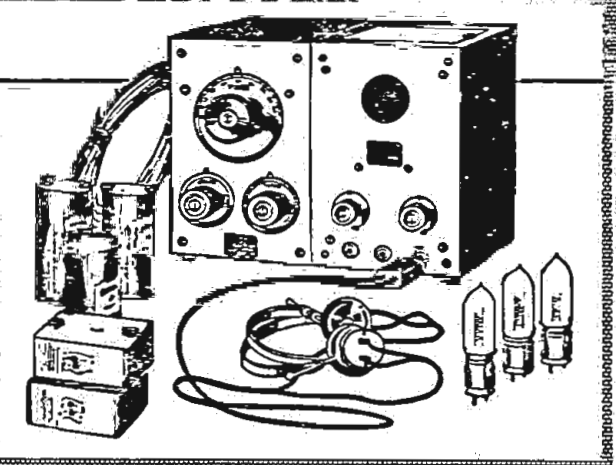
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### The Dynamic Type Speaker

The dynamic type speaker is a radical departure from the other two principles described and is perhaps the best type of loud speaker. It makes use of the principle employed in motor practice and is capable of handling the loudest signals without danger to the mechanism. If we place a conductor in a strong magnetic field and then pass a current through the conductor, the magnetic lines of force around the wire tend to cause the wire to travel at right angles to the magnetic lines. The direction of movement will depend on the direction of the magnetic lines and the direction of current flow. Reversing either will result in the reversal of movement of the wire.

In the dynamic talker, such as the Magnavox, use is made of this principle to operate the device. The actual construction of such an instrument was described in detail some months ago in these columns, so we will confine ourselves to the

(Continued on page 14)



# Combination Crystal and Tube Circuit

## Batteries Saved While Hearing Local Stations

Every Radiophan is eager to operate his set at the least possible expense. Here is one way to use a crystal on local stations and leave the expensive tube operation for distance work, eliminating the battery dis-

### WORKSHOP KINKS? EARN A DOLLAR—

**T**HERE 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.

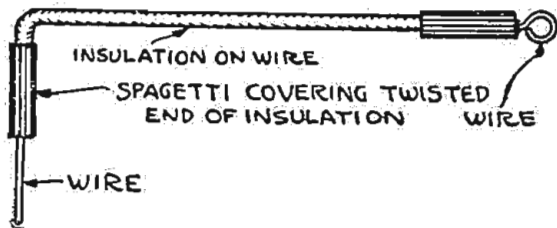
RADIO KINKS DEPARTMENT,  
Radio Digest,  
123 W. Madison St., Chicago

charge on a tube when it is not necessary to use on local stations.

By connecting the crystal detector to the circuit, as shown, I can hear the local stations on the crystal. To listen with the crystal it is necessary only to turn off the A and B batteries, switch on the crystal and tune in the station with the condenser and variocoupler.—Jay Nunes, Des Moines, Iowa.

### Wire End Insulation Covering

When using long leads to switches, batteries, etc., consisting of lengths of annunciator or like wire the usual difficulty encountered is that the insulation shreds at the ends and makes a bad looking job. A novel way of overcoming this

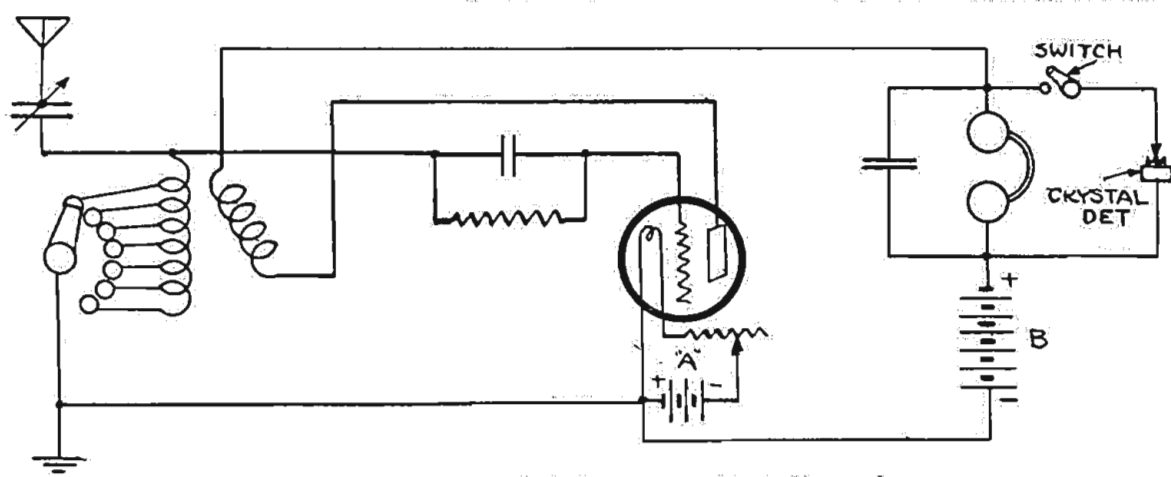


is as follows: cut the wires to the desired length; then cut some of the insulation away, leaving about 1/2 inch of the wire exposed. Twist the insulation at this end; then cut a piece of spaghetti about 1/2 inch long and cover the end of the insulation, leaving the end of the wire still exposed.—T. Meyers, New York City.

### Iron Nails and Tacks

Never use nails or tacks when making up panels for a set. Holes in bakelite or hard rubber or fiber must be made with a drill.

## EITHER DETECTOR MAY BE USED



### Solder All Connections

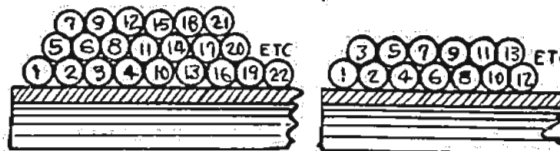
Loose connections have been the cause of many of the troubles experienced in receiving sets. When wires are connected to nuts, binding posts, etc., or with each other, care should be taken to see that these joints are tight and if possible soldered. No joints should be left unsoldered except those which have to be changed from time to time, such as the batteries and the headphones. It is advisable sometimes to solder the B batteries, as these usually last about six months. A good joint is, first of all, one that is strong enough to hold up under the strains of handling. When two wires are connected they should be soldered at the center. The solder part makes the connection perfect, and the rest of the splice takes up the strain.

### Utilizing Flashlight Battery

For one-tube receiving set designed for a minimum size and weight, it is possible to use a flashlight battery to light the filament. Such a battery may supply service of one hour per day for a month.

### Bank Winding Made Easy

Give the surface to be wound a coat of shellac and bake it on to prevent shrinkage. The surface is then covered with adhesive tape with the coated side out. The best width of tape is 1 1/2 inches. Wrap one turn of the tape around the part at the end where the winding of the wire

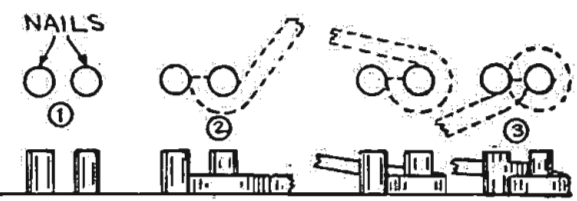


is to start. If necessary to cover space for the wire, wrap another piece on with the edges joining. Wind the wire on the tape.

The gum on the tape will hold the under layers so that they will not slip. This will make winding easy. Triple winding is done as shown in the left of the sketch and double winding at the right.—J. B. Yingling, Newton, Kansas.

## Tool For Bending Loop Ends on Bus Bar Wires

When it becomes necessary to make several loops on the ends of bus bar wires while wiring a set, time will be saved in making the bends if a tool is constructed as shown in the illustration. To make the tool procure two ten penny nails and remove their heads. Drive the body of the nails into a board, placing them just far enough apart so that the ends of the wire may be slipped between them. Place the end of the wire against the side of one of



END LAPS UNDER SEE ③  
FLATTEN LOOP WITH HAMMER.

the nails; it then becomes easy to bend the wire around the other nail, making a uniform loop.—Horace Mason, Republic, Washington.

### Most Sensitive Headphones

Headphones are most sensitive when wound with the finest wire to give the greatest number of turns; copper is the best kind of wire for the purpose.

### Magnetism Increases Reception

Magnetism plays an important part in Radio reception; the sensitivity of an audion tube sometimes may be increased by placing a large magneto magnet in a certain position so that the poles of the magnet are on each side of the tube. This probably is due to the magnetic effect upon the moving electrons that flow across from the filament to the plate.

### Connecting Filament Rheostats

In Radio frequency amplifying stages it is advisable to connect the rheostats, which control the filament current, in the negative lead from the filament battery. This permits the potential on the grids to be more negative than the negative side of the filament due to the voltage drop through the tube rheostat. This method of connection usually provides the proper amount of negative potential on the grid without the use of C batteries.

### Radio Equipment

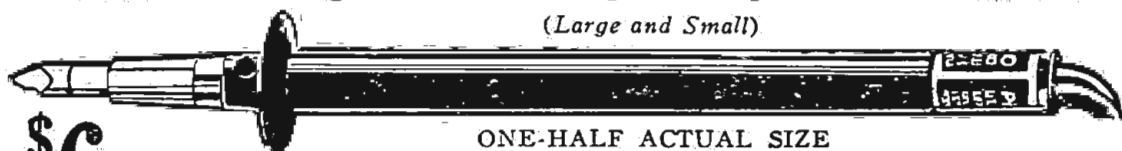
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		\$7.00 Amertran	\$5.55

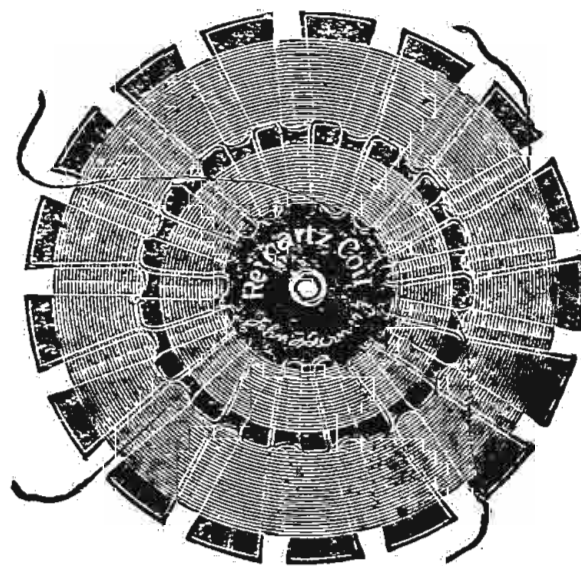
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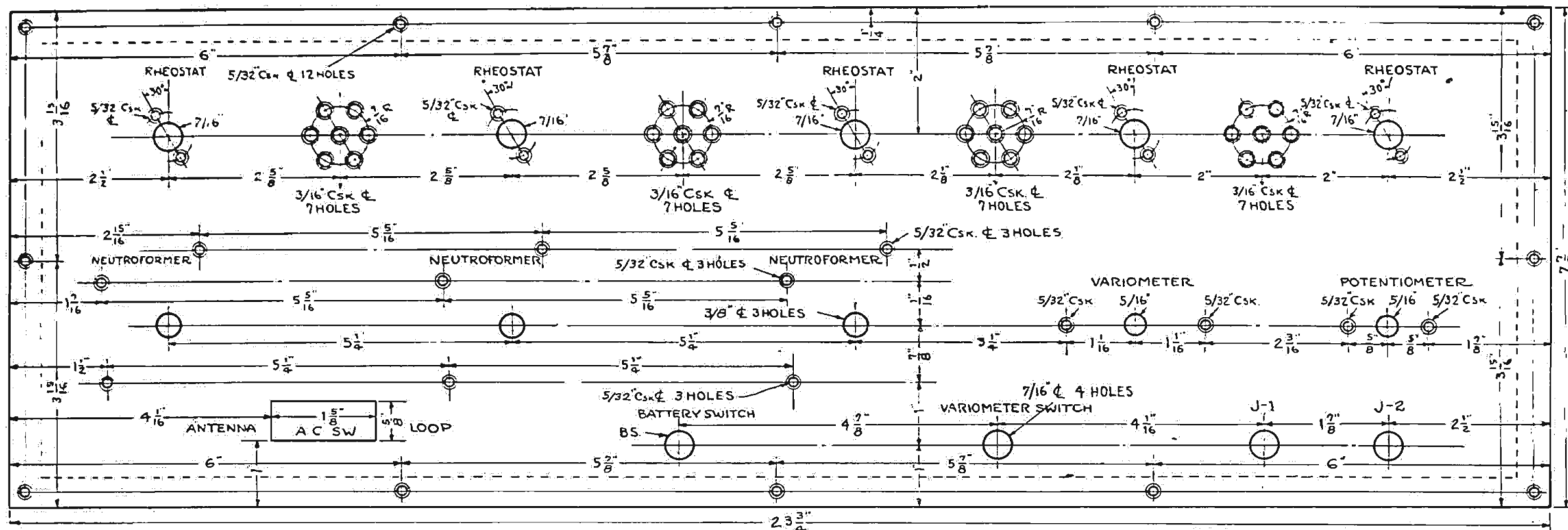
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# Five Tube Neutrodyne Receiving Circuit

## Part II—Panel Layouts

By H. J. Marx



In any circuit employing the use of Radio frequency, the question of mounting the apparatus becomes of paramount importance. Inductive interference between leads has always been a factor to contend with, but in a circuit of the type under consideration capacity and inductive reaction between apparatus, especially in the Radio frequency stages, requires a concentration of thought in order to obtain the best possible layout. It will be noticed that it has become customary to mount the neutroformers at a slight angle; this is done to avoid any stray magnetic field or lines to effect the coupling of the air core transformers.

**The Binding Posts**  
All the binding posts for connections are mounted on the rear edge of this sub-panel. The antenna and ground posts, with the separate two for the loop aerial, are on the one side, while all battery connections are on the other side.

The negative B battery is connected to the positive A battery. A 22½-volt tap is used for the detector stage. About 90-volt plate battery is sufficient for the amplifying stages. For other tubes these values may be altered to suit.

**The Main Panel**  
The five rheostats are mounted along

convenient for making these layouts. Little or no measuring need be done.

After the layout has been drawn to scale, the paper is held in position on the panel, which has been cut to size, and the holes are punched with a center punch through the paper.

All holes are drilled with a 5/32-inch drill and are then enlarged with a taper reamer to proper size. This avoids the necessity of a large number of drill sizes. The ordinary hand drill will not hold a 5/32-inch drill (used for jacks); the reamer solves this and other similar difficulties. The square hole for the anticapacity switch must be cut out with a scroll saw and filed to exact size afterward. The two outer holes for the switch plate are best drilled after the body has been fitted into the square hole.

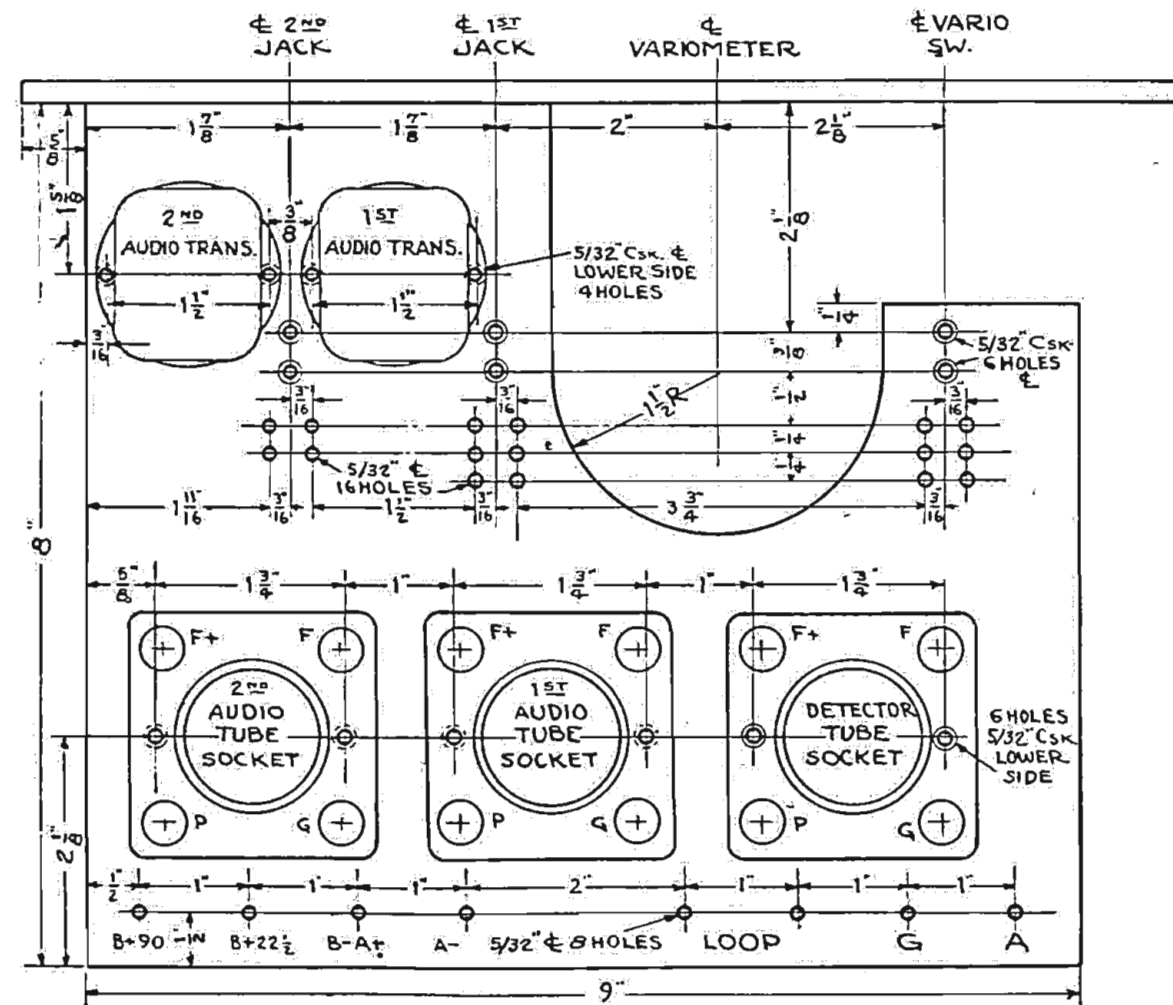
Small counterbores can be purchased for countersinking all holes for flat-head screws. Fans will find the polished hard-rubber panels considerably easier to work than the composition ones.

Naturally, different makes of apparatus will necessitate slight changes in mounting holes. For this reason the apparatus should be checked with the layout and any necessary alterations incorporated.

(TO BE CONTINUED)

### Value of Grid Leak

For all around work the best value for the grid leak is one to two megohms. The actual size of the leak for best results varies slightly, and the range is usually from one-half to five megohms. The most usual value, however, is two megohms.



The spacing between the three neutroformers has been reduced to a minimum and should not be decreased any further. The Radio frequency amplifying tubes are placed sufficiently far apart so that no intertube capacity effects need be anticipated. The detector and audio frequency amplifying tubes are not very susceptible to interference and have therefore been concentrated on the small sub-panel on the back of the right side of the set.

### As to the Sub-Panel

This sub-panel is supported by the two jacks and the variometer jack switch. The six 5/8-inch countersunk holes are for the screws that pass through the sub-panel into the jack and clamp the jack springs in position, taking the place of the screws that are normally used for that purpose.

The sixteen 5/32-inch holes in back of these holes are to permit the leads from the jack terminals to pass through to the upper side of the sub-panel.

The cut-out in one corner of the sub-panel is to permit clearance for the rotor of the variometer. The two small hedgehog type of audio frequency transformers were found to fit conveniently into the rather limited space available. The larger type of transformers could not be used, due to the limitations of space.

the top of the panel. Between the rheostats are four sets of seven peepholes for observing the filament lighting. By countersinking all holes evenly the appearance of the completed panel is considerably improved.

The five controls are in alignment through a line a little below the center of the panel. Once adjusted, the rheostats require little further attention; so the main tuning controls are always at the finger tips.

The anticapacity switch is mounted below this, between the first and second dials. The connections are made so when the lever is thrown to the left the antenna and ground are connected; when to the right, the loop aerial is used.

The jacks and jack type switches are a little lower. The battery switch is centered between the second and third dials.

The variometer switch is between the third and fourth dials, thus putting it very close to the variometer (fourth) dial, with which it works in conjunction. The two audio frequency control jacks are located in the lower right-hand corner.

Twelve countersunk holes are indicated around the edge of the panel for mounting the panel in the set.

The writer has found square ruled paper, eight divisions to the inch, very

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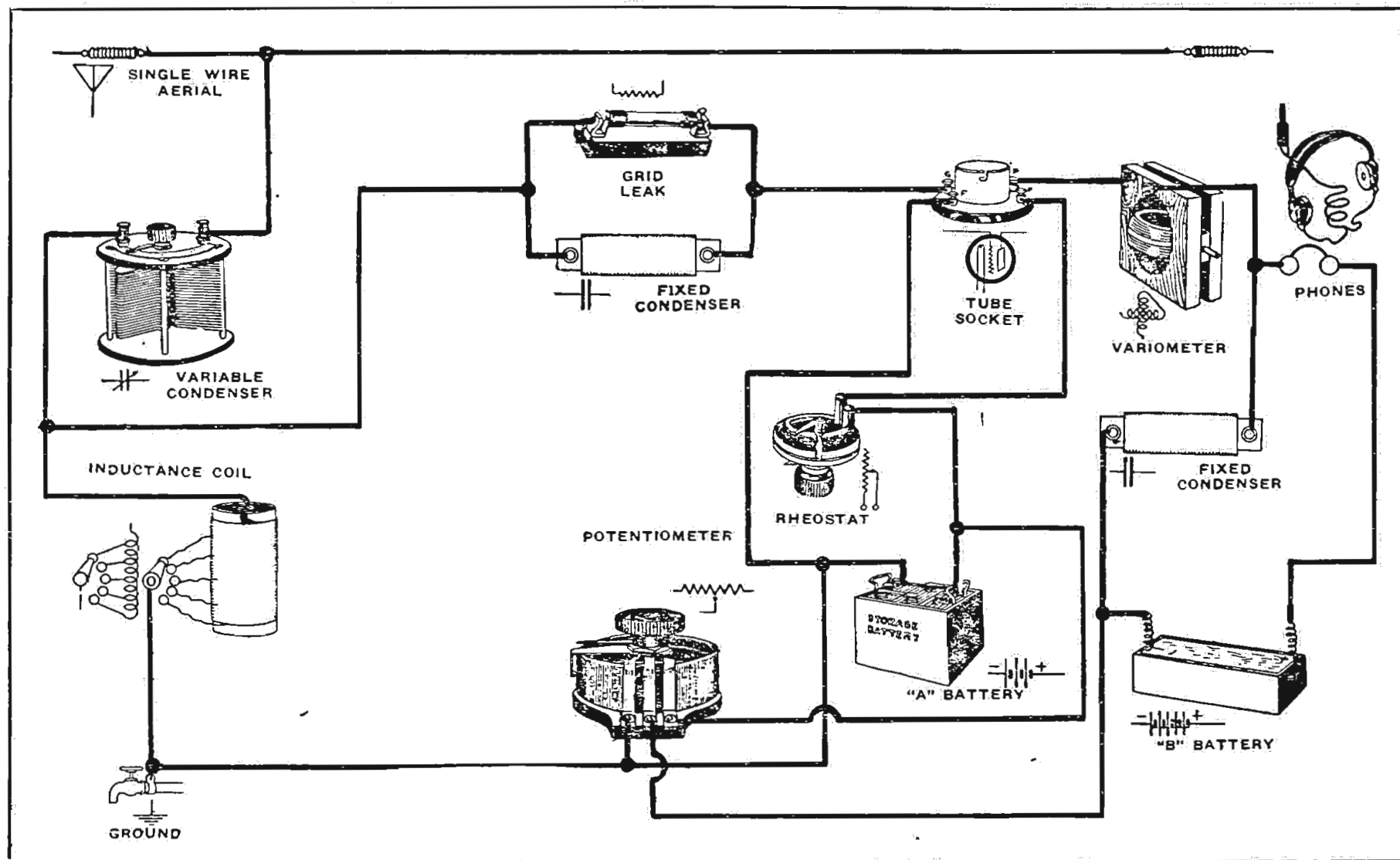
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TAPPED COIL INDUCTANCE IN SIMPLEX CIRCUIT



MANY of the Radio apparatus manufacturers are putting out tapped inductance units. Some are in the form of single layer coils wound on tubing; some are spider web windings; others have a lattice wound honey comb coil. These coils take the place of the old single slide tuners.

The taps need not be more than four or five, since the finer tuning can be taken care of by means of a .001 mfd variable condenser in series in the antenna circuit, as shown in the simplex diagram. For close tuning it will be found advan-

tageous to have some vernier control on this condenser, since it will help clear up the reception through very accurate adjustment.

If a 400 ohm potentiometer is connected across the A battery as shown, very close adjustment of plate potential is possible; this is important with the variety of tubes at present available. The plate or B battery should consist of one 22½ volt unit.

The fixed condenser connected across the receivers should be .002 mfd capacity;

the grid condenser .00025 mfd, and the grid leak should have a resistance of about 1½ megohms. The plate circuit is controlled by means of the variometer. This variometer can be inductively coupled to the inductance coil if desired; that is, the center line of the inductance unit should pass through the variometer. The distance between them depends entirely on the apparatus used and is best determined by experimentation.

Audio frequency amplification can be added in the usual manner if more volume is desired.

Reviews of Books

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

**Ideas for the Radio Experimenter's Laboratory.** By M. B. Sleeper. The novice will find a wealth of information which will assist him in the designing, constructing and testing his set. Data on laboratory instruments are given. Price, 75 cents.

**Experimental Wireless Stations.** By P. E. Edelman. Simple directions are given in this book for making Radio equipment for the transmission of messages over long distances. Price, \$3.

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

**The Radio Amateur's Handbook.** By A. Frederick Collins. A new revised edition of this book is just out. It is complete, authentic and informative work on Radio. Fully illustrated. Price, \$1.50.

**Radio Reception.** By Harry J. Marx, Technical Editor Radio Digest, and Adrian Van Muffling. A simple treatise on Radio reception. Beginning with the elementary principles of electricity it carries the reader on into the essentials of Radio telephony. The most successful methods of Radio reception are explained and special reference given to practical tuning. 230 pages, with 130 illustrations. Price, \$2.00.

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FIRST STEPS IN RADIO

(Continued from page 11)

theory of the operation at this time. As shown in Figure 57, a large electromagnet energized from a storage battery is used to create a dense magnetic field between circular pole pieces. A six-volt storage battery is used; it may be the same battery used with the tube filaments. A large permanent magnet may be employed instead of the electro magnet with some loss in signal intensity.

Within the magnetic field is suspended a coil of very fine wire, which is rigidly attached to a diaphragm cut from thin mica. The movable coil is connected to the secondary of a telephone transformer, the resistance of the movable coil and secondary winding being the same. The primary winding of the transformer primary is connected into the plate circuit of the last tube; it has the same impedance as a standard telephone receiver, being the same as the plate-filament impedance of the tube.

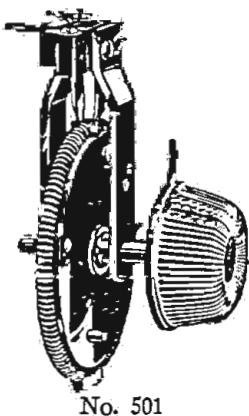
When the audio currents flow in the primary of the transformer they induce currents in the secondary which flow through the wire on the movable coil. When the current flows through the coil in one direction the coil has a tendency to move across or at right angle to the lines of force from the large magnet and thus move the di-

aphragm. A reversal of the current through the movable coil tends to pull the diaphragm in the opposite direction. The transformer has a twofold effect. By using the step-down in voltage it is possible to use fewer turns of wire on the movable coil to balance the low resistance of the secondary winding; thus a short air gap is possible. Were we to attempt to put enough wire on the movable coil to equal the impedance of the tube circuit, the coil would be too heavy and damp the diaphragm, and the longer air gap would make a larger electromagnet necessary. The other effect of the transformer is that it converts the pulsating direct current in the plate circuit into an alternating current that has both a push and pull effect on the diaphragm instead of simple variations in pull, as in the usual receiver.

There are several freak types of loud speaker in the experimental stage; the Radio inventor will find in this field a wide scope for his ingenuity.

(TO BE CONTINUED)

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The Kellogg rheostats are simple in design, having but one movable part. The resistance wire is carried on a rotor of high grade insulating material and the contact arms are so placed that a slight movement brings in the one-half turn of the wire, giving a vernier effect.

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# Questions and Answers

### Glass Panel

(4268) CH, Kansas City, Kas.

Will you please print a panel layout for the following: I have a one-tube, one-honeycomb coil and one condenser outfit. My tube is a C-300 Cunningham; the condenser is 43-plate vernier, and I am using, at present, a 50-turn honeycomb coil. I have heard Minneapolis, Chicago, Davenport, Omaha, and Tulsa, Okla. But none of them is 800 miles away. You said the outfit was good for 800 miles. This is what I want—a panel layout using one honeycomb coil, one variable condenser, one grid condenser, one A battery, one B battery, and I want to apply one step of amplification. My variable condenser is a 43-plate, and my grid condenser is a .0005, wired according to the hook-up Q. and A. Number 03518. You can print the panel layout or you can send me one, as it suits you. I am a constant reader of the RADIO DIGEST, and am saving its issues for future reference. Will you please tell me the best way to drill glass? My panel will be made of plate glass, 3/8 inch thick, by 7 by 12 inches in panel, 7 inches high, by 12 inches long, by 3/8 inch thick.

What size transformer should I use and what tubes? At present I am having considerable trouble with my set. When I start to tune in it sounds just like a windstorm coming; it seems impossible to get rid of it. I have a loop aerial; outside wires are 3 feet from rib to rib, making it 12 feet around, and there are 14 rows of wire on the frame reducing to the center. In using it should I connect both ends of the loop to the aerial post?

A.—The panel layout is entirely a matter of personal discrimination and convenience, the important feature being only to keep the instruments spaced at about two inches and all leads as short as possible.

Glass can be drilled either with a piece of copper tubing of the diameter desired and pumice powder, or with a tri-cornered file with the end ground flat, the latter being the more rapid method; great care must be taken not to crack the glass.

A diagram illustrating the method of amplification with your present set is shown on page 14 of March 3 issue of RADIO DIGEST.

A ten to one ratio audio frequency transformer of rugged construction will prove satisfactory.

A C301-A tube will function best as an amplifier.

The hiss encountered in the operation of the circuit is doubtless due to having the filament turned too high or to too high plate potential on the detector tube.

In stating the receiving range of any circuit it is always based on the most favorable circumstances. The reception you have accomplished with the circuit under discussion and in using a loop aerial would be considered very good.

### Honeycomb Coils

(4113) FRS, Zion, Ill.

Using a single fixed honeycomb coil in the ultra audion set, what are the wave lengths for the coils of different number of turns?

How many ohms should a rheostat be to regulate the filament of a 1 1/2-volt tube?

What capacity grid condenser should be used with a 1 1/2-volt tube?

A.—With reference to wave length values of honey comb coils we advise them approximately as—

150 to 250 meters.....	25 turns
200 to 350 meters.....	35 turns
300 to 450 meters.....	50 turns
350 to 550 meters.....	75 turns

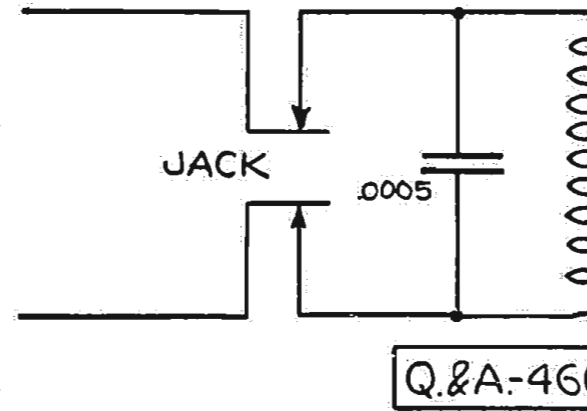
The usual six ohm rheostat is used with a 1 1/2-volt tube. A .00025 mfd grid condenser is indicated.

### Audio Frequency Stage

(4606) MP, Washington, D. C.

Please publish hookup diagram of separate one-stage audio frequency amplifier that is adaptable to any circuit and will give maximum volume with WD-11 tubes.

A.—Complying with your request we are



herewith presenting a diagram employing a one-stage amplifier, audio frequency, which is adaptable to any standard circuit.

### Body Capacity

(4219) CB, Hygiene, Col.

Is there any method that will stop the body capacity effect and the tube hiss? I use the standard three circuit regenerative set. What 'phones do you think are the best on the market? Is Brandis Navy as good as Baldwin type C?

A.—Body capacity effect can be eliminated by shielding the back of the panel with tinfoil and grounding the shield.

Incorrect tuning will cause the tube to hiss. However, this action is most frequently due to the tube being cold. After it has been turned on two or three minutes this should cease. If it does not, cut down the B potential until the hiss stops.

The Brandis 'phones are very good and will stand up under rougher usage than the Baldwin which, however, are more sensitive.

### Super Heterodyne

(4169) FZC, Tampico, Mexico.

Referring to hook-up R. D. 73 appearing on Page 14 of your issue dated February 24, the Armstrong super-heterodyne circuit, will you kindly inform me as to—

What kind of coils are those shown shunted across condensers C4 and C5; are they honeycombs? If so, what size?

Will the UV-199 tubes give just as good results as the standard type 6-volt tubes? If I use the UV-199 tubes will it be necessary to use independent rheostats for each tube?

Which is the detector on this hook-up? A.—The coils may be honeycomb, the size depending on the wave length desired. A table giving the value of respective coils accompanies the descriptive article.

The UV-199 tubes may be used in this circuit, although not as effectively as the UV-201AS. In either instance one rheostat will serve to control the filament.

The first tube is the detector.

### 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.

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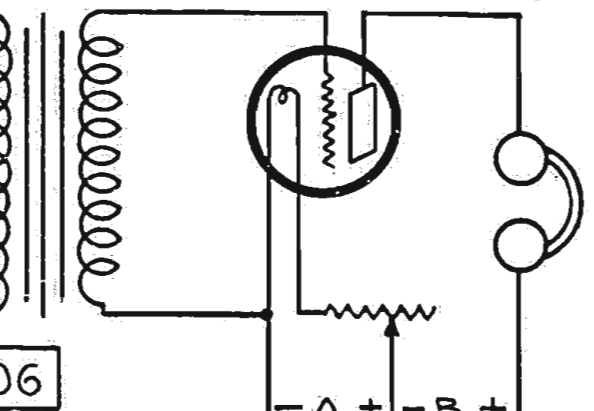
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### Loop Aerial

(4242) CHS, Davenport, Ia.

I have made a folding loop for use with my reflex, which is not completed. I am undecided in regard to the kind of wire to use on the loop. The loop is of the box type, 3 feet square, with cross arms to



hold the wire. The arms are 6 inches long, to hold 10 wires 1/2 inch apart. What is your opinion of copper ribbon? Is it better than stranded wire? What width and thickness is best? Will it have more or less skin resistance than stranded wire? I want something flexible so it will hold up neatly.

A.—We recommend copper ribbon wire, as in a small measure it is more efficient than the stranded wire, although hardly sufficient to be of material difference. The ribbon wire has less skin resistance than stranded wire, but there is so little used in the construction of a loop aerial as to make the ohmic resistance a negligible factor.

### Nacireman Circuit

(4500) GWD, Bowling Green, Fla.

On the Nacireman circuit, RD Number 87, could honeycomb coils be used in place of the variocoupler? What would the values be? I would like to use a 43-plate vernier variable condenser in place of one of the 23-plate condensers. Could this be satisfactorily done? Should I put it in place of C or C2?

In using honeycomb coils instead of the variocoupler, is a 3-coil mounting suitable, or should the 75-coil be isolated?

A.—Two 50-turn honeycomb coils may be substituted for the specified variocoupler.

A 43-plate variable condenser may be used in place of C2, 23-plate if desired.

If the honeycomb coils are used in place of a variocoupler, a 2-coil mount is indicated, as the 750-turn honeycomb coil must not be in inductive relation to other coils.

### Antenna Efficiency

(4634) JVB, Cincinnati, O.

As I cannot get a longer stretch than 45 feet I am now using a two-wire antenna, 45 feet long. What I would like to know is the approximate receiving efficiency of other kinds of antennae compared with the one I have? Please tell me how much better or worse the following antennae are than the one I am now using—single wire antenna 45 feet long; four-wire antennae 45 feet long, cage form?

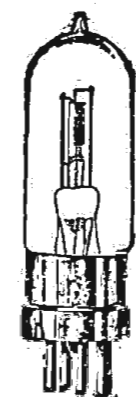
A.—The described construction of antennae will give equal results in reception. If it is impossible to lengthen the antenna an advantage will be gained by raising it to as great a height as practicable.

### Standard Variocoupler

(4573) AE, Bushton, Kans.

Please let me know how to wind a standard variocoupler to get the different wave lengths, static and rotor size of wire?

A.—A standard type variocoupler is accomplished in 56 turns of number 22 wire, tapped at every seventh turn, for the primary, and 40 turns of number 26 wire for the secondary.



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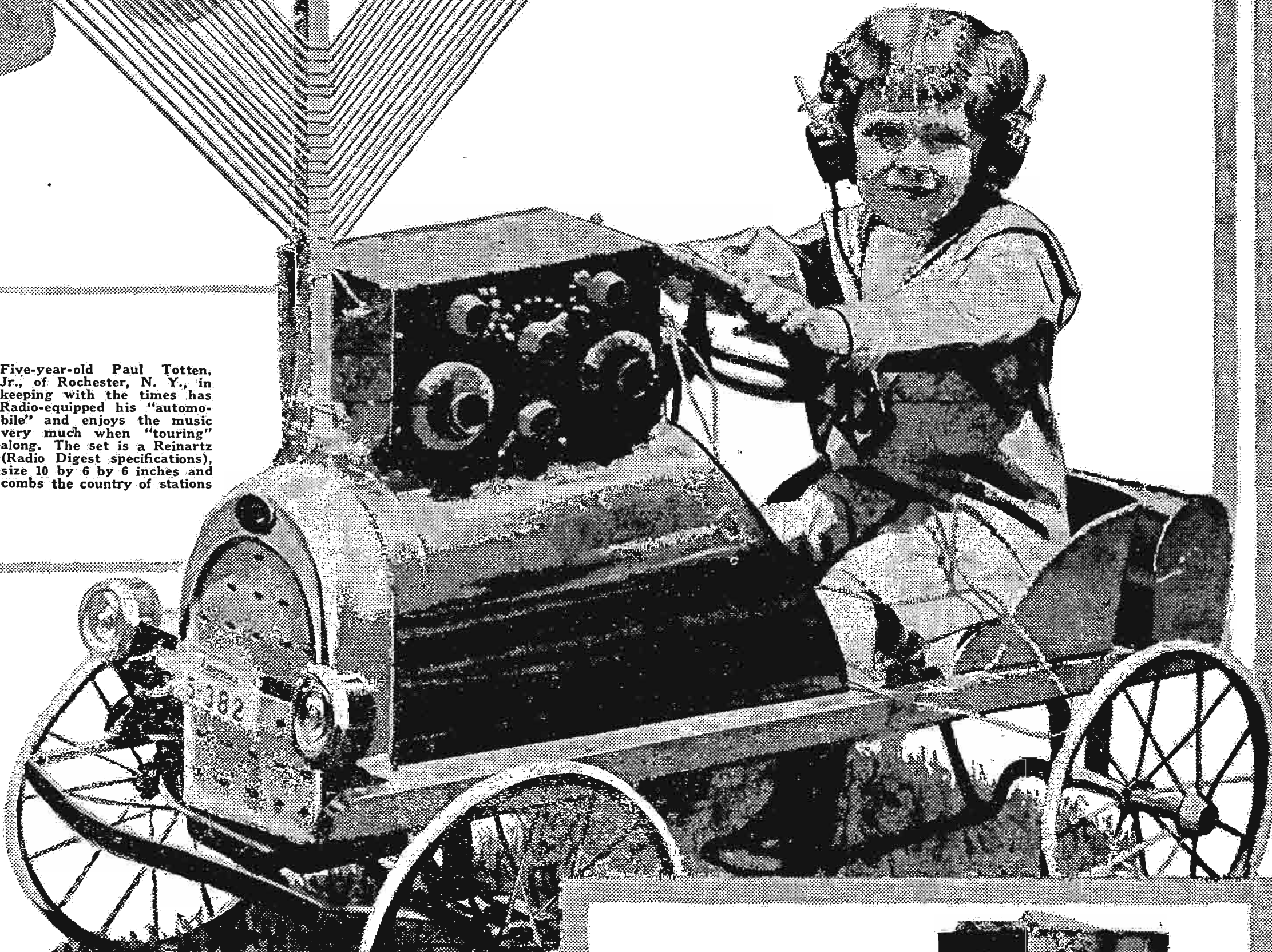
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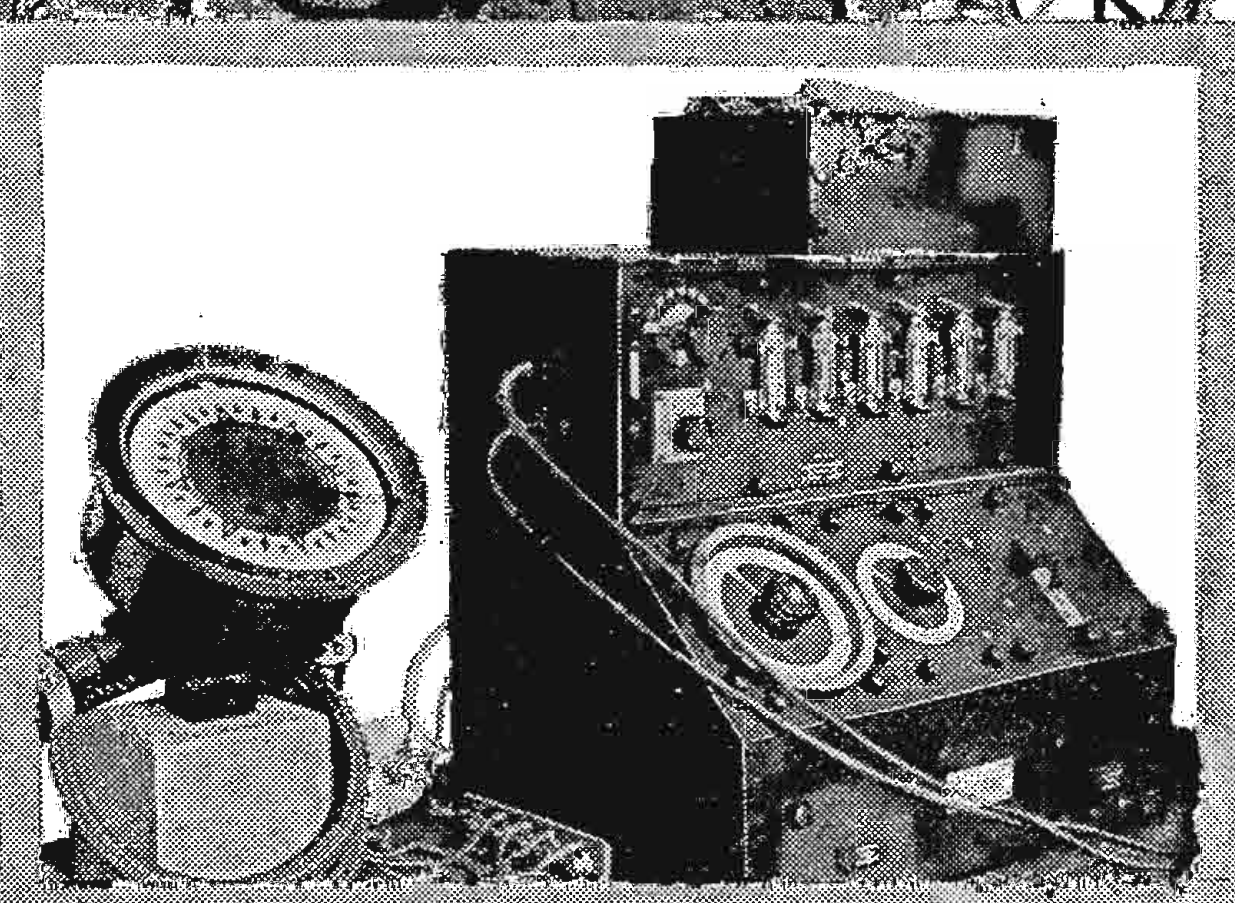
# Radio Digest

## Illustrated

Five-year-old Paul Totten, Jr., of Rochester, N. Y., in keeping with the times has Radio-equipped his "automobile" and enjoys the music very much when "touring" along. The set is a Reinartz (Radio Digest specifications), size 10 by 6 by 6 inches and combs the country of stations



Frank Houck, three years, because of his pluck has been nicknamed "The Sunshine of Hahnemann" at the latter hospital in Philadelphia where he listens in while being cured of spinal curvature  
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