Reflex Sets; How to Double Tube's Work—Page 13

Radio Digest

EVERY WEEK **Illustrated** TEN CENTS

TRADE-MARK

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SHOWS RADICAL TUBE

CROSS OCEAN RADIO TESTS SUCCESSFUL

120 COMMUNICATIONS BY AMERICAN BUGS HEARD

A. G. Jeffress in London Learns of Birth of Daughter In Richmond, Virginia

(Special to RADIO DIGEST)

NEW YORK.—Unexpected success has greeted the third transatlantic Radio telegraph tests conducted by the American Radio Relay League. Reports from Europe show that during the first three days, December 12 to 14 inclusive, 120 communications were made by low power American transmitters.

Many complete messages were received by the European bugs, and among these was one sent successfully to A. G. Jeffress in London announcing the birth of a daughter in Richmond, Va.

French and Swiss Bugs Hear

French and Swiss amateurs were successful for the first time in the three annual tests in hearing messages from the amateur, low power plants of this country. The increased range speaks highly of the efficient American amateur transmitting sets and the highly sensitive receiving sets developed across the Atlantic.

The following is a complete list of American amateur stations heard Decem-

(Continued on page 2)

WOULD PROBE LOUD SPEAKER IN HOUSE

Senator Asks Investigation to Decide Desirability of Making Instrument Permanent

(Special to RADIO DIGEST)

WASHINGTON.—Senator Campbell of Kansas has introduced a resolution in the House providing for the appointment of a committee of five members to make an investigation of the loud speaker which has been installed in the hall of the House of Representatives. The resolution calls for a report "at the earliest practicable date" as to the desirability of permanently installing such a system in the House, with details covering the cost of installation, operation and maintenance. The resolution has been referred to the House committee on rules.

KYW Fans Hear Chaliapin, Leading Basso of World

CHICAGO. — Feodor Chaliapin, celebrated opera star and considered the leading basso of the world, was heard in "Mefistofele," broadcast by Station KYW on the evening of December 19. The famous singer, who is the leading male singer of the Metropolitan opera company of New York, was a visitor, singing as guest star in the production of the Chicago Opera Company.

Station KYW also broadcast "Aida" December 20, which was the third time "Aida" has been sent out.

Prizes for Receiver Ideas

COLUMBUS, O.—The Columbus Dispatch is conducting a new contest open to all Radiophans of this city and Central Ohio, the purpose of which is to collect original ideas on Radio receiving sets that have been found to be successful by the individual operator.

NEW YORKER MAKES [illegible] WITH

Queer Triode Demonstrated Successfully Before Institute of Radio Engineers

Has Heated Sodium Anode

"Non-Interfering" Detector Will Not Oscillate—Equal to Regeneration in Circuit

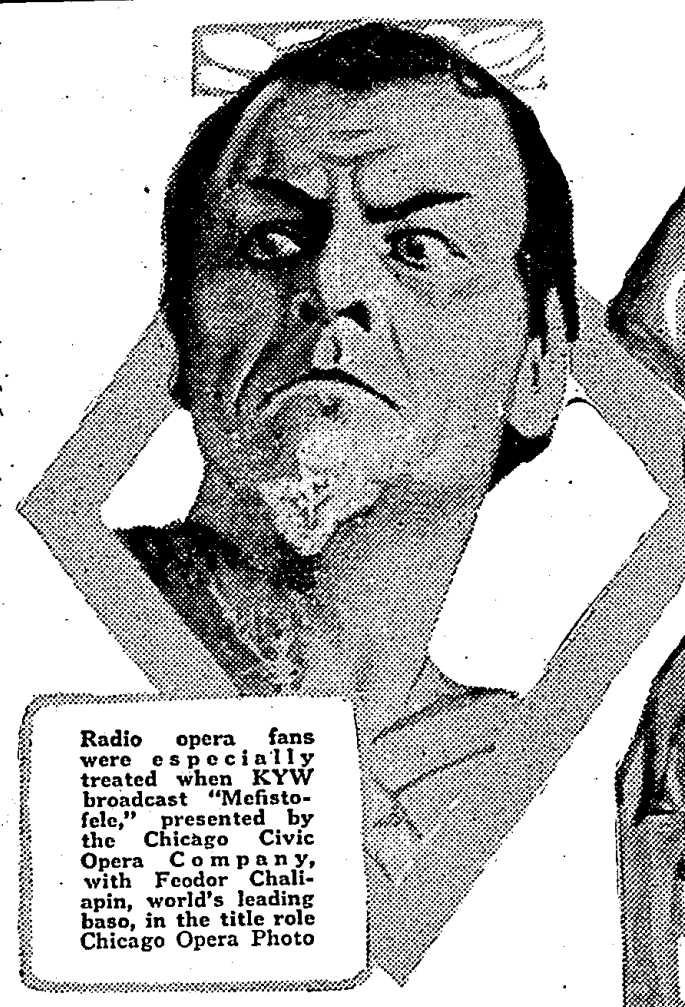
(Special to RADIO DIGEST)

NEW YORK.—A vacuum tube of radical and unique design was successfully demonstrated by H. P. Donle, well-known Radio engineer, Wednesday, December 20, before the Institute of Radio Engineers here.

After years of patient research, Mr. Donle produced the tube which is based upon the principles of ionization and has been named the "non-interfering de-

(Continued on page 2)

Ina Bourskaya, shown here in a costume worn while singing in "Rigoletto," broadcast from Chicago by KYW, was born in Russia and passed her entire girlhood without realizing she possessed a wonderful voice. She did finally discover her ability, however, and became the sensation of opera of Kiev and Odessa. She endured terrible hardships in escaping from Russia during the Revolution.
Chicago Opera Photo



Radio opera fans were especially treated when KYW broadcast "Mefistofele," presented by the Chicago Civic Opera Company, with Feodor Chaliapin, world's leading baso, in the title role
Chicago Opera Photo

Rosa Raisa, another star whose voice has pleased opera fans listening in on KYW broadcasts, is considered one of the foremost dramatic sopranos.
Harsook Photo

SHOWS RADICAL TUBE

(Continued from page 1)

tector'' on account of its desirable inability to oscillate and produce alternating currents.

Construction of Tube

The radical design tube consists of a straight wire filament which extends outside the glass bulb and continues as a heating element underneath a bowl-shape anode made of metallic sodium. A trough-shape "collector" electrode is around the filament inside of the tube. The former collector controls the ionization set up by the anode of sodium when this is heated by the external filament coil.

One of the peculiarities of the tube which Mr. Donle demonstrated was that if the telephones were placed in the collector electrode circuit instead of the sodium anode circuit, the signal strength was practically equivalent.

Best Circuit for Use

Experiments with the tube indicate that the best circuit for it is the regulation loose-coupled two circuit tuner. A potentiometer is shunted across the filament battery and one side of the secondary circuit is connected to the variable arm of the potentiometer, while the other side of the secondary is connected to the collector electrode. The filament is controlled in the usual manner by a rheostat.

The sodium anode circuit runs from the metallic sodium to the telephones and from the latter to the positive side of the B battery; while the negative terminal of the battery is joined to the negative side of the storage battery.

Collector Not Inclosing Filament

The collector electrode, which is prac-ally in the same position as the grid ordinary vacuum tube, does not en-close the filament. Experiments hat when the electrode did t there was no electronic filament and anode. led experiments are that there is abso-ency currents in the ube, and consequently ith it cannot be ob-is circumstance and that the tube is as ordinary regenerative re-ld seem to be an ideal tube for bro st reception.

Better Than UV-201

After experiments with the tube, one authority on Radio said:

"I have tried out these tubes and found their sensitiveness in a plain receiver if anything a little higher than that of a good UV-201 in a high-grade regenerative receiver."

At the present time it has to be inserted in the regulation vacuum tube socket in an inverted position, but future tubes will be so designed that they can be used in the ordinary way.

17 New Plants on 360 Meter Length

Coincidence in Assigning of WPAT Call Letters to St. Patrick's Church Station

CHICAGO.—During the past two weeks seventeen new 360-meter licenses were issued to stations for public service broadcasting. Three plants were promoted to the class B rating. One incident of note is found in the call WPAT, containing the nickname for Patrick, being issued to the St. Patrick's Cathedral, El Paso, Tex. The list of 360-meter licenses follow:

WQAK, Appel-Higley Elec. Co., Dubuque, Ia.; WOAS, Bailey's Radio Shop, Middletown, Conn.; WRAN, Black Hawk Elec. Co., Waterloo, Ia.; WPAJ, Doolittle Radio Corp., New Haven, Conn.; WOAT, Boyd Martell Hamp, Wilmington, Del.; KFDL, Knight-Campbell Music Co., Denver, Colo.; KFDJ, Oregon Agri. College, Corvallis, Ore.; WQAB, Southwest Mo. State Teachers College, Springfield, Mo.; WOAU, Sowder Bolling Piano Co., Evansville, Ind.; WPAR, R. A. Ward, Beloit, Kan.; WOAX, Franklin J. Wolff, Trenton, N. J.; WQAL, Cole County Tel. and Tel. Co., Mattoon, Ill.; WAPK, N. D. Agri. College, Fargo, N. D.; WPAT, St. Patrick's Cathedral, El Paso, Tex.; WPAH, Wis. Dept. of Markets, Waupaca, Wis.; WOAY, John W. Wilder, Birmingham, Ala.; KFDH, Univ. of Ariz., Tucson, Ariz.

The following stations were granted 400-meter wave lengths and class B ratings:

WHAS, Courier Journal & Louisville Times, Louisville, Ky.; WLAG, Cutting & Washington Radio Corp., Minneapolis, Minn.; KGW, Portland Oregonian, Portland, Ore.

Install Temporary Sets

WASHINGTON.—A new phase of the Radio game is that of "entertainment" service furnished on call, just like an orchestra service. If you want Radio entertainment, a local concern states it will bring a set, install it and guarantee entertainment from the ether suitable for a social evening, "or no charge."

America, Fascinated by Airphones, Passes Her First Radio Christmas

New Science Which Now Grips the Entire Nation was Being Recognized as a Popular Hobby Just One Year Ago This Season

We are again at the end of another year. Father time steps aside for the new urchin that makes his way to us. The year just passing has been a busy one for the Radio engineers. Just a year ago the new science was just beginning to be recognized as a popular pastime. It has been an unusual year. It was not necessary to popularize Radio; the people of the nation just had to fall in line to keep up with it. Now as a fitting climax for the last week in the year, everybody has taken up, "This is a Radio Christmas," with fervor and all have lent a hand to make it the best.

There are many thousands who have listened in on the best broadcasts of the year this week who never gave the science a single thought one year ago, but things have traveled fast for most of us and many are "tinkering" with a set who would have pooh-poohed at the idea months ago.

Special Christmas Programs

The special Christmas programs given at the different stations have been such that each has tried to outdo the other in quality and in distance work. The new fan is just as proud to have heard a distant station as a boy with a new toy.

Many of the Radio dealers who put in apparatus just as a sideline, found that the sideline outclassed any other one in their store. In fact some of them have discontinued all other goods and have turned their entire attention to Radio sales and their development.

We have only reached the dawn of a new era and the best of us cannot fathom its future. If we hear of a new circuit, the public goes wild over it. If it works well, then its popularity spreads faster than any new invention ever brought out through the patent office. At this time no one person can set forth a plan of how to go about making the science any more popular than it is today.

While this was a Radio Christmas, the very first one of its kind, there seems to be no question but what there will be many of them in the years to come. What the next one will be nobody can prophesy.

Estimates have been made as to the numbers of Radio enthusiasts. There is no need to make estimates. The numbers are not right. There is no way of getting the exact count, even within many hundreds of thousands. Without a doubt there is not one intelligent person in the nation but what has listened in on broadcasts. You may never have owned a set, but it is so fascinating that you cannot help but get an ear close to one if it is possible for you to do so. We cannot say more for its popularity at this, the First Radio Christmas.

Massachusetts Bars Sales of Radio Concern's Stock

BOSTON, MASS.—Further sales of stock of the Radio Products, Inc., concern have been barred in this state by the state Department of Public Utilities, under the so-called "blue sky" law. The company has failed to submit information asked for by the department, and to which it is entitled, under the law governing the sale of securities in Massachusetts. The Radio concern had planned to issue $200,000 of capital stock. Its offices are given as 35 Huntington avenue, Boston, although mail sent to that address has been returned as undelivered.

CONTENTS

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Looking Ahead

A—B—C Lessons for Radio Beginners, is the title of a series of simple articles by Arthur G. Mohaupt, well-known author on electrical subjects. Mr. Mohaupt will start his clearly written explanations of electricity in the next issue of Radio Digest. Novices would do well to read every installment, for it is by taking the first stumbling steps that one learns to run.

A Few Announcers You May Have Heard, will be pictured in the January 6 issue. After hearing the mysterious voice of some person night after night, the desire to see just what that person may look like, is natural. Radio Digest, with its announcer series, is helping to visualize the mysterious and well-liked voices of the air.

Reflex Circuits, or Making One Tube Work Overtime, is the economically interesting subject of Harry J. Marx this issue. See page 13. He will continue to give more data on these "trick" circuits in the next issue.

Reinartz Circuit in Photo Diagram, together with a detail drawing showing how to assemble the parts, is a much desired feature to appear in an early issue. This sensitive and selective hook-up is one of the most efficient yet known. Have you heard of it? Build one and you won't regret it.

Where the Stations Are, when you may hear them, who the owner is, what you can hear, ranges of the transmitters, and other desirable information is kept up-to-date weekly in the Radiophone Broadcasting Station Directory. See page 8. It is now in three parts, designed for tacking on the wall or removal from the rest of the paper.

TRANSMITS COLOR PICTURES OVER AIR

INVENTOR IMPROVES ON BLACK-WHITE SYSTEM

Various Hues, Sent Singly, Received by Means of Tinted Carbon Papers

SALT LAKE CITY, UTAH.—A step in the development of the transmission of pictures by Radio has been taken by Le Roy J. Leishman, of Ogden, Utah. His device enables him to transmit paintings in color, although the result is still rather crude.

In the transmission of black and white photographs, Mr. Leishman adopted the photo-engraving process of taking an image of the picture through a screen of dots. The various "humps" on this plate formed an electrical contact when a stylus connected to the transmitter was passed over them. These impulses were sent through the air as dashes.

On the receiving end a recording stylus would touch the paper when the dashes were received and make a mark corresponding to the mark at the transmitting end.

How Colors Are Transmitted

In color transmission, Mr. Leishman divided his picture into parts, one part for each primary color. Colored carbons were used at the receiving end, and the picture was transmitted in parts.

For instance, if a picture consisting of red, yellow and blue were to be sent, the red would be transmitted first. A sheet of red carbon paper would be placed over the recording sheet at the receiving end, and the transmitting stylus would pass over only the red section. Then the red carbon would be changed for a yellow, and the transmitter would pass over the yellow sections. This process would be followed with blue. Where the colors overlapped, shadings and other colors would appear at the receiving end.

MAY RENEW MOVE TO RADIO ALL SPEECHES

Congressmen Likely to Bring Back Year-Old Resolution

WASHINGTON.—Now that it has proven feasible to broadcast speeches from Congress, as evidenced by the success which was attained when the President's message to Congress was broadcast to the country, it is probable that the House Joint Resolution (No. 278) which was introduced almost a year ago by Representative Brennan of Michigan, will receive some attention.

This resolution, which was referred to the Committee on Merchant Marine and Fisheries, provides for the "installation and operation of Radiotelephone transmitting apparatus for the purpose of transmitting the speeches and debates of the Senate and the House of Representatives."

CROSS OCEAN RADIO

(Continued from page 1)

ber 12, 13 and 14 in England, France and Switzerland:

England, December 12

1BCG, 1BGF, 1YK, 2AWF, 2AWL, 2BMC, 2BMY, 2BQU, 2CJW, 2EL, 2GK, 2LY, 2NZ, 2UD, 2XAP, 2ZK, 2ZL, 2ZS, 3BGH, 3BGJ, 3HG, 3XM, 3ZW, 4BX, 4FB, 401, 4ZS, 4ZW, 7BO (Seattle), 8AQO, 8AWP, 8GQ.

England, December 13

1AJP, 1BCG, 1BDG, 1BDI, 1BEP, 1GV, 1OR, 1XM, 1YK, 2AHO, 2AWF, 2BML, 2CSL, 2GR, 2KL, 2LO, 2NZ, 2ZA, 2ZS, 3BL, 3BLF, 3BVL, 3XM, 3ZW, 3ZZ, 5AAM, 5BV, 8AQO, 8AR, 8ATU, 8BK, 8DB, 8XE, 9IM.

England, December 14

1BDU, 1CMK, 1CNJ, 1ZE, 2AWL, 2BDT, 2FP, 2LO, 2NZ, 2ZK, 8AD, 8AQO, 8ATU, 9ZN.

France, December 12

1BCG, 1BGF, 1BRQ, 1NX, 1YK, 2BML, 2EL, 2XAP, 2ZK, 2ZS, 3AQO, 3FX, 3HG, 3HM, 8MG.

France, December 13

1BDJ, 2AWF, 2ZK, 8AQO, 8ATU.

France, December 14

1BDT, 1BET, 1ZE, 2EL, 2LI, 2NZ, 2ZK, 3FA, 3HG, 3ZY, 8AQO, 8BU, 8LA, 8UE, 9OM.

Switzerland, December 13

8BSS (J. E. Page, Baldwinville, N. Y.).

Switzerland, December 14

2BGL, 2RP, 8AQO.

Strong Plant for New Zealand

SIDNEY, AUSTRALIA.—A high power Radio station for New Zealand, which would be able to communicate with the large stations of America, Great Britain and Europe, is under consideration.

The Australian government is debating whether it shou establish a station which would render e Dominion independent of the Empir ain system for purposes of world-wid ommunication.

NAA BECOMES U. S. "CHIEF" JANUARY 3

STARTS OFFICIAL SERVICE WITH NEW YEAR

NOF Broadcasting to Be Transferred to Arlington Plant—To Use 710 Meters

By Carl H. Butman

ARLINGTON, W. VA.—NAA, the great naval Radio station near here, becomes the Government's chief broadcasting station for official information on January 3. On that date, all regular broadcasting previously handled by NOF, the Radio experimental station of the Navy at Anacostia, D. C., will be transferred. Thereafter NOF will resume its experimental and research work, which may include the broadcasting of the Navy and Marine Band music in the interest of modulation tests.

A special wave length of 710 meters from the government and public broadcasting band was assigned to Station NAA by Secretary Hoover on December 15, at the request of the Inter-Departmental Radio Committee. This was done in order that the several regular circuits of the Army and Navy located there may be operated simultaneously without the interference from the main antenna which occurred before in tests when phone broadcasting was undertaken on the lower governmental wave lengths.

Arlington Radiophone Transmitter

The new Radiophone transmitting set was especially made for NAA at the naval Radio laboratory at Anacostia. It is based on the master oscillator, power-amplifier system, and employs six 250-watt tubes, giving an output of 1½ kilowatts. The apparatus is arranged so that the waves from 400 to 2,200 meters can be used in transmitting, and the power is derived from a 2 kilowatt generator. When the transmitting, on 710 meters, a special single wire antenna stretched from the top of one of the 400-foot towers is used. This new circuit does not interfere with any of the other circuits although used simultaneously. The height of the antenna gives practically the same efficiency as the low-lying, multiple-tuned antenna used at Anacostia.

When transmitting on the high wave length, 2,050 meters, the large antenna will be used and other circuits will be interrupted temporarily.

May Reach Several Thousand Miles

Transmitting ranges will vary with the season and in the day and night, but it is expected that a range of several thousand miles can be attained in nightime transmission during the winter months, although this may fall off in the daytime sending during the summer months to a 250-mile radius.

Recent broadcasts of the President's congressional address are reported to have been heard as far west as Chicago and Detroit, which speaks well for the work of NOF on 412 meters. Basically the new set for Arlington is built up on the results of Radiophone broadcasting experiments conducted from Anacostia and a knowledge gained from the operation of the well-known set at NOF.

Amundsen Polar Chain Breaks

NEW YORK.—The arrangement with Captain Amundsen and a chain of Radio stations for the transmission of daily messages has not been carried out, according to arrangements. Amundsen's ship, the Maud, was to transmit via Nome, Alaska, and the east coast of America to the Eiffel Tower. Messages were to be received by the Norwegian Meteorological Institute from October 15 onward. A few messages were received and have been duly passed on by the Eiffel Tower. Investigation is being carried out with a view to finding the break in the chain.

The United States shipping board is looking for highly trained Radio operators for positions as officers on vessels.

ROCK CHALK JAY HAW YELL BOOMS OVER AIR

KANSAS CITY, MO.—Kansas University alumni and Radiophans listened in Monday evening, December 11, to a program broadcasted through WDAF, Kansas City Star, and telephoned from Lawrence, Kansas, forty miles away. Various speeches were given and the Alma Mater sung by the ensemble. The program closed with a lusty rumbling, "Rock Chalk Jay Haw, K. U.," the famous university yell.

STEEL LIMITED PICKS UP HONOLULU WAVES

CHICAGO.—The first experience with the use of Radio on a transcontinental train has proven very successful. The Overland Limited, Southern Pacific train, arrived here recently from San Francisco and reported reception of messages and broadcasts en route from Honolulu, San Francisco, Los Angeles, Portland, Ore.; Seattle, Wash.; Kansas City, Mo.; Denver, Colo.; Salt Lake City, Utah; Indianapolis, Ind.; Chicago and Detroit.

HOGGING THE SKATING POND

WEAS in Capital Rigs Powerful New Station

Improvement Increases Range of Broadcast Plant

WASHINGTON.—Station WEAS of the Hecht Company, this city, has just installed a new broadcasting station which will make it one of the most powerful stations locally. Reports are now received from many Radiophans who had difficulty in hearing WEAS before, saying that they were receiving it now very loud and clear. Even Baltimore, which ordinarily has difficulty in receiving concerts from Washington, reported that they were hearing WEAS clearly.

UNEEDA BISCUIT BAND ENTERTAINS AT WOR

45 Pieces, Played by Bakers, In Special Concert

NEWARK, N. J.—The National Biscuit Company Band broadcasted from Station WOR, L. Bamberger & Co., on Friday evening, December 15. It numbers 45 pieces and all of its members are recruited from the New York bakeries of the company. Under the direction of Frank Blanco, it has gained for itself a very enviable reputation all over the country. It was organized more than ten years ago, and from a small beginning it has come to be an institution, being well known throughout the Metropolitan district.

MAKERS BAND TO PROTECT PATENTS

TAKE STEPS TO CLEAR AIR OF COURT ACTIONS

"Independent Radio Manufacturers" Incorporated for Offense and Defense —Valuable for Research

NEW YORK.—What is conceded to be a tremendous step forward in the clearing of the patent entanglements and manufacturer's patent problems, brought to a head by the suits filed by the Radio Corporation, is the recent announcement of the formation of an incorporated group, termed the "Independent Radio Manufacturers," with offices at 165 Broadway, New York.

In an exclusive interview, Walter Russ, of Pennie, Davis, Marvin & Edmonds, attorneys for the group, declared it to be his opinion that the incorporation of the Independent Radio Manufacturers, Inc., marks the first important step forward in the clearing of the atmosphere surrounding the many patents and counter-patents clouding the Radio horizon today.

Will Protect Selves

"At the request of a number of important Radio manufacturing concerns," said Mr. Russ, "the Independent Radio Manufacturers, Inc., was organized to join various Radio interests into a common cause, for defense or offense in connection with the Radio patent situation. Stock is held in equal shares by all the members and the cause of one becomes the cause of all.

"Of course, any action by the group is subject first to the approval of the board of directors, and it is very likely," continued Mr. Russ, "that in the event of patent dispute between members of the organization, such differences could in all probability be arbitrated or some other friendly settlement arrived at.

Will Aid Engineering Development

"The advantages of concerted action are not limited to the division of expense alone," stated Mr. Russ. "For example, the Radio engineering talent represented by the various members of the Independent Radio Manufacturers, Inc., is such that much more technical data on the history of various inventions and important anticipatory material is available to the group in a manner which would be possible in no other way. This information may at any time prove invaluable to some one member in need."

When inquiry was made in regard to new members joining the group, Mr. Russ stated that many new names have been submitted to membership acceptance and will, in all probability, be acted upon in the near future. Many manufacturers of Radio apparatus, learning of the advantages to the industry offered by the organization, are desirous of joining.

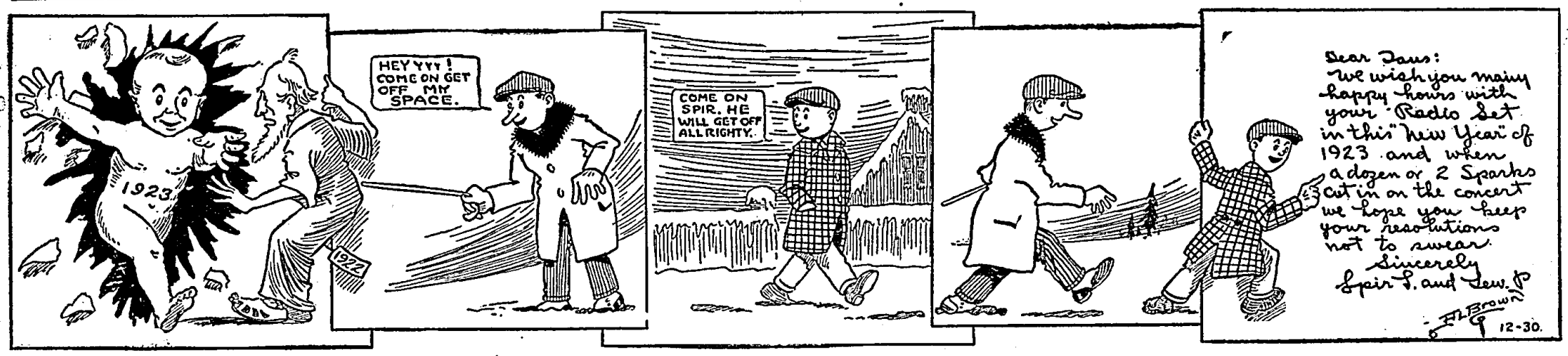
In a recent interview, William Dubilier, well-known independent manufacturer of high-grade condensers, said emphatically that he was not in favor of a Radio monopoly, although there had been some talk about the subject. In fact, he said, he did not see just how a monopoly might be secured inasmuch as the patents were divided among so many people.

Radio Good Turn Is Price of Chair in "Bug" Clan

KANSAS CITY, MO.—WHB, the Sweeney Automobile School of this city, known as "The Heart of America" gave an innovation recently when they began their Radio Bug talks, asking for charter members of the "bug" clan. According to the announcer the only requirement to be a charter member is that you do a good Radio turn at least once. This may consist in taking a set somewhere where it can do some good—where there have not been listeners in, or donating sufficient money to buy a small Radio set for someone who is a shut-in.

An aerial 50 to 75 feet long will permit of much sharper tuning of the receiving circuits than an antenna several hundred feet long.

THE ANTENNA BROTHERS — Spir L. and Lew P. — Stick in Some New Tubes



CHAMBER ACTS TO END CHAOS IN AIR

WOULD RELIEVE INDUSTRY OF HANDICAPS

Plan to Organize Sub Centers to Fight for Improved Broadcasting Situation

NEW YORK.—Plans are under way to solve the problems of broadcasting, which are seriously handicapping the usefulness of the Radio industry, it is announced by the National Radio Chamber of Commerce. Completion of the chamber's executive personnel which will direct the carrying out of these plans was also made known.

Regional Radio chambers will be established in many cities, constituting a network of organization linking up with the central chamber in New York, which will work with the Department of Commerce, the Bureau of Standards, the Navy Department and all other interests from broadcaster to listener in an effort to harmonize on a nationwide scale all Radio instrumentalities.

Discuss Chicago Chamber

The first step in the organization of regional chambers was taken last week in Chicago, when establishment of a Chicago chamber was discussed at the Union League Club. Kenneth P. Gregg, of New York, represented the national chamber at this conference. William H. Davis heads the national chamber as president. Harold J. Power, of Medford Hillside, Mass., is vice-president, and the secretary is George E. Lewis, of New York. Cloyd Marshal, of New York, has been chosen treasurer and Gregg & Gregg, engineers and managers.

The following board of governors has been elected: Alfred H. Grebe, of Richmond Hill, N. Y.; C. B. Cooper, of New York; Alfred P. Morgan, of Upper Montclair, N. J.; Byron L. Moore, of Buffalo, N. Y.; James R. Crawford, of Long Island City, N. Y.; Howden Washington, of New York, and Gordon Sleeper, of New York.

UNCLE SAM'S RECORD OF AMATEURS READY

Official Booklet, Now on Sale, Gives All Data

WASHINGTON.—"Amateur Radio Stations of the United States, edition of June 30, 1922," is now ready for distribution. Applications should be made to the Superintendent of Documents, Government Printing Office. The price is 25 cents, which should be sent as certified checks, express or postal money order or non-defaced coins. The publication contains 300 pages and records 15,504 amateurs licensed up to June 30, 1922. Their calls, address and power, together with special licenses issued to training schools and experimenters, are given.

KYW Reaches Out 3,700 Miles

CHICAGO.—Westinghouse Station KYW of Chicago sends its musical programs a long way from home. This was evidenced recently on receipt of a letter from T. L. Haire, Radio operator aboard the S. S. Stuart Dollar, cruising in the southern Pacific. Haire tuned in KYW's 8 o'clock concert when approximately 3,700 miles airline from Chicago.

Hoover Warns of Great Need for Wider Federal Powers Over Radio

"Foster-Father of Airphones" Points to Peril In Present Free Rein—"What Ails 'Pigeon-holed' White and Kellog Bills?" Radiophans Ask

By Carl H. Butman

WASHINGTON.—The extension of the regulatory powers of the Department of Commerce over Radio is imperative says Secretary Hoover, who has become a sort of foster-father to Radio. Otherwise the development of the Radio art will be greatly retarded, he explains. The sudden increase of Radio telephone broadcasting during the last seven months of the fiscal year from 5 to 382 transmitting stations, and the increase from about 200,000 to 1,500,000 receiving stations, resulted in so much interference between sending stations that the destruction of the usefulness of this very important invention was threatened.

A conference of experts, manufacturers, and government, public and amateur representatives, which was called by Mr. Hoover in February, unanimously recommended the immediate extension of the regulatory powers of the Government and drafted a set of technical provisions for submission to Congress.

What Ails White and Kellogg Bills?

Identical Radio bills were introduced in the two houses of Congress last session by Senator Kellogg and Representative White, but they are apparently "pigeonholed," awaiting, perhaps, the demand of the Radio public itself before any action will be taken. Department of Commerce officials handling Radio matters have cherished the hope that early action would be forthcoming for some time and continued to license all broadcasters every three months, while awaiting a definite law. New legislation would aid the Secretary of Commerce in enforcing the laws and bring about a more satisfactory condition for both operators and fans, they point out.

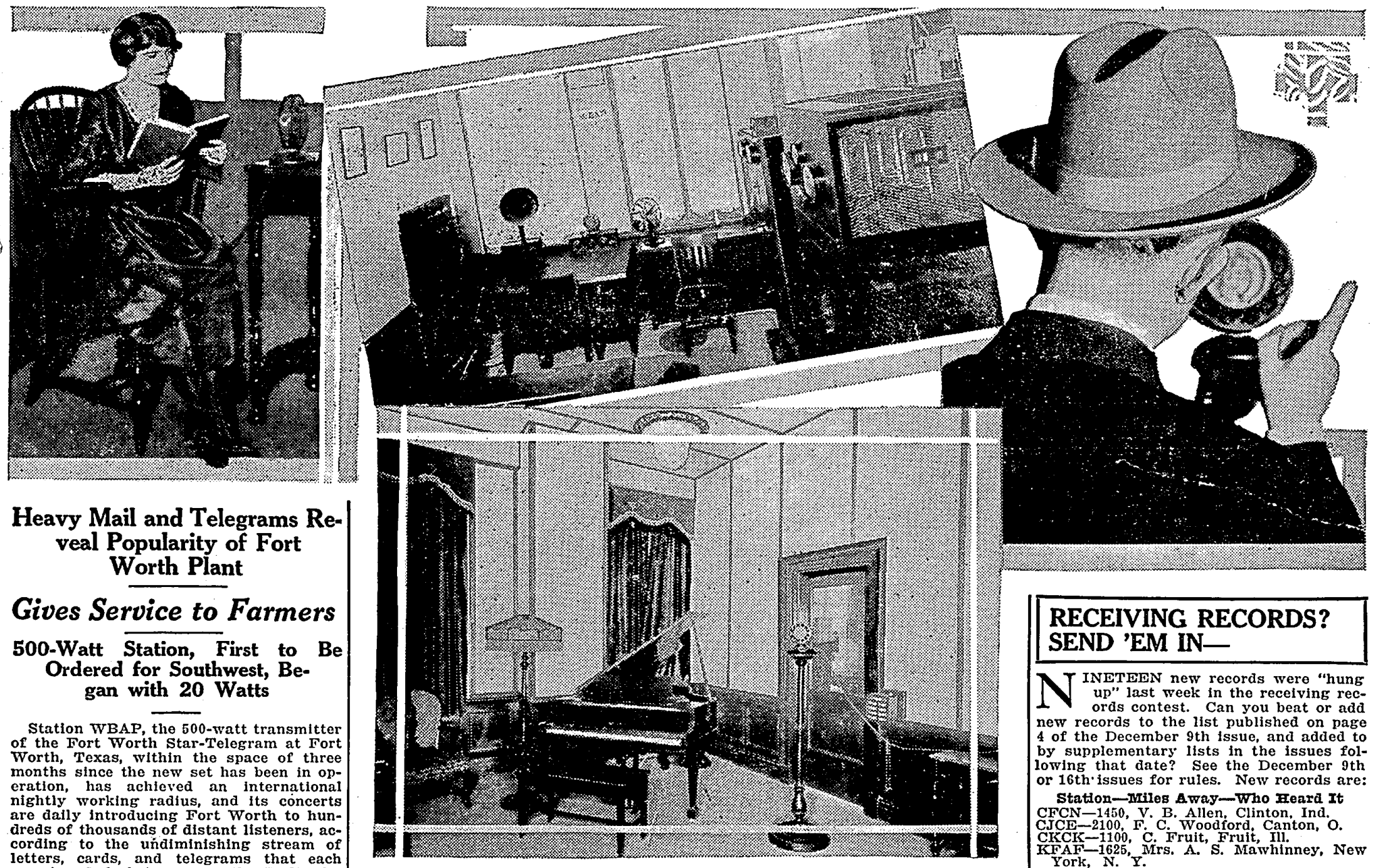
Authority for the appointment of the advisory committee of six Governmental and six outside civilian members, would assist the Secretary in reassigning definite wave lengths and in the allotment of more bands for commercial and private uses. Congressman White's bill is expected to be pushed but action is not assured this session.

Assignment of Waves Hoped For

Recommendations of the Radio conference were for one exclusive governmental broadcasting wave band, two bands for private and toll broadcasting, and four for use by both Government and private broadcasters, which would give such transmitting stations broader scope and prevent interference to a great degree. Today only two public broadcasting waves are available, 360 and 400 meters, while the Government wave is 485, confining a very large amount of matter broadcasted by many stations to only three wave lengths, and necessitating time schedules and silent periods. The assignment of waves under these recommendations, as well as other technical problems, would devolve upon the advisory committee. It is very likely that Secretary Hoover would secure the aid of the present Interdepartmental Radio Committee, or at least six of these technical experts as the Governmental representatives on his new committee.

Another feature planned if new legislation is secured is to make the wave band between 600 and 1,600 meters, now assigned for Governmental use, available to commercial and public stations.

WBAP WAVES COVER 4,000 MILES



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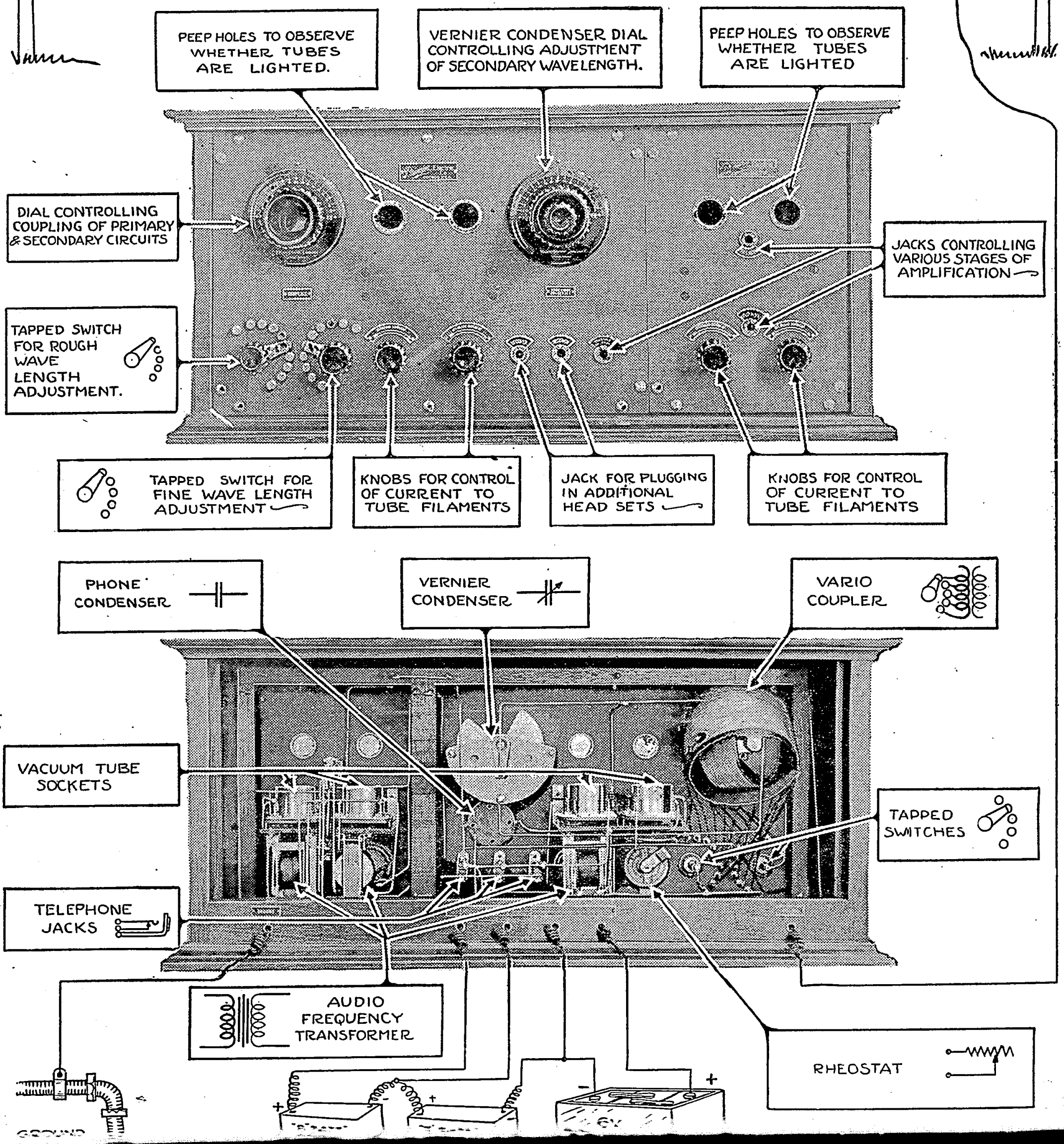
Radio Receiving Sets

Premier Detector and Three Step Amplifier

As the sixteenth of the series of standard receiving sets, Radio Digest presents herewith the Premier Detector Three Step Amplifier receiving set, manufactured by the Premier Electric Company of Chicago, Ill. This receiving unit employs the use of a detector and three stages of audio frequency amplification and is non-regenerative.

Full installation and operation instructions will be found on page 6. Although the amateur may not possess this particular make of apparatus, it will be well for him to study the diagram and instructions carefully. The numerous points of similarity in standard types of receiving sets will enable the amateur to materially benefit.



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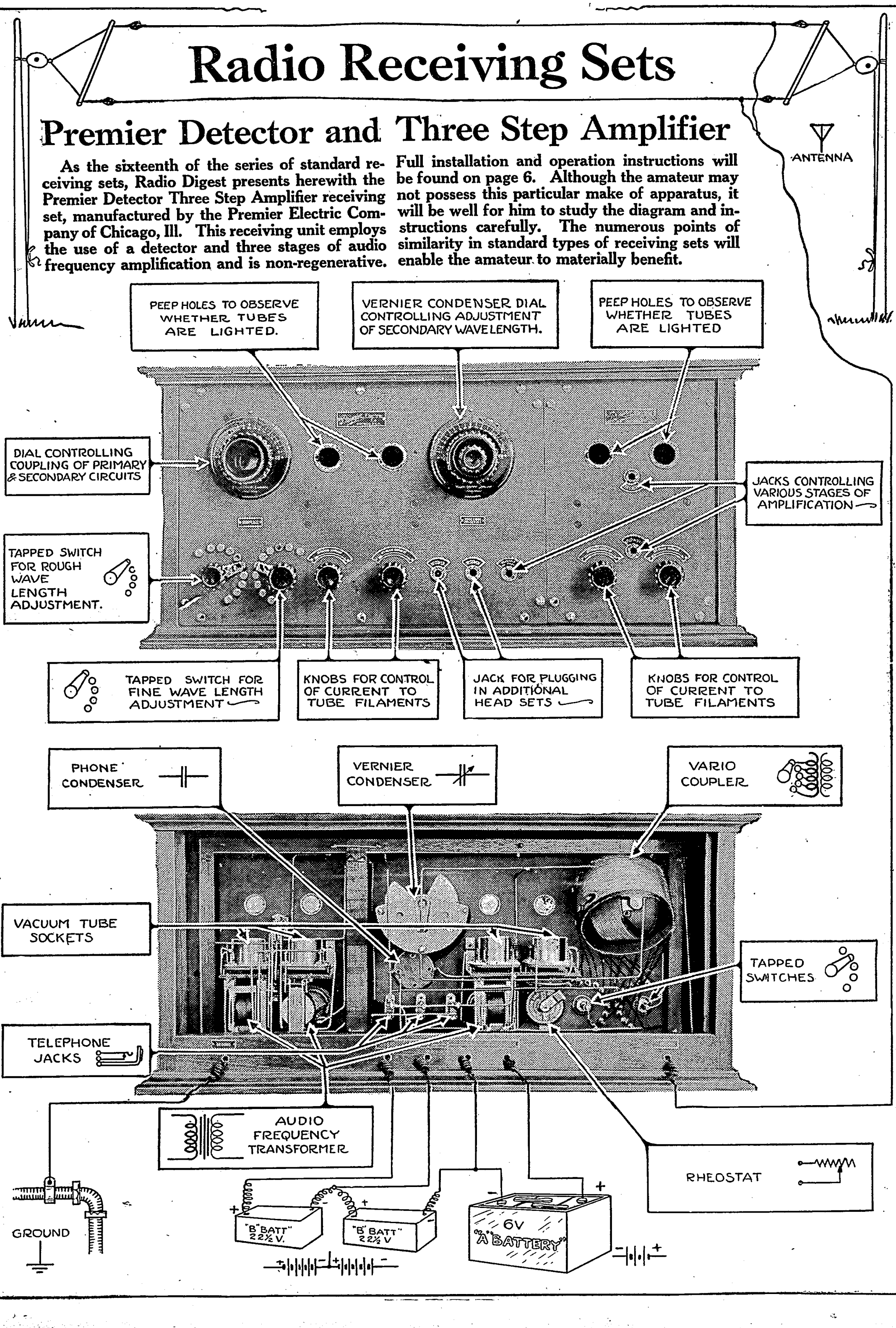


Radiophone Broadcasting Stations

Corrected Every Week—Part III

State, City, Call

Alabama:
Auburn, WMAV
Birmingham, WOAY, WSY
Mobile, WEAP
Montgomery, WKAN

Arizona:
Phoenix, KDYW, KFAD, KFCB
Tucson, KDZA, KFDH

Arkansas:
Fort Smith, WCAC, WGAR
Little Rock, WCAV, WEAX
Pine Bluff, WOK

California:
Altadena, KGO
Bakersfield, KDZB, KYI
Berkeley, KQI, KRE
Del Monte, KLN
El Monte, KUY
Eureka, KNI
Fresno, KDZH, KMJ
Glendale, KFAC
Hanford, KFBD
Hollywood, KFAR
Long Beach, KSS
Los Angeles, KDZF, KDZP, KFCL KFI, KHJ, KJS, KNN, KNV, KOG, KUS, KWH, KXS, KYJ
Modesto, KXD
Oakland, KFBN, KLX, KZM
Pasadena, KDYR, KLB
Reedley, KMC
Sacramento, KFBK, KVQ
San Diego, KDPT, KDYM, KDYO, KFBC, KFFA, KON, KYF
San Francisco, AG1, KDN, KDZG, KDZW, KDZX, KFDB, KLP, KLS, KPO, KSL, KUO, KZY
San Jose, KFAQ, KQW,
San Luis Obispo, KFBE
Santa Ana, KFAW
Stanford Univ., KFGH
Stockton, KJQ, KWG
Sunnyvale, KJJ
Taft, KFEB

Colorado:
Boulder, KFAJ
Colorado Springs, KFBV, KFCK, KHD
Denver, DD5, DN4 KDZQ, KFAF, KFDL, KLZ
Trinidad, KFBS

Connecticut:
Bridgeport, WKAX
Greenwich, WAAQ
Hartford, WDAK
Middleton, WOAS
New Haven, WCJ, WGAH, WPAJ

Delaware:
Wilmington, WHAV, WOAT

District of Columbia:
Anacostia, NOF
Washington, WDM, WEAS, WHAQ, WIL, WIAY, WJH, WMU, WPM, WWX, 3YN

Florida:
Jacksonville, WDAL
Miami, WFAW, WIAZ
Pensacola, WGAN, WLAV
Tampa, WDAE, WEAT, WHAW
West Palm Beach, WKAH

State, City, Call

Georgia:
Atlanta, WGM, WSB
College Park, WDAJ
Decatur, WAAS
Gainesville, WKAY
Macon, WGAK, WMAZ
Savannah, WHAO

Idaho:
Boise, KFAU, KFBJ, KFDD
Lewiston, KFBA
Moscow, KFAN
Wallace, KFCC

Illinois:
Belvidere, WOAG
Chicago, KYW, WAAF, WBU, WDAP, WGAS, WJAZ, WMAQ, WNAJ, WPAD, WQX
Decatur, WBAO, WCAP, WHAP
Mattoon, WQAL
Peoria, WJAN
Quincy, WCAW, WCAZ
Rockford, WIAB, WJAH
Springfield, WDAC
Tuscola, WDZ
Urbana, WRM

Indiana:
Anderson, WEAW
Evansville, WNAM, WOAU
Fort Wayne, WFAS
Greencastle, WLAX
Huntington, WHAY
Indianapolis, WLK, WOH
Marion, WIAQ
Mishawaka, WBAQ
Muncie, WJAF
Richmond, WOZ
South Bend, WGAZ
Terre Haute, WEAC
West Lafayette, WBAA

Iowa:
Ames, WOI
Burlington, WIAS
Cedar Rapids, WJAM, WKAA
Centerville, WDAX
Council Bluffs, WPAF
Cresco, WNAG
Davenport, WHAI, WOC
Des Moines, WGF, WHX
Dubuque, WQAK
Fort Dodge, WEAB
Iowa City, WHAA
Le Mars, WIAU
Marshalltown, WLAR
Newton, WIAH
Shenandoah, WGAJ
Sigourney, WOAD
Sioux City, WEAU, WHAE
Vinton, WIAE
Waterloo, WHAC, WMAR, WRAN

Kansas:
Anthony, WBL
Atwood, WEAD
Beloit, WPAR
Eldorado, WAH
Emporia, WAAZ
Hutchinson, WLAS
Independence, WFAY
Liberal, WMAG
Manhattan, WNAK, WTG
Parsons, WOAJ
Salina, WFAD
Topeka, WJAQ, WPAM
Wichita, WAAP, WEAH, WEY

Kentucky:
Bowling Green, WNAB
Frankfort, WOAK
Louisville, WHAS, WKAG, WLAP, 9ARU
Paducah, WIAR
Waco, WPAA

State, City, Call

Louisiana:
New Orleans, WAAB, WAAC, WCAG, WGV, WIAF, WWL
Shreveport, WDAN, WGAQ

Maine:
Auburn, WMB
Houlton, WLAN
Portland, WJAL
Sanford, WFAR

Maryland:
Baltimore, WCAO, WEAR, WKC, WNAY

Massachusetts:
Boston, WAAJ, WFAU, WNAC
Dartmouth, WMAF
Medford Hillside, WGI
New Bedford, WDAU
Springfield, WBZ
Worcester, WCN, WDAS

Michigan:
Ann Arbor, WMAX
Bay City, WTP
Dearborn, WWI
Detroit, KOP, WCX, WWJ
East Lansing, WKAR
Flint, WEAA
Kalamazoo, WCAP, WLAQ
Lansing, WHAL
Saginaw, WIAW

Minnesota:
Duluth, WJAP, WMAT
Hutchinson, WFAN
Minneapolis, WBAH, WCAS, WLAG, WLB
Northfield, WCAL
St. Cloud, WFAM
St. Paul, WAAH

Missouri:
Butler, WNAR
Cameron, WFAQ
Columbia, WAAN
Independence, WPAG
Jefferson City, WOS
Joplin, WHAH, WJAC
Kansas City, WDAF, WHB, WMAJ, WOQ, WPE
Marshall, WJAT
Rockport, WMAD
St. Joseph, WEAK
St. Louis, KSD, WCK, WEB, WEW, WMAY
Springfield, WIAI, WKAS, WQAB
Tarkio, WIAT
Webster Grove, WOAL

Montana:
Billings, KFCH
Butte, KFAP
Great Falls, KDYS
Havre, KFBB
Polytechnic, KFED

Nebraska:
David City, WRAR
Fremont, WOAE
Hastings, WKAM, WLAD
Lincoln, WFAV, WGAT, WIAX, WJAB, WKAC, WLAF, WMAH, WQAP, WSAS
Norfolk, WJAG
Omaha, WAAW, WCAW, WDV, WIAK, WNAL, WOU, WOV
Rushville, WEAV
Tecumseh, WTAU
University Place, WCAJ
Waco, WPAA

State, City, Call

Nevada:
Reno, KDZK, KFAS,

New Hampshire:
Laconia, WKAV

New Jersey:
Atlantic City, WHAR
Camden, WRP
Deal Beach, 2XJ
Jersey City, WAAT, WNO
Moorestown, WBAF
Newark, WAAM, WBS, WJZ, WOR, 2XAI
N. Plainfield, WEAM
Ocean City, WIAD
Paterson, WBAN
Roselle Park, WDY
Trenton, WMAL, WOAX

New Mexico:
Roswell, KNJ
State College, KOB

New York:
Albany, WNJ
Binghamton, WIAV
Buffalo, WGR, WWT
Canton, WCAD
Cazenovia, WMAC
Ithaca, WEAI
Lockport, WMAK
Newburgh, WCAB
New York, KDOW, WBAY, WDT, WEAF, WJX, WLAW, WWZ
Poughkeepsie, WFAF
Rochester, WHAM
Ridgewood, WHN
Schenectady, WGY, WRL, 2XI
Syracuse, WBAB, WDAI, WFAB, WLAH, WNAN
Tarrytown, WRW
Troy, WHAZ
Utica, WSL
Waterford, WFAG

North Carolina:
Asheville, WFAJ
Charlotte, WBT
Raleigh, WLAC

North Dakota:
Fargo, WDAY, WPAK
Grand Forks, WOAB
Wahpeton, WMAW

Ohio:
Akron, WOE
Athens, WAAV
Canton, WWB
Cincinnati, WAAD, WHAG, WIZ, WLW, WMH
Cleveland, KDPM, WHK, WJAX
Columbus, WBAV, WCAH, WEAO, WMAN, WPAL
Dayton, WAI, WFO, WJAJ
Defiance, WCAQ
Fairfield, WL-2
Granville, WJD
Hamilton, WBAU, WRK
Lebanon, WPG
Lima, WOAC
Marietta, WBAW
Springfield, WLAM, WNAP
Stockdale, WJAK
Toledo, WBAJ WJK
Warren, WLAZ
Washington C. O., WGAX
Wooster, WGAU
Youngstown, WAAY, WMC

State, City, Call

Oklahoma:
Ardmore, WOAA
Enid, WNAF
Muskogee, WDAV
Norman, WNAD
Okemah, WKAK
Oklahoma City, WKY, WMAB
Okmulgee, WPAC
Tulsa, WEH, WLAL

Oregon:
Astoria, KFBM, KFGG
Corvallis, KFDJ
Eugene, KFAT
Hood River, KQP
Marshfield, KFBH
Medford, KFAY
Pendleton, KFFE
Portland, KDYQ, KFEC, KGG, KGN, KGW, KQY
Salem, KFCD

Pennsylvania:
Altoona, WGAW
Bridgeport, WBAG
Brownsville, WDAQ
Clearfield, WPI
Crafton, WAAX
Easton, WMAP
Erie, WOAV, WSX
Grove City, WSAJ
Johnstown, WTAC
Lancaster, WGAL
McKeesport, WIK
Parkesburg, WQAA
Philadelphia, WCAU, WDAR, WFI, WGL, WIP, WNAT, WOO, WPJ
Pittsburgh, KDKA, KQV, WCAE, WHAF, WJAS
Scranton, WLAO, WRAY
State College, WPAB
Villanova, WCAM
Wilkes-Barre, WBAX, WKAZ, WNAH

Rhode Island:
Cranston, WKAP
Edgewood, WEAG
East Providence, WKAD
Providence, WEAN, WJAR

South Carolina:
Charleston, WFAZ, WNAQ, WOAH
Orangeburg, WGAM

South Dakota:
Rapid City, WCAT
Sioux Falls, WFAT
Vermillion, WEAJ
Yankton, WAJU, WNAX

Tennessee:
Knoxville, WNAV
Lawrenceburg, WOAN
Memphis, WKN, WPO

Texas:
Abelene, WQAQ
Amarillo, WDAG, WRAU
Austin, WCM, WNAS
Beaumont, WMAM
College Station, WTAW
Dallas, WDAO, WFAA, WRR
El Paso, WDAH, WPAT
Fort Worth, WBAP, WPA
Galveston, WHAB, WIAC
Houston, WCAK, WEAY, WEV, WGAB, WPAN, WRAA, WSAV
Laredo, WWAX
Orange, WKAL
Port Arthur, WFAH
San Antonio, AS6, DM7, WCAR, WJAE, WOAI
Stanford, WOAZ
Tyler, WOAF
Waco, WJAD, WLAJ, WWAC
Wichita Falls, WKAF

State, City, Call

Utah:
Ogden, KDZL
Salt Lake City, KDYL, KDYV, KZN

Vermont:
Bellows Falls, WLAK
Burlington, WCAX

Virginia:
Blacksburg, WEAE
Fortress Monroe, WNAW
Portsmouth, WOAQ

Washington:
Aberdeen, KNT
Bellingham, KDZR
Centralia, KDZM
Everett, KDZZ, KFBL
Lacey, KGY
Pullman, KFAE
Seattle, KDZE, KDZT, KFC, KHQ, KJR, KTW, KZC
Spokane, KFDC, KFZ
Tacoma, KFBG, KFEJ, KGB, KMO
Walla Walla, KFCF
Wenatchee, KDZI, KZV
Yakima, KFV

West Virginia:
Charleston, WAAO
Clarksburg, WHAK
Huntington, WAAR
Morgantown, WHD

Wisconsin:
Beloit, WKAW
Kenosha, WOAR
Madison, WGAY, WHA
Milwaukee, WAAK, WCAY, WHAD, WIAO
Neenah, WIAJ
Superior, WFAC
Waupaca, WIAA, WPAH

Wyoming:
Casper, KFCQ, KFDF
Laramie, KFBU

Alaska:
Fairbanks, WLAY

Hawaii:
Honolulu, KDYX, KGU, KYQ

Porto Rico:
Ensenada, WGAD
San Juan, WKAQ

Canada:
Calgary, CHBC, CHCQ, CFAC, CFCN, CJCY
Edmonton, CHCC, CJCA
Fort Frances, CFPC
Halifax, CFCE, CJCS
Hamilton, CKOC
Iroquois Falls CFCH
Kitchener, CJCF
London, CFCX, CHCS, CJGC, CKQC
Montreal, CFCF, CHYC,
Montreal, CFCF, CFZC, CHCX, CHYC, CJBC, CKAC, CKCS
Nelson, CJCB
Ottawa, CHXC
Regina, CKCK
St. John, CJCI, CKCR
Toronto, CFCA, CFTC, CHCB, CHCZ, CHVC, CJCD, CJCH, CJCN, CJSC, CKCE, CKCZ, CKKC
Vancouver, CFCB, CFYC, CHCA, CHOC, CJCE, CKCD
Walkerville, CFCI
Winnipeg, CHCF, CJCG, CKCB, CKZC, CJNC

Cuba:
Havana, PWX

(NOTE.—The third and last part of the schedule list appears below. Next week the first part will appear.)

WLW, Cincinnati, O. 485 also. 500 mi. Crosley Mfg. Co. Daily ex Sun, 10 am-3 pm, music, reports. Tues, Thur, Fri, 8-10:30 pm, music, news. Sun, 11 am, church service. Central.

WMA, Anderson, Ind. 25 mi. Arrow Radio Lab. Mon, Wed, Fri, 7:30-8:30 pm, concert, news, etc. Central.

WMAB, Oklahoma City, Okla. 500 mi. Radio Supply Co. Daily ex Sun, 9:30-10:30 pm, music. Fri, 11:30-12:30 pm. Central.

WMAC, Cazenovia, N. Y. 330, 250, 275 only. 500 mi. C. B. Meredith. No definite schedule.

WMAD, Rock Port, Mo. Atchinson County Mail.

WMAF, Dartmouth, Mass. Round Hills Radio Corp.

WMAG, Liberal, Kan. 75 mi. Tucker Elec. Co. Daily ex Fri, Sun, 7:30-8:30 pm, music, news. Fri, 8-9 pm, concert. Central.

WMAH, Lincoln, Neb. 100 mi. General Supply Co. Daily ex Sun, 2:15 pm, music, news. Mon, Wed, Thur, 7:30 pm, music. Sun, 2:30, music, news. Central.

WMAJ, Kansas City, Mo. 485 also. 600 mi. Daily Drovers Telegram. Daily ex Sun, 8:15 am, 9:15, 10:15, 11:15, 1:15 pm, 2:30, weather, markets. Central.

WMAK, Lockport, N. Y. Norton Labs.

WMAL, Trenton, N. J. 100 mi. Trenton Hdwe. Co. Mon, Thur, 7:30-9 pm, music, lecture. Eastern.

WMAM, Beaumont, Tex. Beaumont Radio Equipment Co

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

WMAP, Easton, Pa. Utility Battery Service.

WMAQ, Chicago, Ill. 1,500 mi. Chicago Daily News. Daily, 7-7:30 pm, 9:30-10. Central.

WMAR, Waterloo, Iowa. Waterloo Electrical Supply Co. Schedule not established.

WMAT, Duluth, Minn. Paramount Radio Corp.

WMAV, Auburn, Ala. Ala. Polytechnic Inst.

WMAW, Wahpeton, N. D. 50 mi. Wahpeton Elec. Co. Daily, 7-7:30 pm, music, sports, news. Central.

WMAX, Ann Arbor, Mich. K. & K. Radio Supply Co.

WMAY, St. Louis, Mo. 1,000 mi. Kingshighway Presbyterian Church. Sun, 11 am, 8 pm, church services. Central.

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

WMB, Auburn, Me. Auburn Elec. Co.

WMC, Youngstown, O. 500 mi. Columbia Radio Co. Mon, Wed, Fri, Sat, 8:30-9:45 pm, concert, address etc. Eastern.

WMH, Cincinnati, O. 485 only. 500 mi. Precision Equipment Co. Daily ex Sun, 11 am, 4 pm, reports. Mon, Wed, Sat, 8:15 pm, entertainment. Central.

WMU, Washington, D. C. 100 mi. Doubleday-Hill Elec. Co. Daily, 4:30 pm, concert, sports. Thurs, 8:9, concert. Eastern.

WNAB, Bowling Green, Ky. 200 mi. W. H. Riley. Daily ex Tues, 4-5 pm, 7:30-9, music. Central.

WNAC, Boston, Mass. 200 mi. Shepard Stores. Daily ex Sun, 4-5 pm, dance music. Mon, Tues, Thur, 10-11 pm, concert. Wed, Fri, Sat, 7-8 pm, 8-9, concert. Sun, 11-12 am, 6:30-8:30 pm, church service. Eastern.

WNAD, Norman, Okla. 200 mi. Okla. Radio Engineering Co. Daily ex Sun, 7:45-8:15 pm, news. Central.

WNAF, Enid, Okla. Enid Radio Dist. Co.

WNAG, Cresco, Ia. Rothert Radio and Electric Shop.

WNAH, Wilkes-Barre, Pa. Wilkes-Barre Radio Repair Shop.

WNAJ, Chicago, Ill. Benson Co.

WNAK, Manhattan, Kans. Manhattan Radio Supply Co.

WNAL, Omaha, Neb. R. J. Rockwell.

WNAM, Evansville, Ind. 200 mi. 485 also. Ideal Apparatus Co., Inc. Mon, Wed, Fri, Sat, 10-11 am, music, reports; 3-4 pm, 7-8, entertainment. Sun, 3-4 pm, music. Central.

WNAN, Syracuse, N. Y. Syracuse Radio Telephone Co.

WNAQ, Charleston, S. C. Charleston Radio Elec. Co.

WNAP, Springfield, O. 200 mi. Wittenberg College.

WNAR, Butler, Mo. C. C. Rhodes.

WNAS, Austin, Tex. Tex. Radio Corp. (Austin Statesman).

WNAT, Philadelphia, Pa. 500 mi. Lennig Bros. Co. Daily ex Sun, 12:15-1 pm, Wed, Sat, 7:30-9:30 pm. Sun, 2:30 pm, 4:30, church services. Eastern.

WNAV, Knoxville, Tenn. People's Tel. & Telg. Co.

WNAW, Fortress Monroe, Va. Henry Kunzmann.

WNAX, Yankton, S. D. Dakota Radio Apparatus Co.

WNAY, Baltimore, Md. Shipowners Radio Service.

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

WNO, Jersey City, N. J. Wireless Telephone Co of Hudson Co., N. J.

WOAA, Ardmore, Okla. Dr. Walter Hardy.

WOAB, Grand Forks, No. Dak. 50 mi. 485 also. Valley Radio. Daily ex Sun, 10-11 am, 2-2:30 pm, entertainment, reports. Sun, 3-4 pm, music, church service. Central.

WOAC, Lima, O. Maus Radio Co.

WOAD, Sigourney, Ia. Friday Battery & Elec. Co.

WOAE, Fremont, Nebr. Midland College.

WOAF, Tyler, Tex. Tyler Commercial College.

WOAG, Belvidere, Ill. Apollo Theatre.

WOAH, Charleston, S. C. Palmetto Radio Corp.

WOAI, San Antonio, Tex. 485 also. 1,000 mi. Southern Equip. Co. Daily ex Sun, 10:30 am, 12:15 pm, 3, 6, news, markets. Wed, 7:30-8:30 pm, concert. Sun, 7-8:30 pm, concert. Central.

WOAJ, Parsons, Kans. Ervin's Elec. Co.

WOAK, Frankfort, Ky. Collins Hardware Co.

WOAL, Webster Grove, Mo. William E. Woods.

WOAN, Lawrenceburg, Tenn. 500 mi. J. D. Vaughan. Daily, 8-9 pm, concert. Central.

WOAQ, Portsmouth, Va. Portsmouth Radio Assn.

WOAR, Kenosha, Wis. H. P. Lundskow.

WOAS, Middletown, Conn. Bailey's Radio Shop.

WOAT, Wilmington, Del. Boyd Martell Hamp.

WOAU, Evansville, Ind. Sowder Bowling Piano Co.

WOAV, Erie, Pa. Penna. Nat'l Guard.

WOAX, Trenton, N. J. Franklin J. Wolff.

WOAY, Birmingham, Ala. John W. Wilder.

WOAZ, Stanford, Tex. Penick Hughes Co.

WOC, Davenport, Ia. 400 and 485 only. 500 mi. Palmer School of Chiropractic. Daily ex Sun, 10:55 am, time; 11, weather; 12 m, chimes; 1:30 pm, markets; 3:30, talk; 5:45, chimes; 6:30, sports; 7, concert. Sun, 9 am, chimes; 1 pm, 6, concert; 7, church service; 8, concert. Central.

WOE, Akron, Ohio. 100 mi. Buckeye Radio Service Co. Mon, Wed, Fri, 7-8:15 pm, music, agriograms, sports. Sat, 4-4:30 pm, music, sports. Eastern.

WOH, Indianapolis, Ind. 1,000 mi. Hatfield Elec. Co. (Indianapolis Star.) Daily ex Sun, 10-11 am, music; 10:15, financial, markets; 1-2 pm, music; 1:20, markets; 4-5 pm, music; 4:15, police notes; 4:50, sports. Mon, Wed, Sat, 8:30-10 pm, Concert. Central.

WOI, Ames, Ia. 485 also. 200 mi. Iowa State College. Daily ex Sun, 9:30 am, 12:45 pm, 9:30, music, weather. Central.

WOK, Pine Bluff, Ark. 485 also. 500 mi. Ark. Light & Power Co. Tues, Fri, 8-9:30 pm, concert. Sun, 10-12 am, 7-9 pm, church service. Central.

WOO, Philadelphia, Pa. 400 and 485 only. 500 mi. John Wanamaker.

WOQ, Kansas City, Mo. 485 also. 1,000 mi. Western Radio Co. Mon, Tue, Wed, Thur, 9:45 am, 10:55, 11:30, 12:30 pm, 2, 7:30, time signals, reports, etc. Fri, 1:15 pm, sacred service. Sat, 8 pm, concert. Sun, 7 pm, concert.

WOR, Newark, N. J. 400 only. 150 mi. L. Bamberger & Co. Daily ex Sun, 20 minutes on half hour from 10:30 am to 6:30 pm, miscellaneous. Eastern, daylight saving.

WOS, Jefferson City, Mo. 485 also. 1,500 mi. Mo. State Marketing Bureau. Daily ex Sun, 9:30 am, 11:30, 2 pm, weather, markets. Mon, Wed, Fri, 5 pm, markets, 8-9 pm, concert. Central.

WOV, Omaha, Neb. R. B. Howell.

WOU, Omaha, Neb. Metropolitan Utilities Dist.

WOZ, Richmond, Ind. 485 also. 300 mi. Palladium Printing Co. Daily ex Sun, 12-12:25 pm, 4-5, 6:30-7, music, markets. Central.

WPA, Fort Worth, Tex. 485 also. 500 mi. Fort Worth Record. Daily ex Sun, 11:30 am, 2:30-3 pm, 6-6:15, 7:15-7:30; 9-9:30, Sun, 3-3:30 pm, 6:30, Central.

WPAA, Waco, Neb. Anderson & Webster Elec. Co.

WPAC, Okmulgee, Okla. Donaldson Radio Co.

WPAB, State College, Pa. Pa. State College.

WPAD, Chicago, Ill. 1,000 mi. W. A. Wieboldt & Co. Daily ex Sun, 12:30-1:30 pm, 6:30-7, music. Central.

WPAF, Council Bluffs, Ia. Peterson's Radio Co.

WPAG, Independence, Mo. Central Radio Co., Inc.

WPAH, Waupaca, Wis. Wis. Dept. of Markets.

WPAJ, New Haven, Conn. Doolittle Radio Corp.

WPAK, Fargo, N. D. N. D. Agricultural College.

WPAL, Columbus, O. Superior Radio & Tel. Equip. Co.

WPAM, Topeka, Kans. Awerbach & Guettel.

WPAN, Houston, Tex. 300, 600 also. 50 mi. Levy Bros. Dry Goods Co. Daily ex Sun, 10:30-11 am, fashion talks, beauty hints. Central.

WPAR, Beloit, Kan. R. A. Ward.

WPAT, El Paso, Tex. St. Patrick's Cathedral.

WPE, Kansas City, Mo. 300 mi. Central Radio Co. Mon, Fri, Sun, 7:45 pm, concert. Sun, 8:15 pm, sermonette. Daily, afternoon, sports, scores. Central.

WPG, New Lebanon, Ohio. 485 also. 500 mi. Nushawg Poultry Farm. Daily ex Sun, 8-9 am, 3-4 pm, music, markets. Tues, Thur, Sat, 7:30-9:45 pm, music. Central.

WPI, Clearfield, Pa. Elec. Supply Co.

WPJ, Philadelphia, Pa. 30 mi. St. Joseph's College. Daily ex Sun, 2:30 pm, 8:30, sports, news. Sun, 10:45-12 noon, 7:45-8:30 pm, church service. Eastern.

WPM, Washington, D. C. 200 mi. Thos. J. Williams, Inc. (Washington Daily News.) Daily ex Sun, 12:30 pm, news. Mon, 8 pm, concert. Eastern.

WPO, Memphis, Tenn. 100 mi. United Equip. Co. Daily, 7:15-8:15 pm, music. Central.

WQAA, Parkesburg, Pa. 1,500 mi. Horace A. Beale, Jr. Two nights weekly, 10:05 pm. Eastern.

WQAL, Mattoon, Ill. Cole Tel. & Telg. Co.

WQAB, Springfield, Mo. Southwest Missouri State Teachers College.

WQAK, Dubuque, Ia. Appel-Higley Elec. Co.

WQAP, Lincoln, Nebr. Am. Radio Co.

WQAQ, Abilene, Tex. West Tex. Radio Co.

WQX, Chicago, Ill. Riverview Park, Walter A. Kuehl.

WRAA, Houston, Tex. Rice Institute.

WRAN, Waterloo, Ia. Black Hawk Elec. Co.

WRAR, David City, Nebr. Jacob Carl Thomas.

WRAU, Amarillo, Tex. Daily News.

WRAY, Scranton, Pa. 485 also. 100 mi. Radio Sales Corp. Daily ex Sun, 11 am, music; 12 m, reports; 3:30-5:30 pm, reports, music; 7:8:30, bedtime stories, music. Sun, 3 pm, chapel. Eastern.

WRK, Hamilton, O. 1,000 mi. Doron Bros. Elec. Co. Tues, Thur, 9-10:30 pm, music, lecture. Sun, 10:30 am, church service. Central.

WRL, Schenectady, N. Y. Union College Radio Club.

WRM, Urbana, Ill. 410 also. 300 mi. Univ. of Ill. Mon, Thur, 8:30-8:50 pm, 9-9:30, news, talks, music. Central.

WRP, Camden, N. J. 250 mi. Federal Inst. of Radio Telg. Daily ex Sat, Sun, 10-10:45 pm, music, news, agriograms. Eastern.

WRR, Dallas, Tex. 485 also. 200 mi. City of Dallas. Daily ex Sun, 12-12:30 pm, weather; 3-3:30, 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.

WRW, Tarrytown, N. Y. 500 mi. Koenig Bros. Daily ex Sun, 6:15-7 pm, 10:30-12. Mon, Wed, Sat, 5-5:30 pm. Tues, Fri, 2:30-3 pm. Sun, 1-3 pm. Eastern.

WSAJ, Grove City, Pa. Grove City College.

WSAS, Lincoln, Nebr. 485 also. 700 mi. Nebr. Dept. of Agri. Daily ex Sat pm and Sun, 9:30 am, 9:45, 10, 10:30, 10:45, 11, 11:30, 11:40, 11:50, 12 m, 1:15 pm, 1:30, 1:45, reports.

WSAV, Houston, Tex. 300 mi. C. W. Vick Radio Const'n. Co. Tues, Fri, 8-10 pm, concert, entertainment. Central.

WSB, Atlanta, Ga. 400 and 485 only. 1,500 mi. At-

(Continued on page 9)

STATION SCHEDULES

(Continued from page 8)

lanta Journal. Daily ex Sun, 12-1 pm, music; 2:30, reports; 4-4:45 pm, music, reports; 5-6 pm, 7-8, 10:45-12, music. Sun, 10:45 am, 5-6 pm, 7:30-9, church services. Central.

WSL, Utica, N. Y. 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.

WSN, Norfolk, Va. 100 mi. Shipowners Radio Service Inc. Mon, Wed, Sat, 8:15-9:30 pm, concert. Eastern.

WSX, Erie, Pa. 75 mi. Erie Radio Co. Tues, Thurs, Sat, 10-10:55 pm, news, concert, lecture. Sun, 12:15-1:30 pm, sermon. Eastern.

WSY, Birmingham, Ala. 500 mi. Alabama Power Co. Mon, Wed, Fri, 3-3:30 pm, 8-8:45, reports, concert. Sun, 8-9 pm, church service. Central.

WTAC, Johnston, Pa. Penn Traffic Co.

WTAU, Tecumseh, Neb. Ruegy Battery & Elec. Co.

WTAW, College Station, Tex. Agricultural and Mechanical College of Tex.

WTG, Manhattan, Kan. 485 only. 75 mi. Kan. State Agri. College. Daily ex Sun, 9:55 am, weather (code). Central.

WTP, Bay City, Mich. 75 mi. Ra-Do Corp. Mon, Wed, Fri, 1:30-2 pm, reports, news; 6:30-7:30 pm, concert. Central.

WWAC, Waco, Tex. 485 also. 200 mi. Sanger Bros. Daily ex Sun, 10 am, weather, 1:30 pm, music. Mon, Wed, Fri, 8:45 pm, music. Central.

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

WWB, Canton, O. Daily News Printing Co.

WWI, Dearborn, Mich. 200 mi. Ford Motor Co. Wed, 10-11 pm, music, lectures. Eastern.

WWJ, Detroit, Mich. 400 and 485 only. 1,500 mi. Evening News. Daily ex Sun, 9:30-9:40 am, household hints; 9:40-10:25, entertainment; 10:25-10:30 am, 11:55-12 m, 12:05-12:45 pm, reports, music; 3-3:30, music; 3:30-3:35, reports; 3:35-4:15, markets; 5-6, sports; 7:30-10, entertainment. Sun, November 11 and every other week, 11 am, 4 pm, church services. Sun, fill in weeks, 2 pm, 7:30, church services, special. Eastern.

WWL, New Orleans, La. Loyola Univ.

WWT, Buffalo, N. Y. 200 mi. McCarthy Bros. & Ford. Daily 3-4:30 pm, 7:30-9:30. Eastern.

WWX, Washington, D. C. 1,160 only. 600 mi. Post Office Dept. Daily ex Sun, 10 am, weather; 10:30, markets; 5 pm, 7:30, 8, markets; 9:50, weather. Eastern.

WWZ, New York City. 200 mi. John Wanamaker. Daily ex Sun, 1:15-2:15 pm. Tues, Fri, 7:30-8:30 pm. Eastern.

IXAD, Pawtuckett, R. I. Standard Radio & Elec. Co.

2XAI, Newark, N. J. Westinghouse Elec. & Mfg. Co.

2XI, Schenectady, N. Y. General Elec. Co. Test Call.

2XJ, Deal Beach, N. J. Amer. Tel. & Telg. Co.

3XW, Parkesburg, Pa. 378 only. 400 mi. Horace A. Beale, Jr. No definite schedule. Test station.

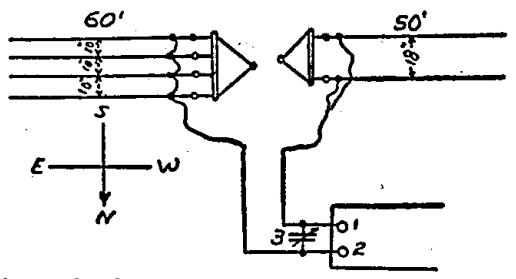
3YN, Washington, D. C. 100 mi. Nat'l Radio Inst. Daily ex Sun, 6:30-7:30 code practice, lecture. Eastern.

9ARU, Louisville, Ky. 200 only. 200 mi. Darrell A. Downard. Mon, Wed, 8 pm, police news, concert. Central.

(Note.—This completes the station schedule list. The first part will appear again next week.)

Use of Two Antennas

The illustration shows how to erect two antennas for use in tuning out a local station for long distance work. A great many distant stations were heard at the



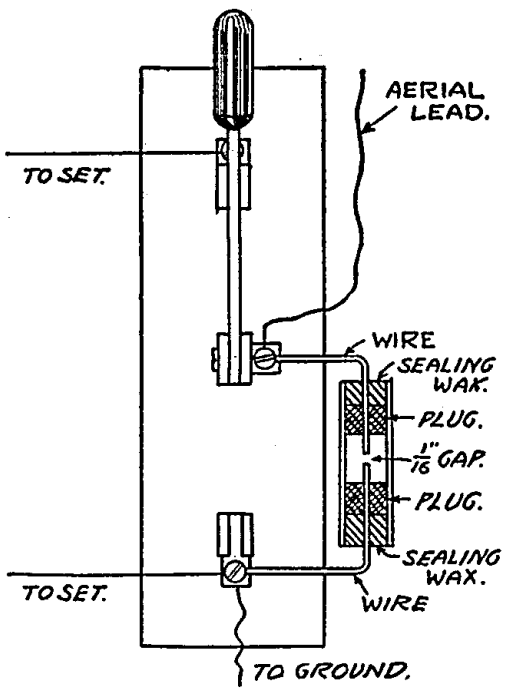
time of a broadcast at a local station one-half mile from my set. It is hooked up with standard antenna and ground. A 23 plate condenser was used at the connection marked 3 to tune out the local station. The numbers on the diagram represent: 1, the antenna; 2, the ground; 3, the condenser. The local station was directly south as indicated.—Jos. Harrison, Hartford, Conn.

Inductance Switch

I found by mounting a switch shaft and knob in combination with a heavy rubber washer mounted so as to tightly fit against my variable condenser dial, helped very much in tuning and also presented a neat appearance on the panel.—Dr. C. C. Reid, Little Rock, Ark.

Gap-Lightning Switch Aid to Forgetful One

Lightning arresters are of no service unless attention is given to turn the switch when the outfit is not in use. The illustration shows a lightning arrester that prevents any harm being done to the set in case the switch is forgotten. The usual lightning switch is a single pole double throw switch with the aerial connected to the blade clip. The set is connected to the upper clip and the ground to the lower clip.

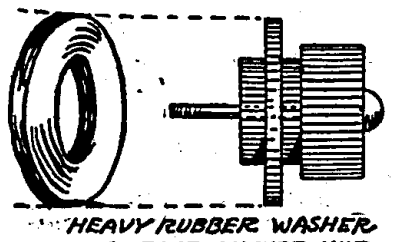


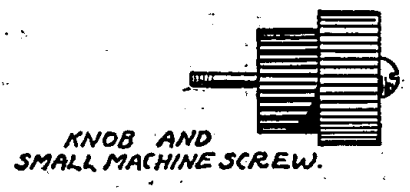
This lightning arrester is shunted across the blade and ground clips. It is made of glass or fiber tubing about ½ inch in diameter, slightly shorter than the distance between the clips where the arrester is to be used. Two small tight fitting plugs of wood are made and a short length of No. 14 bare copper wire is inserted in each plug. Push the plugs into the tube ends so that there remains a gap of 1/16 inch between the wire ends. This will allow the plugs to set down into the tube about ¼ inch. The space should be filled with sealing wax to make the arrester water proof.

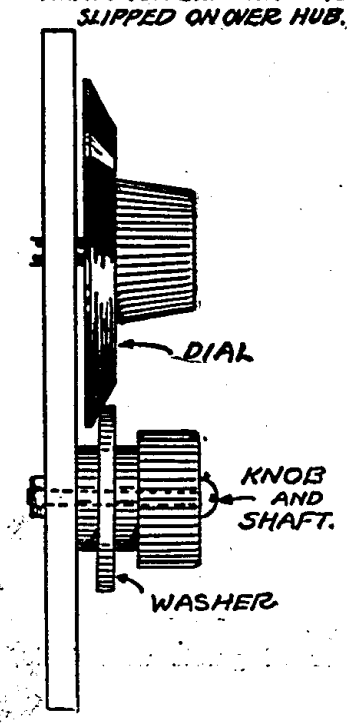
If a fiber tube is used, it may be necessary to bore a hole in the side to see the adjustment of the gap. If this is done the hole, when the arrester is finished, should be covered with a band of heavy wrapping paper, like a label. Then shellac the whole tube. Bend the wires at a right angle to the tube and make loops on the ends for connections. These loops are then fastened under the connecting screws of the switch clips and the arrester is complete. The illustration shows a cross section of the arrester and also the appearance of the arrester mounted on the switch.—Marion J. Estes, Kansas City, Mo.

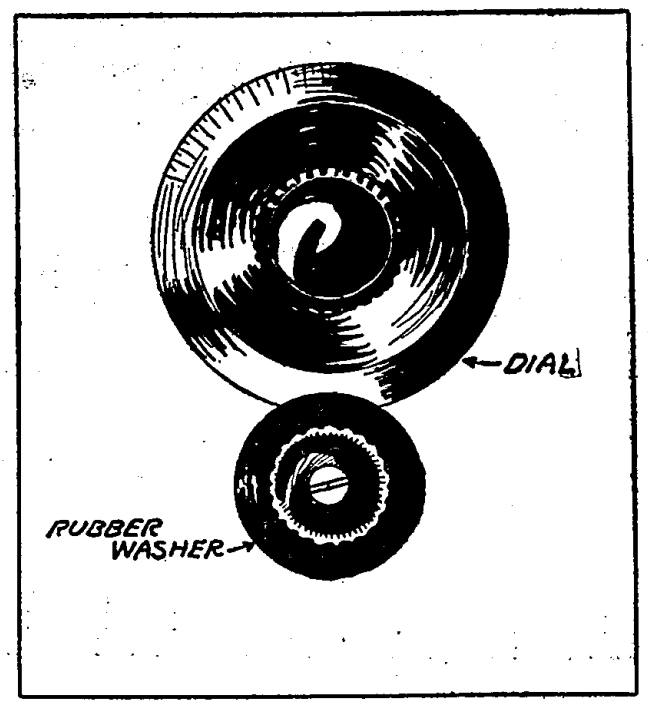
Body Capacity Removed

To eliminate the body capacity as much as possible I mounted my variometer about 4 inches from the panel and used longer shafts. As this did not entirely cut out the capicitance I procured some rubber tubing that would fit over the shaft tightly, cut out ¾-inch of the shafting and used the tubing as a coupling. This has been my only remedy for body capacity. Before doing this I was only able to pick up KYW, 225 miles, now I receive KDN, 2,015 miles, and many others. I use no amplification, just two variometers and a variocoupler.—C. Hackney, Fairmont, Ind.









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Inventors of Today

Monopolists Who Hog It Not Always Inventors

WHERE are the Edisons of today and the kind of persons who are a real service to mankind? An inventor does not always make a good business man, therefore it is usually whispered about that the real inventor was beaten out of his patents.

Many years ago there was the usual faker in the guise of a salesman who "sold county and state rights" on inventions. He had nothing to sell but clear space. Today we have the same fellow in a different makeup. He may have developed into the artistic type, wearing long "bobbed" hair and a big bow tie who would not be seen carrying a laundry package or some edibles for his home, but looks upon the common people as the class which "pays me."

Then again he may be of the regular swindler type that wants to get all he can "while the getting is good." A gold brick purveyor of this type tries to corner all things for his own advantage. He could not invent a hole in the ground, but by nefarious methods tries to beat the inventor out of his ideas and to make the masses pay for it. If he gets control, and the courts allow him to have it, he sells an article for many dollars that costs but a few cents to make. He is not satisfied with a fair profit but will pile up millions of dollars of your money.

Radio did not come about because of one fellow inventing something, but a multiplicity of ideas wrought out by various common people, and many of the youths of the country. There are various patents covering the different parts of the apparatus, but owing to some few basic patents issued long ago, which are expired, bands of persons of the "niffing" class have set about to get control of the patents which will, if they succeed, give them the privilege of closing up all manufacturing plants holding valuable patents or rights on other parts of the apparatus.

Some folks cannot stay at home and mind their own business, but must mix up with what the other fellow is doing, and, find it necessary to "choke" him before he grows beyond reach. If this class of persons really had the qualifications to become inventors, we would feel like taking our hats off to them, but to try and beat the fellow in the class from which the inventions come, causes a feeling which makes us grind our teeth.

Lure of the Distant Broadcasts

Stations Receive Few Replies from Local Fans

IT IS a peculiar fact that, no matter how good a local concert may be, a number of amateurs will not bother with local broadcasting, preferring to try for a distant station, even though that distant station may be broadcasting a lecture on bunions, or some similar subject not of interest to the hearer.

Some broadcasters request post cards of acknowledgment from its hearers and the fans will rain replies on them, whereas if a local station makes the same request, possibly one or two at the most will be received, and those will be grudging acknowledgments that the concert was good, for some strange reason or other.

Future Service of Radio

Stimulus to the Study of Science

RADIO is now being exploited through its appeal to the play instinct of mankind, but it contains also the means of satisfying the service instinct. It is one of those extensions of man's powers which science is ever revealing.

One of the interesting things about Radio is that it furnishes perhaps the greatest stimulus to the popular study of science known. Radio puts life into the study of science—something which, possibly through his own fault, the average man has not always observed there.

Entertainment Supplied England

America Furnishes Music for Fans Abroad

IN CASE the broadcasting stations in England do not give a class of program desired by the fans over there, they will be picking up stations in this country to supply their entertainment. Several numbers transmitted from WJZ were heard in Croydon recently and that is somewhat over three thousands miles away.

Condensed

By DIELECTRIC

Gifts have been exchanged and there is joy in many a household today, for verily Radio receiving sets have entered the homes of thousands who before knew not the magic of their charm! Perhaps you were one of those who rushed to put up an aerial to tune in your set while Christmas night was yet a reality, and not a sweet memory. Well, brother fan, from now hence forward you shall have at your pleasure the varied programs broadcast to a multitude of listeners in, from the early morning gymnastic exercises to the last note of a far distant singer. The fraternity to which you have been initiated is glad to count you as a member. You will not be satisfied until others have joined the ranks through your persuasive efforts.

One of our South American neighbors has been attacked by Radio fever in the most virulent form, and as you know, this is usually a life-long blissful ailment. Argentina, where this condition prevails, is clamoring for receiving sets and is unable to get them fast enough to meet the demand. Most of the sets going into that country are from the United States, for they excel in quality those manufactured in any other land in the world. It is predicted that before the month of May, 1928, every important theater in Buenos Aires, including the Colon Opera House, will be equipped for transmitting concerts by Radio. The race is on and other countries will fall in behind in due season.

I never really wanted a censor of broadcasting until the other day. Women are as enthusiastic fans as men, generally speaking, and where a set is part of the to-be-dusted furniture in a home, they gather their sewing, turn on the dials until some genuinely feminine attraction is heard—and use up the battery. Yes, I know that "owls" are ordinarily of the masculine sex, but of that another time. A talk on domestic science happened to fill the set as a certain lady tuned in, and what she heard I have never ceased to hear since. The sum substance of it was that when a mere man needs utensils he gets them; the wife often must resort to substitutes. The censor should preferably be a married man.

Police headquarters are availing themselves of the opportunity to broadcast news of auto thefts, a service that should meet with beneficial results. There are many who receive such news and the chances of recovery are thereby increased. KDKA sent out a description of a Ford touring car, not long ago, providing information in detail which would serve to help identify this stolen auto. It is practically impossible to move beyond the reach of Radio messages as the flight of electromagnetic waves is a little too fast for ordinary locomotion.

The intention of Station WHAS to broadcast musical numbers as played by an orchestra in a Louisville, Ky., theater is part of a general line of procedure becoming prevalent in many other cities. The experiment of transmitting such programs direct from a theater has already been successfully tried by other stations and appreciated by their Radio audiences. Since none of these amusement houses fears a falling off in attendance from supplying a part of their entertainment to listeners in, why should the Metropolitan Opera Company stubbornly maintain its policy of isolation? In the one case, the majority of people are acquainted with the character of performances, while in the other instance they need educating.

Not only are Radio sets being improved as rapidly as human ingenuity can devise better methods of construction, but the transmitting stations are constantly in search of ways to increase their efficiency. The Alabama Power Company has established a new studio with some exceptional features. The acoustic property of this new broadcasting station is believed to surpass that of any other in this country. Their appeal to the senses of visiting artists in the attractive arrangement of the interior of the studio must have its effect upon the efforts of performers. The Polytechnic Institute in Massachusetts is experimenting with the effects produced upon the performer by various colors in a sudio, as well as other interesting things. We are still in an experimental stage in Radiophony.

It is said that recent tests have proven the error of supposing that a station transmitting on a 360 meter wave length, and one on 400 meters, cannot be tuned so as to receive but one of them. I shall not dispute that point since it is also conceded that with inferior sets this may not be accomplished to the entire satisfaction of the listener. However, when two stations transmitting on the same wave length and not located equidistant from the receiver are on the air simultaneously, then we have a problem of another nature. It is regretable that some large stations are so lacking in the spirit of co-operation as to demand that they broadcast at all times, irrespective of their stations and of the desires of Radio audiences. It seems to me the proposed regulation of all broadcasting should become an established fact at the earliest date possible.

The percentage of fans who prefer jazz to music is not readily computable. It may be fair, or not, to judge the whole by a part, but if the result of a canvass of fans in the Northwest is a safe criterion then classical music has reached a place in the estimation of the maojrity of listeners-in which leaves no doubt on the subject. Dance music and jazz are not synonomous. Now tune me out.

RADIO INDI-GEST

It's Contagious

When you listen to a Radiophone and find it rather nice,
Then get so interested that you ask about the price;
You may not know the symptoms—may not even think you're sick—
But the Radio Bug has stung you, and you need a doctor—quick.

When you buy a cheap detector and a pair of low-priced phones
The Radio Craze has caught you—you should feel it in your bones.
Soon you'll find it all too feeble—that cheap detector "set"—
And you'll restless be, and grouchy, till an amplifier you get.

This will hold you for a little, but 'twill not be very long
Till a second "step" you purchase as the Craze gets "going strong."
Next you buy a pair of "Baldwins," two "steps" more, a Magnavox,
And the Bug calls on your neighbors, and they succumb, too—in flocks.

But I really can not tell you how the Wireless Craze may end,
Though I've watched its spread surprising, and it oft infects a friend;
But I think it is not fatal, though it drains one of his pelf,
And unless you shun its victims you may catch the Craze yourself.

—A. H. HUTCHINSON.

"Gas" vs. Ether

The subject of a broadcast recently at Washington, D. C., was "How to buy an automobile." We hope the next broadcast tells how to buy gasoline, tires and three or four kinds of insurance, and still have enough coin of the realm left to buy new B batteries and tubes.

Hearing the Voices Beyond

A Chicago organization furthering an educational program sent out letters to Radiophans in nearby states, asking them to assemble weekly, if possible, at receiving stations to hear the lectures. Came the reply from a village in northern Michigan, "We have happily arranged with the undertaker to listen in on the desired nights."

Oh, yes, I shud shay sho. Such happy arrangements!

Page the Radio Doctor

Pat, listening to a song over a badly howling regenerative set: "And where does it come from?"

Young amateur: "From the ether."

Pat: "I thought I ricognized it. It sounds like Mary Ann when they took out her appindyseedus."

Our Set Often Does That

Mat (reading)—"The Radio waves are sent out at vibrations as high as 1,000,000 a second which would carry them around the earth six times in a second."

Pat—"Be gorry! It won't be long before they'll be receivin' thim before they start."—CHICAGO DAILY NEWS.

The Reception Was Mushy

A society note headed the local column in a country newspaper as follows:

"Mr. Reo Statt was host at a party in honor of his fiancee, Miss Milly Henry."

Suppose a large number of guests were invited to meter.

Effective Radio Frequency Amplification

Part II—R. F. Transformer Tests and Recommendations

By Laurence C. F. Horle, Research Engineer for The Federal Telephone and Telegraph Company

IN PART I, it was explained that tube couplings in R. F. amplification caused the generation of currents of Radio frequency which were, therefore, inaudible. However, this generation is quite fatal to the amplification that may be secured. It is necessary then to provide means to avoid this generating state.

The commonest means for its prevention is the proper choice of the input tube grid potential relative to its filament. This is usually provided for by a potentiometer

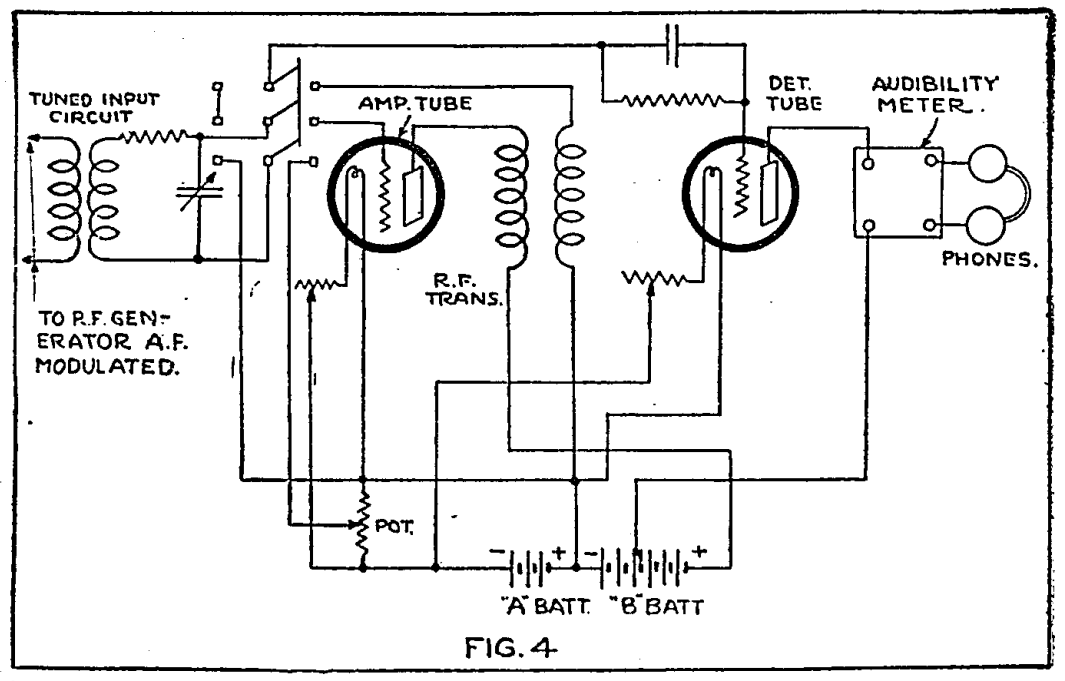


FIG. 4

shunted across the filament supply battery, the circuit from the grid of the first tube through the tuning circuits being brought back to the moving contactor of the potentiometer. By this means, the direct current potential of the grid may be made any value between the terminals of the filament battery. This is usually desirable inasmuch as under almost any conditions it is found desirable to make the grids of the amplifier tubes negative with respect to the positive terminal of the filaments, since, within certain limits, the more negative the grids are, the greater is the amplification.

Compromise Potential Used

It is found in R. F. amplification, particularly in the case of the highly efficient transformer coupled type, that if the grid of the input tube is maintained as negative as in the case of the usual A. F. amplifier, the system will be most unstable and will almost invariably generate, thereby being useless for actual amplification. It is necessary, therefore, in the operation of R. F. amplifiers, that a compromise be made between the highly negative grid that will give great amplification and the positive grid that will give stability.

Potential Needed Varies with Wave

If it were possible to choose a value of the grid potential that would give the best compromise for any wave length, the problem would be much simplified and the R. F. amplifier could be built with a fixed grid potential but, unfortunately, it is always found that the grid potential that will give maximum stable amplification varies widely with wave length for a given tuning system and tube-transformer combination and if, therefore, maximum amplification is to be secured over a band of wave lengths, the potential of the grid must be variable between rather wide limits and must be readjusted for great wave length changes.

The potentiometer, as shown in Figure 1, Part I, for controlling the grid potential, serves satisfactorily and if care is taken in its adjustment, will make possible the operation of the amplifier at maximum efficiency.

Wave Length Range of Transformers

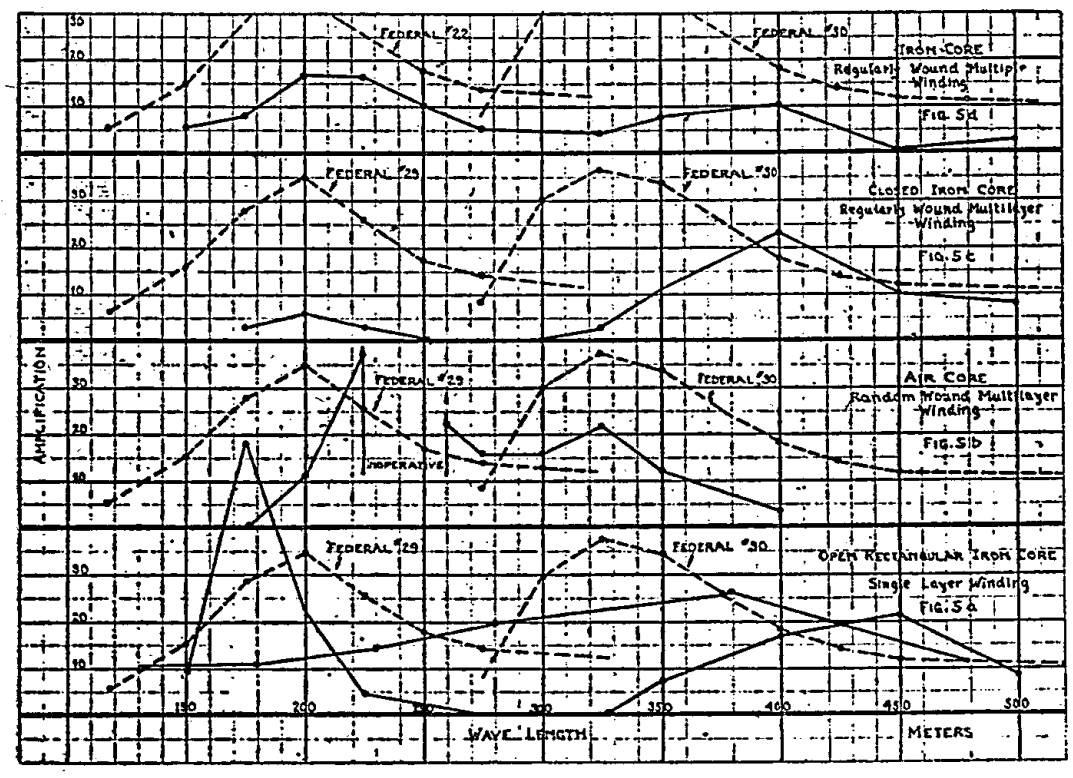
It will be noted that it was stated above that R. F. amplification is necessarily a narrow range device. It is to be borne in mind, that a well-designed transformer will be of narrow frequencey range only in so far as we compare it with the exceptionally broad range of the A. F. transformer. It is quite possible to construct a Radio frequency transformer having sufficient wave length range to work with high efficiency over the entire band of wave lengths devoted to any one type of Radio traffic.

It has, however, been the conviction of the writer that the wave length range of the Radio frequency transformers commercially available to experimenter's is seriously limited or, in the case of transformers having breadth of range, the amplification possible throughout the range is exceptionally low.

Efficiency vs. Range.

This apparent inconsistency between frequency range and efficiency is not unique with Radio frequency transformers, but characterizes all tuned electrical circuit arrangements. High efficiency cannot be secured without a low frequency band at which the device is sensitive and a wide frequency band cannot be secured with high efficiency, unless special methods are adopted for securing the best compromise between these two antagonistic characteristics.

The writer has been occupied during the last six months in the determination of the operational characteristics of the commercially available R. F. transformers and the comparison of action of these transformers with those of his own design and which are now being produced by a well-known Radio manufacturer.



Transformer Test Arrangements

It is felt that a curve of amplification plotted against frequency of wave length will, in general, serve as a basis for comparison of transformers and for this reason the writer has established a method for the measurement of the amplification secured by the use of the combination of the well-known transformers with the UV-201 and UV-200 vacuum tubes.

In making these measurements, the scheme shown in Figure 4 was used. The buzzer driven wavemeter was allowed to supply Radio frequency oscillations to a Radio receiver and the audibility of the signals noted by means of the simple audibility meter. Audibility measurement was first made with the three-pole, double throw switch thrown to the left so that the signal voltage was applied to the grid of the detector tube and then this switch was thrown to the right and measurement made of the R. F. amplified signal. The ratio of the audibility of the amplified signal to the unamplified signal is then called the amplification.

Limitations; Results of Tests

Measurement by this method is not especially precise since it depends on a host of uncontrollable factors, but since the variations in amplification of the several transformers with wave length of signal is very great, the method is sufficiently precise to indicate the effectiveness of the transformers. The results of this method of measurement of the characteristics of four types of R. F. transformers are shown in Figure 5. The solid lines are the amplification characteristics of the four distinct types of R. F. transformers, the rated wave length ranges of which are identical, while the dotted lines give for purposes of comparison the characteristics of two transformers of the author's design.

It will be noted in every case that there is a tremendous variation of the amplification of these transformers throughout the wave length range. So great is the variation that, in using them, one must expect only a narrow wave length range in which the device will be useful.

Useful Ranges Determined

It would seem, from the experimental and measurement work that has been done on these devices, that an amplification of less than ten as measured by this method is too small to be considered practical, and with this limitation in mind it will be noted that the range of these amplifying transformers is exceedingly narrow.

In the transformer of Figure 5a, for instance, the ranges over which amplification in excess of ten is obtained are between 150 and 217 meters and between 364 and 494 meters. While, in Figure 5b, the useful range lies between 20 and 225 meters, and between 260 and 361 meters.

In the plot of Figure 5c, it will be noted that the range of amplification is limited to 346 to 460 meters, while the plot of Figure 5d, shows a useful range of from 180 to 250 meters and a bare indication of usefulness in the region about 400 meters.

Range Data for Comparison

Tabulated below are the values from the plots. In these tabulations it must be remembered that range is taken to mean the wave length band over which the amplification is in excess of 10.

Plot	Range	Max.
Figure 5a	150-217	58
Figure 5b	197-225	38
Figure 5c	.....	6
Figure 5d	180-250	17
Federal No. 29	164-300	35
Plot	**Range**	**Max.**
Figure 5a	364-454	23
Figure 5b	260-360	23
Figure 5c	346-450	23
Figure 5d	.....	10
Federal No. 30	280-500	37

(Continued on page 12)

Spider Web Coil Cabinet Mounting

Panel Knob Controls Three-Coil Coupling

A three spider web coil tuner can be made to operate from the front of the panel in the following manner:

The three coils are placed in back of the panel, as shown in the illustration. The coil B is the secondary coil and is stationary. The coil A is the primary coil and it is moved forward and backward by the knob G attached to the rod E which slides through the tube D. The coil C, the tickler, is operated forward and backward by turning the knob F, which is attached to the threaded tube D.

In order to support the coil B and obtain a bearing for the tube D a support is used, designated by K. If taps are taken off the coils the flexible leads can be taken to the switches in front of the board. These are shown at I, L and H. In order to prevent the coils from turning and breaking the leads a thin strip of fiber, M and J, is used and placed in a position so that it will fit into one of the slots of the coil.

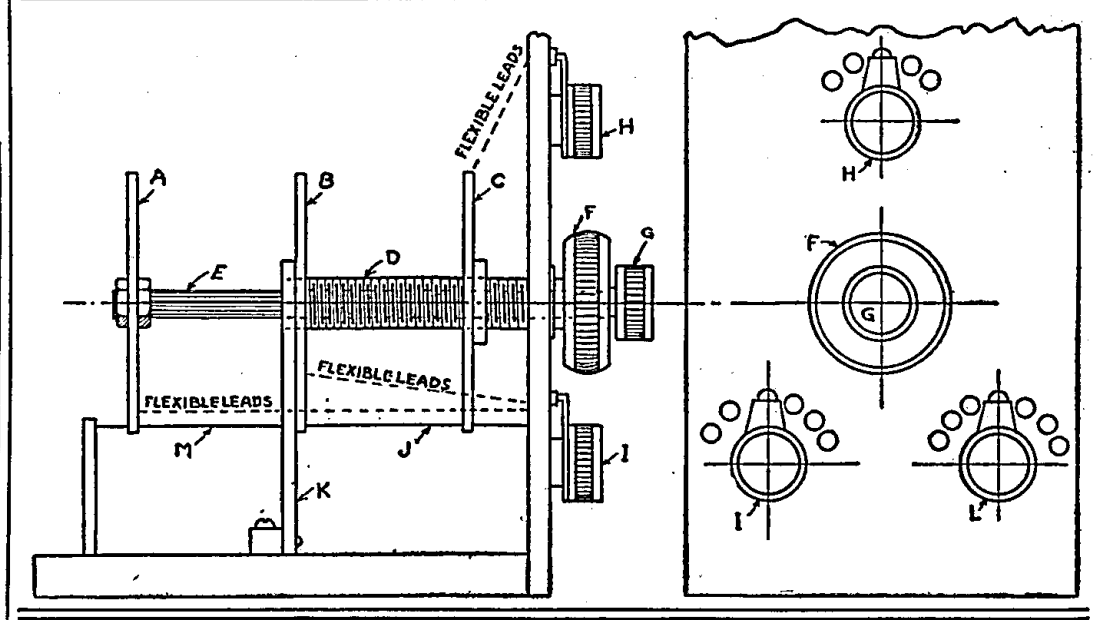
This arrangement makes a very neat appearance on the front of the board and can be made very compact.—G. P. Clute, Philadelphia, Pa.

WORKSHOP KINKS? EARN A DOLLAR—

THERE are many little kinks worked out at home that would aid your fellow Radio worker if he only 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 securing 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.

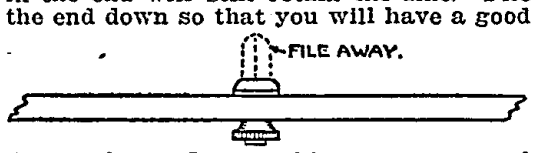
RADIO KINKS DEPARTMENT,
RADIO DIGEST,
123 West Madison St., Chicago, Ill.

HOW MOUNTING IS ASSEMBLED



Terminals Make Contacts

A very good contact point can be made from the outside terminal of an old battery. Take a pair of pliers and break the terminal off sideways so that the groove in the end will still retain the zinc. File the end down so that you will have a good



flat surface. Mount this on your panel and screw the nut in place. Solder the lead to this and you will have a good contact point.—S. Montia, Salt Lake City.

Filament Control

Most regenerative sets need a vernier control on the filament current, especially if a "soft" detector tube is used. Many verniers of different types have been placed on the market but none of them have worked satisfactorily for me. I tried this plan, utilizing two ordinary rheostats, and was surprised at the very close control of filament current.

Connect the two rheostats in series and across the terminals of one of them connect a resistance wire having a current capacity of one ampere and a resistance of about ½ ohm.

If the resistance wire of ½ ohm is used it can be adjusted by steps of .005 ohm instead of by steps of .05 ohm as in the case with an ordinary rheostat.—Lloyd A. Young, Lawrence, Kansas.

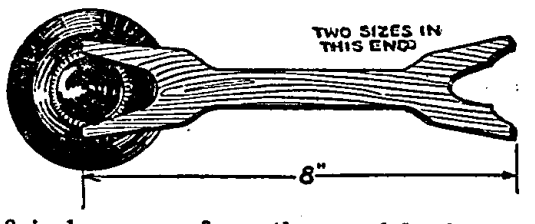
Battery Placed in Basement

In putting my set in the corner of the room I did not like the idea of having the battery where it might damage the table or rug, so I made a hanging shelf in the basement, directly under the receiving set, and put my battery on the shelf. A small hole was bored close to the wall and near the floor joist. The connecting cord was run down through this hole to the battery. The distance is only a foot or two longer than if the battery was on the floor above. —J. Howard Howe, Lewiston, Idaho.

Capacity Eliminated By Turning Fork Use

In tuning my two super-regenerative sets I found some trouble from capacity effect with my hands on the knobs, and not having any vernier controls I have devised a wooden fork, which may be of interest to Radiophans. The fork is about 8 inches long with tapering jaws at each end so that it will fit over any three of the knobs.

This fork can be held very steady with the two hands at the end of the fork,



8 inches away from the panel knobs and almost a vernier effect can be obtained with the small movement. The fork can be whittled out of any hard wood stick, 8 inches long, 1½ inches wide and ¼ inch thick, shaped like the one shown in the sketch. The dimensions need not be exact.—James Metcalfe Redfield, Marshall, Mich.

Detector crystals which are most sensitive to Radio signals are usually the crystals most affected by contact with the air resulting in oxidation of the surface of the crystal and a decrease in the sensitivity. The crystal may be chipped or scraped with a knife to expose a fresh surface.

R.F. AMPLIFICATION

(Continued from page 11)

This range data gives us no indication, however, of the instability which accompanies the use of these transformers, but experience indicates that any transformer which gives a great gain over a very narrow range is invariably exceedingly unstable over that range, and not only is there but a very narrow range over which a useful degree of amplification is possible, but its utility is seriously reduced by the criticalness of adjustment in this range.

Stability in Transformers

The writer has devised a series of transformers in which he has been able to secure a high degree of amplification over a sufficiently wide range and of such a nature as to be exceedingly stable, and hence very easy to use. The characteristics of these transformers are shown by the dotted lines of Figures 5a to 5d. These transformers are the types No. 29 and No. 30 of the Federal Telephone & Telegraph Company. They make no pretense of being suited to operation over a greater band than that used by the amateur (type No. 29 transformer, 175 to 300 meters) or over the broadcast band (type No. 30 transformer, 275 to 600 meters) and in these bands these transformers are remarkably effective.

It will be noted that these transformers are not only capable of a high degree of amplification throughout their bands of usefulness, but that the degree of amplification varies but slowly with changing wave length. This results in a remarkably high degree of stability and ease of operation.

Reform in Rating R. F. Transformers

The writer feels that the manufacturers' wave length ratings of the transformers shown in Figures 1 to 4, are exceedingly extravagant and that they are undoubtedly misleading to the purchaser. He believes that in choosing R. F. transformers the prospective user must, of necessity, determine carefully what range in wave lengths he proposes to work and choose the transformer accordingly, the degree of amplification and stability throughout this range being given due consideration in his choice of the device.

It is believed, that the above given method of rating R. F. transformer ranges as the limiting wave lengths between which the amplification is in excess of some arbitrary value as is done above, is far from satisfactory since it gives no idea of the maximum amplification that may be secured, nor does it indicate at what wave length this amplification may be secured.

What Should Be Given

The writer believes, however, that in rating transformers, the limits above and below which the amplification is less than some definite useful and given value, might well be given along with the statement of the value of wave length of the maximum amplification and the value of the maximum amplification.

This will assure the prospective purchaser of his being able to secure a transformer which will most nearly meet his needs, and when such data is given, he can secure some approximate idea of the stability of the device, for when the ratio of maximum to minimum is high he can be quite certain that the device is unstable, and where the ratio is small he is assured that the device will be stable and usable.

Alternative Rating Suggestion

As an alternative method of rating transformers it might be advisable to express the wave length range as the band in which the amplification is some definite percentage of the maximum or to define the range as the band in which the amplification is some definite fraction of the mean amplification.

These suggestions are given with the hope that the manufacturers of R. F. amplifying equipment may determine upon some standard method of rating their transformers for the satisfaction of the Radio public and themselves.

Construction and Operation of Reflex Circuits

How to Make Single and Three-Tube Receivers

By H. J. Marx

MUCH has been said on the use of Reflex circuits, but as a rule they have been too complicated both in their connections and their use of special apparatus to be considered for amateur use. In addition, the doubt as to their ultimate operation has caused many a fan to hesitate before assembling one.

The single tube reflex shown in the panel diagram (Figure 1) is simple enough for any fan to set up. In addition, the possibility of compactness makes it an admirable unit for the man who contemplates carrying his set around much. This single tube reflex is made up entirely enclosed with the exception of variable condenser No. 1 in a small medical kit, measuring about ten by four by four inches deep. This was acomplished by using a Myers 4-volt tube instead of the usual C-301 or UV-201. This small kit can be operated through the use of a loop aerial with a variable condenser shunted across it.

Three Tube Circuit

The three-tube circuit shown in Figure 2 is considerably more complicated and is the equivalent of three stages of Radio frequency, detector and two stages of audio frequency amplification. The apparatus is more selective and requires much greater care and accuracy in assembly than the single tube reflex.

Theory of Reflex Circuits

In order to understand more fully the operation of reflex circuits, it might be advisable to trace through the path of the reflex current from the tuning apparatus to the phone receivers. After passing through the first tube, it will be noticed that the plate current runs to the primary of the Radio frequency transformer No. 4 and from there through the phones to the positive side of the B battery. We have, then, at this point, merely the addition of the phone impedance. The current, however, has not been rectified and is still of high frequency, so that in conjunction with the phone condenser 7, there is no effective resistance to its passage.

The induced current in the secondary of this Radio frequency transformer then passes through the crystal detector No. 3 and is here rectified. From the detector the circuit is completed through the primary of the audio frequency transformer No. 5. Similarly as in use across the phones the by-pass condenser No. 6 is added to permit the passage of any high frequency currents that may leak through.

Amplification Feed-Back

Following the current through from the secondary of the audio frequency transformer No. 5, the one terminal leads to the grid of the amplifying tube No. 2 through the condenser No. 1, which is in series, and the other end goes to the potentiometer No. 8, which permits the adjustment of the proper potential on the grid for this particular stage. The condenser No. 1 does not stop the control of the grid as this control is merely a condition of potential charge which is passed on through the condenser.

This tube, then, is carrying at this time not only the audio frequency current, which is pulsating, but also the Radio frequency current, which is alternating. Due to the fact that the audio frequency, however, is of a much lower frequency, there is little or no interaction between the two circuits. The audio frequency current passing from the plate encounters no material resistance in the primary of the Radio frequency transformer, and from there goes right on through the receivers to the positive side of the B battery. This audio frequency current operates the receivers, reproducing reception, whereas the Radio frequency current passes on through the condenser No. 7.

Path Through Three-Tube Circuit

The path of the signals through the three-tube hook-up is fundamentally similar, passing through the first tube with a resistance and choke coupling to the second tube with a Radio frequency transformer coupling to the third tube, with another Radio frequency transformer coupling to the crystal detector, and coupled by means of an audio frequency transformer to the second tube again, which also has an audio frequency transformer coupling to the third tube, from which it passes to the phones. The basic principle is the same with the exception that additonal stages or tubes have been added.

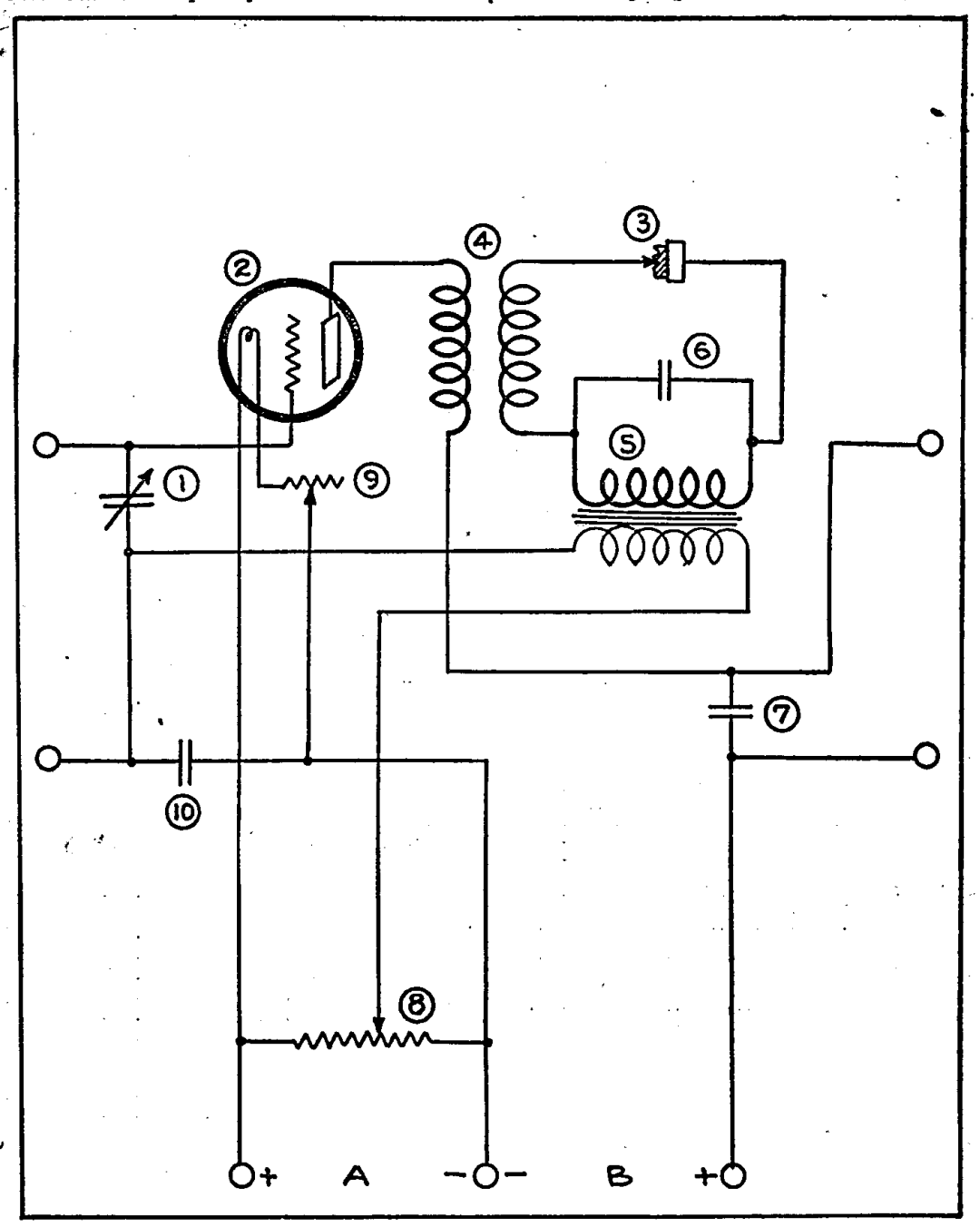


Figure 1

LIST OF APPARATUS FOR SINGLE TUBE REFLEX

7 Binding posts
Panel
No. 1—.001 mfd. variable condenser (preferably vernier)
No. 2—Amplifying vacuum tube
No. 3—Crystal detector
No. 4—Radio frequency transformer
No. 5—Audio frequency transformer
No. 6—.C01 mfd. fixed condenser
No. 7—.001 mfd. fixed condenser
No. 8—200 to 400 ohm potentiometer
No. 9—Filament rheostat
No. 10—.002 mfd fixed condenser
Storage battery to suit tube
Plate or B battery of 45 to 90 volts

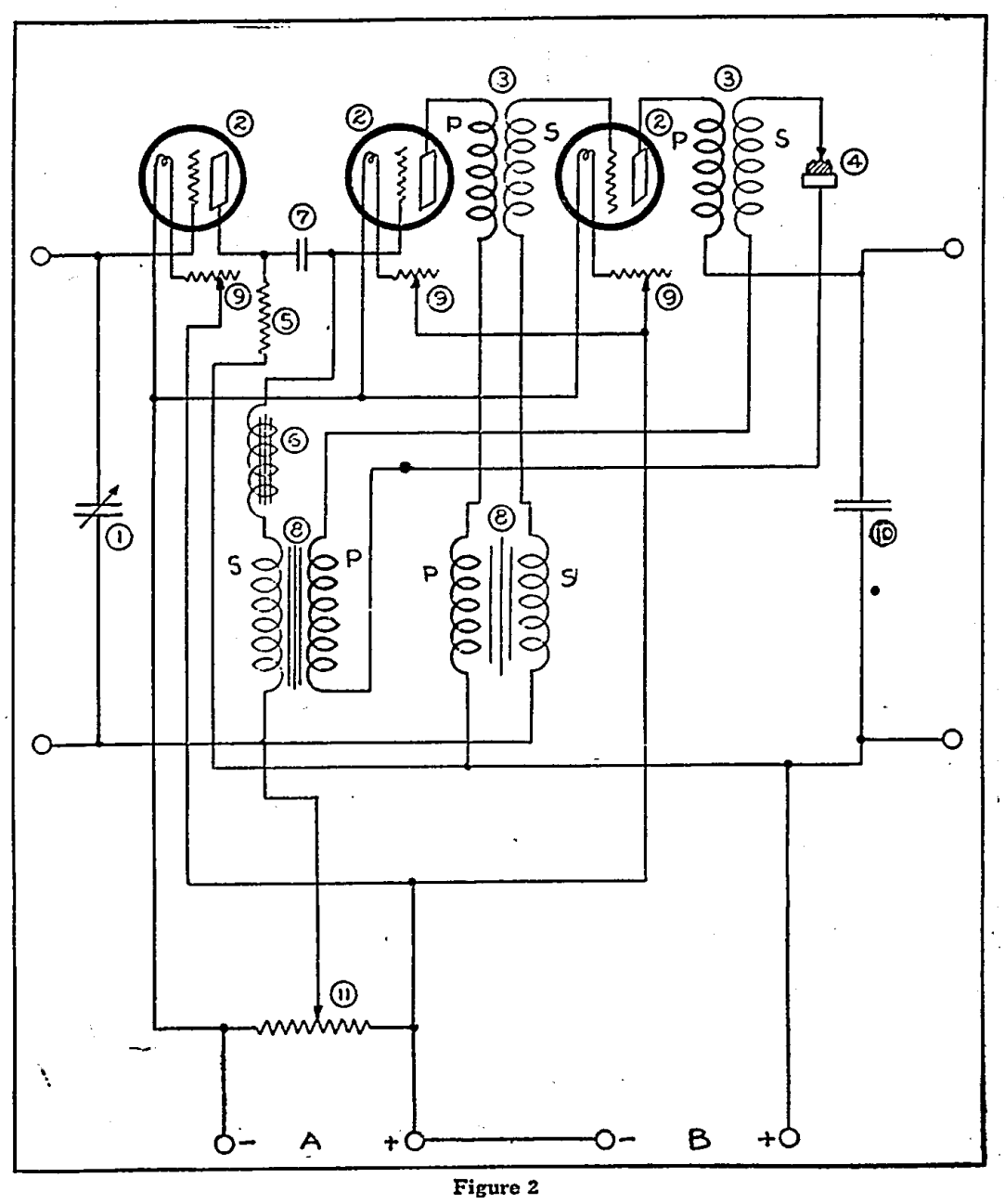


Figure 2

LIST OF APPARATUS FOR THREE-TUBE REFLEX

8 Binding posts
Panel to suit
No. 1—.001 mfd. variable condenser (preferably vernier)
No. 2—Three amplifying vacuum tubes
No. 3—Two Radio frequency transformers
No. 4—Crystal detector
No. 5—50,000 ohm resistance
No. 6—1½ Millihenry choke coil
No. 7—.00025 mfd. fixed condenser
No. 8—Two audio frequency transformers
No. 9—Three filament rheostats
No. 10—.001 mfd. fixed condenser
No. 11—200 to 400 ohm potentiometer
Storage battery to suit tubes
Plate or B battery of 75 to 100 volts

Assembly of Apparatus

It will be found that in the use of these circuits a higher plate voltage will be required, due not only to the double duty of the tubes, but in addition to the fact that more resistance is encountered in the circuit. The values of the constants are more critical than in other circuits, and proper operation is dependent upon accuracy and care in assembly.

It has been found that many of the usual commercial type of transformers do not always operate satisfactorily. No set rule can be given, but must be left more to the patience and experimentation of the amateur. Of course, where a portable set is desired, the use of the loop aerial is of considerable advantage, but considerably better results can be obtained through the usual outdoor antenna and ground connections. In this case some form of tuning apparatus must be supplied. If it is of the variocoupler type, the secondary connections are made to the two left binding posts of either panel.

Regeneration Not Employed

Under no circumstances can regenerative principles be incorporated in this type of circuit, as the reaction would not only be effective on the one frequency passing through, but in addition, would be detrimental to the other frequency.

The selectivity of the circuit is dependent entirely upon the efficiency of the tuning apparatus used in conjunction with it. A loop aerial with but one condenser will not permit sufficiently accurate adjustments in order to eliminate interference, except possibly, through the slightly directional properties of the loop.

Efficiency in selection of any particular broadcasting station is accomplished not only by means of the proper adjustments for wave length in both primary and secondary, but also in critical adjustment of coupling whereby the maximum inductive effect is obtained for particular wave length that is being received. It must be realized that the maximum inductive coupling varies for each alteration in frequency which corresponds to wave length.

About Condensers

Condensers are a very necessary part of any Radio set. They are reservoirs of electrical energy in which the oscillations from the antenna circuit are stored up before they are passed on to devices that detect, amplify and throw out the music or speech in the form of sound waves.

Condensers may be so grouped that the total capacity of the unit is larger than that of any one condenser, or so that it will be less. Sometimes it becomes necessary to change the capacity of a circuit containing fixed condensers. This can be done by connecting the condensers in the required fashion.

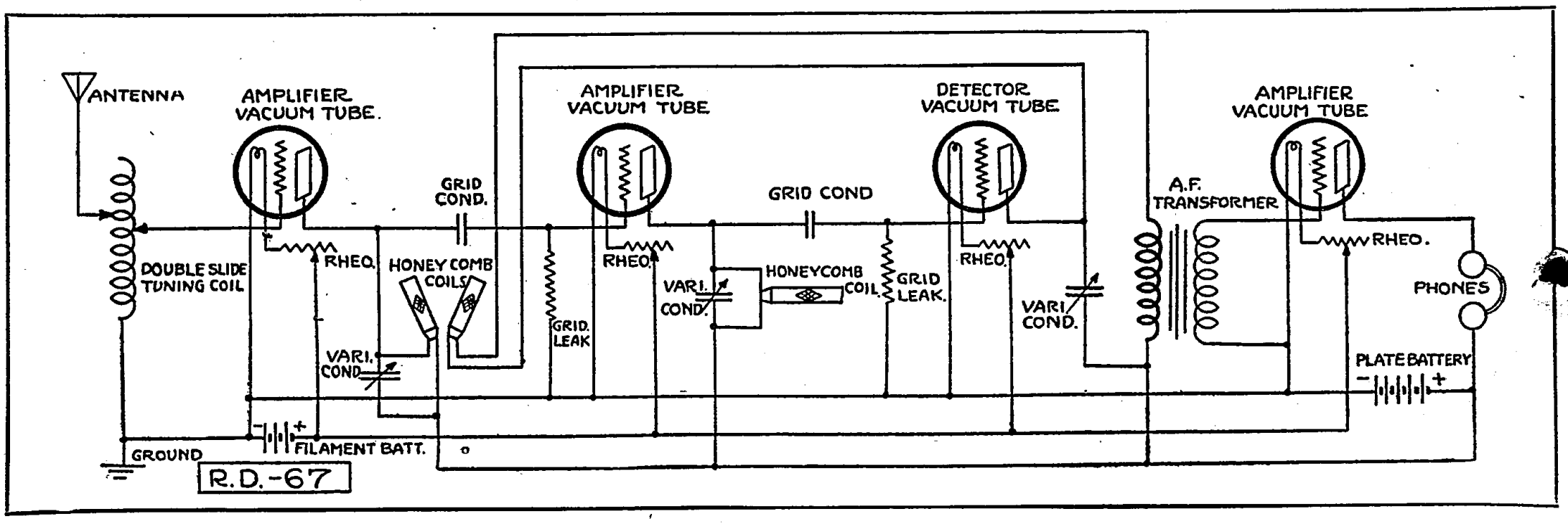
The capacity of condensers is measured in a unit called the "farad." As this unit is very large and the capacity of condensers used in Radio work is only a small part of this unit, it is customary to take a unit which is a millionth part of the farad, and is therefore called "microfarad." This is abbreviated mfd. for short and is the standard term used in Radio apparatus.

Learning the Code Correction

Attention has been called to the fact that the "dadit" code symbols for X and Z were interchanged in the article "Easy Method for Learning the Code," by Thomas W. Benson, page 14, December 16 issue. Corrected, the sounds for X and Z by this system would be:

X ..... Dadidida
Z ..... Dadadidit

ENGLISH HOOK-UP COUPLES R.F. WITH HONEYCOMB COILS



THIS hook-up is a typical English type of circuit, using two stages of Radio frequency, detector and one stage of audio frequency. The peculiarity lies in the fact that its regenerative effect is not taken from the original tuning unit, but rather from the honeycomb coil used in coupling between the first and second stages of the Radio frequency.

The use of Radio frequency transformers is avoided and honeycomb coils are substituted. The initial tuning unit is a two-slide tuning coil. If desired, condensers can be added in the primary and secondary sides for more selective tuning. On the second stage, the two honeycomb coils require a variable coupling mount, each coil having about fifty turns for the average concert broadcasting wave length. The regular transformer coupling coil has a .001 mfd. variable condenser shunted across it. The grid condenser on this stage and also on the detector has a fixed capacity of .00025 mfd. The first grid leak has a resistance of 1½ to 2 megohms, while the second grid leak on the detector tube has a resistance of about 1 megohm.

The honeycomb coil between the second tube and the detector tube is also a fifty-turn type with a .001 mfd. variable condenser shunted across it. The primary of the audio frequency transformer and the honeycomb coil used for regeneration in the plate circuit of the detector tube, have another .001 mfd. variable condenser shunted across both of them. An ordinary audio frequency transformer is used. The plate battery voltage should be about 45 to 60 volts. The detector tube is soft, but a hard one can be substituted. No potentiometer is required.

It will be noticed that this circuit is typically foreign in form, inasmuch as all amplifying stages are tuned by means of variable condensers. Considerable success has been attained by these methods on the other side.

The Reader's View

Speaking of Announcers

Here we go. Every fan would like photographs of all the prominent announcers posted in front of his receiving set. Think of the smile of appreciation each of these untiring workers get each evening, and I might say, words that would not sound good in print when they keep us waiting too long at the conclusion of a part. However, I feel they are doing their best for all the fans.

My thoughts go to Georgia. How we would glance at our old friend WSB and give him a smile! Every fan knows he is not going to run any chances of China not hearing him. He does not have to say WSB. We know him and we would like to have him present as near as possible. I may add that our friend at WDAJ, College Park, Ga., is a close competitor with him. None of the far away fans are going to miss his program. These boys are doing good work, and in fact I am more or less partial to the lady announcers at KSD, WOR and others who I have heard try out. We should also have these friends with us.

I think this would be an encouragement for the promotion of good announcers, and at least, would be the means of giving the boys an extra compensation to which I think they are entitled. I know they are doing their best to entertain us, and I feel every fan will back me in this and purchase from time to time, the photo of every announcer within range of their receiving sets.—F. L., Baltimore, Md.

About Station Calls

Would it be out of place if I offered a suggestion? Every Sunday afternoon from about 2:30 until 7:30 there are numerous church and chapel services broadcasted. If one of these services is picked, there is no way of knowing who it is until the service is ended. Several times I have intended to try to pick up a certain place; got what I thought was the station; listened to the end, and found I was "out of luck." I don't see what harm could be done if at various times during the service the station should be named. There is always a chance to do so after the prayer or when an offering is being taken, or just before a sermon. I think that I am voicing the sentiments of a great many fans when I make this suggestion.—T. K. Minsker, East Aurora, N. Y.

Pointing Cat Whiskers

A sharp point on the cat whisker of a crystal detector is quite valuable but most amateurs do not like to file and scrape the wire and they usually leave it blunt. A medium sharp point may be put on with no effort at all, if you have some nitric acid at hand. Make a dilute solution and dip the point end of the cat whisker in this and a fairly sharp point will be the result. Leave the point in the acid long enough for it to cut the metal down. The surplus acid must be removed before using it for the remaining acid will spoil the crystal.—Loren P. Hurd, Northfield, Minn.

Questions and Answers

Radio Encyclopedia

(1179) JGC, Orlando, Fla.

I intend using standard 3-coil honeycomb circuit and prefer placing the honeycomb circuit between the last Radio frequency amplifying tube and the detector tube, making it possible to use only two Radio frequency amplifying transformers, but making it necessary to employ a tuning coil. What would be best to use for a tuning coil, and how should it be tapped?

Please show whether the antenna variable condenser should be in series with or shunted around the tuning coil. When using the detector alone or with audio amplification, what disposal should be made of the variable condenser shunted across the primary honeycomb coil?

I wish to wire my set with the plug and jack system in such a way that I can use the detector alone, or with either one, two or three stages of Radio frequency amplification, and with either the first or second stage of audio frequency amplification. Also so that I can use either an outside aerial or a loop aerial. (If I would sacrifice any efficiency by arranging set so that I could cut in or out either the outside or loop aerial, by means of a jack, please omit this feature, and show set wired for outside aerial.) Please do not show set wired with jack filament control. I do not care for this feature, and the omission of it should greatly simplify the circuit. Please show no more connections to the jacks than necessary.

Will opening of the grid leads of the Radio frequency amplifying tubes be sufficient to cut them out of service? If so, could this be done by means of a jack with a break contact, and an open or cut-out plug?

Would a jack be practical for shortening a condenser? For instance, if I were to insert a jack so that I could short the variable condenser shunted across the primary honeycomb coil by means of a short-cut plug, would there not be condenser action between the springs of the jack when the condenser was not cut out? Please show a practical way of cutting this condenser out if it is necessary.

Is it practical to have the antenna and ground terminate on a jack, separated of course, but is the distance of separation sufficient to prevent leakage from antenna to ground?

I wish to control each stage of Radio frequency amplification and the detector with a separate rheostat, and the two stages of audio frequency amplification with one rheostat, or five in all.

I want also two A battery potentiometers, one to regulate the plate potential of the detector tube, the other to regulate the grid potential of the grids of the three Radio frequency amplifying tubes. Please show diagram for use with two 6-volt A batteries, one to light the filaments of the three Radio amplifying tubes, and the other for use with the detector and two tubes of audio amplification. Show also two B batteries, one for the plates of the Radio amplifying tubes, and one for the plates of the detector and audio amplifying tubes.

I believe I have made clear what I desire in my set. Please tell me what you think of this arrangement, and any description you may send me with the hook-up will be greatly appreciated.

Which type circuit do you think the better, one which uses but two Radio frequency transformers, and has the coil circuit between the Radio amplifying tube and the detector, or one which uses three Radio frequency transformers and places the coil circuit ahead of the first Radio amplifying tube? In Vol. 2, No. 6, page 13, of RADIO DIGEST, there appears a hook-up of the latter description. I like very much your method of jack control. If you think this manner of hook-up is better than the other type, I would be very thankful if you would send me a drawing of it as well, omitting the jack filament control.

If wiring the set for both loop and outside aerial would make a complex circuit, or lessen its efficiency, please show set wired for outside aerial, and show as an insert how I should make changes when I wish to use a loop aerial. Please make as practical a hook-up as possible and give any advantageous hints such as grounding the negative side of the filaments. I intend using the latest type of iron core Radio frequency transformers.

A.—We are pleased to hear from you as an interested reader of RADIO DIGEST and having given your letter careful attention to answer you briefly, and we trust helpfully.

Frankly speaking we believe that the receiver you are contemplating is too elaborate for practical results. We have no blue-print which will afford the exact hook-up you suggest and in lieu of it the best we can offer is that to be found at the top of page thirteen of August 19th issue of RADIO DIGEST, to which you would have to add your third step of Radio frequency and your inductance.

Answering your questions: Any standard tuning coil will be satisfactory. Taps may be made by soldering a lead to every fifth wire.

Position of variable condenser in the antenna circuit depends upon the length of the antenna. Would advice a 43-plate variable in series with antenna and a 23-plate condenser shunted across the tuning coil.

Opening grids of the Radio frequency amplifying tubes is sufficient for cutting them out of service and could be accomplished by means of a jack as suggested. It is not necessary to cut the condenser as you designate.

We would not advise having antenna and ground terminate on a jack if you have a large antenna.

We would recommend preferably the circuit using three Radio frequency transformers.

As before stated we believe that the circuit you have described is altogether too complicated for satisfactory results and prefer to recommend to your attention the one already mentioned as practical and entirely satisfactory.

Jacks; B Batteries

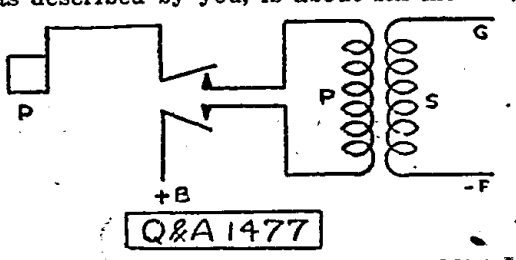
(1477) LB, Oconto Falls, Wis.

1. What kind of a circuit jack is it that you can use to plug in your head phones, and has only two wires going to it? Does that sore of jack have two or four lugs? If it has four would you show me which ones to connect the two wires to?

2. What is the average life of a plain 22½ or 45-volt B battery of good make? How can I hook up a B battery with taps at 16½, 18, 19½, 21, 22½, 75, 85 and 105 volts on a set using two stages of Radio frequency and one of audio? If it is possible please show me or tell me how to make the connections to the various tubes, etc. Understand the above B battery is all in one, with only one negative post for connection.

A.—1. Diagram labeled Q. & A. 1477 shows the method of connecting jacks. The type of jack suggested is usually used on the last tube, but can be used on any of them, if filament control is not desired.

2. The average life of a B battery, such as described by you, is about six months,



much depending upon its care in addition to the service rendered. In making connections for B battery use the negative tap common to all, and the positive 105 volts on the plates of all tubes except the detector, upon which you should use the positive 22½ volt tap.

Antennae and Lead-Ins

(1257) AG, Cato, Wis.

I have an aerial pointing towards the east. If I put up one besides, pointing west and south, can I use the same lead in or must I have another one and work with a switch? My aerial works good but somebody told me it would work still better if I would put up another wire parallel to the first one. Is that so? My aerial is 125 feet long and 50 feet high.

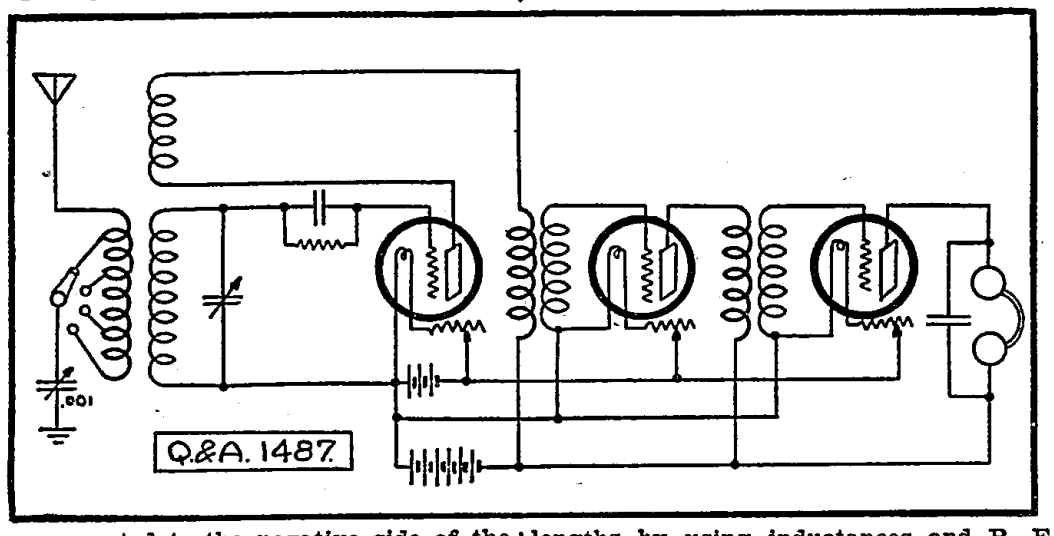
A.—In putting additional aerial as suggested do not use the same lead in but make your switches so that either one or both can be connected to set.

The additional parallel antenna will give such a slight advantage as to scarcely warrant the trouble of placing and arranging it. Your present antenna should be very efficient. However, we would advise the use of a .001 condenser in series with it if you do not now have it.

R. D.-46; Super Heterodyne Notes

(1487) HB, River de Chute, N. B., Can.

1. I do not understand how it is possible for the two amplifier tubes in R. D.-46 to get a positive plate potential when they



are connected to the negative side of the B battery. Please set me right on this.

2. Some additional questions which I should like to have answered are most of them being in connection with the hook-up of the Armstrong super heterodyne receiver as given in the RADIO DIGEST Q. and A. page for September 30th, 1922.

Is this circuit suitable for phone reception?

May this circuit be used for all wave lengths by using honeycomb coils for inductances and Radio frequency transformers instead of resistance coupling?

Do L2 and L3 remain constant for all wave lengths?

What are the values of the coils which C4 and C5 are shunted across?

What is the difference between the super autodyne and the super heterodyne circuits?

In a standard heterodyne circuit is the tickler coil always placed next to the Secondary? I noticed a circuit in some magazine which placed the tickler next to primary. Would this method work?

A.—1. Observation of diagram R. D.-46 has shown the discrepancy to which you call attention. Q. & A. 1487 diagram gives the proper connections for the B battery.

2. The circuit for super heterodyne receiver appearing in September 30, 1922 issue of RADIO DIGEST, is very suitable for phone reception. It was the one used in the trans-continental tests.

This circuit may be used for all wave lengths by using inductances and R. F. transformers as suggested, and will prove very satisfactory when properly executed.

L2 and L3 remain constant to about seven hundred meters.

C4 and C5 are shunted across an ordinary variocoupler or two honeycomb coils L35 and L50 placed in close coupling.

The difference in operation of super autodyne and super heterodyne circuits lies in the latter one of the two oscillations is the received signal in the antenna and the other is generated by a circuit in the receiving station resulting in beat or heterodyne reception, while in the former the same tube may be used as a detector and as a generator of local oscillations and is called autodyne reception.

In a standard heterodyne circuit the tickler coil is placed sometimes in the secondary and at others in the primary.

Radio Illustrated

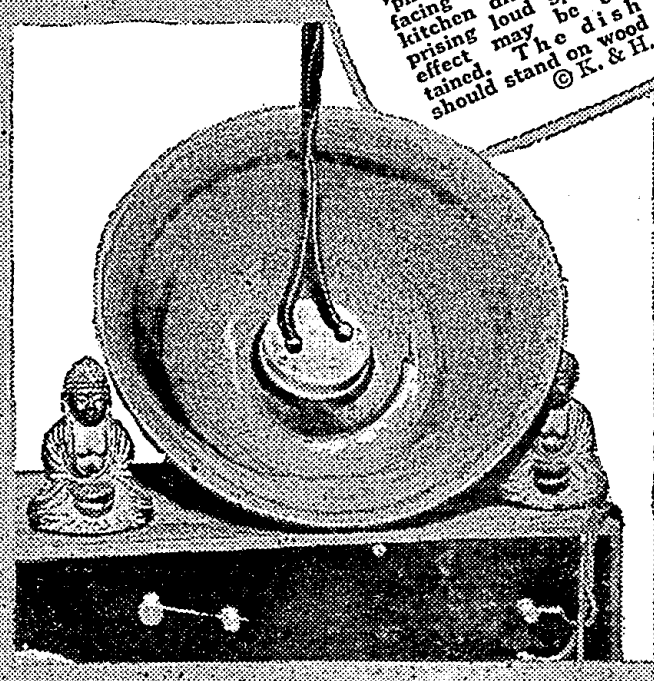
Many doughboys remember Katherine Browne, now of the Chicago Opera Company, whose concerts are being broadcast by KYW. She sang in army camps and canteens in France Chicago Opera Photo

Anna Ludmila is the 19-year-old premier danseuse of the Chicago Civic Opera Company, whose concerts, delivered through KYW, are making a decided hit with Radiophans Pondelicek Photo

MAKING THE SEA AS SAFE AS THE LAND RADIO SAVES THOUSANDS

This is the "Radio Ship" float, manned by some of Uncle Sam's sailors, which attracted much attention in the national capital's recent "Don't Get Hurt" campaign © Int.

By suspending one 'phone in front and facing a common kitchen dish, a surprising loud speaker effect may be obtained. The dish should stand on wood © K. & H.



Phones in the first ten rows of pews of the Unitarian Church of Lynn, Mass., enable hard-of-hearing members of the congregation to listen to the pastor. This picture shows one of the phones in use © Int.

Every play of the recent Yale-Harvard football game was transmitted to Radiophans from the temporary microphone pick-up station set up in the Yale "bowl" by Station WEAF of New York City © U. & U.