New Inductance Tuned Circuit Has No Condensers; 64 Advance Programs; Assembly and Wiring of Neutrodyne Receivers; Trouble Shooting Sets

Radio Digest
EVERY WEEK ILLUSTRATED
REG. U.S. PAT. OFF. & DOM. OF CANADA
Vol. IX
Copyright 1924
By Radio Digest Publishing Co.
SATURDAY, APRIL 26, 1924
No. 3

BROADCASTERS WIN OUT

ACCUSED COMPANIES DENY TRUST CHARGE
FEDERAL TRADE COMMISSION PUSHES HEARING
Will Attempt to Prove R.C.A., A.T.&T. and Others Have Combined in Illegal Monopoly

WASHINGTON—A blanket denial that a Radio monopoly exists has been made by the Radio Corporation of America and other respondents to the Federal Trade Commission's complaint alleging such a monopoly. Within one week, it is believed, the Federal Trade commission will issue a call for hearings on the alleged monopoly and will summon witnesses to testify and prove the existence of an illegal monopoly.

E. L. Smith has been designated by the trade commission to handle its case against the Radio Corporation and other participating in the alleged monopoly.

Say Government Requested R.C.A.

Attorneys for the Federal Trade commission are studying the seven voluminous reports filed in answer to the commission's charges. The seven volumes, practically all alike, deny the charges of the commission, claiming that their agreements were not set forth fairly in the complaint.

(Continued on page 2)

A. T. & T. NOT TO CONTROL BROADCASTS

‘King Telephone’ Settles WHN Suit out of Court—Sells Valuable Rights

License Allows Toll Use

Would Permit Greater Power Than 500 Watts—Same Treaty Open to All Plants

NEW YORK—What seems to be a general renunciation of the policies of the American Telephone and Telegraph company, "King Telephone," as it has been called, is brought to light in the recent settlement out of court of the suit against Station WHN, by means of which it is believed by many, "King Telephone" sought to gain supreme control of the air.

Not alone is "King Telephone" to drop and forget his suit against Marcus Loew,

(Continued on page 3)

X-Ray Gets Share of Blame for 'Crackles'

Commerce Department Hears Complaints of Fans

WASHINGTON, D. C.—The Radio section of the Department of Commerce is receiving complaints from various parts of the country from Radophans relative to interference.

While the Radio section is not clothed with any legislative powers to take up these matters, officials of the section are doing everything they can to co-operate with the Radophans in seeking the interference causes. It is said that some of the interference has been caused by X-ray and violet ray machines, Curtrell electrical precipitation plants and magnets on suburban telephone lines.
A. T. & T. SURRENDERS?

In order to avoid a new license fee, the Telephone company has granted a personal non-transferable license to W2N to use the telephone equipment for broadcast transmissions (including broadcasting for hire).


The license issued to W2N on the 14th of April by the Telephone company is an agreement that at any time during the life of the license it will grant a license to operate with a standard call, on the condition that it will pay the present license fee, "as far as in its power to do so."

The Telephone company is said to have paid the license fee in the amount of $500 for the privilege.

"Listings from Ear Only"

Country beliefs exist however. A well-known engineer in the broadcast industry disputes the claim that the Telephone company licensed W2N. He says that "anyone" means only those stations that conform to regulations.

His statement follows:

"The facts of the matter is that the Telephone company is ready to sell licenses to any broadcasting stations now in operation, but it absolutely refuses to sell to any station that is building their own station, under the plea of preventing competition. The Telephone company is to license the establishment, because it is a sort of the broadcasting which these stations are doing."

Thayer Statement Ranks WHN More

President Thayer of the A. T. & T. company says the $500 license fee is a full payment for the broadcast licenses granted to three stations.

The President adds that if W2N had been engaged in "the practice" of broadcasting the complete results of the recent hurricane, he would have been shut down on the same charge.

"But--until regulation has been established, we cannot encourage the multiplication of broadcasting stations." 

The statement is made by the Royal Bancroft.

That "King Telephone" has found broadcast equipment in their hand a well-worn product, is borne by the incomplete financial statement of the company, but the per share paid for wire broadcasts over WEAF from April 1 to April 5, 1923: 94 cents.

Also, the report of the Attorney General's investigation, is $2.99 per share. Again, April 8, 5; April 9, 5; April 10, 5.

A T. & T. New Age Plan

In reply, the AT&T Corporation of America averts that the Radio Corporation was granted a license by the certain United States officials, and claims this as a misrepresentation.

Who Is in Alleged Trust

The company states all illegally combined and composed to monopolize the broadcast business, and get away from law. American Telephone and Telegraph and "Western Electric," the telephone concern, and Radio Telegraph, Westinghouse Electric, United States Camera and Photographic Specialty Apparatus and the Radio Corporation of America. Members were by the Secretary of the Federal Trade Commission's complaint, but they also deny the jurisdiction of the commission to control the Telephone company, or to cause the companies to desist. The Radio Corporation in this connection 

"Respondent submits that the Federal Trade Commission has no jurisdiction in law to make the order to desist described in its complaint, and to proceed in the manner directed."

RADIO BEACONS GUIDE

FERRIES ACROSS BAY

Mark "Line" in Ether to Keep Boats on Course

RAX FRANCISCO has issued color-coded Radio beacons, developed at the bureau-of-standards and useful in identifying and guiding ferry boats across San Francisco Bay. The color of the beacon mark indicates a "line" in the ether, the points of the compass, so that the receiving set can tell whether the set in that line, and which side of it is.

The signal strength is also determined, a distance of three and one-half miles and carries a powerful current in the large population. All the companies have the same wave.

At this the line in thick that is in the ether, to be heard from the other, and strong tidal currents are encountered.

"SHOW-MES" DIG UP TROUBLE AND PICK

CAROONIST KNOTT MEANS AN EXPLORATION

Radio Listeners' Scare Cover Cause of Disappearance in a Terrace

By Eric E. Belcher

ST. LOUIS—The Missouri Radio Listeners' association is out to dig up Radio trouble. It has been thoroughly and very extensively.

Jack, the celebrated cartoonist and leader of the trouble force under the name of St. Louis Club, which is known on the air as the International Radio Club, is a type of radio enthusiast.

Radio listeners are a group of people who are interested in radio and the technology of radio. They meet regularly to discuss topics related to radio, such as the latest developments in equipment, programming, and broadcasting techniques. The club is made up of people who are passionate about radio and are interested in learning more about it. The club provides a platform for people to share their knowledge, experiences, and insights with others who have similar interests. \n
Radio Digest

You Want It

Be sure of your weekly copy by subscribing now.

Radio Digest, published weekly, is a leading magazine for radio enthusiasts. The magazine covers a wide range of topics related to radio, including equipment reviews, programming ideas, and technical articles. The magazine also provides a platform for people to share their thoughts and experiences about radio. It is a great resource for anyone interested in radio. Free issues can be obtained by writing to the address of the magazine.

Looking Ahead

At Last! A Reliable Super-Het Construction Article is available. Promised a long time, this excellent article by Allan C. Forbes starts next issue. Mr. Forbes has designed and built an excellent superheterodyne, and knows his subject well. Don’t miss this!

Essentials of Radio Electricity is the next topic of P. E. Edelman in his easy-to-understand series for Radio amateurs. He will introduce you to a few of the more important technical Radio terms.

Adjusting and Balancing the Neutrodyne will not be so difficult after you read Peter J. M. Cloet’s description of the proper procedure to follow, to appear in the May issue.

The Famous Milpox Family Picture, heralded for weeks, will make its appearance next issue. The line of the old family skeleton are rattling in the closet.

Newstand's Don't Always Have One Left

When you want Radio Digest

You Want It!

Be sure of your weekly copy by subscribing now.

SEND IN THE BLANK TODAY

Radio Digest, published weekly, is a leading magazine for radio enthusiasts. The magazine covers a wide range of topics related to radio, including equipment reviews, programming ideas, and technical articles. The magazine also provides a platform for people to share their thoughts and experiences about radio. It is a great resource for anyone interested in radio. Free issues can be obtained by writing to the address of the magazine.

POWER AMPLIFYING TRANSFORMERS

Price per pair, $13.00

The new Thorardson Power Amplifying Transformers (push pull) are designed for use as third stage audio frequency amplifiers, to provide high power amplification for operating loud speaking devices.

With power amplification, not only is it possible to increase volume, but the distortion and bowing which usually accompany the overlapping of a single tube on the third stage is done away with entirely.

The Thorardson Power Amplifying Transformers are well designed electrically and are capable of delivering the carrying the additional load without breaking down.

In total purity these transformers equal the Thorardson Super Audio Frequency transformer whose rich tone and evenness has made it the popular transformer of the industry.
CIRCUS ON AIR FROM CLOWNS TO ANIMALS
LIONS DO ROARING BIT FOR THREE STATIONS

Season Premiers of Two Great Shows
Given to World Through KNY, WGY, WJZ

CHICAGO—From calfios to charlot rats, a spectacular opening of the ballyhoo side show "talkers," the circus has gone over the airwaves.

Westinghouse Station KNY here, recently broadcast for the first time in Radio history the metropolitan opening of a big show—the fifth annual premiere of Ringling Brothers and Barnum and Bailey circus. The broadcast was heard from coast to coast.

The new dramatic "highlights" told the story of the circus in a manner that few horseshoers and harpooneers have ever managed before. The broadcast was a success from every standpoint, including phone and letter boxes.

SUPER-HET AND SUPER-SUPER-HET

Miss Josephine Gavin, hands a mammoth super-heterodyne transformer made for exhibit purposes, holds little brother in her hand. However big the special super-heterodyne may be, remember that "good goods always come, etc."—U. & U.

Washington Show in October

WASHINGTON, D. C.—The Radio Merchants association of this city, at a recent meeting here reappointed Alfred L. Stern, who handled Washington's first Radio show so successfully, to stage a second show in the fall. It is probable that it will be held in October or November.

Carolina Fans Organize

ELIZABETH CITY, N. C.—Radiofans here have formed the Radio Club of Elizabeth City and plan, for one thing, to install a Radiophone station. The officers are Rev. Geo. F. Hill, president; Dr. W. W. Kramer, secretary; and S. S. Wood, treasurer.

WBAP USES NOODLE TO END TOOTHACHE

FORT WORTH, Tex.—To Sam Losh director of music here, credit is given for having cured the first toothache by Radio. Mrs. J. W. Kratty of South Omaha, Neb., writes that after having three teeth extracted she could eat no dinner, but expressed her wish for some noodle soup. Tuning in WBAP, the next number announced by Mr. Losh, was the "Noodle Soup Song." "After hearing my toothache was gone," said Mrs. Kratty, "WBAP now uses the same medicine times each night for the benefit of other dental fans.

PIONEER NEWS PLANT BLAZES NEW TRAIL

WWJ PIONEERS IN NEW TRANSMITTER TYPE

Outfit One of Five of Kind in United States

DETROIT—WWJ, the Detroit News, was off the air Sunday and Monday until 9:30 p. m. two weeks ago for the last "silent" period since it began broadcasting.

The cause of this brief rest was due to the fact that WWJ was installing a new transmitter, embodying all the improvements known to the Radio world, which permits the station now to continue its aim of giving the listening public the best there is—careful and accurate reproduction of good music and entertainment.

The Detroit News was the first newspaper in the world to install a broadcasting station, and through this service millions of people have been entertained.

The transmitter which was just replaced is the second that has served the News Radio family. This transmitter was installed January 19, 1922, and was the first Westerm Electric 400-watt set ever sold.

Old Transmitter Broadcast 3,099 Hours

Radio history was made by this transmitting station in broadcasting the distance record. When this old transmitter closed in time of service, it had completed a grand total of 3,099 hours of actual operating time. Of this number, the big 250-watt vacuum tubes have been used in sending out the 1,075 days of entertainment.

More than 25,000 kilowatt-hours of electric energy were required to operate the transmitter during this time.

WWJ dedicates its new transmitter, with an opening program by the Detroit News orchestra. Following the New orchestra was a remote control concert by the Jean Goldkette orchestra broadcast from the Greystone ballroom here.

The news for five of the type in operation in the United States are: WWJ, Detroit; KYW, Chicago; WJAL, Iowa City, and WCAP, Washington.

Jazz Music Under Ban at KFGZ, New Plant

Berrien Springs, Mich., Policy Wins Many Fans' Admiration

BERRIEN SPRINGS, Mich.—Featuring the Commonwealth quartet, Station KFGZ, Berrien Springs, Mich., has a topsy-turvy move, having given a recent Wednesday evening program for children, to give a second Wednesday evening program for adults from 10:30 to 11:30.

The new transmitter was installed on the west side of the station, and the studio is now located in the back room of the station building.

The station is called "The Radio Lighthouse," and can be heard on the air Sunday morning, Monday night, Wednesday evening, and Friday evening.

Longest Telegram Received by WJAZ, Uses 1,623 Words

CINCINNATI—The longest telegram ever received by any Radio station in the United States, and received not long ago by Station WJAZ, now WGN, is the longest transmitted to any station.

The telegram is 1,623 words long. The sender is resident of Ft. Wayne, Indiana, and was composed of a message that the recent rain and dry spell had broken, and that the snow had been flushed away. The station is on the plan to register the snow, and this modification of the Volstead law. The message was sent in the form of a telegram, this vote was not counted.

THE ANTENNA BROTHERS

Spir. L. and Lew P.

"Fare" Enough
Helium Filled Tube Is Big Improvement

Radical Invention Born in Little Laboratory

F. S. McCullough's Discovery Ranks in Importance with Dr. Forest's Addition of Grid

(EDITOR'S NOTE—F. S. McCullough is being proved of the assertion that not all important Radio research work is done in the large manufacturer's laboratory. He has produced the Helium tube, which seems to be the most radical tube invention since Dr. DeForest added the grid to the Fleming valve. Mr. McCullough's honor is Wilma- berg, Pa., where air conductance research is now going on.)

By F. S. McCullough

Helium tubes are playing a great part in the high frequency art today. You listen to the seventeen of the largest broadcasting stations using these tubes 24 hours a day. These are the first stations in the world to use the Helium atom as a carrier for Radio frequency currents.

Hereupon, it has been practically impossible to separate the Helium atom. The Helium in these tubes is by far the purest in existence. There is practically no other gas mixed with it, otherwise the tube would become inoperative. These little carriers also cool the tube.

History of Tube Research

Now just what are these currents? A great many experiments have been carried out in connection with emission of electrons from hot bodies utilizing filaments and plates within a glass bulb, which could be exhausted of air by means of a vacuum pump. The filaments were heated by a battery, and the plates were provided for the measurement of the electrical charge on the plate. With the air inside the bulb at normal atmospheric pressure, the currents of the filament were gradually increased by increasing the current passing through it. While the plate received a positive charge of electricity, the whole filament was at a yellow heat.

When the temperature was raised above this value the charge decreased, until at white heat, the charge was zero. The pressure of the air inside the bulb was now reduced and the charge diminished still further until it reversed and became negative. The negative charge gradually increased as the exhaustion of the bulb continued. Later it was found that the degree of electrification of the plate and also its state depended largely on the nature of the gas inside the bulb. It was noticed that the presence of oxygen tended to reduce the charge received by the plate.

Helium Filled, Air-cooled, Metal Fill-watt Tube

Invented by F. S. McCullough. It has proven to give three times more power per watt than any other tubes of today.

First Move in Neutrodyne

Suit Is Lost by Hazeltime

NEW YORK—An effort of the Hazeltime Research corporation to restrain Frederick Hazeltine, a manufacturer of electrical equipment from continuing manufacturing the set, has been ended, Judge Isaac Langdon, district court of Brooklyn, N. Y., not only refused to grant an injunction, but acted on behalf of Hazeltime corporation to turn over the $1,000 royalties paid to Goldsman, pending further hearing.

You Don't Know How Thrilling Radio Reception Can Be, Until You've Used

Federal Standard Radio Products

The only difference between the program at the broadcasting station and as you receive it in your own home is the origin of its source, if you use Federal Radio Equipment. The reproduction is truly amazing in fidelity and naturalness of tone.

This guaranteed mechanical perfection is the result of the same tremendous experimental and engineering resources that makes every Federal Radio Set and every one of Federal's 130 different radio units, the last word in Radio Equipment.

Federal Telephone and Telegraph Company

Factory: BUFFALO, N. Y.

Boston New York Philadelphia Chicago San Francisco

Pittsburgh Bridgeport, Canada London, England
BEFORE THEY THOUGHT OF "MIKES"

Warren R. Cox, WHK himself, was the serious-minded baby shown at the left in last week’s picture.

Warren R. Cox, WHK
W. I.

Would haven that Warren R. Cox, WHK himself has always been a penchant for things electrical. We find him first making ignition apparatus for automobiles, but when Radio sprang into glorious being like Minerva from the head of Zeus, Warren R. Cox lit into apparatus and spark plugs and bestowed it on spark sets. His first thought was to build equipment, but inasmuch as he had such a good record as a salesman, Mr. Warren’s conscience suggested that he sell their goods in Cleveland and win a place with the city people and accommodating. Mr. Cox obliged in this instance and soon was handing products of the Radio Corporation and Western Electric company in the capacity of distributor.

Warren then became his station, WHK, where Mr. Cox provides entertainment of unusual interest combining the gay, the bits of science and philosophy, and musical talent appealing to the heart rather than to the feet.

Warren Cox is a big man in every sense; as broad-minded as he is broad-shouldered, and the audience of WHK comes into closer touch with the personality of the man broadcasting announcer’s voice than may be possible from many another station.

CLASS "B" DEMAND INCREASES; 49 NEW PLANS ARE AFOOT FOR 14 MORE SUCH PLANTS

Chicago Undergoes Reorganization of Super Broadcasting; New WASHINGTON, D. C.—An increased demand exists for licenses for Class B broadcasting stations to serve the many sections of the country, according to officials of the Federal Radio Commission.

At the present time there are forty-nine Class B broadcasting stations, the record of which shows that the demand for such licenses is increasing. Plans are now being considered for the erection of at least fourteen new Class B broadcasting stations in various sections of the country.

The construction of the new stations has been held up by the new Federal Radio Act, which requires that all the stations must be operated on the public service.

Seven more large plants planned

Although seven large stations are soon to be under construction the department has not yet issued licenses and will not do so unless the applicants can give satisfactory evidence of their financial ability.

“R" is the sort of reorganization in super broadcasting is under way. WJAZ the super broadcasting station of the Radio Laboratory, has become Station WJAZ-Wide, and will operate in a wave length of 454 meters. The Herald, Examiner, with Searcy, Harris, and Atwood, is also a new station which will operate on 454 meters. Both the new stations are being erected on the hill west of the city.

Prearranged codes are employed; it is said that the new broadcasting apparatus is excellent. The new station is to be known as Station WJAZ-Wide. The station is to be operated in two sections, the second to be known as Station WJAZ-Wide 2. The new station will be ready for operation shortly.

Army Plant Asks Kicks as Argument for Funds

COLUMBUS, O.—Liqueurs in and about Columbus have been bickering considerably in recent weeks by code signals sent out from the station at the general army reserve depot at East Columbus. Officials of the department have requested listeners to mail in their complaints so that they can offer them as an argument in a request for government funds to eliminate the interference. The cost of such elimination is estimated at $250.

The Little fellow who went last week, wrapped in the bear skin, was none other than the popular announcer, Sam Kaney, chief of KYW and now of WGN.

Follow Ponies by Air in Cleveland

Bookmakers, One Jump Ahead of Cops, Take to Telephone instead of Woods

CLEVELAND.—Since the police department has been able to make the various gamblers and makers of the gambling frauds known and has extended the surveillance to telephone circuits, it seems that the police are placing a bet which is not in the difficult of accomplishment. It is said, however, that the returns are now being received with customary regularity and no complaints are being pressed in bringing the business to the bookmakers. According to rumors, transmitting sets of low power are being installed in suburban villages outside the limits of Cuyahoga County, and these stations receive and transmit reports as was done in the case of the bookmakers.

Prearranged codes are employed; it is said that the new broadcasting apparatus is excellent. The new station is to be known as Station WJAZ-Wide. The station is to be operated in two sections, the second to be known as Station WJAZ-Wide 2. The new station will be ready for operation shortly.

Army Plant Asks Kicks as Argument for Funds

COLUMBUS, O.—Liqueurs in and about Columbus have been bickering considerably in recent weeks by code signals sent out from the station at the general army reserve depot at East Columbus. Officials of the department have requested listeners to mail in their complaints so that they can offer them as an argument in a request for government funds to eliminate the interference. The cost of such elimination is estimated at $250.

Capitol Hears First Test of Leavenworth Station

WASHINGTON.—Last week the Army Message Center here was in a unique position in direct touch with its new Radio station, Station WLV, in Leavenworth, Kansas. The new circuit of about 1,400 miles was opened for tests, and results of the transmission were tried out. WDC, the call of Leavenworth was heard here first time by operators at WVA, the call of the Army Message Center in the Morrison building.

Your Choice

FREE

Limited Supply

Your prompt action gives you one bound volume with each subscription. New or renewal.

Greatest Collection of Radio Information

- A. F. Carew for Radio Digest

Two Years, starting at full subscription; thereafter, $2.00 a year. Full subscription rates apply.

Wireless Popular "Flower" Circuit

- Real Tube Novelties, Special Radio Digest Offer

Limited Supply. Offer one only. Bound Volumes run out.

Radio Digest, Volume 1

- $1.00 your first year's subscription, and chance to win a trophy.

- $2.00 second year's subscription, and choice of Deluxe Volume. Send Vol. 2...today...

- $2.25 second year's subscription and Deluxe Volume

- $2.50 special offers. Full subscription rates apply.

Radio Digest, Volume 7

- $1.00 your first year's subscription, and chance to win a trophy.

- $2.00 second year's subscription, and choice of Deluxe Volume. Send Vol. 2...today...

- $2.25 second year's subscription and Deluxe Volume

- $2.50 special offers. Full subscription rates apply.

Radio Digest, Volume 11

- $1.00 your first year's subscription, and chance to win a trophy.

- $2.00 second year's subscription, and choice of Deluxe Volume. Send Vol. 2...today...

- $2.25 second year's subscription and Deluxe Volume

- $2.50 special offers. Full subscription rates apply.

Your personal choice gives you one volume with each subscription. New or renewal.

Greatest Collection of Radio Information

- A. F. Carew for Radio Digest

Two Years, starting at full subscription; thereafter, $2.00 a year. Full subscription rates apply.

Wireless Popular "Flower" Circuit

- Real Tube Novelties, Special Radio Digest Offer

Limited Supply. Offer one only. Bound Volumes run out.

Radio Digest, Volume 1

- $1.00 your first year's subscription, and chance to win a trophy.

- $2.00 second year's subscription, and choice of Deluxe Volume. Send Vol. 2...today...

- $2.25 second year's subscription and Deluxe Volume

- $2.50 special offers. Full subscription rates apply.

Radio Digest, Volume 7

- $1.00 your first year's subscription, and chance to win a trophy.

- $2.00 second year's subscription, and choice of Deluxe Volume. Send Vol. 2...today...

- $2.25 second year's subscription and Deluxe Volume

- $2.50 special offers. Full subscription rates apply.

Radio Digest, Volume 11

- $1.00 your first year's subscription, and chance to win a trophy.

- $2.00 second year's subscription, and choice of Deluxe Volume. Send Vol. 2...today...

- $2.25 second year's subscription and Deluxe Volume

- $2.50 special offers. Full subscription rates apply.

Being Sick in Omaha Has Its Advantages

Pastor Installs Headsets in Every Room of Hospital

OMAHA—Being sick in an Omaha hospital has its advantages, according to patients who have been enjoying the special efforts that are being made to entertain them, chief of which is radio in every room.

Herefore, only a few patients were able to hear the radio programs, but the Rev. D. B. Cleveland, chaplain of the LDS hospital, has overcome this difficulty by installing a headset in every room.

This offer good only in U. S. and Canada.

This offer not good through dealers or subscription agencies, but must be sent as direct with the full subscription price. Remittance must be by check, money order or draft.

This issue published by RADIO DIgEST, 123 W. Madison St., Chicago.
**Here — the new Radiola**

**New Triumphs of Radio Invention**

**New Performance Records**

*There's a Radiola for Every Home*

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PRICE</th>
<th>APPROXIMATE RANGE</th>
<th>TYPE OF ANTENNA</th>
<th>DEGREE OF SELECTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radiola III</strong>&lt;br&gt;With two WD-11 Radiotrons and head telephones.</td>
<td>$35</td>
<td>Up to 1500 miles with headphones. Local stations on Loudspeaker.</td>
<td>Outdoor or indoor antenna.</td>
<td>Improved selectivity. Minimum radiation.</td>
</tr>
<tr>
<td><strong>Radiola Balanced Amplifier</strong>&lt;br&gt;To be used with Radiola III. With two WD-11 Radiotrons.</td>
<td>$30</td>
<td>Gives Loudspeaker operation up to 1500 miles under favorable conditions.</td>
<td>Outdoor or indoor antenna.</td>
<td></td>
</tr>
<tr>
<td><strong>Radiola III-A</strong>&lt;br&gt;With four WD-11 Radiotrons, head telephones and Radiola Loudspeaker.</td>
<td>$100</td>
<td>Loudspeaker operation up to 2000 miles under favorable conditions.</td>
<td>Outdoor or indoor antenna.</td>
<td>Improved selectivity. Minimum radiation.</td>
</tr>
<tr>
<td>Same without Loudspeaker.</td>
<td>$65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same without Radiotrons or Loudspeaker.</td>
<td>$150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same without Radiotrons or Loudspeaker,</td>
<td>$220</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Radiola Super-VIII</strong>&lt;br&gt;With six UV-199 Radiotrons. Loudspeaker is built-in.</td>
<td>$425</td>
<td>Loudspeaker operation up to 3000 miles under favorable conditions.</td>
<td>No antenna. (Concealed large loop built into set.)</td>
<td>Super-selectivity. Non-radiating.</td>
</tr>
</tbody>
</table>

*All Radiolas sold without batteries.*

* Only dry batteries used.

---

**Price Range:**

- Up to 1500 miles: $35 to $42
- Up to 2000 miles: $65 to $220
- Up to 3000 miles: $245 to $425

---

**Radio Corporation of America**

133 Broadway, New York 10 So. La Salle St., Chicago, Ill.

433 California St., San Francisco, Cal.

Dept. 314. (Address offer nearest you.)

Please send me your new free Radio Booklet.

Name:

Street Address:

City:

State:

R. F. D.

---

© Radio Corporation of America, 1924. Published as a supplement to Radio Digest—Illustrated, April 26, 1924. All rights reserved.

---

**Type of Antenna:**

- **Outdoor or indoor antenna:**
  - **Outdoor:** Used for both indoor and outdoor reception.
  - **Indoor:** Used for indoor reception only.

**Degree of Selectivity:**

- **Improved selectivity:**
  - **Minimum radiation:**
    - Suitable for weak signal reception.
  - **Maximum radiation:**
    - Suitable for strong signal reception.

**Super-selectivity:**

- **Non-radiating:**
  - Used for specific frequency reception.

---

**Antenna Options:**

- **Outdoor or indoor antenna:**
  - **Outdoor:** Used for outdoor reception.
  - **Indoor:** Used for indoor reception.

---

**Batteries:**

*Only dry batteries used.*

---

**Battery Types:**

- **Electrical Generation:**
  - **Internal loop:**
    - Used for indoor reception.
  - **External loop:**
    - Used for outdoor reception.

---

**Concealed Loop:**

- **Small loop:**
  - Suitable for indoor reception.
- **Large loop:**
  - Suitable for outdoor reception.

---

**Radio Models:**

- **Radiola III:**
  - With two WD-11 Radiotrons and head telephones.
- **Radiola Balanced Amplifier:**
  - To be used with Radiola III. With two WD-11 Radiotrons.
- **Radiola III-A:**
  - With four WD-11 Radiotrons, head telephones and Radiola Loudspeaker.
- **Radiola Regenoflex:**
  - With four WD-11 Radiotrons, and Radiola Loudspeaker.
- **Radiola X:**
  - With four WD-11 Radiotrons. Loudspeaker built-in.
- **Radiola Super-Heterodyne:**
  - With six UV-199 Radiotrons and Radiola Loudspeaker.
- **Radiola Super-VIII:**
  - With six UV-199 Radiotrons. Loudspeaker is built-in.
Use WGR to Identify
Owner of $1,651 Roll

Police Call on Radio to Help Find
His Missing Kin

BUFFALO, N. Y. — WGR was used re-
cently in identifying the owner of a $1,651.

Theodore Van Andel, a man of sixty-
years, was picked up by the police while
wandering aimlessly along some railroad
yards at the railroad crossing in Buffalo
and displaying a large roll of bills.

At the police station $450 in small bills
were found on him and later some more
that a thousand dollars was discovered se-
cored in different parts of his clothing.

Only master details of his life and an
inocent story which involved Cleve-
land, Detroit, Chicago and other western
points as well as Toronto, Ont., could be
obtained from the man.

The court ordered him to the city hospital for observa-
tion, pending the location of friends and
relatives. To the latter end, WGR went
on the air with a lengthy description of
the man and a statement of the affair.

France Features Radio
at Exhibit in Gotham

Will Exchange Greetings
with America by Airwaves

NEW YORK — Radio is a feature of the
French exposition now held at the
Grand Central Palace here under the of-
icial patronage of the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. An
official at the French government. AN

HOLDS RADIO LEADS
to WORLD TONGUE

ENGLISH FORESEEN AS AIR
LANGUAGE OF ALL

Esperantists, however, are trying to
Stop "Artificial" Rivals as
New Grown

NEW YORK — That radio broadcasts
will lead to the development of a single
language used throughout the world is
one of the latest predictions brought
forward by experts.

W Ill a single universal language will be
likely to develop for almost simulta-
eneously as with the prediction by Guy E. Tripp, an electrical
expert of this city, that instead of an
artificial tongue, English will become
the world's radio language. It is
announced that an organization
has been formed in London
to establish "GUT E. TRIPP
Esperanto as the medium of radio
communication. Mr. Tripp expressed the opinion that when English and other for-
tern regions will become conversed in
radio waves bearing an inconceivable change of mixed and confusing tongues there will be a result, because every
language will be learned by everyone with
the least trouble possible."

But metals such as copper, iron, and another
that may be predicted with certain
communication. This is the subject of a
universal language.

CLOSER inspection of many regen-
erate receivers reveals but one
langue in every body-
capacity effects. The Grebe en-

engineers believed that this method
resulted in the absorption and dissi-
ination of too much precious energy.

As a result of their research, each
the control on a GREBE Re-

ceiver that has its own aluminum shield
of special size and shape.

This is just one of many details of
craftsmanship which make for the high
efficiency of Grebe Receivers.

A. H. GREBE & CO., INC.

Richmond Hill, N.Y.
WASHINGTON.—The first conference on the White bill was held April 12 by the Radio subcommittee, when a number of recommendations were considered. It is understood that Representative White of Maine, chairman of the committee, will insist that the bill continue its work until ready to report the bill to Congress.

The committee included no amendments that would affect the copyright law, according to the report of the bill and the Senator stated that he had been told by the telegraph companies that no such number of telegrams have been received in connection with any copyrighted matter since the declaration of war with Germany.

F. McDonald, Jr., representing the National Association of Broadcasters, told the committee the broadcasters of the country do not favor collections from the public to pay for programs. He went into some detail regarding the activities of the American Society of Composers, Authors and Publishers and stated that up to a year or so ago any songs could be broadcast free. Relative to profits derived by broadcasters he stated that radio apparatus manufacturers of the country could stop broadcasting any day and their profits would go on just the same.

Charles H. Tuttle, counsel for the broadcasters’ association, was the principal witness and he presented a very good case in favor of the bill particularly from the legal standpoint. He said that if the position of the opposition is upheld that either the broadcasters will have to go out of business or they will have to receive some compensation.

Mr. Tuttle told the committee that the music publishers have a 10 per cent monopoly. He said thatUsually the composers have pooled their interests. He spoke also of the conference held between the composers and the broadcasters at which it was stated that $60 per cent of the publishers belong to the association. He said that a large part of the broadcast songs are copyrighted.

Says American Society Is Illegal

The publisher’s association, he said, is an organization in restraint of trade. He told the committee that the public is vitally interested because they know what is at stake. He contended that the bill is not contrary to the copyright law, as it deals with Radio, which was not heard of when the copyright bill was passed. He spoke also of publicity given the music publishers by the radio broadcasters. He spoke also of the cost of publication. He said that the publishers are now asking the broadcasters to cease their music, aside from the association. The issue, he concluded, is between the small number of music publishers, composers, etc., and the American Radiophonic. Frank Sheridan, an independent music publisher, told the committee of the value of Radio publicity and said that four-fifths of the sales of one of his popular songs was directly traceable to Radio publicity. He opposed the bill and called for a new bill to take place before the Senate patent committee April 17. Opponents to

TAX BILL PROTESTS FLOOD IN SENATE

WASHINGTON.—Thousands of protest against the proposed ten per cent Radio tax have been received from Radiophones and from almost every Radio manufacturer in the United States, according to the finance committee of the Senate. It is believed the wisdom of protest may do much to defeat the pass of the tax.

TALK WORLD TONGUE

(Continued from page 1)

The perfection of an Esperanto-Radio Dictionary is one of its first intentions. Dr. Pierre Cornet of Versailles, France, an Esperantist and Radio expert, has been selected as president. Harry A. Union, of the British Esperanto Association of London, honorary secretary said the organization welcomes members from the world’s radio fans, whether they are Esperantists or not. Esperanto, it explained, was established twenty-eight years ago and is briefly being described as being formed from the best of six existing languages.

The bill did not come to be heard then. Representatives of the Society of Composers, Authors and Publishers were to appear. What method of attack the veteran society lobbyists would take was a question. It was believed that they would use tactics similar to those successful in the days of

BUILD "THE ROLLS-ROYCE OF RADIO"—A

Super-Teleodyne!

All-American is ready for you! Ready with a thoroughly tried and proved transformer—at only $6.00—that makes the utmost of the high efficiency of long wave radio frequency amplification. It’s the new All-American Type R-110, a little gem of beauty in its handsome, round, nickelplated shield! Easy to assemble and looks like a million dollars in the set. Works to perfection! For wave lengths 4,000 to 20,000 meters (75 to 15 K.C.).

ALL-AMERICAN Long Wave

Radio Frequency Transformer. Includes all for Super-Heterodyne, Ultraphone and straight radio frequencies. Ideal for coupling to various types of receivers to prevent inter-stage coupling or reactions. Complete $6.00 each.

STANDARD ON THE BETTER SETS

SOLD BY ALL THE BETTER DEALERS

A type for every circuit

AMPLIFYING TRANSFORMERS

LARGEST SELLING TRANSFORMERS IN THE WORLD

TALK WORLD TONGUE

(Continued from page 1)

The perfection of an Esperanto-Radio Dictionary is one of its first intentions. Dr. Pierre Cornet of Versailles, France, an Esperantist and Radio expert, has been selected as president. Harry A. Union, of the British Esperanto Association of London, honorary secretary said the organization welcomes members from the world’s radio fans, whether they are Esperantists or not. Esperanto, it explained, was established twenty-eight years ago and is briefly being described as being formed from the best of six existing languages.

The bill did not come to be heard then. Representatives of the Society of Composers, Authors and Publishers were to appear. What method of attack the veteran society lobbyists would take was a question. It was believed that they would use tactics similar to those successful in the days of

BUILD "THE ROLLS-ROYCE OF RADIO"—A

Super-Teleodyne!

All-American is ready for you! Ready with a thoroughly tried and proved transformer—at only $6.00—that makes the utmost of the high efficiency of long wave radio frequency amplification. It’s the new All-American Type R-110, a little gem of beauty in its handsome, round, nickelplated shield! Easy to assemble and looks like a million dollars in the set. Works to perfection! For wave lengths 4,000 to 20,000 meters (75 to 15 K.C.).

ALL-AMERICAN Long Wave

Radio Frequency Transformer. Includes all for Super-Heterodyne, Ultraphone and straight radio frequencies. Ideal for coupling to various types of receivers to prevent inter-stage coupling or reactions. Complete $6.00 each.

STANDARD ON THE BETTER SETS

SOLD BY ALL THE BETTER DEALERS

A type for every circuit

AMPLIFYING TRANSFORMERS

LARGEST SELLING TRANSFORMERS IN THE WORLD
WHB's "Invisible Theater" Offers Seats for "Soup and Fish" and Gallery Gods

E. J. Sweeney, Operator of Kansas City Station, Says "One Half the World's a Stage and the Other Half's Audience"—Advances Subscription Plan

By Vera Brady Shipman

S

HAKESHAPE—You know it when he

said "All the world's a stage," ac-


gording to J. E. Sweeney, president

and owner of the Sweeney Automotive and

Electrical School, which operates KLO Radio

Station. The broadcast station, Mr. Sweeney says

that half the world is the stage and the other

half is the audience of the "In-

visible Theater" for which WHB is

offering seats for the year's broadcasting

program. After two years of paying his li-

bles for educational and entertaining

programs, a definite plan to suggest to his

other half of the combination—the listeners—

may pay their part, has brought a flood of

comments.

Seats in this vast invisible theater range

from a dollar to ten dollars. Certificates of

sale are mailed to the purchaser with a

reserved seat ticket according to your

choice on the seat diagram accompanying

your order blank. Honorable mention is

also made over the Radio.

"Invisible and Soup and Fish!"

For a dollar you may be a gallery god

and for ten dollars you may enjoy all the

pleasures of a tuition, opera hat and

wife's new evening gown, and sit in a

comfortable Fireside the while. It

saves tax, face, too.

You have an opportunity to give your

program preference with your ticket order

by checking the desired kind of music or

lectures.

This novel plan is sent out to the WHB

fans mailing list. George H. Stone is listed

as director of the new invisible theater.

But the story of E. J. Sweeney himself,

to his fall with his motor school,

is worth telling here, for you may begin to

about Sweeney to appreciate this

school's elevating WHB programs for

the coming year.

Sweeney School Launched

on Seventy-Dollar Plan

The Sweeney school is the result of one

man's mind and labor. With an initial

capital of seventy dollars, E. J. Sweeney

began operations in a small room

in one school in Kansas City, for the

young man who possessed himself

and could not afford an engineering

course. The practical man organized a

school where short time courses turned

out garage and airplane mechanics, Radio op-

erators, and plumbers.

Born in Illinois and moving to Kansas

City, the banker's son, a youth with vision

but little capital, his present home at

Kansas City, the Sweeney School City subdivision—

a showcase of comfort and happiness—

is a type of a mechanical training place for

the world. The war opened the Sweeney doors to

many a boy and girl who never before had

a chance for an education in the Kansas City

school for overseas mechanics. More than

fifty radio mechanics entered the Sweeney's short

time course into the service.

With peace came Radio development.

Naturally the Sweeney school was an

early exponent, for the automobile and

Radio are first cousins. The heart of the

mechanic turns to both. In June 1922 WHB

was opened. Its two aerials tower rise 135 feet each above the ten-

story building, bringing the aerial to a height of 450 feet above the

ground. Five rooms on the top floor have been given over to the

Station WHB.

Broadcasting on all 141 million as a class

B station, Tuesday, Thursday, and Sunday,

evenings are filled with musical programs

and special announcements, waves and

weather reports given all day long. WHB has its own

orchestra and Kansas City soloists as well as

visiting artists have helped make WHB a high standard.

The regular announcer for WHB since

its beginning has been John T. Schilling. The Radiophonist knows Schilling's voice

the instant he hears it in Kansas City.

Sweeney Personality Reflects in WHB

Plan. In a sense, the Sweeney plan is a

fact that is mistaken for Radio personality

and presents an interesting study to watch the growth of a

Radio station as such is reflected in that of

a society. The Sweeney Wave is a unique

character in the Kansas City School of

Radio.

"WHB programs are high grade," said

David Brittain, to the insertion of the

broadcast. "I have the impression that

listeners want them to be so. The

situation is the same in every large

Kansas City, the Radiophonist in the

north West. When WHB is heard in

lands, each listener to WHB programs

knows he has a voice of potentiality. We want

him to feel that WHB is his station.

Major J. Andrew White, known to thousands as

the "Radio Sporting Resource," has become fa-

mous for his ability to visualize the quick action

in all kinds of sports from football and cham-

pionship pigpenny encounters to the World Series baseball games. He is indeed king of

sports announcers.

WJZ Announcer Taken For Better or Worse

Milton J. Cross Puts One Over on His Listeners

NEW YORK—Milton J. Cross, better

known to hundreds of thousands of list-

eners throughout the country as "AJN," one of the most popular announcers of the

city's best radio stations WJZ and WXY, was married

on a recent Sunday afternoon unknown to the

listeners in, for the ceremony took place early enough day to be before the

microphone of WJZ at 12:30 clock to introduce the broadcast orchestra just
two, though nothing unusual had happened.

Mr. Cross made his debut as an announcer in the fall of 1921 from station WJZ in

Newark, N. J. When WHJ moved to its present home in the Audubon building, New

York, Cross was heard from both stations WHJ and its twin station, WXY.
NEVER BEFORE in Radio History has there been a proposition like this. NOW bringing the finest and most efficient of radio down to the level of everybody’s purse. Here is luxurious beauty that a millionaire can envy. Here is the design and the power to gather in broadcasts from coast to coast. No money could ever buy greater Handasme. Three to five times the price cannot NOW buy better Results. You must and will Be SATISFIED, or your money is returned.

The De Luxe NEUTRODYNE

TUBE GENUINE HAZELTINE NEUTRODYNE

Knock-Down Set COMPLETE

Send C. O. D.

$34.49

Send No Money

Study this Magnificent List of Parts—All Matched—All Licensed

Demonstrators Wanted

We want a live young man in every town, and in every section of large cities, to own, operate and demonstrate "The De Luxe Neutrodyne." Get furnished at discount, and spec- ified parts. Orders take immediate effect. Address Sales Office, M. C. Perry, Executive Officer, The Radio Shack, America’s Largest Radio Dealers, 55 Vesey St., Dept. BD 48, New York City.

We acknowledge all orders same day received. We ship same day or following day. We answer EVERY LETTER we get on the same day we get it. WRITTEN Money-Back Guarantee with every pur- chase.

The RADIO- SHACK

Executive Offices: Dept. BD 426
55 Vesey Street, New York City

Goods shipped C. O. D.

Just pay the postman

EVERY ARTICLE SOLD ON WRITTEN MONEY-BACK GUARANTEE

Largest Radio Dealers in America

Send this Coupon Now

THE RADIO SHACK, Executive Offices, Dept. RD 89,
55 Vesey St., New York, N. Y.

Mark X here ONLY if you want to order Radio Set

Mark X here ONLY if you want all accessories

Mark X here ONLY if your local dealer is licensed

Ship me, C. O. D., subject to your WRITTEN Money-Back Guarantee, the parts for this $34.49 "De Luxe Neutrodyne Kit including Hazeltine Neutroformer mounted in the famous Genuine Hazeltine Condensers, Mahogany Panel, Engraved with a Nepali Emblem. When shipped to your address, a mail order is complete. Complete assembly.

Sign Name

Address (print plainly)

NAME

ADDRESS

Send your order and you will get

THE RACIO DigEST—Illustrated

April 26, 1924

This Newest Marvel of Radio Engineering Smashes High Price!
OPERATING AND TROUBLE SHOOTING

For the Owner of a FADA "One-Sixty" Receiver

OPERATING and Trouble Shooting is a Radio Digest feature whose purpose is to study the latest models of various standard receiving sets and to show the newly initiated broadcast listener, who has purchased such a set, how he can operate it to get the best there is in it and how he can overcome some minor difficulties which may be causing some trouble. On pages 11 and 12 this week, the Fada "One-Sixty" Receiver is described. Radiophans with other sets will also find these articles worth reading, particularly the notes on trouble finding.

T HIS Fada "One-Sixty" four-tube receiver incorporates a new circuit invented by Professor L. A. Haslett of Stevens Institute of Technology at Hoboken, N. J.

Using only four vacuum tubes the receiver actually does the work of five tubes. Technically, it is a tuning device, two stages of tuned Radio Frequency amplification, vacuum tube detector and two stages of audio frequency amplification. One of the features about the "One-Sixty" is the fact that it can be very easily tuned and the method of tuning is in itself extremely simple. The Fada "One-Sixty" with only three dials and with none of them rotating practically at the same time, becomes exceedingly simple to operate.

Antenna

Battery Connections

Connecting the A and B batteries to the receiver is a simple task. The drawing showing the battery connections will aid in understanding the wires should they. An insulated shield extends through the rear right-hand end of the "One-Sixty" and on this is mounted the battery binding posts.

Both the A and B batteries have a certain polarity. That is, there is a positive terminal (marked +) and a negative terminal (marked -) to each battery. On both A and B batteries the positive terminal is usually painted red or has a red connection wire attached.

From the positive terminal of the A battery a wire should be connected directly to the positive (+) battery binding post to the rear of the receiver. From the other or negative (-) terminal of the A battery a wire should be connected directly to the negative A battery binding post of the receiver.

A switch S. is provided in the "One-Sixty" receiver to turn on or off the current from the A battery. The switch is located on the front of the panel at the extreme right and below the rheostat knob. It should be pulled out to light the tubes and pushed in to turn out the tubes. The B batteries are made in blocks of 15-volts each. Three of these batteries are connected as shown in the drawing. The negative (-) and positive (+) terminals of the B battery will be found marked in the insulated wax on the top of the battery. To make the series battery connection wires should connect from the positive (+) terminal of one battery to the negative (-) terminal of the second battery, and from the positive (+) terminal of the second battery to the negative (-) terminal of another battery. This will leave the positive and negative B battery terminal wires and wires should connect from the negative (-) terminal to the second negative or center binding post on the receiver shelf, and from the remaining positive B battery terminal to the extreme left hand binding post on the receiver shelf marked "amplifier positive." Now only one binding post on the rear of the receiver shelf remains free. The connection wire should go from this binding post to the right of the two battery sockets.

Battery terminals are marked (+) and (-) in the upper left and lower right corners of the battery compartments. A rubber plug is provided for the B battery terminals which will be inserted when the batteries are to be used. The plug is removed when the batteries are not being used.

T HIS week's notes should be read carefully and the manner of addressing thoroughly understood, otherwise the receiver will seemingly be blanketed, this being, however, being the receiver.

Shooting alone is not an indication of proper installation. The various terminal blocks of the receiver may be made by connecting a wire from any pair of the terminals in one battery to the other battery.

The procedure of tuning a "One-Sixty" receiver, providing antenna, ground, and a dial, is shown in diagram and may be observed exactly on the opposite page.

(Continued on page 12)

THE De Forest name has been in the forefront of radio research for twenty-three years. De Forest invented the three-electrode vacuum tube which makes present-day radio possible. The sets and parts made today by the De Forest Company are worthy of the De Forest name.

DE FOREST RADIO TEL. & TEL. CO.
Dept. R. D. 8
JERSEY CITY, N. J.

How to Tune In

These tuning instructions should be read carefully and the manner of addressing thoroughly understood, otherwise the receiver will seemingly be blanketed, this being, however, being the receiver.
their efficiency of operation at any time as good as with the soft tube.

When the detector tube is not functioning properly, the right operating point of the receiver will be in time to a wave length of 143 meters. This will be considered to be 65 on dial 2 and 65 on dial 3. Actually use the numbers written in for the particular tube for which the calibration is made. Now bring the dial 1 in the same position as dial 2 and then move slowly up a few divisions and down again. If the noise is materially reduced, possibly as low as on 60. If any broadcasting station is at the particular time transmitting on 143 meters, it will be heard at a maximum setting on the dial 1 approximately in the range of from 3 divisions above dial 2 to 20 divisions below dial 2.

If the signals from any particular broadcasting station are coming in it is advisable to slightly readjust dials 1, 2 and 3 and possibly also the rheostat, in order to increase the intensity and at the same time to bring signals in without distortion. In tuning, the dials should not be moved faster than a few divisions per second. With either the headphones or loud speaker plugged into either the "Phone" or "Horn" jack it will be found that the tuning adjustment may need to be changed slightly when shifting from one jack to the other.

When tuning a short wave antenna, such as is used in a television receiver, the adjustment is reached. At this point bring in a comparatively loud listening and tuning noise, which is objectionable. For the study of the receiver should be turned back slightly to a point just before this noise and tuning start. Great care is necessary for a small degree of tuning and noise will not occur except with a soft or very sensitive ear. That is, it will probably be entirely absent with a WD-12 or UV-199 or C-339 tube and on these tubes the position of the detector circuit does not materially effect their efficiency of operation, nor is it for the particular station you wish to hear.

As the user proceeds in picking up programs by tuning, various stations will be made. A log book of the call signs and dial settings is kept. Also if a station is kept long enough, the signals will be heard in the receiver of the next station.

(ANOTHER SET NEXT WEEK)

Switch Knob
To make a simple switch knob, cut the top of an ordinary spoon off at the place where it joins to the handle, and staple paper in its place. A convenient size will be one which requires from two to three coats of black enamel to improve its appearance. This makes the knob. A long threaded bolt of sufficient thickness to fit snuggly into the hole in the knob is then pushed through the knob. The top of the hole is then countersunk, so that the head of the bolt lies flush with the top of the knob. The contact arm is cut from a strip of brass or copper. A hole is made in one end, and the arm is then tightened to the knob by means of a nut. On the other side of the panel the usual arrangement of washers, tension nuts, and wire connections is followed.

The Interference
Selectivity—which is merely the ability to cut out interference—is the dominating difference between the very expensive sets and the comparatively expensive ones. Why pay $50 to $200 extra for increased selectivity, when for $30 you can get a FERBEND WAVE TRAP which will absolutely cut out any interfering station, no matter how loud, how close by or how troublesome.

Add a FERBEND Wave Trap to Your Set
You will find it a valuable addition. It is designed and manufactured complete by us, of years of care- ful experience. You need not be confused with the limitations hardly assembled from ordinary parts. The 5 TUBE NEUTRONYDE tube is made with an adjustable C.C. D. plus a few cents postage. If you prefer, you can send cash in full with order and we will ship purchase prepaid. Send in your order today.

The Interference
Selectivity—which is merely the ability to cut out interference—is the dominating difference between the very expensive sets and the comparatively expensive ones. Why pay $50 to $200 extra for increased selectivity, when for $30 you can get a FERBEND WAVE TRAP which will absolutely cut out any interfering station, no matter how loud, how close by or how troublesome.

Add a FERBEND Wave Trap to Your Set
You will find it a valuable addition. It is designed and manufactured complete by us, of years of care- ful experience. You need not be confused with the limitations hardly assembled from ordinary parts. The 5 TUBE NEUTRONYDE tube is made with an adjustable C.C. D. plus a few cents postage. If you prefer, you can send cash in full with order and we will ship purchase prepaid. Send in your order today.
What's Wrong with Your Receiving Set?

Chapter IX—Assembling and Wiring Neutrodyne Receivers

By Peter J. M. Clute

The diagram of the five-tube receiver shown in the preceding article was designed for operation on the neutralized tuned radio frequency amplification (neutrodyn). Two stages of straight audio frequency amplification are provided in the neutrodyn, and two neutrodyne sets. Standard transformers are employed in the neutrodyn amplifiers, and two neutrodyne sets, the receiver for use in a loud speaking device.

Three neutrodyne sets are provided. The standard variable condensers and two neutrodyne sets are necessary whether the Radiophon builds the three-tube, four-tube, or five-tube neutrodyne receiver.

In general, there will be little advantage in signal strength gained by the five-tube receiver. It differs from the four-tube refex in that the two Radio frequency amplifying tubes are used for Radio frequency amplification only, while in the four-tube refex one of them is also employed simultaneously as an audio frequency amplifier. The four-tube refex receiver will be found a little harder to adjust at first, but when properly adjusted it will produce satisfactory results with almost equal voltage.

In the preceding discussion, there has been presented several of the popular types of neutrodyne circuit receivers, namely, the three-tube, four-tube refex, and the five-tube sets. It is recommended that a tube of one of these receiver sets be selected for the details and expected performances of these types and for the principle of deciding which to construct. Neutrodyne receivers will be found more efficient than the DX scoops and their utmost simplicity of operation will recommend themselves to the large host of Radiohophans. With the introduction of these receivers, it was clearly demonstrated to the skeptical class of fans that it was possible to construct a receiver which combines a very high degree of efficiency with ease and operating simplicity.

Obviously, with the neutrodyne receiver, as with any other form of receiver, the efficiency of operation is dependent to a great extent upon the cost of the parts used. Correctness and accuracy in the construction of the various units is a must for a successful operator. Needless to say, the five-tube refex receiver will be more expensive. The units required for the neutrodyne receiver are essential. The various adjustable parts of the circuit, as well as the input to the output transformer, must be set up accurately.

Dial Settings for Wavelength

Manufacturers of neutrodyne parts make it easy for the Radiophon to secure the circuits for the neutrodyne receiver, including the three neutrodyne sets and two neutrodyne sets. Each of these transformers have been completely tested and guaranteed to work as to form a closed circuit and calibrated for you. Thus ensuring that the three neutrodyne sets in a single package will function at practically identical dial settings for any given wavelength.

The neutrodyne receiver should be considered a single stage or the only one that will not be able to apply with equipment to any amplification and wave. Efficiency, if any of the neutrodyne tubes. Measurably tested, these tubes have demonstrated that best results are obtained by placing them at any angle of 15 degrees. Mounting the neutrodyne transformer at this angle will prevent magnetic coupling or interaction between the coils.

SPEARING THE TUBES

In arranging the sockets for the Radio frequency meters it is necessary to exercise them sufficiently far apart to prevent intertube capacity effects. The detector and audio frequency amplifying tubes can be mounted close together without being susceptible to interferences. The sockets used should be of the panel mounted variety, with sufficient room for mounting the control rheostats between the rear of the panel and the socket where necessary. Before assembling the sockets on the panel it is advisable to mount the control equipment at two smaller sections or bands, and the knobs securely attached to the base of the socket, and (Continued on page 24)

**PEERLESS RADIO, 349 Fulton St. BROOKLYN, N.Y.**

Parcel Post prepaid on all orders above $5.00. Express Money Order, Certified Check, Bank Draft accepted; also C. O. D. Guarantees with all merchandise.

The Long-life Tube!

Since their inception, radio vacuum tubes have been fragile. To knock or drop one incurred the expense of a new tube. But now there are Myers Tubes PRACTICALLY UNBREAKABLE

As protected by their unique design that they have been dropped on the floor without injury. But their hardness is only one feature. They are exceptional in stability and performance, and on broken leads mean less interference—more clarity and greater efficiency. If your order includes more than one Myers tube, there will be a reduction in price.
AN EVENING AT HOME WITH THE LISTENER IN

<table>
<thead>
<tr>
<th>Day</th>
<th>Show</th>
<th>Time</th>
<th>Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Silent</td>
<td>8:00-8:30</td>
<td>309</td>
</tr>
<tr>
<td>Monday</td>
<td>Silent</td>
<td>8:30-9:00</td>
<td>309</td>
</tr>
<tr>
<td>Monday</td>
<td>Silent</td>
<td>9:00-9:30</td>
<td>309</td>
</tr>
<tr>
<td>Monday</td>
<td>Silent</td>
<td>9:30-10:00</td>
<td>309</td>
</tr>
<tr>
<td>Monday</td>
<td>Silent</td>
<td>10:00-10:30</td>
<td>309</td>
</tr>
<tr>
<td>Monday</td>
<td>Silent</td>
<td>10:30-11:00</td>
<td>309</td>
</tr>
<tr>
<td>Monday</td>
<td>Silent</td>
<td>11:00-11:30</td>
<td>309</td>
</tr>
<tr>
<td>Monday</td>
<td>Silent</td>
<td>11:30-12:00</td>
<td>309</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Silent</td>
<td>8:00-8:30</td>
<td>309</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Silent</td>
<td>8:30-9:00</td>
<td>309</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Silent</td>
<td>9:00-9:30</td>
<td>309</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Silent</td>
<td>9:30-10:00</td>
<td>309</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Silent</td>
<td>10:00-10:30</td>
<td>309</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Silent</td>
<td>10:30-11:00</td>
<td>309</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Silent</td>
<td>11:00-11:30</td>
<td>309</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Silent</td>
<td>11:30-12:00</td>
<td>309</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Silent</td>
<td>8:00-8:30</td>
<td>309</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Silent</td>
<td>8:30-9:00</td>
<td>309</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Silent</td>
<td>9:00-9:30</td>
<td>309</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Silent</td>
<td>9:30-10:00</td>
<td>309</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Silent</td>
<td>10:00-10:30</td>
<td>309</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Silent</td>
<td>10:30-11:00</td>
<td>309</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Silent</td>
<td>11:00-11:30</td>
<td>309</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Silent</td>
<td>11:30-12:00</td>
<td>309</td>
</tr>
<tr>
<td>Thursday</td>
<td>Silent</td>
<td>8:00-8:30</td>
<td>309</td>
</tr>
<tr>
<td>Thursday</td>
<td>Silent</td>
<td>8:30-9:00</td>
<td>309</td>
</tr>
<tr>
<td>Thursday</td>
<td>Silent</td>
<td>9:00-9:30</td>
<td>309</td>
</tr>
<tr>
<td>Thursday</td>
<td>Silent</td>
<td>9:30-10:00</td>
<td>309</td>
</tr>
<tr>
<td>Thursday</td>
<td>Silent</td>
<td>10:00-10:30</td>
<td>309</td>
</tr>
<tr>
<td>Thursday</td>
<td>Silent</td>
<td>10:30-11:00</td>
<td>309</td>
</tr>
<tr>
<td>Thursday</td>
<td>Silent</td>
<td>11:00-11:30</td>
<td>309</td>
</tr>
<tr>
<td>Thursday</td>
<td>Silent</td>
<td>11:30-12:00</td>
<td>309</td>
</tr>
<tr>
<td>Friday</td>
<td>Silent</td>
<td>8:00-8:30</td>
<td>309</td>
</tr>
<tr>
<td>Friday</td>
<td>Silent</td>
<td>8:30-9:00</td>
<td>309</td>
</tr>
<tr>
<td>Friday</td>
<td>Silent</td>
<td>9:00-9:30</td>
<td>309</td>
</tr>
<tr>
<td>Friday</td>
<td>Silent</td>
<td>9:30-10:00</td>
<td>309</td>
</tr>
<tr>
<td>Friday</td>
<td>Silent</td>
<td>10:00-10:30</td>
<td>309</td>
</tr>
<tr>
<td>Friday</td>
<td>Silent</td>
<td>10:30-11:00</td>
<td>309</td>
</tr>
<tr>
<td>Friday</td>
<td>Silent</td>
<td>11:00-11:30</td>
<td>309</td>
</tr>
<tr>
<td>Friday</td>
<td>Silent</td>
<td>11:30-12:00</td>
<td>309</td>
</tr>
<tr>
<td>Saturday</td>
<td>Silent</td>
<td>8:00-8:30</td>
<td>309</td>
</tr>
<tr>
<td>Saturday</td>
<td>Silent</td>
<td>8:30-9:00</td>
<td>309</td>
</tr>
<tr>
<td>Saturday</td>
<td>Silent</td>
<td>9:00-9:30</td>
<td>309</td>
</tr>
<tr>
<td>Saturday</td>
<td>Silent</td>
<td>9:30-10:00</td>
<td>309</td>
</tr>
<tr>
<td>Saturday</td>
<td>Silent</td>
<td>10:00-10:30</td>
<td>309</td>
</tr>
<tr>
<td>Saturday</td>
<td>Silent</td>
<td>10:30-11:00</td>
<td>309</td>
</tr>
<tr>
<td>Saturday</td>
<td>Silent</td>
<td>11:00-11:30</td>
<td>309</td>
</tr>
<tr>
<td>Saturday</td>
<td>Silent</td>
<td>11:30-12:00</td>
<td>309</td>
</tr>
<tr>
<td>Sunday</td>
<td>Silent</td>
<td>8:00-8:30</td>
<td>309</td>
</tr>
<tr>
<td>Sunday</td>
<td>Silent</td>
<td>8:30-9:00</td>
<td>309</td>
</tr>
<tr>
<td>Sunday</td>
<td>Silent</td>
<td>9:00-9:30</td>
<td>309</td>
</tr>
<tr>
<td>Sunday</td>
<td>Silent</td>
<td>9:30-10:00</td>
<td>309</td>
</tr>
<tr>
<td>Sunday</td>
<td>Silent</td>
<td>10:00-10:30</td>
<td>309</td>
</tr>
<tr>
<td>Sunday</td>
<td>Silent</td>
<td>10:30-11:00</td>
<td>309</td>
</tr>
<tr>
<td>Sunday</td>
<td>Silent</td>
<td>11:00-11:30</td>
<td>309</td>
</tr>
<tr>
<td>Sunday</td>
<td>Silent</td>
<td>11:30-12:00</td>
<td>309</td>
</tr>
</tbody>
</table>

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

Don't take your ground connection for granted; check it over; it often prepares terrestrials and makes a good ground a poor one in four or five months. Most people simply open the window, putting the tubing across the window and the window. A short piece of porcelain tubing should be used to prevent leakage.

2-LO, LONDON, ENGLAND ON ONE TUBE

Another Record for the ELGIN SUPER-REINARTZ

Tuesday, November 27, during the test period between 9 and 9:30 P.M., Rev. E. A. Cole in the residence of J. A. Melzer, of Roadhouse, Ill., while operating a set made of materials and in accordance with the hookup furnished by the ELGIN RADIO SUPPLY CO. of St. Louis, L. O. London, and using receivers but one tube. Later another tube was added and the loud speaker used, so that four people could hear the program and concluding announcement. The numbers, time, and the order in which they were played were...
64 PROGRAMS FOR EIGHT DAYS

Tuesday, April 22

Headliners of the Week

For those who fear modern fiction, KDRA gives a lecture Tuesday night, "The Contemporary Novel: Some Guenther Novels," by Frederick P. Haynes. Wednesday, one of the world's youngest experts, Dick Winfield, will talk over KDRA how he became a successful newspaper man. The United States Marine Band which is not heard very often will play over WABE this same evening.

WRN is giving an exceptionally fine music talk every Thursday. This week the title is "The Greatest Songs: A Ritual of Masterpieces.

The talk given by WMAQ Friday night will suggest a new sport to the tired motorist, "Hunting Crocodiles in the Hothorns," by Karl P. Schmidt of the Field Museum. "Chile is a friendly home from the U. S., lying as it does along the western edge of S. A. WRJ will bring this closer tonight with a Chilean program in honor of the sons of the Pan American Union.

Saturday night CKAC again lists the discoveries band and artists direct from the brewery. Prize awards are offered. WWAM is putting on the N. E. Y. C. A. Minstrel Tramp and the Jolly Five Singing Orchestra. These members of the Jolly Five are all boys under fifteen.

The Columbia Sunday Evening Club has secured America's best known writer as a speaker this Sunday night, I. E. Henry Van Dyke will be heard over KWW's microphones.

Debates are very common nowadays over the radio. WIX, however, will surely attract attention Monday night. The subject is the question of prohibition enforcement. A new musical instrument never heard over the radio before and still stirs as makes its debut over WIX, Ray Johnson will play among other instruments his own invention, the vernon. This instrument sounds something like a violoncello or a saxophone and has a range of two octaves.

Tuesday get WSB and a good old-fashioned southern program in the dark spiritual given by the Bethel choir, No. 2.

Robert E. Golden (left) is the director of the Wannamaker Crystal Tea Room Orchestra, which is broadcast every Wednesday afternoon from WDD, Philadelphia. A popular orchestra with the listeners because of their musical program, it is composed entirely of a personnel with a truly remarkable voice, will be heard from WDD, Philadelphia, May 4th, at 2:30 p.m. Every Monday and Thursday the orchestra will be heard through WFI, Wednesday, April 22, at 2:30 p.m.


Where to Hear Concerts

**THERESE** are the stations for music lovers to dial and you can hear, providing you dial correctly and read the programs carefully, everything from jazz to opera.

**Thursday:** KDKA, KGO, KFI, KKSF, KOH, KGK, KOA, KYW, WLS, WMAQ, WKBW, WOR, WOR, WOR, WOR, WOR. **Goodnight, General:**

**Friday:** KDKA, KGO, KFI, KJMO, KOH, KGK, KOA, KYW, WLS, WMAQ, WKBW, WOR, WOR, WOR, WOR, WOR. **Goodnight, General:**

**Saturday:** KDKA, KGO, KFI, KKSF, KOH, KGK, KOA, KYW, WLS, WMAQ, WKBW, WOR, WOR, WOR, WOR, WOR. **Goodnight, General:**

**Sunday:** KDKA, KGO, KFI, KKSF, KOH, KGK, KOA, KYW, WLS, WMAQ, WKBW, WOR, WOR, WOR, WOR, WOR. **Goodnight, General:**

**Monday:** KDKA, KGO, KFI, KKSF, KOH, KGK, KOA, KYW, WLS, WMAQ, WKBW, WOR, WOR, WOR, WOR, WOR. **Goodnight, General:**

**Tuesday:** KDKA, KGO, KFI, KKSF, KOH, KGK, KOA, KYW, WLS, WMAQ, WKBW, WOR, WOR, WOR, WOR, WOR. **Goodnight, General:**

**Wednesday:** KDKA, KGO, KFI, KKSF, KOH, KGK, KOA, KYW, WLS, WMAQ, WKBW, WOR, WOR, WOR, WOR, WOR. **Goodnight, General:**

**Thursday, April 23**

**KDKA, Pittsburgh, Pa.** (Eastern, 427), 7:00 p.m. - Fred Mazzoni, violist: 640 Statesman: 650, Western: 650. **WKBW, Buffalo, N.Y.** (Central, 417), 7:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 7:00-7:30. **WOR, New York City.** (Eastern, 427), 7:00 p.m. - Radio City Symphony Orchestra; Arthur Fiedler, conductor: 7:00-7:30. **WOR, New York City.** (Eastern, 427), 7:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 7:30-8:00. **WGN, Chicago, Ill.** (Central, 417), 7:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 7:30-8:00. **WWZ, Newark, N.J.** (Eastern, 427), 7:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 7:30-8:00.

**4:00 p.m.**

**WAS, Minneapolis-St. Paul, Minn.** (Central, 417), 4:00 p.m. - Dr. Donald C. Sanders, professor of music: 4:00-4:30. **KCMO, Kansas City, Mo.** (Central, 417), 4:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 4:15-4:45. **WMAQ, Chicago. Ill.** (Central, 417), 4:00 p.m. - Metropolitan Opera Orchestra; Kurt Adler, conductor: 4:00-4:30. **WOR, New York City.** (Eastern, 427), 4:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 4:00-4:30. **WOR, New York City.** (Eastern, 427), 4:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 4:30-5:00. **WOR, New York City.** (Eastern, 427), 5:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 5:00-6:00. **WIP, Philadelphia.** (Eastern, 427), 5:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 5:00-6:00. **WGR, Buffalo, N.Y.** (Central, 417), 5:00 p.m. - American Broadcasting Company; Romano Bianchi, conductor: 5:00-5:30.

**5:00 p.m.**

**KDKA, Pittsburgh, Pa.** (Eastern, 427), 5:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 5:00-5:30. **WOR, New York City.** (Eastern, 427), 5:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 5:00-5:30. **WOR, New York City.** (Eastern, 427), 5:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 5:30-6:00. **WOR, New York City.** (Eastern, 427), 6:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 6:00-6:30. **WOR, New York City.** (Eastern, 427), 7:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 7:00-7:30. **WWZ, Newark, N.J.** (Eastern, 427), 7:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 7:00-7:30. **WNNY, Rochester, N.Y.** (Eastern, 427), 7:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 7:30-8:00. **WOR, New York City.** (Eastern, 427), 8:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 8:00-8:30. **WWZ, Newark, N.J.** (Eastern, 427), 8:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 8:30-9:00. **WWZ, Newark, N.J.** (Eastern, 427), 9:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 9:00-9:30. **WWZ, Newark, N.J.** (Eastern, 427), 9:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 9:30-10:00.

**6:00 p.m.**

**KDKA, Pittsburgh, Pa.** (Eastern, 427), 6:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 6:30-7:00. **WOR, New York City.** (Eastern, 427), 6:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 6:00-6:30. **WOR, New York City.** (Eastern, 427), 6:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 6:30-7:00. **WOR, New York City.** (Eastern, 427), 7:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 7:00-7:30. **WWZ, Newark, N.J.** (Eastern, 427), 7:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 7:30-8:00. **WOR, New York City.** (Eastern, 427), 8:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 8:00-8:30. **WWZ, Newark, N.J.** (Eastern, 427), 8:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 8:30-9:00. **WWZ, Newark, N.J.** (Eastern, 427), 9:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 9:00-9:30. **WWZ, Newark, N.J.** (Eastern, 427), 9:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 9:30-10:00.

**9:00 p.m.**

**KDKA, Pittsburgh, Pa.** (Eastern, 427), 9:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 9:00-9:30. **WOR, New York City.** (Eastern, 427), 9:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 9:00-9:30. **WOR, New York City.** (Eastern, 427), 9:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 9:30-10:00. **WOR, New York City.** (Eastern, 427), 10:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 10:00-10:30. **WOR, New York City.** (Eastern, 427), 10:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 10:30-11:00. **WWZ, Newark, N.J.** (Eastern, 427), 11:00 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 11:00-11:30. **WWZ, Newark, N.J.** (Eastern, 427), 11:30 p.m. - Symphony of the Air: NBC Symphony Orchestra; Robert Shaw, conductor: 11:30-12:00.
Where to Hear Talks

TALKS, instructive, serious, humorous and even frivolous, are broadcast daily and below are lists of some of the stations.

Tuesday: KDKA, KFAP, KVOY, WHAG, WLYN, WMAQ, WOC, WWJ. 
Program: KDKA, KFAP, KVOY, WHAG, WLYN, WMAQ, WOC, WWJ.

Wednesday: KDKA, KFAP, KVOY, WHAG, WLYN, WMAQ, WOC, WWJ. 
Program: KDKA, KFAP, KVOY, WHAG, WLYN, WMAQ, WOC, WWJ.

Thursday: KDKA, KFAP, KVOY, WHAG, WLYN, WMAQ, WOC, WWJ. 
Program: KDKA, KFAP, KVOY, WHAG, WLYN, WMAQ, WOC, WWJ.

Friday, April 25

WKRK, Huntsville, Ala. (Central), 8:00 a.m., Male Broadcast Orchestra; 12:00 noon, Rural Radio Orchestra.

WKNM, Ames, Iowa (Central), 1:00 a.m., The Chamber of Alabama.

KDAZ, Des Moines, Iowa (Central), 1:00 a.m., The Chamber of Iowa.

WRN, West Point, Va. (Central), 1:00 a.m., The Chamber of Virginia.

WRTI, Philadelphia, Pa. (Eastern), 1:00 a.m., The Chamber of Pennsylvania.

WWBN, Danbury, Conn. (Eastern), 1:00 a.m., The Chamber of Connecticut.

WAPL, Milwaukee, Wis. (Central), 1:00 a.m., The Chamber of Wisconsin.

WWOC, San Francisco, Calif. (Pacific), 1:00 a.m., The Chamber of California.

WNYC, New York, N. Y. (Atlantic), 1:00 a.m., The Chamber of New York.

WDRB, Louisville, Ky. (Central), 1:00 a.m., The Chamber of Kentucky.

WJTL, Jackson, Mich. (Central), 1:00 a.m., The Chamber of Michigan.

Wroc, Wrocław, Poland (Central), 1:00 a.m., The Chamber of Poland.

WRBQ, Birmingham, Ala. (Central), 1:00 a.m., The Chamber of Alabama.

WMAQ, Chicago, Ill. (Central), 1:00 a.m., The Chamber of Illinois.

WONW, St. Louis, Mo. (Central), 1:00 a.m., The Chamber of Missouri.

KDCO, Dallas, Texas (Central), 1:00 a.m., The Chamber of Texas.

WGN, Chicago, Ill. (Central), 1:00 a.m., The Chamber of Illinois.

WMAH, Asheville, N. C. (Central), 1:00 a.m., The Chamber of North Carolina.

WJBL, Seattle, Wash. (Pacific), 1:00 a.m., The Chamber of Washington.

WSTL, St. Louis, Mo. (Central), 1:00 a.m., The Chamber of Missouri.

WRBS, Chicago, Ill. (Central), 1:00 a.m., The Chamber of Illinois.

WJBL, Seattle, Wash. (Pacific), 1:00 a.m., The Chamber of Washington.

WMAQ, Chicago, Ill. (Central), 1:00 a.m., The Chamber of Illinois.
GALAXY OF "MIKE" STARS BRIGHTEN WEEK OF PROGRAMS ON THE AIR

Where to Hear Concerts

These are the stations for music lovers to dial—-and you can hear the world's best and select concert music and events:

Wednesday, April 23

(Continued from page 15)

Where to Hear Talks

Talks, programs, news, interviews, and even broadcasts are heard.

Thursday, April 24

Friday, April 25

Dining

Dining....Café.

Inn...The.

The National Broadcast Authority—Radio Digest—Illustrated, April 25, 1923
Friday, April 25

(Continued from page 17)

Tn this series of articles the story of Radio is told in so simple a manner that the curious can follow the progress and practice whether he knows anything about electricity or its applications in broadcasting and receiving. The first five chapters, of which the fifth was entitled: "Chapter VI—Essentials of Radio Electricians, Chapter VIII—The Key to Radio Circuits, Chapter X—Radio's Cast of Characters, Chapter XI—What a Vacuum Tube Does, Charter XII—The Short Hand of Radio—Diagram Reading.

WEN a CROWD tries to get home from a baseball game, there is a rush for the gates and only a certain number of people can pass through the gates at a time. Thus the gates have resistance to the flow of the crowd, much as a wire offers resistance to the flow of electrons (electric current) through it. When a battery is connected to a wire, Figure 59, the electrons have to be pushed through the molecules in it. The smaller the wire the harder this will be. Thus any coil of wire, Figure 60, has resistance and acts in a circuit so that it will be in two parts, one a coil, and two a resistance.

A common form of resistance is the rheostat, which is merely an adjustable resistance and, in Radio, usually is employed to control the amount of current supplied to a vacuum tube filament. A fixed rheostat is diagrammed in Figure 61. Instead of wire, graphite discs can be used, Figure 61A. As the pressure on the graphite is increased the resistance in decreased. Sometimes graphs or platers, as shown in Figure 61B, will be adjusted by means of a plunger, to vary the resistance. Devices using the principles shown in Figure 62 usually give more regulation than the wire resistances.

"You have solved the Reflex problem!"

-SAID EDITOR OF N.Y.E.WORLD'S RADIO MAGAZINE

The new Freshman 'double adjustable' crystal detector 'stayed put,' even when the set was deliberately shaken, and stood up to 130 volts on the plate circuit without noise or distortion," wrote editor in article of March 29th, 1924. And in a review he continued: "This detector meets every requirement of the reflex circuit. It is enclosed and provided with two adjustments, one varying the position of the crystal, and the other regulating the brush contact adjustment.

The crystal is a pure natural one and is embedded in an insulating housing, thus eliminating short circuits and consequent loud noises resulting from the cat whisker touching the metal housing.

The new Freshman detector can be panel mounted with only a small knob showing. All around it is the best crystal detector unit found for reflex work."

World's Most Efficient Crystal

Every experimenter can feel confident that when the radio authority of one of the greatest newspaper in America says the Freshman is the best detector—it must be true!

Note these exclusive Features:

- Loop-on contact
- Non-metallic housing!
- Double Adjustable
- Mounts neatly on panel
- Stays set when adjusted!
- Withstands high voltages!

FRESHMAN

Double adjustable Crystal Detector for panel or base use, complete with crystal.

Freshman Crystal with Non-metallic Housing

No more searching for the sensitive spot—merely turn the knob and you would dial!

"LIKE ADDING ANOTHER TUBE of Audio-Frequency!" That's the way enthusiastic "Bugs" sum up the Super speaker that revolutionary reproducing instrument that is sweeping the market in Chicago, Detroit, Cleveland, and wherever else it has been introduced. Just try it!
Radio Monopoly Can Be Prevented

There is No Government Regulation on Radio

FEAR of a monopoly that will seriously affect broadcasting has gripped the public mind. The A. T. & T. company is said to be attempting to assure the public that this is not their intention, but give this chartily toned organization a thorough check is a wise move, and it will take a mile.

People commonly believe that the government controls the air, but not under the present system. The Department of Commerce has tried to control it, and considering the tools and money they have, it is a sad joke. The act and business of Radio has outgrown the present system, and we require an up-to-date one of regulation.

The two laws governing Radio in the United States have outgrown their usefulness because they are too vague. Even one specifically with the most important branch of Radio, and to that, is as effective as the printing of a new health law can be to stop the spread of tuberculosis.

The S.A. F. Commission, in the laws of today that will prevent a Radio monopoly, and as long as we leave Radio open to anyone, it will remain as vulnerable as a person or group trying to find a way to do it. Right now, if the A. T. & T. company succeeds in putting forward a license that stops at 500 watts and does not provide for the use of wires outside of the studio, they will be able to "end it". In another word, no other broadcasting stations will be able to relay programs from the unique use of power, they could blanket every station in existence and lease out wires only to their own stations.

Another thing that must be passed to prevent such eventualities. There was a time when there were few radio stations and the public was interested, but today, with millions of persons and dollars interested, we have the power to control to a great degree the community.

About three years ago, Wallace H. White Jr., correspondent of the New York Times, wisely visualized the growth of Radio and studied it with a view to preserving its usefulness to the people by a correct law. The present session of Congress is the third time that he has tried to pass it. The Army and Navy has asked revision of the public interests in the Radio, and Congress White is well versed in Radio and its needs. Any law that is to be accepted will not weaken the power with which it was originally drawn. But, if many amendments come into it everybody interested in Radio desirable and an important Amendment.

The White bill will give the Department of Commerce more freedom and power. The people will have more power to protect themselves, and it is in the public interest to have the bill passed.

Household Necessity

Set as Much Needed as the Kitchen Stove

The time has passed, with the year 1925, when Radio is looked upon as playing or as a child’s toy. It has passed through the preliminary stage of telephone and electric light in the latter 70’s. It has come to the world as a public expectation. The formation of the National Association of Manufacturers which aims at the dissemination of the importance of high class. If nearby stations do not furnish sufficient entertainment is a matter of the few minutes to turn them on and tune in to the distant ones. Some stations broadcast every half hour during certain hours, giving the important news and market reports in a few minutes. Radio is fast assuming a household necessity, and is found in millions of homes today for service as well as amusement.

Radio Indi-Gest

Tragedy of Distances

They listened to the same music, But together, they couldn’t dance, For she was in Chicago. And he was in France.

Radio Monopoly Can Be Prevented

There is No Government Regulation on Radio

FEAR of a monopoly that will seriously affect broadcasting has gripped the public mind. The A. T. & T. company is said to be attempting to assure the public that this is not their intention, but give this chartily toned organization a thorough check is a wise move, and it will take a mile.

People commonly believe that the government controls the air, but not under the present system. The Department of Commerce has tried to control it, and considering the tools and money they have, it is a sad joke. The act and business of Radio has outgrown the present system, and we require an up-to-date one of regulation.

The two laws governing Radio in the United States have outgrown their usefulness because they are too vague. Even one specifically with the most important branch of Radio, and to that, is as effective as the printing of a new health law can be to stop the spread of tuberculosis.

The S.A. F. Commission, in the laws of today that will prevent a Radio monopoly, and as long as we leave Radio open to anyone, it will remain as vulnerable as a person or group trying to find a way to do it. Right now, if the A. T. & T. company succeeds in putting forward a license that stops at 500 watts and does not provide for the use of wires outside of the studio, they will be able to "end it". In another word, no other broadcasting stations will be able to relay programs from the unique use of power, they could blanket every station in existence and lease out wires only to their own stations.

Another thing that must be passed to prevent such eventualities. There was a time when there were few radio stations and the public was interested, but today, with millions of persons and dollars interested, we have the power to control to a great degree the community.

About three years ago, Wallace H. White Jr., correspondent of the New York Times, wisely visualized the growth of Radio and studied it with a view to preserving its usefulness to the people by a correct law. The present session of Congress is the third time that he has tried to pass it. The Army and Navy has asked revision of the public interests in the Radio, and Congress White is well versed in Radio and its needs. Any law that is to be accepted will not weaken the power with which it was originally drawn. But, if many amendments come into it everybody interested in Radio desirable and an important Amendment.

The White bill will give the Department of Commerce more freedom and power. The people will have more power to protect themselves, and it is in the public interest to have the bill passed.

Household Necessity

Set as Much Needed as the Kitchen Stove

The time has passed, with the year 1925, when Radio is looked upon as playing or as a child’s toy. It has passed through the preliminary stage of telephone and electric light in the latter 70’s. It has come to the world as a public expectation. The formation of the National Association of Manufacturers which aims at the dissemination of the importance of high class. If nearby stations do not furnish sufficient entertainment is a matter of the few minutes to turn them on and tune in to the distant ones. Some stations broadcast every half hour during certain hours, giving the important news and market reports in a few minutes. Radio is fast assuming a household necessity, and is found in millions of homes today for service as well as amusement.

Radio Indi-Gest

Tragedy of Distances

They listened to the same music, But together, they couldn’t dance, For she was in Chicago. And he was in France.

Radio Monopoly Can Be Prevented

There is No Government Regulation on Radio

FEAR of a monopoly that will seriously affect broadcasting has gripped the public mind. The A. T. & T. company is said to be attempting to assure the public that this is not their intention, but give this chartily toned organization a thorough check is a wise move, and it will take a mile.

People commonly believe that the government controls the air, but not under the present system. The Department of Commerce has tried to control it, and considering the tools and money they have, it is a sad joke. The act and business of Radio has outgrown the present system, and we require an up-to-date one of regulation.

The two laws governing Radio in the United States have outgrown their usefulness because they are too vague. Even one specifically with the most important branch of Radio, and to that, is as effective as the printing of a new health law can be to stop the spread of tuberculosis.

The S.A. F. Commission, in the laws of today that will prevent a Radio monopoly, and as long as we leave Radio open to anyone, it will remain as vulnerable as a person or group trying to find a way to do it. Right now, if the A. T. & T. company succeeds in putting forward a license that stops at 500 watts and does not provide for the use of wires outside of the studio, they will be able to "end it". In another word, no other broadcasting stations will be able to relay programs from the unique use of power, they could blanket every station in existence and lease out wires only to their own stations.

Another thing that must be passed to prevent such eventualities. There was a time when there were few radio stations and the public was interested, but today, with millions of persons and dollars interested, we have the power to control to a great degree the community.

About three years ago, Wallace H. White Jr., correspondent of the New York Times, wisely visualized the growth of Radio and studied it with a view to preserving its usefulness to the people by a correct law. The present session of Congress is the third time that he has tried to pass it. The Army and Navy has asked revision of the public interests in the Radio, and Congress White is well versed in Radio and its needs. Any law that is to be accepted will not weaken the power with which it was originally drawn. But, if many amendments come into it everybody interested in Radio desirable and an important Amendment.

The White bill will give the Department of Commerce more freedom and power. The people will have more power to protect themselves, and it is in the public interest to have the bill passed.

Household Necessity

Set as Much Needed as the Kitchen Stove

The time has passed, with the year 1925, when Radio is looked upon as playing or as a child’s toy. It has passed through the preliminary stage of telephone and electric light in the latter 70’s. It has come to the world as a public expectation. The formation of the National Association of Manufacturers which aims at the dissemination of the importance of high class. If nearby stations do not furnish sufficient entertainment is a matter of the few minutes to turn them on and tune in to the distant ones. Some stations broadcast every half hour during certain hours, giving the important news and market reports in a few minutes. Radio is fast assuming a household necessity, and is found in millions of homes today for service as well as amusement.
Latest Inductance Tuned Circuit Explained

Variometers Used Instead of Condensers

By H. M. Taylor

**A** DURING the last few months the indueance tuned circuit has received widespread attention from Radio enthusiasts. Just what is this indueance tuning that has recently so aroused such intense interest?

Fundamentally it means tuning by indu-

*duances, such as variometers, instead of variable condensers.

It is conceded by engineers that inductance tuning gives best results, because the voltage built up to affect the vacuum has a greater value.

Why Inductance Tuning is Efficient

The vacuum tube, which detects the music or broadcasting, is a voltage operated device. It is only the voltage (the force which pushes the current through the electric circuit) of the energy picked up by the antenna which affects the vacuum tube detector. It is the voltage impressed between the grid and the filament of a tube which changes the flow of current through the telephone, battery, and plate and filament circuit of the tube. It is this change in current through the telephone which vibrates the diaphragm of the receiver, and so produces the sound which is heard. It is not just the amount of current through the telephone which counts for strength of signals, but of more importance, the percentage change or fluctuation in the current flowing through the telephone receivers. The greater this variation in current the more the diaphragm is wobbled up and down. Naturally, the greater the vibration of the diaphragm, the louder will be the sound produced.

Accordingly, it is plain to see that in order to get the maximum output, it is necessary to improve the highest possible voltage output of the vacuum tube and the filament of the vacuum tube, thus causing the greatest change in the plate circuit.

**S**upplied-By-**C**apacity

How can the highest voltage be pro-

duced without the predetermination of in-

ductance in the tuning circuits, rather than capacity. It is a law of electric cir-


cuits that the greater the inductance is in proportion to the capacity, the greater is the voltage set up.

However, most of the popular Radio frequency hook-ups are capacity tuned. They are easier to balance. On the other hand, building a successful inductance tuned receiver requires careful balancing of each part, but once accomplished gives a receiver inherently better because it is in keeping with the law of electric circuits.

Some New England engineers have de-

veloped an inductance tuned circuit which is in entire practice.

First of all it has simplicity of opera-

tion—at most, only two dial controls. The dials can be calibrated for wave lengths, and if properly adjusted both will read nearly alike. For instance, on a set of this kind a given station may come in at 58 on single-dial tuning, and on two dial tuning both dials may read, say, 46. This enables you to log the stations you want— to quickly turn to them any time.

**Selective Features**

In the inductance tuned circuit there is unusual selectivity because of the extremely low capacity with respect to the inductance—the decrement is lower. This makes it possible to eliminate interference between stations, and yet retain cap-


cacity, good tubes and batteries, exceptional volume and range of tone are obtained. This combination of fundamentals is exceptional, for often to get volume you must force the tubes until the broadcasting signal is swamped.

A study of the wiring diagram reveals a hook-up which is different in two of three essential respects from any that have been published heretofore. This will be apparent at once to the experienced experimenter, but to those building their first set the following details are of interest.

This inductance tuned circuit uses four tubes, one Radio frequency amplifier, one detector and one audio frequency amplifi-


er. Aside from the detector which is not very critical, there is only one other element which enters into the tuning control. This is the stabilizer, which controls the Radio frequency tube. This consists of two potentiometers (50 ohm resistance each) with connection forms determined on a single chart and connected together electrolytically. Two 60 ohm rheostats can be used for this purpose.

**Uses Special Variometers**

Standard parts may be used throughout; except the variometers must have their distributed capacity reduced to a very low minimum. This, in fact, is the (Continued on page 21)

---

**SUPER VALUES**

**SUPER-HETERODYNE**

**IMPROVED TYPE**—Write for Details

Cockaday Four Circuit Receiver

PARTS AS SPECIFIED BY MR. COCKADAY.

**$59.00**

**SUPPLIES**

We have one of the LARGEST and MOST COMPLETE HIGH GRADE STANDARD APPARATUS in the United States and can make Prompt Shipments.

WRITE FOR OUR NEW CATALOGUE, DEPT. Z.

All Mail Orders Shipped Promptly

Send Money Order, Enclosing Postage

These Radio Mail Order House—(For Low Prices)

**HANES-ZENER**

1480 Broadway, Corner 42nd St., New York City

World’s Biggest Battery Bargain

Guaranteed in Writing for 2 YEARS

FREE

**HYDROMETER**

**AN 65 VOLT**

Save 50%

Thousands of Radio Digest readers will profit by this offering. Take in the famous Fyfe Master battery for a mere 

$5.00. A genuine Master, I am told, one, of the largest of its kind. I feel confident that you can make 100\% return on it. It will carry the battery built, with 50\% more current.

**FEE**

$5.00

World

World

**FREE**

**VOLTAGE**

**65**

**FREE**

**FREE**

**FREE**

**FREE**

Send Your

Order

Today

World

World

**NORTH STAR**

**NEW JERSEY RADIO SUPPLY CO.**

76 SPRINGFIELD AVE.

Dept. B

NEWARK, N. J.

---

**Steinete**

The Marvelous New Crystal

On Crystal Sets!

RESULTS truly amazing. Every-

one astonished by STEINITE.

B. A. Conner, Jr., R. C. M., says: "I got Delux, Chicago, February 10, 1924. I have six crystal sets on my premises, and this is the finest of any," he says. "I have been in retail business most of my life, and I've never seen a crystal set do what this does.

The Steinete Stone is a true crystal set. It always gives a pleasing sensation to be able to blend suitable crystals in the volume and tone of the set. You are welcome to test the better.

Blauke Laboratories, Jan. 28, 1924.

Arkansas, R.

**NEW 50\% Price**

NOW 50\% Each SPECIAL 3 ($1.00)

STEINITE is an ordinary crystal. It’s new discovery. Opens up new possi-

bilities in crystal set operation.

TEST RESULTS truly astonishing.

STEINITE crystals today—NOW. Nine crystals without letter or stamp on side.

STEINITE LABORATORIES ATTACH, KANSAS.
Antenna

Latest Tuned Circuit

(Continued from page 91)

Heart of the set, and if you have too much capacity between turns by using an inferior variometer, you will lose all the value of general engineering principle of enducation.

Cautions

In using enducation tuned receivers employing this circuit, care must be taken to eliminate all "rat's eye" capacities which come from poorly soldered connections. Careless placing of various parts in their relation one to another. The aerial must not be too long—about 75 feet, including the lead-in and it must have the characteristic of all obstructions, such as trees, tin roofs, garages, etc., a good ground is very essential. The Radio Frequency must be carefully selected. Silver-coated tubes such as the UV-211A are satisfactory as audio amplifiers, but the high-power coated 301A must be used as the Radio Frequency amplifier. Any C-431A tube is satisfactory as an amplifier. The detector tubes selected must have the right plate voltages

16V to 12V.

The correct way to hook-up is pictured here, you will not have any trouble with whistling and other noises.

Cold Electron Emission Is a Future Possibility

A most remarkable development which will exert a very great influence on future means of communication is proceeding rapidly as a result of the impetus given to research work by the popularity of Radiophone broadcasting. Slowly but surely we are approaching the possibility of obtaining electron emission from a cold electrode. Just as cold light is the goal of all illuminating engineers, so is cold emission of that of the Radio experimenter. It has been reported for several years that a great deal of the energy expended in producing light within an electric bulb is dissipated in the heat. Now, without the heat, but one desires the light, therefore if the heat could be eliminated without affecting the brilliancy of the lamp everybody's electric light bulb would be immediately reduced and the energy saved in producing the unheated light could be applied more usefully.

In radio apparatus the vacuum tube is the element supreme. Most of us know how a general way just how it functions. We know that as soon as the filament inside is heated up an electron stream is shot off. We know, too, that this stream of electrons which plays such an important part in the operation of the tube.

The Twitchell Auxiliary Tuner


More Than a Wave Trap

A Twitchell auxiliary tuner connected to any make of tube receiving set will positively cut out any local broadcasting or code stations so you may tune in any long distance stations without regard to local conditions. Unlike any wave trap, the Twitchell auxiliary tuner does not damp or muffle the natural sound, but in many cases increases it.

These tuners are in daily use within 40 feet of large broadcast stations and cut out noise and static in a trice. They can be inserted in the lead-in or any location where a wave trap is now in place.

Copyrighted diagram of this tuner, 50¢, or with all parts, $2.50. This tuner is fully adjustable by the Rhodesian circuit for those who want the best. Price $2.50.

This circuit belongs to both amateur and dealer, and is the most successful Rhodes modification yet produced.

All parts prepaid. These instruments are easy to build, easy to operate. Everything clearly shown.

Prices Stashed—Guaranteed Storage Batteries

Quality Not Sacrificed

Here is real battery quality, guaranteed to you, at prices that will astound the crude battery-buying Public. A direct order from Factory. Put the Dealer's Profit in your own pocket. You actually save much more than half and so that you can be convinced of true quality and performance, we give

With Every Arrow Storage Battery a 2-Year Guarantee in Writing

Here is your protection! No need to take a chance. Our battery is right—and the price is a lot lower. Our guarantee is complete. Send in this card and you will receive your battery. The bond is delivered free.

Special 2 Volt Radio Storage Battery.................. $1.35
Special 4 Volt Radio Storage Battery............... $2.50
Super 2 Volt Radio Storage Battery................. $1.42
Super 4 Volt Radio Storage Battery................. $2.50
4 Volt, 6 Ampere Radio Storage Battery........... $1.97
6 Volt, 6 Ampere Radio Storage Battery........... $2.75
6 Volt, 10 Ampere Radio Storage Battery.......... $3.30
12 Volt, 15 Ampere Radio Storage Batteries $11.26
3 Volt, 18 Ampere Radio Storage Batteries........ $3.60

We ask for no deposit. Simply send name and address, and order. Battery will be delivered the next day we receive your order. Express C.O.D. furnished on purchase of one battery. Guaranteed Bond accompanies such battery. We allow 30 days' time to try it in full use. Send order at once. Quick, send your order today. NOW.

Arrow Battery Co.
201 E. Ontario St., Dept. 5, Chicago, Ill.

Audio Amplification at a Popular Price

The volume and clarity of amplification of this HALF PRICE transformer is always a pleasant surprise to users. Many have written us that they prefer their 3 to 1 ratio Coto Special to others selling at double the price.

Great for reflex circuits.

Type 4500...... $2.50

If your dealer fails you, write us, giving your name and address, and list of Coto parts you need.

Coto-Coil Co.
7 Willard Ave., Providence, R. I.

We Guarantee

The Scientific Headset to be the greatest value on the market. Try it for five days. If not satisfactory send it back and your money* will be refunded immediately. Circular on request.

The Scientific Electric Works
98 Brookline Ave., Dept. W, Boston, Mass.

Agents for New York and Vicinity—Ambassador Sales Co.
74 Cortlandt St., Phone Cortland 6218

Coto-Coil Co.
7 Willard Ave., Providence, R. I.

Branch Office
305 W. 5th St., Los Angeles, California

Audio Amplification at a Popular Price

The wheel and compass of amplification of this HALF PRICE transformer is always a pleasant surprise to users. Many have written us that they prefer their 3 to 1 ratio Coto Special to others selling at double the price.

Great for reflex circuits.

Type 4500...... $2.50

If your dealer fails you, write us, giving your name and address, and list of Coto parts you need.

Coto-Coil Co.
7 Willard Ave., Providence, R. I.
Selection of Sets Having Desirable Hook-Up Part III—Assembly and Wiring of Set
By Thomas W. Benson

The two previous chapters covered the location and construction of the apparatus in a regenerative circuit in which the aim was to eliminate all losses. Now we shall take up the assembly of the instruments used in the market.

Fans as a rule fail to realize the importance of proper mounting of the apparatus. How many have you held that worked perfectly when first flat but when mounted in the cabinet? The back panel is the ideal place for mounting. With the rear panel held too close to the woodwork, or placed too near a wall, you may add to the resistance of the circuit. As the last thing you do not want to do is to add to the resistance of the circuit. As the last thing you do not want to do is to add to the resistance of the circuit. As the last thing you do not want to do is to add to the resistance of the circuit. As the last thing you do not want to do is to add to the resistance of the circuit. As the last thing you do not want to do is to add to the resistance of the circuit.

Poor Main Controls
In the circuits under consideration, we have four main controls, the grid variometer, grid condenser, rheostat, and rheostat. Body capacity acts chiefly upon the three first mentioned, and are mounted at least 4 inches behind the panel, with the shafts extending to the dials on the front of the panel. This is easily done with the knitting needle shaft used in the variocoupler described in the second part of this series.

The variometer is the way, must meet certain specifications. Use one that has the least amount of solid material in its form. There are several on the market meeting these specifications, but none of the basket ball type is ideal. The better ones use the proper material for the ball such as the ball type used in the grid condenser for the other, they look more like a true ball. A suitable variometer is recommended. This can be obtained at a good price and mounted on the back pack of the panel as shown in this chapter. The grid cloth is mounted along the side of the condenser, the potentialmeter being placed at the rear of the backboard.

A vernier scale is used on the panel. Use only the best. The writer prefers the wire wound instrument. Don't try to save money on the scale. Get the best quality and one you can pick out a porcelain shaft that will be fairly straight. A suitable wire wound variometer is recommended. This can be obtained at a good price and mounted on the back pack of the panel as shown in this chapter. The grid cloth is mounted along the side of the condenser, the potentialmeter being placed at the rear of the backboard.

The binding posts for the set are mounted on a balestake strip at the rear of the backboard. The phone posts are also mounted with the by-pass condenser connected directly beneath the post. This will give you a good starting point if you want to be sure of best results. They may not do any harm but do not take chances.

Wiring the Set
Use box wire that is wire for the circuit which is run in the run. Do not let the wire touch anything but the terminals of the apparatus and do not use spaghetti tubing. There is some good spaghetti on the market but if you can't be more it is the best. It is better than nothing. Don't worry very much about every square centimeter on the wiring except the shortest route between two points but keep the wires separated as much as possible. The illustration shows some of the wiring and will give an idea of how it should be laid out. The complete wiring diagram was given in the previous chapter.

The set may be enclosed in a cabinet which should be at least 10 inches deep to give plenty of clearance, with the lid arranged so it can be swung back. A small space between the lid and the backboard may be made and the set is ready for testing. When the cell tubes or back tubes are used the potentialmeter may be omitted, but for the regular detector tubes such as the UV-200 or C-300 they should be included.

We are all ready to go. Insert the tube in the socket and turn on filament rheostat until a rushing sound is heard, in the phones. Then turn back rheostat until this stops and turn on the station by adjusting the variometer, keeping the tickler at right angles to the stator winding. When a station is heard, turn it up as loud as possible with the variometer and small variable condenser, making necessary adjustments of the detector until a good sound is heard.

When maximum signal strength is reached try changing the plate potential by tapping back on the switch adjusting the potentiometer. Then vary the tickler and grid condenser until the signals are at their maximum. It is not the easiest thing in the world to get the factors in the circuit properly balanced and you should keep making adjustments of plate voltage, grid capacity and lead until maximum signals are obtained. It takes a little time to get them just right but once you have adjusted you begin to realize the sensitivity of the soft detector tube.

Volume of the Set
This set will be found to be a real proctor as to range and volume and will be working constantly when the trick circuits are simply doing tricks. The principles underlying its efficiency can be applied to any receiver if the general rules followed in its construction are kept in mind when building other sets.

First of all let me say everything that mean's extra wire or resistance, this means luck, switchers, etc. It is practically impossible to tune an outdoor aerial merely because of its resistance on untuned primaries.

Do not use inductances wound on solid supports. They add resistance and it is not wanted. Keep a metal away from inductances as much as possible. This means no shields and no fiber control. Keep all wiring in the open and separated as much as possible, and keep the wires direct from point to point. Last but not least, it's not the circuit, but the stuff put in the set and how it is put in that makes or breaks.

THE END).

Roto Connections
The leads from the rotor are sometimes twisted off, especially when there are no stops used to prevent the rotor from turning a full circle. I have made use of an old phone plug, as shown in the illustration, wherever an insulated stop may be used instead. The two brass springs keep the plug from falling out.

At Last! A practical authoritative book on RADIO

154 pages. Price only $1.
Compiled by HARRY F. BART, E.E.
Formerly with Western Electric Co., and U. S. Army Institute of Radio.
Technically aided by E. W. SHANK.
40,000 ALREADY SOLD

USE-IS THE TEST KELLOGG
Build Your Radio Set With
KELLOGG Guaranteed Parts

At last! A practical authoritative book on RADIO

154 pages. Price only $1.
Compiled by HARRY F. BART, E.E.
Formerly with Western Electric Co., and U. S. Army Institute of Radio.
Technically aided by E. W. SHANK.
40,000 ALREADY SOLD

THE most complete book of its kind ever published. Written, compiled and edited by practical radio experts of national reputation. Packed with concise, sound information useful to every radio fan—from beginner to veteran hard-boiled old eagle. Hundreds of illustrations and diagrams to make every point clear. Note this partial list of contents:

Different types of receiving and sending hook-ups, electrical terms, condensers, air-circuiting, circuits, coupled circuits, induction coils, transformers, systems, electric lines, wiring devices, crystal detectors, generators, transformers, radio circuits, radio experiments, International and Morse codes, commercial receiving sets, etc.

Send 31-day and get this 154-page I.C.S. Construction Manual free. You speak another cent on parts. Money back if not satisfied.

THE COMPLETE SET OF KELLOGG TUBES that you need to get your radio set up at a minimum cost. Especially low in cost, the 6 Volt 200 and 6 Volt 120 tubes.

STU-RIE BATTERY CO.

And Guarantee You in Writing 2 Years of Better Battery Performance

STU-RIE RADIO BATTERIES are designed especially for Radio and the big saving is made possible by coming direct to you instead of through distributors, dealers, etc. Rock-et Down and the plate is very thin and will give a steady discharge over a long period. No smell, no fumes, good, honest battery value.

TRY TO BEAT THESE PRICES

2 Volt for W. 6 Volt 6 Volt 12 Volt
……… $4.00 each ……$ 7.50 $ 7.50
12 …….. 6 Volt 80" 8.50
6 Volt $ 6.50 10.00
4 Volt for U. V. 199 6 Volt 12 Volt 12.10
7.00 12 Volt 12 Volt 14.00
8 Volt 9.00 17.00
12 Volt 12 Volt

Get Yours Today—NOW—Send No Money

The batteries are fully guaranteed to last and shipped subject to examination on the day they are ordered. You pay for delivery and not for breakage. If you order 25 cents or more order at one time.

STU-RIE BATTERY CO.

And Guarantee You in Writing 2 Years of Better Battery Performance

STU-RIE RADIO BATTERIES are designed especially for Radio and the big saving is made possible by coming direct to you instead of through distributors, dealers, etc. Rocket Down and the plate is very thin and will give a steady discharge over a long period. No smell, no fumes, good, honest battery value.

TRY TO BEAT THESE PRICES

2 Volt for W. 6 Volt 6 Volt 6 Volt
……… $4.00 each ……$ 7.50 $ 7.50
12 …….. 6 Volt 80" 8.50
6 Volt $ 6.50 10.00
4 Volt for U. V. 199 6 Volt 12 Volt 12.10
7.00 12 Volt 12 Volt 14.00
8 Volt 9.00 17.00
12 Volt 12 Volt

Get Yours Today—NOW—Send No Money

The batteries are fully guaranteed to last and shipped subject to examination on the day they are ordered. You pay for delivery and not for breakage. If you order 25 cents or more order at one time.

STU-RIE BATTERY CO.

And Guarantee You in Writing 2 Years of Better Battery Performance

STU-RIE RADIO BATTERIES are designed especially for Radio and the big saving is made possible by coming direct to you instead of through distributors, dealers, etc. Rocket Down and the plate is very thin and will give a steady discharge over a long period. No smell, no fumes, good, honest battery value.

TRY TO BEAT THESE PRICES

2 Volt for W. 6 Volt 6 Volt 6 Volt
……… $4.00 each ……$ 7.50 $ 7.50
12 …….. 6 Volt 80" 8.50
6 Volt $ 6.50 10.00
4 Volt for U. V. 199 6 Volt 12 Volt 12.10
7.00 12 Volt 12 Volt 14.00
8 Volt 9.00 17.00
12 Volt 12 Volt

Get Yours Today—NOW—Send No Money

The batteries are fully guaranteed to last and shipped subject to examination on the day they are ordered. You pay for delivery and not for breakage. If you order 25 cents or more order at one time.

STU-RIE BATTERY CO.
India ink and dried. Variable grid leaks are made in several forms for use as indic—
ators. Figure 14 is a combination with a tiny condenser.

Another form of resistance used in some radio sets is a potentiometer. It resembles a rheostat but has a higher resistance, such as 400 ohms, with the case in the form of a moveable tap. The principle of a potentiometer is shown in Figure 4c.

The resistance, in this case 5,000 ohms, is connected across a battery. A vol—
ometer or other output circuit is connected between one end of the battery and the switch arm. The voltage across this output

ing a high resistance may result, as illus—
trated in Figure 66. A wire 10 feet long has an ohmic resistance of 6,000 ohms; only 5 feet long, Figure 67. Increasing the length of a wire decreases its resistance.

Figure 68 illustrates a graph in which the wires held between two contacts which

6. RESISTANCE in Poor Mica Vacuum

Genuine WIRE by Figure 1005.

5. RESISTANCE in Poor Mica Vacuum

Genuine WIRE by Figure 1005.
Meditations by the Inventor of King Milopex
Part XXVII—Life History of the King Mystery Man
By the Mystery Man

W WHAT we think about the in-
... yesterday. It was the first time, as far as I can remember, that I had a clear out of my head. I had been trying to think about something important, and I had been having a hard time. I finally decided to take a break and go for a walk.

It was a beautiful day, the sun was shining, and the birds were singing. I walked for a while, enjoying the fresh air and the peace and quiet. Then I decided to sit down by a tree and have a rest.

As I sat there, I started thinking about the past. I remembered all the things I had done and all the people I had met. I thought about my family and my friends, and I remembered all the good times we had shared.

Then I started thinking about the future. I wondered what was going to happen next. I didn't know what to expect, but I knew that I was going to make the best of it.

I realized that life is a journey, and that we all have our own paths to follow. I decided to enjoy the journey, and to make the most of every step.

Then I started thinking about the present. I realized that I was living in the present, and that I was the only person who could control my own destiny. I decided to live in the present, and to enjoy every moment of it.

I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

Then I started thinking about the past. I remembered all the things I had done and all the people I had met. I thought about my family and my friends, and I remembered all the good times we had shared.

I realized that life is a journey, and that we all have our own paths to follow. I decided to enjoy the journey, and to make the best of it.

I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.

I decided to live in the present, and to enjoy every moment of it. I realized that the key to happiness is to live in the present, and to enjoy every moment of it. I decided to make the most of every step, and to make the best of every situation.
Fixing What's Wrong

When you instruct your workmen to place the tubes in such a manner as to keep them from coming in contact, you will have a good chance of securing neatness.

The two neutral circuits or neutral stages should be on the backboard between the first and second and the second and third stage transformers. This is the most logical place to mount them as to be as far as possible from the transformer boxes for shortest leads. The adjustable metal tubes of the transformer boxes should be placed at about the center of the back of the chassis, under the fastening-down clamp.

Two audio frequency amplifying transformers are employed in both the four- and five-tube receivers. To reduce magnetic interference to a minimum, it is customary to make the transformers with their cores at right angles to each other. This precaution does not have the slightest effect, however, when the transformer is covered with a sheet of metal. Care must be exercised in placing the audio frequency transformers, it being advisable to arrange that all wiring to the transformer be as short and direct as possible.

Arrangement of Apparatus

In any circuit employing Radio frequency amplification, the problem of where and how to arrange the apparatus becomes of paramount importance. Wiring should not be haphazard done, because induective interference between leads must be reduced to a minimum. Likewise, in the type of circuit under consideration, the neutral terminations of the various parts of the apparatus, in the back panel, must be arranged properly. Good practice in the wiring and wiring of the receiver, the radio frequency transformers, the radio frequency stages, and the coupling transformers to each other, as well as the common coupling transformers, must be given thorough consideration. The neutral stage of the circuit being used for a neutralizing circuit, the neutralizing transformer must be given thorough consideration.

The Radio frequency apparatus in the circuit should be separated from the audio or low frequency apparatus and all wires from circuits of different frequencies should be kept well apart to prevent interference and re-

The complete connection diagrams for three, four and five-tube receivers have been given. Before proceeding with the wiring, it is advisable to carefully study the diagram so as to get a general idea of the scheme of connections.

In wiring the set, all filament and B battery connections should be made first. All of the filament stages, if proper soldering can be done, the wire to be soldered to each end of the terminals of the connections. This will hold the condensers rigidly in position. All condensers have holes in the lugs, the wire can be looped around a terminal, twisting the lug and clamped tightly by means of a nut. In this manner the danger of shorting the condenser during the soldering operation will be obviated.

Connecting Neutral transformers

In connecting up the neutral transformers care should be taken not to make any connections to the tap on the secondary winding of the first neutral transformer which leads from the secondary to the primary of the transformer. The taps to the radio frequency stage or neutral stages, should be connected as nearly as possible to the terminal of the neutralizing transformer. The neutralizing transformer is usually molded in two halves. The selected primary for each half is wired to the neutro-}

Densification and feeder cables. The neutro stages, therefore, should be given thorough consideration, in that the circuit should be separated from the audio or low frequency apparatus, and all wires from different frequencies should be kept well apart to prevent interference and re-
Battery Charging Magnetic Rectifier

Step Down Transformer Used for Low Voltage

Owing to the cost of the various magnetic rectifiers which are on the market, and of the inefficiency of the electrolytic type, I have devised a rectifier which uses a step down transformer to furnish the low voltage. I made it as follows:

Procure a step down transformer which consumes about 46 watts on the primary. This will give you approximately five amperes at 18 volts. This transformer should be tapped so that the current can be taken off at three different places, with a voltage of 12 volts between the taps.

The middle tap supplies the negative side of the battery. The two extreme points supply the positive current. With the rectifiers, B and F, are required. Coil F must be wound clockwise and coil E must be wound counterclockwise. Thebeginnings of the two cocnt are connected to the two extreme points on the transformer, and wound through an approppriate number of turns on silken covered wire. The more wire put on, the higher the voltage of the battery will be. The armature is made from a piece of 1/2-inch steel, 4 inches long. This rectifier has many more uses than most types of magnetic rectifiers on the market, and can be built at much lower prices. I recommend it for all with Simplexes and Dynasonics. Wash.

Mr. Dealer!!

At 5155 E. 6th. St., Los Angeles, Calif., is taking the radio world by storm. You'll be in for a treat when you visit their store. They have everything your heart could desire. Big warehouse ready to supply you immediately with anything you want.

Get your big catalog—only to dealers. Ask for A1002. No orders sent out.

WAKEM & MCLAUGHLIN
225 E. ILLINOIS ST., CHICAGO

DEALERS
PROMPT SHIPMENTS
LIBERAL DISCOUNTS
ERLA Selectofomer

As Usual We Are First With the Latest
Send in your name so we can send you our complete catalog on all the standard equipment.

Hudson Ross
123 W. Madison St., Chicago

Dial Collector

Tube for Tube-the Most Powerful Circuits Ever Built. Write for free Bulletin No. 16.

Electrical Research Laboratories
CHICAGO, ILL.

Professional testimony

Kenneth Harkness Says—"Fil-Ko Stat is the most dependable instrument in our inventory. Its accuracy and sensitivity are the envy of many radio enthusiasts. Its simplicity of operation is a great attraction. We are now convinced that the Fil-Ko Stat is an almost indispensable adjunct of the radio tube bench in every laboratory. For use in the research laboratory, or the tuning room, the Fil-Ko Stat is the best tool we have."

To the makers of the Fil-Ko Stat for their great effort in the advancement of sound radio instruments.

FILKO-STAT
80 E. 53rd St., New York City

THE NEW
"ONE WAY"
CARVER PLUG

Takes one head set or loud speaker. Simple, the rear-most end of unit is adjusted by means of a screw on the plug. Makes contact entire length of cord tip. Carter Quality throughout.

Any dealer can supply...

The Reliable Radio Receiver

FADA "ONE SIXTY"
NEUTRON CIRCUIT

For perfection in the radio, ask your dealer for the NEW Unisonic Neutron Circuit radio received the approval of the armed forces. This radio is a great success. In a test, the Armed Forces of this country ordered 12,000 of them. The reception and selectivity is so great that it will be adopted by many other countries. It is at present manufactured by Carter Radio Co., 231 Jerome Ave., New York City.

The Radio Fans Are Gathering the Stars

The complete line of "Fil-Ko Stat" instruments is available at all leading dealers. Make sure you ask for the Fil-Ko Stat. They are available at all leading dealers in the United States.

FADA
29 E. 53rd St., New York City

Price $150c
FRESHMAN VERNIER DIAL

A RAKELITE dial with Vernier adjustment. A small rubber-tired wheel through the slot in the dial permits you to set the dial to the exact point and obtain the same dial setting every time. Just the thing for beginners. Perfect and Super- Vernier.

Price, 3 in. $1.00
Price, 4 in. $1.50

At your dealer's, or write directly to:

The Newman-Stern Co.
309 Fifth Avenue, New York City

Guaranteed Head-Set

RED HEADS are guaranteed not to run any risk when you buy them. Money back if not used within 7 days trial, your satisfaction is guaranteed. Be sure you have what you want and you will find that this was necessary with one 192-1A. Free published, when in the first stage of Radio frequency.—Wm. F. Bremner, Concordia, Mo.

hint to Neutrodyne Builders

If you have trouble neutralizing your tubes and find that the tube is better neutralized with the neonotron set either at maximum or very nearly so, try adding extra capacity across the grid and plate. This can be done by twisting two insulated wires together and soldering one to the grid and the other to the plate. This will increase your capacity of the neonotron.

BREMER-TULLY MFG. CO.
180 South Canal St., Chicago

BREMER-TULLY 3 Circuit Transformer

used in the B-T Prize circuit. Order your place with your dealer today and insure getting early delivery.

Price for Set of 3 $1.50
Full Diagram and Each Set
Folder on request

BREMER-TULLY MFG. CO.
180 South Canal St., Chicago

ONE TUBE SUPER CRYSTAL

2 FEET 17 TURNS
SPACE & ARARIT

2.000,000 METER

CRYSTAL .0025 M.F.

1.50V.

2.000,000 METER

CRYSTAL .0025 M.F.

1.50V.

I N the ordinary single-tube super-regenerative circuits, the tube has to oscillate at least twice, those of oscillating at the signal frequency, and oscillating at the quenching frequency, as well as of rectifying. Such circuits give bad results on comparatively strong signals and therefore if the tube could be relieved of one of its duties, better results might be obtained when receiving comparatively weak signals. This has been born out in practice as exemplified in the circuit B. D. 318, in which the tube acts as an oscillator at signal and quencher frequencies in the guise of a high-frequency amplifier, while rectifying is obtained by means of a crystal shunted across the inductance in the plate circuit of the tube. As might be expected, the circuit is not suitable for receiving extremely strong signals, owing to the current carrying limitation of the crystal, but with weak signals it is remarkably efficient.

The operation of the set is quite simple. First, the correct coupling between the honeycomb coil should be found—it will unusually be fairly loose, and once found little readjustment is necessary. The best whistling common to all super-regenerative circuits will then be heard, but it will not prove nearly so bothersome as with some other circuits, owing to the filtering action of the tuned plate circuit.

Capacity Effects Reduced

With a fixed and variable condenser of the capacities indicated the whole of the broadcasting range of wave lengths can be covered—the only tuning adjustments being those of the condenser and variable.

Instead of a variable, a suitable condenser shunted across the plate circuit can be used. It is to be noted that the only operating coupling between the grid and plate circuits that is provided by the variable condenser is between grid and plate, owing to their construction and wiring.

This circuit may be found rather puzzling at first, but the particular knack is very soon acquired and excellent results are obtained.

Elements of Radio Communication. By Ellery W. Stone. A splendid, well connected, complete, accurate and up-to-date discussion of every phase of Radio telegraphy and Radio telephony. Written in a clear text. The subject is presented from the physical rather than from the mathematical standpoint, avoiding the use of higher mathematics. $5.25.

The Armstrong Super-Regenerative Circuit. By George J. Tully. This is a De Luxe edition of this famous circuit. Contains many illustrations, and fully explained. Fifty-two pages. Price, $1.00.


How to Make DX. By A. Hyatt Verrill. This book is particularly addressed to the amateur who desires to know how to make Radiophones. Twelve full-page illustrations, and Prices, 75 cents.


Perfection Coil Antenna

PERFECT RECEPTION.
NO HOOF ACRS.
RECEIVES BOTH SHORT AND LONG WAVE.
INCREASES SELECTIVITY.
JUST SETTLE AROUND corners of the room.

Price $2.00
Postpaid

25th and Race Streets

Philadelphia

review of the best of the wave

with Perfect Vernier

No body capacity.
No losses.

Makes sharp tuning.

Guaranteed.

Build them in your new set.
Install them in your old one.

Price $1.00 Postpaid

24th & Race Sts., Philadelphia

a hint to Neutrodyne Builders

If you have trouble neutralizing your tubes and find that the tube is better neutralized with the neonotron set either at minimum or very nearly so, try adding extra capacity across the grid and plate. This can be done by twisting two insulated wires together and soldering one to the grid and the other to the plate. This will increase your capacity of the neonotron.

Guaranteed Head-Set

RED HEADS are guaranteed not to run any risk when you buy them. Money back if not used within 7 days trial, your satisfaction is guaranteed. Be sure you have what you want and you will find that this was necessary with one 192-1A. Free published, when in the first stage of Radio frequency.—Wm. F. Bremner, Concordia, Mo.
In Shipment Apparatus May Be Much Damaged

When buying a complete set of expens;

The tubes are then based; leads are
tubing and the vacuum audion tubes.

In the comparatively brief period of

To handle the softest and finest produc-
tubes have been developed, marvelou

To begin with the individual parts

The stems are in the form of long glass

tubes and are cut to the proper length

From Glass and Metal to Vacuum Audion Tubes

Building Detectors and Amplifiers

All. Radio fans appreciate the genius

In its native

handled
disable

is, as far as is possible, of uniform

and
carried

through
cuts all.

the

a

the

are

While the tube has been punched

they are heated so that there will be no

will be no variation in the product, and

the bulb prop-

The air and gases drawn

£o by

sweeps the air, creates a vacuum.

The discs are then passed

The first cuts all the wires

familiar

and

and

with

The bulb is then sealed into the

the"rim are cut and punched in the top

the air, and there is no question

the form

the

"Kills Reflex Troubles"

You DON'T NEED TUBES
to hear concerts from out of town. If you want to

ON YOUR CRYSTAL SET

In a few minutes you can

Electr
dew 1924

RADIO DIGEST — Illustrated

29

1.00.

the

the

with gas.

are left

of the

the

of the

of the

wires. Same hardening.

to your nearest DURABRAN DEALER at once.

in

\$3.50

Send in your C. O. D. order for the

the

your

to

must

the

the

the

tube.

the

the

the

the

the

Epic

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the
Questions and Answers

Neutrodyne Push-Pull Circuit

A. The diagram Q&A-5040 illustrates a six-tube neutrodyne with two stages of radio frequency, detector, and one stage of straight audio frequency and one stage of push-pull amplification. Any of the typical push-pull transformers now on the market can be used in this circuit.

Correction of tuning of the regenerative circuit will not permit the tube to pass the point of oscillation at which it re-radiates. Without going into an exhaustive discussion, we can only advise that familiarity with the action of your circuit will enable you to determine this point and you should take care to keep your listener at this critical adjustment at all times. This requires considerable skill, we admit. It can be determined if the tube is oscillating by inserting a milliammeter in the plate lead of the tube. When it is oscillating, the reading will be much less than when not so. A meter with a 0.1 scale will serve for such a test. Making a note of the adjustments at this point, you will soon be able to tune your set without interfering with your neighbor.

B. D-99

(4952) CRG, Dyer, N. H.

In the September 23, 1923 issue of your paper I noticed a long distance hook-up for these tubes much after the ultrasonic. D-99 was the number of the package.

It mentioned that sixty turns of 22 dec. were wound on a 1-inch tube. Would it be of any advantage to tap a coil like this and if so what points would you recommend? If I should tap it, would it be better to tap from both ends, one for fine tuning and the other for course tuning? What is the meaning of dead end loss and how does it effect the working of a set? The small turns of wire should be on the rotor of the varietorneter, and how may you determine this?

If I should use number 20 dec. on station 4 to 12,600 dec. on another, would each have the same number of turns? How should I wind my transformer, and should I use a flat of half an inch and then wind the stator of my varietorneter on the same tube, putting the rotor in its place after the initial adjustment?

What radio transformers would you recommend for this set?

With my ultra-audio I have heard FL Worth, Texas; Omaha, Neb.; and Davenport, Iowa. I would get a greater distance on the R. D-99 hook-up.

The above named stations were heard during August and September.

A. We are advising in your inquiry with reference to D-99, that there would be no advantage in tapping coil, as suggested.

The unused portions of a tapped coil are left more or less closely coupled to the active portion, and in these unused turns induced currents will cause loss and increase of the resistance of the main circuit which is characterized as dead end loss.

A varietorneter has from 60 to 65 turns of wire on rotor and stator alike, and should be number twenty on both. Winding coil in the manner of your description would result in greater efficiency than by merely tapping coil.

Transformers should be of a five to one and three to one ratio on first and second stages respectively.

It is quite possible that a greater receiving range may be accomplished with the circuit of our first edition with the ultra-audio, although it is largely a matter of preference.

Tube Does Not Work

(69413) RGH, Chicago, Ill.

A few months ago I bought a detector tube, C-500, Cunningham, and when I got it, it worked fine (I couldn't be better), but now it will not oscillate or bring in out-of-town stations. Some people tell me it is polarized and by reading it a few weeks it will work again, but this I tried and had no success. I also tried burning the filament without any plate voltage on it for 10 minutes, but neither seems to work.

Is there any way of bringing life back into the tube?

A. The action of your tube is due to insufficient battery voltage. Buy a second battery. Both should be tested to determine if they are functioning normally.

Polarization of tube is merely due to a loud signal and should immediately disappear with disconnection of coil.

It is our opinion that attention to battery potentials will be all that is necessary to remedy the condition encountered.

1500 MILES AND MORE ON A CRYSTAL SET

Send for Free Booklet describing Simple to build, cheap and effective. No variable condenser, just ordinary tubes. Get 25 stations in one night from Winnipeg, Full range One Nickel. GE. OXON. 314 Colony Street, Winnipeg, Canada.

THE SIMPLIEST

New transformer from Denver to Mexico on one nickel a day. It is the same tube, but has longer, larger range and volume. Build a complete set. Pay with the nickel and there will be enough for the tube, tuning, and other accessories.

THE RADIOTRON

Box 401
Santa Fe, New Mexico

DEALERS

We are now making prompt deliveries on the New Grebe RORQ Clarifier.

List - $30.00

Write for Our Price List

THE RADIO SHOP OF NEWARK, Inc.
17 Springfield Ave. Dept. B Newark, N. J.

Don't Ask for a Grid Leak

Ask for a DAVENSON

It is just as easy and saves a lot more!

3000 B BATTERIES

Of Factory Prices

Greater Radio Service in a Smaller Package. Full information sent on request. We are the makers of the "B" B battery. Send for Catalog. Makers of the "B" B battery. Shipping points: New York, Chicago, Boston, Philadelphia, Baltimore, Washington, D. C., Buffalo, Detroit, St. Louis, St. Paul, Kansas City, Denver, Salt Lake City, Los Angeles, Portland, Seattle, San Francisco, Minneapolis, Rochester, Milwaukie, Montreal, Toronto, Winnipeg. All orders filled from nearest shipping point. Free air and freight on orders over $10.00. 1200, 1250, 1800, 2500 and up. Immediate delivery. WRITE TODAY FOR CATALOG.

Add: DAVENSON BATTERY CORPORATION, Cleveland, Ohio.
Pencil Vernier

Vernier adjustment is one of the requirements connected with the operation of a receiving set. A vernier adjustment can be made as follows: First, cut the tip of round wood, ½ inch in diameter and ½ inch in length—a wooden holder will do—and drive a very small nail through the ½ inch of one end. Cut the nail off, leaving about ¾ inch sticking out, which should be painted with a friccess tape, as shown. This is to make a firm butt joint when the nail is driven into the wood in order to hold the vernier adjustment in place.


Grounding Transformer Cores

If attaching the filaments of an amplifier, do not forget to ground the transformer by attaching a wire to the ground terminals of the battery. Dusting the windings with a very fine powder will help to accomplish this if you have any trouble in the point of contact; also, use a small, dry, soft brush to remove any dust before connecting the transformer. To avoid this trouble, you may try using a small spring clip which will hold the core to the terminal, using a small spring wire, and then grounding it with a screw or other device, as shown. Never allow radio batteries to stand in the sunlight. Heat shortens the life of the battery.

Agricultural and Veterinary College of Tex. (All-Ch. College.): KSKM, Austin, Tex., 1,500 watts, 850 KHz, 7-9 A. M., 1-7 P.M., and 7-9 P.M. (Eastern).

All-Ch. College: WAW, Austin, Tex., 1,500 watts, 850 KHz, 7-9 A.M., 1-7 P.M., and 7-9 P.M. (Eastern).

All-Ch. College: WAW, Austin, Tex., 1,500 watts, 850 KHz, 7-9 A.M., 1-7 P.M., and 7-9 P.M. (Eastern).

All-Ch. College: WAW, Austin, Tex., 1,500 watts, 850 KHz, 7-9 A.M., 1-7 P.M., and 7-9 P.M. (Eastern).

All-Ch. College: WAW, Austin, Tex., 1,500 watts, 850 KHz, 7-9 A.M., 1-7 P.M., and 7-9 P.M. (Eastern).

All-Ch. College: WAW, Austin, Tex., 1,500 watts, 850 KHz, 7-9 A.M., 1-7 P.M., and 7-9 P.M. (Eastern).

All-Ch. College: WAW, Austin, Tex., 1,500 watts, 850 KHz, 7-9 A.M., 1-7 P.M., and 7-9 P.M. (Eastern).

All-Ch. College: WAW, Austin, Tex., 1,500 watts, 850 KHz, 7-9 A.M., 1-7 P.M., and 7-9 P.M. (Eastern).

All-Ch. College: WAW, Austin, Tex., 1,500 watts, 850 KHz, 7-9 A.M., 1-7 P.M., and 7-9 P.M. (Eastern).
A penny for your thoughts, via Radio. Here is D. Marie Bowker of Chicago, listening in during a recent experiment by three university professors in an attempt to send "thought waves" through the air from WGN, Chicago. If you had known Miss Bowker was on the air, what would you have thought about?

Music, baseball scores, stock reports while you work with this novel crystal receiving set made from a coil of wire wound as an ash tray. Karl W. Zoeller is shown at his office listening in with his "ash tray Radio." [Image: Keystone]

"The Voice from the Storage Battery" is reality. Pretty Mary Mitchell, one of the staff of WTAM, Cleveland, listening to "The Voice from the Storage Battery." [Image: Keystone]