

3-Tube Neutrodyne; Flewelling; Grimes Reflex

# Radio Digest

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No. 12

## RADIO UNITES CHURCHES

### "TINY TIM" GIVEN HIS RECEIVING SET

BRINGS HAPPINESS TO LITTLE CRIPPLE

Lawrence Comes Home from School and Finds His Heart's Desire

CINCINNATI.—There is no happier child in the world than Lawrence Hundermer, of this city, the real "Tiny Tim" of Radio, a helplessly crippled little boy to whom a Radio receiving set was given recently by the Manufacturing Co.

Station WLW suggested some of the listeners who would like to help purchase a tube set for this little fellow. A fund was raised and one day last week the complete outfit was taken to his home. Lawrence was in school. The receiver was hooked up. Soon a school bus stopped at the door and the driver carried the little cripple into the house. The first thing he saw was his new set. His face beamed, but he was speechless. His mother was crying.

The happy boy, whose crippled legs and twisted back make him absolutely helpless, was lifted into a chair and the phones were placed on his head. WLW was broadcasting market quotations.

Tears were in the eyes of everyone present—everyone but Lawrence. His eyes were on the new set.



### ALL RELIGIONS JOIN IN PLAN TO BROADCAST

World Peace Is Possible

Report Tells of Station for Vatican in Rome—Creeds See Benefit of Radio

By J. L. Newman

CHICAGO.—With the Christmastide has come to an awed and reverent world what is termed a true message of "Peace on earth, good will toward men"; the glad tidings that that ethereal something between the stars which carries the feeble voice of man, Radio, is to be dedicated a messenger of the Messiah.

And millions of the faithful, under the cross, even under the crescent, on desert and moor, in valley and on mount, will soon bow head or bend knee, it is prophesied, in homage to the word of God as it vibrates through the ether.

Creeds May Unite for Peace Radio

Because of the universality of Radio as a means of communication, the chasms of the creeds may soon be bridged, predict various leaders, and what they call the greatest curse to man—war—may, within the minds of those who now read, be but a hideous memory.

(Continued on page 2)



Alice Brady, star of film and stage, recently gave an interesting beauty talk on station WJAX, Union Trust Co., Cleveland. Miss Brady has been heard from many stations

How even a little lame girl may dream of love was described by Sara Southern, one of the stars of "The Fool," when she spoke from Station WMAQ, the Chicago Daily News. Channing Pollock, producer of the play, is one of the growing number of dramatists who are sold on the advertising value of broadcasting



Alice G. Poyner, prominent violinist, is popular throughout the Pacific coast for her broadcasts from Hale Brothers, KPO

## WORLD RADIO PLAN TAKES EYE OF ALL CREEDS

(Continued from page 1)

The world's greatest savants and diplomats, pontiffs and princes, now vision what they describe as the longest stride toward the peace of all peoples since the birth of the Babe of Bethlehem. In these days of travail the various sects have united in one purpose—to cast abroad through the cosmos by means of Radio words of peace and calm, the unctious of the church to those wounded by the woes of the world.

### Roman Catholic Church to Broadcast

The courts and chancelleries of Europe, some of the satrapies of the East, the republics of earth—all Christendom—awaits the first international move of its churches to bring religion by means of Radio to humanity.

First to take what is said to be the most momentous step of the kind is the Roman Catholic church. The Vatican will, in a few months, adopt Radio to spread the word of the Pope to millions of devout men and women all over the earth. It is said that official word to this effect will soon be received by prelates of the church in the United States, especially by His Excellency, the Most Rev. Pietro Fumasoni-Biondi, papal delegate to the government in Washington.

### Station in the Vatican

Due to the efforts of the company of which Guglielmo Marconi, pioneer Radio inventor, is head, a broadcasting station may soon be operated in the Vatican. By this means Rome will be enabled to transmit the voice of the Holy Father to almost every land. There are in North America more than 37,000,000 Roman Catholics; in South America, 36,000,000; Europe, 184,000,000; Asia, 5,500,000; Africa, 2,000,000, and in Oceania, 9,000,000, a grand total of 273,500,000.

The plans of the Roman hierarchy have not as yet been detailed, but it is considered probable that broadcasting stations will be established or operated by it wherever its cross is raised aloft.

### U. S. Protestants Consider Use

Of similar magnitude is the probable scheme of Protestant churches, particularly in the United States. Millions of communicants of and adherents to the various sects in this country may soon be in direct vocal communication with their governing bodies, according to reports emanating from what are considered authoritative sources.

During the last few years the chiefs of Protestant denominations in North America have considered the practicability of Radio as a means of spiritual regeneration. Independently of each other their executives and prominent ministers have used Radio for such purposes as the broadcasting of sermons, Biblical lessons and appeals to the public conscience. But not until the last few months have the national advantages of Radio been deeply considered.

### Federal Council to Discuss Broadcasting

As an important part of what is called the world's greatest religious revival the next quadrennial meeting of the Federal Council of Churches of Christ in America, headquarters New York city, may include in its program plans for utilizing Radio in a national scheme to bring the church to the people.

This was the opinion expressed here recently by Dr. Herbert L. Willett of Chicago, one of the executives of the council. "It is likely, too," said he, "that during the next meeting (in New York city on the second Friday in January, 1924) the administrative committee of the council may discuss in detail the use of Radio as a national instrument."

### Radio Will Promote Church Unity

"One of the features of the meeting of the executive committee of the Council in Columbus, O., a few days ago, was the wide use of Radio in broadcasting formal addresses. The plant at the University of Ohio, WEAO, was thus used to communicate with hundreds of thousands. That was the first instance in which the various Protestant sects co-operated in sending their messages to the people.

"Radio did it. And our leaders declare that Radio opens a new field for religious effort." The churches realize that by working together they can do more. Radio will enable them to work together as they have seldom worked before.

### M. E. Church Utilizes Airphone

Among the leading Protestant churches in America which contemplate a wider use of Radio is the Methodist Episcopal. Its committee on conservation and advance, the leading executive body of the church, may soon consider the national use of Radio, according to Dr. R. J. Wade of Chicago, one of the executive leaders.

As a part of the climax of the centenary of the church, Radio may be used by it from coast to coast and from the Great Lakes to the gulf. The Epworth League, composed of more than 800,000 young men and women of the Methodist Episcopal church, will probably consider the national application of Radio.

It is considered probable that during the meeting in February, in Atlantic City, N. J., of executives of the Presbyterian church in the United States, of which the Rev. Charles Wishart of Wooster, O., is moderator, the national use of Radio may be discussed.

### Creeds of World to Confer on Radio

Perhaps the most important phase of the probable international use of Radio by the churches is that in which the Protestant Episcopal church of the United States, generally known as the Episcopal, and other factors with a delegation to be appointed by the Holy See (Roman Catholic headquarters in Rome) and a like body named by the Greek Orthodox (Catholic) church in Constantinople is likely to confer soon as to the practicable use of Radio to send spiritual and other messages to all religious denominations throughout the world. This was the opinion of the Rev. George Craig Stewart of Evanston, Ill. (suburb of Chicago), on his return from a conclave in New York City which received from the League of Nations a proposal regarding the international conference.

According to the Rev. Fred Pfotenhauer of Chicago, synodical head of the Lutheran church, the first step in what may be, he said, the national use of Radio by the church is the purchase and operation of a broadcasting plant by the Lutheran theological seminary in St. Louis, Mo.

### Other Denominations Consider Radio

The general promotion board, in New York City, of the Baptist church in the United States, according to the Rev. Alfred E. Peterson of Oak Park, Ill. (suburb of Chicago), one of the church's executives, recognizing the growing use of Radio not only by its own ministers but by those of other religious denominations, may soon consider its national use.

Another step toward the national use of Radio is that in which the Radio Bible

Service bureau of Cincinnati purposes to broadcast Biblical lessons daily.

The Radio Bible Service bureau was organized and is supported largely by business firms throughout the country. The Rev. Dr. Robert Watson of Boston, Mass., is president; Dr. Frank H. Stevenson of Cincinnati, vice president; Addison Y. Reid of Cincinnati, secretary; I. F. Tunison, M. D., Cincinnati, treasurer, and Arthur Wilson of Battle Creek, Mich., field secretary.

The service of the bureau is free to broadcasting stations. Of these the San Francisco Examiner, Station KUO, Memphis Commercial Appeal, Station WMC, and Louisville Courier-Journal, Station WHAS, are already enlisted. The bureau is to operate soon in Canada.

Thus, in line with one of its primal aims the church as a whole throughout the world apparently is to rely on Radio to bring permanent peace to all peoples.

## Woman Diver Tells What She Found on Bed of Sea

NEWARK, N. J. — Martha Campbell Goodman, who enjoys the unique distinction of being the only woman professional deep sea diver, talked from Station WOR recently. Her broadcast was on the subject, "What I Found at the Bottom of the Sea."

The only woman deep sea diver is a wee mite of a person, four feet five inches tall. Although she weighs but 110 pounds, she has served on boards of directors with marine men, bankers, literary folk and organized political factions.

# CONTENTS

Radio Digest, Illustrated, Volume VII, Number 12, published Chicago, Illinois, December 29, 1923. Published weekly by Radio Digest Publishing Company, 123 West Madison Street, Chicago, Illinois. Subscription rates, yearly, Five Dollars; Foreign Postage One Dollar additional; single copies Ten Cents. Entered as second-class matter at the postoffice at Chicago, Illinois, under the Act of March 3, 1879.

"All the Live News of Radio" .....	1 to 9
Charts and Lessons in Dancing to Accompany Arthur Murray Broadcasts.....	4
An Evening at Home with the Listener In.....	8
Neurodyne Circuit Using Only Three Tubes, by Harry J. Marx.....	9
Two Stage R. F. and Detector, R.D.-108; Review of Books.....	10
Further Details of Miloplex Hook-Up.....	11
Advance Programs for Current Week.....	12
Simple Explanation of Radio for Everybody, Chapter VIII, Part III—Antennas and Grounds, by M. W. Thompson.....	15
Editorials; Indi-Gest; Condensed, by Dielectric.....	16
Latest Development in Grimes Inverse Duplex, Part VI—Tuned Radio and the Inverse Duplex, by David Grimes.....	17
Spider Web Hook-Up Similar to Miloplex.....	18
Simple and Efficient Honeycomb Coil Circuit, Part I—Kinds and Types of Coil Windings, by H. J. Marx.....	19
R. F. and A. F. with Special Transformer.....	21
Questions and Answers.....	22
Broadcasting Stations, Part IV.....	23
Radio Illustrated, a Page of Pictures.....	24

## Looking Ahead

**Single Tube Reflex Hook-Ups Take Home the Bacon** when it comes to picking a good fool-proof circuit for the beginner to build, but C. K. Beebe tells us his tuned impedance form has them all backed off the boards. He'll tell about it next issue. And David Grimes, the inventor of inverse reflexing, concludes his interesting series on the adaptations of his circuit by giving a number of precautions.

**WD-11 and WD-12 Tubes Are Fine When Used Right**—but when used wrong, they won't percolate a whimper. So in R. D.-106 next issue we'll tell you a dandy circuit for the single dry cell tubes.

**Regeneration—What Is It?** M. W. Thompson knows, and he will tell, beginning next issue. You might as well get in on the secret. Regeneration is liable to happen most any place where you don't want it, or not happen where you do want it, so learn how to tame it!

**Honeycomb Coils and Other Forms of Special Inductances** will be discussed again by H. J. Marx in the first number of the New Year. Certain hook-ups lend themselves more easily to these special coils. Get the hook-ups for future reference. Yes sir, his super-heterodyne set building series is coming soon.

**When We Told About Dr. A. Meisner Last Week** a lot of anxious readers wanted to get an advance line on him. Well, since it takes a long time and fifty billion marks to get a letter over from Germany, Dr. Meisner's series won't begin at once. So you'll hear a lot about him for several issues yet. He's the man who invented regeneration in Germany almost at the same identical moment as did Major E. H. Armstrong in this country. You've heard and read a lot about the Major, but Dr. Meisner is worth keeping in mind. He is to Germany what Marconi is to Italy; Lodge to England; Flewelling to the United States.

Newsstands 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

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

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

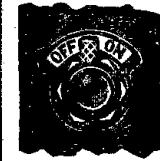
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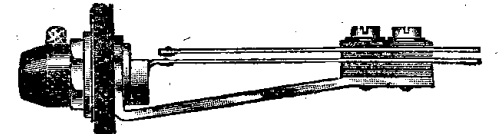
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## Carter Jack Switch

\$1.00



The best radio switch yet devised—easily mounted on panel—just like a jack—a quarter turn of the knob operates the heavy phosphor-bronze springs.



Furnished complete with "On and Off" name plate, knob and pointer. Made in four different spring combinations. Ask your dealer.

Send for FREE wiring diagrams of various hook-ups; also complete catalog of other new improved Carter Radio Products.

**Carter Radio Co.**  
205 STATE STREET  
CHICAGO



## Columbia Inside Coil Mounting

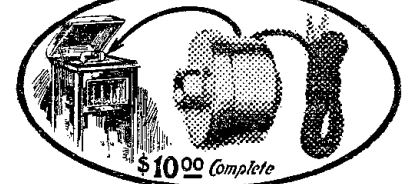
Newer, Neater, Better Here is an inside coil mounting made for the radio owner who wishes to keep bulky coils out of sight. It is friction geared and fine "vernier" adjustments are possible. Nothing shows outside panel except knob and pointer. Only \$6.00 at all good dealers.

**Columbia**  
155 UNION STREET  
CORPORATION



It's Columbia—So It's Good!

## Morrison



Loud Speaker --to the LUCKY ONES

YOU who received new receiving sets for Christmas naturally are eager to get the best from the wonderful broadcasting now sending from all over the country.

Morrison Loud Speaker, attached to the tone arm of your phonograph, will give you the real thrill of radio. Relaxing in your chair, you hear the chosen concert with unbelievable reality. No fussing and adjusting—Morrison has but one adjustment to make and this is from soft to loud—no distracting vibrations and harsh noises—Morrison brings it in smoothly, truly.

You'll like your new set with Morrison Loud Speaker

\$10.00

Complete with 5 foot cord Nickel Plated Model

Our new two-color folder is just out—it's yours for the asking

**Morrison Laboratories, Inc.**  
343 Jefferson Avenue East, Detroit, Mich.

# EXPOSE OF MUSIC TRUST PRINCIPLES

## PUBLISHER OF OLD DAYS WELCOMED ADVERTISING

### Mechanical Reproduction and Radio Makes Song Hits for Publishers Now Crying at "Injuries"

(The following article is one of a series which is being published with the express purpose of explaining to the Radio public the situation existing between the broadcasting stations and the American Society of Composers, Authors and Publishers. The series tells in detail the reasons why the National Association of Broadcasters was organized, and why certain popular songs, the copyrights for which are controlled by the "music trust," are not being broadcast.—The Editor.)

#### PART VI

IN THE days preceding and up to "After the Ball," popular "hits" were rare. Comparatively few songs were composed. A "hit" took years to "get over" and once well launched lasted years. The "publishers' plugging machinery" was crude and squeaky. The profits were meager; the game was not strenuous. The public were satisfied, when once they landed on a tuneful hit, to stand by it. There were no phonographs or piano players.

Music was universally poorly played as compared with today—it was before the two-step. There were the waltz, polka, schottische, and the square and round dances. Music at that time was composed especially for these dances. Waltzing was taught in the old foreign style by the dancing master "hop-a-leetle, hop-a-leetle—waan-two-tree."

#### Fast and Present

Supposing that some good fairy could have whispered in the ears of a publisher of those days the following: "I will provide a phonograph and a piano player which will mechanically play your song in a more perfect manner than any ordinary pianist. Your song will never be heard on these instruments unless they are played by the world's most competent professionals."

"That is good advertising. Your songs are now murdered by the playing of mediocre home talent. That's poor advertising. Then I will provide a projecting mechanism which will carry your song electrically into the homes of millions of people. That is super-advertising. And all of this without cost to you."

#### Could Have Jumped at Opportunity

Would that publisher have grasped the opportunity? He would. His chief problem was to get his music heard. He could only reach a small percentage of the population. The avenues now open to the modern publisher would have meant great wealth to the old-timer.

As time went on the commercial instincts of the popular music publisher developed rapidly. Modern mechanism for mechanical reproduction was at first welcomed by the publisher as an advertising means. And they profited in full measure in those days. It is not a far cry from what we are pleased to term the "commercial instinct" to avarice.

In the old days popular music wholesaled at about seven cents a copy. The price is now about fifteen cents. And a popular hit will reach well up to two million copies.

#### Publishers Make Bold Stroke

Early in this century, publishers in surveying their opportunities and profiting greatly from the benefits of advertising coming to them through perfectly played mechanical reproductions determined upon a bold stroke. They showed positive genius. Some publishers who must have been as smart as the man who invented interest, must have said: "If we could only get these mechanical people who are spending so very much money in advertising to pay us for the privilege of doing so we would have a fat income."

Then someone must have said: "You cannot do this. They are doing us a great service. Without cost they are giving us

## TALKS FROM AIR TO HELPMET ILL IN BED

INDIANAPOLIS, IND.—Lieut. Harold Harris, commanding officer of the Barling bomber, largest United States airplane, talked to his wife, who is ill in a local hospital, over a new type of Radiophone transmitter as the bomber circled over the hospital a few days ago. A Radio receiving set had been installed in Mrs. Harris' room.

## CALM AT FIRE TILL AERIAL IS DAMAGED

NEW YORK.—Herman Brookman, thirteen, showed the results of school-taught discipline a few days ago when his home in the Bronx was in flames, and stood quietly by watching the firemen at work—until suddenly he shouted in wild alarm as he saw the fire fighters tearing down his antenna. He almost collapsed.

## SOCIETY TAKES UP LISTENING IN



New York society has been bitten by the Radio bug, as witness this photograph of Miss Irene Beadston, one of the great metropolis' Four Hundred. The picture was taken at a benefit fair at which Radio sets were raffled K. & H. Photo

hundreds of thousands of dollars worth of free advertising. How could you ever make them pay for this privilege?"

#### Play Both Ends Against Middle

And then the shrewd one retorted: "Easiest thing in the world. We will claim that they are injuring our business. We don't have to show any books. Nor exhibit any balance sheets. We will just make the unsupported claim and demand payment."

And so they did, and so was born the unheard of policy of the advertising

medium paying for the privilege of advertising the advertiser. It would be just as sensible for a safety razor concern to ask the Saturday Evening Post to pay for the privilege of running a razor advertisement.

This policy has been developed step by step until hundreds of thousands of dollars are annually rolling into the coffers of that aggressive minority known as the American Society of Composers, Authors and Publishers.

(TO BE CONTINUED.)

## HALF-HOURLY NEWS BY 'WORLD CRIER'

### TWO PAPERS WITH KYW IN 24-HOUR SERVICE

#### Chicago Publications Give Listeners Bulletins of Earth's Affairs Throughout Day and Night

CHICAGO.—Airy news vehicles have been established here by a morning and an evening publication through KYW, Westinghouse station here.

Instead of broadcasting bulletins at certain times during the day, the evening paper transmits news every thirty minutes, on the half-hour and the hour, from 5 o'clock in the morning until 5 o'clock in the evening; the morning publication, whose ownership is the same as the evening paper, broadcasts at similar intervals from 5 o'clock in the evening to 5 o'clock in the morning.

#### Sets Example for A. S. C. A. P.

The twenty-four hour service, known as the "World Crier," enables thousands of listeners in from the Great Lakes to the Panama Canal Zone and from the Atlantic to the Pacific ocean to keep abreast at all times with affairs all over the earth.

The evening newspaper, in connection with the "World Crier," sends the correct time every half-hour.

"The World Crier," conceived by Wilson J. Wetherbee, director of KYW, is another instance called to the attention of the Association of Composers, Authors and Publishers, of the manner in which Radio spurs business. Instead of lowering the circulation of the newspapers, the "World Crier," it was said, has tended to raise it.

## BLAME SHIPS FOR BIG INTERFERENCE

### Reradiation Held Second Main Disturbance by Radio Club of America

NEW YORK.—Radio interference problems were discussed at the last meeting of the Radio Club of America, held in Schermerhorn Hall, Columbia University. A general committee reported the results of an investigation conducted relative to various types of interference each could be eliminated.

Observations made by the committee showed that code interference caused by ships and commercial shore stations using spark transmitters was the chief disturbance in the ether. Reradiation of regenerative receiving was rated second.

Paul Godley, a member of the Investigating Committee, points out that the bulk of interference from code in the New York district was caused by Station WNY, Bush Terminal; NAH, Brooklyn Navy Yard; Cape May, N. J., and New London, Conn.

Professor L. A. Hazeltine, inventor of the Neutrodyne circuit, declared it scientifically impossible to design a receiving set to cut out spark interference. Such disturbance is not caused by the nominal frequency of the spark, but by one of its many side frequencies.

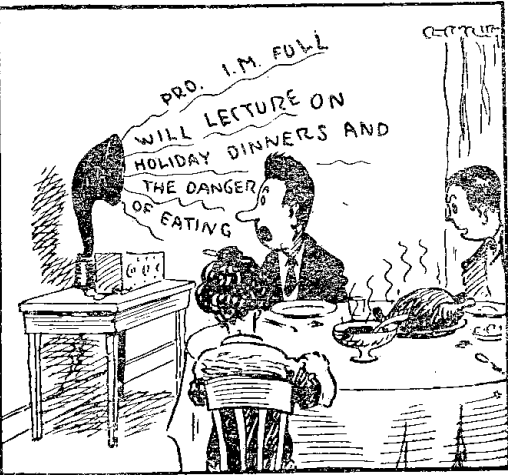
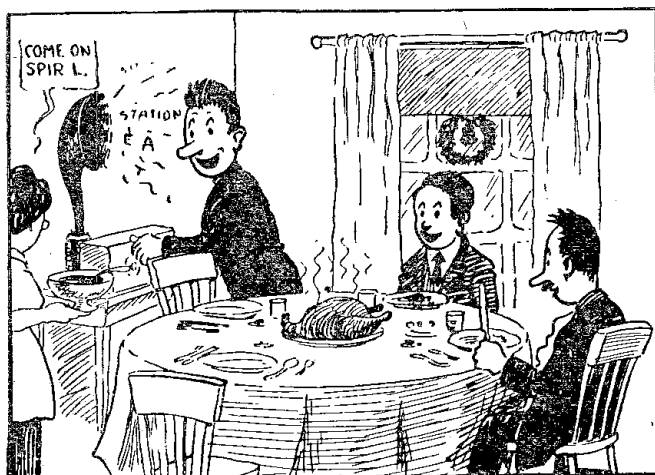
## Station WTAY, Oak Park, Rebuilt with More Power

CHICAGO.—Station WTAY, the Pioneer Publishing Co., Oak Park, Ill., has been rebuilt under the supervision of R. H. G. Mathews to have an antenna input of 500 watts. Mr. Mathews had much to do with the construction of Station WJAZ, Zenith-Edgewater Beach Hotel, here. The studio of WTAY is now located in the Oak Park Arms Hotel, and microphones have been installed in the lounge and dining rooms. Hugh B. Marshall, former studio manager of WJAZ, has taken the same position at WTAY. The new station will work on a wave length of 244 meters.

## THE ANTENNA BROTHERS

## Spir L. and Lew P.

## Unnecessary Programs



# SIXTH LAST DANCE LESSON BROADCAST

## REPEAT LESSONS II AND III FOR LATE COMERS

### Instructions Republished to Meet Demand from Listeners in Who Missed First of Series

Learn to dance by listening in! Radio Digest has perfected an arrangement with Arthur Murray, nationally known teacher of ballroom dancing, whereby Mr. Murray is broadcasting dancing lessons from WOR, L. Bamberger and Company, Newark, N. J., and a score of other prominent stations. Radio Digest exclusively will give the charts and instructions which apply to the lessons broadcast by Mr. Murray personally at WOR and by the other stations. WOC, WBAP, WNAC, WLW, WLAG, WRW, WHAS, WFI, KPO, CFCF, WSAD, WHTAS, WGY, WMC, KDKA, WRC, WGI, WCAE, WHAM, WBZ, WGR, and KYW are broadcasting the series of lessons. The series below may be used in conjunction with or after hearing the broadcast lessons. Save the lessons to use with the broadcasts. —The Editor.

### Lesson VI—Review By Arthur Murray

WE HAVE now completed the most important steps one should know to become a good dancer. The final lesson, as broadcast, is a review. Study over the first five lessons. Read carefully and practice diligently.

If you have been unable to secure a complete file of Radio Digest, start saving the copies now. Due to demands for the charts, Radio Digest is republishing the entire series in turn. The second and third lessons, the Forward Waltz and the Backward Waltz, respectively, are given following the conclusion of this, the last lesson. Lesson I was repeated last week.

There are several points in etiquette the beginner should do well to have in mind before ending this series. I will discuss them here briefly.

### How to Leave One Partner to Dance with Another

After dancing with a girl, if a young man wishes to seek another partner, he should leave his first partner with friends or the chaperons and seek another gentleman to dance the next dance with his original partner. He can leave his partner by explaining that he wishes to hunt a friend whom he is anxious for her to meet.

When a hostess sees some neglected girl, she will seek out a partner for her and present him with some word of pleasantry, "Miss West, may I present Mr. Adams? He hopes that you can spare him a dance," or, to a closer friend, "Lucia, Mr. Adams has asked to be presented to you. My friend Miss Kent, Mr. Adams."

### Two California Amateurs Get Messages from Java

LOS ANGELES.—Radio messages from Bondo, Java, have been picked up at Santa Barbara by two amateurs. The distance is more than 12,000 miles. The Santa Barbara stations are three miles apart and they have been picking up the Java messages at intervals for a month. The Panama-Pacific liner Finland, just arrived in this port from New York, all the way from the canal was in touch with both WEA, New York, and KHJ, Los Angeles.

**Introductions and Asking for Dance**  
To a strange young man, the hostess may say, "Mr. Brown, my sister would like to know you. May I introduce you?" It is the duty of the hostess and other chaperons to make introductions whenever possible, especially among the younger people, and see that the dancing men are presented to the young women, so that no one will be neglected.

The gentleman places himself in the position of asking for the favor when he asks the lady to dance. At the end of the dance he thanks her and makes some complimentary remark to the effect that

ing this most important dance. Build a good foundation and you will always be a good dancer.

Do not be content with simply learning how to do the steps; each movement should be practiced until you can do it very rapidly and almost mechanically. Practice each step until you have perfected it to such an extent that you do not need to count or even think of your feet. When you waltz with a partner you will not have sufficient time to think of the step.

The Waltz steps here described may also be done to Fox Trot and One-Step music.

### First and Second Part of Forward Waltz Step Combined

Here is the count for the complete Forward Waltz Step:

1. Step forward on left foot;
2. Step diagonally forward to right;
3. Draw left up to right, weight on left;
4. Step directly forward with right;
5. Step diagonally forward to left;
6. Draw right foot up to left, weight on right.

Practice this step around the room

going in the line of direction. Study Figure 3 carefully and follow the numbered foot-steps. The right foot is shaded.

### How to Waltz to Music

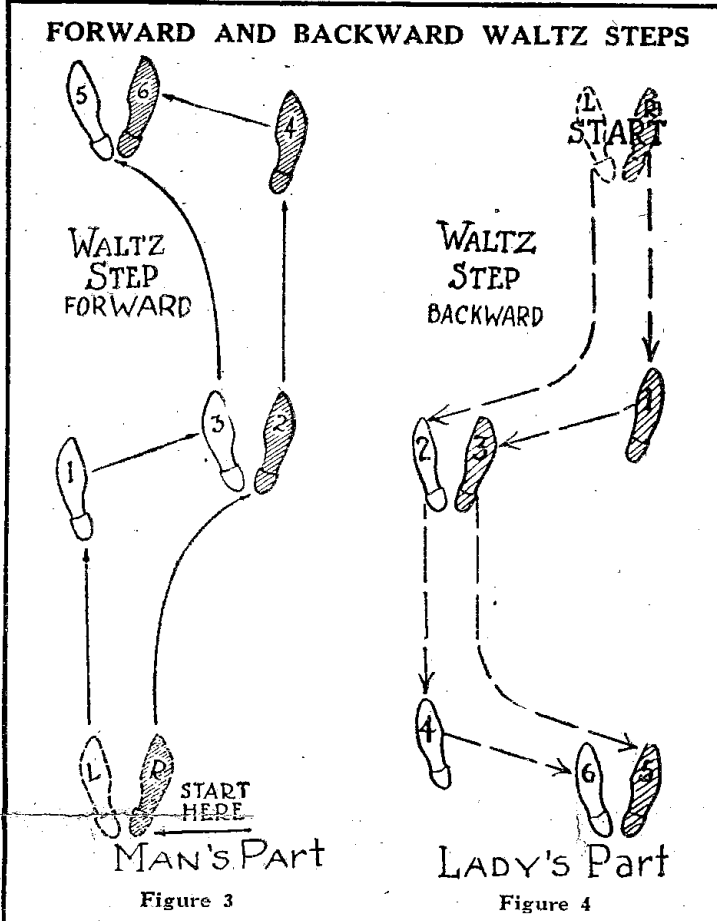
Dance the Forward Waltz step beginning with the left foot forward. As you go through the steps, sing or hum, counting ONE—two—three. Remember that the first of every three beats is counted louder. Count: ONE—two—three—FOUR—five—six.

### Lady's Part of Waltz Movement Backward

The Backward Waltz movement is just the opposite of the Forward Waltz movement. When the man does the forward movement, the lady does the Backward Waltz.

1. Step backward with right foot;
2. Step back, slightly to left, with left foot;
3. Draw right foot up to left; weight on right (see diagram);
4. Step directly backward with left foot;
5. Step back, slightly to right, with right;
6. Draw left foot up to right, weight on left.

That's all. Study Figure 4 carefully. (TO BE CONTINUED.)



## World's Biggest Battery Bargain

**FREE**  **FREE**


**Hydrometer and "B" Battery FREE**  
**READ THIS SPECIAL CHRISTMAS OFFER. THEN ACT!**

Thousands of Radio Digest Readers will profit by this amazing offer. They will buy the famous 2-year guaranteed World Battery at the lowest price ever quoted. They will get a hydrometer and a "B" Battery FREE. And they get the best battery built. It is "World" quality that makes possible our 2-year ironclad guarantee. It is "World" quality that makes "World" owners "tell their friends." That's the best proof of performance any product can have.

**SEND NO MONEY**  
You need not send a penny. Just clip this ad and attach your name and address. The battery will be shipped to you the day your order is received. When the battery arrives, inspect it—read our 2-year guarantee before you pay one penny. Convince yourself you are protected from every angle—that the World battery price saves you 50%. Get the "B" Battery and hydrometer FREE. Order today.

**Special Christmas Offer**  
Clip and mail this ad with your World battery order and get this hydrometer and "B" battery FREE.

**World Battery Co., Dept. L, 60 E. Roosevelt Rd., Chicago, Ill.**

**World**  **Send your order today.**

he enjoyed the dance. Perhaps the most commonly used form of asking for a dance is to say, "May I have the pleasure of a dance?" or, "May I have the next dance?" It is poor taste to say, "Have you the next dance?" And then if a negative answer is given, to ask for the dance. Often a girl does not like to admit that her dances are not taken and this question is not at all pleasant. (THE END.)

### Lessons II and III—Forward and Backward Waltz By Arthur Murray

THE WALTZ is recognized as the foundation of all ballroom dancing. It is therefore, essential to go very slowly and practice faithfully while learn-



PACIFIC COAST BRANCH:  
329 Union League Bldg.  
LOS ANGELES

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

**COTO-COIL CO. PROVIDENCE**



**GREBE RADIO**

**All Batteries Concealed**  
No unsightly batteries mar the appearance of your living room with

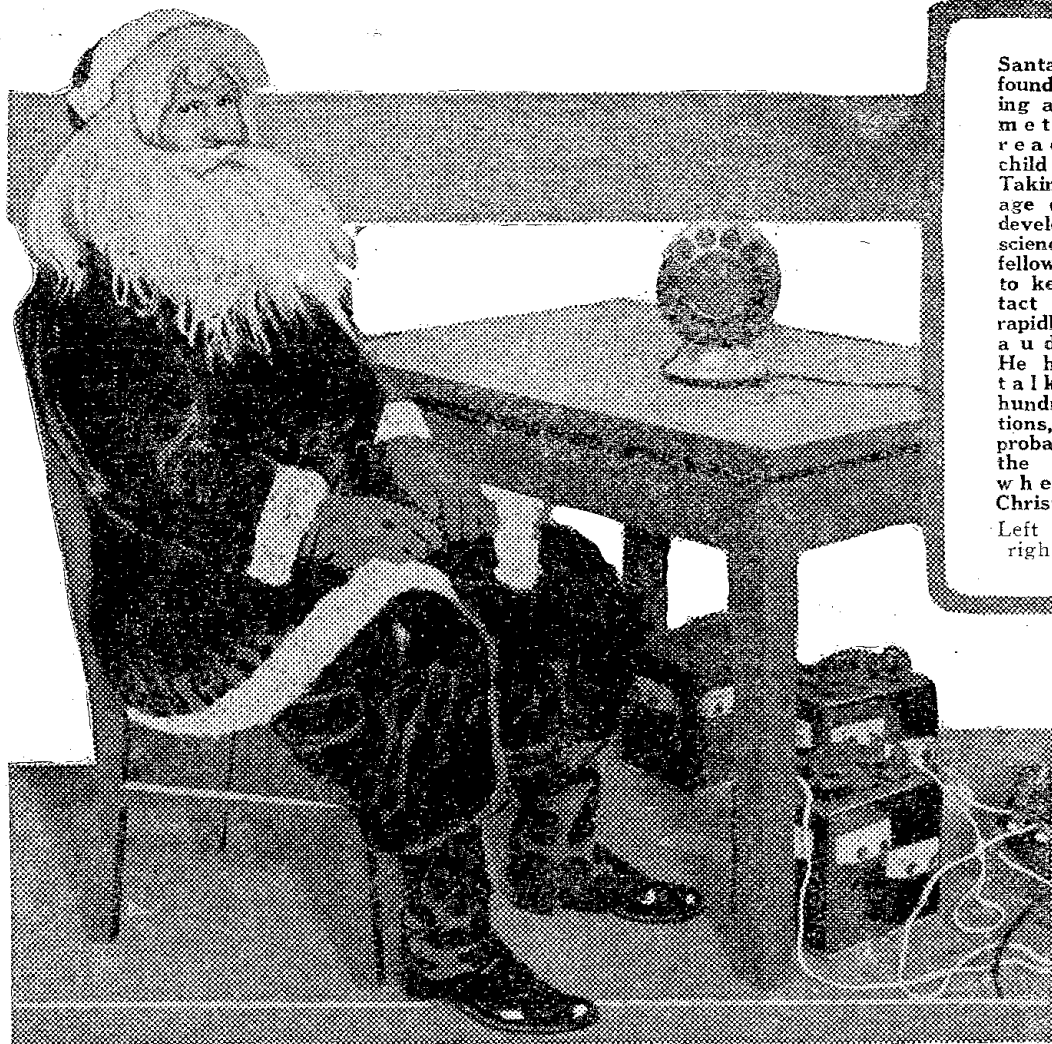
**The New GREBE Broadcast Receiver**

Compartment are provided in the attractively finished walnut cabinet for both A and B dry cells. Ask your Dealer for a copy of "Grebe Radio in the Well-Appointed Home."

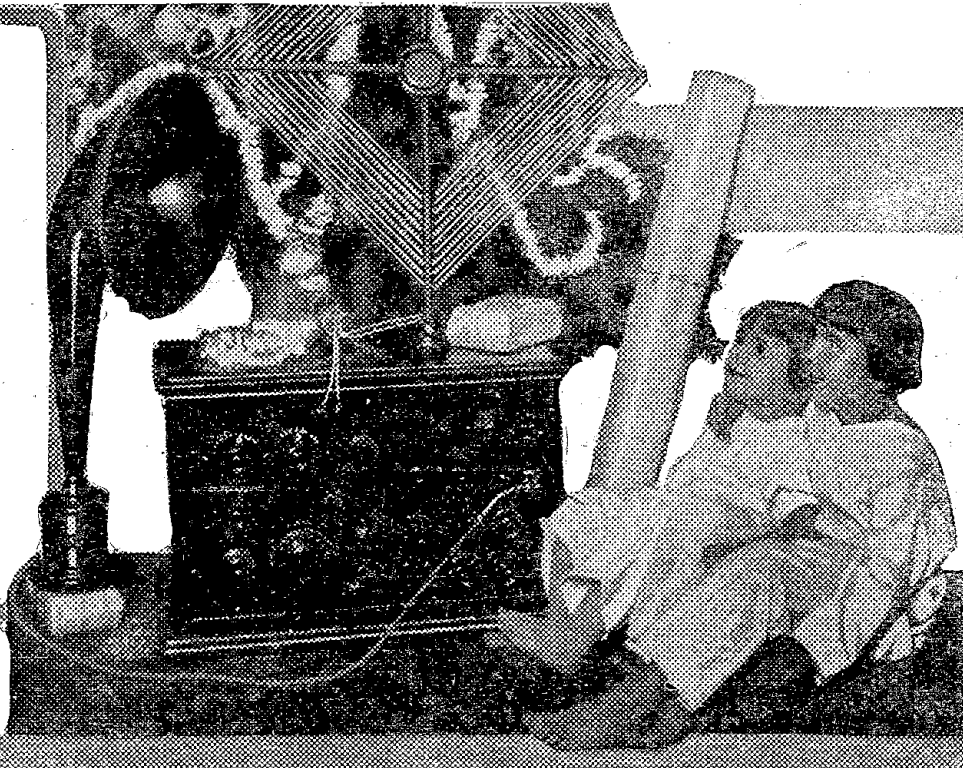
Licensed under Armstrong U. S. Pat. No. 115149

**A. H. GREBE & CO., Inc.**  
Richmond Hill, N. Y.  
Western Branch—451 East 3rd St., Los Angeles, Cal.

# “HELLO CHILDREN, THIS IS SANTA”



Santa Claus has found broadcasting a very good method of reaching his child admirers. Taking advantage of the new developments of science, the old fellow manages to keep in contact with his rapidly growing audience. He has already talked from hundreds of stations, and will probably be on the air everywhere before Christmas.  
Left Photo Int., right Keystone



## Railroaders Okeh Radio Dispatching

KYW to Be Central Relief Center in Emergency Control System—Amateurs Volunteer Services

(Continued from page 1)

eric; J. J. Graf, Delaware, Lackawanna and Western; R. J. Mathews, Chicago Radio Laboratory; Elam Miller, American Telephone and Telegraph; D. Sarnoff, Radio Corporation of America, and G. T. Stanton, Cleveland, Cincinnati, Chicago and St. Louis railway, are the other members.

### Relay League as Volunteers

Co-operation effected recently between the American Railway association, perhaps the most powerful body of its kind, and the American Radio Relay League, headquarters Hartford, Conn., has thus far resulted in an arrangement said to be the greatest step toward the application of Radio to the movement of trains. The latter association has obtained the co-operation of a great number of its members throughout the country by means of which they will serve as volunteers when railway traffic is impeded by fire, storm, flood or like causes. For each railroad in the United States there will be an emergency Radio manager (many have already

been named) whose duty will be to organize, either by division or by the entire railway system, a mode of communication with railway transportation or telegraph (or telephone) officials. Amateur stations in the jurisdiction of the A. R. R. L. division chief are to be enrolled (many of them have already been enlisted) to serve in emergency. As an instance of the progress of the work—125 DX operators from Chicago to Fargo, N. D., and as far west as the Missouri river have already entered into an emergency arrangement with the Chicago, Milwaukee and St. Paul railway, headquarters Chicago.

### KYW Relief Center

With Station KYW of Chicago (as an instance) as a central point the amateurs in the region outlined will in time of stress assist railway officials in finding trains that have been "lost" and thus help to restore traffic. In that way the superintendent of a railway division will be guided not only as to the operation of his own trains but as to those of connecting divisions. The amateurs will aid too in furthering communication with wrecking crews along blockaded railway lines.

The telegraph and telephone committee of the American Railway association has been instructed to study and has already reported favorably, in a sense, the use of Radio in relation to the dispatching of trains en route, that is, from caboose or coach to engine, and from tug to shore. The committee, which had been instructed

to confer with manufacturers of Radio apparatus, reported that the American Telephone and Telegraph company is experimenting with short wave devices, that the Westinghouse company and the General Electric companies are proceeding along similar lines and that the Radio Corporation of America "is now in position to furnish portable Radio transmitting and receiving equipment for short range emergency work" along railway (and tug) systems.

### Vacuum Tube Seen Best

In referring to the various opinions of Radio engineers as to the relative values of the arc transmitter and the vacuum tube the telephone and telegraph committee said that Radio "is intended not only as a reserve in emergency when the wire circuits are out of commission but . . . at all times to augment the wire circuits." The use of undamped wave Radio transmitters is becoming more common, according to the report of the committee,

because of its "increased efficiency when compared with the usual spark set." Use of the undamped waves in the future will be almost compulsory because of the sharply tuned transmission it affords. The vacuum tube continuous wave transmitter, said a prior report, is the only type of Radio transmitter which will meet the ultimate requirements of commercial railroad communication.

### Station KFYV Now KFIQ

YAKIMA, WASH.—The call of Station KFYV, formerly owned by a Radio shop here but now the property of the Yakima Valley Radio Broadcasting association of listeners in, is now KFIQ. The plant is the only one in the United States, perhaps in the world, owned and operated by listeners in.

Direct Radio communication has been established between Punta Arenas, South America, and Stanley, Falkland Islands.

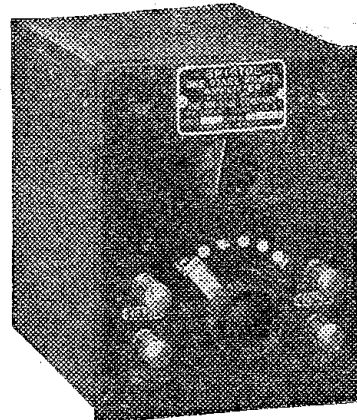
THE

TRADE MARK  
**AUDIOPHONE**  
REG. U. S. PAT. OFFICE

Quality of reproduction such as only the original itself can equal. Speech that is so distinct that the voice heard is the actual voice of the speaker. Music that requires no tolerant imagination to be recognized as music of the finest type.



## Bristol's Single Stage Power Amplifier

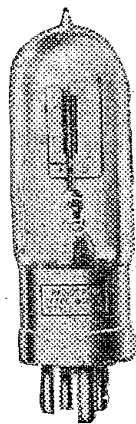


gives additional VOLUME with any two stage amplifier. No C batteries required. It provides the additional volume necessary to bring in very distant stations on the loud speaker.

Write for bulletin and address of the nearest dealer handling our instruments

**THE BRISTOL COMPANY**  
WATERBURY, CONN.

Boston New York Philadelphia Pittsburgh Detroit Chicago St. Louis San Francisco



## WD-11

Radiotron WD-11 is famous as the tube that really made possible the swift growth of radio in the home, as we know it today.

Inexpensive to operate—using but one 1½-volt dry cell—doing away with the need for storage batteries—it has lowered the cost of radio.

Price  
**\$6.50**

Radio Corporation of America

Sales Offices—Dept. 3002  
233 Broadway, New York



This Symbol of quality is your protection

10 South LaSalle St., Chicago, Ill.

433 California St., San Francisco, Cal.

Be sure that every vacuum tube you buy is marked **RADIOTRON**

# Radiotrons

REG. U. S. PAT. OFF.

# 'LITTLE OPIUM' CRIES FOR VERACIOUS DAD

## FOUNDER OF RADIO TRUTH SOCIETY DENIES BABE

### Station WBAP's Tale about Hired Hand's Parenthood Laid by Him to Jealousy

FORT WORTH, TEXAS.—If there's to be any crushing of Truth here or elsewhere, let the Radio Truth Society, founded and operated by Station WBAP (Star-Telegram) of this city, help it arise again, for the Radio Truth Society admits that Truth must be protected from abuse—and overwork.

The Hired Hand is chief champion of Truth. His headquarters are in the boiler room of Station WBAP where the heat has accustomed him, he said recently, to the hot air attacks on Truth, his fair charge. The toplofty temperature of his offices has prepared him, he declared, for that of the county seat just south of the sky to which he has often been consigned by those whom he has defeated in defense of Truth.

### Well Known Like Truth—Almost

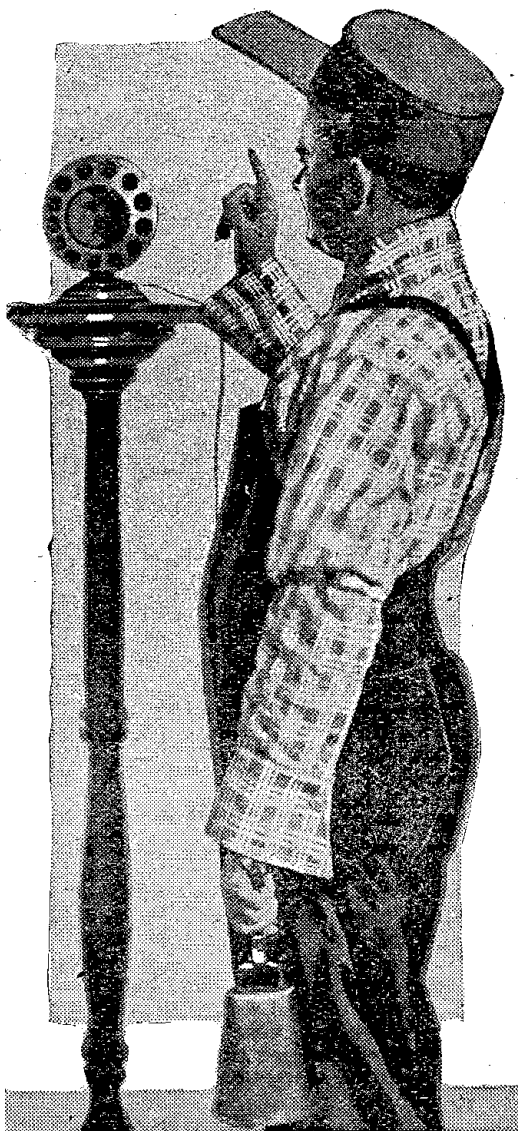
Truth may be a stranger in the land below, but the Hired Hand, according to himself, is known so well that a letter addressed a few days ago by J. A. Bucke in Lincoln, Ill., to The Hired Hand, Cowbells, Somewhere in the U. S., was delivered to the Hired Hand forty-eight hours afterward. As president of the Radio Truth Society the Hired Hand's assertions must be true, it is said.

Like Truth, the Hired Hand was almost crushed the other day. In his extremity he made known the following appeal:

### WBAP Presents Him with "Offspring"

"The regular announcer of Station WBAP recently started broadcasting the untrue information that a little Hired Hand had arrived at my boarding house and that its name was to be 'Opium.'" (The Hired Hand is substitute announcer for Station WBAP; whenever the regular announcer is invited out, Hired Hand takes his place. He has already helped the regular out of several homes.) A doll which yelled "Mama" when squeezed before the microphone, was said to have been little Opium crying for Mrs. Hired Hand.

# WBAP'S HIRED HAND ANNOUNCING TRUTH



The Hired Hand, president of the Radio Truth Society, founded and directed by Station WBAP, Fort Worth Star-Telegram, who usually, as substitute announcer, prefaces his talk with cowbells. The Hired Hand and his friend and ward, Truth, have been in quite a mess since WBAP's chief announcer announced that the Hired Hand was father of "Little Opium"

"As president of the Radio Truth Society I hereby solemnly declare and as-

severate that there is no Little Opium, and that there probably won't be unless some one of the big mail order houses place him in their next catalog."

The Hired Hand insisted that Station WBAP's announcers would not rectify their errors as to Little Opium. "Just because I'm president of the Radio Truth Society the static cussers won't believe me," he said.

"I had about decided to quit my protest and to let Truth lie in the mud," continued the Hired Hand, "when I received a letter from a Radiophan in Chicago in which he congratulated me on the safe arrival of Little Ethiopian.

"I hereby make known to the world that I am the father of neither Little Opium nor of Little Ethiopian and that I can lick anybody who says I am."

# Thrills from Radio

No. 8 of a Series Featuring Experiences of "ALL-AMERICAN" Users

## Have Boosted My List to 102 Stations

By Joseph Kemmerter, Jefferson, Wis.

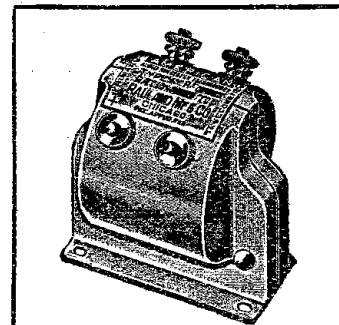
"I have just built a four-tube set consisting of two stages of R. F., F. T. Detector and one stage

"I have heard 90 stations on my three circuit regenerative type set—but with the four-tube set,

A. F. and wish to compliment you on the good transformers you manufacture.

"I use 'All-Americans' throughout. Am hearing WOAI San Antonio, WDAL Jacksonville, and KHJ Los Angeles (very powerful).

W J A X Cleveland can be heard all over the room from the phones.



All-American Audio Frequency Transformers come in three ratios: 3:1, 5:1, 10:1, \$4.50 to \$4.75.

and the pick-up ability of your transformers, I can get the small stations and the distant ones much easier. Have already boosted my list of stations to 102 on this set.

"Will always boost 'All-Americans' for distance as I sure am getting it."

### Special Offer!

All-American diagram and circular describing Power Amplification; also Book of Hook-ups containing 22 tested circuits. Send 4c in stamps.

All the better dealers sell "ALL-AMERICAN"

RAULAND MFG. CO., 200 N. Jefferson St., CHICAGO PIONEERS IN THE INDUSTRY

AUDIO AND RADIO FREQUENCY

POWER AMPLIFYING INPUT AND OUTPUT



# ALL-AMERICAN AMPLIFYING TRANSFORMERS

Largest Selling Transformers in the World

### RADIO TALKS

High grade Radio apparatus is so essential to a set that often times it is a real good investment to purchase an article at even three or four times the price of the article in its cheapest form.

Lessons from the bitter school of experience have firmly impressed this angle upon the writer.

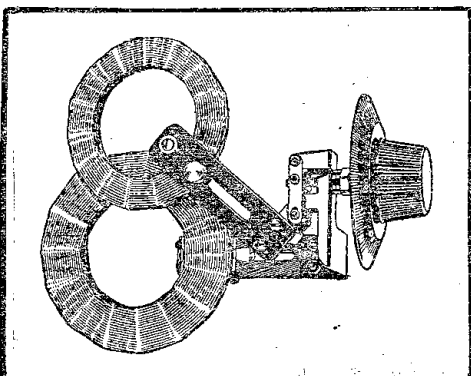
*E. J. Flewelling*

# E. J. Flewelling Tuner

Made of sheet bakelite and nickel plated parts, this instrument is the ultimate in tuning units. Neat, compact and of rigid construction. No loss producing taps. No unsightly lead wires. Mounting requires only one panel hole and but little cabinet space. Tuning is simplified to one condenser setting and adjustment of tuner to maximum volume. Practically all solid dielectrics are eliminated from coil field. No wood or fiber forms are used and coils are made to stand more than average abuse. A large wave band can be reached without changing coils. It is a unit that produces volume and clarity.

### BUELL MANUFACTURING COMPANY

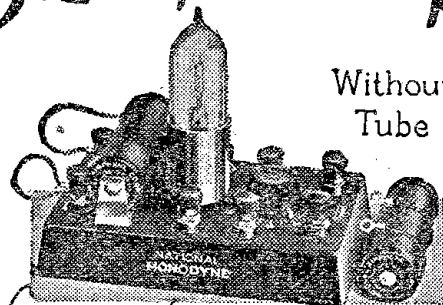
2977 COTTAGE GROVE AVE. CHICAGO



\$ **8.00** At your dealers or post paid.

# A Merry GIFT for a Merry Christmas

NATIONAL MONODYNE TUBE SET MODEL GT-1



Without Tube

\$ **10.00**

The Monodyne One Tube Radio Receiver will be treasured by all who receive it.

No technical knowledge is required for operation.

Only one tuning control.

Long distance as far as London, England, has been received clear and loud without distortion.

The wonderful performance of this little set astonishes the most skeptical.

With the single tuning knob, you can tune in on all wave-lengths with perfect selectivity.

A loud speaker can be used in connection with the Monodyne single stage amplifier unit retailing at \$8.50.

Two stages of amplification give perfect results.

16-22 Hudson St.

# NATIONAL AIRPHONE CORPORATION

NEW YORK

# PRESIDENT'S WORD DIRECT TO PUBLIC

## COOLIDGE RADIO ADDRESS SETS HISTORY EPOCH

More Than 1,500,000 Listeners Receive  
Speech by Means of Plants  
Across Country

By L. M. Lamm

WASHINGTON.—Few of the 1,500,000 or more listeners in the recent message of President Calvin Coolidge to Congress, realized, it was said, that the electromagnetic wave virtually had solved one of the most vexing problems of government.

From the time that man, for self-protection, had to live with his fellows, through the ages to the ancient Solons of Rome and the days of the American and French revolutions, one of the hardest problems of government has been to reach the ears of all the governed at the same time, thus to insure their widest and fairest representation. That was why the fathers of the constitution conceived the government of this country as a republic in a democracy — there was no way in which to crowd all the people in one place. Hence the election of representatives.



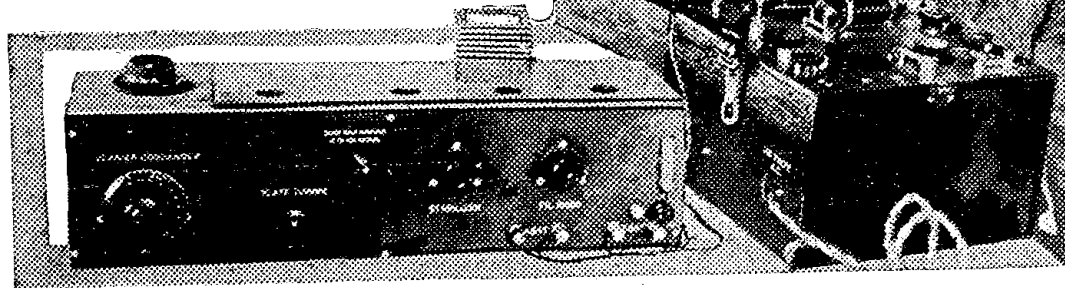
### Tells Citizens Policies of Nation

Thus did the Radio delivery of the president's speech solve in a sense a primary problem of government. From coast to coast, from the great lakes to the gulf, even in Canada and Mexico, hundreds of thousands of men, women and children heard the voice of the chief executive outline the policies of the administration.

It was the first instance in recorded history in which the leader of a people talked directly to them over an area of millions of square miles. This feat, which in past eras, would have been considered

# SET RECORDS MESSAGES IN TYPE

This receiving set records messages in typewriting just like an ordinary telegraph apparatus. It is connected into the circuit in place of the phones and may be used with any set using two or more tubes. The inventor, F. W. Dunsmore, of the Radio division of the Bureau of Standards, is here seen demonstrating the instrument, which he calls the "Radio Relay Recorder".  
Photonews Photo



miraculous, was scheduled for repetition by the Radio delivery of the president's eulogy of the late Warren G. Harding to the people of the United States.

### 3,800 Miles of Wire

For the consummation of what is considered one of the greatest achievements of man the American Telephone and Telegraph company and like concerns worked hard and long. It is estimated that 68 experts and 3,800 miles of telephone wires were employed in the broadcasting of President Coolidge's address.

Microphones placed before the president as he stood at the speaker's table in the House of Representatives here were connected by long distance telephone lines with broadcasting plants in various parts of the country. A shielded cable from the speaker's table to the basement of the capitol, where input equipment had been installed, passed the president's voice to Station WCAP (Chesapeake and Potomac Telephone company), Washington, D. C.; WBAF (American Telephone and Telegraph Company), New York City; WJAR (the Outlet company), Providence, R. I.; KSD (Post-Dispatch), St. Louis, Mo.; WBAF (The Star), Kansas City, Mo., and WFAA (The News), Dallas, Texas.

Fifty repeater stations were required at intermediate points. All of the tele-

phone equipment, including the circuits, was duplicated to provide for emergencies. In addition, a network of telegraph wires connected the various broadcasting and repeating stations. Crowds (they numbered thousands) outside the capitol heard the address by means of loud speakers on the steps of the building.

So that there would be no interference during the delivery of the eulogy to Harding, the secretary of commerce, Herbert Hoover, urged that the air be cleared for 15 minutes. Stations WBAF, WCAP and WJAR were scheduled to broadcast Coolidge's encomium.

## Michigan "Aggie" Outfit Can Now Cover 1,000 Miles

DETROIT.—The Michigan Agricultural College station, WKAR, at Lansing, Mich., has been equipped for transmitting over a radius of 1,000 miles. Acting President R. J. Shaw is planning an elaborate Radio extension service for the winter months, covering matters of particular interest to farmers. There will be talks on engineering and other interesting scientific matters as well. No decision has yet been reached regarding musical entertainment in connection with the extension talks.

# REPORT MONOPOLY IN RADIO INDUSTRY

## R. C. OF A. IS DECLARED "DOMINANT FACTOR"

Trade Board Offers No Conclusions to  
Question of Anti-Trust Law  
Violation

WASHINGTON.—Not only does the Radio Corporation of America control commercial Radio communication between the United States and foreign countries but it has virtually established a monopoly in sale of Radio devices. This is the gist of the recent report to Congress of the federal trade commission.

Reviewing the history of Radio in this country from 1899, when the Marconi Wireless Telegraph Company of America (a British corporation) was authorized to operate in the United States, to the present, the commission cites the methods by which the Radio Corporation of America, which was organized by the General Electric company, obtained control of the distribution of Radio devices manufactured under 2,000 patents.

### Says Sea Folks Monopolized

Communication by Radio from ship to ship and from ship to shore is dominated, the commission asserts, by the Radio Corporation. The arrangements which the concern has established with other companies practically precludes, the commission contends, competitive trans-oceanic Radio communication.

The refusal by the Radio Corporation to sell or lease apparatus to enable competitors to effect cross-sea communication was cited by the commission. Devices sold by the company bear licenses which, the report declares, restricts their use to amateur and experimental purposes. Contrivances for use aboard ships or airplanes carry licenses issued by the company which prevents any other use.

### Sales Conditions Cited

Independent manufacturers of receiving sets cannot buy vacuum tubes manufactured by the Radio Corporation for resale with the sets, the commission reported. Lack of substantial evidence was admitted in this instance.

The federal trade commission ended its report by saying that it submitted no conclusions as to whether or not the tactics of the Radio Corporation constituted violation of anti-trust laws.



The name  
**Federal**  
on Radio Products

is a guarantee that the part or set is of unusual quality and capable of producing unusual results.

Each of the more than 130 radio products, designed, manufactured and guaranteed by Federal, is on a par with the Federal head set, which built an international reputation for Federal by serving five governments efficiently during the world war.

Price  
2200 OHMS  
**\$7.00**

**Federal**  
Standard RADIO Products

**I**T DIDN'T take the boys of the nation long to wake up to the fact that they could get De Forest Audions for their Radio Receiving Sets. They knew De Forest was the inventor of the vacuum tube—they knew that every tube made, no matter what set it works in, was based on De Forest patents. So they are all insisting on De Forest Audions, and they are getting the DX and clear reception results they deserve. Three types available—DV 6-A Universal at \$5.00—DV-1 for dry cell use at \$6.50—and DV-2 Power Amplifier Audion are suitable for use with receiving sets of all makes, and they work particularly well in the famous cross-continent Reflex Radiophones with indoor loop—D-7-A at \$125.00 and D-10 Portable (dry cells enclosed in cabinet) at \$150.00. To prices quoted add approximately 6% for transportation for territories west of the Rocky Mountains.

Send for circular "What Tubes Shall I Use?" which gives full details and table of various tubes for different receiving sets.

DE FOREST RADIO TEL. & TEL. CO.  
Dept. R. D. 4 JERSEY CITY, N. J.

If Located West of Pennsylvania address  
DE FOREST RADIO TEL. & TEL. CO.  
Western Sales Division  
Dept. R. D. 4, 5680 12th St. DETROIT, MICH.



AN EVENING AT HOME WITH THE LISTENER IN

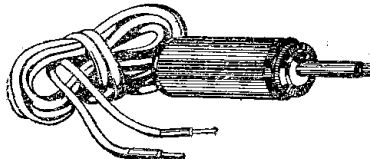
(SEE INSTRUCTIONS FOR USE BELOW)

Table with columns: Station and City, Mct, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday. Lists various radio stations and their broadcast times.

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

YOU NEED

The Original Automatic COMSCO



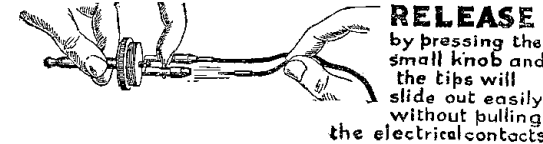
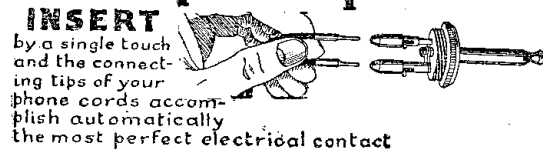
Bull Dog Grip Telephone Plug

(Licensed under Pat. Pend. Serial No. D 3010—No. 578540)

WE GUARANTEE

Simple to operate

that with this plug you will not demagnetize your phones, ruin your transformers, short-circuit your batteries, have battery kicks, or break your finger nails. The COMSCO PLUG is the last link in perfect reception. At a small cost it is the final refinement for your set.



Your Money Back

IF NOT BETTER THAN ANY OTHER



Bull Dog Grip Plug

Price for one pair of Phones.....\$1.00
Price for two pair of Phones..... 1.50

FOR SALE AT YOUR DEALER

Otherwise send purchase price direct to us and you will be supplied

GENERAL INSTRUMENT CORP.

123 Liberty Street NEW YORK CITY

RADIO AT N.Y. PRICES Daily Parcel Post

HOW TO ORDER—Write your order plainly: state number, description and price of items wanted. Send Post Office or Express Money Order, personal check or bank draft.

Moulded Bakelite Variometer or Variocoupler C79 Each \$4.95. List.....\$7.00

VARIOCOUPLER C77 High Grade 180 Degree Coupler, made of Bakelite tubing wound with green silk wire. Special.....\$2.45

DIETZEN SUPER HEAD SET C181 2200 Ohms.....\$2.95

INSULATORS These are very strong strain type Insulators. C158 Moulded insulator shown above. Each.....10c; Dozen.....\$1.10

STANDARD BRAND HEAD PHONES C134 Brandes Superior.....\$5.25

WAVE TRAP Simplifies tuning. Eliminates interfering stations, thereby improving the selectivity of your set. Selects between conflicting stations. Special while quantity lasts. C131 Each.....\$4.95

MISCELLANEOUS C163 Spaghetti Tubing per yard.....\$ .09

JACKS AND PLUGS Jacks are polished nickel constructed with pure silver contacts. C118 One spring open circuit.....\$ .39

FILAMENT CONTROLLED RHEOSTATS Highest grade of material used, tapered knob. C104—6 ohm.....\$ .39

AUDIO FREQUENCY TRANSFORMERS The following transformers are guaranteed standard makes, and will produce very efficient results. C63—Dietzen 3 to 1 Ratio.....\$3.95

SUPER VALUES

HAZELTINES NEUTRODYNE

The ultimate receiver for local and long distance Radio concert reception

THE MOST TALKED ABOUT SET OF TODAY

- 1. SIMPLICITY (A child can operate it)
2. SELECTIVITY (You can tune out local stations)
3. STABILITY (Always ready to entertain)
4. DISTANCE (Average range about 2000 miles)
5. NOISELESS (No squeals, no howls, no whistles)

Complete Parts for Building This Master Receiver \$49.65 AS LISTED BELOW, ONLY

Table with columns: Stock No., Quantity, Description, Price. Lists various parts for the HazelTine receiver.

Table with columns: Stock No., Quantity, Description, Price. Lists accessories necessary to complete the set for operation.

OUR SPECIAL COMBINATION OFFER \$47.35

To each purchaser of the above parts and accessories for the HAZELTINE NEUTRODYNE RECEIVER at the low price of.....\$97.00 we will, without cost to you, ship a Genuine HANES-ZENER special hand rubbed solid mahogany cabinet. Value.....\$10.00

Each of the above parts are of the highest standard grade, and carry the HANES-ZENER guarantee and can be purchased separately at our special prices.

WRITE FOR OUR CATALOGUE B

HANES-ZENER

3 WEST 29TH STREET, NEW YORK CITY

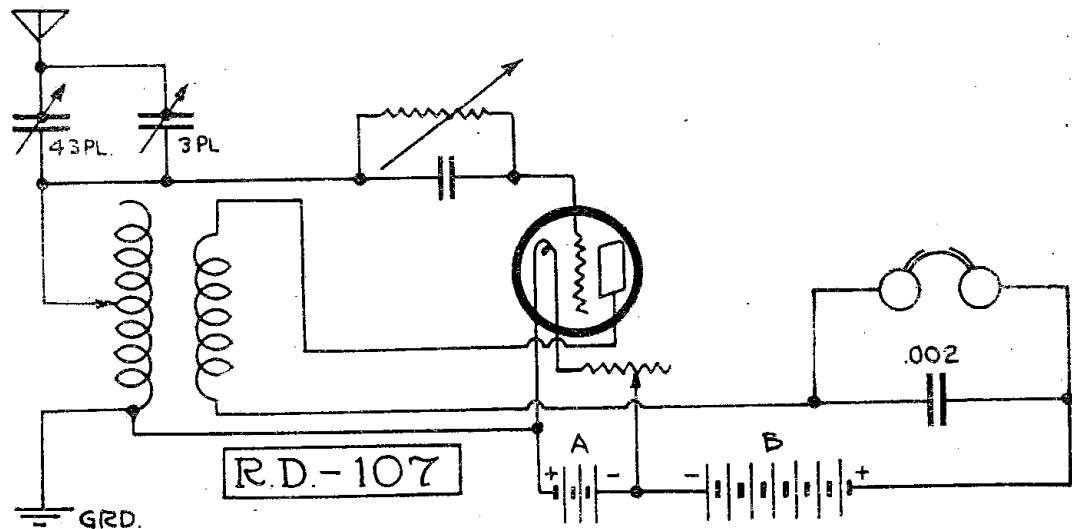
Modells ESTABLISHED 1899

71 Cortlandt Street NEW YORK, N. Y.

America's Greatest Radio Mail Order House ELEVEN NEW YORK STORES



### HOOK-UP EQUALS TWO-TUBE SET



**M**R. J. C. HARRIS, JR., of 1403 Galatin Road, Nashville, Tenn., has a circuit for which he claims volume and distance to satisfy anyone. This circuit is shown as R. D.-107. He has received broadcasting from all parts of the country and has found the volume to be equal to any two-tube set. A variometer is used as a coupler. The stator is tapped at one-half and two-thirds of the full winding, giving three adjustments for any variations in wave

length. Only 22½ volts are required on the plate when a WD-11 tube is used. He doesn't recommend shielding as it reduces the volume. He has found that connecting the filament and plate battery negatives gives best results. A vernier condenser, .0001 mfd., is used in the antenna circuit. Best operation for tube efficiency requires a variable grid leak and a .0005-mfd. grid condenser. This circuit is easily assembled and a simple one to tune.

tion. A well-wired circuit not only works better, but it also looks very much neater than a carelessly connected one.

Three things must especially be remembered while soldering. It is always important to have the surface or surfaces to be soldered perfectly clean. Emery cloth or a fine file may be used in some cases. Unclean surfaces do not permit the solder to flow freely.

The second point to bear in mind is to tin the surfaces properly. This is done by first applying a soldering flux, such as resin, acid or paste, to the surfaces, and then the well-tinned iron is run over them. This will leave a thin coating of solder on the surfaces, thus making them ready for the connection.

The final operation should not be attempted unless the soldering copper is of the proper heat. It should never be heated above the point where the solder begins to turn gray. To tin the iron, dip the end in the soldering flux and rub a piece of solder on the surface. A thin coat of solder will remain on the soldering tip.

When soldering, the iron is placed on the surfaces to be joined together. When the solder has melted around the parts being soldered, the iron is removed and the solder will quickly set. Precaution should be taken not to jar the pieces while the solder is setting. Care should be taken to allow only a minimum amount of solder to flow and thus prevent an unsightly joint.—P. J. M. Clute, Schenectady, N. Y.

#### Filament Current

When a "soft" tube is used for a detector, a hissing sound will be heard when the filament is burned above a certain point. Sometimes this hissing is very pronounced, while at other times it is scarcely noticeable. It is best to operate all tubes at as weak a filament current as possible with satisfactory results.

### Receiver Connections Must Be Well Soldered

It is of the utmost importance that all connections on a Radio receiver be soldered. An exceedingly small amount of energy operates the telephone receivers, and if maximum audibility is desired every small bit of energy must be made use of in the telephone circuit. Loose connections and poor contact offer a high resistance to the flow of current, and much energy is lost which could advantageously be employed to obtain louder signals. Soldering does away to a large extent

with loose or imperfect connections, that is, if it is properly done. Once a few points in soldering have been learned, there will be no trouble in making a perfect connection.

\$195

**GENUINE  
Western  
Electric  
MICROPHONE**

Including six feet of cord,  
Attachment plug,  
Breast plate,  
Shoulder straps,  
Transmitter.

These are all BRAND NEW microphone transmitters, not second hand. They were used by the Army and Navy as regular equipment. Each instrument has been thoroughly tested, and was originally made to sell at \$7.50.

Every radio experimenter needs one of these transmitters. Particularly useful because with it you have both of your hands free for operating your set. Nearly every one or two tube radio receiver can be converted into a radio transmitter. Most textbooks show how this can be accomplished. These microphone transmitters may sometimes save lives or property when connected to the radio receiving outfit!

The microphone is of a supersensitive type and is entirely waterproof. Remember, it was made for war purposes and only the best of material was used in it. The microphone has a double swivel arrangement so that any adjustment can be made either to or away from the mouth or sideways, if you want to push it out of the way.

Other uses: The microphone can be detached from the breast plate and attached to your set permanently if you so desire.

Or it may be used for land line work inasmuch as it has a wonderfully sensitive microphone.

Due to its peculiar filter plate, this transmitter can be used where there is an unusual amount of noise and still the spoken words will come out clear on the other end.

The entire transmitter is nicely finished and is heavily zinc plated all over. It positively will not rust.

As only a few hundred of these transmitters are left, we urge you to place your order at once.

**\$7.50 VALUE \$195**

**MAIL ORDERS**  
Shipped to you PROMPTLY  
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Genuine Supertrons

Types UV201A UV199, WD12

\$3.75

"B" BATTERIES

<b>22½ Variable</b>		
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Reg. 2.65	1.99	for
Reg. 3.00	2.49	1c
<b>45 Variable</b>		
Reg. \$3.50	\$2.99	More
Reg. 4.00	3.49	
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6 Ohm Shacton, Fada Type, Complete.....	\$0.39
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Metal Socket Wiping Snap Contact.....	.49
Genuine Bakelite Heavy Shell.....	.55

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3 Plate, for Vernier.....	\$0.49
23 Plate, Moulded end plates, Accurate.....	.98
23 Vernier, complete with Moulded Ends and Dials.....	2.69
43 Plate, Plain, Same as Above..	1.39
43 Plate Vernier, Same as Above..	3.19

---

COMPLETE PARTS FOR MILOPLEX CIRCUIT ..... \$25.00

1—Columbia split variometer.....	\$5.50	\$4.10
1—.0005 Variable condenser.....	2.75	1.25
1—.00025 Variable condenser.....	2.25	1.05
2—.002 Dubilier fixed condensers..	.89	.67
1—.00025 Dubilier fixed condensers	.35	.28
1—1850 Ohm potentiometer.....	2.20	1.70
3—3" Dials.....	1.05	.70
1—6, 25, 40 or 60 Ohm rheostat.....	1.10	.90
1—Double circuit jack.....	.90	.65
1—Federal standard socket.....	1.00	.75
1—Tapped 45 volt "B" battery.....	5.50	3.00
1—Bakelite panel, 9x14x½".....	2.52	2.10
16 Feet square hook-up wire.....	.32	.25
8—Binding posts.....	.80	.60
1—Freshman variable grid leak.....	.75	.55
2—Red Seal dry cells.....	.90	.75
1—UV-199 or C-299 Tube.....	6.50	5.70

TOTAL .....\$35.19 \$25.00

---

COMPLETE PARTS FOR AUTOPLEX CIRCUIT ..... \$20.95

2—Columbia variometers.....	\$11.00	\$8.26
1—Columbia 1250 turn honeycomb coil.....	2.00	1.50
1—UV-201A or C-301A tube.....	6.50	5.70
1—25 Ohm Howard rheostat.....	1.10	.90
1—Bakelite panel, 9x14x½".....	2.52	2.10
2—3" Dials.....	.70	.47
1—Federal standard socket.....	1.00	.75
6—Binding posts.....	.60	.45
16 Feet square hook-up wire.....	.32	.25
1—Double circuit jack.....	.90	.65

TOTAL .....\$26.64 \$20.95

Any of the above parts may be had separately at prices shown.

---

.001 Mfd. Vernier Condensers.....	\$6.00	\$3.00
22½ Volt "B" Batteries—(Large size, tapped).....	3.00	1.80
Electric Soldering Iron—(110 volts A. C. or D. C.).....	2.50	1.85

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All American 3-1 Shielded.....	\$3.95
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Shacton, most efficient; reg. \$5.00.....	2.95
Tri-Coil Radio Freak Extra on Reflex.....	1.89

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2" with Brass Bushing, DeForest Type.....	\$0.19
2½" Same.....	.25
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3" Grebe Type, Brass Bushing, Tapered Knob.....	.29

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Double Circuit Jacks, heavy silver contacts.....	.39
Switch Levers, Fada Type, tapered knob.....	.19
Vernier Dial Controls. Make your condenser a vernier..	.25

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# Methods of Securing the Neutrodyne Effect

## Capacity and Inductance Employed in Balancing

By Harry J. Marx

FEW will disagree with the statement that the most popular form of circuit at the present time is the Neutrodyne type. The keynote of the neutrodyne circuit is the neutralization of the intertube capacity. Now the strange part of it all is the fact that very few succeed in prop-

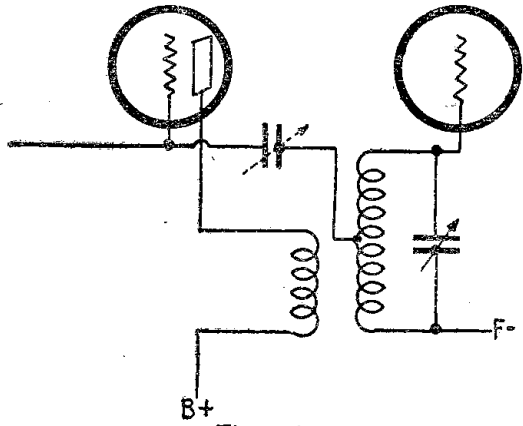


Figure 1

erly neutralizing their circuits. Fortunately tuned transformer coupled Radio frequency amplification is very efficient, and for this reason there have not been many fans who found any serious objection, or possibly even realized that the set was not properly balanced. As long as some of those long distance fellows came hammering in, even if the whistle was there, they had no kick coming.

### Theory of Neutralization

In order to present the theory of neutralization, a long introduction dealing with equations, formulas, tube characteristics, transformers, capacity reactions, and what not, would be required; so, possibly, analogy will do more toward explaining the situation than a theoretical discussion that will leave the fan bewildered and knowing even less than he did before. In boring underground, in tunnels or subways, to run under streams or bodies of water there is likely to be a constant seepage or inflow of water. This inflow of water is naturally due to the pressure of the stream above it. A method employed in work of this nature is the use of a coun-

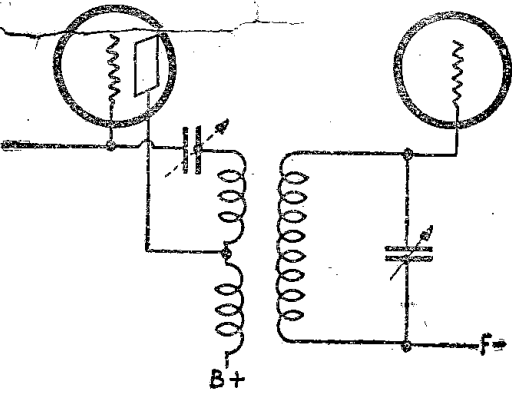


Figure 2

teracting air pressure in the excavation, sufficient to overcome the natural external pressure. To compare this, then, with the situation in Radio frequency circuits, we would state that there is a leakage, or what might be termed a detrimental pressure, mainly between the grid and plate of each tube. In addition, we have considerable leakage throughout the windings of

the transformers, the wiring of the set and in numerous other parts of the apparatus. Now, if there can be created a counterpressure that exactly balances the detrimental pressure or leakage, we have balanced the set. If the counterpressure is insufficient, we have only partially remedied the trouble, whereas if our counterpressure is too great we have introduced a new trouble. We find, therefore, that neutralization, unless properly adjusted, is valueless and might even be detrimental.

### Methods Employed

At the present there are two methods employed in creating a counterpressure for neutralization. The better known is the capacity method, the other—not quite so well-known but used in a half-understanding manner in the past—is the inductance method.

In the capacity method, although only one form was originally introduced, a number of other types are now in vogue and have been found to operate very successfully.

In Figure 1 is shown the popular method of applying a neutrodon between the grid and the secondary winding of the neutroformer. Although the reaction is in the

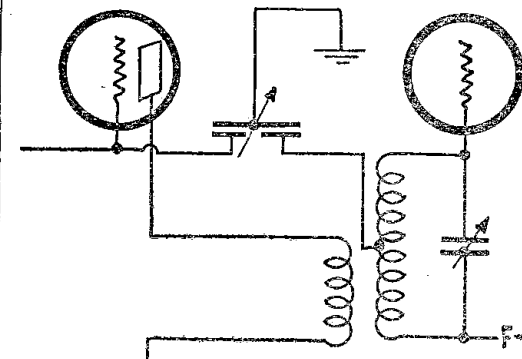


Figure 3

form of a capacity value, yet the induction, or number of turns in the secondary winding of the neutroformer, must be taken in consideration. There is one point, and this point or tap on the winding, in conjunction with the proper adjustment of capacity in the neutrodyne, gives the required balance.

A common difficulty in this method has been due mainly to two causes. First, that the fan was too anxious to make his own neutroformer, in spite of the fact that it was a patented article, and usually placed the tap anywhere on the secondary winding that happened to be convenient; and second, that the neutrodons that were first placed on the market, and some that are on the market even now, showed little or no intelligence on the part of the designers. Their adjustment is a sort of hit-and-miss operation; it stays put for about five seconds and then varies every time somebody looks at the set. As a rule, no ten of them, of the same type, have anywhere near a consistent range covering the minute capacity value required. For this reason the fan often discovers that it doesn't seem to make any difference at all where he adjusts it. Fortunately, new designs with decided improvements are now available and the fan has a better opportunity of successfully neutralizing his receiver.

Another way of obtaining neutralization,

by the same method applied in a slightly different manner, is shown in Figure 2. Here the neutralizing capacity is placed

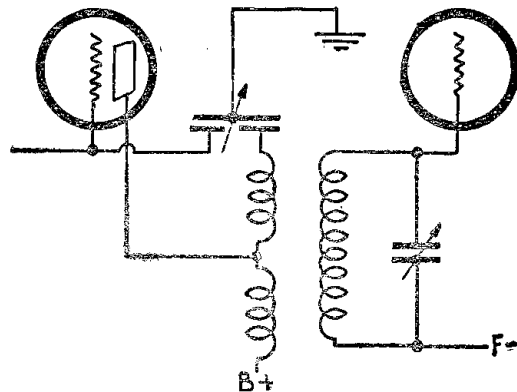


Figure 4

between the grid and the primary of the neutroformer. A number of turns connected in series to the primary winding are added and in this way the proper inductive value, used in conjunction with the capacity adjustment, gives us the required balance. The difficulties mentioned

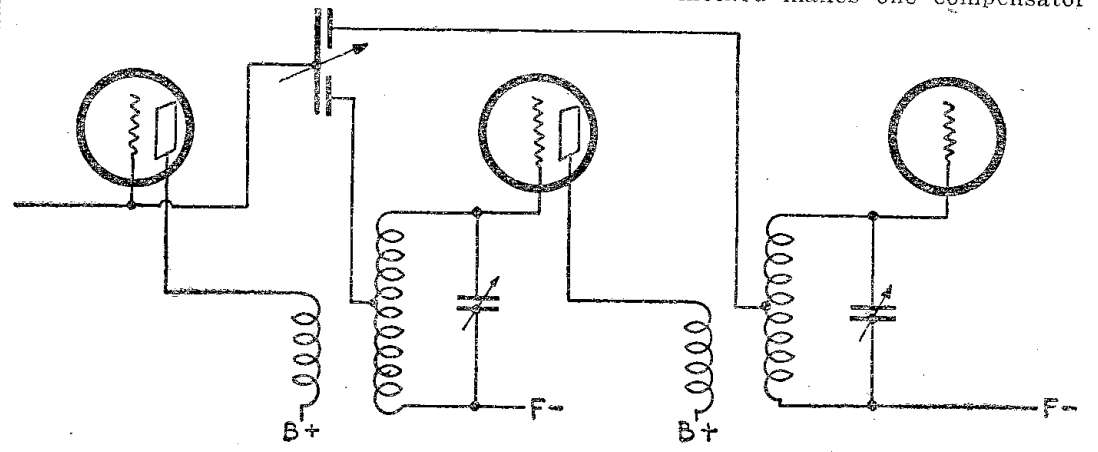


Figure 5

in connection with the original neutrodons apply here.

**Compensating Condensers**  
Of different construction (Figures 3 and 4), but operating fundamentally in the same

manner, are the compensating condensers now on the market. The most valuable feature of this instrument is its convenience of adjustment, the practical and familiar form of condenser design and convenience of control. Its application to the original neutrodyne form of circuit is illustrated in Figures 3 and 4. Its distinctive feature is the grounding of the center plate which forms one side of each of the two condensers in series. This will be found to considerably stabilize adjustments and at the same time eliminate outside tendency of variations under the different conditions. The peculiar symbol used indicates that this condenser is made up of three plates, two of which are fixed and one rotating. There is, then, a capacity reaction from the one fixed plate to the rotating plate, and again from the rotating plate to the other fixed plate. This gives us the equivalent of two capacities in series between the two fixed plates. The rotation of the one plate varies this capacity relation to the two fixed plates.

Another form of application of the compensating condenser is indicated in Figure 5. This method makes one compensator

cover the work of two neutrodynes. The method, however, is not as satisfactory as might be desired.

(Continued on page 14)

**Complete Parts for Miloplex Circuit—Cabinet Free**

1 .0005 Variable Condenser, 3 3/4-inch Dials, each 75c... \$2.25	1 B Battery, Burgess, 22 1/2 volt... \$3.00
1 Vernier... \$6.00	1 Potentiometer, 1850 ohm... 2.20
1 Estru Variometer... 5.00	1 Rheostat... 1.00
1 .00025 Variable Condenser... 2.00	1 Socket Bakelite Base... .90
1 Variable Grid Leak... .75	1 Socket Bakelite Base... .90
1 .00025 Mica Fixed Condenser... .40	1 Bakelite Panel 9x14x 1/2... 2.50
2 .002 Phone Condensers... .80	1 DeForest D.V. 6 Tube... 6.50
<b>TOTAL... \$35.70</b>	

**Our Price Only \$28.50** Blue print FREE only with order for complete parts

**Complete Parts for One Tube Reflex**

1 Radiometer... \$3.00	1 23 Plate Condenser... 3.00	1 Tricoil Transformer... 4.00	1 Audio Transformer... 4.00	1 199 Socket... .90	1 199 Tube... 6.50	1 Baseboard, 7x9... .25	1 7x9x 1/2 Bakelite Panel... 1.25	1 Set Readem Binding Post... .75	2 .002 Mica Fixed Condensers... .80	1 Type B. B. Metal Detector... 1.50	1 Cabinet, 7x9x8... 2.50
<b>Complete</b>	<b>OUR PRICE ONLY... \$22.45</b>	<b>TOTAL \$26.45</b>									

**Complete Parts RD 99 Long Distance Receiving Set**  
(See Radio Digest, September 29th issue)

3 Bakelite Base Sockets... \$2.25	3 Rheostats... 3.00	2 A. F. Transformers... 8.00	2 Double Circuit Jacks... 1.90	1 Open Circuit Jack... .75	1 Estru Variometer... 5.00	1 Variable Grid Leak and Condenser... 1.00	1 .0005 Variable Condenser with Vernier... 6.00	1 .005 Fixed Condenser... .75	1 75-turn Honeycomb Coil, mounted... 1.20	1 Single Coil Mounting... .50	1 Set Readem Binding Post... .75	1 Panel Bakelite, 7x16x 1/2... 2.25	1 Cabinet, 7x16x8, fine mahogany finish... 6.00
<b>Our price complete with panel drawing</b>	<b>ONLY \$30.25</b>	<b>TOTAL \$39.25</b>											

**Complete parts for a Neutrodyne Tube Set. Nothing extra to buy in parts. The complete parts are of the highest quality apparatus.**

**NEUTRODYNE**  
This is your opportunity to secure the parts for this famous set at a decided reduction in price. Nothing extra to buy, as this price includes all parts essential to build it... **\$45.50**

Same parts complete with 1 UV-200 and 3 UV-201A Tubes; 3 22 1/2-volt large size B Batteries; 1 Storage A Battery, 110-ampere; Baldwin Head Phones and Aerial Equipment... **\$92.15**  
This set would cost you \$181.65 if it was bought ready made.

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With Phones, Aerial, Lead-in Wire, Insulators. An attractive Christmas Gift... **\$8.50**  
Above Set alone, without Phones or Aerial Equipment... **\$2.50**

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Our List Price  
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Loud Speaker Cord, 20 ft., 4 tips, our price... 1.00

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Knock-down Loop Aerial, Special... .85  
UV-199 Adapter... .69  
UV-199 Socket... .69  
WD-11 Socket... .69

**VARIABLE CONDENSERS**  
Our Price  
Variable Condenser, .0005 (Same as 23 plate)... \$1.95  
Variable Condenser with Vernier, .0005 (Same as 23 plate)... 3.45  
Variable Condenser, .001 (Same as 45 plate)... 2.35  
Variable Condenser, with Vernier, .001... 3.95  
Walnut Variable Condenser, .00025... 1.75  
H. C. Coil Mounting Geared... \$4.50  
C. R. L. Grid Leak and Condenser... \$1.59  
C. R. L. Grid Leak... 1.29  
C. R. L. Potentiometer, 1,850 ohms... 2.00  
Marco Armored Potentiometer, 600 ohms... 1.75  
3-Coil Mounting, geared... \$4.50  
3-Coil Mounting (Crown)... 3.85  
Radon Panels, black or mahogany—all standard sizes, 1 1/2c per square inch...  
\$3.00 Electric Soldering Iron, guaranteed... \$2.45  
Spaghetti, yellow or black, 36 inches... \$ .10  
Tait Dials, 3 inch... \$ .90  
Tait Dials, 4 inch... 1.39  
1 Special Voltmeter, from 0 to 50 volts, for your A and B Batteries... \$1.19

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(Patented)

Now available for **DEALERS' SALE**

Radio users have learned that Radeco Safety Fuses are a necessary tube protection—that their price (50 cents) is small compared with the great service they render.

The merit of the fuses, their low price and our extensive advertising have created a ready sale.

Up to now these fuses have been sold direct by mail, but the demand is so great that we want to distribute them in larger units through the trade channels. You will find Radeco Fuses a profitable item to add to your stock.

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**ORDER TODAY**

Radio Fans! Radeco Fuses can now be purchased at your Dealers.

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# Further Details of the Famous Miloplex Hook-Up

## Part XII—King "X" Works with or without Antenna or Ground

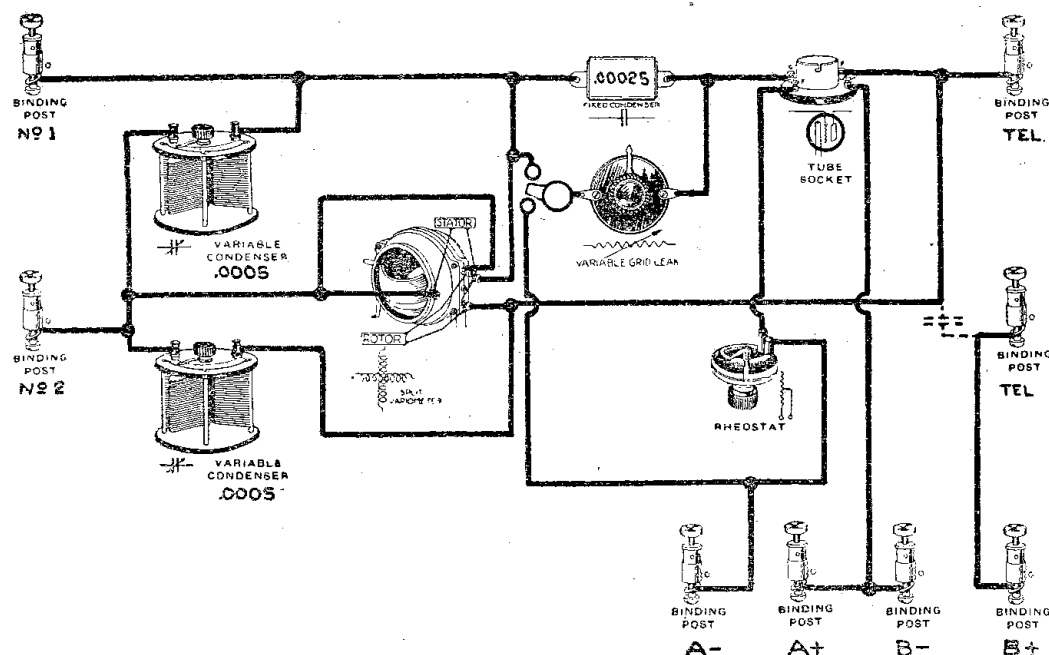
By the Mystery Man

SO THIS is Xmas—or the ragged edge—two days more for Santa to get close to the chimney so he can fill the little stockings and big socks. Mercy, one can hardly realize it has happened 1923 times—time surely do fly.

Thanksgiving was some day. You know after not eating (regularly) for some weeks, I copied in my notebook all the goodies I was going to masticate besides his honor the Turk (you know what I mean) and then—but why should I tell the sad story other than to casually mention that on that eventful day of eats, my tummy went "blooie"—stalled flat—about one hour and seven minutes before the herald announced "let's eat," and as a result when the Doctor had finished giving me the once over and handed Maggie two messages in code for the druggist, besides telling her to "Keep hot bricks on his feet," I kissed Mr. and Mrs. Gobbler goodby.

### Introducing King X

But, Oh Boy! Soon is Xmas and my canteen is ready. I'll say it's Christmas and here's your Xmas present circuit—the King "X," your present from the Mystery Man as a token of my appreciation for your interest in my previous try at pleasing you. Even my closest friends (you know the kind I mean—those you ask to help you inventory your basement



the King can build the King "X" sure fire or I'll have to go back to crystal circuits.

### Description of the Circuit

And the whole circuit is nothing more than a couple of good condensers—most any kind of energy collector—a socket and ordinary fixings. Diagram shows my using a variometer (sure—I'm a variometer hound). Try it on local and DX and see it—hear it work!

A couple of honeycomb coils will work just as well, but remember, both coils

must be of the same number of turns. Whatever you use for energy collector makes little difference so long as the one going to grid is of the same inductance value as the one going to plate.

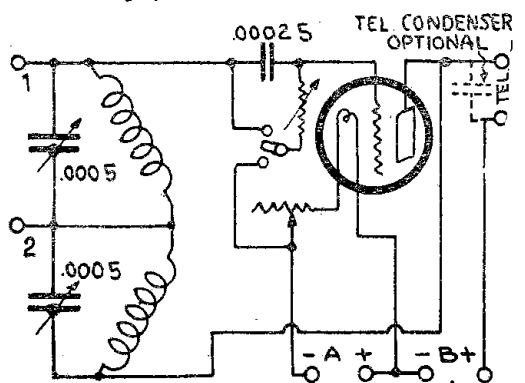
Next week I'll tell you the whole story about this new pet.

Think you will find that using a ground connection won't help you a bit. Antenna should go on point number 1, though you

may like it better on point 2. If you do, use ground with antenna, then antenna goes on 1 and ground on 2.

Look this little fellow over and get ready for Santa Claus. Anyway, the King "X" is different and "do work." Hain't that enough for Xmas?

Howler the dog is hungry, Maggie opines she is famished and, well, I'm a customer. Let's Eat, and get ready to welcome the Kiddie's King Santa Claus. (TO BE CONTINUED.)



stocks) haven't had a ghost of an inkling on this new circuit.

How does it work? Answer, with or without antenna or ground; speaks all languages and you fans who stumbled on

### RADIO WALL MAP 10c

Up to date, just off the press. Shows call letters, location, wave length, and kilocycles of all radio broadcasting stations; also American Relay divisions and radio districts. Complete with scale for measuring distances. Size 28x34 inches, printed in three colors. Postpaid for a dime.

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To Get Real Long Distance

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Deposit \$1.40 (plus postage) with Postman. Cash in full with order, postage prepaid. If, after ten days trial, you are not delighted, money back quick. You see you take no risk, so send name and address at once to

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IMPROVED COILS MADE TO COVER NEW WAVE LENGTHS

21 tap coils.....\$1.00  
16 tap coils..... .90

Above prices include coil mounting and also circuit diagram. Sent postpaid upon receipt of money order. Attractive discounts to dealers.

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\$2.00

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## 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. Melver, of Roodhouse, Ill., while operating a set made of materials and in accordance with the hookup furnished by the ELGIN RADIO SUPPLY CO., tuned in 2-LO, London, England, using receivers and but one tube. Later another tube was lighted 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

### Officially Confirmed

by the St. Louis Post Dispatch in conjunction with the National Association of Broadcasters, who had charge of the tests. (See page 34, St. Louis Post Dispatch, Dec. 2, 1923.) This same hookup has been advertised extensively as the one which brings in stations 2000 miles overland on a loud speaker and one tube; and this has been demonstrated so often as to need no repetition.

Send a two-cent stamp for circular giving one, two, and three tube hookup, and price list of parts for this remarkable circuit. Address the

## ELGIN RADIO SUPPLY CO.

207 Chicago St.

ELGIN, ILL.

## WILLARD RADIO COMPANY

291 Broadway New York City

"The Best for Less"

### REINARTZ CIRCUIT EVERY PART COMPLETE

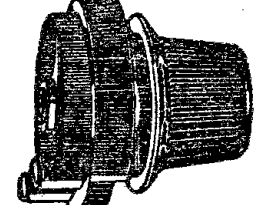
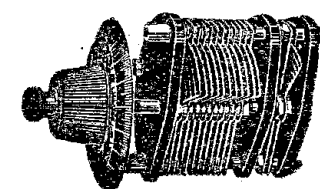
1 Reinartz wound coil, 1 tube socket, 1 rheostat, 1 23-plate .0005 MFD. variable condenser, 1 13-plate .00025 MFD. variable condenser, 3 inductance switches, 23 switch points and nuts, 6 switch stops and nuts, 8 binding posts, 2 3" dials, 1 variable grid leak, 1 .002 MFD. phono condenser, 23 feet bus bar wire, 1 high-grade panel ALREADY DRILLED AS PER DIAGRAM \$10.95 and complete instructions.....

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CKAC, Montreal, Can. (Eastern, 430), 7:00 p. m., Kiddies' stories in French and English; 7:30, Orchestra; 8:15, Concert, Raoul Venant, director.



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Thursday, December 20

CKAC, Montreal, Can. (Eastern, 430), 7:00 p. m., Kiddies' stories in French and English; 7:30, Concert, Desrosiers' Trio; Paul Valade, soloist.

Wednesday, December 19

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 6:30 p. m., Pittsburgh Athletic Association Orchestra; 7:30, Talk on Books, Priscilla Guthrie's Book Store; 7:45, John Martin's evening with the children; 8:15, 'The Advantages of Physical Examination in Industry'...

CHRISTMAS TALES

This week's Christmas tales are a special feature of WEAF. The air will be brant with happy tunes and visible tunes...



**NEUTRODYNE**

(Continued from page 9)

Much discussion has taken place covering the so-called superdyne circuit. This circuit illustrates quite clearly the idea of

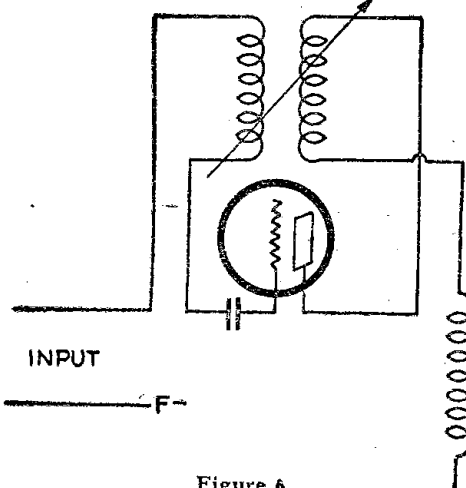


Figure 6

using an inductive reaction for neutralization. Inasmuch as the main difficulty is the leakage from grid to plate of the tube, we have the reverse inductance coupling in the grid and plate circuits, which is adjustable to exactly balance the leakage in the tube. This method has been used in various forms and manners before, especially in European circuits, but has not been given as much prominence in the past as it will no doubt receive in the future. (Figure 6.)

**Balancing Operation**

The instruction given with the Five-Tube Neutrodyne Receiving Circuit in the September 15 issue is here repeated for the convenience of those fans who have not as yet mastered the problem of balancing their circuits.

Light first four tubes and plug receivers in on first audio jack. Tune in for reception, but avoid any nearby local station where the volume is very great.

The reception should be clearly heard but not so loudly as to make it uncomfortable to the ears. Remove the second tube from the socket and insert a piece of paper under one of the filament contacts, then replace the tube in the socket. Although the rheostat is turned on, the filament naturally will not light. Don't turn off the rheostat; the real balancing should neutralize all capacity effects, even the filament battery leads; hence the method used.

With this tube inoperative, reception will still be heard faintly in the receiver due to the capacity coupling that exists and which is to be neutralized. If the dials are slightly readjusted, the volume can usually be increased a trifle. This step is now ready for balancing.

The adjustment is made on the second neutrodon. The screws are tuned in and out until the reception is entirely eliminated or reduced to minimum volume. If the volume of the reception is too great, it will be very difficult to judge this point. The dial adjustment should then be gone over to see if readjustment does not bring back the reception. If so, the balancing

operation will have to be repeated. After the adjustment is complete on this neutrodon the screws should be locked by means of the locknuts.

Take out the tube, remove the paper, then replace the tube and again retune the set. The procedure is then repeated with the first tube and the first neutrodon.

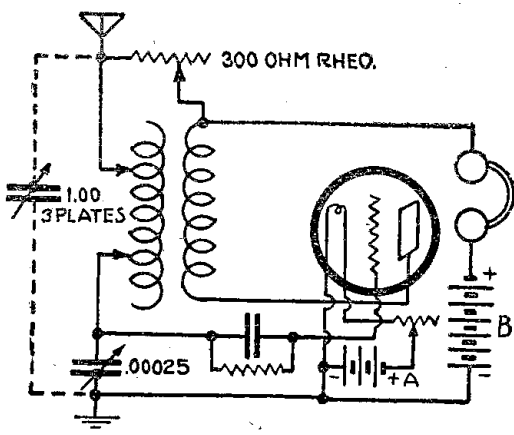
**Simple Double Feedback Produces Good Results**

F. H. Wetherald, an amateur, has devised what he call a double feedback circuit, and having very good results with it, feels that other amateurs might like to experiment with it. In reality the circuit is probably a modified super-regenerative one, which the inventor claims will operate satisfactorily with a ground, but better without one.

Referring to the diagram, the 300-ohm direct feedback resistance is made from an ordinary potentiometer of the same resistance. Without this device the tone of reception is inclined to be harsh and vibrant.

The rotor of the variocoupler is 3 inches in diameter, with 32 turns of number 22 wire.

The diameter of the stator is 3 3/4 inches, and it is wound with 100 turns of the same size wire with taps at the following points: 0, 10, 10, 10, 40, 10, 10, 10.



The 40 turns are at the center of the cylinder and are divided by the rotor shaft.

Two inductance switches are provided for, with four switch points to each. For the higher wave lengths additional windings are added symmetrically on each side

of the rotor and starter, so as to maintain the center of induction constant on all wave lengths.

There are thirteen plates to the variable condenser shown, with a vernier attachment for sharp tuning. Only a small part of the condenser is usually required for best results, as a maximum of turns is desired for given wave length. A variable grid leak from .5 to 5 megohms is necessary and at times permits separating two stations which are supposed to be on the same wave length. The grid condenser is the usual .00025 type.

A WD-11 tube works very well with this circuit. In tuning, the tickler is set for close coupling for weak signals and opened slightly for stronger ones. Set the 300-ohm feedback resistance about halfway to tune in a station. Carefully adjust the vernier on the variable tuning condenser to bring in the carrier wave of the broadcast stations. Should speech or music prove to be somewhat vibrant, this can usually be clarified by further adjustment of the vernier tuning condenser, filament rheostat, feedback resistance and tickler.

**Multiple Headset Connector**

In order that many members of the family may listen in with headsets, connect a closed circuit jack in series with the regular jack in the lead that goes to the plate of the last tube, or the lead



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to the positive terminal of the B battery. I have two headsets tied on one plug and one to another. In this way, either one, two or three headsets can be used. For clearness and long distance, headsets surpass any loud speaker, especially if power amplification is necessary for the loud speaker, cost being considered.—J. B. Owen, Blair, Okla.

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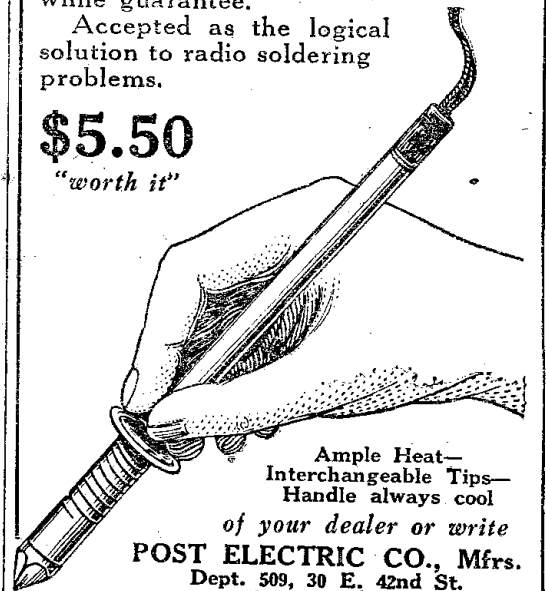
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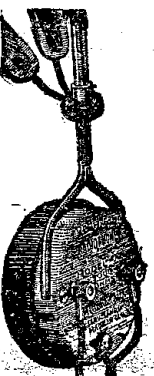
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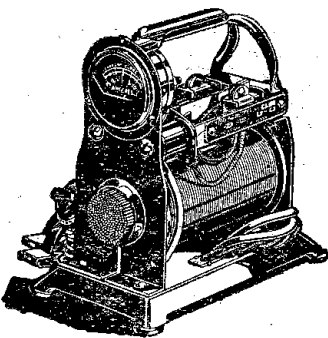
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# Simple Explanation of Radio for Everybody

## Chapter VII, Part II—Antennas and Grounds

By M. W. Thompson

**T**HE following article is the thirteenth of a series for Radio beginners, written by Marvin W. Thompson, well known in air-phone circles for his understandable style of approaching his subject, and his ability as a Radio engineer. Mr. Thompson is now an associate editor on the staff of Radio Digest. A preliminary outline of the chapters to follow is:

- Chapter VII—Antennas and Grounds.
- Chapter VIII—Regeneration.
- Chapter IX—Audio Frequency Amplification.
- Chapter X—Loud Speakers.

### The T-Antenna

**T**HE T-type aerial is best suited for use where one's station is located midway between two high points. Figure 49 shows an aerial of this kind.

wires strung, the pole and spreaders would be unsightly and considered undesirable by the landlord, but a single thin wire attracts no attention and is noticed by no one.

### The V-Antenna

The V-aerial is really a variety of the inverted L, yet should be considered a different type. Figure 51 illustrates the use of this aerial on a roof. One thing should be noted here. The distance from the little stair house at the far end to the flagpole at the left is not the same as the distance from stair house to chimney. The two wires, however, should be the same length, so that wire AB is cut the same length as wire BC, and a long support wire connects the insulator A to the flagpole. Insulators are inserted in each about 2 feet from pole B and a short lead connected to each close to these insulators. The two leads are then connected

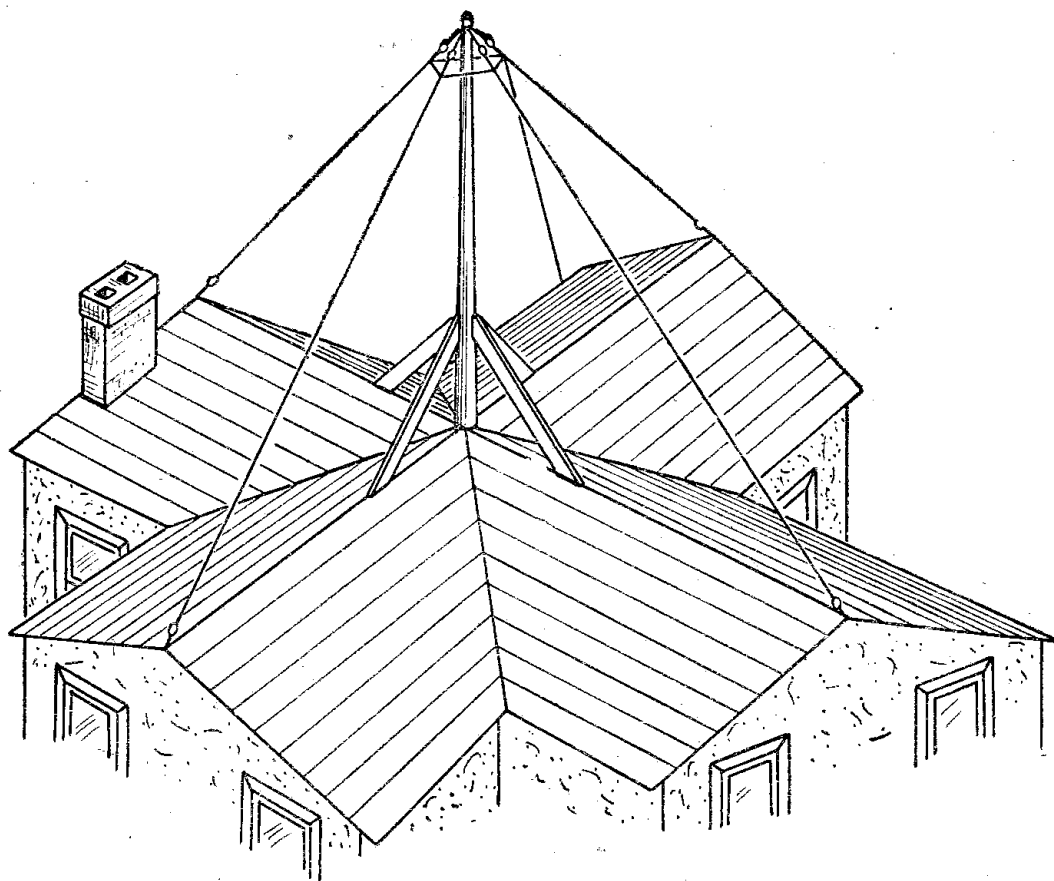


Figure 52—The umbrella aerial may be used where large horizontal area cannot be obtained

V-aerial has the advantage over the parallel-wire inverted L that each wire receives energy from a strong, unweakened part of the advancing wave, whereas in the latter type the wire reached first absorbs energy and the next wire does not receive as much unless they are 6 to 10 feet apart.

### The Umbrella Aerial

The umbrella aerial is used when the horizontal area is very limited and there is no objection to a tall pole (see Figure 52). In this case the distance from one end of the house to the other is likely to be only 30 feet. By erecting a 30 to 10 feet apart.

(Continued on page 20)

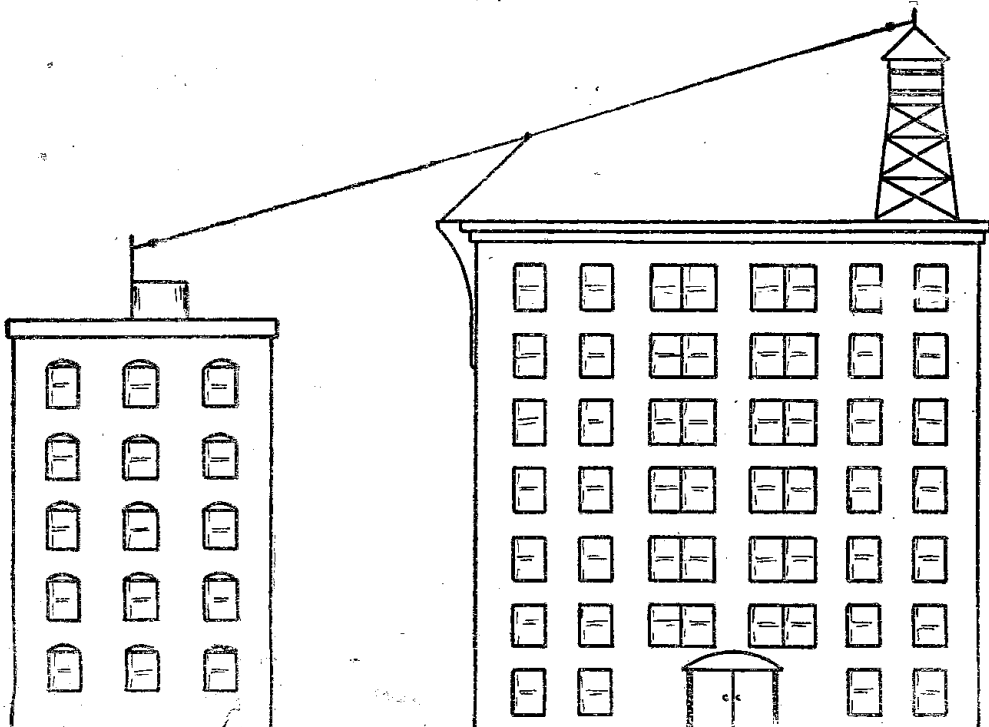


Figure 50—The single wire T, in this case, is less unsightly than a multi-wire inverted T would be. The natural period is equivalent to that of a four wire inverted L, one-half as long. Figure 50 illustrates a situation in which

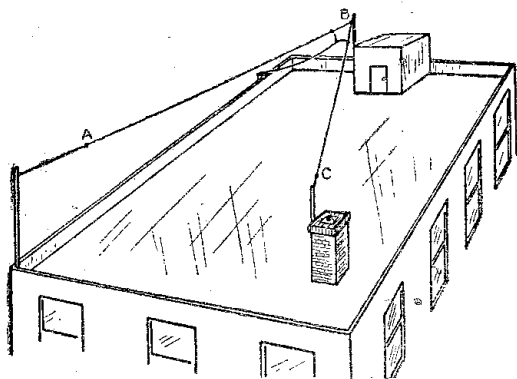


Figure 51—The arrangement of high points often makes a V-aerial possible

this aerial may be advantageously used. If a pole were to be erected at the left-hand edge of the taller building and two



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## Air Controlled Devices

Future Wars Will Be Prevented by the Use of Radio

RADIO-CONTROLLED mechanical devices, electrically operated, will exercise an influence difficult to foretell. Ten years and a new war will develop Radio and make its uses so far-reaching, in conjunction with chemicals and mechanics, that another world war will be impossible.

## Christmas Spirit

A New Thing for Giving at the Forthcoming Holidays

A LOT of Radio receivers are going to be given for gifts this Christmas, as they stand at the top of the list of requests for Santa to fill, along with sleds, trains and dolls. However, the children are not the only ones that will receive them, for receiving sets have more interest for grown-ups.

This will create a demand for much advice. Scores are going to ask, "What kind shall I buy?" There are many standard sets now being sold that will give splendid service and can be recommended. The kind not to buy is the "\$2.98," etc., sold as the unknown mail order variety. Even the best sets sometimes are contrary, and if you have made a purchase of a reliable dealer you can get service in making it right.

Big values advertised seldom prove beneficial, you pay actual value for what you get, and you cannot expect to obtain the best quality for little money. It is easy to fool the uninitiated in Radio. It is best to buy a good single tube set, one that may be expanded as the purchaser desires when he knows more about the working of a set.

## Women and Radio

Broadcasts Dispel Weariness and Entertains

WOMAN has the world by her elbow, thanks to Radio. No longer need the woman of leisure in the city wonder what to do with her spare time, nor kill time in the vain effort to dispel weariness. Radio, which has brought both entertainment and educational features to her drawing room, not alone for her but for her guests, is coming to be as fully appreciated by women as by the most ardent male Radiophan. One indication of this fact was seen in the surprisingly large number of women in attendance at the recent Radio shows, and in the alert and intelligent interest which they displayed in new circuits, equipment and recent improvements in the art.

But Radio is even more popular in the homes of women who reside on isolated farms and in small towns at a distance from the great urban centers of music, entertainment and general culture. To women thus situated, Radio is not merely a joy, it is rapidly becoming a necessity. Radio has a universal appeal to all classes of women. For every woman, housewife or lady of leisure, there is a program in the air somewhere which will appeal to her.

Furthermore, Radio lightens her burdens. For instance, instead of having to invent a story to tell the children at bedtime, she can turn to a station broadcasting a bedtime story, which, ten to one, is better than she could tell. Or instead of wondering what to cook for dinner, she can tune in on another station and obtain a menu—all by turning a knob. Each day, too, some of the largest stations broadcast information about fashions.

In fact, with the growth of women's interest in Radio it is rapidly assuming an indispensable place in every home. No longer is Radio a complicated maze of wires and controls, which confuse women and discourage their use of it. Circuits have been developed which require fewer operations and controls than ever before.

Then, too, many women are making their own sets nowadays. Women are taking Radio to their hearts, to their homes. This means that it has come into the American home to stay, and will be an increasingly important factor in promoting happiness, culture and good cheer in the humblest as well as the most pretentious home in the land.

## RADIO INDI-GEST

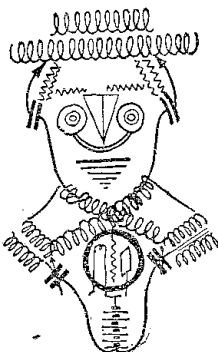
Hello, England!

Hello, England, How-do-you-do?  
Your old Yankee cousins have been thinking of you,  
We've been wondering ever since the Radio came  
If we both could converse and hear just the same  
As we do in the States by this new fangled thing,  
And whether you'd listen if we gave you a ring.  
'Tis been along while since we've teased your John Bull  
By giving the tail of his lion a pull,  
Though once in a while when our jingoes all howl  
We've heard the old lion give out a low growl.  
We had a nice visit from the young Prince of Wales,  
What he did here, no matter, we carry no tales,  
And Lloyd George came to see us and minded his tongue,  
But the old dog cut capers as though he were young;  
Since the war we've been watching the trend of affairs  
In your tight little isle with its trouble and cares,  
Our papers are filled with the important news  
That the Queen has a headache and the King has the blues.

Now, regarding the King, he's a jolly good sport,  
And if you've got to have kings, why he's the right sort,  
If ever his job as a monarch he'd shirk,  
Send Georgie to us, we will put him to work!  
Send your whole bally island to see us, by gum,  
But bring us no more of your infernal rum,  
Uncle Sam's on the wagon for good, you'll agree,  
So please, please be careful upon the high sea;  
Now England will say, "Are you there?" and "Hello,"  
Don't be a-bit bashful, and please let us know  
If our message came through, and how you all fare,  
And accept our best wishes and regards on the air.

—CHARLES L. H. WAGNER.

## We Stand Corrected. You Win



Dear Indi: I am enclosing a rough sketch of what I dreamed the Mystery Man of the Miloplex resembles, after laboring in vain till 3 A. M. to make a "Plexy" plex. As this was revealed to me while in the "arms of Morpheus" my subconscious surely must be correct. Your picture of the King doesn't agree with my psychic revelation. Did I dream right or wrong? ARKAHLO.

## Vision of the Radio Man

(Part I, Part II will appear next week.)

Once there lived by the shore of the limitless sea  
An ancient Radio man.  
The far-flung song of his faithful spark  
Was known to all his clan.  
He worked by night and he slept by day  
His phones upon his ears;  
And had no other thought beside  
Though he was gray with years.

On a night in Fall there came a call  
That sounded out of space,  
An S. O. S. distant, faint but clear,  
That drew the blood from his face.  
But the morning papers bore no news  
Of disaster to any craft.  
When he made so bold his tale to unfold  
Friends shook their heads and laughed.

He labored early, he labored late  
On a new transmitting set.  
And every night as steady as fate  
The far-away call he'd get  
Till there came a day when the last coil set,  
And the last dial put in place  
He tuned her up to bridge the void  
And with the elements race.

Again the call—an S. O. S.,  
And from his fingers true,  
Back rang his answer into space:  
"S. O. S., who are you?"  
Thrice he hurled his answer back  
And the third time it was heard  
For whispering back came the distant call  
With its message word by word.

J. A. BYERS.

(To Be Concluded.)

## A Martyr to Science

Here lies the body of "Old Man" Flack,  
Who cured his ills without pill or quack;  
He used his Radio—he was a Phan;  
Mourned by his wife and daughter Nan.

H. K. C.

Apropos: It will be our privilege to give to the scientific world in the Indi-Gest column next week, a full account of the experiment by "Old Man" Flack in the new field of Radiotherapy, curing disease by high frequency Radio current.

## Practice Watcha Broadcast—Quit @-ing Us

Deer Endy: A thing is funny wunce—& no more! In ref. to the endy-jest kinks dept. the notice appeared furst and wuz laffed @. When it came out the second time nine persinul friends uv mine laffed theyselves sick and three died uv ex-austium. Up tu date they haz been twenty seven persuns which haz passed away @ a youthful age acct. uv laffing two hard @ the dam thing. For gawdsaik take it out an forget it.

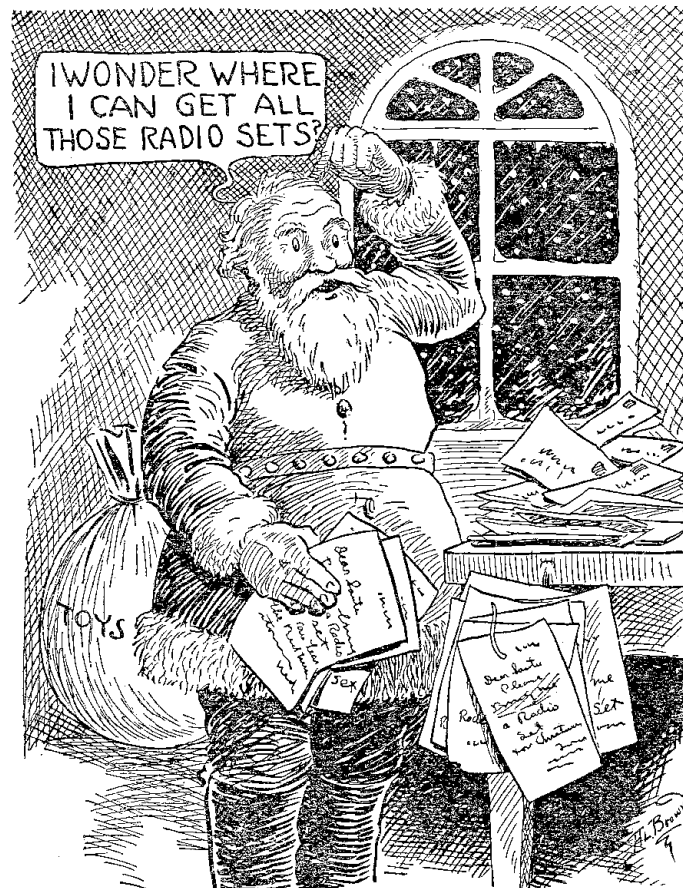
eZra hecht.

eZra: You forgot to include the usual challenge going something like this: "I dare you to print this, etc."

INDI.

## To Contribs, Readers and Other Sufferers

At this jovial season of the year, Indi-Gest expresses his appreciation of all the fine things his followers have done for him, and in turn, desires that everybody have a merry Christmas, even to the extent of tuning in China.



## Condensed

By DIELECTRIC

To all fans desirous of hearing some excellent orchestra playing music of a high order I would commend the Fox theater programs, from Philadelphia, and broadcast through station WOO. Each Monday evening at 7:30 this splendidly trained organization comes on the air with selections to suit any taste. It is possible that others will come to see broadcasting from the same angle as Mr. Rapee, managing director, who believes in Radiophony as a box office feeder. On former occasions I have tried to impress upon the readers of this column the importance of acquainting broadcasting stations with their critical analysis of each feature. Let me do so again. Mr. Rapee assures me of his keen appreciation of your letters to him.

During the recent tests for trans-oceanic Radio reception it is doubtful if there was a single fan in this country whose set was not tuned to one of the several British stations at some time in the week. Even crystal set owners may have prayed for some miracle to happen whereby they would be able to catch the strains of music from across the sea, which to some of us was quite audible. Having heard two of the English stations on as many nights, I feel free to say that it is entirely unnecessary to tune England in order to hear some good musical numbers; it's fascinating, but we do nicely at home. The really significant thing is the vast field of educational potentialities opened up through our ability to reach one another by speech. It's a great age!

Like every other endeavor in which man is concerned, Radio has enthusiasts seeking to establish new records in speed of code transmission or distance covered. Usually we have not long to wait between the superseding by one record of another. In a recent case of Radio relaying the new long-distance speed record was made between Hartford, Conn., Avalon, Calif., and Etah, Greenland. Major Mott received the message for the McMillan party from Mr. Phelps and relayed the answer, consuming slightly more than five minutes in the entire transmission, which covered a total distance of about 12,000 miles. Another feather in the cap of Radio relaying. The Bowdoin is not without news, at least.

Radio as a means of linking up officers of the law in their search for criminals is rapidly finding its proper place among the various instrumentalities employed. More cities are coming to realize the great service rendered to law enforcement by establishing a system of Radio communication between headquarters and the officers on duty. One of the latest to make use of this modern device is New York City. There classes are formed to instruct the men in code and operation of Radiophony instruments, and as fast as the men qualify they are assigned to stations throughout the city until eventually a complete system of Radio communication will be established. Just here is where you listeners in could make yourselves more valuable citizens by learning the code and co-operating with the police in your own town.

You may not consider the life of a moving picture director a particularly hard one—maybe it isn't—deserving of sympathy and needing labor-saving devices. Whatever your attitude on the subject, they themselves consider any means of facilitating the work of running through a big picture something very much to be desired. Hence, Radio is resorted to as a substitute for a number of megaphones manned by as many subalterns scattered over the field of operations giving directions to the stars and lesser lights in an attempt to make a film that you and I would be willing to pay to see. Now, the directors speak to "Mike" and have him broadcast what instructions are needed. Very simple!



# Latest Development in Grimes Inverse Duplex

## Part V—Crystal Detectors and Extra Radio Amplification

By David Grimes

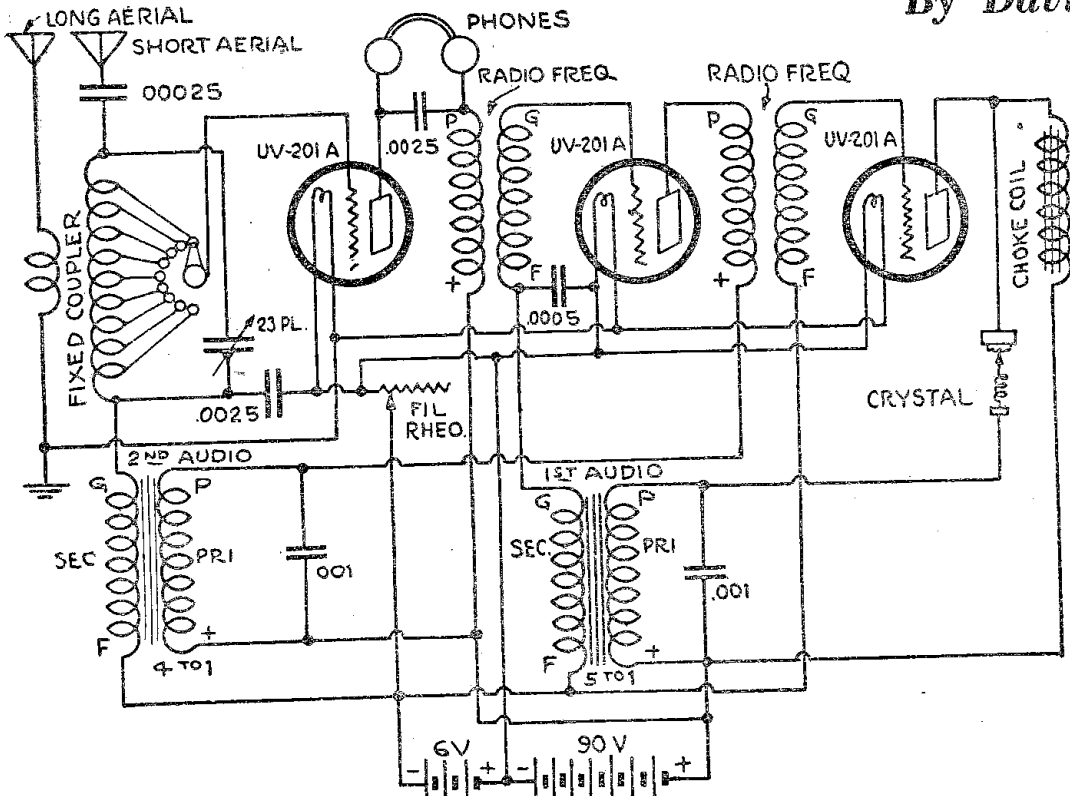


Figure 11—Grimes Inverse Duplex system, three Radio, crystal and two audio aerial operation

**Third Stage of Radio Amplification**  
In order to simplify the problem, we will first discuss the addition of a third stage of Radio to the two tube Inverse Duplex crystal aerial set shown in Figure 8, Part IV.

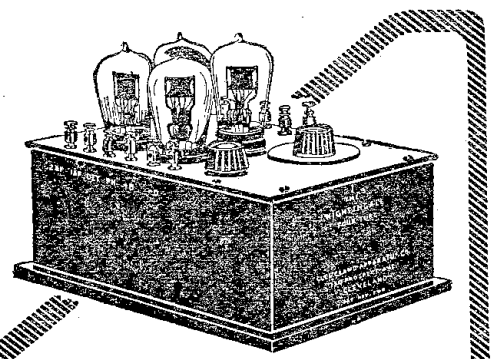
**Radio Reception under Difficulties**

On December 1 I changed my hook-up to the Inverse Duplex shown on page 18 of Radio Digest of that date. I set all the parts on a large table and had no connections soldered, using three tubes and a variocoupler. Though there was a rain-storm causing much static trouble, I received programs from Detroit, Kansas City, Chicago, Louisville, Zion City, Ill., and Minneapolis very plainly. I used a Miller connection between my phone receiver and a large phonograph horn, and could hear music anywhere in the house. My experience may interest other fans. —Adrian J. Will, St. Cloud, Minn.

The natural question that arises when this problem presents itself is, where will the extra stage be added, before or after the duplex stages? Extensive experience has shown that it should be placed after the duplex stages and before the crystal detector. A little thought on the matter and several reasons will occur which confirm the practical work.

**Location of Third Stage**

One of the advantages of the Inverse Duplex System, as pointed out in an earlier article, was the reduction to a minimum of the possibility of overloading the duplexed tubes. Now, if the extra stage of Radio amplification is placed ahead of the duplex stages, the duplex tubes will be carrying the second and third degrees of Radio amplification. If (Continued on page 18)



**Radio Frequency Set for Only \$30**

Send \$30 today and receive prepaid this fine non-regenerative Radio Frequency Set. Results guaranteed equal to sets costing three or four times as much. Four tube assembly—detector, 1 radio, 2 audio frequency. Only one simple adjustment for wide range of wave lengths. Perfect modulation. No howling or squeaking. Large, complete production in our own factory makes this wonderful value possible. Make draft or money order payable to CLEVELAND APPARATUS COMPANY, GRAFTON, OHIO.

**The NIGHTINGALE**

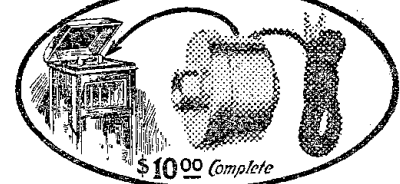
**Super-Triplex Circuit Tuner to Radio Digest Specifications.....\$6.90**

- Aerola Sr. Style Tuner Unit, 150-600 Meters
  - Push Pull Circuit Hi-Power Transformers
  - Neutralizing and Tuned R. F. Transformers
  - Reinartz Coils "New Static Reducing Winding"
  - Bureau Standards Style Resonance Wave Coils
  - Wavemeter and Wave Trap Combined, 150-600 Meter
  - Edison "Signal Corps" Batteries and Elements
  - New "Handy" Chargers, 2 to 24 Volt Batteries
  - 30 Henry Power Amplifier Chokes with 4 Values
  - Hi-Power Transformer with Variable Ratio
  - Nathaniel Baldwin New Loud Speakers and Phones
  - 200-300-400-600-800 Ohm Potentiometers
  - 6-10-30-50 Ohm and "Universal" Rheostats
  - Rheostat and Potentiometer Resistance Windings
  - Bishop "Phantom Super" Tuner Units
  - Quality Precision Var. Grid Leak, 0-10 Meg's
  - Outfits of Parts for Any Circuit You Desire
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QUALITY RADIO SHOP, Richmond, Ind.

**Takes the Rattle Out of Radio**

The Loud Speaker you have been waiting for. Will fit any phonograph or horn. Sold on a money-back guarantee.

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Loud Speaker \$10.00 Complete

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The tone can be adjusted to suit any set or occasion.

LIST PRICE \$10.00

**ASK YOUR DEALER FOR DEMONSTRATION,**

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Dealers Write for Sample and Special Discount Offer

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Six New York Retail Stores

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Do Not Send Stamps

208 page complete Radio catalogue free with orders of \$5.00 on request. Otherwise prepaid for 25 cents.

THE use of crystal detectors in connection with the Inverse Duplex was described in Part IV. The relative sensitivity of various types of tubes used as rectifiers was discussed and compared with crystals. It was suggested that, due to the decreased efficiency of crystal rectifiers, it would be necessary to add another stage of Radio frequency amplification or else operate the set entirely on an aerial. Even in some localities, on aerial operation, it would be advantageous to employ three stages of Radio frequency amplification when using a crystal detector. It is the purpose of this article to disclose information pertaining to this arrangement.

**CAST CAST**

E. MacDonald of Bangor, Me., received Wenatchee, Wash., on 1 tube Royal Portable Broadcast Receiver. One dial control. Takes all wave lengths. Complete parts, cabinet, instructions..... \$7.95  
Royal Portable 1 tube set assembled..... 10.00  
Phones, batteries, tube, aerial, etc., extra.... 9.75  
Autoplex circuit complete Tube FREE..... 18.50  
Cockaday-Reinartz—Ultra-Audion circuits, panel, complete parts—Tube Free with each 13.67  
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ROYALTRON tubes, guaranteed. Standard base, 1 1/2 volt detector or amp. 6 V. amp. 3.95

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PATENT APPLIED FOR  
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**SEND NO MONEY**

You need not send a penny. Pay the postman on arrival while you test your Ferbend. Every Ferbend is guaranteed to tune out local stations or money back quick. You see, you take no risk, so mail your name and address today.

"The Original Wave Filter"

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Mounted on formica panel in mahogany finished cabinet 6x5x6, \$8.50 postpaid.

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**INVERSE DUPLEX**

(Continued from page 17)

the extra Radio tube is placed after the duplex tubes, they will only be called upon to amplify the first and second stages of

Figure 8; so, except for the additional tube, the new circuit arrangement is quite inexpensive. Even with the cost of the tube, the results are well worth the money and, in fact, the additional equipment is necessary on loop reception. Ex-

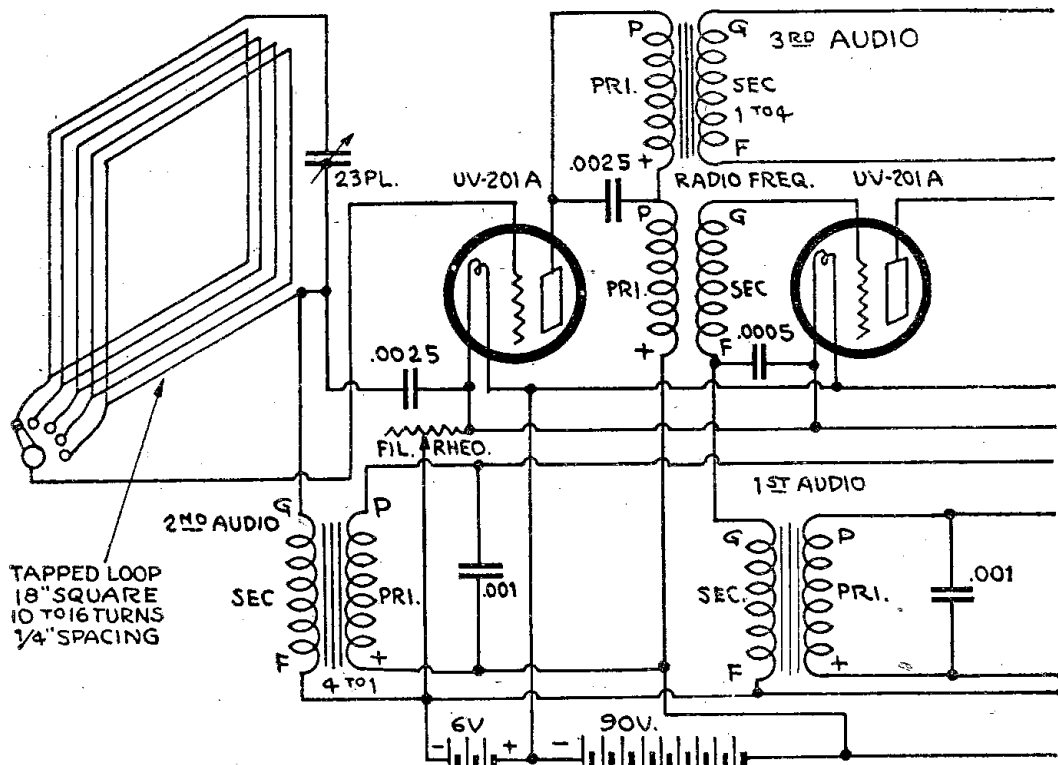


Figure 13—Grimes Inverse Duplex system, showing loop connections for Figure 12

Radio. This is obviously an easier task and will permit them to carry greater audio currents without being distorted from overloading. Another consideration enters into the problem. If a straight stage of pure Radio amplification is utilized without any precautions, it will tend to oscillate and interfere with proper operation of the set. Some means must be found to place a load or resistance on that free stage of Radio. If placed ahead of the duplex stages, the following tubes are not a sufficient load on the free stage of Radio to prevent oscillation. Something like placing a positive bias on the grid by means of a potentiometer would have to be employed and this would greatly broaden the tuning. In placing the free Radio tube in the other position, the crystal detector forms an excellent load or resistance on this amplifier tube, accomplishing the stabilizing effect without adding any detrimental factors.

**Changes Made in Circuit**

Referring to Figure 11, then, the reader will understand quite readily the changes which have been made in Figure 8 to accomplish the above outlined change. In order to add the third stage of Radio amplification, it is necessary to add another Radio transformer or Radio choke coil. Figure 11 shows the use of a choke coil as this method is as good as the transformer system and will be easier to make if the amateur so desires. The design and building of a satisfactory Radio transformer requires experience usually far beyond that possessed by the average experimenter. A Radio choke coil, on the other hand, is something even the beginner can build and use successfully. The choke coil shown may be made by winding about 100 turns of number 19 cc. wire on a 3-inch diameter insulated tube, such as fiber, cardboard, or the like. If one does not care to do this, it will be possible to use an ordinary Radio frequency transformer, as a choke with the primary and secondary windings in series. It will be necessary to make certain in this arrangement that the windings are not opposing one another. By merely reversing the connections on one of the windings and determining the proper connection for best results.

The other two Radio frequency transformers will be the same as employed in

extreme care should be taken in selecting Radio transformers and the crystal detector. On these parts depend the success of the circuit. A chain is no stronger than its weakest link and it is unreasonable to expect satisfactory results from the Inverse Duplex system if you handicap it from the start by utilizing a poor Radio frequency circuit or a mediocre detector. Most of the audio transformers on the market are suitable, if they are of the proper ratio. The art of making audio transformers is more generally understood, but very few organizations at the present time understand anything about a Radio transformer.

**Another Circuit**

Figure 12 shows the addition of the extra stage of Radio frequency amplifica-

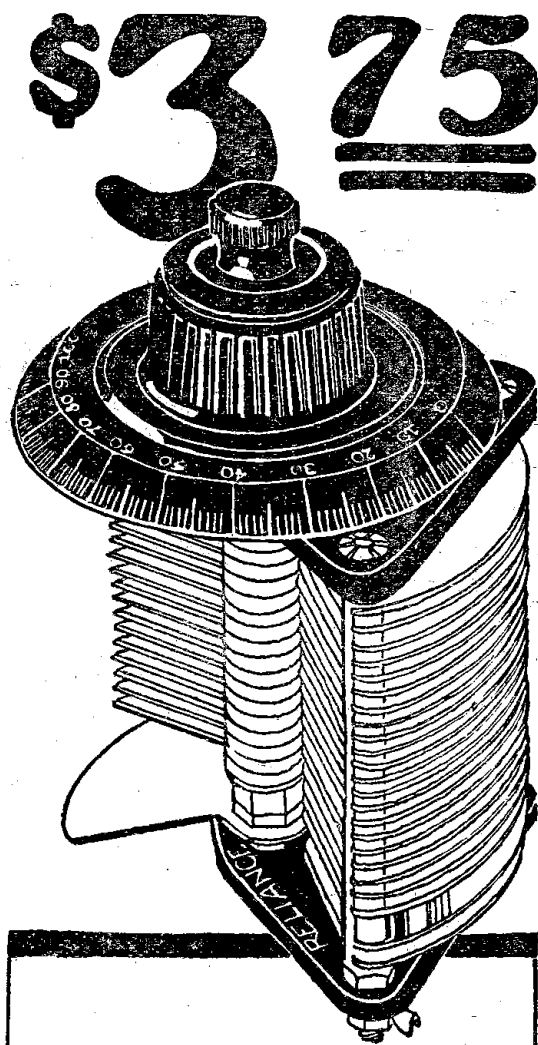
**GENUINE EDISON ELEMENTS** (new) for making "B" Batteries, obtained from U. S. Government. A positive and negative element—6c; glass tube—3c; all other parts at reasonable prices. Postage, etc., 50c extra per order. Free instructions. **TODD ELECTRIC COMPANY**, 109 West 23rd Street, New York.

tion to the circuit previously disclosed in Figure 9, Part 4. The free Radio stage is still placed between the duplex stages and the detector as in Figure 11, and for the same reasons. If you have understood the circuits in the preceding diagrams, this figure will not particularly annoy you. It is the most complicated so far, but with all that, it shows nothing which has not been described in the other sketches. Its intricacy lies mainly in combinations of easily understood arrangements. This circuit, when operating properly, should give greater distance reception than the other diagrams, greater ease of crystal adjustment, and somewhat greater volume of signal. The very fact that its receiving range has been increased will, however, increase the amount of static disturbance and telegraph interference. Any sensitive aerial set is subject to the same drawback. If audio howl is heard with three stages of audio, a change to a 4-to-1 transformer will usually remedy it.

**Loop Operation**

Loop operation has several distinct advantages over aerial operation. It is much more free from static effects and less interrupted by telegraph interference. And it also permits tuning stunts not possible on the aerial. If two stations are coming in to the receiver on nearly the same wave length, a whistling will occur which ruins both programs. This whistling phenomenon is called heterodyning. If two stations are thus close to the same wave length, it is impossible to tune one out and the other in on an aerial receiving set. It is often possible to do this on a loop by resorting to its directional effect. Very rarely are the two

Fifty assorted flathead solid brass machine screws, nuts, washers, copper lugs, 50c. Eight initialed binding posts, set, 60c. Twelve nickelled binding posts, 50c. All three items, \$1.50. **RADIO LIST** for stamp. All prepaid. Stamps accepted. **Kladag Radio Laboratories**, Kent, O.



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annoying stations coming from the same direction, and the loop can be so placed that it will practically eliminate one of them and the program from the other can be enjoyed with some degree of pleasure.

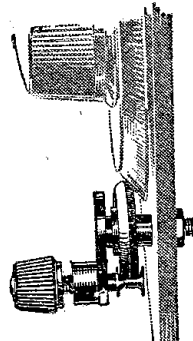
Accordingly Figure 13 shows the connections necessary for adapting the last four tube crystal aerial set to loop work. The changes are self-explanatory. Upon trying this circuit out on the loop, don't be disappointed in the diminution of volume over that which you received on the aerial. Remember that a loop picks up only a very small fraction of the energy collected by an aerial. This energy is so small, in fact, that with most circuits it would be impossible to perform on a loop. But, you will have reduced your interfering noises much more than the signal you wish to receive, and this is the result for which you have been

(Continued on page 20)

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TINY TURN makes possible an exactness in tuning never before attained. It has a 30 to 1 gear ratio instead of only 4 or 5 to 1 as in the ordinary vernier. No lost motion! The vernier turns in the same direction as dial. It can be instantly disengaged, leaving dial free. TINY TURN provides a continuous vernier adjustment over



Pats. Pend. Side View showing friction drive against dial.

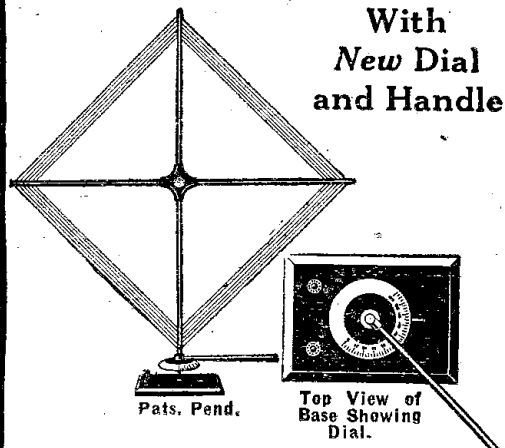
the entire range of the dial. When you desire, you can pass from one station to another by a continuous rotation of the vernier knob, without touching the dial at all. TINY TURN can be INSTALLED ON ANY SET IN 3 MINUTES. Handsome nickel and black finish. Packed in individual containers. We furnish counter display demonstrating boards.

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Pats. Pend. Top View of Base Showing Dial.

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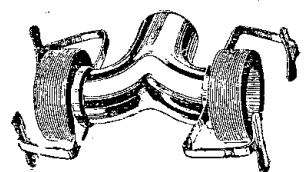
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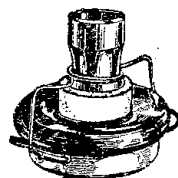


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Ekko Clamp 25c. Pair (for battery terminals) 50c Ekko Adapter and Ekko Clamp at your dealer's. Or order direct from us. Sent postpaid. Money back if not satisfied.

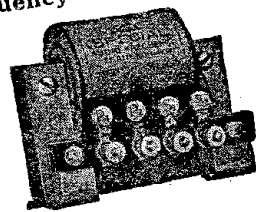
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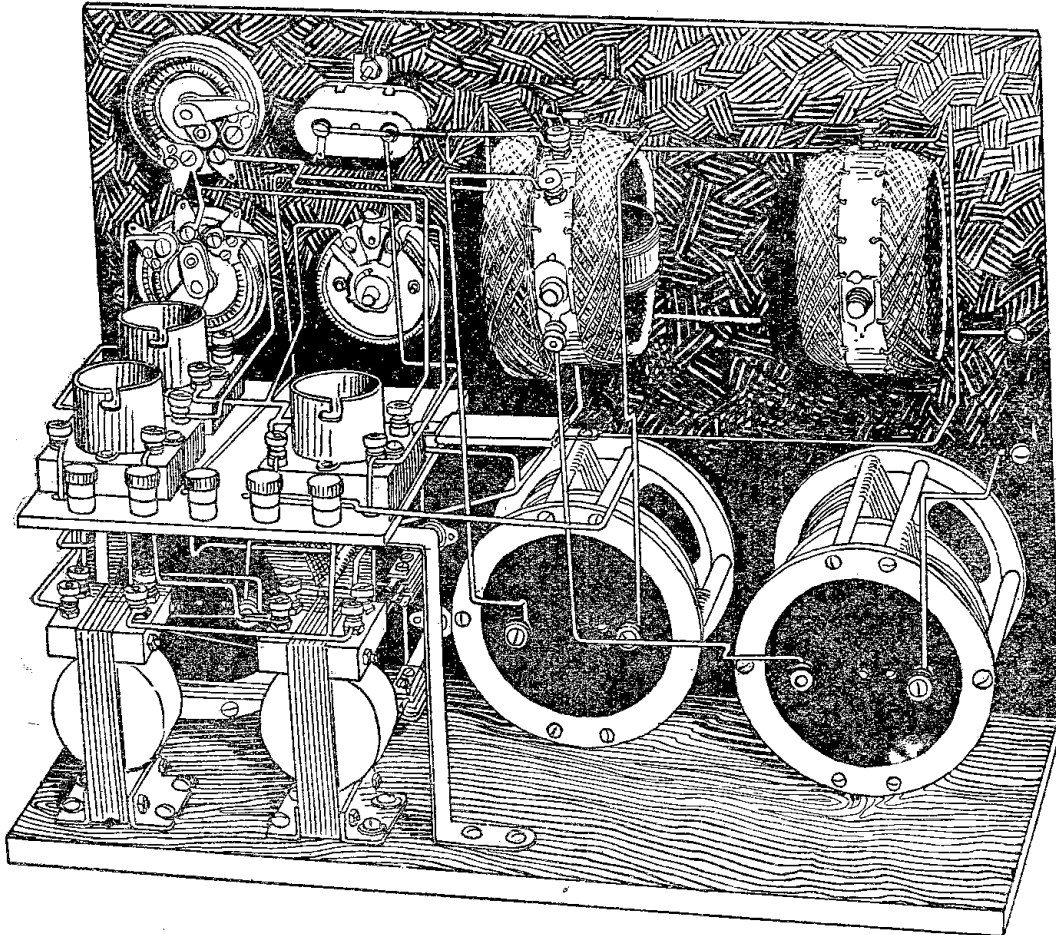
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# Super-Triplex Selective Receiver Construction

## Part III—Conclusion

By H. J. Marx



**N**O DOUBT a number of fans were at a loss to identify eight of the holes in the sub-panel. These were not added for mounting of apparatus but are used for the leads running from the upper to the lower side of the sub-panel. The rear view shows a number of these wires

shown in the rear view. The locations of the audio frequency transformers are also clearly shown in this view. The identification of the five binding posts is given in the plan view.

### Wiring

The same precautions that have been

ever, does not mean that the set can be carelessly wired. Although the writer uses little or no spaghetti, it is recommended that the average fan cover wires wherever they run in close proximity. Careless handling may short the B battery leads to the filament of the tubes with disastrous results. Beware of long leads that have a tendency to sag against other wires below them. The writer has been consistently using  $\frac{1}{8}$ -inch brass bus bar wire, which is quite stiff and not only has no tendency to sag but in itself helps stiffen up the general assembly of parts. In spite of repeated suggestions that close attention be paid to well soldered joints, sets are constantly brought in because of trouble, in which carelessly soldered joints can be pulled apart with no effort at all. Many a receiver has a peculiar throbbing reception owing to a poor connection somewhere in the circuit. A fair percentage of the difficulties encountered are wire troubles, and many of the remainder can be attributed to poor apparatus. Be careful to avoid splash soldering, especially when working around variable condensers. Hot solder when dropped on lattice windings burns through the insulation and often shorts out a considerable number of turns.

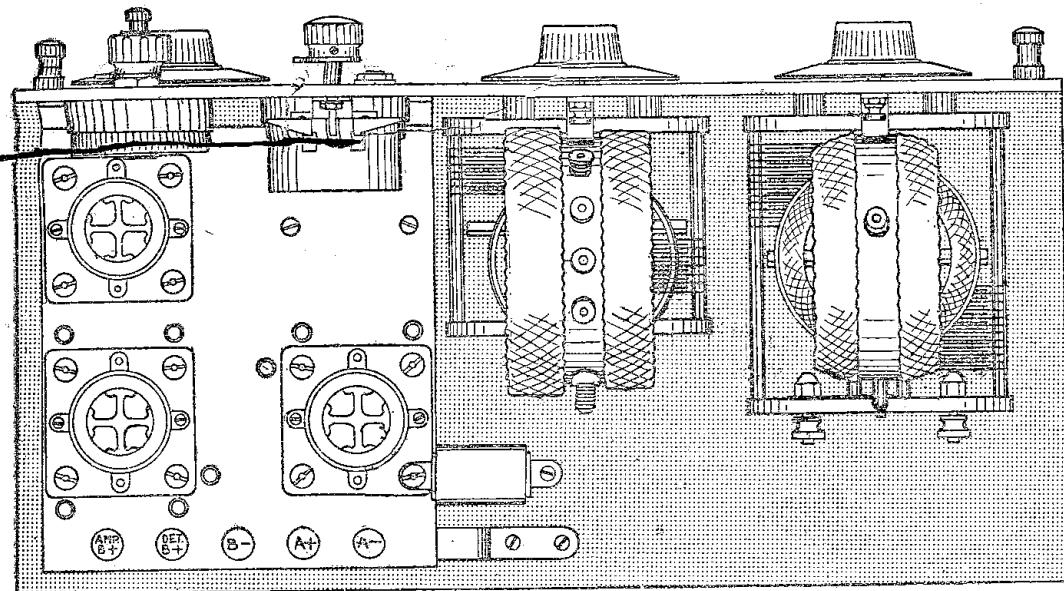
### Battery Connections

The five binding posts for battery connections are the only terminals in the rear. When the set has been placed in a suitable cabinet, some means can be arranged that connections can be made directly to these binding posts through a small opening or a series of openings in the rear of the cabinet. The A battery voltage should suit the particular type of tubes to be used. Although a soft detector tube was used in the original set with two A tubes, yet three A tubes can be used as well. With the soft detector tube the detector plate voltage should be  $22\frac{1}{2}$ . With an "A" tube in the detector stage it may be found necessary to increase this to approximately 45 volts, while  $67\frac{1}{2}$  volts on the plate of the amplifier tube is sufficient.

### Tuning

Because of the number of controls the question of tuning may appear to be rather difficult. This, however, need by no means be the case. After all connections have been completed and the tubes inserted, adjust the rheostats. The potentiometer should be thrown over completely on the negative side. It is understood, of course, that, in wiring, the positive and negative terminals to the potentiometer were made to conform to the marking in front. The grid leak should be placed at about the halfway position. Set the coupling at halfway, that is, with the rotor at right angles to the fixed

windings. The antenna condenser is set at about three-fourths full capacity. The oscillating condenser at about one-fourth full capacity. The secondary condenser dial and antenna variometer dial should both be rotated in conjunction with one another. This rotation, especially of the secondary condenser, should be very slow, as the adjustment may be found some- (Continued on page 20)



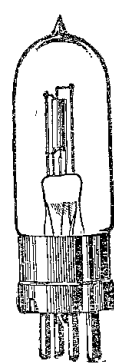
passing from top to bottom through these openings. Plan view shows the relative position of the apparatus as viewed from above. In reference to the arrangement of the tube sockets, the one shown on the left is the detector tube and the one alongside of it, on the right, is the first audio stage, and the one in front of that is the second audio tube.

In mounting the special three circuit coupler the 75 turn fixed coil should face to the right or sub-panel side. As previously explained the sub-panel is supported in front by means of the panel supports taken from two panel mount sockets. In the rear, a metal strip is bent up and fastened to the sub-panel and base as

emphasized before hold true in this set also. Naturally the leads should be kept as short and direct as possible. Inasmuch as there is no Radio frequency used, the constructor is not likely to run into interference difficulties. This, how-

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# Inside Mounting for Honeycomb Coils

## Coupling May Be Placed at Back Edge of Base

The illustration shows a mounting for honeycomb coils in the back of the cabinet with knob control on the panel. I am using this mounting on my Flewelling set. As only one coil moves on this set

### WORKSHOP KINKS? EARN A DOLLAR—

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

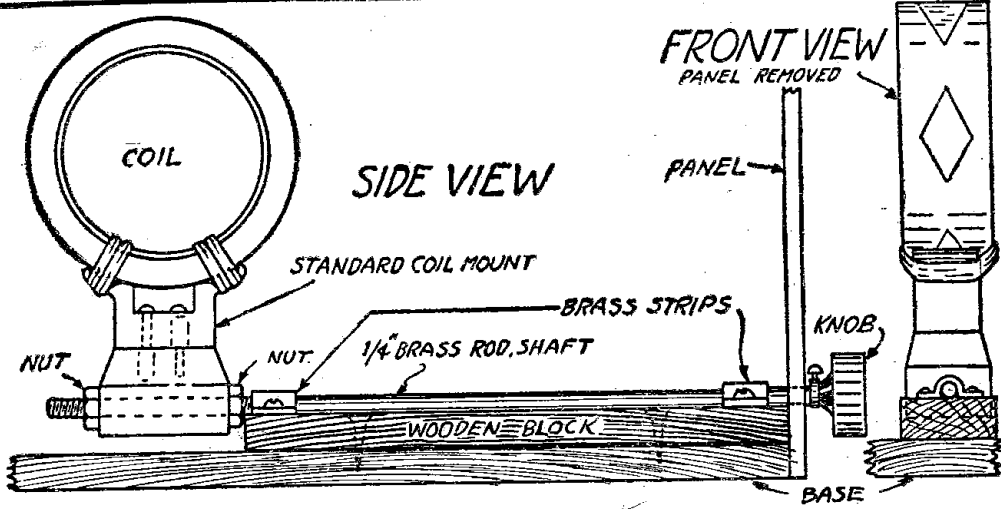
RADIO KINKS DEPARTMENT,  
Radio Digest,  
123 W. Madison St., Chicago

it is mounted on a shaft which extends through the panel in front. Strips of brass are formed to fit over the shaft as bearings. These are attached to a wooden block which in turn is fastened to the base of the set.—Wm. Fernando, Cal.

### Adjusting Phone Diaphragm

I purchased two phones recently of the same make. They were cheap phones and I did not expect very excellent results. However, one of them gave results that were surprising. The other, though of the same make, was not nearly so loud. By removing the diaphragm, I placed a card or straightedge across the ring and magnets and found the weak phone had the diaphragm placed about twice as far from the magnets as in the better set. By carefully filing the ring or shoulder on which the diaphragm rests, I made both phones of equal strength. This is a work

## PANEL DIAL ROTATES THE SHAFT



at which one must be very careful, however, as the diaphragm must not be bent and the shoulder on which it rests must be level.—J. B. Owen, Blair, Okla.

### Eliminate Hazards in Radio

Do not permit wires to trail into thoroughfares or across high-power electric lines.

Support the antenna mast with guy wires to prevent its falling during a storm.

Lead-in and ground wires should be kept at least 5 inches away from the building. All joints should be soldered or made with approved types of clamps or splicing devices.

If fuses are used in circuits, they should be of approved types and not make-shift devices, such as copper wire or copper pennies. Small fuses should be placed on

a storage battery and connected in the storage battery leads to prevent short circuits. Keep fires and sparks away from storage batteries, especially after the batteries have been freshly charged, as the highly explosive hydrogen gas is expelled. Be careful no liquid is spilled out of the battery onto anything of value, as this fluid will ruin almost anything it touches.—Eric E. Leibner, St. Louis, Mo.

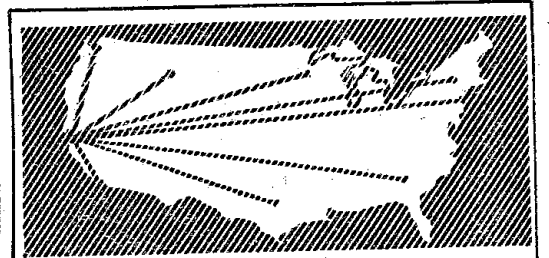
## Lettering Panel with Draftsman's White Ink

To letter a bakelite panel, clean the surface with wood alcohol to remove any film of grease, and then print on the panel with a steel pen and draftsman's white ink.

When the writing is dry, cover it with a protective coat of transparent varnish, using a fine camel's-hair brush. If at any future time the lettering is to be removed, it may be done with a rag dampened in wood alcohol.—Eric E. Leibner, St. Louis, Mo.

### Water Pipe Ground

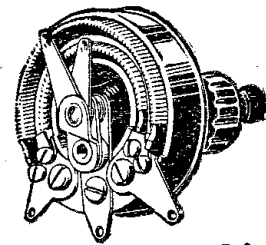
I was having some trouble to get a good ground at a lake cottage which was not supplied with water pipes, and a rod driven into the ground gave very weak signals. I procured a piece of pipe, about 12 feet long, plugged the end to keep out the dirt, drilled a few holes above the plug and drove end into the ground. Using a funnel, water was poured in to make the soil wet at the bottom of the pipe. This made a good ground for the set.—Paul R. Boeringer, St. Paul, Minn.



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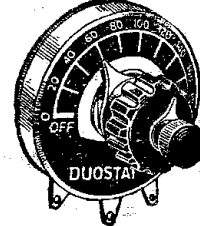
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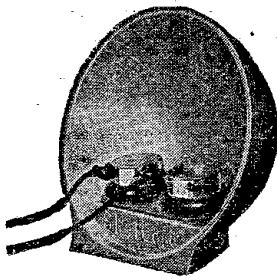
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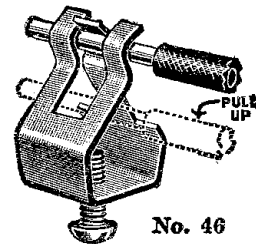
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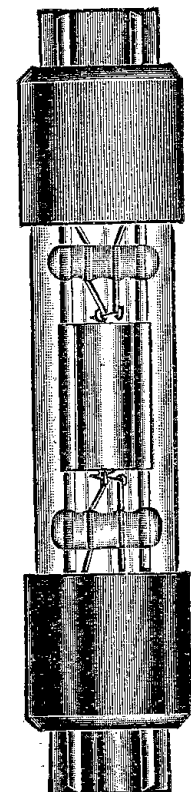
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Corrected Every Week—Part III

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ONE DOLLAR will be paid to every Radiophan reader of Radio Digest submitting the most errors in any one station's listing in the Directory of Radiophone Stations, which appears in four parts, serially continuously, on page 23. Letters must reach Radio Digest's office not later than one week from date of issue corrected.

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

WHD, Morgantown, W. Va. 360 meters. 250 watts. V. A. University. Temporarily discontinued. WKAP, Cranston, R. I. 360 meters. 200 watts. Dutee Wilcox Flint.

WKAN, Montgomery, Ala. 226 meters. 20 watts. United Battery Service Co. Mon, Wed, Fri, 6:30-7 pm, music, news, Central. WKAP, Cranston, R. I. 360 meters. 200 watts. Dutee Wilcox Flint.

ex Sun, 10:30 am, 12:15 pm, 3, 6:15, news, markets. Tues, 9:30-10:30 pm, concert, Thurs, 7:30-8:30 pm, concert. Sun, 11 am, church services; 9:30-10:30 pm, concert, Central.

WRAM, Galesburg, Ill. 244 meters. 250 watts. Lombard College. WRAX, Waterloo, Iowa. 236 meters. 10 watts. Blackhawk Elec. Co. Slogan, "We Radiate all news."

# Radio Illustrated



Below is a complete crystal Radio set built as an integral part of an ordinary telephone receiver. It is made by a school boy and was exhibited at a recent show. Int. Photo

Novel loop, that works on the principle of a variometer, with its Radio amateur inventor, W. W. Obermiller. This makes it possible to tune in stations with the loop alone, eliminating controls on the Radio set. K. & H. Photo

Disorders in Germany are frequent and the Berlin "Schutzman" (police officer) has to carry this cumbersome Radio set for receiving orders from headquarters when a riot makes his presence elsewhere needed. K. & H. Photo



Dancing to Radio music from a set in the circuit of which the metal "dress" she is wearing forms a part, is pretty Virginia Beardsley, youthful member of the "Ziegfeld Follies" company. © Keystone



"Sport" Herman, director of the Chicago Radio Show, and his dog "Rowdy," who is his constant companion and an enthusiastic Radiophan. "Sport" claims "Rowdy" knows everything about Radio and is a music lover besides. Here he is getting an earful. Int. Photo