

3-Tube Neutrodyne; Flewelling; Grimes Reflex

Radio Digest

EVERY WEEK

Illustrated

TEN CENTS

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

Vol. VII

Copyright 1923
By Radio Digest Publishing Co.

SATURDAY, DECEMBER 29, 1923

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 Dayton Manufacturing Co.

Station WLW suggested that 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, 3,000,000, 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. Pfotenbauer 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.

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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 Dollars for One Year's Subscription to Radio Digest, Illustrated.)

Name

Address

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

Carter Jack Switch

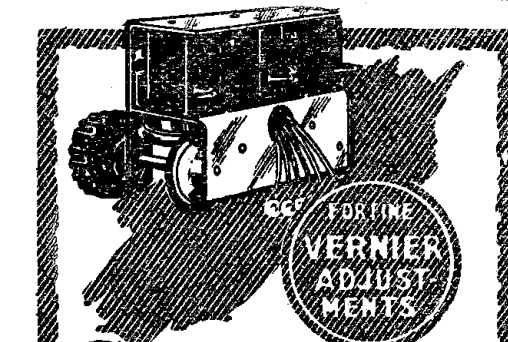
\$1.00



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.



Columbia Inside Coil Mounting

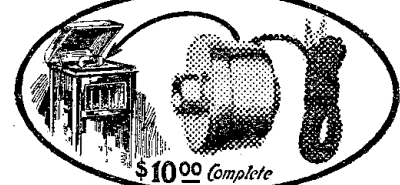
Newer, Neater, Better

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.

DEALERS—Responsible distributors all have Columbia Radio products. It pays to give your customers the best. No other radio products have this name—Insist on it.



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

ADMIT CLEVERNESS OF AMERICAN SOCIETY

Patrons Paying Tribute to Organization Believe Money Going Wrong Way

(The following article is the last of a series which has been 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 VII.—Conclusion

CLEVERNESS must be conceded to the management of the American Society. They have their arguments and though their logic may be twisted they make the most of what they have to do with. For instance, when they are confronted with the very pertinent argument that broadcasting does popularize their music, they very quickly dodge and say: "Thank you, but we do not ask for your help and do not want it. We will choose our own advertising mediums."

While unresponsive to the question being discussed, it is a rather adroit answer, you will admit. It ignores Judge Lynch's opinion that "broadcasting of a newly copyrighted musical composition would greatly enhance the sales."

Turn About Is Fair Play

But broadcasters send them the retort courteous: "You may choose your own advertising mediums, and we will choose our own music."

Can this attitude of the broadcasters in any manner be considered a boycott of the music of the American Society? The answer is "by no means," because the Bureau of Music Release of the National Association of Broadcasters will just as willingly release the music of the American Society as that of any others, providing that their music will pass inspection for musical merit; is of clean lyrics and that an agreement is made similar to those now in existence between copyright owners and the National Association of Broad-

casters. The success of the American Society in collecting from theaters, cafes, restaurants, cabarets, hotels, dancing academies and halls, moving picture shows, fairs, expositions, summer shows, carnivals, phonograph records, piano player rolls, street pianos and organs, and others had led them to believe that their policy must be right, and that millions more could be collected from Radio stations. Half a million yearly, you remember, was their figure.

There is fairness in all things. No situation can be permanent which is not founded upon equity. Justice endures, avarice fades. Right triumphs—wrong never.

Issue Moral—and Financial

These people who have been paying tribute to the American Society of Composers, Authors and Publishers are rebellious. They are looking for a way out, not entirely because of the tax they pay, but more particularly because of the feeling that they are being held up; that they are doing a service and if anyone pays, they are the ones who should receive. It is a moral issue as much as financial and they believe the money is going the wrong way.

And so comes the National Association of Broadcasters, well organized and furnishing new music weekly upon which no tax need be paid to anyone. The world is combed for this music. Less than three per cent of that submitted is accepted. The result is a surpassing quality of music going out weekly from the Broadcasters' offices, music of a quality declared by prominent orchestra leaders to be fully equal, and in many respects superior, to that which the American Society puts out.

WJY FINISHES TESTS AND SPEAKS AGAIN

NEW YORK.—After a period of silence during which research and experimental work has been in progress, WJY, the twin station of WJZ, at the Radio Corporation of America's dual broadcasting station located in the Aeolian Building here, has resumed broadcasting during its former periods on Tuesdays, Thursdays, Fridays and Sundays. The old wave of 405 meters is used.

JACK TELLS OF HIS EARLY DAYS IN RING

NEW YORK.—Jack Dempsey, heavyweight champion of the world, spoke from Station WHN, Loew's State Theater here recently, making his Radio debut. Dempsey has just arrived from California where he has been resting and offered an interesting talk on his early career as a boxer and vicissitudes of a boxer's life. Dempsey said that he had frequently listened in to WHN.

GIVES VOICE TO MOTION PICTURES



Perfect synchronization of sound and motion so as to supply the missing link of speech between the screen actor and the movie fan was promised not long ago by Dr. Lee De Forest as a development of the near future and is now ready for demonstration before the public. Here is seen Mrs. De Forest singing before the microphone while her motions are recorded by the movie camera K. & H. Photo

Meet American Society on Own Ground

This is the first attempt ever made to meet the American Society on their own ground—not by haggling over what rights they may or may not have legally, but by meeting them squarely on the moral issue involved: that they profit greatly through the advertising given them and that if anyone is to pay, it should be the members of the American Society.

Very few Radio stations have been impressed by the claims of the American Society. The low-priced licenses offered (from \$200 to \$5,000 annually) are recognized as honey to catch the fly. Just a fairly good beginning.

If there were no association of broadcasters to stand between the American Society and broadcasting stations, there

would be an expensive bill to be paid by someone, and not more than one guess is needed as to who this "someone" would be. (THE END.)

Sunday Night Concerts Again on Air from WJY

NEW YORK.—The Sunday evening concerts by the Waldorf-Astoria Symphonic Orchestra, of which Joseph Knecht is director, have been resumed as a regular Sunday evening feature from Station WJY here. The orchestra is one of the best known in the country. There are thirty-five musicians and Joseph Knecht, the conductor, was formerly assistant director of the Metropolitan Opera.

TALKING PICTURES READY FOR PUBLIC

GET GOOD RECEPTION IN NEW YORK

"Sprung" on "Cold" Audience, Undergoes Ordinary Stage Tests

NEW YORK.—Dr. Lee De Forest's phonofilm which was demonstrated last Spring when the inventor of the three element vacuum tube gave a demonstration before the New York Engineering Societies, is now ready to be shown to the public.

At the first showing Dr. De Forest received congratulations from scientists all over the country on his accomplishment of synchronizing sound and picture on a motion picture film—a problem that had baffled experimenters for many years. It was admitted at the time that while the demonstration was satisfactory from a scientific point of view, the phonofilm needed refinement before it could be generally introduced to the public.

Make Refinements in Device

Dr. De Forest has worked day and night to get the film to the point where it would be acceptable to theater audiences. Experiments were continually carried on at the De Forest studios here, where a corps of technicians labored side by side with theatrical advisors.

Satisfactory scientific results were obtained about two months ago and then the theatrical angle was taken up in earnest.

Within the last month, the phonofilm was given the same sort of severe test that all new vaudeville acts undergo. It was installed in the Coliseum Theater here, and it was "sprung" on the audience "cold" just as a new act is given a try-out.

How Phonofilms Are Made

The response on the part of the audience was very encouraging.

It is easy to visualize the relation of the phonofilm to Radio if one has ever been in a broadcasting station. There the speaker or the singer speaks into the microphone and the words or music are taken up and launched upon the ether to be again picked up by countless receiving stations scattered far and wide. In the case of the phonofilm, however, the microphone catches the actor's voice or the music from the orchestra in a similar manner, but instead of sending these tones out upon the ether, they are photographed onto standard negative motion picture film.

WLAG TO BE CENTRAL CALIBRATING STATION

Chosen by Standards Bureau for Power and Location

MINNEAPOLIS, MINN.—Ray A. Sweet, chief engineer of WLAG, the Twin City (Minneapolis and St. Paul) Radio Central, operated by the Cutting & Washington Radio Corp., has been notified that WLAG has been selected by the U. S. Bureau of Standards as the bureau's "central" calibrating station.

WLAG was chosen as the result of a series of tests because of its power, central location and capability of being heard on both the Pacific and Atlantic coasts consistently. The government started the calibrating work December 7, broadcasting standard signals all over the country so the 700 or more sending and hundreds of thousands of receiving stations may tune their wave lengths.

The eastern station designated by the bureau to calibrate is KDKA, at East Pittsburgh, which broadcasts to the Pacific coast with the aid of its relay station KFKX, at Hastings, Neb.

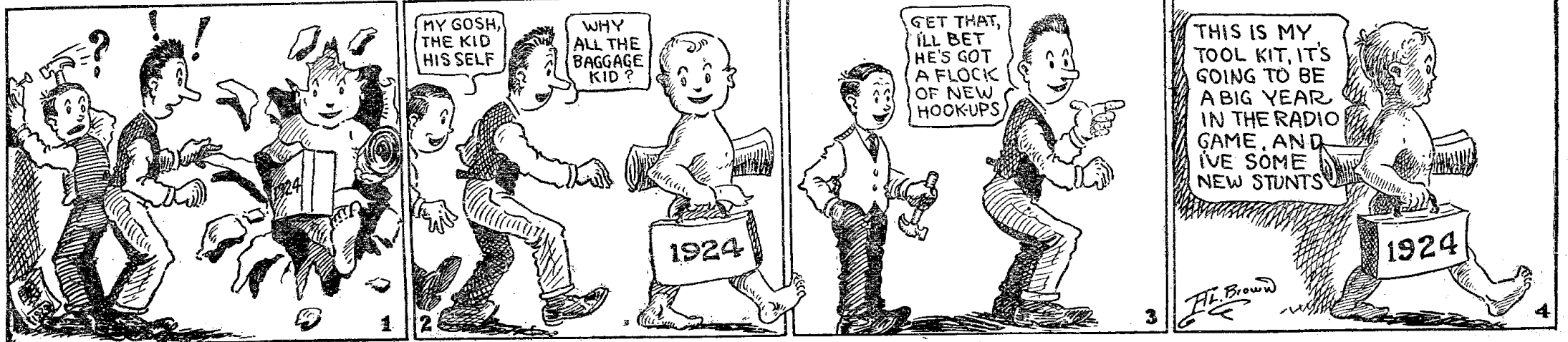
Broadcast "Sampler" Plays

TROY, N. Y.—At the invitation of Station WHAZ, Rensselaer Polytechnic Institute in this city, the Masque of Troy, a prominent local Little Theater organization, recently broadcast a "sampler" production, including four one-act plays.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Tuning in Station 1924



GIVE LESSON FOUR OF MURRAY SERIES

REPEAT CHARTS FOR ENTHUSIASTIC RADIOPHANS

Instructions Republished to Meet Demand from Listeners 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 is giving the charts and instructions which apply to the lessons broadcast by Mr. Murray at WOR and by the other stations. WOC, WBAP, WNAC, WLW, WLAG, WRW, WHAS, WFL, KPO, CFCE, WSAD, WTAS, WGY, WMC, KDKA, WRC, WGI, WCAE, WHAM, WBZ, WGR, and KYW are broadcasting the series. The complete course occupies six lessons, one of which will be given each week. Save the lessons to use with the broadcasts.—The Editor.

Lesson IV—The Two-Step

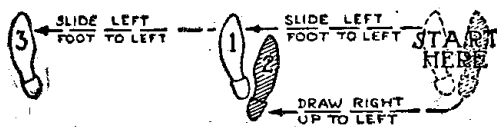
By Arthur Murray

REMEMBER that a Two-Step is simply two sliding steps. Beginning with the left foot, slide sideways two steps with the left foot. This you count:

1. Slide left foot directly to left; 2. Draw up right foot; 3. Slide left foot to left, weight on left. (Take right foot slightly off the floor.)

This completes a Two-Step to the right. See Figure 5.

THE TWO-STEP TO LEFT



The second part, two slides to right, is taken with the right foot:

1. Slide right foot to right; 2. Draw up left foot to right; 3. Slide right foot to right, weight on right. (Take left foot off the floor.)

This completes a Two-Step to the right. See Figure 6.

DON'TS FOR DANCERS

By Arthur Murray

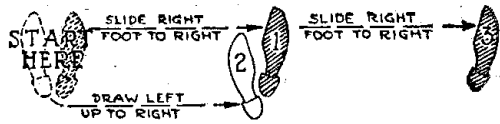
Don't take short steps; they are not only ungraceful, but betray a lack of confidence.

When a man wants to be sure of stepping on his partner's feet, he starts with his right foot. Moral: start the dance with the left foot.

Don't cry about it. Dancing is supposed to be an expression of joy. The funereal expressions on the faces of some of our brethren certainly contradict that assumption.

To repeat, begin with the left foot and do the first part. Practice two slides to

THE TWO-STEP TO RIGHT



the left and two slides to right for thirty minutes.

(TO BE CONTINUED.)

Listens In with His Set of Tin Dishpans

Minneapolis Expert Evolves "Cascade" Principle

MINNEAPOLIS.—Using an ordinary tin dishpan for an antenna and another like it for a counterpoise, Bowden Washington, Minneapolis Radio engineer, is hearing broadcasting stations all over the United States, according to announcements made recently.

The set is reported to be operated on a new principle of cascade regeneration worked out by Mr. Washington in two and a half years of laboratory experimentation.

It uses four UV-199 tubes. On a test with a six foot steel fishing rod as antenna, stuck between the cushions of a touring car, the signals of WLAG, Twin City Radio Central here, were copied for several hundred yards while the car was in motion twenty to thirty miles away.

All the British lightships will be connected with the home office by Radio telephone.



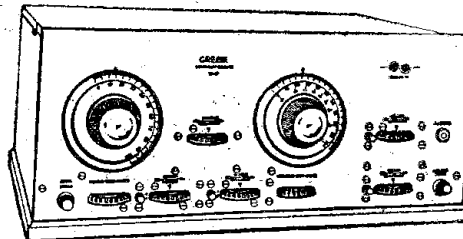
For the Living Room—

Unsightly wires and acid-filled storage batteries are unnecessary with

The New GREBE Broadcast Receiver



Here is an Instrument whose beauty adds charm to any room. The rich walnut cabinet has compartments for all necessary batteries. Ask your Dealer.



Licensed under Armstrong U. S. Pat. No. 1113149

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

Western Branch—451 East 3rd St., Los Angeles, Cal.



You will marvel and be thrilled by the performance of Federal Radio Parts

Ideal Gifts

Groups of Federal Radio Parts to make complete set

Federal Standard RADIO Products

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

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



JOE LAURIE TELLS HIMSELF OF RADIO

FAMOUS COMEDIAN GIVES SELF INTERVIEW

"Radio, and What of It?" His Topic—"Gingham Girl" Laugh-Producer Tells about Broadcasts

By Joe Laurie, Jr.

In the not distant past when Mr. Laurie played in vaudeville I had an occasion to interview him—I think it was about a bill—and I found him dressing in a room in the basement of the theater. At another time I had to climb so many steps that when I finally reached his floor I forgot whom I came to see—but now—it is different. Here he was dressing right on the stage—and it was news to me to find that he was one of the proprietors of the show—there it was, a big sign outside of his dressing room door—PROPS. I was glad to see this youngster getting along so nicely. I always liked him. Joe Laurie, Jr., always impressed me as a decent sort of a chap. He is small in stature, about five feet standing or sitting, has a very pleasing personality in spite of it—big brown eyes and large cigars—and a vaudeville heart. I started with—

Reporter.—"My dear Mr. Laurie, or may I call you Joe?"

Actor.—"If you ever call me Mr. Laurie I'd think you were sarcastic."

R.—"Thanks. I want to ask you if—"

A.—(Interrupting.) "Certainly help yourself—and don't be afraid of it. It's good. I made it myself."

R.—"No thanks. I mean I won't be afraid of it. My gosh, you almost had me saying no. It's so seldom I am offered this stuff free."

A.—"You have a good nose for news, a good taste for liquor and large generous ears. You have every qualification to be a genius."

R.—"Please let's not discuss my past. I came here to interview you about Radio. I want you to tell me what you think of Radio, its programs, its relation to the stage and the artists, its future, and what your experiences were when you first broadcast. Just tell it to me in your own crude, ordinary way and I will tune it up for you. Remember this interview may go through the mails so act accordingly. Don't be offended if I act bored. This is my business; I get paid for it."

Mr. Laurie Tells Why He Broadcast

A.—"Mr. Laurie I'll start at the beginning. That's the usual procedure, isn't it? And end up by telling you the finish. Mr. Hertzman, the manager of the Gingham Girl Co., the show I am appearing in, matinees Wednesdays and Saturdays, asked me one afternoon if I would broadcast some of my monologue that I did in vaudeville, that it would be a good stunt for the show—get publicity for myself, etc., etc. Well, I never did broadcast before, and I was anxious to see what it was all about. But a star must never be too anxious, (must not show it to his manager anyway), so I acted sort of starchy. I can do that sort of stuff. I was an office boy in a dentist's office once. And I hemmed and hawed a YES to him."

What a Microphone Is

"So he arranged for me to appear at a studio in Chicago. In the center of the room was a stand with an instrument on it that looked a lot like a motor meter, only it didn't have the personality. The instrument is called a MICROPHONE. It is the

JOE LAURIE, JR., INTERVIEWS JOE LAURIE, JR.



Joe Laurie, above, is telling Westinghouse Station KYW listeners how he caught a fish by telling him one of his "Gingham Girl" jokes. The fish (note length) laughed himself to death, getting a pain in the gills. At right, the photographer caught Joe as he appears in the show

connecting link 'tween your larynx and the Radio Public. It's through this little instrument you TELL THE WORLD.

"The place was empty except for my manager and the announcer. The juice was turned on and the Radio public were informed that America's Greatest Comedian would make a few alleged comic remarks. I knew at once he meant me, so I pointed myself at the microphone and started.

"Can you imagine trying to be funny in an empty room? I started fast—not being funny—speaking. I passed some of my best wows and not a ripple. I went faster—got scared. Can you imagine a swell actor like me spilling nifties one after another and not a ripple of applause, not a laugh, not even a snicker?"

Prays Radio Booking Office Radio Is Out

"I made a mental prayer that the booking office Radio wasn't working. I knew if it was I wouldn't be. Here was I who have played houses where they had to strap the customers to the seats for fear I would knock them off with my merry sayings, happy quips and rebuilt jokes—FLOPPING—and over the Radio, and me dressed so nice for the occasion.

"Well the perspiration was rolling up my brow, yes UP. I had my head away back—and this is strictly between ourselves—for the first time in my life I HAD STAGE FRIGHT, and the funny part of it all was I wasn't on a stage. Well, maybe I got no applause, but then again I got no censure. I took a couple of bows through force of habit and my first experience with Italy's greatest invention outside of spaghetti, was over. Gee, I felt worse than



a week in Baton Rouge. Please pass me that bottle of Witch Hazel. Thanks." It was several hours later when the reporter and the actor came too. An in-

roduction of Auld Lang Syne was played and Mr. Laurie went into the following:

His Second Adventure with "Mike"

A.—"The next time I touched my public was through the KYW studio in Chicago. I arrived at the studio and found an audience of over fifty ladies and gentlemen. A friendly spirit permeated the air. Still there was dignity enough to give it the proper atmosphere. They all were seated facing the artist who was broadcasting. I was announced and I stepped up for my second introduction to the deadly microphone, but this time it was so different.

"I just looked at my little audience. I am used to looking at small audiences. (I played Baton Rouge once.) I did my stuff, sang a couple of songs from the show, and pulled a few wise cracks which were greeted with laughter from the audience and made me feel fine. I did about twenty minutes, and finished to hearing applause, so different than my first experience. The studio received telephone calls and wires from all over the country asking me to repeat in the near future.

Joe, the Announcer

"I did. A week later I acted as announcer for KYW. I have received many hundreds of letters since from all over the United States, and one from Brooklyn, saying that they hoped to have an opportunity of seeing me in person. So you see it pays to lead a simple, honest life. Of course, not too simple and not too honest. Now Joe, I wish you would reach down on the floor and pick up that word resumé. It's one of the words a dramatic critic dropped while visiting me here the other night. I don't know what the word means but I will take a chance on it as he certainly knows how to put words together. So here is my resumé.

Resumé of Joe's Idea of Radio

"That the studios will get better results from the artists if they have audiences there to listen to them.

"That the announcers should put comedy into their announcements, and get more intimate with the Radiophans. They like it.

"That managers of shows and broadcasting stations should get together. They will both gain by it.

"That the actor can reach more people through Radio than he could ever hope to meet otherwise—future customers. The actor's drawing power isn't hurt a bit. I have many friends who have Radio sets that work, and they tell me that hearing the artist on the headset makes them anxious to see the show. Meet him not via the ears, but the eyes.

"That the studios should have more variety to their programs. Too many violin, soprano and piano solos. Pay the artists if you have to, but get variety, with plenty of COMEDY.

"In conclusion, REMEMBER—
"BROADCAST UPON THE WATERS
WILL BE RETURNED AN HUNDRED
FOLD TO YOU IN PUBLICITY."

Thrills from Radio

No. 9 of a Series Featuring Experiences of "ALL-AMERICAN" Users

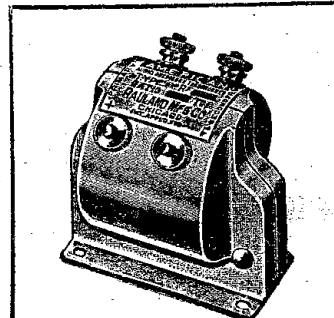
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By Frank Sasek, New York City

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MARCONI PREDICTS RADIO UPHEAVAL

INVENTOR SEES AIR WAVE GUIDED TO RECEIVER

Recent Tests in London May Enable Crystal Sets to Hear Cross-Sea Signals

LONDON.—Even the wildest dreams of Radiophans throughout the world may soon become real if the plans of Senatore Guglielmo Marconi, noted Radio inventor, based on recent experiments, are successfully developed. The Italian-American whose devices largely have made Radio communication practicable has completed a series of experiments here which he said will revolutionize present methods of long-distance transmission.

Instead of projecting or impelling electromagnetic waves without direction or destination, Marconi declared at a meeting of the Wireless Telegraph company over which he presided, that his proposed apparatus will be propagated and guided in the form of a beam which may be turned to any direction.

Crystal Sets May Hear London

The inventor asserted that he and C. S. Franklin, co-experimenter, had recently communicated with St. Vincent on one of the Cape Verde islands, 2,250 nautical miles from England, by means of the new system. The electrical energy required for the directed transmission was much less, Marconi said, than that otherwise employed.

Marconi also reported that his recent experiments led him to believe that owners of crystal sets in the United States would soon be enabled to receive messages broadcast from London. This, he said, was because all the power would be sent in one direction, thus intensifying the signals in receivers lying within that beam.

Canada Hears Frisco Organ

SAN FRANCISCO.—Way up in Canada, in the town of Nipawin, twenty-five miles from a railway, 100 miles east of Prince Albert, a listener in heard Station KPO (Hale Brothers) here broadcast an organ recital clearly. The listener in, manager of a branch bank, wrote his appreciation to Ada Morgan O'Brien, director of the station.

UNCLE SAM BUILDS BARGAIN RECEIVER



A crystal receiver for sixty cents! That is the claim of the inventor and designer, John P. Brickley of the U. S. Bureau of Standards. The set consists of two pieces of fiberboard with eight and ten turns of wire for secondary and primary, respectively. (Note: Write Mr. Brickley for further details.) *Fotograms Photo*

South American "Bugs" Talk

VALPARAISO, CHILE.—Another step was taken recently in the development of Radiophony here when for the first time a conversation was held between a private broadcasting station, belonging to a Chilean amateur in Vina del Mar, on the Pacific Coast, and Tucuman, Argentina. The Vina del Mar station was distinctly heard in a Radio club in the latter city at midnight, whereupon conversation was kept up for over an hour.

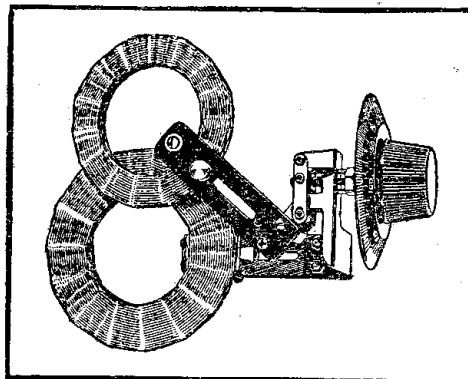
RADIO TALKS

One would not expect split second time keeping qualities from a poor alarm clock and those of us who have been through the battle with Radio have learned not to expect maximum results from poor Radio apparatus. *E. J. Flewelling*

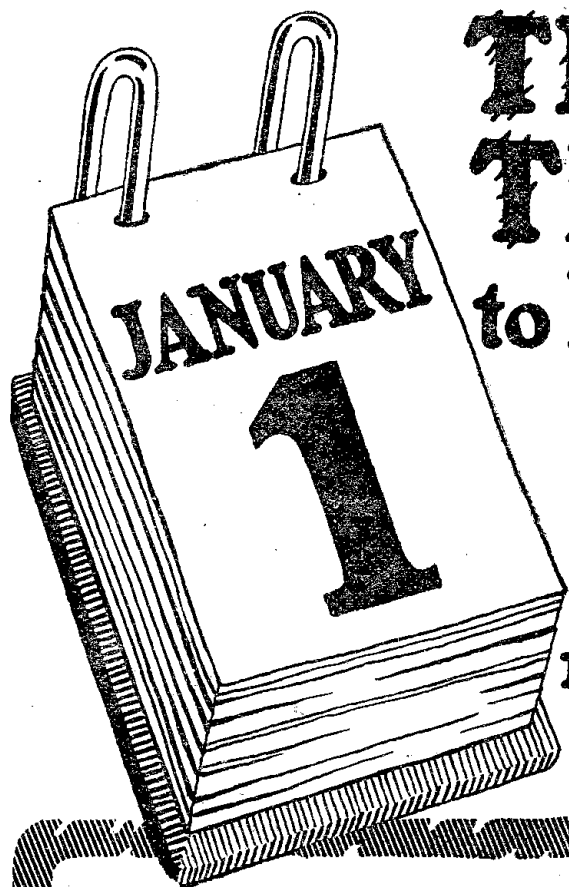
E. J. Flewelling Tuner

Designed to meet the requirements for a tuner embracing simplicity, neatness and efficiency, the Flewelling Tuner is the utmost in Radio perfection. Made of heavy sheet bakelite and nickel parts (no wood or fibre is used in the entire construction). Has no loss producing taps or unsightly leads; no solid dielectrics in coil field, all bearings and parts substantially and accurately made. But a single panel hole is required for mounting. Tuning is controlled by one dial and reduced to one condenser setting and adjustment of tuner to maximum volume, in the usual single circuit hook-up. Coils are firmly held in place by thumb screws and are easily removed and replaced. However, a wide wave band can be reached without coil change. This tuner is exceptionally efficient when used in the Flewelling super circuit.

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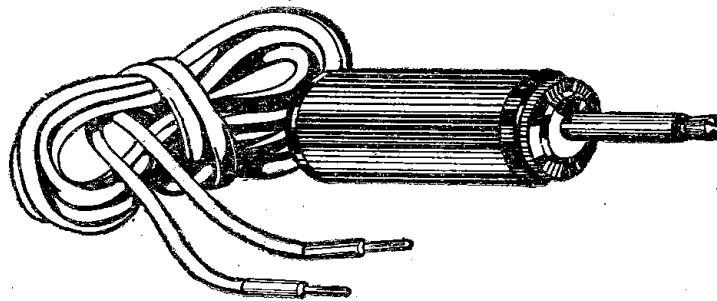


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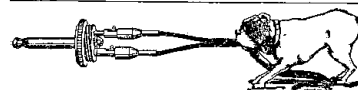


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Performance of WDAP and WBAH Gives Impetus to Power Amplifier Station

Co-Designer of Far-Reaching Chicago Plant Tells Secret of Great Success—Drake Hotel Outfit and Minneapolis Transmitter Heard Regularly in England

By J. Elliott Jenkins, Executive Engineer for Station WDAP, Board of Trade, Chicago

OWING to developments during the trans-Atlantic broadcasts, I think the time is about ripe to publish a few facts concerning the design of the transmitter at Station WDAP, of the Chicago Board of Trade. It has been generally known by those interested in Radiophone transmission that this outfit is not of the usual type, a Hartley or Colpitts oscillator with plate modulation, but some curious freak vaguely known as a power amplifier. The hook-up of WDAP has never been guarded as a dark mystery, but on the other hand, little has been published about it.

WDAP is indeed a power amplifier, which, after all, is a very simple affair. It is much like a Radio frequency receiving set. Here you have a very slight modulated oscillation set up in a coil which is coupled to an antenna or loop. You tune this coil to resonance and let it feed into the grid of a vacuum tube. The plate of this tube is run through the primary of a transformer to the B batteries. The secondary of this transformer, often tuned by a condenser, goes to the grid and filament of the next tube. So far WDAP is about like a receiving set. But the output of this tube, instead of going to a detector, goes into the big transmitting antenna.

100-Watt Set Now Amplified

Here it is. Two fifty-watt tubes in parallel are connected in the Hartley oscillator hook-up, so familiar to the "ham." Two similar tubes impress the voice currents on the plates of these oscillators—the well-known "constant current system" of modulation. Most every "ham" phone set in the country is built on this order. It is easy to build and get going, and is very stable. The inductance of this circuit is the familiar helix of flat copper ribbon, about seven inches in diameter and a foot long. It has a large variable condenser across it to tune it to the exact wave length required.

So far we have a simple 100-watt phone set, without an antenna. About a foot from this inductance, and in line with it,

stands a similar helix of the same size. This is the secondary of the Radio frequency transformer, as in the receiving set. But remember that the coupling is

the filaments. The plates of these tubes get about 2,500 volts from the generators, and are hooked into the antenna inductance through a stopping condenser. This antenna inductance is in the form of a big variometer of copper tubing, which makes the circuit easy to tune or change wave length.

Big Tubes Strengthen Twenty-Two Times
Here is what happens. The output of the 100-watt set is of course a modulated oscillation. Instead of going out on the air, it strikes the grids of the big tubes. They amplify it about twenty-two times and let the result into the antenna. Owing to the loose coupling of the driver circuit, you have a very pure carrier wave and

PARIS USES 6 FOOT WAVE WITH SUCCESS

PARIS.—As a result of his recent experiments here, General Gustav Ferrie, director of Station FL, Eiffel Tower, has obtained excellent results over a distance of two miles using only six-foot wave lengths. According to Mr. Ferrie, the antenna current employed did not exceed thirty milliamperes. The low wave lengths were very free from static disturbances.

side bands, and local listeners have little difficulty tuning the station out, unless they have poor apparatus or are in the actual field of the antenna.

I would like to tell a little of what WDAP has done by way of distance, not for the sake of blowing my own horn, but in behalf of the circuit which I would like to see generally used for broadcasting. For the last two months the station has been radiating only 6½ amperes. There are five letters from England, two from the Hawaiian Islands, one from Rio de Janeiro, and numerous reports from the Panama zone and from near the North Pole. Last week an English gentleman, a Mr. Hamblett Hardlane, living near Liverpool, rose to the point of sending us two prepaid cablegrams, having heard two entire concerts. And now the last, Station WBAH, of the Dayton Co., Minneapolis, was heard the best of all American stations in the trans-Atlantic tests on Monday night, November 26. WBAH was radiating ten amperes into a small antenna surrounded by steel buildings, water tanks and electric signs, but it is a power amplifier of exactly the same type as WDAP.

That is all I want to say. My partner, Thorne Donnelly, and I have worked very hard over this power amplifier circuit, and I think its recent performances make it deserving of the attention of those interested in voice transmission.

Broadcast on Bible

BIRMINGHAM, ALA.—Alabama College at Montevallo, Ala., is the only college in the South broadcasting lectures on the Bible. These lectures are delivered by Rev. P. H. Carmichael.

TRIS OF "INDIANS" LOVES MIKE



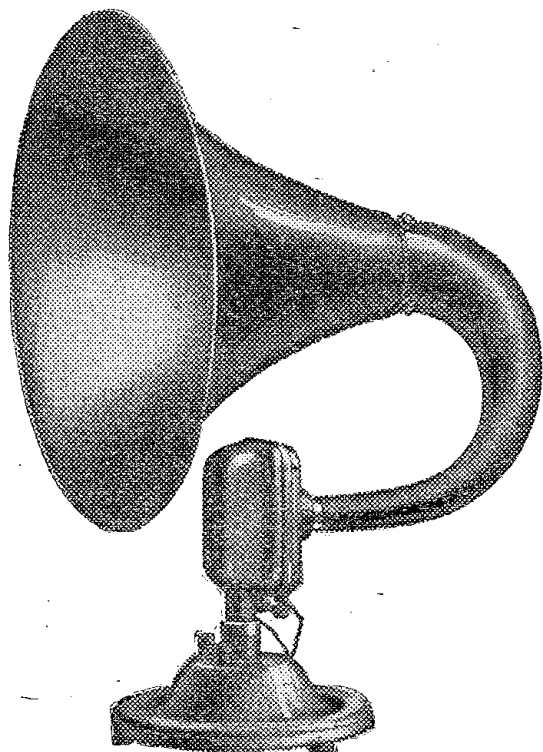
Of course you recognize this gentleman as Tris Speaker, the redoubtable manager of the Cleveland "Indians." This photograph was posed especially for Radio Digest, in the studio of WJAX, the broadcasting station of the Union Trust Company, Cleveland, Ohio. Tris is a Radiophan of most ardent type, as may be seen from the affectionate smile he is bestowing on friend "Mike"

very loose—a foot or so. This secondary is also tuned by a variable condenser, easily accessible to the operator. One end of this coil goes right to the grids of eight 250-watt tubes, all in parallel. The other end runs through a storage C battery to

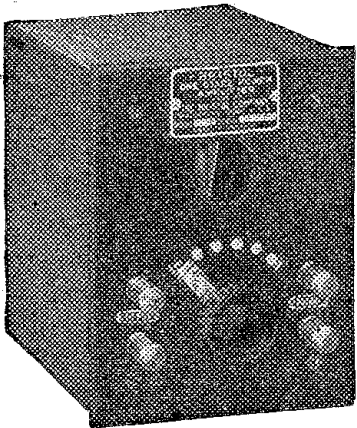
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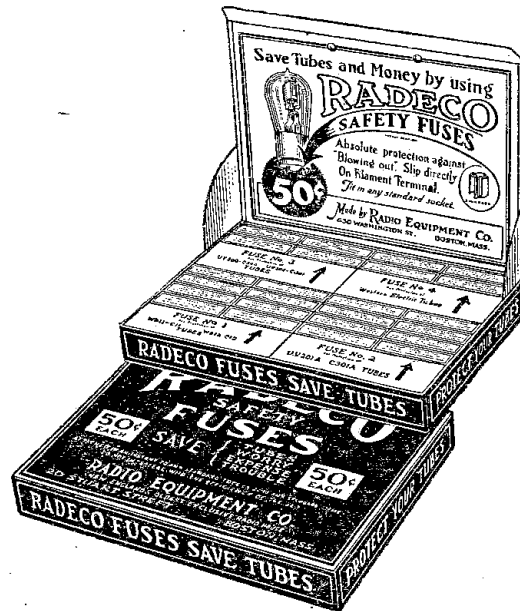
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AN EVENING AT HOME WITH THE LISTENER IN

(SEE INSTRUCTIONS FOR USE BELOW)

Table with columns for Station and City, Met., Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, and Sunday. Lists radio stations across various cities 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.

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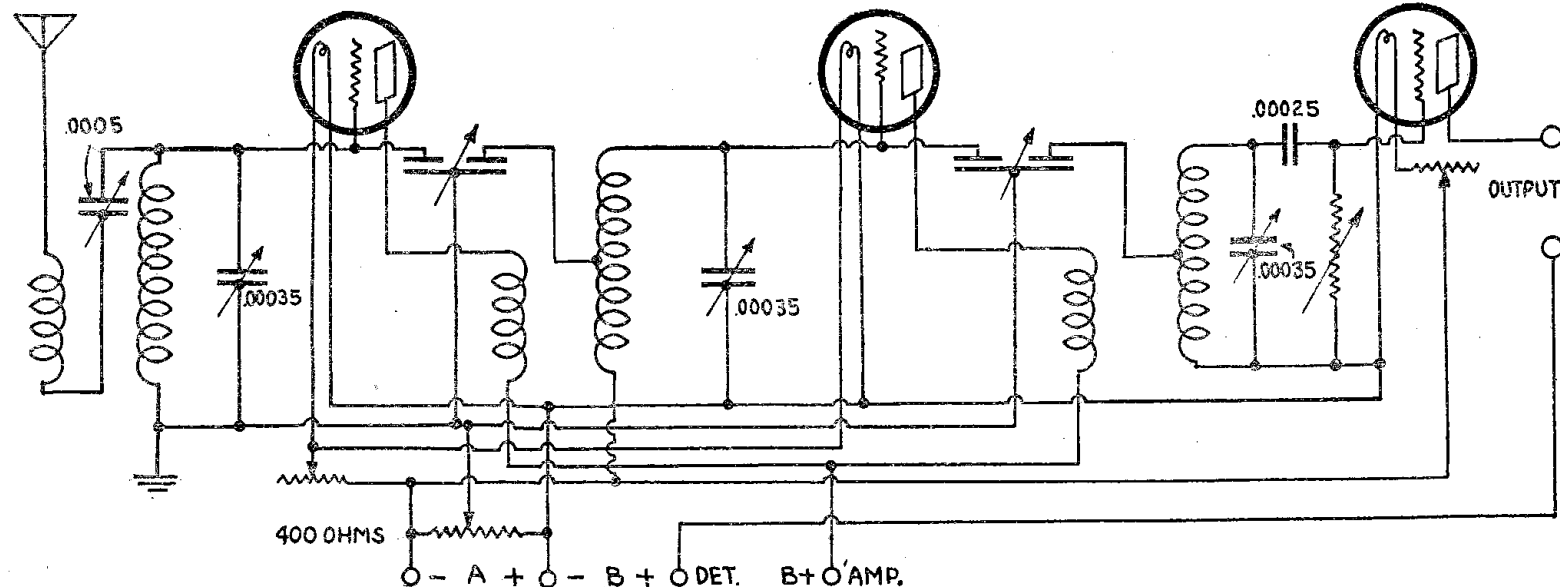
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Neutrodyne Circuit Using Only Three Tubes

Balanced with Compensating Condensers

By Harry J. Marx



MANY fans felt that the five-tube Neutrodyne was too large a proposition to start in with, or they possessed an audio frequency amplifier unit which could be used with any detector outfit and therefore did not require the

additional audio frequency stages. To meet the requirements of these fans and also to illustrate the use of the compensating condenser method of neutralization, the three-tube circuit shown in the illustration is presented.

Tuning Unit

The standard neutroformer is used in the initial tuning unit, but is hooked up in a manner slightly varying from the usual procedure. The primary winding of the air core transformer, the .0005 vari-

able condenser and the secondary winding are all connected in series as shown. In this way all of them make up the primary circuit which is tuned by the variable condenser between the windings, while the secondary consists merely of the secondary winding of the transformer or neutroformer with its .00035 condenser shunted across it. This method of hooking up the tuning unit was found slightly more efficient than the old method.

The neutroformers consist of the standard neutrodyne air core transformers with the single tap secondary used in conjunction with the regular .00035 condenser. The special compensating condenser consists of the two separate fixed plates and one rotating plate. A 400-ohm potentiometer is used for the grid potential control on the first tube, and a variable grid leak is used for proper adjustment of the grid of the detector tube. If desired, audio frequency amplification can be added as in standard practice. About 22½ volts are required on the plate circuit of the detector tube if the UV-200 or C-300 type are used; with A tubes about 45 volts are necessary. The amplifier plate voltage should be about 90. Only two rheostats are necessary, one for the two audio frequency tubes and one for the detector stage.

What Is a Good Condenser?

How to Buy and Test Your Own

By E. T. Flewelling

WE HAVE received a great many inquiries from fans in regard to our repeated advice to use only the highest grade of apparatus in our Radio sets. Many have asked how they can tell when they have a real good variable condenser, because there are so many different types on the market that one is bewildered as to which is the best. The easiest and quickest way for one to find the answer to such a question is to look for the name or trade-mark of the good reliable manufacturer, of which there are many, and dig deep if necessary. This really is a good way of saving money, because it means better satisfaction.

Advantages of Test Laboratory

In the electrical industry almost everything is passed upon by a disinterested testing laboratory maintained by the National Board of Underwriters. This laboratory is only interested in finding out whether or not a certain piece of apparatus comes up to a certain mark of quality, but it is also a guarantee to the public that an article approved by the laboratory is reliable merchandise. This also works out well for the manufacturer, because the tests soon tell him how he can improve his article.

The establishment and maintenance of such testing laboratories has resulted in a very high grade of electrical materials, and it occurs to the writer that it might prove to be of great value to the Radio industry if it, too, had such a laboratory. Perhaps it will in time. Radio is still somewhat of a baby.

It is the purpose of this article, however, to show how we may tell whether or not we are using a good condenser, and the following is offered as one means that is available to most anyone.

How to Test Apparatus Oneself

In a regenerative circuit we know that as we increase regeneration by moving the tickler coil, we are cutting down the resistance in the circuit. It is possible to increase regeneration to the point where the resistance of the circuit is zero or where the set "spills over." As long as this is true it is self-evident that, everything else being unchanged we will have

to increase the regeneration if we increase the resistance of the circuit. Tune in a long distance station, then, and note the reading of the dial of the plate coil. Insert somewhere in the circuit—say, between the antenna and the antenna post of your set—a light bulb or an electric iron. Now retune your set for the same station and read again the tickler coil dial. It will be found this time that it is necessary to use closer coupling of the plate coil, or in other words more regeneration to overcome the resistance of the lamp or the flat iron. Regeneration is then, roughly speaking, capable of being used as a means of measuring the resistance of various parts of our set, but owing to various other factors is better suited, perhaps, to be used as a convenient means of comparing the relative efficiencies of the tuning condensers that we might be lucky enough to call our own or to borrow.

It must not be assumed, however, that the use of regeneration to overcome resistance will make it possible to neglect the resistance in the circuit used. Add a bit of resistance to your grid circuit, and your audibility will suffer for it. The more resistance in the grid circuit (the plate circuit does not matter), the less the audibility every time, but it will take increased regeneration to bring out the maximum audibility with the added resistance. On a 180° dial the difference in reading might be extremely small but can be noted if carefully watched for.

A Concrete Example

If, for example, we have four variable condensers and are curious as to which one we will use for that new Radio frequency or reflex set that we are going to build and which is not going to use any

regeneration at all if we can help it, a single-circuit regenerative receiver is the simplest for our test. So, using such a set, we do our tuning with one of the four variable condensers. Pick out and tune in a moderately distant station as sharply as you can and take note of the reading on the plate coil dial.

The next thing to do is to substitute, in turn, each of the variable condensers that we are testing for the one first used and take the reading of the dial. It is necessary to use exactly the same leads or connections for each condenser, and keep everything in the circuit exactly the same for each condenser and also to tune

in as sharply as possible for each condenser, the same moderately distant station. If we use a nearby station, we will not be able to tune sharply enough and if the station is too distant we will have too much trouble picking it up.

Dial Tells Best Condenser

Suppose then that with our four condensers, the plate coil dial gave us a reading of 10° with one condenser, 12° with another, and so on; then we know, with a fair degree of accuracy, which is the best condenser of the lot, because it will be the one that gave us the lowest reading on the dial, or, in other words, it

(Continued on page 19)

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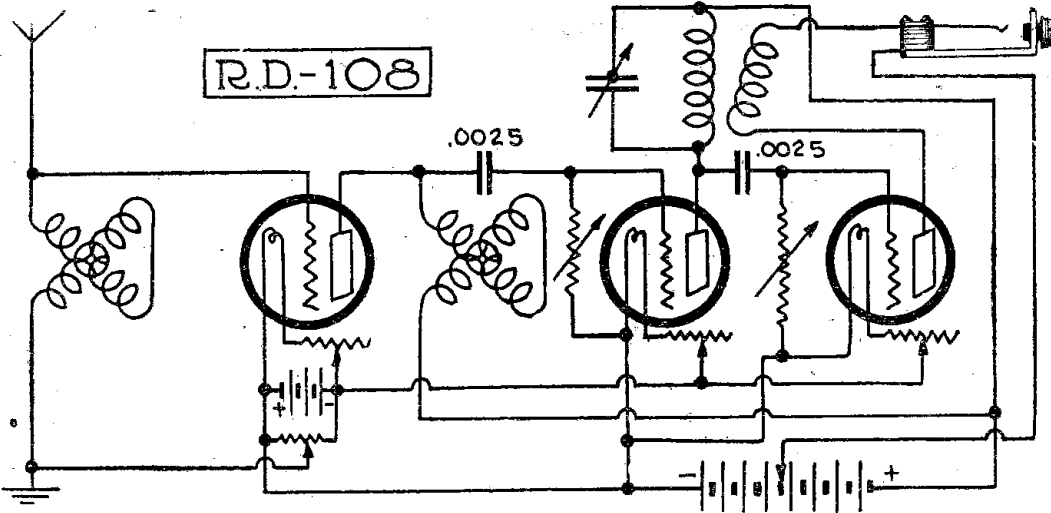
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necessary on the last two tubes. Although the controls are rather numerous, results were found to be unusually good. The addition of two stages of standard audio frequency amplification will give loud speaker volume on even the long distance stations.

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How to Retail Radio. A new book telling of tested plans and methods and policies for the dealer in Radio. Financing, location, store equipment and arrangement. Price, \$2.00.

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

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

Home Radio—How to Make It. By A. Hyatt Verrill. This book is particularly adapted for the amateur who desires to know how to make Radiophones. Twelve full page illustrations and diagrams. Price, 75 cents.

Elements of Radiotelegraphy. By Elery W. Stone. The text was written for the guidance and instruction of Radio students in the communication service of the Navy. It is an instruction book for Radio schools. Price, \$2.50.

Radio for the Amateur. By A. H. Packer and R. R. Haugh. The underlying

principles of Radio thoroughly explained in simple language and understandable illustrations. This book will teach you how to construct and operate a receiving set successfully. Price, \$1.50.

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

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

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Simple Explanation of Radio for Everybody

Chapter VII, Part III—Antennas and Grounds

By M. W. Thompson

THE following article is the fourteenth 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. The remaining chapters will be:

- Chapter VIII—Regeneration.
- Chapter IX—Audio Frequency Amplification.
- Chapter X—Loud Speakers.

FIGURE 53 shows a cage aerial, which is more of a transmitting than a receiving aerial, though the owner of a receiving set may erect it for reception, if he likes. The supporting hoops should be about 3 feet in diameter, made of

of this last insulator being attached to a short length fastened to the roof.

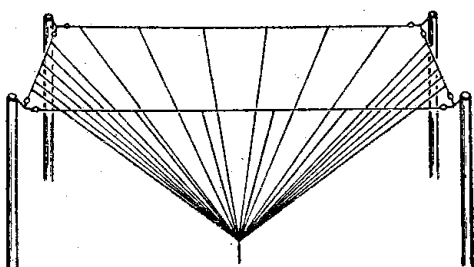


Figure 55—The four-fan antenna is unsurpassed in efficiency but difficult of erection

Figure 55 shows a four-fan aerial, this being given for those who wish to and can experiment with aerials. The four-

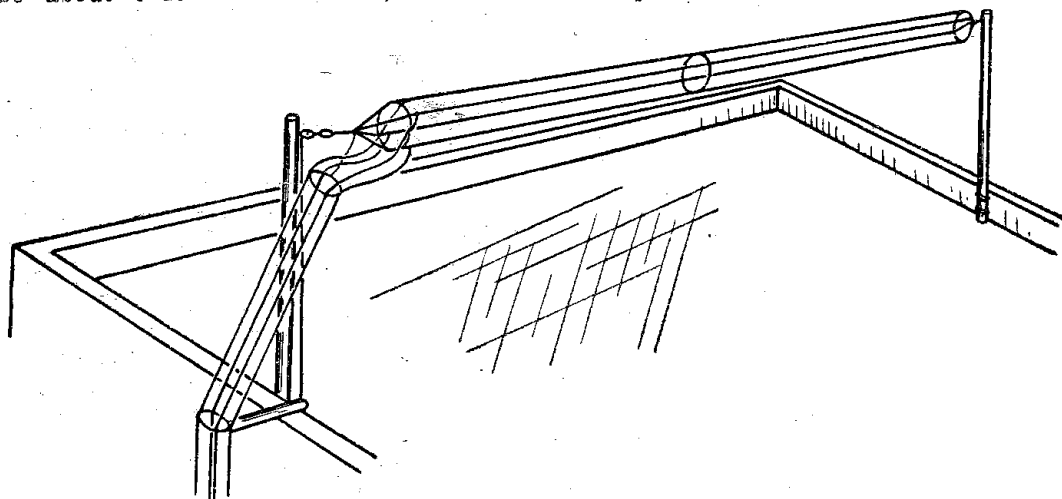


Figure 53—The cage antenna as used by amateurs for transmission is also good for reception

any material, and of sufficient tensile strength not to break and twist. The argument advanced by users of this aerial for transmitting is that the energy is more evenly distributed, it being claimed that, with a four-wire inverted L, most of the energy is in the two outer wires. The hoops for the cage lead-in are 6 inches across and serve both to keep the wires separated and to support them away from the wall.

Fan Aerial

The fan aerial was one of the earliest types used and the only good reason for its less frequent employment now is the

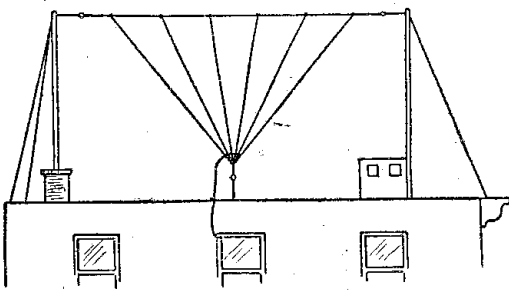


Figure 54—The fan aerial is one of the older types and very efficient

fact that other types are more easily erected. Figure 54 illustrates the fan type, and it should be noted that an insulator is placed at each end of the support wire about 1 foot from the poles and another just below the point where all wires come together, the lower end

fan aerial should prove excellent, being equally efficient in all directions.

The Spiral

Last, we have the spiral. Where space is limited, as on an automobile, motorboat, houseboat, etc., the spiral will give excellent results. It may be hung either vertically or horizontally (see Figures 56 and 57.)

This aerial is easily constructed by taking two light brass hoops, about 2 feet in diameter, and connecting them with four pieces of fishline about 12 feet long, these being fastened equidistantly around each hoop. Beginning at one end, the wire is wound around in the form of a spiral, the turns being fastened each time they cross the fishlines. Twenty-five turns spaced 6 inches apart will give excellent results. The chief advantage of the spiral lies in the fact that it is collapsible, being only a coil of wire and two brass hoops when folded.

Grounds

Grounds have never received enough attention, either by the Radiophan or Radio publications. A man will erect a wonderful aerial, will put in large expensive insulators, will bring the lead-in through a porcelain tube in the wall—and then hastily twist a piece of wire around the radiator valve for a ground. The aerial and ground are both in the same circuit—with the capacity between aerial and ground they form an oscillating circuit—and one should receive as much attention as the other.

The gas pipe should be avoided as a ground as there may be rubber hose connections in it somewhere. The radiator frequently makes an excellent ground, but

tion of all is the grounded side of the electric light circuit. To connect onto this, some care should be used and the following test made. Take an ordinary

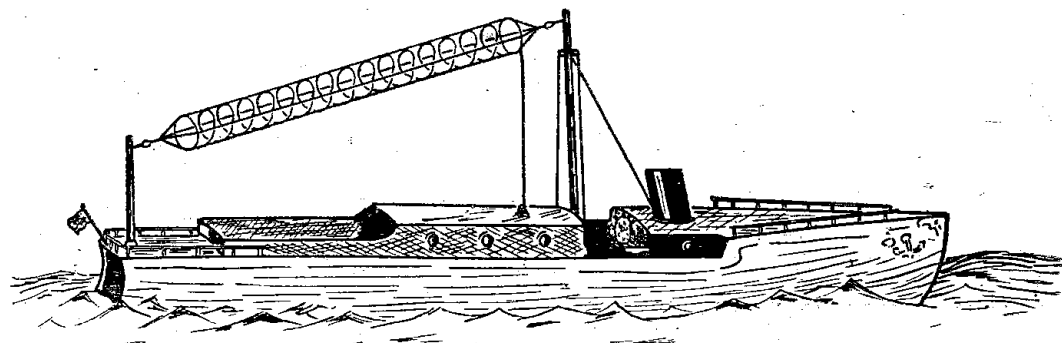


Figure 56—The spiral as applied to use on a motorboat is equally good on an automobile

one cannot be certain that it is the best available. The water pipe has always been considered the best place to connect

electric lamp bulb intended for use on 110 volts and twist a piece of heavy bare wire (bell wire with the insulation removed will do) around the threaded base.

(Continued on page 20)

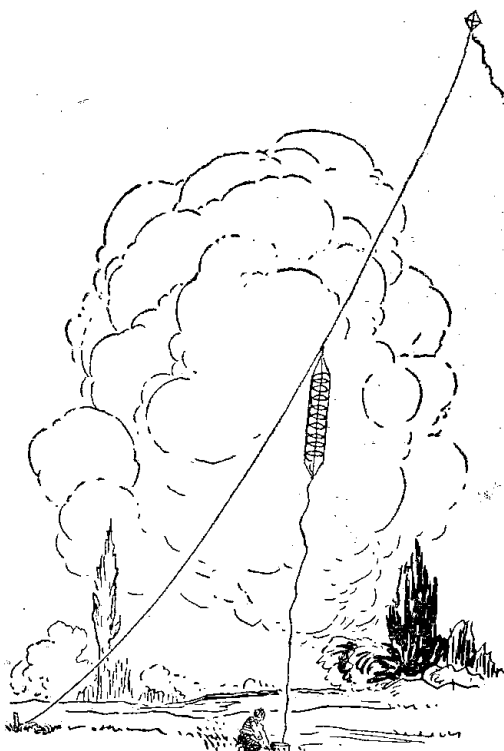


Figure 57—The spiral elevated by a kite for use with portable sets

the ground lead, and has proved itself better than either of the other two.

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207A.	1	A battery switch	.75	217A.	1	Grid leak, 2 megohms	.50
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Latest Development in Grimes Inverse Duplex

Part VI—Tuned Radio and the Inverse Duplex

By David Grimes

BEFORE the years 1913-1914, Radio frequency amplification was absolutely a closed book. No one had any idea of amplification of Radio signals before detection. All the amplification was being performed in the audio branch of the circuit. This, of course, had its limitations because a detector device will refuse to function when the incoming energy drops below a certain minimum value. An amplifier tube, on the other hand, will pick up much weaker signals and will, in turn, amplify them. By a sufficient number of such Radio amplifying tubes, a signal many times too weak for detection could be brought up to the proper value to operate the detector tube. This system of amplification before detection was introduced in this country by the U. S. patent number 1,087,892 granted to Schloemilch and Von Bronk. This veritable broadside covers not only Radio frequency amplification, but also tuned Radio frequency and reflex as well.

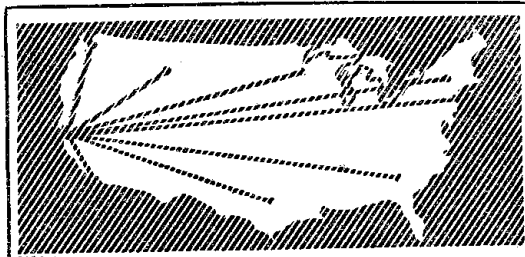
Tuned Radio Frequency

From then on for the next few years, tuned Radio frequency amplification was the only known method. A fixed untuned Radio transformer was thought to be an impossibility. And so we see the progress of the art clearly revealed in patent number 1,173,079 granted to Alexanderson. This patent shows a series of tuned Radio frequency amplifying tubes—an extension of the Schloemilch idea which only disclosed one Radio tube. These multi-stage tuned Radio circuits had a tendency to oscillate and, in general, were quite unstable. This was particularly so with certain types of tubes when high efficiency amplification was attempted.

And then came Chester W. Rice, who made a thorough study of the Alexanderson system of multi-stage tuned Radio frequency circuits. He admirably ferreted out the cause of the oscillations in such circuits and prescribed the remedy. This he has clearly shown in U. S. patent number 1,334,118 filed in 1917. He describes the oscillations as due to the inherent capacity coupling between the grid and plate in the vacuum tube itself. This causes a feedback from the plate circuit to the grid, resulting in regeneration and oscillation. He gives the general remedy by using a second path of feedback from the plate to the grid in such a manner as to oppose the original feedback and thus neutralize it. He employs both neutralizing transformers and neutralizing condensers. Some improvements have lately been added to this arrangement, notably those of Lester Jones and more recently those of Professor Hazeltine and Mr. Wheeler.

Untuned Radio Frequency

When the broadcasting boom broke out in 1921, it was realized that if Radio fre-



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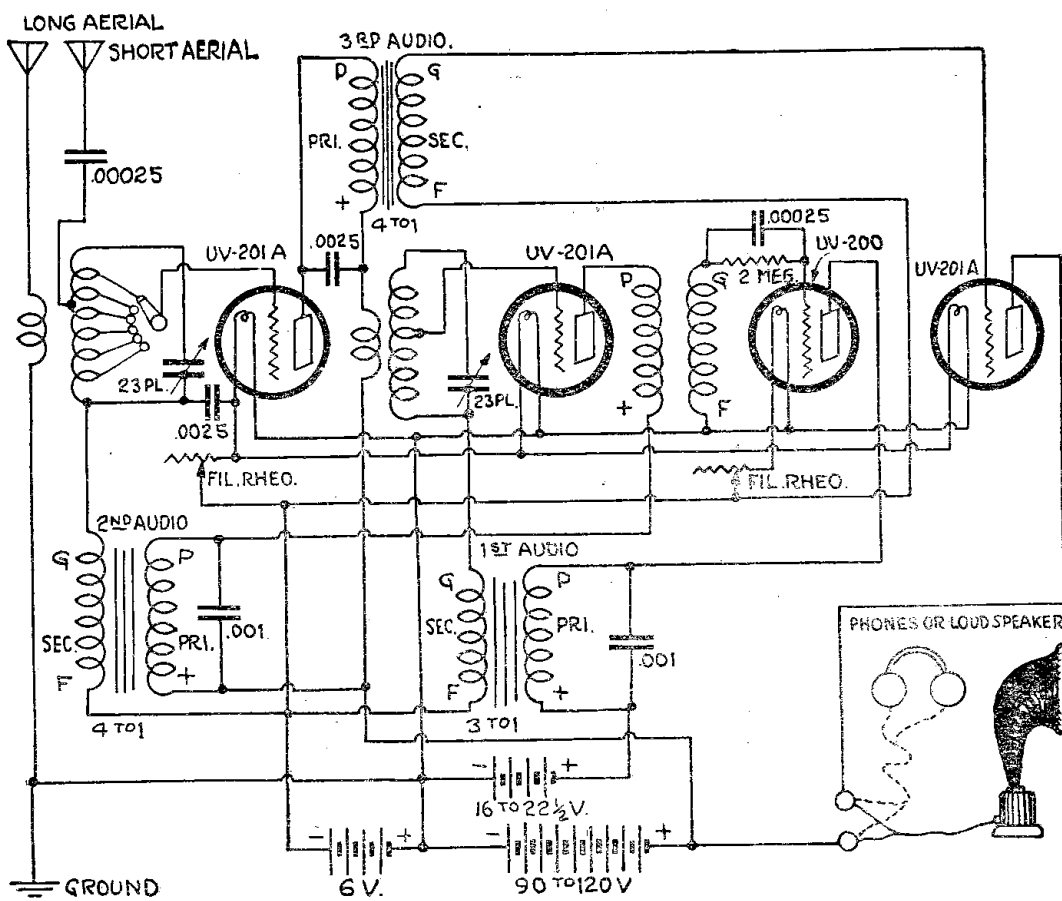


Figure 14—Tuned Radio and the Grimes Inverse Duplex

quency amplification was ever to become popular, it would be necessary to develop an untuned fixed Radio frequency transformer. In this way only could the excessive number of tuning controls be reduced to a practical arrangement, that could be operated by the ordinary enthusiast. Most of the Radio frequency geniuses started at once to produce such an instrument and, as a result, several highly successful types of fixed transformers are now on the market. This was heralded as a great step forward in Radio frequency development and it was this development alone which first made Radio

frequency possible and popular with the public.

Recently, however, there has been a tendency on the part of some of the Radiophans to drift back into the tuned Radio circuits. This is caused by the fact that some of us live very near some high powered Radio broadcasting station. Such a station is difficult to tune out with only one tuning control, and if we desire to hear the more distant station while that local one is on the air, we will be forced to employ more tuning controls at the sacrifice of simplicity. But let it be said right here, that tuned Radio is not the

panacea, or cure-all, for Radio troubles. It has certain advantages when one is located under the eaves of a high powered broadcasting station. Otherwise the many tuning controls become a nuisance and are not required. The criticalness of operation makes the tuned Radio circuit impractical for loop reception, and therefore, being decidedly an aerial arrangement, it is subject to telegraphic code and static interference, in spite of its fine tuning.

Combination Tuned and Fixed

The field, then, for tuned Radio is that territory within a five-mile radius of a high powered broadcasting station, and it is for this class of reception that the set described in this article is recommended. Even then, the set is a compromise between tuned and fixed Radio. Two stages of tuned Radio would ordinarily require three tuning controls—the input into the first tube, the input into the second tube, and the input into the detector tube. Unfortunately nature has not supplied us with three hands with which to operate three such controls. Accordingly, I have made the input into the detector tube a fixed coupling or fixed transformer. This

(Continued on page 20)

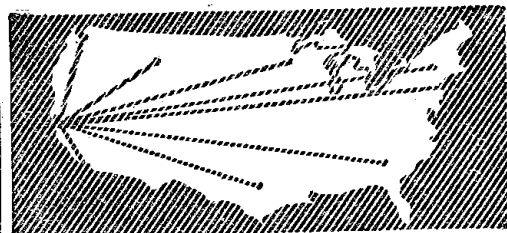
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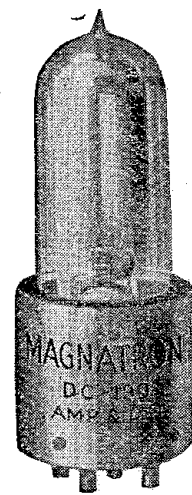


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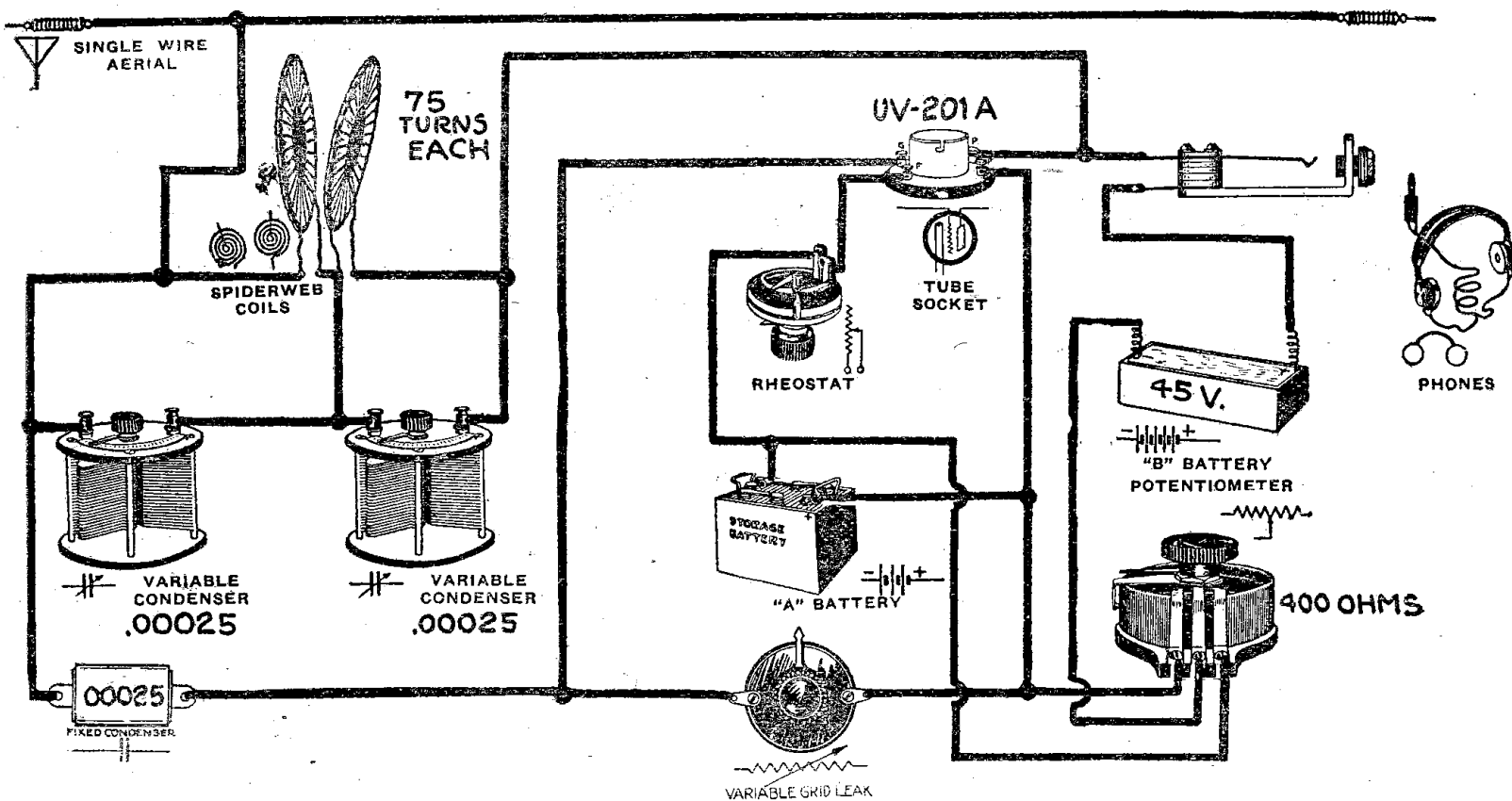
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SPIDER WEB HOOK-UP SIMILAR TO THE MILOPLEX



SOME experimental work in the laboratory developed the circuit illustrated. Unfortunately, after looking over that latest Miloplex we are anticipating that that Mystery Man is going to tell us, "Old stuff, you copied my latest circuit." There is no question or doubt but what the circuit is very similar, but what's the difference? Try it and have your fun with it.

Two spider web coils are both wound with 75 turns of wire. The frame should be the same size in each case, and the two variable condensers must be of the same capacity. A slight variation from the circuit presented is to substitute a variable grid condenser of the same capacity in conjunction with the variable grid leak. A UV-201A tube is used with a 45-volt

plate battery and the potentiometer has a resistance of 400 ohms. The coupling adjustment between the two spider web coils is apt to be very critical and therefore some form of vernier control is recommended. Vernier plates on the variable condenser are not necessary, although some form of vernier control of the dial will be found of decided value in tuning.

KING MILOPLEX

(Continued from page 11)

Note particularly that this innocent baby on one tube traveled from Buffalo to California and stopped off at Kansas City on the way; so if some of you curious fans will look up the exact location of Rokeby, methinks you will say it's a good enough circuit to cause you to send Maggie a postal card.

And there's another big idea back of all this; listen!

Now that winter has forced me into the bathtub when I can remember which is Saturday night. I'm going to stick together a little reflex trick, take it up as far north as the Canadian railway will let me ride on last year's pass and give it a chance to step out. 'Tain't exactly a new reflex circuit—well, maybe it is too—but it has a couple of "common horse-sense" ideas in it that will probably cause a few engineers to sit up and take nourishment.

And it's going to be all yours for only a dime. Five hundred postal cards to Maggie; say, boy, I know you'll send her 2,000 and make her love her King. Atta baby! Start them coming now after you have looked over the log of the loop. If it looks good send the card and I'll do the rest. Let's eat.

(TO BE CONTINUED.)

Testing Condensers

Test your condensers. If you can squeeze them, they are probably poor. If the plates of your variable condensers are of thin, paperlike aluminum or brass, there is a great chance that the entire condenser is poor. Variable condensers should have sturdy-looking plates, well-made or pressed spacers, machined bearings and uniform spacings. A condenser is made for hard use, probably harder and more constant wearing use than any other part of the apparatus, so get one that is sturdy.

Concerning Condensers

In selecting variable condensers make sure that there is no lost motion between the shaft and the bearing, and that the provisions for panel mounting, if of that type, are suitable for the thickness of the panel in your set. To test a condenser for short circuits, connect the filament lighting battery across the two binding posts on the condenser and then rotate the movable plates. Sparking will indicate when and where the plates touch.

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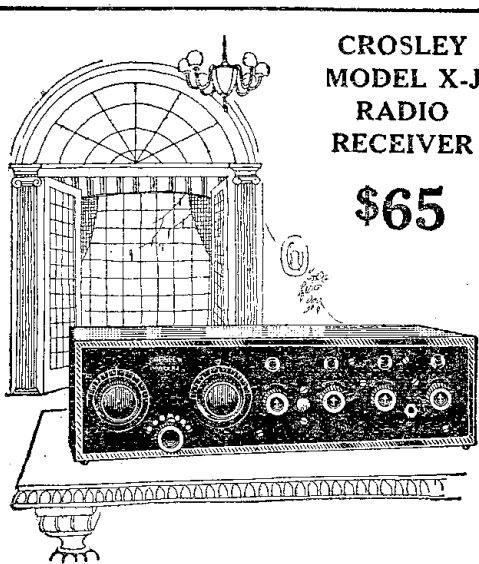
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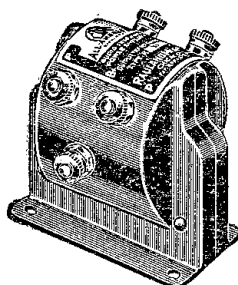
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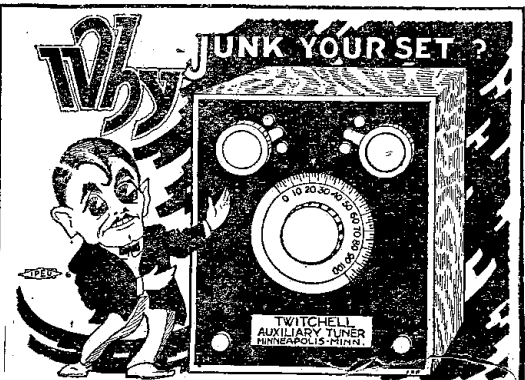
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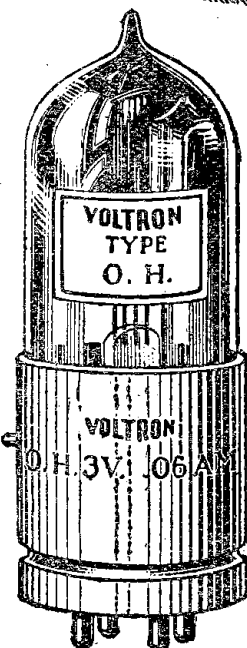
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Simple and Efficient Honeycomb Coil Circuits

Part I—Kinds and Types of Coil Windings

By H. J. Marx

IT IS a well-known fact that the familiar form of single layer tube wound inductance dates farthest back in the development of Radio apparatus. Its particular disadvantage was the unnecessary large space it occupied. As a result the bank winding, spider web winding and honeycomb coils followed shortly afterwards. Each has its distinct advantages and likewise its disadvantages. Spider web coils for a long while became purely a home construction product. In addition, when two or more circuits were to be closely coupled, it became necessary to wind all on the same form. In most cases the tuning of each circuit was accomplished by means of taps or variable condensers. The dead-end losses in tapped coils are quite apparent. If a variable coupling was necessary it was found that the efficiency of the coupling decreases as the number of turns on the coils is increased. This is due to the fact that the

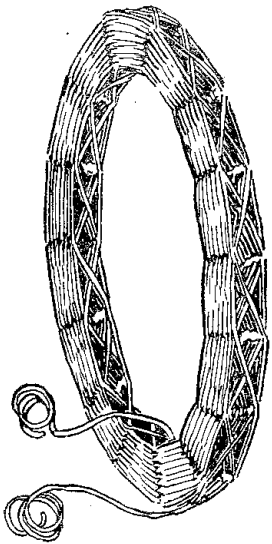


Figure 1

outside diameter becomes too great, producing a piece of apparatus that again gets back to the old difficulty of too much space requirement.

A GOOD CONDENSER

(Continued from page 9)

will be the one with which it was necessary to use the smallest amount of regeneration. Self-evident, isn't it?

Capacity Effect Also Factor

In general, too, it will be found that with an equal amount of shielding for each condenser, the condenser which shows the smallest amount of hand capacity effect will be the condenser having the smallest amount of stray fields and hence, the condenser having the smallest amount of losses due to this cause.

The above are of course only comparative tests, but if they are carried out with ordinary care and under the same conditions, you may be very sure that the condenser you pick is the best one in the lot under test, and that you can rely on its quality and its performance in any Radio circuit or set you contemplate building.

Influence of Short Waves

Short waves such as 300 meters down to 100 meters are very fussy about the condenser used with them. Many con-

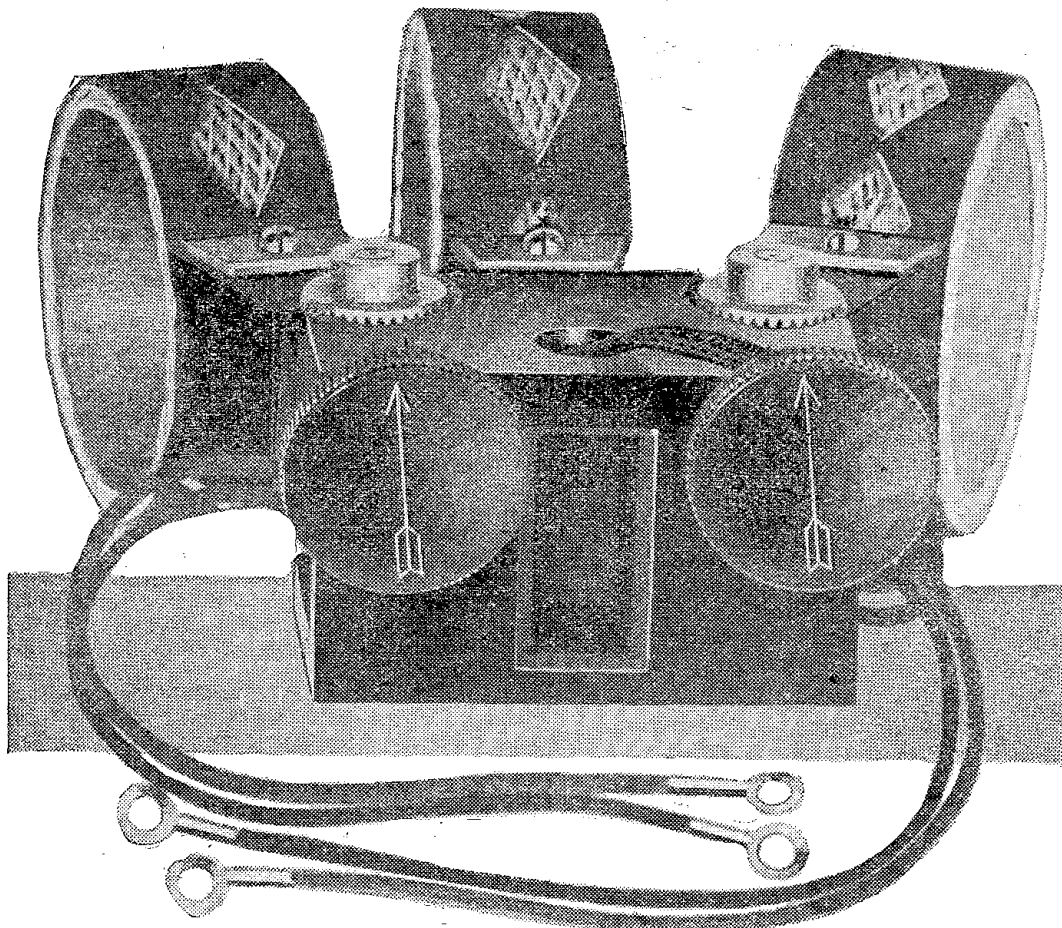


Figure 2—Inside triple coil mounting

Bank Winding

The old form of bank-wound inductance produced an efficient coil but was found to be a difficult and expensive manufacturing proposition. For this reason the production of honeycomb coils followed the natural sequence of popularity. There have been a considerable number of changes in the method of winding. The custom of running the wire diagonally and crosswise from side to side is still adhered to but a further development has been the addition of a layer of material between successive windings. This has consider-

ably reduced the internal capacity of the inductance and thus appreciably raised their efficiency.

Panel Mounting

When first developed it was quite natural to assemble the mounting for the honeycomb coils on the front of the panel because of the required accessibility for changing the coils for different wave length ranges to be covered. The public at the present time have overcome the initial impression that Radio is simply a new marvel and that they were lucky in getting what they could. They have

condensers are not able to handle 100-meter work at all. Radio frequency and reflex circuits, too, are in a similar class and many a set has failed to give the anticipated results simply because the tuning condensers used had too many losses of one kind or another in their makeup.

Number of Plates Not Essential

The range over which we can tune our set with a given condenser does not, as so many seem to believe, depend upon the number of plates in the condenser. It does not matter, particularly in the broadcasting range, whether our condenser has 43 or 11 plates, so far as what range it

will cover is concerned. We might be able to tune from 250 to around 600 meters with a given coil and no taps, using the 11-plate, and only be able to tune from 300 to 500 meters with the 43-plate condenser. Our ability to tune over a big range with a given condenser depends upon how small the zero reading of the condenser is in relation to its maximum reading or capacity. That is, if one condenser has a capacity at its zero setting, plates all out, of 1 mfd., and a maximum, plates all in, of 10 mfd., for the sake of round numbers, it will tune over

(Continued on page 20)

reached the stage where quality and efficiency are demanded and received, and are even going a step farther and expect additional factors such as tone quality, neatness of appearance and efficiency in constructional design. The front of the apparatus must show no bulky parts and require no unsightly wires, but should be pleasing to the eye and retain only the essential controls. This, then, killed the old form of front panel coil mounts. Another factor was the problem of capacity effects created by placing the hand on the knob (very close to the coils) which controlled the coupling of the coils.

For quite a time nothing was done to supply the demand for an inside coil mount. Now, however, there are two or three different makes on the market, one of which is shown in the illustration. It has another good feature, in that the gearing gives positive action and the arrow on the knob at the same time indicates the relative position of the coils. The result is a panel mounted piece of apparatus in which only the two control knobs show.

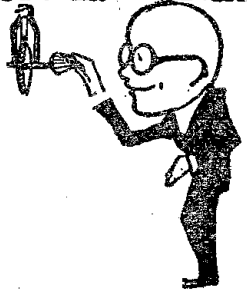
Another Inductance Form

Another highly efficient form of inductance, similar to and used like the honeycomb coils, is that shown in Figure 1. This form of winding is practically a self-supported spider web coil without the bulky and awkward form commonly used in the home constructed article. This form of coil is highly efficient and inexpensive. Although there are no standard units for mounting with variable coupling, a number of manufacturers are making different types of special tuning units utilizing this type of coil in an efficient and satisfactory manner. Some illustrations of this special unit will be shown in later parts of this series. This form of unit can be substituted with as good, and often decidedly better, results in any of the standard honeycomb coil hook-ups. Details on some special form of mounting for the amateur to make will also be given later.

Special Miloplex

There have been numerous demands for Miloplex circuits with honeycomb coils. (Continued on page 20)

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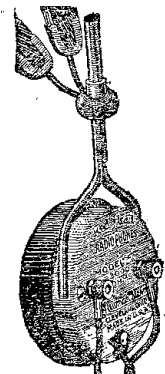
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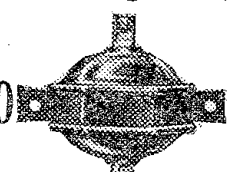
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H. C. COIL CIRCUITS

(Continued from page 19)

As this circuit is especially sensitive to losses, the type of winding shown in Figure 1 will be found to give considerably better results. This special Miloplex is

or 50 turns each for the lower range of wave lengths.

A Simple Hook-Up

A very simple form of two coil hook-up is shown in Figure 4. Two .0005 variable condensers, preferably with vernier control, are shunted across the coils and tune the primary and secondary circuits. The

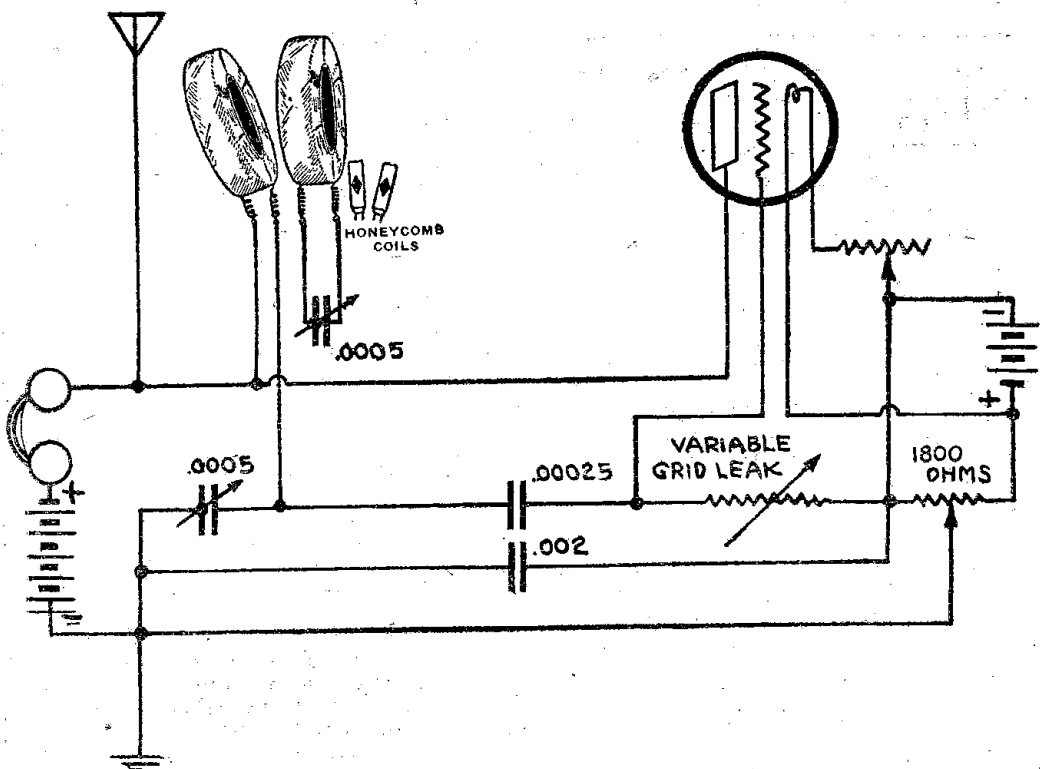


Figure 3

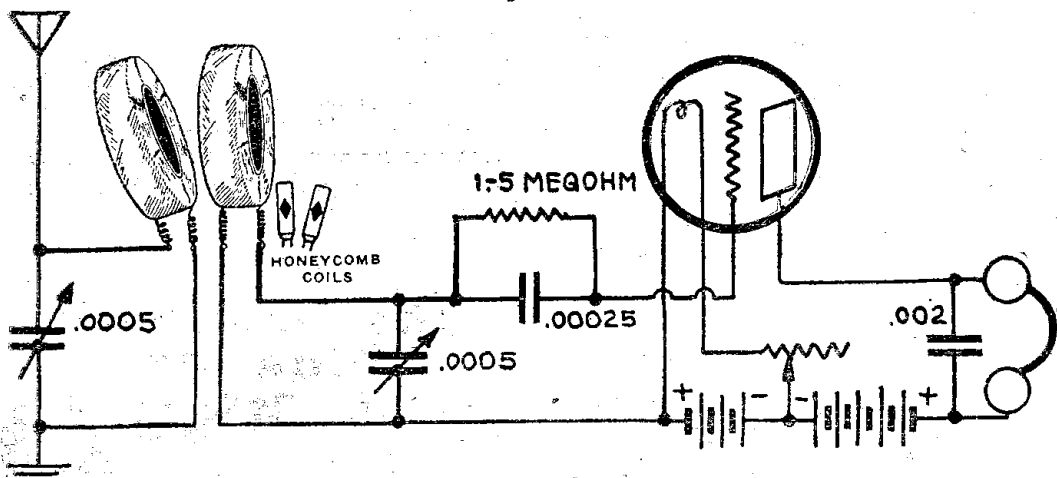


Figure 4

shown in Figure 3. All values are indicated and conform to the specifications given in the Miloplex articles with the exception of the coils, which should be 75 turns each for the normal wave length

circuit is non-regenerative and will be found very satisfactory for local work. The coupling between the two coils must be variable. A detector tube with 16 to 22½ volts on the plate is required.

(TO BE CONTINUED.)

INVERSE DUPLEX

(Continued from page 17)

permits the entire tuning to be accomplished with two hands—the two dials reading practically the same value for a given station. This arrangement of tuned Radio is more reasonable and is entirely excusable, considering the extreme conditions for which it is recommended.

Set Employed Radio Frequency

Referring to Figure 14, it will be seen that the set employs four tubes and is designed to work on an aerial and ground. There are three UV-201A amplifying tubes and one UV-200 detector tube. Other tubes than these can be used, but with nowhere near the same efficient results.

A separate 22-volt B battery is used with the detector tube, as there is generally a likelihood of audio howling when three audio tubes and a detector are operated from the same set of B batteries. This is particularly true if the B batteries have somewhat depreciated. This point will be taken up in more detail in the next article which shows the additional audio

tube added to the previously described three tube loop set. The fixed Radio transformer, between the last Radio tube and the detector, should be one which covers the entire broadcasting wave length band.

The audio transformers should preferably be of a low ratio although no definite rule can be given, as so much depends on the impedance and self-capacity of the primary and secondary windings. A few of the high ratio transformers have worked in this circuit admirably well while others have been failures. Very few of the low ratio types have refused to function properly. An indication of the ratios is given in the drawing, but this is not to be taken as ironclad. The values of the small by-passing condensers come under the same reservations. They are not critical and for best results will vary with the type of audio transformer used.

Two Tuned Radio Transformers

The two tuned Radio transformers or

fixed couplers, are shown at the input to the first and second tubes. The primaries are indicated by a few turns of wire while the secondaries are shown with many turns and a tuning condenser across them. The secondary of the first transformer is tapped about five turns through its entire length. The secondary of the second transformer is tapped in only one place and that is about two-thirds of the way up from the end where the primary is wound.

These two transformers can be very easily made. The first things required are two pieces of 3-inch diameter cardboard, bakelite, or fiber tubing. These need only be about 3 inches long. The primaries and secondaries of both transformers are wound with number 28 dcc. wire. The primaries consist of 8 turns of wire wound at one end of the tube. The secondaries are then wound on the tube and each one has about 40 turns of wire, the actual number depending on the capacity of a 23-plate tuning condenser, used to tune the secondaries.

The secondary of the first transformer is tapped every five turns, so that the grid to the first tube may be connected to the proper one for best volume and quality. The short aerial connection is permanently placed on the thirtieth tap. The one tap on the secondary of the second transformer is permanently wired to the grid of the second tube. This tap is at the twenty-sixth turn. This gives sharper tuning and about the same volume as compared with the grid connection being placed on the last turn, as is customary. The end of the secondary nearest the primary, in each case, is wired to the audio transformer.

It is felt that this article will solve your question as to whether you do or do not wish to experiment with tuned Radio frequency. If you do, the information given, while limited, is sufficient to enable the average experimenter to proceed with fair assurance of success. There are many questions which will naturally arise and, obviously, the variations possible in Figure 14 are almost limitless. If there is enough interest evinced in the form of letters concerning the possibilities in the Tuned Inverse Duplex, there will probably be other articles forthcoming dealing with these.

The next and last article of the present series will discuss various precautions necessary in all the arrangements, and particularly those required when a third stage of audio amplification is added. The suggestions forthcoming will be helpful to a large group of Radio enthusiasts who have tried in vain to add a power audio to any and all types of circuits already using two audio stages. The usual difficulties will be shown together with their common remedies.

(TO BE CONTINUED.)

GOOD CONDENSER

(Continued from page 19)

a much greater range than a condenser having a minimum of 3 mfd. and a maximum of 15 mfd., and it would be better to use it because our condenser should be as small and the inductance as large as possible, particularly in the broadcasting range. An 11-plate condenser with a low zero capacity and high maximum capacity is about as large as should be used for such work.

Briefly stated, of two condensers of the same size, 11 or 43 plate, set at zero, that which brings in the shortest wave is the one having the greatest range. This last assuming that their maximum is the same.

To shield the panel, use only tinfoil or copper foil, never sheet tin or iron.

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RADIO FOR EVERYBODY

(Continued from page 15)

Now connect this wire to the cold-water pipe. From your electric light socket bring the two wires out through a plug and keep them carefully separated so that they do not make a short circuit. Holding the bulb in one hand by the glass part, touch one of the wires to the little brass button in the center of the bottom of the base. Then lay that wire down and touch the other wire from the socket to the little brass plug in the bottom of the bulb. Touching one of these will cause the bulb to light; touching the other will not. Use for a ground the one that does not; that is, the grounded side of the electric light circuit. The second wire from the socket should be removed.

However, should the reader not have an electric light circuit available, or should he not care to use it, the cold-water pipe should be used as the next best connection. But you will find its surface corroded and it is essential that this be removed for good results. With a file or a knife scrape off the pipe all around for a length of 3 inches. The lead from the ground post of your set should now be run to this point, and a length of wire, about 3 feet long, carefully scraped shiny. Wrap this around the pipe closely and tightly ten or twelve times and solder it.

If it is absolutely impossible to solder the connection, cover it with black electrician's tape.

(TO BE CONTINUED.)

Double Wire on Coil

If you have some wire from an old coil of some sort and want to make a tuning coil but think the wire is too small for this work as it will have too much resistance, two wires may be used if the coil is wound neatly. I find that by winding one wire on one layer and the other on the next, and tapping in on exactly the same lengths of wire, excellent results can be obtained.—J. B. Owen, Blair, Okla.

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Marshall & Co., Los Angeles, Cal.

R. F. and A. F. with Special Transformer

Crystal Rectifier Used in Circuit with Tube

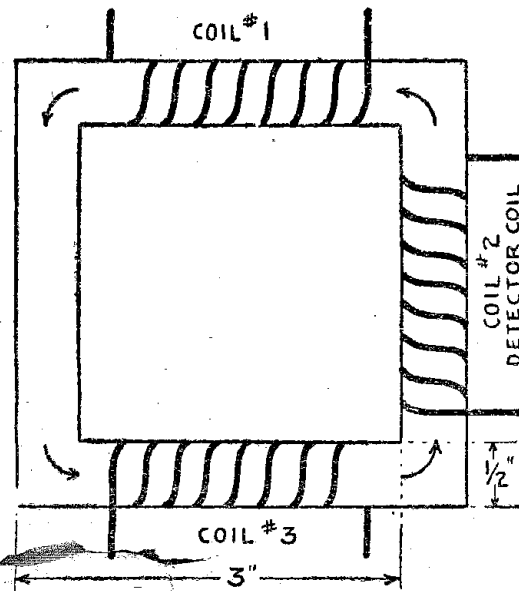
It is with much hesitation that I give the theory upon which the following circuit operates. However, it comes closer

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

to giving the maximum output of a tube in signal strength than any other circuit



I have ever been able to operate. It gives the equivalent of two steps of R. F. and

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YOUR CRYSTAL SET

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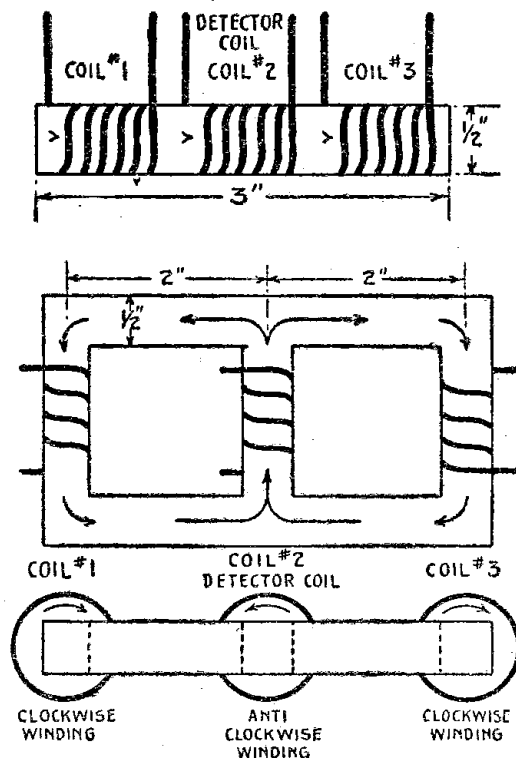
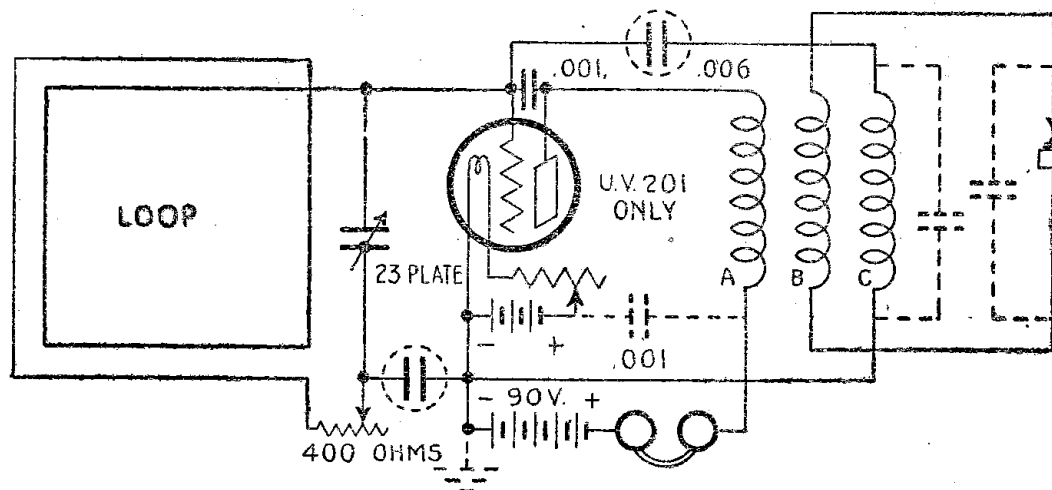
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WD-11	3.50	WD-12	3.50
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TRIPLE COILS GIVE STRENGTH

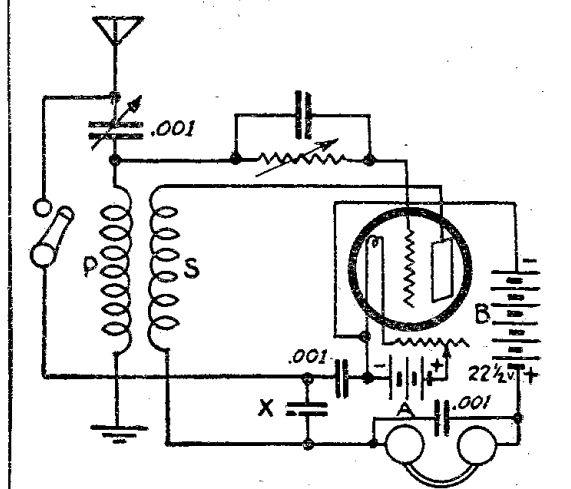


two steps of A. F. on the one tube and crystal rectifier. The .001-mfd. condenser acts as one stage of R. F., and one stage of A. F., and the triple wound transformer also acts as both an A. F. and R. F. amplifier.

Tracing out the impulse, it may be seen that the loop brings in the signal, which operates the grid. The plate current then passes through the primary of the transformer, and the secondary impulse feeds back to the grid. Also the impulse is fed back through the .001 condenser. The second secondary coil in the crystal circuit rectifies and a second feedback of A. F. occurs, which is also amplified one step of A. F. on the R. F. secondary and an additional step across the .001 condenser. The wave length is controlled by the 23-plate condenser, while signal

Special Condenser for a Flewelling Hook-Up

In the hook-up shown I use a variocoupler for tuning. Using an aerial and



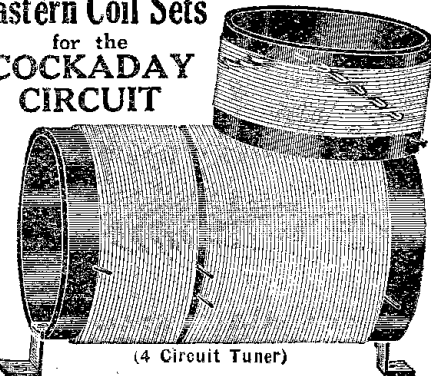
ground, the switch must be open, but it is possible with the switch closed to hear local stations with no QRM from V.B.G. which I could not shut out before. It must be closed when using the aerial or ground alone.

Local stations can be heard without either ground or aerial. The condenser marked X is a special one, tested for my purpose. It consists of 16 sheets of foil, 2 1/2 by 4 1/2 inches. The diagram explains the circuit.—A. Bickerton, Toronto, Can.

strength or oscillation is controlled by the 400-ohm rheostat.—J. O. Yeiser, Omaha, Neb.

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Questions and Answers

(Many readers, through negligence or on purpose, send in questions and fail to sign the letter. We do not use such a letter in the Questions and Answers department of RADIO DIGEST, therefore it is useless to even send a letter without your name and address.—Editor.)

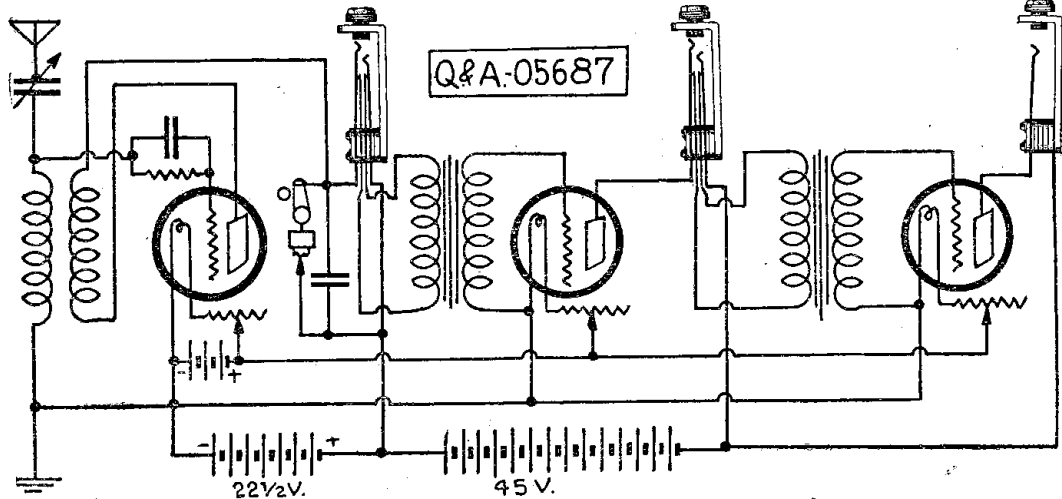
Audio Frequency

(05687) GMW, Woodbury, N. J.
I am a constant reader of your wonderful magazine, Radio Digest, and am tak-

this does not employ confusing symbols which distract the uninitiated, we hope it will be of real help to you.

We can suggest no better medium of learning the theory of Radio communication and the art of operating receiving circuits than Radio Digest itself, which gives special attention to the needs of the novice through its special articles for beginners.

Doubtless an indoor antenna system



ing the liberty to write for information on diagram of a combination crystal and tube, published in the September 1 issue. Hook-up I think is a very good one. I am herewith sending you same to have it checked if possible, and also would like to be advised how to connect to my other point for the addition of one step of audio frequency, as parts are not connected as shown.

If this information will be given I will keep my eyes open for details of it in some one of your near future issues.

A.—In answer to your inquiry we present herewith a diagram showing the method of adding amplification. When amplifier tube is used, if desired, the crystal detector may be substituted for tube detector.

Mere Woman and Radio!

(05561) BMCI, Dover, N. H.
I have been reading all the beginners' articles on Radio for the last three days having got the "bug" suddenly, but as yet I have not found out what sort of a set to start out on. I do not wish the cost of parts to exceed \$30 (not including headsets) and naturally I want to get stations as far away as possible. What is this Miloplex hook-up and would it be advisable for a rank amateur to attempt it? I'm "nothing but a woman," but have worked a little with electricity and thought perhaps I might be able to get a Radio set together.

What hook-up would you advise me to try, and where can I get directions simple enough so that one who knows nothing about Radio could put it together? I should also want to know all about placing of the aerial, etc.

It was only three nights ago that I listened in for the first time, and now I have "Radio fever."

A.—We are happy to welcome a "mere woman" to our fraternity of enthusiasts in the Radio art.

Not because you are a woman, but because being one, we know that you are possessed of good sense we are advising that the better part of wisdom in entering this fascinating pastime is to proceed in a progressive spirit.

We recommend the simple circuit illustrated in a simple manner on page 18 of the October 13 issue of Radio Digest. As

may serve until your enthusiasm drives you to extreme measures for the acquirement of greater efficiency in that part of your equipment. As to construction of an aerial, a single wire 150 feet in length, including lead-in, and placed as high as possible is advised.

Q. & A. 5212 Circuit

(05936) AJ, Libertyville, Ill.

I constructed the two variometer hook-up given in your Q. & A. columns in answer to question No. 5212, and have had good results from same. In about three weeks' time I have heard 43 stations.

I am using two Dayton variometers, two C-299 tubes, .002 mica condenser across primary of 10 to 1 All-American transformer, and .00025 grid condenser with 2-megohm grid leak.

The set is very sensitive, and sometimes I can tune a distant station out by removing my hand from the dials. Also, on low wave lengths, the setting of the plate variometer is very critical and I am troubled by body capacity when I set it.

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STA-RITE BATTERY CO., Louisville, Ky.

I think it is on account of using either the wrong value of grid leak or phone condenser, and would request that you kindly furnish me with the proper values of the parts necessary; also any other information to increase the efficiency.

I am using an 80-foot aerial, single strand, 20 feet high, with a 10-foot lead-in, and a 25-foot ground lead.

A.—We take pleasure in congratulating you upon your very excellent reception record.

Body capacity effect is not normally a marked attribute of the circuit under discussion, and it may be eliminated by shielding the back of the panel with tinfoil and grounding the shield.

The correct value of the grid leak is 2 megohms and of the phone condenser, .001 mfd.

Crystal Hook-up

(06000) LAB, Los Angeles, Calif.

In the September 15, 1923, issue of the Radio Digest is a crystal set hook-up capable of receiving 300 miles. This hook-up does not show any variable condensers for tuning; is this correct? Would variable condenser in the aerial or ground lead help, and what capacity should I use? Would a 180 degree Shamrock coupler and Shamrock variometer be all right to use? How often should the coupler be tapped?

A.—In the long range crystal detector circuit mentioned no variable condenser is

indicated because it offers no advantage. A standard variocoupler will serve; that of your specification will be effective. A primary wound with 56 turns and tapped at every seventh turn is suitable.

R. D.-102

(05902) A. J. S., Chicago.

Have you complete data as to what kind of variocoupler is used in hook-up R. D.-102? I wish to know size of coupler and number of turns of wire, etc.

A.—Any standard type of variocoupler can be used in circuit of R. D.-102. If you intend to construct an efficient coupler, 56 turns of number 20 wire, tapped at every seventh turn, for primary, and 50 turns of number 26 wire for secondary, serve well. Either dcc. or scc. can be used.

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Arkansas: Conway, KFKQ Fayetteville, KFDD, KFMO Fort Smith, WCAO Little Rock, KFLQ, WCAV	Iowa: Ames, WOI Atlantic, KFLZ Boone, KFGQ Burlington, WIAS Cedar Falls, KFJX Cedar Rapids, KFLP, WJAM, WKAA Centerville, WDAJ Davenport, WHAL, WOC Dexter, KFJV Fort Dodge, KFEE, KFJY Gladbrook, KFJK Iowa City, WHAA Lamoni, KFFV Le Mars, KFCY, WIAU Marshalltown, KFJB Newton, WIAH Ottumwa, KFJL Sigourney, WOAD Sioux City, KFMR, WEAU Waterloo, WHAC, WRAN	Massachusetts: Boston, WNAC, WTAT Dartmouth, WMAF Fall River, WSAR, WTAB Lowell, WQAS Medford Hills, WOI New Bedford, WDAU Springfield, WBZ Worcester, WABK, WDAS	New Mexico: Albuquerque, KFLR State College, KOB	Wisconsin: Beloit, WKAW Fond du Lac, KFIZ Kenosha, WOAR La Crosse, WABN Madison, WDAY, WHA Milwaukee, WAAK, WCAJ, WHAD, WIAO Neenah, WTAJ Ossau, WTAQ Sisilut, WABT St. Croix Falls, WRAL Waupaca, WPAH
California: Bakersfield, KDZB Berkeley, KQL, KRE Del Monte, KLN El Monte, KUY Fresno, KMJ Hollywood, KFAJ Long Beach, KSS Los Angeles, KDZV, KFCL, KFI, KHJ, KJS, KNV, KNX, KUS Los Gatos, KFHQ Modesto, KPD Oakland, KPD, KLX, KZM Richmond, KFDM Sacramento, KFBI San Diego, KDPT, KDYM, KFBO San Francisco, KFDS, KPO, KSL, KUC San Jose, KQW San Luis Obispo, KFBE Santa Ana, KFAV Santa Barbara, KFBI Stanford Univ., KFHH Stockton, KJQ, KWG Venice, KFAV	Kansas: Anthony, WBL Beloit, WPAR Hutchinson, KFHX Iola, KFID Louisburg, KFIL Manhattan, WTG Marion, WRAD Milford, KFJB Parsons, WQAJ Pittsburgh, KFIV Topeka, WIAQ, WPM Towanda, KFJV Wichita, WEAH	Michigan: Berrien Springs, KFGZ Dearborn, WWI Detroit, KOP, WCX, WWJ East Lansing, WKAR Flint, WEZ Houghton, WVAO Kalamazoo, WOAP, WLAQ Memphis, KFLB Rogers, WHT Saginaw, WABM	New York: Albany, WNJ Buffalo, WGR Canandaigua, WSAW Canton, WCAD Cazenovia, WMAJ Ithaca, WEAJ Lockport, WMAK New York, WBAJ, WDT, WEAJ, WJH, WJX, WJY, WJZ, WLAW, WQAO, WSAJ Port Chester, WSAJ Poughkeepsie, WPAJ Rochester, WABO, WHAM Schenectady, WBY, WRL Syracuse, WGB, WLAH, WNAN Tarrytown, WRW Troy, WHAZ Utica, WSL	Wyoming: Douglas, KFV Laramie, KFBU
Colorado: Boulder, KFAJ Colorado Springs, KFCK, KFFQ, KFKZ Denver, AAS, KDZQ, KFAF, KFEL, KFHH, KFLE, KLZ Greeley, KFID, KFKA Gunnison, KFBA Lakewood, KFHH Trinidad, KFBS	Kentucky: Lexington, WQAH Louisville, WHAS, WLAP	Minnesota: Hutchinson, WFAN Minneapolis, KFDD, KFEX, WBAH, WCAS, WCE, WLAG, WLB Moorhead, WPAU Northfield, WCAL St. Cloud, WFAM St. Paul, AV7	North Carolina: Asheville, WFAJ Charlotte, WBT	Alaska: Juneau, KFII
Connecticut: Hartford, WDAK New Haven, WPAJ Storrs, WABL Waterbury, WQAD	Missouri: Butler, WVAR Cameron, WPAQ Cape Girardeau, WSAB Carrollton, KFJJ Columbia, WIAJ Independence, KFJX, WPAJ Jefferson City, WOS Joplin, WIAH Kansas City, WDAF, WHB, WMAJ, WOO Marshall, WJAT St. Joseph, KFHD St. Louis, KFEE, KFIB, KFGJ, KSD, WCK, WEB, WEW, WMAY, WRAO Springfield, WIAI Tarkio, WIAJ Webster Groves, WOAL	Montana: Billings, KFCH Bozeman, KFDO Butte, KFAP, KFV, KFLA Great Falls, KDYS Havre, KFBE Missoula, KFJL Stevensville, KFJR	North Dakota: Fargo, KFJL, WDAY, WPAK Grand Forks, KFJM Mayville, KFHU	Hawaii: Honolulu, KDYX, KGU Lihue, KFBS
Delaware: Wilmington, WHAV, WOAT	Nebraska: Fremont, WOAE Grand Island, KFJA Hastings, KFJX Kearney, KFJL Lincoln, KFDD, WFAV, WJAB, WMAJ Norfolk, WJAG Oak, KFEE Omaha, KFCC, KFJX, WAAW, WIAK, WNAL, WQAW Tecumseh, WTAU University Place, WCAJ Utica, KFDR York, KFDR	Nevada: Reno, KDZK Sparks, KFFR	Ohio: Canton, AQB Cincinnati, WAAD, WHAG, WLV, WSAI Cleveland, KDPM, WHK, WJAX, WTAJ Columbus, WBAV, WCAH, WEAQ, WMAN, WPAJ Dayton, AW5, WABD Dover, WABP Fairfield, WL2 Granville, WJD Hamilton, WRK Lima, WOAC Marietta, WIAW Newark, WBBA New Lebanon, WPG Pomeroy, WSAZ Sandusky, WABH, WQAF Springfield, WNAJ Toledo, WABR, WTAL Yellow Springs, WRAV	Porto Rico: San Juan, WKAQ
District of Columbia: Washington, WABE, WCAP, WDM, WIL, WJH, WMU, WQAW, WRC	Florida: Jacksonville, WDAJ Miami, WDAJ Orlando, WDAJ Tallahassee, WDAJ Tampa, WDAJ St. Petersburg, WDAJ	Georgia: Atlanta, WSB Gainesville, WKAY Macon, WMAZ	Idaho: Boise, KFAU, KFDD, KFFR Killing, KFEE Moscow, KFAV	British Isles: Aberdeen, 2BD Birmingham, 5IT Bournemouth, 6BM Cardiff, 5WA Glasgow, 5SC London, 2LO Manchester, 2ZY Newcastle, 5NO
Florida: Jacksonville, WDAJ Miami, WDAJ Orlando, WDAJ Tallahassee, WDAJ Tampa, WDAJ St. Petersburg, WDAJ	Georgia: Atlanta, WSB Gainesville, WKAY Macon, WMAZ	Idaho: Boise, KFAU, KFDD, KFFR Killing, KFEE Moscow, KFAV	Ohio: Canton, AQB Cincinnati, WAAD, WHAG, WLV, WSAI Cleveland, KDPM, WHK, WJAX, WTAJ Columbus, WBAV, WCAH, WEAQ, WMAN, WPAJ Dayton, AW5, WABD Dover, WABP Fairfield, WL2 Granville, WJD Hamilton, WRK Lima, WOAC Marietta, WIAW Newark, WBBA New Lebanon, WPG Pomeroy, WSAZ Sandusky, WABH, WQAF Springfield, WNAJ Toledo, WABR, WTAL Yellow Springs, WRAV	Canada: Bellevue, CFCC Calgary, CFAC, CFCA, CHBC Edmonton, CFCK, CJOA Hamilton, CKOC Innisburg, CFCH Kingston, CFRC London, CFVW, CJGC Montreal, CFCE, CFUC, CHY Ottawa, CKAC Oshawa, CJOA Quebec, CFCL, CHCD Regina, CKCK St. John, CJCI Saskatoon, CFBC Sudbury, CFOR Toronto, CFCA, CJCD, CJOA, CJSC, CKCE Vancouver, CFCE, CHCL, CJCE, CKCD Victoria, CFCL, CHCE Winnipeg, CKY
Florida: Jacksonville, WDAJ Miami, WDAJ Orlando, WDAJ Tallahassee, WDAJ Tampa, WDAJ St. Petersburg, WDAJ	Georgia: Atlanta, WSB Gainesville, WKAY Macon, WMAZ	Idaho: Boise, KFAU, KFDD, KFFR Killing, KFEE Moscow, KFAV	Ohio: Canton, AQB Cincinnati, WAAD, WHAG, WLV, WSAI Cleveland, KDPM, WHK, WJAX, WTAJ Columbus, WBAV, WCAH, WEAQ, WMAN, WPAJ Dayton, AW5, WABD Dover, WABP Fairfield, WL2 Granville, WJD Hamilton, WRK Lima, WOAC Marietta, WIAW Newark, WBBA New Lebanon, WPG Pomeroy, WSAZ Sandusky, WABH, WQAF Springfield, WNAJ Toledo, WABR, WTAL Yellow Springs, WRAV	Mexico: Mexico City, CYB, CYL

PART IV—STATION DATA
(The following schedules complete the alphabetical station data list, Part III of which was given last week.)

WVAO, Houghton, Mich. 244 meters. 250 watts. Mich. College of Mines.

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

WVLA, New Orleans, La. 280 meters. 100 watts. Loyola Univ.

2BD, Aberdeen, Scot. 495 meters. British Broadcasting Co.

2LO, London, Eng. 363 meters. British Broadcasting Co.

2ZY, Manchester, Eng. 370 meters. British Broadcasting Co.

5IT, Birmingham, Eng. 425 meters. British Broadcasting Co.

5NO, Newcastle, Eng. 400 meters. British Broadcasting Co.

5SC, Glasgow, Scot. 415 meters. British Broadcasting Co.

5WA, Cardiff, Wales. 353 meters. British Broadcasting Co.

6BM, Bournemouth, Eng. 385 meters. British Broadcasting Co.

6KW, Tunnicliffe, Cuba. 332 meters. 500 watts. Frank H. Jones. Slogan, "If You Hear the Koo of the Cuckoo You Are in Tune With Tunnicliffe." Mon., Tues., Fri., Sun., 9 pm, music. Wed., Thurs., Sat., 6:30 pm, music. Central.

A Good Indoor Antenna
A new type of indoor antenna which rivals the loop can be made in a moment with nothing more than 100 feet of wire. The wire is coiled into a long spiral and suspended by one end. Number 16 or 18 insulated wire works well, although many other kinds are quite as good, heavier wire being, in general, better than light wire. Wind the coil on any convenient tube;

suspend it from a window and it will rival an outdoor aerial. It cannot be counted upon to give results with a crystal set, but is practical for any kind of vacuum tube receiver. It is almost always better than bedsprings, piano strings, and even better than wires strung about the room.

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BUILT AND REPAIRED
Panels Drilled
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421 West 65th Street CHICAGO

COAST COAST
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, \$7.75. Autotune circuit complete Tube FREE, \$18.50. Cockaday—Reinartz—Ultra-Audio circuits, panel, complete parts—Tube Free with each 13.67 5 Tube ROYAL Neutrodyne (mounted), \$49.47. ROYALTRON tubes, guaranteed. Standard base, 1 1/2 volt detector or amp. 6 V. amp., 3.95. Write for Catalog. ROYAL MANUFACTURING COMPANY Dept. 50 World Building, New York City

The New WALNART INDUCTANCE SWITCH

Only with positive contacts can you get good reception. Switch points are unsightly and the contacts are poor. A Walnut Inductance Switch, 1-10 points, gives positive contact and better reception. Bakelite numbered dial shows exact position at all times.

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List Price \$1.00 **WALNART VARIABLE GRID RESISTANCE**

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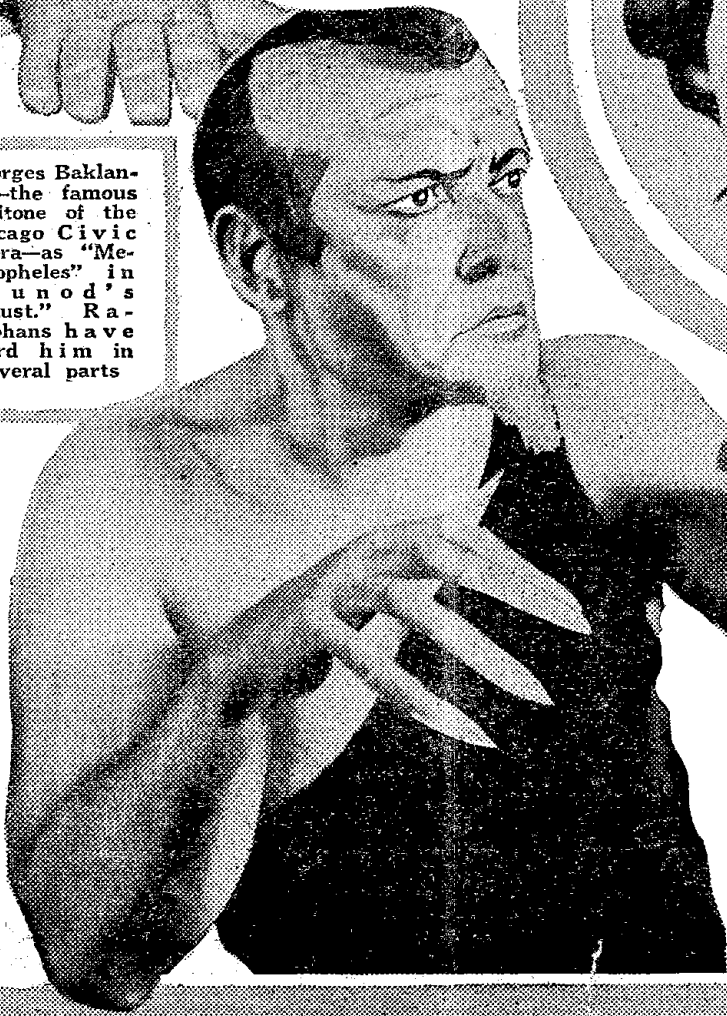
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Radio Illustrated

Baby Peggy Montgomery is the rival screen star of Jackie Coogan, and is shown here (with her mother) making her first speech over the Radiophone. She is not yet five years old
K. & H. Photo



Georges Baklanoff—the famous baritone of the Chicago Civic Opera—as “Mefistopheles” in Gounod’s “Faust.” Radiophans have heard him in several parts



Giacomo Rimini, also a baritone, is here presented as “Iago” in “Othello,” broadcast recently by KYW, Chicago. Earlier he has been heard by listeners in as “Rigoletto” in Verdi’s opera of that name, and in “Andrea Chenier”

Here is another “devil of a man” — Virgilio Lazzari, in title part of Boito’s “Mefistofele.” He is a bass-baritone, and has sung many parts during the present season at Chicago, notably the “High Priest” in “Aida,” the revolutionary servant in “Andrea Chenier,” and “Sparafucile” in “Rigoletto,” all of them broadcast by KYW or WMAO

“Cheer” can be got out of a bottle even in these days, witness the outfit below, in which a Radiophan has rigged up a “bone-dry” bottle as a tuning coil for his crystal set. The coils are wound on the outside of the bottle. It was exhibited at a recent show
Int. Photo

