

How to Make New Singing and Talking Suitcase; Advance Programs; Installing Radio in a Chevrolet; Wiring and Tuning the Super-Heterodyne

Radio Digest

EVERY WEEK **Illustrated** PROGRAMS **TEN CENTS**

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

Vol. IX Copyright 1924 By Radio Digest Publishing Co. SATURDAY, MAY 24, 1924 No. 7

WHO'S BEST ANNOUNCER?

MAKE PROGRESS TO BROADCAST SENATE

TAKE SURVEY OF CHAMBER TO ESTIMATE COST

Radio Experts of Army and Navy to See What Changes Will be Necessary

WASHINGTON, D. C.—The Senate last week passed the resolution introduced some weeks ago by Senator Howell of Nebraska, calling upon the Secretaries of War and Navy to have their Radio experts make a survey of the Senate chamber to see what changes, if any, would have to be made to have the debates of the upper chamber broadcast to the country.

In bringing up his resolution some weeks ago Senator Howell asked for its immediate consideration, but it was blocked by Senator Lodge of Massachusetts, majority leader of the Republican party, and a number of other conservative senators.

The resolution was referred to the rules committee of the Senate, from which it was reported back favorably. The Senate action followed. A survey of the Senate chamber will now be made by government Radio experts to ascertain the practicability of broadcasting from the Senate chamber. An estimate of the cost will be made.



NEXT IS AIRPHONE WAR, SAYS EXPERT

Norse Inventor Would Sell U. S. "Mechanical Soldier" Remote Controlled by Radio

NEW YORK.—That the next war will be fought in the air by Radio electric methods is the conviction of the Norwegian inventor Niels Aasen, who is now submitting to the United States his "mechanical soldier"—a series of underground bombs which can be controlled from a subterranean Radio transmitting set, so that they will explode at the moment when attacking troops pass over them.



FANS' VOTES TO PICK MIKE KING OF 1924

Radio Digest Gold Cup Award to Go to Most Popular

Golden Trophy Is Annual

Competition Opens at Once—Results Will Show More than Most-Liked "Voice"

Who is the world's most popular Radio announcer?

Radiophans far and wide will be given an opportunity to answer this much-debated question. With this issue is inaugurated a competition open to every broadcasting station announcer in the world, and to be decided entirely by the balloting of Radiophans in the Radio Digest First Annual Gold Cup Award.

Radio Digest, realizing that no one is so close to the invisible audience as the announcer, will endeavor to determine by an international vote who is world's champion master of Radio ceremonies. Listeners in of the United States, Canada, Mexico, Hawaii, Great Britain, in fact, of every country in the world, are invited to join in the election of the man or woman to be "king" announcer for 1924 and recipient of the Radio Digest Gold Cup Award.

(Continued on page 2)

Colorado Senator Saves Fans' Wires

Broadcast Telegram from KFAF Telling of Pledge to Oppose Proposed Radio Tax

DENVER.—That at least one Senator paid heed to the demands of Radiophans is shown by the splendid response and support of Senator Phipps of Colorado against the now defeated Radio tax of ten per cent recently proposed in the Senate.

Senator Phipps made clear his position by a telegram broadcast from Station KFAF, Western Radio Corporation, here. Unable to begin even to answer the thousands upon thousands of letters and telegrams addressed him by anxious listeners in, the Senator relied on the means most sure of reaching the invisible audience: broadcasting. His telegram also served to save further Radiophans the expense of telegraphing him, urging the removal of the tax.

Jane Burns Albert (above), soprano who recently gave a recital from Station KGW, Portland. Clarice Balas (right), solo pianist, who took part in the first program to be broadcast from the new WJAX studio on the twentieth floor of the Union Trust Building, Cleveland. This exceptionally gifted young lady is soloist for the St. Louis and the Cleveland Symphony Orchestras. Helen Abbott Byfield (left) soprano, is a frequent entertainer on the programs of the Chicago Daily News Station WMAQ.



No. 1 OFFICIAL BALLOT

Announcers' Contest

RADIO DIGEST FIRST ANNUAL GOLD CUP AWARD

Gold Cup Award Editor, Radio Digest,
510 North Dearborn St., Chicago, Ill.

Please credit this ballot as one vote for:

..... of Station
(Announcer's name) (Call letters)

Signed

Address

5-24-24 City State

If you desire, tell below in five or less words what you most like about the announcer for whom you have cast this ballot:

.....

WHO'S BEST ANNOUNCER?

(Continued from page 1)

Aims and Purpose of Award

It is believed by Radio Digest that not only will the favorite announcer be elected by this listener vote, but that the standard of quality of announcer's work, already high, will be raised even higher. From the results of the balloting will come deductions as to what characteristics are essential to the successful announcer. What holds for announcers also will be to an extent true of all other microphone speakers.

Radio Digest believes that the Annual Gold Cup Award will stimulate the development of Radio personality. Unnumbered by precedent, the announcer's contest is expected to divulge much of interest to listeners, broadcast stations, their artists and the Radio industry in general.

Announcer Stands for Station

Broadcast announcers are a big factor in the success of each and every station. No single person appearing before the microphone is so representative of what a station stands for in the minds of the Radiophans as the man who arranges and announces the program, who tells what will be broadcast next, and what station is doing the broadcasting. Many of these men and women have become known internationally because of vocal mannerisms and intonations coupled with charm of wit or philosophy.

Gold Cup to Be Annual

Radio Digest Gold Cup Award will be an annual trophy to be presented to the most popular Radio announcer in the world. Each year Radiophans will be given the opportunity to select a new "king."

The golden trophy that will be given to the victor selected by listeners' ballots in the 1924 competition is depicted on page fourteen of this issue. The design of this beautiful gold cup is based on the microphone, symbolic of the gateway to the listening world. Its dignity of line and grace of symmetry are truly worthy of the winner.

All of Family Can Vote

On page fourteen is given the regulations governing the balloting and a nomination certificate by which the Radiophan may enter his favorite announcer in the contest. On page two is the first official ballot form.

The ballot form on page two will appear for sixteen consecutive weeks. There is no limit to the number of ballots sent in by anyone. This provision is made to allow all members of the family an equal opportunity of voicing their approval of their candidate for the Radio Digest Gold Cup Award.

Why Sixteen Ballots

Some Radiophans may be undecided as to their choice. Three or four announcers may come to their mind as the most popular. In this case the sixteen ballots will afford an opportunity of splitting the vote among the three or four announcers.

The rules provide bonus votes when consecutive ballots are saved and sent in together.

The world's most popular Radio announcer will be decided entirely by the highest number of votes received.

Who May Be Nominated

Any broadcast station announcer is eligible to be nominated in the Radio Digest First Annual Gold Cup Award.

Any Radiophan anywhere is eligible to do the nominating. All that is necessary is for the Radiophan to clip, fill and send in the nomination certificate appearing on page fourteen.

Every listener in has one or more well-liked announcers in mind. But internationally the question of popularity has never before been decided. Radio Digest believes the invisible audience will welcome this opportunity to express their collective applause of their favorites.

Be sure to read carefully the rules on page fourteen and the ballot on this page.

Reveal Origin of Mothers' Day Through Station WJZ

NEW YORK.—Where, when and how Mothers' Day originated, and how it came to be a national institution, was a particularly interesting story Station WJZ told recently in commemoration of that day.

Don't rush the construction of a set by making poor connections and using no solder, and then blame the originator of the circuit if it fails to come up to your expectations.

Advance Amateurs' Time One Hour for Operating

Gives Broadcast Listeners Chance to Hear without Interruption

WASHINGTON, D. C.—Broadcast listeners throughout the country will be glad to know that the time for evening amateur transmission has been moved forward an hour during the period of "daylight saving," by a new order of the Department of Commerce.

The nine district supervisors of Radio have been instructed to advise all general, restricted and special amateurs that they are required to observe a silent period from 7:00 p. m. to 10:30 p. m. local standard time, or from 8:00 p. m. to 11:30 p. m. daylight saving time, and on Sundays during church services, from May 1 until October 1, 1924. Copies of the above order will be sent to all licensed amateurs by the district supervisors of the department as soon as they are received.

The above order was not issued by the department until the approval of the American Radio Relay league was received. Credit is reflected on that organization for its offer to co-operate with the department in the effort to prevent a repetition of the confusion and increased complaints of last year following the adoption of daylight saving time in many sections of the country.

Civil Service Holds Quiz to Fill Inspector Vacancy

WASHINGTON, D. C.—The United States Civil Service Commission has announced that it would hold an examination on May 21 for Radio inspector, Signal Service at large, at an annual salary of \$2,400.

HOOVER WILL CALL NEW RULES CONFAB

NEED ONE REGARDLESS OF LEGISLATION, BELIEF

Will Consider Wave Re-allocation of and Time Division to Clear Tangled Ether

By Carl H. Butman

WASHINGTON.—Secretary of Commerce Hoover will call a general Radio conference in Washington soon after the adjournment of Congress in an effort to secure cooperation of all Radio interests in clearing up the ether and solving the problem of distributing wave lengths. A conference will be called whether or not new legislation is enacted.

The conference will be similar to those in the springs of 1922 and 1923, at which representatives of the manufacturers, broadcasters, engineers, amateurs, commercial operators, and broadcast listeners aided in drawing up voluntary regulations under which Radio has been supervised ever since.

Present indications are that broadcasting stations will continue to increase, although wave lengths available for this use are practically exhausted and stations are doubling up. Even time allotments in congested sections are becoming difficult to make.

Secretary Hoover believes congested conditions and interference are getting worse. If present conditions continue, he is unable to see how we could operate five years from now, and as a consequence he intends taking advantage of such suggestions from representatives of the allied Radio art and industry as may be made.

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Looking Ahead

Installing a Radio Set in Your Dodge and further details of the automobile type of set, will be told by H. J. Marx in the next issue. This series will continue to cover all the popular makes of cars.

Details of the Singing and Talking Suitcase will complete S. R. Winters' article upon the construction of a novel portable receiving set for the outdoorsman. The circuit used and directions for the assembly will be given.

What Radio Shorthand Means is the title of the next article by P. E. Edelman who will describe just what all the little figures in various circuits signify. Did you ever think of the symbols as Radio stenography?

A Combination Radio Frequency and Regeneration Circuit by Brainard Foote, a popular eastern writer will start soon. Don't miss it.

Picked Your Favorite Announcer? Remember the balloting begins this week and continues for sixteen issues. Who do you want to get the Radio Digest First Annual Gold Cup Award?

Take Radio Digest with You on Your Vacation

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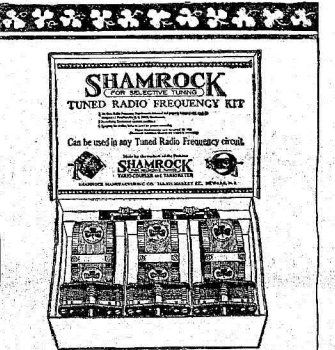


Chart the air with SHAMROCKS

How one fan did it

"SOME broadcast listeners grope in the dark not knowing what is coming. Others have their entertainment thrust upon them. But I can get Cuba, Montreal and other outlying stations—from my chart which I have made with my Shamrock set. And my chart is as accurate as a ship's log—I know exactly where to get every station."

Anybody can build this set with the Shamrock kit. It gives you 3000 mile reception on a loud speaker—and permits you to log every station. The kit contains two Shamrock balancing condensers—and three Shamrock air core transformers, mounted and properly balanced on U. S. Tool condensers, made expressly for Shamrock.

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Kit, list price \$20

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Gentlemen: Send me detailed information on the Shamrock Kit.

Name

Address

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LANGUAGE GROWING BECAUSE OF RADIO

MANY NEW WORDS ADDED DURING PAST YEAR

Lexicographer Claims Our Speech Has Been Enriched as a Result of Broadcasting

NEW YORK.—Nearly 5,000 new words have been added to the English language by the advent of radio, declares Dr. Frank H. Vizetelly, lexicographer of many years' standing. To be exact, the eminent authority states that 4,998 words, from "heterodyne" to "variocoupler," equally scientific and usually of Latin derivation, are used by laymen generally as a result of the influence of Radiophone broadcasting.

"Radio has not only precipitated the exchange of ideas," Dr. Vizetelly said, "but it also has enriched our very speech with a vocabulary indispensable to those that would understand mechanism."

War Added Many Words

"The English language has been growing at the rate of 5,000 words a year. Certain years the increase is less. Other years it grows with leaps and bounds as a direct result of some world event, like Radio, or the war.

"The war gave rise to approximately 6,000 new words. These were not merely military. They added to the chemical, political and social vocabularies as well.

"Every season brings in new styles, colors and trade marks. The number of actual new words each season—well, their name is legion. There are many that are coined and thrown away forty-eight hours afterward.

"We collect all the new words and then have to wait for the public to judge it. Once the public has put its stamp on a word, and its usage, even misusage, we put it into the dictionary."

Station WGY Wins First Place, Say Bostonians

Programs Excellent, Splendid Volume, Very Little Fading

BOSTON.—During a canvass of Radio listeners throughout the state of Massachusetts for the purpose of ascertaining the favorite broadcast station of the Radiophans it was found that first honors go to Station WGY of Schenectady, while the local standby, WNAC, runs second.

From this it is taken that the Bay Staters as a whole depend upon WGY for their evening's entertainment. In a city picked at random by the investigators, WGY received fully eighty per cent of the popular votes because of the fact that the programs were excellent and the volume splendid.

DEALER'S SUPER-HET LOCATES NOISY LINES

Red Bank, N. J. Fans Learn Source of Interference

RED BANK, N. J.—Local fans had just ceased complaining about the amount of static mixing up with their reception when "a worse calamity befell them." Even WEAJ, the rarest powerful station, could not be had through an interference which puzzled everyone for a time, then the trouble-maker was found and corrected.

J. C. Gregory, local Radio dealer, placed a super-heterodyne in his auto and started out to locate the offender. He soon found that the wires in a steel light pole on the main street were responsible for it all—poor insulation, the repairing of which brought peace to the regular listeners-in.

"Don't, if you expect to get best results, charge your A battery at the same time you are listening in.

GIFT OF PEANUTS TO BAND; PUT ON MIKE

DAVENPORT, IA.—One evening not long ago an orchestra playing from Station WOC here, found a basket of roasted peanuts waiting for them as an appreciation from a Davenport grocer. So that everyone would have the benefit of the peanuts, several were cracked before the microphone. Reports came from coast to coast, and from Texas to Canada, that the peanuts sounded very good.

BUGGY BUG LECTURE FOR WJY RADIO BUGS

NEW YORK.—Radio bugs and others listened to a talk given here recently by Dr. Frank E. Lutz of the Museum of Natural History on the subject of bugs. He told why it was that a "cootie" stuck closer than a brother, describing their quaint customs and manners, as well as their outstanding business methods and religious rites. An itchy time was had by all.

LISTENING IN FOR HER DADDY



Little Helen Marie Ludgate is listening in for her daddy who is an operator at Station KSD. Although only two years of age, she is an ardent Radiophan and listens in every night, especially when her dad's station is on the air. I wonder what is on now to make her smile?

Marconi Gets Concessions

WASHINGTON, D. C.—Control of Radio broadcasting in Portugal is being sought by the British Marconi company, which has obtained a concession from Portugal

to operate broadcast stations. Reports reaching the Department of Commerce also state that this company is already active in Spain, and Radio interest at Lisbon is growing rapidly.

CINCINNATI SUMMER OPERAS NOW ON AIR

SEASON OPENING JUNE 23 CONTINUES TO AUGUST

Cincinnati Zoological Park Association to Give Shut-Ins Opportunity to Enjoy Performances

CINCINNATI.—Operas to be given this summer at the Cincinnati Zoo will be broadcast, beginning June 23, through WLW, the Crosley Radio Corporation station here, each Monday evening during the season. The Radio audience will hear the operas through the courtesy of the Cincinnati Zoological Park Association, which hopes to give the shut-ins an opportunity to enjoy the performances, which are attended by thousands every summer.

Although no definite schedule has been arranged, the operas to be given will include the first presentation here of Donizetti's "The Elixir of Love"; while "Martha," "Lakme," "Manon," "Barber of Seville," "Rigoletto," "Meistersingers," "Lohengrin," and two by Puccini, are the old stand-bys.

Artists Who Will Sing

They will be directed by Ralph Lyford. William Kopp will lead the large orchestra, composed of players from the Cincinnati Symphony Orchestra.

The principal artists will be Edith deLys, dramatic soprano; Josephine Luchese, coloratura soprano; Stella deMette, mezzo-soprano; Anita Klinova, mezzo-soprano; Regilio Baldrich, lyric tenor; Ludovico Tomarechio, dramatic tenor; Murio Valle, baritone; Millo Picco, baritone; Italo Paochi, basso; Natale Cervi, basso-buffo. A fine chorus will augment the soloists.

It is also possible that some of the band music and other features which precede and follow the opera season will be broadcast through Station WLW.

Premiere of Play Goes on KYW Before Stage

Innovation Presented in Opening of Comedy "Easy Street"

CHICAGO.—An innovation in the premiere of a theatrical performance was given Radiophans tuning in Westinghouse Station KYW recently when the new play, "Easy Street" broadcast its first public presentation prior to the opening of the play at the Playhouse theater here.

"First nighters" were not limited by this procedure except by the qualification that a receiving set was required. Ralph Thomas Kettering, of Chicago, author of the play, introduced the players to the invisible audience.

The innovation of a Radio opening night is said to have had its reflection in a completely sold out house for the actual opening of the comedy at the Playhouse.

WGY PLAYERS ON WJZ VIA CONNECTING WIRES

First Time Schenectady Program Goes on New York

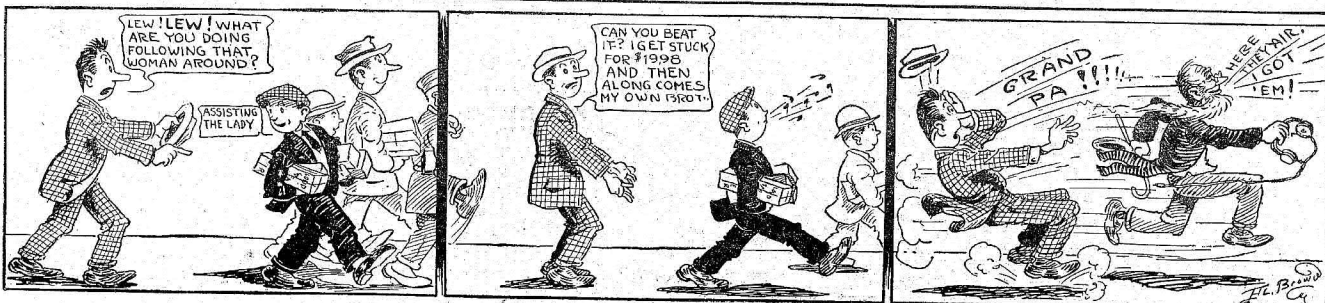
NEW YORK.—The nationally famous "WGY Players" were heard for the first time through Station WJZ here recently, when the drama "Billeted" was simultaneously broadcast by the two stations.

The direct-wire connection between Station WJZ, Radio Corporation of America in New York, and Station WGY, General Electric Company in Schenectady, has linked the two stations many times during the past season for the joint broadcasting of major events occurring in New York, but the recent presentation of the famous Radio dramatists through both stations was the first instance where the proceeding has been reversed and the New York station has rebroadcast a program sent from Schenectady.

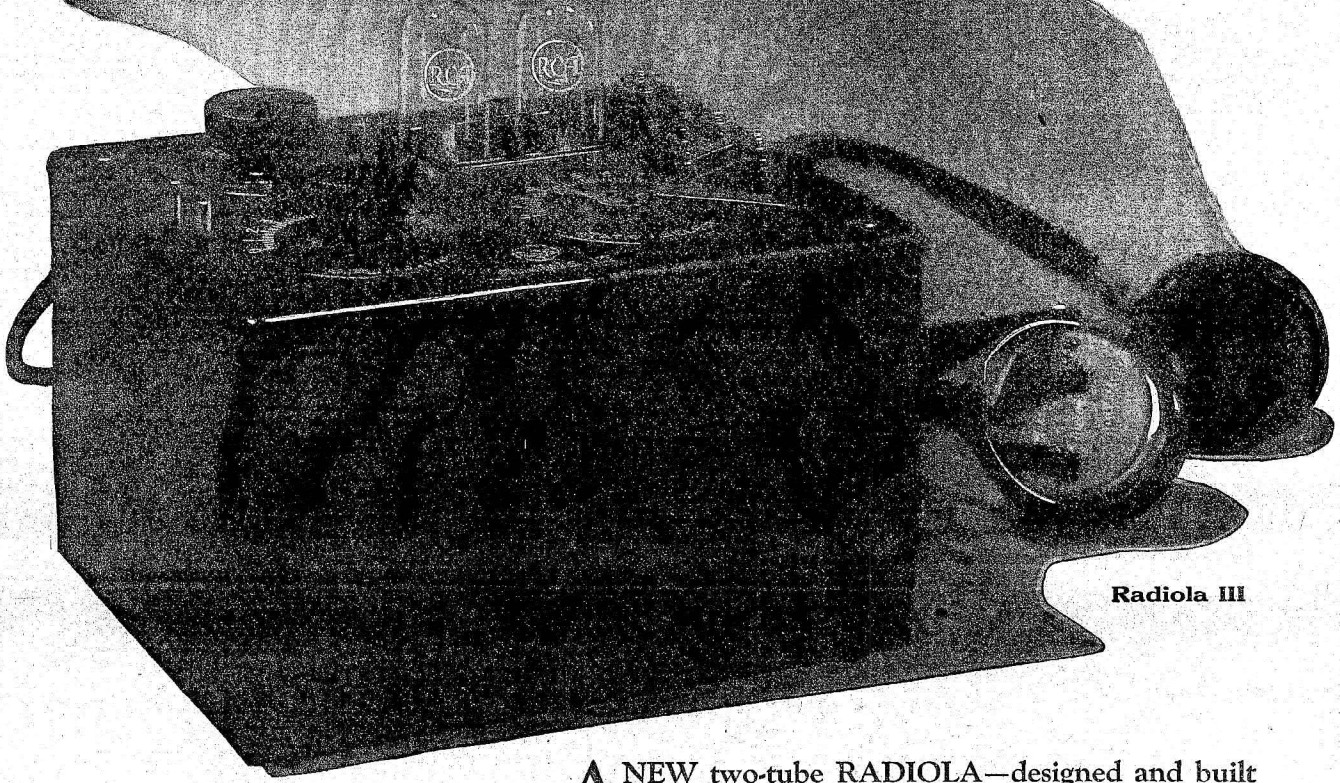
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Or Buy Complete

RADIOLA III-A, the amplifier combined with Radiola III in one cabinet; with four Radiotrons WD-11, head telephones and Radiola Loudspeaker \$100

Operates on Dry Batteries

There are many Radiolas at many prices. Send for the free booklet that describes them all.

A NEW two-tube RADIOLA—designed and built by world-famed engineers in the great RCA laboratories—priced at less than you could build it for at home! A real RADIOLA—including the tubes and the headphones. A new model. Improved in sensitivity and selectivity. Getting distance on the headphones, and near stations on a loudspeaker. Receiving clearly—reproducing truthfully. Its thirty-five dollar price means at last that every home everywhere can tune in on the fun with a small receiver built for big performance.

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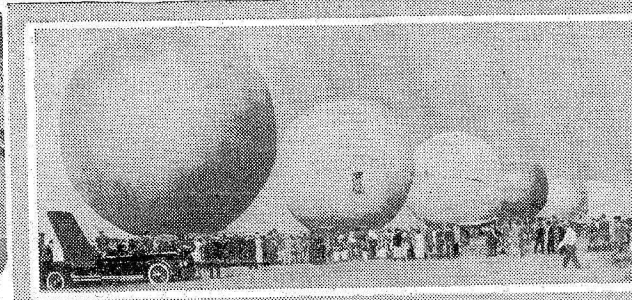
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WINS BALLOON RACE AIDED BY RADIO



Mrs. Van Orman, wife of the pilot spoke to her husband from WTAM, Cleveland. He received her message while traveling northward over Oklahoma.



Ready for the hop-off. Van Orman's balloon, Goodyear III, in the foreground. It landed at Rochester, Minn., covering a distance of 1100 miles from the starting point. Photo at the right shows Ward T. Van Orman, pilot of the Goodyear III, tuning in before the ascent at Kelly Field.



Weather Reports Help Goodyear III

Winning Pilot Thanks Broadcast Stations Much for Success—Music Helps Break Monotony

By H. G. Wilson

FOR the first time in the history of free ballooning, Radio reception proved its value to pilots high in the air and drifting with the winds.

Ward T. Van Orman, pilot of the Goodyear III, winning entry in the National Elimination Balloon race, April 25, says that Radio played an important part in the victory of the Goodyear III over seven contestants for first honors.

Van Orman, veteran pilot of five national and two international races, and C. E. Wollam, his aide, who has spent thousands of hours in the air, flying both lighter and heavier-than-air craft, said that Radio added a new thrill to balloon racing besides keeping them in touch with advantageous weather currents and giving them the positions of the other contestants.

Receiving Set Designed by Pilot

The receiving set of the Goodyear III weighs exactly nineteen pounds. It is all contained in a cabinet less than a foot high and eight inches square. Van Orman tested the outfit which he himself built, over a period of six months.

DRY LAW HITS HIS TRADE, SAYS SOUSA

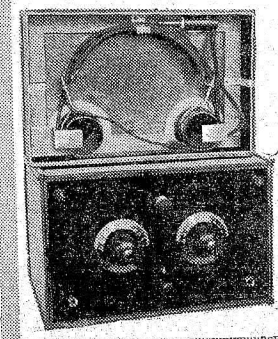
John Takes Crack at Volstead and Dill Bill for American Society When Heard Before Committee

WASHINGTON, D. C.—In a declaration before the House patents committee here recently, John Philip Sousa stated that the eighteenth amendment had sent the light opera industry to the "bow-wows."

Upon being questioned, was that people wanted the old time drinking songs, but the inspiration to the writers of said songs was lacking.

No longer do the trumpeter and the fellow who works the slide trombone look with longing eyes at a glass of ancient amber fluid, thinking that after the song they could go out and quaff a tank or two.

Mr. Herbert said sales of sheet music was decreasing at an alarming rate. He also said the poor "renders" of such music at present was getting on the nerves of the people.



Van Orman's set was made by himself. It enabled him to get weather reports which were of advantage in winning the race.

to get the results he was after. The set is a four-tube dry cell outfit, the last two of which are reflexed back upon themselves, giving the volume output of six tubes. The antenna system used on the balloon consisted of two wires, each 200 feet long, suspended half-way up the sides of the balloon and opposite each other. The two wires were fifty-three feet apart, the diameter of the balloon envelope.

Because the balloon had no ground contact, use of this type of antenna system was necessitated, one of the wires acting as a counterpoise, and the other serving as aerial.

Sixteen stations, including Los Angeles, Springfield, Mass., Chicago and Davenport, the stations farthest away from the start of the race at Kelly Field, San Antonio, were picked up. Reception from every station was both clear and strong—stronger than with sets that are on the ground, Van Orman said. The stations were heard at levels varying from 2,000 to 10,000 feet.

Weather Reports Aid to Navigation

By means of the frequent weather reports broadcast from stations all over the country, Van Orman was able to pilot the Goodyear III into air currents that carried him around or over storm areas and helped him select the most favorable winds both for direction and for speed. The Radio receiving set also served a purpose in detecting storm areas and giving advance information about both snow and thunderstorms by picking up the static generated.

Programs broadcast during the flight from WTAM, Cleveland, under the auspices of the Goodyear Radio club, were distinctly heard by the pilots who were traveling at that time over Oklahoma at an elevation of about 2,000 feet. During the evening, Mrs. Van Orman, wife of the pilot, spoke to her husband through the microphone, and Goodyear company officials also sent greetings to the balloonists. Every station that was broadcasting reports or messages to the balloonists at specified times was distinctly received.

Locate Other Balloons by Broadcasting

A coincidence of the trip came while the balloons were passing over Kansas City low enough to have been seen. R. S. Herman, manager of The Goodyear Tire & Rubber Co. branch in that city was speaking over the microphone at WHB and sending his regards to the balloonists. This Radio contact from WHB gave the Goodyear III men information about the landings made by two contestants in the

race and the positions of the others as observed at other points.

"In the old days of ballooning," said Van Orman, "when the balloon was going along at a good rate of speed and there was nothing particular to do for the moment, a fellow got pretty lonesome and fell to wondering what the folks on the earth were doing. But now, with Radio contact with any number of points on the ground, not only the portion directly above the balloon's course, but the old home town as well, the pilot's morale is buoyed up to a considerable extent.

"We give Radio a good share of the credit in the winning of this race," he continued. "Knowing about the conditions ahead and being able to figure out a course in advance was a decided advantage."

Balloon Acts as Loop Aerial

Among the Radio observations made by the Goodyear III pilot were the directional features of his antenna system. He discovered that, when the plane of the

wires, which hung from the opposite sides of the balloon was perpendicular to the direction in which the sending station was located, the receptive properties were at the maximum, while the swinging of the balloon into another position diminished the set's receptibility. Checks of this were made with the craft's compass so that the pilots found this to be an invariable rule.

Van Orman and his aide, Wollam, as winners of the American contest this year, are placed as entries in the International Free Balloon Race to be held in Brussels, Belgium, in June. They will sail for Europe on May 28.

Following are the stations which Van Orman and Wollam heard.

WOAL, San Antonio; WHAZ, Troy, N. Y.; WDAP, Chicago; WFAA, Dallas; WOC, Davenport; KHJ, Los Angeles; WTAM, Cleveland; KDKA, Pittsburgh; KSD, St. Louis; WBZ, Springfield; WHN, Akron (code); WNC, Memphis; WGY, Schenectady; WJAX, Cleveland; WHB, Kansas City.

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Additional Bound Volumes at \$2.00 each.

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Today is Your Radio Day

DEALERS BROADCAST TO SELL EQUIPMENT

ORGANIZATION FORMED TO BENEFIT PEOPLE

Keep Stores Open Evenings so that Prospective Purchasers Can Have Demonstration

BUFFALO, N. Y.—“Open Evenings” signs on the business places of some of the Radio dealers of Buffalo have incidentally done the broadcast listeners of the vicinity considerable good.

It all came about this way:

There was a time in the good old, bad old days when Radio parts and equipment could be sold because of the novelty of the thing. But gradually things changed and the public began to demand to be shown concerning the capabilities of Radio apparatus. Now, everyone knows that it is rather difficult to show off Radio equipment if there is little or nothing on the air.

Moreover, the Radio dealer in the outlying sections of the city was getting a lot of business because he saw fit to keep his shop open evenings. In fact, if the truth was known, that is practically the only way some of these people could “make a go of it.”

Dealers Put On Paid Talent

The result of this was for the bigger dealers to start something in order to land more business. So they formed the Radio Dealers' Association of Western New York, composed of about seventy-five members. Someone conceived the bright idea of putting on programs from Station WGR in the afternoons and giving them a real chance to demonstrate their wares.

To the credit of the Radio dealers it may be said that from the first the programs which they put on have been of a high-grade nature and the people have benefited thereby. The programs run from 2:30 to 4:00 every afternoon except Sunday. Only paid talent is used, and a program director, A. J. Brisman, spends his entire time arranging programs. The programs are a hit. Incidentally, they sell Radio equipment.

DAILY FINANCIAL DATA ARE VACATIONISTS' AID

New Service by WJZ Is Valuable Summer Feature

NEW YORK—Starting recently, Station WJZ here began broadcasting a daily financial summary feature of particular appeal to business men throughout the country.

The summary, which bears the title, “The Day's Financial Developments,” is compiled by the financial specialists of the Dow and Jones company, and gives Radio listeners the closing stock market, exchanges, money, and cotton quotations, the standardized Dow and Jones Averages, and a brief digest of the important occurrences on “the Street.”

The service, is particularly suited to summertime Radio as it enables men to whom happenings of the financial world are of first importance, to keep in close contact with the movements of the market even though they be far removed from the city. The service is broadcast from 7:20 to 7:30 p. m., Eastern daylight saving time, every night except Saturday and Sunday.

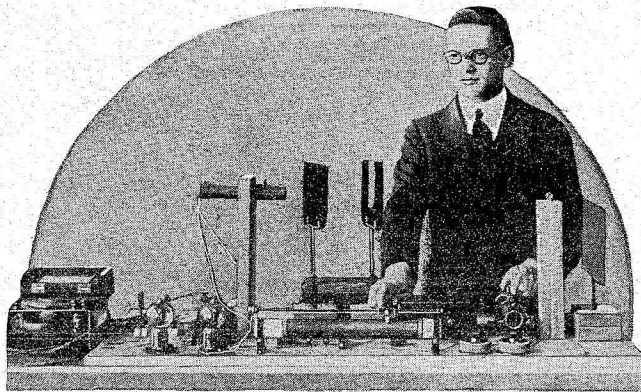
Church Attendance Not Hurt by Broadcasting

CKY Check Shows Even More People at Worship

WINNIPEG, MAN.—CKY, here, was the first station in Canada to broadcast a service from a church and claims the record in the number of services broadcast from various Canadian churches to date. Over twenty churches of the principal denominations are connected with CKY by special wire and a service is broadcast from a different one each Sunday evening.

Often two services in a day are broadcast, and occasionally three. If Radio adversely affects church attendance, as it has been claimed to do, Winnipeg churches should be suffering more than those in any Canadian city. According to local newspapers, however, church attendance on a recent Sunday exceeded that of any previous year. Churches of all denominations were crowded to the doors on the Sunday in question. Certainly it has been demonstrated in Winnipeg that the churches have nothing to fear in broadcasting their services.

PREDICTS VISION USING RADIO



Prof. Arthur C. Hardy, of the Massachusetts Institute of Technology, Boston, who recently predicted to a large audience of engineers that movies would soon be sent by Radio, is here seen with a small working example of what the future machine will be based on.

French Like KFKX Plan

PARIS.—Suggestions are being advanced at the moment in France to organize a system of broadcasting stations to

carry the Paris programs clearly over the entire country. The system would resemble somewhat the plan of the American relay station at Hastings, Neb.

RADIO RECEPTION SIMPLIFIED TO SINGLE CONTROL DIAL

It Is an Easy Matter for Any Member of the Family to Operate a Set Like This

BRISTOL

Single Control Radio Receiver Using Grimes Inverse Duplex System Patents Pending

A good illustration of the absolute simplicity is the fact that a set is installed in the home of a blind woman who operates it herself, and is able to bring in station after station at her will.

Powerful enough to get long distance reception. It is a four-tube set using Grimes Inverse Duplex System, which makes it equal to six tubes because the first two tubes are utilized for both Radio and Audio Amplification.

Non reradiating—will not disturb your neighbors' reception when you tune in. Many refinements including panel with telephone jacks on the back of the case for making connections.

Used with aerial or loop, and in some locations short inside antenna will give good results. When aerial and loop are both provided, it is only necessary to operate a lever to change from one to the other. The case is solid mahogany finished with walnut stain. It is handsome in appearance and at the same time provides a rugged protection for the working parts.

Price of Bristol Single Control Radio Receiver without accessories, \$190.00
Bristol Audiophone Loud Speakers, made in three models:

Senior	\$30.00
Junior	22.50
Baby	12.50

The most recent development in these models is the Fiber Horn with which the Baby Audiophone is now furnished. Write for Bulletins Nos. 3013 and AY-3015.

THE BRISTOL COMPANY
WATERBURY, CONNECTICUT

BUFFALO FLAT HAS SETS FOR TENANTS

“Cliff-Dwellers” De Luxe Get Six-Tube Sets with Their Rent

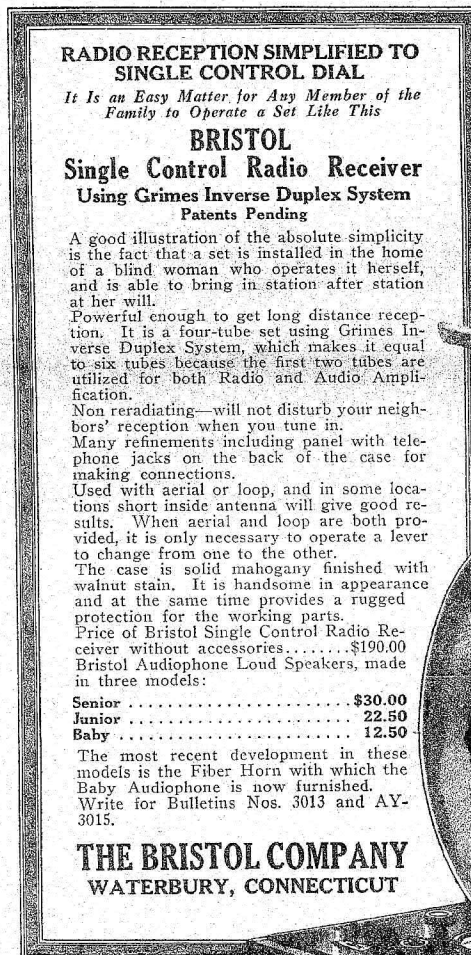
BUFFALO, N. Y.—The modern apartment house! Cliff-dwelling, de luxe! It isn't de luxe any more unless it is Radio equipped.

By Radio equipped is meant just that; individual equipment for each apartment. It is that sort of equipment which has been installed in Buffalo in the recently completed exclusive North Court apartments.

There are twelve six-tube Radio sets and twelve separate concealed aeriels. Each set is incased in a special mahogany cabinet which also contains the A and B batteries and recharging equipment. Several tests were made before the installation was made and the set manufacturer has made a guarantee to the installing firm that there will be no interference between the sets.

The experiment was tried one night of placing two of the sets side by side and running aeriels to opposite ends of the building. On one receiving set they tuned in WDAP, Chicago, and on the other, WHAS, Louisville, without the slightest trace of interference. At the same time WGR, Buffalo, was putting a concert on the air but there was no interference from that in any way.

It is estimated roughly that \$175,000,000 was spent during 1933 by Radiophans for sets and accessories, including batteries.



BEFORE THEY THOUGHT OF "MIKES"



This is one of the greatest announcers (in size, at least) in the middle west. He is worshiped by thousands of children.



Fred Smith (right) announcer at Station WLW, Cincinnati. Eugene S. Goebel (below), one of the announcers at W D A R, Philadelphia, was the youngster shown last week, sitting in the late model automobile.



This youngster, hardly able to walk is now announcer at Station W—, owned and operated by a large newspaper.



Eugene S. Goebel, W D A R
THE middle initial stands for Shallcross; just what he shall cross we don't know—but he shall. Born in the quiet old Quaker city of Philadelphia, in 1902, he had a fine start for a Radio man.
 From 1902 until he was sixteen he did about everything that any other kid would do, then he decided to become a Radio operator on a merchant ship. As a result, he spent about two-and-one-half years cruising around the world, visiting among other places the bund at Yokohama, Iceland, Mexico and all points east.
 After listening to a recruiting officer for about an hour, he was strong for

joining the Navy during the war, so that he could pick up German SOS signals, but the powers that be ruled him out as too young, so he spent his time teaching the sea-going gobs around Boston the way to "pound brass."
 Among other things Mr. Goebel possesses a fine baritone voice. It is reported that during a typhoon in the China Sea the captain of the ship he was on asked him to come out on deck one morning to sing to the wayes.
 He is credited with being the originator of dual broadcasting via telephone, that is, the singing voice of a person in one outlying place is joined to the accompaniment of music from another.

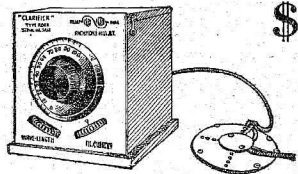
Fred Smith, WLW
YES, it WAS Fred Smith; the chubby-faced youngster who founded his baby talk vocabulary on the word "good-night"; to hear him repeat it night after night, thousands of Radiophans remain tuned in to WLW till he signs off.
 To some, perhaps, Smith's "good-night" may sound different now, for he went off and got married the other day after he had assured the girls that he wouldn't do anything of the kind.
 At the age of 21 he was the victim of a nervous breakdown resulting from overstudy. Impaired sight, almost to the degree of blindness, followed his recovery, and he set out for a tour of Europe. He spent five years in Spain and three years in France, Belgium, Holland, Germany and England.
 When America entered the war, Smith went to Paris and offered his services to his native country. Because of his

knowledge of Spanish he was sent back to Barcelona and placed in charge of transportation for the purchasing department.
 Before leaving Germany at the close of the war he submitted to an eye operation and his vision was restored to normal, practically. Upon his return to America he started out for a Radio career by producing the first Radario, a short play designed especially for Radio production. Up to the time of going to press Smith had not told when that baby picture was taken out in California.



The GREBE CLARIFIER

THE first practical, workable solution of the problem of radiation from regenerative receivers. Unlike the "wave-trap" it increases signal intensity.



\$30

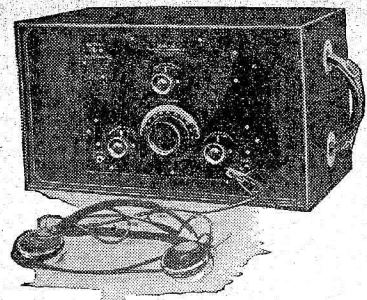
- Increases Selectivity
- Increases Signal Intensity
- Improves Quality
- Prevents Radiation

And—
Is Easily Connected

Ask your dealer or write for literature

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

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



Federal No. 102 Special Set is "CONVERTIBLE"

"CONVERTIBLE" is the only word that even nearly describes the Federal No. 102 Special Receiver. It is a complete "portable" set, with dry batteries, head phones, etc., ready for immediate camp or road use,—PLUS the capacity for quick and easy changing to wet battery for city or country "home" use. True to Federal Standards, the No. 102 Special incorporates exceptional tone beauty, selectivity and distance range. Federal flexibility pervades throughout,—the No. 102 Special will operate perfectly on any tube interchangeably.

Ask any Federal dealer for a demonstration of the Federal No. 102 Special Set

FEDERAL TELEPHONE & TELEGRAPH CO.
Buffalo, N. Y.



Federal

Standard RADIO Products

Boston, New York, Philadelphia, Chicago, Pittsburgh
San Francisco, Bridgeburg, Canada, London, England



Look for this sign



WGY EXPERIMENTAL STATION PROPOSED

RESEARCH WORK REQUIRES LARGER QUARTERS

General Electric Company Will Erect Special New Structure to Improve Broadcast Transmission

SCHENECTADY.—A large new experimental station will be built here shortly by the General Electric company for use in the research of Radio phenomena. It will be located on land recently acquired by the company and will cost approximately \$150,000 to construct.

While no plans have been drawn for the new experimental station, it is understood the General Electric company will build a powerhouse capable of delivering higher power at various frequencies, and antenna structures will be erected for a wide range of wave lengths so that systematic investigation can be made of the advantages of various wave lengths in solving the many problems with which Radio now has to deal.

Present Space Limited

The requirements of the present-day broadcast program, including stock reports at noon, an afternoon program for those at home, evening stock and market quotations, weather reports, musical programs, plays, and religious services, have filled up the available time. It has also

RELEASES OFFICIAL STATEMENT



H. B. Thayer, president of the American Telephone and Telegraph company, when interviewed recently relative to Radio broadcasting, said: "We intend to develop Radio transmission and in connection with that development, we shall continue to broadcast. But, until regulations have been established we shall not encourage the multiplication of broadcast stations." ©United

been found that the space available in the power house and operating section of the big broadcasting station is not sufficient to permit experimental work without interfering with the regular programs. On this account a new station was considered necessary for experimental work.

The broadcast station now known the world over as WGY was originally built several years ago for experimental purposes. Operating under the experimental license 2XI, it had conducted various Radio experiments and added materially to the fund of available knowledge. It

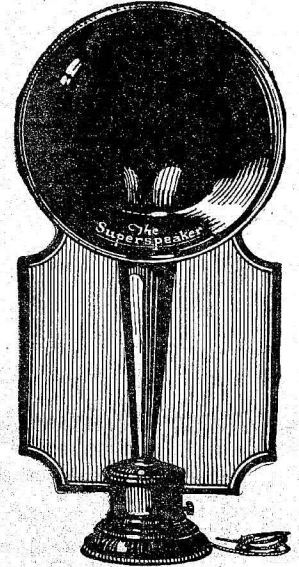
Booksellers See Sales Aided by Broadcasting

Hoxie Neale Fairchild Addresses Book Men at Convention

NEW YORK.—"Broadcasting Books," was the subject of a talk by Hoxie Neale Fairchild, lecturer of English at Columbia University, at the recent convention of the American Booksellers association here.

Mr. Fairchild has been broadcasting Browning for some time, and said that he has found that his Radio talks have resulted in countless and immediate sales. The booksellers feel with Mr. Fairchild that broadcasting books increase sales.

is known by those familiar with the workings of the station that the regular programs have been broadcast for many months at two wave lengths—the regular wave length of 330 meters available to those using standard receiving outfits and also a lower wave length of 107 meters, well adapted to rebroadcasting.



GIVE YOUR SET A REAL CHANCE

to show the tone and volume it can develop with this sensationally successful, long range reproducer! Exclusive micrometer adjustment means more stations, better values, real music. No extra batteries or coils—natural reproduction.

Superspeaker

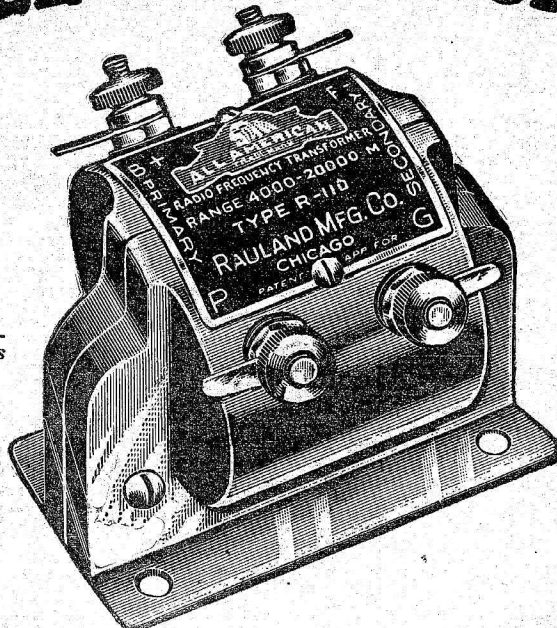
Costs no more than others but yields results that can't be equalled—As fine in appearance as in performance—A big, substantial, well finished musical instrument—any dealer can be proud to stand back of it.

JEWETT RADIO & PHONOGRAPH COMPANY
5660 Twelfth Street
DETROIT MICHIGAN

For Super-Heterodyne!



ALL-AMERICAN



At all stores

Six Dollars

THE MASTERPIECE OF AMPLIFICATION

Especially vital to success in Super-Heterodyne, Ultradyn and all straight radio frequency and reflex circuits is distortionless and yet powerful amplification of weak signals. This problem has been incomparably mastered in All-American Long Wave Radio Frequency Transformers, as the most exhaustive and all inclusive tests have shown. Not only are these latest All-Americans supreme value

at around six dollars. They are the best long wave transformers that can be purchased at any price! Watch for the new All-American Low Wave Radio Frequency Transformers.

RAULAND MFG. CO.
2648 COYNE STREET, CHICAGO
Pioneers in the Industry

COURT GIVES DE FOREST RIGHTS

JUSTICE SAYS PRIORITY NOT ARMSTRONG'S

"Father of Radio" Comes into Own Finally After Seven Years' Battle

Decision Revolutionary

(By Special Correspondence)

NEW YORK.—"It took seven years, but truths and justice have triumphed at last." Such was the brief reply of Dr. Lee De Forest to the inquiry of your reporter who had asked the famous inventor what it felt like to be entitled to legal priority as the inventor of the audion or regeneration as a means of producing sustained electrical oscillations in radio reception and transmission or otherwise. The doctor, truly father of broadcasting, was delivering a Radio lecture before the student body of his Alma Mater, Yale, when he was informed of the court's decision favoring him.

Takes Victory Quietly

Elated, but quiet withal, Dr. De Forest, whose hair is now white from his years of experimenting and litigations seeking to defend his rights, told of the important legal victory and his future plans.

The far-reaching decision, so important to the Radio Industry, was that made May 5, by Justice Van Orsdel of the District of Columbia Court of Appeals. In it Dr. De Forest was declared entitled to priority as inventor of regeneration in transmitting and receiving and the oscillating audion.

Major Edwin H. Armstrong was declared to have conceived regeneration several months after Dr. De Forest had actually put the principle into practice as vouchsafed by documentary evidence.

Strips Armstrong of Glory

The opinion of the appellate court reverses the finding of the commissioner of patents, who had awarded priority to Edwin H. Armstrong. Claims to be the inventor had also been made by Dr. Alexander Meissner of Germany and Irving Langmuir.

In reaching the decision Justice Van Orsdel said that using by one of fact merely as to whether Dr. Forest, who admittedly first conceived the idea, had not abandoned it after reducing it to practice.

As neither Meissner nor Langmuir could go back as far as October, 1912, when Armstrong evinced to have conceived regeneration, the two were eliminated by leaving the question merely between Dr. De Forest and Armstrong. The eminent doctor had reduced his invention to practice in August, 1912, and testimony failed to disclose that he abandoned it, Justice Van Orsdel found.

Counts De Forest's Suit Included

The case which brought forth the final decision from the court of appeals, was brought by Dr. De Forest, Langmuir and Meissner from the decision of the commissioner of patents, which had awarded priority to the invention to Armstrong. There were also appeals by De Forest against Meissner and Langmuir jointly, and against Langmuir individually on the following counts:

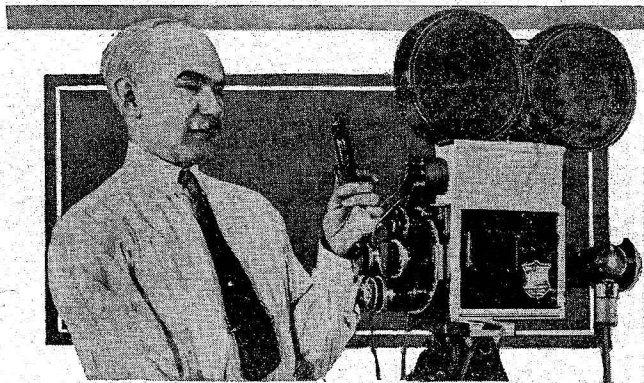
- 1.—Means for producing sustained electrical oscillations comprising an oscillatory circuit having two electrodes in an exhausted receptacle, and a second circuit coupled thereto having a conducting body interposed between the electrodes.
- 2.—Means for producing sustained electrical oscillations comprising an oscillatory circuit having two electrodes, a second circuit coupled thereto having a conducting body interposed between the electrodes, and means for varying the frequency of the produced oscillations.
- 3.—The method of producing electrical alternating currents which consists in causing currents to flow in one of two coupled circuits and varying the flow of current in the first circuit by impressing the potential induced in the second circuit upon a conducting body interposed between two electrodes in the first circuit."

Basis of Revolutionary Decision

"De Forest was the inventor of the epoch-making invention, the audion, which he patented both as an amplifier and a detector," the decision stated. "Prior to 1912, he had devoted much of his time to experiments on the audion, and to the various uses to which it might be put. At the time he discovered the oscillating audion, he was investigating telegraphone recording, the telephone two-way repeater and the amplifier for radio work.

"It appears from his note book records

TRUE INVENTOR OF REGENERATION



Dr. Lee De Forest, often known as "Father of Radio," inventor of the vacuum tube in use by millions of Radiophans today, was recently awarded legal priority as and declared to be the true inventor of regeneration in Radio receiving and transmitting. The patent, now held by Major E. H. Armstrong, will be set aside, it is believed. Dr. De Forest is here shown with one of his first and latest inventions, the tube and the phonofilm respectively. ©Photograms Photo

that the first discovery of the feedback circuit occurred in connection with his work on the amplifier. There is some testimony that prior to August, 1912, the oscillating properties of the audion were discovered by De Forest. It is unnecessary, however, to go beyond the written records of August 6, 1912. This record, with the accompanying drawing, clearly shows a feed-back circuit.

De Forest Undeniably the Inventor

"It is generally conceded, indeed it must be, that this drawing and the notes, not only disclosed the invention, but disclosed it in a clear, workable manner. It matters little whether the case be disposed of upon the theory that what was done in August, 1912, amounted to reduction to practice or merely conception of the invention. In either event De Forest must prevail.

"The decisions of the commissioner of patents are reversed and priority awarded to De Forest."

"While no information is available at this time, an appeal to the decision of the court of appeals by the Radio Corporation of America or allied interests is believed

inevitable. However, the case presented by Dr. De Forest is believed to be so strong that no such appeal can hope to reverse Justice Van Orsdel's decision.

"It has been a long fight," Dr. De Forest said, "and I am, of course, highly gratified over the outcome." He would make no further statement.

Fought Against Big Interests

The history of the litigation reads like a romance. The Westinghouse company had long ago acquired Armstrong's claim to the invention, which, until now, had been upheld. Dr. De Forest, struggling against untold disadvantages and powerful financial backing, hung on doggedly, always asserting he was right. Now he has, at last, and for all time, been awarded at least the credit to which he is entitled, and for which he has fought for over seven years.

It will be remembered by Radiophans that Radio Digest over a year ago assailed Major Armstrong's title to another patent, that on super-regeneration. This principle, it is believed, belongs by priority to Charles V. Logwood, another Radio pioneer

whose work helped the art make the strides it has.

It is interesting to note also that Harry Houck and Armstrong, who developed the super-heterodyne receiver while in the service of the United States Army, may lose the title to this patent owing to a claim of the government that inventions made by its employees belong to the government.

Future Plans of De Forest

While undecided, definitely what the next step will be, Dr. De Forest, speaking for the De Forest Radio Telephone and Telegraph company, holder of the disputed patent, stated that an effort would be made to get patent papers on the sixty claims awarded by the decision and request that the Armstrong patents be set aside.

No difficulty in accomplishing this is anticipated and it seems certain that regeneration in all forms for both transmission and reception will be taken away from Armstrong and given the De Forest organization. The award of Justice Van Orsdel is so broad, it is claimed, that the patent may also cover the neutrodyne principle.

The Radio Corporation of America and allied interests will make no statement regarding the decision so unfavorable to them, or what their plans are.

Hear Station WEAF in Apia, Says American Vice-Consul

NEW YORK.—American Vice-Consul Quincy F. Roberts, at Apia, Samoa, 7300 miles from here, reports the reception of Station WEAF's program from 7:18 to 7:50 p. m. on Friday evening, March 14, which was from 1:48 to 2:20 a. m. New York time. A special program by Paul Whiteman was being broadcast on this occasion. The equipment used by Vice-Consul in Charge Roberts consisted of a single-circuit regenerative set with two stages of audio frequency amplification.



BEST for summertime receiving. Summer heat and static exhaust any crystal. STEINITZ is the original long distance crystal—far more sensitive spots—longer life. Sold all over U. S. and Canada. Thousands of letters like one reproduced. Free hook-ups show how to get distance and clear reception. Also \$15 Portable Tube Set illustrated for vacation time. You'll soon be watching your baseball stars. Listen in on STEINITZ at mystic.

Steinitz Laboratories, Jan. 23, 1924
Atchison, Kans.

Presume you like to know when one is pleased. I was skeptical, as I suppose many others are; however, I am now convinced Steinitz crystals will bring in outside stations. I have heard besides at Kansas City Stations, KKK, Hastings, Neb., WQAW, Omaha; WDAP, Chicago; WSAI, Cincinnati; and Fort Worth, Tex. I have just an ordinary two-side-band crystal set.

It is certainly a pleasure to hear outside stations with a crystal set, without expense of batteries, tubes, etc. You can use this letter.

1523 Colorado, Kansas City, Mo. Best W. of Midwest

Favorable conditions and location will give you marvelous results with Steinitz Crystals

NOW 50¢ Each SPECIAL 3 for \$1.00

STEINITZ is no ordinary crystal. It's an entirely new discovery. Opens up new possibilities for crystal set receivers. STEINITZ CRYSTALS are being limited. Now Genuine United States Patent.

My Money-Back GUARANTEE

I unreservedly guarantee STEINITZ to give you better results than you overthought possible on your crystal set, and if you are not surprised and more than pleased I will send back your money without any question.

Reference: Exchange National Bank, Atchison Savings Bank, Atchison, Kansas.

FREE Hookups show you how to get clear reception and distant stations. Postal card brings it without obligation. Also beautiful folder showing Steinitz Special \$15 Portable for vacation and week-end drives: Famous Stein \$10 Tube Sets, Long Distance Crystal Sets \$8, Stein Wave Trap \$3 and Stein Two Stage Amplifier \$12.50.

Don't delay the radio treat in for you. Order first STEINITZ crystals today—NOW.

STEINITZ LABORATORIES, 603 Radio Bldg., ATCHISON, KANSAS

Try a Bradley Leak



This remarkable adjustable grid leak is endorsed by Flewelling, Cockaday, Amrad, Kennedy, Crossley, and many other prominent radio experts. It enables you to get the exact grid leak resistance for the best operation of your tubes. Every conceivable resistance is obtainable without steps and jumps between 1/4 and 10 megohms.

Every tube requires some particular grid leak value for maximum efficiency. Fixed-step grid leaks do not fulfill the exacting requirements of grid leak control. The Bradley Leak, which is unaffected by temperature or moisture, gives a permanent setting and precisely the value required for best operation. Try one, tonight.

ALLEN-BRADLEY CO., 290 Greenfield Avenue, Milwaukee, Wisconsin

RADIO ON CABLES IF SQUIER PLAN COMES

FAMOUS ENGINEER WOULD RAISE EFFICIENCY

Believes Submarine Telegraph Lines Would Benefit by Application of Ether Principles

NEW YORK. — Outlining what he termed the "Key Plan," applying Radio to cable operations, Major General George O. Squier, until recently chief signal officer of the Army, said a short time ago that Radio engineering was approaching a phase of development which would eventually give a speed and accuracy heretofore unthought of in cable communication.

By adapting the basic principles of Radio communication to the sub-audible band of frequencies, which apply principally to ocean cable practice, General Squier said Signal Corps experiments on the new Seattle-Alaskan cable have already shown marked progress. At the laboratory of William M. Bruce, Jr., a cable engineer, at Springfield, O., a universal automatic telegraph transmitter, applicable to Radio, land lines and submarine cables, has been developed and tested under the newly devised "key plan." An improved form of rectified received record has also been developed and tested, he announced.

May Revolutionize Cable Operation

An entirely new range in cable efficiency will be opened up by the use of electron tubes, which will amplify the cable signals several times, just as amplifying tubes increase incoming broadcast signals, General Squier predicted. Adding that with properly designated signals, such amplification has already been demonstrated as practical in laboratory work.

Following up his application of Radio to wires in 1910, which made possible the employment of an unused band of frequencies between 15,000 and 100,000 per second, and resulted in the use of multiplex telephony and telegraphy on wire circuits, General Squier now proposes a second fundamental step, which may revolutionize cable operation.

How Squier Would Do It

By utilizing the special means of transmitting and speeding up the Morse code alphabet, as demonstrated by General

SELECTED TO HEAD WORLD RADIO MEET

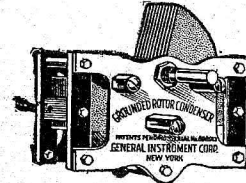


Hiram Percy Maxim, famous inventor, who has been elected president of the International Radio Congress, which will be held in Europe next year. Mr. Maxim is one of the best friends the Radio amateur in this country has. ©Wide World

Squier last year, he now proposes to hook up his cable transmitting and receiving system as follows: First, the generator of the carrier wave, and the modulator; then the transmitting cable, on the opposite end of which is connected the sub-audio amplifier, followed by the detector unit, and finally the interpreter, which makes the message legible.

The key plan, through the powerful amplification made possible by electron tubes, should logically become a vital step in the reception of long, submarine cable signals, the general points out. In the near future cable practice, he believes, will include several bands of sub-audible signal frequencies.

PROVED BY LABORATORY TESTS THE LOW LOSS GENERAL INSTRUMENT CORPORATION GROUNDED ROTOR CONDENSER



THE LOWEST LOSS CONDENSER

That explains why nationally known manufacturers of radio sets have accepted and contracted for these condensers to be used as their

STANDARD EQUIPMENT

Here are excerpts from two of the many letters received from our manufacturing customers:

"Since using your GROUNDED ROTOR CONDENSERS, we believe we will surprise the public next season not only with the best looking but also with the best operating receiving set on the market."

Another accompanies his order with the following:

"Your readings check up perfectly—your condenser improves the quality of reception to a remarkable degree. We hope the uniformity of your first shipment will always be continued."

Type	Minimum	Maximum	
Type 46X 11 Plate 5 MMFD.	.00025 MFD	\$4.50
Type 46A 13 Plate 6 MMFD.	.0003 MFD	4.50
Type 46D 21 Plate 9 MMFD.	.0005 MFD	5.00
Type 46F 43 Plate 15 MMFD.	.001 MFD	5.50

AT YOUR DEALER

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

GENERAL INSTRUMENT CORP.

423 Broome Street
NEW YORK CITY

Demonstrators WANTED

The Deluxe Neutrodyne

5 TUBE NEUTRODYNE Knock-Down Set COMPLETE

Written Money-Back Guarantee Sent With Each Purchase **\$34.49** We Ship C.O.D. **SEND NO MONEY**



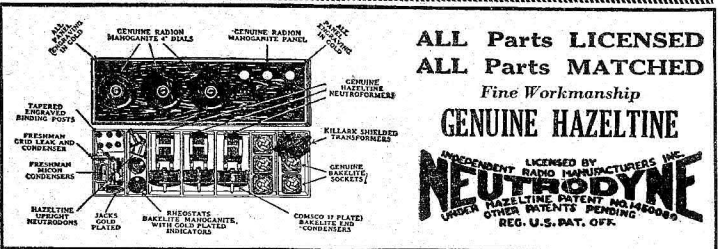
DEMONSTRATORS WANTED

We want a live young man in every town, and in every section of large cities, to own, operate and demonstrate "The Deluxe Neutrodyne." Set furnished you at discount, and special financial arrangements. Write fully about yourself to Mr. Perry, Executive Offices, The Radio Shack, America's Largest Radio Dealers, 55 Vesey St., Dept. RD 524, New York City. Speaking with authority as the largest radio dealers in America, we know of no others large enough to both meet our price and also give our quality of goods.

STANDARD PARTS

- 1 Drilled Radion Mahogany Panel, engraved in Gold
- 3 Four-inch Radion Mahogany Dials, gold engraved.
- 2 Gold Plated Jacks.
- 3 Genuine Hazeltine Neutroformers mounted on the famous Comco Bakelite End Condensers. Positively the only Neutrodyne Kit including these famous Comco Condensers.
- 2 Hazeltine Neutrons.
- 5 Bakelite Sockets.
- 1 6-Ohm Rheostat with gold plated knob to match panel.
- 1 50-Ohm Rheostat with gold plated knob to match panel.
- 2 Genuine Killark Shielded Audio Transformers.
- 1 Baseboard.
- 20 feet Tinned Bus-bar.
- 1 .00025 Freshman Grid Condenser.
- 1 Tubular Glass Grid Leak.
- 1 Set Engraved Binding Posts.
- 1 .002 Micon Condenser.
- 1 .006 Micon Condenser.

Exact size special panel and base blueprint.
All packed in attractive box.
Written Money-Back Guarantee.
Complete Assembly Kit, Genuine 5-Tube Neutrodyne **\$34.49**



ALL Parts LICENSED
ALL Parts MATCHED

Fine Workmanship

GENUINE HAZELTINE



CABINET FREE

Here is EVERYTHING needed to operate this coast-to-coast set after building:
5 Tested Tubes (Type 20 A).....\$19.50
2 45-Volt Extra Large Variable "B" Batteries for Neutrodyne..... 6.50
1 50 Ampere Hour Storage Battery, guaranteed 2 Years..... 11.25
1 pc. 3000-ohm Head Phones and Cord..... 3.75
1 Antenna Equipment..... 1.50

Complete Outfit, \$43.40

(Parts Also Sold Separately)
If you order Building Kit and Operating Outfit both together we will include Fine Mahogany Finish CABINET FREE.

The RADIO-SHACK

EXECUTIVE OFFICE:
55 Vesey Street, Dept. RD 524
NEW YORK CITY

Send no money. We ship C. O. D. Pay your postman. Then build your set under our WRITTEN Money-Back Guarantee sent with shipment. We acknowledge all orders by return mail. Ship same on following day. We answer every letter we get on same day. The Radio Shack are the Largest Radio Dealers in America. No inferior goods. Only the best and most reliable. You buy in safety. Send your C. O. D. order today. This present low price may not continue. Use the coupon NOW.

The Radio Shack, Dept. RD 524, 55 Vesey St., New York, N. Y.

Mark X here only to order Radio Set

FREE BARGAIN LIST Here Mark X

Mark X here only to order Accessories

NAME (Print Plain).....
ADDRESS

How to Make a Talking and Singing Suitcase

Part I—A Convenient Container for Radio Set

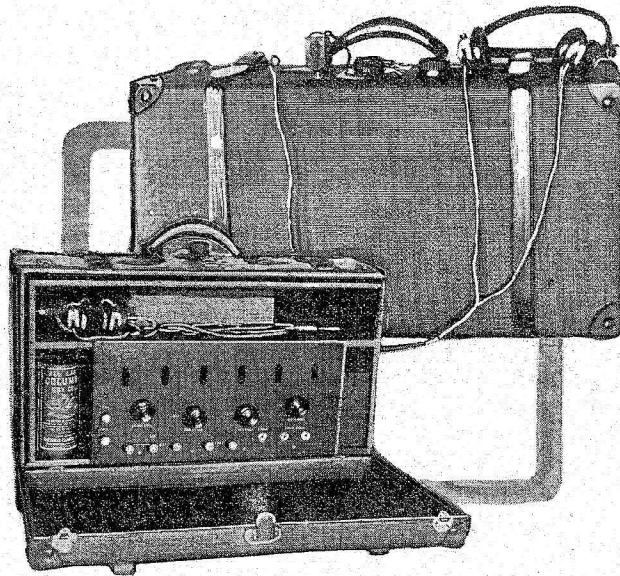
By S. R. Winters

THE phonograph, victrola and graphophone are frequently referred to as talking machines. These instruments have long been standardized in the capacity of reproducing speech and music. The talking and singing suitcase, however, is a comparatively recent invention, which term implies that a complete Radio-telephone receiving equipment for the reception of speech and music is contained in an ordinary suitcase. This self-contained, portable Radio receiving set was devised and perfected by E. D. Lowell and Brent Daniel, both of whom were formerly identified with the Radio Laboratory of the Bureau of Standards. It has been recently standardized and the talking and singing suitcase is a catch phrase that may eventually be banded about with quite the frequency of the term "talking machine."

Suitcase an Appropriate Container

The conversion of a suitcase into a container for batteries, head telephone, loop antenna, condenser, vacuum tubes, and other units comprising a Radio telephone receiving outfit, clearly is a perversion of the original intent of the leather-made container. However, when speech or music is heard coming forth from a closed suitcase the popular imagination is arrested and the lay mind is prone to doubt the hearing faculty. The magic wand is completely enthroned for the moment! Aside from the capacity of a suitcase transformed into a miniature Radio telephone receiving station to stimulate our imagining faculty, a receiving set in this form personifies compactness and ease of transportation from place to place. The suitcase continues to represent the embodiment of convenient carriage whether the thing to be transported is a suit of clothes or a quart bottle from the illicit stock of the "bootlegging" industry.

The talking and singing suitcase lends itself to a multitude of uses in the out-of-doors. It may be carried as a novelty along the streets of a city, conducted far afield in woods or on plains by means of the automobile, removed from land by boat, or taken in the open spaces by hand. Weighing approximately forty pounds, this self-contained Radio set for the reception of speech and music is not a staggering burden for carriage from one point to another. When taken afield, if there is a broadcasting station within one hundred miles of its location, the offerings of the ether may be heard by an adjustment of two knobs near the handle of the suitcase, when the head telephones are clamped on the eardrums. The programs of broadcasting stations within a range of ten miles of this novel Radio telephone receiving unit can be heard with remarkable clarity, while the distance between



New York City and Washington, D. C., has been bridged by a communication received by this talking and singing suitcase.

Product of the Bureau of Standards

The conception of enclosing Radio instruments in a leather-made container is not novel of itself, the suggestion having been first given tangible shape by experimental efforts at the Radio Laboratory of the Bureau of Standards about two years ago. Lately, however, this self-contained unit for the reception of music and speech has emerged from a laboratory experiment into a full-fledged standardized product. The development of electron tubes susceptible to operation through the use of dry-cell batteries, instead of the necessity for using storage batteries, has hastened the practical realization of the advantages of this and similar compact receiving outfits. In this instance, six UV-199 vacuum tubes are employed in the amplifying circuit, comprised of a detector, three stages of Radio frequency and two stages of audio frequency am-

plification. The filaments and plates both derive their electric energy from dry-cell batteries, 60 volts being used for the plates. The original design of the talking and singing suitcase involved the use of bulky storage batteries, these then being necessary to keep the filaments lighted for any considerable period of time, which heavy batteries contributed to the weight of the portable outfit.

Loop Aerial Used

The use of a towering antenna or ex-

ternal aerial is dispensed with in this self-contained Radio receiving equipment. Instead of such a more or less cumbersome form of antenna, a loop 12 by 21 inches in dimension is employed. Of course, the larger the loop the greater relatively will be the range of the reception of the signals. Button-like knobs under the leather handle of the suitcase afford means for adjusting the tuning condenser and for stabilizing the instruments to their greatest sensitivity. A single-action electrical switch, on the outside of the suitcase, is a means for introducing and suspending the filament current. These knobs are visible when the leather container is closed, but they are not conspicuous enough to identify the cleverly concealed conversion of a common suitcase into a miniature portable station for the reception of music and speech.

This portable receiving outfit also has the advantage of assisting in the location of a Radio broadcast station, a loop antenna having directional characteristics. Also, indicative of its variable uses, a plug may be arranged on the suitcase so that a telephone receiver can be connected in place of the amplification horn. Thereby, when held in front of a Bell telephone landline transmitter, conversation may be relayed to a person at some distant point. Practical tests have included a realization of this feat.

Recent experiments have determined the adaptability of this compact Radio receiving outfit to reception on an automobile. It was adjusted in resonance with WCAP, the transmitting station of the Chesapeake and Potomac Telephone Company, while the receiver was on the fourth floor of a building. The suitcase was carried to an automobile without once interrupting the reception of the strains of music. Subsequently, the automobile carried the outfit from Washington, D. C., to Hyattsville, Md., during which time the musical program from the local broadcasting station was heard without interruption. After reaching Hyattsville the talking and singing suitcase was installed on the floor of the laboratory of Dr. J. Harris Rogers, the noted inventor, which placement en-

(Continued on page 12)

2-LO, LONDON, ENGLAND ON ONE TUBE

Another Record for the ELGIN SUPER-REINARTZ

Tuesday, November 27, during the test period between 9 and 9:30 P. M., Rev. E. A. Cole in the residence of J. A. Melver, of Roodhouse, Ill., while operating a set made of materials and in accordance with the hookup furnished by the ELGIN RADIO SUPPLY CO., tuned in 2-LO, London, England, using receivers and but one tube. Later another tube was lighted and the loud speaker used, so that four people could hear the program and concluding announcement. The numbers, time, and the order in which they were played were

Officially Confirmed

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

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

ELGIN RADIO SUPPLY CO.

207 Chicago St.

ELGIN, ILL.

BLUE PRINTS Make Your Own Set



Special Offer 5 Books for \$2.00

REINARTZ
Three Tube Receiver
Assembly Details
Tuning Instructions
Blueprints

FLEWELLING
Three Tube Receiver
Assembly Details
Tuning Instructions
Blueprints

REFLEX DE LUXE
Three Tube Receiver
Full Details for Assembly
Blueprints
Tuning Instructions
How to Make a Loop Aerial
De Luxe

Only 50 Cents Each
All five blueprints
for \$2.00

Send Only Money Orders.
No Checks or Stamps.
Coins at Your Own Risk.

MILOPLEX
Three Tube Receiver
Assembly Details
Tuning Instructions
Blueprints

NEUTRODYNE
Five Tube Receiver
Full Assembly Details
Blueprints
Tuning Instructions

RADIO DIGEST PUBLICATIONS

510 North Dearborn St.
Chicago, Ill.

Please send me the Special Offer of 5 Books.
I am enclosing M. O. for \$2.00.

Name

Address

City State

AN EVENING AT HOME WITH THE LISTENER IN (SEE INSTRUCTIONS FOR USE BELOW)

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

Instructions for Use—All the hours above are given in Central Standard Time. If your city uses Eastern Time, add one hour to each of the periods stated...

STATIONS IN ORDER OF WAVE LENGTHS USED

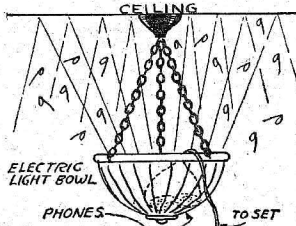
Table with columns: Meters Call, Meters Call, Meters Call, Meters Call, Meters Call, Meters Call. Lists stations grouped by wavelength.

A SINGING SUITCASE (Continued from page 11)

abled the reception of signals from WHAZ, broadcasting station in Troy, N. Y. The difficulty of reception ordinarily experienced during the summer months from atmospheric disturbances was negligible by virtue of the use of a loop antenna...

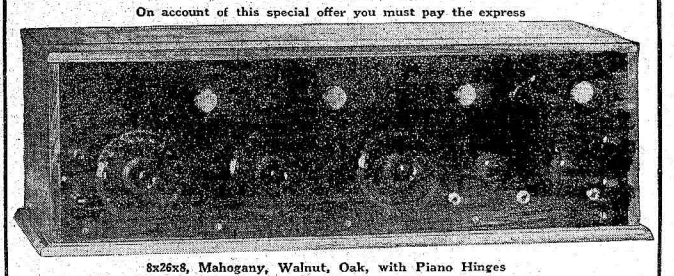
Overhead Loud Speaker

Just place the headphones in the bottom of an electric light bowl hanging from the ceiling and see what a fine loud speaker you have. If the signals come



in loud the sound is thrown up against the ceiling where it is reflected down into the room with pleasing results.—A. A. Jones, Chicago, Ill.

5 Tube Licensed Neutrodyne Tunes Out Any Station

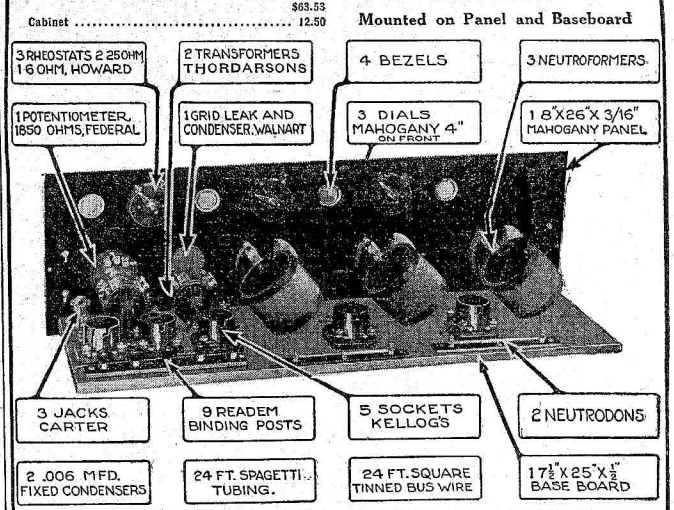


5x26x8, Mahogany, Walnut, Oak, with Piano Hinges

ALL LICENSED PARTS

WHEN you get this magnificent looking set wired and hooked up, you will be able to hear all stations without interference. All parts are same as illustrated in Radio Digest, Feb. 2nd.

- 2 Rheostats, 25 ohms, Howard, Mah. Dial..... \$ 2.40
1 Rheostat, 6 ohms, Howard, Mah. Dial..... 1.20
3 Neutroformers, 2 Neutrodons, Licensed..... 25.00
1 Potentiometer, 1850 ohms, Federal..... 2.20
3 Jacks, Carter..... 2.70
2 .008 Condensers, Muter..... 1.50
1 Grid Leak with Condenser, Walnut..... 4.50
5 Sockets, Kellogg's..... 5.00
2 Transformers, Thordarson's..... 9.00
9 Readem Binding Posts..... .85
1 8x26 Mahogany Panel..... 4.68
4 Bezels..... .80
3 Dials, Mahogany, 4 in..... 4.50
1 Baseboard..... .50
24 ft. Square Bus Wire..... .50
24 ft. Spaggetti..... .80
Cabinet..... \$98.58
Mounted on Panel and Baseboard..... 12.50



Panel not mounted or drilled, only \$45.50. Blueprints FREE

COMPLETE WITH ALL EQUIPMENT

- IN ADDITION TO ABOVE PARTS
5 Tubes..... \$25.00
2 2 1/2 Volt B Batteries..... \$ 6.00
1 110 Ampere Storage Battery..... 18.00
1 DeLuxe Homesaver..... 18.00
1 Headset..... \$86.00
1 Loud Speaker..... 12.50
1 Complete Aerial Equipment..... 1.50
1 45 Volt B Battery..... 5.50
TOTAL..... \$98.50

The above parts and equipment complete would cost you \$159.50! Our Price \$125.00

Written Money Back Guarantee with Each Set
Special Sale on Webster Condensers, Fine for Super-Heterodyne
Variable Condenser, .0005 (same as 23 plate), \$2.98
Variable Condenser, .001 (same as 45 plate), \$2.98
List, \$5.50. While they last—Bargain at..... \$2.98

We are responsible folks, money cheerfully refunded within ten days if you are not satisfied
All Orders Mailed Promptly. Stamps Accepted. Send Check or Money Order.
Quality Merchandise at Low Prices
Economic Radio House
4600 LINCOLN AVENUE, CHICAGO
We Personally Guarantee All Goods

How to Install a Radio Set in Your Automobile

Part III—Chevrolet Installation and Panel Layout

By Harry J. Marx

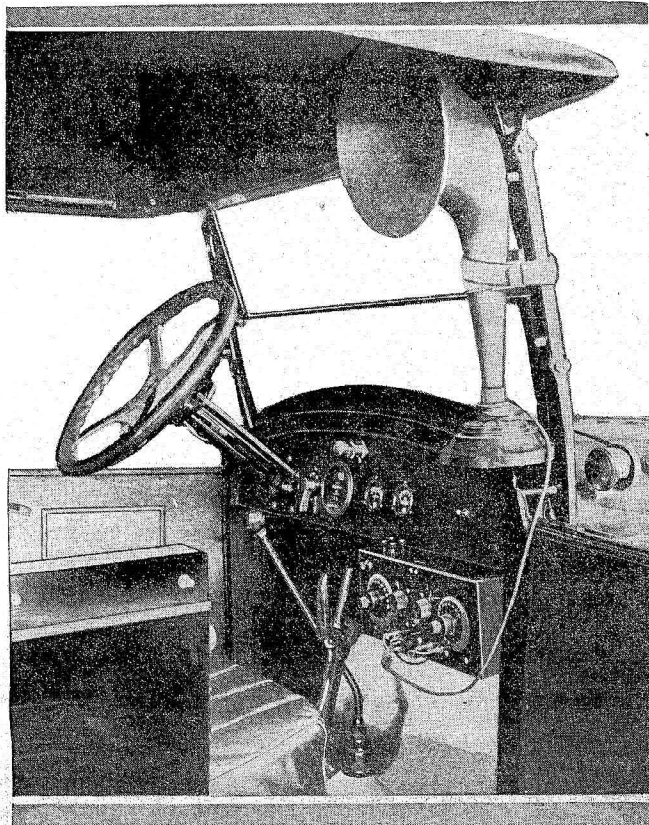


Figure 1

THE Chevrolet Motor company has a descriptive circular with the following caption on the front: "Will Your Family Be Happy This Spring?" The answer is: "Yes—if the Chevrolet is equipped with a Radio set!" No, the firm does not deliver the car with this set installed; but there is no reason why any regular Radiophan cannot make this set

himself and then install it in his car with satisfying results. The illustration (Figure 1) shows the portable Radio receiver installed in the Chevrolet touring car, 1924 model. This portable receiver is the one at present being described in this series. The dashboard in this model of the Chevrolet car is straight along the lower horizontal edge,

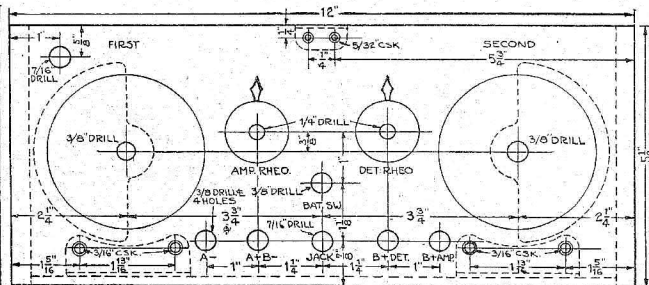


Figure 2

making it a simple matter to fasten the set directly underneath it. A small box containing the B batteries was bolted to the wall underneath the dashboard.

results. When the loop aerial was used the base was fastened to the top of the upper edge of the front seat. The loop was one with 20 turns wound helically

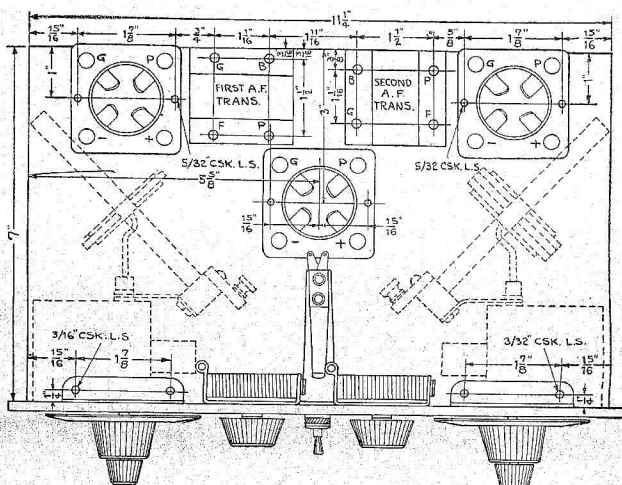


Figure 3

Antenna System

Both the four-wire antenna described in Part I of this series and a loop aerial were tried out, and with very satisfactory

results on two sides of a crossed pole frame, each side of the square being 18 inches. The four-wire aerial inside the top

(Continued on page 24)

RECEPTRAD

PARTS FOR THE
SUPER-HETERODYNE
the choice of
FORBES
in his "Super-Het"
described in the Radio Digest—issues of May 3 to 24th.

Supreme for the
SUPER-HETERODYNE

REPLACE all others with RECEPTRAD, only then will you do justice to the vast possibilities in Super-Heterodyne! RECEPTRAD parts are recommended and specified by Lieut. Greiff. They make the Super-Heterodyne—the greatest circuit today—extremely easy. It enables distance reception that is unequalled, and volume so great that tuning with headsets is unnecessary.

The RECEPTRAD Transformer (Type 1716) is remarkably efficient for use in Super-Heterodyne and other long wave work.

FREE
8-TUBE GREIFF
SUPER-HETERODYNE
BLUE PRINT SENT UPON RECEIPT OF YOUR DEALER'S NAME AND ADDRESS.

If your dealer does not as yet carry RECEPTRAD Parts, write us direct, including his name.
RADIO RECEPTOR CO.
59 Bank St. New York
Chicago Office—R. C. BLUME
140 South Dearborn Street

PROVED!

Success is measured by results. Results are only as complete as signed testimony can make them. Read the evidence!

Make Every Night Silent Night

The Ferbend Wave Trap is guaranteed to tune out any interfering station. It is not to be confused with imitations hastily assembled from ordinary parts. The price is \$8.50. Shipment is made parcel post C. O. D., plus a few cents postage. If you prefer, you can send cash in full with order and we will ship postage prepaid. Send us your order today.

FERBEND ELECTRIC CO.
23 E. So. Water St., Chicago, Ill.

FERBEND
Wave Trap
REG. U.S. PAT. OFF.

ANNOUNCERS' CONTEST

Radio Digest First Annual

GOLD CUP AWARD

THIS beautiful GOLD CUP will be awarded by Radio Digest to the World's Most Popular Broadcast Announcer.

You are invited, together with Radiophans all over the world, to help us select the man or woman who will receive this priceless trophy. You will find a ballot on page two of this issue which you can use to vote for your favorite announcer.



RADIO Digest GOLD CUP AWARD will be an annual trophy presented to the most popular Radio announcer in the world. Every year Radiophans will be given the opportunity to select the announcing "King." Everybody is invited to vote for their favorite announcer. It is up to you who will be the winner in the 1924 competition. Send your ballots in early.

ENTER YOUR FAVORITE'S NAME

How to Nominate and Vote

ON THIS page will be found the rules and regulations governing the Radio Digest First Annual GOLD CUP AWARD to be given to the world's most popular broadcasting station announcer in a competition which starts with this number and will continue until the issue of September 6th. Below will be found a nomination certificate. All that is necessary for you to do to place your favorite announcer in the contest is to fill out this certificate with your candidate's name and the broadcasting station call letters. Write in your name and address and mail to GOLD CUP AWARD Editor of the Radio Digest. This will place your choice of announcers in nomination. If you will then turn to page two of this issue you will find a ballot with which you can vote for your candidate. These ballots, numbered consecutively, will

appear in each issue of the Radio Digest until the close of the contest, with the September 6th number. Each of these ballots will count for one vote when sent in separately. You can hold these ballots until you have four that are consecutively numbered, and when they are sent in, a bonus of ten votes will be allowed for your favorite announcer. For each eight consecutively numbered ballots your candidate will receive a bonus of twenty-five votes. For each twelve consecutively numbered ballots fifty votes, and for each sixteen consecutively numbered ballots—seventy-five votes will be allowed. Who will be the winner of the Radio Digest first annual GOLD CUP AWARD is a matter entirely in your hands.

Send in Your Nomination Certificate and Ballot Today

Rules and Regulations

1. Radio Digest offers its first annual GOLD CUP AWARD to the most popular broadcasting station announcer. This popularity to be determined by the balloting of the readers of Radio Digest, and the winning announcer will be the one polling the largest number of votes.
2. All broadcasting station announcers are eligible to enter. Nominations can be made either by the announcer or any Radiophan. Nominations should be made by using the "Nomination Certificate" appearing in the issues of Radio Digest. The names of the announcers entered in this contest will be published from time to time in Radio Digest. The progress of the voting for the announcers will be published frequently during the contest at the discretion of the GOLD CUP AWARD Editor.
3. Effective with May 24th issue a ballot will be printed in each issue of this publication on page 2. These ballots will be numbered consecutively from one to sixteen. The voting officially opens with the publication of ballot No. 1 in May 24th issue. The contest closes with ballot No. 16 published in September 6th issue of Radio Digest, and the official closing date of this contest is midnight, September 8th, 1924.
4. Voting will consist of filling in these ballots with the name, initials or nickname of the announcer and the station and mailing to the GOLD CUP AWARD Editor.
5. Ballots when sent in separately will count for one vote. Bonus votes

- will be allowed during the contest according to the following schedule:
- For each four consecutively numbered ballots sent in at the same time a bonus of ten votes will be allowed.
 - For each eight consecutively numbered ballots sent in at the same time a bonus of twenty-five votes will be allowed.
 - For each twelve consecutively numbered ballots sent in at the same time a bonus of fifty votes will be allowed.
 - For each sixteen consecutively numbered ballots sent in at the same time, being a complete set, a bonus of seventy-five votes will be allowed.
6. The broadcasting station announcer polling the largest number of votes in the contest will be awarded the Radio Digest GOLD CUP. In the event of a tie for the GOLD CUP AWARD each tying contestant will receive the same identical award.
 7. Anyone may vote for their favorite announcer with ballots clipped from Radio Digest.
 8. All votes to be credited must be mailed on or before midnight, September 8th, 1924.
 9. The Radio Digest first annual GOLD CUP AWARD will be made by a committee appointed by the publication.
 10. Any question that may arise during the contest will be decided by the GOLD CUP AWARD Editor and his decision will be final.
 11. These Rules and Regulations are complete and cover the awarding of Radio Digest First Annual GOLD CUP AWARD.

NOMINATION CERTIFICATE

Announcers' Contest

Radio Digest First Annual GOLD CUP AWARD

GOLD CUP AWARD Editor, Radio Digest,
510 N. Dearborn St., Chicago, Ill.

Dear Sir:

I nominate.....

Station Broadcasting Station

Signed

Address

Town..... State.....

66 STATIONS' ADVANCE PROGRAMS

Tuesday, May 20

CKAC, Montreal, Can. (Eastern, 425), 7:00 p. m., *Kid-dies' stories in French and English;* 7:30, *Mount Royal dinner concert;* 8:30, *English program;* *White Star Dominion Steamship "Resina";* 10:30, *Mount Royal Dance Orchestra.*

DKY, Winnipeg, Can. (Central, 450), 8:15 p. m., *Concert, J. J. H. McLean Music Company.*

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 11:45 a. m., *Howard K. Webb, organist;* 3:30 p. m., *Dinner concert, Grand Symphony Orchestra;* 5:30, *Children's period;* 7:15, *"The Contemporary Novel; Sea, Pirates and Swordplay," Prof. Percival Hunt;* 7:50, *"The Fortieth Anniversary of the Westinghouse Company";* Concerts, *KDKA Woodchuck Choir;* 10:30, *Special concert.*

KFAF, Denver, Colo. (Mountain, 362), 8:00-9:30 p. m., *KFAF Glenn Busters; Talk, Denver Real Estate Exchange.*

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., *Vocal concert;* 8:00-9:00, *Ambassador-Max Fisher's Coconut Grove Orchestra;* 9:00-10:00, *Examiner concert;* 10:00-11:00, *Concert, Harry Foster, director.*

KFKX, Hastings, Neb. (Central, 341), *Rebroadcasts program of KDKA.*

KFSG, Los Angeles, Calif. (Pacific, 270), 3:30-4:00 p. m., *Organ recital;* 4:00-5:30 p. m., *Vocal and instrumental concert;* 6:30-7:00, *"Key Hour," program of vocal and instrumental numbers by children;* 8:00-10:00, *Speaking; "The Swango Jubilee Singers; vocal selections; Talk, Alvin Temple McChesney.*

KGO, Oakland, Calif. (Pacific, 312), 4:00-5:30 p. m., *Concert orchestra, Hotel St. Francis;* 8:30, *Radio play, "Seven Keys to Balldale";* *KGO Players; Arlon Gray;* 10:00-11:00 p. m., *Hotel St. Francis Dance Orchestra, Henry Hirtz, leader.*

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., *Concert, Civic Music Club;* 3:30, *Talk, Jeannette P. Cramer;* 7:45, *Talk for farmers, Oregon Agricultural College Extension Service.*

KHL, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., *Program, Lenore Kilian, soprano; Claire F. Crane, pianist; White's Californians;* 2:30-3:30, *Matinee audience;* 8:00-8:30, *Art Hickman's Concert Orchestra;* *saxa;* 8:30-8:50, *Art Hickman's Concert Orchestra;*

Headliners of the Week

THIS WEEK might be called "Variety Week." It begins with a prize fight broadcast by WSB, Tune in *Tuesday* and you will hear all the gory details of the fight between Young Stribling and Dan Oswald. For those unable to stand such recreation WIP offers one of Europe's greatest violincellists, Willy Lampung. Better not miss this, he will only be here three months.

Wednesday night is Kids' night for WTAM. Two of the performers, Jack and Loretta Clemens, are first cousins of that great writer of kids' books, Mark Twain. The Cincinnati Conservatory of Music will award a Radio Scholarship through Station WLW to the winner of a unique educational contest. Tune in, musicians, and see how keen your ears are.

WAAW offers a very unusual talk *Thursday*, when Rev. Edgar Brown will tell about his experiences hunting "dope" in Omaha. His disguise was so complete that none of his flock would have recognized him.

Every *Friday* night bridge fans have tuned in to WAAW to listen to Mrs. Guy U. Purdy's bridge lessons. No doubt, you

will be interested to know that Mrs. Purdy is a pupil of Hubert Work, New York international bridge authority.

Saturday, tune in for WRC, first because Honorio Pueyrredon, the Ambassador of Argentine, will speak and second because the United States Marine Band will be broadcast.

Did you know that a band could consist of one man? Frank G. Robertson is called the champion one-man band artist and will be heard over WOS *Monday*. While you are tuning in this particular locality get WJNP and hear the gang from Harley Bartles' garage. Normally these men adjust spark plugs for their every day vocation, but they are going to try their hand at entertaining the Radio public.

WGY is a Station always up to stunts. *Tuesday*, if you live on a farm and are tired of the early morning crow of the rooster, tune in for this Station and listen to the voice of the city. You will hear the calls of the pettlers, sounds of the traffic, and music of the hurdy-gurdy, and will, no doubt, be more than pleased with your lot.

St. Olaf College Chapel services.

WGX, Detroit, Mich. (Eastern, 377), 6:00 p. m., *Dinner concert;* 10:00, *Red Apple Club.*

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., *Joseph Blanda's Sexton Cafe Orchestra;* 7:00-7:30, *School of the Air, piano tuning-in number, Duo-Art; Address: speaker from the National Livestock and Meat Board; Address: Clara Zunkwa, M. A.; the Tell-Me-a-Story Lady; music, Fritz Hanlein's Triton Ensemble;* 11:45 p. m., 1:00 a. m., *Nighthawk Frolic, the Plantation Players.*

WDAP, Chicago, Ill. (Central, Daylight Saving, 360), 7:00-8:00 p. m., *Drama Concert, Ensemble and Blackstone String Quintet;* 8:00-8:30, *Barton Organ, played by Ralph Emerson;* 10:00, *C. Louis Green, Laundon Bros. Rosemary Hughes, Fred W. Asard, Vera Worthley, Jack Chapman's Orchestra.*

WDAK, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 11:45 a. m., *Daily almanac;* 12:02 p. m., *Organ recital, Stanley Theator;* 12:30, *Arcadia Cafe Concert Orchestra;* 2:00, *Arcadia Cafe Concert Orchestra;* 7:30, *Dream Daddy with boys and girls;* 7:55, *Play review by Arpeal Abbott.*

WEAF, New York, N. Y. (Eastern, Daylight Saving, 492), 11:15 a. m., *Gertrude Evelyn, soprano; Orlan Ross, pianist;* 11:30, *Business Picture club;* 2:50 p. m., *Sara Setti, soprano;* 4:20, *Plaza Grill Orchestra;* 5:00, *C. Beilwin Allen, baritone;* 5:30, *Children's program;* 6:00-7:20, *Dinner music from Waldorf Astoria;* 7:30, *Thermost Fisher;* 7:40, *Lilli Olin, soprano;* 7:50, *Sopra Irene Lieb;* 8:00, *Tom Products Orchestra;* 8:30, *Brooklyn Radio News Review;* 8:00, *Giuseppe Lombardo, tenor;* 9:20, *Talk on Blue Ribbon Moviemaking;* 9:30, *Everette Milton.*

WEAO, Columbus, O. (Eastern, 360), 1:30 p. m., *Garden talk, member Ohio State University faculty.*

WFAB, Dallas, Tex. (Central, 478), 11:00 a. m., *Address, DeWitt McMurtry;* 8:30-9:30, *Varied program by performers from Texas;* 11:00-12:00, *Musical recital, Miss L. Mabel Crumill and assisting artists.*

WFJ, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 1:00 p. m., *Avery Davis' Bellevue Stratford Concert Orchestra;* 3:00, *"Romance of Solid Silver;"* *A. Alvin, 6:00, Sunny Jim, the Kidder's Pat;* 8:30, *McGee Davis' Bellevue Stratford Concert Orchestra;* 8:00, *"Miniature" Lacey operetta, conducted by E. M. Stultz;* 9:15, *Four-Leaf Shamrock Concert;* 10:15, *Charlie Kerr and his Symphony Dance Orchestra.*

WGN, Chicago, Ill. (Central, 370), 7:00-10:00 p. m.,



WBB, Kansas City, Mo. (Central, 411), 2:00-3:00 p. m., *Ladies' Hour program, Sweeney Radio Orchestra;* 7:00-7:30, *Fondler dance numbers, Sweeney Radio Orchestra;* 8:00-10:00, *Program, Hotel Ricardo, Mr. William Gook, of St. Joseph, Mo., will entertain the Radio artists of WBB;* 10:00, *Sweeney Radio Orchestra; Solos by popular WBB artists.*

WBN, New York, N. Y. (Eastern, Daylight Saving, 360), 2:15-2:45 p. m., *Edw. B. Marks Music Co.;* 2:45-3:15, *Jack Stern's Dance Orchestra;* 3:45-4:30, *Bob Schaefer and his Entertainment Orchestra, directed by the Original Georgia Fire;* 4:45-5:00, *Jack Morris and Lucile Dumont, in song;* 5:00-5:30, *Sammy Harris in songs;* 5:30-5:50, *Louie Colton's orchestra;* 5:50-6:00, *Anniversary of the Signing of the Mecklenburg Declaration of Independence;* by George N. Sano of the National Sea League; 9:45-10:30, *Ace Briggs and His Fourteen Virginians from the Monte Carlo;* 10:30-11:00, *Program of recorded songs by the All Nations Orchestra, conducted by Henry Tutor Mason, founder;* 11:00-12:00, *Bernard Goodwin's orchestra.*

WIP, Philadelphia, Pa. (Eastern, Daylight Saving, 360), 1:00 p. m., *Organ recital, Karl Bonawitz;* 3:00, *Popular program by Clarence City, directed by the Original Georgia Fire;* 4:15, *"A Strong Baby—a Good Citizen;"* *Talk by J. C. Clifton;* 6:45, *Jack Regan and Ala WIP Little Symphony Orchestra;* 7:00, *WIP's bedtime stories;* 8:00, *Concert, Philadelphia Police Band;* 8:30, *Willy Lampung, violinist; Lucile Dumont, Helen Doornbroed, piano; accompanist;* 9:00, *"Toll of 4024,"* *Shamrock Catholic Club;* 10:00, *Ted Weens and his Victor Recording Orchestra.*

WJAX, Cleveland, O. (Eastern, 390), *Program arranged by Cleveland News Leader;* 7:00 p. m., *Bedtime story, "Explosion and Loan Association;"* *Mr. Palmer; 8:00, E. G. Johnson's Radio Talk Cartoon, Dan Palmer; Selections, Joe Smith-Martha Lee Club Orchestra; Johnny "The Great Guit;" Selections, Martha Lee Club Mandolin Club; vocal numbers, Carabelle Johnson, soloist;* *Harlequin dancing, members Martha Lee Dancing Club; Announcements.*

WJY, New York, N. Y. (Eastern, Daylight Saving, 405), 7:00 p. m., *"Explosion and Loan Association;"* *George D. Woodruff;* 7:30, *Radio Talk, "The Museum;"* *Broadcasting Broadway, Bertha Brainerd;* 8:15, *Mildred Debra, soprano;* 8:30, *The Museum, England, M. Rose Collins;* 9:00, *Mildred Debra, soprano;* 9:15, *The Original Mammoth Aces, John J. 1:00-1:30, Field and Loan Association;* *Marie Calati, cellist; Keith McLeod, accompanist;* 10:30, *Marie Calati, soprano; Virginia Fenwick, soprano;* 11:00, *Marie Calati, cellist.*

6:30-7:00, *Music memory contest, Fitzgerald Music Company; Raymond Harmon, director;* 7:30-7:50, *Children's program, Stories of American History, Prof. Walter Sylvester Hertzig; Weekly visit of the Sand-mand and Queen Titania, Minnie Estima, pianist; 8 years old; Sarah Gordon, reader; Bedtime story, Uncle John;* 8:30-10:00, *Deluxe program;* 10:00-11:00, *Art Hickman's Dance Orchestra.*

KIS, Los Angeles, Calif. (Pacific, 360), 8:00-9:00 p. m., *Concert program of vocal and instrumental selections; other features.*

KFO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., *Rudy Seiger's Fairmont Hotel Orchestra;* 2:30-3:30, *Theodore J. Irwin, organist;* 4:30-5:30, *Rudy Seiger's Fairmont Hotel Orchestra; Children's hour stories, Big Brothers of KFO;* 6:30-7:00, *"Cleveland Six;"* 7:00-7:30, *Rudy Seiger's Fairmont Hotel Orchestra;* 8:00-10:00, *Richard Jose, Isolan Jealous;* 10:00-11:00, *E. Max Braund's Versatile Band.*

KGV, Pittsburgh, Pa. (Eastern, Daylight Saving, 270), 8:00-8:30 p. m., *"Twilight Tale and Jimmy of Snakey Dog;"* *For the kiddies.*

KSL, St. Louis, Mo. (Central, 460), 6:30 p. m., *Abergh's Concert Ensemble;* 9:00, *Program, Western Military Academy Orchestra and Glee Club;* *Alumnus;"* *O. H. Pierce;* 11:00, *Hotel Statler dance music, Rothenfeld's orchestra.*

KW, Chicago, Ill. (Central, Daylight Saving, 530), 10:35 a. m., *Pable talk, Mrs. Anna J. Peterson;* 1:35-2:00 p. m., *Studio program;* 5:45, *Children's bedtime story;* 6:00-8:30, *Dinner concert, Josie De Eabary's orchestra;* *Paul Whiteman's "College;"*

7:00-7:20, *Florence Bruscha Herron, soprano; F. W. Soltykal, tenor; Hilda B. Parr, pianist; Norma T. Gaus, dramatic reader; Sallie Menkes, accompanist;* 7:30, *Speeches, American Farm Bureau Federation;* 7:55, *Musical program continued.*

WAAW, Newark, N. J. (Eastern, Daylight Saving, 255), 7:00-7:20 p. m., *"Star-Spangled Banner;"* *Edw. A. Sussman and his Original Memphis Syncopators;* 7:30-7:45, *Arturo Felner, soprano;* 7:45-8:00, *Theodora Alban, tenor;* 8:00-8:15, *Hattie Mathews, soprano;* 8:15-8:30, *Arundel Coker of Wall Street Journal, talking on Men of Prominence;* 8:30-8:45, *Arthur L. Leo, managing director McAlbin Hotel, New York City, on "Traveling New Yorkward;"* 8:45-9:00, *Bliss Quartet of Union Hill, N. J.;* 9:00-9:30, *Fred Burton's Trio;* 9:30-9:45, *Figures Famous in History, Grover Cleveland;* by Elizabeth Burt; 10:00-10:20, *American Warblers;* 10:30-11:00, *Robert S. Williams, John Hill, Ira LaShan and the Triton Melody Ensemble;* *Clarence Williams, Eva Taylor and Lawrence Jones, singing.*

WBAP, Fort Worth, Tex. (Central, 476), 7:30-8:30 p. m., *Concert, Walter Collier's Band of Commerce, Tex.;* 9:30-10:15, *Concert, Fort Worth Harmony Club artists.*

WBAY, Columbus, O. (Eastern, 390), 12:00 p. m., *Piano solo, Is. Lorch Owens.*

WBZ, Springfield, Mass. (Eastern, Daylight Saving, 327), 8:30 a. m., *Morning devotional service, General Conference of the Methodist Episcopal Church;* 6:00 p. m., *Dinner concert, Leo Teisman Ensemble;* 6:30, *Dance music, Leo Teisman Ensemble;* 7:20, *Bedtime story for the kiddies;* 8:00, *Address, Guy E. Triggs;* 11:00, *Summary of Day's Events, General Conference of the Methodist Episcopal Church.*

WGAE, Pittsburgh, Pa. (Eastern, Daylight Saving, 462), 4:30 p. m., *The Sunshine Girls;* 6:30, *Dinner concert, William Penn Hotel;* 7:30, *Uncle Kaybo;* 7:45, *Songs, Charles Mundy;* 8:30, *Thomas Parks, pianist;* *George B. Kiefer, pianist, cellist, banjoist, guitarist; James Daugherty, Pittsburgh's Harry Lauder;* 11:00, *Loew's Radio Theatre.*

WCAL, Northfield, Minn. (Central, 360), 9:45 a. m.,

(Continued on page 16)

W; ONE-MAN BAND ARTIST AT WORK



Sandy Meek, baritone, who has appeared a number of times at all of the Chicago stations, will be heard from Station WDAF, The Drake Hotel, on Saturday evening, May 24.

Bernice Bell who broadcasts to household hints every morning at 10:45 a. m. from Station WLAG, Twin City Radio, Central located at Minneapolis and St. Paul.

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accompanied: Cornet solo, Willie Kell, Mildred Kelly, Tom Libard, soprano; Soprano solo, Jack Clemens, 14 years old, Larcia Clemens, accompanist; Mouth-harp duo, Carl Knecht, Fred Peters; Trombone solo, Gertrude Knecht, Mildred Kelly, accompanist; Baritone solo, Gertrude Knecht, accompanist.
WTAS, Elgin, Ill. (Central, 286), 7:30-7:45 p. m. "Oldies," child broadcaster in the world telling bedtime stories to children; 7:45, Leo Sims, pianist; 8:00-12:00 midnight, Jules Horbeux's orchestra.
WJW, Detroit, Mich. (Eastern, 517), 8:00 p. m. Bedtime to children; 8:00-9:00, "Gold-kette's" Orchestra; 9:00 p. m., Detroit News Orchestra; 9:30, Detroit News Orchestra; Mrs. May D. McCoy, soprano; Mrs. Thelma Weidemann, soprano.

Thursday, May 22
CKAC, Montreal, Can. (Eastern, 425), 3:00 p. m., Canadian National Radio Entertainers; Windsor City; Margaret L. Moody, soprano; H. G. Williams, violinist; Salvatore Cibelli, baritone; Address, C. Windsor.
WCAE, Pittsburgh, Pa. (Eastern, 262), 11:15 a. m., Howard R. Webb, organist; 5:30 p. m., Dinner concert, KDKA Little Symphony Orchestra; 6:30, Children's concert; "The Midway"; 7:30, "The Home," Radio Garden edict; 7:15, Farm program, National Stockman and Farmer; 8:00, Concert, KDKA Little Symphony Orchestra; 8:30, Concert, KDKA Little Symphony Orchestra; 9:00, Concert, KDKA Little Symphony Orchestra; 9:30, Concert, KDKA Little Symphony Orchestra; 10:00, Concert, KDKA Little Symphony Orchestra; 10:30, Concert, KDKA Little Symphony Orchestra; 11:00, Concert, KDKA Little Symphony Orchestra; 11:30, Concert, KDKA Little Symphony Orchestra; 12:00, Concert, KDKA Little Symphony Orchestra.
KFI, Los Angeles, Calif. (Pacific, 460), 6:45-7:30 p. m., M. C. A. concert and lecture; 8:00-9:00, Ambrose concert; 9:00-10:00, Elicia Perry and orchestra; 10:00-11:00, Elicia Perry and orchestra; 11:00-12:00, Elicia Perry and orchestra.
KFKK, Hastings, Neb. (Central, 341), 9:30 p. m., Camp and Hayrack Life, Hastings Post of the American Legion.
KFMF, Shenandoah, Va. (Central, 260), 7:30 p. m., Program of music, featuring Henry Ford School company ensembles; (Pacific, 312), 4:00-5:30 p. m., Concert Orchestra of the Hotel St. Francis; 8:00, Program, Tracy High School; Tracy High School Orchestra; "Education of the Future"; 9:00, Concert, Xylophone trio, Lawrence Moore, Celsyza Richards, Lourene Richards; Elicia Moore, pianist; Robert Chrusch, violinist; Helen Ritzenhouse, Julietta Presser, cellist; Edna Linkowski, pianist; Laura Broderick, soprano; James E. Ziegler, baritone.
KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., Concert, Selmering Lucas Music Co.; 3:30, Women's story program, including "The Midway"; 4:30, 5:00, Dinner concert, dance music, George Olsen's Metropolitan Orchestra; "Dance music, George Olsen's Metropolitan Orchestra"; 7:00-7:30, Children's program, stories of American history; Prof. Walter Hertzog; 7:30-8:00, Dinner concert, "The Midway"; 8:00-9:00, Dinner concert, "The Midway"; 9:00-10:00, Dinner concert, "The Midway"; 10:00-11:00, Dinner concert, "The Midway"; 11:00-12:00, Dinner concert, "The Midway"; 12:00-1:00, Dinner concert, "The Midway"; 1:00-2:00, Dinner concert, "The Midway"; 2:00-3:00, Dinner concert, "The Midway"; 3:00-4:00, Dinner concert, "The Midway"; 4:00-5:00, Dinner concert, "The Midway"; 5:00-6:00, Dinner concert, "The Midway"; 6:00-7:00, Dinner concert, "The Midway"; 7:00-8:00, Dinner concert, "The Midway"; 8:00-9:00, Dinner concert, "The Midway"; 9:00-10:00, Dinner concert, "The Midway"; 10:00-11:00, Dinner concert, "The Midway"; 11:00-12:00, Dinner concert, "The Midway"; 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30 Minute A-B-C Lessons for Radio Beginners

Chapter X—What a Vacuum Tube Does

By P. E. Edelman

IN THIS series of articles the story of Radio is told in so simple a manner that the uninitiated can follow theory and practice whether he knows anything about electricity or its application to broadcasting and reception or not. The series consists of twenty-five chapters, of which the five next will be: Chapter XI—The Shorthand of Radio—Diagram Reading. Chapter XII—Catching Radio Waves. Chapter XIII—The Radio Detective. Chapter XIV—Tuning In. Chapter XV—Working Through Interference.

MODERN Radio apparatus is centered around the device called a vacuum tube. Its function is to convert, change, or amplify electrical energy. It consists, Figure 93, of three elements in a tube or evacuated container. The

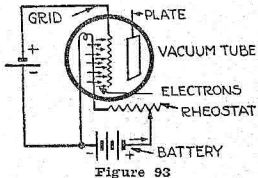
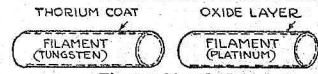


Figure 93

filament or heater serves as an electron emitting surface. The grid is spaced therefrom and serves as a control member or valve to govern the electron flow from the filament. The plate is placed outside of the grid and is a piece of metal

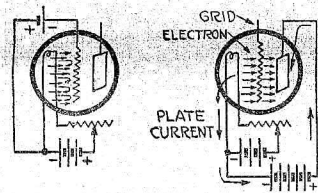


Figures 94 and 95

which can receive the electrons coming from the filament.

Vacuum Tube Action

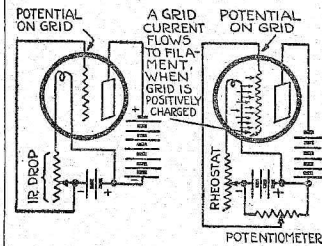
The filament, Figures 94, 95, consists of a fine resistance wire which heats up upon passage of a current through it. Most



Figures 96 and 97

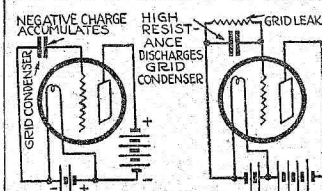
filaments in use today are treated to increase the electron emission. The well-

known type illustrated by Figure 94 consists of the metal tungsten fused with a small portion of the element thorium. The thorium is then driven to the surface by heat treatment. A thoriated filament has the same electron emitting ability as a



Figures 98 and 99

common tungsten wire of greater diameter which requires more current for heating. The type of filament of Figure 95 comprises a platinum ribbon coated with oxides, baked thereon. Electrons are better able to escape from such an oxide coat than from the surface of the platinum



Figures 100 and 101

wire alone. The heating pushes the electrons out from the surface of the wire.

As shown in Figure 93, the tube is using the grid as a plate because the grid has a positive battery connection. Electrons are negative electricity and are attracted

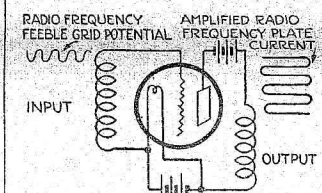


Figure 102

to a positively charged surface or repelled by a negative charge.

It is necessary to recognize what goes on in a vacuum tube to comprehend the action in a receiving set.

Figure 96 shows the grid negatively charged and returning or pushing electrons back to the filament.

Figure 97 illustrates the grid without charge from external circuit, so that electrons reach the plate. Then a battery connected to the plate can supply a current which will flow through the space between the plate and filament, now filled by electrons. This plate current will increase if the emission of electrons from the filament is increased, or vice versa. This plate current will also be controllable by applying a smaller or larger charge either negative or positive to the grid, because this will then control the electron flow.

Putting Potential on Grid

A simple way to put potential on the

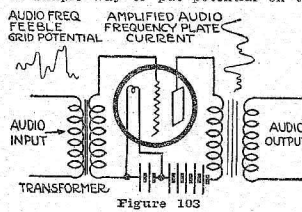


Figure 103

grid is to let the rheostat controlling the filament current be included in the grid circuit. A so-called IR drop or potential, set up by the current flowing through the rheostat, can then reach the grid. Such a potential is used as a control for the action of the vacuum tube. It could be obtained from a grid leak resistance or from a potentiometer or a separate battery. This is shown in Figures 98 and 99.

Figure 100 shows how a grid condenser lets a negative charge accumulate on the grid from the electrons, by condenser action. Figure 101 shows how a high resistance called a grid leak is used to allow such a charge to disperse away slowly.

Alternating Potential Applied to Grid

If then the potential applied to a grid controls the electron flow to the plate, what will alternating potential do? From Figure 102 it will be seen that an alternating input potential or frequency will cause the plate current to vary at the same frequency. The plate current, however, gets energy from the local battery and will

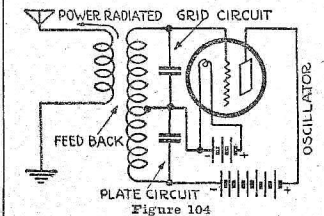


Figure 104

contain greater energy at this same frequency than was applied to the grid. This is amplifier action. Also if a fluctuating potential is applied to the grid (Figure 103) the plate current will repeat the same fluctuations.

Oscillations

By coupling back the plate circuit to

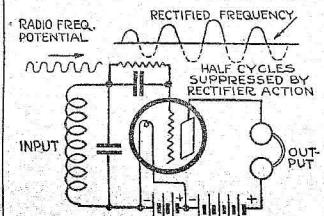


Figure 105

the grid circuit regeneration sets up oscillations. Power can be radiated from such (Continued on page 28)

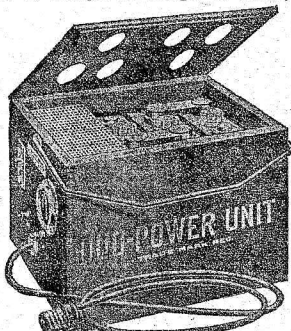
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is a high grade charger and battery combined in one cabinet, thereby eliminating the possibility of incorrectly connecting battery wires to charger; the usual mess of unsightly wires, cables, clips, etc., and the carrying to battery to charger or charger to battery for use.

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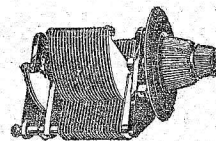
This DUO-POWER UNIT can be used while set is in operation; charger or battery can be used separately. All parts are easily accessible should adjustments or repairs ever become necessary. Will also charge your WET "B" BATTERIES.

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New Crosley Engineering Achievement

Four and Five Tube Receivers with Three Tube Receiver

For over a year the Crosley Engineering Department has been working on a new circuit. This has now been perfected into an unusual radio receiving set—a triumph in radio engineering.

This remarkable set is equipped with two condenser dials, two rheostats and a slide tapper. It uses three tubes; one stage of non-radiating radio frequency amplification, regenerative detector with perfectly stabilized control of regeneration from which the signal goes back to the first tube, using that tube over again for one stage of audio frequency amplification and then traveling into the third tube, an additional stage of audio frequency.

From this combination of three "R's"—Radio Frequency Amplification, Regeneration and Reflex—we have coined the name Tri-R-Dyn, which will be written Tri-R-Dyn.

Advantages Never Before Offered

The advantages resulting from this successful circuit have, to our knowledge, never before been offered. Radiation is reduced to an absolute minimum, the signal is intensified before it goes to the detector, thus giving the detector an unusually strong signal upon which to function, and the dial can positively be calibrated to any wave length between 200 and 600 meters. With only two dials, the most inexperienced person can pick up station after station, without calibration and without difficulty, bringing stations in volume equal to any four or five tube set on the market.

See this latest Crosley achievement at your dealers or write for further complete information concerning it.

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Political Significance of Radio

It Will Be Easy to Reach the Multitudes

THE old time political meeting is doomed. Men came together to be told about issues and men because the candidates could not be transported to each voter. The latter now will forego actually seeing the candidate and will listen to what he has to say over the Radio.

Already some politicians have adopted Radio as the best means of reaching their constituency. All others to be successful will have to meet this competition. The change has come almost over night.

In the political gathering the voter was subjected to the mob influence. The lights, the crowds, the pushing and pulling, the flags, the old veterans holding down the front rows, the flowery references to the "Grand Old Party of —, and — and —," the bands, all this will be missing as so potent an element and factor in the future for most of us. We'll be at home, listening in.

The personal bodily appearance of the candidates is bound to suffer in this development. The big man will have to show something better than a large frame. His personality also will not have the opportunity to impress itself as formerly on his hearers.

It is true that the written word—newspapers, magazines, mail matter campaign literature, heretofore supplemented the meeting. But the people demanded the personal touch and were willing to transport themselves to get it. Now, folks are staying at home because of the Radio, and they will compromise between their natural desire to actually see their candidate and their more natural liking for home. They will use their ears instead of their eyes. Incidentally they will be better rounded individuals for this evening up of the use of the senses.

Politicians will have to give us hereafter a more straight-forward story. Removed from the influences that interfere with reasoning, in the quiet of the home and the circle of family and friends, which things are usually seen as they are, calm analyses will meet the offerings of the spell-binders. And we unto them, if they continue the bunk which has regularly characterized the conventional political meeting.

The broadcaster has no comeback. He must "produce." And the politician, being the most discerning of the race, will meet the occasion by supplying an improved brand of wares.

It will not be long until the sessions of the legislative and judicial bodies will be available over the Radio. This phase of the problem is important because so much time is now wasted in just plain "talk." What is said will have to have some meat. That will cut the mass quite a bit. The raucous roar of the political lightweight will find too little encouragement.

The leading men of each part will sense the value of this method of setting forward its principles, with the result that only the best men will be given the fullest privilege to speak. Part discipline will take care of this. Perhaps we shall see a finer type striving for office, in view of the greater facilities now at hand for influencing large numbers of people. In opposition to this view it is useless to say that the newspapers now offer this opportunity: too much is printed these days; the people rarely read a paragraph through. Radio is yet a novelty and folks will listen, for the additional reason that listening is less work than reading.

Who Will Pay the Broadcaster?

If Advertisers Hold Sway, Interest Will Be Lost

ONE of these days we are going to come face to face with the problem of who is to pay for broadcasting. The financing of broadcasting stations is steadily becoming more difficult, with the public demanding better programs, the performers demanding pay for their services, and the overhead costs mounting. A high-power station nowadays is coming to be a kingly luxury, even for publicity purposes.

The Radiophone, with its millions of nightly listeners is obviously well adapted to publicity and propaganda effort of many kinds, yet if that side of the game were overdone, patrons would lose interest, just as they would in a newspaper that was nearly all advertising.

RADIO INDI-GEST

The Ear Marks of a Wise Crack

Manager Indi-Gest (ion) Dept.: I failed to get any limericks when I sent in a batch sometime ago so it is plain to be seen that Indi-Gest readers do not want heavy stuff. Now I am sending something new and I believe I am the discoverer of this terrible condition which is doing more to bring us all to one level than all the preachments of Carl Marx, Mike Rofarad, Neut R. O'Dyne or any other pioneer. Is this a symbol of universal brotherhood or is it to be held up to scorn because the poor can afford a mark as distinct as that worn by the aristocrat? I'll leave it to the readers of this column. Here is the situation:

THE "EAR MARKS"

You will always know a tradesman,
An artist or a lord;
An actor or a preacher
Or the man who wields the sword;
The man who drives or shoeds,
Or drives the ship of state,
Each has some tell-tale marking
Which sticks to him like fate.
But the markings are peculiar
To the class which they adorn,
Each depicts a man's vocation
More than all the clothes that's worn.
In the masses or the classes,
Pick them out by special mark,
As you would at a type or species,
Or a tree just by the bark.
A new mark now is growing common,
Which adorns in every class,
High or low, rich or poor,
The one thing common to the mass.
It's the mark on Radio listeners
Who've grown legion in recent years,
You can always tell a brother
By the callous on his ears.

H. ED FONES.

The Old Dogs Will Appreciate This

Dear Indi: At last, I, Prof. Hoozzlegoozzle, have perfected my Shingle Circuit Receiving Set which at any time will pick up any Aee's speech. I find that conversation between two flees is most interesting, presenting at times a scratching sound, especially when mother flee and daughter fleec flee. You will find the hook-up in the upper right corner of page 33. You're welcome! Prof. Hoozzlegoozzle.

Mrs. Partington Speaks Out



Dear Indi: Mrs. Partington says she heard Mr. K. D. K. A. Radio casting a lecture of the Travel Explorer, and Big Story Hunter, who was telling his unvisable and innocent audience about fishes climbing tres, and birds fishing big snakes out of the sea, and she sez, sez, she, ain't inventions wonderful since the 18th commandment

was elected and unforced.

SIGNING OFF.

Click! Click! Keys!

Wait Whitman gets the sympathy this time.

Click! click! keys!—hum! cws! hum!
Through the windows—through doors—burst like a ruthless force,
Into the shank where fellow hum is working,
Leave not the super quiet—no happiness must be have with his loop,
Nor the cheerful child any peace, receiving with crystal, gathering the static,
So fierce you thump and pound, you keys—so low you cws hum.
Click! click! keys!—hum! cws! hum!
Over the traffic of messages—over the rattle of jazz in the air;
Beds are prepared for sleepers at night in the houses. No broadcast is heard through your drone.
All BCL's argue by day—no pleasure or speculation—will you continue?
Would the talkers be talking? Had you not interfered with a song.
Shall a lawyer rise in court to plead your case before a judge?
Then thump faster, nimble keys—you cws louder hum.
Click! click! keys!—hum! cws! hum!
Make no parley—stop for no expostulation,
Mind not the others—mind not complainer or justness,
Mind not the old man beseeching you, young man,
Let not the fau's voice be heard nor your true friends' entreaties.
Make even your own death with your clamor, while without, the awaiting hearers,
As strong you thump, O terrible keys—while loud you cws hum. 5XV.

Business Is Picking Up

Dear Indi: I see by the papers that they caught a man acting suspicious in one of the large Radio stores. Upon questioning him and examining him at the office, 25 tubes were found concealed upon his person in specially made pockets.

Wonder if he could be a representative of some of the tube manufacturers drumming up business? SPIDER WEBB.

"Shoot If You Must—"



Condensed

By DIELECTRIC

Next in order will be an investigation at Washington to find those responsible for the "propaganda" against the inclusion of a tax on Radio in the new tax bill. There are several millions of us ready to admit our share of the guilt in putting this brilliant (?) idea to death. Senator Sinoof was not far wrong in considering the large Radio manufacturers monopolistic, yet the cure for that does not lie in taxing consumers. What struck me forcibly was the avalanche of protests aimed at the "August chamber" by listeners in. We can repeat, too.

You need not walk very far away from your set to find someone ready to shout at you about the damage Radiophony has done to this and that industry. A little patience and they would discover that both the industry in question and Radio itself prosper under wise procedure. The phonograph business suffered as a consequence of the advent of Radio—at first, but now the two are inseparable companions. It will be the same with this music snarl; eventually broadcasting will be regarded as a prime requisite to insure large sales of sheet music. Let 'em holler!

A great many fans think the air is overladen with programs as sent out by the five hundred odd broadcasting stations now operating, though that is a matter of opinion. Some of the features have a very limited appeal, it is true, but much that comes into the receiving set is welcome. Just how many of us would take the trouble to tune in on a station broadcasting the heavy-side of a Senator's thoughts is something for statisticians to determine. The War and Navy departments have been asked to decide the feasibility of broadcasting proceedings in the Senate through government stations. They might need both branches of the service to stand ready for action, if they get going too strong.

Another attempt to make use of the new method of covering our country via Radio was successfully carried out recently and should leave no doubt as to the effectiveness of the short-wave scheme. WJZ held the stage from which music and speeches were broadcast to listeners tuning in KDKA, WGY, KFKX and KGO. Each of these stations, excepting the first and last mentioned, used two transmitters, one working at the regular frequency while the other at a special frequency to be picked up by the next station along the line. More of this might be done.

In December of last year, station WOR made a special effort to reach Japan with a program of dance music supplied by Paul Whiteman's orchestra. It got across all right, but the record made last month by this station is heralded by the owners as something to brag about. A speech was made in Esperanto by James Sayers before their mike at 6:15 p. m., Eastern standard time. Mr. Ando, a famous Japanese Radio engineer, heard first the music then the talk in the international language. No special effort was being made at the time to reach so far.

Most broadcasting studios are things of ornate design, furnished rather elaborately at quite some cost. Naturally you don't expect Chippendale chairs to serve as speakers' rostrums, nor a mike that can be reeled from one position to another in the studio—at least we didn't until WMC started us questioning. That popular southern station had "Billy" Sunday as a guest one day, during his stay in Memphis, and I never heard of his preaching from a given spot nor of a dislike for standing on chairs. Perhaps he can flay us just as well while standing on the floor, stationary.

How to Construct a Super-Heterodyne Receiver

Part IV—Wiring and Tuning the Set

By Allen C. Forbes

THE wiring of the super-heterodyne set can be made simple or hard, depending entirely upon the person making the set. If the apparatus has been laid out as recommended in the previous articles, you can start right in by screwing the panel to the base board. A small angle of brass should be shaped and fastened on the rear of the .001 condenser (if of the mechanical geared type) and resting on the baseboard. This will assist in supporting the panel and holding it rigid.

Your next step is to commence wiring. First look over the assembled set and compare the placed apparatus with the circuit diagram, noting mentally how the wires will fit in and where they will go. Now wire up the filaments of the tubes and the rheostats, then tackle the oscillator circuit, then the intermediate frequency transformers, then the audio frequency to the jacks and the job is done.

Wire Filament Circuit First

The writer always figures out the longest leads first, but then this is no criterion because it is very doubtful if any two men will wire up a set the same way or go about it in the same manner. However, that is not of any great importance. It isn't going to affect the operation of the set a great deal or even in the slightest degree as to which piece of apparatus is wired up first. Experience has shown, however, that by wiring up the filaments first the chances of making a wrong connection to the B battery are greatly reduced. It is also a fact that there are a number of returns to filament and these can be connected at once when working on them if the filament leads are already in.

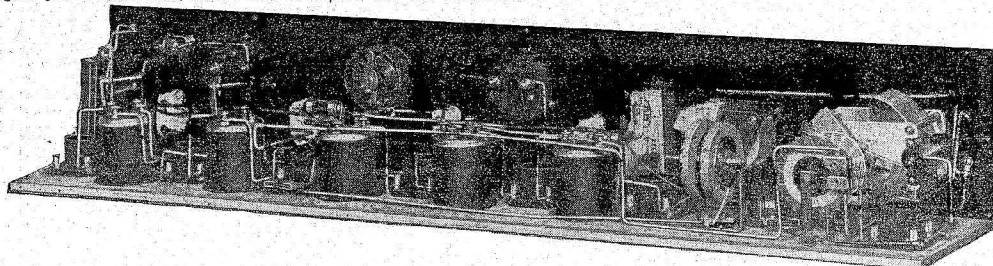
The question of whether to use square brass, square brass tinned, number 12 round or number 14 round tinned wire, is mostly one of convenience and individual taste. If you think square brass makes a neater job and looks better to you, use it. On the other hand, if you wish a "classy" job as well as one that is of real service, use number 14 round and cover it with genuine varnished cambric tubing. Get five colors: yellow, black, red, brown and green. Put black tubing on all negative and yellow on all positive six-volt sets.

Use the red on all plate connections and 90-volt B positive leads—except the two detectors. Use the brown on the plate leads of the two detectors, and wherever the 22½ B positive goes. Use the green on all grid leads for all tubes. This will give you a color code, as we call it in

the correct connections for each lead go. The great trouble in wiring a set with a lot of connections is liability to connect grids where plates should go, and often the fatal mistake of connecting 90-volt B positive to the negative A somewhere in the set and connecting the positive A

with extreme care—soldering paste will run down and into the case.

Keep the leads off the base board as much as possible. Run each lead direct and short. Don't try to see how many fancy square corners you can make. The purpose in wiring a set is to furnish a



telephone work, that will improve the looks of your set a thousand per cent, as well as enable you to wire it absolutely correct. It will be hard for you to make a mistake in wiring if you stick to the color code, because it acts as a check on your wiring.

Advantages of the Color Code

The writer recommends using the color code for all inexperienced as well as experienced men. It is only slightly more expensive than doing without, and the check that it holds on the making of mistakes is more than worth the extra cost. It is surprising how few of the average laymen there are that will take the little extra time and place "spaghetti" on the leads, using different colors to distinguish the leads and denote what they carry and where they go. The writer doesn't claim originality on the introduction of this method, but just wants to call it back to memory so as to make the wiring of the super just as easy as possible. Try this method once in making your next set, whether it's the super or some other kind. Note with what ease you can trace the wiring and how sure you are of where

and negative B outside the set, so that when it comes time to insert the tubes preparatory to turning on the "juice" eight tubes will be burned out slick as a whistle. Using a color code, this kind of a wrong connection cannot happen, because in making the final trace to see if everything is O. K. you would notice the red to black and would know it was wrong immediately. You wouldn't have to guess. And by the way, let us mention right now: don't ever guess where a lead goes in a super-heterodyne set, or for that matter, in any other set—know where each lead goes. Guessing has blown more tubes than any other indoor sport.

Use Lugs for Solder Connections

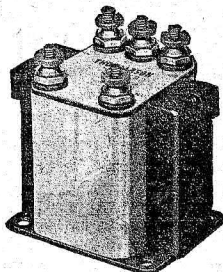
Get yourself a small box of tinned copper or brass flat lugs and insert these lugs under the binding posts on the various pieces of apparatus, then solder all wires to these lugs. The writer never recommends soldering direct to any piece of apparatus if it is at all possible to avoid it. One of the most important reasons for so doing is that unless—and even

path for the current to flow from and to. It is not placed in the set to see how fancy it can be made to look. First on the program in wiring is efficiency. Second is looks. If a particular lead can be made extremely short, but you don't think it will look good, take my advice and run it short.

Get all your wires in first, then put in your fixed by-pass condensers. Remember this, do not solder wires direct to the fixed condensers. All of them are fitted with holes. These holes are not there for ornaments, they are placed there so that a 6-32 screw goes in nicely. Just get yourself a 6-32 machine screw, round head, and a nut, then insert it in the hole on the condenser and slip one of the aforementioned tinned lugs under the nut and tighten up on it, then solder the wire to this lug. Better practice would be to solder the lug to the wire before mount-

(Continued on page 26)

THORDARSON



POWER AMPLIFYING TRANSFORMERS

Price per pair, \$13.00

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

With power amplification, not only is it possible to increase volume, but, since two tubes replace the usual one, the distortion and howling which usually accompany the overloading of a single tube on the third stage is done away with entirely.

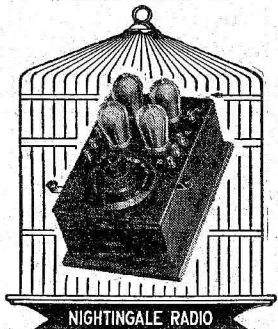
The Thordarson Power Amplifying Transformers are well constructed electrically and are capable of indefinitely carrying the additional load without breaking down.

In tonal purity these transformers equal the Thordarson Super Audio Frequency transformer whose rich quality and even amplification has made it the popular transformer of the day.

THORDARSON
ELECT. MFG. CO.
500 W. Huron St. CHICAGO

HANSEN BIRD CAGELINE 'Nightingale'

4-TUBE RADIO SET
\$32.50
WITHOUT ACCESSORIES



It is simplified Radio at its best and at a price within the reach of all.

It is small but has a 2000 mile range with a loud speaker.

Its small size makes it ideal for vacations or auto trips.

One stage of R. F. helps to reduce static.

Hansen MOCKINGBIRD. 6 Tube Long Distance Loop Set. \$90.00

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DEALERS—A wonderfully attractive proposition.

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National Distributor
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"The Million-Dollar Warehouse Company"
Radio Department

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United Auto Supply Co. Columbus, Ohio
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Mention second choice to be shipped if article ordered is out of stock.

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Also cabinets in imitation mahogany.
Write for prices. All sizes.

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17 Plate—Standard.....\$ 1.04
Vernier, with dial.....\$ 1.87
23 Plate—Standard.....\$ 1.12
Vernier, with dial.....\$ 1.94
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M Magnavox.....\$ 24.35
M Magnavox.....\$ 24.80
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Acme A 2.....\$ 3.55
All American, 3 to 1, 10 to 1.....\$ 3.45
Amertan.....\$ 5.10

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Radiotron—UV 200, UV 201A, UV 199, WD 11, WD 12.....\$ 4.22
Phuformer.....\$ 7.13

PHONES

Western Electric.....\$ 8.50
Baldwin C.....\$ 8.43
Facet, 2200 ohm.....\$ 2.85
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BURGESS B BATTERIES

2150—22½-volt, large.....\$ 1.85
2300—45-volt.....\$ 3.45

SETS

Radiola Type Set, 1 tube.....\$ 7.50
Crosley 51.....\$ 13.85
Fada 160 Neutrodyne.....\$ 90.00
Triodyne.....\$ 48.75

Complete Parts for Super-Heterodyne 8-Tube, including drilled panel (Permalac) engraved, blueprints and pictures, solid walnut cabinet.....\$99.50

AUTO NECESSITIES

Little Wonder Windshield Wiper.....\$.78
Acme Ball Bearing Motor Driven Horn.....\$ 3.76

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Well-known Polar Cub Elec. Fan, 6-inch; operate either on A. C. or D. C.....\$ 3.09

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Radio & Audio Frequency TRANSFORMERS

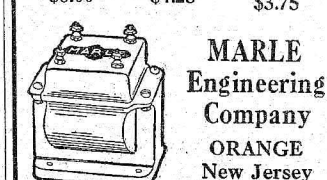
"The Heart of a Good Receiver"

GUARDIANS of perfect amplification! Equal to the sternest tests. Repeated tests prove that Marle Transformers amplify uniformly over the widest practical range of frequencies. No Marle Transformers ever known to howl or produce the slightest distortion. Sold on that basis and bought repeatedly after proof by use.

Tested and found well adapted to the best circuits, superdyne, super-heterodyne, four-circuit tuner, neutrodyne, teledyne and inverse duplex.

Speak to your dealer about Marle Transformers

Type A 9 Shell Type Radio F.	Type A 6 Coretype Ratio 5 to 1 Audio F.	Type A 4 Coretype Ratio 3 3/4 to 1 Audio F.
\$6.00	\$4.25	\$3.75



MARLE
Engineering Company
ORANGE
New Jersey

Audio F. Core Type Type A 7 Ratio 3 3/4 to 1 \$4.50

Radio F. Type R 1 and R 2 Coretype \$4.00

How to Make a Superdyne 4-Tube Wonder Set

Simple Construction of the Popular Receiver of Today

By Lewis A. Morrison

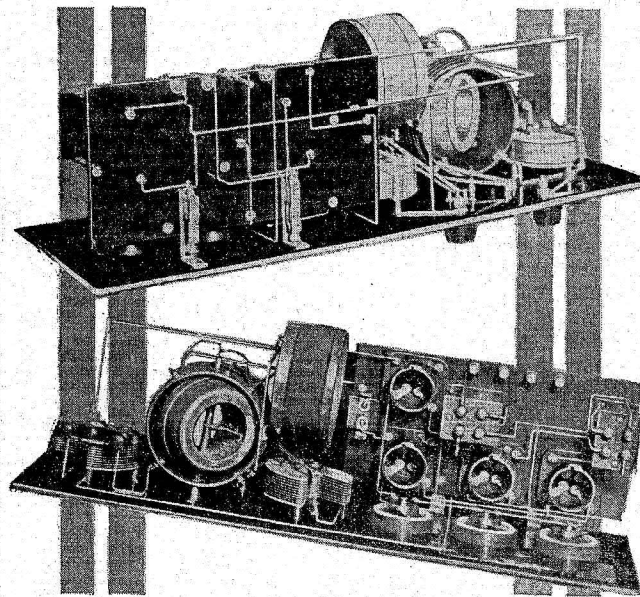
THE superdyne circuit is becoming popular every day with Radio-phans because it is a comparatively easy set to build; gives remarkable volume and clear speech, and produces DX results with a short indoor aerial that here-to-fore have only been accomplished with a good out-door antenna system.

While admitting that Radio is far from perfect, the superdyne is a great step toward that end. However, we cannot approach perfection without some sacrifices and the superdyne is no exception. It is to help the novice over the bumps that this article is written.

Although easy to build, there is no set which reflects the care and pains of the builder with more satisfaction than the superdyne. You cannot throw this set together as you can some others and expect results. This has been the reason for many experimenters discarding the circuit with the excuse of "well it may work some places but not in my location." Superdyne will work in practically any location and without an aerial at that.

Laying Out Panel

In laying the set out on a panel, the most satisfactory arrangement is to mount the coupler between the condensers with the plate coil at right angles to the coupler and behind the plate condenser. A small piece of bakelite can be attached to the first or grid condenser for the aerial and ground binding posts, as shown in the photograph. A neat back panel arrangement, is to attach the jacks as low as possible to the main panel and by drilling holes in the body of the jacks, use them as angles for the support of the back panel. In placing the tube sockets, permit the grid condenser, (a .0025 mfd.) to come as close as possible to the grid terminal of the detector or second tube. Best results will be obtained by using a separate



rheostat for the Radio frequency tube which will necessitate three rheostats for the complete set. The two audio frequency tubes are controlled by a single rheostat.

Although not shown in many diagrams of this circuit a grid leak is strongly advised. However, it should not be used across the grid condenser, but rather

from the grid of the detector tube to the positive filament. This gridleak is not critical but will vary with the type of tube used. It should be placed close to the

grid of the detector tube socket.

Now a word about the selection of parts. Be sure the coils are wound to specifications and although in contradiction to previous articles, these specifications can be altered slightly with good results. However, it is best for the novice to have them correct.

The coupler should be wound with 42 turns number 22 dsc wire tapped at the 20th turn. On top of this winding and spaced approximately 1/4-inch, wind 4 turns of a somewhat heavy insulated stranded wire such as lamp cord. This is to act as the untuned aerial circuit. Have these terminals come on the left side of the stator. The ball rotor should have 36 turns of the same wire. The plate coil, 46 turns, tapped at the 21st turn. The bakelite tubing should be 4 inches in diameter. The taps can be eliminated if the builder so desires and the set will tune as low as 300 meters without them. Two separate tap switches may be used, but a double pole double throw switch is better and with the push-pull type of switch now on the market, makes an attractive arrangement.

Variable Condensers

This is a delicate subject. Too much stress can not be laid on the necessity for good condensers. This does not mean the most expensive condenser, but it does mean that they must be of good material, preferably bakelite and most important of all, the bearings of the movable plates should be constructed to give a minimum electrical resistance. The superdyne set is peculiarly sensitive to resistance in condenser bearings. Do not use vernier condensers of a type that employ an extra movable plate, unless the plates are joined by pigtails. Vernier condensers are not necessary, but if they are desired, use a type that em-

(Continued on page 24)

Building your own? use DeForest Parts.

DE FOREST RADIO TEL. & TEL. CO., Dept. R.D.9, JERSEY CITY, N. J.

The Twitchell Auxiliary Tuner

Patents Pending. Name Registered.

MORE THAN A WAVE TRAP

A TWITCHELL AUXILIARY TUNER connected to any make of tube receiving set will positively cut out any local broadcasting or code stations so you may tune in all long distance stations any time regardless of local conditions.

Unlike any wave trap, THE TWITCHELL AUXILIARY TUNER does not ever decrease but in many cases increases the volume from distant stations.

These TUNERS are in daily use within 400 feet of large broadcasting stations and enable their owners to easily and completely cut out the local station and bring in distant stations at any time on a loud speaker.

This instrument will also enable you to bring in programs sent out on longer waves than you can tune in without it, thus bringing all the broadcasting stations within the wave length range of the many sets of limited range now in use.

Copyrighted diagram of this tuner, 50c, or with all parts, \$9.00. Complete instrument in walnut cabinet, ready to use, \$15.00.

A New and Wonderfully Efficient Coil for the Reinartz circuit for those who want the best. Price \$3.00, or with blueprint for either one of three tubes, \$3.50.

This circuit brings in both coasts loud and clear and is the most successful Reinartz modification yet produced.

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

1925 WESTERN AVENUE S. A. TWITCHELL MINNEAPOLIS, MINN.

STA-RITE RADIO BATTERIES SAVE YOU 60%

And Guarantee You in Writing 2 Years of Better Battery Performance

STA-RITE RADIO BATTERIES are made especially for Radio and the big saving is made possible by coming direct to you instead of thru distributors, dealers, etc. Boxes are made of oak, finished in mahogany and the plates very thick and will give a steady discharge over a long period. No premiums, just good, honest battery value.

TRY TO BEAT THESE PRICES			
2 Volt for W. D. 11 and 12	\$4.00	6 Volt 60 Amprh.	\$ 7.50
4 Volt for U. V. 199 Tubes	7.00	6 Volt 80 "	8.50
RADIO B. STORAGE		6 Volt 100 "	10.00
Glass Jars, Heavy Plates—		6 Volt 120 "	12.10
Case of 12 Cells, 24 V.	4.90	6 Volt 150 "	14.00
		6 Volt 200 "	17.00

Get Yours Today—NOW—Send No Money

The batteries are fully guaranteed in writing and shipped subject to examination on the day your order is received. You pay on delivery or deduct 5 per cent if full cash accompanies order. You may deduct 10 per cent if two or more are ordered at one time.

STA-RITE BATTERY CO.
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"Built First to Last"

Audio Amplification at a Popular Price

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

Great for reflex circuits.
Type 4500..... **\$2.50**

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

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4-TUBE WONDER SET

(Continued from page 23)

plays a reduced ratio movement of the main shaft.

UV-201A and C-301A are excellent Radio frequency tubes with a 30-ohm rheostat on negative filament; however, there is a marked difference in individual tubes, a small percentage being much better Radio frequency amplifiers than the general run. Any good soft tube will answer for a detector. A VT-1 or J tube being exceptionally good in this circuit. The detector plate voltage will make a

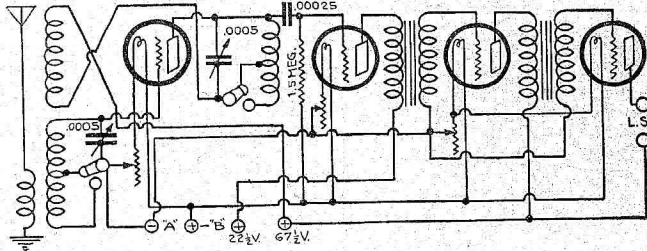
does it "superdyne?" This circuit has the peculiarity of producing some results even though not wired correctly and is apt to fool the novice into believing that the set is wired correctly but N. G. This can be best determined by lighting the filaments of all four tubes, and with the taps in position for long wave lengths, rotate the ball rotor to a horizontal position, making mental note of which face of the rotor is up. By operating both condensers in unison as though they were geared together, one of two things will happen. Either a beat note or squeal will be produced or a station will be tuned in,

as it should be, they will not fail to produce results.

The superdyne circuit embodies qualities which make it the best circuit so far produced for the broadcast listener. It will take summer weather for its real worth to be appreciated, for then with a small indoor aerial or no aerial at all, thus reducing static, volume and DX results will be a surprise to all who try it.

Coast to coast Radio reception is now possible for us all without the outlay of a king's ransom, proving that:

All things come to him who waits, but here's a rule the slicker: He who goes after what he wants, will get it all the quicker.



marked difference in the sweetness of musical tones, but is not very critical.

Amplification

The audio amplifier follows the general outline of any good two step, except that it is advisable to use transformers of a low or medium ratio. Because of the great volume this set gives, a small fixed condenser of .001 or .002 mfd, as the case may be, placed across the secondary of the last transformer, will greatly soften and improve the quality of the tone produced, but this is optional.

Now a word about operating this circuit. Many a good superdyne has been tried and discarded because the operator had not acquired the knack of tuning. The writer himself, an experienced Radio man, was quite disappointed with the first night's results, but once the trick is accomplished it becomes a simple matter. It has been said that the superdyne is not selective and such will be the case if it is not handled properly. However, with proper operation the writer has on numerous occasions brought in WDAP, Chicago, 800 miles distant, right through WHN, less than 3 miles distant, both stations scheduled to operate on 360 meters. That is selectivity enough. The first thing to determine on completion of the set is,

If the first takes place, turn out the Radio frequency tube, when it should be possible to tune in the station on three tubes. This position of the ball rotor is that of the positive feedback. If the second condition takes place, and a station is tuned in, turn the Radio frequency tube out, when the signals should disappear. This position of the ball rotor is that of negative feedback and the proper position for superdyne. Now with the ball rotor in the negative feedback position and all tubes going, rotate both condensers until a station is heard, then turn the ball rotor toward the vertical, when a position will be found that will produce a sharp snap in the horn, showing that the oscillating point is reached. Now, by operating the grid coil or first condenser against the ball rotor, a combination will be reached that will produce clear and loud results. The finer this adjustment, the more sensitive and louder the signals will come in. This last adjustment is quite critical and when mastered will produce great selectivity.

Of course, these tests should be made when a near-by station is known to be on the air. Variations from this rule will be developed by the individual as he acquires skill in tuning, but if everything

PORTABLE SET FOR AUTO

(Continued from page 13)

cover gave slightly better results. The framework of the car was used for a ground connection when running, while a stake driven in the ground, when stopping anywhere, gave considerably better results.

Loud Speaker

The loud speaker was very conveniently strapped to the side frames of the windshield. Some pieces of large, heavy rubber bands were used to cushion the loud-speaker against the metal framework of the windshield wherever they came in contact.

A pair of headphones should be kept in some convenient spot, preferably the pocket in the front door, as tuning in on a loudspeaker when car is in motion is by no means a simple matter.

As the depth of this set is only 5 1/2 inches below the lower edge of the dashboard the passenger next to the driver will experience no discomfort in placing the feet underneath the set. With a set not properly designed the position of the set might make it decidedly uncomfortable for this passenger.

The Auto-Portable Receiver

In last week's article of this series the hook-up diagram of the circuit was shown

and a list of parts required was given. In this article, Figure 2, is the panel layout and Figure 3 is the baseboard layout.

Front Panel

The front panel requires a piece of 7-inch stock measuring 12 by 5 1/2 inches. The two tuning condensers are mounted on the left and right hand sides. Only the shaft holes are indicated, the mounting holes depend on the type of condenser used and should be added as required.

The two knobs in the center are the two rheostat controls, the left one being used for the two amplifier tubes and the right for the detector tube. The hole in the center just under the two knobs is for the battery switch. The one directly beneath that is for the single-circuit jack.

The four holes, two on each side of this jack, are for the battery connections.

The small single-connection jacks were used so that connections can be made by just pushing in the small tip plugs fastened to the battery leads.

The hole in the upper left-hand corner is for the switch controlling the connections for loop aerial use. This was indicated as a four-spring jack switch in the circuit diagram.

In the center at the top and on the right and left sides of the lower edge of this panel layout are indicated in dotted lines some angle plates that were used to fasten the top panel and baseplate to this front panel. These pieces will be detailed later.

Base Layout

Figure 3 serves a double purpose. It gives the size and drilling layout of the baseboard and also gives the apparatus layout inside of the set. This baseboard can be made of wood, but it is advisable that panel stock be used. The size should be 7 by 11 1/2 inches.

The tube sockets in the upper left and right hand corners are the two amplifiers, while the one in the center is the detector. This corresponds to the arrangement in the circuit diagram of last issue.

The first audio frequency transformer in this base layout is the lower one shown (Continued on page 28)

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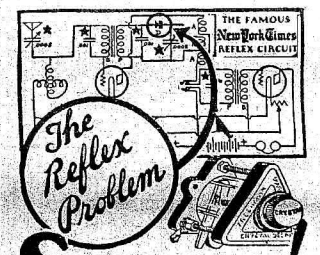
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An Easy Way of Charging Storage B Batteries

Connections for Bulb Rectifiers as Charging Units

By A. R. Leinbach

D OUBTLESS every possessor of a storage B battery has tried the electrolytic rectifier method of recharging it and found it rather unsatisfactory and bothersome. As much simpler and more convenient method is to use the bulb rectifier that is used to charge the A battery. All that is necessary is to make a slight change and addition to the wiring. The writer has been using this method for over a year with excellent results and has changed quite a number of rectifiers for friends.

In the diagram 1, a bulb rectifier schematic diagram is shown of the internal connections. The same thing with the necessary changes made is shown in 2. The standard connections of the old type charger is shown in 3 and the revised connections are given in 4.

Although the diagrams tell the whole story, a step by step description of the necessary changes will be given.

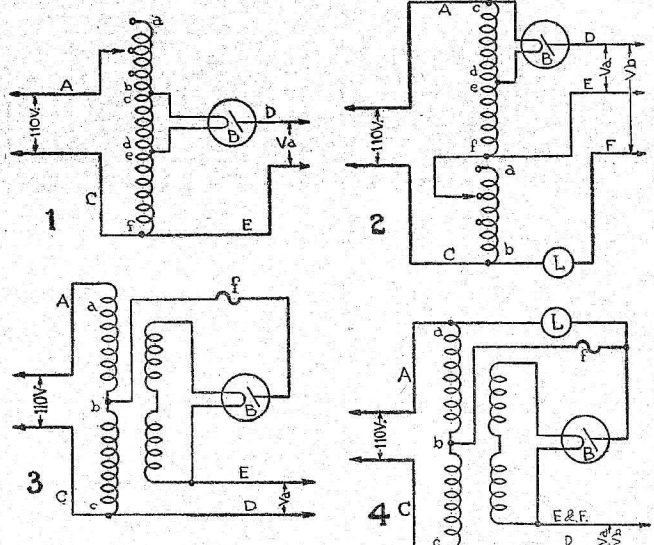
Making the Change

If it is desired to charge a battery of about 60 to 70 volts or less, it is only necessary to add one wire to the diagram 1. This wire should be attached to the 110 volt feed wire marked A, the other end being attached to the positive or plus side of the battery, making sure to connect a lamp in the series of about 100 watts. The negative side of the battery is connected to the wire marked D, which is the lead with the black or unmarked lead. The battery lead with the red mark or red lead marked B on the diagram is not used when charging the B battery. Leads D and E, the leads equipped with clamps, may be used as before for charging the A battery. Caution—Do not attempt to charge both A and B batteries at the same time, as that will put alternating current through the B battery and probably ruin it. This method will provide about 60 volts direct current reading on a direct current voltmeter when no battery is connected. When charging a higher voltage will be obtained. It is not necessary to trace out any wires or even remove the charger from its case to get this connection. Merely attach the wire specified for attaching to A one of the 110 volt leads and connect to the battery as directed above. If the battery starts gassing, the right wire was selected. If not, change to the other wire. No diagram is given for this case.

If it is desired to charge a battery of 90 to 100 volts or less the schemes shown in 2 and 4 should be used. These may also be used for larger batteries by dividing it into two or more parts and connecting them in parallel. To change from 1 to 2, disconnect A from a, b from c, and C from f. A should then be connected to c, one side of the tube socket. C goes to b with another wire attached at the same point,

which is connected to a lamp socket and from there (wire F) to positive B battery. A short lead is run from f (leaving E there

be removed. A wire will be seen running from the plate (top) of the tube to a fuse block. At the point where this wire is

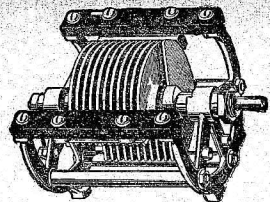


also) to a, the connection block provided at the top for taking care of different alternating current voltages of 105, 115, and 125. Va, the voltage between D and E, is the supply for charging the A battery (these are the same leads as previously used, the ones provided with clamps) and the black lead D and the new lead F are used for the B battery, D being negative or minus and F positive or plus. Vb, the voltage between D and E is used for charging the B battery, the black lead D going to the negative side of the battery. The same caution given for the previous case applies here for both A and B batteries cannot be charged at the same time.

In the case of the old style rectifier, considerably less work is required. In this, as in the one above, the case should

attached to the latter, attach another wire which should go to a lamp socket. From the lamp socket, this wire should go to the 110-volt lead A. As in the first case,

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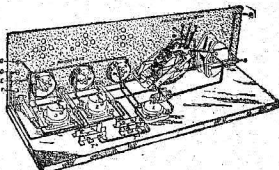
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it is not necessary to trace out the 110-volt leads in order to find the correct one (though it will probably be most convenient to attach same inside of the case), but it can be attached to one of the leads and the battery connected. If the battery gasses, it is O. K. If not, change to the other 110-volt lead. When charging the A battery, the lead marked B and F with the red lead and clamp should be connected to positive and D, the black lead to negative, with no lamp in the socket. To charge the B battery, remove the fuse and put a lamp in the socket just provided for it. Never try to charge either battery with both a lamp and a fuse in circuit. A lamp and no fuse for the B and a fuse and no lamp for the A is required.

It will be noted that a 100-watt lamp was specified in the first case. This is not an iron-clad rule, as any suitable size lamp may be used. When charging a large battery in several parallel sections, a larger lamp will be required. The author, for example, is using a bulb charger connected like the circuit 2 to charge a 108 cell (approximately 150 volts) battery in two parallel sections, using a 200-watt lamp. The best charging rate to use is one-quarter ampere, though it is only necessary to adhere closely to this value for lead plate batteries, as the batteries composed of Edison elements are practically impossible to injure. If the battery gasses moderately but not violently, the charge is about right.

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SUPER-HET DETAILS

(Continued from page 21)

ing on the condenser. The thing to bear in mind is the avoidance of the paste running into the condenser.

I do not want to get boring on the subject of short leads, but if all of you who are reading this could have seen the simple regenerative receiver made by E. T. Flewelling and exhibited at the Chicago Radio Show last November you would never again run a lot of unsightly looking leads all over the set.

Most of us run in ruts and follow precedent. We make a set with a cabinet and binding posts and square turns only because it is customary to do so. Then someone comes along and tells you to use no wire at all, or something else, and the first thing you think of is that the set won't look good. What are you making? An ornament, or a radio set that will work better than the ordinary? Make your ornament out of the cabinet, but for goodness' sake don't try to make an ornament out of the insides!

Set Ready to Operate

Now that you have the set all wired up according to instructions, it should be ready to operate. The first thing to do is to connect up the loop and the A battery, then insert one (one only) tube in any of the sockets. Pull the switch and see if the voltmeter reads correctly. It should. If it does, then turn the rheostat controlling the current to the tube you have in the socket. The tube should light. If it doesn't, the trouble is probably in the prongs on the tube not making good contact with the prongs in the socket. Fix this, then try the tube in each socket, testing the rheostats and satisfying yourself that the tube makes good contact in the socket.

This completes the testing of the individual tube sockets. Now remove the tube and leave the A battery connected. Get an ordinary 110-volt lamp such as you use for lighting purposes in the house. Connect a short length of wire to the 90-volt binding post on the set. Now connect the negative terminal of the B battery to the set at its proper binding post. Now hold the bulb in your right hand with the bottom contact on the 90-volt terminal of the B battery. Then touch the short lead from the set to the side contact on the lamp. If the lamp lights you have a short circuit in the wiring of the set. If you have the set wired correctly the lamp will not light. Assuming that you have it correct, then remove the short lead from the binding post and connect the B battery, both the 22½-volt and the 90-volt terminals to their respective binding posts. Now connect the C battery in place but be sure you have the polarity correct.

You can now feel safe in inserting the tubes in the sockets. After putting in the tubes, plug in the loud speaker, set the oscillator condenser on or between 20 and 30 and set the wave length condenser on 20 or 25, place the wave change switch on long, adjust the rheostats on all tubes, then vary the potentiometer. If the set is correctly wired you will cause it to howl or stop howling by varying the potentiometer. If the set doesn't howl in this condition readjust the rheostats with one hand, at the same time varying the potentiometer. If this doesn't help, then try pressing down on the tubes in the sockets. It may be that they are not making good contact. Assuming that you have wired the set correctly and get the howl, then swing the potentiometer around until it stops howling and let it stay there. Now go to the oscillator condenser and as you move it one way or the other over the scale you will get a series of whistles. This will tell you plainly that the set is working.

Tuning-In Stations

To tune in a station for the first time requires a great deal of patience, as the tuning of a super is a knack that is acquired with practice only. You must learn it yourself. No one can teach it to you. It's like playing a piano—the instructor can show you how you can get music out of it, but if you don't learn how yourself you will never be able to play. Set the potentiometer at a point where the tubes almost howl, then vary the oscillator slowly with the vernier; start at about 15 on the dial and go up the scale. If you hear the station at all you can hear them on the loud speaker.

Let the potentiometer alone when you are varying the oscillator condenser. While you are adjusting the oscillator condenser, move the wave length condenser along with it. When you have picked up a station set its best point on the oscillator condenser, then vary the wave length condenser to its loudest point, then swing the loop so as to bring it in best, then, lastly, readjust the potentiometer to its best point.

After you have operated the set for a while you will discover that the loop direction and the wave length condenser are not so critical as you thought they were. You will also find a number of places on the oscillator dial where you can pick up the same station without changing any other control. There is one pair of points where you will get the station loudest, and even one of these is the louder. The rest of the points are due to harmonics and are not discussed here.

You will find in operating that all you have to do is adjust the oscillator condenser, as the setting of the wave length condenser can be approximated closely enough. You will also find that once the rheostats and potentiometer are adjusted you won't have to bother about them again. After the set is going and you have learned how to adjust and bring in stations you can try changing the tubes around. Sometimes it happens that certain tubes are noisy. If you find any that are, it is best to take them out of the set entirely or use them as detectors, because sometimes the noisy tubes are only noisy on the higher plate voltages, and using

them as detector tubes on lower plate voltages cuts out the noise and enables you to use the tubes.

I do not advocate shielding the set, as if it is wired correctly the body capacity effect is negligible. The set made by the writer has absolutely no body capacity at all and is not shielded.

(THE END)

Review of Books

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

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.

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.

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.

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.

Amateur Radio Call Book. We have a few copies of this valuable book of the fourth edition. It contains a list of amateurs, special amateurs, technical and training stations. Tells how to construct a Reinartz tuner, detector and amplifier. A two-color map comes with it. Original cost, \$1. While they last, 50 cents.

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 attention given to practical tuning. Price, \$2.00.

Elements of Radio Communication. By Ellery W. Stone. A splendid, well connected, complete, accurate and up-to-date discussion of every phase of Radio telegraphy and Radio telephony. Written in simple language. The subject is presented from the physical rather than from the mathematical standpoint, avoiding the use of higher mathematics. Price, \$2.50.

The A. B. C. of Vacuum Tubes. By E. H. Lewis. It is a book for beginners who have no knowledge of either Radio or electricity and sets forth the elementary principles of theory and operation of the vacuum tube. No attempt has been made in this book to describe all the possible circuit arrangements, but those shown may serve as suggestions to experimenters who desire to evolve their own circuits. Price, \$1.00.

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WHAT USERS SAY

EAST—Aank more than pleased with the parts ordered from you. The first night I hooked it up and received Omaha. Since then Minneapolis and Los Angeles. It works better without amplification than most sets with two stages.—Donald, S. C.

WEST—I am sending you a list of some of the stations heard on one tube: WSB, WJY, KDKA every night. PWX, WWJ, WTAM, WLW every night. CFAC, CHCB. Not long ago I purchased another set of parts from you and first night got WGR, Buffalo, and KDKA.

NORTH—Received coils C. K. If I have same result with these that I if I have still will be wanting more. I am 1,500 miles from nearest station and have picked up to date. Chicago, Havana, Mobile, New Orleans and TWO IN ENGLAND.

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Send stamp for further information
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Range Increased with The Additional Coils

Everyone possessing receiving sets of the three-circuit type, employing two variometers and a variocoupler, should try this simple addition to their sets. Only

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. If rejected copy may be returned. The work must be entirely original, not copied.

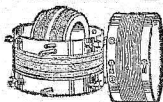
RADIO KINKS DEPARTMENT, Radio Digest, 510 North Dearborn St., Chicago

two coils are required, these being preferably of the honeycomb type. You will need one of about 50 turns and the other of about 75; however, it would be better to experiment with different sizes to see which will give the best results. The method of connecting these coils in the circuit is shown in the diagram, a switch lever being used to short them when it is desired to throw them out of the circuit. You will also note that the negative of the B battery connects to the positive of the A, and the negative of the A connects to the variocoupler. I have found that this method is far the best of the others.

The adding of the two honeycomb coils does not seem to change the wave length of the set in any way, but greatly increases the volume and makes the tuning much easier; also they bring in many stations that cannot be heard otherwise. By the addition of the coils to a set of standard instruments (which will tune up to 800 meters), stations on all wave lengths from 200 up to 800 meters can be heard more loudly than before and many stations can be heard that were impossible to hear before their addition. These coils, besides making the set more easily to tune, make the stations more easily to be held, and fading is hardly noticeable.—Evermont Hiesl, Lebanon Junction, Ky.

A vacuum tube is fragile; do not handle it like an ordinary incandescent lamp.

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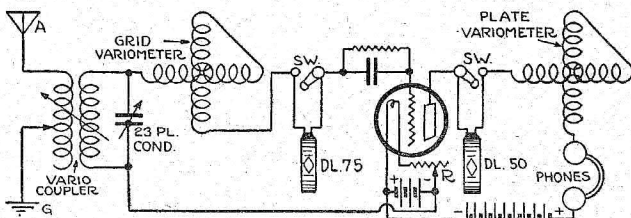
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Price \$120 at dealers. Extra for tubes, batteries, phones. F. A. D. ANDREA, Inc. 1511 Jerome Ave., New York City

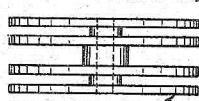
Fada RADIO

POSITION OF HONEYCOMB COILS

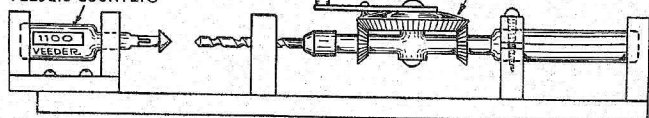


Homemade Coil Winder

Usually the maker of home built apparatus has a hand or breast drill. This handy tool can be used for a number of things besides just drilling holes. The illustration shows a way in which coils



TRANSFORMER SPOOL OR FORM. VEEDER COUNTER.



may be wound for the Radio apparatus by the application of this drilling tool. No dimensions are given as these will depend on the hand drill used. Three standards mount the drill on a base that is long enough to mount a small number-

ing machine or shaft revolution counter. A drill point may be used for turning the coil core.—H. K. Mayer, Ft. Collins, Colo.

Rules for Efficiency

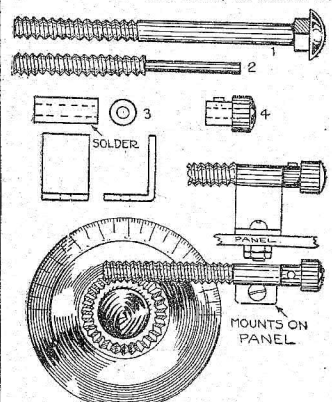
Cheap parts with poor electrical qualities and sloppy workmanship which add resistance and cause leaks in the circuit are responsible for virtually every failure in Radio. An amateur should exercise every effort in hooking up a set so as to make a good job of it. Use good parts,

arrange them neatly and efficiently in the cabinet, keep all wires well separated and exercise great care in soldering connections. If these rules are followed, success is almost sure to follow.

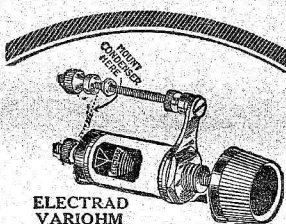
Vernier Attachment for Regular Dial or Knob

The vernier attachment shown can be applied to any one of the different types of knobs and dials in use. It is simple in construction and efficient in operation and can be made without the purchase of any parts.

The device consists of a bolt (1), which is cut off and turned down, as shown in



sketch 2. The bracket and knob for this bolt are shown in 3 and 4. The bracket holding the bolt mounts on the panel in such a position where the threads will come in contact with the ribs of the knob or dial. The illustration is self-explanatory.—John Schute, S. Boston, Mass.



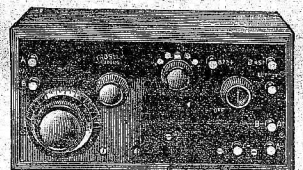
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- 1 Percent Doub. Jacks
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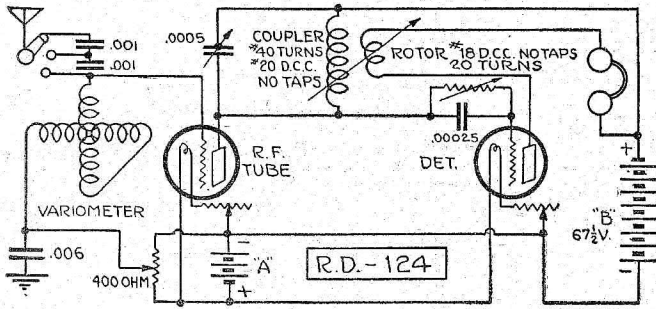
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FREE BATTERY HYDROMETER

REGENERATIVE RADIO FREQUENCY



HERE is another English circuit, R. D.-124, with one stage of Radio frequency amplification and a regenerative detector. There are three major and five minor dial controls. The operation of these controls is very simple and the fan need not worry about any difficulties in tuning.

Audio frequency amplification can be added by inserting the primary of the transformer in place of the phones. The use of A tubes is recommended.

The capacity switch in the antenna lead takes care of all possible variations of antenna wave length. This control does not require much variation once the best setting is determined.

Tuning Instructions

Turn the rotor of the coupler, so that it is at right angles to the outside tube. Turn variometer dial to the left from its zero position. Ten to fifteen degrees will bring in stations in the neighborhood of 360 meters and the condenser dial must now be moved to bring the circuit in to resonance. The rotor of coupler is slightly turned, which gives the regeneration and increases the volume. If turned too far distortion results, and it will be easily learned just how much regeneration can be successfully employed. It will be apparent that tuning is accomplished by the use of two controls, and when hunting for a station both the variometer and variable condenser must be moved together.

The potentiometer should be set with

the lever approximately in the center and need not be readjusted once the proper setting is ascertained.

As tuned Radio frequency is indicated the volume and sensitivity of the one stage will equal the volume of three stages of untuned transformers.

The selectivity is superior to that of a single circuit, as the Radio frequency circuit must also be tuned. It is possible that there will be some difficulty in separating two stations operating on a small difference in wave length, particularly if the set is fairly close to two such stations. This, however, is true of practically any other receiving set regardless of the circuits in the tuner.

THIRTY MINUTE A-B-C

(Continued from page 19)

a circuit combination. This is shown in Figure 104.

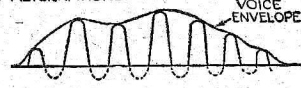
Detector Action

The circuit of Figure 105 illustrates detector action. The Radio frequency current from the tuner sets up a Radio frequency potential on the grid. The function of the grid leak condenser is to maintain an initial potential on the grid favorable to the detector action.

Detecting means rectification. The vacuum tube must let one-half cycle pass better than the next half cycle, otherwise the tube will only amplify the Radio frequency input. That is what a tube con-

nected for detector action does, as the reversing frequency finds a good path in one direction and a very poor path back. The plate current then gets a series of half cycles at Radio frequency, which means current flowing in one direction. The windings of the phones then smooth this out into a voice current as originally carried by the incoming frequency. This is illustrated in Figure 106.

RECTIFIED RADIO FREQUENCY ALTERNATIONS



DETECTOR ACTION
Figure 106

With a soft tube or a tube containing some gas such rectifier action is possible without the use of a grid condenser. Or with hard tubes, sufficient plate current will permit detector action without the grid condenser.

Other Forms of Vacuum Tubes

Special types of vacuum tubes are used for power purposes, for rectification only, for special circuits, etc. Figure 107 shows a tube with plate but no grid. It can act as a rectifier.

Figure 108 diagrams a tube with two grids, so that all three actions, detection, audio amplification, and Radio amplification occur together in the one unit.

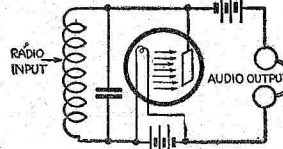


Figure 107

The essential points are that a potential can be applied to a grid as a steady potential or a fluctuating one, or as a frequency. Radio or audio, to control local energy supplied as plate current.

Practical Pointers on Vacuum Tubes

The sensitive tubes used as detectors mean that a very small incoming Radio

frequency impressed on the grid can control the plate current. Poor detector tubes require a much larger initial energy to operate the grid.

If the plate battery is connected to the filament, it will send a large rush of current through and burn it out. Don't!

A soft tube means one containing some gas. It will work better as a detector because more critical, so that smaller grid energy is necessary for operation.

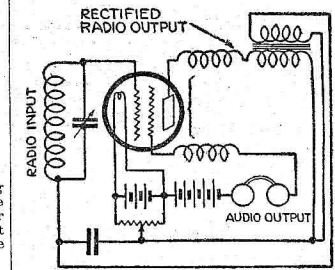


Figure 108

Vacuum tubes on the market, even of the same type and make, vary considerably from one another, due to variations in manufacture, but on the average, perform with reasonable uniformity. Sometimes changing tubes around in a set will improve the operation. Do not have the battery ON while changing tubes as this may result in burned-out filaments.

(Is your wife an ex-stenographer—or did you ever form "pot hooks?" Mr. Edelman will devote next week's lesson to "What Radio Shortband Means."—Editor's Note.)

PORTABLE SET FOR AUTO

(Continued from page 24)

in the hook-up diagram. The second audio frequency transformer of the base layout is the upper right side one of the circuit drawing.

The two coils and condenser units shown (dotted) will be described later.

The proper placing of the sockets and transformers is indicated by the terminal markings that are shown on each in the illustration.

(Owners of Dodge cars will have their tuning next issue when Mr. Marv shows what to do to enjoy broadcast pleasures while rolling along the road in this make of automobile.—Editor's Note.)

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Inductance and Capacity of Loop Type Aerials

Properly Constructed Loop Gives Good Results

By R. H. Langley

THE loop antenna is a very interesting device. It is quite different in its method of operation from the outdoor antenna. The outdoor antenna is in effect nothing more nor less than a condenser. It is a very large condenser to be sure so far as its physical dimensions are concerned, but electrically it is a relatively small one. The loop on the other hand is an inductance. This fundamental difference between the two is the reason why it is necessary to use different methods of tuning in the two cases.

Let us examine this special form of inductance, which we call a loop, and see why it serves as a pick-up device for Radio signals and how it should be made effective.

There is a very close parallel between the ordinary direct current generator or dynamo and the loop antenna exposed to passing Radio wave. In the dynamo a number of coils corresponding to the loop antenna are rotated in a powerful magnetic field. The purpose of rotating them is in order that they may move with respect to the field and thus have a voltage generated in them. The amount of this voltage depends, of course, upon the strength of the field and the speed at which the wires are swept through it.

In the Radio case, the coil stands still, but the field moves swiftly past the coil, thus accomplishing the same result. The speed at which the field moves cannot of course be varied and is always the speed of light, that is, 186,000 miles per second.

Voltage Generated

Let us see now what form of loop would have the greatest voltage generated in it by a passing Radio wave. Let us think of this Radio wave as very much like great smooth waves on the ocean, which of course, also move forward with a very definite velocity. The turns of wire on our loop antenna are necessarily in series with each other, that is to say, they form a continuous winding. If the maximum voltage is to be generated in any one turn of the loop, then the voltage generated in the two sides of this turn should be in opposite direction so that they may add and not oppose each other. If the voltage generated in both sides of the loop were in the upward direction at any one instance, then these two voltages would cancel each other, but if the voltage on one side of the turn was up and on the other side of turn, it was down, then they would add and if the loop were connected to a receiver, a current would flow around the turns of the loop. This is, of course, exactly what we wish to have happen.

Now in order to have the voltage gen-

erated on one side of the loop in the opposite direction to that generated on the other side of the loop, the loop would have to be one-half a wave length long that is to say, it would have to be long enough in the horizontal direction so that one side was in the crest of the wave when the other side was in the trough of the wave. Since the distance between the crest of the wave is the wave length itself, then the distance from the crest to the trough is one-half the wave length. The higher the sides of the loop are, that is, the longer the vertical wires are, the greater will be the voltage generated, and of course the voltage generated in each turn is added to the voltage generated in all the other turns.

Wave Length of Loop

But a loop one-half a wave length long is quite out of the question. It would be as long as a steamship and almost as difficult to handle. The loops which we are using every day are of quite reasonable dimensions. They are only a few thousandths of a wave length long. How do they function? In order to answer this question let us ask ourselves how we would build a coil of wire in order that absolutely no voltage should be generated in it by the passing wave. The only way in which this could be accomplished would be to so build the coil that the same voltage would be generated in both sides of it and that the voltages generated in the two sides would be opposed to each other. This would give a complete cancellation and no voltage at all at the terminals of the loop or coil. It is obvious that the only way in which this could be done would be by so arranging the loop that it had no length at all. That is to say, arranging it so that the two sides were exactly in the same position in space. This would mean that the horizontal wires across the top and bottom of the loop would cease to exist and the loop would become nothing but a wire laced up and down between pegs on the plain surface of a board.

If there is any distance at all between the two sides of the loop, then there will be some difference not in the amount of voltage generated in the two sides, but in the time at which this voltage is generated and there will consequently be some voltage at the terminals

of the loop since complete cancellation of voltages cannot occur.

Directional Properties

If the loop is rotated so that its horizontal wires are at right angles to the direction in which the signal is coming, then the loop has no length so far as those signals are concerned. The passing wave strikes both sides of each turn in the loop at exactly the same instance and the voltages generated are therefore, equal and opposed and there is no terminal voltage. This is, of course, the fact which gives the loop antenna its very useful directional property. It is to be noted, however, that if the loop is turned ever so slightly from this zero position then the voltages no longer cancel and there is a voltage at the terminal. This means that the zero position of the loop is very sharp, but the maximum position is very broad.

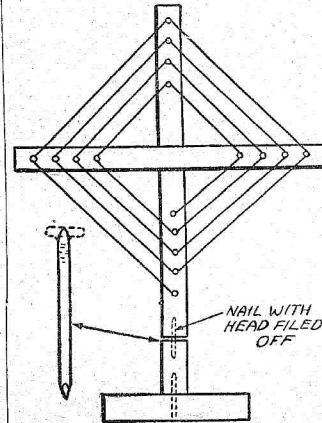
In applying the loop antenna to an actual Radio receiver, it is necessary that provision be made to tune it to resonance with the desired signal. This is accomplished by means of a variable air condenser and since this condenser has a very definite maximum capacity, the amount of inductance which the loop can have is also limited. This maximum inductance with the maximum capacity of the variable condenser, must give resonance to the longest wave to be received. The specification for the best loop antenna therefore, is that it shall have just as many turns as possible, each turn being just as long as possible and just as high as possible, and still have no more than the required maximum inductance. The higher the loop is, the greater will be the voltage generated in each side of each turn and the longer it is, the greater will be the difference in time at which these voltages are generated in the two sides of the loop and consequently the greater will be the voltage at the terminals, but it must not have an inductance value greater than that required for tuning.

Now the inductance of a coil of wire increases very rapidly as the turns are wound closer together. The maximum inductance is obtained with the minimum number of turns when they are wound just as close to each other as possible.

In order to get the maximum number of turns for a given inductance, which is what our loop requires, the turns should be wound just as far apart as possible. Now it is found that this spacing is best accomplished by winding the loop on a frame which has the form of a vertical cylinder. The wire goes up one side of the cylinder across the top, and down the other side and across the bottom and turns are spaced around the circumference of the cylinder so that the complete winding covers an arc of about 120 degrees on each side of the cylinder.

Homemade Loop

The illustration shows the construction of a loop that can be easily put together at home. The tools necessary are a saw, hammer and file. The parts required are



four pieces of wood, two for the frame and two for the base. How to put it together is clearly shown.—Curtis Springer, Indianapolis, Ind.

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Questions and Answers

Spark Reception

(07302) TWD, Columbia, S. C.
My reason for writing is for your explanation of the queer manner, or queer way our Radio receiving set acted the other morning.

It was on the morning of February 1st, at about eleven forty-five a. m. Weather condition—Warm, very dark clouds, very slow drizzling rain, no lightning nor thunder.

Radio Set—Radiola V with loud speaker, four 24-volt B batteries connected to set; large 6-volt A battery. The A battery was not connected to the set and it was about 15 feet away from the set with no wire connection. No lightning arrester was connected to the antenna.

At the above time stated there was no one operating the set, neither was it turned on. Several men were sitting about 10 feet away when they heard a funny noise in the set. One of them looked in the set and found it throwing out large electric sparks. Disconnecting the B batteries, he received a shock at the same time, but that did not help at all. Disconnecting the antenna wire from the set, the sparks quit coming from the machine, but when the antenna wire was held within 6 inches of any metal, a strong spark would pass from the wire to the metal.

This went on for about ten minutes. At the same time other men were going over the antenna carefully but could not find any electric wires on or near the antenna, as it is 100 feet high on one end and 80 feet high on the other end. It is hooked to a large steel tower on one end, and on the other to an iron pipe on top of a two-story brick building, but there are no wires connected to the tower whatsoever, and only telephone and light wires to the building.

A.—We are advising in your inquiry that the action in your receiver as described is not an uncommon occurrence and is due to atmospheric conditions solely. We have numerous citations of a similar action under weather conditions like those prevailing at the time your attention was engaged in the display of electrical phenomena.

No concern need be entertained as there is no hazard involved.

Super-Triplex

(07053) WCC, Minneapolis, Minn.

I have arrived at the point of success or failure in my super-tri-plex book-up. The set is full of "whiskers" on amplification, which occurs only on the two amplifying steps, the detector being perfectly clear. I am getting distance and

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S. A. TWITCHELL

1925 Western Av., Minneapolis, Minn.

volume but am unable to clear up the signals for long distance work. The reception under these conditions is very distorted, speech is not understandable and music is a jumble. I am using an aerial 135 feet long and twenty feet high, perfectly clear from interfering wires, etc., with 40 feet of heavy insulated lead-in wire.

The coupler was made as closely as possible to your specifications, a Hilco lattice open wound variometer was used, a 200 detector and 201A amplifiers. Have used from 18 to 22½-volts on the detector plate and from 67½ to 90 on the amplifier. Have checked the set over for interference and do not seem to be able to take out the distortion enough to clear up long distance stations, although all local stations come in without any distortion whatsoever even on three tubes and the greatest possible volume. I have shunted the primary leak with .00025 condenser and have helped to clear up the signals to some extent, however, with quite a loss of volume. Do you think I can clear up the set by the use of a C battery? Would you recommend crossing the transformers with a leak and a condenser, or either? I was unable to obtain transformers or a ratio of 3 and 5 to 1, and, therefore, used a Jefferson transformer ratio 6-1 on the first step and 2-1 on the second step. Have tested these transformers and find their induction is splendid.

A.—We have carefully noted difficulties encountered in operation of the Super-Triplex circuit offered in Radio Digest. It is our opinion that the source lies in the amplifier unit and from experience believe that it can be traced to the make of transformer which are often found to be defective, causing distortion. The ratio on the first step is a bit high.

We are unable from the details offered to isolate any other factor that would seem to be responsible for limitations. Try a C battery in circuit as it may serve to clear up reception to some extent.

Abelé Circuit

(07980) KA, Carthage, Ill.

Please answer the following questions concerning the Abelé circuit discussed by M. W. Thompson in the March 1 issue of Radio Digest.

What is the capacity of the fixed condenser across the phones? Will this set cover the entire range of broadcast wave lengths from 224 to 546 meters? If not, how can it be made to do it? Is this circuit difficult to set up and operate? Would vernier rheostats or a grid leak

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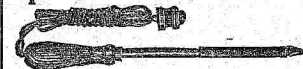
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and condenser in the grid lead of the second tube help any? If so, what sizes for A tubes? Is not this circuit the same that is used in the Grebe CR-12 receiver? Would it be all right to use 30 turns on the primary inductance tapped every 10 turns? Is number 24 dsc. wire suitable for winding the coils? Would it be possible to construct this set so that it would cover a wave band of 75 to 750 meters? Is this circuit as efficient as the neutrodyne circuit? Would a neutrodon connected between the grid of the first tube and the plate or the grid of the second tube help any? Would this circuit prove efficient in the hands of the average B. C. L. with two stages of audio frequency amplification? One stage of push-pull amplification? How can it be determined when the taps on the second coil are located correctly?

A.—The fixed condenser across the phones is, as usual, a .001 mfd. The circuit is capable of reception on all present broadcast wave lengths. The circuit is simple of construction and operation and if specifications are followed will prove effective. Innovation in the nature of departure from the diagram and the values cited is not recommended. It is similar to that involved in the Grebe CR-12. Number 24 dsc. wire will serve for winding and eight turns tapped at every ten turns will accomplish an effective primary inductance.

Additional number of turns on coil would permit of reception on higher wave lengths. The circuit in question compares favorably with the neutrodyne receiver, although we would prefer the latter. Two stage audio frequency, one push-pull method, would be advantageous.

Long Distance Simplex

(06551) NRM, Providence, R. I.
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- 1 Rheostat, V. T. Socket
- 1 Grid Leak, 2 lengths Bus Bar
- 8 Marked Binding Posts, 1 Phone Condenser
- 1 Wiring Diagram

These parts will build the famous Ben Franklin Triple Circuit Radiating Set; has a receiving range of 1,500 miles.

Ben Franklin Air Key, 3\$19.75
Tube Knockdown Set.

This outfit consists of the same material as the 1 tube set with the addition of 2 audio transformers, 2 jacks. Will bring in distance on Long Speaker.

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selective long distance simplex receiving set on page 14.

Could this set be made with the use of dry cell batteries in place of the storage battery? If so, how many should be used and what voltage of B battery should be used?

In using dry cells and proper B battery what kind of tube and what resistance should be used?

What number of plates should the condenser have and what kind?

What kind of wire is used to make connections from part to part?

I will be very grateful if you will send me a list of the exact parts to use in the making of this set, also any information that you may send in regards to the building of same.

A.—Dry cell tubes can be used, generally speaking, in any standard circuit without necessitating change of wiring. The voltage of both A and B battery will depend upon the tube employed. We are recommending the UV-199 tube with three dry cells and a 30 ohm rheostat and 45 volts plate potential.

A 23-plate vernier variable condenser is indicated. Number 18 tinned copper wire is suitable for making connections. Standard apparatus of rugged construction is recommended.

Helpful discussions in behalf of the beginners are conducted in current issues of Radio Digest and afford a medium of valuable data on the theory and practice of Radio communication and its underlying principles.

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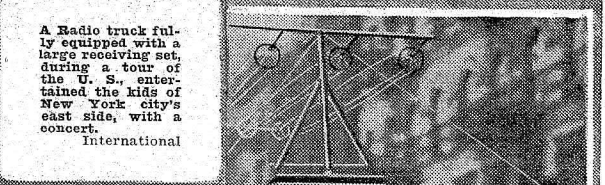
How Miss Adele Waugh started early spring promenades on the boardwalk at Atlantic city when she was wheeled up that famous thoroughfare sharing a wheel chair with a Radio set. Atlantic Photo



A novel two-tube reflex set built by Sidney Kasindorf, is shown above. The set and batteries are built in a small-sized suitcase. The ground and aerial wires are wound on a fish reel and reeled in when not in use. K. & H.



Nurses of the Maternity hospital, London, entertaining their wee charges with a Radio concert. One little tot took exception and entered his loud squawker in competition with the Radio. International



A Radio truck fully equipped with a large receiving set, during a tour of the U. S., entertained the kids of New York city's east side, with a concert. International

