

How to Make Low Loss Coils; Simple Wiring Instructions for Super-Het; Atwater Kent Operating and Trouble Shooting; Regenerative R. F. Hook-Up

Radio Digest

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

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Vol. XI Copyright 1924 By Radio Digest Publishing Co. SATURDAY, NOVEMBER 22, 1924 No. 7

CLAIMS WORLD SLIPPING

FRENCH SAVANT CALLS UPON RADIO TO HELP IN CHECK-UP

Shrinkage of Earth and Slippage of Surface Blamed by Gen. Gustave Ferrie for Longitude Errors—Many Charts Incorrect

PARIS, France.—That there has been in the past a certain amount of error in the values accepted for the longitudes of places all over the world has long been suspected by leading scientists of all countries—especially since they have discovered the latitude variations caused by the slightly erratic motion of the poles.

How to check up the longitudinal variations has been the problem.

Now General Gustave Ferrie, chief of Radio communications of the French army, and long distinguished for his splendid work in advancing the science of Radio, has begun preliminary negotiations for a general check of the world's longitudes by means of the various Radio stations. In a special interview given the writer, he stated that while this work had been his dream for two years, he was not yet ready to give the exact details of its operation, save to say that Professor Bowie, chief of the United States geodetic survey at Washington, will work with him.

Islands May Be Charted Wrong

"We had originally planned to operate from three stations only," said General Ferrie. "One was to be on the west coast of America, one in China—probably the Zikawei observatory—and one on the Mediterranean. This was found to be too

(Continued on page 2)

First Radio College Pep Session Is Lead by WHN

NEW YORK.—For the first time in the history of college football Radio has been drafted into service to aid cheer leaders.

Alumni of Ohio State university in New York recently broadcast college yells and songs from Station WHN, on the eve of the Michigan-Ohio State game at Columbus. Ted Lewis, jazz band leader and former student of Ohio State, originated the idea, because he was unable to attend the big Homecoming game and yell.



COOLIDGE PRESENTED WITH EXCELLENT SET

Gold Plated Fittings Mark Second Receiver Gift

WASHINGTON, D. C.—President Coolidge has been presented with another Radio set.

This time it is a five tube neodyne, housed in an African mahogany cabinet. It was presented by one of the local Radio firms and contains an inscription "Donated to His Excellency Calvin Coolidge."

All of the metal parts of the set are gold plated, while the polished panel is engraved and filled with gold. There is a desk connected with the set for the Radio log and a loud speaker console table attached.

Elizabeth Hines, star of "Marjorie" which was broadcast direct from the stage through Station WJZ, is shown on the left. Above, Kathryn Wells Bassett, soprano, composer and pianist, who recently broadcast from Station WOE. Right, Claiborne Foster, who played the part of Hazel in the hilarious comedy, "Applesauce," which was broadcast recently from the stage through KYW. This play created widespread comment because of its human interest.



CHILDREN RECEIVING INSTRUCTION BY AIR

CALIFORNIA ADOPTS NEW SCIENCE FOR TEACHING

Feature State Geography and History by Novel Story Telling Method Interspersed With Music

OAKLAND, Cal.—Twenty thousand California school teachers scattered over the valleys and mountains of the state are now to be aided by Radio broadcasting. Theirs is the job every morning of getting over 600,000 children to be punctual in attendance at school.

Beginning Monday morning, November 3, at 9 o'clock, their job will be easier, when a series of weekly programs furnished by the State Board of Education and broadcast by KGO, are expected to be so interesting that children will want to be at school in time to hear them.

Schools Very Enthusiastic

Schools throughout that state are reporting great enthusiasm for the new venture, according to Grace C. Stanley, Commissioner of Elementary schools, who will have charge of the work. It is not known at the present time how many pupils will actually listen in on the first program, but schools in isolated districts, who will be so greatly benefited are expected to be in the lead of those tuned in on the broadcasts.

It is planned to feature California history and geography in the lessons by Radio. Professors of the various universities and colleges of the state and other eminent educators and story tellers will contribute. No lesson will be more than twenty minutes long, and will begin with music and end with music. The story telling method of teaching will be used. That is, interesting stories will be told about the geographical and historical features of the state, aimed to entertain pupil listeners as well as educate them.

First Time Tried in State

The problem of the country school teacher will in this manner not only be lessened, but teachers are enthusiastically reporting their belief that they themselves will receive benefit and instruction from speakers over the air.

This is said to be the first time that a state-wide plan to use Radio in public schools has ever been attempted. The idea is said to have originated in a conference this summer on rural education held in San Francisco when requests from delegates that some attempt to reach the schools in the rural sections of the state by Radio was made.

A committee consisting of Will C. Wood, state superintendent of public instruction, and Archibald Anderson, president of the San Francisco State Teachers' college, was appointed to take up the question. After carefully studying the problem the committee decided to work with Station KGO.

WORLD SLIPPING CLAIM

(Continued from page 1)

small a number for the exactitude that we decided necessary; so we are now simply trying to locate the proper station to add to our list, and will not be ready to work before some time in the winter of 1925, at least."

The general pointed out that many of the smaller islands in mid-ocean were charted in such manner that there might well be a slight error. Then, too, he suggested that we may not yet be fully acquainted with the variations of the earth's motion, and that there may be some "eccentricity" which would lead to a change of longitudinal points.

Shrinkage of Earth Cause?

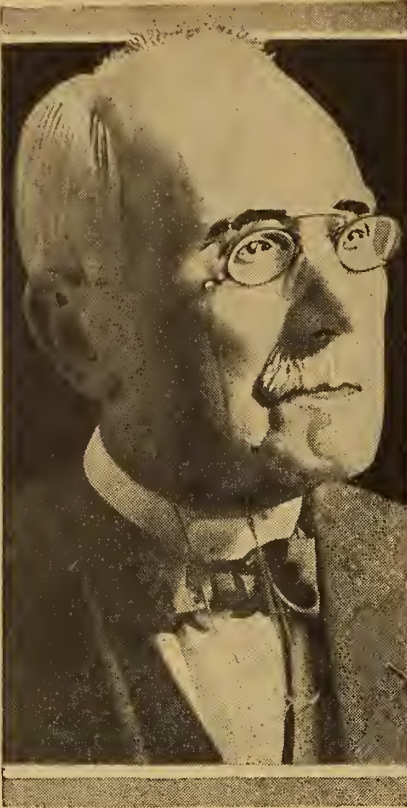
Whether or not the constant shrinkage of the crust of the earth can make a difference great enough to be detected, the general will not venture to say. According to reports from the Observatory Radio station at Zikawei (Shanghai), Honolulu seems to be irregular in time signals, varying often as much as three to five seconds from the European stations, which the observatory picks up with equal ease. It may at least be possible to correct these errors in various stations, whether or not anything is discovered regarding the alterations of the earth's crust.

Replying to a question as to whether the great number of earthquakes in the Pacific might have caused changes in the earth's longitude, General Ferrie said that this among other questions would be studied carefully. The object of the whole investigation, he said, was "to study the question of variations and improve the precision of the world's longitudes."

Sunday Matinee Musicales Regular Feature at WGBS

NEW YORK.—Because of the success the first Sunday matinee musical met with last week, WGBS has decided to adopt this as a regular feature. Sunday afternoon at 2:30 the Russian Eagle orchestra will play for an hour, followed by an hour of music by the Vincent Rose Symphonic Dance orchestra.

COHERER INVENTOR HONORED FOR WORK



M. Edouard Branly

LONDON.—M. Edouard Branly, the famous French scientist, and known in his own country as "the father of Radio" (he invented the Branly "coherer," one of the earliest forms of

WLW Incognito Night Brings Many Letters

Broadcasts Without Giving Call Letters for Two Hours

CINCINNATI.—An experiment of inestimable value was recently made by broadcasting an incognito program from the Crosley WLW station. The entire program was broadcast for over two hours without announcing the call letters, city or owner of the station. Numerous prizes were offered to those who wrote letters and postal cards from places outside of a radius of one hundred miles.

More than a thousand Radio fans from all parts of the country wrote to the WLW station. This proved the popularity of the station and the recognition of the voice of Fred Smith, studio director, who conceived the unique idea.

WBCN Has New Director

CHICAGO.—A change in the staff of WBCN, the Radio station being built on the south side by the Southtown Economist has just been announced. For the present William H. McDonnell, who, with John E. Foster, owns both WBCN and the Economist, will be the nominal director. Robert Northrop, who has been director, is no longer with the station.

detection, anticipating the crystal detector era), was the recipient recently of thousands of congratulatory messages on the occasion of his eightieth birthday.

Professor Branly is one of the hardest working men in France, devoting ten hours every day to experimental researches. He again came into prominence in 1921, when parliament voted a subvention of 20,000 francs to permit him to continue his researches in the laboratory of the Catholic institute. The value of his discovery was beyond discussion, and his scientific genius did not pale before that of Marconi. Despite his incomparable industry, M. Branly works practically in poverty. A banquet in his honor took place November 6.

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Looking Ahead

From \$8 to \$12 for a Selective Crystal Set. Would you pay that much to get Radio concerts, news and markets? You already have a set? Well, then, tell your non-Radio friends to follow the instructions of V. A. Mattison in next issue of Radio Digest. If they build it, they'll like it.

More Low Loss Information Coming. Jacques Fournier's next article tells another low loss method of mounting low loss inductances and discusses various condensers and their "profits and losses." He also promises for the future instructions for building a REAL low loss receiver—not one that is so named and having three or four varieties of dielectric and metal in the fields of the coils.

Possessors of Stromberg Carlson Sets will be glad to know that their make of receiver will be featured next in the "How to Operate and Find Trouble" department.

Final Super-Heterodyne Instructions—Testing and Operating—complete the excellent series next week on the "Simplest Possible Super-Het," written by John G. Ryan. This worth-while receiver article has aroused so much favorable comment that the series will be prepared soon in book form.

More Station Feature Pages in the Future. Write the station feature editor what broadcasting station you would like to see in pictures and he will try to give you your favorite.

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Apponnap, Rhode Island. "I purchased my Crosley one tube No. 50 around the first of August and I think it is my duty to express my satisfaction of its performance during the warm spell. Have heard New York, Boston, Pittsburg, Cincinnati, Chicago, Detroit, Ottawa, Canada, and many other stations."

Dallas, Texas. "The set, Model 51, has already surpassed my greatest expectations. On the night of September 13th, Oakland, California, was received with sufficient volume to be clearly heard throughout seven rooms. Kansas City, Chicago and many other stations were received with respectively greater volume."

Chicago, Illinois. "My Trirdyn has done all that you claimed for it. The first silent night, Monday, September 22nd, using only two tubes, I pulled in twenty-eight stations. On the following night with most of the Chicago stations going full blast, using two tubes, I pulled in Memphis, Cincinnati, Dallas and Omaha."

(Names upon request) These are only a few of the thousands of unsolicited letters that come to us. You, too, can enjoy similar results with a Crosley. And the cost of any Crosley is remarkably low.

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Write For Complete Catalog The Crosley Radio Corporation Powel Crosley, Jr., President 11494 Alfred Street Cincinnati, O. Crosley Owns and Operates Broadcasting Station WLW

COULD GUIDE ZR3 TO AMERICA CREWLESS

ITALIAN ENGINEER MAKES ASTONISHING CLAIM

Backed by Italian Government Signor Fiamma Visualizes Manless Freight Carrying Planes

By A. C. Blackall

LONDON.—Signor Fiamma, an Italian engineer and inventor of a ingenious device for directing and steering ships and aircraft at a distance by means of Radio waves, has just made the astonishing claim that it would have been possible with his apparatus to have guided ZR3 to America from any part of the world at any distance and, with equal ease, to have brought the dirigible back without a human being on board.

He is willing to take up a challenge at any time to prove his invention is all he claims for it, and has already given proof of its capabilities in the presence of an official commission, composed of Admiral Bellini and other distinguished naval officers, in Spezia.

The invention is being protected in every country and the Italian government is taking the greatest interest in it.

Visualizes Crewless Freight Planes

Fiamma claims that with his apparatus it will soon be possible also to establish cross-Channel air transportation at all times and in any kind of weather by means of airplanes without a person on board. These planes could be made to start from London punctually, at fixed hours, with mail or other matter for Paris, Brussels, Berlin, and other Continental cities without any crew aboard.

Their flight would be directed simply by someone in a London office, and the same machines at fixed hours would be commanded, to rise from the ground and return. In the same manner, he alleges, cross-Channel transport by ships, entirely covered in and proof against any storm, could be organized to carry goods or mail to Calais, Boulogne, Ostend, or any continental port, and return at schedule time without any personnel on board or risk to lives.

MUSIC PLUS STEAM ATTRACTS BATHERS

BOSTON.—Why do people still go to Turkish baths when prohibition is in effect? Many have wondered. The staff at Station WEEI here have found the solution in a telegram from a well-known Back Bay steam parlor. The telegram said, "Have thirty-two men in the St. Botolph Turkish baths listening to Station WEEI." It was signed by the proprietor.

What Is The Matter With Canadian Fans?

Refusal to Send Applause Cards Hurts Station Officials

WINNIPEG, Can.—The absence of Canadian applause cards in their daily mail, have caused the Radio department of the Canadian National Railways to wonder what the trouble can be.

Either Canadian audiences are "cold," or else their enthusiasm for broadcasting does not carry them to the extent of sitting down to write and mail applause cards and letters, as their American cousins do, some of them with pleasing regularity.

"Less than 15 per cent of the total letters and cards received every week are from Canadians" declared one of the Radio department staff in western Canada. "Here, in four days which have passed since the last broadcast from the Fort Garry Hotel, we have over one hundred and fifty applause cards and letters addressed to the department. About 85 per cent of these come from people who, in a great many cases, have never seen Canada but are glad to welcome a Canadian station 'on the air.'"

Officials at Station CNRW, will be glad to hear from every Canadian who hear them, as well as the American fans who are interested in the welfare of the station.

REALTORS ADAPT RECEIVER AS AID

Detroit Concern Induces Hundreds to Visit New Sub-Divisions for Inspection

DETROIT.—Real estate men here are now turning to Radio to increase their sales.

Featuring their subdivision in an outlying section one realty company has installed a Radio set with a ten-foot megaphone, with which visitors are attracted and entertained.

This Radio is said to have induced hundreds of persons to stop at the subdivision property, look it over and enjoy the program broadcast from Detroit and other stations. Many sales have resulted.

Three of the youngsters at the Mooseheart home doing their best before the microphone of WJJD. For the first time in the history of broadcasting, these artists claimed that they were not "mike" shy.



Ralph Shugart, formerly chief operator at WDAP, now engineer of the Loyal Order of Moose station, WJJD, at Mooseheart, Illinois. He is well known to the Radio public throughout the middle west.



Mooseheart camp-fire girls listening to some of their pals broadcast from their own station, WJJD. This station is located on the outskirts of Chicago and belongs to the L. O. O. M. The studio is on the buildings of the home for parentless children and a direct wire connection has been established to one of the prominent hotels in Chicago for dance music.



Jack Nelson, formerly program director and announcer at WDAP, is director-announcer of Station WJJD. He is a distinguished pianist and singer, well liked by the invisible audience throughout the country. Listen in for him on 278 meters wave length.

TITANIA HOLDS COURT AT KHJ



Queen Titania sitting on Uncle John's lap while the Sandman listens to her telling stories to the children from Station KHJ. The Sandman writes the stories that the little fairy queen tells.

"THE Fairy of the Microphone," Queen Titania of KHJ, The Times, Los Angeles, California, is a Tuesday evening feature. With her able assistants, Uncle John and the Sandman, she has not missed a program since its beginning, September, 1923.

Each week is a story, read from manuscript. It is the realm of right living and actions. Radio children listeners are often taken across "Slumber Sea" into the "Land of Ought to Be."

For more than eight months, listeners had no clue to the identity of either the Queen or the Sandman. Uncle John they all knew, the beloved announcer-director of KHJ since its beginning. But who was "Queen Titania" and her faithful Sandman, who always helped her tell the Radio children the stories each Tuesday? Recently the secret of their identity

leaked out. The Queen is no other than the popular little movie actress of child pictures and is known in the film world by the same name. And the Sandman is her father, who watches her career and (another secret) writes the original manuscript story for each Tuesday night Radiocast. These stories are about to be published in book form. Their distribution will be under the supervision of Uncle John of KHJ, and children who cannot afford to buy the book will in some way have it given to them.

Queen Titania is nearly nine years old and has been featured in child films for three years. An announcement of a series of twelve pictures starring the little queen will be made soon.

October 9 was the fairy queen's birthday and in celebration the Radio stars of KHJ gave a voluntary complimentary program over the Radio in her honor.

Radio Becomes Messenger of Death; Locates Father

MEMPHIS, Tenn.—Radio became the messenger of death here recently when the baby son of Capt. J. H. Jones of Meridian, Miss., who traveling in Tennessee by automobile, died.

WMC, the Commercial Appeal, broadcast news of Capt. Jones' son's death and a description of Mr. Jones and his car. The Atlanta Journal station, WSB, did likewise.

A man in Trenton, Miss., heard WMC's message and identified Captain Jones by means of the Mississippi license plate on his car.

WWJ Gives Michigan Games

DETROIT.—A newly added feature at WWJ, The Detroit News, is the play-by-play broadcasting of Michigan's football scores from Ferry field, Ann Arbor. The games played at home by Michigan since October 25 have been broadcast by WWJ.

A special telephone wire connects the main broadcasting plant in Detroit with Ferry field at Ann Arbor, thirty-eight miles distant.

WHITE RADIO BILL FACES DOWNFALL

Changes in Situation Cause Officials to Revise Minds; Hoover Against

WASHINGTON, D. C.—Changes in the Radio situation have been so rapid during the past year that it is almost impossible for anyone to keep track of them and this situation has lead, it is believed, to the change in the attitude of the officials of the department of commerce relative to the White Radio bill, which will again be before Congress when it convenes on December 1.

Since Congress has adjourned, and even since the Third Radio conference, Mr. Hoover has changed his mind on the matter of legislation and it is understood that he is not now at all enthusiastic about any law, feeling that things are moving too fast. In other words if a law is passed it will be no time at all before it is almost obsolete.



BRITISH EX-PREMIER RIVALS GEORGE HAY

THRILLED BY WONDERFUL VOICE; FANS JUBILATED

Stanley Baldwin Boosting Party Causes Spasms of Envy to Come From Professional Announcers

LONDON. — That Stanley Baldwin, former premier of Great Britain and leader of the Conservative party, would have rivaled George Dewey Hay (winner of Radio Digest Gold Cup for world's best program announcer) had he been chosen program announcing as his profession is the opinion of British Radiophans.

Enthusiasts who have listened to hundreds of Radiocast talks are unanimously of the opinion that they never heard a speaking voice so perfectly suited to the needs of the microphone as that of Mr. Baldwin when he broadcast from 2LO recently. His excellent enunciation and perfect modulation caused every word to come through with such delightful purity and clarity as to cause spasms of envy to shoot down the spines of professional announcers throughout the British Isles.

Premier's Voice Not So Good

In striking contrast with Mr. Baldwin, however, was Premier Ramsay MacDonald's speech Radiocast just previously. Mr. MacDonald's voice sank and swelled, ebbed and flowed, as at one moment he shouted stentoriously, and the next dropped to an oratorical whisper. He addressed first one section of his visible audience and then another, the Radio listeners catching what they could. If Baldwin's effort was worthy of a championship prize, then MacDonald's was equally a lesson in how it should be done to carry off the booby prize.

Radio Taught by Machine

CAMP ALFRED VAIL, N. J.—A mechanical device is to take the place of human instructors in Morse and Continental code at the Army Signal Corps school here, following successful experiments with the new adaption of phonographic instruction.

Oxford Vs. Carleton on Air

NORTHFIELD, Minn.—Oxford university, England, and Carleton college, located here, were heard in debate recently when KFMX, Carleton college station, broadcast the intercollegiate contest.

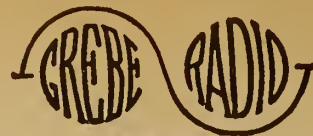
BUILD HIGH TOWERS FOR GIGANTIC WLW



CINCINNATI.—The task of erecting the two 200-foot aerial towers for the new five kilowatt super power station of WLW, the Crosley Radio corporation at Harrison, Ohio, is nearly completed. Every effort is being made to rush the completion of this station so as to be able to broadcast Christmas tidings to Radio listeners throughout the world. Telephone wires will connect this new station with the microphones in the studios at 3401 Colerain avenue, Cincinnati, some twenty-five miles away.

There is a great difference between the aerial used for the reception of broadcasting and the transmission aerial.

Some idea of the weight of these towers and their size may be had from the fact that a seven-foot depth of solid concrete is used to imbed the four supports.



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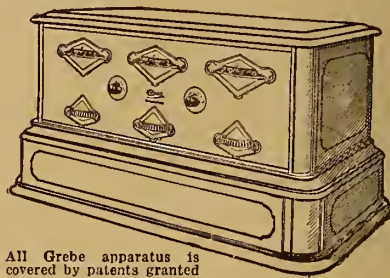


"Of what use is cleverness of speech?"

—Confucius

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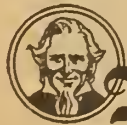
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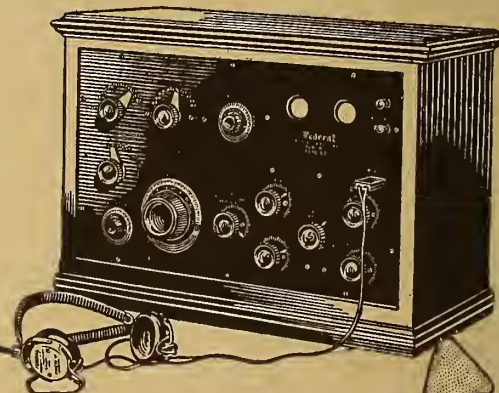
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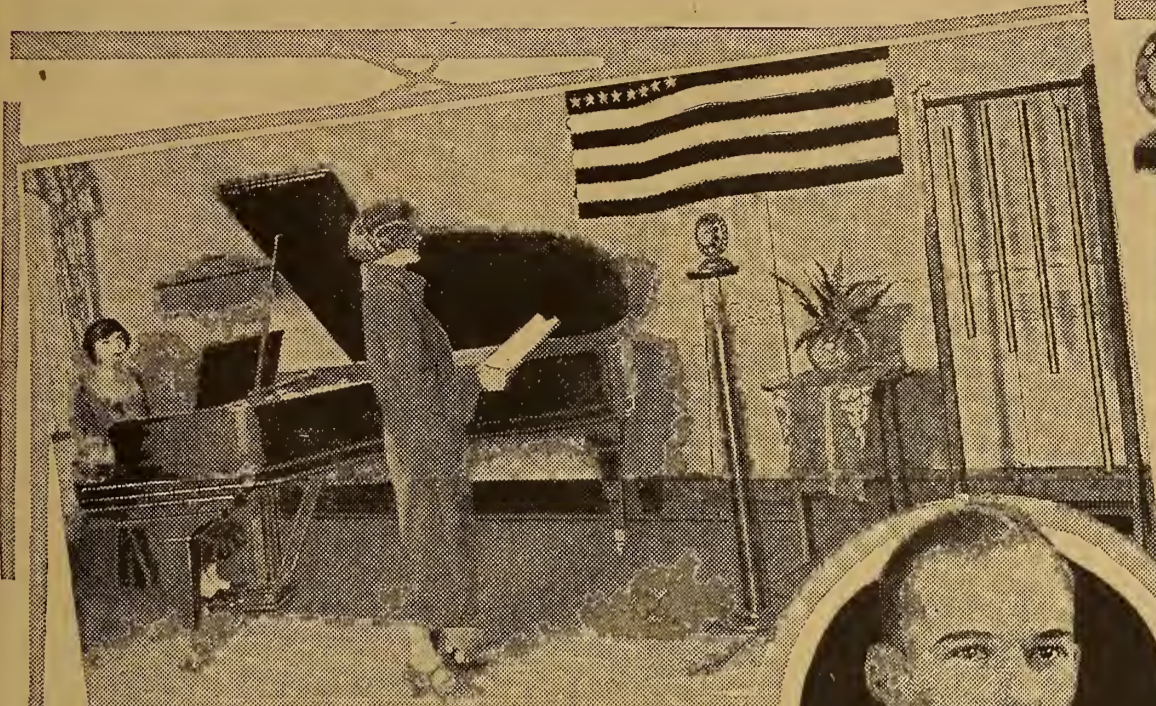
Black enameled shield completely surrounding windings

Heavy nickel plated brass mounting feet—2 screw slots and 2 screw holes for mounting.

Look for this sign



KPO—"The Voice of The Golden Gate"



View of the elaborate studio, showing an artist singing, with Ada Morgan O'Brien, program director, at the piano.



Theodore J. Irwin, official organist of Station KPO, and one of the few chosen organists playing the great municipal organ of San Francisco. Every program he gives his listeners one movement of some symphonic number.



Claire Morrison, chief operator and announcer at Station KPO, well known to thousands of Radiophans.

California Favorite

By Vera Brady Shipman

IF AN entertainer visiting KPO for the first time, sat down to their Radio supper after the show, he might feel himself especially honored, for the long table is loaded with good things which California offers her friends. But that entertainer need not feel too "chesty" but should be thankful that he was invited to perform for KPO, for the KPO Radio supper is a nightly feature.

The studios are on the top floor of the great Hale Brothers Department Store on San Francisco's busy corner of Market and Fifth streets. The tea room adjoining the studio, enjoys noon hour pipe organ recitals as well as Radio listeners. The studio is large and attractive. The adjoining operating room with Claire Morrison as chief operator and announcer, assisted by Harold Perry, Earl Thomas and John Signer opens out onto a roof from which the visitor can watch the twinkling lights of San Francisco and the bay.

When KPO was ready to open in January, 1923, they offered the program direction to Ada Morgan O'Brien, one

of San Francisco's society matrons, not a business woman but a woman of social distinction who understood social usages and could adapt them to correct form in a Radiocasting station studio. Mrs. O'Brien was visiting in the East at the time and wired back her acceptance. The charming mother of two daughters, Mrs. O'Brien has made KPO a station of genuine worth. Everything from French lessons to bedtime stories, from grand opera to "Bananas" goes on the air in season.

"More and more I realize the need of musical education among program directors, and more and more I feel that musical program direction of Radio is a woman's work. It requires tact. The woman can best deal with the temperamental artist or the phlegmatic plodder. The woman arranges details, she can best plan a balanced program for her listeners of whom many today are women. Radio is no longer a man's game. It is as much the woman's field and in the program balancing, the home —of which the woman is the central factor—is considered in its continuity and beneficial interest."

KPO is the only station in the West to operate its own pipe organ in its studio. A Wurlitzer, with Theodore John Irwin giving daily programs, is a feature which is always listened for.

Irwin is an Australian by birth, a graduate of the New England Conservatory of Music, and one of the few chosen organists playing the great municipal organ of San Francisco. Here in the West he has pioneered in organ music. From KPO he gives his listeners programs of great value. One every program (and he goes on the air three times a week) he gives his hearers one movement of some standard symphonic number, a prelude or an adagio, an overture or a rhapsody—but always from a classic composition.

The recent addition to KPO management of Oliver W. Tuttle, a well-known publicity man and former Radio editor of a San Francisco paper, was announced simultaneously with plans of remote control to many of the largest auditoriums in the city.

"We are planning to have as many auditoriums as possible for size, connected with KPO by wire, giving our listeners everything which we may hear in the city. The first principle of Radio in a department store is service—the kind of service which such a store gives to its customers. This we are giving through KPO to its listeners everywhere."

Four days a week, at five thirty, Big Brother of KPO talks to the children. He advises them in their daily life and the letters (Continued on page 8)



Oliver W. Tuttle, managing director of one of the largest broadcast stations on the Pacific coast, KPO.



Dora Williams, secretary of Station KPO, who handles all the station correspondence.

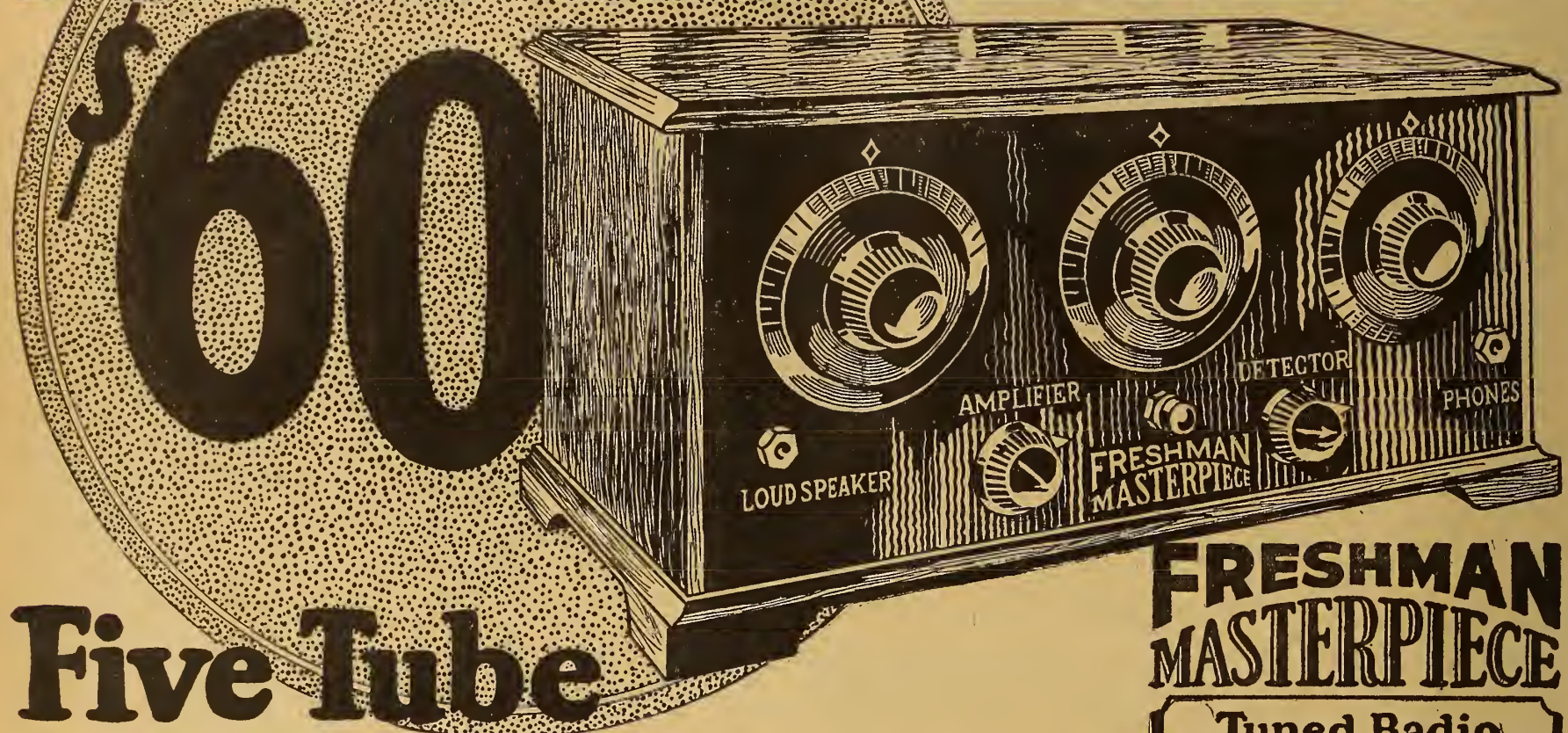


This is the Big Brother of KPO, a regular feature with this popular western station, having a great audience.



Ada Morgan O'Brien, celebrated program director and society matron at Station KPO.

FRESHMAN MASTERPIECE



Five Tube Tuned Radio Frequency

Made of the finest low loss materials and in a beautiful genuine solid mahogany cabinet, it is attractive enough for the most pretentious room, and, at sixty dollars, economical enough for the most modest.

The Greatest Value Ever Offered in a Radio Receiving Set

Combines every single point essential to the perfect receiver. Real distance reception without that squealing and howling. So selective that once a station is picked up—it can be brought in again at the same points on the dial whenever you want it. And what's more,

It's the Easiest of All Sets to Operate

All genuine Freshman Masterpiece Sets have a serial number and trade-mark riveted on the sub-panel. The Receiver is not guaranteed if number has been removed or tampered with.

HAVE YOUR DEALER INSTALL ONE IN YOUR HOME

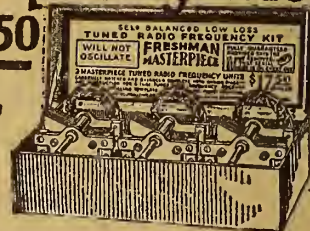
Chas. Freshman Co. Inc.
Radio & Condenser Products

106 Seventh Ave., New York, U.S.A.

FRESHMAN MASTERPIECE

Tuned Radio Frequency Kit

\$17⁵⁰



It's Easy to Build

With these marvelous units you can easily build a five-tube tuned Radio Frequency Receiver that will be highly selective as well as a remarkable distance-getter, bringing in all stations with pleasing clarity and volume.

Kit consists of 3 Masterpiece Tuned Radio Frequency Units carefully matched and balanced. Complete with wiring diagram and instructions for building any 5-tube tuned radio frequency receiver, and also drilling template for proper mounting.

Each and every Freshman Masterpiece Coil bears a serial number and trademark—our guarantee of electrical and mechanical perfection. For your protection demand only the genuine.

**No Neutralizing or Balancing
Condensers Required**

STATIONS MULTIPLY AFTER CONFERENCE

LARGE NUMBER CLOSED BROADCAST ONCE MORE

Many New Stations Found Among List Wanting License to Operate—Modern Equipment Used

Since the closing of the Third Radio conference, numerous broadcasting stations which were closed for indefinite periods have again taken the air. Along with these stations, several more new stations have applied for, and have been granted licenses.

Prominent among the stations which are reopening is KQV, who have been closed for more than a month. Mrs. George Santemeyer, a popular favorite with Pittsburgh Radiophans, was the premier artist on the opening program.

WFBG Opens at Altoona
Listed among the new stations is WFBG, the Tribune-Gable station, located in Altoona, Pennsylvania. On Friday evening November 7, the bands of the Pennsylvania railroad located in Altoona, broadcast a special program. The works choir, more than one hundred employees of the Pennsylvania system furnished three special numbers during the evening.

This station will be known on the air by the ringing of an engine bell, the blowing of an engine whistle and the rubbing of sand blocks, imitating a train about to start. They will operate on a wave length of 261 meters.

Station KFUG, owned and operated by the Concordia Seminary at St. Louis, Missouri, recently went on the air with their first program. They are using 500 watts power and broadcast on a wave length of 545 meters.

Church Contemplates New Station
The First Baptist church of Memphis, Tennessee, will soon be broadcasting with their own equipment. They have made application for a license, and will broadcast every Sunday morning.

KTHS, meaning "Kum to Hot Springs," is the call assigned to the new station now nearing completion on the roof of the Arlington hotel at Hot Springs, Arkansas. They will broadcast on a wave length of 375 meters.

G. C. Arnoux, formerly connected with Station WBAP, will be director.

NOTED CRITICISM'S TO BE PUT IN BOOK FORM

"Footlight and Lamplight" by Oliver Saylor for Fans

NEW YORK.—"Footlight and Lamplight," Oliver Saylor's half-hour of criticism of books and plays which is broadcast by WGBS every Thursday evening at 8:30, is to be released in printed form free to all who wish to obtain it. Mr. Saylor, the well known writer and critic, in this series discusses the latest worth while offerings in the dramatic and literary fields.

On the Fridays and Saturdays following Mr. Saylor's talks, printed copies of "Footlight and Lamplight" will be placed in every book that is sold over the counter in Gimbel's book department. Those who hear it over the Radio may also obtain copies, without expense, by sending a stamped addressed envelope to Mr. Saylor, care of WGBS, Gimbel Brothers. "Footlight and Lamplight" is also to be distributed in the theaters where plays are running that Mr. Saylor reviews.

From Oklahoma City comes word that a new 500 watt station will be erected and in operation some time in December. The exact location for the station has been undetermined as yet, but a survey is under way to find the best possible site.

The station has already been characterized as "The Voice of Oklahoma." The station will be dedicated to the people of Oklahoma for their use. Plans are under way to create a "Church of the Air," whereby various denominations will have an opportunity to put on special programs each Sunday.

Call letters have not been assigned to the station as yet, but are expected soon from Washington.

Charleston Wants Station
A project to give Charleston, West Virginia, one of the largest broadcasting stations in the country, was broached at the weekly luncheon of the Charleston real estate board recently, and received the approval of those present.

The Peoples Bank building owners have offered the use of the roof of their building for the station and a studio will be located there. Sending apparatus will be on the roof and lines connecting all the theaters and places of public meetings will be installed.

Football Radiocasts

November 22

Boston College-Vermont, WBZ (337).
Carnegie Tech.-U. S. Marines at Pittsburgh, WCAE (462).

Harvard-Yale at New Haven, WEAH (492), WGY (380), WJZ (455), WJAR (360), WCAP (469), WFI (395).

Illinois-Ohio at Urbana, WBAV (423), WGN (370), WRM (360).

Iowa-Michigan at Ann Arbor, WWJ (517).

Minnesota-Vanderbilt at Minneapolis, WCCO (417).

Rutgers-Bucknell, WIP (509), Stanford-California at Berkeley, KLX (411).

Wisconsin-Chicago at Chicago, KYW (536), WMAQ (448).

November 27

Cornell-Pennsylvania at Philadelphia, WEAH (492), WGY (380), WJZ (455).

Kansas-Missouri at Columbia, WDAF (411).

Louisiana-Tulane at Baton Rouge, KFPC (254).

Penn-Cornell, WIP (509).

November 29

Boston College-Holy Cross, WBZ (337).

Japanese Listen In to KGO 2-Hour Program

Using Super-Heterodyne Receiver Program Hear Complete

OAKLAND, Cal.—Millions of people in the Orient may soon be sweeping the air for American Radio programs as a result of recent tests between KGO, and officials of the Japanese Ministry of Communications.

Confirming Radiograms received a month ago, detailed reports by letter were received recently from the Hon. Eitaro Yokoyama, Japanese Ministry of Communications, covering reception of the international test broadcast from KGO August 30. After carefully checking the Japanese report with the KGO control room records, officials said today that no doubt exists but that Japanese listeners heard KGO's full two hour broadcast.

Using a Super-Heterodyne, receiver operators of the Hiraio experimental station of the Electro-Technical laboratory according to the report, successfully picked up the KGO international program and held it throughout. The Hiraio station is situated about 500 miles northeast of Tokyo.

FRANCE, ENGLAND TO EXCHANGE PROGRAMS

Rebroadcast Trials Made for Crystal Sets' Benefit

LONDON.—During a recent trip to Paris, the general manager of the British Broadcasting company held a meeting with the managers of the Compagnie Francaise de Radiphone, in connection with an agreement concerning the retransmission of concerts given in one country in various other countries.

The Radio-Paris station recently conducted trials in which concerts broadcast by station 2LO of London were retransmitted for the benefit of French amateurs with low-power receiving sets.

The Fiesta de la Raza in Spain was broadcast this year for the first time by Radio-Madrid.

Wyoming Builds First Broadcasting Station

Call Letters and Wave Length Not Assigned Yet

SALT LAKE CITY, Utah.—The first broadcasting station in Wyoming is being erected by J. Auerbach, a Radio dealer of Rock Springs. The wave length and station call have not been assigned by the government as yet. At present a government station is maintained at the air field at Rock Springs.

Secretary Wilbur Thanks A.R.R.L.

WASHINGTON, D. C.—Secretary of the Navy Wilbur has given the department's appreciation to amateur Radio operators in connection with their co-operation during the recent transcontinental flight of the Shenandoah. His communication was sent to the American Radio Relay league.

ATWATER KENT RADIO



In Selecting Radio—Performance is the First Essential

YOU want selectivity: to tune out a station you do not want. Sensitiveness to bring in a station you do want. You want faithful reproduction; ample volume, without distortion. You want an instrument that is easy to operate.

For distance, ease of tuning and reception without interference, ATWATER KENT receiving sets have no peer.

There is an ATWATER KENT instrument—receiving set or loudspeaker to suit your preference,—in size, type and price, but only one standard—the best that twenty-six years' experience in making scientific electrical instruments can produce.

Before you purchase a radio instrument—see the ATWATER KENT line—examine it—and there will be no doubt as to your choice.

ATWATER KENT MANUFACTURING Co., 4749 Wissahickon Ave., Phila., Pa.

THINK OF WHAT IS BACK OF IT

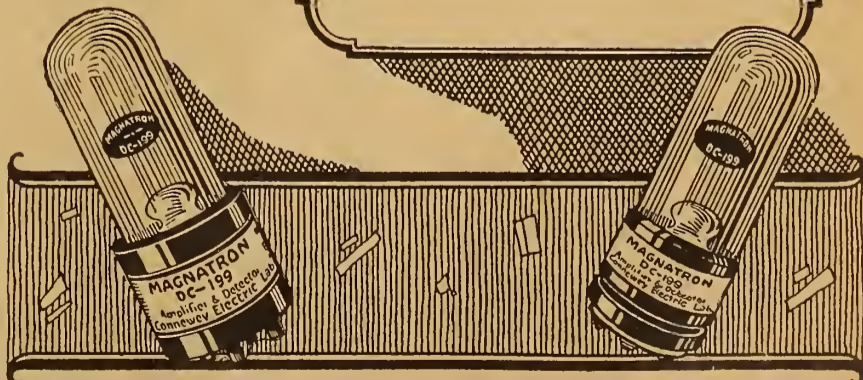
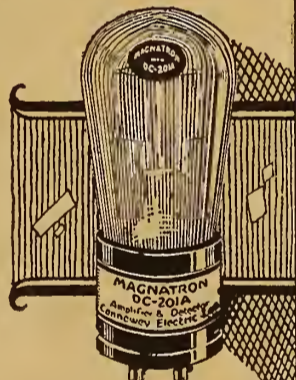


MAGNATRONS

THE improved MAGNATRON available to you today knows no equal in the vacuum tube field. It is the most sensitive detector, the most powerful audio amplifier and the most stable Radio amplifier we have ever developed.

The improved MAGNATRON far surpasses even the original MAGNATRON upon which we have built our reputation. That, in itself, is saying enough.

The improved MAGNATRONS are tipless. This feature prevents breakage. The price is low. The MAGNATRON DC-201A, the MAGNATRON DC-199, and the MAGNATRON DC-199 with large base all list at only \$4 Your dealer sells them!



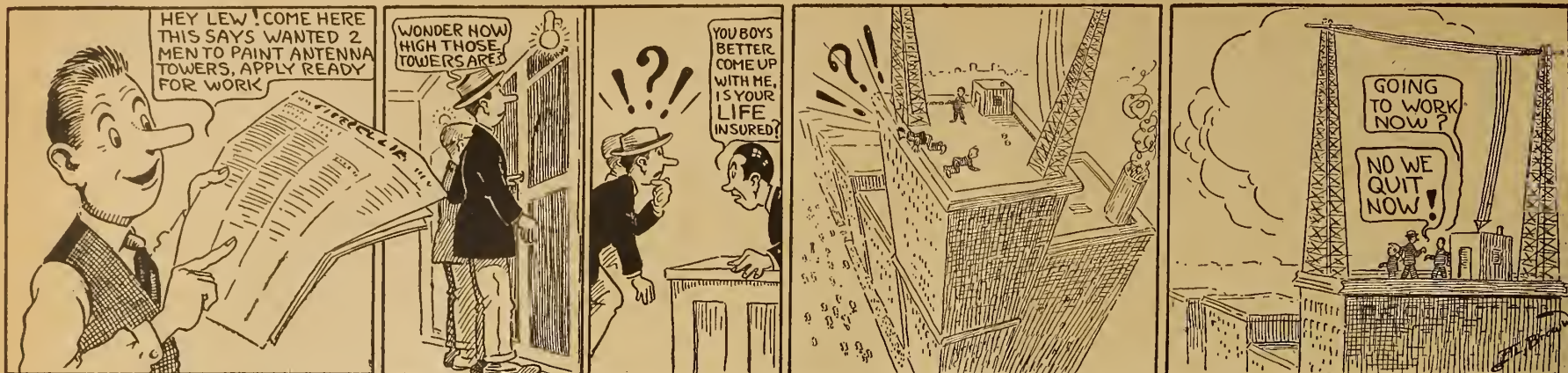
CONNEWAY ELECTRIC LABORATORIES

309 Fifth Ave., New York City

THE ANTENNA BROTHERS

Spir L. and Lew P.

High Ambitions



CALIFORNIA FAVORITE

(Continued from page 5)

received evidence a warm following. He reads to them and he reads from them. He is the Big Brother to the Radio child as his name implies.

KPO operates on 423 meters, and is a typical class B, 500-watt station. Its listeners are loyal whether within a radius of a few hundred miles or DX followers who write their appreciation of every new departure from the beaten path of standardized Radiocasting.

And you feel that you belong to the family of KPO, that the Big Brother is yours too; and Mrs. O'Brien, O. W. Tuttle and T. J. Irwin at the organ, with the able assistance of operators and the office staff, claim you as another member of their vast Radio family.

Uncle Geebee at WGBS

NEW YORK.—In planning its unusual and interesting programs the new broadcasting station WGBS has not overlooked the kiddies. No less a person than "Uncle Geebee" has been obtained by WGBS to amuse them.

Alfred G. Robyn—though internationally known by his pseudonym—makes his appearances before the microphone every evening, when all the kiddies tune in to listen to half an hour of fun by their favorite fun-maker.

Mysterious Sermons Broadcast

LONDON.—Every Sunday for the past weeks, English Radio amateurs have been receiving church services and sermons from an unknown source. Widespread searches for the mysterious station have not located it so far.

CKY Heard in Hawaii

WINNIPEG, Man.—CKY broadcasting the Canadian National Railways program under call letters CNRW on Thursday evening October 23, was heard in Haiku, Hawaii, according to a letter just received here. This is considered a remarkable

record resulting from structural improvements at CKY.

It is interesting to note that popular superstition among the elder inhabitants of Rome considers Radio as a work of the devil, while Mussolini and even the Pope listen in daily over their sets.

YOUR CHOICE FREE

Radio Digest Illustrated
Volume 10

limited supply

65 Copies

A RADIO REFERENCE LIBRARY

You receive 52 issues with your subscription and 13 issues in each bound volume. Bound volumes 5, 8, 9 and 10 ready for shipment. Volumes No. 1, 2, 3, 4, 6, and 7 are out of print. This offer good only in the United States and Canada. This offer good only for subscriptions coming to us direct with full amount of remittance. Not good through dealers or subscription agencies.

Great collection of Radio Information. Lessons for the beginner. Instruction on how to build and operate the standard reliable sets. Valuable Question and Answer department.

TODAY IS YOUR RADIO DAY

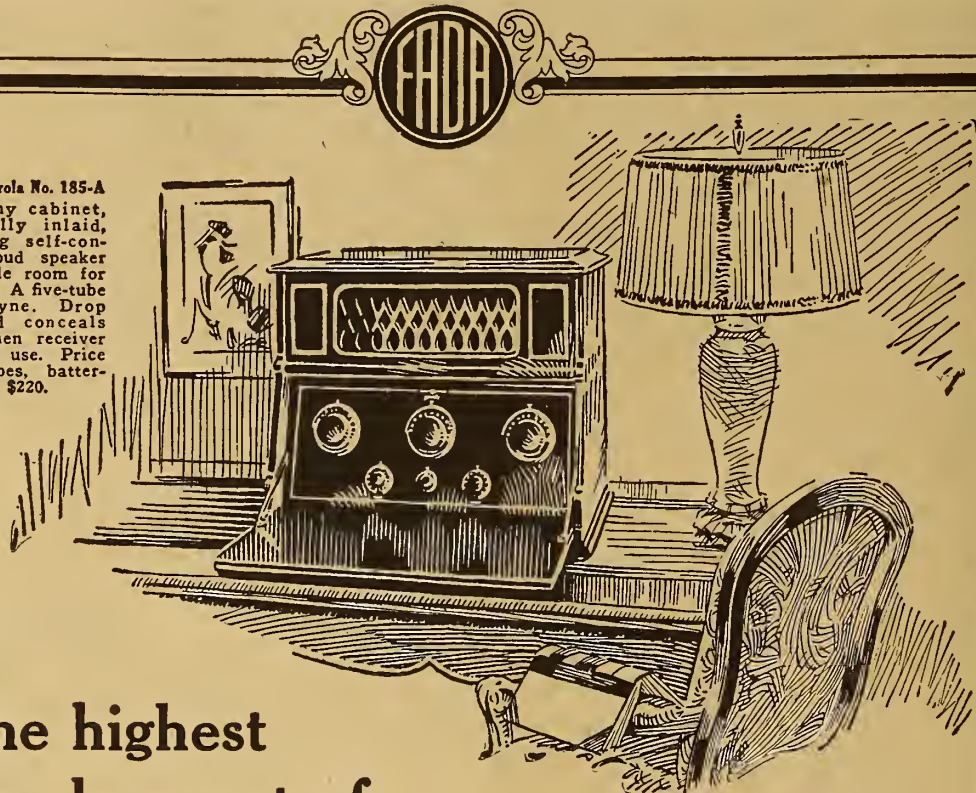
In addition to these features the current issues give you all the live news in Radio. Advance Broadcasting Station programs. Correct and authoritative list of all Broadcasting stations. The first and last word in Radio.

RADIO DIGEST, 510 N. Dearborn St., Chicago. One year's subscription and choice of one volume. Send Vol. No. Enclose, \$5.00. (Additional Bound Volumes at \$2.00 each.)

Name..... Address..... City.....State.....

11-22-24

FADA Neutrola No. 185-A Mahogany cabinet, beautifully inlaid, including self-contained loud speaker and ample room for batteries. A five-tube Neutrodyne. Drop desk lid conceals panel when receiver is not in use. Price (less tubes, batteries, etc.) \$220.



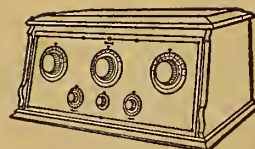
The highest development of the Neutrodyne

YOU can now purchase a FADA Neutrodyne radio receiver that will amaze you with its performance as well as delight you with its appearance and price.

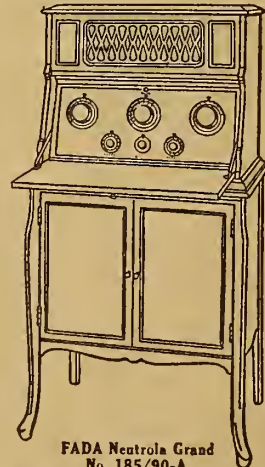
The FADA Neutrola and the FADA Neutroceiver incorporate the latest Neutrodyne improvements. Each is a five-tube receiver that the most particular radio expert would delight to use. Each is encased in a cabinet of solid mahogany that represents the best of the designer's art.

The Neutrola and Neutroceiver are leaders in the complete FADA line of Neutrodyne receivers. Six models in all—three, four and five tube sets ranging in price from \$75 to \$295. Nothing has been left undone to make these FADA receivers remarkable performers and remarkable values. Your dealer has the various models awaiting your choice.

F. A. D. ANDREA, INC., 1581 JEROME AVE., NEW YORK

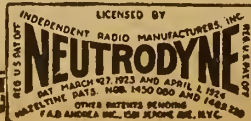


FADA Neutroceiver No. 175-A Mahogany cabinet. Inclined panel and roomy battery shelf. 5 tubes. Price (less tubes, batteries, etc.) \$160.



FADA Neutrola Grand No. 185/90-A The 5-tube Neutrola 185-A, mounted on FADA Cabinet Table No. 190-A. Price (less tubes, batteries, etc.) \$295.

FADA Radio



OPERATING AND TROUBLE SHOOTING

For the Owner of an Atwater Kent Model 20

EXTENSIVE tests with this set showed that it could be used, with excellent results, on almost any type of antenna. Naturally, the best results are secured with a high outside wire since more energy reaches this type. The length over-all, including the lead-in and ground should, preferably, not exceed 100 to 150 feet. If one long straightaway wire is impossible and an aerial of two or more wires is used, the space between wires should be not less than 3 feet and greater separation would be to advantage.

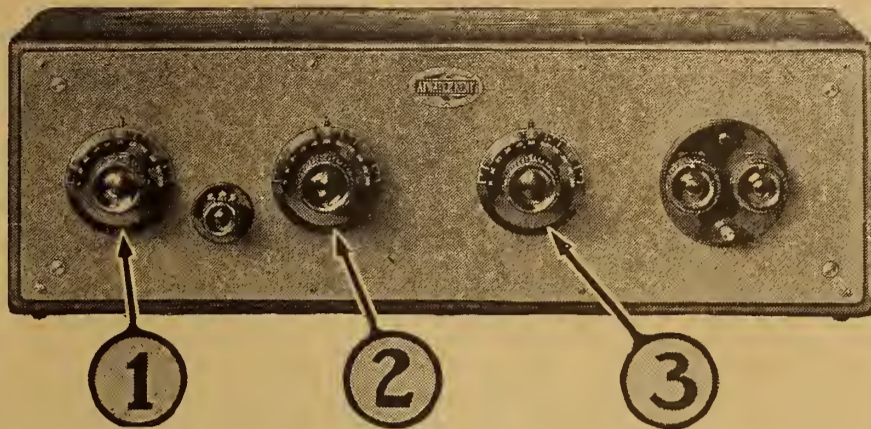
Antenna and Ground

Between a loop antenna and an indoor wire, tryouts proved the indoor to be slightly better. A wire was strung straight down a hallway about 40 feet in length and 6 inches below the ceiling, attached at each end to the top of a door frame with insulators. This worked very nearly as well as the outside wire. Since an antenna strung behind the picture moulding of two rooms was available this was also tried and, while the volume was not quite as great, the selectivity was increased to knife-like sharpness and the range differed not at all. Although it was not tried, there seems good reason to believe that an attic antenna would give even better results than the wire strung in the hall.

The ground, as usual, was made by scraping the water pipe and tightening a substantial ground clamp around the clean portion. In this case the connection was made in the basement near a window, the wire run out through a small hole in the basement window frame and up to the window through which the antenna lead from the outside wire was passed. Both wires are brought, in porcelain tubes, through a board under the sash.

Tubes and Batteries

Following the manufacturers instructions, five "hard" tubes of the A type were used, instead of four A tubes and a soft detector. Although the set performed



well on the first insertion of tubes, they were switched around while the set was left tuned to a station to ascertain whether any of them performed better as Radio frequency amplifiers. Some improvement in both volume and clearness was perceptible when the first Radio frequency tube and the detector tube were exchanged. The battery is a 6-volt, 120 ampere hour unit and, while it may be used for several days and then recharged for several hours at a high rate, it has been found better practice to charge it a little each evening while at dinner to make up what was used the evening before. A charging rate of 2 1/4 amperes for an hour seems to keep this one about right.

Model 20 was used on both storage and dry cell B batteries. Performance over a period of six weeks is apt to be more consistent with the former, but no difference could be noted during the two nights' test of this set, though the dry cell blocks were 10 per cent gone and the storage cells freshly charged. When making connections to this receiver, or any other for that matter, make one complete connection from set to battery at a time, rather than making five connections to the batteries and then connecting all the loose wires to the set. Care should be observed when connecting the loud speaker that the cord with the red thread inter-

woven in it is connected to the post marked "Red Tracer Lead."

Check all battery, antenna, ground and speaker connections once before putting in any tubes; then insert one in any socket and pull the filament switch out. Turn the rheostat over slowly and, if tube lights dimly it will be alright to insert the other four tubes. Turn both rheostats to right nearly to the maximum position, and one is ready to tune in stations.

Operation

It will be found that the second and third dials will always be at very nearly the same setting for any given stations, while the first dial will be at some point slightly above or below them, depending on the position of the tap switch. This switch is provided to adjust the set to any antenna with which it may be used. A few trials will show on which tap it should be set for maximum results, after which it can be left there. In the case of our tests it was found that tap number 2 worked slightly better than the others. First of all set dials 2 and 3 on, let us say, 56. Then swing dial 1 slowly from 40 to 70. If no program is heard, even faintly, shift dials 2 and 3 to 54 and again swing dial 1 through the short arc. After two or three shifts, a station will be heard and all dials can quickly be set to maxi-

mum response. Then adjust the two rheostats to the point where both volume and clearness are at maximum, but do not turn them any further to the right as this would merely be burning up energy uselessly and will shorten the life of the tubes.

With a distant station tuned in, try shifting the switch located between dials 1 and 2 and reset the dials slightly. If any increased response is noted write down the dial settings and then tune in another station with the switch back on the point at which it was before. Then shift switch and reset dials as before. This procedure on different stations located in several directions will determine once and for all the switch setting and it should then be left alone. It will be found an excellent idea to keep a little red tag or something else bright in color, attached to the filament switch for a few days, as otherwise if one leaves the set at a time when signals are not tuned in, it is very easy to go off and leave the tubes burning, possibly for many hours. The tag serves to attract one's attention and remind that the switch should be pushed in. After the fact that the switch is there and is to be used, has been sufficiently impressed on one's mind, the tag can be removed.

Dial Settings

The dial settings we found with the antenna compensating switch on point 2 are shown here and it seems reasonable to believe that other Model 20 sets will follow these settings very closely.

Wave Length	Dial 1	Dial 2	Dial 3
278	18	22	22
309	24	28	28
337	30	34	34
380	41	45	45
429	52	56	56
469	64	68	68
492	70	74	74
517	78	82	82
536	84	88	88

A. R. R. L. Holds Convention

OMAHA, Nebr.—The midwest division of the American Radio relay league will hold its first convention in Omaha, November 24, 25 and 26, under auspices of the Citizen's Radio club of this city. Amateur telegraphers from Nebraska, Iowa, Kansas and Missouri will attend.

Both Must Be Musical Instruments

If you are to enjoy the rich resonance of an old Cremona violin, your loud speaker must also be a true musical instrument. So designed and powered as to respond as faithfully to the inspiring crescendos of a Wagner Opera as to the whispers of a Moonlight Sonata.

The new Bristol AUDIOPHONE does that. With its joyous, open-throated rubber horn, and its finely adjusted tone mechanism, it is on a musical plane with the noblest instrument or voice at your favorite station.

Send for bulletins Nos. AY-3011 and 3017, mentioning name of your dealer.

THE BRISTOL CO., Waterbury, Conn.

Bristol
AUDIOPHONE LOUD SPEAKER

Model S Audiophone \$25
Rubber horn 14 1/2" diameter. Velvet mat finish of mottled bronze and gold; classic base. Other models \$20, \$15 and \$12.50.

Consistent distant Loudspeaker' reception

Kit Complete PRICE \$35

Licensed under U. S. Pat. Office Serial No. 719,264 for Radio Receiver Systems

EXPERIENCE the satisfaction of hearing distant points always as loud and clear as if they were near at hand.

Radio frequency, controlled by variable condensers mounted on air core transformers, gives the Neutrodyne its remarkable distance. The Shamrock-Harkness Two Tube Reflex uses these transformers (flexoformers).

But this set also gets clarity from the Reflex and volume from the Regenerative, thereby combining the outstanding features of the leading circuits. Enjoy the best radio set in your neighborhood. Build it yourself, at half the cost. All parts necessary to make this marvelous set, including full directions simply told, furnished in the Shamrock Kit.

Before building your set, mail coupon below for "Shamrock Radio Builder's Guide Book."

SHAMROCK MANUFACTURING CO.
Dept. 26-C, Market St., Newark, N. J.

SHAMROCK
FOR SELECTIVE TUNING
The set for the masses as well as the classes

SHAMROCK MFG CO., Dept. 26C, Market Street, Newark, N. J.
I enclose 10 cents (U. S. stamps or coin) for copy of "Shamrock Radio Builder's Guide Book," containing diagrams and complete instructions for building 10 sets at prices ranging from \$15 to \$50.

Name
Address
Dealer's Name

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

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

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

STATIONS IN ORDER OF WAVE LENGTHS USED

Table with columns for Meters Call, listing stations in order of wave lengths used.

England Establishes Direct Contact with New Zealand LONDON.—Two British amateurs have achieved the record feat of exchanging Radio messages across the world. They listened to New Zealand and transmitted a reply. A cable has just arrived to the postal address Radioed from London the previous night, which confirms the almost incredible achievement. Describing the feat, the secretary of the Radio Society of Great Britain said: E. J. Symonds, an amateur living near London, whose call sign is G2OD, was

astonished on the morning of October 16 to hear the Morse call sign of Z4AG, calling up U6ARE, an American amateur station with which he was apparently in communication. He realized that for the first time an English station (home-made and with ridiculously small power) had got a message across thirteen thousand miles of space. The first tramp steamer to be equipped with a Radio fitted motor lifeboat is the Geraldine Mary, recently designed and built for the Anglo-Newfoundland Development company.

Site for England's Super Power Station Determined

LONDON.—Britain's new super power broadcaster, to take the place of 5XX at Chelmsford (which was never intended to be more than an experimental station), is likely to be erected at Northampton. The British Broadcasting company's engineers have examined several other suggested sites, and a final decision will be made shortly.

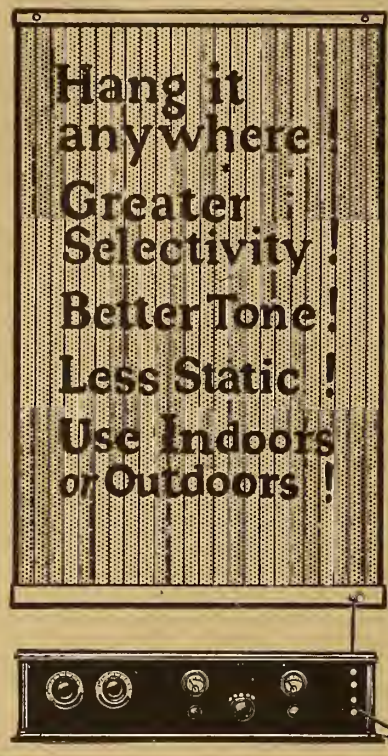
The new station will have a transmitting power of at least 25 kilowatts.

Walter Johnson at KHJ

LOS ANGELES, Cal.—The mighty Walter Johnson took his turn in the broadcasting studio of KHJ here recently. In a two minute speech, he expressed the desire to settle down in California when "finis" is definitely written to his major league career.

Effarsee for Better Reception

YOU get less noise and more music on an Effarsee Portable Antenna. It brings in stations from coast to coast on sensitive sets, and very good volume and distance on other sets.



It stops all aerial troubles in congested places and makes it easy to install a radio set. It reduces static and improves the tone. Used in series with an outdoor aerial it stabilizes and improves the signals. Every set owner should have one for nights when static is bad. In apartment houses Effarsee can be put under the rugs. Dealers are using them for demonstrations.

Three Sizes: \$1.00, \$1.50 and \$2.50

If your dealer cannot supply you, write us direct—money back if not satisfied.

Jobbers and Dealers: Effarsee is going big this year and offers a real profit opportunity.

Effarsee PORTABLE ANTENNAE

The Fishwick Radio Co. Edwards Bldg., Cincinnati, Ohio



Look at that Finish!

And the High Gloss Is Everlasting

A beautiful black, high gloss finish is but one of the superior features Spaulding Bakelite-Duresto panels can offer you. Bakelite-Duresto panels drill and engrave easily without chipping. Positively will not warp, shrink or split. Highest in dielectric properties and tensile strength. The best that money can buy.

Insist on Bakelite-Duresto. Your dealer can furnish standard sizes, special sizes to order.

Write nearest office for descriptive circular. SPAULDING FIBRE COMPANY - - Tonawanda, N. Y.

Factory: Tonawanda, N. Y. Sales Offices: Warehouses

- 848 Broome Street, New York City. 659 W. Lake Street, Chicago. 310 E. Fourth Street, Los Angeles. 141 N. Fourth Street, Philadelphia. 15 Elkins Street, Boston. 171 Second Street, San Francisco. 509 First Nat'l Bank Bldg., Milwaukee.

Spaulding BAKELITE-DURESTO Panels - Sheets - Tubes - Rods

45-7:45 p. m.,
 eek, baritone;
 m & Company
 Paradise ball-
 m, setting-up
 s dinner and a
 l Shaw, pianist
 Day, special
 tet.

ber 26

, KFMQ, KGO,
 WGY, WHAA,
 WRBC, WRC.

, 12:15 p. m.,
 i; 6:30, dinner
 idren's period;
 of Pittsburgh;

, 7:30 p. m.,
 ulmer, pianist;
 V. Ellington;
 i talk; kitchen

p. m., U. of I.

, 5-5:30 p. m.,
 30-6, Examiner,
 ick Harris de-
 ; 8-9, Evening
 isters of Long
 z singer; 9-10,
 Marian Walters
 no; 11-12, Abe

7:30 p. m., pro-
 i. S. A. quartet.

'8), 10:30-11:30
 m.; Auditorium
 non; 6:30-7:30,
 Mrs. Edward

30 p. m., con-
 dren's program;
 0, dance music.

95), 12:30-1:30
 Room orchestra;
 Art Hickman's
 director; 6:30-
 stories American
 le and reporter;
 on astronomy;
 Hatch Graham,
 Hickman's dance

i a. m., morning
 er hour music;
 Carson-Baruch
 l orchestra.

in, 360), 7:30-
 Testing, Prof.
 t of Entomology
 re Corbin, New
 an.

23), 1-2 p. m.,
 stra; 4:30-5:30,
 tra; 5:30-6:30,
 Seiger's Fair-
 giving program;
 s Versatile band.
), 6:45 p. m.,
 nesen, violinist;

30, 7, 8 a. m.,
 us; 11:35, table
 news, financial
 Bob; 7, dinner
 program, Duncan
 8, musical pro-
 gram; 9-05,
 9-10, talk, H.
 midnight revue;

7:30-10 p. m.,
 rmy, Capt. Jose

'6), 7:30-8:30 p.
 , Alford, Texas;
 ey's Texas Hotel

, 273), 8 p. m., I. B.
 vocal solo, Fred Twarosch;
 is So Hard to Understand,
 8:40, Fred Twarosch; 8:45,
 I. B. S. A. quartet.

WCAE, Pittsburgh, Pa. (Eastern, 462), 4:30 p. m.,
 Uncle Kaybee; 6:30, dinner concert, William Penn
 hotel; 7:30, Sunshine girl; 7:45, special feature; 8,
 orchestra and artists, Nixon restaurant; 9:30, religious
 program, Haines Evangelistic concert party.

WCAE, Milwaukee, Wis. (Central, 266), 6:30 p. m.,
 Boston Store night; WCAE Silver Lake orchestra;
 Badger Opera quartet; Ben Bertelson, violinist.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 9:30
 a. m., news bulletins; daily program; 10:45, home
 service, "Last Minute Plans for Thanksgiving," 2
 p. m., woman's hour; 2:30, musical program; 4, maga-
 zine hour; 5:30, children's hour, Alpha Stalson; 6,
 sport hour; 6:30, weekly summary Flour, Flax and
 Feed Markets; Henry Bellows, editor Northwestern
 Miller; 7-8, vesper service; 9, weather report; musical
 program, Engelbert Roentgen, cellist; Alexandre Duvoir,
 oboe soloist; Gabriel Fenyes, pianist.

WCK, Detroit, Mich. (Central, 517), 3:15 p. m., music,
 Paramount entertainers; 5, dinner concert, Hotel Tuller;
 7:30, musical program.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30
 p. m., the Star's string trio; 6-7, school of the air,
 piano tuning-in number on the Duo-Art; address, rep-
 resentative of the Meat Council of Greater Kansas
 City; address, auspices of the Health Conservation
 association; the Tell-Me-a-Story Lady; music, Hotel

(Continued on page 14)

WHN, 9:30,
 10,
 WLW, 11,
 11:45,
 WJZ,
 10:15,
 WJH,
 11:45,
 WDO, 7,
 H, 8,
 WDA, 8,
 WBN,
 WGR,
 11,
 JAF.

Health service bulletin and talks; 2 p. m., the Detroit
 News orchestra; 6 p. m., the Detroit News orchestra;
 T. Stanley Perry, tenor.

Tuesday, November 25

Tuesday, silent night for: KFAE, KFAU, KOB, KSD,
 PWX, WBAV, WBBR, WEAO, WHAZ, WHO, WKK,
 WMH, WOI, WRBC, WTAM.
 CKAC, Montreal, Can. (Eastern, 425), 7 p. m., kiddies'
 stories in French and English; 7:30, Rex Battle and
 his Mount Royal hotel classic orchestra; 8:30, La
 Presse variety entertainment; 10:30, Joseph C. Smith
 and his Mount Royal hotel dance orchestra.
 OKY, Winnipeg, Can. (Eastern, 450), 7:30 p. m., Uni-
 versity lecture; 8:15, concert, Winnipeg branch of
 "Toc H."
 KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:15 p. m.,
 concert, Scialzo's orchestra; 6:30, organ recital, Albert
 Taylor; 7:15, children's period; 8, program, Tree of
 Life congregation; 8:30, concert; 11, concert, Pitts-
 burgh Post studio.
 KFI, Los Angeles, Calif. (Pacific, 469), 5-5:30 p. m.,
 Evening Herald, table talk, news items; 5:30-6,
 Examiner, music, news and markets; 6:45-8, Aeolian
 pipe organ studio recital; 8-9, Abe Lyman's Coconut

cafo concert orchestra; 4:30, Edna Finestone, pianist;
 7:30, Dream Daddy; 7:50, "Both Sides of the Foot-
 lights," Arnold Abbott.
 WEAF, New York, N. Y. (Eastern, 492), 11:30-11:45
 a. m., motion picture forecast, Adele Woodard; 6-7
 p. m., dinner music, Waldorf-Astoria hotel; 7:15-7:30,
 Betty Whitehall, contralto; 8-8:20, politics, Barnard
 college; 8:20-8:30, John F. Hill; 9:30-9:45, Charles
 Phillips, pianist; 10-11, National Carbon company.
 WEJ, New York, N. Y. (Eastern, 273), 7-7:15 p. m.,
 Blybrun's review of the new photoplays on Broadway;
 7:15-7:30, Herbert Mallett, baritone; 7:30-9, Kiwanis
 club, special program.
 WEEL, Boston, Mass. (Eastern, 303), 6:30 p. m., dance
 selections, Dok-Eisenbourg and his Sinfonians; 7,
 Boston Edison Big Brother club; 7:30, talk; 8:30,
 pianist, Abraham Alexander; 9, program from WEAF;
 10, DeScenza Majestic orchestra; 11, Fenway theater
 midnight organ recital, Lloyd G. Del Castillo.
 WFAA, Dallas, Tex. (Central, 476), 12:30-1 p. m.,
 musio, Red Head girl; Couss Rubinoftak, Russian
 pianist; 8:30-9:30, Mrs. D. A. Little, Mrs. Sam R.
 Barwell; Victoria Howard, pianist; 11-12, Dwight
 Brown, organist.
 WFI, Philadelphia, Pa. (Eastern, 395), 1 p. m., Meyer
 Davis Bellevue Stratford concert orchestra; 3, report,
 closing prices, Chicago grain market; 3:05, Women's
 Symphony orchestra of Philadelphia; 6:15, review of
 local plays, T. Lawton Slough; 6:30, Meyer Davis
 Bellevue Stratford concert orchestra; 7, Sunny Jim,
 the kiddies' pal; 8, Wilkes-Barre male quartet.

WAW, Omaha, Nebr. (Central, 526), 6 p. m., advice
 to lovelorn Cynthia Grey; 6:25, dinner program; 9,
 program, courtesy, B. P. O. E. Omaha Lodge No. 39;
 10:30, Wowl frolic, Frank Hodek, Jr. and his Omaha
 Nightingales.
 WOR, Newark, N. J. (Eastern, 405), 7-7:30 a. m., WOR
 gym class; 2:30-2:45 p. m., Patti Levine, dramatic
 soprano; 3-3:15, Patti Levine; 6:15-6:30, "Music
 While You Dine," Jersey collegians; 6:30-6:45, "Man-
 in-the-Moon" stories, Josephine Lawrence and Wm. F.
 B. McNeary; 7-7:15, "Music While You Dine,"
 Jersey collegians; 7:15-7:30, resume of the day's
 sports, Jolly Bill Steinke.
 WRC, Washington, D. C. (Eastern, 469), 6 p. m.,
 children's hour, Peggy Abblon; 7:30, talk on farming;
 7:45, to be announced; 8, "Show Shopping," Leonard
 Hall; 8:15, piano; 8:30, music; 9, "The Political
 Situation in Washington Tonight," Frederic William
 Wile; 9:20, concert, Irving Boernstein's Wardman
 Park hotel quartet; 10:15, dance program, Meyer Davis'
 Le Paradis orchestra.
 WSAI, Cincinnati, Ohio (Central, 309), 7 p. m., Hotel
 Gibson orchestra; 7:30, chimes concert; 7:45, children's
 stories, Ethel Knapp Behrman; 8, Gibson orchestra;
 9, Bass solo, Milton Sachs; reading, "Mrs. Rastus on
 the Telephone," Mrs. Behrman; clarinet solo, Foster
 Lovett; popular songs, Bernard and Robinson.

"Low Loss," What It Is and Why

By Jacques Fournier

TO MANY readers, all of the columns of printed matter on low loss coils and low loss condensers may seem to be a great deal of hullabaloo about a very small and comparatively unimportant factor. It may seem to many that the actual gain resulting from paying strict attention to all of these little details does not result in sufficient gain to warrant the winding of special coils and the choosing of unusually efficient condensers. The results of some tests recently made will readily prove that these losses are all important for selectivity and signal strength.

Low Loss Tests

A fairly low loss coil, and a condenser that may be considered about average, were connected in series with a resistance box and a thermal ammeter. The coil was then placed close to an oscillating circuit adjusted to a wave length of 400 meters. The resistance box enabled the experimenter to insert more or less resistance in the circuit, exactly as it is present in a Radio frequency circuit when resistance due to poor construction is found. The condenser was then swung through the scale of wave lengths from 350 to 450 meters; the oscillator being left at 400 meters. The resulting curves were rather startling, for with no resistance inserted the thermal ammeter registered 82, while, with one ohm inserted the meter registered but 65. When 5 ohms were placed in the circuit the meter would show a maximum of only 33. This procedure was continued until 25 ohms had been inserted, at which point the meter registered but 8 and the curve was so broad that a similar circuit in a receiver would be useless in a congested area.

Transferring the experiments from the purely theoretical to the practical, the resistance of a well-known low loss condenser was measured and found to be .02

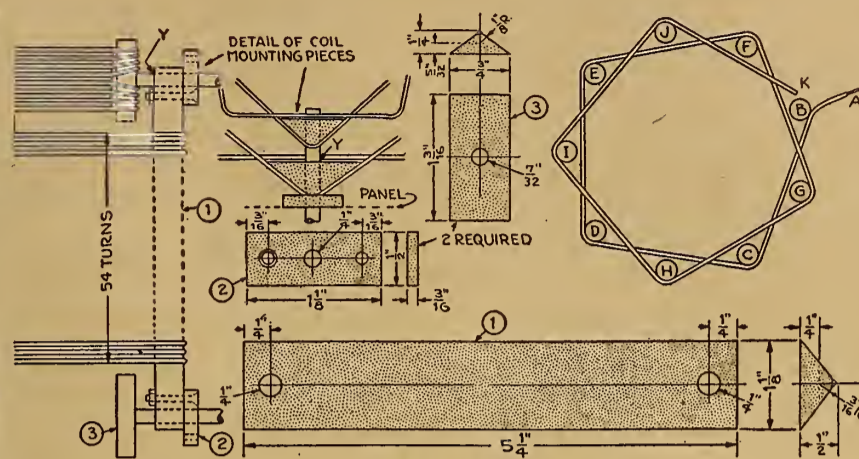


Figure 3.

found that the resistance had been increased .8 ohm. A coil wound on a solid tube was then tested and it was found that its resistance was 4 ohms more. Plainly, such a coil would reduce the efficiency of a Radio frequency circuit a great deal.

The type of inductance known as the basket coil has the lowest losses of any type now used in Radio, and while such a coil is somewhat delicate and must be handled with care, it is not hard to make and mount behind a panel.

We will take up the construction of a tuning unit suitable for use in a regenerative receiver and the instructions for winding the coils will cover coils used for any purpose in a receiver. This unit will have a large fixed secondary coil with a rotor

intersections. Dowel rod can be obtained at any lumber yard 3/8-inch in diameter and nine pieces should be cut 5 inches long as shown in Figure 1. One end of each of these pieces should be slightly rounded off with a file so that the rod will slip into the holes in the baseboard readily. Before inserting these rods they should be smoothed down with fine sandpaper so that when finished our coil will slip off without trouble. The rounded end of each rod is now coated with glue to a height of 1 inch and the rods inserted in the holes.

The method of winding will be made clear by reference to Figure 3-a; the wire being number 14 dcc. The starting end of the wire is denoted at A and the wire passes outside of the rod B, inside of G, outside of C and inside of H. Since we have an uneven number of rods, the wire will pass outside of the alternate rods on the second turn and the resulting outline of the coil is a nine-pointed star. It will be found most convenient to slip the wire loosely around four or five pegs and then slide it down toward the bottom. This winding is continued until 54 turns have

been wound on the pegs. It will be noted that there are nine intersections of wire between the nine rods and at these nine points a piece of heavy thread or string should be tied lengthwise around the wire; that is, it should pass from one end to the other on the outside of the coil over the wire at each end and then down inside the coil. This will hold the turns tightly together at nine points and it will be found that with a little maneuvering and bending of the dowel rods the coil can be slipped off of the form at one end. No cement or collodion mixture of any kind should be used on this coil as we are trying to keep losses at an absolute minimum.

The two smaller coils which will form the rotors at the end of the large coil will now be taken up. The form is similar in construction to that used for the secondary, except that the dimensions used in Figure 2 are to be followed and 1/4-inch dowel rod used. These smaller coils are to be wound with number 18 double cotton covered wire and one is to contain 18 turns while the other should contain 10 turns. The 10-turn coil is the primary. These smaller coils having been wound and tied up with heavy thread, as was the large one, we are ready to mount them into a single unit.

Assembly of Unit

The complete assembly is shown in Figure 3, the small numbers connected to each piece by arrows indicating the small part, details of which are shown in Figure 3. Item 1, which is the spine or backbone in the construction, should preferably be made of hard rubber or bakelite, but can also be made of hard wood soaked in paraffin if the builder does not have the tools to work bakelite into this shape. It will be noted that this piece is exactly the same shape and size as the opening left in the coil where one of the dowel rods passed through in winding. It is suggested that this piece be slipped through the large coil at the point where rod D was located, so that the ends of the coil will be at the rear and handy for connection.

If the design of the set in which this coil is to be used is such that the ends (Continued on page 20)

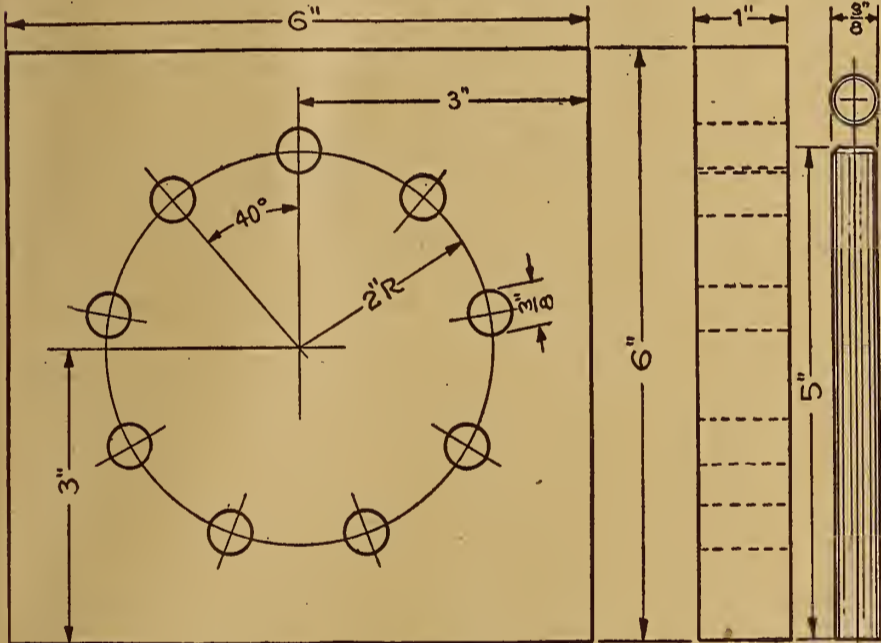


Figure 1.

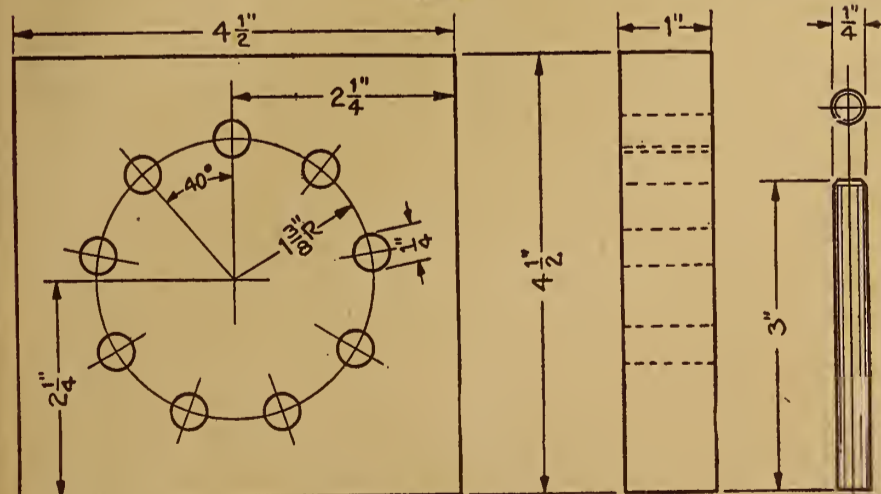


Figure 2.

ohm, while another well-known condenser with dielectric end plate and not equipped with a pigtail showed a resistance of 5 ohms. Such a condenser in a circuit would reduce the efficiency 30 per cent. Experiments were then conducted to determine the value of low loss construction in inductance.

A coil wound on a wooden form, coated with cement and then slipped from the form was measured and its ohmage determined. Two strips of bakelite were then inserted within the coil and it was

at each end, one of which is the primary and the other is the tickler.

Winding Basket Coils

Figure 1 shows the details of the form used to wind the large secondary coil. The baseboard is made of some hard wood such as maple, measuring 6 by 6 inches by 1 inch thick. With a compass set for two inches, draw a 4-inch circle in the center of this baseboard; then with a protractor, nine points are marked off around this circle 40 degrees apart. A 3/8-inch hole is now drilled at each of the nine

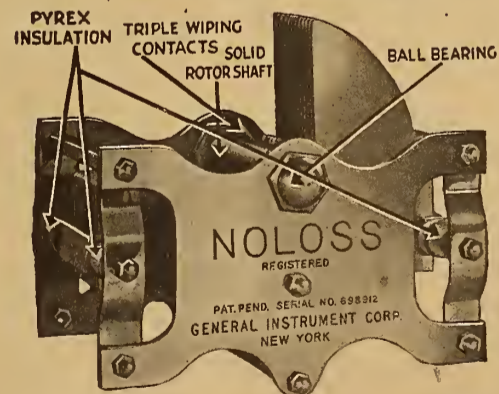
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51F	.001 mfd.	20 mmfd.	7.00
52D	.0005 mfd.	13 mmfd.	9.00
52F	.001 mfd.	20 mmfd.	9.50

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Announcing Call Letters

If Station Is Not Known Interest Is Lost

THERE has been much said about announcing station call letters that it appears impossible to say more, yet announcers at many stations fail to take heed and give their call letters or station's name. Most of the thrill comes from getting a certain station and then to hear its fine program. Stations have sent out broadcasts for an hour at a time without any mention whatever of its call letters. It can be readily understood that a lecture or a discourse by a minister takes from twenty minutes to a half hour and when broadcast there is not much chance for the call letters to be sent out on the air. Even at that ministers and lecturers have brought it about in their speeches so that the station's name was mentioned purposely to acquaint the listeners of the person speaking and the locality of the broadcasting station. This is much appreciated. However, the whole discourse or service need not be sent out without being interspersed with the station's name or call letters. To substantiate our position in this matter we herewith present a typical letter, hundreds of which from our readers:

"I would like to ask why so many announcers in our broadcasting stations fail utterly to give their call letters or location before and after each number on the program. They apparently take for granted that all who are tuned in know where the Radio message is coming from. Now, I think it is far more interesting to know the station's location, but I have waited sometimes for twenty minutes and then failed to find out "where I was at;" for all I got, many times, was something like this: "The next number on our program will be, etc. Miss Smith's next offering will be, etc. You will now hear "Jasboo Orchestra" play, etc. This concludes our program for the evening, good night."

"I cannot understand how an announcer can be so lax—but there are many of them. I am glad to say that the Chicago stations, as a rule, are free from this criticism and I am hoping the offenders will pattern after them. Perhaps a word or two from you, editorially, would help a whole lot.—J. M. W."

We would suggest, for each station's good, that this important part of the announcing is not forgotten. Let the listener know who is broadcasting and he will give you better support.

Standardization of Parts

Means Sought to Bring About Unification

OFFICIALS and engineers of the U. S. bureau of standards are seeking means to effect the manufacture of standard Radio parts. It is the first step made toward unification of the industry throughout the country.

At present each manufacturer has his own measurements for apparatus that is used generally in as many forms as there are producers. Standardization of such parts would reduce their cost and make replacements easier.

Taking note of the advancement made in the automobile and other similar industries through the agreement of the manufacturers for standardization of their parts, some Radio producers have already signified their willingness to achieve the same results in their industry.

Conferences have been held, with the officials of the bureau of standards taking part, and more are expected to come.

It is only after certain important parts have been standardized that the Radio industry will be in a position to produce apparatus on a large quantity basis. At present each manufacturer is virtually for himself.

Recognize Station by Sound

Oddities Tell You Who You've Tuned In

THIS may be called mental telepathy but whatever it is, one may recognize a station by the way it tunes in. To the novice such keen auditory perception is unbelievable, but to one who knows his set and understands how to handle it, the trick is simple.

RADIO INDI-GEST

Father Makes a Radio

Father answered every ad in every magazine; Copied every hook-up that this world had ever seen; Neutrodyne and superdyne and every kind of dyne. His workshop was a junkshop, his high ethereal shlnie; His bench was strewn with everything from rheostat to tap; The layout of his panel was a second German map. But father worked on unabashed—he had an end in view; He'd have a wonder Radio that no one could outdo.

For one whole month he labored hard; a Herculean feat, Then called a family meeting and announced it as complete.

He hooked it to the aerial, he hooked it to the ground, He hooked it to his A's and B's and turned the dials around. At first there wasn't anything, and then an awful howl, A cross between a buzz-saw and a hootin', tootin' owl. Then twenty thousand cannon seemed to hammer in the phones, While fifty thousand dishpans were a-rolling on the stones.

When everything was at its worst, the old world seemed at bay,

Willie says, "Gee, listen, Pa, I made a set today." He brought it in and hooked it up, 'twas wonderful, that's all;

It brought in all the DX with each station's clear-cut call.

The music came like tinkling bells, so soothing to the ear,

While Pa got so much smaller that they feared he'd disappear.

"Each generation has its fun," said mother with a laugh;

"Why, John, you know when we were young we had the phonograph!"

Mrs. Partington Speaks Out

Dear Indi: Mrs. Partington says that in Radio Digest a party who lives at a place that wasn't Radio made it famous, is blaming his crystal set for some "stunts with Radio," and she says that if this fan will clip his article and mail it to "The Hired Hand" at Station WBAP, he will receive a very appropriate document by return mail. Mizz Partington says there's nothing mysterious about disconnecting the wires from your set and still getting a concert. She says she has often turned the lights out in her set and listened to KDKA coming in strong and clear. No mystery, either, just her neighbor's "Hot-water Cant" set across the street. She says she had a letter from a fan in Pensacola, last winter, who wrote her that on his 8-tube Super-



Het, he always got next week's programs, this week, but your correspondent was able to hear, with one ear, in daylight, the buzz of a time signal across two time zones, with his tubes dark and turned off—thirty days before the signals were even made. He might have proved it on the bed springs, if he had found a bug "between the ticks." He says he had "accessories of all kinds," in his room, so naturally had the one kind that made his town "famous," that's all.

SIGNING OFF.

Slum Gullion

My friend and neighbor, yclept Doug,
Was bit by the blankety blank Radiobug.

He bought a lot of plans and books,
And sought himself some sheltered nooks
In which to read this wordy stuff.

No matter, he had had his chance,
But bit and dug into his pants
To buy up the stuff he thought he needed,
'Till he felt that he'd been bled.

This and that in parts and truck.
Spaghetti—and here it was his luck,
To have his cook hear about this buy
And sit her down to wonder why.

Anyway, he got everything
That he needed to make the Radio sing;
And worked all day for two or three,
Even as Bill, and you, and me.

He finished it one afternoon
And knew he'd best wait for the rising moon,
The thing he'd made to properly try out
And see if the books knew what they were
talking about.

He ordered a cute collapsible loop
Made like a funny hexagon hoop,
For he wasn't going to chance a lightning fire
From an outdoor aerial wire.

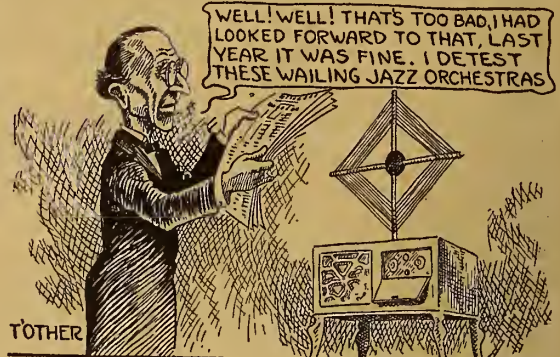
So that evening late he headed home
To listen in to—maybe—Romc;
But disappointment became his po'tion,
And you can't imagine half his emotion,

For though, there set his nice new loop:
His wonderful set was in the soup. 5XV.

Pa Knows Everything

"Say, paw, what does A. T. T. stand for?"
"American Trade Trimmers." Now run along and
play with your Radiola and don't bother me.
THE THIRD TROMBONE PLAYER.

A Matter of Choice



Condensed

By DIELECTRIC

A regular feature on the program of WAHG is the appearance of Mr. Kaltenborn, associate editor of the Brooklyn Daily Eagle, whose timely comments are genuinely informing. It is an advantage to have at your command the means whereby such men may address themselves to you audibly. Their editorials may be read, but are more limited in scope.

So far as I can recall there have been very few features put out through Station WGY subject to adverse criticism. Whenever you tune to this station you will find good programs well Radiocast. Such was the case when the WGY male quartet sang in a group of carefully chosen numbers with intelligence and good voice. I like them, don't you?

To anyone not a resident of Chicago it might have been a question whether that city had a City Police band or not—until WEBH came on the air with it. There is one, as its spirited playing before Mike discloses to all listeners. What about encores; are they allowed?

The program director of KFKX showed his wisdom in selecting musicians from the First Baptist church of Hastings, Neb., to give enjoyment to all who would listen. There were violin and vocal numbers in variety sufficient to satisfy everyone. KFKX will appear here again.

Then the set brought in one of the Quaker City stations, WDAR. Unfortunately, at the time of getting this station a baritone was sorrowfully intoning the dirge: "It Had to Be You!" This sentiment found an echo near my set as we drifted away to other, and less popular (?) selections. Do you ever find classical music to be worn out?

WSAI was another "station stop," as they used to say on the day coaches when approaching a getting-off place. There was a violinist for you, one of the do or die executionists! Verdi never meant any harm by writing music to "La Miserere." The harm comes from hearing it at the close of an evening's search for enjoyment—in vain.

Gimble Brothers are running a program of variety at their new station, WGBS, in New York city, which appeals to most every interest. Eddie Cantor was himself on the opening night, with his ready wit always on tap as announcer. Since, there was presented orchestra, chorus and description of "The Miracle," a stupendous production. We are indebted to WGBS for the privilege of hearing the music to it.

Some day, I suppose, this column will review English, French and African Radiocasts. Dielectric is pursuing a course in Zulu now. At present, however, the only stops outside the country are in Canada. If you have never "dialed" to Montreal, try it. CKAC will put you on to hear the Mount Royal orchestra from the roof garden. It's fine.

My membership in the Red Apple club was never recognized, though WCX is on the list for late sessions, so it isn't a reinstatement; I just dropped in on them. They not only are doing business but appear to be keeping right up to the latest in Radiocasting.

WEBH (a fine announcer they have) merits our salaams for choosing the Chicago university quartet to entertain us. Bring them on again Mr. Boniel and they'll get another hand.

How to Build the Simplest Possible Super-Het

Part II—Wiring Instructions You Can't Mistake

By John G. Ryan

IN WIRING this receiver, the first leads to put in are the filament connections. Looking at the layout, Figure 2, the binding post furthest to the right at the rear of the baseboard is the minus A; a soldering lug is slipped under the head of the screw holding it in place. A piece of bus bar wire is now bent so that it will go around to the right of the last tube socket and then to the left to the filament switch. Slip a piece of spaghetti tubing over this lead and solder one end to the lug on the binding post and the other to one of the switch terminals.

Now lay a piece of bus bar along the front edge of the tube sockets; if it will not reach from socket 1 at the left to socket 7, solder on another short piece so that it will. Put a soldering lug on each right front binding post on each socket and bend them down at an angle. Solder one end of the long piece of wire to the lug on the first socket to the left, then cut a piece of spaghetti just long enough to reach from that point to the corresponding post on socket 2. Solder the long piece to that lug and slip on a second piece of spaghetti to cover the wire to the front right post on socket 3. Proceed across the board until each socket has the corresponding filament binding post soldered to the long lead with spaghetti between. A short wire is now bent and soldered to the long lead where it is attached to socket 5; the other end is soldered to the second filament switch terminal. That completes the negative A circuit.

The Positive Circuit

The binding post at the back of the set and second from the right is the positive A. A wire is bent to pass between the audio frequency transformer and the C battery, then to the right of socket 6, over the .5 mfd. fixed condenser, to the rheostat. Slip spaghetti over this wire and, using soldering lugs, attach to the plus A binding post and to the rheostat. A long piece of bus bar is now connected to all sockets to the front left hand binding posts exactly as was the other except that the soldering lugs on the sockets are bent up. This will place the second long filament wire directly above the first.

Now run a short spaghetti-covered lead from the remaining rheostat terminal to this upper filament bus at the point where it connects to the left front post on socket 6 (counting from the left). The filament circuit is now complete and may be tested. Connect the 6-volt storage battery to the terminals marked "A Bat." Put all tubes in the sockets, turn the filament switch to "On" position and turn up the rheostat slowly. The tubes will glow dimly at first and, finally, with some brightness. If all tubes light, remove them and disconnect battery.

The potentiometer is now connected by running a short lead from its left binding post to the lower filament bus where it is attached to socket 4, and another from its right terminal to the upper bus where it is soldered to the front left binding post on socket 5. Each wire should be bent, covered with spaghetti and attached to a soldering lug. This leaves the center terminal to be connected later.

The Oscillator

We will now take up the oscillator tube, coupler and condenser. It is usual for the manufacturers of super kits to enclose a diagram showing the proper connections for the oscillator coupler, and every builder will probably have such

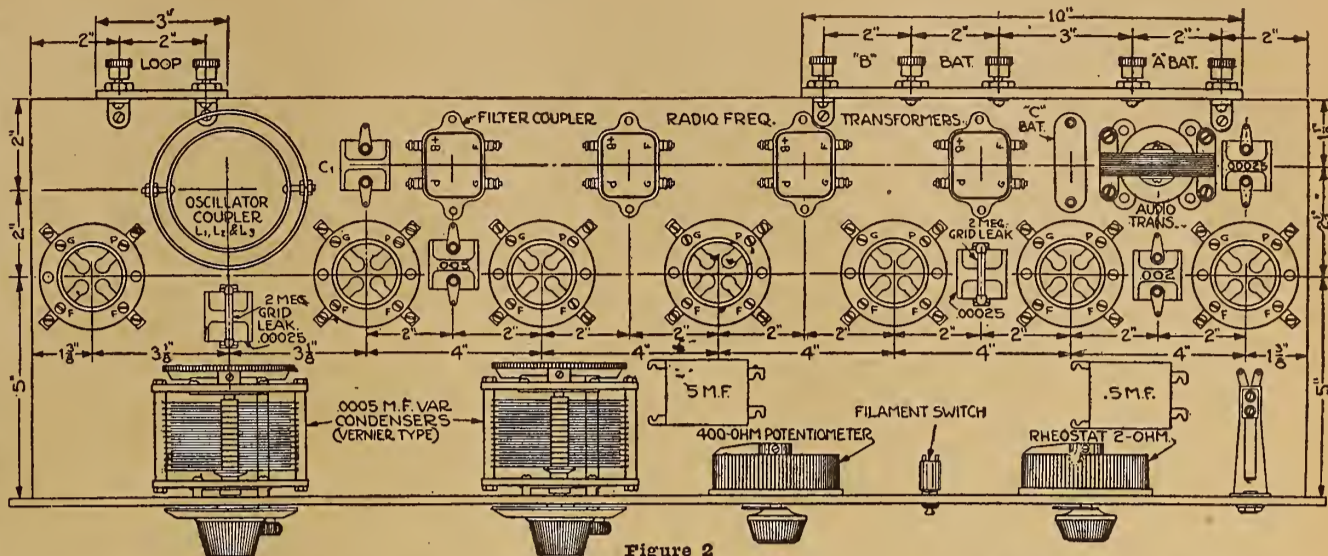


Figure 2

a diagram. The coupler shown was made from a 180 degree variocoupler on which the outer tube is 3 1/2 inches in diameter, wound with two separate coils of number 24 silk covered wire. One winding contains 18 turns and the end nearest the edge is connected to grid (G) binding post of tube socket 1 and the stator (fixed) plates of the variable condenser at the left end of panel. This is inductance L-3 in the wiring diagram Figure 3. The end in the middle of the tube is connected to the right front binding post of socket 1 (the lower filament bus). The 8-turn coil is wound beside the 18-turn coil.

The end of the 8-turn coil (L-1) nearest the second edge of the tube is now connected to the movable or rotor plates of the second variable condenser and to the right binding post of the two marked "Loop" at the rear edge of the baseboard. The inner end of this 8-turn coil is connected to the plus filament circuit at the point where the upper filament bus connects to the left front post on socket 2. The rotor of this oscillator coupler is 3 inches in diameter with 22 turns of number 24 silk covered wire. One end at this winding is connected, by spaghetti-covered wire, to the rotor plates of the left hand variable condenser and to the terminal on socket 1 marked P.

A long piece of wire should now be bent so that, when one end is connected to the second terminal of this inner coil, the wire will lie close to and in back of the filter coupler and about 1 inch behind the Radio frequency transformers along the rear edge of the baseboard. A soldering lug is slipped on the terminal of the filter coupler marked B plus and this long wire is soldered to it. Spaghetti is slipped over this long lead and the free end is soldered to a lug on the center post of the three marked "B Bat." Another wire is bent so that it passes from this last-named binding post, between the third Radio frequency transformer and the C battery, behind socket 6, then diagonally forward and to the right over the .002 condenser to the longest spring on the upper jack. Slip spaghetti on this lead and solder to the center B battery post and the long spring on the jack.

It will be noted in Figure 2 that a fixed mica condenser of .005 mfd. capacity is placed between sockets 2 and 3. The rear

terminal of this condenser is now connected to the B plus binding post on the filter coupler. At the same time it would be well to connect the rear terminal of condenser C-1 to the B plus terminal of the filter coupler. The front terminal of the .005 condenser is connected to the lower (negative) filament bus wire where it is soldered to socket 2.

The Intermediate Amplifiers

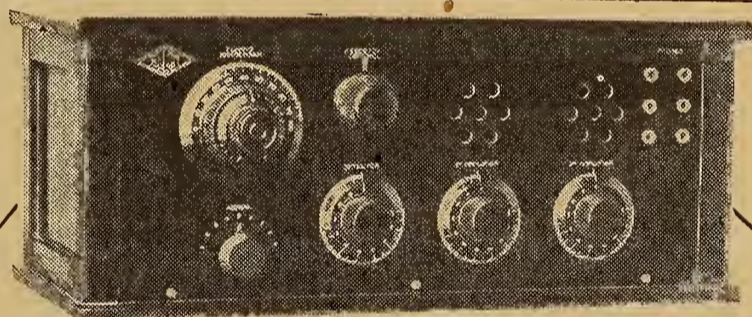
A long lead is now bent from bus bar so that, when one end is at the B plus terminal of the first Radio frequency transformer, it lies in back of the Radio frequency transformers, but close up against them and ends at the first or left hand post of the three marked "B Bat." A soldering lug is slipped on each of the B plus terminals on the Radio frequency transformers and the long wire just placed is then soldered to these lugs and to the B battery post with spaghetti between joints.

Slip a lug on the P binding post on the filter coupler and also on the P binding

post of tube socket 2. A short wire can now be bent that can be soldered to these two lugs and to the front terminal on condenser C-1. Now connect G of the filter coupler to G on socket 3, P on socket 3 to P on the first Radio frequency transformer, G of this transformer to G on socket 4, P of socket 4 to P on second transformer, terminal G of second transformer to G on socket 5 and, finally, P on socket 5 to P on the third transformer.

Between sockets 5 and 6 is a grid condenser and leak. A short lead is now run from the G post on the last Radio frequency transformer to the rear terminal of this condenser; another wire should connect G on socket 6 to the front terminal of the grid condenser and its leak. Now bend a wire that it will connect the F binding post of this last Radio transformer with the left front post of socket 6 by going over the right edge of the grid condenser and leak. To complete the Radio frequency circuits, the F binding posts on filter coupler and the first

(Continued on page 18)



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HOW TO HOOK-UP SIMPLEST POSSIBLE SUPER-HET

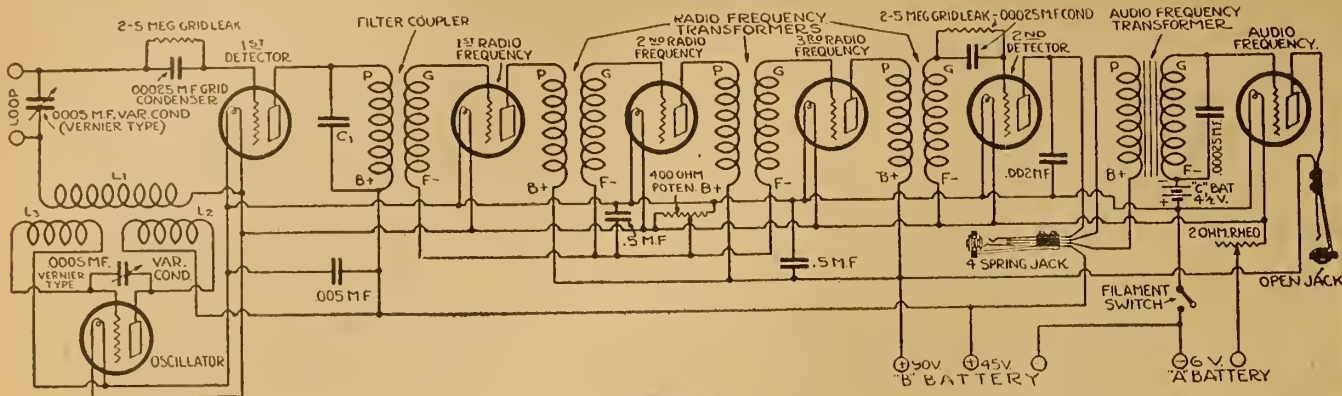


Figure 3

SUPER-HETERODYNE

(Continued from page 17)

two transformers must be connected to the center terminal of the potentiometer. Bend a wire so that it will go up from F on the filter coupler, to the right and over the first and second transformers and down to F on the second one. Where this wire passes over F on the first transformer solder a short lead that will connect to that post; also, another wire that goes straight toward the panel, down to the front terminal of the .5 mfd. fixed condenser and on to the center terminal of the potentiometer. Spaghetti is, as usual, placed on this lead between joints. The rear terminal of this condenser is then connected to the lower filament bus where it joins the front right post on socket 4.

The Finishing Touches

Now to complete the amplifier B battery circuit. A wire is bent to connect at one end to the left binding post of the three marked "B Bat." and pass between the C battery and audio transformer, over the .002 mfd. fixed condenser to the long spring on the lower jack. While soldering this lead to the jack, put in another wire that goes to the front terminal of the .5 mfd. fixed condenser behind the rheostat. The rear terminal of this condenser is connected to the lower filament bus where it is soldered to the front right terminal of socket 6. The short spring of the lower

jack is now connected to P on socket 7, the wire being covered with spaghetti. If the lower jack is of the type that has but one spring, the frame acts as would a long spring and should be connected as such.

Examination of the upper jack will show two short springs that, when no plug is inserted, make contact with the longer ones. Note which one touches the long spring and connect it to the terminal of the audio frequency transformer marked B plus. The other short spring is then connected to the P terminal on the audio transformer. This leaves the shorter of the two long springs, so it is now connected to the rear terminal of the .002 mfd. fixed condenser between sockets 6 and 7 and to P on socket 6. The front terminal of this condenser connects to the front right post on socket 6.

Bend and solder a wire to connect G on the audio transformer with one terminal of the .00025 mfd. condenser beside it and continue the wire to G on socket 7. The second terminal of this condenser should be connected to F minus on the audio transformer and to the negative post on the C battery. The C battery should be placed that its negative terminal is toward the front. Its positive terminal can now be easily connected to the negative A binding post at the rear edge of the set (the right end post). While working in this part of the set,

the minus A binding post should be connected to the right hand post of the three marked "B Bat."

Going now to the other end of the set, we are ready to finish up. Run a wire from the stator (fixed) plates of the second variable condenser (from the left) to the front terminal of the grid leak and condenser between sockets 1 and 2, and continue it around the oscillator coil to the remaining loop binding post. A second wire is used to connect the rear terminal of the grid condenser and leak with the G post on socket 2. This completes the wiring and we are ready to test the set.

(Mr. Ryan, next week, will tell how to look for trouble, test circuits and operate.—Editor's note.)

Aerial Efficiency

Attach a stiff spiral spring between two insulators at the end of the aerial wire. Tighten the aerial wire so that the spring is stretched a little. The aerial will then stay tightly stretched at all times. In summer, when the aerial expands, the spring contracts and takes up the slack. In winter, when the cold makes the aerial wire contract, the spring will give and will prevent it from snapping. The aerial will also be better able to withstand storms because of its "spring" and elasticity, will present a better appearance and will be more efficient.

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Our Type 501A Identical with UV201A Amplifier & Detector (5 volts, .18 amps)

Examine the Clip

When tubes refuse to light when turned on, do not condemn the batteries. If the "springy" type of battery clip is used, quite often the cause is found here. Always make sure that the part of the clip that touches the battery post is free from dust, dirt, grease, etc.

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Helpful Hints to Get the Most from Radio

Chapter X—Amplifying the Signals

By Thomas W. Benson

IN THIS series of articles set operation will be told in so simple a manner that the uninitiated can follow instructions and get the most out of reception, whether or not he knows anything about electricity or its application to broadcasting and reception. The series consists of thirteen chapters, of which the three next will be:
 Chapter XI—Care of Radio Batteries.
 Chapter XII—Telephones and Loud Speakers.
 Chapter XIII—Hints on Tuning.

TO INCREASE the range or volume of a receiver it is possible to employ amplification methods that will accomplish one of these effects to a greater extent than the other. Thus by using Radio frequency amplification, that is amplifying the received energy before

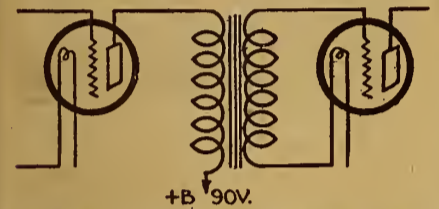


Figure 24.—Transformer coupling as used in audio frequency amplification is the most efficient arrangement.

detection, the range of the set is increased in that it will build up the weak Radio impulses to a point where they will readily affect the detector with but slight increase in volume of the signals.

The value of Radio frequency amplification lies in the fact that the response in a detector varies as the square of the impressed grid voltage. In other words, when the voltage impressed on the grid by the Radio impulses is reduced by half



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A radical improvement in the construction of MECO Tubes makes it possible to operate them at a lower temperature which in turn allows the efficient use of dry cell A battery. The longer battery life and tube service resulting are as much appreciated by particular radiophans as the greater volume without impairing its clear, distinctive receptive tubes.

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Your dealer has MECO Tubes or can get them for you from recognized radio jobbers.

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MECO
RADIO TUBES

the response in the phones is reduced to one quarter. It will be seen that very weak impulses will not be sufficient to give a response in the detector plate circuit but by building up the signal by

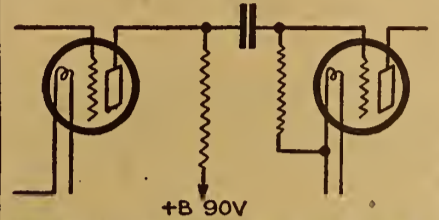


Figure 25.—Impedance coupling using a resistance as shown or an inductance, gives clear reproduction with decreased efficiency.

Radio frequency amplifiers the voltage is raised to the point where the detector tube can be operated.

Audio Frequency Amplification

On the other hand audio frequency amplification acts chiefly to increase the volume of the signals. It is true that with audio amplification signals will be heard that would be inaudible with detector alone thus having the effect of increasing the range. But this action is limited to signals that are strong enough to affect the detector, for audio frequency amplifiers can only amplify signals that have been detected.

The real problem of amplification is the design of the apparatus used to couple the output circuit of one tube to the input of the next amplifier without distorting the signals. It is true of all amplifying systems that the current in the output or plate circuit of the last tube must be an enlarged reproduction of the current variations applied to the grid of the first amplifier. All coupling methods fall into two classes, namely, transformer and impedance coupling.

In Figure 24 is shown the essentials of a transformer coupled amplifier in which a coil in the plate circuit of one

tube is coupled inductively to a second coil in the grid circuit of the next tube. Let us consider the essentials of a good frequency transformer. It must be practically non-resonant, that is, it must amplify all the notes within the audible range to an equal extent. A poorly designed transformer will amplify currents of a certain frequency much better than those of other frequencies and thus give distortion.

Input Voltage

Since the tube is actuated by the voltage applied to the grid every effort is made to make the input voltage as high as possible and to that end the secondary of the transformer is wound with more turns than the primary to obtain a step up in voltage in the transformer. This is entirely practical and desirable up to a certain point. We find on the market transformers with ratios all the way from 3 to 1 up to 10 to 1. This means in the first case that there are three times as many turns on the secondary as there are

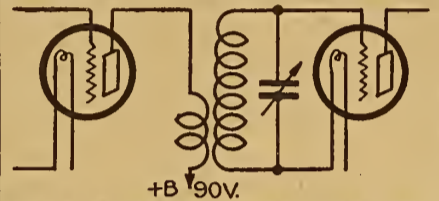


Figure 26.—At Radio frequencies transformer coupling should be tuned to obtain high efficiency over the entire range.

on the primary, in the last case ten times as many turns. Theoretically there should

be a step up in voltage of 3 to 1 or 10 to 1. Actually we find that this ratio holds true for low ratio transformers, but as the ratio increases the increased turns of wire adds to the capacity and re-

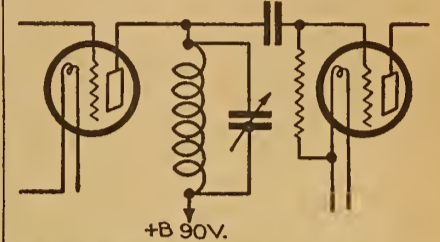


Figure 27.—Tuned impedance coupling is very efficient but is entirely too unstable for practical purposes.

istance in the circuit to such an extent that the ratio of turns is no measure of step up.

The best practice is to use low ratio transformers, never more than 5 to 1 in the first stage and 3 to 1 in the second stage. Higher ratios than this are bound to give distortion and more than two stages of straight audio frequency amplification is rarely practical because of the tube noises encountered. To overcome this and give extreme volume we can have recourse to push-pull amplification. Each stage of a push-pull amplifier requires two tubes that are so connected that the distortion produced by one tube is neutralized by the other, thus giving

(Continued on page 20)

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Your dealer has the ROYALTY Variable High Resistance (type B, 1,500 to 100,000 ohms;—type C, 500 to 50,000 ohms) and ROYALTY Variable Grid Leak (type A, 100,000 to 7,000,000 ohms).

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GET MOST FROM RADIO

(Continued from page 19)

perfect reproduction. One stage of push-pull gives about the same amplification as a single stage of straight amplification and is recommended only in extreme cases where large volume is necessary and a third stage required.

Shielding the Transformers

Shielding of transformers is desirable but not really necessary on well designed transformers for the stray field is small. Feedbacks in transformer coupled audio amplifiers is usually due to capacity effects and can only be prevented by using the shortest leads possible between transformers and tubes.

The other method of coupling amplifiers uses an impedance connected in the plate circuit as shown in Figure 25. The plate of one amplifier tube is connected through a condenser to the grid of the next tube. The principle of operation is simply that changes in the plate current will cause the drop of potential across the impedance to vary, which potential changes are transferred direct to the grid of the next tube through the condenser.

This type of amplification has been recently rediscovered and much talked about because of its freedom from distortion when a pure resistance is used as the impedance in the circuit. The disadvantage of the arrangement is that full B battery potential is not applied to the plates of the tubes and no step up is possible in the coupling. Both factors act to reduce the amount of amplification obtained per stage and it takes three stages of resistance coupling to equal two of transformer coupling. This type of coupling seems to filter out much of the tube noise and gives beautifully clear reproduction, but everything considered a transformer coupled amplifier with low ratio transformers and the tubes worked within the bends in their curves will give reproduction with fewer tubes.

Efficiency of Transformers

And so in Radio frequency amplifiers we find two similar methods of coupling the amplifiers but modified to suit the higher frequencies dealt with. In audio frequency amplification the currents have a comparatively low frequency while in Radio frequencies we must handle currents having frequencies up into the hundred thousands of cycles per second. Here it is found more difficult to design trans-

formers that will amplify uniformly over the entire broadcast wave band. They usually work best at some wave length near the center of the band or about 375 meters and fall off in efficiency at higher and lower wave lengths.

Another factor difficult to overcome in the use of untuned Radio frequency transformers is the fact that the storage capacity between the electrodes in the tubes as this capacity acts as a bypass for some of the Radio frequency currents, thus lowering the potential applied to the grids. Generally speaking it can be said that a receiver using untuned transformers is not an efficient amplifier.

A much superior arrangement is the tuned transformer as in the neutrodyne and similar receivers. Here the transformers are tuned to the wave length being amplified and operate with equal efficiency at all wave lengths within their range.

(Batteries, the life of the receiving set, will be the next subject of Mr. Benson. Too little is known about the forms used and you will derive much benefit by following instructions given.—Editor's Note.)

LOW LOSS—WHAT IS IT?

(Continued from page 15)

of the coil might better come out at one side, item 1 can be slipped through the coil at points C or J. Item 2, of which two are required, serves the double purpose of mounting this unit on the panel and keeping the wires of the secondary coil from touching the panel. Item 3 is similar in shape to item 1, but is much smaller and is used to support the small coils. It will be noted that, while 1/4-inch shafts are used, the hole in item 3 is but 7/32 inch. This size is used so that the builder can slightly ream this hole until the 1/4-inch shaft can be forced in as a very snug fit. Item 3 is then inserted in one of the spaces of the small coil and the wire on each side of center slightly pushed apart so that the shaft can be passed between them and through item 3.

The coils should be handled very gin-

gerly during this operation and no pressure should be brought to bear upon them. It will be found perfectly feasible to mount this unit on the panel and then adjust the dial on the shaft so that the shaft is held in the correct position so the small coils revolve freely. Should the builder care to do an exceptionally meticulous job, a groove can be filed around the shaft at the point Y as shown in Figure 4. A piece of wire can be looped around the shaft and fastened under the nut shown directly below the point Y, with sufficient tension on it so that the shaft cannot be pulled in and out due to the wire being in the groove.

While wire as small as number 24 can be used in the construction of basket inductances it makes a very delicate coil that is too easily broken and it will be

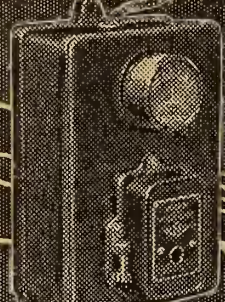
found much better to stick to sizes number 18 and number 20 for the small coils and number 14 and number 16 for inductances 3 inches and more in diameter.

(In the next article another method of mounting the inductance will be shown and Mr. Fournier will take up losses in various condensers.—Editor's Note.)

Old Batteries Cause Noise

An old B battery makes a receiving set noisy. As the battery becomes run down its resistance increases and gives rise to noises that are annoying, to say the least. When the voltage of the plate battery has dropped 20 per cent, it is advisable to replace it; thus a 22 1/3-volt battery becomes useless when it has dropped to 17 volts. Larger batteries can be figured in the same proportion.

The Quiet NILES Battery Charger



SOLVES ANOTHER RADIO PROBLEM
A safe, dependable, efficient charger for home use. Easy to operate. Light to handle. Puts 72% of the current in to the battery. Handsome crystallized black finish. An attractive addition to your radio equipment. No liquids. No fumes. No bulbs. For radio and auto batteries.
Model A for 6-volt batteries, \$19.00;
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Sold by Dealers—Write for Literature
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200% Profit

The new FAHNESTOCK Display Case
Will stimulate your sales of Fahnestock Radio correct place for his set. A constant invitation to are included. Shows the purchaser instantly the correct place for his set. A constant invitation to buy Fahnestock Products. Dealers are offered 200% profit on each case, an unusual offer on standard merchandise.
Price to Dealer.....\$17.50
West of Mississippi..... 18.50
Transportation prepaid when money order or check accompanies order.
Contents Retail for \$51.50
Refills will be supplied at the regular 100 lot prices, shown in catalogue, which comes with case, less discount shown on enclosed sheet. Send check or money order, today.
FAHNESTOCK ELEC. CO.
LONG ISLAND CITY NEW YORK

Erla precision parts get the best out of Erla SUPEREFLEX circuits; most powerful, tube for tube. Ask for Bulletin 24.
Electrical Research Laboratories, Chicago

Jiffy Blow Torch
Makes Your Connections Reception-Tight!
Building a one tube "flivver" or Super-Heterodyne? Jiffy Blow Torch is just the thing you need. You know the value of good soldering! Jiffy is on the job to give it to you.
Jiffy Blow Torch is self-blowing, lights instantly and burns with a blue, hot flame. Complete with heavy duty soldering iron, solder, non-corrosive flux and all accessories, \$2.50
At your dealer's or direct
Apex Stamping Company
Dept. 271 Riverdale, Ill.

The "Goode" Two-o-One
A
Le Ton d'argent
Guaranteed BY MAIL ONLY \$2.39 Postpaid
QUARTER AMPERE AMPLIFIER—DETECTOR
RADIO TUBE
GUARANTEED SATISFACTORY
All "GOODE" Tubes Sold Direct to the Consumer—No Dealer Profits
ONE—"Goode" Detector-Amplifier..... \$2.39
THREE—"Goode" Detector-Amplifiers..... 6.42 (All postage prepaid)
The "Goode" Two-o-One A Tube amplifies or detects. It is a quarter ampere, five volts, standard base silvered tube.
Send express or postal money order or New York draft to—
The Goode Tube Corporation
Incorporated
Owensboro (Dept. A) Kentucky

The kind of Letters Thordarson gets No. 7
Los Angeles, Calif.
THORDARSON MFG. CO.
500 W. Huron St., Chicago, Ill.
Gentlemen—Perhaps this letter will be of interest to you as well as to the beginner who is selecting material for his set, but is afraid to buy because there are so many inferior makes of transformers, and he has heard bad and good about most of them.
I have tried several well-known makes of transformers, but none compare with "Thordarson." As for less distortion and other good qualities they can't be beat.
Following is a list of stations 1,000 miles or more that I have heard during my use of THORDARSON TRANSFORMERS.
CALL LOCATION DISTANCE
CHBG Alberta, Can 1200
CFCN Alberta, Can 1300
WAAW Omaha, Neb. 1200
WFAA Fort Worth, Tex. 1200
WBAP Fort Worth, Tex. 1600
WSD St. Louis, Mo. 1725
WDP Chicago, Ill. 1950
WLV Detroit, Mich. 1775
WCAH Pensacola, Fla. 2000
WRL (30 watts only) 2400
WBF Cleveland, Ohio 2575
WOR Schenectady, N. Y. 2400
WSB Boston, Mass. 1900
Newark, N. J.
Atlanta, Ga.
All of my success is laid to the use of "THORDARSON TRANSFORMERS" and I highly recommend them in the use of any radio set.
A. B. BATTERS (signed)
1152 So. Serrano Ave.
Los Angeles, Calif.
P. S.—In addition to the list above I have heard about 40 other stations between 100 and 5,000 miles.
THORDARSON
Super
AMPLIFYING TRANSFORMERS
Standard on the majority of quality sets
Audio Frequency: 2-1, \$5; 3 1/2-1, \$4; 6-1, \$4.50. Power Amplifying, pair \$13.
P.S. Write for some real bulletins!

EFLA
STAR-ITE
THE STAR-ITE CRYSTAL
Because many people have had good results with the STAR-ITE CRYSTAL sets, we have had a great many letters from radio folks who seem to be of the impression that this is the—as yet unperfected—OSCILLATING CRYSTAL, of which so much has been said in the radio press.
We have secured oscillation with crystals in a laboratory fashion, but would not attempt to sell the STAR-ITE to take the place of amplifying tubes.
We do say that the STAR-ITE is the absolute pinnacle of perfection as a crystal to be used in a REFLEX Set, or a CRYSTAL Set, and as a detector in many non-generative tube sets, and are glad to support our belief by making it extremely easy to try one for yourself.
As this crystal is a new one put out by an old firm in the crystal business your dealer may not have it, but try to get him to order one for you, on our money back guarantee. If he does not wish to do so send us his name with a \$1.00 bill at our risk, and we will send you one with the understanding that you may return it, and we will refund you the \$1.00 at any time within 30 days. Gold Cat Whisker in Each Package
Star Crystal Co.
14711 525 Woodward Avenue
DETROIT - MICHIGAN

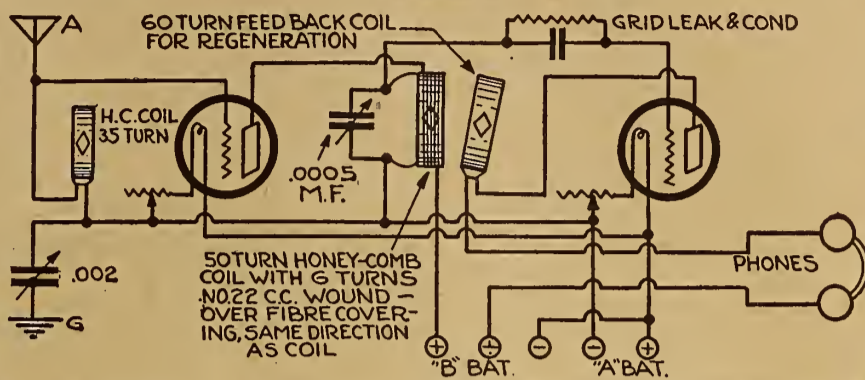
LANE 100 Volt Non-Acid Storage "B" BATTERY
Makes a wonderful improvement in your radio set. Gives it more life and pep. Makes listening in a real pleasure. Gives a clearer reception than you have ever experienced. Brings in more stations louder and clearer, takes the guesswork out of distance reception.
Life of Battery Unlimited
No deterioration—easiest, quickest to charge—will operate a 3 tube set continually for over 50 hrs. Ordinary use one to four months without recharging.
PANEL SWITCHES Gives Instant and Correct Voltage
A great and necessary improvement on batteries. Gives instantly correct voltage at all times and perfect reception. Allows for charging in two equal parts. Comes in handsome case, \$25 At your dealer's or direct. 150 v. \$37.50.
Attractive Proposition to Dealers and Jobbers.
LANE MFG. CO., Dept. 12 2941 W. Lake St., CHICAGO

Regenerative Radio Frequency Set

Few Parts Required for Building R. F. Receiver

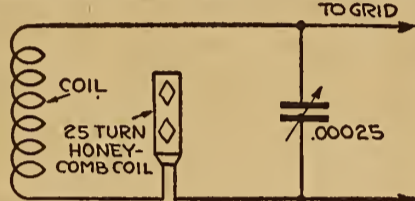
After experimenting with Radio frequency, combined with regeneration, for some time I have found the circuit shown in the accompanying sketch to give

HONEYCOMB COILS IN CIRCUIT



winding the secondary, this being connected, as shown, with a 23-plate condenser in parallel. The feedback coil is arranged to swing to and away from the transformer which controls the regeneration, this coil having about 60 turns. With a vernier condenser across the transformer, the set will tune very sharply. If desired another, step of Radio frequency may be added, using a similar made transformer, or a manufactured one.—Evermont Fisel, Lebanon Junction, Ky.

have a .00025 condenser on hand and need the larger capacity this method



saves the cost of a new condenser.—Alfred E. Ritter, New York, N. Y.

Large Condenser Substitute

A .00025 variable condenser may be used as a .0005 by connecting a 25 turn honeycomb coil in series from the stator plates of the condenser to the tuning coil as shown in the illustration. If you

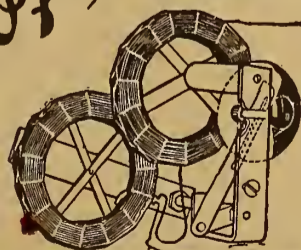
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	Turns	List Price	Wave Length
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P-202.....	35	.59	125-470
P-203.....	50	.65	170-650
P-204.....	75	.74	220-960
P-205.....	100	.90	300-1300
P-206.....	150	1.10	470-1980
Pfanstiehl Ultra-Audion, P-225.....		.95	
Pfanstiehl Reinartz.....		1.75	

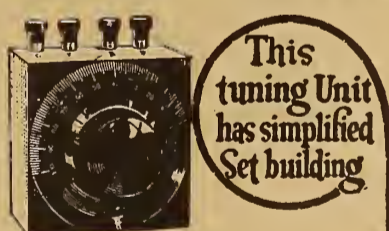
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This tuning Unit has simplified Set building

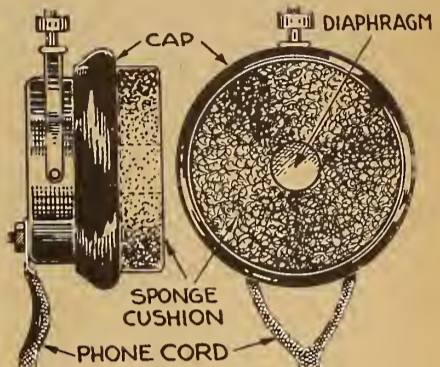
The Cosmopolitan Phusiformer, which has won the Universal praise of Radio Engineers, enables you to start in with the small expense of a crystal or a one-tube set and to build, by degrees, a multi-tube set with as many stages of tuned R.F. as desired, simply by adding more tubes and Phusiformers. Radio sets that use Phusiformers as tuning units are free from oscillation, squeals and howls. Phusiformers are self-neutralizing, no extra condensers or coils are necessary to balance the capacity of the tubes. Build a Phusiformer tuned radio set and learn with what clarity and volume distant stations can be received.

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Rubber Sponge Makes Cushion for Telephone

Cut a flat rubber sponge in half and then trim it in the shape of the receiver and cut it down to 3/4-inch thick. A small hole is cut in the center so that the sound may come through unobstructed.



The cushion is fastened on the rubber cap by means of rubber cement. The softness of this attachment is quite pleasing to the ears.—Edwin T. Moffett, Lexington, Ky.



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No antenna—just screw the Ducon into your electric light socket and tune in. A great saving in expense and labor—and great results with your set.

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CONDENSER AND RADIO CORPORATION



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Strengthen Your Speaker Volume

Conserve the current at full strength and strengthen your speaker volume with this radically different socket. Has the lowest insulation leakage to radio frequency current. Bakelite between terminals is purposely thin, and all metallic parts are placed so as to reduce capacity between them and the terminals to the very minimum. Contact springs in the "LO-LOSS" are in one piece from binding post to tip of tube. The skeleton tube barrel permits inspection of contact at prong tips while tube is in the socket. The contact springs automatically clean the tube prongs as the tube is inserted, insuring good contact always. The new tube lock with the cam action makes the proper insertion of the tube easy. A twist of the wrist does it. The terminals are curved and will stand unusual deflection without setting.

Write for Free Bulletin No. 94 showing complete line of Premier Quality Radio Parts. Ask your dealer if he has Premier free hook-ups. If not, send his name and receive a set free.

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Premier Quality Radio Parts

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A remarkable new style of storage "B" battery that gives increased range, volume and clarity to your set. Insures full and uniform voltage on plate. Eliminates all battery noises. An astonishing feature is the perforated, hard-rubber insulating shield (see circle) over the extra-heavy plates. Guaranteed to give 25% to 50% LONGER LIFE!



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FOR SELECTIVE TUNING

SHAMROCK, MANUFACTURING CO., Dept 28-B, Market St., Newark, N. J.
I enclose 10 cents (U. S. Stamps or coin) for copy of "Shamrock Radio Builder's Guide Book," containing diagram and complete instructions for building 10 sets at prices ranging from \$15 to \$50.
Name.....
Address.....
Dealer's Name.....

Questions and Answers

Reinartz Coil

(08191) HHO, Winnipeg, Can.


I want to wind a Reinartz spider web coil and would like to know the dimensions of the frame, number of turns, taps, etc., to cover the broadcasting wave lengths (200 to 600 meters).

A.—We are advising in your inquiry that several methods of accomplishing suitable coils for the Reinartz circuit are employed and described in detail in our booklet on the circuit as a whole. This is available for fifty cents through our book department and will be helpful in perfecting an efficient type of receiver.

Briefly, coil form can consist of a cardboard form, properly treated to be moisture-proof, with a 2 1/2-inch core and an uneven number of slots for winding. Either No. 24 or No. 26 dcc wire can be used. Taps should be taken in steps each on the slot following the preceding tap. The turns are counted from each tap point. The first or tickler winding has sixty turns with a tap at every fifteenth turn, counting the start and finish taps. This will give five connection points. The primary and secondary are all one length of winding spaced with fifteen extra turns connecting the two sets of taps. The primary consists of ten turns with a tap for every turn, counting the starting lead, making eleven connection points. After the last tap fifteen extra turns are made before the next tap is taken. This tap is the first connection point for the secondary tap switch. The secondary winding consists of twenty-eight turns, tapped after every seventh turn. Counting the first tap, this will give five connection points.

Send me your burned-out or broken Power tubes—50 watts or over. Will pay liberally. W. Baker, 36 West 20th Street, New York City.

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FIXED CRYSTAL DETECTOR
BEST BY TEST
Price, \$1.50**

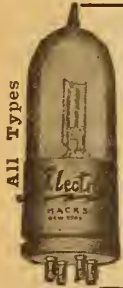


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Demonstrate once—results mean sure sale. Coast to Coast, lowest prices, attractive four tube instrument \$39.50. Big commission to you. Exclusive territory to proven salesman. Territory going fast. Write today for large illustrated book No. 100. Don't fail to give name of your county.

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Big Profit

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only \$29.50**

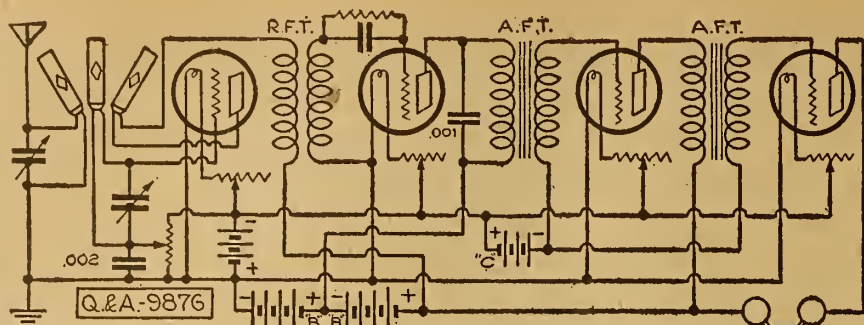
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LONG DISTANCE RADIO**

Users everywhere report Miraco Tuned Radio Frequency sets get programs coast to coast; outperform sets 3 times as costly. Send for proof they are radio's most amazing values. One tube guaranteed, completely assembled long distance outfit, only \$14.35. Three tube (above), \$29.50. Five tube \$75.

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MIRACO RADIO GETS 'EM COAST TO COAST

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Honeycomb Coil Circuit
(9876) GT, Derby Line, Vt.

I am desirous of building a Radio set using honeycomb coils, and that will enable me to receive up to about 1,500 miles. I desire to use with my honeycomb coils one stage of audio frequency and one or two stages of Radio frequency and one peanut tube as detector tube and necessary additional instruments to complete the set as condensers, rheostats, etc.

Will you please give me a hook-up that you think will give me satisfaction, and, if possible, I desire to use a loud speaker.

Radio Log. Book will record 350 stations. Postpaid 25 cents. Dealers wanted. Roy Stacy, Royal Ave., Rockford, Ill.

A Super Antenna. Greater volume. Easily and cheaply made. Less wire. Directions 50. Satisfaction guaranteed. Eugene A. Rhea, Garden City, Kans.

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Pins shown designed especially for RADIO CLUBS. Words "Radio Club" cannot be changed. Other lettering can, only name must not exceed 8 letters. Silver plate, 25¢ ea., \$2.50 doz. Sterling silver, 40¢ ea., \$4.00 doz.

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The Smallest Made



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A.—We are showing a diagram of a circuit embodying your specification which under favorable construction and operation will meet with your requirements.

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