

Radio Digest

EVERY WEEK

Illustrated

TEN CENTS

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

Vol. V

Copyright, 1923
R. D. P. Co. Inc.

SATURDAY, JULY 7, 1923

No. 13

MOVIES SENT BY RADIO



AIR CHURCH ON WHEELS BUILT

WWJ ENGINEERS PUT SET ON TRUCK

Baseball Scores, Markets, Weather, Music, to Supplement Sermons

DETROIT.—Radio engineers from WWJ, the Detroit News broadcasting station, have converted a large motor truck into a Radio church for the Episcopal Diocese of Michigan. Vestrymen of St. Paul's Episcopal Cathedral, the services of which are broadcast every Sunday, turned over all its contributions from its Radio audience for this work. Some parts of the apparatus are loaned by manufacturers and retailers, but it is the aim of the church officials

Now we know why the devil enters our Radio sets these days. If you receive devilish music, just lay it to Miss June Farley, for she is the imp that sings at WJAX, Cleveland. Sorry we cannot show the bright red of the costume to make the picture more impressive.

Photo by Radio Digest

Broadcasters of Britain Building Radiotheater

Take Step When Actors' Union Bars Members from Microphone

LONDON, ENG.—Because the Theatrical Managers' Association of London has decided to ban the broadcasting of plays, music, songs and other entertainments in which performers in employ of members of that body appear, the British Broadcasting Company is building a large new studio-theater from which to broadcast such entertainment. The company will organize playing troupes of its own and will engage independent singers, musicians and other entertainers. The studio-theater will be at Savoy Hill, a London district, and will be the first of its kind in the world.

Prize Set for Best Radio Record at Citizens' Camp

DETROIT.—General J. G. Harbord has announced that he will present to the young man who makes the best record in Radio at the Citizens' Military Training Camp at Custer, Mich., this year, an up-to-date Radio receiving set. This offer is open to amateurs in Illinois, Wisconsin and Michigan. The camp opens at Custer, August 1, and continues until September 1. General Harbord was, until recently, the deputy chief of staff of the Army.

FILM ON AIR EXPERIMENT PROVES GOOD

Small Box and Curtain May Soon Make Radio Visible in the Home

Plans City-to-City Test

Follows Up "Still" Photo Work Outlined Recently in Digest —Has War Uses

By Carl H. Buttman

WASHINGTON.—The near future will see the perfection of Radio movies; essentially, they are here today. Every "listener-in," with the aid of a special apparatus, contained in a box about a foot square and a small curtain, will be able to see as

(Continued on page 2)

Rye bread and hot dogs go well together. This may be a dainty bit for a breakfast but it looks as if a good noon lunch could be made of it. The beaches draw many people these hot days and the Radio set is always in prominence, especially among movie actors. Miss Lucy Fox at the water's edge with her receiving set © U. & U.

"Radio Can't Save Sinners"

PARIS.—Sermons broadcast by Radio can never convert sinners, Cardinal Dubois, Archbishop of Paris, believes. The Cardinal is himself a Radio enthusiast.

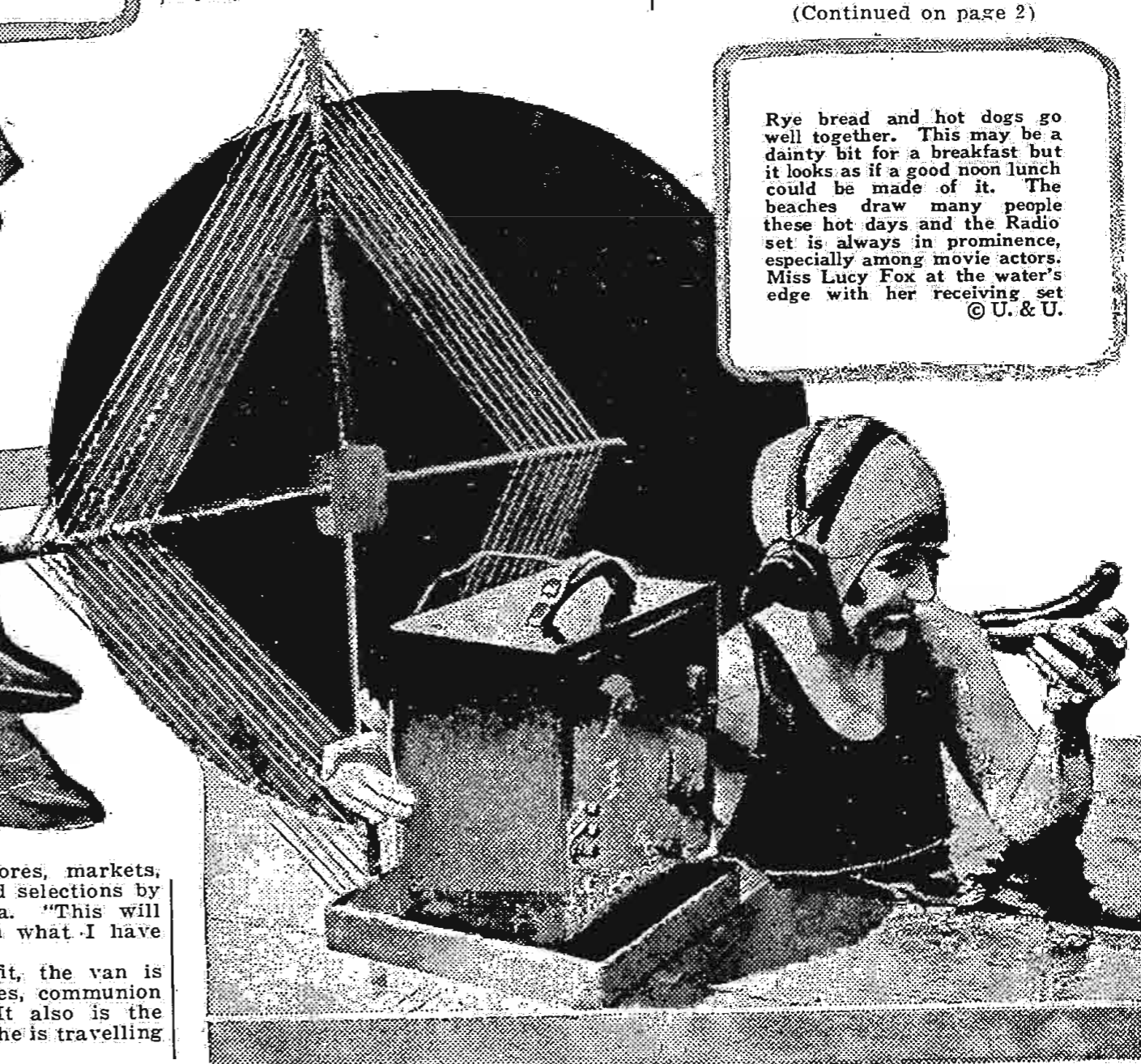
SAYS RADIO MAKES "SCATTER-BRAINS"

CLEVELAND.—Radio, moving pictures, modern newspapers and automobiles have made the American people a scatter-brained race, James M. Beck, United States solicitor general, declared recently in an address here. The multiplication of mechanical facilities has substituted love of power for things of eternal moment, he said. He urged the preaching of love of work as the best possible cure.

finally to pay for entire equipment with money sent to the church in appreciation of the services broadcast by WWJ.

Reverend Jerome, in charge of the Radio church van, says he is going to give baseball scores, markets, weather forecasts, solos and selections by the Detroit News orchestra. "This will get the folks interested in what I have to tell them," he says.

Besides the Radio outfit, the van is equipped for church services, communion and baptismal services. It also is the pastor's rolling home while he is travelling about the state.



MORE VALUABLE OF PARTS REQUESTED

RETURNS INDICATE THAT POPULARITY GROWS

Many Fans Saving Up Coupons to Get Several Prizes—Sixth Coupon of Series Appears

SPECIAL REWARD OFFER Coupon Number 6. This Special Reward Coupon appears each issue in Radio Digest until further notice. When sent in, accompanied by necessary remittance, according to the rules governing same, apparatus can be secured. See apparatus list and rules of offer below. Save Me—I Am Valuable

Each week the number of Radiophans who are sending in the valuable Special Reward Coupons is increasing and it tends to show that a great number of our readers are anxious to secure the more valuable articles listed. As we stated before, the number of coupons that any one Radiophan may send in is unlimited, the only stipulation being that they must be consecutively numbered and accompanied with the necessary amount of cash, as required for the articles.

This method of obtaining such a varied number of valuable standard Radio parts and accessories is so simple that the plan is gaining new converts every day, as is indicated by the number of letters pouring into the office of the Radio Digest. Do not fail to secure your copy of the Digest each week and clip the coupon so that they may be consecutively numbered in order to obtain the more valuable of the many parts and accessories that are offered for selection.

Rules to Remember

One point must be emphasized to those contemplating taking advantage of the special offer; that is, that the coupons turned in for any item must be numbered consecutively, as for example, 1, 2, 3, and 4 or 3, 4, 5 and 6. The number of coupons necessary and the cash remittance, of course, depend on the item sought by the reader. There is no limit to the number of series turned in by any one reader.

Another point to remember is that cash, checks and money orders but no postage stamps will be accepted. To make selection more simple the items have been divided into eight classes, each class depending on the number of consecutive coupons and amount of cash remittance necessary. The eight classes of items follow:

Class A Articles

For two consecutively numbered coupons and thirty cents (\$0.30) any one of the following articles will be sent: 1 Carter Imp Jack and Plug; 1 Carter 15-Ohm Resistance Unit; 1 Schindler .00025 mfd. Build-up Mica Condenser; 1 Schindler .0005 mfd. Build-up Mica Condenser; 1 Schindler .001 mfd. Build-Up Mica Condenser; 1 Schindler .002 mfd. Build-Up Mica Condenser; 1 Schindler .0025 mfd. Build-Up Mica Condenser; 1 Martin-Copeland Sta Put Plug; Walnut Standard Tube Socket; Walnut UV-199 Socket; Ray-O-Vac Dry Battery, 1 1/2 volts; Dubilier Micadons Type 601 (.0001, .00025, .0005, .001, .002, .0025, .003 or .004 mfd.); Premier Grid Condenser (.00025 or .0005 mfd.); Premier Variable Resistance; 1 Carter 25-ohm Resistance Unit; Standard Socket Adapter for Delta Midget Tube.

Class B Articles

For four consecutively numbered coupons and sixty cents (\$0.60) any one of the following articles will be sent: 1 Carter .04 mfd. Special Fixed Condenser; 1 Carter Jack Switch; 1 Carter Hold-Tite Jack, One Spring Open Circuit; 1 Carter Hold-Tite Jack, Two Spring Closed Circuit; 1 Carter Hold-Tite Jack, Three Spring Filament Control; 1 Carter Hold-Tite Jack, Four Spring Closed Circuit; 1 Carter Hold-Tite Jack, Five Spring Filament Control; 1 Puddin Variable Grid Leak with .00025 mfd. Condenser; 1 Federal Universal Phone Plug; 1 Federal Open Circuit Jack; 1 Federal Closed Circuit Jack; 1 Federal Double Circuit Jack; 1 Martin-Copeland Shur Grip Plug; 1 Martin-Copeland WD-11 Socket; 1 Martin-Copeland WD-11 Adapter; 1 Martin-Copeland UV-199 Socket; 1 Martin-Copeland UV-199 Adapter 1 Martin-Copeland Pull Switch; 1 Martin-Copeland 5-point Inductance Switch; 1 Martin-Copeland Variable Grid Leak; 1 Martin-Copeland SPST Knife Switch 1 Martin-Copeland SPDT Knife Switch; 1 Martin-Copeland DPST Knife Switch; 1 Martin-Copeland DPDT Knife Switch; Walnut Variable Grid Leak; Walnut Inductance Switch; Electrad Grid Leak (with clip mountings); Dubilier Micadons Type 600 (.0001, .00025, .0005, .001, .002, .0025, .003, .004, or .005 mfd.); Dubilier Micadons Type 610 (.001, .002, .0025, .003, .004, or .005 mfd.); Dubilier Micadons Type 601 (.006 mfd.); Dubilier By-Laws Condenser (.1, .25, or 5 mfd.); Premier Universal Tube Socket; Premier Radio Dial (3/16, 1/4, or 5/16 inch black or white face); Premier Universal Radio Jack, Open Circuit; Premier Universal Radio Jack, Two-Circuit Three Spring; Premier Universal Radio Jack, Two-Circuit Four Spring; Premier Universal Radio Jack, Filament Control Three Spring; Premier Switch Lever and 10 Points; Turney Spider Web Coil (SW-20 with .038 milhenry inductance, SW-15 with .066 MH., or SW-20 with .300 MH).

Class C Articles

For six consecutively numbered coupons and ninety cents (\$0.90) any one of the following articles will be sent: 1 Carter 6-Ohm Vernier Control Rheostat; 1 Carter "Tu-Way" Plug; 1 Federal Panel Mount Socket; 1 Federal 6-Ohm Rheostat; 1 Federal 3-Ohm (Power) Rheostat; 1 Amperite Automatic Filament Control (with mounting); 1 Martin-Copeland Marco Rheostat; 1 Martin-Copeland Series Parallel Switch; 1 Martin-Copeland DPDT Panel Switch; 1 Martin-Copeland 7-Point Inductance Switch; 1 Martin-Copeland 9-Point Inductance Switch; 1 Martin-Copeland 11-Point Inductance Switch; Walnut Variable Grid Leak with .00025 mfd. Condenser; Walnut Variable Condenser (3-plate .0006 mfd.); Ray-O-Vac Dry Battery, 2 cells 1 1/2 volts; Dubilier Ducon; Dubilier Micadon Type 600 (.006 mfd.);

(Continued on page 9)

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

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

Instructions for Use.—All the hours above are given in Central Standard Time. If your city uses Eastern Time, add one hour to each of the periods stated; if your city uses Mountain Time, subtract one hour; if your city uses Pacific Time, subtract two hours. If in addition your city is using Daylight Saving Time, add one hour to this result.

CONTENTS

Table listing contents of the issue: All the Live News of Radio, President Harding Speaks to Nation, Hopwood No-Ground Hook-up First Simplex Diagram, This Week's Advance Programs, Radiophone Broadcasting Station Directory, Editorials, First Steps for Beginners in Radio, Flewelling Super with Loop Aerial, How to Make a Camper's Portable Reflex Set, Single Tube Super Good for Portable, Questions and Answers, Radio Illustrated, a Page of Pictures.

Looking Ahead

"Cooperative Competition" in Radio Merchandising—an instructive series of articles telling who owns the patents to the various Radio systems and circuits and how you are pretty well cornered in a giant Radio patent monopoly by certain well-known concerns who have somewhat pooled their interests, written by John B. Brady, a patent attorney of note, will be started in the July 13 issue. Find out why the independent manufacturer has a hard road to travel. Begin reading this informative series next issue.

Radio Frequency Amplification Told Simply—July 13 by Thomas W. Benson in his series for newcomers, "First Steps for Beginners in Radio." Followers of Mr. Benson are unanimous in saying that he misses no detail, no matter how small, in his remarkably clear exposition of Radio principles.

Another Simplex Picture Hook-Up—the second of its kind, will appear next week in the Digest. Turn to Page Six and see the extraordinary method of illustrating circuits that has been started this issue. The uninitiated layman need have no trouble in arranging a hook-up with the assistance of this series.

"How to Make a Camper's Portable Reflex Set"—will be concluded next issue. Details of wiring and the assembly, as well as pictures of the assembled set will be given by H. J. Marx, who will also give operating instructions.

Part Four of the Broadcast Station "Telephone Book"—appears in the next issue. This part will be devoted entirely to the state, city-station index, and is necessary to make best use of the station schedule list.

Have a Copy with You on Your Vacation WHEN YOU WANT Radio Digest YOU WANT IT! BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW. SEND IN THE BLANK TODAY. Publisher Radio Digest, 123 West Madison St., Chicago, Illinois. Please find enclosed check M. O. for Five Dollars (Six Dollars for One Year's Subscription to Radio Digest, Illustrated.) Name, Address, City, State.

SENDS RADIO MOVIES

(Continued from page 1)

well as hear over the versatile Radio, according to C. Francis Jenkins, of this city. Mr. Jenkins some time ago made successful tests of sending photographs by Radio, as already detailed in a story appearing in Radio Digest some weeks ago. Following the success of this, Mr. Jenkins started work on the sending of the motion pictures.

Last week he showed on a screen in his laboratory, the movements of his hand and other objects held in front of his Radio transmitting apparatus in another room. The apparatus used in transmitting still pictures was employed in the last experiment, but a new "lens-faced prismatic ring" was introduced to show a rapid succession of pictures depicting movement.

Needs Large Corona Glow Lamp. Perfection of the moving picture Radio transmitting set now awaits only the manufacture of a new and more powerful electric lamp of the "corona glow" type. In the recent demonstration a temporary lamp was made by the inventor, but it is not strong enough to transmit large pictures. The question of rapidity is solved, Mr. Jenkins says, as he has already sent pictures at twice the standard movie speed. What he needs is a better and stronger lamp which will stand up when the signal strength is increased about 3,000 times, as is necessary in sending pictures in motion.

Not only actual pictures of moving bodies can be transmitted by pointing the machine at them, but films can be broadcast, Mr. Jenkins claims, and shown on screens in theaters or homes where proper receiving and reproducing apparatus and a screen are available. When the power of the light is raised the size of the picture can be increased, it was explained.

Plans City to City Test

Radio experts of the Navy, who saw the first demonstration between two rooms of Mr. Jenkins' laboratory on Connecticut avenue, say that the invention is adaptable in military operations as well as in commercial fields. They point out that a transmitter used in an airplane over the enemy feet or trenches would give officers far in the rear an actual view of the fall of shells and all front line activities. In the commercial field, with some adaptations, moving picture distributors might transmit their films to subscribers via Radio instead of by express, saving time and the making of many copies. With the completion of his new lamp, probably not sooner than several weeks, Mr. Jenkins promises to give a long-distance demonstration, transmitting pictures of objects in motion and perhaps films between Washington and probably Philadelphia.

Doctor Uses Radio to Direct Birth on Isle Gives His Instructions from Distant Life Guard Plant

HALIFAX, N. S.—One of the most impressive accounts of the service rendered by Radio, that of bringing a child into the world when other help was unobtainable, has just been related, for the first time, by Charles Wells, a member of the St. Kilda Life Guard Station on St. Kilda Island off the coast of Nova Scotia. On account of the unprecedented ice-conditions, efforts of the Government ice-breakers to reach the island with doctor and nurse to render aid to Mrs. J. Kartney, wife of one of the members of the life guard staff, failed, so the services of a doctor who had an amateur broadcasting station 150 miles distant was obtained. He had often sent out impromptu concerts which had been received by the members of St. Kilda lighthouse and other receiving centers throughout Nova Scotia.

When informed of Mrs. Kartney's plight he immediately began broadcasting so that the Kilda Isle residents, several of whom had receiving sets, could hear. He gave directions to three women, also living at the lighthouse, repeated the directions several times, and gave all the information necessary. The three women carried out his instructions and the birth was successful. A few days later the doctor who had sent orders by Radio made the trip via a Government ice-breaker and personally attended Mrs. Kartney and found her and an eight-pound baby boy very well.

NEW BROADCASTING STATIONS FOR MEXICO

Government Grants Permission for Erection of Plants

MEXICO CITY. — Two Radiophone broadcasting stations were recently opened here. Various efforts have been made in recent months to obtain concessions for the establishment of such stations, but it is only recently that the government granted this permission. There is great enthusiasm over local broadcasting, and it is believed that the market for Radio sets in Mexico is favorable to considerable development by American manufacturers.

MAN-MADE STORMS "OLD STUFF"—TESLA

SAYS HE MANUFACTURED LIGHTNING FIRST

Inventor Discounts Value of Recent Sensational G. E. Experiment

By F. J. Andrews

BOSTON, MASS.—Much interest was incited in manufactured lightning recently, when engineers of the General Electric Company produced artificial lightning in the laboratories of the General Electric Works at Pittsfield, Mass., but Nikola Tesla, when told of the experiment, said that the manufacture of lightning is nothing new, he himself having succeeded in producing lightning discharges over a hundred feet long twenty-three years ago.

The G. E. engineers constructed a miniature village, including a steeped church, and in the course of the exhibit made the lightning strike the steeple of the church, demolishing it. They also produced rain from manufactured clouds.

"Old Stuff," Says Tesla

"When the average man hears of a manufactured thunderstorm he is naturally dumfounded," Tesla said. "What he doesn't realize is that the village struck by the artificial bolt was only a tiny model, that such experiments are not at all new, and that there is not any prospect of their being of any particular utility. I understand that electrical discharges obtained were fifteen feet long under a pressure of 2,000,000 volts.

"I might also point out that electrical effects such as are here considered grow in intensity with the square of the pressure. Thus the discharges I produced were eighty-one times stronger than those described. I communicated the results to the scientific world at the time and they were widely commented upon."

PHONE WIRES BREAK; AIR COMES TO RESCUE

Radio Proves Superiority Over Lines in Canadian Storm

TORONTO.—Radio communication is destined to play a vitally important part in maintenance of continuity of service on high tension power transmission lines in the future, in the opinion of operating officials of the Toronto Hydro Power Company. This newest form of communication has already been successfully used by the company in quickly locating "trouble" on its lines, and it has proved greatly superior to wire telephone methods used previously.

On a recent report following a severe snowstorm appeared this note: "Bronte—Tower 46, wires number 4 and 6 down—time 2.50 A. M." Beneath the message was the following notation: "Bronte—46—4 and 6 O. K.—time 3.10 A. M."

Behind this prosaic statement is hidden something which is of decided interest to the public and to power companies. When these two wires snapped beneath a weight of snow and accumulated ice, and under the pressure of wind the telephone wires also snapped and communication through that source was eliminated. The operator at the Bronte service station acted quickly and within twenty minutes the service was continued. Wire telephone communication was not re-established until a half hour later.

Beauty Exercises by Radio

COLUMBUS, OHIO.—Physical education by Radio is the latest addition in Columbus broadcasting circles. The flabby, skinny and over or under-developed specimens of humanity, or those who merely wish to take some wholesome exercise, now hear plenty of advice when WPAL of the Superior Radio & Telephone Equipment Company broadcast its lessons in instructive and constructive exercises.

ETHER TAKES HUMAN VOICE TO DEAF MUTE

HONOLULU, T. H.—The sensations of a man, born a deaf mute, who heard a human voice distinctly for the first time by means of Radio, were told by Fred W. Baars, who heard a Radio program recently. Baars is 55 years old. "Always before the night I heard the Radio I had heard only a vague roar," he wrote.

ADD SUMMER SIGNS: HAY FEVER CAUTIONS

WASHINGTON, D. C.—Signs of summer are seen in the recent broadcasts from Station NAA by the public health service on "Hay Fever and Weeds." NAA will not send out band music again until the fall and the bulletins and other broadcasts from the department of labor will not be resumed until December.

PEGGY'S DEBUT AS A RADIOPHAN



Movie fans in general are Radiophans and "Baby Peggy," the well-known little movie vamp, is not to be outdone by her elders, so it seems

Brazil Firm to Receivers

BUENOS AIRES.—The largest manufacturer of Radio equipment in Argentine has applied for receivership. Its financial difficulties are said to be directly due to intense competition that exists in the Argentine market, which has resulted in considerable price cutting.

Recruit Reserves by Air

CHICAGO.—Recruiting by Radio has recently accomplished marvelous results for the Illinois Naval Reserve. The Zenith-Edgewater Beach hotel station, WJAZ, has broadcast several talks by Capt. E. A. Evers, commandant of the reserve.

AIRPHONE NEW FEAR IN OUTLAW WORLD

LOS ANGELES COPS' AUTOS RADIO-EQUIPPED

Chief Flashes Orders to Motor Squads; "Apprehension of Crooks Now Matter of Minutes"

By Strachan McMillan

LOS ANGELES.—"Beware of the Radio," may soon be the "pass-word" among the outlaws in crookland who desire to escape the net of justice, if the experiments recently conducted by the Los Angeles police department prove to be successful. The Radio will shortly become the bitterest enemy of the criminal and his sure nemesis.

According to members of the police department, if the results of these experiments meet with the approval of the city authorities and the Radio is accepted as a permanent adjunct in the city's criminal-hunting business, crooks and other law-breakers will be apprehended in minutes instead of hours and days after the commission of a crime.

Together with a committee of newspaper men invited by Chief of Police Louis D. Oaks to act as judges of the efficiency of Radio, and with several of the police automobiles equipped with Radio receiving sets, a "crook" in a high-powered car was to be sought by a fleet of department autos each one of the pursuing machines being directed by the voice of Chief Oaks—sitting in his own car, perhaps miles away from the scene of the chase.

How Plan Works

The police automobiles were notified of the crime, were given the number of the bandit car, its direction when last seen, the number of persons in the car, and other bits of information which the central office had at the time.

Chief Oaks stated that "the fine point in the chase" was that he knew where the crime was committed, and that he also knew where his scout cars were stationed at the time. "Suppose that the robbery took place on Tenth street and also suppose that I have Radio-equipped automobiles located at Fiftieth street, First street and at other streets east and west of the point where the crime was committed.

"Then it would be merely a matter of ordering the Fiftieth street auto to head toward Tenth street, the First street car to head out toward Tenth and the other outlying cars to come in, as the circumstances of the particular crime would seem to dictate. The crook in his high-powered car, with his number known and with several other marks of identification at once in the hands of each police automobile, will stand but little chance of getting away."

Kiddies' Story Teller Profits by Broadcasts

"Lamplight Tales" of Caroline Bouve, Proven Feature

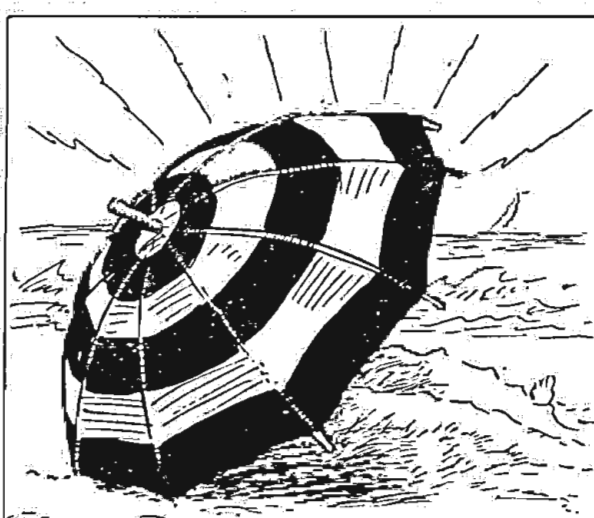
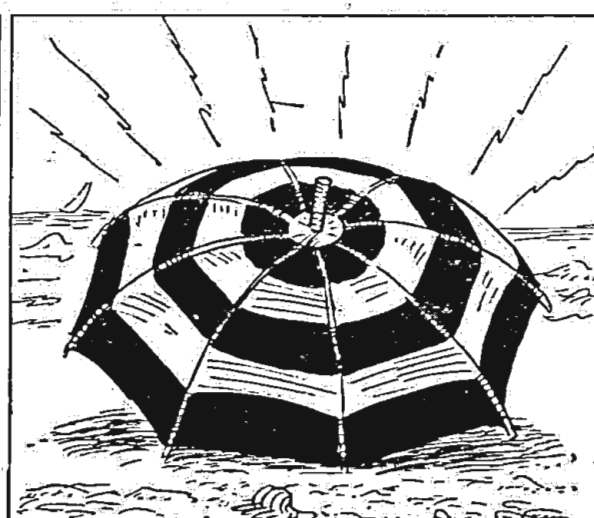
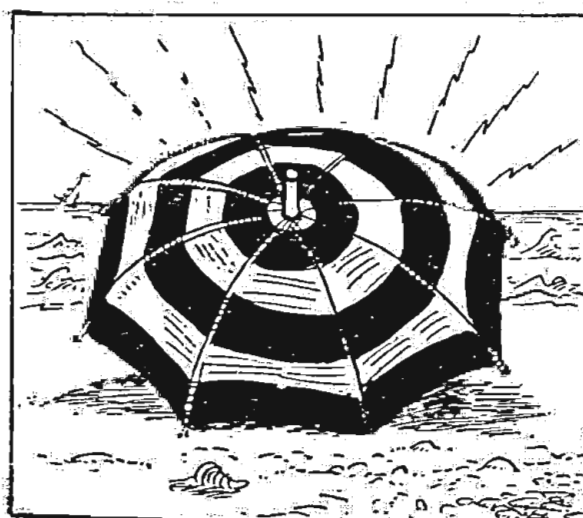
BOSTON, MASS.—At least one author is strong for the Radiophone. This is Miss Caroline Bouve, author of "Lamplight Tales," who says that the bedtime story telling from WNAC by Mrs. Stewart, who was the first to introduce "Lamplight Tales" to the Radio public, have heavily increased the sales of Miss Bouve's book in and around Boston. Miss Bouve recently paid a personal call at WNAC to meet Mrs. Stewart and thank her for her splendid rendition of the stories. The Children's Half-hour, three times a week, proves a big attraction to thousands of children throughout New England, who are privileged to listen in.

The British war office reports the loss of seven secret Radio codes, and an entirely new set of codes is now in process of drafting.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Shades of Hertzian Waves



COUNTRY TUNES IN HARDING'S MESSAGE

ALL STATIONS STAND BY AS PRESIDENT SPEAKS

Event Is of Historical Record—First Time U. S. President Addresses Entire Country

By F. J. Andrews

ST. LOUIS, MO.—On Thursday night, June 21, the chief executive of our country, President Harding, broadcast a speech from station KSD, St. Louis. His speech, the first one of a series which he is giving during his trip to Alaska, was delivered at the international convention of Rotary clubs and was relayed from the convention hall to the broadcast station. The wave length used was 546 meters.

As a special courtesy to the President, all Radio stations in the United States stood by while the President was speaking.

It is quite probable that no one person has ever addressed so vast an audience by word of mouth at one time as did the nation's chief executive on this occasion. Historical importance of the event was enhanced by the fact that it was the first time a President of the United States has made use of the Radiophone to speak to the citizens of the nation on a great political question.

Microphones, coupled to a special loud speaker, picked up the sound-waves and transferred them by wire to the broadcasting station, where they launched into the ether in the usual manner.

MAE MARSH TELLS OF HER MOVIE WORK

Received Munificent Pay of Three Dollars Per Day to Start

NEWARK, N. J.—Mae Marsh, pretty and demure, recently sat down in front of the microphone at WOR here, and in a hesitating sort of way, not frightened or nervous, told the multitude of "listeners in" some interesting things about her work. The main theme of her talk was about David Warwick Griffith, the "daddy" of super-productions, and, of course, she told of her start in pictures.

"In my first picture," Miss Marsh explained, "I received the fabulous salary of three dollars a day. In my second I was paid five dollars a day, and in my third, for some unknown reason, it dropped back to three." (This, of course, brought on a laugh.)

Holland-East Indies by Radio

WASHINGTON, D. C.—Radio Service between Holland and the Dutch East Indies is now in operation, according to a report just received from the American Commercial Attache at The Hague. For the present the service is restricted.

On account of the unusual growth of Radio traffic to Europe, the cable companies have postponed the construction of the proposed new cable between this country and Germany.

CARTER AUTOMATIC RHEOSTAT

THE LATEST THE BEST
Eliminates first and second stage jacks. Decidedly simplifies amplification. Clock-spring pligtail connection insures consistently reliable operation.
No. 3, 6-ohm, for UV-200 tube.....\$2.25 each
No. 3-C, 20-ohm, for UV-201 tube.....\$2.50 each
No. 3-D, 30-ohm, for UV-199 tube.....\$2.50 each
Write for Bulletin on Distinctive Carter Products. Carter Radio Co., 209 S. State St., Chicago.

Minister Heads Big Bible Study Class from Dallas Journal's Plant

Rev. William M. Anderson Tells Story of Origin of Feature at WFAA—Members Listen in with Scriptures in Hand—Letters Proclaim Approval

By Rev. Wm. M. Anderson, D. D.

Much interest has been raised among the members and friends of the Bible Class which is conducted over the broadcasting station of the Dallas News and Dallas Journal by the stories of other classes and other stations, and a bit of pleasant rivalry has come up as to the claims of priority in organization. These things and the desire to pass on a successful part of the work of Radio Bible teaching have brought about the request that the writer of these lines tell the story of the WFAA Radio Bible Class.

The writer is pastor of the First Presbyterian Church of Dallas, one of the larger downtown churches, and, like pastors of similar churches in many places, was interested in the possibilities of broadcasting the church services for some who might not be able to attend.

Asked to Conduct WFAA Chapel

It was in making the investigation of the possibilities of this service that he was taken courteously into the plans of the management of the Dallas News and asked if he would undertake to conduct the chapel on the first Sunday afternoon of the operation of the then contemplated station of the News and Journal. Quickly, although with some fear and trembling, he agreed.

It was then made known that the next day, Friday, June 23, 1922, would be the first test day; that Saturday following would be also for testing and that Sunday would wind up the testing ready for official opening, June 26, 1922. The writer did not fully understand, but presently found out that part of the testing would be of his moral courage and nerve force as he faced the untried ordeal of speaking into a little microphone to an unseen audience of unknown number and sympathy.

Begins with "Microphone Fright"

The experience will be doubtless in agreement with many who tried for the first time to broadcast. Approaching the hour of that first chapel service was enduring agony. There was little sleep Saturday night. There was less comfort Sunday morning. As the hour of 2:30 approached the chapel speaker was barely in possession of the strength to talk.

With much floundering and great effort the talk was delivered to the air. The talker was as much in the air as the talk. But finally both came down. Fortunately the talk came down into receiving sets that were friendly and the speaker had an equally happy fate. That was the beginning of the writer's experience with broadcasting.

Consecutive Bible Study Started

In about six weeks a suggestion was made by L. B. Henson, supervisor of the

station, that consecutive Bible Study would be more valuable to many listeners than unconnected addresses. Consecutive Bible studies were begun. That means that the class undertook the study of the Epistle to the Ephesians verse by verse and section following section. Members of the class were asked to have their Bibles at hand and follow in the scripture the reading and explanation of the passage.

A flood of letters proclaimed the approval of the listeners. For several months, until December 10 in fact, the number of listeners increased with the natural growth of interest in Radio generally, and many letters gave evidence of their presence in the Sunday afternoon audience.

Enrolls Radio Bible Class

Then came December 17 of last year, 1922. For the Bible Class it is an important date. It was this date that announcement was made to the listeners in that the station personnel and the teacher of the class had made a plan to enroll the names of all who would write in a request for the enrollment and have what was believed to be the first enrolled Radio Bible Class. Adams Calhoun, the clear voice of WFAA, gave out the word of announcement. Immediately, by telephone and telegraph, came in the names and the WFAA Radio Bible Class was in existence.

To the best of our knowledge, this marked the first organized Bible Class taught by Radio anywhere. It would be interesting to know from any readers if they have information of any earlier and similarly organized class. Many stations had taught Sunday School lessons, and had chapel, and broadcast services before that date, but we have no knowledge of any earlier organization.

Pass 3,000 Mark

It was predicted that the enrollment

might eventually go to 3,000 or maybe five, and that we might have 2,000 in the first thirty days. The names poured in. An effort was made at first to read broadcast the names. One week 631 names came in. It was a hopeless task to read them all. We had no time left for announcements even—none for teaching. The reading had to be abandoned. Still the names for enrollment came in. Today, as these words are written, we are past the 3,000 mark, and still enrolling.

To each member of the class is sent out a certificate handsomely printed, declaring that the person named on its face is an enrolled member of the class. The certificate bears the teacher's signature.

Letters from invalids, shut-ins, and others who cannot get out to services show the interest of many of these in the growth and work of the class. The orphans' homes of several nearby towns have receiving sets and belong. Altogether the possibilities of its usefulness and reach pass the limits of imagination.

Aviation Talks to Be Broadcast

DAYTON, OHIO.—Plans for establishing a Radio broadcasting station are being made at McCook field. The proposed station will serve as a means of broadcasting lectures on aeronautics from the field in addition to military use. It is expected that equipment, which has arrived at the field, will be set up in time to begin broadcasting by early fall.

Book of Hookups

For One Dollar


Reinartz Flewelling Reflex

many others, simple and elaborate, fully diagrammed and explained. Used continuously by thousands of Radio fans, both amateurs and professionals. The greatest book ever published for experimenting. Keep this valuable little book before you at all times. Send your check or money-order for one dollar and the book will be mailed to you. Forty-seven hook-ups, all different. Send your order today. The edition is limited.

Book of Hook-ups, \$1.00

E L S RADIO COMPANY
Randolph Building
CHICAGO, ILL.
Special Offer to Dealers

a Chi-Rad Special!



for W.D. 11 tubes—

Standard, threaded rubber, Willard's specially adapted for use with W.D. 11 Tubes. Supply current at 2 volts to one W.D. 11 Tube for 210 hours on a single charge. Rechargeable. Brand new, size 4x5 1/2 x 7 inches—Chi-Rad guaranteed.

2-Volt Willard Charged... \$7.50
2-Volt Willard Dry..... 6.50

These same Willards can be adapted to deliver 8 volts for pure D. C. for C. W. Transmitters. Better than a generator because no filter is necessary. Much less expensive.

In lots of 40 (320 volts) \$160.00
(Better prices on larger quantity)
Specify dry or charged when ordering.

Chicago Radio Apparatus Co.
415 S. Dearborn St., Chicago, Ill.

WE REPAIR

WD-11, \$3.50

and OTHER VACUUM TUBES

Excepting VT-I and VT-II

MAIL ORDERS Solicited and Promptly Attended To

H & H RADIO CO.

516 Clinton Avenue NEWARK, N. J.

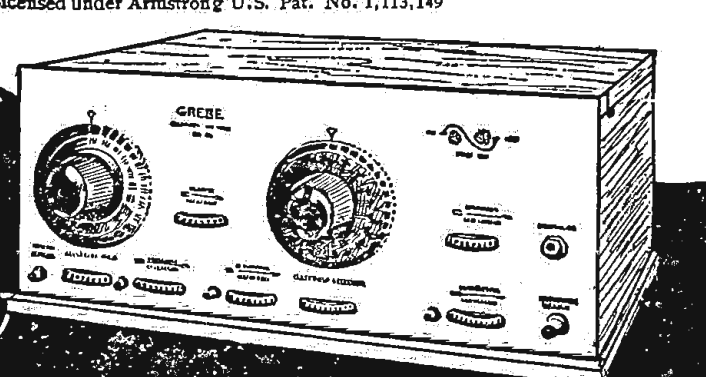
New GREBE Broadcast Receiver

has Seven Points of Satisfaction

THESE points will be appreciated by those who have long awaited the coming of the perfect receiver.

ASK YOUR DEALER TODAY!

Licensed under Armstrong U.S. Pat. No. 1,113,149



PERFECTION

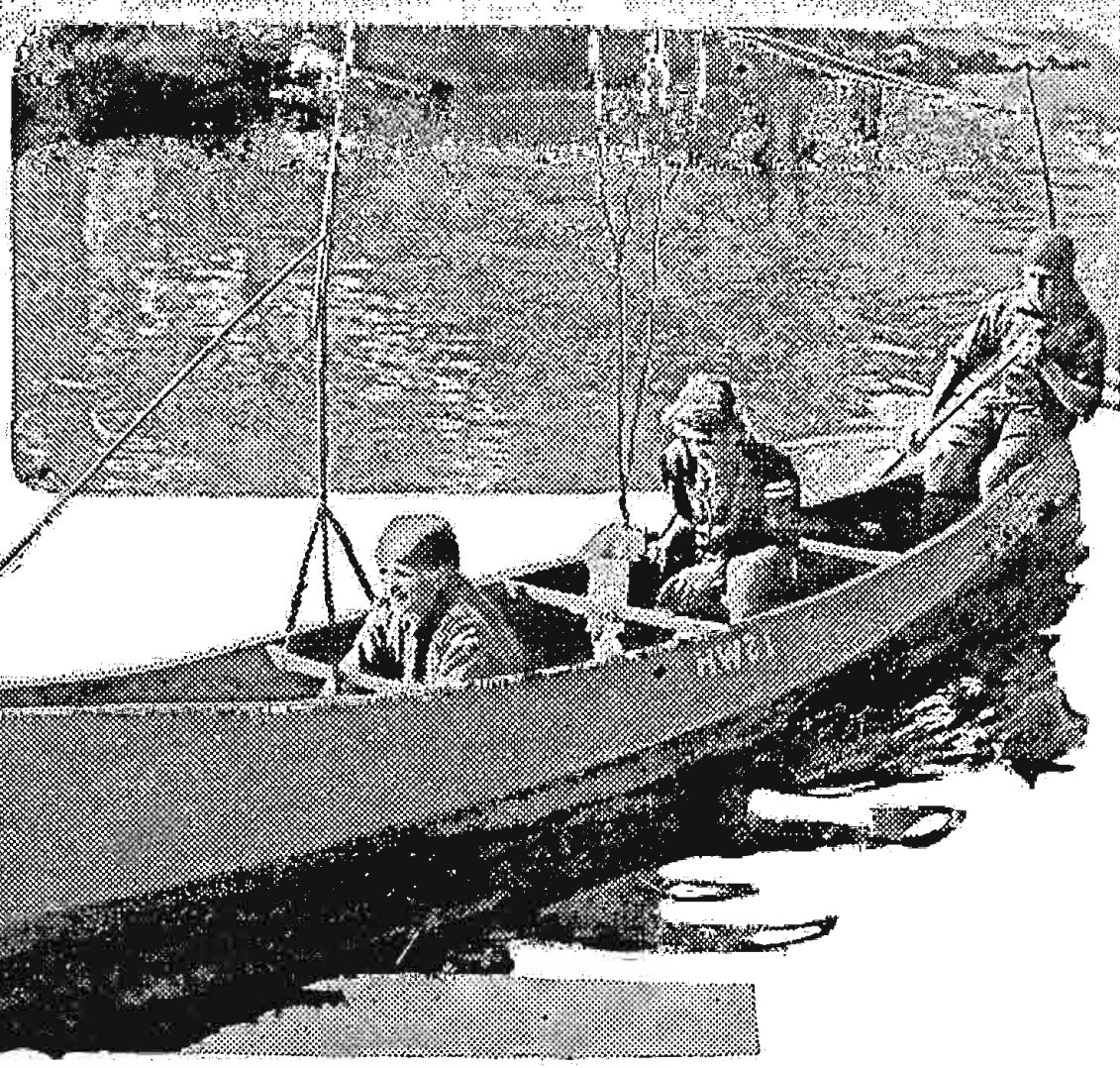
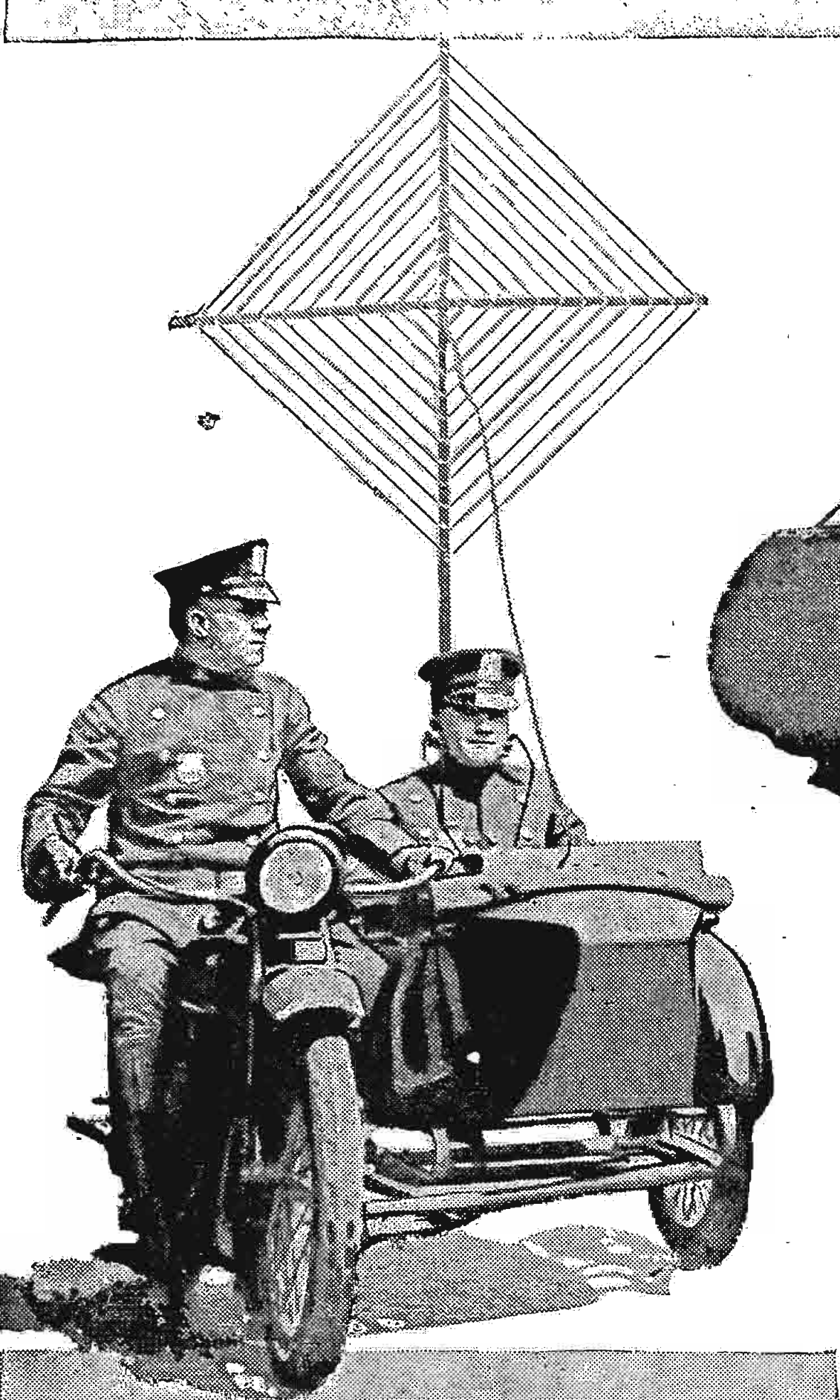
MAKE PERFECTION YOUR SELECTION

We Carry Only STANDARD Advertised Radio Equipment. Every Product Sold on a MONEY BACK GUARANTEE.

MAGNAVOX LOUD SPEAKER, Type R. 3.... \$24.95	FLEWELLING CIRCUIT Complete parts, including Panel, Double Coil Mounting and 2 Honeycomb Coils. Mounted. ONLY Standard Equipment Used. Free Diagram..... \$13.95
N. & K. PHONES—6000 Ohms. None Better Made for DX Reception. 1m- \$6.50	REINARTZ CIRCUIT Complete parts for this remarkable set. Free Diagram..... \$11.95
"B" BATTERIES. List Price	WESTERN ELECTRIC Phones. None better made. List \$12.00. Our price..... \$7.95
Eversady—No. 763—22 1/2 Volts... \$1.75	PANELS—3/16" Thick
Eversady—No. 767—45 Volts... 4.50	Hard Rubber Bakelite 7x18... \$1.85
Bright Star—No. 15-50—22 1/2 V. 1.75	Hard Rubber Bakelite 7x10... \$0.95
Bright Star—No. 15-03-6—22 1/2 V. 2.25	7x12... 1.25
Bright Star—No. 30-90—45 Volts. 5.00	7x14... 1.40
Franco—No. 1529V—22 1/2 Volts... 2.50	7x24... 2.15
Franco—No. 3045V—45 Volts... 5.75	3.25
Nathaniel Baldwin Phones—Genuine SINGLES AND CORD..... \$4.50	DOUBLES, CORD AND BAND..... 8.75
QUEEN'S VARIOCOUPERS OR VARIOMETERS..... \$2.50	

Perfection Radio Corporation, 59 Cortland St., New York City
ADD PARCEL POST—DO NOT SEND STAMPS

SCOUTS AND COPS SHOW INGENUITY



Speeding along the highways after criminals or drifting along the languid stream in a canoe, Radio works well in either situation. Above is shown the Radio-equipped canoe of the 1st S. W. Herts Boy Scout Troop. The three members of the troop are sending and receiving messages to and from the scout camp headquarters while drifting down the canal. At the left is one of the new criminal catching motorcycle equipments now in use by the New York City police. Direct contact is maintained with the central office of the department by the novel sidecar arrangement

© News Events

© Keystone

CFCN MOVING 3,500 FEET UP ON MOUNT

PLAN NEW STATION TO BE BEST IN CANADA

Present Quarters Too Small for Equipment—Need More Studio Space for Artists

CALGARY, ALTA.—CFCN, station of W. W. Grant Radio, Ltd., here, will soon be installed permanently in its new headquarters on Mount Royal, one of the outlying suburbs to the southwest of the city, which is many hundred feet above the level of Calgary, as the city is situated in the deep valley of two rivers. The station will be approximately 3500 feet above sea level, and thus will have a higher altitude than almost any station in Canada or the United States.

W. W. Grant has announced his intention of abandoning the present quarters on Crescent Heights owing to the fact that two stations, CFCN and CHBC, The Morning Albertan station, are housed in the same building, with the result that space has become insufficient for the many purposes for which it is needed.

To Be Best in Canada

The new Mount Royal station will have all the conveniences of an ultra-modern broadcasting station. Its broadcasting room, when completed, will be one of the finest, most richly appointed and elaborate in the Dominion.

Considerable difficulty has been encountered in the past owing to the lack of available space in which to accommodate the artists who nightly entertain from CFCN. This obstacle will be completely overcome in the new station.

Moving of equipment will start soon, it is announced.

"RADIO WEST POINT" GRADUATES 65 MEN

Officers Complete 10 Months' Course for Signal Certificates

WASHINGTON.—Gen. George O. Squier, chief signal officer of the Army, presided at the graduation exercises at Camp Alfred Vail, in New Jersey, a few days ago, when sixty-five officers received certificates as signal officers. They all completed a ten months' course in communication work, including Radio in its many phases, and now have been ordered back to their regular duties with cavalry, artillery, infantry and other arms of the service, where they will act as communication specialists.

Quits Shipping Board for R. C. A.

WASHINGTON, D. C.—F. P. Guthrie, chief of the Radio communication activities of the United States Shipping Board, has resigned to accept a position as Washington manager of the R. C. A.

CUNNINGHAM TUBES REPAIRED

C-300 or UV-200.....	\$2.75
C-301 or UV-201.....	3.00
C-302 or UV-202.....	3.50
C-301A or UV-201A.....	3.50
WD-11 or WD-12.....	3.50
Moorehead Detectors.....	2.75
Moorehead Amplifiers.....	3.00
DV-5 or DV-6A.....	3.00
Also the new UV-189.....	3.50
NEW DX 1/2 VOLT TUBES.....	4.00

All tubes guaranteed to work like new.
Mail Orders Given Prompt Attention
"24 Hour Service"

RADIO TUBE CORP.
55 Halsey Street Newark, N. J.
TUBES SENT PARCEL POST, C. O. D.

MAKE FANS GUESS OLD SONGS' NAMES

Fans Who Send in Correct Lists of Names Receive Prizes

BOSTON, MASS.—A song contest was recently conducted by the Copley-Plaza Hotel, through the WNAC station, of music broadcast from the Copley-Plaza orchestra. In all the orchestra played 21 old familiar songs, the listeners who sent in the longest list of correct titles receiving prizes of five-pound boxes of candy sent by the hotel management. Miss Janet Hollander, of 70 Columbia Road, Brookline, had the largest list, with eighteen songs correctly named. Some of the songs dated back twenty years.

By request of a Radiophan at sea, sent in by Radio from the steamship Belgian, the Copley-Plaza orchestra played "Angel Face," which was sent out direct from the hotel by WNAC station. This establishes a new record for this enterprising station.

To humanize jail life, a Radio set has been installed in the Allegheny County jail in Pittsburgh, Pa.


SUMMER PHOTOGRAPHS? EARN A DOLLAR—

SUMMERTIME means summer pictures. You and your camera can earn a dollar by sending the Digest out-of-doors photos involving the use of Radio in camp, the automobile, swimming, boating, canoeing, on the lake, playing golf, etc. Send such photographs with negatives and a few descriptive words, including a stamped, addressed envelope so that unsuitable pictures may be returned.

SUMMER PHOTO DEPARTMENT,
Radio Digest,
123 Madison St., Chicago.

Transfer Admiral Ziegemeier

WASHINGTON.—Rear Admiral Henry J. Ziegemeier, director of naval communications, and one of the foremost experts of the navy, has been detailed to command the Norfolk Navy Yard. His successor as director of naval communications has not been named, but it is stated that Commander D. C. Bingham, assistant director, will be acting chief.



Money Earning Opportunity


HERE is your chance to cash in on your spare time. A special offer is being made to you for the summer.

YOU can easily earn some real money, or your choice of Radio parts needed for your receiving set.

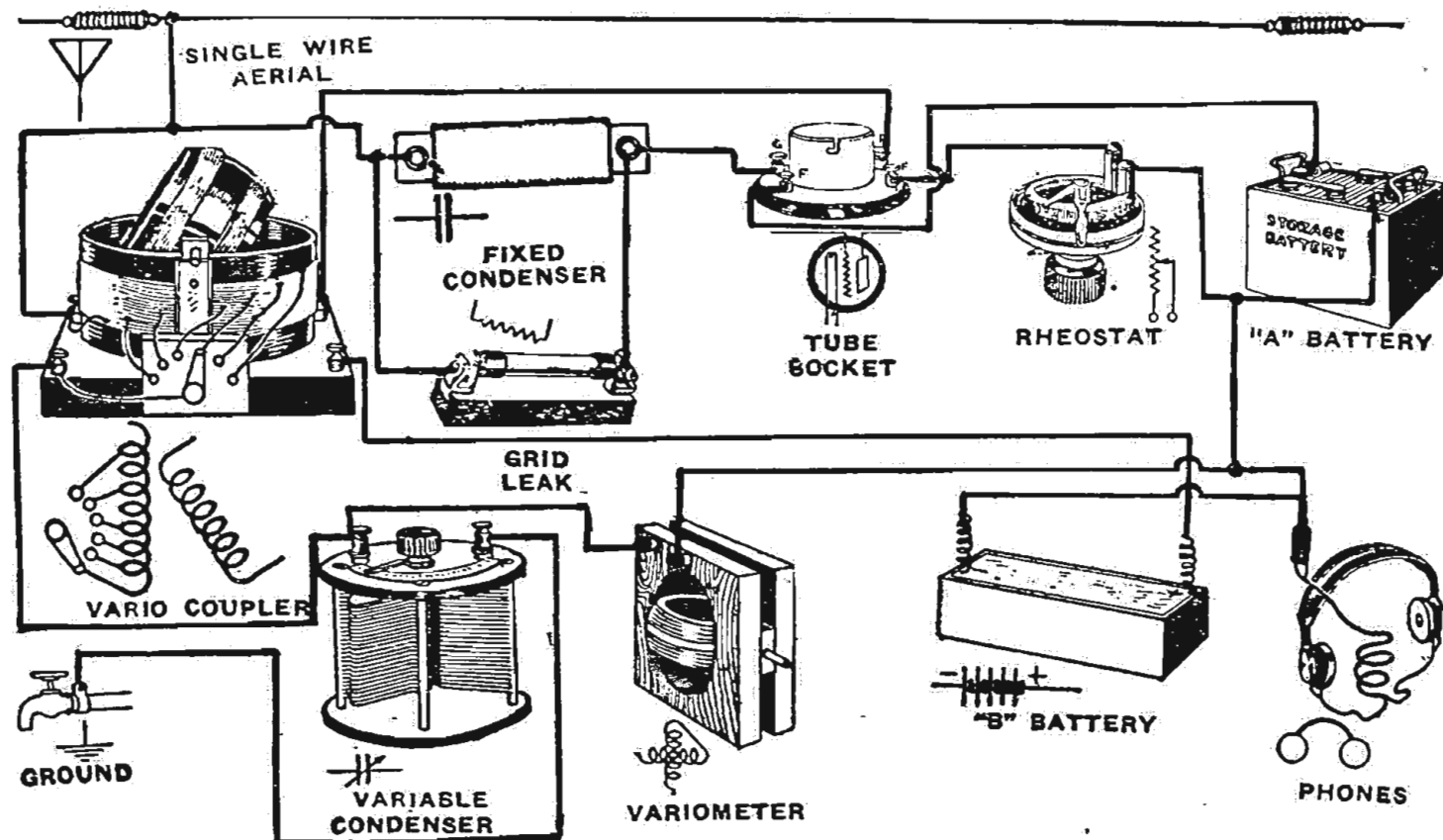
WORK is pleasant and profitable. Just call on your friends, enrolling their names on our large family roll of readers.

WRITE at once for our proposition which is yours for the asking. Address

Circulation Manager, Radio Digest
123 W. Madison St., Chicago



HOPWOOD NO-GROUND HOOK-UP FIRST SIMPLEX



HOPWOOD'S regenerative circuit has been taken as the first to be shown by Radio Digest in the new, simplex diagram series. As will be seen, the diagram symbol, picture and name of each piece of apparatus, is given. The newest comer to the Radio field should not find it hard to set up this hook-up according to the above layout.

The peculiar feature of the Hopwood hook-up is that it sometimes receives very well without using a ground at all. The ground is connected, however, above in the correct location so as to be used if necessary. If used without ground, put the variable condenser in series with the aerial at a point before reaching set. The fixed condenser shown in the grid-aerial lead should have a capacity of .00025 mfd. while the grid leak resistance

across this same condenser should be two megohms. The B battery used has 22½ volts potential, and most any tube, soft preferred, will work well. The variable condenser shown in the ground lead should have .0005 mfd. capacity. While an ordinary rheostat will work satisfactorily to control the filament brilliancy, a vernier type rheostat will aid in tuning in.

Reviews of Books

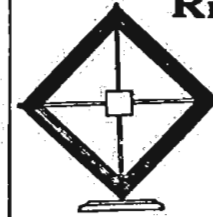
- Radio Experimenter's Hand Book.** By M. B. Sleeper. This book will help in the selection and the construction of simple apparatus for transmission and reception of radio telegraph and telephone signals. Price, \$1.00.
- Home Radio—How to Make It.** By A. Hyatt Verrill. This book is particularly adapted for the amateur who desires to know how to make Radiophones. Twelve full page illustrations and diagrams. Price, 75c.
- Elements of Radiotelegraphy.** By Elery W. Stone. The text was written for the guidance and instruction of Radio students in the communication service of the Navy. It is an instruction book for Radio schools. Price, \$2.50.
- The Armstrong Super-Regenerative Circuit.** By George J. Eltz, Jr., E. E. This is a De Luxe edition of this famous circuit. Profusely illustrated and fully explained. Fifty-two pages. Price, \$1.00.
- Radio First Aid.** Illustrated with working drawings and complete data as to the necessary equipment and cost of constructing from the simplest to the most modern Radio outfits at home. Price, \$1.
- The Radio Amateur's Handbook.** By A. Frederick Collins. A new revised edition of this book is just out. It is a complete, authentic and informative work on Radio. Fully illustrated. Price, \$1.50.

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

PATENT ATTORNEYS

PATENTS. Booklet free. Highest references. Best results. WATSON E. COLEMAN, Patent Lawyer, 624 F Street, Washington, D. C.

Ritter Loop Aerial \$1



Including wood parts—wire and binding posts. Can be assembled in a few minutes—Portable, requires little space, 36 inches across. Interference—Static—Lightning practically eliminated. Instructions with every SET. By Mail, 10c Extra. Ritter Radio Company 230 Canal Street, NEW YORK

PARIS COMPOSER SCOUTS RADIO-OPERA RIVALRY

Broadcasts Won't Destroy Interest in Theater

PARIS.—"The Radiophone will no more destroy public interest in the theater or concerts than tinned corned beef will satisfy the gourmet," says Raynaldo Hahn, composer of "Ciboulette," discussing the rapid growth of broadcasting in France during the last few months. From a few hundred instruments last summer it is now estimated there are more than 30,000 receiving sets in the Paris district alone. The Society of Musicians in Paris, however, does not agree with him and is planning a formal protest to the government. Such a renowned musician as Georges de Lausnay, director of the Orchestre de Paris, is planning to collaborate with eight other associations to this end on the grounds that already a diminution is noticeable in attendance at the better class concerts.

"Air Detectives" May Aid Chicago Crime War

Chief Studies Detroit "Land-Water" Radio Patrol

CHICAGO.—This city may soon have Radiophone detectives to combat crookedness in the city's crime war, if suggestions made by Chief of Police Collins are carried out. Chief Collins recently returned from the International Convention of Police Chiefs at Buffalo, N. Y. In a conference with Chief William Rutledge, of Detroit, he learned that the Radiophone is used successfully in that city to combat crime, both on land and water. Many of the police river patrol boats, constantly on the lookout for rum

runners, are equipped with Radiophone receiving and transmitting apparatus.

One of the chief uses to which the "Radio detective" is put to in the Motor City is the broadcasting of the descriptions and license numbers of stolen cars. Also the news of holdups is flung out on the air so that the "strong arms" of the law in the outlying towns can be on the alert for any suspicious cars or persons.

WE REPAIR YOUR VACUUM TUBES

- WD-11, WD-12, UV-199, UV-201-A. C-301-A \$3.50 each
 - UV-200, C-300, AP Detectors 2.75 each
 - UV-201, C-301, AP Amplifiers 3.00 each
 - DV-6, DV-6-A 3.50 each
 - UV-202 4.00 each
- And Guarantee Them Equal to New
- QUICK SERVICE** Include with your order remittance to cover repair plus parcel postage for one pound per tube. If preferred, tubes will be returned C.O.D., repair charges.
- Abalene Radio** 14 Vesey Street New York, N.Y.

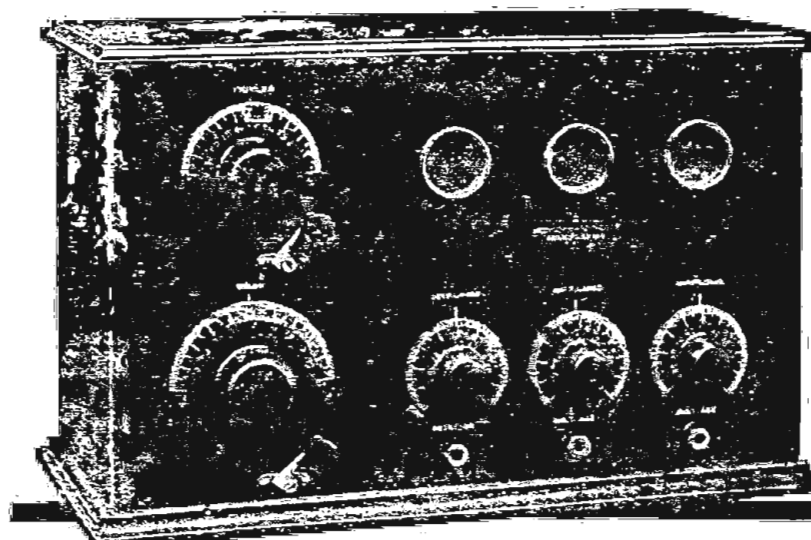
SOMETHING NEW

A real loud talking detector made of "B" Metal, 100% superior to any crystal. Puts new life into your set. Guaranteed for one year. It's the cheapest in the long run.



50c

Sold by all live dealers, or can be ordered from the **B-Metal Refining Co.** 3134 Trumbull Ave. Detroit, Mich.



MICHIGAN "SENIOR" REGENERATIVE RECEIVER

A Large Measure of CERTAINTY and Much Less "Guessing"

Michigan "Senior" and "Junior" Regenerative Receiving Sets, with our patented Split-hair Vernier Dial Adjuster give the operator practically complete control of radio reception.

Our set owners report remarkable success in bringing in any desired station on which they had made previous dial-position records.

Troublesome nearby stations can be tuned out almost at will and signals come in clear, strong, pure-toned.

Loudspeaker reception on the "Senior," or on the "Junior" with our two-stage amplifier, is especially satisfactory.

Michigan Sets are Regenerative, licensed under Armstrong's U. S. Patent No. 1,113,149 and pending Letters Patent 807,388.



Michigan Accessories and Parts include vernier dial adjuster, two-stage amplifier, and a long line of highly perfected variometers, variocouplers, plate condensers, grid condensers, rheostats, etc. Send for our catalog.

The New Grebe Broadcast Receiver



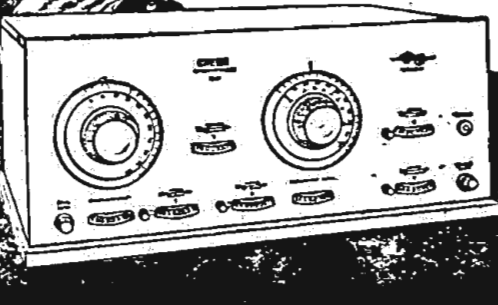
Point No. 1 A SILK-COVERED WIRE but 20 feet long, supplied with this Receiver, does the work of the unsightly outdoor antenna, or loop. This wire may be concealed behind the picture moulding or run along the baseboard.

Just one of its seven points of satisfaction

Licensed under Armstrong U.S. Pat. No. 1,113,149

Ask Your Dealer Today!

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



MICHIGAN RADIO CORPORATION

GRAND RAPIDS, MICHIGAN

The Week's Advance Broadcast Programs

Tuesday, July 3

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert. "Peer Gynt." Star Orchestra; "Swiss Echo Song." Edna Charles, soprano; "Serenade." Manuella Roth, violinist; "Moment Musical." Pulcinello, Orchestra; "Love Sends a Little Gift of Roses." Edna Charles; "H. M. S. Pinafore." Orchestra; "Allee, Where Art Thou?" Orchestra; "My Message." Edna Charles; "Trite Song" from "The Meistersinger." Orchestra.

KHJ (Pacific, 395), 12:30-1:15 P. M., Concert. Baisden's Lion Toin Hallroom Orchestra; 2:30-3:30 P. M., Musical matinee; 6:45-7:30 P. M., Children's Hour, "Uncle John"; 8:00-10:00 P. M., Program arranged by Western Union Telegraph Co.

KSD (Central, 546), 8:00 P. M., Concert. Grand Central Theater talent.

KYW (Central, Daylight Saving, 345), 8:00-8:58 P. M., Musical program; Laura Grassman, soprano; Miriam Aaron, soprano; Bertha Kaplan, reader; Earl Wetteland, pianist; Cope Harvey's Orchestra; Wendell W. Hall, KYW's Music Maker.

WBAP (Central, 476), 9:30-10:45 P. M., Concert. Fred Caloon's Texas Hotel Orchestra.

WDT (Eastern, Daylight Saving, 405), 12:00-1:00 P. M., Talk, "Care of the Hands," Vaughn De Leath; Ranjo solo, John Martell; Popular songs, Will Von Tilzer; Ranjo solos, John Martell.

WFAA (Central, 476), 12:30-1:00 P. M., Address. DeWalt McMurray, 8:30-9:30 P. M., Musical program, Elk's Quartet; 11:00-2:00 P. M., Musical program under auspices of Lester Gust Co.

WGI (Eastern, Daylight Saving, 360), 3:00 P. M., Amrad Women's Club; 5:00 P. M., "Twilight Tales," Uncle David; 8:30 P. M., Business report, Roger W. Babson; Instrumental concert.

WGY (Eastern, 380), 1:00 P. M., Address, "Old Glory." Mrs. Margaret Tucker; 7:45 P. M., Musical program; "Les Sylphides," Earl Hermance, pianist; "La Nuit Monte." Helen B. Beeler, soprano; "Ave Maria," Bernardino Gazerra, cornetist; "Just You," Samuel E. Beeler, Jr.; "Reverie, Opus 32, No. 2," Eugene Scuffio, violinist; "Ave Maria," Harry Bannister, tenor; "At Dawning," "His Lullaby," Mary Roberts, contralto; "Spring Song," Bernardino Gazerra; "Slumber Song," "Reverie," Helen B. Beeler; "Mother," Samuel E. Beeler, Jr.; "La Capricieuse," Bernardino Gazerra, violinist; "A Dream," Harry Bannister; "Where'er You Walk," from "Semeeles," Helen B. Beeler; "Scotch Poem," Earl Hermance, pianist.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; 7:30-9:00 P. M., Concert, The Junior Historical and Nature Study Society of New Albany, Indiana; Reading, "An Interesting Historical Episode."

WJAX (Eastern, 390), 7:30 P. M., Concert, Cleveland News.

WLW (Eastern, 309), 10:00 P. M., Concert, "Sonata in A Minor," Norma Rath, pianist; Rubin Phillips, violinist; comedy, "That Blessed Baby," Mr. & Mrs. Harry J. Plogstedt; Pappilons," Norma Rath; Rubin Phillips, violinist; "Chant d'Amour," "Waltz in C Sharp Minor," "The Magic Fire Scene," Norma Rath.

WMAQ (Central, Daylight Saving, 447), 7:00 P. M., Babson report; Talk, "American Indians," Mrs. Flora Warren Seymour; The Benson children, violinist and soprano; 9:15 P. M., Instrumental concert, The Schubert Trio.

WMC (Central, 400), 8:30 P. M., Musical program, Marjorie Lamkin; Mr. Gulp; Hiram Fulsom; Louise Strickland.

WDC (Central, 484), 3:30 P. M., Educational talk, A. G. Hinrichs; 5:45 P. M., Chimes concert.

WDR (Eastern, 409), 2:30 P. M., Recital, Pupils of Alma I. Germain, pianist; Talk, A. R. Nelson, Educational Director of Y. M. C. A.; Songs, Arthur G. Balcolm; Selections by pupils of Alma I. Germain; Arthur G. Balcolm; Excerpts from "An American Bible," Elbert Hubbard; 6:16 P. M., Talk, "Psychology of Humor," Leon Moses; Children's stories; Recital, Mary Fitz Simmons, soprano; George E. Patten, tenor.

WJW (Eastern, 517), 3:00 P. M., Concert, Schmemman's Band; 8:30 P. M., Concert, Detroit News Orchestra; The Town Crier; Musical program, Pupils of Mrs. Earl F. Chase.

Wednesday, July 4

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert. "Peer Gynt." Star Orchestra; "The Roseary." Muriel Lomax, soprano; "The Roseary." Jacques Sterin, cellist; "Berceuse," Orchestra; "Calm as the Night," Muriel Lomax; "Passied," Orchestra; "Air," Jacques Sterin; Selection from "Tannhauser," Orchestra; "Scent of Lillies," Muriel Lomax; "Somewhere a Voice is Calling," Orchestra.

KHJ (Pacific, 395), 12:30-1:15 P. M., Music; 2:30-3:30 P. M., Matinee musical; 6:45-7:30 P. M., Children's Hour, "Uncle John"; 8:00-10:00 P. M., De Luxe program.

KSD (Central, 546), 8:00 P. M., Concert, Band and Glee Club of the Junior Order American Mechanics' Orphans' Home of Tiffin, Ohio.

KYW (Central Daylight Saving, 345), 8:00-8:58 P. M., Musical program, courtesy of Rock Island Railroad; Cope Harvey's Orchestra.

WBAP (Central, 476), 9:30-10:45 P. M., Concert, Hilo Five Hawaiian Orchestra.

WDT (Eastern, Daylight Saving, 405), 12:00-1:00 P. M., Program under auspices of American Legion, courtesy of Col. Simmons.

WFAA (Central, 476), 12:30-1:00 P. M., Address, "Rights, Liberties and Duties," M. B. Bogarte, headmaster of Terrill School for Boys.

WGI (Eastern, Daylight Saving, 360), 8:30 P. M., Talk, "Science Up to Date," Scientific American; Band concert.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; 7:30-9:00 P. M., Concert, 10th U. S. Reg., Band; Address, General Dwight Altman; Reading, "An Interesting Historical Episode."

WHK (Eastern, 360), 8:00 P. M., Lecture; Concert; Babson's Radio Release.

WLW (Eastern, 309), 8 P. M., Patriotic songs, Roulman School of Expression; Excerpts from the Declaration of Independence; Bugle calls, Private Ward of



Gettem While the Gettins Good

Everybody can use an extra pair of Receivers. Limited quantity. 2200 Ohms Supersensitive. Regular..... \$5.00

Well known ECONOMY quality

ECONOMY RADIO COMPANY
132 Nassau Street New York, N. Y.

Send for complete list of Bargains.

Fort Thomas Military Post; Popular songs, Gasulo Bishop; "Nocturne," "Rondino," Mitchell Humphrey, violinist; "Call Me Back, Pal O' Mine," "When the Gold Turns to Gray," "Old Fashioned Days," Donald W. Copelan; "Aria," Mitchell Humphrey; "Ah, So Pure!" G. Harris, tenor; "The Old Refrain," Mitchell Humphrey, violinist; "God Touched the Rose," "Womans is Fickle," G. Harris; "Ave Marie," Mitchell Humphrey.

WDC (Central, 484), 8:00 P. M., Recital, Erwin Swindell, organist; 10:00 P. M., Musical program.

WJAX (Eastern, 390), 8:00 P. M., Recital, Vincent H. Percy, organist.

WLW (Eastern, 309), 10:00 P. M., Concert, The General Protestant Orphans' Home Band, Edward Schath, director; "The Star-Spangled Banner," "Military Escort," Band; Aria from "Fierza del Distaio," Ida Blackschlegler; "Overture," Band; Address, Supt. H. A. Longman; "Ardley Selection," Band; "To Be Near You," "The Slave Song," Ida Blackschlegler; "The Last Rose of Summer," "Old Folks at Home," Ida Blackschlegler.

Farr, pianist; Cope Harvey's Orchestra; 9:05-9:25 P. M., Book review.

WBAP (Central, 476), 9:30-10:45 P. M., Concert, Mrs. Pearl Althorn Davis, soprano.

WDT (Eastern, Daylight Saving, 405), 12:00-1:00 P. M., Musical acts, Romo & Dunn; Miller & Bradford; Stern & Waters; Keller Sisters & Lynch; Jason & Harrigan; Olive Hayes & Jack Smith; Al Bellan; 11:00-12:00 P. M., Musical program; A. Adams, cellist; B. Mudro, violinist; G. Black, pianist.

WFAA (Central, 476), 12:30-1:00 P. M., Address, Dr. Robert Stuart Iyer, Southern Methodist University; 8:30-9:30 P. M., Recital, Edith Bellharz, violinist and assisting entertainers.

WGI (Eastern, Daylight Saving, 360), 3:00 P. M., Amrad Women's Club; 5:00 P. M., "Twilight Tales," Eunice L. Randall; 8:30 P. M., "Silversmilt Series," David M. Cheney; Concert.

WGY (Eastern, 380), 1:00 P. M., Talk, "Patterns for Hats"; 7:35 P. M., Health talk, "Dog Fights and Dog Days," State Dept. of Health; 7:45 P. M., Musical program; "Twilight," Roland Davis, pianist; "Lifo," "Dance the Romalita," Mrs. Fred Ellison, soprano; "Concerto No. 4, Allegro Movement," George Mann, violinist; "Dance of the Butterflies," Roland Davis; "Moro Grand His Humble Estate," Mrs. Fred Ellison; "Concerto No. 4, Andante Cantabile," George Mann; "Hears Wish," Roland Davis; "Allah," "A June Morning," Mrs. Fred Ellison; "Minuet," George Mann; "Valso Impromptu," Roland Davis; 10:30 P. M., Musical program; "Waiu Lullullu," Scheneclady Hawaiian Trio; "I Love a Little Cottage," Mae MacCarroll, soprano; "Lonesome, That's All," Quartet; "Aloha Oe," Hawaiian Trio; "At Parting," Mae MacCarroll; "The Story of a Tack," Bill's Nanny Goat, Quartet; "Hawaiian March," Trio; "The Green Cathedral," Mae MacCarroll; "Sing Me a Song of the South," Quartet.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; 7:30-9:00 P. M., Concert, Rosta Trio; Maurice Mcneen, saxophonist; Gregor Balough, violinist; Reading, "An Interesting Historical Episode."

WMAQ (Central, Daylight Saving, 447), 7:00 P. M., Children's program, arranged by Mrs. Frances Ford; 9:15 P. M., Helen Howe, contralto.

WMC (Central, 400), 8:30 P. M., Concert, Union Avenue Methodist Church Orchestra.

WDC (Central, 484), 3:30 P. M., Educational talk, C. E. Wilent; 5:45 P. M., Chimes concert; 6:30 P. M., Sandman.

WDR (Eastern, 409), 2:30 P. M., Florence Robrecht, soprano; Talk, "The Simple Life," Karl E. Termohlen; Talk, "Broadway and Broad Street," Walt K. Szeze; Sophia Komocss, pianist; 6:16 P. M., Arthur C. Comly, baritone; Children's stories; Arthur C. Comly, baritone.

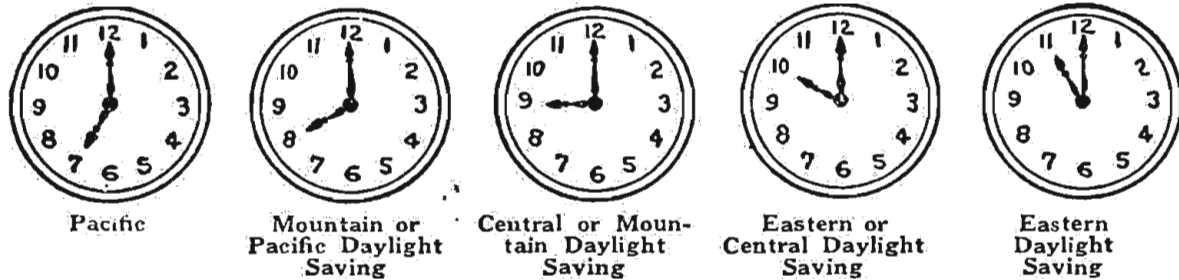
WJW (Eastern, 517), 3:00 P. M., Concert, Schmemman's Band; 8:30 P. M., Concert, News Orchestra; The Town Crier; Thomas B. Rhodes, tenor; Edward C. Dent, baritone; Alne Huck, pianist.

Saturday, July 7

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "Scenes Poetiques," Orchestra; Fred Rogers, tenor; "Ship o' Dreams," W. Woods, cornetist; "The Merry Widow," Orchestra; Fred Rogers; "Serenade," Orchestra; "A Mother's Croon," W. Woods.

(Continued on page 9.)

What Time Is It?



THE above clock dials are shown to clear up the misunderstanding which the various time bands and the Daylight Saving plan are creating. Although each dial registers time one hour ahead or behind of its neighbor, the exact period indicated on each dial is the same as that on every other. This chart will aid in the use of the advance programs and the schedules in the Radiophone Broadcasting Station Directory, both of which give the hours stated in the particular kind of time in use at each station. Only features are listed in the advance programs below. Much additional data and such parts of station schedules as are regular features week in and week out, will be found in the station directory which appears serially continuously on page eight.

Ladies' Glee Club of Palmer School of Chiropractic.

WDR (Eastern, 409), 2:30 P. M., Patriotic program; Songs, Helen Mohr; Richard E. Stout, violinist; Talk, "Independence Days on the Trail," King Stanley; 6:16 P. M., Irene Owens, soprano; Talk, Willard E. Hicks; Talk, "Radio for the Layman," Albert E. Soun; 8:00 P. M., Address, "The Meaning of Independence Day," Dr. Allen; Blanci Randall, soprano; Address, "Significance of Our National Banner," Alice D. Stueck; Address, "Citizen's Responsibility," Mayor Geo. K. Weston; Mrs. Ralph Bud, soprano; Accordion selections, Michael Caracere; 10:30 P. M., Production of "Cavalleria Rusticana."

Thursday, July 5

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "In the Tavern," Star Orchestra; Selection from "Manon," Nellye Gill, soprano; "Indian Lament," Harry Adaskin, violinist; "Graceful Dance," Orchestra; "The Spirit Flower," Nellye Gill; "Sol-vie's Song," "Russian Serenade," Orchestra; "On Wings of Song," Harry Adaskin; "When Irish Eyes are Smiling," Nellye Gill; "Soldier's Chorus," from "Faust," Orchestra.

KHJ (Pacific, 395), 12:30-1:15 P. M., Music; 2:30-3:30 P. M., Musical matinee; 6:45-7:30 P. M., Children's Hour, "Uncle John"; 8:00-10:00 P. M., Musical program, Raymond Harmon, tenor; Mrs. Elwell, soprano.

KYW (Central, Daylight Saving, 345), 8:00-8:58 P. M., Musical program, Leon & Healy Artist Dept.; Cope Harvey's Orchestra; 9:05-9:25 P. M., "Twenty Minutes of Good Reading," Rev. C. J. Perrin.

WBAP (Central, 476), 9:30-10:45 P. M., Concert, under auspices of Will Foster, organist.

WDT (Eastern, Daylight Saving, 405), 12:00-1:00 P. M., Talk, "Care of the Hair," Vaughn De Leath; Songs, Jimmie McHugh & Co., Songs, Vaughn De Leath; Songs, Jimmie McHugh & Co.

WFAA (Central, 476), 12:30-1:00 P. M., Address, "What Is Law?" Judge Eugene B. Muse; 8:30-9:30 P. M., Program arranged by Masonic Service Committee of the Grand Lodge of Texas Masons; 11:30-12:00 P. M., Netto Male Quartet.

WGI (Eastern, Daylight Saving, 360), 5:00 P. M., "Twilight Tales," Uncle David; 8:30 P. M., Songs, Dean Winslow Hanson, tenor; Thrift talk, conducted by American Bond and Mortgage Co; Concert.

WGY (Eastern, 380), 1:00 P. M., Address, "The Mentally Retarded Child in the Public Schools," Eleanor A. Gray; 7:35 P. M., Talk, "Fly Fishing for Black Bass," Jud Landis; 7:45 P. M., Musical program; "Les Pappilons," Wilfred Lebus, pianist; "O, Canada," Chorus Franco-Canadian; "Poeme," Mme. Chantermerle, reader; "A la Claire Fontaine," "Bergeretta," "Le Jeune Fillette," Alphonse Girard, baritone; Address, "French Canadians and Their Music," Prof. Jos. Brodeur; "Ou va la jeune Hindoue," from "Lakme," Lucille L. Hebert; "Soirs au Quebec," Chorus; "The Music Box," Wilfred Lebus, pianist; "Berceuse," from "Jocelyn," Edward Froment, tenor; "Obstination," "Je vous donnai mon Coeur," Mlle. Beatrice Girard, soprano; "L'illusion," Mme. Chantermerle, reader; "Tes Yeux," Edward Froment, tenor; "L'Alouette," "Bon Soir, mes Amis," Chorus.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; 7:30-9:00 P. M., Concert, Howard Hardaway, director; Angelina McCrocklin, contralto; Sue Bettinger, Grace Hardaway, ukuleles; William Fries, flutist; Howard Hardaway, guitarist; Reading, Joseph Hill, Mary Margaret Hill, Mildred Schirmer, pianist; Byron Holloway, baritone; Sunday School lesson; Talk, "Kentucky State Board of Charities and Correction," Mrs. Charles B. Semple.



Amsco Rheostats

Guarantee an unusually uniform and steady contact.

For base or panel mounting. Condensite base, high-grade resistance unit, attractive knob. Adjustable shaft to any thickness panel.

6 Ohms.....\$1.00; with dial.....\$1.25
20 Ohms..... 1.25; with dial..... 1.50
(For UV-201A Tubes)

50 Ohms..... 1.30; with dial..... 1.55
(For UV-199 Tubes)

At All Good Dealers

AMSCO PRODUCTS, INC.
Broome & Lafayette Sts., New York City

Friday, July 6

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, Selection from "Carmen," Orchestra; Aria from "Louise," Mrs. Douglas Raymond, soprano; "Spanish Dance," Mannie Roth, violinist; "My Dreams," Orchestra; "Radiant Night," Mrs. Douglas Raymond; "The Blue Danube," Orchestra; "Londonderry Air," Mannie Roth; "Salut d'Amour," Orchestra; "The Bird of Love Divine," Mrs. Douglas Raymond; "Coronation March," Orchestra.

KHJ (Pacific, 395), 12:30-1:15 P. M., Music; 2:30-3:30 P. M., Matinee musical; 6:45-7:30 P. M., Children's Hour, "Uncle John"; 8:00-10:00 P. M., De Luxe program.

KSD (Central, 546), 8:00 P. M., Opera, "Sweethearts," Municipal Theater.

KYW (Central, Daylight Saving, 345), 8:00-8:58 P. M., Musical program, Lucille O'Brien, soprano; Dan Toomey, tenor; Agnes Mullen, soprano; Hilda B.



SPECIAL

Direct From Manufacturer to Consumer

Save the Difference

LOUD SPEAKER

GENUINE WOOD FIBRE HDRN

10-inch Bell with Standard Attachment; Complete. Height 24 inches. Colors, Black, Mahogany and Olive Green.

Price—\$5.00

Delivered to any part of the United States and Canada.

Send Money Order

EMIL DECLYNE
15 Park Row Room 2525
NEW YORK CITY
Dept. R. D. Barclay 6298



DON'T PASS THIS-BUY

World Radio Batteries

SAVE YOU 50%

WRITTEN 2 YEAR GUARANTEE

Every World User is a Booster

Because you deal direct with a manufacturer who is responsible for the performance and quality of the Battery.

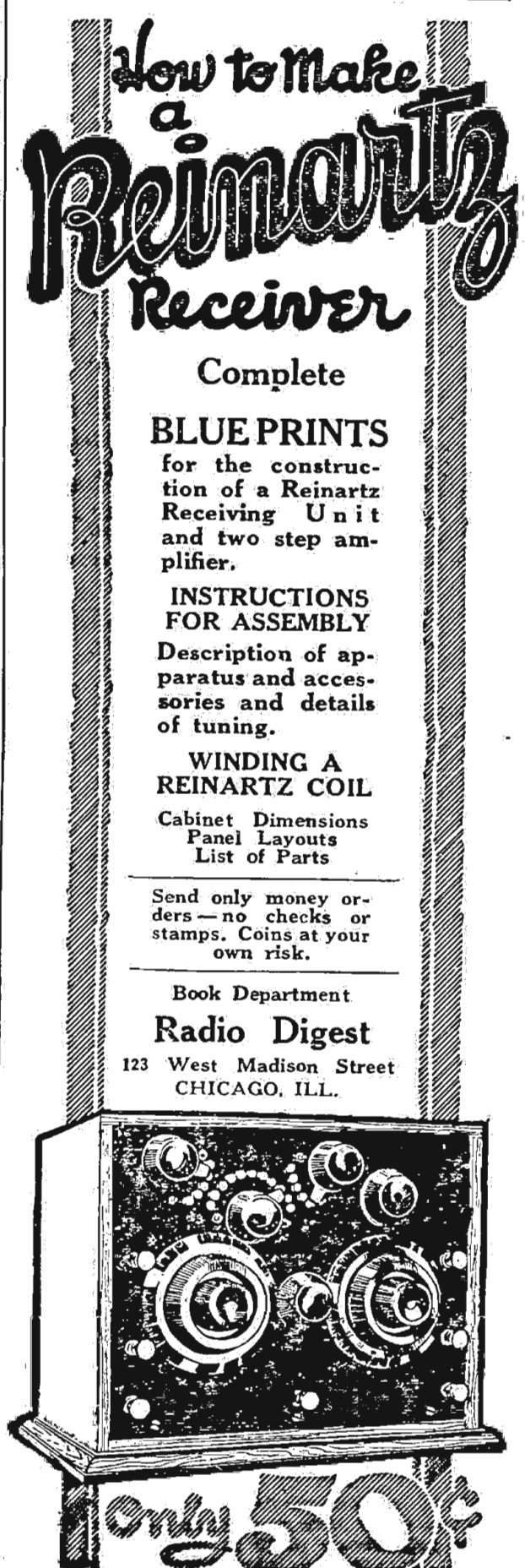
World-Radio-Batteries

6 Volts—40 Amps., \$8.50
6 Volts—80 Amps., \$12.50
6 Volts—60 Amps., \$10.00
6 Volts—100 Amps., \$14.50
6 Volts \$16.00 120 Amps.

Full Rating Guaranteed

MAIL YOUR ORDER TODAY. WE SHIP EXPRESS C. O. D., SUBJECT TO INSPECTION, OR WILL ALLOW 5% FOR CASH WITH ORDER. ALL ORDERS SHIPPED SAME DAY AS RECEIVED.

WORLD BATTERY COMPANY,
60 E. Roosevelt Rd., Dept. L, Chicago, Ill.



How to Make a Reinartz Receiver

Complete

BLUE PRINTS

for the construction of a Reinartz Receiving Unit and two step amplifier.

INSTRUCTIONS FOR ASSEMBLY

Description of apparatus and accessories and details of tuning.

WINDING A REINARTZ COIL

Cabinet Dimensions
Panel Layouts
List of Parts

Send only money orders—no checks or stamps. Coins at your own risk.

Book Department

Radio Digest
123 West Madison Street
CHICAGO, ILL.

only 50¢

ADVANCE PROGRAMS

(Continued from page 7)

"Tales from the Vienna Woods." Orchestra; Fred Rogers, tenor; "Pomp and Circumstance." Orchestra. KNJ (Central, 395), 12:30-1:15 P. M., Musical program. Jenny Lind Wiles, soprano; 2:30-3:30 P. M., Concert. Bouquet's Southland Serenaders Orchestra; 6:45-7:30 P. M., Children's Hour, "Uncle John"; 8:00-10:00 P. M., De Luxe program.

FLEWELLING ANSWERS TO QUERIES

By E. T. Flewelling

(Editor's Note.—This department is written by Mr. Flewelling, the inventor of the famous super circuit. From the questions sent him each week care of Radio Digest, he picks the one considered most informative for all and answers it in this column.)

denser recommended for the Flewelling Super. When you bring in a station two or three hundred miles away and your set is only connected to the ground, you must realize that you are dealing in mighty small quantities and that you must take advantage of every little factor that might be of help.

The Reader's View

Single Circuit Selectivity

What's all this twaddle about single circuit receivers not being selective? I say "twaddle" because that's just what it is.

There are several amateurs in this town who use the phone a lot and they never interfere with my reception of broadcasting. Canadian 3AEO, using four tubes, is only three blocks away, never bothers me at all. I have heard him talking to 3KO, ten blocks away and then tuned in WWJ or VVGJ and haven't heard a peep out of 3AEO or 3KO. They were still going for I turned back to see if they were still there and they were very much so. I could hear them all over the room on two tubes when I had either one tuned in.

I have had 3AEO speaking to me and giving me a message and 3KO, a 10-watter, come on calling 3IR. I could hear 3KO faintly but being tuned to 3AEO, I heard every word of his message with no difficulty. 3KO works on 190 meters and 3AEO works on 200 meters.

My set isn't a freak for I have built four just like it and they all work equally as well. I have made them all get KHJ or KFI as a final long range test before I pronounced them O. K. Los Angeles is about 2,200 miles away from here.

I have heard several two circuit sets around here and have gone away disgusted and feeling glad that I owned a single circuit receiver.

I think it's about time somebody started out with an axe after the guys who spout the piffle about a single circuit set not being as selective as a two circuit set.

Your issue of May 5, 1923, contains an article on editorial page of this nature. In view of my own observations and tests I cannot help but think that such an article is everlasting piffle. I maintain that selectivity is more easily obtainable in a single circuit than in a two circuit set for the reason that very few owners of two circuit sets know how to handle them, even after months of monkeying with them.—Cliff H. Dafoe, Chatham, Canada.

Sunday, July 8

WFAA (Central, 476), 2:30-3:30 P. M., Bible Class, Dr. William M. Anderson, Jr.; 9:30-10:00 P. M., Sacred music, Central Christian Church; 10:00-11:00 P. M., Concert, Henry Ashley's Kidd Springs Orchestra.

Monday, July 9

WGY (Eastern, 380), 1:00 P. M., Talk, "The New Bias Fold Applique." Modern Priscilla; 7:45 P. M., Musical program; "Rhapsody, No. 9." Kathryn P. Hinkey, pianist; Travelogue address, "A Trip Through India," Part I, Dr. Sigel Roush; "Indian Lament," "Song of India," William Helm, violinist; "A Trip Through India," Part II, Dr. Sigel Roush; "Sparks," "The Winter Wind Etude," Kathryn P. Hinkey; "A Trip Through India," Part III, Dr. Sigel Roush; "Serenade," "Viennese Melody," William Helm, violinist.

SPECIAL OFFER LIST

(Continued from page 2)

Dubliler Mleadon Type 610 (.01 or .02 mfd.); Dubliler By-Pass Condenser (1 mfd.); Premier Universal Radio Jack, Filament Control Five Spring; CRL Variable Grid Leak, without condenser; Premier No. 250 Variable Resistance, panel mounting.

Class D Articles

For eight consecutive coupons and one dollar and twenty cents (\$1.20) any one of the following articles will be sent: 1 Carter 20-Ohm Vernier Control Rheostat; 1 Schindler Radio Frequency Transformer; 1 Martin-Copeland 13-Point Inductance Switch; 1 Martin-Copeland 15-Point Inductance Switch; 1 Martin-Copeland 19-Point Inductance Switch; Walnut Variable Condenser (5-Plate, .001 mfd.); Ray-O-Vac No. 4151 B Battery, 2 1/2 volts; Ray-O-Vac Dry Battery, 3 cells 4 1/2 volts; Electrad Variotom, with mica condenser; Dubliler By-Pass Condenser (2 mfd.); CRL Variable Grid Leak with Condenser; Resistometer (Type A or 2A).

Class E Articles

For ten consecutively numbered coupons and one dollar and fifty cents (\$1.50) any one of the following articles will be sent: 1 Carter 6-Ohm Automatic Control Rheostat; 1 Carter 20 Ohm Automatic Control

POSITIVE RESULTS

are being obtained by thousands of satisfied users of the

EASTERN COIL SETS for Cockaday Circuit

The remarkable features which are making this circuit more popular each day are its simplicity of construction and control—wonderful selectivity—distance recording—clearness and loudness of reception, and the fact that all capacity squealing, interference, etc., are eliminated.

Made as per specifications of Mr. Cockaday, using No. 18 wire with D coil bank-wound. COMPLETE SET OF B, C AND D COILS—PRICE \$2.75

Hook-up, directions and material list furnished free with each set of coils. Mail Orders Filled. Dealers Communicate. EASTERN RADIO MFG. CO. 22 WARREN STREET NEW YORK, N. Y.

Series Condenser and Tube (Submitted by F. W. S., Fostoria, Ohio.) Question.—Have built a Flewelling Super set exactly as per the instructions in Radio Digest except that I am using a 23-plate .9005 mfd. variable condenser instead of the 11-plate .00025 mfd. condenser that you recommended, and am also using a UV-200 tube. Would this make any difference? I tune in nearly all of the stations, but do not hear anything of the whistle that you speak of. Can you tell me what my trouble is?

Answer.—So long as you get all of the various stations you can be sure that you are able to tune your set with the 23-plate condenser, so unless you care for maximum results, you can continue using this one. The reason that an 11-plate condenser is recommended for the Flewelling Super is explained by the following: A vacuum tube when used as a detector gives returns dependent upon the voltage impressed upon the grid of the tube, the rule being that the output is proportional to the square of the input. If we multiply the input voltage by five times, we increase the output of the tube 25 times. Now, the voltage that we impress upon the grid of our detector tube is dependent upon, among other things, the amount of inductance we use in our tuning device. The more inductance and the less capacity, the greater will be the voltage on the grid of our tube. If we can still tune our set to resonance, then the smaller the condenser we use, the better will be the results. That is one reason for the 11-plate con-

denser recommended for the Flewelling Super. When you bring in a station two or three hundred miles away and your set is only connected to the ground, you must realize that you are dealing in mighty small quantities and that you must take advantage of every little factor that might be of help.

Now as to the tube that you are using. The Flewelling Super is undoubtedly the simplest known method of producing super regeneration. It does this in the following manner: We allow our set to regenerate to the point of "spill over" and block the tube. This stops the action of the set, but our .006 mfd. condenser has now accumulated a charge, our grid leak is so set that it allows the blocking charge to leak off of the grid. As this charge leaks off, the tube and set go into action again, but (and here is the important feature) the .006 mfd. condenser now discharges. This charge and discharge are exactly timed by the grid leak adjustment, therefore giving up the opportunity of letting our tube regenerate to its full capacity and yet restricting from oscillating at its own free will. Ordinarily we are restricted as to the amount of regeneration that we can use, because of this tendency toward free and sustained oscillation.

Were we to use a soft tube such as the UV-200 we could do the same thing, but at a great loss in efficiency and at the expense of a great deal of trouble. We could not block the tube so readily nor could we use high enough plate voltage to give maximum results.

A real good regenerative set plus one .006 mfd. condenser used in conjunction with a hard tube and a good variable grid leak, will enable one to operate what is perhaps the most sensitive Radio receiver known today, the super regenerator.

Rheostat; 1 Decma 3-Plate Variable Condenser; Walnut Variable Condenser (13-Plate .00025 mfd.); Ray-O-Vac Dry Battery, 4 cells 1 1/2 volts; Dubliler Variodion (.0004 or .0006 mfd.); Resistometer (Type B); Delta Midgee Tube and Socket.

Class F Articles

For twelve consecutively numbered coupons and one dollar and eighty cents (\$1.80) the following will be sent: 1 Acme Pot-Rheo (potentiometer and rheostat); Walnut Variable Condenser (23-Plate .0005 mfd.); Ray-O-Vac No. 2151 B Battery, 2 1/2 volts; Dubliler By-Pass Condenser (3 mfd.); Premier Variable Condenser without dial (.00039 mfd.).

Class G Articles

For fourteen consecutively numbered coupons and two dollars and forty cents (\$2.40) any one of the following articles will be sent: 1 Federal 7-Plate Variable Condenser; 1 Federal 11-Plate Variable Condenser; 1 Federal 21-Plate Variable Condenser; 1 Federal Anti-capacity Switch; 1 Decma Variable Condenser 11-Plate; Walnut Variable Condenser (43-Plate .001 mfd.); Dubliler Variodion (.001 mfd.); Dubliler By-Pass Condenser (4 mfd.); Premier Variable Condenser with dial (.00078 mfd.); Premier Hegehog A. F. Transformer, 4 to 2 Ratio.

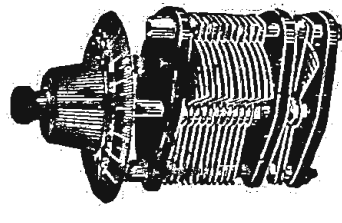
Class H Articles

For sixteen consecutively numbered coupons and three dollars (\$3.00) any one of the following articles will be sent: 1 Federal Audio Frequency Transformer No. 228 W; 1 Decma 23-Plate Variable Condenser; 1 Acme Audio Frequency Transformer; 1 Acme Radio Frequency Transformer (R-2, R-3, or R-4); Walnut Variable Condenser (13-Plate vernier; Walnut Variable Condenser (23-Plate vernier); Ray-O-Vac No. 2301 "B" Battery 4 1/2 volts; Ray-O-Vac Dry Battery, 6 cells 1 1/2 volts; Dubliler Duratran (R. F. transformer); Premier Micrometer Variocoupler with dial; Premier Variable Condenser with dial (.0015 mfd.); Premier Variable Condenser with vernier (.0004 mfd.); Premier Hegehog A. F. Transformer, 10 to 1 Ratio; Premier Hegehog A. F. Transformer, Tube Socket Type, 4 to 1 Ratio; Turney Spider Web Coil Mount, Type B.

Reflex Amplifier

A "reflex amplifier" using three tubes, a crystal detector and associated apparatus, may be so connected as to provide three stages of Radio frequency amplification, detection and two stages of audio frequency amplification. The tubes thus operate both as Radio and audio frequency amplifiers, but it is not advisable to attempt the use of more than two stages of audio frequency amplifications, due to the fact that the highly magnified audio frequency signal prevents the tubes from operating efficiently as Radio frequency amplifiers.

For Perfect Reception You Must Use



AMSCO Vernier Condensers They satisfy the most exacting. Perfect spacing, permanent adjustment—finished in white nickel. 13 plate\$5.50 23 plate 6.00 43 plate 6.50

At All Good Dealers AMSCO PRODUCTS, INC. Broome & Lafayette Sts., New York City

A. C. Used for Amplifier Tubes

Alternating current may be used to heat the filaments of amplifier tubes, but cannot be used for the filament of the detector as the alternating current hum is so loud that it is impossible to receive the Radio signal. A crystal detector is usually employed to rectify the signal in multi-stage amplifiers which have the filaments of the amplifier tubes heated by alternating current. By using a "hard" tube with the grid and plate elements connected together as a rectifier, and employing a proper filter circuit, the alternating current supply may also be used to provide the necessary plate voltage.

A single coil crystal set will not tune as good as a two circuit one.

AT LAST! You Can Buy a Real 1 1/2 - Volt Clear Tube. W. D. 12's only Competitor. Functions at 1 to 1.1 Volts. Genuine Platinum Coated Filament. Fits Standard Socket. Do not confuse this tube with common Sintered Tubes advertised as 1 1/2-Volt. Detector—Amplifier Absolutely Guaranteed \$4.50 Mail Orders Filled Promptly. Cash or Money Order (No Checks) Dealers write for Quantity Discount. TREXO TRADING CO. 200 Broadway (Suite 210), N. Y. City

Freshman Fix-0 A Fixed Resistance Leak Combination—4 in One. Freshman Condenser Leak Mounting Freshman Fixed Leak SAFE-T HANDLE 65c. Furnished in Any Value of Resistance from 1/2 to 10 Megohms. Separate Condenser and Mounting, 40c. Separate Leak with Safe-T Handle, 30c. At your dealers, otherwise send purchase price and you will be supplied postpaid. Chas. Freshman Co. Inc. Radio Condenser Products 106 SEVENTH AVE., NEW YORK

RADIO VIA PARCEL POST AT N. Y. PRICES Standard Parts Only, in Original Packing NO SALVAGED GOODS SOLD Where "Money Back Policy Prevails" PHONES For Parcel Post Inve. Add Dietzen 3,000 Ohm\$3.75 \$0.12 Dictograph Phones 5.75 .14 Royal 2,200 Ohm 3.75 .12 Holtzer Cabot 7.95 .14 COUPLERS All Wave (Genuine Capitol) 6.95 .18 Dayton 4.85 .12 VARIABLE CONDENSERS 3 Plate Vernier95 .08 24 Plate Vernier, Dietzen 3.10 .14 46 Plate Vernier 3.65 .18 TRANSFORMERS (Audio Frequency) Sampson 4.95 .15 All American 3 to 1 4.00 .14 All American 5 to 1 4.10 .14 All American 10 to 1 4.30 .14 Acme 3.45 .14 TRANSFORMERS (Radio Frequency) Acme 3.45 .14 Cotoco 3.45 .12 Owl95 .10 MISCELLANEOUS Switch Lever, Fada Typewr.19 .06 Ammeter Testing B Battery49 .08 Two Slide Tuning Coll. 1.25 .12 Hydrometers49 .08 Electric Soldering Iron 2.50 .15 Double Phonograph Attachment 1.15 .08 SETS Weetinghouse, Jr. 8.95 .40 Aerex Crystal Set 7.95 .45 Victor Single Tube, completely assembled 12.50 .45 Victor Two Stage Amplifier 12.50 .45 RHEOSTATS Klossner Vernier 1.25 .14 Bradleystat 1.49 .10 Union Radio65 .08 SOCKETS Bell V. T. & W. D. 1189 .10 V. T. Bakelite50 .10 LOUD SPEAKERS King Amplitude Horn 4.95 .28 Reflex 9.85 .30 Phonaflex 15.00 .50 TUBES Welch Peanut Tube 2.00 .10 Sterling 1 1/2 V 9.95 .15 Margo 1 1/2 V. (2 Element) 1.00 .15 De Forest D. V. 6 A 5.75 .15 CABINETS (In White) 7x10 1.45 .20 7x12 1.65 .25 7x14 1.85 .30 7x18 2.15 .40 7x21 2.45 .40 7x24 2.95 .40 LIGHTNING ARRESTERS Argus, Outdoor or Indoor95 .12 Brach, Outdoor 1.95 .14 DIALS 2-inch (Bakelite)25 .06 3-inch (Bakelite)35 .08

Modeltts ESTABLISHED 1914 191 Fulton St., Dept. F-19, New York City 9 New York Stores America's Greatest Radio Mail Order House

Radio Digest Illustrated

REG. U. S. PAT. OFF.

Published by the Radio Digest Publishing Company, Inc.
123 West Madison Street
Telephone State 4844-4845
Chicago, Illinois

E. C. RAYNER, Publisher

Clas. F. Smisor, Editor Evans E. Plummer, Managing Editor
Harry J. Marx, Technical Editor

Eastern Representative, Jacob Miller, Times Bldg., Times Square,
New York; Telephone Bryant 4909

Pacific Coast Representatives

E. J. Wood, 251 Kearney St., San Francisco
Telephone Kearney 1472

H. M. Morris, 417 Western Mutual Life Building, Los Angeles
Telephone 12011

58

PUBLISHED WEEKLY

SUBSCRIPTION RATES

Yearly.....\$5.00 Foreign.....\$6.00
Single Copies, 10 Cents

Vol. V Chicago, Saturday, July 7, 1923 No. 13

Summer Teaches Us Lessons

Many Things to Be Learned for General Improvement
THE little setbacks that Radio may receive this season will be a boon to the entire industry. The dealers and manufacturers will have time to learn the needed lesson. The time has come when a dealer cannot afford to carry a conglomerate stock of odds and ends, expecting to unload it at a great profit on the public. The time has passed when a newly born fan will step into a store and buy anything with a piece of wire wrapped around it. The spasmodic demand of the faddists will not prove profitable in the long run. The dealer is beginning to realize that dependable apparatus, bought to meet the varying Radio conditions, is more to be relied upon than unknown apparatus that looks good in the catalogue and is merely an ornament on the shelves.

Radio Intelligence Work

Invaluable Assistance in Army Maneuvers

ALTHOUGH little was known of the work of the Radio intelligence section of the army during or since the war, it was one of the most spectacular. Radio direction finders were placed all along the lines at a distance of about five miles from the actual front and spaced about twelve miles apart. These receiving sets located the enemy stations in operation, recorded their bearings by means of directional coils, not unlike modern Radio compasses, and forwarded the bearings to headquarters, where they were plotted on maps. Other Radio receiving stations at army headquarters intercepted and copied all enemy code messages and telegraphed them back to general headquarters, where code experts worked them out, giving the staff valuable information as to the movements or intentions of the enemy.

Humidity Makes Trouble

Dampness Will Make Set Inoperative

YOU will find that a great many ills with the Radio set are laid at the door of static, but a large portion of them can be found in dampness. The summer season is attended with damp spells which fills the air with humidity. The outside weather conditions are let into the house, for windows are allowed to be left open most of the time. Sets are taken to the seaside and on boating trips where dampness prevails.

Under such conditions the broadcast listener is apt to wonder why that set which has acted so faithfully at home in a warm room has suddenly become languid. Dampness in most cases is the secret of the jinx that is resting on the wonder box.

Water is one of the highest conducting substances of electrical energy, and dampness indicates the presence of water. Sets in which the base and panel mountings are not damp-proof are not going to be efficient in damp weather. Leakage that to the lay mind may mean nothing will appall the Radio engineer who is able to comprehend what this means.

Real Pleasure in Making Sets

Homemade Sets Outnumber Manufactured Ones

A NUMBER of years ago, before Radio had the universal appeal that it has at the present time, it was necessary for the experimenter, or man who was interested in the science, to make practically all of the parts that went into his set, but the present tendency seems to be to go to some store and buy these parts already built. This means that the cost of the sets are higher, and a great deal of the real pleasure is left out of the operation of building your own set. Incidentally, a great deal of this apparatus is not as good as the real homemade parts. However, there are some parts, such as head phones, vacuum tubes and transformers, that are much better manufactured where duplication of the finer details may be procured.

The average fan takes much pride in making parts, and there is a great deal of satisfaction taken when those parts function correctly and bring in messages. Careful construction always brings results, and many times a homemade set will surpass those of special manufacture.

RADIO INDI-GEST

In Quest of the Kanoofis

Part IV—The Arrival at Walla Walla

After thirteen years of sailing upon the ocean blue. (Bloo-ee.) A little island in the sea came popping into view. (Pop-pop.) We landed on the shore at night, because we thought it best. (Fraid cats.) And there were all the contribs to Radio Indi-gest. (Playing hop scotch.) They greeted us with open arms and asked us where and how. (Wherfor.) They did not recognize us, for we are old men now. (We looked like Santa Claus.) The Spaniards that we took from Spain, all spoke good English too. (We taught them how.) They were all Radiophans, you see, and stuck to us like glue. (Major's cement.) It seems Indi-gest bought this place for reasons of his own. (Real estate.) And put a station on it that throughout the world is known. (This is Station B-U-N-K broadcasting.) A laboratory he has, too. Now there's some common sense. (Horse sense.) From here he broadcasts funny things, and does experiments. (Gives big prizes, too.) We told him of our searching for years to get one part. (We looked, too.)



So he said, "WALLA WALLA'S where you should have made your start. (What did we know?) We have a real Kanoofis here. It's buried in the ground." (So, you've been hiding it?) He scraped the earth a little bit, and that was what he found. (May have some lickie buried, too.) Now, we suppose you're right on edge to know what it can be. (You are, too, aren't you?) A Kanoofis is the funniest thing that ever you did see. (Never was in a circus, either.) "It's a SILK THREAD off the corner of a dark red TURKISH TOWEL. (Aw, I knew it all the time.) You hang it on your switch points, so your Radio set don't howl. (Certainly glad that's over with.) —ENDED BY JENNIE JEROME. (Readers desiring Kanoofises may secure same from Mr. Indi-Gest by tendering suitable contributions, or what have you?)

(1) Sure; (2) The Natives Stole 'Em for Beads

Dear Indi: By the looks of the flashlight photo of your new station you have already joined the A. R. R. L. (Sure, I'll bite. Why?) Because, note the moonshine and how still it looks. Am I right? I also note the insulators are conspicuous by their absence. Whyfor? —MIKE ROFARADS.

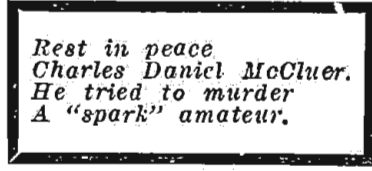
A-B-C Lessons for Indigest Beginners Chapter III—Have You a Little Crystal?

BY GOSH

C IS for crystal,
A chuck of stuff quite neat,
That brings in all the locals
Quite clear and very sweet.

Revenue Officers Say You Can't Work Your Circuit

Gents: Well, the great problem is solved at last. The illicit liquor which is being broadcast by the A. R. R. L. can now be received. The answer is in the Undiluted Still Condenser Circuit. A copy of this circuit is enclosed. The 20 gallon tube is mounted with the water-cooled plate at the lower end. The faucet is mounted at the lower end of the plate so that the ether which gathers in the tube through the process of Volsteadization may be drawn out. The phones should be worn during the reception and one will hear the sweet strains of "How dry I am." —HOOTCH SHOT DICK OF BLAND CANYON, COLO.

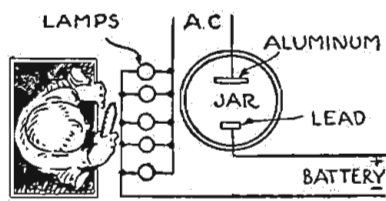


Referred to the P. and Q. Dept.

Deer cir? I have saw your unvaluable paper and wood like to get sum inflammation how to bild a set. Wear dos the varyomeet her go? How meny bees do you use in a bee battery? Do you keep the bees in a honie combe coil? I have not got a aunt enna, I have a aunt Mary & she is only five feat long. Do you roast a peanut toobe? Wil I kneed a potatoe meter? Yours in variable. FEEDBACK FOG.

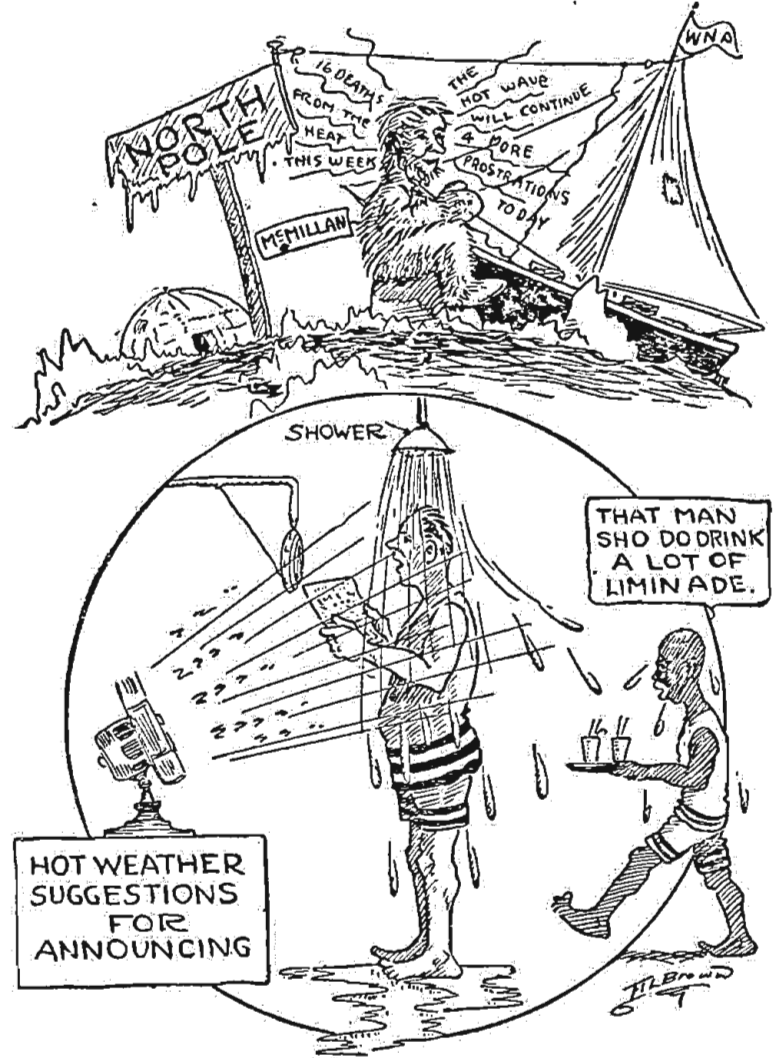
We Passed It on a Blind Man

Dear Indi: I notice your kinks department and since I have a dollar no one will accept I am sending it with the kink. An amateur told me that a wrecktifier is necessary to charge my storage battery from A.C. current. Having a small baby sister who wrecktifies the tubes in 1.45 seconds flat (world's record) I decided to use her to advantage. Following is the circuit:
Put baby in the box and in few moments she will wrecktify the lamps. Then take disconnected battery and carry to battery station. The best feature of this wrecktifier is the exercise you get carrying the battery. Yours cruelly. —I. T. SMEE.



Looking Ahead

You Can Never Tell What's Wrong with a broadcasting station program till you hear from its listeners. If you were one of the lucky Radiophans to hear Indigest's opening night program, don't let us hear from you, unless you have a kick. We always like a good kick in anything. Send along the kicks-as Walla Walla has a complete repertoire of non-trust songs and, oh, boy! What a CHARMING flock of sopranos. Now, these sopranos are very versatile and strive to please. Bambdin Bray is training them that way. If you don't hear what you want, ask for it and Bambdin will train 'em. What is your ideal Indigest Program? Read Indigest two weeks from now and maybe somebody will send some in. Buy Indigest from your most horrible newsdealer, 10c. In fact, continue buying Indi until we tell you to stop.



Condensed

By DIELECTRIC

News of the Marine Band concerts from Station NAA being off for the summer months was not received with joy by the thousands who tune in for them, but later advice is very acceptable. With the new station in the national capital on the air these concerts may still be heard. The music will be picked up in the local parks and sent out as usual. WEAJ will relay some of the concerts and speeches, which will ensure many weaker sets the pleasure of listening in too—though far away.

And now photosculpture! There is only one fault with this new marvel in Radio, and that is that two cameras are required for the job. So many folks get to oscillating when they face only one camera, and with two before them they may distort the image entirely. Borah or LaFollette would enjoy the experience probably; although it requires an hour to transmit the impressions from subject to sculptor they would lose nothing in the interim—and we would gain bronze tablets. Would that constitute base-relief?

"Al" Smith is not regarded as exactly bone dry, nor does he believe in treating a dry subject without some admixture of moisture, and I submit the proof of that was given only recently. This genial governor of New York state addressed the people of his state by using Station WGY to report directly on the financial status of the commouwealth. Usually such reports are very dry. This was not, and while the choice of phrases may have had something to do with that, I believe the main factor was receiving sets in comfortable home surroundings.

The General Electric Company plans to have duplicates of its well known Station WGY in sections of the country serving the largest audiences. One of these, as already indicated, is to be completed by fall at Oakland, Cal., and another is likely to be built at Fort Worth, Texas. Each of these stations has a normal radius of well over a thousand miles and Radiophans will look forward to having so good service as they are accustomed to from WGY, in other parts of the country.

Every Radio journal, and section of daily papers covering the subject, is calling attention to the manner of using Radio sets on vacations. We need to be educated to the idea that the pleasure of listening in is there for us this summer as never before. Static, of course, is still on the job as in seasons past, but the powerful stations can cut through it for a considerable distance, also interference has been reduced nearly to the limit. If you fail to include your set on that trip, you will certainly regret it and spoil your outing to a large extent.

There are many who prefer to listen to well-balanced programs of lasting music rather than the evanescent outpouring of a wailing ukelele. To such the "pop" concerts given from Station WNAC in Boston offer real treats. Not only do you hear an orchestra, comprised of members of the Boston Symphony, but it has been possible to listen to the Harvard glee club, a thoroughly trained body of singers.

Radiophans of the country owe much to station WEAJ for their enterprise in boosting along the speeches of President Harding, the one from St. Louis and another from Kansas City. We have been looking forward to the time when it would be possible for the mass of American citizens to hear (if not see) the head of the nation. I do not doubt the ultimate effect of this presidential broadcasting will be to focus larger attention on Radiophony to our general benefit. The next step—already visioned—is to accompany speech carried by ether waves with a moving picture of the speaker right in the home. This would almost entirely eliminate the sense of distance, which has already been materially reduced through the use of Radio.

First Steps for Beginners in Radio

Chapter VIII—The Regenerative Detector

By Thomas W. Benson, A. M. I. R. E.

BEGINNERS will find the accompanying series by Mr. Benson very helpful in learning the rudiments of the popular science of Radiotelephony. The articles yet to appear are:

- Chapter IX—Radio Frequency Amplification.
- Chapter X—Audio Frequency Amplification.
- Chapter XI—How Super Regeneration Is Accomplished.
- Chapter XII—Reflex Circuit Operation.
- Chapter XIII—About Headsets and Loud Speakers.
- Chapter XIV—Batteries Used in Radiophony.

REGENERATION is possible only by reason of the fact that the energy or current flowing in the plate circuit of a tube is many times greater than the controlling current in the grid circuit. Obviously it should be possible to take a small part of this energy and feed it back into the grid circuit and thus cause a still greater change in the plate current. It

find a second coil connected between the plate and the positive B battery. This coil is placed in inductive relation to the inductance in the aerial circuit, the two coils usually taking the form of a variocoupler, the stator in the aerial circuit, the rotor in the plate circuit. The func-

reduced till the speech clears up and the signals are the loudest.

Direction of Windings

To obtain maximum results with this circuit, two things are essential. The winding on the tickler must be in such a direction that the current induced in the

created, when the clicks come closer together, till finally they are just inaudible. At this point the grid leak is of proper value.

Having laid down the theory of the regenerative circuit, possible variations come rapidly to mind. Thus the two windings may be honeycomb coils, or spider web coils. A variometer with the stator in the aerial circuit and the rotor in the plate circuit will serve the same purpose.

It will be found that the filament brilliancy and plate voltage have a decided effect upon the operation of the circuit and should both be varied till best results are obtained. A vernier rheostat is well worth the extra cost, and a potentiometer shunted across the A battery as shown by the dotted lines will enable one to control the plate voltage to a nicety. It will be noted that a fixed condenser is connected across the phones and B battery. This functions to bypass the Radio frequency currents that flow in the plate circuit to obtain regeneration and will make the set more stable.

The Ultraudion circuit devised by DeForest was possibly the first form of the

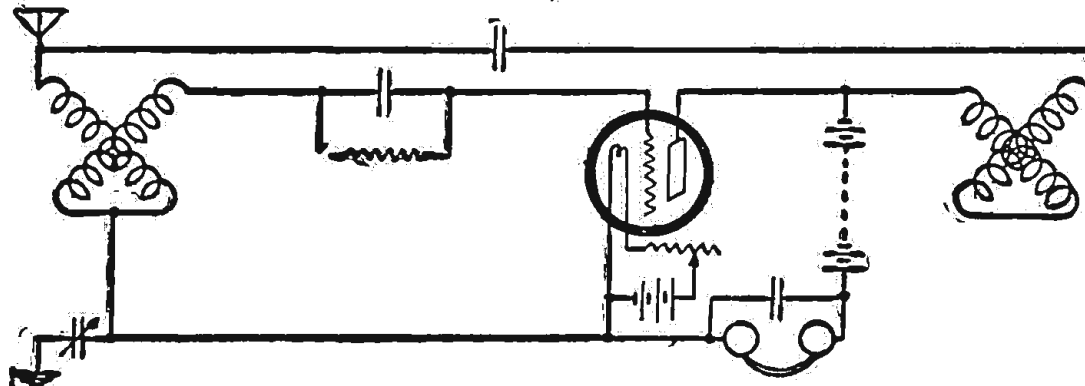


Figure 38—Capacitive Feed Back as Applied in a Modified Reinartz Circuit

tion of the coil in the plate circuit is to transfer energy by means of its inductive properties back into the grid circuit.

The action of the arrangement is as follows: Consider the tube lighted and a signal striking the aerial circuit. The tube functioning as described under tube detectors acts to vary the plate current. The plate current flowing through the "tickler," as it is termed, induces a current in the aerial circuit to cause greater electrostatic charges to reach the grid and hence greater changes in the plate current with an increase of signal strength.

The adjustment of the tickler is rather critical; when the coupling is too close, too much energy reaches the grid and the whole circuit oscillates, acting as a Radio transmitter. In fact, the device will transmit speech for a half mile or so if a telephone transmitter is connected in the ground lead to modulate the waves emitted from the aerial.

Loose Coupling Between Coils.

On the other hand, with too loose a coupling between the coils the maximum effect upon the plate current will not be obtained and the loudness of the signals decreased. The proper point of operation is just before the oscillating point. The

aerial circuit will be in the same direction as the current from the received waves. Should the set not function when first connected, the leads to the tickler

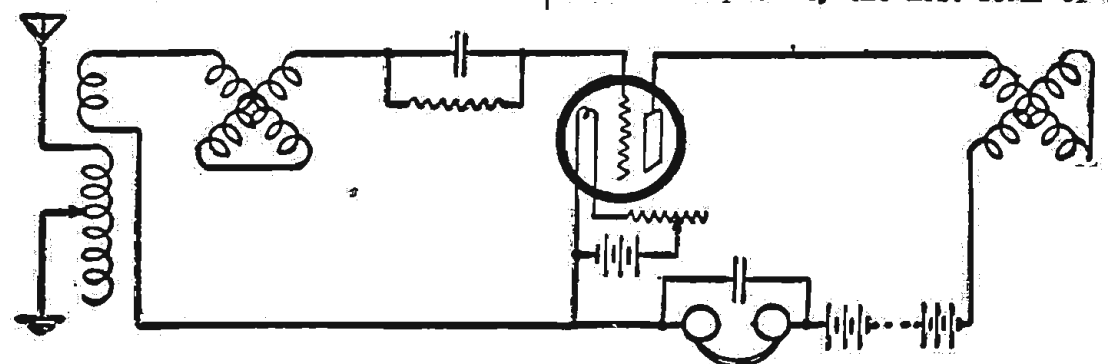


Figure 39—Three Circuit Tuner Using Tuned Plate Feed Back

can be reversed. The other factor is the grid leak value. This should be variable and carefully adjusted.

Too low a value will cause the tube to block, that is, give clicks in the receiver which may have quite a time interval between them. The leak should then be in-

capacity feed back type of regenerative circuit and is shown in Figure 36 in its original form. Its action is based on the presence of the capacity across the phones being in both the grid and plate circuits.

(Continued on page 14)

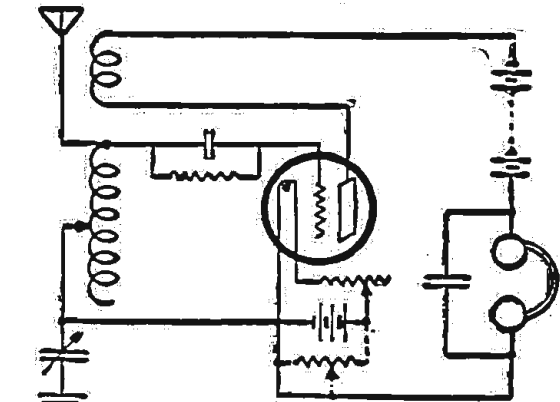


Fig. 35—Conventional Type of Single Tuned Regenerative Circuit Using Tickler Feed Back

should be remembered that it is the extent of the change in the plate current that determines the strength of the signals in the head phones or loud speaker.

Regeneration

It simply remains then to arrange some means of transferring energy from the

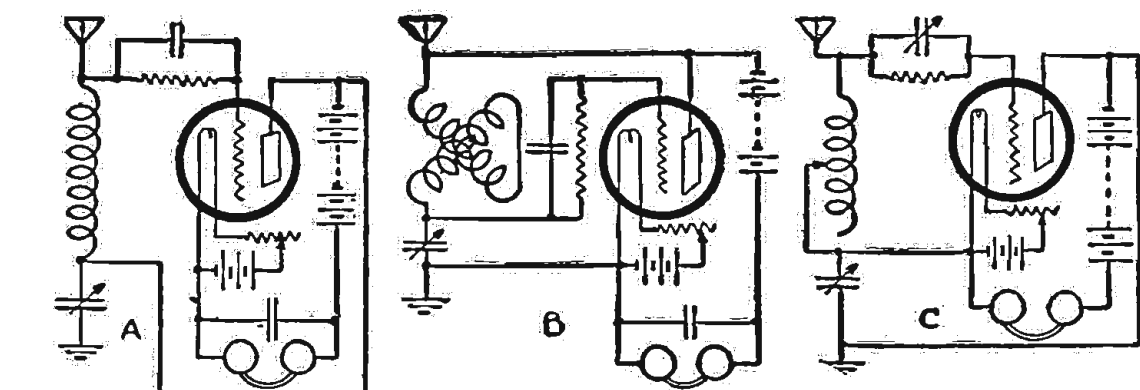


Figure 36—The True Ultra Audion Circuit and Two Modifications that Employ Capacitive Feed Back

plate to the grid circuit to convert the regular tube detector into a regenerative detector. There are a number of methods of accomplishing this, but these can all be divided into three classes, inductive, capacitive or resistive. The first two methods are in more general use and we shall

circuit is then just balanced, a hollow purring sound being heard in the receivers. An incoming signal just unbalances the circuit so to speak and trips it into oscillation, but the oscillations stop immediately upon the removal of the disturbing medium.

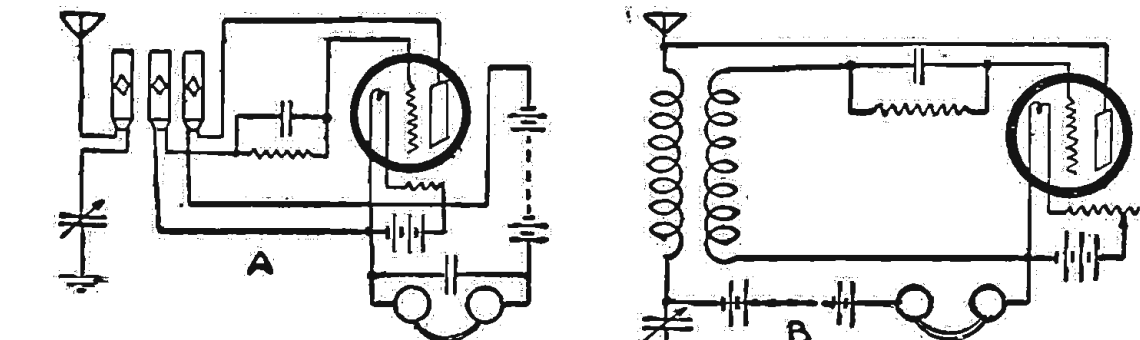


Figure 37—Tickler Feed Back as Applied to Two Circuit Tuners and a Method of Obtaining Regeneration. (Not Advised.)

first consider their application to single circuit tuners. Considering the simpler form of single circuit tuner as shown in Figure 35, we

However, when receiving Radiophone broadcasts, it will usually be found that the sound is distorted when the regeneration is pushed this far, so the coupling is

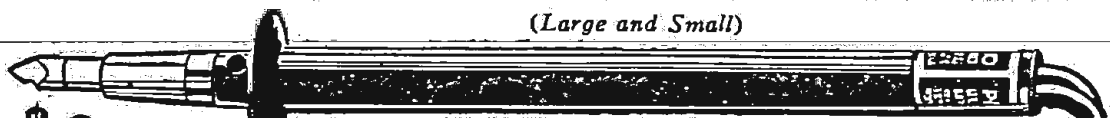
Delicate Soldering

Both the manufacturers' and amateurs' problems on all fine work are readily solved by the instrument constructed for this particular purpose.

THE POST SOLDERING IRON

Platinum Heating Unit—Interchangeable Tips—Universal Current

(Large and Small)



\$6

ONE-HALF ACTUAL SIZE

Awarded Certificate of Excellency, N. Y. Evening Mail Radio Institute
From your Dealer, or write

POST ELECTRIC COMPANY (Dept. 509), 30 E. 42nd St., New York

THE LARGEST RADIO STORE IN AMERICA

BUILD YOUR OWN SET

THE LARGEST RADIO STORE IN AMERICA

ACCORDING TO OUR INSTRUCTIONS
RESULTS GUARANTEED—PANELS ON ALL SETS DRILLED—
READY TO MOUNT

<p>Complete Parts for Knocked-Down Receiving Set \$17.95</p> <p>CONSISTING OF</p> <p>2 Variometers \$10.00 \$3.90</p> <p>1 Variocoupler 5.00 1.75</p> <p>3 Bakelite Dials 3.00 .75</p> <p>Remler Bakelite Socket. 1.00 .45</p> <p>Howard Vernier Rheostat 1.10 .80</p> <p>Cunningham C-300 Detector Tube 5.00 4.45</p> <p>Mahogany Cabinet 4.50 2.75</p> <p>Genuine Formica Panel 2.25 1.75</p> <p>8 Binding Posts80 .40</p> <p>Switch Lever50 .25</p> <p>12 Switch Points40 .20</p> <p>Freshman Grid Leak and Condenser Combined.. 1.00 .75</p> <p>Complete Drawing for Assembly and Wiring 1.00 .50</p> <p>Regular Price \$30.85 Our Price \$17.95</p>	<p>Complete Parts for Reinartz Sets \$11.45</p> <p>CONSISTING OF</p> <p>7x18 Formica Panel... \$1.89 \$1.70</p> <p>Remler Bakelite Socket. 1.00 .45</p> <p>Howard Vernier Rheostat 1.50 1.35</p> <p>23 Plate Variable Condenser 3.30 1.45</p> <p>11 Plate Cuni Variable. 3.10 1.35</p> <p>2 Switch Levers 1.50 .75</p> <p>2 Dozen Switch Points. .80 .40</p> <p>1 Schoonhoven Reinartz Coil 3.00 1.95</p> <p>Freshman Variable Grid Leak and Condenser Combined 1.00 .75</p> <p>8 Binding Posts80 .40</p> <p>25 Feet Tinned Wire. .30 .20</p> <p>Baseboard for Mounting .50 .25</p> <p>Blueprint with Complete Instructions for Assembly and Wiring 1.00 .50</p> <p>Regular Price \$21.69 Our Price \$11.45</p>	<p>Complete Parts for 2 Step Amplifier \$12.45</p> <p>Can be used to amplify Reinartz, Flewelling, Short Wave Receiver, Crystal, Ultra Audion or any Receiving Set so that Loud Speaker or Phonograph can be used in place of Head Set.</p> <p>CONSISTING OF</p> <p>7x18 Formica Panel or Other Suitable Size. \$1.05 \$0.85</p> <p>High Ratio All-American or Thordarson Transformer 4.75 3.95</p> <p>Low Ratio Thordarson or All-American Transformer 4.50 2.95</p> <p>2 Howard Rheostats... 2.20 2.00</p> <p>2 Remler Bakelite Sockets 2.00 .80</p> <p>3 Double Patent Jacks. 3.00 1.50</p> <p>13 Binding Posts 1.30 .65</p> <p>Baseboard for Mounting .30 .15</p> <p>Regular Price \$20.10 Wiring Diagram, with Complete Instruction for Drilling and Assembling Panel Our Price \$12.45</p>
<p>Complete Parts for Flewelling Circuit \$12.45</p> <p>CONSISTING OF</p> <p>6x14 Formica Panel... \$1.26 \$1.10</p> <p>23 Plate Variable Condenser 3.30 1.45</p> <p>Three .006 Mica Condensers 3.00 2.25</p> <p>CRL Variable Grid Leak 1.85 1.35</p> <p>Remler Grid Leak40 .25</p> <p>2 Coil Adjustable Honeycomb Coil Mounting with Knobs 4.00 2.65</p> <p>50 Turn Honeycomb Coil .75 .40</p> <p>75 Turn Honeycomb Coil .80 .40</p> <p>2 Remler Coil Mounts with Straps 1.20 .80</p> <p>1 Remler Bakelite Socket 1.00 .45</p> <p>Howard Vernier Rheostat 1.50 1.35</p> <p>1 Bakelite 3" Dial. 1.00 .25</p> <p>8 Binding Posts80 .40</p> <p>1 Baseboard for Mounting30 .20</p> <p>1 Blueprint with Complete Instructions for Assembly and Wiring. 1.00 .50</p> <p>Regular Price \$22.16 Our Price \$12.45</p>	<p>Complete Parts for Ultra Audion Circuit, \$11.90 (Known as the Wonder Circuit)</p> <p>CONSISTING OF</p> <p>9x10 1/2 Formica Panel. \$1.42 \$1.20</p> <p>23 Plate Condenser. 3.30 1.45</p> <p>Bakelite Socket (Remler) 1.00 .45</p> <p>Special Ultra Audion Coil, plain or bank wound with tape 3.00 1.95</p> <p>Howard Vernier Rheostat 1.50 1.35</p> <p>CRL Grid Leak 1.50 .95</p> <p>.0005 Micon Condenser. .35 .25</p> <p>18 Switch Levers70 .50</p> <p>2 Switch Points50 .30</p> <p>2 Switch Stops10 .05</p> <p>8 Binding Posts80 .40</p> <p>Genuine Solid Mahogany Cabinet, size 9x10 1/2, with hinged top. 5.00 2.95</p> <p>25 ft. Hookup Wire... .20 .10</p> <p>Regular Price \$19.37 Each order includes complete instructions for drilling, assembling and wiring. These construction plans are not drawn in schematic form but are drawn so that any one without any technical knowledge can follow with ease. \$11.90 Our Price..... \$11.90</p>	<p>Complete Parts for Single Tube Reflex Circuit \$32.65</p> <p>CONSISTING OF</p> <p>43 Plate Vernier Variable Condenser \$7.00 \$3.95</p> <p>Radion Loop Aerial... 8.50 5.95</p> <p>Cunningham C301-A Tube 9.00 5.95</p> <p>Greslow Glass Enclosed Detector 2.00 1.65</p> <p>Era Radio Frequency Transformer 4.50 3.45</p> <p>All-American 5 to 1 Radio Audio Frequency Transformer... 4.75 3.95</p> <p>2-.001 Micon Condensers .70 .50</p> <p>1-.002 Micon Condenser .45 .35</p> <p>Howard Potentiometer... 1.50 1.35</p> <p>Howard 25 Ohm Rheostat 1.10 1.00</p> <p>8 Binding Posts80 .40</p> <p>9x10 1/2 Formica Panel. 1.42 1.20</p> <p>9x10 1/2 Genuine Solid Mahogany Cabinet with Hinged Top... 5.00 2.95</p> <p>Complete instructions for drilling, assembling and wiring furnished so that any one with no technical knowledge can easily follow. Regular price, \$35.22. Our Price..... \$32.65</p>

We guarantee all merchandise purchased of us. Mail orders receive immediate attention.

BUY HERE FOR LESS

CHICAGO SALVAGE STOCK STORE

509 South State Street

Dept. R. D.

CHICAGO, ILLINOIS

Flewelling Super with Loop Aerial

Need Make Few Changes to Convert Flivver Set

I have tried out the Flewelling hook-up and found it satisfactory and tried to adapt it to a loop antenna and the results have been more than satisfactory. For

WORKSHOP KINKS? EARN A DOLLAR—

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

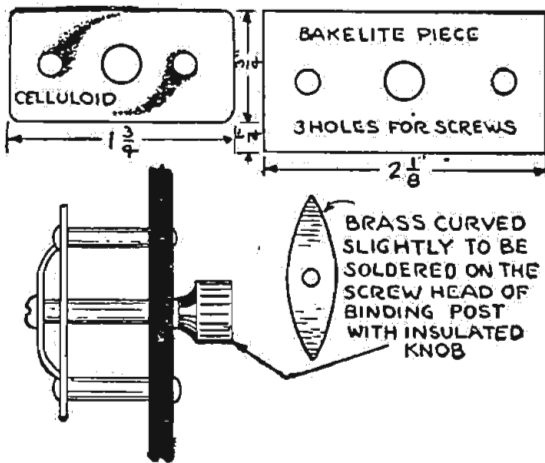
RADIO KINKS DEPARTMENT,
Radio Digest
123 West Madison St., Chicago, Ill.

anyone desiring to take along their portable Flewelling for that camping trip or vacation this summer, they will be wise to use a loop, as the results are practically the same as when I used a regular antenna and also has the usual additional advantages of the loop antenna. By following the hook-up, the method of arrangement is readily seen and the additional cost is quite negligible.

With this super hook-up I have logged 46 stations in one month, none less than 600 miles and the most distant was WSB at Atlanta, Georgia. The airline distance being approximately 1,437 miles from Sydney, N. S. I claim my super hook-up to be original with me, although it does incorporate an idea from Flewelling and uses tuned plate regeneration. I also claim that it is the simplest form of a super set with a loop or regular antenna. I used the Canadian dry cell tube (Northern Electric 215A) with 90 volts on the plate.—Allison D. Trumbull, Sydney, N. S.

Variable Grid Leak

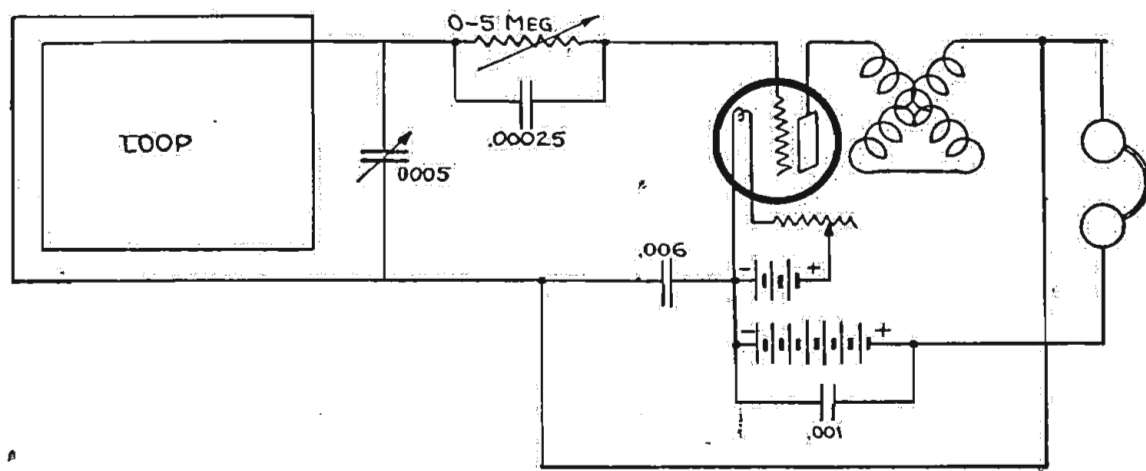
A variable grid leak can be made from the parts shown in the illustration. Three holes large enough for binding posts are made in a piece of celluloid 1 3/4 by 3/4 inches. Other parts required are two



brass bolts with nuts, one binding post with insulated knob, one piece of brass or copper, like the one shown in the sketch, long enough to reach from the center hole and to follow in the ink line on the celluloid.

The piece of brass or copper is soldered to the head of the screw and the insulated

CIRCUIT GOOD FOR CAMP OUTFIT



binding post and the metal index pointer is screwed on the end.

The assembled parts can be either mounted on the panel or on a piece of bakelite a little larger in size than the celluloid. If a condenser is desired the screw heads can be raised above the celluloid with brass pieces or nuts and the condenser mounted above. The line or mark should be made with India ink, and the two points when straight across should almost touch the binding posts at the ends.—Ira N. Faurot, Smith Center, Kansas.

R. R. Spike Good for Portable

Scorn not the lowly railroad spike. It has the makings of a crackerjack antenna or ground and may be a valuable adjunct to the summer Radio kit of any "bug" who would rather swing a few healthy heaves of the hammer than climb a tree to string an aerial.

Take a railroad spike and file it off clean. Then drive it deep into the trunk of a good-sized tree. Use a common ground clamp for making a connection, and you'll find you have a ground of unusual quality. Drive a spike like the first one in another tree and hook it up to your antenna binding post. The tree will do the rest. What could be sweeter?

Old and New B Batteries

It is not advisable to connect old and new plate batteries of the dry cell types in the same circuit. The reason for this is that the internal resistance of the battery increases with the age and a large amount of the energy of the new dry battery is consumed in forcing the current through the high resistance of the old battery. A block of B battery having a potential of 22.5 volts when first put in service may be used until the potential has fallen to 15 volts. Then it should be discarded and replaced by a new battery.

REFLEX

Erla Reflex Transformers
DEALERS: SEND FOR LITERATURE

NOTE: We are the Largest Exclusive Radio Jobbers in the Middle West.

HUDSON-ROSS
123 W. Madison St. Chicago

Finding Battery Noises

Interfering noises in a Radio receiver employing a vacuum tube may be due to current irregularities in the filament battery or in the plate battery. To locate the source of the noises, these batteries may be tested in turn by touching the cord tips of the telephone receivers across the terminals of the batteries. If a click and no further noises are heard when the filament battery is tested in this manner the trouble is elsewhere, but if a hissing sound is heard in the receivers the battery needs charging. If a crackling or snapping sound is heard when the plate battery is tested it should be discarded and a new battery placed in service.

Regenerative Interference

A regenerative receiver, when operated beyond the oscillating point, causes considerable interference with nearby receiving stations. This is due to the fact that oscillations of small power are produced by the set and radiated from the antenna. These oscillations when combined with oscillations transmitted from a Radio-telephone station, produce a beat of audible frequency which seriously interferes with the reception of broadcast music or speech. This interference, due to re-radiation, may be prevented by combining Radio frequency amplification with the regenerative set, thus effectually preventing the radiation of oscillations from the antenna system.

We Will Mail You One

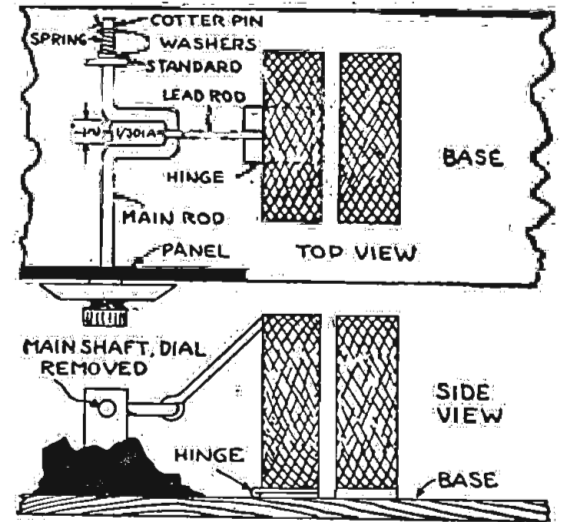


COMPARE IT WITH WHAT YOU ARE NOW USING
IF OURS IS BETTER MAIL US 30 CENTS
IF NOT Return it at Our Expense

ZOBEL-STEIN LABORATORIES
322 9TH ST. BROOKLYN, N.Y. SOUTH 2650

Back of Panel Mounting for Two Honeycombs

The accompanying illustration shows a method of mounting two honeycomb coils back of a panel. The main rod or shaft may be of No. 6 wire or 1/8-inch brass rod, 8 to 10 inches long. The lead may be a piece of No. 8 or 10 wire of suitable



length. A washer must be placed between the dial and panel to keep the dial from rubbing. The spring at the end of the rod is to keep a strain on the rod and coil to prevent its moving of its own accord. The loop in the main rod equals one-third of the diameter of the movable coil (outside diameter). —E. A. Boepple, Rocky River, Ohio.

HOOK-UP BLUE PRINTS WITH ALL PARTS' VALUES GIVEN FOR—

- 1—Hazeltine Neutrodyne
 - 2—Gibbons Ultra Audion
 - 3—Cockaday Four-Circuit
 - 4—Single Tube Reflex
 - 5—Three Tube Reflex
 - 6—Flewelling Flivver
 - 7—Armstrong Super Regenerative
 - 8—Armstrong Super Heterodyne
 - 9—New Ultra Reinartz
 - 10—Kaufman Circuit
- These helpful prints designed by a Member of the Institute of Radio Engineers. All ten mailed prepaid for five dollars (\$5) or single prints at 75c apiece. Send money order or check (no stamps).

HOME WORKSHOP CO., P.O. Box 1062, CHICAGO

How to Make a Flewelling Receiver

BLUE PRINTS

for the construction of a Flewelling Receiving Unit and two step amplifier.

ALL DETAILS FOR ASSEMBLY

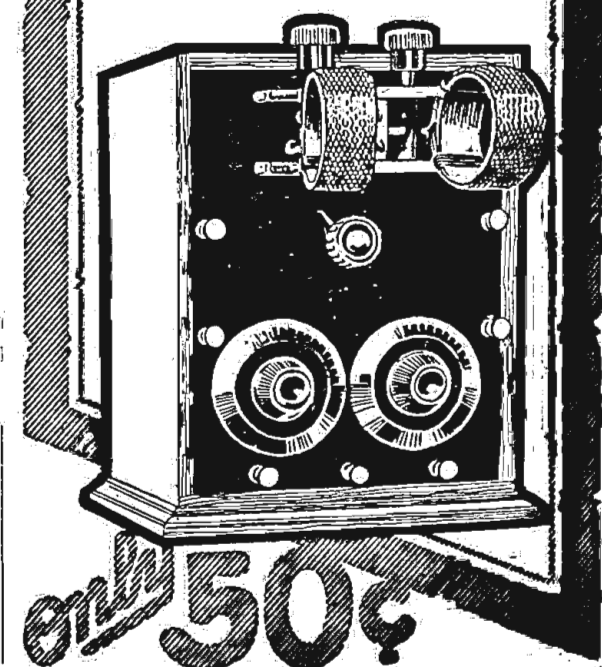
Description of apparatus and accessories and details of tuning.

CABINET DIMENSIONS PANEL LAYOUTS LIST OF PARTS

Send only money orders—no checks or stamps. Coins at your own risk.

Book Department

Radio Digest
123 W. Madison St., Chicago, Ill.



Premier Radio Products

Are all their name implies

Why not begin standardizing now?

- Variocouplers
- Transformers
- Rheostats
- Potentiometers
- Head Sets
- Resistances
- "Microstats"
- Dials and Knobs
- Condensers
- Jacks
- Plugs

Correspondence solicited from responsible distributors

Write today for Radio "Parts" Bulletin.

Premier Electric Company

Established 1905
3810 RAVENSWOOD AVENUE
CHICAGO, ILL.

WILLARD RADIO COMPANY

291 Broadway

New York City

FLEWELLING CIRCUIT

Every part complete, including drilled panel and book of diagrams and instructions \$11.95

REINARTZ CIRCUIT

Every part complete, including drilled panel and book of diagrams and instructions \$10.95

Two-stage Audio-Frequency Amplifier. Every part complete for above circuits at \$11.00

CONDENSERS

3 Plate Variable; value, 1.75.....	\$1.05
13 Plate Variable; value, 2.50.....	1.20
23 Plate Variable; value, 3.50.....	1.35
43 Plate Variable; value, 4.50.....	1.95
13 Plate Vernier; value, 5.50.....	3.75
23 Plate Vernier; value, 6.00.....	4.00
43 Plate Vernier; value, 6.50.....	4.25

Honeycomb Coils, 50 turns mounted.....	.95
Honeycomb Coils, 75 turns mounted.....	1.00
Double Coil Mountings.....	2.45
Triple Coil Mountings.....	3.35
Reinartz Coils, increased wave length and mounting.....	1.45
Jacks, Single Circuit; value, 65c, special at.....	.30
Double Circuit; value, 90c; special at.....	.45
Multiple Point Inductance Switch with Knob and Dial (15 Switch Points).....	1.75
Lightning Arresters, approved.....	.90
Three-inch Dials, unbreakable, heat resisting composition, high finish; special.....	.30

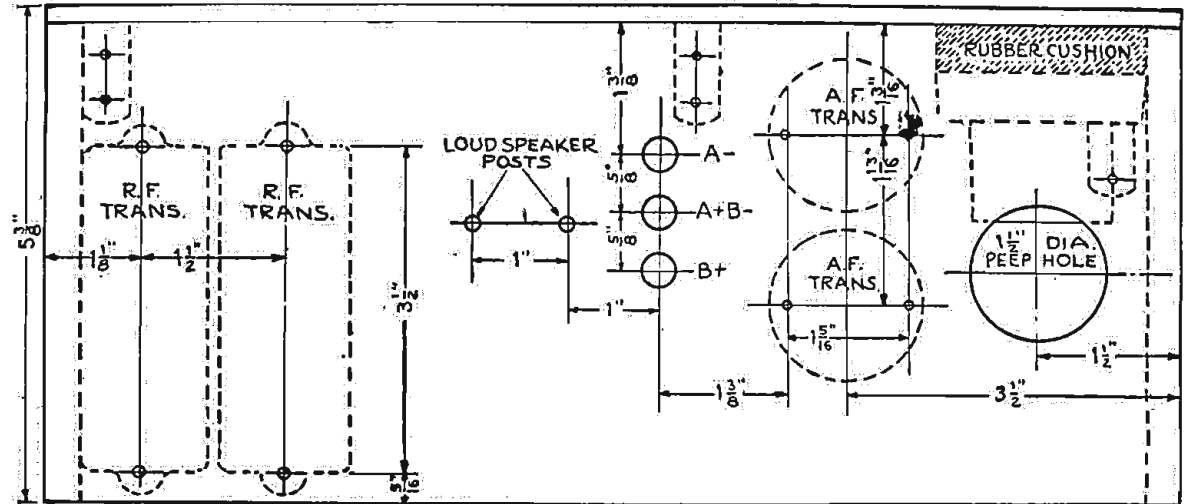
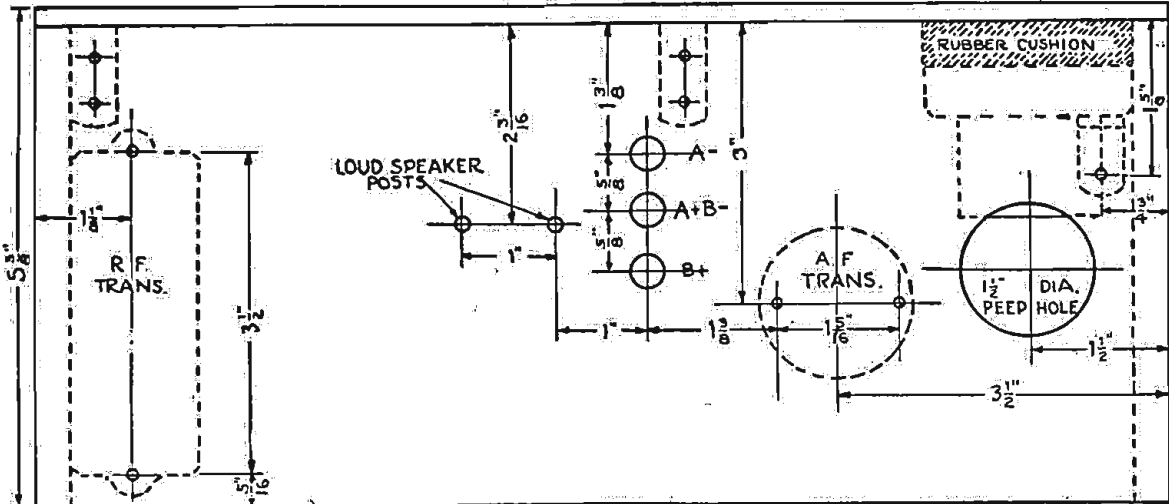
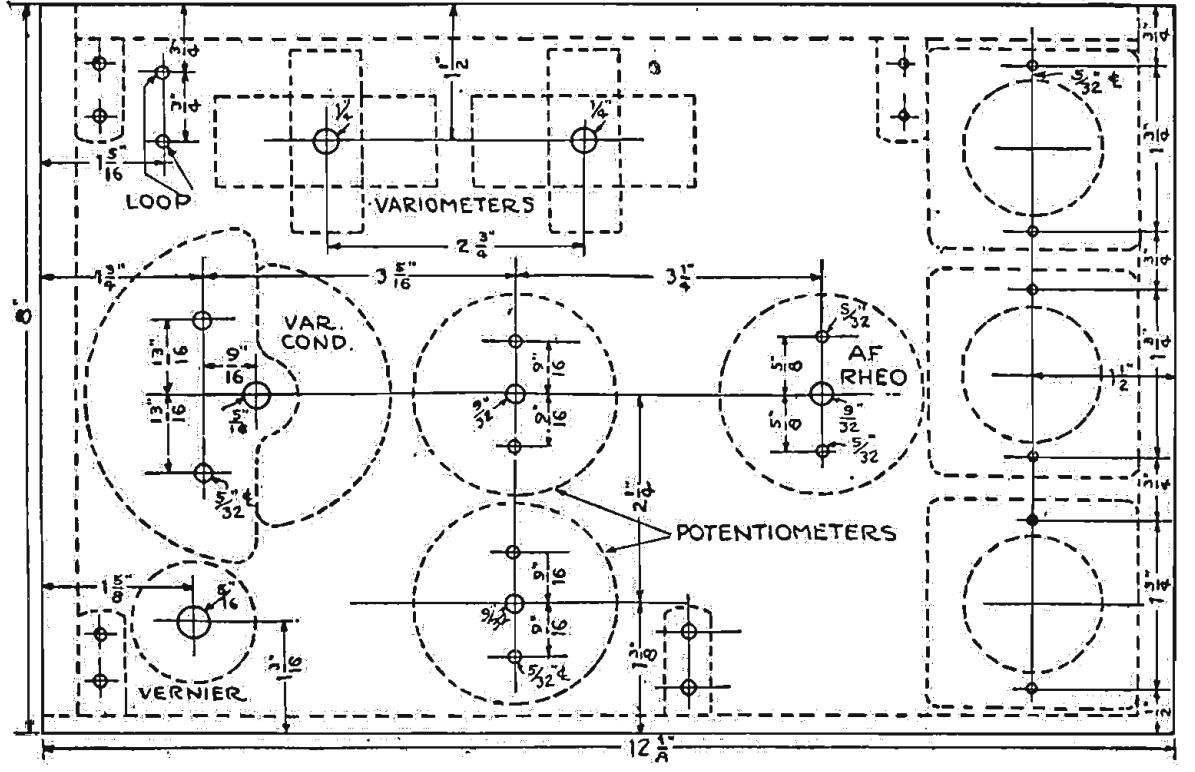
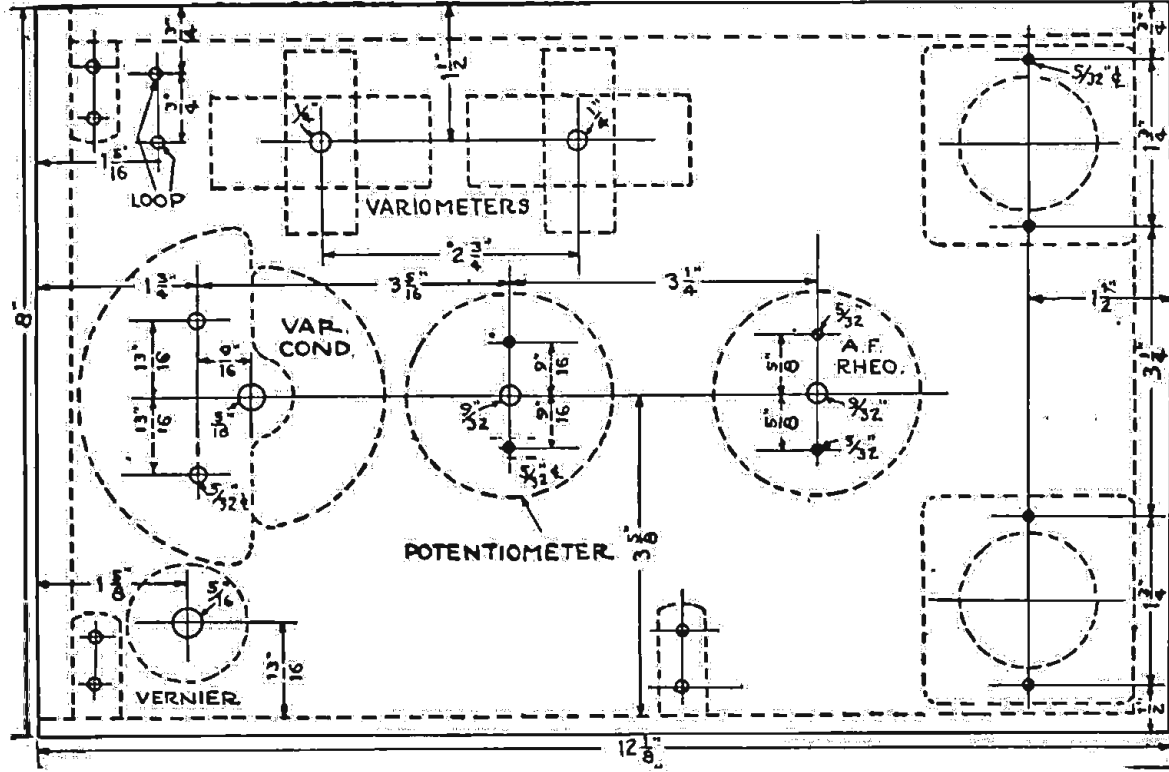
Two-inch Dials, same design, for rheostats and potentiometer; special at.....	\$0.25
Audio Frequency Transformer. Designed for use with W. D. 11 tubes; list, \$4.50; price.....	2.75
Variocoupler—Litz Wire Wound Secondary; value, \$4.50; special.....	2.25
Ball Bearing Inductance Switch; value, 75c; special.....	.30
V. T. Sockets, nicked, brass, sleeve, composition base; value, \$1.00; special at.....	.40
Aluminum Loud Speaking Horn, nickel plated, highly polished; \$8.00 list.....	3.75
Filament Rheostat, 6 ohm.....	.65
Filament Rheostat, 20 ohm.....	.80
Filament Rheostat, 50 ohm.....	.90
With 2" Dial, 15c extra.	

Every article advertised above is guaranteed by the manufacturer and by us. Mail orders filled immediately. Transportation PREPAID on all orders of \$5.00 or over, east of the Mississippi River. All others include postage.

How to Make a Camper's Portable Reflex Set

Part III—Panel Layouts

By H. J. Marx



Layout for Reflex Number One

Layout for Reflex Number Two

REGARDLESS of which of the three circuits the constructor contemplates using, the sizes of the two pieces of panel stock for the top and side remain the same. The variations are simply a question of changes in the number and location of the drilled holes for mounting the apparatus.

Compactness is a valuable asset in reflex circuits, but the arrangement of the apparatus, to avoid interference, is very important. The position of the audio frequency transformers with respect to the Radio frequency transformers must be given a little consideration. Watch to see that any magnetic field that may emanate from the audio frequency transformer will not be in a position to affect the windings of the Radio frequency transformer. The variometer also should be kept away from any position where it would be affected by the magnetic field of the transformers.

Resilient Socket Mounting

Because dry cell tubes are to be used, and on account of their microphonic nature, some form of resilient mounting for the tube sockets is advisable. The black sponge rubbers used by draftsmen make very good cushions. They should be cut to match the base of the tube socket. In order to get a real cushion effect, it is not sufficient to merely insert the rubber under the sockets and then to pull up tight on the screws holding it. The socket should be attached to the rubber cushion with one set of screws and the rubber to the panel with another set of screws. Any shocks or jars cannot be transmitted through the screws, but are absorbed by the rubber cushions. A flexible lead should be used between the terminals on the sockets and the bus bar wiring. If the heavy bus bar wiring is connected directly to the socket binding posts, it again helps to add rigidity and permits the transmission of shocks and bumps.

Corner Angles

The small brass corner angles that can be purchased in the five and ten-cent stores will come in handy for panel assembly and also for mounting any sub-panels, as was used in the four-tube hook-ups for supporting the three audio frequency transformers. In using these an-

gles and brass screws, a little care and attention is necessary in order to avoid additional connections and short circuits where they come in contact with other apparatus, such as condensers and transformers.

Another convenience is the use of the small brass drilled strips bought in the same manner. They often come in very handy for set assembly. One was used for mounting the crystal detector direct to the grid terminal of the secondary of the Radio frequency transformer.

Reflex Number Three

The panel layouts not only give the locations for the mounting of apparatus, but also show in dotted lines the position of the sub-panel and the three small audio frequency transformers.

A small variable condenser with a cross section about the size of a quarter was used as a vernier and connected in parallel with the large variable condenser.

The cushion mounting of the sockets is illustrated in the view of the side panel.

The mounting of the sub-panel is left to the ingenuity of the constructor since it is simply a matter of using brass angles. Slight variations in location are immaterial.

Two 1 1/2-inch peep holes are drilled in the side panel for observing the filament lighting of the tubes. These diameters can be increased if desired. The two Radio frequency transformers are mounted on the inside of the panel.

For battery connections the small telephone cord tip jacks were used. Regular binding posts are mounted for the loud

speaker terminals. Care should be taken in mounting the (Continued on page 14)



Get a Federal Standard HEAD SET

For every member of the family

Add to the pleasure you get out of Radio by permitting all the members of your family to enjoy it at once.

Federal Standard Head Sets are fully Guaranteed. Permanent magnets and a uniform air-gap give just the correct diaphragm action, perfect clarity of tone, and durable efficiency.

Scientific winding and the expert hand-workmanship of master craftsmen give exceptional range and power.

Get these guaranteed head sets from your dealer today and refuse to accept a substitute

Federal Telephone and Telegraph Co.

Factory: BUFFALO, N. Y.

Western District Office: 417 South Dearborn St., Chicago, Ill.

HUNDREDS OF RECEIVERS

built from my plans are giving good service this summer. I sell plans, parts and complete sets. See my ad in last week's and next week's issues of Radio Digest.

S. A. TWITCHELL

1925 Western Avenue, Minneapolis, Minn.



(Patent Pending)

THE PERFECT SYNTHETIC CRYSTAL DETECTOR, SENSITIVE OVER ENTIRE SURFACE. No Hunting for "Spots." Loud and Clear. Endorsed by thousands of satisfied users. Sensitiveness Guaranteed. Price, Mounted..... 50c

14 K. GOLD SUPERSENSITIVE RUSONITE CATWHISKER. Permanent. Will Not Oxidize. Price..... 25c

RUSONITE REFLEX CRYSTAL. Manufactured Expressly for Reflex Circuits. Will Stand Up Under Heavy Plate Voltage. Guaranteed. Price, Mounted.. \$1.00

Order from your dealer or direct from RUSONITE PRODUCTS 15 Park Row New York, N. Y.

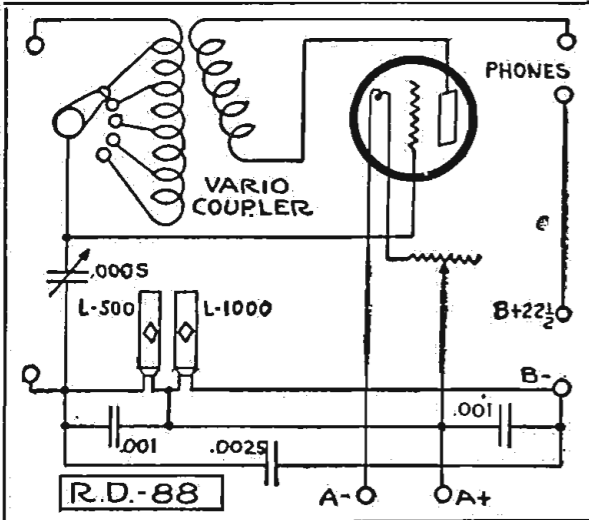
Northern Electric Peanut Tubes, Type 215A

DEALERS — ATTRACTIVE DISCOUNTS

NOTE: We are the Largest Exclusive Radio Jobbers in the Middle West

HUDSON-ROSS 123 W. Madison St. Chicago

SINGLE TUBE SUPER GOOD FOR PORTABLE



THE problem of a good circuit for a portable set using a loop aerial can be very satisfactorily solved through the simplified type of a single tube super regenerator. A typical circuit of this type is presented as RD-88.

The loop should be about 2 feet square with about 12 turns spaced 1/2 inch apart. The wire can be about No. 20 gauge single or double silk covered.

Any of the standard type of variocouplers can be used. The variable condenser gives best service if it has the vernier adjustment feature. The two honeycomb coils are connected in series with a coupling adjustment. A standard two-coil mounting should be used. The fixed condensers should be of the mica type, as the paper condensers are too unreliable in capacity values.

This circuit will give satisfactory service with practically any type of tube. With hard tubes the plate voltage can be increased.

FIRST STEPS IN RADIO

(Continued from page 11)

Thus when a difference of potential across this condenser was varied by variations in the plate voltage, the changing values were impressed upon the grid circuit, giving a feed-back effect and regeneration. This circuit is used in a somewhat different form at present, shown at B in Figure 36.

The variable condenser in the aerial circuit will be found to have a positive potential applied to one set of plates and the other plates being connected to the negative of the B battery through the phones. Thus when the plate current is varied by the original signal wave current, the potential across this condenser will vary and current impulses will be impressed upon the grid circuit to assist those from the wave, thus giving regeneration.

The action is assisted by the inductive effect of the variometer in the aerial lead, the self induced current in it increasing the variation in the potential differences across the variable condenser.

With this circuit the grid leak is very critical, for the positive of the B battery reaches one side of the grid condenser and if too much escapes across through the leak, the grid will be unable to assume an appreciable negative charge from the incoming wave and the set will not be sensitive.

Modification of the Circuit

A modification of this circuit that is somewhat superior to that just described is shown at C in Figure 36. The action is identical but the regeneration is easier to control and the signals are somewhat louder by reason of the tuning inductance being connected to the grid and plate.

The application of regeneration to double circuit tuners is identical in principle, the only difference being that the energy is transferred to the secondary tuning circuit instead of to the aerial circuit, although the latter method is occasionally used, the aerial circuit in turn transferring it to the secondary. The simplest form of inductive feed-back in the two circuit tuners is the three-coil honeycomb or spider web circuit. In this arrangement, three coils are arranged close together, the center one or secondary being fixed in position, the other two being so mounted that they may be swung to the side. The coil on the left is usually made the primary or aerial inductance, while that on the right the tickler.

In operation, the left hand coil is used to vary the coupling between the aerial and secondary circuit for best selectivity. Then by moving the coil on the right the proper amount of current can be transferred from the plate circuit to the secondary circuit to get good regeneration without distortion.

Sometimes a variable condenser is shunted across the tickler coil to help control the regeneration, which is highly critical. A better method is to connect the variable across the phones, in which position it acts as a throttle to control the amount of Radio frequency currents flowing in the plate circuits and thus assist in controlling the regeneration.

As a rule, a variable condenser across the phones instead of the fixed condenser used there in most regenerative circuits, will permit better control of the operation and may overcome the squealing and howling that cannot be completely cleared up in many sets.

There are numerous methods of inductively coupling the plate circuit to the secondary, but as a general rule no circuit should be used where a change in tuning will vary the feed-back effect.

For instance, at B in Figure 37 is shown a circuit used by many where one inductance is made to act as the tickler and aerial tuner. It will be very apparent that any attempt to vary the coupling to obtain selectivity will alter the feed-back, or in attempting to control the feed-back the selectivity of the set must be sacrificed.

Various other arrangements of inductively coupled methods are described by the technical press, but a study of the above will show the principle used and will assist in the selection of a suitable set.

Feed-Back in the Reinartz Set

The well known Reinartz tuner is a form of capacity feed-back with a special untuned or aperiodic aerial circuit. In Figure 38 is shown a modification of the Reinartz tuner that is somewhat easier to build and will be found very simple in operation. As shown, a tap is taken off one variometer between the stator halves and grounded through a variable condenser. Another variometer is connected to the plate and the other terminal to a .0005 mfd. condenser, which is connected to the aerial lead.

This set functions as a closely coupled two circuit tuner. Half of one variometer stator and the aerial circuit condenser form the primary while the balance of the variometer forms the secondary circuit. Regeneration is obtained in the following manner: The variometer being connected to the plate, the small fixed condenser and the aerial tuning inductance form a tuned circuit between the positive and negative terminals of the B battery. Should a change of potential on the grid cause a variation of the plate current, the voltage applied to the tuned circuit will vary and the currents will flow therein at Radio frequencies.

When this circuit is tuned to the same wave length as the secondary circuit, the currents therein build up rapidly and flowing through the aerial inductance part will be transferred to the grid circuit, and being in phase with the currents therein, will assist them and increase the changes in grid potentials, giving greater signal strength. This circuit is recommended for trial by those not familiar with it, for it has given excellent results wherever used. The action in the regular Reinartz circuit is similar, except that the inductances are varied by taps and the condenser in the plate aerial circuit is made variable.

The Three Circuit Tuner

We come now to the three circuit tuner which is exclusively regenerative and the earliest type of feed-back circuit discovered by Armstrong. The circuit is shown in Figure 38 and is usually known as the variocoupler-two variometer circuit. The action here is rather difficult to explain.

When the set is operating the plate current is varied by the changing potentials on the grid. Each change of the plate current is opposed by the inductive action of the plate variometer. Thus when the plate current is decreased by a negative charge on the grid, the plate variometer tends to keep the current flowing through the tube and builds up the plate voltage.

The increase of positive potential on the plate induces a greater negative charge on the grid by electrostatic attraction, which in turn reduces the plate current still lower, giving a greater change in plate current than would result from the original negative charge on the grid. The plate circuit is tuned to the incoming wave and thus the inductive action of the plate variometer is properly timed to act in synchronism with the Radio frequency currents in the grid circuit.

The proper operation of this circuit demands the adjustment of three different circuits to obtain maximum signal strength and therefore is more difficult to adjust. As a rule, it is unsatisfactory to the beginner for its great selectivity and difficulty in tuning a station, but once the

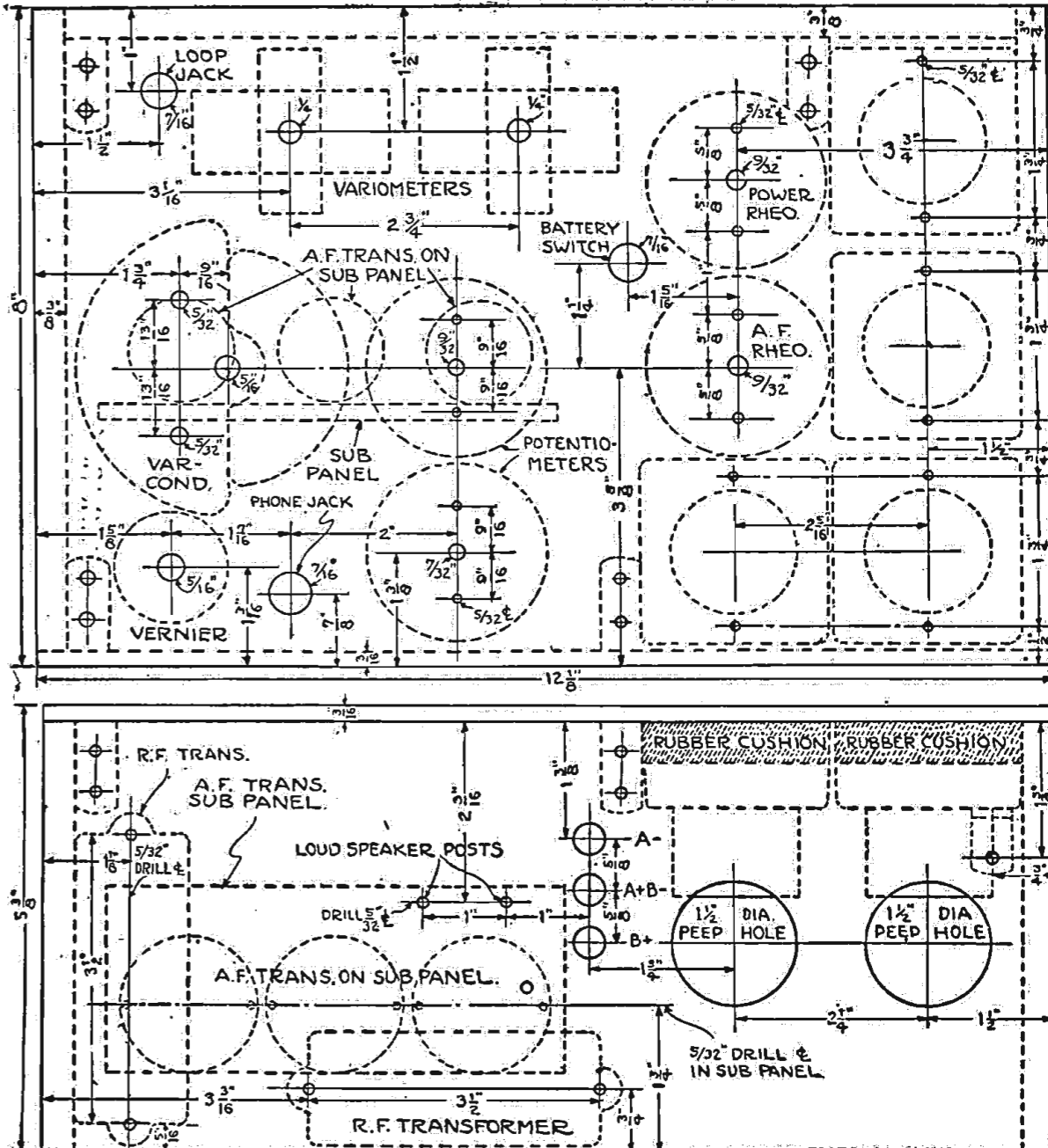
PORTABLE RECEIVER

(Continued from page 13)

apparatus so as not to interfere with the wooden strips in the carrying case. This also holds true when wiring the set.

mounted on the side panel in this layout, and the sub-panel eliminated. The one peep hole is dispensed with also.

Two binding posts take the place of the loop jack. The Radio frequency transformers are mounted on the sub-panel



Layout for Reflex Number Three

Reflex Number Two

The panel layout for the three-tube circuit is slightly changed from that of the four-tube set. The control apparatus is the same, except that the rheostat for the separate audio frequency tube has been eliminated.

The loop and phone jacks and the battery switch have also been eliminated. The audio frequency transformers are also

knack of handling the tuner is mastered, it is second to none for long distance reception with amplifiers.

Body Capacity

In most regenerative tuners the approach of the hands to adjust the dials untunes the set. This is termed body capacity and is due to the fact that any conductor brought near the set forms one plate of a condenser and thus changes the tuning of the circuits. This is prevented by shielding the set by fastening sheets of conducting material to the back of the panel and grounding to the ground terminal or to the negative filament.

The wiring of a regenerative set should be such as to prevent any feed-back to the grid circuit other than that provided for in the instruments themselves. It is apparent that any lead in the plate circuit which lies parallel to the grid circuit lead would induce currents in the latter either by inductive or electrostatic action. Therefore separate all wires carefully and let them cross only at right angles.

(TO BE CONTINUED.)

alongside of each other.

Reflex Number One

The panel layout of the two-tube circuit becomes very simple with plenty of room for mounting of apparatus and accessibility. One of the sockets and one of the potentiometers are eliminated, otherwise the top panel presents no variations from the three-tube layout.

In the side panel layout, just one transformer of each of the two sets is eliminated.

(TO BE CONCLUDED.)

Electric Soldering Iron

\$2.50

A. C. OR D. C. CURRENT

DEALERS—Attractive Discounts

NOTE: We are the Largest Exclusive Radio Jobbers in the Middle West

HUDSON-ROSS

123 W. Madison St. Chicago

THE NEW B-T VERNIER TUNER

Gives 100% Improvement on
REINARTZ CIRCUITS

Does away with soldered taps, switch points, etc. Easy to change to other circuits if desired. Photo Diagrams furnished—ask your dealer, or write for circular.

"IT'S A BEAUT"

BREMER-TULLY MFG. CO.

532 South Canal Street CHICAGO

Cotogrip

"Built First to Last"

This little beauty was approved by our engineers only when convinced that they had produced the one socket that combines all the essential features of a good socket.

1. Positive Cotogrip Contacts.
2. Hard Rubber Insulation.
3. Rugged Construction.
4. Compact Design.
5. Concealed Mounting.

It is impossible to show the unique mechanical action of Cotogrip contacts in a photograph. It is different from any other socket you have ever seen. This socket will interest you in every way.

You ought to have one.
Ask Your Dealer

PACIFIC COAST BRANCH:
 329 Union League Bldg.
 LOS ANGELES

COTO-COIL CO. PROVIDENCE

Questions and Answers

R. D. 68-69.

(3056) ECF, Nanuet, N. Y.
 In your Jan. 6th issue you printed a R. F. and an A. F. three-coil regenerator (R. D. 68-69).
 I constructed one of these sets and would like to have some information about it.

Your diagram calls for primary 35, secondary 50, tickler 75. I find that better results are obtained with a primary 75, turns on a secondary or tickler of 50 turns, and then I must place my secondary at right angles to the primary. Is there any way I can overcome this? Will coils of more turns help me?

I do not seem to be able to tune in distant stations while the local stations are broadcasting. Is there anything you can suggest that will make this possible?

What are the VT-2 and E tubes you recommend for the 2-step and where can I get them? Will these tubes give me better results than the two Cunningham tubes I am now using?

What transformers are the best for audio frequency amplification and is it necessary to have a high and low ratio transformer, and which is placed first?

Can you furnish me with a panel diagram and size for the two cabinets?

A.—Noting your specifications and experience in operation of R. D. diagrams 68-69 will advise that a discrepancy is indicated in the variance of coils best functioning contrary to those shown in diagram. Values as specified are correct and should afford the best results. The circuit is selective and capable of discrimination in reception. Would advise a careful review of connections to determine what factor is acting as a deterrent to operation of set.

VT-2 and E tubes are manufactured by the Western Electric Company, but would not prove of sufficient advantage to warrant a change from those now employed.

Transformers of standard type having ten to one ratio on first and three or four to one ratio on second stage of amplification are used for audio frequency.

Panel construction is largely a matter of personal discrimination. Regret that we have no constructional data to offer for set in question.

Condenser Values.

(2908) JAG, Frederick, Okla.
 How many square inches of soft copper tinned on one side would it take to make a variable condenser of .001 mfd. capacity? Give the thickness of the metal.

Would some other material be better than the copper? If so, what kind, and why?

What is the best dielectric and how thick should it be?

Where can I obtain all necessary materials?

Would you advise the use of amperite current adjusters on amplifier tubes?

Is there any way to measure resistance and capacity without a lot of expensive instruments?

A.—We are pleased to answer your inquiries as follows: For a book type condenser a sheet of soft copper tinned on one side 3 by 4 inches and separated either by a very thin piece of mica or heavy wax paper will approximate a .001 mfd. Tin-foil pasted on wood forms could be used but would be no better.

Mica is the best dielectric, .003-inch thickness, if possible. Materials in question should be obtainable at any Radio supply store. Amperite current adjuster is very good, probably more effective than a rheostat.

Resistance may be calculated or measured with an ammeter. Capacity is rather difficult for a novice to arrive at without special apparatus designed for the purpose.

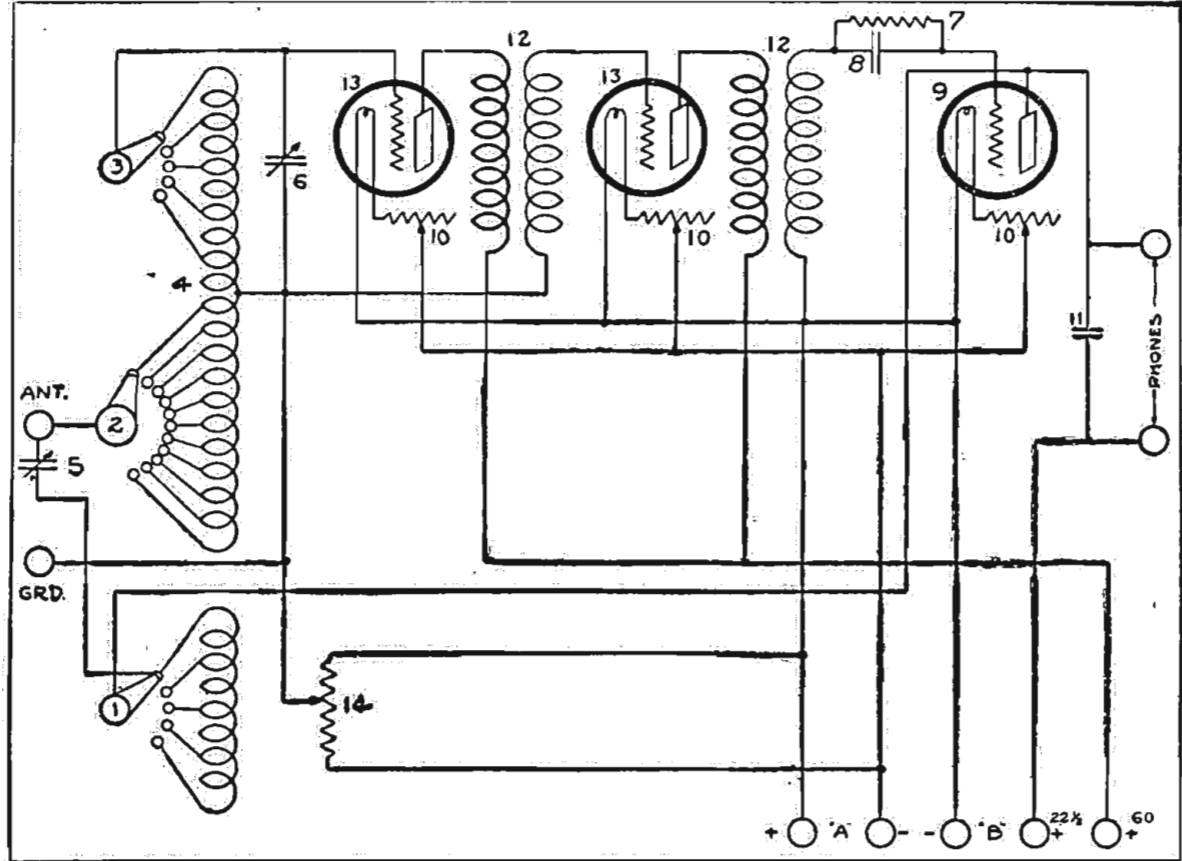
Reinartz and R. F.

(4124) WGG, Tucson, Arizona.
 How may I add two stages of untuned transformer Radio frequency to my Reinartz circuit?

Will I need a variable grid leak in the above requested circuit?
 How may I wind a Reinartz coil for use up to 750 meters?

In the above requested circuit will a 23-plate condenser work as well as the 13-plate condenser shown in the antenna circuit?

A.—Answering your inquiry we are advising that the employment of Radio frequency amplification in the Reinartz cir-



cuit has not always been found to be practical. However, we are referring you to the diagram on this page. No grid leak is indicated.

A Reinartz coil wound to accomplish 750 meters wave length would be cumbersome and impractical. It is advised that circuit be loaded by placing a 35 turn honeycomb coil in the antenna circuit and secondary circuit, grid lead, respectively. A twenty-three plate variable condenser can be used.

Flewelling Queries.

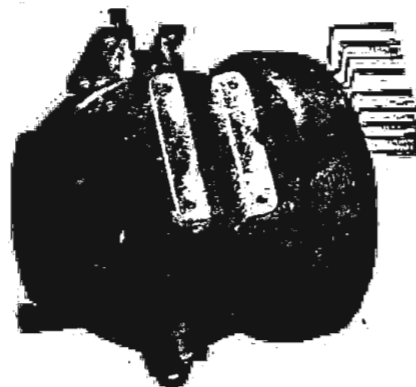
(2856) ABS, Fort Smith, Ark.
 Your name was handed me by the St. Louis Post Dispatch Radio Department, as being in position to answer the following questions concerning the Flewelling Circuit:

What vacuum tube would you suggest as the best detector and amplifier?

PHANTOM-CIRCUIT

Build Your Own. This marvel of mystery, using no loop, no aerial and no ground, brings in music instead of interference. We have heard stations 950 miles distant on one tube. By using WD-11 tube set can be entirely self contained. Very easy to build from our instructions, use your own spare parts, nothing complicated like radio frequency or super regenerative. Only one tuning control. Complete instructions, with hookup and photo of circuit mailed to you for 60 cents. Stamps accepted. VESCO RADIO SHOP, Box D-704, Vacaville, Calif.

Kellogg Radio Equipment For Better Results



VARIOCOUPLER
 The Kellogg variocoupler is of the same standard design as our variometer, being made of molded Bakelite, with reinforced construction.

For increasing the wave length from 500 to 2,500 meters, the Kellogg standard wound induction is added to the variocoupler.

It is arranged for either panel or base mounting. No. 501 Variocoupler \$9.00

With No. 502 Diamond Wound Coil, as shown in illustration..... \$13.00

Kellogg Switchboard & Supply Company
 CHICAGO

Do the book type variable condensers function best, if so, what kind?

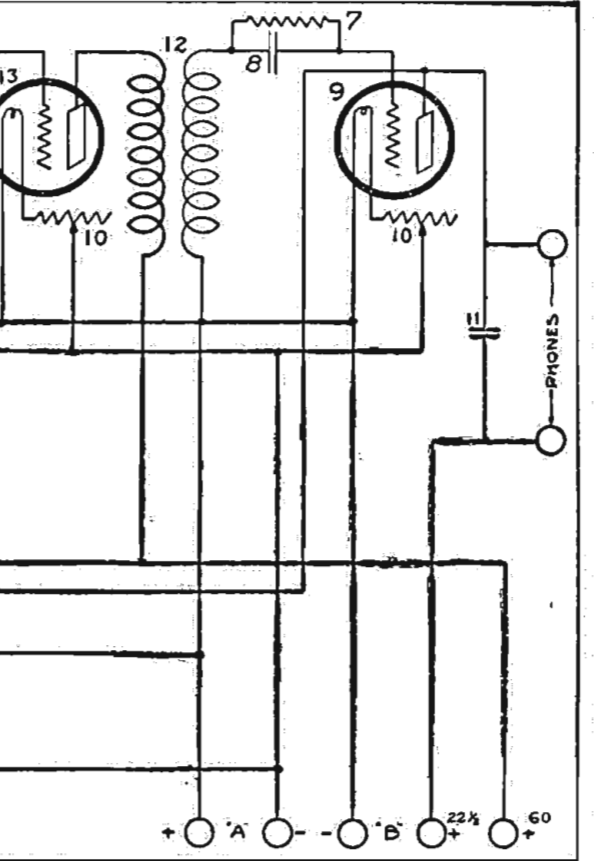
Will the Jefferson transformers No. 45 give appreciably greater and clearer amplification than Myers AF choke coils?

What should I use as grid-leak? Please furnish detailed Flewelling hook-up and one stage of transformer or choke coil (whichever functions better) amplification.

Will .005 condensers function as well as .006 condensers?

Using two G-R coils will a double or triple coil mounting function better?

How can hand capacity effect while tuning with H. C. coils be eliminated?



What size panel do you recommend this set to be placed on?

A.—Answering your inquiries with relation to the Flewelling circuit will advise: That selection of suitable tube may be made from Western Electric VT-2, UV-202 and 201. WD-11 using one and one-half volt dry cell is also effective considering the amount of current consumed.

Would not advise use of book type vari-

able condenser as it is not efficient.

Jefferson transformers No. 43 will afford better and clearer amplification than audio frequency choke coils.

Pencil line or any standard variable grid leak will serve.

Page thirteen of December 9 issue of Radio Digest contains complete details and panel layout for method of audio frequency amplifications. Blueprints can be secured for fifty cents through our book department.

Would advise a strict adherence to capacities designated by author of circuit, condensers, etc.

A double coil mounting is all that is required, although a three-coil mounting may be used in order that if it seems desirable to use a different hook-up at any time a new mount is not necessitated should new hook-up require a three-coil mount.

Body capacity effect experienced in tuning honeycomb coils can be reduced by placing them in the back of cabinet and shielding cabinet, grounding shield.

In making this circuit, as before stated, a strict adherence to specifications is advised, to assure the results possible with this popular circuit.

Mr. Flewelling has been writing for Radio Digest on the subject of the circuit which bears his name, and you will without doubt find interest and helpfulness by reading his articles.

About WD-11 and WD-11A

The dry cell tube known as the WD-11 may be used either as a detector or an amplifier. Due to the fact that this tube is more highly evacuated than the usual type of gas-content detector tube, it is less critical in adjustment. A slight change in mechanical design is the only difference between the WD-11A and the WD-11, as these tubes have the same characteristics. A plate potential of about 20 volts should be used when operating this tube as a detector and 40 volts as an amplifier.

Long Distance Crystal Set

We receive programs from Atlanta, Minneapolis, Davenport, Fort Worth, Dallas, Kansas City, St. Louis, Denver on Crystal without batteries. Usual crystal set requires only easy, inexpensive changes. Send stamp for further information or \$1 for copyright drawings and instructions. Everything clearly explained. Satisfaction GUARANTEED. Leon Lambert, 501 South Volusia, Wichita, Kan.

Your Choice

Bound Volumes

Numbers Two, Three, or Four

Postpaid by Parcel Post with One Year's Subscription to Radio Digest

Radio Digest Illustrated

Volume 2

Flewelling

Radio Digest Illustrated

Volume 3

Reinartz

Flewelling

Radio Digest Illustrated

Volume 4

Reflex, Reinartz

Flewelling

65 Numbers

13 Numbers in the Bound Volume

52 Numbers in Year's Subscription

COUPON 7-7

PUBLISHER, RADIO DIGEST,
123 West Madison St., Chicago, Illinois.

Please reserve me Bound Volume Number Two and also Number Three and one year's subscription to the Radio Digest, for which I am enclosing check—M. O. for Seven Dollars.

Please reserve me Bound Volume Number Two or Three or Four and one year's subscription to the Radio Digest, for which I am enclosing check—M. O. for Five Dollars.

Name.....

Address.....

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

FORMICA

A Laminated Phenolic Condensation Product

SHEETS TUBES RODS

RADIO PANELS

POLISHED BLACK FINISH

CUT PERFECTLY SQUARE TO ANY SIZE

1/32" THICK	1/2¢ PER SQ. INCH
1/16" THICK	3/4¢ PER SQ. INCH
3/32" THICK	1¢ PER SQ. INCH
1/8" THICK	1 1/2¢ PER SQ. INCH
3/16" THICK	2¢ PER SQ. INCH
1/4" THICK	2 1/2¢ PER SQ. INCH
3/8" THICK	4¢ PER SQ. INCH
1/2" THICK	5 1/4¢ PER SQ. INCH

SEND FOR COMPLETE PRICE LIST
PROMPT ATTENTION TO MAIL ORDERS
DEALERS PRICES ON APPLICATION

STARRETT MFG. CO.
519 SOUTH GREEN ST. CHICAGO



Illustrated

May Murray, the famous moving picture actress, in the garb of a role she recently starred. A few weeks ago she gave Radiophans a treat with a talk from Station WOR on dancing. A great many actors and actresses in the motion picture profession have used the microphone to further their popularity with the great open audiences in the country and places wherein they cannot reach in person. Photo by Edwin Bower Hessler

Just a little listening-in party, the party being Miss Peggy Stohel, at the camp. Seventy-five per cent of the persons who travel to vacation lands in cars have their Radio sets with them. If they do not have cars, the sets are sent as baggage © K. & H.

Dogs are usually much interested in the voice from the Radio set, but Whiskers seems to be in a doleful mood, while his master, Charles Ray, movie star, is enjoying it immensely. Radio is a great pastime for the idle hours of those in the movie profession © Photonevs



You may just as well start the baby on "Radio food," for it is bound to need it sooner or later. This shows Jim Little listening in on a concert just before he is put to bed for his afternoon nap. Jim is a modern fellow, and now that he has been started on the Radio trail he will not go to sleep until his Radio requirements have been filled. © Fotograms

