

Radio Digest

EVERY WEEK

Illustrated

TEN CENTS

TRADE-MARK

Vol. III

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CHICAGO, ILL., SATURDAY, NOVEMBER 18, 1922

No. 6

RADIO FINGER PRINTS

JAPS' OUTFIT MOST ELABORATE AFLOAT

IMPERIAL VESSEL HAS LATEST DEVICES

Radio Engineers Honor the Kamoi, Fuel Boat, Equipped by American Manufacturer

NEW YORK.—The Kamoi, fuel ship of the Imperial Japanese navy, which steamed out of New York recently on the way to Japan on her maiden voyage, has the most elaborate Radio equipment of any ship afloat, according to Radio engineers. The most recent inventions in the field of Radio art have been included in the outfit, which was furnished by an American manufacturer.

Included in the transmitting equipment are a one-kilowatt Radio telephone and telegraph set which may be used for telegraphy on continuous or interrupted continuous wave; a twenty-kilowatt telegraph transmitter and a two-kilowatt 500-cycle quenched spark transmitter for telegraph only.

Has Number of Receiving Sets

In the reception equipment are a long wave receiver with a range of from 1,000 to 30,000 meters and a short wave receiver ranging from 200 to 7,000 meters. In ad-

(Continued on page 6)

Industry Joins Art and Gives Program

Tool Company Workers Present Concert from Station KHJ, Los Angeles Class B Plant

LOS ANGELES, CALIF.—Joining hands to prove to the many listeners of Radio, that others beside those who are engaged in the profession of art as a means of self-expression, can hold the interest on Radio programs, industry and art combined one evening recently to present a Radio program. The concert which was broadcast from Station KHJ, the Los Angeles Times, was presented in full by the employees of the Union Tool Company of Torrance, Calif. It was a demonstration of the fact that one can never tell by the work in which a person may be engaged, what accomplishments may be hidden just back of the daily routine.

GOLDEN THROATED SONGSTRESS



Edith Mason is singing for the Chicago Opera Company for her second season. Hence her broadcast voice will not be entirely new to fans. Van Riel Photo

POLICE OF WORLD TO JOIN IN RADIO CHAIN BATTLING DANGER OF INTERNATIONAL CRIME

Authorities Throughout U. S. Approve New System of Identification as Fugitive Tracer

PHILADELPHIA, PA.—A criminal identification system, based on the Bertillon finger-print method, which was introduced into this country at the recent convention of International Police Chiefs in New York, will be used soon by the police throughout the country. The system is one that can be sent by Radio from one country to another to aid in speedy interception of fugitives.

Superintendent Mills, who represented the police of Philadelphia at the International convention, said he has perfected plans which will revolutionize the present identification division of the detective bureau.

To Be World Wide

The new system, which is already in operation in several European countries, was explained at the convention by Erik Shaffer, military attache of the police of Copenhagen.

The new system, once established in all large cities of the United States, will prove the first step in connecting the police departments of Europe with those of this country.

The greatest improvement under the new system is that it is not necessary to send photographs and measurements of the criminals as at present.

Another benefit is that the system will be installed without any additional expense to taxpayers.

Crooks Use Inventions

"The high-class criminal," said one expert, "is taking advantage of every modern invention to fleece his victims and escape the police."

"As we have said before, crime waves would be unheard of if it were not for the automobile and the airplane which are stolen and used by daring thieves."

"It seems that the sole salvation of the police of the world in their fight against the criminal class is to establish a code fashioned after the new finger-print system."

"The Radiophone also will prove a great help to police all over the world in rounding up international thieves. With the new finger-print system in full operation throughout the United States, we surely will keep the so-called high class criminals on the jump or in prison."

"SAM" KEEPS BOATS ON COURSE FOR \$1.34

THE GOOD old American name SAM is the call of a new Radio compass station at Hallö on the Skagerrak, in Sweden, which was opened for general service on November 1. The new station will determine the true bearing of vessels calling within 150 miles on 600 meters. The charge for a bearing is placed at five kroner or \$1.34.

Paper to Put Burgess' Bedtime Tales on Ether

WASHINGTON.—The Evening Star of this city, which prints Thornton Burgess' Bedtime Stories, has announced that it will broadcast them. The necessary arrangements have been made between the paper and the owners of the copyrights. The plan is to broadcast the stories one evening each week.

New York has a Radio cadet corps. The boys are taught the fundamentals of the science at nine years of age and in three years are efficient in all its branches.

VOTE TO SEND SERMONS

Congregation Favors Transmitting Set for Church

WASHINGTON.—At the annual meeting of the congregation of the Vermont Avenue Christian Church held recently, it was voted to install a Radiophone transmitting station for the purpose of broadcasting the service, including the sermons, the musical numbers of the mixed and male quartets, and the chorus.

CONCERT IN SPANISH CROSSES RIO GRANDE

SAN ANTONIO, TEX.—Besides having a Radio-equipped special train on the recent Good Will Tour, the local Chamber of Commerce furnished a Mexican governor at Nueva Laredo with a Radio concert in Spanish. The concert was sent out by WOAI at San Antonio, more than 100 miles from the little city across the Rio Grande in the Republic of Mexico.

WHOLE RADIO WORLD AWAKENS TO CALL FOR NEW YORK OPERA

Fans, Manufacturers and Leaders in All Walks of Life Rally to Campaign Being Waged by RADIO DIGEST for Metropolitan Broadcasts

Artist Contracts Hinder?

Little Poor Girl Sends in Heart Appeal—Crippled Lad Likes Idea

The whole world of Radio has been awakened to action by the clarion call of Radio Digest to save opera for the millions in the East. Fans, prominent manufacturers, in fact leaders in all walks of life have rallied to the campaign being waged by this paper to influence the Metropolitan Opera Company to broadcast. Telegrams, letters, postcards, long distance calls and a flood of petitions have been keeping the publication office in pandemonium. All are assuring their co-operation and active interest in the great movement to save the opera for the hundreds of thousands listening in over the Radiophone.

Two great obstacles stand in the way of the Metropolitan company broadcasting. One is the fact that the Metropolitan management claims contracts with the opera stars prohibit broadcasting. Another is the mechanical difficulties encountered in attempting to broadcast the opera from one of the large stations in New York. Both hindrances, however can be overcome if enough pressure is brought to bear upon the management of the Metropolitan company so that it will give its consent to broadcasting. Once this is accomplished the rest will be easy.

An indication of the interest being aroused in the opera saving campaign of RADIO DIGEST is shown by some of the many communications received from people all over the country. No movement in Radio has ever received the attention being bestowed on the effort to free Metropolitan opera for the air.

Poor Girl Appeals

One little girl residing on the east side of the great metropolis sent in a heart appealing letter which is indicative of the great benefits accruing in the broadcasting of opera. In her letter, she said: "I am only thirteen years old and like music very much. My folks are poor and can't afford to go to the opera. If the Radio stations would send opera out, I would be able to hear it, because my older brother has made a little crystal receiving set. On it we can hear all the New York stations and I know we could hear the opera."

Many Similar Cases

Many letters have contained petitions from Eastern Radiophans who are also unable to afford the cost of opera tickets.

One bedridden little crippled lad accompanies his petition with, "I hope you are able to have Metropolitan Opera broadcast, for it will be very nice for me. I have been reading a book on the opera which my father borrowed at the public library."

The many touching appeals indicate broadcasting of Metropolitan Opera will be a philanthropic venture of the greatest magnitude on account of the many thousands of receiving set owners in the

"great melting pot" who are not financially able to attend the opera.

Other than the humane standpoint the Metropolitan Company should broadcast opera because it is claimed that the air-phone has not hurt, but helped the Chicago Opera. If such is the case, the question presents itself: "Why should Metropolitan Opera refuse to permit broadcasting of its productions when millions of people could enjoy what only a scanty few thousands can hear under the present conditions?"

Letters Confirm Stand

Many are of the same opinion as evidenced by the letters arriving daily confirming the stand RADIO DIGEST has taken in this regard. Leaders in Radio broadcasting and the industry in the East agree that the campaign to secure opera is a worthy one. All assure their active co-operation. Many of these prominent men are already at work on solving the problem.

The following letter from William Dubilier, well-known manufacturer of condensers, has many salient features:

"This matter has been considered by me for over a year and it may interest you to know that I have already taken the matter up with the opera house officials, but did not meet with success, as they fear Radio will harm them.

"I have tried to show the officers that Radio will help the opera for it will be the first time an opportunity will be given to many millions to awaken their sense to the finer type of music. The same attitude was taken toward the phonograph when the Metropolitan artists began to sing and they thought it would ruin the opera. Instead it has made it popular.

Phonograph Popularized Opera

"Ten years ago, the opera was a losing proposition and they had to depend upon public benefactors to contribute towards the maintenance of the opera house. Seats were sold for about \$2.00 and over and they were usually given away free. Today, you cannot buy a seat at \$7.70. All this may be attributed to the phonograph, so, if the men, such as Otto Kahn, who are interested, contribute to the largest number of the public, a musical institution, this is their opportunity to show whether their motive is unselfish or not.

"By broadcasting opera, many millions of people will be able to enjoy the same concert that a few do at present, without any added expense.

Warns Opera to Beware

"This warns, not only the Metropolitan Opera House, but the men associated with them, that unless they are reasonable and see the logic in this argument, some real public benefactor will come forward and contribute a million dollars towards the erection of a Radio broadcasting institution, the same as Carnegie Hall, which with a very small expense, can benefit many millions."

Others Back Move

Chas. E. Hammond, Western Vice-Chairman of the Radio Section of the Associated Manufacturers of Electric Supplies, implored the Metropolitan Opera to reconsider their stand. In reply the management said: "Regret that it is not possible to accede to your request because of existing contracts."

L. G. Pacent, president of the Pacent Electric Company, telegraphed: "Assure you of my co-operation in influencing the Metropolitan Opera Company to broadcast opera this season."

James H. Betts, president of Betts and Betts Corporation, a large electrical manufacturing concern of New York City, says in a letter to RADIO DIGEST:

"Your telegram received and I certainly think that you deserve a great deal of credit for your activity in your attempt to get the Metropolitan Opera Company to broadcast their operas.

"It is impossible to estimate the great advantage that would accrue to the Radio industry by the broadcasting of grand opera and as a director of the New York Electrical League I will have influence brought to bear by all of the important men in the electrical industry in this city."

Radio Section to Act

Charles Gilbert, president of the De Forest Radio Telephone and Telegraph Company, assures his aid as follows:

"It goes without saying that I, of course, would be interested to help you in your efforts to secure the opera for the public, and I have taken the matter up with Mr. M. C. Rypinski, Chairman of the Radio Section, to decide what steps can be taken to secure results with the least delay."

M. Rypinski, Chairman of the Radio Section of the Associated Manufacturers of Electric Supplies, to whom Mr. Gilbert referred, is at work on the project. He has wired RADIO DIGEST:

"I will do all I can to help in the campaign to secure the broadcasting of Metropolitan Opera. Am already moving in the matter but the task is apparently a difficult one."

Godley Hints Wire Trouble

Paul Godley, known to every true "ham" as the man who in Ardrossan, Scotland, heard a number of low power American stations across the Atlantic Ocean, says:

"I am in receipt of your telegram of the 31st and am very much pleased to note your interest in means of furthering good broadcasting. I shall take this matter up with such parties as it may be possible for me to see in an effort to learn the reasons why we cannot in this territory be supplied with the Metropolitan Company's programs nightly. There are many things which will need to be considered in this connection, however, on account of plans which the American Telephone and Telegraph Company have with reference to supplying their wires for such service."

Remember, if you haven't sent in a Metropolitan Opera petition to RADIO DIGEST, do it today. If you have, get more signatures from your friends and send in another. RADIO DIGEST is trying to help the fan, but you must help too. Do it today!

KYW TELLS WHAT OPERAS GO ON AIR

"Carmen" and "La Boheme" Scheduled for First Week—May Give "Parsifal"

CHICAGO.—A last minute announcement from Manager Weatherbee of Station KYW, said that "Carmen," Tuesday, November 14, and "La Boheme," Wednesday, November 15, would be the operas broadcast during the opening week of the Chicago Opera Company. On Sunday afternoon, November 19, "Parsifal" may be broadcast. Two operas will be "on the air" every week from 8 to 11 o'clock, Central time, and after football season, the Saturday matinee operas will be broadcast. Scores of important intercollegiate football games will occupy that period for the present however. The matinee operas will be heard from 2 to 5 o'clock.

The most suitable operas, according to Radio broadcasting limitations, will be selected each week. The selections will then be announced previous to their presentation.

Cast of "Carmen"

The cast announced for "Carmen" is: Carmen, Mary Garden; Jose and Morales, brigadiers in a regiment, Riccardo Mar-

(Continued on page 4)

Radio Digest Illustrated

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Looking Ahead

The twelfth and last of the series by H. M. Towne will appear next week. All apparatus described in these series were made and tested by Mr. Towne before they were written up for Radio Digest.

The much talked of articles by Letson Balliet will soon appear in the most interesting form that he can write them. Considerable comment was made on the recent short series to enable us to see that the forthcoming series will be read with a great deal of interest.

Broadcasting Directory. Gets better and larger each week. The only convenient reference to aid you in finding a station heard.

"How to Make Department." Many kinks every week are interchanged here. Radio Illustrated. The picture page is the best of its kind.

Newsstands Don't Always Have One Left

WHEN YOU WANT Radio Digest YOU WANT IT!

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

MAIL THIS IN TODAY FOR OPERA

METROPOLITAN OPERA PETITION

Mail to Opera Editor, RADIO DIGEST, 123 W. Madison St., Chicago

We, the undersigned, most heartily endorse the RADIO DIGEST campaign to secure opera for the eastern citizens possessing Radio receiving sets, and petition the METROPOLITAN OPERA COMPANY to broadcast their presentations in a manner similar to the service rendered by the CHICAGO OPERA COMPANY and Station KYW.

(Blanks are provided for friends' signatures.)

1. (Name) (Address)
2.
3.
4.
5.

(This petition may be pasted on another sheet of paper in case it is desired to add more names)

U. S. DOMINATES IN FIELD OF AIR WAVES

MAY BE ARBITER OF WORLD COMMUNICATION

Americans Hold Power to Dictate Terms of International Convention in Spring

WASHINGTON.—The United States yet may become the arbiter of international communication by reason of the intensive development here of Radio telephony and the huge investment of private enterprise in this form of communication, whereas in other nations their governments only have given attention to this tremendous avenue for international intercourse, and these have not progressed very far. The United States without a doubt now holds the dominant position at an opportune moment. The second international conference on electrical communications in the spring is fast approaching.

Since the preliminary conferences in Washington in October and November, 1920, Radio telephony has been transformed from a purely scientific project to one of incalculable commercial importance.

International Regulation Needed

At that time, the representatives of the various governments did give to the subject some discussion and consideration. International regulation of Radio telephony since then has become of paramount importance and necessity. The government and the commercial interests of the United States are in a very powerful position by reason of the advance that has been made in the science in this country and the measures that already have been mapped out with respect to its regulation, as a result of the conference called last spring by Secretary of Commerce Hoover.

The Government and the American commercial companies consequently are alive to what they desire to obtain at the hands of an international meeting, and since they are thoroughly conversant with the subject and occupy the most powerful position by reason of the development within the past two years, will be in a position to dictate terms of the international conventions which certainly will be promulgated.

Radio Monopoly Question

At the preliminary conference on electrical communication held in Washington two years ago, certain questions were formulated upon which discussion will continue until agreement has been reached by the representatives of all governments concerned. The foremost will be adoption of a general agreement with reference to cable and Radio monopolies, in order to make available for common use geographical points so located as to be especially desirable for cable and Radio stations. It is in this connection that this government will be in a very desirable position to enforce its views upon the conference.

The work done at the Washington conference in regard to the disposition of former German cables has been continued by a committee representing the State Department and the embassies of France, Great Britain, Italy and Japan. It is believed that this question will be settled prior to the proposed meeting at Paris.

DOT AND DASH LESSONS ARE STARTED IN WEST

KOG Launches Series of Lessons in Code Signals

LOS ANGELES, CALIF.—The launching of a series of code lessons in Radio telegraphy was effected a few days ago by Radio station KOG, the Los Angeles Evening Herald. The lessons in telegraphy are the result of the desire of many amateurs to learn the code. A vote conducted by the Evening Herald, showed that many Radiophans were interested in them.

Class time for the daily code lessons is 5 to 5:15 p. m., Pacific time, except on Wednesday when the code lesson is fifteen minutes earlier.

BLIND YOUTH PLAYS HIS "SAX" FOR WBAV

SPRINGFIELD, O.—Raymond Clark, of this city, blind, broadcasted a saxophone solo from Station WBAV in Columbus recently. His contribution to the entertainment of the evening was fully appreciated in various parts of the state, especially in this city. Mr. Clark was blinded through the explosion of a cartridge.

SHERIFF OUTFITS TO HELP CATCH BAD 'UNS

DENVER, COLO.—Colorado is planning to have a comprehensive system of Radio communication, which is now being evolved by the police and military authorities. Every sheriff's office is to be equipped to listen in under a regular schedule, and word of escaping criminals or fugitives from justice will be broadcast.

IRENE PAVLOSKA 'ON AIR' AGAIN



Irene Pavloska in the soprano role of Musetta, the grisette in "La Boheme," one of the Chicago Operas to be broadcast by Station KYW. The elaborate costume of Musetta really must be seen to be appreciated. Miss Pavloska has broadcasted from other plants, one of these being KGB, Tacoma, Washington

Chicago Opera Photo

Army Radio Engineers Busy Improving Infantry Sets

WASHINGTON.—United States signal corps Radio engineers are perfecting a better field Radio set for army infantry units. The present spark set, SCR 105, developed during the war, has become practically obsolete and continuous wave sets are desired.

A board of signal corps officers has recommended that surplus vacuum tube sets be issued to infantry regiments for training purposes until continuous wave sets can be developed and distributed to replace the old 105s. Recently the continuous wave sets were adopted for all army Radio communication.

The old 105 sets are quenched-spark sets used for transmitting and receiving between headquarters, usually not more than five miles apart.

SHIP NEWSPAPERS GET NEWS ON SET

"UKELELE" AND "HULA" MAKE ETHER SCOOPS

"Priceless" and "Unbiased" Publications Aboard Ship to Hawaii in Daily Touch with World

LOS ANGELES, CALIF.—Newspapers have become such important factors in the daily life of the American people that editions have to be served both morning and evening to the public whether they live in the city, country or are out on the high seas. So recently when the Los Angeles Chamber of Commerce conducted their excursion to the Hawaiian Islands on the "Pride of the Western Seas," the S. S. City of Los Angeles, in honor of the opening of direct steamship service between the Islands and Los Angeles Harbor, it was decided that both a morning and an evening newspaper would be required to keep the passengers informed of world events.

The question of how the news was to be received was soon settled when arrangements were made with Broadcasting Station KOG and the Los Angeles Evening Herald, whereby the steamship would receive world news events, results of baseball games, market quotations and other interesting matter which could be published in a "high seas newspaper."

Radio Makes Two Possible

The result was the publication on shipboard of two newspapers, made possible by Radio. Both publications appeared daily during the trip. They were under the editorial direction of Morris M. Rathbun, director of publicity for the Chamber. "The Morning Ukulele," and "The Evening Hula Hula," were the names under which the papers appeared.

"The Morning Ukulele" was "priceless per copy." The paper also carried the information that it was unbiased, untrammelled, unfettered and unlimited. The advertising rates were prohibitive. Foreign and stage coin were accepted only when properly baled for spending purpose. Both papers were of course indicative of the spirit of sea travel and of the "sport" that was going on both during the day and evening. There were quips and "shots" at the well-known passengers who were on the list. However, the radio furnished much of the necessary, serious material for the two papers.

'GHOSTS' IN CONTEST HALLOWEEN NIGHT

Newspaper Station Awards Prizes to Radiophans Best at Guessing Artists

SAN ANTONIO, TEX.—One of the most unusual contests ever held in Texas was staged Halloween night here when twenty artists who have appeared from time to time at WOAI, the Southern Equipment Company's broadcasting station, each gave one number under the title "Ghost Number So-and-so."

The Evening News, which co-operates with the owners of the station, gave prizes totaling \$30 to the Radio fans guessing the names of the various artists. Two days ahead of time, the names of the 50 or more artists who have appeared at WOAI were published in the Evening News. The twenty actually to be heard as "ghosts" were not designated, thus adding further difficulties to the contestants.

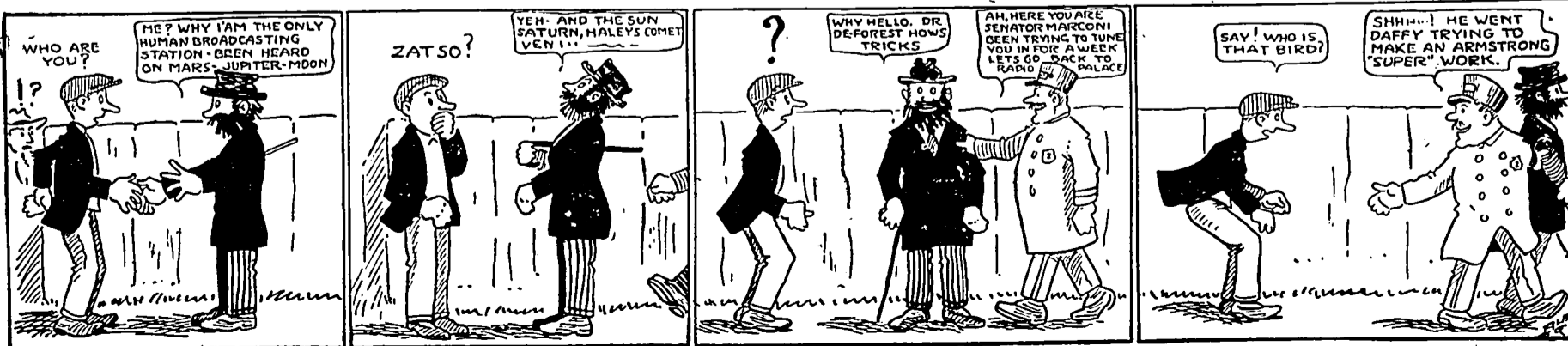
Irish Rebels Lose Clifden

LONDON, ENGLAND.—After a number of attempts, the Marconi Radio station at Clifden, Ireland, has been recaptured from the Irish irregulars, and is now in operation once more. It had been silent for several weeks, while in the hands of the irregulars, who did considerable damage to the equipment.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Just a Loose Connection



AIR WAVES ACQUIRE MORE WAR DUTIES

DIRECTION, RANGE FINDERS IN COAST DEFENSE

Extend Firing Distance of Shore Guns Twenty-Five Miles Farther to Sea Using New Method

By Carl H. Butman

WASHINGTON.—The ranges of the shore defense guns of the United States in all probability will be extended twenty-five miles farther to sea by virtue of a newly developed Radio range finder, now being tested on the Atlantic Coast. Previously the maximum range of the great coastal guns was 25 miles when visibility was good, but with the perfection of the signal corps Radio devices, poor visibility is not a handicap. It is expected that a maximum range of about 50 miles can be reached provided the guns can be elevated high enough to shoot that far. Enemy ships will have to stand farther out at sea to be safe; at least, the fleets will be prevented from anchoring or disembarking troops within fifty miles of our shores in war time.

Employs Radio, Aviation and Plotting

Three factors make up the essential principles of the new long-range fire control: Radio, aviation and plotting. For the first time in history, the post-war developed Radio compass will be employed for a purpose other than to locate stations or give ships their bearings. The use of an airplane equipped with Radio for spotting the fall of projectiles is not new but the unique feature today is the fact that the airplane itself will be out of sight, over the target or ship. Without awaiting the fall of sighting shots, the observer will send a series of Radio signals which will make it possible on shore to plot the successive positions of the ship and determine its course and speed.

First Test Held

The Joint Coast Artillery and Air Service maneuvers off the Virginia Capes, on Tuesday, November 7, held a test of the new Radio fire control devices and a comparison was made with the old method. These were highly successful.

A boat visible from the shore ran various courses in an area several miles wide stretching seaward from Cape Charles and Cape Henry, the master of the vessel keeping an accurate time record of his course and speed. An airplane from Langley Field equipped with Radio-sending apparatus flew out, located the ship and remained over it as much as possible by executing figure eights in the the air. Flying at a height of several thousand feet, calculated to be safe from anti-aircraft fire, this observation plane sent special signals to the shore only when it was exactly over the vessel.

Radio Direction Stations Get Signals

On shore two Radio compass stations several miles apart were set up and had direct lines of communication to the batteries. Operating just as when a ship's bearing is furnished, these two stations picked up the signals by the observing plane when it was just over the target ship. In other words they turned their compass coils until the Radio signal was received with equal strength in both receivers, then the direction or angle from the stations was read and plotted. With the angles at each station read simultaneously and the distance apart known accurately, it was a simple problem in

trigonometry to locate the position of the ship and its distance from the battery. It was even simpler to plot the location of the ship on a map by laying down the angles from the two stations, extending the lines and noting their intersection. Within a few seconds a second signal comes in, when in actual operation, and then another, all of which, when carefully plotted and timed, give the course of the moving target and its speed.

Words to Europe at 6 Cents Each

Radio Corporation of America Offers Communication with London and Germany

NEW YORK.—For the first time in the history of international communication, the public is now enabled to send messages to London and Germany at a rate slightly higher than postage. The rate of the new service, afforded by the Radio Corporation of America, is six cents per word with no minimum requirement.

It will be possible hereafter for individuals and business houses to send messages of as few words as three or four at the fixed rate of six cents for each word, as for instance, "All well" would cost only twelve cents plus charges for address and signature, if any.

For the present, the service is confined to London and to Germany. A message may be filed any day in the week up to Saturday with the designation "Radioletter" or its abbreviation "RL," and it will be transmitted in time to reach London or Germany the following Monday morning.

WGI Plant Gives "Silent Hour" Its Second Trial

MEDFORD HILLSIDE, MASS.—The experiment of a "Silent Hour" was given its second trial recently by Station WGI. The "Silent Night" was allowed so that owners of vacuum tube receiving sets could tune in with distant Radiophone stations. Complaints have been numerous that the larger broadcasting stations are completely blanketing the time in their vicinity and that the programs of other stations are lost to the owners of high priced receiving sets. The comments of the Radio audience are asked by the management of the Amrad station.

WBAV Gives News Bulletins

COLUMBUS, O.—Station WBAV of the Erner & Hopkins Co. has adopted a new daily schedule and is sending out news bulletins from the Columbus Dispatch.

MYERS TUBES CUNNINGHAM—RADIOTRONS

Dealers, Send for Our Discount Sheets Hudson-Ross, 123 W. Madison, Chicago

THE ONLY KNOB and DIAL WITHOUT A SET SCREW

ASK YOUR DEALER
4 in., \$1.50 3 in., \$1.00

TAIT KNOB & DIAL CO., Inc.
11 East 42nd Street NEW YORK CITY

KYW TELLS OF OPERAS

(Continued from page 2)

tin and Milo Luka, respectively; Zuniga, captain in the same regiment, Edouard Cotreuil; Frasnquita and Mercedes, gypsy girls, Melvena Passmore and Irene Pavloska, respectively; Escamillo, a toreador, Georges Baklanoff; Micaela, a peasant girl, Mary McCormic; Dancairo and Remendado, smugglers, Desire Defrere and Jose Mojica respectively; Lillas Pastia, an inn-keeper, Eugenio Corenti; conductor, Richard Hageman. Incidental dances by Adolphi Bolm, Anna Ludmilla, Amata Grassi and Corps de Ballet.

"La Boheme" Cast

The cast for "La Boheme" is: Mimi, an embroidery maker, Edith Mason; Rudolph, a poet, Angelo Minghetti; Marcel, a painter, Giacomo Rimini; Colline, a philosopher, Virgilio Lazzari; Schaunard, a musician, Desire Defrere; Musette, a grisette, Irene Pavloska; Alcindore, a wealthy Parisian and admirer of Musette, Vittorio Trevisian; Benoit, the landlord, Vittorio Trevisian; Parpignol, Lodovico Oliviero; Custom guards, Max Toft and Harry Cantor; Conductor, Ettore Panizza.

"Parsifal" Uncertain

The cast of "Parsifal" is omitted on account of the uncertainty of its being broadcasted. The second week of Chicago Opera will present on Monday "Tosca," featuring Mary Garden; Tuesday, "The Snow Maiden," with the same cast as the first week's performance; Edith Mason singing the role of Sniegurotchka; Wednesday, "Il Trovatore," with Rosa Raisa, and the debut of Louise Homer in Chicago as Azucena; Thursday, "Carmen;" Saturday matinee, "La Boheme;" Saturday night, "The Love of Three Kings," (L'Amore Dei Tre Re.) The last three operas will have the same casts as when presented the first week.

Headquarters for

Radio Supplies and Equipment

Radio Department

COMMONWEALTH EDISON ELECTRIC SHOPS

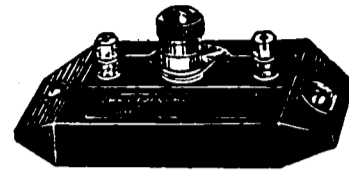
72 West Adams Street
Chicago, Ill.

New Plant at Aeolian Hall New York's Latest

NEW YORK.—A Radio broadcasting station to transmit musical concerts and later opera is to be erected atop the Aeolian building, it was announced today.

The new station, according to the present plans, will supplant the station WJZ, in Newark, N. J. The concerts of the foremost artists of the world appearing in Aeolian hall will be broadcasted through the station, which will be one of the largest in the world, it is said.

The Latest and Most Essential Part of an Efficient Tube Set



Variable Grid Leak and Micon Condenser Combined

Obtainable in an unbroken range from zero to 5 megohms—all intermediate points. Fixed capacity—.00025 M. F. Will improve your set wonderfully by

Clarifying Signals

Lowering Filament Current
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Price only \$1

At your dealers—otherwise send purchase price and you will be supplied without further charge.

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97 Beekman St., New York City

Home of Micon and Antenella

The BIG Games

are to be played in the next four weeks. You may not be able to afford the trip to the various stadiums, but you can hear at home everything that is going on at the games—the cheers, the songs and then follow the game play for play. All you need is the



One of the most famous Radio receiving sets on the market. It made a name for itself in one day.

AERIAL-A is a vacuum tube detector set compactly and efficiently built that will stand rough usage when necessary and is a decoration to any home. With its perfect construction and simplicity of operation the AERIAL-A is the ideal receiving set for you.

There are two dials for tuning and one rheostat for lighting bulb. The wiring connections are placed at the back of the machine, first for ease in connecting, and second to increase the beauty of the set, and eliminate confusion.

The AERIAL-A has been awarded the certificate of Excellence by the New York Evening Mail and is guaranteed by the New York Tribune Institute. Nothing more need be said.

PRICE COMPLETE \$35.00

(Including Phones, Tube, Aerial and Batteries)

Don't buy a Radio Set until you have seen and heard this one

We are developing and perfecting two new vacuum tube sets to be known as AERIAL-B and AERIAL-C. Watch for our announcements soon.

W.E. Supply & Service Corp.

Dept. RD 18 Murray Street, New York City
Two blocks South of Chambers St., bet. Broadway and Church



"HE who wishes to know the road through the mountains must ask the experienced traveler."

In seeking the right path in radio profit by the experience of others—buy a Grebe Receiver.

A. H. GREBE & CO., Inc.
RICHMOND HILL, N. Y.

Doctor Mhu.

EVER HEARD THEM? HERE THEY ARE



A. V. Llufric, WEAF announcer, has pleasing dimples © K. & H.

Willard Elms, KYW announcer, is an artist, too

Robert Campbell, KYW announcer, as "Uncle Bob"

Thomas H. Cowan, WJZ announcer © K. & H.

You've probably heard the voices of the announcers pictured above, and you may have wondered who "belonged" to the voices. Well, now A. V. Llufric is one of several announcers at Station WEAF, New York City. Outside of the fact that Mr. Llufric's voice travels a quarter mile before being put "on the air," we can't say much against him, except that he has a mustache. Willard Elms has been announcing from KYW, Chicago, for six months and has gained a reputation for the clarity of his enunciation. He is also a commercial artist. Robert Campbell is another one of the half dozen KYW announcers. He is known to thousands of little tots as "Uncle Bob" when he delights them each evening with a bedtime story. He is during the day a student of medicine at the University of Chicago. Thomas H. Cowan, "ACN" to thousands of WJZ listeners in, is one of a group of famous announcers at that station. He is concert manager there and is one of the pioneer announcers, having announced the first Radio concert ever given and the first broadcast World's Series games. He is twenty-six years old and (attention, young ladies) is unmarried. He was formerly connected with the Metropolitan Opera Company

PLANTS SHIFT TIME FOR CHICAGO OPERA

Change Schedules to Accommodate KYW's Two-Nights-a-Week Musical Offering

CHICAGO.—Two nights a week are being set aside for the broadcasting of opera by Station KYW. In order that there might be no conflict in the broadcasting of the operas by courtesy of the Chicago Opera, it was found necessary at a recent meeting held in the office of Radio Inspector E. A. Beane, to shift the schedules of every Chicago station except the municipal station, WBU, whose evening programs are broadcast Monday, Wednesday and Friday between 7:30 and 8 o'clock, Central time.

It was agreed by stations WMAQ, WGAS, WDAP and WBU that it would be satisfactory for KYW to broadcast the opera two nights each week.

Opera Programs Govern Nights

"I am willing to make any concession in order that the people may be given the opera," said Thorne Donnelley, representative of station WDAP on the Drake hotel. The other broadcasting station representatives also expressed their willingness to have the operas broadcast. On account of the uncertainty of the opera programs, it was found impossible to select the nights, inasmuch as certain of the operas are more adaptable to broadcasting than others.

Station WGAS was given permission to broadcast its musical programs every evening between 8 and 9 o'clock on 360 meters wave length. The plant will work at the same time KYW is sending its opera and other musical programs on the 400-meter wave length.

WMAQ to Stand By

In order that the tremendous power station WMAQ, on the Fair building, might not conflict with the broadcasting of the opera, the proposition was made by the Chicago Daily News to discontinue its 9:30 to 10 o'clock program on the nights when opera is to be sent out.

Station WDAP offered to turn over to the Daily News the period from 7:30 to 8 o'clock on Tuesdays and Thursdays, provided station KYW would concede to him two half-hour periods between 9 and 9:30 o'clock on evenings when the opera was not being sent out. Wilson J. Weatherbee, station manager of KYW, agreed to take the matter up with other officials of the Westinghouse Company in order to effect this arrangement.

Concerns Quit Massachusetts

BOSTON, MASS.—A number of companies have filed notice with the Commissioner of Corporations of this state that they have stopped selling their securities in Massachusetts, no explanation being given out by the commission as to the reason. Three Radio concerns are included in the list, as follows:

Aetna Radiophone Co., Hartford, Conn., 50,000 shares, no par value; New England Radio Co., Springfield, Mass., capital, \$3,000,000; Wireless Improvement Co., Jersey City, N. J., capital, \$3,000,000.

Take Over KMO, Tacoma

TACOMA, WASH.—KMO, formerly the Tacoma Times-Love Electric Company broadcasting station of this city, has been taken over by the Love Company in conjunction with the Northwestern Supply Company. The newspaper has been withdrawn from the combine.

Plant Won't Send "Can" Music; Drops Programs

Army Station at Brooks Field Halts After Fans' Complaints

SAN ANTONIO, TEX.—"We will not fill the air with a lot of cheap 'canned piano' and 'canned phonograph' music," declared the officer in charge of DM-7, the U. S. Army broadcasting station in announcing discontinuance of regular programs from that station. The army air service is anxious to add its equipment to the regular service obtainable by Radio fans of Southwest Texas, but continuous changing of personnel at Brooks Field made it impossible to maintain regular programs without resorting to "canned music." This brought scores of letters from persons who declare they could hear more enjoyable entertainment elsewhere. Besides, according to officers at Brooks Field, the men there would rather listen to "real stuff" from outside than "canned stuff" at home.

SEEK CONTROL OF RADIO FOR CANADA PROVINCES

Telephone System to Recommend Transfer of Authority

WINNIPEG, CAN.—Seeking control of Radio telephony, executives of the Western Provinces Government Telephone systems, will recommend, through the Ministers of Telephones to their respective legislatures, the transfer of authority from the Federal to Provincial Governments of the enforcement of the Radio Telegraph Act dealing with Radio telephony.

The recommendations of the Manitoba, Saskatchewan and Alberta Government Telephone systems, are identical, and the recommendations ask for the authority for the issuing of licenses for transmitting or receiving stations for Radio telephony to be vested in the Minister of Telephones. Stations would be licensed by the Provincial Governments and fifty per cent of the license fee would go to the Dominion Government.

BUT YOU CAN'T HEAR HER DANCE



Although many of the operas of the Chicago Opera Company, of the ballet of which Miss Anna Ludmila is premiere danseuse, will be broadcast, no Radiophon will be able to listen in to her dancing. They must needs buy a seat at the Auditorium to appreciate the ability of this nineteen-year-old master of the opera ballet. Miss Ludmila, Jean Kaehle off the stage, is a native of Chicago. Pondelick Photo

56 NEW LICENSES INSURE BROADCASTS

Month's Total of Permits Disperses Doubt as to Life of Public Radio Service

CHICAGO.—The question of whether or not broadcasting will die out is bothering a number of people, but not the Department of Commerce. During October 56 stations were licensed to broadcast, and twenty-two dropped out, which shows that the industry is at least increasing by about 24 a month.

On November 3 there were 553 broadcasting stations operating, nineteen of them on 400 meters or under class B and the balance on the old 360-meter wave. During the past week eleven new stations were licensed to broadcast.

The new stations licensed follow:

KFFE, Eastern Oregon Radio Co., Pendleton, Oregon; WMAZ, Mercer University, Macon, Ga.; WPAF, Peterson's Radio Co., Council Bluffs, Ia.; WSAS, State of Nebraska, Lincoln, Neb.; WNAS, Texas Radio Corporation and Austin Statesman, Austin, Tex.; WRAR, Thomas, Jacob Carl, David City, Neb.; KFCE, Frank A. Moore, Walla Walla, Wash.; KYQ, Electric Shop, Honolulu, T. H.; WPAB, Pennsylvania State College, State College, Pa.; WWAC, Sanger Bros., Waco, Tex.

New class B station on 400 meters, WBZ, Westinghouse Elec. & Mfg. Co., Springfield, Mass.

Canadian Fans Vote for One Night Each Week of Silence

TORONTO, ONT.—At the regular meeting of the Wireless Association of Ontario last night it was decided to request the director of the Radio service to make an order that all amateur transmitting licenses in Toronto be made subject to a restriction preventing transmission between the hours of 7 to 10:30 o'clock every evening.

The previous meeting of the association had ruled that all members regard these three hours and a half as a "silent period," to prevent interference with entertainment programs which were being broadcast. All members of the association have since refrained from transmitting in the "silent period," but a few others, perhaps not aware of the decision of the club members, have continued to make a nuisance of their sparks when thousands of people are listening to concert programs.

Broadcast in Uruguay

WASHINGTON.—Recent modifications of the rigid laws of Uruguay governing the installation of Radiophone and telegraph stations have made possible the institution of Radio broadcasting, according to Vice Consul Edwin B. Montgomery, of Montevideo. Applications are now pending which, if granted, should mean the opening of a splendid market for Radio telephone receiving apparatus there.

Phone Link Opened to Public

NEW YORK.—Radio telephone link between Copenhagen (Denmark) and Bornholm (Sweden) was recently opened to the public. The arc system is used and the rates are lower than for similar service by telegraph. This is the first public Radio telephone in service in Scandinavia.

INVENTION ASSURES AIR CODE SECRECY

CUT UP SIGNALS CONFUSE WOULD-BE DETECTOR

Synchronized Decoding Disk Principle of Device of Inventor of Telephonic Photography, Edouard Belin

PARIS, FRANCE.—Radio code secrecy in the future is assured by an apparatus which has just been perfected by Edouard Belin, inventor of telephonic photography.

The principle of the invention consists in the emission of Radio waves by means of six discs, the movement of which is synchronized with six other discs on the receiving post so that the reception of messages is impossible unless the receiver is exactly tuned with the sending apparatus.

The messages are tapped by the operator in ordinary words, which the machine thereupon translates into signals resembling Morse dots and dashes, and these are again translated into words by the receiving discs.

In order to prevent outsiders from picking up the synchronized signals the machines keep up a perpetual tapping of false signals which are not recorded on the receiving machine and serve only to confuse the would-be discoverer of the code.

The code is subject to practically an illimitable number of variations, none of which can be received except on the discs for which they are meant.

Age 93; Says Radio's Great MECHANICSBURG, O.—Mrs. Sarah Owen, aged 93, oldest inhabitant of this town, is a Radio fan. Recently the receiving set in the high school building across the street from her home was tuned in and the loud speaker reproduced concerts. Mrs. Owen rested in her easy chair and heard concerts from Pittsburgh and Louisville.

England Heavy Radio Buyer WASHINGTON.—According to the Department of Commerce, exports in July of domestic made Radio apparatus amounted to 225,475 pounds, valued at \$385,861. The largest proportion of this apparatus was shipped to England, the value of whose imports was \$139,027, while \$42,415 worth of apparatus went to Cuba.

Phantom-Circuit
BUILD YOUR OWN. This marvel of mystery with no aerial, no loop, no ground, brings in music instead of static showers. We consistently hear concerts on Magnavox from stations over 500 miles distant, and audible 100 feet from horn. The simplicity of this hookup will surprise you. No Radio frequency used. Just one tuning control. Complete instructions, including photo of circuit, prepaid for 60c.
VESCO RADIO SHOP, Box 703, Vacaville, Calif.

FREE RADIO SET
WE WILL GIVE YOU THIS
National Radio Crystal Set FREE
for selling 30 pieces Mother Pearl Jewelry, 10c each.
Warren Pearl Works
2219-P Arch St., Phila., Pa.

Book Reviews

Radio Receivers for Beginners. By Snodgrass and Camp. Answers the universal question, "How can I receive Radio?" Price, \$1.00.

Home Radio—How to Make It. By A. Hyatt Verrill. This book is particularly adapted for the amateur that 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.

Radio for the Amateur. By A. H. Packer and R. R. Haugh. The underlying principles of Radio thoroughly explained in simple language and understandable illustrations. This book will teach you how to construct and operate a receiving set successfully. Price, \$1.50.

Radio Communication. By John Mills. The fundamental principles and methods upon which recent developments are based are emphasized. The vacuum tube is treated in a simple, fundamental and up-to-date manner. Present methods and tendencies of the art are explained in a chapter which is non-mathematical. Price \$2.00.

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

Experimental Wireless Stations. By S. E. Edelman. This book assumes that the

reader has some knowledge of fundamental electricity and mathematics and is a readily understandable text for beginners in the art of Radio communication who desire to start with the elements. Earlier editions of this book were published during the war. The 1922 edition has been revised and enlarged so as to cover the progress made in the last few years. Price, \$3.00.

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

JAP OUTFIT ELABORATE

(Continued from page 1)

dition there is a super-heterodyne receiver for long and short waves and a standard three-tube commercial ship receiver with a range of from 200 to 7,000 meters.

An interesting feature of the installation is a Radio telephone exchange by means of which the ship's operator can transfer control of Radio telephone transmitter and receiver to any one of several stations. These stations are located in the commander's room, the commander's

office, the senior officer's ward room, the bridge, etc.

By means of the telephone exchange the commander or any other officer may communicate with any vessel in the fleet from any one of the stations on the Kamol. The exchange board differs very little from the usual telephone exchange. A red light indicates that the receiver has been taken from a phone hook and the operator, by throwing a switch puts the officer in immediate control of transmitter and receiver.

There also is a Radio compass by means of which it is possible to find the direction of distant transmitting stations.

The Kamol is the show ship of the Japanese navy. She was recently completed by the New York Ship Building Corporation and is the first vessel of any other than the United States navy to be electrically propelled.

RADIO MAILING LISTS

2770 Retail Radio Dealers U.S. per M \$ 7.50
1024 Radio Manufacturers per list \$0.50
1307 Radio Supply Jobbers per " 12.50
280 Radio Stations per " 4.00
14000 Radio Amateurs and Managers of Radio Stations per M 7.50
Typewritten and ready to send on receipt of remittance covering the amount. Guaranteed 98% correct.
Trade Circular Addressing Co., 166 W. Adams St., Chicago, Ill.

Radio PLAN-O-PHONE

LOUD SPEAKER \$3.50
Most amazing value. Remarkable acoustics. Used with any 2 stage amplified receiving set. Made of bronze—handsome, durable. Nothing half so good at several times the price. Ask your dealer to show it. Mfd. and guaranteed by
Planet Radio Corp., 1223 S. Wabash Ave., Dept. K 4, Chicago, Ill.

Government Surplus RADIO SETS

U. S. ARMY SIGNAL CORPS, TYPE B. C. 14-A

We were lucky enough to secure a limited number of these wonderful Radio Sets and Head Phones, which have just been declared Surplus! These Receiving Sets are complete in every way with wave length range, 200 to 600 meters. **\$23.95**

ALSO U. S. A. AVIATION TYPE, 194 W. WESTERN ELECTRIC PHONES **\$7.95**

Each Phone Cap is covered with large soft rubber ear cushions, and an aviation leather helmet goes with each set!

SIGNAL CORPS SUPER-SENSITIVE MICROPHONE TRANSMITTER, **\$2.45**

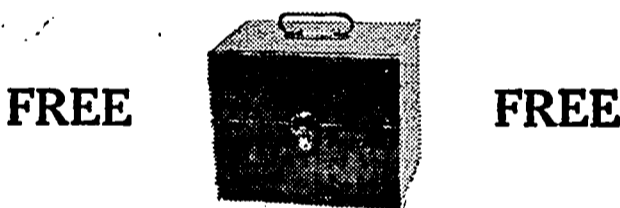
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Wessco

W. E. SUPPLY & SERVICE CORPORATION
18 MURRAY STREET, NEW YORK
Two Blocks South of Chambers, between Broadway and Church Street
Write Department RD

WE ARE GIVING AWAY! This Beautiful Crystal Set



An excellent detector set in a highly polished mahogany case with nickel plated fitting. This set will receive everything broadcasted within a radius of 25 miles.

FREE FREE FREE
To you with every \$25.00 purchase
OUR PRICES SPEAK LOUDER THAN WORDS

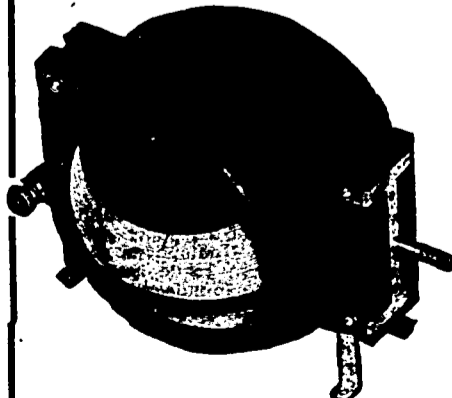
All Merchandise offered is Standard, Guaranteed, and is of perfect workmanship. Mail orders must include postage. TERMS:—Money Orders with Orders—checks are not accepted.

AERIAL—A Vacuum Tube Detector Set—"THE SET THAT MADE GOOD IN A NIGHT." "BETTER THAN THE BEST." Complete with Radiotron Tube, A and B Batteries, Phones, Aerial and Lightning Arrester \$35.00

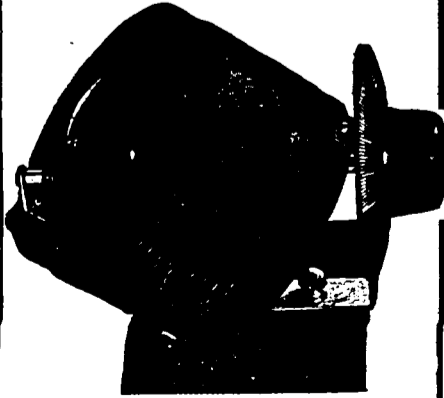
\$16.00 GENUINE BALDWIN PHONE, TYPE C, DOUBLE	\$10.85	\$2.00 Keystone Lightning Arresters	\$ 1.25
\$8.00 GENUINE BALDWIN TYPE C PHONES, SINGLE	6.30	HOMCHARGER DE LUXE	15.25
\$7.00 GENUINE BALDWIN TYPE C PHONES, NO BAND OR CORD	5.70	\$4.50 Thordarson Transformers	2.25
\$24.00 A Battery, 100 amp., 6 V.	16.75	Thordarson Grid Condensers	.15
\$19.00 A Battery, 80 amp., 6 V.	11.45	\$1.50 Thordarson Vernier Rheostat	1.10
\$14.50 A Battery, 60 amp., 6 V.	8.75	\$5.50 Fort Wood Tuning Coil	3.94
\$5.00 Rheostat	.32	\$3.00 Knockdown 2-slide Tuning Coils	1.50
75c Assorted Crystal Detectors	.35	43-in. Composition Red Fibre Tube	.45
Switch Arm	.14	3 1/2-in. Composition Red Fibre Tube	.42
\$45.00 MAGNAVOX	31.50	3-in. Composition Red Fibre Tube	.39
75c High Quality Dial	.20	Johns-Manville Bk. Comp. Tubes, 4-in.	.35
\$5.00 23-pl. Variable Cond.	1.65	Johns-Manville Bk. Comp. Tubes, 3-in.	.25
\$5.50 43-pl. Variable Cond.	1.95	\$1.50 Crystal Detector	.98
\$4.50 Variometer, guaranteed, high quality	2.40	\$1.50 Multi Jack	1.15
\$4.25 Variocoupler, guaranteed, high quality	2.25	\$1.50 Twin Adapter	1.15
Unassembled Variocoupler, complete	1.00	\$1.25 Universal Plug	.95
Unassembled Variometer, complete	1.25	70c Open Circuit Jack	.50
Insulators	.09	85c Closed Circuit	.65
Contact Points, dozen	.04	\$1.00 2 Circuit Jack	.80
Bronze Bus Bar, tinned, ft.	.02	\$8.00 Head Phones	3.76
75c Sockets	.23	125 ft. Coils, No. 14 Phosphor Bronze Tinned Wire	.09
\$3.00 B Battery, 22 1/2 V., variable, highest quality, guaranteed, large size	1.45	40c K. D. Crystal Detector	.16
\$1.75 B Battery, 22 1/2 V., variable, highest quality, guaranteed, small size	.75	Magnet Wire20 per cent. discount off list	.15
3-Plate Vernier Variable Condenser	.70	Rotors	.15
Guaranteed Genuine Bakelite Panels—7x10		\$3.00 Radio Frequency Transformers	1.65
\$1.25 7x12, \$2.00 8x10, \$1.45 5x5, \$0.47 5x5 \$0.95 5x12	1.25	\$1.00 Champion Socket	.60
12,000 ohms Resistance	.85	\$1.00 Bethchem Radiophone Plug	.75
50c Mica Condensers	.25	75c Battery Hydrometer	.35
\$1.00 All Moulded V. T. Sockets	.25	\$1.65 Amco Improved Potentiometers	1.10
\$1.50 MICROSTATS	.95	Volta Variometers	2.00
Spaghettil, per length	.07 1/2	Volta Variocouplers	2.00
		\$6.75 Westinghouse Storage Battery	5.05
		\$6.50 Wessco Audio Transformers, highest quality guaranteed	3.25

YOU PAY TOO MUCH!

When You Pay Six or Eight Dollars for Moulded Variometers!



\$5.50



\$5.00

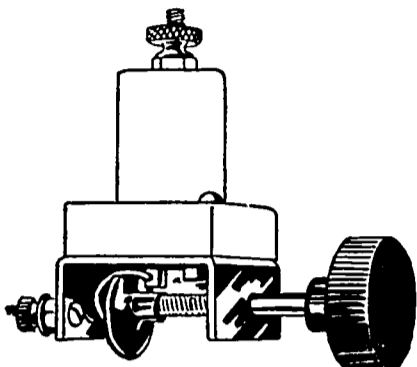
You can build the equal of the most sensitive receiving set by using two variometers and one variocoupler and a few accessories. We have all of it at real prices.

Special Offer { 2 VARIOMETERS } **\$15.25**
 { 1 VARIOCOUPLER }

RADIO INSTRUMENT & PANEL CO., 26 N. Desplaines Street, Chicago, Ill.

The Radiophonist's Mart

THE Mazda Radio Mfg. Company of Cleveland, Ohio, is producing a new form of rheostat of the carbon pile resistance type. This form is similar in principle and application to the resistances in use in delicate electrical measuring instruments. It is so designed that the total useful range of movement is about three turns. One turn from the time the filament begins to glow will bring it to near its critical temperature and in the remaining two turns the control range by voltage



Carbon Pile Rheostat for Tube Filament

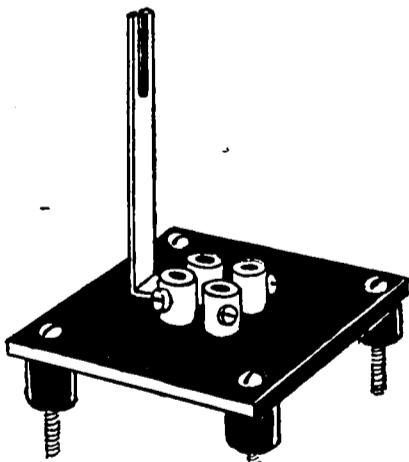
is approximately 1 1/4 volts, thus allowing very delicate single knob control over the critical range of the tube.

To insure flat contact surfaces and thus avoid losses, the rheostat is assembled without alternate disks and washers. The resistance pile is carried in a porcelain container. The movement of the control knob working through a wire cam, either increases the pressure on the resistance pile up to the maximum of the pressure spring, thus decreasing the resistance; or compresses the pressure spring and releases the pressure on the carbon pile, thus increasing the resistance. The main feature is in the fact that the maximum pressure is exerted by the pressure spring and not by the knob setting, thus avoiding the possibility of a crushing pressure on the pile.

This type of rheostat is especially recommended where it is desired to have one rheostat controlling, say three or four amplifying tubes where the amperage flow would be too great for the average rheostat.

The shaft is of 1/4-inch stock and is equipped with a hard rubber knob. Thumb nuts are used for the two connecting terminals.

TO THE amateur who has been experimenting with Radio for any length of time, the set screw socket of vacuum tube presents quite an appeal.

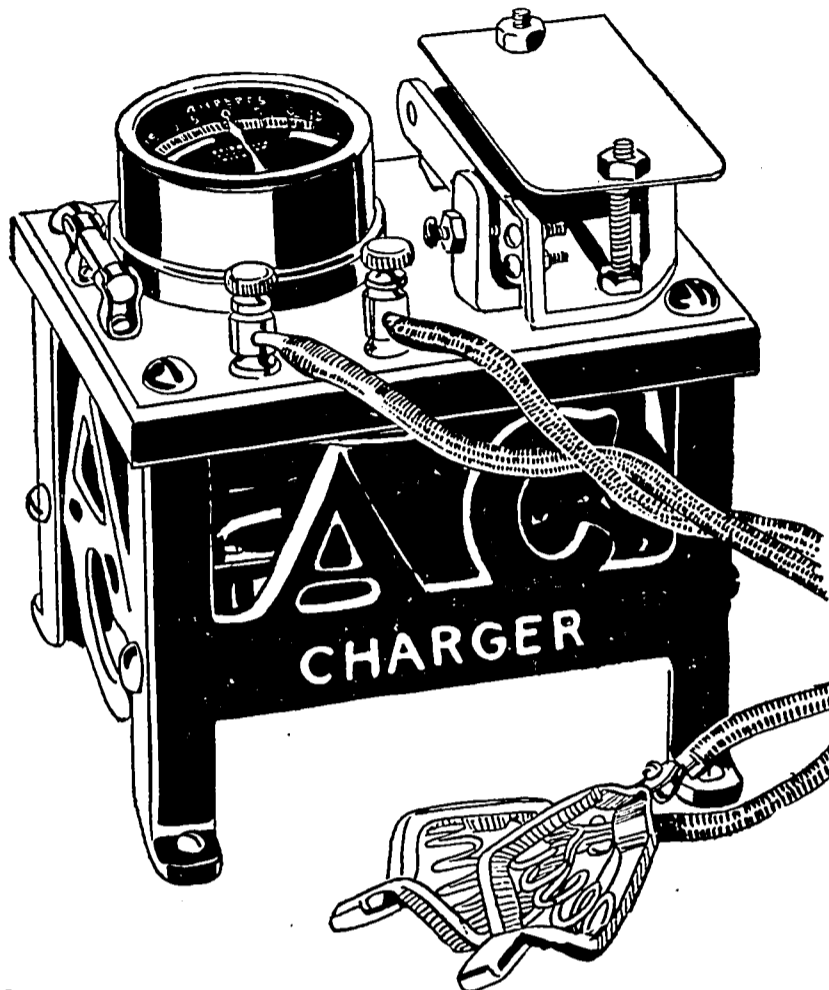


Set Screw Socket Base for Tubes

Instead of unreliable spring contacts which persist in making poor connections, the socket shown in the illustration permits each prong to be inserted in a collar and locked with the set screw. This positively insures perfect electrical contact. Each of the four posts is mounted in a slightly oversized hole in a black dielectric base to allow sufficient movement to compensate for slight deviations in tube manufacture or bent tube posts. In addition a slotted bar is provided, into which the pin on the side of the tube fits, acting similar to the locking slide in a spring contact socket, and insuring correct insertion of tubes. The brass posts are provided with long stems, each having two nuts to which wiring connections may be made. The base is also fitted with four feet of long mounting screws with extra nuts, the feet being long enough to keep contact stems clear from the shelf or panel floor. The long screws have extra nuts provide assembly requirements without purchasing extra parts.

This set screw socket is manufactured by the Mazda Radio Mfg. Company of Cleveland, Ohio.

A. C. Charger for A and B Batteries

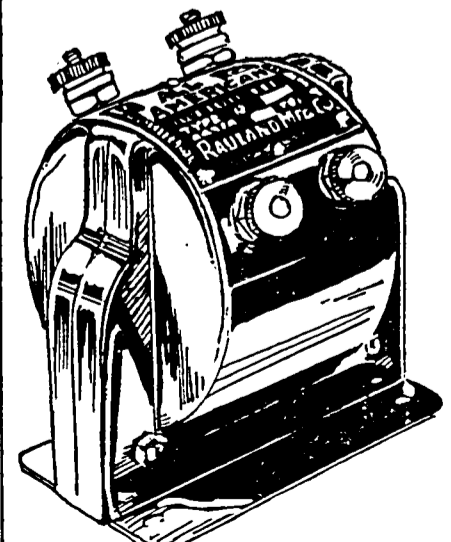


WHY carry your battery out to be charged when you can charge it yourself through the lamp socket? The A. C. Charger shown in the illustration operates automatically and practically noiselessly, is self-polarizing and can also be used to charge B batteries with as high a potential as seventy-five volts. All that is necessary is to attach the battery clips and plug in the socket. It can be left in operation indefinitely. An automatically tapering charge safeguards against overcharging the battery. Radio batteries need frequent recharging to obtain the best results from the tubes.

The only moving part will last many thousands of hours before replacing, and no other adjustment or attention is necessary. To operate, the attachment plug is connected to the socket. Make sure the

current applied corresponds to that indicated on name-plate of charger. Next connect the two battery clips to the terminals of the battery, making sure that charging current bridges at least three cells. The vibrating element on the charger will hum if all connections are complete, and the ammeter will indicate the rate of charge from 6 to 4 amperes, depending on the state of charge and the condition of the battery. The vibrating element should never be tampered with or touched when making connections. It is necessary to have a good contact between the charging clips and battery terminals. The makers advocate, if necessary, scraping off the terminals so as to remove sulphate before charging. The device is manufactured by the Holmes Electrical Mfg. Co., of Chicago, Ill.

ONE OF the neatest examples in appearance and workmanship without sacrifice of efficiency in operation is the new All-American audio frequency transformer made by the Rauland Mfg. Company of Chicago, Ill. In an entirely metal case, nickel plated, the transformer is perfectly shielded from outside interference, thus permitting maximum efficiency and clearest type of amplification. This shielding shell is made in two parts in order to reduce any eddy current effects to a minimum. The core is built up of good quality Silicon steel laminations.



Shielded Audio Frequency Transformer

There are three types made—R-13 with a ten-to-one ratio, R-11 with a five-to-one ratio, and R-2 with a three-to-one ratio.

All types are wound with No. 40 enamel wire with a special spacing arrangement between adjacent windings, and the whole is vacuum impregnated with wax compound to reduce capacity effects. Resistance characteristics of the respective types are as follows:

R-13; primary resistance 590 ohms, secondary resistance 9,140 ohms, primary impedance with the secondary open 67,000 ohms, with the secondary closed 1,030 ohms, secondary impedance with primary closed 120,000 ohms, with primary open 2,500,000 ohms. All impedance values are taken at one thousand cycles.

R-11; primary resistance 935 ohms, secondary resistance 8,100 ohms, primary impedance with the secondary open 100,000 ohms, with secondary closed 1,930 ohms, secondary impedance with the primary closed 70,000 ohms, with the primary open 1,750,000 ohms.

R-2; primary resistance 1,225 ohms, secondary resistance 4,790 ohms, primary impedance with the secondary open 280,000 ohms, with the secondary closed 2,300 ohms, secondary impedance with the primary closed 29,000 ohms, with the primary open 1,500,000 ohms.

Officers of the American fleet in the Adriatic have concluded that the moon affects Radio. They report they noticed that on each change of the moon, there was an appreciable change in the amount of atmospheric interference.

CARTER "HOLD-TITE" JACKS

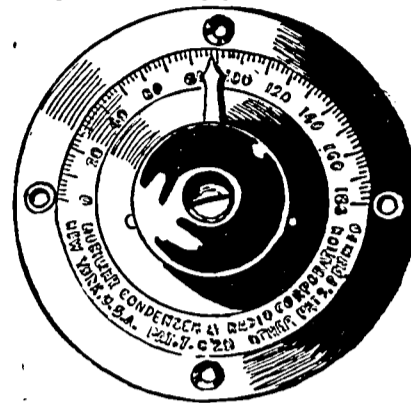
1 to 5 springs: price 70c to \$1.10

New design; heavy phosphor-bronze springs; no spacer washers required. Write for Bulletin on these Jacks, "TU-WAY" Plugs and other Carter products.

CARTER RADIO CO., 209 S. State St., Chicago

THE condenser shown in the illustration is a new type of variable produced by the Dubilier Condenser & Radio Corporation of New York City. It is marketed in two units, one with a capacity value of .001 mfd. and the other of .0005 mfd.

At the present time when the plate type variable condenser takes up the large space that its design demands, this small disk type of unit is quite an attraction to the Radiophonist who enjoys small and com-



Small Disk Type Variable Condenser

compact receiving sets. It is readily adapted for panel mounting, having the usual form of knob with an indicating pointer attached. If mounted in front of the panel the graduations are right on the face of the unit, thus avoiding the necessity of a dial.

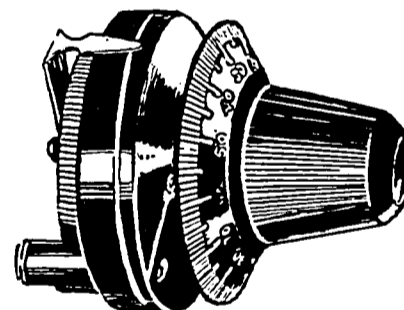
MANY Radio fans do not realize that one of the chief causes of weak reception of signals or music is lack of control of their detector tubes.

One can redesign and rebuild his set as much as he pleases, but unless he has accurate adjustment of his filament current, he will never get the full joy of hearing concerts clearly and distinctly.

When reaching for that small faint voice 'way off somewhere and the slightest touch of the rheostat is too much, it is then that the need of a rheostat with a more sensitive adjustment is appreciated.

The rheostat shown in the illustration has a micrometer adjustment. It is equipped with a vernier which permits the critical adjustment needed for best reception. Both coarse and fine adjustments are operated by one knob.

It is wire-wound and equipped with a dial to indicate the exact adjustment at all times. It is made of moulded condenser, white letters on black, phosphor

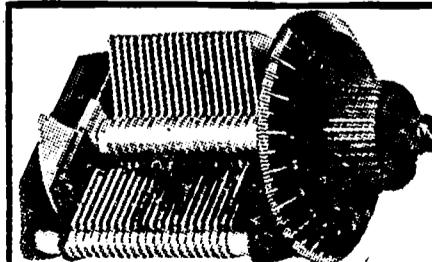


Rheostat with Micrometer Adjustment

bronze contacts. The rheostat is manufactured by the Klosner Improved Apparatus Company of New York City.

Idle Crystal Detector Set

When a crystal detector set is not in use it should always be disconnected from the antenna. If this is not done, sensitivity will be gradually destroyed by continual static splashes and loud signals.



THE ORIGINAL B-T Vernier Condenser
Has No Equal for Fine Work
\$.0025-\$4.50 .0005-\$5.00 .001-\$6.00
WITH HIGH CLASS 3-INCH DIAL

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Manufacturers—Distributors
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532-536 S. Canal St., CHICAGO
Pacific Coast Office
171 Second Street SAN FRANCISCO

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State, City, Call

Georgia: Atlanta, WDAW, WGM, WSB, College Park, WDAJ, Decatur, WAAS, Gainesville, WKAY, Macon, WGAK, WMAZ, Savannah, WHAO... Idaho: Boise, KFAU, KFBJ, KFDD, Lewiston, KFBA, Moscow, KFAN, Wallace, KFCC...

State, City, Call

Louisiana: New Orleans, WAAB, WAAC, WCAW, WGV, WIAP, WWL, Shreveport, WAAG, WDNAN, WGAQ, WMAU... Maine: Auburn, WMB, Houlton, WLAN, Portland, WJAL, Sanford, WFAZ... Maryland: Baltimore, WCAO, WEAR, WKC... Massachusetts: Boston, WAAJ, WFAU, WNAC, Dartmouth, WMAF, Medford Hills, WGI, New Bedford, WDAU, Springfield, WBZ, Worcester, WCN, WDS...

State, City, Call

Nevada: Reno, KDZK, KFAS... New Hampshire: Laconia, WKAV... New Jersey: Atlantic City, WHAR, Camden, WRP, Deal Beach, 2XJ, Jersey City, WAAT, WNO, Moorestown, WBAF, Newark, WAAW, WBS, WJZ, WOR, 2XAI, N. Plainfield, WEAM, Ocean City, WIAD, Paterson, WBAN, Roselle Park, WDY, Trenton, WMAL... New Mexico: Roswell, KNJ, State College, KOB... New York: Albany, WNJ, Binghamton, WFAX, Buffalo, WGR, Canton, WCAD, Cazenovia, WMAC, Ithaca, WEAT, Lockport, WMAK, Newburgh, WCAW, New York, KQW, WBY, WDT, WEAF, WJX, WLAB, WVP, WWZ, 2XI, Poughkeepsie, WFAF, Rochester, WHAM, Ridgewood, WHN, Schenectady, WGY, WRL, Syracuse, WBAH, WDAI, WFAB, WLAI, WNAJ, Tarrytown, WRW, Troy, WHAZ, Utica, WSL, Waterford, WFAQ... North Carolina: Asheville, WFAJ, Charlotte, WBT, Raleigh, WLAC... North Dakota: Fargo, WDAY, WKAJ, Grand Forks, WQAB, Wahpeton, WMAW... Ohio: Akron, WOE, Athens, WAAV, Canton, WVB, Cincinnati, WAAD, WHAG, WIZ, WLV, WMH, Cleveland, KDPM, WHK, WJAX, Columbus, WBAW, WCAH, WEO, WMAN, Dayton, WAI, WFO, WJAJ, Defiance, WCAQ, Fairfield, WL-2, Granville, WJD, Hamilton, WBAU, WRK, Lebanon, WPG, Lima, WQAC, Marietta, WBAW, Springfield, WLAM, WNAP, Stockdale, WJAK, Toledo, WBAJ, WHU, WJK, Warren, WLZ, Washington C. O., WGAX, Wooster, WGAU, Youngstown, WAAV, WMC... Oklahoma: Ardmore, WQAA, Enid, WNAF, Muskogee, WDAV, Norman, WNAD, Okemah, WKAK, Oklahoma City, WKY, WMB, Tulsa, WEH, WGAF, WLAL, Yale, WHAT... Oregon: Astoria, KFAM, Eugene, KDZJ, KFAT, Hood River, KQP, Klamath Falls, KDYU, Marshfield, KFBH, Medford, KFAY, Pendleton, KFEE, Portland, KDYQ, KFAB, KFEC, KGG, KGN, KGW, KQY, KYG, Salem, KFCD... Pennsylvania: Allentown, WIAN, Altoona, WGAU, Bridgeport, WBAG, Brownsville, WDAQ, Clearfield, WPI, Crafton, WAAK, Easton, WMAP, Erie, WQAV, WSX, Lancaster, WGAL, McKeesport, WIK, Parkersburg, WQAA, Philadelphia, WCAU, WDR, WFI, WGL, WTP, WNAT, WOO, WJP... Pittsburgh, KDKA, KQV, WCAE, WHAF, WJAS, Scranton, WLAO, State College, WPAB, Villanova, WCAM, Wilkes-Barre, WBAX, WKAZ, WNAH... Rhode Island: Cranston, WKAP, Eastwood, WEAG, Pawtucket, WXT, Providence, WEAN, WJAR... South Carolina: Charleston, WFAZ, Orangeburg, WGM, Rapid City, WCAT, Sioux Falls, WFAT, Vermillion, WEAJ, Yankton, WAJU... Tennessee: Memphis, WKN, WPO, Nashville, WDAW... Texas: Abilene, WQAG, Amarillo, WDAQ, WRAU, Austin, WCM, WNAS, Beaumont, WMAM, College Station, WTAU, Dallas, WDAO, WFAA, WRR, El Paso, WDAH, Fort Worth, WBAP, WPA, Galveston, WHAB, WTAC, Houston, WCAK, WEAU, WEV, WFAI, WGAB, WPAW, WSAU, Laredo, WVAZ, Orange, WKAL, Paris, WTK, Port Arthur, WFAH, San Antonio, AS6, DM7, WCAR, WJAE, WQAI, Waco, WJAD, WLAJ, WWAC... Utah: Salt Lake City, KDYL, KZLN... Vermont: Bellows Falls, WLAK, Burlington, WCAK... Virginia: Blacksburg, WEAE... Washington: Aberdeen, KNT, Bellingham, KDZR, Centralia, KDZM, Everett, KDZK, KFBL, Lacey, KGY, Pullman, KFAE, Seattle, KDZE, KDZT, KFCE, KHQ, KJR, KTW, KZC, Spokane, KFZ, Tacoma, KFBG, KGB, KMO, Walla Walla, KFCE, Wenatchee, KDZI, KZV, Yakima, KFY... West Virginia: Charleston, WAAO, Charlesburg, WHAK, Huntington, WAAR, Morgantown, WHD... Wisconsin: Beloit, WKAV, Madison, WGAY, WHA, Milwaukee, WAAK, WCAV, WHAD, WIAO, Neenah, WIAJ, Superior, WFAW, Waupaca, WIAA... Wyoming: Laramie, KFBU... Alaska: Fairbanks, WLAY... Hawaii: Honolulu, KDYX, KGU, KYQ... Porto Rico: Ensenada, WGAD, San Juan, WKAQ... Canada: Calgary, CHBC, CHCQ, CFAC, CFCN, CJCJ, Edmonton, CHCC, CJCA, Fort Frances, CFPC, Halifax, CFCE, CJCS, Hamilton, CKOC, Iroquois Falls, CFCH, Kitchener, CJCF, London, CFCX, CHCS, CJGC, CKCK, Montreal, CFCF, CHY, Montreal, CFCF, CFZC, CHXC, CHYC, CJBC, CKAC, CKCS, Nelson, CJCB, Ottawa, CHXC, Regina, CKK, St. John, CICI, CKCR, Toronto, CFCA, CFTC, CHCB, CHCZ, CHVC, CJCD, CJCH, CJCN, CJSC, CKCE, CKCZ, CKKC... Vancouver, CFCB, CFYC, CHCA, CHOC, CJCE, CKCD... Walkerville, CFCI, Winnipeg, CHCF, CJCG, CKCB, CKZC, CJNC... Cuba: Havana, PWX

State, City, Call

Alabama: Auburn, WMAV, Birmingham, WIAG, WSY, Mobile, WEAP, Montgomery, WKAN... Arizona: Phoenix, KDIW, KFAD, KFCE, Prescott, KFBC, Tucson, KDZA...

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Alabama: Auburn, WMAV, Birmingham, WIAG, WSY, Mobile, WEAP, Montgomery, WKAN... Arizona: Phoenix, KDIW, KFAD, KFCE, Prescott, KFBC, Tucson, KDZA...

STATION SCHEDULES

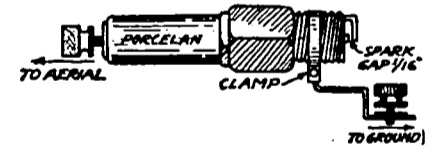
(Continued from page 8)

WBAF, Moorestown, N. J. Fred M. Middleton. WBAF, Bridgeport, Pa. 485 also, 300 ml. Diamond St. Fibro Co. Daily, 11:45-12 m. markets, weather. Eastern. WBAH, Minneapolis, Minn. 200 ml. The Dayton Co. Daily ex Sun, 1-1:30 pm, 3-3:30, 5-5:30, 9:30-10:30, 11-11:30 am. Wed, 8-10 pm. Central. WBAJ, Toledo, O. 300 ml. Marshall-Gerken Co. Daily ex Sun, 12:05-2 pm, 2-7:30, news, music, reports. Tues, Thurs, Sat, 8-9 pm. concert. Eastern. WBAN, Paterson, N. J. 100 ml. Wireless Phone Corp. Daily ex Sun, 10:30 am, on the hour to 9:30 pm. concert, baseball. Eastern. WBAO, Decatur, Ill. James Millikin Univ. WBAQ, South Bend, Ind. 200 ml. Myron L. Harmon. Tues, Thurs, Sat, 7 pm, Sun, 2 pm. Central. WBAF, Fort Worth, Texas. 400 and 485 only. 1,500 ml. Ft. Worth Star Telegram. Daily ex Sun, 9:45-10 am, 11-11:30, 3-3:30, 4:45-5:15, 5:30-6:30, 6:30-6:45, 9:30-10:30, news, reports, concert. Central. WBAU, Hamilton, O. Republican Pub. Co. WBAV, Columbus, O. 485 also, 300 ml. Erner & Hopkins Co. Daily ex Sun, 12:30 pm, news, weather. Mon, 7 pm, music. WBAW, Marietta, O. Marietta College. WBAK, Wilkes-Barre, Pa. 200 ml. John H. Stenger, Jr. Three nights of week, not regular. WBAY, New York, N. Y. 400 only. 1,500 ml. A. T. & T. Co. Daily, 11-12 am, 4:30-5:30 pm. Thurs, 7:30 pm on Eastern daylight saving. WBL, Antonio, Texas. 200 ml. T. & H. Radlo Co. WBL, San Antonio, Texas. 200 ml. T. & H. Radlo Co. WBS, Newark, N. J. 100 ml. D. W. May, Inc. Mon, Wed, Thurs, 7:30-8:30 pm, reports, music. Sun, 9-10:30 am, 1-3 pm, church service. Eastern. WBT, Charlotte, N. C. 485 also, 500 ml. Southern Radio Co. Daily ex Sun, 11 am, reports, 8 pm, music. Sun, 7:30 pm, church service. Eastern. WBU, Chicago, Ill. City of Chicago. WBZ, Springfield, Mass. 400 only. 500 ml. Westinghouse Elec. & Mfg. Co. Daily ex Sun, 7:30 pm, children's hour; 7:45, markets, weather, lecture; 8-9, concert. Sun, 3 and 8, church service. Eastern. WCA, Newark, N. J. 150 ml. Newburgh Daily News. Daily ex Sun, 1 pm, 2, 8, 7. Mon, Fri, 10:30 pm. Eastern. WCAC, Fort Smith, Ark. 500 ml. John Fink Jewelry Co. Fri, Sun, 8-10 pm, music, talks, sermon. Central. WCAD, Canton, N. Y. 200, 485 also, 300 ml. St. Lawrence Univ. No regular schedule. Eastern. WCAG, Pittsburgh, Pa. Kaufman & Baer Co. WCAG, New Orleans, La. Daily States Pub. Co. WCAN, Columbus, O. 150 ml. Entreklin Elec. Co. Tues, Fri, 7-9 pm, music. Wed, Thurs, Sat, 7-8 pm, music. Sun, 10-12:30, church service. Central. WCAI, San Antonio, Tex. Southern Equipment Co. WCAJ, Univ. Place, Neb. 485 also, 100 ml. Wesleyan Univ. Daily ex Sun, 11 am, weather, news, Wed, 9 pm, music, lecture. Central. WCAK, Houston, Tex. 100 ml. Alfred P. Daniel. Daily ex Sun, 7-7:15 pm, music. Wed, 8-9:15, concert. Sun, 3-4:30 pm, concert. Central. WCAL, Northfield, Minn. 500 ml. St. Olaf College. Thurs, 11 pm, music. Sun, 8:30 pm, music, concert, lecture. Central. WCAM, Villanova, Pa. Villanova College. WCAO, Baltimore, Md. 100 ml. Sellers & Stayman Co. Daily ex Sun, 12-12:20 pm, 5-5:20. Mon, Wed, 7:30-8:30 pm. Eastern. WCAP, Decatur, Ill. Central Radio Service. WCAQ, Decatur, O. 200 ml. Tri-State Radio Mfg. Co. Daily, 11:30-12:30 pm, 8, baseball; 6-6:30, baseball, concert; 8, special program. Central.

WCAW, San Antonio, Tex. 200 ml. Alamo Radio Elec. Co. Mon, Thurs, Sat, 8:30-9:30 pm, concert. Sun, 11 am, church service. Central. WCAS, Minneapolis, Minn. 200 ml. Wm. H. Dunwoody Industrial Inst. Mon, 8-8:45 pm, music, lectures. Central. WCAT, Rapid City, S. Dak. 485 also, 300 ml. S. Dak. School of Mines. Daily ex Sun, 9:30-12:30 pm, weather. Mountain. WCAU, Philadelphia, Pa. Phila. Radiophone Co. WCAV, Little Rock, Ark. J. C. Dico Elec. Co. WCAW, Quincy, Ill. 200 ml. Quincy Elec. Sup. Co. (Quincy Herald.) Daily ex Sun, 8:45 am, markets; 11, markets; 1 pm, markets; 6, music, baseball. Tues, Wed, Thurs, Sat, 8:30-9:45 pm, concert. Sun, 6:30-7:30 pm, religious. Central. WCAK, Burlington, Vt. Univ. of Vt. WCAJ, Milwaukee, Wis. Kesselman O'Driscoll Co. WCAZ, Quincy, Ill. Whig-General. WCE, Minneapolis, Minn. Findley Elec. Co. WCF, New Haven, Conn. 400 ml. A. C. Gilbert Co. Mon, Wed, Thurs, 7:30-8:30 pm, news, music. Eastern. WCK, St. Louis, Mo. 485 also, 50 ml. Stix Baer & Fuller (Grand Leader). Mon, Wed, Fri, 6:45-8 pm, concert, lecture, bedtime story. Central. WCM, Austin, Tex. Univ. of Tex. WCN, Worcester, Mass. 485 also, 100 ml. Clark Univ. Daily, 11:15 am, 8:15 pm, weather. Evening program irregular. Eastern. WCK, Detroit, Mich. Detroit Free Press. WDAA, Nashville, Tenn. Ward Belmont School. WDAC, Springfield, Ill. Ill. Watch Co. WDAE, Tampa, Fla. 485 also, 500 ml. Tampa Daily Times. Wed, Fri, 8-10 pm, music, lecture. Eastern. WDAF, Kansas City, Mo. 400 and 485 only. 500 ml. Kansas City Star. Daily ex Sun, 3-4 pm, reports, music; 6-7, educational, bedtime story, etc. Mon, Wed, Fri, 8-10 pm, concert. Sun, 3:30-5:30 pm, music. Central. WDAE, Amarillo, Tex. K. Laurance Martin. WDAE, Belvidere, Ill. Apollo Theatre. WDAH, El Paso, Texas. 485 also, 300 ml. Mine & Smelter Supply Co. Daily ex Sun, 10 am, news, reports. Tues, Thurs, Sat, 7:30-8:30 pm, music. Mountain. WDAI, Syracuse, N. Y. 485 also, 200 ml. Hughes Radio Corp. Daily ex Sun, 12 m, reports. Wed, Sat, evening concert. WDAJ, College Park, Ga. 485 also, 300 ml. A. & W. P. R. Co. Daily, 9-10 pm, concert etc. Central. WDAK, Hartford, Conn. 150 ml. Hartford Courant. Daily ex Sun, 2:30 pm, 3:30, 4:30, 5:30, music; 7:40, bedtime story; 8:15, concert. Eastern. WDAL, Jacksonville, Fla. 485 also, 250 ml. Florida Times Union. Daily, 11 am, time, weather, 3-3:15, 4-4:15, 5-5:15, 8-9:30 music. 10:05-10:20 pm, reports. Eastern. WDAN, Shreveport, La. Centenary College and Glenwood Radio Corp. WDAO, Dallas, Tex. Automotive Elec. Co. WDAF, Chicago, Ill. 485 also, 1,000 ml. Midwest Radio Inc. Daily ex Sun, 9:45 am, 9:45 am, 10:45, 11:45, 1:45 pm, 3:15, foreign exchange; 3:17, closing Chicago stocks. Sat, 9:45 am, 10:45, 11:45, 12:45 pm, foreign exchange; 12:17, closing Chicago stocks. Sun, 8:30-10:30, concert. Central. WDAQ, Brownsville, Pa. 200 ml. Hartman-Riker Elec. & Mach. Co. Daily ex Sun, 10:30-10:50 am, music; 12:50-1:10 pm, music, news, weather; 5:05-5:30, music. Tues, Thurs, Fri, 9:15-10 pm, concert. Sun, 5 pm, chapel. Eastern. WDAE, Philadelphia, Pa. Lit Bros. WDAE, Worcester, Mass. Samuel A. Waite. WDAU, New Bedford, Mass. 50 ml. Slocum & Kilburn. Mon, Wed, 7-9 pm, concert etc. Eastern. WDAV, Muskogee, Okla. Daily Phoenix. WDAW, Atlanta, Ga. 85 also, 500 ml. Georgia By. & Power Co. Daily ex Sun, 6-7 pm; 9-9:55. Sun, 3:30-4:30 pm. Central.

WDAW, Centerville, Iowa. 500 ml. First Nat'l. Bank. Daily ex Sun, 11:30 am, reports, news. Mon, Thurs, 7:30-9 pm, concert. (NOTE.—The second half of the station schedule list will appear next week.)

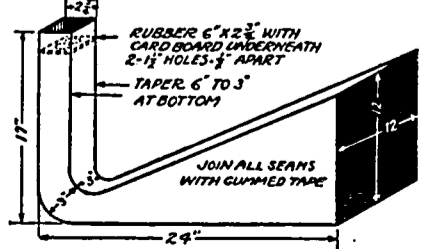
Spark Plug Lightning Arrester An automobile spark plug makes a highly efficient lightning arrester. It has a porcelain insulator and the spark gap is



already fixed to take care of the electrical discharge if lightning should strike the aerial. One wire from the aerial can be fastened to the center electrode of the plug and a wire from the ground fastened to the body of the plug. After the plug is wired it can be enclosed in a glass tube so all danger from fire will be removed. Use a good spark plug and you will have as good or better arrester than the kind purchased.—C. L. Smith, Jackson, Miss.

Cardboard Loud Speaker

A horn for a loud speaker can be made of cardboard, as shown in the illustration. A rubber sheet is used in the smaller end to hold the phones snugly to the openings.



A piece of old inerttube will make the rubber. If the builder so desires this horn may be made of wood veneer and it will be more resonant than the cardboard.—Norman J. Forsman, Milwaukee, Wis.

Cold Tube Not Conductor

A vacuum tube is not a conductor of electricity except when a stream of electrons is flowing through it, being shot from the heated filament. It is the heat in the filament, and not the potential across it, caused by the A battery that causes the emission of electrons. When lit up, the vacuum tube is a lively affair, but when the filament is not lit it is quite dead, and almost a perfect insulator. For this reason it is not necessary to worry about exhausting your B batteries when left in the circuit after the filament current has been turned off, as the very high resistance in the tube effectively prevents the B battery from discharging.

Easy to Understand Radio with This Book

A clear explanation of the operation of Radio Receiving Sets, with Simple Instructions on Tuning and the Calculations of Wavelengths, and Plenty of Hook-up Diagrams.

Radio Reception

by Harry J. Marx, Technical Editor "RADIO DIGEST," and Adrian Van Muffling 230 Pages, 130 Illustrations, 38 Hook-up Diagrams with descriptions, 12 Tables of Data, 30 Radio Formulae, Sample Problems worked out, Radio and Audio Frequency Amplification, Every piece of apparatus described and shown in hook-up Only \$2.00 Mail Your Order Today to HARRY J. MARX 900 Wilson Ave., CHICAGO

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Crystal Set Limitations

Cannot Expect Distance Reception Regularly

INSTEAD of seeking a more reliable source of information the novice is apt to base his purchases on the glaring headlines of the skillful advertiser. After the purchase is made and he finds that he can receive nothing but code he will register a complaint with the dealer regarding the efficiency of his set.

It is getting to be an old story, and still the beginner fails to heed the sound information through newspapers and periodicals regarding the crystal receivers. It does not make one particle of difference what the advertisement says. The crystal at its best is good for a maximum of thirty miles only. Any phone heard with a crystal set over that distance is but a freak reception. If distance is the thing that is on the mind of the beginner, the tube set is the one to buy, as a crystal absolutely will not give reliable long distance reception.

Winter's Activity in Radio

Revival of Interest Fast Gaining Impetus

INDICATION of a revival that will greatly surpass the boom of last winter is quite evident. The most skeptical are beginning to admit freely that within a comparatively few weeks a wave of Radio enthusiasm will start sweeping over the country and will outclass the similar wave of last season.

The large numbers of inquiries received at broadcasting stations prove that many thousands of names have been added to the list of Radiophone owners. The indications are that the receiving stations will be more than twice the number in existence at the first of the year.

Reasons for this are many, but the chief ones probably are the development and improvement in broadcasting stations. There are practically no sections of the country today that are not covered by the range of one or more stations, and so there is no section that is not live, valuable territory for a manufacturer to enter.

With the revival of interest in the great entertainment there will come a wonderful improvement in the character of programs to be broadcasted. It has been noticed that during the summer the programs have been shortened and, as a result of vacations and the extreme heat, the talent offered in many cases has not been of the best. This has caused a great amount of comment and criticism on the part of many persons who listen in regularly, and those who do not take into consideration the conditions under which Radio programs are arranged.

Over Amplification and Transmission

Self Enthusiast Making It Disagreeable for Many

THERE may be many people who have no appreciation for the artistic, but the most unfortunate of all is the one without a musical ear. To him the most blatant jazz is as pleasing as the "Melody in F." It is all a collection of sounds that make him want to dance, and the quicker the tempo and the greater the volume the better he likes it. Such a person is more to be pitied than scorned, but he should not become a public nuisance.

Too many owners of Radio sets now measure successful reception by quantity rather than quality. Although they may be receiving in rather a small room, they use an amplifying horn that is amply large for a concert hall, and what is worse, this horn at the same time it amplifies the volume, magnifies the imperfections of the artist and the non-musical sounds of the Radio apparatus.

It is not necessary to amplify the programs so that they will jar your neighbors. Cut down the volume until you get the same amount that you would have if a singer or instrument were in the room with you. Your results are sure to be more satisfactory in their original volume, and some of them might well be even softer than originally rendered. You must bear in mind that your neighbor may have an ear trained to artistic musical rendition, and that your amplification may not only be annoying him, but that you may be causing him actual mental pain. You may come close to a nuisance and a hindrance to the development of Radio. Be reasonable.

Condensed

By DIELECTRIC

Eight years of separation since last hearing from an old friend and then to hear his voice coming from the transmitter at WJZ while listening in in Texas—!! Well, that's Radio. Really, if some of you write short stories, there is a beautiful plot for you. I'm not going to map it out here for you, though. Just keep your headsets on and be ready for any remarkable incident to happen to you.

Probably many of you have tuned in a station, then when a number was completed thought you had lost it. It seems that WGY decided some means should be provided by them to insure a fan's knowing he still had them tuned in, so they produce a whistling sound between numbers. That may suffice, but it is possible that in some cases other distant stations would sound too faintly to be brought in, and then the whistle would be unwelcome. How is it possible to please everyone?

The idea of controlling ships by means of Radio, since that has proved practicable, may easily lead to directing the movements of many other objects. It has been shown by Army tests that tanks may move about entirely at the discretion of the Radio operator, who may be located some distance away. How much of future wars will depend on the successful use of electromagnetic waves for their prosecution is a difficult thing to foretell at this early date. Early date? Well, I hope so, at least.

The man who has furnished us with the phrase, "Kodak as you go," gave a real thrill to listeners in recently who were tuned to station WHAM. In the Eastman School of Music there is a wonderful organ and music from it was sent out during some experimenting with their equipment. Now, if there is one thing that will insure my headset fitting comfortably, it is to hear some music from a fine pipe organ.

Old Man Static might just as well give up without a longer struggle, for he is surely doomed with all the Radio Bugs hot after him. I suppose you know of the tests a Dr. McCaa made quite recently, attempting to overcome the persistent interference of this famous intruder on Radio conversations. From all accounts O. M. S. hasn't the ghost of a show to spoil good reception where the Dr.'s invention is in use. Naturally, we are all a bit skeptical about the genuine success of eliminating static, but we are mighty hopeful.

Receiving sets for the delectation of patrons in restaurants is something which has proved to be very efficient. To have a headset installed over the ears of the chef, however, is another matter. An order for "ham and" might very easily be misconstrued by this necessary adjunct to a chop house, especially if he were listening to crop reports over the Radio. A true Bug could not deny the pleasure of listening in to anyone, however much he might suffer the consequences.

We have come at last to the time when it is possible for a broadcasting station to celebrate its first birthday. Station WJZ held such a commemorative service in October. The artists who first appeared with that station were again on hand to give joy to the large audiences listening to them. It will be remembered that this station was about the very first to broadcast, and in spite of a few ill-timed bouquets, it was appreciative of the birthday remembrances which came to them on the proper date.

I heartily agree with the Editor of RADIO DIGEST in suggesting that all broadcasting stations repeat their call letters more frequently during the course of their programs. Once in an evening is not often enough, and yet it seemed to me, as I was listening to a very enjoyable program recently, that the announcer couldn't get his microphone to announce the location of his station until ready to sign off. That is aggravating, and unfair to listeners in all along the row. If we have a loud speaker and a number of friends in front of it, it is natural for them to want to know where the entertainment is coming from. KFBU will be announcing their call letters, you see if they don't.

Where exhibitors at Radio shows have been permitted to demonstrate reception, consternation has ensued for the very simple reason that, up to the present, several have attempted demonstrating simultaneously. Such procedure was harmful to all concerned. When you try to hear everything, you usually hear very little of anything, and new fans are not secured in that manner.

Thousands of fans are genuinely interested in sports of various kinds and many of them, unable to attend in person, have followed the playing of a game with real enjoyment by means of the ever faithful receiving set. Possibly some of you were listening in to the Syracuse-Penn State football game, as it was being broadcast by WGY. I was seated in the Polo Grounds, New York city, instead of at my set during the playing of that game. But the evening before, in four gatherings of alumni of Penn State in various parts of the country, the president of State College, Pa., was heard in an address of welcome. Radio made possible the feat of virtually speaking in five places at one time. Colleges are just beginning to grasp the possibilities afforded in the use of Radiophony. New educational features will develop as the result of greater attention to this marvelous agency.

RADIO INDI-GEST

General Call, All Stations

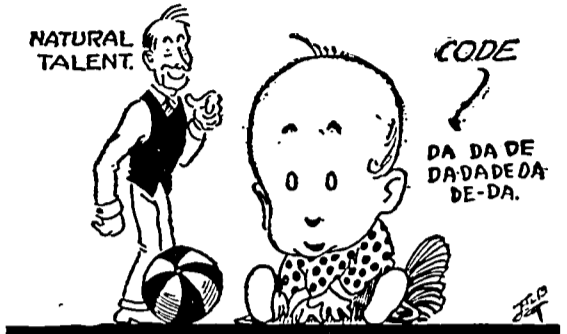
Hel-lo—do you hear—hel-lo—do you hear—this is station—this is station—BVD—signing off until—spring—good-night!—F. W. K. in "Line o' Type or Two," Chicago Tribune.

Or Toreadoring

Some cynic will be sure to describe broadcasted talk on the meat packing industry as "beefing."

He's Just Learning to Talk Himself

You can't be sure that the dapper young man who



absent-mindedly murmurs da-da, talks that way to the baby at home. He may be learning the Continental code.

Why, We Use a Filter on Our Home Brew

One of the latest inventions in the Radio field is a filter that separates the telephone and telegraph waves. We shall look forward to the day when a filter will separate the good music from the bad and automatically send the latter to Uranus.

They're Just Learning How

"One of the hardest things to think of is what people talked about before they had Radio outfits," says a contemporary. That's easy. They didn't.

Modern Jack Horner



Little Jack Horner
Sat in the corner,
Over his Radio Set.
He plugged in for a trial,
Tuned in on his dial,
And said, "I've got
Pittsburgh, you bet."
—Harriet Reynolds Marchant.

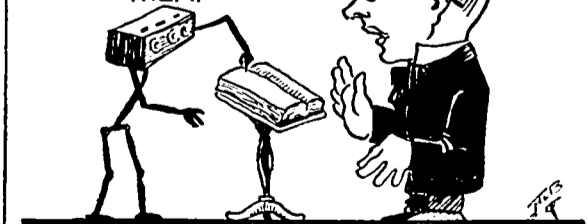
Use a Wave Trap and Catch 'Em

Small Boy: Mother, I want a Radio set.
Mother: I've had hard enough time getting rid of cockroaches in this house and I'm not going to have any of those Radio bugs running around.

They Must Be Bugs

The influence of Radio is felt everywhere. The Buffalo Commercial says: "Thousands of persons within a

RE-WRITE IT,
NOAH DIDN'T
GET HALF OF
THEM.



R-A-D-I-O-U-S of several hundred miles." We assume that this is a new word, a combination of "RADIO" and "RADIUS."

"Job" Lotz and "Toot" Sweet

Lotz and Sweet are two artists who have come into the broadcasting field. Mr. Lotz is a baritone for KDKA, and Miss Sweet a soprano for KYW. With these two artists we should expect a satisfactory quantity of music as well as a pleasing quality.

Some Sets Need the Wires, All Right

Sezze: "What are all those wires on there for?"
Sezzye: "Oh, they hold the instruments together."

Use of the Radio Receiving Set in the Home

Part XI—Indoor Loop Antennae

By H. M. Towne

THERE are quite a number of instances where the customary outdoor antenna cannot be erected, often because of lack of space or suitable support. There are also conditions of severe interference caused by static or by induction from electric power circuits which will

a definite natural wave length, just as the elevated antenna wire has a definite wave length. For maximum results, this natural wave length should be somewhere near the wave length of the incoming waves and for this reason it becomes necessary to use several turns of wire unless

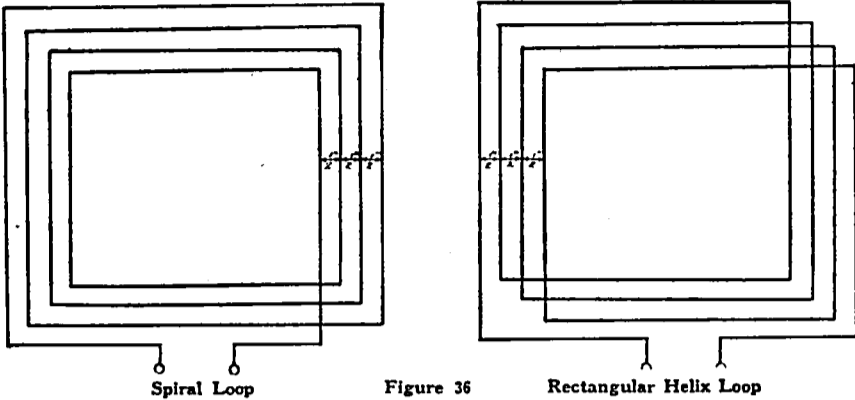


Figure 36

invite attention to the indoor loop form of antenna.

The indoor loop is becoming increasingly popular for Radio reception of broadcasting over short distances. When employed with Radio frequency amplification, a loop will give good signals over considerable distances. One outstanding advantage of the loop is its directive characteristic. This feature of the loop has greatly simplified Radio direction finding, a phase of Radio of no little importance in modern navigation.

Simple Form of Loop Antenna

In its simplest form, the loop antenna may be one turn of wire, the turn forming a large square and enclosing a large area.

the single turn can enclose a very large area. Owing to the greater convenience in handling, the more common practice is to wind several adjacent turns of wire on a frame of relatively small dimensions.

Two Designs of a Loop

There are two different designs for simple loop, one of which consists of the turns being wound within each other in spiral form so that all turns will be in precisely the same plane, while the other design embodies a rectangular helix with the turns spread out side by side. Figure 36 shows both types. Obviously, some means of support must be had for the turn of wire.

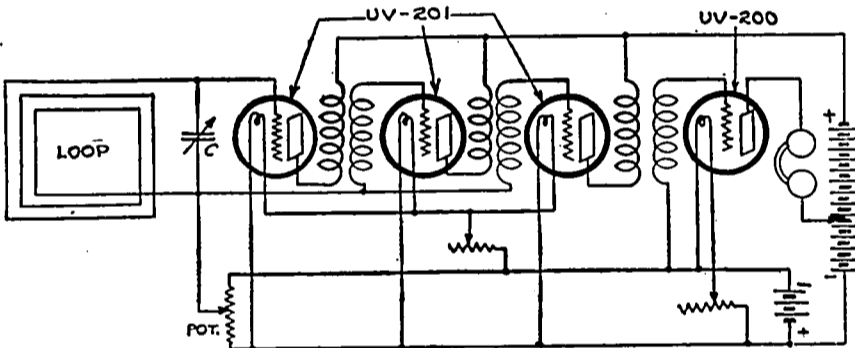


Figure 37

For instance, let's assume a square turn of wire having dimensions of 20 ft. on each side, making a total of 80 ft. of wire to complete the single turn. If this turn of wire is suspended or supported in a vertical position; that is, the plane of the turn vertical, there will be a very feeble voltage induced in the wire by electro-magnetic waves. When the plane of the turn points to, or directly away, from the source of the electro-magnetic waves the voltage induced therein is a maximum. If, however, the plane of the turn is at right angles to the direction of the wave travel, the induced voltage in the turn is a minimum. The induced energy is said to vary as the cosine of the angle which the plane of the loop makes with the direction of the advancing wave.

For the spiral winding the support may be a simple wood frame consisting essentially of two light pieces of wood about 4½ feet in length and of small cross section, and these assembled rigidly together in the form of a cross. The wire is then wound from corner to corner of the cross and the turns spaced about ½ inch apart by small blind staples or by holes drilled through the supports.

For the rectangular helix type of winding, the support will be a similar cross, but the ends will be provided with small wood spreader pieces over which the wire is wound, keeping a space of ½ inch between the turns. A length of 4½ feet for the cross pieces will result in a loop having dimensions of about 3 feet on each side. This is not too large to be mounted

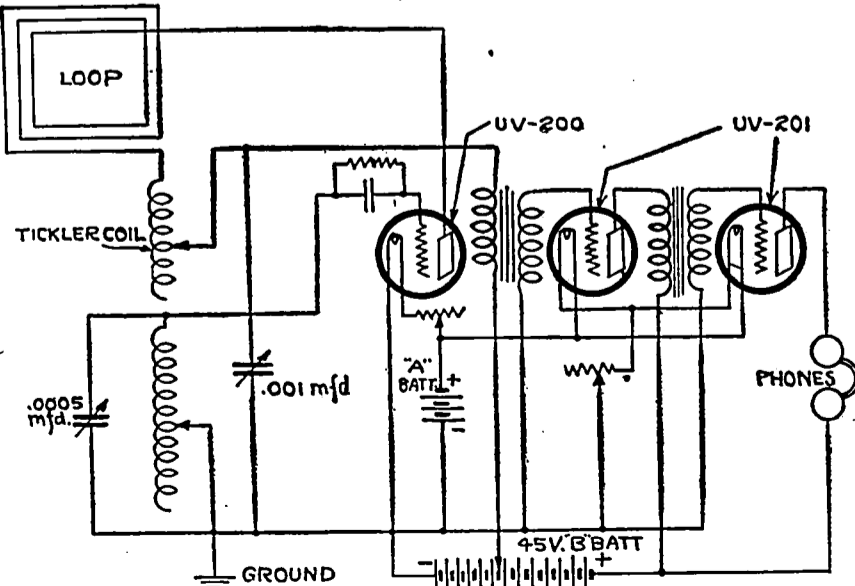


Figure 38

Such a turn of wire will, of course, have a certain inductance value, and it will also have a certain capacitance value, both of which combine to give the turn

vertically on base with suitable bearing to enable the plane of the winding to be varied in direction through a range of 180 degrees, or one half turn.

Suspending Loop from Ceiling

Another simple method is to suspend the frame from one corner to a string attached to the ceiling of the room and located near to the receiving set. The string suspension enables the loop to be turned completely around in either direction.

For the usual broadcasting wave lengths, the loop winding may consist of 10 to 12 turns of single conductor or litzendraht stranded wire, having cross section from No. 16 to No. 20 B&S gauge. It is desirable to use bare wire so that the number of turns in use can be varied by an adjustable tap.

The rectangular helix type of loop has better directive properties, but the spiral type is much more simple to construct.

Increasing Range of Loop Reception

Unless signals are to be received from very near by stations, the energy received by the loop will not be sufficient to properly operate a detector tube and so one or more stages of Radio frequency amplification are necessary to increase the range of loop reception.

The writer has used a loop as described, in conjunction with the receiving circuit shown in Figure 31 of the last installment, which consisted of one stage of Radio amplification and three stages of audio amplification. The combination enabled the larger broadcasting stations up to 300 miles distant to be heard on the loud speaker.

It must be remembered that if the loop is shielded by considerable metal work such as steel building frame or walls containing expanded metal lathing or by an extensive steam, water, or gas piping system, the received energy will be materially reduced. The best results will therefore be had when installed in a wooden building.

Used with Variable Condenser

Figure 37 shows the connection for a loop to a receiving set employing three stages of Radio amplification using transformer coupling. In this circuit the variable condenser C, in shunt with the loop, should be about 21-plate size, which, with a 10-turn loop having adjustable tap on turns, will enable a wide range of tuning and will include the broadcasting range of wave lengths.

If the loop is to be considered without Radio amplification, a good circuit is that shown in Figure 38. It will be seen that the loop is connected in series with the tickler coil in the detector plate circuit, and the usual ground connection is retained. Two stages of audio amplification with this combination will give surprisingly good signals, though of course not comparable with those had by Radio amplification.

Directional Properties

Owing to the directive property of the loop, it will be apparent that it can play an important part in tuning to avoid the signals of undesired stations. This may be accomplished with the loop antenna much more easily than can be done on outdoor antenna wire. However, as far as initial cost, simplicity of operation, and maintenance costs, and operating efficiency are concerned, the outdoor elevated antenna wire is to be much preferred, and therefore, the loop should hardly be considered with the average home receiving set. A good antenna will enable equal or better signal intensity on about a half the number of amplifying stages. The loop has the advantage of being a much poorer radiator of waves than the usual elevated antenna and it will therefore be less liable to cause interference with other receiving stations should the circuit be in the state of oscillation.

(Continued in the November 25th issue.)

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Series Parallel Condenser Switch

Cutout for Condenser In Aerial Hook-Up

The series parallel antenna condenser switch shown in the illustration is much easier to make and install than the double pole, double throw switch. The two arms

WORKSHOP KINKS? EARN A DOLLAR—

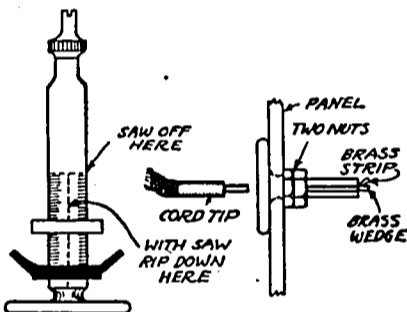
THERE are many little kinks worked out at home that would add your fellow Radio worker if he only knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. RADIO DIGEST is very much interested in securing such material. 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.

AA are made from standard contact switch blades. The crosspiece is made of a little heavier gage material. The switch is placed in the circuit as shown in the diagram.—E. Reisman, Chicago.

Cord Tip Jack

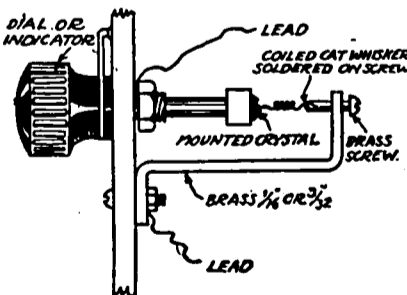
An old tire valve stem furnishes the material for making a phone tip jack. After removing the stem from the tire clean and polish the base and saw it off as indicated, about one-third of the way



up from the base. Rip down one side of the air hole to the bottom of the threads. Do not make the cut down the center of the hole, just one side only. Cut a strip of brass long enough to fit into the split and leave enough of the end to project for making a solder connection. Wedge another piece under the first one to hold it in place, then solder them in the stem. Push the jack thus made in a hole bored in the panel and turn up the nuts. The result is a very good jack at practically no cost.—Preston Hensley, Nevada, Mo.

Panel Setting for Crystal Detector

In the illustration is shown a new mounting for a crystal detector. It consists of a dial knob, shaft and indicator, with a bracket arm to hold the cat whisker. The crystal is mounted on the end of the dial shaft. The bracket is attached to the inside surface of the panel.

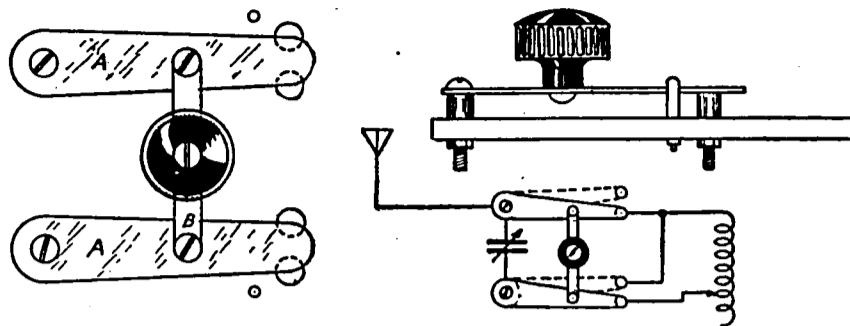


The sketch clearly illustrates the construction. The graduations on the dial, when the detector is mounted on a panel, will be of service in again locating a sensitive spot, once one has been found.—W. O. Arzinger, Birmingham, Ala.

Holding Aerial Straight

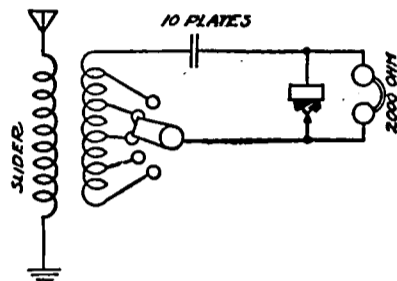
When you put up your antenna you may not get it quite evenly supported and it will stand lopsided, or if it is in a place where the wind is continually rocking it from side to side, some means must be applied to keep it straight. A good aid or support is to take about 20 feet of No. 24 wire and fasten its ends to the ends of the spreader. Then find the exact center and nail this to the post or mast after making the aerial and the No. 18 wire taut. If your aerial is of the T-type, this must be done at both ends, but the inverted L-type is held at one end by the lead-in.—Vernon Hagelin, Geneseo, Ill.

LOCATION OF SWITCH IN CIRCUIT



Long Distance Crystal Hook-Up

The illustration shows a simple hook-up with an 83-foot aerial that received messages for 225 miles. The aerial consisted

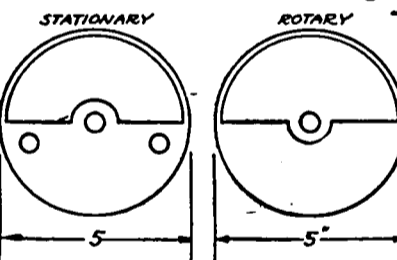


of one wire containing seven small strands and two wires of 22 gage. A 25-foot lead-in and a 35-foot ground was used.—Fogarty.

Homemade Variable Condenser

Few amateurs undertake to build their own vernier variable condensers, but many do not know how to make one. I needed just such a condenser and did not know how to go about it until I happened to think of a plan and worked out the instrument, as shown in the illustration.

Two fiber disks were procured, each 5 inches in diameter by 1/8-inch thick, and holes were drilled in them as shown. One plate has three holes in it, for attaching to the panel. Pieces of tinfoil are cut the



same size and shape of the fiber pieces, and then they are glued to the fiber surface.

Fasten the piece with the three holes in it on the panel and run the threaded part of a brass bolt through the panel and fiber disk in the center hole. Attach a knob and pointer on the front end of the bolt outside of the panel. Run a nut on the bolt up to the first plate, then put on the other fiber disk and then another nut.

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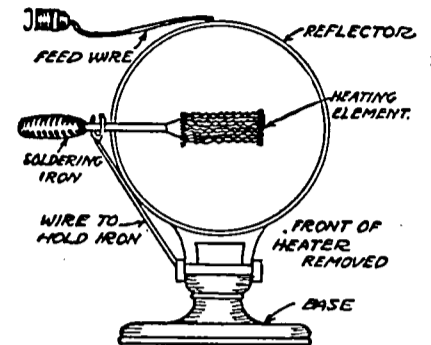
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Home Electric Heater Heats Soldering Iron

While working on my station I needed to do some soldering. Having no fire of any kind close at hand I was at a loss to know what to do. Electric irons cost too much for me, but as there was an electric heater in the home I used its



heating element for heating the iron. The illustration shows how this was accomplished. It required only a few seconds to heat the iron properly. The iron was placed inside the element.—Clarence G. Munns, Hoisington, Kan.

Detector Tube Adjustments

Keep in mind when tuning, especially for distant signals or weak broadcasting, that the final adjustments and best tuning is done with your detector tube. The slightest movement of the detector rheostat will bring in or shut out a weak signal.

Static Interference

Interference from static is at its lowest when the weather is fair, humidity low, and temperature cool. If results cannot be obtained in spite of good weather conditions, look for something else. Possibly the aerial runs parallel to nearby telephone or telegraph wires. This reduces the efficiency of the aerial and will interfere with reception. Crossed or coiled wires in the receiving set will create induced currents and noise in the phones. Care in installing the apparatus leads to best possible efficiency in the set.

A Crystal Detector

Take a piece of mica about 1/2 inch in diameter, and make a 1/8-inch hole in the center. In this hole secure a small piece of galena with a bit of glue. Glue a battery nut to each side of the mica and put in some fine brass filings. In each hole put a short machine screw. The detector can be mounted with a couple of small angles. It is adjusted with the machine screws or by turning the whole thing.—Hollis Balrd, River de Chute, New Brunswick, Canada.

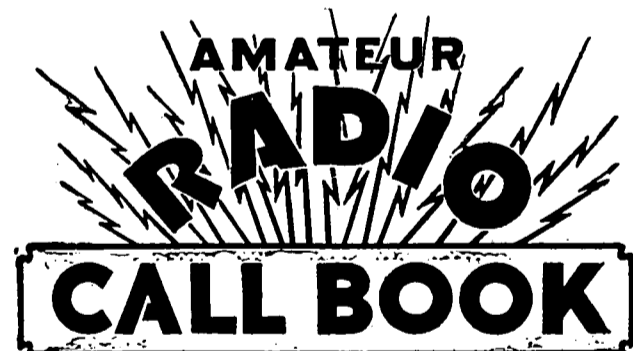
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45—R VESEY STREET NEW YORK, N. Y.

Five-Tube Radio and Audio Frequency Receiver

Jacks and Anti-Capacity Switches Give Variety of Circuits

By H. J. Marx

THIS receiving set and hook-up is designed primarily to furnish the more advanced Radio fan with an opportunity of constructing a set that will permit long distance reception with very selective tuning on both outside and loop antennae. The design is such that by means of proper manipulation of controls, the high frequency amplification stages can be reduced or eliminated, as desired. Anti-capacity switches provide for proper control of the Radio frequency amplification and telephone jacks accomplish audio frequency amplification control. Ammeters in the filament and plate circuits give accurate reading of the filament current consumption and the ultimate plate flow.

Circuit and Apparatus

The complete circuit is composed of two stages of Radio frequency, detector, and two stages of audio frequency amplification. Means are provided for alternative use of either the outdoor or loop aerial, the switching of the primary condenser in series or in shunt as desired, and the use of the variocoupler and its secondary condenser with the outdoor aerial. The anti-capacity switches permit adjustment for elimination or use of Radio frequency amplification as best suited for the reception. All tubes have separate rheostat controls in order to take advantage of maximum efficiency of each tube and for economical consumption of battery current.

The plate circuit of each Radio frequency amplifying tube is tuned. Grid control of these tubes is accomplished through the potentiometer. The telephone jacks control the filament lighting of the particular tubes required for use, and at the same time allow selectivity of the stages of audio frequency amplification. The milliammeter in the plate circuit of the last tube can be cut out by a shunt switch when not required for use.

Explanation of Controls

The controls are numbered in the diagram and the following description explains its operation and use:

No. 1 permits switching from outdoor to indoor loop; when turned counter-clockwise the outside antenna is connected; when turned clockwise, the loop antenna is in the circuit.

No. 2 controls the insertion of primary condenser (4) in the circuit; when turned counter-clockwise the condenser is shunted across; when turned clockwise it is placed in series; when the switch is vertical the condenser is cut out.

No. 3 controls the use of variocoupler; when turned counter-clockwise the variocoupler is not in use; when turned clockwise the variocoupler is placed in the circuit.

No. 4 is the primary variable condenser control for the adjustment of the wave length of the antenna circuit.

No. 5 is the tap switch adjustment for rough primary circuit adjustment of wave length when the variocoupler is used.

No. 12 is tuning condenser for control of the resonance frequency of the primary of the second Radio frequency transformer.

No. 13 is rheostat for controlling filament current adjustment when first stage of Radio frequency amplification is in use. This rheostat is set at "cut off" position when this stage is not in use.

No. 14 is rheostat for controlling filament current adjustment when second stage of Radio frequency amplification is in use. This rheostat is set at "cut off" position when this stage is not in use.

No. 15 is rheostat for control of filament current of the detector tube.

Nos. 16, 17 are rheostats for control of

when not in use, and thus prevent "dead" losses from the unused section of the circuit. This Radio frequency plate battery can consist of three 22½-volt units. Likewise the detector and audio frequency stages use three separate 22½-volt units, with one tapped at the first 22½-volt battery for the lower plate voltage of the detector circuit.

This article will be continued. A description of the panel lay-out and assembly of the instruments will follow.

Loop Aerial Correction

In the article by Mr. H. J. Marx entitled "Formulas for Construction of Loop Aerials" appearing in the November 4th issue of RADIO DIGEST, page 13, a mistake was made. In the first specimen problem, calculating for the w/d factor, d was substituted in inches instead of centimeters. The change in the value of the factor then, and the value of X, caused the result incorrectly given as .169 milhenries. The result should have been .180 milhenries. In the second specimen problem, the values of X and w/d are taken from the first problem, and so are incorrect. With the proper values substituted here, the result becomes .1408 milhenries, instead of .136 milhenries, the result given in the incorrect solution to the problem.

Long Distance Spider Web Set

I built a three coil spider web set using ¼ inch fiber board 4 inches in diameter with 7 slots cut in each disk ½ inch from the edge. I used No. 24 silk covered black enameled wire wound as follows: 25 turns on the primary, 37 turns on the secondary and 50 turns on the tickler. These coils were mounted on two small brass hinges with the primary coil stationary. A small B battery, four dry cells, tube, socket and rheostat completed the outfit.

With this set I have heard Atlanta, Louisville, Detroit, Newark, Kansas City and Davenport, Iowa, from Jacksonville, Florida. Please note that I have used no variable condensers. The coils are not tapped. Recently I put in two condensers in the circuit and they make it a little more flexible. —Edgar H. Rogers, Jacksonville, Fla.

LIST OF APPARATUS REQUIRED

- Outdoor antenna
- Loop aerial
- Three series parallel switches
- Three anti-capacity switches
- One 43-plate variable condenser
- Three 23-plate variable condensers
- One variocoupler with primary tap switches
- Five rheostats
- Five tube sockets
- Four amplifier vacuum tubes
- One detector vacuum tube

- One grid leak and condenser
- Two Radio frequency transformers
- Two audio frequency transformers
- One potentiometer
- Two 5-spring filament control jacks
- One 3-spring filament control jack
- One 6-volt, 120-ampere hour storage battery
- Six 22½-volt units Plate or B batteries
- One pair receivers and loud speaker if desired
- Eleven binding posts

This adjustment may consist of either a single or two tap switches.

No. 6 is the coupling adjustment of the secondary rotor for resonance.

No. 7 is the variable condenser for wave length adjustment of the secondary circuit.

Nos. 8, 9, 10. When the lever arms of all three anti-capacity switches are thrown to the right as shown in the diagram, both stages of Radio frequency are in use. When 8 and 9 are thrown to the left and 10 is kept to the right, only one stage of Radio frequency is in use. When all three are swung to the left, the coupling between the secondary of the second transformer and the detector tube is disconnected and the aerial current is led direct to the detector tube without any Radio frequency amplification.

No. 11 is tuning condenser for control of the resonance frequency of the primary of the first Radio frequency transformer.

filament current of first and second stages of audio frequency amplification respectively.

No. 18 is telephone jack for plugging receivers in detector circuit without audio frequency amplification.

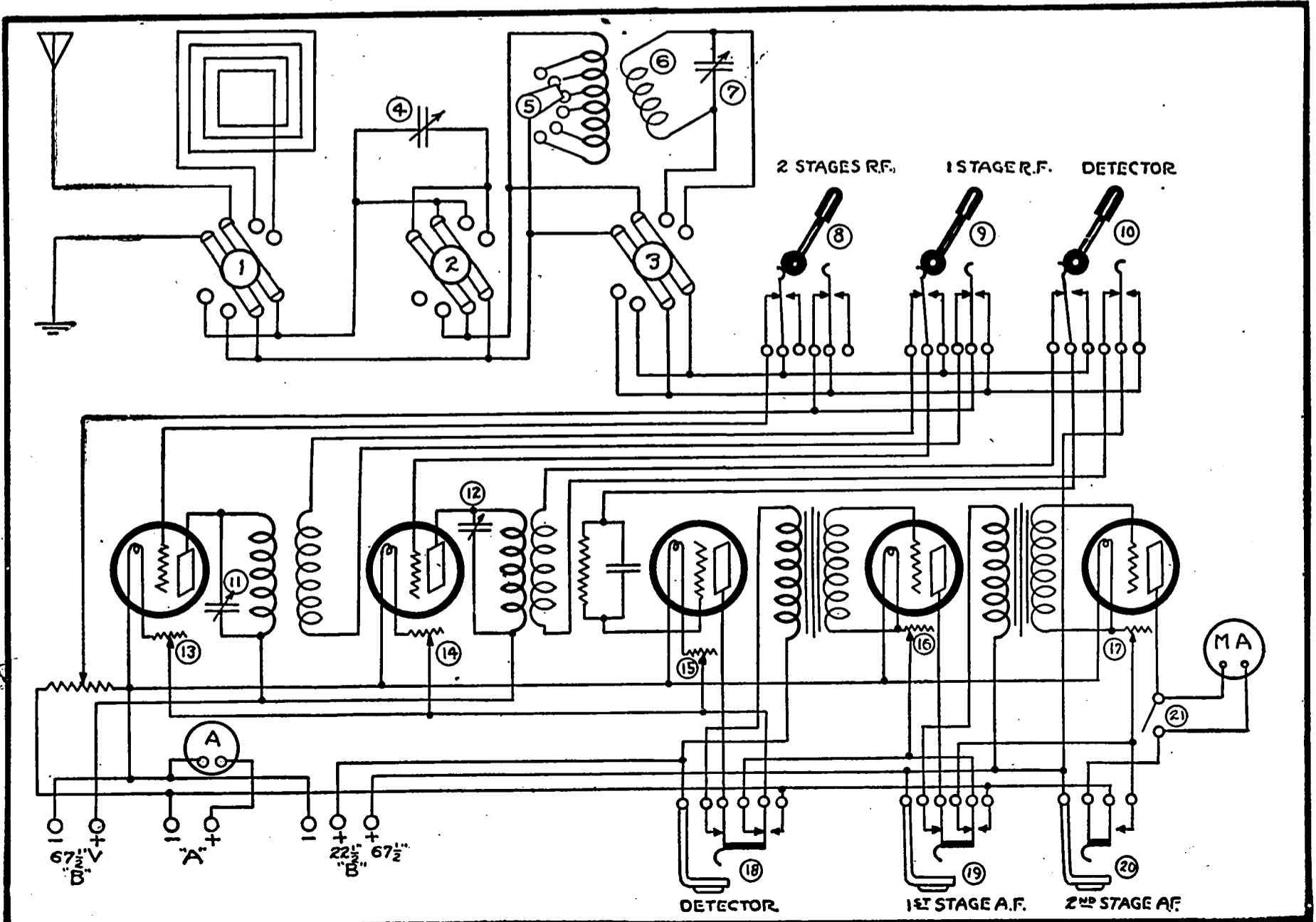
Nos. 19, 20 are telephone jacks for plugging in on the first and second stages of audio frequency amplification respectively.

No. 21 is switch for shunting out milliammeter from plate circuit.

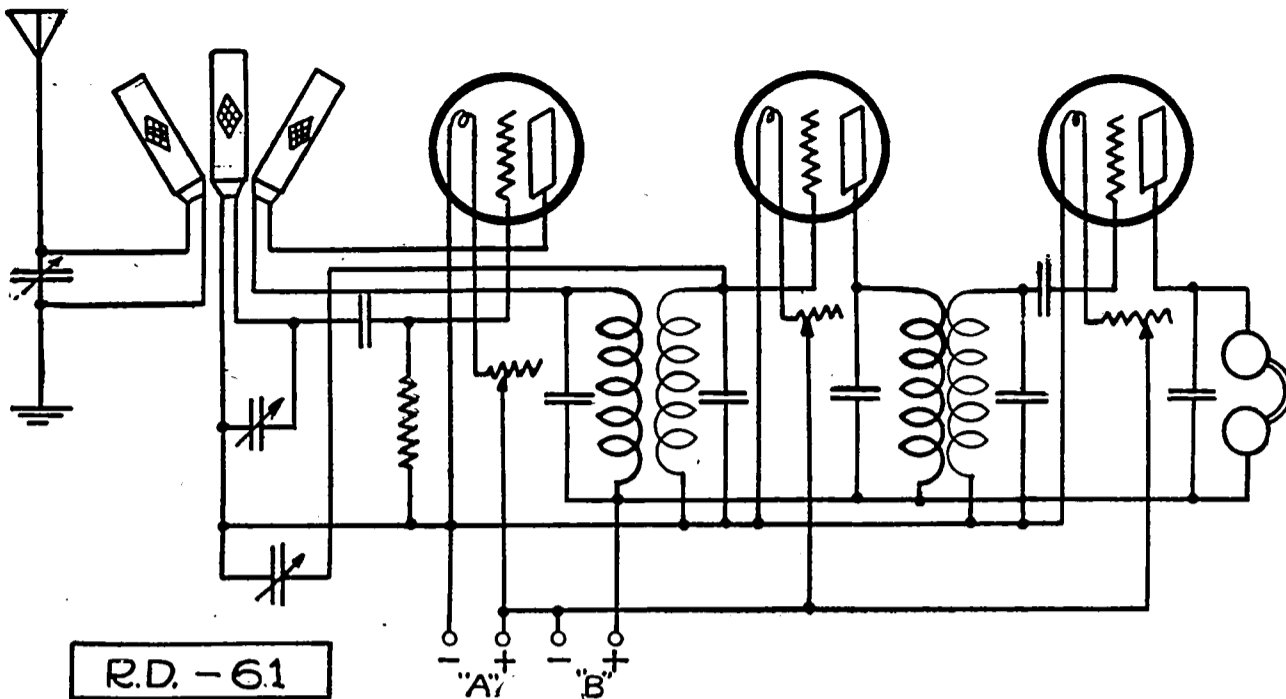
Batteries to Be Used

The filament battery should be of the 6-volt, 120 ampere hour type. A high amperage rating will be required because of the five tubes in use. Otherwise, due to the heavy current consumption, constant re-charging would be required if a storage battery of lower ampere hour capacity.

The stages of Radio frequency have separate plate or B batteries in order to keep the high frequency circuit disconnected from the balance of the hook-up



REGENERATIVE, TWO R.F., HONEYCOMB SET



R.D.-61

Although this circuit may at first sight appear to be a condenser advertisement, still it is recommended because of its high efficiency and selectivity for long distance reception. If desired, further stages of audio frequency amplification can be had by removing the phones and using the two terminals as input connections. The two transformers are of the Radio frequency air core type. Honeycomb coils are used for tuning.

The circuit is regenerative, using a tickler coil inserted in series with the plate circuit of the first tube. Hard tubes should be used throughout for this hook-up. There are 60 volts on the plate circuit and 6 volts on the filament circuit. The voltage of the plate battery should be experimented with in order to find the value at which best results are obtained.

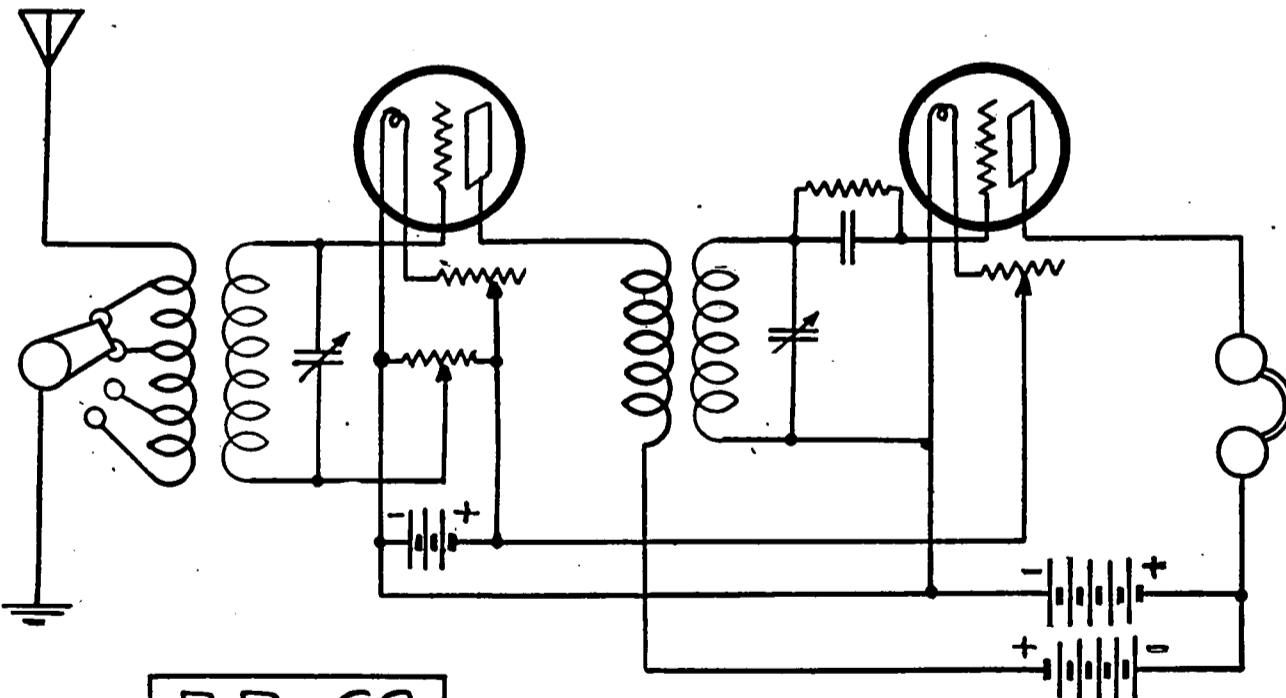
For concert broadcasting, best results will be obtainable with a 35-turn primary, 50-turn secondary and either 50 or 75-turn coil for the tickler. The results with the tickler coil will vary considerably and it may be necessary occasionally to change

coils in order to intensify signals for maximum reception. The condenser in the primary circuit is available with a maximum capacity of .001 mfd. The two condensers in the secondary are both variable of .0005 mfd. capacity. The grid leak across the secondary circuit before the first tube is one megohm but should preferably be of the variable type for more accurate control of potential between the tube and the filament. All fixed condensers are about .001 mfd. This value, however, is not fixed for all cases. It is recommended that the amateur take each step while receiving, and test out reception by inserting different capacity values varying from .00025 mfd. to .005 mfd. It is only by tests of this kind that such hook-ups can be made to perform with highest efficiency. This may require considerable patience and labor, but will amply repay the amateur through efficient long distance reception, a factor that is desired but seldom attained. Separate rheostats are used for all three tubes. A point often overlooked is the fact that

good receivers are necessary for long distance work.

In tuning this set, the primary condenser and the secondary series condenser are set approximately half way, and the main tuning is accomplished through the secondary shunt condenser. This will be found very critical and it would be advantageous to use the vernier single plate type. The movement of the honeycomb coils should also have a vernier attachment as the resonance adjustment is very critical. Each change in setting of the primary will require a corresponding change in the setting of the tickler coil. After the secondary shunt and angular setting of the honeycomb coils has been completed, the primary condenser is next adjusted and the secondary series condenser last. The rheostats will help materially in eliminating spark stations. In experimenting with this hook-up it was found that full power of the battery is not advisable and unless the batteries are run down. Ordinarily a three-fourths position on the rheostat will be sufficient.

ONE STAGE RADIO FREQUENCY CIRCUIT



R.D.-62

This hook-up is not quite as complicated as the preceding one but at the same time will give very satisfactory results. A variocoupler is used for tuning, with a 23-plate variable condenser controlling the secondary circuit. The grid potential of the first or amplifier tube is maintained through a potentiometer control of about 200 ohms resistance, shunted across the six-volt filament battery. A Radio frequency transformer is used for coupling with another 23-plate variable condenser in its secondary circuit. The grid leak has a resistance of about 1 megohm with a .0005 mfd. condenser in parallel with it. Each tube has a separate rheostat control. The phones in the plate circuit of the detector tube connect to the positive side of a 22 1/2-volt battery. Another 22 1/2-volt unit is added in series with this battery and connects to the primary terminal of the transformer, thus placing 45 volts in

the plate circuit of the first or amplifier tube. The simplicity of this circuit in comparison with the one preceding, recommends it more for the novice who has yet to reach that stage where he can experiment and yet get best results from any of the various types of hook-ups. Such experimentation requires experience and considerable knowledge of the theory rather than a haphazard cut and try method.

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The Reader's View

Going Visiting by Radio

I confidently believe station operators, Radio artists and Radio enthusiasts both old and young with small sets and long range equipment will join with me in this suggestion that the management of broadcasting stations, by localities, arrange with each other and agree upon a one-night layoff each week for the following reasons:

First, it will give operators and artists the equivalent of a Sunday rest.

Second, and most important it will permit a tryout of receiving stations in any locality to determine their range and the variety of adjustments necessary to pick up out-of-town sending stations.

I live in Chicago almost in the shadow of several large antennae. I have with great care built up during the summer an elaborate 5-tube set in anticipation of some opportunity to try it out during the winter evening hours, but with three high powered broadcasting stations and half a dozen smaller sets waiting like hawks for their turn at the air or even sometimes doubling their dissimilar wave bands, how can a chap expect to get out of his own back yard, so to speak? I like to go visiting occasionally, that is, I would like to hear someone else besides homefolks, but with every moment of my off duty time crowded full of home-made legitimate and "canned" music frequently designated as "So and So toasting," how am I to get away? The country fellow has the advantage of the city chap in this matter.

Recently on one occasion in a 30-minute period of relief from local disturbances during the early evening broadcasting hour I was able to tune in clearly just six stations, viz: Detroit, Louisville, Kansas City, Waco, Oklahoma City and Denver, and later on during the evening I heard Schenectady. Of course, I also heard that popular southern station, The Atlanta Journal. All of these stations furnished a wide variety of program readily available for selection, but all were too quickly spoiled by a local carrier wave. I experienced more real thrill in that thirty minutes than for the whole of the rest of the week. So I am pleading for a night off, and, as a basis for an agreement I suggest that the New England states and New York City close up absolutely tight on Monday night of each week between the hours of 7 P. M. and 10 P. M. local time. That the Pittsburgh and the Buffalo longitude close Tuesday nights, that Detroit, Chicago, Indianapolis, etc., close Wednesday nights, that St. Louis, Kansas City, Omaha, etc., close Thursday nights, that Denver and that longitude close Friday nights and the Pacific Coast observe Saturday nights, each area to observe the same hours, 7 to 10 P. M., in its own local time.

This will give everyone a chance. Let's see who will be the first and others to follow in this movement.—Wm. P. Bear, Chicago.

Broadcasting Station Calls

I wish to add my thanks for your editorial article on "Broadcasters Should Repeat Calls." There is not a night but what I retire with regrets that I was unable to learn from what stations came some good music, and it seems that broadcasters are getting more careless in announcing their stations in a clear voice as they should.

Keep their attention called to this important matter until they give it more attention.—O. R. Johnson, Memphis, Tenn.

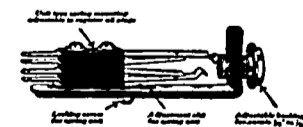
Hawaii is making use of Radio for rural education. A powerful transmitting plant installed by the public instruction department at Honolulu makes it possible to broadcast lectures on educational subjects, which are received through receiving sets in the district schoolhouses.

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Questions and Answers

Is Super-Regeneration Practical? (1071) LRR

Being very new in the Radio game I will appreciate very much, information on some points which undoubtedly will verify the foregoing statement.

1. Has experience proved the Super-regenerative circuit to be as dependable and generally efficient for telephone reception as the simple regenerative types? In other words, would you recommend the construction of this type in preference to the other or standard circuits?

2. I have studied the different super-regenerative circuits from the standpoint of cheapness and ease of construction, but find that I do not get anywhere. Of the different plans that have appeared in the DIGEST or otherwise is there any particular hook-up that you would recommend?

3. In constructing the book type of variable condenser I would like to know how to figure the area of the plates, copper or tinfoil, when used with mica, for certain capacities. Or, what size plates should be used for .001 and .0005 mfd. values?

4. Does the Aeriotron bulb have sufficient range or other qualities to make it worth working with? If so is it adapted to any hook-ups used with the standard types of detector bulbs?

5. I hope to put in a small Radiophone transmitting set in our school this winter. We have 110-volt, 25-cycle current. Can you give me, or refer me to where I can obtain hook-ups and directions for making such a set? I would be pleased to know something about the license regulations for such a set.

6. I have heard that a regenerative circuit can be had from an ordinary variocoupler such as the Remler, by bringing the plate lead from the secondary back to the ground. This also uses a two lever switch so that two points of contact from the primary taps is had at all times. An .001 and an .0005 mfd. variable condenser is used in the primary and secondary circuits respectively. It is said to be very selective, easily tuned and efficient but I have not been able to figure out the hook-up, i. e., how the get the leads to the detector, phones, batteries, etc. Can you give me some idea of how this is done and as to whether the circuit is a good one or not, comparatively speaking?

In closing I wish to express my appreciation to the RADIO DIGEST. It is the one Radio publication I find a "stand-by." I realize that I have given you a pretty big order for one time.

A.—We take pleasure in answering your several inquiries, to the best of our knowledge, briefly as follows:

1. From experimental demonstrations it is evident that with the Armstrong Super-regenerative circuit amplification of signals is all that the inventor claims. Judgment of quality of received speech, by which any scheme of amplification must stand or fall, must await the verdict of a more general experience under all circumstances. There is no question that more manipulative skill is required and its action can only be satisfactorily understood by one familiar with regenerative circuits. But, perhaps it will not be beyond the ability of those whose interest in Radio has passed the stage of "turning the knob and listening in." Development of other circuits which were thought too intricate for amateur use, would give us encouragement to believe so.

2. The different types of hook-ups which have appeared in RADIO DIGEST from time to time have been selected with care and if followed should prove entirely efficient. There are many oversights in construction, apparently insignificant, which give rise to criticism of circuit and apparatus, where as a matter of fact the fault lies with the operator. August 12, 1922 issue, pages 6 and 7 give very complete details for building one of the best circuits.

3. Page 13 of the May 13th RADIO DIGEST affords a very interesting article on construction of condenser, including formula for calculating capacity, and values of dielectric power. Circular No. 74 Bureau of Standards contains a treatise of Radio measurements. Plates to be used for .001 mfd. value should consist of fifteen mediums one-half by one inch and for .0005 seven mediums one-half by one inch dimension of metal and mica as suggested.

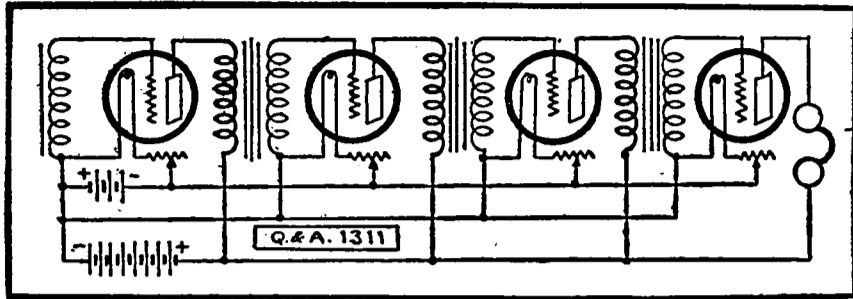
4. Aeriotron tube is adapted to any hook-up any other receiving tube is used on. RADIO DIGEST contains a real Radio text of theory, practice and construction and you will find it an invaluable guide.

5. In order to operate a Radio transmitting station, both a station license and an operator license are required. Provision for your use is made class five Technical and Training School Station. Would advise you to secure from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a cost of fifteen cents, pamphlet "Radio Communication Laws."

6. The circuit suggested by you can be accomplished but we would not advise it as being unusually selective or efficient.

Anti-Capacity Switch

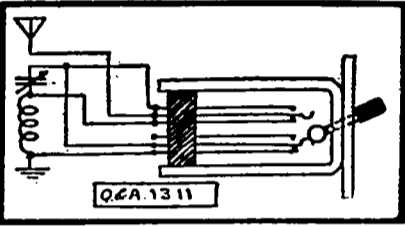
(or) 1311
1. Please publish a hook-up showing how to use an anti-capacity switch for changing a variable condenser from series to parallel.



2. What kind of receiver is necessary to receive from any station in the world? Please give hook-up for same.

3. Please give a hook-up of a four-step audio frequency amplifier using a 5-watt tube in the last step.

A. Figure Q. & A. 1311 shows hook-up for anti-capacity switch. Under the same



number is diagram for four-stage audio frequency circuit.

For a receiver having a universal range the circuit using honeycomb coils and diagrammed on page thirteen of August 19th issue of RADIO DIGEST should fill the requirements.

Armstrong Super-Regenerator

(1020) JKG
I would like to have you answer the following questions:
1. In the Armstrong super-regenera-

tive circuit as described in your issue of August 12th if an outside aerial is used, would not a variable condenser in the primary circuit be necessary to get better tuning?

2. Could the set be hooked up without the one stage of amplification?

3. What is the function of the 400-turn coil in the circuit and as yet has there been any definite fixed value determined for it? Why in the different hook-ups slightly different values are given, for it?

4. Has this hook-up been followed by

ordinary amateurs giving the results claimed of it?

I am sure that I voice not only my own feelings but the feelings of a very large number of Radio amateurs when I say that what is looked for most in a Radio magazine at the present time is the latest and most specific and authentic information as to the new Armstrong circuit. I feel quite sure that the results of the experimentation with this new circuit would be the most valuable thing you could publish for the host of Radio fans awaiting your paper from week to week.

A.—The Armstrong super-regenerative circuit is designed for use with loop antenna only as B current goes through this coil. The circuit is intended primarily for dwellers in congested districts where outdoor antennae are impractical. Frankly speaking it is an intricate, sensitive creature for amateur use and under less than expert manipulation may lead to disappointment and discouragement.

The set could be hooked up without amplification but the signals would be very weak, possibly too weak to hear.

The value determined for the 400-turn coil in the circuit is determined by the size of the loop used.

Considerable space is being devoted in RADIO DIGEST to this Armstrong Circuit. Radio Digest Illustrated is alive and abreast of everything that is vital to all interests and nothing will be left undone that can advance and stimulate this greatest of all things, Radio reception.

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Cyrena Van Gordon is in her eighth year with the Chicago Opera and has become known as a leading contralto. She is shown as Brunnhilde
Matzenc Photo



Rosa Raisa as Aida, the Ethiopian slave girl in the opening opera, "Aida," of the Chicago Opera Company. Miss Raisa is acclaimed as one of the foremost dramatic sopranos. Many Radiophans will hear her voice via Station KYW during the opera season
Matzenc Photo



Mary Garden is back "on the air" again. Her first appearance this season was as Carmen in the opera by that name. Here the famous soprano, who was general director of the Chicago Opera Company last season, is shown as Fiora in "The Love of Three Kings"
Moffet Photo



And here we again have with us Anna Ludmila, premiere danseuse of the Chicago Opera Ballet. As was said on page 5 of this issue, you'll have to buy a seat to see her dance, for Prof. Fessenden's Radio picture invention isn't on the market yet
Pondelicek Photo



What do you think of the wicked princess, Amneris, in "Aida"? Here she is portrayed by Ina Bourskaya, who made her debut with the Chicago Opera Company in that role on the opening night of the season
Moffet Photo