

Radio Digest

EVERY WEEK **Illustrated** TEN CENTS

REG. U. S. PAT. OFF.

Vol. V

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SATURDAY, MAY 19, 1923

No. 6

RADIO FINDS RARE ORES

MOVIE STAR BROADCASTS ON COAST-TO-COAST TRAIN

Listeners In Hear Ruth Roland's Message—Shower Her with Bouquets At Stations Along Route

(See Photo Below)

LOS ANGELES, CALIF.—Ruth Roland, pretty star of the silver sheet, was heard from coast to coast when she recently broadcast from a moving train an invitation to Radiophans to attend the Motion Picture Exposition, to be held during the

Station WDAP, Chicago, to Be Entirely Remodeled

Board of Trade to Construct New Mushroom Antenna

CHICAGO.—Board of trade members and friends of station WDAP on the Drake hotel will have an opportunity of seeing "the wheels go 'round" in a few weeks. The transmitting apparatus, which is being installed in one room, will be glass-enclosed, with a runway around the room, so that visitors may see the set in operation. Each part of apparatus will be named and its function explained on a card attached. The new antenna tower 135 feet high is built like a mushroom.

NEW INVENTION LOCATES VALUABLE MINING SITES

D. G. and Carl Chilson, Inventors, Demonstrate Device Before Board from University of Arizona

By F. J. Huntley

DOUGLAS, ARIZ.—A Radio set that promises to revolutionize the mining industry was recently given a successful demonstration before a board from the University of Arizona by the inventors, D. G. and Carl Chilson. The two brothers have

At the left is Ruth Roland, star of the silver sheet, who recently broadcast from coast to coast on the "Momus" Special. Miss Roland is a real Radiophan as well as Madge Bellamy, another charming star of the screen. Miss Bellamy (right) recently spoke from Station WJAX

Princess Waukomis (below) is a real Indian Princess of Cherokee blood. She was recently heard on a WOR program



Monroe Doctrine Centennial at Los Angeles July 2 to August 4, inclusive.

When the Momus Special, a Southern Pacific train, sped from the train shed of the Los Angeles terminal station the huge generator on board was turned on and the Pacific coast fans heard the clear voice of Miss Roland issuing them her cordial invitation to come to Los Angeles. This was repeated from time to time, and as the huge Mogul plowed its way across the arid wastes of the great desert other fans came within range and those on the back trail lost-out.

Upon arrival at the various stations en route the train was met by throngs of enthusiastic fans who had heard the message and Miss Roland was the recipient of numerous huge bouquets and other offerings of appreciation by those who had followed her exploits of the

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WOMAN FAN MAKES PRACTICAL RECEIVER

ALLSTON, MASS.—Miss Edna Trezice of this place is the first woman Radiophan to design a Radio receiving set. The apparatus is of a very efficient type and is made to sell for \$15.

It was tried out recently and surpassed all expectations. The circuit was the principal feature designed by Miss Trezice, who is one of the most enthusiastic fans in New England.



WGR Off Air Two Days

BUFFALO, N. Y.—WGR station will be transferred to the New Hotel Statler, May 19. It is doubtful whether the transfer can be completed on this date and it may be necessary to cancel the programs of May 19 and 21.

been working on the instrument for the past six years and have now perfected the apparatus to where it will locate valuable sulphide ores without the slightest degree of guesswork. Further experiments and tests will be given.

In the set there are the usual triode tubes, two stages of amplification and other parts common to the regular Radio apparatus. The feature is a coil about nine feet in circumference which turns on an axis, at the center of which is a compass level and gradient scale. The coil contains several thousand feet of very fine insulated wire.

The device was tried recently at the Verde Central property at Jerome, Arizona. It is said that as the coil was changed in position the vibrations varied. The minimum of vibrations, the inventors found, occurred directly away from the shaft, and as the coil was

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LARGEST STATION IN WORLD BEING BUILT

SAN FRANCISCO.—The most powerful Radio broadcasting station in the world is to be constructed in Oakland, Calif., by the General Electric company, according to an announcement made recently by officials of the company. The giant plant is to be located at East Fourteenth street and Fifty-fourth avenue, and will have a range of several thousand miles.

RADIO FINDS RARE ORES

(Continued from page 1)

swung around facing the shaft, the maximum of vibration was observed. At this point the telephone receivers gave forth a thunderous roar, but on the opposite side there practically was no sound.

Before going to the Verdi Central, the experimenters took their apparatus to the United Verde mine, where a large deposit of sulphide copper ore was exposed. They found on setting up the instrument some distance from the deposit that the maximum vibration was directly in line with the ore body. Following this they experimented in other locations at some distance from the ore body, and the result was always the same.

Mining Official Gives Okeh

In an interview, George A. Newett, director of Calumet and Arizona mining concerns, said: "Undoubtedly there is merit in the device and it is my opinion it will be of inestimable value in the location of sulphide ores in any part of the world where they are suspected to be found."

Local mining officials are very enthusiastic over the new device. Following the experiments and tests to prove the practicability of certain changes and adaptations in the hook-up the apparatus will be put in actual field work.

MOVIE STAR BROADCAST

(Continued from page 1)

screen. And yet of all the countless thousands who appeared at the stations this was only a small part of the vast audience who heard Miss Roland by Radio.

During the time the train's broadcasting plant was not in operation the receiving set was tuned in in the observation car and entertainment was furnished the passengers from many of the large stations en route.

Radiophans from all parts of the United States heard Miss Roland's broadcast with unusual clarity and the exploitation of transmission from train board was considered a huge success.

Train Equipment Practical

The outstanding fact gained from the tests is that with specially designed receiving equipment on a train, it is quite possible to communicate from any part of the United States with the train while it is in motion, no matter what its speed.

The specific lessons taught by the experiments are: That tunnels and cuts will not affect this communication so seriously as was at first thought. Lakes and other large bodies of water near the railroad tracks have the peculiar property of increasing the signal strength. Mountains rising directly above the railroad tracks completely wipe out the signals when the mountain stands between the fixed Radio station and the train.

Flat Top Aerial Directional

The tests in other directions confirm many theories, particularly that of the directional effect of the flat top aerial. This was very pronounced when the train was rounding a curve. The position of the antenna in regard to the station, from which signals were received was another important factor, for often going around a curve on a perfectly level plain would make one station fade out and bring in another.

A right angle crossing under high tension and 500-volt trolley wires completely cut out reception for a fraction of a second.

The antenna on the train consisted of one No. 16 copper strand stretched the full length of the car 18 inches above the center line of the roof, also a loop aerial inside of the car.

WNAC HARD TO HEAR ON 286 WAVE LENGTH

Roger Babson's New Plant to Be on 337 Meters

BOSTON, MASS.—Varying reports are coming in from Radiophans regarding reception of WNAC on the new wave length of 286 meters. Those living nearby report they notice little if any change, but others report reception much weaker, while still others report that they cannot get the station at all. Since WNAC is rated as a 100-watt station, under the new grouping, it is excluded from the 360-meter wave length, in spite of the high-class programs it is broadcasting, and has been sending ever since it was built—programs the equal of any in the East, and superior to many programs given elsewhere.

Until the WNAC engineers have solved the problems confronting them, Radiophans will have to be patient, but they may rest assured that everything will be done that can be done to make the station heard by as many and as far away as possible. As the former wave length was extremely broad, fans found it easier to tune in, and now they will have to be more critical in their tuning. Perhaps if they are careful and work finer in their tuning, they may get better results with WNAC.

Roger Babson's new station at Wellesley Hills, being of 500-watt power or more, will be allocated a wave length of 337 meters.

AN EVENING AT HOME WITH THE LISTENER IN

(SEE NOTE BELOW FOR INSTRUCTIONS)

Station and City	Met.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
CFCA, Toronto, Ont.	400	7:00-8:00	7:00-8:00	7:00-8:00	7:00-8:00	7:00-8:00	7:00-8:00	6:45-7:45
CFCN, Calgary, Alta.	440	.....	.....	11:30-12:30	.....	.....	11:30-12:30	.....
CKAC, Montreal, Que.	430	.....	6:00-10:30	.....	6:00-10:30	.....	6:00-10:30	3:00-5:00
KDKA, E. Pittsburgh, Pa.	360	5:00-9:00	5:00-9:00	5:00-9:00	5:00-9:00	5:00-9:00	5:00-9:00	1:45-3:45
KFAF, Denver, Colo.	360	9:00-10:00	9:00-10:00	.....	9:00-10:00	.....	9:00-10:00	.....
KFDB, San Francisco, Calif.	509	10:00-12:00	.....	10:00-12:00	.....	10:00-12:00	.....	9:00-9:30
KFI, Los Angeles, Calif.	469	7:00-1:00	7:00-1:00	7:00-1:00	7:00-1:00	7:00-1:00	7:00-1:00	10:00-1:00
KGW, Portland, Ore.	455	10:00-2:00	.....	10:00-11:00	.....	9:00-2:00	.....	9:00-10:00
KHJ, Los Angeles, Calif.	395	8:45-11:30	8:45-11:30	8:45-11:30	8:45-11:30	8:45-11:30	8:45-11:30	12:00-1:00
KPO, San Francisco, Calif.	423	.....	10:00-12:00	.....	10:00-12:00	.....	10:00-12:00	.....
KSD, St. Louis, Mo.	546	8:00-12:30	8:00-12:00	8:00-12:00	8:00-12:00	8:00-11:30	8:00-12:00	.....
KYW, Chicago, Ill.	448	8:00-9:30	8:00-9:30	8:00-9:30	8:00-9:30	8:00-9:30	8:00-9:30	7:00-8:00
NAA, Radio, Va.	435	5:45-7:30	6:05-7:20	6:25-8:40	5:45-7:40	7:00-8:40	.....	.....
PWX, Havana, Cuba	400	.....	.....	8:00-10:30	.....	.....	8:00-10:30	.....
WBAP, Fort Worth, Texas	476	7:15-10:30	7:15-10:30	7:15-10:30	7:15-10:30	7:15-10:30	.....	6:30-6:45
WBZ, Springfield, Mass.	337	6:30-8:00	6:30-8:00	6:30-8:00	6:30-8:00	6:30-8:00	6:30-8:00	7:00-8:00
WCK, Detroit, Mich.	517	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	.....	4:00-5:00
WDAF, Kansas City, Mo.	411	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	11:45-1:00
WDAI, College Park, Ga.	360	7:30-11:30	7:30-11:30	10:30-11:30	7:30-11:30	7:30-11:30	7:30-11:30	7:30-11:30
WDAP, Chicago, Ill.	390	.....	10:00-2:00	.....	10:00-2:00	.....	10:00-2:00	9:00-12:00
WEAF, New York, N. Y.	402	6:30-9:00	6:30-7:00	6:30-9:00	6:30-9:00	6:30-7:00	6:30-9:00	.....
WFAX, Dallas, Tex.	476	8:30-9:30	8:30-12:00	8:30-9:30	8:30-12:00	8:30-9:30	8:30-12:00	9:30-10:30
WFI, Philadelphia, Pa.	305	5:30-6:00	5:30-6:00	7:00-9:30	5:30-6:00	7:30-9:30	8:00-11:00	.....
WGI, Medford, Mass.	360	.....	7:30-9:00	5:45-7:30	8:30-10:00	8:30-10:00	7:30-9:00	8:30-10:00
WGM, Atlanta, Ga.	429	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	7:30-8:00
WGR, Buffalo, N. Y.	360	7:00-9:00	.....	7:00-9:00	.....	7:00-9:00	.....	.....
WGY, Schenectady, N. Y.	380	6:45-9:00	6:45-9:00	.....	6:45-9:00	6:45-11:00	.....	6:30-7:30
WHA, Madison, Wis.	360	7:00-9:00	7:00-8:00	7:00-8:00	7:00-9:00	7:00-8:00	7:00-8:00	.....
WHAS, Louisville, Ky.	400	.....	7:30-9:00	7:30-9:00	7:30-9:00	7:30-9:00	7:30-9:00	.....
WHAZ, Troy, N. Y.	380	7:15-8:30	.....	.....	.....	.....	.....	.....
WHB, Kansas City, Mo.	411	.....	8:00-10:00	.....	8:00-10:00	.....	.....	8:00-10:00
WHK, Cleveland, O.	390	5:00-5:30	5:00-5:30	7:00-8:45	5:00-5:30	5:00-5:30	5:00-5:30	7:00-8:45
WIP, Philadelphia, Pa.	509	6:00-6:30	6:00-11:00	6:00-6:30	6:00-6:30	6:00-8:55	9:10-11:00	.....
WJAX, Cleveland, O.	390	.....	8:00-7:30	.....	7:15-9:30	.....	.....	.....
WJZ, New York, N. Y.	455	7:30-9:30	6:00-9:30	8:00-9:30	7:30-9:30	7:30-9:30	7:30-10:00	7:30-9:00
WKAQ, San Juan, P. R.	360	.....	.....	.....	7:30-9:30	.....	.....	.....
WLAG, Minneapolis, Minn.	417	10:10-11:30	6:00-7:30	6:00-7:30	9:15-10:30	6:00-7:30	8:30-10:30	.....
WLW, Cincinnati, O.	360	7:00-9:00	9:00-11:00	7:00-9:00	9:00-11:00	.....	.....	.....
WMAQ, Chicago, Ill.	448	.....	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	.....
WMC, Memphis, Tenn.	500	8:00-9:30	8:00-9:30	.....	8:00-9:30	8:00-9:30	8:00-9:30	.....
WQAI, San Antonio, Texas	400	.....	9:30-10:30	.....	7:30-8:30	.....	.....	9:30-10:30
WOC, Davenport, Ia.	484	7:00-8:30	.....	10:00-11:00	7:00-8:30	7:00-8:30	9:30-10:30	7:00-9:00
WOO, Philadelphia, Pa.	509	6:50-11:00	.....	.....	6:50-9:10	.....	.....	.....
WOR, Newark, N. J.	405	5:15-6:30	7:00-10:00	5:15-6:30	5:15-6:30	7:00-10:00	5:15-6:30	.....
WSB, Atlanta, Ga.	429	10:45-12:00	10:45-12:00	10:45-12:00	10:45-12:00	10:45-12:00	10:45-12:00	7:30-9:00
WSY, Birmingham, Ala.	360	8:00-8:45	.....	8:00-8:45	.....	8:00-8:45	.....	7:30-8:30
WWJ, Detroit, Mich.	517	.....	6:00-9:00	6:00-9:00	6:00-9:00	6:00-9:00	.....	6:30-7:30

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

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Looking Ahead

Loud Speaker Builders—Next issue Thomas W. Benson will elaborate on his recent article telling how to make a moving coil loud speaker. He has had many queries as a result of the first article and has "boiled" these down into a round table discussion.

Then, Too, His Beginners' Series Chapter—next week—will explore the realm of loop antennae.

H. J. Marx Winds up His Three-Tube Reflex Series Next Issue—telling how to put the set in a cabinet and the tricks of operation. In another part of the same issue he will give some "dope" on a very good Four-Circuit Tuner—something new.

E. T. Flewelling Believes—and He Ought to Know—that panel layout is very important in the functioning of his circuit. In Part IV, next week, he will tell how to arrange the panel for the One Condenser Super Set.

More Reasons for Buying Next Issue—Advance programs for the big stations; new wave lengths for stations as they change; an interview with C. Francis Jenkins, inventor of Radio motion pictures.

Looking Ahead into the Summer—a Portable Set Number. The latest Radio vacation aids will be described. Radio is a GO this summer. Plenty of big stations are on plenty of different waves. Fish for broadcasts with your trout.

Newsstands Don't Always Have One Left

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STOLEN BOY FOUND BY BROADCAST AID

SON OF RADIO ENGINEER RETURNED HOME

Sheriff of Watertown, N. Y., Hears Broadcast Description and Discovers Child in Lonely Hut

SCHENECTADY, N. Y.—Little Vernon Alexanderson, age 5, was recently returned safely to his home here after being kept in a lonely hut by kidnapers for nearly a week. The child was rescued by the direct results of Radio broadcast.

Vernon, the son of E. F. Alexanderson, chief engineer for the Radio Corporation of America, was lured away from his home by a man who promised him some rabbits. The man sent Vernon's little sister for a box to keep the rabbits in and when the girl was out of sight the boy was thrown into a waiting auto which sped away.

Upon learning of his child's disappearance, Mr. Alexanderson brought into play one of the most powerful forces of news spreading known to man—Radio. Complete description of the lost child and full information of his disappearance was broadcast from all the larger plants in the eastern and central states.

Find Lad in Watertown

The lad was later found in a hut near Watertown, N. Y., in the care of Mrs. M. L. Grennell, 66, who alleges she was paid to care for the child and knew nothing of the kidnapping. The sheriff of Watertown became suspicious of the new occupants of the house in which Vernon was found after hearing the broadcast sent out from a local station. He at once investigated and the result is Vernon is safe at home with his Mom and Dad.

Complete descriptions of two men who are said to be implicated in the child stealing have been obtained from Mrs. Grennell and Vernon's sister and a net has been spread by the Radio broadcasting stations that is practically impossible to be escaped. The capture of the men is expected at an early date.

K. C. Broadcast Fourth Degree

BUFFALO, N. Y.—For the first time in the history of the Knights of Columbus in Albany speeches that were delivered at a fourth degree dinner were broadcast.

Replace your old Coils with a

B-T REINARTZ VERNIER TUNER

Another Bremer-Tully "hit" which guarantees greater RANGE, SELECTIVITY and CONTROL than any coil ever made. Saves work—no taps, switches or switch points needed. Suitable for all NEW BROADCASTING WAVE LENGTHS.

Designed for adaptation to practically all modern hook-ups.

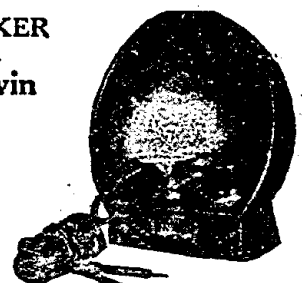
DO NOT START YOUR SET UNTIL YOU GET INFORMATION

Special Condensers and Transformers for NEUTRODYNE CIRCUITS ready May 10.

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70 HALSEY STREET, NEWARK, N. J.

SEND AND RECEIVE AT SAME THEATER

AUDIENCE SEE ARTISTS BUT HEAR THEM BY AIR

Unique Stunt of Broadcasting and Listening in at Same Point Accomplished Through WMC

By G. P. Newbern.

MEMPHIS, TENN.—Broadcasting and receiving the same concert at the same point which has been unsuccessfully tried many times, was successfully accomplished recently by WMC, station of The Commercial Appeal, during the celebration of Radio week in Memphis. During the week, 28 special concerts were broadcast from an upper box in the main auditorium of the theater, in plain view of the audiences, and were heard only through loudspeakers placed in various parts of the theater. Persons seated in the adjoining box from where the broadcast took place heard only the notes of the singer and musicians as they came from the Radio receiving sets in the theater.

A specially constructed microphone (homemade) and speech amplifier were installed in the front, upper, left box at the theater. From the amplifier a special telephone line ran directly to WMC studio and into the broadcasting set. It was broadcast from WMC in exactly the same manner that other broadcasting is done from points remote from the studio.

Much Depends on Artists

Receiving sets of several types, installed by Memphis Radio dealers in Loew's Palace Theater, received these broadcasts, turned on the several loudspeakers in the theater and the audience heard the singer and musicians and announcements, not as they were delivered into the microphone, but by Radio.

Much of the success of this stunt is due to the artists who furnished the songs and music. In order that those in adjoining boxes and other parts of the theater could not hear them, it was necessary for the songs to be sung as low as possible. Mr. Harry Bruton, tenor, varying his song number each day of the week, sang almost in a whisper but each and every note was perfect. While singing, his face was about three inches from the microphone.

The same is true of the violin solos played by Mr. Dave Love, director of Loew's Palace Symphony Orchestra, and Mr. Harry Blix, cornetist, of the orchestra. Their notes although perfectly rendered were pitched so low that they were not audible six feet away.

Movies Show WMC in Action

Radio Week not only included the above mentioned feature but included the showing at Loew's Palace Theater, of Gloria Swanson in "Prodigal Daughters," a Radio romance of the films. The Mystery Box which explains in detail the principle of Radio, and special motion pictures showing WMC in action. This latter picture showed the announcer of WMC introducing before the microphone Mr. Harry Bruton, tenor, and Mr. Dave Love, director of the orchestra. As Mr. Bruton was introduced, as shown on the screen, the announcer's voice could be heard making the identical announcement as lipreaders saw him repeat in the picture.

DEVICE IS INVENTED TO CUT INTERFERENCE

New Instrument to be Known as "Interference Eliminator"

WASHINGTON.—Designed to reduce atmospheric disturbance for Radio receiving sets, a new device to be known as an interference eliminator has just been patented.

The device comprises a resonant circuit, with an amplifier connected to the circuit and a current limiting relay connected to the output amplifier with the detector and

BOSTON IS FIRST CITY WITH RADIO FIRETUGS

BOSTON, MASS.—This city will be the first municipality in the world to have its firetug equipped with Radio. Fire Commissioner Glynn is planning to have the three boats of the harbor fire service thus equipped at a total cost of \$7,000 to \$8,000, and has asked the city council for a special appropriation.

"SPARKS" JOB FILLED IN 3 MINUTES BY AIR.

NEWARK, N. J.—Three minutes after an announcement was made from WOR to the effect that a first-grade Radio operator was needed on a sea-going tug to go to a ship up the coast, which the Shipowners' Radio Service requested WOR to make, word was received by WOR that the job was filled.

RADIO REPLACES THE MANDOLIN



Venice, a gondola, the tinkling of mandolins, soft splashing of tiny waves—that is romance. California, a canoe, the Radio set and the same splashing of tiny waves is just as romantic and quite a bit more up-to-date. These two happy fans are listening in to the twilight broadcast of KFI while drifting in the moonlight waters of a California lagoon. Can you think of a nicer way to spend a summer evening?

telephones connected to the output of the current limiting relay.

The resonant circuit and the output of the current limiting relay are interconnected, whereby an electromotive force derived from the current limiting relay is impressed upon the resonant circuit opposing the flow of currents having a

frequency equal to the natural frequency of the resonant circuit.

Never get impatient with your set. Nine chances out of ten a man familiar with Radio can find your trouble in a half-minute. If you will take the trouble to familiarize yourself with the principles of Radio you can do the same.

DIRECTIONAL WAVE PROVES SUCCESSFUL

CHBC UNHEARD 100 MILES OFF STRAIGHT PATH

Giant Aerial, 120 Feet Square Erected at Albertan Station to Carry Out Feat

CALGARY, ALTA.—Directional transmission of voice on the Radiophone has been achieved.

For the first time in the history of the Radiophone, the human voice has been transmitted in a definite direction. W. W. Grant, chief engineer of CHBC, The Morning Albertan Radio broadcasting station, and president of the W. W. Grant Radio, Ltd., spoke to KEDE, the Mercantile Trust Co., at San Francisco, 1,000 miles from Calgary, and only those within a radius of 50 miles of the direct line between the two cities could hear.

Mr. Grant has perfected directional transmission of the voice by Radio by means of a giant loop aerial, the largest in use at the present time by any station on the American continent. The loop antenna, which is 120 feet square, is supported by two masts 115 feet in height. Another factor operating to Mr. Grant's advantage is the fact that The Albertan station is located on Crescent Heights in Calgary, which gives it an elevation of around 4,000 feet above sea level.

Only North and South

At the present time the masts of the aerial are so situated that Mr. Grant is able to transmit his voice directly north and south, but at the same time prevent it from traveling east and west. The loop which is being employed consists of five wires 120 feet in length. There are five lead-in wires from each mast, each of which are 150 feet long, one lead-in being attached to each of the five cross wires. This special type of circuit, which was devised and discovered by Mr. Grant, is the dominant factor in the directional transmission.

Thus Mr. Grant can control the direction of his voice on the waves of ether in a manner similar to the way in which the beam of a searchlight is directed, with the exception that the voice travels both ways. Mr. Grant, however, hopes he will be able to overcome this difficulty in the near future. Preliminary experiments in directional transmission have been conducted by other Radio engineers in the past, but no workable system such as Mr. Grant has devised was ever used, nor was the distance which he is able to cover ever attained.

Tests Are Carried Out

Saturday night and Sunday morning Mr. Grant, operating on a wave length of slightly above 440 meters, conducted tests on the new loop aerial which was installed last week. Tests had been arranged and it was found that his voice could be heard north and south, but not east and west and thus it was proven that directional transmission of the voice was attainable. Therefore Radiophans of San Francisco heard The Albertan when operating on this loop, but eastern Canada points could not hear. By switching the lead-in wires, which operation entails only a few moments' work, the giant loop aerial is transformed into a standard broadcasting antenna.

Commercial Value

"As yet the experiments have not gone far enough to tell whether this will have any great commercial value," said Mr. Grant. "However, if one wished to communicate with southern points only, and leave out eastern and western points, this would make it possible."

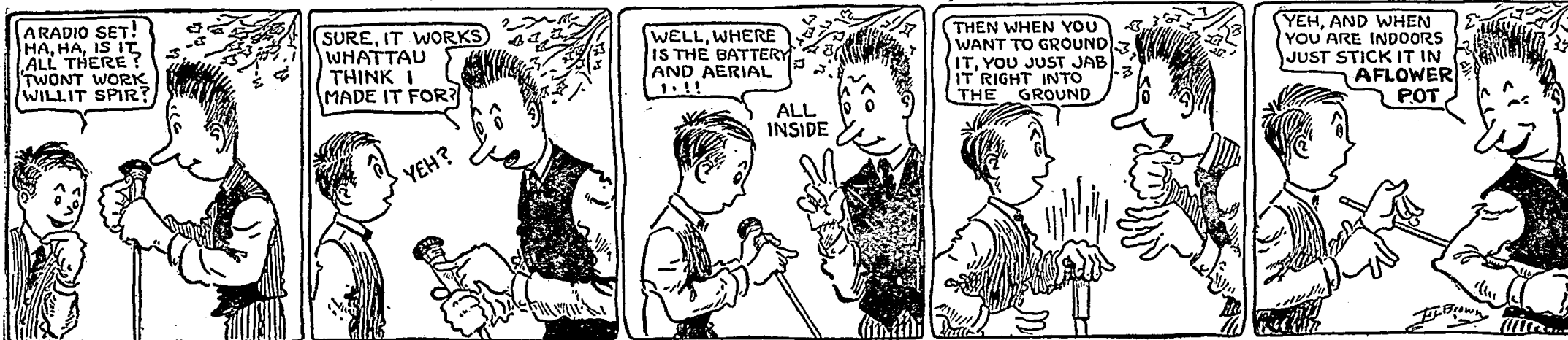
Norway to Broadcast

CHRISTIANA, NORWAY.—It is proposed to erect broadcasting stations at Christiana, Bergen and Trondhjem, and application for the necessary licenses has already been made for the Norwegian Marconi company and the Morse Telegram Bureau.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Not the Rubber Plant Pot!



TUBE SUPPLY QUIZ TO DISCLOSE FACTS

CHAMBER OF COMMERCE TO SURVEY CONDITIONS

Broadcasting Section Announces Careful Study of Copyright Controversy Caused by Music Publishers

NEW YORK.—A national survey of the vacuum tube supply in this country has been undertaken by the National Radio Chamber of Commerce, it was announced recently, at headquarters of the chamber, 165 Broadway.

This survey, the first to be made and said to be well under way, "vitaly concerns every one in the Radio industry as well as the public," according to the announcement, issued after a meeting of the Board of Governors, at which numerous groups were represented. The Governors, it was stated, acted at the request of the chamber's membership and of other elements in the Radio industry.

Discloses Actual Situation

Tresham D. Gregg, one of the engineers and managers of the Chamber, said that the survey claims to disclose the actual situation nationally with regard to the tube supply. Specifically, the supply of the following tubes is concerned: 200, 300, 201, 801, 201-A, 301-A, DV-6, DV-6A, WD 11 and WD 12. Among the questions asked are these:

"Have you an adequate supply of these tubes?"

"Have you a supply in sight for the next two months?"

"If the supply of any of these tubes is short, when did such shortage first appear?"

"What number of each would you deem an adequate stock?"

"What number of each does your trade normally demand for the season?"

Aids Development of Radio

The survey, it was explained, is a part of a program to aid in the orderly development of the Radio industry in the interest of both the industry and the general public. Co-operation with the Department of Commerce and other Government departments, as well as with universities and public and private institutions is embraced in the plans.

The broadcasting section of the Chamber, it was also announced, is making a careful study of the copyright controversy between the American Society of Composers, Authors and Publishers and the broadcasters. A conference to consider this conflict was held by the Chamber recently. Middle West broadcasters were represented by John E. Jenkins, of Chicago.

Membership in the Chamber, which now takes in all interests from manufacturer to listener, has, it was stated, recently increased about thirty per cent. The educational section is pushing its work among the universities and churches.

WEAY Promises Real Amusement

HOUSTON, TEXAS.—Preparation of an elaborate midnight program featuring professional and proven local talent, is now at the point where Radiophans may expect witchy hours to bring real amusement from WEAY. This station has been sending one program each week from The Evening Post studio, Friday nights; from McMillan's dancing academy Wednesday nights and from the First Baptist church Sunday nights.

NAVY TO ABANDON PLANTS ON LAKES

Eight Stations "For Sale" by Government—Radio-Compass Service Remains

GREAT LAKES, ILL.—The navy department has decided to abandon virtually all of its Radio service on the Great Lakes with the exception of the Radio-compass stations, and will shortly advertise eight Radio stations for sale. Lack of men and money to operate them led to the decision to abandon the plants.

An inventory of the material and supplies to be sold is being prepared by the district communications superintendent, Lieut. A. G. Berry, preparatory to advertising for bids.

The stations to be abandoned are located at Alpena, Mich., Buffalo, Cleveland, Detroit, Duluth, Mackinac Island, Milwaukee and Manistique, Mich. Stations at Chicago, Great Lakes and Eagle Harbor will be retained, in addition to the Radio compass stations at Detour, Grand Marais and Whitefish Point, Mich.

The three Radio-compass stations safeguard vessels passing through the fog enshrouded lower end of Lake Superior, Whitefish Bay and St. Mary's river.

Besides handling the Radio business of the lakes the stations to be closed have taken care of most of the commercial messages passing between Great Lakes ships and the shore. The strictly commercial Radio companies have never invaded the Great Lakes field, and with the exception of a few stations privately owned by the steamship companies, virtually all business has been handled by the navy Radio.

Commissioner Gets Mules by Radio

ATLANTA, GA.—While in Atlanta recently on a Radio inspection trip, Commissioner Carson of the Department of Commerce, was advised that his best team of mules had disappeared from his farm in a nearby state, and being later in the broadcasting station of a local paper he let their loss be broadcasted with a description. A few days afterwards when in Nashville, he was advised that his mules had been found.

Atlantic City's Crowds Stroll to Ether Music

City Officials Plan to Entertain Visitors Daily

ATLANTIC CITY, N. J.—Crowds on Atlantic City's famous boardwalk were surprised one Saturday afternoon recently to hear voices of invisible speakers and singers above the boom of the surf and the myriads of sounds peculiar to the "Great Wood Way."

The sounds came from a set of amplifying apparatus, known as a public address system, installed by the Western Electric company and being tested for a group of city and hotel officials. A motor truck carrying the vacuum tubes, control apparatus and batteries was parked alongside the Brighton hotel. Wires connected it with a microphone in the concert hall of the National Exhibitors and to sound-projectors mounted at intervals on the Brighton and the Traymore. Speeches and music were distributed clearly along 2,000 feet of the boardwalk.

City officials are considering a permanent installation of loud speakers along the entire boardwalk, so that everyone on it could hear addresses by prominent visitors, play-by-play stories of important games, dance music from local hotels, and all the rich variety available through tapping the programs of nearby broadcasting stations.

A movement is under way to provide Toledo, Ohio, with a Radio broadcasting and receiving station for its police department.

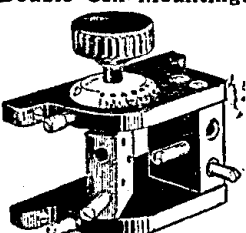
MEXICO HAS FIRST BROADCAST PLANT

Transmitting on 400 Meters from Regional Exposition of Nuevo Leon

MONTERREY, MEXICO.—The first Radiophone broadcasting station ever successfully operated in Mexico now is sending out programs from the Regional Exposition of Nuevo Leon, according to Radiophans, who heard the announcer's name given as Senor Reyes. The station uses a wave length of 400 meters. Musicians and public speakers have volunteered to work every night if necessary to supply entertainment to mining camps.

ADJUSTABLE COIL MOUNTINGS FOR FLEWELLING CIRCUIT

Triple Coil Mounting.....\$5.00 List
Double Coil Mountings..... 3.50 List



A patented feature locks the coil in place and prevents the coil from being thrown out of adjustment once station is tuned in.

Licensed under U. S. De Forest Pat. 1365170
ASTORLOID MFG. CO., 416 Marcy Ave., Brooklyn, N. Y.

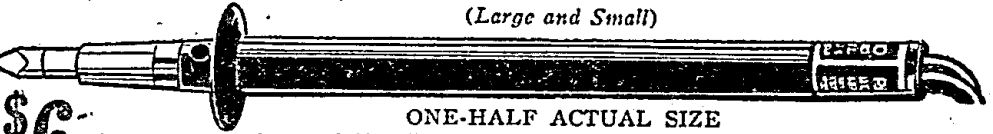
Dealers write for special discounts

Delicate Soldering

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

THE POST SOLDERING IRON

Platinum Heating Unit—Interchangeable Tips—Universal Current (Large and Small)



\$6 ONE-HALF ACTUAL SIZE

Awarded Certificate of Excellency, N. Y. Evening Mail Radio Institute

From your Dealer, or write

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

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TRUTH

ABOUT VARIABLE LEAKS

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REVELATION LEAKS

0-5 MEGOHMS VARIABLE LEAK ONLY

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DITTO WITH .00025 or .0005 MICA CONDENSER

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PAY NO MORE

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SOLE NATIONAL DISTRIBUTOR

ALBERT J. SLAP

132 NASSAU ST., NEW YORK CITY

GREBE RADIO



"Fame is the follower of reality."

Yu-Tse

The unrivalled reputation of the Grebe Receiver is built upon its years of thoroughly dependable service.

Write for "Musings of Dr. Mu"

Doctor Mu



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

A. H. GREBE & CO., Inc.

Richmond Hill, N. Y.

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

Cotogrip

"Built First to Last"

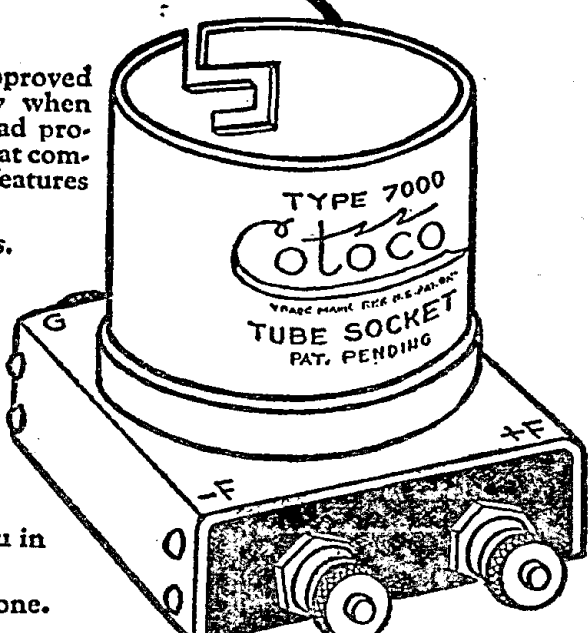
This little beauty was approved by our engineers only when convinced that they had produced the one socket that combines all the essential features of a good socket.

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

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

You ought to have one.

Ask Your Dealer



COTO-COIL CO PROVIDENCE

HAWAIIANS IN U. S. HEARD AT HOME



Had the setting been transferred to the moonlit beach of Waikiki or the mystic, palm-decked hills of Hilo, the Radiophans who listened in to tinkling ukeleles and wailing steel guitars could not have felt the Hawaiian atmosphere more than they did when the Hawaiian group of the Ford Motor Com-

pany of Highland Park, was on the air. In the circle is shown two natives of the land of the hula girls actually listening in to a broadcast from the United States. Can you imagine their surprise when they tune in their own national songs and music?

CRIB KEEPER SAVED BY AMATEUR RADIO

SICK FAN PICKS UP CALL OF STORM BOUND MEN

Thrilling Tale of Battle with Death by Life Guards Told Newspapers by Ether Waves

CLEVELAND.—One of the most thrilling adventures ever recorded in the annals of stormy Lake Erie was the rescue by amateur Radio of Harry Holzworth, keeper of the crib in the waters a few miles off this city. While Holzworth lay ill with pneumonia, a storm raging outside the steel enclosure, two of his companions frantically sent out a call for help which was picked up by a Cleveland amateur.

Radio for Help

Inside the walls were dripping with dampness while the waves dashed on the rocks below and the spray swept over the sides. For a man with such an illness the crib was not a safe place and he was in dire need of medical aid. It was impossible to launch a boat and valuable minutes slipped away as his fellow workers waited for an answer. Patiently one of them tapped the key until word came back through the air that the coast guard would be notified to send immediate relief.

After an hour of maneuvering, Captain William E. Crapo got the craft alongside, and three coast guards, numbed by the icy spray, lay flat on the canvas top of the launch waiting for their chance to grasp the crib keeper as he dangled from a rope in midair. Time and time again the launch slid up under the skillful guidance of the captain and slipped back when it appeared likely to be tossed up against the wall.

Difficult Transfer Made

As the boat poised for a moment on the crest of a wave, one of the guardsmen reached up and Holzworth fell safely inside.

Behind the simple story of the rescue, there was still another scene in a comfortable room at 1372 West Eighty-fifth street, Harold J. Hill, an amateur member of the American Radio Relay league, was tinkering with his Radio set.

He, too, had been ill and was then recovering from an attack of scarlet fever which had confined him at home for more than three weeks. For several days he had been passing the time by talking with other amateurs. In the afternoon, Thomas B. Keller, Radio man at the crib, told him about the heavy sea and the high wind which was howling about the rock pile. He said that Captain Holzworth had a sore throat.

Picks Up Call for Help

It was not until later in the evening that Hill once more "tuned in" and listened to the frantic message from the crib that the captain was much worse.

After notifying the coast guard, Hill was not satisfied and waited to hear the result of the rescue. The launch had hardly left the side of the crib before Keller, worn and weary from his long vigil at the captain's side, sat down before his key and told the whole story.

And sitting there in his bedroom, Hill copied the facts by Radio for reporters waiting to make the first morning edition.



St. Louis Post-Dispatch Gives Direct Service to Stores, Banks and Schools

Market Reports from Station KSD Received by Community Receiving Set in Small Towns and Relayed to Individual Homes and Businesses by Telephone

By Vera Brady Shipman

The original newspaper of the famous Pulitzer chain of publications, The St. Louis Post-Dispatch, has pioneered in Radio broadcasting in the central west as the newspaper has furthered each enterprise for local advancement. The Radio field is broader than any local readers of a newspaper, for Radio distance is limitless, bounded only by the power of receiving sets placed in the listeners' hands.

A Radio newspaper which gives its direct service to hundreds of thousands of farmers, stores, banks and schools, bulletined hourly, broadcasting markets and stock reports, the St. Louis Post-Dispatch KSD, as it is known on the air, is located in the core of that prosperous section of farming, business and mining country—the great Mississippi valley. Beginning with the opening of the St. Louis stock exchange at 9:40, Central time, each morning, reports are broadcasted hourly to the listeners-in on distant farms or in large or small communities.

Have Community Radio

Situated atop a building grounded on sixty pillars of steel which run through a layer of quicksand down to bed rock, with a perfected aerial and with little steel interference from other buildings, KSD is adequately equipped with its powerful broadcasting outfit, to send its message to the people. KSD operates on 485 meters daylight schedule and 400 for evening.

Do the farmers appreciate the service they are getting? Do we as American people continue to ride a free horse or are

we noticeably appreciative? KSD broadcasts reports of every market which interest the farmer or the business man.

Take a day in a small town within Radio distance of the KSD daylight market service. In many towns the Radio receiving set is installed in the local garage. This is in turn relayed by telephone to any home or business firm wishing to connect with them. Another favorite place of receiving in a small community is the local bank. And this service is all free. The great newspaper furnishes reports direct from the city exchanges, and the small community has instant access as well as her larger sister.

Has Woman Announcer

"And is the St. Louis announcer really a woman?" How many times I met that question on my recent trip south. The voice, which a Radio magazine editor once called "that effeminate voice of KSD" would be unfortunately handicapped if it were not so, for the announcer and director of Radio programs at KSD since its Radio conception last July, is Miss V. L. Jones, graduate of Leland Stanford College of California, a former newspaper woman and at present owner of a public utility firm in St. Louis, a musician and critic, and above all a woman of great personal charm.

Miss Jones begins her announcing at eight each evening. During the day market and stock reports are announced by the chief operator, Willis Corwin, or either of his two licensed assistants, W. F. Ludgate or S. C. Mahaney. KSD maintains Sunday and Thursday silent nights with the exception of a midnight Thursday concert.

STATION WSY HAS FIRST ANNIVERSARY

WINDOW DISPLAY SHOWS WSY'S AUDIENCE

Feminine Announcer Says, "WSY is Dedicated to Alabama and Not to Service of Owners"

BIRMINGHAM, ALA.—In two show windows of a down-town department store is a novel display of the WSY, Birmingham's broadcasting station. And the display is attracting the attention of thousands of people who pass by this busy corner every day.

The display consists of a map of the United States, Canada and Mexico, showing the various points where thousands of people listened in on WSY programs. The map forms the background, and running to the map are many ribbons showing the points where people have listened in on this program. On the floor of the windows are hundreds of letters from all sections of the three nations named from admiring auditors.

Celebrates First Anniversary

WSY has only recently celebrated its first anniversary with an extended and varied program.

Among other things the program included an address by Miss Georgia Bryant, the WSY's feminine announcer. She spoke in part as follows: "WSY feels certain that its millions of listeners have noticed with a degree of satisfaction that at no time during the one year of its existence has it in any way permitted its operatives to exploit through the ether so-called propaganda, concerning the Alabama Power company. We have always endeavored to make our broadcasting station an agency for pleasure and education and our programs have been arranged with every possible care and precaution, with the hope that they would afford our listeners evenings of real enjoyment and enlightenment.

Promise Highest Efficiency

"WSY has been dedicated to the service of Alabama, and not to the service of the Alabama Power Company. As it has been in the past, our policy in the future will be to keep this service on the highest plane of efficiency, permitting no one to use it in the furtherance of any individual's, firm's or corporation's interest. Its greatest ambition is to serve well its state and its multitude of friends with clean, wholesome entertainment, and spiritual and educational broadcasting, and it is indeed gratifying to know that this ambition has, in a degree, been cherished during our first year of existence. For this we are greatly indebted to the artists, who have so generously contributed their talent free of charge, and to our listeners who have not been sparing in their indulgence."

Fish Prices Via Radio

WASHINGTON, D. C.—The Fisheries Bureau of the Government issued a broadcast recently, giving wholesale market prices on fish, together with the quantity of varieties available at New York, Boston, Norfolk, Jacksonville and Chicago. Each week on Tuesday evening NAA will carry similar broadcasts between 7:45 and 8 p. m.

How to Make One Condenser Flivver Super Set

Part III—Circuit Diagram and List of Parts

By E. T. Flewelling

OUR last talk on the one condenser Flewelling circuit discussed the tuning and tickler coils for this set. These were of the variocoupler type in contrast to honeycomb coils, and the question has arisen as to why the change was made. It really is a matter of personal choice. All Radio sets may be constructed in various ways according to the needs or fancies of the builders, and the set which we are now describing is merely another method of arriving at the successful operation of the Flewelling circuit.

The circuits and sets that have been previously described have worked out very well indeed, but one never stands still and the present set, we believe, will be accepted as another step ahead. The advantage is in the circuit used and it will be seen at once that it might just as well be constructed with honeycomb coils as not, according to the builder's desires.

The next step for us to consider after the inductances is what parts are to be used, and it is perhaps best to give here the complete list of parts that will be necessary to use to construct the set.

The list is as follows:

The inductance unit described last issue. One bakelite panel about 9 by 9 inches and one sheet of copper foil of same size to be used to shield the instruments.

One tube socket. One 11-plate variable condenser .00025 mfd. vernier type recommended.

One tube rheostat, vernier type if possible.

Two dials, one for the variable condenser and one for the tickler.

Eight binding posts. One switch lever with 7 points. One switch lever with 2 points.

One suitable wooden board to mount panel, etc., on. This board should be 1/2 inch shorter than panel to allow for mounting set in cabinet if it is desired and about 8 1/2 by 5 by 1/2 inch thick will be right for the panel size given.

One variable grid leak, panel mounting type preferable.

One grid condenser .00025 mfd. capacity, with mica dielectric.

One mica dielectric fixed condenser of .006 mfd. capacity.

Suitable screws for mounting parts, wire and clips for connections, A battery, B battery, phones and a tube.

Many fans will ask just what particular parts to use, and to this question we must answer, just the best. No fear need be entertained as to whether the receiver will operate and one will be far better satisfied in the end if only good reliable apparatus is used.

Critical Apparatus

The only critical pieces to consider are the following, and we might offer a few suggestions regarding them: The variable grid leak is very important and should be one that has a large range of adjustment. Try to get one that is guaranteed and that may be exchanged if it does not operate properly. The best that you can buy will be the surest way to success that we know of.

The grid condenser should be of a well constructed type, that uses mica for its dielectric and one that will be easy to mount with the grid leak. In this connection let me advise the use of a combination grid leak and grid condenser that may be mounted directly upon the panel so that all adjustments of the leak may easily be made.

The large fixed condenser of .006 mfd. capacity should also follow the scheme of things. This should be of good solid construction and it is important that this condenser also uses mica for its dielectric.

Tube for Best Results

Regarding the tube to be used with the set, the following is suggested: A hard tube such as the UV201, UV201A, WD11 or WD12 is recommended and note also that if you wish to, you may use a soft tube such as the UV200. In other words, use the tube that you have on hand or is easiest to obtain.

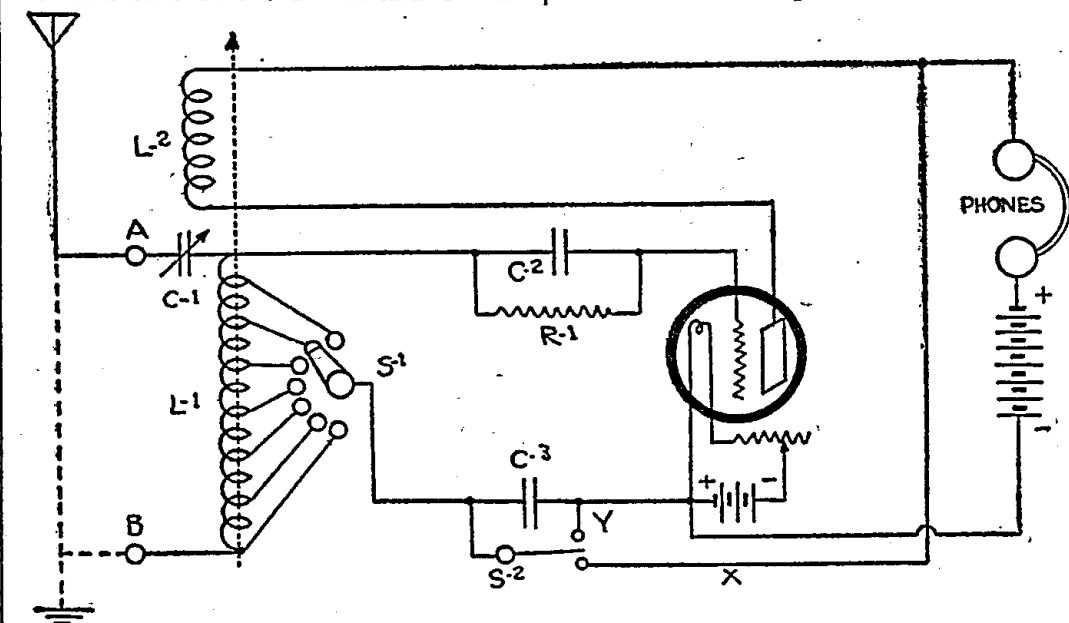
A great many will ask at once, which

tube is the best? There is no direct answer to this question because no two tubes are alike in their operating characteristics even though they may bear the same labels. The advantage lies with the hard tube of the UV201 and UV201A

this wiring diagram of the set.

Connections for the Set

It will be seen at once that the variable condenser has been changed from a parallel or shunt connection with the inductance to a point where it is in



In the circuit above, L-1 (stator) and L-2 (rotor) combined are the inductance described previously; S-1, tap switch on stator of inductance; C-1, 11-plate variable condenser, vernier preferred; C-2, .00025 mfd. mica fixed condenser; R-1, variable grid leak; C-3, .006 mfd. mica fixed condenser; S-2, single pole double throw switch when thrown to X makes set a Flewelling Super, when thrown to Y, converts set to straight regenerative; A and B, terminals for either aerial or ground, or one of these alone, interchangeable

type because of the greater volume that these tubes give.

If a soft tube is used, it will be found very critical when used in the set, especially if it is operating as a Flewelling set. The volume is not as great as may be wished for. This tube however is perhaps our best tube for use as a plain detector tube, it is at all times best at a critical plate voltage. Summing the tube question up gives us the answer that any good vacuum tube will work in the circuit and that the difference in various tubes lies in the volume that they deliver and in how critical they are to handle.

Departure from Original Layout

It will be seen by now that this receiver is going to depart a bit from the usual Flewelling layout. The reason for this is that it will enable the greatest number of fans to join the circle and also because we are finding it possible to further simplify the circuit. We all are anxious to reduce our sets to the simplest possible form and the writer believes that the set that we are describing is a real step in the right direction. For instance you are asked to study very carefully

series with the antenna, or ground, whichever is being used. That is, one side of the variable tuning condenser is connected to the side of the inductance that is connected to the grid condenser and leak and whatever type of energy collector that is used, is connected to the other side of the variable condenser.

The incoming signal goes from the energy collector, through the variable

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tuning condenser, touches on one side of the tuning inductance, goes through the grid leak and its condenser directly to the grid of the tube. If this variable tuning condenser were to be connected to the side of the inductance that is connected to the filament of the tube it would be useless and this is why the above emphasis is made.

Used as a Super

When the circuit is used as a super there will be no connection whatever to the point B on the diagram. This point is only to be used when the set is operating as a plain regenerative circuit. As a super any connection of the set to ground or antenna should be made to the point marked A. Here is a point to remember, although we will speak of it when referring to the operation of the set in order to secure any effect from the tuning condenser when using no antenna or ground it will be necessary to arbitrate and use a short antenna consisting of from 3 to 6 feet of wire or a convenient coal hod or bed spring or auto frame connected as stated to the point A.

This completes the list of parts and materials needed and we will pass on to the panel layout, because we are going to try to show that there is a best position for the various pieces.

Panel layout will be the next article. (TO BE CONTINUED.)

RADIO "BUGS" GET INTO BUSINESS FOR YOURSELF

Why not turn your hobby into money? You can easily make \$15.00 a day, or as much more as you like, by our wonderful plan of selling Radio direct to the millions of people just waiting for our better parts or sets. We furnish everything you need at lowest factory prices and tell you how to build a profitable business of your own. Knott products are up to the minute. Knott plans are unique and unbeatable. Radio is just beginning to come into its own. Are you? Want to make more money? Want to be your own boss? Write TODAY for FREE instructions How to Sell Real Radio.

E. R. KNOTT MACHINE CO., 1-D Ellery St. S. Boston 27, Mass.



Get a

Federal Standard Radio Head Set

For every member of the family

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

When a family favorite is being played or sung, everybody wishes to listen at once. They can hear clearly and distinctly when each little one (and the grownups, too) have an individual Federal Head Set. The pleasure of each individual will be enhanced by the pleasure of the family as a whole.

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

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

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

Federal Telephone and Telegraph Co.

Factory at BUFFALO, N. Y.

Western District Office: 417 South Dearborn Street, CHICAGO, ILL.

Vernier Var. Condensers

COMPLETE WITH KNOB AND 3 IN. RUBBER DIAL

\$5.00 Value 11 plate with 3 plate Vernier.....	\$2.00
5.50 Value 19 plate with 3 plate Vernier.....	2.15
6.50 Value 41 plate with 3 plate Vernier.....	2.50
Plain—	
3 Plate	\$0.75
11 Plate .....	.98
23 Plate	\$1.25
43 Plate	1.50

Include 5c per item for parcel post.

CHI-CITY-RADIO CO. 945 CRESCENT PLACE, CHICAGO, ILL.

DON'T PASS THIS-BUY

World Radio Batteries SAVE YOU 50% WRITTEN 2 YR GUAR

Every World User Is a Booster WRITTEN 2 YEAR GUARANTEE

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

World-Radio-Batteries	
6 Volts—40 Amps., \$8.50	6 Volts—80 Amps., \$12.50
6 Volts—60 Amps., \$10.00	6 Volts—100 Amps., \$14.50
6 Volts \$16.00 120 Amps.	
Full Rating Guaranteed	
MAIL YOUR ORDER TODAY. WE SHIP EXPRESS C. O. D. SUBJECT TO INSPECTION, OR WILL ALLOW 5% FOR CASH WITH ORDER. ALL ORDERS SHIPPED SAME DAY AS RECEIVED.	
WORLD BATTERY COMPANY, 60 E. Roosevelt Rd., Dept. L, Chicago, Ill.	

WE REPAIR WD-11, \$3.50

and OTHER VACUUM TUBES

Excepting VT-I and VT-II

MAIL ORDERS Solicited and Promptly Attended To



H & H RADIO CO. 516 Clinton Avenue NEWARK, N. J.

ADVANCE PROGRAMS

(Continued from page 6)

WDAR (Eastern, 395), 11:00 A. M.-1:00 P. M., Organ recital, Stanley Theater; Dinner dance music, Arcadia Cafe Orchestra; 2:00-3:00 P. M., Short talks and musical program; 4:30-6:00 P. M., "Affairs of the Heart," Betsy Logan; Dream Daddy with the little tots; 7:30-8:00 P. M., Dream Daddy with boys and girls.

WMAQ (Central, 448, Daylight Saving), 4:35 P. M., Travelogue, Homer Barton; 7:00 P. M., Talk of New England Music, Max E. Oberdorfer; Louise Steele, soprano; 9:15 P. M., Musical program, Mrs. H. J. Brewer, violinist; Miss Bowman, pianist.

Saturday, May 19

CFCA (Eastern, 400, Daylight Saving), 8:00-9:00 P. M., Concert, Selection from "Tom Jones," Star Orchestra; "Danny Boy," Kate Jackson, contralto; Second Movement from Tschalkowsky Concerto, Harry Adaskin, violinist; "Sizellita," Orchestra; "Lullaby," Kate Jackson; "España," Orchestra; "Entrance of the Boyers," Orchestra; Contralto solo, Kate Jackson; "Serenade D'Amour," Orchestra; Soldiers' Chorus from Faust," Orchestra.

Sunday, May 20

KFDB (Pacific, 400), 7:00-7:30 P. M., Bedtime stories, Hermione Henze. KFO (Pacific, 400), 11:00-12:15 P. M., Sacred music; Organ recital; readings. KYW (Central, 447, Daylight Saving), 11:00 A. M., Church services, Orchestra Hall, Dr. F. F. Shannon, pastor; Musical program under direction of Daniel Protheros; 3:30 P. M., Chapel services, Ernest Bourner Allen, minister; Pilgrims' Church, Oak Park, Ill.; 7:30 P. M., Sunday Evening Club services; Musical program, Choir of one hundred; direction of Edgar Nelson; Speaker, Cornelius Woolfkin, New York City.

Monday, May 21

KFDB (Pacific, 400), 2:00-2:30 P. M., Book chat, Paul Elder's book store; 2:30-3:00 P. M., Talk; 8:00-10:00 P. M., "A Trip Thru Russia," San Francisco Chamber of Commerce, Russian Music. WBAP (Central, 476), 9:30-10:30 P. M., Concert, Fred Wagon's Orchestra.

Choral Society: "Nightfall in Granada," Chorus; "Variations—Old Black Joe," Esther Wall, pianist; "Shumber Song," Mrs. John Siple, contralto; "Venus Valse," Oscar E. Bacon, cornetist; "Daybreak," "Evening," Chorus; "Ave Maria," Mrs. Frank Shattuck, violinist; "The Rosary," Edward F. Myers, tenor; "Night in June," Ladies' Chorus; "Melody in F," Merrill Abbot, violinist; John Bierly, cellist; Selma, Chaliff, pianist; "By the Waters of Minnetonka," Bessie W. Hall, soprano; "Serenade, Male Chorus; "Romance," "Romano," Mrs. Frank Shattuck, violinist; "Sweet and Low," "How Can I Leave Thee," "Swing Low, Sweet Chariot," Edward F. Myers; Piano solo, Mrs. Edward Halloran; "Mighty Lak" a Rose," Ladies' Quartet; "Intermezzo," Trio; "The Silent Sea," Chorus.

Reviews of Books

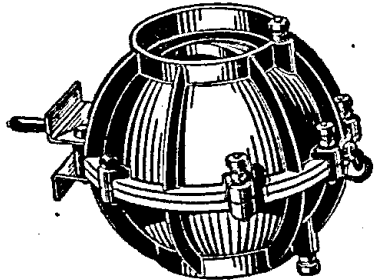
How to Retail Radio. A new book telling of tested plans and methods and policies for the dealer in Radio. Financing, location, store equipment and arrangement. Price, \$2.00. Lefax Radio Handbook. A loose-leaf handbook. This book never grows old or out of date. All of the latest apparatus and hook-ups are added as time goes on. Anything that grows old is taken out and new leaves substituted. Price, \$3.50. 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. Radio for the Amateur. By A. H. Packer and R. R. H. 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. Elements of Radio Telephony. By William C. Ballard, Jr., M. E. A reliable, authoritative discussion, in simple form, of the essential principles of Radio telephony and their application. The use of mathematics has been almost entirely avoided. Price, \$1.50. The book department of the Radio Digest is prepared to send you any of the books on Radio published, whether listed in our Book Review or not. Let us know and we will see that the book is mailed to you. Postage stamps in payments for books not accepted. Send money order or check. Radio Book Department, Radio Digest, 123 W. Madison St., Chicago, Ill.

Friday, May 18

CFCA (Eastern, 400, Daylight Saving), 8:00-9:00 P. M., Concert, Selection from "Cavalleria Rusticana," Star Orchestra; Tenor solo, W. J. Colebrook; "Ballet La Source," Orchestra; "Hungarian Dance No. III," Mannie Roth, violinist; Tenor solo, W. J. Colebrook; "Gold and Silver," Orchestra; "Souvenir," Mannie Roth, violinist; "Shepherd's Hey," Orchestra; Tenor solo, W. J. Colebrook; "Soldiers' Joy," Orchestra.

Kellogg Radio Equipment

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The stator and rotor are of Kellogg Bakelite, with properly proportioned windings of well insulated copper wire. Two terminals are provided for the rotor and three of the stator, permitting the variometer to be used in all known variometer circuits. Kellogg variometers have no sliding contacts; nothing to wear or short. A spring takes up all play and allows the rotor to turn with a smooth even motion. No. 501..... Each \$8.00

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58
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Out-of-Studio vs. Studio Broadcasting

Atmosphere and Echoes Gained; Quality Lost
THE chief value of out-of-the-studio broadcasting lies in the possibility of securing events that could not be staged in the studio. But there is another factor that is important; namely, the atmosphere of life that is transmitted. The artist or speaker in the studio is addressing a silent audience. When he indulges in humor, there is no laughter; when he scores a point, there is no sign of approval; and when he finishes, there is no applause. But when the affair is broadcast in the presence of a real audience, both the speaker or artist and the Radio audience feel the difference. The great difficulty with outside broadcasting is the poor acoustic conditions that are often encountered. Proper location of the microphone will sometimes remedy the worst defects, but there is usually a great deal of echoing and extraneous noises. The best artistic results will therefore always be obtained in the well designed studio until theaters, churches, auditoriums and other public places are specially designed with thought toward broadcasting.

Wonders of Radioland

Its Boundaries Have No Limits

WE have had dreamland, no-man's land and many other lands surrounded with mystery and romance. Few of us have failed to delight in the descriptions of what Alice found in Wonderland. But compared to Radioland, they are all places restricted in their delights. Fairyland has always been associated with the relief of the troubled, the reward of the virtuous and the triumph of the lovely personality. Who does not remember the transformation of Cinderella; the glorious transformation of the handsome prince who for so many years was destined to live in the form of a frog? But the story of Radioland furnishes more surprising accomplishments than Fairyland. It has all of the romance and all of the beauty of Dreamland. Its boundaries are far beyond the limits of no-man's land. Greater than all of the wonders of Wonderland, is the fact that Radioland is a reality. It is the land that furnishes each day some astonishing accomplishment for the pleasure and benefit of the people. Romance, education, wealth and health are dealt out in it as if by magic. To the islands in the middle of the ocean and to the poles of the earth it sends and benefits. No imagination can fathom what it may do in the future.

Sets, Unlike Styles, Do Not Change

Once a Radiophan, Always a Radiophan

RADIO does not change overnight. The set that you purchase today will be good a year from today, and probably for many more years. The long distance receiving sets in thousands of homes at present are practically identical, with a few minor refinements, to the sets that were used by Radiotelegraph enthusiasts five years ago. If you have postponed getting a good set because you are waiting for a big change in Radio, you are missing more enjoyment per square inch than the individual who puts off buying an automobile for the same reason. Radio is not new—it is not a fad. Popular interest has merely become more widespread in the past year. Radiophone broadcasting has been conducted on a small scale for years; and Radiotelegraph broadcasting for more than a decade.

Don't expect your Radio sets to act like phonographs. You can't push the button for grand opera or jazz and get it necessarily. You will hear many stations better than over a phonograph, but some of them cannot be heard over a loud speaker for the reason that they are out of your range. When you analyze it, you will realize that in this fact lies the root of the lure of Radio. The fascination is in the uncertainty of the thing; always something new, greater distance to cover, and the ever increasing mystery of the science. If you just had to push the button to bring in anything you wanted to hear you would discard the set within a month. As it is, the experience of those who have followed Radio since its inception, decidedly indicates "once a Radiophan, always a Radiophan."

RADIO INDI-GEST

\$500,000,000,000.19 COPPER IN CASH PRIZES—SOOPER CONTEST

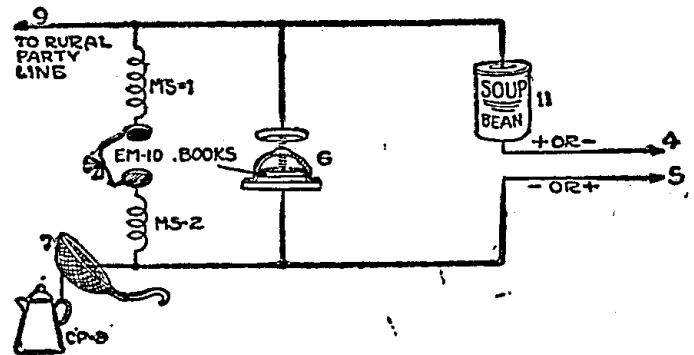
Since the Stebbin's Sooper Degenerative circuit appeared in Indigest last week, seven mail carriers have dropped in a faint due to overwork bringing in letters of praise from Radioknits. As this circuit has caused this great wave of interest from so many, we have decided to offer \$500,000,000,000.19 in copper to the Radioknits who send in the best drawings and letters of explanation on adaptations and operation of the Stebbin's Sooper Degenerative circuit. The rules of the contest are but few and simple, so it is merely a matter of expended energy for you to be placed in the idle rich class by winning one of the cash prizes offered.

Rules of the Contest

- 1—Contestants should write on both sides of the paper only.
- 2—All answers should be mailed in and not delivered in person. (However, those Radioknits living outside of Chicago may do so if they care to.)
- 3—In case of a tie for any one of the prizes the money will be donated to the Ice Fund for Esquimoux.
- 4—No person of sound mind is allowed to enter the contest if such is known to be the case by us.
- 5—All papers should be in our office at the earliest date possible as the contest will be considered closed at MIDNIGHT OF THAT DAY.
- 6—All contestants should give age and full name and present address; members of fair sex should send their latest photos. (Your right name will not be printed if you so specify.)
- 7—Judges of the contest will be Spire and Lew Antenna, The Radio and Music Trusts and Al Brown. (If we can locate H. J. Marx he will be added to open the mail.)
- 8—Cash prizes in copper will be paid as follows:
First Prize\$500,000,000,000.07
Second Prize 000,000,000,000.05
Third Prize 000,000,000,000.03
Four Equal Prizes..... 000,000,000,000.01

The Stebbin's Sooper Degenerative Circuit

For the convenience of those Radioknits who intend to enter our big \$500,000,000,000.19 cash copper contest we are again showing the hook-up of the Stebbin's Sooper Degenerative Circuit.



Key to Parts and Connections

MS-1, Marcellled coil; MS-2, Waterwave coil; 3, Nothing; 4 and 5, Connections to 110 or 1 1/2 volt D. C. generator that has A. C. output; 6, Letter-press type condenser; 7, Strainer to keep out static and coffee; 8, Coffee pot for grounds; 9, Connection to rural party line; 10, Pair of D. C. C. ear muffs; 11, Campbell or Van Camp Sooper Detector.

Send in your papers or drawings AT ONCE, and see which prize you cop off.

QUESTIONS AND ANSWERS

Q. & A. Dept. Indigest—Please give me a good test for ascertaining if tubes have the proper vacuum. —Hill.

A—Grasp tube firmly in the right hand. Tap tip of tube with brick or sledge hammer, held in left hand. If there is a "plop" sound you can be reasonably sure that the tube had a good vacuum.

Dear Indigest: I see on quite a few Radio parts and pieces of apparatus the name Pat Pending. Can you tell me who this fellow is? —Polly W.

A—Patrick is the inventor.

Dear Indi: In reply to Jimsie you say you are the leading paper in the Radio field and that you are running 000,000,000,007 more copies than your nearest competitor, the Radio Digest. I would like to get the address of the latter publication and also where can I buy it?—Lillian G.

A—We have never seen an issue of it yet, sorry can not give more information but it is unknown to us.

You Wrecked Our Week's Salary Sending It Collect

WESTERN UNION TELEGRAM

INDIGEST
123 W MADISON ST
CHICAGO ILL

COLLECT

NOTE ALAGONQUIN TONSILS III LETTER STOP CAN YOU ADVISE WAVE LENGTH OF BROADCAST OF LIQUOR BY A R R L STOP LOCAL GIN MILL ADVERTISES THREE FINGER LISTEN IN FOR HALF BUCK SPIDER WEBB

Then You Have a Record?

Dear Indigestures: As soon as I got my last week's copy of Indi-Gest I started in frantically to build a Stebbin's Sooper Degenerative set. I had hardly got the connections tied when I heard the Victrola in the next room very plainly. —Spark Coil.

(1) We Do Too, (2) We Shall, (3) So Do We

Dear Indi: I appreciated the poems of Walt Drummond and J. Foster More very much. Please ask them to broadcast some more of this stuff on the same wave length. I like the column fine since you moved over. —J. Walker.

Looking Ahead

Who Will Win the Great \$500,000,000,000.19 Cash Copper Contest? We have sat up all night long for the past week trying to figure it out. It will be with great anxiety and impatience that we shall sit outside of the locked and barred doors of the judge's room to await the decision. As for you—WATCH INDIGEST!—Get your copy of INDIGEST from your most politic newsdealers—10c.



Spencer, in The Omaha World Herald

Condensed By DIELECTRIC

A very interesting number of Copley Plaza Topics describes what took place in their broadcasting rooms when they offered prizes of Easter eggs to listeners in. Few hotels in the country have availed themselves of transmitting sets, but this one in Boston is having a great success.

Radio expositions are as popular centers of attraction now as they were when the initiated were fewer in number. The National Radio and Electrical Exposition held at the Civic Auditorium in San Francisco had an average daily attendance of five thousand persons. To make it distinctly a Radio affair the music was supplied by Station KPO and received in the auditorium each evening. Mayor Rolph's speech was heard not only by those present but by a host of listeners in, as it was transmitted by this same station.

Considerable fuss has been stirred up over the broadcasting of copyright music. That many of the larger broadcasting stations are determined to replace such music with unrestricted selections would indicate a very small profit to the American Society of Composers, etc., from this source. It's the same old tale: the broadcasters are providing free advertising, but the beneficiary thinks he should be paid to allow them to do it. Radio cut the sales of phonograph records, sheet music, opera tickets and so on down the list! What a curse it is!!

That Detroit news item about "bootlegging peanut tubes" is easily explained—I mean the matter, not the appearance of the item. You see, the Canadian Radio dealers are a far-sighted lot of men who purchased an enormous quantity of these little tubes soon as they appeared on the market. That naturally created a scarcity, since the maximum output is so limited (?), and we in this country have had to wait for the factories to catch up. Plausible, isn't it? Quite as much so as some of the excuses offered to fretting consumers.

For those who enjoy dance music, and can pick up WNAC the Shepard Stores station in Boston, a great treat is in store since the music supplied by the orchestra of the Copley-Plaza Hotel in that city is now sent out through the ether. There are quite a number of stations supplying regularly to their Radio audiences dance music that is well played and no one need be without music in his home for the purpose of entertaining guests by dancing. The new wave length, 286 meters, which WNAC is now using, should be an aid in picking up their station.

There have been instances of those out of employment attempting to have broadcasting stations announce their predicament to the world of listeners in. Had they applied to the New York State Employment Bureau the result might have been different, as that bureau is locating men for vacant positions through its weekly announcements from Station WGR. The applications coming in response to the broadcasting are said to be from all over the world. This is a feature that other employment bureaus might consider with a view of relieving the present shortage of labor in some sections of the country.

There have been several instances of Radio reception by societies in one state from an allied body in another, so while the recent Radio concert given the members of the New Orleans Chapter of American Association of Engineers by the San Francisco chapter was not unique, it serves to emphasize the practical way in which two fraternal groups may feel as one. Also it becomes possible to have a very diversified program without the necessity of transporting a large number of entertainers. It would be an interesting experiment to have an evening devoted to addresses by officials in some national order representative of each section of the country. The speakers would follow one another in some preconceived order from their respective broadcasting stations, thus holding a national public meeting.

First Steps for Beginners in Radio

Chapter III—Part I; Pointers About Aerials and Grounds

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

STRICTLY speaking, the aerial is that part of a receiving set which collects or rather has currents induced in it by the passage of Radio waves. Therefore it often happens that the wiring in the Radio set proper acts as an aerial to receive over fairly long distances. However, we usually connect the term with some particular device arranged for the purpose of receiving the wave impulses. Aerials can be classified into two general classes, namely, capacitive and inductive, although the action of most aerials combines both properties in their operation.

Outdoor Aerial

The usual outdoor aerial structure comprising one or more insulated wires suspended between elevated supports is of the capacitive type, that is, the elevated conductors form one plate of a condenser, the ground being the other. As regards types they are either of the inverted L or T type as shown in Figure 6. We shall first consider how these aerials function and then decide which method of construction is preferable.

For an example let us take an inverted L as shown in Figure 7, with the free end pointing in the direction from which the waves are coming. When the wave strikes

BEGINNERS will find the accompanying series by Mr. Benson very helpful in learning the rudiments of the popular science of Radiophony. The first chapter of his series appeared in the May 5 issue. The articles yet to appear are:

- Chapter IV—About Condensers and Inductances.
- Chapter V—Tuners and How to Tune Your Set.
- Chapter VI—About Crystal Detectors.
- Chapter VII—Tube Detector Theory and Operation.
- Chapter VIII—The Regenerative Detector.
- Chapter IX—Radio Frequency Amplification.
- Chapter X—Audio Frequency Amplification.
- Chapter XI—How Super Regeneration is Accomplished.
- Chapter XII—Reflex Circuit Operation.
- Chapter XIII—About Headsets and Loud Speakers.
- Chapter XIV—Batteries Used in Radiophony.

its free end. In the T aerial, where the lead-in is brought down from the center, the directional effect is not so noticeable. **Resistance of the Aerial** Since the induced currents are at best very weak, it is advisable to keep the resistance of the aerial circuit as low as

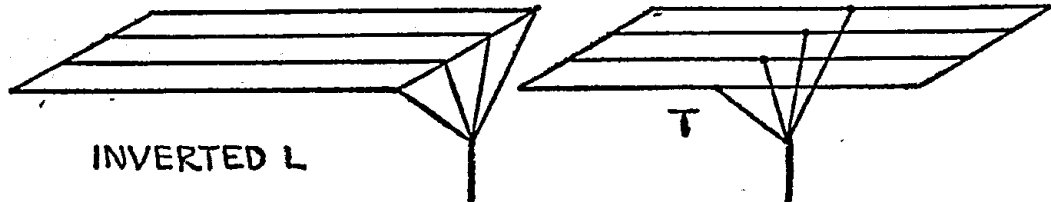


Figure 6—Two Types of Capacitive Aerials

the aerial the electrostatic component of the wave place an electric field between the two plates of the condenser formed by the aerial and the ground. We know that when an electric charge is put on two plates separated by a dielectric, an electric stress is present between the plates.

Conversely, when we put an electric stress between two plates as in this case an electric charge will be induced on the plates, hence a difference of potential exists between the elevated wire and the ground which causes a current to flow between the two plates. In addition, when the wave passes the vertical wire or lead in the magnetic component induces a current in the vertical wire that either as-

possible. We cannot always do this by using simply a heavier wire because another phenomena comes into effect; namely, skin resistance. When the current in a wire is of very high frequency, say 750,000 cycles at 400 meters wave length, as we learned previously, the alternations in direction of flow take place so rapidly that the current does not penetrate to the center of the wire.

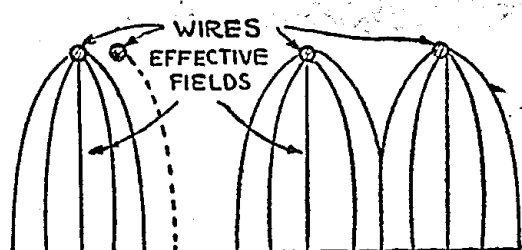


Figure 8—Showing Resulting Fields When Wires Are Spaced Close and Far Apart

At such frequencies it flows only on the surface of the wire. Therefore we reduce the resistance by using a stranded wire, usually 7 strands of No. 22. For the same reason it is advisable to use a wire that is noncorrosive or is protected in some way from the action of the elements. The tinned wire is then to be preferred, while a wire made up from enameled wires stranded together makes an excellent aerial.

PHANTOM-CIRCUIT

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

it as shown the added field is but slightly larger, whereas, when the wires are spaced 10, 12 or 15 feet apart, then an appreciable advantage is obtained. The effect of placing the wires close together is then only that of one wire, but with a lower resistance due to the increase of conducting surface.

Length of the Aerial

Another factor that is important is the length. For efficient operation the length of an aerial should be considered from the point of view of the wave lengths to be received. The length should be such that the fundamental or natural wave length of the aerial is less than the wave length to be received.

A simple method of calculating the wave length of an aerial is as follows: Add the length in feet of the flat top, lead-in and ground wire, and multiply their sum by 1.5. When more than one wire is used in the flat top the result is increased by one third, due to the inductance of the additional wires. Where a T aerial is used only one half of the length of the flat top is used in the formula.

Number of Wires Used Another point often in question is how many wires to use in the flat top. The usual practice is four, separated about

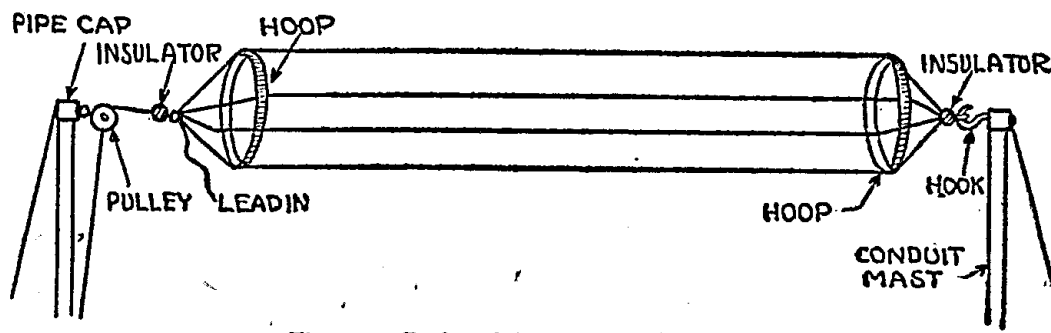


Figure 9—Preferred Type of Outdoor Aerial

3 feet apart. As a matter of fact it is the writer's belief that there is no advantage in using more than one wire unless they are separated 10 or 12 feet. The reason for this will be apparent from Figure 8. Consider one wire used as an aerial and its effective field will take the form shown by the lines. If this wire is 30 feet high and we put another wire within 3 feet of

Natural Wave Length

The natural wave length of the aerial should be enough shorter than the wave length to be received that sufficient inductance can be used in the tuner that a high voltage drop will be obtained across same if of the straight tuned type, or enough turns can be employed to transfer

(Continued on page 14)



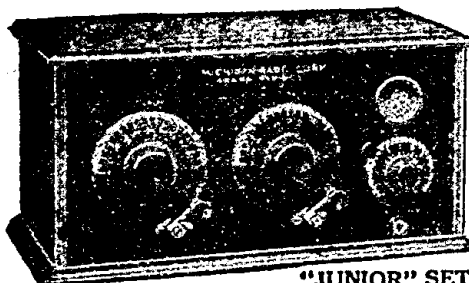
"SENIOR" SET

WONDERFUL!

That one word appears in nearly every one of the hundreds of letters written to us by happy owners of

MICHIGAN "SENIOR" and "JUNIOR" Regenerative Receivers

They tell us how stations two or three thousand miles away come in so clear that they can scarcely believe their ears when the announcer tells his location. How our patented Split Hair Vernier Dial Control enables them to tune in to almost any station, on which they had made previous record of dial-positions. How the tone-quality and volume they get through their Loudspeaker (with the Michigan Senior Receiver) approaches that of headphone reception on ordinary sets.



"JUNIOR" SET

Regeneration — or feeding the output of the detector tube back into the same tube instead of into a second tube; gives an enormous increase in the sensitivity of the detector. This invention by Armstrong made modern radio telephony what it is.

"Michigan" Receivers are licensed under Armstrong's U. S. Patent No. 1,113,149, and pending letters patent No. 807,388.

MICHIGAN RADIO CORPORATION
GRAND RAPIDS, MICHIGAN

Spirola BETTER LOUD SPEAKERS \$3.85

TRUE CABINET TYPE, like the finest modern phonographs, with all their beauty and perfect tone. Makes your two-step set a real ENTERTAINER for family and friends. SPIROLA DUPLEX uses any headset. SPIROLA SIMPLEX uses Baldwin or other unit. Either type, black with nicked fittings, \$3.85; mahogany finish with bronzed throat, \$4.85.

At dealers or postpaid (C. O. D. if preferred). Absolutely guaranteed.
L. H. DONNELL MFG. COMPANY, Dept. D. Box 70. ANN ARBOR, MICH.

1000 Miles Guaranteed on One Tube
A real radio set at a low price

Consisting of the following parts: 180° Variocoupler, Variable Condenser, 7x15 Panel already drilled, 2 Dials, Switch Lever Points Stops, Rheostat Socket, Binding Posts, Bus Bar, Sphagetti, Lugs and complete blue print to assemble in one-half hour.

At the special low price.....\$15.00
Two Stage Amplifier for above.....\$15.00

\$5.00 Audio Transformer.....\$2.95	\$8.00 Long range receivers.....\$4.50
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\$1.25 7x10 Panels......80	.75 Freshman Var. Leak only......60
\$1.00 Phonograph attach single......50	\$5.00 Elect. soldering Iron.....3.75
\$6.50 1 1/2 Volt Tubes Guar.....3.95	\$9.00 Detector Tube Guar.....3.50
.50 W.D.11 Bakelite Socket......35	\$6.50 Amplifier tube, Guar.....3.95

Write for complete list of other bargains

ECONOMY RADIO CO., 132 Nassau Street, Dept. R. D. NEW YORK CITY, NEW YORK

How to Make a Two Electrode Tube

Range of Crystal Set Increased with Tube

Those who are thinking of replacing their crystal detector with one of the new two element tubes may be interested to know that a very efficient one may be made

WORKSHOP KINKS? EARN A DOLLAR—

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

cheaply, as follows: Secure an ordinary 3 volt miniature lamp bulb and stick tinfoil all around the outside of the glass tightly with liquid glue, taking care to exclude all air pockets in the tinfoil between it and the glass.

A wire is carefully soldered to the tinfoil with an iron which is no warmer than is absolutely necessary for the solder to run. The tinfoil covering is used as the plate in the ordinary two element tube.

Even better results can be obtained by immersing the globe in a metal dish of mercury. The mercury is used for the plate.

If such an arranged tube is used in place of the ordinary crystal detector, much louder signals and also an increase in range will be the result. Two ordinary dry cells should be used to light the tube filament and the flow of the current should be regulated with a 25-ohm rheostat. A hook-up using this tube is given. Range, 50 miles.—J. K. Smith, Chicago, Ill.

Pilot Lamp for Loud Speaker

Different attempts have already been made to attach pilot lights to loud talkers, utilizing the magnetic current so as to indicate the on and off condition. Generally a small 6-volt lamp is used, but it will be found that such lamps only help to drain the storage batteries.

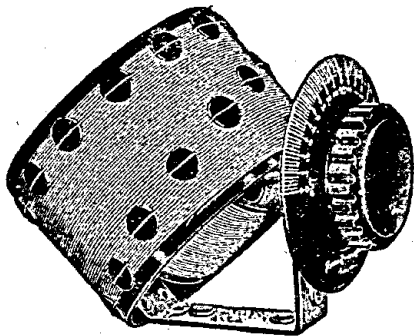
I have developed a way to use alternating current to light a lamp. Any type relay can be used for this purpose, but it should be kept in mind that most relays have a high resistance, and it will be necessary to rewind the magnet. The magnet used in this case was a single type core and was rewound with No. 12 cc

THE PIONEER TUNING-IN CHART

The latest necessity of a radio set in which complete record is taken of your set when tuned in. By referring to chart in future, you immediately know if you can get the station wanted. Room for 24 stations on each chart. Don't mark the dials of your set! Use modern methods. Printed on bristol board, elaborately designed, gold bronze border—25c each; 5 for \$1.00. PIONEER RADIO PRINTERS, 900 North Main St., Ottawa, Kansas.

PREMIER "MICROMETER" VARIOCOUPERS

Satisfy The Most Critical

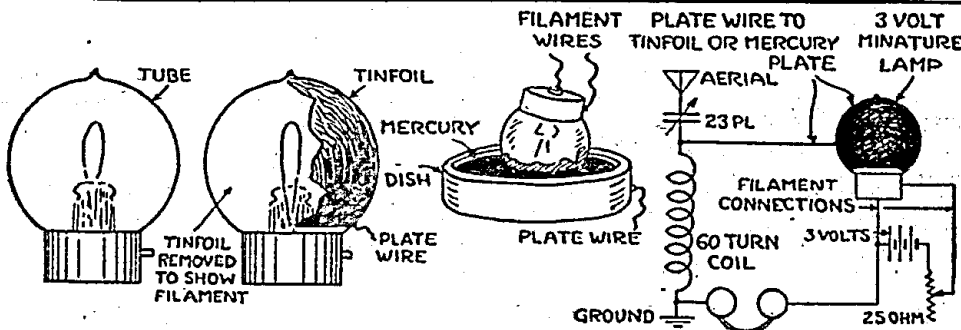


\$5.00 COMPLETE WITH DIAL.

A HIGHLY SELECTIVE VARIOCOUPLER having 180-degree orientation and 20 Antenna taps which facilitate very sharp tuning. Wound with No. 21 single silk or black enameled pure copper wire. Eighty turns on stator—fifty-five on rotor. Wave lengths range from 150 to 750 meters. All metal parts brass—contacts positive—stays "put" at any angle. Adaptable for either single circuit or loose coupled tuned plate hook-ups. Bakelite button on each tap wire permitting easy and safe soldering.

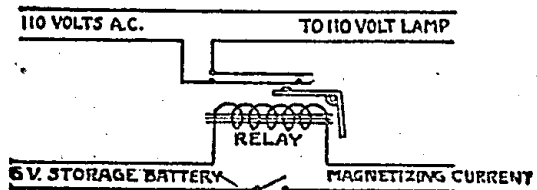
Our Complete Parts Bulletin on request. DISTRIBUTORS—We make a most complete line of Radio parts. Some territory open for live, responsible concerns.
PREMIER ELECTRIC COMPANY
Manufacturers Est. 1905.
3810 Ravenswood Avenue, CHICAGO, ILL.

MINIATURE GLOBE USED AS TUBE



magnet wire, with two layers, twenty turns to each layer.

Suitable lamps can be obtained for this purpose. A very neat and small lamp will be found in the red bullseye lamps which are used in flush receptacles for heating units or a switchboard pilot bullseye (red,



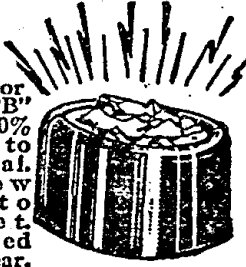
green or white). Any kind of a good switch may be used, such as the automobile dash switch or push button kind used in lighting fixtures.—Peter S. Schott, Perth Amboy, N. J.

Faulty Audio Amplifiers

Faulty audio frequency amplifiers on weak signals, particularly on the first stage, is a common complaint. To begin with the same degree of amplification, should not be expected on weak and strong signals. That is, if with a nearby station the first stage gives an audibility amplification of twenty times, it will give less amplification possibly only doubling the signals of a distant transmitter. This is due to the fact that the output of a tube does not vary directly with the applied E. M. F., but more approximately with its square. Also throwing in amplifying apparatus appreciably alters the receiving conditions of the entire set which in the case of the very weak signals may render them inaudible. Therefore, when tuning is done the set should be slightly retuned when the amplifier is plugged in, especially on the adjustment determining regeneration.

SOMETHING NEW

A real Loud Talking Detector made of "B" Metal. 100% superior to any crystal. Puts new life into your set. Guaranteed for one year. It's the cheapest in the long run. Sold by all live dealers, or can be ordered from the



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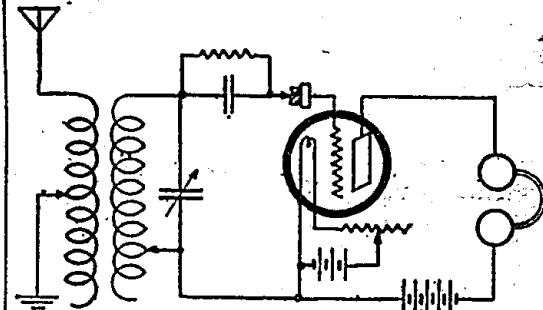
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Crystal in Grid Lead Aids Signal Strength

Some time ago I inserted a crystal detector in series with the grid of my vacuum tube and found that it increased the range of my set about 350 miles. I use a loose coupler and a 23-plate condenser for tuning.

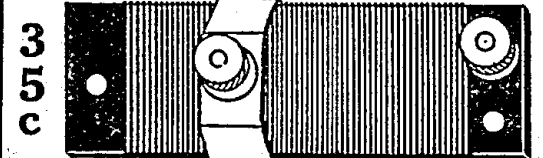
I am passing this hook-up along so that



it can be experimented with by some other Radio bug to increase their range.—R. Hoffman, Cincinnati, Ohio.

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REFLEX AUDIO TRANSFORMER \$2.65
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PEANUT TUBES, TINY AEROPLANE STYLE
REFLEX-REINARTZ-FLEWELLING
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Probably the most common cause of such amplification lies in the failure to include a small .001 mfd. telephone shunt condenser across the primary of the first step. It is once more the problem of reducing the positive reactance in a Radio circuit. The inductance of an audio frequency transformer is made very high in order to secure a transfer of audio-frequency energy. The reactance is, therefore, much greater than that of the resistance, which combined with resistance obstructs the passage of the plate current.

Many instances of faulty amplification are due to transformer and tube troubles and the experimenter should always make tests to determine just where the trouble lies.

Directional Effect

An outdoor aerial does not necessarily have to run in any particular direction to pick up a certain station. The directional effect is very slight in most cases. Run the line the way that gives the most "open view," unobstructed by houses, etc.

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WHOLESALE AND RETAIL

Making a Three Tube Reflex De Luxe Receiver

Part III—Details of Wiring

By H. J. Marx

THE COMPACTNESS of the Reflex De Luxe makes it ideal for automobile or motor boat installation, and will help make your summer recreation trips a real pleasure. A good loop or an aerial stretched between two trees with a natural ground, is all that is necessary for good reception. The storage battery in the car or boat will light the tubes and the plate battery takes but little room.

Importance of Proper Wiring

Just to emphasize the importance of careful wiring, it might be wise to relate the writer's experience with the first Reflex De Luxe Cabinet Set. The experimental circuit was first developed by means of apparatus mounted on a flat board. The wiring appeared to be a bewildering entanglement but strange to relate no inductive interference was encountered. When the cabinet set was assembled, it had to be done in very limited time. For this reason the wiring was hurriedly done, but not carelessly soldered. Insufficient attention however was paid to the alignment of the various leads. Fortunately no "bugs" were present at the first test. After all the battery connections, plus loud speaker and loop, were made the filament rheostats were turned. The ungodly collection of shrieks, groans, howls, squeals, grunts, whistles, etc., that issued from the horn, reminded one of Armistice Day, New Years, Fourth of July and St. Patrick's Day celebrations all confined in one room! Fearing ejection from the apartment, considering the hour, further testing was postponed.

The next night, after three vain hours of attempts at straightening out matters, it was decided to entirely rewire the set and take a whole lot more care in aligning the leads and making the connections.

Transformer Interference

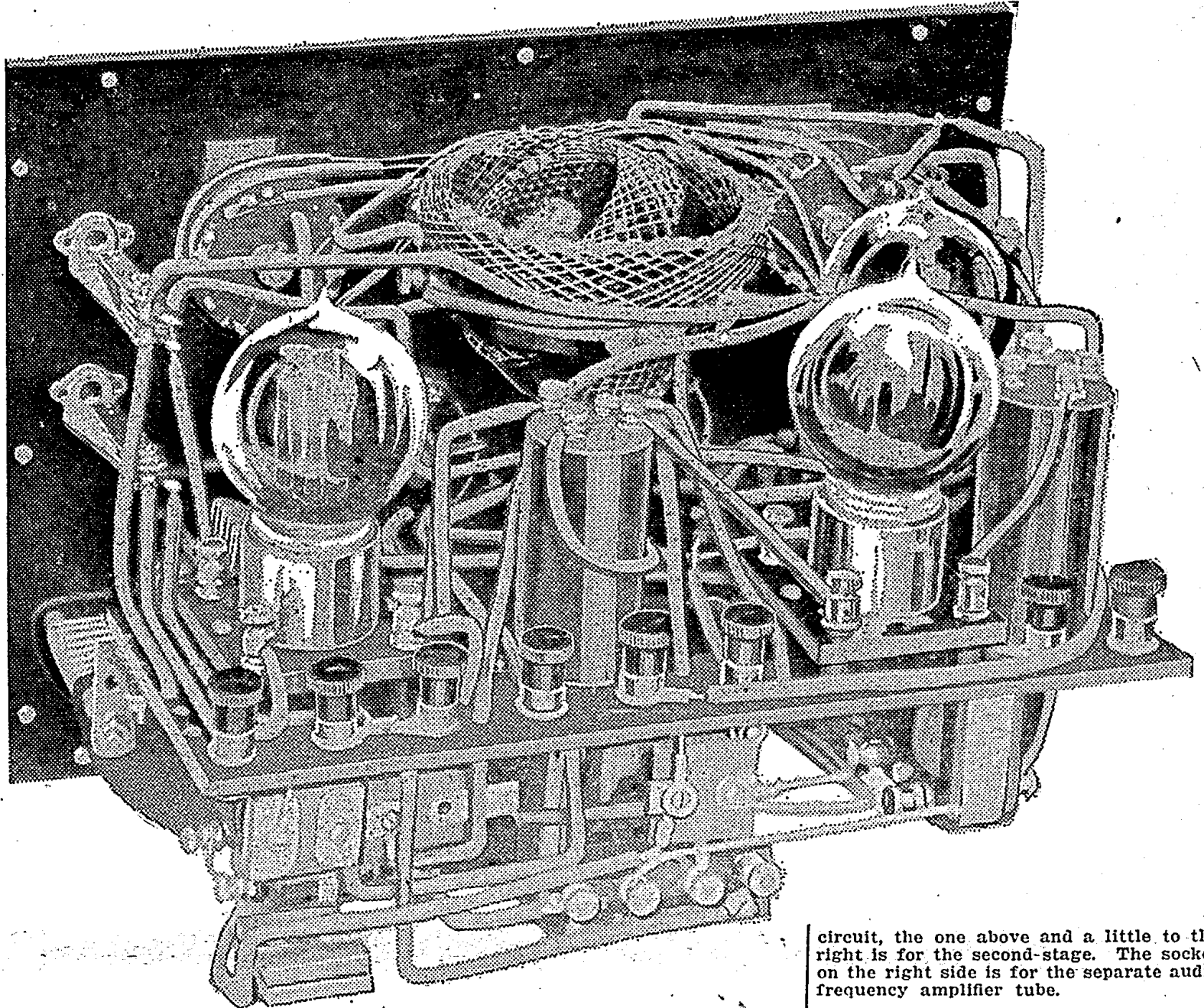
Both of the R.F. transformers are over A.F. transformers. In order to avoid the possibility of magnetic influence from the audio transformers, the Radio transformers were raised 1/4-inch above the sub-panel. This was accomplished by taking some fiber tubing 3/8-inch inside diameter 1/2-inch wall and cutting off four pieces 1/2-inch long. These spacers were then inserted on the four transformer mounting screws between the base and the sub-panel. The space between was found sufficient to avoid interference.

Classification of Leads

In order to keep track of interference possibilities, the leads for connecting apparatus can be classified as follows in the order of their importance:

1. Grid Leads.
2. Plate Leads.
3. Secondary By-pass Leads.
4. Primary By-pass Leads.
5. Negative "A" Battery Leads.
6. Remaining Leads.

The grid and plate leads should be



added first keeping them absolutely as short as possible, and well separated from each other unless crossing at right angles.

The secondary and primary by-pass leads will have to be added in conjunction with the A battery leads, since the secondary by-pass runs to the negative A and the primary by-pass to the positive A. The remaining leads can then be added avoiding proximity and parallel runs to the grid and plate leads as much as possible.

Identification of Apparatus

In Part II, Figure 2, the sub-panel layout, the tube socket in the lower left hand corner is for the first tube in the

circuit, the one above and a little to the right is for the second-stage. The socket on the right side is for the separate audio frequency amplifier tube.

(Continued on page 14)

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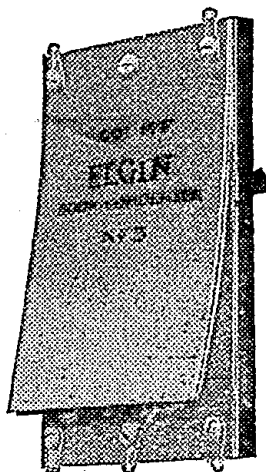
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Ask for FREE Diagram of FLEWELLING CIRCUIT

FIRST STEPS IN RADIO

(Continued from page 11)

the energy if a coupled circuit. For this reason it is advisable to allow about 200 meters to be made up by the tuner and the balance in the aerial.

Thus an aerial with a natural wave length of 200 meters would measure over all 200 divided by 1.5, or 150 feet, including lead-in and ground. From the above anyone can readily determine the length of an aerial best suited to his particular conditions.

Lower Aerial More Selective

It should be borne in mind that the lower the aerial, within limits, the more selective, while the higher aerial gives a higher voltage reception factor and louder signals. The disadvantage of the higher aerial lies in that it picks up more static and strays and is more subject to interference from local high power stations.

The use of a high aerial necessitates the use of a coupled tuner to obtain selectivity, whereas a lower aerial, say 10 feet above the house top, will give selective tuning with the straight tuner using no coupling.

Height of the Aerial

With all the foregoing facts in mind, the best aerial for those preferring an outdoor structure is one elevated 10 feet or so above the roof or other elevation, so it is 35 or 40 feet above ground. It should consist of four wires spaced equidistant around an 8-inch wood or metal hoop and of such a length that with a lead-in and ground wire it will not be over 150 feet.

The use of hoops is advised because this arrangement gives the effect of a large conductor with low skin resistance and eliminates the swaying of spreaders. One large insulator should be employed at each end, the wires being brought to the insulator from the hoops as shown in Figure 9. The lead-in can be attached to the wires where they are bunched and run over suitable insulators down the side of the building.

The details of the masts are not important, but a length of enameled or galvanized conduit properly guyed makes an excellent and lasting job. The lead-in should be made of stranded wire, using preferably four strands of the same wire used in the

aerial. All joints should be well soldered. We are well aware that many aeriels work satisfactorily without all these precautions being taken, but the aerial is put up to gather energy from the ether and the range of a set is often hampered by a poor aerial structure that is as easy to put up right as wrong.

Capacity of Aerials

While on the subject of capacity of aerials it would be well to make mention of the small capacity aeriels recently experimented with by the Bureau of Standards, that give much promise. Considering the outdoor aerial as a condenser, one realizes that included in the field between the elevated conductor and the ground are many substances that well could be dispensed with from the viewpoint of efficiency.

There are usually masses of building material, pipework, masonry or vegetation that form poor dielectric for a condenser. With this thought in mind, experiments were started on aeriels wherein the two plates are supported in the air without any intervening matter. Using metallic netting as plates a few feet square and supported 2 feet apart, results were obtained that were very promising and should offer a good suggestion to those anxious to try out new arrangements.

It might seem that reducing the distance between the plates so much would reduce the voltage reception factor to an extent that would make reception impossible because we know the higher the aerial the greater the induced voltage. This is offset to a great extent by the fact that the resistance is much lower and that for a given size the capacity is much greater.

(TO BE CONTINUED.)

THREE TUBE REFLEX

(Continued from page 13)

The first R.F. transformer is in the upper left hand corner and the second

is a little to the right of the center line. The A.F. transformer under the panel at the right side (sub-panel layout) is the first of the audio frequency amplifier stages after the detector. This transformer is the one on the left in the rear view shown on the preceding page. The second A. F. stage transformer is on the opposite side, while the separate amplifying stage transformer is in the center.

In the rear view, the primary binding posts of both reflexed audio frequency transformers face to the right.

The tube sockets are set, so that the filament binding posts all face towards the front panel. If these arrangements of the apparatus are carefully followed, it will be found that the grid and plate leads are kept as short as possible and thus helps to avoid interference.

Holes were drilled through the sub-panel alongside of the sockets and transformers wherever it was found necessary to connect from the upper instruments to the lower.

Precautions

A few precautions that it will pay every amateur to heed are as follows:

Don't solder leads to binding posts on transformers. Very often the connections are soldered on the inside and when heat is applied the inside connection is loosened.

Don't solder connections to by-pass condensers. When heat is applied the mica dielectric is apt to fuse and the condenser becomes shorted or possibly seriously weakened.

Don't let the leads come in contact with the metallic framework of any of the apparatus. This, although possibly not a short circuit, often creates an undesirable capacity reaction.

Don't let hot solder splash over your apparatus.

Don't solder in your leads until you are sure they clear all moving parts of apparatus, and also are not in the way when inserting and removing the tubes. This may sound humorous and unnecessary, but it's been done time and time again.

Take your time and don't try to rush the job—you'll save time in the end.

A very little solder applied properly makes a better job than a whole lot held in place by scarcely heated flux.

Where apparatus is equipped with binding posts there is usually little to be gained by a soldered connection.

If a poor connection is made repair it immediately; postponed operations are usually forgotten.

(TO BE CONTINUED.)

A Radio set will not work satisfactorily when the storage battery or B batteries are nearly run down. Have the storage battery charged and get new B batteries. B batteries should last six months, and often last several years.

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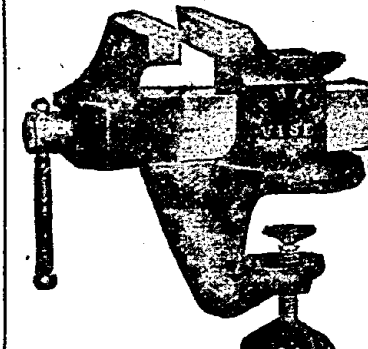
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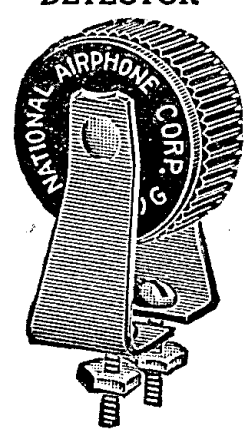


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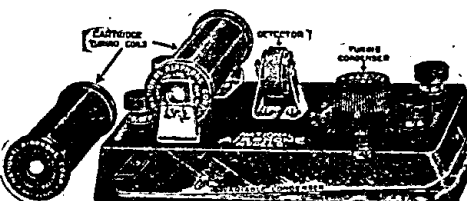
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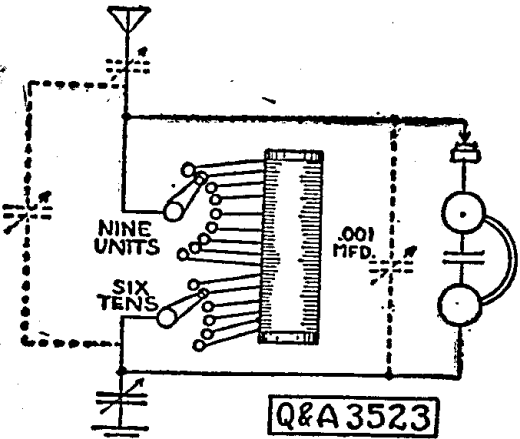
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Questions and Answers

Crystal Set

(3523) AFK, Chicago, Ill.
 Is enclosed hookup all right? What is the range?
 Which condensers shall I eliminate? Forty-three plates?
 Can an electric light socket be used as an aerial for this set?
 How far is Argo, Ill., from the loop of Chicago?
 A.—Noting sketch of hookup shown in illustration we are advising that it is cor-



rect in detail and would have a range of about fifty miles. Would advise elimination of all condensers shown with dotted lines. Use only the one in the ground lead.
 An electric light socket can be used for an antenna, as suggested. A regular antenna is preferable, however. We are not at this writing familiar with the exact location of Argo, Illinois. However, its distance from Chicago can be ascertained easily through RR time table. The Q. and A. department service is intended for assistance in Radio information, not for geographical measurements which can be answered through the efforts of the interrogator.

RD 66

(2413) REE, Baltimore, Md.
 Please refer to your issue of December 23, 1922, describing receiving outfit RD 66. Several of us have hooked up this set and we find that it does have selective qualities and appears to have fair signal strength. However, the drawing as published does not appear to us to be correct because in the tickler coil circuit there appears to be no tuning adjustment with either the secondary condensers or the movement of the two honeycomb coils. In fact you can remove the honeycomb coil from this set, where it is in the tickler coil circuit and the set will work just the same. No doubt these coils were inserted to have some effect on the operation of the set and if so, your published diagram does not place them properly.

Will you please refer this matter to

the author of the drawing or to your Radio editor, who may be in position to advise? Would also like to have advice as to the size and capacity of condensers that should go in this circuit.

A.—Answering your inquiries with reference to RD 66 would advise that this circuit as it appears is correct. While the set will function, as cited, without the use of tickler coil, its purpose when employed is to offer impedance to signals of wave lengths other than those desired. It merely provides a lockout and does not require to be separately tuned. The condensers are both variable of .0005 capacity.

Flewelling Development

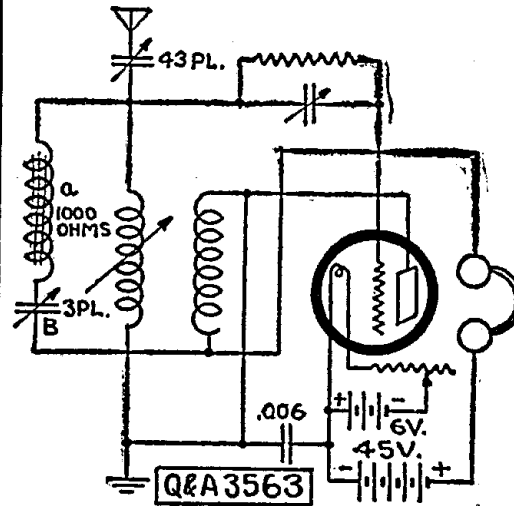
(3563) BMB, Montgomery, Ala.
 Enclosed you will find a Radio circuit diagram. I have been experimenting with the Flewelling principle on a single tuner and the circuit I enclose is the result of my experiment.

I have received KDKA, WHAS, WOAW, WGM, WSY, WOC, WJHB, PWX, WFAA, WEAY, WOAL, WBAP, and several others without any aerial or ground with one bulb of the hard type as loud as the usual single circuit with one step of audio frequency amplification.

You will notice a resistance marked ten thousand ohms. I am guessing at the ohms as I am using the secondary winding of an old automobile. The condenser B is a three plate vernier and it is very sharp tuning in stations, also cutting down a disagreeable hum so noticeable in the Flewelling Circuit. The variable condenser of the forty-three plate variety is not very sensitive. The inductance is a standard variocoupler.

Please examine this circuit and explain

actions to me. The part I cannot understand is that it brings in station louder and clearer without aerial or ground.
 I receive your paper every week and enjoy reading it very much.



A.—Noting your specifications and sketch of Flewelling circuit evolved through experimentation shown in illustration we are advising that the action cited is quite similar to that of the original Flewelling circuit. The resistance choke and three plate condenser act as verniers.

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 My Highly Improved Reinartz brings in all important stations on both coasts and Mexican border, loud, clear and without distortion. We dance to music from Atlanta received on one loud Baldwin unit. Build one of these wonderful sets from my blueprints and specifications, price 50c, or with a perfect and complete double wound spiderweb coil, \$3.00 by mail. No other windings used. *Photo of my set on a glass panel with every order.

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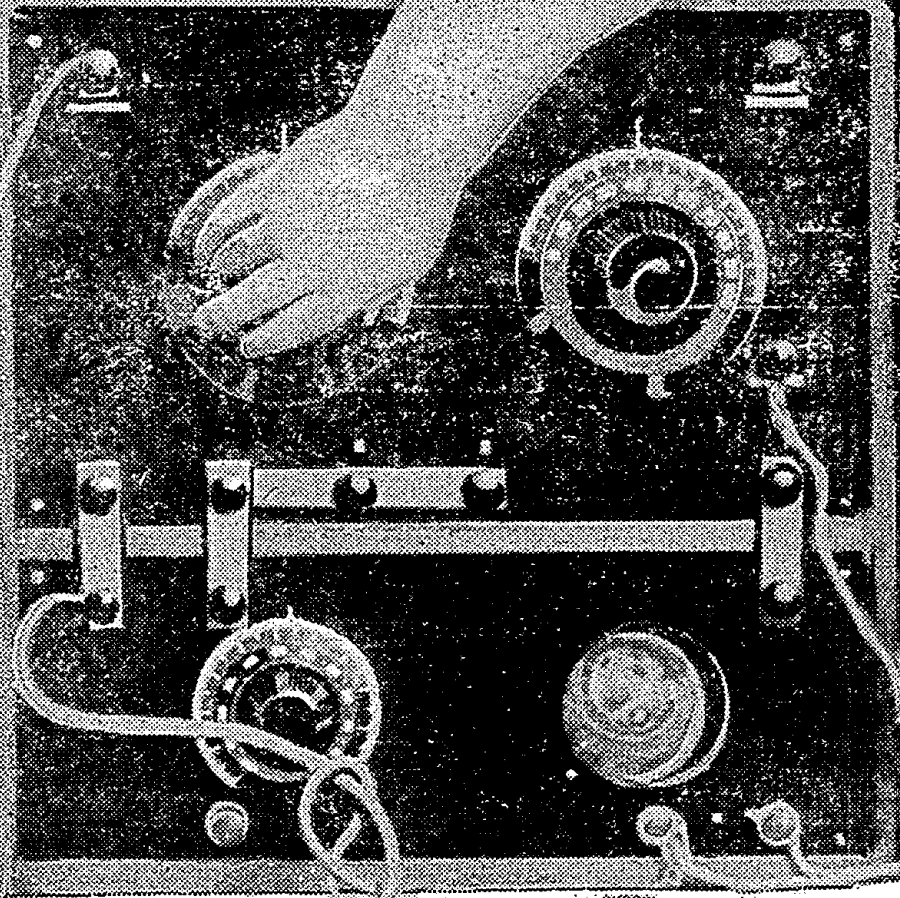
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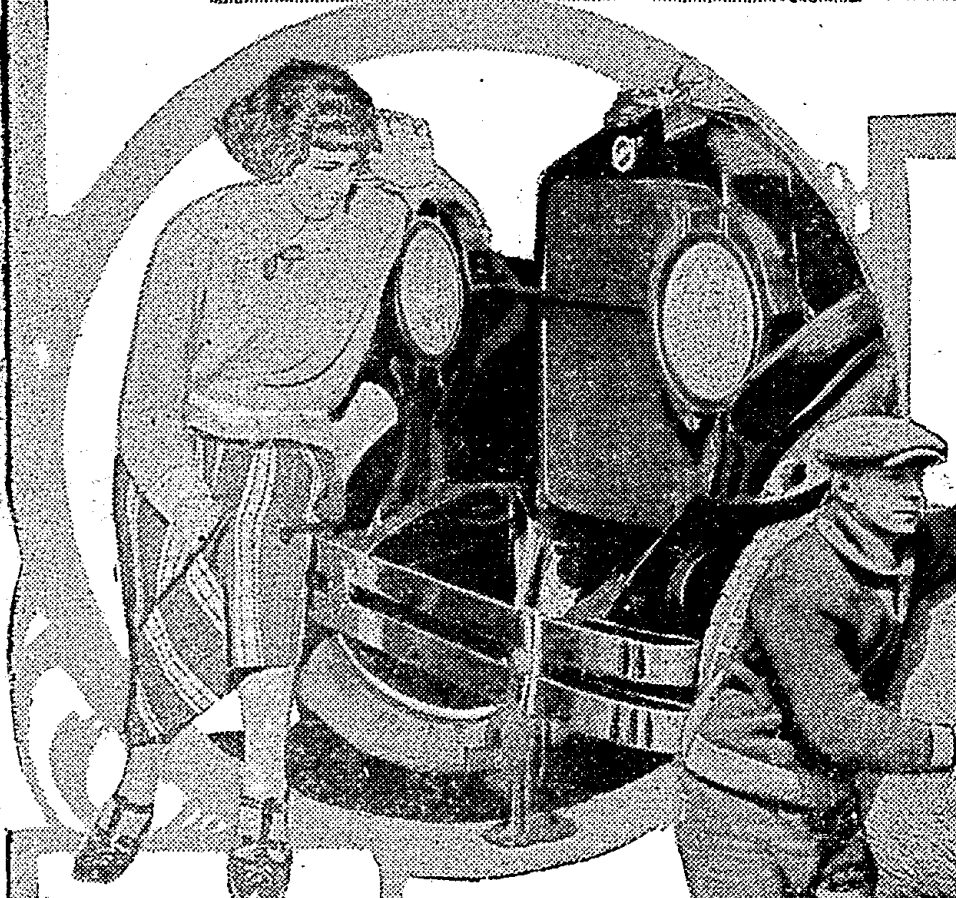
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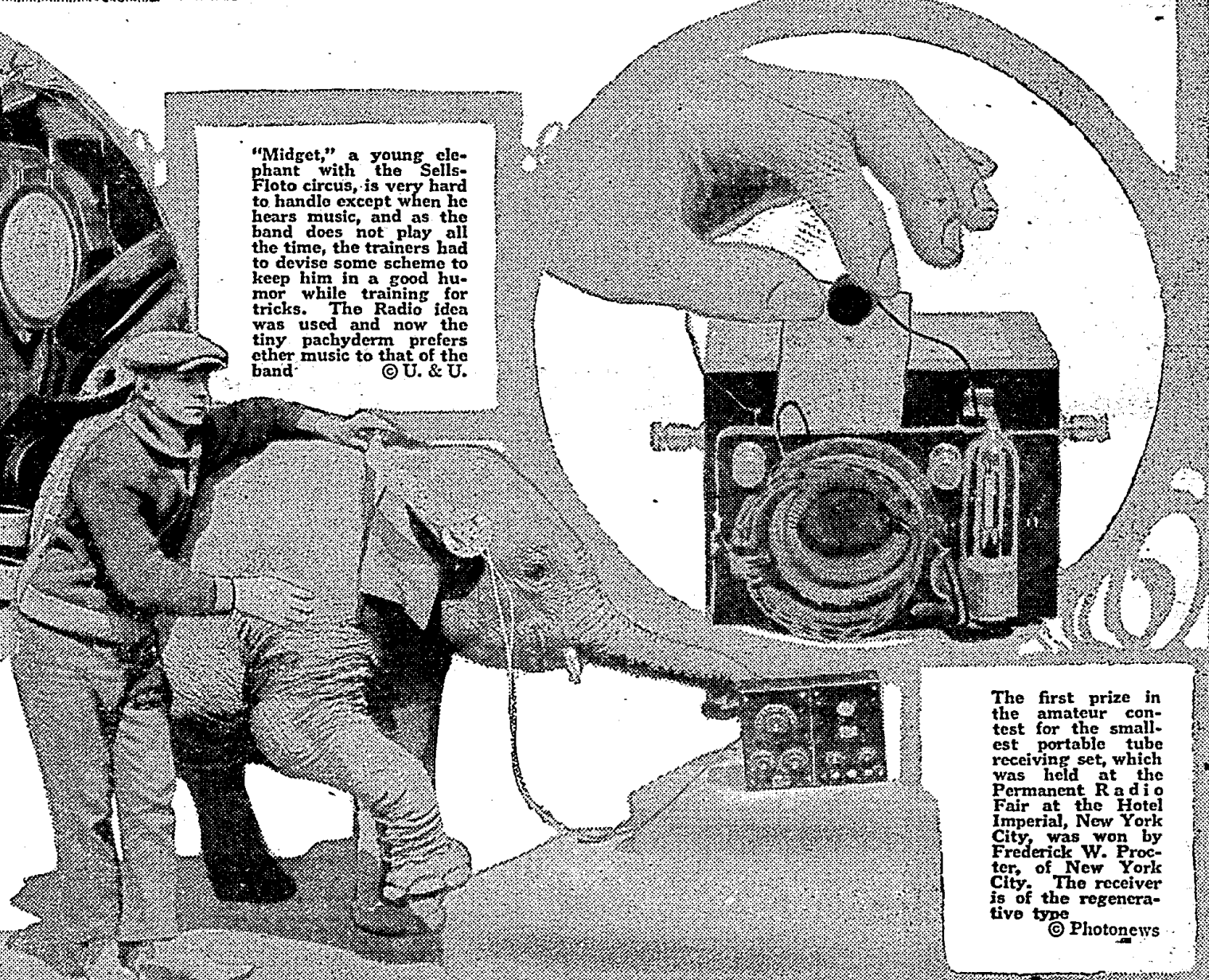


Baby Yvonne Day, who has just reached the age of twenty-one months, is no doubt the youngest Radiophan. Her father, Major Bernard Day, presented Yvonne with a set on her first birthday and she has been a confirmed listener in ever since. The Radio set has even proved a greater attraction for the kiddie than her dolls and other toys © K. & H.



"Are you an automobile?" That is the question Miss Fredericka Brew is asking this car. A Washington, D. C., distributor of automobiles has inaugurated a system which helps to eliminate a large sales force on the floor. The prospective buyer simply asks questions into the radiator and a voice from somewhere answers © Photograms

"Midget," a young elephant with the Sells-Floto circus, is very hard to handle except when he hears music, and as the band does not play all the time, the trainers had to devise some scheme to keep him in a good humor while training for tricks. The Radio idea was used and now the tiny pachyderm prefers ether music to that of the band © U. & U.



The first prize in the amateur contest for the smallest portable tube receiving set, which was held at the Permanent Radio Fair at the Hotel Imperial, New York City, was won by Frederick W. Procter, of New York City. The receiver is of the regenerative type © Photograms