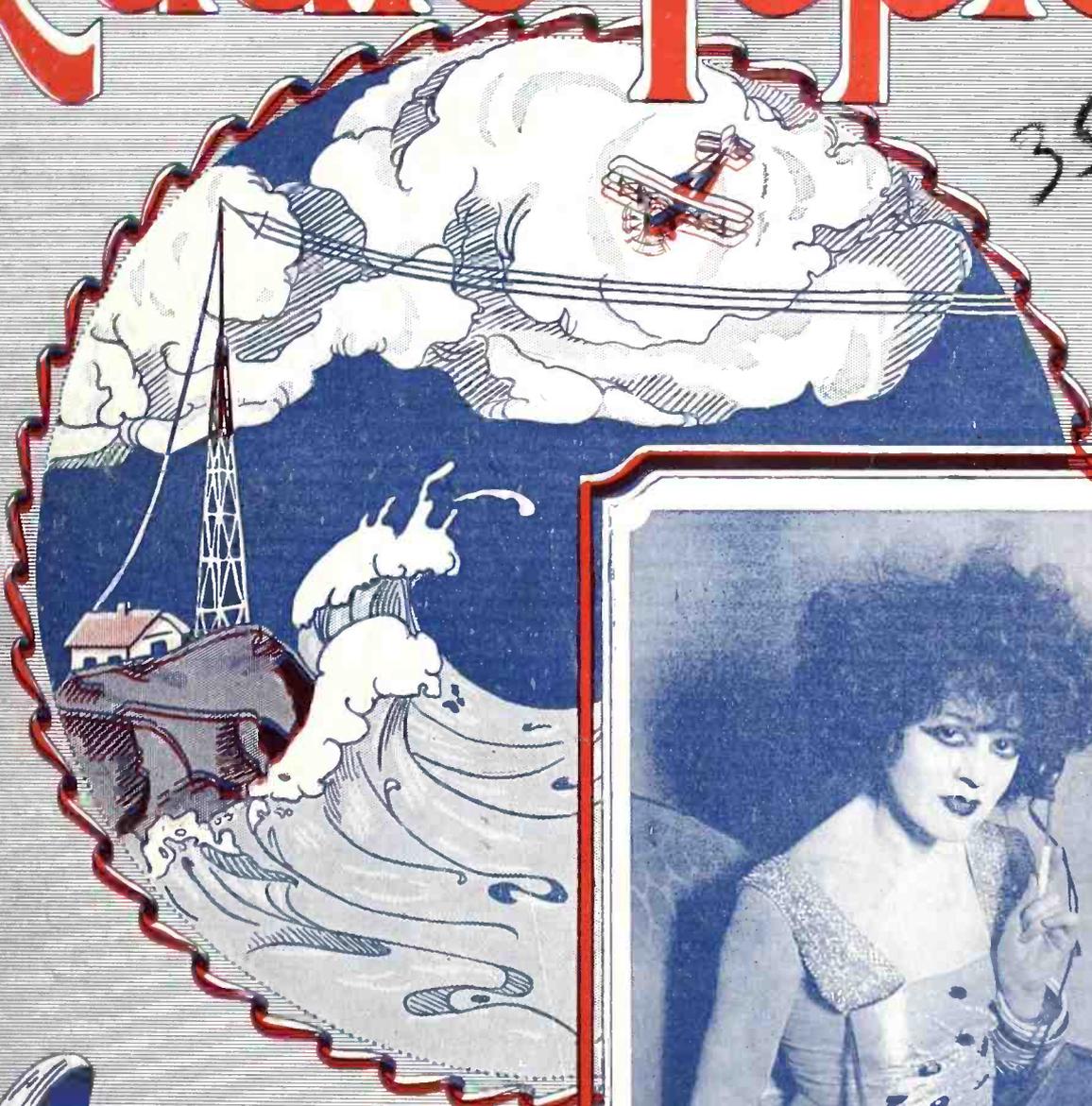


MAY, 1924

Radio Topics



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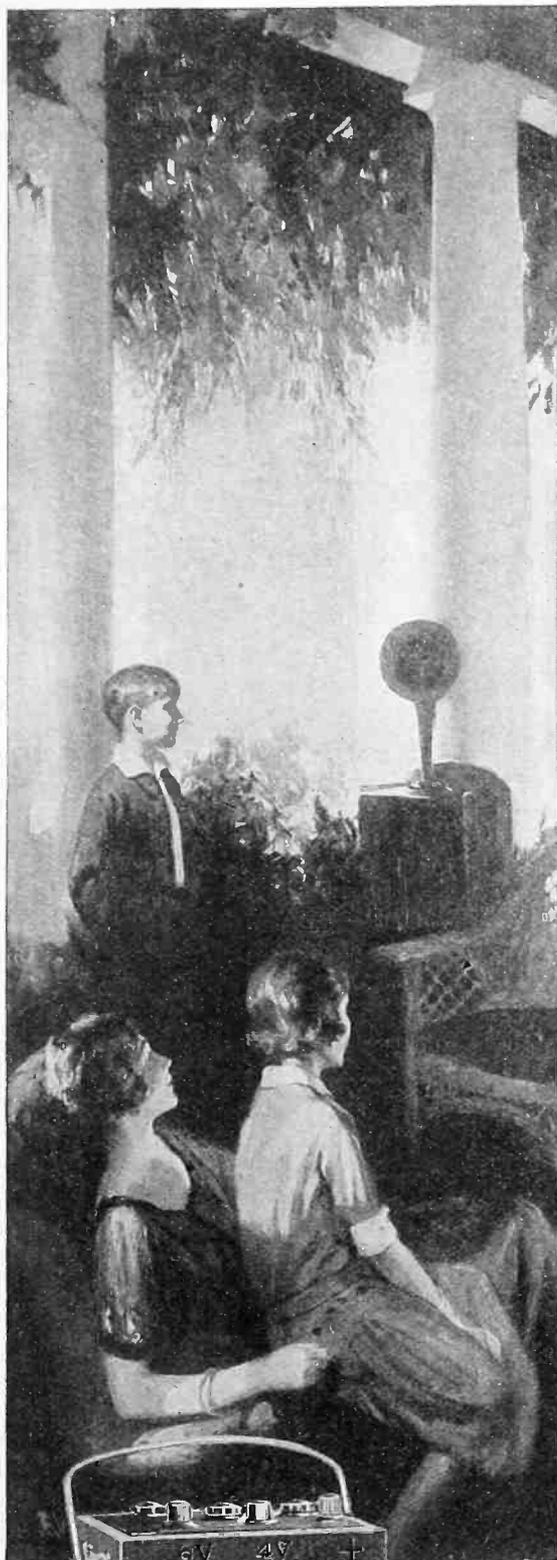
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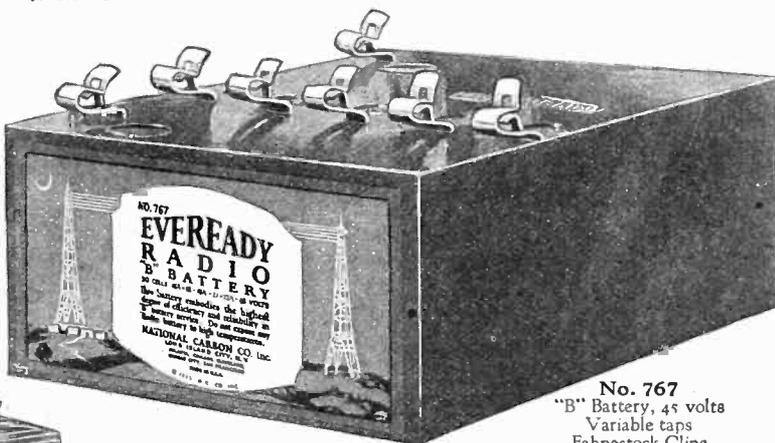
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and prolongs
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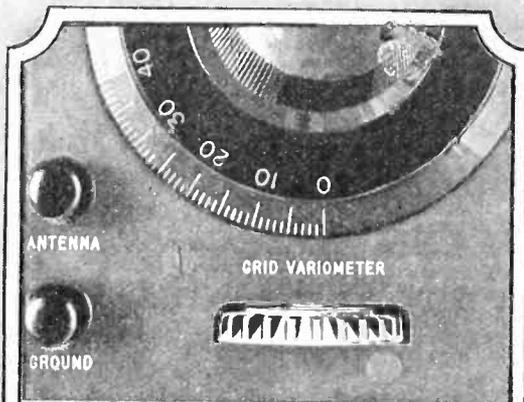
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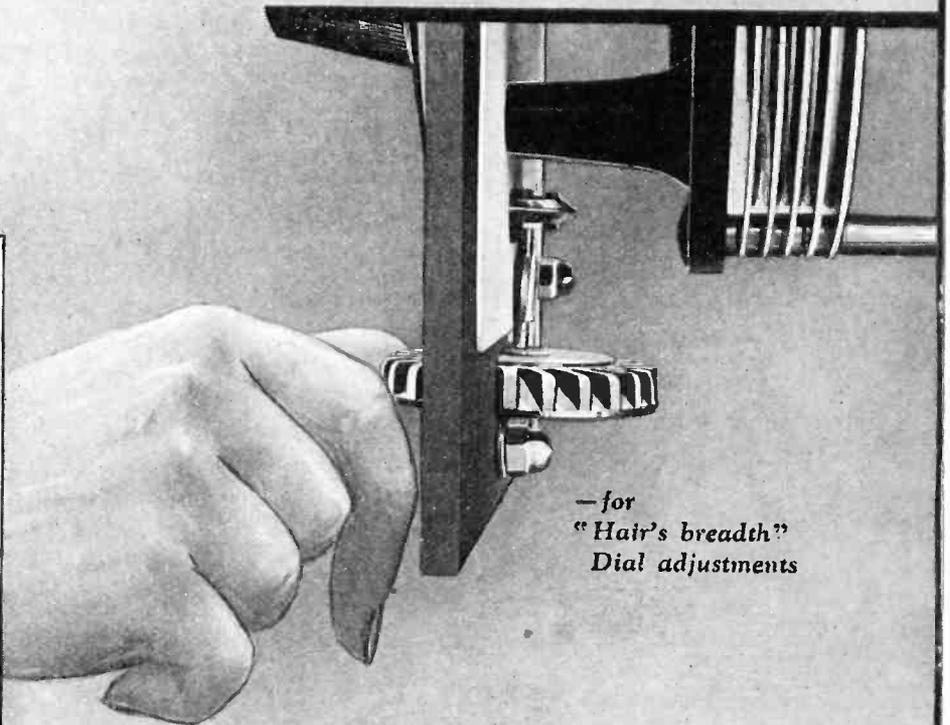
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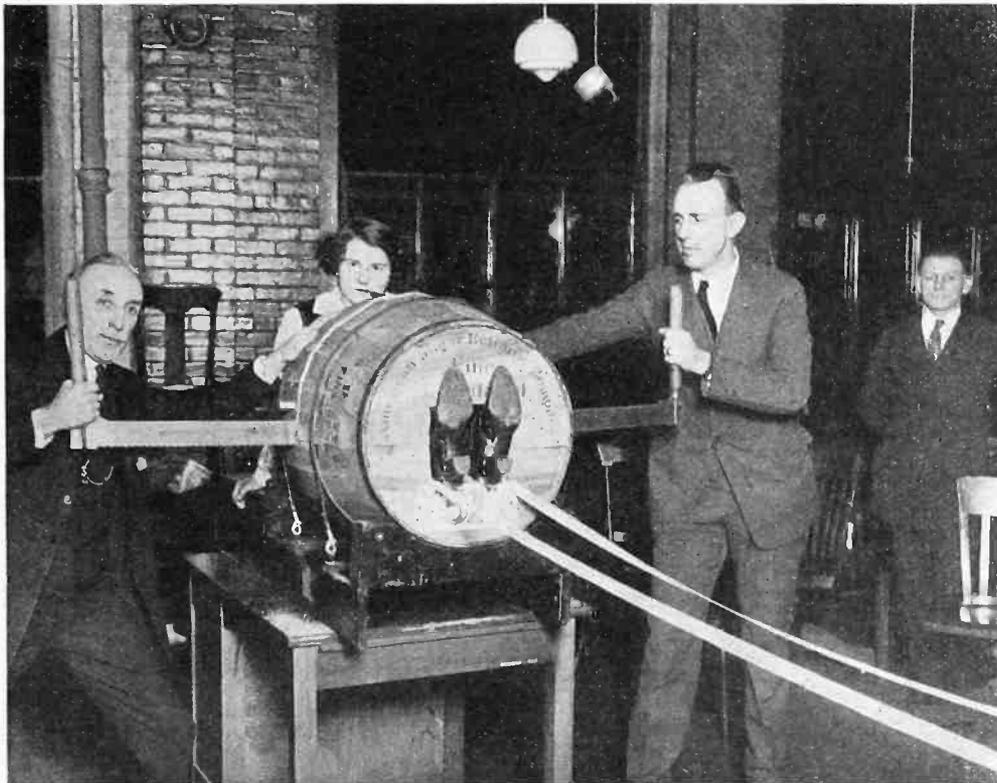
Radio Topics

An Illustrated Monthly Devoted to Radio

Volume IV

MAY, 1924

Number 4



Sawing a lady in two over the radio might thrill some folks, but it is much more interesting to see it on the vaudeville stage. However, Powel Crosley, Jr., assisted George Stock, magician, to pull off the stunt at the Crosley station WLW recently, with considerable success.

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PUBLISHED MONTHLY BY RADIO TOPICS

Entered as second-class matter at the Postoffice at Oak Park, Ill., February 25, 1922, under the Act of Congress of March 3, 1879.

Business and Editorial Office at 1112 North Blvd., Oak Park, Ill.

Chicago Phone: Austin 9300

New York Office, 240 Broadway

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Radio Topics



FOUNDED 1921

PUBLISHED EVERY MONTH BY
RADIO TOPICS, PUBLISHERS

1112 North Blvd.
OAK PARK, ILLINOIS, U. S. A.

J. RAY MURRAY, EDITOR
WILL M. HIGHT, General Manager

PUBLISHING AND EDITORIAL OFFICES

Chicago Phone: Austin 9300 Oak Park Phone: Oak Park 3200

Twenty Cents the Copy From All Newsdealers. By Subscription: To the United States and Possessions, Cuba and Mexico, \$2.00 the Year. Remit by U. S. Money Order, Express Money Order, Check or by Draft, payable in U. S. Funds.

To Canada—By Subscription, \$3.00 the Year. Single Copies 25 Cents—Canadian or U. S. Funds.

RADIO TOPICS is on sale the 10th of preceding month. Text and advertising forms close the 22nd of second month preceding issue.

Vol. IV.

May, 1924

No. 4

Defeat the Radio Tax

EVERYONE interested in radio has been stirred to vigorous protest by the action of the Senate finance committee in recommending a tax of ten per cent on radio sets and parts. It is also proposed to tax mah jongg. We wonder if the Senate knows any more good jokes.

The average citizen is now about taxed to the limit and because he chooses to pass a few pleasant hours at home constructing one or listening on a radio set it is now proposed to put an extra burden upon his shoulders. The heads of the leading manufacturers consider the movement ill-advised and have registered their protests in Washington. The amateur can also do his part toward defeating this proposed tax by registering his protest in Washington.

Radio Surgery the Latest

BY means of a specially constructed radio outfit a delicate operation for cancer was recently performed in the Alexian Brothers Hospital, Chicago, by Dr. Louis E. Schmidt. And it was practically a bloodless operation too. The knife used looks like a knitting needle and a low power radio transmitting set was used. The needle forms one terminal and the patient lies on a tin foil sheet, forming the other. The set was equipped with two 40-watt power tubes and condensers and the current oscillates at the rate of 40,000 cycles per second. The tension is 800 volts at 450 milli-amperes. Two men were operated upon for cancer of the

bladder during the trial of the radio needle. Radio fans within a few miles of the new machine can hear a strange, wild, new static whenever the needle is used.

Radio to Run Clocks

IT is predicted that in the not far distant day all the clocks of the world will be operated by radio. At a recent watchmakers' convention in Chicago one speaker said: "The time is coming when we will take time from radio. The Arlington observatory will broadcast the time and the watches and clocks of the nations will automatically pick it up. Vessels all over the world are now getting their time by radio. The watches of the future will be manufactured with a receiving apparatus to pick up the time out of the ether."

Getting After the "Black Sheep"

ONE hundred and fifty radio amateurs met recently in Chicago to take steps to eliminate unlawful transmitting sets. These young men, members of the Chicago Radio Traffic Club, are anxious to do their part toward clearing the air of unnecessary interference, and while but a small part of the city's transmitting stations are causing trouble, a general warning has been sent out and it is hoped the desired effect will be reached. Many stations besides amateurs are guilty of cluttering up the air with unnecessary signals, or so-called testing signals, between 8 p. m. and 10:30 p. m. This gives the innocent amateur a bad name with those operating receiving sets, when he is entirely innocent.

THE day of the radiating receiving set is fast fading out. No one who operates one of these sets and knows that it is a public nuisance will long continue to do so. There are too many good sports interested in radio to tolerate the interfering sets and they will gradually eliminate themselves. No legislation, such as the vice-president of the Radio Corporation of America recently proposed in Washington, is necessary.

It is estimated President Coolidge's address at the annual luncheon of the Associated Press, in New York, on April 22, was heard by more than 20 millions of people, on five million receiving sets. The speech was broadcast through ten stations, WMAQ, Chicago; KSD, St. Louis; WDAF, Kansas City; WWJ, Detroit; WBAP, Fort Worth; WCAE, Pittsburgh; WEA, New York; WCAP, Washington; WFL, Philadelphia; WNAC, Boston.

Station WHN, on top of Marcus Loew's State Theatre, New York City, and one of the most popular stations in the East, has agreed to pay the American Telephone & Telegraph Company \$2,000, and the suit for infringement of patents brought by the A. T. & T. has been dropped. The license covers the use of parts in the transmitting station.

Public Opposes Drastic Tax

SENATE FINANCE COMMITTEE'S RECOMMENDATION OF TEN PER CENT TAX ON RADIO OPPOSED BY GENERAL PUBLIC

THE recent decision of the Senate Finance Committee, after more than a month's deliberation revising the tax bill, to impose a tax of ten per cent on radio sets and parts, has met with stormy protest from manufacturers, dealers and users of radio apparatus alike. At first it was voted to make no exceptions. Treasury regulations will cover details of taxing the parts of sets.

Injustice of Measure

"A tax on radio receiving sets or radio parts is a direct tax on the spread of public opinion," said Henry M. Shaw, president of the Radio Trade Association.

"The Senate Finance Committee is not supposed to know anything about the radio business, but it is amusing to see the assurance with which it recommended a tax on radio receiving sets before they found out just exactly what is a receiving set.

"Once they have discovered what radio parts or kinds of sets they want to tax they will have a hard job finding some of the manufacturers to collect their taxes. A large percentage of high priced radio sets are built to order, built from parts bought by the owner of the set. Does the government intend taxing the individual because he wants to build a radio set and find out what is going on in the world?

"Perhaps the government will be willing to pass up the individual buyer, perhaps they can devise some system of taxation that will actually bring a real revenue from the radio trade. Perhaps they will find some way to make people pay ten per cent more for a battery because they expect to use it in a radio set instead of an automobile. Granted all that, the fact remains that the proposed tax, or any excessive tax on radio parts, sets or supplies, will be a blow at the development of this youthful industry."

Radio sales in 1924 will exceed three hundred million dollars, Mr. Shaw quoted from reports from various statistical organizations, in some cases exceeding his figures. Radio sales, however, he explained, would be less than one-third that figure if all the items were eliminated that can and are sold and used for other purposes.

What Will They Tax?

"Why should the listener be taxed on a vacuum tube while the telephone company buys them in quantities from the Western Electric Company for use in telephone amplification?

"Why should a radio set user be taxed on connection wire or clips or any of the dozen other items that are used by radio and are also used in every day electrical work?

"Where would the senate committee draw the line? A tax on sets alone would bring practically no revenue. Manufacturers might even sell all apparatus 'partly wired.' The trade believes that unwired sets are not sets, certainly they are no more radio sets than a bunch of parts are a radio set, even though you can make a set from either the parts or the 'partly wired' parts."

"Not only is a tax on radio parts difficult of collection, likely to be unprofitable, but it strikes home to the heart of the American people.

Asks for Fair Play

"More than four million homes have radio sets today. These four million people read the papers and hear broadcasters talk. They also vote. Their protests will be heard from every corner of the United States and it is inconceivable that the senate will adopt a tax that will be as unpopular as one on radio apparatus.

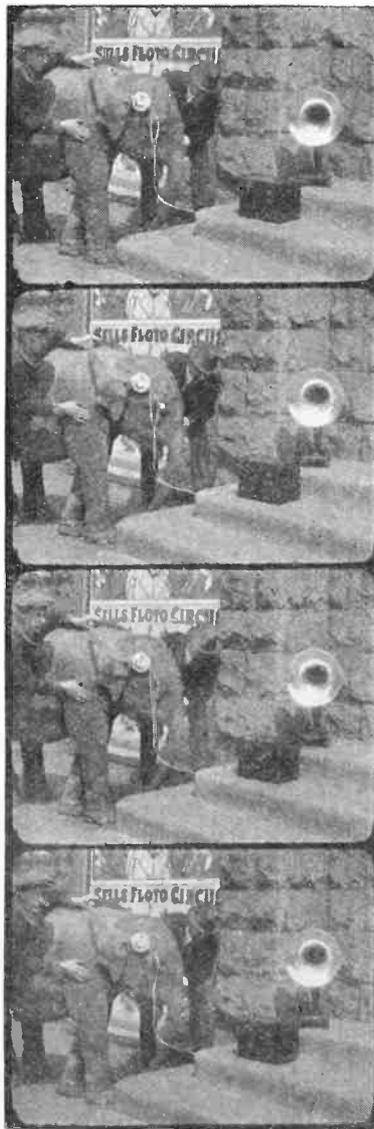
"Give the radio industry a chance and it will pay taxes, excess taxes if the government wants, but it seems to me as very unwise to attempt to tie the radio trade down with taxes at this time, especially when the revenue possibilities are so light."

Would Add to Cost

The ten per cent tax on radio apparatus as proposed by the senate tax committee would add approximately twenty-one per cent to the retail cost of radio receivers, according to Bowden Washington, chief engineer and vice-president of the Cutting & Washington Radio Corporation of Minneapolis, Minn.

"The tax would be a serious burden on a young industry and a detriment to a great public educational institution such as radio has become.

"The assessment would make costs almost prohibitive to many farmers, poor families, hospital



Even an elephant may become a regular radio fan. This fellow at least enjoyed it, outside the Coliseum, Chicago, where he posed for Harry Birch as a stunt for Sells-Floto circus.

invalids and school boys and girls for whom radio has become a source of enlightenment and entertainment. Radio is not a luxury, but has become almost as universal as the press and free speech.

"Although it is the committee's idea to compel manufacturers to pay a tax, the assessment would



Joe Laurie, Jr., the star of "The Gingham Girl" Company, being entertained by the stars of KYW, the Westinghouse station at Chicago.

naturally, as are other taxes, be passed on to the public. The distributing and selling formula would necessitate the added twenty-one per cent more that the public would be asked to pay. Independent manufacturers who produce the great majority of sets now sold already pay heavy license fees, and the additional tax would constitute a burden that might prove a disaster to the young and not yet stabilized industry."

Music Publishers Ask Pay

THE conflict over radio music between the American Society of Composers, Authors and Publishers on the one side and the National Association of Broadcasters, was taken up in Washington, D. C., on April 9.

The Senate committee in hearings on the Dill bill which provides that broadcasting stations may use copyrighted music without paying fees to the composers, must decide these questions:

First: Do the educational advantages of radio warrant the removal of all restriction as to music that may be broadcast?

Second: Does broadcasting injure the sale of music, particularly song hits?

Third: Is it just that the composers be permitted to charge broadcasting stations fees for using their music in view of royalties already received from the sale of their productions and fees charged orchestras for rendering their music in public performances?

Fourth: Will the production of good music and the stimulation of the art be injured by exempting radio from the copyright laws pertaining to music?

Senator Dill of Washington, author of the bill, says he does

not wish to injure such an important art as music, but believes the possibilities of radio demand every encouragement to its full development.

"Ultimately radio will give rise to a universal language," said Dill. "We should promote that end as far as possible by removing restrictions and encouraging its use."

"Freedom of the air will be more easily attained if the suit of the Watterson, Berlin and Snyder Company against the American Society of Authors, Composers and Publishers is won, than otherwise," said C. B. Cooper, chairman of the broadcasting committee of the Radio Trade Association.

"Contrary to articles in many newspapers, this suit is not being brought for the purpose of stopping broadcasting stations from using popular music, but, if won, it will give more popular music of more publishers to more broadcasters than ever before.

"The American Society has contracts with a number of music publishers, the Berlin company among them, covering the collecting of royalties for public performances for profit.

"On these contracts the American Society licenses hotels, dance halls, picture shows and others collecting royalties for the use of music in almost every place where popular music is played.

"For some time the American Society has attempted to make broadcasting stations pay for the use of the music owned by their members, claiming that broadcasting was a public performance for profit.

"Most broadcasting stations in the country have opposed this unnecessary tax, claiming that the broadcasting was not charged for and that it was not a performance for profit. A few broadcasters, however, paid the fees asked by the American Society.

"Many music publishers, members of the American Society, claim that the refusal of broadcasting stations to play their numbers, coupled with the increased publicity given the musical compositions of non-members,

(Continued on page 35)



Arthur Biner, who is leader of the orchestra that is heard from station WTAY, the Oak Park broadcasting station.

Big International Radio Show

ARRANGEMENTS COMPLETED FOR MAMMOTH EXPOSITION IN MADISON SQUARE GARDEN, NEW YORK, NEXT SEPTEMBER

FINAL arrangements have just been made for the world's first Annual International Radio Show, which is to open at Madison Square Garden on Monday, September 22, and continue until Sunday night, September 28.

The coming exposition, the largest and most complete show of its kind ever staged anywhere, will be held under the auspices of the newly organized Radio Manufacturers' Show Association, composed of sixty of the most prominent American radio manufacturers. U. J. Herrmann and James F. Kerr, the well-known theatrical managers who have made such a success of the annual Chicago Radio Show, will be Managing Director and General Manager, respectively.

There will also be an Advisory Board made up of E. B. Mallory, Chairman of the Radio Division of the Associated Manufacturers of Electrical Supplies, Paul B. Klugh, Executive Secretary of the National Association of Broadcasters, and Calvin Harris, the pioneer radio publicity expert.

To Hold Three Shows

The Radio Manufacturers' Show Association will hold three great expositions next season which will probably revolutionize the show end of the business. The first will be in New York, at Madison Square Garden, September 22 to 28; the second will be held in Chicago, at the Coliseum, November 18 to 23, and the third will take place on the Pacific coast early in 1925. The name of the latter city and exact dates will be made known within a few days.

The Board of Directors of the R. M. S. A. has taken a ten years' lease on Madison Square Garden for its Annual and International Radio Show which will be held there every fall until 1934. The Association has also taken over the Chicago Coliseum for a like period and another ten year lease is being negotiated on a Western exposition building. The new organization, which is heavily financed, is said to be a permanent institution which promises to be of great benefit to radio in general.

Managers Herrmann and Kerr have incorporated many of their own original ideas into next season's plans which are expected to make the show itself an unusually attractive spectacle and also eliminate nearly all of the unpleasant features of past radio exhibitions, for both exhibitors and patrons.

Foreign Exhibits

An outstanding feature next season will be the introduction of

foreign exhibits. Several of the leading European manufacturers have applied to Manager Kerr for space and he is now trying to rearrange his plans so as to enable them to have a section of their own.

There will also be a series of ultra-important public experiments and demonstrations held during the show, under the supervision of a special jury of celebrated radio authorities, for the purpose of bringing to light and testing out new radio inventions and theories. An extensive search is now being carried on for unknown wireless inventions of all sorts and, in all probability, many startling devices will be uncovered. The jury of scientists will also make a concerted effort to solve many of the most perplexing radio problems of the present day.

In addition to awarding suitable prizes to all successful inventors, the show management will also endeavor to assist them to market their inventions to the best possible advantage, gratis.

Big Amateur Contest

Another interesting feature will be an Amateur Builders' Contest which will surpass all former competitions of the kind. There will be three classes. The first for high school boys, the second for graded school boys (public or private) and the third for girls of all ages. Attractive prizes will be offered to each division and enough space will be allotted to

accommodate several hundred entries.

The decorative equipment of the coming exposition will be the most elaborate ever built for an American trade show of any sort. A noted architect, several famous artists and a score of scenic designers and builders have been engaged to assist in its production. At the close of the local show the exhibits, booths and decorations will be transported intact, by special trains, from New York to Chicago, and from there to the Pacific coast.

Manager Kerr has opened headquarters at the Prince George Hotel, 14 East 28th street, New York, where he will remain with his personal staff until September 15.

Massachusetts Man Hears French Program

THE first radio concert heard in America transmitted from the Eiffel Tower, Paris, France, was intercepted Saturday night, March 29, by Bert Moulton, Chatham, Mass. Moulton is employed at the Radio Corporation of America coastal station at Chatham, Mass., besides operating his own experimental station.

The powerful station on the Eiffel Tower, with the call letters "SFR," operated by the Compagnie Francaise De Radiophone, used a wavelength of 1780 meters, and broadcast a special program intended for American listeners between 5 p. m. and 7 p. m.

A carefully calibrated receiver employing four tubes was used, and Moulton listened to the French broadcast program for over an hour. He heard instrumental and vocal selections at 6:10 p. m. and held them until 7:15 p. m.

It was the first time regular concert from France was received in America. Station SFR used 2,000 watts, which is twice as much power as American broadcast stations use.

Nickel-in-the-Slot Radio Latest

By S. R. WINTERS

NICKEL-IN-THE-SLOT machines for the automatic selling of chewing gum, postage stamps, and similar commodities are being patterned after in a radio receiving instrument designed by D. J. Richardson, of Washington, D. C. By means of this ingenious device, a person may drop a nickel in a slot, turn a button (similar to a stamp-vending machine), clamp the head telephones on the ears, and by properly adjusting a dial on front of the apparatus, music or speech from a local radio broadcasting station is heard.

Contrary to the operation of some automatic vending machines, the nickel-in-the-slot radio receiving set is provided with certain safeguards for insuring to patrons the value of money thus deposited. In recognition of the fact that local radio broadcasting stations do not operate continuously, this apparatus is so manipulated that by placing the telephones to the ears and turning the dial on the outfit to an arbitrary figure it can be ascertained whether or not any local transmitting station is "on the air." If the answer is in the affirmative, then a five-cent piece is deposited in the slot, and after pressing the button to its extreme position, music or speech may be heard without interruption for a very limited period of time.

If, however, the patron desires to extend the form of entertainment, it is necessary to deposit other nickels at regular intervals of time. The service in this manner may be continued, without interruption, for a more or less indefinite period of time. The machine is equipped with an automatic signaling device, whereby the operator is warned twenty seconds in advance of the automatic cut-off when to deposit another five cents, if reception is to be continuous. Signaling is done by means of a red light.

The first of these nickel-in-the-slot radio receivers has been installed in a local barber shop, located at the intersection of two busy thoroughfares of the National Capitol. The instrument operates by means of power supplied by dry-cell batteries, which are connected by short wires on the back of the cabinet. The elec-

tric circuit is completed by "grounding" a wire to the radiator or other metallic base. The box or cabinet is mounted on a table and the size of the apparatus may be determined by a glance at the photograph illustrating this article.

Instructions for operating this machine for vending radio waves are printed on a card contained in the front of the cabinet. Other than the button for turning in conveying the nickel to the inside of the apparatus, there is only one control in manipulating the device. This consists of a dial common to radio receiving equipment, which is adjusted to a point for audible reception of the incoming radio signals. This dial does not require fine adjustment, since it largely serves the purpose of increasing the volume of the music or speech. In other words, reception is possible when the dial

is adjusted at any point, but the relative intensity of signals is thus controlled. At extreme loudness, the instrument contains sufficient strength to operate a loud-speaking device.

The nickel-in-the-slot receiving machine is attracting no little attention. Aside from its debatable practical service, the very ingenuity displayed by the inventor excites the ever-increasing audience of broadcast listeners who never fail to wonder at the numerous ways of intercepting the invisible electro-magnetic waves. Then, too, like the self-contained radio receiving suitcase, the accomplishment of reducing radio reception to terms of chewing-gum, postage-stamps, and penny-in-the-slot weighing machines, this device both arrests and stimulates the popular imagination.

George Was Different

A teacher was instructing a class in history.

"Tommy Jones," she said, "what was there about George Washington which distinguished him from all other famous Americans?"

"He didn't lie," was the prompt answer.—Crosley Radio Weekly.



The latest thing in nickel-in-the-slot machines in this radio receiving set, installed in a Washington, D. C. barber shop.

A Real Super-Heterodyne

By W. F. KUSTER

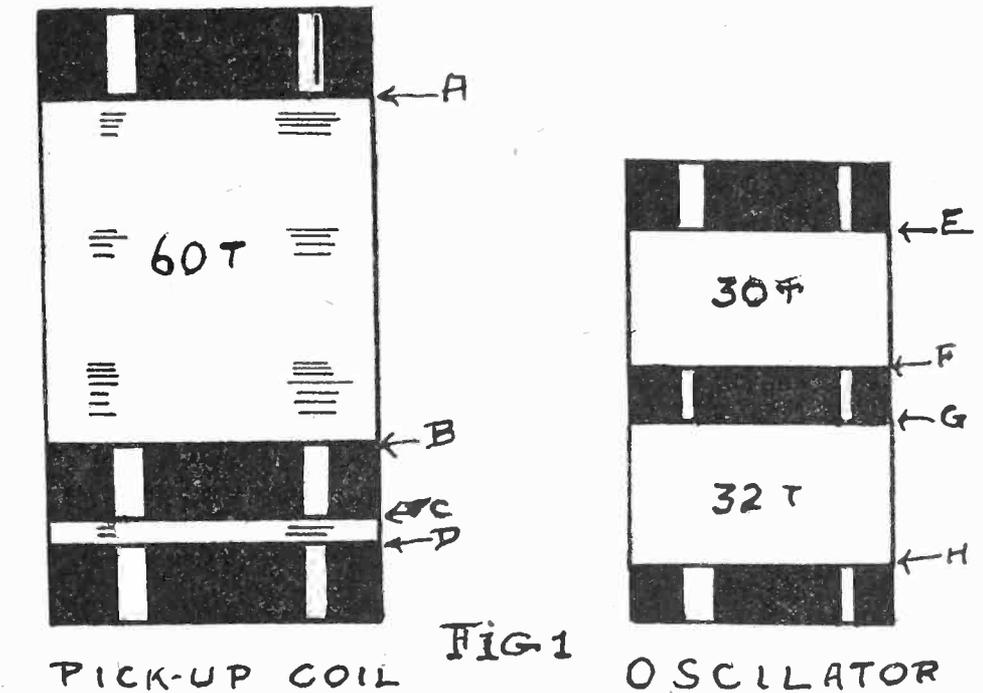
PRES. RADIO INSTRUMENT CO. OF CHICAGO

THE mere mention of Super-Heterodyne conjures up visions in the mind of most any sincere radio fan of tubes by the bushel, myriads of controls, and a depleted bank balance.

That vision is gradually disappearing, due to the many so-called simplified Super-Heterodyne receivers that have come to light in the past sixty days.

Unfortunately the larger percentage of these new wonders have proven to be receivers which, to borrow an expression from a Chicago newspaper editor made "eight tubes do the work of three." Nevertheless some few stand out above the crowd and have proven themselves worthy of the name of Super-Heterodyne, without the disadvantages that have heretofore been coupled with the name.

R. E. Lecault, A. M. I. R. E., has the distinction of having perfected the best of the modified and simplified Super-Heterodynes which he has named the Ultradyne. It employs a new prin-



ciple of radio reception which Mr. Lecault calls the "Metropolitan System," the modulator tube using no direct "B" battery voltage on the plate.

Extra Sensitive

By reason of this new principle, the sensitiveness is increased over that of any other receiver, with the exception perhaps of the

standard but complex Super-Heterodyne.

Results obtained with the Ultradyne circuit easily surpass those of sets employing the neutrodyne principle—reflexes, super-regeneratives, etc. This, however, holds true only when the Ultradyne is correctly built of the best possible materials.

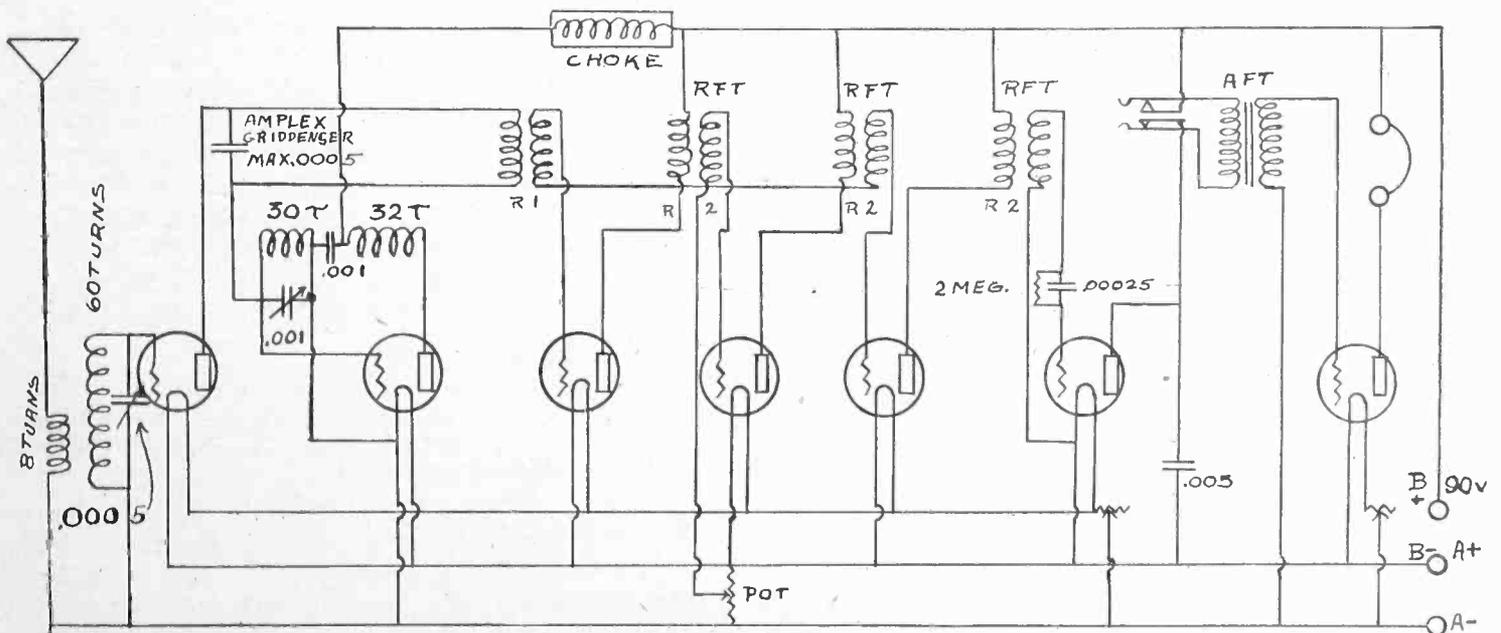


FIG. 2

Wiring diagram of Super-heterodyne Employing Special Choke Coil and Long-wave Radio Frequency Transformers.

The receiver to be described in this article is based on Lecault's Ultradyne and the modulation principle—but embodies improvements, without complications, which render it the premier receiver of the day.

Uses Long-Wave Transformers

To obtain perfect results special honeycomb-wound long-wave R. F. transformers are employed and a special choke coil, but these can be readily obtained as the market is being generously supplied at a moderate price.

The following constructional data relates to the building of a seven-tube improved choke type Ultradyne using 1 Modulator, 1 Oscillator tube, 3 Radio Frequency tubes, 1 detector, and 1 stage of Audio Frequency.

An additional stage of Audio Frequency can be added although this should be necessary only for the reception of very distant stations on a loud speaker.

Parts Required

The necessary parts required for building the sets are as follows:

- 1 panel 7x30.
- 1 cabinet 7x30.
- 1 .001 M. F. variable condenser.
- 1 .0005 M. F. variable condenser.
- 1 400 ohm potentiometer
- 1 6 ohm rheostat.
- 1 20 ohm rheostat.
- 2 double circuit jacks.
- 7 binding posts.
- 7 sockets.
- 4 equity R. F. transformers.
- 1 Amplex griddenser.
- 1 .00025 grid condenser with grid mounting.
- 1 .001 M. F. fixed condenser.
- 1 .005 fixed condenser.
- 1 6 to 1 audio frequency transformers.
- 1 piece tubing 3 in. diameter by 6 in. long.
- 1 piece tubing 3 in. diameter by 3¾ in. long.
- Busbar wire.
- Base board or panel 7x28.
- Screws.

Pickup and Oscillator Coils

The pickup coil, Fig. 1, is wound on a 6-inch tube. No. 20 D. C. C. wire is used and 60 turns beginning at point A are wound and fastened on a screw or binding post at point B. Beginning

at point C—1½ inches away from point B, eight turns more of number 20 D. C. C. are wound, fastening the turns on a screw or binding post at point D.

The Oscillator coil is wound on 3¾-inch tubing. The first section between points E and F consists of 30 turns of No. 20 D. C. C. The 30 turns of No. 20 D. C. C. The space between points F and G should be ¾-inch before winding the second section, which consists of 32 turns.

A. R. R. L. Members Want a Third Ballot

CONSERVATIVE members of the central division of the American Radio Relay League, under the leadership of Clyde R. Darr of Detroit, are asking for another ballot, claiming by a political trick another member was elected to office to represent the central division. The A. R. R. L. members comprising the states of Kentucky, Ohio, Indiana, Michigan, Wisconsin and Illinois, have recently been called upon to elect a new director to represent them at the headquarters of the league. There have been four candidates for this office, chief among them being Clyde E. Darr, present assistant division manager of the league in the state of Michigan, and a member of the board of direction for several years as well as an active radio man.

The Milwaukee Amateur Radio Club of Milwaukee, Wis., has been diligently pushing the candidacy of one of their own members, C. N. Crapo of Milwaukee, a comparative newcomer in the amateur field but whose advisers are apparently fully aware of all of the tricks of the political game.

The elections of the league are made through sealed ballots sent to each member by mail. Complaint has recently been lodged with the headquarters of the league immediately following the announced results of the election which showed Darr an overwhelming victor to the effect that the vote should be thrown out and a new ballot sent out because

of the fact that the Milwaukee candidate's name was not properly entered on the ballot. In accordance with this complaint the officers of the league at Hartford, Conn., decided to send out a second ballot explaining the reason why it was sent out.

It has now come to light that the majority of the members of the league in this division assumed that the second ballot was sent them by mistake and since they voted on the first one have discarded the second without voting. The Milwaukee contingent, however, have, of course, voted 100 per cent for their candidate.

Due to the watchfulness of the Darr campaign managers, who represent the more prominent and conservative amateur radio element of the division, this attempt has been frustrated and an appeal lodged with the offices of the league requesting a third ballot after a complete explanation of the circumstances to the membership.

The Darr campaign managers predict that Darr will be returned an even more overwhelming victor on the third ballot which, it is hoped, will be held after due notice of the circumstances has been given the entire membership.

New Palmer Radio Orchestra

The new orchestra at WOC which made its debut recently has met with instant and enthusiastic approval of the radio audience. The organization has been named The Palmer School Radio Orchestra and has replaced the P. S. C. Orchestra which has been heard from the Davenport station for many months. Every member of the new orchestra is a soloist of merit, and all are members of the well-known Tri-City Symphony Orchestra, which is conducted by Ludwig Becker of Chicago.

Eight pieces comprise the orchestra used for broadcasting, with Erwin Swindell, WOC's musical director, conducting. Reeds and strings only are used for concert work, as it has been demonstrated at a number of radio stations that this combination records most faithfully and produces the most pleasing radio effects.

The Future of Broadcasting

By ELEANOR POEHLER

MANAGING DIRECTOR OF CUTTING & WASHINGTON STATION, WLAG.

WHAT is the future of broadcasting?

How long is broadcasting going to last?

How long can the broadcasting stations get talent without paying for it?

It would require a high class ouija board operator to answer all these questions correctly, but certain trends are becoming apparent and may now be recognized. They are gradually working themselves out.

In the midst of the ebb and flow of broadcasting stations, the enthusiastic inauguration of new broadcasters and the "signing off" of other stations that were started with just as much enthusiasm, it begins to be quite apparent that the future of broadcasting is the future of the race. The only thing that will kill off broadcasting will be something that renders it obsolete and thus far there seems to be nothing formulated in the imagination of the scientific world that makes this likely within a thousand years.

Supervision Necessary

One thing, of course, might easily kill broadcasting if it were allowed to do so, and that is broadcasting itself. But so long as the governments of the world continue to exercise proper supervision and broadcasting stations obey the rules, there is no great danger of this. Indications are that the clamor of the smaller voices in the concert of the air will be stilled through the insistence of the listening public, and that a few dozen of the best broadcasters will continue to carry the burden of radio entertainment.

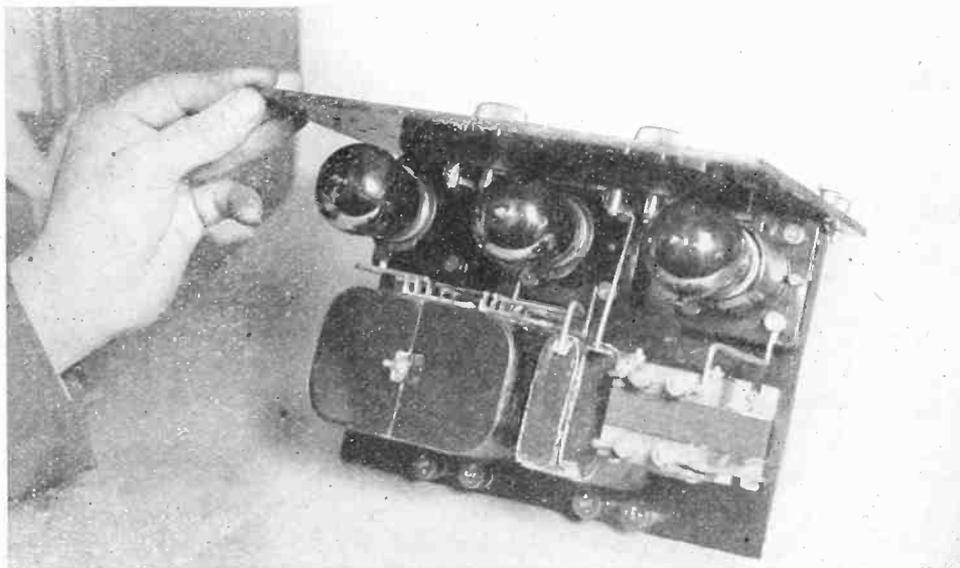
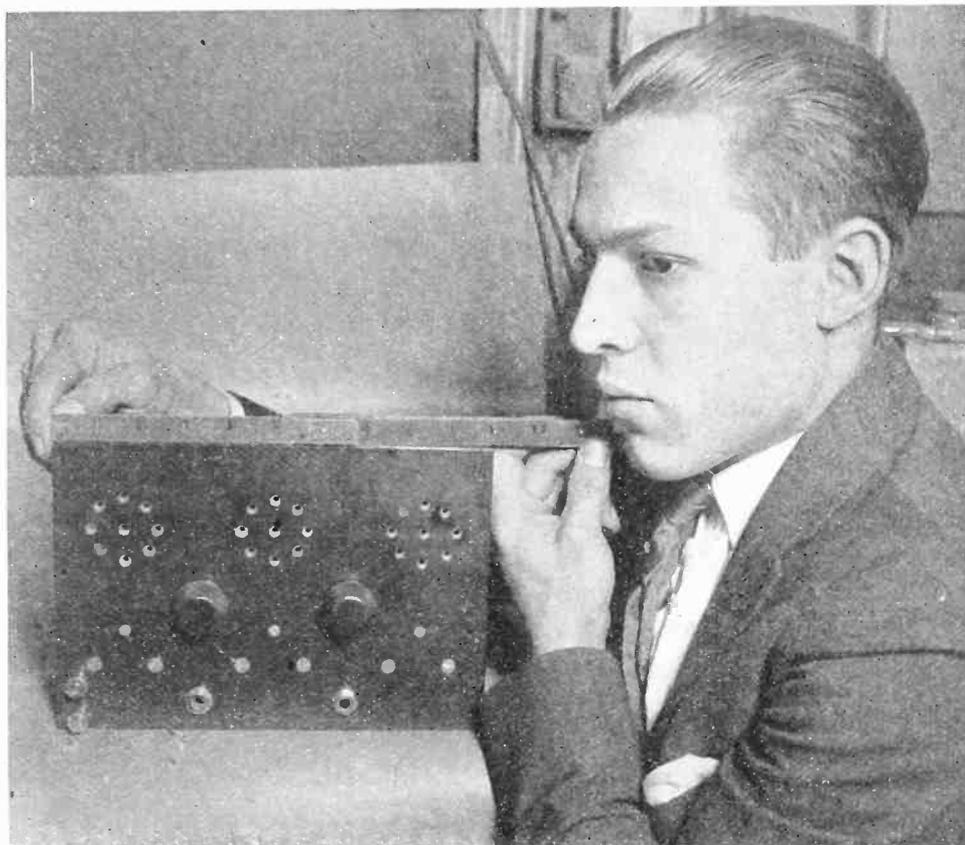
This weeding out process is inevitable, and will be done by the public and its agency, the government, and it behooves every broadcaster to share its programs and handle its technical equipment so that it may survive the test.

The question of the payment of talent and that related question of the payment of royalty on publications and compositions used

by the broadcasters are working themselves out.

Sooner or later, perhaps sooner than later, publishers will come to

realize that the commercial organizations that can benefit directly from the publicity and advertising incident to broadcasting are



A PUSH-PULL AMPLIFIER. SIMPLE TO MAKE

Radio fans are gradually beginning to realize that the only way to amplify with quality when using the "push-pull" system. This method not only gives distortionless amplification but very great volume. Three tubes, however, are used for but two stages of amplification when using this method, the first tube being the first audio-frequency stage while the next two tubes function together as the second stage. Special type push-pull tapped transformers are used for this purpose. This photo shows the interior of a push-pull amplifier designed and built by Sidney Kasindorf, well-known amateur of station 2-ATV. On extreme left is the first audio transformer and tube, while on the extreme right is the pair of push-pull transformers mounted close together. The small flashlight batteries shown in the center are used as "C" batteries. Note how simple this layout is (lower photo.) Upper photo shows Sidney Kasindorf and the panel arrangement of his push-pull amplifier. Note by the ruler that it is only ten inches long. (Photo by Kadel & Herbert.)

the publishers, authors, and composers of the music broadcast.

Song Publishers' Folly

It seems a little ridiculous for music publishers who hire hundreds of song "pluggers" to sing their songs in order to popularize them to protest when broadcasting stations broadcast them without charge.

The rapid inroads being made by independent publishers and song composers who have never before been able to get any kind of a hearing from the czars of the music world indicates that it will not be long before every publisher of material that can be broadcast will besiege the radio stations for a chance to put his performers on the program.

My own idea is that the finest musicians will soon be engaged by publishers to present their publications by radio.

Another significant indication in the radio world may be found in the appearances of Wendell Hall as the special broadcast representative of a battery company of which every radio listener knows the name.

How long will it be before every national manufacturer of consequence will engage the best artists it can find and plead for a place on the program? The way is open at little expense for the commercial world to entertain the public in a way most profitable to itself and at the same time place its firm names before the public in a manner that cannot possibly offend the listener.

Entertainers Will Be Paid

This means that sooner or later every broadcast entertainer will be well paid and at the same time the burden of financing this payment will not be laid on the broadcasting station.

The problem of finance for the broadcaster is a serious one, but it has been solved by the Twin City station in a manner which may possibly be adopted by other stations throughout the country.

This station has 10 subscribers who share its budget. They are the Munsingwear Corporation, the L. S. Donaldson Company, the Northwest Farmstead, the



Morgan L. Eastman, musical director of KYW, Westinghouse station, Chicago

Benzo Gas Motor Fuel Company, the Northwestern National Bank and Minnesota Loan and Trust Company, Brown & Bigelow, Purity Baking Company, the St. Paul Retailers, the St. Paul Jobbers, and the Cutting & Washington Radio Corporation, which owns and operates the station.

Each of these companies might find it difficult to justify an expense of \$20,000 or \$30,000 for broadcasting, but among them they are easily able to provide a sum sufficient for WLAG. In fact, each company is able to participate in a national advertising plan for a full year for less than the price of one full page in a certain large weekly popular magazine.

Surely some such plan as this will grow out of the present free for all scheme, except in the cases of national companies of great size, capable of taking care of the entire expense of a station.

Swain Heads Power Club

G. A. Swain, assistant to manager, Supply Sales department, Westinghouse Electric and Manufacturing Company, has been elected chairman of a new section of the Electric Power Club. The section, including instruments and instrument transformers, was recently organized.

WLAG Heard in New Zealand

OLD-FASHIONED barn dance music broadcast by radio from Minneapolis, Minn., has been heard in Motueka, New Zealand, one-third of the way around the world, sufficiently loud for dancers to do quadrilles and reels, according to a letter received by officials of the Cutting & Washington Radio Corporation.

The music, an "old time" program, was broadcast by WLAG, operated by the corporation, the night of February 27 and according to the letter which came from W. K. Lane, High street, Motueka, Nelson, South Island, New Zealand, was received "very loud and clear" on a loud speaker. The University of Minneapolis estimates the air-line distance between Minneapolis and New Zealand at 8,400 miles.

Lane also reported that he heard a part of a speech from WLAG, the reception being "very good" until ships' sparks "blocked out everything and I was unable to continue to listen in."

WLAG, a 500-watt station, has been heard in Batum, Russia; Kragero, Norway; South America, 400 miles southeast of Honolulu; in the Arctic Circle and by ships passing Bering Straits.

Battery Chargers

By C. R. BLUZAT, TECHNICAL EDITOR

Part 1

SOONER or later the average radio fan has to buy a battery. For a single or two tube outfit there is no need for it, for the consumption of the so-called "dry cell tubes" enables one to use dry cell batteries with which buying and running ex-

Such is not the case in radio where the discharge is fairly constant and can be figured easily from the number of tubes of the set. It is then safe to use any kind of battery used for automobiles. Special batteries are made for radio, which cost less than the ones

made for automobiles and are perfectly reliable.

Charging the Battery

But when it comes to choosing the mode of charging the battery, the puzzle begins. First it must be determined whether your house is supplied with alternating or direct current. If it is fed from a transformer, you are sure that it is alternating current. If you do not know, ask the lighting company meter man.

If the lighting system is direct current, the easiest way to charge your battery is to make a lamp bank, using lamps in parallel so that the charging current will be limited to its proper value. 60 watt carbon lamps may be used, each limiting the current to approximately half an ampere. Should two amperes charging current be required, four lamps should be used in parallel. A battery should be charged at the rate specified by the manufacturer. In case no indication is given it is safe not to use a higher charging current than the tenth of the ampere-hours capacity of the battery. For example: a 60 ampere-hours battery should preferably be charged at a current lower than 6 amperes.

The next point is to determine the positive and negative sides of the lighting system so that the current will flow in the proper direction through the battery. A

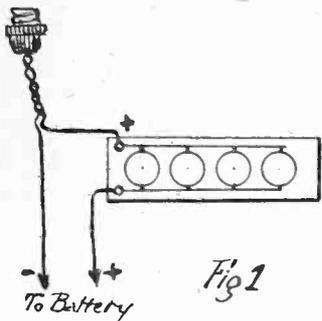


Fig 1

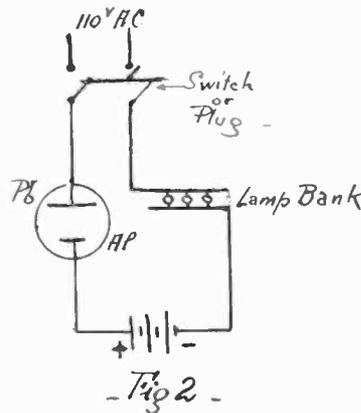


Fig 2

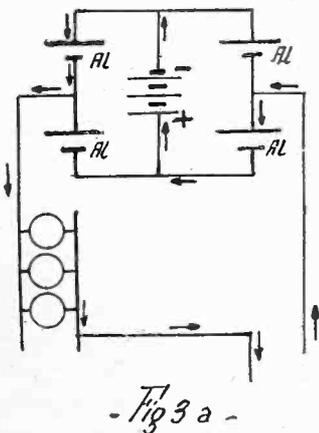


Fig 3 a

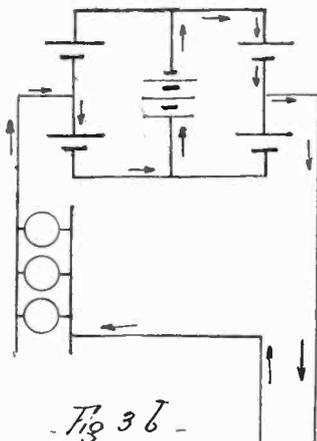


Fig 3 b

penses are within the reach of every pocket.

When the construction or buying of a three tube set, a Neutrodyne, a Super-heterodyne, is considered, economy of space and money makes it imperative to buy a battery.

No difficulty is generally encountered in the choice of it, many good makes being on the market. It must be said also that the requirements of a battery for radio purposes are much less strict than for automotive purposes. In the last case the battery is subjected to many evils detrimental to its life, such as jarring and heavy discharge current.

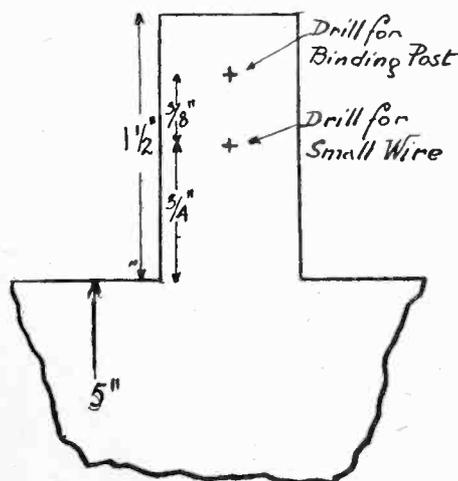


Fig 4

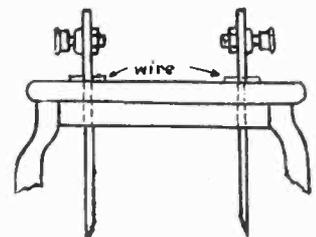


Fig 5

plug which screws is to be preferred.

If another type is used, be sure that you always put it in the same way, otherwise the polarity of your leads would be reversed. If a separable plug is used, file a mark across the edge of the two parts, then to get the same polarity you must match up the mark. The plug is equipped with two insulated wires (lamp cord No. 12 or 14) of the proper length and the ends bared, and kept apart.

Use a Voltmeter

If you own a voltmeter of the proper range; that is, having a scale up to or above the voltage of your lighting current, 110 or 220 volts, the polarity will be easily determined. If not, a glass vessel containing some water in which salt is dissolved may be used. The two leads are dipped in the water, care being taken not to have one touch the other. The wire where bubbling occurs is the negative lead. The other is the positive.

The negative lead should be surrounded with a string blackened with ink so as to differentiate the two leads. Remember that, to charge the battery, the positive must be tied to the positive lead and the negative to the negative lead. Figure 1 shows how to connect the lamp bank and the battery.

In most cases, alternating current only is available. It is obvious that a battery cannot be charged by tying it directly to the alternating current line. The current would flow in one direction for an instant, flow in the reverse direction for an equal time, resulting in no gain whatever for the battery. It is then necessary to use a rectifier; that is, a device which delivers current in one direction only.

The rectifiers may be divided into four groups: electrolytic, mechanical, bulb, motor-generator.

How It Works

The electrolytic type works on the following principle:

Suppose a plate of aluminum and a plate of lead are immersed in a solution of ammonium phosphate or borate, or ordinary borax. The Al plate acts as a valve permitting current to flow when the aluminum plate is negative and stopping it when the

aluminum plate is positive. When the aluminum plate is positive, a film of highly resistant oxygen gas is formed on the aluminum which presents a porous surface due to a coating of aluminum oxide (the oxygen of the air reacts on the aluminum and gives this oxide); then no current will pass. When the aluminum plate is negative, the oxygen goes to the lead, and hydrogen is evolved at the aluminum plate. As no oxygen film can form on the lead plate, the current will flow. A pulsating current of the same polarity is thus obtained.

The aluminum rectifier has not met with much success. The leakage when the aluminum is negative is sometimes considerable. High charging current will cause overheating, destruction of the plates.

The tantalum rectifier based on the same principle is to be preferred, being independent of temperature over a bigger range than the aluminum type. For a certain voltage the film breaks down and the rectification does not take place. For tantalum and aluminum this voltage is above 100 volts. The efficiency of this type of rectifier is around 40 per cent, but may fall very low if the solution is not pure and if improperly operated; the current ratings of the manufacturers must be strictly adhered to.

Fig. 2 shows the connections when only one rectifier is used. As pointed out previously, only one side of the wave is utilized. Both sides of the wave may be utilized in an arrangement such as the one shown in Fig. 3.

Fig. 3-a and 3-b will be easily understood, if one remembers that the current can flow only from the lead to the aluminum. Fig. 3-a corresponds to one-half of the wave, Fig. 3-b to the other half. The direction of currents is indicated by the arrows.

Note that the current in the battery has the same direction in both cases, so that the battery is always under charge through the whole cycle. The lamp bank regulates the current as in the D. C. charger.

The construction of an electrolytic rectifier is easily done. Preserve jars may be used for containers. Covers for these are turned out of wood or hard rubber. Pure soft aluminum and lead

sheets of one-eighth of an inch thickness are to be bought. Figs. 4 and 5 show an easy way of mounting the plates on the covers. The solution may be ammonium phosphate or borate, or ordinary borax (20 Mule Team). For the last one, use about one pound to a quart of warm distilled water; for good results, it is very important to use distilled water. The rectifier must then be "formed"; it is connected in series with the lamp bank (2 to 4 60-watt lamps); that is one of the plates is connected to one side of the lamp bank; the other side of the lamp bank and the other plate are connected to the A. C. line. Five to ten hours will "form" the rectifier.

Part two of this article will take in consideration the other types of rectifiers and a rapid comparison of all the described rectifiers.

U. S. Civil Service Examination

The United States Civil Service Commission announces the following open competitive examination for junior radio engineers.

The examinations will be held throughout the country on May 7. It is to fill vacancies in various branches of the government service, at an entrance salary of \$1,860 a year.

Applicants must have been graduated with a degree in engineering, preferably in radio engineering, from a college of recognized standing; or must be senior students in such course and furnish within three months from the date of the examination, proof of actual graduation. Applicants who have completed two full years of the engineering course may substitute for each of the additional years, one year of experience in radio engineering.

Competitors will be rated on general physics and chemistry, pure and applied mathematics, practical questions on radio engineering, and education, training and experience.

Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil service examiners at the post office or custom house in any city.

Untangling the Radiation Tangle

By RALPH R. BATCHER, E. E.,
RESEARCH ENGINEER, A. H. GREBE & CO., INC.

ARTICLE 1

AS A result of the publicity given certain recommendations made at a meeting of the Radio Club of America several weeks ago, the problem of receiver radiation has been the subject of much controversy ever since. Not that this radiation interference is worse than before, because in most locations this disturbance is not as bothersome as a year ago.

As a result, as many "solutions" have appeared as there have been self-appointed "Committees of One" take up the investigation. For all the prevalence of the trouble that is reported, there seems a great lack of actual data on the subject. Actual comparative tests with various receiver circuits are necessary before any particular circuit can be condemned as the worst offender. In all probability the effect of radiation will be heard with a fairly sensitive receiver within an area having a radius of 100 to 500 feet, from the center of radiation, but the instances of radiations of over a half mile are doubtful. But in thickly populated areas a disturbance extending for even 100 feet may cause a considerable amount of interference.

Minimizing Interference

All interference that is unnecessary, however, should be minimized as much as possible for the

good of the art, since there are plenty of sources of interference which cannot be done away with. Before any "solution" is foisted upon the public it should be carefully investigated from all angles. The majority of receiver owners are willing to try some plan once, but after taking up one or two plans which prove to be false alarms, they are bound to become skeptical and refuse to fool around with other schemes.

The plans that have received most publicity are the following (some of which are more or less related):

1. Doing away with single circuit receivers.
2. Doing away with regenerative receivers.
3. Adding a resistance to the antenna circuit.
4. Using special antenna coupling coils.
5. Using a "blocking" tube.

The first method, involving single circuit receivers, is one of the most inadequate plans of the list, since it assumes a single circuit receiver radiates, but one with a double circuit does not! It cannot be argued, of course, that the former does not radiate, for it does with many adjustments, but to advise or require an owner to go to an expense of changing his receiver to a two circuit receiver to eliminate, or even lessen the radiation of oscillations a great amount, is certainly not warranted. This statement needs some explanation

on account of the widespread ideas to the contrary. It is true without doubt that a single circuit receiver gives greater intensity of incoming signals than one with more than one circuit. Therefore, in an effort to obtain the same reception that he has been accustomed to the owner who has listened to this advice will spend more time tuning in, and it must be remembered that radiation occurs only during the interval in which the tuning is done. At all events, it will take much longer to adjust two dials "just right" than one, or to adjust three dials than two. The argument has been advanced by the sponsors of this plan that the two circuits are always more or less out of tuning with each other during the adjustment interval and, therefore, less energy will flow between them. However, the operator in tuning for the best reception will adjust the receiver to a coupling condition most favorable to the reception of the signals, and it can be shown that this is also the condition under which the receiver will radiate the greatest amount of energy. There is, therefore, not enough to be gained towards the solution of this problem by this method to warrant alteration of single circuit receivers.

Can't Adopt Drastic Methods

Others have recommended doing away entirely with regenerative receivers. This seems to be a drastic and unwarranted method since regeneration is one of the most useful factors in radio reception, since it is the cheapest, simplest and most reliable method of securing distance, selectivity and volume—three requisites of a receiving set. To resort to this plan certainly would not speak well for the engineering ability in the country.

Since many of the single circuit receivers did not seem to adapt themselves for the addition of another circuit the sponsors of plan 1, bunched these circuits under one head and suggested "Add a 400 ohm potentiometer in the antenna circuit." Of the many articles the author has noticed (or discussions he has heard) no one has given him any idea as to what to do with this device after it is added since no details for its use were advanced.

Presumably the idea which they have had in mind is: While making adjustments and tuning a station in, a certain amount of resistance should be added to the antenna circuit. Then when adjustments have been completed the resistance may be set at zero.

This plan sounds good, for no one doubts but that radiation will cease if enough resistance is added to the

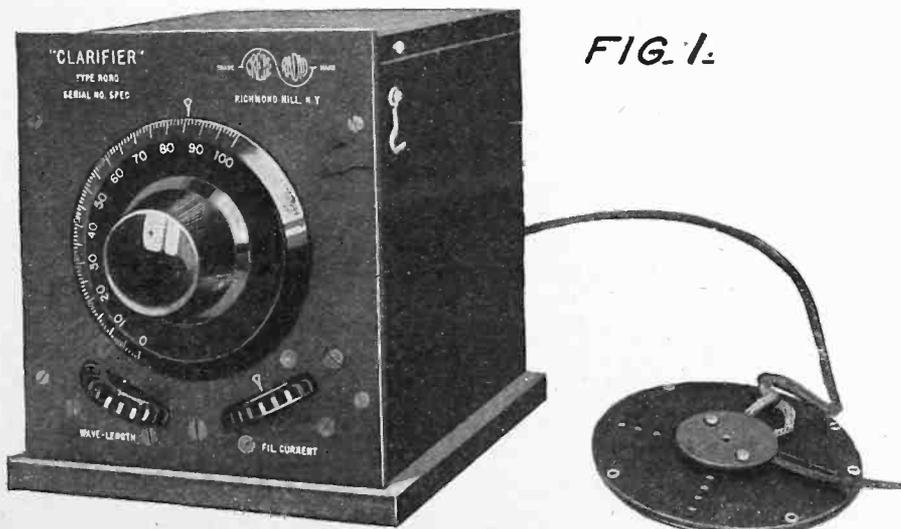
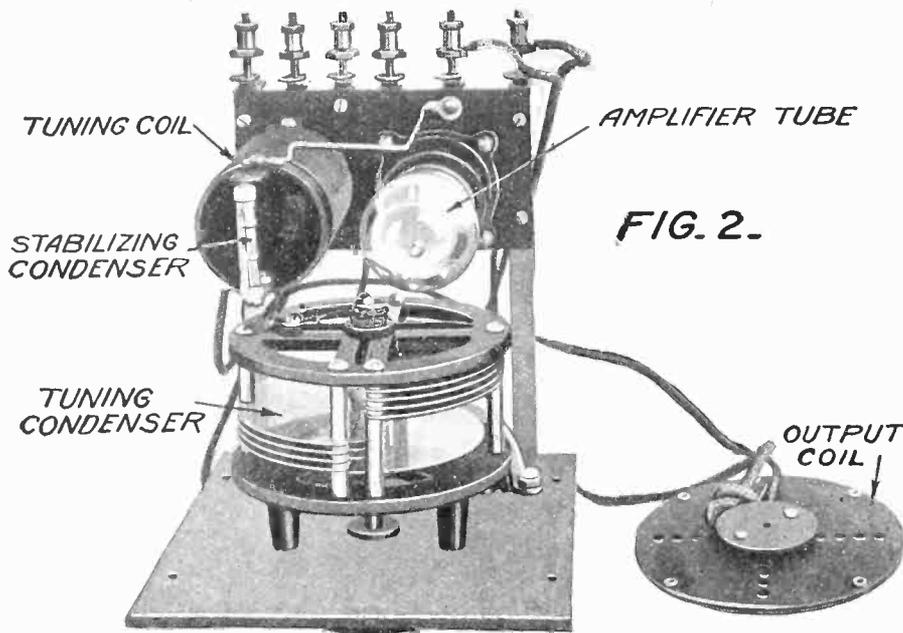


FIG. 1.

The Grebe Clarifier



Interior of Grebe Clarifier

antenna circuit. However, the operator will find it necessary to retune after the setting has been changed, since the constants of the circuit have been changed by the removal of the resistance. In retuning, radiation from the receiver will generally occur. Besides this in the case of some circuits, regeneration may balance out this resistance (unless it is too large), so that there is nothing to be gained by the addition of the resistance in the amount of disturbance from that produced without it.

No Fading Is Found

Then again in all cases the amount of interference is very small when local stations are received because very little manipulation of the tuning dials is necessary and there is no fading found, giving no excuse for retuning during a program. But distant stations which often require considerable manipulation of the dials cannot be received with sufficient resistance in the antenna circuit to prevent radiation, so the tendency is to cut down the amount of resistance (generally to zero) so that this plan seems valueless.

Another plan makes use of certain types of coupling coils, which are specified. This plan cannot be fully outlined here without some mathematical analyses, but it can be shown that the coefficient of coupling is the same whether measured from coil A to coil B, as it is then measured from coil B back to coil A. In other words, if two coils are so located that a portion of the incoming energy in coil A is transferred to another coil B, energy will be transferred just as easily from the second coil B to the first provided the amount of energy in coil B is increased until it is larger than in coil A. In any regenerative receiver that is working efficiently, if coil B happens to be in the grid circuit some energy is bound to be radiated. So this plan does not seem to be the "solution" desired.

Many references have been made to the use of a "blocking" tube to prevent radiation. This method, which consists of connecting the antenna to

the receiver through a Vacuum Tube, appears to have many practical aspects, but the data given out on the constructional details have been very meager. Many admit that a blocking tube is supposed to do nothing but prevent radiation troubles.

The benefits which the general use of a non-radiating device would give to the art will be great. To gain favor which will promote its general adoption by the public, the device should:

1. Absolutely prevent radiation from any regenerative receiver.
2. Give a gain in signal intensity.
3. Present no greater tuning difficulties.
4. Add considerably selectivity.
5. Increase quality of signals or at least the device should not impair quality.
6. Extend distance range.

Any device which fulfills all of the above items requires considerable experimenting and laboratory testing, so that details of the "Clarifier" a unit which was recently developed in the laboratory of a prominent manufacturer may prove of interest to readers.

Besides the above six requirements this unit was designed to take care of five additional items:—

7. Must work with available types of tubes.
8. Must be adaptable to all types of receivers without wiring changes.
9. Must cover the entire broadcasting wavelength range without resorting to taps on the inductance coil.
10. Must work with both long and short aeriars.
11. The setting for each particular wavelength must not change from day to day.

Figure 1 is a photograph of the unit complete showing its general appearance. The circuit in this equipment comprises of the balanced output type of circuit so that the instrument will not oscillate under any wavelength, "B" battery or filament current condition.

Figure 2 shows a top view of the instrument in which the elements

have been indicated. The output coil is connected by a flexible cord so that it may readily be placed in inductive relation with the grid coil or variometer of the receiver proper by laying it on top of the cabinet. The coupling here is not critical and need not be varied while tuning. When used in conjunction with a single circuit receiving set, in which the antenna is part of the grid oscillatory circuit it is necessary to short circuit the antenna and ground posts on the receiver and connect the antenna to the "Clarifier."

For the benefit of those who are interested in constructional details and the methods used whereby the instrument was made to fulfill the ten requirements listed above will be taken up in a future installment.

Article 2 will be published in June RADIO TOPICS.

R. C. A. Announces Tube Policy

If the present system of tube replacements which the Radio Corporation of America has adopted, fails, the corporation will take over this branch of the industry itself, according to H. T. Melhuish, assistant general sales manager of the R. C. A., who spoke before the New York Branch of the Radio Trade Association at the Hotel McAlpin on March 27.

The problem of replacing defective tubes is one of the most difficult which the radio dealer has to face and the business men who gathered to hear Mr. Melhuish were pleased to hear of the determination of the Radio Corporation to help in solving the difficulty.

Henry L. Seidman, well-known cost accountant, also told the meeting of the cost of operating a radio business. According to his statements, based on a nationwide questionnaire among radio dealers, a surprising majority are engaged in business on no profit at all.

The meeting was the first since the organization of the branch two weeks ago, when radio retailers gathered to hear W. E. Harkness, assistant vice-president of the American Telephone and Telegraph Company defend his company against the charge that it was attempting to establish a broadcasting monopoly in the United States.

Department of RADIO ENGINEERING

Radio Topics Institute



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Wave-Trap That Eliminates Interference

By C. R. BLUZAT, TECHNICAL EDITOR

Here It Is

RADIO TOPICS has received so many requests for information regarding wave-traps, how to build them and their value, that we have had our Technical Editor prepare this article which covers the matter thoroughly.

WITH the increasing number of broadcasting stations and the increasing length of their programs, interference has become a very difficult problem to solve. Cities like New York or Chicago each have half a dozen stations broadcasting every day. The radio fan who lives in a big city where one or more broadcasting stations are operating and who is using an ordinary set finds that he has trouble in hearing distant stations because of the local interference. If he lives close to a station, he

may not even be able to listen to another station in the same city.

The object of the wave-trap is to eliminate the interfering signal. The wave-trap consists merely of a coil and a variable condenser in parallel with it. The condenser affords a means of varying the wavelength of the trap.

The trap may be used in two different ways:

How to Connect

In Fig. 1a, the trap is connected in series with the receiving set in the antenna circuit. The signals received by the antenna must go through the wave-trap before reaching the set. The wave-trap consisting of a coil and capacity in parallel with it is an oscillating circuit, and it has a definite wavelength for each particular value of the variable condenser.

For currents having the same wavelength as the wave-trap, the resistance of the wave-trap is very high. The currents are thus prevented from going through it and

do not reach the set. For the other currents of different wavelengths the resistance offered by the wave-trap is much smaller and they flow easily through it to the set. The trap may also be connected as per Fig. 1b.

In Fig. 2 is shown a different hook-up of the wave-trap.

In this case the wave-trap offers a low resistance to signals having same wavelength as the trap; these go to the ground. The other signals go through the set.

Such a wave-trap can be obtained at most dealers, but it is very easy to build. The coil may be a 50-turn honeycomb coil or you may wind fifty turns of No. 22 or No. 24 double cotton covered wire on a three-inch diameter tube of fiber or cardboard.

To prevent moisture absorption and hold the turns together, use a very thin coat of shellac, or better, use collodion.

An ordinary condenser can be bought of any dealer. It will be

best to choose one of the "low loss" type. The rotating plates must not be too thin and a flexible connection is preferable to the spring rubbing contact too common on cheap condensers. A vernier condenser is not essential but if one is used, the geared type is the best. Make the unit as compact as possible; have the coil and condenser close to each other, which can be obtained by fastening the coil to the condenser.

Tuning the Trap

The tuning is done in the following manner for Fig. 1 hook-up:

It is advisable to use across the wave-trap a switch enabling to short circuit it. This switch being in, you tune to your favorite program. If there is interference, you open the switch and turn slowly the wave-trap condenser till the interfering station is weeded out or so weakened that it will not interfere any more. Then you will have to slightly re-tune your set.

In the case of Fig. 2, you listen in, the wave-trap being disconnected. If there is interference you connect it and tune out the station with the condenser.

This type of trap is effective in most cases. However, for the more exacting fan, the following type will be of interest. This improved trap is a "compound" one. Due to the loose coupling possible, it has less effect on the tuning of the receiving set and better volume of the desired station is obtained. The type described above can readily be changed to the new one. The tube should be provided with four terminals and two mounting screw holes. The terminals are situated 1/4-inch from the edge, and as shown on Fig. 3. Ordinary switch points will make good terminals, being clamped to the form with hexagonal brass nuts. Small holes should be drilled near the terminals in order to pass the wire. The fifty turns are wound starting at terminal 1 and ending at terminal 2; both ends are soldered to the terminals. This winding is insulated with a strip of umpire cloth of the proper width, held in place with glue. Then, starting at terminal 3, and in the same direction are wound nine turns of No. 18 D. C. wire so that this sec-

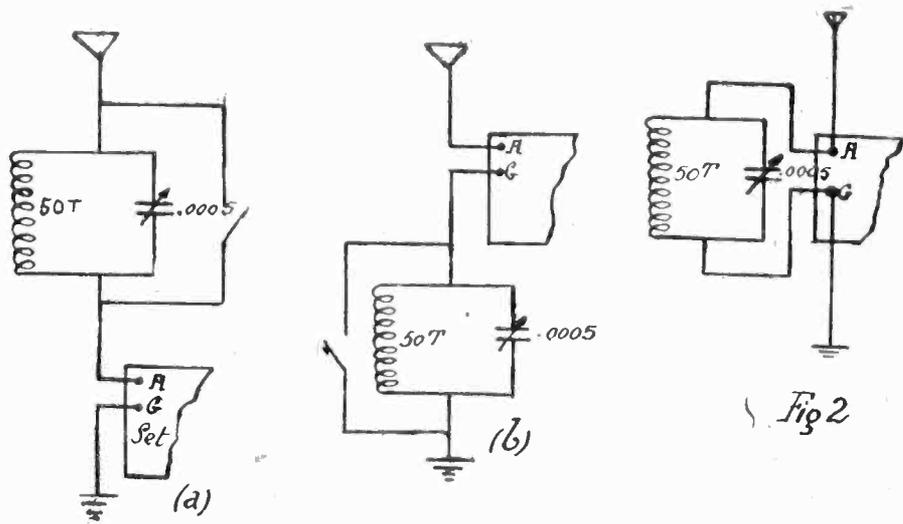


Fig 1-a & b -

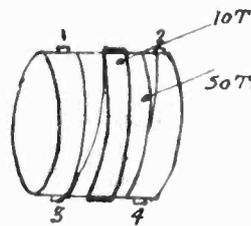
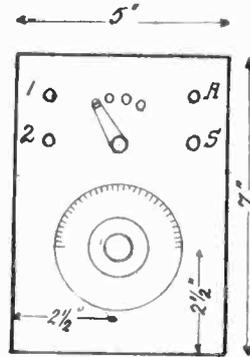
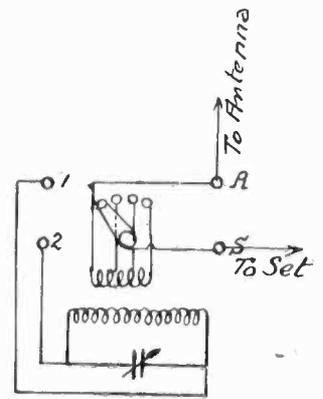


Fig 3 -



Wave Trap Panel
Front-View
-Scale 1/8



Diag 4

A Workable Wave-trap Showing Hook-up, Panel Lay-out, etc.

ond layer is in the middle of the first winding. Loops should be made at turn 3 and turn 6, where taps will be made. Terminate at 4. The condenser is mounted on the condenser, using small brass angles.

Wiring Isn't Difficult

The wiring should be done in the following manner: Referring to the front view of the panel and to diagram 1, terminals 1 and 2 on the coil are connected to the condenser and to the corresponding terminals on the panel.

Terminal 3 is connected to the first switch point from the left, turn 3 to the second, turn 6 to the third and terminal 4 to the fourth. Terminal A is connected to the switch and terminal S to the fourth switch point.

A panel 5 inches by 7 inches, with a cabinet 6 inches deep will be found practical.

The tuning is done in the following manner: Connect binding

post A to the antenna, binding post S to the antenna post on your set. Turn the switch to the left on the first switch point; the trap is cut out. Should interference occur, turn the switch completely to the right, thus inserting the 9 turns in the antenna circuit of your set. Turn very slowly the condenser until the interfering station disappears. This will occur for a range of one or two divisions of the condenser scale; so turn the knob very slowly.

If you use a vernier condenser the vernier adjustment will enable you to tune out more sharply the interference. The switch should then be moved to the left so as to use the least number of turns possible, readjusting the trap with the vernier if necessary.

One Signal at a Time

It is obvious that this trap can be used also as the first type described by connecting the antenna

(Continued on page 22)

CORRESPONDENCE WITH THE INSTITUTE

THIS department is conducted by C. R. Bluzat, Technical Editor, RADIO TOPICS. Any inquiries addressed to him will be answered promptly, provided stamped and self-addressed envelope is enclosed with inquiry.

Please make your questions as concise or brief as possible.

This is your department. Use it freely.

TECHNICAL EDITOR, RADIO TOPICS,
1114 North Boulevard, Oak Park, Ill.

TECHNICAL EDITOR, RADIO TOPICS:

In accordance with your very kind offer to help the fans in their radio difficulties, please give me the "low down" on the following:

I have a home-made two-stage audio-frequency amplifier which works perfectly on the first stage but very frequently howls and squeals with great intensity on the second stage. This howling can be stopped by putting my finger on the headset terminal. This does not always take place, as some times the amplifier works well. Both transformers are shielded and placed about eight inches apart. The tubes are about six inches on centers and the circuit is the one recommended by the Radio Corporation of America in their catalogue.

The tubes are UV 201A and the transformers All-American. I shall be greatly obliged to you for any information that you can afford me on this difficulty. I might say that I tried grounding the cores of the transformers, but with negative results. H. A. L., 5325 Indiana Avenue, Chicago, Illinois.

Answer: In answer to your query, we advise you to look first for a loose, or poor connection on the second stage (jack contacts especially). Next see if grid and plate leads do not run parallel to each other. Separate them as much as possible. Last try reversing connections on secondary or primary of first transformer.

Late in December last some gentlemen became interested in me and during one of their visits interested me in Radio. I am an unfortunate, penned up or house-ridden cripple, and my wife, perforce of circumstances, has taken the load of providing for two children and myself. On the 5th of January my new friends presented me with a 3-tube Ultra-Audion radio, and with it I have been entertained greatly, and my long winter evenings have been shortened by this new addition to our home and the entertainment much appreciated indeed.

Yes, since the "Oak Leaves Station" came on the "air" I've listened in every evening and must congratulate you upon the excellence of your programs and wish you the success you wish yourselves in your broadcasting.

The other night I heard you offer to give advice to those who required same if their radios were refractory.

I have a few questions I would like you to answer if you can give me the desired information.

What length of antenna should I have, and what length of lead in?

I live in a rear cottage and the antenna is on top of the front two-flat building. We think we have about 150 feet of antenna and about 55 feet of lead-in. The antenna is about 6 feet above the other houses.

The antenna is joined, two pieces. Should it be soldered at the joint? And should the lead also be soldered on to the antenna? As at present the joint in the antenna is only wound around, or the strands plaited together, and the lead-in is only wound around the antenna. The above may be the seat of my trouble.

We experience such a lot of wheezing, sizzling or frying, we would be delighted to eliminate same. We have a "Bradleystat" on the first tube, still we are unable to tune out KYW and WMAQ, etc., when we want to listen to Oak Leaves station. Why is this? Our tubes are WD 12. Are they O. K.? The hook-up is "Casey's." Another big trouble with us is the number of dry batteries we eat up. We run through two 1½-volt dry cells in three days, which we consider excessive. Do you agree with us in this? We were led to believe that two 1½ dry cells would last 2½ to 3 weeks. I have tuned in on WGY, WHAV, WOS, WOAW, KDKA and others with but indifferent success, the volume being anything but satisfactory, sometimes being scarcely audible. I suppose that most people experience this, but should we expect this with a 3-tube set?

I am the crudest of amateurs, having no electrical knowledge whatsoever, therefore feel that I am heavily handicapped in writing you even a crude description of the lay-out, and of course being a house-ridden cripple, am unable to get about to ferret out the necessary information.

Again, I hate to trouble the gentlemen who gave me the set, as they are very busy teachers and use up all their spare time in study.

Now the set gives every satisfaction with KYW and with other local stations when KYW is silent, but the tuning in, when they are on the air, and keeping a station is very difficult and the results

bad. And, outside stations are impossible for the last three weeks, again the number of batteries used in keeping the tube lights going is really beyond my finances and possibly I shall have to revert to a crystal set, for I now could hardly do without a set.

Now I hope that I have made myself understood, but, if not, I would so much appreciate a call if you happened to be driving downtown some day and had a few minutes to spare to run in and look it over, at No. 4118 (rear cottage) Gladys avenue, one short block south of Jackson boulevard. Of course this is a monstrous proposition and is only suggested in the event you have the spare time and that you wouldn't be inconvenienced.

If you can be of any assistance, I would greatly esteem your efforts.—F. D., 4118 Gladys avenue, Chicago.

In answer to your query, apparently your antenna is too long. The best is a one wire aerial of 80 to 100 feet with a 20 to 30 foot lead-in. The lead-in should be not only wound around, but soldered to the antenna. The lead-in must be an insulated wire.

This shorter antenna will help you to tune out KYW and listen to WTAY. Your tubes are O. K. Your consumption of dry cells is excessive. I understand that you operate three tubes with only two dry cell batteries. This is a bad practice. For economy, use at least a separate battery for each tube or three cells in parallel for your three tubes, I say at least, because the life of your batteries will be increased 30% if you use two batteries per tube (or six in parallel for your three tubes) that is, instead of say 30 hours with one battery per tube, you will have not 60 hours with two, but approximately 80 hours.

You should see that no connection is loose in your set. Also check your "B" batteries; they may be the cause of all the frying and of the poor reception.

TECHNICAL EDITOR:

I want to rewire my set which was built about 1½ years ago, using the regenerative hook-up at that time.

1 37 Plate Condenser.

1 10 pt. Varicoupler.

2 Variometers.

3 W. D. tubes.

If there is a hook-up that you could recommend that is better than the one I have I would appreciate very much to get it.—C. L. P., 29 A. East Ga. Ave., Atlanta, Ga.

Answer: In answer to your query, the regenerative hook-up you are using is the best you can build with the named parts. It may be beneficial to see if all connections are good and resolder any doubtful one.

RADIO TOPICS INSTITUTE

Would you kindly refer to Circuit No. 224 at page 260 of Henley's 222 Circuit. Designs, and advise the method of making a resonance wave coil that is mentioned in this particular circuit. If you could secure the parts for me at Oak Park, that is, the tube wire and slider, and advise me of the cost, I would be pleased to remit upon receipt of the amount.

Will this circuit work with any re-

generative receiver, so as to eliminate static?—H. L.

Answer: In answer to your query, the resonance coil you mention will have to be made an order and will have to be long in order to be efficient; we do not think this coil would give much better results than a good wave trap for eliminating interference.

We suggest, if you want that coil built, that you write to Chicago Salvage Stores, 509 S. State St., Chicago., referring them to the circuit and telling them what frequencies you want to receive.

Static can be most effectively reduced by using short antennae radio amplification and very loosely coupled circuits.

RADIO TOPICS INSTITUTE:

Referring to "Radio Topics" issue of January, 1924, Page 19, wherein you urge the purchase of only such radio apparatus as carry your stamp of inspection and approval, and requesting inquiries as to merits of radio parts.

My attention has been called lately to the "Sun Coil" and I have been considering the purchase of one. However, would appreciate your advice as to its merits.—W. F. K., Pittsburg, Pa.

Answering your query of March 7th, the "Sun Coil" is a unit carefully balanced in the laboratory and very satisfactory results can be obtained from a "Sun Circuit" set.

Taking advantage of your kind offer as broadcast at 8:30 tonight (Friday 3-7) to answer questions about anything in radio which troubled your listeners in. For the love of Mike tell me what wave length you use. I find your station listed as 226, 263 and 447.5 and get about 285 meters.—W. J. Parkes, Pine Bluff, Ark.

Answer: In answer to your card we will state that the wave length of WTAY is 278 meters.

TECHNICAL EDITOR:

I am taking advantage of your offer. I have a one tube Erla Reflex Set, but I am having quite a lot of trouble with the Erla crystal. I have tried six of them, but am unable to get satisfactory results. Is it possible for me to use a tube instead of the crystal? If so, please mark on the enclosed diagram where I shall connect the grid and plate terminals.—J. O. B.

Answer: In answer to your query, it is possible for you to use a tube instead of a crystal. In all reflex circuits the crystal rectifier is to be preferred to a tube which has a tendency to oscillate and so cause howling.

I advise that you use an adjustable crystal such as Dutec or R. & W. or a Diode tube which is a two electrode tube and is not subject to oscillate. The Diode tube should be connected as per sketch.

EDITOR, RADIO TOPICS:

Reading in your February issue a request signed "L. A.", a Cincinnati man, about his W. F. Kuster dry cell hook-up he built, but he could only get local messages.

I built one and can get almost any distant station, but the only thing bothering me is the whistles and noise, some nights more so than others.

I wish you would let me know what to do to overcome this trouble.—W. U., Cincinnati, Ohio.

In answer to your query, the whistles you hear may originate in your set if you use too much regeneration. This can be eliminated by proper adjustment of your tickler coil. They also may come from other fans turning recklessly their tickler coils, and it is only by teaching them how to tune that the trouble can be eliminated.

As you do not state the exact nature of the noise I can only make a guess at it: they most likely are due to discharged batteries.

Battery Man Gives Interesting Talk

THE address by A. J. Helfrecht of the Engineering Department of the Burgess Battery Company, was undoubtedly the most important event in the monthly program of the Milwaukee Radio Amateurs' Club, Inc.

Mr. Helfrecht spoke on the operating characteristics of dry cell radio batteries, illustrating his talk with charts showing the curves of the different types of batteries under varying conditions. The many sample batteries which he brought with him he donated to the club, and a live auction was held, with Fred W. Catel, 9DTK, officiating as auctioneer. The proceeds from this sale were divided between the club treasury and the fund of the campaign to elect Clarence W. Crapo, 9VD, to the office of Central Division director of the American Radio Relay League.

An important change was made in the personnel of the club's officers when Fred W. Catel, 9DTK, was elected secretary to replace Charles S. Polacheck, who has assumed the chairmanship of the publicity committee.

Features of other meetings included a talk by Justin W. Blauert, 9ELV, on Racine amateur stations, which he saw on a recent visit to that city, and on the improvements which he helped the owners of these stations to carry out. Marian F. Szukalski, Jr., 9AAP, city manager for Milwaukee, also gave a talk on the construction and principles of the

various types of electrical measuring instruments.

The club has been contemplating publishing an official organ, and a committee has been appointed to investigate the feasibility of this project. Another matter which has been taken under advisement is the probability of holding a Wisconsin State A. R. R. L. convention here early in the fall.

French Scientists Coming Here

NEGOTIATIONS are under way to have General Jouaust and Major Mesny, the eminent radio experts of the French Military Wireless Laboratory of Paris, to stage a series of demonstrations of their new invention, yet unnamed, with which they recently succeeded in transforming light waves from the star Capella into audible sounds, during the First International Radio Exposition at Madison Square Garden, New York, next September.

If manager James F. Kerr's offer of today meets with the approval of the noted French scientists he will establish a fully equipped, high powered testing station in the tower of Madison Square Garden for their exclusive use and he will also arrange for a committee of famous European and American wireless engineers to assist them, if necessary.

PRACTICAL WAVE-TRAP

(Continued from page 20)

to binding post 1 and the antenna post of the set to binding post 2.

Only signals of one wavelength can be eliminated at a time. If you have interference from two stations of different wavelengths you may eliminate one as explained and the second one by adding another trap in series with the first.

We advise readers to build this last type of wavetrap, and try the different ways of connecting it to the set and the antenna. The careful builder will find his efforts well rewarded and he will enjoy thoroughly the radio programs.

Saving Micro-Watts Aim of Radio Men

ONE of the indications of the progress of the radio art is the increased attention which is being paid to the design of the individual parts which are used in radio receiving sets. Until quite recently most of this care was focused on the design of the coils and condensers alone. However, it is now realized that there are mile-wasting losses in poorly designed tube bases, tube sockets and other parts, as well.

A modern fairly efficient radio receiver will receive signals which have as low a pressure as .001 volts. Even in a very good antenna this will not produce an energy of more than .0000001 watts. It is hard to imagine such a small quantity of energy, but forty million receiving sets would produce just about power enough to light one ordinary 40 watt tungsten light.

The oldest manufacturer of vacuum tubes has recently greatly improved his product by eliminating the traditional metal shell which surrounds the base of the tube. This change reduces the internal capacity of the tube and at the same time eliminates the losses from eddy currents in the metal shell itself. While the saving of power thus accomplished is quite small when expressed in figures, it becomes of importance when compared with the minute currents received on the antenna.

Importance of Tube Socket

Second only in importance to the vacuum tube itself is the tube socket, for all the energy must pass thru the socket before it reaches the tube. Indications are that the metal shell socket will soon become obsolete as the single slide tuning coil. The best radio engineering practice of today calls for the elimination of as much material as possible in the neighborhood of the parts of the

radio set which carry the radio frequency current. This applies not only to metallic substances, but to insulating materials as well. The socket of the future will undoubtedly consist merely of a comparatively thin shell of some high grade insulating material, and a base only sufficiently large to accommodate the necessary contact springs and connecting posts.

Some manufacturers are already marketing sockets of this type. The necessary strength and durability is being secured by the use of Bakelite or similar material of uniform cross-section which assures thorough curing of the material, giving it the highest possible di-electric properties, as well as making it mechanically strong.

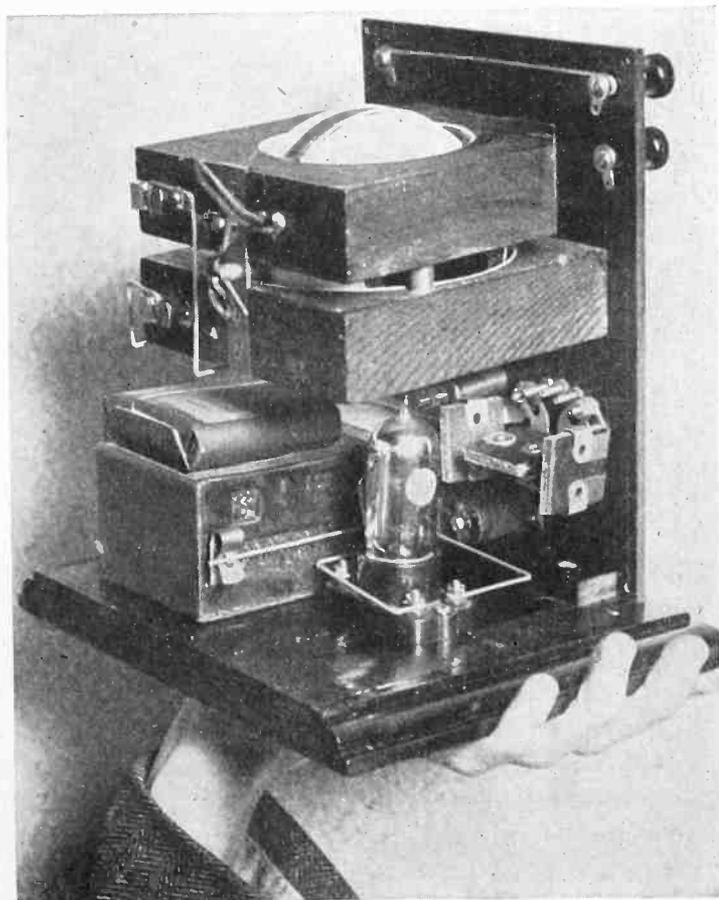
A further interesting fact that has been developed through research conducted by one of the largest battery manufacturers, is, that the "hissing" and "frying" noises often attributed to B batteries are in reality caused by poor connections, usually between tube terminals and the socket contacts. Their research shows that there are no noisy B batteries.

Watch the Connections

To prevent such noises and the shortening of many otherwise good concerts there are manufacturers who have not only provided sockets with the high insulating properties but have devised contacts that are of a wiping nature with dependable ten-

sion for each and every type of tube. In certain instances they have also provided dual wipe contacts on both ends and sides of the tube terminals, eliminating all possibility of trouble from this score.

It is interesting to realize that only a few years ago we were thrilled at the thought of receiving broadcasting at distances of a few hundred miles, while today coast to coast reception is by no means uncommon. While a large part of this progress has no doubt been due to new circuits and to the refinement of old ones, we must not forget to give due credit to the radio engineer who has been silently but busily engaged in saving the micro-micro watts which add the mileage to our receiving sets.



MINIATURE SET THAT OPERATES WITHOUT AERIAL

This radio set was built by Raymond Chassevent, a Bronx, New York, amateur. It uses but one dry cell vacuum tube and novel hook-up. It will receive, using ground only, and is made with a variometer and several fixed condensers, these taking the place of variable condensers. Taps are used to cut in and out the various condensers for various wavelengths. (Photo by Kadel & Herbert.)

Radio in Grand Canyon

AS A first step in the harnessing of the Colorado River for the use of man, the Geological Survey has been making a detailed survey of its 1,400-mile course through seven states. The roughest and most dangerous 300 miles of the river, including the Grand Canyon, was left until the last.

Starting from Lees Ferry, Arizona, on August 1, 1923, our little party of ten men fought its way in four wooden boats through rapid after rapid in Marble and Grand Canyons, and, after three months of hardships and thrills, reached its destination at Needles, Calif. Time and time again the boats were swamped and on two occasions were overturned, not to mention several attempts on the part of the boats to knock the rocks out of the channel.

Arrangements had been made with the Los Angeles Times Station KHJ to broadcast, each night at 9 o'clock, items of especial interest to the party. John Daggett, the radio manager, better known as "Uncle John," entered into the spirit of the venture with zest and on many a dark night the little party was cheered by hearing his jovial voice in greeting or message for our especial benefit.

At Lees Ferry, near the Utah-Arizona line, Station KHJ came in clear and strong in spite of static interference caused by the mid-summer thunder storms. We also heard stations in Phoenix, Salt Lake City, San Francisco, Denver, Colorado Springs, and on one occasion, Chicago.

* * *

Passing down the river the walls reared higher and higher until the narrow chasm was a mile deep, but still the radio waves reached the bottom, and nearly every night the radio apparatus was set up and not once did we fail to hear KHJ.

Besides hearing the news of President Harding's death, we were able to follow the course of the funeral train across the coun-

try, and when newspapers were brought in at the first supply point we read little of importance that we had not learned by radio. Important news items, weather reports, time signals, and baseball scores were received daily—so different than on similar expeditions in the old days.

The piling up on the rocks near Santa Barbara of a fleet of destroyers was a piece of news which came in one night after our little navy had suffered a somewhat similar, but not so disastrous, experience in the rock-strewn rapids. We knew of the Japanese earthquake and fire probably as soon as did most of you who are listening to me now.

Each night during the World Series there was a scramble for bleacher seats around the radio set and again we had reason to feel that "Uncle John" had a real interest in us, for, after giving the scores he would invariably say, "The boys in the Grand Canyon have not seen a paper tonight, so

let's spend a moment and give them a few of the details." Then followed briefly an account of the game.

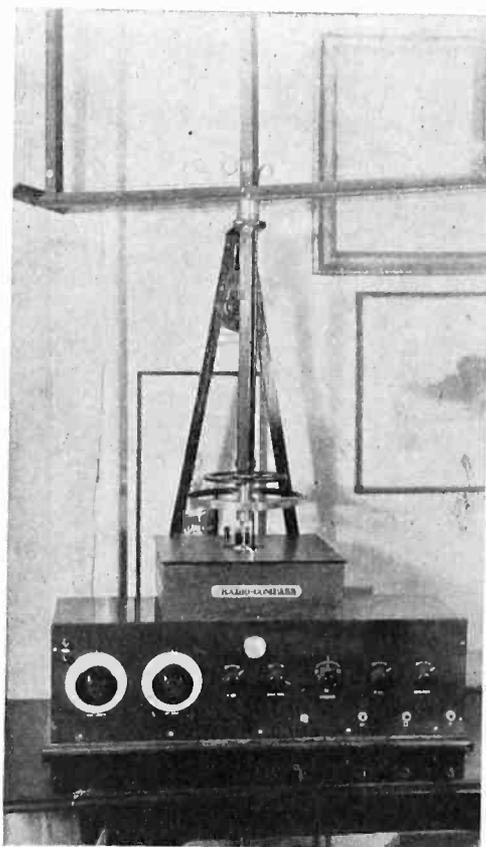
Once only did the radio fail us—and then it was not the fault of the radio but the result of a hitch in our supply arrangements. At Havasu Creek, one of our supply points on the west edge of the Grand Canyon National Park, the packers failed to bring fresh batteries and the intense heat in the Canyon had about ruined those then in use. So we sent the set out to be overhauled and brought in at Diamond Creek, the next supply point 60 miles below. A few days later the river went on a rampage and rose 21 feet overnight. Flood warnings were broadcast to us for three days before the rise, but they were sent in vain, and we were caught at sun down in a treacherous place.

So we proved that radio reception in a deep canyon is not only probable but highly successful, and I can assure you that no single item of our equipment gave more satisfaction or pleasure than our little 20 pound radio box. Men in out-of-the-way places need no longer be out of touch with civilization and as equipment and methods are improved even closer contact will be possible and it is not too much to expect that light, portable sending apparatus will soon be available so messages can be sent as well as received.

Independent Concern Gets Tubes

ON THE heels of the statement by the Radio Corporation of America that it is doing everything in its power to alleviate the tube shortage, comes the announcement that vacuum tubes will be supplied by the corporation direct to the Freed-Eise-mann Radio corporation, a so-called "independent concern."

This is said to be the first time the Radio corporation has entered into an agreement to supply an "independent" with tubes for its output of radio sets.



A radio compass carrying a 4-foot loop which is used to operate an 8-tube super-heterodyne, constructed by Gustave W. Cook, Philadelphia. He has a graduated scale, mounted at the base, above which are two pointers, one in the plane and the other at right angles to the loop and revolving with it. The contacts are of the phone plug type.

Radio Relayed to Six Stations

NOVEL EXPERIMENT OF SIMULTANEOUS BROADCASTING OF PROGRAM BY STATIONS THOUSANDS OF MILES APART

ON Friday evening, March 7, the latest and greatest achievement of modern radio science was successfully demonstrated by an experiment of heretofore unheard-of proportions when five powerful broadcasting stations in the United States and one in England, linked only by the ethereal medium of radio, simultaneously broadcast the speeches and music at the Annual Alumni Dinner of Massachusetts Institute of technology given by the Technology Club of New York in the main ballroom of the Waldorf-Astoria Hotel in New York City. The test was effected through the co-operation of the Radio Corporation of America, the Westinghouse Company and the General Electric Company.

The novel technical operations necessary for the success of the event embodied the use of the new short meter wave relay transmitter and receiver, and the proof of their efficiency opens new and boundless vistas to the radio public. In detail, the simultaneous broadcasting was accomplished in the following manner:

Station WJZ of the Radio Corporation of America in New York City had its microphones installed upon the speakers' table and beside the musicians' rostrum in the main ballroom of the Waldorf-Astoria, and carried the program from there to its control room at Broadcast Central by direct wire. Station WJZ broadcast the pro-

gram on its usual wave length of 455 meters, while a tap-off wire from the amplifier panel in the control room carried the speeches and music to Station WGY of the General Electric Company in Schenectady.

From that wire the program was sent out from WGY by two different transmitters, one on the customary wavelength of 380 meters and by the other, a specially designed short wave transmitter, on a wavelength of 105 meters. This 105 meter signal, inaudible to the ordinary listener-in, acted as a carrier wave, being received on a special receiving set at Station KDKA of the Westinghouse Company in Pittsburgh. From that receiving set the program was again transferred to two separate transmitters, one broadcasting on KDKA's usual wave of 326 meters for listener-in reception, the other sending on a 94 meter wavelength. This 94 meter wave served as carrier in similar fashion as did the 105 meter radio link between WGY and KDKA, but linked KDKA with Stations KFKX in Hastings, Neb., and 2AC in Manchester, England. Station KFKX also served as a radio relay station, sending the speeches on a 104 meter wave to Station KGO in Oakland, California, which latter station re-broadcast the received signals for local reception on the west coast.

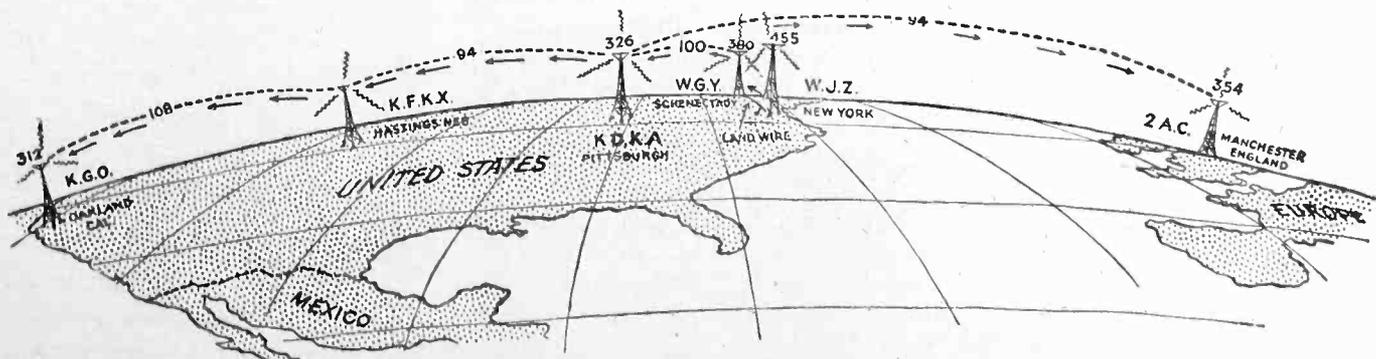
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The accompanying illustration shows pictorially just what paths

the radio waves followed in their leaps from station to station. The speed with which the radio waves travel is so terrific that 2AC was broadcasting the same sounds as KGO at practically the same instant, there being an inappreciable time loss in the jump from the Waldorf to Manchester or to Oakland.

Because of some difficulty in perfecting relay transmission at one link of the chain, no advance notification of the experiment was given the listener-in, although telephonic, telegraphic and radiogram communication was arranged between the Waldorf-Astoria and the various stations which were to rebroadcast the program in order that early reports as to the success of the transmission could be secured. Consequently listeners-in from England to California were amazed to hear the announcement that "This program is being broadcast by Stations WJZ, New York City; WGY in Schenectady, KDKA in Pittsburgh, KFKX in Hastings, Neb., and KGO, Oakland, Calif.

Almost immediately upon the conclusion of Ralph Howes' opening address telegrams of congratulation commenced pouring in to the Waldorf-Astoria Hotel and continued to arrive from increasing distances until the conclusion of the program at 12:15 Eastern Standard time. At 11:22 p. m. eastern standard time the first report of reception by Station



This shows how six stations were linked by short waves for the purpose of re-broadcasting the same program

Tridyn 3-R-3 Newest Crosley Set

2AC in England was telephoned from the radiogram office. At 12:15 a. m. eastern standard time a telegram from Mr. Sadenwater, engineer-in-charge of Station KGO in California, stated that the signals had been received and rebroadcast. These latter messages definitely placed the stamp of success upon the experiment, for two stations over seven thousand miles apart had inconceivably received and been able to rebroadcast the same program without the use of any material connection.

The full value of the experiment lies in the fact that the listener-in on a small set in Southern California or Northern Washington, who ordinarily receives little else but KGO—the families in the Southwest to whom KFKX is the clearest station—those in the Mississippi Valley whose sets will not receive east of KDKA, and those in Northern Maine and Canada to whom WGY is the "Distant Station"—could listen in to the program at the Waldorf-Astoria Hotel with as much ease and clearness as did the New Yorkers and New Englanders to whom WJZ is a next door neighbor. To link up six broadcast stations, to blanket the country so that anybody, anywhere, with an ordinary receiving set could hear the one program, all without the use of wire or other material connections, constitutes the most magnificent example of radio's advance and of its practicability that has yet been shown.

Sun Corporation Sued

Suit has been filed in the Circuit court by Capt. Anatole Gollos against the Sun Radio corporation, Attorney P. J. Tuohy, representing Capt. Gollos, stated his client is suing the Sun Radio corporation for dissolution of the corporation and also asking an accounting. The suit also involves rights to patents on inventions made by Capt. Gollos.

British Like Radio

Enthusiasm for radio continues to grow throughout Great Britain, according to Acting Commercial Attache Hugh A. Butler. Up to March 1, 1924, over 600,000 licenses for receiving sets had been issued.

THE rapidly increasing popularity of tuned radio frequency in receiving sets is clearly indicative of its extreme efficiency. The Crosley Radio Corporation has used tuned radio frequency for the last two years, notwithstanding the great amount of publicity already given to tuned radio frequency of the transformer type. It is gratifying to Powel Crosley, Jr., president of the corporation, to know that so many large and influential manufacturers are turning to tuned radio frequency amplification in the design of the new receivers.

The newest addition to the Crosley line is the Tridyn 3-R-3, announced on the third anniversary of the corporation. The Tridyn, having passed through a thorough test from every angle and after practical use by people in various parts of the United States, was deemed ready to distribute to the public. Laboratory tests are not always as practical as those given a receiver under the different circumstances encountered in actual operation and the reports received bore out the excellent tests of the designers. A year has been given to perfecting this receiver.

Four important principles are accomplished in receiver design in the Tridyn: tuned radio frequency amplification with the first tube; Armstrong regenerative detector action with the second tube; reflex amplification by employing the first, or radio tube as an audio amplifier and one-stage of audio frequency with the third tube. These factors combined in the particular arrangement of this receiver, give signal strength of a receiver utilizing five tubes.

Will Not Re-Radiate

The Tridyn will not re-radiate when receiving broadcasting stations' signals, due to the fact that the antenna is very loosely coupled to the secondary circuit and a non-oscillating radio-frequency amplifier is employed before the regenerative detector, as a barrier

to prevent oscillations generated by the detector upon reaching the antenna.

The primary or antenna circuit of this set is aperiodic or untuned, making it possible to calibrate the secondary circuit and the tuned radio frequency amplifier in terms of wavelength, thereby enabling the receiver to be accurately adjusted to the signals of any broadcasting station from a calibration table or curve sheet.

This arrangement greatly simplifies tuning, making it possible for the operator after having once located a given broadcasting station, to again return to it by adjusting the two tuning dials at the numbers previously logged. This makes it the ideal receiver.

Very Selective Receiver

The set is very selective because it employs tuned radio frequency, loose-coupled antenna and a tuned secondary. It is possible to receive the distant stations despite local interference. For example, in Cincinnati it is possible to tune in KDKA which is only 17 meters higher in wavelength than WLW, while the latter station is in operation.

The operation of the Tridyn is very simple and will give excellent results with any type of antenna, it is said. It operates satisfactorily with a small indoor antenna, which provides loudspeaker volume, even on long distance stations and good results have been obtained without using any antenna, using only a ground connection.

It requires a detector and two amplifier tubes of standard type and satisfactory results are obtained when dry cells are employed for lighting the filament, but the volume will be greater with 6-volt tubes. The amplifier circuit employs 90 volts of "B" battery, but will operate satisfactorily with 45 volts. A "C" battery may be employed if desired. The Tridyn is enclosed in a beautiful solid mahogany cabinet and a cabinet to match may be used for the dry cell batteries. It sells for \$65.



New and Novel Radio Patents

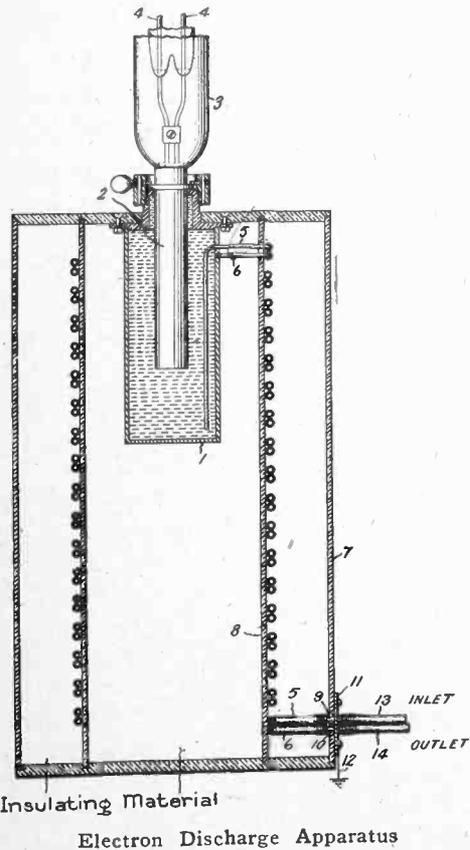


ELECTRONE-DISCHARGE DEVICE

(Patent No. 1,487,353, issued to Henry J. Nolte of Schenectady, N. Y., under date of March 18, 1924.)

This invention relates to electron discharge apparatus, and more particularly to means for evolving one of the electrodes of such apparatus.

As indicated in the drawing, the cooling apparatus comprises a container 1 for cooling liquid in which the metal portion 2 of the electron discharge device may be inserted; the portion 3 of the device which is outside of the container 1 is composed of glass or other vitreous material through which the leading-in conductors 4 for supplying current to the cathode may be sealed. Cool liquid is supplied to the container 1 by means of an inlet pipe 5 which discharges near the bottom of the container. The heated liquid in the container which rises toward the top is carried away through an outlet pipe 6. The inlet and outlet pipes 5 and 6 are made of insulating material and are of such length that the column of liquid therein, which may be ordinary tap water, will be of high enough resistance to furnish a good insulation between the container 1 and the apparatus by means of which the circulation of cooling liquid is



maintained. This is essential since in the operation of the electron discharge device the anode 2 may have impressed thereon a positive potential of several thousand volts with respect to the cathode which may be normally maintained at or near earth potential.

The container 1 is surrounded by a second container 7 and the pipes 5 and 6 are enclosed in this second container. They may conveniently be coiled around a cylinder 8 in case they are of rubber and in this way maintained in their proper position within the container 7. Two short lengths of metal pipes 7 and 10 are inserted in the wall of the container 7 and the inlet and outlet pipes 5 and 6 are connected to these short metal pipes. These metal pipes 9 and 10 pass through and make good contact with plate 11 which is grounded at 12. By means of the pipes 13 and 14 which are connected to the metal pipes 9 and 10, the cooling liquid may be supplied to the apparatus either by connecting the pipe 13 to a

water tap, and the pipe 14 to a drain, or by connecting these two pipes in a suitable manner to any apparatus whereby a cooling liquid may be continuously supplied through the pipes to the container 1. After the container 1 and the pipes connected thereto have been assembled in the container 7, the space within this container will preferably be filled with some readily fusible insulating material such, for example, as paraffin.

CRYSTAL DETECTOR

(Patent No. 1,485,524, issued to Hugo H. Pickron, Rock Island, Ill., under date of March 4, 1924.)

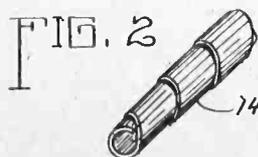
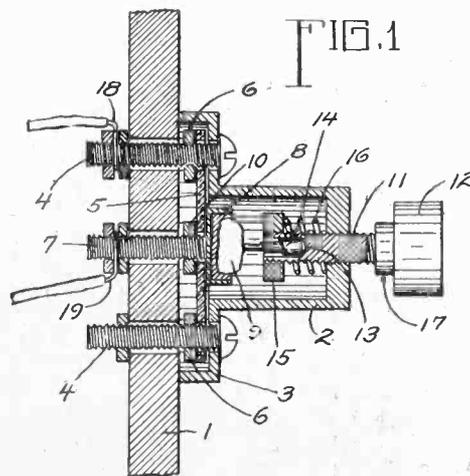
This invention has reference to a crystal detector for radio instruments, and aims to increase the efficiency of such devices, by improving the character of the engagement between the contact member and the mineral. It frequently happens that a deposit of dust or moisture on the crystal will interfere with the perfect operation thereof, especially in instruments wherein a single point of contact is depended upon. This part is rotatable, so that it can be manipulated to cut into any film or coating which may form on the face of the crystal. This part is also of a telescopic formation, so as to have a delicate yielding action under the control of adjustment features which are embodied in the device. By means of this adjustment feature the degree of contact can be quickly regulated, so as to conform to the amount of meter wave by which the instrument is affected.

Another purpose of the invention is to provide for a positive contact of the contacting element with the mineral, after the same has been properly adjusted, and to retain the same in such position so long as the same is suited to the meter waves passing through the same.

Fig. 1 shows the invention in vertical medial section.

Fig. 2 is a detail of the spring 14, in perspective.

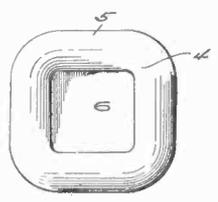
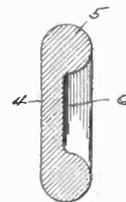
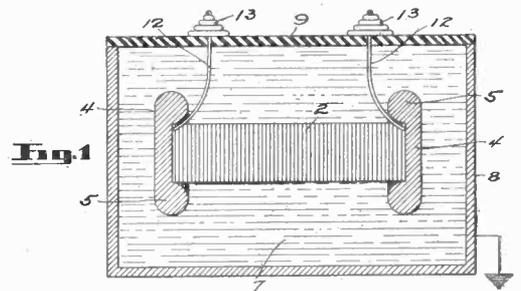
The reference numeral 1 indicates a section of a panel, or side of an instrument case, and 2 a cylindrical casing having an enlarged portion 3, which is attached to the panel 1 by means of bolts 4. Said bolts also pass through a strip 5 of fiber or similar non-conducting material, held in place in the part



Crystal Detector for Radio

2 by means of nuts 6. Passing through the strip 5 and panel 1 is a threaded stem 7, on the inner end of which, within the casing 2, is a crystal cup 8, within which is mounted a piece of mineral 9. The stem 7 is held in place by means of a nut 10, bearing against the strip 5.

When in use the stem 11 is positioned with the end of the spring 14 lightly in contact with the mineral, as shown in the drawings. If properly adjusted no change in the relative positions of the parts may be necessary for a long period of time, but at times a variation in the length of the meter waves passing through the instrument will call for a delicate adjustment of the spring 14, in order to get better results.



Electrical Condenser

AN ELECTRICAL CONDENSER

(Patent No. 1,487,096, issued to Leonard F. Fuller, Palo Alto, Calif., under date of March 18, 1924.)

The invention relates to electrical condensers for use in radio transmission systems.

An object of the invention is to provide means for increasing the voltage that a condenser will withstand.

Another object of the invention is to increase the corona voltage of a condenser.

Figure 1 is a vertical longitudinal section through a condenser constructed in accordance with my invention.

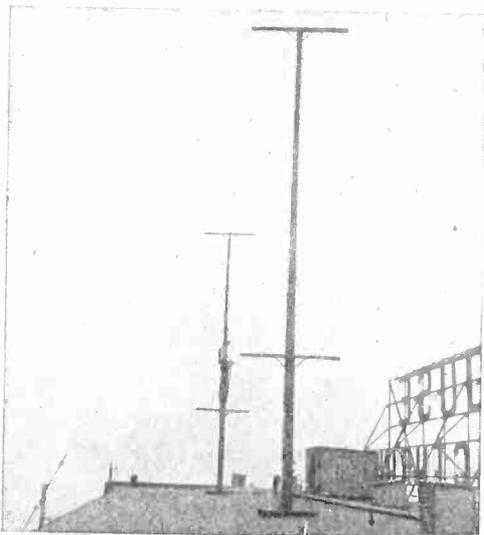
Fig. 2 is a vertical section through one of the flux distributing shields.

Fig. 3 is a front elevation of one of the shields.

The device of my invention comprises a condenser 2, formed of alternate layers of mica or other dielectric and metal foil, with sheets of metal foil at the ends of the series of layers. Arranged at the ends of the condenser and in contact with the end metallic layers and metallic flux distributing shields 4, preferably formed of brass or aluminum. The flux distributing shields are formed with curved surfaces of comparatively large radius, presenting no sharp edges which would encourage the production of corona. The shields are preferably formed with a large peripheral bead 5, of circular or substantially circular cross-section and within the body of the shield is depressed, forming a recess 6, in which the end of the condenser is disposed. The bead joins the body in smooth curves, thereby eliminating all sharp edges from the shield. The condenser plates themselves may be formed with rounded corners, instead of sharp corners, to further discourage the formation of corona.

Speech Travels Twice Across Continent

WHILE operating his receiving set almost in the shadow of the towers of WGY, Friday evening, March 7, A. Ford Williams of Scotia, N. Y., picked up KGO, the Oakland, California, station of General Electric Company while it was re-broadcasting the words of a



The antenna used on KDKA to send to Europe. It is 35 feet in length and radiates on 94 meters.

speech which, at practically the same fraction of a second, were being relayed by WGY.

This unusual reception achieve-

ment was recorded during the epochal experimental broadcast relay conducted in connection with the dinner of the alumni of the Massachusetts Institute of Technology at the Waldorf-Astoria, New York.

The General Electric Company stations, WGY and KGO, were the first and last links, respectively, in the transcontinental relay. WGY was connected to the amplifying apparatus of WJZ, the Radio Corporation station, which in turn, was directly connected to microphones in the banquet hall.

Signals were conveyed via wire to Schenectady, at which place WGY broadcast on 380 meters for radio listeners tuned in to the station wavelength and 105 meters to energize the next relay station, KDKA at East Pittsburgh. The Westinghouse station also broadcast on two wavelengths; that is, 326 meters and 94 meters, the low wave transmission for KFKX at Hastings, Neb., as well as 2AC in London, England. Hastings rebroadcast on 108 meters.

From 9 p. m. to 9:20, Pacific coast time, KGO at Oakland picked up and rebroadcast the proceedings of the banquet in New York. KGO, by using a super-sensitive receiver, picked up the signals from KDKA at East Pittsburgh. Mr. Williams, only a half mile away from the antenna of WGY, was listening in along the relay line, picking up station after station. Getting on 312 meters, he found KGO as the Pacific coast station was rebroadcasting the address of Gerard Swope, president of the General Electric Company.

Shortly after the address Mr. Williams tuned back and heard WJZ sign off for all the stations on the relay. Then he picked up WGY as the Schenectady station sang out "good night" and then KGO came in with its "good night."

Bureau of Standards Wavemeter

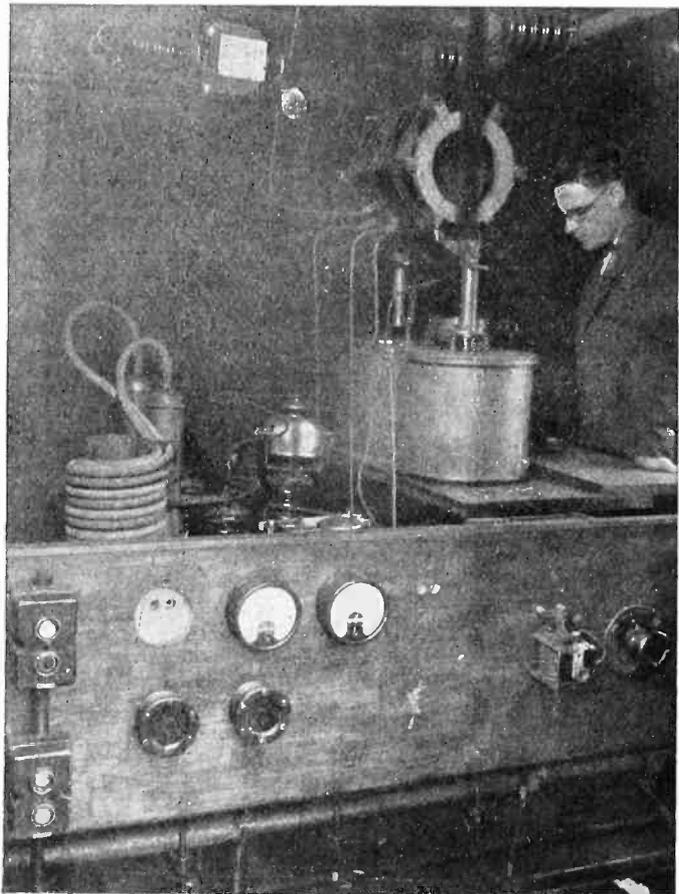
To serve as a standard of radio frequency, the Bureau of Standards has two especially constructed wavemeters covering the frequencies in more general use from 18 to 4,600 kilocycles per second (16,650 to 65 meters). These standard wavemeters are used in calibrating wavemeters belonging to the Radio Inspection Service, manufacturers, colleges or others in need of standards of frequency, in radio measurements and in adjusting the radio transmitting set which is used to transmit standard frequency signals.

Each standard wavemeter consists of a variable air condenser of special design, four fixed mica condensers, a number of interchangeable inductors or coils and a resonance indicating device. The majority of the inductors are wound with high frequency cable in a single layer upon a skeleton frame of laminated phenolic insulating material, sometimes called bakelite.

The wavemeter is tuned to a source of radio frequency currents by varying the air condenser and obtaining the maximum deflection of an indicating instrument which is connected to two turns of wire and loosely coupled to the inductor in the wavemeter circuit. Either of two indicating instruments may be used, a thermogalvanometer or a d. c. milliammeter and crystal detector. The d. c. milliammeter and crystal detector are used when more accurate indications are desired than are possible with the thermogalvanometer.

Radio Wanted in India

Catalogs and price lists for American receiving sets and parts for amateur assembling are wanted by radio enthusiasts in India. Firms interested are requested to send such literature to the American Trade Commissioner, James E. Miller, Esq., Room 29, Grosvenor House, 21 Old Court House, Street, Calcutta, India, who will be glad to make it available to those interested.



This is the 94 meter transmitter used at KDKA to send to Europe and to KFKX, the repeater station at Hastings, Neb.

Need of Government Radio Service

By GEORGE LEWIS

NO greater part has been played in the development of the radio art than that contributed by the National Bureau of Standards. Little do we appreciate the vast service being rendered by this institution. In all probabilities the term "Bureau of Standards" immediately suggests a department fitted to care for the checking of weights and measures; a building or laboratory, if you please, in which a yard stick can be checked, or the accuracy of a pair of scales determined.

The Bureau of Standards, a sub-department of the Department of Commerce, is a technical institution in which every phase of the scientific field is made the subject of the most advanced research. Here we find a staff of the most advanced scientists and engineers experimenting and rendering pronounced assistance in the development of all phases of the technical industry.

Radio is only a very small branch of this great institution. However, the development in radio coming from the hands of the Bureau of Standards is recognized in all parts of the world. The technical bulletins and the reports of researches are accepted by the scientists of every country as representing the most complete and advanced contributions to the art.

In addition to maintaining radio standards, such as high frequency standards of inductance, capacity and resistance, the Bureau publishes the methods of making all radio measurements, the degree of accuracy obtained, the instruments to employ, etc. Not only are the measurements confined to the more fundamentals of radio as might be expected from an ultra-scientific institution, but extremely valuable information is continually being prepared and circulated in an elementary and practical manner on such subjects as the most efficient construction of an antenna and ground, the construction of a sim-

ple receiving set, the method of determining the efficiency of receiving and amplifying apparatus, etc.

Information of this character is exceedingly valuable to the radio manufacturer and merchant. These studies have resulted in marked increases in the efficiency of American radio equipment as a whole, in other words, the American radio industry has reached its present unquestioned position as a leader of foreign radio apparatus solely through the untiring efforts of our government.

The Bureau of Standards, together with the Bureau of Navigation, represent our American Governmental radio service. To be sure, the War and Navy Departments contribute to the American scientific field, but the purely commercial assistance given to the radio industry comes only from either the Bureau of Standards or the Bureau of Navigation.

* * *

Do you realize that stations are being received practically free from interference from other transmitting stations? This condition is only possible through the efforts exerted by the Department of Commerce, wherein the Bureau of Standards has studied the possibilities and limitations of radio broadcasting, the improvement of transmitting and receiving apparatus, and laid the information before the American public without charge. Do you realize that the Bureau of Navigation has carefully inspected all stations to make sure that they are transmitting on the proper wave, that they have the proper equipment and arrangement of apparatus to transmit clear, undistorted signals for your receiver to pick up, and that their operators have been examined by the inspectors of this Bureau of Navigation, and unless they are found to be capable of operating the stations in a manner so that you will receive the maximum service from

these stations, they would not be awarded a license?

The Bureau of Navigation is the government radio police headquarters, from which radio police are stationed at nine different points of the United States, and commissioned to protect your radio interests—to see that you get the maximum service from American radio broadcasting stations, to see that the stations are prepared to render this service, to see that any station interfering with your reception is immediately corrected.

I would like to make a plea to you, that you will show some consideration for the government's efforts in this work by communicating with your congressman or senator, requesting that any movement tending to increase the appropriation of these departments be given his serious consideration. Do not give me your assurance of this assistance and neglect to help in your small way. If you intend to give me your assistance, communicate with Washington immediately, as there is a grave possibility that our radio service may be overlooked this coming year, which means that experts laboring in our laboratories, and inspectors caring for our transmitting stations both on shipboard and on shore must continue throughout a second year without sufficient assistance or recompense.

Radio Fees Increased

The Canadian Government Radio Service announces an increase in the fees payable for radio licenses. In future operators of amateur experimental stations will be called upon to pay \$2.50 instead of \$1 for their permits. Amateur broadcasting stations will pay \$10 instead of \$5 as formerly, and ship station licenses will cost \$10 instead of \$1. No change has been made in the fees for amateur receiving station permits, which continue to be issued for the nominal sum of \$1.

White Bill Can Prevent Radio Monopoly

By C. B. COOPER,

CHAIRMAN ON BROADCASTING CO-OPERATION, RADIO TRADE ASSOCIATION

THE radio world fears a monopoly of broadcasting and although assurances have come from the American Telephone and Telegraph Company that they do not intend to establish such a monopoly, radio broadcasting is too precious and important a thing to become the prey of a large corporation, should the opportunity present itself.

People commonly believe that the government controls the air, but it does not under the present law. The Department of Commerce has tried to control it and considering the tools of the law and money, they have been doing a mighty good job, but the art and business of radio has outgrown the present system and we require an up-to-date law and set of regulations.

The two laws governing radio in the United States have outgrown their usefulness, because neither deals specifically with the most important branch of radio and that is broadcasting. Neither gives the Secretary of Commerce the right to refuse licenses. If I wanted to, I could put in a station in New York, demand a license, put on a business, phonograph, or other kind of program for twenty-four hours a day. Under the present laws, I don't believe I could be stopped, as long as I attended to business and did not cause malicious interference.

On the other hand, there is nothing in the present laws to prevent a radio monopoly, and as long as we leave radio open to a possible monopoly, there will always be some person or group trying to do it. Right now, if the American Telephone and Telegraph Company succeeds in putting forward a license that stops at 500 watts and does not provide for the use of wires outside the studio, they have all stations "sewed up." In other words, no

other broadcasting stations will be able to relay programs. And by the exclusive use of high power, they could blanket every station in existence and lease outside wires only to their own stations.

Apparently some law must be passed to prevent such eventualities. There was a time when there were so few in radio that the public had to swallow many things, but today, with millions of persons and dollars interested, we have the power to control this new public utility.



(Top)—John Allen Goodrich, one of the operators of Station WLS, Sears-Roebuck Agricultural Foundation radio station, Chicago, formerly opened April 12. (Bottom)—Samuel R. Guard, director, and Edgar L. Bill, director of Foundation's radio station, arranging first program.

Some three years ago, Wallace H. White, Jr., congressman from Maine, wisely visioned the growth of radio and studied it with a view to preserving its usefulness to the people by a correct law. The present session of Congress is the third time that he has tried to pass this bill. Two years ago it died because of lack of interest; last year it passed the House, but died in the Senate because there was undoubtedly plenty of push against it because of its anti-monopoly clause.

The bill is up for consideration again. Now is the time to pass it. The Army and Navy have asked revisions. So have various private interests. But Congressman White is well versed in radio and its needs. Any amendments he accepts will not weaken the power with which it was originally blessed. But if careful amendments come into it, everybody interested in radio is duty-bound to oppose these amendments.

The White bill will give the Department of Commerce the power to police the air. It is our duty to see that this bill goes through. Every radio fan and radio business man should write individually to his congressman and senator to interest himself in this legislation and to help its passage.

Baby Audiophone Is the Latest

Another member of the Bristol family which is attracting considerable attention is the Baby Audiophone, which comes with a 15-inch bell metal horn and one with a fiber horn. It may be used on two or three stages of amplification and give excellent results, the manufacturers claim. In every way it is a high grade loudspeaker. They sell for \$15 and \$12.50, the latter being the price of the fiber horn.

Radio Employs Many People

RADIO, the newest industry and science, now claims the labor of 250,000 people and the leisure and rest of countless more. In the broadcasting branch of the science a new vocation has developed, that of the radio announcer.

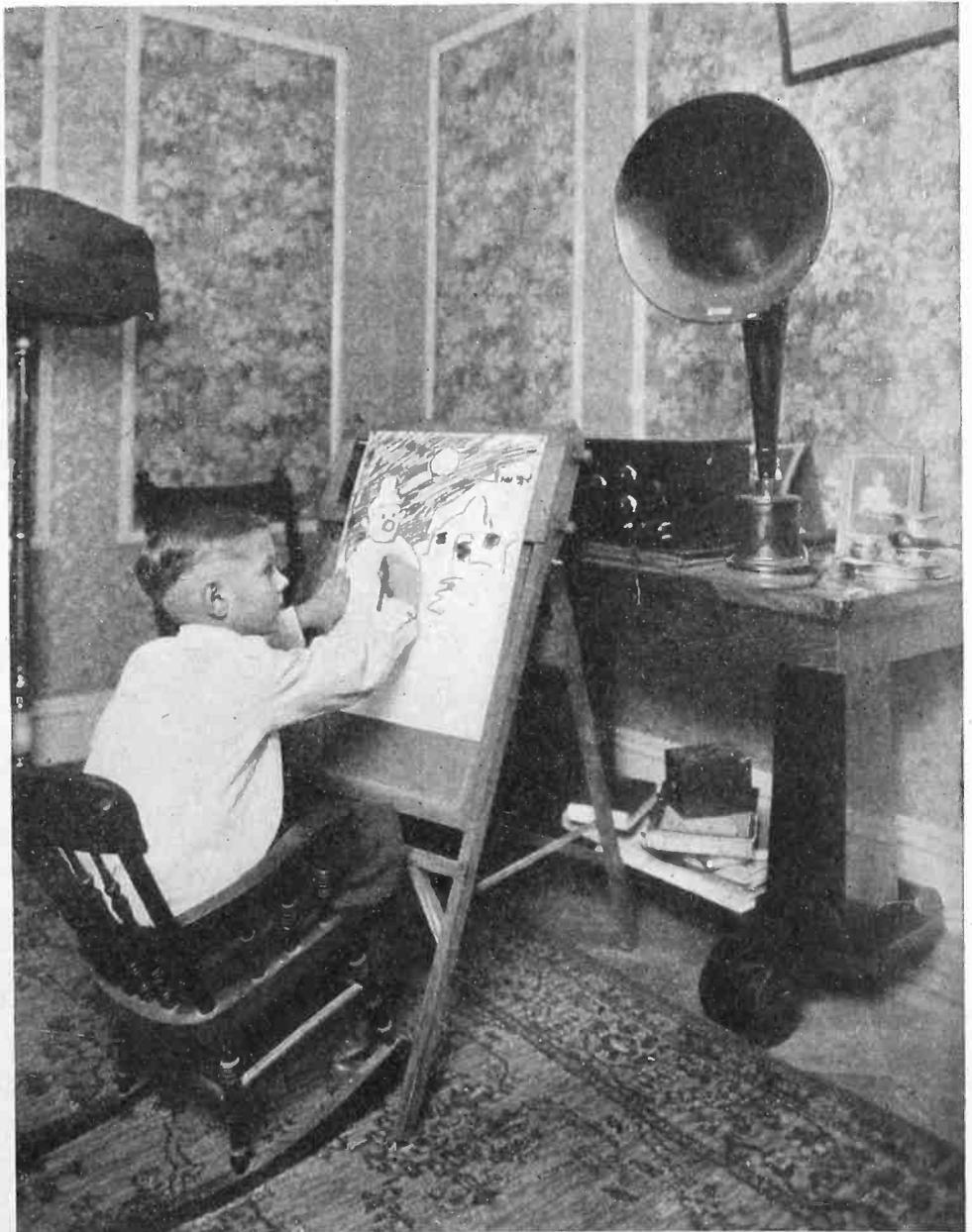
To be a successful announcer something more than a pleasing voice and clear enunciation are required. The ideal announcer is a musician with a knowledge of composers and their work; he should be a linguist familiar with French, Italian and German; he should be able in an emergency to make an announcement in English without confusion and free from grammatical errors. He must be tactful in receiving artists and instructing them in proper position before the microphone. Singers and speakers accustomed to public appearance very often develop microphone fright, not because the studio surroundings are overpowering, but because they miss the stimulating presence of an audience; it is difficult to visualize the vast radio audience, headphones on head or grouped about loud speakers.

The announcer's duties are not limited to his appearance before the microphone. At WGY, the popular station of the General Electric Company at Schenectady, rehearsals are conducted by one of the group of six announcers at WGY. By means of the try-out poor singers are saved the embarrassment of failure before the microphone. The rehearsal also serves to demonstrate that certain voices have not the quality for radio transmission. Sometimes the finished and successful singer is found to have a voice unsuited for radio transmission, and on the other hand, a singer whose voice is too weak for public hall or theater, sometimes possesses quality and tone which win in-

stantaneous popularity with the radio audience.

Four of the six announcers at WGY are vocal soloists and say, in the event of an emergency, such as the failure of scheduled artists to arrive, step before the microphone and give a creditable performance. Rolin Hager, the chief announcer, has been associated with WGY since the station opened. He is a trained musician, linguist and public speaker. When a boy he was soprano soloist in an Albany cathedral, and is now baritone soloist in a Schenectady church. Carl Jester is a tenor with a thorough musical education, and for the past year he has directed the WGY Light Opera Company in its various ap-

pearances. Asa O. Coggeshall, also a tenor, a third announcer, is director of a boy choir in an Amsterdam, N. Y. P., church. William Fay, the last to join the announcer force at WGY, is a baritone, and his voice has brought him many fan letters. The other announcers at Schenectady station are Robert Wiedaw, who gives much of his time to the executive work of the studio, and Edward H. Smith, who is director and leading man of the players, and assists in planning feature programs such as Uncle Josh's golden wedding and minstrel shows. An entire evening's program may be put on by the announcers without the aid of outside talent.



A youthful artist gaining his instructions over the radio. (Photo copyrighted by Western Electric Co.)

A New Loud Speaker

RADIO listeners who now demand not only volume and quality of tone, but pleasing appearance, will find in the new Western Electric No. 14-A Loud Speaking Telephone Outfit an efficient cabinet type of instrument that makes use of the latest developments in the electrical communication art. It is a combined loud speaking telephone and audio-frequency amplifier. This outfit, including the horn, is built into a mahogany cabinet of attractive design, which may be placed on a table.

The novel feature of this outfit is the horn, which, folded into a relatively small compass, has yet the properties of a straight horn almost twice as long as the cabinet is deep. Despite its small size, it is more effective even than the horn supplied with the 10-A and 10-D loud speaking telephone outfits. Connected to the horn is a loud speaking telephone similar to that used on many occasions to project the voices of speakers, notably at the inauguration of the late President Harding.

Two stages of audio-frequency amplification are provided, the last stage using two tubes connected in "push-pull." This arrangement gives the maximum output with practically no distortion of the quality of the transmission. Volume control is effected by turning a knob on the front of the cabinet; this varies the audio voltage to the

grid of the first tube. A snap-switch, also controlled from the front, turns on and off the filament current.

The outfit has been designed to operate with No. 216-A tubes, which are designed to work on a 6-volt storage battery. Plate current supply may be secured from any battery which will give 22 milliamperes at 120 to 135 volts. Six large size 22½ volt "B" batteries may be used, or a Western Electric No. 2-A Current Supply Set will furnish both filament and plate current.

Since this outfit can do no more than give an amplified reproduction of the output of a radio receiver, it is important that the latter be capable of giving an output of good quality and of sufficient volume to be satisfactory to a listener using a telephone head set. It should be remembered that this outfit is in no sense a radio receiver or tuning device.

Good Publicity for This Show

THE radio proved its case recently when the entire play of "Abie's Irish Rose," playing at the Studebaker Theater, Chicago, was broadcast from Westinghouse Station KYW, the box office receipts, according to Manager Frank A. Gazzolo, were doubled in forty-eight hours.

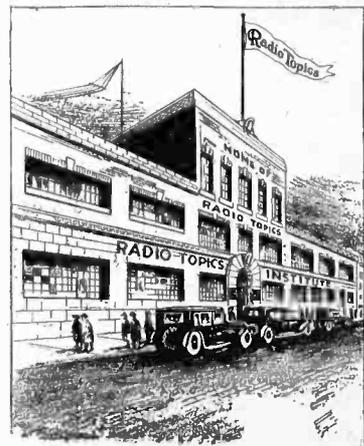
Mr. Gazzolo wrote the following letter to Station KYW:

"Never in my twenty years' experience as a Chicago theater manager has any one feature helped patronage like the broadcasting of 'Abie's Irish Rose' from the Studebaker Theater stage last Tuesday evening.

"By actual count at the box office, 2,876 persons mentioned they had heard 'Abie' over the radio when purchasing tickets. And all this number forty-eight hours after the actual broadcasting. Two box offices were kept open from 8:30 a. m. until 11:30 p. m. At 1 o'clock two lines of eager patrons reached from the box offices to the Auditorium Hotel, 200 feet from the theater.

"Letters came from all parts of the country. One man came to the theater with a telegram from New York in which the sender said he had heard 'Abie' over the radio. He sought two seats for a week-end performance.

"The telephone has been ringing constantly, radio fans making inquiry as to when they could purchase tickets. On the night of the broadcasting, two girls answered phone calls until 2 o'clock in the morning."



Radio Topics Institute

extends you a hearty invitation

To call on our radio engineers for help of any kind to adjust

Your Radio Troubles
Free for the Asking

Tell all your friends who are interested in Radio that they are included in this invitation.



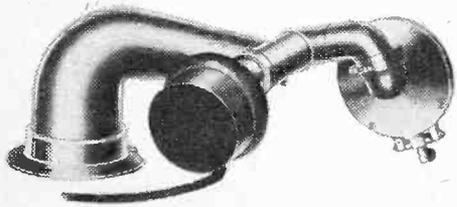
Rear View Showing Apparatus Panel

The Toman Radio Tone Arm

IT HAS long been recognized that the phonograph tone chamber provides the best possible loud speaker horn for radio reception. This is but natural in view of the many long years and millions of dollars invested in experimental work in devising the best tone amplifier for the phonograph.

For some time many radio fans have been making use of the phonograph tone arm and substituting a radio loud speaking unit. The chief disadvantage to this, however, is the fact that frequent handling of the phonograph reproducer in changing often unbalances the delicate mechanism of the reproducer and renders it unfit to give proper tone when used on the phonograph.

C. W. Howe & Company, Chicago, who are Chicago district factory representatives for a number of well known products, including Electrasote panels, have recently announced a new product



Toman Radio Tone Arm

that will revolutionize radio reception. One of their factories, E. Toman & Company, after two years of experiment, have perfected a combination phonograph and radio tone arm which permits the use of the phonograph as a talking machine or a radio loud speaker at will.

The Toman Radio Tone Arm can be substituted on any phonograph having approximately an 8½ inch span from the center of the base of the tone arm to the turn table spindle.

The valve arrangement in the neck of the tone arm is such that by a simple half turn of the valve, the phonograph can be instantly changed to a radio loud speaker. The radio loud speaking unit is attached without removing the reproducer from the tone arm.



THE BURT and PACKARD
"Korrek Shape"

TRADE MARK
Reg. U.S. Pat. Off.

\$10
for most styles

Send for free illustrated style book

FIELD & FLINT
MAKERS
BROCKTON, MASS.

Also makers of the celebrated
Anatomik Shoes
for Men



Bien Last
Just one of many smart styles

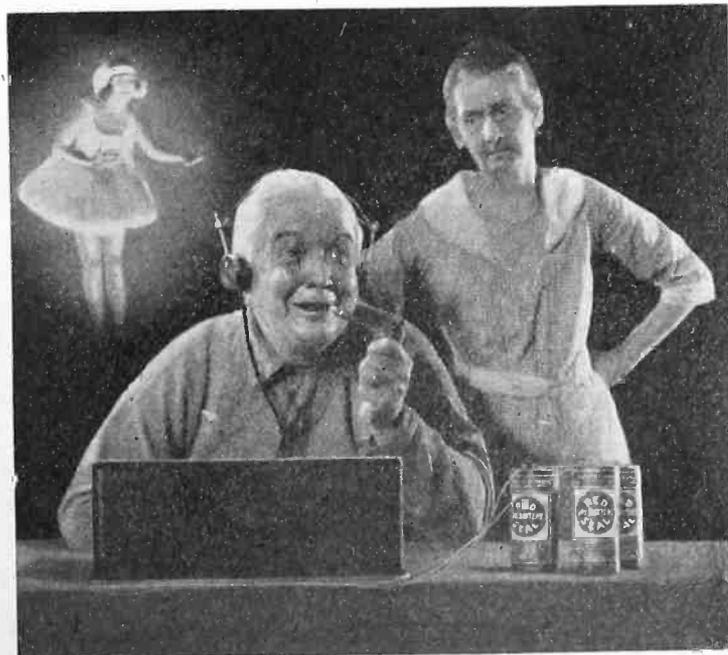
All "Korrek Shape" Shoes are molded to the lasts under ¼-ton pressure.

Slight adjustment of the valve provides the most perfect tone modulator ever devised for either phonograph or radio. The Toman Radio Tone Arm is adapted to take all standard radio loud speaking units.

Unique Drawing

RADIO TOPICS' April cover, showing a pleasant faced, prosperous farmer, with his pipe, listening to a snappy number being sung by a musical comedy star in a distant city, attracted more than usual attention appar-

ently from the comments received. This unusually appropriate picture was furnished through the courtesy of Clarke G. Methot, general manager of the Manhattan Electrical Supply Company, and has attracted wide attention in the advertising trade journals throughout the country. The Beatrice Creamery Company of Chicago used it on 20,000 folders advertising their product and the Advertising Fortnightly also used it for a cover design. The picture tells its own story and the Manhattan Electric Company is to be congratulated upon the cleverness of its artist.



This may be the trouble with YOUR set—

You can probably adjust your
grid lead for higher

DETECTING EFFICIENCY

The highest efficiency can only
be obtained by adjusting the re-
sistor and condenser.



Can You Do This?

THE DAVEN COMBINED
RESISTOR-CONDENSER
DOES BOTH

DAVEN RADIO COMPANY

MOUNTINGS AND RESISTANCES

9-13 CAMPBELL ST.

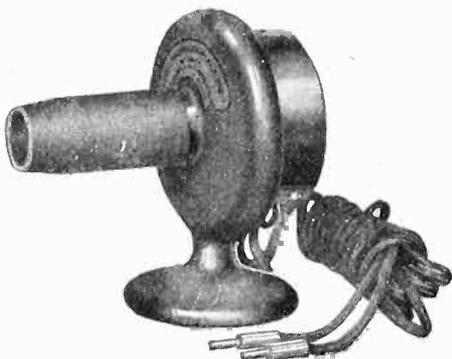
NEWARK, N. J.

Phonograph Attachment

The phonograph stores have recently taken considerable interest in radio. The increased publicity that will be devoted to radio should make for more sales not only for themselves but for all classes of stores selling radio.

Phonographs will not be discarded as a result of this interest but will be used as an auxiliary to the radio set.

To tie in with this activity the Manhattan Electrical Supply Company is offering for sale a new phonograph attachment under their well-known trade mark "Red Seal." This consists of a special Red Seal receiver attached to a heavy non-resonant metal base with air chamber and diaphragm especially designed to operate the large air column of a reproducing horn. Attachment is made to the tone arm of the phonograph by means of a soft rubber tube.



A New Phonograph Attachment

The Red Seal phonograph attachment is very sensitive to faint signals and re-creates musical programs with the same fidelity as the well-known Red Seal head set. The quality is natural, rich and pleasing. The list price is \$5. In appearance it is very attractive, being finished in a rich brown mahogany color, with brown silk telephone cord and case of genuine Bakelite.

Listens for SOS

FEW radio listeners know that behind the scenes in the broadcasting station there is stationed a licensed code operator whose only duty during the period the station is on the air is to listen in for distress signals. While music and addresses are going out from an adjoining room he sits at a receiving set that is tuned to 600 meters, the wavelength of ship and coast stations. At the first signal of distress he notifies the engineer in charge and the broadcasting stops at once, the air is left free for the unobstructed transmission of SOS signals.

On Saturday evening, March 22, shortly after 11 o'clock, while WGY, the Schenectady, N. Y., station was in the midst of a dance program from Albany, an SOS was picked up from a ship at sea. Instantly WGY left the

air and remained out until permission was received to resume. This is the first time, during two years of operation, that WGY has been interrupted by distress signals.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CON- GRESS OF AUGUST 24, 1912,

Of Radio Topics, published monthly at Oak Park, Illinois, for April 1, 1924.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared William M. Hight, who, having been duly sworn according to law, deposes and says that he is the business manager of the Radio Topics and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Radio Topics, Inc., Oak Park, Illinois.

Editor—J. Ray Murray, Oak Park, Illinois.
Business manager—William M. Hight, Oak Park, Illinois.

2. That the owner is: (If the publication is owned by an individual his name and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent or more of the total amount of stock should be given.)

John N. Bos, 200 S. Humphrey avenue, Oak Park, Illinois.

Nanko C. Bos, 200 S. Humphrey avenue, Oak Park, Illinois.

B. W. Stolte, 3500 S. Halsted street, Chicago, Illinois.

William M. Hight, Oak Park Arms Hotel, Oak Park, Illinois.

Telfer MacArthur, 1112 North boulevard, Oak Park, Illinois.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company and also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is _____ (This information is required from daily publications only.)

WILLIAM M. HIGHT,
Business Manager.

Sworn to and subscribed before me this 9th day of April, 1924.

M. L. WALPOLE.

(My commission expires June 30, 1925)
(Seal)

French Issue New Regulations

FRENCH authorities have issued a set of regulations intended to encourage broadcasting and the use of radio equipment by amateurs throughout the country, according to advices received at the Department of Commerce from the American Commercial Attache at Paris. It is provided that receiving sets may be possessed by any citizen of France who will sign a formal declaration, receivable at any post office, stating the kind of equipment used and agreeing that no part shall be taken in the transmission of private correspondence. Sets in the possession of foreigners, or used to receive private correspondence, require individual authorization.

The right to operate transmitting sets will be regulated by the Under-Secretary of the French Postal Service, on the recommendation of a permanent commission upon which public service groups, manufacturers, and amateurs, will have representation. Transmitting sets are to be classified as, those intended for establishing private communication; public broadcasting sets; portable sets; sets used for technical experiments, and amateurs' sets.

Wavelength standards and other technical regulations will be set up for each class by public authority. The use of amateur and experimental sets will not involve the payment of any fees. Public broadcasting is made the subject of individual contract.

Music Publishers Ask Pay
(Continued from page 8)

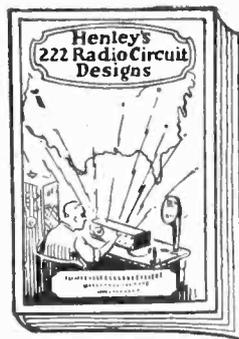
has injured the business of the music publishers.

"The Watterson, Berlin & Snyder company is anxious to have their music played by as many broadcasters as possible, the stations not now in the American Society tax list being by far in the majority. The Radio Trade Association is certain that when this case is finally decided, if the Berlin Company gets a victory, there will be a great deal more popular music broadcast from radio stations than ever before."

Here's Your Chance

to get a complete and up-to-date collection

of MODERN RECEIVING and TRANSMITTING HOOK-UPS



Henley's 222 Radio Circuit Designs

Surpasses All Other Books

256 Pages, 284 Diagrams and Illustrations

A Book Worth Its Weight in Gold to the Radio Fan

Will meet the needs of every radio enthusiast, whether novice or expert, amateur or professional. Price, \$1.00.

RADIO TOPICS

The magazine published in the interest of the radio industry in its entirety will give this storehouse of radio information to all sending in their subscription to Radio Topics for one year—\$2.00 per year.

THINK OF IT

An up-to-date and a day ahead Radio Monthly for twelve months and a book that stands without an equal in its special field of the radio art.

Address Circulation Dept.

RADIO TOPICS

1112 NORTH BOULEVARD

OAK PARK, ILL.

BRISTOL SINGLE CONTROL RADIO RECEIVER

USING GRIMES INVERSE DUPLEX SYSTEM
PATENTS PENDING



Most Simple to Operate.

The set for those who want results with little effort. Anyone in the family can quickly learn to operate it because technicalities and guesswork are eliminated—one Control Dial does it all.

Does Not Interfere With Your Neighbor.

Other close-by reception is not disturbed when you tune in with this non-radiating Receiving Set. It gives you a comfortable sensation of freedom to be able to change from one station to another, knowing that you will not interfere with your neighbor's receiving.

Choice of Aerial or Loop.

Where conditions make it difficult to install an outside aerial, as in congested sections of cities, good results can usually be had by using inside loop. Mounted in solid mahogany case with walnut finish, the Bristol Single Control Radio Receiver is handsome in appearance. The price is \$190.00. Bulletin 3013-P describing this set will be mailed on request.

BRISTOL

TRADE MARK

AUDIOPHONE

REG. U. S. PAT. OFFICE

LOUD SPEAKER



This is known everywhere as the Loud Speaker with the quality tone. Not only is the tone natural and without mechanical distortion, but is sufficiently big in volume to be easily heard in a large room or all through the house. Comes to you ready to use—no auxiliary batteries are required.

Made in three models:

Audiophone Senior.....	Price	\$30.00
Audiophone Junior.....	Price	22.50
Baby Audiophone.....	Price	12.50

THE BRISTOL COMPANY

WATERBURY, CONN.

Cuba Fan Hears Six U. S. Stations

WHEN radio engineers conceived the idea of linking together by radio six powerful broadcasting stations to simultaneously reach an audience approaching fifty million in number with the same program, little did they realize that certain persons, favorably situated, would be able to hear all six stations in the \$7,000-mile "chain."

Successful reception from the six stations is the claim of Frank

H. Jones, however, owner of station 6KW, in far away Tuinuca, Cuba, the night of March 7, when the Annual Alumni Dinner of the Massachusetts Institute of Technology Society was being broadcast by stations WJZ, at New York City, WGY, at Schenectady, and rebroadcast after the program was extricated from the air by sensitive receivers at four other stations, KDKA, Pittsburgh, Pa., KFKX, Hastings, Neb., KGO, Oakland, Cal., and 2AC, Manchester, England.

Broadcasting stations always find

many interesting and revealing letters in the mail after such an unusual experiment, but the experience Mr. Jones relates in a letter to General Harbord, president of the Radio Corporation of America, and one of the principal speakers on the program that night, is unique and extraordinary.

Mr. Jones reported using two receiving sets, one for waves between 300 meters and 500 meters, and a shorter wave set to receive on wavelengths between 80 meters and 300 meters. Both are untuned radio frequency sets, the longer wave set working on a loop, while the short wave set picks up the signals upon a thirty-foot indoor antenna.

Excerpts from the letter follow:

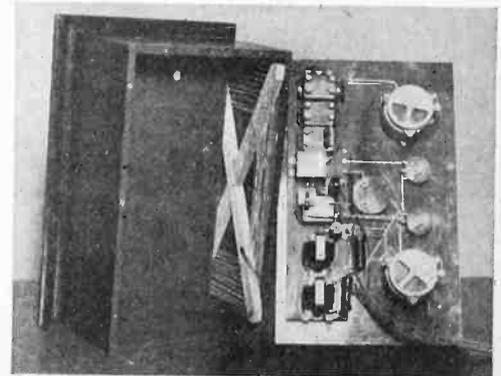
"I was first listening in on KDKA's 100-meter wave and heard the announcement about broadcast of meeting of Massachusetts Institute of Technology from N. Y. I then checked them on their 326 meter wave. In going back to their 100-meter wave I ran into WGY at about 105 meters with the same broadcast, much to my surprise. I then checked WGY on their 380-meter wave and had the proceedings coming out of two loud speakers at the same time, one from WGY on 380 and the other from WGY on 105 meters."

"I then did the same stunt with KDKA's two waves. Then put KFKX and KDKA together. I then got KGO on the loop."

"I kept both loud speakers going on all the combinations I could think of."

"I tried to get London but failed as the station was on his wave, coming in like a 'ton of bricks.'"

In the scale from 100 meters to 455 meters, Mr. Jones heard the same program on seven different wavelengths.



A super-heterodyne that brings them in. Newest set made by Maj. K. H. Armstrong, the father of radio, demonstrated at the Engineers Society of New York. He employs only small loop antenna and dry cell batteries. It is a six-tube set. (Photo by Kadel & Herbert).

Radio Manufacturers Organize

A N N O U N C E M E N T was made April 19 of the formation of one of the strongest trades organizations yet formed in the radio industry in Chicago. It is to be known as the Associated Radio Manufacturers, with Herbert H. Frost, A. A. Howard, A. J. Carter, Frank Reichman and E. N. Rauland as the board of directors.

The immediate object of the organization is to defeat the efforts of some members of Congress to put a 10 per cent tax on all radio apparatus on the ground that radio is an infant industry, not stabilized as yet and that its fundamental purpose is educational, according to Mr. Frost.

The organization was started on its way less than ten days ago, when an organization committee composed of Messrs. Frost, Carter, Wellman, Huth, Reichman, Flewelling and Will was named at an informal meeting.

Constitution and by-laws were prepared by Ernest R. Reichman, Mr. Flewelling and Mr. Huth, and the organization was chartered at Springfield by Ernest R. Reichman, Mr. Will and Charles H. Porter.

It was announced on April 19 that the temporary board of five directors will serve for ninety days, at which time a complete board of nine members, along with other officers, will be elected.

Among the radio manufacturing concerns already in the organization are the Rauland Manufacturing Company, Electrical Research Laboratories, the Belden Manufacturing Company, Premier Electric Company, Bremer-Tully Manufacturing Company, Zenith Radio Corporation, Herbert H. Frost, Winkler-Reichman Company, Dudlo Manufacturing Company, Carter Radio Company, Trimm Radio Manufacturing Company, Runzel-Lenz Electric Manufacturing Company, Multiple Electric Products Company, Seaman Paper Company, American Art Mache Company, Howard Radio Company, French Battery Company, Walbert Manufacturing Company, Buell Manufacturing Company, and others.

ELECTRASOTE

TRADE MARK
(Registered in U. S. and Foreign Countries)

RADIO PANELS

A new panel material developed after several years of research and recognized by authorities as possessing the properties making it exceptionally desirable for radio uses. Electrasote is furnished with a beautiful satin-grained surface on one side and a polished surface on the other side, thereby conveniently filling the demand of the user. Because of the absence of abrasive material Electrasote machines well and easily without the usual dulling effects on tools.

Electrasote Radio Panels

are a quality product at a very low price and are especially recommended because of the following properties:

- 1—High surface resistivity.
- 2—High volume resistivity. (Both points proven by its radio-frequency phase difference. Electrasote average is 1.8.)
- 3—Low water absorption. (Proven by Electrasote average 1.05.)

ELECTRASOTE RADIO PANELS

	Retail
6 x 7x3/16	\$0.53
7 x 9x3/16	.79
7 x 10x3/16	.88
7 x 12x3/16	1.05
7 x 14x3/16	1.23
7 x 18x3/16	1.58
7 x 21x3/16	1.82
7 x 24x3/16	2.10
7 x 26x3/16	2.28
7 x 28x3/16	2.45
24x30x3/16	9.00

Above standard sizes in Chicago stock for immediate shipment.

EVERY PANEL IN AN INDIVIDUAL ENVELOPE

Dealers and Jobbers—Write Us for Attractive Proposition

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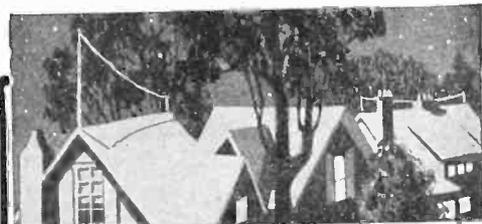
RICHARD B. OWEN, Patent Lawyer
81 Owen Bldg., Washington, D. C.
2278-M Woolworth Bldg., N.Y. City

SOMETHING REALLY FREE



Here is something actually given away. In an effort to introduce the qualities of the **YELLOWTIP** Crystal and Crystal Detector to a great number of radio fans, we offer for a limited time to give away the regular 50c **YELLOWTIP** Crystal with each order for a **YELLOWTIP** Crystal Detector—Price \$2. Pin a two dollar bill to this advertisement and mail it today together with your dealers name.

Yellowtip Detector Sales Co., 40 First St., Carlstadt, N. J.
FIXED — ADJUSTABLE — DUST-PROOF



Better Tone for Your Radio!

FRANK D. PEARNE, famous Radio engineer, says **TRANSCONTINENTAL RIBBON** Aerials aid reception by combining maximum surface with minimum resistance. **FORREST**, eminent inventor, says, "I get best results by twisting Ribbon Aerial, 2 twists per 50 feet." Complete with snap hooks soldered to ends for instant attachment to insulators.

Transcontinental 50-Foot **RIBBON** **COPPER** **AERIAL** **\$1.50**
75-Ft. \$2.25
100-Ft. \$3.00
150-Ft. \$4.50
(Trade Mark)

Clearer tone, greater volume, increased distance and selectivity guaranteed or your money refunded! Improves any set, tube or crystal. A laboratory product, with capacity, resistance and strength calculated to give better results.

Try It Without Risk! If your dealers cannot supply you, order direct from manufacturer, enclosing price. 100-foot length most generally used. Money-back guarantee protects you.

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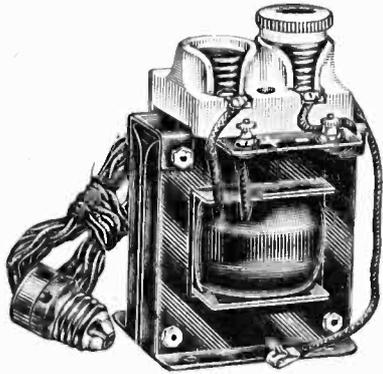
TRANSCONTINENTAL RIBBON AERIAL

DEALERS! Write for Special Offer!

Keep your Radio Topics on file as a ready reference

Why Pay More?

T-100 Battery Charger
*The Best and Lowest Priced
 on the Market*



This battery charger operates on 110 volt, 60 cycle, A. C. circuit, charging a 6 volt battery at a 2 ampere rate. Standard 2 ampere charging tube is used. The T-100 is the lowest priced first-class charger on the market. Large numbers now in use have proved entirely satisfactory. No vibrating parts to get out of order. Absolutely noiseless in operation. Furnished with plug and cord for lamp socket. Battery leads marked. Fuse protects charger from accidental short circuit of 110 volt leads. Fully guaranteed.

Price complete, with 2 ampere tube, **\$12.00**

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 Quality Radio Exclusively

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Student Winding a Stator

To the Great Shops of **Coyne**

We pay your railroad fare to Chicago—the Electrical Center of the World—from any place in the United States. Grasp the opportunity to see the country at our expense. Come to Coyne—learn electricity in 3½ months. Get a complete training so you can make big money as Power Plant Operator, Superintendent, Telephone man, Construction worker, auto, truck or tractor electrician, battery man, radio expert, or you can go into business for yourself as electrical contractor, dealer, auto ignition or battery expert and make from \$3,000 to \$20,000 a year. Hundreds of our graduates today are making big money and you can do the same if you grasp this opportunity—act now.

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No books or useless theory. You are trained on \$100,000 worth of electrical equipment. Everything from door bells to power plants. You work on motors, generators, house-wiring, autos, batteries, radio, switch-boards, power plants—everything to make you an expert ready to step right into a position paying from \$45 to \$100 a week.

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We include the following free with the regular course;
 (1) A complete course in auto, truck and tractor electricity and storage batteries. Greatest outlay of auto, electrical and battery equipment in the country.
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 (3) A life scholarship in the Coyne school. You can stay as long as you wish and return for further training at any time in the future.

Earn While You Learn

We help students to secure jobs to earn a good part of their expense while studying.

Send Coupon Now

Don't delay a minute—send that coupon in right now for our big free catalog and full particulars of Free Railroad Fare offer. Act now!

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A \$200,000.00 COMPANY STANDS SQUARELY BACK of EVERY PHONE

TOWER'S Scientific
 WEIGHS ONLY 8 OZ
 Perfect Tone Mates
\$2.95

Plus a few cents postage

SEND NO MONEY

Order by mail if your dealer cannot supply you and we will ship immediately. Written 5-day money back Guarantee with each set. Our next year's production schedule of two million phones UNDOUBTEDLY places us as the

WORLD'S LARGEST HEADSET MAKERS
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WORLD'S GREATEST HEADSET VALUE

Five-Day Money-Back Guarantee If Not Fully Satisfied. We Guarantee the Scientific to be

1. One of the finest phones on the market regardless of price.
2. The most comfortable—weight only 8 oz.
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4. Made of standard double pole construction (no single pole nonsense to save expense.)
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FOR SALE—10 watt set for key or broadcasting. For particulars write A. E. Schilling, 108 Elm St., Kalamazoo, Mich. Will mail photo on request. Station WLAQ.

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FROSTONES Best for Your Radio Set
 Bring in programs clear and sweet! Free from distortion. Highest quality—biggest value. 2000 ohms, \$5; 8000 ohms, \$6.
HERBERT H. FROST, Inc.
 154 W. Lake St. • Chicago

Keep your Radio Topics on file as a ready reference

Ten-Foot Wire Good Antenna

THE Teledyne, the new non-radiating regenerative four-tube receiver perfected by Bowden Washington, has been found by tests to give good results with a ten-foot single wire antenna inside the rooms, such an inside aerial being recommended providing facilities for an outside aerial are not available.

The wire may be suspended from a picture moulding and connected to the upper support for the vertical coil by a clamp. Both volume and selectivity are good under this arrangement, though the volume, of course, will not be equal to that on an outside antenna.

The only additional necessity for using a single-wire inside aerial is a condenser across the antenna and ground binding posts. The condenser should be of the .000125 MF capacity. Two ordinary .00025 Dubilier condensers in series will do the work.

Mr. Washington announced that during tests to determine the best inside aerials good loud speaker signals were received in Minneapolis from stations like St. Louis, Memphis, Kansas City, Davenport, Pittsburgh and Chicago on such a wire.

General Radio Research League Notes

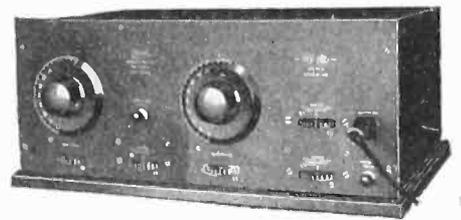
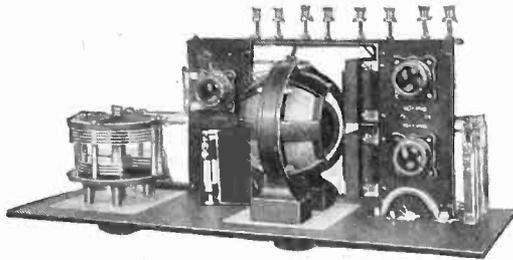
The primary object of the G. R. R. L. is to promote the science of radio in all its branches. Today the most important topic of radio unrest is the prevailing ill-will which exists between the radio amateur who has a transmitting station and the amateur with his broadcast receiving set

In this connection the Davenport chapter has started a movement which has been taken up by the nation's newspapers and is causing much discussion in favor of the G. R. R. L. and its policies. The Davenport Chapter at each meeting has a part of the meeting devoted to hearings of the grievances of the broadcast listener and the amateur operator. These two elements meet and discuss their views in open forum and the result is always favorable.

The Davenport Times, February 21, devoted a great deal of space to this subject naming the General

BAKELITE

TRADE MARK REG. U. S. PAT. OFF.



Grebe and Bakelite

The character of broadcast reception enjoyed by users of Grebe Radio Sets is due, in no small measure, to the extensive use of Bakelite.

Grebe standards of craftsmanship demand the best, and in selecting a dependable insulating material which would present a refined physical appearance, they chose Bakelite as the one material which would meet their requirements.

The excellence of Bakelite and the dependability of its qualities is indicated by the fact that a large majority of Radio Manufacturers choose Bakelite as insulation, and

for improving and simplifying the design of their sets and parts.

Bakelite combines in ONE material the essential properties of many. It is highly dielectric and mechanically strong; it is unaffected by moisture, temperature or climatic changes; its color will not fade, even in strong sunlight; it will not warp, bloom or crack—but the most important property of "The Material of a Thousand Uses" in its relation to Radio is that of providing *permanently* effective insulation regardless of temperature or atmospheric conditions.

Write for a copy of our Radio Booklet H.

BAKELITE
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 are the registered
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 Phenol Resin Products
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 patents owned by
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CORPORATION

Send for our Radio Map

Enclose 10c. to cover mailing cost and we will send you a large Radio Map which lists the call letters, wave length and location of every broadcasting station in the world. Address Map Department.

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THE MATERIAL OF A THOUSAND USES

SOMETHING REALLY FREE

Here is something actually given away. In an effort to introduce the qualities of the YELLOWTIP Crystal and Crystal Detector to a great number of radio fans, we offer for a limited time to give away the regular 50c YELLOWTIP Crystal with each order for a YELLOWTIP Crystal Detector. Price \$2. Pin a two dollar bill to this advertisement and mail it today together with your dealers name.

Yellowtip Detector Sales Co. 46 First St., Carlstadt, N. J.
FIXED - ADJUSTABLE - DUST-PROOF

Use INDIVIDUAL Call Cards and Radiograms with YOUR OWN Name, Address and Station



ARRL Emblem Added if Requested
MONEY REFUNDED if Not Satisfied
 Cards: Red call, black printing.
 High quality. 100—\$1.75; 200—\$2.75;
 300—\$3.50, postpaid. Gov. post
 cards 1 cent extra per card.
 Radiograms: Same prices.

Write for INDIVIDUAL Radio Stationery and log samples and prices
 Send order with check or money order Today — NOW.
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Watch the Roof-tops!

TRANSCONTINENTAL RIBBON COPPER AERIAL
 (Trade-Mark)

For better tone, bigger volume, greater distance with any tube or crystal set use Transcontinental RIBBON Aerials. Nearly a million "on the roofs" everywhere. Order by mail C. O. D. (plus postage)

50 Ft.	\$1.50
75 Ft.	\$2.25
100 Ft.	\$3.00
150 Ft.	\$4.50

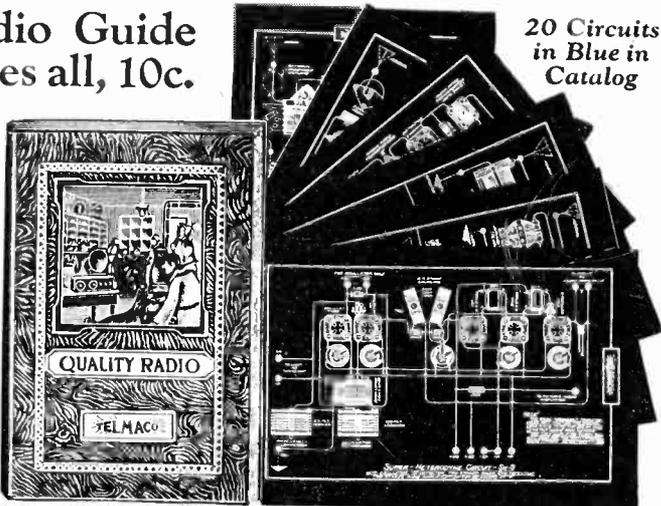
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The Best in Radio

Telmaco Radio Guide Book describes all, 10c.

Our new 64-page Catalog No. TGR contains twenty of the most popular radio circuits printed in blue. These include the Super-Heterodyne, Neutrodyne, Grimes Inverted, Colpitts, Flewelling, Reinartz, Diode Electrad, Super-Regenerative and many others. Each article used in circuits is attractively pictured instead of appearing in straight schematic form. Besides containing blue prints, the best in radio is also illustrated and described. Catalog sent postpaid for Ten Cents. Each circuit worth double.

Send for your copy today.



DEALERS! Our New Dealers' Catalog and Price List describes nearly all the better Standard Radio Lines. You should have it. Mailed FREE to all bonafide dealers making request on their business stationery.

TELMACO
Quality Radio Exclusively
Established 1918

Radio Division
TELEPHONE MAINTENANCE CO.
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BROADCASTING STATION FOR SALE

Complete With All Equipment

Including Special Studio Microphone. Has a radius of 1,000 miles and over. Worth \$800.00.

No reasonable offer will be refused. Address Station,

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RADIO TOPICS—1112 North Boulevard
OAK PARK, ILLINOIS

Radio Research League as the first to launch such an idea and gave us a most favorable writeup. A paper in Syracuse, N. Y., follows with an article on similar lines and asking the G. R. R. L. to establish a chapter there which matter is being handled by K. J. Shepard of that city. It is our desire to please all radioists in all branches of radio and this is one branch that is of great importance. Another is the subject of the single circuit interference hound that has a little one in the house that likes to hear the piggies squeal in the big horn. That man has absolutely no constituents in the radio field and may as well retire. But the G. R. R. L. will take him and show him how to make the piggies squeal without disturbing the whole countryside and also show him how to reconstruct his set so that he and every one else can enjoy the air as it should be.

* * *

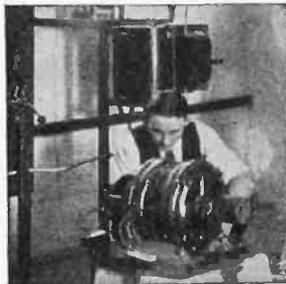
The following is the new council of the G. R. R. L. which has been placed in office as a result of the recent election. They held their first regular meeting the evening of February 27, 1924: President, Gilson V. Willets, care of Radiophone, "WOC," Davenport, Ia.; vice president, Hugo C. Gibson, care of Lysle Gonse, secretary; secretary, Lysle E. Gonse, 1408 Fourth ave., Rock Island, Ill.; assistant secretary, Kenneth J. Shepard, 240 Putnam street, Syracuse, N. Y.; assistant secretary, W. N. Benson, 9DYL, Davenport, Ia.; consulting engineer, Franklin Pierce, care of Radiophone, "WOC," Davenport, Ia.; financial secretary, E. J. Green, 2812 Carey avenue, Davenport, Ia.; chief operator, R. B. Mossman, 711½ West Third street, Davenport, Ia.; assistant operator, G. J. Altfilisch, 503 Dover Court, Davenport, Ia.; councilman, Frank Eppley, 1317 East Tenth street, Davenport, Ia.; and Walter F. Mee, 1043 Fourth avenue, Rock Island, Ill.

Get a Job Like These Earn \$3500 to \$10,000 a Year



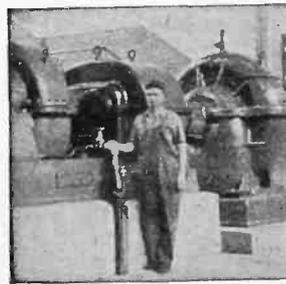
20 Years Old— Makes Almost \$500 a Month

Harold Hastings of Somers, Mass., says: "The profit on my electrical business amounts to \$475.00 a month. My success is due entirely to your instruction. You make your men just what you say—Electrical Experts. No man will ever make a mistake enrolling for your course."



Dickerson Gets \$7500 a Year

"I earned \$30 a week when I started with you—\$50 a week when half through your course. Now I clean up at the rate of \$7500 a year. Thank you a thousand times for what you did for me. Electricity pays big on the farm." Herbert M. Dickerson, Warrentown, Va.



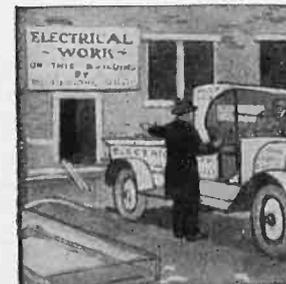
\$20.00 a Day for Schreck

"Use my name as a reference and depend on me as a booster. The biggest thing I ever did was answer your advertisement. I am averaging better than \$500 a month from my own business now. I used to make \$18.00 a week." A. Schreck, Phoenix, Ariz.



Pence Earns \$9000 a Year

W. E. Pence, Chehalis, Wash., says: "Your course put me where I am today, Mr. Cooke—making \$750 a month doing automobile electrical work—think of it—\$9000 a year. Besides that I am my own boss. My wife joins me in thanking you for what you did for us."



\$30 to \$50 a Day for J. R. Morgan

"When I started on your course I was a carpenter's helper, earning around \$5.00 a day. Now I make from \$30 to \$50 a day and am busy all the time. Use this letter if you want to—I stand behind it." J. R. Morgan, Delaware, Ohio.



Spare Time Work Pays Stewart \$100 a Month

"Your course has already obtained a substantial increase in pay for me and made it possible for me to make at least \$100 a month in spare time work. You can shout this at the weak fellows who haven't made up their minds to do something yet." Earl Stewart, Corona, Calif.

in the Big Pay Field of **ELECTRICITY**

It's your own fault if you don't earn more. Blame yourself if you stick to your small pay job when I have made it so easy for you to earn \$3500 to \$10,000 a year as an electrical expert. Electrical Experts are badly needed. Thousands of men must be trained at once. One billion dollars a year is being spent for electrical expansion and everything is ready but the men. Will you answer the call of this big pay field? Will you get ready now for the big job I will help you get? The biggest money of your life is waiting for you.

I Will Train You at Home

I will train you just like I trained the six men whose pictures you see here. Just like I have trained thousands of other men—ordinary, everyday sort of fellows—pulling them out of the depths of starvation wages into jobs that pay \$12.00 to \$30.00 a day. Electricity offers you more opportunities—bigger opportunities—than any other line and with my easily learned, spare time course, I can fit you for one of the biggest jobs in a few short months' time.

Quick and Easy to Learn

Don't let any doubt about your being able to do what these other men have done rob you of your just success. Pence and Morgan and these other fellows didn't have a thing on you when they started. You can easily duplicate their success. Age, lack of experience or lack of education makes no difference. Start just as you are and I will guarantee the result with a signed money back guarantee bond. If you are not 100% satisfied with my course it won't cost you a cent.

Free—Electrical Working Outfit and Tools

In addition to giving my students free employment service and free consultation service, I give them also a complete working outfit. This includes tools, measuring instruments, material and a real electric motor—the finest beginners' outfit ever gotten together. You do practical work right from the start. After the first few lessons it enables you to make extra money every week doing odd electrical jobs in your spare time. Some students make as high as \$25 to \$35 a week in spare time work while learning. This outfit is all FREE.

Mail Coupon for FREE BOOK— The Vital Facts of the Electrical Industry

The coupon below will bring you my big free electrical book—over 100 interesting pictures. The real dope about your opportunities in electricity—positive proof that you, too, can earn \$3500 to \$10,000 a year. Send for it now. Along with the book I will send you a sample lesson, a credit check allowing you a \$45.50 reduction, my guarantee bond and particulars of the most wonderful pay-raising course in the world. Send the coupon now—this very second may be the turning point in your life. Send it while the desire for a better job and more money is upon you, to

L. L. COOKE, Chief Engineer

Chicago Engineering Works

DEPT. 97-A 2150 Lawrence Ave., Chicago

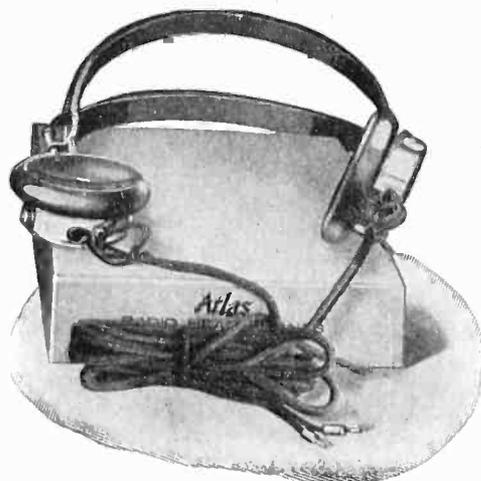
**The Cooke
Trained Man
is the Big
Pay Man**



L. L. COOKE, Chief Engineer
Chicago Engineering Works, Dept. 97-A
2150 Lawrence Ave., Chicago, Ill.
Without obligating me in any way send me the "Vital Facts," your Free Book, Sample Lessons and particulars of your Free Outfit Offer, Free Employment Service, and proof that you can fit me for a big-pay electrical job.
Name.....
Address.....

Blairco
Radio

Buy at the Radio Store where they display this sign—the distinguishing mark of Blairco Proven Products.

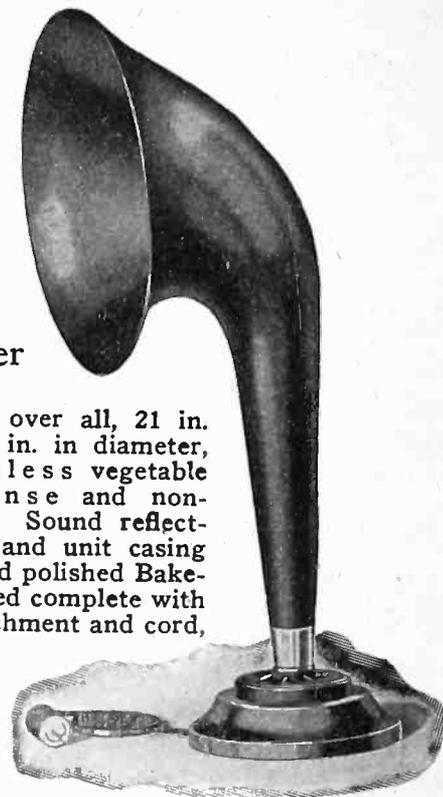


ATLAS HEAD PHONES

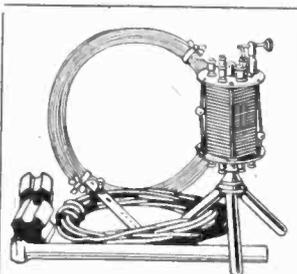
The only high-grade receiver set offered at a reasonable price. Sensitiveness and adaptability positively is unequaled. Price \$9.00.

Atlas Loud Speaker

Height over all, 21 in. Horn, 11 in. in diameter, of seamless vegetable fibre, dense and non-vibrating. Sound reflecting base and unit casing of dark red polished Bakelite. Priced complete with horn attachment and cord, \$25.00.



The ATLAS Gives Tone Volume With Perfect Tone Control



Blairco "4" Crystal Set

Takes 4 head phones—Enables 4 to listen as well as 1. All nicked steel 9 in. high. Price only \$7.50.

Complete with copper clad aerial, waterproof lead-in and ground wire, strain and wall tube insulators, lightning arrester, ground wire clamp and set of \$9.00 Blairco Headphones, \$17.50.

Dealers: An unbeatable profit opportunity is offered you in the Blairco Proven Products. Write quick for our proposition.

Multiplied enjoyment with your radio follows the use of a loud speaker which, set in any convenient spot, throws out the tones so that a roomful of family and friends can hear.

But in selecting the loud speaker, bear in mind that loudness without clearness is mere noise—and get an ATLAS.

With the Atlas you get the true tone of the original—clear, pure, exquisitely sweet—and perfectly controlled. Tone distortion, distracting mechanical sounds, confusing echoes and blasts—all are noticeably absent.

All is due to the patented double composition diaphragm—found only in the Atlas. And to the use of finer materials which, with scientific assembling, also insures permanence.

A typical example of the extra quality afforded at no extra cost by all radio equipment sold under the Blairco trademark.

No matter what you want in Radio, buy at the "Blairco" Radio store and get dependable value. Every article sold under the Blairco trade name, whether our own make or others, is of proved superiority. Exacting tests have proved it the best of its kind, bar none! If you have no Blairco dealer, write us now for Folder and Prices.

Mitchell Blair

"First With the Best"

1429 SO. MICHIGAN AVE., CHICAGO

WorkRite Former

\$2.00



This aircore Transformer has been perfected for use in the Neutrodyne method of receiving. It should be used with .0004 mfd. variable condenser for tuning to all broadcasting wavelengths. It can also be used as a transformer for tuned radio frequency reception, or fixed coupler with condenser across secondary. It is made with tubes of moulded Bakelite and wound with green silk wire. Extreme care has been taken to see that the tubes are properly spaced and just the right number of turns of wire are used, insuring maximum efficiency. Like all WorkRite products, it has been thoroughly tested by other laboratories as well as our own before being put on the market. It will measure up to the "WorkRite" standard of quality and efficiency.

Watch for the WorkRite Variable Condenser

WorkRite Super Vernier Rheostat



This improved WorkRite Vernier Rheostat is just the instrument you have been looking for, 50,000 possible adjustments. A turn of 1-32" will separate two stations or clear up one. Made in three different resistances so that there is a WorkRite Vernier Rheostat for every tube now on the market. 6 ohms, \$1.00; 15 ohms, \$1.15; 30 ohms—\$1.25

WorkRite E-Z-Tune Dial Snappiest Dial on the market. Has a knurled flange on the rim for delicate leverage. Price _____75c

WorkRite Resistance Cartridge

Raises the resistance of your 5 or 6 ohm Rheostat to the 15 or 30 ohms required for UV 199, and similar tubes. Price, either 15 or 25 ohms—40c

WorkRite Neutralizing Condenser



Neat, compact and very efficient. This instrument has a glass insulation on the outside which greatly expedites neutralizing the set. Price each, 25c.

WorkRite Tuner Team

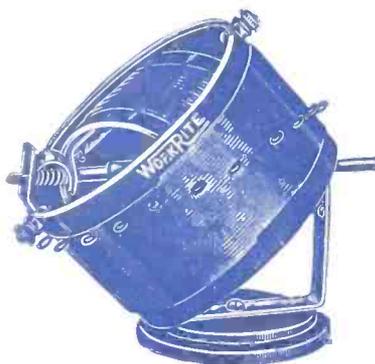


WorkRite Super Variometer

Tunes out local stations and gets the one you want. This famous Tuner Team is made up of two WorkRite Super Variometers and one WorkRite 180° Super Variocoupler. Variometer is made from polished mahogany. Variocoupler made from moulded Bakelite and wound with green silk wire. Range 150 to 705 meters. Shaft 3-16".

WorkRite Super Variometer, each—\$3.50

WorkRite 180° Super Variocoupler, each—\$3.50



WorkRite 180° Super Variocoupler

WorkRite Nonmicrophonic Socket



Here is the right Socket for use with your UV 199 and C 299 Tubes. It is moulded with a sponge rubber base in one piece which is even better than the soft rubber recommended for use with these tubes. Very neat and attractive. Price _____60c

WorkRite Hydrometer You need one for your storage "A" battery. Full instructions with each instrument. Price _____75c

WorkRite Head Set Very Sensitive. Light and sanitary. Try one and see. Price _____\$6.00

WorkRite Switch Set Just what you want. Use the block for drilling panel. Arms and points made to work together. Price _____50c

**"WORKRITE RADIO PARTS
WORKRITE"**

THE WORKRITE MANUFACTURING CO.

5536 EUCLID AVENUE

CLEVELAND, OHIO

(BRANCH OFFICE, 536 LAKE SHORE DRIVE, CHICAGO)



CROSLY MODEL 51
\$18.50

In 24 Days the Crosley Model 51 Became the Biggest Selling Radio Receiver in the World!

On Monday morning, February 4, Powel Crosley, Jr., returned to his desk after a two weeks' hunting trip in Mississippi. He brought with him the idea of an entirely new Radio Receiving Set to be added to the Crosley line.

A short conference with his engineers followed. On Tuesday morning, February 5, a model had been completed and tested. These sets were put into production immediately after the model was approved.

On Tuesday afternoon, February 5, night letters were sent to the leading distributors of The Crosley Radio Corporation announcing this new model which had been called MODEL 51. Wednesday afternoon, the orders commenced coming in, showing the faith of the distributors in anything brought out by this Company. Announcements were made in leading metropolitan newspapers of the country on Saturday and Sunday, February 9 and 10. Shipments commenced about February 13, and were immediately followed by an avalanche of complimentary letters and orders, and have increased steadily ever since.

Production started at 50 a day—was increased to 200—then 300—and on February 28, just 24 days after the thought of this set had been put into being, the production reached 500 a day. Orders were received on February 28 for 1,115 of these sets—every effort being made to increase the production to 1,000 sets per day to supply the phenomenal demand for this new model.

This message was written on February 29 in the face of promises of an even greater record than is indicated here.

The demand for this set has not in any way lessened the sale but has increased the orders on various other models in the Crosley line.

Now, what is this set that has made such an enviable record, which in 24 days has, we believe, become the biggest selling Radio Receiving Set on the market?

It incorporated a tuning element made famous in the Crosley Model V, the \$16.00 set used by Leonard Weeks of Minot, N. D., in his consistent handling of traffic with the McMillan Expedition at the North Pole; a genuine Armstrong regenerative tuning and detective circuit.

Now, to this has been added a one-stage of audio-frequency amplification. With the well-known Crosley Sheltran 9 to 1 ratio transformer, giving an unusual volume. Thus, this set uses 2 vacuum tubes.

It is the ideal all-around receiver. For local and nearby broadcasting stations, it will operate a loud speaker, giving phonograph volume in the home. Under reasonably good receiving conditions, it will bring in stations up to 1,000 miles, with sufficient volume for the average sized room.

When receiving conditions are bad, however, head phones should be used on distant stations.

This Receiver is unusually selective—it incorporates standard sockets so that all makes of tubes can be used. The various units are mounted on beautifully engraved grained panels, and mounted in a hardwood, mahogany finished cabinet, which completely encloses all parts and tubes.

A glance at this beautiful instrument sells it, and the results it gives create many friends for it. Perhaps the most startling thing of all is its price, \$18.50. Add 10% West of the Rocky Mountains.

Licensed under Armstrong Regenerative Patent No. 1,113,149

THE CROSLY RADIO CORPORATION

POWEL CROSLY, Jr., President
Formerly

The Precision Equipment Company and Crosley Manufacturing Company
523 ALFRED STREET CINCINNATI, OHIO

CROSLY

**Better - Cost Less
Radio Products**