

THIS TURNBULL CIRCUIT WILL SURPRISE YOU (See Inside)

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\$6.00 a Year

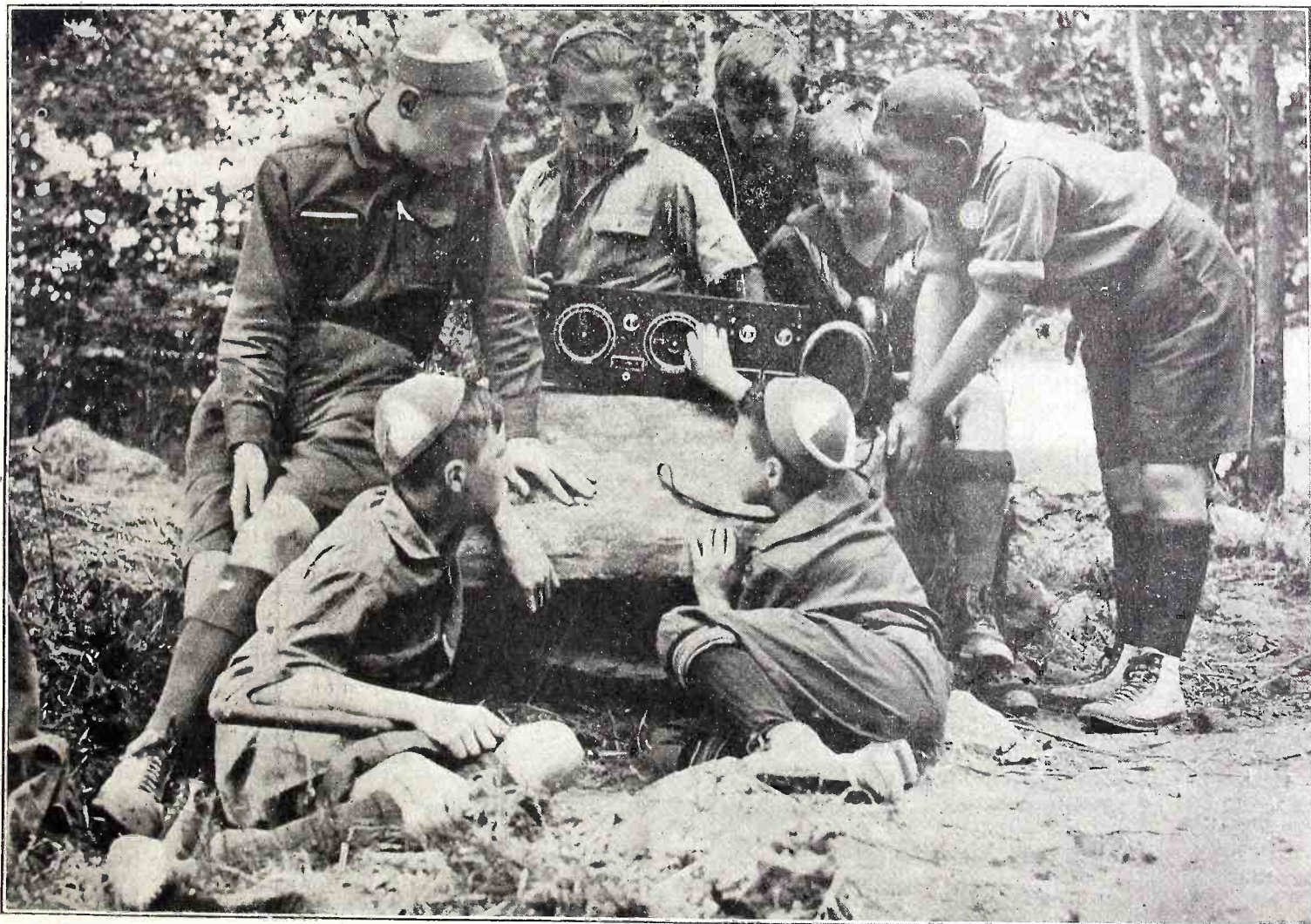
# RADIO WORLD

Title Reg. U. S. Pat Off.

ILLUSTRATED

EVERY WEEK

## RADIO RECEIVER KEEPS BOY SCOUTS HAPPY IN CAMP



(C. Photonews, N. Y.)

Boy Scouts in their camp at Kanohwahee Lakes, N. Y., spend their idle hours listening to radio music from the big broadcasters. The picture shows a group enjoying a radio concert under the shade of the trees at the edge of the lake.

SECURING THE AMATEUR'S CO-OPERATION (See Inside)



## Big Opportunities for Inventors in the Radio Field

RADIO is undoubtedly the most fertile field for the development of invention that man has under cultivation at the present time, says a writer in the *New York Tribune*. Moreover there is the greatest possible incentive to invention because of the intense public interest which broadcasting has brought about.

All of the big industrial companies are fully aware of the possibilities, and they maintain extensive research laboratories in order to solve the problems which face them in the orderly evolution of the radio art.

As a result of the stupendous growth of radio as an amusement enterprise through the medium of broadcasting, the other aspects of the art have been to a certain extent overlooked, yet they are as a matter of fact vastly more important. Just think what radio communication is as a method of insuring life and property at sea, especially the radio compass in protecting valuable ships!

Take, for instance, the value of radio in cases of distress. The difficulty of equipping every vessel which floats is not so much a question of expense for apparatus, as one of expense in maintaining operators aboard so that a continuous watch may be had. Most of the tramp steamers would be quite content to have apparatus aboard which would flash the distress call in case of need.

Under these circumstances an automatic device which would continuously send out the distress call when the captain of a tramp steamer pressed a button would be a most valuable contribution to the art. Such an apparatus would adequately cover the needs of the tramp steamer because the radio compass instruments upon other ships or at land stations would enable other operators to get the necessary information the moment they heard the distress call.

The greatest drawback to the development of trans-Atlantic wireless communication at the present moment is interference. Continuous wave telegraphy has improved matters a great deal, but there is still a lot left to be desired.

Radio, while it may not immediately supplant the cable, will in the near future supersede it. The reason is that in radio there is none of the inherent difficulties which exist in cable operation. Theoretically there is no limit to the speed which trans-Atlantic wireless communication can be operated at. Automatic transmitting and receiving equipment already allows a speed of 200 words a minute under favorable conditions. This may eventually be increased to 1,000 words a minute.

If some means could be devised whereby dots and dashes could be dispensed with altogether and an electrical recording instrument operated by variations of frequency in alternating current above the range of human hearing the problem of interference would be quickly eliminated.

Audible frequencies, roughly speaking, range from 200 to 5,000 alternations a second. Above the latter figure there is a tremendous range which could be taken advantage of in the formation of a code of signaling, provided apparatus could be perfected which would follow the rapid change in frequency and record those changes.

In this manner continuous application of modulating current would be obtained and the present system of breaking up the current to form the dots and dashes would be avoided. Such a method would also take away the present interference caused by the low wave telegraph stations upon broadcast reception. It would, in fact, leave all of the audible band of frequencies for the exclusive use of radio telephony.

It is hardly necessary to point out the need for a static eliminator. The inventor of such a device would be in a position to write his check for any amount of money his fancy might dictate. It would at once remove the curse from all wireless telegraph communication and permit the instantaneous linking up of every part of the world in the most economical manner.

For broadcast listeners it would be an inestimable boon, and from this source alone a very large fortune could be obtained by the successful inventor. In the realm of radio telephony it would enable us to establish immediately day and night telephone communication with all parts of Europe in such manner that the radio system could be effectively and economically linked up with the land telephone systems on both continents.

## French Airplane Steered by Wireless 250 Miles

A PARIS dispatch to the Associated Press states that a French government airplane has successfully completed a flight from the Saint Assises wireless station to Tours and return, a total of about 250 miles, steering only by wireless.

The indications were received on an apparatus called the radio goniometer, which showed the airplane's position with relation to the wireless station. This device enabled the pilot to make the journey with an error of only 2 per cent in direction on the outward flight and with entire accuracy on the return.

The test was announced as proving the practicability of such a method for night flying.

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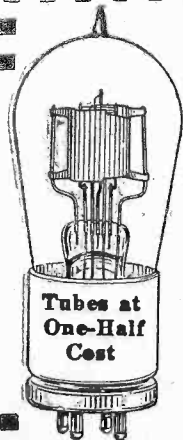
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[Entered as second-class matter, March 28, 1922, at the Post Office at New York, N. Y., under the Act of March 3, 1879]

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August 4, 1923

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## A Dry-Cell Tube Circuit That Will Surprise You

By A. D. Turnbull

HERE has been much said lately about the relative capabilities of single circuit sets versus tuned circuit and the interference caused by re-radiation in the case of the first mentioned type. Discounting the fact that a single circuit set in the hands of an amateur is capable of creating a private bedlam all its own, there is probably no type of circuit yet discovered that will give the volume on one tube that this type will deliver. Furthermore, when you combine capacity feedback and the super-regenerator principle, a circuit of this type will produce signals that are equal to a triple circuit with at least one stage of audio and radio-frequency amplification.

A circuit that is easily controlled and that will, if operated properly, produce exceptional results in both distance and volume, is shown on this page. As can be seen it combines several features not found in any other circuit. It is flexibility personified, as with an ordinary type of variometer and an antenna of from 75 to 100 feet in length it will tune from 180 to 600 meters with no trouble at all. It is as efficient on 200 meters as it is on 600, not losing any volume or selectivity at either extreme.

Apparatus necessary for the construction of this set is easily obtainable as there are no parts that have to be specially constructed or sought for. They are: 1 variometer; 2 .001 fixed condensers; 1 .00025 grid condenser (no leak); 1 grid leak, 2 megohm (preferably tubular type); 1 .0005 vernier variable condenser; 1 dry cell tube; 1 socket; 1 vernier rheostat.

When constructing the set pay particular attention to keeping the leads separated and well insulated. If leads are allowed to run parallel the whose purpose and scheme of the receiver will be defeated as due to the capacity feedback and coupling, any extra capacity which is allowed to enter the circuit will entirely destroy the principle of the set and you will have a set which tunes broad and has no volume.

Too much stress cannot be laid on careful construction, especially the location of the condensers A, B, C. These are the controlling features of this circuit and they should be located in such a manner that the leads from one cannot interfere with the leads of another.

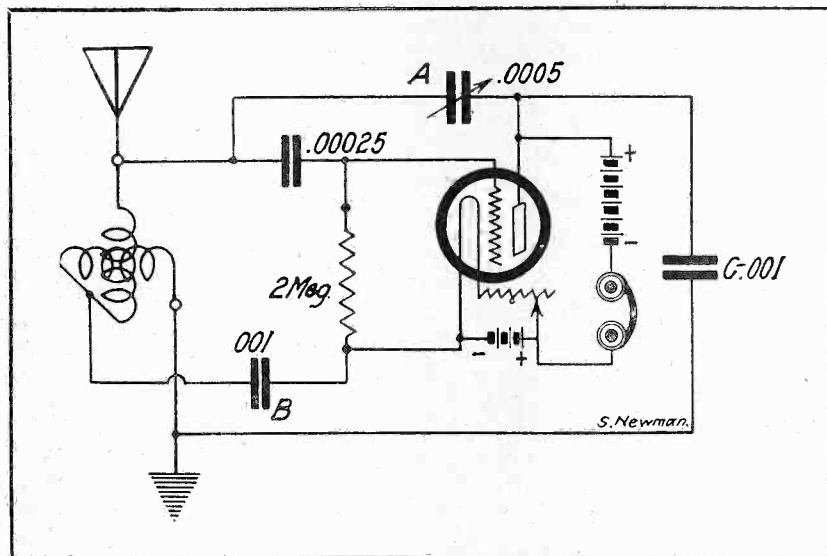
When the set is constructed it is necessary to shield the panel, but it should not be grounded to the ground terminal. In this set it is much better to ground it to the minus side of the filament, as if grounded to the ground terminal, it will form one side of a condenser with your body through the phones as the other and every time you go to tune the set it will break out in the most awful howls and capacity effect will be so bad that you will have to tune it with a broomstick.

The set is tuned in the following manner: The feedback capacity A is set at about 50° and the variometer is turned till the carrier wave of a station is heard. The rheostat of the tube is then turned down until it is just above the point where it "clicks" out. If when tuning this part of the circuit it goes out, go back and re-tune the filament until it is just at that point. Then using the variable condenser, tune the set until the signals are clear and loud, clearing up all the noise with the vernier of the condenser.

As advantage of the super principle is taken, a lot of noise will ensue if the circuit is not tuned correctly. So if when the set is first tuned you get lots of funny sounds do not be discouraged but learn to tune it properly and you will find that it is a very selective and sensitive circuit.

Of great importance is the tapping of the variometer. The two winding of the stator and rotor are generally connected in a manner that makes this easy as most variometers use the shaft of the rotor to make the connection, but if yours doesn't, trace the windings and tap it with flexible wire.

If trouble in clearing up the signals is noticed you  
(Concluded on next page)



Circuit diagram of a receiver that will enable the average fan to reach out and corral the long distance. Watch the condenser capacities.

# Influence of Radio on Arctic Expeditions

By Hendrick Hansen

**S**WINGING off to the top of the world! A little packet of letters from members of the expedition to their friends at home, left at a tiny village at the northern coast of Labrador, and every Arctic exploration party turned toward the vast ice fields to the North with all ties to civilization broken. While their last farewells were carried back to the States, they proceeded slowly to the land of ice, darkness and Northern Lights. The world bid them "bon voyage" and forgot them for months and even years.

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iliary schooner "Bowdoin." Four strands of wire between the masts of this little vessel comprise the link that makes the parting easier and the future less doubtful.

Cheerfully will they leave their letters on the Labrador coast for they know that these are not the last farewells; radio will keep them in contact with the world below—there will be no good-bye—and while they wave a greeting to natives on shore, Donald H. Mix, their radio operator sent by the American Radio Relay League, may even then be communicating with amateurs 2,000 miles away, or listening to concerts from Chicago.

In the forecastle of the little vessel with headphones fastened over their ears members of MacMillan's crew, through this marvelous new adaptation of radio, will not only listen to the same concerts that thousands hear nightly at home, but what is of more value to them the latest news of world happenings from the Arlington station. And just as they will keep informed of national and international events as well as the result of a world championship bout or the outcome of the next presidential election, so will they describe their own vivid experience in scientific exploration.

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Should some sudden emergency overtake the exploring party and their rescue be brought about then the weeks spent in preparation, the painstaking care while the radio equipment was assembled and installed to the satisfaction of expert engineers, will not have been in vain and radio will have proved its value in a new field.

One of the spectators of MacMillan's departure from the Maine coast was Major General A. W. Greely, leader of the Greely expedition of 1881. "The whole cause for the death of 18 members of the party," he said referring to his own experience, "was due entirely to the fact that the relief expeditions failed to reach us and our supplies consequently gave out. Of the 25 members, seven were finally rescued, but one man who had lost his hands and feet died from the effects of experience in Greenland where the party stopped on its way home."

Under such circumstances what would radio have meant to the Greely exploration party? What may it mean to Donald MacMillan who is now on his way to the desolate ice fields where so many have gone but for one reason or another failed to return?

What power there is in four little strands of wire!

## Ode to Electricity

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Whose awful glitter quells and blinds my eye,  
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And smites the steeple with a sudden stroke;  
Lights as with sunshine the on-rolling storm,  
Causing the world to shrink from seeming harm;  
Splitting the stubborn granite to the core,  
Ere the slow thunder breaks with sullen roar—  
And I bow down in reverence to the sod  
Before a might that's god-like but not God.

Yet, scouting fear, I list you, marvelous friend,  
Who at a finger's touch will noontide send;  
Who, with your faithful, tiny suns, will light  
The haunting blackness of the starless night;  
Who at a button's pressure bids the cranks  
And belts and wheels of workshops play their pranks  
Of usefulness in Labor's priceless cause—  
You, the invisible fashioner of laws.

And as the daring Franklin, from the shroud  
Of thunderbolts that lesser souls had cowed,  
Coaxed with his kite the tingling proof that we  
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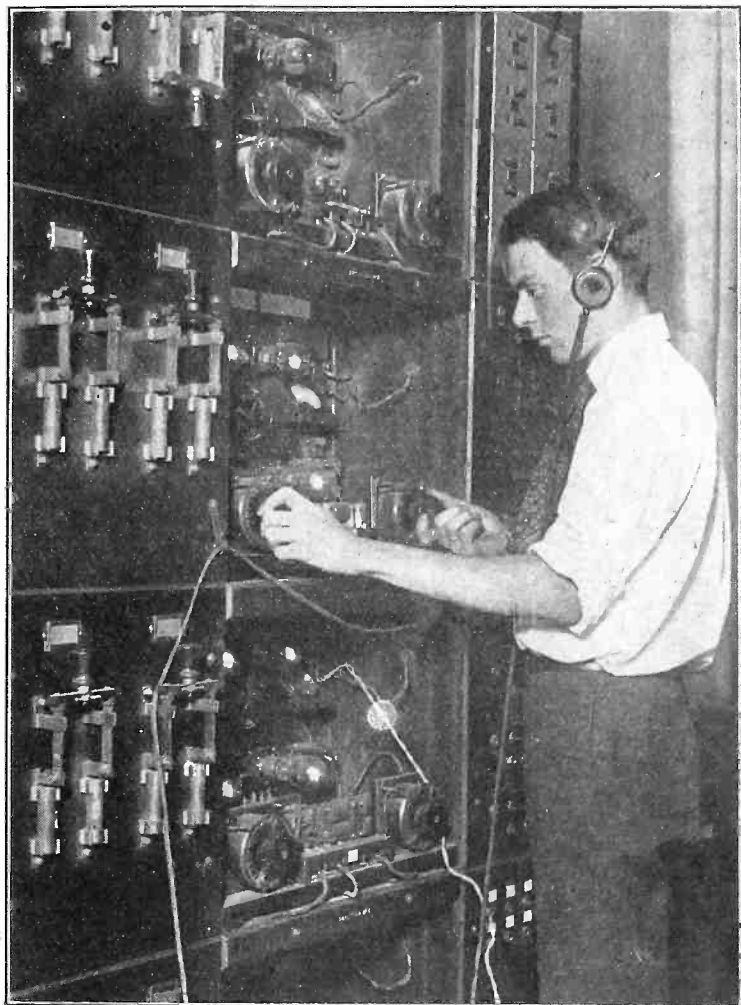
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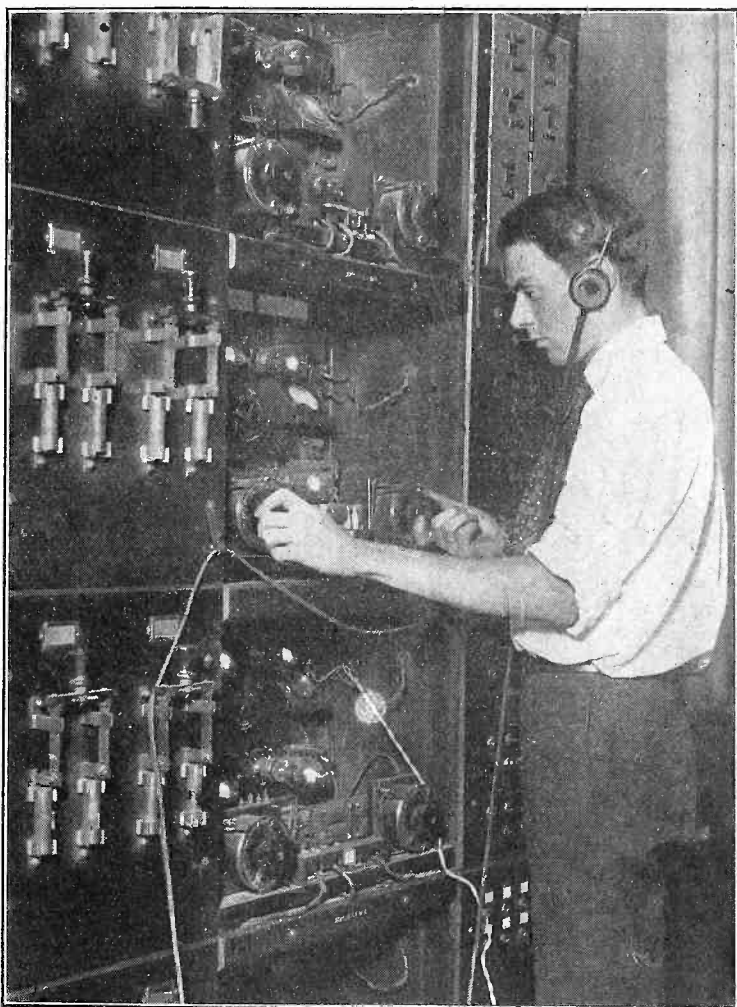
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In the forecabin of the little vessel with headphones fastened over their ears members of MacMillan's crew, through this marvelous new adaptation of radio, will not only listen to the same concerts that thousands hear nightly at home, but what is of more value to them the latest news of world happenings from the Arlington station. And just as they will keep informed of national and international events as well as the result of a world championship bout or the outcome of the next presidential election, so will they describe their own vivid experience in scientific exploration.

The use of radio for Arctic work is new and untried and the results of the plan of communication, designed jointly by Captain MacMillan and officers of the American Radio Relay League, are expected to pave the way for future expeditions under vastly improved circumstances both as to the morale of the explorers and the enlightenment of science.

Should some sudden emergency overtake the exploring party and their rescue be brought about then the weeks spent in preparation, the painstaking care while the radio equipment was assembled and installed to the satisfaction of expert engineers, will not have been in vain and radio will have proved its value in a new field.

One of the spectators of MacMillan's departure from the Maine coast was Major General A. W. Greely, leader of the Greely expedition of 1881. "The whole cause for the death of 18 members of the party," he said referring to his own experience, "was due entirely to the fact that the relief expeditions failed to reach us and our supplies consequently gave out. Of the 25 members, seven were finally rescued, but one man who had lost his hands and feet died from the effects of experience in Greenland where the party stopped on its way home."

Under such circumstances what would radio have meant to the Greely exploration party? What may it mean to Donald MacMillan who is now on his way to the desolate ice fields where so many have gone but for one reason or another failed to return?

What power there is in four little strands of wire!

## Ode to Electricity

By Will Chamberlain

**S**OME call you Jove, but back of you, I know,  
There is a vaster Power that guides your flow,  
That thrusts your zigzag saber through the sky,  
Whose awful glitter quells and blinds my eye,  
Whose magic lance rends to its heart the oak,  
And smites the steeple with a sudden stroke;  
Lights as with sunshine the on-rolling storm,  
Causing the world to shrink from seeming harm;  
Splitting the stubborn granite to the core,  
Ere the slow thunder breaks with sullen roar—  
And I bow down in reverence to the sod  
Before a might that's god-like but not God.

Yet, scouting fear, I list you, marvelous friend,  
Who at a finger's touch will noontide send;  
Who, with your faithful, tiny suns, will light  
The haunting blackness of the starless night;  
Who at a button's pressure bids the cranks  
And belts and wheels of workshops play their pranks  
Of usefulness in Labor's priceless cause—  
You, the invisible fashioner of laws.

And as the daring Franklin, from the shroud  
Of thunderbolts that lesser souls had cowed,  
Coaxed with his kite the tingling proof that we  
Acknowledge everywhere on land and sea,  
So I, the least of men, with frail lines plod  
Before a force which says, "There is a God!"

(Concluded from preceding page)

can experiment with a smaller grid leak capacity, but for most dry cell tubes I have found that two megohms is about the correct capacity.

If the set is carefully constructed and directions are all closely followed, the builder will have a set that he can rely upon to bring in the most distant stations clear and undistorted and with a minimum of tuning.

## Do You Watch Them?

**M**OST fans using dry cells for lighting their tubes never think of their batteries until they actually go dead on them. It is always a good plan to test them with an ammeter every so often. By doing this you can keep an accurate check on your filament supply and never need miss anything for need of "juice." Remember the old saying that runs something like this: "For want of a nail the shoe was lost, etc."



## Helpful Summer Hints for Listeners

**T**HESE are ten good rules for broadcast listeners:

1. Don't try to hear Australia in midsummer. Be satisfied to enjoy the nearer stations most of the time.

2. Don't be disappointed if an occasional storm interferes with your summer radio evening. There are many fine concerts coming. You can't expect to find a pearl in every oyster, nor to receive a record-breaking concert every night.

3. If you want louder signals use a longer aerial, more tubes, higher plate voltage, more sensitive loud-speakers, and more careful tickler and receiver adjustment.

4. A pleasant signal filling a moderate sized room

Remember that "Rome wasn't built in a day" and keep on getting more and more familiar with your set and how it works.

8. It is a fine idea to read a good radio magazine or two. It helps you to know how your set works and keeps you up to date in radio. Information of this sort is an aid in getting the concerts loud and clear.

9. Ask your radio dealer for advice; he can probably tell you what you want to know, and will be glad to do so. The manufacturer of your set is also willing to help you get the desired results from its use.

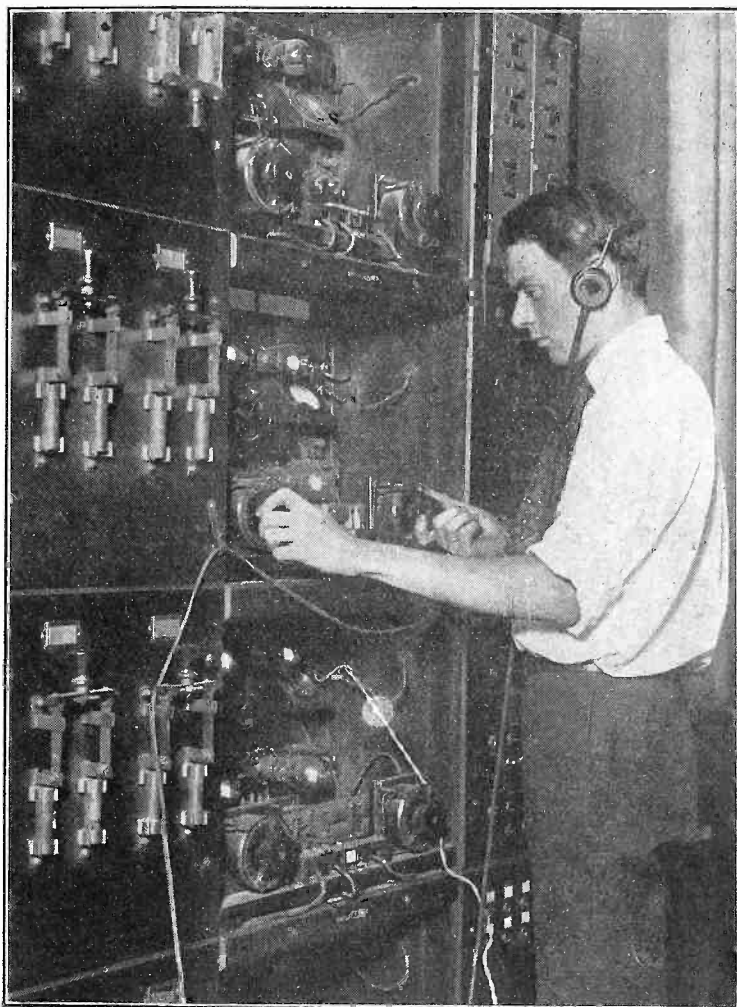
10. Do not throw away the direction sheets or booklet that came with your set and with the tubes. Read all such

## Round Trip in Three Minutes

The picture below is a view in the New York sending station of the Radio Corporation of America. Messages are sent from here direct to London, Paris and Berlin through the control station at Rocky Point, Long Island. A high-speed duplex system is used on wave lengths from 10,000 to 20,000 meters. At the right is illustrated the receiving apparatus which catches the signals automatically relayed from Riverhead, Long Island, and transmits them to operators who decode them. A round trip from New York to London in three minutes is common.



(C. Kadel & Herbert)



(C. Kadel & Herbert)

should be enough to give satisfaction. It is not worth while producing signals which deafen the neighbors. It is wasteful to insist on tremendous signals, which are generally less pleasant than moderate signals.

5. If your local station comes in too loudly and drowns others out, a smaller aerial will help in tuning him out, with a smaller condenser connected between aerial and ground. And if all measures to get rid of the local station fail, why not enjoy his concerts? He is working hard for you, and it is nobody's fault that you are so close to him that you are bound to hear him. Broadcast stations have to be closer to some people than to others.

6. For the new longer waves above 450 meters use a condenser connected between the aerial and ground terminals of your set.

7. A little patience in learning to handle your receiver yields rich returns in satisfaction from fine signals.

material carefully now and then. If you have lost the direction sheet write to the dealer or manufacturer for another. The direction sheet must answer most of the questions which have been puzzling you and preventing you from getting the best out of your set.

## Tipping You Off

**W**HERE a set is used that combines radio-frequency and tube detector, with either straight or regenerative qualities, it is much better to use separate A and B batteries than to combine the leads so as to get all the tubes feeding from one set of batteries. You will find you will not be bothered with broad tuning and the distance you will get will be increased.

# Securing the Co-operation of the Amateur

By *Kenneth M. Swezey*

**I**N most every town and hamlet where there are at least a few amateurs, you are certain to find a radio club. Radio, more than any other popular avocation, seems to harbor such a powerful fraternal spirit that the average person has a hard time to dodge. That is, referring to the real dyed-in-the-wool amateur—the “ham.” These clubs serve the purpose of bringing the members together for good fellowship, and more than that, they serve to disseminate a greater understanding of radio by the exchange of ideas, the conducting of classes and the making of group experiments. Many clubs have a very complete equipment of apparatus, both sending and receiving, along with facilities for theory instruction and code practice. And probably a goodly number of the members are experts, having at their command a proficiency above the average commercial man. Indeed, many of the members of clubs with whom the writer is acquainted hold first-grade commercial operators’ licenses.

Ever since the inception of broadcasting on its present scale there has been a misunderstanding between the broadcast fans and the amateur. One continually flays the other without rhyme or reason—and simply because the existing conditions are not clearly understood. It seems that the broadcast fans have been doing most of the kicking, so I will take up the brief of the amateur, and try to show the fans the utter lack of antagonism on the amateur’s part toward them.

The amateurs are not a bunch of kids whose only ambition is to disturb the ether, bust up the programs and all such nonsense. As was mentioned before, they are most of them well-trained mature fellows who are in the game for pleasure and development. During the past year they have voluntarily sacrificed a good portion of their rights for the sake of broadcasting. They resigned themselves to the very late hours of the night so that the concerts could go on undisturbed, when really they were not the disturbing factors at all, but the poor tuning ability of a large percentage of the receiving sets. The amateur wave length band is sufficiently distant from the broadcast band to enable all good sets to tune them out completely. So, after all, the amateur is not such a bad fellow.

To convince himself that what I have said is true, the best thing the broadcast fan could do is to visit one of the clubs and perhaps join it. Lists and announcements of their doings can be found in this or most any other radio magazine. You will have an interesting time and you will find the “hams” very willing to co-operate in anything pertaining to their hobby. If you have anything the matter with your set, take it along with you, and let them have a hand at trying to diagnose its ailment; it’s great sport to them, and each will try to show his superior knowledge.

The harder and more knotty the problem, the better it is

It is very probable that the vast broadcasting audience would advance a long stride if they would take advantage of the service that the amateurs offer them. The ignorance that now exists would soon fade away in the light of proper instruction. There would be less worthless apparatus sold and fewer good sets ruined by lack of operating knowledge. And the amateur would be able to take a step forward because of the increased membership in the ranks and the increased capital resulting therefrom.

Just what has the club to offer the fan? Well, I will use for an example a representative club in which I have a membership. First of all, it offers to increase your friendship circle by about twenty good old scouts; that’s a point not to be overlooked. And they are truly real good fellows—except that they will talk you deaf, dumb and blind about radio and nothing else. Next, it offers a person sound theory instruction on the subject. By the aid of good instructors, blackboard talks and practical demonstrations they can pump enough “dope” into your head in an evening to swell it beyond the hatband limits. Besides the regular theory, the members bring their individual problems, new hook-ups, and such things, to be discussed.

If you want code instruction, here is where you can get it, and first class stuff at that. This particular club had code tables arranged for different speeds, and had the option of either hand sending or sending with an omnigraph. I know of at least eight fellows, who joined the club with a very slight knowledge of radio, and in a few months had successfully taken their first grade amateur license examination.

The club also offers social features that are worth while. Every month or so they set aside for a festive occasion, when they have a great time with the games and their “eats.” When it comes to filling the stomach, the non-technical fan can put up as good a showing as his fraternal brother, the ham.

Everything considered, the getting together of the hams and the fans would be mighty beneficial. For one thing it would instill a respect in the mind of the fan for the amateur; and the amateur might think a whole lot more of his fan brother if he knew him just a little better—just enough to realize him as human. A lot of receiving set owners would get to understand their apparatus better, and there would be less cheated and disappointed souls. And as a result of this, a great strain would be taken off the newspaper and magazine question and answer departments. Thus more time would be given the editors to produce better goods. And the fan and the amateur will exclaim in unison, “This is Heaven! Where do we go from here?”

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## Where to Look for Trouble

**I**F you hear a constant clicking noise, like the dropping of water on a hot stove, vary your grid leak and watch your grid condenser.

If there is a steady sound like a motor running, look around for a loose or broken connection.

If your tube vibrates when the set is operated mount the socket on felt or soft rubber.

If there is a crackling sound when the coupling is increased, decrease your filament current.

If the signals stop and go and the set is functioning properly, inspect your antenna. It is probably swinging and grounding periodically.

If your set howls when you are tuning, or the signals fade when you take your hand from the controls, shield your panel and ground the shielding.

If your set will not oscillate, reverse the plate and phone leads of your tickler.

If signals are weak, look for dirt and dust inside.



# A Radio-Frequency Push-Pull Amplifier Using a Crystal Detector

By J. E. Anderson, M. A.

THE push-pull circuit for the amplification of audio-frequency currents is well known in radio circles, but it has not gained the popularity that it deserves on account of the difficulty of obtaining the necessary transformers. Only a few manufacturers have placed these coils on the market and the number of dealers handling them is very limited. It is to be hoped that this condition will soon be remedied, and that the coils may be procured at a price that is commensurate with the pocketbook of the average amateur, so that all who desire may avail themselves of the advantages of this circuit. In the meantime, however, we may apply the same principle to a radio-frequency push-pull amplifier and thus retain some of the advantages of the balanced circuit. This may be done at an expense no greater than that of an ordinary radio-frequency amplifier since the necessary coils may be constructed at home.

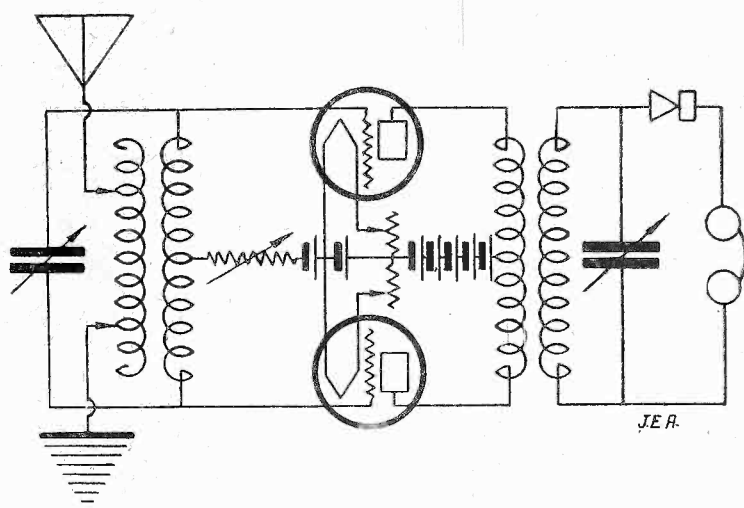
The accompanying diagram illustrates one method of connecting a push-pull radio-frequency amplifier, using a crystal detector to render the signals audible. In this circuit double tuning is used on the input side of the tubes and the output circuits are tuned indirectly through tuning of the secondary of the output oscillation transformer. The middle point of the grid coil is connected to the negative end of filaments through the common "C" battery and a variable resistance. The positive side of the common "B" battery is connected to the middle point of the plate coil and the negative side of the "B" battery is connected to the positive side of the "A" battery.

This circuit may be used without any connection between the middle point of the grid coil and the negative end of the filaments with fair results, but the grids will then be "floating" and there will be no definite grid potential with respect to the filament. If the proper negative biasing battery is inserted between these points the circuit is liable to oscillate vigorously and no signals will be heard. But the oscillations may be stopped by inserting a resistance in series with the battery as is shown in the diagram. The amount of this resistance necessary depends on so many conditions that it cannot be stated; it must be found experimentally for each circuit, and for this reason the resistance should be variable. Sometimes the circuit will not oscillate when the resistance is zero and at other times several thousand ohms will be required to stop oscillations. The tendency of the circuit to oscillate depends on the various characteristics of the tubes, the inductance of the grid and plate coils, the degree of coupling in the two oscillation transformers, and on the degree of unbalance of the two tubes.

The most important consideration in this circuit is to obtain as nearly perfect electrical balance as possible. The two tubes should be alike in all their characteristics and they should be carefully adjusted to operate over the corresponding parts of their characteristic curves. This may be done by adjusting the "C" and "B" potentials separately, but it is more convenient to use common batteries and adjust any small unbalance in the circuit by adjusting the temperatures of the filaments. The use of small compensating batteries would merely introduce complications. The adjust-

ment for electrical symmetry may be facilitated by maintaining physical symmetry in constructing the circuit. This would automatically balance out any stray electro-magnetic or electrostatic effects. If the input impedances of the two tubes are different, the effective input potentials will not be the same, even if the electromotive forces induced in the two halves of the grid coil are the same, and the resulting currents in the two plate circuits will not be equal. This may be corrected by connecting the common grid return lead to a point to one side of the middle. This, however, is not recommended. Similarly, if the output impedances of two tubes are different, the output currents will be different, even if the effective input potentials are the same.

The best way of testing the circuit for unbalance is to insert a small coil in series with the "B" battery and to couple a detector circuit to this coil. If the circuit



Hook-up for a radio-frequency push-pull amplifier.

is perfectly balanced there will be no sound in the telephone in this detector circuit. This condition cannot be attained ordinarily in a practical circuit, but it may be approached closely by adjusting the circuit until the sound is a minimum. It will not do to insert a telephone directly in series with the "B" battery in order to test for unbalance. This would merely show whether one tube is a better detector or rectifier than the other, and would not show their balance as amplifiers.

The variable resistance in the grid circuit may be used to control regeneration as well as the oscillations, provided it is capable of variation in small steps or of continuous variation. If it is desired to use a tickler to obtain regeneration for long wave lengths, this should be inserted in series with the secondary of the output oscillation transformer and placed in inductive relation with the grid coil.

Since only one-half of the grid coil is in each grid circuit, this coil should be larger than is usual in order to get a high potential on each grid. If an 11-plate variable condenser is available the coil should have an inductance of about 400 microhenries. If a 23-plate condenser is used the inductance should be about 200 microhenries. The first combination is preferred.

(Concluded on next page)

# Auxiliary Radio Equipment Saves Passengers

**A**N example of the value of auxiliary radio power in the form of batteries on seagoing vessels and the necessity of their frequent inspection, is found in the report on the total loss of the S. S. "Advance."

When the "Advance" went aground off Halifax recently, the operator found that his power was cut off soon after grounding, as it was feared there might be a boiler explosion. This made it necessary for him to shift to his emergency batteries for transmitting SOS calls to ships and shore stations. His batteries stood up one-and-a-half hours, when it became necessary to

abandon ship. All lives were saved, though the vessel itself was lost, due to the bringing of aid by radio.

There would undoubtedly have been a loss of life if the batteries had not been in good shape, and it is understood that just before the vessel cleared from Boston for Halifax, a government radio inspector discovered that the old batteries were in very bad shape and condemned them. The owners immediately installed an entirely new unit of battery power supply, which insured radio communication when the regular power failed.

## The Radio Woman

**W**HY don't more of you ladies sit down once in a while and write me your experiences or troubles or joys of the redoubtable radio set? It's really an easy thing to do, sisters, and you'd be surprised how delighted some of my readers are at seeing their literary efforts in print. The next time you have a spare minute or two think of me and tell me something about that set you are all enjoying so much. Just write as you talk—our editors will polish up your efforts.

\* \* \*

The other night, when they were giving out the returns of the Leonard-Tandler fight, I unfortunately had an appointment and could not remain at home with my men folks who were waiting for the returns. I passed about four radio shops and at each one the same condition existed—a mob of men and women, mostly men, of course, were gathered about the store and way out into the gutter intently listening to the reports of the rounds. I was just thinking how much more comfortable my little brood was at home with iced tea to sip, cozy lounging chairs, and no crowding. If some of these men could see the picture in my mind, they would undoubtedly walk into one of those stores instead of remaining outside, and purchase the best set they could afford.

\* \* \*

I told F. H. of the conditions existing on the outside and he said, "Well, my dear, we can't all be prosperous and some have to be on the outside or the inside will be crowded, too."

\* \* \*

One of my little boy friends, a high school senior, is working during his summer vacation for the first time. He could have gone to the country with his mother and younger brother this year as usual but preferred to remain in the city with his dad this year. He is earning twelve dollars a week at a place quite near his

home, which means no outlay for carfares or lunches and allows him to keep his salary. His intention is to work for seven weeks, save up \$84.00 or thereabouts, and buy a beautiful radio set when the winter is here. His parents wisely refused to lay out the money—hence his sudden burst of worthy ambition.

## New Broadcasters Licensed

**E**IGHT new broadcasting stations of the A Class and one in Class B were licensed during the past week by the Department of Commerce. Four stations in Class C were transferred to Class A and one to Class B.

### New Class A

Call	Station	Frequency Keys.	Wave Length, Meters	Power, Watts
KFIY	Brott Laboratories, Seattle, Wash..	1,270	236	15
WSAU	Camp Marienfield, Chesham, N. H.	1,310	229	10
WSAW	Curtice & McElwee, Canandaigua, N. Y. ....	1,090	275	100
KFIZ	Daily Commonwealth, Fond du Lac, Wis. ....	1,100	273	100
KFJI	Liberty Theatre, Astoria, Ore.....	1,190	252	10
KFJF	National Radio Mfg. Co., Okla- homa City, Okla.....	1,190	252	20
KFJC	Post-Intelligencer, Seattle, Wash..	1,290	233	100
KFJH	The Sugar Bowl, Selma, Cal.....	1,100	273	10

### New Class B

WRC	Radio Corporation of America, Washington, D. C.....	640	469	500
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### Transferred from Class C to Class A

WWL	Loyola University, New Orleans, La. ....	1,070	280	100
KFCZ	Omaha Central High School, Omaha, Neb. ....	1,160	258	100
WLAN	Putnam Hardware Co., Houlton, Me. ....	1,060	283	250
WRAD	Taylor Radio Shop, Marion, Kan..	1,210	248	10

### Transferred from Class C to Class B

KDZE	Rhodes Co., The, Seattle, Wash...	660	455	500
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(Concluded from preceding page)

From 60 to 70 turns on a 3.5" tube will give an inductance of about 400 microhenries. The plate coil may be somewhat smaller than this. The magnitude of the secondary in the output oscillation transformer is not important. A 43-plate condenser with a coil of 100 microhenries may be used, or a 23-plate condenser with a coil of 200 microhenries. The antenna coil should be capable of variation in steps of a single turn.

This circuit may also be used as a single circuit tuner by connecting the grid leads directly across the antenna coil and the common grid return lead to the middle point. When this is done an antenna condenser must

be used to tune the circuit. If any changes are made in the antenna inductance they must be made symmetrically with the common middle point. Another variation in this circuit may be made by eliminating the secondary of the output oscillation transformer and connecting the tuning condenser and the crystal-telephone branch directly across the plate inductance coil. This would simplify the circuit but it would render it less selective.

The circuit described here operates as a radio-frequency amplifier, and therefore only hard tubes should be used. These are not so critical and not so difficult to balance as the detector tubes.



# RADIOGRAMS

WORLD NEWS HAPPENINGS BRIEFLY  
PHRASED FOR OUR BUSY READERS

**BXZ** has been assigned as a general signal call to all British war vessels.

\* \* \*

The coast station at Puno, Guyas, Ecuador, is now open to PG service.

\* \* \*

Amateur radio again proved its value when long distance messages were handled during the recent telephone strike in New England cities.

\* \* \*

The Director of Telegraphs of Venezuela has announced that bids will be asked for the erection of a new high-power radio station at Caracas in the near future.

\* \* \*

Commander R. R. Mann, U. S. N., has relieved Commander J. J. London, U. S. N., as superintendent of Atlantic Coast Naval Communications. He is in charge of both radio and land line circuits.

\* \* \*

Powell Crosley, Jr., president of the Crosley Manufacturing Company and the Precision Equipment Company, Cincinnati, is taking a special radio set with him on his vacation to the wild camping district of the north. He will make some special tests with this equipment.

\* \* \*

The radio baby carriage man has appeared at Forest Hills Gardens, Long Island. He trundles a loop set in a perambulator up and down the residence streets prepared to give an instantaneous demonstration—in fact, the set is sometimes talking when he pulls up to the front door.

\* \* \*

Radio returns of the Dempsey-Gibbons fight, crop reports and bedtime stories filled idle minutes under the big gas bag which carried him to victory in the national elimination balloon race last week, Lieut. Robert S. Olmstead, pilot of the army balloon S-6, said on his return to his post at Middleton. Olmstead and is aide, Lieut. John Shottow of Chanute Field, Illinois, were over Lake Erie when they began to pick up the broadcast programs.

\* \* \*

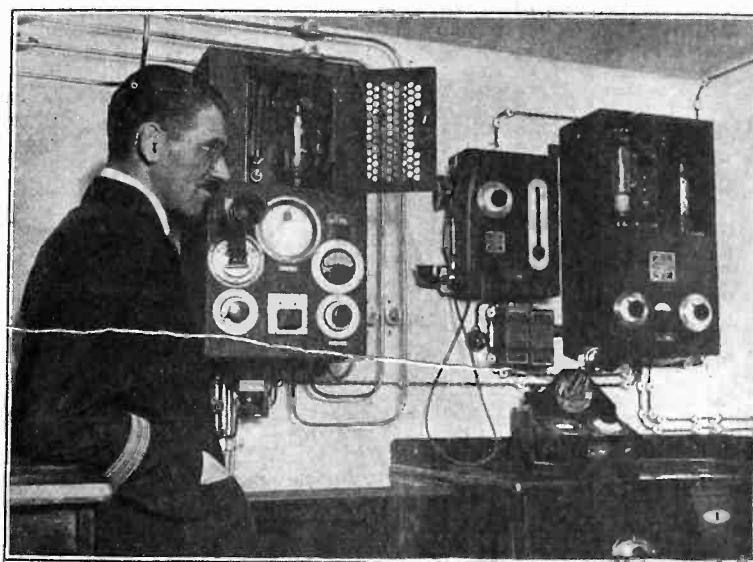
Radio service on the Great Lakes formerly handled by the Naval Radio Service has been taken over by the Intercity Radio Company, which has established stations at Cleveland, Detroit and Chicago. Other stations will be opened shortly in all the important lake cities. Ordinary telegraph service between the cities also will be handled. The new installations will operate on 1,800 meters with call letters WTK for the Cleveland station. The station will operate continuously.

Radio service for each of its 1,215 guest rooms will be one of the novel features of the thirty-story Book-Cadillac Hotel, under construction at Detroit, Mich.

\* \* \*

The French Cabinet, on Premier Poincare's demand, has passed a special decree establishing control of the material for radio broadcasting. The decree was presented to President Millerand for signature. The measure forbids the use of radio for anything except Government announcements, ministerial speeches or other matter specifically permitted by the Ministry of Posts and Telegraphs.

## Music Radioed From Ship to Shore



(C. Kadel & Herbert)

This is the equipment to be used in broadcasting music from the new S. S. "Albert Ballin's" orchestra as soon as a permit is obtained. Both panels on the wall contain speech amplifiers, which will amplify the music picked up by the microphones. The music will then enter the transmitter to be broadcast to thousands of listeners on shore. Chief Operator William M. Hannemann at the microphone.

## RADIO PRIMER

**CARE OF THE STORAGE BATTERY IN SUMMER:** During the summer months the radio set does not get as much use as it normally would, partly due to the fact that portable sets are used, and also partly due to the fact that the set is not used as much, if it is used at all during the real hot weather.

When you start in the fall, if certain precautions are not used you will be surprised to find that your battery is rapidly deteriorating. Where the battery stands idle, it should always be kept under full charge, regardless of whether it is used or not.

This is because the chemical action that takes place in a storage battery is slowly going on all the time, and if the battery is not kept charged you will find that your battery has "gone dead" on you, or worse yet, the plates will be sulphated (covered with a scaly powdered white coating) and will have to be thrown away. In view of this therefore, always take the precaution to charge it every month.

Another and equally important point in the scheme of things is the fact that the solution should be kept above the tops of the plates. During the warm weather, there is naturally more evaporation than would nor-

mally take place in the colder months. Use only distilled water and put enough in the cells every two weeks to keep the plates covered.

Keeping the battery dust proof is also a very good idea. Sulphuric acid has a very bad habit of "creeping." If some is allowed to gather on the composition filler covering the battery you will soon find that it covers the entire top of the battery, creeping to the wood and destroying it.

It is always good practice to cover the terminals and lead strips and all metal parts, such as the lugs that connect the leads of the filament circuit to the battery, with a light coating of vaseline. This is a precaution that will save much time and trouble when you start to use the set later on. If this is not done, you will have trouble with corroded joints, as the fumes of the acid will work havoc with metal if it is not properly protected.

A battery is almost like a human being in some respects. At least once a year you should take the battery to some service station and have it looked over and cleaned out. A lot of sediment generally collects at the bottom of the jars, due to the acid working on the wooden separators and other parts. If this deposit is allowed to stay, it will short circuit the plates and seriously harm the working of the battery.

# The Vacuum Tube as An Amplifier

By C. White, Consulting Engineer

**I**N a previous article I endeavored to explain the difference between the vacuum tube when it was employed as a detector and when employed as an amplifier. For a brief summary, the determining factor was the particular characteristic we were working the tube on that would decide whether the action were that of a detector or an amplifier. Then again, when a tube was to be used as a detector it must have a rectifying quality which is not at all present when the tube is to be used as an amplifier. You will also note from the previous article that when a tube is used as a rectifier it is only the positive impulses that are passed on to the plate circuit, and also that when the grid is positive there is a small current flowing on the grid circuit. This is the reason that a grid leak resistance is used in the grid circuit of a detector tube to regulate the resistance of the leakage path of this cur-

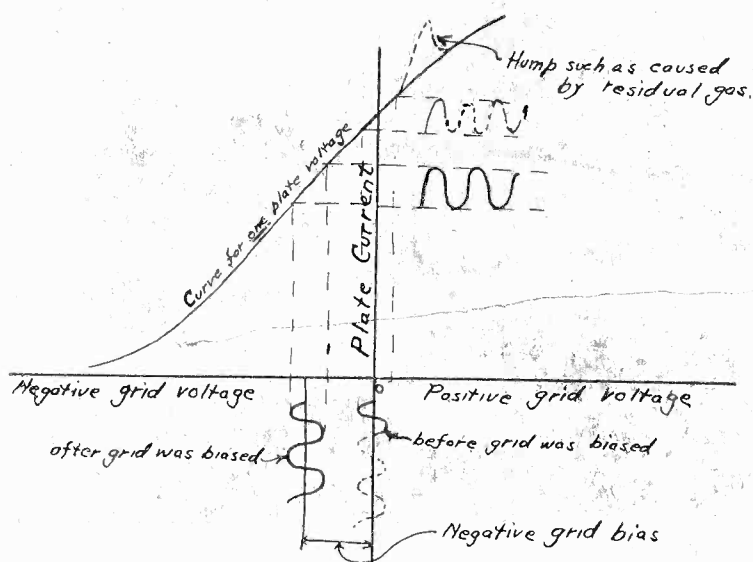


Fig. 1—Results of laboratory tests on a soft tube.

rent, or of the positive charges on the grid, if you so desire to think of the action in terms of charges. But when the tube is acting in capacity as an amplifier, negative as well as positive impulses must be passed on amplified to the plate circuit, otherwise serious signal distortion would result, to say the least. The grid current, though only appearing on the positive impulses of the grid voltage, would not at all be beneficial since it would flow through the secondary of the amplifying transformer, thus causing the core to be demagnetized, thereby cutting down the volume. To overcome this tendency of the grid to become positive at times it is customary to connect the grid return wire to the negative leg or side of the filament "A" battery. This action causes the grid to be biased with a negative potential which does the same thing graphically as shifting the grid variations from the dotted line position, as shown in Fig. 1, to the solid line position. It means that the grid will remain negative at all variations of the grid potential, unless the positive throw of the grid alternation is greater than the negative bias, and under such circumstances an additional negative potential bias must be obtained from a "C" battery as illustrated in Fig. 2. If, perchance, a high "B" or plate battery voltage is employed the grid will have a strong tendency to become positive at certain times, or when amplifying certain notes. This means that there will be a grid current for those particular notes and no grid current for all the others—hence distortion will be present. To prevent this a

"C" battery is used when high plate voltages are used. The advantage of the latter is that the amount of amplification is greatly increased with an increase in plate voltage provided we keep the grid negative at all times and we do not overload any part of the circuit.

The old question as to why a soft tube makes a good detector and a poor amplifier arises. A soft tube is one in which a small amount of residual gas still remains. When the filament is heated there is an electron emission from the material of the filament itself and another entirely separate electron action caused by the residual gas. The action is quite analogous to boiling a pot of fluid that contains ether and water. Of course, you would expect that the ether would boil off at a different temperature than the water. The same is true of the gas in the tube. The combination of the two actions makes the tube very erratic or "sensitive," which fact is easily seen in a laboratory test of a given tube by a hump or lump appearing on the characteristic, as shown by the dotted line on the curve in Fig. 1. A lumpy curve is no more desirable for amplification than a rough road is for motoring. Strange to say, the lumps do come in handy when a tube is to be used as a detector, but do not be misled into the belief that only a soft tube will act satisfactorily as a detector. This fact, though very common a year ago, is now falling into the background because experience has shown that a hard tube will often do the job just as well and in some cases better than a soft.

There is always a bridge from the theoretical side to the practical. Remember that I said that when the grid was negative that no grid current flowed. This fact is not entirely true for at all times there is a very small grid current, although it is to be conceded that the amount flowing when the grid is positive is many times larger. Then again, experience has taught that

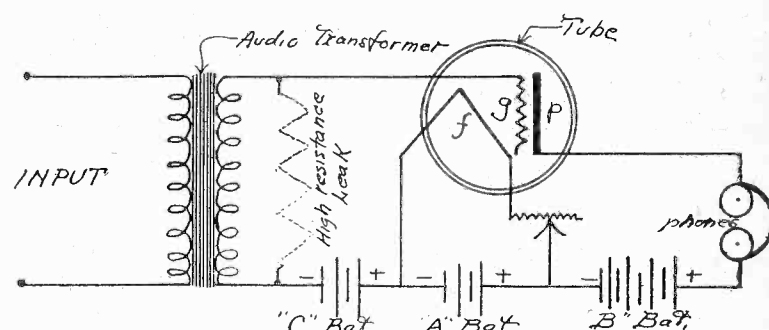


Fig. 2—Hook-up showing grid leak so placed as to cut down crackling and other noises.

a constant input impedance for an amplifying circuit is very desirable; hence the practice of placing a variable grid leak across the secondary of the amplifying transformer in order to provide a constant input impedance once it is adjusted to the correct value. If the secondary is left open the input impedance can vary anywhere from a known value to infinite value, depending upon the insulation resistance and other constants of the circuit. With some transformers you will find that a grid leak in the position as indicated in Fig. 2 certainly takes a lot of noises and crackling out of the signal without cutting down amplification to a marked degree. If you now have an amplifier and it is very noisy try a grid leak across the secondary and a "C" battery. Try reversing the secondary terminal connections to the transformer and note the difference. Little tricks will often enable you to locate trouble as well as improve your outfit.



# Second Convention of Radio Amateurs Meets in Chicago, September 12-15

**C**HICAGO, ILL.—All "Hamdom" will meet in Chicago!

The largest gathering of radio amateurs in history is scheduled for this city September 12 to 15, when the Second National A. R. R. L. Convention will be held here under the auspices of the Chicago Radio Traffic Association with headquarters at 959 Rookery. This was announced last week following receipt of information that Chicago had been selected as the scene of the convention by the American Radio Relay League Board of Direction at a meeting in New York City.

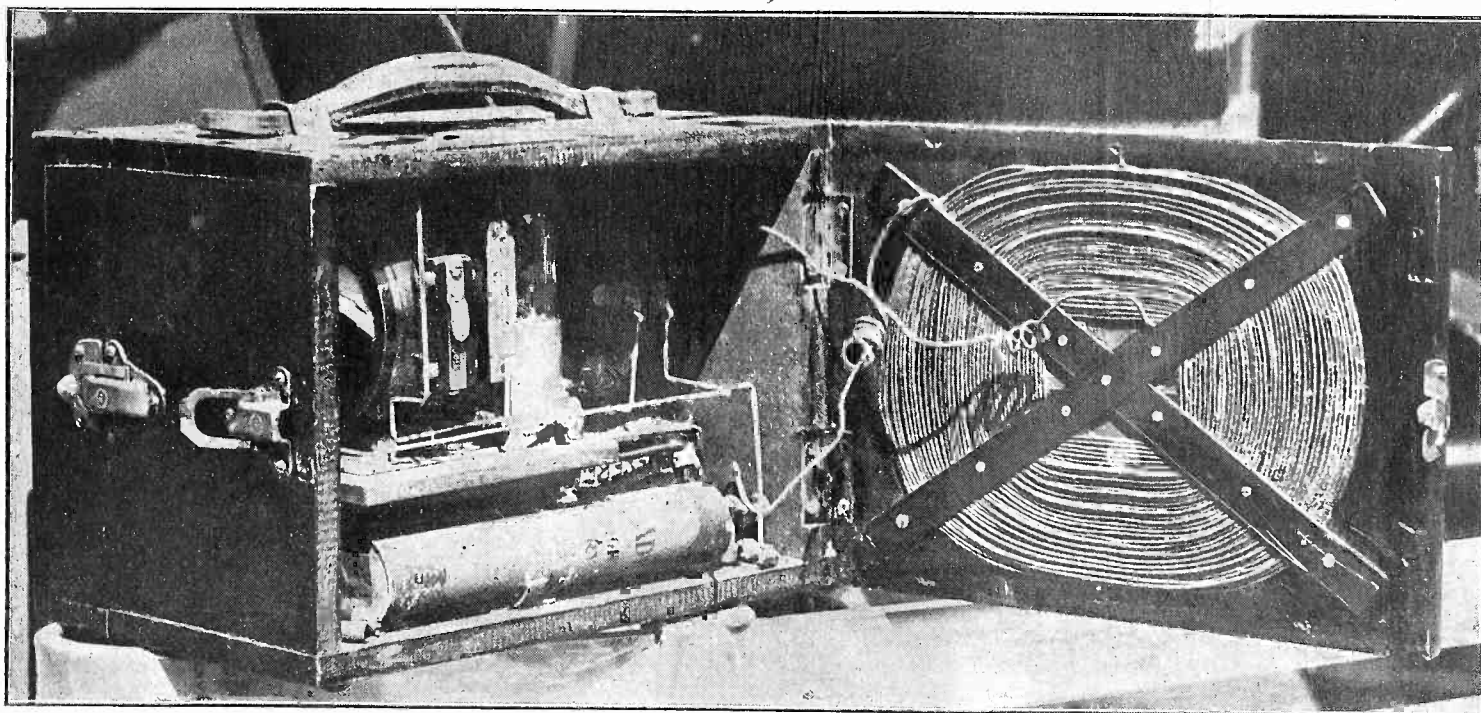
DX fans all over the country and Canada, from New York to the Golden Gate and Ontario to the Gulf, many of whom communicate with each other nightly over thousands of miles through the A. R. R. L. relay system and who know each other best by their call letters, will here meet face to face for a discussion of their special problems.

There has been but one other such convention, held here in 1921, and the tremendous strides in amateur radio since that time and with it the growth of the amateurs' representative body, the A. R. R. L., will make the coming event one of great moment to all amateurs and to the radio public in general.

Since that first meeting amateurs using low power have sent their signals across the Atlantic and Pacific Oceans, their transmitters have worked stations in Australia and New Zealand and their calls have been heard in South America and Africa. One of their number is now radio operator on Captain Donald B. MacMillan's schooner "Bowdoin" bound for exploration in the Arctic.

With their transmitting stations reducing the size of the globe month by month, amateur interest is running high and the coming convention will carry this spirit of progress in review.

## A Light Weight Portable Receiver for Automobile Use



This picture shows an interior view of a new auto portable receiver built by L. J. Miller, of Brooklyn, N. Y. The set weighs nine pounds and is complete with batteries and head phones. It operates on a 7x10-inch loop incorporated in the set. It will receive up to 25 miles in the city and 50 miles in the country.

## Condenser Substitute

**S**OME time during the operation of your transmitter you have had the hard luck of blowing a condenser, just when you needed your transmitter most. No doubt you sat there and made the surrounding air a deep navy with your remarks.

The next time it happens (we don't wish it on you, but accidents are liable to happen) don't cuss. Simply get a mason jar and a test tube, or smaller jar which will fit inside of it, and fill both three-quarters full of salt water. Immerse two leads in both jars, and you have a condenser. It is a makeshift at best, but it has saved many a futile hour hunting for a glass plate to mend the old one.

## Are You Undecided?

**M**ANY times the fan sees a circuit that he wishes to try, or wants to build a set and doesn't know which type to tackle. Will it be a triple circuit, double circuit, single circuit or reflex? If he has no experience in set building, the last one that he ought to tackle from a practical standpoint is the reflex. But if he is looking for selectivity, he ought to give the triple circuit sets careful consideration. If he wants volume he should tackle some simple single circuit, but first give a thought to the neighbors, because most single circuits can cause more ruction in a neighborhood than a mouse at a "sew-circle."

# A Crystal Receiver and Wave Meter Combined

By Kenneth Malcolm, A. I. R. E.

A WAVE meter serves the purpose which its name implies—it measures waves. Not long ago the writer was asked how anyone knew that a station had a wave length of so many meters, since the waves themselves were imperceptible to any of the senses, and they could not be measured with a rule, as visible material things could be measured. We cannot see amperes or volts or watts, yet we can measure them very accurately with instruments that are made for the purpose—and radio waves can be measured in the same way by instruments.

The length of a radio wave depends upon its frequency, and the frequency of a wave depends upon the product of the inductance and the capacity in the circuit. By knowing the inductance and the capacity of the circuit we know the frequency, and by knowing the speed at which the waves travel, we can easily calculate the wave length—simply by dividing the speed by the frequency. The waves travel through the

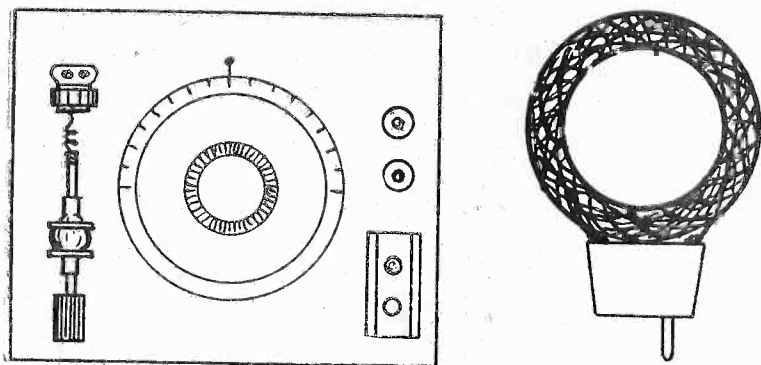


Fig. 1. Panel layout and coil for a crystal receiver and wave meter combined.

ether at the speed of light, or 300,000,000 meters a second. If we have the circuit constants of such a value that they will give a frequency of 500,000 waves a second, the process of simple division gives us the figure 600, which is the length in meters of a single wave.

To simplify the process of calculation, an inductance coil of known value is incorporated in a circuit with a variable condenser, and the combination is calibrated from standards and called a wave meter. Some of these instruments read directly in meters, while others must be used in connection with a calibration chart, which gives the meter values for the different scale readings of the condenser.

It is not absolutely necessary to have a wave meter when you have only a receiving set, but its use would prove interesting, as well as aiding in the calibration of the set and in tuning.

The meter to be described can be made quite easily and at a very moderate cost, and besides being a measure for wave lengths, it may be used as a very fine crystal receiver for use with a large loop; a loop such as described a short time ago in this magazine.

The necessary parts are few and include: a good variable condenser of .0005 mfd. capacity; the parts for a crystal detector; four binding posts; a pair of phones; a phone condenser of a capacity of about .002 or .003 mfd.; a DL coil plug socket; a DL-35 honeycomb coil;

an insulating panel 3/16-inch thick, seven inches long and six inches wide; and a box of a size to fit the panel and about four inches deep.

Too much stress cannot be laid on securing good parts—those whose constants will not easily change with weather conditions and with handling. The condenser should be of solid construction, with heavy plates that are held firmly in position and well spaced. The DL coil should be perfect, with no loose wires and with the plug well secured. The detector may be of most any type, but the one illustrated is convenient and will give good service. The parts may be bought for very little, or they may be demounted from a mounted detector. The box should be of hard wood, and of a depth sufficient to take the particular condenser which you are able to get.

With all the parts at hand, you can start to lay out the panel for drilling. The arrangement shown in the drawing is very good, both for accessibility of instruments and making short and direct connections. If you wish to use the instrument solely for a wave meter, you may omit the pair of binding posts on the right hand side next to the plug socket, for these were designed to admit the outfit being used as a receiving set with a loop, or connected in the secondary of a loose coupler.

After all the holes have been drilled, the apparatus may be assembled. Then comes the wiring. Use heavy wire for this—say, No. 18 or 14—and make the connections direct, and solder them all. The circuit for the meter is shown as the circuit in Fig. 2, in which the inductance A is included. The two right hand binding posts are connected in parallel to the plug socket. The lower pair of posts are for the phones.

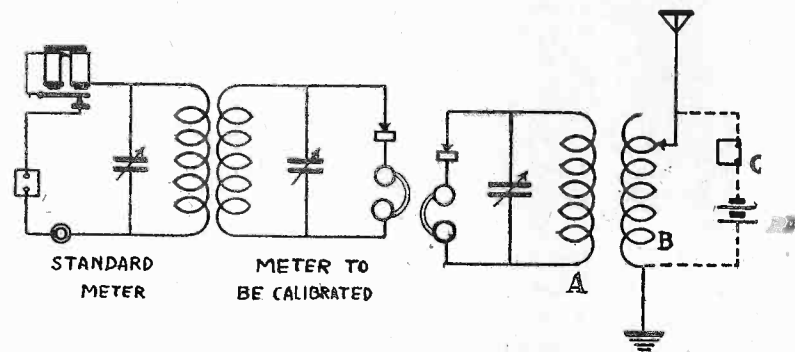


Fig. 2. Arrangement of apparatus for measuring incoming waves. Fig. 3 (at the right). Method of calibrating instrument from a standard.

When this has been done, your wave meter is complete, except for the calibration. This may be done with the aid of a standard wave meter, or, at least partly, by the assistance of the standard waves that are sent out periodically by the government. The former mentioned method is the easiest and the most satisfactory, and will be described. The standard wave meter should have a buzzer exciter, and the two meters should be placed in the relationship to each other as shown. That is, the coils of the two meters should be in inductive relation to each other. The exact degree of coupling can only be determined by experiment, but it should not be any greater than is necessary for

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good audibility, for the looser the coupling, the greater the accuracy that may be obtained.

To begin the calibration, set the standard meter at some arbitrary wave length, such as 250 meters. Start the buzzer going, and adjust the detector of the meter to be calibrated. Then vary the condenser until the maximum response is heard in the phones. This point is the point of resonance, and the degree on the scale of your condenser should be noted on a piece of paper, beside the wave length; such as 250 meters, 30 degrees. Go through this operation with a number of other wave lengths, marking down each one on the paper. Try about 10 points. Also determine the maximum and minimum wave length that is possible with your particular coil and condenser. If a higher wave length is desired than is obtainable with your DL-35 coil, use a larger coil, and make a separate calibration list for this coil. It might be here mentioned, that after a particular coil has been calibrated in connection with the wave meter, it should always be used, and not changed for another of supposedly the same inductance value, for a very slight difference in the coils will make a considerable change in the accuracy of the meter.

When you have secured the scale readings for about ten wave lengths, you can make a *calibration curve* on a sheet of cross-section paper. This paper you may buy in any store where draftsmen's materials are sold; or can make it yourself, by ruling horizontal and vertical lines on a sheet of paper, forming a large number of squares, somewhat as shown in the sample in Fig. 4. The curve is made by first dividing the horizontal lines as scale readings on the condenser and the vertical lines as wave length readings. Now, at the intersections, mark dots, for each of the test readings that were taken. For instance, the scale at 20 gave a meter reading of 175—mark a dot at the intersection of the vertical line 20 and the horizontal line 175. The scale at 70 gave a reading of 450 meters—mark a dot at this intersection. And do the same with the other readings, as shown. Then, when this is done, draw a line connecting all these dots. This will give you at a glance the wave length for any scale reading on your condenser.

Next comes the practical use of the meter, in measuring waves. Fig. 2 shows how the apparatus should be arranged to measure the wave length of a wave that is coming in through the aerial. In this instance the apparatus connected by the dotted lines is not used. B is the primary of your coupler, and A is the wave meter coil. Get these in inductive relation to each other, tune your set in the regular way, and then adjust the wave meter for maximum response. The maximum audibility point indicates resonance, and by checking up your dial reading with your calibration chart you can tell the wave length.

The value of knowing the exact wave length cannot be overestimated, for with this knowledge the receiving set can also be calibrated; which means that tuning comes out of the realm of guess-work and becomes exact. To calibrate your set, you have simply to tune in a station, ascertain its exact wave length, and either mark the dials, or else mark their relative positions on a sheet of paper, or in a little book for future reference. Or, instead of tuning in a station, you may connect a buzzer and battery across your primary coil, as shown by the dotted lines in Fig. 2; then set your wave meter at some arbitrary wave length, and adjust the coupler primary switch until maximum response is obtained. When the primary is adjusted to resonance, the other circuits may be tuned to it, the buzzer still going.

The wave meter shows its real value in tuning a transmitting set, for here we more than have a wave of an exact length. The process that must be gone through is identical with that of tuning a receiving set, except that the power is supplied to the set from a

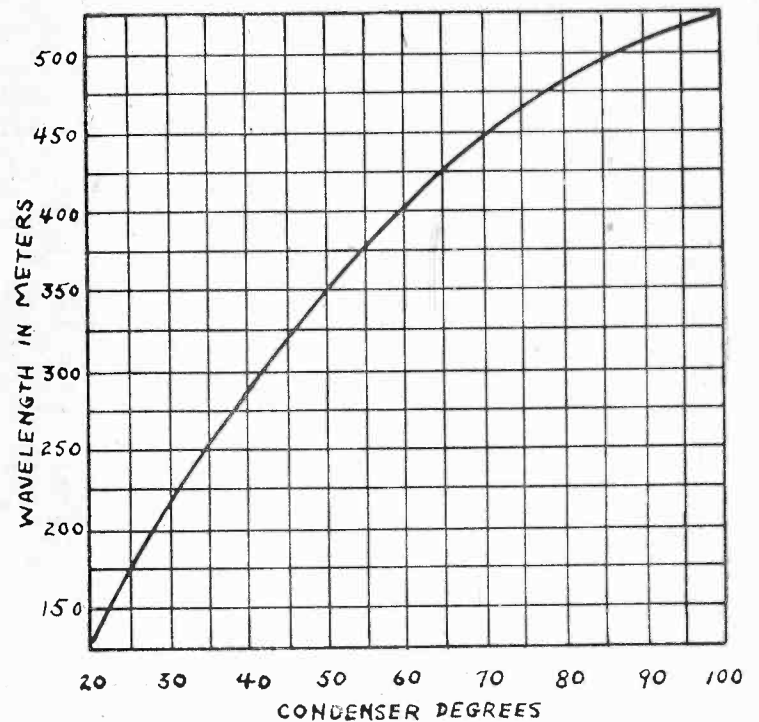


Fig. 4. Specimen calibration curve.

small spark coil, a transformer, or a vacuum tube, instead of incoming signals. For best results, each circuit should be tuned separately, and then finally both together. First, the closed circuit is tuned with the secondary, or open circuit, out of inductive relation. Then the open circuit is tuned, without being coupled to the closed circuit. Finally the normal coupling is used, and the circuits slightly readjusted as required.

## Texas Amateur Station Makes Record

**H**ARTFORD, CONN.—Relaying of private messages by amateur radio telegraph stations of the American Radio Relay League is holding up well during the summer. The report of F. H. Schnell, traffic manager, shows a total of 34,648 messages handled during June by North American amateurs. The messages handled by spark transmitters were only six per cent. as compared with 94 per cent. using continuous wave.

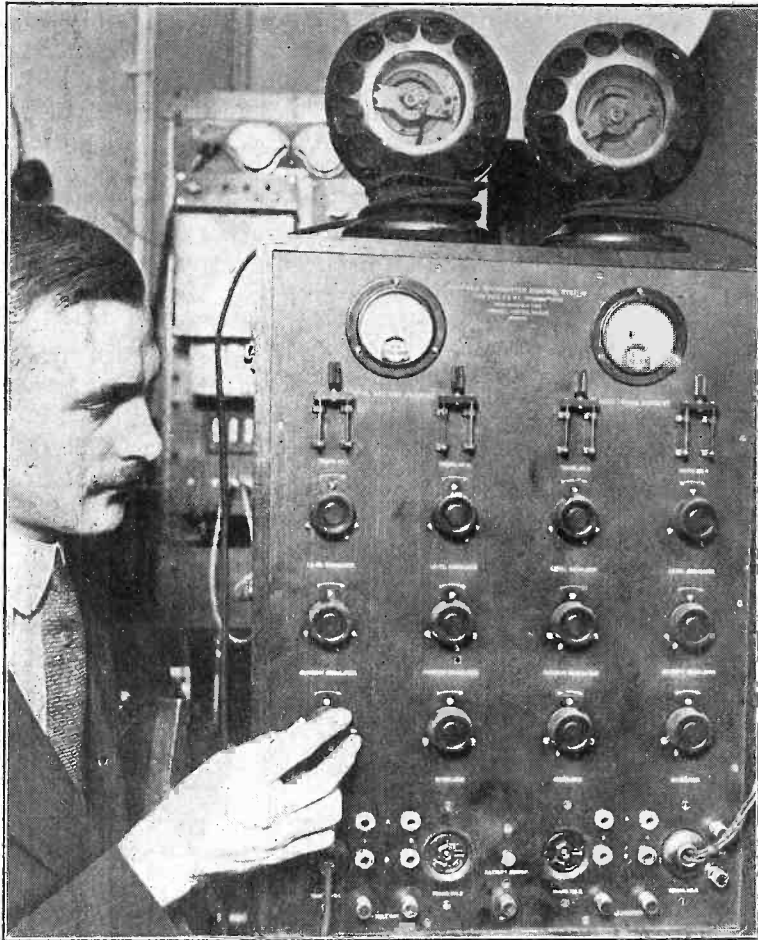
Despite the tremendous amount of static which prevails in the Gulf states at this season, the best individual record was made by Roy S. Lay, operator of

official A. R. R. L. relay station 5TM, at 110 Hubbard St., Yoakum, Texas.

## Have You Made Sure?

**D**O you understand the polarity of your phones? Phones always work best when a definite lead is connected to the positive side of the B battery. If you do not know, ask someone who does and note the difference. The same applies to loud speakers, especially the ones that do not need a field battery.

# It's Wonderful the Way Radio Pe



(C. Kadel & Herbert)

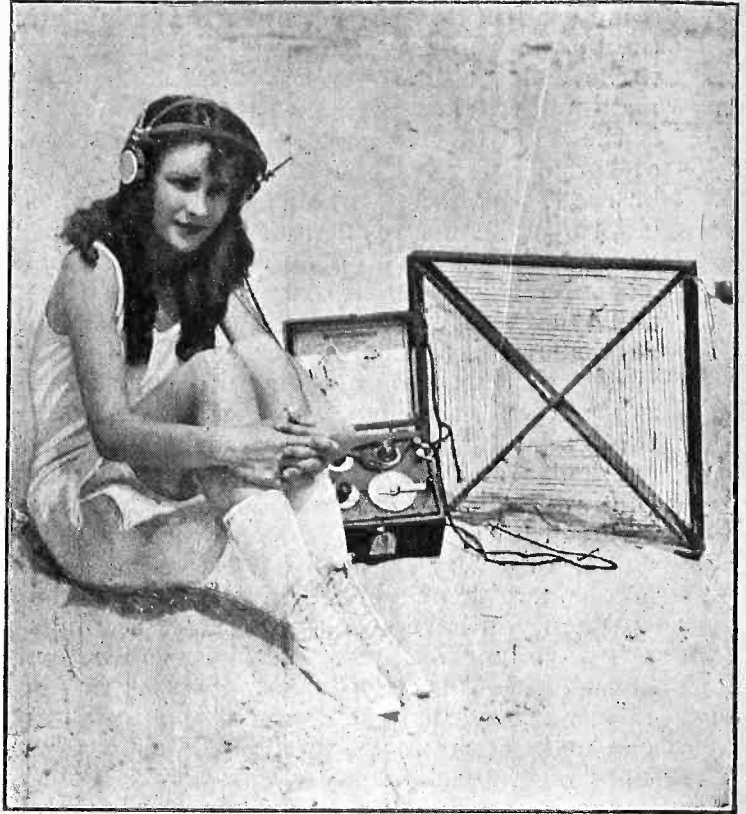
Station WNAC of the Shepard Stores at Boston, has developed a system whereby organ music, band concerts, etc., can be broadcast with all tones preserved intact. Most of the low tones of a pipe organ or orchestra are lost when broadcast by radio, but by means of this device four microphones can be used simultaneously to pick up the music. The picture shows Chief Operator Samuel Curtis who contrived the device.

## Captions by Robert L. Dougherty



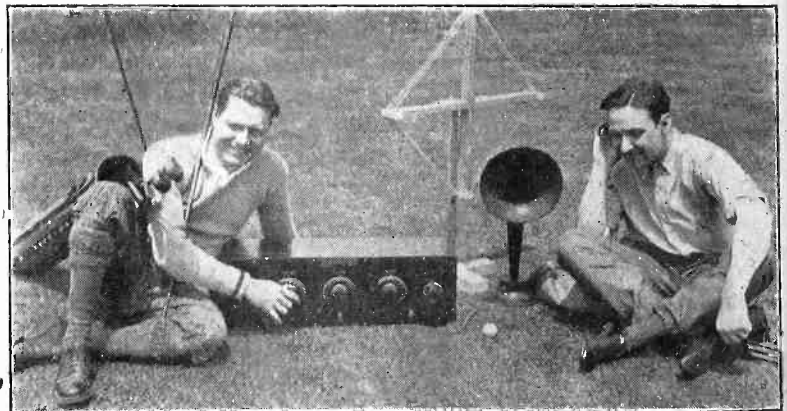
(C. Joel Feder)

A charming interior with the radio set artistically arranged. Mother and daughter are apparently enjoying a program which interests and pleases. The set is equipped with the Sleeper "Monotrol."



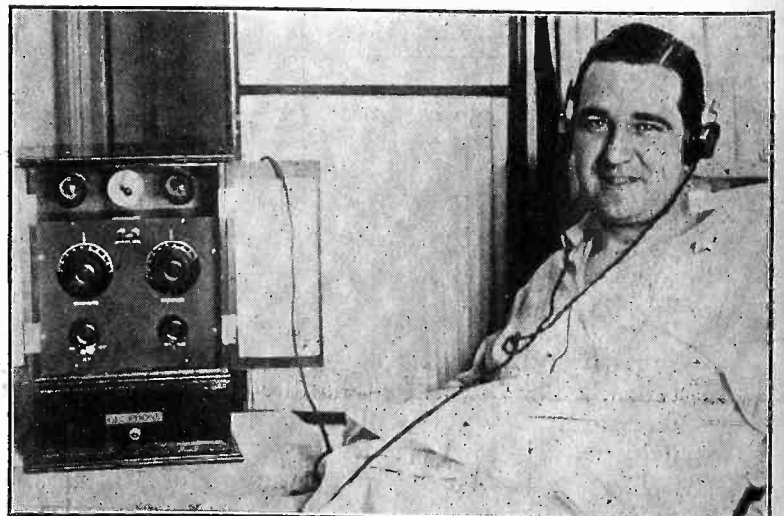
(C. Atlantic Foto Service)

Many summer residents of Atlantic City, N. J., carry their portable sets with them to the beach. Miss Beryl Williams is one of these. Having tired of the ocean waves she is resting on the sands and picking up something interesting via radio.



(C. Kadel & Herbert)

Phil Hughes and Willie Keeler have finished a strenuous eighteen holes and are now listening in while resting for a final round. Not only in the club house but on the course radio is gaining in popularity at golf clubs.

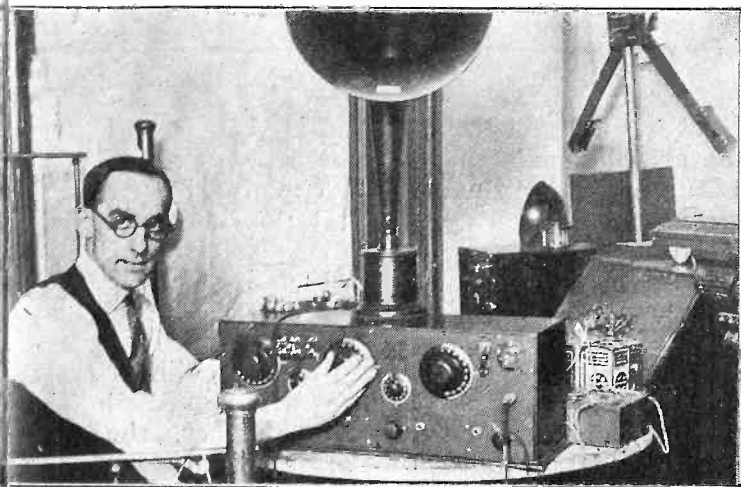


(C. P. & A. Photos)

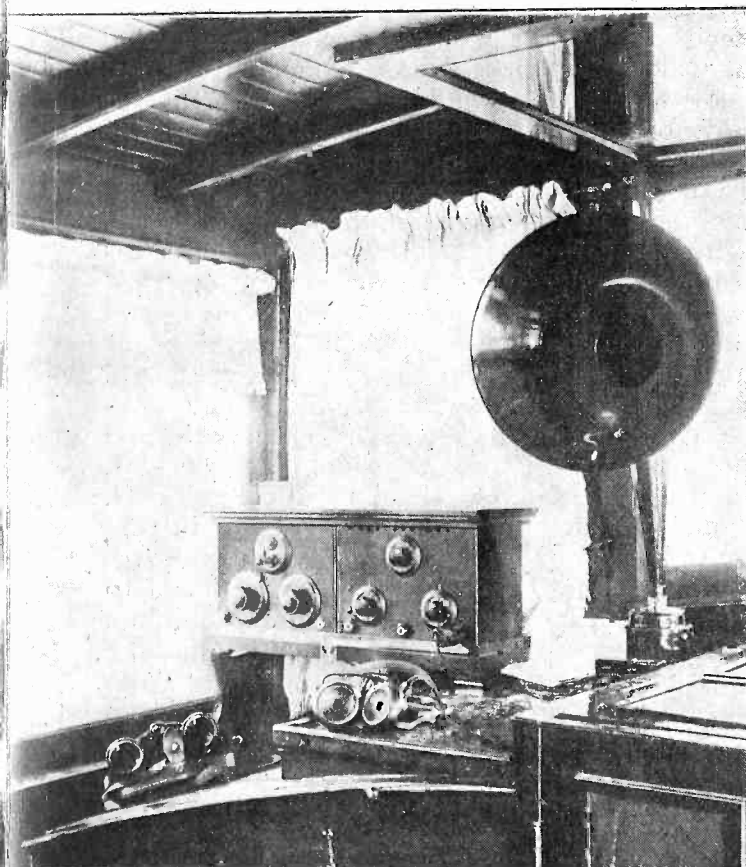
Capt. Gypsy Pat Smith, famous English revivalist, is recovering from an operation at a nursing home in Edinburgh, Scotland. His hours of convalescence are lightened by listening in to radio programs.



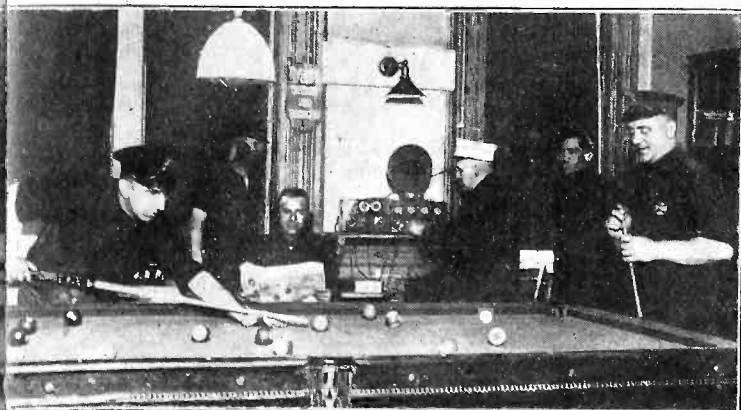
# meates the Whole Wide World



(Kadel & Herbert)  
 Charles Hall, of New York City, using a bed spring aerial and an interesting combination of a neutrodyne and tuned radio frequency, easily receives WC, WOAW and WDAP right in mid-summer. Mr. Hall has a unique off arrangement in this set by which he can use a crystal detector or one or more tubes.



(Kadel & Herbert)  
 Here's the neat receiving set on the beautiful yacht of Harry C. Stevenson, Rochester, N. Y. The set is grounded to the shaft of the engine. For an aerial he uses a rubber insulated cable about 75 feet long with the outer carefully sealed and insulated. This is tossed in the water and drags after the yacht. It is said to work well.



(Photonews, N. Y.)  
 New York firemen haven't much spare time, but with a pool table and radio set presented by a friend, the men of Engine Company No. 8 are well fixed to enjoy their leisure. Captain Joseph Donovan is tuning in.



(C. Underwood & Underwood)  
 Harry Schwartz is here shown giving pointers on the construction of radio sets to Boy Scouts at Camp Spence, Bear Mountain, N. Y. A day's tramping in the forest, a lesson in woodcraft, a cooling plunge in the lake or stream, dinner and a radio program—well, it's good to be a Boy Scout!



(C. Keystone View Co.)  
 Suzanne Lenglen, the greatest woman tennis player of them all, is here shown broadcasting tennis instruction to thousands of fans. This is an unusually quiet pose for the tennis star.

# Scott Clariphone Kills Static

By Carl H. Butman

**T**HE Scott clariphone, an acoustical device for the elimination of static, will undoubtedly be one of the greatest advancements in radio communication when perfected, naval radio experts declare. Through its selective action the clariphone subdues the mechanical sounds of discontinuous character and sustains the continuous notes as well as uniformly pitched sounds, enabling stations transmitting from a long distance through static interference, to be read much more easily.

Although the inventor, Chief Electrician Wm. J. Scott, U. S. N., began work on this static eliminator eleven years ago and filed an application in the Patent Office in January, 1921, little except the name of the filtering device has been made public. Since successful tests at the Bureau of Standards and at Naval Radio Central at Washington, naval officials have decided to release certain facts regarding the unique apparatus in the interest of those who are also fighting summer static in an effort to perfect radio communication.

While the clariphone is still in its experimental stage, the results obtained from the tests in Radio Central seem to indicate that the entire elimination of static may be hoped for in the near future, one naval expert asserts. Without going into the technical details, and the operation is complicated, the writer can vouch for the fact that the instrument works. While in one of the receiving stations on the third floor of the Navy Building a few days ago, we tuned in NPG, San Francisco, which we heard faintly through bad static. By changing from the set of head phones on the regular receiving set to a pair connected with the clariphone, a remarkable improvement was at once noted; the static was reduced materially and the distant signals from 'Frisco came in clearer and sharper. Dispatches from the naval stations NBA, Balboa, and NPL, San Diego, were also read with ease when the clariphone was connected in, whereas the dots and dashes were difficult to distinguish through the phones directly on the receiving set.

Mr. Scott also hopes to be able to eliminate all interference from nearby stations using wave lengths which are close to the wave length that the instrument is tuned to.

The apparatus consists of a large metallic chamber or tube about four feet long and 18 inches in diameter, with adjustable ends slightly smaller in diameter. From the chamber eight smaller tubes or "telescopes" project radially in pairs. Each "telescope" contains a watch case telephone receiver used for introducing the radio signals received from the radio set into the re-

ceiving chamber. The incoming sound is then passed through the chamber acoustically, where it is broken up several hundred times, the inventor explains, by the internal arrangement. All of the static is absorbed by over 10,000 separate pieces used in its construction. Exactly how is not divulged. To a lesser degree, the sound waves themselves are also absorbed in the filtering process. A weaker but a clear note is picked up by four microphones, two on the top of the cylinder and one on each end. The microphones are connected in parallel to the primary of a transformer, the secondary being connected to a head set where the operator receives the outgoing signals after the static is eliminated. The sound of the signals may also be heard through two acoustical phones also attached to the top of the apparatus. When the outgoing sounds are found too weak, they may be amplified in the usual manner.

Whatever the internal acoustical mechanism may be, the Patent Office recognizes it as a pioneer invention, and Mr. Scott has patents pending in the United States and several foreign countries. The clariphone will operate for the elimination of static either in radio telegraphic or telephonic communication.

To date only one instrument is in operation, but another with some improvements is under construction, it is understood. The inventor is now engaged in working out a practical method for producing a good audible tone to the sound waves which leave the four microphones on the cylindrical chamber and are heard in the head phones by the operator. Many naval experts have examined and tested the clariphone and have made helpful suggestions. Chief Gunner J. J. Delaney and Chief Radiomen John Gilmore, E. H. Wilkinson and E. L. Cash are aiding Mr. Scott in perfecting the radio end of his invention. With improvements now under way the apparatus can be tuned to maximum strength wireless signal and minimum strength of atmospheric disturbance, which goes a long way toward improving long distance wireless communication. The apparatus is not yet available to owners of private receiving stations nor amateurs, because of its cost, but future developments and production on a large scale may make it a practical adjunct to general radio reception.

The navy is particularly interested since apparatus of this sort could be used on its ships and shore stations, particularly in the tropics where static interferes greatly with communication. Lighter sets for adoption in airplanes and submarines for the elimination of various forms of noise are also being considered.

## Consider the Others

**M**ANY operators of sets like to tune in long distance stations. Many of the sets are single circuit regenerators that oscillate to beat the cars, and re-radiate everything. When tuning in, consider the other fellows in the surrounding district and do not tune by the beat method. It is only through everyone co-operating in this matter that any help can be had on the worst problem of interference that has yet come up. Think it over, fellows, and tune in right.

## Radio Dealers, Do You and Your Salesmen Set the Right Example?

**You believe, of course, that radio is a great thing, and that every home should be radio equipped.**  
**Have you a radio set in your home?**  
**Have your employees sets in their homes?**  
**Think it over for a moment.**  
**Salesmanship begins at home!**



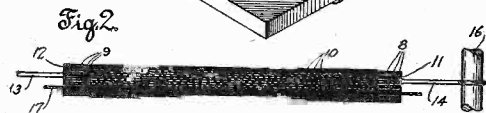
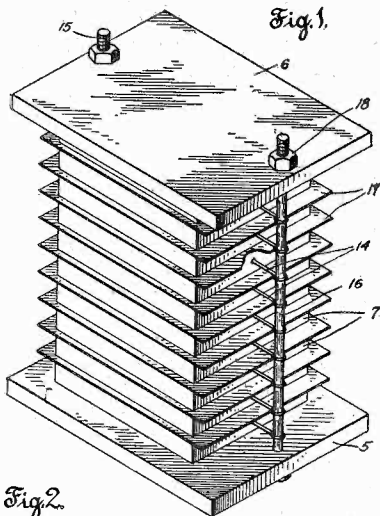
# Latest Radio Patents

## Dubilier's Electric Condenser

No. 1,455,781: Patented May 22, 1923. Patentee: William Dubilier, New York, N. Y.

The object of this invention is in the provision of an improved condenser or electrostatic accumulator in which induction takes place through its mass, causing a difference of potential energy at its terminals.

Such condensers are usually composed of a plurality of thin sheet metal or metallic foil layers separated by a non-conducting material, such as mica, paraffine paper, etc.,



Dubilier's improved electric condenser.

the opposite layers forming terminals from which current is received and delivered.

In condensers in which mica is used as the dielectric, where the size of the mica sheet is limited for commercial reasons, if large capacities are required, say for example one microfarad, the number of layers and sheets must be increased.

A large number of sheets must be built up into a single unit and if mica sheets of for instance 2x3 inches by .003 be used, a one microfarad unit will be about two inches thick.

## Electric Indicator for Vibrations of the Air

No. 1,454,085: Patented May 8, 1923. Patentee: Elmer A. Sperry, Brooklyn, N. Y.

This invention relates to a method or means for indicating periodic wave motions of the air which are not readily detected by the ear. Such wave motions may consist of feeble sounds or of wave motions of a frequency above or below that of audibility. The invention has especial relation to the detection of feeble wave motions produced by radiant energy receivers, such as used in wireless telegraphy.

According to my invention I make use of a sensitive fluid jet such as a manometric flame which, as is well known, consists of a long splindling slender gas flame. Such a flame when acted upon by sound waves or the like instantly changes its form by first squatting or greatly shortening its length and then broadening or flaring out laterally in all directions as though effected by a blast or a draught. The moment the vibration ceases the jet resumes its former proportions. Adjacent the flame I place some

With the use of commercial sizes of mica in order to get a microfarad, almost 1,000 sheets will be used in the unit. We then will have about 500 layers piled on one side electrically connected together and 500 layers on the other side of the pile electrically connected together.

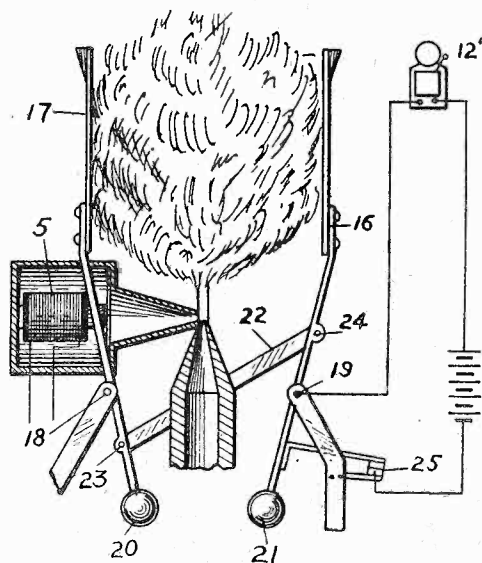
If there should be one defective mica sheet in this pile which for some reason or other should break down after the unit is assembled, the entire condenser becomes defective and it becomes expensive to repair.

If however, we should make small groups or sections of say 50 layers and then connect these 20 groups or sections in one pile with insulated separators between each group, and the group containing the defective sheet should break down, the whole unit of course will be defective but it will be much easier to repair by taking out that single group or section which contained the defective sheet.

If however, these groups or sections were connected in parallel through a thin or light conductor which is easily fusible, as for instance a small lead wire, then if one section or a sheet in one section should break down, all the remaining sections that are connected in parallel will momentarily discharge through that broken down section with the result that a heavy rush of current will surge through that single section, it acting somewhat the same as a spark gap across a condenser, with the result that the heavy current will rush through the single light conductor connecting the defective section.

This conductor will fuse thus opening the circuit to the defective group or section, similar to the action of a fuse in an electric light circuit, automatically disconnecting the defective section, with the result that the remaining sections remain in circuit and continue to function.

This invention is designed to overcome the defects as above stated, in that, should the insulation fail between any of the plates or sheets constituting one of the several series or groups of condenser elements, those remaining in groups will continue to function effectively.



Sperry's electric air vibration indicator.

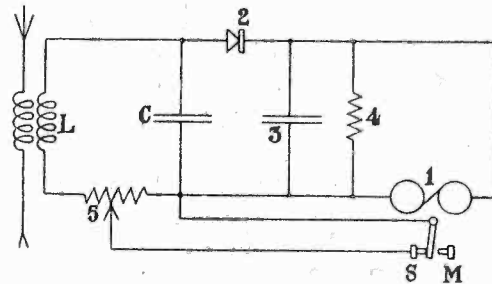
form of sensitive electric apparatus brought into operation by changes in the form of the flame to operate an indicator.

## Wireless Telegraph Receiver

No. 1,455,896: Patented May 22, 1923. Patentee: L. B. Turner, London, England.

In high-speed signalling by wireless telegraphy with long waves and with receiving circuits of small damping, limitation of speed is imposed by the slowness with which the oscillation produced in the receiving circuit during a dot or dash of the signalling code dies away during the subsequent space of the signalling code. The rate of dying away is increased if the damping is increased; but the amplitude reached is then decreased, which implies a decrease in the sensitiveness of the receiver.

The present invention consists in the provision of means whereby the received signal (dot or dash, in the Morse code), upon reaching an amplitude competent to operate the receiving instrument, introduces additional damping into the receiving circuit;



Turner's wireless telegraph receiver circuit.

which additional damping is maintained as long as the incoming signal is maintained but automatically disappears, or substantially disappears during the next spacing period. The automatic increasing of the damping is hereinafter referred to as "curbing"; and curbing is said to begin when the additional damping is first introduced, and to end when it is removed. The curbing is preferably maintained throughout as large a proportion of the spacing period as possible. Under these conditions, the decrement of the uncurbed receiving circuit may be made small, thus favoring the growth of the oscillation in the receiving circuit up to its operative amplitude; the curbing thereupon effected imposes a restriction on the further growth of amplitude; and, if the curbing is maintained for a time after the cessation of the incoming signal, the rate at which the amplitude dies away towards zero is greater than that corresponding to the decrement of the uncurbed circuit.

Curbing may be effected in all or any of the receiving circuits, including the antenna circuit itself; but the arrangement preferred is one in which the antenna is relatively highly damped, and has coupled to it a circuit of specially low decrement to which the curbing is applied. The low decrement of the uncurbed receiving circuit may be arrived at in any known way, with or without the aid of retroactive thermionic triode circuits associated with the receiving circuit for the purpose of reducing its decrement in the well known manner.

## Another Subscriber Likes the Diet We Provide

EDITOR, RADIO WORLD: Enclosed please find check for six dollars. Kindly send RADIO WORLD for another year, beginning July 14, 1923, taking care not to miss sending me any of the fifty-two issues. I have a copy of all issues to date, and make the fur fly if the mail doesn't bring each copy on time. RADIO WORLD is breakfast, dinner and supper to me.

Yours very truly,

L. HAMILTON ADAMS, JR.

10 Roosevelt St.,  
Norwalk, Conn.

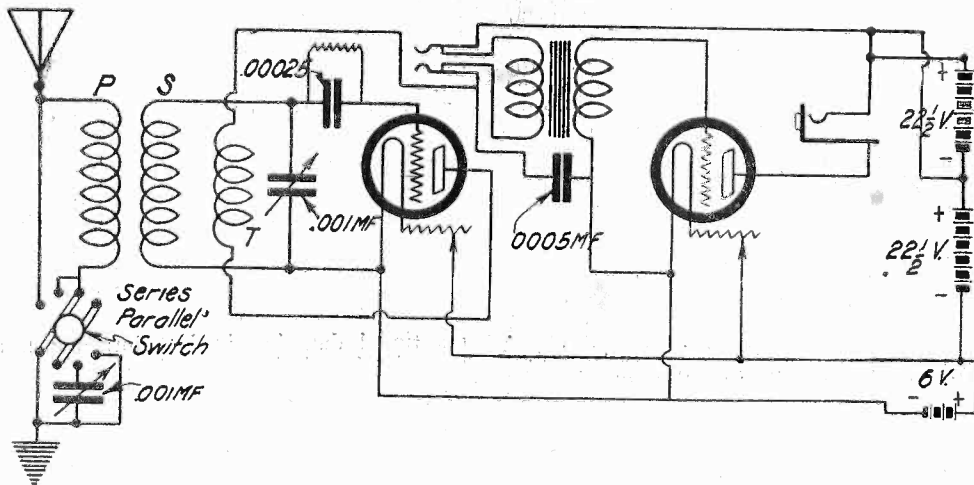
# Answers to Readers of Radio World

Kindly advise me if the enclosed radio-frequency circuit can be used with the De Forest coils and triple mounting?—Arthur Peterson, Rockaway Building, South Ozone Park, L. I.

You could not use the De Forest coils and mounting with this circuit without changing it entirely around. It is regenerative as it stands, and no benefit would be derived in changing it.

I recently constructed a reflex set using one tube and a crystal detector, with a honeycomb coil and condenser as a radio-frequency transformer. I can take the crystal detector out of the circuit and still hear signals. What is the trouble?—Charles Leslie, Box 134, San Francisco, Cal.

It is quite evident that, in the construction of your receiver, you made some mistake, otherwise you would not be able to hear signals when you remove your crystal detector. Go over your connections



Three circuit honeycomb coil set with one stage of amplification, requested by A. B. June. A series parallel switch is used to give a wide range of adjustment with but few primary coils.

very carefully, and make sure that your leads do not run parallel. See that everything is connected right, or, better yet, rehook your set. Be extremely careful about your battery connections. You are using your tube as a rectifier (detector) and the current is leaking through some of your leads. Reflex sets require very careful construction in order to work correctly, and you should not go about the construction of these sets unless you are prepared to take every care and precaution and plenty of time in the wiring and use only the best of parts.

I am located just on the outskirts of Rochester, N. Y. I have great trouble getting distant stations to the South and Southwest, although I use five tubes and can get the far Western and Northern stations. I should be able to get greater distances as the set operated perfectly when up in Albany, and stations all over pounded in; but where I am located I cannot get anything but at one location.—Gene Fowlman, 132 Main Street, Rochester, N. Y.

It is quite evident that you are in a "dead spot," as can be seen by your explanation. Nothing can be done to alleviate your trouble as there is some condition existing which is causing it that you have no control over. It may be that your set is located in a district that has some steel structures that are robbing you of your signals, or it might be some other cause. Suggest that you ask some of your radio friends in Rochester and see if they are bothered in the same manner. Writing

your troubles to the Radio Division, General Electric Co., Schenectady, N. Y., would probably give them some information that they would be glad to investigate.

Do the call letters signify anything particular outside of a certain station? Can each station pick its own call letters?—A Radiofan, Cincinnati, Ohio.

The call letters are given as an indication of each station and do not have any valid meaning. The call letters are assigned by the government, and are arranged alphabetically and given in order.

Will you publish a circuit diagram of a receiver capable of receiving from 150 to 25,000 meters using two tubes? It is to be a portable receiver.—A. B. June 11 Fairview Avenue, New Brighton, Staten Island.

The circuit you wish is published herewith. The fact that you want to make it a portable receiver is optional with your-

self. We can only furnish the circuit diagram. The design of the set is up to you.

The light for the house and barn is furnished by a 32-volt, gasoline-driven generator. Can I use this to light the filaments and supply the plate voltage of the tubes of my set?—Charles Customer, Spring Lake, N. J.

You can do this by the use of proper resistances and a filter system to remove the commutator ripple. Be very careful when using this voltage, however, or you will blow out your tubes. In the long run it will be safer if you use the regulation battery for filament supply.

I purchased a three-tube set made by the ..... company last winter. I have heard that, during the summer months, distant reception is impossible. During the winter my range was 2,000 miles, yet now I can only get extremely local stations within a range of 50 miles and with extremely poor volume. Should my reception and volume be cut down that low?—J. S. Domidion, 155 West 45th Street, New York City.

Your reception will not be as great in the summer as in the winter, but the enormous cut in reception that you notice probably is not due to this condition. Examine your antenna, especially your insulators, and see if they are not shorted by dust and dirt. Clean them thoroughly and look at your lead-in connection.

Examine your ground connection thoroughly and try using another ground in connection with it. Examine your phones carefully and test them, if possible, against another pair to see if it is the phones or the set itself that is at fault. Renew your B batteries.

I recently constructed the Grimes' inverse duplex receiver as per instructions in RADIO WORLD for June 2. Will it be possible for me to operate three loud-speakers on different floors of my house with the aid of a single power amplifier in connection with this set? Should I lay the wires in conduit? What size wire should be used in wiring for this purpose?—John Guilbert, 232 West 4th Street, Newark, N. J.

You should be able to operate three loud-speakers from a single power amplifier on the set you mention. They should be wired in parallel. You do not have to use conduit in wiring the loud-speakers, as the tenement and building laws only prescribe that method when commercial currents are being used (110 or 220 volts). The double stranded or braided light wires will serve this purpose.

What is the consistent range of the De Forest reflex loop set? I have been told that signals have been received 2,800 miles, but wish to find out before going any further.—E. L. MacNabb, 3 Water Street, Quebec, Canada.

We cannot specify the range of any receiver as there are too many variable factors which affect the range of such apparatus. However, it is perfectly possible to cover the range you mention with such a receiver, conditions being favorable.

Concerning the WD-11 circuit described by Ortherus Gordon in RADIO WORLD for Jan. 20. I cannot get it to work properly. There seems to be no difference whether I have the tickler coil one-half or three inches away, it does not vary the tuning. Also, my antenna condenser does not vary the wave length.—Eugene L. Kills, 524 W. Fourth St., Cameron, Mo.

Reverse your tickler connections and make sure that you have it wired correctly. This is the conventional single circuit tuner, using a tickler in the plate circuit to produce regeneration. As to your condenser, there is no reason in the world why it should not vary the wave length if it is properly inserted. Make sure that it is not short-circuited. If it is this would cause the trouble that you are experiencing.

Is it possible to lessen interference by the use of resistances in series with the antenna inductance? I am bothered by considerable inductive hum from the feeder lines of the railroad that run parallel to my antenna.—Morris Muller, East Philadelphia, Pa.

Putting resistances in your antenna circuit would not tend to lessen the induction hum you notice. Place your antenna at right angles to the feeder lines and use a filter coil such as is described in RADIO WORLD for January 20, page 20.

Is it possible for me to accommodate the neotrodyne principle that is so popular with the set shown herewith?—Louis Plantaka, 244 East 72d Street, New York City.

It is impossible to apply the neotrodyne principle to the receiver you show. It is a three-circuit regenerative, and if you kill its regenerative action you are losing the advantage of the circuit.



## MAGNAVOX Radio in Summer

THE man who purchases a Magnavox for its clearness of reproduction, finds additional advantages in its use which contribute greatly to his enjoyment of Radio.

For instance, due to its extreme sensitivity, the Magnavox can clearly reproduce signals which otherwise would be indistinguishable.

This means a great increase in distance range—more stations brought within the Magnavox owner's reach.

Magnavox Reproducers and Power Amplifiers can be used with any receiving set of good quality. Without Magnavox, no receiving set is complete.

**Magnavox R2 Reproducer and 2 stage Power Amplifier (as illustrated)**  
\$115.00

**R2 Magnavox Reproducer with 18-inch curvex horn:** the utmost in amplifying power; requires only .6 of an ampere for the field . . . . \$60.00

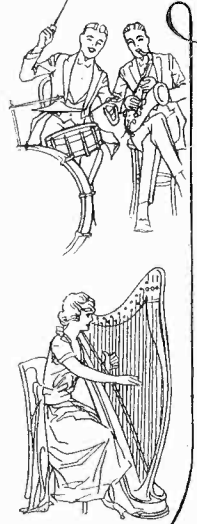
**R3 Magnavox Reproducer with 14-inch curvex horn:** ideal for homes, offices, etc. . . . \$35.00

**Model C Magnavox Power Amplifier** insures getting the largest possible power input for your Magnavox Reproducer.

AC-2-C, 2-stage, \$55.00  
AC-3-C, 3-stage, \$75.00



**ANY GOOD  
RECEIVING SET**



*A clearer Radio voice,  
sounding above the  
tumult of vacation time*

WHEN days are spent in summer's outdoor playgrounds, Magnavox needs only an instant's notice to supply dance music, sporting news or entertainment for all.

Open places test impartially the real quality of Radio reproduction—with Magnavox equipment your receiving set will give superbly adequate performances, indoors or out, the year 'round.

*Magnavox products can be had of good dealers everywhere. Send for copy of unusual booklet.*

The Magnavox Co., Oakland, California  
New York: 370 Seventh Avenue

**MAGNAVOX**  
*Radio*  
*The Reproducer Supreme*

THE RADIO BUSINESS IS GETTING INTO FINE SHAPE. AS FORBES SAYS: "THE BEST STEEL IS THAT WHICH HAS UNDERGONE THE HARDEST POUNDING."

# Radio Merchandising

Advertising Rates: Display, \$5.00 an inch, \$150.00 a page. Classified Quick-Action Advertising, 5 cents a word.

Telephone Bryant 4796

## Radio Literature Wanted

Manufacturers of and dealers in radio apparatus and accessories are notified that literature and catalogues describing their products have been requested, through the Service Editor of RADIO WORLD, by the following:

Morker Electric Co., 340 St. Mary St., Phoenixville, Pa. (Retailer.)  
 C. D. McDaniel, 2072 East 55th St., Cleveland, Ohio.  
 G. S. McIntire, 412 N. Fifth St., Apollo, Pa. (Dealer.)  
 Fred Hoffman, Jr., 1963 Sixty-first St., Brooklyn, N. Y. (Interested especially in transmitters.)  
 Henry Boehning, 2205 Eighth St., Brooklyn, N. Y. (Wants 30-volt, 5 to 10-ampere D. C. generator or motor generator for radio work.)  
 Donald McCamman, Lebanon, Ky.  
 W. B. Dobson, 201 University Ave., Toronto, Ontario, Canada.  
 Ratcliff & Broyles, Barnes City, Iowa. (Retailers.)  
 George Fisher, P. O. Box 514, Atlantic City, N. J.  
 J. W. Irwin, 5754 Holmes Ave., Los Angeles, Calif. (Builds sets.)  
 New England Stock Co., Box 79, Haverhill, Mass. (Distributors and retailers.)  
 H. H. Oge, Box 32, Boonville, Ind. (Wants to represent reliable wholesalers.)  
 N. Appelbaum, 178 Middleton St., Brooklyn, N. Y.  
 C. H. Barnett, Hagerman, New Mexico. (Builds sets for the public.)  
 Ralph L. Arthur, 924 South Sixth St., Atchison, Kansas. (Dealer.)  
 E. E. Gosher, Brandon, Vermont.  
 Howard E. Litchfield, 14 Shepard St., Lynn, Mass. (Constructs sets.)  
 Warren T. Slown, West Haven, Conn.  
 Wesley McArdeil, Radio Construction Club, Brooklyn Technical High School, Manhattan Bridge Plaza, Brooklyn, N. Y.  
 Samuel O'Toole, 75 Baldwin St., Pawtucket, R. I.

## Coming Events

AMERICAN RADIO EXPOSITION, Grand Central Palace, New York City, October 6 to 13, 1923. J. C. Johnson, general manager.

ANNUAL HOME AND CITY BEAUTIFUL EXPOSITION, featuring radio exhibits, Atlantic City, N. J., June 16 to September 8, 1923.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEER, Pacific Coast convention, Del Monte, Cal., Oct. 2-5. F. L. Hutchinson, 33 West 39th St., New York.

## He Boosts the Radio Game

**M**R. O. H. HOVEY, general manager of the Southern Radio Supply Company, Perry, Okla., is a real booster for the radio industry. He seems to take a broad view of the business and does many things easy for any one to do to advance the business in a broad-gauge manner. For instance, his company's stationery is printed in two colors on tinted stock and carries the following good propaganda in red: "Get the market reports. Enjoy splendid concerts and lectures. Get the weather reports. Outfits cost no more than a good phonograph. Give far more pleasure and satisfaction, and no more trouble to operate."

## A New Loop Aerial

**A** LOOP aerial that should prove of interest to amateurs because of its inexpensiveness and convenience is being manufactured by the Ritter Radio Corporation, 232 Canal Street, New York City. The loop is joined with dowels with an upright fitting into a slot at the base. The crosspieces are slotted to take the enameled wire which is sold with the outfit. The loop can be stained to match the color of the particular set for which it is purchased.

## Westinghouse Sales Grow

**T**HE Westinghouse Electric & Manufacturing Co., in the three months ended June 30, 1923, booked new contracts valued at \$47,649,129, an increase of \$15,530,205 over the same period last year. Billings for the same period were valued at \$35,094,884 against \$25,713,707 last year. In the first quarter of the year bookings were valued at \$45,741,000 and billings \$39,577,000.

## Horne Company Changes

The Horne Electric & Manufacturing Company, whose main office is at Mercer and Colgate streets, Jersey City, N. J., have succeeded the Horne Manufacturing Company and will continue the manufacture and sale of the well-known Horne radio products.

## New Radio and Electric Firms

Wayman Electric & Manufacturing Co., Wilmington, Del., \$200,000. (Colonial Charters Co.)

Albert Weber, New York City, electrical devices, \$50,000; A. Weber, L. Inkeles, M. Kane. (Attorney, L. J. Feinstein, 47 West 34th St.)

United-Edison Electrical Contractors, Brooklyn, N. Y., \$5,000; J. Katsch, A. Goldberg, H. Schein. Attorney, R. H. Kit-tel, 522 5th Av., New York City.

Steel-O-Graph, New York City, make electrical appliances, \$250,000; W. C. Lamphier, J. Wood Jr. (Attorney J. S. Twaddel, 261 Broadway.)

New York Central Electric Corp., New York City, has increased its capital from \$7,000,000 to \$10,000,000.

Rubes Radio Manufacturing Company, Delaware, \$125,000; Rep. C. A. Vauhan, 302 Church street, New York City.

Drew Electric Construction Co., Rochester, N. Y., \$10,000; G. E. Drew, G. H. Pond, F. B. Warren. (Attorneys Carnahan, Pierce & Block, Rochester.)

Penn Fibro-Electro Co., deal in transmitting and receiving apparatus radios, \$500,000; Arthur Johns, Clifford Roberts, John E. Voegel, New York, N. Y. (U. S. Corporation Co.)

Home Electric Co., N. J., 300 shares preferred stock, \$100 each; \$1,000 common, no par value; A. C. Maccabe, 50 Church St., New York City.

Warner Speed Control Corp. of America, New York City, to manufacture motors and engines, 20,000; G. and A. Worsnop, W. G. Lovatt. (Attorney, H. S. Hechheimer, 1540 Broadway.)

International Patents Development Co., Wilmington, Del., engineers and contractors, \$1,000,000; Frank H. Hall, Daniel Royse, New York, N. Y.; Arthur R. Oakley, Pearl River, N. Y. (Registrar & Transfer Co.)

Electric Milker Corporation has changed its name to Electric Products Corporation, Chicago, Ill.

Superior Radio Inc., has changed its name to Shipley & Co., Inc., Philadelphia, Pa.

# Put Your Shoulder to the Wheel for the Second Annual National Radio Week!

**L**AST fall the idea of National Radio Week was originated in the editorial columns of RADIO WORLD. The radio press and trade generally took up the matter and everybody worked hard to make this first annual seven-day event of importance.

Another year is swinging around, and it is time now to think of the Second National Annual Radio Week. Every radio editor of a daily paper, publishers of all radio magazines, and manufacturers, distributors and dealers should give careful thought to the Second National Radio Week.

We shall be glad to have special opinions from all those interested. What do you think the date should be, and what are

the special features you would suggest for this seven-day period? Last year's National Radio Week came just about the time when folks were making purchases for holiday gifts. Why not fix on about the same period this year?

RADIO WORLD does not claim ownership of the National Radio Week idea. It merely acted as the original sponsor. The event is too big a thing for any one publication to try and keep to itself.

Now, let's all get together, make the right kind of preparations, and see if we can't make the Second Annual National Radio Week bigger, better, and more far-reaching in every way than the initial event of last year.

THE EDITOR



## Newark, N. J., Considering City Broadcasting

**EDITOR, RADIO WORLD:** Your favor of the 23d instant came duly to hand requesting an opinion from Mayor F. C. Breidenbach regarding a municipally-owned-and-operated radio-broadcasting station, and was taken up at a meeting of the Board of Commissioners of the City of Newark, held this day.

Hon. William J. Brennan, Director of the Department of Public Safety, moved that your letter be referred to Mayor F. C. Breidenbach. The motion was adopted.

Very truly yours,

W. J. EGAN,

Newark, N. J.

City Clerk.

## Springfield, Mass., Is Lucky on Broadcasting

**EDITOR, RADIO WORLD:** Replying to your request of the 23d inst., would say that the Westinghouse company has a large equipment in this city, from which they are glad to broadcast anything the city desires to send.

I should think cities not so favored would need a municipally-owned station—a source of pleasure and profit.

Yours very truly,

EDWIN F. LEONARD,

Springfield, Mass.

Mayor.

## Baltimore Considering a Broadcasting Station

**EDITOR, RADIO WORLD:** I acknowledge receipt of your letter of July 23 regarding municipally-owned radio-broadcasting station for Baltimore.

I have had this matter under consideration for some time, but at the moment no definite action has been decided upon.

Yours very truly,

HOWARD W. JACKSON,

Baltimore, Md.

Mayor.

## Enjoys Us, But Wants a Radio Daily

**EDITOR RADIO WORLD:** I am a regular subscriber to RADIO WORLD and wish to say that I have enjoyed reading it more than any other radio magazine published. It shows the newest things first and is also full of valuable information. My only regret is that it is a weekly magazine instead of a daily.

Yours truly,

KENT DECKARD.

Rusk, Texas.

## Radio Weddings Now in View

**APPLICATIONS** are coming by every mail from those who wish to participate in the radio wedding which is to be broadcast by WLW of the Crosley Manufacturing Company at the Fall Festival to be held during the last week in August and the first week in September from the Cincinnati Fall Festival. There will be two weddings, one each week, and the whole radio world is invited to be "air guests." A receiving set is all you need to be "present."

## Station KFHX Is Correct

**IN RADIO WORLD** for July 14 the call for KFHX, operated by the Nelson Manufacturing and Supply Company, Hutchinson, Kansas, was published in a list of new broadcasting stations of KFHS. This was incorrect, according to Mr. R. A. Nelson. The correct call is KFHX.

# Broadcasting of Fights Helps Demand for Radio Goods

**THERE** is no longer any doubt that the broadcasting of big fights means a great deal to the radio trade. This was noticeable immediately following the broadcasting of the Firpo-Willard contest. On the day after this event the dealers in New York and throughout the country, particularly in the East, noticed an increase in demand for sets and parts, and the same thing obtained before and after the broadcasting of the Leonard-Tendler bout last week.

The broadcasting of the latter fight, by the way, was handled in masterly fashion. Major J. Andrew White was the man at the microphone. Not only did his voice carry clearly, but Major White made his description so graphic that he delighted millions of fans throughout the country, many of whom have declared that this was the most satisfactory fight broadcasting in the history of radio.

## Gimbel's Radio Sale a Wonderful Success

**GIMBEL BROTHERS**, New York department store, whose purchase of approximately \$3,000,000 worth of radio receiving sets from the Radio Corporation of America was announced in last week's issue of RADIO WORLD, have scored what is probably the biggest selling success in the history of the radio industry. The sets were priced at a comparatively very low figure and heavily advertised in the New York daily newspapers. Gimbel Brothers inform RADIO WORLD that over 1,600 sets were disposed of during the first two days of the sale. At the time of going to press sales figures had not been received from the firm's stores in Philadelphia and Milwaukee, which also participated in the event.

## Wants Radio Sets for Mail Order Trade

**EDITOR, RADIO WORLD:** We are contemplating entering the mail order field, and desire to specialize in radio equipment.

Can you furnish us with a list of manufacturers who supply dealers with catalogs for imprint, and also those firms who specialize in small, complete sets at a price which would be low enough to make them specials?

Our activities will be mostly confined to the farmers of foreign birth and we, of course, do not desire to handle trash of any kind, but would want to guarantee all equipment sold by us as far as possible. Very truly yours,

MAHLER'S TRAVEL BUREAU,

By Richard J. Ward.

205 Seventh Ave., New York City.

## Likes Our Style—Thanks!

**EDITOR RADIO WORLD:** As per your subscription offer, I enclose herewith my check for \$6.00 in payment for one year's subscription. Your magazine is far-and-away the most interesting and instructive—genuinely helpful—of any now on the market, especially to the thousands and thousands of us who have neither the time nor the desire to become expert radioticians (or whatever you call 'em), and who nevertheless enjoy our broadcasting-receiving instruments and want to keep in touch with the general progress of radio.

You boil it down for us, give us the essentials, aren't ashamed to use everyday English (some of the publishers foolishly think the way to impress their readers with their superior wisdom and learning is by using extremely technical terms and the terminology of the most expert electrical engineering shopwork), and the questions of your readers do not seem to bore you.

Sincerely,

H. L. SMITHTON.

Cincinnati.

## Radio Trade Notes

Modell's has opened another store at Whitehall and Stone streets, New York City, to meet the radio needs of lower Manhattan and residents of Staten Island who use the ferries.

\* \* \*

Freed-Eisemann Radio Corporation, 255 Fourth Avenue, New York City, announce that they have recently added to their organization Mr. A. B. Ayers, formerly with F. D. Andrea, Inc. Mr. Ayers will act in the capacity of Eastern District Sales Manager.

\* \* \*

C. C. Henry, of the Federal Telephone & Telegraph Company, has been appointed a member of the board of directors of the Radio Trade Association of New York City, to fill the unexpired term of C. H. Love, resigned.

\* \* \*

Leading manufacturers to the number of 45 already have signed contracts for space in the second annual American Radio Exposition, to be held in Grand Central Palace, New York City, October 6 to 13.

\* \* \*

Poster & Co., manufacturers of panels, have removed to 244 West 42d Street, New York City.

\* \* \*

The Mercury Radio Products Company, Little Falls, N. J., has been granted the second license issued by E. L. Grimes, of Staten Island, N. Y., for the manufacture of the Grimes inverse reflex, with exclusive rights to the music field, as well as rights with other licensees in the radio field. The Sleeper Radio Corporation, of New York, is at present the only other licensee.

## Radio Trade Association to Meet at Radio Show

**THE** board of directors of the Radio Trade Association, New York City, has accepted the offer of the American Radio Exposition Company to conduct a series of meetings at the Grand Central Palace during the fall exposition of the American Radio Exposition Company which will be held the week of October 6th. The program committee is working on a list of speakers. These general meetings doubtless will be of interest to the entire trade. Exact dates and hours of meetings as well as lists of speakers will be announced later.

## WLW Now Used by Salesmen

**J. L. WOODS, JR.**, sales representative of Crosley Manufacturing Company, Cincinnati, has left for the west coast states, but before going he was the center of a re-christening party when he was given a new first initial W in order that he could use WLW as his initials. These stand for the WLW designated by the government as the call letters of the Crosley radio broadcasting station. He now signs his name W. L. Woods, Jr.

**"RADIO TUBES REPAIRED"**  
 Work Guaranteed  
 W. D. 11 and 12  
 U. V. 201 A **\$3.25**  
 SIX VOLT TUBES  
 DETECTORS ..... \$2.75  
 AMPLIFIERS ..... \$3.00  
**Radio Tube Laboratories**  
 776 Broad Street Newark, N. J.

**YOU SAVE 50% OF THE USUAL COST**



**WORLD RADIO BATTERIES**  
 Are Guaranteed 2 years in Writing  
 Will ship C. O. D. subject to inspection, or allow 5% discount for cash with order. Order shipped same day received. WRITE TODAY.

**World Battery Co.**  
 Dept. 17  
 1219 So. Wabash Ave. Chicago, Ill.

**2 VOLT STORAGE BATTERY for**  
 WD11—WD12 \$5.00  
 6 V., 60 Amps. \$10.00  
 6 V., 80 Amps. 12.50

6 Volt, 100 Amps. \$14.50  
 6 Volt, 120 Amps. 16.00

**PATENTS**

**To the Man with an Idea**

I offer a comprehensive, experienced, efficient service for his prompt, legal protection, and the development of his proposition.

Send sketch or model and description, for advice as to cost, search through prior United States patents, etc. Preliminary advice gladly furnished without charge.

My experience and familiarity with various arts frequently enable me to accurately advise clients as to probable patentability before they go to any expense.

Booklet of valuable information, and form for properly disclosing your idea, free on request. Write today.

**RICHARD B. OWEN**  
 Patent Lawyer  
 32 Owen Building, Washington, D. C.  
 2276-P Woolworth Bldg., New York City

**Return of the Lightning Rod**

THE lightning-rod is coming back, says an editorial writer in the New York World. The first electrical scientists of the time, Thomas A. Edison and Dr. Charles P. Steinmetz of the General Electric Company, have reindorsed it, when properly installed, as a protector of buildings from fires caused by lightning. The National Board of Fire Underwriters now gives a great practical push toward its restoration by declaring that 99 per cent. of such fires can be prevented by a general use of the rod, and by offering its services for the adoption of right methods of installation.

It is a new vindication for Benjamin Franklin and the first lightning-rod, which grew out of his kite experiment some 170 years ago. But it needs to be said that in all this time electrical science has never flatly condemned lightning conductors on buildings and other lofty objects as useless. What killed them in popular favor and use was the "lightning-rod man" and his tricky commercialization of the Franklin discovery. Memories of men now living easily go back to the time when this person was considered a worse pest along the countryside than the book agent or the Yankee-notion peddler. Faulty material, bad insulation, superficial grounding, and failure to follow a direct path from the tip of the rod to the ground, commonly made it useless and often worse.

Against a return in the lightning-rod's comeback of his ignorance and petty swindling, owners of exposed property can have the help of the fire-insurance companies, and with it the incentive of reduced insurance rates. Nor will the run of humankind fail to gather comfort from this assurance of electrical science in its present rapid and extraordinary developments that the dreaded lightning stroke may yet be robbed of its power to injure or destroy where due precaution is taken.

No Good

SAY, Sam, what did yo' all do wif dat radio set you bo't for yo' Melindy?"

"Done gone trow de darn ting fru de winder. Sum smart perfesser told us over it dat chickun oughtn't to be eaten, and prescribed cown beef 'stead. I ain't gonna have no man tellin' me how to reg'late my meinyou."

**Federal Standard Radio Products**  
 Standard of the Radio World, 130 separate units, each fully Guaranteed.  
 Write for Catalog.  
**Federal Telephone and Telegraph Co.**  
 BUFFALO, N. Y.

**"RADION"**  
 The Best Hard Rubber Insulation  
**PANELS BLACK AND MAHOGANITE**  
 DIALS—KNOBS  
 20 Stock Size Panels and Also CUT TO ANY SIZE  
 "Radion" Tubing: 2", 2 1/2", 3", 3 1/4", 3 1/2", 4", 5"  
 Cut to Any Length  
 Special Parts Experimental Work Made to Order  
**N. Y. Hard Rubber Turning Co.**  
 212 CENTRE STREET NEW YORK

**WD-11 and WD-12 TUBES REPAIRED**

WD-11 or WD-12	\$3.50
C-300 or UV-200	2.75
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## Telephoning Over High Voltage Lines

By Lloyd Jaquet

EXECUTIVES from large power plants from various sections of the United States, as well as officials of the Consumers' Power Company of Michigan, witnessed the first demonstration of telephoning over power transmission lines over the company's system between Jackson and Battle Creek last week.

The celebration upon the occasion of the opening of the first new high frequency automatic telephone system was in charge of B. E. Morrow and C. W. Tippy, officials of the Consumers' Power Company, and the first to talk over it.

This system has just been installed by engineers of the Westinghouse Electric & Mfg. Company, who developed and designed the installation. Only two sets, located at Jackson and Battle Creek, are completed. Four other similar stations will be installed at various points along the six hundred miles of transmission lines.

The installation on the Consumers' Power Company of Michigan is a long step in advance of anything yet attempted in experiments with "wired wireless."

This system provides for two-way communication, similar to an ordinary telephone line system. While the radio impulses are guided by the high voltage transmission lines along the entire system, in event of breaks in the power lines, communication is not interrupted, as the radio impulses readily jump the gap. In fact, signals can be exchanged even if several miles of transmission lines are down. During lightning storms, which will interrupt ordinary line telephones momentarily, speech can be transmitted without difficulty over the system. This feature of the installation gives it a marked advantage over the conventional wire telephone circuits.

The high frequency apparatus, or the radio units of the system, are located at the various terminal stations. Two antenna wires are strung for a short distance on the towers which support high tension power lines. One of these is a sending antenna and one used exclusively for receiving. The antenna wire is given about 12 feet clearance from the power line wire. The upper or transmitting antenna is connected to the transmitting set and the lower antenna to the receiving set.

High frequency currents are generated by a 250-watt vacuum tube similar to those used in broadcasting stations. This tube operates on 2,000-volt direct current. The high frequency current flows into the transmitting antenna and instead of being broadcast through the air, it induces, by electrostatic and electro-magnetic induction, corresponding high frequency current in the adjacent power line and this high frequency energy, superimposed upon the energy transmitted normally by the power line, is carried on the power line to the receiving station where, by induction, it is led into the receiving set through the receiving antenna. This unit is an ordinary long wave, coupled circuit radio receiver. It is equipped with a detector and one-step amplifier.

The high frequency currents generated by the 250-watt vacuum tube type oscillator and modulated by a second 250-watt vacuum tube to the grid of which the voice frequencies developed by the microphone are applied. A 50-watt vacuum tube is interposed between the relatively weak microphone circuit and the grid of the 250-watt modulator tube for the purpose of amplifying the voice frequencies.

## Station WLW Locates Missing Man

THE value of the radio broadcasting station in its relation to locating missing persons and articles was fully demonstrated when WLW of the Crosley Manufacturing Company, Cincinnati, located Herbert Weber within a day after his description had been sent into the air. This marks the first recovery of a person by radio although thousands of messages and descriptions have been sent to all parts of the world by radio.

Immediately after the church services by radio, WLW broadcast a description of Herbert Weber, a deaf and dumb man whose wife had not been able to locate him. He had wandered off and so the wife turned to the new agency, radio, to help her in her search. She gave a full description of him and then trusted to the modern miracle to do the rest.

T. Paul Jordan of Newtonsville, Ohio, a radio listener to the church services, heard this message of distress and began a search for the missing man. It was not until the next afternoon that the deaf and dumb man was found wandering along a country road. Mr. Jordan approached him and wrote on a paper the message he had heard on his radio receiving set. The man wrote back that he was the missing one. Within a short time he was safely home.

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# Radio as a Means of Expression and Contact

By Dr. Lee De Forest

TO celebrate its first anniversary WOR has tonight assembled representatives from the three great principles of expression—the newspaper, the motion picture and the radio—and has done me the honor to speak on behalf of radio as a medium of expression. I like better to consider radio broadcasting as a medium of *contact*, for without question it has already demonstrated the fact that radio broadcasting brings the millions of our citizens, high and low, in cities and in the most remote districts, into contact with our leaders in every field of activity—political leaders, leaders of the drama, of art, great editors, captains of industry, singers and musicians—in a manner in which no other medium since the beginning of civilization has begun to approach. And I hold that it is in this peculiar property of personal contact between the widespread millions of our citizens and the comparatively few gathered nightly in the small auditoriums of our broadcasting stations which is more responsible than any other factor for the immense and ever-increasing popularity of radio.

In 1909, when the idea of radio broadcasting first occurred to me, and the music of the Metropolitan opera singers was for the first time launched upon the ether, and again in 1916, when, for the first time, regular radio concerts were maintained, from the old station at Highbridge, when I had a small but intensely interested audience growing in numbers nightly, there began to dawn before me a vision of the astonishing potentialities of the radio broadcast, which vision the last eighteen months has been bringing more and more into reality. But I confess that in those early pioneer days my eager imagination fell far short of picturing the astonishing hold with which this idea so suddenly gripped our entire nation. And not alone the American people, for I have found that, in England, France, Holland, and even in Germany, wherever the fame of American broadcasting has penetrated it has enkindled to an astonishing degree the imagination of classes which one might doubt would respond so quickly. In truth, the broadcasting idea, which America may be justly proud of originating, is already outgrowing national boundaries. Already the radio telephone is beginning its benign work of breaking down the artificial barriers erected by politics or race. Nothing since the early days of the discoverers has so appealed to the imagination of a nation. No other medium in man's history has demonstrated its unique powers for uniting far separated sections of a great country, for causing to become acquainted dwellers in distant districts from north to south, from east to west. More than the newspaper, more than the postal service, this mighty hearing of the spoken voice in greeting, the public address, the sermon, the lecture, the musical program, is actively uniting us in a bond of common fellowship, common acquaintanceship as no other conceivable instrumentality can accomplish. I predict that, as an educational medium, the radio telephone broadcast will in time prove second in importance only to the public school. Already we see a closer interlinkage between the people of Canada and ourselves, due to the broadcasting idea; and soon these benefits will extend to Europe, between the peoples of the Old World, always heretofore strangers; enemies because strangers and personally unacquainted. When, night after night, the citizens of foreign lands will hear the friendly words, the music and the songs from across strange frontiers, then gradually will the feelings

of enmity and suspicion, based chiefly on distance and ignorance of each other, change to understanding and good will. Thus I maintain that radio broadcast with its irresistible educational influence is destined to prove one of the most potent powers for the abolition of war.

So rapidly is this movement growing that it will not be long before the necessary high-power broadcasting stations will be planted in all our cities, each covering a sufficiently wide area to enfold the entire land in a mantle of music; to breathe into every ear which cares to listen voices of comfort, of nightly companionship with the world's doings and the world's best minds. "Just a Song at Twilight," but its lovely echoes are being heard in the miner's cabin, in the rancher's hut, in the living room of the old farmhouse, over the mountain range, beyond the desert, across the silent prairie, over the wastes of sea. And who can say what minds are not awakened, what souls that were deadened, what hearts long embittered by loneliness, will not be stirred to a new life, a new outlook by that sound?

When one seriously considers the human side of this broadcasting idea and its possibilities one must admit that it possesses potentialities for universal education and for all the trail of good which results from universal education, which can be compared only to that brought about during the past five centuries by the art of printing. Only this new revolution will grow to maturity in a decade instead of 500 years—a graphic commentary on the acceleration of man's present progress.

I have for a long time maintained that this educational value of radio broadcasting will prove by far its greatest worth to the people of our country, and, later, of all nations. No doubt just now the entertainment feature is the most striking; the phase most appealing to the popular desire, naturally enough. Unquestionably the fine programs which are now being given by the large broadcasting stations are accountable for the astonishing spread of receiving stations during the past eighteen months.

But comparison of radio broadcasting with the introduction of the printing press is not too bold. When newspaper and press syndicates realize its full possibilities in their own field (and their leaders are rapidly coming to this realization) this comparison will become concededly commonplace. Editors now have a medium where antenna wires take the place of Mergenthaler typesetters, ether waves of ink and press paper, head phones of spectacles, and ears of eyes. It is indeed gratifying to me to note the whole-hearted and enthusiastic co-operation of the American press generally with the broadcasting idea. Without this broad vision on the part of newspaper men the present popularity and astonishingly rapid growth of broadcasting would have been quite impossible.

It is therefore a great pleasure for me to speak to you tonight, in company with that Nestor of the American press—Melville E. Stone, of the Associated Press—who, earlier than any other American newspaper man (as far back as 1899), foresaw something of the immense possibilities of wireless in newspaper service, and who has ever since those early years stood out conspicuously as a believer and advocate in the future of wireless as a medium of contact with the people.

Such occasions as this tonight, when I again take part in the radio telephone broadcasting, which I have labored so many years to bring about, are occasions of profound personal satisfaction. They bring back vividly to me the countless nights of experiment—frequently discouraging—the

step-by-step upbuilding of this idea, and the device which has made it finally a reality. And with them comes a profound sense of gratitude, for I realize on such occasions as this the personal sense of contact and friendship with the untold thousands of listeners who are realizing with me the actuality of an old dream.

## An Unusual Broadcasting Anomaly

ALTHOUGH the words of President Harding when he spoke in the Civic Auditorium at San Francisco on July 31 were heard as far away as New York and Washington within one-fifteenth of a second after they were spoken, according to telephone engineers, it was nevertheless the following day and month when they were heard in New York. The President began speaking at San Francisco at 8 o'clock, July 31, which was midnight in New York (daylight saving time), and consequently he was not heard there until August 1.

## Delights of Radio for the Hard of Hearing

JOHN G. GEBHARD, of Mt. Vernon, N. Y., writes to the New York Times as follows:

There is one feature of radio broadcasting which should get wide publicity. I refer to radio for the deaf. Not all deaf people can use a telephone, but a large majority of them can, and every one of these would find a good radio an unspeakable joy. To those who have good ears, listening-in is more or less of a mere pastime; but for those whose poor ears catch only a fraction of the words and other sounds around them, radio broadcasting becomes a new and delightful entrance into the joys of hearing.

I am 65 years old and hard of hearing, but the happiest hours of my days are those I spend with my home-built radio receiver. One day stands out with unforgettable distinctness. It was one of those hot June days when the mercury was soaring into the nineties. In the middle of the afternoon, as I was touching up a connection here and there, I suddenly heard the strains of the wedding march, and then and there became an intensely interested listener to a wedding ceremony in Newark, N. J., which was being broadcast by WOR. When I had the best of hearing I never heard a marriage ceremony with such distinctness, every word of the officiating clergyman, every word of the responses of the bride and bridegroom, and the bridegroom's kiss were as plain as if the whole affair were taking place five feet away in my own room.

Early that evening my son asked, "Father, who is WGY?" "Schenectady," I shouted, and clapped on my head-piece to hear two magnificent Gregorian chants from a cathedral, broadcast by Schenectady. At 10 o'clock that same night I enjoyed, with my whole family, every word of President Harding's speech at St. Louis on "The World Court," broadcast by WEAf.

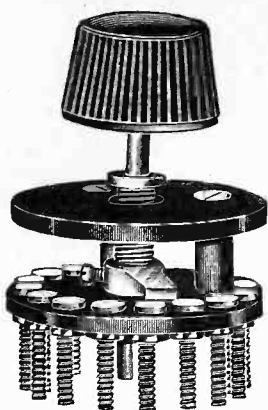
The wonder of it all was that each of these three treats was a complete surprise, extras, which did not appear in the printed programs for the day. No retiring of my radio for the summer! I'm in for listening every day in the year, barring thunder weather.

Radio for the deaf is my slogan, which I wish might be sent out broadcast from every station in the land.



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## European Radio Dispatches for American Dailies

THE Canadian Department of Marine has issued a license for the erection of a high-powered press radiq station at St. Margaret's Bay, Nova Scotia, near Halifax, to C. F. Crandall of the British United Press, acting for the American publishers' committee. For over a year a group of American papers, including New York, Philadelphia, Chicago and other dailies, has been operating an experimental radio station at Dartmouth, across the bay from Halifax, for the reception of wireless press reports from London and Europe, and relaying them by land lines to the newspapers. The project will now be made permanent.

## Radio Broadcasting Now Permitted in Germany

A BERLIN dispatch to the Associated Press states that the popularity which wireless broadcasting has attained in the United States has been directly responsible for a decision reached by the Ministry of Posts and Telegraphs to lift the embargo on wireless telephones, beginning Sept. 1. The present prohibition restricts the use of all wireless apparatus to commercial purposes.

Applications for private wireless telephones must be filed with local post offices, which will supply programs and supervise broadcasting in order not to interfere with the official or commercial use of wireless.

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**EVERY RADIO FAN** should have these two books, "101 Receiving Circuits" and "Six Successful Receiving Sets." By M. B. Sleeper. They are the most up-to-date radio books for the fan who likes to make his own, and will help you out and save you many times their cost. Both books are full of illustrations. Price, 50c. each, with 10c. extra for postage, or both for \$1.00 sent postpaid. COLUMBIA PRINT, 1493 Broadway, New York City.

**TWO FOR THE PRICE OF ONE—Send \$3.00** now for six months' subscription (26 numbers) for Radio World during the coming month and we will send you also Popular Radio or Wireless Age or Radio for six months without any extra charge. Or send \$6.00 now and we will send you Radio World for one year (52 numbers) and Popular Radio, or Wireless Age or Radio for one year. These offers not good after July 23, 1923. If you are already a subscriber you can take advantage of this offer by renewing from the end of your present subscription. Sub. Department, RADIO WORLD, 1493 Broadway, New York City.

Fifty-two issues for \$6.00. Subscription Department, RADIO WORLD, 1493 Broadway, New York City.

**WOULD YOU LIKE TO RECEIVE RADIO ADVERTISING MATTER?**

Are you in the market for radio goods of any kind, either as a consumer, a distributor or a retailer? If so, send us your name and address on a post card and we will see that your name reaches the right people so that you will receive pamphlets, circulars, etc., regarding the goods you want.

ADDRESS SERVICE EDITOR, RADIO WORLD, 1493 BROADWAY, NEW YORK CITY

**SPECIAL VACATION SUBSCRIPTION OFFER (FOR NEW SUBSCRIBERS ONLY)**

In order to materially increase our subscription list we are offering for a limited time a special subscription of seven issues of Radio World for \$1.00. You may begin your subscription now, or have us start sending the first issue on this subscription offer when you go out of town.

CUT OUT THIS TODAY SO THAT YOU WILL NOT FORGET ABOUT IT  
Radio World's Special Summer Subscription Offer

Radio World, 1493 Broadway,  
New York City

Enclosed find \$1.00, for which send me Radio World for seven issues, beginning with your number dated.....

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Single Copy.....\$.15  
One Year (52 numbers)..... 6.00  
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Add \$1.00 a year for foreign postage.  
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**Cram's Radio Broadcasting Map of United States and Canada**

With all the new allocations and changes recently brought out. Scale, 100 miles to the inch; in two colors—Size 8 1/2 x 23 1/2.

PRINTED ON HIGH-GRADE MAP PAPER WITH ALL UP-TO-THE-MINUTE INFORMATION BY WHICH YOU CAN LOCATE ANY BROADCASTING OR HIGH POWER STATION. A COMPLETE INDEX OF THE ARMY, NAVY AND BROADCASTING STATIONS. The Most UP-TO-DATE MAP out!  
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**THE COLUMBIA PRINT**  
1493 BROADWAY, NEW YORK CITY

**Construction of New Type Transatlantic Receiving Sets**

By M. B. SLEEPER  
Fully Illustrated. Price 75 Cents

In addition to the listening to ships and broadcasting stations on short wave lengths there is a peculiar fascination about listening to the high-power telegraph stations of England, France, Germany, Russia and Italy as well as those located in the Pacific Ocean and the Oriental Countries. It is much easier to do this than most people imagine. The sending is very slow, a feature of assistance to the beginner in telegraphy. Several types of receiving sets for this task are described. Detection, amplifiers, oscillators, etc., for long distance reception are also described. Suggestions for the reproduction of relays by the signals and the reproduction of them, on a phonograph are given. In addition there is some valuable data on home made wavemeters for testing and experimenting.

Sent P. P., prepaid, on receipt of price, by  
**THE COLUMBIA PRINT**  
1493 BROADWAY, NEW YORK CITY



# Tale of Woe

By G. Lorimer Bascom

I WAS sitting  
 \* \* \*  
 AT MY radio set  
 \* \* \*  
 HEARING ALL the news  
 \* \* \*  
 WHEN A thought struck  
 \* \* \*  
 ME LIKE a flash  
 \* \* \*  
 THAT I could hear  
 \* \* \*  
 EVERYTHING LOUDER  
 \* \* \*  
 IF I attached that  
 \* \* \*  
 NEW BATTERY that I  
 \* \* \*  
 HAD just purchased  
 \* \* \*  
 THAT MORNING.  
 \* \* \*  
 WITHOUT MORE ado  
 \* \* \*  
 I DUG it out  
 \* \* \*  
 AND FISHING behind  
 \* \* \*  
 MY SET I detached  
 \* \* \*  
 TWO WIRES that I  
 \* \* \*  
 THOUGHT WERE my B  
 \* \* \*  
 BATTERY LEADS.  
 \* \* \*  
 THEN I turned on  
 \* \* \*  
 THE JUICE and  
 \* \* \*  
 THE TUBES tried to  
 \* \* \*  
 COMPETE IN brightness  
 \* \* \*  
 WITH THE 100 watt lamps  
 \* \* \*  
 THAT THEY use on the signs.  
 \* \* \*  
 BUT JUST for a second  
 \* \* \*  
 BECAUSE AFTER THAT they  
 \* \* \*  
 JUST WENT out and  
 \* \* \*  
 I REALIZED that  
 \* \* \*  
 I HAD spent eighteen  
 \* \* \*  
 DOLLARS without ever  
 \* \* \*  
 GETTING ANYTHING for  
 \* \* \*  
 IT AND I was mad  
 \* \* \*  
 UNTIL I realized  
 \* \* \*  
 THAT I shouldn't  
 \* \* \*  
 HAVE TURNED on  
 \* \* \*  
 THE TUBES until I  
 \* \* \*  
 HAD MADE sure of  
 \* \* \*  
 WHAT I was doing.

## Wanted Music

LITTLE WILLIE, aged five, was seen standing on the corner intently watching a man with an ear horn strapped to his head. The man was evidently undecided as to what the main attraction was, until Willie went up and asked him why he didn't turn on the loud speaker and let him hear the music.

# EXTRAORDINARY SUMMER SUBSCRIPTION OFFER

## Radio World and Other Popular Radio Publications for the Price of Subscription for Radio World Alone

- Radio World has made arrangements  
 —by which it is possible  
 —to offer a year's subscription for  
 —any one of the following publications  
 —with one year's subscription for
- Radio World:
  - RADIO NEWS or
  - POPULAR RADIO or
  - WIRELESS AGE or
  - RADIO DEALER or
  - RADIO (San Francisco)

This is the way to get two publications  
 —for the price of one:  
 —Send \$6.00 today for Radio World  
 —for one year (regular price  
 —for 52 numbers)  
 —and select any one of the other  
 —four publications for twelve months—  
 —This offer good only up to and  
 —including August 20, 1923.  
 —Present Radio World subscribers  
 —can take advantage of this offer by  
 —extending subscriptions one year NOW.  
 —Or order thru your newsdealer.

### RADIO WORLD'S SPECIAL TWO-FOR-PRICE-OF-ONE SUBSCRIPTION BLANK

RADIO WORLD, 1493 Broadway, New York City.

Enclosed find \$6.00, for which send me RADIO WORLD for twelve months (52 numbers), beginning ....., and also, without additional cost, Radio News, or Popular Radio, or Wireless Age, or Radio Dealer, or Radio for twelve months beginning .....

Name .....

Street Address .....

This Offer Good  
 Until Only  
 August 20, 1923

City and State .....

## Freshman FIX-O

A Fixed Resistance Leak  
Combination—4 in ONE



Freshman Condenser  
Leak Mounting  
Freshman Fixed Leak  
**SAFE-T HANDLE** } Price  
Complete **65c**

Furnished in any value of resistance  
from 1/2 to 10 Megohms

The only Resistance Leak using no carbon,  
graphite or lamp black—and guaranteed to  
be permanently constant.

Separate Condenser and Mountings...40c  
Separate Leaks with Safe-T Handle...30c

At your dealers, otherwise send purchase  
price and you will be supplied postpaid.

**Chas. Freshman Co. Inc.**  
Radio Condenser Products  
106 SEVENTH AVENUE NEW YORK

## Latest London Water Sport



(C. International Newsreel)

This London girl has found a way to listen  
in in comfort during the hot weather, and  
was seen floating in the Thames River on  
an "inner" tube with her wireless set on  
her lap.

## Radio Station Conducting Tall Corn Contest

ONE of the most unique contests of the  
year is that being sponsored by Station  
WOC, at Davenport, Iowa.

This broadcasting station is often heard  
acclaiming proudly that it is located in  
Iowa, "The state where the tall corn  
grows." To exemplify the phrase and to  
justify the statement in the eyes of any  
who may be skeptical among its many  
visitors from other states, a tall glass case  
has been installed as a part of the sta-  
tion's unique furnishings, and in this case  
is to be displayed twenty stalks of Iowa's  
tallest corn.

To stimulate interest in intensive culti-  
vation The Palmer School of Chiropractic  
has offered fifty dollars in prizes to the  
Iowa boys and girls who produce the  
twenty stalks with the greatest average  
height. Twenty-five dollars is to be paid  
to the first prize winner, fifteen dollars to  
the second, and ten dollars to the third.

At the end of the growing season con-  
testants are to submit the average height  
of their twenty tallest stalks, measured  
from the ground line to the tip of the  
tassel. When the winners have been  
picked they will be notified to ship the  
corn (crated and with ears attached) to  
the Davenport station, where the meas-  
urements will be checked and the prizes  
awarded.

Any Iowa boy or girl under twenty  
years of age is eligible for entrance in  
the contest.

## Capt. Miller Praises Radio for Balloons

IN the recent race four balloons carried  
radio. Captain Lester T. Miller has  
written the General Electric Company in-  
formally praising the radio set and its  
valuable use during the race.

"Lieut. Brown and myself during our  
flight found your set worked very satis-  
factory in every way," Capt. Miller  
writes. "As you know the counterpoise  
we used was a seven-strand copper wire,  
woven 15 times about our basket. For  
our aerial we used 300 feet of the same  
kind of wire. During the night of July 4  
and on July 5 we flew at an altitude of  
about 4,000 feet. All our weather reports  
were received very clearly; in fact, the  
clearness of tones surprised both of us  
as they were clearer than our regular  
station sets on the ground.

"On July 5, after 8:30 a. m., we flew  
at a higher altitude and at heights of 5,000  
feet and above we found that static was  
so bad that we were not able to receive  
satisfactory signals. We consider the set  
a very fine one and heartily recommend  
it for purposes of this kind."

## Truth in Advertising

OVER \$600,000 will be appropriated  
to further the "truth in advertising"  
campaign, it was announced at the annual  
meeting of the Executive Committee of  
the Advertising Association in Chicago  
last week. Of this amount \$500,000 will  
be subscribed by forty Better Business  
Bureaus throughout the country and the  
rest will be appropriated by the Asso-  
ciated Advertising Clubs of the World.

"The results of advertising depend en-  
tirely on the impression that the reading  
public gets from advertising," said Paul  
Hunt, manager of the association.  
"Through the agency of the Associated  
Advertising Clubs of the World thirty-  
seven states and a number of municipal-  
ities have passed statutes requiring that  
all advertisements be true representa-  
tions. We are now trying to get all of  
the states to pass such laws."

The meeting passed a resolution com-  
mending Postmaster General New for his  
activity and that of his department in  
helping to identify fraudulent advertisers.

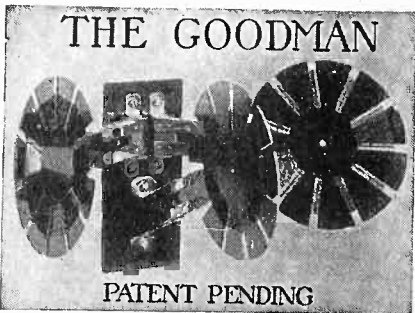
## Stockholders in Electric Com- panies Rapidly Increase

A SURVEY of 156 electric companies  
made by the New York State Com-  
mittee on Public Utility Information  
shows that in nine years the annual sale  
of shares of stock in the companies, of a  
value of \$100 a share, increased from 92,-  
310 to 1,750,707 shares, and in same period  
the number of stockholders had jumped  
from 4,044 to 198,018. An increase in  
number of shares sold of approximately  
1,800 per cent. was sold to a group of  
investors whose numerical increases was  
nearly 4,800 per cent.

The point is made that these figures  
indicate that the customers of the com-  
panies are becoming stockholders in  
them. There are more than 1,600,000  
owners of electrical securities in the  
United States. In 1914 the average num-  
ber of shares purchased by each new  
stockholder was 22.8, involving an in-  
vestment of \$2,280. In 1922, when the  
number of purchasers had grown from  
4,044 to 198,018, the individual number  
of shares bought was 8.6 or an invest-  
ment of \$880.

## Station WJY Takes a Vacation

THE call of station WJY, New York City,  
with one exception will not be heard  
during its usual program period until  
some time in September. This station  
will fill its usual Sunday afternoon hours  
each week. During the intervening weeks  
this station and its operating force will  
be occupied in carrying out certain re-  
search work designated to improve the  
quality of broadcasting from all radio  
stations.



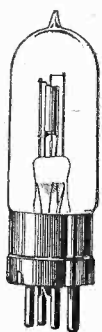
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PATENT PENDING

The Niftiest Short Wave Tuner on the Market  
Only \$6.00 & PP on 1 lb. Send for pamphlet.

**L. W. GOODMAN**  
DREXEL HILL, PA.

The Goodman is really a high grade instrument,  
well and sturdily constructed. The PANEL and  
FANS are GENUINE BAKELITE—the best material  
known for the purpose.



**WE REPAIR**  
**WD-11, \$3.50**  
AND POSTAGE

Also other vacuum  
tubes, excepting  
VT-1 and VT-2.

Mail orders solicited and  
promptly attended to.

**H. & H. RADIO CO.**

514 Clinton Avenue

Newark, N. J.

**RADIO** Do you want to sell your old set?  
**FANS** Do you want to exchange anything for something?  
Do you want to buy something?

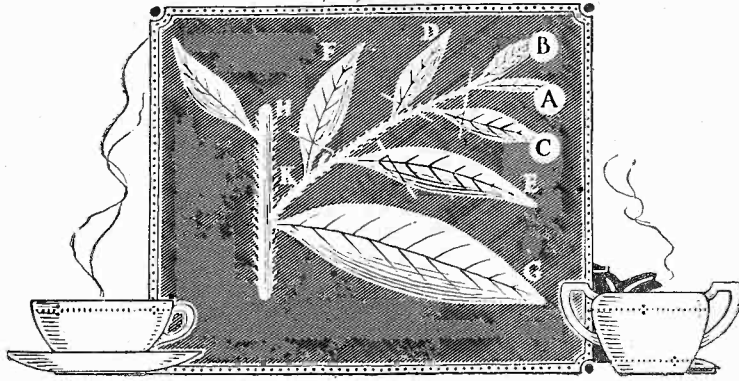
If so, why don't you use the Classified Department of Radio  
World? You can get fine results for five cents a word, minimum  
ten words. Your message will reach thousands including other  
fans, dealers, etc., etc.

Try Radio World's Classified Department  
for your personal radio and other needs.

**RADIO WORLD, 1493 Broadway, New York City**



# The A.B.C. of Good Tea



**T**HIS diagram shows clearly one reason for the superior flavor, strength and aroma of RIDGWAYS TEA.

The plucking season commences in the early Spring and continues right into the Autumn. At the commencement of the season, the plant sends forth its first tiny shoots. In order to get the very choicest pickings, only those leaves marked "A," "B" and "C" are gathered for Ridgways. These tender, young tip-leaves give to Ridgways Tea that rare quality of flavor

which distinguishes the famous Ridgway blends. The leaves marked "D," "E," "F" and "G" are coarser and less flavory and therefore *are never used by Ridgways.*

This carefully guarded Ridgway quality also assures more cups to the pound. When you buy Ridgways Tea you not only get the best tea, but actually more of it than is possible from inferior tea. As an example of rare good tea we suggest that you order Ridgways (GOLD LABEL), the *Genuine Orange Pekoe.*

Be Sure to Insist Upon  
**Ridgways Genuine Orange Pekoe Tea**

A GENEROUS SAMPLE  
WILL BE SENT ON REQUEST

*Address: Ridgway Tea Co., Dept. A., 60 Warren St., New York*

INDIA-CEYLON  
**Ridgways Tea**

## Sleeper's Two Latest Radio Books

Two new and remarkably good radio books by M. B. Sleeper—one is entitled "Six Successful Radio Sets," with design data and instructions for receiving sets specially selected for exceptionally long distance reception. The other is "101 Receiving Circuits," being a most complete compilation of diagrams including circuits for a regenerative, superregenerative, Reinartz, Flivver, Flewelling, super-heterodyne, reflex and radio frequency sets. Each book mailed on receipt of fifty cents and ten cents extra for postage. Both books for \$1.00 and no extra charge for postage. The Columbia Print. 1493 Broadway, New York City.

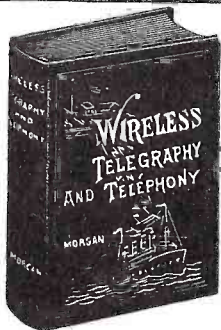
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Send \$6.00 for yearly subscription for Radio World (52 numbers) and these two Sleeper Radio Books will be sent you free, parcel post prepaid. This offer good only until August 20, 1923. If you are already a subscriber, send \$6.00 for a renewal and books will be sent you.

IF YOU ARE INTERESTED IN RADIO YOU NEED THESE BOOKS

## Radio Books for Your Vacation

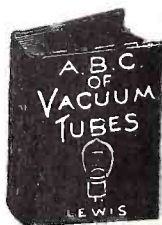
Telling How to Operate a Radio Set—How to Build a Set—Principles of Vacuum Tubes and Other Radio Problems



### Wireless Telegraphy and Telephony Simply Explained

By ALFRED P. MORGAN

One of the most complete and comprehensive treatises on the subject ever published. A study of its pages will enable one to master all the details of the wireless transmission of messages. The author explains in simple language the theory and practice of wireless telegraphy and telephony. 154 pages, 156 engravings.....PRICE \$1.50

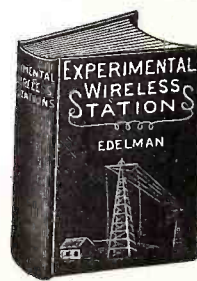


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By E. H. LEWIS

Assoc. I. R. E., and Radio Instructor

Written particularly for the person who "knows nothing about radio," but who would like to gain an understanding of the elementary principles of operation of vacuum tubes and various circuits in which they are used for the reception of radio-telegraph signals and radio-telephone music and speech. Illustrated.....PRICE \$1.00



### Experimental Wireless Stations

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Tells how to make apparatus to not only hear all telephoned and telegraphed radio messages, but also how to make simple equipment that works for transmission over reasonable long distances. Then there is a host of new information included. The first and only book to give you all the recent important radio improvements, some of which have never before been published. 392 pages, 167 illustrations.....PRICE \$3.00

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