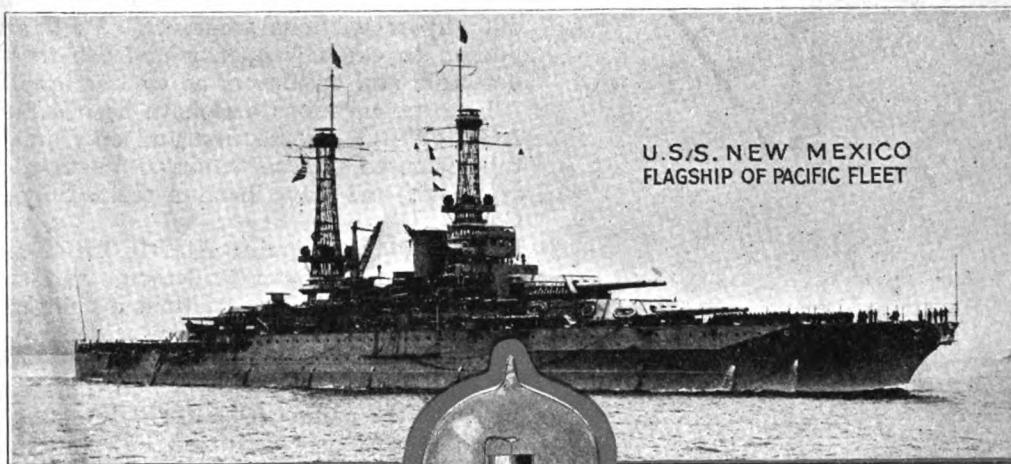
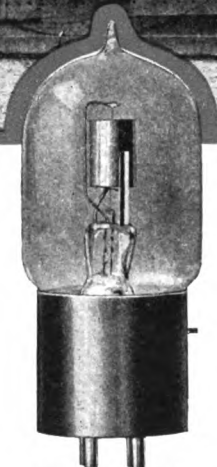


PACIFIC RADIO NEWS

*Pioneer Journal of
Western Radio News and Development.*



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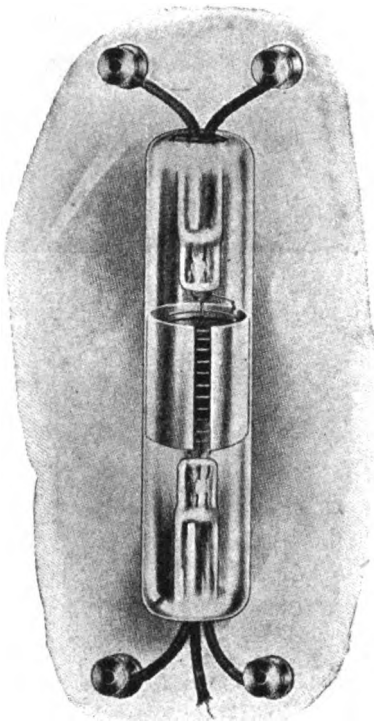
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PACIFIC RADIO NEWS

PAUL R. FENNER
Editor

PUBLISHED
MONTHLY

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Pacific Radio Pub. Co.

H. W. DICKOW
Advertising Manager

50 Main St., S. F., Cal.

Boston Office
18 Boylston St.

RADIOTORIAL

BY THE EDITOR

341888

YOUR INTEREST AT HEART

DID you ever stop to figure out how the Golden Rule is the only one that works out? Well, it most certainly is. Take, for instance, the business of getting out a publication like "Pacific Radio News." The advertisers who pay us for printing their ads in "Pacific Radio News" secure something for their money. Through the advertisement they are enabled to sell their goods, make a profit, and so are enabled to live prosperously. These advertisers know that we certainly could not hope to secure a full page advertisement from them, selling for a high rate unless they were sure that the advertisement would sell sufficient goods for them to pay for the ad and make a fair profit for them besides. Thus, we aim to give the advertiser the largest space for the least cost possible, and leave a fair profit to ourselves. But this

is the least important to YOU, the reader of "Pacific Radio News."

YOU are interested in the reading matter. You pay so much for "Pacific Radio News" each month and you expect us to furnish you with so much good information or news on the subject of radio. But—did you ever know that you pay less for "Pacific Radio News" than it ACTUALLY COSTS US TO PRINT IT? Well, you do pay less in cash, but we work on the principle of the Golden Rule. We give you each month the best we can, we spare no expense to give you what is valuable information. And, just as we have said, we expend more money than you pay us for the service in cash—BUT, you give us an inestimable service that more than enables us to exist and make a profit on our business. YOU, the reader,

do for us what you would have us do for you. You show the advertiser that we are worth-while. You buy from the advertiser and show him that his advertisement in "Pacific Radio News" was profitable. In other words you maintain for us and do for us something which we cannot buy at any price. And if you are doing so much for us we are doing something for you too.

Each month we are laying foundations for service to YOU, the reader. We are lining up with authors for good articles and good stories. Do you think that we are pleased with our work? Satisfied with "Pacific Radio News?" No, we are not. If we were, it would be time for us to step out and let someone else in the field. We are ever working to make "Pacific Radio News" better for YOU, and we know that the best is none too good.

OUR APPRECIATION

IN our last issue we asked you to fill in a questionnaire and mail it to us in order that we may know your particular wants in the line of reading matter for the big numbers of "Pacific Radio News." As we go to press the questionnaires are still coming through the mail, and the answers to the questions asked are many and varied.

Judging from returns received to date it is safe to assume that the majority of our readers are under 21 years of age; only a small percentage hold commercial licenses and the average reader is a high-school student whose ambition lies in the direction of securing a commercial license. He does not desire to

make radio his life-long study. Highly technical articles do not appeal to him but on the other hand a certain amount of semi-technical information is desired. Current radio news is asked for by all, and the time-worn proverb, "A little jester now and then, is cherished by the best of men," holds particularly true in the case of our readers. Good radio humor is hard to obtain but we are going to do our best to give you a little of it in every issue.

Constructional articles are wanted by many readers. This field has already been well covered but it has been brought to our attention that many amateur radio mechanics have been dissat-

isfied with results obtained from apparatus that was built in accordance with directions found in radio periodicals. With this fact in mind we are hereby assuring you that all apparatus described in our "How-to-make-it" department will accomplish all that the writer of the article claims.

We extend our thanks to those who have sent us the filled in questionnaire, and bearing in mind the nature of material that is asked for by our readers we will strive to give you, at all times, the best that is to be had for publication on the particular subjects that are in such high demand.

DOWN TO THE
MINUTE

Current Radio News

UP TO THE
STANDARD

ONE of the largest radio stations on the Pacific Coast will be built at Portland by the Federal Telegraph Co. to replace the former station of this company at Lents, Oregon, which was dismantled during the war.

The towers for the new station will be 600 feet in height and will support an umbrella aerial that will be used to transmit and receive three messages on the same aerial at one time. Most of the apparatus that was originally used at Lents was shipped to Siberia by the Navy Department during the war.

MR. L. Krumm, radio inspector at New York, in a circular letter states that hereafter applicants for licenses at New York will be required to give a thorough demonstration of their sending ability. They will be required to send 500 words, made up of all characters in the alphabet. Their transmitting will also be recorded on tape. Similar action will be taken by the San Francisco radio inspector as soon as the necessary equipment for recording the sending of the applicant is received from the east.

A PUBLIC demonstration of the wireless telephone equipment installed on Catalano Island will mark the inauguration of radio communication between the island and the mainland. The demonstration will consist of wireless telephone communication with Chicago, San Francisco and other points on the continent. The service is expected to be in operation July 1st, and is said to be the first commercial enterprise of its kind in the world. The rate for a three minute conversation between Avalon and Los Angeles will be forty cents.

MR. Dubilier, manufacturer of the Dubilier transmitting and protective condensers bearing his name, was formerly a Seattle amateur. His condensers have become the standard in radio work.

LEE De Forest, the well-known American scientist, according to the New York press, has petitioned to have his alimony payments to his former wife broken off, declaring that her new husband is wealthy and that she is in no need of alimony.

THE Pacific Radio Supplies Company of San Francisco, distributors of the A-P tubes, are supplying a chart of twelve vacuum tube circuits with every tube sold.

BECAUSE of the shortage of enlisted personnel at Eureka, Farallone Islands, Point Arguello, Avalon and Point Loma radio compass stations shipping interests were requested to use the other six stations during daylight hours.

The appeal was made by District Communication Superintendent, S. D. McCaughey. San Francisco mariners are arriving here from the Atlantic report inability to get bearings from any of the compass control stations which have been reported as operating on the Atlantic Coast. The captain of the "West Helix" reported that he was compelled to proceed by soundings, while approaching New York harbor in a heavy fog, because none of the compass stations responded to the radio calls of the ship.

A strike of marine radio operators was declared on June 15th by the Association of Wireless Telegraphists of London, England. The men demand an increase of wages approximately 180 per cent. over the pre-war salary. Ship operators were instructed to cease work upon arrival in port. Shore station operators were not affected by the strike. The minimum salary demanded by the association from the Marconi Company is two pounds and sixteen shillings weekly. 4,500 operators were affected. The strike was called off on June 23rd after guarantees of fair treatment were secured by the strike leaders.

THE use of radio telegraphy as a means of gaining rapid communication between different police stations in the United States, will be installed generally throughout the country in the near future, Chief of Police August Vollmer, of Berkeley, Cal., announced recently upon his return from the national convention of chiefs of police at Detroit, Michigan.

MR. W. H. WARREN, of Ashbury Park has invented a wireless telephone for seashore rolling chairs, so that the patrons of the vehicles can listen to the music transmitted by nearby radio stations.

RADIO experimenters and commercial radio men in the east speak very highly of Lieut. E. W. Stone's book, "Elements of Radio Telegraphy." Not since Prof. Pierce's "Principles of Wireless Telegraphy" have we had such a fine treatise on this subject. Eastern sales are heavy.

A RADIO compass for airplanes, which will enable them to locate other planes accurately, regardless of weather conditions, has been successfully tested by the navy flyers.

On a recent trip from Philadelphia to Pensacola, the NC3 and another from the Anacostia, D. C. field, were equipped with the new device. Communication and bearings were successfully established. The two planes were directed toward each other from the field until, when 65 miles apart, the compass of each was brought into operation and confirmed their positions.

MADAM Nellie Melba, the opera singer, sang several songs into a microphone at the Marconi works in London and telegrams were received from Paris, The Hague and other cities, reporting that the songs were heard there very clearly.

THE Kilbourne & Clark Manufacturing Company has recently undergone an entire reorganization and has actively resumed operations under new management. The company is continuing the manufacture of its well-known wireless apparatus, and also has in hand a large contract for amplifiers for the United States Navy. In addition, special attention is being paid to transformers and motor-generators for radio purposes.

H. F. Jefferson, formerly acting chief engineer of the company, has been appointed general manager. He has had extensive experience in the electrical industry, both in Europe and America, and is a member of several international engineering organizations.

Service work on vessels equipped with Kilbourne & Clark wireless apparatus will continue to be handled as before by the Ship Owners Radio Service, Inc., a subsidiary organization of the Kilbourne & Clark Manufacturing Co.

The California district, with headquarters in the Fife Bldg., is under the management of N. R. Kuhn, formerly of the Communication Service, United States Navy, who has been with the firm since the first of the year.

THE Independent Wireless Telegraph Co., Inc., will soon have on the market a 2 K.W. undamped wave set, according to reports received here.

MME. Marconi, mother of the radio inventor died recently at Bologna, Italy.

The Radio Equipment of a U. S. Destroyer

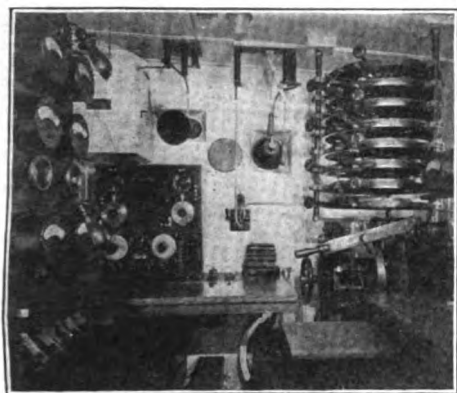


Figure 1.

THE destroyers built for the United States Navy during the war are exceptionally well equipped with radio apparatus. To the casual observer, these small fighting craft appear to be of too little importance to have anything but a very modest and simple radio installation, and it is often with surprise that uniformed people, although familiar with radio apparatus and equipment, learn of the elaborate sets installed on our destroyers.

The accompanying views show the general lay-out of the main radio room as arranged on the average destroyer. Figure 1 is a general view of the control panel, receivers and main transmitter. This transmitter, which can be seen at the right hand side of the figure, is a five kilowatt, 500 cycle transmitter, equipped with a wave changer and load coils, which allow the set to be quickly changed to any of the standard navy wave-lengths. Nine wave are usually provided each of which may be easily obtained by a simple throw of the wave changer switch. The control wheel for this switch can be seen at the end of the center table, below the left hand side of the antenna load coils. To the extreme right can be seen the radiation ammeter, a Western thermocouple type, connected in the earth lead. The condensers are located beneath the primary and secondary of the inductive coupler and consist of a bank of standard Dubilier mica units. The power transformer is located beneath the table. The motor generator is located in the dynamo room and is operated entirely by the control board seen to the extreme right of the picture. This machine is operated by a solenoid controlled automatic starter, but in case of emergency it may also be operated by hand.

The receiving equipment can be seen just to the right of the power control board. It consists of a Navy Standard short wave receiver (200 to 3,000 meters), and a long wave receiver with a range of from 2,500 to 15,000 meters. The audion control panel and two-step amplifier are located to the left of the

power panel, as can be partly seen behind the shade on the pilot lamp on the power panel. Standard Western Electric head telephones are plugged into the two jacks, visible just under the edge of the table in front of the tuners. A multi-pole switch enables the use of the audion on either receiving cabinet.

Two antennae are used with the equipment, one being the main antenna, used for the main set, and the other, an auxiliary antenna, is used only for the telephone set. A ground switch for the main antenna can be seen near the top of the picture. The smaller switch to the left is the telephone antenna grounding switch.

The radio telephone equipment is shown in Figure 2. This is a standard navy type telephone set, which uses one VT2 oscillator tube and another tube as a modulator. The central panel houses the entire sending and receiving apparatus, together with a two-step amplifier. The small panel to the left is used for the dynamotor control for supplying a voltage of 350 to the plate circuit. This telephone is operated entirely by a 30-volt storage battery which is independent of the ship's main power system. The box in the foreground to the right, is a three-step audio frequency amplifier which operates the loud speaker in the pilot house. The loud speaker is arranged in such a manner that the Commander of the vessel can stand in the pilot house and converse directly with the Commanders of other vessels by radio telephone without leaving his post.

A microphone transmitter is located in the pilot house which directly controls the modulation or control circuit of the set. A simple push button is provided in the pilot house to operate the send-receive relay, located inside of the main panel. Using the loud speaker it is not, as can easily be seen, necessary for the Commander to leave his post, or to wear head telephones; it is only necessary for him to depress or release the control button which operates the send-receive control relay, located within the set itself. The operator on watch is required to listen-in at the same time and attend to all tuning, adjustments, etc., which may be necessary. The radiation of the telephone set is usually in the neighborhood of from 0.65 to 0.7 amperes and the normal

transmitting range is ten miles, although distances of over a hundred miles have been covered at times. The radiation of the main spark transmitter is about 38 amperes on 950 meters, but due to the small, low antenna the signals do not carry very well.

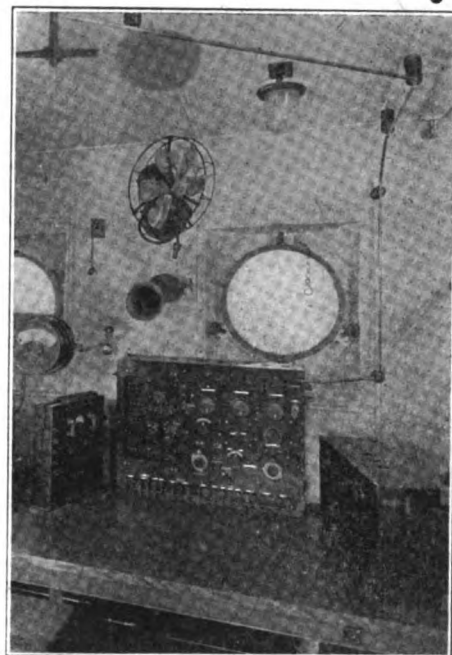


Figure 2

The complement of the regular destroyer's crew calls for three radio men; one chief electrician and two assistants. A continuous watch is maintained at all times while the vessel is under way. Radio operators who enlist in the navy at the present time, will if they so desire, be assigned to a destroyer which is equipped with a set similar to the one herein described.

John R. Wakeman, a member of the U. S. S. "Birmingham" was married recently by wireless. His bride in Detroit went to the church with her wedding party. The minister read the wedding ceremony and it was wirelessly to the "Birmingham." The crew of the cruiser stood at attention on the deck with Wakeman out in front while the messages were read.

If you have something that you don't need and want to sell, use the Classified Advertising columns of "Pacific Radio News."

The First Lecture by Radiophone

On June 29, 1920, at 8:00 p. m., the first lecture ever given over the radio telephone was delivered by Lieutenant Ellery W. Stone, U. S. Navy, General Manager of the Pacific Radio Supplies Co., from the radio station of the De Forest Radio Telephone and Telegraph Co. at the California Theatre, San Francisco.

Considerable interest was aroused in radio circles over Lieutenant Stone's speech particularly from the fact that it was the first time in the history of the radio art that a lecture by radio had ever been made. Operators for several hundred miles reported receiving the talk clearly and distinctly, and the students at several radio schools listened in as part of their instruction.

Lieutenant Stone was introduced to his "audience" by Mr. C. V. Logwood, chief engineer of the De Forest Co., who spoke as follows:

"As we have announced for the past week, we shall now have a lecture by Lieutenant Ellery W. Stone, U. S. Navy, general manager of the Pacific Radio Supplies Co., distributors for the Moorhead Laboratories of San Francisco. Lieutenant Stone is a member of the Institute of Radio Engineers, the U. S. Naval Institute and the American Institute of Electrical Engineers, and is the author of a book and many papers on radiotelegraphy?"

Following this introduction, Lieutenant Stone spoke for about fifteen minutes as follows:



LIEUT. ELLERY W. STONE

GOOD evening, gentlemen, this is Ellery W. Stone speaking. I can assure you that it affords me a great deal of pleasure to address you tonight in what is probably the first lecture ever delivered over the radio telephone, and in so doing, I must express my thanks to the DeForest Co. and to the management of the California Theatre who have accorded me this privilege.

I shall take this opportunity to say a few words on the subject of vacuum tube operation for the benefit of those operators, experimental, commercial and naval, who may be using them in their receiving sets. While the theory of vacuum tubes is, of course, quite thoroughly understood, it has occurred to me that a few points on the actual operation or adjustment of vacuum tubes for most efficient results might be of interest.

You will of course appreciate the fact that without charts or diagrams, it is somewhat difficult to present any sort of a talk.

I shall endeavor to make the talk as clear as possible considering the limitations of the conditions under which I am speaking.

Vacuum tubes may roughly be divided into two classes, hard and soft. By a hard tube, or amplifier-oscillator, we mean one in which there is no trace of gas left in the tube, insofar, of course, as it is humanly possible to so exhaust it. A soft tube, or detector, on the other hand, is one in which a small trace of some gas is deliberately retained in the tubes. This gas may be air, composed largely of oxygen and nitrogen, or

traces of mercury vapor, or some of the rarer gases such as argon, neon or helium. Commercially, however, such gas as is present in soft tubes is usually air, nitrogen, or mercury vapor.

Soft tubes are used for detector purposes while hard tubes are used for amplification and the generation of oscillations. Hard tubes should be used, therefore, for regenerative work and amplifying work in a receiver and for oscillation work for transmitting purposes in an undamped wave telephone or telegraph set.

As you all know, the principle on which a hard tube works is that of the pure electron discharge radiated from the heated filament while with the soft tube, the electrons radiated from the filament break up the molecules of gas purposely left within the tube into positive and negative ions. In addition to the radiated electrons themselves, these positive and negative ions separated from the original molecules through their collision with the radiated electrons also serve as the carriers of the plate current, which is the current made audible in the telephone receivers.

You are familiar with the characteristic curve of vacuum tubes in which the plate current is plotted against different grid potentials, the potential of the grid being measured with respect to the negative side of the filament. However, in order that this action may be visualized, I would suggest that you draw a curve as follows. Take a pencil and draw to the right a horizontal line about a half inch long. Now curve this line upwards until it is almost straight up and down or vertical for a distance

of two inches. Now curve this line a half inch to the right again until it is practically horizontal. The ordinates or vertical components of this curve are plate current, the abscissae or horizontal measurements are grid potential. The grid potential half way up the curve is zero, to the left it is negative and to the right it is positive. This curve is approximately the characteristic curve of the vacuum tube. From this curve it will be observed that for very minute changes in the grid potential, this potential is that of the incoming radio wave, very large values of the plate current, relatively speaking, may be triggered through the telephone receiver. The vacuum tube thus acts as a sort of relay, the radio potential being used to relay the energy supplied by the B battery through the telephone receivers. As another analogy, we may cite the trigger effect of a pistol. The relatively light pressure of the finger on the trigger, corresponding to the radio wave potential on the grid, serves to release the chemical energy stored in the powder charge of the cartridge, the latter corresponding of course to the electrical energy of the B battery.

Referring again to the characteristic curve of the average vacuum tube, the sensitivity of any one tube depends upon the steepness of this curve, for the steeper the curve, the more B battery energy will be released for a given change in grid potential, that is to say—for a given strength of received radio current.

In a soft tube, the steepness of this curve depends upon the potential ap-
(Continued on page 8)

The Construction of an Ideal Amateur Short Wave Regenerative Receiver

By A. F. Pendleton*

ALTHOUGH the vacuum tube is almost universally used as a detector, oscillator or amplifier in receiving circuits by amateurs, there seems to be a general lack of knowledge in obtaining the maximum results with this most valuable instrument. The intention of this article will be to describe accurately the construction of a moderately priced receiving tuner wherein the maximum efficiency is secured, with the use of one vacuum tube, on signals of 200 meter wave length.

In the first place it is essential that the receiver be a set designed for receiving 200 meter waves, or thereabouts, only. The 200 to 3,000 meter tuner

ANOTHER REGENERATIVE RECEIVER WILL BE DESCRIBED IN OUR NEXT ISSUE BY MR. T. LAMBERT, MANAGER OF THE RADIO SHOP, SAN JOSE, CAL. COMPLETE SPECIFICATIONS AND WORKING DRAWINGS WILL ACCOMPANY THE ARTICLE.

may be shunted with a small condenser and the grid variometer may be removed. In place of the plate variometer a small coil shunted by a variable condenser may be used.

In regard to the sizes of the various instruments, the variable condensers 1 and 2 should be of approximately .001 mfd. capacity, which is usually one hav-

22 plates) shunted across secondary 4. Variometer 6 may be replaced by a coil of No. 22 D. C. C. wire wound on a 3 inch tube, 30 turns, no taps, and by shunting an .0005 mfd. condenser across this coil. The variometer is much better, however.

In making the loose coupler it is not necessary to adhere to the sizes of cardboard tubes as given above. A tube from 4 to 5 inches in diameter will be just as good but the same size wire should be used as specified. In order to find the correct amount of wire or, in other words the right number of turns, wind the tube with a number of turns of wire, say forty or fifty turns, winding

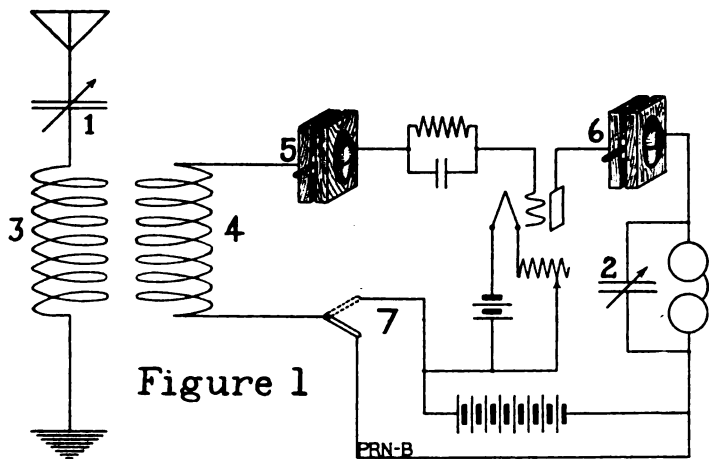


Figure 1

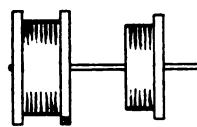


Figure 2

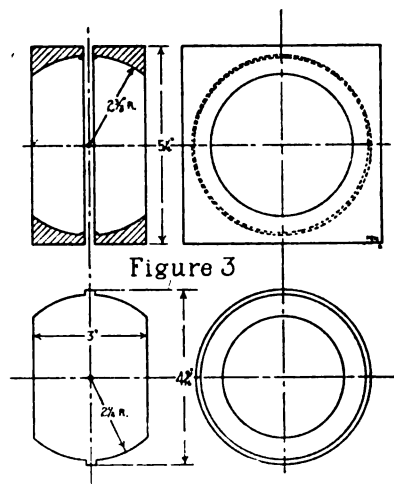


Figure 3

must be placed in the discard, with its faulty switches and dead ended turns.

The receiver described herein is positively the most sensitive short wave receiver now known. This statement is made because it has stood the test in competition with the most expensive products of the foremost makers for the past five years.

The cost of construction rests to a great extent with the builder. If the apparatus is to be housed in a polished hardwood case with a bakelite panel, the cost will run up, but if, on the other hand, it is not housed the cost should not run as high as fifteen dollars. If the amateur possesses some of the necessary instruments already the receiver can be made for even less money.

Figure 1 shows the hook-up used. The following instruments are shown: Three variable condensers, small loose coupler, two variometers, two-point switch, grid leak, vacuum tube, phones and necessary battery. Almost equally good results may be obtained by certain substitutions from this number of instruments. For instance, the secondary of the coupler

ing about 43 plates or more. The primary of the loose coupler 3 may be wound on a 3½ inch tube 2 inches long and with 32 turns of No. 20 or 22 D. C. C. Magnet Wire. No taps need be taken off. Secondary 4 is a 3 inch tube 1½ inches long wound with 35 turns of No. 28 or 30 D. C. C. wire; no taps being taken. Figure 2 shows a good way to make the loose coupler, but any method may be used that suits the builder. Figure 3 shows the dimensions of variometer 5. The rotor is wound with 70 turns of No. 22 D. C. C. The stator is also wound with 70 turns of the same size wire. Variometer 6 is made to the same size as variometer 5 but the rotor instead is wound with 50 turns of No. 18 D. C. C. wire and the stator with the same number of turns of the same size wire as the rotor.

Switch 7 is for changing the relation of the B battery to the circuit. It is found very helpful to cause the circuit to oscillate at times when the bulb seems obstinate.

To substitute instruments, variometer 5 may be done away with and a small condenser of .0005 mfd. capacity (about

the secondary tube with an equal amount of wire approximately. Then connect up the set according to the hookup. Listen in for a station that is operating on exactly 200 meters. The variable condenser in the primary circuit should be at about one-third full scale reading. If it is over this, cut out turns of wire on the primary coil; if the condenser reading is under a third of the scale reading add wire to the coil until just right. On the secondary add or take off turns until 200 meter signals come in loudest with about five degrees deflection of the secondary condenser. Use as little wire as is possible in the secondary. Greatest efficiency is obtained when the secondary turns are cut down until minimum amount are used on 200 meters with zero scale deflection of the secondary condenser. When such a minimum is reached it will be found that the secondary may be pulled out a considerable distance without the signals fading appreciably. This condition makes for success in eliminating interference.

As can be seen from the above description (Continued on page 18)

*Manager, Radio Phone Shop.

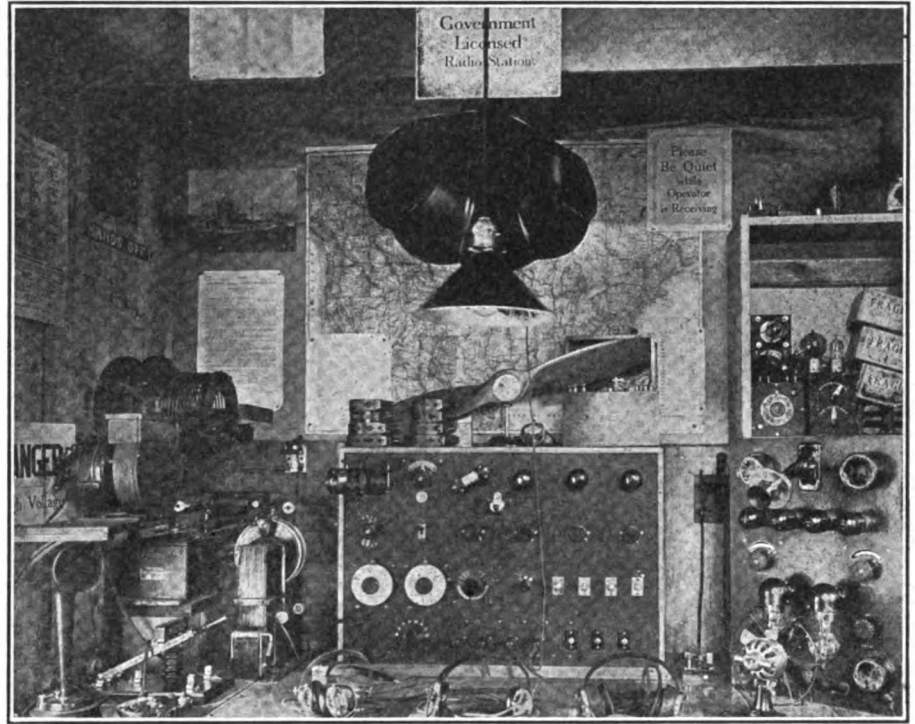
Amateur Radio Station of Hugh and Harold Robinson (2QR)

THE accompanying half-tone of the radio station, owned and operated by Hugh and Harold Robinson of Keyport, New Jersey, is a splendid example of amateur radio development. The call of the station is 2QR and a distance of 1,100 miles has been covered by the spark transmitter.

The receiving equipment consists of a three-stage amplifier, long and short wave honeycomb inductances and vacuum tube detector. The amplifier is wired with copper tubing, one-eighth inch in diameter, and all joints are soldered.

The transmitting equipment is composed of a 1 K.W. Thordarson transformer, International oscillation transformer, Dubilier 200 meter special condenser and a Clapp-Eastham rotary gap.

The receiving aerial is 60 feet high consisting of three stranded bronze wires 160 feet in length, spaced three feet apart. The transmitting aerial is 60 feet high, consisting of six stranded bronze wires 60 feet long, spaced two feet apart. The normal transmitting radiation is four amperes. A DeForest Type "O" radiophone set has also been installed and has covered a distance of 90 miles without difficulty.



GOING UP!

ON July first the publishers of all magazines must pay a higher rate to the postal authorities for second class matter sent through the mails. Another increase in mailing rates becomes effective in 1921. The cost of paper and printing have also taken several pronounced jumps of late, and no relief is at present in sight. We are therefore compelled to increase the price of "Pacific Radio News" to 20 cents per copy, beginning with the September number. With the increase in size of the magazine our expenses are increased and in order to give you a bigger and better "Pacific Radio News" it becomes necessary to increase the price.

In the past, every issue has had a fair turnover, but we can honestly say that every cent of our surplus has been put into the issue that followed. It is our desire to add more pages to the coming issues and to give you the best that money can buy. The September number will sell for 20 cents a copy on the news-stands and the subscription rate will be increased to \$2.00 per year. All subscriptions received before July 20th will be accepted at the present rate of \$1.50 and all subscribers on our present mailing list may extend their subscription for a term of not longer than three years at the rate of \$1.50 per year. This also applies to prospective subscribers.

THE RIGHT KIND OF TRANSFORMER OIL

By R. Waller

Castor Oil is an ideal insulating medium for transformer primary and secondary insulation, provided that all trace of water is removed from the oil. Water is the sole enemy of perfect insulation. Castor oil, if bought from your local druggist, usually contains a certain amount of water. The substance will appear thick and opaque, but by shaking and allowing it to settle the water will separate from the oil.

Traces of water are likely to be present in the oil even though it is impossible to detect it. In order to remove the water from the oil add a few lumps of unslaked lime and shake the oil container. The lime will combine with the water and, after settling, the water-free oil can be poured off. The most effective method of separation is obtained by placing a small piece of metallic sodium, about the size of a marble, in the oil and shaking well. Sodium can be procured from your druggist. Care should be exercised in handling as it will cause burns.

HOW TO SOLDER SMALL WIRES

When soldering small wires never use acid or paste. A flux made of resin, dissolved in alcohol, is the best thing to use.

A cote of homing pigeons, trained by H. P. Brown of Aberdeen, Washington, will furnish a connecting link between the radio station at Westport and Aberdeen. The Westport station is now under construction and will be completed in about 60 days.

The pigeons will carry the messages in a small aluminum capsule tied to the leg, and the arrival of each bird will be announced by the ringing of an electric bell.

Our next issue will contain the first of a series of articles on arc transmitters. The new Federal arc will replace spark transmitters on many vessels in the near future, and for this reason the arc series should prove of considerable interest to all commercial radio men.

Ensign J. B. Dow, U. S. N., covers the subject in a non-technical manner. The series will be illustrated with many diagrams and half-tones.

To remove the enamel (Cellulose Acetate) covering from wire, dip the parts to be bared into a mixture of the following:

Ammonia	1 part
Acetone	1 part
Alcohol	1 part
Benzol	1 part

The liquids should be kept in separate bottles and mixed as needed. They will decompose if left exposed to the air.

Radio Club News

RADIOPHONE FOR SAN FRANCISCO RADIO CLUB

Through the courtesy of the Leo J. Meyberg Company, the DeForest Radio Tel. and Tel. Co., will install an amateur radiophone in the club rooms of the local radio organization. Mr. R. M. Klein, manager of the Pacific Coast branch, will supervise the installation of the equipment and will give a demonstration of the apparatus.

The radiophone will be used for experimental purposes as well as for announcing meetings and spreading "club propaganda."

MEETINGS SUSPENDED

The Bay Counties Radio Club has decided to adjourn until August 27th. A large number of members find it impossible to attend the meetings until the vacation season is over.

U. R. T. A. OF S. F. JOINS NATIONAL U. R. T. A.

Beginning July first the United Radio Telegraphers' Association, located at 24 California street, San Francisco, Cal., will operate under charter issued by the National United Radio Telegraphers' Association of New York City. The latter association is the national organization of all radio operators sailing on American vessels and it is composed of seven branch offices located in the principal seaport cities of the U. S. The action of the Pacific Coast radio men has completed the combining of radio operators employed on ships flying the American flag. Offices have been established in Boston, New York, Philadelphia, Baltimore, Norfolk, New Orleans, Cleveland and San Francisco. Additional offices will soon be opened in Chicago and Seattle.

MAXIM SPEAKS AT RADIO CLUB

Hiram Percy Maxim, president of the American Radio Relay League, was a recent visitor in San Francisco. Members of the San Francisco Radio Club, Inc., were favored by an interesting address on the history of the A. R. R. L.

RADIO COMPASS STATIONS TO BE TESTED

Experiments with the radio compass stations on the Pacific Coast will be made during the month of July. Circulars have been sent to all steamship companies requesting that they instruct the captains of vessels to try out the new method of reckoning. Complete service will not be established for some time due to the shortage of operators.

Extend your subscription for another year and take advantage of the present low subscription rate.

Radio Club Directory

Published every month. It keeps you posted on important meetings.

United Radio Telegraphers' Association, Pacific Coast Division—Rooms 418-420, 24 California St., San Francisco Cal. Phone Douglas 706. All commercial operators eligible for membership. Address communications to above address.

San Francisco Radio Club, Inc., 355 Presidio Ave., San Francisco, Calif. Meetings every Tuesday evening at 8:30 P. M. Visitors welcome at any meeting except first meeting of the month. Initiation fee \$2.50. Monthly dues 50c. For experimental and commercial radio operators, address communications to the secretary, 355 Presidio Avenue.

The Bay Counties Radio Club. Meetings held every Friday evening at 354 Perry St., Oakland. Special Notice: Meetings suspended for summer months. Next meeting to be held on August 27th. Monthly dues 50c. Age limit 16 years. Visitors welcome. Address communications to the secretary, 354 Perry street, Oakland. —adv.

SIXTH DISTRICT AMATEUR STATIONS—Continued.

6UN	F. Arnberger	1354 Grove st.	Alameda, Cal.
6UO	C. B. Newcombe	Main st.	Yerington, Nevada.
6UP	A. E. Harris	200 E. Santa Barbara st.	Los Angeles, Cal.
6UQ	C. E. Thompson	1896 15th st.	San Francisco, Cal.
6UR	R. Maxsen	827 Turk st.	San Francisco, Cal.
6US	L. E. Rice	1214 E. Sonora st.	Stockton, Cal.
6UT	E. Blom	525 Pacific st.	Alameda, Cal.
6UU	G. Gabinett	90 Naples st.	San Francisco, Cal.
6UV	A. F. Pendleton	1246 California st.	San Francisco, Cal.
6UW	L. Farwell	Broadway st.	Los Gatos, Cal.
6UX	A. Phillips	1333A Stevenson st.	San Francisco, Cal.
6UY	H. L. Wirth	3757 Dalton ave.	Los Angeles, Cal.
6UZ	T. A. Fisher	573 Scott st.	San Francisco, Cal.
6VA	J. M. Glesner	(Portable station)	Berkeley, Cal.
6VB	E. Anderson	1371 6th ave.	San Francisco, Cal.
6VC	M. Umbriaco	2528 Market st.	Oakland, Cal.
6VD	H. B. Drake	5830 Colby st.	Oakland, Cal.
6VE	E. Kluss	414 Moss ave.	Oakland, Cal.
6VF	L. Gianninni	561 Brussels st.	San Francisco, Cal.
6VG	S. Peterson	1424 Grove st.	San Francisco, Cal.
6VH	H. J. McCoy	1305 Arch st.	Berkeley, Cal.
6VI	D. M. Whirle		Oakland, Cal.
6VJ	Boy Scouts' Camp		Del Mar, Cal.
6VK	D. O'Brien		Oakland, Cal.
6VL	Boy Scouts Headquarters		San Diego, Cal.
6VM	P. Parsons	633 Middlefield road	Palo Alto, Cal.
6VN	C. L. Johnson	2104 Prince st.	Berkeley, Cal.
6VO	H. C. Crawford	800 S. Central ave.	Glendale, Cal.
6VP	F. G. Davis	610 Fillmore st.	San Francisco, Cal.
6VQ	L. McMahon	911 Rand st.	Sacramento, Cal.
6VR	J. W. Babcock	R. F. D. No. 58	Wrights, Cal.
6VS	J. C. Chez, Jr.	818 24th st.	Ogden, Utah.
6VT	W. Thompson	6th and Los Robles ave.	Puente, Cal.
6VU	A. M. Knox	7245 Franklin st.	Hollywood, Cal.
6VV	L. Kilgore	1482 W. 45th st.	Los Angeles, Cal.
6VW	B. Rosenberg	240 Richland ave.	San Francisco, Cal.
6VX	A. A. Hunt	122 Market st.	Los Gatos, Cal.
6VY	T. E. Stimson, Jr.	4533 Marmion Way	Los Angeles, Cal.
6VZ	C. Burrows	103 W. Pleasant st.	Santa Paula, Cal.
6WA	T. F. Blackburn	1719 Gardner st.	Los Angeles, Cal.
6WB	G. Barnes	725 N. 4th st.	Reno, Nevada
6WC	R. Barrow	7618 Hollywood blvd.	Los Angeles, Cal.
6WD	A. H. Hart	90 Surfside st.	Santa Cruz, Cal.
6WE	R. Dobson	957 Ellen ave.	Los Angeles, Cal.
6WF	G. Harrison	7 Cabrillo st.	Stanford University, Cal.
6WG	W. Honsinger	1412 10th st.	Sacramento, Cal.
6WH	R. Ward	170 Arlington ave.	Pasadena, Cal.
6WI	G. Albee	1241 W. 40th Place	Los Angeles, Cal.
6WJ	G. Beurgingnon	198 Johnson avg.	Santa Clara, Cal.
6WK	L. Feldt	2044 India st.	San Diego, Cal.
6WL	C. Muncy	2226 Grove st.	Berkeley, Cal.
6WM	F. Ellert	325 E. St. James st.	San Jose, Cal.
6WN	B. Alexander	4340 Cleveland ave.	San Diego, Cal.
6WO	A. G. Leech	5665 San Pablo ave.	Oakland, Cal.
6WP	H. J. Irthum	1882 54th st.	Oakland, Cal.
6WQ	G. Murray	1437 Hyde st.	San Francisco, Cal.
6WR	A. Khazoyan	484 S. Los Robles ave.	Pasadena, Cal.
6WS	C. Whalen	163 Sa. Pac. Blvd.	Huntington Park, Cal.
6WT	C. Sutherland	340 Moran st.	Reno, Nevada
6WU	C. Richardson	406 W. 28th st.	Los Angeles, Cal.
6WV	J. L. Roberts	3450 Iowa st.	Fresno, Cal.

THE FIRST LECTURE BY RADIO-PHONE

(Continued from page 4)

plied to the plate and the degree of ionization present within the tube. Under our present conception of electronic radiation from a filament, we believe that the heat generated within the metal due to the passage of the electrical current imparts such tremendous activity to the electrons contained within the metal that they cannot be restrained and are driven off into space. If we surround the filament wire with gas under atmospheric pressure, this pressure will tend to restrain the electrons so that they cannot leave the wire. On the other hand, as we pump out the tube, the diminishing gas pressure makes it very easy for the electrons to leave. The higher the vacuum, that is to say, the lower the pressure on the wall of the filament, the more electrons will be radiated for a given filament temperature.

As we exhaust the tube, however, we are removing molecules of air from the enclosed space so that there will be fewer molecules left to be broken up into positive and negative ions by the filament. If the filament were sawed off and the wire for maximum ionization, which depends on bombardment of the electrons. Thus upon maximum electron radiation coupled with a maximum number of molecules to be broken up, we must obtain a happy medium between these two opposing actions. If we pump the tube too much, we shall have plenty of electrons radiated but not enough gas molecules to be broken up. On the other hand, if we do not exhaust the tube enough, we shall have plenty of gas molecules present to be ionized but not enough electrons radiated to bring such ionization about. The difficulty in detector or soft tube manufacture, therefore, is to obtain that exact pressure which will give maximum ionization. At the laboratories of the Pacific Radio Supplies Co., we have been able by very careful manufacture, to obtain this exact gas pressure, and in our new detector tube, the Electron Relay, have brought out a detector for the reception of spark signals or radio telephone speech which we believe cannot be equaled.

The soft tube has a disadvantage, however, which makes it impracticable for amplifier work. While the detector curve is very steep due to the ionization effect and is hence a very efficient amplifier of the rectified current charge built up on the grid, the curve has a very low saturation point. The saturation current is the upper flat portion of the curve. That is to say, if too much potential be applied to the plate, the increased velocity of the electrons completely ionizes the gas, the familiar blue glow manifests itself and a fluctuation in the grid potential produces no effect

in the plate current. For amplifier work, therefore, it becomes necessary to pump the tube to a very high vacuum so that there shall be no upper limit to this curve within the operating range of the grid potential, whether the tube be used on the first or last step of a multi-stage amplifier. On the amplifier vacuum tube sold by the Pacific Radio Supplies Co., it is possible to secure tremendous amplification of the grid energy. In order that the curve in a hard tube should be as steep as possible, it is desirable to apply a fairly high potential to the plate so that our VT amplifier-oscillator should be used with a B battery of from 60 to 110 volts.

The generation of oscillations by a vacuum tube is in reality simply an adaptation of its amplifying properties. We may connect the plate circuit back into the grid circuit by one or two of three methods. By employing a tickler coil, we secure inductive coupling between these circuits, with a feedback condenser, we secure electrostatic or capacity coupling, and with resistances or variometers we secure conductive coupling and such electrostatic coupling as may be obtained from the close proximity of the tube elements and lead wires.

By connecting the plate circuit back into the grid circuit and by causing an initial fluctuation of the grid potential, as by grounding any of the grid circuit leads with the finger or by throwing the filament into the circuit, this transient variation of the grid potential will be amplified in the plate circuit. This will be fed back into the grid circuit and reamplified in the plate circuit. The whole process repeats itself many times, the final magnitude of the oscillating currents being limited by the tube constants and the operating plate potential. This generation of radio frequency, undamped oscillations thru regeneration, is similar to the howler circuit used on the wire telephone in which a telephone receiver is held a short distance from the transmitter. A sound made in the vicinity of the system will be reamplified back and forth between the receiver and transmitter, the only limit to the sound heard in the receiver being its current carrying capacity and the maximum possible amplitude in which the diaphragm can vibrate.

Hard or amplifier tubes are commonly operated on 6 volts A battery or filament potential and from 60 to 110 volts B battery. Adjustments of filament current and B battery are not critical.

With the detector tube, on the other hand, the necessity for an exact electronic radiation so as to secure maximum ionization with a given gas pressure makes it necessary to have a very fine regulation of the filament rheostat. The plate potential should be varied in steps of not more than 3 or 4 volts but

best operation will be secured when a high resistance potentiometer is connected across part or all of the B battery.

With our electron relay, the filament current should be adjusted to from four to five-tenths of an ampere. This means that the filament will be burning at a little more than red heat. The plate potential varies with different tubes but every effort is made to bring them to a gas pressure such that their best operating point will be with a potential of 35 volts on the plate. Some tubes, however, may run as high as 60 volts. All detector tubes are tested before and after basing so that every detector tube sold by the Pacific Radio Supplies Co. is guaranteed.

No grid leak is necessary with the Electron Relay for the positive ions within the tube, due to the dissociation of the gas molecules by collision, serve to conduct away such negative charge as may remain on the grid and grid condenser at the end of each wave train.

If the filament current or plate potential on the detector tube be too high, a hissing sound will be heard. The filament current should now be slightly reduced, possibly the plate potential as well—the detector will now be adjusted for best results. In adjusting the detector or electron relay, be sure that adjustments are made on weak signals. By running up the plate potential or filament current, signals from nearby stations can be made very loud, but this adjustment will be a very poor one for the reception of distant stations. If the correct adjustment is made for weak signals, strong signals will of course be received with sufficient intensity, whereas if the adjustment be made for loud signals, the weak ones may often be lost.

Gentlemen, I think this will conclude my remarks for the evening, and in closing allow me to thank you for your very kind attention.

RADIO CONVENTION TO BE HELD IN SAN FRANCISCO

During the month of October, 1920, a Pacific Coast Amateur Radio Convention will be held in San Francisco. A committee on arrangements has been appointed by the San Francisco Radio Club, Inc., who will have full charge of the affair. Radio clubs from Seattle to San Diego will be invited to send delegates to the convention and it is proposed to have many prominent radio men in attendance.

Prof. Tinsley, of the Polytechnic High School, has been appointed Chairman of the Committee and he will appreciate communications from those who desire to take an active part in the affair.

One dollar will bring you "Pacific Radio News" for nine months if you send it to us now.

With the - - - Manufacturers

Mr. T. Lambert, manager of the Radio Shop, San Jose, Cal., has a new regenerative receiver ready for the market. The popularity created by the well-known variometer units have prompted the manufacturer to incorporate them in a complete cabinet type receiver. "Beauty goes further than skin deep" in this receiver. Exactness and neatness have been the watchwords throughout. Mr. A. E. Bessey (6BR) has copied Chicago (9ZN) with one of the regenerative units and only two steps of amplification.

Tresco tuners are "putting over" some good work of late. Mr. W. Solinski, of Chicago, Ill., says that his aerial was blown down in a recent storm with nothing but the lead-in remaining. The Tresco tuner was hooked up to the lead-in and signals were received with very good audibility. Other tuners were tried on the same lead-in but no success was had.

Mr. W. A. Vetter, of the Pacific Radio Exchange, has a direction finder, static eliminator, compass coil and indoor aerial ready for the market. He affords the amateur radio man the first opportunity of purchasing an instrument of this character.

The new A. H. Grebe catalogue of experimental and laboratory radio equipment contains a copy of all bulletins issued between February and April, 1920. It is illustrated with many half-tones that do full justice to the well-known line of apparatus that bears the "Grebe Radio" trade-mark.

The Wireless Manufacturing Company of Canton, Ohio, is back in our midst with a rotary gap for amateur use. This is the first that we have heard from Canton for several years. Mr. Henry L. Levy, the manufacturer of the gap, states that it is a dependable instrument, ruggedly constructed. Running at its highest speed, 4,200 R.P.M., a 420 spark per second note is obtained.

The Atlantic Radio Company, Inc., has recently issued a catalog containing 107 pages of information covering a reliable line of goods that they offer to the radio trade.

The Western Radio Electric Company, a Los Angeles concern, is now managed by Mr. L. E. Taufenback, one of the old-timers in the radio game. A complete line of radio apparatus is handled by the Southern company and they have been appointed exclusive

agents for the Grebe product in the Southwest.

Mr. H. Berringer is now with the California Electric Supply Company in charge of the radio department. "6WZ" of the pre-war days will probably be remembered by many Pacific Coast amateurs. Berringer signs "6BJ."

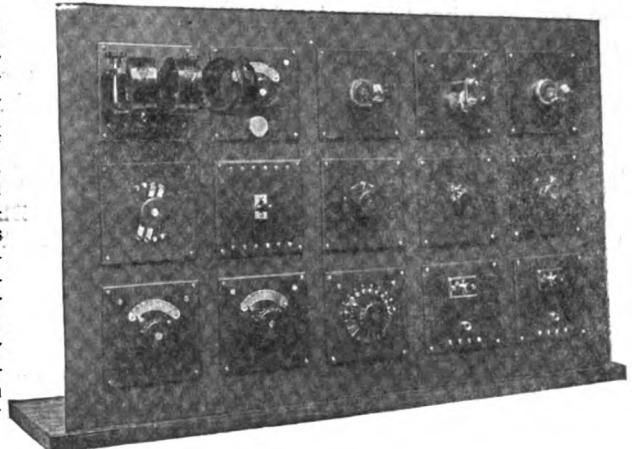
In aviation it's Aviators,
In navigation it's Navigators,
In gladiation it's Gladiators,
So why not call radio men Radiators?

The Spokane Radio Telephone and Telegraph Company has recently been formed by two amateur radio men who will commence an extensive radio business in Spokane, Wash. Radio telephones will be installed in the interior for the use of farmers and to offset the present high cost of the wire service.

Radio club secretaries should write for our attractive subscription offer to club members before our new rate becomes effective.



Picture here shows typical 15-panel DE FOREST Unit Receiving Set consisting of a Tuner with wave length range of 150 to 25,000 meters; a crystal and an audion detector, and a que-step amplifier. This Set is the most complete and efficient receiving apparatus ever put out under \$175.00; its cost is considerably less than that; the entire set of Units shown here totaling only \$162.64.



DE FOREST Unit Receiving Sets

Give You Better Apparatus at Low Cost

DE FOREST Unit Receiving Sets offer the most practical system of securing accurately designed, and highly efficient receiving apparatus without paying for expensive factory assembly and costly cabinets. You buy the individual instruments, each mounted on a panel, and assemble and wire them yourself.

You can start with a few Units giving you a Receiving Set of efficient but simple type, and build up, always fitting new Units into the system as additions to the old. You can even fit these Units into any system you may now have.

For the Amateur, Student or Experimenter, this Unit System is the most instructive because in using your own ingenuity in assembling and wiring the Units you will greatly broaden your Radio knowledge. There are many possible combinations and you should

Send for the De Forest Radio Manual

which describes the Unit System in full and also contains much valuable general Radio material. Send 10 cents for a copy at once.

DeForest Radio Telephone and Telegraph Co.

Inventors and Manufacturers of High Grade Radio Apparatus
1425 SEDGWICK AVENUE NEW YORK CITY

Sole Western Distributors

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Shipments Made From San Francisco Warehouse

451 THIRD ST.



WITHOUT A PEER!

The Wesrad Oscillation Transformer

is introduced to you—not just born—but developed from the ordinary awkward and unhandy contrivance into a graceful, efficient and highly scientific piece of apparatus.

THE WESRAD, designed for 200 meter wave-length and for power up to 1 kilowatt, has the following distinctive specifications which make it superior to any other on the market:

Insulation: Bakelite Dilecto $\frac{1}{4}$ " throughout. **Wood-work, base and arms:** Quartered oak, Standard weathered oak finish. **Primary:** 3 turns of 1-inch heavy brass ribbon. **Secondary:** 8 turns. **Primary inductance,** 4 microhenries. **Secondary** about 10 microhenries.

Extremely rugged in construction, yet compact and light of weight. Can be placed in any position and easily adjusted wherever you put it. Net weight 6 lbs. Shipping weight 9 lbs. Price..\$10.00



WESTERN RADIO ELECTRIC COMPANY

ESTABLISHED

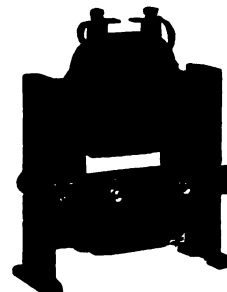
"FOR BETTER SERVICE TO THE WESTERNER"

Immediate Deliveries
Leading Manufacturers Products

512 East Ninth Street,
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ACME MEANS HIGHEST

- HIGHEST EFFICIENCY
- HIGHEST POWER FACTOR
- HIGHEST LOAD VOLTAGE
- HIGHEST SPARK FREQUENCY
- HIGHEST RECORDS



Acme 250

TYPE	SPECIFICATIONS						PRICE	
	Power Factor	Efficiency	Load Voltage	Spark Frequency	Pri. Current 110 Volts	Fully Mounted	Semi-Mounted	
ACME 250	.95	82	8000	700—800	2.4	\$16.00	\$13.00	
ACME 500	.95	85	11000	700—800	4.8	22.00	18.00	
ACME 1000	.95	90	15000	700—800	9.6	33.00	28.00	

Write for Bulletin

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BREAKS RECORDS

ACME APPARATUS COMPANY

21 WINDSOR STREET,
CAMBRIDGE 39, MASS.

TRANSFORMER AND RADIO ENGINEERS AND MANUFACTURERS

Does this Summertime Atmosphere Bother You?

We all know that our best radio work is done during the winter—on those cold, crispy, dry winter evenings when the ether is as clear as a bell. And we also know—that the summertime is not over-friendly to radio work. The dull and muddled ether, surcharged with atmospheric electricity, is by no means an ideal medium for our radio waves. So it comes right down to a matter of using every ounce that's in our transmitters if we are to maintain any sort of transmitting efficiency. If your transmitter does not satisfy you with it's summertime performance, it's high time that you install a **GENUINE DUBILIER CONDENSER.**

Type	Watts	Max. Volts	Capacity	Price	Type	Watts	Max. Volts	Capacity	Price
D100	250	10000 v.	.007 mfd.	\$19.00	D110	250	10000 v.	.01 mfd.	\$21.00
D101	500	14000 v.	.007 mfd.	30.00	D111	500	14000 v.	.01 mfd.	35.00
D102	1000	21000 v.	.007 mfd.	45.00	D112	1000	21000 v.	.01 mfd.	50.00
D103	1000	25000 v.	.007 mfd.	50.00	D113	1000	25000 v.	.01 mfd.	55.00

DUBILIER CONDENSERS have gained an enviable reputation for excellence of design, workmanship and materials. To maintain the old prices would have meant a lowering of the Dubilier Standard. Rather than change the quality we have felt incumbent upon us to advance the prices only in so far as was necessary to cover the increased cost of manufacture.

PACENT ELECTRIC COMPANY

(Incorporated)

BUILDERS AND SPECIALISTS IN RADIO, ELECTRICAL AND LABORATORY EQUIPMENT

SALES AGENTS for A. H. Grebe & Co., Dubilier Condenser Co., Electrical Products Mfg. Co., Rawson Electrical Instrument Company, Richter & Byrne, The Magnavox Co., and others

150 Nassau Street

TELEPHONE BEEKMAN 5810

New York City



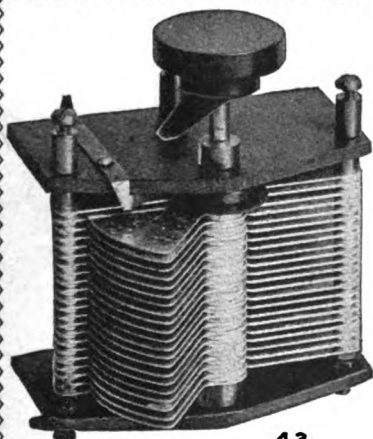
DUCK'S

New Big 200-Page No. 14 Wireless Catalog and 100-Page Electrical Catalog

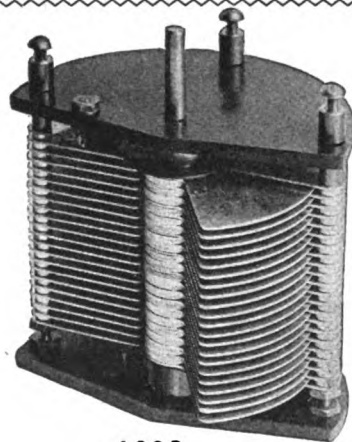
The wireless catalog mailed for 12c and the electrical catalog for 6c, either in stamps or coin, which amount you are privileged to deduct on your first order of \$1.00. Catalog positively not sent otherwise.

Everything in wireless worth while is listed in this catalog. The experienced amateur will tell you to see our catalog before buying. You are thereby insured against an unwise purchase. It is the Beacon Light to guide you right in the selection of your wireless apparatus. No bigger or better values are obtainable elsewhere.

THE WILLIAM B. DUCK CO., 210-212 Superior St., Toledo, Ohio



43



4300

Announcing a New Variable Condenser

Built along the same general lines as our SERIES "S" condenser, but heavier construction throughout. The plates are die-stamped from 1/32" hard rolled aluminum, and are separated by heavier spacers. Extreme rigidity, best of materials, accurate machine work and careful assembly are the outstanding features of construction. At the present time we are unable to fill orders for the SERIES "S" condenser, as we are unable to obtain materials for its construction, but we can ship the NEW SERIES "T" and the SERIES "L" VARIABLE CONDENSER from stock.

REMEMBER—WE ABSOLUTELY GUARANTEE SATISFACTION OR YOUR MONEY BACK.

SERIES "T"			— PRICES —	SERIES "L"		
No. 20	2 plate	VERNIER	\$2.00	No. 2300	23 plate, .00075	\$ 6.00
No. 70	7 "	.0001 m.f.	2.35	No. 4300	43 plate, .0013	8.00
No. 130	13 "	.0002 m.f.	2.75	No. 6300	63 plate, .002	10.00
No. 170	17 "	.0003 m.f.	3.15			
No. 230	23 "	.0005 m.f.	3.60			
No. 310	31 "	.0007 m.f.	4.30			
No. 430	43 "	.001 m.f.	5.25			
No. 630	63 "	.0015 m.f.	7.50			

Include postage for one pound

Either style of condenser fitted with indicating dial at additional cost of 75c.

Include postage for two pounds

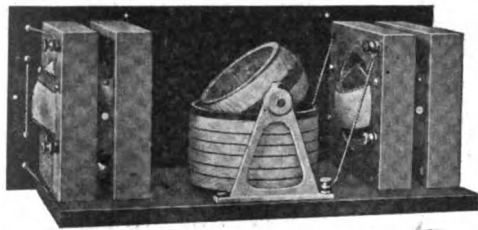
The Wireless Shop

511 W. WASHINGTON STREET

A. J. Edgcomb

LOS ANGELES, CAL.

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Back View

General Specifications:—Ball type Variometers and Vario-Coupler (described in detail in the June "QST"). Heavy "bus-bar" wiring with soldered connections. Genuine bakelite panel and dials (not composition). Mahogany cabinet. Range 140 to 500 meters. Shipping weight 15 pounds.

Price.....\$42.50

Variometers and Vario-Couplers identical with those used in the above regenerative receiver.

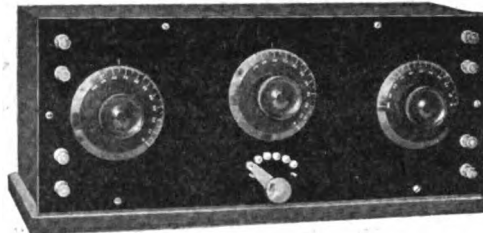
- Variometers\$10.00
- Vario-Couplers 7.00
- Bakelite Dial and Knob..... 1.30
- Knob and Pointer..... .60

Blueprint of instructions sent with set and parts.

IMMEDIATE DELIVERY

Fine Clothes May Make the Man

but,—highly polished bakelite, engraving, and mahogany cases, do not make the Radio Set! Have you ever suffered the keenest of disappointment when you "opened her up"? While you may have been getting good results, still, does not careless construction and poor wiring detract somewhat from the absolute confidence you must have in your apparatus? Our policy is to sell from the inside, because, we know that our construction is the best. As an example we offer our Short Wave Regenerative Receiver, which is sold with the distinct understanding that your money will be refunded if you are not satisfied.



Front View

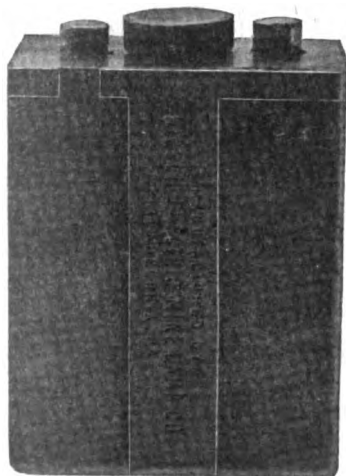
Sales Offices: Bank of Italy Building
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The RADIO SHOP

Dept. 5

Plant: SUNNYVALE, CALIF.

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400 Hirsch Mine Lamp Cells in perfect condition, never been used. Capacity 15 A. H. These cells are in hard rubber containers and are of very rugged construction.

These cells were originally a part of a large Government order and the original quotation was in excess of \$5.00 each.

Three for your filament or twenty for your "B" Battery will solve your

Battery problems for good. Price: Single cells \$1.50. In lots of twenty \$1.35.

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BINDING POSTS, BOLTS, NUTS,
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CHAIN, PINION WIRE,
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THE "PARADEX"

Increase the efficiency of your De Forest Honey-Comb Coils. Our extension arm, when used in connection with a De Forest Coil Mounting, permits a wide range of coupling than is possible to be obtained with the present mounting and coil.

CONSTRUCTED OF BAKELITE, HIGHLY FINISHED WITH ACCURATELY MACHINED CONNECTORS

Obtain a set of these extension arm-adapters and secure the benefit of increased selectivity.

\$1.50 each, prepaid. A set of three for primary, secondary and tickler, \$4.00 prepaid.

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SAVE MONEY

BY TAKING ADVANTAGE OF OUR SPECIAL COMBINATION SUBSCRIPTION OFFER.

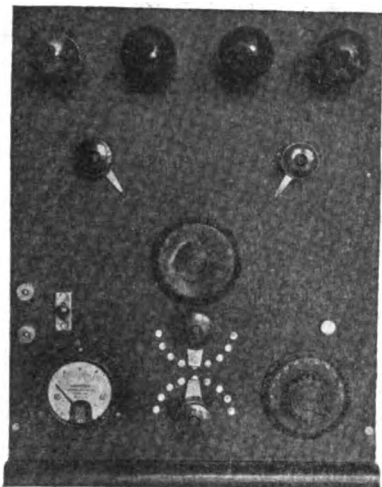
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Front view of Radio Telephone Panel. Microphone Transmitter not attached. Voice transmission about 25 miles. Parts for complete set (without tubes) \$175.00. With full directions for assembling

A Rectifying Transformer for direct connection to 110 volt, 60 cycle A. C. included.

PARTS SOLD SEPARATELY

- "B" Battery Transformer
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- 2 M. F. Condensers.
- Telephone Transmitters.
- Variable Condensers (all makes).
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Bakelite Panels cut to any size. Mission or Mahogany finish Cabinets built to your specifications.

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The Up-Town Radio Store
GIVE US A TRIAL
We're Always Glad to Talk
"WIRELESS"

ON MARKET STREET
Opposite Powell

No Seals—No Secrets— But Service!

There is only one Relay Receiver, the



TYPE CR-3 Relay Receiver



Inspection of the interior of this Receiver reveals design and workmanship fully in keeping with its outward appearance.

The circuits used are thoroughly explained in the instructions and blue prints which accompany each Receiver.

The use of this Receiver is licensed under the original Armstrong and Marconi patents.

The GREBE RADIO guarantee is absolute and unconditional. Each instrument manufactured by us must give satisfactory service. Our interest in the purchaser does not terminate with the sale.

The CR-3 Receiver may be inspected at any of the following progressive dealers:

- Barker-Fowler Electric Co., Lansing, Mich.
- Continental Radio and Electric Corp., New York
- Doubleday-Hill Electric Co., Pittsburgh, Pa.
- Holt Electric Utilities Co., Jacksonville, Fla.
- Hurlburt-Still Electrical Co., Houston, Texas
- Kelly and Phillips, Brooklyn, N. Y.
- Manhattan Electrical Supply Co., New York, Chicago, St. Louis
- Pacent Electric Co., Inc., New York City
- Geo. W. Parezo & Co., Washington, D. C.
- F. D. Pitts Co., Inc., Boston, Mass.
- Philadelphia School of Wireless Telegraphy, Philadelphia, Pa.
- F. S. Katzenbach, Trenton, N. J.
- Western Radio Electric Co., Los Angeles, Calif.

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Pacific Coast Representative Maurice Raphael, 414-5 Walter P. Story Bldg., Los Angeles, California

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THE MOST UP-TO-DATE AND EXCLUSIVE RADIO SCHOOL IN THE WEST. LATEST TYPE POULSEN 2 KW ARC TRANSMITTER AND INDEPENDENT TYPE ONE KW 500 CYCLE SPARK SET.

EQUIPMENT IN ACTUAL OPERATION.
NAVY STANDARD RECEIVING SET WITH AUDION AMPLIFIER.
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INSPECTION INVITED. SEND FOR DESCRIPTIVE CIRCULAR.

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It may be the foundation of a big business. Trust only Uncle Sam with your idea. His fees are small; pay no others. Full instruction how to get your own patent, including a complete set of application forms and specimen patent for \$2.00. CUTTING PATENT SCHOOL, CAMPBELL, CALIF.

"B" MERACO Batteries

Volts. Standard
22.5 B A-2 type. Postpaid \$1.20

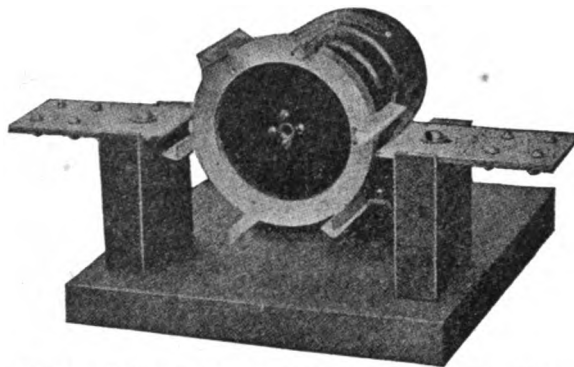
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GIVE YOUR SPARK A CHANCE



Our New Rotary allows all of the energy in the closed circuit a free discharge surface. Electrodes are 2 1/2 inches wide and 1-16th inch thick, accurately shaped on a milling machine. Made with 6 or 12 points for high or low notes. You can't beat the combination of an Acme transformer and our 12 point rotary. Absolutely highest efficient gap ever offered, fully guaranteed.

PRICED AT \$50.00 WITH EITHER ROTOR
Literature ready for distribution June
first and IMMEDIATE DELIVERIES

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"Yours (the General Insulate Company) is the only firm we have bought from in the East in the last year, which has kept ITS PROMISES REGARDING DELIVERIES and given us the Service we need. I consider this wonderful knowing the trouble all you folks in the East have had to get materials, labor, transportation, etc.

You have also given me the squarest deals in all our transactions."

This statement was made to us unsolicited, recently by two of our "Coast" customers from whom we had the pleasure of personal calls at our factory. (Names will be given if interested.)

Nuff sed!!!

General Insulate Co.

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The standard insulating material for all radio work. Water-proof, permanent, strong, used by all important manufacturers of wireless apparatus and others requiring the utmost in insulation.

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We also manufacture VULCANIZED FIBRE in sheets, rods and tubes and CONITE, a special insulation, in sheets or rolls from .005" to .020" thick.

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Electric Supply and Repair Co.

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Formerly of Paul Seiler Electric Works

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QST de **ACE**

LET'S SING

(Tune, Battle Hymn of the Republic)
 Mine ears have heard the signals
 From a dozen different lands
 From Greenland's icy mountains
 To Sahara's burning sands
 From the land of cherry blossoms
 To where Mount Sorata stands.
 And I've learned a thing or two

CHORUS

Q. R. X. I'm going to tell you
 Q. R. X. I'm going to tell you
 Q. R. X. I'm going to tell you
 How you can get them too

This spasm continued next month.
 Watch our ads., they are "different."
 So are our instruments. It's to our
 mutual advantage to get acquainted.
 "You may pay more, but you can't
 buy better."

Dealers.—If you don't stock Ace
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KLAUS RADIO COMPANY

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A complete line of Standard
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 Equipment for every purpose.

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Catalog 6c

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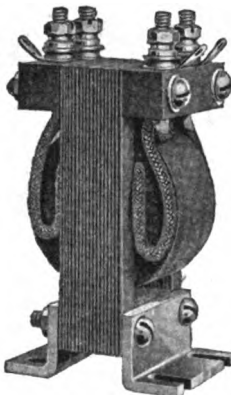
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Our new Bulletin 102 W-B is now
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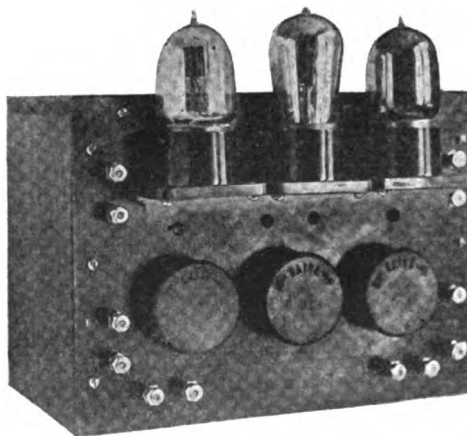
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If your dealer does not have them,
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Federal Telephone and Telegraph Company

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Two Stage Amplifier & Detector \$38.00 Prepaid

Complete with "B" Battery, Two
 Amplifying Transformers, Three
 Tube Sockets, Three Rheostats,
 Bakelite Panel, Grid Condenser,
 Hardwood Cabinet and Nicked
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 one "A" Battery. Specially priced
 for thirty days. 10 per cent. in-
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Audion Control Panel

Constructed of Bakelite. Completely wired and consists of
 latest model tube socket, filament rheostat, "B" battery switch
 with taps, brackets and nicked binding posts, prepaid..... **\$8.00**

IMMEDIATE DELIVERY. REMITTANCE MUST ACCOMPANY ORDER

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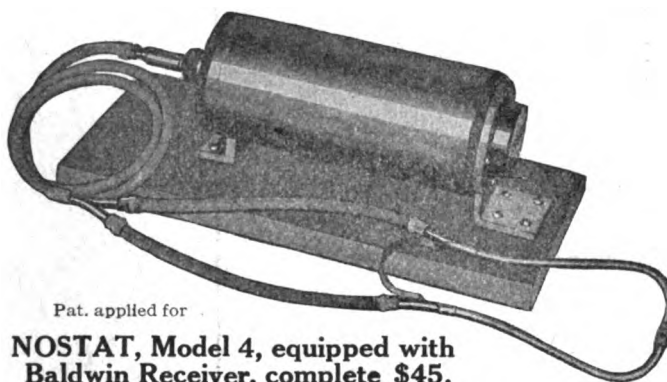
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N O S T A T

"Conquerer of Static"

Something entirely new which does acoustically what the most efficient radio set fails to do electrically

--Cuts out Static (QRN)
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Involves no freak circuits.
 Simply connect NOSTAT in place of
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Pat. applied for
**NOSTAT, Model 4, equipped with
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NOSTAT utilizes an old scientific principle in a modern way and is so simple and effective you will wonder why it was not applied before: it tunes to the tone frequency of the sound produced by the telephone receiver after the usual electrical tuning has been accomplished, thus affording the means for differentiating between the acoustic pitches.

Static tones being of entirely different frequency from those of radio signals, when tuned to respond to one NOSTAT cuts out the other. This is true of radio signals of the same electrical wave length but of different tones.

The only adjustment necessary to cut out static, interference or the compensating wave of the undamped stations is the movement of the cylinder for tuning to the acoustic wave length.

NOSTAT functions equally well on all wave lengths.

The materials and workmanship are scientifically correct. Baldwin mica-diaphragm receivers are supplied.

NOSTAT is sold at present for experimental use only and the present price is subject to advance with increased cost of materials.

NOSTAT may be procured from the following dealers:

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Manhattan Electric Supply Co., Inc., New York, Chicago, St. Louis.
Continental Radio & Electric Corp., 6 Warren St., New York, N. Y.

Dealers: An attractive proposition is offered by NOSTAT to progressive dealers—write us.

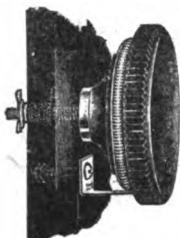
NOSTAT COMPANY



118 St. James Pl., Brooklyn, N. Y.

PARKIN RHEOSTAT

\$1.00 Post paid
WHY PAY MORE?



when this is the easiest mounted, smoothest running, best rheostat on the market.

No. 35 Parkin Panel Type Rheostat (Pat. March 30, 1920), has easily renewed resistance unit mounted on back of moulded Bakelite Knob. Shaft is moulded into knob, cannot come loose. "Off" position provided. 360 degree rotation insures fine adjustment.

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Full particulars, including the RVA BULLETIN each month, Loose-Leaf Binder, and Bargain Supplement sent on receipt of ten cents, 1c stamps or coin.

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The Best Combination

OF THEM ALL

\$3.00

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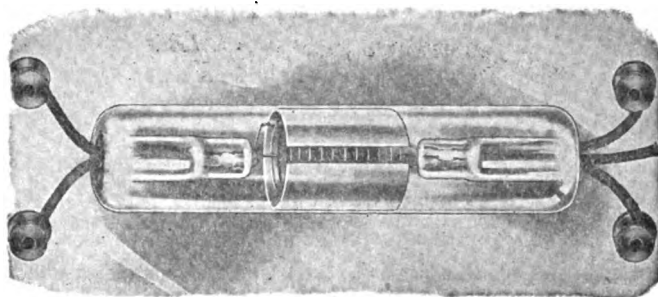
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Your Save 50c by Taking Advantage of This Offer

PACIFIC RADIO PUB. CO.

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AUDIOTRON THE ORIGINAL TUBULAR VACUUM DETECTOR, AMPLIFIER, OSCILLATOR



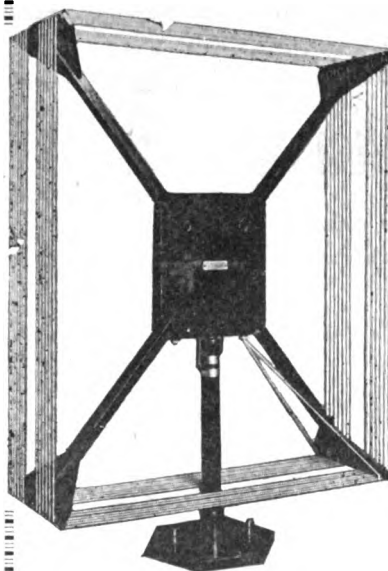
Price \$6.00 Prepaid

YOUR LAST CHANCE FOR AN AUDIOTRON DOUBLE FILAMENT DETECTOR

Manufacturing reasons make it impossible to continue the present hand-made audiotron. After the present supply is exhausted, new types of audiotron, manufactured entirely by machinery, will be offered for sale.

LEO. J. MEYBERG CO. 428 Market St., San Francisco, Calif.

Static Eliminator--Direction Finder-Compass Coil and Indoor Aerial. The "Paradox" Compass Coil



Assists in Tuning Out Undesired Stations. Revives Your Interest in Radio Reception.

As a compass coil and direction finder, the PARADEX will locate the exact direction, within a few degrees, of any received signals. It enables you to locate the direction of amateur and commercial stations and ships at sea. Many other interesting experiments may also be performed.

Where it is impractical to erect masts and aerials, a PARADEX will solve the problem. Locate the coil in the basement, middle flat, attic or roof—it will do the business anywhere.

As a static eliminator it can't be beat. A device of this kind is the only known means of entirely doing away with static. When your friend has to ground his aerial on account of electrical storms, you, with your PARADEX, will still be on the job, copying messages without interference. There is no danger from lightning when using the PARADEX as it requires **NO GROUND CONNECTION**. It will not operate properly with a ground.

1/14 Actual Size. Mahogany Finish. Nickered Brass Fittings. Shipped knocked-down. Requires 10 minutes to assemble. Directions and hook-up furnished.

With one V.T., signals from a station 40 miles distant were readable five feet from the 'phones and with a two-stage amplifier the signals could be heard 80 feet from the 'phones. Good distances can be received with one V.T., but for greater distances a two or three-stage amplifier is recommended **AS AN INTRODUCTORY PRICE FOR A SHORT TIME ONLY THE "PARADEX" WILL BE SHIPPED PREPAID TO ANY PART OF THE UNITED STATES FOR**

\$28.00

Sold on a Money-back guarantee. Dealers: Write for proposition.

PACIFIC RADIO EXCHANGE

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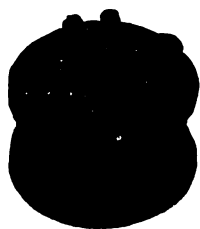
SAN FRANCISCO, CAL.

50c

Per Set

Pre-War Issues of Pacific Radio News { FEBRUARY, 1917
MARCH, 1917
MAY, 1917

Get your order in the mail early. Only a few sets on hand
PACIFIC RADIO PUB. CO. 50 Main St., San Francisco, Cal.



Hook'er to Yer Bulb.

The most wonderful Tuner in the world for only \$15. Last month this Tuner beat in a test one of the NAVY STANDARDS at Ketchikan, Alaska.



10 Captains of ocean going ships have had their wireless operators install one of our tuners in the captain's cabin so the exact time by wireless can be had without using either tube, bell, or hand.

"GREAT" says old sea dog. "WHAT IN SAM HILL WILL YOU SMART ALECS GET UP NEXT?" European stations copied in day time and no fancy aerial is needed. A single wire about 40 long by 25 high will do the trick. London amateur W. R. Wade, Clifton, Bristol, promises report for

the magazines to publish showing how the amateurs there read our sigs in England. Junk your funny wound coils and get a regular two pound tuner that you can use during the static season. 20000 meters maximum wave length. Hook up on bottom of tuner.

KNOCKED DOWN AND ASSEMBLED CONDENSERS.

Which kind do you want? Made for panel mounting and are complete with scale pointer and knob. Used all over the world now and still going strong. No C.O.D. orders. Add parcel post. Buy from your dealers and send us

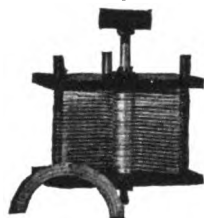
his name if he cannot supply you. Canadian amateurs buy from local dealers or write us for nearest dealer. Formica tops and bases. Movable plates are screwed on and not clamped.

11 plate knocked down	\$1.80
21 plate knocked down	2.25
41 plate knocked down	3.20
11 plate assembled	2.75
21 plate assembled	3.25
41 plate assembled	4.25

Sold by your dealer or

Tri-City Radlo Electric Supply Co.

TRESCO—Davenport, Iowa



THE CONSTRUCTION OF AN IDEAL AMATEUR SHORT-WAVE REGENERATIVE RECEIVER

(Continued From Page 5)

cription, no dead ends whatsoever are allowed in the receiver. Leads from one instrument to another should be as short as possible, but at the same time instruments should not be placed in too close a proximity. The frequency of the current at 200 meters is extremely high, close to 2,000,000 cycles per second and harmonic frequencies are easily induced and interfere with efficient reception. Wires should not be run parallel for any distance in connecting up the set.

The author has experimented for five years on different sets and hookups including many post-war developments, but none was found to equal the one described above.

From New York City amateur stations were easily copied with a single De Forest Audion Bulb, using no amplifier. Some of the longest work done will be found in the following: Dallas, Texas; Kansas City, Kansas; Jefferson City, Mo.; Davenport, Delmar and Monticello, Iowa; St. Paul, Minn.; St. Louis, Mo.; Newport, Ky.; Lake Geneva, Wis.; etc. Most of the amateurs heard in the above cities from New York City were heard not just once but a number of times.

In conclusion it might be suggested that a very efficient 600 meter set could be constructed along the same lines as the one described here for 200 meters. All that is necessary is the use of a larger coupler and larger wire in the variometers is also recommended.

You should be a regular subscriber.



Pat. App. for

Attention Amateurs!

This is the adapter which tubular bulb owners have been looking for

Price \$1.50

Radisco Agency
We make special instruments to order



Catalogue sent on receipt of 10c, which may be deducted from first order

Dealers write for propositions.

Amateur Wireless Equipment Co.
1390A Prospect Ave., Bronx, N. Y.

-MARCONI INSTITUTE-

Conducted by the greatest and most experienced radio telegraph organization in the world.

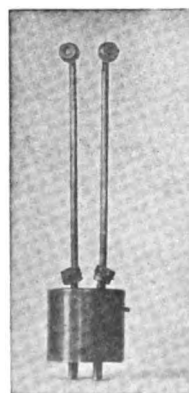
Thorough training given in radio operating, traffic, and in damped and undamped systems.

Tuition ten dollars a month for either the day or evening sessions or both combined.

RADIO CORPORATION OF AMERICA

Phone Douglas 3030

335 New Call Bld., San Francisco



**TUBULAR
BULB
ADAPTER
\$1.50**

**VARIABLE
GRID LEAKS**

A NEW TYPE OF
EXTREMELY EFFICIENT
RECEIVING SET
Write for Literature

Sonoma Radio Laboratories
Box 297, Sonoma, Sonoma Co., Cal.

SPECIAL! For the Summer Only.

AUDIO TRON ADAPTER Our world known famous adapter.



We are offering this adapter for the summer months at the small price of \$1.50. This will enable the Amateur to get one of these adapters for their fall and winter work.

Special

Honey Comb coil adapters which are now in use in this and foreign countries for only \$1.25.

Price \$1.50
Summer Only

We also carry other reliable products such as the
Paragon Rheostats\$1.75
Standard socket 1.00
Paragon short wave receiver... 55.00
Amplifigon det. one step..... 65.00
W. E. Fones.....12.50
Electron relays 6.00

Let us know your wants and we will quote you prices that will save you money.

TeCo Radio Co.

P. O. Box 3362 BOSTON, MASS.

REMEMBER WE CARRY NOTHING
BUT THE LATEST AND BEST
IN RADIO

Classified Advertisements

ADVERTISEMENTS IN THIS SECTION ARE THREE CENTS PER WORD NET. REMITTANCE, IN FORM OF CURRENCY, MONEY ORDER OR STAMPS, MUST ACCOMPANY ORDER.

BACK NUMBERS of "Pacific Radio News" are now available. We have a few copies of the March, 1920, and May, 1920 issues on hand. Ten cents takes a copy of either issue. PACIFIC RADIO PUB. CO., 50 Main St., S. F. Cal.

FOR SALE OR TRADE—Audion Control Panel. Blitzen Receiving Transformer. Western Radio 10,000 Loading Coil. Murdock Phones. Clapp Eastham .0005 Variable. Murdock .001 Variable. Honeycomb coils. Oscillation Transformer. Sell for \$30. Trade for parts two-stage amplifier. L. KING, 659 26th avenue, San Francisco.

ALL AMATEUR APPARATUS bought or made in accordance with the Radio Buyers and Builders Handbook. Invariably resell very profitably. Study my June and July display advertisements. See why and get your copy now. R. CLARK, Barnes Road, Newton, Mass.

REPRESENTATIVES wanted to secure subscriptions to "Pacific Radio News" Write today for attractive proposition. Pacific Radio Pub. Co., 50 Main St., S. F. Cal.

"SHRAMCO"

Specialties are needed for an efficient set

SWITCH POINTS

	Brass	Nickel
No. 626— $\frac{1}{4}$ "x $\frac{3}{8}$ " with screw.....	\$2.00 per 100	\$3.00 per 100
No. 627— $\frac{1}{4}$ " head, $\frac{5}{8}$ " shank with nut and washer.....	2.25 per 100	3.35 per 100
No. 628— $\frac{1}{4}$ "x $\frac{3}{4}$ " with screw.....	1.75 per 100	2.60 per 100

SWITCHES

No. 750—3-blade Laminated, $1\frac{3}{8}$ " radius.....	\$1.00 each
No. 751—Single Blade, $1\frac{3}{8}$ " radius.....	0.35 "
No. 800—Panel Binding Post, brass finish.....	0.10 "

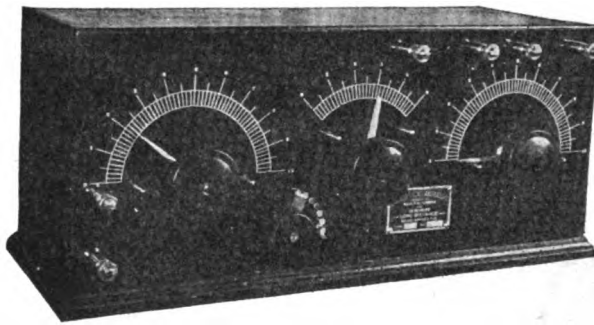
Complete line reliable moderate priced apparatus
Radisco Agency, Coils, "B" Batteries, Dial Indicators, etc.

Send 5c in stamps for Catalog J showing complete line.

Shotton Radio Manufacturing Co.

P. O. BOX 3, SCRANTON, PA.

Seals—But—No Secrets and Service



C. R. L. Paragon Regenerative Receiver

The C. R. L. Paragon Short Wave Regenerative Receiver is sealed for your protection not ours.

The seals give you our **two year unconditional** guarantee, showing our confidence in the set and our interest in the purchaser.

Full instructions for connection and operation with each instrument.

The C. R. L. Paragon has solved the summer relay problem!

Licensed under original Armstrong U. S. Patent No. 1, 113,149 and U. S. Application Serial No. 807,388.

Price, complete, F. O. B. Chicago.....\$55.00

Write for our descriptive Bulletin J-20.

CHICAGO RADIO LABORATORY

1316 CARMEN AVENUE

5525 Sheridan Road (Testing Station 9ZN) CHICAGO, ILL., U. S. A.

"The Radio Telegrapher"

Official Organ

UNITED RADIO TELEGRAPHERS' ASSOCIATION

Room 303

44 Broad Street, New York

Read about what's going on among the Commercial, Navy and Army operators

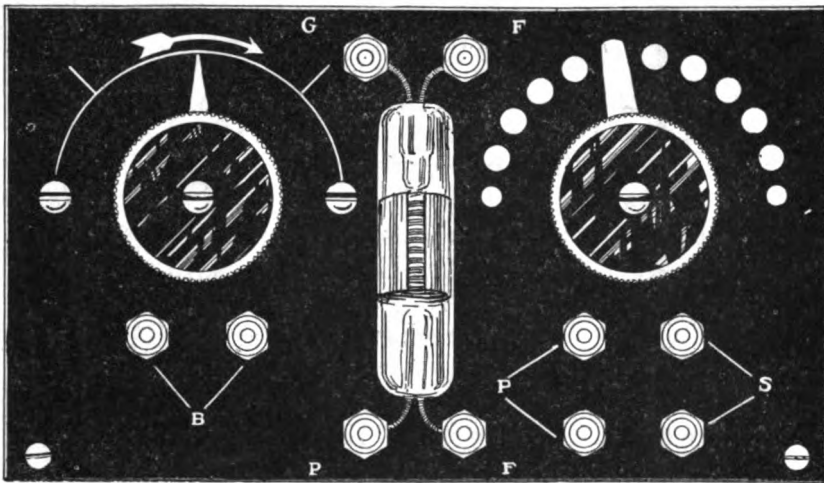
ON SHIPBOARD

AT SHORE STATIONS

AT HOME AND ABROAD

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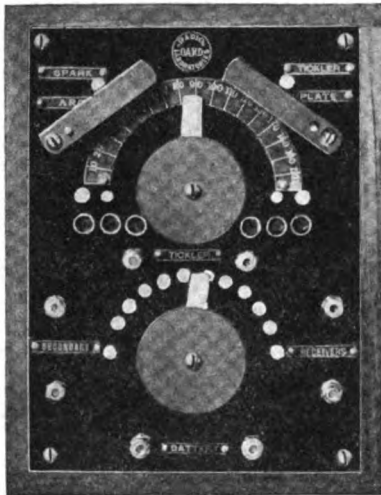
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A Complete Audion Control Panel for \$8.50

Genuine XX Grade Bakelite. Panel 5x8½"; knobs of genuine Bakelite; all finish in nickel plate. 10-point control switch, smooth running rheostat. The biggest value ever offered in an audion control panel. Price complete as illustrated without bulb.....\$8.50 Fitted with V. T. socket enabling operator to use both tubular and Moorhead types of tubes.....\$10.00 Knock-down, all ready for assembly, panel drilled\$6.50 With V. T. socket for both types of tubes\$7.50

Oard Professional Audion Control Panels and Cabinets

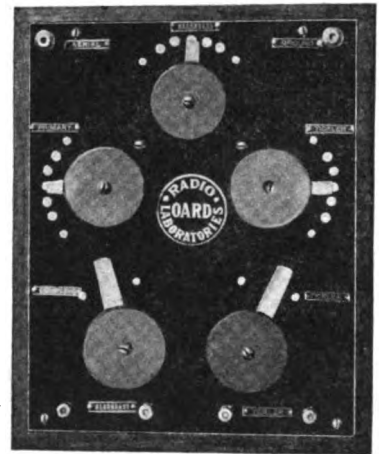


Size over all 6x8x6

The most complete control panel made, fitted with arc and spark switches, and tickler shorting switch.

Bakelite panel, nickel finish. Cabinets in red southern gum. Complete\$20.00 Panel only ...\$17.50 Knock-down, panel only\$11.50 With Cabinet \$13.75

Regenerative Short Wave Receiver



Size over all 9x11x6

This receiver copies NPG 75 miles, with no aerial or ground, using only one bulb. Comes in beautifully finished red southern gum case, Bakelite Panel, Nickel finish. 100-600 meters.

Complete\$50.00 Ready for Assembly\$25.00



Size 10x25x10 Over all

Regenerative Receiver

An instrument that we place against any other instrument of this type. Unexcelled in sharpness, audibility and cash value. Cabinet in red southern gum, Bakelite panel, nickel finish. Note the knock-down price. 100-600 meters.

Complete\$110.00 Knock-down, ready for assembly, panel drilled, tubes wound.....\$50.00

Our Loose Leaf Catalogue

Now ready for distribution. Shows exceptional values from cover to cover. Sent only on receipt of 15 cents which will be refunded on first order of \$5.00 or over. Every instrument we manufacture may be obtained in knock-down form. We carry a complete line of Murdock instruments, vacuum tubes, Baldwin receivers, Federal transformers and buzzers.

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Stockton, California