VOLUME 1 NUMBER 7

PACIFIC RADIO NEWS

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The VACUUM TUBE SITUATION

ADDITIONAL SIXTH DISTRICT AMATEURS

INSTRUCTIONS TO COMMERCIAL OPERATORS FOR OBTAINING THEIR SHIP'S POSITION BY RADIO COMPASS STATIONS

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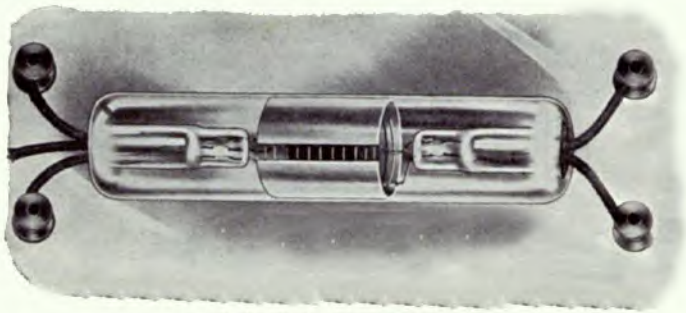

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Pacific Radio News

50 MAIN ST., SAN FRANCISCO

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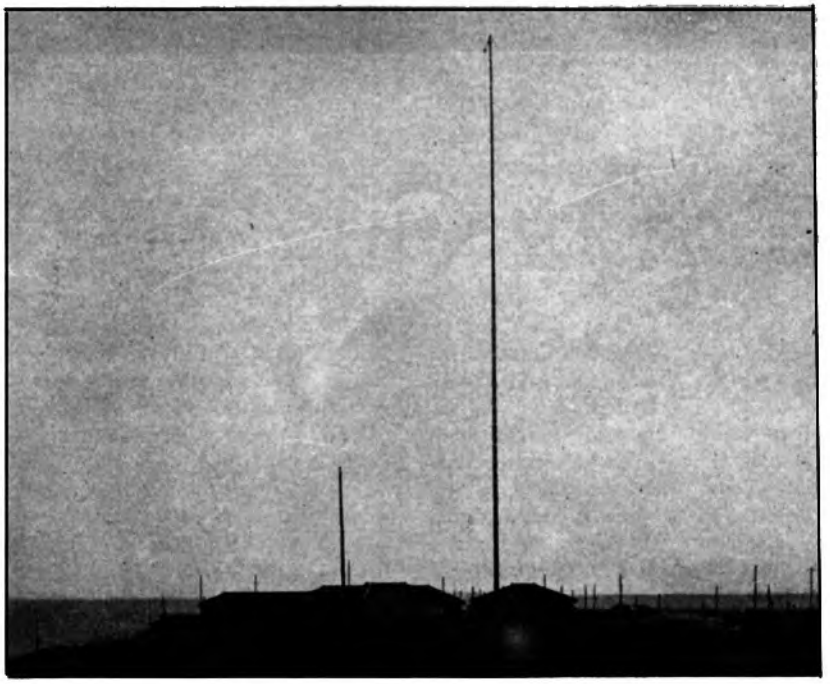
Pacific Radio News
50 MAIN ST., SAN FRANCISCO

Volume I FEBRUARY, 1920 No. 7

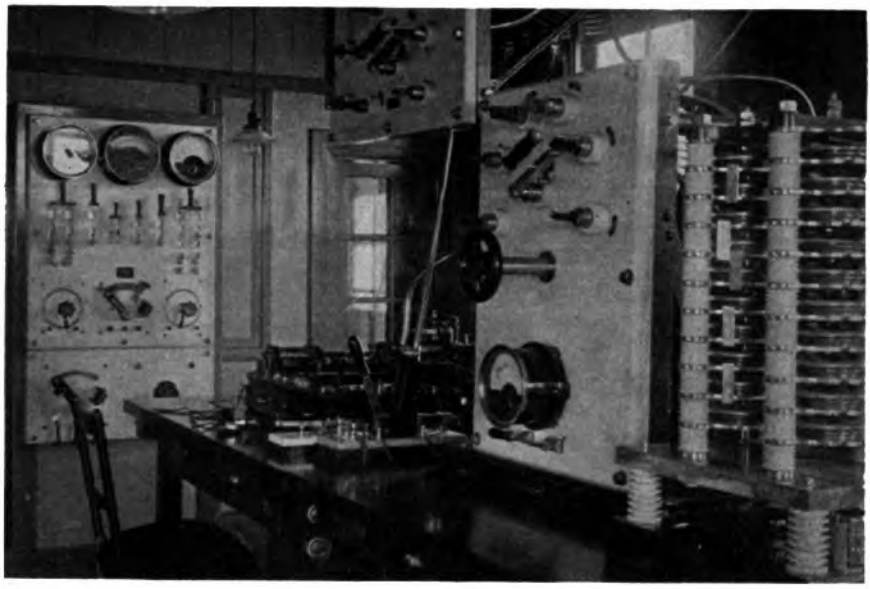
THE CHOSHI RADIO STATION

By J. Komatsu, Choshi Radio Station,
Choshi, Japan



About three miles from the little village of Choshi on a cliff overlooking the sea and amidst the most p aceful rural surroundings lies the radio station of Choshi. If one knows much of the Japanese and the history of Nippon, he wonders with just what approval sacred Fujiyama, the holy mountain of Japan, looks on little Choshi from its height in the distance, with its modern radio station of the "white devil."

Close to the station are two typical tea houses, which cater to those



who visit the station and the coastal scenery. But even the pretty Japanese tea maidens do not hold us in this spot of charm when we look at one of the world's most impressive and modern of radio stations.

As is used throughout Japan, the system of radio telegraphy at the Choshi Station is the Teishinshoshiki. This almost unpronounceable word means "The Department of Communications of the Imperial Government System." The Choshi Station, because of its nearness to the capitol of Japan and the great shipping port of Yokohama, its long range and proximity to the sea is one of Japan's foremost. The Imperial Telegraphs connect it with all parts of Japan, the cable offices, the Transpacific Radio Station at Funabashi and the Tokyo Astronomical Observatory.

The transmitter is a 15 kilowatt 500-cycle quenched spark apparatus. Power is supplied by a prime mover —namely, a 30-horsepower Diesel engine. The feature of the transmitter is the quenched gap, which is shown in the accompanying half-tone. This gap is the invention of Professor Sayeki, a Japanese radio engineer. It is used in practically every 500-cycle radio station belonging to the Imperial Government on land or sea, and its remarkable efficiency justifies its wide use. The electrodes are toothed discs and are revolved at the rate of about one revolution per minute to insure uniformity of spark discharge. A motor compressor forces alcohol vapor between the sparking surfaces. The note given by the gap is as clear as a bell.

Great care is taken to secure the utmost of efficiency by grounding all metal parts not entering into the transmitter circuit. All power circuits are provided with condensers across them to prevent dangerous results from kickbacks. When one considers that the most expert radio electrician in Japan is glad to work for twenty cents in our money a day, there is little wonder of the attention to small details given to Japanese radio installations.

The insulation used is porcelain entirely, except, of course, for panels, switch handles, etc. Even the strain insulators used in antenna construction are of porcelain. These are much more efficient than other insulators of compounded material.

Regular three electrode vacuum tubes are used, both for detector, amplifier and oscillator circuits. The tubes have no base, but simply leads through the glass. They are very highly evacuated and work with excellent efficiency. Amongst other stations heard are Nauen, Germany, and this is surprisingly loud in consideration of the distance.

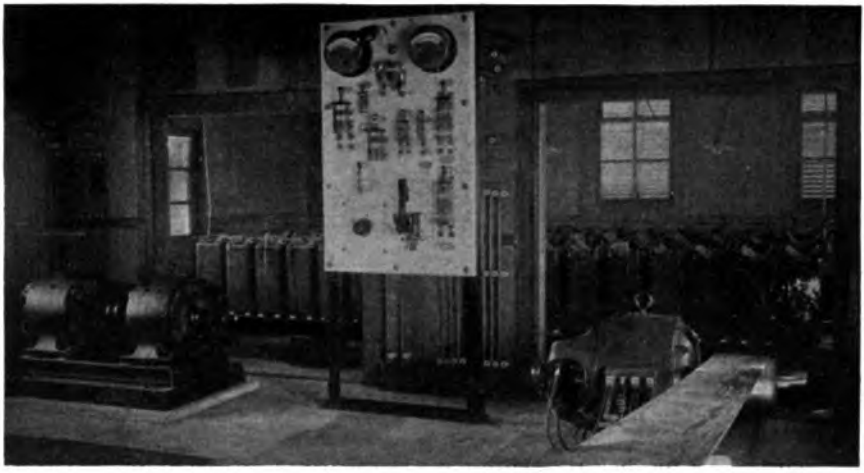
The tuners are very interesting. Taps are taken off every few turns and are brought to a straight row of contact points. A slider is moved back and forth across these contacts by a threaded rod actuated from the front by a crank. Coupling is also varied similarly.

The antenna is suspended from a 220-foot steel tower. The supporting stays and the tower itself are well insulated from the ground. The antenna, which is shaped like a kite, has a natural wave length of 410 meters and a capacity of .001155 M. F. D. For increasing the fundamental wave length of the main antenna an expansion antenna containing three 800-foot wires can be used and a natural period of 1480 meters is thus obtained.

Besides an earth plate, a counterpoise, with .012 M. F. D. capacity between it and the ground, is used.

The staff of the station consists of five operators, two workmen and one servant, each one having a house of his own alloted by the Imperial Government. Most of the men are married and have families, and although they are associated with the newest of sciences, their daily life is as simple and peaceful as that of the ancients. Several of the families can usually be found in their gardens raising vegetables or flocks of chickens and doves.

Although you might be interested in the Japanese code, which you may have sometimes puzzled over upon hearing it, we had better keep it to ourselves and take you back to the tea house to divert your attention.



Valuable Effects of Vacuum Tube Syphoning

By E. T. Jones, A. M. I. R. E.

Everyone familiar with the present-day types of audion circuits employing the fed-back system realizes the fact that if two such receivers in close proximity are tuned to the same wave length "syphon effects" are produced and the oscillations emitted by one tube are picked up by the other receiver and vice-versa. This peculiar phenomena is very interesting and led to investigations which will no doubt have some bearing on the advancement of several statements made in this article. It is claimed that what follows has been discovered by the author and that this "syphon effect" plays a very important part in helping amateurs with short range apparatus to receive signals from the same distance as the largest station in that paricular vicinity.

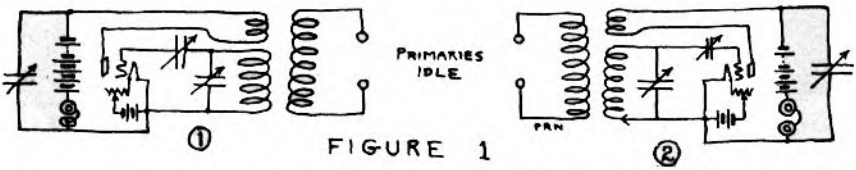


FIGURE 1

Since the general use of vacuum tubes and their associated circuits have been adopted, it has been heard from numerous sources that amateurs who have copied a certain land station one night could not receive the same station the next. This further lends aid to these beliefs, and as the reader shall understand from what follows, it was due to the fact that the "controlling station in that vicinity which was "syphoning the smaller station was not listening on that wave length at the time and naturally the short range of the smaller amateur installation did not permit it to copy signals from the extraordinary distance recorded the night previously, due to the lack of aid from the "controlling station" as mentioned.

Referring to Figure I, where two receiving sets are located, say some fifty feet apart, both sets are tuned to the same wave length (say 600 meters) and the two sets are then in resonance. Number one can hear the true clear note of the oscillating audion at Station Two, and vice versa; this is caused by the receiver also acting as a transmitter, and if a key is arranged in the circuit to vary either the inductance or capacity, then intelligent signals can be transmitted between the two. This effect has been termed "syphoning" and is very pronounced at stations where the receivers are very near to each other. **Experiments have been carried out at distances up to two thousand yards, and with a suitable receiving apparatus the receiving operator has been informed the correct wave length he was listening-in on.**

Of course, as mentioned before, this depended upon the receiving sets having the bulbs oscillating in order to pick up the undamped oscillations being emitted by the receiving apparatus.

Large Local Commercial or Naval Station Syphoning Amateurs

Furthermore, without an antenna

connected to a receiver, but same maintained in a state of oscillation, large receiving stations have "syphoned" some five hundred feet distant from the antenna and receiving apparatus. Now, the MAIN FEATURE OF THIS PARTICULAR INCIDENT WAS THAT THE SYPHONING WAVE ACTED AS THE CARRIER OF THE SIGNALS THE OPERATOR WAS LISTENING IN TO IN THE RECEIVING ROOM PROPER. This prompts the belief that many of the amateurs in and about a city where there is a large commercial station or naval station should not put too much faith in their own receiving apparatus in respect to the remarkable distances covered with same, for it may be that these stations are being "syphoned" by the local station which has the apparatus to easily cover the distance.

Another fact which I may mention here is that when a station is in the act of syphoning another it tends to reduce the strength of the signals received originally and the latter tends to rob it of some of its signal strength. It may be that the total is divided between the two and there is the further probability that this drain of signal from the receiving station may result in a serious weakening of that station's signals and make it impossible to copy without difficulty, especially if there are too many such stations robbing energy from the receiver.

Locating Submarines by Syphon Method

Now that the H-2 has successfully submerged and communicated with ships and airplanes above the waterline, another advancement in that field has been accomplished. Now, in times of war, this same H-2 can be an enemy submarine, and while it would not dare open its transmitter, unless reasonably sure that there are no other craft in that vicinity, it is to be expected that the operator will be busily engaged listening in with his audion oscillating at a fair degree. With this in mind we need but provide a variable receiver from minimum to maximum rotating at all times termed "syphon receiver" and the ship operator or subchaser or destroyer's operator with the aid of a small compass antenna can pick up here the "syphon effect" and immediately hunt down the submarine, unaware of the fact that she is transmitting enough to be noticeable by enemy craft. This method seems quite feasible, and will no doubt receive no little consideration.

Elimination of Static By Syphon Method

I have found by extensive experiments that when the syphon wave acts as a carrier from the main receiver to another receiver installed some several hundred feet away, the static which is so pronounced in the first instance is hardly preceptible at the second receiving apparatus, although the signal has not decreased noticeably. Now, if a receiver, say number one in Figure 2, had a coil of fairly large dimensions inserted in the secondary circuit so that this syphon-

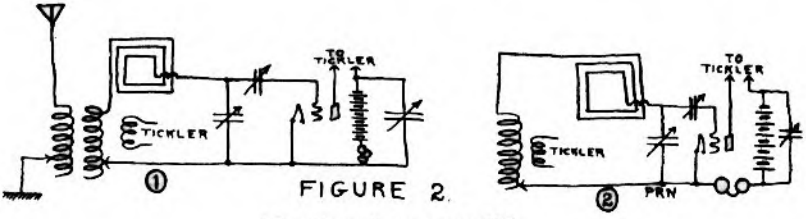


FIGURE 2.

(Continued on page 275

Instructions to the Ship Operator For Obtaining Ship's Position From Radio Compass Stations

Ship radio operators on the Pacific Coast will be interested to know just how to secure their ship's positions when the new radio compass stations of the Navy Department are completed. The following procedure is as used on the Atlantic Coast:

Vessels desiring to obtain a bearing from compass stations which operate independently should call the station from which the bearing is desired and request bearings by means of a conventional signal given below. Simultaneously bearings from two or more compass stations can be obtained by making the call include the other compass stations desired.

Vessels desiring to obtain their position from harbor-entrance compass stations should carry out the same procedure, with the exception that they call the compass-control station instead of the compass station.

When bearings are requested simultaneously from two or more independent compass stations, the compass station which is farthest north will supply the ship with its bearing first; the others will then follow in the order of their north to south, or east to west, geographical location.

The following abbreviated signals will be used until further notice:

QTE?—meaning, What is my true bearing?

QTE—meaning, Your true bearing is .... degrees from .... radio compass station.

QTF?—meaning, What is my position?

QTF—meaning, Your position is latitude ...., longitude .....

The radio compass station (or compass-control station for harbor-entrance compass stations) will answer requests for bearings and positions in the customary manner of answering calls and follow their call letters with "K" if they desire to take the bearing at that time; "QRX" if they desire the vessel to stand by, or other abbreviated signal authorized by International Regulations.

On being told to "K," vessels desiring bearings or positions will transmit their radio call letters for 30 seconds and then make dashes 5 seconds long for one minute, making their call letters three times between each 5-second dash and terminating with the conventional signal "K" (go ahead).

At the expiration of the direction-determining signals the radio compass station (or compass-control station) will call the vessel, make "QTE," and send the bearing in degrees (0 to 359) and the name of the compass station which obtained the bearing, or "QTF" and the position in latitude and longitude. Bearings and positions will always be transmitted to the vessel in words to avoid error.

The vessel acknowledges receipt of bearings and positions by making the call letters of the station transmitting the bearing or position once, "DE," vessel's radio call letters, and then repeats the bearing or position received using numerals.

Independent radio compass stations keep watch on 600 meters and this wave length should always be used to call these stations; but as soon as they answer naval vessels will shift to tune "M" (952 meters), all transmission from the vessel being carried out thereafter on this wave length.

The control stations for harbor-entrance radio compass stations keep

watch on 600 and 952 meters. Naval vessels will call these stations on 952 meters and carry out all tests and communication with them thereafter on 952 meters.

Merchant vessels will call all radio compass and compass-control stations on 600 meters and carry out all tests and communication with them thereafter on this wave length.

Vessels should note that shore radio compass stations can not distinguish between the bearings of a ship and its reciprocal unless the reciprocal bears inland. There is, therefore, a possibility of an error of 180 degrees; in such cases the decision is left to the ship as to which is her correct bearing.

Subject to the foregoing, bearings should be accurate within 1 degree of arc. When bearings from three or more compass stations are not over 1 degree of arc in error, but do not meet at a fixed point, the center of an area inclosed by the bearings can generally be taken as the approximate position of the vessel.

The primary object of these radio compass stations is to assist in the navigation of vessels during atmosphere of low visibility. They are operated by the Navy Department and there is no charge for the service.

AMATEUR DISTANCE RECORDS

Station 6EA at Los Angeles, California, has done some very creditable work recently. Direct communication was had with the station 7ZB at Portland, Oregon; LF, Roswell, New Mexico; 6BQ Reno, Nevada, and several amateurs about San Francisco.

This station has been heard by CA of Portland, Oregon; 7CH at Boise, Idaho; 6IZ at Phoenix, Arizona, and many other nearer stations. Such amateur work is quite above the ordinary and should encourage other amateurs to try to do similar distance work on 200 meters.

JUTLAND RADIO SLIP COSTLY SAY BRITISH

London.—The British government's official account of the battle of Jutland, the biggest naval engagement of the war, which is to be published in January, will show that a slipup in transmitting a message from Admiral Beatty to Admiral John Jellicoe, then in command of the grand fleet, enabled the Germans to escape, it was learned.

"Follow me, sir, and we have them cold!"—Beatty's famous message to his chieftain—did not reach Jellicoe until twelve hours after it had been written. And then the Germans had escaped.

The official book on the Jutland operations does not explain just why this signal did not reach Jellicoe promptly.

The book, however, will endeavor to show that the indecisive character of the battle was largely due to the difficulty of intercommunication between various squadrons.

Shell fire and explosions played havoc with the wireless and signal apparatus and in more than one case vital news could not be transmitted to Jellicoe's flagship.—S. F. "Call."

RADIO SERVICE TO VLADIVOSTOK NOW OPEN

Messages can now be transmitted by radio telegraph to Vladivostok, Siberia. This was recently announced upon the opening of a naval station in the Russian city. Messages are relayed from any Pacific Coast point to Bremerton, thence to Cordova and from St. Paul Island direct to Vladivostok. Service is quite dependable.

RELAYING A RADIO MESSAGE WITHOUT ANY OPERATOR

The Cordova Naval Station proved its exceptional receiving ability when in December, 1919, its transmitter was connected by an ingenious relay device to its receiver and sent signals from Nauen, Germany (POZ); San Francisco, Cal.; Honolulu, T. H.; New Brunswick, N. J., and other distant stations. The received signals were transferred instantaneously to the transmitting relay key of the Cordova Station and thus Cordova relayed messages to all within range, practically acting as a relay transmitter for the mentioned stations without the services of a single operator. It is believed that this work was a freak due to the exceptional receiving conditions at the Cordova Station. If such work could be accomplished with any degree of reliability messages could be instantaneously transmitted to any part of the world by a chain of relay stations and all controlled by the one operator at the point of origin of the message.

COMMERCIAL OPERATOR RECEIVES DISTANT STATION

The Halcun Special receiving set on board the S. S. Sachem certainly produced some good results when Operator J. E. Squires heard the Choshi Station, Japan (JOC), when 200 miles off San Francisco. A single tube audiotron detector was used and the signals were of high audibility. In consideration of the fact that the Choshi station was at the time using their 500 cycle 600 meter transmitter this is a very creditable distance record.

UNIVERSITY OF CALIFORNIA HAS EXTENSION DIVISION COURSE IN RADIO TELEGRAPHY

The University of California announces a course in Radio Telegraphy to be given under the Extension Division at the Polytechnic High School, San Francisco. The course opens on January 13th, 1920. Many other courses are also announced in chemistry, engineering, architecture and electricity.

PROGRESSIVE RADIO COMPANY IN SAN FRANCISCO ADOPTS NEW SYSTEM

How often one goes into a store to buy some piece of apparatus and wonders just what service he may expect from it. Customers of the Leo J. Meyberg Company will not have to do any such wondering since the firm has a room fitted out with modern radio telephone and telegraph apparatus, where the purchaser may test his new apparatus to his heart's content. Since the Meyberg Company bought out the former Haller-Cunningham Electric Company they have put in the most complete line of radio apparatus on the Pacific Coast. Some idea of the completeness of their new radio station may be gained from the fact that they carry stock of the following radio manufacurers: William J. Murdock Co., Clapp-Eastham Co., C. Brandes, Inc., John Firth & Co., Remler Radio Mfg. Co., Halcun Radio Company, Acme Apparatus Co., De Forest Radio Telephone and Telegraph Co., Manhattan Electric Supply Co., American Everready Co., Marconi Wireless Co., Auditron Sales Co., Thoardson Mfg. Co. and the Jewell Electrical Instrument Co.

M. S. Petersen, who was formerly with the old Haller-Cunningham Electric Company is now manager of the Meyberg Company.

The Vacuum Tube Situation

By E. T. Cunningham

The attorneys for the Radio Corporation of America (formerly Marconi Company) have been issuing a statement to the effect that Judge Mayer has decided that not only audions, but also amplifiers and oscillions are infringements of the Fleming patent owned by their client. In the opinion of our counsel, Messrs. White and Prost, this statement is most misleading; is not justified by Judge Mayers' opinion, and is in direct conflict with the DISCLAIMER filed in the U. S. Patent Office by the assignee of the patentee, John A. Fleming. We present the following facts that you and your readers may understand the exact situation:

On October 21, 1884, there was issued to Thos. A. Edison, patent No. 307,031, for "electrical indicator," embracing an evacuated bulb containing a hot filament and a cold electrode with a flow of current between the two; in other words, a structure identical with that of Fleming. As said by Judge Mayer, in Marconi Co. vs. De Forest Co., 236 Federal Reporter 946:

"Stripped of technical phraseology, what Fleming did was to take the well known hot and cold electrode incandescent electric lamp of Edison and use it for a DETECTOR of radio signals. No one had disclosed, nor even intimated, the possibility of this USE of a device then LONG KNOWN IN ANOTHER ART."

From the foregoing you will see that, according to Judge Mayer, Fleming did not invent A NEW DEVICE, but merely suggested a NEW USE of an OLD DEVICE and which USE is that of a DETECTOR of RADIO FREQUENCY alternating currents.

In the above mentioned suit only two of Fleming's patent claims were involved or considered by the court, to-wit; Claims 1 and 37. Claim 1 reads as follows:

"1. The combination of a vacuous vessel; two conductors adjacent to, but not touching each other in the vessel; means for heating one of the conductors, and a circuit outside the vessel connecting the two conductors."

This claim accurately describes and covers the Edison hot and cold electrode lamp and therefore, if not limited in respect to USE, would be anticipated by such Edison device and therefore VOID.

Appreciating the foregoing situation and in order to save this claim the assignee of Fleming filed in the U. S. Patent Office a document known in law as a "disclaimer," whereby he disclaimed the idea that his STRUCTURE was new and limited his patent monopoly to one and only one particular and specific use, to-wit: the USE as a rectifier in connection with high frequency alternating electric currents of the order employed in Hertzian wave or wireless transmission. The following is an exact copy of such disclaimer:

DISCLAIMER

803,684. John Ambrose Fleming, London, England. Instrument for converting alternating electric currents into continuous currents. Patent dated Nov. 7, 1905. Disclaimer filed November 17, 1915 by the assignee, Marconi Wireless Telegraph Company of America.

Enters this disclaimer:

"To the combination of elements set forth in Claims 1 to 6, inclusive, and 10 to 15, inclusive, respectively, of said Letters Patent, EXCEPT AS THE SAME ARE USED IN CONNECTION WITH HIGH FREQUENCY ALTERNATING ELECTRIC CURRENTS OR ELECTRIC

OSCILLATIONS of the order employed in Hertzian wave transmission, and to the words in the specification: 'Whether of low frequency or' at page 2, lines 32 and 33; 'either,' at page 2, line 98; and 'or low frequency alternating currents of,' at page 2, lines 98 and 99."

Copy of Fleming Patent No. 803,684, dated Nov. 7, 1905, and the above disclaimer may be obtained for 10c from the Commissioner of Patents, Washington, D. C.

As said by Judge Mayer, "Claim 1, as limited by the DISCLAIMER, is a broad claim for the incandescent lamp AS A RADIO DETECTOR."

In other words, CONTRARY TO THE STATEMENTS OF MESSRS. SHEFFIELD & BETTS, Judge Mayer held this Claim 1 limited to a DETECTOR and nowhere, in his opinion, is there any suggestion that this claim covers the OLD EDISON DEVICE when and as used as an AMPLIFIER or OSCILLION. In fact, such USES of this old device are impossible with the two-member Fleming rectifier, and were never dreamt of by Prof. Fleming at the time he applied for his patent, and at such time were not known to anyone else. As Flemings' entire invention consisted of suggesting a new USE of this OLD EDISON DEVICE, to-wit: As a detector operating to rectify radio frequency alternating currents, it must be obvious to you that no court would adjudge this Fleming patent to cover other USES not possibile with his structure, not thought of by Fleming and consequently NOT INVENTED by him. Furthermore, an amplifier, as used in audio frequency circuits, comes within the Fleming DISCLAIMER and therefore cannot be covered by his patent.

Claim 37 reads as follows:

"37. At a receiving station in a system of wireless telegraphy employing electrical oscillations of high frequency a DETECTOR comprising a vacuous vessel, two conductors adjacent to, but not touching each other in the vessel; means for heating one of the conductors; a circuit outside the vessel connecting the two conductors; means for detecting a continuous current in this circuit, and means for impressing upon the circuit the received oscillations."

You will note this claim is specifically limited to a DETECTOR and therefore does not cover an amplifier or oscillion.

The previous attitude of the Marconi Company confirms the foregoing, as numerous concerns, according to our information, are using without license from such company, audions as amplifiers and oscillions. The Western Electric Company and the American Bell Telephone and Telegraph Company and affiliated companies are making and using three-member tubes as amplifiers and oscillions in long distance telephony and telegraphy; the DeForest Radio Telephone & Telegraph Co. are making and selling oscillions or audion generators to be supplied with their wireless telephone sets. See advertisement, page 706, of the November Electrical Experimenter and the De Forest trade notices. The General Electric Company make and sell the Tungar rectifier and the Coolidge X-ray tube, both embodying the old Edison structure claimed by Fleming.

We feel quite certain that the Audio-Tron does not infringe the Fleming patent, no matter to what uses it may be put, and we are prepared to attack the validity of such patent.

However, as the use of our device as an amplifier in audio frequency circuits is clearly within the specific language of the Fleming disclaimer and therefore cannot infringe such patent, we are selling same for that use only, although we have a license from the De Forest Company which permits us to sell it as a detector or

amplifier for amateur purposes only.

In the De Forest litigation the Marconi Company contended that the grid and plate elements were merely the Fleming plate divided into two portions and that the two electrodes performed the same function as their one electrode. While the Fleming patent is for a rectifier of high frequency currents only and did not specify the use of a local battery, Judge Mayer held that Fleming had the right to use his device in the ORDINARY detector circuits of the PRIOR ART. At Fleming's date (1905) amplifier and oscillating circuits were unknown and as is well known to all radio engineers, it is impossible to substitute the two member Fleming rectifier in the three-member audion amplifier and oscillating circuits and obtain the same results. This proof is sufficient to show that the mode of operation is different and that therefore an amplifier or oscillion can not be an infringement of the Fleming patent.

I have not attempted to go into detail except in respect to an audio frequency use in radio work of an improved form of the old Edison device and to show that such use is not an infringement of Fleming. In the Marconi-De Forest litigation, De Forest was unable to prove a difference in mode of operation between a two-member and a three-member tube and since much difference does exist and we believe it can be proven beyond question of a doubt, the use of the three-member audion is not an infringement of Fleming.

Don't fail to read on page 278 how you can win 50 cents worth of radio apparatus for every single subscription you send to Pacific Radio News. Other big prizes up to a $70 short-wave regenerative receiver.

CALL LIST ERRATA IN JANUARY ISSUE

Referring to page 244:

6ES—Underwood, E. G., 903 E. Commercial street, is located in Inglewood and not Los Angeles.

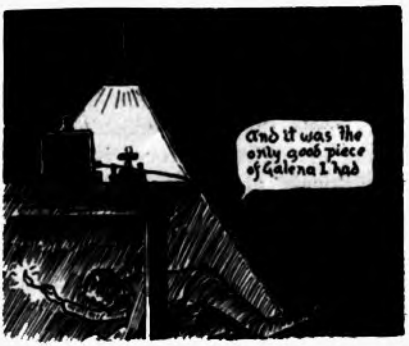
6CU—Fiktead, C. F., should be Filstead, C. F., 1240 Arapahoe street, Los Angeles, Cal.

TWO MORE AMATEURS SCORED

Two more amateurs were penalized for operating their radio stations in a manner contrary to law. They were:

William Bates, Palo Alto, Cal.—Operating without station license and using false call letters; station closed thirty days and warned officially.

Oscar Ruf, Santa Clara, Cal. — Operating without station or operator's licenses; station closed thirty days.



Ye Guid Auld Days

RADIOTORIAL

By the Editor

GOVERNMENT OWNERSHIP

There is only one question unproved in our minds regarding the advantage of Government ownership of radio telegraph systems. That question comes right down to this: What percentage of human beings engaged in Government work, or in any work who would be available for Government work, are scrupulously and absolutely honest and conscientious to a tee? Do not imagine that this is a slur on the men engaged in Government work or in civil employment—it is NOT. But isn't it the absolute truth that we are all selfish and a bit untruthful. Even without knowing it or caring about it, during every day of our lives? That, then, is the trouble with Government ownership.

A private enterprise works on the principle that its receipts must be larger than its expenditures. In order to insure this and to maintain this principle all privately-owned organizations are headed by men who are sufficiently dependent on the income derived from the organization to see that all under their jurisdiction are earning more for them than they are spending in salaries. This system works down to the office boy. If the president of the organization finds that the purchasing agent is buying at too low a margin; if he finds that every morning as he enters his office the force is not conscientiously at work, he does not blame the person who is losing money for him, but rather the man in his force that is responsible for the employment of such poor help. Thus it is that from the president to the general manager, from the general manager to the plant superintendent or office manager, and so on down to the janitor, are men who must produce results or get out.

In Government work this is NOT the exact state of affairs. In the very first place the Government is not a person, and financially is always thought of as being a figurative gold mine, even though the national debt may be tremendous. It is much easier to cheat the Government in connection with labor than an individual or private enterprise. Moreover, there are so many activities in Government work which do not earn money for the Government that it is an extremely hard problem to guard against financial loss in various departments.

Of course, the question is always brought up about the advancement of the art of radio if Government control were allowed. This is, in our minds, not so serious a question. Competition, it is said, benefits the advancement of radio. But has our advancement in radio been beneficial to the art alone or to the individual? One example of competitive advancement might be cited. Take that of the vacuum bulb. Has the art been benefited after the development of the three electrode bulb by competitive struggle? No. And if anyone should ask Dr. De Forest whether competition was responsible for the invention of the grid in the vacuum bulb he would probably say very decidedly, "No."

The various privately-owned corporations and companies engaged in commercial radio communicating systems are turning over fair margins of profit. The advancement of the art is carried on by both Government

RADIOTORIAL

and commercial enterprise. Why should we seek to give the Government a money-losing proposition when it is already hampered by billions in national loans and debts? We emphatically should NOT.

Legislation regarding the Government ownership of radio communication systems is probably pending and will come to issue in the near future. Let's all do everything within our power to leave matters as they are.

AMATEUR RADIO VS. THE GOVERNMENT

If there ever was an objection to amateur radio before the war it was an objection for which improper execution of laws is responsible. There never will be, nor could be, such a thing as amateur interference when this class of station fully complies with the law in connection with transmitting wave length, decrement and pure emitted wave. Our laws governing radio communication covering the amateur are beyond criticism. If these laws are enforced there should be no objection to amateur radio communication.

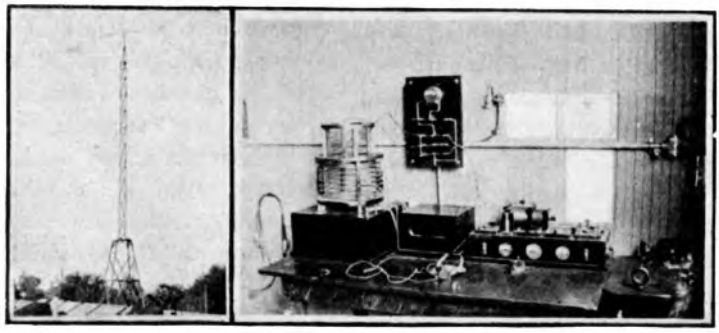
On the other hand, there is an element in this country that desires to banish amateur radio work. That element, from time to time, makes itself known in Washington and stirs doubts in the minds of our legislators regarding amateur communication. Amateurs throughout the country should not feel satisfied with the contention that amateur radio is back and back to stay. Remember, "Preparedness . . ." The foremost thing for every amateur and experimenter to keep in mind is the law. His responsibility does not end with an admonition to simply obey the law. That is the wrong angle to start with. Each and every man who owns an amateur or experimental radio station should make up his mind, no matter how hard it is, not to press his key or let a single dot into the ether until he has had standardized instruments at his station to cause it to comply with the law. It is utterly impossible to tune an amateur transmitter to the requirements of the law without the proper measuring instruments. Even if the wave length is all right the decrement may be too high or probably the wave is not pure. It requires a wave meter and a decremeter to tune a set. The question certainly is not where the amateur can obtain these measuring instruments. That is his own responsibility. If he looks around a bit he can find the essential instruments all right and can borrow them; if he is clever enough he can even construct his own. And the beautiful side of this argument is that when his set is properly tuned, his transmitting distance will be increased.

The second thing for the amateur to keep in reserve is this. Everything he does is a subject for criticism by those agitators against amateur radio. Remember that. And don't only make your actions beyond criticism, but build up a store of backing achievements. If you accomplish something, let it be known. Show the world that the amateur radio man is worth his salt and then some. We want to insure ourselves against any possible break now that

amateur radio communication is again legal.

If the amateur guides his actions accordingly, then amateur radio will not only remain, but will gain prestige and further recognition. We are willing to back amateur radio to the limit. We will help by publicity. But it is up to you to make the publicity worth while.

ONE OF THE "BETTER" RADIO STATIONS

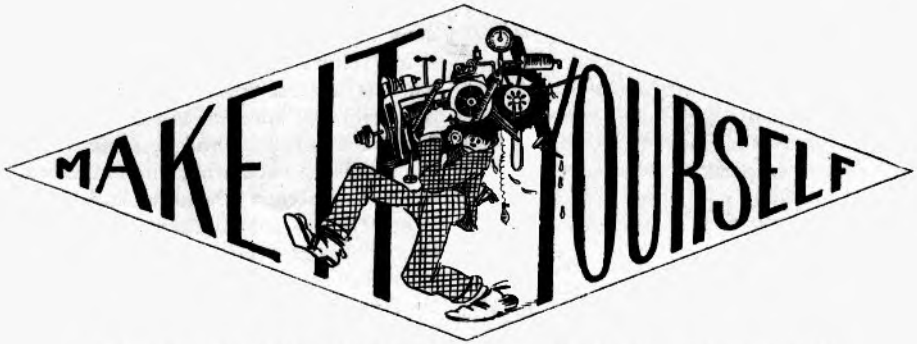


We show herewith two halftones of the station of Mr. R. C. Denny of Fresno California. This is one of the better class amateur stations of the Pacific Coast.

The station was almost entirely constructed by Mr. Denny. The transmitter radiates five amperes at only three-quarters of a kilowatt transformer input. A range of several hundred miles is easily the normal working range. Oil-immersed transmitting condensers are used and can be seen immediately below the oscillation transformer. The rotary spark gap is contained in the box below the antenna switch.

The receiving instruments are mostly of Murdock apparatus and are arranged very compactly. Los Angeles and San Francisco amateurs are heard, but fade badly, probably due to mountain ranges intervening.

Mr. Denny is interested in working up a relay route through the San Joaquin Valley, having stations in towns about twenty-seven of thirty miles apart. The following towns are suggested: Sacramento, Walnut Grove, Stockton, Modesto, Merced, Madera, Fresno, Visalia, Portersville, McFarland and Bakersfield. From Bakersfield via Santa Barbara communication could be assured to Los Angeles. Amateurs in any of the above towns should by all means communicate with Mr. R. C. Denny, who is president of the Fresno Radio Club, and may be addressed at general superintendent's office, H and Tulare streets, Fresno, California. The call letters of Mr. Denny's station are 6CS.



AN UNDAMPED TRANSMITTER OR RADIO TELEPHONE

By Robert Velner

Part II.—Construction Detail

In the first part of this article an endeavor was made to familiarize the reader with the vacuum bulb when employed as a generator of oscillations. This part will deal with constructional data and upon reading it you will find it qualitative rather than quantitive data. In other words, it is felt that all radio experimenters and amateurs are anxious to build their apparatus with material readily obtainable or on hand rather than to be forced to adhere to definite dimensions, certain sizes of wire, etc. Directions for the building of this transmitter will be broad enough so that the constructor can use his own ideas in making it and yet be assured that it will give good results when complete. If it doesn't work, write the author in care of this publication, and his co-operation will be secured to help you.

The essentials for the transmitter are:

1. One or more vacuum bulbs that will have even the very feeblest of oscillating characteristics or better.

2. A high voltage D. C. source, preferably 40 volts or over, either dynamo or battery.

3. A low voltage D. C. source of proper voltage to heat the filament or filaments of the vacuum bulb or bulbs.

4. Wire, insulated, 40 feet or more, and No. 16 or larger or better yet litzendraght.

5. Some kind of tubes—cardboard, composition, bakelite, etc., any size, preferably 3½-in. or over.

6. An ordinary telegraph key if a telegraph transmitter is desired, or a telephone transmitter if a radio telephone is desired.

Additional material in the way of binding posts, bakelite or hard rubber, etc., for a panel; switches, socket for standard vacuum tubes; cabinet work, and so-forth, while not actually necessary, add to make the transmitter something more than an experimental one.

Figure 1 shows the diagram of connections. The inductance—7, 8, 9—is wound on the tube. If cardboard is used it should be saturated in a compound of melted paraffin and rosin to increase its insulating properties. As stated before, litzendraht is the best conductor to use for the inductance, as it has a much greater carrying capacity for an oscillating current than a single conductor. The values of inductances from 7 to 8 should equal that from 8 to 9. This provides a tuned grid circuit (G 9 8 F) equal in wave length to the plate circuit (F 8 7 3 4 P) and makes a much more efficient oscillator than

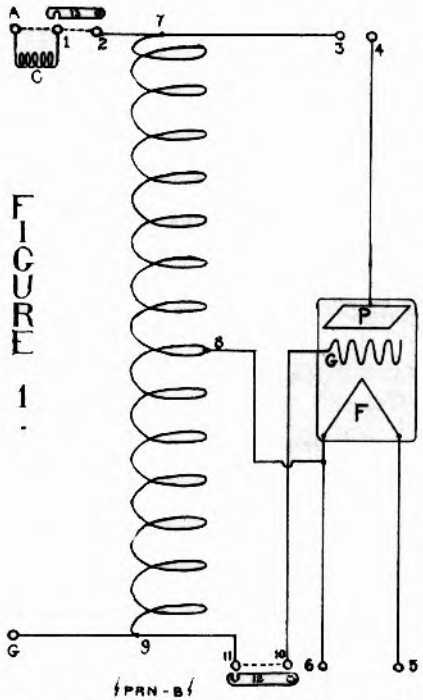


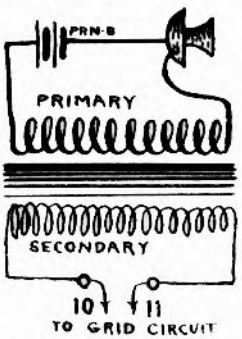
FIGURE 1.

ones using an untuned grid circuit. The wave length radiated by the completed transmitter will depend on the values of half of the inductance (7 8) and the capacity of the tube itself, the latter being usually almost negligible.

Referring to Figure 1 again, 3 and 4 are the connecting terminals for the high voltage battery or generator. From our study of Part I we found that the positive side of the high voltage source always was connected to the plate, thus to terminal (4). Three binding posts are provided at the plate side of the inductance. These are of great convenience when used in connection with the short circuiting strip (13). For telegraph, the key is connected across posts 1 and 2 and the strip (13) is connected from A to 1, shorting coil (C). This transmits an undamped wave whenever the key is pressed, no oscillations being evident in the antenna when the key is up. However, if it is desired to use what is called "compensated wave," the strip (13) is connected across 1 and 2 and the key to A and 1. Now when the key is up oscillating current flows to the antenna through coil (C). When the key is pressed a slight wave length change occurs due to the short circuiting of coil (C). This small coil should be wound of about twelve turns of conductor, two inches in diameter. In tuning the transmitter to resonance the key should be held down continuously whether the "compensated" or plain cut-in wave is used.

Binding posts are provided at 10 and 11 for the radio telephone circuit. The secondary terminals of an ordinary telephone induction coil (or any kind of induction coil with a primary and secondary of different number turns wire) are connected to the terminals and a telephone transmitter in series with a battery of two dry cells is connected across the primary. This circuit is shown in Figure 2.

FIGURE 2.



All connections to the tube and to the antenna and ground posts should be of heavy conductor, or at least the size of the wire used in the inductance.

(Part III of this series will describe a suggestive way of mounting the apparatus, showing a neat panel design and also how to make a rectifier that will enable 110-volt A. C. to be used for both filament and plate current for telephone or telegraph.)

REVIEW OF PUBLICATIONS ON RADIO COMMUNICATION

The Wireless Press, Limited, 12 and 13 Henrietta street, London (West Center), has started the publication of a monthly scientific record of progress in the radio field. Prof. G. W. O. Howe, D. Sc., M. I. E. E., is the editor.

The publication is highly technical and treats to a great extent with quantitive research work and observations. The editorial policy, as outlined in the first issue of October, 1919, is broad, and contributions will come from scientists in the radio art, no matter what system or corporation they are interested in.

In his editorial, in explanation of the necessity of mathematics in treating with various radio phenomena, Prof. Howe says:

"We trust, therefore, that non-mathematical readers will appreciate this when articles are published which appear to them too mathematical, and remember that the fault, if it is one, is probably not with the writer of the article, but with the phenomena, which are so complex that such treatment is essential to their elucidation."

The Bureau of Standards has recently published two interesting Scientific Papers. No. 354 is entitled Principles of Radio Transmission and Reception with antenna and coil aerials and was writen by J. H. Dellinger, Physicist. This publication deals with radiation and received currents in various antennae, including coil aerials, their relative effectiveness and by comparison shows the practical value of coil aerials in comparison with usual types. Methods of measuring the various current values are also discussed.

No. 355 discourses principally on vacuum bulbs as transmitters and is entitled Determination of the Output Characteristics of Electron Tube Generators. Lewis M. Hull, Assistant Physicist, is the author.

Those interested may secure either or both of the above publications by writing to the Bureau of Standards.

Plain Gap

Quenched Gap

(Continued from page 263)

ing wave could be directed to one certain point (where the second receiving apparatus was installed) that a maximum of the signal would be received there in a greater proportion than the static. While there is no good theory for the foregoing statement, it has been proved in actual tests and therefore there seems no need for lengthy explanations.

This syphon effect has not been discussed before and it will come into general use before long for some very valuable purpose. It has not been used in the ways described herein as yet.

Sixth District Amateur Stations

6FL	Metcalf, D. E.	1825 So. Ardmore Ave.	Los Angeles, Cal.
6FM	Baker, M. P.		Los Gatos, Cal.
6FN	Hoyt, L. L.		Hayward, Cal.
6FO	Burglund, B. N.	3338 22nd St.	San Francisco, Cal.
6FP	Renosche, G.	1781 Ninth Ave.	San Francisco, Cal.
6FQ	Wickersham, H. H.	149 San Carlos Ave.	San Francisco, Cal.
6FR	Stubbe, F. A.	978 Valencia St.	San Francisco, Cal.
6FS	Sutton, Wm.	509 Parker Ave.	Sacramento, Cal.
6FT	Roe, C. D.	661 So. Chicago St.	Los Angeles, Cal.
6FU	Shelton, R. O.	3443 5th St.	San Diego, Cal.
6FV	Parsley, Wm.	243½ Alvarado St.	Monterey, Cal.
6FW	Fehren, B. R.	345 N. 3rd St.	San Jose, Cal.
6FX	Tudhope, G. V.	4187 Manila Ave.	Los Angeles, Cal.
6FY	Wing, Harry	Care California Cap Co.	Stege, Cal.
6FZ	Calhoun, R. E.	2436 Dwight Way	Berkeley, Cal.
6GA	Hughes, Merton	1407 Market St.	Oakland, Cal.
6GB	Carrillon, W. R.	793 Cole St.	San Francisco, Cal.
6GC	Provinse, F. E.	1320 N. Douglas St.	Los Angeles, Cal.
6GD	Wright, O.	784 So. El Molino Ave.	Pasadena, Cal.
6GE	Buxton, J. R.	805 Ninth St.	Douglas, Arizona
6GF	Statts, E.	3347 U St.	Sacramento, Cal.
6GG	Larkin, H. W.	2487 Altadena Ave.	Pasadena, Cal.
6GH	Phillips, Vance	237 State St.	Pasadena, Cal.
6GI	Wade, A.	465 N. Lake St.	Los Angeles, Cal.
6GJ	Gould, G. G.	2205 Clinton Ave.	Alameda, Cal.
6GK	Bickel, P.	1434 25th Ave.	San Francisco, Cal.
6GL	Birch, W. A.	1819 10th St.	Berkeley, Cal.
6GM	Ewing, G. W.		Highland, Cal.
6GN	Breuner, W. E.	4110 Folsom Blvd.	Sacramento, Cal.
6GO	Bennett, G.	4116 E. 16th St.	Oakland, Cal.
6GP	Seamens, C. W.	159 So. El Molino Ave.	Pasadena, Cal.
6GQ	Coggins, R.	45 Coronado Road	Phoenix, Arizona
6GR	Anderson, Edw.	1905 L St.	Sacramento, Cal.
6GS	Powell, M. W.		Lowell, Arizona
6GT	Kennedy, R.	1475 Victoria Ave.	Riverside, Cal.
6GU	Van Aukon, G. L.	Route No. 1, Box 170	San Jose, Cal.
6GV	Davidson, M. T.	419 S. Alvarado Ave.	Los Angeles, Cal.
6GW	Wiegand, F.	4593 Lexington Ave.	Los Angeles, Cal.
6GX	Lynam, A.	2409 Q St.	Sacramento, Cal.
6GY	Wood, I.	275 S. 9th St.	San Jose, Cal.
6GZ	Bruere, C.	1430 Wright St.	Los Angeles, Cal.
6HA	Hill, K. M.	316 W. Grant Ave.	Eureka, Cal.
6HB	Wilkins, R. A.	532 N. 17th St.	San Jose, Cal.
6HC	Enwicht, H.	405 N. 3rd St.	San Jose, Cal.
6HD	McKinlay, J. M.	3120 21st St.	San Francisco, Cal.
6HE	Scoville, G. W.	1750 35th St.	Oakland, Cal.
6HF	Nutting, D. C.	2915 Forest Ave.	Berkeley, Cal.
6HG	Knox, L. B.	525 Sylvan Blvd.	Redlands, Cal.
6HH	Latta, P.	2158 Woolman Ave.	San Diego, Cal.
6HI	Lane, F.	1362 42nd Ave.	San Francisco, Cal.
6HJ	Martin, H. J.	2100 Raymond Ave.	Pasadena, Cal.
6HK	Creswell, F. Jr.	4272 S. Hoover St.	Los Angeles, Cal.
6HL	Jarvis, Wm. L.	1221 52nd St.	Los Angeles, Cal.
6HM	Hansen, C. R.	575 N. Grower St.	Los Angeles, Cal.
6HN	Birlew, P. E.	1632 Euclid Ave.	Berkeley, Cal.
6HO	Ardenyi, Wm. A.	41 Greenbank Ave.	Oakland, Cal.
6HP	Poage, E. A.	143 15th St.	Richmond, Cal.
6HQ	Brinckmann, F. E.	406 56th St.	Oakland, Cal.
6HR	Kimball, M. P.	5227 Santa Monica Blvd.	Los Angeles, Cal.
6HS	Brown, C.	1125 4th Ave.	Los Angeles, Cal.
6HT	Wood, S. J.	512 Watson Ave.	Monterey, Cal.
6HU	Beck, F. G.	417 C St.	Wilmington, Cal.
6HV	Hemenway, C. C.	1407 Vermont St.	San Francisco, Cal.

(Continued on page 286)

WITH THE MANUFACTURERS

COMPANY ORGANIZES TO MANUFACTURE RADIO APPARATUS IN SOUTHERN CALIFORNIA

This month sees another company in the radio apparatus manufacturing field. It is the Western Radio Electric Company, 512 East Ninth street, Los Angeles, California. It is indeed interesting to note that this company is manufacturing undamped wave transmitters for 200-meter work. Ranges of the sets will be from 25 miles up to 200 miles, day time. These transmitting sets may be used with either the Marconi or Western Electric vacuum bulbs. Only the very best of material, such as Weston 1-A and 1-B meters, will be used. The transmitters may be used for either radio, telegraph or telephone communication. They will be ideal for amateurs and experimenters that desire a long distance daylight range at all times.

NEW TRANSFORMER

A new transformer for radio work has been developed by the Acme Apparatus Company of Cambridge, Mass. The outstanding feature of this instrument is the close coupling of primary and secondary, making it the ideal instrument for rotary gap work. It is also non-resonant and can be used on almost any size condenser, but is particularly adapted for a value of .007 to .008 MF. Made in ¼, ½ and 1 KW sizes, they will all draw full-rated power with a spark gap discharging at 700 to 800 sparks per second. They will draw less power on smaller condensers and more than rated power on condensers of .01 or over. Of course, drawing more than full-rated power lowers the transformer efficiency.

The manufacturers claim that no other transformer now in the market will draw full power on a condenser small enough to allow sufficient coupling for 200-meter work.

The power factor is also exceptionally high, which is important, as this reduces the flickering of lights on house circuits to a minimum.

An open style of mounting is used, with engraved Bakelite panel and high tension insulators with nickel-plated binding posts and fillings.

This instrument should fill the long-felt want for a transformer properly designed for rotary gap work.

OLD AMATEURS ORGANIZE RADIO APPARATUS COMPANY

Two "old-time" radio men have established a firm in Washington, D. C., with new ideas in view. They desire to present a better class of selling service for the radio amateur.

This new firm is the Radio Apparatus Service and Mr. Harvey H. Mitchell is the sales manager and Mr. Chalious O. Miller is the general manager. Both of these men are well-known for their square methods and progressive ideas and there is no doubt that their company will have success come to them in formulating a service that is better than the average.

FAIR PLAY

IN the history of journalism there has, we believe, never been a subscription contest that really gave "FAIR PLAY" to ALL contestants. In most, or all, of these contests the contestant who receives no prize may have, and no doubt has, spent a great deal of time and may have sent in many subscriptions, BUT, because others have turned in more subscriptions he did not win anything. PACIFIC RADIO NEWS believes in a

SQUARE DEAL

THEREFORE we are going to start a subscription contest where every man who enters will win a prize. Here is our plan.

We are going to give a coupon good for 50 cents in trade at the best radio apparatus manufacturers in the U. S. for EVERY year's subscription received from contestants. In this way everyone who enters the contest will receive something for his efforts.

Contestants must fill out the blank below in order to enter the contest. Beginning with FEBRUARY FIRST all subscriptions will be credited to contestants who have entered their names. In next month's Pacific Radio News a list of prizes will be announced and also the names of manufacturers who will credit the 50 cent coupons. The first prize will be a $70.00 Regenerative Tuner 150 to 700 meters, the second prize a Vacuum Tube Cabinet worth $25.00 and a 2,000 meter Tuner worth $15.00. These first prizes will be given outright, instead of coupons.

ENTER AT ONCE TO GET A GOOD START

ENTRY BLANK

PACIFIC RADIO NEWS,
50 Main St.
San Francisco, Cal.

I hereby enter my name as contestant for the Pacific Radio News subscription contest starting February 1st, 1920, and ending May 1st, 1920.

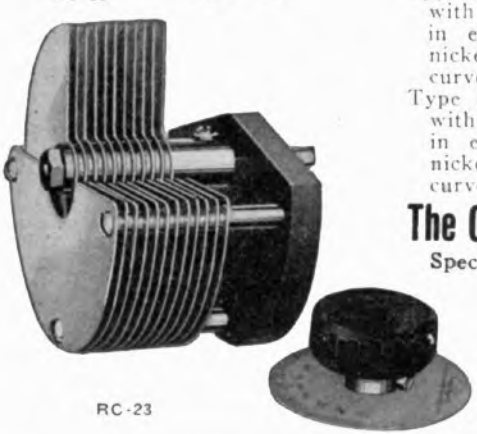
Name.....

Address.....

City and State.....

RC-23-C

RC-38



RC-23

Types RC-38 and RC-23
Rotary Variable Condensers

These condensers embodying new constructional features, are equal in all respects to the best commercial types upon the market, and are available at a considerable reduction in price.

The plates are stamped from .025 aluminum stock and hand finished to a 4" diameter stator and 3¼" rotor.

The bearing plates supporting the shaft bushings are of heavy natural bakelite insuring efficient insulation and exceptionally low Radio frequency resistance.

The scales are neatly etched on oxidized silvered brass showing 100 divisions, and the handles are machined from bakelite with positive milled knurls.

The capacity values are checked against Bureau of Standards instruments and are guaranteed correct.

In Type RC-38 perfect balance is maintained by placing the plates in diametric opposition, while the same effect is arrived at in Type RC-23 by a special compression bearing.

Type RC-38—Maximum Capacity .001 mfd., Minimum .00003 mfd. Specially adapted for panel mounting **$12.00**

Type RC-23—Maximum Capacity .0006 mfd., Minimum .00001 mfd. Specially adapted for panel mounting **$7.00**

Type RC-38-C—Same as RC-38 with heavy seamless brass case in either gun-metal or satin nickel finish with calibration curve **$17.00**

Type RC-23-C—Same as RC-23 with heavy seamless brass case in either gun-metal or satin nickel finish with calibration curve **$11.00**

The Colin B. Kennedy Co.

Special Radio and Electrical Apparatus

140 Second St.

San Francisco, Cal.

We solicit inquiries for raw materials and parts of all descriptions.

(Continued from page 276)

6HW	Post, G. W.	1233 Talbot Ave.	Berkeley, Cal.
6HX	Morgan, Nick	12 W 4th St.	Eureka, Cal.
6HY	Terrell, E. C.	1423 E. 61st St.	Los Angeles, Cal.
6HZ	Lowell, C. H.	1403 Martel Ave.	Los Angeles, Cal.
6IA	Foss, K.	2143 Cedar St.	Berkeley, Cal.
6IB	Ruf, Oscar	1480 Santa Clara St.	Santa Clara, Cal.
6IC	Stadler, E.	2408 O St.	Sacramento, Cal.
6ID	Woods, Hunert	122 W. Milford St.	Glendale, Cal.
6IE	Bowers, N. A.	237 Summitt Ave.	Mill Valley, Cal.
6IF	Riedman, L. J.	1731 Atlantic Ave.	Long Beach, Cal.

Classified Advertisements

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

FIRST CLASS wireless station complete in every detail. Receiving cabinet, mahogany finish, hard rubber front, silver contacts, 10 to one condensers, 200 to 20,000 meters for damped and undamped waves. Cost $225.00. One audion cabinet, beautiful instrument, mahogany finish, hard rubber front; has condenser and plug switches, etc.; cost $38.00. Also one pair of Brandes navy type phones, 1 variable condenser, .001 M.F., 1 variable condenser .0075 M. F., 1 galena detector, 2 audion bulbs, 1 fixed condenser, 1 rotary spark gap, 120 volts, 8000 r.p.m., 1 large rheostat, 1 copper helix, 1 large D.P.D.T. switch on marble base, 1 hot wire ammeter, 3 amperes; 1 large key on marble base, 1 Thordarson, 1 K. W. transformer, 1 copper plate condenser, 4 copper leyden jars, 1 spark coil, 1 telegraph key, 2 small field sets and one wood switch board. Complete outfit cost $425.00. Will sell for $200, cash. All instruments in perfect condition with exception of the field sets. Must sell as a whole. No parts for sale. I. A. FOX, 1403 9th St., Oakland, Cal.

USED, NOT ABUSED, RADIO APPARATUS FOR SALE—1 ¼ h.p. 115 v., 60 cycle A. C. induction motor $20.00, with flange and rotor, $22.00. This motor is fine for a rotary—comes up to speed in a few seconds; 1 pr. Brandes Transatlantic phones $7.50; 1 wave meter 0 to 300 meters, $15.00; ¼ inch thick sheet hard rubber $1.50 a pound; 1 compressed air glass adjustable spark gap, silver electrodes will increase the efficiency of your set 25% over a rotary, $5.00; 1 inductance coil solenoid, 7 turns 5 inches in diameter neatly wound of No. 0000 solid copper trolley wire, $1.00; 2 cardboard tubes 6 in. diam., 12 in. long, $.50; 2 cardboard tubes 7 in. diam., 12 in. long, $.50; odd lots of stranded antenna wire, lead in cable 18 strands of No. 18, at 15 cents a pound; 1 new Audiotron or Moorhead Tube panel hard rubber, $5.00; small quantities of double conductor in flexible armored conduit 20 or 30 ft. lengths, make offer. Come out and see this stuff, it's good done. For appointment write Box 117, Pacific Radio News, 50 Main Street, S. F., Cal., or Telephone Market 7655, San Francisco, Cal.

WHAT HAVE YOU TO SELL? What do you want to buy? THE RADIO EXCHANGE, 354 Perry St., Oakland, Calif., does it all on a consignment basis. 20% commission charged on all sales. Send anything and everything you have. Charges prepaid. We display and advertise. No sale, no charge. You name your price.

AMATEURS:—Add refinement to your home-made apparatus, Gold Lacquer for Brass parts—80 cents a bottle. Lasting White Cement for Engraving purposes. RADIO EQUIPMENT CO., 1525 N. Fawn St., Philadelphia, Pa.

PERFECTION

20000 Meter Long Wave Tuner Type BS.

Weight, 2 lbs. Gets all the "sigs" in this hemisphere. Involute coils machine wound, beat honeycomb. XDA on first tap, NSS on fourth. Formica top and nickel finish. Coils set in special wax, works through worst static. Hookup glued on bottom. Fits Deforest cabinets. Absolutely, we will refund money if not as represented. Round or square pattern. L. C. M. Norway—Copied last month.

200 Meter Amateur Regenerative Tuner Type CS2.

Designed for short waves and just the thing for relay work. Machine wound coils set in wax and has tickler coil and ten taps. Hookup on bottom. Carry them with you. Same weight, and finish. Now in use.

3000 Meter Arlington Tuner—Type AS

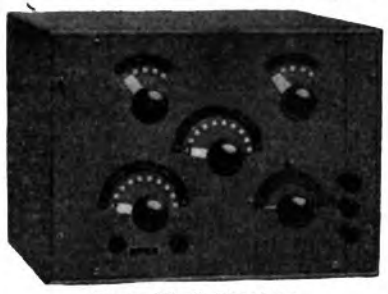
Designed to get NAA and does it. Range 600 M. to 3000 M. small aerials. Price of either of above tuners **$15.00.** Agents wanted.

Knocked Down Variable Condensers

43 plate—.001MF.—**$2.75;** 21 plate—.0005MF.—**$2.25,** 11 plate grid variable **$1.75.** Assemble and save money. Packed in neat box with full instructions. Tuners licensed Marconi.

TRESCO, DAVENPORT, IOWA

Universal Radio Apparatus



Type UL-5 Receiver

This is a complete receiver for undamped waves up to 17,000 meters. No external coils or condensers are needed, since it is entirely selfcontained. Sizes 8"x12"x7" approx.

We are the pre representatives for the UNIVERSAL radio manufacturers and can supply these instruments immediately.

The UL-5 Sell for complete $50.00. Shipped postpaid.

THE RADIO APPARATUS SERVICE

"A supply Company for the Radio Amateur"

803 Union Savings Bank Bldg., Washington, D. C. Address Dept. "D"

A Letter to Western Amateurs

The Acme Apparatus Company
27 Windsor Street
Cambridge, Mass.

Gentlemen:

About the time you read this, those of you who are listed will receive our bulletin describing our radio transformer.

This is the transformer that is making the big noise in the East. We designed it for high power factor and efficiency and knew it was good, but its performance, judging from reports and enthusiasm shown, has greatly exceeded our expectations.

While we do not get the distance here in the East that you boys enjoy, amateurs of Massachusetts using this transformer have broken what have been considered local long distance records. Now we want to see what can be done out where real records can be made, and in order to introduce them we will prepay the express on the first ten orders received from amateurs west of the Rockies. We will refund the purchase price to any one who is not satisfied with the instrument, as this offer is not for the sake of the sale but for the future business.

We will publish the names of the first 10 purchasers in the Pacific Radio News. This is a genuine offer, which should interest every amateur whether he now has a transformer or not. Those who do not receive our bulletin should send for one at once.

Very truly yours,

ACME APPARATUS COMPANY.

A Warning

to Manufacturers
Importers
Dealers
Jobbers
Agents
Amateurs
Purchasers
Users of

Vacuum Tubes

Fleming Pat. No. 803,684
DeForest Pat. Nos. 841,387
879,532

The Marconi V. T. Patent is Basic

United States Letters Patent to Fleming No. 803,684, November 7, 1905, has been held to be valid by Judge Mayer of the United States District Court for the Southern District of New York, and by the United States Circuit Court of Appeals for the Second Circuit.

It is a basic patent and controls broadly all vacuum tubes used as detectors, amplifiers or oscillions in radio work.

No one is authorized to make, sell, import or use such tubes for radio purposes, other than the owners of the patent and licensees thereunder. Any others making, selling, importing or using them alone or in combination with other devices, infringe upon the Fleming patent and are liable to a suit for injunction, damages and profits. And they will be prosecuted.

THE AUDIOTRON AND THE LIBERTY VALVE ARE NOT LICENSED UNDER THE FLEMING PATENT

The price of the genuine Marconi V. T. delivered is $7.00 each. The standardized socket is $1.50 additional. The standard resistance, complete, costs $1.00 and is made in the following sizes: ½ megohm, 1 megohm, 2 megohms, 4 megohms, 6 megohms.

Do not take chances by making, importing, selling, purchasing or using vacuum tubes for radio purposes not licensed under the Fleming patent. By selling, purchasing or using licensed tubes for radio purposes you secure protection under the Fleming patent and avoid the risk of litigation for infringement thereof.

This warning is given so that the trade and public may know the facts and be governed accordingly.

Send all remittances with order to COMMERCIAL DEPARTMENT

Marconi Wireless Telegraph Co. of America
Radio Corporation of America

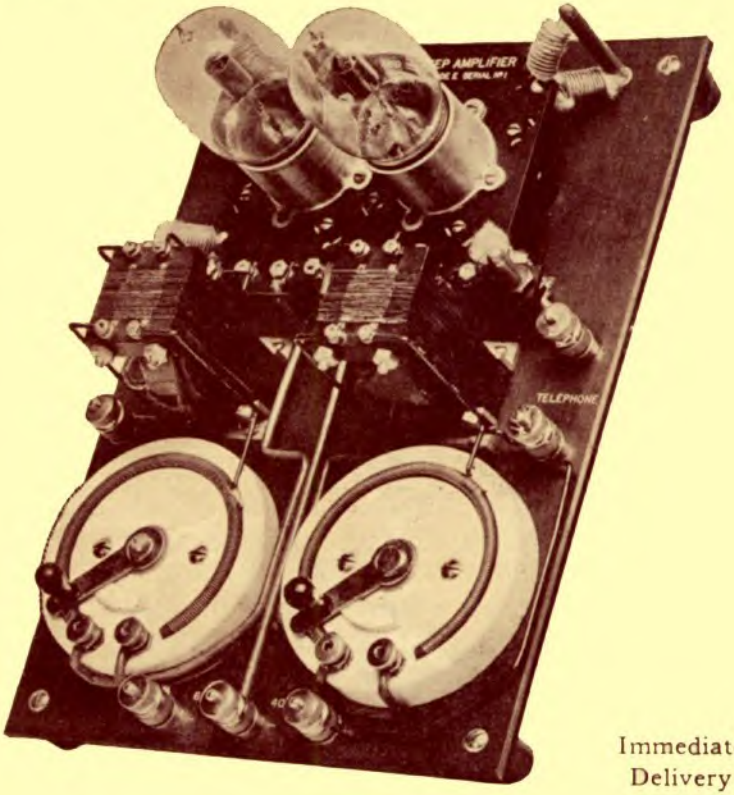
1864 Woolworth Building, New York
Sole Distributors for De Forest Radio Telephone & Telegraph Co.
Retail Office and Exhibition Rooms, 25 Elm St., New York

Schofield Bldg., Cleveland, Ohio Insurance Exch. Bldg., San Francisco, Cal.
American Bldg., Baltimore, Md. 136 Federal St., Boston, Mass.
301 Commercial Bank Annex, New Orleans, La.
109 South 2nd St., Philadelphia, Pa.

TWO-STEP AMPLIFIER

TYPE TRIODE E

PRICE
(without tubes)
$39.00 Postpaid



Immediate
Delivery

Due to its operation on the principle of voltage amplification thru resonance this amplifier provides a maximum of low frequency amplification and is superior to all others.

Permits reliable daylight reception from European stations.

Establishes new amateur long distance records.

Renders remarkable amplification of all signals.

May be used with Marconi and all standard tubes.

WIRELESS SPECIALTY APPARATUS CO.

BOSTON, MASS., U. S. A.