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A SUPER-NEUTRODYNE—Page 353



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AMATEUR RADIO

VOLUME 3

OCTOBER, 1924

NUMBER 10



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NOUVEAUTES FOR NOVEMBER

Greetings, Good Readers. This is Station AR broadcasting. Our Program for next month is being made ready, and if you will tune in on our low wave of 15 centimeters, here is what you will enjoy:

One of our start performers, Milton B. Sleeper, will offer a complete description of his "No-Loss" Receiver. It's quite a novelty, and very interesting, too, as it fits in quite well with the "low-loss" program inaugurated by amateurs.

We will have also with us one of our favorites, John L. Reinartz. He's been up to some peculiar tricks in his little laboratory up South Manchester way. Our special long distance remote control device is picking up much of this for our readers. And it's exclusive, too.

Exactly what is a "low-loss" coil? Why use such heavy wire in winding those coils? There will be some good discussions on this subject in our next number, by authorities who have done some work with these things.

Have you a little harmonic? There are many of them running around the ether. We would like to clear the air about harmonics. We give our first contribution on the subject in November.

There will be, too, some "dope" on that most alluring of all subjects, short waves. We have been fortunate in getting some of the latest styles in short wave practice.

Our staff artist, who has been looking around for material, will have a large good display of his effort. Really, it's very good. You will find "CIC's" page—the last in the book, you know—as refreshing as usual. In fact, he has a few "new ones" that will cause you to oscillate freely. Just try them.

Now please turn to the next pages. They contain all that's good, and new, and interesting for the month of October. We're signing off till November. . . .

The Soothsayer.

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VOLUME 3

OCTOBER, 1924

NUMBER 10



A Very Sensitive SUPER-NEUTRODYNE

By Charles M. Srebroff, 2BHY

The Neutrodyne Receiver was an important step in the design of broadcast receivers. In the past year or so, very little has been done along original lines with this efficient receiver. The novel receiver described herewith makes use of the Neutrodyne circuit, and goes a step farther in making it still more sensitive through the ingenious use of regeneration

PROBABLY one of the most popular types of Receiving sets for the past two years has been the "Neutrodyne." This, no doubt, being due to its ease of operation and also the facility in "logging" stations. It is easy for the novice Broadcast listener to approximately set his three dials alike and tune in various stations. But when these stations are tuned-in there is still something lacking.

The users of regenerative sets know what this something is. They know that a certain control on their apparatus will give greater signal intensity. By means of the tickler, plate variometer or by a condenser, "regeneration" is created. This makes use of the detector doubly, once as a detector and then as a partial amplifier. Although some people may think otherwise, this is still the cheapest and most positive means of obtaining good DX signals.

Wouldn't the correct combination of "Neutrodyne," or Tuned Radio Frequency and Regeneration make a mighty efficient receiver?

Now, if the very sensitive radio frequency amplifier of the Neutrodyne is combined with the super-sensitive regenerative circuit, we should expect a receiver that would unite the long distance receive-

ing advantages secured through tuned radio frequency, and also amplification through regeneration. Such a result is achieved in the receiver described herewith. To the amateur, it is an efficient combination of the Neutrodyne and regenerative circuits. To the radio fan, who finds it necessary to label all of the sets that he knows of, the name "Regeno-dyne" is as good as any.

Let us discuss the "Neutrodyne" again. Everyone probably knows that this set is supposed to be neutralized on about 250 meters. That means oscillation are suppressed above that wavelength and are uncontrollable below that. Such receivers that have been perfectly neutralized at that wavelength seldom bring in much DX above 400 meters. Many of these sets, which have not been properly adjusted, will oscillate on waves up to 400 meters. It is these receivers that have been doing most of the real DX work.

In such cases as the last, there is no means of controlling the oscillations except by throwing one of the three dials off balance. This actually cuts off some of the signal strength. If another adjustment is added to control the regeneration and leave the three tuning to function alone, a very good medium will have been reached.

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Referring to the wiring diagram of this Receiver, Fig. 1, it will be noticed that the coil L₃ (shown in dotted lines) is nothing more than an ordinary tickler. This will work in two positions, in the first as indicated, and the second, when coupled to the primary or antenna coil. Better results will be experienced if the tickler coil is placed in inductive relation with the first coil. When the radio-frequency coils have been properly constructed, it will be found that only a few turns of tickler will be necessary.

A coil of the following dimensions will be found quite sufficient. Ten turns Number 22 D.C.C. Wire wound on 2-inch O.D. tube. A rugged means of mounting the tickler coil and its rotating shaft will have to be devised. This affair should be arranged near the grid end of the coil to which it is to be in inductive relation.

Another means of controlling regeneration would be to make the fixed condenser C₂ variable. The only objection is that the maximum capacity would be about .006 MFD. and would therefore be hard to obtain in a continuously variable condenser. It is of importance to see that this fixed capacity is of correct size, otherwise, it will be in constant state of oscillation and the tickler will be of no value. To determine the approximate value of this it will be necessary to place the set in actual

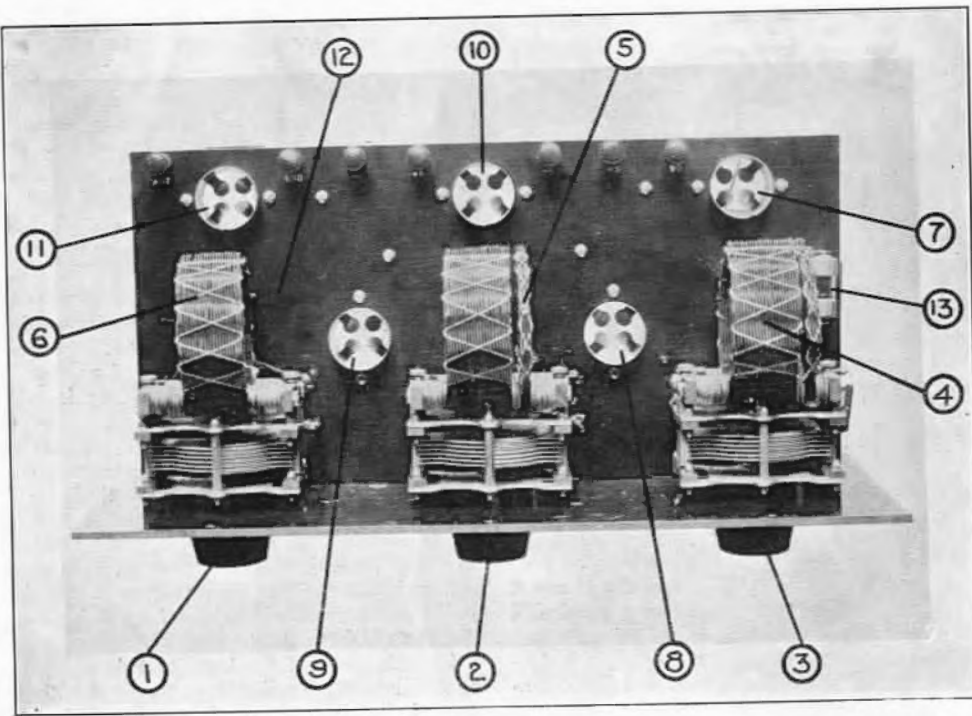
operation, tune to some station around 500 meters, adjust the tickler to give maximum regeneration then insert a condenser that will just about set up oscillations. This will not be necessary if the coils specified are used.

The Low Loss Tune R.F. Coils

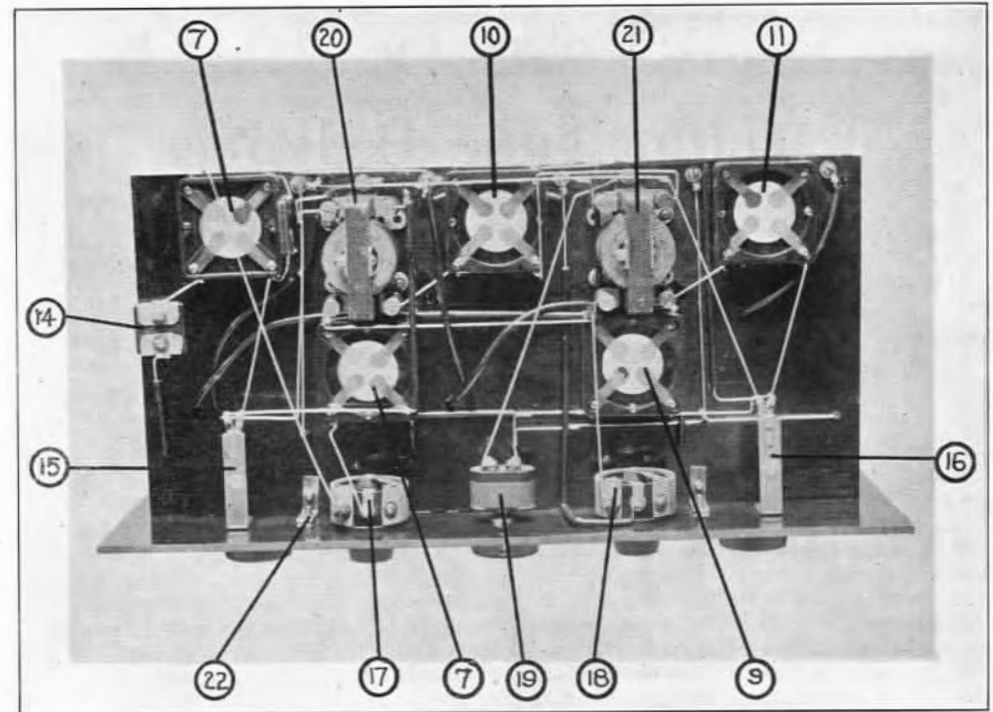
Next we come to the actual set construction. Of first importance are the Low Loss Tuned R.F. Transformers; these are wound with triple cotton covered wire on a 3 1/4-inch diameter form having 14 pegs in a stagger winding fashion. The secondary coils have 68 turns and the primaries have 10 turns. The primaries are placed 1/8-inch apart from the secondary coils. The size of wire used is No. 20 T.C.C. Triple covering is used to insure perfect insulation as these cotton wrappings are the only material between bare wires. No "dope" is used to treat the coils, in fact, they are freely suspended in air with only a dry string used to lace the turns.

The coils thus constructed should be mounted behind a good and "honest to goodness" low loss variable condenser having a capacity of .0003 MFD. Do not place these coils any nearer than 1 1/2-inch to the rear plate of the condenser. The coils want to be kept clear of the condenser field, otherwise eddy-current losses will offset the other advantages. Also, be sure to mount the coils at right angles to the condenser, do not place in the same plane. A very well known manufacturer does just this thing and will surely find out a better way before long.

A set designed along these lines is shown here. The front panel is compact, measuring 8 inches by 18 inches. The rear panel contains the tube sockets and transformers. Due to lack of time the tickler has not been put in. This, however, is a small item and can easily be arranged to suit the constructor.



A good idea of the layout of the instruments is had from this top view of the receiver. The components are numbered as follows: 1—Antenna tuning control; 2—Second stage R.F. control; 3—First stage R.F. control; 4—Low Loss secondary winding; 5—Low Loss primary winding; 6—Low Loss Antenna Coil; 7—Detector; 8—First R.F.; 9—Second R.F.; 10—First A.F.; 11—Second A.F.; 12—Shows position which Tickler coil would occupy; 13—Adjustable grid leak



In the bottom view the transformer and tube socket mounting is illustrated. The location of each piece of apparatus can be traced by the numbers: 7—Detector; 8—First R.F.; 9—Second R.F.; 10—First A.F.; 11—Second A.F.; 14—Grid Condenser .00025 Mfd.; 15—Phone Jack; 16—Loud Jack; 17—Rheostat for all amplifier Tubes; 18—Rheostat for detector tube; 19—Filament Battery switch; 20—Second A.F. Transformer; 21—First A.F. Transformer; 22—Bracket for holding sub-panel to front panel. The A. F. Transformers cores act as rear support for sub-panel

Stagger Wound Coils

Let us go back a minute to the stagger wound coils. This form of winding is becoming very popular, since its introduction in the low loss Tuners and will be spoken of more and more frequently. Many amateurs will no doubt construct coils of this shape for other purposes. A formula for inductance has been used by the writer, which gives a fairly accurate result. Many of you will be acquainted with it already.

$$L = \frac{.0002 \times D^2 \times N^2}{3D + 9.1}$$

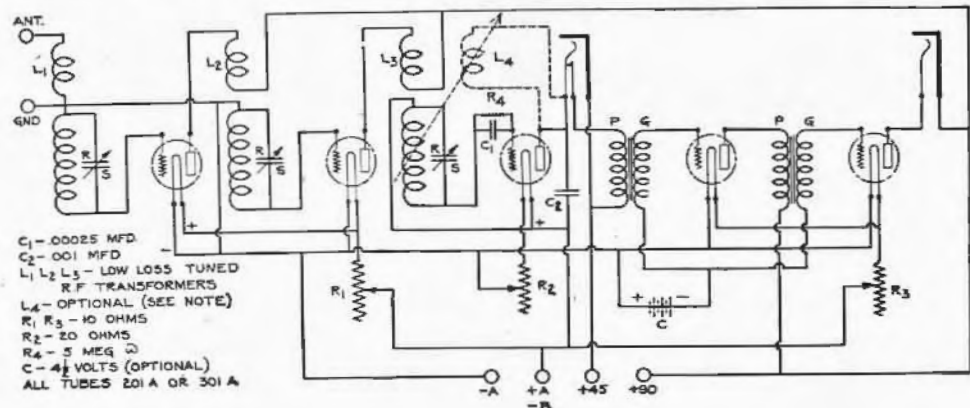
- L—micro henrys
- D—diameter of coil in inches (mean diameter)
- l—length of winding in inches
- N—number of turns

This will give the correct result if the coil would have been wound in regular fashion where one turn runs paral-

lel with the next one. But for the "Stagger" winding the inductance will be approximately 1/3 less. Therefore, after making correct substitutions in this formula and having completed calculations divide the result by 1/3. As conclusion to this article a mention can be made as to the soldering flux. There is only one flux that should be used for radio apparatus. Get some lump rosin at the drug store, place this in a cloth and pound it into powder.

Then taking one part of this rosin and 10 parts of alcohol a mixture will be had. Let this stand about 24 hours. Apply with small brush on surfaces to be soldered. If after many days of standing the alcohol has evaporated just add some more. A set wired up thus will not show signs of corrosion after a year's time.

The customary talk about great distances received on this set have been omitted. The receiver is a good one and whoever builds it will have the pleasure of noting down many DX stations.



- C₁ - .00025 MFD
- C₂ - .001 MFD
- L₁ L₂ L₃ - LOW LOSS TUNED R.F. TRANSFORMERS
- L₄ - OPTIONAL (SEE NOTE)
- R₁ R₂ - 10 OHMS
- R₃ - 20 OHMS
- R₄ - 5 MEG Ω
- C - 4 1/2 VOLTS (OPTIONAL)
- ALL TUBES 201A OR 301A

Vacuum Tube Pedigrees

By Townsend D. MacCoun, A.M., I.R.E.

What do you know about vacuum tubes? Which will work best as a detector, as an amplifier? When is a "genuine" tube a "bootleg" tube? What do you mean by "Amplification Constant," "Mutual Conductance," and all those other terms? All of these questions are answered in this article on vacuum tube characteristics

IT is my purpose in this article to point out the differences in the characteristics between the detector (or "soft") tube and the amplifier tube. The curves accompanying this article were all made by me and show actually what I found in a number of tubes of well known types.

It is essential that we understand just what we mean by the term "characteristics" at the outset. The three most generally used characteristics are known as Amplification Constant, Mutual Conductance, and Plate Impedance, all of which may be derived from the familiar characteristic curves.

Amplification Constant

The Amplification Constant may be defined as the ratio of minimum change in plate voltage to minimum change in grid voltage for a given plate current. The formula being:—

$$K = \frac{\Delta E_p}{\Delta E_g}$$

Let us now examine Fig. 1 and see how we can apply this formula. The two curves marked 1 and

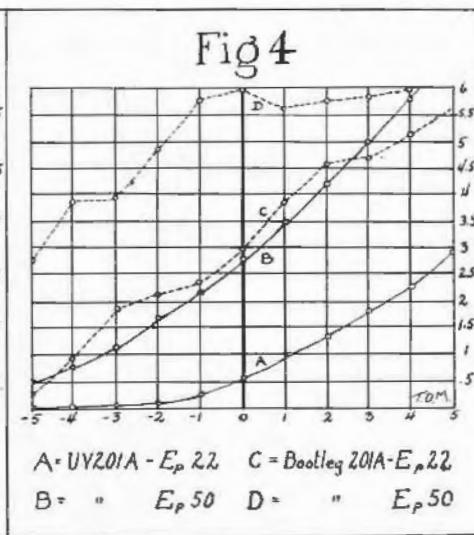
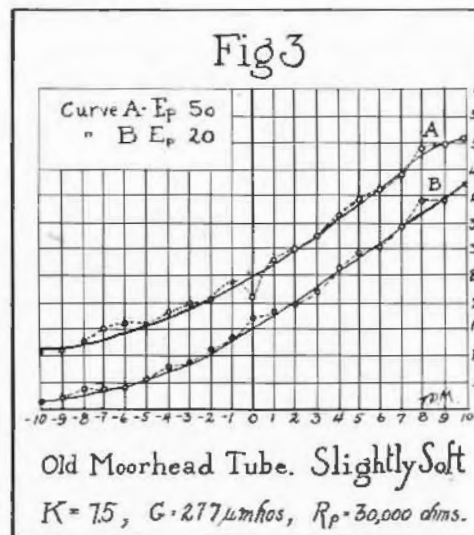
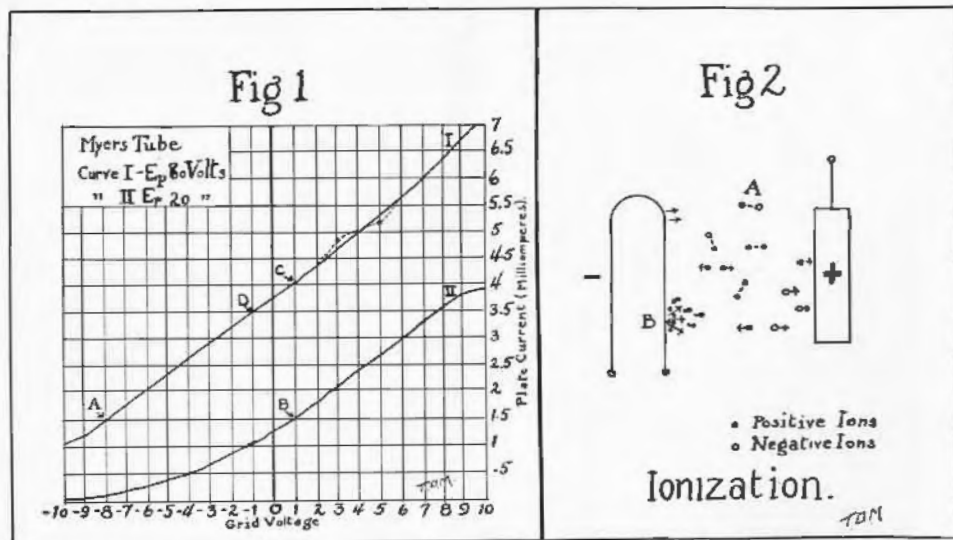
2 were made at 80 and 20 volts on the plate, respectively. We note that with grid 1 volt positive and 20 volts on the plate we get a plate current of 1.5 milliamperes (B). If we raise the plate voltage to 80 we get 4 milliamperes plate current at the same grid potential (C). However, we see that if we make the grid 8 volts negative we can bring the plate current down to 1.5 milliamperes again (A). In other words, a change of 9 volts (1 to -8) on the grid compensates for a change of 60 volts (20 to 80) on the plate. Applying this to the formula we have:—

$$K = \frac{60}{9} = 6.666 \quad (1)$$

This simply means that a change of 1 volt on the grid has as much control as a change of 6.666 volts on the plate in affecting the plate current.

Mutual Conductance

Mutual conductance is the ratio of the rate of change in plate current to grid voltage. It is usually indicated by the letter G and expressed in



Mhos or μMhos . The formula is:—

$$G = \frac{\Delta I_p}{\Delta E_g} \quad (2)$$

Applying this again to Fig. 1 we find that on curve I from A to D that a change of 7 volts on the grid produces a change of 2 milliamperes in plate current, or:—

$$G = \frac{.002}{7} = .000285 \text{ mhos or } 285 \mu\text{mhos}$$

In order to clear up any uncertainty on this let us look at it from another angle. Let us consider the tube as a resistance. When we apply a voltage to the input (Grid) we get, as in a circuit containing resistance, a certain output (Plate) current. This apparent resistance might be termed for want of a better name "Mutual Resistance." Now with this same data we have we can calculate this so called resistance by Ohm's Law thus:—

$$R_m = \frac{7}{.002} = 3500 \text{ ohms}$$

It is customary, however, to speak of this characteristic in terms of "conductance" rather than "resistance." The unit of conductance is the Mho (the opposite of an ohm) which is numerically the reciprocal of the ohm. Therefore, to convert this into the corresponding conductance we take the reciprocal of 3500 and we get .00285 mhos which for the sake of convenience we call 285 μmhos . This is the same amount, of course, as we got from formula 2. The higher this amount is the higher is the efficiency of the tube. The output being greater for a given input. The Mutual Conductance might be called the Efficiency Factor, and is a much better indication of the merits of a tube than the Amplification Constant.*

* Ballantines Radio Telephony for Amateurs, page 231, gives the characteristics of some of the well known tubes.

Plate Impedance

The plate impedance is the ratio of rate of change in plate voltage to plate current for a given grid voltage.

$$R_p = \frac{\Delta E_p}{\Delta I_p} \quad (3)$$

Referring once more to Fig. 1 we choose a grid voltage that is about the middle of the flat portion of the curve, say in this case 1 volt positive. We see that a change of 60 volts in plate potential produces a change of 2.5 milliamperes (B to C) in plate current, or:—

$$R_p = \frac{60}{.0025} = 24,000 \text{ ohms}$$

This is called an "impedance" rather than a "resistance" because, due to the capacity between the plate and filament, this value changes at the higher frequencies.

These three characteristics are all related and dependent on each other and also on a number of other things, viz:—size of filament grid and plate, the distance between them, the degree of evacuation, etc.

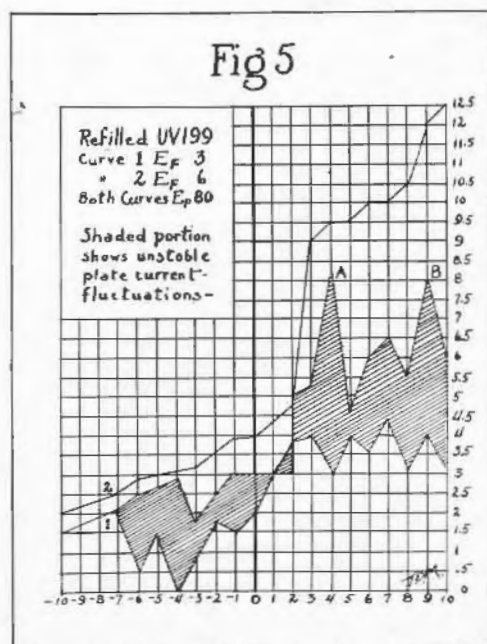
The relationship of the characteristics may be expressed by the equation:—

$$K = R_p G \quad (4)$$

Having the meanings of the characteristics clearly in mind let us now examine, briefly, the phenomenon of ionization. During the process of manufacture every precaution is taken to remove all traces of gas from the tube. The tubes are baked during the pumping process to drive out the gasses which lodge in the small surface irregularities of the glass and in the filament grid and plate. The modern amplifying or "hard" tubes have an extremely high degree of evacuation.

However, after a year or even less it is not un-

common to find that they have become gassy or "soft," due to stem leakage or gases that have come from the elements after the tubes were completed. We are all familiar with the blue glow that



appears in a tube that is soft, when too high a plate voltage is used. Let us now turn to Fig. 2 and see what happens in a tube under these circumstances. Between the filament and plate we find molecules of gas. "A" represents one molecule of gas. The negative ion being the white spot and the positive the black, which as we see are held together by a bond of attraction. Ionization is the breaking up or separation of these positive and negative ions. The gas in a tube is, of course, under normal conditions an insulator. However, gas when under a low pressure when heated by the filament has a tendency to ionize with excessive plate voltages. When this happens the negative ions are attracted to the plate it being positive and the positive ions in like manner going to the filament.

Referring again to Fig. 2 we note that several positive ions have bombarded the filament at the point "B." The result of this bombardment is that the filament is heated excessively at this point. The filament on being heated to this point releases gas which was not driven out by the lower baking temperature during the manufacture. This gas will, of course, immediately ionize, too, and thus the action will concentrate on the one spot and unless the plate voltage is immediately cut down will in all probability burn the filament out at this point, or render the tube useless by causing the destruction of the electron emission.

If a tube has not been too badly ionized it can sometimes be used at lower voltages than rated. When ionization occurs, the plate current usually jumps up very suddenly and to quite a high value, as the ionized gas affords a leakage path between plate and filament. Ionization is analogous to the breaking down of any dielectric.

We are now ready to see what effect the gas in a "soft" tube has on its characteristics and how the detector and a amplifier tube characteristics differ.

Figure 3 shows the curves of an old Moorhead tube which is slightly soft or gassy, curve A at 50 volts and B at 20. The solid line indicates the most probable curve while the dotted line the actual variations from this due to the gas in the tube. Note the humps at 0, +8, -8, -7, -6, and -1 grid volts that are characteristic of the soft tube and is the reason they are such good detectors. There is no need to repeat here the theory of detection on the curved portion of the curve and amplification on the straight part, as it may be found in almost any standard book on radio. It might be interesting to note that Ballantine gives the characteristics for the Moorhead as " $K = 9$, $G = 280$, and $R_p = 32,000$. As might be expected the gas has lowered the plate impedance by providing a leakage path from plate to filament and we find the R_p to be 30,000 ohms. The mutual conductance of 277 micromhos checks closely with 280, and the amplification constant dropping to 7.5 from 9 along with the plate impedance.

In Figure 4 we have a more striking example. Curve A and B are of a genuine UV201A which is very hard, as you may observe from the regularity of the curves and noting that practically all points observed are on the curves. C and D, however, are the curves of a bootleg 201A under identical conditions and supposedly having identical characteristics. The tube is, of course, a good detector and amplifier although it is quite critical in operation. Due to its irregularities it is almost impossible to figure the constants, the amplification constant varying approximately from 4.6 to 7. The chief disadvantages of this tube are its critical operation, and as you may have observed it draws almost twice as much B battery current as the standard. The tube may be said to be literally "full of grid leaks" in the form of ionized gas and consequently will be noisy in operation. It is quite characteristic of the majority of bootleg tubes on the market.

I have frequently been asked by amateurs "What do you think of refilled tubes?" My answer to this is given in Figure 5. With the normal filament voltage of 3 on this refilled UV199 I found the filament current to be 2 amps. against the rated .06, or an increase in battery consumption of 333%. Curve 1 was obtained. The tube was so soft that it was almost impossible to take

(Turn to page 380)

How to Transmit ULTRA SHORT WAVES

By John L. Reinartz, 1XAM, 1QP

This is the second of the series of special articles written exclusively for AMATEUR RADIO by the experimental amateur, John L. Reinartz. It concerns itself primarily with the design and operation of the oscillator for use with the antenna system discussed and described in Part I. Together, these articles represent the latest practice in amateur transmission on the new wavelengths. No amateur can afford to overlook them

PART II. THE OSCILLATOR CIRCUIT

NOW that we have considered under its several aspects the radiating system for short-wave work, the next matter is that of the oscillator. This device, when coupled to the radiating system chosen, will enable the amateur operator to transmit signals of the wavelength chosen with little difficulty, without the necessity of changing greatly his present antenna system.

Data is given herewith for the construction of an oscillator circuit that will oscillate down to 30 meters with merely a change in the plate and grid connections to the inductance, and the capacity of one of the 203-A's type tubes' internal elements in circuit. It will go still lower with a five-watt tube, and will reach to 35 meters with a 204-A tube. The circuit diagram for this oscillator is shown in Figure 4.

It is not advisable to use more than one vacuum tube in a self excited oscillating circuit when using waves below 20 meters, unless you have a great number of vacuum tubes on hand to replace those that are rapidly destroyed. If parallel tube connection is utilized, the master oscillator arrangement will have to be brought into play. This will be discussed later, as we are no doubt very anxious to get on the air as soon as possible with wavelengths of 40 to 75 meters.

Coupling the Circuits

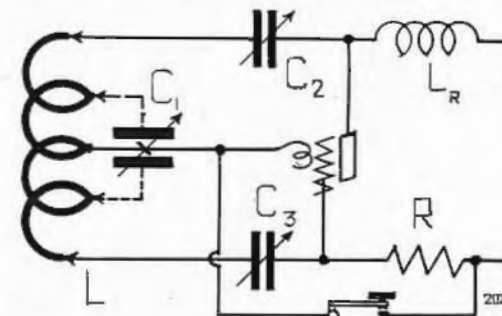
In Part I, the antenna radiating system was discussed in a general way. The system shown in Figure 3-d is the one which will be considered for these paragraphs. It is repeated, but with the addition of the oscillator circuit,—which is in all details similar to that shown in Figure 4,—as given in full in Figure 5 with this text.

Let us consider the constructional details of the inductances L-1 and L-2, and the special variable tuning condenser C-a, which are all in this circuit. Inductances L-1 and L-2 consist of five turns each. They are placed about two inches away from the oscillator inductance, L-3. This coil may be, of course, removed still more from L-1 and L-2, as the input may be varied with an increase, or decrease in this coupling.

The correct coupling value between these coils is found by trial, for when the coupling is too close, there is a reaction which causes the plate to draw more current than is needed to keep the tube oscillating. This minimum can be found by removing L-1 and L-2 entirely.

Coil L-3 consists of ten turns of copper strip. A very easy and ingenious method of obtaining a mounting of the three coils L-1, L-2, and L-3 is to procure a regular R.C.A. inductance coil, cut it through at the fifth turn from each end, copper strip, wood, and all. This will provide the experimenter with three sections that will be self-supporting, and which can be mounted on a base. If the center section is kept fixed, and means are provided for sliding the two outer ones toward or away from the middle one, a very convenient coupling device is secured.

The variable condenser C-1 is shunted across the oscillator coil L-3 so that this circuit may be tuned to the high band as well as to the low one. Only the number of turns on each side of the filament tap point are to be used that will allow tuning on 80 meters. Be sure to keep the number of turns on each side of the point the same. At from 40 to 43 meters, the condenser can



The Oscillator Circuit

be dispensed with, as the adjustments are then made with the plate and grid taps, and also the plate and grid condensers. Any double-spaced variable condenser can be used for this purpose. A type is

suggested in Figure 3-d, the rotary plates of which are connected to the filament lead on the center turn of the inductance L-3. This will be very useful in eliminating hand capacity effects when tuning the circuit.

The plate stopping condenser, C-2, is best variable, as is the grid condenser, C-3. Both have a capacity of about .0005 microfarads, and should be able to withstand from 5,000 to 8,000 volts potential when the supply voltage does not exceed 1,000 volts A.C., or 1,400 volts D.C. For the plate choke coil, L-4, a single layer inductance two inches in diameter, and 5 inches long, wound on a glass tube with number 30 single silk covered wire will service well. Make the connection from it to the plate terminal on the socket as short as possible, taking care the while that it is not placed in an inductive relation to either of the transmitting inductances.

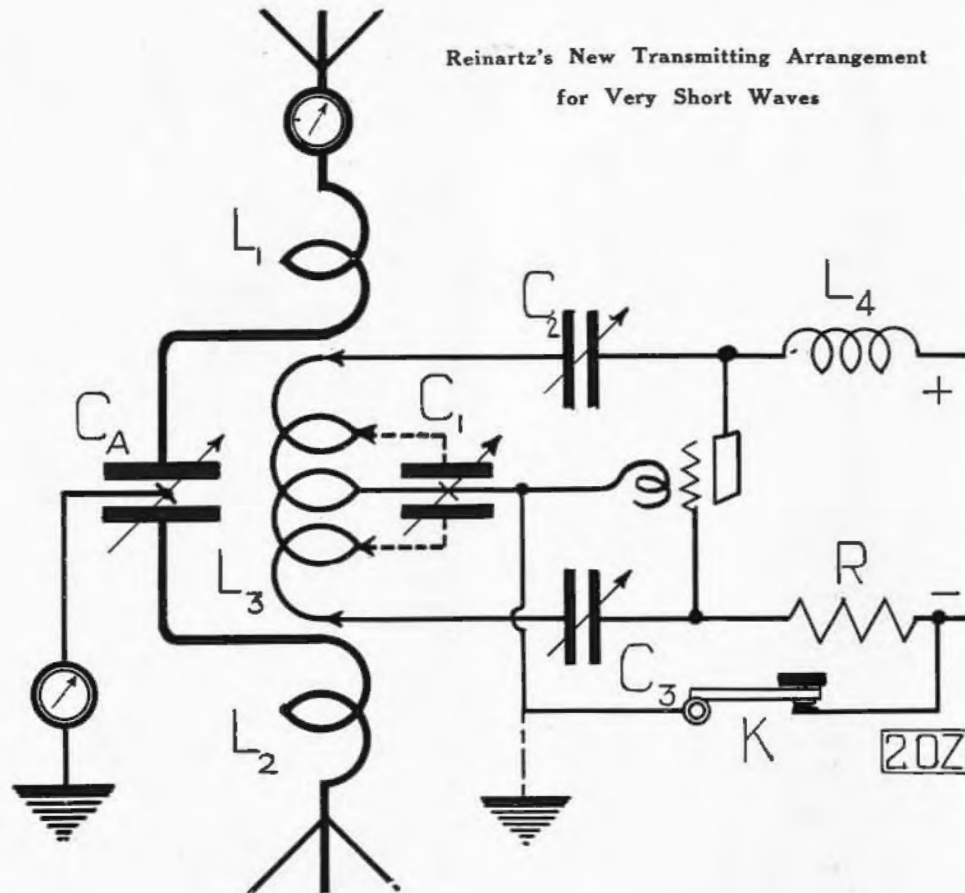
Operation

If all of this apparatus has been carefully assembled and each individual circuit tested, we are

ready to make the preliminary trials. The first step is to tune the primary circuit to the wave that we wish to operate on. Let it be in this case 77 meters. Tune that circuit to 77 meters with a wavemeter, and then slowly turn the variable condenser C-a in the secondary circuit until the plate meter shows an increased reading. If it is turned too far, the meter will read low again, and if the reading should be too high for the type of tube you are using the coupling should be loosened until it returns to normal value. If you find that it isn't sufficient to load the tube, move the plate and grid taps, which had been previously located at the end turns, one turn at a time toward each other until you obtain a suitable plate current reading. The plate and grid condenser are to be set at that point at which the tube will still oscillate, yet reduces the output to a minimum. Be guided in all of these tests by the plate input, *not by the radiation meter readings.*

If you have a meter connected in the lead from the rotary plates of the secondary tuning condenser, it should give a reading when the set is work-

(Turn to page 380)



Short Wave Transmitting Tips

By E. M. Glaser, 2BRB

There have been many inquiries concerning operation of transmitters on short wavelengths. Most of them ask for practical "dope" that can be applied to the present transmitting equipment. This article by 2BRB, who has experimented considerably on short waves, should answer a great many of those questions

STRANGE as it may sound to many amateurs, there is nothing mysterious about operation on the short wavelengths. You do not have to use "trick circuits," special precision equipment accurate to a hairs breadth, but only the familiar equipment, and a little common sense.

There have been innumerable inquiries about the short waves so here are a few hints on how to get down to the 80-meter band.

First, get a good wavemeter with a range from about 60 to 100 meters or work by the harmonic method from your receiver if it is calibrated from 150 to 200. This is absolutely essential.

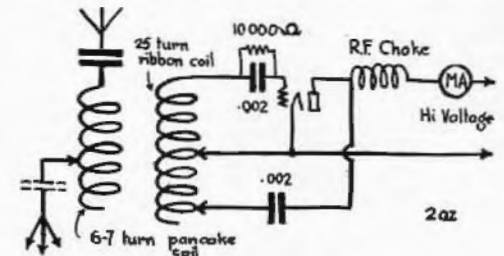
Cut down the plate voltage to half normal. Get hold of some ribbon (which ought not to be wider than a half inch), and wind two pancake coils, the primary (closed circuit) coil with about fifteen large turns and the secondary with about 6 large turns, both spaced equal to the width of the ribbon. An R.C.A. inductance is OK for the primary. Use a pancake coil for the antenna. Don't be afraid to give it too much coupling. You may need as much as 6 inches. Couple the antenna to the grid side of the coil.

No condenser is used across the primary but a variable antenna series condenser is essential. Get a good one. If your antenna has a fundamental of 130 or over, it will be necessary to put two or more series condensers in series. These need not all be variable. For an R.F. Choke, use about 500 turns of No. 30 D.C.C. on a 2-inch cardboard tube. Don't use a honeycomb type coil. The distributed capacity causes much leakage.

When "all set," take a last look at your good tubes and go over the circuit again. Use two grid leaks in series if you can get them. Put the grid on one end of the primary and the plate on the other. The filament tap will be about in the center. The Grid-plate turns control the wavelength and the filament tap the plate current and efficiency. With the antenna disconnected (don't get excited—with the inductive coupled Hartley, the plate current drops when the antenna is off or when the circuits are off tune), light the tube or tubes (not more than two fifties or four fivers), and press the key. The plate current should be low and the tubes should operate with no heat. By all means, get a milliammeter. Measure the wavelength. It should be too high (over 80). Leave the grid alone and adjust the plate clip, moving the filament clip as necessary, until the wave is OK. Wiggle the key for a while until you are sure that the circuit is stable and doesn't "flop over." Then connect the antenna and counterpoise to the secondary coil and couple

it closely to the primary.

Press the key and watch the milliammeter for a resonant point which is indicated by a sudden rise in plate current. Then take a peek at the antenna meter, but don't be alarmed if it doesn't read. HI. Wiggle the key and you will probably notice that the circuit "flops over." Increase



S/W Layout

coupling, retune and wiggle the key as before. Repeat until the circuit is absolutely stable and give it a little more coupling for good measure. Then retune using less antenna turns and greater coupling.

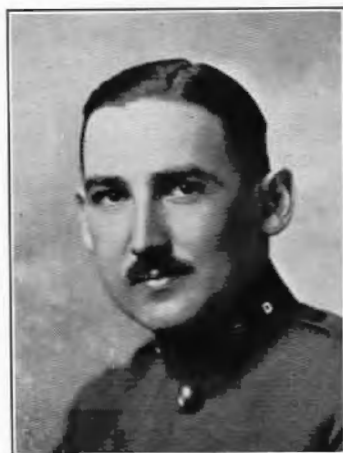
After a few hours of experimenting to obtain the point of highest efficiency the point where the input is greatest and the heat least, not the point where the antenna meter reads the most, and after making doubly sure that you are on the right wavelength, try raising someone. (A local is OK. Don't try 7s or foreigners yet.) When he tells you the note is rotten, don't get discouraged. It naturally will be worse than on 150. Now you can try raising the plate voltage, experimenting with the filament tap as compared to coupling for normal plate coupling. *Increased coupling lowers the plate current.* Moving the filament clip towards the grid does likewise, hence the Coupling vs. clip adjustment for maximum efficiency. The tubes should not heat any more with a given input than they would on 150. If they do, it's probably your fault or that of a poor series condenser. It may also be that something is in resonance and is drawing energy away. This is where a resistance curve of your antenna comes in handy. Who ever invented BCL antenna?

If you get too little antenna current to notice on the meter, borrow a meter just to convince yourself that there is something going out in the way of amperes,—beg pardon—we mean milliamperes. Don't touch the antenna. The watts are there even if the current isn't—which means a very high R.F. voltage. On these high frequencies, you cannot be too careful about sufficient insulation.

SECOND DISTRICT PERSONALITIES

Two Candidates for Directorship of the Hudson Division

DR. LAWRENCE J. DUNN



CAPTAIN GEORGE T. DROSTE



DR. LAWRENCE J. DUNN was born in New York City in 1893. Hence he had the benefit of growing up in a metropolis where the achievements of Dr. DeForest, Major Armstrong, and other men early associated with radio progress still left in the air the pungent taste of their first experiments.

In 1908, at the ripe age of 15, Larry first smelt ozone, and shortly thereafter put together his first transmitter, following the style and method of the day. He communicated with the Bush Terminal outfit, covering the fabulous distance of 6 miles with a 2 KW transmitter! In 1913, determined to learn what this business of radio was all about, he studied hard for a first commercial license, and got it, and retained it as a proof of his early interest.

He graduated from Stuyvesant High School (the school that has given us many notables in the radio field), and from there went to the University of Pennsylvania, where he put in his time learning how to become a dentist. He accomplished this as successfully as his getting that commercial license some years before, and he graduated from Pennsylvania University in 1916 with the degree of D.D.S.

Shortly after this, the War broke out, and Dr. Dunn, heeding the call, joined the ranks as a First Lieutenant, O.R.C., U. S. A. In 1918, when things were happening fast, he got into the Regulars, and after two years of service, he resigned his commission. Today, the Doctor is Captain of the 77th Division, U. S. Reserves.

Dr. Dunn's radio activities, somewhat interrupted by the War call, were resumed shortly after

(Continued on page 363)

IT was 'way back in 1906, when most of us young 'uns were still playing with wooden blocks, that George first began to know a coherer apart from a spark coil. Those were the only two instruments available for radio purposes, but it wasn't long before the E. I. handbook, an early edition of which fell into George's hands announced new and revolutionary apparatus, like the crystal detector, electrolytic interrupter, Tesla coil, and such. Soon after, the call "GTD" was on the air, pushed by a 10-inch spark coil fed first by batteries, but later with A.C., for economy's sake. This was in 1908. The usual junk pile grew, and is still growing, but now, it's 2IN, which call graced the walls of the old station after the war. The pre-war call letters, which attest to the interest as well as to the anxiety of the owner, were 2EU. Morse was used in those days, and 2EU switched over to the Continental Code reluctantly when it was adopted by this country.

Droste is a member of a number of radio organizations. To list them in their order, he was an original member of the A.R.R.L., when it was being in the process of formation sometime in 1913. He joined the I.R.E. as an Associate Member, when Mr. Marriott, who was Radio Inspector of the District, was President. He has been a member of the Radio Club of America since its inception. He was a moving factor in the Fordham Radio Club, and in the R. A. G. N. Y., and was Business Manager of that Club's own publication, *The Modulator*.

The Signal Corps was one of the few places where genuine radio apparatus could be found in

the old days, so Droste joined the First Company, Signal Corps, N. G. N. Y. in 1911, and specialized in radio work with the outfit, continuing in the service until this date. With this Company he did brilliant work in the World War. Commissioned as First Lieutenant O.R.C., U. S. A., in 1917, when the outfit needed trained radio men, and needed them badly, Droste served for two years in France, and later in Germany. While connected with the Division of Research and Inspection, which did most of the inspection and development work on the Signal equipment, he was commissioned as a Captain. He was co-worker with such engineers as Major Armstrong, Preiss, Houck, McDonald, Pressley, and others. As a reward for his services, he was placed in command of Company B, 101st Signal Battalion, N. Y. N. G., in March, 1922.

In spite of Droste's many activities, military and otherwise, he devoted considerable time to the amateur movement. He has been one of the moving spirits in the Executive Radio Council of this District, and has been its Vice-President for two years. He was the business executive of the 1923 Amateur Convention, lending much to the success of the affairs through his co-operation, knowledge of men, and unflinching interest. He is acting as advisor to the 1925 Convention Committee, in which he will also take a very active part.

Although Droste has been a consistent "ether buster," his many duties have kept him from burning the midnight oil as in the old days. But for all that he is just as interested as he ever was in amateur things. He has been one of the Second District's biggest boosters, and it is due in no small amount to his work that the Hudson Division has been formed.

Those who have come in contact with Droste, and who have worked with him know him as a capable, fearless, and progressive executive. He knows how to handle men, and get results. He has made many friends through his ability to adapt himself to the others' viewpoint, and not lose sight of the ultimate goal. He has farsight, imagination, and ability and interest. Nothing more could be asked of a man who is a candidate for the responsible position of Director for the League's greatest Division.

(Continued from page 362)

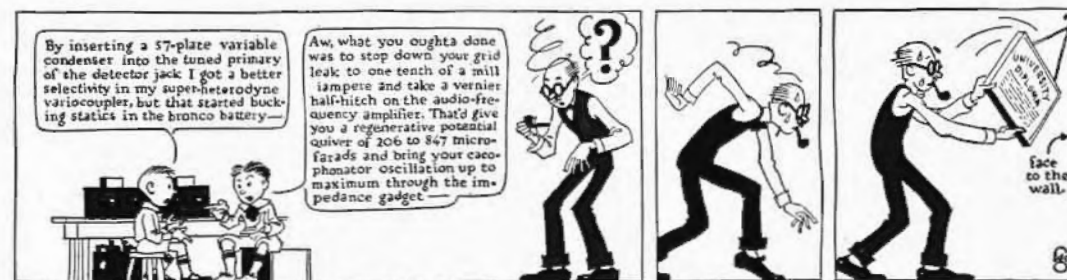
the Armistice. His station, whose call letters are 2CLA, is well known over the air to the transmitting amateur. Dr. Dunn is a genial and well-liked personality in amateur, business, and social circles. He has worked hard to make his station one of those that we are proud of in this district of many stations. This station has been "on the air" for over three years, and has developed and progressed consistently. Dr. Dunn was one of the successful American "hams" to have been heard on the other side of the Atlantic.

While Larry's professional duties have kept him pretty busy, he has found time to put his shoulder to the wheel of amateur activities, and is one of the busiest individuals wherever "hams" congregate and do things. He is a powerful figure in Brooklyn, which is reputed to have the best relay system in the East, and the cleanest "air" of all five boroughs. This may be due to the fact that the Radio Supervisor, Mr. Batcheller, resides in Brooklyn, but it is also due to no small degree to the amount of work that Larry and his associates have done to improve conditions in general.

Dr. Dunn is President of the Radio Club of Brooklyn, the most influential, as well as the largest body of its kind in Brooklyn. He has taken also considerable interest in the affairs of the Council, of which Board of Directors he is a member.

Like a great many amateurs, Larry has the welfare of the game at heart, and has been one of Amateur Radio's staunchest supporters, helping through more ways than one in protecting the amateur's rights when there was any danger of trouble. His amateur views are known to many, and he is ever ready to help follow "ham."

Being a candidate for the highest honor of the Division, Dr. Dunn is, of course, an A.R.R.L. member. He has foresight, organizing ability and sympathy, qualities that make him a fine candidate for the post. He is very likable, and thoroughly human, in spite of his being a dentist. He has keen judgment, breadth, and vision. He is thoroughly familiar with the amateur and his problem, and knows the requirements of the men of the Hudson Division as well as any one.



AMATEUR RADIO

with which is combined Radio Relays

Founded 1921 as The Modulator



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OCTOBER, 1924

WELCOME, DON MIX!

WITH a warmth akin to that reserved for heroes of the World War and returning world fliers, amateur radio men everywhere have joined in welcoming Don Mix, the outstanding hero of their national organization, the A. R. R. L., on his return to civilization.

Enduring for more than a year the hardships of the frozen Arctic with others comprising the crew of Capt. Donald MacMillan's ship the *Bowdoin*, Mix demonstrated to the world more vividly than had ever been done before the importance and the indispensability of amateur radio.

Frozen in the ice a short distance from the North Pole, Mix was able to maintain comparatively regular communication with the civilized world through the vast army of eager, watchful amateurs who listened for his signals nightly.

As amateurs, we have reason to be proud of Mix's and our accomplishment in connection with the MacMillan polar expedition. Commercial organizations had attempted the same feat and had failed, while the American Radio Relay League succeeded in its first attempt.

RADIO RELATIONS IN BRITAIN

IN vivid contrast are the radio regulations of our own country and those of Great Britain. Here we have recourse to a reasonable variety of wavelengths with free rein to develop them to their utmost. Outside of the altogether rational restrictions that we shall keep within our allotted

bands, we can use most of the wavelengths to transmit when and anywhere we please.

The radio regulations of Great Britain would be considered as liberal were it not for one sentence which, if rigidly enforced, will mean isolation for the many enthusiasts of the British Isles who have heretofore communicated with whom-ever they were able.

The single, sinister sentence which has stalked light a nightmare into the pages of British radio law is to the effect that "messages shall be transmitted only to stations in Great Britain or Northern Ireland which are actually co-operating with the licensee's experiments and shall relate solely to such experiments."

Can it be that the higher officials of Great Britain have no desire to have their amateurs co-operate with those in other parts of the world?

Can it be that they have no wish to avail themselves of this one medium which more than anything else, will promote friendly relations between their own and other nationals?

We think not. We prefer rather to consider this as a blunder on the part of the framers of Britain's radio laws which will be rectified before the season is ripe for trans-Atlantic work or other distance transmission to points beyond the British Isles.

AMATEUR RADIO extends the hand of sympathy to the British amateurs in the present situation. We hope most sincerely that their program of publicity will succeed to the end that this "small town" regulation will be erased from the statute books of Great Britain.

W. J. H.

SECRETARY HOOVER'S CONFERENCE

WHILE this issue is going to press scores of persons interested in the development of radio are on their way to Washington to attend the national radio conference called by Secretary Hoover.

Although the announced purpose of the conference is generally "to revise broadcasting," it may be counted on as a certainty that the amateur will come in for some discussion.

No doubt there will be a few men at the conference with private axes to grind who would like to see the amateur legislated out of existence. Men such as these close their eyes to the record of the amateur during the war and turn a deaf ear on his accomplishments in time of peace.

No more at this than at any other time is there any question or bear about "what will become of the amateur." We have shown the world something of the possibilities of communication on the shorter waves. The government has seen fit to assign us several bands of these waves for further experiment. And the leading radio engineers, the men who are interested in radio for science's sake, have approved.



Fortunately the opponents of amateur radio are in the minority. In their verbose plans for the revision of broadcasting we can expect to find a multitude of schemes aimed to deprive the amateur of his right to exist. Their efforts though, will come to nought and we can look for a calm revision of broadcasting which will entail no further restriction of the amateur.

W. J. H.

VOTE FOR YOUR DIRECTOR

THE business of getting the Hudson Division under way has now progressed to the point where a director must be appointed. Under the governing rules of the A.R.R.L., this important official is to be elected by the A.R.R.L. members in the Division in the early part of November, and will take office on the first of January, 1925.

So far, there are two candidates in the field, Dr. L. J. Dunn and Captain G. E. Droste. Elsewhere in this issue there appears a short biography of each man. The Council endorses both of them for consideration by members of this Division. Both are well qualified, and have a splendid running chance. The best man will win, of course. Here, as in every other activity, traditional amateur fair play will prevail.

You must give your candidate every chance to win. There is at least one thing that you can do for the man that you pick out, and that is to cast your ballot when you receive it from Hartford. Don't delay, don't forget!

MAGAZINES EXCHANGED

EVERY month, editors of other radio magazines send to AMATEUR RADIO their current issues. We desire to acknowledge, with thanks, the receipt of the following magazines, which have been placed in AMATEUR RADIO's reference room: *Radio* (San Francisco), *Radio News* (New York), *Radio in the Home* (Philadelphia, Pa.), *Radio Broadcast* (New York), *Popular Radio* (New York), *QST* (Hartford), *Radio News* (Canada), *Talking Machine World* (New York), *Radio Stories* (New York), *La T.S.F. Moderne* (Paris, France), *Radio-Amateur* (Paris, France), *Radio* (Berlin), *Journal Des Huit* (France), *Radio Revue* (Paris, France), and others received too late to mention here.

Lady (engaging maid)—Why did you leave your last situation?

The Maid—Because they only had a crystal set.
—*Passing Show* (London).



The Log Book And Traffic Notes

By Edward M. Glaser, 2BRB

Traffic Supervisor, Executive Radio Council, and A. R. R. L. Hudson Division Manager

News Correspondents

1st District—Helen G. Daniels.
2nd District—The Operating Dept. of the Hudson Division.
3rd District—F. J. Kern, 3KJ; R. J. Carr, 3BMN; E. G. Raser, 3CS.
8th District—W. E. Slabaugh, Jr., 8BNH.
9th District—A. H. Barnett, 9AKO.
Other Districts and Miscellaneous—E. M. Glaser, 2BRB.

THIS is the last Traffic Report under the Atlantic Division. The newly born Hudson Division will shine in all its glory next month, although at this writing, the Division is well under way with nearly all the officers appointed and forty Official Relay Stations going strong. All existing A.D.M., D.S., C.M., and O.R.S. certificates in the Second Federal District are being called in by the Hudson Division Manager for replacement by new certificates issued under the Hudson Division.

Hereafter, all City Managers except in New York City, will report to their District Superintendents, sending them all form 1 O.R.S. cards received. (In New York City, the City Managers of the five boroughs will report to F. H. Mardon, 2CWR, A.D.M. of New York City.) The District Superintendents will transfer the form 1 reports to a single report made on form 2 sheets with any remarks that he may care to make. The C.M. reports to the D.S. not later than the 19th of the month and the D.S. reports to the A.D.M. before the 23rd. The A.D.M. will make out a complete typewritten report with the traffic totals all together at the end of the report and report to the Division Manager before the first of the next month. These dates will probably be changed as soon as the Division is well under way. Only Stations issued the new O.R.S. appointments under the Hudson Division will send in reports and these reports must be made on form 1 O.R.S. cards. To be issued an O.R.S. appointment, the applicant must first be a member

of the A.R.R.L. He should apply for an appointment thru his City Manager or Dist. Supt. If the applicant is satisfactory in the eyes of the C. M. or D.S. and the A.D.M., the Division Manager sends the applicant an O.R.S. certificate which must be signed and returned to the Hudson Division Manager direct for his serial number and signature, otherwise the certificate is void. The station may hold the appointment as long as the operator is a member of the league in good standing and provided that he does not violate the conditions of the oath. All O.R.S. must be familiar with the Rules and Regulations of the Traffic Department of the A.R.R.L. They should all have a copy of the latest edition which may be obtained from Hartford by simply asking for it. All O. R. S. must use the method of numbering messages as described in June QST. Any official of the operating department is privileged to drop in at any O.R.S. and ask to see the records of messages handled as well as the messages themselves. A complete list of the Personnel of the Hudson Division with O.R.S. will appear next month in AMATEUR RADIO.

First District News

IKX is the new A.D.M. of Maine beginning September 1st. The former A. D. M., 1BHJ, is going to M. I. T. 1AAC is one of the best 1s on 75 meters, being QSO 4SA of Porto Rico with 50 watts input. He has been appointed one of the R.R. emergency Stations along the B&A. 1ALL of Bridgewater, and 1BZQ of Waltham are new O.R.S. in Eastern Mass.

1AIR is now using the Meissner with S tubes. 1GV of R. I. has a new power house signal with his 250. Mr. Joy, of Watch Hill has his big transmitter going at his house with the call 1AH M and another on his yacht, KFKW. He has been carrying on some fone tests with 1BVB while the yacht was running around the Sound.

A new station has opened up in Westerly under the call 1QV and is already an O.R.S. 1AAP, also of Westerly, is doing good work on fone. He works the 9th Dist. with 2-5 watters using loop modulation. There seems to be quite an epidemic of fone lately. What's the idea? Anyway, they cant use fone below 150.

Walter Ostman of 2OM and A. J. Fitzgerald of 1AJT were week end visitors at 1BVB. Western Mass. has a new A.D.M. in 1AWW of Springfield. We wish him lots of luck and hope the fellows will co-operate with him.

Second District

2CWR, the new A.D.M. of New York City, will be going full force with many improvements. 2CRQ was away most of the month on a much needed vacation. 2BBX is one of the most consistent Bronx stations. Marty, 2CYX (SWYX), is back from his trip and going strong. He worked 6CGW in August. FB, OM. 2CVU is a newcomer as far as reports go. He will be our O.R.S. if he keeps up the good work. 2CWP is a consistent station. 2AAI has rectified and filtered his raw A.C. and gets out much better. He expects to forsake us for the commercial side of the game. Wish you luck, OM.

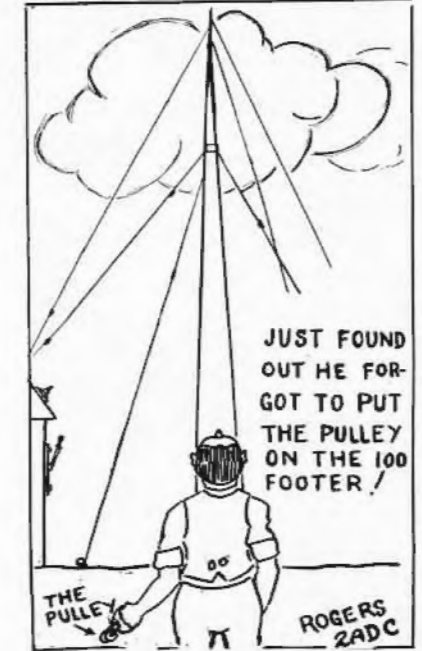
2WC has changed to a coupled Hartley which has improved his sigs and his DX a great deal. 2PF will be going on 80 meters soon. 2ABN has been heard in France. He is now trying to get down to the new bands and see what he can do. So far, the set doesn't radiate. HI. 2WZ is also having lots of trouble trying to work on 75 meters. 2ABR is a good traffic station. 2ADC ditto. GS of 2BRB handled most of this month's traffic. All districts were worked on 79 meters with 200 watts input and three tenths of an amp in the antenna. 2AX is back from his vacation.

The impossible seems to have happened. 2BYO is an inhabitant of Brooklyn. He used to swear that he would never live in a foreign country but now the worm has turned. 2CWQ says that radio is not the only cause of the change in location. I wonder what he means? Don't be missled by the fairer (?) sex O. M. HI.

2CHK went away and told the Manhattan stations to report direct to the A.D.M. 2CZR, 2CIZ, 2BNL and 2TT reported. Many thanks, OMs. FB. They will all be recommended for O.R.S. Many new stations and old timers are starting up this fall and we want to see them trying for ORS appointments. Some have already been issued application blanks.

2AVE and 2BNC will be going again soon—probably on 80 meters. 2BCK is going again and has been recommended for an O.R.S. 2AIT is a new station in Astoria, L. I.—a real live A.R.R.L. station and AIT is only a beginner too. F.B., O. M. You are on the right track for an O.R.S. 2RB is doing excellent work on pure DC CW.

MISTAKES WEVE ALL MADE.



2CEV junked the spark at last. HOORAY! A 100 watter will be perking soon if CEV can coax someone to go over and tune it. HI. Spark hams know mighty little about tube sets. 2CEP is the only other active station on S. I.

L. I. has been dead this month except for 2CJS, the summer station of 2BRB. 2CXB and 2BPB will be going strong next month. 2BSC is on again with pure DC.

2BQB, who is taking 2ZA's place as D.S. temporarily while ZA gets settled at his new QRA at 21 Lawton Ave., Hartsdale, sent in a fine report for Dist. No. 2. BQB has been away but handled 24 messages in four days. FB, OM. He operated 1AJG and 1CQM during his vacation. 2DJ is going on a 900 cycle spark. 2CTB, the White Plains High School, will be going on a fifty. 2ASO is seldom heard. He must be after the YLs. 2CVJ is doing good work. 2AIG is a new station at Rye Beach.

All CW transmitters in Yonkers are inductive coupled. FB. The Club has a 48 hour relay pledge going strong with all club members signed up. The pledge also calls for inspection of records and messages. This comes pretty near making every member of the club an O.R.S. 2ADD will be away at school but will hold on to his position as C.M. 2AAC is on very seldom with the old Boiler Factory for which every owner of a receiver is thankful. 2ADD, 2APY and 2AQH are down on 80 meters. 2APY is still the best DX station in town. 2AQH has put in two 5 watters and does better work than with the old

rock crusher. 2BGD is getting along nicely but he had better not use that spark if he expects to be an O.R.S. 2ADH, 2nd op at 2ADD, is seen nearly every night bringing home parts for his new station. 2CIL has a job that keeps him off the air most of the time. 2AAN uses two 201s.

2CFE is going again with a fifty and expects to be on 75 meters soon. 2CZD is going to school soon, leaving CFE as the only station in New Rochelle.

2CDH is the most active station in Dist. No. 3. 2ANM hasn't been very active this month.

2CHZ went to the Poultney convention with the Schenectady gang and had a fine time. 2CYM of Spring Valley is doing good work on low power. 2CXG will be going soon with a new cage. 2AGQ, the Dist. Supt., visited 2COW and says it's an Amateur's Paradise. Some excellent work is expected from this station. 2AGQ continues his good work. 2AQR has been away but will be very active next month.

The height of the QRN season finds 2CGH of Delmar the only active station in the fifth Dist. He will be an O.R.S. shortly.

A. G. Kastenmayer, 2GK, is now the A.D.M. of Eastern N. Y., having taken over 2BRB's job. A new antenna for short waves has been put up at 2GR and every station heard is worked with two 250s. The Radio Association has been formed with 20 active members and having 2BY as temporary president. 2GK, 2BY, 2ACS, 2AAZ and 2CGJ of Schenectady attended the Vermont convention. 2ACS Robert Graham, Jr., is the new Dist. Supt. of Dist. No. 5, taking in Schenectady also. 2ADM is using a 250 with raw A.C. Awful stuff, O.M. Better rectify the plate supply. 2BY works all over as usual. 2CPA borrowed a bunch

No message reports will be printed for this month because they may or may not have been delivered. We don't know anything about them. but starting next month with the Hudson Division in full swing, and only Official Relay Stations reporting, every message will be one that reached its destination because the O.R.S. are bound by oath to forward messages promptly.

2BMR is back on the air again with renewed pep as shown in his last tariff report which tops the Jersey list. 2BKR came through with a large report which is excellent for a 5-watt station. No report has been received from 2AJF and a new Dist. Supt. will have to be considered if no action is shown. 2CTQ complains that business is slow and his "Pliabletron" won't work overtime in the hot season. 2CRP never forgets to report and is always on the job.

3ACC is another old-timer who is on again altho he has to depend on storage batteries for his total current supply. 3GS, in charge of 3XAN, will operate daily and would like to have a schedule with a few stations for daytime traffic going to and from Philadelphia. 2ACO has been rebuilding the transmitter instead of bothering with YL's as was recently accused. 2AXF is down on 80 meters along with 2AGB and 2CQZ and the trio can be heard nightly handling traffic. 2CMK has been keeping Newark on the map and will be in line for an O.R.S. soon.

2ZB is satisfied operating 2XBF 8 hours a day which accounts for no noise from Rutherford. 2FC had a busy season as amateur from every district stopped at his shack in Asbury. 2AUH is doing fine work with his 5 watter and works all but the 6th and 7th Districts. 2BAW handles traffic in fast shape and claims a msg. never hangs over 24 hours. 2BZJ just put up a 68 foot lattice mast and expects reports from all the world. 2WR had the misfortune of losing 2 more fifty's and is hoping to stage a come-back soon.

Third District

THE following were at Camp Vail this season: 1ATO, 2ABT, 3BEA, 3AWZ, 3KJ, 8BBE and 8AOL.

3MB is putting in a 204A this winter. Ought to work Australia. 3BDI works anyone on 80 meters. 3CBL works the coast on a 50. 3BJ and 3KO are combining and installing two 50s. They expect to use a Super on the low waves. 3BJ will be heard working 3YO, Lafayette College. 3KO and 3BDI will be heard at Penn state, 8XE. 3MB and 3CBL will race for first place in Reading. 3KJ has just returned from a month's training in the Signal Corps at Camp Vail. 3JU was reported by G 6LJ while using two fivers. 3ME is still getting out across the ocean. 3CKJ also

(Turn to page 370)

MISTAKES WEVE ALL MADE



BRINGING HOME THE SECOND OP AFTER HE TESTED YOUR "B" BATS WITH HIS TONGUE.

of parts to open up again. Just can't quit. 2CWJ is known as Schenectady's sleepless wonder, being on the air most all the time. He is doing fine work. 2GM is a new station.

THE MESSAGE HOOK

An exchange for ideas, "dope," and reflexions

METERING THE S/W'S

Sept. 13, 1924.

Editor AMATEUR RADIO:

A great many of the gang have the itch to go down on the real low waves, but some have hesitated to do so without knowing definitely just where they were going. Yet it is very simply if you have one of those General Radio type 247 combined wavemeters and traps. This instrument, by the way, is very accurate, despite its low price. Mine has been checked with WWV repeatedly and shows a surprisingly small error.

The instrument ordinarily is supplied with a coil having 40 turns and covering a wave band between 150 and 500 meters. Additional coils may be purchased from the General Radio Company having 10 turns, and giving one-fourth the scale reading, having 20 turns, and giving one-half the scale reading and a larger coil, though I don't know the number of turns, but presume it to be 80, giving twice scale reading.

Even with the 10-turn coil in use, though, the wavemeter will only go down to 37½ meters. But if another coil is made, winding 5 turns of wire on a three-inch tube and carefully spacing it to one-inch width, you will then have a coil that will give one-eighth scale reading and will go down to 18.75 meters, which is quite low enough for the 20-meter band and about as low as you can make such an instrument go with reasonable accuracy. The 5-turn coil may be almost any size wire you like, preferably double cotton covered. The wiring must be put on very tightly so that it will not shift and spoil the calibration. After the coil is finished, put on the ten-turn coil, tune your receiver to, say, 40 meters, remove the 10-turn coil, substitute the 5-turn coil and see what reading you get on the wavemeter scale, using the resonance click method. If the coil has been carefully made and is rigidly supported on the wavemeter, the reading will be very close to 320 on the scale, indicating that the 5-turn coil is giving a reading one-eighth of scale. Several other wavelengths can be similarly checked.

Cordially,

S. P. McMinn, 2WC.

WE'RE SURPRISED BUT HAPPY

14 Gold Street,
Gloversville, N. Y.

Dear OM's—

Was surprised when I read my first copy of AMATEUR RADIO, and still get a tremendous surprise every month. It seems like a chip off the old block "QST."

Am enclosing money order for \$1.50 for another short year's subscription to your magazine.

Best 73's,

H. E. Hotaling, 8AVR.

SOS FOR S/W CO-OPERATION!

841 Lexington Ave.,
New York City, N. Y.

Dear Editor:

I have just secured the use of the New York University radio laboratory for the purpose of experimenting with very short wave transmission. I am having my old license, 2JL, given back to me within a few weeks. I am writing this with the intention of securing co-operation from fellow amateurs who have the means to do so at their disposal. By this I mean amateurs who have the apparatus and who are willing to devote a little time to a needy and worthy research.

Experiments will be carried on, on all the newly allotted wave-length, viz.: 5—20—75 meters.

Any who are interested can address their communications to the above address. The further away from New York, the better, for the tests are mainly to study the carrying power and fading characteristics of these waves.

Yours truly,

Joseph Roemisch.

LOG FORM SUGGESTION

7 Morris Place, Yonkers, N. Y.

Dear O.M.:

On various occasions I have noticed forms in the call and instruction books on the market which are suggested

for use as log sheets. Most of these are miserable in that they omit space for certain necessities or else have space for other things which are entirely superfluous.

The following is a form of log sheets which I have used for some time and which seems to meet the requirements very well:

October 1, 1924.							
Time	Hrd	Cld	Wrkd	Aud	Qrl	Msgs	Remarks
6:30		CQ					
6:45			2CIL	10	182	Ir, Is	
7:00	Zt				6		Slight QSS
7:15		3CDK			8		SM using bug; makes note wobble; hard to read

Under mags, "r" stands for received; "s" for sent. Certain log sheets have a column for QRM and one for

QRN. This is not necessary, since we always have QRM and it is not worth mentioning unless it becomes so bad that it is impossible to read a certain station. Then it belongs in the remarks column. QRN is to be expected during the summer and a small comment in the remarks column at the beginning of summer will do for all time.

As to the wave used at your own station, most fellows keep the same wave until their tube blows. With the Yonkers gang it's different. We all use the coupled Hartley and if you hear one of us on 200 and then hear us again on 150 don't be surprised. We listen in for a quiet wave somewhere and put our transmitter on that wave. As the quiet waves vary, so do we.

It is possible and very easy to refer to your log for some time back to check a report on your signals, that's the reason why some fellows use a log, and at the same time the reason why some fellows don't. Hi!

73 u 2ADH

C. Peacor.

DO YOU THINK THIS WAY?

A petition asking for a Hudson Division of the ARRL was sent to Hartford and a great many letters from ARRL members and clubs re-inforced it. A ballot to all ARRL members in the district following asking for a vote for or against the Division and first and second choice for Division Manager. It seems funny that several Second District members never received a ballot. Following is an answer to ballot received at A.R.R.L. Headquarters: Mr. F. H. Schnell.

Dear Sir:

Yours of the 26th received with interest. You ask for a vote on a proposal to create a new A.R. R.L. Division. I would like to ask, "what reasons are there for such a proposal?" The notice fails to mention any reasons whatsoever for the proposal. Can anyone be expected to give an intelligent answer to such a proposal when he does not know why he votes one way or the other? (Hi Because 184 licensed amateurs have filed such a proposal with the A.R.R.L. means nothing unless they have definite reasons for such a proposal. (Hi AGN.) From the notice as sent out to Second District amateurs none can account for such an action by the Second District amateurs. (Hi for the third time.)

I would propose that, in order to get an intelligent representative vote from the amateurs that a new notice be sent out giving a few GOOD reasons for such action. You state no platform yet expect a vote representative from us on the above mentioned proposal.

Hoping to hear from you on the above matter, I remain,

Yours sincerely,

John J. Gauber, 2BMS.

Shall we pass this on to our own Publicity Manager? Wonder whether 2BMS reads AMATEUR RADIO, or any other "ham" paper? Doesn't he think a new Division, created specially for Second District men through the efforts of the Council is something GOOD for him?

(Continued from page 368)
gets out consistently. 3CHK has returned from a vacation and is going to make some radical changes. 3BQP has been pounding brass all summer. Guess he is too busy for a vacation. HI.



Up in the Air

—N. Y. World

Ahoy! There, Gang, and lend an ear. Plenty static, weak signals and no DX; that's the existing conditions down in Virginia at this writing: But with the approaching fall and the advent of the shorter waves, that were so unexpected, fell at our key points, we should all be in our seventh heaven of delight.

3AUU works 2BRB for a starter on the short waves, and 2BRB wins the bakelite pineapple for a peach of a signal on the razor blade waves, of that new region 76 meters. 3AUU is working 10 watts in the coupled hartley circuit, with 1000 volts of storage batteries, and gets one-half ampere on 80 meters. He also wkd. Colo. for the second stn on those waves.

3CKL has about as pretty a note that any combination of "S" tubes will give, its DC-and then some, with a kick like Maud, Hold her Newt!

3BVL still sounds like IANA, with that bird whistle, which we think is enjoyed at greater distances, than just 22 miles. His family of parallel oscillators have decreased by that wonderful patented method of "Over the River." HI!

3CEL, with his mighty chain of 5 watters, still knocks holes in the old ether, and is heard quite frequently wiggling the fish-tail.

3CKK is heard often, but is changing from VT-2's to UV'zz, hope he puts more pep in the cans here. Sez the VT's will not stand the gaff the UV's will—next.

3BUY still comes thru between static and QRM with that steady DC note.

4DX has a fine DC signal thats plenty loud for comfort, and knocks off the DX for the summer by working 6 — Sixth dist. stations. He pushed 50 watts on 150 meters.

4FT the Bunnell manipulator, uses 100 watts in the 4 coil Meissner and works even more 6'es and 7'es. Tho the note automatically changed to a modified ICW tone and spoiled the berrie there, we tinks.

4BX has the mast up again and using the same old good signal, with a possibility of an early change to "S" tubes.

4SU grew tired of the old brass thrill and pulled one better, "Stepped off with a YL."

4JR is very consistent with a good signal and equal fist.

4IT, 4SH and 4PV ring in with fine sigs often. 4FG had better lay off that spark.

3BMN is juggling connections, in and between hashing up the harmonics to make the radiator respond to 80 meters, and still be able to make the ammeter wiggle. He worked 1AID lately, which is the latter's best southern DX so far as yet, that's not all either, but the story is too long to give details, and too personal for a topic of general conversation HI. He still uses 5 watts. BIM!

Eighth District

8 PL is still busting fifties under the call 8DTC. He has one left now but has a peach of a signal. The low waves give the good signals and make the tubes depart.—If you aren't careful. 8BYN is trying to find someone to climb his 60 footer and put a rope thru the pulley. HI. Tuff luck, OM. 8AAP is a new Columbus station which gets good results. 8ADA has dropped to 80 meters and is like a local. 8CYI was very consistent for a while on the low waves. 8BPL has a fine signal there. 8RJ is on quite a bit. 8BWB has started to break some records this winter. 8BKM works all over the country on a lone 5 watter. Input unknown. HI. 8DKM is putting up a new mast. 8BNH and 8ES will be on the air when not at school. BNH has a fine signal on 150. 8CYT is making many improvements including a new mast, S tubes, and a new Cage. 8AXT signs 8BEG while at Long Lake near Akron. 8HN has changed his antenna system for the lower waves. 8BFM needs a new fifty to start in again.

Ninth District

9ALI is a very consistent traffic station. 9CII was heard by RCB8. 9BKC is remodelling his antenna for 80 meters. 9ELD and 9ELB are very consistent and QSA. 9BIB was heard in England using two fivers. 9ALA is a new O.R.S. 9AMB from Denver is going strong again. 9AOG from Kansas is very consistent and QSA. 9HW and 9EM are heard every night. 9CCF is back after a long illness. 9AFZ labored two hours to get a 97 word msg thru heavy QRM. FB, OM.

Any ratio you want

With an ACME variable ratio audio amplifying transformer



ACME VA-2

\$7

FROM the standpoint of the Amateur the use of a high ratio audio frequency transformer gives a very satisfactory increase in receiver sensitivity. In response to the demand for a factory-built instrument ACME offers the VA-2—variable ratio audio frequency amplifying transformer. In the higher ratios this transformer gives the Amateur maximum amplification for code; while "The Receiving Experimenter"

can get ratios from 2.5 to 1 to 11.5 to 1, in small steps as follows:

Ratio	Sec. B.P.	Prim. B.P.
2.5 :1	1-4	5-6
3. :1	1-3	5-6
3.25:1	1-4	5-7
3.5 :1	1-4	5-8
3.75:1	1-2	5-6
4. :1	1-3	5-7
4.25:1	1-3	5-8
4.75:1	1-2	5-7
5.25:1	1-2	5-8
7.5 :1	2-4	5-6
9.5 :1	2-4	5-7
11.5 :1	2-4	5-8

The Acme VA-2 is made according to the high standards of manufacture which have made Acme famous.

ACME APPARATUS COMPANY, Dept. 164, Cambridge, Mass.

Transformer and Radio Engineers and Manufacturers

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Dept 164, Cambridge, Mass.
Gentlemen: Kindly send me your latest catalog of:
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 Booklet on "Amplification without Distortion"—(Enclose 10c).

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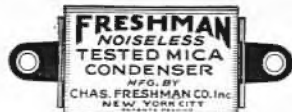
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Noiseless Tested Mica Condensers



maintain their fixed capacity due to scientific design and construction, in which constant equal pressure is exerted on the condenser plates over the entire area, making the Freshman condensers the only ones that avoid noises due to variable pressure on the plates. A metal casing protects the plates and reduces hysteresis losses to a minimum.

Capacity	Each	Capacity	Each
.00005	\$.35	.0025	\$0.50
.0001	.35	.003	.60
.00015	.35	.0035	.70
.0002	.35	.004	.75
.00025	.35	.005	.75
.0003	.35	.006	.75
.00035	.35	.0075	1.00
.0005	.35	.008	1.00
.0006	.40	.009	1.00
.0008	.40	.01	1.00
.001	.40	.015	1.50
.0015	.40	.02	2.00
.002	.40	.025	2.50

Exclusive Features of Freshman Noiseless Tested Mica Condensers

1. No losses through di-electric hysteresis of fibre covers.
2. No insulating binder to melt at the application of heat and by releasing pressure, change the capacity.
3. Capacity fixed and invariable.
4. Metal case protects against accidental injury.
5. Direct connection to copper plates avoids losses through inefficient eyelet contact.
6. Application of soldering iron does not affect condenser.

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

Chas. Freshman Co. Inc.
Radio Condenser Products

106 Seventh Ave., New York

9EHU is down at Memphis attending the convention there. Give us all the dope Stew.

9CZF is using S tubes and sure likes fireworks. He is putting 350 m.a. on a lone 50 watter. Safety first om. MIM.

9UC our own Charley is sure getting out. The other morning he was hrd wrkng 6AWT on a lone fiver. Charley sure does get out. Wassa a matter with the 50 Chuck?

9AXE ex8VA is a new comer here and is putting in 20 watts. Welcome om.

9DBJ "Harmonics" is very consistent in the 2nd and 3rd districts on a 50 watter.

9BKJ is getting down in the gulf in daylight. fb George: and he is only using 20 watts.

9AKO is building a 20 watt set using S tubes and expects to be on the air soon.

9AFI has been touring the west and is going to get some of those cards some of the gang there promised him. HI. Good Method ar't.

ex9BBI the sleeping beauty is with us now, being the new radio expert at the Vim here and by the way is our new club vice pres filling 9AKOs place who was recently elected Pres.

9QR is doing a lot of changing at his shack lately and will be on shortly with the old Westinghouse fone and cw set. How do you like ur new shack Doc?

9DLW is having a hard time getting traffic. Whats the trouble Heiny?

9DLN is on his vacation hurry back George

9BWF is dismantling as he is going back to school he is going to be a druggist and the gang expects to have a lot of prescriptions filled.

The gang here dont seem to take to short waves come on fellows lets get down.

Other Districts

The active 5s include 5AEK, AGV, AIR, AME, AMH, AMV, APC, FV, IN, JF, KQ, LI, QM, and ZAL.

6LV and 6LP have fine sigs.

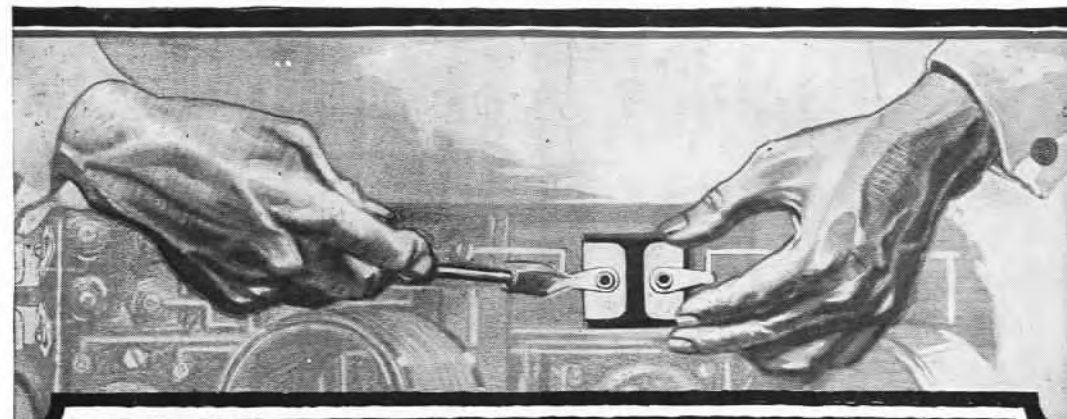
7GK was the only one heard on 80 meters.

Canadian 3CO, 3GG and 3KQ are consistent.

FORMS AMPLION CORPORATION OF AMERICA

Owing to the enormous demand for the "Amplion" Loudspeaker last season, which far exceeded the supply, a new company has been formed entitled *The Amplion Corporation of America*, with head offices at 280 Madison Ave., New York, to manufacture and sell Amplion Loudspeakers in America.

The Amplion Loudspeaker is the invention of E. A. Graham, head of Alfred Graham & Co., of London, England. This concern originated and made the first loudspeaking telephone twenty-five years ago, and has equipped the British and other Navies, together with a large number of our mercantile vessels since then. The Amplion has become the largest selling loudspeaker in Europe.



Nine out of ten sets use MICADONS

Nine out of every ten sets made use Micadons—the standard fixed radio condenser. Set builders choose them for many reasons.

They know that the Micadon is a Dubilier product: hence supreme in quality and efficiency.

They know that Micadons can be obtained in accurately matched capacities and the capacity is permanent.

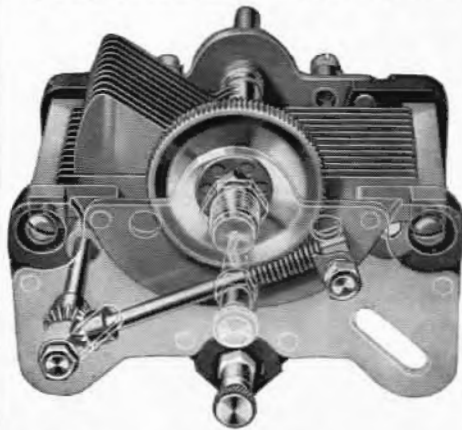
They know that Micadons are easily installed, equipped as they are with extension tabs for soldering and eyelets for machine screw assembly.

They know that Micadons are made with type variations to meet every possible requirement.

Dubilier

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*A Whirlwind
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**AMERICAN
BRAND
CONDENSERS**



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Worm Drive
23 Plate, only \$5.00

Praised by experts everywhere and acclaimed by the Public, the American Brand Worm Drive Vernier Condenser is the sensation of the radio world.

The highest ratio geared adjustment ever developed on variable Condensers makes the loss on the American Brand practically zero.

The price is no higher than of ordinary condensers. Ask your dealer to show you one. If he can't do so, write for descriptive folder and send us his name.

NOTE TO DEALER:—If your jobber can't supply you, write us—

American Brand Corporation
8 West Park St. Newark, N. J.
Factory—PHILADELPHIA

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NONE OTHER.
DUPLEX



"DR" Series

Popular Priced,
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densers—absolutely
low loss—used
by thousands of
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The highest type
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for super-
heterodyne,
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that is needed
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Write for complete literature on all Duplex Products.

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**Best for
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and Crystal Sets
FRESHMAN

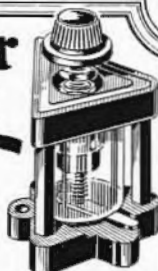
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Crystal Detector

No more searching for the sensitive spot.
—Merely turn the knob as you would a dial.

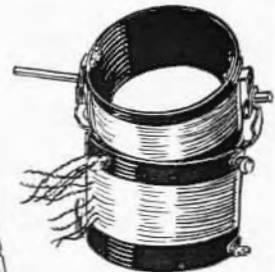
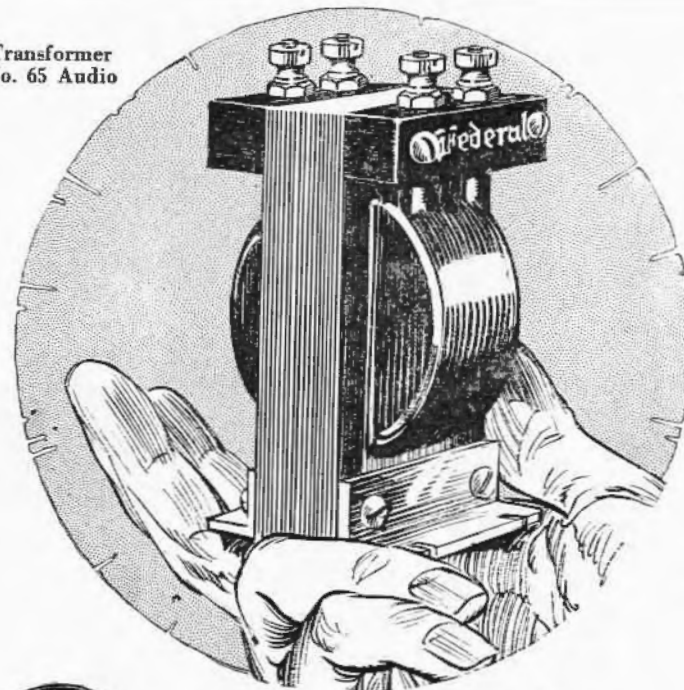
For base or panel mounting, complete with Freshman Super-Crystal \$1.50

At your dealer's, otherwise send purchase price and you will be supplied postpaid.

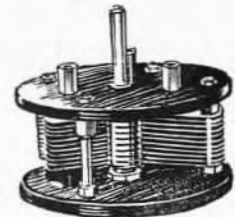
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106-7th Avenue, New York



Transformer
No. 65 Audio



No. 95
Variocoupler



Variable Condenser



Head Telephones

**"Guaranteed
by Federal"**

THE famous Federal No. 65 Audio Frequency Transformer and over 130 other standard radio parts now bear the Federal ironclad performance guarantee.

If you want exceptional tone beauty, selectivity and distance range in your home assembly, insist that each part bear the Federal Guarantee.

A Book "The Radio Work Bench" aids you in avoiding construction pitfalls. Sold by Federal dealers — 25c. — Canada, 35c.

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Take advantage of these wonderful opportunities to step into a big paying position in this great new field. Radio offers you an opportunity to travel and see the world, with all expenses paid, and a fine salary besides. Or you can stay at home and work up to a position paying up to \$10,000 a year. One of our recent graduates secured a position one week after graduating, paying a salary of \$300 a month. Hundreds of others report equal success.

Easy to Learn Radio at Home

Hundreds of men are already earning handsome incomes in this wonder science. If you want to get into a profession where opportunities are unlimited make Radio your career—become a Certified Radio-technician.

Thousands of Certified Radio-technicians are wanted to design Radio sets; to make new Radio improvements, to manufacture Radio equipment and to install it; to maintain and operate great broadcasting stations and home Radio sets; to repair and sell Radio apparatus; to go into business for themselves; to operate aboard ship and at land stations.

You can easily and quickly qualify in your spare time at home through the help of the National Radio Institute, first school to teach radio successfully by mail, established 1914. No previous experience or training needed. Prominent Radio experts will help you. FREE, with course—circuits and parts for building latest receiving set also, three instruments are loaned to students, making the work thoroughly practical. The same plan that has already helped hundreds of our graduates to real success and real money in Radio is open to you.

Send for BIG BOOK

No other field today offers such great opportunities as Radio. Take your choice of the many wonderful openings everywhere. Prepare now to step into the most interesting and best paid profession today. Read about the opportunities open now—the different kinds of work—the salaries paid. Write today for the 32-page book that tells how America's first and biggest Radio school can teach you to become a Certified Radio-technician in your spare time. Mail the coupon or write a letter NOW.

National Radio Institute, Dept. 92KA, Washington, D. C.

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Washington, D. C.

Without obligation send me your book, "Rich Rewards in Radio," which tells all about the opportunities in Radio, how spare time study at home will qualify me quickly as a Certified Radio-technician so I can get one of the splendid positions, and how your Employment Service helps me to secure a big pay job. Please write plainly.

Name Age

Street

City State

Poly Plug

Positive contact always maintained

The tension slot is the reason—a feature found only in Poly Plug. Permits the phone cords to be pulled and jarred without disturbing the contact a bit. The plug you have been waiting for.

It's genuine Bakelite, too.

At your dealers otherwise send purchase price direct for plug **75¢**

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THIRD NATIONAL RADIO EXPOSITION

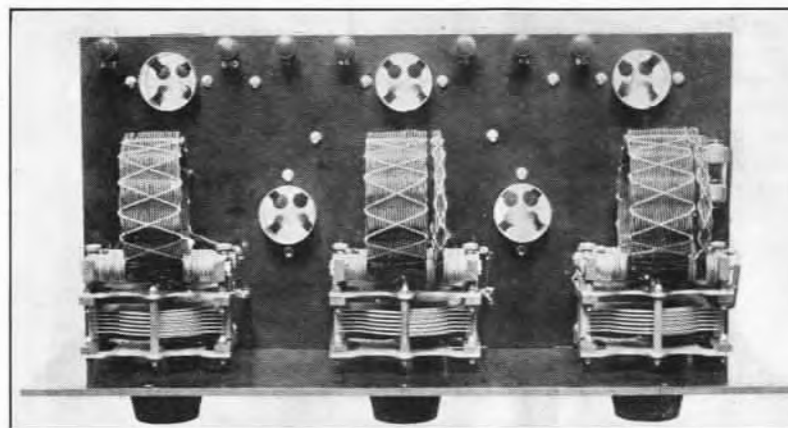
NEXT month, on November 3rd, to be exact, the Third Annual National Radio Exposition will open at the Grand Central Palace to continue until the 9th. This Exposition, as in previous years, will be under the direction of the American Radio Exposition Company, of which Harold Bolster is Director, and J. C. Johnston, General Manager.

There will be exhibitors of national prominence, who will display apparatus illustrating the latest models and designs for 1925. In fact, special receiving set models, phonograph radio combinations, and improved equipment for 1925 will be featured.

The Executive Radio Council's booth will be of unusual interest to the amateur and layman. It is planned to have on view a modern, complete amateur receiving and transmitting station, of the type in successful operation in the metropolitan district. In addition, a model ship station, of the kind that many amateurs are manning, will also be shown.

An idea of what the amateur must do, and what he must know in order to own and operate a station will be told by the display of various grades of licenses and records necessary.

Low Loss Tuned R. F. and Regeneration



Rear View of the "Regenodyne"

COMPLETE PARTS READY FOR THOSE WHO BUILD THEIR OWN

Write for Information

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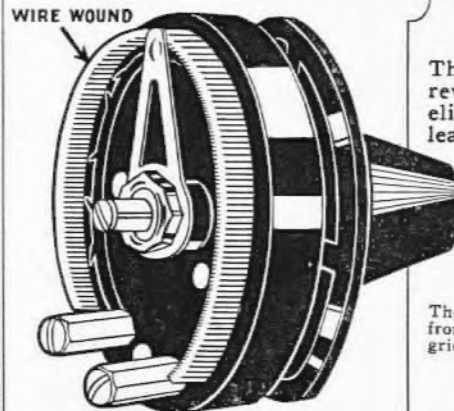
New York, N. Y.

Extreme Selectivity

Clear Clean Reproduction

Consistent D.X. Reception

ROYALTY VARIABLE GRID LEAK



REVOLUTIONARY!

The ROYALTY Variable GRIDLEAK has revolutionized gridleak construction. It has eliminated at one stroke every source of grid-leak trouble. It is a *wirewound* grid-leak!

The lever arm *cannot* scrape away the resistance element, as it does in ordinary gridleaks, because of this wire winding. The ROYALTY Variable GRIDLEAK is noiseless; it retains its resistance value indefinitely. It is absolutely non-inductive.

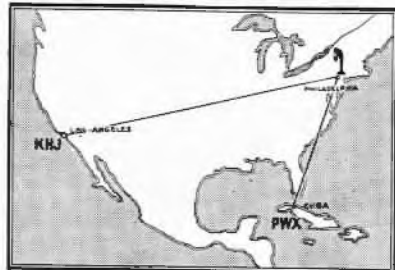
The ROYALTY Variable GRIDLEAK has a range of from 100,000 ohms to 7,000,000 ohms. It meets every gridleak requirement and more. Ask your dealer!

FREE—Write for hook-up booklets of ROYALTY Variable GRIDLEAKS and RESISTANCE UNITS.

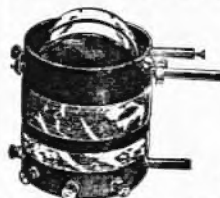
WIRELESS PRODUCTS CORPORATION
136 Prince Street, New York City

VOLUME!

Mr. R. V. Montgomery, 33 Lambert's Lane, Port Richmond, S. I., entertained a committee of engineers to a demonstration on a loud speaker using only 3 tubes, bringing in clearly and loudly such far distant stations as KHJ and PWX. A step of radio frequency is unnecessary when you use the all Litz.



UNCLE SAM MASTER TUNING COIL
THE MOST WONDERFUL COIL
IN THE HISTORY OF RADIO FOR
Volume - Distance - Selectivity



The Only Licensed
All Litz Tuner

\$5.50

At all Good Dealers

Ask your dealer or send self-addressed, stamped envelope for FREE wiring diagrams of circuits using this coil.

UNCLE SAM ELECTRIC CO.
Plainfield New Jersey

Amateurs!

EXTRA SPECIAL PRICES

on Standard Transmitting Apparatus.

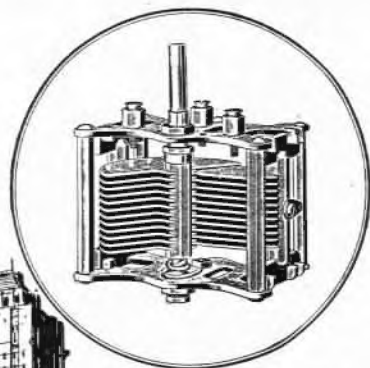
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American Sales Agency

38 Park Row

New York City

"Satisfies
Every
Radio
Wish."



The Amsco Low Loss Variable Condenser is built with the same infinite care required by architectural masterpieces. With losses far too small to measure accurately, the Amsco achieves absolutely noiseless tuning in every circuit allowing micrometer adjustment when real selectivity is wanted. Ask Your Dealer, or Write for Booklet.

AMSCO PRODUCTS INC
Broome & Lafayette Strs. New York

TRADE NEWS

The Carter Radio Company has moved into its new and larger Chicago factory, located at 300 South Racine Avenue.

This plant, together with the manufacturing plants at Bristol, Conn., and Hamilton, Canada, are the results of the ever increasing demand for CARTER RADIO products.

The General Sales Offices remain at 1808 Republic Bldg., Chicago, and have acquired additional space.

E-Z-TOON RADIO COMPANY FORMED

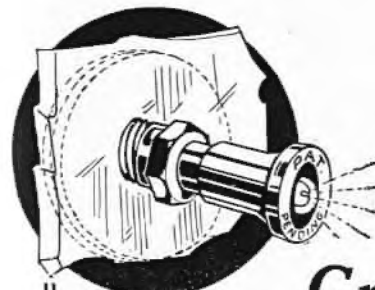
The Eztoon Radio Company have taken over the manufacture and sale of the EZTOON dial, which was formerly manufactured by the Butler Mfg. Co. of Indianapolis, Ind.

Mr. Charles Sparks, formerly General Manager of the Kellogg Company, has joined the organization as General Manager. The offices will remain at the same address, 3236 W. Washington St., Indianapolis. Otherwise, of course, the organization is unchanged.

ALWAYS MENTION AMATEUR RADIO WHEN ANSWERING ADVERTISERS

"The Kant-Blo Switch on our Super-Heterodyne does all that you claim for it. If we had installed this signal long ago it would have paid for itself hundreds of times."

(Copy of letter on request)



One of Radio's Greatest Problems Solved

Push-Pull "A" Battery
Switch Style

Only one Kant-Blo needed to protect any number of any kind of radio tubes

MONEY-BACK GUARANTEE

Kant-Blo

SWITCH SIGNAL BINDING POST

"Lights on any Short Circuit"

The KANT-BLO gives the solution to radio tube protection against short circuits. It makes the impossibility of yesterday the accomplishment of today. It reaches the apex of tube insurance without interfering in any way with the reception of your set. The KANT-BLO signal has astonished well-known radio engineer and fans.

The KANT-BLO is not a fuse or a plain high resistance. The introduction of any considerable high resistance in the B battery has a definite cut-off point which is considerably raised by additional resistance. The KANT-BLO has a very low resistance at all times when the

normal current flows through the B batteries, except when a short circuit occurs, then the special long filament KANT-BLO lamp lights up, becomes hot and increases the resistance instantly, protecting any kind and any number of tubes. The KANT-BLO is not an extra accessory on your set. It is designed as a B battery Binding Post or as an A battery filament switch.

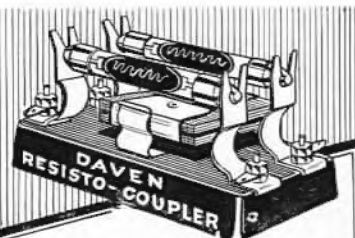
KANT-BLO Signals—both Binding Post Style and Switch Style—are at all the best radio stores. If your dealer is out of stock send us \$2 for a KANT-BLO Binding Post Style, or \$3 for the Switch Style, and we will ship any number of KANT-BLOS direct to you, charges prepaid.

Sole Distributors
APEX RADIO COMPANY

503 Fifth Avenue

New York, N. Y.

Manufactured by Gano, Kramer Co., Inc., New York



Resistance Coupled Amplification

The tone quality from a Daven Resistance Coupled Amplifier is the most perfect known to the Radio Art. The Daven Resisto-Coupler, illustrated, greatly simplifies the construction in building up one of these distortionless amplifiers.

Sold Everywhere, \$1.50

Read "RESISTORS—THEIR APPLICATION TO RADIO RECEPTION," by Zeh Bouck. Price...15c

Also read "The How and Why of Resistance Coupled Amplification." Price, 10c.

DAVEN RADIO CORP.
"Resistor Specialists"
12 Campbell St. Newark, N. J.

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\$ 2.00

TRI-COIL

is a radio frequency transformer that has made an especial hit in one tube reflex circuits. Handsome bakelite case.

90¢

TRI-JACK

is a solid bakelite super-compact radio jack. It is solderless and dust proof.

75¢

TRI-PLUG

Lic. Patent Pat. 1,498,198 is an automatic radio plug that requires no levers for connection. Just insert the phone tips.

Write for One Tube TRI-COIL Reflex Circuit Hook-up that operates a loud speaker. It's FREE.

BROOKLYN METAL STAMPING Corp.
718 Atlantic Avenue Brooklyn N.Y.

CLASSIFIED ADS

Classified Advertisements accepted for publication in Amateur Radio at the rate of three cents per word.

LOOP ANTENNA WIRE 65 strands 38 reinforced with five strands phosphor bronze, mahogany color, double cotton overall. Better than Litz. \$1.25 per 100-foot spool, postpaid. Van Blaricom Co., Helena, Mont.

IS YOUR NEUT RIGHT? To revitalize unneutralizable Neutrodyne, we devised this Kladag Coast to Coast Circuit. Uses same panel, etc., as Neut, except three less parts. Merely rewire. Success certain. Necessary stabilizer, 22 feet gold sheathed wire, circuit and complete, simple instructions—\$5.00 prepaid. Many have already rebuilt their Neuts—and written wonderful testimonials. Thousands will do it. Be FIRST—have the finest five-tube set in your neighborhood, revitalize others' Neuts. Description, etc.—10c Radio Lists—2c stamps accepted. Kladag Laboratories, Kent, Ohio.

DIRECTIONS for constructing home-built Radio with two thousand mile receiving range. Maitland Roach, Electrical Engineer, 2905 Columbus Ave., Philadelphia, Pa.

HAM SPECIALS—Acme 75 watt CW Unit, full mounted, \$10.00. RCA UC1819 Condenser, \$5.00. Connecticut J107 Condenser, \$3.25. What do you need? Van Blaricom Co., Helena, Mont.

HAS YOUR CLUB ONE?—We have on hand a limited supply of volumes 1 and 2 of "The Modulator" (October, 1921, to September, 1922), bound in flexible leather. A valuable addition to any club's library. Over two hundred pages of real amateur radio information. Copies will be sent for every \$2.50 received while the supply lasts. Publication Committee, Executive Radio Council, 2nd District, 120 Liberty Street, N. Y. C.

"HOW TO BUILD A CW SET." By L. M. Cockaday. Tells how to construct a low power CW SET, using Voice Straight C. W. and Modulated C. W. Written by a well-known authority. Fully illustrated. Sent postpaid for 25c, or free with a Subscription (\$1.50) to Amateur Radio, 120 Liberty St., N. Y. C.

158 GENUINE FOREIGN STAMPS. Mexican War Issues, Venezuela, Salvador and India Service, Guatemala, China, etc., only 5c. Finest approval sheets, 50 to 60%. Agents Wanted. Big 72-pp. Lists Free. We Buy Stamps. Established 20 years. Hussman Stamp Co., Dept. 154, St. Louis, Mo.

FOR SALE—WESTINGHOUSE DYNAMOTOR. 10-12 volt drive, 350-425 output mounted on Bakelite base with filter. Price, \$15.00. A few 30-32 volt drive with same output at special price of \$15.00. Type M. H. Westinghouse 110 volt D.C. motor generator with field rheostat, brand new, list \$170.00; our price \$110.00. 50 watt 203A tubes, \$28.00. 36-in. by 26-in. by 7-16-in. Bakelite sheets, fine for transmitter panels, special, \$25.00. We have for immediate shipment R. C. A.—Amrad lighting switches, lead in and wall insulators, Acme and R.C.A. plate and filament transformers, Ward-Leonard field rheostats and many others too numerous to mention. Send for our full price list and particularly anything you need in transmission materials. TROY RADIO COMPANY, "The only Brooklyn store stocking transmitting parts," 1258 St. John's Place, Brooklyn, N. Y. Decatur 6139.

READING STANDARD MOTORCYCLE 1920 for swap for complete transmitter set using motor generator. Write Henry Tisserant, Church St. Aqueduct, L. I.

GE 12/350 VOLT DYNAMOTORS, \$18. Holtzer-Cabot 12/500 volt, \$18. GE 24/1500, 350 watt for belt or battery drive, \$45. Crocker-Wheeler 500 cycle motor generators. Harry Kienzle, 501 East 84th Street, New York.

FIRST \$40 takes new Grebe CR13 Short Wave Tuner. John Herland, 273 94th St., Brooklyn, N. Y.

ALWAYS MENTION AMATEUR RADIO WHEN ANSWERING ADVERTISERS

(Continued from page 360)

ing. It may be well to try and shift the antenna and counterpoise connections to a different point on inductances L-1 and L-2, respectively. If no current is flowing in the circuit when the turns in coil L-1 are about 5 and when there are 4 turns in L-2, this is an indication that the counterpoise is too large, and it should be shortened until good results are obtained.

At 40 meters, the shunting condenser in the primary circuit is dispensed with, and the nine turns of the inductance L-3 together with the internal capacity of the tube will supply enough capacity so that operation below 40 meters will be just nice. Reaching down on 20 meters and lower is quite another story, which will be told about in future articles. Get the transmitter going on 40 meters first, and the experience gained thus will be invaluable later.

(Editor's Note.—This is the second of a series of articles concerning short wave transmission, which Mr. Reinartz has written exclusively for AMATEUR RADIO. Mr. Reinartz will be glad to answer questions for the amateurs who like to secure additional information. He will be "on the air" every night, from 6 p.m., E.S.T., until late, and will co-operate with the amateurs who so indicate.)

(Continued from page 358)

readings and they fluctuated all over the shaded portion as indicated. It was extremely noisy. At the points A and B the tube gave distinct audible cracking sounds (not in the phones, actually the tube itself). I then resorted to all the known means of cleaning out the gas, such as giving the filament a 15 volt shot for 10 seconds, and burning for 6 hours at 4 volts with no B battery, in an attempt to burn up this gas. It was of no avail. I did find, however, that by burning the filament at 6 volts and .4 amps. I could get a fairly stable curve at No. 2. It was extremely critical, however, and as you may see the plate current was still rising at 12.5 mills, twice as much as a tube of this type should draw. The life of this tube was extremely short about 25 hours, due to the excessive current necessary for operation and ionization.

THE GREBE SYNCHROPHASE

Synchronized Radio Frequency tuning with "Binocular Coils" and "S-L-F" (Straight Line Frequency) condensers form the basis of this new Broadcast Receiver.

Many of the standard practices in general use today originated in the earlier Grebe receivers and the new "Synchrophase" provides additional evidence of the spirit of pioneering for which the Grebe Company has become known. A distinct departure from the usual indicators in the form of horizontally mounted dials projecting through gold covered escutcheon plates of ornamental design mounted on a mahogany bakelite panel is found. The original Grebe Tangent Wheel Vernier has been retained in the new model.

HAROLD BOLSTER
on behalf of the Principal Radio Manufacturers and Dealers of America Presents

This greatest radio show ever held will be profit-sharing with exhibitors

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**Special
Election Week
Program Features**

Main and Mezzanine Floors

THIRD ANNUAL



**NATIONAL
RADIO
EXPOSITION**

**GRAND CENTRAL
PALACE**

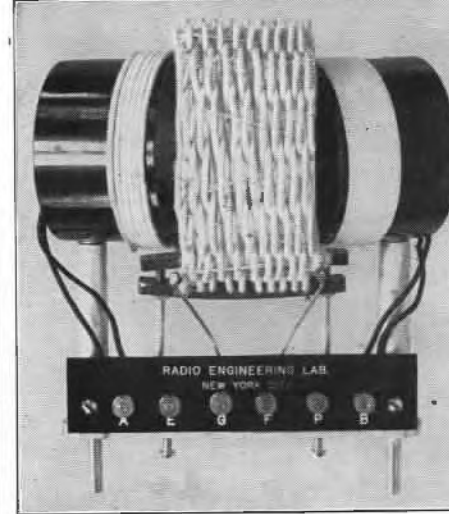
NOV. 3rd. to 9th. 1924

Featuring, in advance, the most striking development in the Radio art and the Radio industry for the coming year

- Receiving Set Models for 1925
- Phonograph Radio Combination for 1925
- Improved Equipment for 1925

"The World and his Girl will be there"

NEW YORK CITY
AMERICAN RADIO EXPOSITION COMPANY
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LOW LOSS TUNER UNIT

MOST EFFICIENT TUNER AVAILABLE
REAL DX. RECEPTION
EXTREMELY SHARP TUNING
TWO TYPES

AMATEUR—40 TO 205 METERS with tap
BROADCAST—200 TO 600 METERS

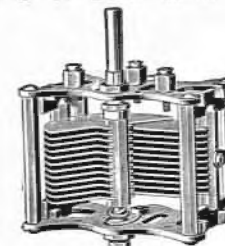
Price \$10 each. Write for Information.

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334 FIFTH AVENUE NEW YORK CITY
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CARDWELL

Low Loss, Grounded Rotor
CONDENSER



Cardwell is the original low loss, rotor grounded condenser. It is a significant fact that of all the various kinds of radio apparatus on the market to-day the CARDWELL CONDENSER is the ONLY unit which is recognized by engineers and technical Editors of National prominence as the ONE best.

A Post Card Brings you an
Education on Condensers.

Allen D. Cardwell Mfg. Corp.
81 Prospect St. Brooklyn, N. Y.

RADIOFAX

THE monthly radio supplement that keeps the Lefax Radio Handbook up-to-date.

EVERY month it brings to you information on the latest developments and experiments in radio. Not mere opinion, but facts that have been proven by our Research Department.

IT is punched and cut to fit the loose-leaf edition of the Lefax Radio Handbook and its pages may be easily removed and inserted in the Handbook (see opposite page).

RADIOFAX is a section of LEFAX—the pocket magazine of important articles on business, health, engineering, and radio. Write for a sample copy.

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Poor Birds



Are
SAD!—

Because they can't read and enjoy

AMATEUR RADIO

The Magazine that really tells about radio

BUT—

You can read, and you can buy AMATEUR RADIO at the nearest newsstand. Or better yet, use the conveniently handy slip below!

Dear Om!

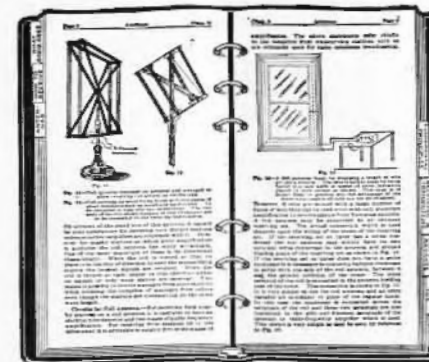
I don't want to be sad, and I want to enjoy AMATEUR RADIO for another twelve months. Here's my \$1.50, so I won't miss out. Don't fail to make an entry of this! Thanks.

Yours for shorter radio hours.

ALWAYS MENTION AMATEUR RADIO WHEN ANSWERING ADVERTISERS

IF YOU'RE A RADIO "BUG"

Nibble away at this book for a while



LEFAX RADIO HANDBOOK

WRITTEN in simple language so the novice can understand it. Yet it is so comprehensive that the radio "bug" can find in it new worlds to conquer.

The One Best Book on *RADIO*

PRINTED in both bound and loose-leaf editions with clear, readable type on high-grade paper. Bound with handsome imitation morocco cover.

Bound edition\$2.00
Loose-leaf edition 3.50

See opposite page for a description of RADIOFAX—the monthly supplement that keeps the Lefax Radio Handbook up-to-date.

See your dealer or order direct from

LEFAX, Incorporated

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Philadelphia, Pa.

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FOR THE LOVE OF MIKE

WHN—We Have Nerve.
WEAF—We Earn Advertising Fees.
to be continued, perhaps.

MONTHLY MIKE is adverse to delving into dusty files and exhuming hoary hook-ups. We are not satisfied to merely present present practices and procedures. While current circuits are capably covered and recovered, cussed and discussed every Saturday by our three-cent contemporaries.

Rather our pet policy is to predict possible phases, prophesy probably panaceas and perhaps prognosticate in *re* radical rubbish.

We have spared no expense in establishing a *Cook-up Department*. A chef of generous body capacity is constantly in charge, counting calories, sampling sets, testing tubes and roasting renamed "radiating" receivers. He can smell a rat in a worthless wave-trap, and as an authority on Honeycomb Coils he's the bee's *patella*.

Already our investigating committee has dissected the so-called Dry (?) Cell Radio batteries and exposed a condition which has out oolong-ed the Tea Pot Dome scandal, and reduced it in comparison to the metaphorical Tempest in a Tea Pot.

See the November issue of MIKE for an exposure in detail. We have not been content with calling a "spade" a spade, but have come right out and labeled it a coal shovel.

Why is it that the radio magazines insist on referring to the broadcasting on 100 meters as "inaudible?" Just tune it in some night and see how inaudible it is!

—John Carr.

Uxtry!

Ampere, N. J., October 1 (special to AMATEUR RADIO): Mr. and Mrs. *Tenna* announce the hook-up of their daughter *Ann* to *Phil A. Ment*. *Millie Ampere* is reported to have secured an alleged divorce from Mike R. O'Henry. The judge gave her the custody of the "Super Het." Mr. and Mrs. Ray D. O'Phann announce the arrival of a seven-pound loud speaker. Both volume and quality of reception are doing as well as could be expected.

"High Jack Capacity Is Not Detrimental" is the heading for a radio column published recently. What have hijacks got to do with radio and what radio fan cares anything about how much capacity for liquor a hijacker has anyway?

—John Carr.

THOSE GOOD-NATURED LIARS

You work a DX Ham and get a prompt report. He plays the game and acts the thorough sport; But on the other hand, you know a fellow, who Will never send that postal card to you. The latter type invariably are known to tell Of how they're always glad to QSL; Yet your young head is very apt to grow grey hairs,

Before you see that promised card of theirs. Still in the hot hereafter they'll find fires, Provided just for those good-natured liars.

I. Gallagher, 2CRIV.

LOST AND FOUND

A *deal-end loss* has been reported—the finder is welcome to keep it.

In the case of a *grid return* no questions will be asked.

Hot weather radio has one advantage. You can hear the band concerts in Central Park while dressed in a costume that would land you in the lock-up if you appeared at the concert in person in it. —John Carr.

CURRENT NEWS

Both Direct and Alternating
(In *Hammeter*)

- On Monday:*
A Radio expert (?) in Butte
For a patent* does not give a hoot.
He is easily able,
By changing the label,
To neutralize chance for a suit.
(*Neutrodyne)
- On Tuesday:*
A B.C.L. Fan on-the-Sound,
With an ignorance crass and profound,
Must complain to the papers
Of "Amateur Capers."
On hearing a ship that's a-ground.
- On Wednesday:*
"Eliminate batteries!" some cry—
"Just throw out both your wet cells and dry—
And buy current devices
At scandalous prices;
But bark how those 'humdingers' fry."
- On Thursday:*
A Radio Bug down-in-Maine
Shrieks: "Those Amateurs give me a pain.
Whatever I'm logging,
That place they are hogging.
Their static 'most drives me insane."
- On Friday:*
A Fan who believed all he read,
In the Radio Magazine, said:
"O whenever I look-up,
Some novelty hook-up,
The circuits fly 'round in my head."
- On Saturday:*
The critics quite craftily goad
The Listeners-in to explode.
At the spark-gap transmitter,
They're specially bitter,
And favor a law to stop code.
- On Sunday:*
A Tightwad, each Sabbath in search
Of religion, tunes into some church:
But safe from detection
Tunes out the collection,
And so leaves the "plate" in the lurch.

73
Charles Irving Corwin.

for scientific
tube tuning

FIL-KO-STAT
SCIENTIFICALLY CORRECT RADIO RHEOSTAT
with Battery
Switch

\$2

In Canada \$2.75

With the new and improved FIL-KO-STAT you get a battery switch that fits the FIL-KO-STAT mounting screws. This switch—"at your finger tips"—enables you to turn the current "on" or "off" without disturbing the FIL-KO-STATS adjustment and it distinctly signals "on" or "off". FIL-KO-STAT is the only radio rheostat enabling you to get maximum reception, bringing in stations you never heard before and cutting out tube noises. It lengthens tube and battery life and permits infinite adjustment of any type tube in any hook-up. It's unconditionally guaranteed.

to eliminate
leakage losses

You lose many DX stations through leakage in the antenna circuit. Make sure all radio impulses reaching the antenna reach your radio set. The FIL-KO Lightning Arrester will help you, because it's "Umbrella" shield keeps dust, rain, etc., from the moisture-proof, hermetically sealed Bakelite insulation and prevents partial grounding of the antenna. And what's more the FIL-KO ARRESTER carries a guarantee that's virtually an added insurance policy. You get positive protection for \$1.50

FIL-KO-LEAK
SCIENTIFICALLY CORRECT
VARIABLE GRID LEAK
individually
calibrated



\$2

In Canada \$2.75

for correct
grid bias

Unless the grid potential is precisely correct, incoming radio frequency impulses will be "blocked" FIL-KO-LEAK is the only variable grid leak that you can set for a specified resistance and adjust for best results. Each one is hand calibrated and doubly checked over the operating range for all tubes— $\frac{1}{2}$ to 5 megohms. FIL-KO-LEAK is not affected by atmospheric conditions or wear. Markings are read through panel peep-hole. Tablemounting bracket furnished. And it's unconditionally guaranteed for service and accuracy.

FIL-KO-SWITCH
SCIENTIFICALLY CORRECT
"A" BATTERY SWITCH

Simple
Sturdy
Sure



50¢

In Canada 70¢

FIL-KO-ARRESTER
SCIENTIFICALLY CORRECT
RADIO LIGHTNING ARRESTER

with the
\$100
Guarantee



\$1.50

In Canada \$2.05

improved
reception

Send 2c postage for our free booklet "Improved Radio Reception Through Scientific Tube Tuning." Tells about vacuum tubes, how to control them to get more DX, greater volume, etc. Write to Dept. RN 1124.

FIL-KO-SWITCH is made of non-magnetic metal. Wiping contacts, entirely insulated from the nickled brass housing and knob, assure sharp, clean "make and break." Scientifically correct to avoid current leakage and added capacity. And unconditionally guaranteed.

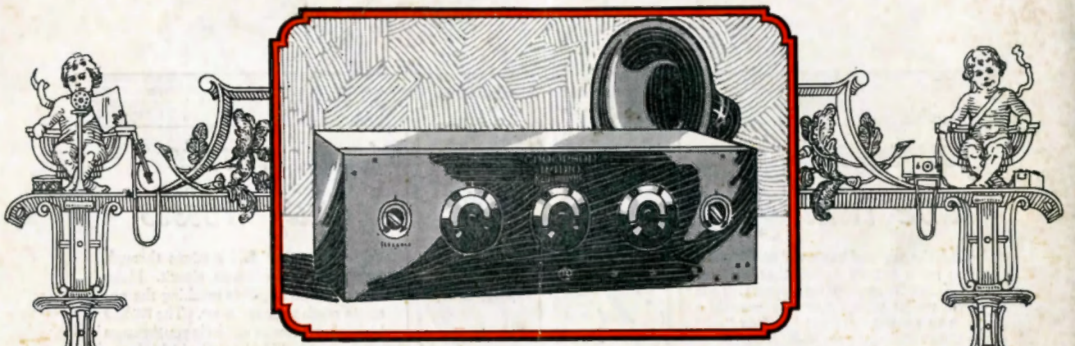
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HARRISBURG - PENNSYLVANIA

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"EXPERIENCE IS THE VITAL FACTOR IN EXCELLENCE"

THOMPSON RADIO

Thompson radio products are as fully developed and as standardized in radio as is the telephone in wire communication. Thompson owners do not worry about how their set and speaker will compare with "next year's model." Perfection remains Perfection.

Thompson simplicity of operation as well as Thompson range and power makes it possible to receive the desired radio program just exactly as it is given before

the microphone. Those who wish *real* radio entertainment at low cost will be decidedly interested in the Thompson Neutrodyne Radio Receiving Set—NOW \$125—and the Thompson Speaker—NOW \$28.

The fully developed Thompson Radio Products at such reasonable prices are possible only to an organization that has been making radio products *exclusively* for many years.

If your dealer does not handle Thompson radio products, write to us for descriptive literature and the name of a Thompson dealer near you.

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