Dec. 5
1925

RADIO WORLD

Title Reg. U.S. Pat. Off

15 Cents

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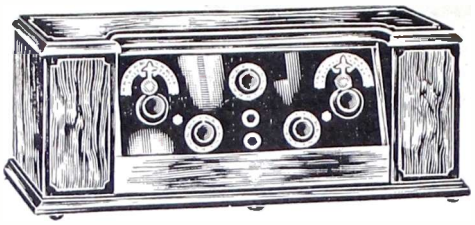
193-193

ROXY (S. L. Rothafel) receives the medal symbolic of his winning RADIO WORLD'S contest to determine the most popular radio entertainer. He expressed appreciation of the honor and said he would strive to do still better work, to be deserving of the token thus bestowed. (Foto Topics.)



Crosley Super-Tridyn Special

The improved Super-Tridyn panel is assembled in a new solid mahogany cabinet finished in duotone. This cabinet with its striking lines and simple detail decoration is of ample size to house all dry batteries required for dry cell tube operation.....$60.00

Performance
That Has No Peer In Any Field of Radio

Since the announcement of the present new Crosley models, Crosley sales have been leaping to sensational figures, literally taxing the production facilities of all Crosley plants.

This new leadership in sales is based on Crosley's new leadership in value; and this latter resolves itself into two simple propositions:

Crosley sets consistently deliver a performance that has no peer in any field of radio—and this matchless performance is offered at the lower prices that only the economies of tremendous production make possible!

On this page are shown four of the new Crosleys—the two famous Super Tridyns and the two Special De Luxe models. Not only do they offer an effective beauty and accurate workmanship but they provide a performance that cannot be surpassed in the $23.50-$60 price range or many dollars above it!

Make your own comparison on the basis of selectivity, distance, clarity, and volume. Place the competing receivers side by side with lead-ins from the same antennae, and put them through their paces.

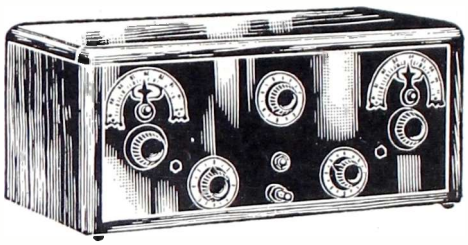
Forget the radical difference in price. Reach your conclusion solely on results. Then and then only will you understand why thousands upon thousands of radio buyers are singling these Crosleys out of the entire field—unwilling to pay more because a greater investment cannot provide greater enjoyment.

See the complete Crosley line at the nearest Crosley dealer's. Address Department 40 for his name and our illustrated catalogue.

The Crosley Radio Corporation, Cincinnati, Ohio

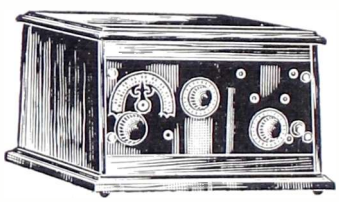
Cable Address: Listenin—Cincinnati

Owning and operating WLW, first remote control super-power broadcasting station. Crosley manufacturers receiving sets which are licensed under Armstrong U. S. patent No. 1,113,149 and priced from $9.75 to $60.00 without accessories. None of the prices quoted include batteries, tubes, headphones, etc. Add 10% to all prices west of the Rocky Mountains.



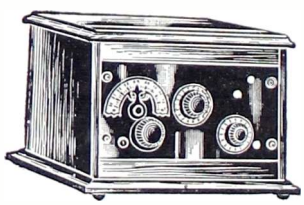
Crosley Super-Tridyn Regular

Incorporating the famous Tridyn hook-up, this set brings in stations sharp, clear, and mellow on the Musicone. The cabinet is of oil rubbed solid mahogany, exquisitely simple in design and beautifully finished. For sheer performance under all conditions the Super-Tridyn cannot be surpassed.....$45.00



Crosley 3-Tube 52 S. D.

In this improved model are introduced radical refinements that increase its general efficiency. Refinement of parts and improvements in design have made it a truly remarkable price considering its nominal price. Genuine Armstrong regeneration with the double circuit to reduce radiation to a minimum. Beautifully proportioned with attractive sloping panel. Cabinet holds all necessary dry cells. A genuine long range radio, easy to tune, easy to enjoy, and easy to pay for.....$32.50



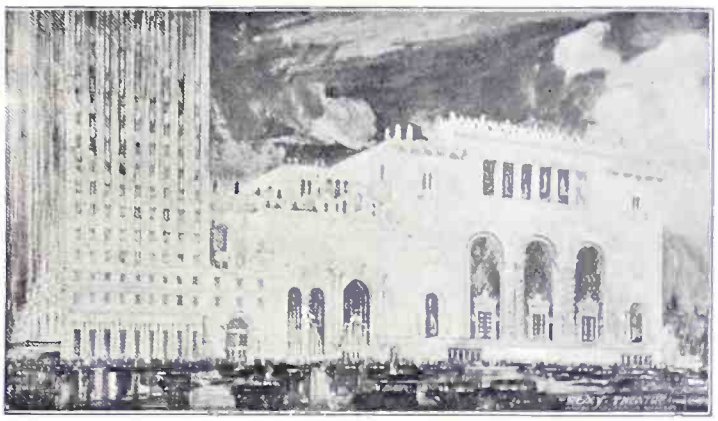
Crosley 2-Tube 51 S. D.

This superb long range set combines Armstrong regeneration and one stage of audio frequency amplification. The handsome mahogany finished cabinet, with sloping panel, holds all required dry batteries. Improvements include new worm type tickler, new vernier plate condenser, and a double circuit to minimize radiation. Unusual selectivity and distance, extreme accuracy of control.....$23.50

CROSLEY·RADIO

BETTER · COSTS LESS

ROXY'S NEW THEATRE



(Architect's drawing of Roxy's New Theatre at 50th Street and Seventh Avenue)

Roxy's own theatre is now in the process of building. When completed in 1926 it will be the largest motion picture theatre in the world—situated in the largest city—in the most ideal location—*and managed and directed by Roxy himself*. The value of the completed property is officially appraised at $8,950,000. The theatre will cost $4,250,000.

Subject to prior sale, we offer shares of Class A (preferred and participating) stock in this new theatre (The Roxy Theatre Corporation) at $40 per share. Yearly dividends will yield about 8½% on your investment. Estimated yearly net earnings available for dividends on this stock amount to more than $2,100,000, or over 4½ times requirements. 125,000 shares will be outstanding. With every three shares of this class A Preferred one share of Common stock will be given as a bonus.

Send this coupon now, without the slightest obligation. We will send you complete information about Roxy's new theatre and the class A Preferred and Participating stock in the Roxy Theatre Corporation.

We do not guarantee this information but it is received from reliable sources.

Bennett, Post & Coghill, Inc.

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Please send me, without obligation on my part, complete information about Roxy's new theatre and the Class A Preferred and Participating Stock in the Roxy Theatre Corporation.

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RADIO WORLD

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A Toroid RF Set, Using Crystal

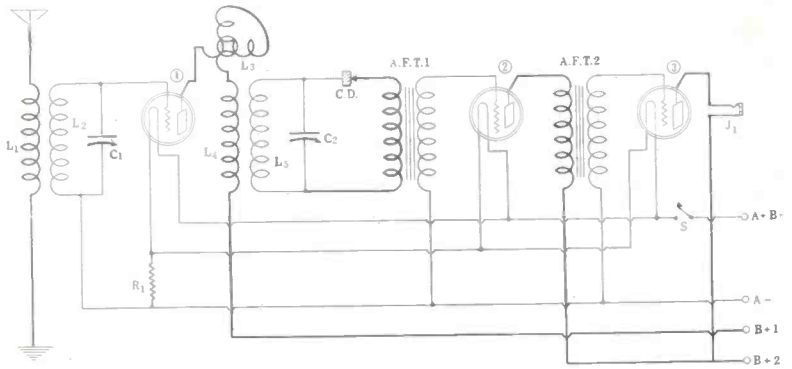


FIG. 1, the electrical schematic diagram of the receiver.

By Lewis Winner

Associate, Institute of Radio Engineers

A VERY simple 3-tube set using a crystal as a detector, is shown in Fig. 1. The receiver employs one step of tuned RF with regeneration, a crystal detector, and two steps of transformer coupled audio-frequency amplification. The set could be made simpler by taking the regeneration out but at a 50 per cent. loss of volume.

LEWIS WINNER

On most receivers, no matter how many stages of tuned RF you add, the signals of the local stations do not increase much. This was found to be true on many tests with such receivers. The RF steps were so aranged that they could be snapped in and out of the circuit. A station was tuned in. The RF tubes were put in and then out of the circuit. The difference was so small that only with milliameter in the output circuit could the effect be noticed.

There are only about a dozen leads to make. No soldering is necessary. The Orbit toroid coils were used in the set; also Air-gap sockets.

Placing the Parts

The shaft of the variable condenser, C1, that shunts the secondary of the antenna coupler, L2, passes through a hole 3/16" in diameter, which is 5¼" from the left-hand edge of the panel, and 3½" from the top and the bottom. Lay the template over this hole and then drill the holding holes according to those laid out upon the template. The same policy is followed with the other variable condenser. The hole through which the shaft of the variometer L3 passes, is 10¼" from both the right and the left-hand edges. It is also 3½" from the top and the bottom of the panel. The hole for the shaft of the last variable condenser is 5¼" from the right-hand edge and 3½" from the top and the bottom of the panel. The hole for the filament control switch, S, is 10¼" from the right and the left-hand edges of the panel. It is ¾" from the bottom of the panel. This necessitates cutting away a small bit of the baseboard. The holes for the screws, which hold the baseboard, are best located by the builder, as these depend upon the thickness of the baseboard, etc. I used a comparatively thin board and therefore had to place the screws very near the bottom of the panel.

We have now automatically placed the variable condensers, variometer, board and switch. The positions of the coils are best determined by looking at the photographs. Angle irons are used to mount the coils onto the condensers. You will note that these condensers have special provisions for mounting the coils, which are placed at right angles to each other. The set of plates of one variable condenser runs in the opposite direction to the other set of plates. That is one condenser is mounted upside down. This was done for so that the coils could conveniently be mounted. If the condensers are mounted in the regular fashion, it will be difficult to mount the coils.

The transformers are mounted at right angles to each other. The crystal detector, which is of the fixed type, has a special type of mounting. You cannot fit it into a grid leak holder, as it is too small. Therefore take a pair of mountings and bolt them together, seeing that when doing so that the crystal fit into the holders. You then have a perfect holder. This is then screwed down to the baseboard and the crystal is fitted into the clips. There was no jack used when this set was constructed although one is shown in the diagram. A pair of phone clips, mounted at the extreme right of the set, were used. No large binding post strip was used. A battery cable was used instead and attached to the proper points.

Wiring the Set

The beginning of the primary winding, L1, goes to the antenna post on the small terminal strip. The end of the same winding, L1, goes to the Gnd. binding post. The end of the secondary L2 winding goes to the G post on socket 1, and to the stationary plates of the variable condenser, C1. The beginning of this same winding, L2, goes to the rotary plates of this variable condenser, C1, and to one terminal of the resistance R1. Now with the variometer you may have some difficulty when wiring up. Most have binding posts, but some, such as the one that was employed in this set, have none at all. If the latter case prevails, scrutinize the variometer very carefully. See where the beginning of the stationary winding goes to and also to where the end of the rotary winding goes to. In most cases the stator winding terminal goes to one frame and the rotary end to the other frame. Neither of these frames, of course, is electrically connected. After finding these connections place small tags on them. The rotary winding will terminate at the front of the variometer while the stationary winding will terminate at the back. This can be clearly seen in the photographs. The rotary winding terminal goes to the P post on socket 1. The stationary winding goes to the beginning of the primary L3 of the second RFT. The end goes to the B+ 45 (1) of the cable. The beginning of the secondary winding L5, goes to the variable plate of the variable condenser, C2, and to the B+ post on the audio-frequency transformer AFT1. The end of this winding goes to the stationary plates of the same variable condenser and also to one terminal of the crystal detector (high potential marked A on the carborundum). The other crystal end (G on the Carborundum) goes to the P post of the audio-frequency transformer, AFT1. The F— post on socket 1, goes to the other terminal of the resistance, R1. The G post on AFT1 goes to the G post on socket 2. The F— post on the transformer goes to the same terminal that the beginning of L2 went to, or to one terminal of the resistance, R1. The F— post on this socket goes to the F— post on socket 1, and also 3. This common lead goes to one terminal of the resistance. This means that the resistance is in the negative lead of the filament. The P post on the socket 2 goes to the P post on AFT2. The B+ post on this socket goes to the B+ 67½ volt cable lead (2). The G post on AFT2, goes to the G post on socket 3. The plate post on the same socket goes to either the top terminal of the single circuit jack or to one terminal of the phone tips. The F+ of this last socket goes to one terminal of the filament control switch, S. The other terminal of this switch goes to the A+B— cable lead. All the F+ leads from the sockets are common. All the grid returns are placed in the negative lead of the A battery. No C battery is employed, although the same may be used. If you desire to use a C battery, break the two leads that come from the F— post of the two AFT, and bring the same to the C— lead of the C battery. The C+ lead goes to the A— lead.

This receiver is very simple to operate. The only trouble that you may come up

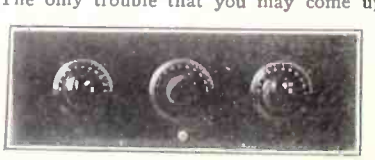


FIG. 2, the panel view of the set.

How to Arrange the Baseboard

LIST OF PARTS

Two tuned radio-frequency transformers (toroids) L1L2, L4L5.
One variometer, L3.
One crystal detector, CD (Carborundum).
Two audio - frequency transformers, AFT1, AFT2 (Acme).
One ¾-ampere ballast resistors, R1.
Three sockets (Air-Gap).
Two .0005 mfd. vernier variable condensers, with dials, C1C2 (U. S. Tool).
One single circuit jack or two phone tips, J1.
One 3½" dial (for variometer).
One A battery switch.
One 7x21" panel.
One cable cord.
One baseboard, 6x19x½.
Accessories: Bus bar, mounting for crystal detector, batteries, phones, antenna, ground, and lead-in wire, etc.

against is the difficult controlling of the oscillatory flow of the RF tube. This is due to the fact that many variometers will not oscillate over the complete broadcast band. A small 20 turn coil placed in series with the plate circuit of this same tube will cure this ill. The two condenser dials should tune in step. Don't forget to reverse the leads of the crystal detector, in case the signals are not loud enough. Also reverse the A battery leads. A 100-foot antenna should be used. The ground should be made to the old faithful water pipe. If you find that the RF tube is difficult to control, the insertion of a 10 rheostat, may help. I say may, because, with some tubes it helps and with others it is of no use. That is, you bring the filament temperature up to a certain point and the tube starts to oscillate in the same manner as if the control were automatic. If you turn it down, it stops all together, turn it up, it howls too much. The variometer in this set should do all the controlling of the regeneration. By increasing and decreasing the voltage, better or worse results will be obtained. Try changing the tubes around for louder signals. This receiver is selective, and if one finds the results vice versa, they should reverse the secondaries of the radio-frequency transformers.

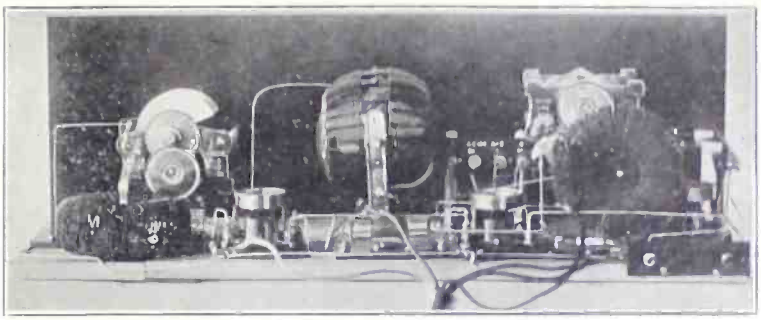


FIG. 3, the back view.

Super-Power Effects Small

WASHINGTON.

Super-power probably never will enable a small group of stations to blanket the entire country nor will it guarantee good reception at great distances.

These facts are indicated by an analysis of super-power tests. The tests were made on the signals of WGY, Schenectady, through the cooperation of fans scattered throughout the country.

The conclusions of the Bureau of Standards in regard to the super-power tests follow:

"**Intensity**—The ratio of received field intensity at high and low power was very small in comparison with the variation of either from instant to instant. The results strikingly emphasize the vagaries of night reception at distances over 50 miles (or even less). On the average, the 50-kilowatt transmission gave just twice the intensity of the 2.5-kilowatt. The tests, however, were not a quantitative comparison of these two particulars because the two antennas used were of very different radiating ability. Careful analysis of the observations reveals no characteristic features definitely assignable to any one particular place, direction, distance or time. It may be concluded from the intensity observations that the higher power definitely increases the area around the station in which an intensity above a given minimum (say for crystal reception or for reception not disturbed by interference) is produced. The comparisons of high intensity are not as significant as they would be if the high and low power transmissions were from the same antenna.

"**Station Interference**—Interference from other broadcast stations was less when the high power was used, but the difference between the high and low power was not great and was not found by all observers.

"**Static**—Interference from atmospheric disturbances was definitely less when the high power was used.

"**Electrical Interference** — Interference from electrical noises and similar disturbances was less when the high power was used.

"**Fading**—The very large fluctuations of intensity averaged the same on high and low power, although the average fluctuation for any one place or time were in some cases greater for the low power and in some instances greater for the high power. This conclusion is based on the analysis of the actual records of field intensity. A majority of these observers, however, and broadcast listeners as well, reported that they considered fading was less on 50 than on 2.5 kilowatts. A surprising feature of the results was the large amount of fading observed as small as 25 miles from Schenectady."

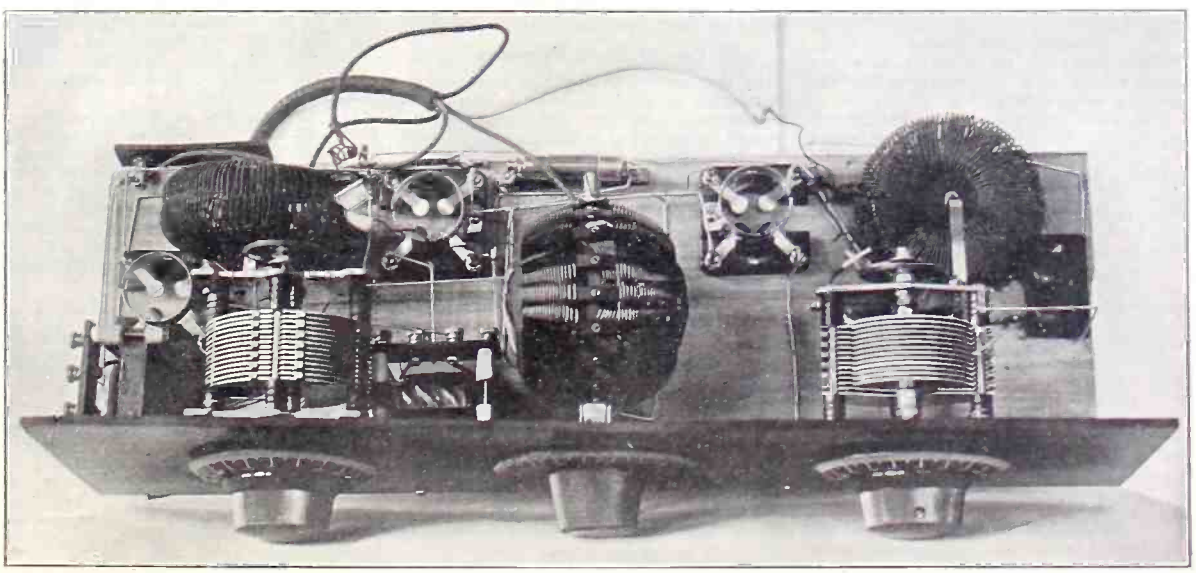


FIG. 4, looking down upon the set.

Pointers on Batteryless Sets

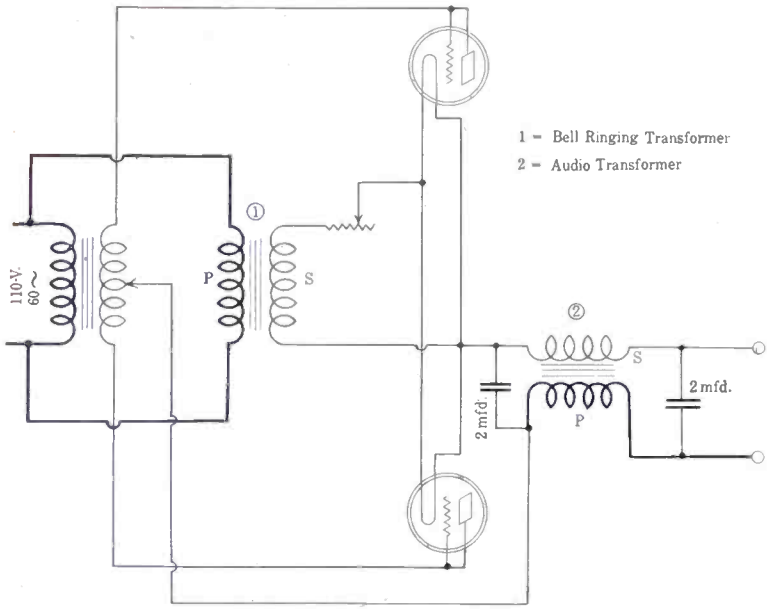


FIG. 1, how alternating current is used as a source of B power. Two ordinary tubes are used, with grids and plates interconnected. A bell-ringing transformer is shown at 1 and an audio-transformer at 2.

By Wm. H. Forthington

THE eyes of the radio fans lately have turned to the design of apparatus and receivers whereby the alternating and direct current supply mains may be utilized to eliminate A and B batteries.

The problem of eliminating B batteries is not really serious, since the plate current required to operate even eight tubes is comparatively small when compared with the amount of current required to heat the filament of an ordinary vacuum tube.

Many fairly successful B battery eliminators have made their appearance upon the market, and although several manufacturers have attempted to utilize alternating current for heating the filaments of their tubes either in a rectified form or as straight alternating current, apparently little success has been attained along these lines.

Convenience Served

The elimination of batteries does not count so much for economy as for the resulting convenience.

The state or quality of the current supplied to the plates of vacuum tubes for radio telephone reception must be perfectly smooth and entirely free from hum. This must be particularly emphasized in the case of the detector tube. Fig. 1 shows schematically a method of utilizing alternating current as a source of B battery, two ordinary three electrode tubes are used with their grids and plates connected together to form one element, making the tube a two electrode or kenetron rectifier.

The alternating current is taken from the supply mains and transformed up a little to allow for the drop of voltage across the smoothing chokes on the output side of the rectifier, and also the voltage drop across the tube. Full wave rectification is used.

Problem Simplified

The problem of filtering or smoothing out current having both sides of the wave rectified is much simpler than in the case of half wave rectification where only one-half of the sine wave is used. This type of B battery eliminator is quite practical where the current required to operate the tubes does not exceed 40 milliamperes, since any undue overloading causes a speedy breakdown of the tube.

For the experimenter who wishes to build a B battery eliminator of this description the following data are given: The iron core should be of about ½ to ¾" cross-section. Such a core may be obtained by stripping up a 20-watt bell ringing transformer. The primary winding may be composed of 350 turns of No. 33 double silk covered wire. The secondary winding is composed of 800 turns of the same wire having a center tap which forms the negative output lead of the rectifier. This particular type of eliminator has been used by me for quite some time now, and has given efficient service using two power tubes in the manner previously specified.

Careful Work Necessary

In the construction of the transformer care must be taken to insulate the windings from one another, and also great care should be exercised in maintaining perfect insulation between the iron core and the primary winding. The secondary winding is wound on top of the primary, and not on a separate leg of the core.

The condensers used in the filter system of these rectifiers where a fairly high voltage output is used should be capable of withstanding at least three times the voltage that is carried over the output leads.

The question now arises as to the method of heating the filaments. Since the average tube draws about ¼ ampere on a 5-tube set the current required to illuminate them will be 1¼ amperes. Such a current is not obtainable from an ordinary receiving or small transmitting vacuum tube. The most common type of tube available which is capable of passing fairly heavy currents is the gaseous conduction tube, which takes many and varied forms. Some of these tubes utilize filaments and some do not.

It is obvious that there is a distinct advantage in using a tube employing no filament to burn out. A few of these tubes, some rated to carry perhaps 100 milliamperes, have been tested out by me, and have been found to be efficient while others are not so good.

Before entering upon a discussion of the application of rectified alternating current to the filaments of vacuum tubes it would be advisable to see how far we may get to using straight or raw AC on the filaments. Fig. 2 is a diagram of a complete receiving set employing alternating current to heat the filaments of the amplifier tubes, while a dry battery is used to illuminate the filament of the detector tube. The reason is that the alternation or reversals of current applied to the filament of the detector tube cause considerable fluctuation in plate current, which is greatly magnified by the audio-frequency amplifier.

Even in this state with a good loud speaker a certain amount of hum is audible. It is not noticeable, however, until one is searching for distant stations, and in fact unless remarked upon, would not be noticed by the average experimenter. However, a 60-cycle hum is not really annoying when sufficiently subdued. It will be seen that C batteries are used in this set. The B battery eliminator is identical with the one described in the preceding paragraphs. Such a set in my opinion is a very poor makeshift, since no claim can be made that the set is batteryless.

Sets of this description have been described by persons who figure more on guesswork than on practical experiment and fact. A certain amount of engineering knowledge is required to conduct experiments along these lines.

Five-fold Elimination

Let us now turn and see how A, B and C batteries, together with antenna and ground, may be eliminated. I recently conducted experiments along similar lines, as will be described hereafter, and the reader may depend that with a certain amount of ingenuity on his own part he may obtain satisfactory results. A set which works without batteries and even antenna and ground would no doubt be considered an ideal set, and it will be recalled that one set of this description made a sudden appearance upon the market last year and an equally rapid exit. The particular failing of this type of set seems to be a moot point, and not open to discussion. The ideal set with the ideal conditions surrounding it is still in the incubator stage. It is in the minds of engineers today, and in many cases in the laboratory.

We may consider a set employing two stages of tuned radio-frequency, detector tube, and three stages of audio-frequency amplification, employing impedance coupling as an ideal set for broadcast reception. UV199 tubes must be used for tuned radio-frequency, in my opinion, since the inherent capacities of this tube are exceedingly low as compared with the 201A.

The Circuit

Referring to Fig. 3 it will be seen that the set depicted is designed to work without antenna, ground and batteries. While in the opinion of the majority of experimenters the external antenna and ground are certainly desirable, the accompanying description of the set goes to prove what can be done with the modern radio receiver. The alternating current which in the majority of American homes is 110 volts at a frequency of 60 cycles is stepped up to approximately 300 volts before passing through the rectifier tube, which is of the gas conduction variety. This tube may take many forms. The current must be stepped up in the manner de-

Antenna Elimination Discussed

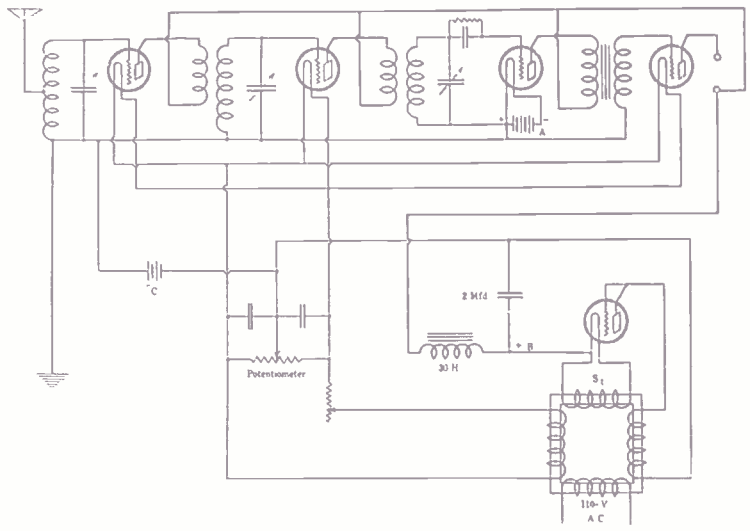


FIG. 2, a complete diagram for a receiving set using AC to light the filaments of the amplifier tubes. A dry battery heats the detector tube, hence this is not a batteryless set.

scribed, since the voltage drop across the average gas conduction tube is enormous, being in the case of the one I have in mind 100 volts at an input of 250. After the current has been stepped up to a suitable operating voltage it is rectified on the one side of the wave and sufficiently filtered out to supply the plates of the tubes.

Problems Solved

After investigating the many and varied types of rectifying devices available upon the American market I decided that there could be only one suitable method of rectification. The electrolytic cell when used as a rectifier may certainly be made to pass heavy currents, but it has the attendant disadvantages of requiring constant attention, such as maintaining the electrolyte at its proper strength and level and cleaning the electrodes. It is by no means clean in use. In any case its attendant disadvantages by far outweigh its advantages. For this reason only the tube rectifier will be considered.

I have been experimenting with a tube of the gaseous conduction order which is capable of passing 150 milliampers for several hours on end without even overheating the glass. This tube glows brightly at a cherry red temperature when in operation under normal load.

The current obtainable through this tube will light many tubes of the UV199 type when connected in series, and since the rectifier delivers 150 milliamperes without overloading, the tubes may be connected in two banks that is, in series parallel, thereby drawing approximately 120 milliamperes.

I have a tube which is capable of lighting several filaments drawing one ¼ ampere as used in the 201A tube, but at present I am not in a position to give any data upon its operating characteristics.

Wire Requisites

Where half wave rectification is employed to heat the filaments of the tubes it is often found necessary to use some method of filtering the output. A simple choke and condensers of large capacity can be used with advantage to smooth out any hum which may be present. The gauge of wire used in the construction of such chokes should be sufficiently heavy to carry the current and should be designed so that the voltage drop across the choke maintains the correct potential at the output end to operate the tubes at their rated voltage, bearing in mind that the tubes are connected in series.

If they were connected in series—parallel the gauge of wire would have to be heavier of course, since the flow of current through the choke is doubled thereby.

It would be advisable to say a few words regarding transformer and choke design. It is the usual practice of electrical engineers to allow one thousand circular mils in the sectional area of the wire for every ampere of current to be carried in a circuit. Since the secondary winding of the transformer which supplies the current to heat the filaments must deliver 60 milliamperes, the wire used would have to be at least 60 circular mils sectional area. The nearest gauge of wire to this is 32 which has a circular cross section of 63 mils.

Better to Overrate

It is certainly advisable to overrate this margin of safety, and we might find it an advantage to use a wire of perhaps 28 gauge to supply the current for the filaments. This wire has a sectional area of 159.8 circular mils, which will carry of course approximately 160 milliamperes with safety. The gauge of wire used in the designing of transformers of this description might in every case be well overrated, since the voltage drop across the chokes and in any other filtering devices which may be used must be counted in the resistance of the circuit.

The winding which supplies the high tension current or plate current might be wound with 33 gauge wire. This wire has a sectional area of 50 circular mils and will of course carry 50 milliamperes with a margin of safety which is sufficient for all sets up to eight tubes.

The gauge of wire for use in the primary winding of the power transformer must be determined by the total output of the transformer in watts. As an example of this, if the secondary winding delivering the plate current was rated to give 300 volts at 100 milliamperes and the winding delivering the current for the filaments was rated at 20 volts at 150 milliamperes the total output would be 33 watts. Allow for attendant loss as in a transformer, which may be considered as being 25 per cent. In such designs as described here it is necessary to design a primary winding to handle 40 watts at a fair load. Since the voltage of the supply mains is normally 110 volts the maximum current permissible in this winding would be roughly .36 amperes. It is obvious that sectional area of wire to be used must be around 360 circular mils, the nearest gauge to which is 25 with a sectional area of 320 circular mils. However it might perhaps be advisable to enlarge this a little and use 24 gauge, having a sectional area of 404 circular mils.

The cross-section of the iron core for use in such a transformer should be about ¾ to 1", a suitable size being 5½x4½" outside measurement.

In the majority of cases the same type of tube may be used for filament current rectification as for plate current, since 60 milliamperes is not really a high current.

Impedance AF Used

In the diagram it will be noticed that three stages of impedance amplification in conjunction with UV199 tubes, since the voltage amplification of these tubes is not as high as the larger type tubes, and in any case the impedance amplifier does not give the same amplification as the transformer. Generally speaking however this amplifier is far more satisfactory than the transformer coupled type.

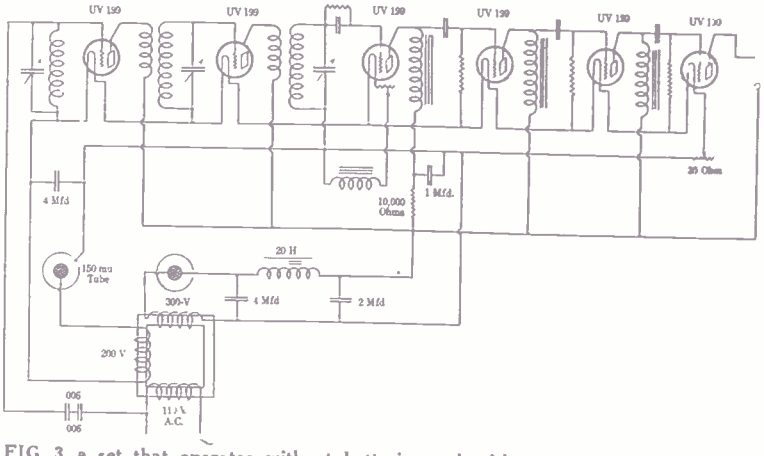


FIG. 3, a set that operates without batteries and without external antenna and ground. The RF pick-up of the lighting system is used for delivering the radio component to the first input. The detector tube is banked with the amplifiers.

A 70-to-1208 Meter Receiver

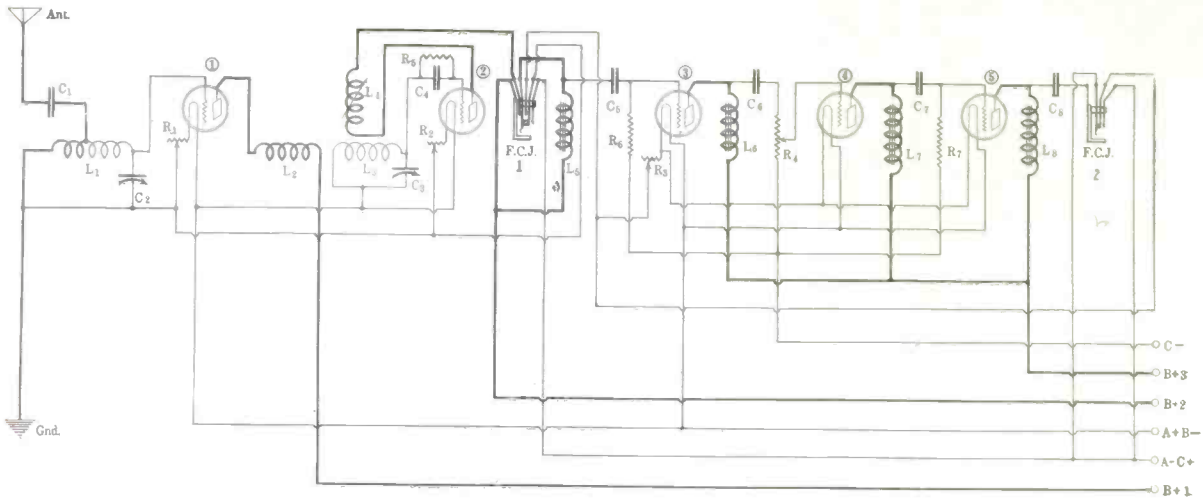


FIG. 1, showing the electrical diagram.

FIG. 2, the panel view.

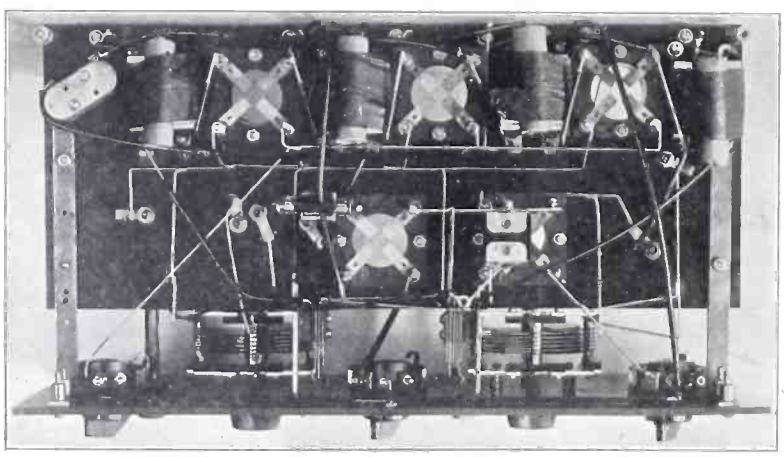


FIG. 3, Bottom view, showing the wiring.

By Robert Force

THE receiver shown in the electrical diagram in Fig. 1, is one for which many fans have been looking forward to for a long time. With this receiver wavelengths from 70 to 1208 meters can be obtained. A single winding antenna coil is used instead of the separate primary and secondary winding. With this type of antenna coil the signal strength was increased. In the detector the popular 3-circuit tuner is employed. In the AF stages, the choke coil method of coupling is employed. Filament control jacks are also employed. One is in the detector output, and the other is in the AF output.

One of the difficulties of this type of a receiver was the method to be employed in both varying the tickler, and also adding on more turns. However, it was found, that only with three different bands did the tickler winding have to be changed, viz., from 70 to 150 meters, 150 to 550; and from 550 to 1208. On the lower bands, the only real trouble was hit. It was found difficult to make the set oscillate up to the 150 meters. By placing a small radio-frequency choke, which consisted of 100 turns of No. 22 DCC wire wound on a tubing 1" in diameter, this was cured. For all the other frequencies, there was no trouble encountered. A special shaft is connected to the tickler for varying. On this shaft, a plug-in terminal is placed, so that the ticklers can also be plugged in and out. For the short wave band, the tickler should have 10 turns. For the broadcast band, the tickler should have 35 turns. For the high waves, the tickler should consist of 70 turns.

The panel is 7x14".

Wiring the Set

The antenna post on the terminal strip goes to one terminal of the fixed condenser C1. The other terminal of this condenser goes to the tap on the antenna coil L1. This tap is at the portion of the coil, where the greatest amount of turns are in the grid circuit, while the least amount of turns are in the antenna circuit. The end of the winding with the least amount of turns, goes to the ground post. This also goes to the rotary plates of the variable condenser C2. The stator plates of this variable condenser goes to the G post of the socket 1. This at the same time goes to the beginning of the antenna winding. The rotary plates of the variable condenser goes to the arm of the rheostat R1. The resistance wire of the rheostat R1 goes to the F— post on socket 1. The F+ post on socket 1 goes to the F+ post on socket 2. The beginning of L2 goes to the P post on socket 1. The end of this coil goes to the B+1 post on the terminal strip. The beginning of L3 goes to the rotary plates of the variable condenser C3, and also to the F— post on socket 2. The end of this coil L3 goes to the stator plates of the variable condenser C3. The beginning of the tickler coil winding L4 goes to the P post on socket 2. The end of this winding goes to the second terminal from the frame of the FCJ. The arm of the rheostat R2 goes to the arm

(*Concluded on page 26*)

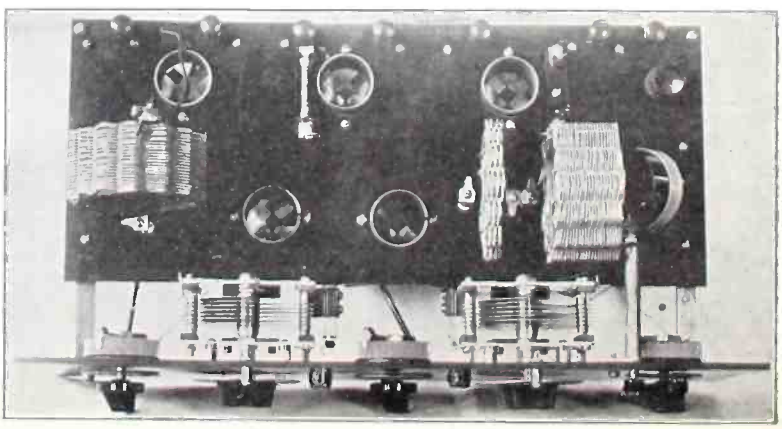


FIG. 4, the top view of the all-wave set.

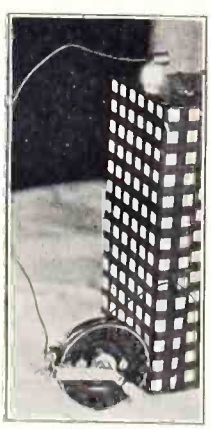
Coil Fields Guaged

NEEDLE as direction-finder.

A magnetic compass serves an excellent purpose in determining the relative direction of current flow in a coil. When one desires to determine how properly to connect coil terminals he may put the needle in the core of the coil and join the terminals of a 1½-volt dry cell to the ends of the coil windings. This should not be kept up for more than a few seconds, due to the heat generated. However, in those brief moments the experimenter will be able to determine which way the needle points. Consider the coil terminal that went to the positive terminal of the battery as positive and the other as negative. By repeating the same test with the same relative position of the battery terminals one may discover whether the coil windings are in the same direction. This comes in handy when wiring up sets that have toroidal, bank-wound or otherwise obscured coils. If the needle points the same way when two coils are tested, then the two pairs of like or corresponding terminals are determined. Primary and secondary windings may be tested for polarities in the same fashion.

Getting Proper B Voltage

Some fans use B batteries that have taps at only 45 and 22½ volts and are at a loss to know how to get lower plate voltages for tubes that function better that way. Connect a rheostat in series with the B plus detector lead and turn it to cut down the voltage to the best point. Once set, the rheostat may be left that way, unless a rundown condition of the B battery requires that the amount of resistance in the circuit be lowered, to increase the voltage to what it was before the batteries dropped.



VOLTAGE Control

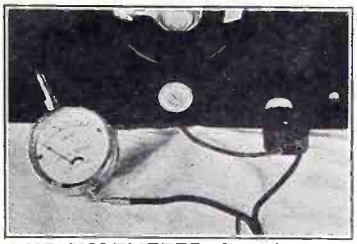
Detector Voltage Kink

The detector B voltage usually recommended by tube manufacturers does not pply if the first stage is resistance coupled. Instead of 22½ or even 45 volts one should use 67½ or even a little more, due to the voltage drop in the plate resistor...More than half the voltage is dropped in any such case.

The Wiggling Needle Discloses Distortion

The voltmeter has uses beyond its customary function of measuring voltage. The amperage affects the needle, too, hence the voltmeter may be connected in series with the plate of a radio-frequency, detector or audio-frequency tube, and one may determine just where distortion is present in a receiver. The B plus lead, instead of being connected to the end of a primary coil or direct to plate, is connected to the positive side of the meter, and the other terminal of the meter is joined to the plate post. If there is serious distortion the needle will wiggle considerably. The ideal condition would be to have the needle stand still while giving a reading, but this is not always easy, since, no matter how carefully the circuit may be wired, the distortion may be due to overloaded tubes, and this might be corrected in audio stages by using hi-mu tubes, in a resistance or impedance circuit, or, in any circuit, using a lo-mu or power tube in the last stage.

The photograph shows a voltmeter connected in series with the final output of a multi-tube set. It is in the last audio stage. The set is not operating, at the moment, but when the tubes are lighted the needle will show a positive reading. If it does not, reverse the connections to the meter.



THE VOLTMETER distortion test.

There are various ways of preventing distortion. One way is to use a variable primary in the aerial circuit or a variable resistance in series with the ground lead. These cut down the input, relieving distortion causes at that end. If everything checks all right up to the first audio stage, put a variable resistance across the secondary of the first audio transformer, or a variable resistance in the B plus detector lead.

Lazy Folk's Delight

A SWITCH in bed.

Many persons like to lie abed, listening to a jazz orchestra, and finally get too lazy to get up and to turn off the set. What happens then is a matter of speculation, but some persons no doubt fall asleep, leaving the tubes going all night. Rather than do that it is cheaper and better to have an A battery switch under the pillow. Turn the set on or off by a twist of the switch knob. The lead may be brought from the positive A battery terminal to one side of the switch, the other side of the switch making the return course and being joined to the F plus posts of the sockets.

Six Musical Glasses

WATER tumblers all wired.

An interesting way to try out a simple resistance audio circuit is to get six tumblers, have them three-quarters full of water and use them in a hookup. Each glass of water has two wires in it, the insulation being scraped off the wire ends. The water is the resistor. The conventional three resistance-coupled steps of audio may be tried out in this way, any convenient size of fixed condenser being used for blocking purposes in between stages.

Spray Helps Neatness

SPRAYING bronze liquid on parts.
(Photos by Hayden.)

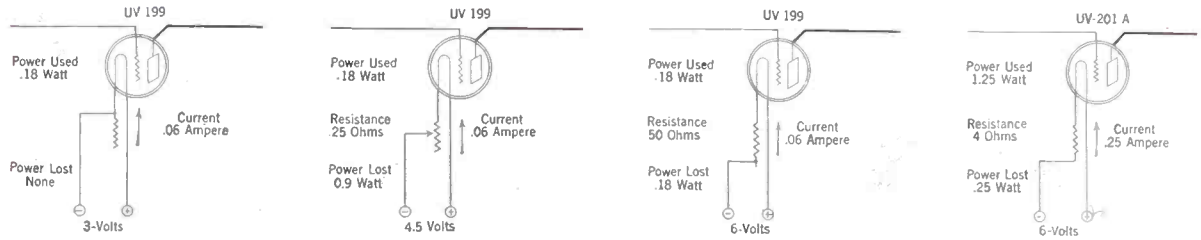
Many an experimenter has desired to put a professional touch to some hinge or other metal part, even a screwhead, bronzing it in delicate fashion, but has been at a loss how to proceed. An excellent method is to mix the bronze solution carefully, then place it in an inexpensive atomizer and spray the bronze liquid on the hinge or other part. Even an entire panel may be treated in this way. If small parts are to be bronzed, Place them on a piece of cardboard, then spray. This stunt will equalize the appearance of metal parts where one has an unmatched assortment and desires to make the visible part of the set constitute a synchronized unit.

Keeps Tabs on Him

MRS. GRAHAM McNAMEE, wife of the popular announcer of WEAF, New York City, listening in while her husband is on the air, so that she may assist him in correcting any faults he may develop. She has found none so far. (Underwood & Underwood)

Radio World's Radio Gifts Number Out Next Week

What's Watt About Ohm's Law



Noted Authority Explains How the Difference in Voltage Between the Source and the Input Is Totally Lost in Heat in the Rheostat or Other Resistor — Points Out Ways to Connect Tubes So as to Avoid This Waste—Ohm's Law Explained and Applied to the Fan's Everyday Problems—Only 4 Ohms Resistance Needed for 201A Tubes.

By J. E. Anderson

Consulting Engineer

VOLTS, amperes, watts, and ohms are more or less familiar to the majority of radio fans. They all sound familiar, at least, to the fans because they have been mentioned so often that the fans regard them as old friends. Some of the fans may not have a very distinct conception of the quantities which these terms are used to measure, but they have had some practical experiences with them. Perhaps they have put the B battery across the filament terminals and have had the painful experience of a set of burnt-out vacuum tubes; perhaps they have inserted rheostats or other resistances to prevent such disasters; perhaps they have measured the current with an ammeter; perhaps they have used a voltmeter to test the voltage of their A, B and C batteries.

J. E. ANDERSON

Many may be the fans who greet the above units by their common names, but few there be who know the laws connecting them. Not many can sit down and predetermine the right combinations of volts, amperes, ohms and watts to bring about the desired results. To many Ohm's law might be a Bavarian statute for enforcing beer drinking, for all they know. By some who know the law imperfectly it is as often violated as the Volstead act. Unlie the latter law, violations of Ohm's law always meets with instant punishment. The connection between volts, amperes and watts is not even as well known as Ohm's law.

Ohm's Law

Now Ohm's law is simply that the current flowing in an electrical circuit is proportional to the potential, or voltage, and inversely proportional to the resistance in the circuit. That is, if the current is measured in amperes and designated by A, the potential measured in volts and designated by V, and the resistance measured in ohms, designated by R, then A= V/R. That is, if the voltage is 110 and the resistance is 20 ohms, the current which will flow in a closed circuit will equal 5.5 ampere. The relation between volts, amperes, and watts is simply that the wattage is equal to the product of the current in amperes and the voltage in volts. Thus in the above example the voltage is 110 volts and the current is 5.5 amperes, and therefore the wattage is 605. That means that electrical work is being done at the rate of 605 watts, or that electrical energy is being dissipated at that rate. The resistance may be the heating element in an electric heating device like a soldering iron, or the filament of a vacuum tube, or the rheostat in the filament circuit, or a combination of various resistances. In determining the current flowing in a circuit the total voltage and resistance in that circuit must be taken into account. In determining the wattage in a given resistance the current flowing through it and the voltage difference between the ends of the resistance are taken into account. Let us consider the more common types of filament circuit in radio receivers in greater detail.

The UV199 Analyzed

First consider the case of a UV199 tube on a 3-volt filament supply. The rated filament voltage of this tube is three volts and the rated current is .06 ampere. By an application of Ohm's law we see that the resistance of the tube filament is 50 ohms, since 3 divided by .06 is equal to 50. When this voltage is used at the source no filament rheostat or other resistance is required in series with the filament to cut the current down to normal. A 3-volt dry cell battery is enough, as long as the cells are fresh, but after they have been used a while the voltage is less than the required three volts. To have some reserve voltage it is customary to add another cell to the battery so that the voltage of the source is 4.5. This will drive 50 per cent. more current through the filament, which is neither safe nor economical. Hence it is required to use a rheostat in series with the filament and this rheostat should have such a resistance as to cause a fall of potential of 1.5 volt when a current of .06 ampere is flowing through. Ohm's law tells us that the required resistance is 25 ohms, that is, when the cells of the battery are new. The useful energy expended in the filament is at the rate of 3 watts, and the energy dissipated in the rheostat is at the rate of 1.5 watt. The latter part is wasted, but it is a necessary waste.

If the UV199 tube is operated on a 6-volt storage battery it is necessary to insert a 50-ohm resistance, or rheostat, in series with the filament to establish the rated filament terminal voltage across the tube. As before energy is used in the filament at the rate of 3 watts, but now energy is dissipated at an equal rate in the rheostat, since this has the same resistance as the filament and the same current flows through both. The filament circuit is now only 50 per cent. efficient. But even with this low efficiency it is possible that a multitube set is more economically operated at the filaments on a 6-volt storage battery than on a 4.5 volt dry cell battery, on account of the lower cost of replacing the charge.

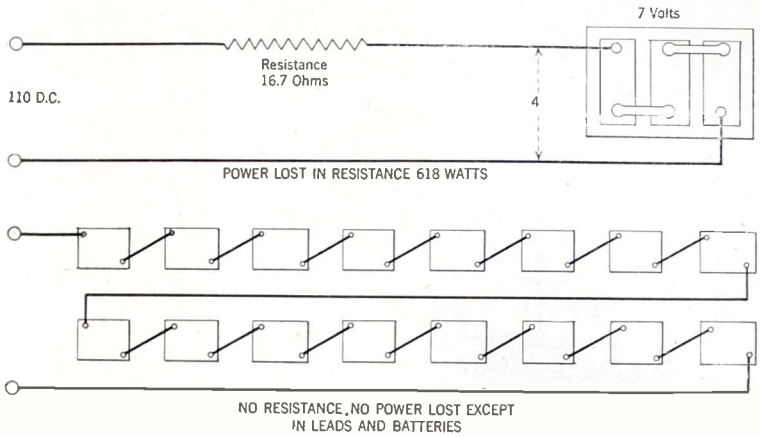
When several UV199 tubes are operated in parallel on a given voltage the total current flowing in the circuit is multiplied by the number of the tubes. Thus if there are five tubes the total current is 5x.06=.3 ampere. That holds only of course when the filament voltage across each tube is 3. If the voltage is different at the source resistances or rheostats must be used as stated above. If the source is 4.5 volts the resistance in each filament circuit must be 25 ohms and if the source is 6 volts the resistance in each filament branch must be 50 ohms. When several tubes are used in parallel it is possible to put more than one tube on a resistance, or rheostat. In that case less resistance is required to bring about the desired voltage drop. For instance the entire five tubes in a Neutrodyne may be placed on one rheostat. Then if the voltage at the source is 6 and the current in each tube is .06 ampere, the required common resistance is 10 ohms, or one-fifth the resistance required for a single tube. This is determined in the following way: The required terminal voltage is 3. This leaves 3 volts to be dropped in the rheostat. The total current flowing in this rheostat is 5X.06=.3 ampere, hence by Ohm's law the resistance is 3 volts divided by .3 ampere which gives 10 ohms. In case two UV199 tubes are operated on a single rheostat from the 6-volt source the required resistance is 25 ohms, which may be determined in the same way.

A Way to Economize

The energy dissipated in the resistance may be saved by operating the tubes in series parallel on a 6-volt source. Since the normal filament voltage is 3 volts it is possible to operate two of the UV199 tubes in series. One of the tubes then becomes the resistance in which the excess voltage is dropped, but now the energy used to heat the resistance is no longer wasted. If the number of tubes in the set is even, no resistance at all will be necessary, because two and two may be connected in series and the pairs then connected in parallel. A 6-tube set could then be operated on a 6-volt battery with a current drain of .18 ampere. The total power expenditure would be 1.08 watt, none of which would be wasted. To make this method of operation a success it is necessary to keep the battery fully charged. It should never be allowed to fall below 5.8 volts. Then on the dis-

How to Economize on Juice

Using DC for Storage Battery Charging, 15 Batteries Can Be Restored at the Cost of Recharging One—If Only One Is Charged It Costs 77 Cents for Power, of Which 72 Are Thrown Away—Motor Generator Would Soon More Than Pay for Itself—Losses in Rheostats Due to Heat Which Is Dissipated So Quickly That the Resistor Itself Does Not Get Hot.



charged condition of the battery the filament terminal voltage on each tube would be 2.9 volts, and in the charged condition it would be about 3.2 volt.

The series-parallel method of operation may also be used to good advantage in connection with dry cells. Four in series would be required to give about 6 volts. Since the total current drain of the set is only .18 ampere it is near the current condition which gives most economical operation of dry cells.

Only 4 Ohms for 201A

UV201A and similar tubes draw .25 ampere and require a filament terminal voltage of 5. If such tubes are operated on a 6-volt source a rheostat or Amperite is required to produce a drop of one volt. The required resistance is by Ohm's law 1/.25=4 ohms.

Usually a 20-ohm rheostat is used, to enable tube operation at less than the required voltage, to prolong tube life. But no juice is saved.

The power expended in the 4-ohm resistance is one-quarter of a watt, and the useful power in the filament is 1.25 watt. The filament circuit is therefore 83.3 per cent. efficient. When more than one of this type of tube are put on one rheostat the required resistance will be less as before. The current in each tube is .25 ampere. The total current in a 5-tube receiver would therefore be 1.25 ampere. If all these are on one resistance the value of this would be 1/1.25 ohm, or .8 ohm. The power wasted in this resistance would be 1.25 watts, but this would be the same percentage of the total as in the case of one tube, that is, the efficiency would be the same.

The Charging of Batteries

The units under discussion together with Ohm's law are useful in connection with the charging of storage batteries. Suppose it is required to charge a 6-volt storage battery and that the current supply is 110 volts DC. The back pressure of a 6-volt storage battery when on charge is about 7 volts. The rated charging current of a 100-ampere-hour battery is 6 amperes, which should not be exceeded. If the 110 volt line were connected across the battery directly, the current would be so great as to ruin the battery in a few minutes. It is necessary to insert a resistance in series with the battery and the charging source. The proper value of this may be determined as follows.

Since the voltage at the battery terminals is only seven it will be necessary so to choose the resistance that the voltage drop in it is 103 volts when 6 amperes flow through. Hence by ohm's law the required resistance is 103/6=17.2 ohms. If the resistance is less than this the charging rate will be too great, if it is greater the charging will be slower than necessary, but no harm will be done to the battery by the slower method.

Cutting Down the Cost

The cost of charging a storage battery is a problem of practical importance, as a large number of radio fans are now charging their own. The cost of electrical energy is 7c per kilowatt-hour to most home users. When a 100 ampere-hour battery is charged at the rate of 6 amperes it takes 16.7 hours to charge it fully. Now if the voltage of the charging source is 110 DC, the charging power is 110x6 or 660 watts. This is equal to .66 kilowatt. This power delivered for 16.7 hours will amount to 11 kilowatt hours, which at a price of 7c per K.W.H. will come to 77c. If the charging rate had been less than 6 amperes the cost would have remained the same, because the charging time would have been increased.

The efficiency of charging a storage battery on a 110 volt supply is very low, since the greater part of the energy drawn from the source is used up in heating the resistance coil. The total voltage is 110, of which only 7 volts are useful, according to the above assumption, and the wasted voltage is 103. Hence the efficiency, aside from losses in the battery itself, is only 6.36 per cent. Hence 72c of the 77c is thrown away. This waste would soon amount to the cost of a motor generator which would convert the voltage to the proper value for charging a battery, and this conversion could be done so cheaply that the final cost of charging a 100 ampere-hour battery would not cost more than 6 or 7 cents.

15 At The Price of One

If more than one storage battery is available two or more should be charged connected in series. It will cost no more to charge 15 storage batteries on a 110 volt supply than to charge a smaller number of batteries, because 7 is contained in 110 just 15.7 times. If 15 are connected in series no resistance in series will be required, or at least only a very small one. If fewer than 15 are used resistances will be required, and the ohmage of course depends on the number of batteries connected in series.

If only DC current is available, and if many batteries are not to be charged often the purchase of a motor-generator which gives the correct secondary voltage is an economical step. Many radio fans who have multi-tube receivers with all tubes drawing a .25 ampere or more, and who use their sets several hours every day will have to charge their batteries at least once a week, and every time they charge them 72c is thrown away. They would find a motor-generator economical.

If AC at 110 volts is available the 72c may be saved much more easily. All that is necessary is a step-down transformer of proper ratio and some kind of rectifier. These may be had in various grades and at various prices to suit the radio allowance of most fans.

What Happens to the Excess?

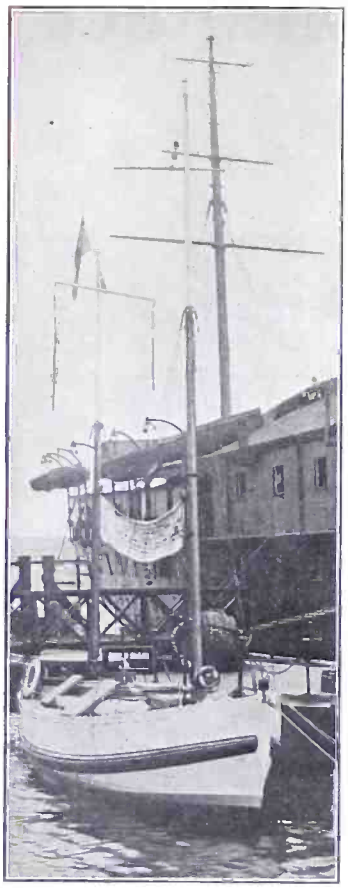
What becomes of the voltage that is dropped in a rheostat or in the resistance in the charger? What becomes of the potential energy in a stone when the stone is dropped from a height? The potential energy of the stone is converted energy of motion. Ultimately when the stone encounters the resistance of the ground energy is changed into kinetic energy of heat. Similarly the voltage, which is potential energy, is converted into energy of motion of electrons, and when these encounter resistance in the wire the energy is changed into heat. The answer to the question then is heat.

If this energy is converted into heat, why does not the resistance get hot, like the filament of the tube? The answer is that it does. The reason that it does not get so hot as to hurt when you touch it is that rheostats and similar devices are in the open air and that they have a greater surface. In air hot bodies cool quickly and the larger their surfaces the more quickly they cool. The filament is in a vacuum and it has a very small surface, hence it cools slowly. The amount of heat generated in a resistance depends on the voltage, the current, and the time, that is, on the watt-hours. The temperature of the resistance depends on the watts generated and the watts dissipated in radiant heat. The resistance heats up until these two are equal.

Set Bequeathed in Will; First Case on Record

In disposing of his radio set in his will, Edward F. Gordon of New York City, who died on April 26, set a precedent. His will, executed on March 12, six weeks before his death, directs that the radio set be given to Gustave W. Fuerth, a friend, of 108 South Seventh Street, Newark, N. J.

Radio Aids Long Voyage



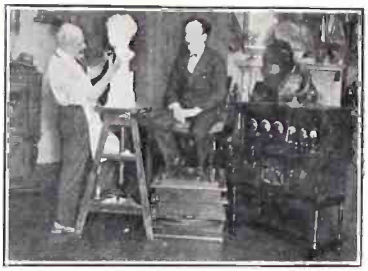
READY for the cruise. (Kadel & Herbert)

Four English mariners headed by Captain G. E. Hitchens, in a few days will depart from London in a forty-foot lifeboat on a most ambitious expedition. The object of the tour which, if completed, will involve actually sailing more than 38,000 miles, is to demonstrate that a lifeboat can be fitted for a long cruise without exposing its crew to serious hardships. The radio will play a large role. Rations and medical supplies will be carried in sufficient quantities to provide comfortable traveling between scheduled stops. If unforseen delays should occur the radio will be called up for relief from passing ships. The itinerary of the little craft will be via Africa, India, Australia, to Cape Horn, up the East Coast of South and North Americas to New York, through the Canadian lakes, down the St. Lawrence river to the Atlantic and back to England. The trip will take at least three years. The photo shows the lifeboat "Elizabeth and Blanche," in the Thames river at London. Note the wireless aerial between the masts, and the box shape directional aerial near the deck.

Farmers Enjoy Radio

Radio is playing a great part in the life of the farmer and he is finding increasing benefits in it every day. Constantly in touch with the big centers of the continent, he has the latest market reports while the diversion of cities can be brought to his isolated home. With the sweeping progress of the radio the farmer has lessened any disadvantage he may be expected to sustain by reason of his position and imparted something unique and particularly enjoyable in the way of farming.

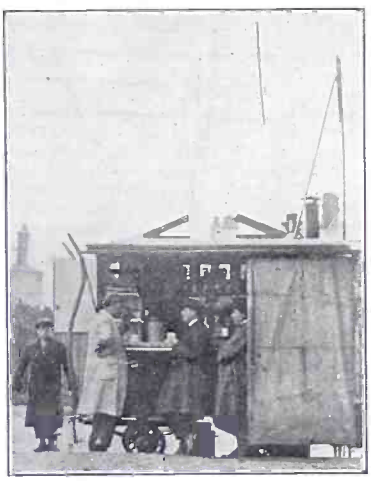
The Strain of Posing Greatly Lightened for Impresario



Riesenfeld posing. (Kadel & Herbert.)

Hugo Riesenfeld, musician himself, and director of the Rialto and Rivoli Theatres, New York City, whose musical programs frequently are broadcast, felt the weight of fame on his shoulders when he was asked to sit for the famous sculptor, Emil Fuchs. Now Mr. Riesenfeld's artistic countenance is safe in marble perpetuity. But it was a severe task, at first, to sit there for hours, not even being able to breathe heavily, much less wield a baton. The task was lightened considerably when a radio was installed. Pleasant music tempted the broadcaster to smile, but he restrained himself, knowing how confusing changing expressions would be to the sculptor. Once in a while Mr. Riesenfeld felt like raising a pout higher than the topmost hair of his moustache. That was when some specialist in cacaphony outraged the word music and defied the trained musicianship of every listening impresario by playing "Mama Loves Papa" on a musical saw. But now the ordeal is over and radioists who admire Mr. Riesenfeld's musicianship may bow their heads in reverence as they pass the marble embodiment of his facial features.

The Fan's "Coffee Pot"



THE coffee pot idea abroad. (Kadel & Herbert)

Although he doesn't, the owner of this English coffee pot could advertise that he supplies music by the Hotel Savoy (London) orchestra to his patrons By the means of a powerful receiver and an elaborate antenna system the enterprising owner of this establishment furnishes real music with his food and his enterprise has brought him much trade.

A Model of Fine Taste

BEAUTIFUL studio interior.

The idea of stressing beauty in the design and decoration of a studio is well exemplified by WSBC. This station, operated by the World Battery Co., is now one of the most popular on the air. It is located in the New Southern Hotel, Chicago, and uses a wavelength of 210 meters.

A SPECIAL 4-TUBE DX SET appeared in RADIO WORLD dated Nov. 14. 15c per copy, or start your subscription with that number. RADIO WORLD, 145 W. 45th St., New York City.

Parlor Remote Control

MISS FLOSSIE ERICKSON trying out the new no-knob remote control receiving set. Stations are brought in by pushing a control button on the keyboard. This is one of the interesting exhibits at the Radio Show which opened at the Coliseum in Chicago on Nov. 17, for a week's run. (Underwood & Underwood)

A TABLE FOR CONVERSION OF FREQUENCIES AND METERS appeared in RADIO WORLD dated Nov. 28. Other features in that number are: The Zero Potential Loop, by Frank Freeri; the 1-Tube Headset Receiver, by J. E. Anderson, etc. 15c per copy, or start your subscription with that number. RADIO WORLD, 145 W. 45th St., N. Y. C.

Radio University

A QUESTION and Answer Department conducted by RADIO WORLD for its Readers by its staff of Experts. Address Letters to The Radio University, RADIO WORLD, 145 West 45th St., New York City. Just East of Broadway.

WILL YOU please give me a diagram illustrating how to connect up the secondaries of 3 radio-frequency transformers so that they may all be turned at one time. That is a diagram of how to gear up these coils is requested. I would like to know the issues that a set using these coils were described.—H. D. Hartzell, Sioux City, Ia.

Fig. 236 shows the diagram that you request. The diagram is self-explanatory. A receiver using this type of coils was completely described in the Sept. 5 and 12 issues of RADIO WORLD, by Lewis Winner. 144-180, 181

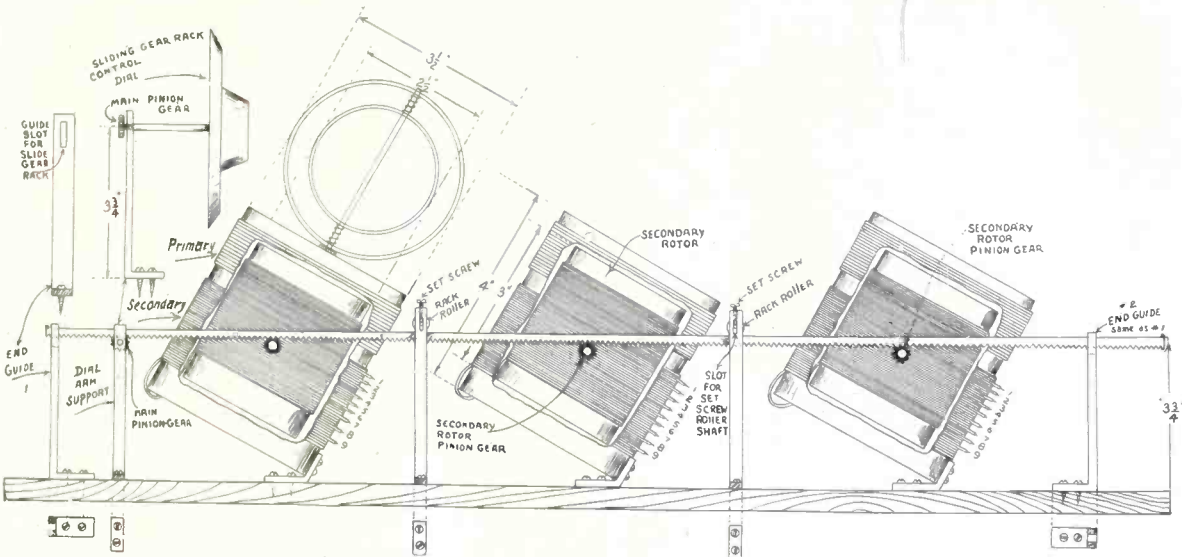


FIG. 236, showing the diagram Mr. Hartzell requested.

WILL THE Diamond of the Air bring in Los Angeles stations through the San Francisco and Oakland stations? (2)—Will the DX reflex set, published in the Sept. 19 issue of RADIO WORLD, give results equal in volume and DX to the Diamond? (3)—Is the clarity of the Diamond good? —Robert J. Craker, 835 Pine St., San Francisco, Cal.

(1)—Yes, if the set is properly constructed, carefully tuned. (2)—The Diamond is much louder. (3)—Very good.

* * *

I AM constructing the 1926 Model Diamond of the Air. (1)—I would like to know if I can use the Ambassador Baby Antenna coil in this receiver (2)—Can I use the Clarotuner as a 3-circuit tuner? (3)—I should like to use two steps of transformer AF coupling. Will this be O. K.?—J. B. Quinlan, 262 Fulton St., Brooklyn, N. Y.

(1)—Yes. (2)—Yes. (3)—Yes.

* * *

WILL YOU please answer the following queries? (1)—Is a 1-control Neutrodyne selective? (2)—Is it as good as the standard Neutrodyne in so far as volume and distance are concerned?—Robert Williams, 317 Havell St., Rocky Mount, N. C.

(1)—Fair. (2)—No.

* * *

WOULD CABLING all the leads except the Plate and the Grid wires make the Diamond more stable?—W. J. Bothe, 105 Morne Ave., San Antonio, Tex.

No, there would be no difference noticed at all.

* * *

MAY THE Bremer-Tully Tuner, and RFT be used in the Diamond of the Air with success? (2)—Is it possible to use a tandem condenser instead of the two shown?—E. H. Thomson, Des Moines, Ia.

(1)—Yes. (2)—Yes, but the results will not be as good unless you have the coils absolutely matched.

* * *

IS THE Diamond more selective than the Superdyne? (2)—I have trouble in going down below 250 meters with this set.—J. H. Heinemann, Foley, Mo.

(1)—The Diamond is more selective than the Superdyne. (2)—Take off 3 turns from the secondaries of both the RF tuner and the RFT.

* * *

IN REFERENCE to the 1-control set described by Percy Warren in the Sept. 26 issue of RADIO WORLD, I would like to have the following queries answered: (1)—I have two variable condensers, one consisting of 17 plates and the other of 13 plates, with which I would like to build two sets. Will you please give me the coil data for each condenser using a 3" or a 3½" or a 4" form, as I have all these forms? (2)—Will it be all right to use C3 with the leak shunted across it, instead of the leak going to the A+? (3)—Will this set obtain DX? (4)—Can AF transformer coupled amplification be added in the usual way? (5)—What dry cell tube will work well in this set?—A. S. Bailey, Houston, Tex.

(1)—Using the 3" tubing and a 13 plate condenser, L1 has 15 turns. The tap is taken at the 8th turn. L2 has 65 turns. L3 has 60 turns and is tapped at the 30th turn. Using the 3½" tubing and a 13 plate condenser, L1 has 12 turns, tapped at the 7th turn. L2 has 56 turns. L3 has 51 turns and is tapped at the 26th turn. Using the 4" tubing, and still the 13 plate condenser, L1 has 10 turns, tapped at 5th turn. L2 has 55 turns. L3 has 45 turns, and is tapped at the 23d turn. Using the 17 plate condenser with the 3" tubing, L1 has 15 turns, and is tapped at the 8th turn. L2 has 60 turns. L3 has 55 turns and is tapped at the 27th turn. Using the 3½" tubing with the 17 plate condenser, L1 has 12 turns, and is tapped at the 7th turn. L2 has 51 turns. L3 has 46 turns, and is tapped at the 23d turn. Using the 4" form, L1 has 10 turns. It is tapped at the 5th turn. L2 has 50 turns. L3 has 40 turns, and is tapped at the 20th turn. Use No. 22 DCC wire. (2)—Yes. Use a positive grid return though. (3)—Yes. (4)—Yes. (5)—The UV199. Use a 4½ volt battery to light the filaments.

* * *

I WOULD like to know the number of turns that is placed on the primary and the secondary of the RFT in the Pathfinder, described by Sydney E. Finkelstein in the Oct. 31 issue of RADIO WORLD, using a basket weave form instead of the toroid coils. Also please give the number of wire that is to be used when winding the same.—H. G. Lesley, Clayton, Ga.

L1, the primary, is wound on a tubing 3½" in diameter. There are 10 turns placed here. L2, the secondary, is wound on the same tubing. There are 60 turns placed here. L3 contains the same number of turns as L1. L4 contains the same number of turns as L2. L3L4 is wound on a tubing 3½" in diameter. The tap on L4 is taken at the 20th turn. Use No. 22 double cotton covered wire.

* * *

I BUILT the DX Wonder of 1925, described by Herman Bernard in the March 28 issue of RADIO WORLD and get wonderful results. The primary of the tuner consists of 8 turns wound on a 4" tubing. The secondary is wound on the same tubing, with 31 turns. No. 20 double cotton covered wire is used. The tickler is wound on a tubing 3" in diameter and 2¼" high. There are 20 turns placed here, using No. 26 silk covered wire. The only trouble lies in the fact that I cannot receive stations above 455 meters. Do you think that I should add more turns to the secondary of both the RF coil and the tuner to get the high wave stations?—M. Bremmer, 600 E. 18th St., N. Y. City.

Yes. Add 10 turns to both secondaries.

* * *

I WISH to build the 1925 3-Control Diamond. Now I have a Gen-Win 3-circuit tuner. The winding is of the basket weave type. No. 18 double cotton covered wire is used for the secondary. The inside diameter of the secondary

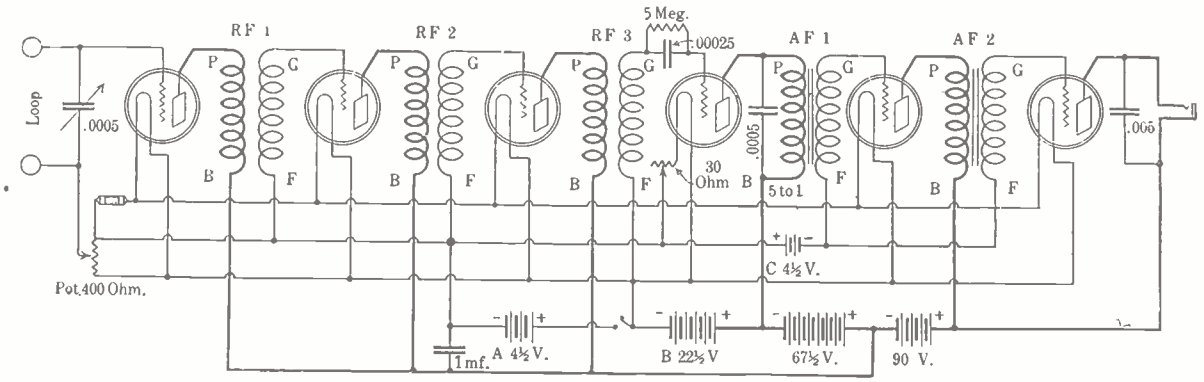


FIG. 236A, showing the 6-tube 1-dial set.

winding is 4". The secondary, which is wound on the inside, contains 44 turns. The primary is wound over the secondary, with 6 turns. No. 14 bare copper wire is used. The tickler is wound in the basket weave pancake style. I have a bakelite tubing 3½" in diameter, 2½" high, and some No. 22 double silk covered wire. I wish to construct a radio-frequency transformer to match this tuner. The secondary of this RFT is to be tuned by a .0005 mfd. variable condenser. Will you please give me the correct number of turns to be placed on the primary and the secondary?—W. H. Dorsey, 16 Waldron Ave., Summit, N. J.

There are 10 turns placed on the primary and 50 turns placed on the secondary.

* * *

WOULD YOU please give me a diagram of a 6-tube non-regenerative, 1-dial, loop-model receiver. I have a 400 ohm potentiometer which I would like to put into use. If it can be used, will you put it into the diagram?—G. Westonais, Norfolk, Mass.

Fig. 236A shows the electrical diagram of a receiver of that type. The transformers used are fixed, and should reach the broadcast range of from 200 to 550 meters. The audio-frequency transformers used are of the low ratio type, and should be of the same manufacture. The UV199 tubes are used. If you wish to use the 201A tubes, you will have to employ a 6-volt battery. The 1 mfd. condenser, may be eliminated, if so desired. The results obtainable therewith will be determined only upon test. Only one variable condenser is used. This should be of the SLF type.

* * *

A DIAGRAM of a B battery eliminator employing the S tube is requested with full details.—R. Traskins, St. Francisco, Cal.

Fig. 237 shows the electrical diagram of an eliminator. The AC transformer is

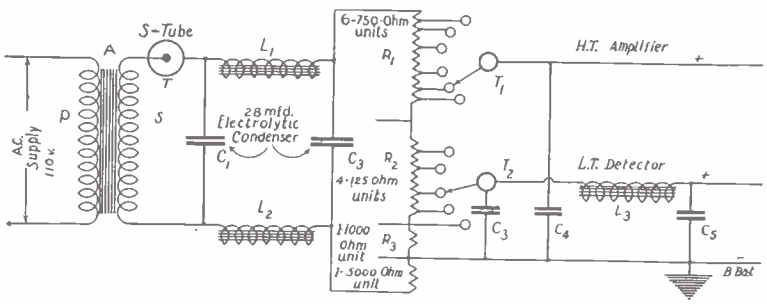


FIG. 237, showing the electrical diagram of the eliminator.

made as per: The core consists of the laminated ¾" square cross section type. This means that the surface of the metal is ¾" square. The outside dimensions of the core is 3¼" square. There are 100 laminations in this core. Procure one-quarter pound of No. 22 single cotton covered enameled wire. Also one pound of No. 30 single cotton enameled wire. Obtain some 1/16" waxed paper (about 2 sheets 6x8") and one sheet of .002" paper. Wrap the 1/16" paper on both legs of the core. Wind 225 turns on each leg of the core, making a total of 450 turns, using the No. 22 SCE wire. This is the primary. Take the beginning and end of the primary winding out for leads. Now wrap the .002" paper over the primary. Take the No. 30 SCE wire and 787 turns on one leg over the primary and 788 turns on the other leg over the other be 1575 turns in the secondary winding. The voltage output of this transformer is approximately 340 volts.

L1, L2, L3 are 10 henry choke coils. C1 and C2 the electrolytic condensers, C3 and C4 the .005 mfd. mica by-pass condensers and C5 the 1.0 mfd. paper condenser, constitute the capacity part of the system.

The choke coils can be made. Procure

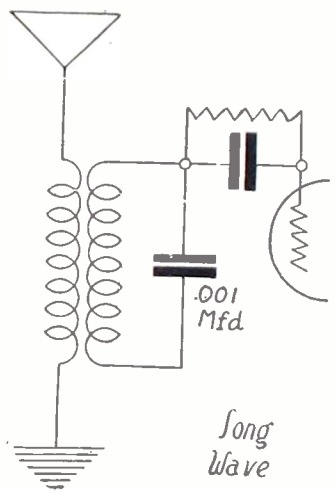


FIG. 238, increased wavelength.

an old audio-frequency transformer. Take off all the windings, until you have only the core. Now get some No. 36 single cotton enameled wire. Wind 4,000 turns of this wire on the core in any fashion. R1 is a 4500-ohm resistance unit, tapped every 750 ohms, which gives us 6 taps. This means that the voltage is divided up into 15 volts steps. R2 is a 500-ohm resistance unit. There are four 125-ohm units connected in series and a tap taken off every unit. In series with this unit is a 1000-ohm unit (R3) and a 5000-ohm resistance unit.

* * *

WHAT is the effect of a condenser in parallel with a coil?—J. A. Stevens, Unionport, N. Y.

The wavelength is increased. If the condenser is placed in series the wavelength is reduced. Fig. 238 shows the parallel or shunt connection. In tuned circuits this condenser is .001 or .0005 or .00035 mfd. and is variable.

Diamond Wiring Kinks Solved

[The following is the third and last of a series of articles dealing with laboratory tests of the 1926 Model Diamond of the Air. The two other articles were published in the November 21 and 28 issues. Those intending to construct this receiver should obtain also the September 12, 19 and 26 issues, which deal comprehensively with constructional and other phases not treated in this series.]

By Herman Bernard

Associate, Institute of Radio Engineers

EVEN the novice should have no trouble in constructing the 1926 Model Diamond of the Air. The chief difficulty to be expected might be magnetic interplay, but the arrangement of parts prevents this, and the diagram as shown pictorially this week should be followed exactly. You can see where each wire goes. Moreover, the parts appear just as they are in the same relative positions as on the original laboratory model. Except for elucidation of a few points the fan can go right ahead with utter safety. The results obtained by others can be duplicated by any one, under like conditions, simply by following the pictorial plan. Those who find that working from a full-sized blueprint helps them in establishing position of parts and making wired connections should obtain the blueprints.

HERMAN BERNARD

Coil Terminals Explained

The coil terminals in the schematic diagram, published November 21, were designated by letters, the same ones used in the picture diagram shown this week. These should be followed without alteration, except that I and J may be interchanged. The coil terminals are as follows:

A is the beginning of the aperiodic primary Lo, in the antenna circuit, and is connected to aerial.

B is the end of that winding and goes to ground.

C and D should be watched carefully, as their source may be lost in the confusion of jack wiring. C is the beginning of the secondary L1, and is that terminal of the secondary which adjoins the end of the primary Lo. In the laboratory receiver the Bruno coils were used, and these have binding posts on them, to which the coil terminals are secured. The wire terminals are not brought to the nearest binding posts, but the wire is turned back, so that the winding is thus given added support, hence this is something to watch in determining the beginning and the end of a winding. It is easily done at a glance, but might be overlooked unless attention were called to it.

C is the beginning of the secondary winding and goes to that inside spring of the jack which ultimately connects to minus A when the jack is closed.

D is the end of the winding and makes connection to the other inside spring of J1, which ultimately goes to grid. Trace this carefully. Note that the rotor plates of C1 connect to that terminal of the coil which goes to A minus, i. e., terminal C.

E is the beginning of the RF plate coil L2 and connects to the plate of tube 1.

F is the end of L2 and connects to B plus 45.

G is the beginning of the detector input secondary L3 and connects to positive A. The rotor plates of C3, the only other tuning condenser used, go to this lead, too.

H is the end of the secondary winding and goes to one side of the grid leak-condenser combination. The other side of this combination goes to the grid post of the detector socket. An excellent precaution is to connect the grid post of the socket to the lug of the Bretwood variable grid leak farthest from the panel, while the lug close to the panel goes to the other side of the grid condenser and to the stator plates of C3. This is shown in the picture diagram above. The H terminal goes to the stator plates of C3, the connecting point being a lug on the insulation strip on the right-hand side of the tuning condenser. The connection to the rotor plates of C3 is made by soldering the lead from G direct to the condenser frame.

As for the tickler coil, since its angle of variation is very wide, there need be no special precaution about this wiring. As the flexible tickler leads on the coil are easily reversible, one may wire the tickler either way, reverse as a test, and retain that manner of connection which affords best results. Normally the same effect may be had with either method, because the reversal of current flow can be accomplished by turning the tickler out of its positive angle of variation into the negative angle.

The Binding Posts

The diagram published this week may be slightly confusing on one point. The binding post switch method used between the detector and the audio circuit calls for the joining of two pairs of posts by two separate little pieces of bus bar, called straps.

The diagram shows the bottom view of the set, as all the wiring is underneath, except for the two straps, so these are so shown projected from dotted lines. The binding posts referred to are W, X, Y and Z.

The jacks are shown mounted sideways. This makes it easier to read the connections. Also, the actual construction by that method will make it possible to tell at a glance whether there is a short in a jack, which would be hard, indeed, to find out by the aid of the eye alone if the jacks were mounted conventionally.

Reconciliation

The battery cable leads that project in the foreground of this week's diagram, of course, actually are brought to the rear and through a hole in the cabinet to the proper battery connections. They are shown forward because to bring them across the wiring would obscure the diagram.

Terminal C goes to A minus, rather than to filament minus. The November 21 diagram showed filament minus at this point.

C Battery

At extreme right and left are the brackets. The socket strip is not wholly supported by these but would sag in the middle were it not for the support contributed by the audio transformer.

The C minus lead is shown emerging from the same point where A minus is introduced through the battery cable. The distance between C minus and C plus may be cut down, if desired, by making the C plus connection at some point farther to the left in the diagram. C plus and C minus are shown with lug connections, but these are not necessary, the bare ends of wire, where the insulation has been scraped off, being just as good.

Wiring Directions

Join A plus to one side of the switch S1, the other side of that switch to the one side of the switch S2. The other side of S1 goes to the F plus post of the RF and detector sockets (1 and 2). A minus goes to one side of R7, to one side of R2 and to one side of R1. The other side of R7 goes only to the F minus post of the last audio socket (5). The other side of R2 goes only to the F minus post of the detector socket (2). But the other side of R1 goes to three points. They are the F minus posts of the RF, first audio and second audio sockets (1, 3 and 4). The open side of S2 goes to the F plus posts of the three audio sockets (3, 4 and 5).

This completes the A battery wiring, but as grid returns go to these leads, connect them next.

Coil Connections

C terminal of L1 goes through the jack J1 to minus A. Do not connect this to F minus on the socket. G of L3 goes to A plus at any convenient point. This may be even to F plus on any socket, since A plus and F plus are the same, there being no resistor in the positive leg in any case. The end of the transformer secondary, marked Neg. Fil. on the instrument, goes instead to negative A battery, as shown in the diagrams. The leak R4 goes to negative A, also, while R6 goes to minus C. The plus C post is joined to minus A.

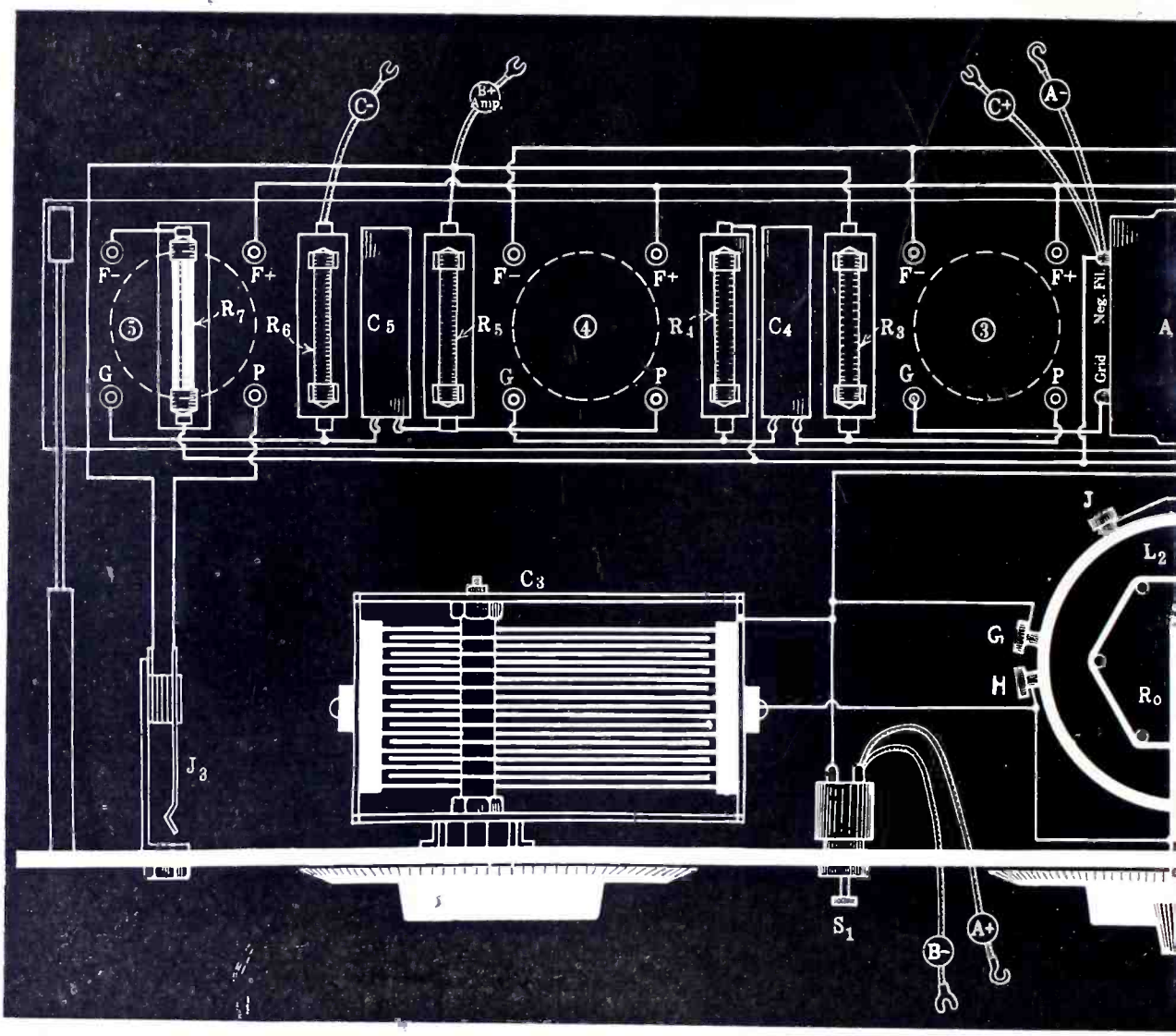
Connect antenna to A, ground to B. That disposes of Lo. Connect C to one inside spring of the jack J1 and D to the other inside spring. Then carefully see that the outside terminal of the jack that contacts with C goes to minus A and to rotor of C1, while the other outside terminal goes to grid of the socket 1 and to stator plates of C1.

Connect plate of the RF tube (1) to E, the beginning of L2, while the end of L, marked F on the diagrams, goes to B plus detector voltage. This is normally

Following is a new list of names of fans who requested and received free nameplates for the 1926 Model Diamond of the Air:

H. C. Powell, 920 N. 6th St., Terre Haute, Ind.
H. E. George, 2905 Jefferson St., Wilmington, Del.
Richard Glass, 897 Neil Ave., Columbus, O.
Walter O. Sterborn, 119 Walker St., Michigan City, Ind.
G. E. Williams, 104 E. 16th St., Oklahoma City, Okla.
E. L. McIntyre, 514 E. Brookside, Colorado Springs, Colo.
John Kerch, 106½ South Elwood, Tulsa, Okla.
Charles H. Ward, Jr., 1242 Wisconsin Ave., N. W., Washington, D. C.
A. Hayward, 1719 Clark St., Des Moines, Ia.
Wm. De Bender, 917 Anna St., Elizabeth, N. J.
William Mahler, 53 Columbus Ave., Jersey City, N. J.
Fred H. Hackett, care Wakefield Industrial School, Wakefield, Mich.
R. W. Deck, 406 Center St., Sandusky, O.
Joseph Alexas, 221 Migeon Ave., Lorrington, Conn.
Dr. H. A. Reynolds, 105 Lillian Ave., Eastwood, Syracuse, N. Y.
Frank Smith, R. 4, Centralia, Mo.
C. L. McPhee, Box 273, Blenheim, Ontario, Can.
J. J. Moody, Star Route, B. Brook, N. J.
C. W. Born, Welmerding, Pa.
O. E. Hiltbrand, 132 Hart Ave., Santa Monica, Cal.
Dr. H. Tuttle Stull, 2321 East Cumberland St., Philadelphia, Pa.
Walter Easley, 223 South 3rd St., Enid, Okla.
W. H. Schoenfeld, 1708 Huron Ave., New Castle, Pa.
J. P. Reynolds, 5616 S. San Pedro, Los Angeles, Cal.
Dr. D. S. Dade, P. O. Box 167, New Bedford, Mass.
James Donahue, 2273 East Grand Boulevard, Detroit, Mich.
F. P. Read, 425 W. Bellevue Boulevard, Memphis, Tenn.
D. Loe, 9518 Benham Ave., Cleveland, O.
Everett Roberts, 2534 Dupont Ave., Minneapolis, Minn.
L. Bardell, 47 Edinburgh Ave., Hamilton, Ont., Canada.
Wm. Metzer, 1310 E. Price St., Philadelphia, Pa.
Robert Appleby, 119 Prince Arthur St., West Montreal, Canada.
Lawrence W. Mauff, 870 Golapago St., Denver, Colo.
Douglas John Dobsen, 505 Thompson Chambers, Saskatchewan, Canada.
A. E. Holt, Geneva, Neb.
Geo. W. Smith, Sioux City, Ia.

The Wiring of the Diamo



45 and may be made to the frame of the jack J2. G terminal of L3 goes to A plus, H to one side of the grid condenser C2. The other side of the grid condenser is connected to the G post of the detector socket (2). G also connects to the stator plates of C3, the rotor plates of which go to A plus. The variable grid leak Ro is connected across the grid condenser, the lug near the panel being joined to the H post of the coil and the other leak lug to the grid condenser, on the side of that condenser other than the one joined to the socket post.

The plate of the detector tube (2) goes to one terminal of the tickler L4, the other terminal of L4 to the only remaining outside spring of the jack J2. The other outside terminal of the jack went to B plus detector.

The inside spring of J2 that contacts with the outside spring that went to the end of the tickler coil goes to binding post W. The inside spring of J2 that contacts with B plus detector goes to binding post Y. The gaps between W and X and between Y and Z are bridged by two separate short pieces of bus bar tightened under the bolt of the post. The dotted lines project those bus bar strips in the diagram. The straps are atop the socket strip. All the other wiring is beneath, which accounts for the right-to-left order.

Post X is joined to the plate post of AFT, while post Z goes to the B post. Grid of AFT connects to grid of the first AF tube (3) while the end of the secondary, marked Neg. Fil. on the instrument, goes not to negative filament but to A minus. This particular lead was established previously.

The plate of the first AF tube (3) goes to two points. They are one side of the plate resistor R3, and one side of the blocking condenser C4, which is of the by-pass type. The other side of R3 goes to B plus amplifier, normally 135, while the other side of C4 connects to the open end of the leak R4, and also to the grid post of the second AF socket (4).

The plate of this socket is connected to one side of R5 and to one side of C5, while the other side of R5 goes to B plus amplifier voltage and the other side of C5 to the grid of the final tube and to the open side of R6. The closed sides of R4 and R6 previously were connected, the on to minus A, the other to minus C.

The plate of the last tube (5) goes to one side of the single-circuit jack J3 and the other side of that jack goes to B plus amplifier.

DIAMOND GLITTERINGS

DIAMOND EDITOR:

I have built the wonder set, the Diamond of the Air, and have received from Coast to Coast and also Cuba using an outdoor aerial. I get all that can be expected from a loop. I have built a number of receivers of different types, but none has come up to the qualities of this set.

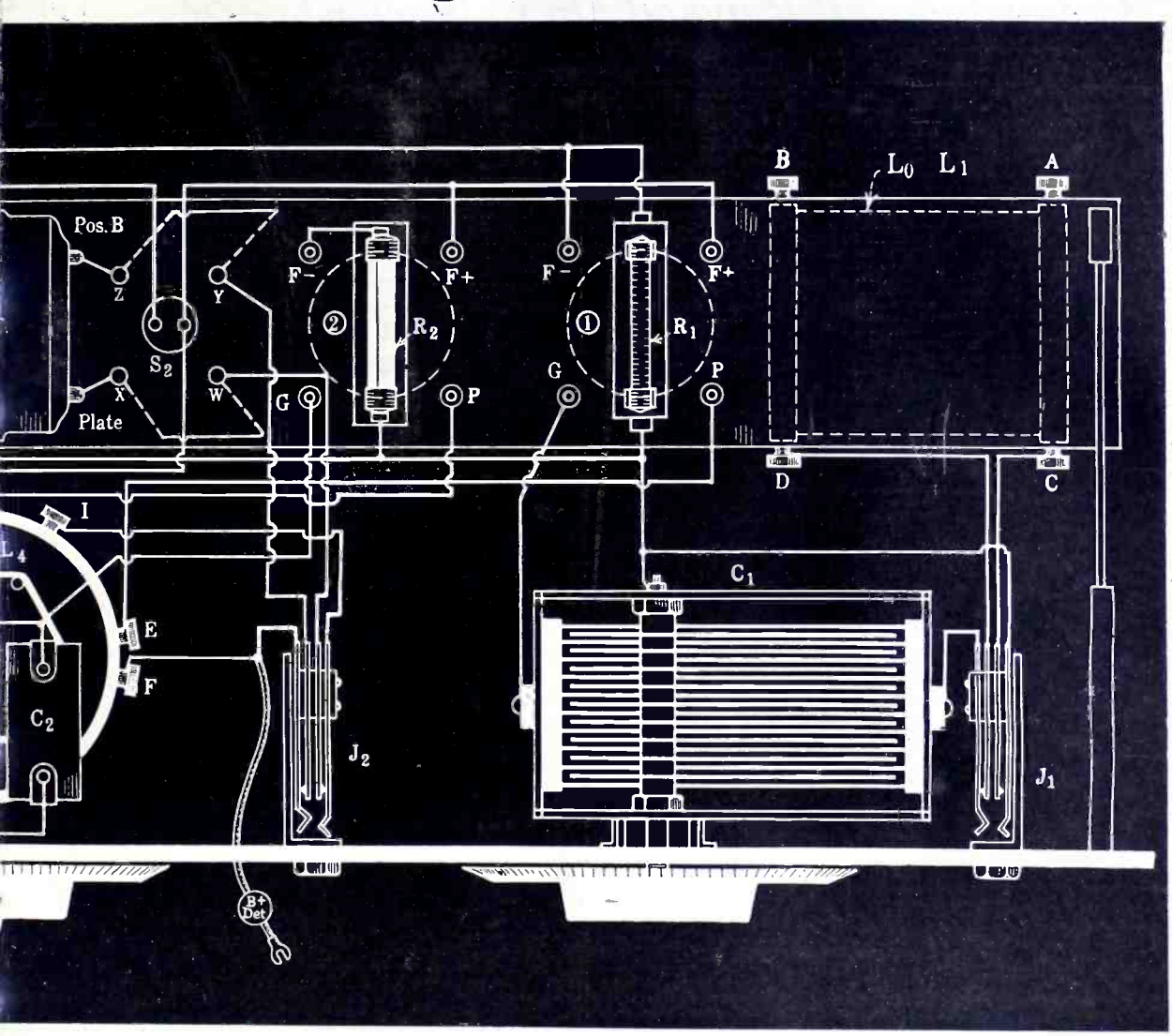
SIDNEY NORDGREN,
42 McGovern,
Ashtabula, Ohio.

* * *

DIAMOND EDITOR:

Just a line to tell you what I think of your Diamond set. I read regularly your RADIO WORLD, which I take now every week, but which I would not bother

nd in Diagram and Text



with at one time. A friend of mine showed me the Diamond and at that time I had a Superdyne. So I built the Diamond. The second night I had it built I got 18 stations on the speaker with good volume.

S. JUPP,
232 Ash Ave.,
Pt. St. Charles,
Montreal, Can.

* * *

DIAMOND EDITOR:

Just built the Diamond, using 201A type tubes. Range, excellent; volume, good; selectivity, fine; tuning, simple.

BERTRAM SUSDORF,
Rantoul, Ill.

* * *

DIAMOND EDITOR:

I have completed the 1926 Diamond of the Air. This set will do all that was promised. I am more than pleased with the Diamond.

This set is well worth the name that you gave it. I am able to tune from about 150 meters to 600.

A. W. SWINDEN,
1313 Willow St.,
Austin, Tex.

DIAMOND EDITOR:

Just finished my Diamond of the Air. It certainly is great. It does all it is recommended to do and a good deal more. I am at present tuned in on New York on my loudspeaker and the reception is great. Please send me a nameplate.

C. D. SHOOK,
Fire Co. 34, Ludlow & Clifton,
Cincinnati, Ohio.

* * *

DIAMOND EDITOR:

Many thanks to you for the excellent hookups you have furnished. Lord knows I have tried many hookups, but Superdyne and the Diamond sure are THE REAL THING. The results on the loop are excellent for distance, volume and quality. I'll be watching with interest for a better hookup by you than the Diamond, but here's where I'm from Missouri.

J. B. CARAVATTA,
10 Sixth St.,
Weehawken, N. J.

* * *

DIAMOND EDITOR:

I have just finished building the 1926 Diamond of the Air. I can only get New York, Dallas, Texas, and California on three tubes. In the three or four nights that I have used the set I have only been able to log 35 stations. There must be something wrong with this set, but I'll admit that I can't seem to locate the trouble.

I made some minor changes from the original model. I put the earphone jack in after the first audio tube and this is strong enough to operate the loud speaker on the strong stations.

It surely is a joy and pleasure to operate this set. It is quiet in operation, has a beautiful tone and volume enough for anyone.

H. D. McCHESNEY,
Princess Theatre,
Crandon, Wisconsin.

* * *

DIAMOND EDITOR:

I have built The Diamond and do not know of a set that will equal it. I have built several sets, but the Diamond takes the cake. I have had my Diamond a week and have received 55 stations with it. I am a constant reader of RADIO WORLD and look forward to getting it every week.

FRANK KCHOP,
4307 72nd St.,
Winfield, Long Island, N. Y.

The Official List of Stations

Corrected and Revised Up to November 24

Station	Owner and Location	Meters
KDKA	Westinghouse E. & M. Co., Pittsburgh, Pa.	309
KDLR	Radio Elec. Co., Devils Lake, N. D.,	231
KDPM	Westinghouse E. & M. Co., Cleveland, Ohio	250
KDYL	Newhouse Hotel, Salt Lake City, Utah	246
KDZB	F. E. Seifert, Bakersfield, Cal.	210
KFAB	Nebraska Buick Auto Co., Lincoln Neb.	340
KFAD	Electrical Equipment Co., Phoenix Ariz.	273
KFAE	State College, Pullman, Wash.	349
KFAF	A. E. Fowler, San Jose, Calif.	213.3
KFAJ	University of Colorado, Boulder, Colo.	261
KFAU	Boise High School, Boise, Idaho	278
KFAW	Radio Den, Santa Ana, Cal.	214
KFBB	F. A. Buttry Co., Havre, Mont.	275
KFBC	W. K. Asbill, San Diego, Cal.	224
KFBG	1st Presbyterian Church, Tacoma, Wash.	250
KFBK	Kimball Upson Co., Sacramento, Cal.	248
KFBL	Leese Bros., Everett, Wash.	224
KFBS	School District No. 1, Trinidad, Col.	238
KFBU	Bishop N. S. Thomas, Laramie, Wyo.	270
KFCB	Nielson Radio Co., Phoenix, Ariz.	238
KFCF	F. A. Moore, Walla Walla, Wash.	256
KFCY	Western Union College, Lemars, Iowa.	252
KFCZ	Central High School, Omaha, Neb.	258
KFDD	St. Michael's Cathedral, Boise, Idaho.	278
KFDH	University of Arizona, Tuscon, Ariz.	258
KFDJ	Oregon Agricultural College, Corvallis, Ore.	254
KFDM	Magnolia Petroleum Co., Beaumont, Texas	316
KFDX	1st Baptist Church, Shreveport, La.	250
KFDY	State College of Agriculture, Brookings, S. D	273
KFDZ	H. O. Iverson, Minneapolis, Minn.	231
KFEC	Meier & Frank Co., Portland, Ore.	248
KFEL	Winner Radio Corp., Denver, Colo.	254
KFEQ	J. L. Scroggin, Oak, Neb.	268
KFEY	Bunker Hill & Sullivan, Kellog, Idaho	233
KFFP	1st Baptist Church, Moberly, Mo.	242
KFFV	Graceland College, Lamoni, Iowa	250
KFGC	Louisiana State University, Baton Rouge, La.	268
KFGD	College for Women, Chickasha, Okla.	252
KFGH	Leland Stanford Junior University, Stanford University, Cal.	270
KFGQ	Crary Co., Boone, Iowa	226
KFGX	1st Presbyterian Church, Orange, Texas	250
KFHA	Western State College, Gunnison, Colo.	252
KFHL	Penn College, Oskaloosa, Iowa	240
KFI	E. C. Anthony, Inc., Los Angeles, Cal.	469
KFIF	Benson Institute, Portland, Ore.	248
KFIO	North Central High School, Spokane, Wash.	266
KFIQ	1st Methodist Church, Yakima, Wash.	256
KFIU	Alaska Elec. Co., Juneau, Alaska	226
KFIZ	Daily Commonwealth, Fond du Lac, Wis.	273
KFJB	Marshall Elec Co., Marshalltown, Ia.	248
KFJC	R. B. Fegan, Junction City, Kan.	219
KFJF	National Radio Co., Oklahoma City, Okla.	261
KFJI	Liberty Theatre, Astoria, Ore.	246
KFJM	University of N. D., Grand Forks, N. D.	278
KFJR	Ashley C. Dixon & Son, Portland, Ore.	263
KFJX	State Teachers College, Cedar Falls, Ia.	258
KFJY	Tunwall Radio Co., Ft. Dodge, Iowa.	246
KFKA	State Teachers College, Greeley, Colo.	273
KFKQ	Conway Radio Laboratory, Conway, Ark.	250
KFKU	University of Kansas, Lawrence, Kans.	275
KFKX	Westinghouse E. & M. Co., Hastings, Neb.	288
KFKZ	F. M. Henry, Kirksville, Mo.	226
KFLP	Everett M. Foster, Cedar Rapids, Ia.	256
KFLR	University of N. M., Albuquerque, N. M.	254
KFLU	Rio Grande Radio Sup. Co., San Benito, Texas	236
KFLV	Swedish Evangelist Church, Rockford, Ill.	229
KFLX	George R. Clough, Galveston, Texas	240
KFLZ	Atlantic Auto Co., Atlantic, Iowa.	273
KFMB	Christian Churches of Little Rock, Little Rock, Ark.	254
KFMO	University of Ark., Fayetteville, Ark.	300
KFMR	Morningside College, Sioux City, Iowa	261
KFMT	Dr. G. W. Young, Minneapolis, Minn.	263
KFMW	M. G. Sataren, Houghton, Mich.	263
KFMX	Carleton College, Northfield, Minn.	337
KFNF	Henry Field Seed Co., Shenandoah, Iowa	266
KFNG	Wooten Radio Shop, Coldwater, Miss.	254
KFNL	Union High School, Paso Robles, Cal.	240
KFNV	L. A. Drake, Santa Rosa, Cal.	229
KFOA	Rhodes Company, Seattle, Wash.	454
KFGN	Echophone Radio Shop, Long Beach, Cal.	233
KFOO	Latter Day Saints University, Salt Lake City, Utah	236
KFOR	David City Tire & Elec. Co., David City, Neb.	226
KFOT	College Hill Radio Club, Wichita, Kan.	231
KFOX	Technical High School, Omaha, Neb.	248
KFOY	Beacon Radio Service, St. Paul, Minn.	252
KFPG	Oliver S. Garretson, Los Angeles, Cal.	238
KFPL	C. C. Baxter, Dublin, Texas	252
KFPM	New Furniture Co., Greenville, Texas	242
KFPR	Forestry Department, Los Angeles, Cal.	231
KFPW	St. John's Church, Carterville, Mo.	258
KFPY	Symonds Investment Co., Spokane, Wash.	266
KFQA	The Principia, St. Louis, Mo.	261
KFQB	Searchlight Publishing Co., Ft. Worth, Texas	263
KFOC	Kidd Bros., Taft, Cal.	231
KFQH	Radio Service Co., Burlingame, Cal.	220
KFQP	G. S. Carson, Jr., Iowa City, Ia.	224
KFQT	National Guard, Denison, Tex.	252
KFQU	W. Riker, Holy City, Cal.	222
KFQW	F. C. Knierim, North Bend, Wash.	216
KFOZ	Taft Radio Co., Hollywood, Cal.	226
KFRB	Hall Bros., Beeville, Texas	248
KFRC	Paris Dry Goods Co., San Francisco.	268
KFRM	First Field Artillery, Fort Sill, Okla.	242
KFRW	United Churches, Olympia, Wash.	220
KFRX	J. G. Klemgard, Pullman, Wash.	217
KFRY	College of Agriculture, State College, N. M.	266
KFRZ	The Electric Shop, Hartington, Neb.	222
KFSG	Echo Park Evangelistic Ass'n., Los Angeles, Cal.	275
KFUJ	Hoppert P. and H. Co., Breckenridge, Minn.	242
KFUL	T. Goggan & Bro., Galveston, Tex.	258
KFUM	W. D. Corley, Colorado Springs, Colo.	242
KFUO	Concordia Theo. Seminary, St. Louis, Mo.	545
KFUP	Fitzsimmons General Hospital, Denver, Colo.	234
KFUR	H. W. Peery and R. Redfield, Ogden, Utah	224
KFUS	Louis L. Sherman, Oakland, Cal.	233
KFUU	Colburn Radio Laboratories, San Leandro, Cal.	224
KFUV	G. P. Ward, Springfield, Mo.	252
KFVD	Chas. & W. J. McWhinnie, San Pedro, Cal.	205
KFVE	Film Corp., St. Louis, Mo.	240
KFVF	Clarence B. Juneau, Hollywood, Cal.	208
KFVG	1st Meth-Epis. Church, Independence, Kan.	236
KFVH	Herbert Whan, Manhattan, Kans.	219
KFVI	56th Cav. Brigade, Houston, Tex.	240
KFVN	C. E. Bagley, Welcome, Minn.	227
KFVO	F. M. Henry, Kirksville, Mo.	226
KFVR	Moonlight Ranch, Denver, Col.	246
KFVS	Cape Girardeau Battery Station, Cape Girardeau, Mo.	224
KFVU	The Radio Shop, Eureka, Cal.	210
KFVW	Airfan Radio Corp., San Diego, Cal.	246
KFVX	Radio Shop, Bentonville, Ark.	236
KFVY	Radio Supply Co., Albuquerque, N. M.	250
KFVZ	Glad Tidings Tabernacle, Inc., San Francisco, Cal.	234
KFWA	Browning Bros. Co., Ogden, Utah.	261
KFWB	Warner Bros. Pictures, Inc., Hollywood, Cal.	252
KFWC	L. E. Wall & C. S. Myers, Upland, Cal.	211
KFWF	St. Louis Truth Center, St. Louis, Mo.	214
KFWH	F. Wellington Morse, Jr., Chico, Cal.	254
KFWO	Lawrence Mott, Avalon, Cal.	211
KFWP	Rio Grande Radio Supply House, Bronsville, Texas	214
KFWI	Radio Entertainers, Inc., South San Francisco, Cal.	220
KFWM	Oakland Educational Soc., Oakland, Cal.	207
KFWU	Louisiana College, Pineville, La.	238
KFWV	Wilbur Jerman, Portland, Ore.	213
KFYN	Carl E. Bagley, Welcome, Minn.	227
KFYF	Carl's Radio Den, Oxnard, Cal.	205
KFBX	B. O. Heller, Big Bear Lake, Cal.	203
KFXC	Santa Maria Valley R. R. Co., Santa Maria, Cal.	210
KFXD	L. H. Strong, Logan, Utah.	205
KFXE	Electric Research and Mfg. Co., Waterloo, Ia.	236
KFXH	Bledsoe Radio Co., El Paso, Texas.	242
KFXJ	Mt. States Radio District, Inc., (Portable), Col.	216
KFXF	Pikes Peak Broadcasting Station Co., Colo. Springs, Colo.	250
KFXM	Neches Electric Co., Beaumont, Tex.	227
KFXY	Mary M. Costigan, Flagstaff, Ariz.	205
KGB	The Ledger, Tacoma, Wash.	250
KGO	General Electric Company, Oakland, Cal.	361
KGU	M. A. Mulrony, Honolulu, Hawaii	270
KGW	The Oregonian, Portland, Ore.	492
KGY	St. Martin's College, Lacey, Wash.	246
KHJ	The Times, Los Angeles, Cal.	405
KHQ	Louis Wasmer, Seattle, Wash.	273
KJBS	J. Brunton & Sons Co., San Francisco, Cal.	236
KJR	Northwest Radio Co., Seattle, Wash.	384
KLDS	Reorganized Church of Jesus Christ of Latter Day Saints, Independence, Mo.	441
KLS	Warner Bros. Radio Co., Oakland, Cal.	242
KLX	Tribune, Oakland, Cal.	508
KLZ	Reynolds Radio Co., Denver, Col.	266
KMA	May Seed & Nursery Co., Shenandoah, Ia.	252
KMJ	San Joaquin Corp., Fresno, Cal.	234
KMO	Love Elec. Co., Tacoma, Wash.	250
KNX	Express, Hollywood, Cal.	337
KOA	General Electric Co., Denver, Col.	322
KOB	College of Agri., State College, N. M.	349
KOIL	Monarch Manufacturing Co., Council Bluffs, Ia.	278
KOP	Detroit Police Department, Detroit, Mich.	278
KPO	Hale Brothers, San Francisco, Cal.	429
KPPC	Pasadena Presbyterian Church, Pasadena, Cal.	229
KPRC	Houston Print Co., Houston, Tex.	297
KQV	Doubleday Hill Elec. Co., Pittsburgh, Pa.	275
KQW	First Baptist Church, San Jose, Cal.	227
KRE	Gazette, Berkeley, Cal.	258
KSAC	Kansas State Agricultural College, Manhattan, Kans.	341
KSD	Post Dispatch, St. Louis, Mo.	545
KSL	Radio Service Corp., Salt Lake City, Utah	300
KTAB	Tenth Ave. Baptist Church, Oakland, Cal.	240
KTBI	Bible Inst., Los Angeles, Cal.	294
KTBR	Brown's Radio Shop, Portland, Ore.	263
KTCL	American Radio Tel. Co., Inc., Seattle, Wash.	306
KTHS	New Arlington Hotel, Hot Springs, Ark.	375
KTW	1st Presbyterian Church, Seattle, Wash.	454
KUO	Examiner, San Francisco, Cal.	246
KUOM	State University of Montana, Missoula, Mont.	245
KUPR	Union Pacifio R. R. Co., Omaha, Neb.	270
KUT	University of Texas, Austin.	231
KWG	Portable Wireless Tel. Co., Stockton, Cal.	248
KWKC	Wilson Duncan Studios, Kansas City, Mo.	236
KWKH	W. K. Henderson I. W. & S. Co., Kennonwood, La.	273
KWSC	State College, Pullman, Wash.	349
KWWG	City of Brownsville, Brownsville, Tex.	278
KYW	Westinghouse E. & M. Co., Chicago, Ill.	535
KZKZ	Electric Supply Co., Manila, P. I.	270
KZM	Western Radio Inst., Oakland, Cal.	241
KZRO	Far Eastern Radio, Inc., Manila, P. I.	222
WAAB	V. Jensen, New Orleans, La.	268
WAAC	Tulane University, New Orleans, La.	275
WAAD	Ohio Mech. Institute, Cincinnati, O.	258
WAAF	Drovers Journal, Chicago, Ill.	278
WAAM	I. R. Nelson Co., Newark, N. J.	263
WAAW	Omaha Grain Exchange, Omaha, Neb.	278
WABB	Harrisburg Sporting Goods Co., Harrisburg, Pa.	266
WABC	Asheville Battery Co., Inc., Asheville, N. C.	254
WABI	Bangor Ry. & Elec. Co., Bangor, Me.	240
WABL	Agricultural College, Storrs, Conn.	375
WABO	Lake Avenue Baptist Church, Rochester, N. Y.	278
WABQ	Haverford College Radio Club, Haverford, Pa.	261
WABR	Scott High School, Toledo, O.	263
WABW	College of Wooster, Wooster, O.	207
WABX	H. B. Joy, Mt Clemens, Mich.	246
WABY	John Magaldi, Philadelphia, Pa.	242
WABZ	Coliseum Place Baptist Church, New Orleans, La.	275
WADC	Allen Theatre, Akron, Ohio.	258
WAFD	A. B. Parfet Co., Port Huron, Mich.	275
WAHG	A. H. Grebe Co., Richmond Hill, N. Y.	316
WAIT	A. H. Waite & Co., Taunton, Mass.	229
WAMD	Hubbard & Co., Minneapolis, Minn.	244
WAPI	Alabama Polytechnic Inst., Auburn, Ala.	248
WARC	American Radio Res. Corp., Medford Hillside, Mass.	261
WBAA	Purdue University, West Lafayette, Ind.	273
WBAK	State Police, Harrisburg, Pa.	276
WBAO	James Millikia University, Decatur, Ill.	270
WBAP	Star Telegram, Fort Worth, Tex.	476
WBAV	Erner Hopkins Co., Columbus, O.	294
WBAX	J. H. Stenger, Jr., Wilkes-Barre, Pa.	256
WBBA	Plymouth Congregational Church, Newark, O.	226
WBBG	I. Vermilyea, Mattapoisett, Mass.	248
WBBL	Grace Covenant Presbyterian Church, Richmond, Va.	229
WBBM	H. L. Atlass, Chicago, Ill.	226
WBBP	Petoskey High School, Petoskey, Mich.	238
WBBR	Peoples Pulpit Ass'n., Rossville, N. Y.	273
WBBS	1st Baptist Church, New Orleans, La.	252
WBBU	Jenks Motor Sales Co., Monmouth, Ill.	224
WBBW	Ruffner City High School, Norfolk, Va.	222
WBBY	Washington Light Infantry, Charleston, S. C.	268
WBBZ	C. L. Carrell, (Portable), Chicago, Ill.	216
WBCN	Southtown Economist, Chicago, Ill.	266
WBDC	Baxter Laundry Co., Grand Rapids, Mich.	256
WBES	Bliss Electrical School, Takoma Park, Md.	222

Station	Owner and Location	Meters
WBOQ	A. H. Grebe & Co., Richmond Hill, N. Y.	236
WBNY	Miss S. Katz, New York City	210
WBR	State Police, Butler, Pa.	203
WBRC	Bell Radio Corp., Birmingham, Ala.	248
WBRE	Baltimore Radio Ex., Wilkes-Barre, Pa.	231
WBZ	Westinghouse E. & M. Co., Springfield, Mass.	333
WBZA	Westinghouse Electric and Mfg. Co., Boston, Mass.	242
WCAC	Agricultural College, Mansfield, Conn.	275
WCAD	St. Lawrence University, Canton, N. Y.	263
WCAE	Kaufman & Baer, Pittsburgh, Pa.	461
WCAH	Entrekin Electric Co., Columbus, O.	266
WCAJ	Nebraska Wesleyan University, University Place, Neb.	254
WCAL	St. Olaf College, Northfield, Minn.	337
WCAO	Sanders & Stayman, Baltimore, Md.	275
WCAP	C. & P. Tel. Co., Washington, D. C.	469
WCAR	Southern Radio Corp., San Antonio, Texas.	263
WCAT	School of Mines, Rapids City, S. D.	240
WCAU	Universal Broadcasting Co., Philadelphia, Pa.	278
WCAX	University of Vermont, Burlington, Vt.	250
WCAZ	Carthage College, Carthage, Ill.	246
WCBA	C. W. Heinbach, Allentown, Pa.	254
WCBD	W. G. Voliva, Zion, Ill.	345
WCBE	Uhalt Radio Co., New Orleans, La.	263
WCBG	H. S. Williams, Pascagoula, Miss.	268
WCBH	University of Mississippi, Oxford, Miss.	242
WCMB	C. Schwartz, Baltimore, Md.	229
WCBQ	1st Baptist Church, Nashville, Tenn.	236
WCBR	C. H. Messter (Portable), Providence, R. I.	205
WCBY	Ferks Electrical Shop, Buck Hill Falls, Pa.	231
WCBZ	Neutrowound Radio Mfg. Co., Chicago Heights, Ill.	217
WCCO	Washburn Crosby Co., Anoka, Minn.	416
WCEE	C. E. Erbstein, Elgin, Ill.	275
WCK	Stix Baer & Fuller Co., St. Louis, Mo.	273
WCLO	C. E. Whitmore, Camp Lake, Wis.	231
WCLS	H. M. Church, Joliet, Ill.	214
WCM	Texas Market Department, Austin, Texas	268
WCSH	Henry P. Rines, Portland, Me.	256
WCSO	Wittenberg College, Springfield, Ohio.	248
WCUW	Clark University, Worcester, Mass.	238
WCWS	C. W. Selen, Providence, R. I.	210
WCX	Detroit Free Pres & Jewitt Radio and Phonograph Co., Pontiac, Mich.	517
WDND	Dod's Auto Accessories, Inc., 160-164 8th Ave., N., Nashville, Tenn.	226
WDZ	J. L. Bush, Tuscola, Ill.	278
WDAD	Dad's Auto Accessories, Inc., Nashville, Tenn.	226
WDAE	Tampa Daily News, Tampa, Fla.	273
WDAF	Kansas City Star, Kansas City, Mo.	366
WDAG	J. L. Martin, Amarillo, Tex.	263
WDAY	Radio Equipment Corp., Fargo, N. D.	261
WDBC	Kirk, Johnson & Co., Lancaster, Pa.	258
WDBE	Gilham-Schoen Elec. Co., Atlanta, Ga.	278
WDBF	R. G. Phillips, Youngstown, O.	222
WDBJ	Richardson Wayland Elec. Co., Roanoke, Va.	229
WDBK	M. F. Broz, Furn., Cleveland, O.	227
WDBL	Department of Markets, Stevens Point, Wis.	278
WDBO	Rollins College, Winter Park, Fla.	240
WDBQ	Morton Radio Supply Co., Salem, N. J.	234
WDBR	Tremont Temple Baptist Church, Boston, Mass.	261
WDBS	S. M. K. Radio Corp., Dayton, O.	275
WDBX	Dyckman Radio Shop, New York, N. Y.	233
WDBY	North Shore Congregational Church, Chicago, Ill.	258
WDBZ	Boy Scouts of America, Kingston, N. Y.	233
WDCH	Dartmouth College, Hanover, N. H.	250
WDOD	Chattanooga Radio Co., Chattanooga, Tenn.	256
WDZ	J. L. Bush, Tuscola, Ill.	278
WDRC	Doolittle Radio Corp., New Haven, Conn.	268
WDWF	Dutee Wilcox Flint, Inc., Cranston, R. I.	441
WEAA	F. D. Fallain, Flint, Mich.	234
WEAF	A. T. & T. Co., N. Y. City, N. Y.	492
WEAH	Hotel Lassen, Wichita, Kans.	268
WEAI	Cornell University, Ithaca, N. Y.	254
WEAJ	University of South Dakota, Vermillion, S. D.	278
WEAM	Borough of North Plainfield, N. Plainfield, N. J.	261
WEAN	Shepard Co., Providence, R. I.	270
WEAO	Ohio State University, Columbus, O.	294
WEAR	Goodyear T. and R. Co., Cleveland, O.	390
WEAU	Davidson Bros. Co., Sioux City, Ia.	275
WEBA	The Electric Shop, Highland Park, N. J.	233
WEBC	W. C. Bridges, Superior, Wisc.	242
WEBD	Elec. Equipment & Service Co., Anderson, Ind.	246
WEBE	Roy W. Waller, Cambridge, Ohio.	234
WEBH	Edgewater Beach Hotel, Chicago, Ill.	370
WEBJ	Third Avenue R. R. Co., New York, N. Y.	273
WEBK	Grand Rapids Radio Co., Grand Rapids, Mich.	242
WERL	Radio Corp. of Ama. (Portable)	226
WEBM	Radio Corp. of Ama., Portable Mobile Station	226
WEBP	E. B. Peddicord, New Orleans, La.	280
WEBQ	Tate Radio Co., Harrisburg, Ill.	226
WEBR	H. H. Howell, Buffalo, N. Y.	244
WEBT	Dayton High School, Dayton, Ohio.	256
WEBW	Beloit College, Beloit, Wisc.	268
WEBZ	Savannah Radio Corp., Savannah, Ga.	263
WEEI	Edison Electric Illuminating Co., Boston, Mass.	476
WEHS	Robert E. Hughes, Evanston, Ill.	203
WEMC	Emm. Missionary College, Berrien Springs, Mich.	286
WENR	All-Amer. Radio Corp., Chicago, Ill.	266
WEW	St. Louis University, St. Louis, Mo.	248
WFAA	Dallas News & Journal, Dallas, Texas	476
WFAM	The Times, St. Cloud, Minn.	273
WFAV	University of Nebr., Lincoln, Nebr.	275
WFBB	Eureka College, Eureka, Ill.	240
WFBC	1st Baptist Church, Knoxville, Tenn.	250
WFBD	Gethsemane Baptist Church, Philadelphia, Pa.	234
WFBE	J. V. De Walle, Seymour, Ind.	226
WFBG	W. F. Gable Co., Altoona, Pa.	278
WFBH	Concourse Radio Corp., New York, N. Y.	273
WFBI	Galvin Radio Supply Co., Camden, N. J.	236
WFBJ	St. Johns University, Collegeville, Minn.	236
WFBL	Onondaga Hotel, Syracuse, N. Y.	252
WFBM	Merchants Lighting Co., Indianapolis, Ind.	268
WFBQ	Wynne Radio Co., Raleigh, N. C.	252
WFBR	Maryland National Guard, Baltimore, Md.	254
WFBY	Signal Corps, Ft. Ben Harrison, Ind.	258
WFBZ	Knox College, Galesburg, Ill.	254
WFBK	Francis K. Bridgman, Chicago, Ill.	217
WFDF	F. D. Fallain, Flint, Mich.	234
WFI	Strawbridge & Clothier, Philadelphia, Pa.	396
WFKB	F. K. Bridgman, Chicago, Ill.	217
WFKJ	Chronicle, Houston, Texas.	238
WFRL	R. M. Lacey, Brooklyn, N. Y.	205
WGAL	Lancaster Elec. Supply Co., Lancaster, Pa.	248
WGAQ	W. G. Patterson, Shreveport, La.	263
WGAZ	The Tribune, South Bend, Ind.	275
WGBA	Jones Elec. & Radio Co., Baltimore, Md.	254
WGBB	H. H. Carman, Freeport, N. Y.	244
WGBC	1st Baptist Church, Memphis, Tenn.	266
WGBF	The Finke Furniture Co., Evansville, Ind	236
WGBI	Frank S. Megargee, Scranton, Pa.	240
WGBK	L. W. Campbell, Johnstown, Pa.	248
WGBL	Elyria Radio Assn., Elyria, Ohio.	227
WGBM	T. N. Saaty, Providence, R. I.	234
WGBN	Hub Radio Shop, La Salle, Ill.	256
WGBO	Dr. Roses Artlan, San Juan, P. R.	275
WGBQ	Stout Institute, Menomonie, Wis.	234
WGBU	Florida Cities Finance Co., Fulford By-the-Sea, Fla.	278
WGBR	Marshfield Broadcasting Association, Marshfield, Wis.	229
WGBS	Gimbel Brothers, New York, N. Y.	316
WGBW	Hub Radio Shop, Spring Valley, Ill.	256
WGBX	University of Maine, Orono, Maine.	252
WGES	Oak Leaves Broadcasting Station, Oak Park, Ill.	250
WGN	The Tribune, Chicago, Ill.	370
WGMU	A. H. Grebe & Co., Inc., Richmond Hill, N. Y.	236
WGNP	George H. Phelps, Inc., Detroit, Mich.	270
WGCP	Grand Central Palace, N. Y. City.	252
WGHP	G. H. Phelps, Inc., Detroit, Mich.	270
WGR	Federal Telephone Mfg. Co., Buffalo, N. Y.	319
WGST	Ga. School of Tech., Atlanta, Ga.	270
WGY	General Elec. Co., Schenectady, N. Y.	380
WHA	University of Wisconsin, Madison, Wis.	535
WHAD	Marquette University, Milwaukee, Wis.	275
WHAG	University of Cincinnati, Cincinnati, Ohio	233
WHAM	University of Rochester, Rochester, N. Y.	278
WHAP	Taylor Finance Corp., 426 West 31 St., N. Y. City.	241
WHAR	F. P. Cooks Sons, Atlantic City, N. J.	275
WHAS	The Courier Journal-Times, Louisville, Ky.	400
WHAT	Dr. G. W. Young, Minneapolis, Minn.	263
WHAV	Wilmington Elc. Spec. Co., Wilmington, Del.	266
WHAZ	Rensselaer Polytechnic Institute, Troy, N. Y.	280
WHB	Sweeney School Co., Kansas City, Mo.	366
WHBA	Shaffer Music House, Oil City, Pa.	250
WHBC	Rev. E. P. Graham, Canton, Ohio.	254
WHBD	Charles W. Howard, Bellefontaine, Ohio	222
WHBF	Beardsley Specialty Co., Rock Island, Ill.	222
WHBG	John S. Skane, Harrisburg, Pa.	231
WHBH	Culver Military Academy, Culver, Ind.	222
WHBJ	Laver Auto Co., Ft. Wayne, Ind.	234
WHBK	Franklin St. Garage, Ellsworth, Me.	231
WHBL	J. H. Slusser, Logansport, Ind.	216
WHBM	C. L. Carroll (Portable), Chicago, Ill.	233
WHBN	1st Ave. Methodist Church, St. Petersburg, Fla.	238
WHBO	Y. M. C. A., Providence, R. I.	231
WHBP	Johnstown Auto Co., Johnstown, Pa.	256
WHBQ	St. John's M. E. Church, Memphis, Tenn.	233
WHBR	Scientific E. & M. Co., Cincinnati, O.	216
WHBS	E. W. Loche, Mechanicsburg, Ohio.	208
WHBU	B. L. Bing's Sons, Anderson, Ind.	219
WHBW	D. R. Kienzle, Philadelphia, Pa.	216
WHBY	St. Norbert's Coll., West DePere, Wis.	250
WHDI	Wm. Hood Dunwoody Ind. Inst., Minneapolis, Minn.	278
WHEC	Hickson Elec. Co., Rochester, N. Y.	258
WHN	George Schubel, New York, N. Y.	361
WHO	Bankers Life Co., Des Moines, Ia.	526
WHT	Radiophone Corp., Deerfield, Ill.	238
WIAD	H. R. Miller, Philadelphia, Pa.	250
WIAS	Home Elec. Co., Burlington, Ia.	254
WIBA	Capital Times, Madison, Wis.	236
WIBC	L. M. Tate Post, V. F. W., St.	
WIBD	X-L Radio Service, Joliet, Ill.	203
WIBG	St. Paul's P. E. Church, Elkins Park, Pa.	222
WIBH	Elite Radio, New Bedford, Mass.	210
WIBI	Fredk. B. Zittell, Flushing, N. Y.	219
WIBJ	C. L. Carrell, Chicago (portable)	216
WIBO	Nelson Bros., Chicago, Ill.	226
WIBQ	F. M. Schmidt, Farina, Ill.	205
WIBN	Elite Radio Stores, New Bedford, Mass.	210
WIBM	Billy Maine, Chicago, Ill.	216
WIBO	F. M. Schmidt, Farina, Ill.	226
WIBR	Thurman A. Owings, Weirton, W. Va.	246
WIBS	N. J. National Guard, Elizabeth, N. J.	203
WIBU	The Electric Farm, Faynette, Wis.	222
WIBW	Dr. L .L. Dill, Logansport, Ind.	220
WIBX	Grid-Leak, Inc., Utica, N. Y.	205
WIBZ	Powell Electric Co., Montgomery, Ala.	231
WIL	Benson Radio Co., St. Louis, Mo.	273
WIP	Gimbel Brothers, Philadelphia, Pa.	508
WJAD	Jackson's Radio Elec. Co., Waco, Tex.	353
WJAG	Norfolk Daily News, Norfolk, Nebr.	270
WJAK	Rev. C. L. White, Greentown, Ind.	285
WJAM	D. M. Perham, Cedar Rapids, Ia.	268
WJAR	The Outlet Co., Providence, R. I.	306
WJAS	Pittsburgh Radio Supply House, Pittsburgh, Pa.	275
WJAZ	Zenith Radio Corp., Chicago, Ill.	322
WJBA	D. H. Lentz, Jr., Joliet, Ill.	207
WJBB	L. W. McClung, St. Petersburg, Fla.	254
WJBC	Hummer Furniture Co., 2nd and Joliet Sts., La Salle, Ill.	234
WJBD	Ashland Broadcasting Committee, Ashland, Wis.	223
WJBG	Interstate Radio, Inc., Charlotte, N. C.	224
WJBI	R. S. Johnson, Red Bank, N. J.	219
WJBL	Wm. Gushard Dry Goods Co., Decatur, Ill.	270
WJBN	St. John's Ev. Lutheran Church, Sycamore, Ill.	256
WJBP	Seneca Vocational School, Buffalo, N. Y.	218.8
WJBR	Ernest F. Goodwin, Ypsilanti, Mich.	233
WJD	Dennison University, Granville, O.	217
WJJD	Loyal Order of Moose, Mooseheart, Ill.	303
WJY	Radio Corp. of Ama., New York, N. Y.	405
WJZ	Radio Corp. of Ama., New York, N. Y.	455
WKAA	H. F. Paar, Cedar Rapids, Iowa.	278
WKAF	WKAF Broadcasting Co., Milwaukee, Wis.	261
WKAP	D. W. Flint, Cranston, R. I.	234
WKAQ	Radio Corp. of Porto Rico, San Juan, P. R.	341
WKAR	Mich. Agricultural College, Lansing.	285
WKAV	Laconia Radio Club, Laconia, N. H.	210
WKBB	Sanders Bros., Joliet, Ill.	214
WKBE	K. & B. Electric Co., Webster, Mass.	231
WKBG	C. L. Carrell, (Portable) Chicago, Ill.	216
WKRC	Kodel Radio Corp., Cincinnati, O.	326
WKY	C. E. Hill and H. S. Richards, Oklahoma City, Okla.	275
WLAL	1st Presbyterian Church, Tulsa, Okla.	250
WLAP	W. V. Jordan, Louisville, Ky.	275
WLAX	Greencastle Commun. Broad. Sta., Greencastle, Ind.	231
WLB	University of Minneapolis, Minneapolis, Minn.	278
WLBL	Wisconsin Department of Markets, Stevens Point, Wis.	278
WLIT	Lit Brothers, Philadelphia, Pa.	395
WLS	Sears Roebuck Co., Chicago, Ill.	345
WLTS	Lane Technical High School, Chicago, Ill	258
WLW	Crosley Radio Corp., Cincinnati, O.	422
WLWL	Missionary Society of St. Paul the Apostle, N. Y. City.	288
WMAC	C. B. Meredith, Cazenovia, N. Y.	275
WMAF	Round Hills Radio Corp., Dartmouth, Mass.	441
WMAK	Norton Laboratory, Lockport, N. Y.	266
WMAN	1st Baptist Church, Columbus, Ohio	278
WMAQ	Chicago Daily News, Chicago, Ill.	448
WMAY	Kings Highway Presbyterian Church, St. Louis, Mo.	248
WMAZ	Mercer University, Macon, Ga.	261
WMBB	American Bond and Mortgage Co., Chicago, Ill.	250
WMBB	Trianon Ball Room, Chicago, Ill.	250
WMBF	Fleetwood Hotel, Miami Beach, Fla.	384
WMC	The Commercial Appeal, Memphis, Tenn.	500
WMCA	Hotel McAlpin, N. Y. C.	341
WNAB	Shepard Stores, Boston, Mass.	250
WNAC	Shepard Stores, Boston, Mass.	280
WNAD	University of Okla., Norman, Okla.	254
WNAL	Omaha Central High School, Omaha, Nebr.	258
WNAP	Wittenberg College, Springfield, O.	248
WNAR	1st Christian Church, Butler, Mo.	231
WNAT	Lenning Bros. Co., Philadelphia, Pa.	250
WNAX	Dakota Radio App. Co., Yankton, S. D.	244
WNBH	New Bedford Hotel, New Bedford, Mass.	248
WNJ	Radio Shop, Newark, N. J.	252
WNOX	Peoples Tel. & Tel. Co., Knoxville, Tenn.	268
WNYC	Municipal Station, New York, N. Y.	526
WOAC	Page Organ Co., Lima, Ohio.	261
WOAI	South East Equipment Co., San Antonio, Texas	395
WOAN	Vaughan Con. of Music, Lawrenceburg, Tenn.	283
WOAW	Woodmen of the World, Omaha, Neb.	526

(Concluded on page 27)

A THOUGHT FOR THE WEEK

The man who invites his friends to hear his new set and then blows out his tubes just as WXYZ is tuning in nicely, feels like the motorist with one spare and who, ten miles from civilization, gets two flats and asks his guests to walk to the next public garage.

RADIO WORLD

The Link Connecting Radio Fan Dealer, Jobber, Distributor and Manufacturer

Radio World's Slogan: "A radio set for every home."

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PUBLISHED EVERY WEDNESDAY
(Dated Saturday of same week)
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Receipt by new subscribers of the first copy of RADIO WORLD mailed to them after sending in their order is automatic acknowledgment of their subscription order. Changes of address should be received at this office two weeks before date of publication. Always give old address also. State whether subscription is new or a renewal.

ADVERTISING RATES

General Advertising

1 Page, 7¼"x11"	462 lines	$300.00
½ Page, 7¼"x5½"	231 lines	150.00
⅓ Page, 2¼" D. C.	231 lines	150.00
¼ Page, 4½" D. C.	116 lines	75.00
1 Column, 2¼"x11"	154 lines	100.00
1 Inch		10.00
Per Agate Line		.75

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52 consecutive issues	20%
26 times consecutively or E. O. W. one year	15%
4 consecutive issues	10%

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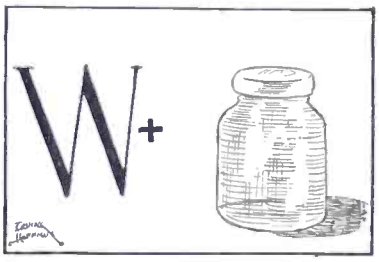
Entered as second-class matter, March 28, 1923, at the Post Office at New York, N. Y., under the act of March 3, 1879.

DECEMBER 5, 1925

The Weekly Rebus



CONSTRUCTION OF THE 4-TUBE A-A RECEIVER, by Herbert E. Hayden, appeared in RADIO WORLD dated Nov. 21. 15c per copy, or start your subscription with that number. RADIO WORLD, 145 W. 45th St., N. Y. C.

HOW TO MAKE THE DX SUPER-HETERODYNE, by J. E. Anderson, appeared in RADIO WORLD dated Nov. 21. Sent on receipt of 15c, or start your subscription with that number. RADIO WORLD, 145 W. 45th St., N. Y. C.

Hoover Insists Localities Must Help Pick Stations

By Thomas Stevenson

WASHINGTON.

The Fourth National Radio conference has come and gone. Many predictions were made as to what it would do for the industry and for the fans. It was said that the conference would be the most important yet held. Did these predictions eventuate?

Secretary Herbert Hoover, Acting Secretary Stephen Davis, Chief Radio Supervisor W. D. Terrell, and Dr. J. H. Dellinger, Chief of the Bureau af Standards Radio Laboratory, have had a chance to analyze the conference recommendations. They all concur in the opinion that, in its broad aspects, the conference did almost everything that could have been hoped for.

These four leading government authorities on radio believe that by far the outstanding accomplishment of the conference was the recognition that public interest and public service should be the dominant consideration.

This simple recommendation, if alone enacted into law, could give the Secretary of Commerce almost unlimited authority. Here are a few things it might enable him to do:

1. Limit broadcasting stations, if by so doing the public would be better served through lessened interference.
2. Close down broadcasting stations which instead of rendering a public service merely interfere with other stations that actually serve the public.
3. Compel stations to maintain constant frequencies or close them down.
4. Prevent the broadcasting of advertising when it tends to rob programs of their interest value.

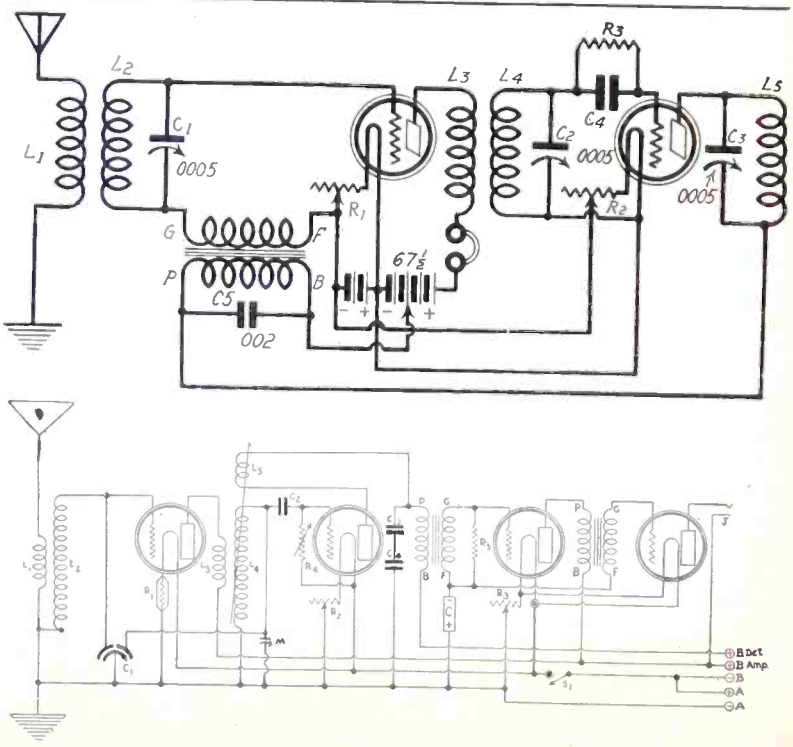
Secretary Hoover does not believe that any one man should be entrusted with the task of interpreting the public will. For this reason he suggested that local regional committees be established to act in an advisory capacity in determining which stations are best capable of serving the public.

In making the suggestion Secretary Hoover was looking forward to the day when it will be possible to license additional stations, and when there may be several applicants in a single locality for one broadcasting privilege. Mr. Hoover believes that it would be better for a local regional committee to make the decision as to which of these applicants might best serve the public.

Mr. Hoover's suggestion was rejected by the committee to which it was referred. The basis for the rejection was that it might tend to inject local politics into radio. In commenting on the rejection Secretary Hoover said:

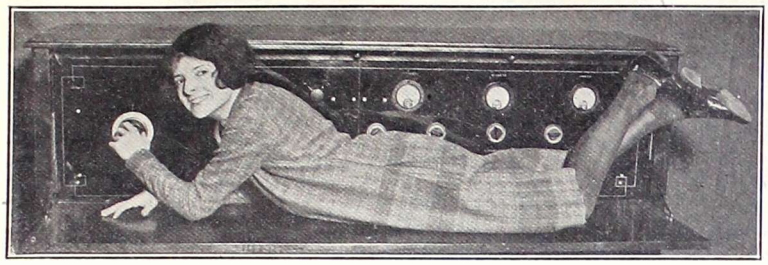
"We are confronted here with a very large discretionary authority, probably larger than has ever in fact been invested in one official of the government hitherto. You perhaps may not have given the weight to that which I would necessarily give in settling all kinds of quarrels over radio from one month to another, and I have the feeling that as a matter of government we have a question of discretionary authority that may affect the right, the good-will, the property and the freedom of individuals, that should never be invested in one single official of the government; that that is a point in government where a number of deliberative minds should be called into action.

"In the whole of our government plan, the plan of the original Federal Government under the Constitution, we were most jealous to divide the authority of the government in such fashion that the judicial and legislative questions, as this practically becomes, should rest in the hands of many men and not in the hands of administrative and executive officials."



A 2-tube reflex (top) and a 4-tube DX set.

An Attraction at the Chicago Show



MISS RENA JANE FREY, with the largest set on exhibition at the radio show in Chicago. This set has 15 tubes and was made by an amateur in Chicago. "Miss Radio" holds the title of having picked up 300 DX stations in 6 years.
(Underwood & Underwood)

THE RADIO TRADE

Increase of $200,000,000 Expected for 1925 Business

CHICAGO.

The 1925 volume of radio busines, said Herbert H. Frost, will exceed that of 1924 by $200,000,000. Five years ago the annual business was less than $6,000,000. This is an increase of 230 per cent. of the 1925 figure.

Manufacturers' estimate for 1925 indicate a sale of 3,000,000 radio sets, and 20,000,000 tubes.

Besides the completed sets, sales of $150,000,000 in parts and accessories indicate a considerable volume of home-made sets. The industry now employs about 300,000 persons in the 1,200 plants and 40,000 dealers' stores, nearly all of which have come into existence in the last five years.

Schools, churches and newspapers have seized upon this new medium of reaching the homes until one-third of the broadcasting stations which supply the entertainment for the millions of sets are operated by these three groups. There are now 584 stations, more or less active, and 108 of these are operated by educational institutions, 47 by churches and 39 by newspapers.

Crosley Boosts Mid-West As Ideal Radio Center

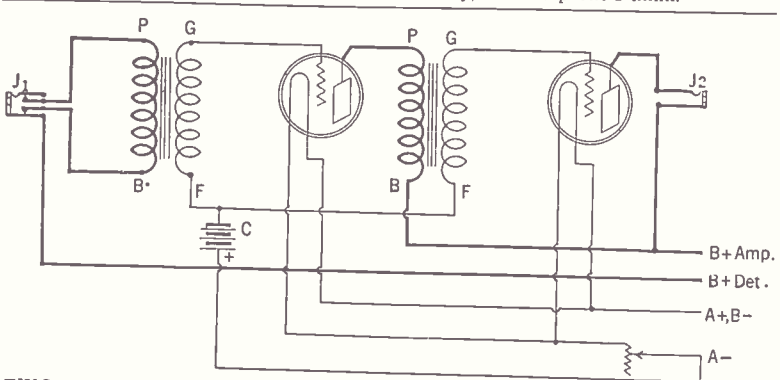
By Powel Crosley, Jr.

When radio began five years ago with the broadcasting from old WJZ at Newark, N. J., practically all the manufacturing of the young industry was centered in the East.

Today conditions are quite different. In Cincinnati, for example, we have factories that produce a large percentage of the radio apparatus of the country, second only to the volume of manufacturing in Chicago radio circles. In Chicago we find more than two hundred radio manufacturers.

This condition is steadily changing with manufacturing in radio circles in the central states increasing to such an extent that before the fifth annual Chicago Radio Show next year it will not be surprising to see three-quarters of the radio merchandise produced in this country made in the States of Illinois and Ohio.

"Ship from the center, not the rim," a slogan used by a central states city, has been taken very seriously by the radio industry, to their profit I think.



TWO stages of transformer-coupled audio-frequency amplification, with C battery. One rheostat controls both tubes.

Literature Wanted

THE names of readers of RADIO WORLD who desire literature from radio jobbers and dealers are published in RADIO WORLD on request of the reader. The blank below may be used, or a post card or letter will do instead.

Trade Service Editor,
RADIO WORLD,
145 West 45th St., N. Y. City.

I desire to receive radio literature.

Name .....

City or town .....

State .....

Are you a dealer? .....

If not who is your dealer?

His Name .....

His Address .....

J. R. Hoffman, 4011 5th St., N. W., Washington, D. C.

C. A. Reed Radio Service, Box 51, Arcadia, Fla. (Dealer).

Dr. Carlos F. Framil Y Font, Taguasco, Provincia de Santa Clara, Cuba.

M. Domingo Gelabert, E. Palma, Alta 84 St., Santiago de Cluba, Cuba.

Herman Markert, 307 E. Palm Ave., Tampa, Fla. (Dealer).

John Priessmann, Cisneros 53, Camaguey, Cuba.

Asa Lamley, 703 Ohio Ave., Erwin, Tenn.

Leslie Neel, 414 W. Church St., Orlando, Fla.

Peter Rubino, 93 President St., Brooklyn, N. Y.

Jeff Walsh, P. O. Box 200, Fresno, Cal.

D. L. Byars, Box 544, Duncan, Okla.

B. C. Lovegrove, 1001 McArthur Building, Winnipeg, Canada.

Andrew Jacoby, 3 Floral Ave., Binghampton, N. Y.

C. Mentges, 1425 Alabama Ave., S. E., Washington, D. C.

Gapar Suth, Avenida de Mexico Y Vigia, Havana, Cuba.

Ross C. Romig, Yeagetown, Pa.

NEW CORPORATIONS

Totten & Rowe Radio Service Stores, $10,000; M. Schussheim, L. Fradkin. (Atty., H. Schapiro, 261 Broadway, N. Y. City).

Samuel Friedman, electrical supplies, N. Y. City, $10,000; S. Feldman, M. Schenker, V. Lampert. (Atty., H. R. Berlincke, 160 Broadway, N. Y. City).

Ideal Products Corp., radio equipment, Newark, N. J., $100,000; Arthur E. Jones, John Slezek, Gerald McCrea, Newark. (Filed by the company).

Strad-O-Vox Corp., N. Y. City, make radio equipment, $50,000; A. L. and J. Levy, W. S. Schwabacher. (Attys., Hays, Hershfield & Wolf, 115 Broadway, N. Y. City).

Naylor Radio Corp., 200 common, no par; J. N. Senegal, H. J. Crawford, S. Thompson, 282 East 17th St., N. Y. City. (No Atty.).

Barclay Radio, $3,000; T. Stochek, E. Blum, B. Mazursky. (Atty., L. Klinger, 291 Broadway, N. Y. City).

Business Opportunities Radio and Electrical

Rates: 10c per word; Minimum, $1.00. Cash with order.

$100 WEEKLY UP. We want experienced radio men to operate branch assembly plants. Part or whole time. Barfield Radio Co., 13 Tillary St., Dept. W. R., Brooklyn, N. Y.

ELECTRICAL AND RADIO STORE, ALSO electrical contracting; have 27 men employed; one of the largest and oldest on Long Island; good paying buisness; very reasonable; must have $15,000 cash; balance in payments. Phone, Jamaica 5666.

LET US BE YOUR FACTORY. Do not use your funds to buy machinery and equip plant; we are thoroughly equipped in machines and have broadest experience in building dies and tools for economical production; will make your parts or build your complete device; make use of our facilities and experience. Interstate Mechanical Laboratories, 521 West 57th St., New York City. Columbus 5321.

MACHINE SHOP FOR SALE; WELL equipped for building medium size machines, tools and production; orders on hand; also consider active man who buys out one of two partners; write for appointment. Box 111, Radio World.

A TABLE FOR CONVERSION OF FREQUENCIES AND METERS appeared in RADIO WORLD dated Nov. 28. 15c per copy, or start subscription with that number. RADIO WORLD, 145 W. 45th St., N. Y. C.

RESULTS

Readers report on their experiences with sets built from hookups published in RADIO WORLD. *Address Results Editor,* RADIO WORLD, 145 *West 45th Street, New York City, and send photographs of sets, if possible.*

RESULTS EDITOR:

I want to thank you for publishing the circuit of "The Bernard 1-Tube DX Set" in the Oct. 24 issue.

I built it the other night and tuned in all the local stations to get the hang of the set. To my surprise I was able to cut out heavy locals with only two degrees on the dial.: In one case I tuned in a semi-distant station clearly, only three meters off the wave of a station just half a mile from my home. Then I lit my pipe and sat down to listen to the stock market reports from KGO at Oakland on the loud speaker.

I have built everything from a crystal to a super and this little set with one stage of audio, is the best for the money of any I have seen. W. S. HUMBERT,
311 South Irving Blvd., Los Angeles.

RESULTS EDITOR:

I thought you might be interested to know that I have had wonderful results with the 3-circuit hook-up described by Capt. P. V. O'Rourke in the June 27 issue of RADIO WORLD. I had better success in tuning the plate with a variometer. It is a great DX getter with plenty of volume, having brought in seven Pacific Coast stations on the loudspeaker in the last two weeks. It is very stable with no tendency to squeal. It tunes very sharp, one degree on the dial cutting out one station and bringing in another. It logs very accurately and covers the wave band so very nicely as I get 205 meters at 5 on the dial and 536 meters at 92 on the dial. It tunes so sharp that I found it necessary to use a vernier dial on the low-loss condenser. A vernier rheostat on detector helps wonderfully.

The variometer dial follows right along with the tuning dial and if I keep the two together it will never squeal. I have built quite a number of sets but for simplicity and results this has them all beat.

C. E. CHORD,
Eddyville, Ia.

* * *

RESULTS EDITOR:

I built the "Sin and a Shame" circuit (Reflex for Novice, by Feodor Rofpatkin, Feb. 21) adding two stages of audio.

The set has brought in Pittsburgh, Denver, St Paul, San Antonio, Beaumont, and on two occasions KFI, at Los Angeles, all on the speaker.

Have only had one failure on your hookup so conclude they are O. K. Your magazine seems to realize that some of us want to build sets, not just assemble them and our friends, Bernard, O'Rourke, Anderson, etc., sure try to help.

H. J. LINKINS,
636 Woodland Ave.,
Springfield, Ill.

* * *

RESULTS EDITOR:

In the June 27 issue of RADIO WORLD there appeared an article on Bernard's 3-Circuit Tuner That You Can Log, which I built but was not satisfactory until I read the Oct. 24 issue which gave the coil windings for 23-plate condensers.

I used the same wire, that is, the same number of feet, only I used 3¼" instead of 3½" and 2¾" instead of 3" and it works the best I have ever built. I sat down one night and between 9:30 and 1:15 I got about 30 stations, all on the loud speaker. I had Canada, Miami, Atlanta, Dallas, Hastings, Detroit, and other cities that are closer.

HARRY AARONSON,
22 Branch Street,
Mt. Holly, N. J.

* * *

RESULTS EDITOR:

I have built the 3-circuit Regenerator (all circuits tuned) by Herbert E. Hayden in the Oct. 11 issue and I find it one of the best 1-tube sets that I ever heard for distance and tone.

THOMAS C. LYNCH,
29 Second St.,
Providence, R. I.

* * *

RESULTS EDITOR:

It is with interest that I have read the comments and letters appearing in your magazine concerning the "Simplest Reflex Set" described in your Feb. 21 issue by Feodor Rofpatkin.

I am not going to relate my experience

with the set mentioned with any spirit of egotism, as the wiring and putting into operation of this hook-up was my first experience in radio building, and I state this fact to refute the charges made against the circuit and to point out to all those who wish to build this type of set that they are assured of exceptionally fine results by simply following the clear building instructions.

Living just a few miles as I do from the Pacific Ocean, I tuned in KDKA, Pittsburgh, and put it on the speaker with sufficient volume to be able to hear clearly all the announcements from farthest side of the adjoining room, and by the way, KDKA had not stepped up its transmission power at that time. This performance was repeated on several occasions. The set proved to be exceptionally selective.

Local stations fifty miles distant provided pleasant reception on the speaker.

G. D. WORSWICK,
515 Cherry Ave.,
San Jose, Cal.

* * *

RESULTS EDITOR:

I have tried that Water Jar stunt as described by Capt. P. V. O'Rourke in the November 14 issue of RADIO WORLD and find that it has improved the volume and clearness of my set considerably. I have a 3-tube set, using dry batteries.

H. JOHNSON,
594 East 34th St.,
Brooklyn, N. Y.

* * *

RESULTS EDITOR:

I was much interested in the article published in a recent issue of the Radio World magazine, in regards to the use of a jar of water connected in series with the detector plus lead of the B battery.

I tried your stunt and now my set is bringing in stations with more volume than ever before. I sure am grateful for this information and take this opportunity to thank you.

The set that I now have in use is a 5-tube tuned radio frequency set, and consists of two radio frequency stages, detector, and two stages of audio frequency.

I have told several of my friends about your jar of water and a couple of them also send to you their thanks, and say that they will watch articles on this subject in the future, so you see it may mean a somewhat increased circulation for RADIO WORLD.

EDWARD M. BROWN,
167 North Allen St.,
Albany, N. Y.

* * *

RESULTS EDITOR:

I am a reader of RADIO WORLD and have made several of your sets with finest results. In the January 31 issue you have a hook-up of a transcontinental 2-tube set which I have just completed. It was described by H. E. Wright. It is a sure enough set. I was surprised at the volume on distant stations. I got 22 stations with this set one night in about an hour and a half.

C. H. BINGHAM,
Care Sanford & Day Iron Wks.,
Knoxville, Tenn.

No New Stations Licensed; First Time in Nearly a Year

WASHINGTON.

For the first time in almost a year a week elapsed without a new broadcasting station being licensed by the Department of Commerce. Heretofore there have been from three to ten new licenses granted weekly.

The absence of new stations is held to be directly due to the recommendations of the Fourth National Radio conference that no further stations be licensed until much of the present congestion in the ether has been relieved.

There is a reason to believe that there is a large number of prospective new broadcasters who have ben holding off on demanding a wavelength and a license because of the possibility of new channels being created by the conference. It was thought that the conference might take the 150-to-200 meter band from the amateurs and throw in open to the broadcasters.

Pressure May Follow

With their hopes in this direction shattered, there is a likelihood that the prospective new broadcasters may try to exert pressure on the Department of Commerce to get a license before Congress has a chance to act upon the matter.

The shortage of wavelengths is becoming acute. A new class B station, equipped to use 5,000 watts, is ready to broadcast at St. Louis. The new station is to be called "The Voice of St. Louis." At present it seems almost impossible for the Department of Commerce to provide a wavelength for this station, although a desperate effort will be made to squeeze it in somewhere.

Baltimore's Case

Then there is the case of Baltimore. WBAL, "The Voice of Baltimore," which was recently completed, was constructed to operate on a class B wavelength and considerable adjustment of apparatus would be necessary for operation below 280 meters.

The station is working temporarily on 375 meters, but this is the wavelength of KVOO, "The Voice of Oklahoma" at Bristow which will be ready to broadcast soon. If Bristow, Baltimore and Hot Springs can work satisfactorily on the same wavelength, Baltimore will be allowed to continue on 375 meters. But it is believed that this will not be the case and that WBAL will be compelled to drop down to 246 meters.

Same in Deerfield

WHT, Deerfield, had the same experience. Constructed to operate on a class B wave, WHT was assigned 238 meters. The station is now using 400 meters, through the courtesy of WHAS, Louisville, until it can adjust its apparatus for the lower wave.

IN PREPARATION—RADIO WORLD'S MOST IMPORTANT ISSUE OF THE YEAR

RADIO GIFTS NUMBER

This Will Be a Radio Christmas

Regular Advertising Rates as Follows:

Page	$300.00
Half-page	150.00
Third page (one col.)	100.00
Quarter page	75.00
Per inch	10.00
Per agate line	.75
Times discounts:	
52 consecutive issues	20%
26 times consecutively, or	
e. o. w. one year	15%
4 consecutive issues	10%

Radio Gifts Number will be dated Dec. 12, issued Dec. 9. Last color form closes Dec. 1. Last black form closes Dec. 2, noon.

It is estimated that our RADIO GIFTS NUMBER of 1924 sold more than $100,000 worth of radio goods for advertisers who used these columns. It is the intention of the publishers to make the 1925 issue of the RADIO GIFTS NUMBER so much better than last year, and to give it so much larger a distribution that the sales through its columns will be increased heavily over last year's figures.

RADIO WORLD'S HOLIDAY GIFTS NUMBER OF 1925 will have a list of notable contributors, a special holiday cover in colors and er special features that will be worth advertising in papers of nearly 5,000,000 circulation throughout the country. There is bound to be a larger sale than usual, becau the selling price will not be increased.

If you want to sell your goods to the millions of holiday gift buyers who will purchase radio goods this year, don't fail to use the columns of this RADIO GIFTS NUMBER.

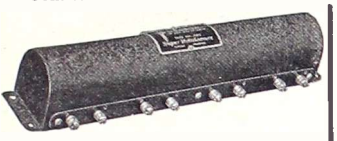
FOR SPECIAL POSITIONS, PHONE OR WIRE IMMEDIATELY!

RADIO WORLD, 145 WEST 45TH STREET. Phones: Bryant 0558-0559

Prices Now are Lower than Ever Before

Here are some bargains taken from Barawik's latest Radio Catalog and Guide which is brimful of new ideas and latest developments in radio. We have the greatest collection of radio supplies ever gathered together by any organization. Barawik guarantees you low prices, for we are the oldest institution in America specializing exclusively in radio. Our mail-order method of selling gets you the best at lowest cost. Shows tremendous savings on standard guaranteed radio sets and supplies. Be sure to get our thrifty illustrated book before you buy, before you spend another penny. It means money in your pocket.

Order what you need now from this page. Simply write down the article numbers, their name and price and send with remittance to us. Goods will be shipped immediately. All goods guaranteed.



PRECISE SUPER-MULTIFORMER

N 2321—Precise Super-Multiformer, Each $15.95

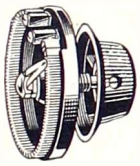
Postage 10c extra.

Contains four radio frequency transformers all accurately matched. Encased as one unit in a brass shell which shields and prevents any electrical action between transformers or other parts of circuit. It simplifies wiring of receivers and assures short grid connection to sockets. May be used to replace all r. f. transformers in a superhet or any similar receiver.

N 2323—Precise No. 480 Transformer 5 to 1 ..... $5.95
N 2324—Precise No. 480 Transformer 2½ to 1 ..... 5.95
N 2325—Precise No. 285 Transformer 3.89
N 2327—Precise Synerodensers Single Unit 3.85
N 2328—Precise Synerodensers Dual Unit 7.38
N 2322—Precise No. 1900 Flittometer 3.65

Postage 8c extra on each.

DE LUXE RHEOSTATS



C 211—2 ohm
C 147— 6 ohm
C 120—10 ohm
C 148—20 ohm
C 149—30 ohm
C 213—50 ohm
Single Lots, 59c
Lots of Ten, 49c

Postage 3c extra.

Highest quality. Genuine bakelite base. Large size attractive polished black knob. Only one hole required for secure mounting. Smooth, quiet regulation of current. Potentiometers are of same high grade design.

N 155—200 ohm potentiometer..Each $ .79
N 156—400 ohm potentiometer..Each .89

AMPERITES—EACH, 92c

N 221—For 201A or 301A Tubes
N 222—For 200 or 300 Tubes
N 223—For 199 Tubes 6-V Battery
N 220—For 199 Tubes 4-V Battery
N 224—For WD11 or C11 Tubes

Postage 3c extra.

YAXLEY RHEOSTATS

N 1321— 2 ohm.....
N 1322— 6 ohm.....
N 1323—10 ohm.....
N 1324—20 ohm..... Each 96c
N 1325—30 ohm.....

Postage 4c extra.

N 1326—200 ohm Potentiometer.... $1.38
N 1327—400 ohm Potentiometer.... 1.38

Postage 4c extra.

BRACH-STAT, EACH, 77c

N 1330—For WD11, 12 tubes with 1½-V Battery
N 1331—For 201A or similar tubes with 6-V Battery
N 1332—For 199 or similar tubes with 4½-V Battery

PACENT SILVERED DIAL RHEOSTATS AND POTENTIOMETERS

N 1070— 6 ohm Rheostat.....
N 1071—10 ohm Rheostat.....
N 1069—20 ohm Rheostat..... Each
N 1072—30 ohm Rheostat..... 57c
N 1073—400 ohm Potentiometer
N 1068—200 ohm Potentiometer

CARTER VERNIER CONTROL RHEOSTATS

N 1338— 3 ohm Rheostat.....
N 1339— 6 ohm Rheostat.....
N 1340—10 ohm Rheosatt..... Each
N 1341—20 ohm Rheostat..... $1.46
N 1342—30 ohm Rheostat.....

Postage 3c extra.

N 1343—200 ohm Potentiometer.... $1.68
N 1344—400 ohm Potentiometer.... 1.68

STANDARD RHEOSTATS AND POTENTIOMETERS

N 132—Composition Base 6 ohm plain
N 135—Composition Base 6 ohm vernier
N 133—Composition Base 10 ohm rheostat
N 129—Composition Base 20 ohm rheostat
N 131—Composition Base 30 ohm rheostat
N 130—Composition Base 50 ohm rheostat

Each, 33c

N 151—200 ohm Potentiometer..... $ .45
N 152—400 ohm Potentiometer..... .50

Postage 3c extra on each of above.

SNAIL SHELL LOUD SPEAKER

For use inside of cabinet or console. Used as standard equipment on speakers selling at $25. Made of processed wood fibre neatly finished in black. Produces wonderful deep, rich tones. Requires space of 8 inches high, 10 inches wide, 9 inches deep.

IN1737—Without Unit....Each, net $3.00
IN1738—With Fine Quality Unit, Each, net 6.00

Postage 15c extra.

IN1735—Flexible Cabinet Speaker without unit..... 3.38

High grade adjustable unit, $3.60 extra.

Postage 20c extra.

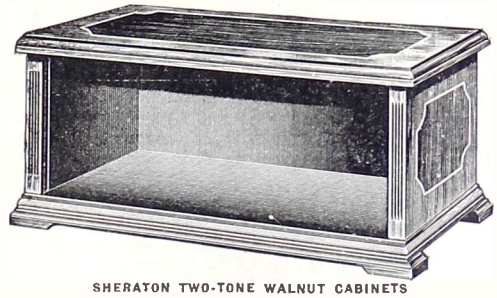
Mail This Coupon for Free Radio Guide

Name .....

Address .....

Name of Radio Fan.....

Address .....



SHERATON TWO-TONE WALNUT CABINETS

Elegantly finished solid walnut top and sides in two-tone effect. Body of cabinet is beautiful brown walnut with larger brown panels relieved with inlaid gold lines. Fine hand-rubbed finish gives these cabinets an appearance equal to that of the most expensive furniture.

Fitted with full-length nickel-plated piano hinge and lid stop. Ends grooved for slide-in panel. Full ten inches deep back of panel. Finest grade walnut, guaranteed perfect construction.

Panel Size, In.	Article Number	List Price	Our Net Price, Each	Shipping Weights
7x18	IN2512	$11.50	$8.95	16 lbs.
7x21	IN2513	12.30	9.55	18 lbs.
7x24	IN2514	13.50	10.60	20 lbs.
7x26	IN2515	14.00	10.95	21 lbs.
7x30	IN2516	16.50	12.95	23 lbs.

Transportation charges extra.

SHEPHERD GUARANTEED TUBES

Fully guaranteed equal of any other $2.50 standard tube.

N 1532—0199 Type Tube..... Each, $1.55
N 1530—0201A Type Tube..... Lots of 10, $1.35

KEN-RAD TUBES

N 103—Type 201A..... Each, $1.15
N 104—Type 199..... Lots of 10, $1.05

RADIOTRON AND CUNNINGHAM TUBES

N 112—Cunningham C301A, CX301A; Radiotron, UV201A, UX201A..... Each $1.95
N 102—Cunningham C299, CX299; Radiotron UV199, UX199..... Each 1.95
N 106—UX120, CX220..... Each 1.95
N 109—UX112, CX212..... Each 4.85
N 108—UX210, CX310..... Each 7.70
N 105—C300, CX300; Radiotron UV200, VX200.... Each 1.95
N 101—Cunningham C12, CX12; Radiotron WD12, WX12..... Each 1.95
N 107—C11, WD11..... Each 1.95

Postage on all above tubes 10c each extra.

The Barawik Co.
102 So. Canal St. Chicago, Ill.

GENUINE BAKELITE DIALS

The finest bakelite dials on the market. Wonderful values at our prices. Large deeply fluted taper knob allows positive grip and enables fine adjustment. Pebbled surface on 3 and 4 inch size adds much to looks. Accurately made and run absolutely true on shaft. For ¼ inch shaft.

Postage 4c extra.

N 1173—4 inch.....Each 46c
N 1174—3 inch.....Each 36c
N 1175—2 inch.....Each 24c

APEX VERNIER DIALS

N 1377—Royal Brass.....Each $1.69
N 1378—Satin Silver.....Each 2.08
N 1379—De Luxe Gold Plated, Each 3.05

Postage 5c extra.

ACCURATE VERNIER CONTROL DIALS

N 914—Clockwise ..... } $2.55
N 95—Counter clockwise..... { Each

Postage 5c extra.

N 1140—Rheostat Control..... $ .59

Postage 4c extra

PACENT MICROVERN DIALS

N 1369—Silver ..... } $1.79
N 1370—Gold ..... { Each

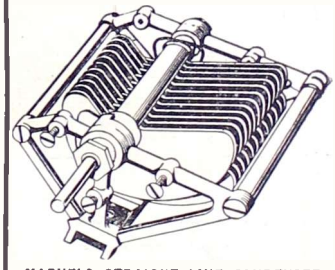
Postage 4c extra

GENUINE BAKELITE SOCKETS

N140—201A Base....21c
N141—UV199 Base....23c
N1421—UX Base....27c
N136—C11 Base....30c

Postage 2c extra.

Moulded of genuine red brown bakelite. The biggest socket value ever offered. Fine quality. Strong and durable. Reinforced slot and screw holes. Binding post connections plainly marked make connections easy. Positive contact springs of phosphor bronze.



MARVELO STRAIGHT LINE CONDENSER

N 1881—.00025 .....Each $2.48
N 1882—.00035 .....Each 2.68
N 1883—.0005 .....Each 2.88

A low loss condenser made along the lines of the most advanced engineering developments yet a price far lower than you would expect to pay for an article of this quality. Heavy aluminum plates rigidly constructed. Minimum amount of dielectric placed where electro-static field density is lowest. Grounded rotor carefully balanced. Positive noiseless contacts. ¼ inch shaft.

OTHER CONDENSER BARGAINS

N 810—Acme Condenser, Special Bargain $3.35
N 1865—Karas Orthometric 11 plate. 5.70
N 1866—Karas Orthometric 17 plate. 5.95
N 1867—Karas Orthometric 23 plate. 6.20
N 787—Cardwell Condenser .00025.. 3.35
N 788—Cardwell Condenser .00035.. 3.80
N 789—Cardwell Condenser .0005.... 3.98
N 790—Cardwell Condenser .001.... 4.80
N 2359—Bremer-Tully Lifetime Multiple Condensers Type LD-17..... 8.25
N 2357—B-T 7 plate .00015 mfd... 3.79
N 775—B-T 13 plate .00025 mfd... 3.89
N 2358—B-T 17 plate .00035 mfd... 4.19
N 776—B-T 23 plate .0005 mfd.... 4.19
N 777—B-T 35 plate .0008 mfd.... 5.85

Postage on all condensers 8c each extra.

BAKELITE VARIOMETER AND VARIOCOUPLER

N522—Variometer Each, $1.23
N521—Variocoupler Each, $1.23

Postage 8c extra.

Usual $2.00 value.

While these instruments are unusually low in price they will give fine results. Properly designed and of good mechanical construction. Green silk windings on Bakelite forms. Firm contacts, ¼ inch shaft. Suitable for all broadcast wave lengths. Variocoupler primary is tapped for fine tuning.

SUPERIOR ARRESTER

N982—Each 21c

Postage 3c extra

A well made and dependable air gap type arrester. Porcelain case. Brass binding posts

The Wide Range Receiver

(*Concluded from page 8*)

of R1 and to the fifth terminal from the frame of the FCJ. The frame terminal goes to B+2 post on the terminal strip. The third terminal from the frame goes to one terminal of the choke coil L5, and to one terminal of the fixed condenser C5. The other terminal of the choke coil L5 goes to the frame of the FCJ. The fourth terminal goes to the arm of the rheostat R3. The sixth or last terminal goes to the A—C+ post on the terminal strip. The other terminal of the fixed condenser C5 goes to one terminal of the resistance R6, and to the G post on socket 3. The left off terminal of the resistance goes to the C— post. One terminal of the choke coil L6 goes to the P post on socket 3. The other terminal goes to the B+3 post. The P post of socket 3 goes to one terminal of the fixed condenser C6, and also to the resistance terminal of the potentiometer R4. The arm of this resistance goes to the G post on socket 4. The other resistance terminal of the potentiometer goes to the C— post. The F— post on socket 4 goes to the resistance wire of the rheostat R3. The F+ post on this socket goes to the F+ post on socket 5 and 3. One terminal of the choke coil L7 goes to the P post on socket 4, and to one terminal of the fixed condenser C7. The other terminal of the inductance L7 goes to the B+3 post. The other terminal of the fixed condenser C7 goes to the G post on socket 5, and to one terminal of the fixed resistance R7. The other terminal of the resistance R7 goes to the C— post. One terminal of the choke coil L8 goes to the P post on socket 5. The other terminal of L8 goes to the B+3 post. The P post of this socket goes to one terminal of the fixed condenser C8. The other goes to the frame of the FCJ. The second terminal from the frame goes to the A—C+ post. The third terminal goes to the arm of the rheostat R3. The last terminal goes to the A—C+ post.

The tuning of this set is not difficult. The portion of the antenna coil in the antenna circuit, before the tap is taken, constitutes the primary, while that portion in the grid circuit is the secondary. Therefore the primaries and the secondaries should be matched, in order to keep the dials reading alike at all times, whether on high or on low wave work. The tickler coil is not very critical in adjustment. If you find that it is, reverse the leads, and reduce the detector plate voltage.

LIST OF PARTS

Two .0005 mfd. variable condensers, C2C3.
One antenna plug-in coil, L1 (REL).
Three 3-circuit tuner plug-in coils, L2L3L4 (REL).
Three 200 henry choke coils, L5L6L7L8 (Thordarson).
Two 500,000 ohm resistances, R6R7.
One 500,000 ohm potentiometer, R4.
One double closed circuit filament control jack FCJ.
One single open circuit filament control jack, FCJ.
Four 1 mfd. fixed condensers, C5C6C7C8.
Two 10 ohm rheostats, R1R2.
One 6 ohm rheostat, R3.
Five sockets.
One Mountford variable grid leak, R5.
One .00025 mfd. condenser, C4.
One 7x14" panel.
One 7x14" sub base.
One pair of brackets.
Seven binding posts.
Two 3½" dials.
Accessories: Connecting wire, batteries, screws, nuts, antenna, ground, and lead-in wire, lugs, etc.

STATIONS

(Concluded from page 19)

Station	Owner and Location	Meters
WOAX	F. J. Wolff, Trenton, N. J.	240
WOC	Palmer School of Chiro, Davenport, Ia.	484
WOCG	Triple Alliance Radio Station, Sycamore, Ind.	227
WOCL	Hotel Jamestown, Jamestown, N. Y.	275
WOI	Iowa State College, Ames, Iowa	270
WOK	Neutrowound Radio Mfg. Co., Homewood, Ill.	217
WOKO	Otto Baur, N. Y. City	233
WOO	John Wanamaker, Philadelphia, Pa.	508
WOQ	Unity School of Christianity, Kansas City, Mo.	278
WOR	L. Bamberger & Co., Newark, N. J.	405
WORD	Peoples Pulpit Assn., Batavia, Ill.	275
WOS	Mo. State Marketing Bureau, Jefferson City, Mo.	441
WOWL	Owl Battery Co., New Orleans, La.	270
WOWO	Main Auto Supply Co., Ft. Wayne, Ind.	227
WPAK	N. D. Agricultural College, Agricultural College, N. D.	275
WPAZ	Dr. John R. Koch, Charleston, W. Va.	268
WPDO	Hiram L. Turner, Buffalo, N. Y.	205
WPG	Municipality, Atlantic City, N. J.	300
WPRC	Wilson Printing & Radio Co., Harrisburg, Pa.	216
WPSC	Penn State College, State College, Pa.	261
WQAA	H. A. Beale, Jr., Parkersburg, Pa.	220
WQAC	Gish Radio Service, Amarillo, Texas	234
WQAE	Moore Radio News Station, Springfield, Vermont	246
WQAM	Electric Equipment Co., Miami, Fla.	263
WQAW	Scranton Times, Scranton, Pa.	250
WQAO	Calvary Baptist Church, New York, N. Y.	360
WQJ	Calumet Rainbo Broadcasting Co., Chicago, Ill.	448
WRAF	Radio Club, Inc., Laporte, Ind.	224
WRAK	Economy Light Co., Escanaba, Mich.	256
WRAM	Lombard College, Galesburg, Ill.	244
WRAV	Antioch College, Yellow Springs, O.	263
WRAW	Avenue Radio Shop, Reading, Pa.	238
WRAX	Flexon's Garage, Gloucester City, N. J.	268
WRBC	Immanuel Lutheran Church, Valparaiso, Ind.	278
WRC	Radio Corp. of America, Washington D. C.	469
WRCO	Wynna Radio Co., Raleigh, N. C.	252
WREC	Wooten's Radio Shop, Coldwater, Miss.	254
WREO	Reo Motor Co., Lansing, Mich.	286
WRHF	Radio Hospital Fund, Washington, D. C.	256
WRHM	Rosedale Hospital, Minneapolis, Minn.	252
WRK	Doron Bros., Elec. Co., Hamilton, O.	270
WRNY	Experimenter Publishing Co., (Radio News) N. Y. City	258
WRM	University of Illinois, Urbana, Ill.	273
WRMU	A. H. Grebe & Co., Inc., Motor Yacht Mu-1, N. Y. City	236
WRST	Radiotel Mfg. Co., Inc., 5 First Ave. Bay Shore, N. Y.	216
WRW	Tarrytown Research Laboratory, Tarrytown, N. Y.	273
WSAI	U. S. Playing Card Co., Cincinnati, O.	326
WSAJ	Grove City College, Grove City, Pa.	229
WSAN	Allentown Call, Allentown, Pa.	229
WSAP	City Temple, New York, N. Y.	263
WSAR	Doughty & Welch Elec. Co., Fall River, Mass.	254
WSAV	C. W. Vick Radio Construction Co., Houston, Tex.	248
WSAX	Zenith Radio Corp., Chicago, Ill.	268
WSAZ	Chase Electric Shop, Pomeroy, Ohio.	244
WSB	The Atlanta Journal, Atlanta, Ga.	428
WSBC	World Battery Co., Chicago, Ill.	210
WSBF	Stix Baer and Fuller, St. Louis, Mo.	273
WSBT	South Bend Tribune, South Bend, Ind.	275
WSDA	Seventh Day Adventist Church, N. Y. City	263
WSKC	World's State Knitting Co., Bay City, Mich.	261
WSM	National Life and Accident Ins., Nashville Tenn.	283
WSMB	Saenger Amusement Co., New Orleans, La.	319
WSMH	Shathick Music House, Owosso, Mich.	240
WSMK	G. M. K. Radio Corp., Dayton, O.	275
WSOE	School of Engineering, Milwaukee, Wisc.	246
WSRO	H. W. Fahlander, Hamilton, Ohio.	251
WSUI	State University of Iowa, Iowa City, Ia.	489
WSY	Alabama Polytechnic Institute, Auburn, Ala.	250
WTAB	Fall River Daily Herald, Fall River Mass.	266
WTAC	Penna. Traffic Co., Johnstown, Pa.	268
WTAD	R. E. Compton, Carthage, Ill.	236
WTAG	Worcester Telegram Publishing Co., Worcester, Mass.	268
WTAL	Toledo Radio & Elec. Co., Toledo, O.	252
WTAM	Willard Storage Battery Co., Cleveland, Ohio	389
WTAP	Cambridge Radio Elec. Co., Cambridge, Ill.	243
WTAQ	S. Van Gordon & Son, Osseo, Wis.	254
WTAR	Reliance Radio & Elec. Co., Norfolk, Va.	261
WTAS	Charles E. Erbstein, Elgin, Ill.	303
WTAT	Edison Elec. Ill. Co. (Portable), Boston, Mass.	244
WTAW	Agricultural & Mech. College, College Station, Tex.	270
WTAX	Williams Hardware Mfg. Co., Streator, Ill.	231
WTAZ	T. J. McGuire, Lambertville, N. J.	261
WTG	Kansas State Agricultural College, Manhattan, Kas.	273
WTIC	Travelers Insurance Co., Hartford Conn.	349
WWAD	Wright & Wright, Inc., Philadelphia, Pa.	250
WWAE	Electric Park, Plainfield, Ill.	242
WWGL	Radio Engineering Corp., Richmond Hill, N. Y.	213
WWI	Ford Motor Co., Dearborn, Mich.	266
WWJ	Detroit News, Detroit, Mich.	353
WWL	Loyola University, New Orleans, La.	275

International Broadcasting Fast Becoming Permanent

WASHINGTON.

A big increase in the use of radio, both for broadcasting and commercial communication purposes, during the last year is shown by the annual report of the Bureau of Navigation which was made public today.

During the year there were 8,603 inspections made compared to 7,727 for the previous year, in connection with the marine service. There was a slight decrease in the total number of amateur stations, but an increase in every other type of radio stations. During the year 245 broadcasting stations were discontinued, while 281 new stations were licensed. Usually the incoming stations were of higher power than the outgoing ones.

The report states that international broadcasting is rapidly becoming a successful and permanent service. "On several occasions the program of American stations were received in foreign countries and rebroadcast by their local stations on their normal wavelengths," the report says. "One of these programs was successfully repeated by a station at Cape Town, South Africa, and other programs have been received at London, Glasgow, Liverpool, Melbourne, Sydney, Johannesburg, Stuttgart and several other foreign cities."

The total expenditures of the radio service during the fiscal year were $205,238, while it is estimated that $220,525 will be spent during 1926.

The report calls attention to the growth of radio since the passage of the 1912 radio law and adds that "steps may be taken to secure by the next Congress new legislation" to enable the department to more adequately control the new services.

Hoover Thanks Writers For Praising His Work

WASHINGTON.

The desire of Secretary Hoover to safeguard the public interest in broadcasting and his gratification over a resolution passed by the National Association of Radio Writers commending him for his administration of radio affairs were recently expressed in a letter to Thomas Stevenson, Secretary of that organization. Mr. Hoover's letter follows:

"It is very gratifying that the representatives of the press are satisfied with the conduct of radio affairs by the Department of Commerce. Ours has been a difficult task in the handling of radio problems and we have sought to make the public interest paramount in all of our deliberations.

"As I believe the radio press is in an excellent position to reflect the public viewpoint, it is a source of great personal satisfaction to have the resolution of the National Association of Radio Writers."

Roxy Gets Popularity Medal; Spurs Him to Greater Work

The medal won by S. L. Rothafel ("Roxy"), when he finished first in RADIO WORLD's voting contest to determine who is America's most popular entertainer, was pinned on his lapel the other day by Herman Bernard, managing editor of RADIO WORLD.

Roxy won the contest by a wide margin of votes. When the medal was presented to him he said that he was grateful for the splendid support given to him in the contest by those who were so good as to admire his work, and pledged himself to even greater efforts, to justify the confidence the people showed in him.

In presenting the medal to the popularity champion Mr. Bernard said:

"This medal is a token of the high esteem in which you, Mr. Rothafel, are held by the army of broadcast listeners in the United States and Canada. There was no effort on your part, or by any one in your organization, to pile up votes for you, yet you won hands down, and it is a pretty compliment indeed. You are one of the announcers whom the fans do not tune out and there should be more like you.

"I pin this medal on your manly breast well knowing that it is justly deserved and represents the sentiment of the people of the United States and Canada as emphatically registered in an international voting contest that lasted several months."

In accepting the medal Mr. Rothafel said:

"This token is indeed something to spur me on to greater efforts. I am deeply grateful for the appreciation that it symbolizes, and my efforts will be redoubled to give the radio listeners even more of my time and thought, so that I may repay them, if indeed I ever can in any way, for the noble inspiration that they have been to my life. Nothing has ever touched my heart so deeply over anything I have done professionally as the sympathetic response from the radio fans to my efforts. It is they who have placed the flowing bowl of opportunity in my hands and to them I address myself in the still larger undertakings upon which I am engaged.

"While it is enjoyable to be thus honored, it serves again as a reminder of responsibilities. This medal is like the personal thanks of each one who balloted for me, heated to the melting point under the flame of sympathy, and poured into the mould that made possible the casting of this prize of gold."

Mr. Rothafel was constrained by his friends to have the medal on exhibition at the offices of the Roxy Theatre, the huge new enterprise in New York City that will be the first of a chain of monuments to his genius.

(Photo on Front Cover)

California Business Good, Says Sawyer

Ernest Walker Sawyer has moved his office from the Chapman Building to 1915 Santa Fe Avenue, Los Angeles. Mr. Sawyer represents the Silver-Marshall, Amsco, Radiotive and several other well-known lines. He reports business very lively in California. The business in Oregon, Washington and other western states is developing but is handicapped by lack of local broadcasting programs of consequence, he says. Mr. Sawyer last year was vice-president and general manager of Electrad and previously was well known for his activities in the formation of the Chas. Freshman Company and others. Pitts Underground Antenna is now being successfully put on the market in the Los Angeles district. Sawyer is factory representative on this device, manufactured by the Osborne-Kelsey Company of Los Angeles.

JOIN THE A. B. C.

A. B. C. stands for American Broadcast Club, an organization of fans banded together to promote the welfare of radio. There are no dues, no obligations. Address A. B. C. Editor, RADIO WORLD, 145 West 45th St., N. Y. City. The names and addresses of new members follow:

W. H. Poulk, Oil Hill, Kansas.
Clarence Young, 2243 Germantown Ave., Philadelphia, Pa.

MORE PRAISE OF DIAMOND

DIAMOND EDITOR:

I have just finished building your 1926 model Diamond of the Air and am more than pleased. I was disappointed at first and possibly inclined to believe with some others that the hookup was not what it was supposed to be. But after replacing the home-made coils I beg to apologize for any thoughts that the Diamond was anything but a real receiver. Please mail a nameplate as soon as possible.

H. B. RILEY,
1410 Sibley Ave.,
Wichita Falls, Tex.

* * *

DIAMOND EDITOR:

I have just completed The Diamond of the Air and can vouch for its DX propensities. It's a great hookup. I have been building radio sets for five years or more, but this is the best yet.

BRUCE THOMPSON,
1125 Fourth Street,
Lorain, Ohio.

QUICK ACTION CLASSIFIED ADS

10 CENTS A WORD. 10 WORDS MINIMUM. CASH WITH ORDER

HONEY, MICHIGAN'S BEST—Clover or buckwheat. Five pounds, $1.40; ten pounds, $2.50, with honey receipt book, delivered fourth zone. Order direct from producers. (An appreciated gift). Shady Lawn Apiaries, Milan, Mich.

DID YOU SEE THE 3-TUBE DRY-CELL CIRCUIT, by Capt. P. V. O'Rourke, that appeared in Nov. 7 issue. 15c per copy. Radio World, 145 W. 45th St., N. Y. C.

DX SUPER-HETERODYNE, by J. E. Anderson, appeared in RADIO WORLD dated Nov. 14. Sent on receipt of 15c, or start your subscription with that number. RADIO WORLD, 145 W. 45th St., New York City.

EXPERT RADIO REPAIRING AND BUILDING at a moderate price. Write Cord Radio Laboratories, Wamego, Kansas.

1000 "NEARGRAVURE" PROCESS PRINTED BUSINESS CARDS (2¼x4") $1.50, postpaid. 250 each Letterheads, Envelopes, Statements $4.44, postpaid. Sollidays, Knox, Ind.

WANTED: A RADIO DEVICE THAT NEEDS ADVERTISING. Have you something that is already manufactured and ready to sell, and which needs only the stimulation of persistent and effective advertising to put it over? I am looking for such devices. Box XX. The Columbia Print, 143 W. 45th Street, N. Y. C.

FILL OUT AND MAIL NOW

SUBSCRIPTION BLANK

RADIO WORLD

RADIO WORLD 145 *West 45th Street, New York City (Just East of Broadway)*

Please send me RADIO WORLD for.....months, for which please find enclosed $.....

SUBSCRIPTION RATES
Single Copy.....$ .15
Three Months..... 1.50
Six Months..... 3.00
One Year, 52 Issues..... 6.00
Add $1.00 a Year for Foreign Postage; 50c for Canadian Postage

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.....

RECENT BACK NUMBERS of RADIO WORLD, 15c each. RADIO WORLD, 145 West 45th Street, New York City.

Bearing the Endorsement of thirteen Leading Manufacturers the new

DIAMOND OF THE AIR KIT

is breaking all records for sales

THESE ARE THE MANUFACTURERS

whose products are used in the kit

- Aerovox Wireless Corp.
- Alden Mfg. Co.
- Bruno Radio Corp.
- Cornish Wire Co.
- Cortland Panel Eng. Co.
- De Luxe Sales Co.
- Kurz-Kasch Co.
- No. American Bretwood Company
- Preferred Radio Prod. Corporation
- Radiall Co.
- Streamline Radio Co.
- Thordarson Elec. Co.
- Veby Mfg. Co.

THIS IS THE KIT

which bears the signature of Herman Bernard

One antenna coupler, L0L1 (Bruno 99 or 55 RF).
One 3-circuit interstage coupler, L2L3L4 (Bruno 99).
Two .0005 mfd. SLF condensers, C1, C3 (Streamline).
Two ¼-amp. ballasts, R2, R7 (Amperites, type 1-A).
One 3½-to-1 AF transformer, AFT (Thordarson).
One ¾-amp. ballast, R1 (Veby).
Two .01 meg. resistors, R3, R5 (Veby).
One 0.5 meg. leak, R6 (Veby).
One variable grid leak, R0 (Bretwood).
Three 4 moulded Bakelite dials (Kurz-Kasch).
Two double-circuit jacks, J1, J2 (Preferred).
One single-circuit jack, J3 (Preferred).
One 7x24 drilled and engraved panel (Cortland).
Five standard sockets (Na-ald).
One socket shelf and brackets (Bruno).
Two 0.25 mfd. fixed condensers, C4, C5 (Aerovox).
One 5-strand multi-colored battery cable (De Luxe).
Two battery switches, S1, S2.
One .00025 mfd. grid condenser, C2.
Four binding posts, W, X, Y, Z.
Five battery cable markers.
Ten lengths of bus bar (Cornish).
Two flexible leads for C battery.
Screws, nuts, spaghetti.

BOXED AND SEALED KIT **$35.00**

The Genuine Sealed Diamond Kit bears the signature of Herman Bernard

"Use 20 Mu. Tubes for first and second AF and Power Tube in the last stage for perfect volume," says Bernard.

Veby 20 Mu. (hi-mu.) tubes . . . . . Each $2.95
Veby 6 Mu. (power tube for last stage) . . . . . Each 3.25

[These are the tubes to use in the 1926 Diamond or any other audio amplifier using two or more resistance or impedance coupled stages.]

"Bruno 55" matched radio frequency coil for 99 and used in the Diamond of the Air . . $3.00

"Bruno 99" 3-circuit tuner wound on quartzite glass and specified in the Diamond of the Air, $6.50

BRUNO BRACKETS

Give your Set that professional appearance

Simplifies wiring and construction of any set. Price per pair $1.00

"Bruno 77" 3-circuit tuner wound on quartzite glass with special tickler for smooth regeneration control $5.50

"Bruno" short wave coil. Tunes from 25-110 meters with .00025 condenser. Wound with flat ribbon wire $5.50

Bruno coils matched for .0005 mfd. SLF condensers, same prices as those stated above. State the make of condenser you use.

A few more left

THE B-C-L SPECIAL METAL VERNIER DIAL **59c ea.**

COMPLETE KITS

Hayden's Thoroughbred	$7.50
Bruno "77" 3-tube DX	19.50
Ambassador 3-tube	17.50
RX-1 using Bruno Coils and S-L-F Condensers	22.25
Freshman Kit—coils and condensers	7.50
Thordarson-Wade	41.50

VARIABLE CONDENSERS

Bruno 3-section (.00025 each section)	$5.95
Preferred .0005 mfd.	1.75
U. S. Tool (all sizes)	1.95
Wade .0005; $8; .00025	7.75
Amsco Allocating .0005, $5.85; .00035	5.75
Heath Radiant vernier all sep.	1.95
King Cardwell all sep.	2.95
Continental Midget	1.00

SOCKETS

5 Gang socket shelf (for Diamond)	$2.50
4 Gang socket shelf	2.00
3 Gang socket shelf	1.50
Panel mount triple	.75
Federal	.65
Na-ald De Luxe	.50
Bruno WD-11	.35
Na-ald small space, 6 for	1.00
Socket shell and prongs	.25

THIS WEEK'S SPECIAL

General Instrument Pyrex and Isolantite Condensers **$2.40**

In sealed boxes—only 3 to a customer.

AUDIO TRANSFORMERS

Thordarson Auto-former	$4.25
Thordarson Push Pull, per set	8.50
Federal 65 and 65A	3.75
Erla 3-1 and 6-1	3.50
Thordarson 2 to 1	3.50
Thordarson 6-1	5.10
Thordarson 3½-1	2.95
Rauland Lyric	6.95
Crescent 6-1, 3-1	2.25
Acme 4½ to 1, A2	2.50
All American 10 to 1	3.75
Amertran 5 to 1, 3 to 1	5.85
De Forest 5 to 1	3.95

COILS

Bruno "66" 3-circuit tuner	$2.25
Clarotuner	3.50
Erla Balloon Cirelold	3.65
Yankee 8-circuit	1.65
Sickles coils for Roberts circuit	6.25
Sickles coils for Browning Drake	9.95
Coils for Jornal 1 knob set	$7.45
Globe Low Loss	4.50
Aero Coils . . . . . each	3.95

SPEAKERS

Crosley Musicone	13.50
Thorola Jr.	15.95
Erla	19.95

RHEOSTATS

Bruno 6, 10, 30 ohms	$ .50
Pacent all sizes	.50
Cutler Hammer	.45
Klosner vernier 6 ohm	.59
Klosner plain 6 ohm	.45
Fada 6 or 30 ohm	.39
Federal 6 ohm	.59
Parker 1 hole mount	.75

JACKS

Firth SC or DC	$ .30
Jones SC or DC	.45
Federal SC	.50

FIXED CRYSTAL

Carborundum	$1.50
Resis	.85
Yellow Dog	.95

DIALS

Kurz-Kasch Bakelite 4"	$ .50
Universler	.95
B. M. B. Metal Vernier	1.10
Na-ald 4"	.50

TUBES

Vesuvius Voltron 201A and 199 types	$1.45
R. C. A. tubes 201A, 199, WD12, UX120	2.25

HARD RUBBER PANELS

7x10	$ .60
7x12	.70
7x14	.80
7x18	1.00
7x21	1.20
7x24	1.50
7x26	1.65
1926 Diamond Drilled and Engraved	2.45
Powertone 7x18 Drilled and Engraved	2.15
3 tube Bruno 7x18 Drilled and Engraved	1.45

MISCELLANEOUS

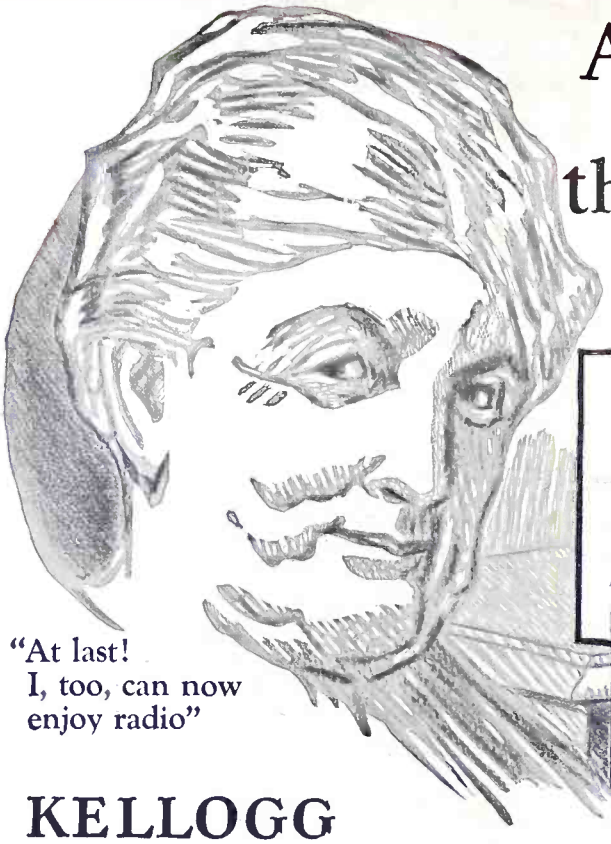
Batts & Batts Loop	$2.25
Bradleystat	1.65
Aerial Kit	2.00
Baldwin type C	3.25
Tower head sets	1.95
D. P. D. T. switch	.45

MARCO Hairline Vernier Dials	$1.59	BERNARD 1-Tube DX Kit, with SLF Condensers	$8.45	AMPLION Type Speaker. Adjustable Unit	$4.50	BRETWOOD Variable Grid Leak	$1.50

Write for Free Catalogue

B-C-L RADIO SERVICE CO., 221 FULTON ST., N. Y. C.

A New Kind of Selectivity that Makes Tuning *a Real Pleasure*



"At last! I, too, can now enjoy radio"

Standard Model 5-Tube Wave Master

in beautifully finished cabinet of solid genuine Mahogany. Price,

$125.00

The Wave Master Consolette

A beautiful genuine mahogany model with inbuilt horn,

$235.00

Also made in a handsome Console Model. Price

$275.00

Kellogg Symphony Reproducer $25.00

KELLOGG

Has Produced the Radio Set for YOU

BY PERFECTING, in the new 5-tube WAVE MASTER, a new kind of *selectivity*, the Kellogg Switchboard & Supply Company has given a new definition to that much abused word.

No professional skill is required to tune the WAVE MASTER. A person who has never before touched a radio receiver can instantly bring in desired stations clear, "sweet" and strong.

With its single Selector dial, the WAVE MASTER gives you what otherwise you can get only by using NINE separate receiving sets of any other types, each one differently adjusted.

For each point on the Wave Zone Separator, you find on the Station Selector dial an entirely different group of broadcasting stations.

Think of the greater selectivity! Think of the wide separation of stations in any one of the nine wavelength divisions. Think of the freedom from interference and the crowding so common on the dials of ordinary sets.

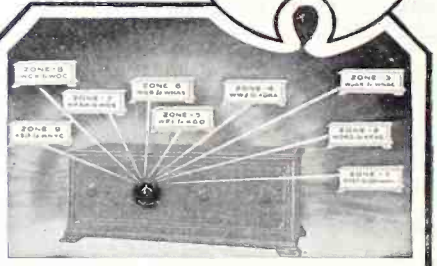
For 28 years the Kellogg Switchboard & Supply Company have been makers of precision telephone instruments, switchboards, etc. Kellogg high-grade parts have been favored by expert and professional designers of receiving sets since the beginning of radio.

Write us for the name of your nearest dealer. We will also send, on request, a complete explanation of the WAVE MASTER circuit. Ask for Folder No. 7-L.

Radio Dealers and Jobbers

The WAVE MASTER franchise, backed by Kellogg resources and our powerful advertising campaign, is most valuable. Open territories are going fast. Write or call on us at once for our money-making proposition.

KELLOGG SWITCHBOARD & SUPPLY COMPANY
1066 West Adams Street, Chicago, Ill.



A Separate Circuit for Each 40 Meter Wavelength Band

One-Dial Control, Yet Greater Selectivity.

KELLOGG WAVE MASTER SWITCHBOARD & SUPPLY CO.