COMPLETE LIST OF STATIONS IN U. S. AND CANADA

RADIO WORLD

Reg. U. S. Pat Off.

America's First and Only National Radio Weekly

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NO MUSIC EVER SENT OVER AIR

"What beautiful music is coming over the air these days!" exclaims the non-technically inclined enthusiast. At first blush it seems hard to realize that no music from a broadcasting studio comes over, through or under the air or ground. The station sends out a radio wave. When we speak of music or speech we mean something audible, and no radio wave is audible.

What is it all—some catch or trick? Is the art of equivocation being practiced to beguile the radio enthusiast who has not made a deep study of transmission and reception? No, indeed. It's plain, certain science, and no fooling.

The work performed at the broadcasting station may be divided into two parts, one the pickup, the other the transmission. The microphone is the first instrument to consider in regard to the pickup. Into the microphone the singer delivers vibrations which constitute music (if he or she knows how to sing). An orchestra may be playing, or a pianist; or a talker may be uttering chin music. The vibrations set up by the voice or musical instruments actuate the carbon in the microphone and become electrical currents, which are carried to an amplifying system which makes them louder. While all this is going on a system of regeneration or oscillation is independently setting up or creating a radio wave, at the wavelength assigned to the station. Let us say it is 300 meters, which is equal to 1,000,000 cycles per second, for frequency in cycles is equal to the speed of light, 300,000,000 meters per second, divided by the wavelength in meters.

The amplified voice currents or music currents are instantaneously mixed with the radio wave which the station is sending out. The radio wave is known as the carrier and its existence can be detected in a receiver even when no program is being sent.

The audible frequencies have a normal range of from 25 cycles to 10,000 cycles. The phenomenon of mixing the fluctuating audible frequencies with the steady radio or inaudible frequency produces a wave that is constantly changing, but is changing only slightly, since the change is equal to the variations in the original sound; suppose, therefore, that a single 5,000 cycle audible note is being put into the microphone. Suppose the carrier frequency is 1,000,000 cycles. The result of mixing the two is several frequencies, principally the frequency represented by the difference between the two and a frequency equal to the sum of the two. Hence the resultant frequency in one case is 995,500 cycles and in the other 1,005,000 cycles. The human ear does not respond to frequencies much above 10,000.

Therefore due to the electrical action, whereby the merging of a radio frequency with an audio frequency far removed from it, leaves only a radio or inaudible frequency, no actual sounds are sent out by stations. If you stand under a station's antenna, for instance, you hear nothing.

PANEL LIGHTS

COIL BRIDGE BALANCES SET

Dr. Somersalo's Latest Invention Is in Line with New Neutralization Trend—Set Performs Excellently

PANEL OF RECEIVER ILLUMINATED

By Jasper Jellicoe

New systems of neutralization and of coupling are among the outstanding features of the new radio season. On the coupling score, the Loftin-White method of uniform energy transfer, with neutralization to boot, made an early apeparance, while the Equamatic System, which does both also, gained a host of friends, too. Both of these were described in previous issues. The Rider system and the Bernard method also have been described. (Aug. 21, 28, Oct. 2, 9, 16.) Another neutralization method, consisting of a inductive bridge (but not a Wheatstone bridge), was invented by Dr. George A. Somersalo, and was discussed briefly in the June 19 issue.

ILLUMINATION on the front panel is the popular taste of the day. Wendell Buck, radio engineer, is shown tuning a 6-tube set balanced by the new method invented by Dr. George A. Somersalo. The National Velvet Vernier dials are of the illuminated type, the light shining from behind the panel through the window. At lower center is a Bruno light switch.

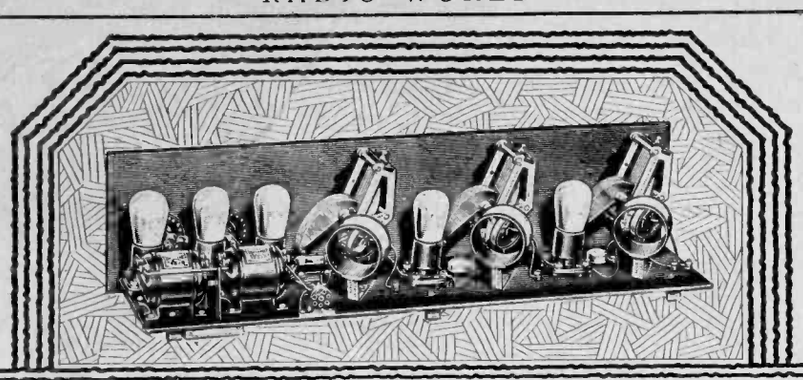
Since that time Dr. Somersalo has made some improvements in his system. It will be shown next week in its advanced form. A set was built and operated in RADIO WORLD'S laboratories, and not a squeal could be developed, although tests were made even below the broadcast belt, for instance on 170.5 meters, the second harmonic of WMCA, New York City, and the rheostats were turned all the way up.

Panel is Illuminated

Wendell Buck, radio engineer, tried out the set, too, and he found it performed in a highly satisfactory manner. The receiver, as the photograph on this page shows, has only two controls. There are six tubes, of which the first is an untuned RF stage, the second is a tuned RF step, while the succeeding RF stage and the detector input are tuned by a double condenser, to keep the number of controls down to the number of hands most persons possess. The audio channel is two stage transformer coupled.

Aside from the hookup features, the illumination fashion has been adopted wholeheartedly. Both dials, which are National Velvet Vernier, have flashlight bulbs behind the windows, and the scale is easily read even in an otherwise dark room. Besides, the Bruno A battery switch has a similar lamp and the switch window casts a pretty red light.

(Construction Article Next Week)



The Karas Equamatic Five Tube Sensation!

Now Being Featured in This Issue of Radio World

This new wonder circuit that is causing such a sensation among fans and set-builders is fully described in the editorial pages of this magazine. The secret of this receiver's remarkable efficiency is due to the solving in a very simple mechanical way a problem that radio engineers have been striving to find the answer to for years.

In the Karas Equamatic there is always a CONSTANT EQUAL TRANSFER OF ENERGY at the practical maximum between primary and secondary inductances. This action is continuous throughout the entire band of broadcast wave lengths. Without this feature perfect reception is impossible on all wave lengths, but in the Karas Equamatic five-tube Sensation stations on all wave lengths come in with the same full volume and undistorted tone quality. No more thin, weak signals on high wave lengths. No troublesome oscillations on those lower down on the scale.

How These Results Are Possible

In order to get a CONSTANT EQUAL TRANSFER OF ENERGY at all wave lengths the Karas Equamatic System uses a radically new and different radio frequency transformer. In the Karas Equamatic coil the primary is entirely separate from the secondary and is mounted on the extended shaft of the condenser so that it turns with the condenser dial. The secondary is attached to a sliding standard and mounted on a subpanel allowing it to be moved toward the primary or away from it to get the proper degree of coupling.

Karas Micrometric Dial. Price $3.50

Makes Possible Perfect Coupling at All Wave Lengths

After the coils in a Karas Equamatic Five Tube Sensation have been adjusted the coupling is varied AUTOMATICALLY at the exact rate to maintain a CONSTANT EQUAL TRANSFER OF ENERGY. The result—tubes operate always at their highest efficiency—just below the oscillation point. This action requires no extra control. It takes place automatically as the set is tuned in the regular manner.

Results Never Before Attained with Five Tubes

Due to the perfect coupling at every wave length and the correct placing of all parts, there is no over-lapping of electromagnetic and electrostatic fields. As a result the circuits in the Karas Equamatic System tune sharply on all wave lengths. Stations on any part of the dial snap in and out with remarkable precision.

The volume of the Karas Equamatic Five-Tube Sensation is equal to that of most seven-tube sets, and it has the pure, clear tones of a crystal receiver. In addition it has a range and sensitivity equal to a regenerative circuit.

Build this Powerful Set Quickly and Easily

It takes but a few hours of your time to build this powerful, rangy, wonderfully clear toned receiver. There are no technical tricks nor complicated wiring.

Packed with every set of Karas Equamatic coils is a manual of simple diagrams and instructions showing where to place every part and how to make each connection. The working principle of the system is also clearly illustrated and described.

When building the Karas Equamatic Five-Tube Sensation you will need the Karas parts listed on the coupon, plus other standard parts easily secured.

Order from Your Dealer or Direct

Karas Equamatic parts are carried in stock by reliable dealers in most cities. If your dealer happens to have none, order direct from us by using the coupon at the right. SEND NO MONEY. Just pay the postman the price of the parts plus a few cents postage.

Build your Karas Equamatic Five-Tube Sensation NOW and you will be sure of having a set that will deliver the most perfect radio reception that it is possible to obtain with any set regardless of the number of tubes.

Equamatic System Licensed Under King Patents, Panama

Essential Parts of the Karas Equamatic Sensation

KARAS EQUAMATIC INDUCTANCE COILS are packed three in a carton, and come to you with complete manual of simple diagrams and instructions, all necessary nuts, screws and binding posts, ready for mounting in your receiver. Price, set of three coils, $12.00.

KARAS SPECIAL 17 PLATE ORTHOMETRIC CONDENSERS, three of which are used in the Equamatic Receiver, have special extended shafts upon which to mount the primary coils of the Inductances. Price, each $7.00.

KARAS HARMONIK AUDIO FREQUENCY AMPLIFYING TRANSFORMERS are essential to the tone quality of the Equamatic receiver. Two of these are used for the two stages of Audio frequency amplification. Price, each $7.00.

KARAS EQUAMATIC RETARD COILS, two of which are used, were designed especially for the Equamatic System. Price, each $1.00.

KARAS EQUAMATIC SUB PANEL BRACKETS. To insure the necessary exact positions of primary and secondary coils these brackets are essential. Price, set of three, 70c.

KARAS MICROMETRIC DIAL. It has a 63 to 1 vernier and tunes to 1/1000 of an inch. Price, $3.50.

KARAS ELECTRIC CO.,
1147 Association Building, Chicago, Illinois.

Please send me a set of 3 Equamatic Inductance Coils, $12.00; 3 special Orthometric Condensers with extended shafts, $7.00 each; 3 Micrometric Vernier Dials, $3.50 each; 2 Harmonik Audio Transformers, $7.00 each; 2 Equamatic Retard Coils, $1.00 each; and 3 sub-panel brackets, 70c, for which I will pay postman $60.20, plus postage, upon delivery. It is understood that I have the privilege of returning any of this apparatus for full refund any time within 30 days if it does not prove entirely satisfactory.

Name .....

Address .....

City ..... State .....

(If cash accompanies order we will ship postpaid)

KARAS ELECTRIC COMPANY

1147 Association Building **CHICAGO**

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The 5-Tube T. C. Samson

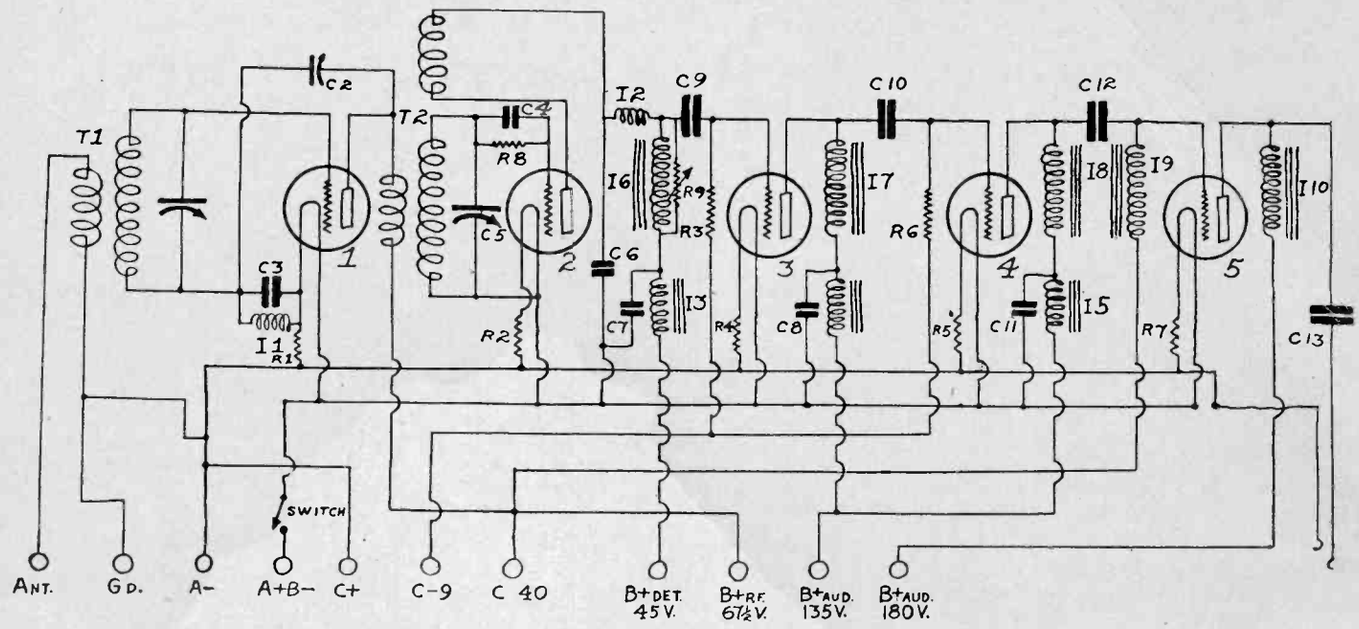


FIG. 1

The circuit diagram of the Samson T.C. Set. Second audio choke is I-4. C1 is the first variable condenser.

By Capt. P. V. O'Rourke

UTMOST attention has been paid to tone quality in the Samson T. C. 5-tube receiver, shown in circuit diagram in Fig. 1. The precautions taken to insure best tonal values were the neutralization of the first radio frequency stage and the selection of an audio channel that produces most gratifying quality amplification.

On the radio side the receiver consists of a neutralized stage of tuned radio frequency amplification and a regenerative detector.

When time came to consider the audio department an impedance coil was selected for the plate circuit of the detector tube, and a radio frequency choke coil, I2, was included as a valuable asset, which it is in this hookup.

The grid circuits of the first and second audio tubes have leaks in them, while the final audio step is double impedance coupled, that is, has a choke coil in the plate circuit and of the previous tube and another choke coil in the grid circuit of the next tube. This impedance leak tends to prevent overloading of the last tube, due to the low DC resistance of the choke.

Uses Tone Filter

The output of the final tube is taken from a tone filter circuit, consisting of another audio choke coil and a large coupling condenser, the other side of the condenser going to one speaker terminal and the other speaker terminal to minus A. Thus only the audio frequency currents are communicated to the speaker and the high voltage direct current (from B battery) does not pass through the speaker windings.

The circuit, therefore, is designed along popular lines. The radio channel is fundamentally the same as that of half a dozen of the most popular circuits of this season and the previous one. The selection of better-grade audio apparatus and hookup is fully in line with the most modern developments, and enables one to get full value out of a good cone speaker, because these speakers, if well made, are likely to be very faithful reproducers, and will faithfully show up distortion where it exists. The T. C., if properly operated, without pressing the tickler for over-regeneration, will give distortionless amplification, and bring out the deep, rich bass notes without sacrificing a higher pitch.

Centralab Resistor Used

The volume control is a variable grid leak in the part of the detector plate circuit. (Centralab 500,000 ohms). This is R9, connected in shunt to choke coil I-6.

It will be noticed that the set operates without rheostats, suitable ballasts being included in the negative battery lead for connection to F minus on the sockets.

On the subject of bias, notice that the diagram suggests the use of a 171 or 371 tube, which requires about 40 volts negative bias at 180 volts on the plate. Of course, if some other type of power tube is used in the final audio stage, the bias will be less and so will the plate voltage. The next tube in line is the 112 or 312 or the equivalent CeCo type F.

Also the second audio tube is negatively biased, and a 112 or equivalent may be used here, with whatever bias works best, say from 6 to 9, at 135 volts on this plate. The RF tube and the detector tube may be —1A type or CeCo type A.

The construction of the receiver is not a bit difficult. The front panel and subpanel may be obtained from a number of dealers completely drilled, which saves considerable time.

Fasten the parts to these two panels. This should be very carefully done, and very firmly done, because of the weight of the cores of the various chokes. Any looseness will tend to loosen the wiring in time.

The wiring for the filament circuits and for leads from B and C binding posts to the various chokes should be done with rubber and spaghetti covered stranded wires, and these wires should be cabled by tying them together at intervals with pieces of cotton string. Do not use wire for this tying purpose. All connections should be soldered either directly to the terminals or to soldering lugs placed under the binding posts.

The various radio frequency leads, connecting directly to plates and grids of tubes and to coils and condensers, should be wired with tinned bus bar, taking care to keep the wire well separated and away from metal parts or the panels.

Prevents "Motor-boating"

The radio freqency choke 1-2 keeps RF out of the audio circuit. It is essential to good impedance-coupled amplification. The plate lead or audio-frequency chokes 1-3, 1-4, and 1-5, are an innovation and great improvement, which prevent audio feedback between the various audio tube plates, and allow the use of any type of good B eliminator without "motor-boating." These Samson No. 3 chokes have an inductance of 3½ henries and a distributed capacity of only 4 micro-microfarads at 550 to 1550 kilocycles. They therefore act both as effective audio and also as radio frequency chokes. The very low distributed capacity is due to the Samson helical winding. Greater distribu-

Set Stresses Pure Tone

ted capacity would by-pass the audio-currents and defeat the object of the impedances.

It will be noted that an impedance 1-9 is used instead of a grid leak on the grid of the last or power tube. This is necessary because of the size of the coupling condenser used—4 mfd.—and because of the magnitude of the output of tube No. 4. The comparatively low resistance of the grid impedance prevents the power-tube grid from becoming too positive and blocking, as it might do in case a grid leak were used instead.

In order to keep DC entirely out of the speaker windings, the output of the power tube No. 5 passes through an impedance-condenser output device, using the Samson Output Impedance Type O, and a 4 mfd. Tobe condenser. This permits the use of speakers of the balanced-armature type, without danger of rattling, and safeguards their windings from the high voltages used.

Excellent Quality

With B eliminators not provided with four plus taps, the high voltage of 180 volts may be connected to the binding-post marked "B-plus, 135 volts." In this case, the biasing battery connected to the binding-post marked "C-minus-9" should have a value of minus 16-18 volts, for 201-A tubes, or if high-mu tubes are used, minus 4½ to 6 volts.

In case it is desired to use the UX-200-A tube for detector, the lower end of the secondary tuning coil on the detector tube should be connected to the minus instead of the plus filament binding post on the detector socket.

There has been nothing omitted from this set to make it the best in quality. Tests of the receiver have shown a capacity for handling volume with quality which is extremely unusual.

VERSATILE

(Hayden)

AN ALTERNATIVE B and C battery has been placed on the market by the National Carbon Co. A card is secured to the top, with terminals marked, so that high C voltages for power tubes may be obtained and also the conventional 4½ volts negative bias for other tubes. If the battery is to be used as a B battery the card is removed because the B voltages are imprinted on the top of the battery.

Results

I have built the Improved Browning-Drake, described in the Aug. 14, 21 and 28 issue of Radio World and have had very satisfactory results. The volume and quality both distant and local stations have been all one could desire. The tuning is very simple while the tickler or volume control is very smooth in action.

I have constructed numerous receivers, but never have I encountered one that gave such delightful results.

JOSEPH KRAMER,
939 Longwood Ave.,
Bronx, N. Y. C.

LIST OF PARTS

Five Eby push type sockets.
One 9½x24x¼" panel.
One 10x23x¼" subpanel.
T1—One Samson fixed coupler.
T2—One Samson double rotor coupler.
C1, C5—Two Samson .0005 mfd. variable condensers.
1-1, 1-2—Two 85 millihenry Samson RF chokes.
One Yaxley switch.
C2—One Samson neutralizing condenser.
C4—One .00025 mfd. Faradon grid condenser with leak mounting.
R8—One 5-meg. Tobe-Vacuum Tip on grid leak.
R6—One .25 meg. Tobe-Vacuum-Tip on grid leak.
1-3, 1-4, 1-5—Three 3½ henry Samson audio frequency chokes, No. 3.
1-6, 1-7, 1-8—Three Samson plate impedances, type P.
1-J—One Samson grid impedance, type G.
1-10—One Samson output impedance, type O.
Two Samson vernier dials.
C6—One Faradon .001 mfd. fixed condenser.
C3—One Faradon .0001 mfd. fixed condenser.
Eleven Eby binding posts.
R9—One Centra.ab 500,000-ohm variable resistance.
R3—One Tobe-Vacuum-Tipon .5 meg. leak.
C7, C8, C11, C12, C13—Five Tobe audio frequency bypass condensers, 4 mfd.
C10—One Tobe 2 mfd. bypass condenser.
C9—One Tobe 1 mfd. bypass condenser.
R4, R5, R7—Three Brach filament resistors to match tubes used.
R1, R2—Two Brach filament resistors to match tubes used.
Five Brach resistor mountings.
One Yaxley output jack.
Panel brackets, hardware, wire, etc.

WBBM Opens Door of Studio to Soprano

That Type of Voice, Barred for Almost a Year Because It Was Deemed Unfit for Reception, Is Welcomed at Last

CHICAGO.

The sopranos win after all!

Barred from the air from station WBBM, the Stewart-Warner Air Theatre, for almost a year, the soprano voice has been reinstated in the person of Lois White, recently added to the staff of the station.

It was the contention of the former studio director of the station that the soprano voice does not register pleasantly over the air, due to the fact that the high notes on the musical scale are received as a screech on many radio receivers. For that reason he refused to allow sopranos before the microphone. As a result, all WBBM feminine voices have been contraltos.

Difficulties in the non-soprano program were encountered, however, with the addition to the programs of three new musical features, "Bright Spots from the Comic Operas," "Hours with the Ultra-Modern Composers," and the weekly Friday night classical recitals. The new director, Kelly Smith, found that it was not practical to arrange soprano songs for contralto voices, so he consented to discard the former policy of the station in the interests of more effective and better balanced programs.

Besides her regular work as a staff member of the station, Miss White, the first WBBM soprano, will be a member of the Stewart-Warner Light Opera Company and will sing in the studio quartette with Hazel McBroom, contralto; Fred L. Jeske, baritone; and Dan Baker, tenor.

FOREIGN CORRESPONDENTS TELL OF LIFE IN DISTANT POINTS

The mystery and intrigue of the Near East, of China and Japan, details of European life, especially intimate facts which seldom get into the newspapers, are being told over WMAQ, Chicago, Ill., every Tuesday night at 9 o'clock by Hal O'Flaherty, chief of the Chicago Daily News Foreign Service.

Broadcast Ticks to Aid Survey of Longitudes

WASHINGTON.

The Navy Department has agreed to assist the Coast and Geodetic Survey in tests during this month and November to check up on world-wide longitudes. The tests are being held under the auspices of the International Astronomical Union and the International Geodetic and Geographical Union.

During the tests certain high power stations will broadcast time ticks on specified schedules. The major stations are at Algiers, Shanghai and San Diego. These stations were selected because they are practically eight hours in time apart and close to the same latitude. In addition to these three principal stations, Annapolis, Bellevue, and Honolulu will broadcast special time ticks. The series of time ticks around the world will be repeated at three different times during the day.

The object of the longitude determination is to fix absolutely the position of the three points of the "fundamental polygon" and from these points to determine accurately the position of intermediate stations.

Voltmeter Tests Milliamps

Easy to Use the Potential Instrument to Measure Plate Current—Regular Milliammeter and the Voltmeter Joined in Series and Readings Noted

By K. B. Humpfrey

IT sometimes happens that the experimenter is in need of a milliammeter for test purposes in a circuit while his other similar meter is in use somewhere else. A voltmeter can be used in place of a milliammeter if it is of the right scale. It is a good plan for the experimenter to have all of his voltmeters calibrated so that he need never be at a loss in measuring small currents when the occasion arises. For the man who has no milliammeter it might be a good plan to borrow one for a short time in order to calibrate the instruments he has.

For calibration purposes it is necessary to have a variable supply of plate curent so that readings may be obtained over the full scale. The easiest way to get a proper supply is to connect up two tubes in parallel, with the voltmeter and the milliammeter in series with the plate supply. Use 90 volts of B battery. The plates and grids are tied together and a rheostat is placed in the filament lead. By varying the filament temperature the plate current in the tubes is varied accordingly.

How it is Calibrated

The voltmeter to be calibrated because a milliammeter is connected in series with the voltmeter so that the same current will pass through both of them. A separate setup is not entirely necessary as the same results may be obtained by placing the two meters in series with the amplifier binding post of an ordinary receiver and regulating the amount of curent by means of the rheostat.

The receiver should be detuned during this test. In taking the readings it is well to start at the lower end of the scale to preclude an possibility of getting too high a current and overloading the meters.

Different voltmeters have different values of internal resistance and consequently each one will have a different calibration curve. The particular meter for which the curve is given is the lower scale of 7.5 volts on a double scale voltmeter for panel mounting. Starting in with a reading of one milliampere on the milliammeter, the current values were increased one milliampere at a time, a reading being taken on the voltmeter for each different reading. It was found that the limit on the scale for this particular voltmeter was about 20 milliamperes.

Must Be Nearly Straight

The curve shown was taken from these readings. It will be noticed that the curve is a straight line passing through the zero point of the graph. The points as shown on the paper do not all fall on the straight line. There are always small errors due to miscalculating the readings and to other inaccuracies which throw the reading off slightly. This error is very small and the curve should be drawn so that it falls on a line which equally divides the difference betwen the various points. None of the points lies more than about one quarter of a milliampere off the straight line as drawn.

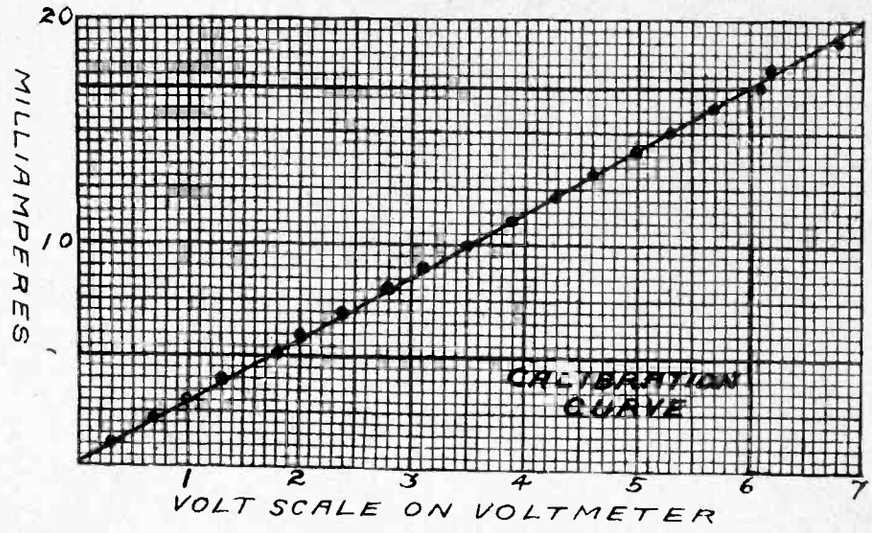


FIG. 1
Calibration of voltmeter as a milliammeter.

If when plotting the curve it is found that some of the points will come at some distance away from the straight line, it can be taken for a certainty that there has either been a mistake in the reading or the reading has been put down wrong. It is best to check any points which seem to be too far off. The millianmperes are plotted on the vertical line and the voltage curve along the horizontal line.

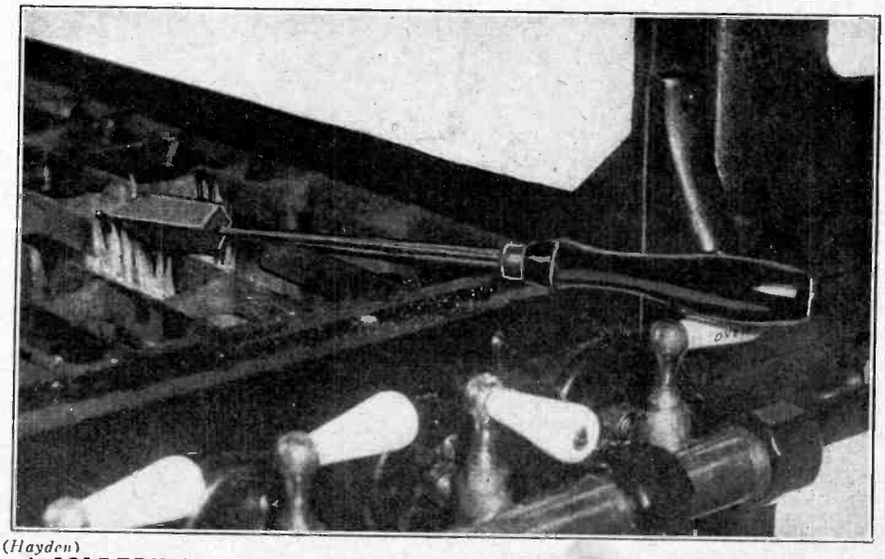
Now, when it is desired to use the voltmeter for measuring milliamperes it is connected in series with the plate circuit. If the needle spurts to zero, reverse the meter connections. A reading of the voltmeter is taken and say it is exactly 6. By following along the horizontal line until we come to six, then going up on the vertical line to a point of intersection, thence across on a horizontal line, we find that the reading is 17 milliamperes. In other words, when the reading of the voltmeter is six the reading in milliamperes is 17.

In a like manner the reading in milliamperes may be found for any value of voltage indicated within the scale of the instrument.

In reality it takes very little time to get the reading and transpose it, much less time than it takes to tell about it. After a little practice in reading the meter in this way the operator will be able to judge the amount of current flowing without even looking at the curve except when very accurate readings are required.

A voltmeter has a higher resistance than the milliammeter and consequently it may cause some trouble if located in circuits which are carrying an alternating potential superimposed on the direct current in the line. While the voltmeter will read nothing but the direct current it will have the effect of a choke on any audio or radio frequency currents in the current. When used in the plate circuit of an amplifying circuit it may perhaps cause a howl in the speaker. This can be stopped by placing a bypass condenser of about .005 capacity directly across the meter. This in no way affects the direct curent readings and simply pases the al- current readings and simply pass the AC to one side of the meter.

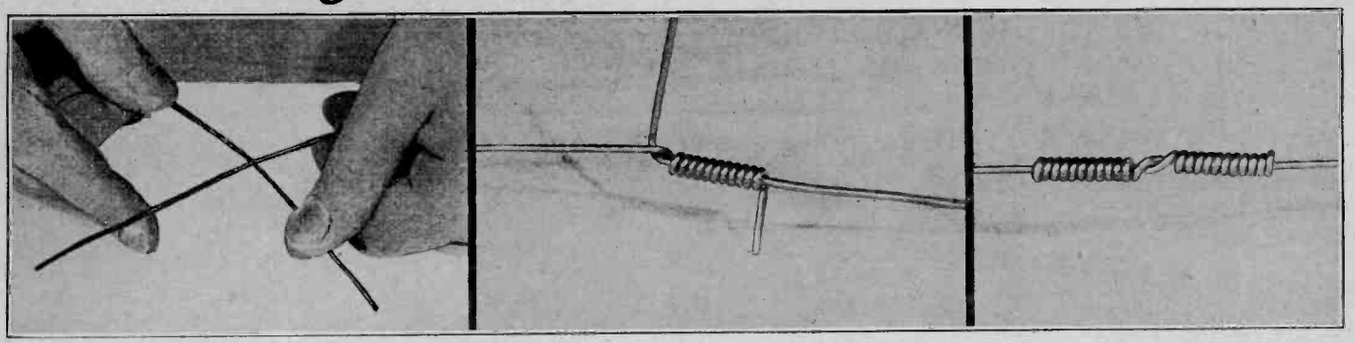
RED HOT IRON WORKS POORLY



(*Haydon*)

A SOLDERING IRON when heated over a flame never should be permitted to get red hot, for then it performs poorly. Get the iron just hot enough to melt the solder.

How Good Is Your Aerial?



(*Hayden*)

IF POSSIBLE, always bring your antenna directly to the set, without any specially connected leadin, advises Don Lippincott. But if you must make a joint, splice it, as shown in the photograph, then solder it well. Canned heat may be necessary, if the joint is to be made on the roof. To splice, cross the leads (left photo), then twine one around the other (center) and repeat with the free ends, giving the result at right. Make each turn as tight as possible.

Expert Finds that Even Owners of Expensive Sets Have Ineffifficient Antennas, So Cites and Explains Six Rules for Efficiency

By Don Lippincott

Engineer, the Magnavox Company

THERE is no investment that the owner of a radio set can ma e which will pay higher returns in satisfaction than a good antenna (or aerial) system, and yet there is no part of the radio installation which is so generally neglected. Many a man pays from $200 to $300 for a receiviing outfit and is dissatisfied with the result because he has neglected to purchase a 15-cent ground clamp.

It is the duty of the antenna to pick up radio waves, just as it is the duty of a camera lens to pick up light waves. If the lens is dirty the picture will be dim and blurred. If the antenna is poor the radio signals will also be dim and blurred by interference from other stations and for precisely similar reasons.

The conditions under which antennas must be installed are so diverse that it is impossible to give exact directions. The rules are simple, however, and there are few places where it is not possible with a little care to erect a satisfactory aerial.

Cites Six Rules

These are the rules which should be followed:

1. Use copper wire, not smaller than No. 14.
2. The fewer joints in the system the better—and all joints must be soldered.
3. Use glass or porcelain insulators, including the leadin insulator.
4. Do not run the wire along walls or partitions.
5. Make the distance between the set and the ground connections as short as possible.
6. The ground connection itself must be of low resistance.

These rules are simple, but sometimes in specific instances one wonders just how they apply, so we will take up the points one by one and consider them in detail.

First, large wire, but what kind? It is doubtful if even a trained ear could detect any difference in the signals from new antennas of solid, bare copper wire, stranded bare, solid or stranded enameled, or solid or stranded tinned wire.

Advantage of Enamel

The bare copper has a slight theoretical advantage when new, and the tinned copper about an equal disadvantage as compared with the enameled. After the aerial has been up a short time and has corroded a bit, the bare copper becomes by a faint margin the poorest of the three classes, with the enamel now leading the list.

Only with the enameled wire is there any difference between the results from solid and stranded wires. The stranded is a little better if all the strands are continuous, but one broken strand will make this type by far the least desirable of all. The various types of special or patented antennas are seldom worth what they cost. In any case the advantage of the best antenna material ever made can readily be sacrificed in one poorly soldered joint.

If it is possible to bring the antenna from the insulator at the far end down to the set in a single length, without any splices whatsoever, by all means do so. There is no real distinction between antenna and leadin, no reason why different kinds of wire should be used. If rubber covered wire is necessary for lead-in insulation, use it, but see that the ends are well scraped and soldered—not merely stuck together with a pasted or rosin joint. The solder must be hot enough to flow to give dependable results.

Leading in the Lead-in

In insulating the antenna the chief problem is in bringing the lead-in through the wall. The strips which are placed under the window sash are very convenient, but the insulation on most of them is useless when wet and is never really good.

In spite of its inconvenience a porcelain tube which slants up from the outside into the house is probably the most generally useful. My own favorite method is to drill a quarter inch hole in the upper glass pane of the window, three inches or more from the sash, and bring the antenna wire directly through this hole, without further insulation; but sometimes this procedure is not desirable because of the necessity of moving the sash or for some other reason. From the electrical standpoint it cannot be improved upon.

Porcelain or glass insulators are recommended because they are permanent. Compositions of various kinds are on the market which are just as good when new, but deteriorate in the weather.

The wire should, of course, be kept from contact with the leaves or branches of trees, not only because of direct losses due to leakage, but because conductors or poor insulators in its neighborhood will absorb power from it even though there be no actual contact. This is the reason for the rule against running the lead close to walls.

Single Wire Best—Hole Through Window Pane Excellent Way of Introducing Leadin—Calls Indoor Aerials Makeshifts

Insulator on a Stick

Where the wire must come down the side of a house use insulators on the ends of sticks to hold it at least six inches away from the building, and wherever possible string the wire directly over the ground rather than over roofs or trees.

The length of the ground wire should usually be figured from the set to the point where the current actually enters the earth, but this may be hard to determine. In a frame house there is usually but a single pipe which runs from the water meter to the faucet which happens to be nearest the radio set, and as this pipe may be long and have many joints it is often better to run a wire parallel with it and ground it at the point where the pipe enters the earth. On the other hand, in an apartment building the various steam and hot and cold water pipes and the steel frame of the building combine to form a network of conductors which acts practically like the ground itself, and in this case running a wire to earth may involve an actual loss. The only sure rule about grounds is to try them all and see which works best.

The ground is as important as the aerial itself, but is much harder to predict. There are a few districts in the United States where, on account of a soil which is almost pure sand (which is an almost perfect insulator) a real ground is very difficult to obtain. In such localities, much ingenuity has been expanded and sometimes with surprising results. There are cases where a ground made by soldering a copper plate to a wire and dropping it down a well so that the plate was submerged has converted an installation which was "dead" into one which broke records.

Counterpoise Effective

There are others where a network of wires, strung back and forth under the floor and completely insulated, acts much better as a ground than the earth itself;

Attic Antennas Successful

there are still others where a fifteen foot brass rod, driven into the ground, has penetrated through the dry sand and made connection with moist earth with gratifying results.

In making connection to a water pipe always use a ground clamp. It is impossible to get a good connection by merely twisting the wire around the pipe, and no pipe containing water can be heated sufficiently to allow a good soldering joint. Of course, the pipe must be scraped clean and bright before applying the clamp.

It must be realized that it is almost impossible to erect an antenna where all of the foregoing points can be followed fully, and for this reason there are very few perfect antennas. There are many cases, however, where only slight compromises are necessary, and it is evident that an antenna, with but one departure from the ideal, must give better results than one which violates good practice all along the line.

Do not think that because a large antenna is good a larger one must be better. Many receivers are designed for use with a single wire antenna from 75 to 90 feet long, including the lead-in. A larger antenna will make the set tune broadly without any corresponding increase in the strength of the received program. If, because of the location, it becomes necessary to use one 125 feet or more in length, connect to it through a small fixed condenser of .0005 mfd. capacity.

Single Wire Usually Best

Multiple wire antennas are seldom advantageous, and besides being unsightly are hard to suuport, so that they will not sway and cause fading. A double wire arrangement twenty-five feet long is by no means equal to a single one fifty feet long. It is more nearly the equivalent of a 35-foot single wire. A third or fourth wire gives still less advantage. Multiple wires may be used where there is not room for a single straight run, but they should always be firmly guyed to keep from swinging, and the length of wire in them should be liberally discounted in figuring the effective amount of aerial.

Indoor antennas usually violate almost all of the rules. The energy they pick up is small and they usually tune quite sharply, but except in unusual cases they are of little use for distant reception. Their only virtue is convenience. In installing them the best way is usually to run a silk or enamel insulated wire around the picture molding in defiance of the rule against hugging the wall.

Makeshift Results

This arrangement often works better if the ground lead from the set is connected to the picture moulding antenna, while the antenna connection goes to the ground. All such arrangements are makeshift, however, and only makeshift results should be expected from them.

Attic antennas may be installed so as to be very satisfactory. Knob insulators can often be so placed on the rafters as to hold the wire well away from the roof for the greater part of its length. The wire may be strung as a closed rectangle having as great an area as possible with the leadin or leaddown rather in this case, taken from the corner or one side as may be convenient. If the leaddown can be kept clear of the walls the results are often just as good as with an outside aerial. No inside antenna will prove satisfactory, in a steel reinforced building, either of reinforced concrete or stuccoed metal lath, as the steel serves to ground the waves before they have a chance to reach the antenna.

Seeks Studio Gobbler for Thanksgiving

Wanted—a turkey gobbler that will gobble on schedule.

WBBM is looking for a mike-trained turkey gobbler. Kelly Smith, studio director, insists that Thanksgiving isn't Thanksgiving without turkey and that WBBM must put a gobbling gobbler on the air.

And so if there is any ambitious young gobbler that prefers to be "on the air" rather than "in the oven" he should apply to Mr. Smith.

No imitations will be accepted.

WGN Opens Season of Choral Singing

Once a month during the Fall, Winter and Spring months WGN, Chicago, is to present a concert by one of the city's most popular choral societies. The season opened recently, when the Irving Park Lutheran Church choir of fifty voices makes its appearance.

The church choir is directed by Harry T. Carlson, who has wielded the baton over many splendid vocal organizations heard over WGN in the past.

Hertzberg Joins Radio News Staff

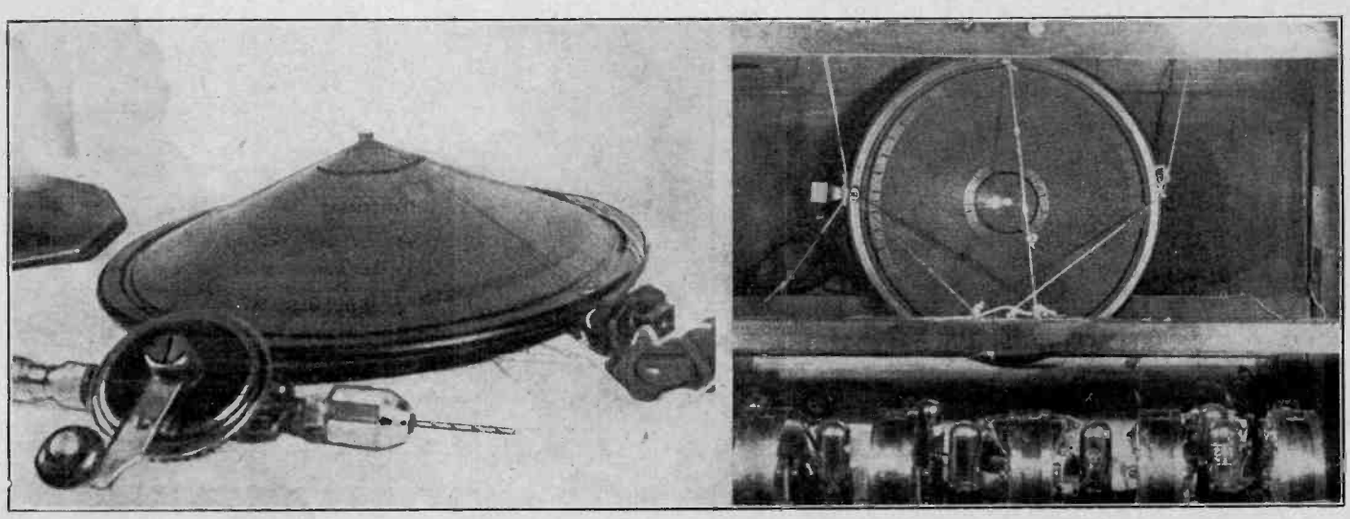
Robert Hertzberg ,free-lance radio author, who has written many articles for the New York newspaper supplements, has been appointed associate editor of "Radio News" and has taken up his duties at the editorial offices of that publication at 53 Park Place, New York City.

Mr. Hertzberg was a member of the original radio staff of the New York "Globe," and served on the "Sun and Globe" and the "Sun" following the Munsey consolidation. Later he was technical radio editor of the New York American. For the past year he did radio feature work for six New York newspapers.

STATION AT PORT AU PRINCE

The International Telephone and Telegraph Corporation announces that its subsidiary, the International Standard Electric Corporation (formerly the International Western Electric Company, Inc.) has completed the installation of a 1-kw. broadcasting station for the Haitian Government at Port Au Prince. The station is in operation now. Call letters are HNK, and the wavelength is 360 meters. It is intended primarily for the broadcasting of lectures on improved agricultural methods and other educational subjects.

CONE SUSPENDED IN CONSOLE AVOIDS RATTLES



(Hayden)

A CONE SPEAKER may be demounted from its base and su spended in the rear of a console. The suspension avoids microphonic effects otherwise likely.

Getting DX on the Bernard

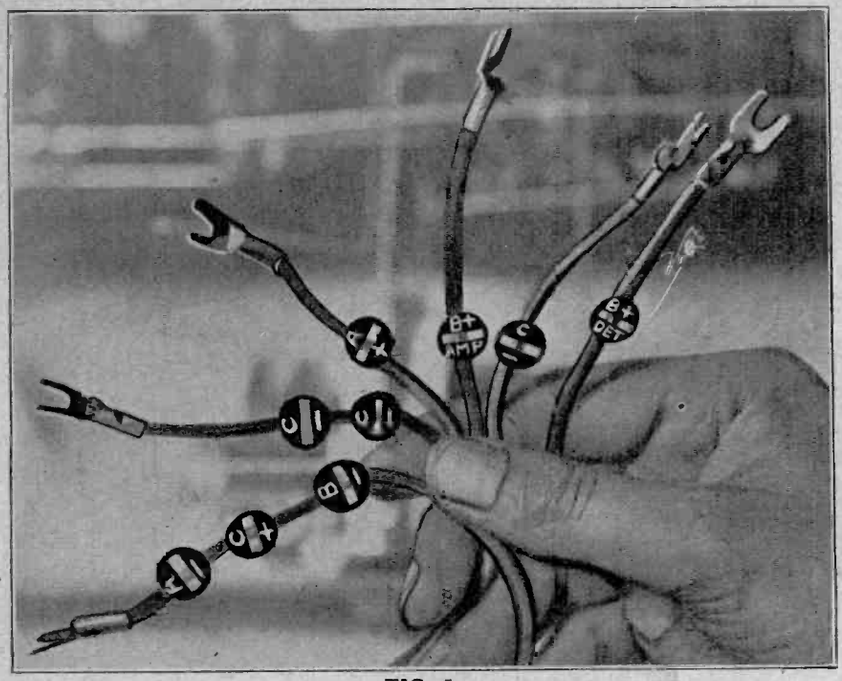


FIG. 5

The 6-lead Birnbach cable for the Bernard circuit is tagged as shown, the prongs of the metal markers being bent back to secure the markers to the leads.

By Lewis Winner

Technical Editor, Associate, Institute of Radio Engineers

THE other night I tuned in, from my home in New York City, several distant stations on the Bernard receiver. These included WORD, Batavia, Ill.; WOK, Homewood, Ill.; WRAM, Galesburg, Ill.; WSAI, Cincinnati; WSBF, St. Louis, and WCBH, Oxford, Miss. Tuning in distance was easier than on most other sets of equal sensitivity because there are only two controls, and your right thumb tunes both of these. In fact, it is like single control, because the dial readings are alike, and you turn both drums with one condenser.

It is physically possible to put a small bolt through the drums and thus lock them for single control, but the advantage of having the drums independent is that whistling, due to one station's wave beating against that of another station, may be reduced considerably by slight detuning. Such whistling is a state of affairs in the air itself and is heard in all receivers.

The construction of the receiver was described by Herman Bernard in the October 16 issue of RADIO WORLD, and details of balancing the receiver against self-oscillation were given. The purpose of the present discussion is to take up the possible troubles that an utter greenhorn at radio might encounter, and to steer him into the easy and correct path for balancing the set and getting distance.

First let us take up an unusual condition, whereby some certain station comes in strongly, and because it is on a fairly

(*Continued on page 9*)

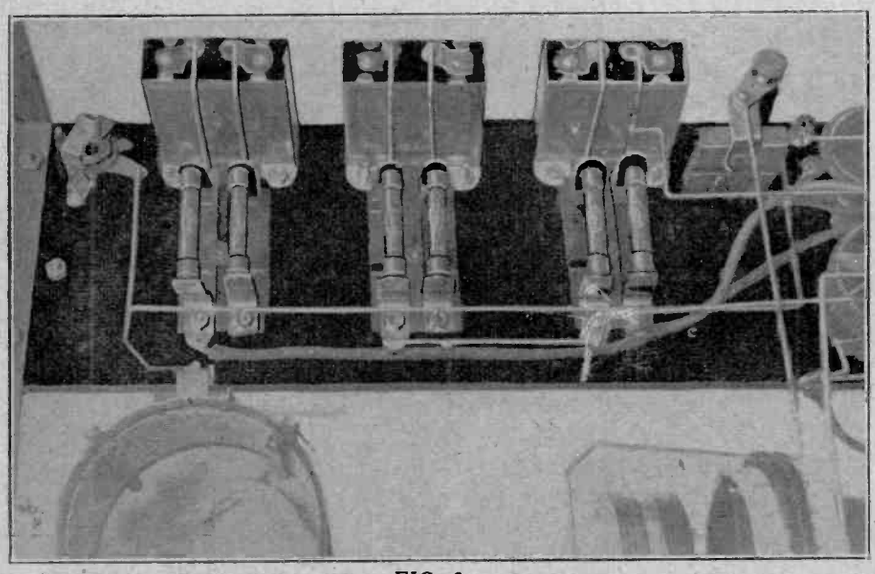


FIG. 6

A close-up of the audio channel, showing the Lynch mountings and resistors and the Electrad bypass condensers (0.25 mfd.). Right to left the condensers are C7, C8 and C9 and the resistors R3, R4, R5, R6, R7 and R8. The Bretwood leak is at upper right.

Instantaneous Hit Made by Circuit

The publication of the article in the October 16 issue on how to build the Bernard, a 6-tube balanced set, stirred up tremendous interest among fans and trade alike. In readiness for the expected market 100 kits had been assembled, but this proved too conservative, as all of these were sold by telegraph, telephone or mailed orders two days after the issue was published. What aggreeably surprised those whose orders were filled was the fact that the Bernard kits were available in complete form simultaneously with publication, instead of time being wasted in gathering together truant parts.

The beautful appearance of the set, due to the Lignole inlaid panel, the Bruno Unitune (drum control), and the simplicity, made an instantaneous hit.

The Bernard keeps pace with the latest features in radio—handsome appearance, simplified tuning and aerial convenience. The set works well, in almost all instances, from a lamp socket antenna.

Herman Bernard's official list of parts for the Bernard, the same parts being contained in all boxed and sealed kits sold by all advertisers of the kit in RADIO WORLD, follows:

C2, C4—Two Bruno .00035 mfd. straight line frequency variable condensers, which, with two drums, mounting frame, bronze panel plate and screws constitute the Bruno Unitune, Model 2CB.

L1, L2—One Aero fixed primary radio frequency transformer, stock No. WT-40.

L3, L4—One Aero adjustable primary radio frequency transformer, stock No. AX—45.

GFPB—One Acme R3 radio frequency transformer.

R2, C5—One Bretwood Variable Grid Leak with attached grid condenser, .00025 mfd.

R3, R5, R7—Three Lynch metallized fixed resistors, 0.1 meg. each.

R4, R6, R8—Three Lynch metallized fixed resistors, respectively 1.0 meg., 0.5 mfg. and 0.25 meg.

1, 2, 3, 4, 5, 6—Six Air Gap push type Sockets.

R1—One Electrad Royalty variable high resistance, Type F, range 0 to 2,000 ohms.

C7, C8, C9—Three Electrad 0.25 mfd. fixed condensers.

R9—One Electrad 2-ohm semi-power rheostat.

J—One Electrad single closed circuit jack.

C1, C3, C6—Three Micamold .00025 mfd. fixed condensers.

One 7x21-inch Lignole standard "inlaid" panel No. 1-D (rotary cut walnut), drilled and engraved.

One 4x20-inch subpanel.

One Birnbach 6-lead battery cable, with forked terminals.

Nine Am. Radio Hdw. cable tags (one A plus, one A minus, one C plus, one B minus, three C minus, one B plus amp. and one B plus det.).

Two Am. Radio Hdw. binding posts (Ant. and Grd.).

Three Lynch double mountings.

One pair of Bruno adjustable brackets.

Ten lengths of stiff Acme Celatsite (varicolored).

Some Hints for the Novices

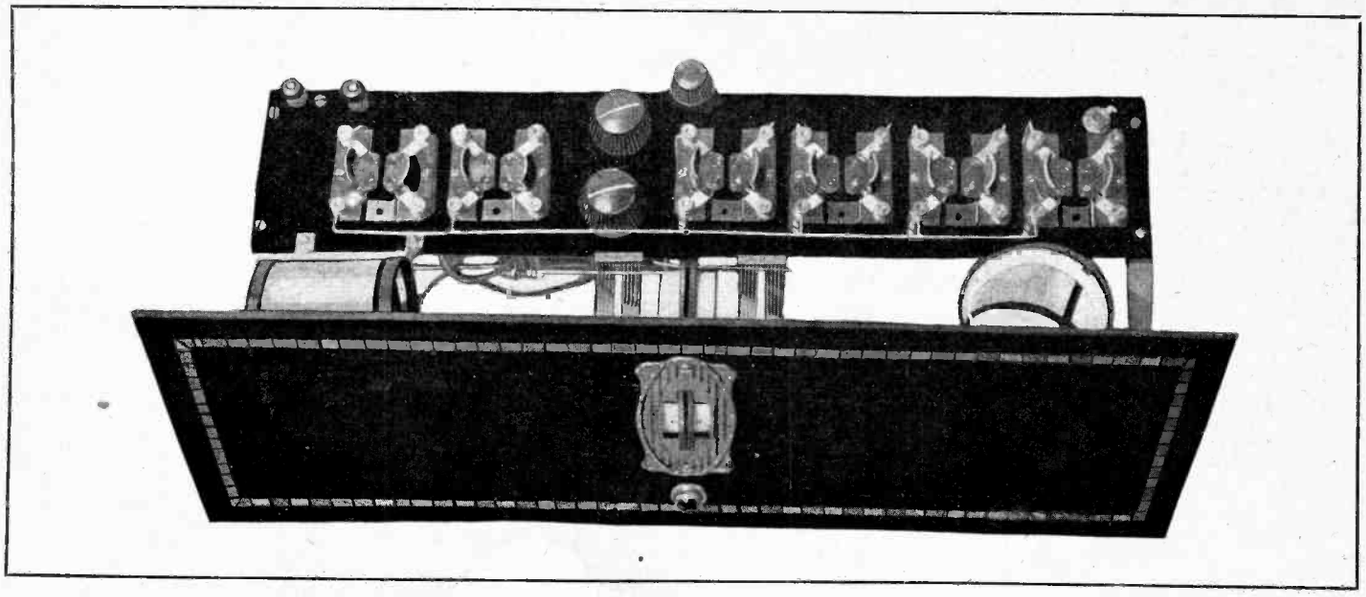


FIG. 7

Slanting view of the front panel, socket shelf and Aero coils in the Bernard set. The variable resistance R1, chief killer of self-oscillation, is at rear, next to the Bretwood variable grid leak.

low wavelength it is more likely to set up self-oscillation than some still stronger station on a somewhat higher wavelength. Indeed, stations on lower wavelengths, nearly as strong, will show less tendency toward self-oscillation.

In my own tests I have found WMCA, New York City, on 341 meters, to be just such a station. It would be possible on almost any balanced set to develop just the faintest "plopping"—something much less than a squeal—due entirely to radio frequency oscillation, in other words, self-regeneration in the set, either through the internal capacities of the tubes or by stray inductive coupling or both. I always solve this problem by the dial method—in the present set by the drum method, let us say, since the Bruno drums constitute the device that turns the condensers. I never hear a squeal, as such, but just a faint "cluck," and this is easily gotten out by turning either drum with the thumb just one division of the scale. It is a peculiar local condition I am speaking of, and I find that method of dealing with it satisfactory, since it would not be good practice to reduce the radio amplification just to take care of this minor point, as would happen if the negative bias on the RF tubes were too high. The rule is to use only so much negative bias as is necessary, on the first and second tube grids, while the plate voltage is maintained as high as possible, by cutting in only a little of the resistor, R1 the Electrad Type F Royalty. The code designations refer to the schematic and picture diagrams of the wiring published October 16, for the constructional article was complete in that issue.

Steps for the Novice

This set is built, let us assume, and the unusual condition that I discussed in the foregoing does not prevail, so we will behave like the merest novice and see what can be done about balancing the set—this one or any other set like it. Do not forget that the Bernard system of neutralization is of general application.

First, we short-circuit the variable resistor R1 (range, 0 to 2,000 ohms), which is accomplished simply by turning the knob until no resistance is cut in. Without even a voltmeter we can determine which terminal represents zero resistance, because with 135 volts on the plates of the tubes, and the C battery tapped say at 3 volts for the C minus RF lead, we encounter self-oscillation on the lower wavelengths. If we do not, we reduce the bias to 1½, as it is safe to say that self-oscillation will occur if that little bias is used and the plate voltage is more than 90.

Let the set squeal just long enough on the low wavelengths to prove to you that you are on the right track. Pick out the station where the squealing is worst. Then turn the knob of the Electrad Royalty until the squealing disappears. It may be that you have turned a little too far, as that will happen, especially to stop a self-oscillating set from continuing its nefarious work. But even less resistance would not have caused the squealing originally, so our cue is to turn back the knob just a little so that volume on the wavelength that was most troublesome is as great as possible, but without any squealing.

System is Versatile

That will solve our problem in nine cases out of ten, for we can start with any stated bias, within reasonable limits, say up to 4½, and with sufficient plate voltage we can get the correct operating point. This is because the Bernard system of neutralization is one for the establishment of the maximum space current consistent with absence of self-regeneration, and that is all the practical amplification that vacuum tubes normally will provide. Another way of looking at it is that the system, by balancing plate current against grid voltage, always establishes about the same plate current, regardless of plate voltage, but dependent on grid bias, and causes tube operation under conditions that supply the practical mutual conductance. While this explanation is a dip into the theory, and hardly intended for full understanding by the mere novice, it will convince others of the efficacy of the system.

Now assume that we have not reached the goal although we have followed directions to the letter. Still there is oscillation. Be sure that the C battery actually is connected in circuit, with C plus to A minus. If we are using a CeCo type F tube, or equivalent 112 power tube in the final audio stage, we may use up to any enjoyable bias, making the audio bias as high as possible, consistent with satisfactory results. Hence a rule one may follow is, granting that there is some RF negative bias, to make that as small as possible, while the bias on the last AF tube is made as high as possible. Follow this rule of opposites and get maximum volume per stage of RF and with minimum B battery drain on the otherwise current-eating final tube.

Use Same C Battery

The same C battery or block of two batteries used in the audio circuit will be tapped for the correct RF bias, the lead marked "C_v" as distinguished from the "CC" lead, which is the higher bias for the final tube. How the cable leads are identified with American Radio Hardware Co. tags is shown in Fig. 5.

Now, we regulate the negative bias, making it a little higher on the RF side, and we find that indeed we have killed off oscillation, but the volume has declined, and we are not satisfied. Very well, we can use more plate voltage, and this is done by turning R1 so that less resistance is cut in the circuit. If still we can not balance the set we have as a sure final resort the adjustable primary of the interstage coupler. This is L3. We return to a condition where some self-oscillation takes place, and which we can not stop either by negative bias or reduced plate voltage, except at a sacrifice we do not care to make, and then, when the set is oscillating, we move that primary a little farther from the secondary, until oscillation stops, whereupon we turn the dials a bit one way and another over the resonance point, to make sure no squeal is emitted. Then we try tightening the coupling until we get maximum volume without oscillation, but never coming to a condition of close relationship, such as existed previously, which caused self-oscillation.

As further means of curing oscillation trouble we can turn down the rheostat

(*Continued on page* 10)

Squeals Easily Stopped

a trifle, use less resistance in the detector grid circuit (higher leakage path, fewer megohms, as to the Bretwood leak, R2), and so, no matter how little we know about radio, or how small our confidence in ourselves as regards succeeding with other systems of neutralization, we can solve our present problem without fail.

In nine cases out of ten, as I said before, we need do nothing more than set the negative bias for RF (and two AF tubes, for the one lead serves both purposes) at 1½ or 3, and slowly turn the knob of R1 until squeals stop, then come back a trifle.

The adjustable primary of the interstage coupler is a handy device for getting just the right stability on both the high and low waves. If you tighten the coupling of this primary, the set will oscillate on low waves. Loosen it and the condition can be killed. of course, with the aid of the plate voltage and current adjustment.

Lignole, Wood Panel, Made by New Process

Rotary Cut Walnut and Ribbon Mahogany Impregnated—Problem of Keeping Wood Dry Is Solved and Good Dielectric Prevails

One afternoon when I was visiting Arthur H. Lynch at his office my eye was caught by some handsome panels lying on top of a desk. They were panels the like of which I had never seen before. Their beauty struck me instantly.

"What's this, Arthur?" I asked, picking up one of the panels—a model that was exquisitely done in walnut, with rich inlay as an inside border, a beautiful ¼-inch marqueterie of satinwood and white holly.

"Why, that's something new," he answered. "It's called Lignole. It certainly catches the eye, doesn't it?"

As soon as I got back to my office I made arrangements to get some of these panels, particularly to test them for their electrical efficiency, since I was looking about for a fine panel for a receiver I had designed (the Bernard, described in full in the October 16 issue of Radio World). The tests took three days and they proved that Lignole was highly suitable electrically.

Distractingly Beautiful

I investigated Lignole some more and learned that it is made in standard and special sizes, either rotary cut walnut face and back, or selected ribbon mahogany face and back, "inlaid" or "standard." The "standard" model is of the two tone or one color type, as you prefer, while the "inlaid" was two-tone.

As my heart had gone out to the "inlaid" type, I enthusiastically selected the 7x21-inch Lignole standard "inlaid" panel No. 1-D. When the completed set was slipped into the Corbett cabinet (2-inch slope for panel), the transformation from the conventional to the aesthetic was so obvious that visitors to my private laboratory focused their attention on the beauty of the front elevation and I found it hard to make them listen, for the moment, to my story about the circuit itself. But I knew that Fred S. Clark was going to permit me to discuss the circuit in Radio World in extenso, so I bided my time. And last week that opportune occasion arrived, by the grace of Mr. Clark, and the public was made acquainted with the electrical features of this attractive circuit.

It took so much room to discuss the theory of the set and the wiring that I had no opportunity to tell the story of Lignole. So here it is now in a form that will apprise both the laymen and those technically inclined of its properties.

Lignole is made by impregnating woods with a material of highest insulating qualities, thereby rendering them dielectric and moisture resistant. The material is forced all through the pores to such an extent that after treatment the wood forms a holder or conveyor for the material. Extraordinary insulating qualities are obtained with the material used, but, in addition thereto, by using woods of rare beauty, truly marvelous specimens of art are produced.

Lignole radio panels are made of laminated ply-wood under the most rigid specifications, the result of over two years' scientific research.

Dry wood is a very good dielectric. The problem has been to keep it dry. This has been accomplished by a very intricate and highly scientific process of impregnation. All panels are first baked in vacuum ovens at extremely high temperatures, and while being subjected to this intense heat are, through an auxiliary process, loaded so to speak, with highly dielectric material.

Laboratory Report

Laboratory tests of Lignole showed:

"The dielectric constant is about 4. The dielectric constant of hard rubber is 4 and of bakelite 5.

"The less the dielectric constant of panel material, the less stray capacity will exist through it, and the smaller the losses will be. The losses will also depend on the dielectric hysteresis, or loss of energy in a high frequency electric field. This is analogous to magnetic hysteresis losses in iron.

"This loss is measured by the power factor which can be found by measuring the equivalent resistance of a condenser using the material as a dielectric and multiplying this by the capacity and 2 times the frequency of the current used.

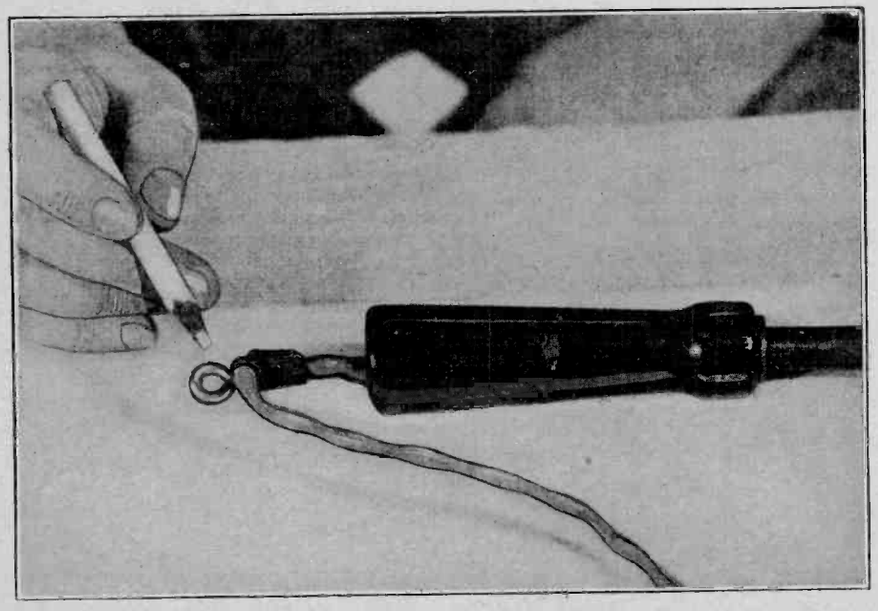
"The power factor of Lignole is .025, which is intermediate between bakelite, .04, and hard rubber, .007. Lignole is better than bakelite in this respect but not as good as hard rubber.

"The insulation resistance per cu.cm. calculated from the area and thickness of sample was:

For bakelite panel..... 5,420 megohms
For poplar wood..... 883,000 megohms
For unvarnished Lignole 746,000 megohms
For varnished Lignole .687,000 megohms"

—Herman Bernard.

HANDY WAY TO HANG IRON



(Hayden)

ELECTRIC soldering irons have such long cords that fans sometimes walk against the cord unwittingly, when the iron is not in use, even making it drop on the floor. An easy remedy is to secure a screweye to the cord with adhesive tape and hang up the iron. The tape holds the eye. No other connection is made between cord and screweye and the insulation on the cord is not molested.

Inductive Tickler Favored

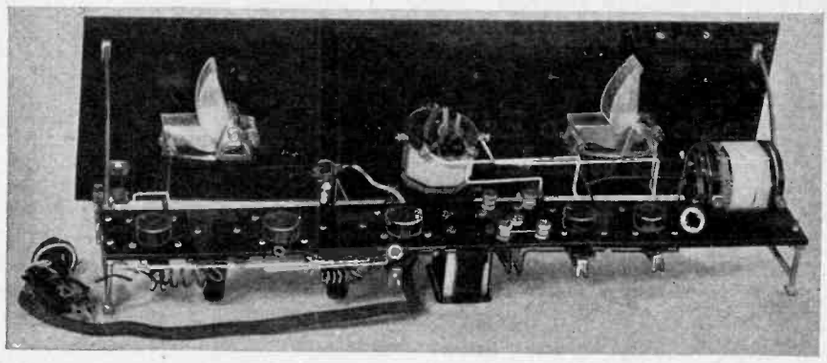


FIG. 1
Rear view of the new Diamond. The coils are placed at right angles.

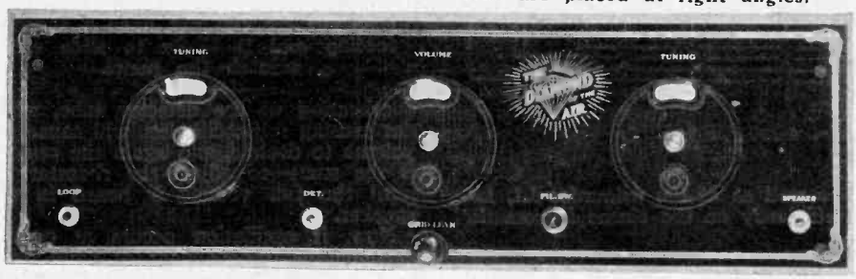


FIG. 2
The panel view, showing the Bruno vernier dials and light switch.

By Herman Bernard

Associate, Institute of Radio Engineers

IN ANY set the layout of parts is important. If constructor has the advantage of photographs to aid him, or better yet, these plus blueprints, the work is greatly simplified, as it is quite enough that the purchaser of the parts builds the set, without having to go into the remifications of originating a design.

It often takes a radio engineer several weeks properly to design a set, because the test of the receiver, on the air and in the laboratory, under varying conditions, is a part of the design work. Trouble that may be encountered is analyzed and solved and design changes made before the public is asked to build the set. This represents the greatest advance in radio literature as it affects the parts field, for only a few years ago it was common for authors to present theoretical circuits, which never had been built and tested, and to let the reader encounter the grief. Today all the leading circuits are sound and no one need fear poor results due to a tricky hookup.

Among the circuits which the fans have accepted as being of good design is the Diamond of the Air, which appears this season in a new form, only because some new parts have been included as substitutes for others, thus bringing about improvement. But there has been no elec-

(*Concluded on page* 16)

LIST OF PARTS

One Bruno No. 99 RF coil, (Lo-L1).
One Bruno No. 99 Tuning coil (L2-L3-L4).
Two No. 101 .0005 SF Bruno condensers, (C1-C3).
One Bruno light switch (S1).
Three Bruno Bakelite vernier dials.
Three No. 1A Amperites, mounted (R, R1 and R7).
One No. 112 Amperite, mounted (R2).
One 3½-1 Bruno Trutone Model D audio transformer (PBGF).
Two General Resistors, .1 megohm resistor (R3-R5).
One General Resistor, .1 megohm leak (R4).
One General Resistor, .5 megohm leak (R6).
One Bretwood variable grid leak (R0).
Two double circuit jacks (J1-J2).
One single circuit jack (J3).
One Century 7x24" drilled and engraved panel.
Five Pacent UX spring sockets (1, 2, 3, 4, 5).
One Century drilled socket strip.
One pair Bruno brackets.
Two .25 mfd. Aerovox by-pass condensers (C4-C5).
One 5-strand Birnbach multicolored battery cable.
One push-pull battery switch (S2).
One .00025 mfd. Aerovox fixed condenser (C2).
Four Bruno binding posts (W, X, Y, Z).
Five battery cable markers.
Two flexible leads for C battery.
Four mounts, bus bar, screws, spaghetti, etc.

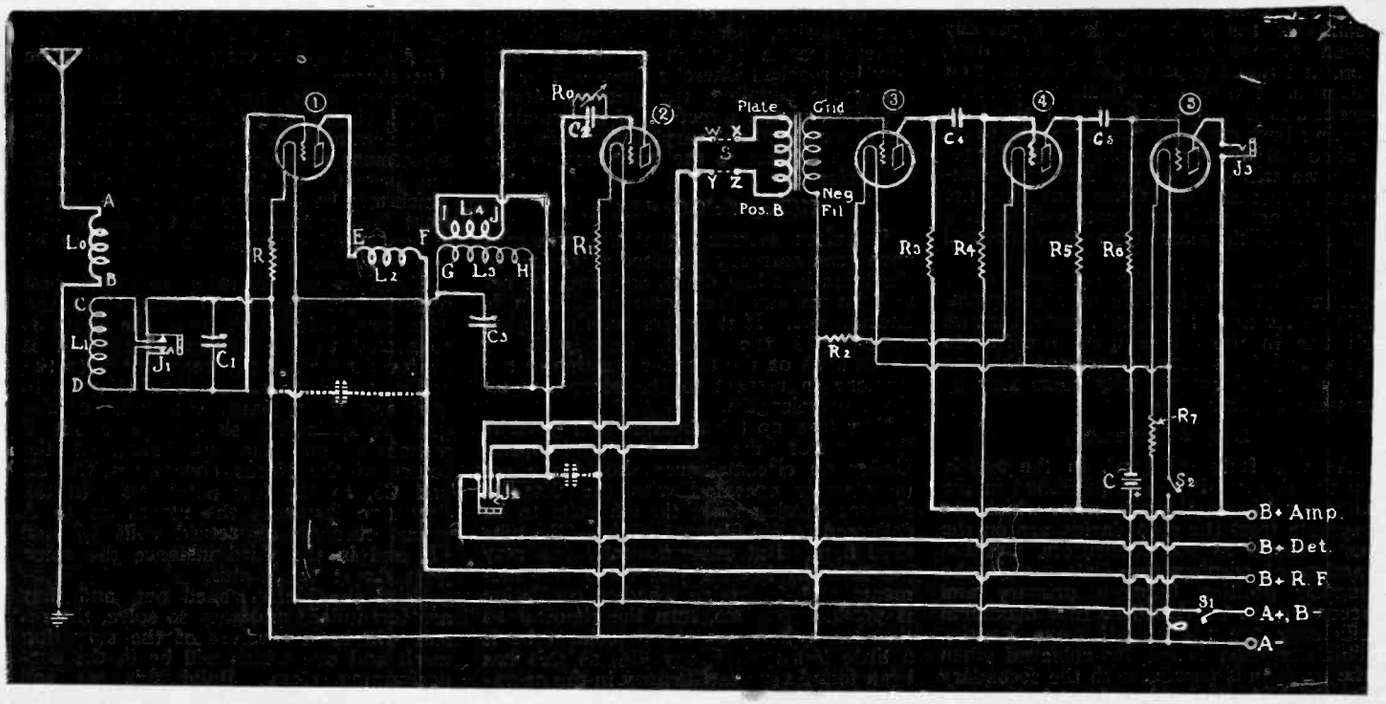


FIG. 3
Circuit diagram of the wiring, showing two optional bypass condensers, which may be .00025 mfd. or higher. In some instances the one at left serves better when one side goes to E instead of to F.

Highest Efficiency On the Karas Equamatic

Simple Rules, Easy to Follow, Enable One to Enjoy Receiver of Extremely Sweet Tone and Wonderful Facilities for Getting DX

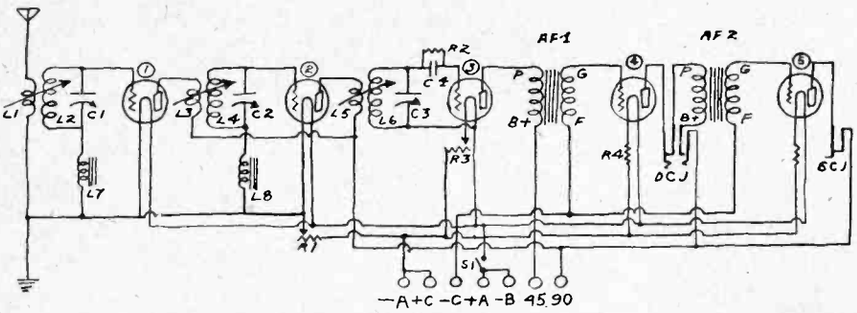


FIG. 1

Correct setting of the rheostats R1 and R3, as well as of the primaries L1, L3 and L5, is necessary to obtain 100 per cent. efficiency on the Karas Equamatic 5-tube set.

[*The Karas Equamatic 5-tube set, described by Capt. Peter V. O'Rourke in the October 9 issue, as to constructional features, makes one of the most satisfactory receivers ever built in* RADIO WORLD'S *laboratories. Its tone is sweet and mellow, its volume is superb, its selectivity so fine that distant stations may be tuned in through the locals. This is the kind of a set many thousands of fans will be glad to build, and it is our hope that such a set will be the selection of fans who desire to construct for themselves a receiver of maximum efficiency.*—EDITOR.]

When one builds a set, he does not always understand fully all the points that are necessary to know so that maximum officiency can be obtained. He turns an eager ear to the man who has built the same set and obtained from it results of the highest order. Especially when something new appears on the horizon, and noted experts hail it as a great advance, as with the Equamatic System, sometimes a fan will just fall short of getting best results because he has overlooked perhaps one simple thing. Therefore we will canvass the Equamatic situation, so that even those fans who are satisfied now with their sets will be able to accomplish more than they deemed possible.

The balancing of the receiver is the outstanding consideration of the Equamatic so far as full efficiency goes, because all else in the set is quite familiar to fans, and it is safe to assume that on the points of unfamiliarity some may be missing opportunities.

Easy Adjustments

As was fully set forth in the article on the theory of the set, published in the October 2 issue, the primaries, which are separate from the secondaries, are on the same shafts as the condensers, and the motion of turning the dials causes the angular position between primary and secondary to be varied so that maximum efficiency prevails on all wave lengths. This condition is usually achieved when the primary is parallel with the secondary for the highest wavelength, and the turning of the condenser to lower capacity settings causes the degree of coupling to grow less and less. The effectiveness remains at the maximum point, because the lower the wavelength the less coupling needed for maximum response, and anything more than necessary causes squeals.

Hence if the coils or rheostats are maladjusted there will be squealing on the lower wavelengths, due to too great energy. The solution may be reached by operating reversely, that is, starting with loosest coupling consistent with full value of signal strength at the lowest receivable wavelength, and noting that the coupling is tightened as the wavelength is made to increase. The correct angle for the primary in respect to the shaft is usually 58 degrees.

It will be noticed that the primary may be adjusted for proper permanent angle with a left and right motion, and that this has the effect of changing the coupling variation, indeed so versatile is the system that a position of the primary may be reached whereby there will be no change in coupling, the primary simply revolving in the direction of the condenser motion, without varying the primary's angle in respect to the secondary in any particular.

Killing Self-Oscillation

Therefore assuming that the primaries have been correctly adjusted according to the rules just laid down, we tune the set and let us say that some oscillation is encountered. If it occurs on the higher wavelengths the simple remedy is to check back on the angular position of the primary in respect to the secondary on these wavelengths.

Now turn up the rheostat that governs the detector tube and see what happens. Under no circumstances should the set be steadily operated with the detector rheosat causing more than 5 volts to be delivered to the filament of the—O1A tube used here. But experimentally you may increase the heating just for a few moments and determine whether oscillation is produced. If so, turn the rheostat so that the voltage on the detector tube is a little less than 5, sav 4½, as this has been found very satisfactory in the operation of the receiver in RADIO WORLD'S laboratories. The correct heating of the detector tube is very important in this circuit.

Some will find that the momentary overheating of the detector tube, while not causing self-oscillation, will cause the volume to decline, and again the remedy is the same—to adjust the rheostat R3 until the full volume is heard in the speaker.

Now, if oscillation occurs at certain wavelengths, independent of what voltage between 4½ and 6 may be applied experimentally to the detector tube filament, then attention should be directed also to the radio frequency rheostat, R1, and this may be turned down slightly. When the correct point is found all local stations may be tuned in with full volume without any further adjustment of either rheostat, but for far disant signals it may be advisable to adjust the RF rheostat slightly, using it as a volume control.

Retarding L3

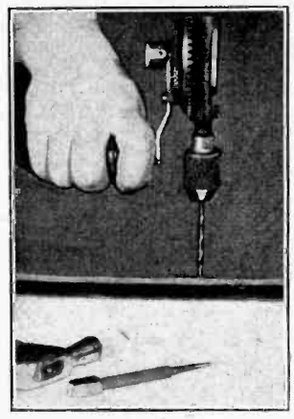
The detector rheostat, however, once properly adjusted, need not be touched again, even for DX, with the single exception that if the position established represents that which was necessary when the storage battery is in a charged condition, this rheostat may have to be turned up a little due to a later semi-discharged state of the battery and the consequent lower volage delivered from that source.

The rheostats, therefore, are important in this circuit, and if highest results are not achieved there is only one other likely adjustment necessary, and that concerns the primary of the second coil (L3), which may be so set as to represent somewhat less coupling than the other primaries at all settings, that is, it may be retarded a little.

Check up the following to insure best results: the method of connecting the primaries, being sure that the plate is connected to the primary lead that is nearer the panel; the connections to the audio transformers, so that G goes to grid and P to plate; the value of the grid leak, which should be about 2 megohms; and the connection of the rotors of the Karas condensers C1, C2 and C3, to the low potentials. In the first two instances the rotors go to A minus through he retard coils L7 and L8, and in the third instance the rotor goes direct to A plus.

With the kinks ironed out, and they are few indeed and easy to solve, the result will be a receiver of the surpasing merit and one which will be in the outperforming class. Build this set and know what real radio is.—H. B.

AVOID SLIP



(*Hayden*)

CENTERPUNCH or tap the point where bakelite is to be drilled, otherwise the bit will not have a secure footing and is likely to slide and scratch the panel.

DX WEATHER HERE

Many fans have noticed how the cold weather is bringing in DX.

BAD SPEAKER WINS PRAISE OF IGNORANT

By C. L. Farrand

The loudspeaker, being the device which produces the sound, is generally blamed for all the deficiencies of the receiving system, including those due to poor receiver, vacuum tubes, batteries, and at times, even the deficiencies of the broadcasting.

The better grade of receiver of today contains good audio transformers and is capable of producing good quality music with sufficient bass. It is, however, necessary that the batteries have voltage to supply sufficient power to the vacuum tubes. It is also necessary that the vacuum tubes have sufficient power capacity, i. e., sufficient filament emission and normal filament brilliancy.

The type 201-A and 301-A tube, when new and used with a 90-volt B battery, have sufficient emission and, therefore, power capacity, to permit faithful reproduction at only very moderate intensity.

Harmful Harmonics

However, when the volume is increased with the combination, an accentuation of harmonics occurs, evidenced in a faithful speaker by nasal or rattling tones. An unfaithful reproducer, however, will smooth these "rough edges" of the sound and give a more pleasing tone. This deceives the listener into believing that the more faithful speaker is faulty, whereas the facts are that the speaker is faithfully reproducing the voice which has been distorted by the vacuum tubes.

This condition can be improved by an increase of plate voltage, which will lower the impedance of the tube and effect a greater transfer of the lower frequencies (when used with a transformer of given inductance), and also will permit the increased amplitude of the lower tones to be passed without distortion.

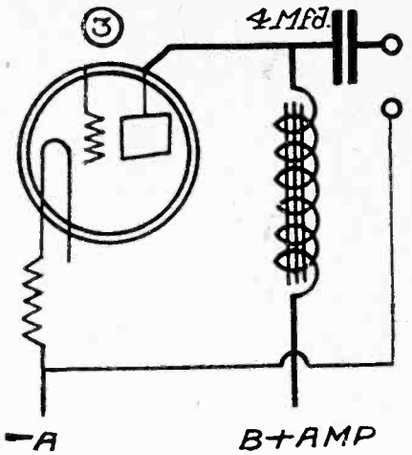
Super-heterodynes and sets of tuned radio frequency type utilizing regeneration have a tendency to change the tonal characteristics of the music or speech, when tuned. As the receiver is tuned to the maximum volume an accentuation of the bass will be observed. This may cause all tones to become somewhat drumlike in nature, at times with a complete loss of the treble.

Tone Should Not Change

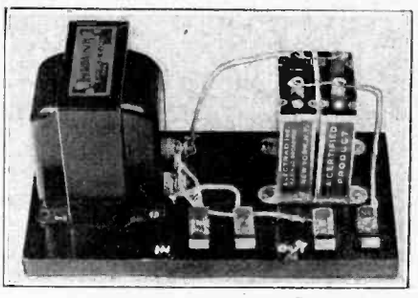
The tuning of a receiver should not change the tonal characteristics of the reception excepting that there is a tendency of the human ear to respond more readily to louder sounds.

In practically all radio reception of today, the magnitude of the treble is greater than that of the bass. This must not, however, be confused with the accentuation of bass due to regeneration as referred to above, when a partial or complete loss of treble occurs at the tuning point of maximum volume. A good receiver and speaker will reproduce throughout the tuning range the true relative value of bass and treble, the reduced bass on either side of the peak tuning point being due to the failure of the ear to notice the bass until it is sufficiently loud. The intensity of treble will not lessen at the tuning point of maximum volume, but the bass will sound louder.

TONE FILTER AN EASY OUTPUT



THE CIRCUIT DIAGRAM for wiring up a tone filter output. This device smoothes out the sound and, where B eliminators are used, aids clarity.



(*Hayden*)

THE INDIRECT COUPLING method of connecting a speaker to a set is easily accomplished. A choke coil and a large capacity fixed condenser are necessary. About 4 mfd. is favored, but if you have two smaller conlensers you may connect them in parallel to add their capacities, as shown. The wiring diagram shows the connections. The tube marked (3) represents the final audio bulb.

Mica Dust Is Used for New Insulators

Salvage Scheme of General Electric Company Produces Devices Highly Suitable for High-Frequency Work — Serves Well as Tube Bases

By W. T. Meenam

Mica particles, which heretofore could not be used, are now utilized as an insulation material for the production of radio high-frequency insulators. The new insulation, known as Mycalex, in a composition of ground mica and lead borate.

Mica previously presented a difficult problem because of the enormous amount of waste. Obtained in India and Canada in large sheets, there was considerable waste at the mines, it being estimated that only about five per cent of the material taken from the mine could be used.

In manufacturing there were still further wastes of small pieces of mica, but some years ago it was found that these mica flakes, mixed with a binding material and compressed under heat, made very good insulation. Such sheets of prepared mica are used by the General Electric Company in manufacturing processes. And now a product has been developed which uses mica particles, so that even more of the mica is utilized.

Better than Porcelain

The new material has better insulating properties than porcelain and several applications for it have been developed by engineers of the General Electric Company. The substance, light gray in color and with a metallic ring, is being used in the manufacture of bases for radio transmitter tubes, for aerial insulators in high frequency work, and for numerous similar applications.

Chief among its characteristics are that metal parts may be inserted or combined with Mycalex during the process of moulding; and, although a hard and stone-like product, it can be subjected to ordinary machining methods.

Mycalex is softened or made plastic by heating to dull redness, and the plastic mass is then formed into the desired shape by compression in steel molds closed under hydraulic pressure. Not only has it better electrical properties than porcelain, but it is stronger mechanically except under pressure. It is not as heat-resistant as porcelain or mica, but tests show that it is far superior in this respect to the ordinary molded insulations made with phenolic resins, shellac, gums, pitches and other materials.

The fact that metal parts can be combined with Mycalex during the molding process means a tighter and a stronger combination. As a rule, metal inserts cannot be imbedded in ceramic products during the process of manufacture, and this is especially true of porcelain, in which it is impossible because of the considerable shrinkage and the high temperature which causes melting or slagging of metal parts.

Needs Some Special Tools

Although Mycalex can be drilled, filed, sawed, polished and similarly treated by usual machining methods, it is necessary in some instances to use special tools since the wear when working with Mycalex is greater than when cutting metal.

The new compound has been recommended for use where the requirements demand an insulating material of high mechanical strength, high dielectric strength and insulating resistance, low losses under high frequencies, heat resistance beyond the ordinary range of moulded or sheet materials, and compact construction with metal inserts securely moulded in place.

Battery Cures Howl

By using a separate B battery block, the howl often heard in regenerative detector outputs can be eliminated. This howl is caused by feedback through the batteries. When connecting up this battery, the plus post should only go to the detector plate through the plate circuit constant. The minus post of this battery should go to the A plus or A minus post.

Radio University

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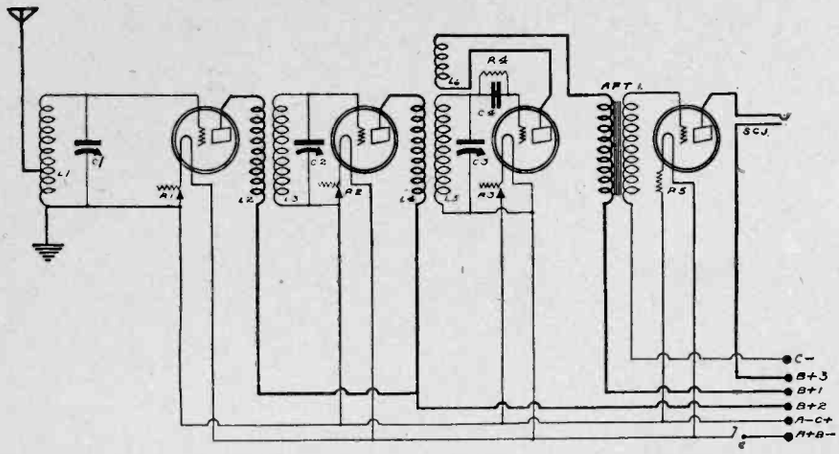


FIG. 445

The circuit diagram of the 4-tube receiver using two stages of TRF amplification, a regenerative detector and a single stage of transformer coupled AF coupling.

I HAVE an antenna coupler, a tuned radio frequency transformer and a 3-circuit tuner. The antenna coupler is of the single winding type, consisting of 54 turns wound on a 3-inch diameter tubing, using No. 24 dcc wire, and tapped at the 8th turn. The primaries of the RFT and the tuner consist of 10 turns. The secondaries of both RFT and tuner consist of 44 turns. Each primary and each secondary is wound on a 3-inch diameter tubing, using No. 24 dcc wire, with a ¼-inch space between the windings. The tickler consists of 36 turns of No. 26 ssc wire, wound on a 1¼-inch tubing. I would like to have a circuit diagram of a 4-tube receiver using these parts, e.g., two stages of tuned radio frequency amplification, a regenerative detector and one stage of transformer audio frequency amplification. Please state the capacity of the variable condensers that should be used, also discuss the rheostats, etc. I wish to use the —01A tubes.—William Strand, Los Angeles, Cal.

Fig. 445 shows the circuit diagram of such a receiver. L1 is the antenna coupler. L2 and L3 represent the primary and secondary windings respectively of the tuned radio frequency transformer. L4, L5 and L6 represent the primary, secondary and tickler windings respectively of the 3-circuit tuner. C1, C2 and C3 are .0005 mfd variable condensers. R1, R2 and R3 are 20 ohm rheostats, which control the filaments of the RF and detector tubes. C4 is a .00025 mfd. fixed grid condenser. R4 is a 2 megohm grid leak. AFT1 is a 3 to 1 ratio audio frequency transformer. SCJ is a single circuit jack. The last tube may be a power tube, or a —01A type. In either case, a C battery should be used. R5, if a —01A type tube is should, should be of the ¼ ampere type. If a power tube, such as the 112 or 171 is used, R5 should be of the ½ ampere type. S is a filament switch. The plates of both RF tubes are connected to a separate B battery voltage, e.g., 67½. The plate of the detector tube is connected to the B plus 45 volt post. The plate of the AF tube is connected to the B plus 3 post. The voltage applied to this post is dependent upon the tube used. Consult the chart, published in the July 10 issue, Radio University columns, for exact B and C voltages. The latter is experimental. Various voltages should be tried until the best results are obtained. Although loud spaker results will be obtained with this set, it is suggested that another stage of transformer coupled AF be added for more satisfactory loud speaker operation.

* * *

I HAVE installed three autotransfomrers, using .25 mfd. fixed condensers as blocking condensers and .5 megohm fixed resistors in the grid circuit. The set will work satisfactory for about 15 minutes and suddenly stop. At times the signal seems to choke up. The —01A type tubes are used in the first two stages, while a 112 tube is used in the last stage. A condenser and choke coil is connected in the output of the last tube to prevent DC from entering the speaker windings. The —01A plates receive 90 volts, while the 112 plate receives 157½ volts. A 4.5 volt C bias is used in the grid circuits of the first two AF tubes, while a 10½ volt C bias is used in the grid circuit of the 112. Amperites are used for filament control. What could I do to remedy this trouble? The B batteries in the AF circuit are not connected in series with the batteries in the RF and detector circuit.—Hans Fasten, Jersey City, N. J.

Suggest you place a 500,000 ohm variable resistance in the grid circuit of the second AF tube. These resistances are made in potentiometer fashion, having three terminals, one for the arm and two for each end of the resistance winding. The arm is brought to the grid post of the second AF tube. One resistance terminal is connected to the terminal of the fixed condenser that formerly went to the grid post of the 2nd AF tube and to one terminal of the fixed resistance. The other resistance terminal is connected to the minus post of the 4.5 C battery. Try reducing the grid and plate voltages. Check up on the terminals of connections of the transformers.

* * *

I HAVE two Federal 4 to 1 ratio AFT. Can they be used in the 4-tube Model Diamond of the Air? (2)—I also have an old model Pathe speaker. Can this be used also?—Martin Maxwell, Atlanta, Ga.

(1)—Yes. (2)—Yes.

* * *

PLEASE GIVE the data for coils in the New and Improved Model Diamond of the Air, using .00025 mfd. variable condensers and 3-inch diameter tubings, with No. 24 dcc wire.—David Alpha, Minneapolis, Minn.

The primaries consist of 10 turns. The secondaries consist of 65 turns. The tickler consists of 36 turns and is wound on a 1¾-inch diameter tubing, using No. 26 ssc wire. Allow a ¼-inch space between the primary and the secondary windings.

* * *

I WISH to construct a 3-circuit tuner, using a tubing 3⅛-inch in diameter to wind the primary and secondary, with No. 24 dcc wire. Please give the coil data for such a tuner, so that KSD will come in at about 97 on the dials. I am going to use a Bremer-Tully .0005 mfd. variable condenser. Please give the number of turns to place on the tickler, also the proper wire. (2)—At which end of the primary-secondary winding is the tickler placed? How far from either end should the holes be drilled for this tickler? (3)—I am going to build the Beacon 3-tube reflex, described in the Sept. 11 issue of RADIO WORLD and would like to know the number of turns to place on forms to constitute RFT, using .0005 mfd. variable condensers. (4)—How many turns should be wound on a ¾-inch diameter form to construct the choke coil for this Beacon? What wire is used? (5)—I have two Rauland-Lyric and also two Thorndarson 3½ to 1 ratio AFT. Which of these can be used in this Beacon? (6)—Can the —01A tubes be used? (7)—Is a power tube used in the last stage?—Dr. J. L. Hill, 1034 East State St., Rockford, Ill.

(1)—The primary consists of 10 turns. The secondary consists of 42 turns. Tubing should be 4 inches long. Tickler consists of 34 turns of No. 26 ssc wire, wound on a 1¾-inch diameter tubing. (2)—The tickler should be placed at the secondary end of winding, or at that portion where the grid post is to be connected. Drill holes at end of secondary winding for the tickler insertion. (3)—Using 2½-inch diameter forms, the secondaries consist of 62 turns. The primaries consist of 10 turns. Use No. 24 dcc wire. (4)—150 turns, using No. 30 enameled wire. (5)—Either can be used with equal success. (6)—Yes. Use the proper Amperites. (7)—Yes.

* * *

WHAT IS the interelectrode capacity of the UV, UX, CX and C-99 type tubes?—Harold Baum, Mobile, Ala.

The approximate interelectrode capacity of these type tubes are: grid to filament —3.6 mmfd.; grid to plate—3.5 mmfd., and plate to filament—4.5 mmfd.

* * *

WHAT CAPACITY condensers are included in the Aerovox Condenser Block, Type 1213, used in B eliminators?—Irving Drawens, Cumberland, Md.

In this block are two 2 mfd. and one 8 mfd. fixed condensers.

* * *

I NOTICE in the Sept. 25 issue of RADIO WORLD, page 13, a circuit diagram of a 7-tube receiver, employing three stages of tuned radio frequency amplification, a non-regenerative detector and three stages of resistance coupled AF amplification. A single condenser is used to tune the antenna circuit, while the 3-gang condenser tunes the secondaries of the other RFT. Could I have a circuit diagram of a 5-tube receiver, using this triple condenser system, but with only two stages of RF amplification, the non-regenerative detector and two stages of transformer coupled AF amplification? I have a triple condenser, each section having a capacity of .00035 mfd.—Robert Maxwell, Butte, Mont.

The revised diagram appears in Fig. 446. The single condenser and radio frequency transformer in the antenna circuit have been cut out. Two standard stages of transformer AF coupling are used. The primaries, L1, L3 and L5, con-

Australians Favor Religious Programs

Poll Shows They Led With 91,102 Votes, While Band Music Was Second, Public Concerts Third and Popular Orchestrations Fourth

WASHINGTON.

Religious services find the greatest favor with Australian radio fans, according to a poll taken by a broadcasting station in Melbourne. For several weeks listeners of the station were invited to submit their preferences.

The detailed results of the poll show that religious services received 91,102 votes; band music was second with 89,914 votes and public concerts followed with 83,720 votes; popular orchestral items polled 77,858 votes, old time programs 76,044, popular instrumental music 74,861, news 74,319 votes. Classical instrumental music, orchestral music, children's hour, educational talks and sacred music followed in the order given. Fashion talks rank last in public favor.

A similar poll was held last year, the results of which were entirely different from this year's votes. Last year public opinion ranked first on band concerts, popular music second with fashion talks last.

The results of last year's voting was used by the program directors or the principal Australian stations in arranging programs, and it is the intention to utilize the results of this year's poll in the same manner.

Many interesting combination programs are planned also.

Why the Diamond Is An Efficient Receiver

(*Concluded from page* 11)

trical change in the wiring and the same blueprint still holds good.

The Diamond represents a type of circuit to which the fans have taken quite heartily. (Fig. 3.) A stage of tuned radio frequency amplification and a regenerative detector constitute the fundamental hookup of the Diamond, the Browning-Drake, the Hammarlund Roberts (now Hi Q); the Universal, the Aristocrat, the Samson TC, and a host of others. The regeneration builds up the amplification at radio frequencies to a great extent, and this is done in the Diamond by what most experts agree is the best method for broadcast reception—a tickler coil of the rotary type, in inductive realtionship to the secondary. The condenser feedback method is better for short-wave work, as in the Schnell tuner and the Reinartz, but for the broadcast frequencies smoother control and better efficiency results from the inductive tickler.

Fans this year are much interested in the chassis type of construction, instead of a wide wooden baseboard. The chassis (Fig. 1) characterized the Diamond from the very beginning. It should be remembered the Diamond is more than a year and a half old.

During the international tests this year several fans reported the reception of foreign stations on their Diamonds. On the DX score the set has given a good account of itself.

The Audio Channel

The audio channel in the Diamond (Fig. 3) also always has been the same—a first stage of transformer coupling, followed by two stages of resistance coupling. Volume and tone purity are combined.

A light switch appears on the Diamond panel and caters excellently to the present demand for some illumination on the panel.

The virtues of the Diamond seem to have been driven home to countless thousands, and instead of interest diminishing in a circuit that has been going for a year and a half, it is actually increasing, as RADIO WORLD'S mail proves. That it will be one of the leading circuits of the present season, just as it was one of the market leaders last season, seems assured.

The tuning of the Diamond is accomplished by means of C1 and C3, their respective dials being at extreme left and extreme right on the panel (Fig. 2). The center dial actuates the tickler, and this is the volume control. The action of the tickler is very smooth.

New Wave Taken By WLWL In Defense

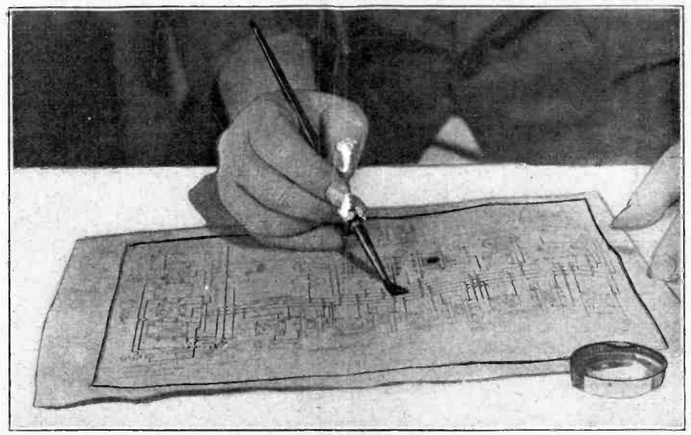
WLWL, the Paulist League broadcasting station located in N. Y. City, announced a change of wavelength to 384.4 meters from 288.3 meters. This station was one of the many that remained on their assigned wavelength, after the recent ruling by the U. S. Attorney General that the Department of Commerce had no authority to assign wavelengths.

"However, during the past week," says James F. Cronin of WLWL, "WKBQ, a licensed station in N. Y. City has chosen a wavelength of 285 meters, crowding WLWL to such an extent as to be only 10 kc away from WLWL's wave.

"Under these conditions, in self defense and as protection to its listeners, WLWL is exercising the right exercised by so many stations in New York, and is changing its wavelength."

With this new wavelength, WLWL will have a 20 kc separation from WRNY, N. Y. City and a 40 kc separation from WOR, Newark, N. J.

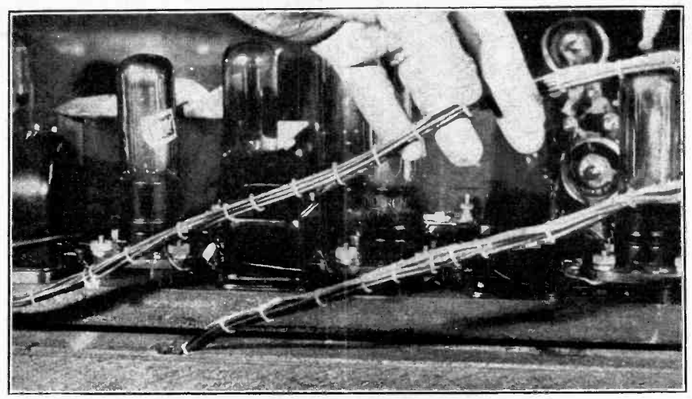
BRUSH GOOD GUIDE TO WIRING



(*Hayden*)

WHEN building a set from a blueprint it is a good plan to paint out the leads with ink as fast as you make the wired connections they call for. Then if any connection has been omitted you will see it at a glance.

USE CORD FOR BINDING LEADS



(*Hayden*)

FLEXIBLE leads may be used with great satisfaction, when wiring up a receiver. However, when binding these leads together, use cord or cotton, not wire, to prevent a short circuit.

New Super-Manager Appointed for WMCA

Donald J. Flamm, who has been instrumental in bringing before the microphone of WMCA, a long list of world-famous celebrities, and who has also regularly sponsored one of the station's principal weekly features, the review of new Broadway plays on each Friday evening, has assumed an active role in guiding the policies and purposes of the station.

At a meeting of WMCA officials the diversified managerial policies which heretofore characterized the station were abandoned. Complete and centralized responsibility was placed in the hands of Mr. Flamm and Marion K. Gilliam, the latter director of the station since its inception. She will continue in that capacity under the new regime.

Mr. Flamm is a publisher and is also the proprietor of a printing company.

The new management will dedicate the station to entertainment exclusively, specializing in the presentation of features of outstanding merit from Broadway legitimate and motion picture theatres. Sunday evenings will be devoted to gala programs participated in by leading Broadway figures in operatic, concert, musical comedy, motion picture and vaudeville circles. Special attention will also be devoted to foreign language features, including Spanish, Italian, Russian, Yiddish and French. Urbaine Ledoux, or as he is better known, Mr. Zero, has been invited, among others, to become a weekly feature at WMCA.

Uncle Sam Bidding for Women's Ears

From More Than 100 Stations the Bureau of Home Economics Will Broadcast Talks on Food, Styles, Sewing and Other Topics Dear to Feminine Hearts

By Thomas Stevenson

Elaborate plans are being made by the Bureau of Home Economics of the Department of Agriculture for the broadcasting of special features for women this Winter.

From more than 100 stations expert advice will be given on such important household subjects as clothing, health, menus, decoration, house-cleaning, millinary, sewing and repair work and other subjects dear to the housekeeper's heart.

The service given by the Department for women up to date has been a great success. Thousands upon thousands of letters have been received praising it and asking for other features. With the new service, practically all of the "high-hat" knowledge of the scientific workers of the Bureau of Home Economics will be placed at the disposition of housekeepers of America via the air.

Most of the information broadcast by the Bureau of Home Economics is put out through local stations. Last year about twenty stations used the material prepared by the government bureau, while various others of the 500 and some stations have employed different housekeeping-by-air experts.

The Department of Agriculture has been in the radio field since 1920, but at first only the sending out of features such as crop and market reports was tried out as an experiment. Radio marketgrams through a laboratory transmitter at the Bureau of Standards were sent out with the idea that various amateurs would copy them and send them to their local papers.

Next the air-mail carried certain of these marketgrams to key-western points where they were distributed by radio.

In the service that has been given by the Department for women up to date, not only are very tempting menus suggested, but the question of why certain foods should be served to the family has been thoroughly discussed.

Questions on Food Answered

Also in the Department's Radio housekeepers' hour service is a question and answer section on foods and diet which has been popular. Any woman who has wondered whether eating fish and milk in the same meal will really make one ill, or why it is that everybody ought to drink milk and eat salads, has been welcome to write through the local station using the Department's Housekeepers' half hour, to Bureau experts who have answered the questions over the air at some future date.

All in all, during the hours when father is in the office or at work on the farm and the radio can be turned over exclusively to the millions of women listeners, the air is now giving mother a complete women's magazine service, entertainment and all departments included.

There are talks on infant-feeding. There are beauty talks by such authorities as Elizabeth Arden and Elsie Pierce. Exercises to make mother slim and beautiful are coming from New York every morning. Current events and "Things Talked About" are being given by lecturers such as Janet Richards and Nina Reed.

Need Take No Notes

Fashion talks prepared by "Women's Wear" are events which no woman likes to miss. She doesn't need to take notes on these, as is necessary when menus and recipes are coming over the air, but can sit quietly with a bit of sewing and get the most important news of the day at the same time.

It is said that many former afternoon bridge experts are being kept at home by the radio these days.

Incidentally mother enjoys getting the fashion news as she sews, and it is a pleasure to have someone tell her about it. That is the kind of news it is hard to get father to read out loud. He may be interested in the fact that girls in general, in these benighted days, do not wear what he considers proper clothing, but he is bored with details of flared skirts, or technical discussion of changes in the silhouette.

The weekly consumer talks from the Department distributed from Philadelphia, New York and Chicago are of special interest to women, as women do most of the buying in this country. These talks have consisted of a description of market conditions and information of supplies of fruits and vegetables, which consumers need so they can tell what to buy for current use for canning.

Ford Mica Makes Hiler Impedances

The Ford Radio and Mica Corp., of N. Y. City, are now manufacturing a double impedance AF unit, under the Hiler patent No. 1,589,692. This form of coupling, they state, does away with distortion and tube blocking. They also state that the power output, when using these units, of the AF tubes is nearly quadrupled, with an even and perfect amplification of all the frequencies. The unit is very compact, nas very clearly marked terminals.

Weil and Cabaniss Now With Frank Co.

Paul S. Weil and C. B. Cabaniss have severed their connection with Frank Kiernan & Co., advertising agents, and are now with Albert Frank & Co., advertising, 14 Stone Street, New York City, with branches in Chicago, Boston and London.

Messrs. Weil and Cabaniss are two of the best-known advertising counsel in the radio field. They received many letters and telegrams wishing them luck.

A THOUGHT FOR THE WEEK

IT is all well enough to say that radio broadcasting shoud be non-political. Try to tell that to the campaign managers who are already preparing the greatest partisan broadsides that ever were fired in the heat of political elections.

RADIO WORLD

REG. U.S. PAT. OFF.

The First and Only National Radio Weekly

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

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PUBLISHED EVERY WEDNESDAY
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TECHNICAL EDITOR, Lewis Winner
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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"x5⅛"	231 lines	150.00
½ Page, 3¼" D. C.	231 lines	150.00
¼ Page, 4⅛" D. C.	115 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%
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WEEKLY, dated each Saturday, published Wednesday. Advertising forms close Tuesday, eleven days in advance of date of issue.

CLASSIFIED ADVERTISEMENTS

Ten cents per word. Minimum 10 words. Cash with order. Business Opportunities ten cents per word, $1.00 minimum.

Entered as second-class matter March 23, 1922, at the Post Office at New York, N. Y., under the Act of March 3, 1879.

People Read, Sew, Talk, Yet Listen

Human Senses Develop Great Versatilty, Due to Radio —Program of Consequence Stops All Competing Engagements

Extreme diversification marks the methods and manners of listening to a radio set. Many folk, when they arrive home after the day's work at the office or after making the hospitable rounds of customers, turn on the set so that they have dinner music. The stations long ago learned of this practice, and many of them make special features of the dinner music, even going into the little symphony class.

Now, the head of the family who sees little enough of his dear ones in this busy age, immediately has many things to discuss with the missus, with Elsie, Mamie and Bobbie, hence while the dinner music, as the saying is, comes over the air, a constant clatter of conversation is taking place, and not even a program manager, if he has the faintest trace of a tender spot in his soul, will quarrel with this wholesome aspect of family life, regardless of consequences to the effectiveness of the program.

The Favorite Piece

Once in a while father or mother or brother, sister, son or daughter, will notice some favorite melody being played and will ask for silence until that rendition is finished. That is sufficient reward, for the program manager who selects favorites aplenty is at least assured of a higher percentage of attention to the music than some other manager not endowed with that much insight and foresight..

Another common condition is to find some person or group reading while the program is being received. So long as music is being heard, it is assumed by many that reading can be carried on concomitantly, due to the cultivation of the faculty of dividing attention. However, when some one is speaking, the reading audience is put to it in baffling manner, since words assail them from two directions, a condition something akin, in effect, to inter-station interference on non-selective sets.

While radio has developed the versatility of the human senses so that persons who spend an hour simultaneously reading "Liberty Aflame" and hearing a condensed and aerated version of Gounod's "Faust," can tell you what they read in the one and what arias were sung in the other, radio has found that concurrence of mere words is too highly competitive to enable one to give a fair report of what was read and what was spoken. Perhaps all the radio audience needs, to reach the height of concurrent understanding of competing words that come through ear and eye, is more training.

Big Program Excludes All

It has been noticed by many that whenever a program of special consequence is on the air the American habit for reading suffers somewhat. It is hard indeed to keep one's mind on even "Liberty Aflame" when J. Andrew White is telling you that Jack Dempsey's knees are sagging as Gene Tunney pounds Jack with left and right to jaw, or when Graham McNamee tells you that the bases are full, it is two out, and the call on the batter is two strikes and three balls, or that the Dartmouth left end is rushing for a touchdown with no likely obstruction in sight. Hence it is no reflection on radio that it must share honors with other attractions in this life, especially as radio exclusively holds the center of the stage when a program of especial interest or importance is on the air. Even women sewing will hold the needle motionless in some of these circumstances.

Radio is due to create for itself even greater attention value as scientific progress brings radio farther toward the highest achievable degree of undistorted reproduction. The past 18 months of radio development were marked by the improvement of tonal quality, until that quality is now on a plane unexcelled by any other form of reproduction, not even by the best phonographs.

Helps Other Endeavors

In fact, radio has been a stimulating agency to other means of education and amusement. The way radio cut into the phonograph industry in the early stages compelled the devising of some far better system of phonograph recording and reproducing than had ever been known, and this came to pass. Perhaps better books, better magazines, better movies, better plays, better operas and better bathing suits and automobiles will result from the enforcing and healthily disturbing influence of radio.—H. B.

Brazil Station Invites U. S. Ears

WASHINGTON.

One of the largest broadcasting stations has recently been completed in Soa Paulo, Brazil, according to a report to the Department of Commerce. The station has sufficient power to be heard in the United States under favorable conditions and should be picked up frequently by American fans.

The station is owned by the Sociedad Radio Educadora Paulista. The equipment, which is of American manufacture, has been designed to give a reproduction of all frequencies between 30 and 7,000 kilocycles. The transmitter is rated at 1,000 watts and has a capacity of 2,500 watts. The transmitter uses a 50-watt speech amplifier, 250-watt modulators and a 5-kilowatt water-cooled amplifier.

It has not yet been decided upon which wavelength the station will operate permanently. but it is believed it will be within the band for which American receivers are made to operate.

TEN-FOLD POWER NEEDED DUE TO CONGESTED AIR

A few years ago 500 watts power gave a station an enviable position of standing and enabled it to reach out great distances. Due to the congested condition of the air today, ten times as much power is needed to accomplish even nearly the same thing.

A couple of stations often use up to 50,000 watts, and there is a plan afoot to try out 500,000 watts at WGY. The more power the leading stations use, the less effective some of the other stations may be, but that fact is counterbalanced by the superiority of the programs from the large stations. Small ones often put on such poor programs that suggestions for limiting the number of stations by law frequently meet with favor. The question will come before Congress.

sist of 10 turns. The secondaries, L2, L4 and L6 consist of 53 turns. Each primary and secondary is wound on a 3¼-inch diameter tubing. No. 24 double cotton covered wire is used. Allow a ¼-inch spacing between the primary and secondary windings. C1 is the triple condenser. S1, S2 and S3 indicate the stationary sections of the condenser. R is the rotary section. A 10 ohm rheostat is used to control the filaments of the RF tubes. A 20 ohm rheostat is used to control the filament of the detector tube. The filaments of the amplifier tubes are controlled by ballast resistors. Use the —01A type tubes. C3 is a .00025 mfd. fixed grid condenser. R3 is a variable grid leak. C2 is a .001 mfd. fixed condenser. AFT1 and 2 are of the low ratio type, e.g., 3 to 1. A filament switch, S, is used to cut off the filament supply. The plates of the RF tubes receive 67½ volts. The plate of the detector tube receives 45 volts. The plate of the first AF tube receives 90 volts. The voltage for the last tube is experimental, depending upon the type of tube used. LS indicate the speaker output terminals.

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DOES THE Amplion Corporation of America make a cone speaker? If so, what is the model number and what are the physical dimensions?—Morton Stewart, Larchmont, N. Y.

Yes. It is known as the AC 12. It is 14x14x9".

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PLEASE GIVE the constants of the coils, condensers, rheostats, etc., used in the receiver shown in electrical diagrammatic form on page 13 of the Oct. 16 issue of RADIO WORLD. I have a tubing 2½" in diameter, 20" long, and some No. 24 double cotton covered wire. Can this be used?—Morris Lipkin, Jersey City, N. J.

The primaries, L1, L3 and L5, consist of 10 turns. The secondaries, L2, L4 and L6, consist of 62 turns. Each primary and secondary is wound on a 2½" tubing. This means that you will require three tubings, approximately 6" long. The wire you have, can be used. Allow a ¼" separation between the windings. Across the secondaries, .0005 mfd. variable condensers, C1, C2 and C3, are shunted. C4 and C5 are .001 mfd. fixed condensers. C6 is a .00025 mfd. fixed grid condenser. R3 is a 2 megohm grid leak. R2 is a 2000 ohm variable resistance. R1 is a 2 ampere, 2 ohm rheostat. AFT1 and AFT2 are 3 to 1 ratio audio frequency transformers. The -01A tubes should be used throughout. The plate of the detector tube should receive 45 volts, indicated at B plus Det. The plates of the amplifier tubes receive 90 volts, indicated at B plus Amp. S is the filament switch.

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I WISH to construct an individual 3-stage resistance coupled frequency amplifier. Please give the proper values of the resistors and the fixed condensers that should be employed.—Clem Bohn, Cleveland, O.

The plate resistors should be of the .1 megohm type. The first grid resistor should have a resistance of 1 megohm. The second grid resistor should have a resistance of .5 megohm. The last resistor should have a resistance of .25 megohm. All the condensers should have a capacity of .25 mfd., at least.

* * *

USING A .00035 mfd. variable condenser and a 2½" diameter tubing, would 82 turns on the secondary be sufficient to cover the broadcast band?—F. Graff, 21 Wegmann Parkway, Jersey City, N. J.

Yes.

* * *

IN THE combination 1 and 5-tube receiver shown on page 13 of the Sept. 25 issue of RADIO WORLD, the wiring of J1

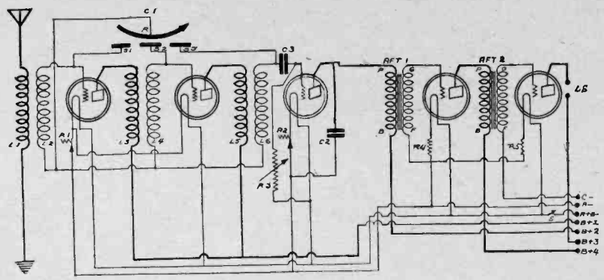

FIG. 446

The circuit diagram of the 5-tube receiver wherein a triple condenser is used for tuning.

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This can be used with a .0005 mfd. variable condenser across it.

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SHOULD A low ratio AFT be used in the first stage of audio frequency amplification, of the 5-tube 1-dial receiver shown on page 11 of the June 26 issue of RADIO WORLD? (2) If -01A type tubes are used, should R1 and R2 be 20 ohm rheostats?—Paul Reman, Syracuse, N. Y.

(1)—Yes, about a 3 to 1 ratio. (2)—Yes.

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Yes, the potentiometer does have a tendency to decrease the life of the battery, since it acts as a load. The results will be equal without it, since you will note that you will have to turn it practically all the way over to the minus side to get the proper results. Therefore, connect the grid return of this tube to the A minus post.

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I HAVE a 75 turn honeycomb coil. Can this be used in the Crosley X-J 4-tube receiver, shown on page 13 of the August 14 issue of RADIO WORLD? If so, what capacity variable condenser should shunt it? (2)—I have a .001 mfd. variable condenser, which I would like to use as C1 in this same receiver. How many turns should I wind, to constitute L1? (3)—Can R5 be variable? (4)—Can 15 ohm rheostats be used to control the filaments of each of the tubes?—William Henley, Boston, Mass.

(1)—Yes. This condenser should have a capacity of .00025 mfd. (2)—This coil should consist of 75 turns, wound on a 3" diameter tubing, using No. 22 double cotton covered wire. Tap the coil at every 5th turn. (3)—Yes. (4)—Yes.

* * *

I HAVE a resistance coupled audio frequency amplifier, which I would like to use in the 4-tube receiver shown on page 11 of June 26 issue of RADIO WORLD. The resistance of the resistors comply with the data given. However, the capacity of the fixed condensers differ. That is .25 mfd. fixed condensers are used. Should I change them to comply with the diagram or let them alone? What other changes should be made? (2)—I will have to use a separate rheostat for the detector tube. What type? I am using —01A tubes.—Thomas L. Robbins, Houston, Tex.

(1)—Don't change condensers in the unit. No change to make, except to see that provision is made for a C battery in the last stage. (2)—Use a 20 ohm, ¼ ampere type.

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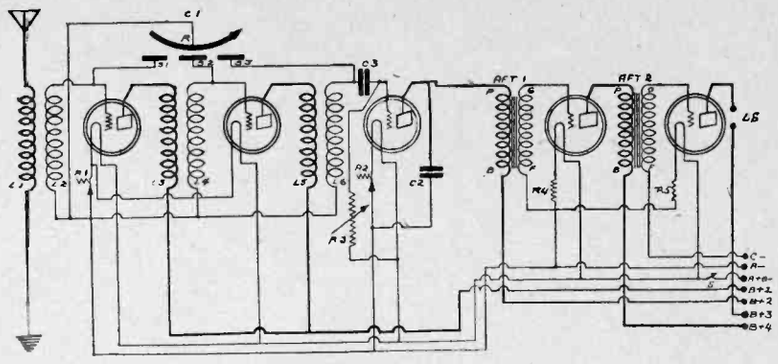

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Australians Favor Religious Programs

Poll Shows They Led With 91,102 Votes, While Band Music Was Second, Public Concerts Third and Popular Orchestrations Fourth

WASHINGTON.

Religious services find the greatest favor with Australian radio fans, according to a poll taken by a broadcasting station in Melbourne. For several weeks listeners of the station were invited to submit their preferences.

The detailed results of the poll show that religious services received 91,102 votes; band music was second with 89,914 votes and public concerts followed with 83,720 votes; popular orchestral items polled 77,858 votes, old time programs 76,044, popular instrumental music 74,861, news 74,319 votes. Classical instrumental music, orchestral music, children's hour, educational talks and sacred music followed in the order given. Fashion talks rank last in public favor.

A similar poll was held last year, the results of which were entirely different from this year's votes. Last year public opinion ranked first on band concerts, popular music second with fashion talks last.

The results of last year's voting was used by the program directors or the principal Australian stations in arranging programs, and it is the intention to utilize the results of this year's poll in the same manner.

Many interesting combination programs are planned also.

Why the Diamond Is An Efficient Receiver

(*Concluded from page* 11)

trical change in the wiring and the same blueprint still holds good.

The Diamond represents a type of circuit to which the fans have taken quite heartily. (Fig. 3.) A stage of tuned radio frequency amplification and a regenerative detector constitute the fundamental hookup of the Diamond, the Browning-Drake, the Hammarlund Roberts (now Hi Q); the Universal, the Aristocrat, the Samson TC, and a host of others. The regeneration builds up the amplification at radio frequencies to a great extent, and this is done in the Diamond by what most experts agree is the best method for broadcast reception—a tickler coil of the rotary type, in inductive realtionship to the secondary. The condenser feedback method is better for short-wave work, as in the Schnell tuner and the Reinartz, but for the broadcast frequencies smoother control and better efficiency results from the inductive tickler.

Fans this year are much interested in the chassis type of construction, instead of a wide wooden baseboard. The chassis (Fig. 1) characterized the Diamond from the very beginning. It should be remembered the Diamond is more than a year and a half old.

During the international tests this year several fans reported the reception of foreign stations on their Diamonds. On the DX score the set has given a good account of itself.

The Audio Channel

The audio channel in the Diamond (Fig. 3) also always has been the same—a first stage of transformer coupling, followed by two stages of resistance coupling. Volume and tone purity are combined.

A light switch appears on the Diamond panel and caters excellently to the present demand for some illumination on the panel.

The virtues of the Diamond seem to have been driven home to countless thousands, and instead of interest diminishing in a circuit that has been going for a year and a half, it is actually increasing, as RADIO WORLD'S mail proves. That it will be one of the leading circuits of the present season, just as it was one of the market leaders last season, seems assured.

The tuning of the Diamond is accomplished by means of C1 and C3, their respective dials being at extreme left and extreme right on the panel (Fig. 2). The center dial actuates the tickler, and this is the volume control. The action of the tickler is very smooth.

New Wave Taken By WLWL In Defense

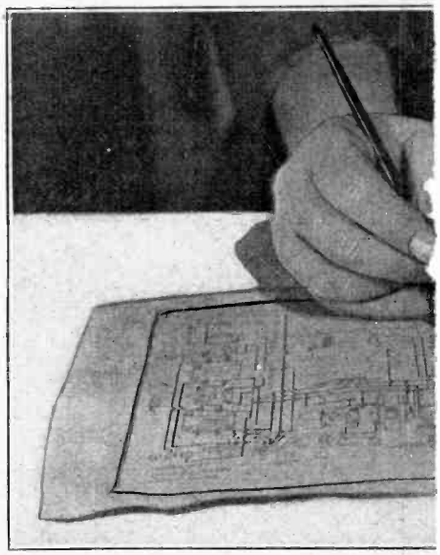
WLWL, the Paulist League broadcasting station located in N. Y. City, announced a change of wavelength to 384.4 meters from 288.3 meters. This station was one of the many that remained on their assigned wavelength, after the recent ruling by the U. S. Attorney General that the Department of Commerce had no authority to assign wavelengths.

"However, during the past week," says James F. Cronin of WLWL, "WKBQ, a licensed station in N. Y. City has chosen a wavelength of 285 meters, crowding WLWL to such an extent as to be only 10 kc away from WLWL's wave.

"Under these conditions, in self defense and as protection to its listeners, WLWL is exercising the right exercised by so many stations in New York, and is changing its wavelength."

With this new wavelength, WLWL will have a 20 kc separation from WRNY, N. Y. City and a 40 kc separation from WOR, Newark, N. J.

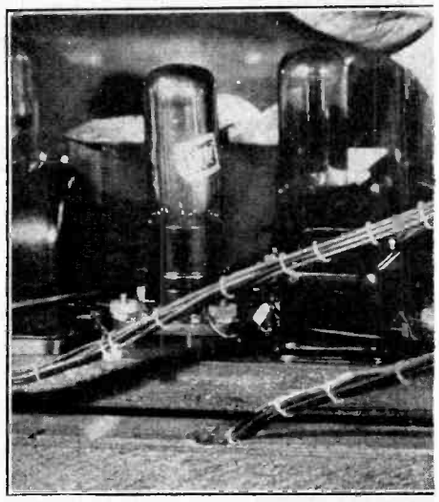
BRUSH GOOD GI



(*Hayden*)

WHEN building a set from a blueprint with ink as fast as you make the wired connection has been omitted

USE CORD FOR



(*Hayden*)

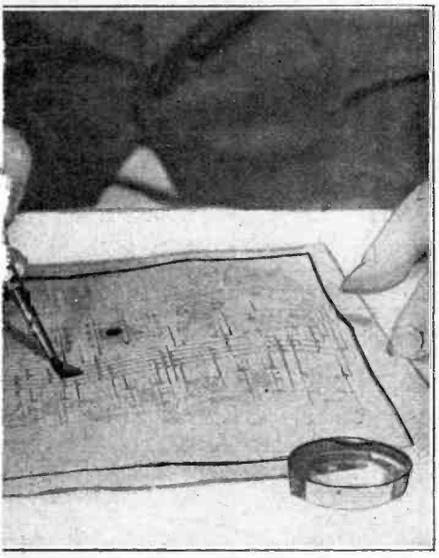
FLEXIBLE leads may be used with grea However, when binding these leads togeth a short

New Super Appointed

Donald J. Flamm, who has been instrumental in bringing before the microphone of WMCA, a long list of world-famous celebrities, and who has also regularly sponsored one of the station's principal weekly features, the review of new Broadway plays on each Friday evening, has assumed an active role in guiding the policies and purposes of the station.

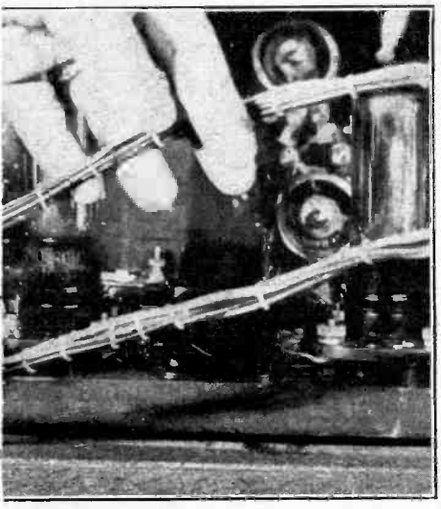
At a meeting of WMCA officials the diversified managerial policies which heretofore characterized the station were abandoned. Complete and centralized responsibility was placed in the hands of Mr. Flamm and Marion K. Gilliam, the latter director of the station since its inception. She will continue in that capacity under the new regime.

JIDE TO WIRING



it is a good plan to paint out the leads
connections they call for. Then if any
you will see it at a glance.

BINDING LEADS



t satisfaction, when wiring up a receiver.
r, use cord or cotton, not wire, to prevent
circuit.

-Manager for WMCA

Mr. Flamm is a publisher and is also the proprietor of a printing company.

The new management will dedicate the station to entertainment exclusively, specializing in the presentation of features of outstanding merit from Broadway legitimate and motion picture theatres. Sunday evenings will be devoted to gala programs participated in by leading Broadway figures in operatic, concert, musical comedy, motion picture and vaudeville circles. Special attention will also be devoted to foreign language features, including Spanish, Italian, Russian, Yiddish and French. Urbaine Ledoux, or as he is better known, Mr. Zero, has been invited, among others, to become a weekly feature at WMCA.

Uncle Sam Bidding for Women's Ears

From More Than 100 Stations the Bureau of Home Economics Will Broadcast Talks on Food, Styles, Sewing and Other Topics Dear to Feminine Hearts

By Thomas Stevenson

Elaborate plans are being made by the Bureau of Home Economics of the Department of Agriculture for the broadcasting of special features for women this Winter.

From more than 100 stations expert advice will be given on such important household subjects as clothing, health, menus, decoration, house-cleaning, milinary, sewing and repair work and other subjects dear to the housekeeper's heart.

The service given by the Department for women up to date has been a great success. Thousands upon thousands of letters have been received praising it and asking for other features. With the new service, practically all of the "high-hat" knowledge of the scientific workers of the Bureau of Home Economics will be placed at the disposition of housekeepers of America via the air.

Most of the information broadcast by the Bureau of Home Economics is put out through local stations. Last year about twenty stations used the material prepared by the government bureau, while various others of the 500 and some stations have employed different housekeeping-by-air experts.

The Department of Agriculture has been in the radio field since 1920, but at first only the sending out of features such as crop and market reports was tried out as an experiment. Radio marketgrams through a laboratory transmitter at the Bureau of Standards were sent out with the idea that various amateurs would copy them and send them to their local papers.

Next the air-mail carried certain of these marketgrams to key-western points where they were distributed by radio.

In the service that has been given by the Department for women up to date, not only are very tempting menus suggested, but the question of why certain foods should be served to the family has been thoroughly discussed.

Questions on Food Answered

Also in the Department's Radio housekeepers' hour service is a question and answer section on foods and diet which has been popular. Any woman who has wondered whether eating fish and milk in the same meal will really make one ill, or why it is that everybody ought to drink milk and eat salads, has been welcome to write through the local station using the Department's Housekeepers' half hour, to Bureau experts who have answered the questions over the air at some future date.

All in all, during the hours when father is in the office or at work on the farm and the radio can be turned over exclusively to the millions of women listeners, the air is now giving mother a complete women's magazine service, entertainment and all departments included.

There are talks on infant-feeding. There are beauty talks by such authorities as Elizabeth Arden and Elsie Pierce. Exercises to make mother slim and beautiful are coming from New York every morning. Current events and "Things Talked About" are being given by lecturers such as Janet Richards and Nina Reed.

Need Take No Notes

Fashion talks prepared by "Women's Wear" are events which no woman likes to miss. She doesn't need to take notes on these, as is necessary when menus and recipes are coming over the air, but can sit quietly with a bit of sewing and get the most important news of the day at the same time.

It is said that many former afternoon bridge experts are being kept at home by the radio these days.

Incidentally mother enjoys getting the fashion news as she sews, and it is a pleasure to have someone tell her about it. That is the kind of news it is hard to get father to read out loud. He may be interested in the fact that girls in general, in these benighted days, do not wear what he considers proper clothing, but he is bored with details of flared skirts, or technical discussion of changes in the silhouette.

The weekly consumer talks from the Department distributed from Philadelphia, New York and Chicago are of special interest to women, as women do most of the buying in this country. These talks have consisted of a description of market conditions and information of supplies of fruits and vegetables, which consumers need so they can tell what to buy for current use for canning.

Ford Mica Makes Hiler Impedances

The Ford Radio and Mica Corp., of N. Y. City, are now manufacturing a double impedance AF unit, under the Hiler patent No. 1,589,692. This form of coupling, they state, does away with distortion and tube blocking. They also state that the power output, when using these units, of the AF tubes is nearly quadrupled, with an even and perfect amplification of all the frequencies. The unit is very compact, has very clearly marked terminals.

Weil and Cabaniss Now With Frank Co.

Paul S. Weil and C. B. Cabaniss have severed their connection with Frank Kiernan & Co., advertising agents, and are now with Albert Frank & Co., advertising, 14 Stone Street, New York City, with branches in Chicago, Boston and London.

Messrs. Weil and Cabaniss are two of the best-known advertising counsel in the radio field. They received many letters and telegrams wishing them luck.

A THOUGHT FOR THE WEEK

IT is all well enough to say that radio broadcasting shoud be non-political. Try to tell that to the campaign managers who are already preparing the greatest partisan broadsides that ever were fired in the heat of political elections.

RADIO WORLD

REG. U.S PAT. OFF.

The First and Only National Radio Weekly

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

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PUBLISHED EVERY WEDNESDAY
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EDITOR, Roland Burke Hennessy
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SUBSCRIPTION RATES

Fifteen cents a copy. $6.00 a year. $3.00 for six months. $1.50 for three months. Add $1.00 a year extra for foreign postage. Canada, 50 cents.

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
½ Page, 8¼" D. C.	231 lines	150.00
¼ Page, 4½" D. C.	115 lines	75.00
1 Column, 2¼"x11"	154 lines	100.00
1 Inch		10.00
Per Agate Line		.75

Time Discount

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

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Ten cents per word. Minimum 10 words. Cash with order. Business Opportunities ten cents per word, $1.00 minimum.

Entered as second-class matter March 23, 1922, at the Post Office at New York, N. Y., under the Act of March 3, 1879.

Brazil Station Invites U. S. Ears

WASHINGTON.

One of the largest broadcasting stations has recently been completed in Soa Paulo, Brazil, according to a report to the Department of Commerce. The station has sufficient power to be heard in the United States under favorable conditions and should be picked up frequently by American fans.

The station is owned by the Sociedad Radio Educadora Paulista. The equipment, which is of American manufacture, has been designed to give a reproduction of all frequencies between 30 and 7,000 kilocycles. The transmitter is rated at 1,000 watts and has a capacity of 2,500 watts. The transmitter uses a 50-watt speech amplifier, 250-watt modulators and a 5-kilowatt water-cooled amplifier.

It has not yet been decided upon which wavelength the station will operate permanently, but it is believed it will be within the band for which American receivers are made to operate.

People Read, Sew, Talk, Yet Listen

Human Senses Develop Great Versatilty, Due to Radio —Program of Consequence Stops All Competing Engagements

Extreme diversification marks the methods and manners of listening to a radio set. Many folk, when they arrive home after the day's work at the office or after making the hospitable rounds of customers, turn on the set so that they have dinner music. The stations long ago learned of this practice, and many of them make special features of the dinner music, even going into the little symphony class.

Now, the head of the family who sees little enough of his dear ones in this busy age, immediately has many things to discuss with the missus, with Elsie, Mamie and Bobbie, hence while the dinner music, as the saying is, comes over the air, a constant clatter of conversation is taking place, and not even a program manager, if he has the faintest trace of a tender spot in his soul, will quarrel with this wholesome aspect of family life, regardless of consequences to the effectiveness of the program.

The Favorite Piece

Once in a while father or mother or brother, sister, son or daughter, will notice some favorite melody being played and will ask for silence until that rendition is finished. That is sufficient reward, for the program manager who selects favorites aplenty is at least assured of a higher percentage of attention to the music than some other manager not endowed with that much insight and foresight..

Another common condition is to find some person or group reading while the program is being received. So long as music is being heard, it is assumed by many that reading can be carried on concomitantly, due to the cultivation of the faculty of dividing attention. However, when some one is speaking, the reading audience is put to it in baffling manner, since words assail them from two directions, a condition something akin, in effect, to inter-station interference on non-selective sets.

While radio has developed the versatility of the human senses so that persons who spend an hour simultaneously reading "Liberty Aflame" and hearing a condensed and aerated version of Gounod's "Faust," can tell you what they read in the one and what arias were sung in the other, radio has found that concurrence of mere words is too highly competitive to enable one to give a fair report of what was read and what was spoken. Perhaps all the radio audience needs, to reach the height of concurrent understanding of competing words that come through ear and eye, is more training.

Big Program Excludes All

It has been noticed by many that whenever a program of special consequence is on the air the American habit for reading suffers somewhat. It is hard indeed to keep one's mind on even "Liberty Aflame" when J. Andrew White is telling you that Jack Dempsey's knees are sagging as Gene Tunney pounds Jack with left and right to jaw, or when Graham McNamee tells you that the bases are full, it is two out, and the call on the batter is two strikes and three balls, or that the Dartmouth left end is rushing for a touchdown with no likely obstruction in sight. Hence it is no reflection on radio that it must share honors with other attractions in this life, especially as radio exclusively holds the center of the stage when a program of especial interest or importance is on the air. Even women sewing will hold the needle motionless in some of these circumstances.

Radio is due to create for itself even greater attention value as scientific progress brings radio farther toward the highest achievable degree of undistorted reproduction. The past 18 months of radio development were marked by the improvement of tonal quality, until that quality is now on a plane unexcelled by any other form of reproduction, not even by the best phonographs.

Helps Other Endeavors

In fact, radio has been a stimulating agency to other means of education and amusement. The way radio cut into the phonograph industry in the early stages compelled the devising of some far better system of phonograph recording and reproducing than had ever been known, and this came to pass. Perhaps better books, better magazines, better movies, better plays, better operas and better bathing suits and automobiles will result from the enforcing and healthily disturbing influence of radio.—H. B.

TEN-FOLD POWER NEEDED DUE TO CONGESTED AIR

A few years ago 500 watts power gave a station an enviable position of standing and enabled it to reach out great distances. Due to the congested condition of the air today, ten times as much power is needed to accomplish even nearly the same thing.

A couple of stations often use up to 50,000 watts, and there is a plan afoot to try out 500,000 watts at WGY. The more power the leading stations use, the less effective some of the other stations may be, but that fact is counterbalanced by the superiority of the programs from the large stations. Small ones often put on such poor programs that suggestions for limiting the number of stations by law frequently meet with favor. The question will come before Congress.

OFFICIAL LIST OF STATIONS

(Corrected and Revised Up to October 13)

[Herewith is published a complete and corrected list of the broadcasting stations in the United States, with wavelengths given in meters, even unto decimals, and equivalent frequency given in kilocycles.]

Station	Location and Owner	kc	m
KDKA	East Pittsburgh, Pa., Westinghouse E. & M. Co.	970	309.1
KDLR	Devils Lake, N. D., Radio Elec. Co.	1300	231
KDYL	Salt Lake City, Utah, Newhouse Hotel	1220	246
KFAB	Lincoln, Neb., Neb. Buick Auto Co.	880	340.7
KFAD	Phoenix, Ariz., Elec. Equip. Co.	1100	273
KFAF	San Jose, Cal., A. E. Fowler	1380	217.3
KFAU	Boise, Idaho, Indep. Sch. Dist. of Boise	1070	280.2
KFBB	Havre, Mont., F. A. Buttrey & Co.	1090	275
KFBC	San Diego, Cal., Union League Club	790	380
KFBL	Everett, Wash., Leese Bros.	1340	224
KFBS	Trinidad, Cal., School District No. 1	1260	238
KFBU	Laramie, Wyo., St. Matthews Cathedral	800	374.8
KFCB	Phoenix, Ariz., Nielson Radio Supply Co.	1260	238
KFDD	Boise, Idaho, St. Michael Cathedral	1090	275.1
KFDM	Beaumont, Tex., Magnolia Petroleum Co.	950	315.6
KFDX	Shreveport, La., First Baptist Church	1270	236.1
KFDY	Brookings, S. D., S. D. State College	980	305.9
KFDZ	Minneapolis, Minn., Harry O. Iverson	1300	231
KFEC	Portland, Ore., Meier & Frank	1210	248
KFEL	Denver, Colo., Eugene P. O'Fallon, Inc.	1180	254.1
KFEQ	Oak, Neb., Scroggin & Co.	1120	268
KFEY	Kellog, Idaho, Bunker Hill & Sullivan	1290	233
KFEP	Moberly, Mo., First Baptist Church	1240	242
KFGQ	Boone, Ia., Crary Hardware Co.	1330	226
KFH	Witchita, Kans., Hotel Lassen	1120	267.7
KFHA	Cunnison, Colo., Western State College of Colo.	1190	252
KFHL	Oskaloosa, Ia., Penn College	1250	240
KFI	Los Angeles, Cal., Earl C. Anthony, Inc.	640	468.5
KF1F	Portland, Ore., Benson Polytechnic Inst.	1210	248
KF1O	Spokane, Wash., North Central High School	1100	272.6
KFIQ	Yakima, Wash., First Methodist Church	1170	256
KFIU	Juneau, Alaska, Alaska Elec. Light & Power Co.	1330	226
KFIZ	Fon du Lac, Wis., Daily Commonwealth	1100	273
KFJB	Marshalltown, Ia., Marshall Electric Company	1210	248
KFJC	Junction City, Kans., R. B. Fegan	1370	218.8
KFJF	Oklahoma City, Okla., Nat'l Radio Mfg. Company	1150	261
KFJI	Astoria, Ore., E. E. Marsh	1220	245.8
KFJM	Grand Forks, N. D., Univ. of N. D.	1080	278
KFJR	Portland, Ore., Ashley C. Dixon & Son	1140	263
KFJY	Fort Dodge, Ia., Tunwall Radio Co.	1220	246
KFJZ	Fort Worth, Tex., W. E. Branch	1180	254.1
KFKA	Greeley, Colo., Colo. State Teachers Col.	1100	273
KFKU	Lawrence, Kans., University of Kans.	1090	275
KFKX	Hastings, Neb., Westinghouse, E. & M. Co.	1040	288.3
KFKZ	Kirksville, Mo., Cham. of Com.	1330	225.4
KFLR	Albuquerque, N. M., Univ. of N. M.	1180	254
KFLU	San Benito, Tex., San Benito Radio Club	1270	236
KFLV	Rockford, Ill., Swedish Evangelist Church	1310	229
KFLX	Galveston, Tex., Geo. Roy Clough	1250	240
KFMR	Sioux City, Ia., Morningside College	1150	261
KFMX	Northfield, Minn., Carlton College	890	336.9
KFNF	Shenandoah, Ia., Henry Field Seed Co.	650	461.3
KFOA	Seattle, Wash., Rhodes Department Store	660	454.3
KFOB	Burlingame, Cal., K. F. O. B., Inc.	1330	225.4
KFON	Long Beach, Cal., Echophone Radio Shop	1290	233
KFOO	Salt Lake City, Utah, Latter Day Saints Union	1270	236
KFOR	David City, Neb., Tire & Electric Co.	1330	226
KFOT	Wichita, Kans., College Hill Radio Club	1300	231
KFOX	Omaha, Neb., Technical High School	1210	248
KFOY	St. Paul, Minn., Beacon Radio Service	1190	252
KFPL	Dublin, Tex., C. C. Baxter	1190	252
KFPM	Greenville, Tex., New Furniture Co.	1240	242
KFPR	Los Angeles, Cal., L. A. County Forestry Dept.	1300	231
KFPW	Carterville, Mo., St. John's Methodist Episcopal Church	1160	258
KFPY	Spokane, Wash., Symons Investment Co.	1098	273
KFQA	St. Louis, Mo., The Principa	1150	261
KFQB	Fort Worth, Tex., Searchlight Publishing Co.	593	508.2
KFQD	Anchorage, Alaska, Chovin Supply Co.	1320	227.1
KFQP	Iowa City, Ia., G. S. Carson, Jr.	1340	224
KFQU	Holy City, Cal., W. E. Riker	1300	230.6
KFQW	North Bend, Wash., C. F. Knierim	1390	215.7
KFQZ	Hollywood, Cal., Taft Products Co.	1330	226
KFRB	Beeville, Tex., Hall Brothers	1210	248
KFRC	San Francisco, Cal., City of Paris	1120	268
KFRU	Columbia, Mo., Stephens College	600	499.7
KFRW	Olympia, Wash., Western Broadcasting Co.	1370	218.8
KFSD	San Diego, Cal., Airfan Radio Corporation	1220	245.8
KFSG	Los Angeles, Cal., Echo Park Evangelist Ass'n	1090	275
KFUL	Galveston, Tex., T. Goggan & Brothers	1160	258
KFUM	Colorado Springs, Colo., W. D. Corley	1250	239.9
KFUO	St. Louis, Mo., Concordia Seminary	550	545.1
KFUP	Denver, Col., Fitzsimmons General Hospital	1280	234
KFUR	Ogden, Utah, Peery Building Company, Inc.	1340	224
KFUS	Oakland, Cal., L. L. Sherman	1170	256
KFUT	Salt Lake City, Utah, University of Utah	1150	261
KFUU	Oakland, Cal., H. C. Colburn & E. L. Mathewson	1360	220.4
KFVD	Venice, Cal., C. I. McWhinnie	1460	205.4
KFVE	St. Louis, Mo., Venson Broadcasting Corp.	1250	239.9
KFVG	Independence, Kans., First M. E. Church	1270	236.1
KFVI	Houston, Tex., Headquarters Troop, 56th Calvary	1250	240
KFVN	Fairmont, Minn., Carl E. Bagley	1320	227
KFVR	Denver, Col., Moonlight Ranch	1230	244
KFVS	Cape Girardeau, Mo., Cape Girardeau Battery Station	1340	224
KFVY	Albuquerque, N. M., Radio Supply Co.	1200	250
KFWB	Hollywood, Cal., Warner Brothers Pictures	1190	252
KFWC	San Bernardino, Cal., L. E. Wall	1030	291.1
KFWF	St. Louis, Mo., St. Louis Truth Center	1400	214.2
KFWH	Eureka, Cal., F. Wellington Morse, Jr.	1180	254.1
KFWI	S. San Francisco, Cal., Radio Entertainments, Inc.	1300	226
KFWM	Oakland, Cal., Oakland Educational Society	1450	206.8
KFWO	Avalon, Cal., Lawrence Mott	1420	211.1
KFWU	Pineville, La., Louisiana College	1260	238
KFWV	Portland, Ore., Wilbur Jerman	1410	212.6
KFXB	Big Bear Lake, Cal., Bertram C. Heller	1480	202.6
KFXD	Logan, Utah, Service Radio Company	1460	205.4
KFXF	Colorado Springs, Colo., Pikes Peak Broadcasting Co.	1200	249.9
KFXH	El Paso, Tex., Bledsoe Radio Co.	1240	242
KFXJ	Near Edgewater, Col., R. G. Howell	1390	215.7
KFXR	Oklahoma City, Okla., Classen Film Finishing Co.	1400	214.2
KFXY	Flagstaff, Ariz., Harry M. Costigan	1460	205.4
KFYF	Oxnard, Cal., Carl's Radio Den	1400	214.2
KFYJ	Portable, Tex., Houston Chronicle Publishing Co.	1260	238
KFYO	Texarkana, Tex., Buchanan-Vaughan Co.	1430	209.7
KFYR	Bismark, N. D., Hoskins-Meyer, Inc.	1210	248
KGAR	Tucson, Ariz., Tucson Citizen	1230	243.8
KGBS	Seattle, Wash., A. C. Dailey	1321	227
KGBU	Ketchikan, Alaska, Roy R. Thornton	1310	228.9
KGBW	Joplin, Mo., Martin Brotherson	1050	282.8
KGBX	St. Joseph, Mo., Julius B. Abercrombie	862	347.8
KGBY	Shelby, Neb., Albert C. Dunning	1480	202.6
KGBZ	York, Neb., Federal Live Stock Remedy Co.	900	333.1
KCCA	Decorah, Ia., Charles Walter Greenley	1070	280.2
KGCB	Oklahoma, Okla., Wallace Radio Institute	905.8	331
KGCG	Newark, Ark., Moore Motor Co.	1280	234.2
KGCH	Wayne, Neb., Wayne Hospital	663.3	450
KGCI	San Antonio, Tex., International Radio Co.	1250	239.9
KGCL	Seattle, Wash., Louis Wasmer	1300	230.6
KGCM	San Antonio, Tex., Robert B. Bridge	1140	263
KGCN	Concordia, Kans., Alva E. Smith	1428	210
KGCR	Brookings, S. D., Cutlers Broadcasting Service	1190	252
KGCX	Vida, Mont., First State Bank	1249	240
KGO	Oakland Cal., General Electric Co.	830	361.2
KGTT	San Francisco, Cal., Glad Tidings Tabernacle, Inc.	1450	206.8
KGU	Honolulu, T. H., Marion A. Mul-	1110	270
KGW	Portland, Ore., Morning Oregonian	610	491.5
KGY	Lacey, Wash., St. Martins College	1080	277.6
KHJ	Los Angeles, Cal., Times Mirror Co.	740	405.2
KHQ	Spokane, Wash., Louis Wasmer	760	394.5
KFLZ	Anita, Ia., Atlantic Automobile Co.	1100	272.6
KJBS	San Francisco, Cal., J. Brunton & Sons Co.	1360	220
KJR	Seattle, Wash., Northwest Radio Service Co.	780	384.4
KLDS	Independence, Mo., Reorganized Church of Jesus Christ	680	440.9
KLS	Oakland, Cal., Warner Brothers	1200	250
KLX	Oakland, Cal., Tribune Publishing Co.	590	508.2
KLZ	Denver, Colo., Reynolds Radio Co.	1130	265.3
KMA	Shenandoah, Ia., May Seed & Nursery	650	461.3
KMJ	Fresno, Cal., The Fresno Bee	1280	234.2
KMMJ	Clay Center, Neb., M. M. Johnson Co.	1310	228.9
KMO	Tacoma, Wash., KMO, Inc.	1200	250
KMOX	St. Louis, Mo., Voice of St. Louis	1070	280.2
KMTR	Los Angeles, Cal., Echophone Co.	1260	238
KNRC	Hollywood, Cal., Clarence B. Juneau	1440	208.2
KNX	Los Angeles, Cal., Los Angeles Express	890	336.9
KOA	Denver, Colo., General Electric Co.	930	322.4
KOAC	Corvallis, Ore., Oregon Agriculture College	1070	280.2
KOB	State College, N. M., New Mexico College of Agri.	860	348.6
KOCH	Omaha, Neb., Omaha Central High School	1160	258
KOCW	Chickashia, Okla., Oklahoma College for Women	1190	252
KOIL	Council Bluffs, Ia., Mona Motor Co.	980	305.9
KOIN	Portland, Ore., KOIN, Inc.	940	319
KOMO	Seattle, Wash., Birt F. Fisher	980	305.9
KOWW	Walla Walla, Wash., Frank A. Moore	1052	285
KPO	San Francisco, Cal., Hale Brothers, Inc.	700	428.3
KPJM	Prescott, Ariz., Wilburn Radio Service	1395	215
KPPC	Pasadena, Cal., Pasadena Presbyterian Church	1310	229
KPRC	Houston, Tex., Houston Printing Co.	1010	296.9
KPSN	Pasadena, Cal., Star-News Publishing Co.	950	315.6
KQW	San Jose, Cal., First Baptist Church	900	333.1
KQV	Pittsburgh, Pa., Doubleday Hill Electric Co.	1090	275
KRE	Berkeley, Cal., Berkeley Daily Gazette	1170	256
KSAC	Manhattan, Kans., Kansas State Agricultural College	880	340.7
KSBA	Shreveport, La., W. G. Paterson	960	312.6
KSD	St. Louis, Mo., Pulitzer Publishing Co.	550	545.1
KSEI	Pocatello, Ida., KSSEI Broadcasting Co.	1150	260.7
KSL	Salt Lake City, Utah, Radio Service Corporation	1000	299.8
KSMR	Santa Maria, Cal., Santa Maria Valley RR.	1430	209.7
KSO	Clarinda, Ia., A. A. Berry Seed Co.	1240	242
KTAB	Oakland, Cal., Associated Broadcasters	990	302.8
KTBI	Los Angeles, Cal., Bible Institute	1020	293.9
KTBR	Portland, Ore., M. E. Brown	1140	263
KTHS	Hot Springs, Ark., New Arlington Hotel	800	374.8
KTNT	Muscatine, Ia., Norman Baker	900	333.1
KTUE	Houston, Tex., Uhalt Electric	1140	263
KTW	Seattle, Wash., First Presbyterian Church	660	454.3
KUOA	Fayetteville, Ark., University of Ark.	1000	299.8
KUOM	Missoula, Mont., University of Mont.	1230	243.8
KUSD	Vermillion, S. D., University of S. D.	1080	278
KUT	Austin, Tex., University of Tex.	1300	231
KVOO	Bristow, Okla., Voice of Okla	800	374.8
KWCR	Cedar Rapids, Ia., H. F. Parr	1080	278
KWG	Stockton, Cal., Portable Wireless Telegraph Co.	1210	248
KWKC	Kansas City, Mo., Wilson Duncan Studios	1270	236
KWKH	Shreveport, La., The W. K. Henderson Iron Works and Supply Co.	960	312.3
KWSC	Pullman, Wash., State College of Wash.	850	348.6
KWUC	Lemars, Ia., Western Union College	1190	252
KWWG	Brownsville, Tex., City of Brownsville	1080	278
KYW	Chicago, Ill., Westinghouse E. & M. Co.	560	535.4
KXRO	Seattle, Wash., Brott Lab.	1249	240
KZM	Oakland, Cal., Preston D. Allen	1250	240
WAAD	Cincinnati, O., Ohio Mechanical Institute	1160	258
WAAF	Chicago, Ill., Daily Drovers Journal	1080	277.6
WAAM	Newark, N. J., Isaiah R. Nelson	1140	263
WAAW	Omaha, Neb., Omaha Grain Exchange	780	384.4
WABB	Harrisburg, Pa., Harrisburg Radio Co.	1470	204
WABC	Asheville, N. C., Asheville Battery Co.	1180	254
WABI	Bangor, Me., First Universalist Church	1250	240

(Continued from page 19)

WABO—Rochester, N. Y., Hickson Electric Co., Inc. 1080 278
WABQ—Haverford, Pa., Haverford College Radio Club 1150 261
WABR—Toledo, O., Scott High School.. 1140 263
WABW—Wooster, O., The College of Wooster 1450 206.8
WABX—Mount Clemens, Mich., Henry B. Joy 1220 246
WABY—Philadelphia, Pa., John Magaldi Jr. 1240 242
WABZ—New Orleans, La., Colis Place Baptist Church 1090 275.1
WADC—Akron, O., Allen T. Simmons.. 1160 258
WAFD—Port Huron, Mich., Albert B. Parfet 1090 275
WAGM—Royal Oak, Mich., Robert L. Miller 1330 275
WAHG—Richmond Hill, N. Y., A. H. Grebe 950 315.6
WAIT—Taunton, Mass., A. H. Waite & Co. 1310 229
WAIU—Columbus, O., American Insurance Union 1020 293.9
WAMD—Minneapolis, Minn., Raddison Radio Corporation 1230 243.8
WAPI—Auburn, Ala., Alabama Polytechnic Institute 650 461.3
WARC—Medford, Mass., American Radio & Research 1150 261
WATT—Portable-First District, Edison Electric, Ill. 1230 243.8
WBAA—W. Lafayette, Ind., Purdue University 1100 273
WBAK—Harrisburg, Pa., Pennsylvania State Police 1090 275
WBAL—Baltimore, Md., Consolidated Gas & Power Co. 1220 245.8
WBAC—Decatur, Ill., James Miliken University 1110 270.1
WBAP—Forth Worth, Tex., Wortham Carter Publishing Co. 630 475.9
WBAW—Nashville, Tenn., Braid Elec. Co. & Waldrum Drug Co..... 1270 236.1
WBAX—Wilkes Barre, Pa., J. H. Stenger Jr. 1170 256
WBBC—Brooklyn, N. Y., Peter J. Testan 1200 249.9
WBBL—Richmond, Va., Grace Covenant Presbyterian Church 1310 228.9
WBBM—Chicago, Ill., Atlass Investment 1330 226
WBBP—Petoskey, Mich., Petoskey High School 1260 238
WBBR—Rossville, N. Y., Peoples Pulpit Ass'n 720 416.4
WBBS—New Orleans, La., First Baptist Church 1190 252
WBBW—Norfolk, Va., Ruffner Junior High School 1350 222
WBBY—Charlestwo, S. C., Washington Light Infantry 1120 268
WBBZ—Portable, Ill., C. L. Carrell.... 1390 215
WBCN—Chicago, Ill., Foster & McDonnell 1130 266
WBDC—Grand Rapids, Mich., Baxter Laundry Co. 1170 256.3
WBES—Takoma Park, Md., Bliss Electrical School 1350 222
WBNY—New York, N. Y., Baruchrome Corporation 930 322.4
WBOQ—Richmond Hill, N. Y., A. H. Grebe & Co., Inc. 1270 236
WBRC—Birmingham, Ala., Birmingham Broadcasting Co. 1210 248
WBRE—Wilkes Barre, Pa., Baltimore Radio Exchange 1300 231
WBRS—Brooklyn, N. Y., Universal Radio Mfg. Co. 761 394
WBT—Charlotte, N. C., Charlotte Cham. of Com. 1090 275
WBZ—Springfield, Mass., Westinghouse E. & M. Co. 900 333.1
WBZA—Boston, Mass., Westinghouse E. & M. Co. 900 333.1
WCAC—Mansfield, Conn., Conn., Agricul. College 1090 275
WCAD—Canton, N. Y., St. Lawrence University 1140 263
WCAE—Pitsburgh, Pa., Kaufman & Baer Co. 650 461.3
WCAH—Columbus. Ohio, Entrekin Elec. Co. 1130 265.3
WCAJ—University Place.. Neb.,. Neb. Wesleyan University 1180 254
WCAL—Northfield, Minn., St. Olaf College 890 336.9
WCAM—Camden, N. J., City of Camden 1270 236.1
WCAO—Baltimore, Md., Brager of Baltimore 1090 275
WCAP—Washington, D. C., Chesapeake and Pot. Telephone Co. 640 468.5
WCAR—San. Antonio,. Tex.,. Southern Radio Corporation 1140 263
WCAT—Rapid City, S. D., School of Mines 1250 240
WCAU—Philadelphia, Pa., Universal Broadcasting Co. 1080 278
WCAX—Burlington, Vt., University of Vermont 1200 250
WCAZ—Carthage, Ill., Carthage Coll 1220 245.8
WCBA—Allentown, Pa., Charles W. Heimbach 1180 254
WCBD—Zion, Ill., Wilber Glenn Voliva 870 344.6
WCBE—New Orleans, La., Uhalt Radio Co. 1140 263
WCBH—Oxford, Miss., University of Miss. 1240 242
WCBM—Baltimore, Mr., Hotel Chateau 1310 229
WCBR—Portable, R. I., C. H. Mosster 1430 209.7
WCES—Portable-First District, H. L. Dewing & H. Messter 1239 242
WCCO—Anoka, Minn., Washburn Crosby Co. 720 416.4
WCFL—Chicago, Ill., Chicago Fed. of Labor 610 491.5
WCFT—Tullahoma, Tenn., Knights of Pythias Home 1190 250.2
WCLO—Camp Lake, Wis., C. E. Whitmore 1300 231
WCLS—Joliet, Ill., H. M. Couch 1400 214
WCMA—Culver, Ind., Culver Military Academy 1160 258.5
WCOA—Pensacola, Fla., City of Pensacola 1350 222.1
WCRW—Chicago, Ill., C. R. White 720 416.4
WCSH—Portland, Me., H. R. Rines.... 1170 256
WCSO—Springfield, O., Wittonberg College 1210 248
WCWK—Fort Wayne, Ind., Chester W. Keen 1280 234.2
WCWS—Portable, Mass., C. W. Selen.... 1430 209.7
WCX—Pontiac, Mich., Detroit Free Press 580 516.9
WJR—Pontiac, Mich., Jewett Radio & Phonograph Co. 580 516.9
WDAD—Nashville, Tenn., Dads Automobile Accessories, Inc. 1330 226
WDAE—Tampa, Fla., Tampa Daily Times 1100 273
WDAF—Kansas City, Mo., Kansas City Star 820 365.6
WDAG—Amarillo, Tex., J. Laurence Martin 1140 263
WDAH—El Paso, Tex., Trinity Methodist Church 1120 267.7
WDAY—Fargo, N. D., Radio Equipment Corp. 1150 260.7
WDBE—Atlanta, Ga., Gilham Schoen Electrical Co. 1120 270
WDBJ—Roanoke, Va., Richardson Wayland land Elec. Corp. 1310 228.9
WDBK—Cleveland, O., M. F. Broz.... 1320 227
WDBO—Winter Park, Fla., Rollins College 1250 240
WDBZ—Kingston, N. Y., Kingston Radio Club 1290 232.4
WDEL—Wilmington. Del., Wilmington Electric Spec. Co. 1130 265.3
WDGY—Minneapolis, Minn., Dr. George W. Young 1140 263
WDOD—Chattanooga, Tenn., Chattanooga Radio Co., Inc. 1170 256
WDRC—New Haven, Conn., Doolittle Radio Corporation 1120 268
WDWF—Cranston, R. I., Dutee Wilcox Flint Inc. 680 440.9
WDXL—Detroit, Mich. DXL Radio Corp. 1010 296.9
WDZ—Tuscola, Ill., James L. Bush.... 1080 278
WEAF—N. Y. City, Broadcasting Company of America, Inc. 610 491.5
WEAI—Ithaca, N. Y., Cornell University 1180 254
WEAM—North Plainfield, N. J., Borough of N. Plainfield 1150 261
WEAN—Providence, R. I., The Shepard Co. 817 367
WEAO—Columbus, O., Ohio State University 1020 293.9
WEAR—Cleveland, O., Willard Storage Battery Co. 770 389.4
WEAU—Sioux City, Ia., Davidson Bros. Co. 1090 275
WEBC—Superior, Wisc., W. C. Bridges 1240 242
WEBH—Chicago, Ill., Edgewater Beach Hotel 810 370.2
WEBJ—New York, N. Y.,Third Avenue R. R. Co. 1100 273
WEBL—Portable, R. C. A. Show..... 1330 226
WEBO—Harrisburgh, Ill., Tate Radio Co. 1330 226
WEBR—Buffalo, N. Y., H. H. Howell.. 1230 244
WEBW—Beloit, Wisc., Beloit College... 1120 258
WEBZ—Savannah, Ga., Savannah Radio Radio Corporation 1140 263
WEDC—Chicago, Ill., Emil Denemark.... 710 422.3
Co. 1150 260.7
WEEI—Boston, Mass., Edison Electric Illuminating Co. 860 348.6
WEHS—Chicago, Ill., O. G. Fordham.. 1480 202.6
WEMC—Berrien Springs, Mich., Emanuel Miss. College 950 315.6
WENR—Chicago, Ill.,All-American Radio Corp. 1130 266
WEW—St. Louis., Mo., St. Louis University 832.8 360
WFAA—Dallas, Tex., Dallas News & Dallas Journal 630 475.9
WFAM—St. Cloud, Minn., Times Publishing Co. 1100 273
WFAV—Lincoln, Neb., University of Neb. 1090 275
WFBC—Knoxville, Tenn., First Baptist Church 1200 250
WFBE—Seymour, Ind., J. V. De Welle 1330 226
WFBG—Altoona, Pa., W. F. Gable Co.... 1080 278
WFBH—N.Y.C., Concourse Radio Corp. 1100 273
WFBJ—Collegeville, Minn., St. John's University 1270 236
WFBL—Syracuse, N. Y., Onondaga Hotel 1190 252
WFBM—Indianapolis, Ind., Merchant H. L. Co. 1120 268
WFBR—Baltimore, Md., Fifth Infantry, National Guard 1180 254
WFBZ—Galesburg, Ill., Knox College.. 1180 254
WFCI—Pawtucket, R. I., Frank Crook, Inc. 1300 229
WFDF—Flint, Mich., Frank D. Fallain 1280 234
WFL—Philadelphia, Pa., Strawbridge & Clothier 760 394.5
WFKB—Chicago, Ill., Vesta Battery Co. 1380 217.3
WFRL—Brooklyn, N. Y., Robert Morrison Lacey 1460 205.4
WGAL—Lancaster, Pa., Lancaster Electric Supply and Construction Co... 1210 248
WGBB—Freeport, N. Y., H. H. Carman 1230 243.8
WGBC—Memphis, Tenn., First Baptist Church 1080 278
WGBS—Evansville, Ind., Finke Furniture Co. 1270 236.1
WGBL—Scranton, Pa., Scranton Broadcasters, Inc. 1250 239.9
WGBR—Marshfield, Wisc., G. S. Ives.. 1310 229
WGBS—Astoria, L. I., N. Y., Gimbel Brothers 950 315.6
WGBU—Fulford-by-the-Sea, Fla., Florida Cities Finance Co. 1080 278
WCBX—Oreno, Me., University of Me... 1280 234.2
WGCP—Newark, N. J., May Radio Broadcasting Corp. 1190 252
WGES—Chicago, Ill., Oak Leaves Broadcasting Corp. 950 315.6
WGHB—Clearwater, Fla., Fort Harrison Hotel 1130 265.3
WGHP—Detroit, Mich., George Harrison Phelps, Inc. 1110 270
WGM—Jeanette, Pa., Verne & Elton Spencer 806 372
WGMU—Portable, N. Y., A. H. Grebe & Co. 1270 236
WGN—Chicago, Ill., Chicago Tribune... 990 302.8
WGR—Buffalo, N. Y., Federal Tel. & Tel. Co. 940 319
WGST—Atlanta, Ga., Georgia School of Technology 1110 270
WGY—Schenectady, N. Y., G. E. Co..... 790 379.5
WHA—Madison, Wisc., University of Wis. 560 535.4
WHAD—Milwaukee, Wisc., Marquette University 1090 275
WHAM—Rochester, N. Y.,Eastman School of Music 1080 278
WHAP—New York, N. Y., Wm. H. Taylor Finance Corp. 695.6 431
WHAR—Atlantic City, N. J., F. D. Cooks Sons 1090 275
WHAS—Louisville, Ky., Courier Journal & Louisville Times 750 399.8
WHAZ—Troy, N. Y., Rensselaer Polytechnic Inst. 790 379.5
WHB—Kansas City, Mo., Sweeney School Co. 820 365.6
WHBA—Oil City, Pa., C. C. Shaffer.... 1200 250
WHBC—Canton, O., Rev. E. P. Graham 1180 254
WHBD—Bellefontaine, O., Chamber of Commerce 1350 222.1
WHBF—Rock Island, Ill., Beardsley Spc. Co. 1350 222
WHBG—Harrisburg, Pa. John S. Skane 1300 231
WHBL—Portable, Ninth District, C. L. Carrell 1390 215
WHBM—Portable, Ninth District, C. L. Carrell 1390 215.7
WHBN—St. Petersburg, Fla., First Avenue M. E. Church 1260 238
WHBP—Johnstown, Pa., Johnstown Automobile Co. 1170 256
WHBQ—Memphis, Tenn., St. Johns M. E. Church 1290 233
WHBU—Anderson, Ind., Riviera Theatre & Bings Clothing 1370 218.8
WHBW—Philadelphia, Pa., D. R. Kienzle 1390 215.7
WHBY—West De Pere, Wisc., St. Norberts College 1200 249.9
WHDI—Minneapolis, Minn., W. H. Dunwoody Institute 1080 278
WHEC—Rochester, N. Y., Hickson Electric Co., Inc. 1160 258
WHFC—Chicago, Ill., Hotel Flanders.. 1160 258.5
WHK—Cleveland, O., Radio Air Service Corporation 1100 272.6
WHN—New York, N. Y., Geo. Schuhel 830 361.2
WHO—Des Moines, Ia., Bankers Life Co. 570 526
WHT—Deerfield, Ill., Radiophone Broadcasting Corp. 1260 238
WIAD—Philadelphia, Pa., Howard R. Miller 1200 250
WIAS—Burlington, Ia., Home Electric 1180 254
WIBA—Madison, Wisc., Capital Times-Strand Theatre 1270 236.1
WIBG—Elkins Park, Pa., St. Paul's Protestant Episcopal Church 1350 222
WIBH—New Bedford, Mass., Elite Radio Stores 1430 209.7
WIBI—Flushing, L. I., N. Y., F. B. Zittell, Jr. 1370 218.8
WIBJ—Portable, Ill., C. L. Carrell.... 1390 215.7
WIBM—Portable, Ill., B. Maine..... 1390 215.7
WIBO—Chicago, Ill., Nelson Brothers.. 1330 226
WIBR—Weirton, W. Va., Thurman A. Owings 1220 246
WIBS—Elizabeth, N. J., Thos. F. Hunter 1480 202.6
WIBU—Poynette, Wisc., The Electric Farm 1350 222
WIBW—Logansport, Ind., Dr. L. L. Dill 1360 220
WIBX—Utica, N. Y., WIBX, Inc..... 1280 234.2
WIEZ—Montgomery, Ala., A. D. Trum 1300 230.6
WIL—St. Louis, Mo., Benson Radio Co. 1160 258
WIOD—Miami, Fla., Carl G. Fisher Co. 1210 247.8
WIP—Philadelphia, Pa., Gimbel Bros. 590 508.2
WJAD—Waco, Tex., Jackson's Radio Engineering Laboratories 850 352.7
WJAF—Ferndale, Mich., J. A. Fernberg Radio Co. 749.6 400
WJAG—Norfolk, Neb., Norfolk Daily News 1110 270
WJAK—Kokomo, Ind., Kokomo Tribune 1180 254
WJAM—Cedar Rapids, Ia., D. M. Perham 1120 268
WJAR—Providence, R. I., The Outlet Co. 980 305.7
WJAS—Pittsburgh, Pa., Pittsburgh Radio Supply House 1090 27
WJAX—Jacksonville, Fla., City of Jacksonville 890 336.9
WJAZ—Mount Prospect, Ill., Zenith Radio Corp. 930 322.4
WJBA—Joliet, Ill., D. H. Lentz, Jr. 1450 206.8
WJBB—St. Petersburg, Fla., Financial Journal 1180 254.1
WJBC—La Salle, Ill., Hummer Furniture Co. 1280 234
WJBI—Red Bank, N. J., Robert S. Johnson 1370 218.8
WJBK—Ypsilanti, Mich., E. F. Goodwin 1290 233
WJBL—Decatur, Ill., Wm. Gushard Dry Goods Co. 1110 27
WJBO—New Orleans, La., V. Jenson 1120 267.7
WJBR—Omro, Wisc., Omro Drug Stores 1320 227.1
WJBT—Chicago, Ill., John S. Boyd..... 1260 238
WJBU—Lewisburg, Pa., Bucknell University 1420 211.1
WJBV—Woodhaven, N. Y., Union Course Lab. 638 469.9

WJBW—New Orleans, La., C. Carlson, Jr. ... 880 340.7
WJBX—Osterville, Mass., Renderson & Ross ... 1071 280
WJBY—Casden, Ala., Elec. Construction Co. ... 1110 270.1
WJJD—Moosehart, Ill., Loyal Order of Moose ... 810 370.2
WJR—Pontiac, Mich., Jewett Radio & Phonograph Co. and The Detroit Free Press ... 580 516.9
WJY—New York, N. Y., R. C. A. ... 740 405.2
WJZ—Bound Brook, N. J., R. C. C. A. ... 660 454.3
WKAF—Milwaukee, Wisc., WKAF Broadcasting Corp. ... 1150 261
WKAQ—San Juan, P. R., Radio Corporation of Porto Rico ... 880 340.7
WKAR—East Lansing, Mich., Michigan State College ... 1050 285.8
WKAV—Laconia, N. H., Laconia Radio Club ... 1340 223.7
WKBA—Chicago, Ill., Arrow Battery Co. 1430 209.7
WKBB—Joilet, Ill., Sanders Brothers.. 1060 282.8
WKBC—Birmingham, Ala., H. L. Ansley ... 1330 225
WKBD—Jersey City., N. J., Frank V. Bremer ... 1276 235
WKBE—Webster, Mass., K. & B. Electric Co. ... 1110 270.1
WKBF—Indianapolis, Ind., Noble D. Watson ... 1229 244
WKBG—Portable, Ill., C. L. Carrell.... 1390 215.7
WKBK—La Crosse, Wisc., Callaway Music ... 1200 249.9
WKBI—Chicago, Ill., Fred L. Schoenwolf ... 1360 220.4
WKBJ—St. Petersburg, Fla., Gospel Tabernacle, Inc. ... 1071 280
WKBL—Monroe, Mich., Monrona Radio Mfg. Co. ... 1190 252
WKBM—Youngstown, O., Radio Elec. Service Co. ... 959 312.6
WKBO—Jersey City, N. J., Camith Corp. 970 309.1
WKBP—Battle Crek, Mich., Enquirer & News ... 1131 265
WKDR—Kenosha, Wisc., Edward A. Dato ... 700 428.3
WKJC—Lancaster, Pa., Kirk Johnson & Co. ... 1160 258.5
WKRC—Cincinnati, O., The Kodel Radio Corp. ... 710 422.3
WKY—Oklahoma City, Okla., R. C. Hull & N. S. Richards ... 1090 275
WLAL—Tulsa, Okla., First Christian Church ... 1200 250
WLAP—Louisville, Ky., W. V. Jordan 1090 275
WLB—Minneapolis, Minn., University of Minnesota ... 1080 278
WLBL—Stevens Point, Wisc., Wisc. Department of Markets ... 1080 278
WLIB—Elgin, Ill., Liberty Weekly, Inc. 990 302.8
WLIT—Philadelphia, Pa., Lit Brothers. 760 394.5
WLS—Crete, Ill., Sears Roebuck Co.... 870 344.5
WLSL—Cranston, R. I., The Lincoln Studies, Inc. ... 680 440.9
WLTS—Chicago, Ill., Lane Technical High School ... 1160 258
WLW—Harrison, O., The Crosley Radio Corp. ... 710 422.3
WLWL—N. Y. C., Paulist Fathers..... 780 384.4
WMAC—Cazenovia, N. Y., C. B. Meredith ... 1090 275
WMAF—Dartmouth, Mass., Round Hills Radio Corp. ... 680 440.9
WMAK—Lockport, N. Y., Norton Laboratories ... 1130 266
WMAL—Washington, D. C., M. A. Leese Optical Co. ... 1410 212.6
WMAN—Columbus, O., Haskett Radio Station ... 1080 278
WMAQ—Chicago, Ill., Chicago Daily News ... 670 447.5
WMAY—St. Louis, Mo., Kings Highway Presb. Ch. ... 1210 243
WMAZ—Macon, Ga., Mercer University 1150 261
WMBB—Chicago, Ill., American Bond & Mortgage Co. ... 1200 250
WMBC—Detroit, Mich., Michigan Broadcasting Co., inc.... 1170 256.3
WMBF—Miami Beach, Fla., Fleetwood Hotel Corp. ... 780 384.4
WMBI—Chicago, Ill., Moody Bible Institute ... 1040 288.3
WMC—Memphis, Tenn., Commercial Publishing Co. ... 600 499.7
WMCA—Hoboken, N. J., Greely Square Hotel Co. ... 880 340.7
WMRJ—Jamaica, N. Y., Peter J. Prinz 1320 227.1
WMSG—N. Y. C., Madison Square Garden Broadcasting Corp.... 990 302.8
WNAB—Boston, Mass., The Shepard Stores ... 1070 280.2
WNAC—Boston, Mass., The Shepard Stores ... 697 430.1
WNAD—Norman, Okla., University of Okla. ... 1180 254
WNAL—Omaha, Neb., Omaha Central High School ... 1160 258
WNAT—Philadelphia, Pa., Lennig Brothers Co. ... 1200 250
WNAX—Yankton, S. D., Dakote Radio Apparatus Co. ... 1230 244
WNBH—New Bedford, Mass., New Bedford Hotel ... 1210 247.8
WNJ—Newark, N. J., Radio Shop of Newark ... 1190 252
WNOX—Knoxville, Tenn., Peoples Tel. & Tel. Co. ... 1120 267.7
WNRC—Greensboro, N. C., Wayne M. Nelson ... 1340 223.7
WNYC—New York, N. Y., Department of Plants & Structures ... 570 526
WOAI—San Antonio, Tex., Southern Equipment Co. ... 760 394.5
WOAN—Lawrenceburg, Tenn., J. D. Vaughn ... 1060 282.8
WOAW—Omaha, Neb., Woodmen of the World ... 570 526
WOAX—Trenton, N. J., Franklyn J. Wood ... 1250 240
WOC—Davenport, Ia., Palmer School of Chiropractic ... 620 483.6
WOCL—Jamestown, N. Y., A. B. Newton 1090 275.1
WODA—Patterson, N. J., O'Dea Temple of Music ... 767 390.9
WOI—Ames, Ia., Iowa State College.. 1110 270
WOK—Homewood, Ill., Neutrowound Radio Mfg. Co. ... 1380 217.3
WOKO—Peekskill, N. Y., Harold E. Smith ... 1290 232.4
WOO—Philadelphia, Pa., John Wanamaker ... 590 508.2
WOOD—Grand Rapids, Mich., Grand Radio Co. ... 1240 241.8
WOQ—Kansas City, Mo., Unity School.. 1080 278
WOR—Newark, N. J., L. Bamberger & Co. ... 740 405.2
WORD—Batavia, Ill., Peoples Pulpit Association ... 1090 275
WOS—Jefferson City, Mo., State Marketing Bureau ... 680 440.9
WOWO—Fort Wayne, Ind., Main Automobile Supply Co. ... 1320 227
WPAK—Agricultural College, N. D., N. D. Agricultural College ... 1090 275
WPAP—Cliffside, N. J., (See WQAO).... 830 361.2
WPCC—Chicago, Ill., North Shore Congregational Ch. ... 1160 258
WPDQ—Buffalo, N. Y., Hiram L. Turner 1460 205.4
WPG—Atlantic City., N. J., Municipality of Atlantic City ... 1000 299.8
WPRC—Harrisburg, Pa., Wilson Printing & Radio Co. ... 1390 215.7
WPSC—State College, Pa., Pennsylvania State College ... 1050 261
WQAA—Parkersburg, Pa., H. A. Beale Jr. ... 1360 220
WQAC—Amarillo, Tex., Gish Radio Service ... 1280 234
WQAE—Springfield, Vt., Moore Radio News Station ... 1220 246
WQAM—Miami, Fla., Electrical Equipment Co. ... 1050 285.5
WQAN—Scranton, Pa., Scranton Times 1200 250
WQAO—Cliffside, N. J., Calvary Baptist Church (WPAP used when Palisade Amusement Park Program is on) ... 830 361
WQJ—Chicago, Il., Calumet Co.... 670 447.5
WRAF—Laporte, Ind., Radio Club, Inc. 1340 224
WRAH—Providence, R. I., Stanley N. N. Real ... 1276 235
WRAK—Escanoba, Mich., Economy Light Co. ... 1170 256
WRAM—Galesburg, Ill., Lombard College ... 1230 244
WRAV—Yellow Springs, O., Antioch College ... 1140 263
WRAW—Reading, Pa., Avenue Radio & Electric Shop ... 1260 238
WRAX—Philadelphia, Pa., Beracah Ch. Inc. ... 1120 267.7
WRBC—Valparaiso, Ind., Immanuel Lutheran Church ... 1080 278
WRC—Washington, D. C., R. C. A.... 640 468.5
WRCO—Raleigh, N. C., Wayne Radio Co. 1190 252
WREC—Coldwater, Miss., Wooten's Radio Shop ... 1180 254
WREO—Lansing, Mich., Reo Motor Car Co. ... 1050 225.5
WRHF—Washington, D. C., Washington Radio Hospital Fund ... 1170 256
WRHM—Minneapolis, Minn., Rosedale Hospital ... 1190 252
WRK—Hamilton, O., Doron Brothers Electric Co. ... 1110 270
WRM—Urbana, Ill., University of Ill. 1100 273
WRMU—Motor Yacht "MU-1," A. H. Grebe & Co. ... 1270 236
WRNY—N. Y. C., Experimenter Publishing Co. ... 792 378.8
WRR—Dallas, Tex., City of Dallas..... 1220 246
WRST—Bay Shore, N. Y., Radiotel Manufacturing Co., Inc. ... 1390 215.7
WRVA—Richmond, Va., Larus & Brother Co., Inc. ... 1170 256
WSAI—Cincinnati, O., United States Playing Card Co.... 920 325.9
WSAJ—Grove City, Pa., Grove City College ... 1310 229
WSAN—Allentown, Pa., Allentown Call Publishing Co., Inc.... 1310 229
WSAR—Fall River, Mass., Doughty & Welch Electric Co. ... 1180 254.1
WSAV—Houston, Tex., Clifford W. Vick 1210 247.8
WSAX—Chicago, Ill., Zenith Radio Corporation ... 1120 268
WSAZ—Pomeroy, O., Chas. Electric Shop ... 1230 244
WSB—Atlanta, Ga., Atlanta Journal Co. 700 428.3
WSBC—Chicago, Ill., World Battery Co. 1040 268.3
WSBF—St. Louis, Mo., Stix Baer & Fuller ... 1100 273
WSBT—South Bend, Ind., South Bend Tribune ... 950 315
WSDA—N. Y. C., Seventh Day Adventist Church ... 1140 263
WSKC—Bay City, Mich., World's Star Knitting Co. ... 1150 261
WSM—Nashville, Tenn., National Life & Accident Insurance Co.... 1060 282.8
WSMZ—New Orleans, La., Sasnger Amusement Co. & Maison Blanche Co. ... 940 319
WSMH—Owosso, Mich., Shattuck Music House ... 1250 240
WSMK—Dayton, O.,S. M. K. Radio Corp. 1090 275
WSOE—Milwaukee, Wisc., School of Engineering of Milwaukee ... 1220 246
WSRO—Hamilton, O., Harry W. Fahlander ... 1190 252
WSSH—Boston, Mass., Tremont Temple Baptist Church ... 1150 260.7
WSUI—Iowa City, Iowa, State University of Ia. ... 620 483.6
WSVS—Buffalo, N. Y., Seneca Vocational School ... 1370 218.8
WSWS—Woodale, Ill., Illinois Broadcasting Corporation ... 1090 275.1
WTAB—Fall River, Mass., Fall River Daily ... 1130 266
WTAD—Carthage, Ill., Robert E. Compton ... 1270 236
WTAG—Worcester, Mass., Worcester Telegram ... 550 545.1
WTAL—Toledo, O., Toledo Radio & Electric Co. ... 1190 252
WTAM—Cleveland, O., Willard Storage Battery Co. ... 770 389.4
WYAQ—Eau Clairo, Wisc., C. S. Van Gordan ... 1180 254.1
WTAR—Norfolk, Va., Reliance Electric Co. ... 1150 261
WTAW—College Station, Tex., Agricultural & Mechanical College of Texas ... 110 270
WTAX—Streator, Ill., Williams Hardware Co. ... 1300 231
WTAZ—Lambertville, N. J., Thomas J. McGuire ... 1150 261.
WTIC—Hartford, Conn., Travelers Insurance Co. ... 630 475.9
WWAE—Plainfield, Ill., Electric Park.. 780 384.4
WWJ—Detroit, Mich., Eveniпg News Association (Detroit News) ... 850 352.7
WWL—New Orleans, La., Loyola University ... 1090 275
WWRL—Woodside, N. Y., Woodside Radio Laboratories ... 1160 258.5

List of Stations In Canada, Cuba and in Mexico

Increases in power by a number of Canadian, Cuban and Mexican stations will enable American fans to pick them up quite readily this winter. Following is a revised list of Canadian, Cuban and Mexican broadcasters:

CANADIAN

Call	Owner and Location	Meters	Watts
CFAF	Calgary Herald, Calgary, Alberta	434.5	750
CFCA	Star Pub. & Printing Co., Toronto, Ont.	356.9	500
CFCF	Canadian Marconi Co., Montreal, Que.	410.7	1,650
CFCN	W. W. Grant Radio Ltd., Calgary, Alberta	434.5	750
CFCT	G. W. Deaville Victoria, B. C.	329.5	500
CFCU	J. V. Elliott, Ltd., Hamilton, Ont.	340.7	500
CFRC	Queens University, Kingston, Ont.	267.7	500
CFQC	The Electric Shop, Saskatoon, Sask.	329.5	500
CFYC	Radio Corp. of Vancouver, Vancouver, B. C.	410.7	500
CHYC	Northern Elec. Co., Montreal, Quebec	410.7	850
CJCA	Edmonton Journal, Edmonton, Alberta	516.9	500
CKAC	La Presse Pub. Co., Montreal Quebec	410.7	1,200
CKCD	Daily Province Vancouver, B. C.	410.7	1,000
CKCK	Leader Pub. Co., Regina, Sask.	312.3	500
CKCL	Dominion Battery Co., Toronto, Ont.	356.9	500
CKNC	Toronto Research Laboratory, Toronto, Ont.	356.9	500
CKNT	Canadian National Carbon Co., Toronto, Ont.	356.9	500
CKY	Manitoba Telephone System, Winnipeg, Man.	384.4	500
CNRA	Canadian National Railways, Moncton, N. B.	312.3	500
CNRO	Canadian National Railways, Ottawa, Ont.	434.5	500
CNRV	Canadian National Railways, Vancouver, B. C.	291.1	500

CUBA

PWX	Cuban Telephone Co. Cienfuegos, Cuba	400	500
2OI	Oscar Collado Orta, Habana..	300	100
6BY	Jose Ganduxe, Habana.....	260	200
6IK	Frank Jones, Santa Clara....	275	100
6KW	Frank Jones, Santa Clara....	340	500
8BY	Alberto Ravelo, Santiago....	250	100

MEXICO

CYA	Elfrian R. Gomez, Mexico City	300	500
CYB	Jose J. Reynosa, Mexico City	275	500
CYL	Raoul Azcarraga, Mexico City	400	500
CYX	El Excelsior, Mexico City..	325	500
CZE	Department de Educacion, Mexico City	350	500
FAM	Federal Military Command, Guadalajara	490	1,000

THE RADIO TRADE

Sales Will Exceed Demand, Says Haugh

Traces Growth of Broadcasting and Finds Public This Season Puts Quality First and Cares Little About DX —Industry Getting Settled

By A. T. Haugh

President, Radio Manufacturers Association. Vice-President, King Radio Manufacturing Corp.

The radio industry is on the threshold of the most successful year ever known in the history of this young and thriving business. The continued efforts of the press of the country in educating the public to the possibilities of broadcasting have created a public acceptance for radio so that in the coming months it will not be at all surprising to see the demand exceed the supply.

Few people outside of scientific and engineering circles in the radio industry realize to what extent Summer interference has been overcome in the past few years with better radio reception experienced by listeners everywhere. Credit to this is not entirely due to the radio industry, or at least not to the manufacture of radio receiving sets, but rather to the manufacturers in the transmission field who by their improved transmitters and refinements in the erection of radio broadcasting stations have enabled the broadcaster to use higher power and deliver more power to the receiving set, as well as permitted the broadcaster to get more efficiency out of the power used in transmission.

Broadcasting has seen a decided improvement in the past twelve months, not only in quality of transmission, but in the increased number of hours of programs available for listeners and in the extensions of the broadcast network so that stations in more remote localities are enabled to bring their listeners the same choice programs that are available to listeners in the larger cities where artists of the highest rank are more easily available for broadcast. There is little doubt that the increase in broadcasting and the improvement of the program offered has been a most decided factor in increasing Summer sales of radio receiving apparatus as well as accessories with the possibility not far distant that the radio sales curve will be leveled by increasing sales in the summer months and banishing the summer slump theory.

Reports from manufacturers of radio receiving sets who complained of overstocks in January show that dealers' Summer

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(*Continued from page 22*)

sales have almost entirely eliminated overstocks, with orders beginning to come in for practically every standard line of radio apparatus. Many manufacturers have reported steady shipments throughout the summer while others have heavy commitments for early fall shipment. All of these factors have combined to start radio manufacturers on their set building programs much earlier this season than in past years.

Although prepartions for mass production of receiving apparatus were completed by practically every manufacturer in the industry early in the month of June, set makers throughout the country are now from three to four weeks behind in filling orders for merchandise from the new lines.

The question which bothered the radio industry in the early part of last year and contributed somewhat to the slowing up of business was the matter of the support of broadcasting. The radio trade frequently asked who would support broadcasting; and as frequently opponents of radio asked the same question of radio manufacturers. As broadcasting undoubtedly is the life blood of the radio industry the question offered a rather serious problem.

The answer to this question is found in the fact that broadcasting stations are beginning to support themselves, the industry of broadcasting is beginning to find it's place, not as a parasite, not as a means of increasing radio sales, nor as a hobby for rich men and radio manufacturers, but as a legitimate means of publicity.

Better Broadcasting

Broadcasters have grown with the radio industry, even raced ahead of the development of radio merchandising lines, until today broadcasting occupies a dominant position in the field of publicity and the force of the spoken word is receiving attention from national advertisers and their advertising agencies to the extent that these same national advertisers are supporting the editorial columns of the air with advertising programs of great interest and with tremendous sales advantages. The improvement in programs that comes as a natural result of commercial broadcasting, coupled with the extension of relay station on the great broadcasting chains has brought the listening public, or the circulation of the broadcasting stations so to speak, into the millions with a radio following that is steadily growing.

The fact that these chain and commercial programs have been kept on the air in the summer months has been a great stimulus to the radio business.

We realized at the beginning of this season that radio in its fundamental has developed to the highest point of efficiency known to the art. Refinements in the already known circuits were practically all left for the engineers to work on. With circuits stabilized iittle remained for the engineering forces to work on save refinements and improvements in the quality of reproduction and betterments of the total qualities of receiving apparatus and reproducers in general.

The public demand seems to have changed almost coincident with the change in laboratory activities until today we have the public calling on the

(*Concluded on page 24*)

A DISCUSSION ON SELECTIVITY, by J. E. Anderson, appeared in RADIO WORLD, dated June 19. Sent on receipt of 15c, or start subscription with that number. RADIO WORLD, 145 W. 45th St., N. Y. C.

THE GREAT AID OF BY-PASS CONDENSERS, by John F. Rider, appeared in RADIO WORLD dated May 8. Sent on receipt of 15c, or start sub. with that number, RADIO WORLD, 145 W. 45th St., N. Y. C.

(*Concluded from page 23*)

set builder for quality. Last year distance was the prime consideration, while this season the radio set buyer seems to have made the distance qualities of the receiver he plans buying a secondary consideration, demanding however, the very best in quality of reproduction..

With the opening of the present season I predict nothing sensational from the technical side of the radio industry, but rather look to the models announced now, and others which will appear on the market in the coming year as representing improvements in appearance, refinements in quality. Developments and adaptations of principles already known to radio engineers and shown in receivers already on the market will predominate.

Architecture and the art of fine furniture making are being called upon to aid radio this season. We will have a radio season with a profusion of radio apparatus prepared for the buying public that presents most pleasing and useful designs, thus making radio more acceptable in the home, rather than the crude devices that once bore the name radio and were tolerated only by home owners in the past.

In the coming season more will be said of the value and uses of radio in musical and education circles, and its adaptions to everyday life and the needs of the householder than will be said of the romance of distance reception of the mastery of the voices in the air. Radio will never lose all it's mystery, but just as the average automobile owner is absolutely ignorant that thousands of explosions are necessary for the propulsion of his car—or knowing cares not—so we will find radio listeners in remote school districts listening to the voices of famous educators in the larger cities brought to them by radio, and while listening, gathering the vital facts these educators can bring them rather than marveling at the miracle that makes such spreading of educational facilities possible.

More and more in the months and years to come, radio will be useful in the spread of education, in the spread of knowledge and in the knitting closer together of the American public. Not only will school groups and other special classes arrange radio programs, but the casual listener in the home will find radio bringing a variety of entertainment and education to the extent that the thrill of hearing the spoken words of some international famous character will be submerged by the benefits gained from the lessons taught by the speaker.

Better Home Life

Turning from the development of broadcasting and the countless opportunities for adapting radio broadcasting to bettering the home life of the nation we find a steady stabilization in the radio industry. Radio merchants in the past who have depended on distressed stocks of merchandise find their sources of supply difficult and the outlet for distressed stocks as difficult. They have to turn their efforts towards finding quality merchandise of the highest type and toward providing the public with standard lines of apparatus which carry not only the makers guarantees, but are of proven quality and known in performance standards.

In one branch of research into radio conditions engineers are developing apparatus that eventually will provide countless untold uses for the ether.

Wholesome Level Reached by Industry

Petty Jealousies and Obstructions Swept Aside As Manufacturers Bring Radio to Its Rightful Plane As a Part of Big Business.

By Eric H. Palmer

Radio as an industry has found its proper level,—rather, reached its just height, and that is at the very top of Big Business in America, in annual turnover, prosperity, stability and service.

That can be the only interpretation if recent developments within the industry. That is the only translation into concrete terms of significant announcements coming in rapid succession: factories working overtime, jobbers behind orders, and a general spirit of cooperation all along the line, on the splendid foundation of better broadcasting and public enthusiasm. The optimistic outlook has been blazoned in every trade journal, the daily press, and by representative commercial organizations.

Daily conferences of the trade took place during the Radio World's Fair in New York City. It was a brilliant show, first of all, a marvelous advertisement for radio. The exposition elevated radio to where it belongs. It did much to demonstrate that radio has eliminated many evils within its ranks, evils that must be expected, tolerated and finally overcome, within so vast a young industry. The Radio World's Fair proved that the leaders of radio were working together as never before in a common aim, not only to increase their own material profits, but to give to the public, which expects and demands so much of an industry that is founded on romance, if there ever was one in the world's history,—a genuine bargain in every dealing.

A Record Exhibition

We saw in New York the largest exhibit ever staged by an industry under a single roof. And radio is the proverbial infant still! That eventuality was predicated on co-operation.

Radio has shaken off petty jealousies, tackled business problems in a business way, and served notice that it stood on solid rock by eliminating the duplicate show held simultaneously, at great inconvenience and expense to manufacturers and public alike. The reaction to this was instantly favorable.

The decision to hold only one annual exposition in New York—and carrying

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(*Concluded from page 25*)

out that idea without delay—meant much in arousing the industry and stimulating public attention to what was in essence the first move towards the organization of radio, a further manifestation of substantiality, that in other industries came neither so quickly nor so wisely.

Everybody marvelled at the Radio World's Fair for many reasons. It proved conclusively that the jazz stage of radio was over. Products wer not being offered with high sounding names instead of guaranteed efficiency. Sets are being marketed on simple truthful statements as to what might be expected of them. Accessories are superior and reasonably priced. Radio has become dependable. No company or individual can stay within the industry without living up to definite rules and redeem every promise. So radio this year is claiming no revolutionary changes, no cure-alls or hear-alls, but presenting equipment that meets (and more than meets) the requirements. The radio audience is obtaining better reproduction or more popular and highly artistic programs than ever before.

Because these facts are evident, attacks upon radio have fallen upon deaf ears. The public is seeking the best there is in radio confident that it represents a value beyond mere dollars.

The public has not been alarmed nor fooled by reports of chaos in the air. Changes in wavelengths have been made. Perhaps there has been a little interference here and there, but it has not created any furore. Rather, it has resulted in much experimenting in shortening aerials and other changes by the listener, addin gto his interest. He (or she) has not found the situation troublesome at all, ever since cooler weather has added a "punch" to this signals from long distance.

With marked rapidity, as such things go, radio has eradicated merchandising evils more quickly, under unbaised analysis, than its present leaders really believed possible. Not all the evils have gone, and they never will, as long as human nature and greed are what they are, but the tone of the radio industry is clean and clear.

Continued and advancing prosperity of radio has been safeguarded by wholesome, progressive, and energetic action. The trade groups, particularly, have done splendid work. It is well that this is so, for the picture will soon be complete with the passage of adequate legislation relative to broadcasting. For there is no business in which the American people are so keenly concerned, that means so much to them in entertainment and education, that presages for the country an enlightened public opinion to insure the rightful maintenance of traditional institutions, that has dealt, almost magnificently, a deathblow to ignorance on questions, political, economic, and sociological, as radio has done and will do.

New Small Rheostat

Amsco Products, Inc., has developed the "Tom Thumb" rheostat. This diminutive rheostate measures only ¼" in its greatest diameter, mounts with a single hole, and extends less than three quarters of an inch behind the panel. The "Tomb Thumb" is a concentrated rather than a reduced design, its compactness being achieved by mounting the air-cooled resistor element on the periphery. It is made in the usual resistance, 10 to 50 ohms, and in potentiometer models.

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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:
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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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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.

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

I desire to receive radio literature

Name .....

Address .....

City or town.....

State .....

F. Amendola, 1417 Pine Ave., Niagara Falls, N. Y.
L. J. White, 511 N. Jefferson, Wellington, Kans.
George W. Wright, 548 Riverside Drive, N. Y.
Stanley Zaharewicz, B. 5, Daisytown, Pa.
W. H. Southcott, 436 Henderson St., Grass Valley, Cal.
A. E. Griffith, 1735 East 69th St., Los Angeles Cal.
Walter Cromwell, 1217 Poplar St., Cincinnati, O.
Earl Murphy, 1327 Park Ave., St. Louis, Mo.
S. M. Hurd, 932 Northampton, Buffalo, N. Y.
Emmett Schnelle, 89 North 3rd Ave., Ilion, N. Y.
H. F. Swearer, 3310 Washington St., Wilmington, Del.
R. H. Maier, 540 South East Ave., Montpelier, O.
Wm. Albach, 140 Carnahan Ave., San Antonio, Tex.
P. C. Sanguinetti, 440 Gregory Ave., West Orange, N. J.
Frank C. Wagner, Holmdel, N. J.
Stuart Electric Co., Wellington, Tex. (Dealer.)
Frank Resnick, 2825 W. 17th St., Coney Island, N. Y.
G. O. Swigert, Box 114, Oxford, Kansas.
Radio Equipment Co., 624 Main St., Jonesboro, Ark. (Dealer.)

Barawik Co-operates On Specified Parts

A unique service has been inaugurated by the Barawik Company, of Chicago, one of the pioneer radio merchandising firms in the country, W. C. Johnson, in charge of this firm's out-of-town business, announced. The service constitutes a plan whereby the reader of any radio publication, immediately after the publication of an article on a new circuit, will be able to obtain from the Barawik Company the parts exactly as specified by the author.

Mr. Johnson states that this service, which has been carried on in a small way heretofore, has so been enlarged as to be immediately available to radio fans who desire to "build their own" and who wish to experiment with new hookups as soon as they appear.

The demand for parts has grown to such proportions, due to the profusion of new circuits appearing in leading radio magazines, that the fan, especially outside of the big cities, found great difficulty in obtaining the parts specified, hence the inauguration of this special service by the Barawik Company.

Mr. Johnson further states that a special 24-hour schedule has been put into effect by his firm to insure speedy service to fans out of town, thus enabling anybody, anywhere, to keep up to date on radio's newest ideas. Many fans have already written in indorsing this plan, and are taking hold of it enthusiastically.

NEW CORPORATIONS

County Electrical Suppiy and Radio Corp., Yonkers, N. Y., $50,000; E. Levy, P. Goodman, M. Kantzman. (Attorney, I. H. Taylor, 1560 Broadway, New York City.)

NAME CHANGES

Davidson Radio Corp., Brooklyn, N. Y., to Rasla Electric.

Sets Put in Factories Increase Production

Music Stimulates Workers, Makes Tasks Easier—More and Better Work Results—The Manager, Elated, Spreads Good News

The radio receiver as a business asset is fast making progress, particularly in factories, where production managers have found that music hath endearing charms of a very solid nature.

In one ladies' cloak factory in West Thirty-ninth Street, New York City, a set was installed recently, following resumption of activities, halted weeks previously by a strike. Approximately the same personnel operated the machines, trimmed the collars with fur and sewed on the buttons. The production manager discovered that the output of the factory was greater than previously. He could not fully understand the reason at the moment, for although the radio was in the back of his head as the probable cause, a sympathizer with Thomas A. Edison—who calls radio music distorted—suggested that the workers did better because they had had a long rest.

But days passed and the effect of the rest, if any effect ever existed, would have worn off, still the production per employe was greater, and growing.

The production manager finally decided that, to the best of his knowledge, the radio was the cause. He even had a speaker put in the kitchen of his home so that the maid would get done with the dishes earlier, and she did.

Thinking that he had discovered something of real value, the manager passed the good word among men who filled similar positions, and with whom he mingled at luncheon each day. As production men have to face black and white (and sometimes red) figures, they constitute an optimistic class, ready to try out new ideas, since the success of any innovation redounds greatly to their credit. Production managers in factories of other sorts, where there had been no strike, and where the effect of a rest could be only imaginative, installed sets, and they, too, found that the production increased. The result is that the radio business in the mid-section of New York City increased beyond the normal increment ascribable to an ascending season. As expected immediately that neighborhood radio stores saw their sales of sets and parts increasing beyond expectations, with deliveries made for the first time to factories, the owners or store managers started to do some thinking. Some of them hired salesmen to canvass factories and sales increased still more, especially where the salesman was able to refer to previous customers, who were eager indeed to corroborate the fact that radio reception yielded more than mere joy and entertainment—although these would be enough in themselves.

A few technical problems developed, but these were not hard to solve. Some of the factories were in steel-and-concrete buildings, hence there was some danger that loop-operated sets would not do all that was expected of them. A slight change in the hookup permitted the use of a lamp socket antenna, which is electrically but not metallically connected to the light socket or main. While an outdoor antenna was to be preferred, it was inconvenient to put one on the roof, or there were proprietary objections, so the other way was adopted or a short indoor antenna was used, and made to connect direct to grid of the first tube, or a copper screen in one of the windows was utilized as an aerial, and other means employed to solve the antenna problem.

In most factories in New York, as elsewhere in the United States, if not the world, the majority of employes is girls, spurred on to greater, and yet easier, effort by stimulating music from the broadcasting stations.

The placement of a receiver in a factory, with assurance of excellent results both from a radio and a business viewpoint, therefore has received great impetus during the past few weeks, especially as problems can be solved where they arise, and again because in less congested districts the factories are not in towering loft buildings, but lend themselves most readily to the installation of the conventional type of antenna—the single wire stretch, about 60 to 100 feet long, including leadin.

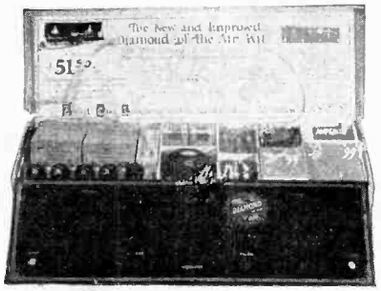
No special set is required for a factory installation, for the set that is suitable for the home also is suitable for the factory. In a very large institution, however, the addition of a power amplifier will increase the volume considerably, and satisfy requirements equivalent to those existing in a large hall or auditorium. A power amplifier usuually consists of an extra stage of audio amplification, often wired in conjunction with a B battery eliminator which enables the supply of all B current to all tubes, in the set proper and in the power amplifier, and additionally supplies the A current for heating the filament of the final power tube. —H. B.

"Bruno" UNITUNE
THE HEART OF THE CIRCUIT

Build This Set— the Standard of Merit!

THE DIAMOND OF THE AIR

For more than a year and a half the Diamond of the Air has been a favorite with fans. It works on loop or indoor or outdoor aerial.



Manufactured by the Clapp-Eastham Co.
Licensed under ARMSTRONG PATENT
No. 1,113,149 exclusively for
BRUNO RADIO CORPORATION

Complete Kit of Parts, with Blue Print, Ready to Wire, as Specified by Herman Bernard

$37.50

Send for Free Booklet. Mail Orders Filled Promptly.

Simplicity Efficiency and Beauty

UNITUNE Model 2C

This basic instrument consists of two bakelite shaft Bruno straight line frequency condensers (.0005 mfd. unless otherwise specified), mounted on an aluminum frame; a bronze panel plate and two drums, with scale. The condensers are insulated from each other..... **$11.00**

Frame, Panel-plate and Drums **$3.50**

UNITUNE Model RF

Consists of the basic condenser frame, Model 2C, and two Bruno LOW LOSS RF transformers. This combination provides two radio frequency stages and covers a wavelength of 200 to 550 meters. Price complete assembled **$17.00**

UNITUNE Model TK

This model is similar to Model RF except that the right hand condenser holds a standard BRUNO THREE-CIRCUIT TUNER. It is adaptable to a variety of circuits. Price, complete, assembled **$20.00**

UNITUNE Model BD

Consists of two condensers and two specially wound coils designed for use only in the BROWNING-DRAKE circuit. Price..... **$21.00**

UNITUNE Model CC

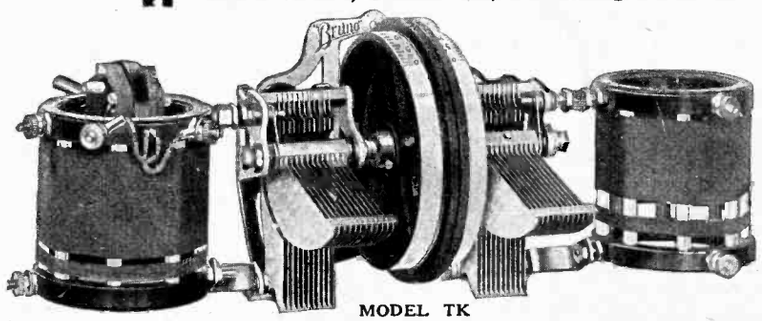
Consists of one .0005 mfd. bakelite shaft, straight line frequency condenser and a three circuit tuner on one frame, with regular Bruo drum control. Price **$12.00**

UNITUNE Model CF

Consists of 2C unit with one fixed RF coupler and special three winding coil, with fixed primary and tickler, for use in capacity feedback regenerative circuits. Price..... **$19.00**

The Bruno Unitune

The name Unitune stands for something new and beautiful in radio—two drums that actuate two Bruno bakelite shaft straight line frequency condensers, the circuit being completely assembled and mounted on a frame. A bronze panel plate goes with the unit, which sells for $11.00 (Model 2C for two .0005 mfd. or Model 2CB for two .00035 mfd.). In conjunction with the drums and dials suitable coils are procurable, already mounted, for all the popular circuits. The photograph shows the Unitune, Model TK, consisting of an RF coil and a 3-winding coil, with condensers to match; a pair of drums and a panel plate.



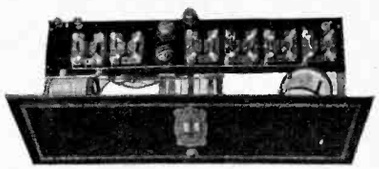
MODEL TK

Price

$20.00

THE Bernard CIRCUIT

A 6-tube set of remarkable tone quality—a set that you tune with your thumb—and you know how simple that is! Nothing more beautiful is available to the home constructor.



The official kit of parts, exactly as specified by Herman Bernard, makes it possible to build a set unsurpassed for tonal and visual beauty.

Kit

$40

The Complete Bernard

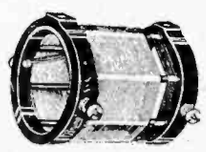
"BRUNO 99"—3-circuit Tuner, wound on Quartzite glass and specified in the Diamond of the Air.

$5.50

"BRUNO 99"—Matched R.F. Coil for the 99 Tuner. Used in the Diamond of the Air.

$3.00

Write for FREE Booklet



BROADCAST LISTENER RADIO SERVICE CORP.

Dept. R. W.
221 Fulton St.
New York City

Radio Queen's Views On Edison's Remark

By Lotta Harrauff

Queen of Radio

The statement of Thomas A. Edison that radio was losing its popularity certainly was not based on the facts of the case.

I have crossed the country from Chicago to New York four times within the last two months, twice by automobile, questioned, and talked with, received hundreds of letters from American women, and I am sure that if Mr. Edison had been with me he would not have given out that statement.

The American wife, mother and homemaker is the purchasing agent of the household today. She is a keen buyer and demands for her home full value in all her purchasing. She wants the latest in everything, and she is no longer satisfied with a music box that simply repeats to her the one song of some artist, and requires her to spend from the family purse fifty cents to a dollar for each new program, but in turning her interest to the radio, which not only gives her the best in music and the greatest artists of the modern day, but gives her a repertoire unexcelled.

In addition, radio brings her everything in which the modern mother and homemaker is interested. It assists her in her work, her social life, and I firmly believe, after a careful canvass of the situation, that radio is the greatest factor of the modern age in assisting and lightening the burden of the American wife, mother and homemaker.

Radio today is only in its infancy, and from the fact that a very satisfactory radio may be bought for less than half of what a good phonograph could be purchased, means that in just a few years each home that could afford a phonograph will have a radio that will bring into the home the world's activities to interest every member of the family, and thereby mother will have her family interested in the home, and they will be more with her; the attractions of the outside world will be less, and thus the radio will bring them back to the fireside and re-establish the old-fashioned family which is the foundation of the Nation.

As you train the young folks, you build citizens. Young folks trained in the old-fashioned homes make better citizens.

SHORT WAVES FOR REBROADCASTING ONLY

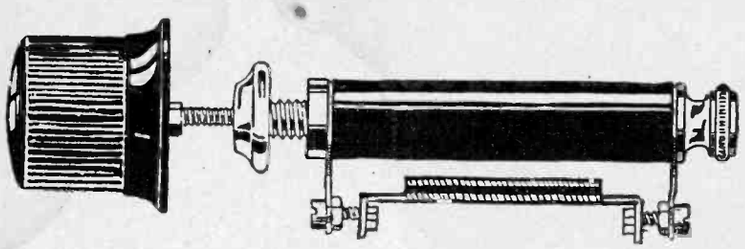
Short-wave broadcasting, rebroadcasting, chain tie-ups and point to point traffic in short waves offer many knotty problems for the engineers, yet like all other problems that have confronted the scientists of the art the difficulties are falling away one by one and without doubt before many months pass the present neglected frequencies will be in almost daily use.

In developing the shorter waves, however, it is believed there will never be found any necessity for a change in the band set aside for broadcasting. Listeners may count on improved broadcasting because of rebroadcasting chains where short waves are used for the connections between stations, but they will not be forced to go into the short waves to hear the best of programs.

Announcing the

NEW BRETWOOD VARIABLE GRID LEAK WITH CONDENSER ATTACHED

This Combination Instrument Used in *Bernard* **The Handsome Set of Rich Tone Quality**



The New Bretwood Variable Grid Leak with Condenser Attached, Price $2.00

Guaranteed Precision Range, ¼ to 10 megohms.

Let the Best Be None Too Good for You!

Connect a BRETWOOD Variable Grid Leak in the detector circuit of your set and turn the knob until the signals clear up beautifully.

Use a BRETWOOD Variable Grid Leak across your last stage audio transformer, or put one in place of the fixed leak in the final grid of impedance or resistance coupled audio. Turn the knob and note the amazing improvement in quality.

In any circuit where a grid leak has to be used its value in ohms is important. Conditions differ in individual circuits and with different equipment. Experts cannot specify definite values that are applicable to all cases. The variable leak takes the guesswork out of the grid circuit, and the BRETWOOD is the best for the purpose. "It Does the Trick!"

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NEW YORK CITY

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