

SEPT. 2

1933

15c

# RADIO

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# WORLD

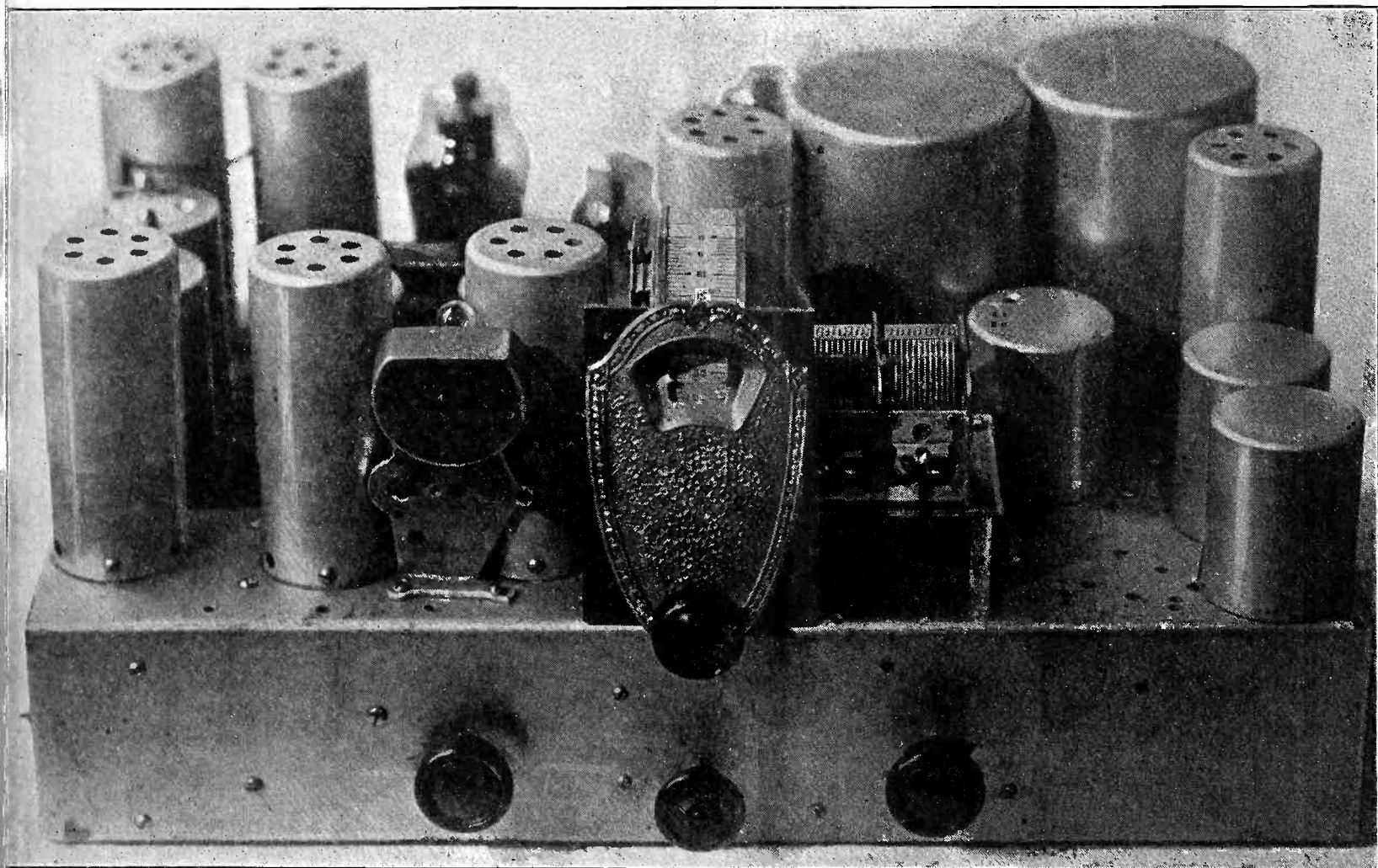
The First and Only National Radio Weekly  
*Twelfth Year*      *597th Consecutive Issue*

## FINAL NRA CODE IN FULL

### 2-to-1 Frequency Ratio for Short Waves

### Universal Set Hints

# ALL-WAVE D-C SET



A 10-tube superheterodyne, 540 kc to 30 mgc, using a switch, and operating from the 110-volt d-c line. See page 8.

**Received VK3ME Melbourne, AUSTRALIA**

**on the POWERTONE  
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Short Wave Receiver**

*As Described in this Issue of  
RADIO WORLD by Herman Cosman*



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All the receiver tubes, and some others, under the following groups: Detectors and Amplifiers, Power Amplifiers, Rectifiers, Phototubes, Regulators. Two full pages, also page of descriptive text. In Radio World of April 1, 1933. 15c a copy, or send \$1.00 for trial subscription of 8 weeks, including April 1. Radio World, 145 W. 45th St., New York City.

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# RADIO WORLD

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# FREQUENCY RATIO OF 2 in a Short-Wave Switch-Type Set

By Herman Bernard

IN short-wave reception there is more and more crowding as the frequencies become higher, and this is almost inevitable, since to make the spread in frequencies the same throughout the bands would require many coils and also a discouraging profusion of padding.

The worst case of crowding results when a receiver is of the so-called all-wave type, using the same condenser, as the broadcast band is included and has to be taken care of without any switching when covering it, due to popular requirement.

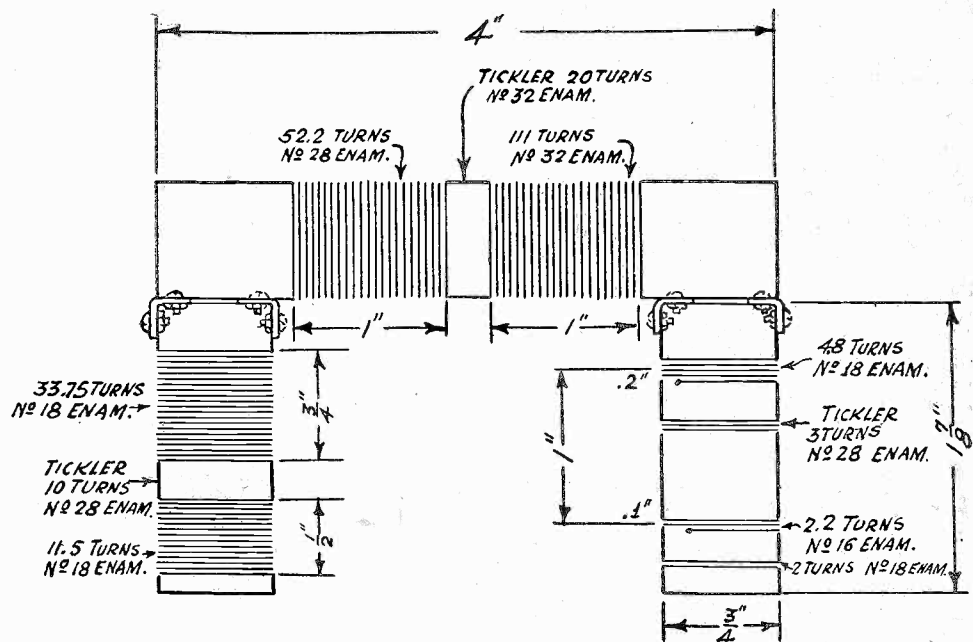
The next step is the short-wave receiver that has the usual condensers of around 0.00014 mfd., with no provision for reducing the maximum tuning capacity. This is about in the same class as the all-wave receiver.

To help atone for such conditions band-spreading is used, with parallel manual condensers cut in, so that the frequencies are lowered, but can not be raised, in respect to the starting point. This has advantages, although the ratio of inductance to capacity becomes rather low, whereas it should be as high as possible.

## 2-to-1 Frequency Ratio

Most sets use plug-in coils, four for each tuned stage, to cover from about 1,500 to 30,000 kc, and the condensers are 0.00014 mfd. to keep down the number of coils.

If switching is used, then an increase in the number of coils is not material. There need be only enough switch points to cover the coil requirements. The tuning capacity may be nearly half of the normal. Thus the frequency ratio is reduced. It may well be selected at 2-to-1, and then it is easy to calibrate the dial for one range and have that calibration hold, with applied multiples, to the other ranges. If the dial is frequency-calibrated, the bars need be only extended, and the multiple frequencies written in. Thus, with a 2-to-1 ratio the extreme frequencies would be: 1,500 and 3,000; 3,000 and 6,000; 6,000 and 12,000; 12,000 and 24,000; 24,000 and 48,000 kc. The low-frequency calibration would be multiplied by 2, 4, 8, 16



Coil assembly and turns data for a switch type short-wave set, using one tuned circuit and regeneration. In two instances one tickler is made to serve two coils, but the polarities of the secondaries would have to be reversed because of the phase shift due to the equivalent difference in the tickler location respecting the two coils concerned. Otherwise one secondary served by one tickler should be wound reverse to the other secondary served by the same tickler.

and 32. That is what is meant by the multiples. One scale would suffice, and one could refer to a chart to obtain integral multiples. Or the scale could be extended radially, as suggested, and the frequencies imprinted on six tiers, using a wide scale, of course, and then the dial would be direct-reading in an instantaneous sense for all bands.

## Inductance Values

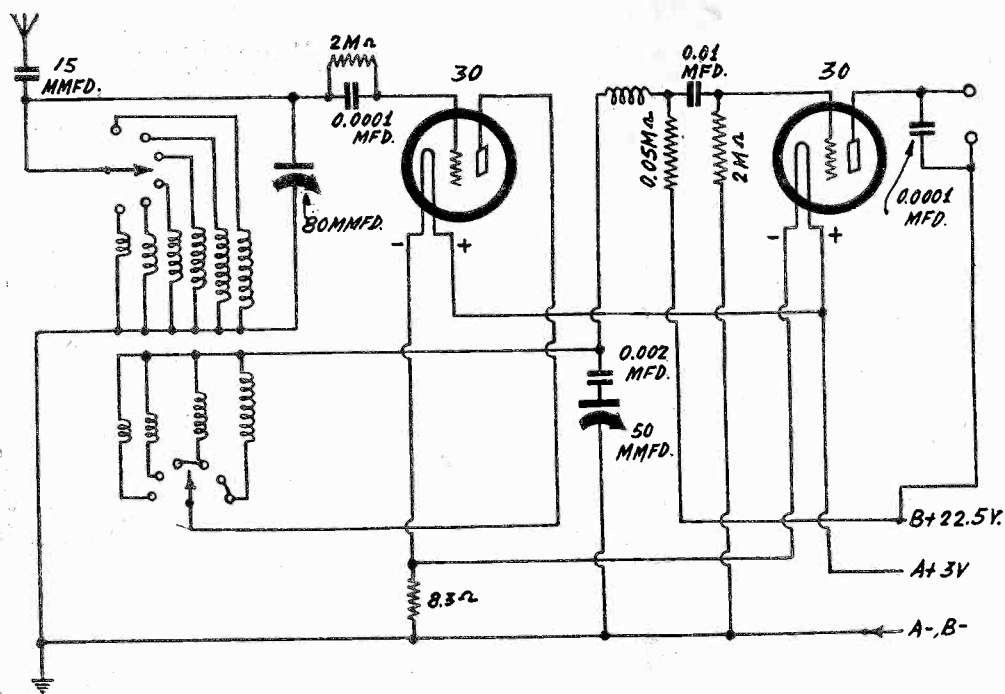
Note, also, that by the system suggested there is an approach to band-spreading

throughout, but not quite successful, because at the higher frequencies there would be crowding. Yet if more coils are not objectionable the frequency ratio could be reduced to 1.5, requiring nine coils, and of course a switch to match. But the present intention is to develop the idea along the lines of a frequency ratio of 2.

We need know the inductance for only one range and then can compute it very simply for the other ranges, since the

(Continued on next page)





**A two-tube short-wave earphone set, using the coil system previously illustrated, and discussed in detail in the text. There are six tuned windings, called secondaries for convenience, and three ticklers, as the two smallest coils have a tickler apiece, and two ticklers serve the four other tuned coils.**

(Continued from preceding page)  
inductance ratio is the reciprocal of the capacity ratio. To get a frequency ratio of 2 the capacity ratio (maximum to minimum of the tuning condenser) must be the square of 2, or 4, so if we know the inductance for the lowest frequency band we know the other inductance values, as they are the reciprocal of 4, or one-fourth.

#### Winding Data

We have to select some capacity values so let us assume a minimum of 20 mmfd., made possible if the series antenna condenser (the effect of which is to shunt the tuning condenser) is less than 20 mmfd. The maximum capacity would have to be 80 mmfd. To reach 1,500 kc with 80 mmfd. requires an inductance of 140.8 microhenries, and so the other inductance values would be 35.2, 8.8, etc., microhenries, dividing the previous inductance value by 4 each time.

The number of turns of different wire

sizes and insulation types for such wires, for any diameters, may be obtained from Edward M. Shiepe's book, "The Inductance Authority," which reduces all this information to curves, so that no computation is required. Thus the coil system may be worked out for different values of condenser and, if desired, for additional frequency ranges.

The winding data for the coils, 80 mmfd. maximum capacity for tuning, form diameter 0.75 inch, are as follow:

Coil No.	Frequency Range Mgc.	Inductance	No. Turns	Winding Space
1	1.5 to 3	140.8	111; 32 en.	1"
2	3 to 6	35.2	58.2; 28 en.	1"
3	6 to 12	8.8	33.75; 18 en.	3/4"
4	12 to 24	2.2	11.5; 18 en.	1/2"
5	24 to 48	0.56	4.8; 18 en.	1/4"
6	48 to 96	0.14	2.2; 18 en.	1/8"

The coils are numbered in the ascending order of frequency. The frequency range is in megacycles and should be multiplied by 1,000 to attain kilocycle

values. The inductance is the accurate value, no shielding assumed, and is not merely the "current sheet inductance." The number of turns refers to close winding. The winding space is the amount of axial length taken up by the winding.

#### Ticklers

The inductance values refer to the tuned coil. There is no primary, as aerial is connected to the grid through the small series condenser. The ticklers in general have about one-quarter the number of turns on the secondaries, except for the highest frequencies, when the tickler may have as many turns as the secondary. Also, it is practical to use one tickler for two bands. This is illustrated in two instances of the coil assembly that leaves room for most switch types now on the market, as 2.25 inches will clear most of them as to width.

Naturally, where switching is used, the fewer the tuned circuits the greater the simplicity. Therefore a circuit is shown for battery use, earphone reception, with the coil system as explained.

As has been stated, the frequency ratio does not change, and all true band-spread depends on such ratio change. However, it is unhandy to have band-spread not related to calibration, and the same general condition obtains, that the spread is not so good for the highest frequencies.

The frequency ratio of 1.5 would require a capacity ratio of 2.25, so if the minimum were 20 the maximum should be 45 mmfd. If the commercial type 50 mmfd. condenser is used, the ratio would prevail if the minimum capacity were raised a bit to 22.2 mmfd. (very nearly), and the low-frequency inductance required would be 220 microhenries. Since the ratio is 1.5 the inductance for each succeeding stage is two-thirds.

## Short-Wave Sets, Metal Tubes, at London Fair

London

Low-powered short-wave transmitters and receivers were featured at the radio exhibition. There were nearly ten miles of booth frontage. Dynamic speakers, Class B amplifiers and unbreakable tubes were exhibited.

The new tubes, made by Osram G. E. C. Lamp Company, are all-metal and called Catkins.

## Handy Manual Gives Money-Making Aids

"Handy Servicemen's Manual" is the title of a 25c book published by Try-Mo Radio Corporation, 85 Cortlandt Street, New York City. The book information is intended to aid servicemen and others to make money. Besides the suggestions for modes of attack, it also contains information of general practical use, including hookups, for ohmmeters, condenser meters, transmitters, sound appliances, etc. The volume appears in its so-called 1934 edition.

#### FEEDBACK IN NOVEL WAY

In battery-operated one-tube test oscillators, sometimes the desired coil is not at hand, for instance tickler may be lacking. However, suppose the coil has a tap. A simple solution to provide oscillation is to ground the coil tap (equivalent to A minus usually, though sometimes A plus), and then connect the terminal of the small winding to B minus. In other words, B minus does not connect directly to the A battery but indirectly, through the feedback section of the winding.

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Readers desiring radio literature from manufacturers and jobbers should send a request for publication of their name and address. Address Literature Editor, RADIO WORLD, 145 West 45th Street, New York, N. Y.

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#### CONDENSER "MIKE" POWER SUPPLY

The Shure Model 41A power supply, manufactured by the Shure Brothers Company, 215 West Huron St., Chicago, is now available for condenser microphones. A special rectifier circuit converts a.c. from commercial circuits into filtered d.c. for both filament and plate circuits of the head amplifier. The equipment weighs 12 pounds.

#### STABILITY AND HARMONICS

The instability of oscillators has been recently associated with the presence of harmonics. Get rid of the harmonics and the frequency-stability is said to be complete. This would require a linear oscillator, as prevention of the generation of harmonics should be accomplished, rather than mere suppression of communication externally of harmonics already produced.



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## Pilot Lamp Burns Out

IN A D-C SET that I am building I have inserted a pilot lamp in series with the heaters, but it gets too bright, and does not last long. Will you please tell me what to do?—H. C. S.

The current of 300 milliamperes or more passed through the pilot lamp is too much. Therefore a resistor should be put across the pilot lamp, whereby the resistor will carry part of the current, preferably around half. Pilot lamps have different current requirements, but none commercially obtainable takes less than 150 milliamperes, and the more usual types take around 200 milliamperes, but will be bright enough at somewhat less than that. A resistance of 10 ohms is commonly used in parallel with the pilot lamp.

\* \* \*

## D-C Set Precaution

IS THERE ANY SAFEGUARD against the use of wrong polarity in a d-c set using electrolytic condensers? I am afraid that the condensers may blow if the positive voltage is applied where the negative should be. How can I determine the line polarity?—L. S.

One way is to have a relay that is thrown by the reverse current, but this is seldom used. The polarity of the line may be determined with a suitable voltmeter (range exceeding 110 volts). The meter terminals are marked plus and minus, or one is marked plus, the minus unmarked. The polarity of the line is the same as that of the meter terminals when the meter needle deflects to the right, that is, in the correct direction. It would be well to test the outlets for polarity

and put on a red paint dot to denote positive, and engrave the positive prong of the line plug in the set's cable, informing all members of the household that the plug must be connected into outlets only one way, and informing them what that way is.

\* \* \*

## Batteries and Frequency Stability

I HAVE READ in a Bureau of Standards publication ("Radio Instruments and Measurements") that it is quite easy to attain high values of accuracy, around 0.1 per cent, in an oscillator, using batteries. The circuits shown are simple and familiar ones, with no attempt at frequency stabilization. Since there has been so much work done on frequency-stabilized oscillators, will not the use of batteries solve the problem, as the Bureau intimates?—J. H.

No, the use of batteries is no solution, particularly since most of the frequency-stabilization work refers to battery-operated circuits. The Bureau of Standards publication set forth that the accuracy could be of the order named, but implied that the terminal voltages had to be kept constant. It specifically pointed out that if two tubes are used from the same A source, the insertion of the second would change the voltage and thus upset the calibration, hence recommended a separate A source for each tube. Frequency-stabilization is the maintenance of the calibration despite these voltage changes, provided they are not enormous. The circuits shown in the Bureau's publication are unstable. That is proved by the fact that the terminal (battery) voltages must not be varied even a little.

## Loudspeaker Network

HOW CAN MEASUREMENT be made of receiver performance without the speaker in the circuit? Are there constants available?—K. C. S.

A network is used that is intended to approximate the loudspeaker characteristic. It is not pretended that this represents even the average, but it is a suitable basis for running tests, and is widely used. An inductance of 0.9 henry is in series with a non-inductive resistor, the total d-c resistance, coil and resistor, being 180 ohms. Therefore if the coil d-c resistance is 30 ohms the series resistor is 150 ohms. The free end of the resistor goes to the B plus connection, the free end of the coil to a stopping condenser. A vacuum tube voltmeter is connected between the free side of the condenser and B plus. The value of the stopping condenser for 5,000-ohm VTVM load is 0.45 mfd. and for 2,000-ohm load is 0.65 mfd.

\* \* \*

## Filters Defined

WILL YOU PLEASE give me the definitions of the various types of filters, such as low-pass, band-pass, etc.?—W. S.

A filter is a selective network designed to pass currents within a continuous band or bands of frequencies, or direct current, and substantially reduce the amplitude of undesired frequencies. A low-pass filter is a filter designed to pass currents of all frequencies below a critical or cut-off frequency and substantially reduce the amplitude of currents of all frequencies above this critical value. A high-pass filter is the reverse of a low-pass filter. A band-pass filter is a filter designed to pass currents of frequencies within a continuous band, limited by an upper and lower critical or cut-off frequency, and substantially reduce the amplitude of currents of all frequencies outside that band. A ripple filter is a low-pass filter designed to reduce the ripple current, while freely passing the direct current, from a rectifier or generator.

\* \* \*

## Audio Oscillation

IN A SET I have just completed, which includes some resistance-coupled audio, there is a steady gurgling sound that at first I thought was radio-frequency oscillation, but now I have confirmed it as being audio-frequency oscillation. It is of a low audio frequency.—K. W.

Reduce the resistance of any one of the grid leaks in the audio circuit. Sometimes it is necessary to use a resistor of very much less resistance than normally recommended to stop this oscillation. There is no reason why the low value of resistance should not be used, either, although this statement seems contrary to the general idea. If there is gurgling then there is over-accentuation of some low frequencies, or distortion in other words, and the lower resistance besides rendering the receiver satisfactorily operative also is a quality factor.

\* \* \*

## Calibration Changed

HAVING BUILT a simple detector and audio stage for measuring oscillations put in, I find that the calibration that should hold has been achieved, but does not stay put. I tried out the test oscillator I use with this out of outfit and find that now there is a somewhat different reading for every frequency. I have tried again and again and the new set of circumstances prevails.—C. B.

There has been a change either in the test oscillator or in the measuring rig. Perhaps the test oscillator condenser became displaced a bit, or the dial shifted, or either of these or other facts might be true of the testing circuit itself. Since the new set of conditions prevails, why not recalibrate on that basis, and see if the new calibration does not hold continuously, if you cannot ascertain what was displaced and thus remedy the trouble at the source?

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**Short-Wave Coil Rig**

WILL YOU PLEASE let me know how to wind coils for short-wave coverage, so that I may use them in the mixer of a superheterodyne, and have two coil forms in one shield?—P. E. S.

The rig is illustrated herewith. The oscillator windings are at left (vertical), and the secondaries are numbered 1, 2, 3 and 4, while the ticklers are T. Two ticklers will suffice, as one each may serve two windings. If there is no oscillation in one of the secondaries thus served, then reverse the connections thereto. The modulator secondaries are at right, also numbered. Secondaries 1 and 2 may have the same number of turns, for the usual intermediate frequencies (lower than 500 kc), while oscillator windings 3 and 4 would have fewer turns than the companion modulator secondaries. The intimate data can not be given, as you do not state the intermediate frequency or the capacity.

\* \* \*

**Simple Super**

CAN ENOUGH sensitivity be obtained from a simple superheterodyne of few tubes for general broadcast reception, and if so will you suggest the tubes?—J. W.

Yes, indeed. The tubes suggested are 58 r-f, 2A7 modulator-oscillator, 58 i-f, 57 detector and pentode output (2A5, 59 or 47). With an 80 rectifier you have a good five-tube set.

\* \* \*

**Oscillation Persists**

NO MATTER WHAT I try I can not get rid of oscillation in the intermediate amplifier of the superheterodyne I built. The audio is transformer-coupled, the speaker a dynamic, the B voltage on the i-f is 180 volts and the screen voltage is taken from the positive filament of the output tube (utilizing the 50-volt bias on the output tube in the opposite direction). What do you suggest?—T. R. D.

If you will omit the present screen method and put a series resistor between B plus 180 volts and the screens, and bypass both the plate and screen feeds with a large capacity, around 0.5 mfd., or more, you should get rid of the oscillation trouble, or at least reduce it greatly. The series resistor may be around 50,000 ohms. Do not take as accurate the screen voltage as you may now read it on an ordinary voltmeter, as actually the voltage will be higher than read. An r-f choke in each i-f plate lead, between the return of the winding and B plus, and bypassed by 0.002 mfd. or larger capacity, also may be used additionally if the foregoing does not constitute a complete cure, and besides the grid bias may be increased.

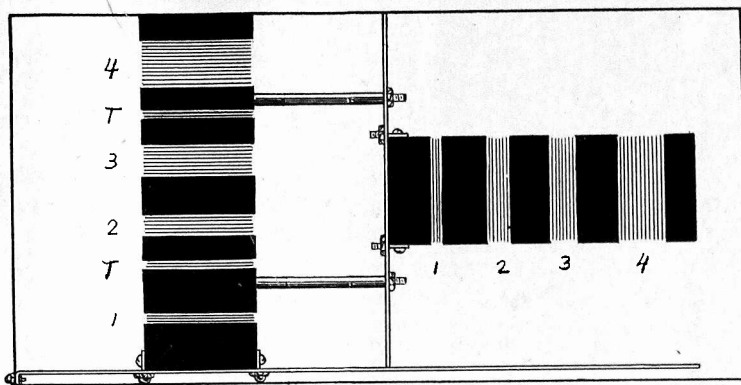
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**Audio Tests**

HOW MAY I test a radio receiver as to its audio response at the standard frequencies? Please state these frequencies.—J. L. O'C.

A radio frequency oscillator is used and is modulated 30 per cent. with an audio tone derived from any source, such as a beat oscillator. If only one audio frequency is used it is 400 cycles. The general run of frequencies for audio tests is 40, 100, 200, 400, 1,000, 2,000, 4,000 and 10,000 cycles. These should be tested also at various radio frequencies. If three radio frequencies are used they should be 600, 1,000 and 1,400 kc. If five are used they would be 600, 800, 1,000, 1,200 and 1,400 kc. The reason for the tests at selected radio frequencies (and the stated selections are standard also) is that the selectivity of the receiver may be great enough to affect the tone. The usual test is made with a speaker network, which has been described in answer to another's question. If an actual speaker is to be used, the difficult sound-pressure test is preferable, and filter networks could be introduced so that the audio would be compensated, and a perfect reproduction achieved.

**Shield assembly for mixer coils for short waves only. The coil system at left is for oscillator, the one at right for modulator. The tuned windings are 1, 2, 3 and 4. T and T are ticklers.**



**An Epic of the Air**

**A Boy's Life Ebbing, A Call for Help, A 2000-Mile Relay, A 'Plane and a Happy Ending**

Dots and dashes hurtled through the ether high above the Arctic storm. From remote Alitak, Alaska amateur radio flashed the urgent plea to save a life.

In Seattle, early that Thursday morning, Ed Stevens, operator of amateur station W7BB, heard the call for help. He engaged in conversation with the operator at Alitak, more than 1000 miles away. At lonely Lazy Bay on Kodiak Island, five-year-old Henry Loof lay near death with appendicitis.

Stevens described the little lad's symptoms to Dr. A. H. Seering of Harbor View hospital, Seattle. The physician diagnosed the case, gravely warned of the danger of peritonitis, urged that the boy be taken to a hospital at once.

"I can't reach Anchorage because of bad weather," the Alitak amateur flashed back. "Please send a message to Anchorage for help," he pleaded.

Stevens called the United States Army Alaska Telegraph, which employs both wireless and cable, and the message was relayed through to Anchorage, a circuit of 2000 miles. Pilot Harry Blunt at once took off through the storm with Dr. A. S. Walkowsky.

Twice the seaplane was forced down. Twice the intrepid duo again roared into the gale. Late that afternoon they reached Lazy Bay, 400 miles from Anchorage. They were just in time to save the little boy's life.

**KEEPING THE SOLDERING IRON CLEAN ALL DAY**

Quite a few readers work at radio and thus keep a soldering iron going all day. Even if they work in a set factory they most likely have to supply their own irons. The tip of the iron should be protected from becoming pitted. Also, the tip must not become oily or slimy. Therefore it has been found after considerable experimenting that flux must be kept off the tip when the iron is not in use for

joining. This is sufficiently accomplished if the tip is wiped with a rag numerous times during the day. The real trick, not generally known, is to maintain the soldering iron at less than the temperature resulting from line voltage. Start at line voltage for quick heating, then insert a series resistor of sufficient power capacity. For a 65-watt iron a 20-ohm resistor is usually about right.

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Enclosed find \$6.00 for Radio World for one year (52 nos.) and also enter my name on the list of members of RADIO WORLD'S UNIVERSITY CLUB, which gives me free answers to radio queries for 52 ensuing weeks, and send me my number indicating membership.

Name .....

Street .....

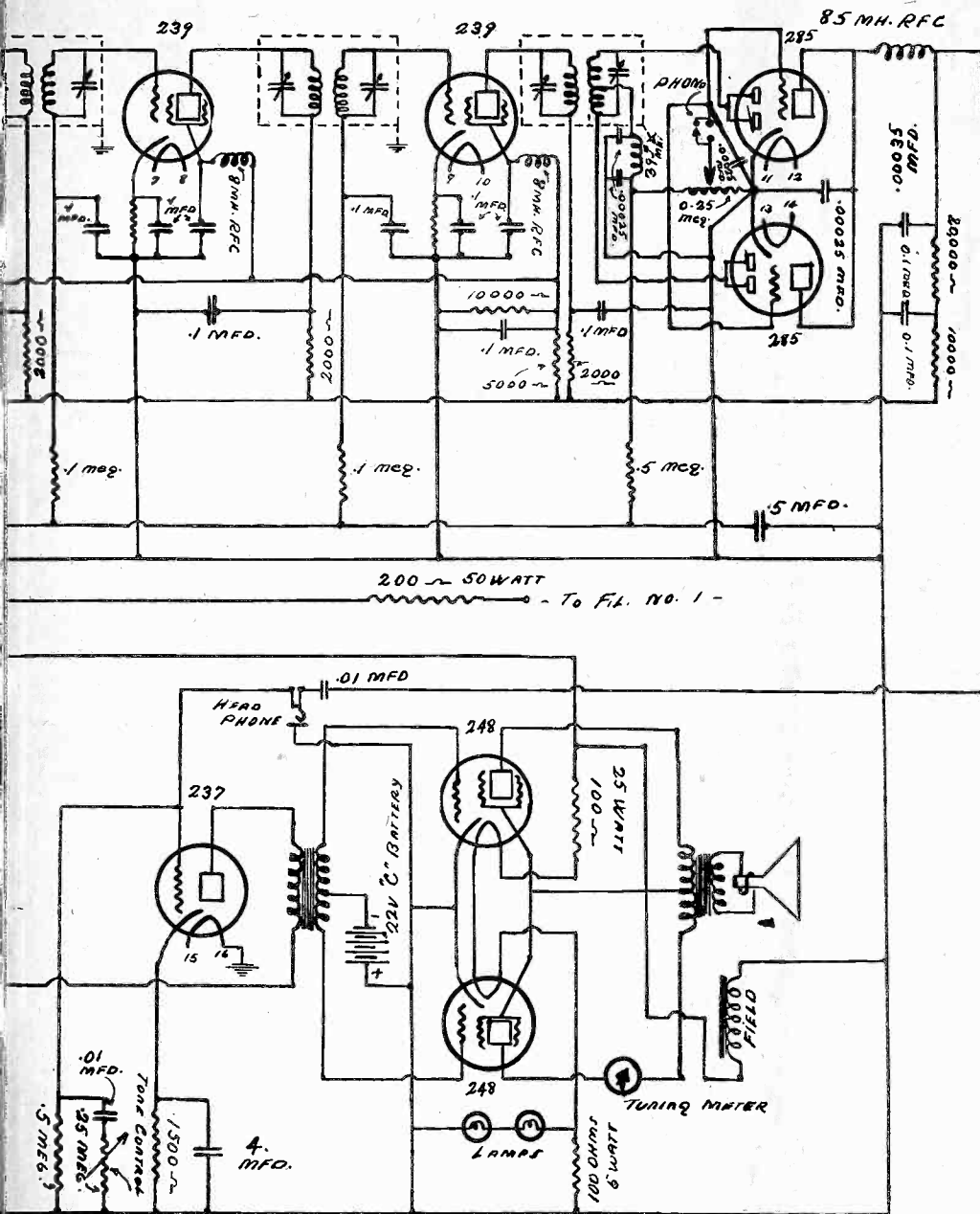
City and State.....





# D-C Superheterodyne Coils Used in Wave-Switching

**Casanova**  
Service Laboratory



## LIST OF PARTS

### Coils

- Four coils for the first two bands each in separate shielding can, as described and two modulator windings on one form and two oscillator windings on another form. (See coil data.)
- Four shielded intermediate frequency transformers picked at 420 kc.
- Four R.F.C. of 8 mh. each.
- One R.F.C. of 39 mh.
- One R.F.C. of 85 mh.
- One 30 henry B choke, d-c resistance about 300 ohms.
- One Dynamic Speaker 1,800 ohms field or any resistance up to 2,500 ohms with output transformer match for P.P. 48 with 10.5 inches diameter.

### Condensers

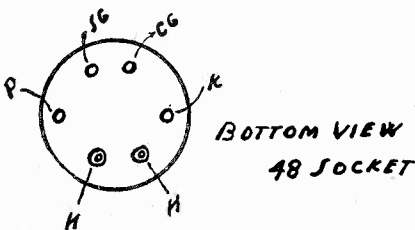
- One two-gang straight frequency line tuning condensers with trimmers.
- One .00025 grid condenser with clip.
- Six .00025 mfd. fixed condensers.
- One .02 mfd. fixed condenser.
- One .0001 mfd. fixed condenser.
- One .00005 mfd. mica fixed condenser.
- Two .01 mfd. fixed condensers.
- Four shielded blocks, each block containing three 0.1 mfd. by-pass condensers.
- Two 0.1 mfd. by-pass condensers.
- One 4 mfd. by-pass condenser.
- One 0.5 mfd. by-pass condenser.
- Two 16 mfd. electrolytic condensers.
- Two padding condensers on isolantite base 350-450 mmfd.

### Resistors

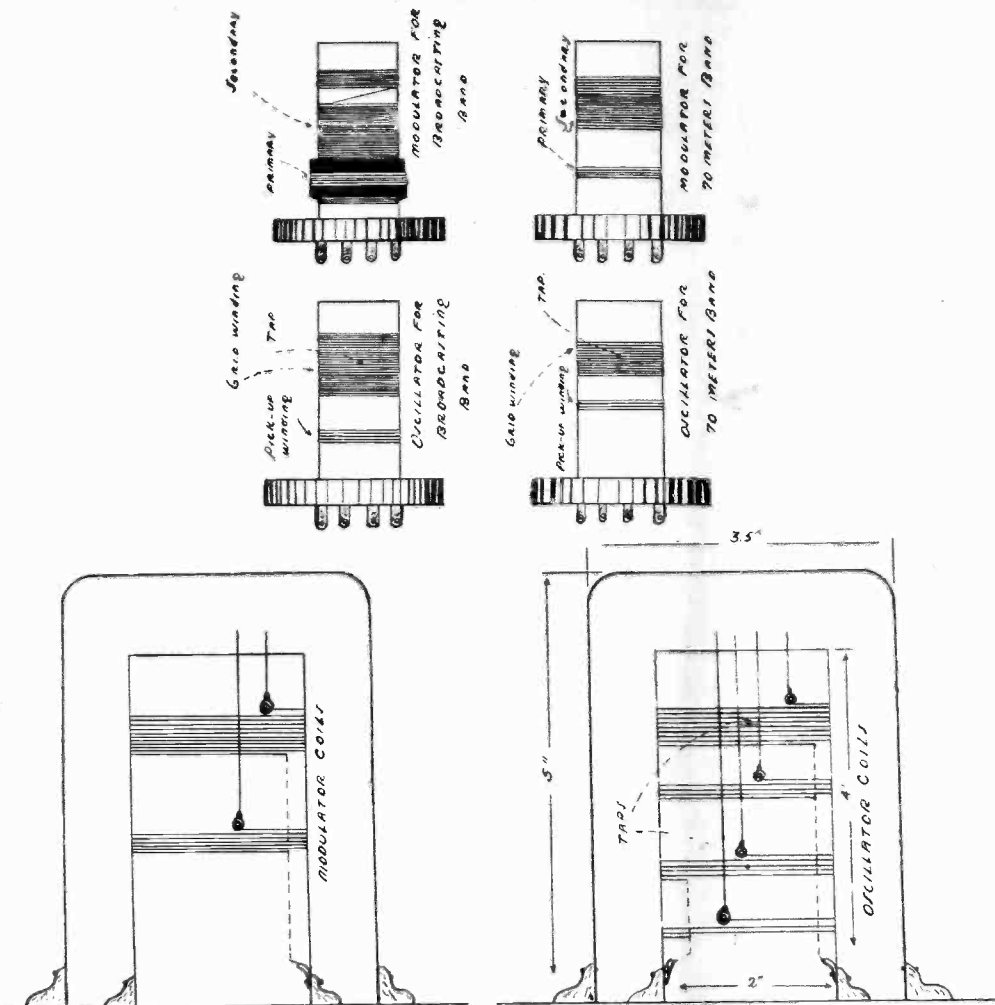
- Four .002 meg. (2,000 ohms) pigtail resistors.
- One 0.0015 meg. (1,500 ohms) pigtail resistor.
- Three 800 ohms bias resistors.
- One 0.05 meg. (50,000 ohms) pigtail resistor.
- One 0.02 meg. (20,000 ohms) pigtail resistor.
- Two 0.01 meg. (10,000 ohms) pigtail resistors.
- One 0.005 meg. (5,000 ohms) pigtail resistor.
- Three 0.5 meg. (500,000 ohms) pigtail resistors.
- Three 0.1 meg. (100,000 ohms) pigtail resistors.
- One 12,000 ohms pigtail resistor.
- One 200 ohms 25 watt resistor.
- One 100 ohms 25 watt resistor.
- One 100 ohms 5 watt resistor.
- Two 250,000 ohms potentiometers (for tone and volume control).

### Other Requirements

- One chassis 18 inches by 10 inches front to back 3/4 inches elevation.
- One drum dial.
- One 22.5 volts C battery.
- One antenna ground binding post assembly.
- 11 sockets, four six pin type and 7 UY, the extra one for the speaker plug.
- Seven tube shield.
- One five-deck four position band shifting switch.
- Two six volt pilot lights.
- One tuning meter.



switch for band-shifting, three intermediate stages, driver and 48 output in push-pull.



Four separate coil assemblies are used for the modulator and oscillator function of Bands I and II (broadcast and next highest bands). Two separate coil assemblies are used for the remaining two bands. See coil data given in detail in the text.

(Continued from preceding page)  
tact resistance is concerned, for plug-in coils are subject, more or less, to the same trouble. The only possible objection in the switching method would be the complication in the hook-up. For this receiver a switching system is used, and it has proved to be on a par with plug-in coils and the convenience for changing bands is far greater. Of course, to accomplish this a good switch should be used.

### Speaker Stands the Gaff

The use of a dynamic speaker capable of withstanding power in excess of the output tubes is recommended, for this is one important reason for the faithful reproduction. Perhaps the greatest cause of distortion and poor quality in most multi-tube receivers today using the duplex diode-triode type 85 and the duplex diode-pentode type 6B7 as well as those using 55 and 2B7 (for a-c) is overloading of the diode detector and in some instances the r-f stages. In this condition the r-f grids draw current due to positive grid swing and act as detectors. When this happens in the r-f the trouble is not so serious and could be easily checked, but when the overloading occurs in the diode, because more is put into it than it could well handle, then other complications arise. Having this in mind and because four intermediates are used in the set, it was necessary to use two duplex diode-triode type 85 tubes in parallel as full-wave diode detectors, in this way almost doubling the capability of voltage handling, avoiding overloading and preserving tone quality. Adequate filtration is advisable to keep r-f out of the amplifier unit of the 85, hence a high inductance choke of 39 millihenries is used and two fixed condensers of 0.00025 mfd. are placed from the two choke terminals to ground.

The voltage developed in the load resistance of the diode is utilized for automatic volume control and it is applied to the intermediate frequency amplifiers. Three 0.1 meg. resistors are used as part of the filter system in the a-v-c branches, being high enough to prevent any serious reduction of the effective value of the load circuit on the second detector. A 0.25 meg. potentiometer is the load resistor of the full-wave diode detectors, the moving arm being connected to the grids, so volume is controlled by the amount of voltage taken off the load.

### The D-C Circuits

There are ten tubes in the circuit in the following arrangement: one 237 oscillator, one 236 modulator, three 239 intermediate frequency amplifiers, two 85 duplex diode-triode full-wave detectors and automatic volume controls, one 237 first audio stage and two 248 output power tubes in push-pull. To hook up the filament of all these tubes some special arrangements have to be used, because only 115 volts are available from the d-c power lines and if all the heaters are connected in series, including the pilot lights, they would require 122.4 volts, hence a series parallel system was chosen. The eight tubes requiring 0.3 ampere were connected in one series with a ballast resistor of 200 ohms. The drop in this resistor is 59.6 volts, assuming the line to be 110 volts, but in most cases the d-c lines are a little higher than that and a little allowance was made to compensate for this. Any 200-ohm resistor rated at 50 watts will do, this being a very popular commercial value. In any instance these tubes will stand from 6 to 7.5 volts. The other parts of the heater circuit are the two 248's and the two pilot lights. Each of the 48's takes 30 volts and each of the pilot lights 6 volts, so 72 volts are needed. In this case a simple series circuit will not

do, for the 48 tubes require 0.4 ampere, whereas the pilot lights require only 0.3 ampere. The ballast resistor for this circuit is 100 ohms rated at 25 watts and the drop in it is 38 volts.

As the pilot lights require only 0.3 ampere we must put a shunt resistor across these lamps and adjust it so that it will take the extra 0.1 ampere. This shunt resistor is given in the diagram as 100 ohms and its dissipation is only 1.2 watts. These pilot lights are used for the dial and tuning meter and the resistor in shunt with them may be decreased in value to protect them, as all lights are not the same. When the power is first turned on the two lamps will burn brilliantly, but will dim as the tubes heat up, attaining the steady state.

### Coil Data

For the broadcasting and the 70-meter bands separate coils are used, each in shielding cans 2-1/16" x 2 1/2", on 1" diameter tubing.

#### BAND I (540 TO 1,500 KC)

R-F secondary inductance, 246 microhenries; 123 turns No. 32 enamel wire.

R-F primary inductance, 7 microhenries; 12 turns of No. 32 enamel wire wound over the secondary, on the ground end.

Oscillator: Grid winding inductance, 145 microhenries; 76 turns No. 30 enamel wire tapped at 38 turns.

Oscillator: Pick-up winding 10 turns No. 32 enamel wire wound near the bottom with a separation of about 0.25 inch from the grid winding.

#### BAND II (1,500 TO 4,285 KC)

R-F secondary inductance, 35 microhenries; 26 turns No. 30 enamel wire.

R-F primary inductance, 3.7 microhenries; 7 turns No. 30 enamel wire, wound near the bottom with a separation of 0.25 inch from the secondary.

Oscillator: Grid winding inductance, 29 microhenries; 22 turns No. 30 enamel wire tapped at 11 turns.

Oscillator: Pick-up winding 5 turns No. 30 enamel wire wound near the bottom with a separation of about 0.25 inch from the grid winding.

#### BANDS III AND IV (4,285 TO 10,000 KC, 10,000 TO 30,000 KC)

For the next two bands special coil forms should be used and large wire diameter. The four windings (two for the modulator and two for the oscillator) are on two separate coils as follows:

Outside diameter of coil forms, 2 inches.  
Length of coil forms, 4 inches.  
Aluminum shields, 3 inches diameter 5 inches high.

Two coil forms and two shields required.

Modulator: (1) inductance, 4.6 microhenries; 7.8 turns No. 18 enamel wire.

Modulator: (2) inductance, 0.7 microhenries; 2.8 turns No. 18 enamel wire.

Separation between these two coils must be about 1 inch.

Oscillator: (1) inductance, 4.1 microhenries; 7 turns No. 18 enamel wire.

Oscillator: (2) inductance, 0.7 microhenries; 2.8 turns No. 18 enamel wire.

Oscillator: (1) pick-up winding 3 turns No. 18 enamel wire wound on the ground end with a separation of about 0.5 inch.

Oscillator: (2) pick-up winding 2 turns No. 18 enamel wire wound on the ground end with a separation of 0.5 inch or more.

### Padding Considerations

It will be noticed from the coil winding data that the inductances for the two smallest coils are the same for the modulator and oscillator purposes, and this is satisfactory because padding for the broadcasting band has been done in such a way that the small trimmer condenser across the oscillator main tuning capacitance is set almost at minimum capacity while the modulator is near maximum, raising in this way the oscillator

frequency over the modulator in the short-wave bands and at the same time reducing the minimum capacity of the oscillator tuning condenser, which is a most important factor if we want to dip to frequencies equivalent to about 10 meters (30,000 kc).

The modulator for the broadcasting band tunes from 540 to little over 1,500 kc and to cover this band of frequencies with 420 kc intermediate the oscillator has to tune from 960 to 1,920 kc. The two tuning condensers (0.00035 mfd.) are ganged, therefore the oscillator will have to be padded. A commercial type of padding condenser 350-450 mmfd. will serve the purpose. The tuning range of the modulator for the second band is from 1,500 to 4,285 kc while the oscillator has to tune to frequencies 420 kc higher or 1,920 or 4,705 kc. The same type of padding condenser may be used for this band. The range of the next band (third coil) is from 4,285 to over 10,000 kc, while the smallest coil will dip to frequencies equivalent to about 10 meters if special care is exercised in the layout of parts and wiring, because some uncertainties affect this end of the spectrum and they have to do with many factors, including position of wires, switch capacity, condenser minimum capacity, etc. Care should be taken, when making the padding for the broadcasting band, that the small trimmer condenser across the oscillator tuning capacity, is set almost at minimum, if we want to reach 30,000 kc.

### Broadcast Line-up

Do not attempt to wire in the switch and all the coils at first, but be content to get the set working satisfactorily on the broadcast band before proceeding to higher frequencies. Once you get the receiver working, the adjustment of the padding can be done in the regular way.

That is, the circuit is first adjusted at about 1,450 kc by setting the main tuning condensers at about 92 on the dial and then tuning in the signal by means of the trimmers on the two tuning condensers sections. (This dial setting for that frequency is recommended only if the same dial, capacity and inductance are used.)

Then the circuit is converted to a t-r-f set and a signal of about 600 kc is tuned in and the dial setting noted, then without touching the tuning condensers the circuit is restored to a superheterodyne and the same 600 kc signal is tuned in with the padding condenser Cp-1 (Cp-2 for the second band) till it comes in the same setting.

This adjustment is best done by using a modulated signal from a laboratory oscillator, but in the absence of such an oscillator the padding may be done on any signal that can be brought in around that frequency.

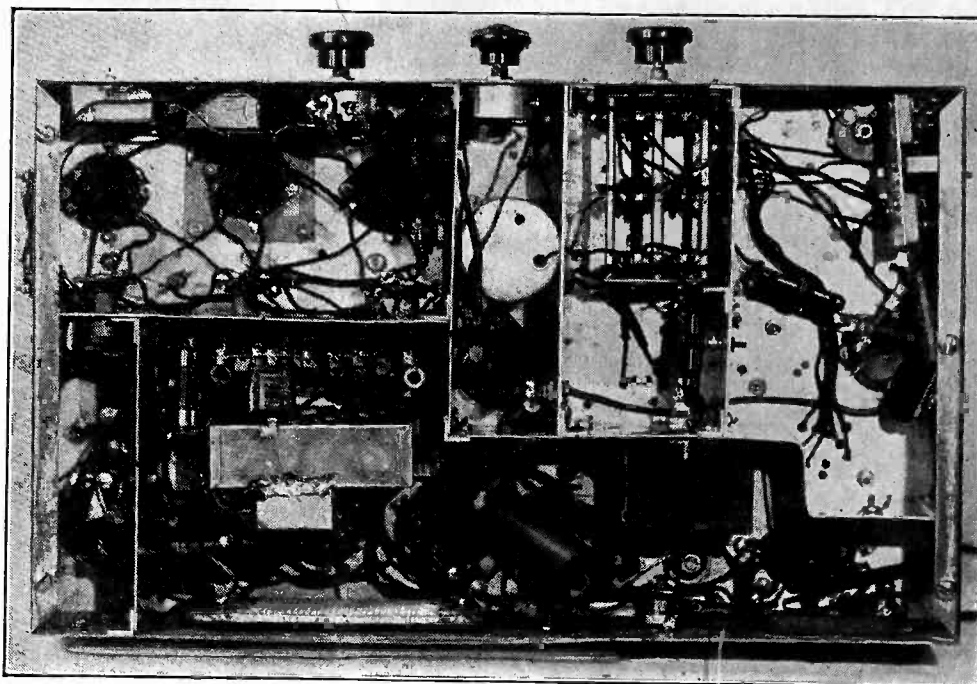
If the padding was done right both circuits will track throughout the band and the sensitivity will be the same in both extremes.

If reception is weak with many squeals and a mushy sound throughout, this is an indication that the intermediate channel is oscillating.

The same method may be used when padding for the second band.

### Filtration of B Feed

The B supply must be well filtered, for in short waves particularly this is important. There is one 16 mfd. electrolytic condenser connected in each side of the filter choke and the B supply for all the plate currents are passed through this choke, except the power tubes that gets the plate voltage directly from the line, it being only filtered by the first 16 mfd. condenser. Each intermediate tube has a resistor of 2,000 ohms by-passed by a 0.1 mfd. condenser and each screen grid an r-f choke of 8 millihenries with a 0.1 mfd. by-pass condenser. It will be no-



Underneath view of the wired receiver. Brackets and shields create five compartments.

ticed that each of these tubes have a separate bias resistor shunted by a 0.1 mfd. condenser, all this filtering being necessary to avoid undesirable coupling between the different circuits that will affect the stability of the set. It is not prac-

tical to pass the plate supply of the 48's through the filter choke, due to the high plate current of these tubes, unless a very "heavy" choke is used. A 22.5 volts "C" battery supplies the bias for the power tubes.

## TRADIOGRAMS

By J. Murray Barron

Already higher price tags are beginning to show in the radio retail stores and some of the mail order firms have sent out flyers announcing an increase in prices. Naturally those co-operating under the NRA, with shorter hours, added help and higher wages will find the cost of business higher and this is carried out right down to the source of the raw material, so inasmuch as profits do not warrant taking this additional cost out of the business, it must become a part of the operating expense. However, there is no need to try to make capital out of the situation and add a margin on the price tags of merchandise bought before the event of the NRA.

\* \* \*

Pierce Airo, Inc., 512 Sixth Ave., New York City, announces a new motor car radio. New models in the DeWald No. 61 are in production now. The Motortone embraces new features. Literature may be had by addressing the organization direct.

\* \* \*

The radio experimenter and home constructor should now come into his own in the matter of purchasing radio parts and the finished set. That more people will have more money to spend this Fall and Winter can hardly be safely denied, for already most of us know of many who are now in that position already and as the majority of folk really enjoys spending money it should not be out of order to assume that the radio business will get its share. However as prices will be higher one will naturally be more particular as to purchases and rightfully so. What could be more fitting than to patronize the better-type retailer and mail order houses and to avoid the "gyp," the substituter and any whose signs or advertising are not absolutely clear and understandable. Let that type of radio

organization disappear with the depression. One should not only avoid them, but warn others against them.

\* \* \*

Although radio receivers may be had to-day in about any combination of tubes or source of supply and variety of design, the days of set construction are by no means over, but there is a large number who not only buy kits and build both for themselves and others, but is constantly seeking new circuits and kits for further construction. There is a considerable market for kits, as testified by those who now supply them. Home constructors and others should find a ready market for custom-built radio receivers in their own communities.

\* \* \*

Those who may want to install an automobile set in their car and will want something satisfactory, it would be well carefully to consider just what one wants and not be lead astray by even nationally-known names. Some who have bought various types of auto receivers that came from the factory of big organizations have been terribly disappointed at results, including the effect on the operation of the car. The capacity of the set and what it will actually do is the first essential. If it actually performs well and the material is high-grade, the name plate is secondary. You must have power behind it. This is also one of the reasons so many like to build their own or have it built for them. A well-designed circuit of the superheterodyne class is meeting with favor and kits are sought eagerly by constructors. A receiver of this type was installed in a car that just recently returned from a 3,000-mile tour, including Canada and the World's Fair at Chicago, and throughout the trip New York City was picked up with excellent volume.



## WORLD MOVING TO TELEVISION; BIG PROGRESS

At all the radio shows, or scientific conventions affecting radio, wherever held throughout the world's leading centers, evidence is presented of the advance of television. The results are almost unanimously reported to be excellent, thus giving weight to the general impression that economic conditions, rather than backwardness of development, are holding up commercial television.

The latest development is that in Germany, exhibited at the radio show at the Kaiserdamm Fairgrounds, Berlin. The previous 90 lines per picture have been doubled, and the picture size has been increased to a square 15 centimeters on each side, or about 6x6 inches. There are 25 pictures per second, or 45,000 lines per second.

### Improved Detail

The doubling of the number of lines increases the detail, while the light source has been so improved that the enlargement provides as much unit illumination as did the smaller-sized pictures of the past.

The tendency in the United States is to use 24 pictures per second in the newer developments, to coincide with the picture frequency of the movies, especially as movie film may become an important factor in television, with sound on film. Moreover, 120-line pictures are common in the improved methods, and it has been stated that there is no reason why the number can not be increased.

Of outstanding importance in television was the recent announcement by Vladimir Zworykin, of RCA Victor Laboratories, of electrical scanning at the transmission end. A cathode ray tube is used, but instead of the fluorescent screen there is an area comprising 3,000,000 photo-cells. The companion apparatus is a fluorescent screen tube at the receiving end.

### No Moving Parts

Thus all mechanical means are dispensed with. In foreign countries, while some work has been done on electric methods, the mechanical ones are in the ascendency, and these were the type demonstrated recently in Berlin.

Several German scientists have made important contributions to television and at least one of them, Baron Wilfred von Ardenne, has made some progress with electric scanning at the receiving end.

In the United States RCA Victor, Philco, several colleges, and a few broadcasting stations and commercial concerns have been doing television experimental work. The trend is toward the use of the ultra frequencies for carriers, as then the required wide band width can be accommodated, and also sight and sound may be transmitted in the same wide channel.

### A THOUGHT FOR THE WEEK

**STATION WBNX** announced that its program presented on August 21, consisted of "vital statistics, such as births, deaths, marriages and confirmations" and "the latest shrieks in shrouds, coffins and layettes." Further information was to the effect that "So far as we know, this is the only program of its kind presented over the radio."

*We sincerely hope so!*

## CBS Enacts 'Don'ts' for Its Announcers

The Columbia Broadcasting System has promulgated rules for announcers, including the following:

"After a speech has been given over the network, do not turn to the speaker and say: 'Thank you, Mr. So-and-So' or 'We appreciate your having spoken' or any comment of that nature.

"Rather, make just a straight announcement of what has been on the air. In other words, 'You have just listened to Mr. So-and-So talking on such-and-such a subject,' without any additions such as 'the brilliant talk of' or the 'the interesting address of' or anything else.

"Avoid the use of such phrases as 'You have been enjoying the music of' or 'You are being entertained by.' Nor should you say: 'We hope you have enjoyed so-and-so as much as we have here in the studio.'"

## WSB IS READY FOR ITS 50 KW

Atlanta, Ga.—WSB, Dixie's first broadcasting station, will dedicate its new 50,000-watt transmitter Saturday evening, September 9th, with an elaborate program of entertainment furnished by the National Broadcasting Company. The dedicatory program will continue from 9 to 10 p.m., Central Standard Time, and will bring many celebrated artists before the microphone.

WSB first went on the air March 15th, 1922 with a 100-watt transmitter. The station's power has been increased five times. WSB now takes its place with the leading super-power stations in the United States. The station is owned and operated by "The Atlanta Journal."

Lambdin Kay, general manager of WSB, has directed the station's activities since its earliest days and is at present a member of the board of directors of the National Association of Broadcasters.

As the first broadcasting station in the South and the second newspaper-owned broadcasting station in America, WSB is credited with many innovations. It was the first station to adopt a slogan—"The Voice of the South"—and was the first to use chimes as a means of identification in addition to the call letters. "The WSB Radi-owls" was the first radio club of the air and the "Transcontinental Broadcast," at 10:45 p.m., was the first late night broadcast regularly scheduled by any American broadcaster.

## Business Periodical Added to Radio List

"Radio Business," a weekly publication devoted to the commercial aspects of radio, made its first appearance with the August 19th issue, consisting of 16 pages, 9 $\frac{1}{4}$ x12 inches, four columns to a text page. News about stations, sponsors, performers and advertising agencies is featured.

The paper is published by Radio Business, Inc., 310 East Forty-fourth St., New York, N. Y. The personnel follows: H. P. Brown, editor; H. E. Tillotson, general manager; Harold E. Tillotson, president; Harold P. Brown, treasurer; Bernard L. Miller, secretary. Trudy Schweitzer, Henry V. Walker, Ainslie Harris and Florence Aaronson, staff.

## AIR NOTABLES IN NEW GROUP ASSISTING NRA

Kate Smith, singer of popular songs, has been appointed head of a committee of seven stars of the entertainment world to mobilize the talent of radio, screen, theatre and concert fields in a nationwide cooperative effort to aid the campaign of the National Recovery Administration.

Miss Smith received her appointment from Louis J. Alber, Chief of the Speakers' Bureau of the National Recovery Administration, as chairman of the group, which includes Dr. Walter Damrosch, Marion Davies, Otis Skinner, Lawrence Tibbett, Rudy Vallee and Peggy Wood. The group will be officially known as the NRA Committee of Radio, Screen and Stage, and will maintain headquarters at the Waldorf-Astoria Hotel in New York City.

### On Tap for a Call

The committee will be part of the NRA national organization and will function under the Speakers' Division. Every actor and entertainer in the United States, every singer and orchestra conductor will be asked by the committee to become part of its organization and will be card-indexed as to his or her availability at any moment for duty at NRA radio broadcasts or mass meetings.

Behind the "Four Minute Men" of the Speakers' Division will be ranged the powerful support of artists of the entertainment world who have risen to success through their ability to capture and hold the attention of audiences. As in war days—and the great days of the Liberty Loan drives—actors, actresses and musicians whose names are household words will strive by speech and slogan to do their part for the Blue Eagle. Memories of the moments in 1918 and 1919 when Elsie Janis, Marie Dressler, Charles Chaplin, Douglas Fairbanks, William S. Hart and Mary Pickford, and scores of others of that time, swayed street corner and auditorium audiences for the Liberty Bond appeals will be recalled.

### Wide Audience Now

Wherever there is a mass meeting or a great city movement for NRA, such as that addressed by General Johnson in St. Louis recently, the services of the artists of the entertainment world will be marshalled for the occasion. But, differing from 1918, when there was no radio and 50,000 people was a vast audience indeed, it will be possible through radio for today's popular favorites to gain the attention of millions of people at one time.

## Crowe Has Two New Controls for Car Sets

Crowe Nameplate and Manufacturing Co., 1749 Grace Street, Chicago, announces two remote tuning controls for automobile radio sets. The size is 3 $\frac{3}{8}$  x 4 $\frac{1}{8}$  inches overall. The catalogue numbers are 101, for the better-looking job, and 102, for the same type instrument but with less attractive finish, being lower-priced.

The dial is scaled over 270 degrees for use with 360-degree geared condensers now made by several manufacturers. The scale and direct pointer are completely exposed to view. Steering post clamps and brackets are obtainable.

# Station Sparks

By Alice Remsen

## ZAZU PITTS ON DECK

Zazu Pitts is the latest screen star to try for radio. Miss Pitts was included in an NBC program which gave an audition for Woodbury last week. It was an ambitious program, embracing a tenor, soprano, full orchestra and Miss Pitts with comedy touches, in the sappy sort of character for which she is famous. Have not yet heard whether the program was accepted. . . . It's a boy and a girl at the Tim Sullivan domiciliary edifice, and Tim is walking on air as befits the proud papa of twins. . . . Jane Froman and her hubby, Don Ross, will be featured in the new edition of the Ziegfeld Follies now being assembled; a precedent will be established, as this is the first time a radio couple has made a Broadway show together. . . . There is a vaudeville and musical comedy troupier who would be a great bet for master of ceremonies on a commercial program—Harland Dixon is the name; a fine personality with a great flow of English, intelligent, well-educated and polished; knows show business in all its phases; why doesn't somebody get hold of him? . . .

## PETER DIXON IN HIS STRIDE

There's another chap by the name of Dixon—Peter I mean; he is just getting into his stride so far as radio writing is concerned; you'll hear from this boy in a big way very shortly. . . . There's to be a wedding in Cincinnati this Fall; two friends of mine at WLW, Don "Ukulele" Becker, and Florence "Dramatic" Golden; Don and Florence have been that way about each other for months, n' months, n' months. . . . Arthur Pryor, Jr. is back from his vacation looking fine and brown and all ready to tackle that big business this Fall. . . . Nyra is holding up a great many programs; until all codes are in and fixed, many firms hesitate to commit themselves—even though they have already bought time; program details must wait, so everything will be at least a month late this year, but don't let that fool you—business is going to be good. . . . You'll be able to buy Ben Bernie phonograph records again this year, but they'll be marked Columbia instead of Brunswick; the lad has changed his affiliations. . . .

## CHANGES IN PROGRAMS

Quite a few of the old stand-bys are to be heard this winter; Bond Bread, Daggett & Ramsdell, Woodbury, A. & P. Gypsies and Cities Service are just a few. . . . Evening in Paris will be back again, but will have two fifteen-minute periods on WABC, with Nat Shilkret's Orchestra and Agnes Moorehead's comedy; no vocalists. . . . A big audition was given at WABC last week for Linit; it was a pot-pourri of most everything, including Jane Froman and Rosa Ponselle; Miss Ponselle could be made into excellent radio material if she would only listen to reason and sing the more simple classics; her voice is delightful. . . . Rumor says that Mae West is considering the air; so don't be surprised to hear her dulcet voice requesting you to come up and see her some time. . . . Ethel Waters is better and is singing again. . . . Jack Arthur is the latest radio star to take up flying in real earnest; hope he has better luck with his plane than he had with his boat, which was always going wrong. . . . Sponsors are considering Chic Sale for a spot this winter; his dry brand of humor should go well with the customers. . . . Peter Dixon suggests that Joe Cook would be fine air material; and why not? His versatility is unbounded. . . .

## ANDRE DESERVES IT

Columbia shows excellent judgement in allowing Andre Kostalanetz to dominate their air-lanes with his fine sense of musical balance. . . . Wish they would give Willard Robison more time. . . . Theo Karle is doing great singing these days on those CBS Artist programs; if you haven't yet heard him tune in, do so, by all means. . . . And speaking of good work, Goldman's Band put over Ravel's Bolero the other evening; I sat in the Mall at Central Park and was all of a dither over that strange piece of tempoistic writing, and the tumultuous climax left me shivering; very excellent work, Mr. Goldman! . . . And have you heard Captain Dobbsie—WEAF, Wednesday's at 10:30 p.m. EDST? What a great microphone personality that man has. John Charles Thomas was his guest last week, and how I enjoyed his rendition of "Trees"! It was perfect. . . . Morton Downey is being considered again for a big commercial account. . . . Kate Smith's sustaining series starts September 18th; Kate will draw down five hundred per from Columbia. . . . Ben Bernie will continue to entertain his listeners for another fifty-two weeks. . . . You'll hear these Harms tunes a great deal over the air this winter: "Moonlight and Pretzels," "Shame on You," "To Be or Not to Be in Love," "Free," "Moon Over Monterey," and a new song which they have just acquired from Europe, "Love is the Sweetest Thing"; and by the way, the new Harms address is 1674 Broadway, and Will Rockwell is still the debonair professional manager. . . . Jan Garber, that extremely popular young band leader, used to be a baseball catcher before he became a professional musician; he's a lad that can really play a fiddle. . . .

## VAUDEVILLE TO A B S

Some old friends of vaudeville days will be on the staff of Ed Wynn's new amalgamated station; Rita Gould, McIntyre and Heath, John Steele, Fred Fradkin, and of course, the redoubtable Wynn himself. . . . Plenty of cigarettes and tobacco will be touted on the air this Fall. . . . The Boswell Sisters have a new schedule of sustaining periods—each Wednesday and Friday at 10:30 p.m., EDST. . . . The Mills Brothers will also be heard each Tuesday and Thursday evening at 7:30 p.m., EDST. . . . Walter Drey has a new series of educational programs for children on WMCA, three times weekly at 5:30 p.m., EDST. . . . Britain has gone crazy over Bing Crosby's style and every British band has its "Bing imitator". . . . WHOM has a new children's program, each Thursday at 12:45 p.m., conducted by Jean Norwood, former director of the Young People's Theatre in Minneapolis; the new program is known as the Play-It Club. . . . "The Silver Dust" evening program moves to a network on September 8th and will be heard over WABC and ten other stations, instead of just locally, as before; time will be the same—Mondays, Wednesdays and Fridays at 7:15 p.m., EDST; talent will be as before—Jeannie Lang, Scrappy Lambert and Jack Denny's Orchestra. . . . Swanee Taylor is instructor and pilot for many radio folk who are air-minded; among his pupils are Fred Waring and Kate Smith. . . .

## LIKE THE GOOD OLD DAYS

Maria Cardinale is doing quite a bit of work on NBC sustaining programs these days; on August 28th, Maria was on a program with me, "The Revolving Stage," WEAF, 2:00 p.m., EDST; it was like old times for us. . . . Joe White, the Silver

## Quick-Action Classified Advertisements

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RADIO WORLD AND POPULAR MECHANICS MAGAZINE—Radio World is \$6.00 a year, and Popular Mechanics Magazine is \$2.50 a year. Popular Mechanics Magazine does not cut rates, but Radio World will send both publications to you for one year for \$7.00. Radio World, 145 West 45th St., New York City.

"AMATEUR MOVIE CRAFT," by James R. Cameron. A book dealing with the making and showing of 16 m/m pictures and equipment necessary for same. Paper cover, \$1.00; Cloth, \$1.50. Radio World, 145 W. 45th St., New York, N. Y.

NEW RADIO AMATEUR'S HANDBOOK, 180,000 words, 207 illustrations, 218 pages (10th edition, issued 1933). Issued by the American Radio Relay League. Price, \$1.00 per copy. Radio World, 145 West 45th Street, New York, N. Y.

THE FORD MODEL—"A" Car and Model "AA" Truck—Construction, Operation and Repair—Revised New Edition. Ford Car authority, Victor W. Page. 708 pages, 318 illustrations. Price \$2.50. Radio World, 145 W. 45th St., New York.

"THE FORD V-EIGHT—'B'-FOUR—'BB'-TRUCK," by C. B. Manly. A New and Practical Book for Everyone Interested in the Construction, Adjustment, Upkeep and Repair of The New Fords. Over 250 pages, 125 illustrations. Complete cross index. Pocket size, flexible leatherette cover. Price \$2.00. Radio World, 145 W. 45th St., New York, N. Y.

Masked Tenor, is sing better than ever; caught him the other afternoon on WJZ and enjoyed his work immensely. . . . Donn Ross, husband of Jane Froman, is an old-timer in show business; as a member of the act of Brooks and Ross Don was known all over the country; he played vaudeville and picture houses, and was featured in the "Greenwich Village Follies"; for several seasons both Brooks and Ross were on the Chicago staff of the Columbia Broadcasting System. . . . Oh, yes; Don's full name is Donald McKaig Ross, and he was born at Osakis, Minnesota, on July 15th, 1905. . . . If it's all the same to you, I'll call a halt 'till this time next week.

## The Magical Marconi

I LIKE a man as William is,  
Who's fit for dance or foray,  
Who graces science with his feats—  
The famous Senatore.

From sluggish dawn to trembling night  
With fearless force and vigor  
In radio's exalted spheres  
He cuts a looming figger.

He sent the letter S across  
The whipped and tamed Atlantic  
To show us all when we were kids  
An unpedantic antic.

And now that we are old enough  
To wear tux and mustaches  
He forages in ether-space  
With ultra dots and dashes.

He trains the quasi-optic waves  
To do his sternest bidding.  
And when he says he's turned the trick  
We know he isn't kidding.

He forces ultra frequencies  
To pierce reluctant mountains,  
Endows his sending aerials  
With spray of magic fountains.

For he's a genius high to whom  
Big obstacles seem petty,  
The man who bends the ultra waves  
Like pretzels and spaghetti.

—H. B.

# National Industrial Recovery Code

## for the

# Electrical Manufacturing Industry

## ELECTRIC CODE NOW IN EFFECT FOR RADIO, TOO

The National Recovery Administration issued the following:

"The Radio Manufacturers Association has today withdrawn its request for exemption from the Code of Fair Competition for the Electrical Manufacturing Industry and has notified the Administrator that the Radio Industry will comply with all the provisions of the Electrical Industry Code.

"The Code of Fair Competition for the Radio Industry, which had been submitted to the Administrator on July 29, 1933, was accordingly withdrawn, and all manufacturers of radio apparatus and parts, including—

Radio Receiving and Television Sets,  
Radio and Television Tubes, Electric  
Tubes and Valves,  
Parts, Cabinets, Accessories,  
Loudspeakers, Condensers and also  
Sound Distribution Equipment

shall from this date fully comply with all the provisions of the Code of Fair Competition for the Electrical Manufacturing Industry which was approved by the President on August 4, 1933, and became effective August 15, 1933.

"W. L. ALLEN, Deputy Administrator."

### Use of Blue Eagle

Radio Manufacturers Association, Inc., is advised by the National Recovery Administration that withdrawal from the Administration of the proposed RMA code for the radio industry and the immediate application of the electrical manufacturing code to radio manufacturers does not affect the use of privileges of the NRA Blue Eagle Insignia for radio manufacturers who have already signed the President's Reemployment Agreement, or voluntary blanket code, as it is sometimes called. For such manufacturers who have signed the President's Voluntary Agreement no further action is necessary except full compliance with and conformance to all provisions of the code for the electrical manufacturing industry.

The NRA also instructs that employers who have not yet signed the President's Voluntary Agreement, in order to obtain the right to use the NRA Blue Eagle Insignia, shall comply with the electrical code and shall file with their local postmaster the following certificate of compliance:

"We have complied with the operative provisions of the code for the electrical manufacturing industry, approved by the President of the United States on August 4, 1933."

### Notification Telegram

Fred D. Williams, president of the Association, advised its membership of the situation in the following telegram:

"To avoid extensive delay, controversy and public hearings over wages and hours and other subjects upon which our industry

To effectuate the policy of Title I of the National Industrial Recovery Act, the following provisions are established as a National Industrial Recovery Code for the Electrical Manufacturing Industry:

**I. DEFINITIONS:** The term "electrical manufacturing industry" as used herein is defined to mean the manufacture for sale of electrical apparatus, appliances, material or supplies, and such other electrical or allied products as are natural affiliates. The term "person" as used herein shall include natural persons, partnerships, associations, trusts, trustees, trustees in bankruptcy, receivers and corporations. The term "employer" as used herein shall include every person promoting, or actively engaged in, the manufacture for sale of the products of the electrical manufacturing industry as herein defined, *provided, however*, that organizations or groups of employers representing a substantial part of any branch or subdivision of the industry may be exempted by the Administrator from the provisions of this code. The term "effective date" as used herein is defined to be the eleventh day after this code shall have been approved by the President of the United States.

**II.** As required by Section 7 (a) of Title I of the National Industrial Recovery Act, the following provisions are conditions of this Code:

"(1) That employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection; (2) that no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and (3) that employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President."

**III.** (a) On and after the effective date employers shall not employ anyone under the age of sixteen years.

(b) On and after the effective date the minimum wage that shall be paid by any employer to any employee, engaged in the processing of the products of the electrical manufacturing industry and in labor operations directly incident thereto shall be 40c per hour, unless the rate per

hour for the same class of labor was on July 15, 1929, less than 40c, in which case the rate per hour paid shall be not less than the rate per hour paid on July 15, 1929, but in no event shall the rate per hour be less than 32c per hour, and provided, also, that learners may be paid not less than 80 per cent of the minimum rate paid determined in the manner above provided, but the number of learners receiving less than such minimum rate so determined shall not exceed 5 per cent of the total number of employees engaged in the processing of products and in labor operations directly incident thereto.

(c) On and after the effective date the minimum wage that shall be paid by any employer to all other employees, except commission salespeople, shall be at the rate of \$15 per week; provided, however, that office boys or girls, and learners may be paid not less than 80 per cent of such minimum wage, but the number of such office boys or girls, and learners paid at a rate of less than \$15 per week shall not exceed 5 per cent of the total number of employees covered by the provisions of this paragraph (c).

(d) The minimum rate of wages provided in this Article shall apply to all employees in all localities unless the Administrator or his representative shall fix a lower rate for particular localities.

(e) Not later than ninety (90) days after the effective date the electrical manufacturing industry shall report to the Administrator through the Board of Governors of National Electrical Manufacturers Association the action taken by all employers in adjusting the hourly wage rates for all employees receiving more than the minimum rates provided in paragraph (b) of this Article.

**IV.** On and after the effective date employers shall not operate on a schedule of hours:

(a) For employees engaged in the processing of products of the electrical manufacturing industry, and in labor operations directly incident thereto, in excess of 36 hours per week.

(b) For all other employees, except executive, administrative and supervisory employees, and traveling and commission salespeople, in excess of 40 hours per week.

*Provided, however*, that these limitations shall not apply to those branches of the electrical manufacturing industry in which seasonal or peak demand places an unusual and temporary burden upon such branches; in such cases such number of hours may be worked as are required by the necessities of the situation, but at the end of each calendar month every employer shall report to the Administrator through the Board of Governors of Na-

is not agreed, your officers on unanimous recommendation and your code committee by authority and direction of board of directors today withdrew the proposed RMA code submitted to administrator July 29th. Also withdrew requests to exempt radio industry from electrical manufacturing industry code.

"This enables administrator to put radio manufacturing industry under electrical manufacturing code approved by the President August 5th. Formal order of administrator making electrical code effective immediately for radio manufacturing industry as permanent code during Recovery Act ex-

pected tomorrow, and announcement in press Saturday.

"Thereafter electrical code is effective for all radio manufacturers in place of President's voluntary agreement and temporary labor provisions of RMA code. One result will be to raise July, 1929, minimum wage rate from 30 to 32 cents. Adopting electrical code does not affect RMA as an organization and no member of radio industry need join NEMA unless he desires. All administration of code will be under NEMA supervision. Planning to hold radio industry meeting within fortnight.

"FRED D. WILLIAMS."



tional Electrical Manufacturers Association, in such detail as may be required, the number of man hours worked in that month on account of seasonal or peak demand requirements, and the ratio which said man hours bear to the total number of man hours of labor during said month; and

*Provided, further,* that these limitations shall not apply in cases of emergency, but at the end of each calendar month every employer shall report to the supervisory agency, hereinafter provided for, in such detail as may be required, the number of man hours worked in that month for emergency reasons and the ratio which said emergency man hours bear to the total number of man hours of labor during said month.

**V.** National Electrical Manufacturers Association is hereby designated the agency for administering, supervising and promoting the performance of the provisions of this code by the members of the electrical manufacturing industry.

With a view to keeping the President of the United States and the Administrator informed as to the observance or non-observance of this code and as to whether the electrical manufacturing industry is taking appropriate steps to effectuate in all respects the declared policy of the National Industrial Recovery Acts, each employer shall, not less than once in each year, prepare and file with the Board of Governors or the Executive Committee of National Electrical Manufacturers Association an earnings statement and balance sheet in a form approved by said Board of Governors or said Executive Committee or in a form acceptable to any recognized stock exchange. Each employer shall likewise prepare and file with such person or organization as the Board of Governors or the Executive Committee of National Electrical Manufacturers Association may designate and at such times and in such manner as may be prescribed, statistics of plant capacity, volume of production, volume of sales in units and dollars, orders received, unfilled orders, stocks on hand, inventory, both raw and finished, number of employees, wage rates, employee earnings, hours of work, and such other data or information as the Board of Governors or the Executive Committee of National Electrical Manufacturers Association may from time to time require.

**VI.** Except as otherwise provided in the National Industrial Recovery Act all statistics, data and information filed in accordance with the provisions of Article V shall be confidential, and the statistics, data and information of one employer shall not be revealed to any other employer except that for the purpose of facilitating the administration and enforcement of the provisions of this code, the Board of Governors or the Executive Committee of National Electrical Manufacturers Association, by their duly authorized representatives (who shall not be in the employ of any employer affected by this code), shall have access to any and all statistics, data and information that may be furnished in accordance with the provisions of this code.

**VII.** Any employer may participate in any endeavors of National Electrical Manufacturers Association in the preparation of any revisions of, or additions or supplements to, this code by accepting the proper pro rata share of the cost and responsibility of creating and administering it, either by becoming a member of National Electrical Manufacturers Association or by paying to it an amount equal to the dues from time to time provided to be paid by a member in like situation of National Electrical Manufacturers Association.

**VIII.** Every employer shall use an accounting system which conforms to the principles of and is at least as detailed

and complete as the uniform and standard method of accounting set forth in the Sixth Edition of the Manual of Accounting, prepared and published by National Electrical Manufacturers Association, and a costing system which conforms to the principles of and is at least as detailed and complete as the standard and uniform method of costing to be formulated or approved by the Board of Governors or Executive Committee of National Electrical Manufacturers Association, with such variations therefrom as may be required by the individual conditions affecting any employers or group of employers and as may be approved by the Board of Governors or the Executive Committee of National Electrical Manufacturers Association or the supervisory agency and made supplements to the said Manual of Accounting or method of costing.

**IX.** No employer shall sell or exchange any product of his manufacture at a price or upon such terms or conditions that will result in the customer paying for the goods received less than the cost to the seller, determined in accordance with the uniform and standard method of costing hereinabove prescribed, provided, however, that dropped lines, seconds, or inventories which must be converted into cash to meet emergency needs may be disposed of in such manner and on such terms and conditions as the supervisory agency may approve and as are necessary to move such product into buyers' hands, and provided further that selling below cost in order to meet existing competition on products of equivalent design, character, quality or specifications shall not be deemed a violation of this Article if provision therefor is made in supplemental codes for any branch or subdivision of the industry, which may be hereafter prepared and duly approved by the Administrator.

**X.** If the supervisory agency determines that in any branch or subdivision of the electrical manufacturing industry it has been the generally recognized practice to sell a specified product on the basis of printed net price lists, or price lists with discount sheets, and fixed terms of payment which are distributed to the trade, each manufacturer of such product shall within ten (10) days after notice of such determination file with the supervisory agency a net price list or a price list and discount sheet as the case may be individually prepared by him showing his current prices, or prices and discounts, and terms of payment, and the supervisory agency shall immediately send copies thereof to all known manufacturers of such specified product. Revised price lists with or without discount sheets may be filed from time to time thereafter with the supervisory agency by any manufacturer of such product, to become effective upon the date specified therein, but such revised price lists and discount sheets shall be filed with the supervisory agency ten days in advance of the effective date, unless the supervisory agency shall authorize a shorter period. Copies of revised price lists and discount sheets, with notice of the effective date specified, shall be immediately sent to all known manufacturers of such product, who thereupon may file, if they so desire, revisions of their price lists and/or discount sheets, which shall become effective upon the date when the revised price list or discount sheet first filed shall go into effect.

If the supervisory agency shall determine that in any branch or subdivision of the electrical manufacturing industry not now selling its products on the basis of price lists with or without discount sheets with fixed terms of payment the distribution or marketing conditions in said branch or subdivision are similar to or the same as the distribution or marketing conditions in a branch or subdivision of the industry where the use of price lists with or without discount sheets is well recognized, and that a system of

selling on net price lists or price lists and discount sheets should be put into effect in such branch or subdivision, each manufacturer of the product or products of such branch or subdivision shall within twenty (20) days after notice of such determination file with the supervisory agency net price lists or price lists and discount sheets as the supervisory agency may direct containing fixed terms of payment showing his prices and discounts and terms of payment, and such price lists and/or discount sheets and terms of payment may be revised in the manner hereinabove provided.

No employer shall sell directly or indirectly by any means whatsoever any product of the industry covered by the provisions of this Article at a price lower or at discounts greater or on more favorable terms of payment than those provided in his current net price lists or price lists and discount sheets.

**XI.** Aggregations of employers having a common interest and common problems will be grouped by National Electrical Manufacturers Association for administrative purposes in various subdivisions or product classifications and report of such grouping made to the Administrator.

**XII.** In each subdivision or product classification there will be a supervisory agency approved or appointed by the Board of Governors or the Executive Committee of National Electrical Manufacturers Association and report thereof made to the Administrator. If formal complaint is made to National Electrical Manufacturers Association that the provisions of this code have been violated by any employer, the proper supervisory agency shall investigate the facts and to that end may cause such examination or audit to be made as may be deemed necessary.

**XIII.** The President may, from time to time, cancel or modify any order, approval, license, rule, or regulation issued under Title I of the National Industrial Recovery Act.

**XIV.** Such of the provisions of this code as are not required by the National Industrial Recovery Act to be included herein may, with the approval of the President of the United States, be modified or eliminated as changed circumstances or experiences may indicate. This code is intended to be a basic code, and study of the trade practices of the electrical manufacturing industry will be continued by the Board of Governors of National Electrical Manufacturers Association with the intention of submitting to the Administrator for approval from time to time, additions to this code applicable to all employers in the electrical manufacturing industry and supplemental codes applicable to one or more branches or subdivisions or product classifications of the electrical manufacturing industry, such supplemental codes, however, to conform to and be consistent with the provisions of this code as now constituted or hereafter changed.

**XV.** If any employer of labor in the electrical manufacturing industry is also an employer of labor in any other industry, the provisions of this code shall apply to and affect only that part of his business which is included in the electrical manufacturing industry.

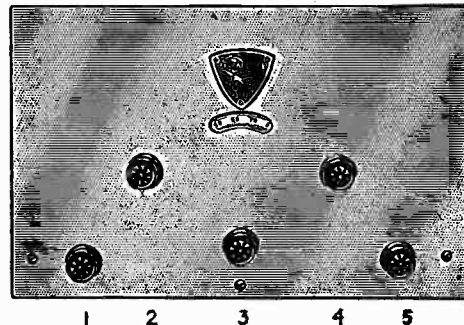
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### Short Wave Receiver



- Control No. 1—"On" and "Off" Switch.
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- Control No. 4—Antenna Tuning Condenser.
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### Made By Powertone Electric Co. Exclusively

**D**ESIGNED by Don C. Wallace, W6AM-W6ZZA, internationally known short wave expert and amateur. Under competitive tests he was able, when using this receiver, to hear more D.X. stations, and many which were entirely inaudible on any other. As a result he was awarded the "Hoover Cup" for premier short wave design and performance. The receiver is finely built of precision parts throughout. Proper circuit design and layout is the result of much painstaking labor. Each part has a definitely set purpose—and functions at peak efficiency at all times. Band spread tuning of the important amateur bands, 160, 80, 40, 20 meters, is controlled by means of a single panel switch.

The receiver, while fundamentally simple has been refined to the last degree. It produces an extremely high ratio of signal to noise. A control is provided for each important circuit, resulting in peak efficiency under all conditions. Heavily cadmium plated sub-base with black crackle metal front panel.

#### CIRCUIT:—

Ultra low-loss design to produce peak efficiency from aerial to headphones. A special system is used, which tunes the aerial circuit to the exact frequency of the sending station. Thus none of the energy is wasted, and at the same time considerable additional selectivity is obtained.

Special flat-wound silvered ribbon inductances are employed throughout, producing the highest possible circuit efficiency. A unique panel controlled inductance switching system suits the receiver to amateur "band spread" tuning or short wave listener requirements at will. Thus this receiver answers all short wave requirements.

Employs two 230 tubes. Requires two volts D. C. for filament operation, 45—90 volts of "B" battery.

#### FEATURES:—

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- \*A Control for Each Circuit.
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- \*HAMMARLUND Regeneration Control.
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- No. 1 Coil:— 20- 32 Meters
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- No. 3 Coil:— 75-150 Meters
- No. 4 Coil:—150-200 Meters

Price of complete kit of parts, including drilled panel and base, a choice of any one of the four plug-in coils and clear constructional blue print ..... **\$14.70**

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Each Coil ..... **\$1.18**

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