Wells-Gardner & Co.

	Model: 6F Series	Chassis:	Year: Pre October 1936
	Power:	Circuit:	IF:
	Tubes:		
	Bands:		

Resources
Riders Volume 7 - WELLS-GARD 7-12
Riders Volume 7 - WELLS-GARD 7-13
Riders Volume 7 - WELLS-GARD 7-14
Riders Volume 7 - WELLS-GARD 7-15
Riders Volume 7 - WELLS-GARD 7-16
Riders Volume 7 - WELLS-GARD 7-17

MODEL 6F Series
R-F. Chassis
Schematic

WELLS-GARDNER & CO.

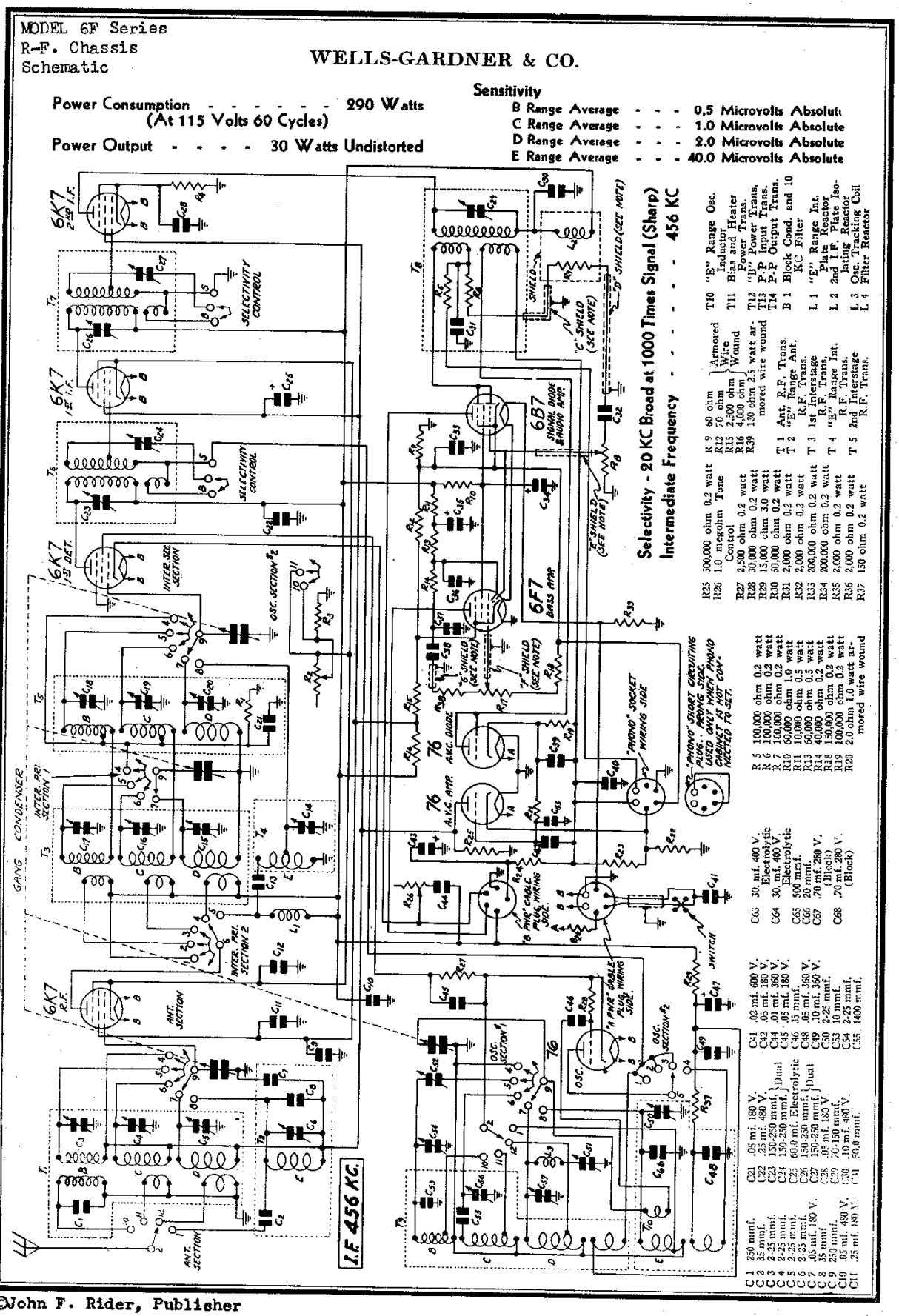
Power Consumption - - - - - - - 290 Watts
(At 115 Volts 60 Cycles)

Power Output - - - - - 30 Watts Undistorted

Sensitivity

B Range Average - - - - 0.5 Microvolts Absolut
C Range Average - - - - 1.0 Microvolts Absolute
D Range Average - - - - 2.0 Microvolts Absolute
E Range Average - - - - 40.0 Microvolts Absolute

Selectivity - 20 KC Broad at 1000 Times Signal (Sharp)
Intermediate Frequency - - - - - - - - 456 KC



C 1	250 mmf.	C21	.05 mf. 180 V.	R 5	100,000 ohm 0.2 watt	C63	30. mf. 400 V. Electrolytic	R25	300,000 ohm 0.2 watt
C 2	65 mmf.	C22	.25 mf. 480 V.	R 6	100,000 ohm 0.2 watt	C64	30. mf. 400 V. Electrolytic	R26	1.0 megohm Tone Control
C 3	2.25 mmf.	C23	150-250 mmf. Dual	R 7	100,000 ohm 0.2 watt	C65	500 mmf.	R27	2,500 ohm 0.2 watt
C 4	2.25 mmf.	C24	150-250 mmf. Dual	R10	60,000 ohm 1.0 watt	C66	20 mmf.	R28	30,000 ohm 0.2 watt
C 5	2.25 mmf.	C25	60.0 mf. Electrolytic	R11	10,000 ohm 0.5 watt	C67	.70 mf. 280 V. (Block)	R29	15,000 ohm 3.0 watt
C 6	2.25 mmf.	C26	150-250 mmf. Dual	R13	60,000 ohm 0.5 watt	C68	.70 mf. 280 V. (Block)	R30	30,000 ohm 0.2 watt
C 7	.05 mf. 180 V.	C27	150-250 mmf. Dual	R14	40,000 ohm 0.2 watt			R31	2,000 ohm 0.2 watt
C 8	150 mmf.	C28	.05 mf. 180 V.	R18	150,000 ohm 0.2 watt			R32	2,000 ohm 0.2 watt
C 9	250 mmf.	C29	70-150 mmf.	R19	100,000 ohm 0.2 watt			R33	200,000 ohm 0.2 watt
C10	.05 mf. 480 V.	C30	.10 mf. 480 V.	R20	2.0 ohm 1.0 watt armored wire wound			R34	200,000 ohm 0.2 watt
C11	.25 mf. 180 V.	C31	50.0 mmf.					R35	2,000 ohm 0.2 watt
		C41	.02 mf. 600 V.					R36	2,000 ohm 0.2 watt
		C42	.05 mf. 180 V.					R37	150 ohm 0.2 watt
		C43	.05 mf. 360 V.						
		C44	.01 mf. 360 V.						
		C45	.05 mf. 180 V.						
		C46	.05 mmf.						
		C47	.05 mf. 360 V.						
		C48	.05 mf. 360 V.						
		C49	.10 mf. 360 V.						
		C50	2-25 mmf.						
		C53	10 mmf.						
		C54	2-25 mmf.						
		C55	1400 mmf.						

R 9	60 ohm Armored Wire	T10	"E" Range Osc. Inductor
R12	70 ohm Wound	T11	Bias and Heater Power Trans.
R15	4,200 ohm	T12	"B" Power Trans.
R16	4,000 ohm	T13	P-P Input Trans.
R39	130 ohm 2.5 watt armored wire wound	T14	P-P Output Trans.
		B 1	Block Cond. and 10 KC Filter
T 1	Ant. R.F. Trans.		
T 2	"E" Range Ant. R.F. Trans.	L 1	"E" Range Int. Plate Reactor
T 3	1st Interstage R.F. Trans.	L 2	2nd I.F. Plate Isolating Reactor
T 4	"E" Range Int. R.F. Trans.	L 3	Osc. Tracking Coil
T 5	2nd Interstage R.F. Trans.	L 4	Filter Reactor

MODEL 6F Series
A-F. Chassis
Schematic

WELLS-GARDNER & CO.

Tuning Frequency Range

B Range . . . . 535 to 1730 KC
C Range . . . . 1715 to 5800 KC
D Range . . . . 5750 to 18300 KC
E Range . . . . 17500 to 48000 KC

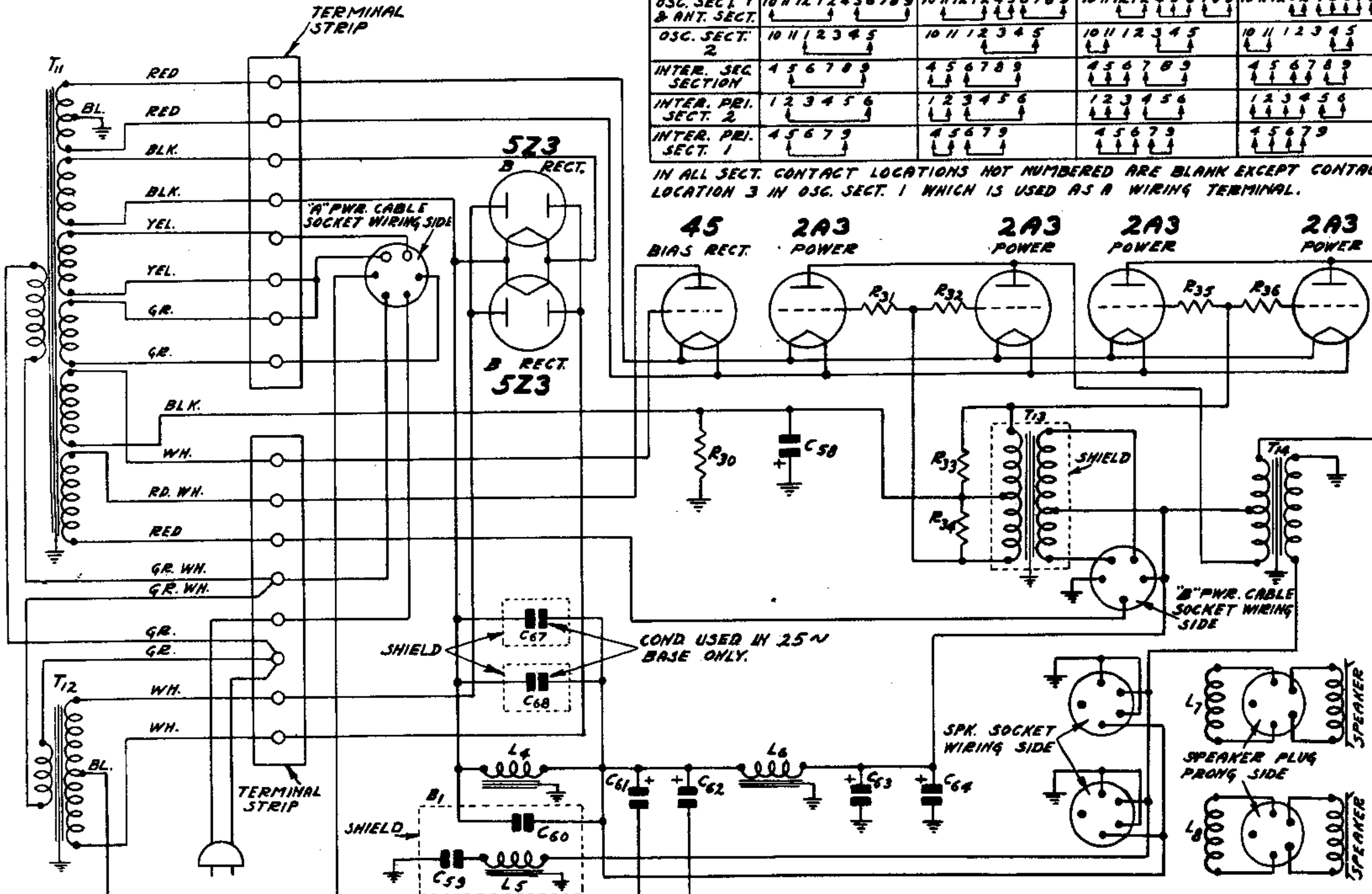
Speaker - - - Two 12 Inch Auditorium Dynamics

C12 .25 mf. 180 V.
C13 .05 mf. 480 V.
C14 2-25 mmf.
C15 2-25 mmf.
C16 2-25 mmf.
C17 2-25 mmf.
C18 2-25 mmf.
C19 2-25 mmf.
C20 2-25 mmf.
C32 .01 mf. 360 V.
C33 .05 mf. 180 V.
C35 12.0 mf. 300 V. Electrolytic
C36 .10 mf. 360 V.
C37 .02 mf. 360 V.
C38 .005 mf. 360 V.
C39 100 mmf.
C40 .50 mf. 180 V.
C56 2-25 mmf.
C57 2-25 mmf.
C58 60 mf. 150 V. Electrolytic
C59 .63 mf. 180 V.
C60 .35 mf. 280 V.
C61 30. mf. 400 V. Electrolytic
C62 30. mf. 400 V. Electrolytic
C34 4.0 mf. 250 V. } Dry
C43 16.0 mf. 150 V. } Electrolytic
C47 4.0 mf. 250 V. } Block
C52 300-600 mmf. } Dual
C51 40-100 mmf. }
R 1 25,000 ohm 0.2 watt
R 3 150 ohm 0.2 watt
R 4 500 ohm 0.2 watt
R21 2.0 megohm 0.2 watt
R22 160,000 ohm 0.2 watt
R23 25,000 ohm 0.2 watt
R24 25,000 ohm 0.2 watt
R38 500,000 ohm 0.2 watt
R 2 2,500 ohm } Volume
R 8 2.0 megohm } Control
R17 1.0 megohm
T 6 1st I.F. Trans.
T 7 2nd I.F. Trans.
T 8 3rd I.F. Trans.
T 9 Osc. Inductors
L 5 Filter Reactor
L 6 Filter Reactor
L 7 Speaker Field 4500 ohm
L 8 Speaker Field 4500 ohm

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SW. WHEN IN POS. SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)	POSITION 4 SHORT WAVE (E)
OSC. SECT. 1 & ANT. SECT.	10 11 12 1 2 4 5 6 7 8 9	10 11 12 1 2 4 5 6 7 8 9	10 11 12 1 2 4 5 6 7 8 9	10 11 12 1 2 4 5 6 7 8 9
OSC. SECT. 2	10 11 1 2 3 4 5	10 11 1 2 3 4 5	10 11 1 2 3 4 5	10 11 1 2 3 4 5
INTER. SEC. SECTION	4 5 6 7 8 9	4 5 6 7 8 9	4 5 6 7 8 9	4 5 6 7 8 9
INTER. PRI. SECT. 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
INTER. PRI. SECT. 1	4 5 6 7 9	4 5 6 7 9	4 5 6 7 9	4 5 6 7 9

IN ALL SECT. CONTACT LOCATIONS NOT NUMBERED ARE BLANK EXCEPT CONTACT LOCATION 3 IN OSC. SECT. 1 WHICH IS USED AS A WIRING TERMINAL.



THE FOLLOWING NOTES APPLY TO THE RADIO FREQUENCY CHASSIS.
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
"B" AND "S" ON SELECTIVITY CONTROL DENOTES "BROAD" AND "SHARP" RESPECTIVELY.
THE CAPACITY OF "C" SHIELD IS 20 MMF. THE CAPACITY OF "D" "F" & "G" SHIELDS IS 70 MMF EACH. THE CAPACITY OF "E" SHIELD IS 15 MMF.

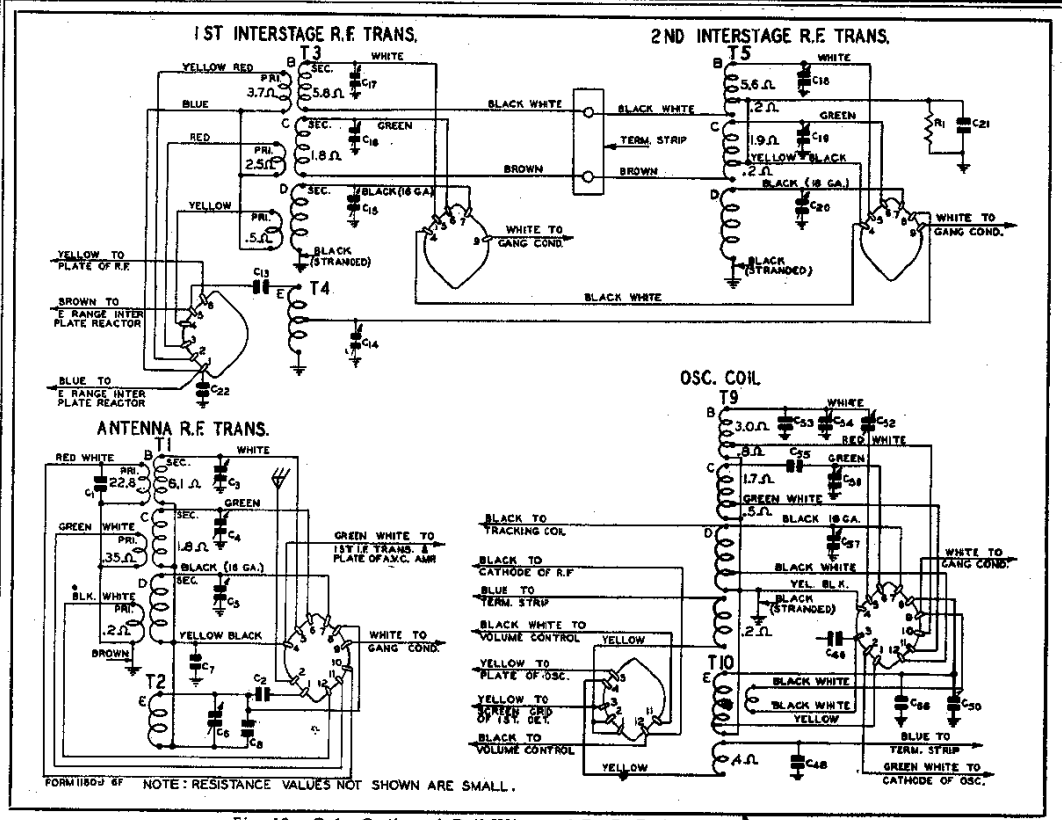


Fig. 12—Color Coding of Coil Wires and D. C. Resistances of Windings

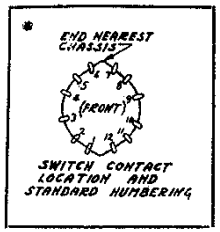


Fig. 9—Numbering of Switch Contacts

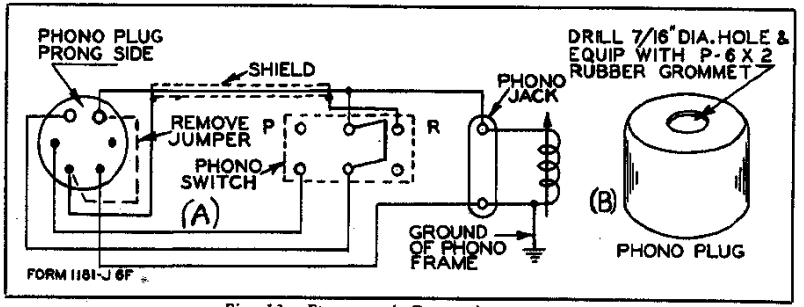


Fig. 13—Phonograph Connections

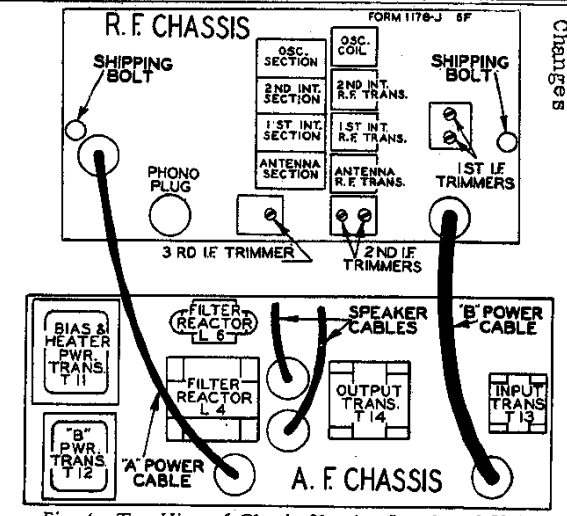


Fig. 4—Top View of Chassis Showing Location of Units

Changes in Early Models

In the early models condenser C65, shown in the R.F. Schematic Fig. 2, was not used. A 20 mmf. condenser, also designated as C65, was connected in parallel with condenser C14.

Condenser C10 from B+ to ground was not used in early models. Another condenser in the early models, also designated as C10 and 250 mmf. in value, was connected from the A.V.C. amplifier plate to ground.

Resistor R38 was not used in early models.

On the A.F. chassis the speaker sockets were wired with ground to the opposite side of voice coil.

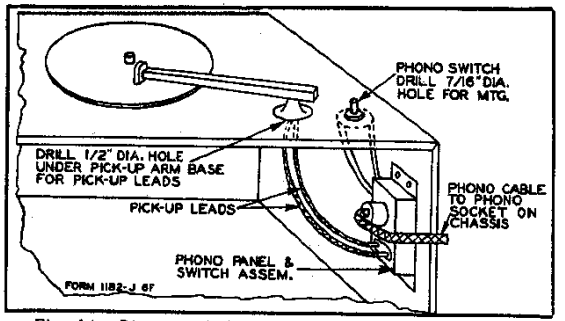


Fig. 14—Phonograph Connections Using Phono Cable and Panel Assembly

WELLS-GARDNER & CO., INC.

MODEL 6F Series
Voltage, Trimmers
Chassis Views

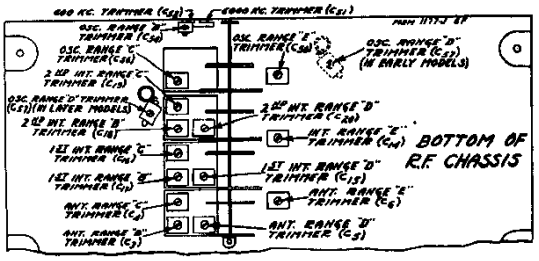


Fig. 6—Trimmer Location

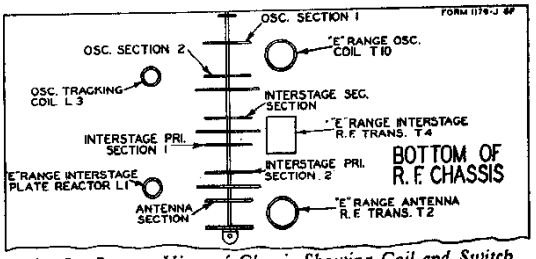


Fig. 5—Bottom View of Chassis Showing Coil and Switch Section Location

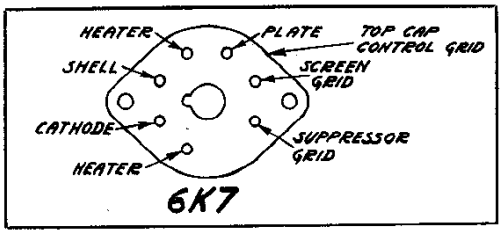


Fig. 7—Bottom View of Metal Tube Socket

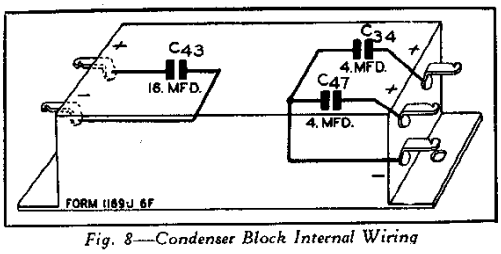


Fig. 8—Condenser Block Internal Wiring

VOLTAGES AT SOCKETS
Antenna Shorted to Ground - Line Voltage 110
Volume Control Maximum

Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode M. A.
6K7	R. F.	5.8	300	110	4.1	10.5
6K7	1st Det.	5.8	300	142	10.0	3.5
76	Osc.	5.8	142			10.0
6K7	1st I. F.	5.8	300	110	4.1	10.5
6K7	2nd I. F.	5.8	300	110	3.7	10.0
6B7	Sig. Diode & Audio Amp.	5.8(1) 5.6(2)	300	115	3.6	4.5
6F7	Bass Amp.	5.8(1) 5.6(2)	275(3) 125(4)	115	7.2	9.0
76	A.V.C. Diode	4.9				
76	A.V.C. Amp.	4.9	0		-62.0	
2A3	Power	2.35	300		-60(5)	60.0(6)
523	'B' Rect.	4.8				375.0(7)
45	Bias Rect.	2.4				

(1) Measured with A. C. Voltmeter—early models with letter "A" under chassis.
(2) Measured with D. C. Voltmeter—later models with letter "B" under chassis.
(3) Peniode Plate
(4) Triode Plate
(5) Control Grid to ground.
(6) Each Side of push-pull Circuit—120 Ma. total for 4 tubes.
(7) Total for both tubes—Milliameter in series with 1st Choke.

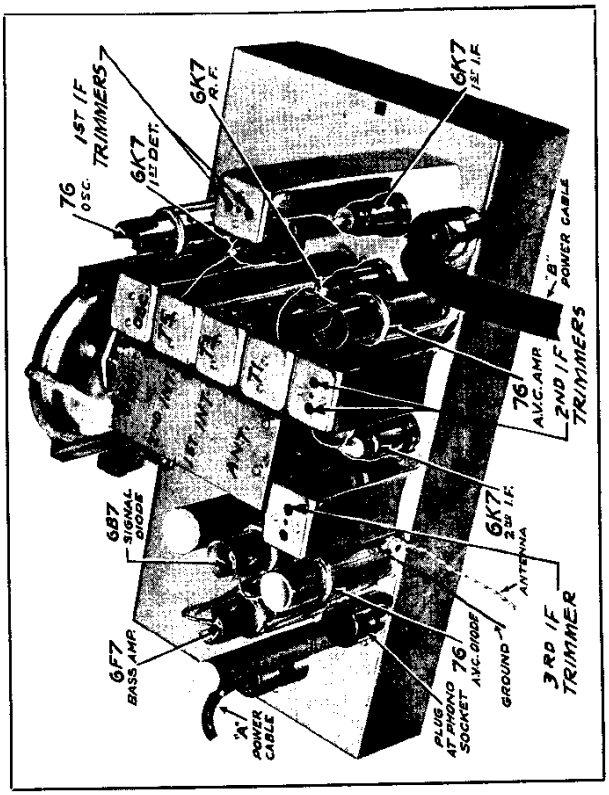


Fig. 10—Tube Arrangement in R.F. Chassis

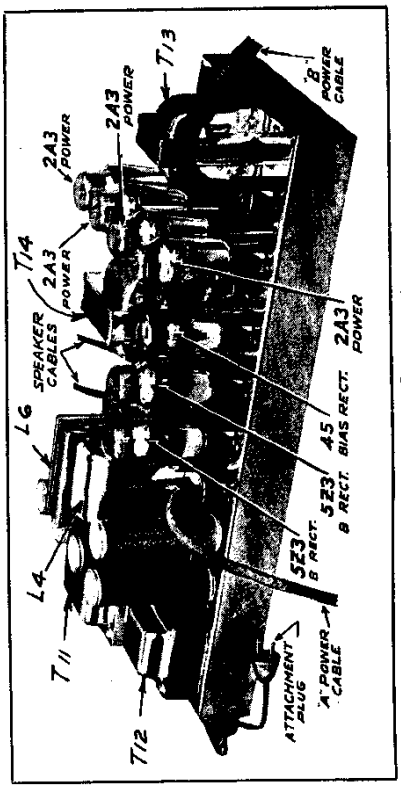


Fig. 11—Tube Arrangement in A.F. Chassis

MODEL 6F Series
Circuit Data
Alignment

WELLS-GARDNER & CO., INC.

Circuit

This model is a four band receiver with a tuning range in each band as shown in the specifications above. Four band coverage is accomplished by means of four sets of antenna, interstage and oscillator coils and a six section four position switch.

Among the many features incorporated in this receiver are—Improved Automatic Volume Control, Adjustable Selectivity Control, Dual Volume and Sensitivity Control, Bass Compensator and a 20 Watt High Fidelity Audio Amplifier. These are discussed in the following circuit description.

Referring to the R.F. Schematic Fig. 2, the following are the code numbers of the R.F. and Oscillator Assemblies:

T1 —Antenna R.F. Transformer
T2 —B Range Antenna R.F. Transformer
T3 —1st Interstage R.F. Transformer
T4 —E Range Interstage R.F. Transformer
T5 —2nd Interstage R.F. Transformer
T9 —Oscillator Inductors
T10—E Range Oscillator Inductors

The standard wave, 1st, 2nd and 3rd short wave coils in each assembly are indicated by the letters B, C, D and E, respectively. The six sections of the band switch are designated in the R.F. schematic Fig. 2 and in Fig. 5 as the antenna section, interstage primary section 2, interstage primary section 1, interstage secondary section, oscillator section 2 and oscillator section 1.

The band switch completes connections to the coils in use. It also short circuits the antenna R.F. transformer secondaries, the interstage transformer primaries and secondaries and the oscillator coils of lower frequency, not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed into a double tuned R.F. stage. The output of the latter actuates the control grid of a 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at a frequency which is 456 KC above the frequency to which the R.F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. As a result of the beating of the two frequencies, the intermediate or beat frequency of 456 KC is present in the plate circuit of this tube.

Two stages of I.F. amplification are employed using 6K7 tubes. The primaries and secondaries of the first and second I.F. transformers and the primary of the 3rd I.F. transformer are tuned by small trimmer condensers.

Referring to the 1st and 2nd I.F. transformers T6 and T7 in Fig. 2, it will be noted that there are coupling windings below the primaries.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity. When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A dual manual volume control is employed. In one section the audio voltage applied to the 1st audio tube is varied (R8). In the other section the R.F. and 1st I.F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R2 is shorted out by the band selector switch when it is in the Range D and E positions.

The 3rd I.F. transformer has 2 secondary windings. One of these windings works into the diode section of the 6B7 signal diode. The other winding works into the 76 A.V.C. diode.

The audio voltage developed by the signal diode across volume control resistor R8 is transmitted through the movable arm to the control grid of the pentode section of the 6B7 which acts as a one stage audio amplifier. The pentode plate of this tube is connected through the "B" power cable to one side of the primary of the push-pull input transformer in the power stage.

The audio voltage developed across volume control resistor R8 is also applied through the movable arm to the control grid of the triode section of the 6F7 bass amplifier. A resistance capacity filter composed of condensers C36 and C37 and resistor R14 in the triode plate circuit of this tube bypasses the higher audio frequencies. The lower audio frequencies which pass through this filter develop a voltage across resistors R38, R17 and R18.

R17 is the bass note control and is connected mechanically to the manual volume control. The movable arm is connected to and applies the bass audio voltage to the control grid of the pentode section of the 6F7 bass amplifier. At high volume settings the movable arm is at the low potential end of R17 (near R18). At low volume settings it is at the other end of this resistor in order to increase the bass note response. The reason for this increase in low note response is that the characteristics of the ear are such that the low notes are not heard as well as the middle register notes at lower volume levels.

The plate of the pentode section of the 6F7 tube is connected through the "B" power cable to the other side of the primary of the push-pull input transformer.

The A.V.C. system used in this receiver is one which has a flat characteristic over an extremely wide input range. As mentioned above, it will be seen in Fig. 2 that one of the 3rd I.F. transformer secondary windings works into the 76 A.V.C. diode tube. A signal passing through this transformer will result in a voltage across diode resistor R19. This voltage is applied to the control grid of the 76 A.V.C. amplifier.

Referring now to Figs. 2 and 3, there is a diode circuit consisting of the A.V.C. amplifier voltage winding of power transformer T11 (sixth winding from top) the plate and cathode elements of the 45 bias rectifier tube and resistors R22, R23 and R24. The diode current flowing in this circuit establishes a drop across these resistors. This voltage is below ground and furnishes operating voltages for the 76 A.V.C. amplifier tube which functions as a DC amplifier. Under no signal conditions, the plate of this tube is at ground potential. The grid is at the voltage of the maximum negative voltage end of resistor R23 while the cathode is at the minimum negative voltage end of this resistor. The resulting bias voltage brings this tube below the cut-off point and no plate current flows.

When a signal of a predetermined value or greater flows in the 3rd I.F. transformer, the voltage established across diode resistor R19 reduces the bias voltage of the A.V.C. amplifier to the point at which plate current flows in this tube. The plate current establishes a drop in resistor R25, lowering the plate voltage by the amount of this drop. The plate of the A.V.C. amplifier tube is connected to the control grid circuits of the R.F. and 1st I.F. tubes, resulting in A.V.C. action.

The ouput stage employs four type 2A3 tubes arranged in push-pull parallel. Fixed bias voltage for these tubes is obtained from a diode circuit in which are the ouput bias winding of power transformer T11 (fifth winding from top) and the grid and cathode elements of the type 45 bias rectifier tube. 30 watts of undistorted output may be obtained. Two 12" auditorium type dynamic speakers are used. Each speaker is provided with deflecting vanes for the purpose of spreading the directional higher audio notes through the entire room.

Two type 5Z3 tubes connected in parallel are used as "B" power rectifiers in the power unit. There are 2 power transformer assemblies, T11 and T12. In assembly T11 the top 4 windings illustrated in Fig. 3 supply the tube heater and filament voltages and the pilot lamp voltages. As mentioned, the fifth winding supplies the output stage bias voltage and the sixth winding supplies the A.V.C. amplifier tube voltages. Assembly T12 supplies the "B" voltage.

To reduce hum, DC is used in the heater circuits of the 6F7 and 6B7 tubes. The 2 heaters are connected in series in the negative "B" line.

The 45 bias rectifier tube, mention of which has already been made, has two functions. The cathode and grid elements act as a diode supplying bias voltage for the output tubes. The cathode and plate elements act as a diode supplying operating voltages for the A.V.C. amplifier. The two associated transformer windings must be in phase and wired as per the color code in the A.F. Schematic, Fig. 3.

The phono short circuiting plug, which is in the phono socket completes the signal diode circuit connections. Phonograph circuit connections are explained in the article under that name in this manual.

Metal Tubes

One type of the new metal tubes is used in this receiver, namely the 6K7. This replaces the type 6D6 glass tube. This metal tube operates at the same voltages and is nearly identical in characteristics to the corresponding glass tube which it replaces. In Fig. 7 are shown the metal tube pin positions from a bottom socket view.

The shells of metal tubes get quite hot and users should be cautioned against touching them.

Phonograph Connections

A phonograph socket is provided on the R.F. chassis by means of which phonograph connections can be made without electrical changes in the chassis. The receiver is shipped from the factory with a plug in this socket. If no phonograph is used this plug must be inserted as it completes the signal diode circuit for radio reception.

Two sets of accessories are supplied for phonograph connections for this model. One set is used when the phonograph is contained in a separate cabinet, and the other set is used when the phonograph and radio are in a combination cabinet. The electrical connections are the same in both cases and are illustrated in Fig. 15 (A). Parts required in either case are shown in the parts list in this manual.

Phonograph in Separate Cabinet

For this assembly, a 5 conductor cable and a small metal panel assembly are supplied. This assembly has the radio-phono switch, tip jacks for pick-up leads and terminal plate for phono cable.

The phono panel is mounted at the most convenient place in the cabinet at which connections can be completed. The switch is secured to the motor board as illustrated in Fig. 14.

The socket at the end of the cable is secured to the terminal plate on the panel and the plug at the other end of the cable is inserted into the phono socket on the R.F. chassis.

When the switch is thrown to the radio side, the phono pick-up is excluded from the signal diode circuit. When it is thrown to the phono side, the signal diode circuit is opened and the phonograph connections completed to this circuit. Resistor R23 is short circuited. This brings the grid and cathode of the 76 A.V.C. amplifier to the same potential and causes a plate current in this tube of sufficient intensity to bring the R.F. and 1st I.F. tubes to the point of cut off (See article on circuit for further information regarding operation of A.V.C. system).

Phonograph and Radio in Combination Cabinet

For this assembly, a number of separate items as shown in the parts list are supplied. The phono short circuiting plug supplied with the receiver is used after certain changes have been made.

First take off the shell of this plug by twisting the shell in either direction. The shell is then drilled and equipped with a rubber grommet as shown in Fig. 13 (B). Next unsolder and remove the jumper wire from the plug as shown in Fig. 13 (A). Extend the leads through the hole in the shell and solder the leads to the prongs on the plug as illustrated. Complete the connections to the switch and tip jacks as shown. The switch is mounted on the motor board and the tip jacks at the nearest convenient place.

The description of the connections as given for the separate phonograph cabinet also applies to the combination

Alignment and Calibration

Correct alignment is extremely important in connection with all-wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 1800, 5000, 18,300, 15,000, 6000, 48,000 and 40,000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator to the grid of the 1st detector through a 0.1 mf. condenser.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 4.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C54) until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Re-tighten the set screw.

Adjust the 1st and 2nd interstage Range B trimmers (C17 and C18) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C56) until maximum output is obtained. See Fig. 6 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C16 and C19) and antenna Range C trimmer (C4) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C57) until maximum output is obtained. See Fig. 6 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C15 and C20) and antenna Range D trimmer (C5) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

Range E Alignment

48,000 KC Adjustment

Set the signal generator for 48,000 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range E position (3rd short wave band—brown dial color).

Adjust the oscillator Range E trimmer (C50) until maximum output is obtained. See Fig. 6 for location of this trimmer.

40,000 KC Adjustment

Set the signal generator for 40,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range E trimmer (C14) and antenna Range E trimmer (C6) to maximum.

Do not change the setting of the oscillator Range E trimmer.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 9. In contact locations not used, the number applying to that particular location is not employed.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver in the fact that special twenty-five cycle filament and "B" power transformers must be used. It also has two additional condensers in the power unit—C67 and C68 as illustrated in Fig. 3. The twenty-five cycle transformers and the condensers are shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply if the two condensers C67 and C68 are removed. However, the reverse is not true, that is, a sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

115-230 Volt, 40 to 60 cycle filament and "B" power transformers are also available for this model.

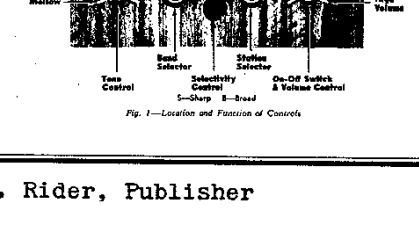


Fig. 1—Location and Function of Controls

MODEL 6F Series
Resistance
Parts

WELLS-GARDNER & CO.

TRANSFORMERS AND COILS

New Part No.	Code	Winding	List Price
P-9A428	T1	Antenna R.F. Transformer and Can Assembly	$4.05
P-9A435	T2	"E" Range Antenna R.F. Coil Assembly	.85
P-9A429	T3	1st Interstage R.F. Transformer and Can Assembly	3.40
P-9A436	T4	"E" Range Interstage R.F. Coil Assembly	.60
P-9A430	T5	2nd Interstage R.F. Coils Assembly	3.50
P-9A432	T6	1st I.F. Transformer and Can Assembly	3.05
P-9A433	T7	2nd I.F. Transformer and Can Assembly	3.05
P-9A434	T8	3rd I.F. Transformer and Can Assembly	3.00
P-9A431	T9	Oscillator Coils and Can Assembly	3.50
P-9A437	T10	"E" Range Oscillator Coil Assembly	1.00
*P-53X88	T11	Filament Transformer (115 Volt - 60 Cycle)	6.85
*P-53X106		Filament Transformer (115 Volt - 25 Cycle)	13.30
*P-53X104		Filament Transformer (115-230 Volt; 40-60 Cycle)	11.50
*P-53X85	T12	"B" Power Transformer (115 Volt - 60 Cycle)	8.65
*P-53X105		"B" Power Transformer (115-230 Volt; 40-60 Cycle)	15.00
*P-53X107		"B" Power Transformer (115 Volt - 25 Cycle)	17.50
*P-50X25	T13	Audio Input Transformer	5.35
*P-51X33	T14	Audio Output Transformer	6.65
P-9A391	L1	"E" Range Interstage Plate Reactor	.25
P-9A450	L2	2nd I.F. Plate Isolating Reactor	.55
P-9A391	L3	High Frequency Oscillator Tracking Coil	.25
*P-52X35	L4	Filter Reactor	8.45
*	L5	10 KC Reactor (Part of P-48X201)	.85
*P-52X36	L6	Filter Reactor	3.55
*P-48X201	B1	Block Condenser (C59 & C60) and 10 KC Reactor—(L5) Assembly	2.35

*These items are part of the A.F. Chassis. All others are on R.F. Chassis.

DIAL AND DRIVE ASSEMBLY

New Part No.	Old Part No.	Description	List Price
		Dial Assembly Complete Less Large Pointers, less Pilot Lamp Sockets and Bulbs	$5.75
P-28X35		Gear Spreader Springs Only	.10
P-28X49		Tension Pulley Spring Only	.10
P-8X36		Drive Belt	.20
P-28X45		Pointer Slide Take-up Spring	.10
P-10X9		4 Inch Indicator Cords doz.	.10
P-29X51		Brass Collars and Set Screws only for securing above Drive Cords to Shaft	.20
		Dial Strip Only (Specify Series No. and Name of Receiver)	.65
P-30X43		Dial Clamp to secure Dial Strip to Frame (with 6-32 x 3/16" Mounting Screw)	.10
		Double End Pointer (Specify Series No. and Name of Receiver)	.10
P-15X26		Micrometer Pointer	.10
P-7A26	2012	Pilot Lamp Bulb (6 - 8V)	.15
P-7A34		Pilot Lamp Sockets and Spring Clip	.15

PHONO ATTACHMENT PARTS

(The following parts are recommended for use when Radio and Phonograph are in separate cabinets)

The first two items only are required

New Part No.	Old Part No.	Description	List Price
P-13X228		Phono Cable (20 feet long)	$5.25
P-13A7		Phono Panel and Switch Assembly Complete	4.15
		The following items are part of the phono panel and switch assembly (P-13A7) listed above and may be purchased separately:	
P-25X263		Phono Attachment Panel Only	2.40
P-2A50		Phono Switch	.60
P-3A12	1193	Phono Jack	.10
P-6A205		6 Prong Phono Cable Pin Plate	.10
P-19X6	20351	Flat Washers	.10
P-10A36	2122	Switch Knob	.20

(The following parts are recommended for use when Radio and Phonograph are in the same cabinet)

The first item only is required

P-13A8		Complete Phono Kit (includes all following parts)	1.20
P-6X2	10153	Rubber Grommet	.10
P-2A50		Phono Switch	.60
P-3A12	1193	Phone Jack	.10
P-10A36	2122	Switch Knob	.20
5 Ft.		Shielded Hook-up Wire	.20

Prices Subject to Change Without Notice.

D. C. Resistance of Windings

Refer to Figs. 12, 2 & 3.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A428	Antenna R.F. Transformer	T1	
	Range B Primary Winding		22.8
	Range C Primary Winding		0.35
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A435	"E" Range Antenna R.F. Coil	T2	Small
P-9A429	1st Interstage R.F. Transformer	T3	
	Range B Primary Winding		3.7
	Range C Primary Winding		2.5
	Range D Primary Winding		0.5
	Range B Secondary Winding		5.8
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A436	"E" Range Interstage R.F. Coil	T4	
	Tap to either side		Small
P-53X85	"B" Power Transformer (115 Volts 60 Cycles)	T12	
	Primary Winding		1.9
	Secondary Winding		
	Center Tap to Inside		48.0
	Center Tap to Outside		53.1
P-50X25	Audio Input Transformer	T13	
	Primary Winding		
	Tap to Plate of 6F7		6600.
	Tap to Tone Control and Plate of 6B7		4650.
	Secondary Winding		
	Center Tap to Inside		2840.
	Center Tap to Outside		3260.
P-51X33	Audio Output Transformer	T14	
	Primary Winding		
	Center Tap to Inside		19.7
	Center Tap to Outside		22.4
	Secondary Winding		0.4
P-12A206	12" Dynamic Speaker		
	Speaker Voice Coil		6.3
	Speaker Field	L7	4500.
P-12A213	12" Dynamic Speaker		
	Speaker Voice Coil		6.3
	Speaker Field	L8	4500.
P-9A391	"E" Range Interstage Plate Reactor	L1	1.0
P-9A450	2nd I.F. Plate Isolating Reactor	L2	35.0
P-9A391	High Frequency Oscillator Tracking Coil	L3	1.0
P-52X35	Filter Reactor	L4	51.6
P-52X36	Filter Reactor	L6	11.2
P-48X201	Block Condenser & 10 KC Reactor Assembly	B1	
	10 KC Reactor	L5	0.6
P-9A430	2nd Interstage R.F. Coils	T5	
	Range B Section		
	Long Portion		5.6
	Short Portion		0.2
	Range C Section		
	Long Portion		1.9
	Short Portion		0.2
	Range D Section		Small
P-9A432	1st I.F. Transformer	T6	
	Primary Winding		4.4
	Coupling Winding		0.3
	Secondary Winding		
	Tap to Condenser Side		3.0
	Tap to Switch Side		1.3
P-9A433	2nd I.F. Transformer	T7	
	Primary Winding		4.4
	Coupling Winding		0.3
	Secondary Winding		
	Tap to Condenser Side		3.0
	Tap to Switch Side		1.3
P-9A434	3rd I.F. Transformer	T8	
	Primary Winding (Yellow to Blue)		9.7
	Signal Diode Secondary		12.4
	A.V.C. Secondary (Brown to Green)		7.0
P-9A431	Oscillator Coils	T9	
	Range B Grid Coil		
	Red-White tap to White		3.0
	Red-White tap to Black-Yellow		0.8
	Range C Grid Coil		
	Green-White tap to Green		1.7
	Green-White tap to Black-Yellow		0.5
	Range D Grid Coil		
	Black-White tap to Black		Small
	Black-White tap to Black-Yellow		Small
	Oscillator Range D Plate Coil		0.2
P-9A437	"E" Range Oscillator Coils	T10	
	Range E Grid Coil		Small
	Range E Plate Coil		.4
	Range E Series Grid Coil		Small
P-53X88	Filament Transformer (115 Volts 60 Cycles)	T11	
	Primary Winding		4.4
	Filament Transformer Secondaries, below		
	Red to Red		Small
	Black to Black		Small
	Yellow to Yellow		Small
	Green to Green		Small
	Black to White		22.8
	Red-White to Red		32.9