The Crosley Service Bulletin

The Crosley Radio Corporation, Cincinnati, Ohio

Model 122

Specifications

This is a superheterodyne receiver quite similar in general design to Model 120, except that it is built on a compact midget chassis. It is for operation from A. C. house lighting circuits and is supplied for 110 volt 25 to 50 cycles, 110 volt 60 cycles, or 220 volt 25 to 60 cycles.

The receiver has seven tubes, a -35 radio-frequency amplifier, a -24 pliodynatron oscillator, a -24 first detector, a -35 intermediate frequency amplifier, a -24 second detector, one pentode a. f. amplifier, and a -80 rectifier.

Installation Notes

The receiver is quite sensitive and requires an antenna of but moderate size.

Care should be taken to use only -24 type tubes of the highest quality for the oscillator. An imperfect oscillator tube will, of course, make reception poor or impossible.

Circuit

For a discussion and explanation of the operation of superheterodynes in general, and a discussion of some of their general characteristics, refer to Service Bulletin No. A-1, March 15, 1931, describing chassis 120.

The circuit of this receiver is quite similar to that of Model 120. It incorporates one stage of tuned radio-frequency amplification, an oscillator, a first detector, an intermediate frequency amplifier stage tuned to 175 kilocycles, a second detector, and pentode audio stage.

Air core radio-frequency transformers are used between the antenna circuit and the radio-frequency amplifier tube, the radio-frequency amplifier tube and the first detector, the first detector and intermediate-frequency amplifier tube, and between the intermediate amplifier and the second detector. Coupling between the second detector and the pentode audio stage is by means of resistance coupling.

The grid circuits of the radio frequency and first detector tubes, and the plate circuit of the oscillator are tuned by variable condensers operated together by the station selector. These are equipped with aligning condensers, for adjusting the tuning condensers so that they track together. (See Service Bulletin No. A-1).

The primary and secondary of the intermediate frequency transformer, between the first detector and the intermediate frequency amplifier, are tuned by small, adjustable condensers. These circuits are adjusted accurately to 175 kilocycles at the factory, and should not be readjusted unless absolutely necessary, and then only with adequate equipment.

The oscillator is of the special Crosley pliodynatron type.

The power transformer has a power switch in its primary circuit, and has three secondaries. One of these secondaries supplies the filament of the rectifier tube, a second supplies the filaments of the other tubes, and a third is the high voltage secondary connected to the plates of the rectifier.

The negative side of the plate supply circuit is connected from a middle tap of the high voltage secondary through the speaker field coil, to the chassis. This method of connecting the field coil utilizes it for a filter choke for the entire plate supply. Two mershon condensers are employed, one from each side of the field coil to the positive high voltage supply.

The positive side of the plate supply circuit is connected from one side of the rectifier filament to the high side of the voltage divider from which taps are taken off to supply the plates and screen grids of all tubes but the output stage. Connection to the plate of the pentode output tube from the positive plate supply circuit is made inside the speaker, through the primary of the output transformer.

The positive plate supply circuit connects to the detector plate through a 60,000 ohm filter resistor, a 300,000 ohm coupling resistor, and a radio-frequency choke coil. It is connected to the plate of the intermediate-frequency amplifier, first detector, and radio-frequency tube through the primaries of the interstage radio-frequency and intermediate-frequency transformers.

The biasing of all tubes but the pentode is accomplished by resistors in the emitter circuits. The pentode tube obtains its bias by returning its grid through a one megohm hum filter resistor to the negative side of the field coil. The voltage across the field coil furnishing the bias. The volume control varies the biasing resistance in the emitter circuits of the radio-frequency and intermediate-frequency amplifier tubes and varies the resistance between antenna and ground.

A series resistor and condenser connected from the pentode plate to the chassis is used as a tone control.

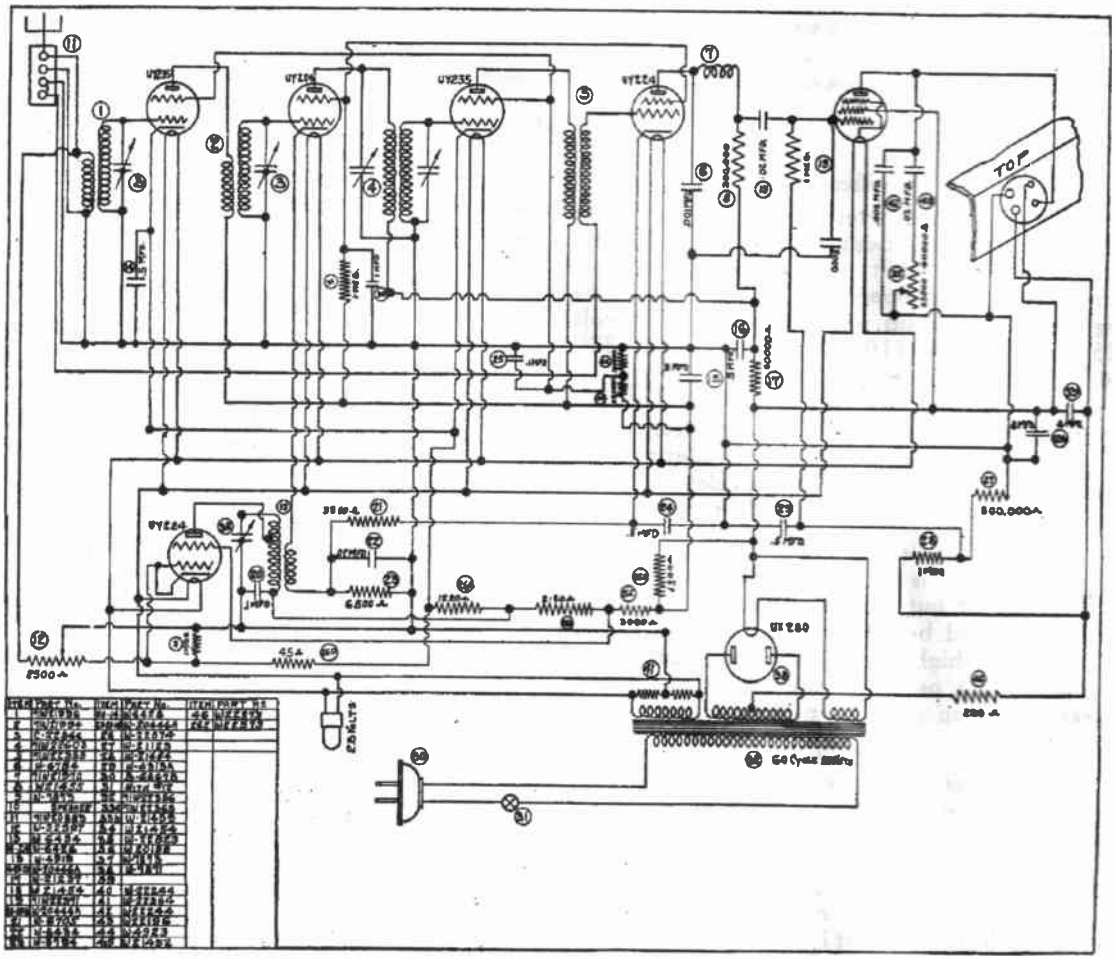


Fig. 1—Circuit Diagram Model 122

NOTE: Item 43 in above parts list should be No. W21876, item 44 should be No. W5370, and item 26 E should be W22906

Alignment of Tuning Condensers and Intermediate-Frequency Amplifier

The procedure is similar to that for Model 120, described in Bulletin No. A-1, March 15, 1931, except that only the first intermediate frequency transformer need be adjusted. The second is inherently tuned to 175 kilocycles and cannot get out of adjustment. Aligning has been further simplified by the elimination of the series padding condenser which is in the oscillator circuit of Model 120. The rotor plates of the oscillator tuning condenser have been so designed as to make this adjustment unnecessary.

The alignment of the tuning condensers is a process requiring considerable skill, and should only be undertaken when absolutely necessary, and only by those who have had extensive servicing experience. While station signals can be used for aligning, it is advised that a local modulated oscillator be employed. The procedure for aligning the tuning condensers is as follows:

1. Tune to a signal between 1300 and 1400 kilocycles.

2. Turn the volume control all of the way on. If all signals within the required range are too loud, connect a 0.00025 m. f. fixed condenser between the "A" and "G" terminals, and then couple the antenna very loosely to a wire connected to the "A" terminal.

3. If, when carefully tuned to the middle of the band, the dial reading does not correspond to the frequency of the signal, but is not more than two channels off, set the dial at the correct frequency, and adjust the padding condenser on the oscillator tuning condenser (the tuning condenser nearest the front of the chassis) until the signal is loudest. Check the tuning by re-adjusting the station selector. It may not be possible to regulate the oscillator padding condenser so that the oscillator con-

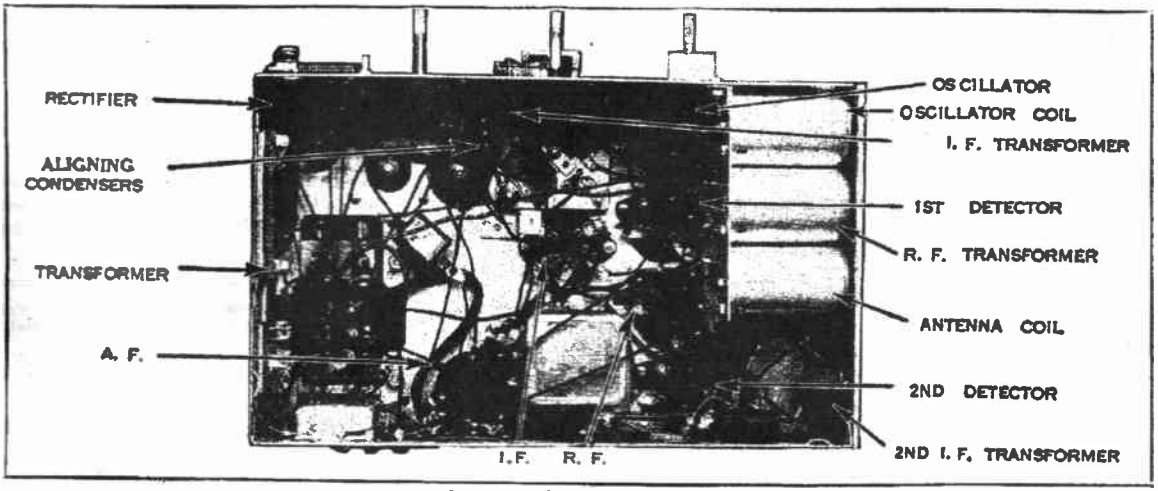


Fig. 2—Bottom View, Model 122 Chassis

denser is properly aligned with the exact dial setting, in which case align the padding condenser with a dial setting as close to the actual frequency as practicable.

4. After aligning the oscillator padding condenser, re-tune to a frequency between 1300 and 1400 kilocycles and carefully adjust the padding condensers on the other two tuning condensers until the signal is received with greatest volume.

5. If a screwdriver of insulating material is not available, adjustment may be made with an ordinary screwdriver by turning the screw slightly, removing the screwdriver, and re-tuning—repeating this process (being sure to turn the screw in such a direction that the tuning approaches more nearly the desired frequency, of course) until the dial setting agrees with, or approximates, the actual signal frequency.

Aligning Intermediate Frequency Stages

The primary and secondary circuits of the intermediate amplifier transformer must be tuned accurately to 175 kilocycles. They are aligned carefully at the factory, and no change should be necessary. In order to align them, an accurately tuned local oscillator operating at 175 kilocycles is essential. The procedure is as follows:

1. A local oscillator tuned accurately to 175 kilocycles frequency is required. Such instruments are supplied by the Weston Electrical Instrument Co., The Jewel Co., the General Radio Corporation, The Radio Products Co., etc.

2. Remove the oscillator tube from the chassis. Remove the clip wire from the first

Voltage Limits

Filament Voltages	
All tubes but rectifier	2.3 to 2.5
Rectifier tube	4.6 to 5.0
Plate Voltages	
1st R. F. and Intermediate Amplifiers	170 to 200
Oscillator	28 to 38
1st Detector and 2nd Detector	185 to 215
Output	280 to 300
Rectifier (A. C. voltage)	280 to 320 each plate
Screen Grid Voltages	
1st R. F. and Intermediate Amplifiers	45 to 55
1st Detector and 2nd Detector	60 to 80
Oscillator	80 to 100
Output	260 to 300
Control Grid Voltages	
1st R. F. and Intermediate Amplifiers	1.5 to 2.5
1st Detector	6.0 to 8.0
2nd Detector	8.0 to 10.0
Output tube	18.0 to 22.0

To be measured with speaker connected, volume control on full, and line voltage of 117½ (235 for 220 volt receivers). Measure plate and grid voltages with a high-resistance D. C. voltmeter (600 ohms or more per volt) from plate or grid tube contact to emitter contact. Use a low range A. C. meter for filament voltages.

detector tube. Connect the test oscillator output from the first detector grid to ground, and adjust the two screws at either side of the front I. F. coil for maximum reading on the output meter. Always re-align the tuning condenser after aligning the I. F. amplifier.

Parts List

INSTRUCTIONS FOR ORDERING—Give part number, and description of part, and serial number of set on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer Orders. Prices are subject to the usual trade discounts.

Qty.	Part No.	Description	List Price Each
		CHASSIS	
1	D-22376C	Chassis	.75
2	W-7871	Socket (4 prong)	.25
6	W-7873	Socket (5 prong)	.30
1	W-22818	Socket Guide (Pen.)	.10
3	W-22819	Socket Guide (224)	.10
2	W-22820	Socket Guide (235)	.10
1	W-7874	Socket Guide (280)	.10
1	W-21297	Socket Guide (280)	.10
1	W-22522	Guide Socket (280)	.15
1	W-20883	Terminal Board (A & G	.20
1	W-22356	Power Trans. (110 V. 60 Cy.)	8.00
	W-22357	Power Trans. (110 V. 25 Cy.)	8.00
	W-22358	Power Trans. (220 V. 25 Cy.)	8.00
2	W-21485	Mershon Socket	.10
2	W-21459	Mershon Condenser (8 mf.)	2.50
1	W-22384	Mershon Insulator Cup	.15
1	W-23112	Volume Control and Switch Assembly	1.50
1	W-22608	I. F. Transformer Assembly	1.75
	W-22018	Base Assembly	.60
	W-22604	Coil Assembly	1.00
	W-21983	Coil Socket	.05
	W-21992	Rubber Spacer	.05
	W-21998	Grid Connector	.10
	W-21991	Coil Shield	.25
1	W-22362	Tube Shield	.25
1	W-20125	Shield Base	.15
1	W-22825	Detector Shield	.25
	W-5054	Rubber Grommet	.10
1	W-22826	Shielded Grid Connector	.20
1	C-22366	Variable Condenser Gang	7.00
2	W-21973	Grid Connector	.10
1	W-22513	Grid Connector	.10
1	W-22330	Dial Drum	.60
1	W-22332	Dial Strip	.40
1	W-22334	Drive Rope	.15
1	W-22460	Drive Bracket	.15
1	W-22461	Drive Shaft with pulley	.25
1	W-22462	Stop Washer	.05
1	W-22463	Stop Washer	.05
1	W-22329	Dial Light Assembly (without lamp)	.20
1	W-22465	Spacer	.05
1	W-22331	Idler Pulley & Bracket	.30
1	W-22469	Spacer	.05
1	W-22464	Spring	.05
		PARTS UNDER CHASSIS	
1	W-22996	Fixed Resistance (2 Lug)	.60
1	W-22364	Fixed Resistance (3 Lug)	.30
1	W-22574	Fixed Resistance (5 Lug)	1.00
1	W-21452	Flexible Resistance (1100 ohms)	.25
1	W-4313	.5 Mfd. Fixed Condenser	.75
1	W-21128	Resistor (500,000 ohms)	.30
2	W-21454	Resistor (Megohm)	.30
1	W-22244	.02 - .002 Fixed Condenser	.60
1	W-22873	Flexible Resistance (220 ohms)	.30
1	W-21876	Resistor (10,000 ohms)	.25
1	W-6428	.5 - .5 Mfd. Fixed Condenser	1.25
1	W-7753	.1 - .5 - .1 Mfd. Fixed Con.	1.50
1	W-21237	Resistor (60,000 Ohms)	.25
1	W-21455	Resistor (300,000 Ohms)	.30
1	W-6434	.02 Mfd. Condenser	.40
1	W-22822	Fibre Retainer	.05
1	W-22823	Tone Control	1.00
1	W-5794	Resistor (6500 ohms)	.25
1	W-6434	.02 Mfd. Fixed Condenser	.40
1	W-21970	Plate Choke	.50
1		R. F. Transformer (Antenna)	1.00
1		R. F. Transformer (Inter.-stage)	1.00
1		R. F. Transformer (Oscillator)	1.00
3	W-22374	Coil Shield	.20
1	B-22373	Mounting Plate	.15
1	W-6705	Resistor (3500 ohms)	.30
1	W-6706	Resistor (25000 ohms)	30
1	W-6754	.001 Mfd. Fixed Condenser	.25
1	W-20188	.1 Mfd. Fixed Condenser	.50
1	W-21454	Resistor (1 meg.)	.30
1	W-4919	.5 Mfd. Fixed Condenser	.75
1	W-22355	I. F. Trans. (Choke Type)	1.00
1	W-22877	Bottom Bracket	.05
1	B-6967	Cable	.50
1	C-22369	Bottom	.20
1	W-22986	.0005 Mfd. Fixed Condenser	.25

Changes In Model 122

The following changes as compared with the circuit diagram shown herein will be found in some chasses.

1. The pentode grid resistor is 300,000 ohms instead of 1 megohm as shown on the diagram.

2. The volume control resistor is 650 ohms instead of 2500 ohms, as shown.

3. The 3,000 ohm resistor shown on the diagram just to the left and above the power transformer is changed to 1790 ohms.

4. The 1100 ohm resistor shunted across a portion of the volume control is deleted.

5. The 25,000 ohm resistor in the r. f. screen grid circuit is replaced by a 20,000 ohm resistor.

Changes In Parts List

The following changes in the parts list of Model 122 receivers apply to later chasses.

Old Part Number	Description	New Part Number
W-22597	Volume Control and Switch Assembly	W-23112
W-21452	Flexible Resistance (1100 ohms)	Deleted
W-22574	Fixed Resistance (5 lug)	W-22574-A
W-6706	Resistor (formerly 25,000 ohms, now 20,000 ohms)	W-5370
W-21454	Resistor (formerly 1 megohm, now 300,000 ohms)	W-21455

Model 123

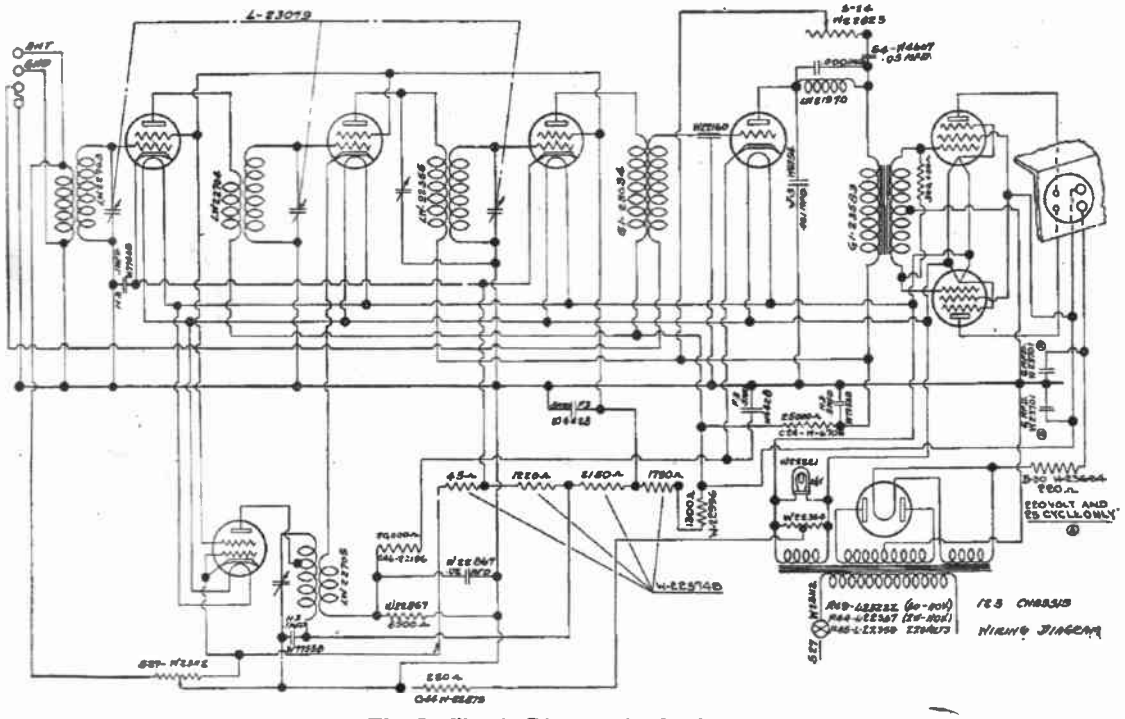


Fig. 3—Circuit Diagram Model 123

Model 123 is the 122 chassis changed so as to have push pull output. A circuit diagram is reproduced herewith (Figure 3).

The important wiring changes are the intro-

Voltage Limits

Filament Voltages	
R. F., First Detector, Oscillator and Second Detector	2.2 to 2.4
I. F. Amplifier	2.2 to 2.5
Output	2.3 to 2.6
Rectifier	4.9 to 5.3
Plate Voltages	
R. F. and I. F. Amplifiers	215 to 245
First Detector	170 to 190
Oscillator	32 to 42
Second Detector	160 to 180
Output	190 to 230
Rectifier, D. C. voltage	290 to 330
Screen Grid Voltages	
Oscillator, R. F. and I. F. Amplifiers	90 to 110
First Detector	80 to 100
Output	200 to 240
Control Grid Voltages	
R. F. and I. F. Amplifiers	1.5 to 2.5
First Detector	7 to 9
Second Detector	18 to 22
Output	13 to 16

Important: See note under "Voltage Limits," Model 122.

Changes In Parts List, Model 123

Use this list in conjunction with Model 122 list in ordering parts:

Qty	Old Part Number	Description	New Part Number
		PARTS DELETED	
3	W-21454	Resistors (1 megohm).....	Deleted
1	W-21876	Resistor (10,000 ohms)	Deleted
1	W-6706	Resistor (25,000 ohms)	Deleted
2	W-6434	0.02 m. f. Fixed Conden.	Deleted
1	W-4313	0.5 m. f. Fixed Coudenser	Deleted
1	W-21123	Resistor (500,000 ohms)....	Deleted
1	W-21455	Resistor (300,000 ohms)....	Deleted
		PARTS CHANGED	
1	W-6428 and W-20446A	Was 0.5-0.4 m. f. Fixed Condenser, now: 0.1 m. f. Fixed Cond.. 0.5 m. f. Fixed Cond. Was 0.1 m. f. Fixed Condenser, now 0.5 m. f. Fixed Cond.....	W-7753B and W-6428
1	W-21237	Resistor (was 60,000 ohms, now 25,000 ohms)	W-6706
2	W-21459	Were 2-8 m. f. Mershou Condensers, now 2-6 m. f. Condensers	W-23701
1	W-22603	I. F. Transformer Assem.	W-22355
		PARTS ADDED	
1		0.05 m. f. Fixed Condenser (Tone control)	W-4607
1		0.0001 m. f. Fixed Condenser (Detector plate choke)	W-7847
1		0.001 m. f. Fixed Condenser (Detector plate bypass)	W-6754
1		Push Pull Input Trans.	G1-23583
1		Resistor (300,000 ohm. A. F. transformer loading resistance)	W-21455

duction of a push-pull pentode output system, with push pull audio transformer instead of a single resistance-coupled output stage, and the change of the detector circuit from screen-grid to triode.

The tubes used are the same as chassis 122 with the exception of the detector, which employs a -27 instead of a -24, and the output, which utilizes two pentodes instead of one.

Model 124

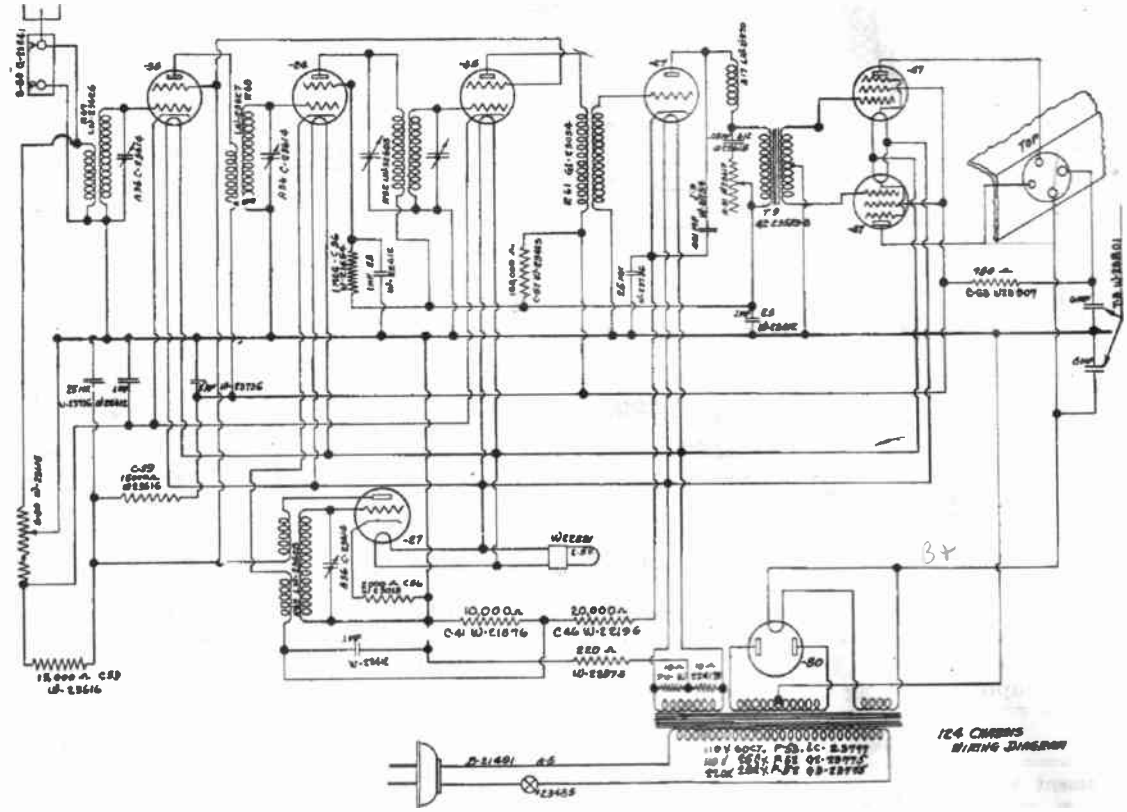


Fig. 4—Circuit Diagram, Model 124

This receiver is very similar in circuit to chassis 123, with the following exceptions:

1. There are no phonograph pick up terminals.

2. A -27 type oscillator is used instead of a -24.

The mechanical layout is quite different.

A circuit diagram is reproduced herewith (Figure 4). The numbers on the circuit diagram correspond with those on the parts list, and may be used for identifying the various parts.

For a description of the various features of the circuit, and for aligning instructions, refer to the discussions of Models 122 and 123.

Voltage Limits

Filament Voltages	
All tubes but rectifier	2.3 to 2.5
Rectifier	4.6 to 5.0
Plate Voltages	
R. F. and I. F. Amplifiers and Output	235 to 265
	170 to 190
First and Second Detectors	60 to 80
Rectifier, D. C. Voltage	300 to 340
Screen Grid Voltages	
R. F. and I. F. Amplifiers	80 to 100
First Detector	55 to 65
Output	230 to 270
Control Grid Voltages	
R. F. and I. F. Amplifiers	1.5 to 2.5
First Detector and Oscillator	7 to 9
Second Detector	18 to 22
Output	15 to 18

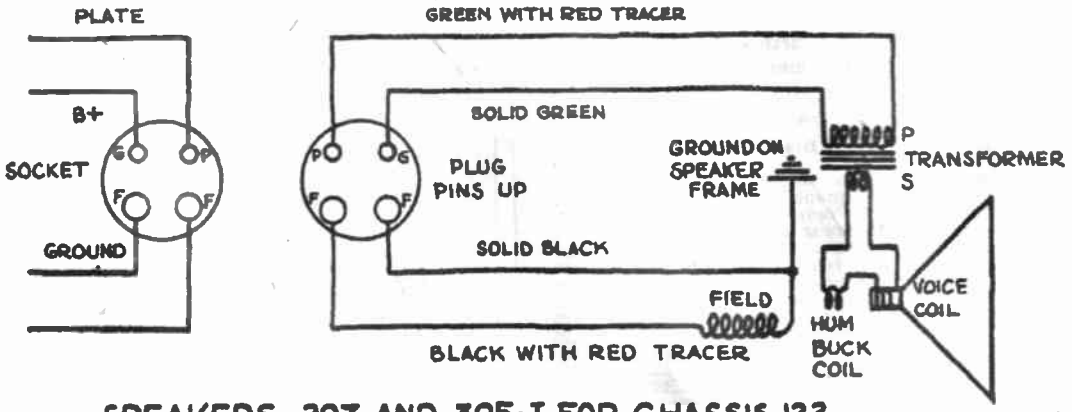
Important: See note under "Voltage Limits."

Parts List—Model 124

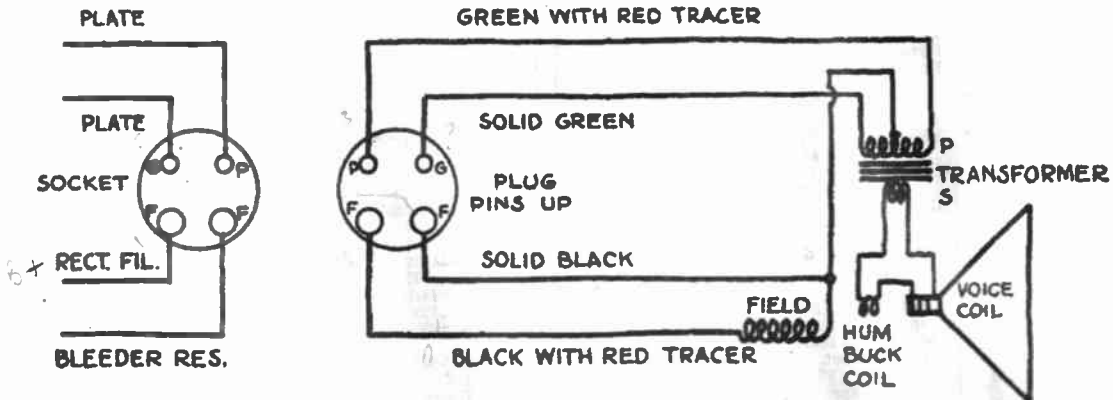
INSTRUCTIONS FOR ORDERING—Give part number, and description of part, and serial number of set on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer Orders. Prices are subject to the usual trade discounts.

Qty.	Part No.	Description	List Price
1	D-23696D	Chassis	.75
1	G1-23800	Four prong Socket (Speaker)	.20
1	G2-23800	Five Prong Socket (24)	.25
2	G3-23800	Five prong Socket ('27)	.25
2	G4-23800	Five prong Socket ('35)	.25
2	G5-23800	Five prong Socket (47)	.25
1	G6-23800	Four prong Socket ('80)	.20
1	G1-23841	Terminal board (A&G)	.20
1	LW-22003	I. F. Coil Assem. (Tuned)	1.75
1	LW-21991	Coil Shield Assembly	.25
1	LW-21993B	Tube Connector Assembly	.10
1	LW-22018C	Base Assembly	.60
1	G2-23583B	A. F. Transformer Assembly	3.00
1	C-23614	Variable Tuning Condenser	6.00
1	G1-23629	Condenser Gang Bracket (Included in Price of Condenser)	
2	G1-23623	Tube Connectors	.10
1	LW-23600	Dial Light Bracket Assem.	.15
1	G1-23080	Dial Drive Assembly	.80
1	LC-23797	Power Trans. 110V.-60Cy.	5.00
1	G2-23775	Power Trans. 110V.-25Cy.	7.00
1	G3-23775	Power Trans. 220V-25Cy.	7.00
		Resistors	
1	W-23013	2,000 Ohm Flexible (Red, red spot, black end)	.25
1	W-21454	1-Megohm (Brown, green spot, black end)	.30
1	W-23403	150,000-Ohm (Brown, yellow spot, green end)	.30
1	W-21876	10,000-Ohm (Brown, orange spot, black end)	.25
1	W-22196	20,000-Ohm (Red, orange spot, black end)	.25
2	W-23016	15,000-Ohm (Brown, orange spot, green end)	.30
1	W-23007	750-Ohm Flexible (Purple, brown spot, green end)	.25
1	W-22873	220-Ohm Flexible (Red, brown spot, red end)	.30
1	W-22417	10-10-Ohm (divided) Resistance	.15
1	W-23618A	Volume Control & Switch	1.50
1	W-23619	Tone Control	1.00
	LB-23625	R. F. Coil Unit Assembly	3.50
1	LW-23626	Antenna Coil	.75
1	LW-23627	Interstage Coil	1.00
1	LW-23628	Oscillator Coil	.75
3	LW-22374	Coil Shield	.20
1	B-23624A	Mounting Plate	.10
1	G1-23634B	I. F. Coil (Untuned)	.50
1	LW-21970	Plate Choke	.50
		Fixed Condensers	
1	W-23615	.05 Mfd.	.25
1	W-22412	.1 - .1 - .1 - .1 Mfd.	1.10
1	W-0754	.001 Mfd.	.25
1	W-22088	.1 Mfd.	.25
1	W-22095	.5 - .1 Mfd.	1.00
1	W-23730	.25 - .5 - .25 Mfd.	1.50
1	W-23621	6 Mfd.	1.50
1	W-23622	8 Mfd.	1.60
1	W-23801	6. and 8. Mfd.	3.00
1	W-23633	Condenser Shelf	.05
1	W-23634	Condenser Clamp	.05
1	B-21491	Cable and Plug	.50
1	C-23613A	Bottom	.20
1	C-23630A	Tube and Condenser Shield	.20
1	W-23880	Thumb Screw	.05
3	G1-23472	Knob	.10
1	LB-21952C	Tennaboard Assembly	.20
1	L-23734	1-H Cabinet (Play Boy)	5.10
	L-23730	1-J Cabinet (Cheerio)	20.35
	L-23732	1-K Cabinet (Merrymaker)	28.35
	L-23802	1-L Cabinet (Announcer)	38.35
	L-23815	1-M Clock Cab. (Playtime)	38.35
1	L-23596	287 Speaker (1-H, 1-J Cab.)	8.00
1	L-23804	306 Speaker (1-K, 1-L, 1-M Cabinet)	10.00
1	LC-23813	Clock Assembly (110V 60Cy)	10.00
	L-23814	Clock Assembly (110V 50Cy)	10.00
	L-23831	Clock Assembly (110V 25Cy)	10.00
	L-23833	Clock Assembly (220V 25Cy)	10.00
	LC-24085	Clock Assembly (8 Day)	10.00

Diagrams of Speaker Connections Models 122, 123, 124



SPEAKERS 297 AND 305-J FOR CHASSIS 122



SPEAKER 287 FOR CHASSIS 123; SPEAKERS 306-J AND 306-M FOR CHASSIS 124