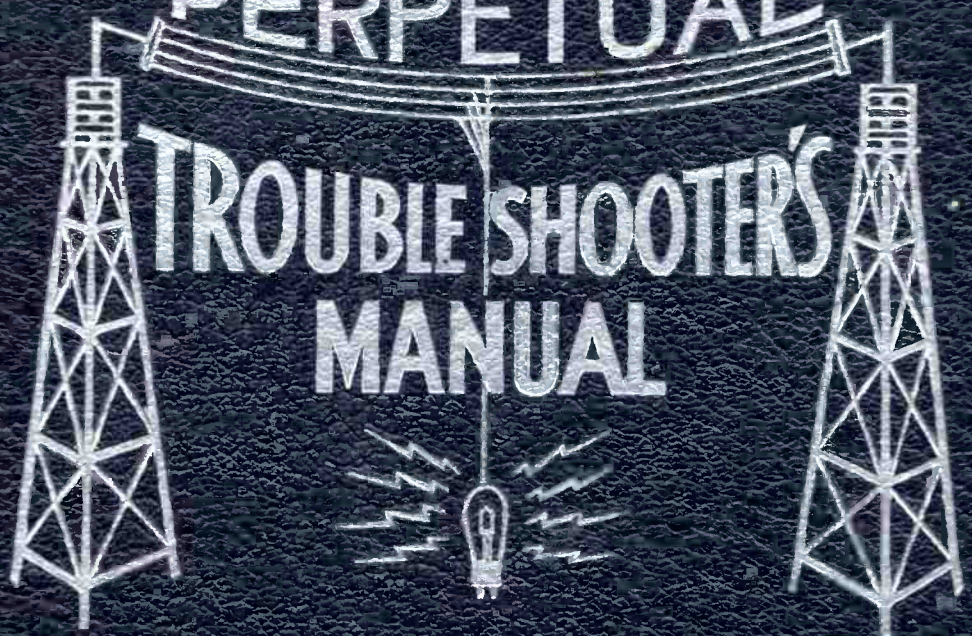
VOLUME II

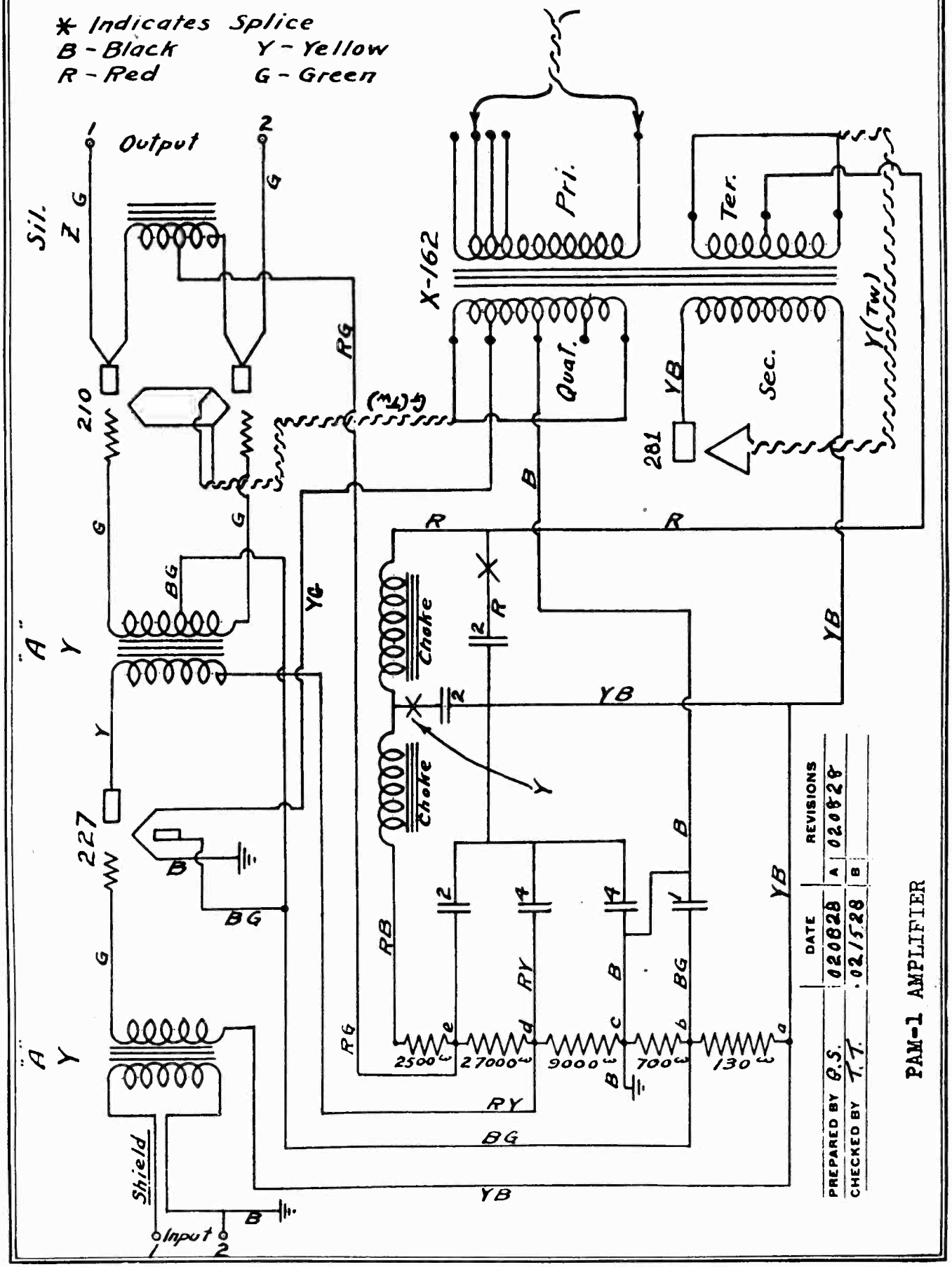
PERPETUAL TROUBLE SHOOTER'S MANUAL



JOHN F. RIDER

MODEL PAM-1

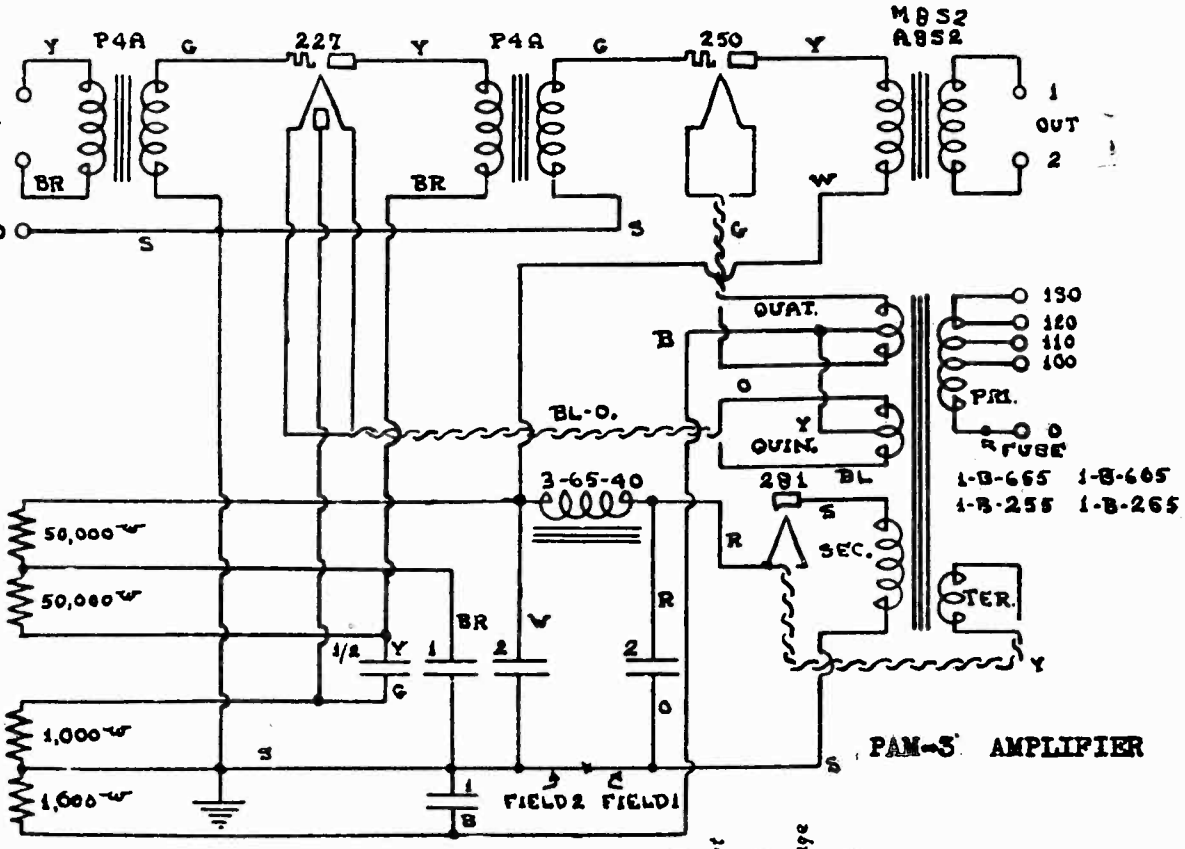
SAMSON ELECTRIC CO.

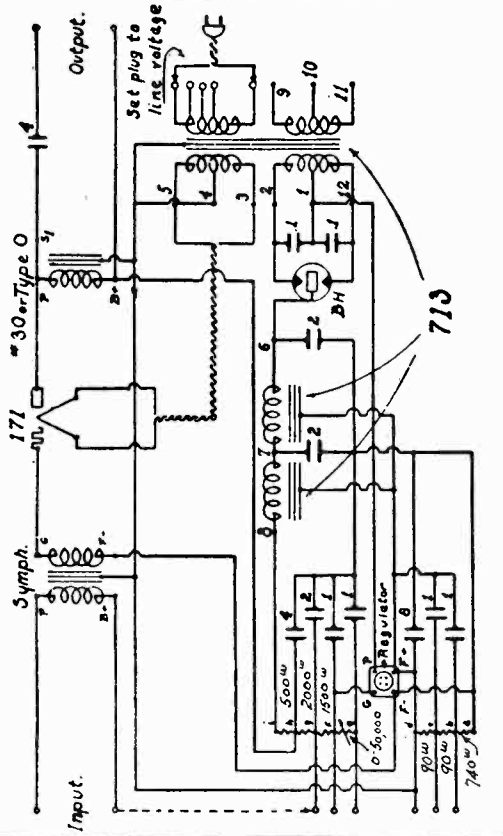


PAM-1 AMPLIFIER

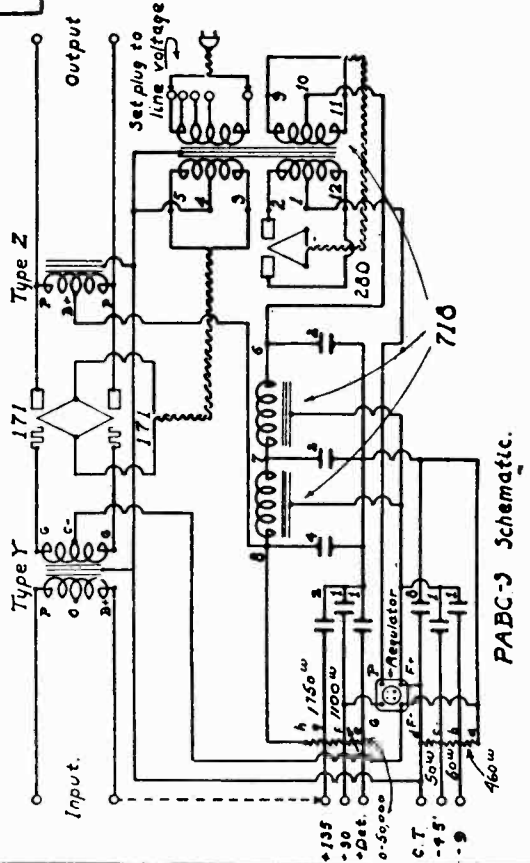
MODEL PABC-2
MODEL PABC-3
MODEL PAM-3

SAMSON ELECTRIC CO.





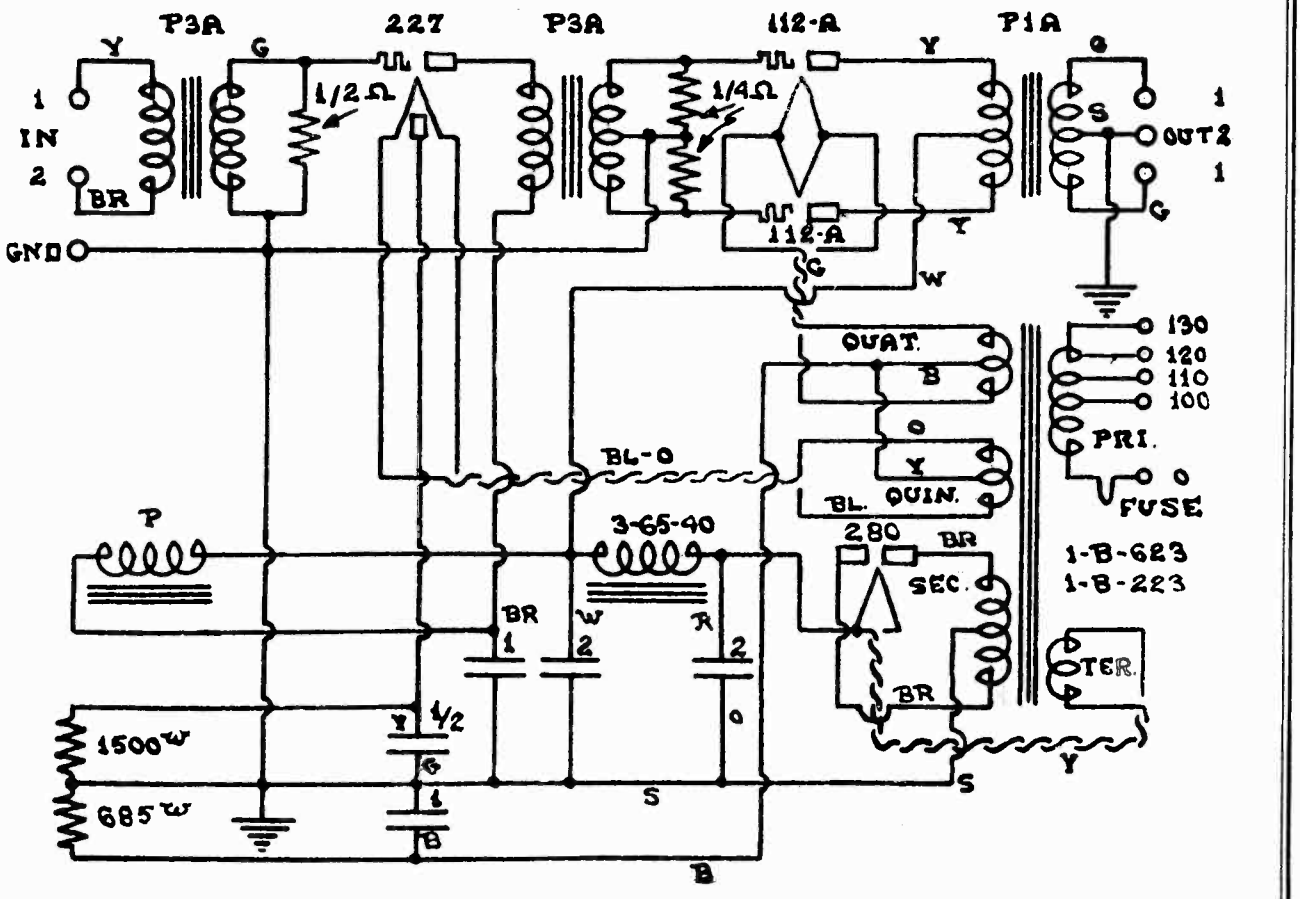
PABC-2 Schematic.



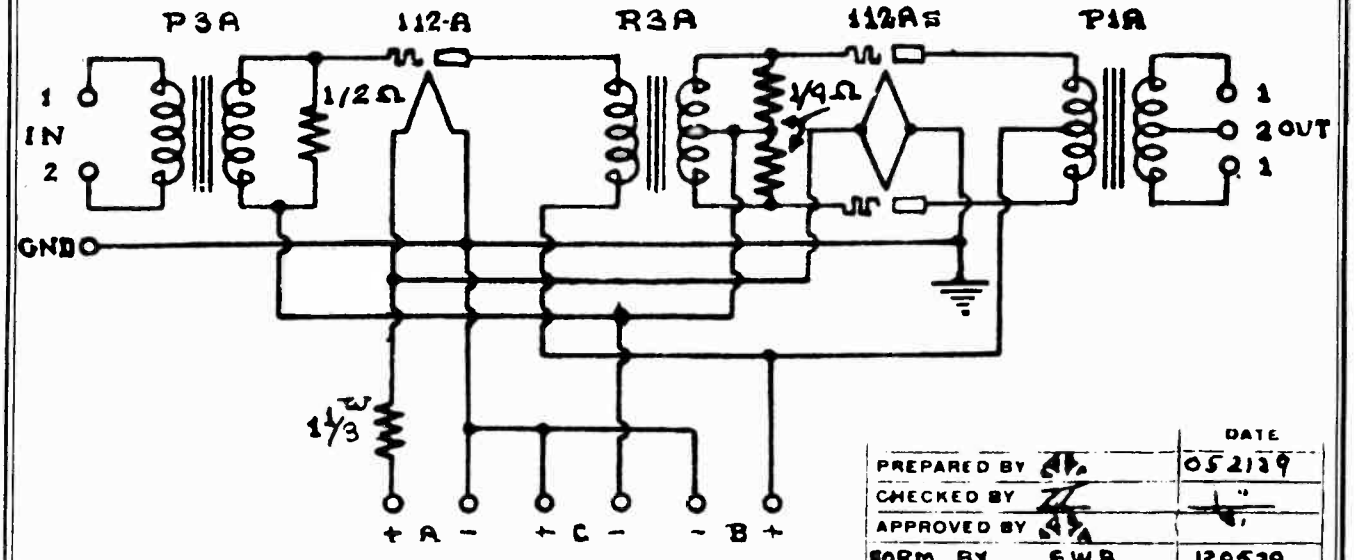
PABC-3 Schematic.

MODEL PAM-5
MODEL PAM-5-D

SAMSON ELECTRIC CO.



PAM-5 AMPLIFIER

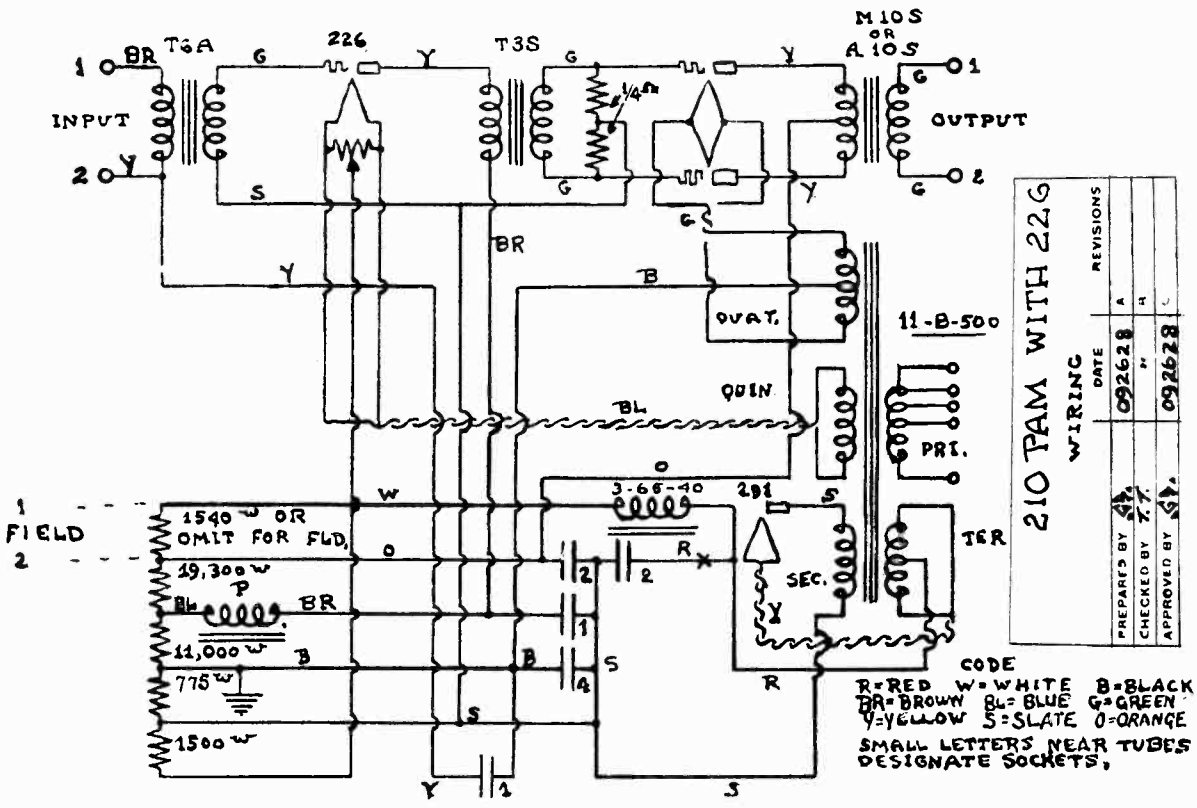


	DATE
PREPARED BY	05 21 39
CHECKED BY	"
APPROVED BY	"
FORM BY E.W.B.	120529

PAM-5-D AMPLIFIER

SAMSON ELECTRIC CO.

MODEL PAM-8,18
MODEL PAM-9



210 PAM WITH 226 WIRING

REVISIONS	DATE	
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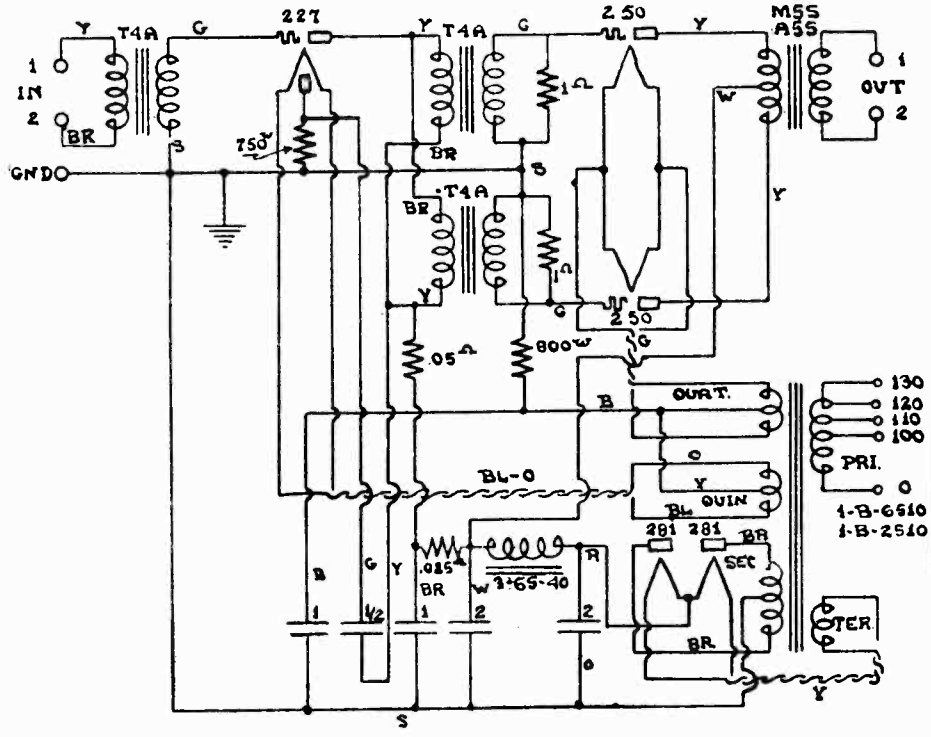
B	"	CHECKED BY
C	092628	APPROVED BY

PAM-8 & PAM-18 AMPLIFIER



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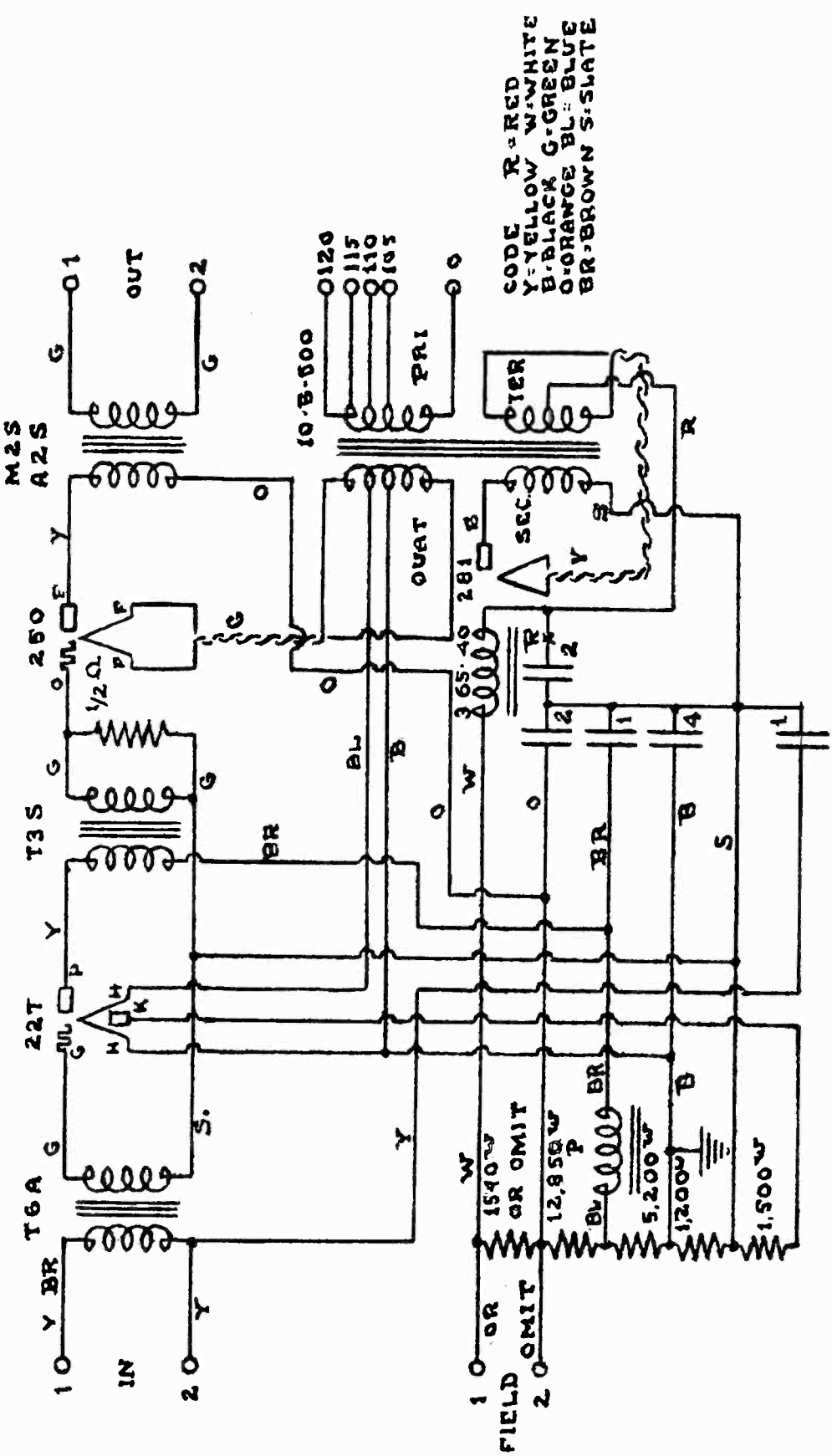
B	"	CHECKED BY
C	"	APPROVED BY
D	081429	FORM BY
E		
F		

PAM-9 AMPLIFIER

MODEL PAM-11;12,13,14

SAMSON ELECTRIC CO.

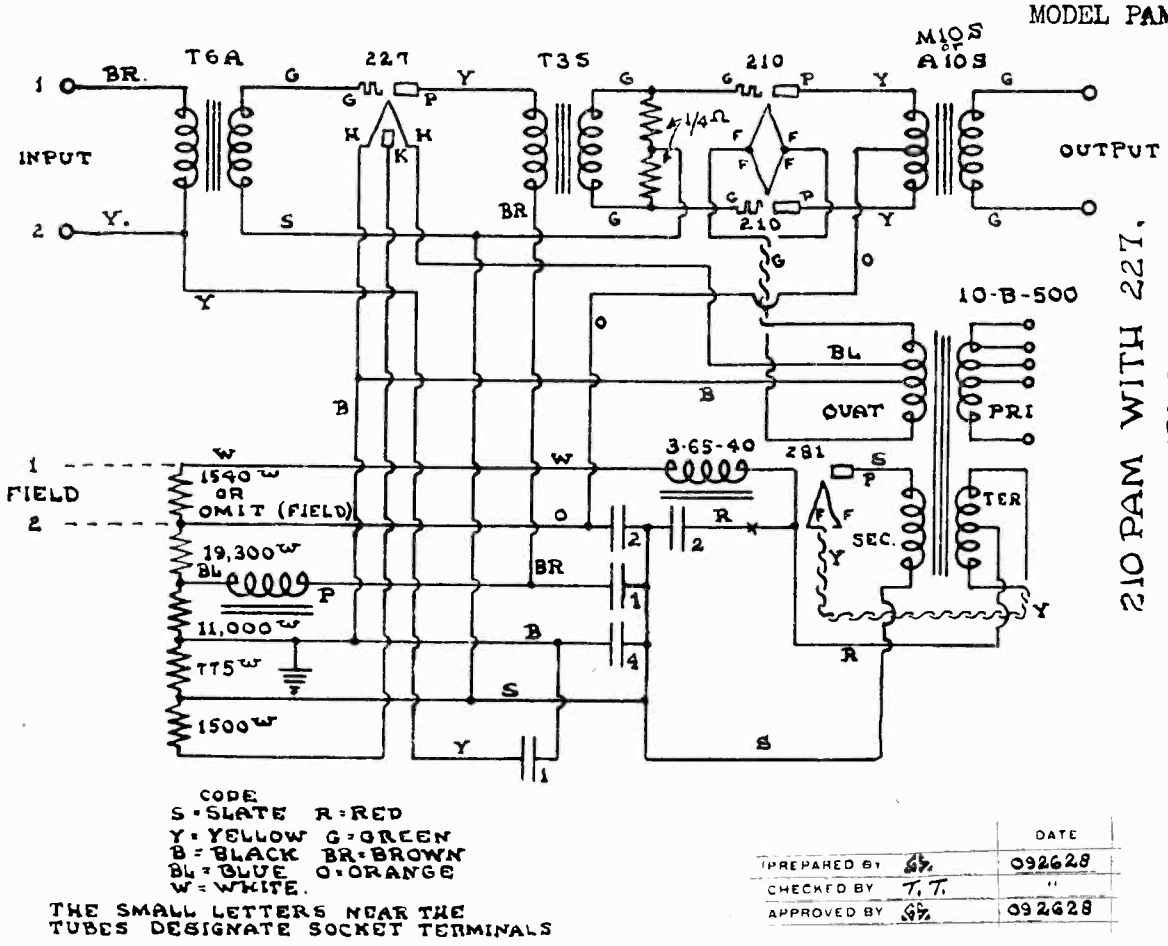


	DATE	REVISION
PREPARED BY SS.	120728	A
CHECKED BY T.T.	"	B
APPROVED BY SS.		C

PAM-11, 12, 13, 14 AMPLIFIERS

SAMSON ELECTRIC CO.

MODEL PAM-16
MODEL PAM-16-N
MODEL PAM-17
MODEL PAM-17-N



210 PAM WITH 227.

WIRING

PAM-16 (No Field)
PAM-17 (Field)

CODE
S = SLATE R = RED
Y = YELLOW G = GREEN
B = BLACK BR = BROWN
BL = BLUE O = ORANGE
W = WHITE.

THE SMALL LETTERS NEAR THE TUBES DESIGNATE SOCKET TERMINALS

		DATE
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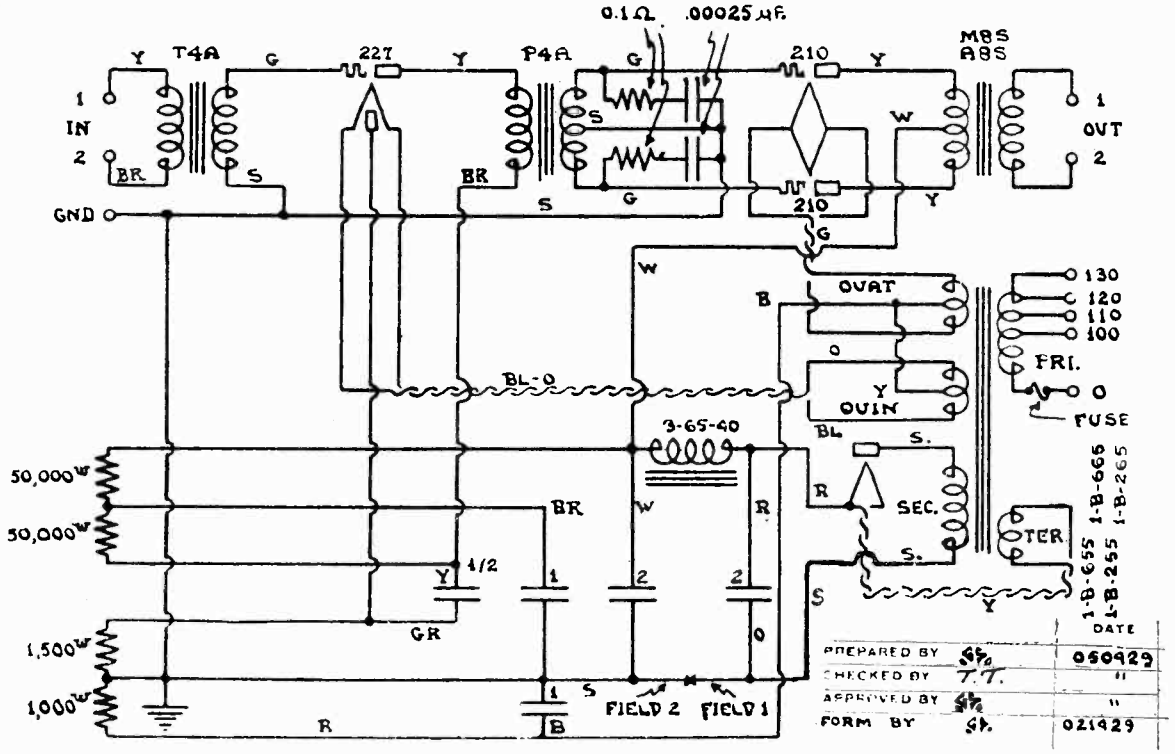
CHECKED BY	T.T.	"
APPROVED BY	GS.	092628

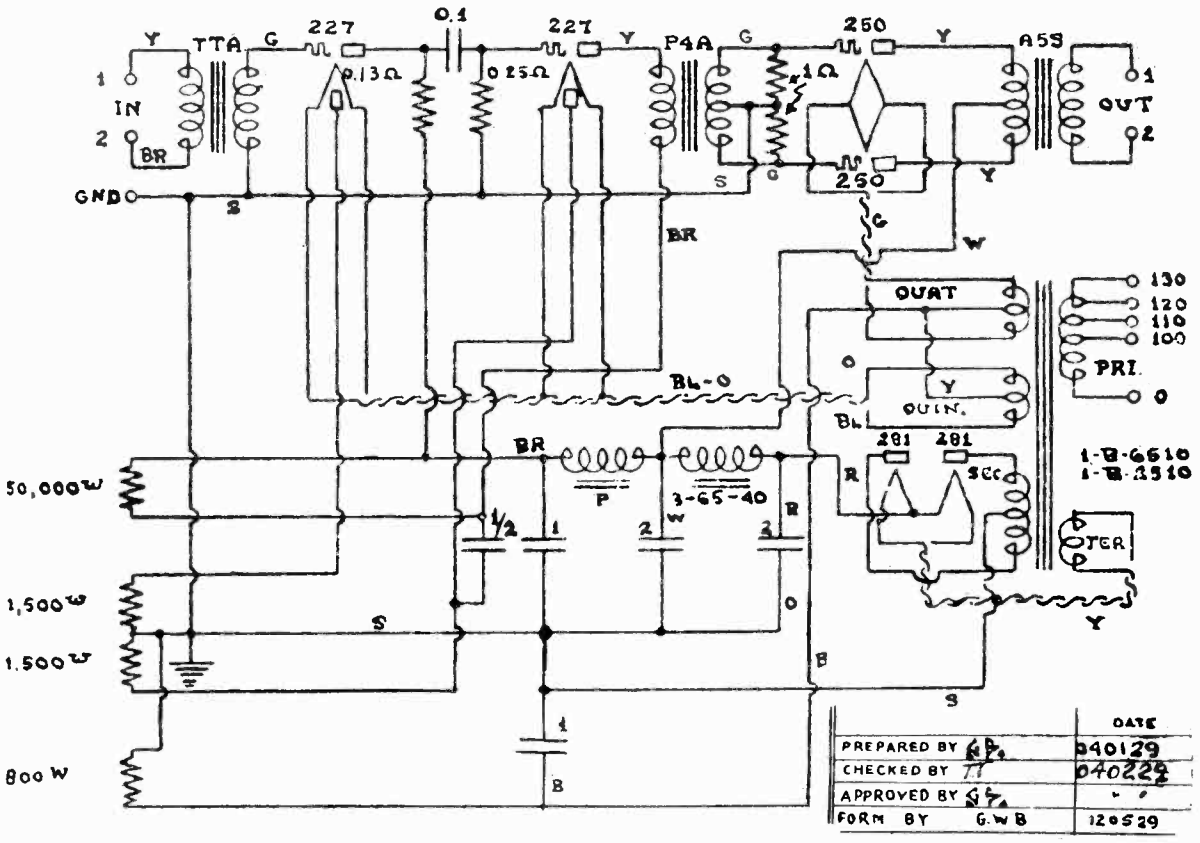


PAM-16-N (No Field)
PAM-17-N (Field)

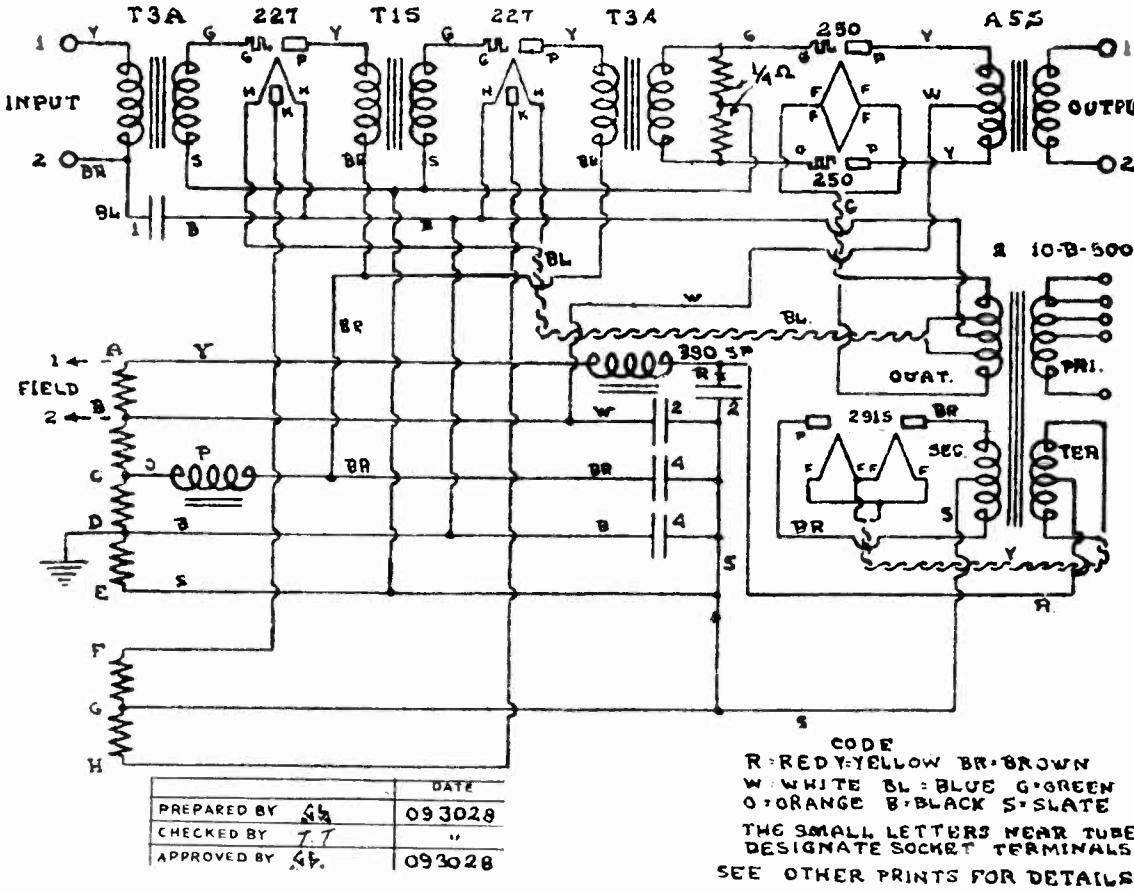
		DATE
PREPARED BY	GS.	050429
CHECKED BY	T.T.	"
APPROVED BY	GS.	"
FORM BY	GS.	021429

SAMSON ELECTRIC CO.

MODEL PAM-19-N
MODEL PAM-19-Q



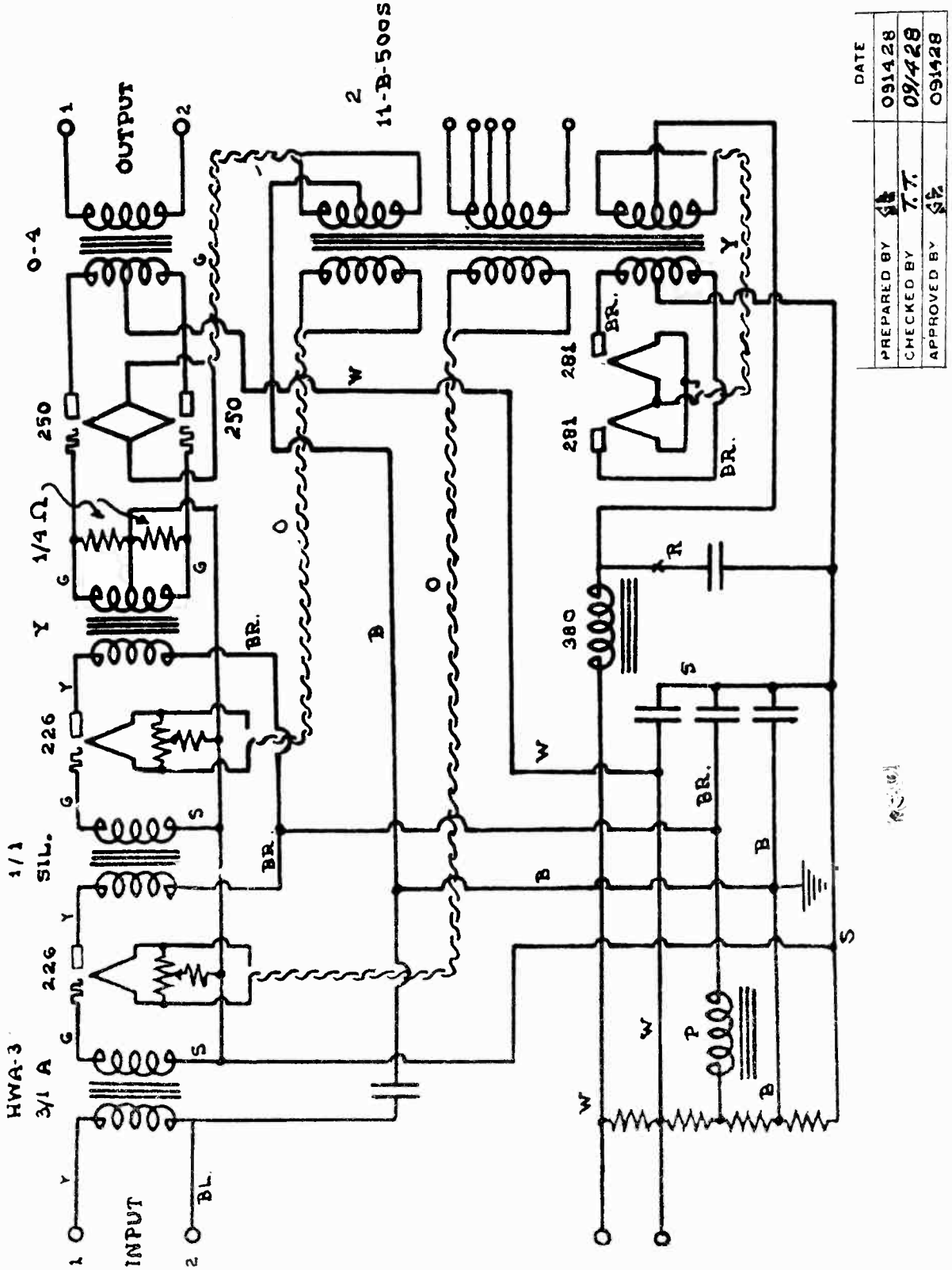
PAM-19-N AMPLIFIER.



PAM-19-Q AMPLIFIER

MODEL PAM-22

SAMSON ELECTRIC CO.

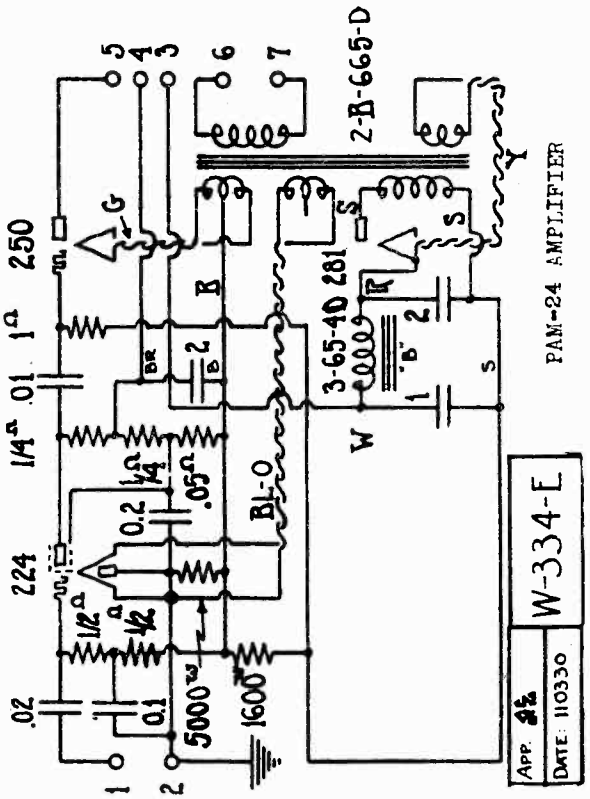


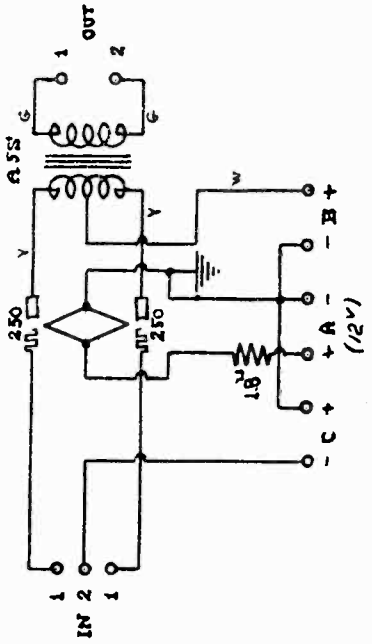
PAM-22 AMPLIFIER

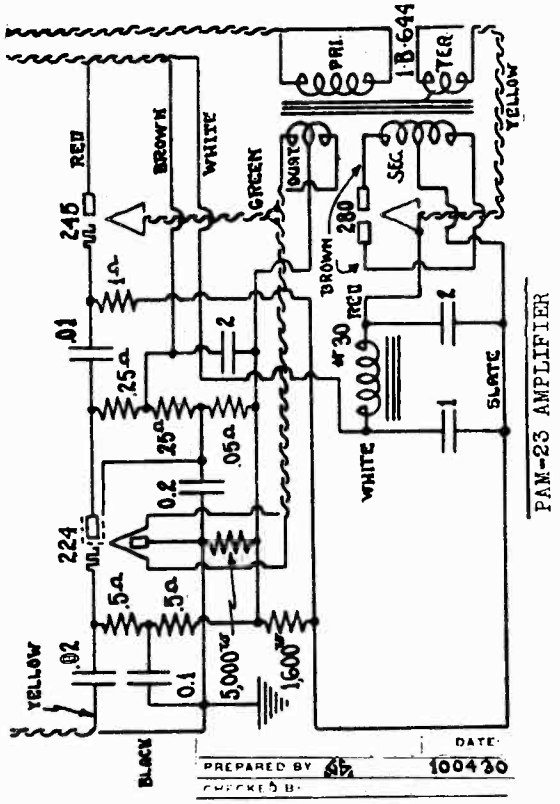
SAMSON ELECTRIC CO.

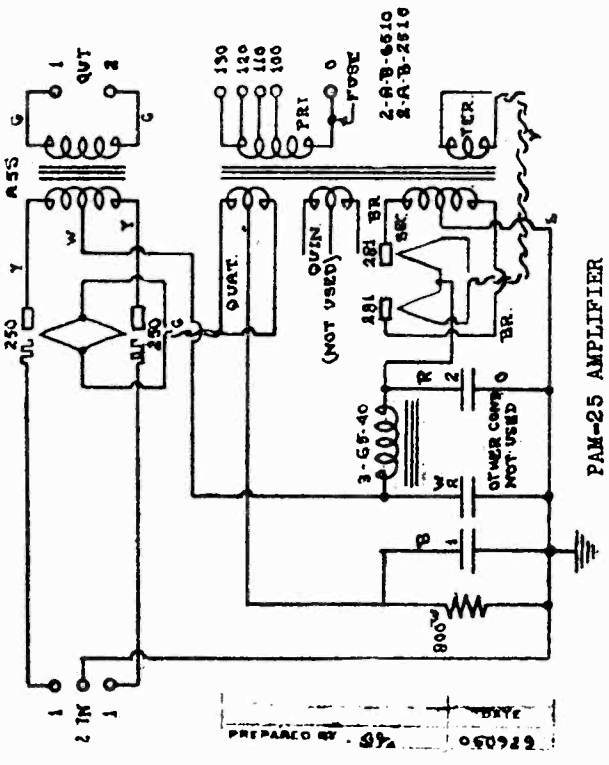
MODEL PAM-23
MODEL PAM-24
MODEL PAM-25
MODEL PAM-25-D

PAM-23, 24, 25 & 25-D AMPLIFIERS



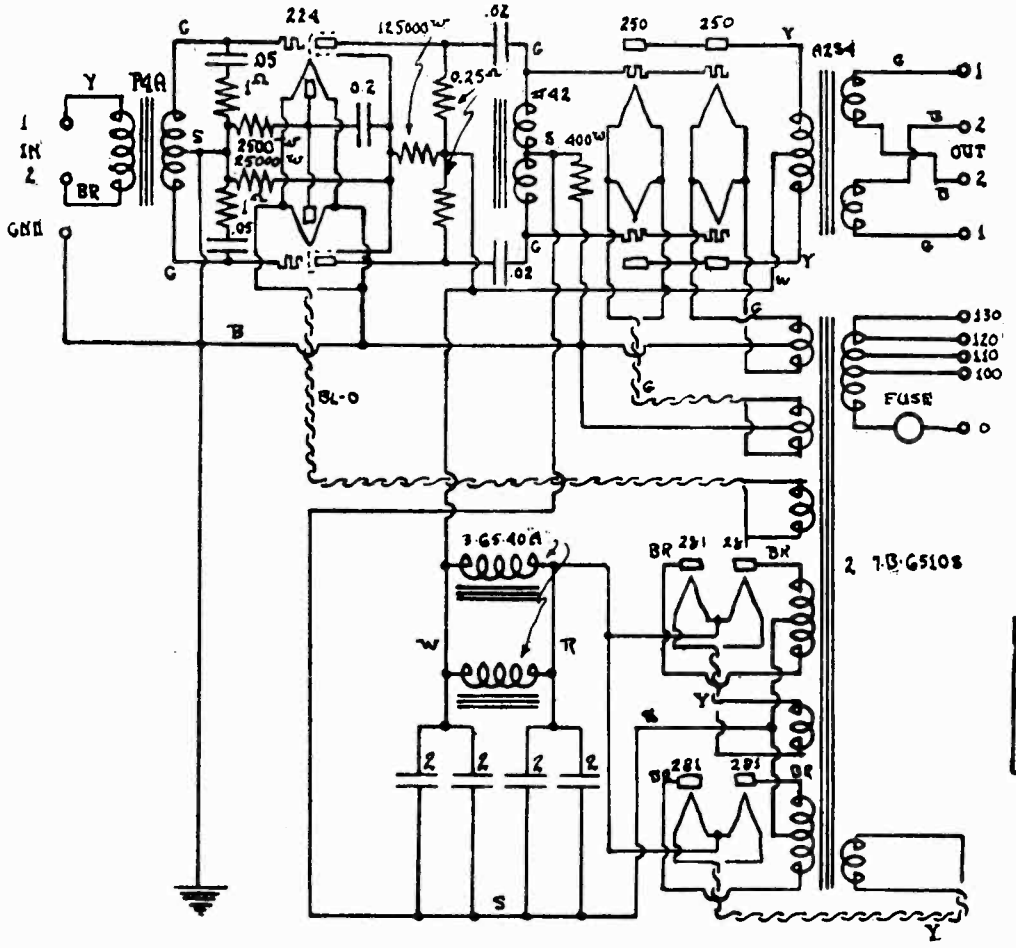






MODEL PAM-29
MODEL PAM-39

SAMSON ELECTRIC CO.



REVISIONS			
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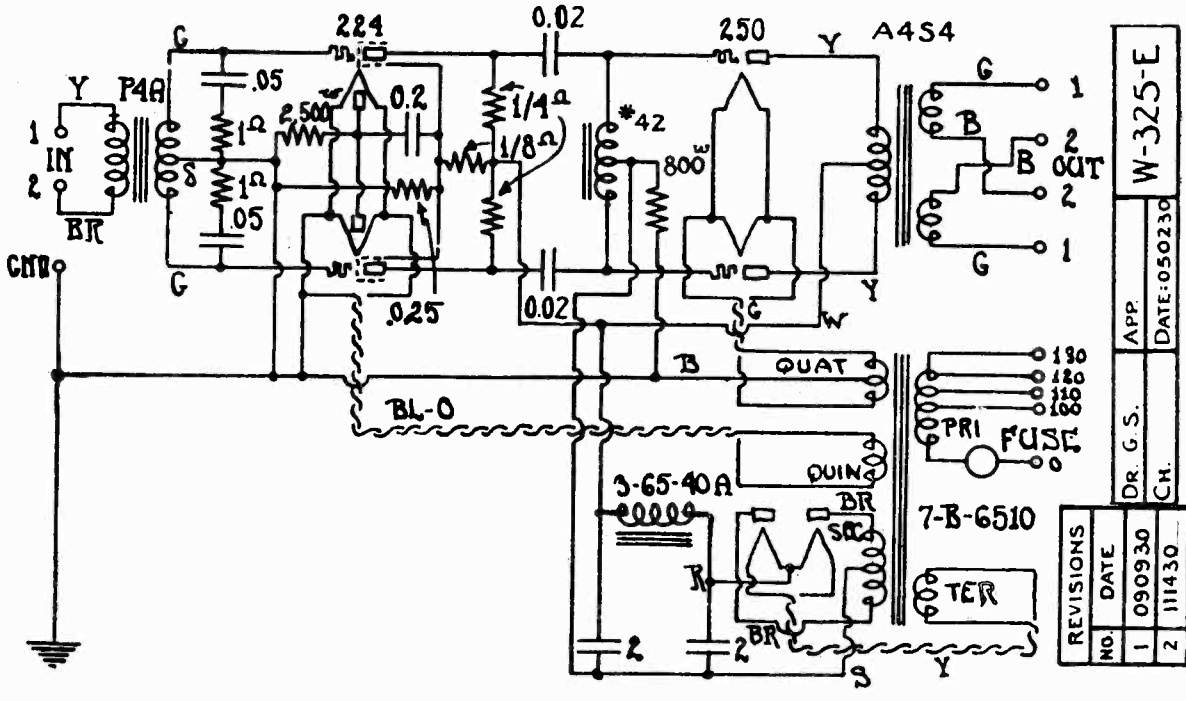
2	123130	CH A P S	DATE 103030

PAM-29 AMPLIFIER

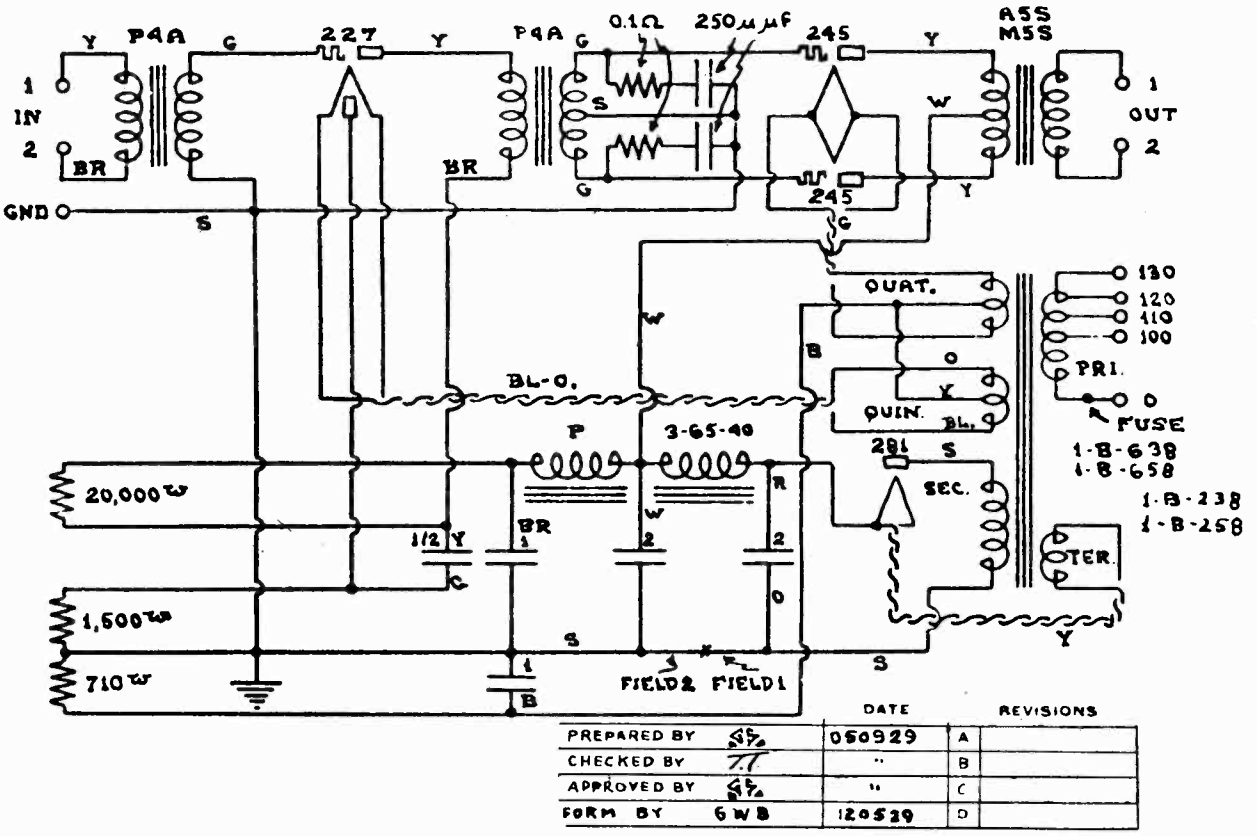


REVISIONS			
NO.	DATE	APP.	W-325-E
1	090930	DR. G.S.	DATE:050230
2	111430	CH.	
3	123130		

PAM-39 AMPLIFIER

SAMSON ELECTRIC CO.

MODEL PAM-45
MODEL PAM-48



PAM-45 AMPLIFIER

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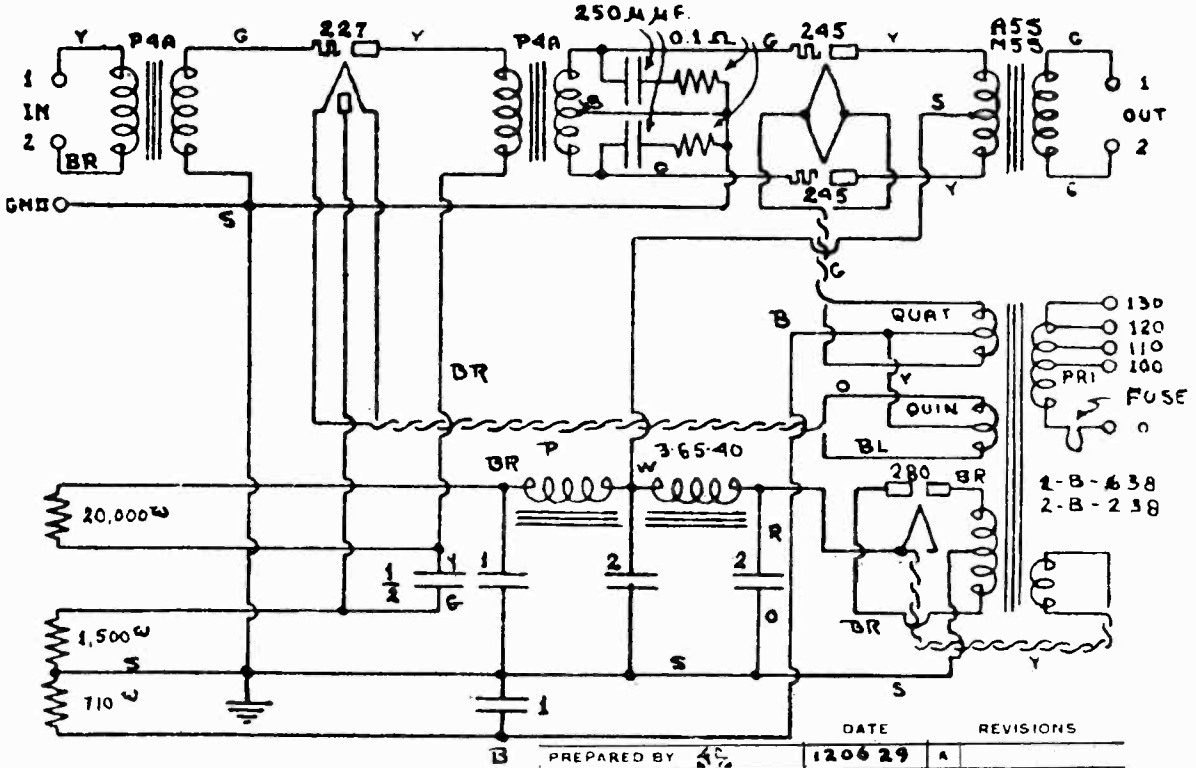
CHECKED BY	"	"	B	
APPROVED BY	GP	"	C	
FORM BY	GWB	120529	D	



PAM-48 AMPLIFIER

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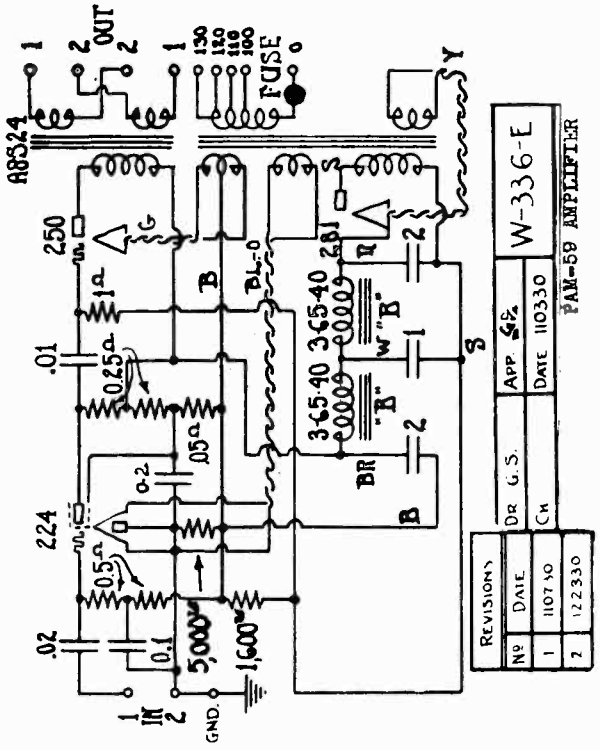
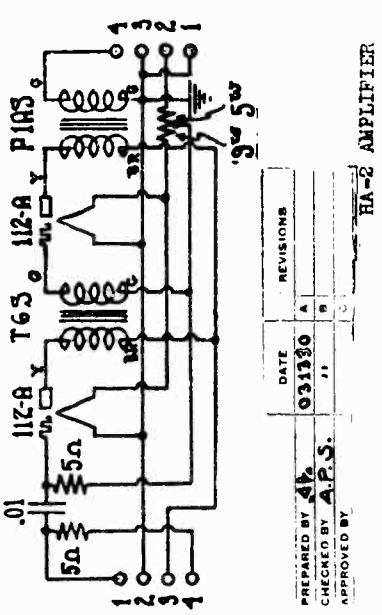
CHECKED BY	G.W.B.	120729	B	
APPROVED BY	GP		C	
FORM BY	GP	021429	D	

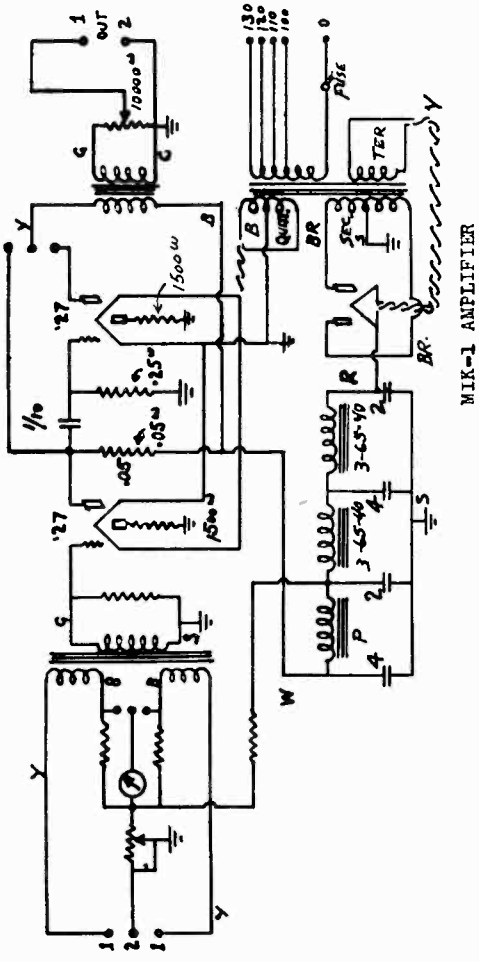
MODEL MIK-1
MODEL MIK-1-D
MODEL HA-2
MODEL PAM-59

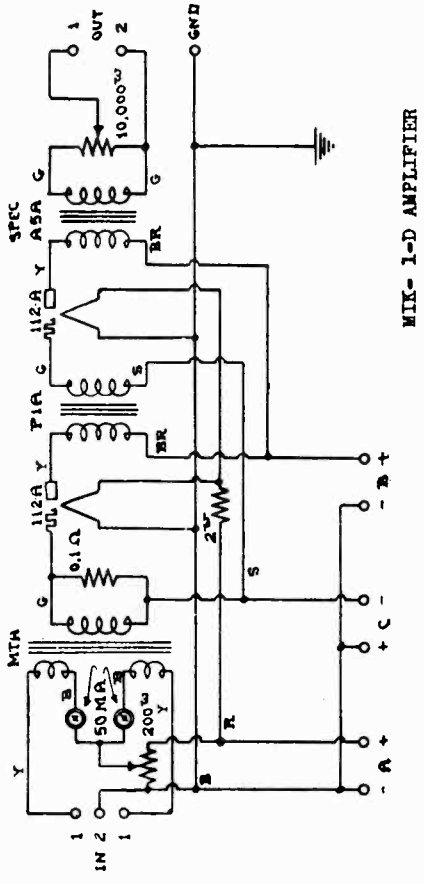
SAMSON ELECTRIC CO.





PAM-59 AMPLIFIER
HA-2 AMPLIFIER

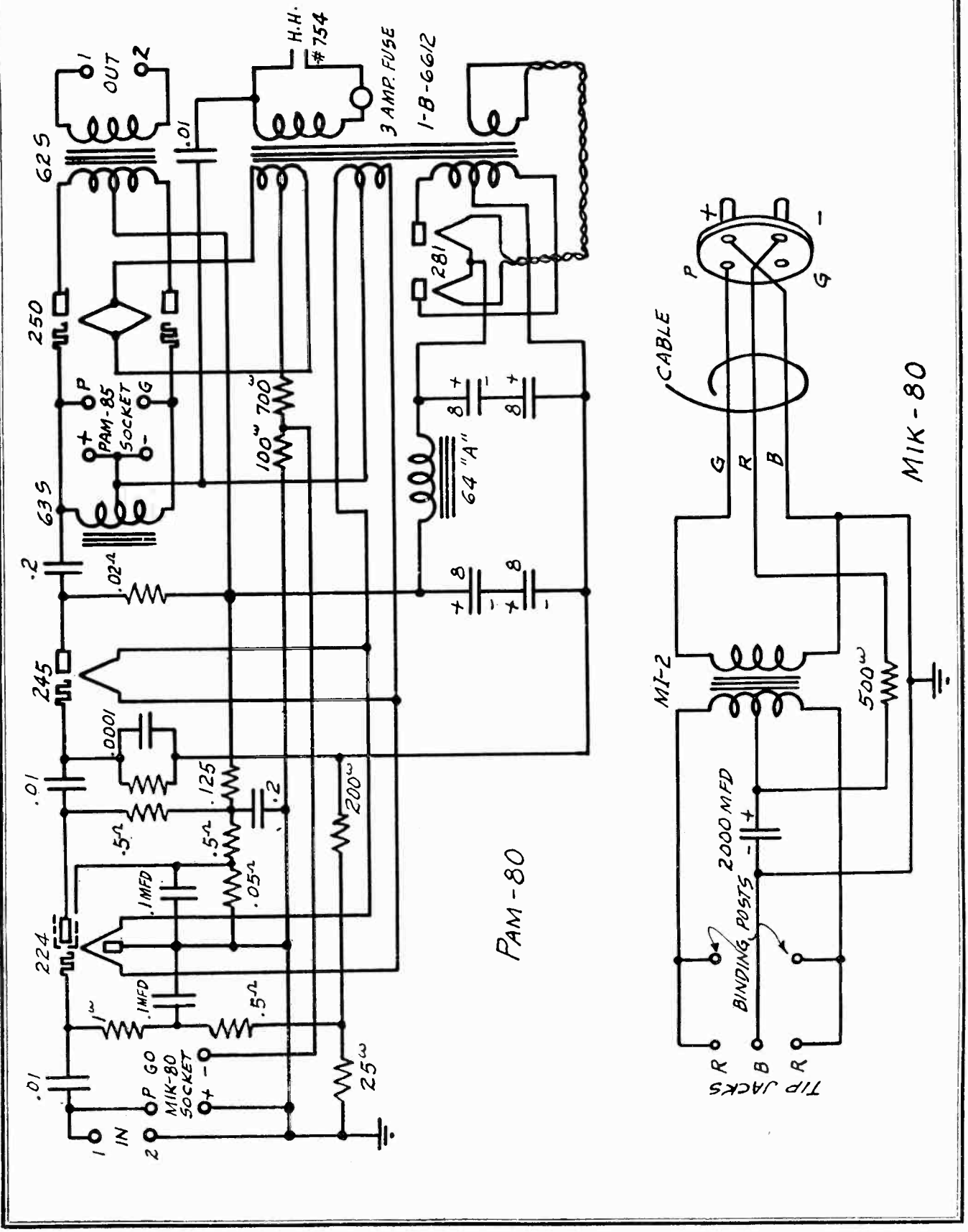




MIK-1 AMPLIFIER
MIK-1-D AMPLIFIER

SAMSON ELECTRIC CO.

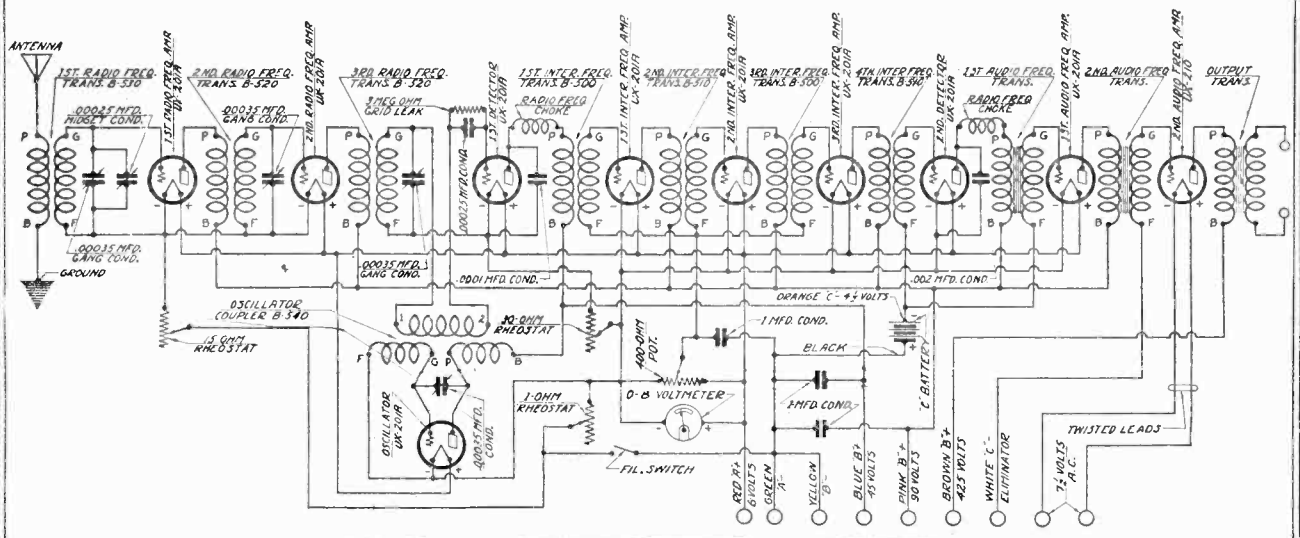
MODEL MIK-80
MODEL PAM-80

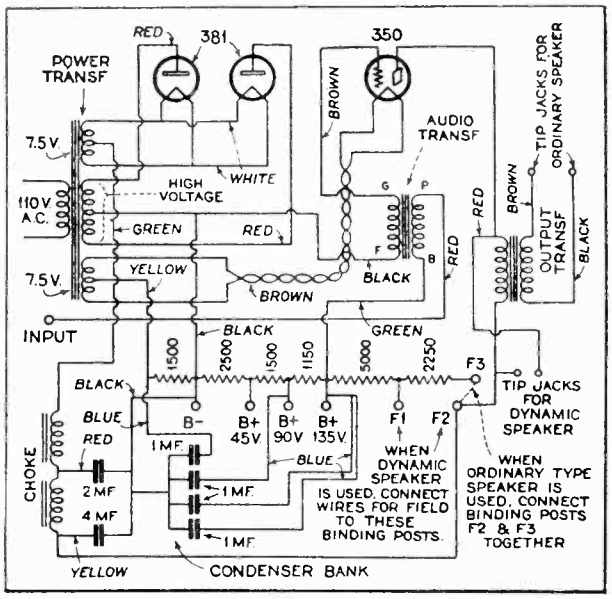


SCOTT TRANSFORMER CO.

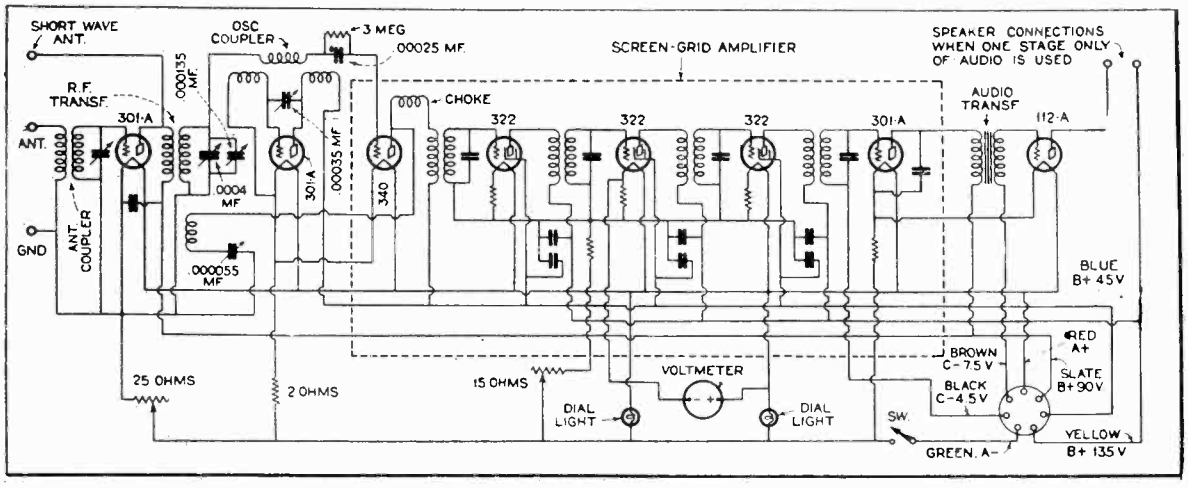
MODEL "World Record" 10
MODEL Shield Grid "9"

Model World Record 10

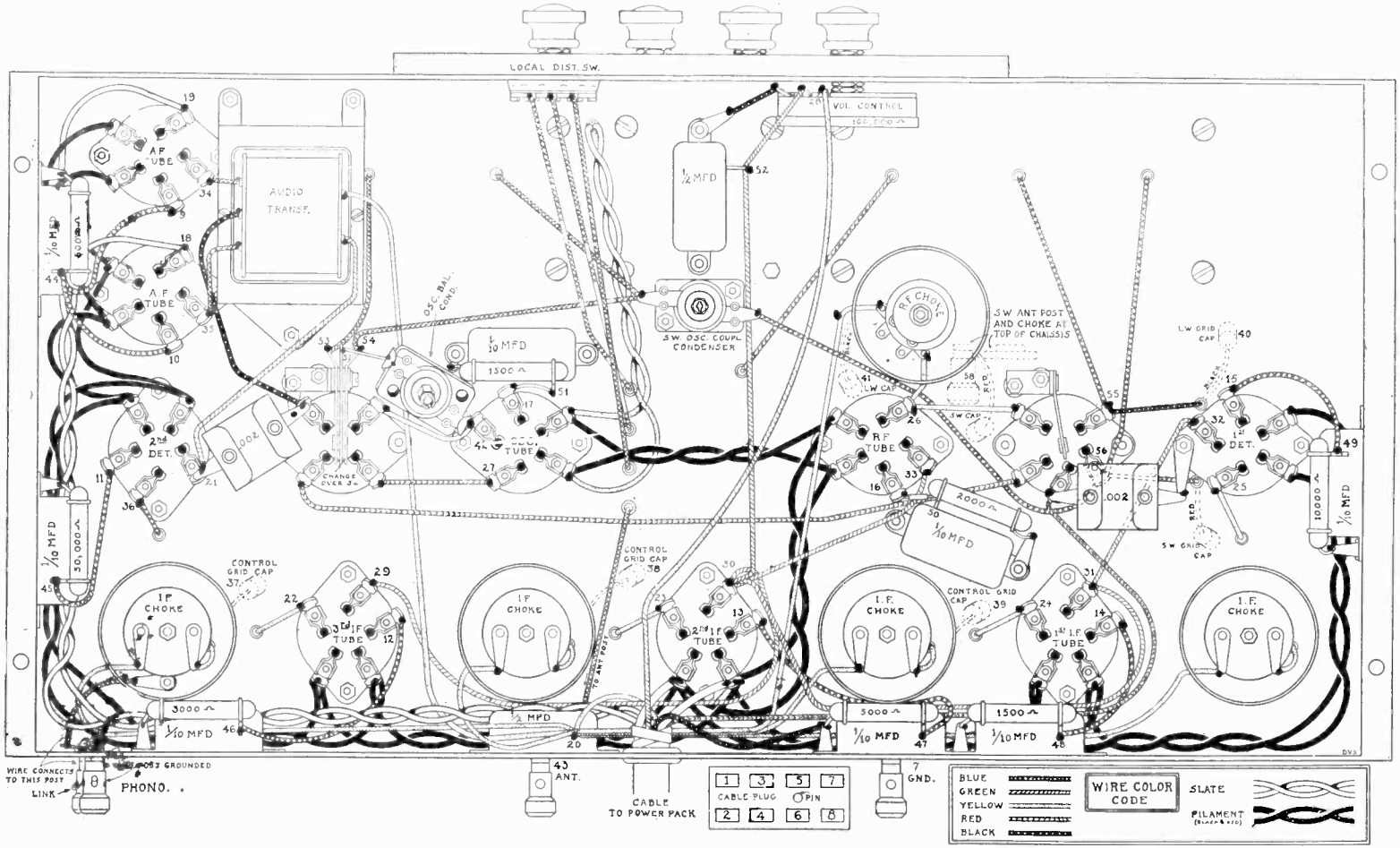




Model Shield Grid 9 Power Pack



Model Shield Grid 9 Receiver Schematic



HOW TO DISTINGUISH OSCILLATOR FROM R. F. COIL

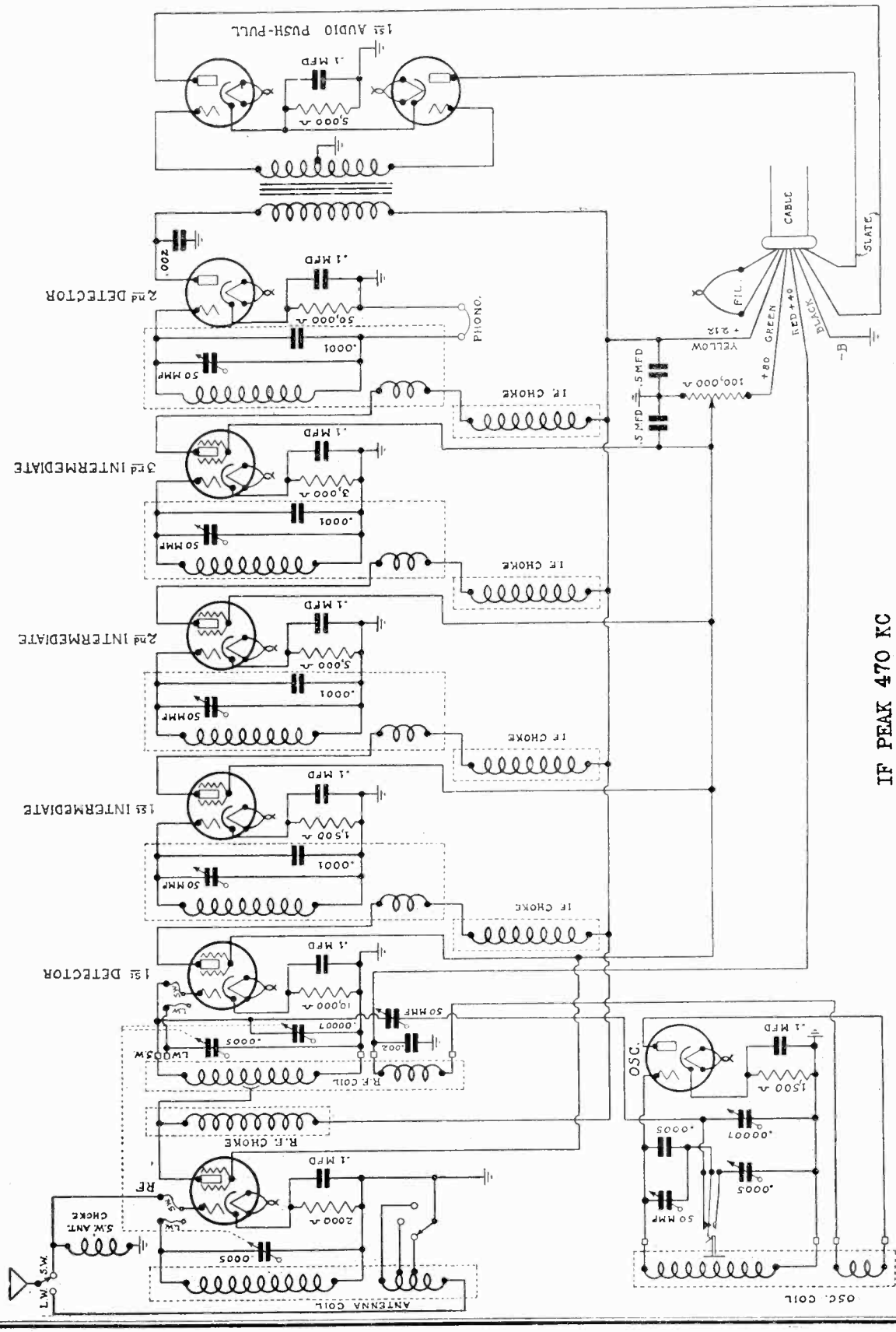
	Oscillator Coil	R. F. Coil
15-21 Meters	Two Enamel Wire Windings	One Enamel Wire Winding
21-27 Meters	Two Enamel Wire Windings	One Enamel Wire Winding
27-38 Meters	Two Enamel Wire Windings	One Enamel Wire Winding
38-84 Meters	Two Enamel Wire Windings	One Enamel, One Silk Winding
84-184 Meters	Two Enamel Wire Windings	One Enamel, One Silk Winding

NOTE:—When tuning short wave stations the short wave coils **must be left exposed** (the aluminum covers **should not be replaced).** Be sure that both oscillator and R. F. coils are for the same wave length band:

The tube on the extreme right of the chassis is the first detector

SCOTT TRANSFORMER CO.

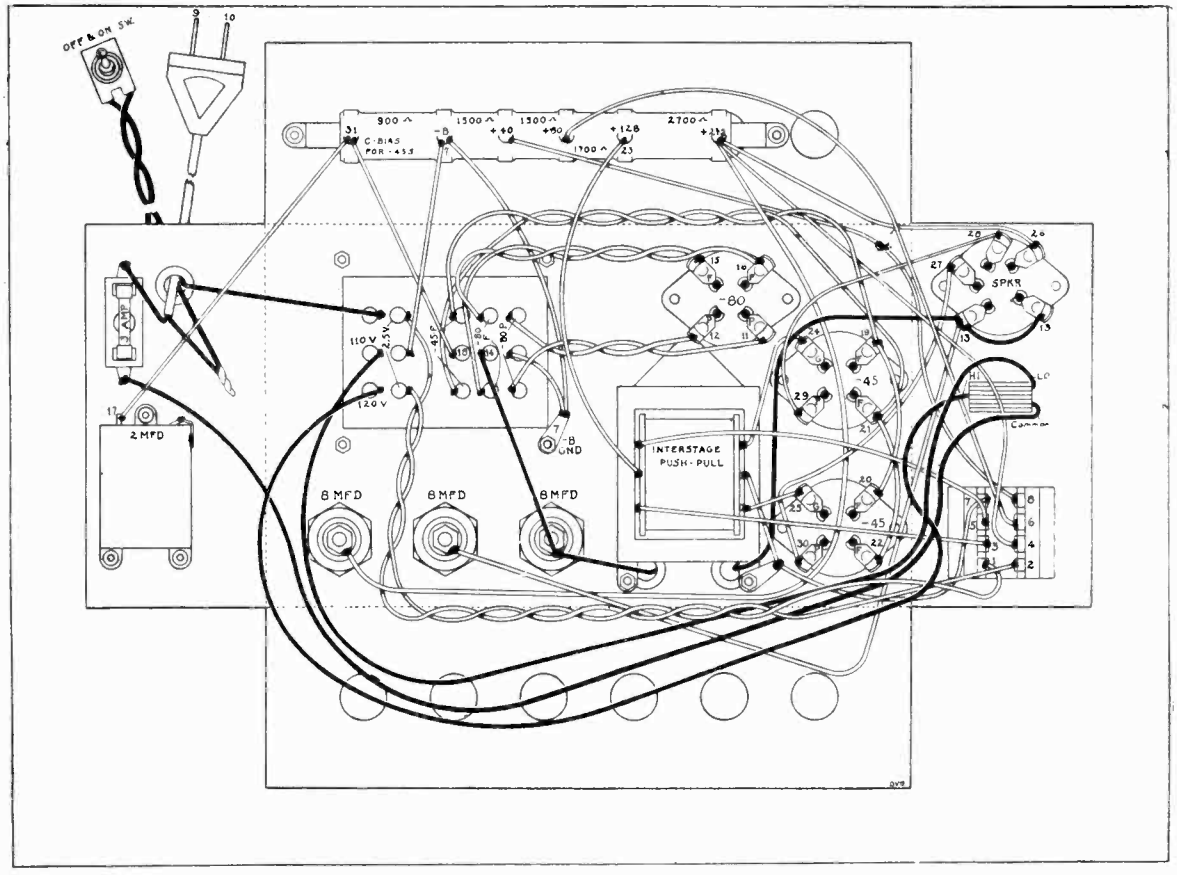
MODEL "All Wave" Super
Receiver Schematic



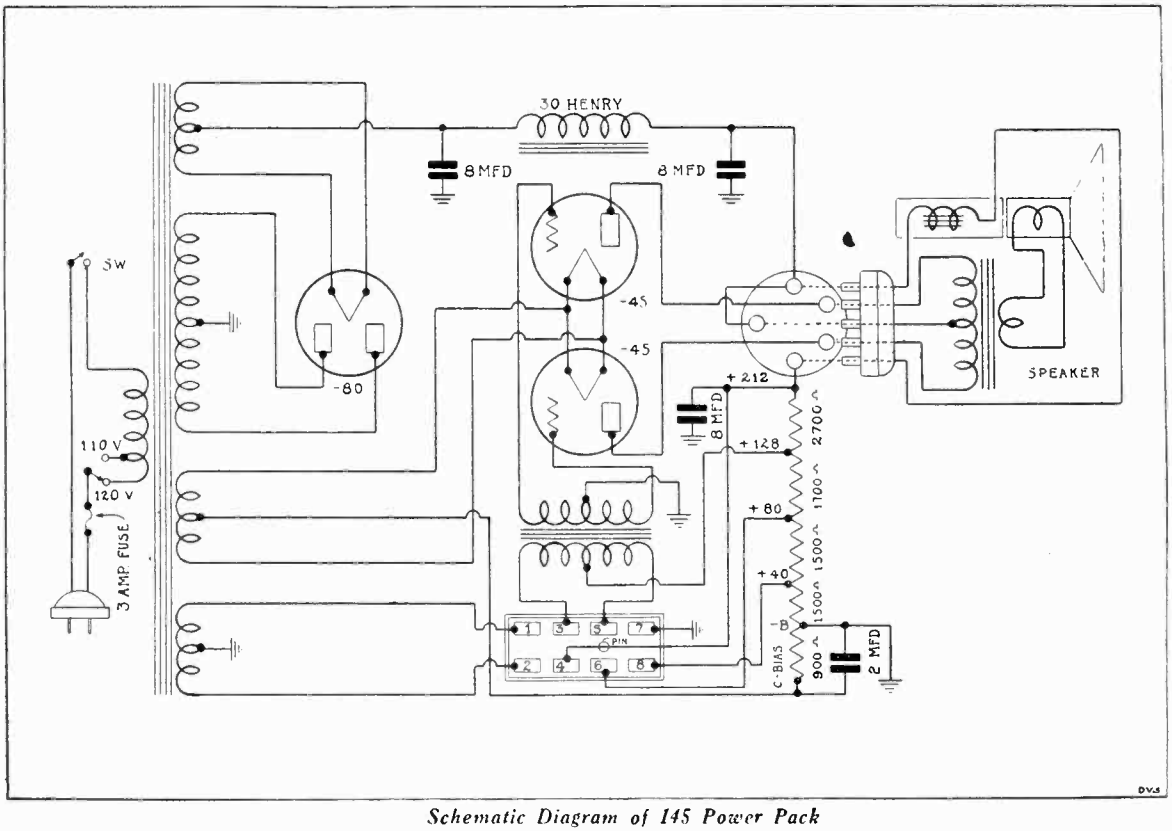
IF PEAK 470 KC

SCOTT TRANSFORMER CO.

MODEL "All Wave" Super
145 Power Pack
Schematic- Chassis



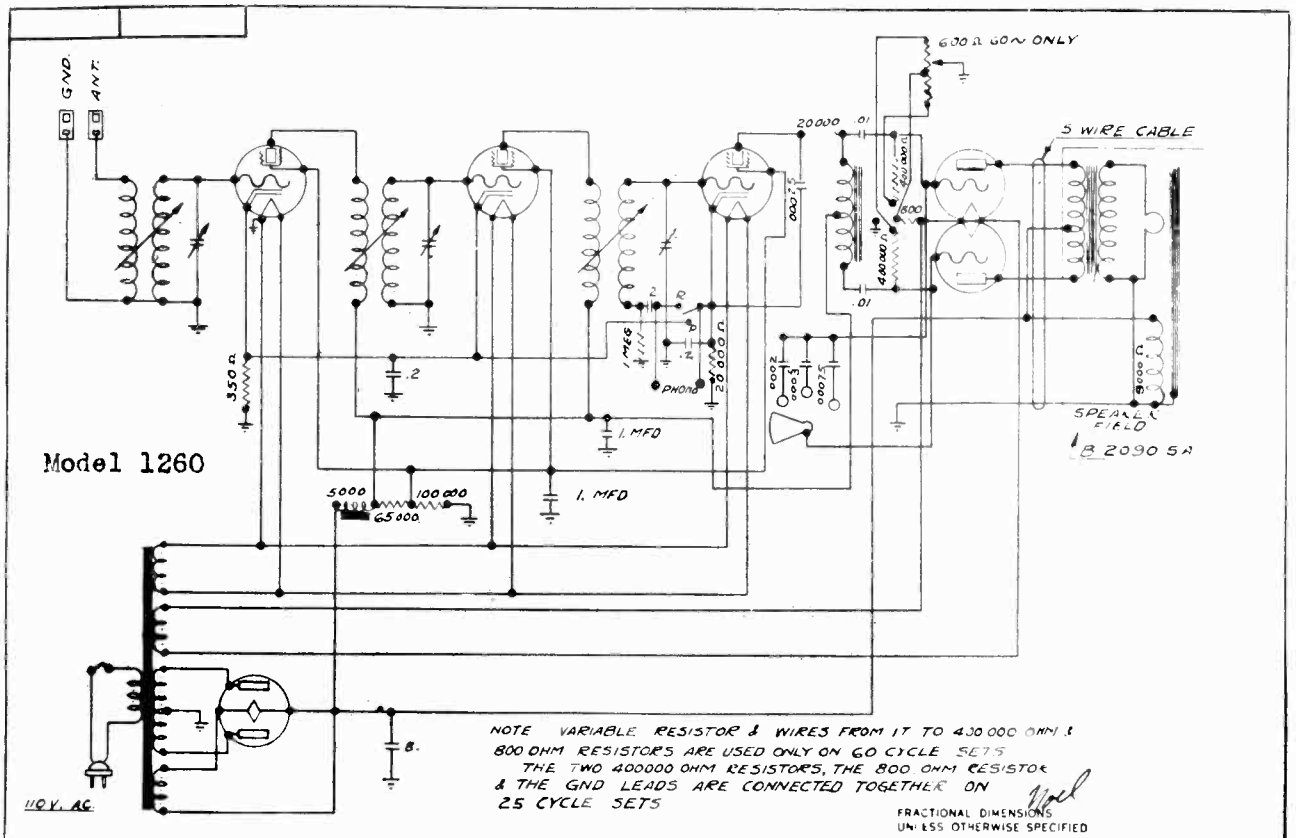
Wiring Diagram of 145 Power Pack

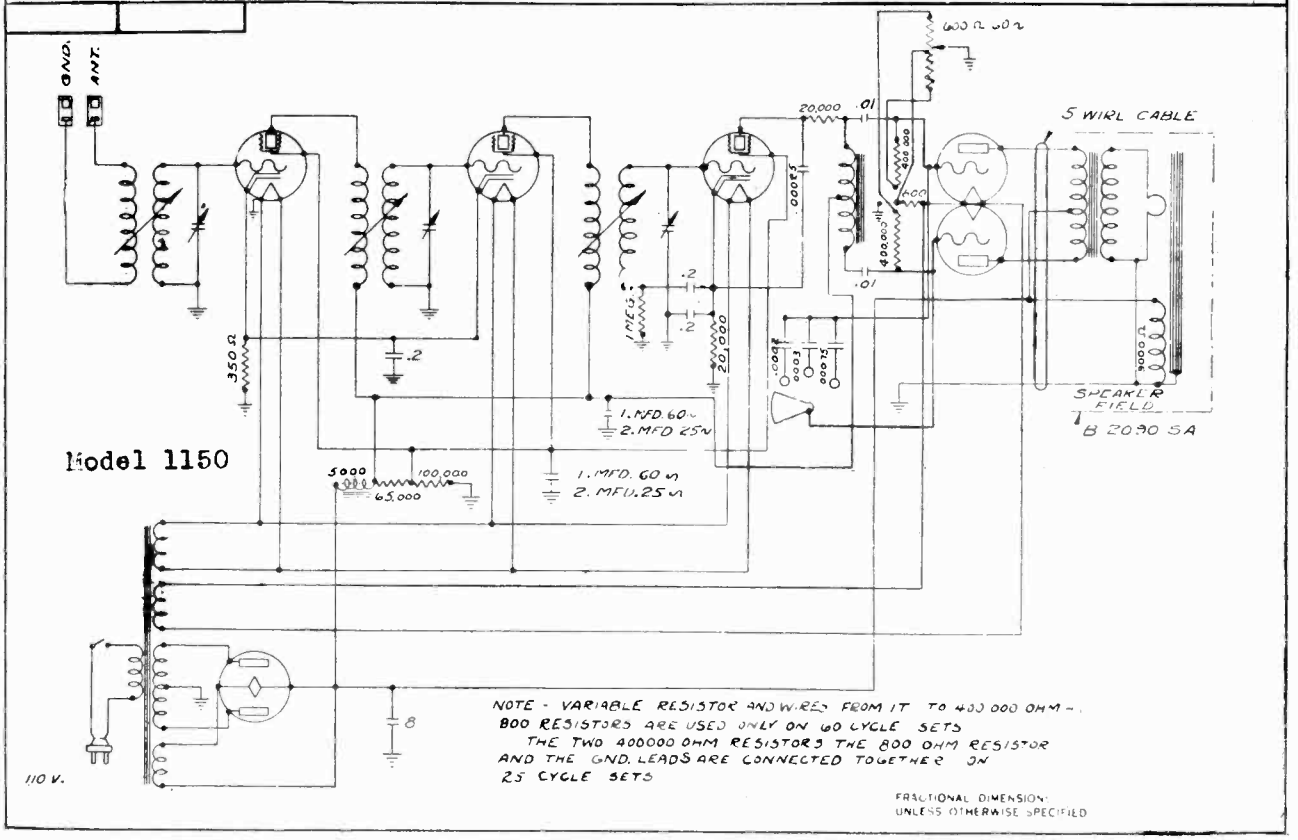


Schematic Diagram of 145 Power Pack

SEARS-ROEBUCK & CO.

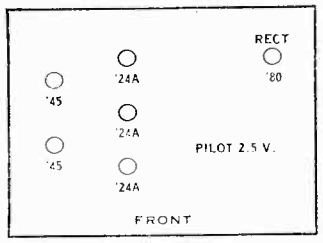
MODEL 1150
MODEL 1260





MODEL 1150
Voltage-Data

SEARS-ROEBUCK & CO.



60 cycle Line 115 V.	RF1	RF2	Det.	245#1	2452	280AC	280DC
Plate Voltage D.C.	250	250	235	250	250	330	300
Screen Voltage D.C.	85	85	85				
Heater Voltage A.C.	2.45	2.45	2.45	2.4	2.4	4.7	
Control Grid Voltage D.C.	3	3	8	50			
Speaker Field Voltage 300							
Total Rectifier Current .090							

25 cycle Line 115 V.	RF1	RF2	Det.	245#1	245#2	280AC	280DC
Plate Voltage D.C.	230	230	215	230	230	315	270
Screen Voltage D.C.	75	75	75				
Heater Voltage A.C.	2.3	2.3	2.3	2.3	2.3	4.85	
Control Grid Voltage D.C.	2.8	2.8	7.5		45	45	
Speaker Field Voltage 270							
Total Rectifier Current .090							

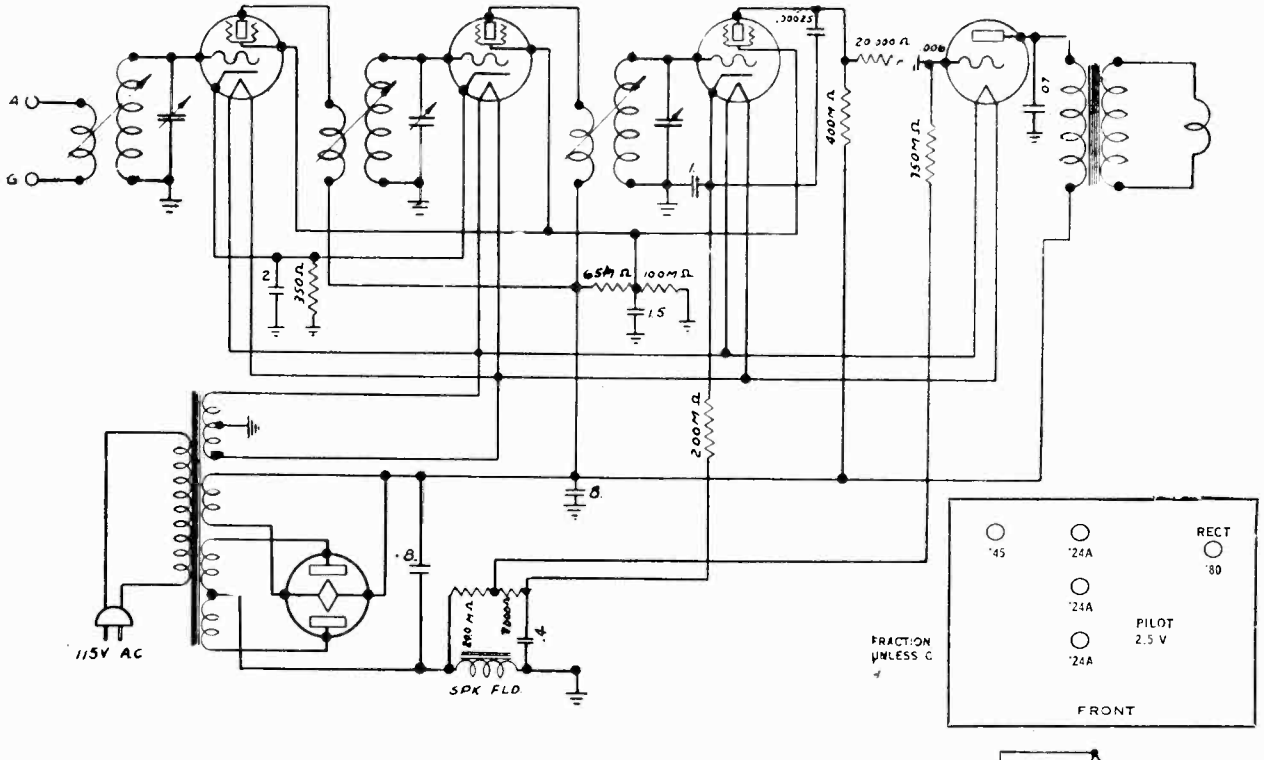
Control grid volts of the R.F. tubes and detector are measured from Cathode to Ground. 245 Grid volts Filament to Ground.

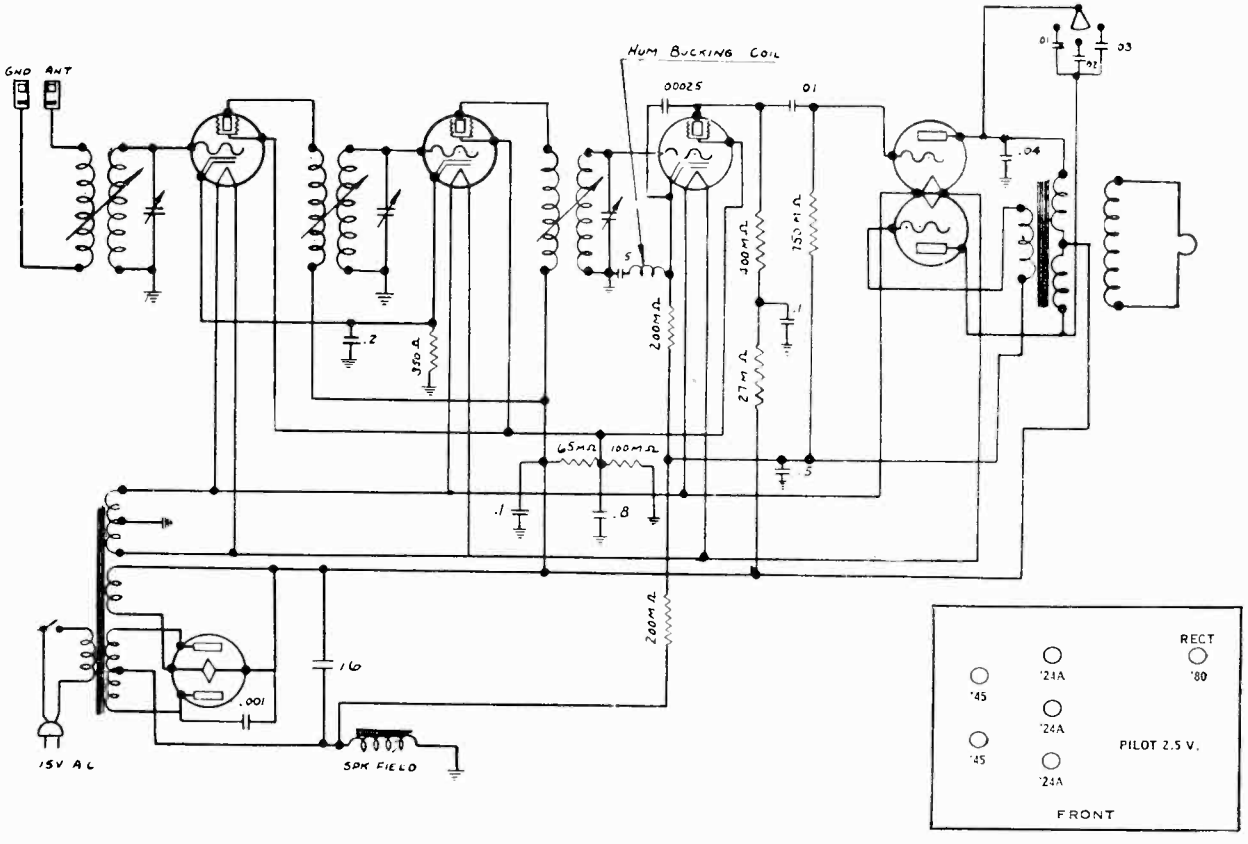
CIRCUIT DATA - The 25 cycle models are identical electrically with the 60 cycle models except for power transformer, filter condensers and omission of hum balance potentiometer. Characteristics are the same as the 60 cycle models. Voltages are slightly lower and there is a difference in the arrangement of parts. The volume control used on these receivers operates by varying the coupling between the primary and secondary on the antenna and R.F. stages. This variation in coupling is effected by moving the primary coils. The antenna and R.F. primaries are also moved by the rotation of the tuning condenser to maintain uniform sensitivity over the broadcast band. The detector primary is not moved to control volume but is moved by rotation of the tuning condenser. This system of volume control does not change the voltages or currents in the tubes. The new variable-mu, screen grid tube, -35, may be used interchangeably with the -24 in the R.F. stages only.

OSCILLATION - Oscillation in receivers employing the variable coupling volume control may be caused by (A) Leads to the movable primary coils too close together, causing interstage coupling. The pairs of leads should be spaced at least 1-1/4 inches apart throughout their length. (B) Movable primaries in wrong position. When the dial is set at 55, and the volume control set at maximum, the primaries should be at the position of maximum coupling. The U-brackets carrying the coils should have about 1/32 clearance from the plate which supports the RF coils. When the volume control is left at maximum and the dial turned to move the condenser to the higher frequency settings, the coils should remain approximately in line, the RF coils moving out slightly more than the detector primary. Adjustment may be made by moving stop collar on rear end of volume control shaft.

SEARS-ROEBUCK & CO.

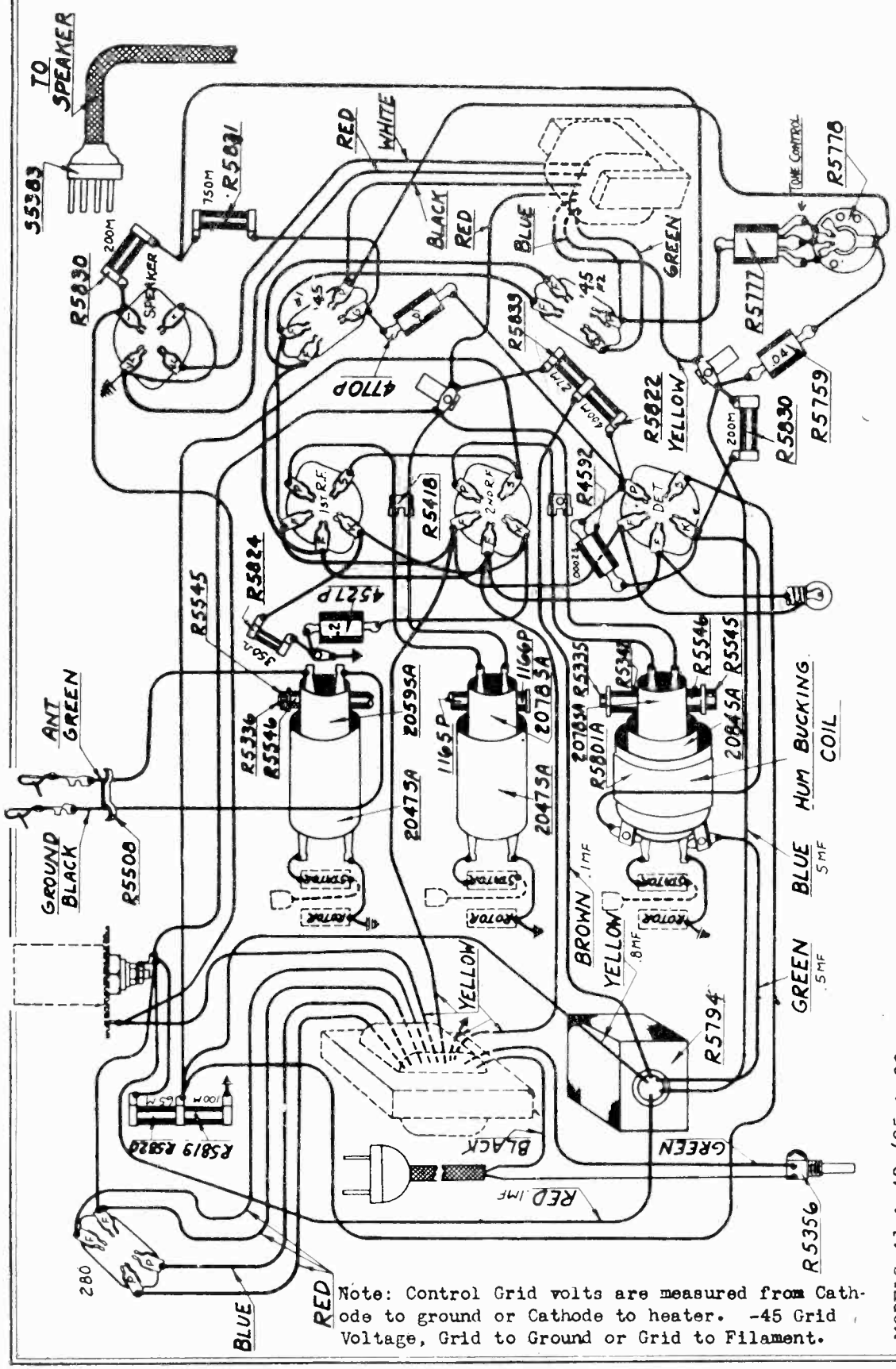
MODEL 1250
MODEL 1152,1420
Schematics





SEARS-ROEBUCK & CO.

MODEL 1152,1420
Chassis-Voltage



Note: Control Grid volts are measured from Cathode to ground or Cathode to heater. -45 Grid Voltage, Grid to Ground or Grid to Filament.

MODELS 41 & 42 (25 & 60~)

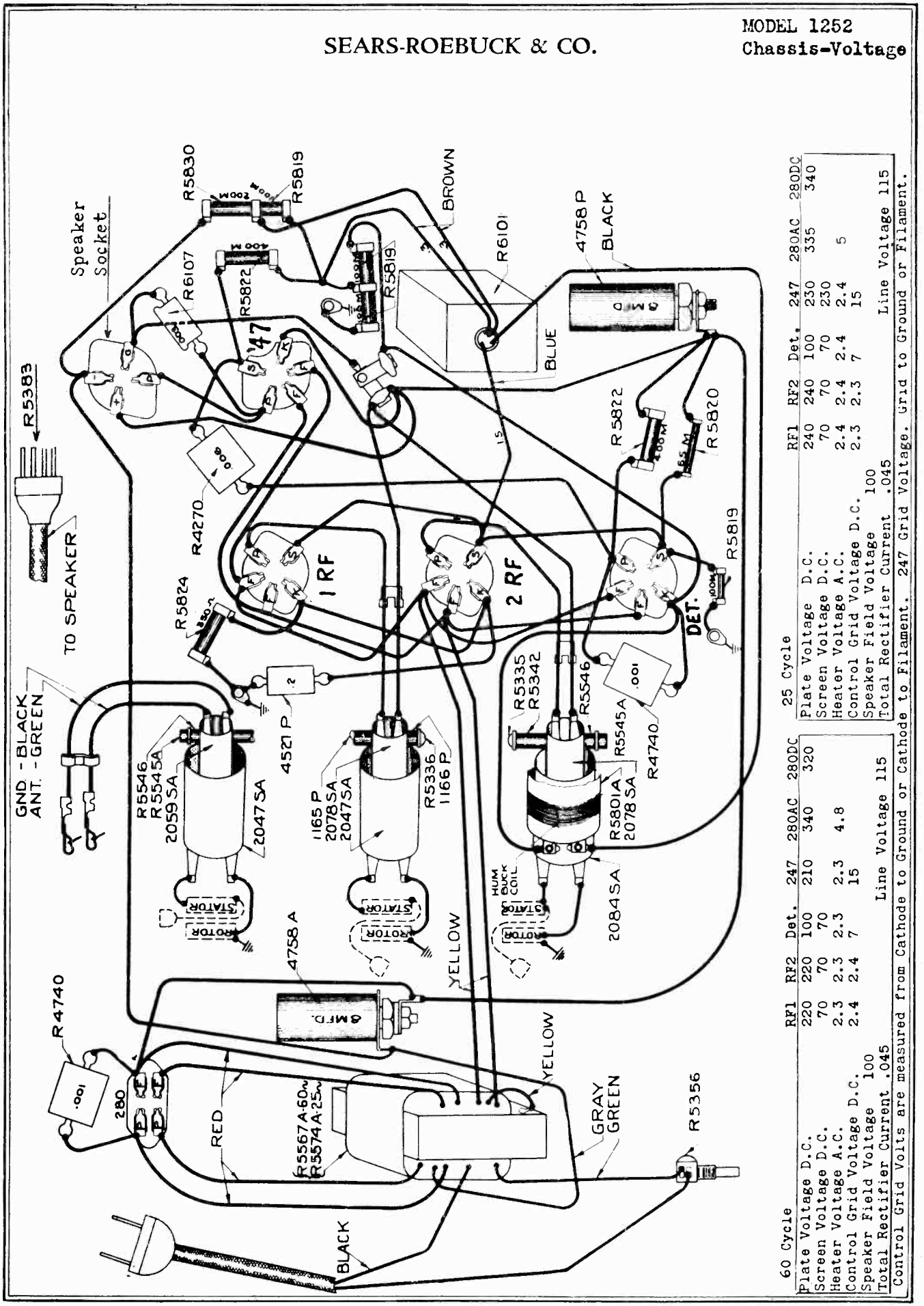
	RF1	RF2	Det.	245#1	245#2	280AC	280DC
Plate Voltage D.C.	240	240	95	240	240	340	340
Screen Voltage D.C.	85	85	85				
Heater Voltage A.C.	2.4	2.4	2.4	2.4	2.4	4.85	
Control Grid Voltage D.C	3	3	8	20	45		
Speaker Field Voltage	100						
Total Rectifier Current	.065						

LINE VOLTS 115.

MODELS 41 & 42 - Type '35 tubes may be used in place of '24 type in R.F.stages.
Note that speaker field is in negative side of filter circuit.Voltage drop across field is used to obtain bias.

SEARS-ROEBUCK & CO.

MODEL 1252
Chassis-Voltage



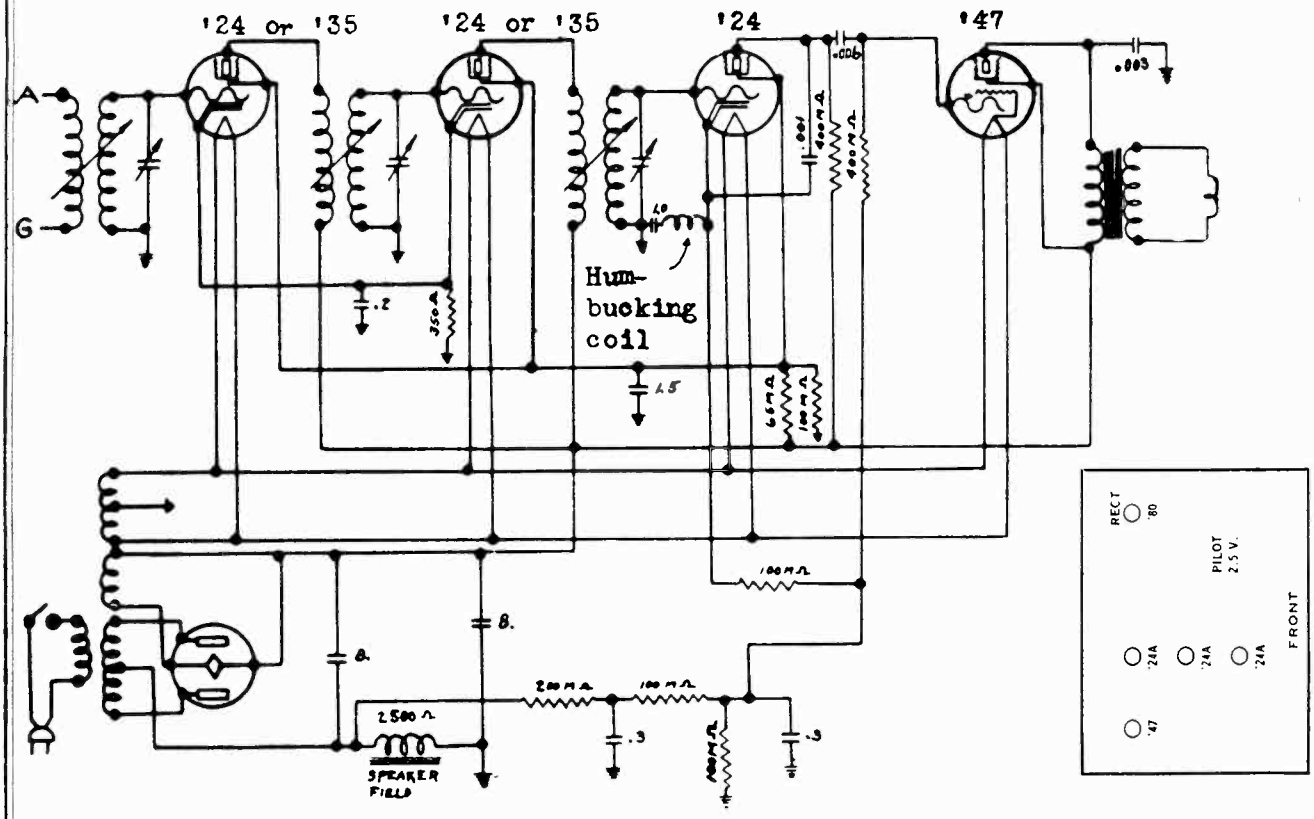
60 Cycle	RF1	RF2	Det.	247	280AC	280DC
Plate Voltage D.C.	220	220	100	210	340	320
Screen Voltage D.C.	70	70	70			
Heater Voltage A.C.	2.3	2.3	2.3	2.3	4.8	
Control Grid Voltage D.C.	2.4	2.4	7	15		
Speaker Field Voltage 100						
Total Rectifier Current .045					Line Voltage 115	

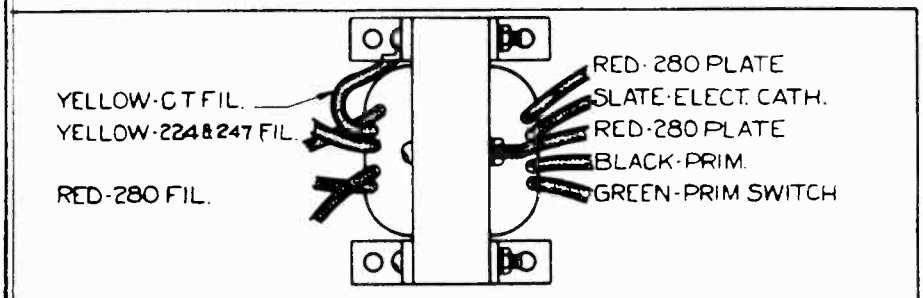
25 Cycle	RF1	RF2	Det.	247	280AC	280DC
Plate Voltage D.C.	240	240	100	230	335	340
Screen Voltage D.C.	70	70	70	230		
Heater Voltage A.C.	2.4	2.4	2.4	2.4	5	
Control Grid Voltage D.C.	2.3	2.3	7	15		
Speaker Field Voltage 100						
Total Rectifier Current .045					Line Voltage 115	

Control Grid Volts are measured from Cathode to Ground or Cathode to Filament. 247 Grid Voltage. Grid to Ground or Filament.

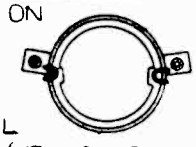
MODEL 1252
Schematic

SEARS-ROEBUCK & CO.

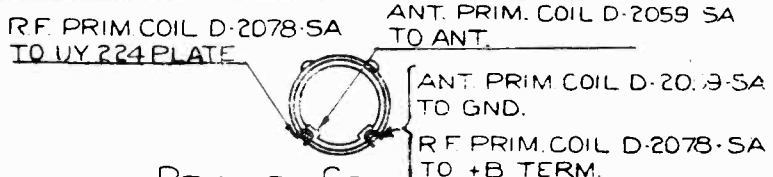




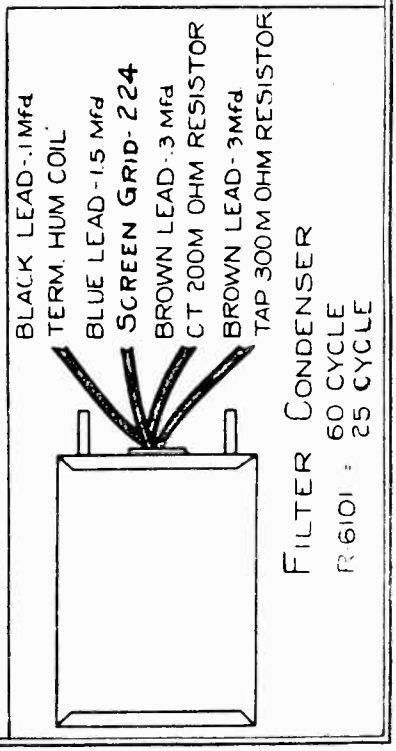
POWER TRANSFORMER
R 5567A = 60~ R 5574A = 25~



SECONDARY COIL
DET. SEC. COIL = D-2084-SA (YELLOW SPOT)
R.F. SEC COIL = D-2047-SA (PLAIN)



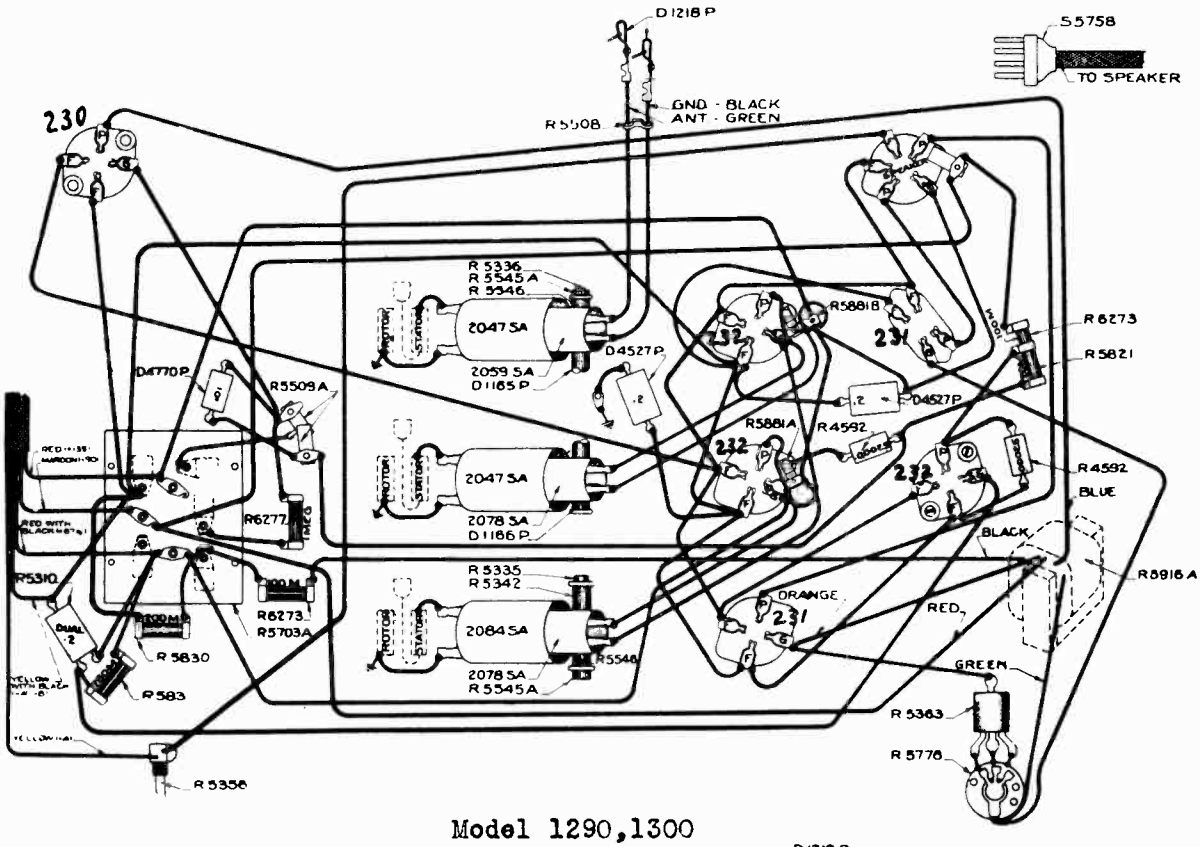
PRIMARY COIL
ANT. PRIM. COIL = D-2059-SA (YELLOW SPOT)
R.F. PRIM. COIL = D-2078-SA (PLAIN)



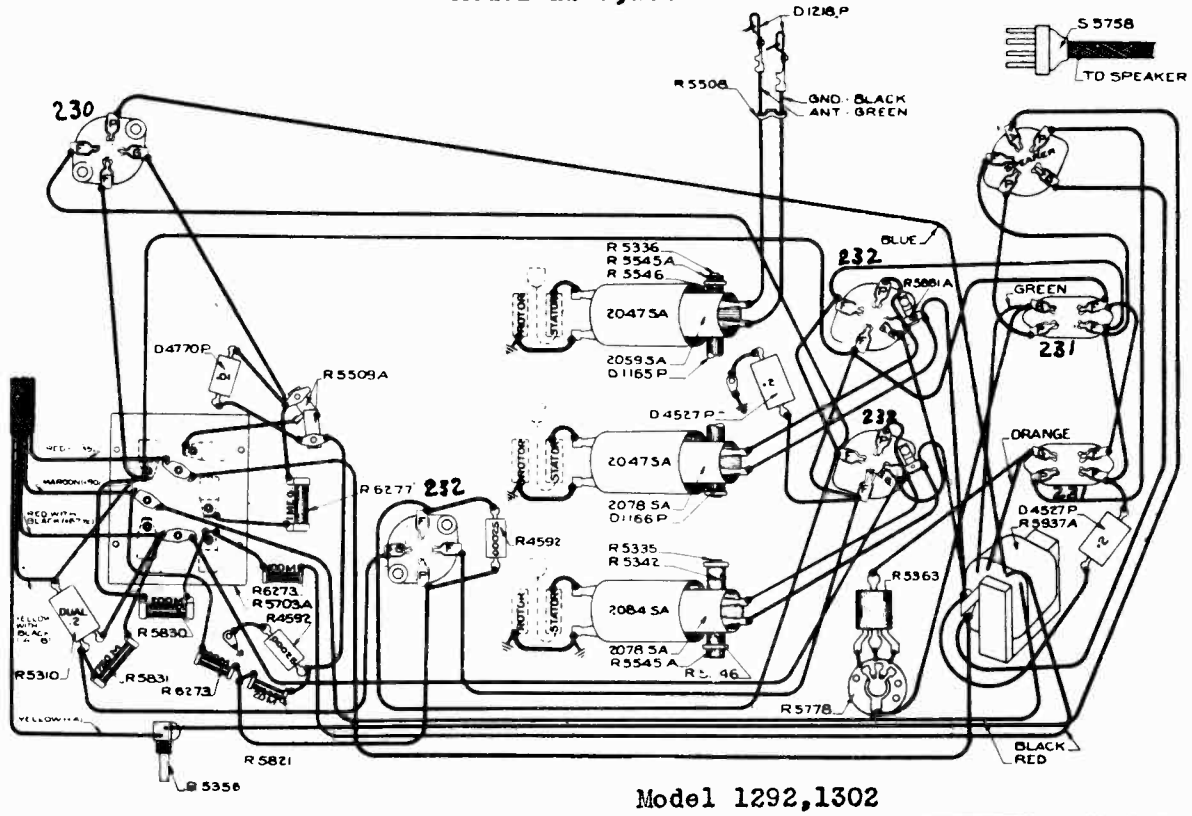
FILTER CONDENSER
R 6101 = 60 CYCLE
25 CYCLE

SEARS-ROEBUCK & CO.

MODEL 1290,1300
MODEL 1292,1302
Chassis



Model 1290,1300

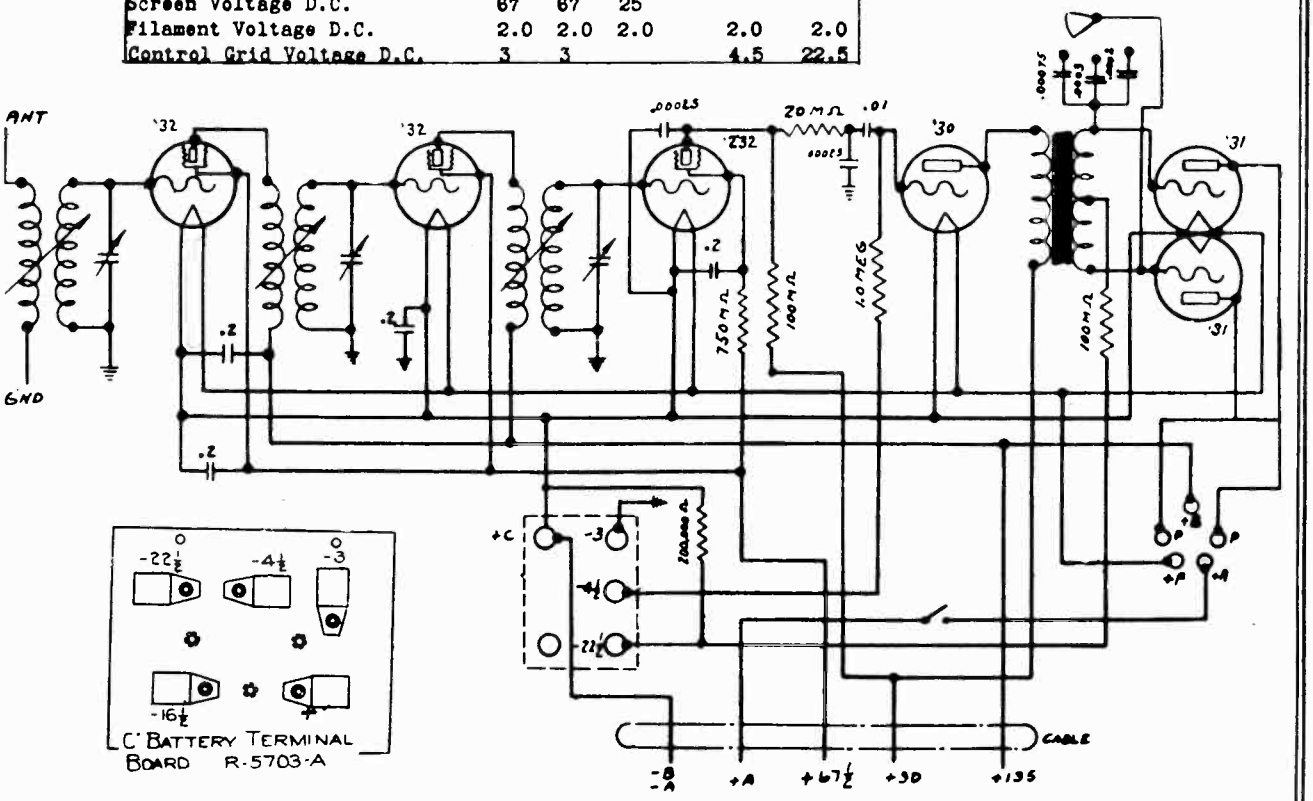


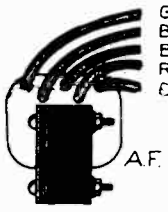
Model 1292,1302

MODEL 1290,1300
MODEL 1292,1302
Schematic

SEARS-ROEBUCK & CO.

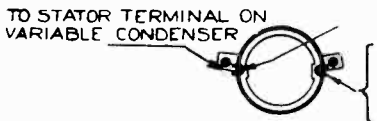
Model 40	RF1	RF2	Det.	1st Audio	231
Plate Voltage D.C.	135	135	80	90	130
Screen Voltage D.C.	67	67	25		
Filament Voltage D.C.	2.0	2.0	2.0	2.0	2.0
Control Grid Voltage D.C.	3	3		4.5	22.5



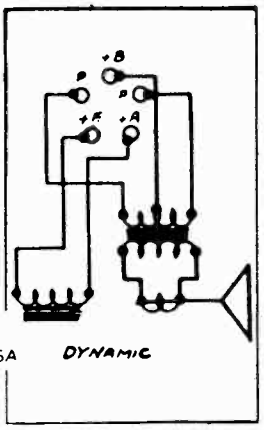


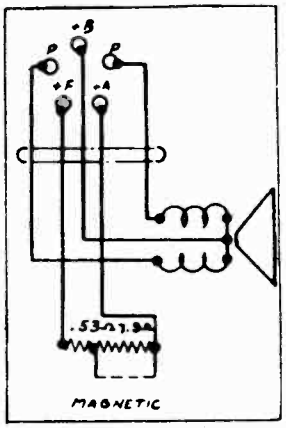
GREEN LEAD - PP GRID
BLUE LEAD - 1ST A.F. PLATE
BLACK LEAD - .1 MEG RESISTOR
RED LEAD - +B90
ORANGE LEAD - PR GRID

A.F. INPUT TRANSFORMER
R-5916-A Mod 40
R-5937-A Mod 43

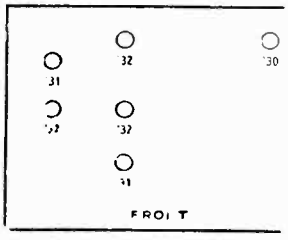


SECONDARY COIL
DET SEC COIL: D-2084-SA (YELLOW SPOT)
R F SEC COIL: D-2047-SA (PLAIN)

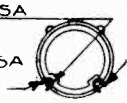




1290,1300



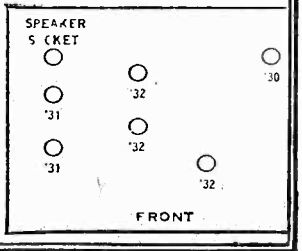
ANT PRIM COIL D-2059-SA TO ANT
R F PRIM COIL D-2078-SA TO ?32 PLATE



ANT PRIM COIL D-2059-SA TO GND
R F PRIM COIL D-2078-SA TO + B TERM.

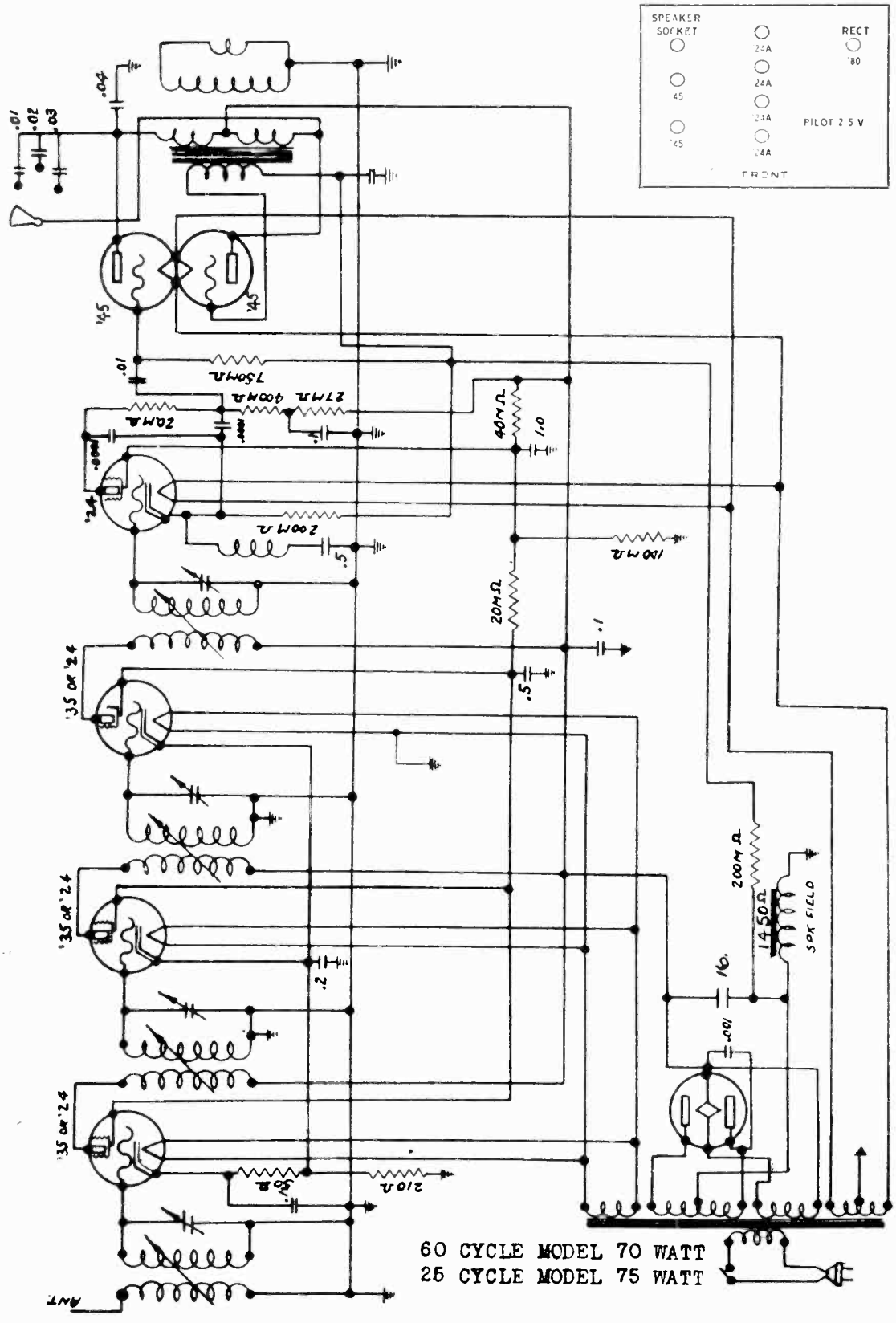
PRIMARY COIL
ANT PRIM COIL: D-2059-SA (YELLOW SPOT)
R.F. PRIM COIL: D-2078-SA (PLAIN)

1292,1302



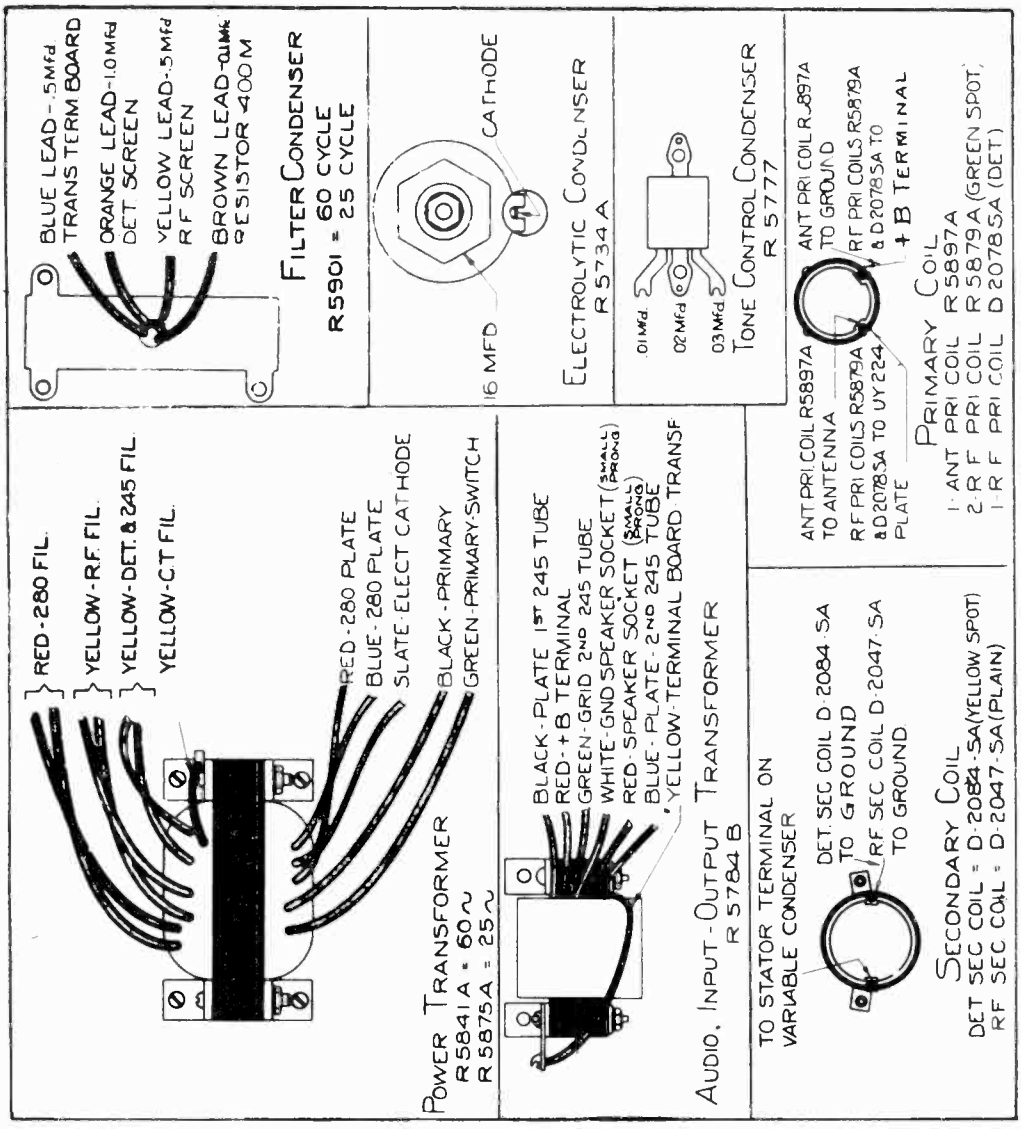
SEARS-ROEBUCK & CO.

MODEL 1310,1312
Schematic



MODEL 1310,1312
Voltage-Data

SEARS-ROEBUCK & CO.



LEAD DETAILS OF POWER & AUDIO TRANSFORMER, FILTER, TONE CONTROL, ELECTROLYTIC CONDENSERS AND R.F. COILS.

VOLTAGE READINGS - MODELS 37 & 37-P

60 Cycle	Line Voltage 115							
	RF1	RF2	RF3	Det.	245#1	245#2	280AC	280DC
Plate Voltage D.C.	250	250	250	115	250	250	345	350
Screen Voltage D.C.	65	65	65	100				
Heater Voltage A.C.	2.4	2.4	2.4	2.4	2.4	2.4	4.8	
Control Grid Voltage D.C.	2.2	2.4	2.4	10	20	48		
Speaker Field Voltage	100							
Total Rectifier Current	.070							

25 Cycle	Line Voltage 115							
	RF1	RF2	RF3	Det.	245#1	245#2	280AC	280DC
Plate Voltage D.C.	240	240	240	100	240	240	340	340
Screen Voltage D.C.	65	65	65	100				
Heater Voltage A.C.	2.4	2.4	2.4	2.4	2.4	2.4	4.8	
Control Grid Voltage D.C.	2.2	2.4	2.4	10	20	45		
Speaker Field Voltage	100							
Total Rectifier Current MADC	.070							

Control grid voltage measured from cathode to ground or from cathode to filament. 245 grid voltage measured from grid to ground.

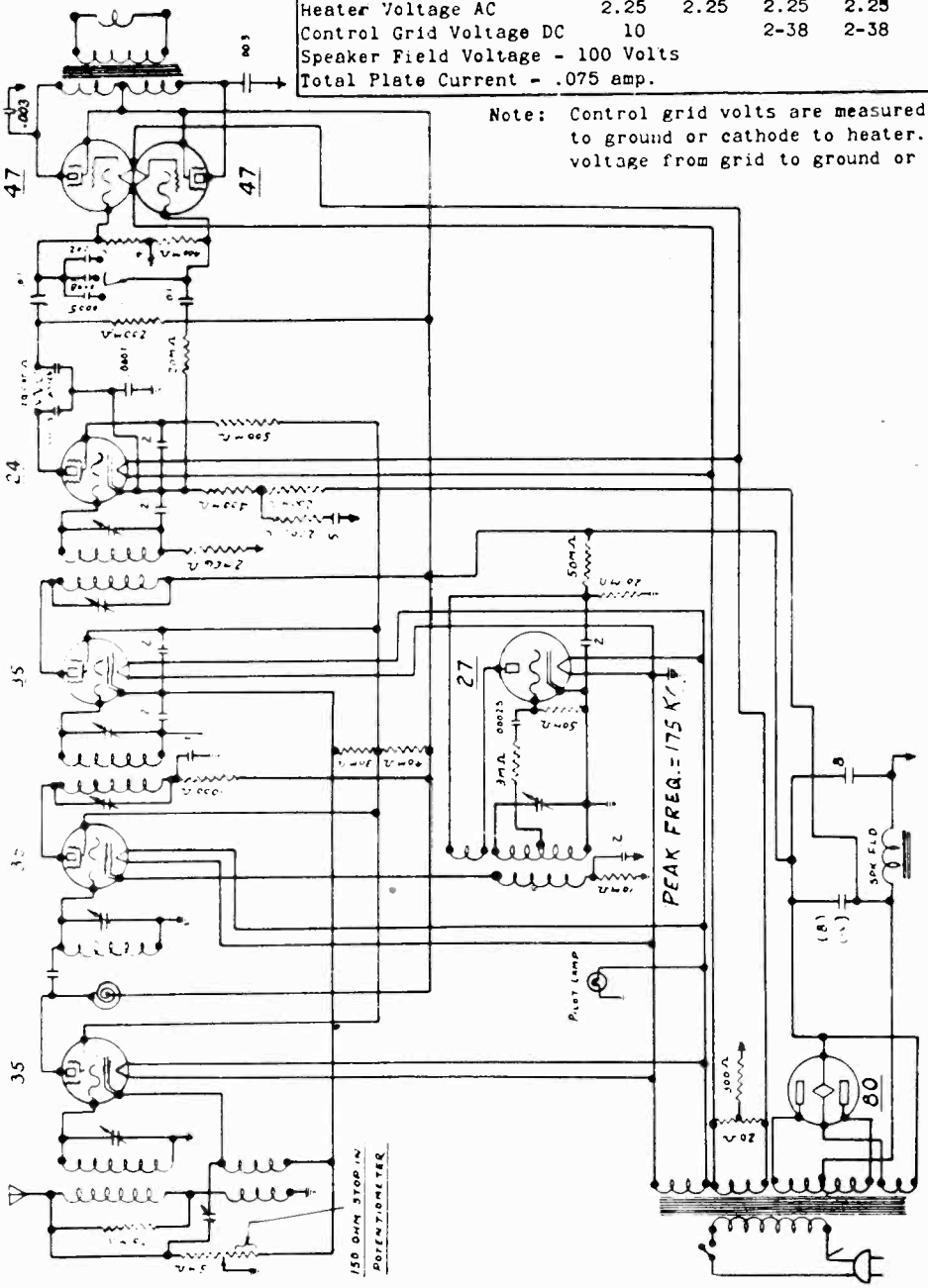
SEARS-ROEBUCK & CO.

MODEL 1320,1322,1324
MODEL 1450
Schematics

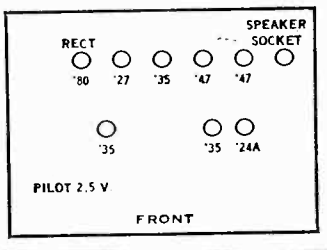
60 Cycle Total Watts - 80 Line Voltage - 115	Tran.	Osc.	I.F.	R.F.	Det.	2-247	280AC	280DC
Plate Voltage DC	230	40	240	240	160	235	240	350
Screen Voltage DC	65		65	65	20	240		
Heater Voltage AC	2.44	2.44	2.44	2.44	2.44	2.45	4.85	
Control Grid Voltage DC	10		1.7-40	1.7-40	20	16		
Speaker Field Voltage	110 Volts.							
Total Plate Current	1075 amp.							

25 Cycle Total Watts - 85 Line Voltage - 115	Tran.	Osc.	I.F.	R.F.	Det.	2-247	280AC	280DC
Plate Voltage DC	220	40	230	230	160	225	325	340
Screen Voltage DC	70		70	70	25	230		
Heater Voltage AC	2.25	2.25	2.25	2.25	2.45	2.45	4.7	
Control Grid Voltage DC	10		2-38	2-38	20	15		
Speaker Field Voltage - 100 Volts								
Total Plate Current - .075 amp.								

Note: Control grid volts are measured from cathode to ground or cathode to heater. 247 grid voltage from grid to ground or filament.

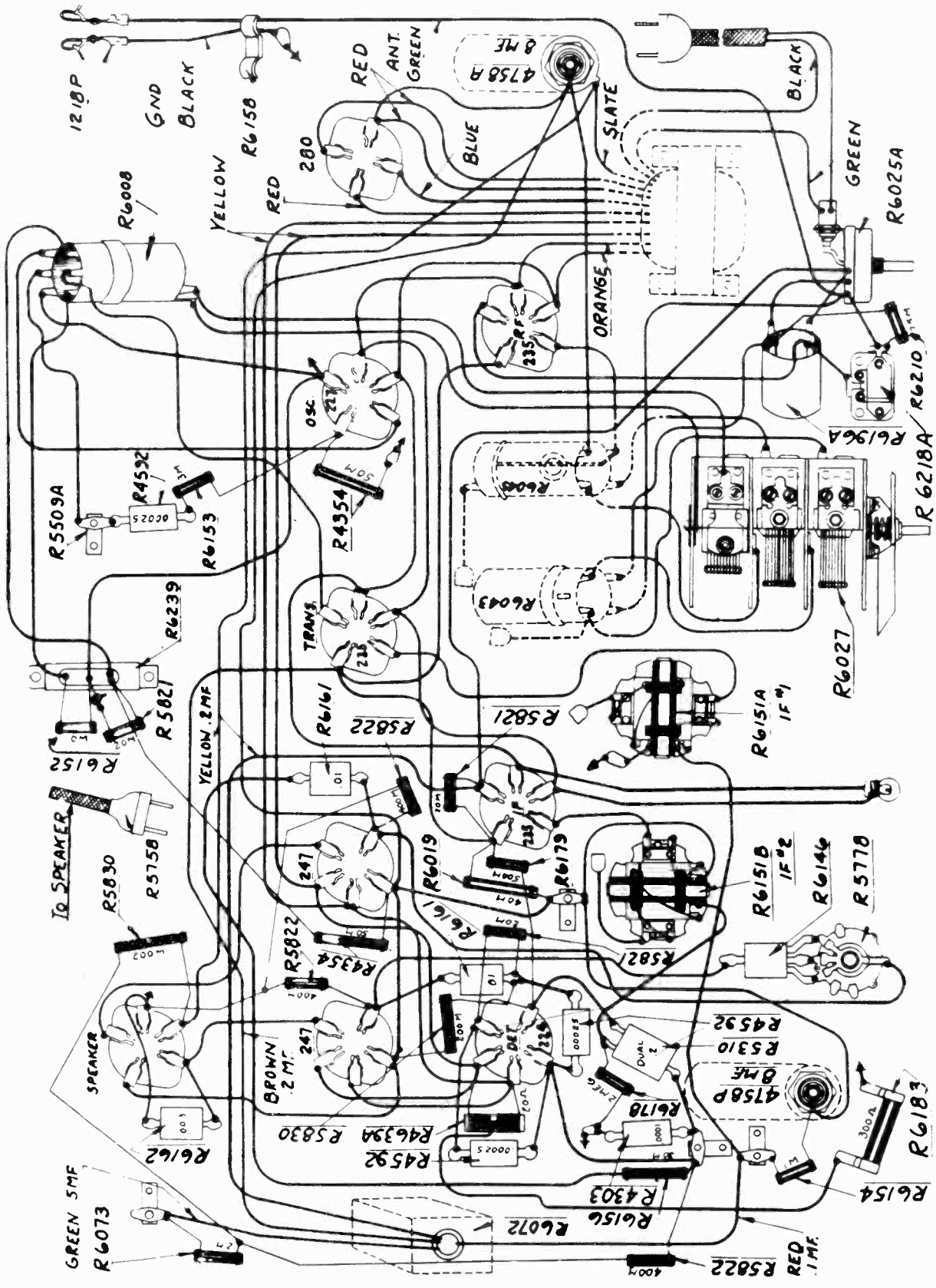


NOTE-In this set the hum across the field coil is used to buck out hum set up in the tube circuits. Causes of hum can be traced to defective detector or output tubes. (Interchange output tubes) Shorted condenser or open resistors in hum filter circuit. The hum filter circuits consists of a 2000 ohm resistor and a 0.5 condenser in the grid bias resistor circuit. This connects from the cathode of the detector to the negative side of the speaker field. Other causes of hum are Reversed speaker field, open or shorted condensers in detector circuit, open or grounded 20 ohm center tapped resistor, defective tone control, defective speaker or a defective electrolytic condenser.



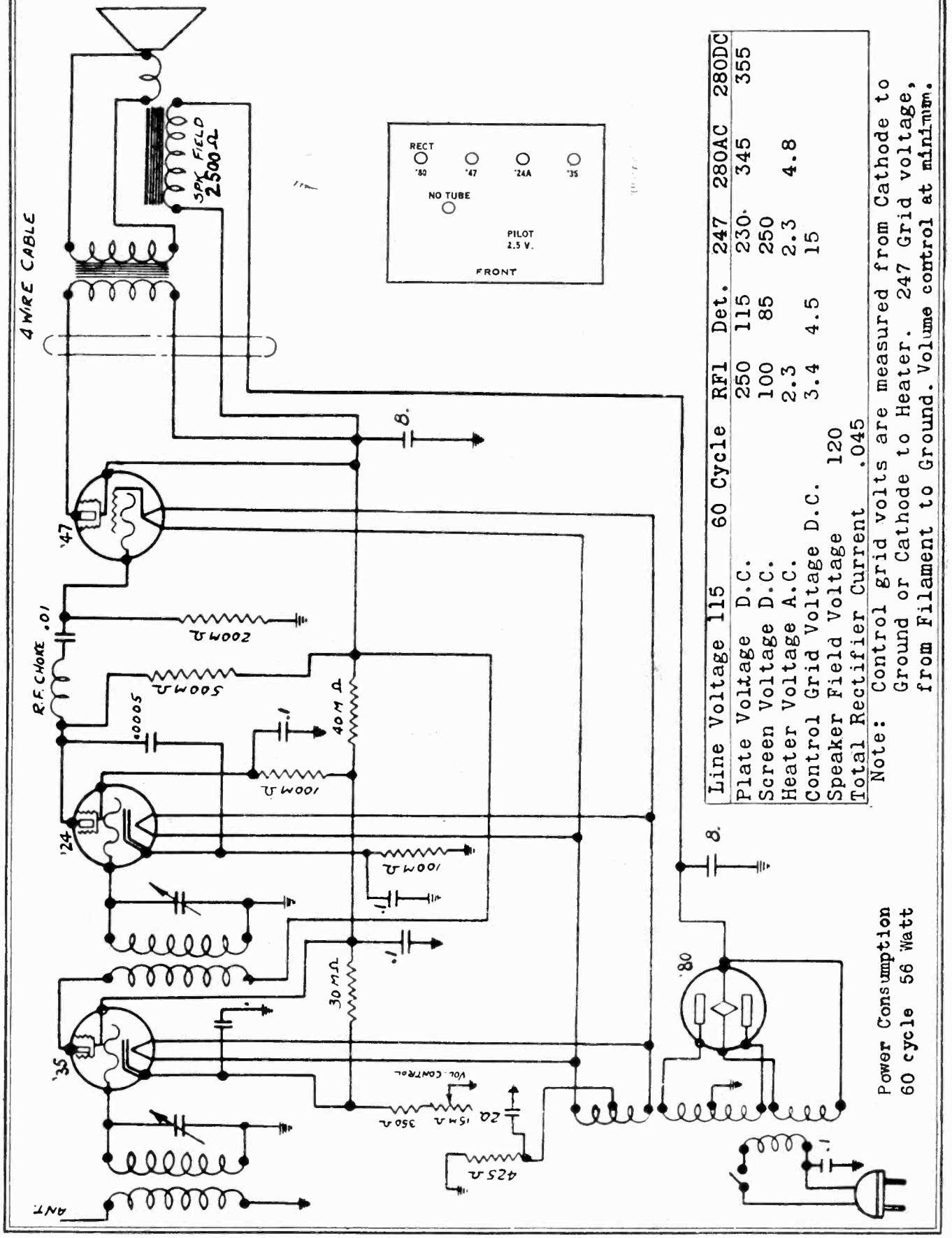
MODEL 1320,1322,1324
Chassis

SEARS-ROEBUCK & CO.



MODEL 1370

SEARS-ROEBUCK & CO.



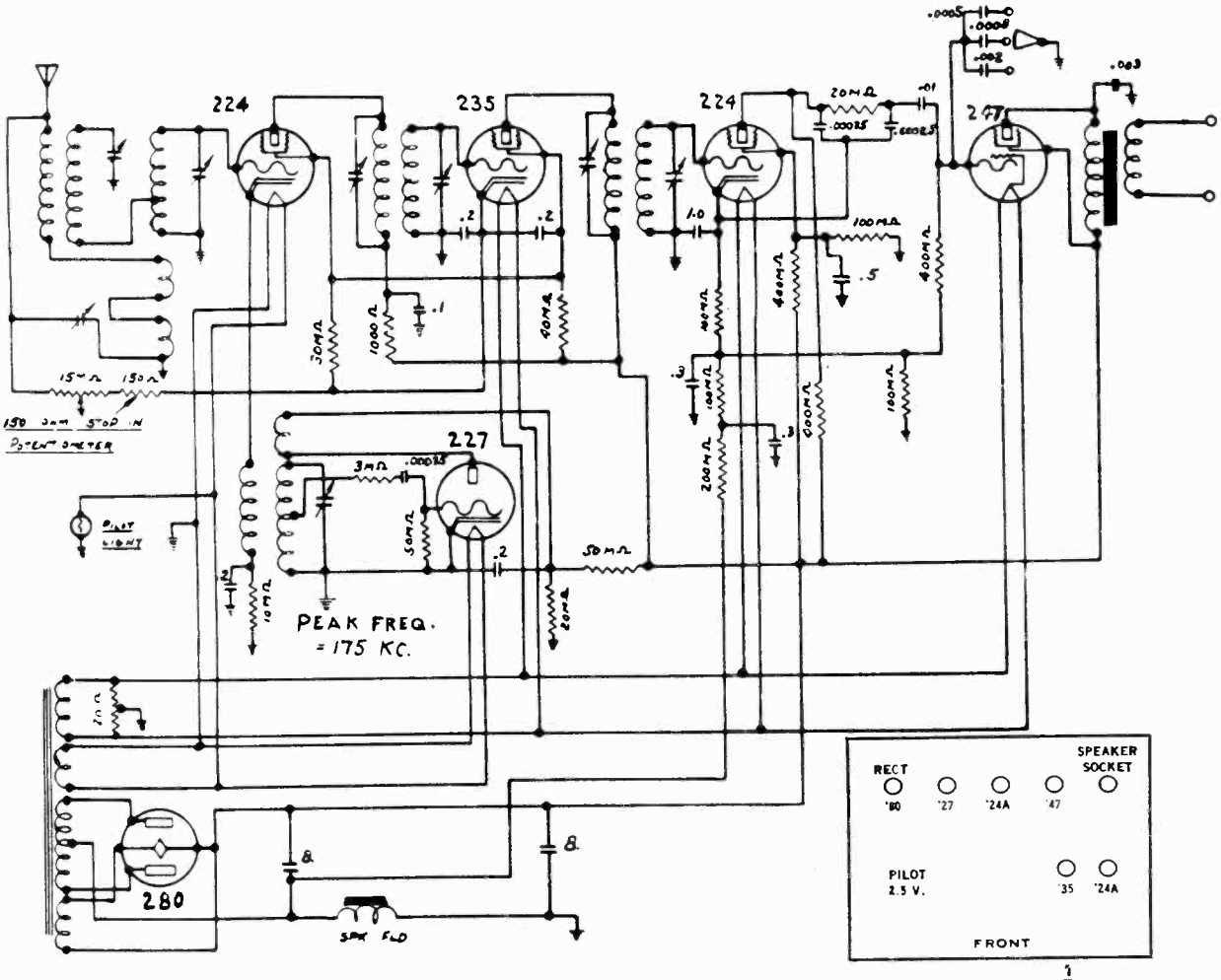
Line Voltage 115	60 Cycle	RF1	Det.	247	280AC	280DC
Plate Voltage D.C.		250	115	230	345	355
Screen Voltage D.C.		100	85	250		
Heater Voltage A.C.		2.3		2.3	4.8	
Control Grid Voltage D.C.		3.4	4.5	15		
Speaker Field Voltage	120					
Total Rectifier Current	.045					

Note: Control grid volts are measured from Cathode to Ground or Cathode to Heater. 247 Grid voltage, from Filament to Ground. Volume control at minimum.

Power Consumption
60 cycle 56 Watt

MODEL 1390,1400, 1402,1404, 1406

SEARS-ROEBUCK & CO.



60 Cycle — Total Watts - 66

Line Voltage - 115	Tran.	Osc.	I.F.	Det.	247	280AC	280DC
Plate Voltage DC	230	40	240	120	240	350	370
Screen Voltage DC	80		80	40	245		
Heater Voltage AC	2.4	2.4	2.4	2.4	2.4	4.8	
Control Grid Voltage DC	10		1.5-30	4	15		
Speaker Field Voltage	125 volts						
Total Plate Current	.050 amperes						

25 Cycle — Total Watts - 70

Line Voltage- 115	Tran.	Osc.	I.F.	Det.	247	280AC	280DC
Plate Voltage DC	225	45	240	125	235	345	360
Screen Voltage DC	80		80	40	240		
Heater Voltage AC	2.5	2.5	2.35	2.35	2.35	4.75	
Control Grid Voltage DC	10		1.5-30	4	15		
Speaker Field Voltage	120 volts						
Total Plate Current	.050 amperes						

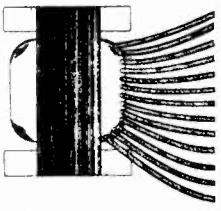
Note: Control grid volts are measured from cathode to ground or cathode to heater. 247 grid voltage from grid to ground or filament.

The 25 cycle models of this receiver are identical in electrical characteristics to the 60 cycle models.

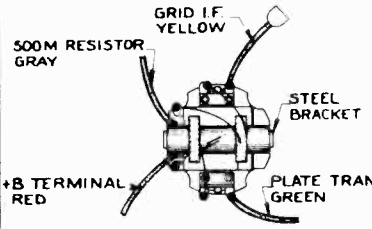
Note-The term Tran. (translator) refers to what is commonly called the first detector. IF transformer aligning screws are accessible through two holes in the base under each IF transformer. A variation voltage of about 20 percent can be allowed for in the voltage chart.

SEARS-ROEBUCK & CO.

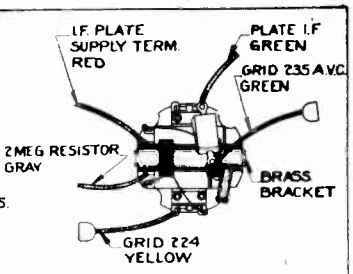
MODEL 1430
Parts-Voltage



POWER TRANSFORMER
R 6248 A - 60 ~
R 6249 A - 25 ~

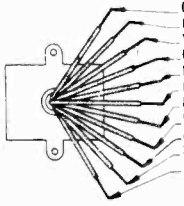


#1
R 6151 C

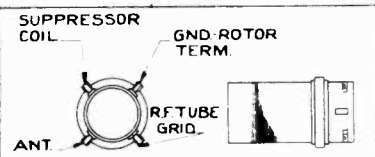


#2
R 6327 A

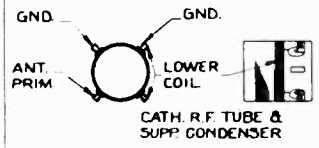
ASSEM. I.F. TRANS & I.F. TUNING CONDENSERS



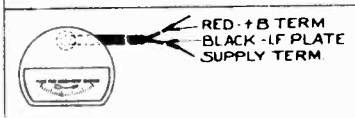
FILTER CONDENSER-R 6238



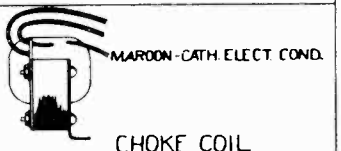
ANTENNA COIL R 6043



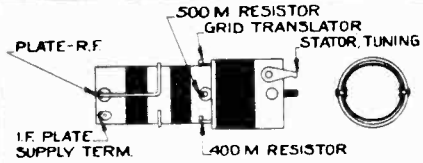
SUPPRESSOR COIL R 6196 A



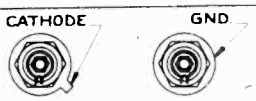
TUNING METER
R 6241



CHOKE COIL
R 6245 A



TRANSLATOR COIL R 6252 B



ELECTROLYTIC CONDENSERS

FILTER CONDENSER
R 6239

LEAD DETAILS OF POWER TRANSFORMER-I.F. TRANS.-I.F. TUNING COND.-FILTER COND.-ELECTROLYTIC COND.-ANTENNA, SUPPRESSOR, TRANSLATOR AND CHOKE COILS - TUNING METER.

MODEL 1430 - 60 CYCLE
Line Voltage 115
Total Watts 100

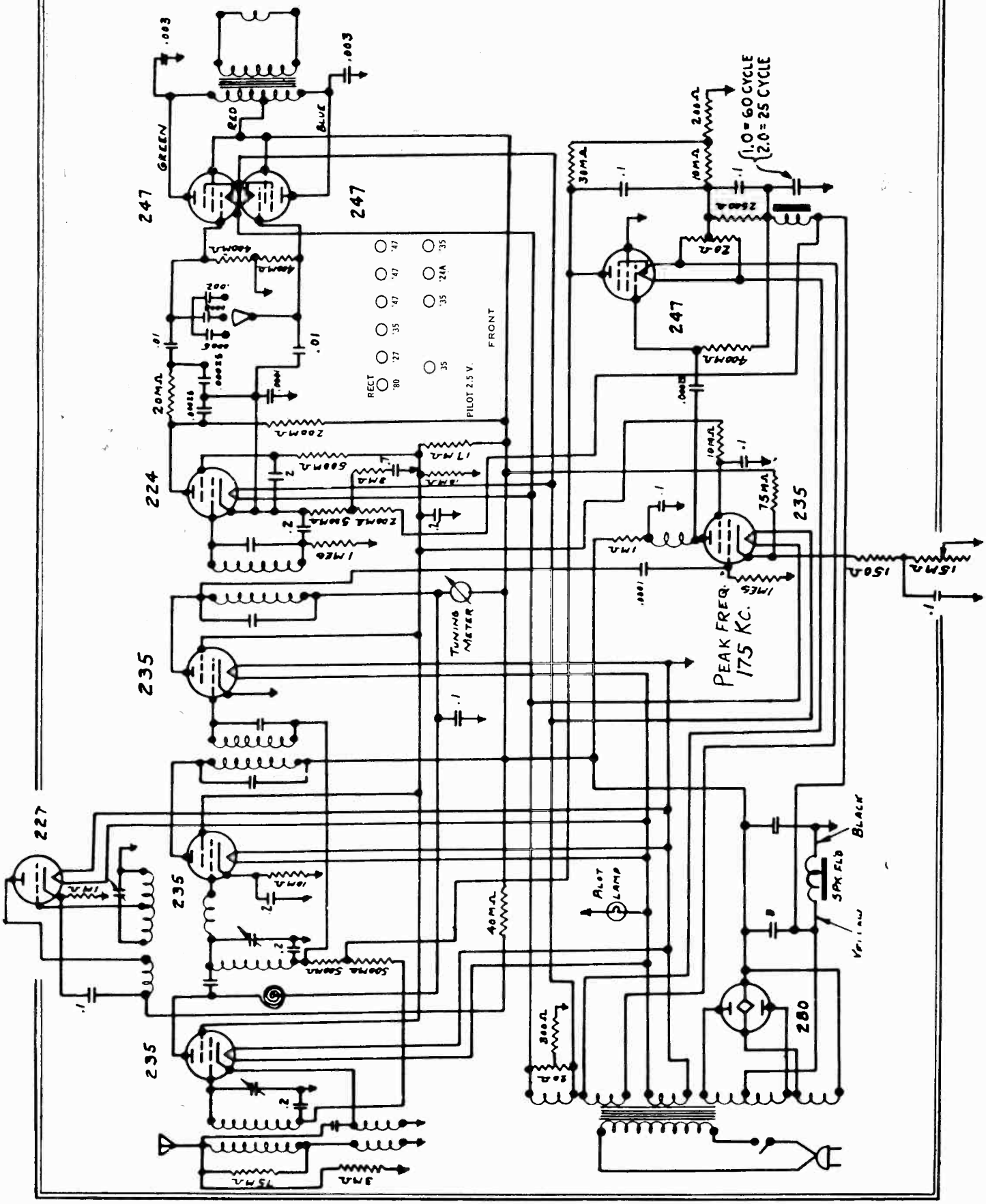
	Trans	Osc.	IF	RF	Det	#1 247 Output	#2 247 Output	AVC Amp 235	AVC 247	280 AC	280 DC
Plate Voltage	230	20	230	230	160	230	230	230		340	340
Screen Voltage	70		70	70	25	230	230	70	100		
Grid Voltage	var		var.	var.	20	15	15	var.	18		
Filament Voltage	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4.85		
Speaker Field Voltage	-	110									
Total Plate Current	-	80 ma.									

Note: All voltages measured with a 1000 ohm per volt meter, 250 volt scale, with volume level control at maximum. 247 output grid voltages were measured from filament to ground, and translator grid from cathode to ground. Grid voltages on the RF and IF will be variable when the set is operating. AVC plate voltages will be the grid voltages on RF IF and translator tubes.

Notes-Causes of no signals can be traced to some of the following reasons. Grid clips shorted to tops of tube shields. Open or shorted condensers. Unsoldered leads. Solder under tube socket terminals. Defective tubes. Oscillator not working. Open image suppressor coil. Defective speaker or shorted tone control connection. Poor quality can be traced to defective output or detector tubes. Set not tuned properly. A poor 235 in the IF, RF or translator sockets will give poor quality and unsatisfactory volume control. Shorted or open grid coupling condenser in the audio circuit, or open resistors in the audio circuits will also contribute to poor quality. Oscillation can be traced to defective tubes, grid leads of detector and IF too close, or an open condenser in the plate circuit of the translator.

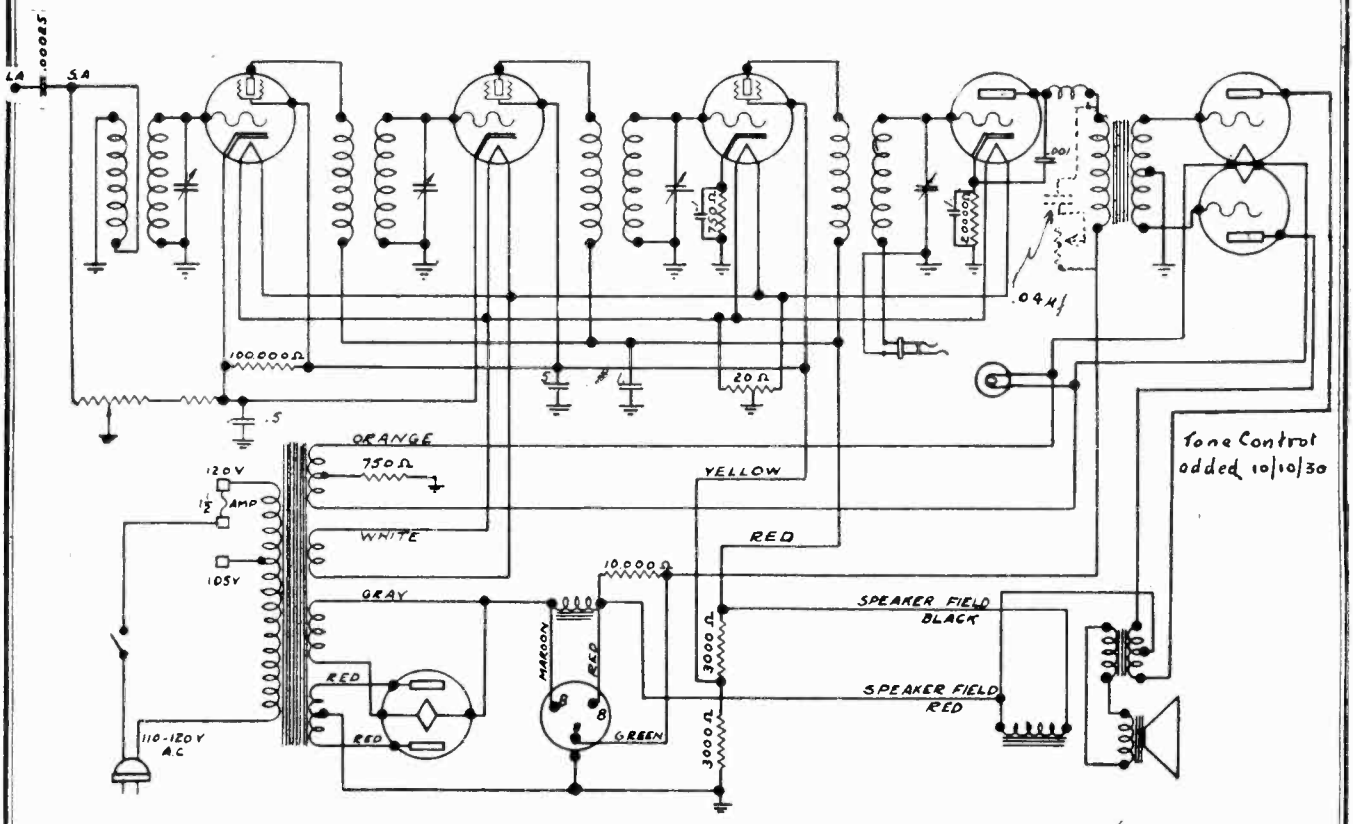
MODEL 1430
Schematic

SEARS-ROEBUCK & CO.



MODEL Silvertone 218

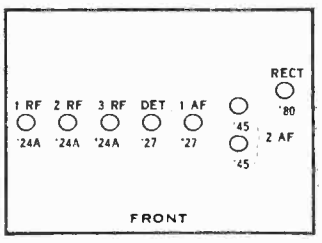
SEARS-ROEBUCK & CO.



READINGS WITH PLUG IN SET SOCKET AND TUBE IN TESTER SOCKET

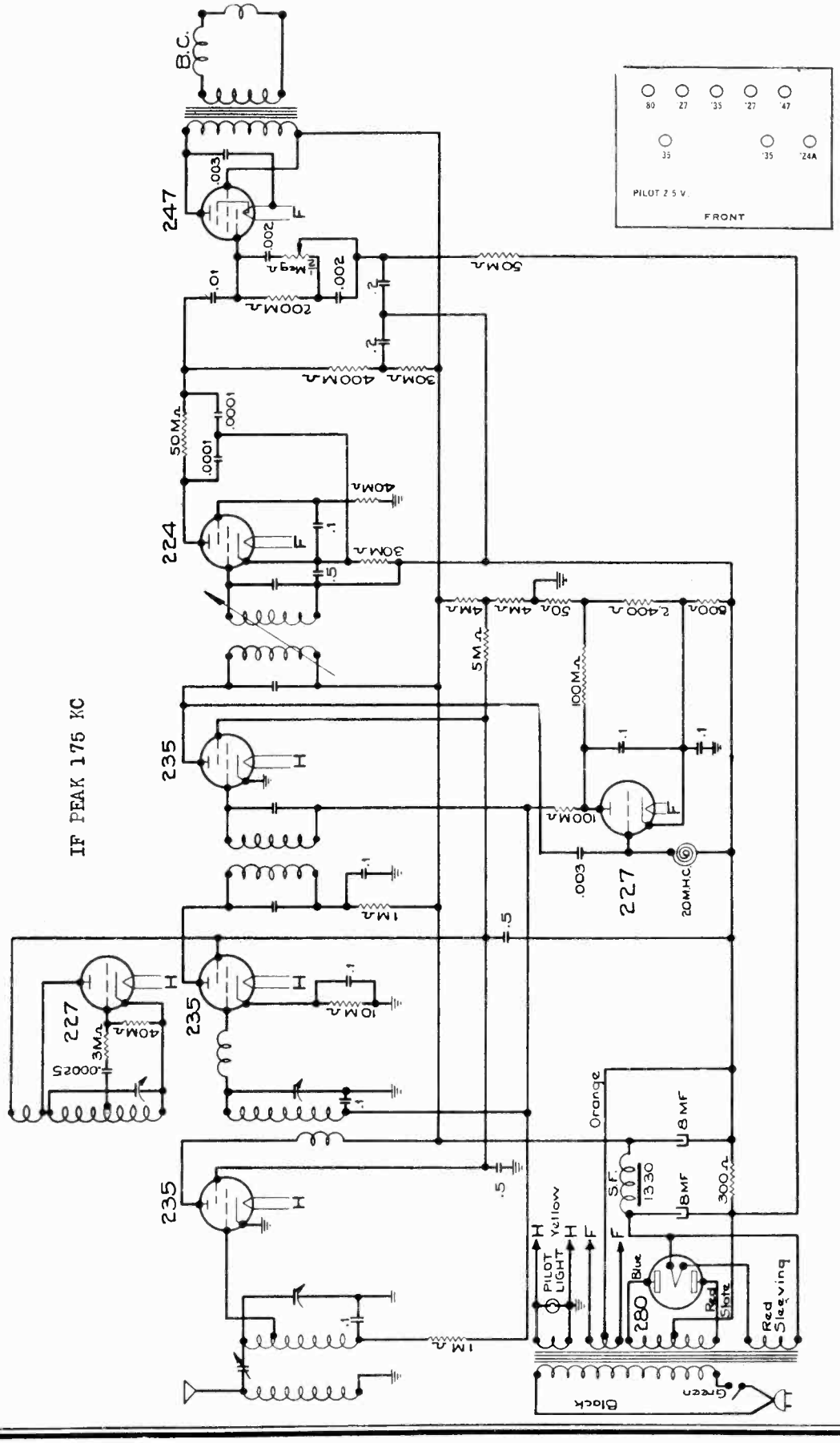
Tube No. in Order	Position of Tube	Type of Tube	A Volts	B Volts	C Volts	Cathode	Plate M.A.	Screen Grid Volts
1	1st R.F.	224	2.4	178	3.4	3.4	3.5	85
2	2nd R.F.	224	2.4	178	3.4	3.4	3.5	85
3	3rd R.F.	224	2.4	178	3.4	3.4	3.5	85
4	DET.	227	2.4	240	23.	2.5	1.1	
5	Push-Pull	245	2.4	235	45		27	
6	Push-Pull	245	2.4	235	45		27	
7	RECT.	280	5.	310				

Line Voltage 120 Set On 120 Volt Tap Volume Control FULL ON



MODEL 1462
Schematic

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODEL 1462
MODEL 1480,1482, 1484

Model 1462

	Trans. 235	Osc. 227	IF 235	RF 235	247 Output	AVC 227	280 DC	Det 224
PLATE VOLTAGE	160	55	160	160	242	48	370	80
AVERAGE PLATE CURRENT MA	1.	-	5.	5.	26.	-	-	.2
SCREEN VOLTAGE	58	-	58	58	250	-	-	40
AVERAGE SCREEN CURRENT MA	.2	-	1.	1.	7.	-	-	.15
GRID VOLTAGE	10	-	1.5	1.5	18	-	-	6
FILAMENT VOLTAGE	2.4	2.4	2.4	2.4	2.6	2.5	5	2.5

SPEAKER FIELD VOLTAGE 83 volts Line Voltage 115 volts
TOTAL PLATE CURRENT 60 ma Total Watts 85

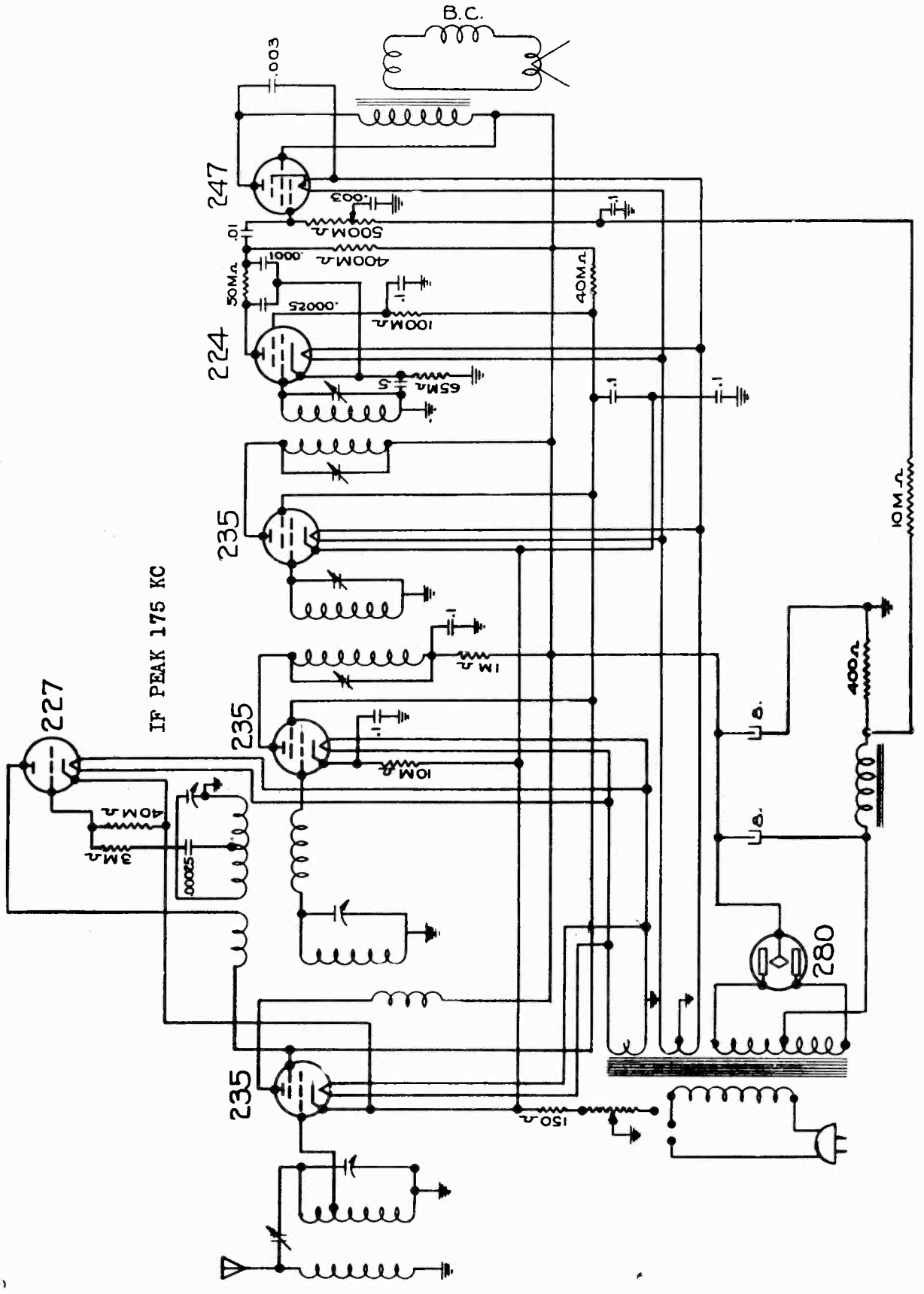
Model 1480,1482, 1484

	Trans. 235	Osc. 227	IF 235	RF 235	Det 224	Pentode 247	280
PLATE VOLTAGE	230	55	230	230	75	220	360
AVERAGE PLATE CURRENT MA	1.	3.	5.	5.	.2	26.	
SCREEN VOLTAGE	55		55	55	38	230	
AVERAGE SCREEN CURRENT MA	.2		1.	1.	.15	7.	
GRID VOLTAGE	10		1.5	1.5	5	17	
FILAMENT VOLTAGE	2.47	2.52	2.54	2.56	2.5	2.49	5

SPEAKER FIELD 115 volts LINE VOLTAGE 115
TOTAL PLATE CURRENT 40 ma. TOTAL WATTS 70

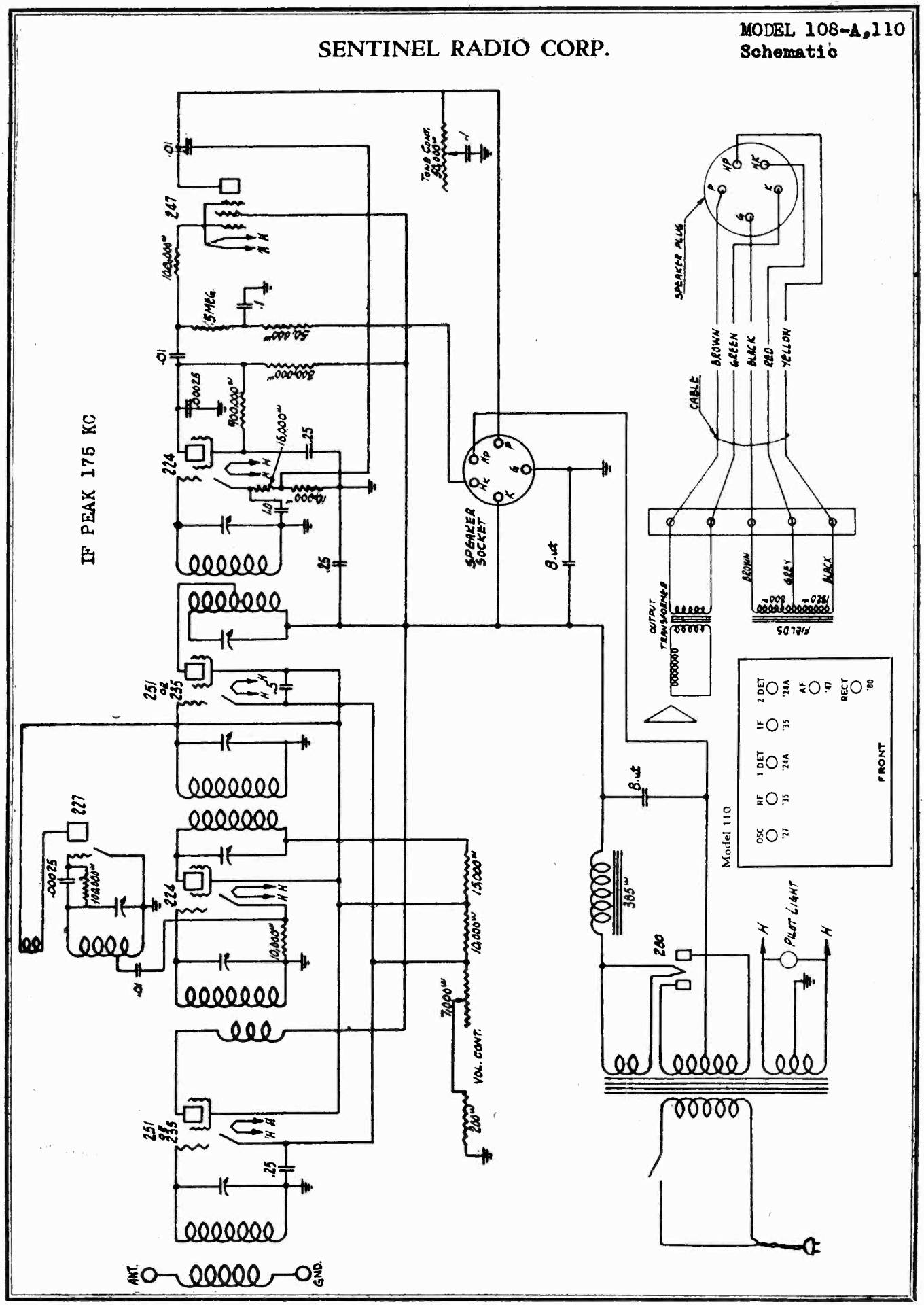
MODEL 1480,1482,1484
Schematic

SEARS-ROEBUCK & CO.



SENTINEL RADIO CORP.

MODEL 108-A,110
Schematic



MODEL 108-A,110
Voltage,Data

SENTINEL RADIO CORP.

VOLTAGE TABLE

Never check voltages until all tubes are fully warmed up to proper operating condition. The voltage table given below is taken at 115 volts line with a Model 547 Weston set checker. It must be remembered that the voltage readings taken vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10% plus or minus is permissible.

115 V. Line Volume Control Full On

TUBE VOLTAGES Type of Tube	Position of Tube	Filament Volts	B Volts	C Volts	NORMAL PLATE M.A.	Screen Volts
227	Oscillator	2.4	62.5		4.75	
235	Radio Frequency	2.4	240	2.15	2.75	27
224	1st Detector	2.4	230	4.35	.5	65
235	Intermediate	2.4	237	2.15	2.75	72
224	2nd Detector	2.4	100*	2.1*	2.5	35*
247	Pentode	2.4	250	16.5**	32.5	250
280	Rectifier	4.95			27.ea.plate	

*These readings are only comparative and are not true voltages applied. The volt meter, when the readings are taken at these points, is in series with a very high resistance.

** To read the 247 bias, read between H.K.speaker socket and ground.

ALIGNMENT OF RECEIVER:

Because of the construction and thorough impregnation of the intermediate coils, the intermediate stages should rarely need re-tracking. Only when an intermediate coil has become defective due either to an open or burned out winding, should it be necessary to re-adjust the intermediate trimmers. Should this occur, it is necessary that an oscillator be used and the intermediate trimmors be adjusted at 175 kilocycles. To align the intermediate stages, connect the high side of the oscillator output to the grid circuit of the first detector, which is done by disconnecting the grid cap of the 224 first detector and connecting the high side of the test oscillator to the control grid of this tube. The ground side of the test oscillator should be connected to the ground post on the chassis. Set the oscillator at 175 kilocycles and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Be sure that the output from the oscillator is not so large that it will overload the second detector. If during the alignment the meter goes off scale, reduce the output of the test oscillator or adjust the receiver volume control.

The trimmers of the intermediate coils are accessible through the small holes in the top of the intermediate shield can. There are two trimmers to each intermediate coil. Align the grid trimmer of the first intermediate coil. After a maximum reading is obtained by adjusting the grid trimmer on the first intermediate, adjust the primary for maximum reading and then re-check the grid side to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate coils. After both intermediate coils are properly aligned the adjustment of the intermediate stage is complete and they should not be further disturbed.

Replace the grid cap on the first detector and connect the oscillator output leads to the antenna and ground posts of the receiver and set the oscillator at 1435 kilocycles. Then tune the receiver to 1435 kilocycles on the dial. It is important that the receiver be tuned to this point. If the receiver is out of the cabinet it will be necessary to use some temporary indicator so that the position 1435 kilocycles on the dial may be accurately located. (This indicator should be set so that when the variable condensers are at the maximum capacity stop the indicator points to the last line on the dial at the low frequency end.) Then track the variable condensers by adjusting the trimmer condensers in the following order: Oscillator, antenna and radio frequency - (reading from the front of the receiver toward the back, the variable condenser sections are : Oscillator, antenna and radio frequency). After the variable condensers have been properly tracked at 1435 kilocycles, adjust the oscillator to 1295 kilocycles. Tune the receiver to this frequency. Check alignment of the condensers at this point by bending the end plate of the rotors in and out, noting the change in reading on the output meter. If when the plates are bent in the reading is increased, it is an indication that that particular section requires more capacity and the end plate should be permanently bent in at this point; or, if when the end plate is bent away, the reading is increased, the end plate should be bent away permanently, as it is an indication that that particular section requires less capacity at that particular point. The variable condensers should be checked in this manner at 1295, 880, 650 and 550 kilocycles. These points have been chosen so as to take advantage of the slots in the end plates of the variable condensers. This procedure of bending plates should rarely be necessary on the oscillator section, as the plates of the oscillator section are especially designed to properly track over the broadcast spectrum, providing the antenna and radio frequency stages are correctly aligned.

ANTENNA:

Satisfactory radio reception is largely dependent upon a proper antenna and ground installation. It is not possible to prescribe any definite form of antenna construction, as the most satisfactory aerial for any particular installation will vary in different locations, depending largely upon local structural details and sources of interference. Because of the enormous amplification obtained from the superheterodyne receiver, a large antenna is not desirable nor necessary. An antenna of from 15 to 35 feet, including lead-in and ground, will in most installations be ample. In congested districts an excessively long antenna will result in apparent loss of tone quality and increased hum. In isolated communities where distant daylight reception is desired, the length of the antenna may be increased so as to obtain satisfactory reception.

While in most installations A.C. receivers apparently work almost as well without a ground as they do with one, in no case should an installation be made where the receiver is not connected to a good ground. Water pipes and steam radiators generally make satisfactory grounds. The ground lead should be connected by means of an approved ground clamp or soldered to a section of the pipe that has been thoroughly cleaned. If neither are available a 6 ft. iron pipe driven in the ground, preferably in a position where the soil is moist, will be satisfactory.

MODEL 109

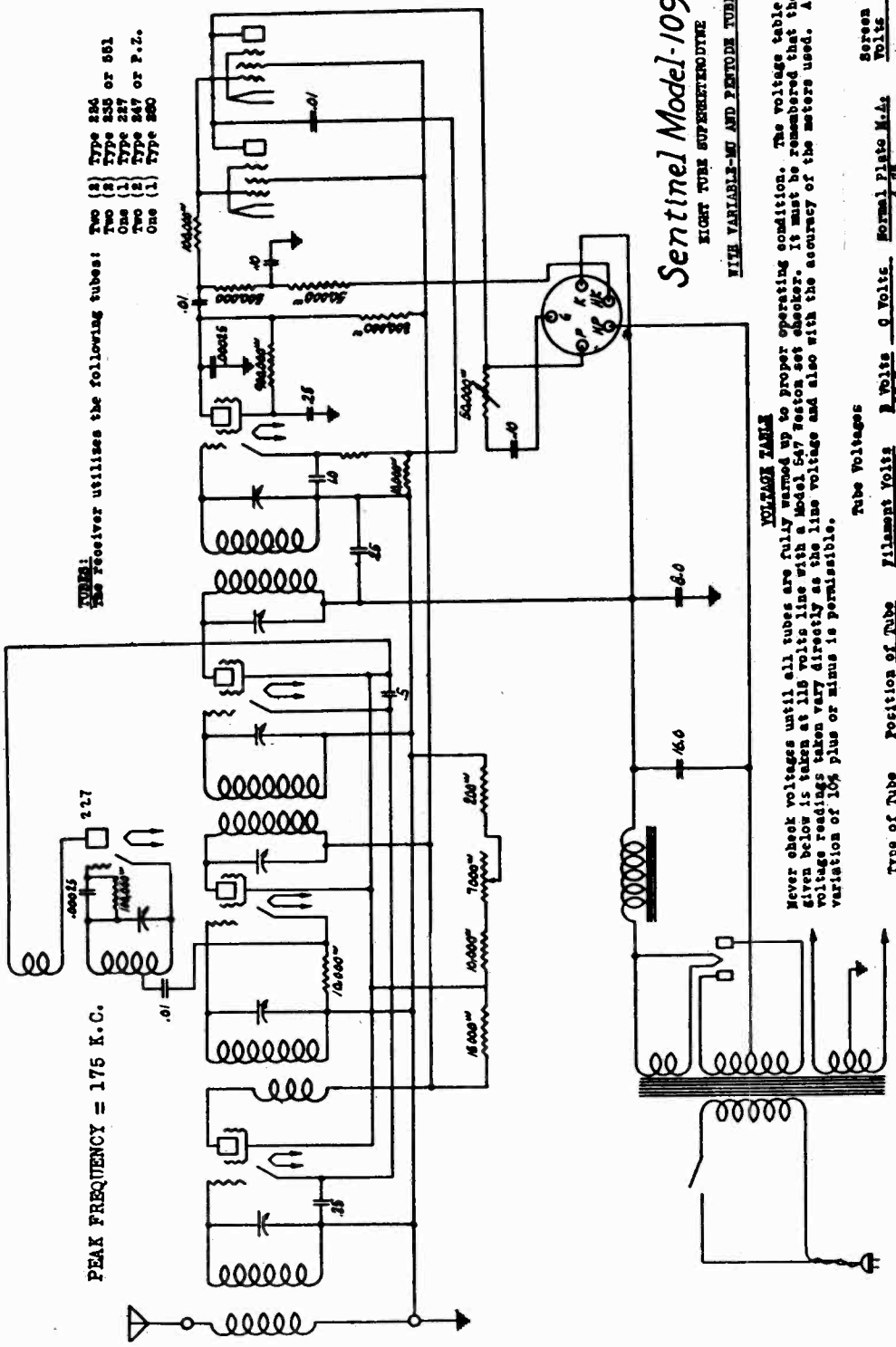
SENTINEL RADIO CORP.

Sentinel Model-109.

EIGHT TUBE SUPERHETERODYNE

WITH VARIABLE-MU AND PENTODE TUBES

TUBES:
The Receiver utilizes the following tubes: Two (2) Type 236
Two (2) Type 235 or 551
One (1) Type 227
Two (2) Type 247 or P.Z.
One (1) Type 280



VOLTAGE TABLE

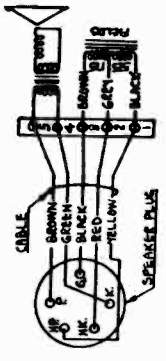
Never check voltages until all tubes are fully warmed up to proper operating condition. The voltage table given below is taken at 115 volts line with a Model 547 Weston set checker. It must be remembered that the voltage readings taken vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10% plus or minus is permissible.

Type of Tube	Position of Tube	Tube Voltages Filament Volts	R Volts	Q Volts	Normal Plate M.A.	Screen Volts
227	Oscillator	2.4	63.5		4.75	
236	Radio Frequency	2.4	240	2.15	2.75	87
224	1st Detector	2.4	230	4.35	.5	65
236	Intermediate	2.4	257	2.15	2.75	78
224	2nd Detector	2.4	100*	2.1*	2.5	35*
247	Pentode	2.4	220	16.8**	32.5	250
247	Pentode	2.4	220	16.8**	32.5	250
280	Rectifier	4.96			47.5 ea.plate	

115 V. Line Volume Control Full On

*These readings are only comparative and are not true voltages applied. The volt meter, when the readings are taken at these points, is in series with a very high resistance.

**To read the 247 bias, read between H.K.speaker socket and ground.



ELECTRO DYNAMIC SPEAKER:
The electro dynamic speaker has a tapped field winding - one section of which is 525 ohms and is utilized as the second choke in the filter circuit. The other section, which is 175 ohms, is used to obtain the proper bias for the 247 tubes. as well as acting as an additional filter choke.

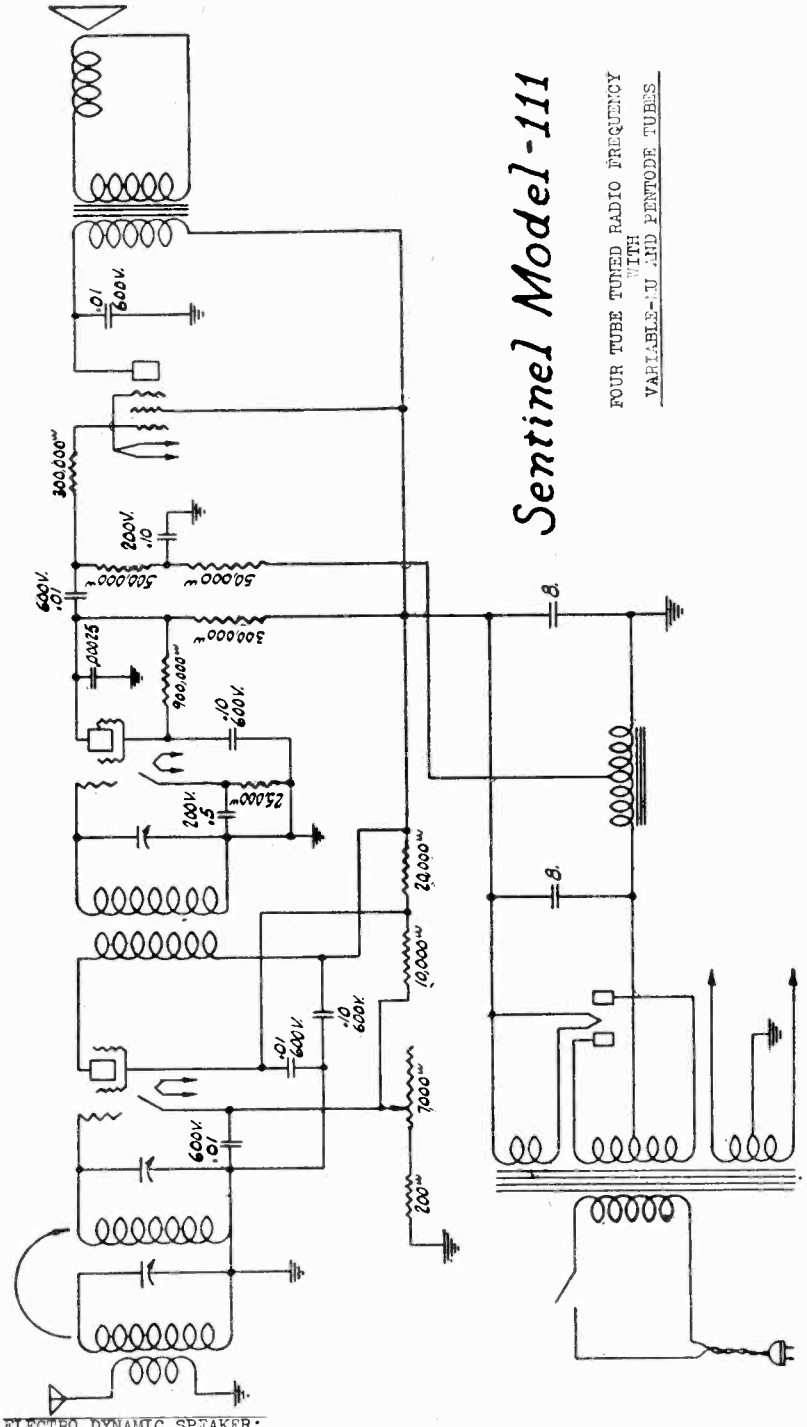
VOLTAGE REGULATOR TUBE:
Shipped with each receiver is a fuse plug containing a 4 ampere fuse and one spare 4 ampere fuse. Frequent and continued burning out of the fuse is an indication that either there is a defective tube, or some part of the receiver is defective, and these possible sources of trouble should be carefully checked if this condition exists. In districts where the line voltage is excessively high or low or fluctuating, the fuse plug may be substituted by a line voltage regulator tube which will maintain the voltage applied to the primary more constant. Either an Amperite #10-10 or Duresite #101 may be used.

MODEL 111

SENTINEL RADIO CORP.

Sentinel Model-111

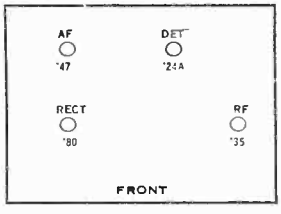
FOUR TUBE TUNED RADIO FREQUENCY
WITH
VARIABLE-MU AND PENTODE TUBES



ALIGNMENT OF RECEIVER:
To align receiver it is recommended that an oscillator and output meter be used, as much better results can be obtained than by aligning on a broadcast signal. However, in either case the procedure is the same. To align the variable condensers connect the high side of the test oscillator to the antenna lead and the low side of the oscillator to the ground lead and tune the oscillator to 1500 kilocycles, adjusting the output of the oscillator so that a convenient reading is obtained on the output meter. If during the alignment the meter goes off scale, adjust the output of the test oscillator or reduce the output by adjusting the receiver volume control. It is important that the receiver be tuned to minimum capacity stop. Then track the variable condensers at this point by adjusting the trimmer condensers, which are mounted on top of the variable condensers, to maximum reading on the output meter in the following order: Antenna, Coupling Stage and Radio Frequency Stage. The variable condenser sections are: (Antenna, Coupling Stage, and Radio Frequency Stage looking at the receiver from the front, reading toward the back.)

After the variable condensers are properly aligned at 1500 kilocycles by adjusting the trimmer condensers, adjust the oscillator to 1295 kilocycles. Tune the receiver to this frequency, making sure that the receiver is tuned exactly in resonance with the incoming signal, and check alignment of the condensers at this point by bending the end plate of the rotors on the antenna coupling stage and radio frequency stage in the order named, noting the change in reading on the output meter. If when the plates are bent in the reading is increased, it is an indication that that particular section requires more capacity at that point of the variable condenser and the end plate should be permanently bent; or if when the end plate is bent away the reading is increased, that section requires less capacity at that particular point, and the receiver is tuned exactly in resonance with the incoming signal, and check alignment of the condensers at this point by bending the end plate of the rotors on the antenna coupling stage and radio frequency stage in the order named, noting the change in reading on the output meter. If when the plates are bent in the reading is increased, it is an indication that that particular section requires more capacity at that point of the variable condenser and the end plate should be permanently bent; or if when the end plate is bent away the reading is increased, that section requires less capacity at that particular point, and the end plate should be permanently bent away from the stator. Each section of the variable condenser should be checked in this manner at 1295, 800, 750 and 550 kilocycles. These frequencies have been chosen so as to take advantage of the slots in the end plates of the variable condenser.

Model 111



ELECTRO DYNAMIC SPEAKER:
The electro dynamic speaker has a tapped winding, one section of which is 1320 ohms and the other section 300 ohms is used to obtain the proper bias for the 247 tube. The field winding is used as the filter choke.

Tube Voltage

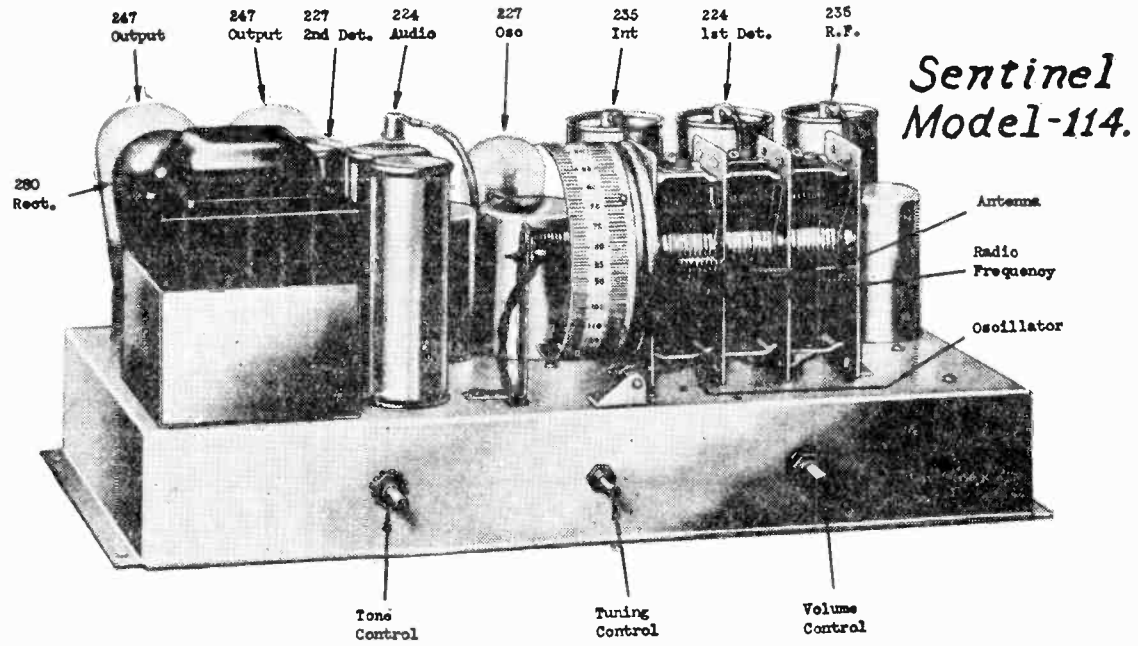
Type of Tube	Position of Tube	Filament Volts	Plate Volts	C Volts	Normal Plate M.A.	Space Charge Grid	Screen Volts
235	Radio Frequency	2.4	250	2.5	4		90
224	Detector	2.4	65*	2.5*	.4		37.5*
247	Output	2.4	230	16.5*	35	250	
280	Rectifier	5.			30 M.A.		

115 V. Line Volume Control Full On

*These readings are only comparative and are not true voltages applied. The volt meter, when the readings are taken at these points, is in series with a very high resistance.

SENTINEL RADIO CORP.

MODEL 114
Voltage- Data



ALIGNMENT OF RECEIVER:
Because of the construction and thorough impregnation of the intermediate coils, the intermediate stages should rarely need retracking. Only when an intermediate coil has become defective due to an open or burned out winding, should it be necessary to readjust the intermediate trimmers. Should this occur, it is necessary that an oscillator be used and the intermediate trimmers be adjusted at 175 kilocycles. To align the intermediate stages, connect the high side of the oscillator output to the grid circuit of the first detector, which is done by disconnecting the grid cap of the 224 first detector and connecting the high side of the test oscillator to the control grid of this tube. The ground side of the test oscillator should be connected to the ground post on the chassis. Set the oscillator at 175 kilocycles and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Be sure that the output from the oscillator is not so large that it will overload the second detector. If during the alignment the meter goes off scale, reduce the output of the test oscillator or adjust the receiver volume control.

The trimmers of the intermediate coils are accessible through the small holes in the bottom of the chassis. There are two trimmers to each intermediate coil. Align the grid trimmer of the first intermediate coil. After a maximum reading is obtained by adjusting the grid trimmer on the first intermediate, adjust the primary for maximum reading and then recheck the grid side to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate coils. After both intermediate coils are properly aligned the adjustment of the intermediate stage is complete and they should not be further disturbed.

Replace the grid cap on the first detector and connect the oscillator output leads to the antenna and ground posts of the receiver and set the oscillator at 1435 kilocycles. Then tune the receiver to 1435 kilocycles on the dial. It is important that the receiver be tuned to this point. If the receiver is out of the cabinet it will be necessary to use some temporary indicator so that the position 1435 kilocycles on the the dial may be accurately located. (This indicator should be set so that when the variable condensers are at the maximum capacity stop the indicator points to the last line on the dial at the low frequency end.) Then track the variable condensers by adjusting the trimmer condensers in the following order: Oscillator, antenna and radio frequency - (reading from the front of the receiver toward the back, the variable condenser sections are: Oscillator, antenna and radio frequency). After the variable condensers have been properly tracked at 1435 kilocycles, adjust the oscillator to 1295 kilocycles. Tune the receiver to this frequency. Check alignment of the condensers at this point by bending the end plate of the rotors in and out, noting the change in reading on the output meter. If when the plates are bent in the reading is increased, it is an indication that that particular section requires more capacity and the end plate should be permanently bent in at this point; or, if when the end plate is bent away the reading is increased, the end plate should be bent away permanently, as it is an indication that that particular section requires less capacity at that particular point. The variable condensers should be checked in this manner at 1295, 880, 650 and 550 kilocycles. These points have been chosen so as to take advantage of the slots in the end plates of the variable condensers. This procedure of bending plates should rarely be necessary on the oscillator section, as the plates of the oscillator section are especially designed to properly track over the broadcast spectrum, providing the antenna and radio frequency stages are correctly aligned.

Tube Voltages

Type of tube	Position of Tube	Filament Volts	B Volts	C Volts	Normal Plate M.A.	Screen Volts
227	Oscillator	2.4	62.5		4.75	
235	Radio Frequency	2.4	240	2.15	2.75	27
224	1st Detector	2.4	230	4.35	.5	65
235	Intermediate	2.4	237	2.15	2.75	72
227	2nd Detector	2.4				
247	Pentode	2.4	220	8.**	32.5	250
247	Pentode	2.4	220	8.**	32.5	250
280	Rectifier	4.9			47.5 ea.plate	
224	1st Audio	2.4	100	2.1*	.5	35*

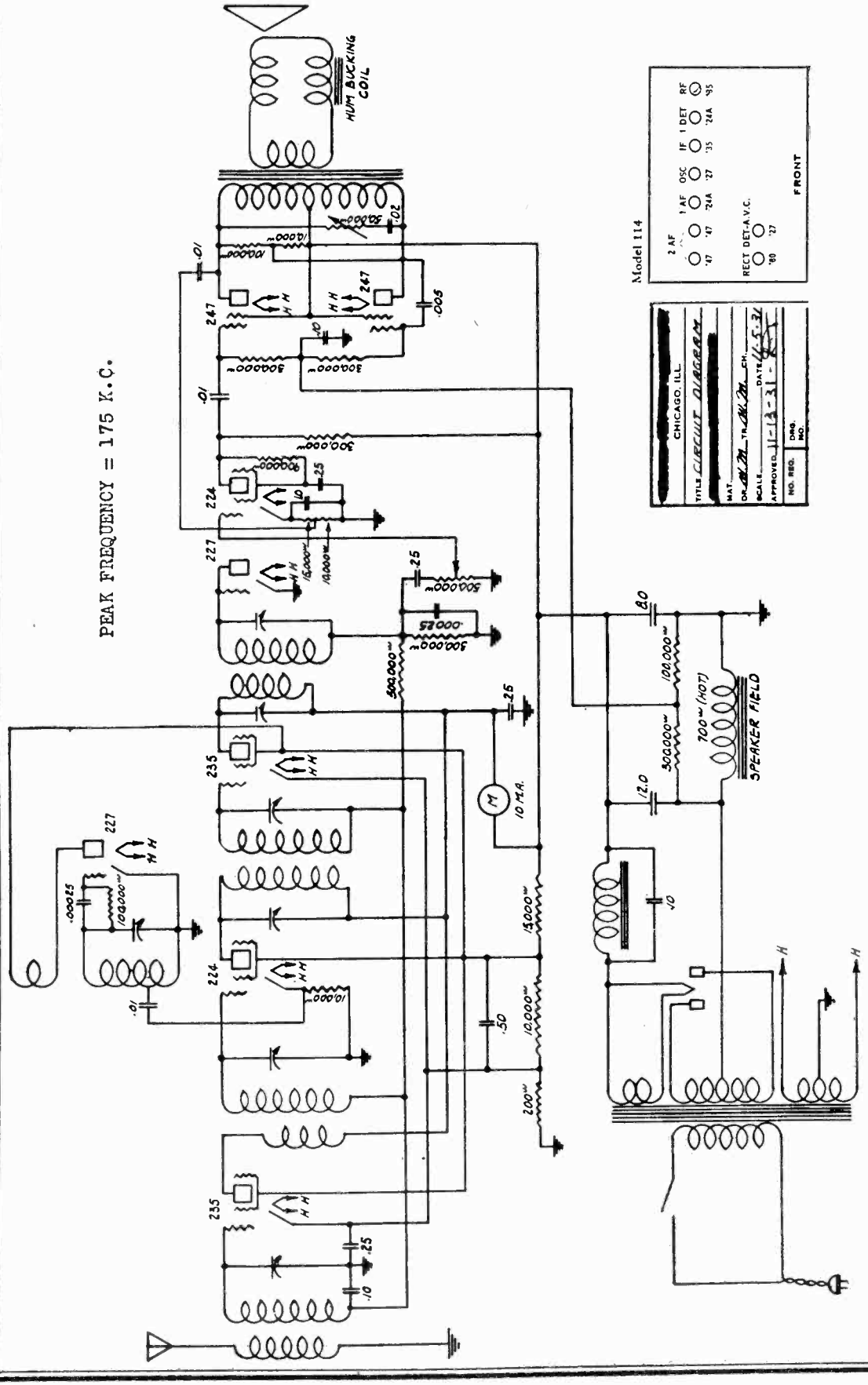
115 V. line Volume Control Full On

**To read the 247 bias, read between 247 grid and ground.

*These readings are only comparative and are not true voltages applied. The volt meter, when the readings are taken at these points, is in series with a very high resistance.

MODEL 114
Schematic

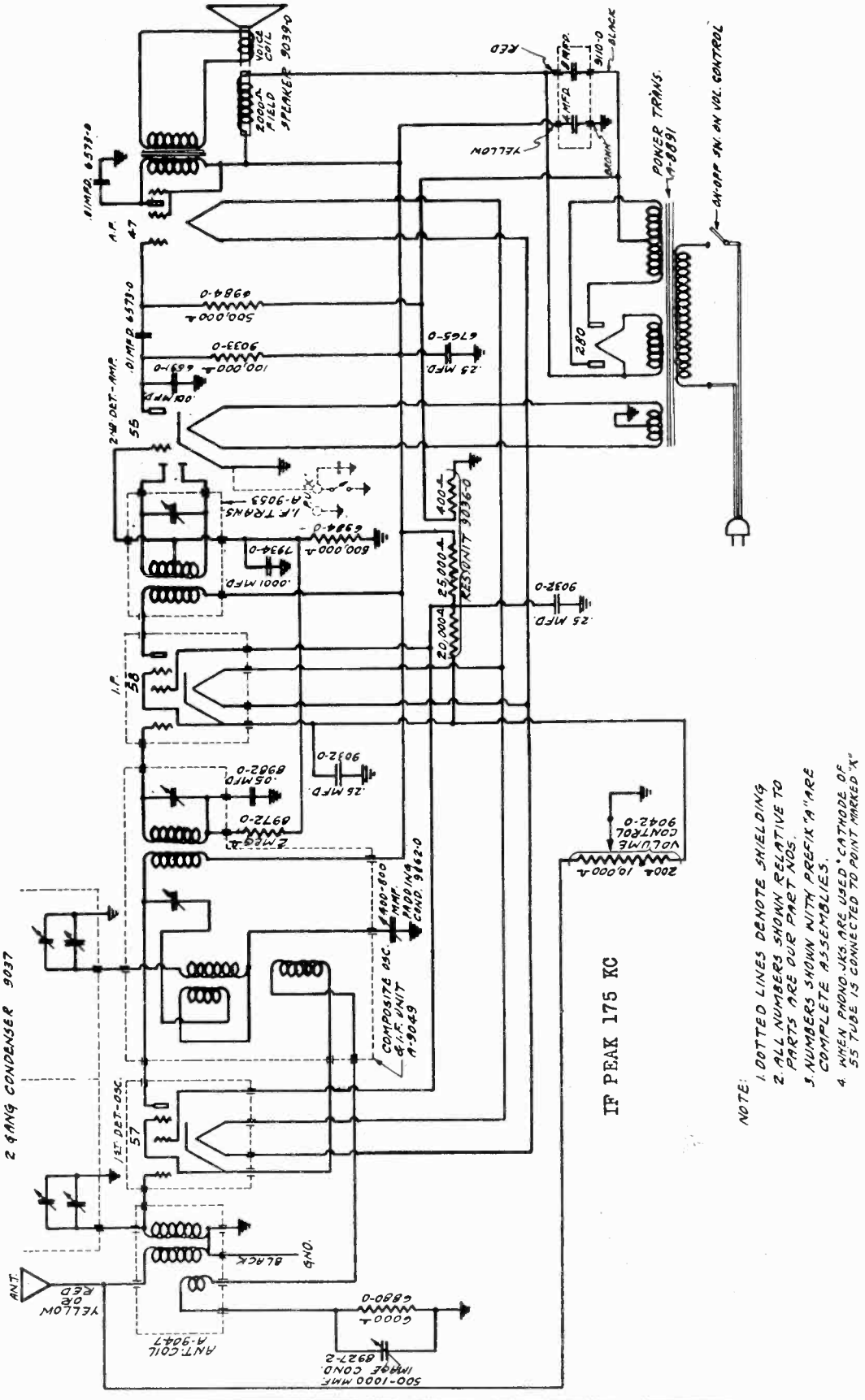
SENTINEL RADIO CORP.



ELECTRO DYNAMIC SPEAKER:
The electro dynamic speaker field winding, which is 700 ohms, is utilized as an additional choke in the filter circuit. The correct bias for the two 247 output tubes is obtained from the voltage drop across the speaker field shunt resistors.

MODEL 513

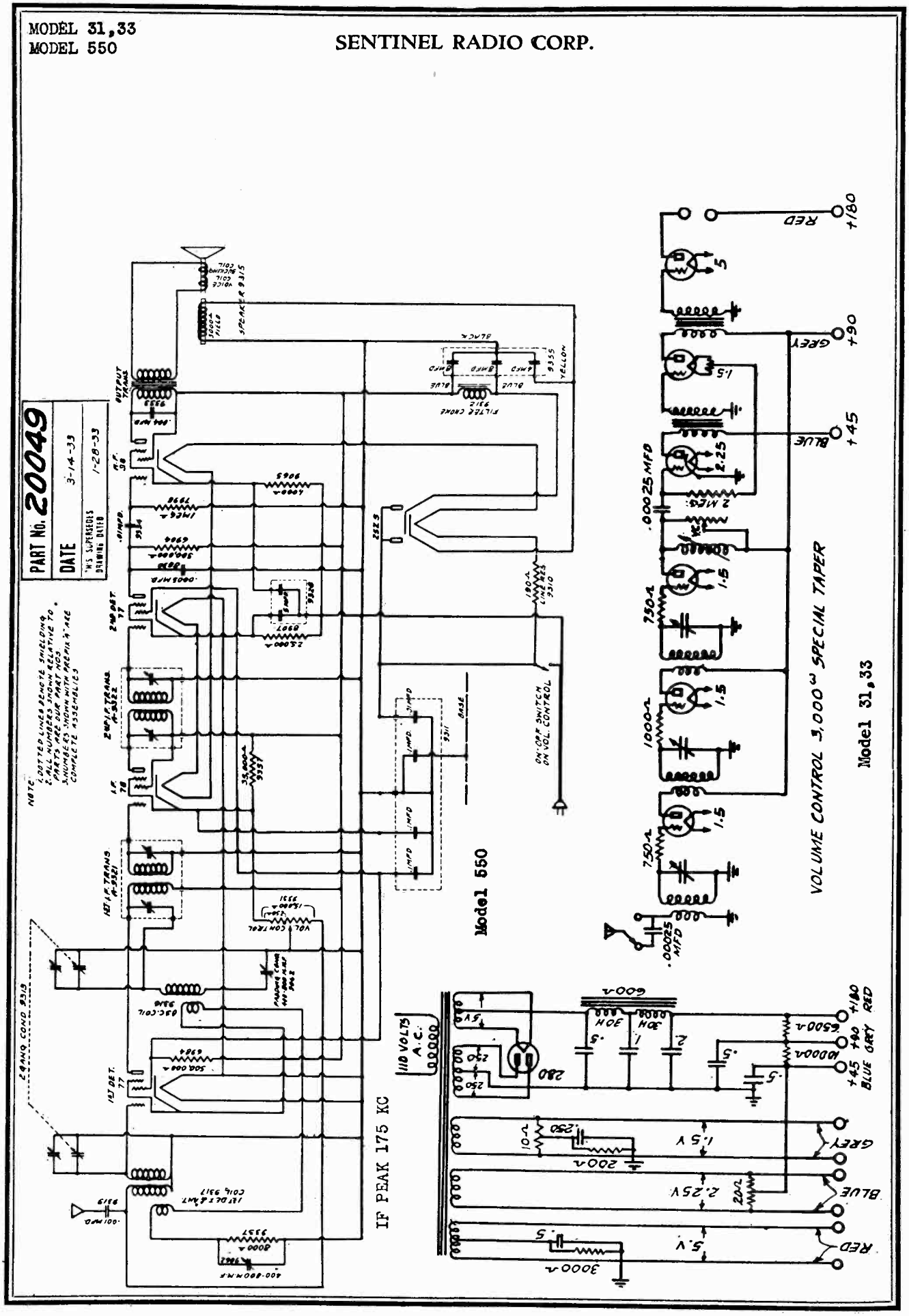
SENTINEL RADIO CORP.



NOTE:
1. DOTTED LINES DENOTE SHIELDING
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. WHEN PHONO JKS. ARE USED "CATHODE OF 55 TUBE IS CONNECTED TO POINT MARKED "X"

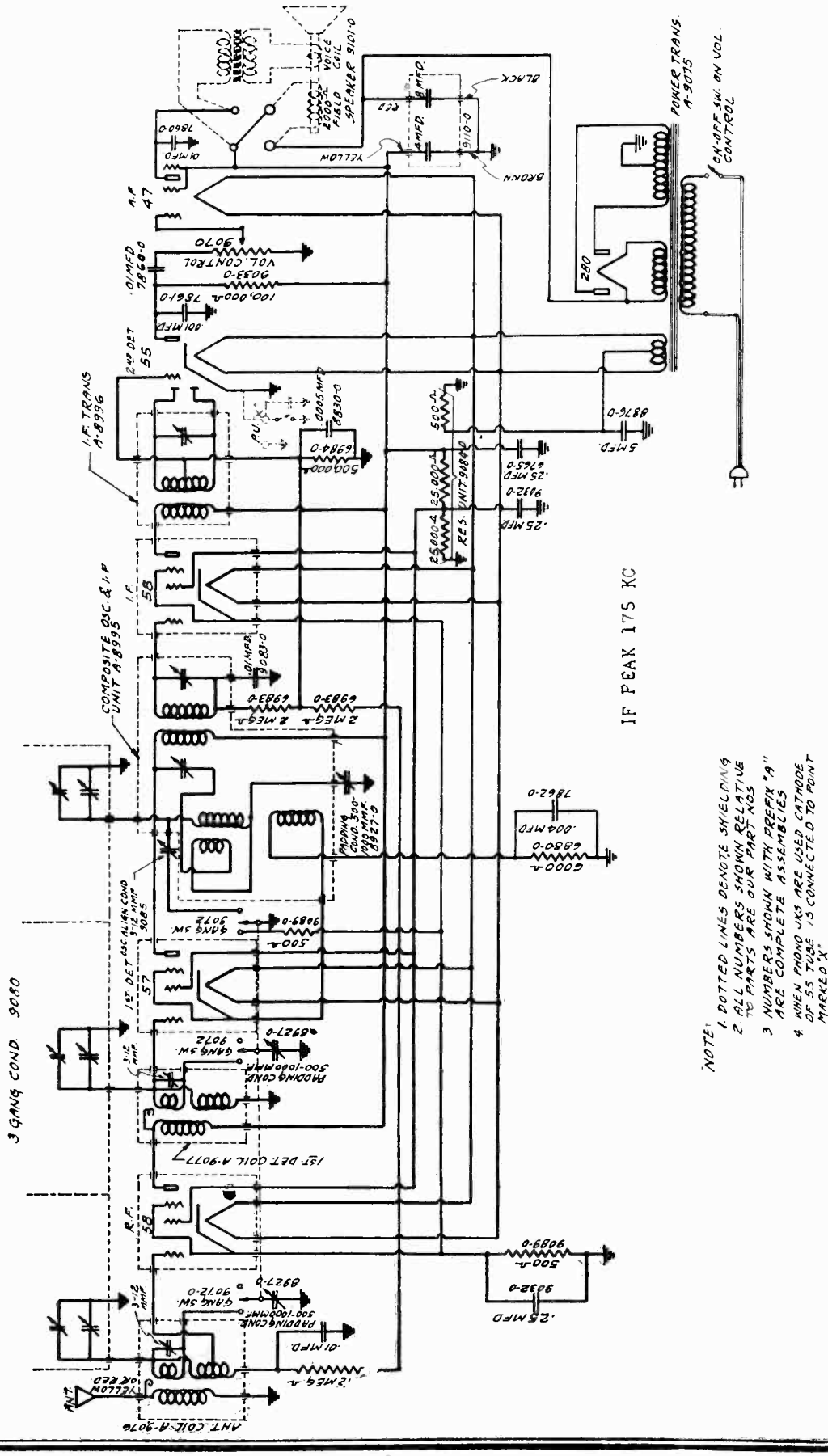
MODEL 31,33
MODEL 550

SENTINEL RADIO CORP.



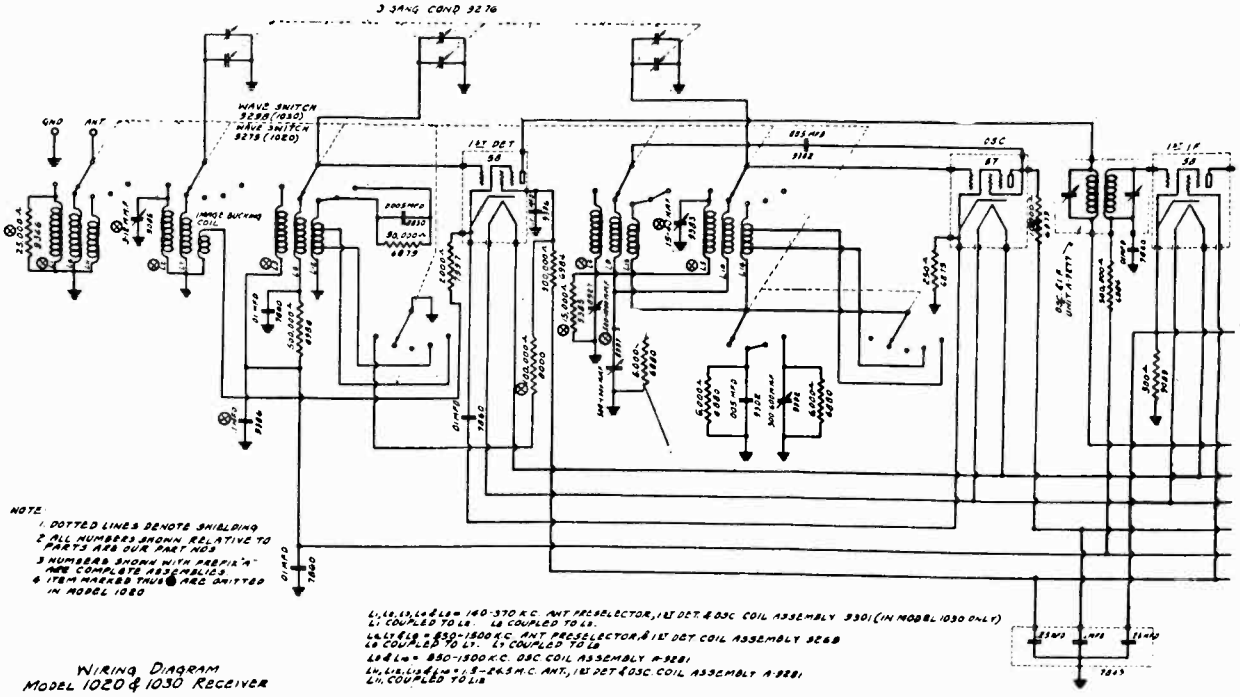
MODEL 614

SENTINEL RADIO CORP.

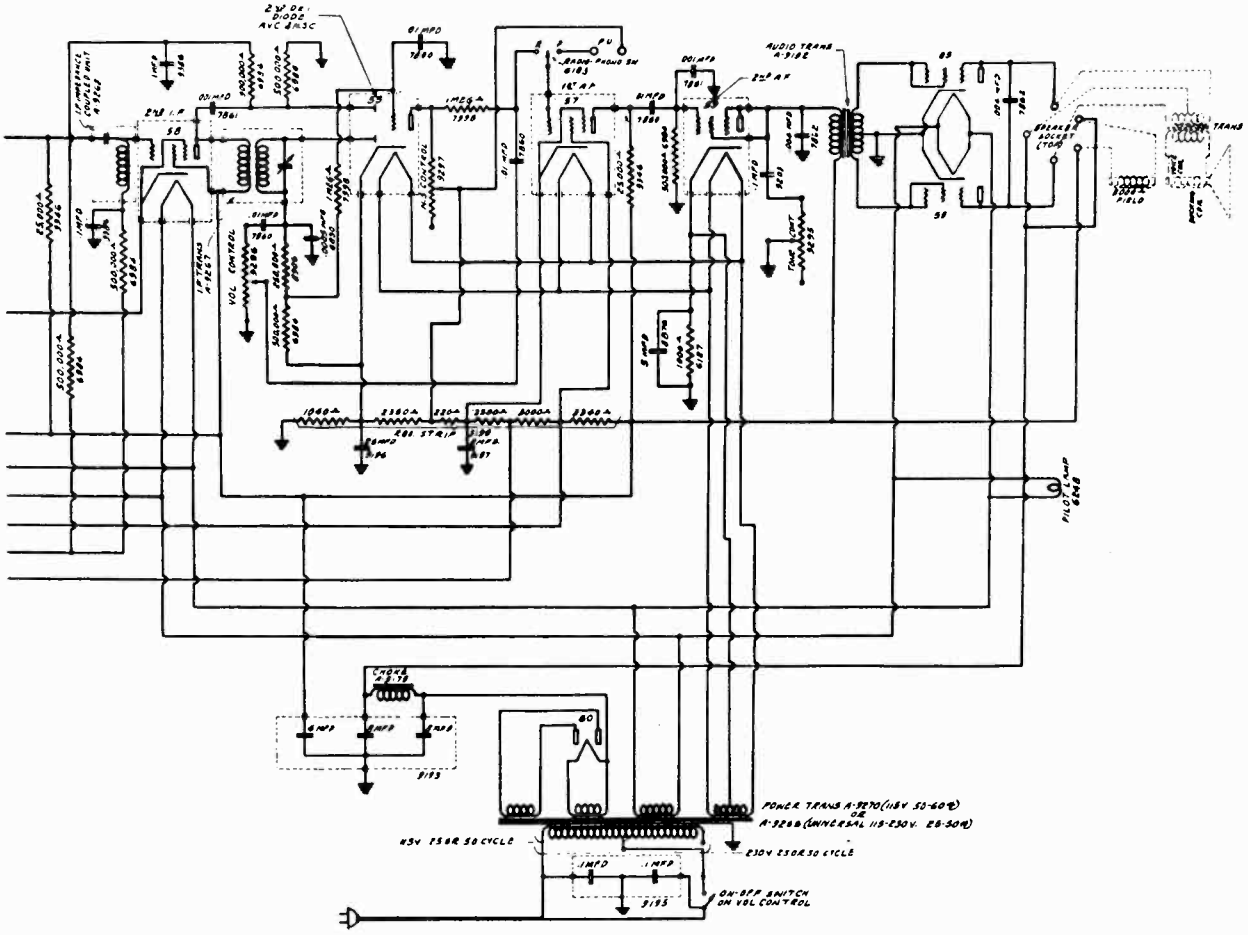


MODEL 1020, 1030

SENTINEL RADIO CORP.

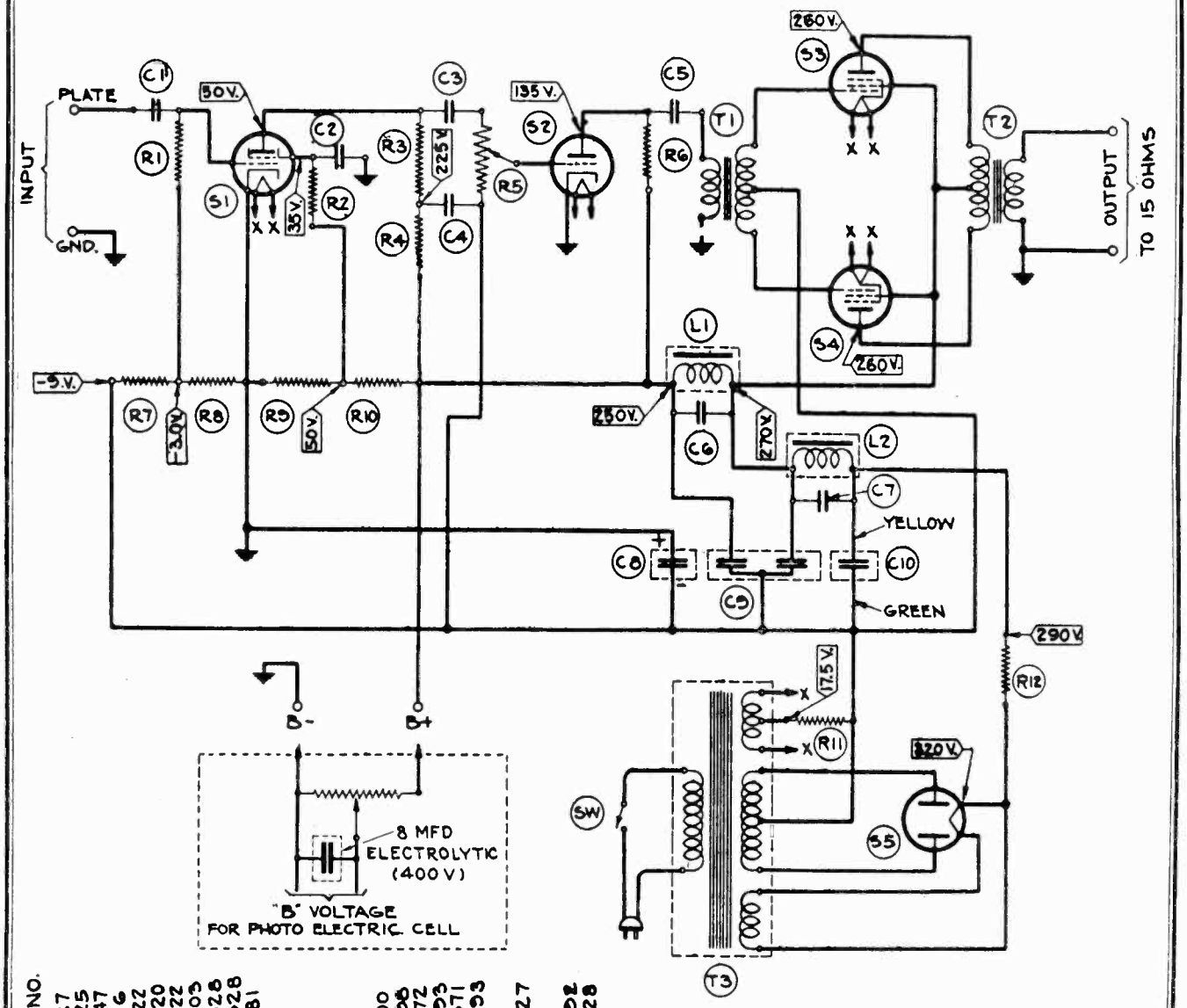


Wiring Diagram
Model 1020 & 1030 Receiver



MODEL 684

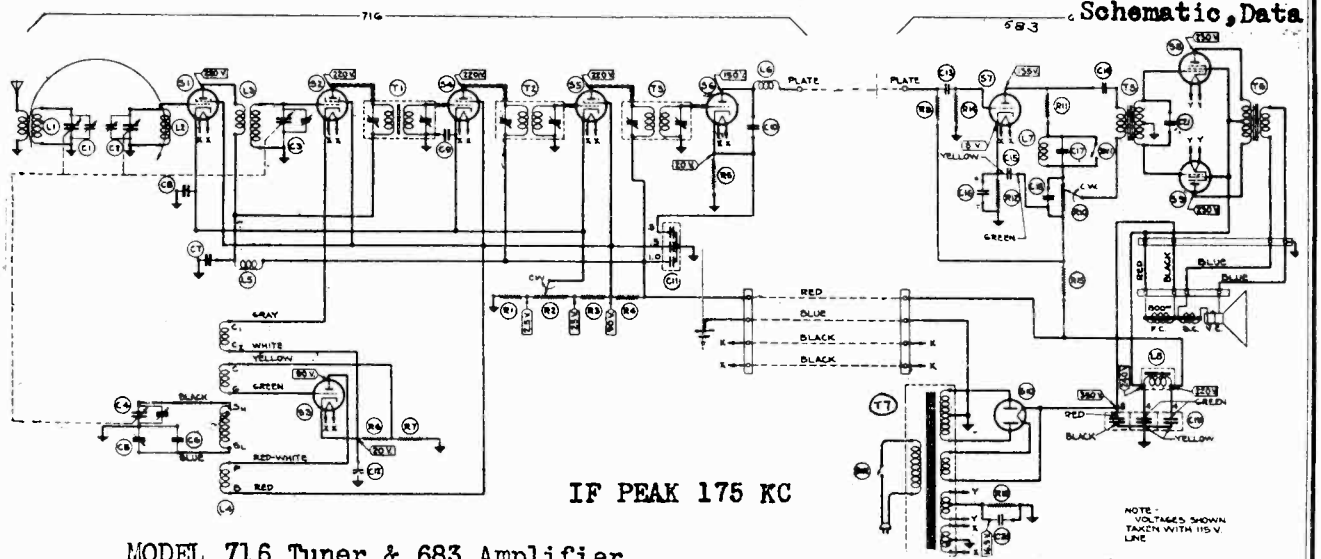
SILVER - MARSHALL, INC.



LEGEND		P.P. NO.
C1 – .05 MFD.	SPRAGUE (400 V.)	13127
C2 – 1.0 MFD.	(150 V.)	3325
C3 – .01 MFD.	(MICA)	7047
C4 – 1.0 MFD.	(200 V.)	7116
C5 – .25 MFD.	SPRAGUE (750 V.)	9322
C6 – .1 MFD.	" "	3220
C7 – .25 MFD.	" "	3322
C8 – 10 MFD. ELECTROLYTIC	(25 V.) DRY	13205
C9 – 2 MFD. (PAPER)	(400 V.)	3328
2 MFD. (PAPER)	(400 V.)	3328
C10 – 8 MFD. ELECTROLYTIC	(450 V.) DRY	13181
L1 – 10145 CHOKE		
L2 – 332-U CHOKE		
R1 – 2 MEGOHMS	1 WATT	4700
R2 – 60,000 OHMS	1 WATT	4636
R3 – ½ MEGOHM	1 WATT	4772
R4 – 30,000 OHMS	1 WATT	14693
R5 – 1 MEGOHM TAPERED VARIABLE RESISTOR		14371
R6 – 30,000 OHMS	1 WATT	14693
R7 – 250 OHMS		
R8 – 125 OHMS	5 WATT	14727
R9 – 2300 OHMS		
R10 – 11,300 OHMS		
R11 – 220 OHMS	2 WATT	14692
R12 – 300 OHMS	5 WATT	14728
S1 – '24		
S2 – '27		
S3 – '47		
S4 – '47		
S5 – '80		
SW – ON-OFF SWITCH		
T1 – 10159 INPUT TRANS.		
T2 – 10143 OUTPUT TRANS.		
T3 – 360-U POWER TRANS.		

SILVER - MARSHALL, INC.

MODEL 716
MODEL 683
Schematic, Data



IF PEAK 175 KC

MODEL 716 Tuner & 683 Amplifier and Power Supply

C1 C2 C3		
C4	Vairable Condenser 365 Mmfd. Max - 5 Mmfd.	13217
C5	Osc. Trimmer Cond. - 120 to 325 Mmf.	16035
C6	500 Mmfd. Cond.Mica - 10% 450-500 (Blue)500-550 (Red)	"
C7	.1 Mfd. Cond. 200 V.Sprague	3220
C8	.1 Mfd. Cond. 200 V. "	3220
C9	.1 Mfd. Cond. 200 V. "	3220
C10	.001 Mfd. Cond. Mica	7039
C11	.5,.5,1.0 Mfd. Cond.(.5-200V.)(1.0-300V.)	13140
C12	.1 Mfd. Cond. 200V.	3220
C13	.02 Mfd. Cond. 500V.	13195
C14	.04 Mfd. Cond.	7046
C15	4 Mfd.Cond.Dry Electro 450V.	13177
C16	10 Mfd. Cond. Dry Electrolytic (25V.)	13023
C17	.01 Mfd. Cond. Mica	7047
C18	0.25 Mfd. Cond. 500V.Sprague	3322
C19	2 4Mfd. Cond. Dry Electrolytic (450V.) 1 8Mfd. Cond. " " (450V.)	13177 13181
C20	.1 Mfd. Cond. 200V.	3220
C21	.00025 Mfd. Cond. Mica	3330
L1 - L2	170 A Coil	
L3	178 Coil	
L4	179 Coil	
L5	281 R.F.Choke	
L6	281 R.F.Choke	
L7	10164 Air Cone Choke	
L8	10145 Choke	
R1	100 Ohm Resistor - wire wound	4743
R2	4500 Ohm Volume Control	14342
R3	13,000 Ohm Resistor - 1 Watt.Carbon, Brown,Orange,Or.	14694
R4	10,000 Ohm Resistor - 2 Watt. Carbon,Brown,Black, Or.	4726
R5	60,000 Ohm Resisto - 1 Watt. Carbon,Blue, Black, Or.	4698
R6 R7	100 Ohms 1700 Ohms) Wire wound tapped resistor No color	14723
R9	30,000 Ohm Resistor - 1 Watt.Carbon, Orange, Black,Or.	14693
R10	10,000 Potentiometer	4492
R11	720 Ohm Resistor - wire wound No color	4786
R12	2,600 Ohm Resistor - 1 watt Carbon Red,Blue,Red.	4770
R13	220 Ohm Resistor - 2 Watt.Ohmite (Red Devil)	14692
R14	300,000 Ohm Resistor 1 Watt.Carbon, Orange,Black,Yel.	4685
R15	10,000 Ohm Resistor 1 Watt.Carbon, Brown,Black,Orange	14696
S1-S4-S5	'51 Tubes	
S2	'24 "	
S3-S6-S7	'27 "	
S8-S9	'47 "	
S10	'80 "	
SW1	Tone Control Switch	5485
SW2	On-Off Switch (Combines with R2)	
T1	1st I.F.Transformer (G-1)	
T2	2nd I.F.Transformer (G-4) Same spacing as G-3	
T3	3rd I.F.Transformer (G-3)	
T5	10159 Input Transformer	
T6	10143 Output Transformer	
T7	3470 Power Transformer.	

List of Parts Used in 716 and 683.

There are two mounting holes left open on the tuner chassis for mounting the variable bass, and the high tone controls that are connected to flexible leads on the 683 amplifier.

Looking at the rear of the tuner, the antenna and ground posts are mounted on the top left of the chassis. On the right rear of the chassis is the output post marked "plate" This is connected to the input post on the 683 amplifier.

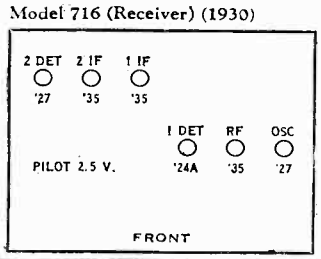
In the rear center of the chassis is a four terminal strip, color coded as follows: Red, Blue, Black, Black. A coded cable is furnished with the tuner for connecting this terminal strip to the 683 or similar amplifier.

The color code reads as follows: Red-B positive 240 volts, Blue-B negative or ground, Black, Black - 2½ volt heater or filament supply. The cable supplied with the tuner contains two heavy duty filament lead wires colored Green-Black and connect to the two Black terminals on this strip.

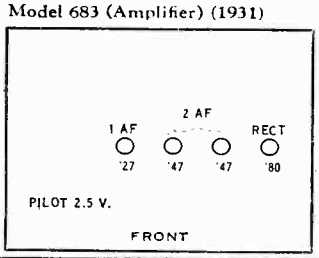
There are two sets of four terminal lugs on the back of the amplifier. Looking at the rear of the amplifier the set on the right are connections for the SM 855B speaker or similar type of speaker, Cable is furnished with the amplifier. This terminal strip is color coded as follows: red, black, blue, blue. The two blue leads connect to the speaker voice coil, the red and

The SM 855B

Model 716 (Receiver) (1930)



Model 683 (Amplifier) (1931)



SILVER-MARSHALL, INC.

MODEL 727 SW - All Wave
Parts List

C1-C2	- 2 Gang Variable Condenser-365 mmfd.Max.±5 mmfd. 0°-90°±1 mmfd. 90°-180°±½ of 1%	13372
C3	- 25 Mmfd. Trimmer Cond.	16249
C4	-200 Mmfd. Variable trimmer condenser	13302
C5	- 0.1 Mfd. Condenser - Sprague 200 V.	3220
C6	- 0.1 Mfd. Condenser - Sprague 200 V.	3220
C7	- 0.1 Mfd. Condenser - Sprague 200 V.	3220
C8	- 0.1 Mfd. Condenser - Sprague 200V.	3220
C9	- 0.1 Mfd. Condenser - Sprague 200 V.	3220
C10	- ½ Mfd. Condenser - Polymet Waxtite 200 V.	13329
C11	- .001 Mfd. Condenser - Mica	7039
C12	- .001 Mfd. Condenser - Mica	7039
C13	- .025 Mfd. Condenser - Sprague 200 V.	3333
C14	- .025 Mfd. Condenser - Sprague 200 V.	3333
C15	- .03 Mfd. Condenser - Sprague 700 V.	13331
C16	- .00015 Mfd. Condenser - Mica	3313
C17	- Oscillator Trimmer Condenser	16179
C18	- 0.1 Mfd. Condenser - Sprague 200 V.	3220
C19	- 0.1 Mfd. Condenser - Sprague 200 V.	3220
C20	- 0.15Mfd. Condenser - Sprague	13145
C21	- .0005 Mfd. Condenser - Mica	7052
C22	- 0.1 Mfd. Condenser - Sprague 200 V.	3220
C23	- 1.0,.5,.5 Mfd. Condenser	13140
C24	- 8 Mfd. Dry Electrolytic Cond. 450 V.	13181
C25	- 12 Mfd. Dry Electrolytic Cond. 450 V.	3162
M	- Tuning Meter - 15 M.A.	13923
P1	- 100,000 Ohm Pot. (Tone control)	14438
P2	- 250,000 Ohm Pot. (Volume control-Comb.with A.C.Switch)	4360
R1	- 100,000 Ohm Resistor - 1 watt carbon	14691
R2	- 250 Ohm Resistor - wire wound	4725
R3	- 60,000 Ohm Resistor - 1 watt carbon	4695
R4	- 25,000 ohm Resistor - 1 watt carbon	4697
R5	- 500,000 Ohm Resistor - 1 watt carbon	4772
R6	- 100,000 Ohm Resistor - 1 watt carbon	14691
R7	- 5,000 Ohm Resistor - 1 watt carbon	14765
R8	- 1 Megohn Resistor - 1 watt carbon	4759
R9	- 1 Megohn Resistor - 1 watt carbon	4759
R10	- 1 Megohn Resistor - 1 watt carbon	4759
R11	- 12,000 Ohm Resistor - 1 watt carbon	4746
R12	- 9,000 Ohm Resistor - 1 watt carbon	14746
R13	- 8,250 Ohm) 14,750 Ohm R.D.Ohmite - 3 watt	14781
R14	- 6,500 Ohm)	
R15	- 300,000 Ohm Resistor - 1 watt carbon	4685
R16	- 400 Ohm Resistor - wire wound	4701
R17	- 400 Ohm Resistor - wire wound	4701
R18	- 300,000 Ohm Resistor - 1 watt carbon	4685
R19	- 3,500 Ohm Resistor - 1 watt carbon	4804
R20	- 60,000 Ohm Resistor - 1 watt carbon	4695
SW1-SW2	- Tandem change-over switch	15298
SW3	- A.C.switch (Combination with volume control)	

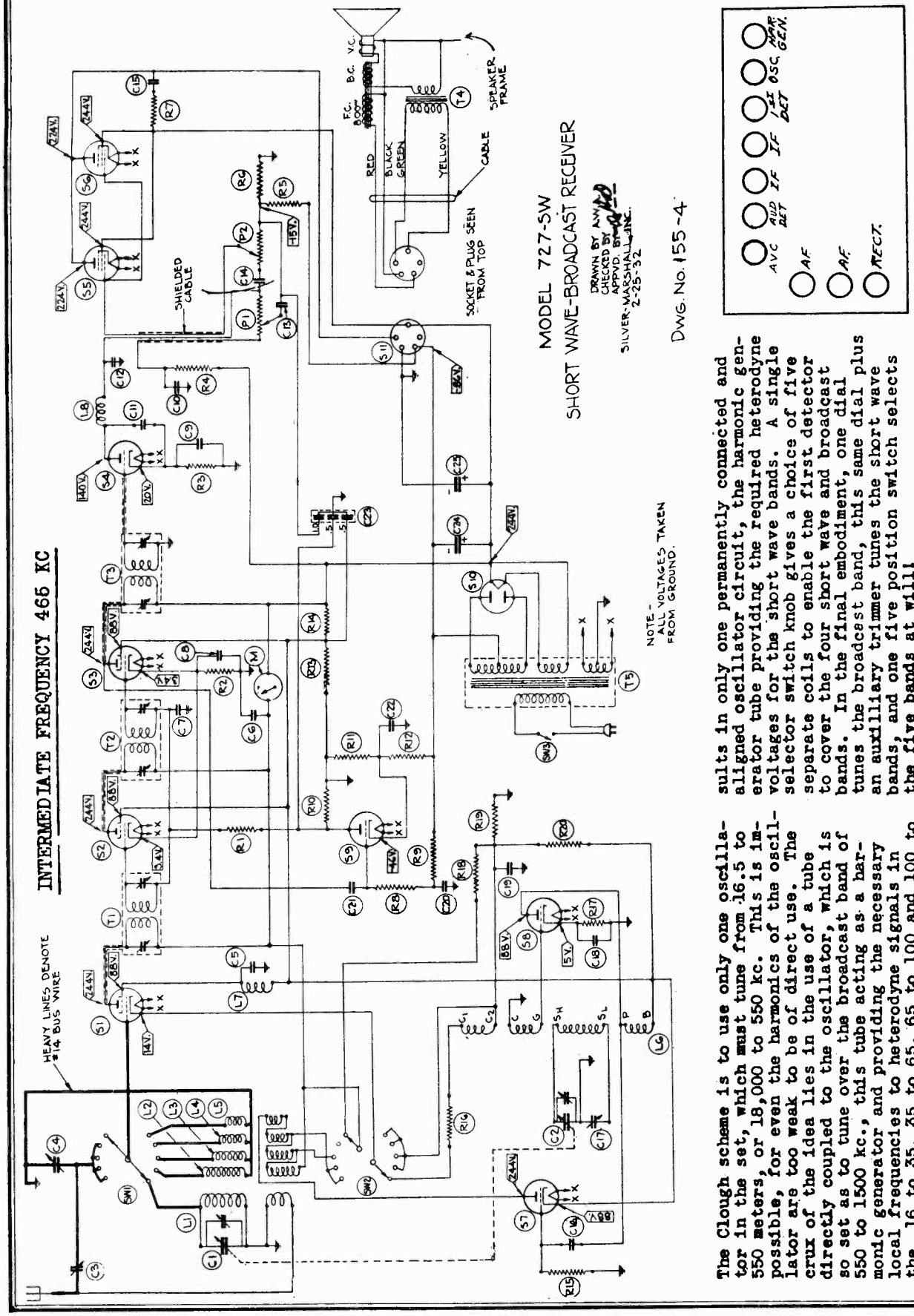
L1 - 197 Broadcast Antenna Coil (550-1500 K.C.)
L2 - 202 Short Wave Antenna Coil (1.56-3.46 megacycles)
L3 - 201 Short Wave Antenna Coil (3.51-5.36 megacycles)
L4 - 200 Short Wave AntennaCoil (5.54-10.29 megacycles)
L5 - 199 Short Wave Antenna Coil (9.6-18.15)megacycles)
L6 - 198 Oscillator Coil
L7 - 281 R.F.Choke
L8 - 283 R.F.Choke

T1 - Q-1 I.F.Transformer
T2 - Q-2 I.F.Transformer
T3 - Q-4 I.F.Transformer
T4 - 10208 Output Transformer
T5 - 10202 Power Transformer

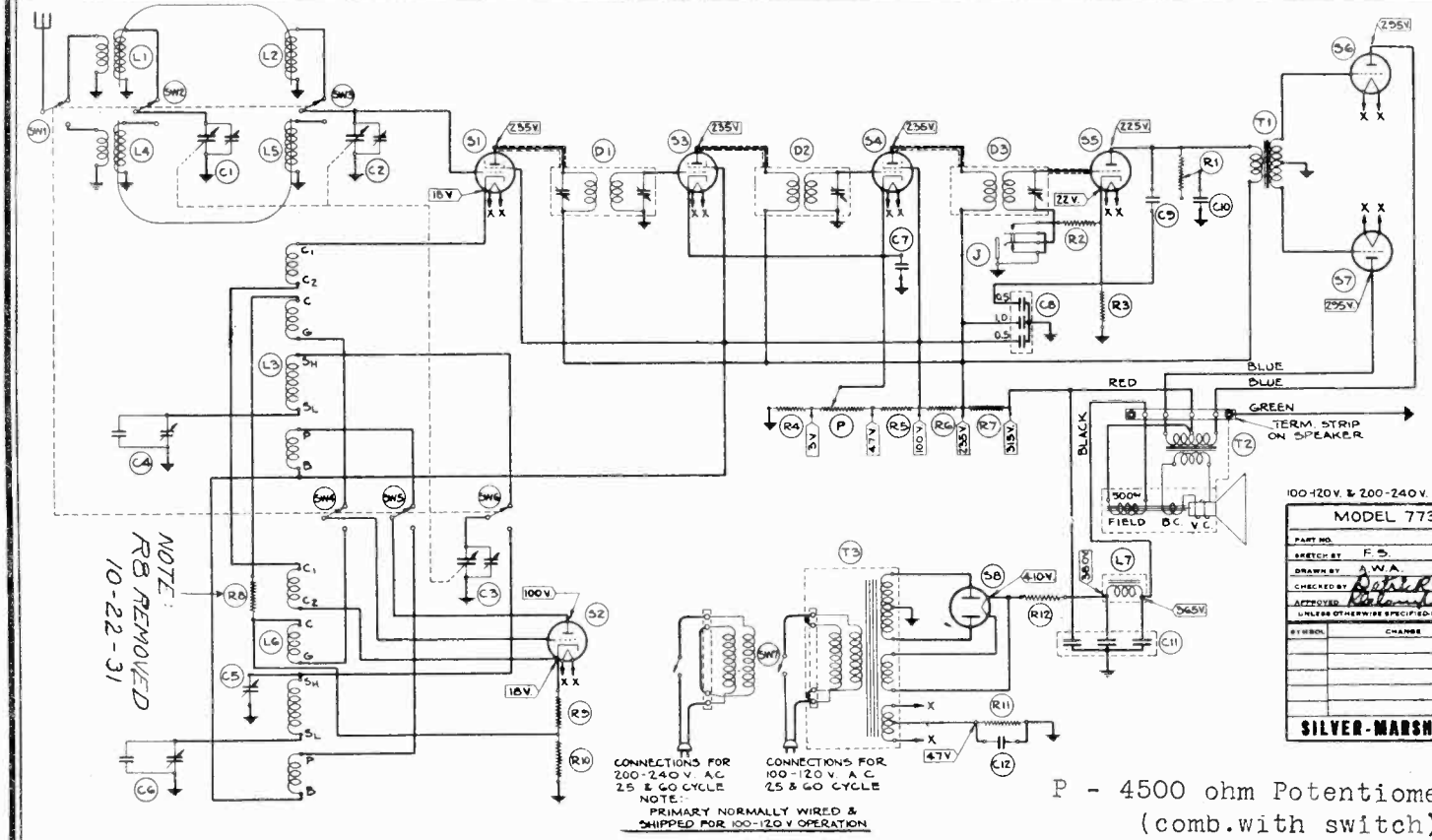
S1 - '24 Tube
S2-S3 - '51 Tubes
S4-S7-S8-S9 - '27 Tubes
S10 - '80 Tubes
S5-S6 - '47 Tubes
S11 - Speaker Socket

MODEL 727 SW-All Wave
Schematic, Data

SILVER - MARSHALL, INC.



The Clough scheme is to use only one oscillator in the set, which must tune from 16.5 to 550 meters, or 18,000 to 550 kc. This is impossible, for even the harmonics of the oscillator are too weak to be of direct use. The crux of the idea lies in the use of a tube directly coupled to the oscillator, which is so set as to tune over the broadcast band of 550 to 1500 kc., this tube acting as a harmonic generator and providing the necessary local frequencies to heterodyne signals in the 16 to 35, 35 to 65, 65 to 100 and 100 to 200 meter short wave bands. This system results in only one permanently connected and aligned oscillator circuit, the harmonic generator tube providing the required heterodyne voltages for the short wave bands. A single selector switch knob gives a choice of five separate coils to enable the first detector to cover the four short wave and broadcast bands. In the final embodiment, one dial tunes the broadcast band, this same dial plus an auxiliary trimmer tunes the short wave bands, and one five position switch selects the five bands at will!

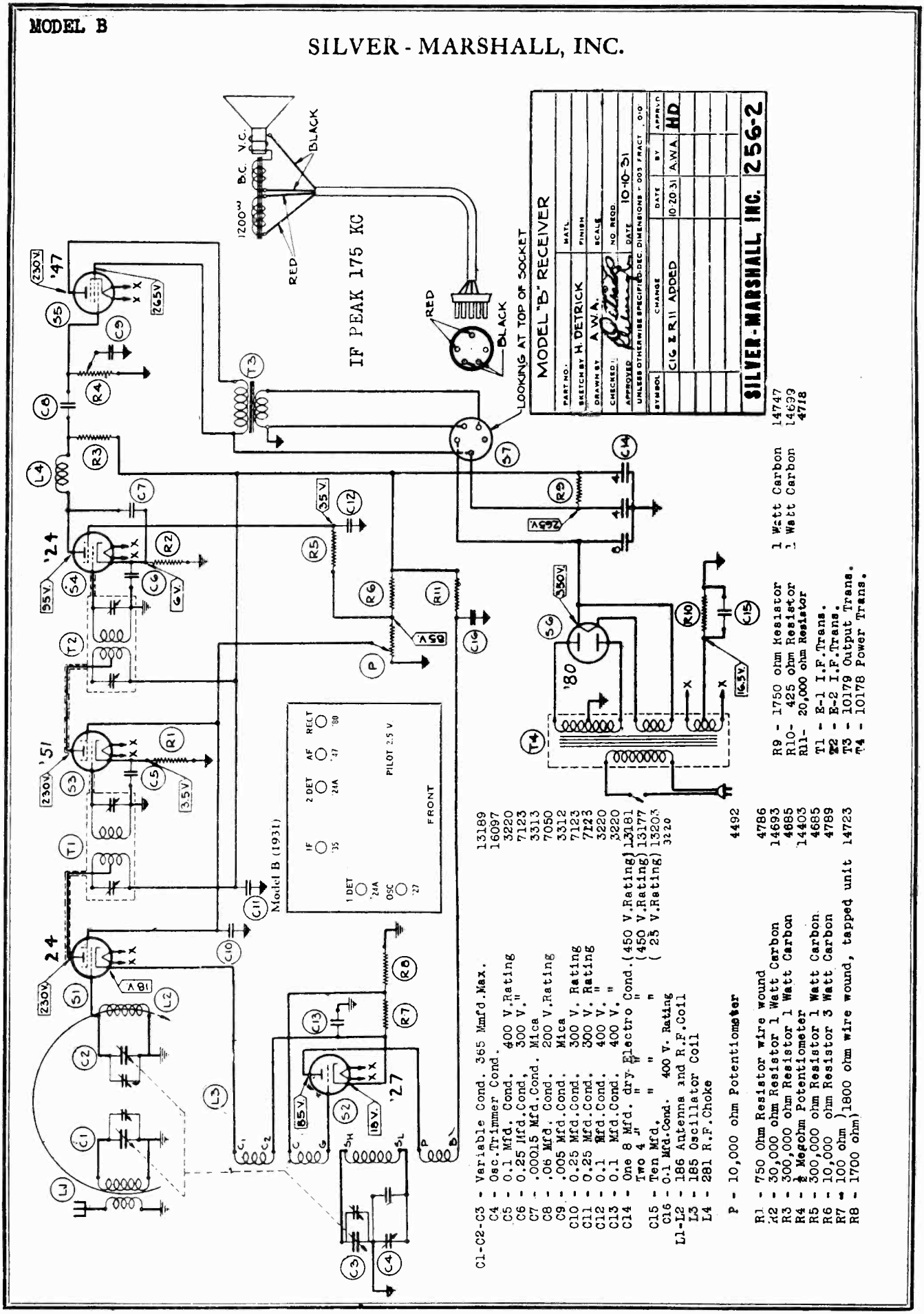


P - 4500 ohm Potentiometer (comb. with switch) 14342

C1-C2-C3	Variable Cond. 407 Mmfd. Max.	3253	R1	1/2 Megohm Variable Resistor	4507
C4	Broadcast Osc. Trimmer Cond.	16058	R2	3500 ohm Resistor 1 watt Carbon	4804
C5	400 kc. Trimmer Cond.	16035	R3	60,000 " " 1 watt Carbon	14695
C6	Long Wave Osc. Trimmer Cond.	16059	R4	100 " " wire wound	4743
C7	.25 Mfd. Cond. 200 V. Rating	3322	R5	6500 " " 1 watt Carbon	
C8	1.0 Mfd. 300 V., 0.5 Mfd. 200 V.	13140	R6	5000 " " 3 watt Carbon	
C9	.001 Mfd. Cond. (Mica)	7039	R7	2000 " " 3 watt Carbon	
C10	.025 Mfd. Cond. 400 V. Rating	3333	R8	400 " " wire wound	4701
C11	Electrolytic Filter Cond. Three 4 mfd. units 450 V.	13120	R9 - R10	100 ohm) 1800 ohm) { wire wound tapped unit }	14723
C12	0.1 Mfd. Cond. 200 V. Rating	3220	R11	800 ohm Resistor 3 watt Carbon	4686
			R12	300 ohm " 3 watt Carbon	14745

MODEL B

SILVER - MARSHALL, INC.



C1-C2-C3 - Variable Cond. 365 Mmfd.Max. 13189
C4 - Osc.Trimmer Cond. 16097
C5 - 0.1 Mfd. Cond. 400 V.Rating 3220
C6 - 0.25 Mfd.Cond, 300 V." 7123
C7 - .00015 Mfd.Cond. Mica 3313
C8 - .06 Mfd. Cond. 200 V.Rating 7050
C9 - .005 Mfd.Cond. Mica 3312
C10 - 0.25 Mfd.Cond. 300 V. Rating 7123
C11 - 0.25 Mfd.Cond. 300 V. Rating 7123
C12 - 0.1 Mfd.Cond. 400 V. " 3220
C13 - 0.1 Mfd.Cond. 400 V. " 3220
C14 - One 8 Mfd. dry Electro Cond.(450 V.Rating) 13181
Two 4 " " " " (450 V.Rating) 13177
C15 - Ten Mfd, " " (25 V.Rating) 13203
C16 - 0.1 Mfd.Cond. 400 V. Rating 3220
L1-L2 - 186 Antenna and R.F.Coil
L3 - 185 Oscillator Coil
L4 - 281 R.F.Choke

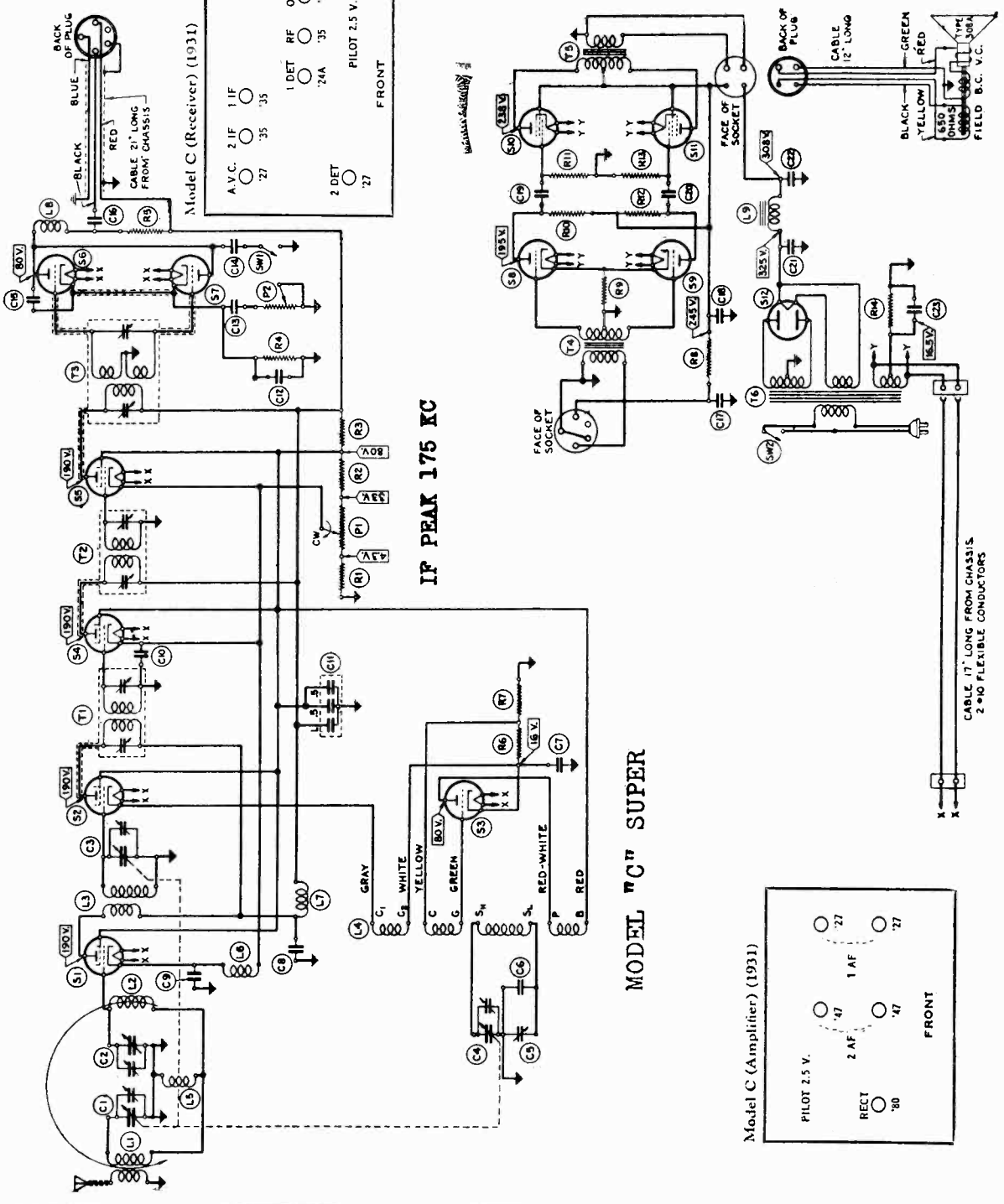
P - 10,000 ohm Potentiometer 4492

R1 - 750 Ohm Resistor wire wound 4786
R2 - 30,000 ohm Resistor 1 Watt Carbon 14693
R3 - 300,000 ohm Resistor 1 Watt Carbon 4685
R4 - ½ Megohm Potentiometer 14403
R5 - 300,000 ohm Resistor 1 Watt Carbon 4685
R6 - 10,000 ohm Resistor 3 Watt Carbon 4789
R7 - 100 ohm)
R8 - 1700 ohm) 1800 ohm wire wound, tapped unit 14723

R9 - 1750 ohm Resistor 1 Watt Carbon 14747
R10- 425 ohm Resistor ½ Watt Carbon 14699
R11- 20,000 ohm Resistor 4718

T1 - E-1 I.F.Trans.
T2 - E-2 I.F.Trans.
T3 - 10179 Output Trans.
T4 - 10178 Power Trans.

SILVER - MARSHALL, INC.



MODEL C
Parts List

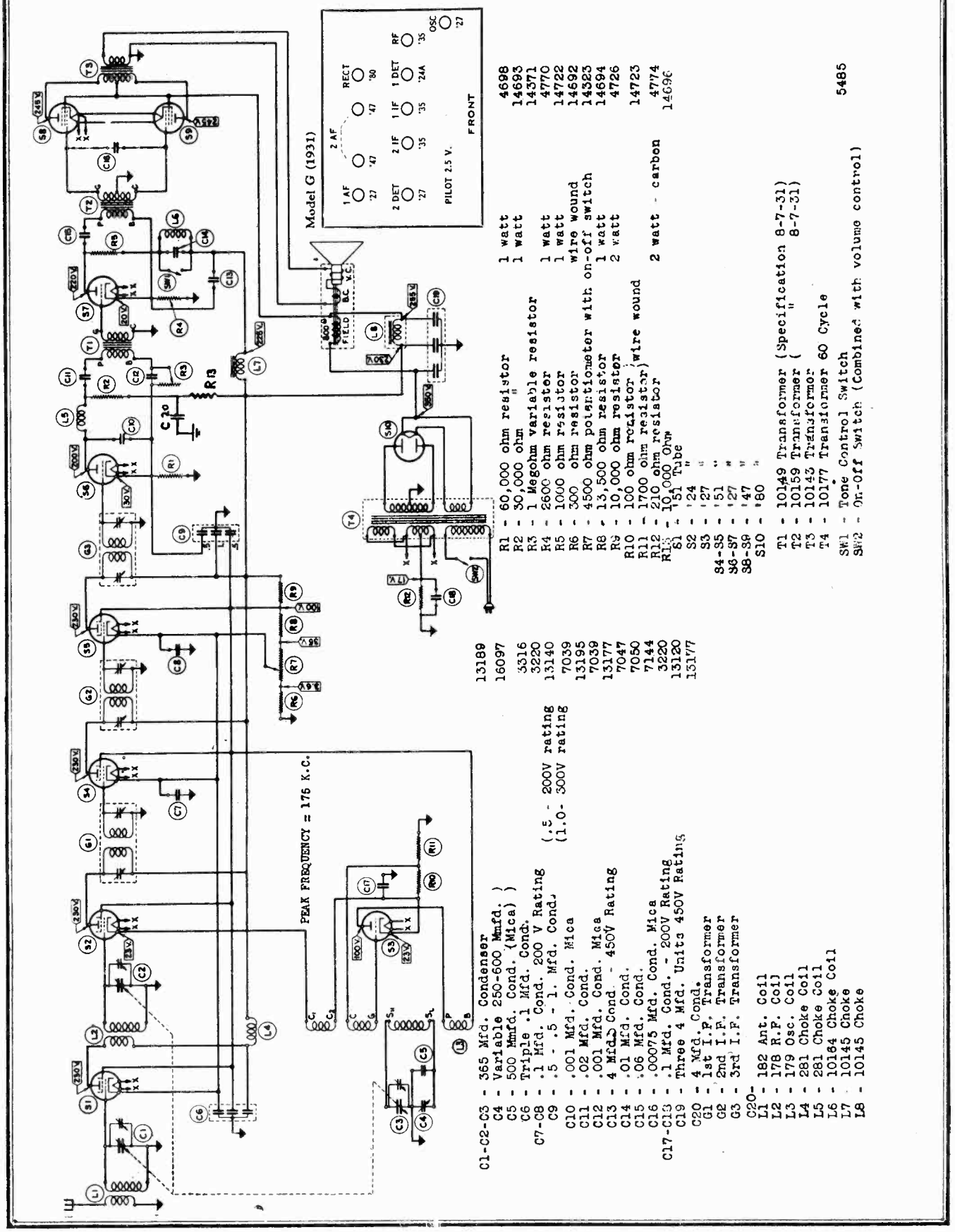
SILVER - MARSHALL, INC.

MODEL "C" SUPERHETERODYNE (60 ~)

C1-C2-C3-C4	- 365 Mmfd. Condenser ± 5 Mmfd. Max.	13217
C5	- Trimmer Cond. 120-325 Mmfd.	16035
C6	- 750 Mmfd. Cond.(mica)±10%(675-750Blue)(750-825Red)	
C7-C8-C9	- .1 Mfd. Cond.	3220
C10	- .25 Mfd. Cond. (1.Mfd. Cond.-300 V.)	7114
C11	-(.5 Mfd. Cond-200V.) (.5 Mfd.Cond - 200 V)	13140
C12	- .04 Mfd. Cond.	7046
C13	- 1.Mfd. Cond. 150 V.Rating	3254
C14	- .025 Mfd. Cond.	3333
C15	- .001 Mfd. Cond.	7039
C16	- .08 Mfd. Cond.	13288
C17	- 8 Mfd. Cond.-450 V.Rating (Dry Electrolytic)	13181
C18	- 4 Mfd. Cond.-450 V.Rating (Dry Electrolytic)	13177
C19-C20	- .15 Mfd. Cond.	13145
C21	- 2 Mfd. Cond. - 600 V.Rating (Paper)	3328
C22	- 8 Mfd. Cond. - 450 V.Rating (Dry Electrolytic)	13181
C23	- .1 Mfd. Cond.	3220
L1	- 194s ANTENNA Coil	
L2	- 193s R.F.Coil	
L3	- 195s R.F.Coil	
L4	- 196s OSC.Coil	
L5	- 30 C Coupling Coil	
L6-L7-L8	- 281 Choke Coil	
L9	- 339U Filter Choke	
P1	- 4500 Ohm Potentiometer	14419
P2	- 20,000 Ohm Potentiometer	14427
R1	- 400 Ohm Resistor, Wire wound Blue	4701
R2	- 10,000 Ohm Resistor, 1 watt, Brown,Black,Orange	14696
R3	- 10,000 Ohm Resistor, 2 watt, Brown,Black,Orange	4726
R4-R5	- 25,000 Ohm Resistor, 1 watt, Brown,Black,Orange	4697
R6	- 100 Ohm Resistor) wire wound	14723
R7	- 1700 Ohm Resistor)	
R8	- 2600 Ohm Resistor 1 watt, Red,Blue,Red	4770
R9	- 1350 Ohm Resistor 1 watt,	14767
R10-R12	- 10,000 Ohm Resistor 1 watt, Brown,Black,Orange	14696
R11-R13	- 300,000 Ohm Resistor 1 watt, Orange,Black,Yellow	4685
R14	- 220 Ohm Resistor, 2 watt, Ohmite Red Devil	14766
SW1	- Tone Control Switch	5485
SW2	- On-Off Switch	5199

MODEL G

SILVER - MARSHALL, INC.



C1-C2-C3 - 365 Mfd. Condenser
C4 - Variable 250-600 Mmfd.)
C5 - 500 Mmfd. Cond. (Mica))
C6 - Triple .1 Mfd. Cond.
C7-C8 - .1 Mfd. Cond. 200 V Rating (.5 - 200V rating
C9 - .5 - .5 - 1. Mfd. Cond. (1.0- 300V rating
C10 - .001 Mfd. Cond. Mica
C11 - .02 Mfd. Cond.
C12 - .001 Mfd. Cond. Mica
C13 - 4 Mfd. Cond - 450V Rating
C14 - .01 Mfd. Cond.
C15 - .06 Mfd. Cond.
C16 - .00075 Mfd. Cond. Mica
C17-C18 - .1 Mfd. Cond. - 200V Rating
C19 - Three 4 Mfd. Units 450V Rating
C20 - 4 Mfd. Cond.
L1 - 182 Ant. Coil
L2 - 178 R.F. Coil
L3 - 179 Osc. Coil
L4 - 281 Choke Coil
L5 - 281 Choke Coil
L6 - 10164 Choke Coil
L7 - 10145 Choke
L8 - 10145 Choke

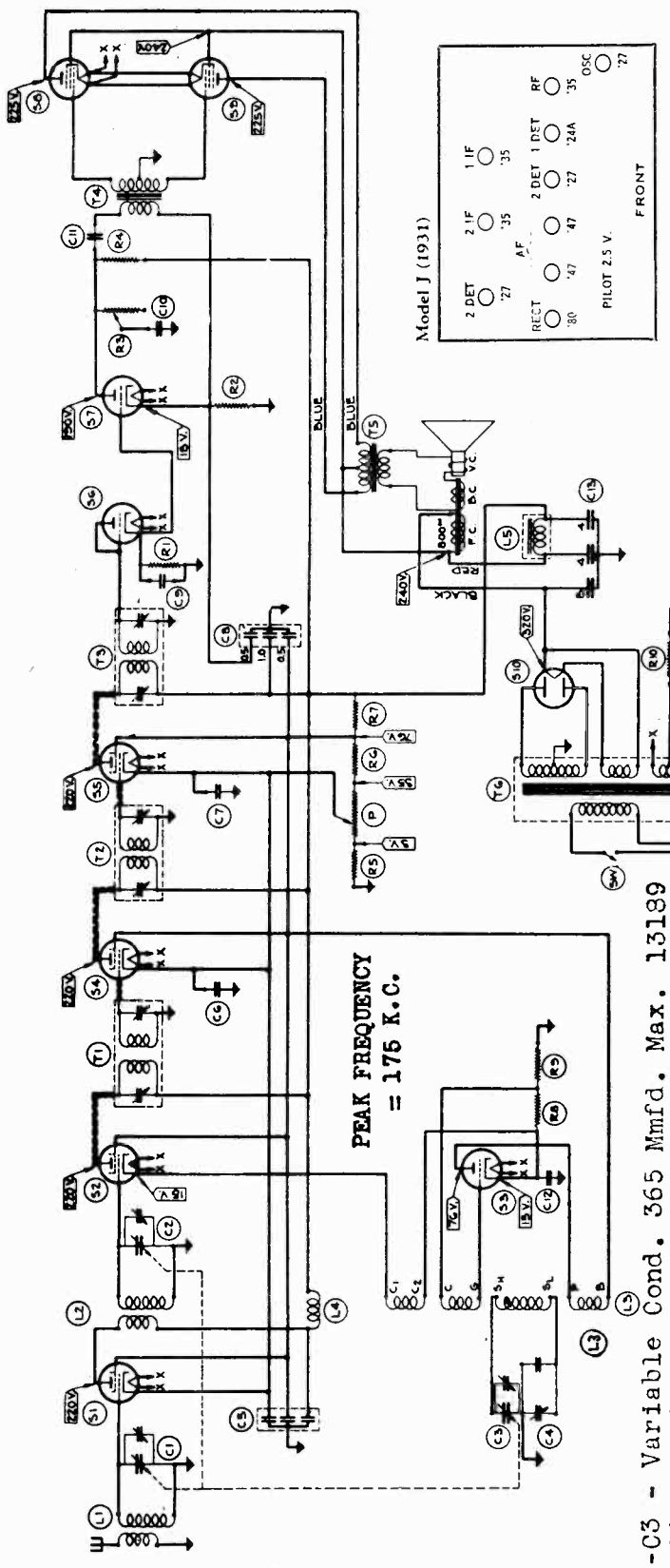
R1 - 60,000 ohm resistor	13189	1 watt	4698
R2 - 30,000 ohm "	16097	1 watt	14693
R3 - 1 Megohm variable resistor	3316		14371
R4 - 2600 ohm resistor	3220	1 watt	4770
R5 - 1000 ohm resistor	13140	1 watt	14722
R6 - 300 ohm resistor	7039	wire wound	14692
R7 - 4500 ohm potentiometer with on-off switch	13195		14323
R8 - 13,500 ohm resistor	7039	1 watt	14694
R9 - 10,000 ohm resistor	13177	2 watt	4726
R10 - 100 ohm resistor (wire wound	7047		
R11 - 1700 ohm resistor)	7050		14723
R12 - 210 ohm resistor	7144	2 watt - carbon	4774
R13 - 10,000 Ohm	3220		14696
S1 - '51 Tube	13120		
S2 - '24 "	13177		
S3 - '27 "			
S4-S5 - '51 "			
S6-S7 - '27 "			
S8-S9 - '47 "			
S10 - '80 "			

T1 - 10149 Transformer (Specification 8-7-31)
T2 - 10159 Transformer (" 8-7-31)
T3 - 10143 Transformer
T4 - 10177 Transformer 60 Cycle 5485

SW1 - Tone Control Switch
SW2 - On-Off Switch (Combined with volume control)

MODEL J

SILVER - MARSHALL, INC.



C1-C2-C3 - Variable Cond. 365 Mmfd. Max. 13139
C4 - Oscillator Trimmer 16097
C5 - Triple 0.1 Mfd. Cond. 3316
C6 - 0.1 Mfd. Cond. 200 V.Rating 3220
C7 - 0.1 Mfd. Cond. 200 V.Rating 3220
C8 - .5,.5,1.0 Mfd. Cond. (10. 300 V.0.5,0.5-200 V.) 13140
C9 - .00015 Mfd. Cond. Mica
C10 - .06 Mfd. Cond.
C11 - 0.15 Mfd. Cond.
C12 - 0.1 Mfd. Cond. 200 V.Rating
C13 - Two 4 Mfd. (Dry Electro.) 450 V.Rating
- One 8 Mfd. (" ") " "
C14 - 0.1 Mfd. Cond. 200 V.Rating

L1 - 182 Antenna Coil
L2 - 178 R.F.Coil
L3 - 179 Osc.Coil
L4 - 281 R.F.Choke
L5 - 10145 Choke

S2 - '24 Tube
S3-S6-S7 - '27 "
S8-S9 - '47 "
S1-S4-S5 - '51 "
S10 - '80 "

R1 - 500,000 Ohm Resistor 1 Watt Carbon
R2 - 30,000 Ohm Resistor 1 Watt Carbon
R3 - ½ Megohm Tapered variable resistor
R4 - 30,000 Ohm Resistor 1 Watt Carbon
R5 - 120 Ohm Resistor Wire Wound
R6 - 10,000 Ohm Resistor 1 Watt Carbon
R7 - 10,000 Ohm Resistor 3 Watt Carbon
R8 - 100 Ohm)
R9 -1700 Ohm) 1800 Ohm tapped resistor
R10 - 220 Ohm Resistor 2 Watt Carbon

T1 - C-1 I.F.Transformer
T2 - C-2 " " "
T3 - C-3 " " "
T4 - A-270 Input Transformer
T5 - 10143 Output Transformer
T6 - 10175 Power Transformer

P-4500 Ohm Potentiometer (Combination)
SW-On-Off A.C.Switch (Combined with Pot)

C1	60-120 mmfd. antenna trimmer condenser	6182
C2	200 mmfd. variable trimmer condenser	3283
C3-C4	2 gang variable condenser - 365 mmfd.	3189
C5	.002 mfd. mica condenser	3311
C6	.1 mfd. condenser - Sprague 200 v.	3277
C7	.1 mfd. condenser - Sprague 400 v.	3278
C8	.25 mfd. condenser - Sprague 200 v.	3269
C9	.5 mfd. condenser - Sprague 200 v.	3266
C10	.1 mfd. condenser - Sprague 400 v.	3278
C11	.1 mfd. condenser - Sprague 400 v.	3278
C12	.0005 mfd. condenser - Sprague	7052
C13	.1 mfd. condenser - Sprague 200 v.	3277
C14	.5 mfd. condenser - Sprague 200 v.	3266
C15	.5 mfd. condenser - Sprague 200 v.	3266
C16	.0005 mfd. condenser - Sprague	7052
C17	.5 mfd. condenser - Sprague 400 v.	3273
C18	.025 mfd. condenser - Sprague 400 v.	3333
C19	.05 mfd. condenser - Sprague 400 v.	13127
C20	275-550 mmfd. osc. trimmer condenser	16179
C21	.05 mfd. condenser - Sprague 400 v.	13127
C22	.00025 mfd. condenser - Sprague	3330
C23	.25 mfd. condenser - Sprague 400 v.	3230
C24	8 mfd. dry electrolytic cond. - 75 v.	13326
C25	4 mfd. dry electrolytic cond. - 450 v.	13177
C26	.15 mfd. condenser - Sprague 400 v.	13145
C27	12 mfd. dry electrolytic cond. 450 v.	3162
C28	.1 mfd. condenser - Sprague 200 v.	3277

L1	209 Antenna choke coil
L2	208 Antenna coil
L3	517 short wave coil (4800- 1550 kilocycles)
L4	518 short wave coil(10,000- 3600 kilocycles)
L5	519 short wave coil(25,350- 9600 kilocycles)
L6	207 Broadcast oscillator coil
L7	516 Short wave oscillator coil
L8-L9-L10	283 choke coils
L11-L12	281 choke coils
L13	10238 Filter choke coil

M	Tuning meter - 20 ma.	
P1	3000 ohm variable resistance	4430
P2	100,000 ohm tone control	14438
P3	375,000 ohm pot.	4360
P4	40 ohm hum balance	4445
R1	25,000 ohm Resistor - 1 watt carbon	4697
R2-R3	1,000 ohm Resistor - wire wound	4688
R4	1 megohm Resistor - 1 watt carbon	4759
R5	6,500 ohm Resistor - Ohmite Red Devil	14777
R6	200 ohm Resistor - wire wound	4722
R7-R8	1 megohm Resistor - 1 watt carbon	4759
R9	.5 megohm Resistor - 1 watt carbon	4772
R10	30,000 ohm Resistor - 1 watt carbon	14693
R11	25,000 ohm Resistor - 1 watt carbon	4697
R12	1405 ohms)	
R13	8720 ohms)	
R14	7315 ohms)	
R15	14,000 ohms) Ohmite Red Devil Resistor	4752
R16	2,000 ohms)	
R17	4,000 ohms)	

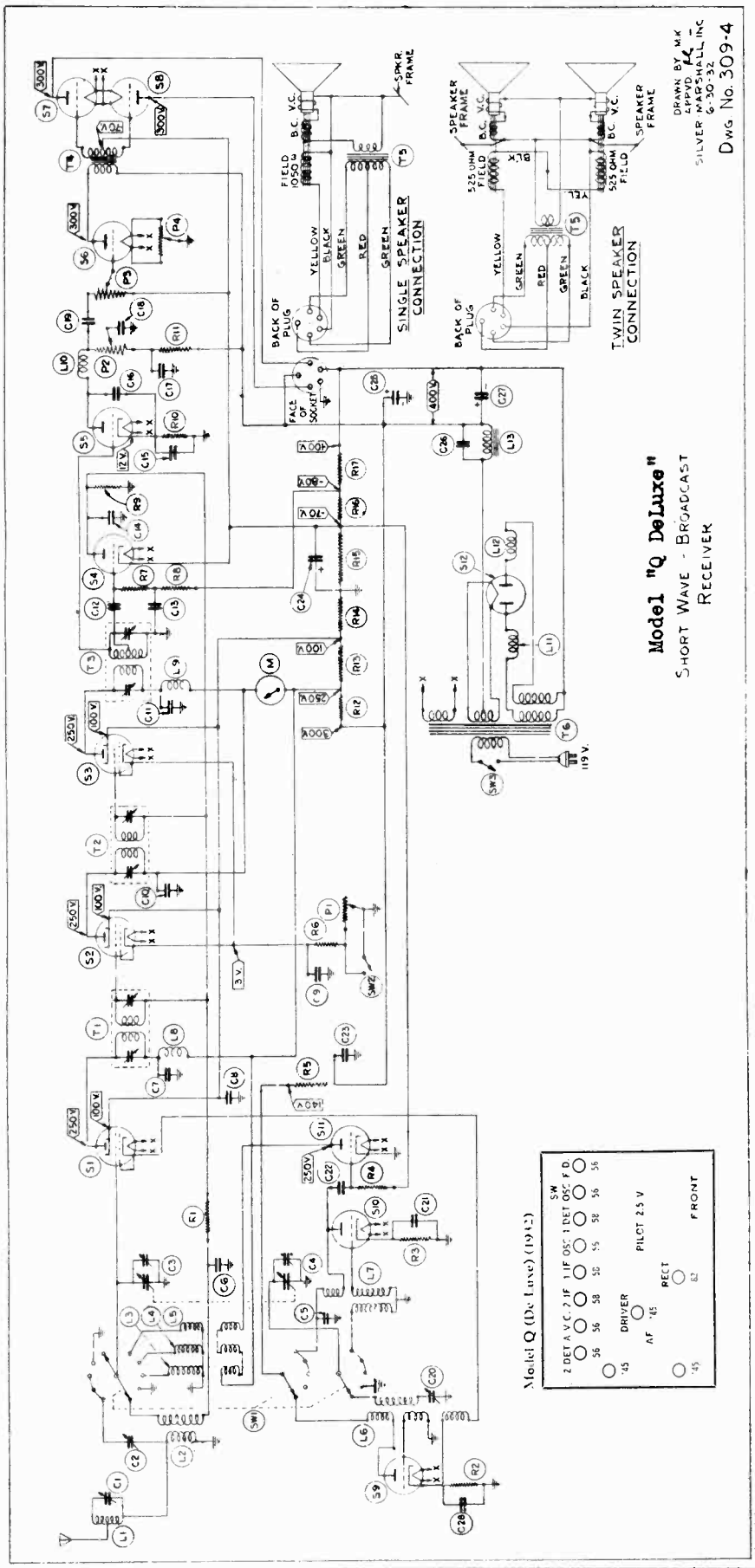
S1-S2-S3 - '58 tubes
S4-S5-S9-S10-S11 - '56 tubes
S6-S7-S8 - '45 tubes
S12 - '82 tubes.

SW1	Tandem Band Selector Switch	15348
SW2	Noise Control Switch	5121
SW3	A.C.Switch (combined with volume control)	

T1	V1 I.F.Transformer
T2	V2 I.F.Transformer
T3	V3 I.F.Transformer
T4	10268 Driver transformer
T5	Output transformer (10244 for Single speaker (10245 for Two speakers
T6	10231 Power transformer

MODEL Q DeLuxe

SILVER - MARSHALL, INC.



SILVER - MARSHALL, INC.

MODEL R
Parts List

MODEL "R" SUPERHETERODYNE

C1	48-112 mmfd. Trimmer Condenser	16275
C2-C3	2 gang variable Condenser - 365 mmfd. max.	13372
C4	4 mfd. Dry Electrolytic Condenser 450 V.	13177
C5	.1 Mfd. Condenser 200 V.	3220
C6	.1 Mfd. Condenser 400 V.	3173
C7	.1 mfd. Condenser 200 V.	3220
C8	.001 Mfd. Condenser - mica	7039
C9	.001 Mfd. Condenser - Mica	7039
C10	.025 Mfd. Condenser - Sprague 200 V.	3333
C11	½ Mfd. ,Condenser - Polymet Waxtite- 200 V.	13329
C12	.025 Mfd. Condenser - Sprague 200 V.	3333
C13	1 Mfd. Cond. (1,½,½, mfd. Unit)	13140
C14	.03 Mfd. Condenser - Sprague 700 V.	13331
C15	75-500 Mfd. Osc.Trimmer Condenser	16179
C16	.1 Mfd. Condenser - Sprague 200 V.	3220
C17	.1 Mfd. Condenser - Sprague 200 V.	3220
C18	.15 Mfd. Condenser - Sprague 200 V.	13145
C19	½ Mfd. Condenser - Polymet Waxtite 200 V.	13329
C20	.0005 Mfd. Condenser - Mica	7052
C21	.1 Mfd. Condenser - Sprague 200 V.	3220
C22	½ Mfd. Condenser (See C13)	
C23	½ Mfd. Condenser (See C13)	
C24	8 Mfd. Dry Electrolytic Condenser 450 V.	13181
C25	12 Mfd. Dry Electrolytic Condenser 450 V.	3162
M	Tuning Meter - 15 ma.	13923
P1	100,000 Ohm Pot. (Tone Control)	14438
P2	250,000 Ohm Pot. (Vol Control combined with A,C.Switch)	4360
R1	250 Ohm Resistor - wire wound	4725
R2	60,000 Ohm Resistor - 1 watt carbon	4695
R3	25,000 Ohm Resistor - 1 watt carbon	4697
R4	100,000 Ohm Resistor - 1 watt carbon	14691
R5	5,000 Ohm Resistor - 1 watt carbon	14765
R6	400 Ohm Resistor - wire wound	4701
R7	3,500 Ohm Resistor - 1 watt carbon	4804
R8	80,000 Ohm Resistor - 1 watt carbon	14778
R9	1 Megohn Resistor - 1 watt carbon	4759
R10	1 Megohn Resistor - 1 watt carbon	4759
R11	9,000 Ohm Resistor - 1 watt carbon	14746
R12	60,000 Ohm Resistor - 1 watt carbon	4695
R13	100,000 Ohm Resistor - 1 watt carbon	14691
R14	1 megohm Resistor - 1 watt carbon	4759
R15 - R16	8,250 Ohms) 6,500 ohms) 14,750 Ohm R.D.Ohmite - 3 watt	14781
R17	½ Megohm Resistor - 1 watt	4772
R18	12,000 Ohm Resistor - 1 watt	4746
SW1	Change-over Switch	15327
SW2	A.C.Switch (Combined with Vol.Control)	

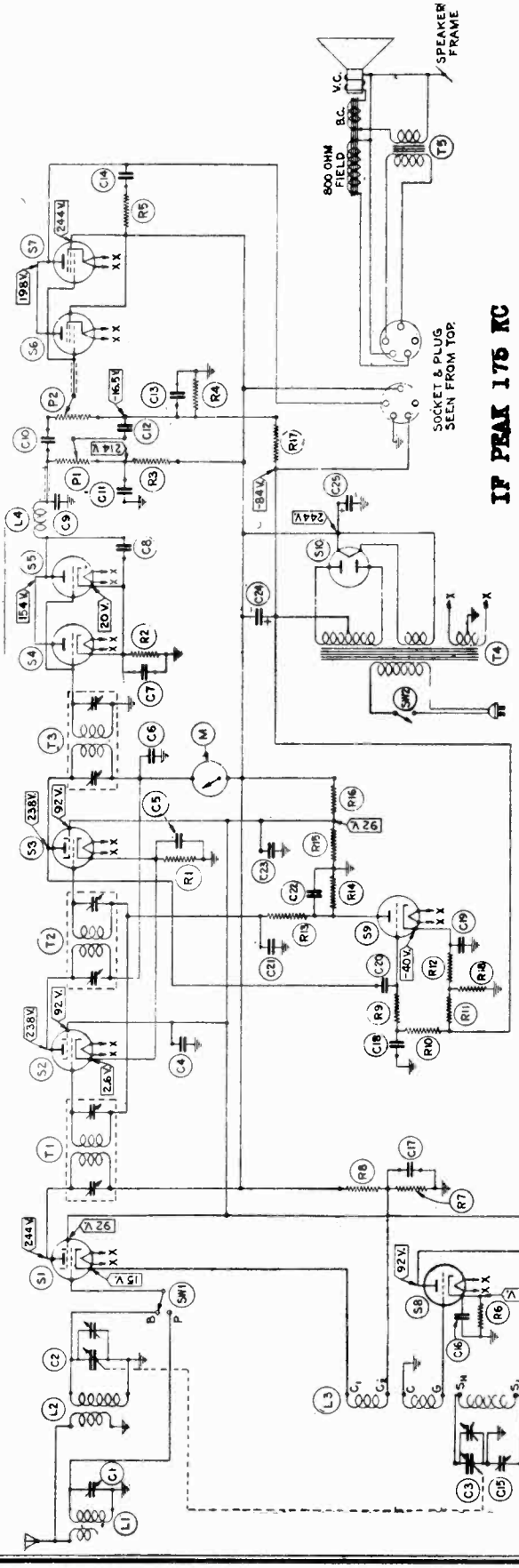
MODEL R

SILVER - MARSHALL, INC.

T1 - Q-1 I.F. Transformer
T2 - Q-2 I.F. Transformer
T3 - Q-4 I.F. Transformer
T4 - 10202 Power Transformer
T5 - 10208 Output Transformer.

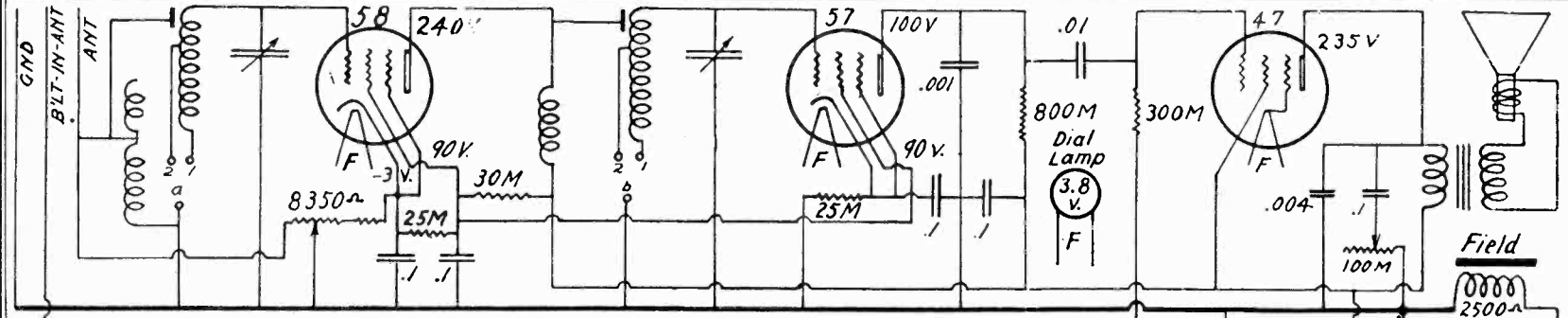
L1 - 203 Police Call Coil
L2 - 204 Antenna Coil
L3 - 205 Oscillator Coil
L4 - 283 R.F Choke

S1 - '24 Tube
S2-S3 - '51 Tubes
S4-S5-S8-S9 - '27 Tubes
S6-S7 - '47 Tubes
S10 - '80 Tube



SIMPLEX RADIO CO.

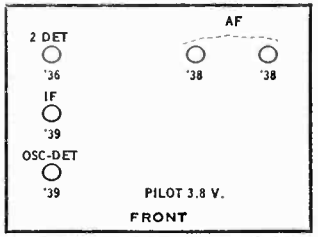
MODEL N D.C.
MODEL R A.C.



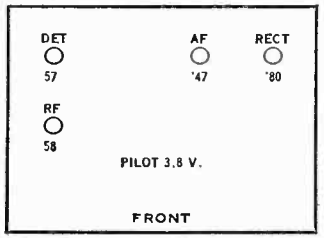
SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

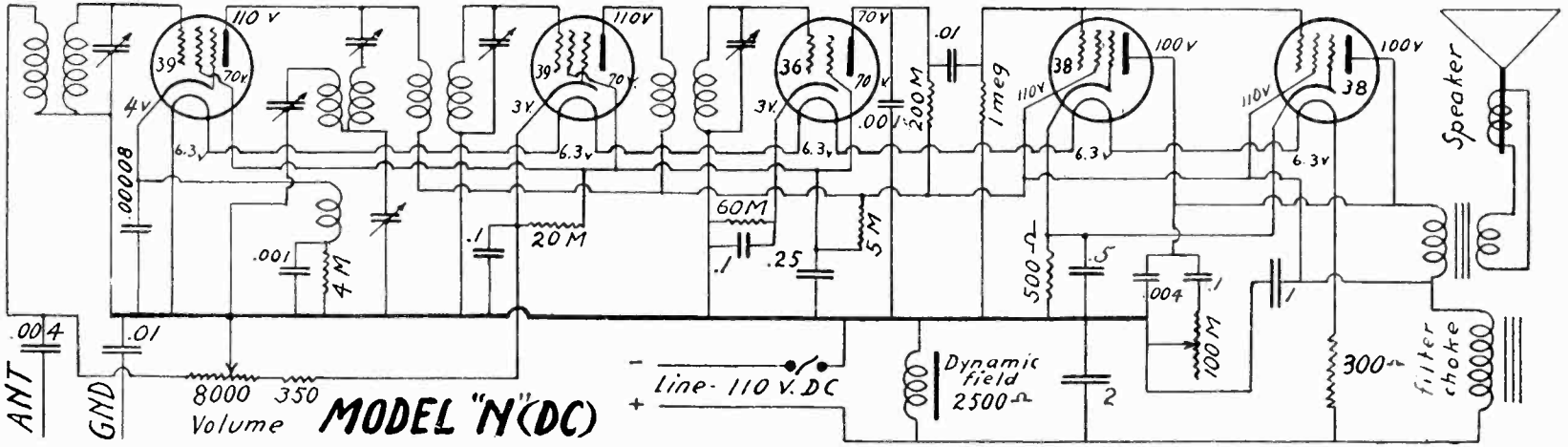
PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to swith terminals.

Models N-DC



Model R (1932)





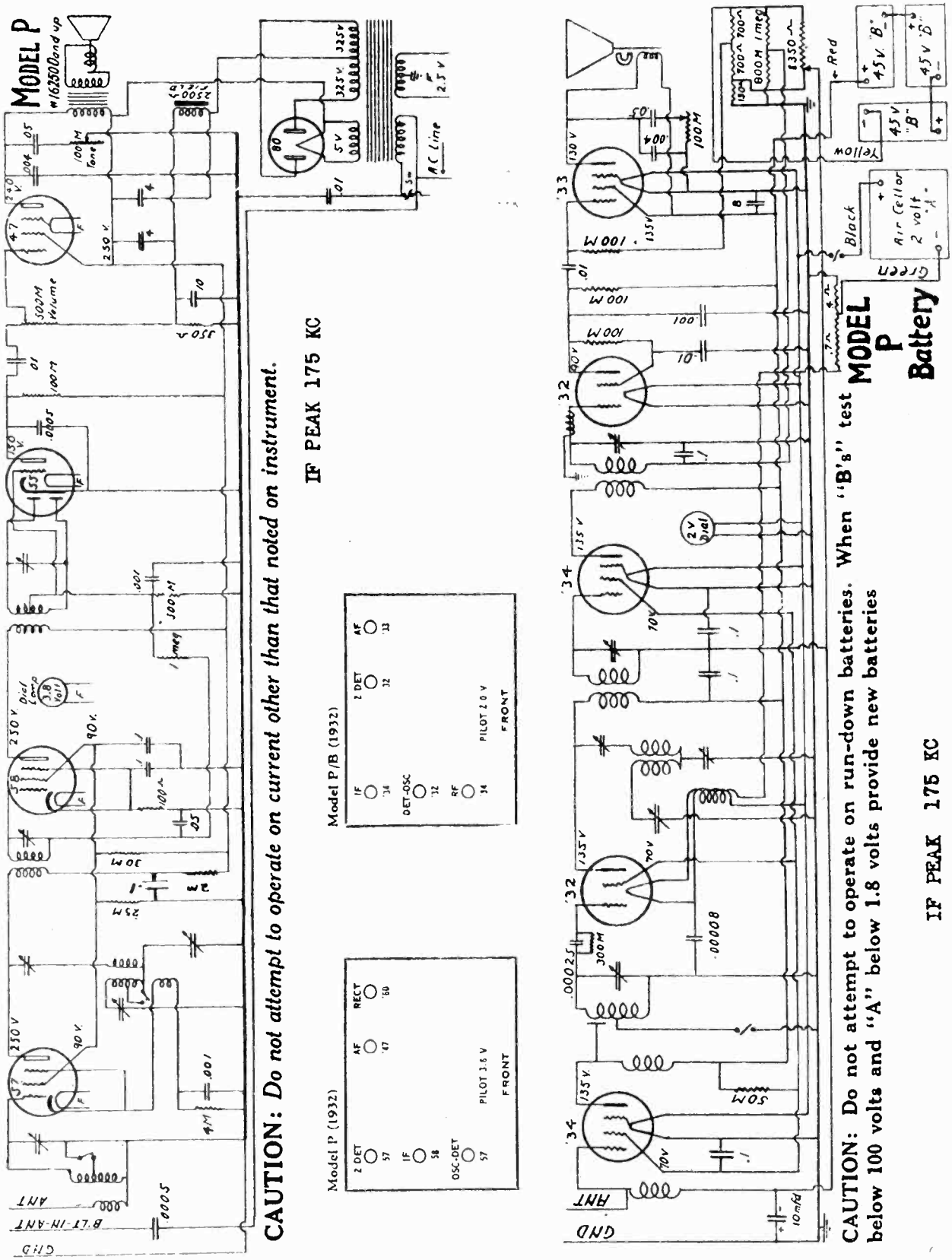
CAUTION : *Do not attempt to operate on current other than that noted on instrument. Reverse attachment plug if set does not start operating in a few seconds after being turned on.*

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. G. and should not be tampered with.

PHONOGRAPH: Use a single pole switch mounted as near as possible to the second detector socket, connect in series with lead from ground end of the grid coil of second detector tube. Solder phonograph pick-up leads to switch terminals

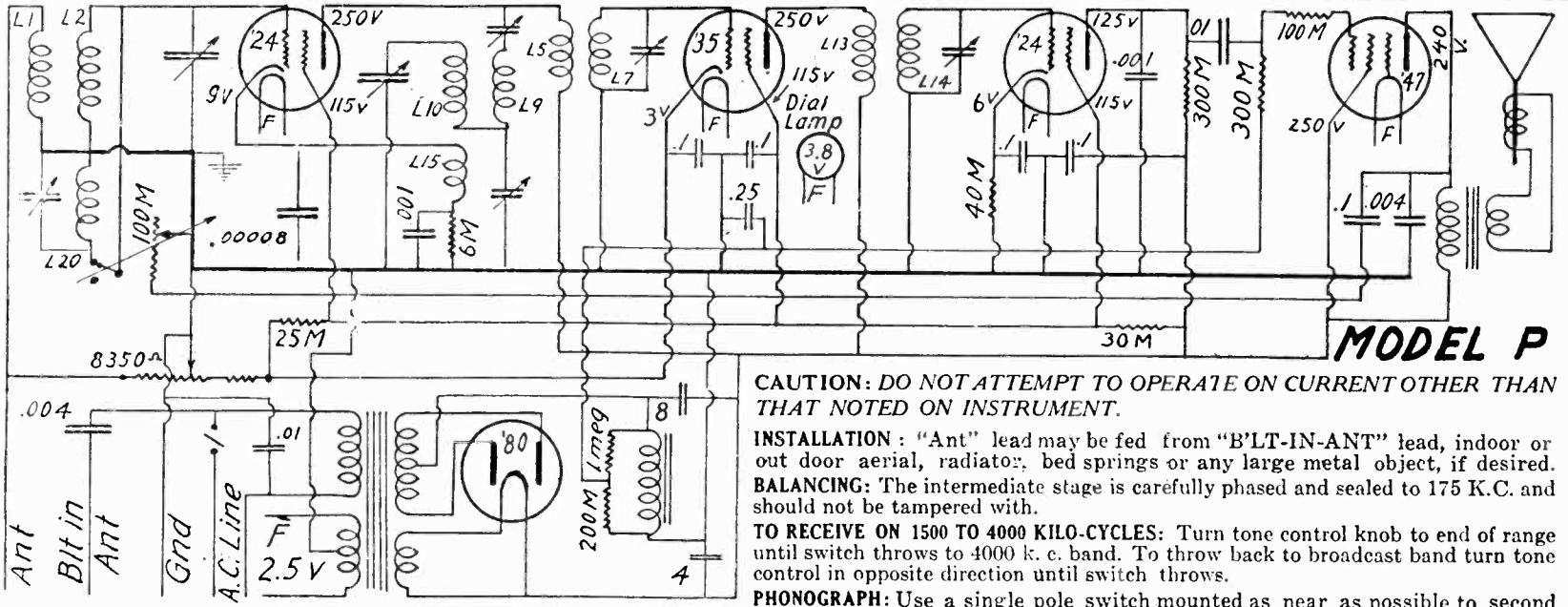
MODEL P
MODEL P Battery

SIMPLEX RADIO CO.



SIMPLEX RADIO CO.

MODEL P 1931
Schematic
MODEL Q 1931
Schematic



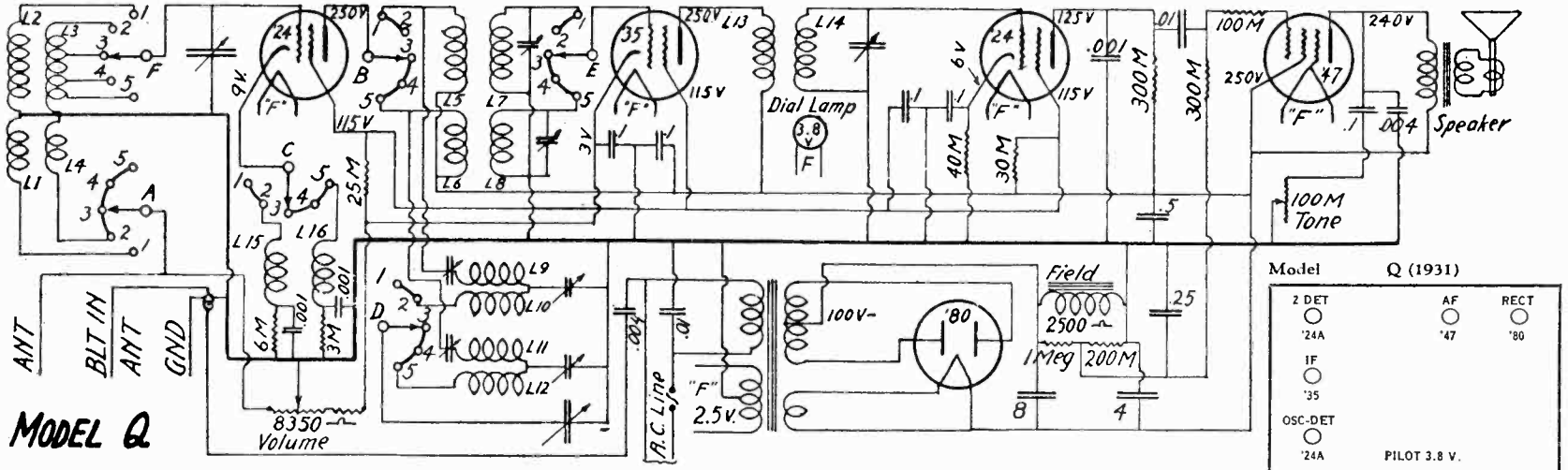
CAUTION: *DO NOT ATTEMPT TO OPERATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT.*

INSTALLATION : "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K.C. and should not be tampered with.

TO RECEIVE ON 1500 TO 4000 KILO-CYCLES: Turn tone control knob to end of range until switch throws to 4000 k. c. band. To throw back to broadcast band turn tone control in opposite direction until switch throws.

PHONOGRAPH: Use a single pole switch mounted as near as possible to second detector socket, connect in series with lead from ground end of grid coil of second detector tube. Solder phonograph pickup leads to switch terminals



CAUTION: *Do not attempt to operate on current other than that noted on instrument.*

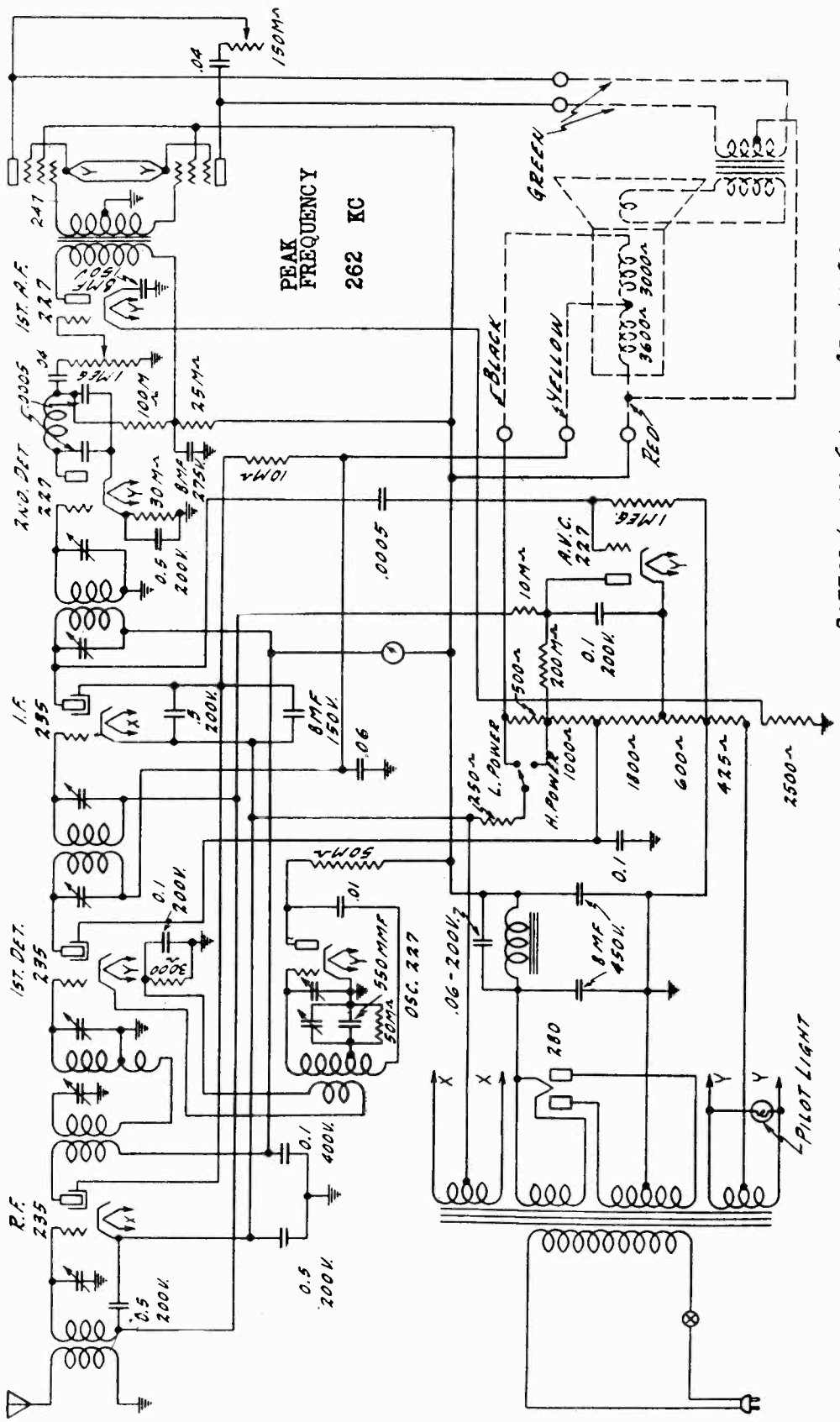
INSTALLATION: "ANT" may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs, or any large metal object, if desired

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

PHONOGRAPH: Use a single pole switch mounted as near as possible to the second detector socket, connect in series with lead from ground end of the grid coil of second detector tube. Solder phonograph pick-up leads to switch terminals.

SONORA

MODEL 71,72,73
Schematic

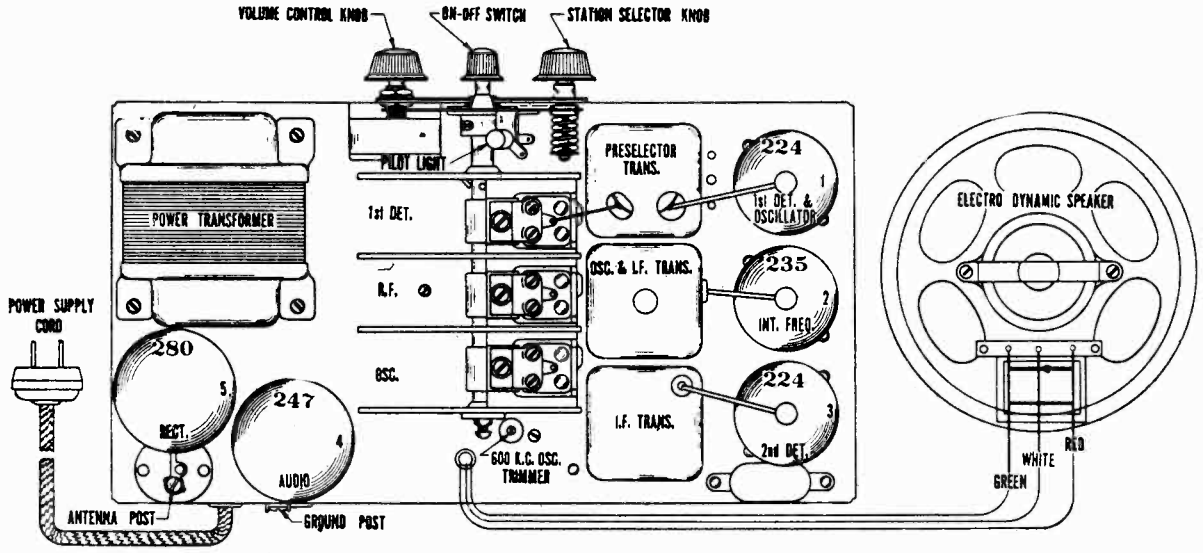


Aligning R.F. and Oscillator Condensers—For adjusting the R.F. and oscillator condensers the signal input from the signal generator should be made to the antenna post.

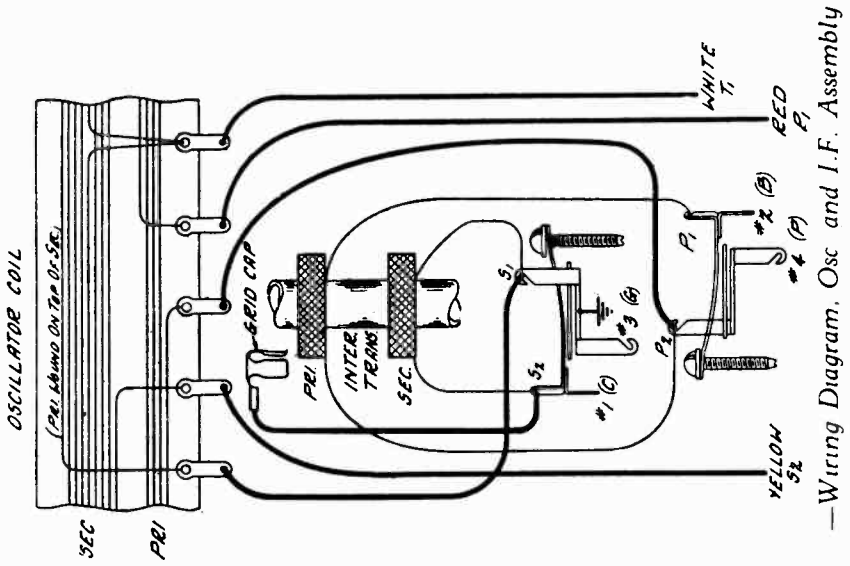
The 25 cycle chassis can be operated satisfactorily from a 60 cycle power supply. If there is excessive hum it will be necessary to secure a .06 Mfd. condenser, Part No. 2854, and connect it in the circuit across the filter choke. The reverse is not true, that is, the No. 10, 60 cycle receiver cannot be operated satisfactorily from a 25 cycle power supply.

MODEL 84,85
Socket
Voltage,Notes

SONORA



Top View of Chassis showing Tube Sequence and Speaker Connections.



—Wiring Diagram, Osc and I.F. Assembly

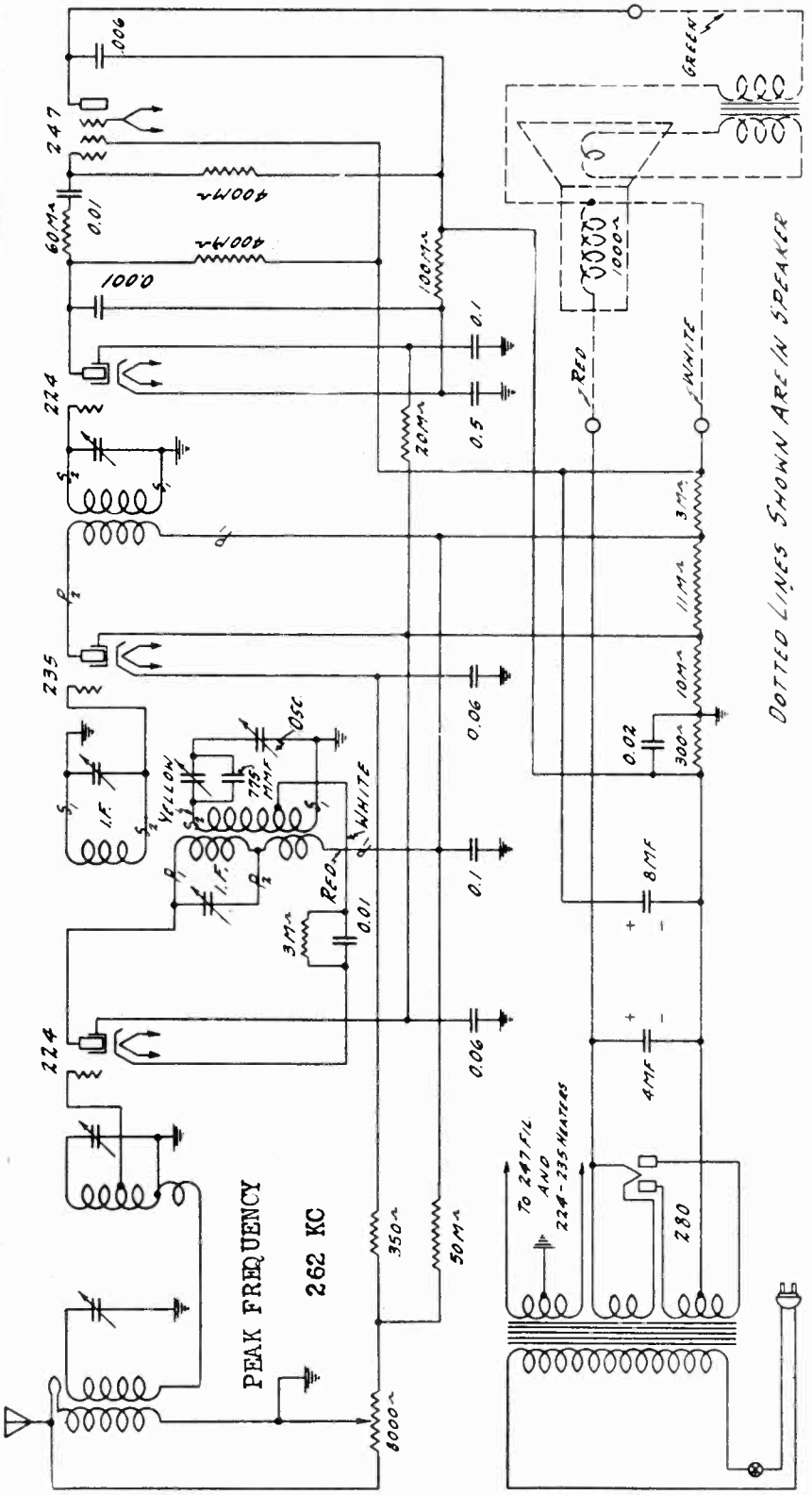
VOLTAGES AT SOCKETS
LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM

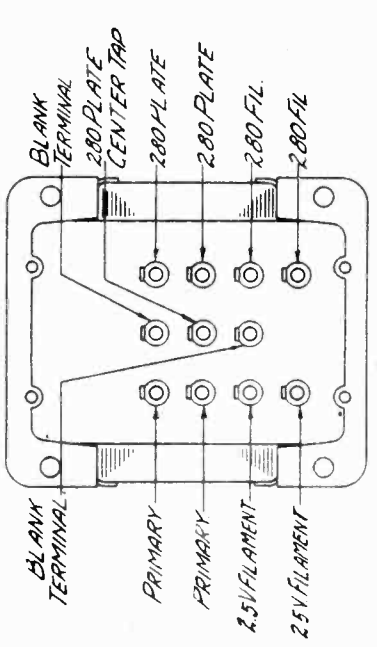
Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate MA	Grid Test MA
224	1	1st Det. & Osc.	2.25	165	4.5-5.25(1)	65	.4	4.5-5.25(1)	1.3	2.0
235	2	I.F.	2.25	165	2.5	65	1.5	2.5	6.4	7.4
224	3	2nd Det.	2.25	128	6.5	60(2)	.05	6.5	.22	.23
247	4	Audio	2.25	205	16. (3)	225	8.0		29.	33.
280	5	Rect.	4.9						27. Per Plate	

(1) Varies with frequency setting of dial approximately as shown.
(2) Voltage as measured with 600,000 ohm meter.
(3) Measured across 300 ohm section of voltage divider resistor.

SONORA

MODEL 84,85
Schematic



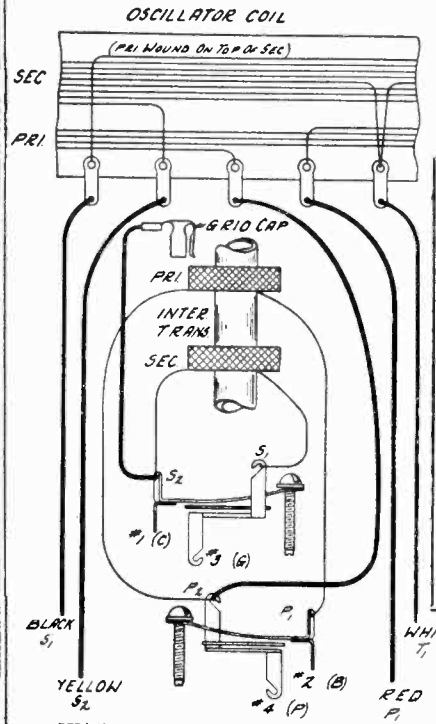


Power Transformer Terminals

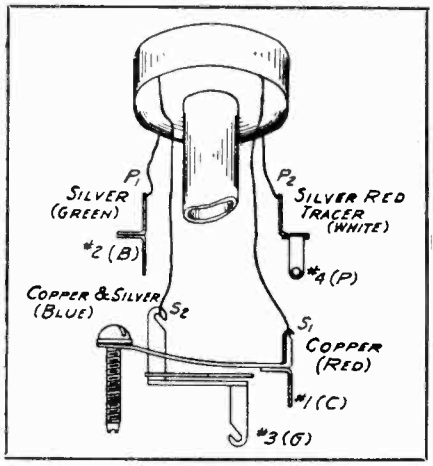
There are certain features to be noted in this receiver. The mixer is of the autodyne type, wherein it functions as a mixer (1st detector) and also as an oscillator. Also that the grid lead from the mixer tube joins the grid coil at a tap upon this winding. This tap is so apportioned that the circuit acts to suppress the transmission of image frequency signals, in this case 524 KC higher than the frequency setting of the tuned circuit. The IF transformer is also of special structure combining the coupling transformer and also the oscillator system. The structure of this transformer-oscillator is illustrated upon the next page.

MODEL 86,87
Voltage
Transformer
Notes

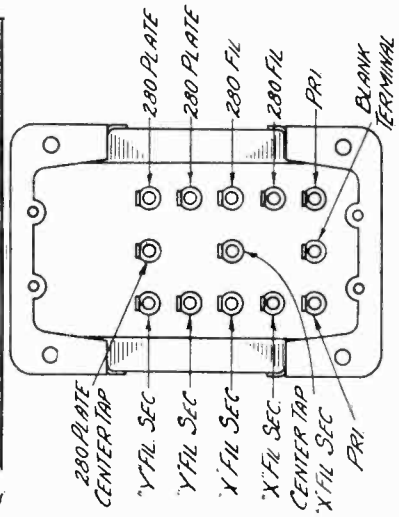
SONORA



-Wiring Diagram, Osc. and I.F. Assembly



Wiring Diagram, 2nd I.F Assembly



-Power Transformer Terminals

VOLTAGES AT SOCKETS—LINE VOLTAGE 115

VOLUME CONTROL AT MAXIMUM—LOCALIZER AT NORMAL SETTING

Type of Tube	*Position of Tube*	*Function*	*Across Filament or Heater*	*Plate to Cathode*	*Grid to Cathode*	*Screen to Cathode*	*Screen MA*	*Cathode to Heater*	*Plate MA*	*Grid Test MA*
235	1	R.F	2.35	150	4.5(1)	70(2)	.9	4.5	2.7	4.2
224	2	1st Det. & Osc.	2.35	240	6.4	93	.3	6.4	1.8	2.6
235	3	I.F.	2.35	150	4.5(1)	70(2)	.9	4.5	2.7	4.2
227	4	2nd Det.	2.35	150	12–24(3)			0–10(3)	.2–.5(3)	.21–.51(3)
224	5	A.V.C.	2.35	60	0–15(3)	9	0 (4)	12	0 (4)	0 (4)
247	6	Power	2.35	220	16 (5)	240	6.4		34	40
280	7	Rect.	4.9						39 Per Plate	

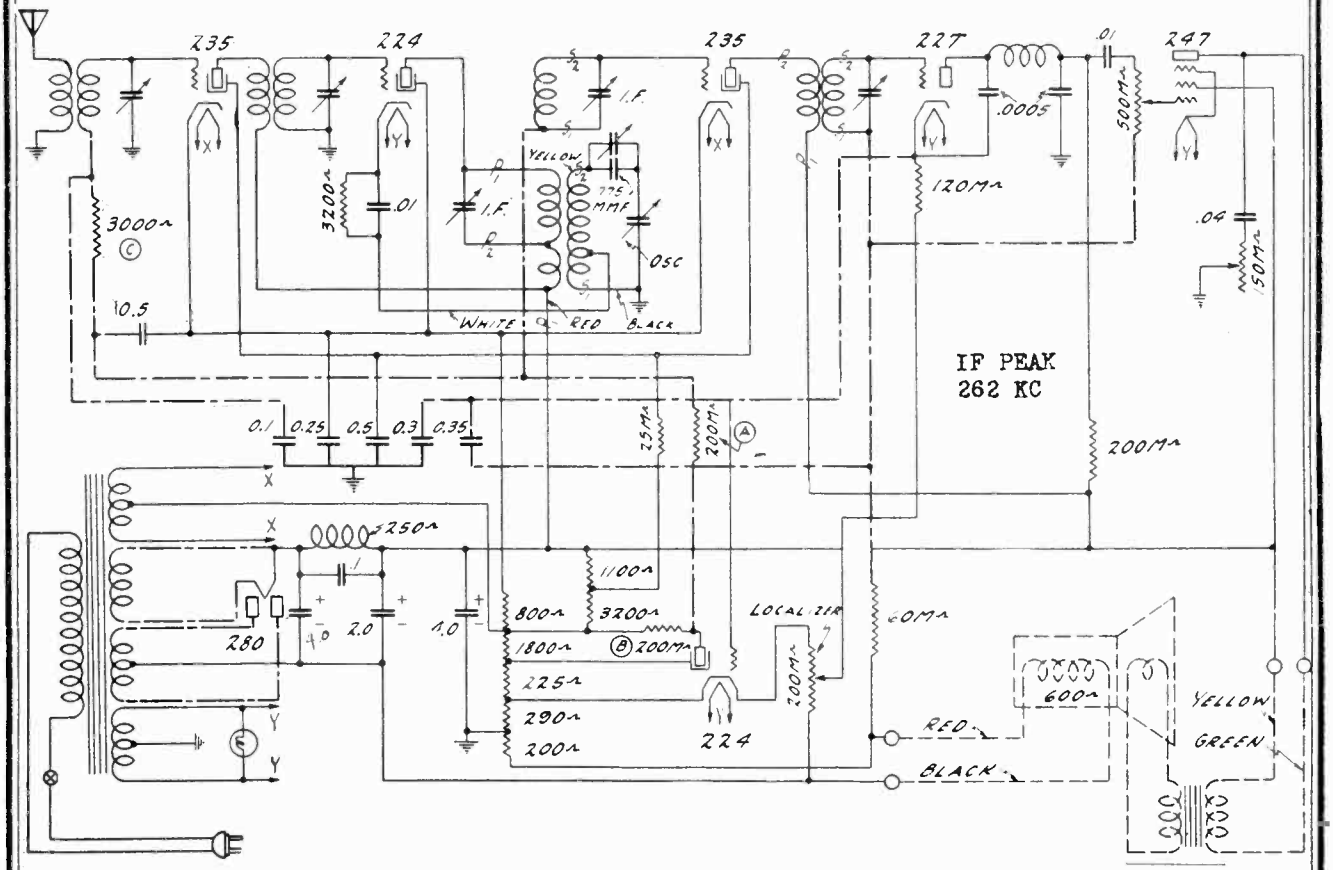
(1) This voltage read across 800 ohm resistor.
(2) Voltage as read with 600,000 ohm meter.
(3) Varies with setting of localizer. Voltages read with high resistance meter
(4) Current zero with no signal and localizer at normal position.
(5) The voltage read across 200 ohm section of voltage divider.

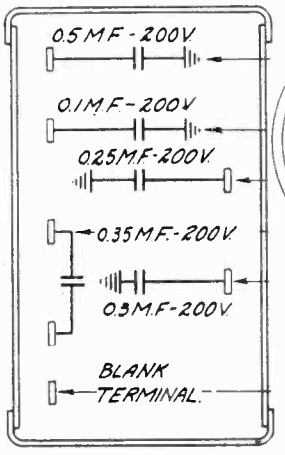
SETTING THE LOCALIZER.

Turn the localizer knob cpunterclockwise as far as it will go. Then turn the knob one quarter turn clockwise. Next tune in a fairly strong signal and reduce the volume by means of the volume control knob on the front panel. Then turn the localizer knob to the extreme clockwise position. This will cause plate current cutoff in the RF and IF tubes. Then turn the knob slowly in a counter-clockwise direction until the signal is again heard. With a slight additional turn in the same direction the signal builds up sharply to full strength and this is the correct position of the localizer setting. This adjustment should not be changed unless the set is reinstalled or the tubes are changed. Incorrect adjustment of this knob will control the action of the AVC tube in such fashion that the automatic action will commence too soon or too late.

SONORA

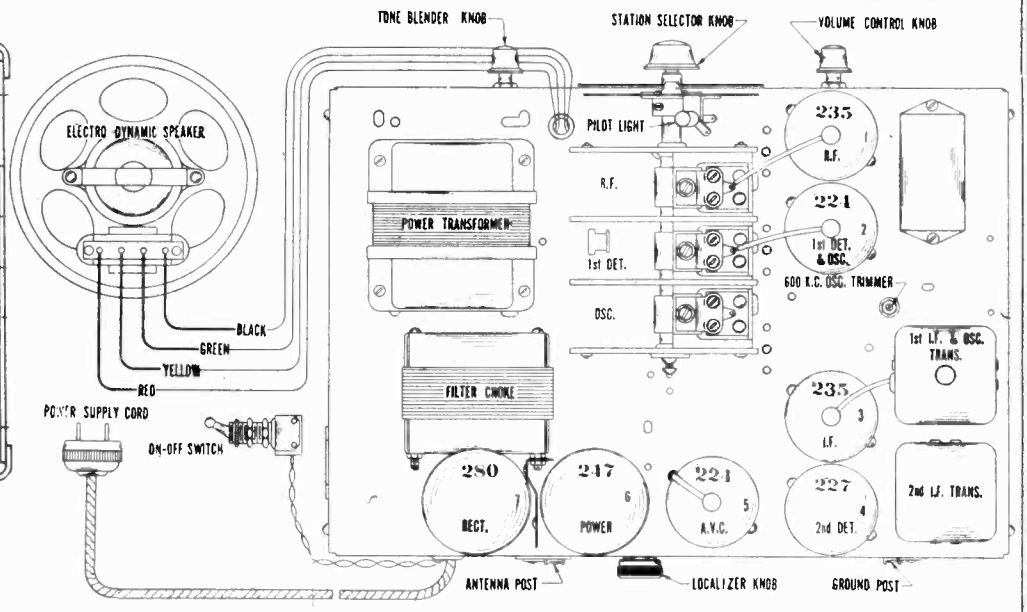
MODEL 86,87
Schematic
Socket





5 Section Condenser

Internal Wiring

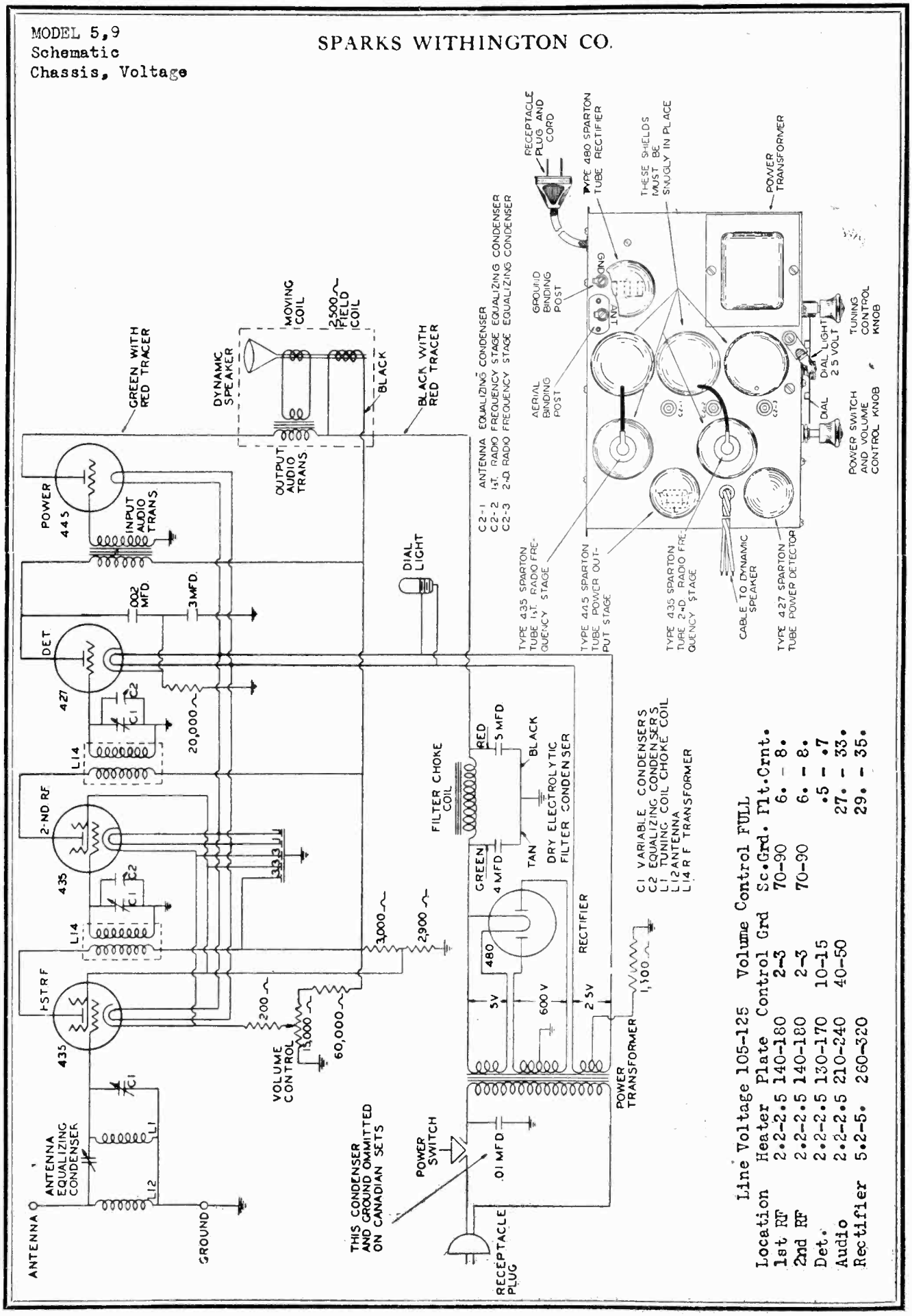


—Top View of Chassis showing Tube Sequence and Speaker Connections

There are certain features to be noted in this receiver. The mixer tube is of the autodyne type, wherein it functions as the mixer (1st detector) and at the same time functions as the oscillator. The structure of the oscillator-IF transformer is shown elsewhere. The structure of the 2nd IF transformer is also shown upon the same page. Take note of the changes recorded upon the wiring diagram. See the footnotes concerning the significance of the numbers contained within the circles.

MODEL 5,9
Schematic
Chassis, Voltage

SPARKS WITHINGTON CO.



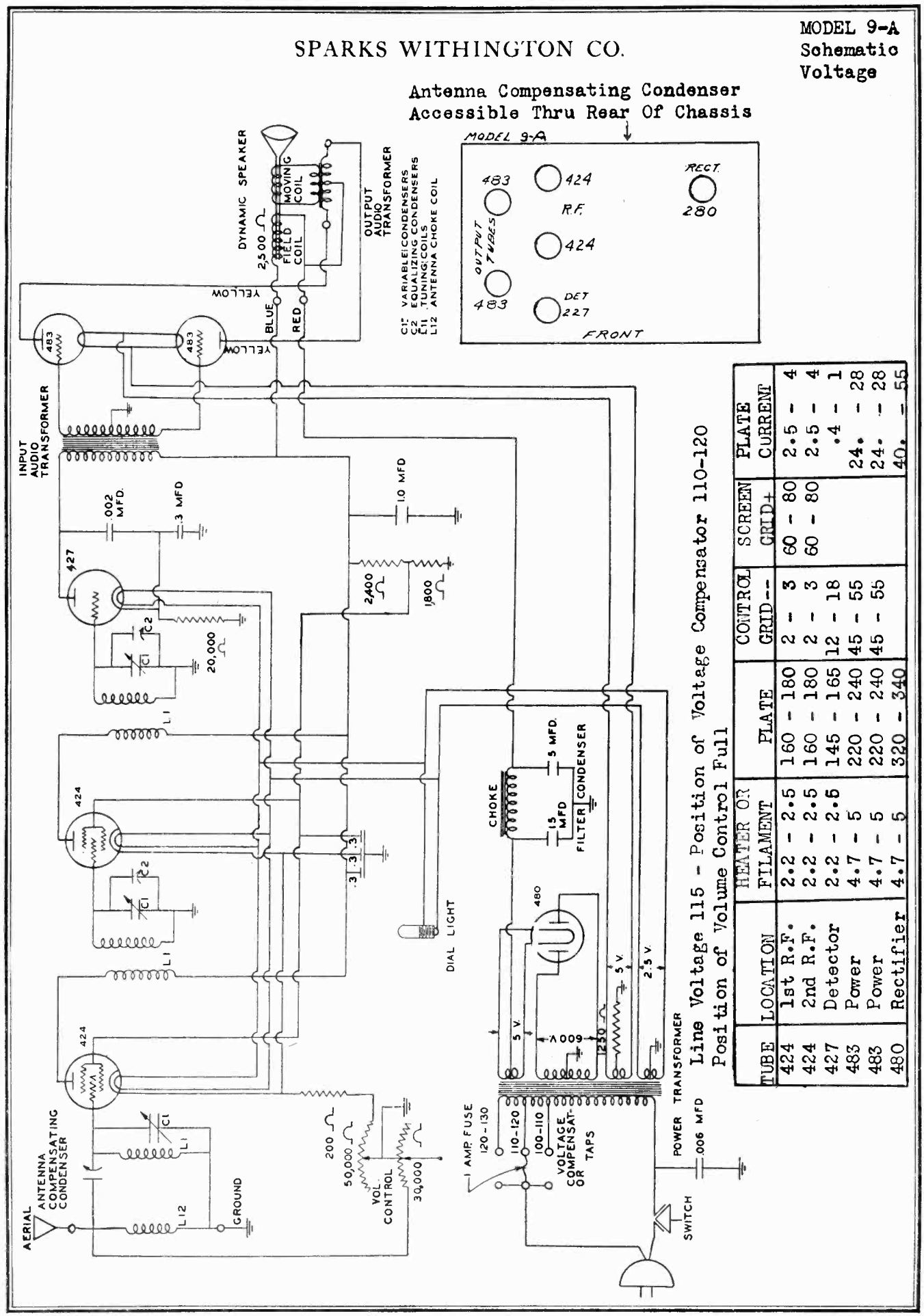
Line Voltage 105-125 Volume Control FULL

Location	Heater	Plate	Control Grd	Sc.Grd.	Plt.Crnt.
1st RF	2.2-2.5	140-180	2-3	70-90	6. - 8.
2nd RF	2.2-2.5	140-180	2-3	70-90	6. - 8.
Det.	2.2-2.5	130-170	10-15		.5 - .7
Audio	2.2-2.5	210-240	40-50		27. - 33.
Rectifier	5.2-5.	260-320			29. - 35.

SPARKS WITHINGTON CO.

MODEL 9-A
Schematic
Voltage

Antenna Compensating Condenser
Accessible Thru Rear Of Chassis

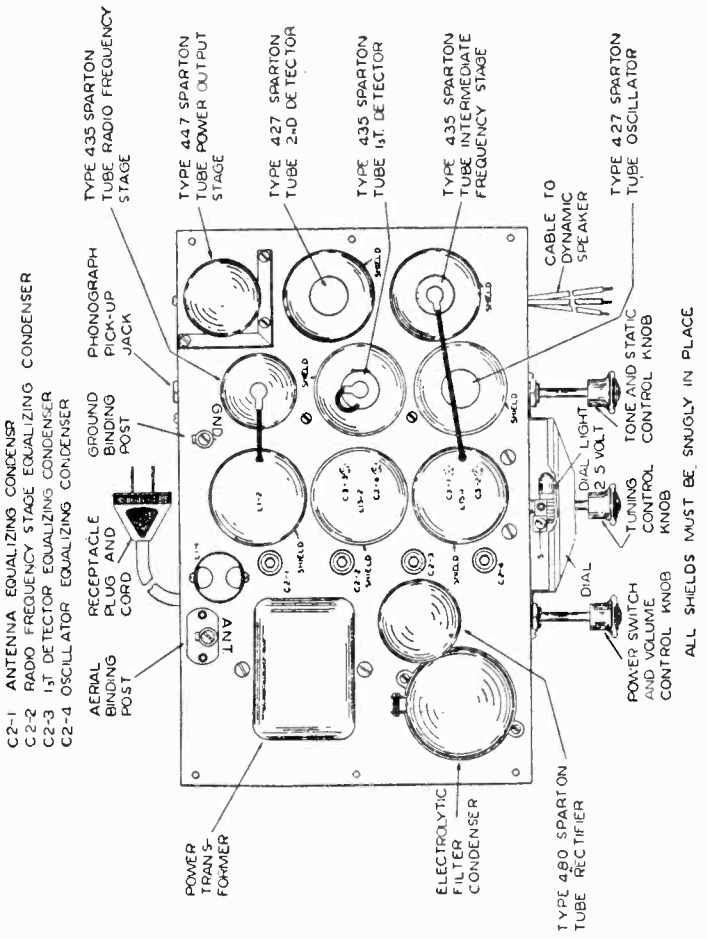


Line Voltage 115 - Position of Voltage Compensator 110-120
Position of Volume Control Full

TUBE	LOCATION	HEATER OR FILAMENT	PLATE	CONTROL GRID--	SCREEN GRID+	PLATE CURRENT
424	1st R.F.	2.2 - 2.5	160 - 180	2 - 3	60 - 80	2.5 - 4
424	2nd R.F.	2.2 - 2.5	160 - 180	2 - 3	60 - 80	2.5 - 4
427	Detector	2.2 - 2.6	145 - 165	12 - 18		.4 - 1
483	Power	4.7 - 5	220 - 240	45 - 55		24. - 28
483	Power	4.7 - 5	220 - 240	45 - 55		24. - 28
480	Rectifier	4.7 - 5	320 - 340			40. - 55

MODEL 10
Chassis, Voltage

SPARKS WITHINGTON CO.



TOP VIEW MODEL 10 SUPERHETERODYNE CHASSIS

L1-1 First R. F. Tuning Coil

L1-2 Second R. F. Tuning Coil

L15-1 First I. F. Transformer (1st. Det. to I.F. Stage)

L15-2 Second I. F. Transformer (I.F. to 2nd. Det. Stage)

C3-1 I. F. Stage First Adjustable Condenser

C3-2 I. F. Stage Second Adjustable Condenser

C3-3 I. F. Stage Third Adjustable Condenser

C3-4 I. F. Stage Fourth Adjustable Condenser

Voltage-Current Characteristics

Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

Tube	Location	OPERATING VOLTAGES				Plate Current Mills.
		Heater or Filament	Plate	Control Grid —	Screen Grid +	
435	1st R. F.	2.2 - 2.5	230 - 270	2.5 - 4.0	85 - 100	5 - 8
435	1st Det.	2.2 - 2.5	230 - 270	**4.5 - 7.5	85 - 110	**1.8 - 3.5
435	1st I. F.	2.2 - 2.5	230 - 270	2.5 - 4.0	85 - 110	5 - 8
427	Oscillator	2.2 - 2.5	85 - 110	†	--------	‡
427	2nd Det.	2.2 - 2.5	*100 - 135	8 - 14	--------	4.0 - .7
447	Power	2.2 - 2.5	220 - 260	15 - 18	--------	30 - 36
480	Rectifier	4.2 - 5	360 - 420	--------	--------	40 - 55

*Use 300 volt scale.

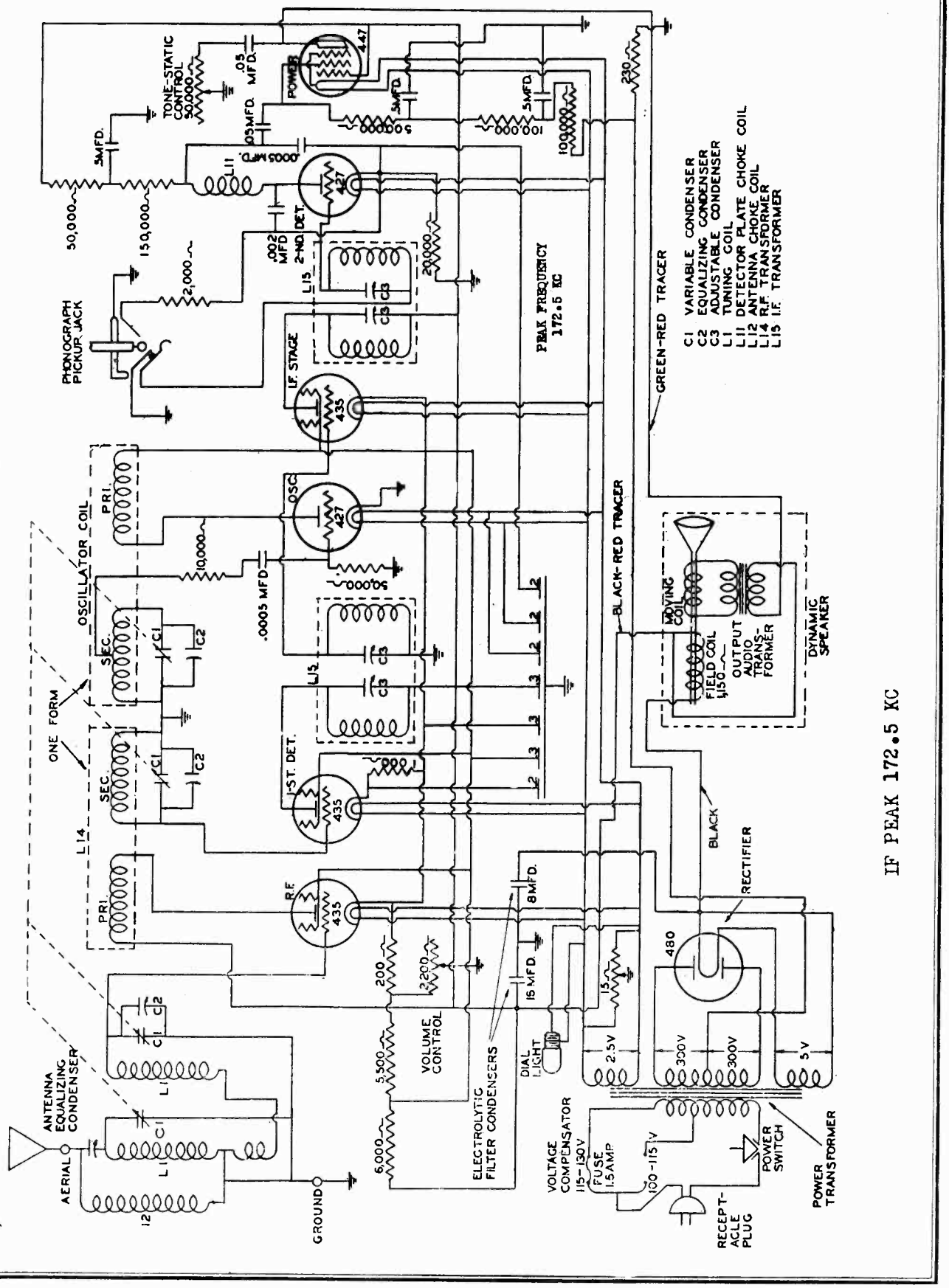
**Remove Oscillator tube.

†Tube generates own bias when oscillating.

‡Test with plug in 2nd. Detector socket and tube in analyzer

MODEL 10
Schematic

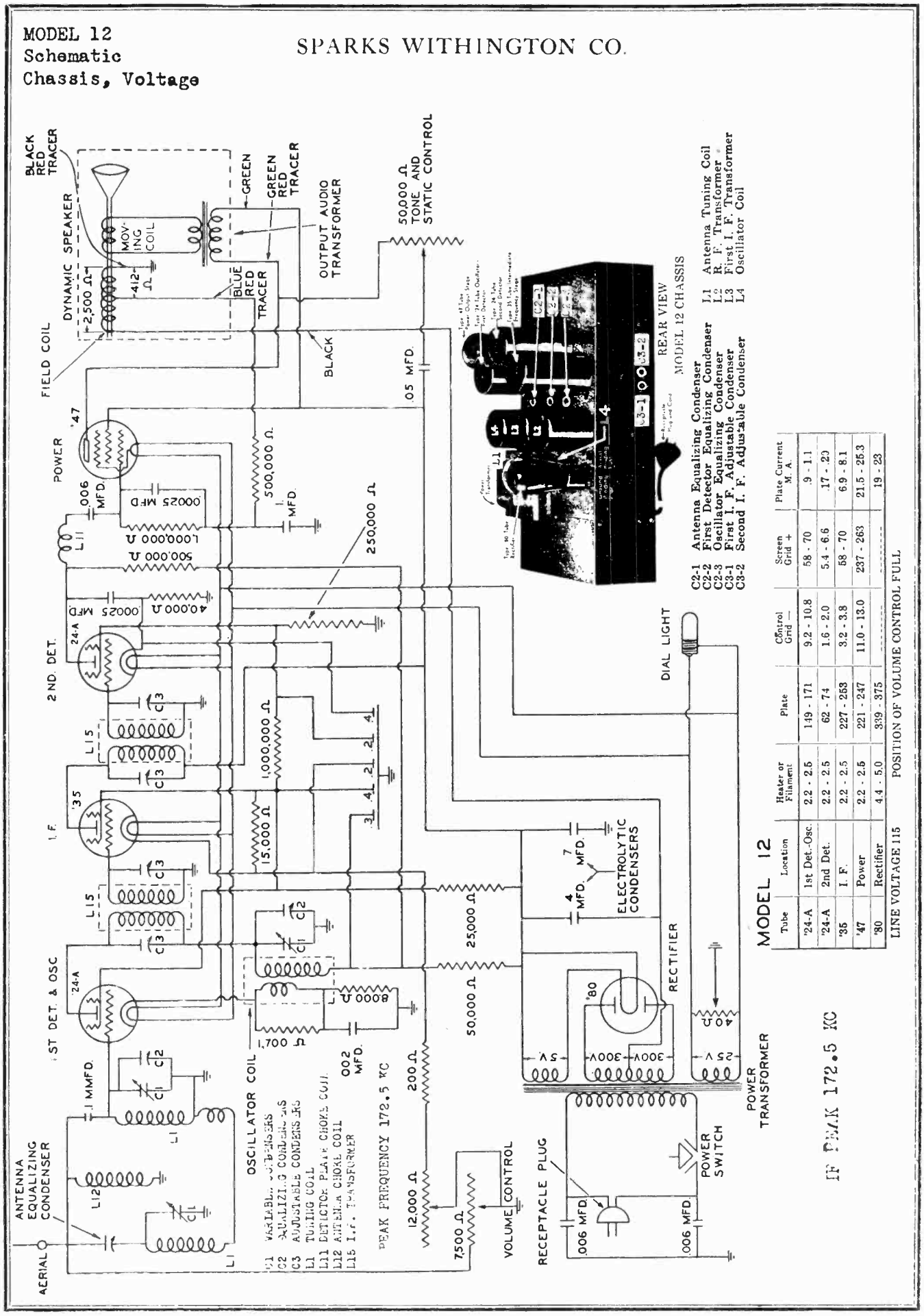
SPARKS WITHINGTON CO.



IF PEAK 172.5 KC

MODEL 12
Schematic
Chassis, Voltage

SPARKS WITHINGTON CO.



MODEL 12

Tube	Location	Heater or Filament	Plate	Control Grid −	Screen Grid +	Plate Current M. A.
'24-A	1st Det.-Osc.	2.2 - 2.5	149 - 171	9.2 - 10.8	58 - 70	.9 - 1.1
'24-A	2nd Det.	2.2 - 2.5	62 - 74	1.6 - 2.0	5.4 - 6.6	.17 - .23
'35	I. F.	2.2 - 2.5	227 - 253	3.2 - 3.8	68 - 70	6.9 - 8.1
'47	Power	2.2 - 2.5	221 - 247	11.0 - 13.0	237 - 263	21.5 - 25.3
'80	Rectifier	4.4 - 5.0	339 - 375	--------	--------	19 - 23

LINE VOLTAGE 115 POSITION OF VOLUME CONTROL FULL

MODEL 14
Chassis, Voltage

SPARKS WITHINGTON CO.

Sparton Model 14 Super-Heterodyne Schematic Diagram and Voltage Analysis

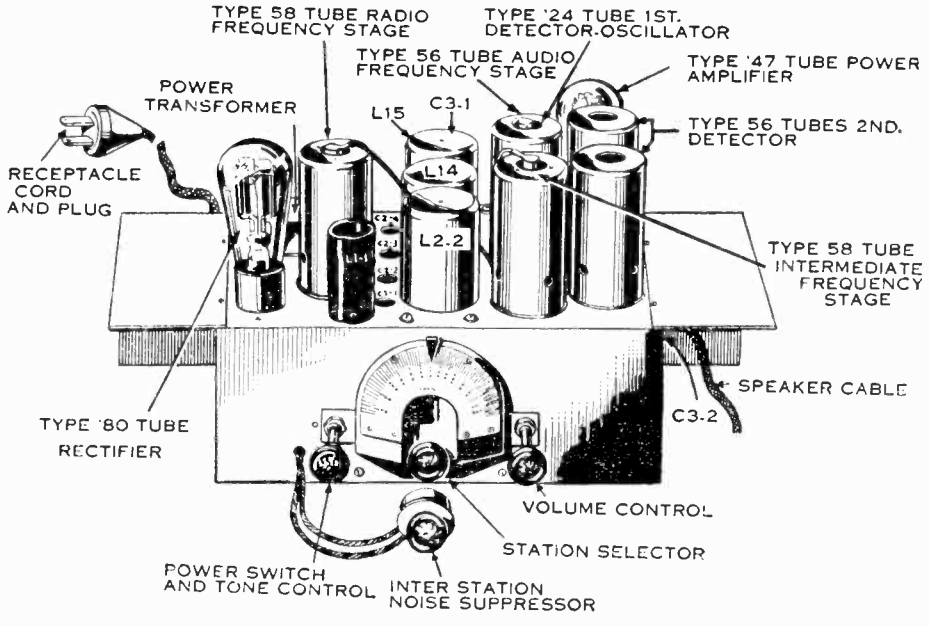
VOLTAGE ANALYSIS

Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A
58	R. F. Stage	2.2—2.5	218—242	2—4	95—105	5.5—7.0
'24	1st Det.-Osc.	2.2—2.5	218—242	——	95—105	0.7—8.0
58	I. F. Stage	2.2—2.5	218—242	2—4	95—105	5.5—7.0
56	2nd Det.-AVC	2.2—2.5	*	*	——	*
56	2nd Det.-AVC	2.2—2.5	*	*	——	*
56	A. F. Stage	2.2—2.5	20—40	Zero	——	0.5—0.7
'47	Power Stage	2.2—2.5	205—225	†18—20	218—242	20—24
'80	Rectifier	4.5—5.0	315—345	——	——	19-23 per Plate

* Present only when signal is applied.
† Measured from tap on field coil to ground.

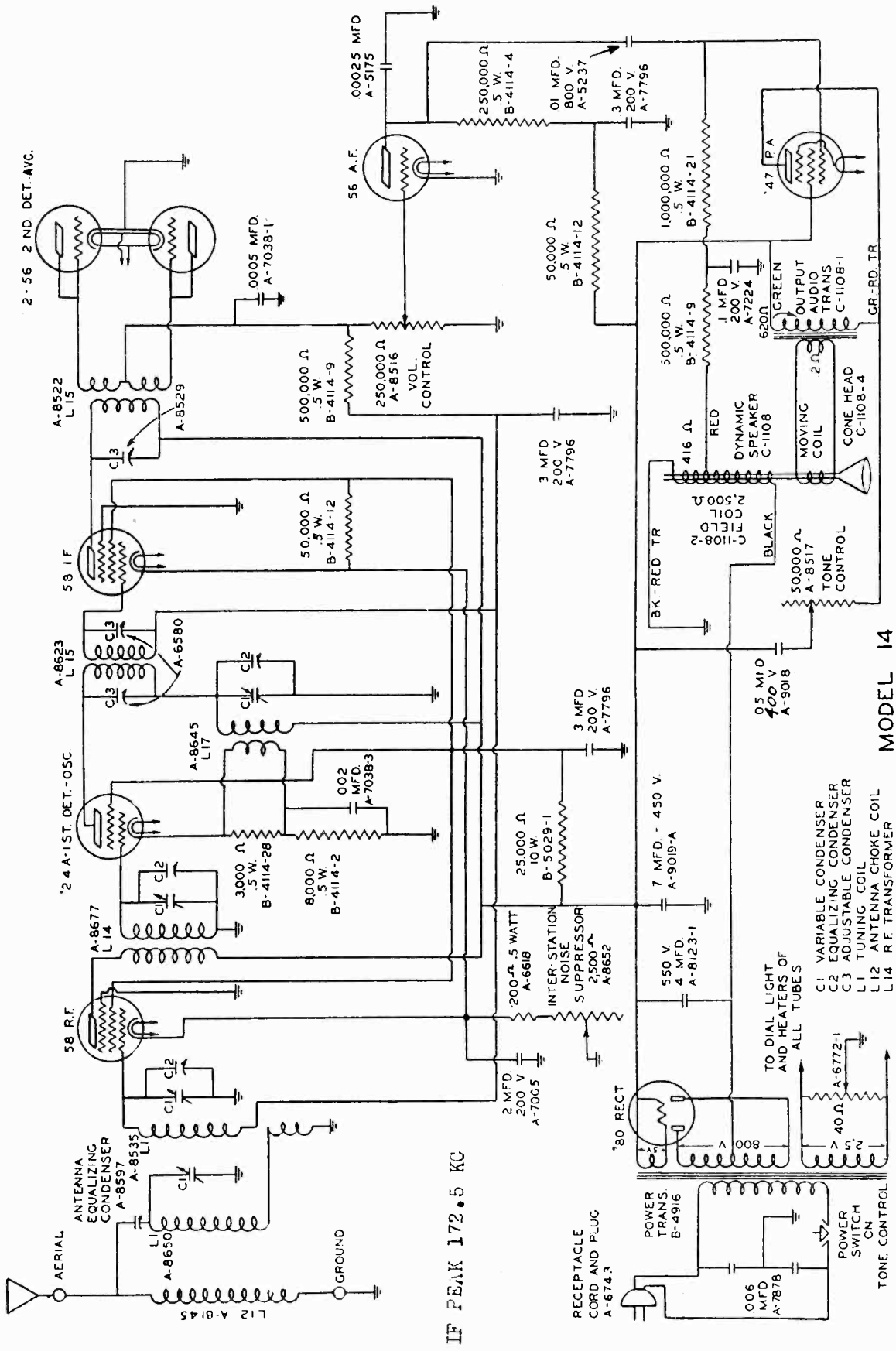
MODEL 14 CHASSIS



C2-1 Antenna Equalizing Condenser
C2-2 R. F. Stage Equalizing Condenser
C2-3 1st Detector Equalizing Condenser
C2-4 Oscillator Equalizing Condenser
C3-1 I. F. Input Stage Adjustable Condenser
C3-2 I. F. Output Stage Adjustable Condenser
L1 1st Tuning Coil
L2 Second Tuning Coil
L14 R. F. Transformer
L15 I. F. Transformer

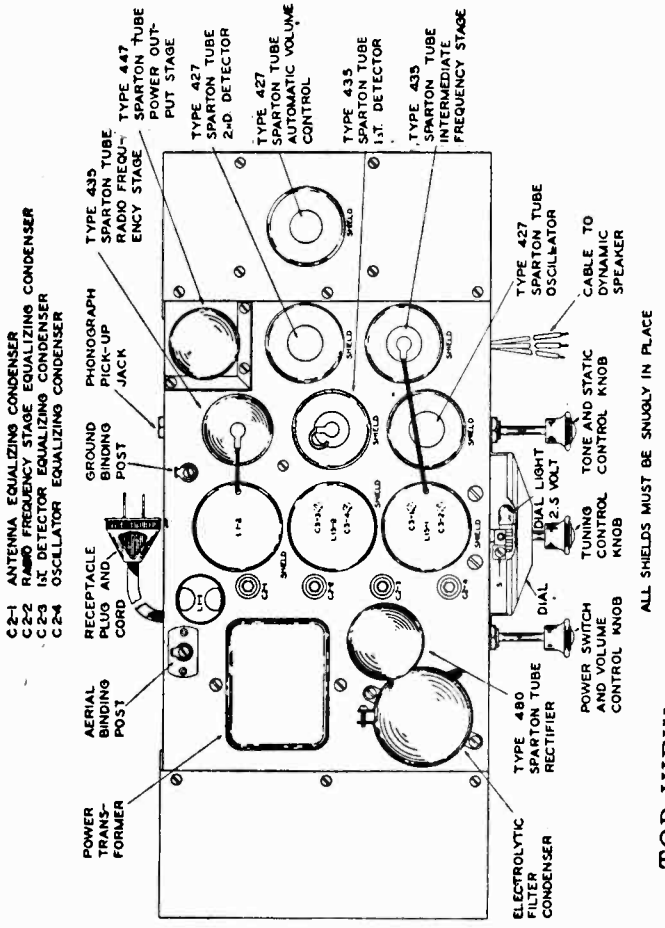
SPARKS WITHINGTON CO.

MODEL 14
Schematic



MODEL 15
Chassis, Voltage

SPARKS WITHINGTON CO.



TOP VIEW

L1-1 First R. F. Tuning Coil
L1-2 Second R. F. Tuning Coil
L15-1 First I. F. Transformer (1st. Det. to I. F. Stage)
L15-2 Second I. F. Transformer (I. F. to 2nd. Det. Stage)
C3-1 I. F. Stage First Adjustable Condenser
C3-2 I. F. Stage Second Adjustable Condenser
C3-3 I. F. Stage Third Adjustable Condenser
C3-4 I. F. Stage Fourth Adjustable Condenser

Voltage-Current Characteristics

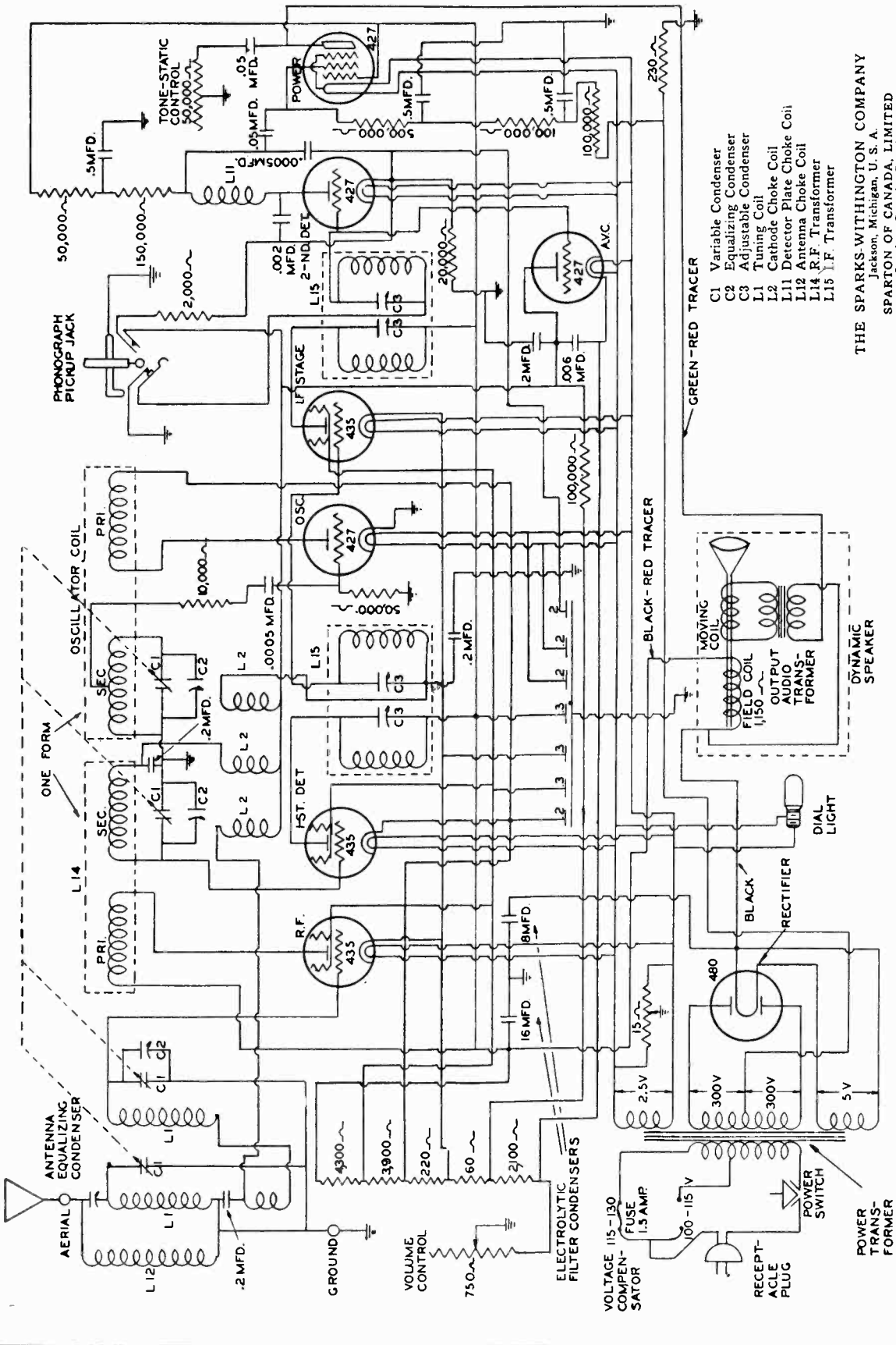
Line Voltage 115—Position of Voltage Compensator 115-130—Position of Volume Control Full

Tube	Location	OPERATING VOLTAGES				Plate Current Mills.
		Heater or Filament	Plate	Control Grid—	Screen Grid+	
435	1st R. F.	2.2 - 2.5	155 - 185	2 - 3	70 - 100	3 - 6
435	1st Det.	2.2 - 2.5	150 - 180	§ 7 - 11	70 - 100	§ 1.8 - 3
435	1st I. F.	2.2 - 2.5	155 - 185	2 - 3	70 - 100	3 - 6
427	Oscillator	2.2 - 2.5	70 - 95	†	.....	‡
427	2nd Det.	2.2 - 2.5	*100 - 135	8 - 14	.....	4.0 - .7
427	A. V. C.	2.2 - 2.5	30 - 40	24	.....	Zero
427	Power	2.2 - 2.5	220 - 260	15 - 18	230 - 270	30 - 36
480	Rectifier	4.2 - 5	320 - 370	.....	.....	40 - 55

* Use 300 volt scale.
§ Remove Oscillator tube.
† Tube generates own bias when oscillating.
‡ Test with plug in 2nd. Detector socket and tube in analyzer.

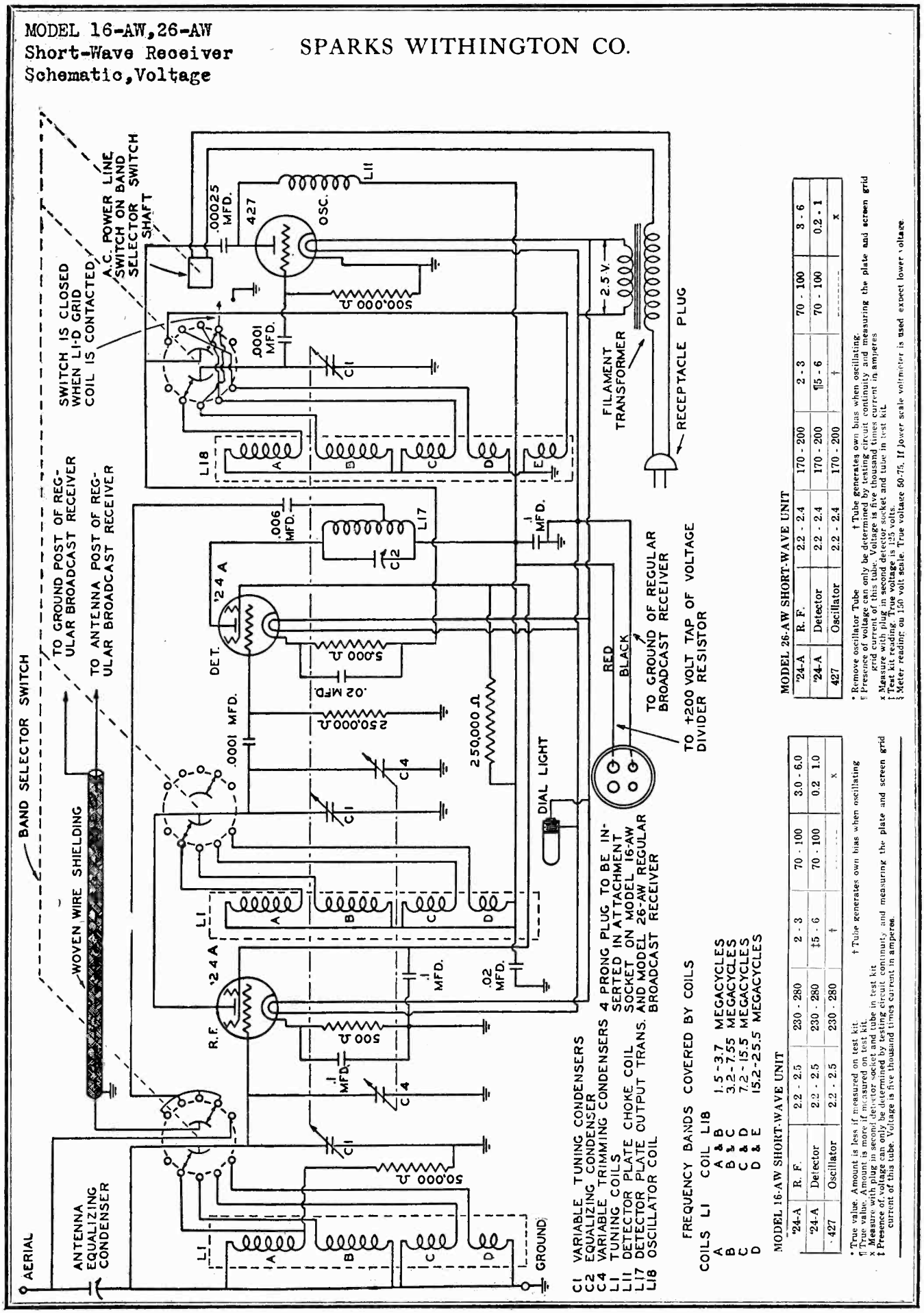
SPARKS WITHINGTON CO.

MODEL 15
Schematic



MODEL 16-AW, 26-AW
Short-Wave Receiver
Schematic, Voltage

SPARKS WITHINGTON CO.



C1 VARIABLE TUNING CONDENSERS
C2 EQUALIZING CONDENSER
C4 VARIABLE TRIMMING CONDENSERS
L1 TUNING COILS
L11 DETECTOR PLATE CHOKE COIL
L17 DETECTOR PLATE OUTPUT TRANS.
L18 OSCILLATOR COIL

4 PRONG PLUG TO BE INSERTED IN ATTACHMENT SOCKET ON MODEL 16-AW AND MODEL 26-AW REGULAR BROADCAST RECEIVER

FREQUENCY BANDS COVERED BY COILS

COILS L1	COIL L18	
A	A & B	1.5 - 3.7 MEGACYCLES
B	B & C	3.2 - 7.55 MEGACYCLES
C	C & D	7.2 - 15.5 MEGACYCLES
D	D & E	15.2 - 25.5 MEGACYCLES

MODEL 16-AW SHORT-WAVE UNIT

'24-A	R. F.	2.2 - 2.5	230 - 280	2 - 3	70 - 100	3.0 - 6.0
'24-A	Detector	2.2 - 2.5	230 - 280	¶5 - 6	70 - 100	0.2 1.0
427	Oscillator	2.2 - 2.5	230 - 280	†	------	x

MODEL 26-AW SHORT-WAVE UNIT

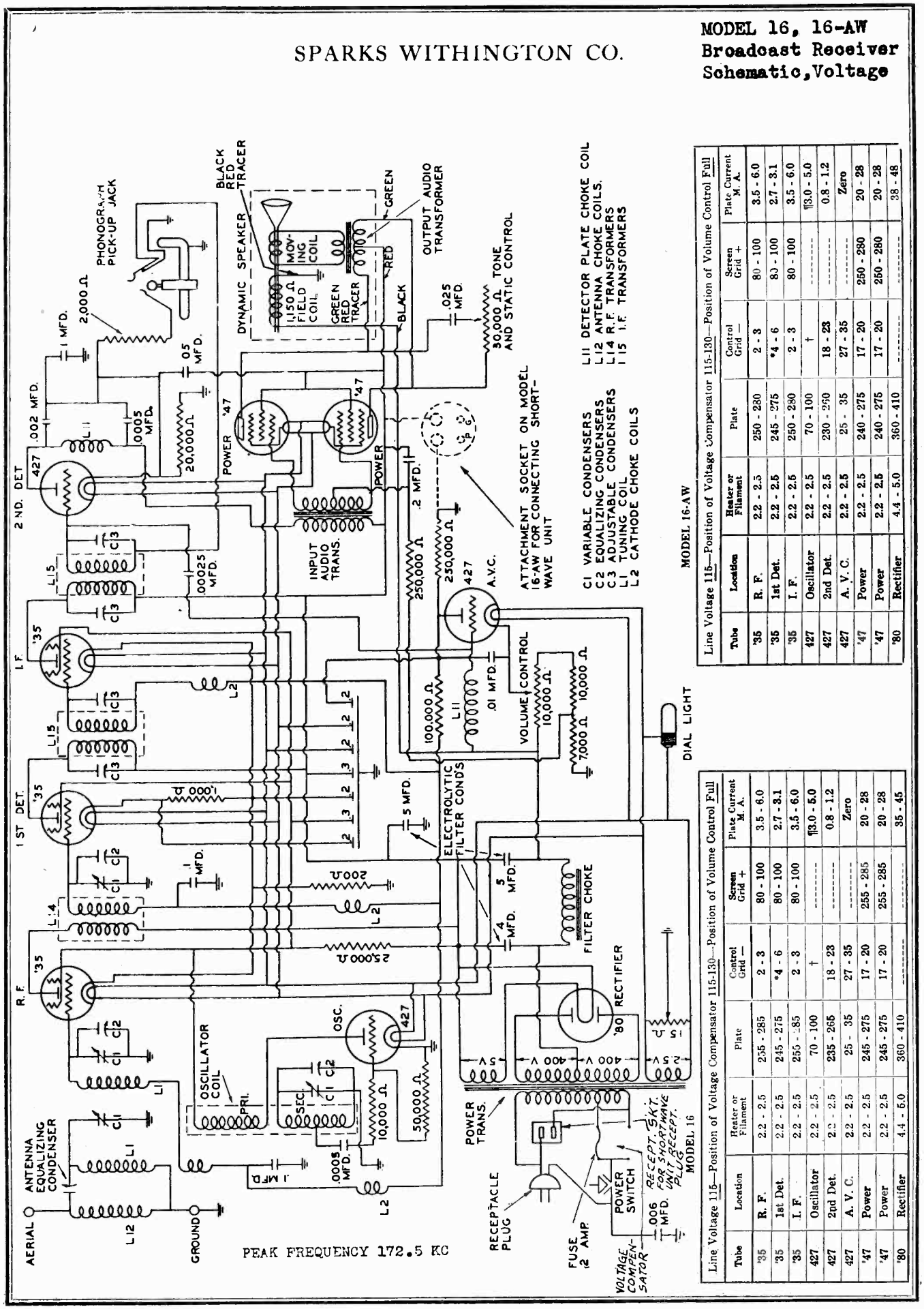
'24-A	R. F.	2.2 - 2.4	170 - 200	2 - 3	70 - 100	3 - 6
'24-A	Detector	2.2 - 2.4	170 - 200	¶5 - 6	70 - 100	0.2 - 1
427	Oscillator	2.2 - 2.4	170 - 200	†	------	x

* True value. Amount is less if measured on test kit.
¶ True value. Amount is more if measured on test kit.
x Measure with plug in second detector socket and tube in test kit
† Presence of voltage can only be determined by testing circuit continuity and measuring the plate and screen grid current of this tube. Voltage is five thousand times current in amperes.

† Tube generates own bias when oscillating.
¶ Presence of voltage can only be determined by testing circuit continuity and measuring the plate and screen grid current of this tube. Voltage is five thousand times current in amperes
x Measure with plug in second detector socket and tube in test kit
† Test kit reading. True voltage is 125 volts.
‡ Meter reading on 150 volt scale. True voltage 50-75. If lower scale voltmeter is used expect lower voltage.

SPARKS WITHINGTON CO.

MODEL 16, 16-AW
Broadcast Receiver
Schematic, Voltage



Line Voltage 115—Position of Voltage Compensator 115-130—Position of Volume Control Full

Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
'35	R. F.	2.2 - 2.5	235 - 285	2 - 3	80 - 100	3.5 - 6.0
'35	1st Det.	2.2 - 2.5	245 - 275	*4 - 6	80 - 100	2.7 - 3.1
'35	I. F.	2.2 - 2.5	255 - 285	2 - 3	80 - 100	3.5 - 6.0
427	Oscillator	2.2 - 2.5	70 - 100	†	--------	¶3.0 - 5.0
427	2nd Det.	2.2 - 2.5	235 - 265	18 - 23	--------	0.8 - 1.2
427	A. V. C.	2.2 - 2.5	25 - 35	27 - 35	--------	Zero
'47	Power	2.2 - 2.5	245 - 275	17 - 20	255 - 285	20 - 28
'47	Power	2.2 - 2.5	245 - 275	17 - 20	255 - 285	20 - 28
'80	Rectifier	4.4 - 5.0	360 - 410	--------	--------	35 - 45

MODEL 16

Line Voltage 115—Position of Voltage Compensator 115-130—Position of Volume Control Full

Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
'35	R. F.	2.2 - 2.5	250 - 280	2 - 3	80 - 100	3.5 - 6.0
'35	1st Det.	2.2 - 2.5	245 - 275	*4 - 6	80 - 100	2.7 - 3.1
'35	I. F.	2.2 - 2.5	250 - 280	2 - 3	80 - 100	3.5 - 6.0
427	Oscillator	2.2 - 2.5	70 - 100	†	--------	¶3.0 - 5.0
427	2nd Det.	2.2 - 2.5	230 - 250	18 - 23	--------	0.8 - 1.2
427	A. V. C.	2.2 - 2.5	25 - 35	27 - 35	--------	Zero
'47	Power	2.2 - 2.5	240 - 275	17 - 20	250 - 280	20 - 28
'47	Power	2.2 - 2.5	240 - 275	17 - 20	250 - 280	20 - 28
'80	Rectifier	4.4 - 5.0	360 - 410	--------	--------	38 - 48

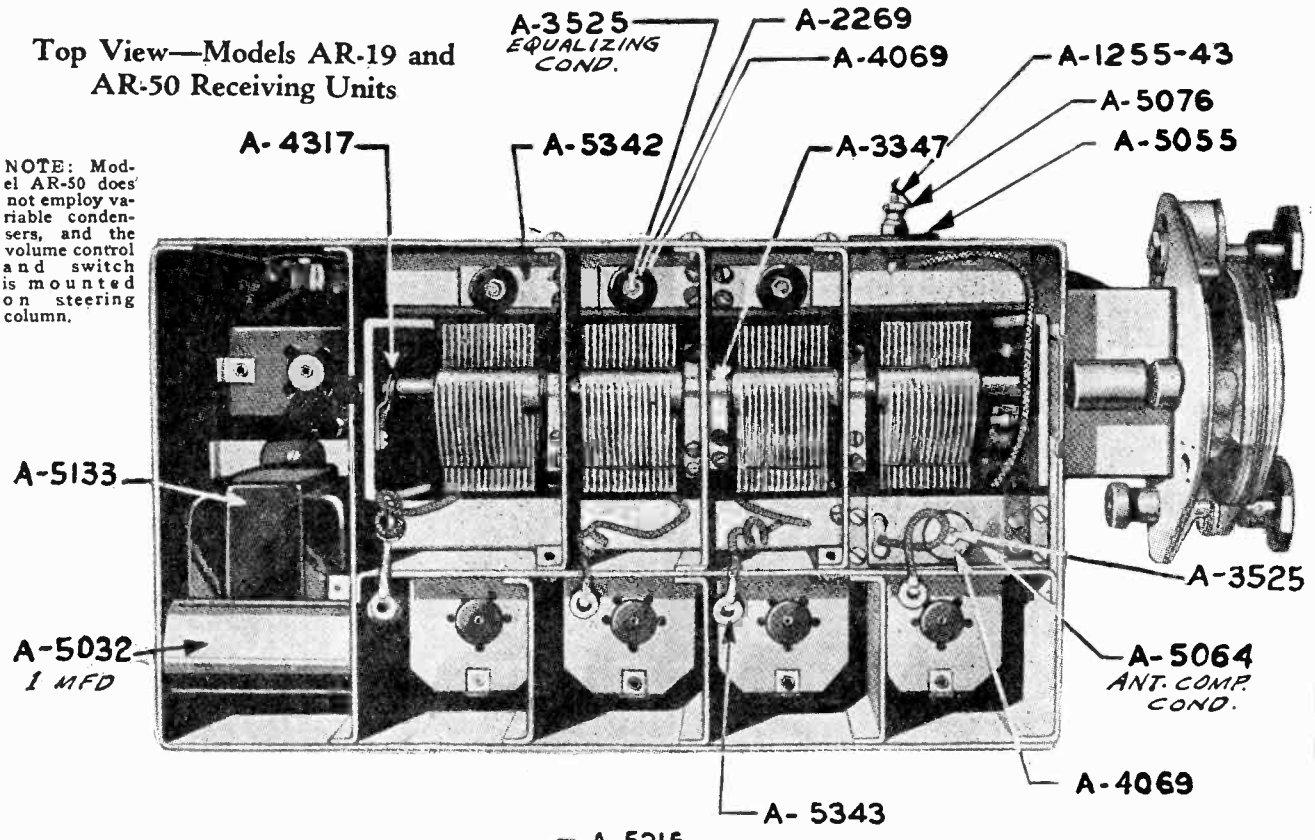
MODEL 16-AW

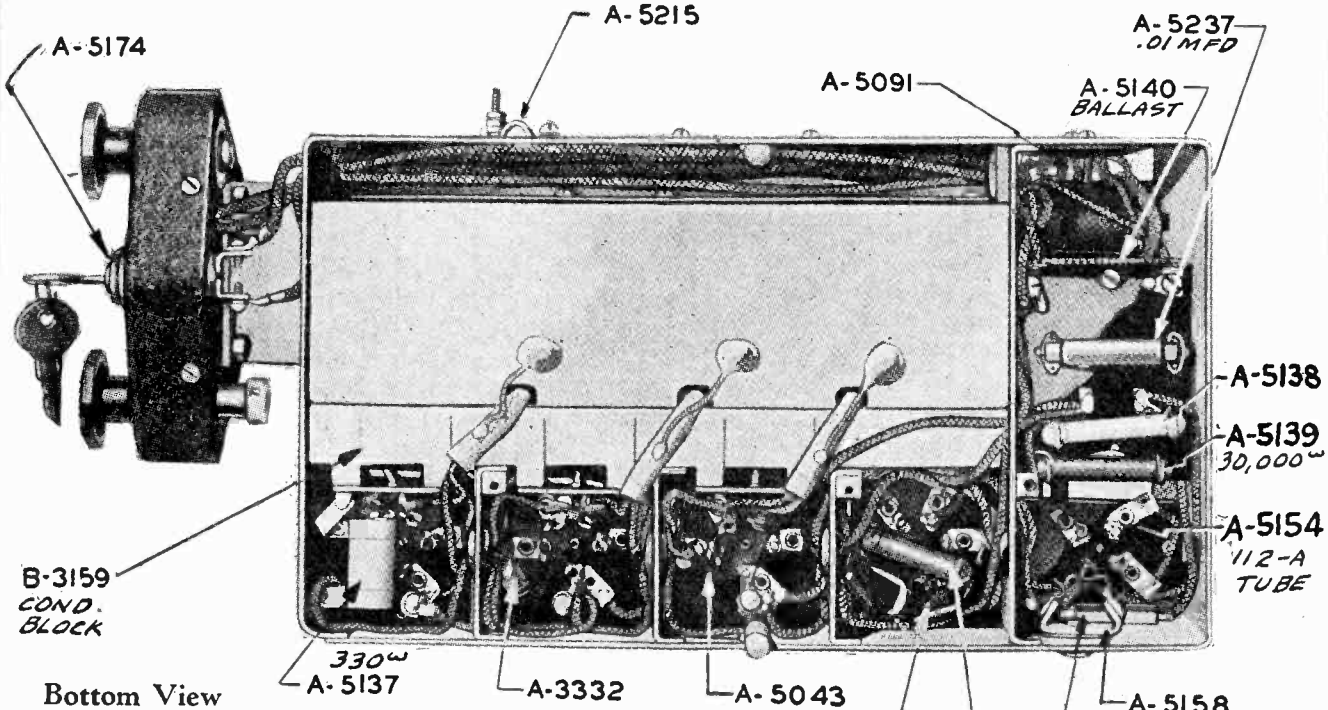
MODEL AR-19
MODEL AR-50
Chassis

SPARKS WITHINGTON CO.

Top View—Models AR-19 and AR-50 Receiving Units

NOTE: Model AR-50 does not employ variable condensers, and the volume control and switch is mounted on steering column.





Bottom View Models AR-19 and AR-50 Receiving Units

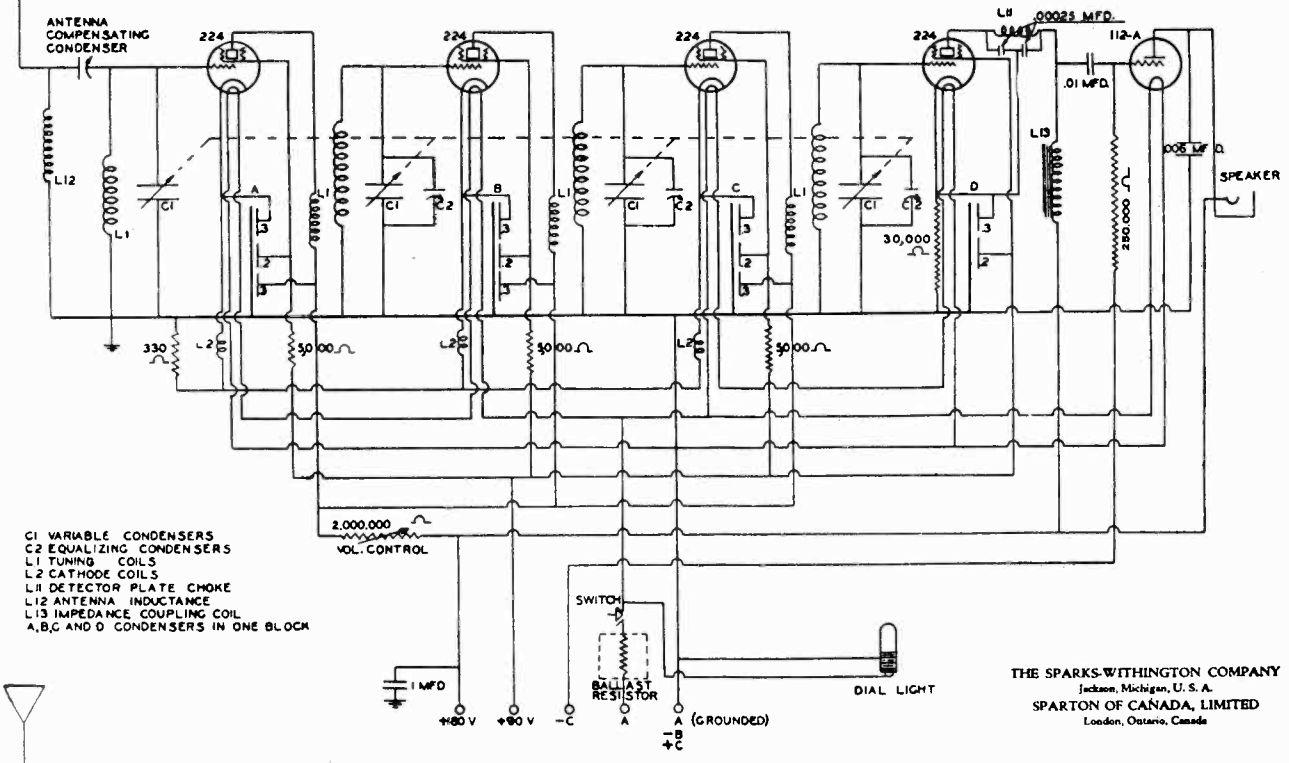
NOTE: In Model AR-50, A-5139 resistor is replaced with A-4261 resistor; A-5174 key switch is replaced with A-5903 toggle switch.

PART #A5217 FOR SPARK PLUG=.01 MFD
PART #A5238 FOR GENERATOR=.01 MFD

MODEL AR-19
MODEL AR-50
Schematic

SPARKS WITHINGTON CO.

MODEL A.R.-19

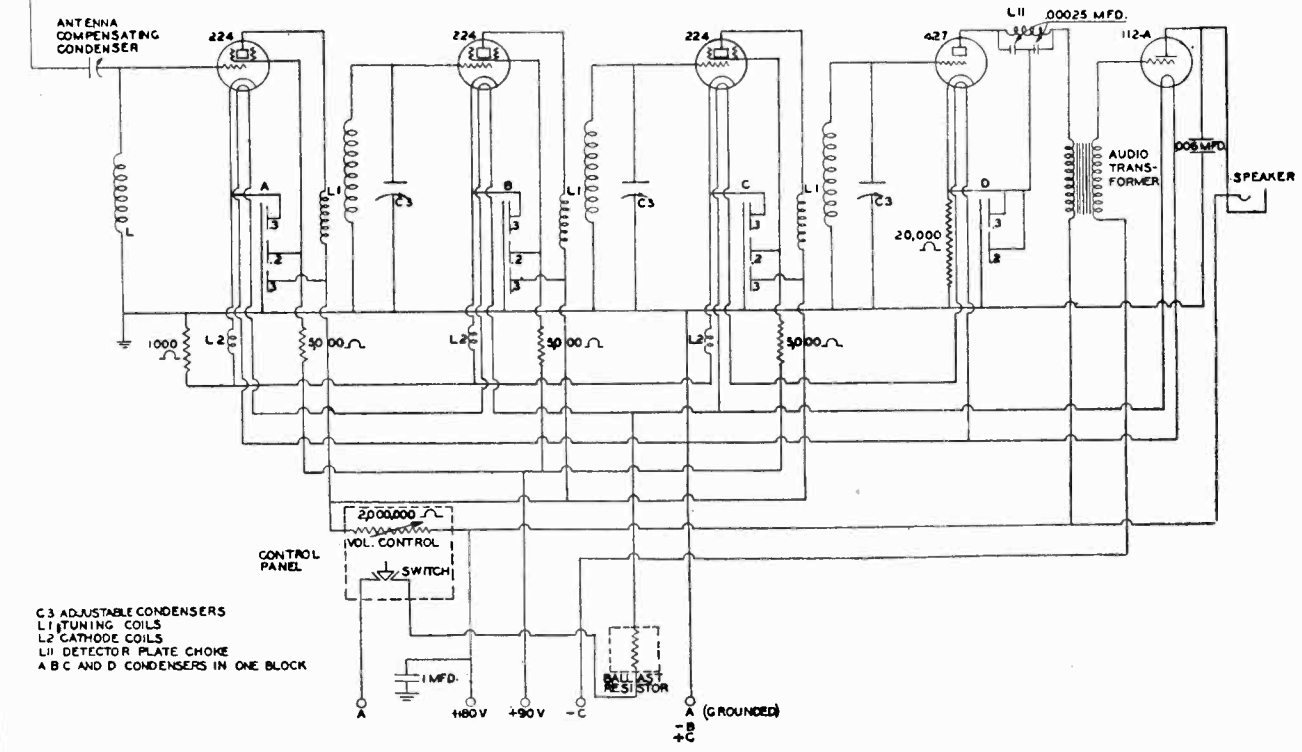


C1 VARIABLE CONDENSERS
C2 EQUALIZING CONDENSERS
L1 TUNING COILS
L2 CATHODE COILS
L11 DETECTOR PLATE CHOKE
L12 ANTENNA INDUCTANCE
L13 IMPEDANCE COUPLING COIL
A,B,C AND D CONDENSERS IN ONE BLOCK

THE SPARKS-WITHINGTON COMPANY
Jackson, Michigan, U. S. A.
SPARTON OF CANADA, LIMITED
London, Ontario, Canada

MODEL AR-50

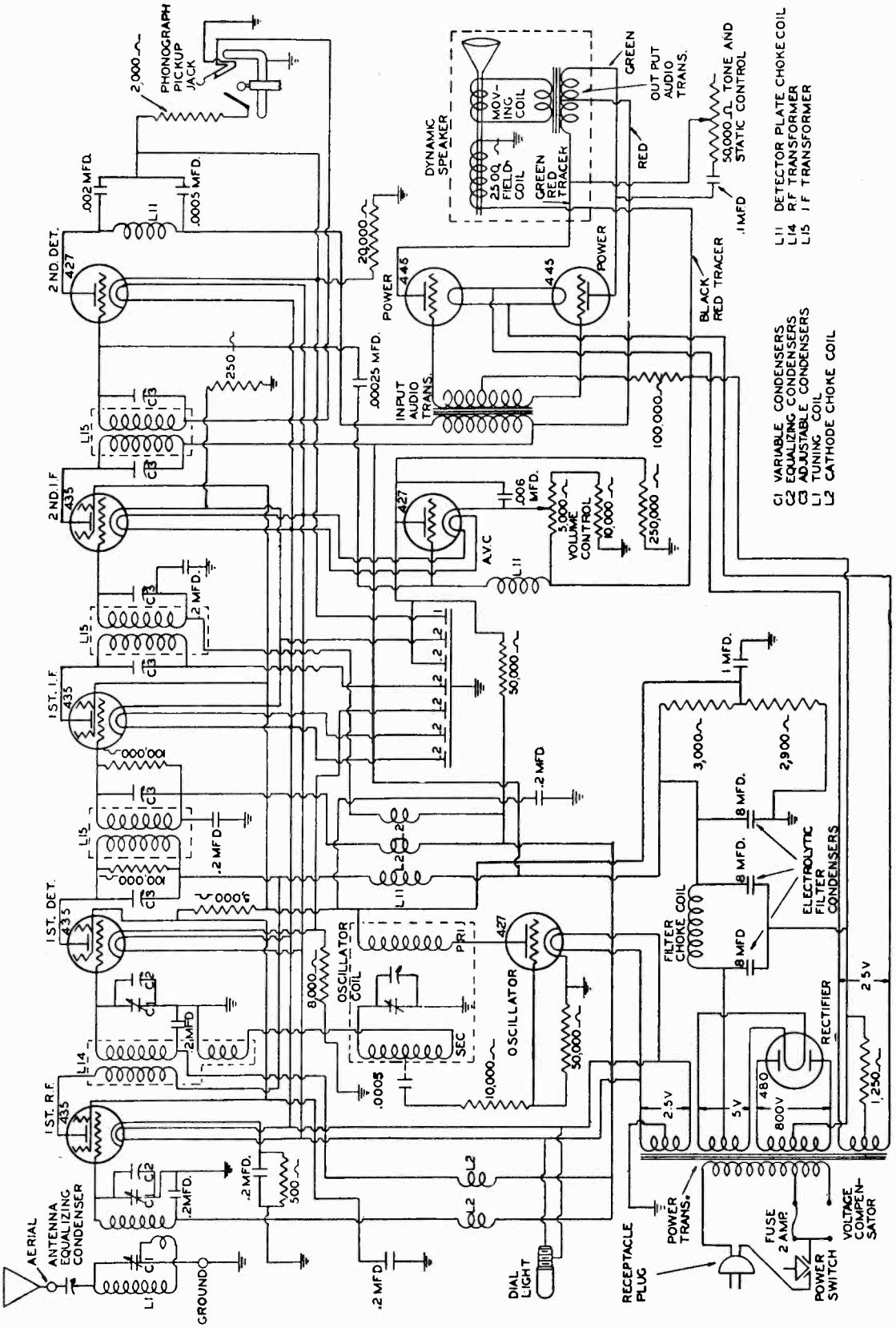
POLICE AUTOMOBILE RADIO



C3 ADJUSTABLE CONDENSERS
L1 TUNING COILS
L2 CATHODE COILS
L11 DETECTOR PLATE CHOKE
A B C AND D CONDENSERS IN ONE BLOCK

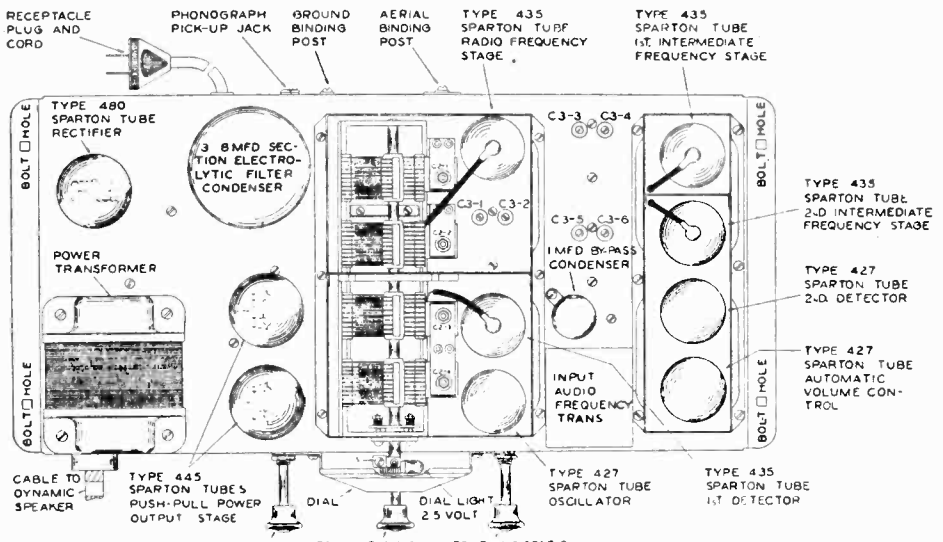
MODEL 25,26
Schematic

SPARKS WITHINGTON CO.



SPARKS WITHINGTON CO

MODEL 25,26
Chassis, Voltage



TOP VIEW OF MODEL 25 AND 26 CHASSIS

Voltage-Current Characteristics

Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

		OPERATING VOLTAGES				
Tube	Location	Heater or Filament	Plate	Control Grid—	Screen Grid+	Plate Current Mills.
435	1st R. F.	2.2 - 2.5	180 - 220	2.5 - 4	80 - 100	5 - 8
435	1st Det.	2.2 - 2.5	180 - 220	*6.4 - 14	80 - 100	*.8 - 1.8
435	1st I. F.	2.2 - 2.5	180 - 220	2.5 - 4	80 - 100	5 - 8
435	2nd I. F.	2.2 - 2.5	180 - 220	2.5 - 4	80 - 100	5 - 8
427	Oscillator	2.2 - 2.5	80 - 100	†	.....	‡
427	2nd Det.	2.2 - 2.5	170 - 205	14 - 20	.....	.7 - 1.0
427	A. V. C.	2.2 - 2.5	§	30 - 50	.....	Zero
445	Power	2.2 - 2.5	225 - 270	‖30 - 45	.....	20 - 30
445	Power	2.2 - 2.5	225 - 270	‖30 - 45	.....	20 - 30
480	Rectifier	4.2 - 5	360 - 440	.....	.....	48 - 58

* Remove oscillator tube.

† Tube generates own bias when oscillating

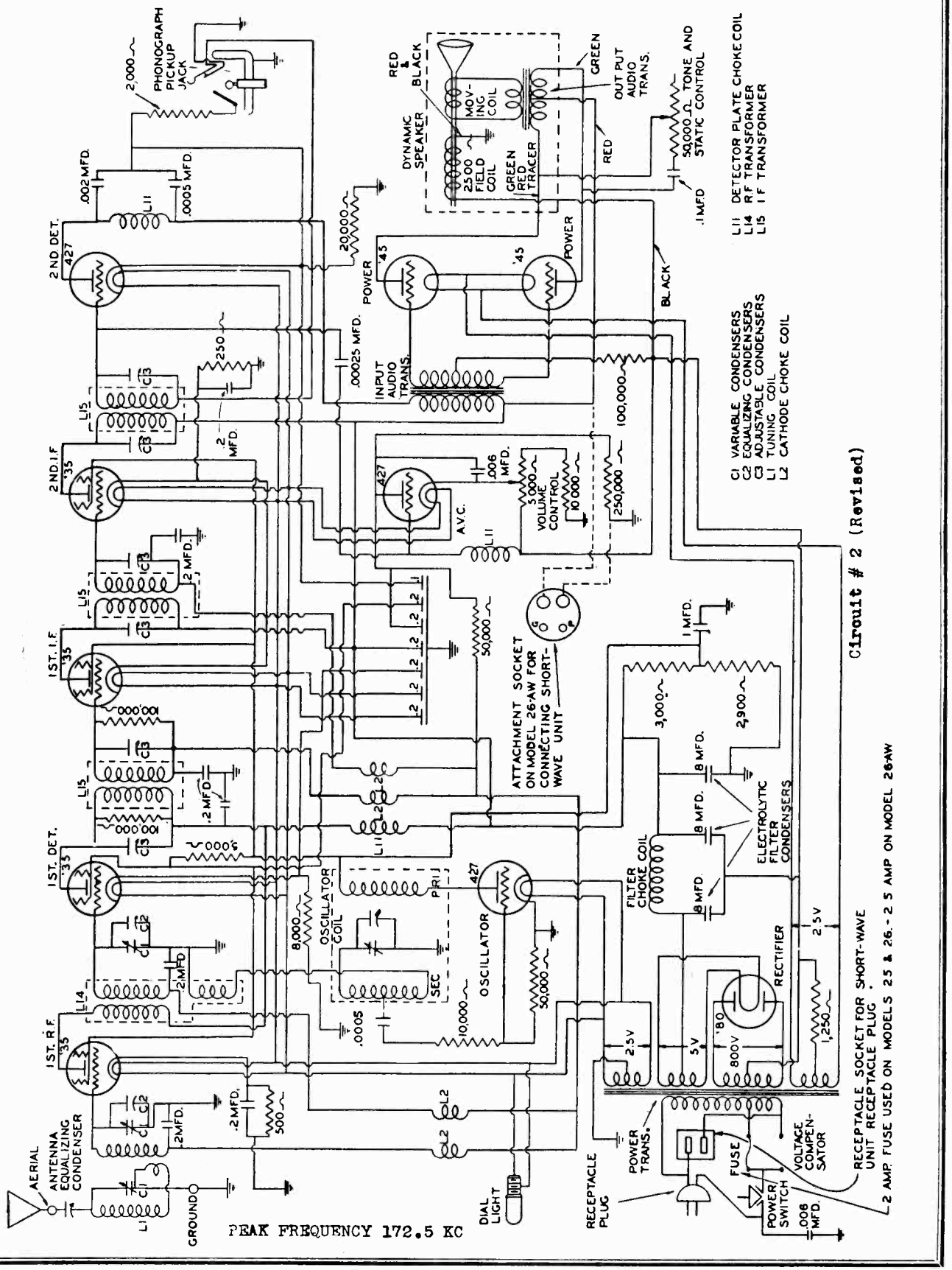
‖ Meter reading use 150 volt scale—true voltage 50-75—if lower scale voltmeter is used expect lower voltages.

§ Test from grid prong to ground approx. 125 volts.

‡ Test with plug in 2nd. Detector socket and tube in Analyzer.

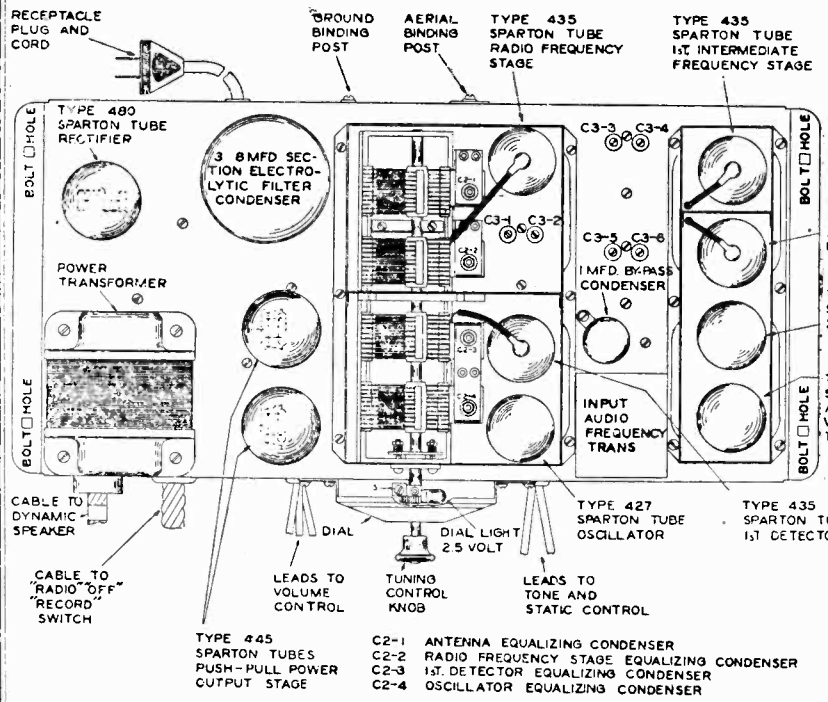
MODEL 26-AW
Circuit #2 (Revised)
Schematic

SPARKS WITHINGTON CO.



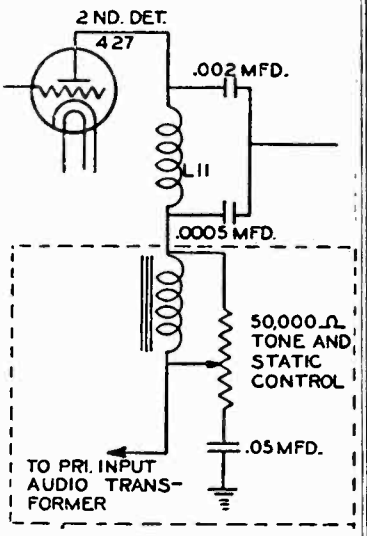
SPARKS WITHINGTON CO.

MODEL 30
Chassis
Voltage



TOP VIEW

SPARTON MODEL 30
ENSEMBLE



Schematic Diagram of Tone Control System used on a few of the first SPARTON Model 30.

Voltage-Current Characteristics

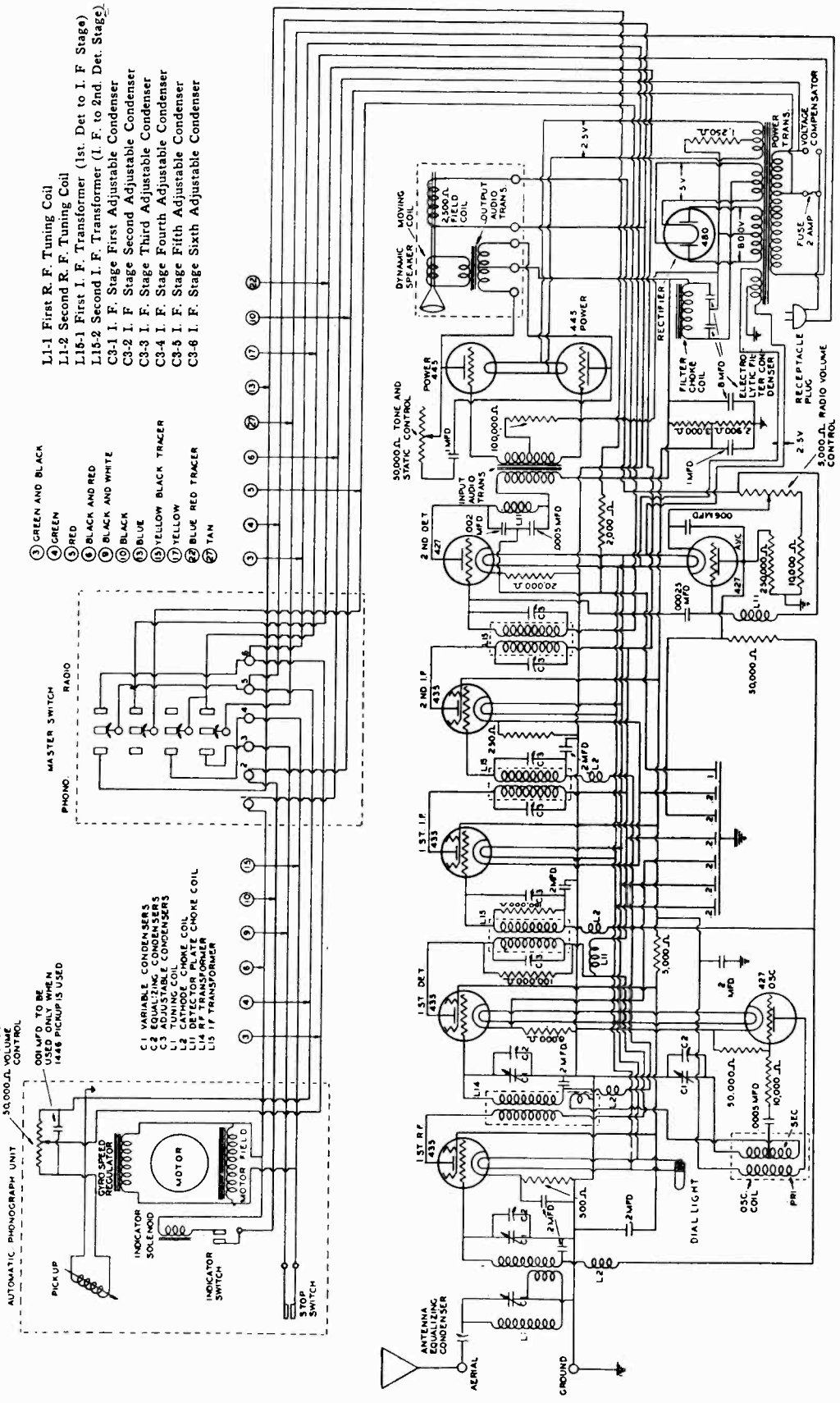
Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

		OPERATING VOLTAGES				
Tube	Location	Heater or Filament	Plate	Control Grid—	Screen Grid+	Plate Current Mills.
435	1st R. F.	2.2 - 2.5	180 - 220	2.5 4	80 - 100	5 - 8
435	1st Det.	2.2 - 2.5	180 - 220	*6.4 - 14	80 - 100	*.8 - 1.8
435	1st I. F.	2.2 - 2.5	180 - 220	2.5 - 4	80 - 100	5 - 8
435	2nd I. F.	2.2 - 2.5	180 - 220	2.5 - 4	80 - 100	5 - 8
427	Oscillator	2.2 - 2.5	80 - 100	†	.....	‡
427	2nd Det	2.2 - 2.5	170 - 205	14 - 20	.....	.7 - 1.0
427	A. V. C.	2.2 - 2.5	§	30 - 50	.....	Zero
445	Power	2.2 - 2.5	225 - 270	‖30 - 45	.....	20 - 30
445	Power	2.2 - 2.5	225 - 270	‖30 - 45	.....	20 - 30
480	Rectifier	4.2 - 5	360 - 440	.....	.....	48 - 58

* Remove oscillator tube.
† Tube generates own bias when oscillating.
‖ Meter reading use 150 volt scale—true voltage 50-75—If lower scale is used expect lower voltages.
§ Test from grid prong to ground approx. 125 volts.
‡ Test with plug in 2nd. Detector socket and tube in Analyzer.

MODEL 30
Schematic

SPARKS WITHINGTON CO.



Sparton Model 30
Radio Phonograph Combination

Service Data for Sparton Ensemble Model 30 Automatic Phonograph Mechanism

The automatic phonograph mechanism of the Model 30 SPARTON Ensemble consists of three principal divisions: The Power Source, the Tripping mechanism, and the Discard-Indicating mechanism. A description of the construction and function of each division is outlined in the following paragraphs.

POWER SOURCE

The Power Source consists of (Fig. 1) Motor 1321 mounted between Top Plate C-623 and Bottom Plate C-619, which are held parallel by (Fig. 2) Spreader 1261 and together by (Fig. 1) eight screws 1365. A worm in the Motor Shaft meshes with the Worm Gear, on the Turntable Shaft and causes the Turntable Shaft to revolve. A portion of this shaft protrudes below the Worm Gear Chamber. On this portion of the shaft (Fig. 2) Pinion 1207 turns freely. It is held in position by Thrust Washers bearing on the end of (Fig. 1) Sleeve 1255, on which Clutch Spool 1206 is mounted and held by Pin 1351. This pin holds the Sleeve integral with the shaft, but allows the Clutch Spool to travel up and down. The pin works in the Slot on the Clutch Spool. The Clutch Spool always revolves with the Turntable Shaft. Raising the Clutch Spool causes one of its three teeth to mesh with one of the two teeth in (Fig. 2) Pinion 1207, causing Pinion to turn with the Turntable Shaft. The teeth of this pinion mesh with the teeth in the (Fig. 1) Compound Intermediate Gear A-6138 causing it to revolve, then the teeth in the Compound Intermediate Gear mesh with the teeth of (Fig. 2) Cam B-3715 and causes the cam to revolve in a clockwise direction. The Compound Intermediate Gear and Cam are held in position by Pivot Studs in The Top Plate, and (Fig. 2) Pivot Bearings, 1262 which are adjustable, and locked into The Bottom Plate by means of Nut 733. These Pivot Bearings should be adjusted so the shafts turn freely, but do not move up and down. Cam B-3715 is the "heart" of the mechanism. All motions and power are derived from it, except the Power for (Fig 3) Turntable C-617-A which is revolved by (Fig. 1) Rubber Washer 1321-1 acting against Metal Washer 1321-2 which is driven by a pin through the top of the Turntable Shaft. The thrust from the Turntable Shaft is taken by (Fig. 1) Thrust Screw 1256-A, which is locked in position by Nut 773.

TRIPPING MECHANISM

When a record has been reproduced the needle in (Fig. 1) Pickup Unit A-6126 travels into the center of the record by means of the eccentric groove or the spiral groove depending upon the type of record. This motion is transmitted through Pickup Arm C-621 which is pivoted to (Fig. 3) Bracket 1269 by (Fig. 2) pivot screws 1270. (Fig. 3) Bracket 1269 is pivoted between the Top and Bottom Plates, at the top by (Fig. 2) Pivot Stud 1263 which is held in position by Top Support 1342-A and at the bottom by Pivot Bearing 1262. The motion of (Fig. 1) Pickup Unit A-6126 causes (Fig. 3) Bracket 1269 to move on a vertical axis. In case of Spiral Groove records (Fig. 2) Pawl Arm 1234 attached to Bracket 1269 moves in and out, causing Spiral Pawl 1245 to raise Trip Lever 1233. In case of Eccentric Groove records Eccentric Pawl 1246 raises Trip Lever 1233. This causes Throw-Out Lever 1275 to be released, allowing it to travel downward and act on (Fig. 1) Clutch Lever 1277-A which pivots on Stud 1467. This allows the forked end to travel upward, which causes Clutch Spool 1206 to also travel upward, and its lugs engage with the lugs on (Fig. 2) Driving Pinion 1207, causing Pinion 1207 to turn which turns Cam B-3715 through (Fig. 1) Compound Intermediate Gear A-6138. When the cam (Fig. 2) B-3715 has nearly completed its cycle the Lug on it passes under the cam surface of Throw-out Lever 1275, causing it to rise and be held in position by allowing the notch in Trip Lever 1233 to engage under the projection step in Throw-out Lever 1275. The Lug also prevents (Fig. 1) Clutch Lever 1277-A from rising. This holds Clutch Spool 1206 in mesh with (Fig. 2) Drive Pinion 1207 placing a strain on Spring 1366. When the Lug passes over the end of (Fig. 1) Clutch Lever 1277-A, the end snaps up, the forked end snaps down, and causes Clutch Spool 1206 to dis-engage from (Fig. 2) Pinion 1207. This stops the cycle operation.

MOVEMENT OF PICKUP

The (Fig. 1) Pick-up Unit A-6126 is moved by means of (Fig. 3) Follow Arm 1271 attached to (Fig. 1) Pick-up Unit Arm C-621 by (Fig. 3) Screws 13830-7 and 13830-9. The Follow Arm is moved by a Pin on the end of it which travels in a groove on the top of (Fig. 2) Cam B-3715. One quarter of the way around the top of the Cam there are two grooves. When the Pin is in the inner groove, the needle in (Fig. 1) Pick-up Unit A-6126 will lower at the starting position for 10" records. When the Pin is in the outer groove the Pick-up Unit will lower at the starting position for 12" records. Cam Track Switch 1266 (not shown) changes this pin into groove required. This is done by (Fig. 3) Switch Cam 1297 being raised up by Shift Lever 1303-A, which is pulled forward by Piston A-6136 in Solenoid A-6135-A which is energized by the Indicator Switch described in a subsequent discussion. When Switch Cam 1297 which is pivoted on Bracket 1357-A, is in contact with Finger 1303-A it causes the inner side of (Fig. 2) Cam B-3715 to rise, making it engage on lower lug of Cam Track Switch 1266 (not shown). This changes the position of the Cam Track Switch, causing the necessary movement for the Pick-up Unit to lower to the starting position for 12" records.

DISCARD-INDICATING MECHANISM

(Fig. 3) Lift Lever 1302-A attached to Shift Lever 1303-A; is caused to rise at each revolution of the (Fig. 2) Cam B-3715 by a roller acting on a perpendicular surface inside of the cam. If (Fig 3) Shift Lever 1303-A is in the proper position to raise Cam 1297 it also will cause end of Lift Lever 1302-A to rise under the low part of (Fig. 2) Roller Arm 1471, causing Roller 1243 to rise on largest perpendicular cam surface on Cam B-3715. This causes (Fig. 1) Discarder B-3711-AA to be pulled back into the proper position to discard 12" records. If (Fig. 3) Shift Lever 1303-A is not in the forward position, Lift Lever 1302-A does not come up under the low part of (Fig. 2) Roller Arm 1471 and the Roller travels around on the smaller perpendicular surface of Cam B-3715 and the (Fig 1) Discarder B-3711-AA stays at the proper position to discard 10" records. These two discarder motions are accomplished by the fork in (Fig. 2) Roller Arm 1471 engaging in the fork of (Fig. 1) Yoke 1238 which is attached to the top and bottom plate by (Fig. 2) Links 1217 and (Fig 1) 1440 so the entire Discard Mechanism B-3711-AA can travel back and forth being controlled by (Fig. 2) Roller Arm 1471, which acts on either of the two perpendicular cam surfaces on Cam B-3715. To (Fig. 1) Link Yoke 1238, Links 1225 are attached. These Links are also attached to Discard Arm B-3711 and Shoe 1226. This gives a parallel motion to the Discard Arm up and down. This movement is accomplished by (Fig. 2) Lift Lever 1224 acting on (Fig. 1) Shoe 1226, when (Fig. 2) Lever 1224 is raised and lowered. Lever 1224 is raised and lowered by Lever 1279-A which is acted upon by the stud in it being in contact with the bottom surface of Cam B-3715. The inward motion of the Discarder is caused by the tension of Spring 1370 and is stopped by Stop Stud 1379. This relieves the pressure of Roller 1243 and allows Roller Arm 1471 to drop from the 12" record position to the 10" record position when the Roller is at the neutral part of cam surface. To prevent this roller from dropping down at any other time, (Fig. 1) Roller Arm Holdup 1452 is made use of, because (Fig. 2) Roller Arm 1471 is always over the vertical leg of (Fig. 1) Hold-up Arm 1452 when it is acting on the 12" cam surface. Repeat Lever 1377 is used when the continuous playing of one record is desired. This Lever when moved in, comes under Link 1225, making it impossible for Discard Arm B-3711 to Lower to the position to discard a record. (Fig. 3) Rest Hook 1349 is made use of when loading records. When Follow-Arm 1271 is placed on this hook, (Fig. 3) Discard Hold-up B-3712 is brought over (Fig. 2) Lever 1279-A, preventing it from acting to lower (Fig. 1) Discard Mechanism and remains in this position until it is pushed out by the Lug on (Fig. 2) Cam B-3715. This is why the Pick-up Unit can be brought to the center of the record and tripped without discarding the record, thus enabling the needle to start in the proper position, according to the record that is to be reproduced.

When (Fig. 1) pick-up Unit A-6126 causes mechanism to trip and begin a cycle of operation due to motion transmitted through it via the spiral or eccentric groove of the record, it is immediately swung away from the center of the record and poised above the edge of the turntable.

At the same instant the pick-up Unit has

stopped in its travel away from the center of the record the Finger on (Fig. 2) Cam 1290 attached to the top of Cam B-3715 engages with indicator finger A-7639 attached to indicator unit shaft A-6002.

Cam B-3715 revolves further, exerts additional influence on the indicator finger causing the (Fig. 3) indicator C-620 and kick-off arm A-6117 attached to it to describe a half circle. Kick-off Arm A-6117-A pushes record to be discarded into the receiving compartment.

When the Kick-off Arm A-6117-A has swung through its arc of travel outward, Indicator Switch B-3710-AA rests on the top record of the group on the turn table. This switch reaches this position only when the arm has completed its arc of travel, and is not visible when the arm has reversed its direction of movement.

This is due to a sloping edge cut on the (Fig. 1) indicator shaft bushing A-6121 onto which the lower parallel arm of the indicator switch rides when the shaft turns as described.

When the roller of the indicator switch rides on a 10" record, the other roller attached to the other parallel arm, to which is also fastened another switch contact, does not rest on any surface and thus the switch remains unclosed.

When the switch sets on a 12" record both rollers rest on the record thus closing the switch. When this occurs, the closing of the switch energizes solenoid A-6135-A, which causes plunger A-6136 to be moved, which in turn actuates switch Cam 1297 attached to it.

The movement of switch Cam 1297 causes switch 1266 (not shown) to move the pin on the end of Follow Arm 1271 from the inner to the outer groove on (Fig. 2) Cam B-3715.

When this is done (Fig 1) Pick-up Unit A-6126 lowers at the position to start a 12" record.

Adjustments on the Model 30 Automatic Phonograph Mechanism

CAUTION—Be sure that you understand exactly what the trouble is with the mechanism before starting to repair it. Do not attempt to "doctor" or "experiment". Remember, the mechanism operated perfectly at the factory.

TO ADJUST MECHANISM SO (Fig. 1) PICK-UP UNIT A-6126 COMES DOWN IN THE PROPER PLACE, adjust (Fig. 3) Screws 13830-7 and 13830-8 in and out as required. Keep the front surface of Follow-Arm 1271 parallel.

TO MAKE (Fig. 3) STOP SWITCH 1412-AA CUT OFF AT THE PROPER PLACE which occurs when (Fig. 1) Pick-up Unit A-6126 drops to its lowest position with no record on the Turntable, adjust screws which hold (Fig. 3) Stop Switch 1412-AA by loosening or tightening the front screw and the holdout screw where the Stop Switch fastens to the top plate.

TO ADJUST MECHANISM SO NEEDLE TRIPS ON INNER CIRCLE OF COLUMBIA RECORDS adjust (Fig. 2) Pawl Arm 1234 by means of screws which attach it to Bracket 1269 so that Pawl Spiral 1245 trips on vertical part of Trip Lever 1233. Spiral Pawl 1245 should clear serrated surface on Trip Lever 1234 by about 1/32".

TO ADJUST (Fig. 1) CLUTCH LEVER 1277-A, loosen Stud 1467 which is in a slot on Bracket 1244, until upper end of Clutch Lever clears the Lug on Cam B-3715 by about 1/32" when Clutch Spool is up as far as it will go. If Clutch rattles or fails to operate properly, it is due to this adjustment. It is possible to change this adjustment by bending the lever, in cases where (Fig. 3) Stud 1467 is not in a slot.

TO ADJUST (Fig. 1) DISCARD ARM B-3711 FOR HEIGHT use set screw in (Fig. 2) Lever 1279-A. The discard arm should be adjusted so that 12" records just clear the top of (Fig. 1) Spindle A-6137-A when the Arm is in its highest upward position.

TO ADJUST (Fig. 3) DISCARD TONGUE A-6099-A, adjust screw A-1255-9. The proper distance for this adjustment is when Roller A-6082 rests on record, (Fig. 1) Discard Arm B-3711 is in the down position, and there is just room for the tongue to pass under a normal size record.

TO ADJUST (Fig. 1) DISCARD ARM B-3711 IN AND OUT adjust (Fig. 3) Discard Tongue A-6099-A so that it will just come down behind a record in its lowest position, using screws which hold Roller Bracket (Fig. 2) 1472-A to Roller Arm 1471.

IF MECHANISM TRIPS HARD, it is probably due to the fact that the notch in (Fig. 2) Trip Lever 1233 is not smooth or not machined at the correct angle. Also, it may be due to the fact that Spring 1366 has too much tension. Throw-out Lever 1275 should rise high enough when the Lug in Cam B-3715 is passing under it to allow the notch in Trip Lever 1233 to enter under the Lug on Lever 1275.

IF NEEDLE FAILS TO SLIDE FROM THE SMOOTH PART OF RECORD into the grooves it is probably due to the (Fig. 1) Pick-up Arm C-621 being tight or not properly adjusted. (Fig. 3) Bracket 1269 should be tilted toward the discard compartment at top, which gives a natural tendency for the (Fig. 1) Pick-up Unit A-6126 to swing toward the center of record. This can be effected by loosening screws which hold (Fig. 2) Top Bearing Plate 1342-A and moving the Plate to the proper position. If Pick-up Arm is then out of center with the hole, it can be readjusted by Pivot Screws 1270.

ADJUST POSITION OF (FIG. 1) KICK-OFF ARM A-6117-A.

When the Kick-off Arm is in a stationary position the finger on the end should clear a 12" record by about ⅛", when the record is being raised from the turntable as shown in Fig. 1.

The position of the Kick-off Arm is regulated by (Fig. 2) finger A-7639 bearing araginst Cam A-6122. This finger is adjusted by the adjusting screws in adjujsting block A-7637. The adjusting block is fastened to spindle A-6022 by set screw 1371.

HEIGHT OF (FIG. 1) GUIDE RAIL B-3709-A. The height is regulated by the position of nuts A-47-N.

ALWAYS BE SURE THAT THE TURNTABLE IS OPERATING AT 78 R.P.M. Often apparent trouble is due to improper speed that the turntable is set to run. If a speed indicator is not available, the speed of the turntable can be ascertained by placing a strip of paper underneath a record in playing position, so it will project just beyond the edge of the turntable. By placing the finger where the paper will strike it the number of revolutions per minute can be counted. Be sure to have the record playing, so the retarding action of the needle on the record will be taken into account while you are counting the revolutions. To regulate the speed of the motor, adjust the speed control lever which extends from beneath the record turntable. The movement of this control lever to the front will decrease the speed of the motor. Vary the setting of this lever until the paper touches the finger seventy-eight (78) times; while the second hand of a watch makes one complete revolution. The speed of the turntable has been properly adjusted at the factory for normal record reproduction, and under normal conditions should require no further adjustment.

BE SURE THAT ALL JOINTS OPERATE FREELY AND SMOOTHLY. A little oil in all joints and wearing surfaces will insure this condition.

BE SURE THAT ENSEMBLE IS STANDING REASONABLY LEVEL.

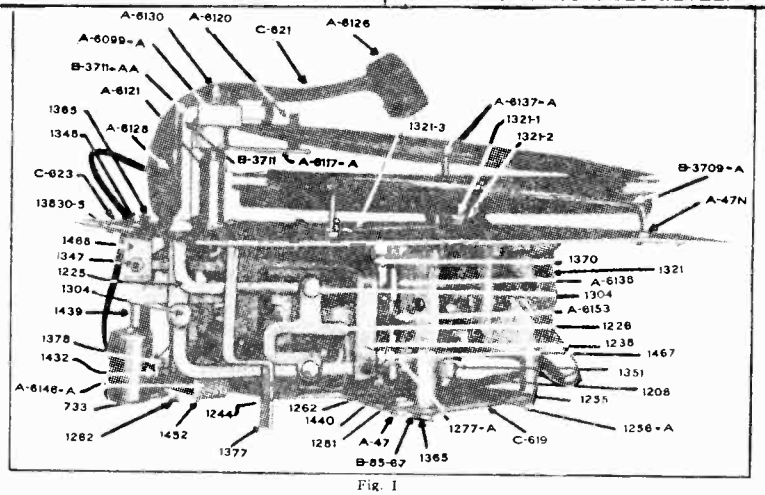


Fig. 1

SPARKS WITHINGTON CO.

MODEL 30
Parts List

SPARTON ENSEMBLE MODEL 30

RECEIVING UNIT PARTS

Description	Part No.
Antenna Terminal and Insulation Assembly	A-6898
Body Complete—Amplifier	B-3627
Body Complete—Selector Assembly Top	B-3623
Bracket—Base Mounting	A-6718
Bracket—Dial Drive Support	B-4109
Bracket—2 Mfd. Condenser	A-7499
Bulb—Dial Light	A-5058
Chassis Less Tubes 25 Cycle	D-327
Chassis—Less Tubes 60 Cycle	D-326
Clamp—Cable 1/32" Radius	A-5215
Clamp—Cable 3/16" Radius	A-2251
Clip—Fuse	A-4983
Choke Coil—Cathode	A-7209
Choke Coil—Detector Plate	A-7297
Choke Coil—Filter	B-3429
Choke Coil—Tone Control	A-6862
Coil—Oscillator	A-6873
Coil—Tuning No. 1	A-6791
Coil—Tuning No. 2	A-6794
Condenser Frame and Anchor Plate Insulation	B-4021
Condenser—Double Equalizing	A-7054
Condenser—I. F. Adjustable and Bracket	A-7097
Condenser—Rotor Assembly	B-3648
Condenser—Single Equalizing	A-2053
Condenser Stator Assembly No. 1, 2, and 4	A-6582
Condenser Stator Assembly No. 3	A-6581
Condenser—.1 Mfd.	A-7475
Condenser—.2 Mfd. Cub	A-7005
Condenser—.2 Mfd. with Cap	A-4998
Condenser—.2 Mfd. Less Cap	A-7094
Condenser—.05 Mfd.	A-6927
Condenser—.002 Mfd.	A-7038-3
Condenser—.006 Mfd.	A-4434
Condenser—.0005 Mfd.	A-7038-1
Condenser—.00025 Mfd.	A-5175
Condenser—1 Mfd.	A-5032
Condenser—8 Mfd. Electrolytic	A-6884
Condenser—Block 7 Lead	B-4107
Contact—Rotor Shaft Center	A-5814
Contact—Rotor Shaft Front	A-5308
Contact—Rotor Shaft Rear	A-4317
Cotter Key—Drive Shaft	A-7130
Cover—Amplifier Body	B-3625
Cover—Bottom	B-4084
Cover—Electrolytic Condenser Assembly	A-6715
Cover—Selector Body	B-3621
Cushion—Rubber Mounting	A-6967
Dial Control Assembly	A-7070
Drive Disc and Light Shield Assembly	A-7166
Fuse—1½ Ampere	A-4980-4

RECEIVING UNIT PARTS (Continued)

Description	Part No.
Grommet—Rubber	A-5183
Insulation—Filter Condenser	A-7264-A
Insulation—Phonograph Volume Control	A-6970
Insulation—1st I. F. Transformer Shield	A-7445
Kilocycle Scale and Support	B-4120
Lug—I. F. Transformer Soldering	A-3737
Lug—Rivet Soldering	A-1866
Lug—Screw Soldering	A-1865
Nut—Equalizing Condenser	A-2269
Plate—Condenser Bearing	A-4226
Plate—Clamping	A-3799-A
Plate and Double Terminal	A-7051
Plate—Filter Condenser Mounting	A-6705
Plate—6 Point Resistor and Condenser	A-7055
Plate—Rotor Shaft Thrust	A-4310-A
Plate—Stator Clamping	A-5751
Pointer—Dial	A-7113
Receptacle Cord and Plug	A-6743
Resistor and Condenser Assembly	B-4259
Resistor—200 Ohm	B-4114-11
Resistor—250 Ohm	B-4114-3
Resistor—1250 Ohm	A-7018
Resistor—500 Ohm	B-4114-1
Resistor—2,000 Ohm	B-4114-6
Resistor—5,000 Ohm	B-4114-20
Resistor—8,000 Ohm	B-4114-2
Resistor—10,000 Ohm .5 Watt	B-4114-7
Resistor—10,000 Ohm 3 Watt	B-4114-5
Resistor—20,000 Ohm	B-4114-14
Resistor—50,000 Ohm	B-4114-12
Resistor—100,000 Ohm	B-4114-10
Resistor—2,900-3,000 Ohm	A-6619
Resistor—250,000 Ohm	B-4114-4
Screw—Aerial and Ground Binding Post	A-6575
Screw—Equalizing Condenser	A-3525
Screw—I. F. Adjustable Condenser	A-7692
Selector Assembly	C-687
Shaft—Drive and Spring	A-7165
Shaft—Drive and Washer	A-7058
Shield—Input Transformer	A-7680
Shield—Condenser Rear Stator	A-6767
Shield—Coil Copper Selector Assembly	B-3602
Shield—I. F. Adjustable Condensers	A-7211
Shield—I. F. Transformer Bottom	A-6600
Spacer Bushing—6 x 1⅞	A-6731
Spacer Bushing—¼ x 7/32	A-7040
Spacer Bushing—¼ x ⅝	A-3725
Spring—Drive	A-7112

MODEL 30
Chassis Views

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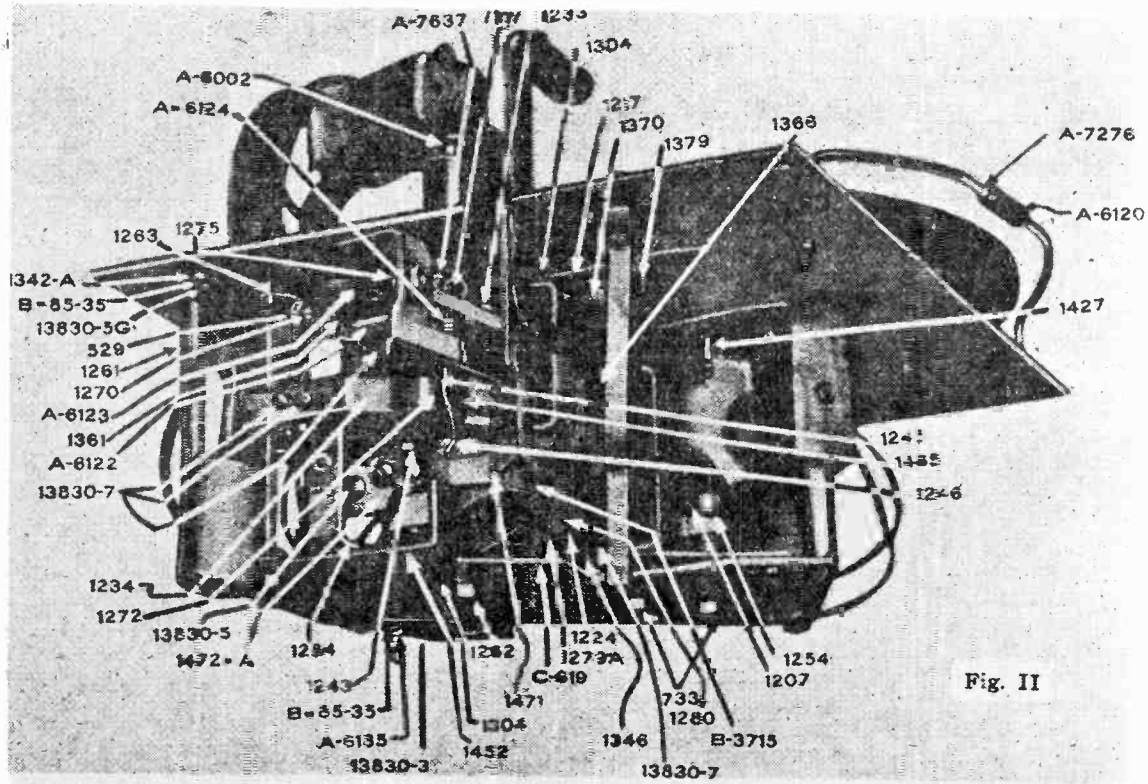


Fig. II

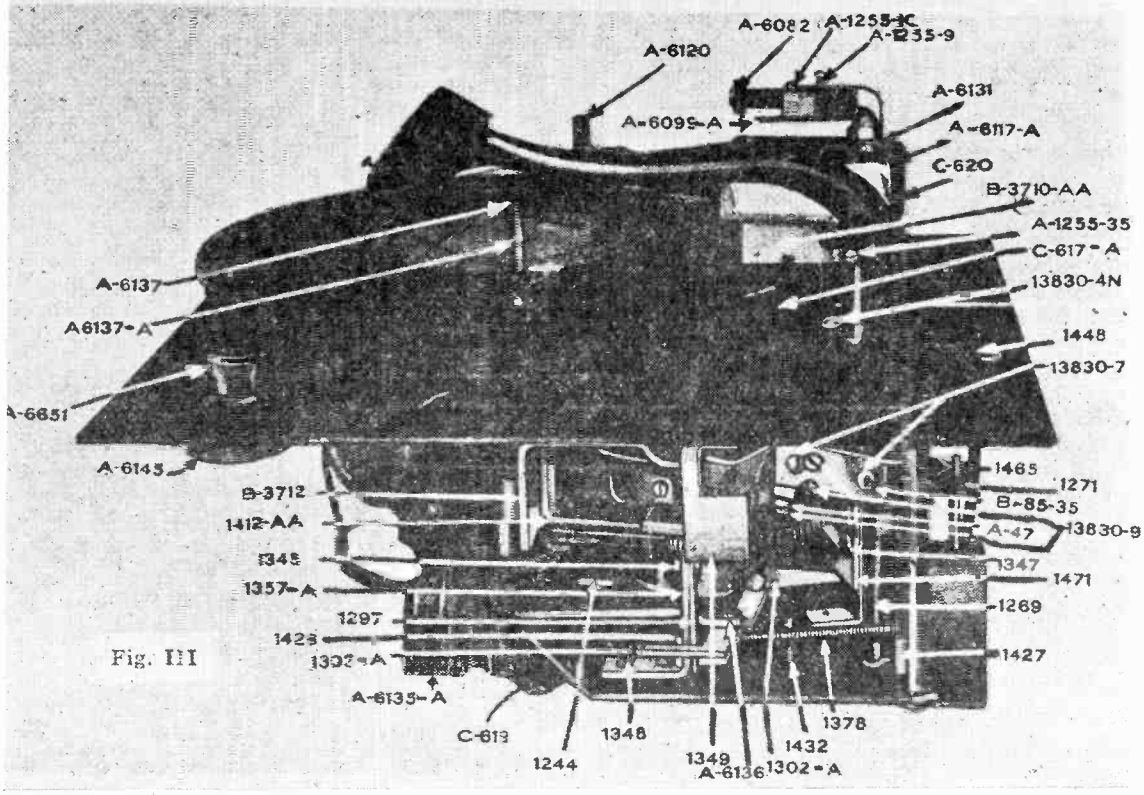
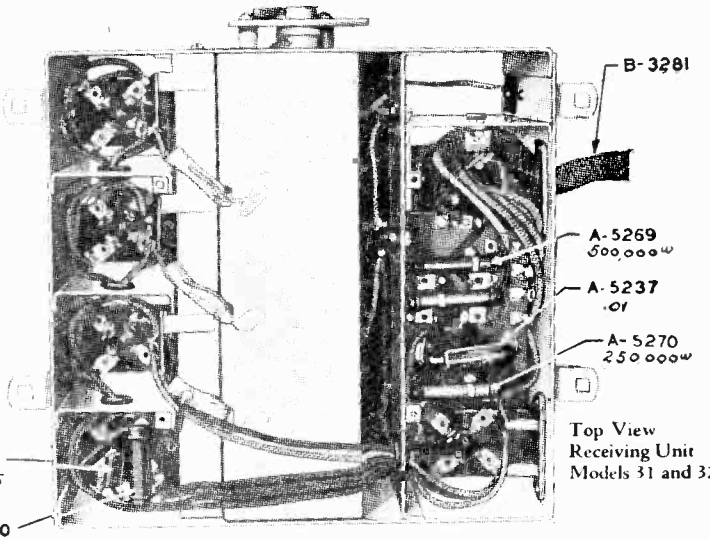
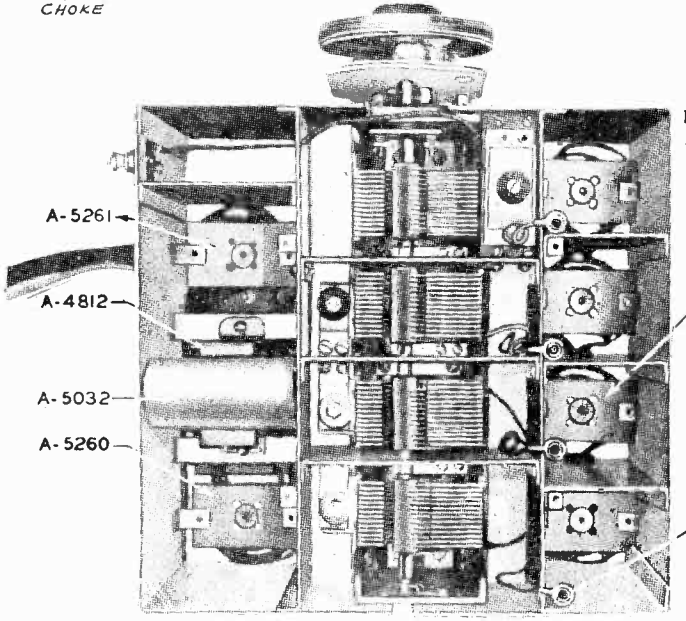


Fig. III

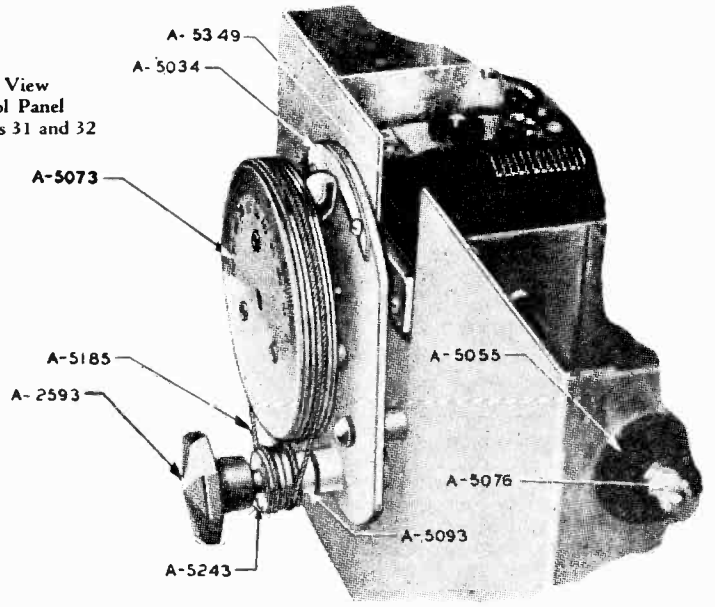


Top View
Receiving Unit
Models 31 and 32

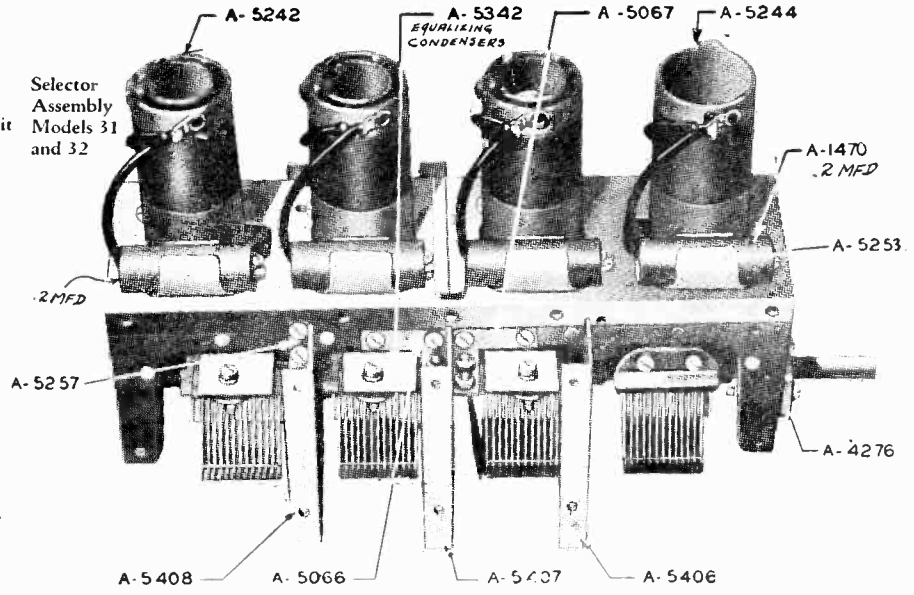


Bottom View
Receiving Unit
Models 31
and 32

Inside View
Control Panel
Models 31 and 32



Selector
Assembly
Models 31
and 32



MODEL 31,32
Chassis Views

Service Data for Sparton Ensemble Model 35 Automatic Phonograph Mechanism

GENERAL OPERATION

At the completion of the reproduction portion of a record, the needle moves into the groove in the center of the record. The first oscillatory movement of the needle on an eccentric groove record, or the feed-in movement on a spiral groove record trips Trip Lever 814, *figure 1*.

Dog 813 *figure 2* for eccentric groove records and Spiral Trip Dog 533 for spiral groove records is attached to Pick-up Arm Lever 811 by means of Adjusting Stud 860 and Adjustment for Pick-up Lever 812. Pick-up Arm Lever 811 is attached to Pick-up Unit 904 *figure 3* by means of Yoke 867 and Pick-up Arm 866 which is connected to Bracket 810 *figure 4*, onto which Pick-up Arm Lever 811 *figure 2* is attached by means of two screws 155 *figure 4*. This whole device is allowed to swing from right to left due to its attachment to Standard 788 by the Dog Point Set Screws 823 which fit into the Bearing in Bracket 810.

When Trip Lever 814 *figure 1* is tripped, it allows Throwout Lever 822 to drop, and this causes Clutch Lever 816-C to push Clutch 526 into the Pins of Clutch Collar 527-C which is revolving; acting through Worm Gear 514-C which is driven by the Worm in Drive Shaft 793 connected to Motor by means of Drive Spring 877. The connecting of this Clutch causes worm shaft 524-C[1] which is meshed with Cam Worm Gear 528[2] to cause Cam 789 to revolve and lower the Turntable to the "swing back" elevation. This is accomplished by Lift Lever 817 *figure 2* which is operated by Cam 789 *figure 1* acting on the bottom of Turntable Shaft 507-C, through Turntable Lift 516 *figure 2* and Adjustment 818 to which the Turntable Shaft is attached.

Turntable 510-C[3] *figure 1* is driven in a clockwise motion by means of Worm Gear 553-C (not shown), which is meshed with Drive Shaft 793. This Worm Gear is provided with inside lugs which fit into the grooves in Turntable Shaft 507-C[4] and allows the Shaft to raise up and down without interfering with its turning motion

DISCARD POSITION OF TURNTABLE

Returning to the action of Cam 789 *figure 1* as it rotates further, Turntable 510-C[3] drops to the discard position, allowing the record to come in contact with Discard Rubber 650 *figure 4*. This raises the record above Receiving Stud 508 *figure 3* and the rotation of Turntable 510-C[3] then causes the record to be discarded into the Receiving Compartment.

"SWING BACK" OF PICKUP UNIT

Before the Cam 789 *figure 1* allows the Turntable to be moved into the discard elevation, and while the Turntable is still in the "swing back" elevation, the Pick-up Unit is swung away from the record by means of Index Lever 815 *figure 2* which is connected to the Pick-up Arm through Pick-up Arm Lever 811. The inner end of the slot in Index Lever 815 acts on Pin 763 *figure 1* that revolves with the Cam in a clockwise motion. It is through this means that the Pick-up is swung away from the record.

SLIDE MOVEMENT FOR 10" RECORDS

When Cam 789 *figure 1* starts to revolve, Eject Arm 790 *figure 2* also starts to revolve as it is driven by Dog 522. Roller 552 attached to Eject Arm 790, travels in the slot in Drive Lever 550 and causes it to move from the left to right, which moves Eject Slide 835-C and brings the center of the record over Receiving Pin 508 *figure 3* in Turntable 510-C[3]. This motion is caused by Drive Lever 550 *figure 2* acting through Link 852 attached to Lever 865 which is pinned to Shaft 558 connected to Top Lever 853-C which acts on Transverse Lever 854-C through Link 856. The Transverse Lever is connected to the twelve inch record Regulating Lever 859 which is fastened to Eject Slide 835-C by means of the Stud in the "L" shaped slot. This Stud remains in the "L" end of Lever 859 and allows Slide 835-C to place a ten inch record in the proper position over Receiving Stud 508 *figure 3*

SLIDE MOVEMENT FOR 12" RECORDS

In case a twelve inch record is on the Slide, Centering Lever 850-C *figure 4* is pushed out by the record to a position where its tail end trips the twelve inch Regulating Lever 859 *figure 2*. Eject Slide 835-C moves forward, causing the Stud to leave the "L" end of the slot in Lever 859 allowing Eject Slide 835-C to travel just far enough to place a twelve inch record over Receiving Stud 508 *figure 3*.

Ten or twelve inch records can be used without discrimination. The engagement of the needle on ten or twelve inch records is controlled by Engaging Regulator Weight 872 *figure 4* acting on Cable 900 which is attached to Index Lever 815 *figure 2*. When the Weight is allowed to act, Index Lever 815 is pulled over and the long slot engages on Pin 763 *figure 1* causing the Pick-up Unit to swing into the proper place to engage on a 12" record. If Regulator Weight 872 *figure 4* is not allowed to act, Index Lever 815 *figure 2* is carried over by means of Drag Link 530 *figure 1* so that the short notch engages on Pin 763 and the needle engages at the proper place to start a 10" record. Whether or not the Weight 872 *figure 4* is allowed to act depends on Shaft 824 which, when underWeight 872, keeps the Weight from acting. Shaft 824 is controlled by Engaging Regulator Arm 787.

When a 12" record is fed out, Centering Lever 850-C *figure 4* is pushed out. The Finger on it carries Arm 787 out with it, swinging end of Shaft 824 from under Weight 872, allowing 872 to act. Shaft 824 will remain in this position until a 10" record is fed out of the Hopper. Thus, a 12" record may be repeated on the Turntable as many times as desired. When a 10" record is fed out of the Hopper, Eject Slide 835-C *figure 2* goes out farther over the Turntable, allowing Pin 887 to come in contact with Arm 787 causing it to move so that Shaft 824 takes a position under Weight 872 and prevents it from acting. This position will be held until a 12" record is fed out of the Hopper, thus, a 10" Record will continue to repeat until the position of Shaft 824 is changed.

RECEIVING POSITION OF TURNTABLE

Again returning to the motion of Cam 789 *figure 1* further rotation of this Cam causes the Turntable to rise to receiving elevation in time to receive the record which has been moved to the positions just described. The Turntable remains in this position while the Cam rotates further, allowing Roller 552 *figure 2* which is attached to Eject Arm 790, to travel in the slot in Drive Lever 550 and return Eject Slide 835-C to its original position. As soon as Eject Slide 835-C has returned to this position, Cam 789 *figure 1* has revolved to a position where it allows the Turntable to drop to the "swing in" elevation.

"SWING IN" MOVEMENT OF PICK-UP UNIT

At this time Pin 763 *figure 1* has revolved far enough to connect with either the ten or twelve inch notch in Index Lever 815 *figure 2*. Its further revolution causes the Pick-up to swing in over the record so the Needle rests on the smooth part of the record as the Turntable is raised to reproducing elevation by means of Cam 789 *figure 1*. Regulating Weight Lever 872 *figure 4* on Standard 788 now causes the Pick-up to move over from the smooth part of the record to the first reproducing groove. Reproduction of the record begins at once.

COCKING MECHANISM AND STOPPING CYCLE OF CAM

When the Pick-up Unit first swings away from the record, Pick-up Arm Lever 811 *figure 2* passes under the tail of Throwout Lever 822 *figure 1*, causing it to rise to a position where the notch in Trip Lever 814 is allowed to enter its proper place under the lug in Throw-out Lever 822, holding Throwout Lever 822 in this

Parts Lists Numbers: [1]524, [2]1026, [3]B-3700, [4]A-6000

(Continued)

position after the Pick-up Arm Lever 811 *figure 2* no longer supports it. When the Throwout Lever is raised to this position, a spring tension is created which pulls on Clutch Lever 816-C *figure 1* attempting to pull back and open Clutch 526 but Clutch Lever 816-C is held in the engaging position by means of Control Disc 864-C until the Cam has completed its entire revolution when a notch in the Control Disc allows the Clutch Lever to follow the urge of the spring and disengage the Clutch.

REPEATING

In case it is desired to play the same record over, the repeat Button *figure 5* is moved to the left. This moves Repeat Lever 809 *figure 2* causing it to press against Drive Dog 522 causing the Dog to recede and not catch on Eject Drive Arm 790. Eject Drive Arm 790 remains stationary and the Eject Slide does not move. The Cam revolves and the Turntable goes through all of the elevating positions except the discard elevation. Eject Arm 790 does not allow Roller 845 to drop to the discard elevation in Cam 789 *figure 1*, thus the record will be repeated until the Repeat Lever is moved to the right.

CONTROL OF RECORDS

When Eject Slide 835-C *figure 4* comes forward, the bottom record is caught between the "V" shaped plates 836 and 837 *figure 3* which brings the bottom record forward with the Slide. The other records slide over the top of these "V" shaped plates and remain in the Hopper. Only the bottom record is allowed to come out of the Hopper onto the Turntable. Other records are prevented from coming out by means of the two Admitters 819-C which are devised so they gauge themselves according to the thickness of the record. Thick, thin or warped records are fed out through the action of the admitters without injury to the records or mechanism. The admitters are held down against the record by means of springs and are adjusted by Screws 902. Back Stops 871 prevent records from sliding too far back in Hopper.

If a ten inch record is on the bottom and is not in the center, it is forced into the center by the two Centering Levers 850-C *figure 4* and 848-C *figure 3* which are held in position under tension by Springs 569 *figure 4* and 565 *figure 3*. These Springs are right and left hand and are attached to bushings in Studs, which have right and left hand threads and have a tendency to keep the spring from unscrewing the studs and nuts which hold them.

These Springs hold the Centering Lever against the Stop Pins which are set so that they hold the Centering Levers just the right distance to allow a 10" record to pass through with a slight amount of tension. In case a 12" record is on the bottom, these Springs are allowed to open up and the Centering Lever 850-C *figure 4* acts to trip the mechanism as described under the paragraph about Slide Movement for 12" records.

THE STARTING BUTTON

In starting or rejecting records, the Starting Button *figure 5* is pressed. When this Button is pressed slightly, it causes the contacts in switch 897-A *figure 2* to be spread apart which changes the fields in the motor from a series connection to a parallel connection for a greater starting torque. Pressing down further causes Lever 662 *figure 2* to act against Throwout Lever Trip 814 and trip mechanism which discards the record. This is the same action as though it were tripped with the Dogs 813 or 814.

THE CLUTCH SWITCH

Clutch Switch 896-A on Bracket 876 *figure 1* is operated by Clutch Lever 816-C by means of a fibre switch Opener, the purpose of this switch is to allow switch 898-A *figure 4* to be opened when the Clutch is engaged and the Cam is in motion. This carries the current whenever Clutch is in motion and the Pick-up Unit is not resting on a Record.

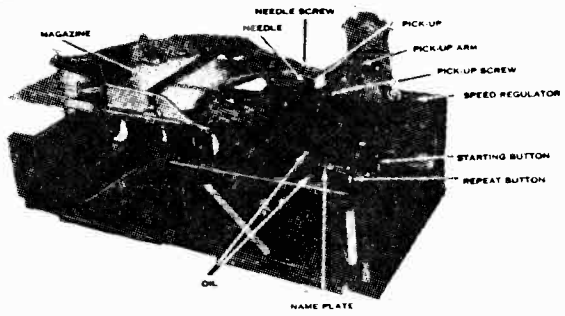


FIGURE 5

THE PICK-UP UNIT SWITCH

Pick-up Switch 898-A *figure 4* is attached to the back of Standard 788. When the Pick-up is not resting on a record, the Pick-up Arm drops down, swiveling at Trunnion Pin 641, *figure 3*. This allows the Brake Shoe on Pick-up Arm 866 to rise and press against Cork Insert 623 *figure 4* which is in the Brake Adjustment 585. This retards the Swinging action of the Pick-up and allows it to move only when forced by Index Lever 815 *figure 2*. This Brake Adjustment 585 can be regulated to bring the Pick-up to the height desired and is locked in place by a nut.

Through the center of Brake Adjustment 585 is a Fibre Rod 590 *figure 4* which also rests on Brake Shoe 974 and is raised whenever the Brake is closed. The upper end of this acts on the Contact Spring in Switch 898-A and causes it to open the Switch and break the entire circuit, acting the same as the Clutch Switch in parallel with it. With both of these switches open, the power supply is entirely cut off. Also, when this switch is open a contact is formed with the upper part of the Switch which cuts out Speed Regulating Rheostat No. 544 *figure 2* and allows the full power to be used while the Cam is in the operating cycle.

Lubrication on the Sparton Ensemble Model 35 Automatic Phonograph Mechanism

The Model 35 automatic phonograph mechanism is thoroughly lubricated at the factory when assembled and requires no oiling or greasing except as noted in this section.

THE ELECTRIC MOTOR ARMATURE SHAFT BEARINGS. Oil once every six months. Use nothing but light fine oil. Located on the upper side of the motor board *figure 5* are two (2) pipe plugs marked "OIL." Remove these plugs and inject a quantity of oil in the tubes under them. This lubricates both armature shaft bearings. The wick type oil wells used on the bearings keep the bearings well lubricated for a six (6) months period of normal operation.

KNUCKLES, JOINTS AND BEARINGS. Oil once every six (6) months. Use nothing but light fine oil.

AUTOMATIC MECHANISM GEARS AND BEARINGS. Grease once every year. Use nothing but a good grade of grease of about the consistency of vaseline, mixed with graphite if possible. In the main body casting, housing the turntable shaft and worm gears two (2) pipe (2) pipe plugs 687 *figure 4* marked "Grease." Remove these Plugs and inject a small quantity of grease in the openings.

Adjustments on the Sparton Ensemble Model 35 Automatic Phonograph Mechanism

ADMITTERS 819-C FIGURE 3. Use Adjusting Screw 902. Turning this screw in a clockwise direction raises the end of the admitter higher. The height of the admitter should be just enough to touch a record on the Eject Slide 835-C *figure* 2 when the slide is out.

ALIGNMENT OF MOTOR DRIVE SPRING 877, FIGURE 1 WITH DRIVE SHAFT 793. Two adjustments are provided for this purpose, one for aligning the spring if it is horizontally off center with the drive shaft and the other for alignment if the spring is vertically off center.

To align the spring if horizontally off center loosen the four collars (see 574-C, *figure 1*) on Screw Studs 797. This will then allow either side of Motor 895-C to be moved back or forth on the studs as the case demands. To align the spring if off center vertically, the Hex. nut on Stud 799 should be loosened or tightened depending upon whether the motor is to be tipped up or down.

PICKUP UNIT TO STRIKE AT PROPER PLACE ON RECORD. Use adjusting Screw 535 *figure 2*. The needle in the Pickup Unit should strike about 1/8 inch in from the outside edge of the record.

PICKUP UNIT TO TRIP MECHANISM ON SPIRAL GROOVE RECORD. Use adjusting Screw 812, *figure 2*. The mechanism should trip on a Columbia record with a 3 5/8 inch diameter inner circle when the needle has followed the spiral groove to within 1/16 inch of the groove's maximum inward travel.

PICKUP UNIT TO TRIP MECHANISM ON ECCENTRIC GROOVE RECORD. Use Adjusting Screw 860, *figure 2*. The tip of eccentric trip Dog 813 should be 1/32 inch above trip lever 814 before it starts to travel in under this lever.

THE NEEDLE ENGAGING REGULATOR SHAFT 824. Loosen Set Screw in Arm 787, *figure 4*, and move Shaft 824 to the required position. When a 10" record is on the turn-table being reproduced, Shaft 824 should be under Weight 872.

THE HEIGHT OF NEEDLE ABOVE RECORD. Use Adjusting Screw 585, *figure 4*. This adjustment should be made immediately after the pickup unit has swung in and just before the turn-table rises. When the turn-table is in this position the needle should be 1/8 inch above the record.

THE HEIGHT OF THE TURN-TABLE. Use Adjusting Screws 818, *figure 2*. The height of the turn-table should be 2 1/8 inches from top of motor board to top of turn-table when the turn-table is in the record receiving, or highest, position.

FORWARD STOP OF EJECT SLIDE. Use the screw in Top Lever 853-C, *figure 4*. The Eject Slide should carry out a 10 inch Victor record to a distance where the tip of Receiving Stud 508, *figure 3*, enters the hole in the record at the front side of the hole. If a 10" Columbia record is used to make this adjustment, the stud should enter the hole in the record at the rear side.

END PLAY IN CAM WORM SHAFT 524-C, FIGURE 1. Use Adjusting Screw 525-C. The end play in this shaft should be just enough to be detected when shaft is moved back and forth by hand. If end play is too great, the clutch will remain engaged and the mechanism will not automatically stop when the last record has been reproduced.

PICKUP SWITCH 898-A, FIGURE 4. This switch is adjusted by loosening the two screws turntable shaft and worm gears are located two by which it is fastened to standard 788, and moving it up or down so the contacts will close when the pickup unit is on a record in reproducing position.

CLUTCH SWITCH 896-A, FIGURE 1. This switch is adjusted by loosening the two screws which hold Bracket 876 to the body casting and moving the bracket one way or the other so the contacts will close when clutch 526 is in gear. Clutch 526 is placed in gear immediately after a record has been discarded automatically or manually.

END PLAY IN DRIVE SHAFT 793, FIGURE 1. Use Adjusting Screw 706-C, *figure 4*. The end play in this shaft should be just enough to be detected when shaft is moved back and forth by hand. If end play is too great, the reproduction of a record will have a wavering effect.

SPRING TENSION ON CENTERING LEVER 848-C and 850-C, FIGURE 4 and 3, RESPECTIVELY. Use Adjusting Screws 847 and 849, *figure 4*. The spring tension on these levers must be equal and sufficient to hold the center of a record in a line with Receiving Stud 508, *figure 3*. If the tension is insufficient or unequal, Eject Slide 835-C, *figure* 2, will not center the record over turn-table 510-C. Loosen these screws and turn them to the right or left to increase or decrease tension as the case demands.

(Continued)

SPARKS WITHINGTON CO.

MODEL 35
Chassis Views

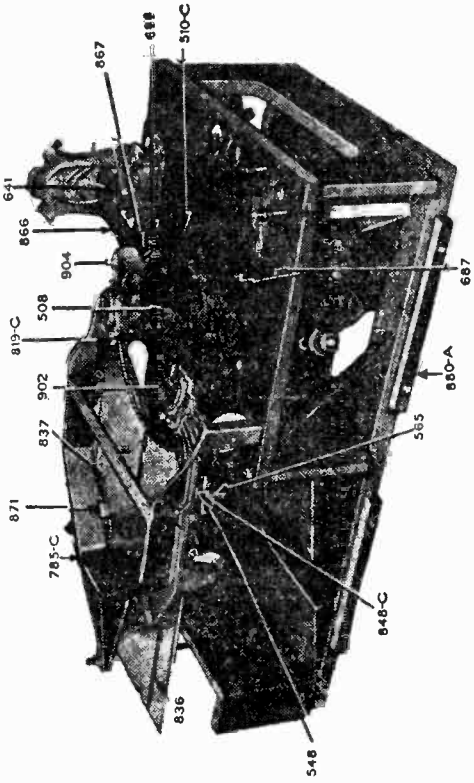


FIGURE 3

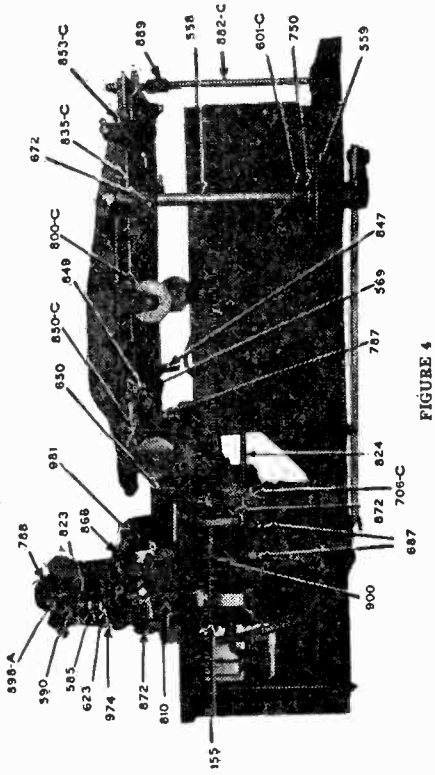


FIGURE 4

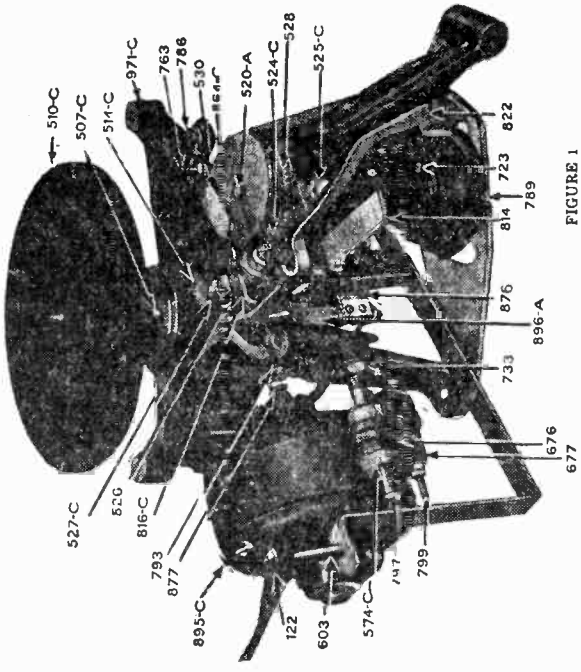


FIGURE 1

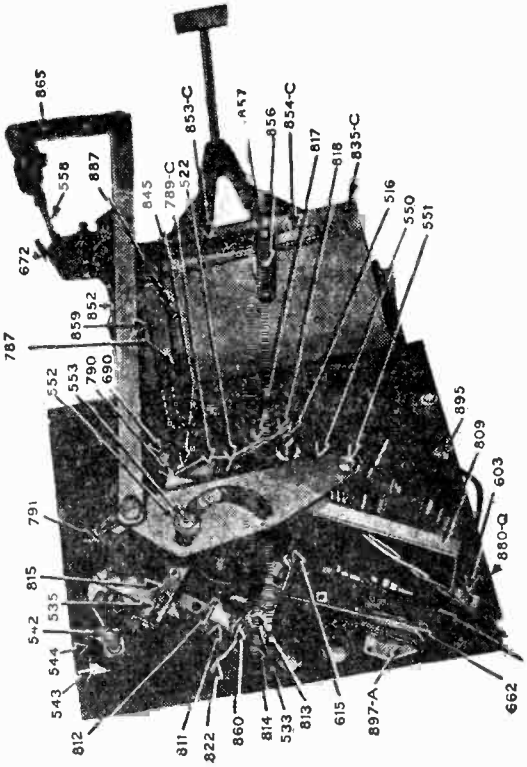


FIGURE 2

Resistor Data

SPARKS WITHINGTON CO.

STANDARD RESISTOR COLOR CODE AND RESISTORS USED IN SPARTON RADIO RECEIVING SETS AND SPARTON ENSEMBLES

Standard Resistor Color Code

0—Black	5—Green
1—Brown	6—Blue
2—Red	7—Violet
3—Orange	8—Gray
4—Yellow	9—White

To determine the value of a resistor, the first significant figure of resistance value is represented by the color of the body of the resistor, and the second figure of resistance value by the color of the tip of the resistor. The number of ciphers following the second figure is determined by the color of the dot or stripe in the center of the body of the resistor. For example, a 20,000 ohm resistor has a red body, black tip, with orange dot or orange stripe. A 2,200 ohm resistor would be red body, with red tip and red dot, or red stripe, and as all colors are the same, it would be a single color resistor.

CARBON RESISTORS

Part No.	Ohms	Watts	Body	Tip	Dot Stripe
B-4114-11	200	.5	Red	Black	Brown
B-4114-3	250	.5	Red	Green	Brown
B-4114-1	500	.5	Green	Black	Brown
B-4114-13	1,000	.5	Brown	Black	Red
A-3397	1,000	2	Light Brown		
A-3397	1,000	2	Brown	Black	Red
A-3750	1,250	3	Brown	Orange	Red
A-3750	1,250	3	Black	Silver	Orange
A-3750	1,250	3	Black		
A-3750	1,250	3	Slate		
A-3325	1,700	2	Dark Brown		
A-3639	1,700	5	Gray	Silver	
A-4613	1,700	1	Brown	Violet	Red
A-5550	2,000	.5	Red	Black	Red
B-4114-6	Use A-5550				
A-5622	2,500	3	Red	Green	Red
A-3232	2,800	.5	Black	Paper Label	
A-4122	2,800	.5	Gray		
A-4122	2,800	.5	Red		
A-4653	2,800	.5	Red	Gray	Red
A-5180	5,000	.5	Green	Black	Red
B-4114-16	Use A-5180				
B-4114-20	Use A-5180				
B-4114-25	7,000	.5	Violet	Black	Red
B-4114-2	8,000	.5	Gray	Black	Red
A-3764-C	10,000	4	Blue		
A-3735	10,000	5	Brown	Black	Orange
A-3735	10,000	5	Gray	Silver	Blue
A-4614	10,000	1	Brown	Black	Orange
B-4114-7	10,000	.5	Brown	Black	Orange
B-4114-5	10,000	.3	Brown	Black	Orange
A-4107	15,000	5	Brown	Green	Orange
A-4107	15,000	5	Gray	Silver	
B-4114-23	15,000	.5	Yellow	Black	Orange
A-2934	20,000	2	Green		
A-2934	20,000	2	Red	Black	Orange
A-3422	20,000	3	Gray		Green
A-3422	20,000	3	Red	Black	Orange
A-4261	20,000	5	Red	Black	Orange
A-4261	20,000	5	Gray	Silver	Blue
B-4114-14	20,000	.5	Red	Black	Orange
B-4114-24	Use B-4114-14				
A-7111	25,000	4.5	Red	Green	Orange

Effective January 1, 1932

Resistor Data

SPARKS WITHINGTON CO.

CARBON RESISTORS—Continued

Part No.	Ohms	Watts	Body	Tip	Dot Stripe
B-4114-18	25,000	.5	Red	Green	Orange
A-5139	30,000	1	Orange	Black	
B-4114-19	30,000	.5	Orange	Black	Orange
B-4114-22	40,000	.5	Yellow	Black	Orange
A-3423	50,000	3	Gray		Red
A-3423	50,000	3	Green	Black	Orange
B-4114-12	50,000	.5	Green	Black	Orange
B-4114-15	60,000	.5	Blue	Black	Orange
A-5354	100,000	1	Brown	Black	Yellow
B-4114-10	100,000	.5	Brown	Black	Yellow
B-4114-8	150,000	.5	Brown	Green	Yellow
A-2702-5	200,000		Glass		
B-4114-17	200,000	.5	Red	Black	Yellow
A-1514	250,000		Glass		
A-4234	250,000	1	Red	Green	Yellow
A-5270	Use A-4234				
B-4114-4	250,000	.5	Red	Green	Yellow
A-2702-6	Use A-1514				
A-5269	500,000	1	Green	Black	Yellow
B-4114-9	500,000	.5	Green	Black	Yellow
A-5138	1,000,000	1	Brown	Black	Green
B-4114-21	1,000,000	.5	Brown	Black	Green
A-2702-11	1,000,000		Glass		
A-1515	.3,000,000		Glass		
A-2702-13	Use A-1515		Glass		

WIRE WOUND RESISTORS

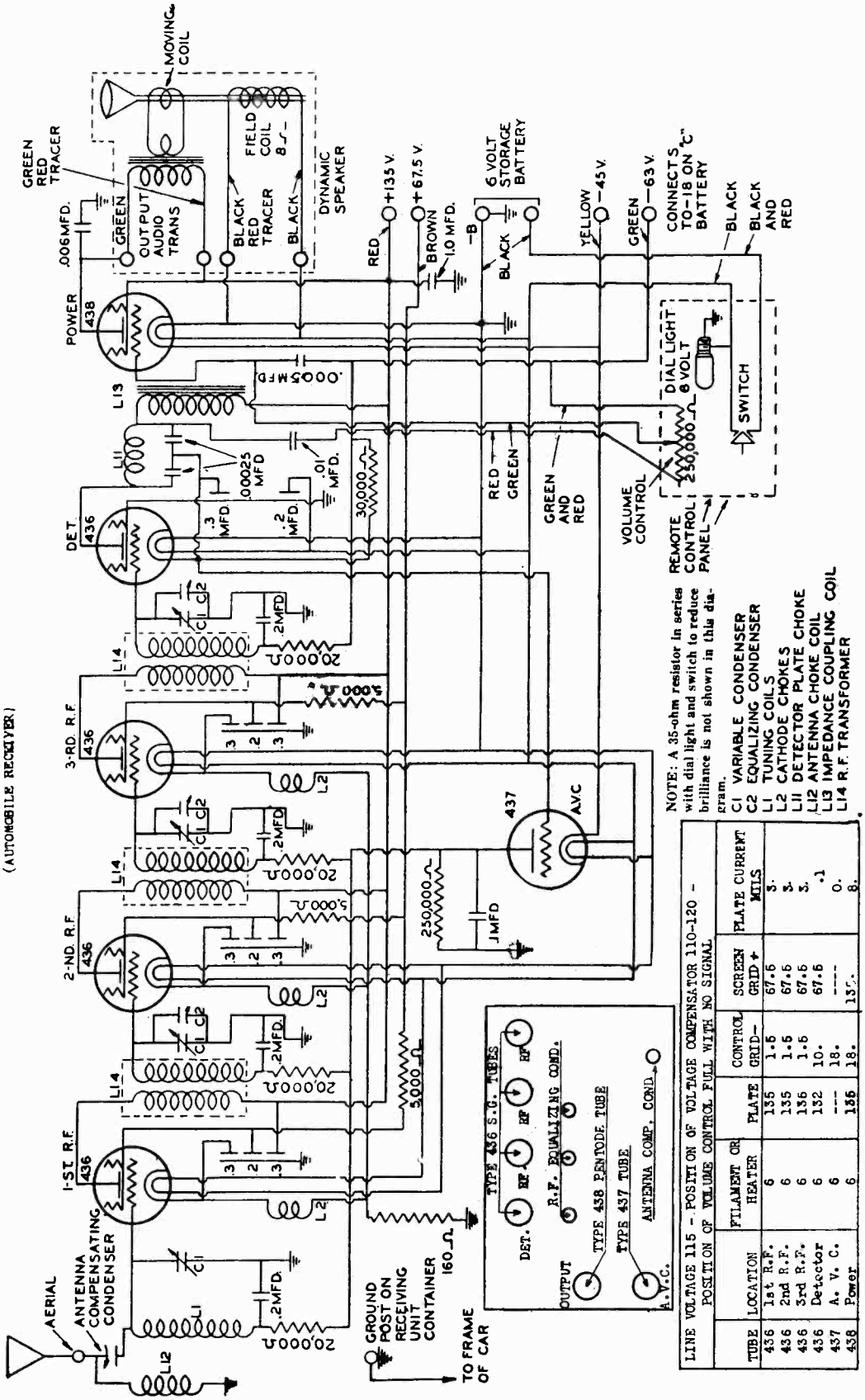
Part No.	Ohms	Watts	Color	Type	Part No.	Ohms	Watts	Color	Type
A-7411	.43			Special	A-7118	250	1	Blue	Wire Wound
A-6890	.54	2.5	5-23/32"	Wire	A-5137	330	1	Gray	Wire Wound
A-6889	.67	2.5	7-7/64"	Wire	A-3536	900	10	Black	Wire Wound
A-5863	2	5	Blue	Wire Wound	A-7119	1,050	7.5	Blue	Wire Wound
A-4363	7	20	Blue	Wire Wound	A-7018	1,250	4		Candohm
A-7509	8-9			Wire Wound	A-4974	1,250	5	Gray	Candohm
A-5140	(.11 ohms	per ft.	at 20° C.)	Wire	A-6617	1,500	2	Brown	Braided
A-5862	12	10	Blue	Wire Wound	A-3383	3,000	10	Black	Wire Wound
A-4364	12	30	Blue	Wire Wound	A-3535	7,000	10	Black	Wire Wound
A-5890	14	10	Blue	Wire Wound	A-4583	Use A-3535			
A-4366	15	50	Blue	Wire Wound	A-2043	10,000	6	Black	Wire Wound
A-7421	35	.25	Red	Braided	A-4356	20,000		Blue	Wire Wound
A-5889	54	175	Blue	Wire Wound	A-3811	30,000	.5	Black	Wire Wound
A-5861	57	175	Blue	Wire Wound	A-3642	(6.04 ohms	per ft.	at 20° C.)	Wire Wd. Tap.
A-4365	63	10	Blue	Wire Wound	A-4260	2,000-7,000	20	Black	Wire Wd. Tap.
A-3590	110	1	Black	Wire Wound	A-5426	1,800-2,400	8	Blue	Wire Wd. Tap.
A-4670	110	1	Black	Wire Wound	A-5870	Use A-5426			
A-4915	110	1	Black	Candohm	A-6619	2,900-3,000	15	Blue	Wire Wd. Tap.
A-7427	160	1	Blue	Wire Wound	A-7120	2,400-3,200	4.5	Blue	Wire Wd. Tap.
A-6618	200	.5	Red	Braided	A-7461	3,900-4,300		Blue	Wire Wd. Tap.
A-5502	200	1	Red	Candohm	A-6977	5,500-6,000	7	Blue	Wire Wd. Tap.
A-6976	230	3	Blue	Wire Wound	A-7462	60-220-2,100		Blue	Wire Wd. Tap.

MODEL 40
Schematic
Voltage

SPARKS WITHINGTON CO.

SPARTON MODEL 40 SCHEMATIC DIAGRAM

(AUTOMOBILE RECEIVER)



NOTE: A 35-ohm resistor in series with dial light and switch to reduce brilliance is not shown in this diagram.

C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
L1 TUNING COILS
L2 CATHODE CHOKES
L11 DETECTOR PLATE CHOKE
L12 ANTENNA CHOKE COIL
L13 IMPEDANCE COUPLING COIL
L14 R.F. TRANSFORMER

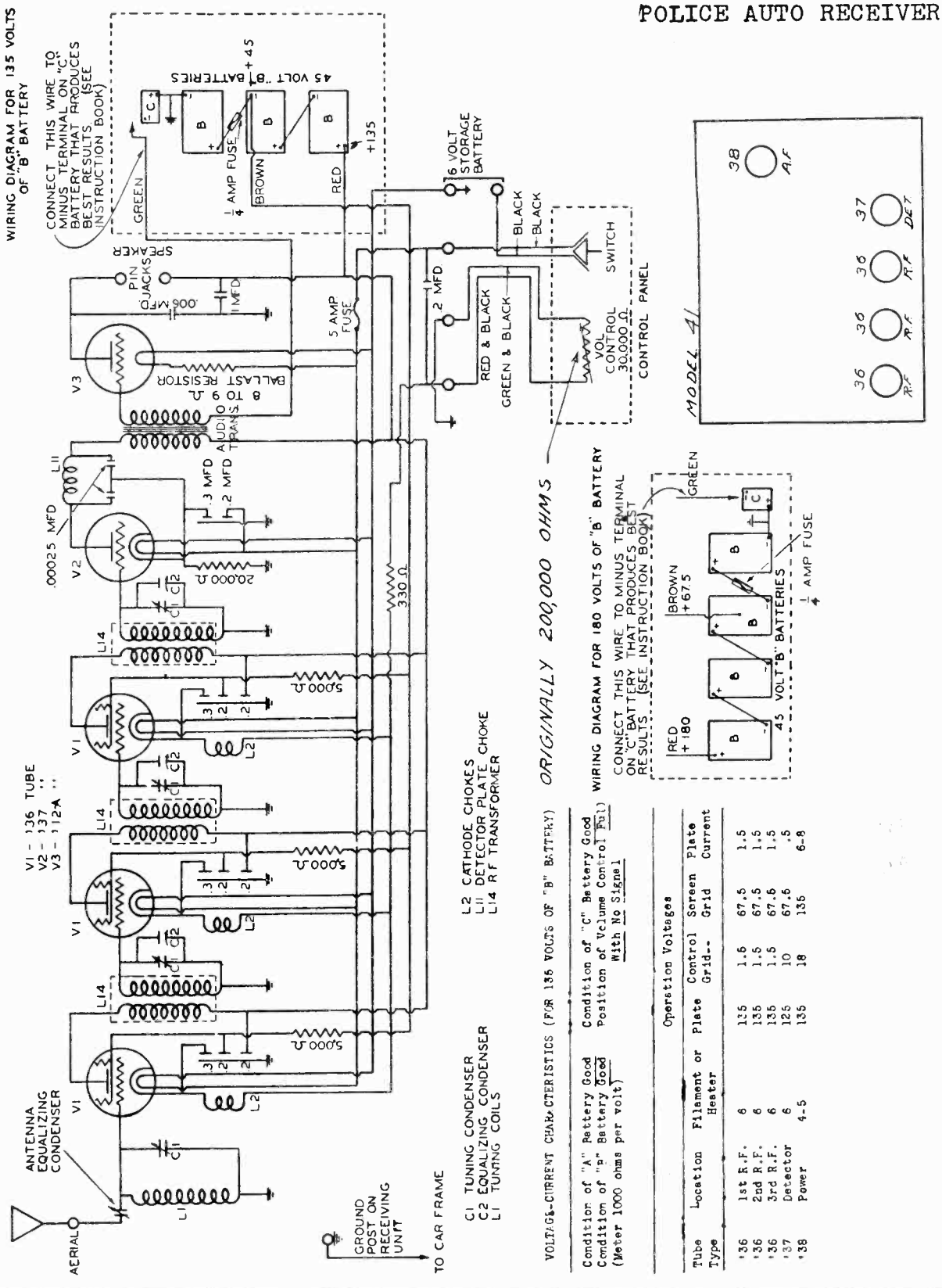
LINE VOLTAGE 115 - POSITION OF VOLTAGE COMPENSATOR 110-120 - POSITION OF VOLUME CONTROL FULL WITH NO SIGNAL

TUBE	LOCATION	FILAMENT OR HEATER	PLATE	CONTROL GRID—	SCREEN GRID +	PLATE CURRENT MILS
436	1st R.F.	6	135	1.6	67.6	3.
436	2nd R.F.	6	135	1.5	67.6	3.
436	3rd R.F.	6	136	1.6	67.6	3.
436	Detector	6	132	10.	67.6	.1
437	A. V. C.	6	---	18.	----	0.
438	Power	6	136	18.	135.	8.

SPARKS WITHINGTON CO.

MODEL 41
Schematic
Voltage

POLICE AUTO RECEIVER



ORIGINALLY 200,000 OHMS

WIRING DIAGRAM FOR 180 VOLTS OF "B" BATTERY

CONNECT THIS WIRE TO MINUS TERMINAL ON "C" BATTERY THAT PRODUCES BEST RESULTS (SEE INSTRUCTION BOOK)

VOLTAGE-CURRENT CHARACTERISTICS (FOR 135 VOLTS OF "B" BATTERY)

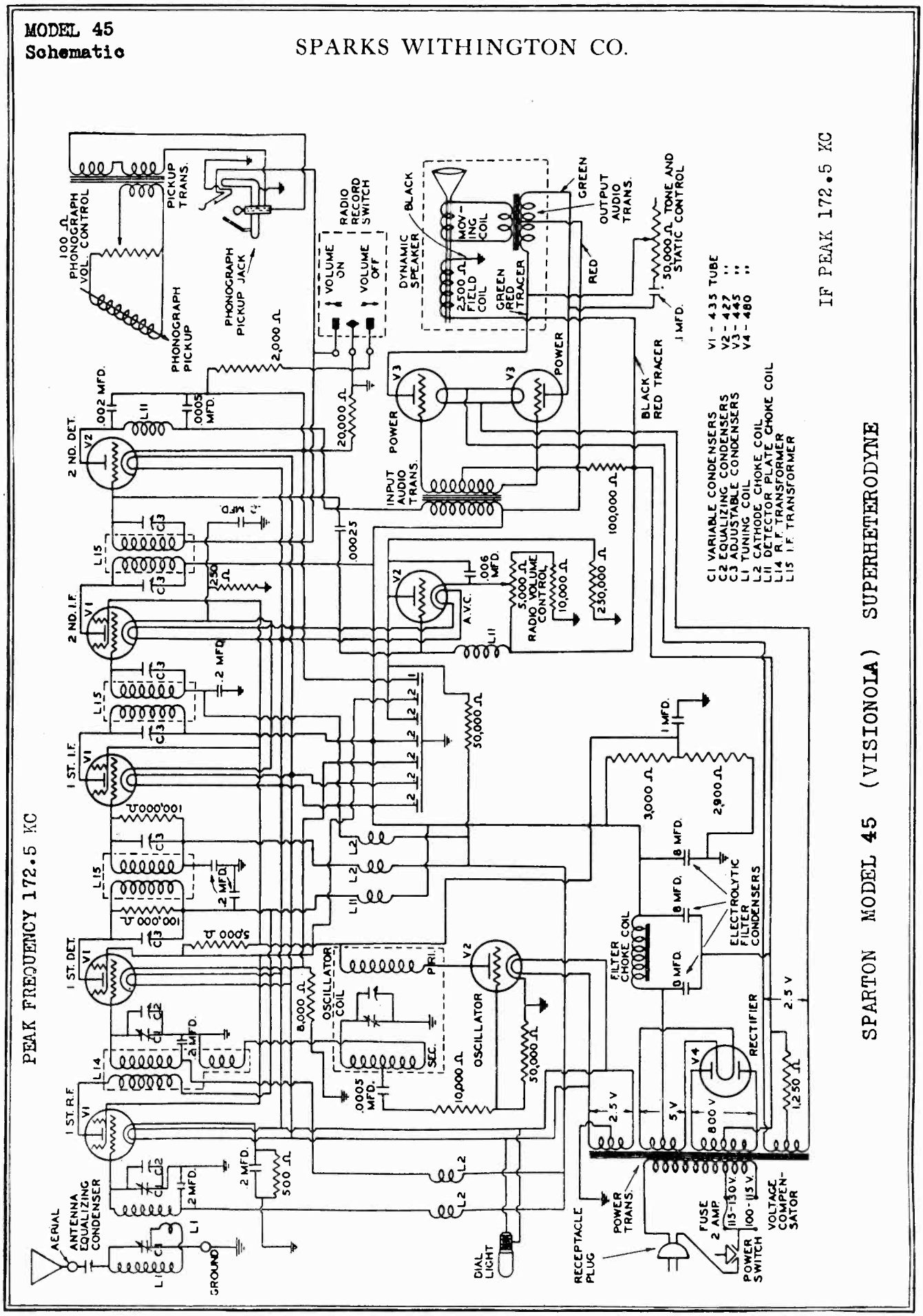
Condition of "A" Battery Good
Condition of "B" Battery Good
(Meter 1000 ohms per volt)

Condition of "C" Battery Good
Position of Volume Control Full
With No Signal

Tube Type	Location	Filament or Heater	Plate	Operation Voltages Control Grid--	Screen Grid	Plate Current
'36	1st R.F.	6	135	1.6	67.5	1.5
'36	2nd R.F.	6	135	1.5	67.5	1.5
'36	3rd R.F.	6	135	1.5	67.6	1.5
'37	Detector	6	125	10	67.5	.5
'38	Power	4-5	135	18	135	6-8

MODEL 45
Schematic

SPARKS WITHINGTON CO.



SPARKS WITHINGTON CO.

MODEL 45
Chassis
Voltage

Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

Tube	Location	OPERATING VOLTAGES				Plate Current Mills.
		Heater or Filament	Plate	Control Grid—	Screen Grid+	
435	1st R. F.	2.2 - 2.5	180 - 220	2.5 - 4	80 - 100	5 - 8
435	1st Det.	2.2 - 2.5	180 - 220	*6.4 - 14	80 - 100	*.8 - 1.8
435	1st I. F.	2.2 - 2.5	180 - 220	2.5 - 4	80 - 100	5 - 8
435	2nd I. F.	2.2 - 2.5	180 - 220	2.5 - 4	80 - 100	5 - 8
427	Oscillator	2.2 - 2.5	80 - 100	†	.....	‡
427	2nd Det.	2.2 - 2.5	170 - 205	14 - 20	.....	.7 - 1.0
427	A. V. C.	2.2 - 2.5	§	30 - 50	.....	Zero
445	Power	2.2 - 2.5	225 - 270	‖30 - 45	.....	20 - 30
445	Power	2.2 - 2.5	225 - 270	‖30 - 45	.....	20 - 30
480	Rectifier	4.2 - 5	360 - 440	.....	.....	48 - 58

(Measured with 1000 ohm per volt voltmeter)

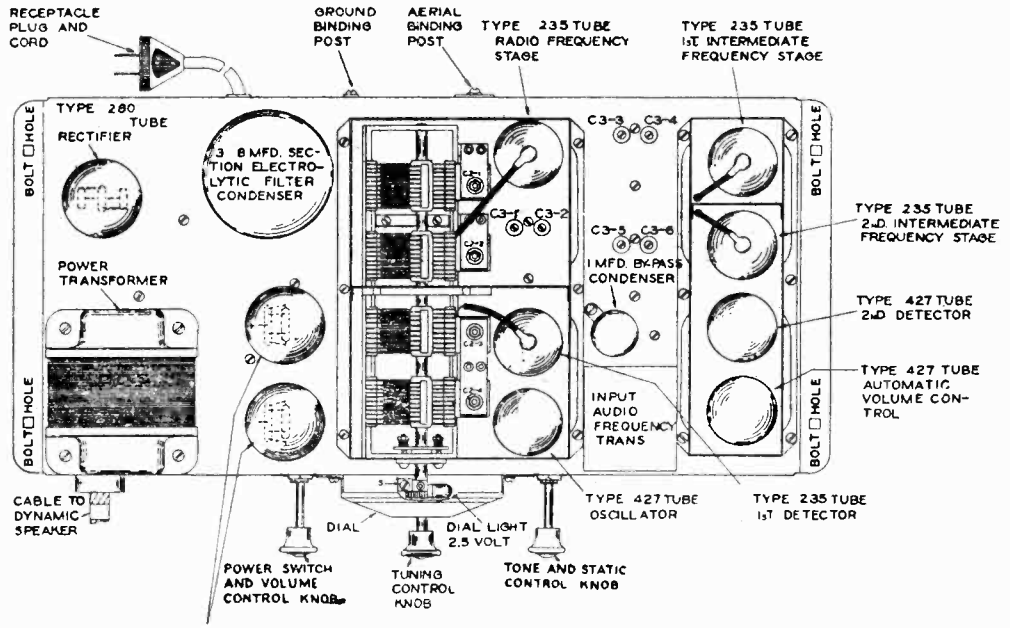
* Remove oscillator tube.

† Tube generates own bias when oscillating.

‖ Meter reading use 150 volt scale—true voltage 50-75—if lower scale voltmeter is used expect lower voltages.

§ Test from grid prong to ground approx. 125 volts.

‡ Test with plug in 2nd. Detector socket and tube in Analyzer.



TOP VIEW

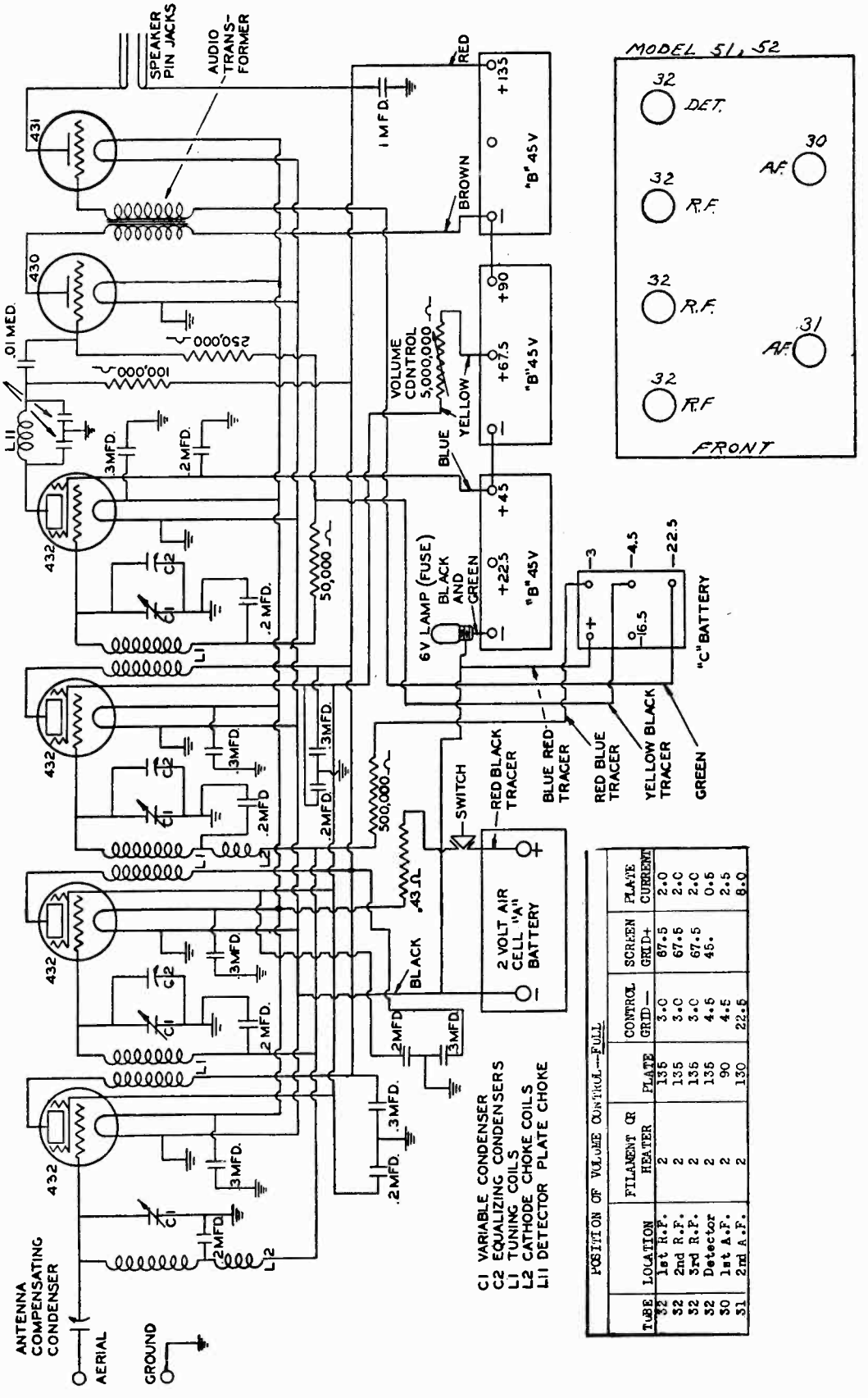
C2-1 ANTENNA EQUALIZING CONDENSER
C2-2 RADIO FREQUENCY STAGE EQUALIZING CONDENSER
C2-3 1ST DETECTOR EQUALIZING CONDENSER
C2-4 OSCILLATOR EQUALIZING CONDENSER

C3-1 I. F. Stage First Adjustable Condenser
C3-2 I. F. Stage Second Adjustable Condenser
C3-3 I. F. Stage Third Adjustable Condenser
C3-4 I. F. Stage Fourth Adjustable Condenser
C3-5 I. F. Stage Fifth Adjustable Condenser
C3-6 I. F. Stage Sixth Adjustable Condenser

MODEL 51,52
Schematic
Voltage

SPARKS WITHINGTON CO.

Sparton Model 51 and 52 Schematic Diagram

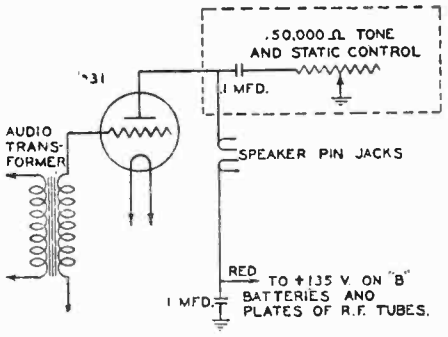


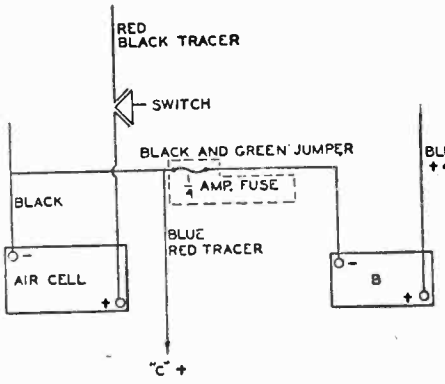
POSITION OF VOLUME CONTROL—FULL

TUBE	LOCATION	FILAMENT OR HEATER	PLATE	CONTROL GRID—	SCREEN GRID+	PLATE CURRENT
32	1st R.F.	2	135	3.0	67.5	2.0
32	2nd R.F.	2	135	3.0	67.5	2.0
32	3rd R.F.	2	135	3.0	67.5	2.0
32	Detector	2	135	4.5	45.	0.6
30	1st A.F.	2	90	4.5		2.5
31	2nd A.F.	2	130	22.5		8.0

SPARKS WITHINGTON CO.

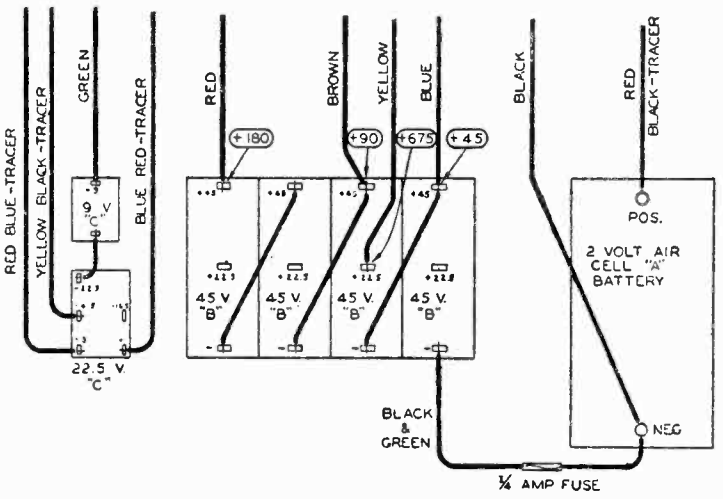
MODEL 51,52
Tone Control
Speaker Cone
Data





SCHEMATIC DRAWING OF TONE AND STATIC CONTROL AND ¼ AMPERE "B" BATTERY FUSE USED ON MODLES 51 AND 52 SERIAL NOS. 345 AND 195 UP RESPECTIVELY

WIRING DIAGRAM FOR 180 VOLTS OF "B" BATTERY SPARTON MODEL 51 AND 52



How to Replace Cone Head in Magnetic Speaker in Model 51 and 52

First:
Remove the motor or speaker driving element by removing the four mounting screws, unsoldering the lead wires from the outside terminal lugs, and unsoldering the driving link from the diaphragm apex pin.

Second:
Remove the cone head and all paper rings from the speaker housing.

Third:
Coat the rim of the speaker housing where the paper ring on the diaphragm rests with an ample coating of cellulose cement (such as Du Pont's Household Cement or Ambroid).

Fourth:
Place the cone head (part No. B-3528) into position, set the speaker housing onto a flat surface with the opening of diaphragm down, place a weight on housing and leave until cement is dry.

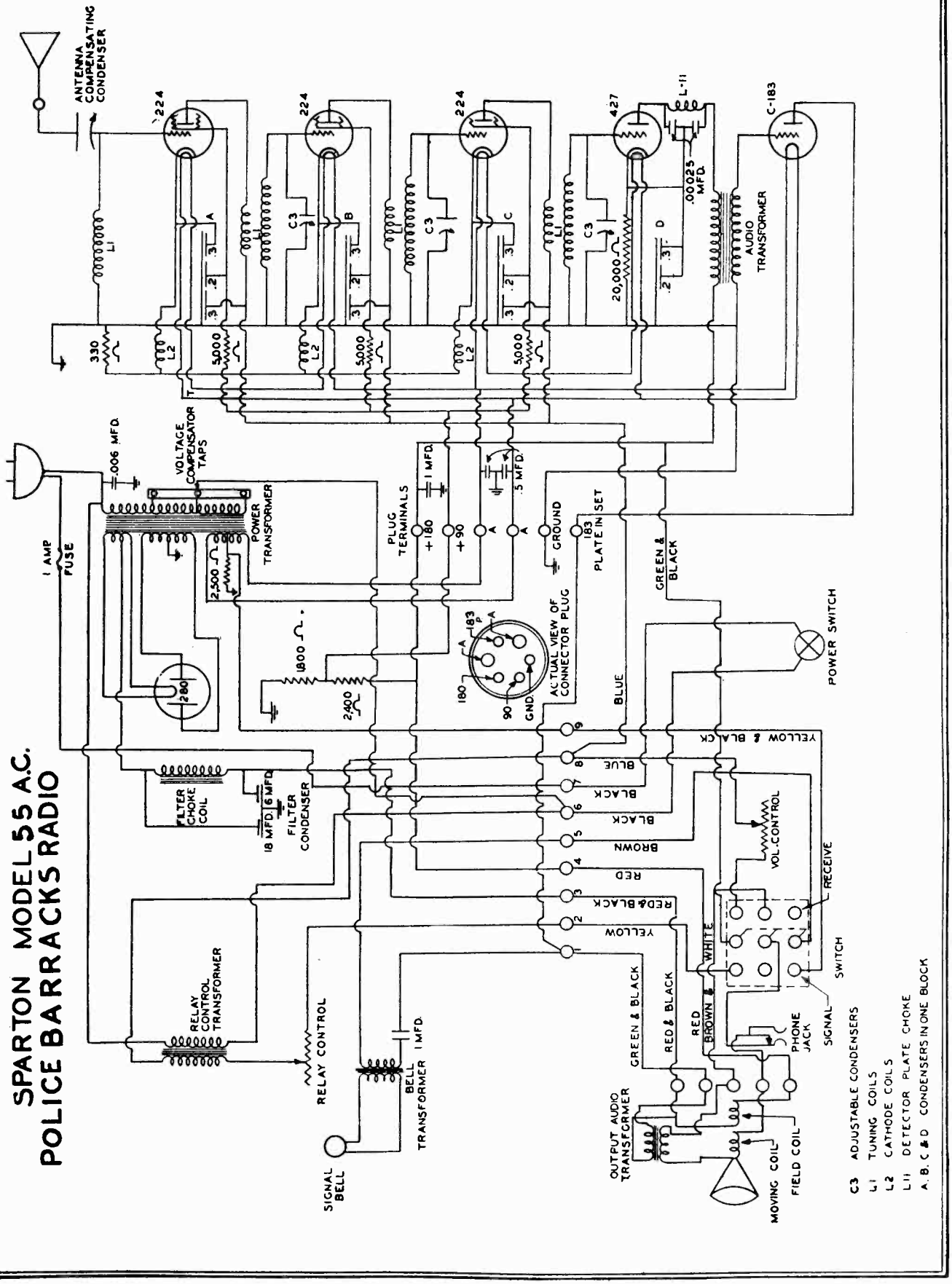
Fifth:
Fasten the driving motor back into position with four mounting screws, making sure that the movable armature of the motor is in exact center between the pole pieces before mounting, and solder the lead wires to the terminal lugs.

Sixth:
Solder the diaphragm apex pin to the apex driving link, making sure not to exert any strain on the drive link which might put the motor armature out of center while soldering. The apex pin should be cut off before soldering, so that it will extend about ¼" along the drive link. Use ordinary soft solder.

Seventh:
Next cement the paper ring (part No. A-5847) and finally the paper ring (part No. A-5846) into position, using cellulose cement.

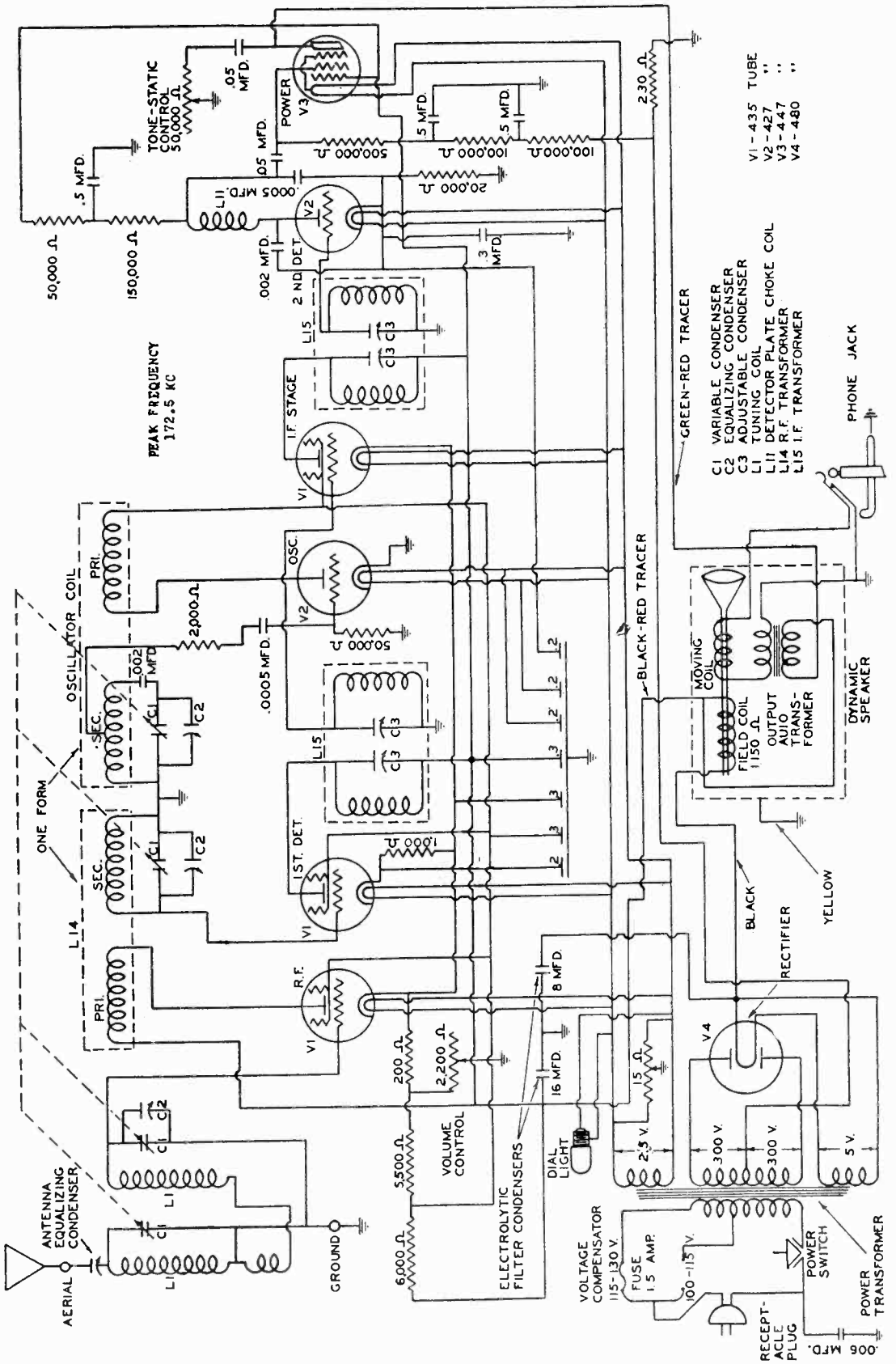
MODEL 55
Police Desk
Schematic

SPARKS WITHINGTON CO.
SPARTON OF CANADA LTD.



MODEL 56
Schematic

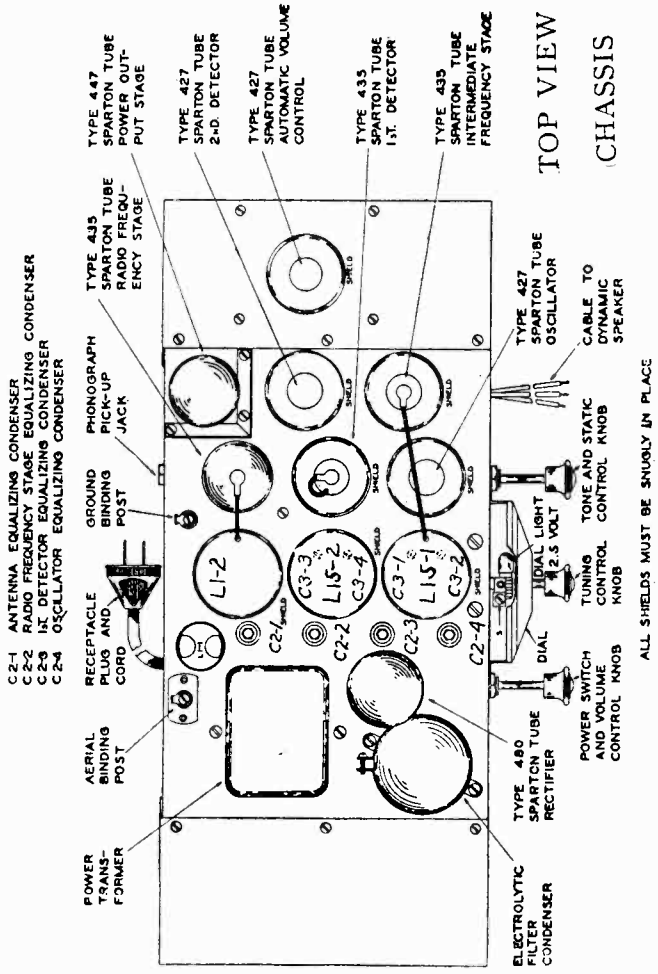
SPARKS WITHINGTON CO.



PEAK FREQUENCY 172.5 KC

MODEL 56
Voltage
Socket
Trimmers

SPARKS WITHINGTON CO.



L1-1 First R. F. Tuning Coil

L1-2 Second R. F. Tuning Coil

L15-1 First I. F. Transformer (1st. Det. to I.F. Stage)

L15-2 Second I. F. Transformer (I.F. to 2nd. Det. Stage)

C3-1 I. F. Stage First Adjustable Condenser

C3-2 I. F. Stage Second Adjustable Condenser

C3-3 I. F. Stage Third Adjustable Condenser

C3-4 I. F. Stage Fourth Adjustable Condenser

Voltage Current Characteristics

Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

		OPERATING VOLTAGES				
Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current Mills.
435	1st R. F.	2.2 - 2.5	230 - 270	2.5 - 4.0	85 - 100	5 - 8
435	1st Det.	2.2 - 2.5	230 - 270	**4.5 - 7.5	85 - 100	**1.8 - 3.5
435	1st I. F.	2.2 - 2.5	230 - 270	2.5 - 4.0	85 - 100	5 - 8
427	Oscillator	2.2 - 2.5	85 - 110	†	.....	‡
427	2nd Det.	2.2 - 2.5	*100 - 135	8 - 14	.....	4.0 - .7
447	Power	2.2 - 2.5	220 - 260	15 - 18	230 - 270	30 - 36
480	Rectifier	4.2 - 5	360 - 420	.....	.....	40 - 55

*Use 300 volt scale.

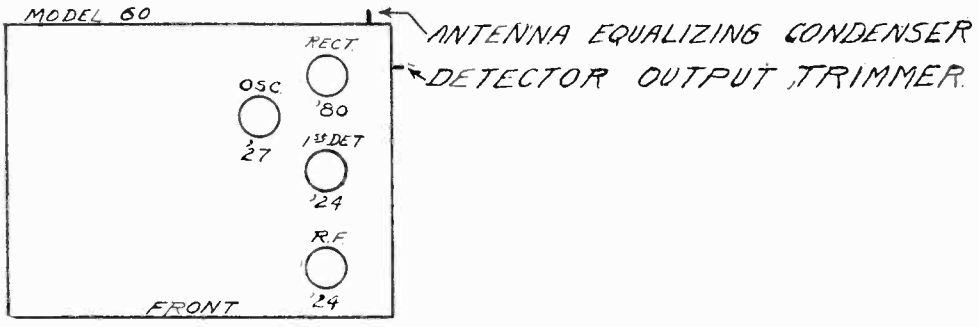
**Remove Oscillator tube.

†Tube generates own bias when oscillating.

‡Test with plug in 2nd. Detector socket and tube in analyzer

SPARKS WITHINGTON CO.

MODEL 60
Short Wave
Converter



MODEL 60 SHORT-WAVE CONVERTER

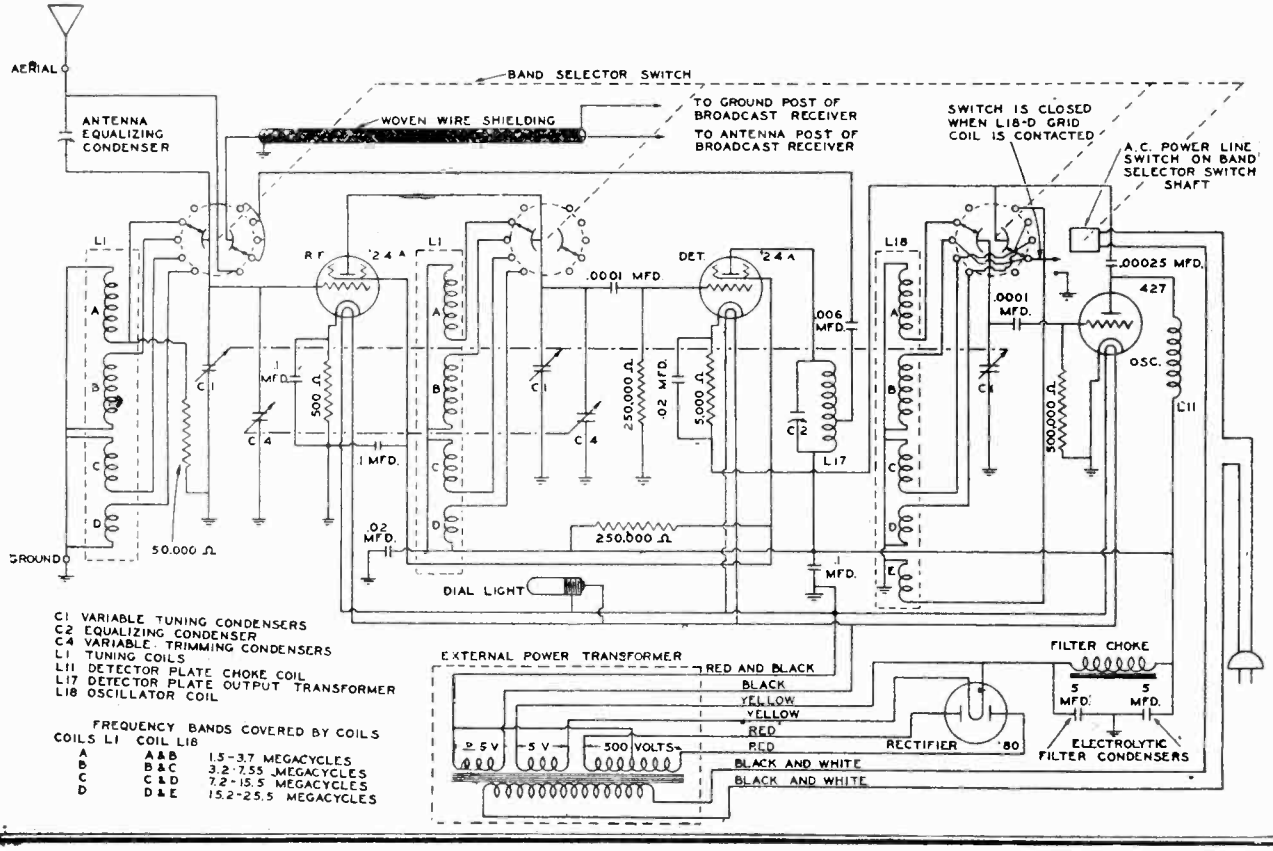
Tube	Location	Filament Heater or	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
'24-A	R. F.	2.2 - 2.5	180 - 230	2 - 3	70 - 100	3 - 6
'24-A	Detector	2.2 - 2.5	180 - 230	*5 - 6	70 - 100	.2 - 1
427	Oscillator	2.2 - 2.5	180 - 230	†	--------	§
'80	Rectifier	4.4 - 5.0	230 - 260	--------	--------	7 - 10

LINE VOLTAGE 115 POSITION OF VOLUME CONTROL FULL

† Tube generates own bias when oscillating.

* Presence of voltage can only be determined by testing circuit continuity and measuring the plate and screen grid current of this tube. Voltage is five thousand times current in amperes.

§ Measure with plug in the second detector socket and tube in test kit.



MODEL 103,578.
Assembly Wiring
Voltage

SPARKS WITHINGTON CO.

SPARTON ENSEMBLE MODEL 103
AND 578 WIRING ASSEMBLY

SPARTON—Model 103.
Line Voltage 120—Volume Control Full

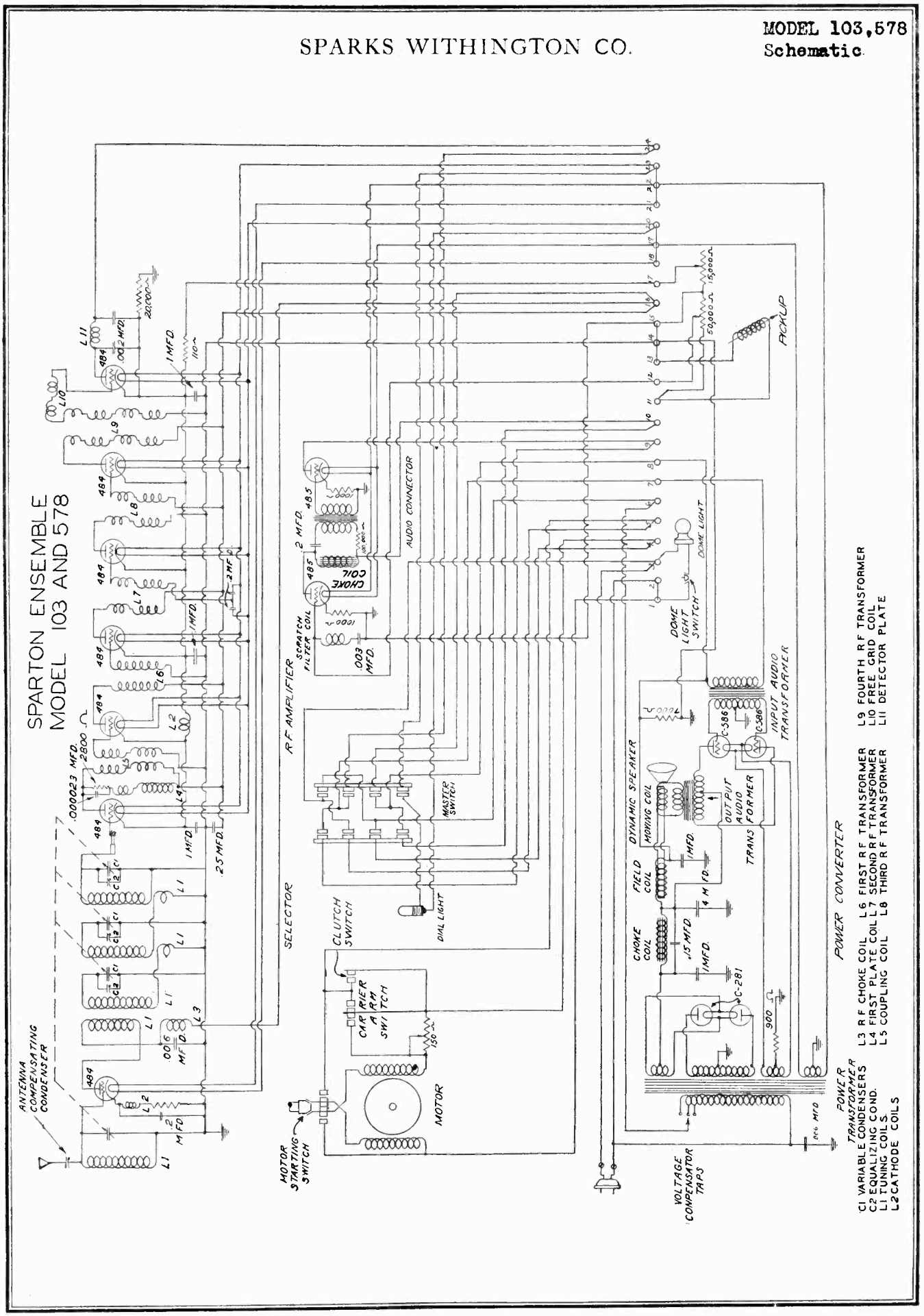
TUBE NO. AS SEEN FROM BACK OF SET	TYPE OF TUBE	POSITION OF TUBE 1ST R.F. DET. ETC.	READINGS, PLUG IN SOCKET OF SET										TUBE IN TESTER									
			TUBE OUT																			
			A VOLTS	@ VOLTS	B VOLTS	@ VOLTS	C VOLTS (CONTROL GRID)	@ VOLTS	CATHODE (NORMAL FILTER)	@ MA.	PLATE (NORMAL FILTER)	@ MA.	PLATE (NORMAL FILTER)	@ TEST	MA.	SCREEN (NORMAL FILTER)	@ VOLTS					
1	C-484	1st RF	3.2	125	3	120	9				4.3		7.3		3.0							
2	C-484	2nd RF	3.2	126	3	122	8				6.5		11.4		4.9							
3	C-484	3rd RF	3.2	125	3	122	8				8		9.5		1.5							
4	C-484	4th RF	3.2	125	3	122	9				6.5		11.2		4.7							
5	C-484	5th RF	3.2	128	3	120	8				6.3		11.0		4.7							
6	C-484	Det.	3.2	240	3	185	32				3.8		6.		2.2							
7	585	Audio	7.9	345	7.7	340	65				55		60		5							
8	585	Audio	7.9	345	7.7	340	65				55		60		5							
9	281	Rect.	8	-	7.7	-	-				68		-		-							
10	281	Rect.	8	-	7.7	-	-				68		-		-							

Model 103—1 Additional 227 Tube, Also 1 Additional 484 in Selector

No.	COLOR AND SIZE OF WIRE
2	GREEN AND BLACK #20
3	GREEN #20
5	RED #20
6	RED AND BLACK #20
8	YELLOW #20
9	BLACK AND WHITE #20
10	BLACK #18
12	PURPLE #20
13	BLUE #20
14	BROWN #20
15	YELLOW WITH BLACK TRACER #20
19	TAN WITH BLUE PIN TRACER #20
20	BLACK TWISTED PAIR #14
22	BLUE WITH RED TRACER #20

SPARKS WITHINGTON CO.

MODEL 103,578
Schematic



How to Adjust the Antenna Compensating and Equalizing Condensers

SPARTON MODELS 103, 235, 564, 570, 574, 578, 589, 591, 593, 600, 610, 620, 740, 750 AND 870, ALSO MODELS EQUIPPED WITH PHONOGRAPH PICKUP JACK MANUFACTURED PRIOR TO JUNE 1, 1936.

After the aerial and ground have been inspected and found to be in good order, and all tubes have been tested and placed in their proper sockets, the final operation in the installation of a SPARTON Radio Receiving Set is adjustment of the antenna compensating and equalizing condensers. This adjustment should ALWAYS be made with the use of a High Resistance Voltmeter as a resonance indicator. Using the ear as a resonance indicator should be resorted to only when it is impossible to employ a Voltmeter.

Any 1,000 ohm per volt 0-60, 75 or 100 scale D. C. Voltmeter will serve the purpose.

Connect two leads to the binding posts of the Voltmeter to be used, and terminate them in a phone plug which is then inserted in the Phonograph Pick-up Jack just far enough to touch the first inside contact. (See figure 2.) (DO NOT PLUG ALL THE WAY INTO THE JACK, as this will short out the Detector tube biasing resistor, and cause inaccurate readings.) Be sure that no Analyzer Adapters are connected to the end of the Analyzer Cord, or plugged into the Analyzer Socket, as this will short-circuit the Voltmeter.

NOTE: (When aligning Models 235 and 103, two small battery clips instead of a phone plug are fastened to the Voltmeter leads. On the Model 235 the leads are connected to terminals No. 11 and No. 13 of the terminal block located on the left-hand side of the cabinet. On the Model 103 the leads are connected to terminals No. 14 and No. 17 on the terminal strip.)

1. With aerial and ground wires connected to the set as they are to be permanently used, tune in a DISTANT STATION at 1200 kilocycles or at a higher frequency.

2. Turn Volume Control on FULL for this entire adjustment.

3. Adjust Antenna Compensating condenser screw with insulated handle Screw Driver until indicator reaches highest point on Voltmeter scale. NOTE: The numerical value that the indicator reaches is of no consequence. The object is to have the indicator deflect from zero upward as high as possible.

4. The equalizing condensers are numbered 1, 2, and 3. Number 3 is next to the dial drum. With the adjusting wrench, adjust No. 3 until the indicator reaches highest point on the Voltmeter scale.

5. Next adjust No. 1 and No. 2 in the same manner.

TO CHECK ADJUSTMENT

6. Tune in a station between 550 and 650 kilocycles.

7. Readjust the Antenna compensating condenser and the Equalizing condensers No. 3, No. 1, and No. 2 in exactly the same manner as they were adjusted at the 1200 or higher kilocycle setting of the dial. The purpose of this adjustment is to check the "tracking" of the four variable condensers. The voltmeter reading should decrease if any of the four original adjustments are changed. That is, the four tuned circuits must show alignment between 550 and 650 kilocycles on the ADJUSTMENT made at 1200 or higher kilocycle setting.

TO READJUST

8. After the check at 550 kilocycles it will be necessary to again readjust the condensers as explained in No. 1 to No. 5 inclusive. This is necessary, due to the adjustments being slightly thrown off in the checking process.

CALIBRATION OF DIAL STRIP ON SPARTON MODELS 103, 235, 410, 420, 564, 570, 574, 578, 589, 591, 593, 600, 610, 620, 740, 750 AND 870.

9. Note carefully whether or not a station around 600 kilocycles indicates correctly on the dial when tuned to the loudest volume.

10. If station reads off its proper setting, loosen the screws which hold the celluloid strip in place and slide the strip so the reading is correct for the station being received.

NOTE: (On Models 410, 420—If station reads off its proper setting, loosen the screws which hold the dial drum to the condenser shaft and move the drum one way or the other, until the reading is correct for the station being received. When doing this be sure that the condenser shaft does not turn when the dial is moved.)

11. Next, tune in a station between 1100 and 1300 kilocycles and see if it reads correctly on the dial.

12. If stations tune in to maximum volume at a setting different from station's correct kilocycle reading, turn dial to the reading the station should come in on according to its log-book reading. Then readjust the Condensers as explained in No. 1 to No. 5.

13. This final adjustment will scarcely affect the calibration of the stations around 600 kilocycles and will properly align the Selector Unit to its highest efficiency, and will cause the dial to read correctly over the entire broadcast spectrum.

MODELS AR-19 AND 31

Due to the construction of these Models, it is not convenient to connect a Voltmeter at the proper place in the circuit so it can be used as a resonance indicator, therefore, a pair of ear phones are substituted for the speaker and are used as the means of determining when the antenna compensating and equalizing condensers have been properly adjusted.

1. With aerial and ground wires connected to the set as they are to be permanently used, tune in a DISTANT STATION between 80 and 90 or higher on the dial.

2. Turn Volume control down until station is barely audible.

3. Adjust Antenna Compensating Condenser with insulated handle screw driver to a point where the station sounds the loudest.

4. The Equalizing Condensers are numbered 1, 2, and 3, from front to back of receiver. Reduce the volume control until the station is barely audible and with the adjusting wrench, adjust No. 3 to a point where the station sounds the loudest.

5. Next adjust No. 1 and No. 2 in the same manner.

TO CHECK ADJUSTMENT

6. Tune in a station between 15 and 25 on the dial.

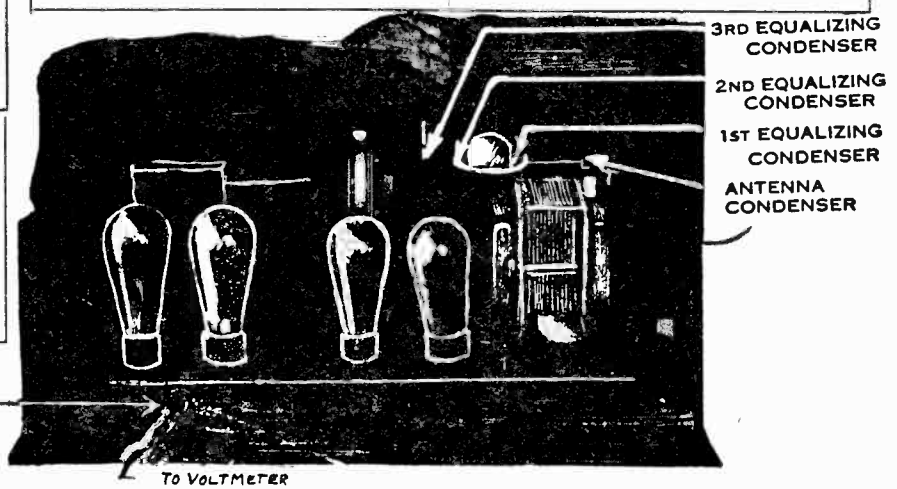
7. Readjust the Antenna Compensating and the Equalizing Condensers No. 3, No. 1, and No. 2 in exactly the same manner as they were adjusted between the 80 to 90 setting of the dial. The purpose of this adjustment is to check the "tracking" of the four condensers. The volume of the station should decrease if any of the four original adjustments are changed. That is, the four tuned circuits must show alignment between 15 and 25 on the dial on the adjustment made between 80 and 90.

TO READJUST

8. After the check between 15 and 25 on the dial, it will be necessary to again readjust the condensers as explained in No. 1 to No. 5 inclusive. This is necessary due to the adjustments being slightly thrown off during the checking process.

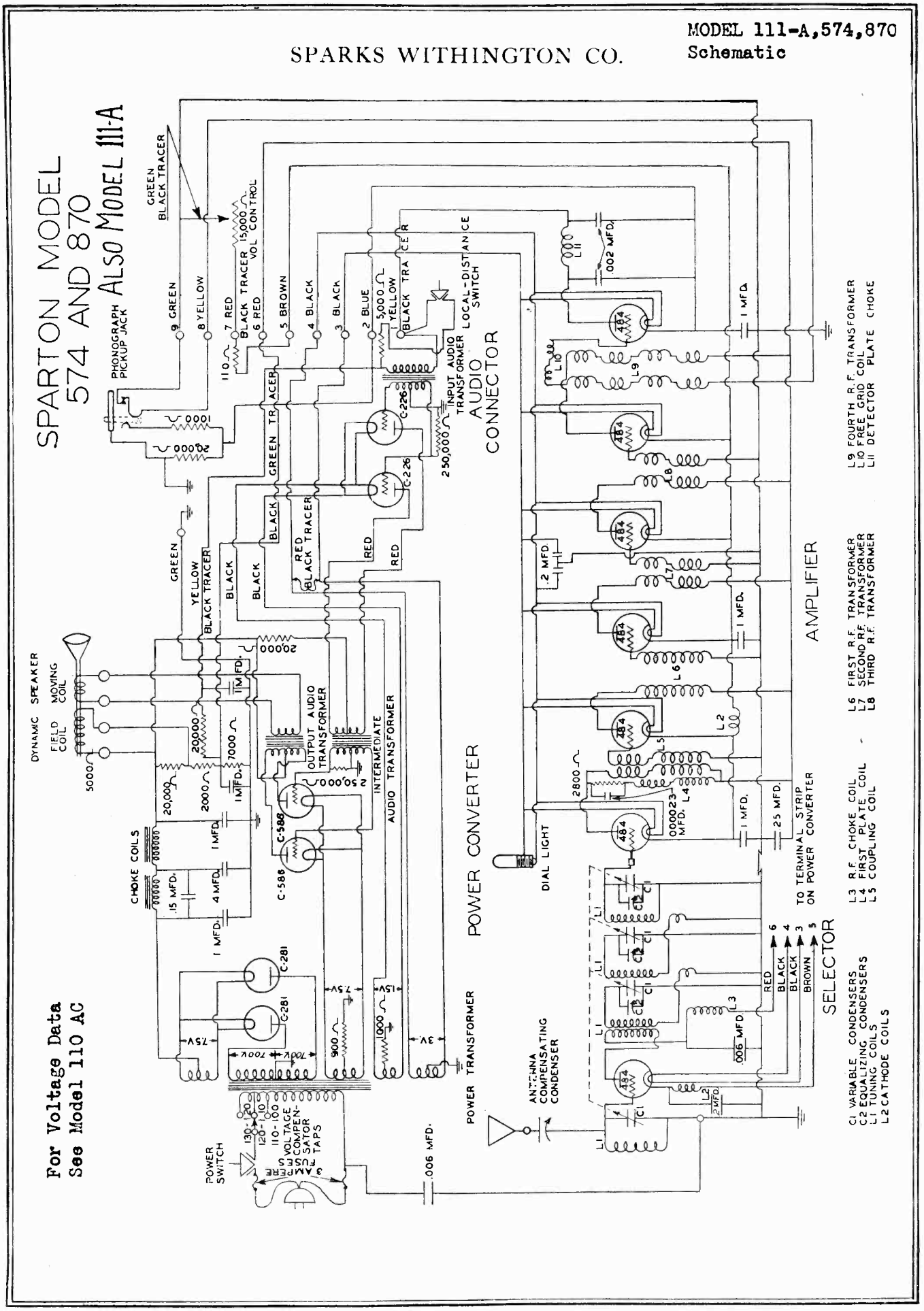
SPARTON MODELS 410 AND 420

Follow the same procedure outlined for adjusting the antenna compensating and equalizing condensers for the SPARTON Models AR-19 and 31, except in this case ear phones are not substituted for the speaker as a means of determining when the condensers are properly adjusted. The speaker serves this purpose as it is, and as the dial is calibrated in kilocycles a station is tuned in at 1200 kilocycles or higher frequency instead of between 80 and 90 as specified in paragraph No. 1, and the re-check is made between 500 and 600 kilocycles instead of between 15 and 25.



MODEL 111-A, 574, 870
Schematic

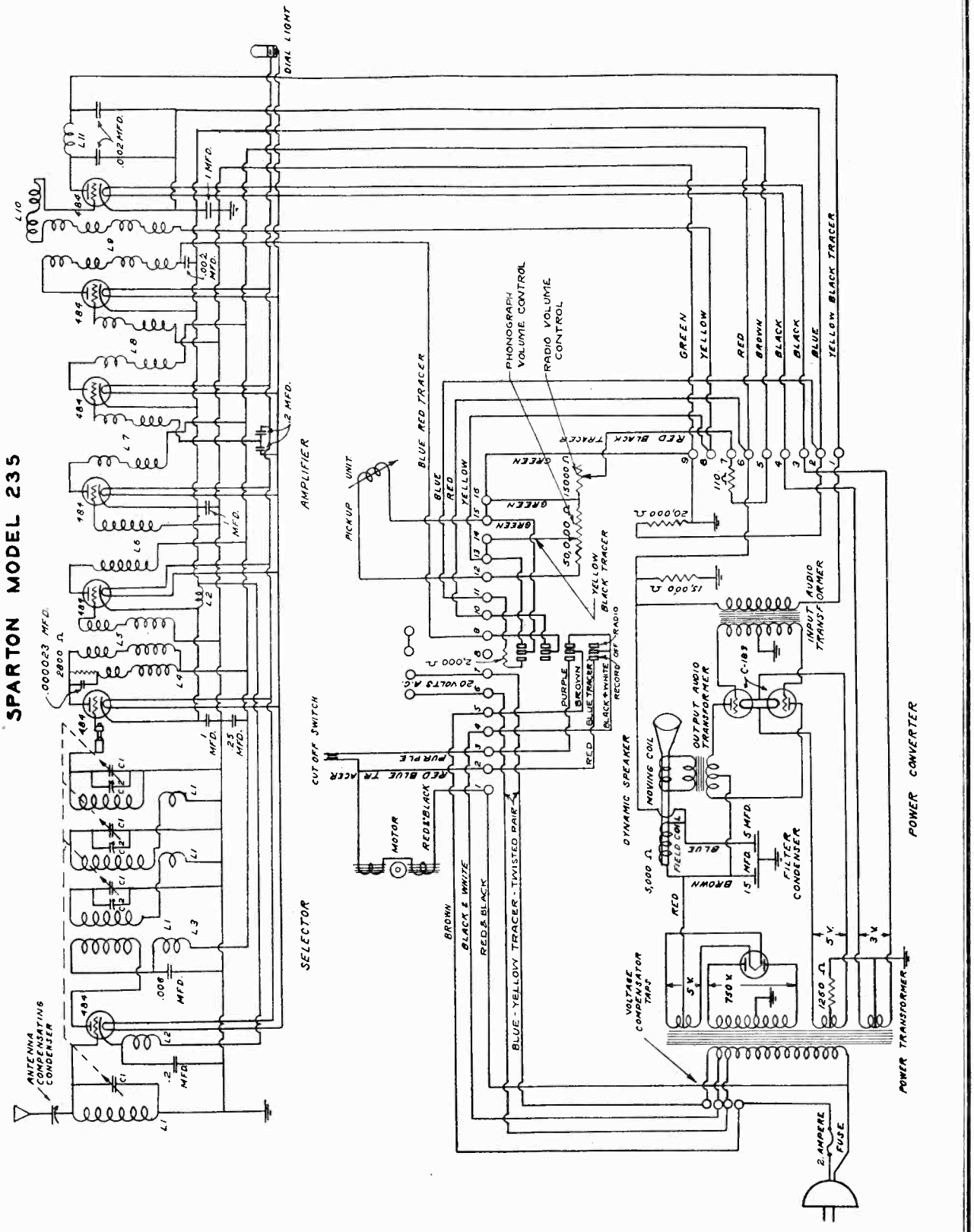
SPARKS WITHINGTON CO.



SPARKS WITHINGTON CO.

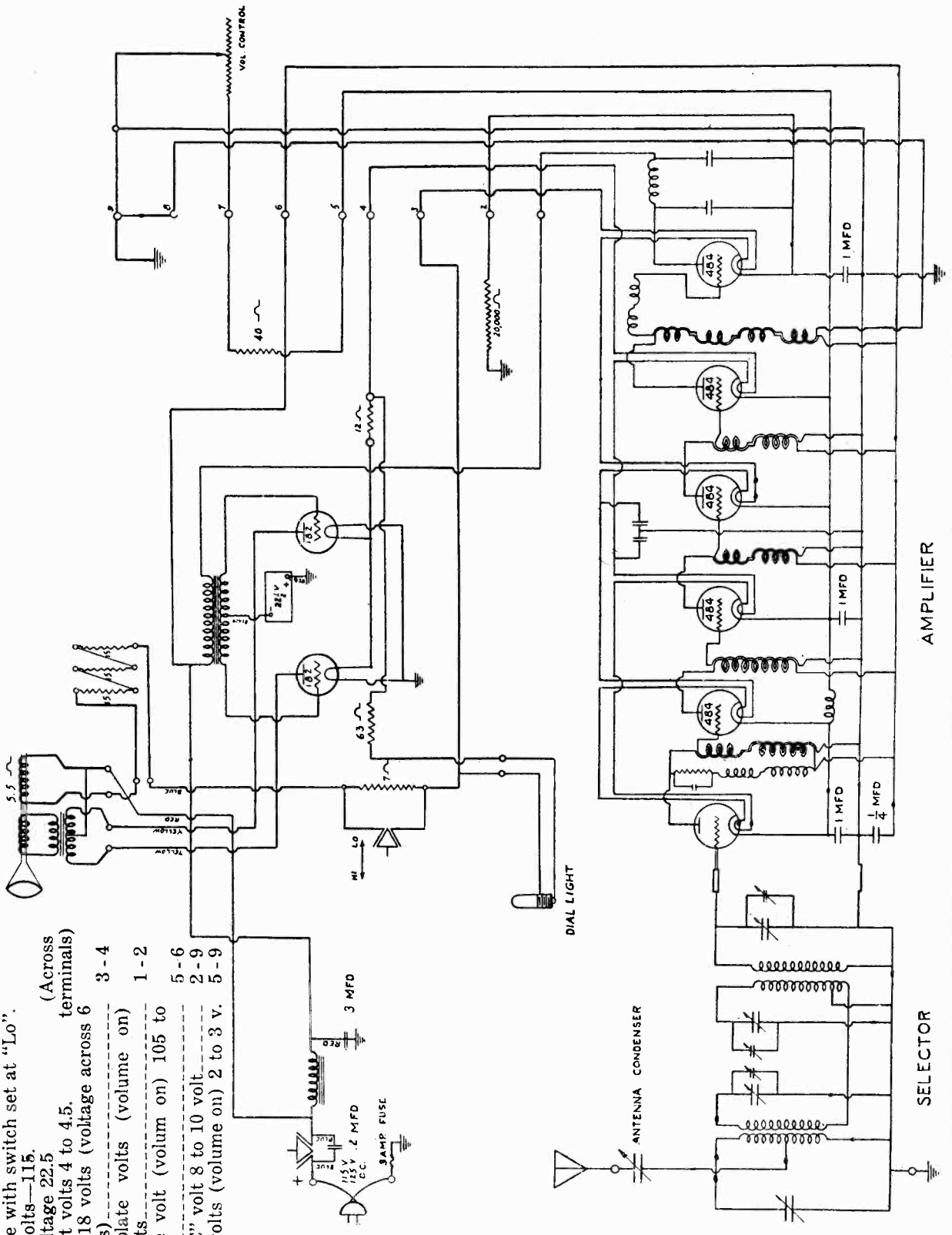
MODEL 235
Schematic

C1 VARIABLE CONDENSERS
C2 EQUALIZING CONDENSERS
L1 TUNING COILS
L2 CATHODE COIL
L3 R.F. CHOKE COIL
L4 FIRST PLATE COIL
L5 COUPLING COIL
L6 FIRST R.F. TRANSFORMER
L7 SECOND R.F. TRANSFORMER
L8 THIRD R.F. TRANSFORMER
L9 FOURTH R.F. TRANSFORMER
L10 GRID COIL
L11 DETECTOR PLATE CHOKE



MODEL 301 DC

SPARKS WITHINGTON CO.

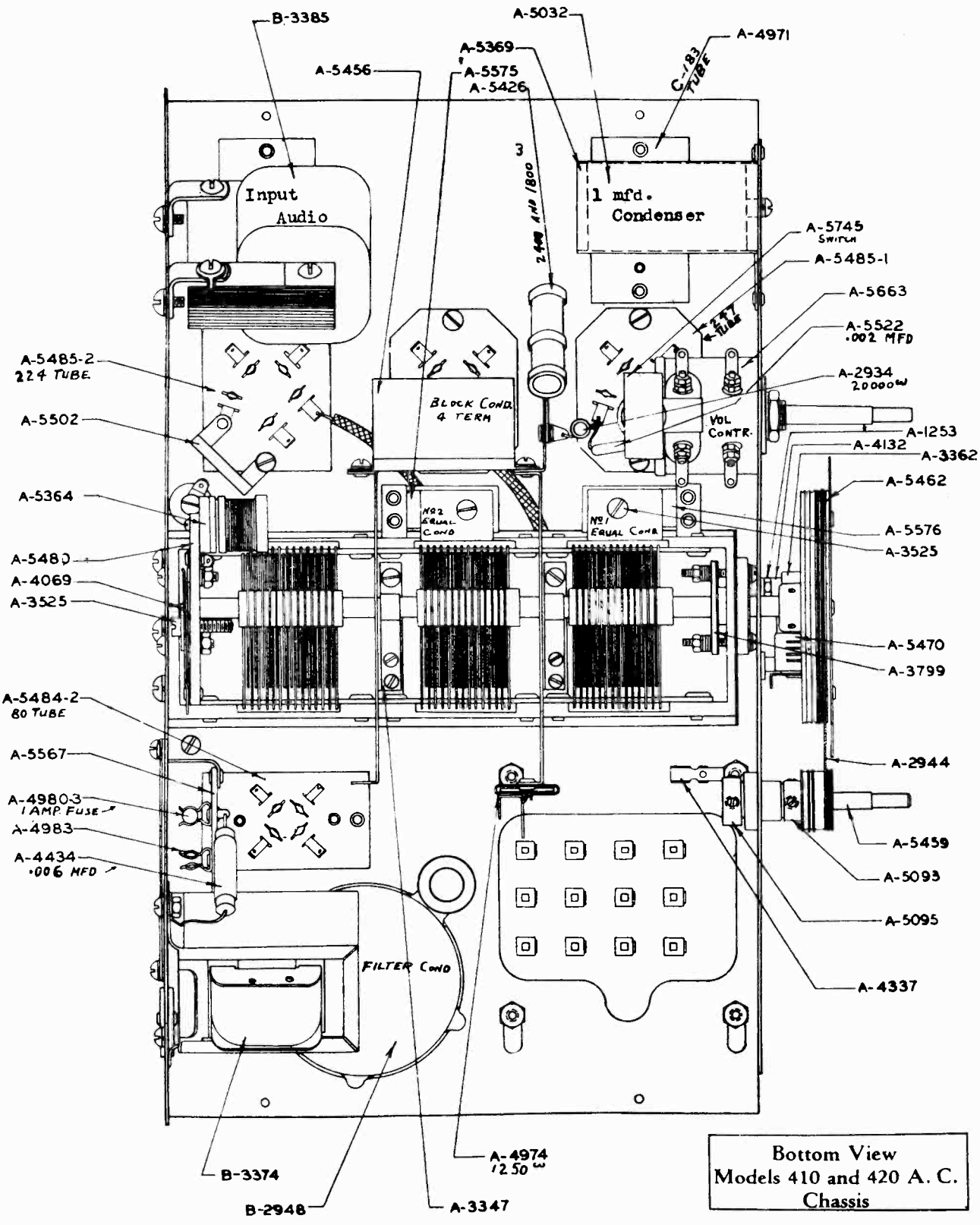


Voltage Readings:

115 volt line with switch set at "Lo".
182 plate volts—115.
182 "C" voltage 22.5 (Across terminals)
182 filament volts 4 to 4.5.
484 volts—18 volts (voltage across 6 tubes in series)
Detector plate volts (volume on) 100 to 108 volts 3 - 4
R. F. plate volt (volum on) 105 to 112 volts 1 - 2
Detector "C" volt 8 to 10 volt 5 - 6
R. F. "C" volts (volume on) 2 to 3 v. 2 - 9
5 - 9

MODEL 420 AC
Chassis

SPARKS WITHINGTON CO.



Bottom View
Models 410 and 420 A. C.
Chassis

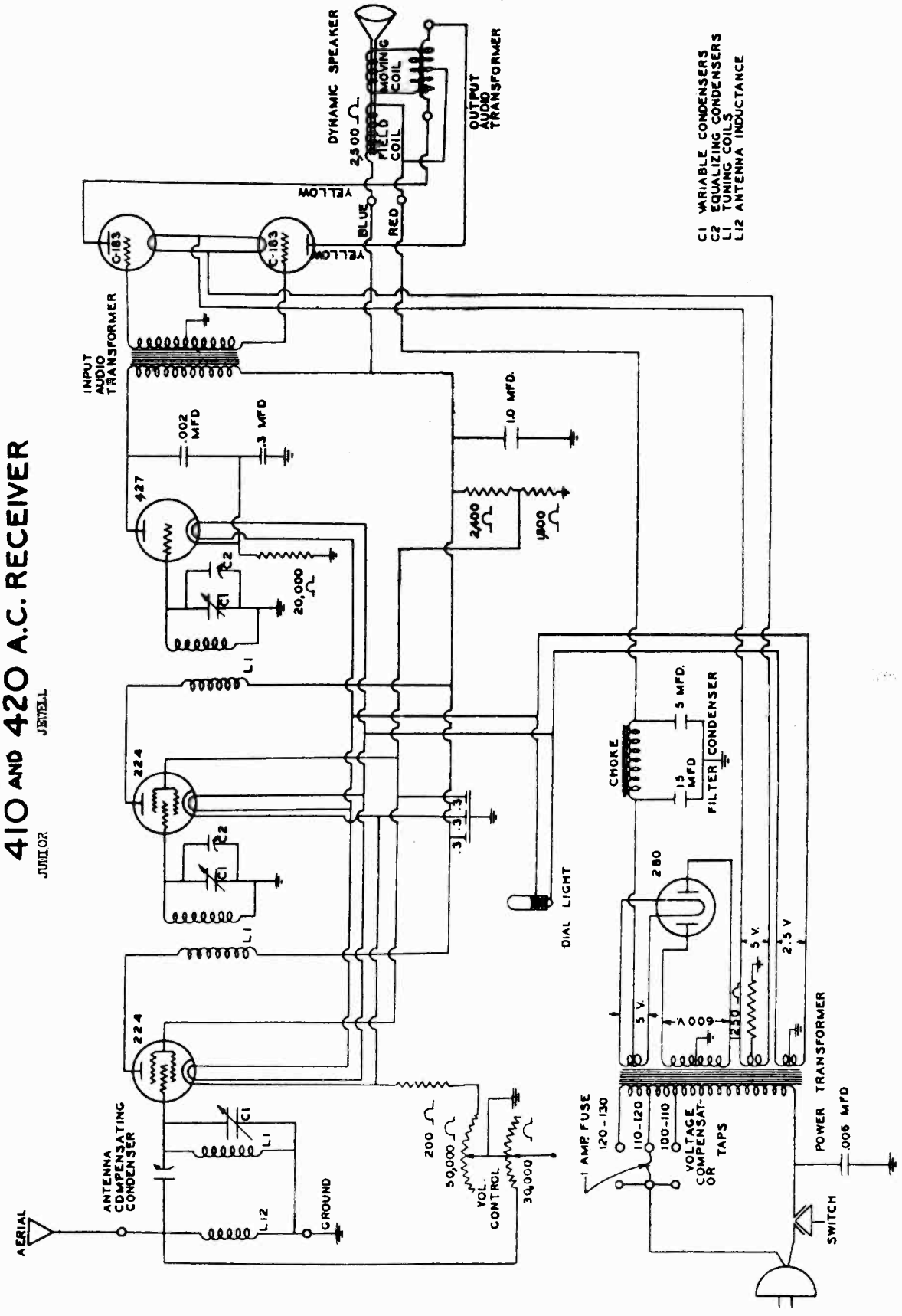
SPARKS WITHINGTON CO.

MODEL 420 AC
Schematic

SPARTON MODEL 410 AND 420 A.C. RECEIVER

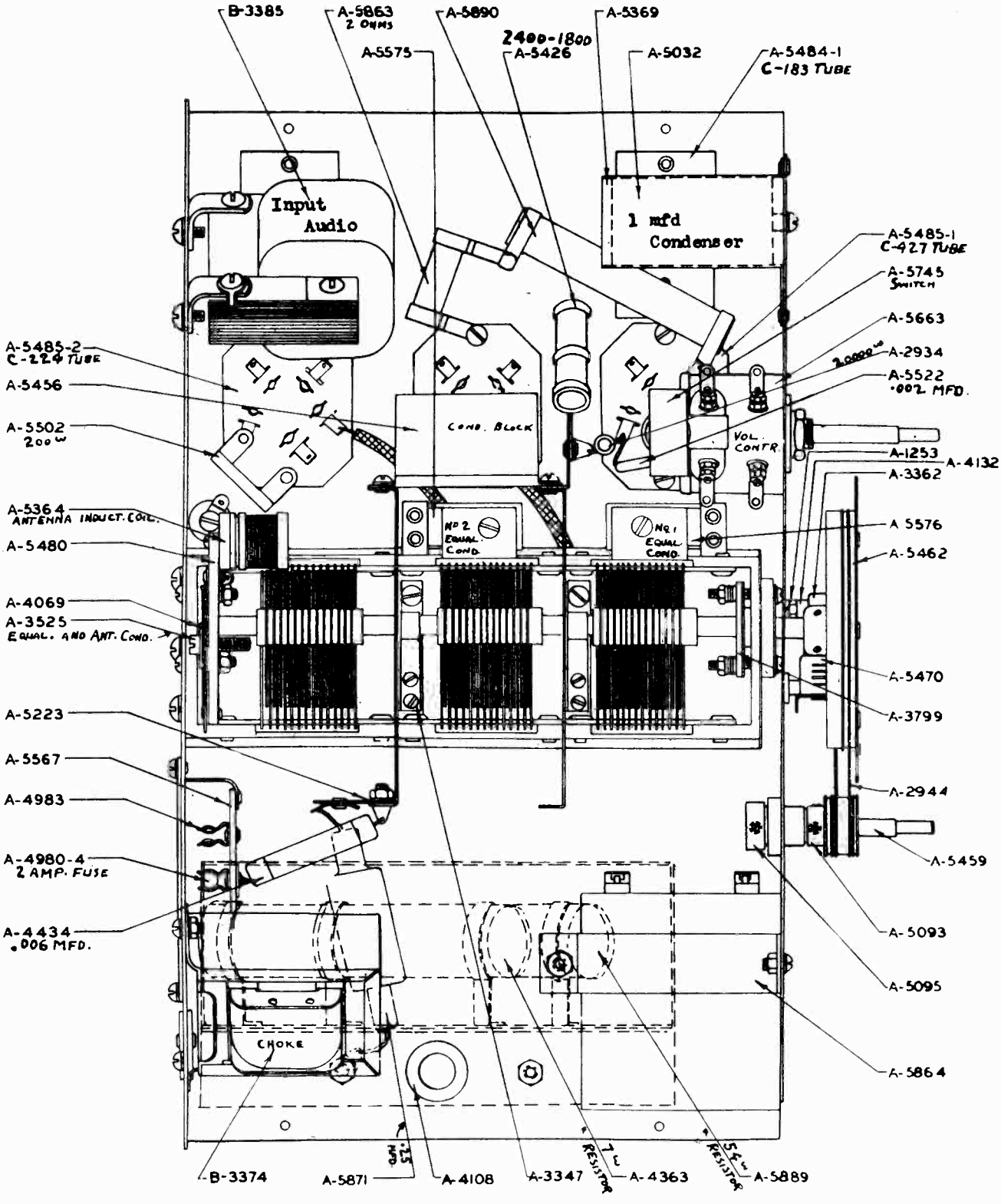
JEWELL

JUNIOR



MODEL 420 DC
Chassis

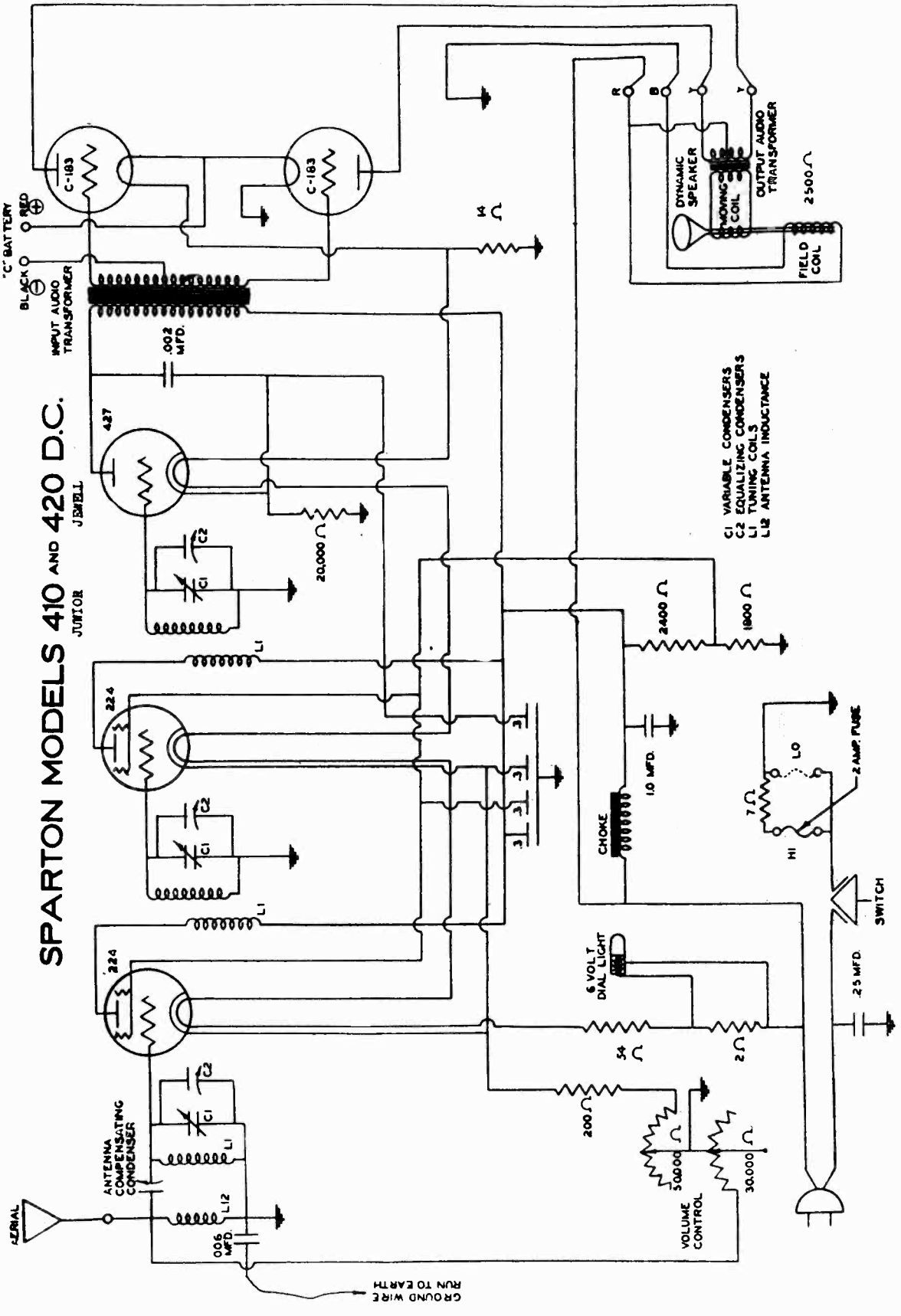
SPARKS WITHINGTON CO.



Bottom View—Model 410 and 420 D. C. Chassis

SPARKS WITHINGTON CO.

MODEL 420 DC
Schematic



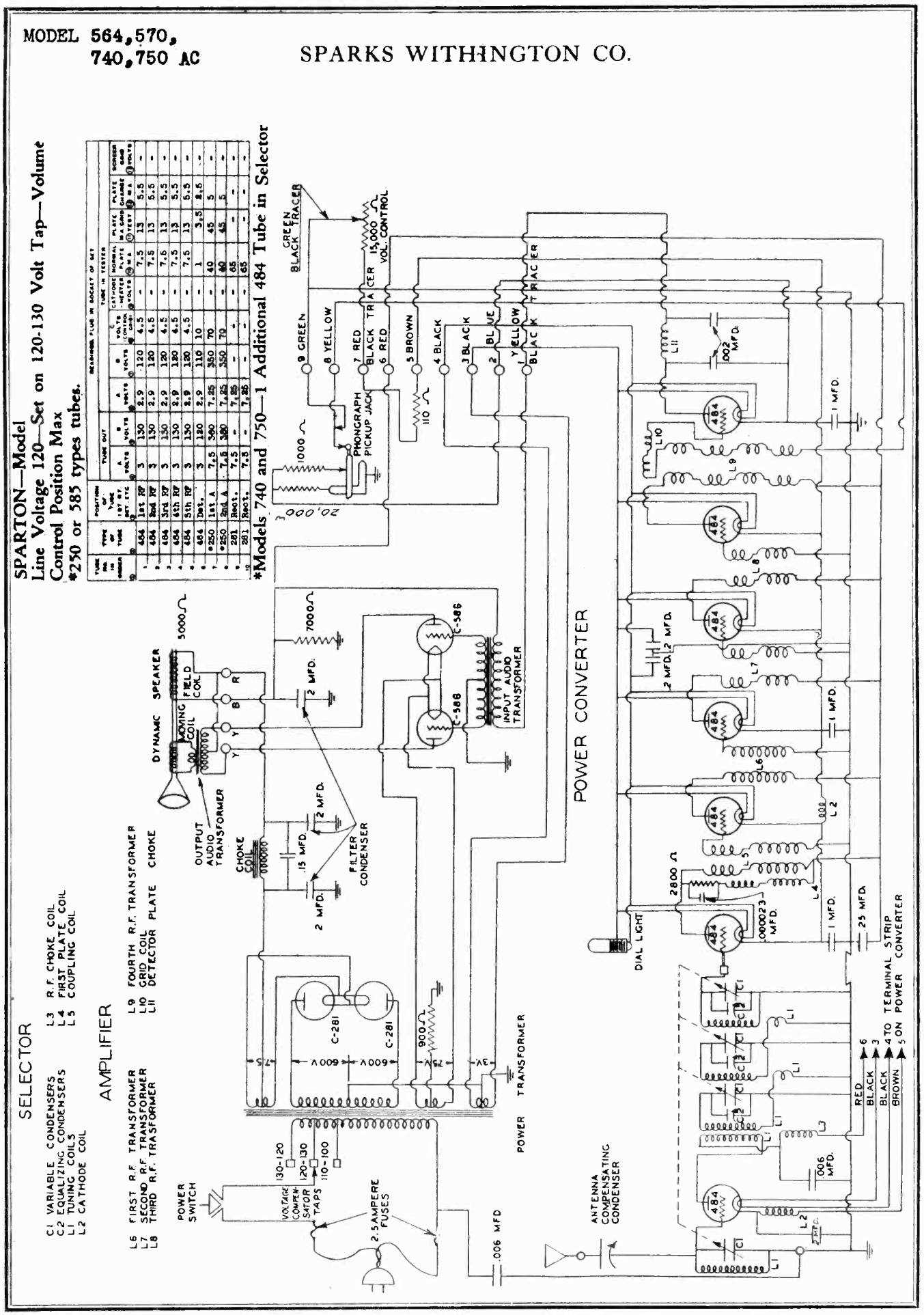
MODEL 564,570,
740,750 AC

SPARKS WITHINGTON CO.

SPARTON—Model
Line Voltage 120—Set on 120-130 Volt Tap—Volume Control Position Max
***250 or 585 types tubes.**

***Models 740 and 750—1 Additional 484 Tube in Selector**

TUBE NO. IN DIAGRAM	TYPE OF TUBE	POSITION OF TUBE LEFT TO RIGHT, SET EYE	TUBE OUT A VOLTS	TUBE OUT B VOLTS	A VOLTS	B VOLTS	C VOLTS (BIAS)	CATHODE METER VOLTS	TUBE IN TESTER NORMAL PLATE MA.	PLATE MA. GRID CHANGE @ TEST	PLATE CHANGE @ MA.	SCREEN GRID @ VOLTS
1	484	1st RF	3	130	2.9	120	4.5	-	7.5	13	5.5	-
2	484	2nd RF	3	130	2.9	120	4.5	-	7.5	13	5.5	-
3	484	3rd RF	3	130	2.9	120	4.5	-	7.6	13	5.5	-
4	484	4th RF	3	130	2.9	120	4.5	-	7.5	13	5.5	-
5	484	5th RF	3	130	2.9	120	4.5	-	7.5	13	6.5	-
6	484	Det.	3	120	2.9	110	10	-	1	3.5	8.5	-
7	*250	1st A	7.5	390	7.25	350	70	-	40	45	5	-
8	*250	2nd A	7.6	380	7.25	350	70	-	40	45	5	-
9	281	Rect.	7.5	-	7.25	-	-	-	65	-	-	-
10	281	Rect.	7.5	-	7.25	-	-	-	65	-	-	-



SPARKS WITHINGTON CO.

Resistor Color Code

Standard Resistor Color Code and Resistors Used In Sparton Radio Receiving Sets and Sparton Ensembles

STANDARD RESISTOR COLOR CODE

0—Black	5—Green
1—Brown	6—Blue
2—Red	7—Violet
3—Orange	8—Gray
4—Yellow	9—White

To determine the value of a resistor, the first significant figure of resistance value is represented by the color of the body of the resistor, and the second figure of resistance value by the color of the tip of the resistor. The number of ciphers following the second figure is determined by the color of the dot or stripe in the center of the body of the resistor. For example, a 20,000 ohm resistor has a red body, black tip, with orange dot or orange stripe. A 2,200 ohm resistor would be red body, with red tip and red dot, or red stripe, and as all colors are the same, it would be a single color resistor.

SPARTON PART NO.	RESISTANCE, OHMS	SIZE, WATTS	OLD COLOR	STANDARD RESISTOR COLOR CODE		
				BODY	TIP	DOT OR STRIPE
A-2934	20,000	2	Green	Red	Black	Orange
A-3397	1,000	2	Tan	Brown	Black	Red
A-3397-X	1,000	0.5	Tan	Brown	Black	Red
A-3423	50,000	2	Red	Green	Black	Orange
*A-3750	1,250	3	Black, Silver Ends	Brown	Orange	Red
A-4107	15,000	5	Black, Silver Ends	Brown	Green	Orange
A-4234	250,000	5	Brown, Blue Ends	Red	Green	Yellow
A-4261	20,000	1	Green	Red	Black	Orange
A-4353	2,800	0.5	Gray	Red	Gray	Red
A-4613	1,700	1	Brown	Brown	Violet	Red
A-4614	10,000	1	Blue	Brown	Black	Orange
A-5139	30,000	1	Red	Orange	Black	Orange
A-5180	5,000	15	Green	Green	Black	Red
A-5269	500,000	1	Green	Black	Black	Yellow
A-5270	250,000	1		Red	Green	Yellow
A-5354	100,000	1		Brown	Black	Yellow

*1250 ohm resistors same color scheme as 1300 ohm resistors.

Standard Resistor Color Code Is Not Applied to Vitreous Enamel Resistors

SPARTON PART NO.	RESISTANCE OHMS	SIZE WATTS	COLOR	SPARTON PART NO.	RESISTANCE OHMS	SIZE WATTS	COLOR
A-4363	7	20	Blue	A-4365	15	50	Blue
A-4364	12	30	Blue	A-5177	160	1	Blue
A-4365	63	10	Blue	A-5426	2,400-1,800	8	Blue
A-5889	54	175	Blue	A-5990	14	6	Blue

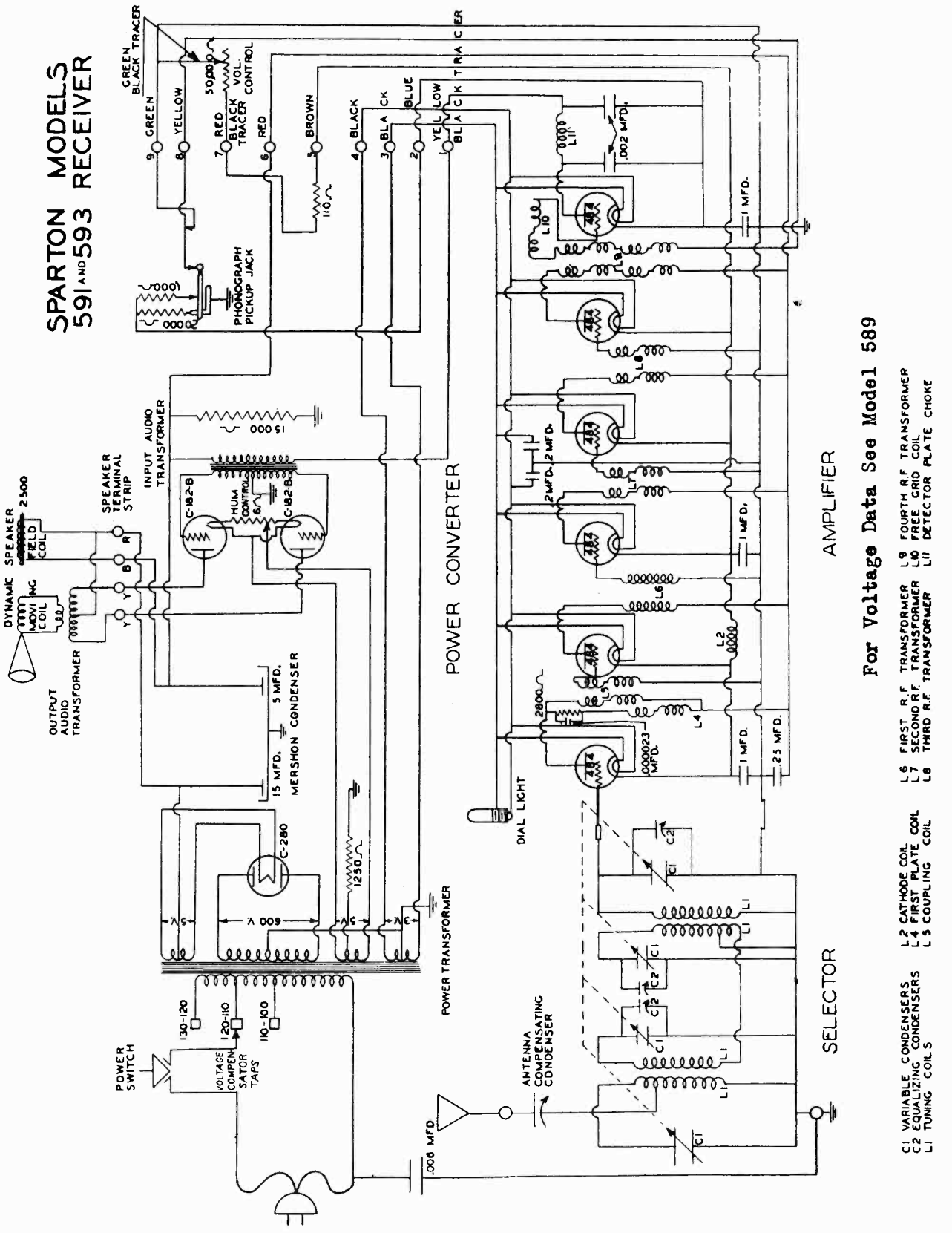
Standard Color Code Is Not Applied to Wire Wound Resistors

SPARTON PART NO.	RESISTANCE OHMS	SIZE, WATTS	COLOR	SPARTON PART NO.	RESISTANCE OHMS	SIZE, WATTS	COLOR
A-3383	3,000	10	Black	A-4915	110	1	Black
A-3535	7,000	10	Black	A-4974	1,250	5	Gray
A-3536	900	10	Black	A-5137	330	1	Gray
A-3811	30,000	0.5	Black	A-5502	200	1	Red
A-4260	7,000-2,000	20	Black	A-5861	57	175	Blue
A-4363	7	20	Black	A-5862	12	10	Blue
A-4583	7,000	10	Black	A-5863	2	5	Blue
A-4670	110	1	Black				

MODEL 591,593 AC

SPARKS WITHINGTON CO.

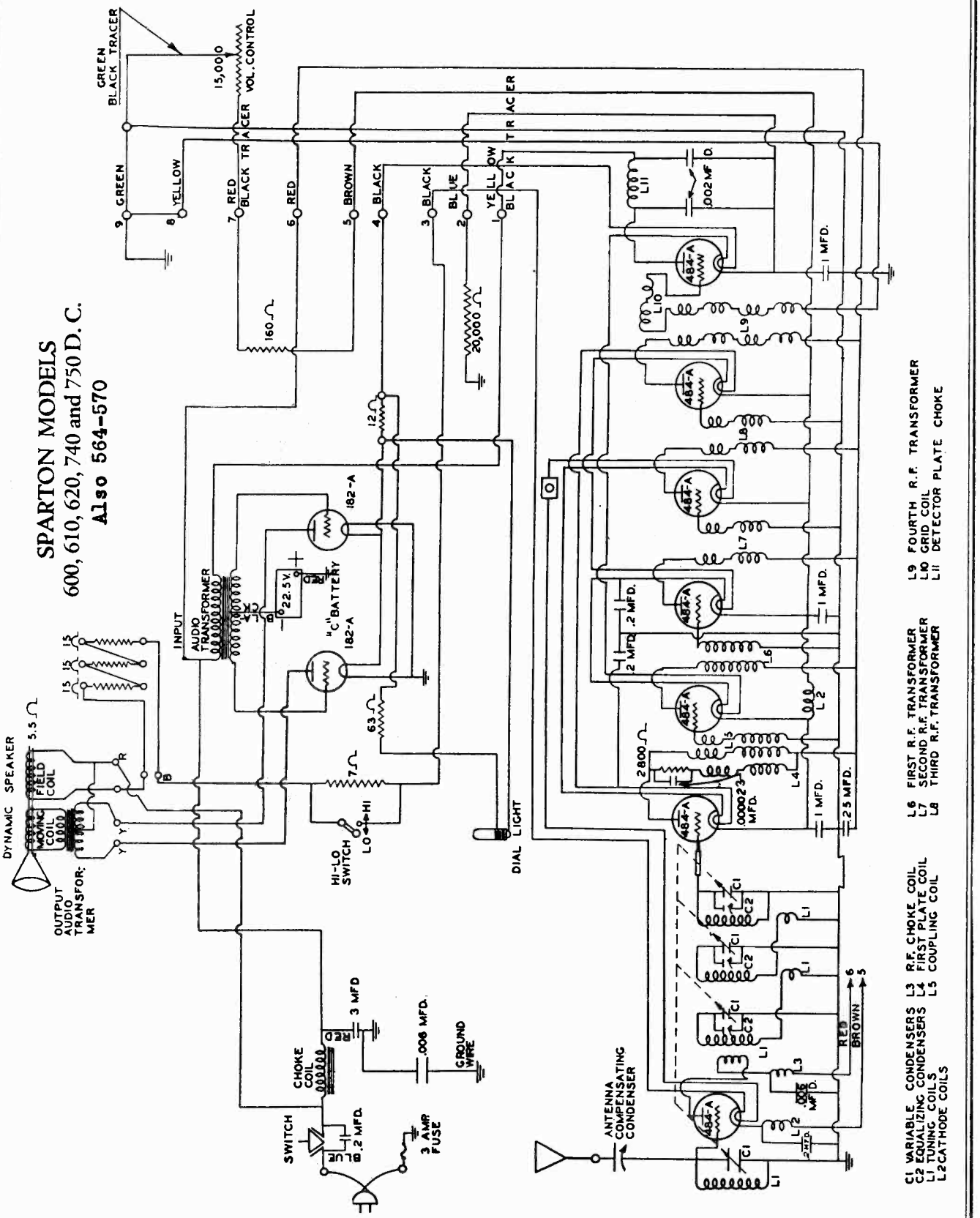
SPARTON MODELS 591 AND 593 RECEIVER



SPARKS WITHINGTON CO.

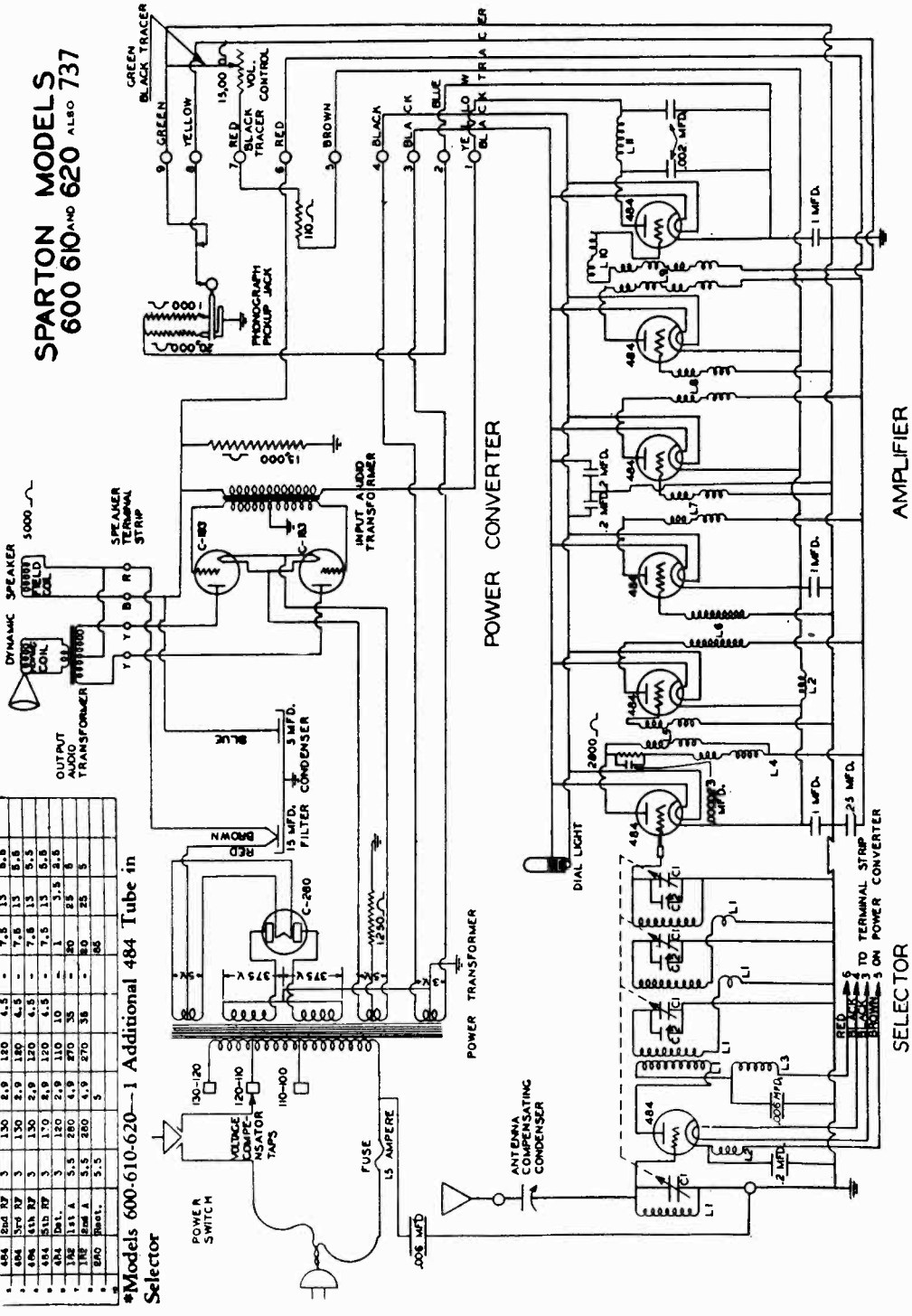
MODEL DC 564,570
600,610,620,
740,750

SPARTON MODELS
600, 610, 620, 740 and 750 D. C.
Also 564-570



MODEL 600,610,620,
737 AC.
737 Below # 6502

SPARKS WITHINGTON CO.



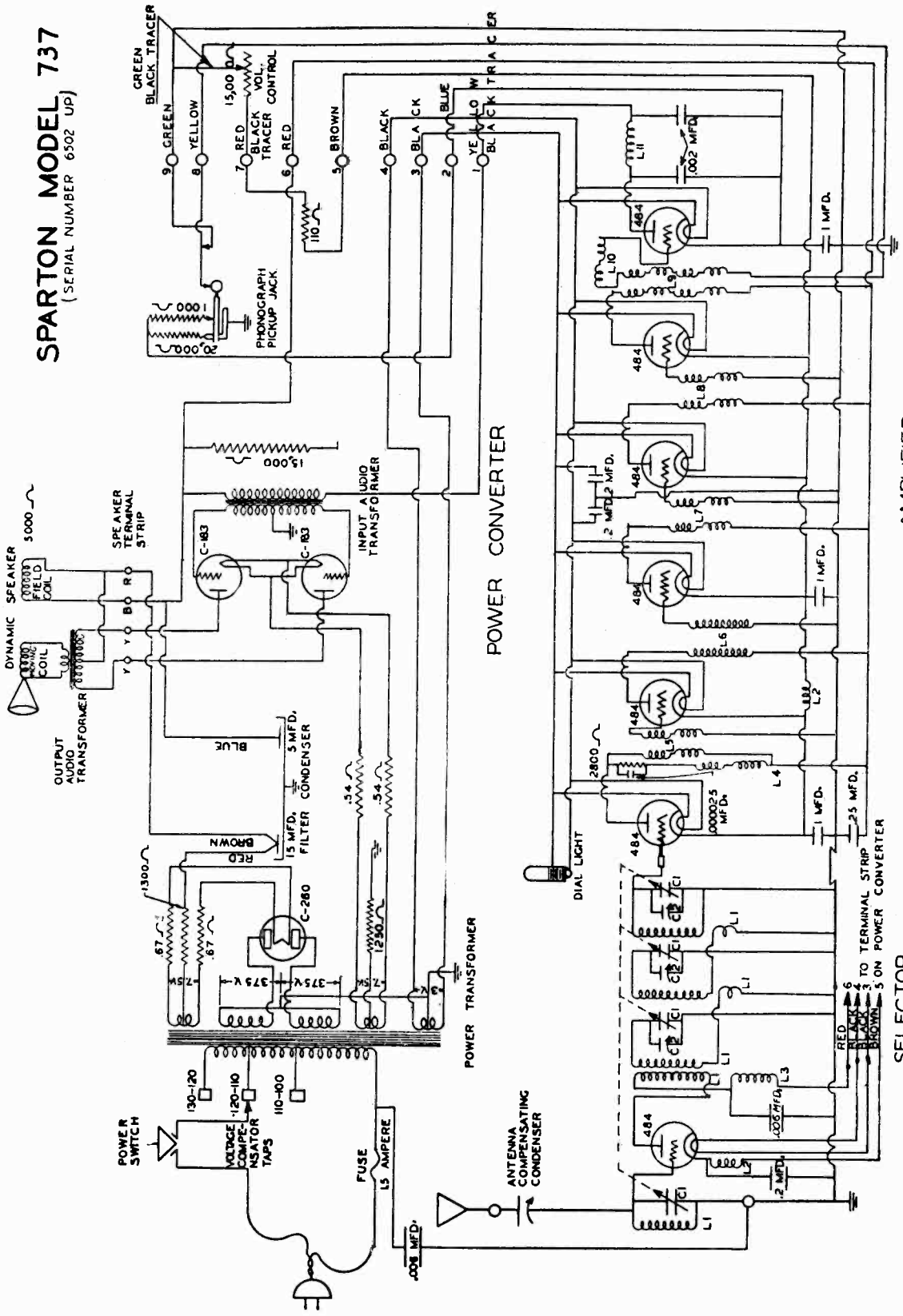
SPARTON—Model 610-620*
Line Voltage 120—Set on 120-130 Volt Tap—Volume Control Position Max

TUBE NO.	TYPE OF TUBE	POSITION OF SELECTOR	TUBE OUT			TUBE IN TESTER							
			A VOLTS	B VOLTS	C VOLTS	A VOLTS (CONTROL)	B VOLTS (CONTROL)	CATHODE MILLIAMPERES	PLATE MILLIAMPERES	PLATE CURRENT (MA)	SCREEN GRID CURRENT (MA)		
1	484	1st RF	3	130	2.9	120	6.5	-	7.5	1.3	5.5		
2	484	2nd RF	3	130	2.9	120	6.5	-	7.5	1.3	5.5		
3	484	3rd RF	3	130	2.9	120	6.5	-	7.5	1.3	5.5		
4	484	4th RF	3	130	2.9	120	6.5	-	7.5	1.3	5.5		
5	484	5th RF	3	130	2.9	120	6.5	-	7.5	1.3	5.5		
6	484	Det.	3	130	2.9	120	6.5	-	7.5	1.3	5.5		
7	182	1st A	3.5	280	4.9	270	35	-	30	25	8		
8	182	2nd A	3.5	280	4.9	270	36	-	30	25	5		
9	280	Rect.	5.5		5				85				

*Models 600-610-620—1 Additional 484 Tube in Selector

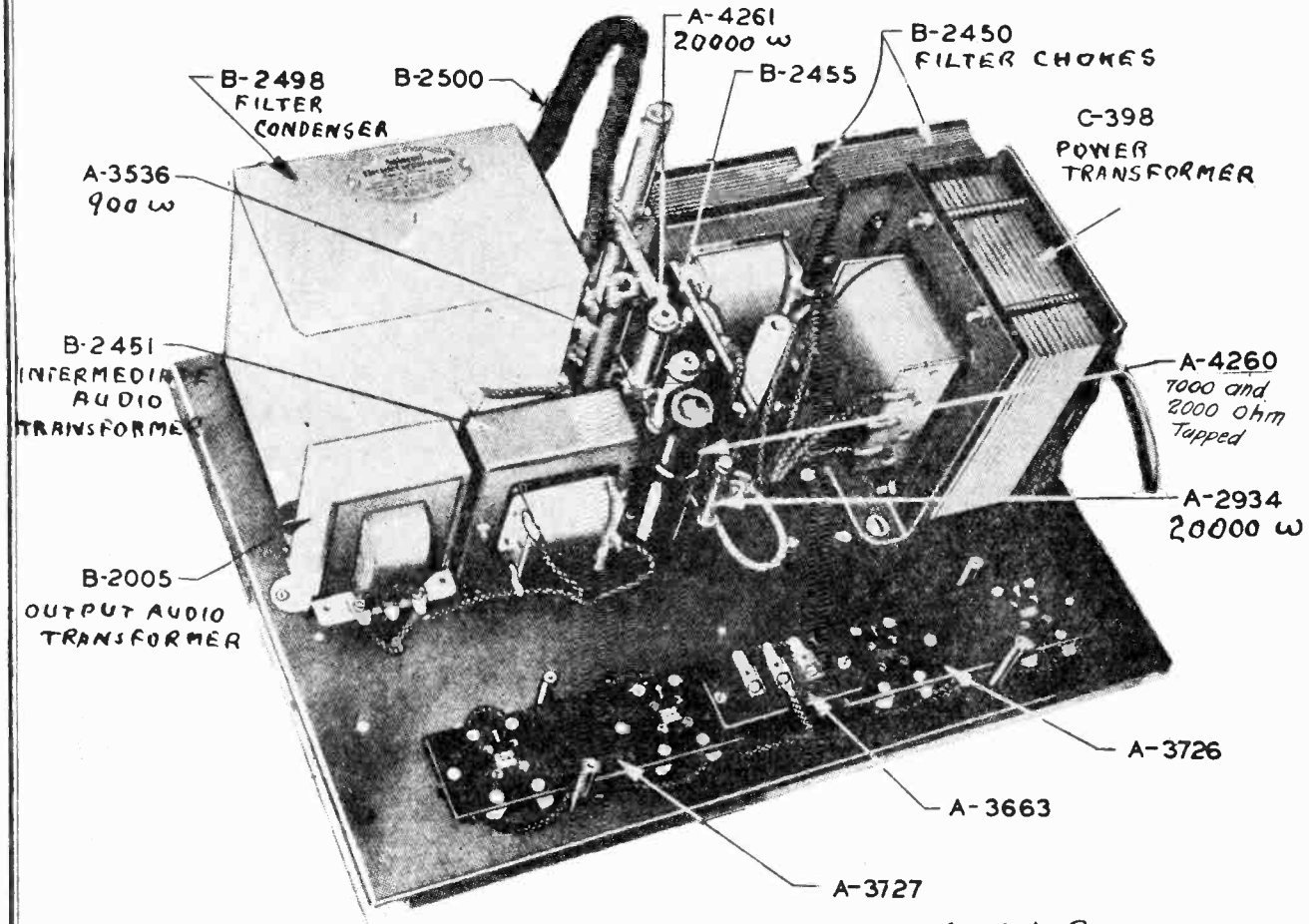
SPARKS WITHINGTON CO.

MODEL 737 AC
Above # 6502

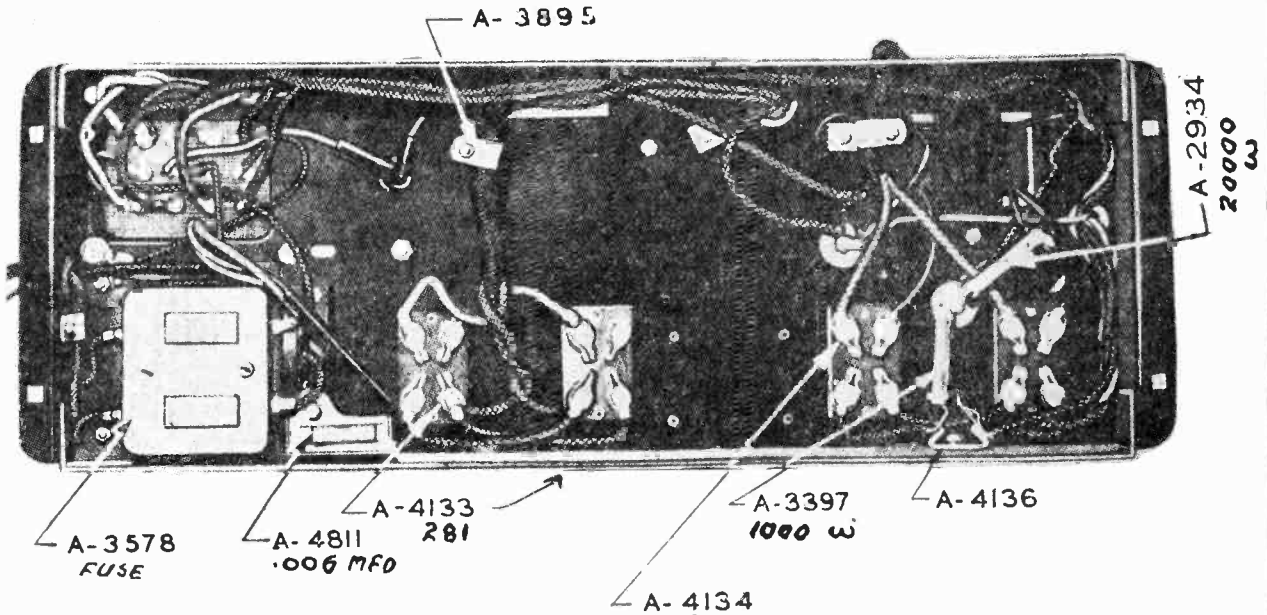


Power Converter

SPARKS WITHINGTON CO.



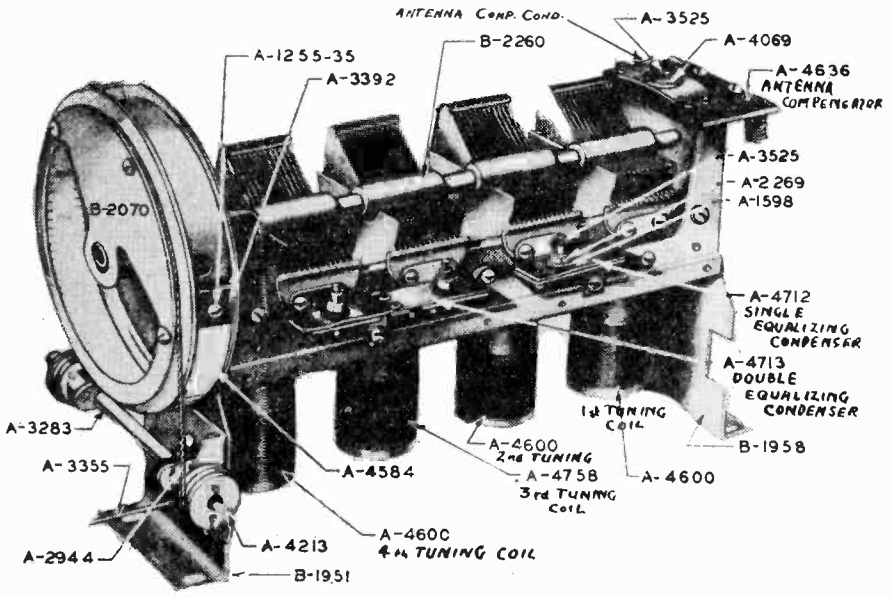
Inside View—Power Convertor, Models 111-A and 870 A. C.
ALSO 574



Bottom View—Power Convertor. Models 103, 301-A, 578, 740 and 750 A. C.

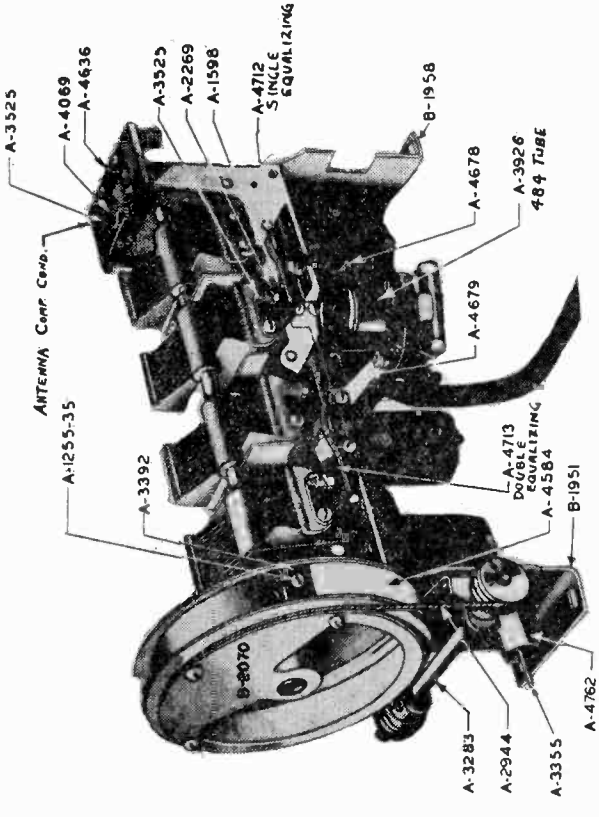
Selector Unit

SPARKS WITHINGTON CO.



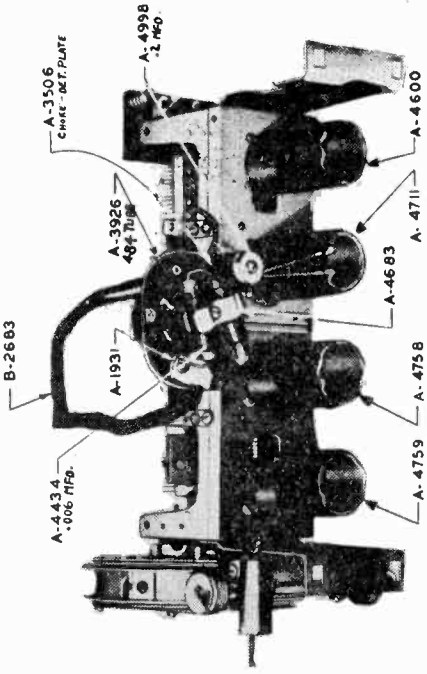
Inside View—Selector Unit Models 301, 591, 593 and 931 A. C. and D. C

Note: D. C. Models use A-4388 Antenna Compensating Condenser.



Top View—Selector Unit, Models 103, 111-A, 235, 301-A, 564, 570, 574, 578, 589, 600, 610, 620, 737, 740, 750 and 870 A. C. and D. C.

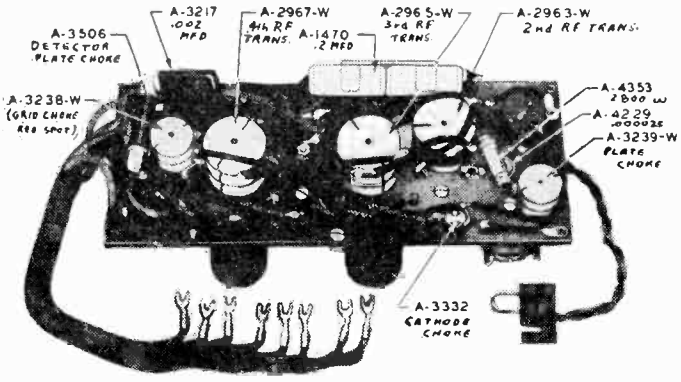
Note: D. C. Models use A-5276 Antenna Compensating Condenser.



Bottom View—Selector Unit Models 103, 235, 301-A, 564, 570, 574, 578, 589, 600, 610, 620, 717, 740 750 and 870 A. C. and D. C.

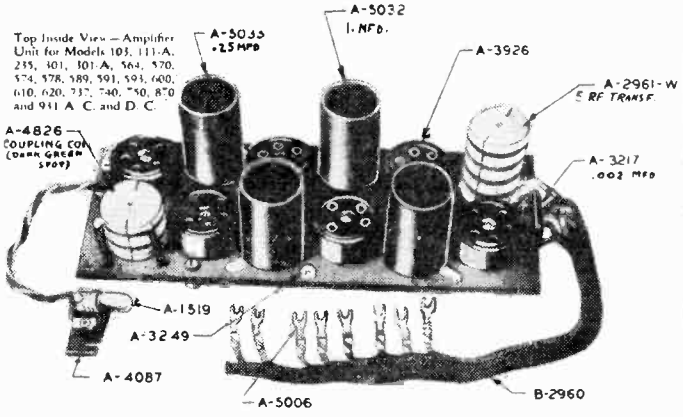
Amplifier Unit
Connector Unit

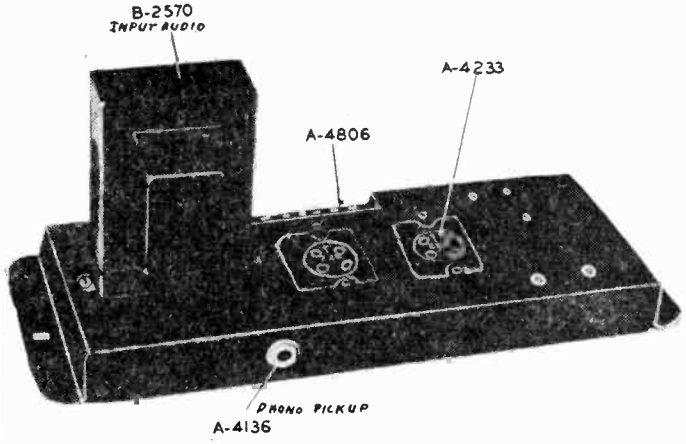
SPARKS WITHINGTON CO.



(Left) Bottom Inside View of Amplifier Unit - Models 103 - 111A- 235- 301- 301A- 564- 570- 578- 589- 600- 610- 650- 737- 740- 750- 870- and 931 AC and DC.

(Right) Top Inside View of Amplifier Unit- Models 103- 111A- 235- 301- 301A- 564- 570- 574- 578- 589- 591- 593- 600- 610- 620- 737- 740- 750- 870- 931 AC and DC.

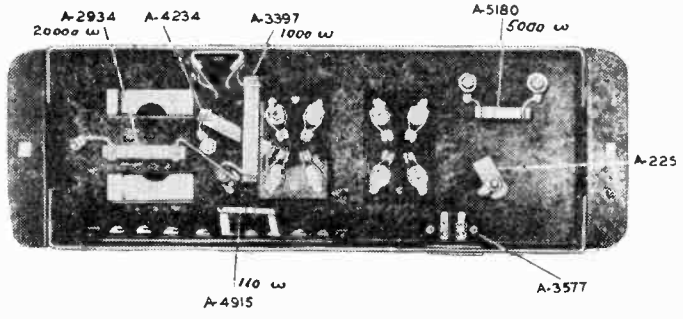




Top View—Connector Unit, Models 111-A and 870 A. C.

(Left) Top View of Connector Unit for Models 111A and 870 AC

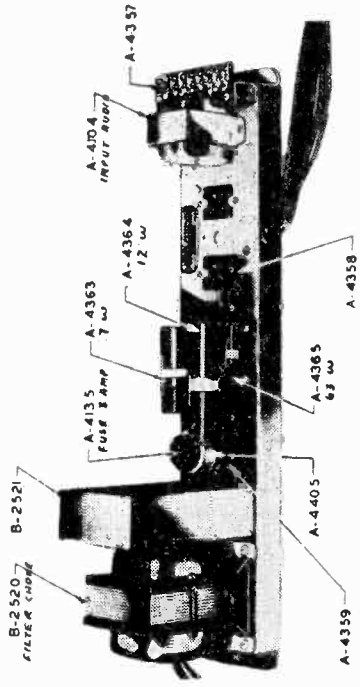
(Right) Bottom View of Connector Unit for Models 111A- 574- 870 AC



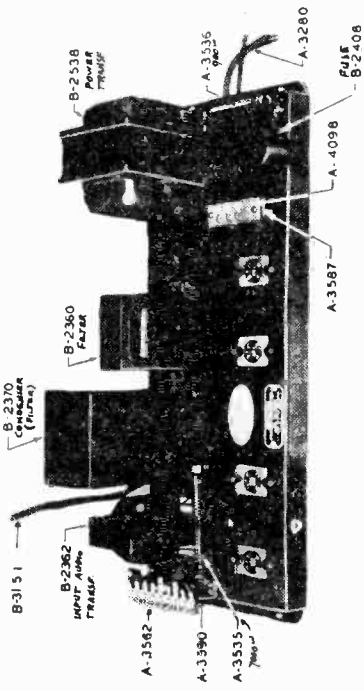
Bottom View—Connector Unit, Models 111-A and 870 A. C.
ALSO 574

SPARKS WITHINGTON CO.

Power Converter

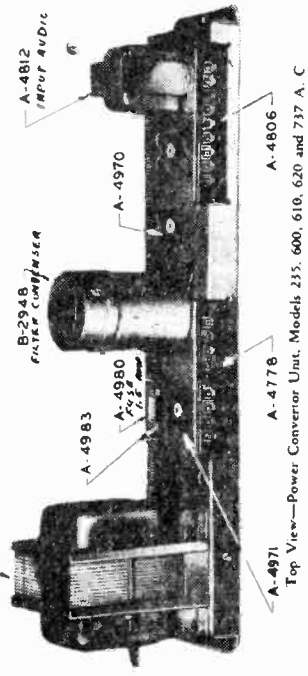


Top View—Power Convertor, Models 235, 600, 610, 620, 737, 740, 750 D. C.

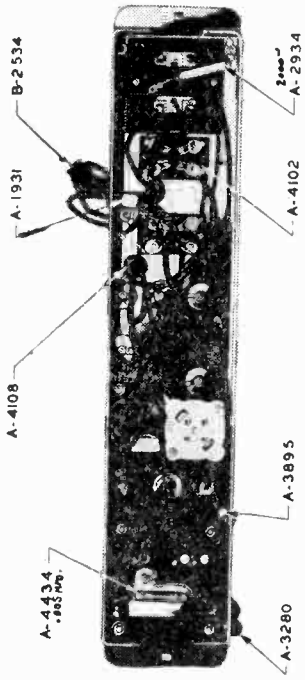


Top View—Power Convertor—Models 101, 101-A, 578, 740 and 750 A. C.

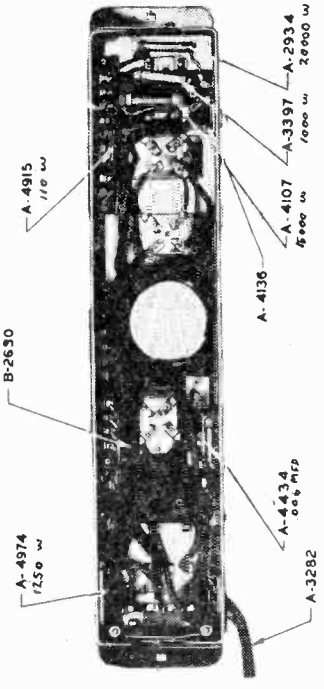
Note: Models 103 and 578 use 302-121B cable instead of B-3151, and B-2320 Filter Condenser instead of B-2370, A-1562 Terminal Block, and A-3590 Terminal Block Brackets are not used



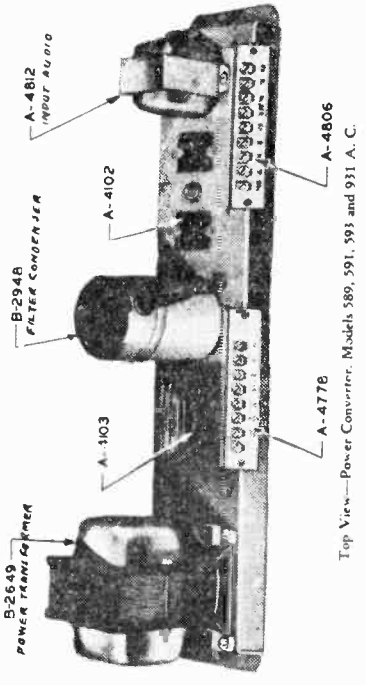
Top View—Power Convertor Unit, Models 235, 600, 610, 620 and 737 A. C



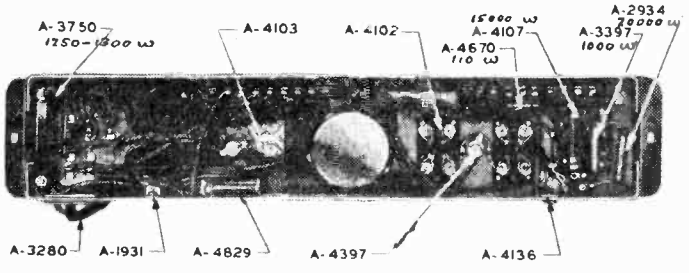
Bottom View—Power Convertor, Models 235, 600, 610, 620, 737, 740 and 750 D. C.



Bottom View—Power Convertor, Models 235, 600, 610 and 620 A. C.



Top View—Power Convertor, Models 589, 591, 593 and 931 A. C.



Bottom View—Power Convertor, Models 589, 591, 593 and 931 A. C.

Sparton
Tube Data

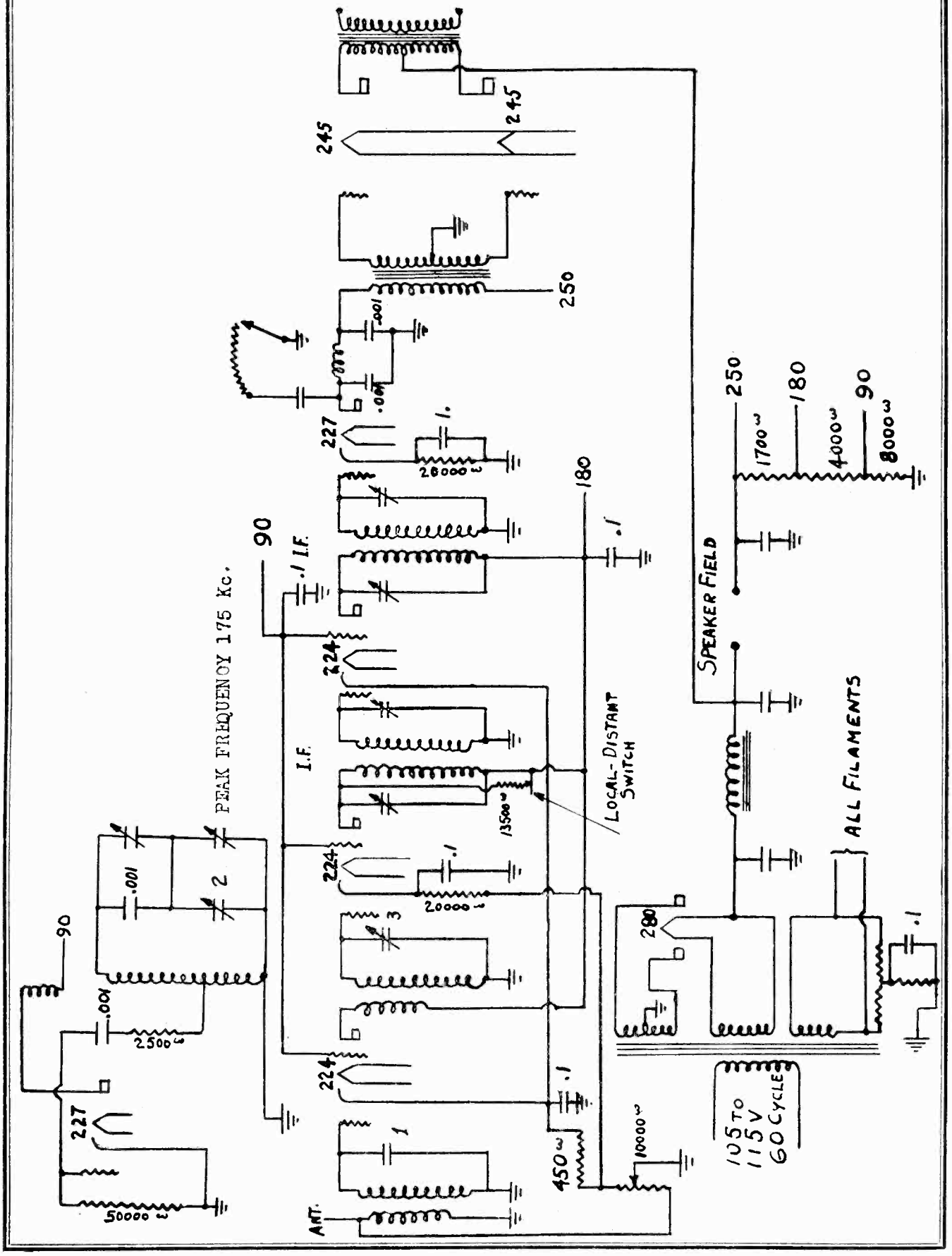
SPARKS WITHINGTON CO.

Characteristics of Sparton Tubes

Type	Base	Use	"A" Supply	Filament Voltage	Filament Current Amperes	Detector Plate Voltage	Detector Plate Current Milli-Amps	Amplifier Plate Voltage	Grid Voltage	Amplifier Plate Current Milli-amps	Plate Impedance Ohms	Mutual Conductance Micromhos	Amplification Factor
C-112-A	Standard 4 prong	Power Amplifier	Stor. 6 volt Transformer 5 volts	5.0	0.25	-------	-------	135 157.5 180	—9.0 —10.5 —13.5	7.0 9.5 7.8	5000 4700 4700	1600 1700 1700	8.0
C-181	Side Pin 4 prong	Power Amplifier	Transformer 3 Volts	3.0	1.3	-------	-------	200	—40	16	2850	1050	3.0
C-182	Standard 4 prong	Power Amplifier	Transformer 5 Volts	5.0	0.9	-------	-------	200	—45	18	2000	1500	3.0
C-182-A	Standard 4 prong	Direct Current Power Amplifier	Transformer 5 Volts	5.0	0.8	-------	-------	200	—45	18	2000	1500	3.0
C-182-B	Standard 4 prong	Power Amplifier	Transformer 5 Volts	5.0	1.25	-------	-------	200	—29	18	3330	1500	5.0
C-183	Standard 4 prong	Power Amplifier	Transformer 5 Volts	5.0	1.25	-------	-------	200	—45	20	2000	1500	3.0
C-210	Standard 4 prong	Power Amplifier	Transformer 7.5	7.5	1.25	-------	-------	350	—27	20	5500	1450	8.0
C-231	Standard 4 prong	Power Amplifier	6 dry cells Series Parallel	2.0	0.150	-------	-------	135	—22.5	8.0	4000	875	3.5
C-245	Standard 4 prong	Power Amplifier	Transformer 2.5	2.5	1.5	-------	-------	180 250	—33 —50	26 32	1460 2250	2400 1450	3.5
C-586	Standard 4 prong	Power Amplifier	Transformer 7.5	7.5	1.25	-------	-------	250 350 450	—45 —63 —84	28 45 55	2150 2000 1950	1575 1700 1750	3.4
C-201-A	Standard 4 prong	Detector Amplifier	Storage 6 volts	5.0	.25	45	1.5	90 135	—4.5 —9.0	2.5 3.0	11000 10000	725 800	8.0
C-230	Standard 4 prong	Detector Amplifier	6 dry cells Series Parallel	2.0	0.060	45	1.5	90	—4.5	2.0	12500	700	8.8
C-401	Side Pin 4 prong	Detector Amplifier	3 Volts	3.0	1.3	45	2	90 120	—3 —4	5.0 6.0	9500 7000	1000 1200	9.5 8.7
C-427	Standard 5 prong	Detector Amplifier	2.5 Volts	2.5	1.75	180	0.8	90	—3	5.0	10800 9300	1150	12.5
C-484	Standard 5 prong	Detector Amplifier	3 Volts	3.0	1.3	135	0.8	90 120	—3 —4	5.0 6.0	10800 9300	1150 1350	12.5
C-484-A	Standard 5 prong	Direct Current Detector Amplifier	3 volts D. C.	3.0	1.6	100	0.5	90 120	—3 —4	5.0 6.0	9300	1150 1350	12.5
C-226	Standard 4 prong	Amplifier	1.5 Volts	1.5	1.05	-------	-------	180	—13.5	6.0	7000	1170	8.2
C-686	Standard 5 prong	Amplifier	Storage 6 volts	3.0	.25	-------	-------	90	—3.0	3.0	28000	450	12.5
C-224	Standard 5 prong	Screen Grid Amplifier	Storage 6 Volt Transformer 2.5 Volt	2.5	1.75	Screen Grid Voltage Plus 90	-------	180	—3.0	4.0	400000	1000	400
C-232	Standard 4 prong	Screen Grid Amplifier	6 dry cells Series Parallel	2.0	0.060	Screen Grid Voltage Plus 67.5	-------	135	—3.0	1.5	800000	550	440
C-280	Standard 4 prong	Full Wave Rectifier	5.0 Volts	5.0	2.0	Max. A. C. Voltage per plate 350 Volts R. M. S. Max. Rectified Current 125 M. A.							
C-281	Standard 4 prong	Half Wave Rectifier	7.5 Volts	7.5	1.25	Max. A. C. Voltage per plate 700 R. M. S. Max. Rectified Current 85 M. A.							

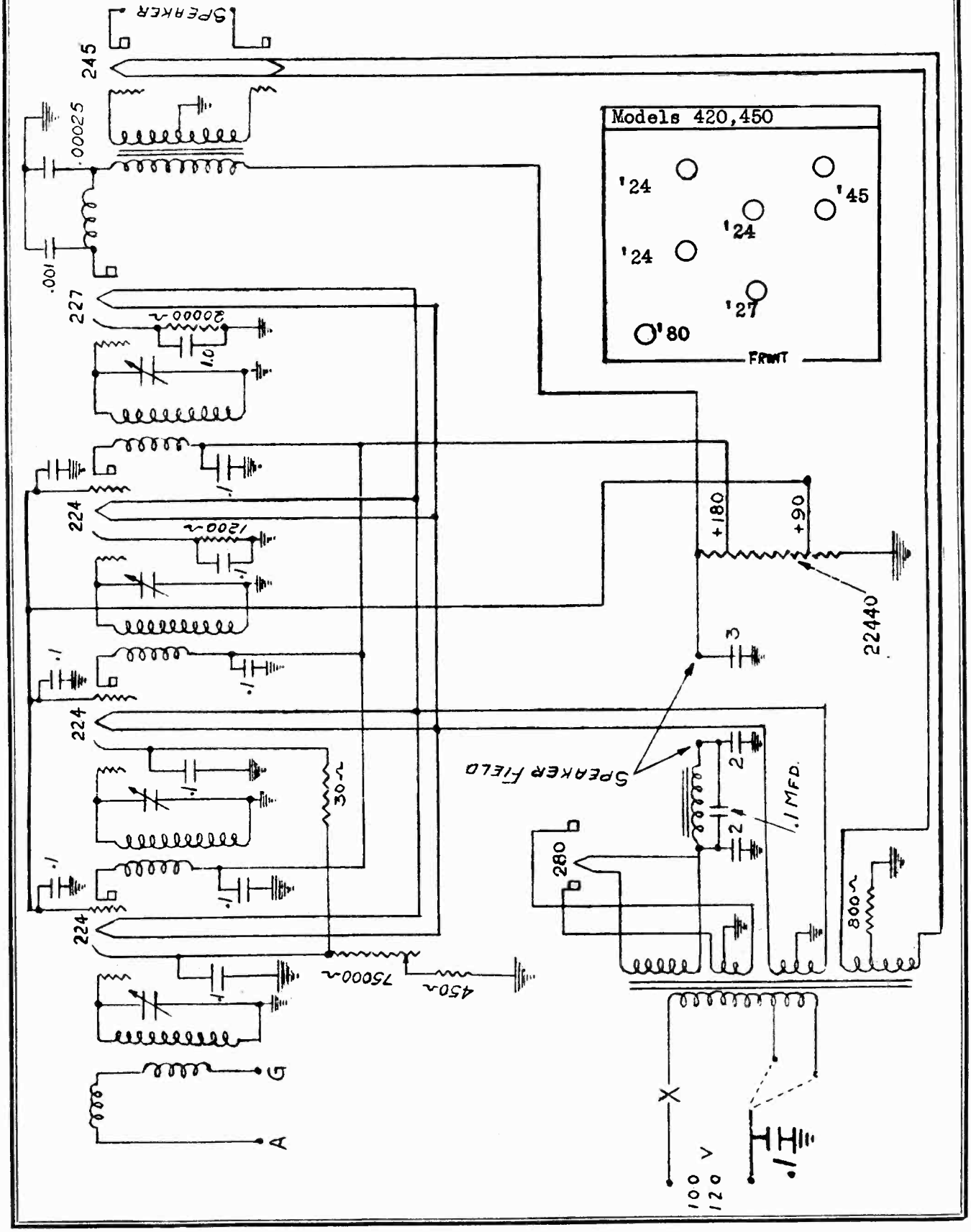
STEINITE RADIO CO.

MODEL 203,600,605,
630,635,642,643
(Chassis 22)



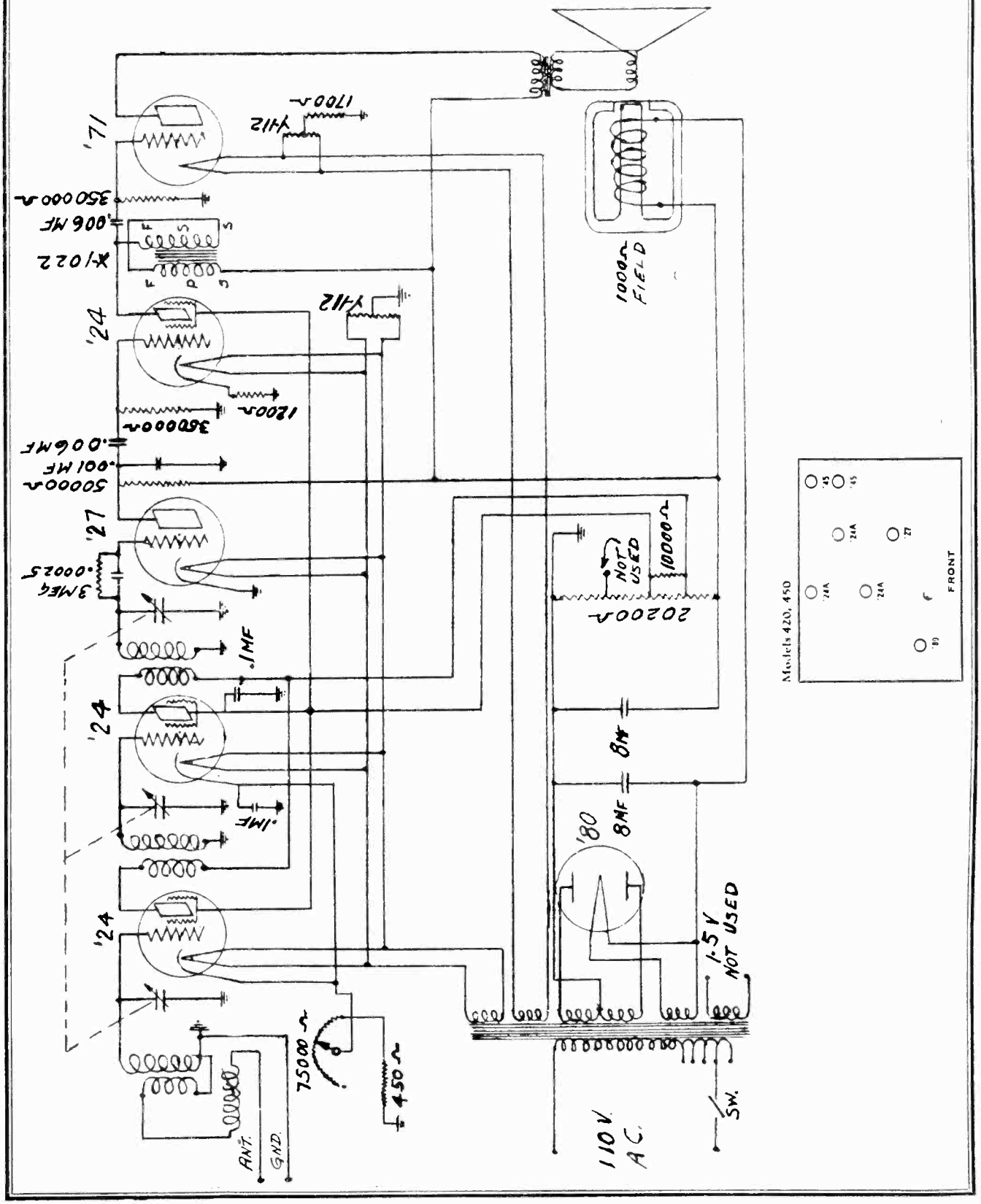
MODEL 420,450
(Chassis 17)
Schematic

STEINITE RADIO CO.



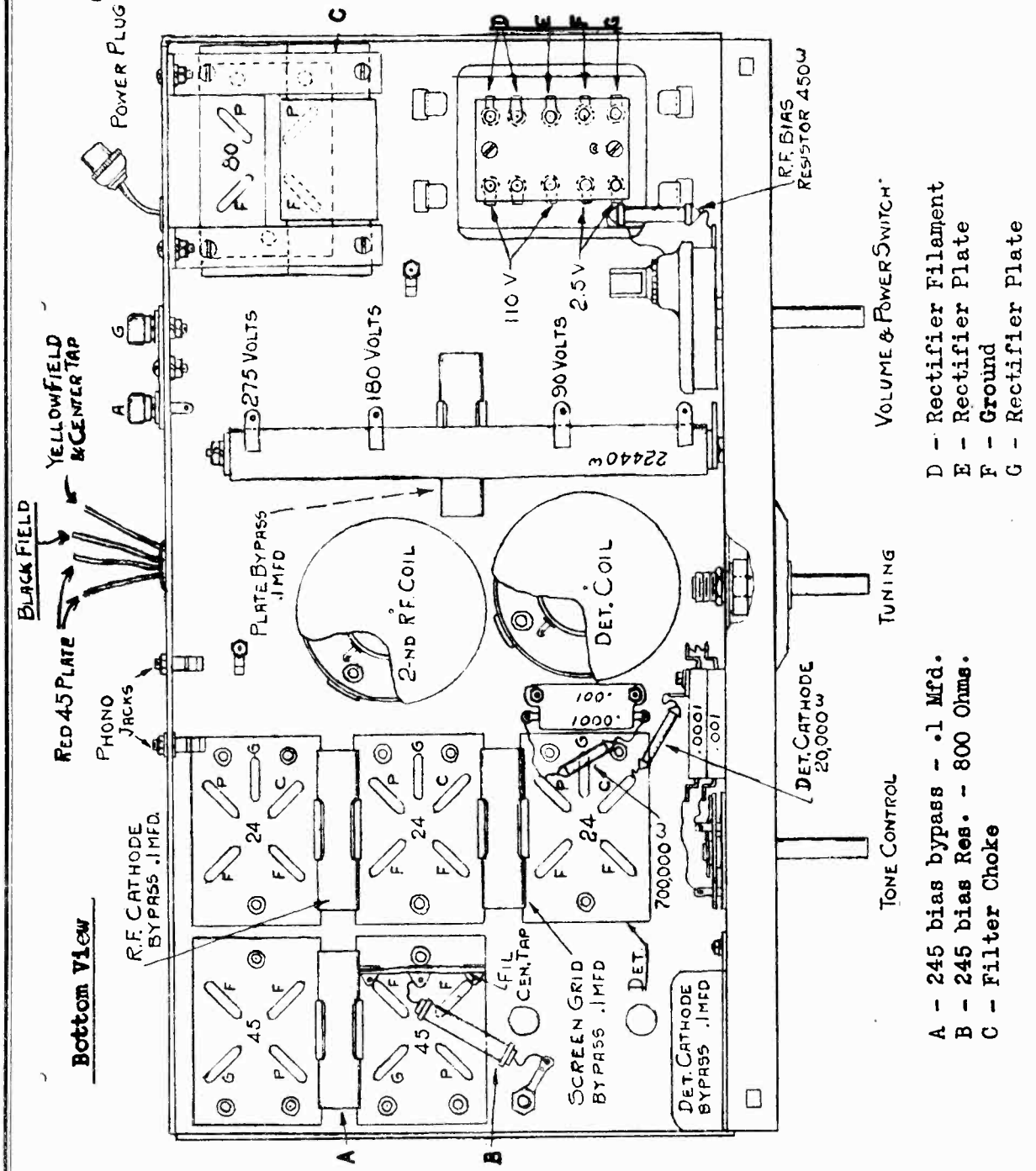
STEINITE RADIO CO.

MODEL 420,450
(Chassis 15)
Schematic



MODEL 421,425
(Chassis 21)
Voltage, Chassis

STEINITE RADIO CO.



D - Rectifier Filament
E - Rectifier Plate
F - Ground
G - Rectifier Plate

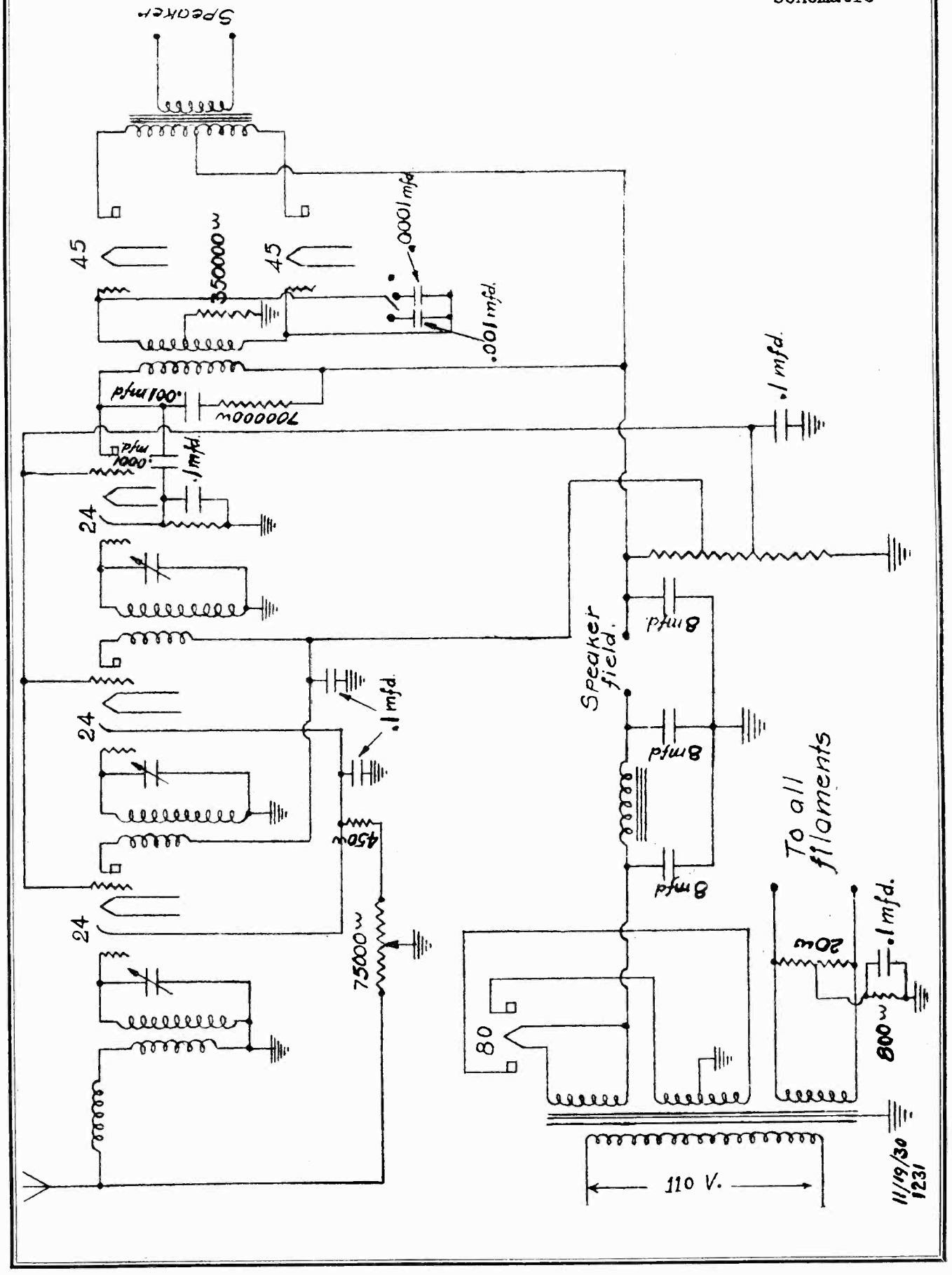
A - 245 bias bypass - .1 Mfd.
B - 245 bias Res. - 800 Ohms.
C - Filter Choke

Readings obtained with
Line Volt. = 110
Vol. Cont. Max.

'24 and '45 filaments	2.2 v
'80 filament	4.5 v
R.F. screen grids (to ground)	90 v
R.F. plates (to ground)	180 v
Detector Plate (to ground)	250 v
Detector screen grid (to ground)	90 v
R.F. Cathode to ground	
Volume Control Maximum	3 v
Volume Control minimum	10 v
Detector Cathode (to ground)	10 v
'45 plate (to ground)	275 v
All filaments to ground	40 v

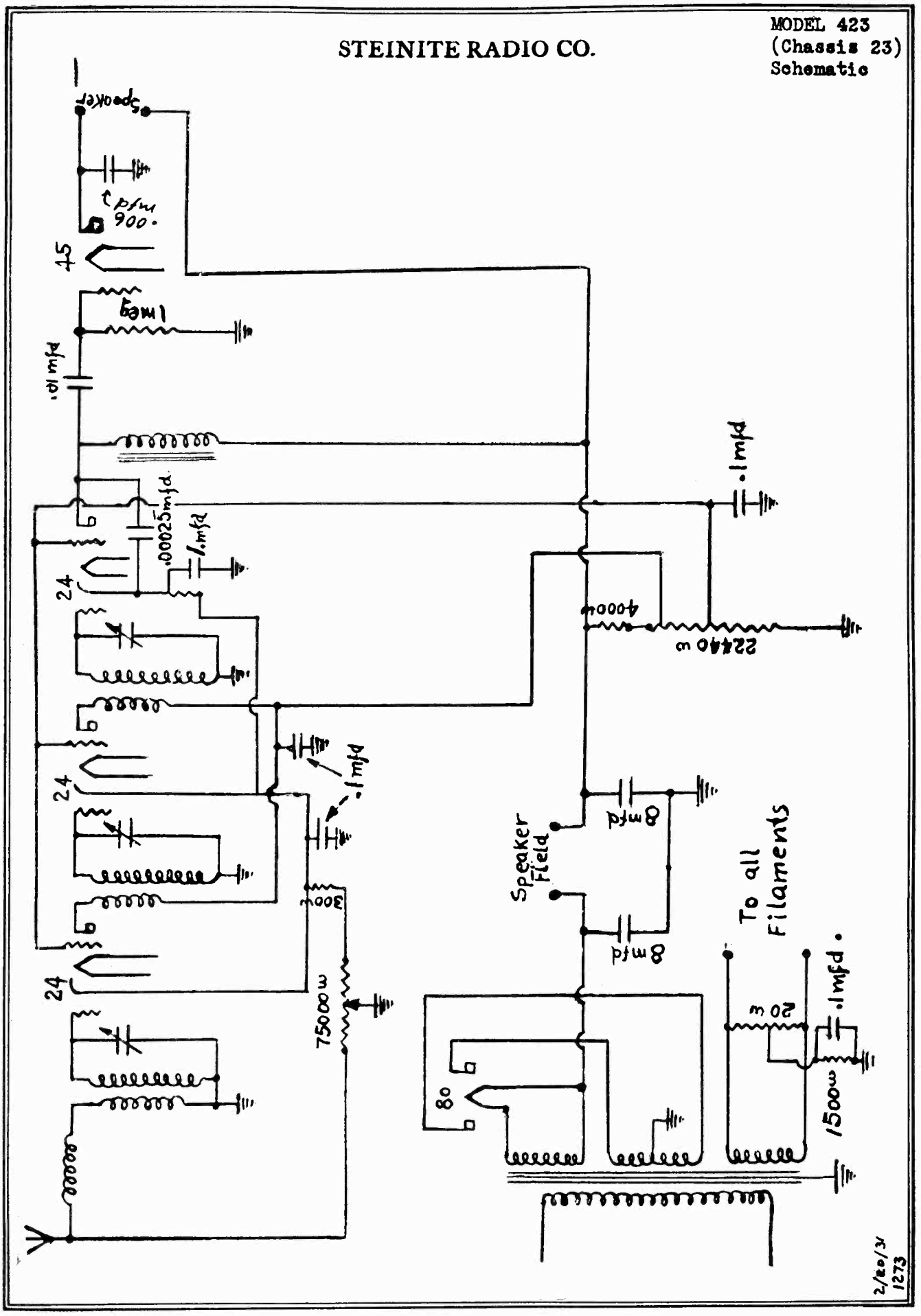
STEINITE RADIO CO.

MODEL 421,425
(Chassis 21)
Schematic



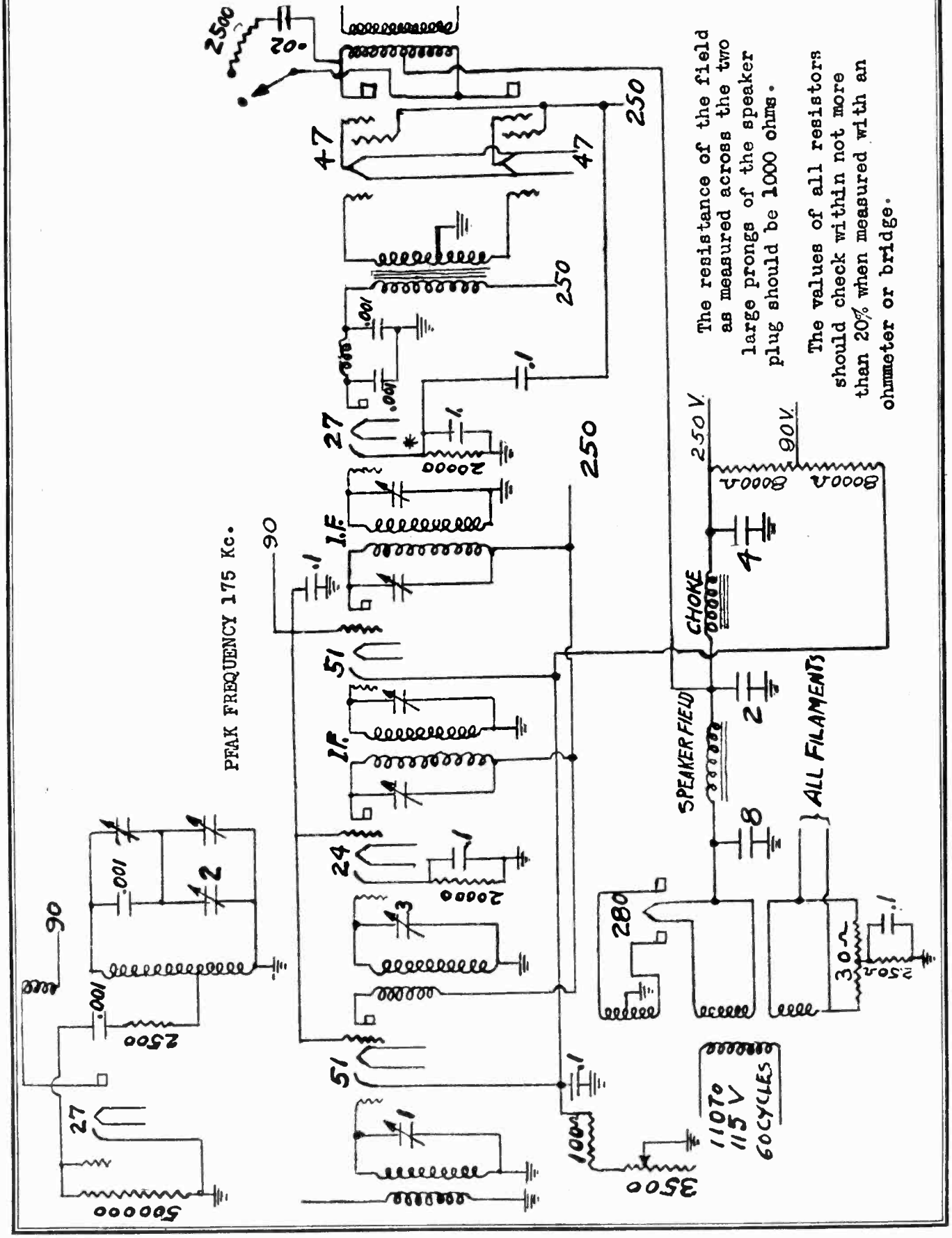
STEINITE RADIO CO.

MODEL 423
(Chassis 23)
Schematic



STEINITE RADIO CO.

MODELS 700,705
706,725,642-B
(Chassis 26)
Schematic



MODELS 700,705
706,725,642-B
(Chassis 26)
Voltage, Data

STEINITE RADIO CO.

If a 175 kilocycle oscillator is available, the receiver may be aligned as follows: (all aligning operations should be made with bottom plate under act)

The output of the 175 K.C. oscillator is connected to the grid of the 1st detector tube and 125 m.a. thermo couple output meter is connected to the voice coil of the loud speaker. The two aligning condensers of each I.F. transformer should then be carefully adjusted for maximum output. These four condensers should be adjusted several times to be certain that all four circuits are tuned to exactly 175 K.C. (Use an insulated screw driver.)

After this has been done a station operating on about 1400 K.C. or preferably a modulated oscillator should be tuned in with the antenna or lead from the oscillator connected to the grid of the R.F. amplifier tube. The tuning dial should be set to correspond to the signal being used. That is, if a 1400 K.C. signal is being used, turn the tuning dial to read 1400 K.C. Then adjust the aligning condenser of the middle section of the gang condenser until maximum output is obtained. The next step is to remove the lead from the grid of the R.F. tube and connect it to the antenna binding post. DO NOT CHANGE THE TUNING DIAL WHILE DOING THIS. Then adjust the aligning condenser on the R.F. section of the condenser (the section at the rear of the chassis) until maximum output is obtained. After this has been completed the receiver is properly aligned at high frequencies.

Next set the oscillator at 600 K.C. or tune in a station near this frequency with the lead from oscillator or the antenna connected to the grid of the R.F. tube. Then adjust the oscillator aligning condenser (mounted in lower center front of chassis) for maximum output. This should be carefully done and at the same time the tuning dial should be changed slightly to see if maximum output is obtained. If it is found necessary to change the oscillator trinning condenser greatly it is well to repeat the aligning operation at the high frequency mentioned above.

Readings obtained with
Line Volt.= 110
Vol.Cont. at Max.

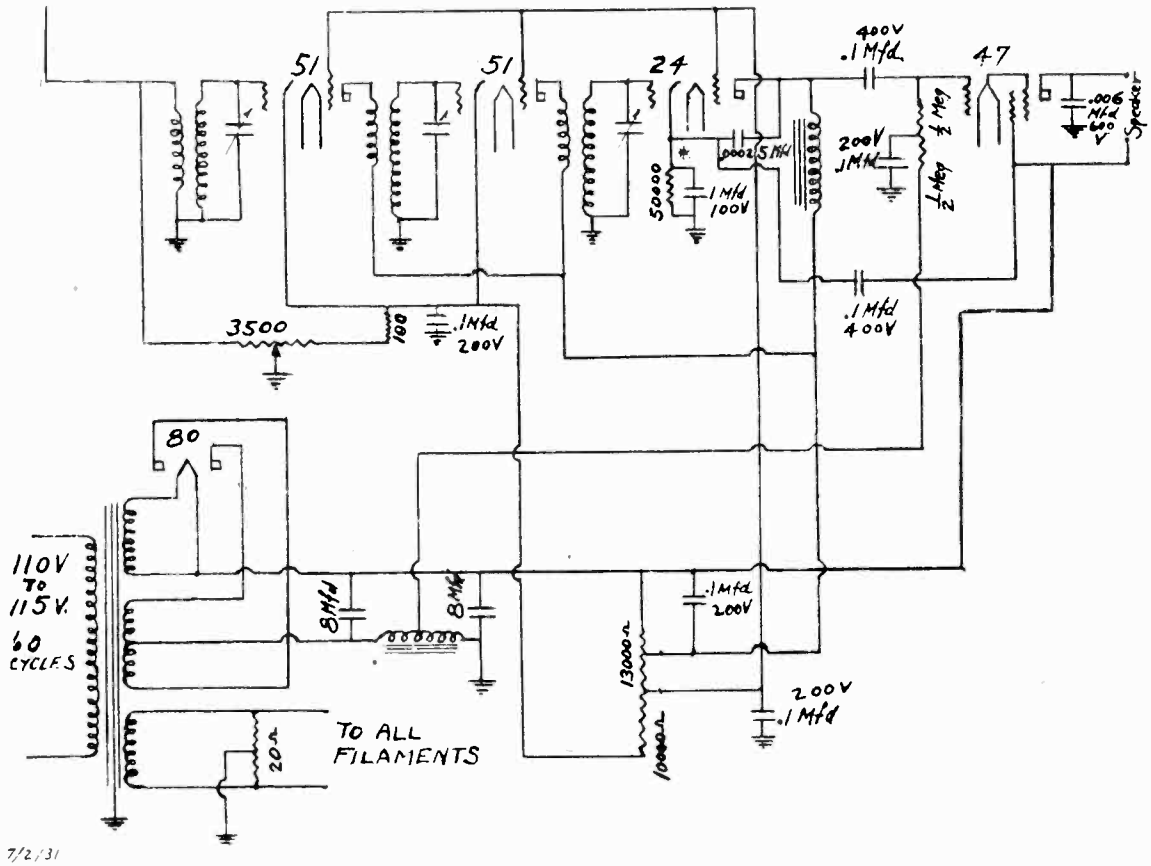
R.F. 1st detector, and I.F.plate to ground	250 volts
R.F. 1st detector, and L.F. screen to ground	90 volts
R.F. and I.F. cathode to ground	3 volts
1st detector, cathode to ground	12 volts
Oscillator, plate to ground	90 volts
2nd, detector, plate to ground	250 volts
2nd, detector, cathode to ground	22 volts
'47 plate to filament	250 volts
'47 screen to filament	250 volts
All filaments to ground	16.5 volts
'51, '47, '27, and '24 filaments	2.4 volts
'80 filament	4.7 volts

The following points should be checked if no signald are heard when a good set of tubes are used.

The oscillator may be checked for oscillation by reading the cathode voltage of the 1st detector. This is normally about 12 volts. Then touch the grid of the oscillator tube and if it is working properly the reading obtained on the cathode of the 1st detector will drop to about half the normal reading. If it is not oscillating various '27 tubes should be tried in the oscillator position and if still no oscillation is obtained connections in the oscillator circuit should be checked for continuity.

MODEL 700,701
(Chassis 28)
Schematic
Voltage

STEINITE RADIO CO.



7/2/31
1323

It will be seen from the wiring diagram that a special impendence coupling is used from the power detector to the power pentode. If the set "motor boats", check opens in this circuit or short circuit in the coupling condenser.

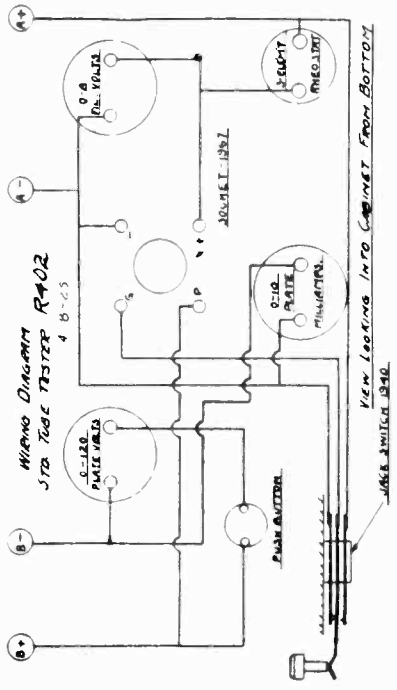
All filaments except that of the type 80 tube are taken from one winding of the power transformer. Bias voltage for '47's is obtained from the drop across a portion of the speaker field. This maintains the grid at a 16.5 potential relative to ground. The grid is connected through two 1/2 meg. resistors, by-passed at center by a .1 mfd. condenser. Should this condenser become open, a very pronounced hum will result. In case of excessive hum or poor quality, check these connections.

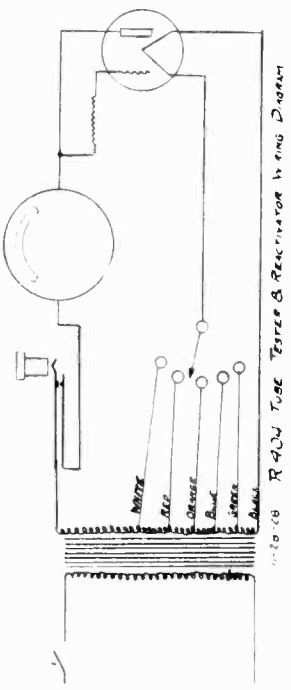
Readings obtained with Line Volt.= 110 Vol. Cont. st Max.

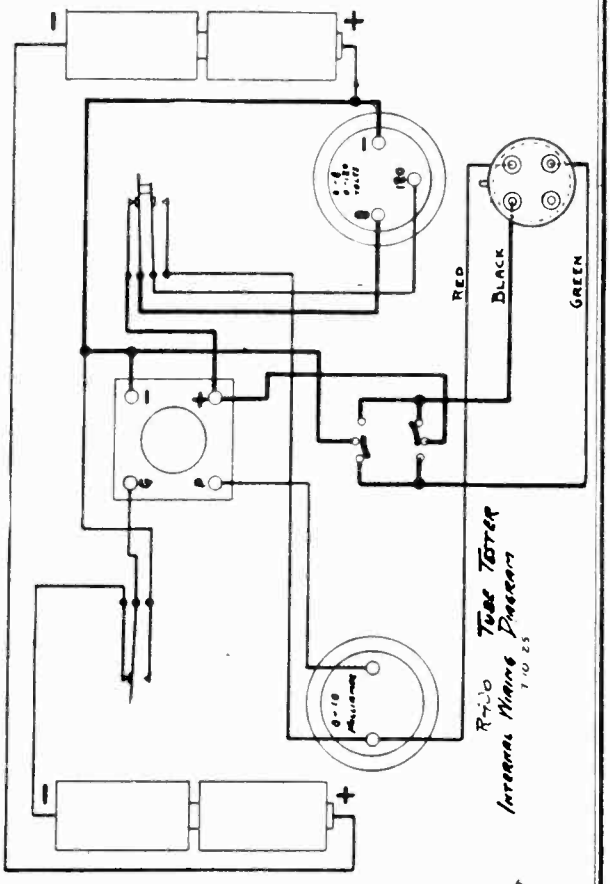
'24 and '45 filaments	2.3
'80 filament	4.7
R.F. screen grids (to ground)	90
R.F. plates (to ground)	250
Detector plate (to ground)	250
Detector screen grid (to ground)	90
R.F. Cathode (to ground)	
Volume Control Maximum	3v
Volume Control Minimum	35
Detector Cathode (to ground)	10
'47 plate (to ground)	250v
'47 Screen (to ground)	250v
All filaments (to ground)	0v
Pentode Bias (at speaker field tap) ( )	16.5v

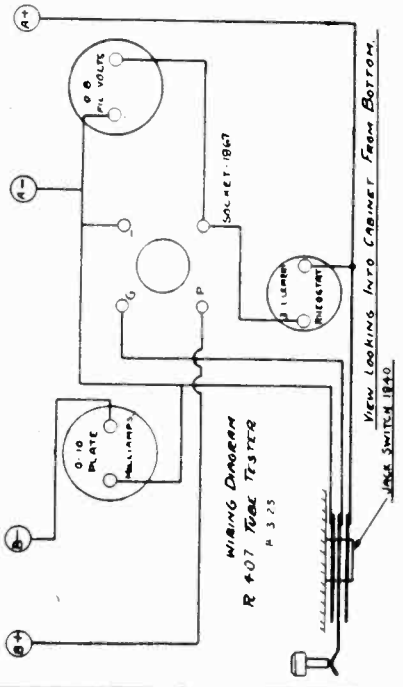
STERLING MFG. CO.

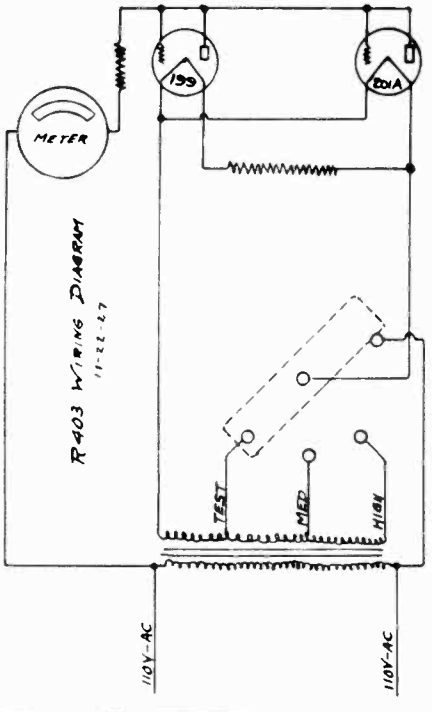
MODEL R-100MV, R-403, R-404, R-402, R-406, R-407

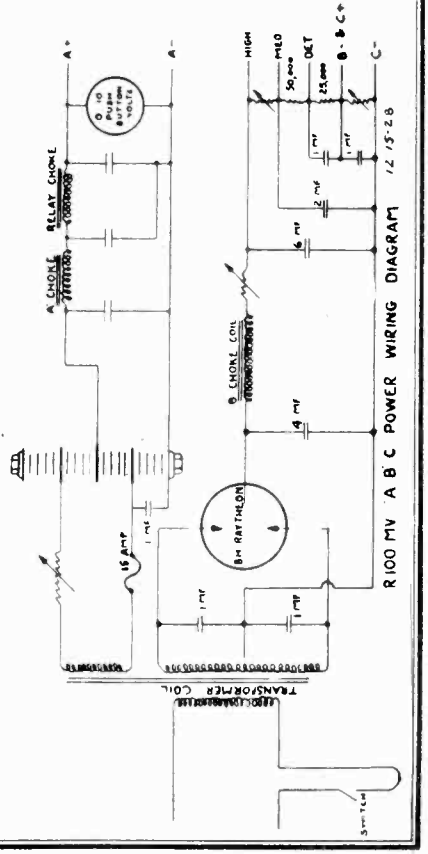






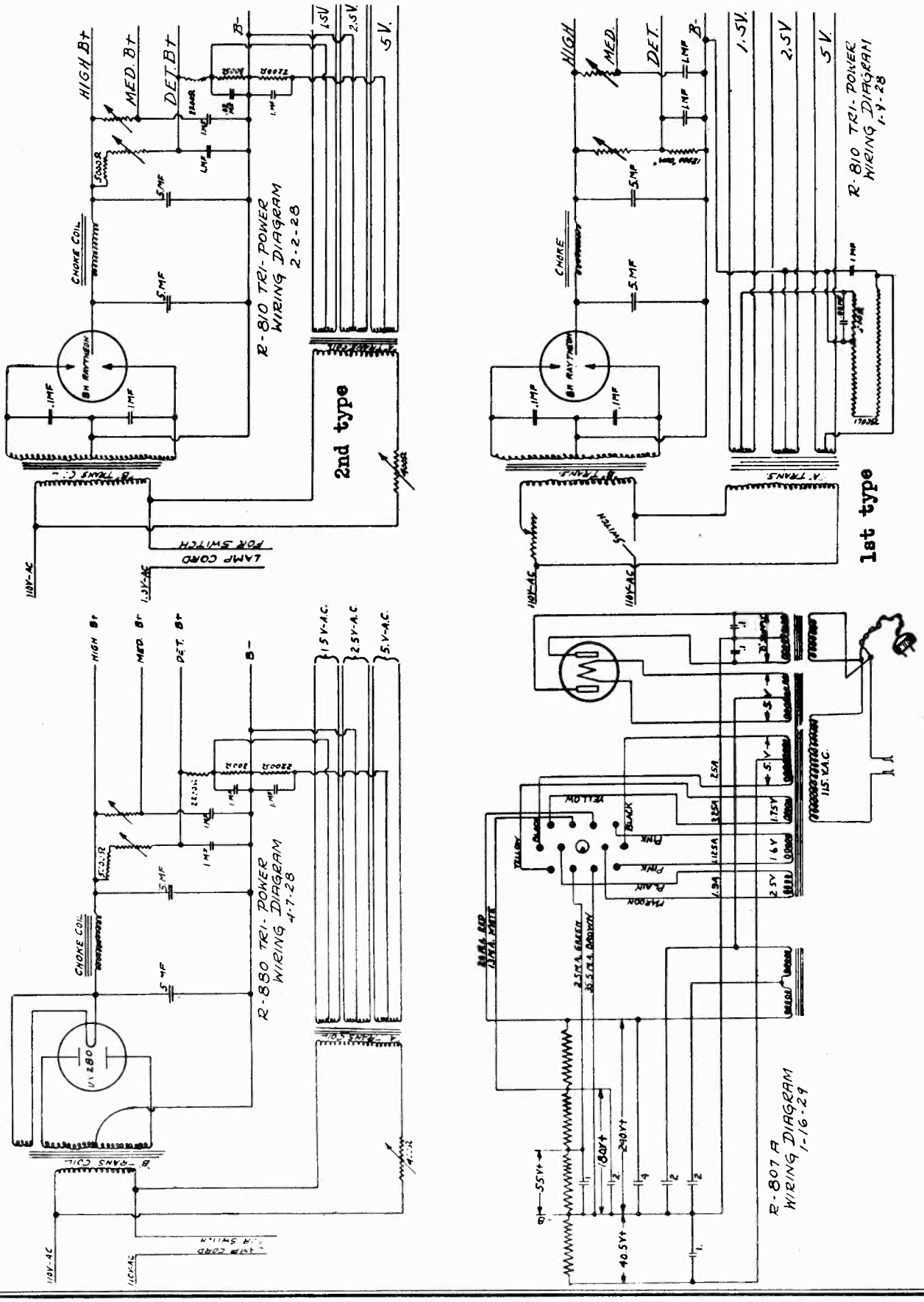






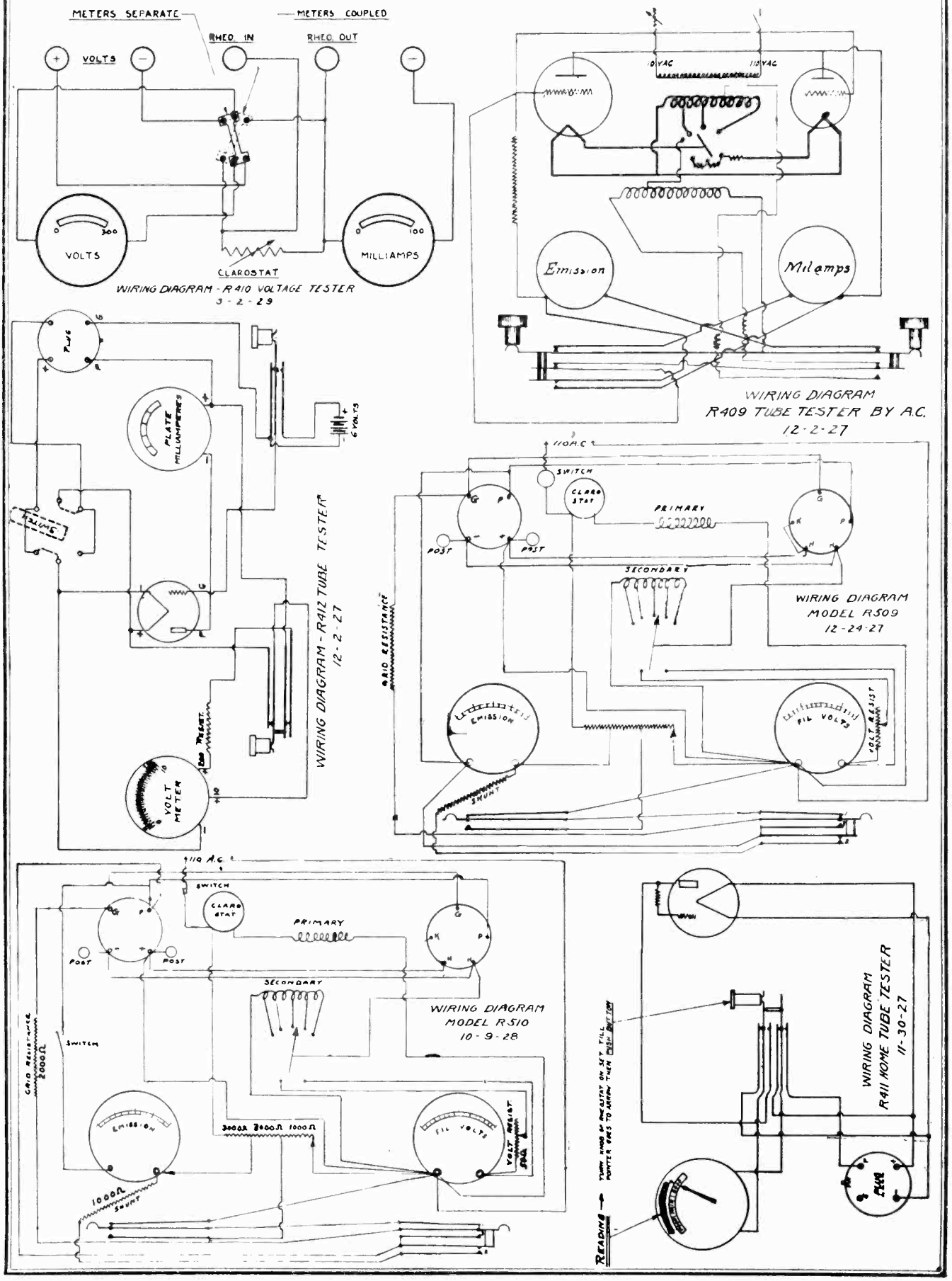
MODEL R-807A, R-810
(1st Type), R-810
(2nd Type), R-880.

STERLING MFG. CO.



STERLING MFG. CO.

MODEL R-409, R-410, R-411, R-412, R-509, R-510

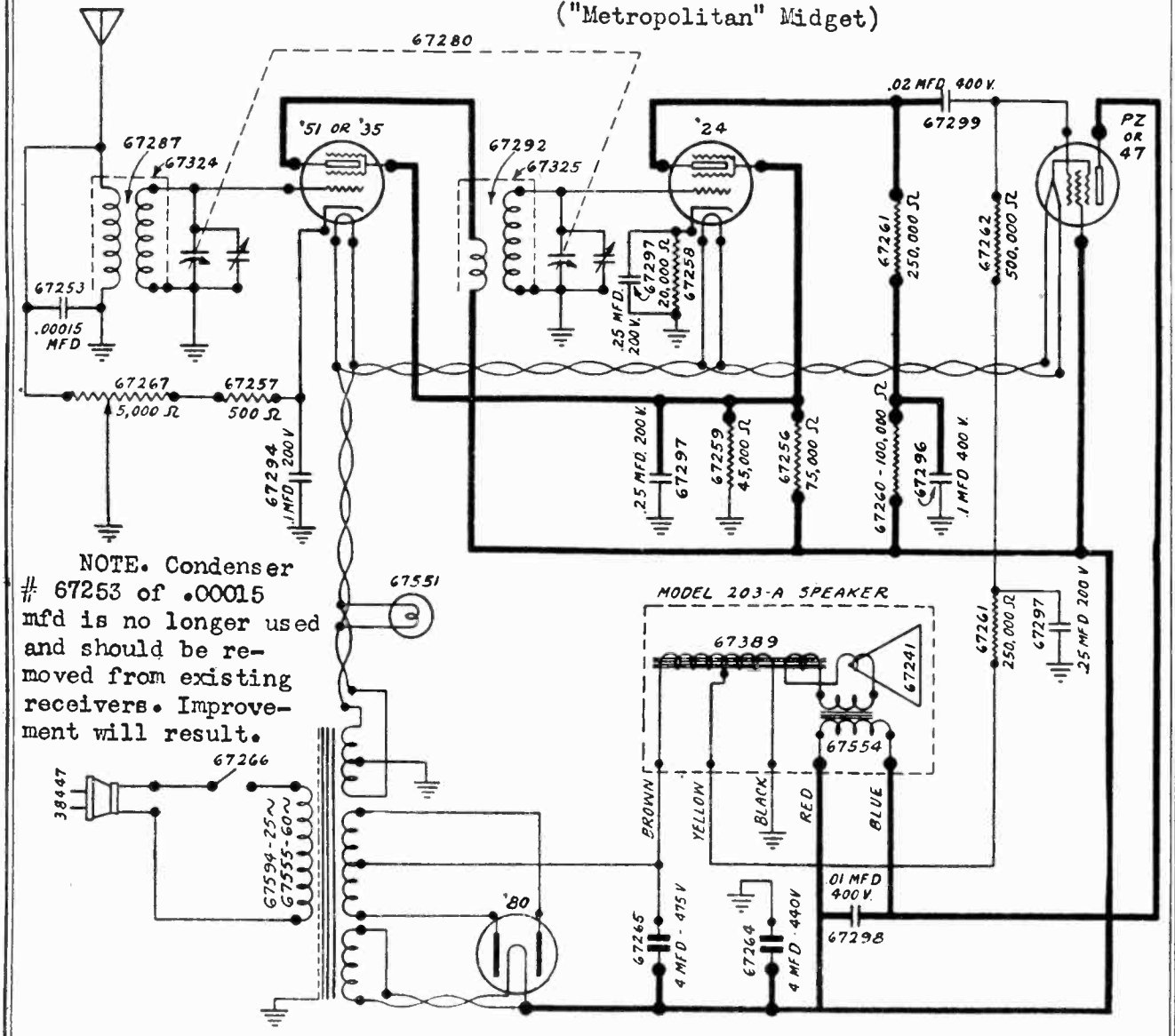


STEWART - WARNER CORP.

MODEL R-101-A
R-101-B
Schematic, Voltage

Model R-101-A and R-101-B Radio Receiver

("Metropolitan" Midget)

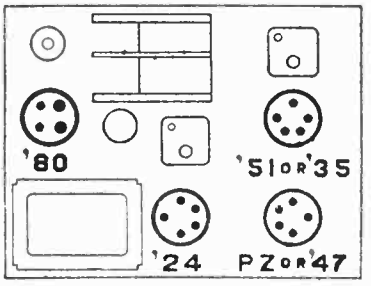


Type of Tube	Tube Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Bias Voltage
'51	R.F.	2.4	243	68	2.75
'24	Det.	2.4	80	68	6
PZ or '47	Output	2.4	228	243	16 *
'80	Rect.	4.8			

* This reading obtained between ground and yellow speaker lead. Direct reading from grid to ground or reading taken with a set tester will show low voltage because of high resistance in grid circuit.

All D.C. voltages are taken between socket terminals and ground with high resistance voltmeters having resistances of 1000 ohms per volt.
Line Voltage—115.
Volume Control full on.

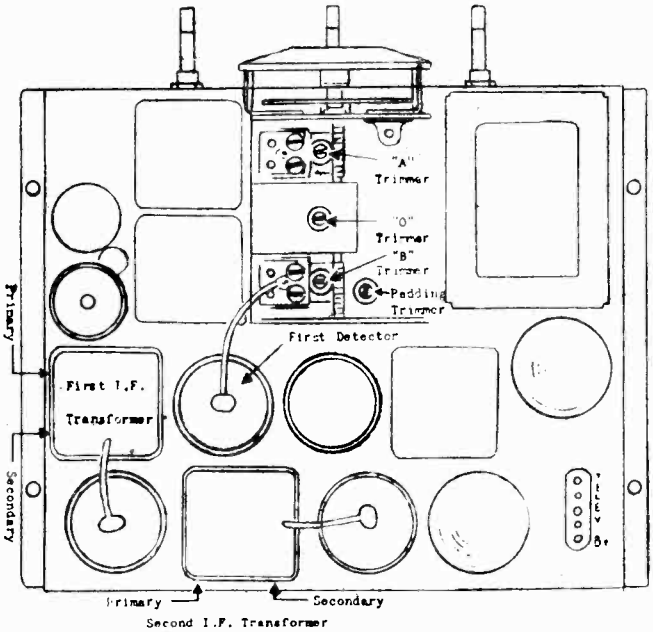
FRONT OF SET

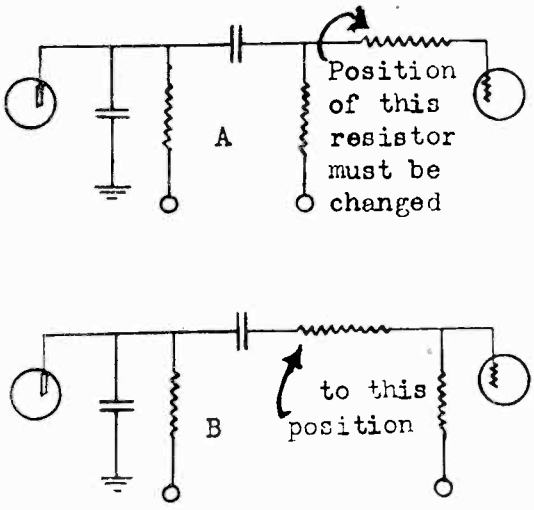


TUBE LOCATIONS

MODEL R-101,R-102
Service Notes

STEWART-WARNER CORP.



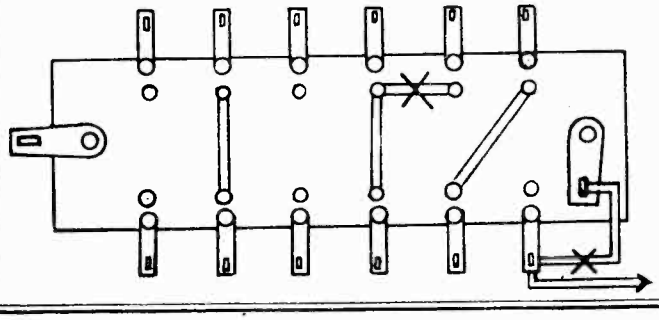


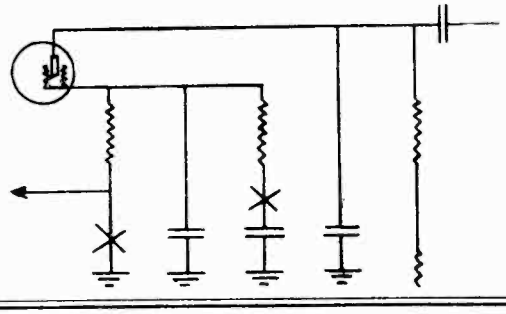
PENTODE SERVICE NOTES FOR MODELS R101-R102 series.

Pentode tubes in which the steady grid current is somewhat higher than average overload readily in the type of circuit used in the R101 and R102 series. Overloading of this type is evidenced in several ways;- by a distinct buzz in the speaker, by a peculiar fluttering reception that develops after the tube warms up and by short tube life. Troubles of this sort can be permanently eliminated by reducing the value of the resistance inserted in the pentode control grid circuit. Figure A shows the normal connection of the pentode control grid circuit in the above receivers. Shift the 500,000 ohm resistor from the normal position shown in figure A to that shown in figure B, namely between the blocking condenser and the junction of the grid leak and the control grid terminal of the pentode tube.

VOLUME DIFFICULTY IN R 102A.

If the output volume is below normal and the alignment is perfect, check the 2nd detector screen grid voltage and circuit. If it is appreciably below 20 volts when measured with a high resistance voltmeter, the 2 meg detector screen grid resistor is probably open circuited. Instead of replacing with a new unit, make the following changes, which as a matter of fact are now incorporated in the production models. The change consists of cutting out the 2 meg resistor and feeding the screen grid through the 500,000 ohm resistor that was previously used as the bleeder unit in this circuit. This change requires nothing more than the cutting of two wires and the soldering of two connections. This change will raise the screen grid voltage to about 30 volts. The diagrams below show the resistor terminal strip and the screen and plate circuits of the 2nd detector indicating the points at which the wires are cut and the new lead inserted. Cut wires at point marked "X" and make changes shown.





ADDITIONAL SERVICE NOTES FOR MODELS R101 and R102 Series

The following applies to oscillation troubles in the R102 series of receivers when the volume control is in an intermediate position. Tighten down all coil shields, then carefully realign the tuned circuits. This applies if the regeneration although excessive is not violently so. If the trouble is very pronounced, the aforementioned operations may not be of complete aid. In such cases the 2000 ohm suppressor resistor in the grid circuit of the oscillator tube should be cut out and shifted to the cathode circuit where it acts both as a suppressor and as a bias resistor. This resistor is the small red unit with the black end, that connects direct from the grid of the "27 oscillator tube to the oscillator coil. After disconnecting the resistor, resolder the open leads. Then remove the short bare wire from the cathode of the oscillator to the grounded lug on the padding trimmer condenser and connect the resistor between these two points.

Parasitic oscillation of the oscillator tube, evidenced by a continuous whistle, particularly upon the high frequency end of the dial is eliminated by the aforementioned change.

The phasing tool required to adjust the trimmers is part # T 70583 and is available at a cost of $.25. To align the tuned circuits it is necessary to remove the chassis. Remove the control knobs and the four hex head screws which hold the chassis in place. The speaker can be left in the cabinet since the leads are of sufficient length. The various trimmers are shown upon the chassis layout illustrated upon page 588-H. The IF transformers are of the tuned primary and tuned secondary type, each tuned by a separate trimmer. The IF trimmer adjusting screws can be reached thru small holes at the base of each shield, the primary in each case being at the left and the secondary at the right. If a commercial output meter is used it can be plugged into the television terminals, but a series condenser must be in one of the output meter leads. The test signal is fed into the 1st detector tube, the "A" lead of the oscillator being connected to the control grid, after the regular control lead has been removed. The IF peak frequency is 177.5 KC.

The RF and oscillator circuits require that the signal be fed to the receiver through the regular aerial and ground posts. Replace the control grid lead to the 1st detector. Ground the set and oscillator. Adjust the oscillator to 1400 KC. Tune the receiver to maximum output. Then reduce oscillator output until output meter reads half scale. Then tune "A" trimmer for maximum meter indication. If the output meter goes beyond full scale, REDUCE THE OSCILLATOR OUTPUT AND DO NOT CHANGE THE RECEIVER VOLUME CONTROL. Then adjust "B" and "C" trimmers for maximum output. The "C" trimmer adjustment is very critical. Then shift test oscillator frequency to 600 KC and tune receiver for maximum output. Then adjust receiver oscillator padding condenser for maximum output, RETUNING the set after each change in adjustment. Then increase test oscillator frequency to 1400 KC and carefully tune the set to this frequency. Then carefully adjust the "A", "B" and "C" trimmers for maximum output.

The following should be of interest in connection with the Models 203 and 204 speakers used in the present line of receivers. A high temperature developed by the field coil is not a sign of a defect. This is true even if the housing becomes too hot to touch, providing of course that the speaker is functioning in normal manner. This design is deliberate and proper porvision has been made to safeguard against injury of the windings.

RADIO SERVICE NOTES (R-101 & 102)

REPLACING POWER TRANSFORMERS

When replacing power transformers in Model 101 or 102 Radio Receivers, the following precautions must be observed, or the transformer is almost certain to hum badly.

After mounting the transformer but prior to clamping it tightly in place, paint the edges of the steel core of the transformer with a liberal quantity of shellac or medium thick clear lacquer to act as a binder and prevent the individual laminations from rattling. Allow the shellac to dry for several minutes and then using a heavy screw driver, tighten down the bolts with as much force as you can exert. A light screw driver will not enable you to tighten the bolts sufficiently. Do not omit the lock-washers under the screw-heads. Do not turn on the set until the binder has had a chance to dry, otherwise hum may not be eliminated.

When servicing a radio receiver in which the transformer hums, remove the two bolts holding it in position, thus loosening the transformer. It is not necessary to unsolder the leads. Drive in the fibre wedge which you will find on one side of the center leg of the core between the core and coil. This tightens the center portion of the core and prevents it from vibrating. Now paint the transformer core liberally with shellac, insulating varnish, or medium thick clear lacquer, and replace as directed above.

For humming filament transformers in Model 301 receivers, remove the two screws holding the transformer to the set and pry off the U shaped metal clamp from about the steel core, taking care that you do not bend it out of shape. Paint the edges, with particular attention to the top I section, with a liberal quantity of shellac or lacquer as in the case of power transformers and replace the U shaped clamp. If necessary, bend in the side flaps of the clamp so that they press the individual laminations together more firmly.

REPAIRING SHORT WAVE CONVERTERS HAVING POOR VOLUME

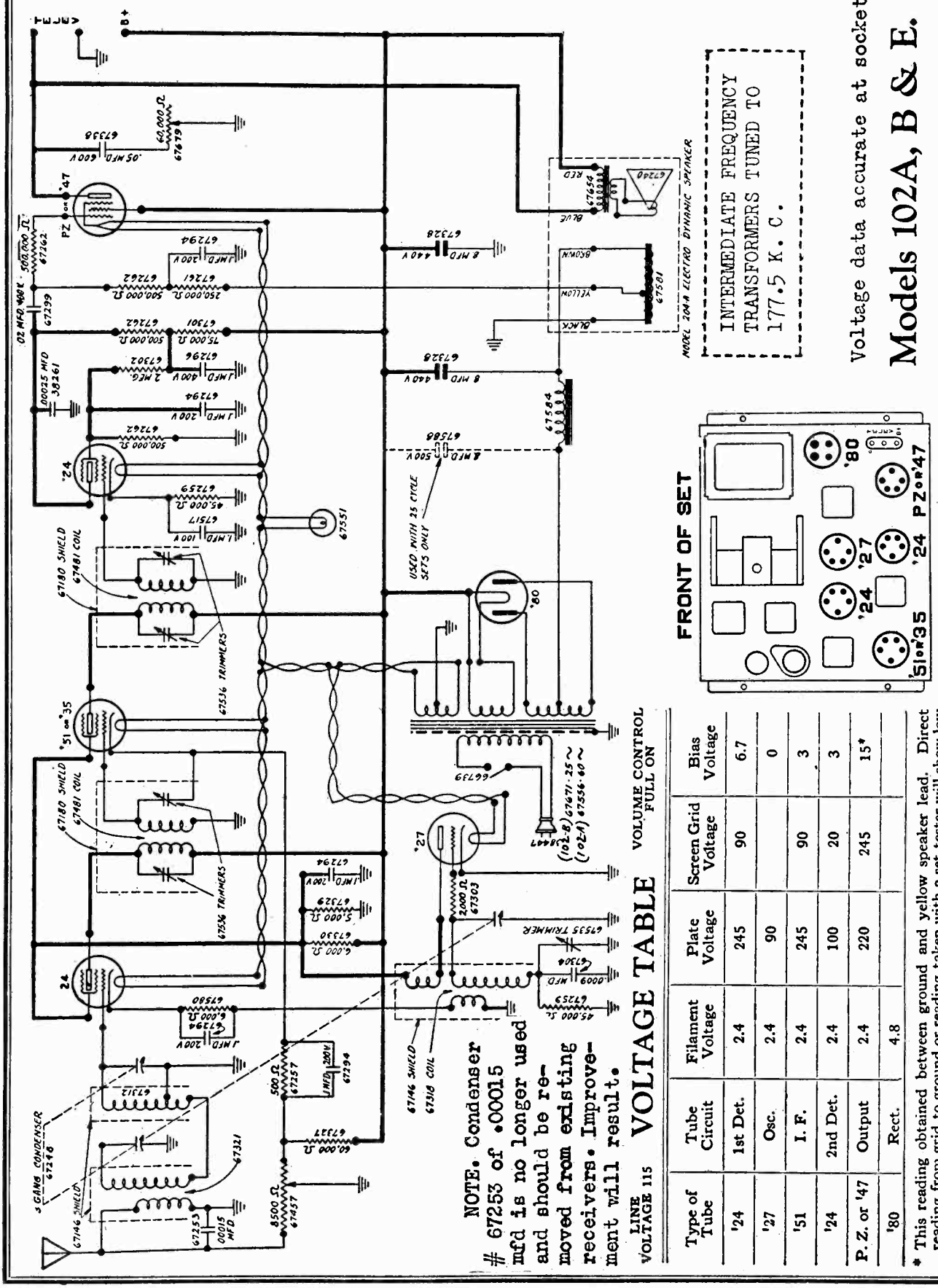
Occasionally a short wave converter may be found which is very insensitive even though all circuits check perfectly and the tubes are in good condition.

Converters of this type may frequently be made to operate satisfactorily by RESOLDERING EVERY SOLDERED CONNECTION IN THE CONVERTER, even though these connections may appear to be entirely satisfactory.

A poorly soldered connection may have sufficiently high resistance to materially affect performance on short waves, yet not high enough to show up on a simple continuity test.

MODEL 102-A,B & E
Schematic, Voltage
1st Type

STEWART-WARNER CORP.



Type of Tube	Tube Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Bias Voltage
'24	1st Det.	2.4	245	90	6.7
'27	Osc.	2.4	90		0
'51	I. F.	2.4	245	90	3
'24	2nd Det.	2.4	100	20	3
P. Z. or '47	Output	2.4	220	245	15*
'80	Rect.	4.8			

* This reading obtained between ground and yellow speaker lead. Direct reading from grid to ground or reading taken with a set tester will show low voltage because of high resistance in grid circuit.

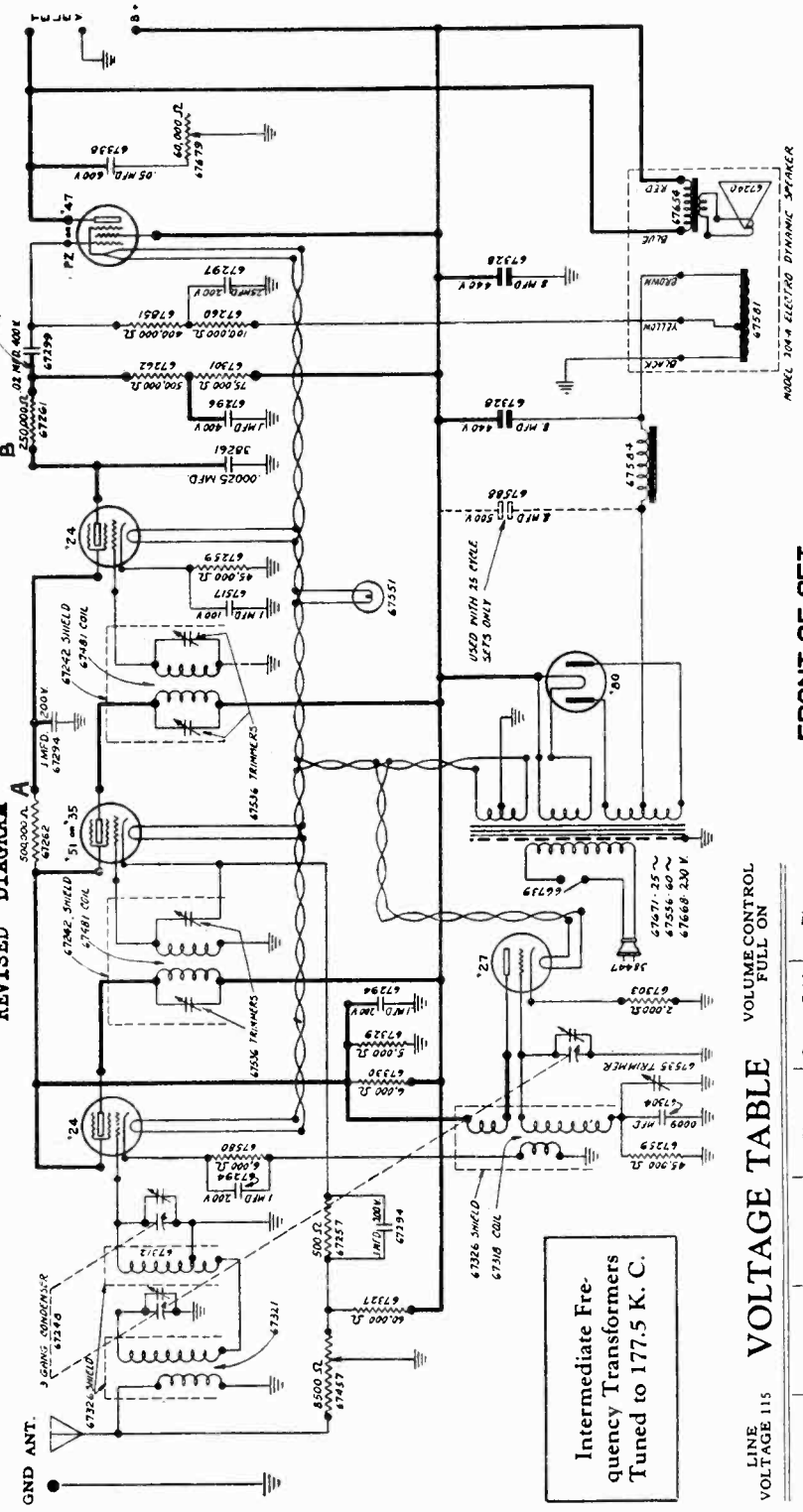
STEWART-WARNER CORP.

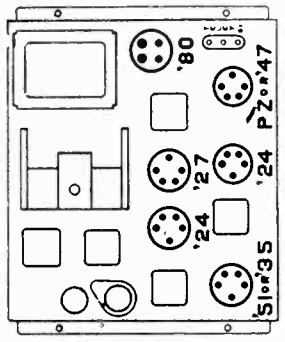
MODEL R-102-A,B & E
Revised Schematic
Voltage.

Circuit Data of Stewart-Warner Models R-102-A, B & E.*

*This data sheet applies to the following serial numbers only:
Model 102-A, 34,000 upwards
Model 102-B, 10,500 upwards
Model 102-E, 10,200 upwards

REVISED DIAGRAM





LINE VOLTAGE 115 — VOLUME CONTROL FULL ON

VOLTAGE TABLE

Type of Tube	Tube Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Bias Voltage
'24	1st Det.	2.45	250	95	6.5
'27	Osc.	2.45	95		9
'51	I. F.	2.40	250	95	3
'24	2nd Det.	2.45	70	30	7
P. Z. or '47	Output	2.45	230	250	15 ‡
'80	Rect.	4.8	170	—	

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector screen grid and plate voltages.

‡ This reading obtained between ground and yellow speaker lead. Direct reading from grid to ground or reading taken with a set tester will show about 3 volts because of high resistance in grid circuit.

CHANGES IN MODELS 102 A,B,E

A. 500,000-ohm resistor changed to 1,000,000 ohms.
B. 250,000-ohm resistor omitted. 100,000-ohm resistor inserted at X When phonograph is used, a 6000-ohm resistor is shunted across the 45,000-ohm detector bias resistor. A radio-phonograph switch has been added to the volume control, connecting the pickup when volume of set is turned off.

Stewart-Warner Short Wave Converter R301-A, B, and E

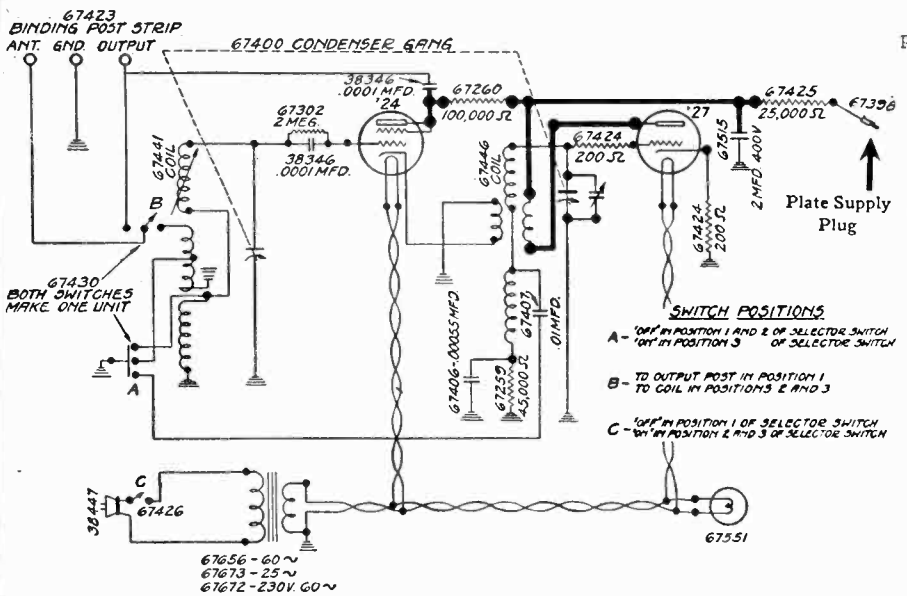
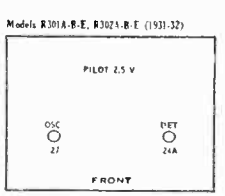


Plate supply plug (#67398) must be connected to some source of filtered D.C. at a potential of 180 to 280 volts. **Recommended voltage is 250.**
The Ground Post of the converter is the negative return and must be connected to the negative side of the external plate supply. The table below gives plate voltages at both tubes for three different plate supply voltages.

Plate Supply Voltage	'24 Plate	'27 Plate
180	26	70
250	34	93
280	37	102



NOTES ON SHORT WAVE CONVERTER

When connecting the Stewart Warner 301 A short wave converter to any receiver other than the 102-A, the following points must be borne in mind.

The plate supply plug must connect to a source of filtered DC inside the radio receiver that will deliver approximately 6 milliamperes at 180 to 280 volts although the recommended plate voltage is 250 volts. If it drops below 180 volts the '27 oscillator tube may not oscillate at the higher frequencies. If it rises above 280 volts parasitic oscillations may be produced.

In this broadcast receivers in which the speaker field is in the positive side of the plate supply, a connection to the high voltage side of the speaker field will usually prpvide a satisfactory source of plate potential.

Where the speaker field and filter choke are in the negative side of the plate power supply, the correct positive potential for the short wave converter can frequently be taken off conveniently at the filament terminal of the 280 rectifier tube socket.

When tapping into the plate supply of any broadcast set, make certain that no resistors are being overloaded by the added drain of the converter. It is always safest to tap as close to the output of the filter as possible. Should this give excessively high voltage, it may be cut down to the correct value by means of a separate series resistor, capable of carrying 6 milliamperes safely. The value of this external resistor will be roughly 175 ohms for every volt in excess of 280. For example, if the B supply voltage is 350, a resistor of 17,500 ohms will be required to reduce it to 250 volts, which is the recommended value.

As a check on the correct voltage, the plate voltages at the tube sockets of the converter may be measured. The '27 tube plate should be kept about 90 volts when in normal operating condition. It should never drop below 70 volts or rise about 105 volts. The attached circuit data sheet gives plate voltage as measured with a high resistance voltmeter, of both tubes at input voltages of 180, 250 and 280.

The negative return of the Converter B supply is made thru its ground binding post to the broadcast receiver ground which, in a great majority of A.C. receivers, is at B negative potential. However, there are some sets on the market in which the negative B supply does not connect to the chassis. When the Model 301-A converter is to be used with sets of this type, the ground binding post of the converter must not be connected to ground but to the negative of the B supply system at a point inside the broadcast set. The broadcast set should be grounded in the usual way.

The plate supply lead of the converter should never go direct to a plate terminal of the broadcast set, since this may result in detuning and objectionable regeneration in the broadcast receiver.

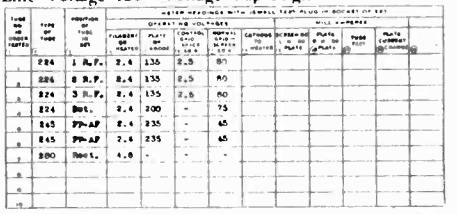
The following advice should also be of interest:

"Don't tune above 33 meters for distant stations in daylight.
"Don't tune below 25 meters for distant stations after dark.
"Don't expect to hear many distant stations above 50 meters.
"Don't skim over the dials. Tune slowly.
"Don't expect to find stations on all parts of the dials. Short wave stations are widely separated except in a very few places.
"Don't expect stations to tune broadly. Most distant stations tune very sharply.

All tubes out of socket and AC plug removed from power supply line. Speaker plug removed from speaker socket. Phone switch in radio position

From Chassis To	Correct		Incorrect
Aerial	Condenser		
1 RF Control Grid to Input Tuning Condenser Stator	9.2	ohms	Coupling condenser
1 RF Control Grid	900-1100	ohms	Volume Control BC- 500 ohm unit-Y TC- 1 rf Cg-Y
1 RF Cathode	0	ohm	
1 RF Screen Grid	5,900	ohms	BC- 1 rf Sg-Y (.3 mfd)
1 RF Plate	11, 610	ohms	BC-1 rf Tr-Y (.3 mfd) BC- VD 80 P wdg BC- 2 rf P-Y (.3 mfd) BC- 3 rf P-Y (.3 mfd)
2 RF Control Grid	100,530	ohms	BC- 2 rf Cg wdg-Y See 1 RF Control Grid
2 RF Cathode	0	ohm	
2 RF Screen	6,500	ohms	BC- 2 rf Sg-Y (.3 mfd) BC- 1 rf Sg-Y (.3 mfd)
2 RF Screen to 3 RF Screen	0	ohm	
2 RF Plate	9,661	ohms	BC- 2 rf P wdg-P (.3 mfd) BC- 600 ohm unit-Y(.3mfd) See 1 RF Plate
2 RF Plate to 3 RF Plate	22	ohms	
Detector Control Grid	5,100,000	ohms	TC-Y Grid condenser BLC- rf grid wdg-Y(.04mfd)
Detector Cathode	20,000	ohms	BC- DK-Y (.6 mfd -1. mfd)
Detector Screen Grid	16,500	ohms	BC-D Sg-Y (.3 mfd
Detector Plate to '80 Fil	51,078	ohms	
Detector Plate	64,653	ohms	BC- DP-Y (.0001 mfd) BC- AF Tr-Y (1 mfd) FC- '80 F -'80 P wdg BC- VD-Y FC- Filter chk-80 p wdg
3 RF Control Grid	942	ohms	BC-500 ohm unit-Y (3.mfd) TC- 3 rf Cg-Y
3 RF Cathode	0	ohms	
3 RF Screen Grid	6,500	ohms	See 2 RF Screen
3 RF Plate	9,661	ohms	See 2 RF Plate See 1 RF Plate
'45 Control Grid	6,400	ohms	
'45 Control Grid to Control Grid	11,400	ohms	Shunt Condenser
'45 Control Grid to '45 Fil	6,650	ohms	
'45 Plate to '45 Plate	406	ohms	Halves of windings are not equally divided
'45 Plate to '80 Fil	350-700	ohms	
'80 Fil to '80 P	15,185	ohms	See Detector Plate
Output Transformer Secondary only	1.6ohms		
RF and Detector Filament to Ground	0 resistance		
Input winding only	4.6ohms		
Secondary winding	4.6ohms		
Broad Band Transformer Primary winding	1,960	ohms	
Broad Band Transformer Secondary winding	81	ohms	
2nd RF Plate Winding only	11	ohms	
Secondary of second bi-resonant circuit	4.6ohms		
3 RF Grid Winding only	4.6ohms		
Input AF Transformer primary alone	11,090	ohms	
Resistance across input AF transformer primary	250,000 ohms		

STROMBERG-CARLSON—Models 10 and 11
Line Voltage 120—Voltage Tap High



MODEL 19,20 AC
Voltage
Electrical Values

STROMBERG - CARLSON TEL. MFG CO.

INDUCTANCES

L1	.9	millihenry
L2	215.	microhenry
L3	215.	microhenry
L4	5.5	millihenry
L5	215.	microhenry
L6	5.5	millihenry
L7	5.5	millihenry
L8	5.5	millihenry
L9	5.5	millihenry
L10	5.5	millihenry
L11	5.5	millihenry
L12	5.5	millihenry
L19	15.	microhenry
L20	5.5	microhenry
L21	172.	microhenry

RESISTANCES

No.	Value	Body	Tip	Dot
R1	500	Green	Blk	Brn
R2	600	Blue	Blk	Brn
R3	600	Blue	Blk	Brn
R4	3	(Wire wound)		
R5	10 megs	Brn	Blk	Blue
R6	100,000	Brn	Blk	Green
R7	750	(Wire wound)		
R8	10	(Wire wound)		
R9	500	Green	Blk	Brn
R10	6,500	Blue	Green	Red
R11	6,500	Blue	Green	Red
R12	60,000	Blue	Blk	Orange
R13	1,575	(Wire wound)		
R14	900	(Wire wound)		
R15	1,000	(Wire wound)		
R16	60	(Wire wound)		
R17	30,000	Orange	Blk	Orange
R18	400	(Wire wound)		
R19	100,000	Carbon potentiometer		

CONDENSERS

C2	.0004	mfd	max.
C3	.0004	mfd	max.
C4	.04	mfd	
C5	.000001	mfd	app.
C6	.3	mfd	
C7	.3	mfd	
C8	.0004	mfd	max.
C11	.3	mfd	
C12	.3	mfd	
C15	.3	mfd	
C16	.3	mfd	
C17	.00025	mfd	
C18	.001	mfd	
C20	.002	mfd	
C21	.6	mfd	
C22	.2	mfd	
C23	.04	mfd	
C24	.001	mfd	
C26	.0004	mfd	max.
C28	.3	mfd	
C29	.001	mfd	
C30	.01	mfd	
C31	.01	mfd	
C32	2.	mfd	
C33	2.	mfd	
C34	3.	mfd	
C35	3.	mfd	
C36	1.	mfd	
C36	4.	mfd	(25 cy.)
C37	1.	mfd	
C38	1.	mfd	

TABLE 4.

Normal Voltage Readings

(Be sure to make these readings with the Meter and Scale indicated, otherwise the results will not agree with those tabulated. Alternating voltages are indicated by italics)

Voltage	Meter	Scale	Where Measured	Approx. Value in Volts
Heater Voltage Nos. 227 & 235 Tubes	A.C.	0-4	Across Heater Terminals of Sockets	*2.4*
Filament Voltage No. 245 Tubes	A.C.	0-4	Across Filament Terminals of Audio Output Sockets	*2.4*
Filament Voltage No. 280 Tube	A.C.	0-8	Across Filament Terminals of Rectifier Socket	*4.8*
Plate Voltage Radio Amplifiers	D.C.	0-250	Between Plate Terminal of R. F. Amplifier Socket (+) and Chassis Base (-)	150-170
Plate Voltage Mixer Tube	D.C.	0-250	Between Plate Terminal Mixer Tube Socket (+) and Chassis Base (-)	150-170
Plate Voltage Oscillator	D.C.	0-250	Between Plate Terminal of Oscillator Socket (+) and Chassis Base (-)	85-90
Plate Voltage I.F. Tubes	D.C.	0-250	Between Plate Terminals of I. F. Amplifier Sockets (+) and Chassis Base (-)	150-170
Plate Voltage Demodulator	D.C.	0-250	Between Plate Terminal of Demodulator Socket (+) and Chassis Base (-)	190-215
Plate Voltage Audio Output Tubes	D.C.	0-250	Between Plate Terminals Audio Output Socket (+) and 10 ohm Mid Tap Resistor R_8(-)	250
Control Grid Voltage R.F Amplifier	D.C.	0-10	Between Control Grid Clip of R. F. Amplifier Tube (-) and Cathode (+) of R. F. Amplifier Tube	3
Control Grid Voltage Mixer Tube	D.C.	0-250	Between Control Grid Clip Mixer Tube (-) and Cathode (+) of Mixer Tube	10-12
Control Grid Voltage 1st I.F. Amplifier	D.C.	0-10	Between Control Grid Clip 1st I. F. Tube (-) to Cathode (+) of 1st I. F. Tube	3
Control Grid Voltage 2nd I.F. Tube	D.C.	0-10	Between Control Grid Clip 2nd I. F. Tube (-) to Cathode (+) of 2nd I. F. Tube	3
Grid Voltage Oscillator	D.C.	0-250	Across 6600 ohm Resistor R_{16}	10-15
Grid Voltage Demodulator	D.C.	0-250	Across 30,000 ohm Resistor R_{17}	20-25
Grid Voltage Audio Tubes	D.C.	0-250	Between Grids of Audio Tubes (-) to Mid Tap 10 ohm Resistor R_8 (+)	45-50*
Screen Voltage Radio Amplifier Mixer 1st & 2nd I.F. Tubes	D.C.	0-250	Between Screen Terminals of Tubes (+) to Chassis Base (-)	80-90*
B Voltage R.F. Amplifier and Mixer Tube	D.C.	0-250	Between Tube Side of 600 ohm Resistor R_7 and Chassis Base	150-170*
B Voltage 1st & 2nd I.F. and Mixer Tubes	D.C.	0-250	Between "High" Side of Voltage Divider and Chassis Base	150-170*
B Voltage Audio Tubes	D.C.	0-250	Between Mid Tap of Audio Output Transformer and Chassis Base (-	300
C Voltage Audio Output Tubes	D.C.	0-250	Across 750 ohm Biasing Resistor R_9	50
Speaker Field Voltage	D.C.	0-250	Across Small Pins of Speaker Connector Socket	150-170
Plate Voltage A.C. Pure Anode No. 280 Rectifier	A.C.	See Remarks	Between P Terminals No. 280 Rectifier Socket and Chassis Base	*325-350**

*These voltage vary with dial setting and position of volume control.
Cannot be measured on Weston Model 538 Meter unless multiplier is used.

MODEL 19,20 AC
Resistance Data

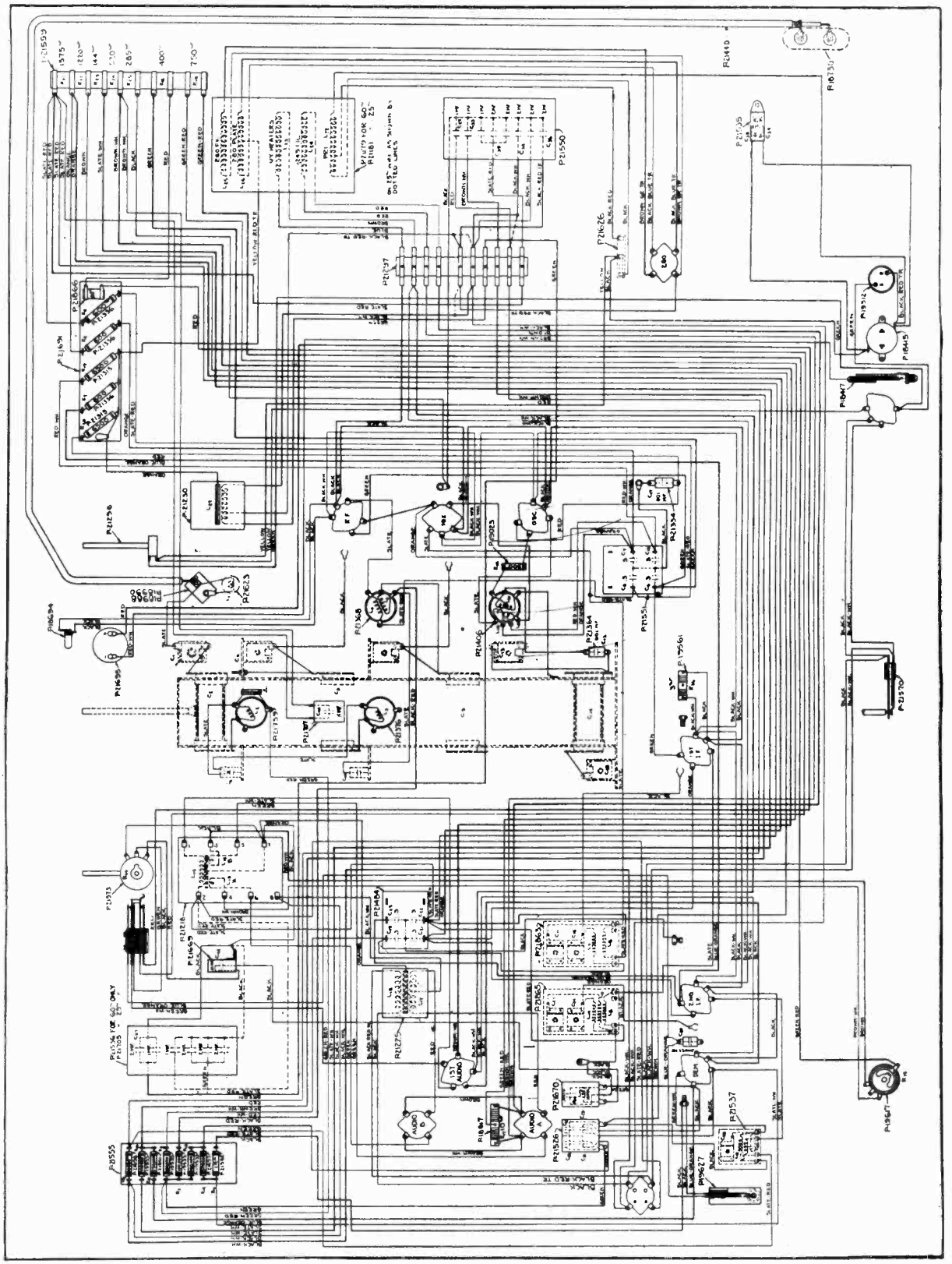
STROMBERG - CARLSON TEL. MFG. CO.

All tubes removed from sockets and AC plug disconnected from power supply. Speaker plug removed from speaker socket. Volume control maximum unless otherwise stated. See Notes.

From Chassis To	Correct		Incorrect
RF Control Grid	504.9	ohms	BC- rf Cg wdg-Y
RF Cathode (V.C.Max)	60	ohms	BC- if K-Y (.3 mfd)
RF Cathode (V.C.Min)	1,060	ohms	
RF Screen Grid	2,560	ohms	BC- rf Sg-Y (.3 mfd)
			BC- if Sg-Y (.3 mfd)
RF Plate	4,179	ohms	BC- rf P-Y (.3 mfd)
			BC- if P wdg-Y (.3 mfd)
			FC- if P wdg-Y (1. mfd)
Mixer Tube Control Grid	4.9	ohms	TC- Mixer Cg-Y
Mixer Cathode	6,560	ohms	BC-Osc Coupling Coil-Y
			See RF Cathode
Mixer Screen Grid	2,560	ohms	See RF Screen
Mixer Plate	4,179	ohms	See RF Plate
			TC- if Tr Primary
Mixer Plate to RF Plate	88	ohms	
1 IF Control Grid	42.3	ohms	TC- 1 if Cg-Y
1 IF Cathode	60	ohms	See RF Cathode
1 IF Screen Grid	1,960	ohms	See RF Screen
1 IF Plate	3,579	ohms	BC- 1 if P wdg-Y
			See Mixer Plate
1 IF Plate to 2 IF Plate	90.5	ohms	
2 IF Control Grid	45.3	ohms	TC- 2 if Cg-Y
2 IF Cathode	60	ohms	BC- 2 if K-Y (.3 mfd)
2 IF Screen	1,960	ohms	See RF Screen
2 IF Plate	3,580	ohms	See 1 IF Plate
Demodulator Control Grid	10,100,000	ohms	TC- grid condenser-Y
			BC- grid wdg-Y (.001 mfd)
Demodulator Cathode	30,000	ohms	BC- Dem K-Y (2 mfd)
Demodulator Plate to 80 Fil	51,040	ohms	
Demodulator Plate to Chassis	0	ohm	BC- AF Tr wdg-Y (2 mfd)
			FC- Filter chk-Y (3 mfd)
			BC- AF Tr wdg- Dem K
			BC- Dem P- Dem K-
'45 Control Grid	4,340-5,350	ohms	Split windings do not have equal resistance
'45 Control Grid to '45 Fil	5,100-6,000	ohms	
'45 Plate to Plate	425	ohms	Tone Control condenser
'45 Plate to 80 Fil	500-525	ohms	
Output Transformer secondary only	1.4	ohms	
Oscillator Control Grid	502	ohms	Oscillator winding is tapped
Oscillator Cathode	6,500	ohms	BC- Osc K-Y (.001 mfd)
Oscillator Plate to RF Screen	1.2	ohms	
RF Mixer- IF and Demodulator Filament to chassis	0	ohm	
Across AC plug (LO)	4.1	ohms	
Across AC plug (HI)	4.5	ohms	
AC plug to chassis	0	ohm	FC- across primary

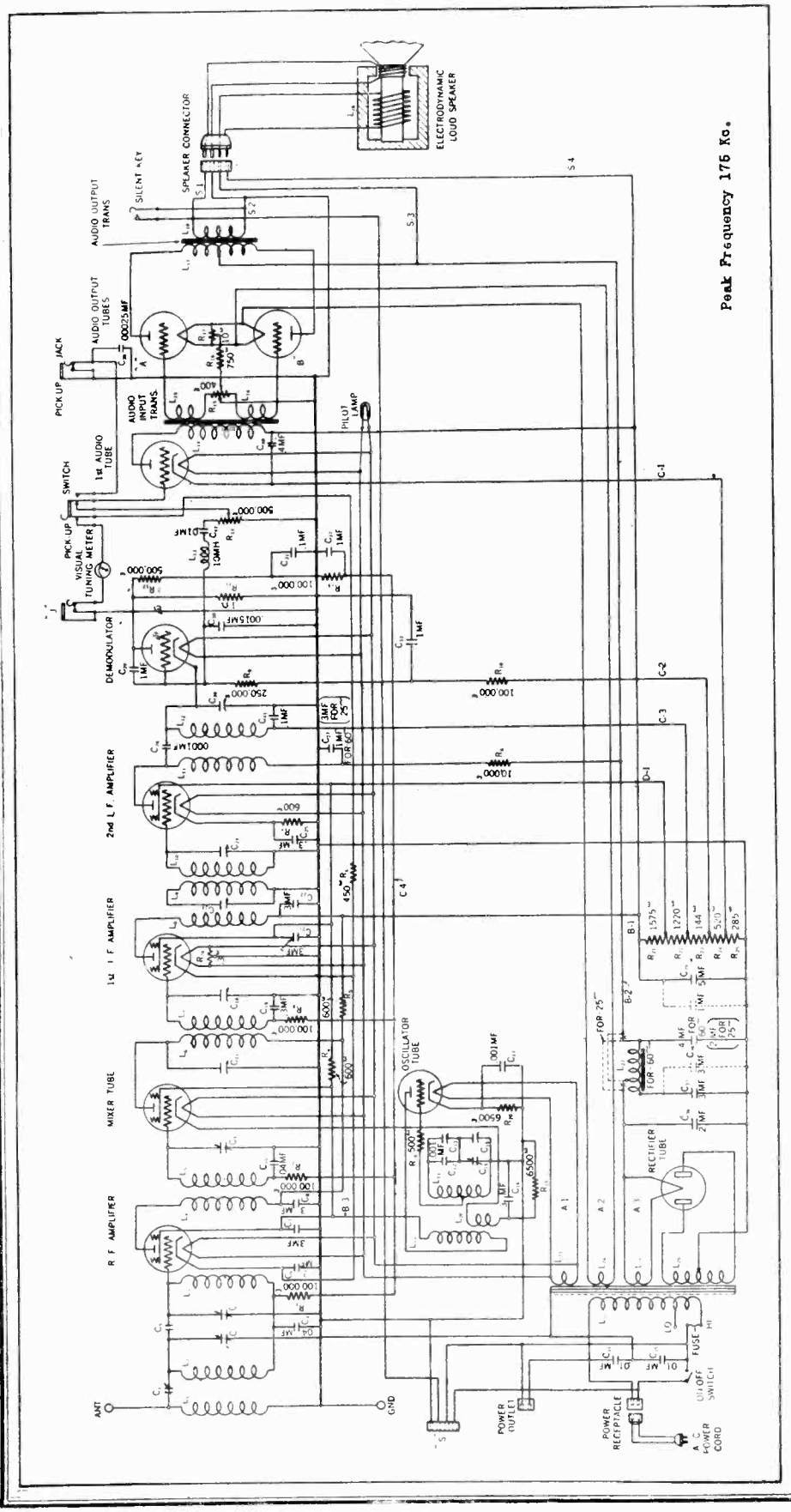
MODEL 22,22-A
Chassis Wiring

STROMBERG - CARLSON TEL. MFG. CO.

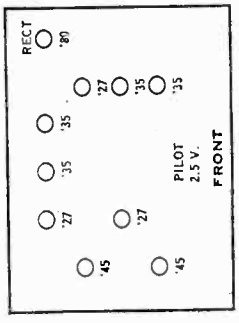


MODEL 22,22-A
Schematic

STROMBERG - CARLSON TEL. MFG. CO.



The 1st and 2nd IF transformers have two tuning adjustments. The 3rd, has but one tuning adjustment. Three windings are used in the 2nd IF transformer. The tuning condensers are accessible through holes through the top of the IF transformer containers.



Model 22 (1931)

STROMBERG - CARLSON TEL. MFG. CO

TUBE	APPROX. VOLTS
Plate Voltage RF	135-155
Plate Voltage 1st Det.	135-155
Plate Voltage Osc.	75-90
Plate Voltage 1st I.F.	135-155
Plate Voltage 2nd I.F.	220-245
Plate Voltage 2nd Det.	Note A
Plate Voltage 1st AF	135-155
Plate Voltage AF Output	230-260
"C" Voltage RF	4.0
"C" Voltage 1st Det.	9.4
"C" Voltage 1st IF	4.1
"C" Voltage 2nd IF	2.8
Grid Voltage Osc.	18.5-21.0
Grid Voltage 2nd Osc.	35-40
Grid Voltage 1st AF	11.6
Grid Voltages AF	45-55*
Screen Voltage RF	75-90*
Screen Voltage 1st Det	75-90*
Screen Voltage IF Tubes	75-90*
B Voltage RF 1st Det	135-155*
B Voltage 1st IF	135-155*
B Voltage 2nd IF	225-250*
B Voltage 1st AF	135-155
B Voltage Output (AF)	285-330
C Voltage 1st AF	11.5
C Voltage AF Output	45-55
Speaker Field Voltage	135-155
AC Plate Voltage per Anode	325-355
Heater Voltage '27-35	2.4
Filament Voltage '45	2.4
Filament Voltage '80	4.8

*These voltages vary with Dial setting and position of Volume Control.

NOTE "A" No voltage can be obtained across these terminals. The plate is grounded to the Chassis through 1 Megohm R 11.

CONDENSERS	
C2	400. mmf max
C3	400. mmf max
C4	.04 mf
C5	Approx. 1 mmf
C6	.3 mf
C7	.3 mf
C8	.3 mf
C9	400. mmf max.
C10	.04 mf
C12	.001 mf
C14	400. mmf max.
C16	.3 mf
C17	.001 mf
C19	.3 mf
C20	250. mmf
C21	.3 mf
C22	.3 mf
C25	.3 mf
C25	.3 mf
C26	100. mmf
C27	1. mf (3 mf for 25 cyc)
C29	.1 mf
C30	.0015 mf
C31	.1 mf
C32	.1 mf
C33	1. mf
C34	.01 mf
C35	.01 mf
C36	2. mf
C37	3. mf (6 mf for 25 cyc)
C38	4. mf (2 mf for 25 cyc)
C39	5. mf (6 mf for 25 cyc)
C40	.4 mf
C41	.1 mf
C42	.01 mf

RESISTANCES		
No.	Value	Body
R1	100,000	Brown Black Yellow
R2	100,000	Brown Black Yellow
R3	100,000	Brown Black Yellow
R4	600	Blue Black Brown
R5	600	Blue Black Brown
R6	450	(Wire Wound)
R7	600	Blue Black Brown
R8	10,000	Brown Black Orange
R9	250,000	Red Green Yellow
R10	100,000	Brown Black Yellow
R11	1 meg	Brown Black Green
R12	500,000	Green Black Yellow
R13	100,000	Brown Black Yellow
R14	500,000	
R15	400	(Wire Wound)
R16	750	(Wire Wound)
R17	10	(Wire Wound)
R18	500	Green Black Brown
R19	6,500	Blue Green Red
R20	6,500	Blue Green Red
R21	1,575	(Wire Wound)
R22	1,220	(Wire Wound)
R23	144	(Wire Wound)
R24	520	(Wire Wound)
R25	285	(Wire Wound)
R26	3	(Wire Wound)

INDUCTANCES	
L1	.9 millihenry
L2	215. microhenry
L3	215. microhenry
L4	5.5 millihenry
L5	215. microhenry
L6	5.5 millihenry
L7	5.5 millihenry
L8	5.5 millihenry
L9	5.5 millihenry
L10	5.5 millihenry
L11	40. millihenry
L12	5.5 millihenry
L13	10. millihenry
L19	15. microhenry
L20	5.5 microhenry
L21	172. microhenry

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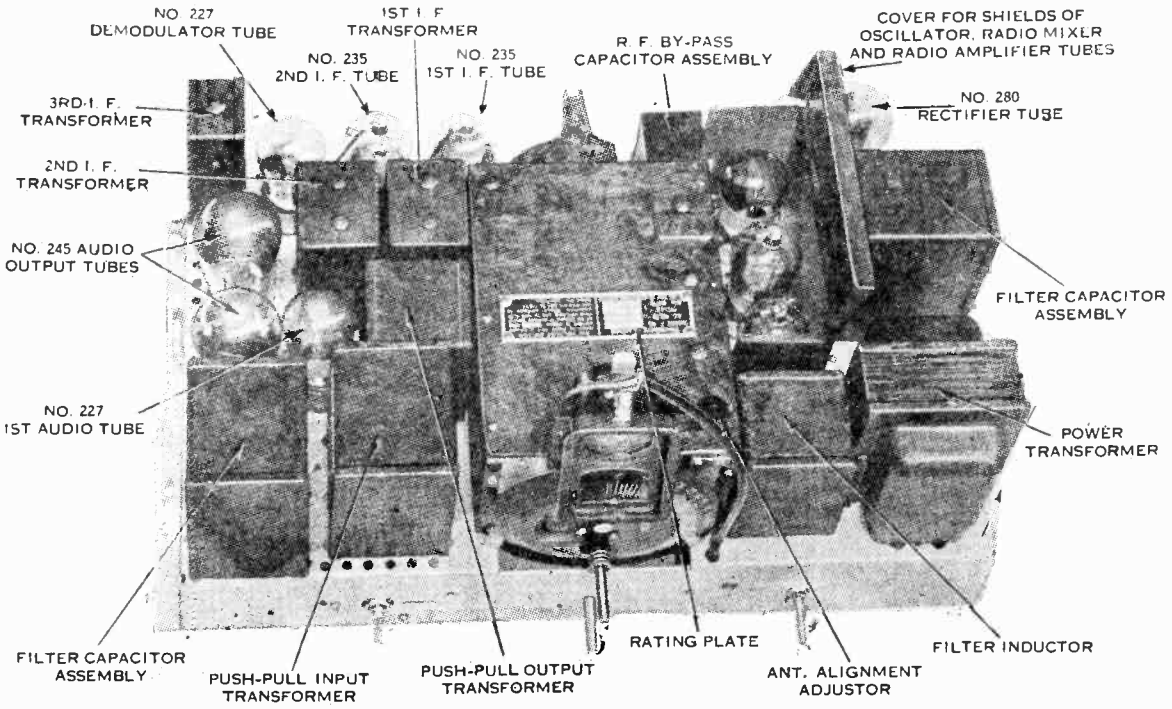
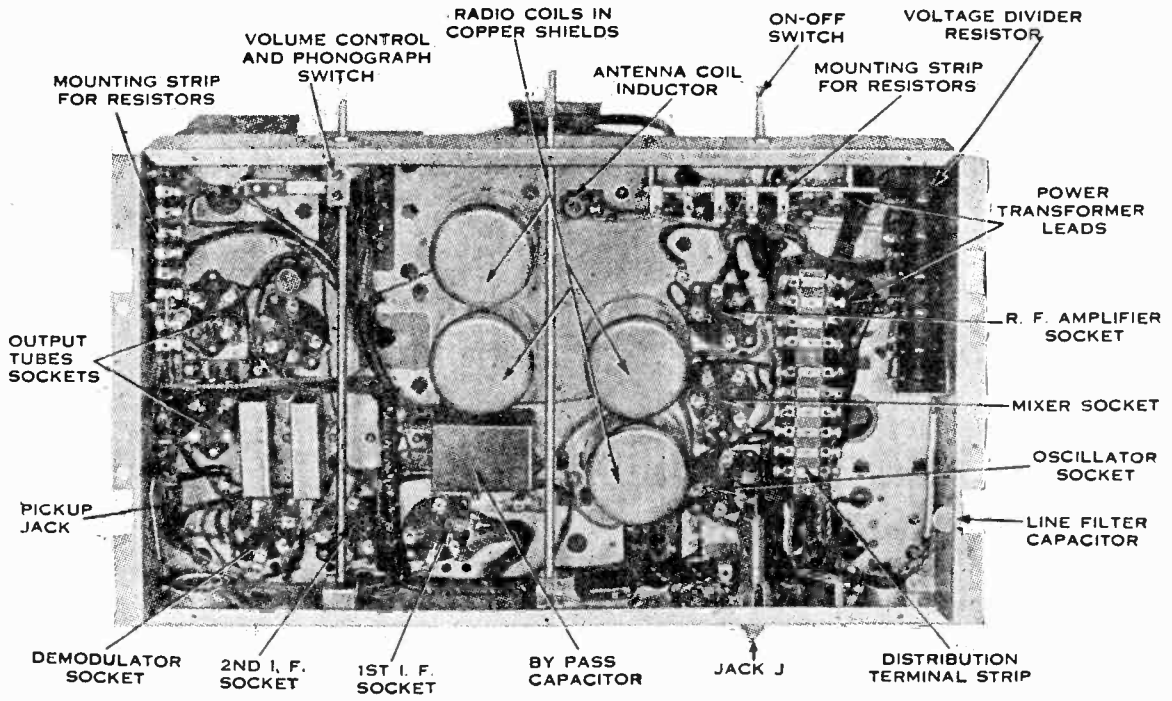
MODEL 22,22-A
Chassis Views



Top View of Chassis with Tube Shields Removed.



Bottom View of Chassis (Bottom Shield Removed).

The hum adjuster is located at the rear of the chassis under the third IF transformer. The fuse box is to the front of the rectifier tube socket looking at the chassis from the front. The two outlets near the rectifier tube socket are the power input and power output. The pickup jack is to the rear of the audio output tubes, next to the speaker connector recepticle.

MODEL 25,26 AC
Chassis Wiring

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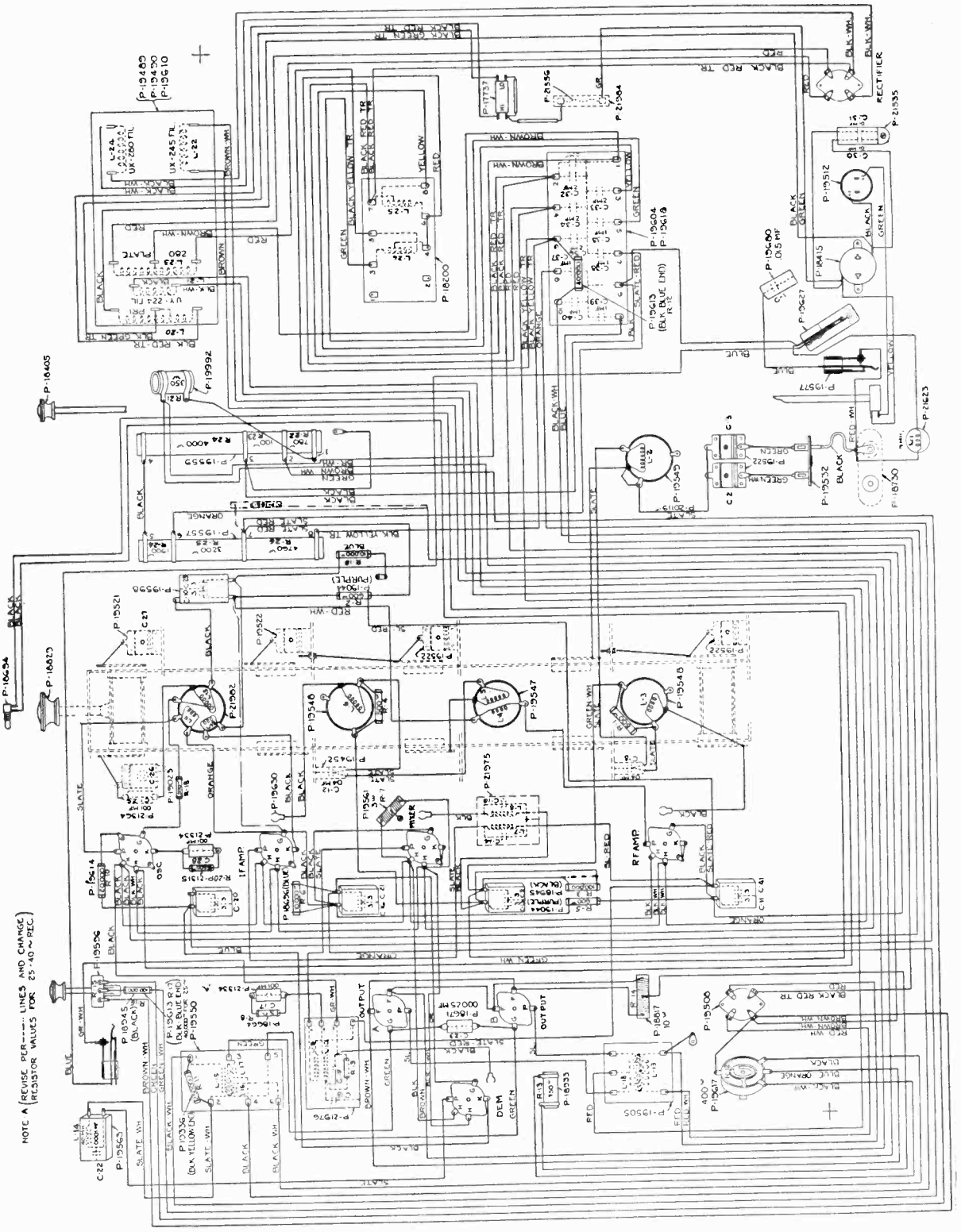

MODEL 25,26 AC
Schematic

Models 25, 26 (1931)

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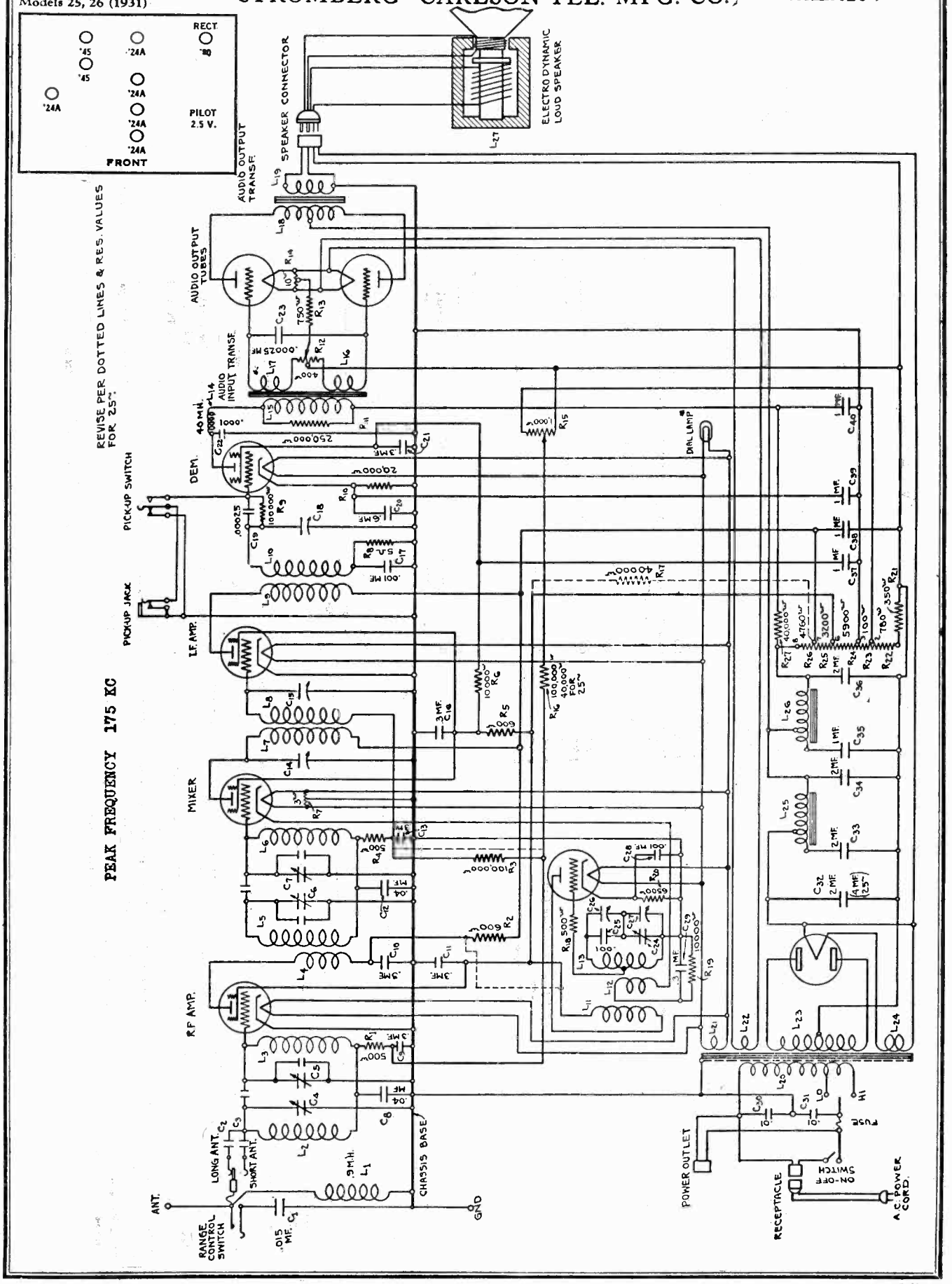


TABLE III. CAPACITOR IDENTIFICATION—Continued

Designation	Function	Value
$C_{..}$	Capacitor across Grids of Push-Pull Output Tubes	250 Mmf.
C_{2a}	Unit of Variable Gang Capacitor	400 Mmf. Max.
$C_{..}$	Series Capacitor for Oscillator Tuning Circuit	.001 Mf.
$C_{..}$	Aligning Capacitor for C_{2a}	
$C_{..}$	Aligning Capacitor for C_{2a}	
$C_{..}$	Cathode By-pass of Oscillator	.001 Mf.
$C_{..}$	Cathode By-pass of Mixer Tube	.3 Mf.
$C_{..}$	Power Line Filter Capacitor	.01 Mf.
C_{31}	Power Line Filter Capacitor	.01 Mf.
C_{32}	Ripple Filter Capacitor	2 Mf. (4 Mf. 25 Cycles)
$C_{..}$	Ripple Filter Capacitor	2 Mf.
$C_{..}$	Ripple Filter Capacitor	2 Mf.
C_{33}	Ripple Filter Capacitor	1 Mf.
$C_{..}$	Ripple Filter Capacitor	2 Mf.
$C_{..}$	Demodulator Screen Circuit Filter Capacitor	1 Mf.
C_{34}	R. F. Amplifier and Mixer Plate Circuit Filter Capacitor	1 Mf.
$C_{..}$	Cathode By-pass of Demodulator	1 Mf.
C_{35}	Demodulator Plate Circuit Filter Capacitor	1 Mf.

III. NORMAL VOLTAGE READINGS

Voltage	Meter	Scale	Where Measured	Approx. Value in Volts
Heater Voltages No. 224 and 227 Tubes	A. C.	0–4	Across Heater Terminals of Sockets	2.4
Heater Voltages No. 245 Tubes	A. C.	0–4	Across Heater Terminals of Audio Output Sockets	2.4
Heater Voltage No. 280 Tube	A. C.	0–8	Across Heater Terminals of Rectifier Socket	4.8
Plate Voltage R. F. Amplifier Tube	D. C.	0–250	Between Plate Terminal of R. F. Amplifier Socket (+) and Chassis Base (–)	135–150
Plate Voltage Mixer Tube	D. C.	0–250	Between Plate Terminal of Mixer Socket (+) and Chassis Base (–)	135–150
Plate Voltage I. F. Tube	D. C.	0–250	Between Plate Terminal of I. F. Socket (+) and Chassis Base (–)	135–150
Plate Voltage Oscillator Tube	D. C.	0–250	Between Plate Terminal of Oscillator Socket (+) and Chassis Base (–)	80–90
Plate Voltage Demodulator Tube	D. C.	0–250	Between Plate Terminal of Demodulator Socket (+) and Chassis Base (–)	190–215

NORMAL VOLTAGE READINGS—Continued

Voltage	Meter	Scale	Where Measured	Approx. Value in Volts
Plate Voltages Audio Output Tubes	D. C.	0–250	Between Plate Terminals of Audio Output Sockets (+) and Mid Tap 10 ohm Resistor (–)	225–255
Control Grid Voltage, R. F., Mixer and I. F. Tubes	D. C.	0–10	Between Center Terminal of 1000 ohm Volume Control Potentiometer (–) and Chassis Base (+)	2.5
Grid Voltage Oscillator Tube	D. C.	0–250	Between Cathode Terminal of Oscillator Socket (+) and Chassis Base (–)	13
Control Grid Voltage Demodulator Tube	D. C.	0–250 (See Note)	Between Cathode Terminal of Demodulator Socket (+) and Chassis Base (–)	7
Grid Voltage Audio Output Tubes	D. C.	0–250	Between Grid Terminals of Audio Output Sockets (–) and Mid Tap 10 ohm Resistor (+)	40–50
Screen Voltages R. F., Mixer, I. F. and Demodulator Tubes	D. C.	0–250	Between Screen Terminals of Tubes (+) and Chassis Base (–)	130–150
B Voltage R. F. Amplifier Tube	D. C.	0–250	Between Tube Side of 600 ohm Resistor (+) and Chassis Base (–)	135–150
B Voltages Mixer and I. F. Tubes	D. C.	0–250	Between Terminal No. 6 on Voltage Divider (+) and Chassis Base (–)	135–150
B Voltage Demodulator Tube	D. C.	0–250	Between Terminal No. 1 on Input Transformer (+) and Chassis Base (–)	200–230
B Voltage Audio Output Tubes	D. C.	0–250	Between Mid Tap on Audio Output Transformer (+) and Chassis Base (–)	250–290
C Voltage R. F., Mixer and I. F. Tubes	D. C.	0–10	Across 100 ohm Resistance on Voltage Divider	2.5
C Voltage Oscillator Tube	D. C.	0–250	Across 6,500 ohm Biasing Resistor	12
C Voltage Demodulator Tube	D. C.	0–250	Across 20,000 ohm Biasing Resistor	7
C Voltage Audio Output Tube	D. C.	0–250	Across 750 ohm Biasing Resistor	40–50
Total B Voltage	D. C.	0–500	Between Terminals No. 1 and No. 8 on Voltage Divider	260–300
Speaker Field Voltage	D. C.	0–500	Across Small Pins of Speaker Connector Socket	300–335
Plate Voltage A. C. Per Anode No. 280 Tube	A. C.		Between P Terminals of No. 280 Rectifier Socket and Negative Side of 350 ohm Resistor	*320–350*

NOTE: Measurements to be taken on 0–250 Volt Scale to give accurate readings as this voltage is across only 20,000 ohms.
* Cannot be measured on Weston Model 528 Meter unless multiplier is used.

II. COMPONENT IDENTIFICATION TABLES

TABLE 1. INDUCTOR IDENTIFICATION

Designation	Function	Value
L_1	Antenna Inductor	.9 Millihenry
L_2	First Coil Preselector Bi-resonator	195 Microhenrys
L_3	Second Coil Preselector Bi-resonator	195 Microhenrys
L_4	Primary of Radio Transformer	
L_5	First Coil of Second Bi-resonator	195 Microhenrys
L_6	Second Coil of Second Bi-resonator	195 Microhenrys
L_7	Primary of First I. F. Transformer	10 Millihenrys
L_8	Secondary of First I. F. Transformer	10 Millihenrys
L_9	Primary of Second I. F. Transformer	10 Millihenrys
L_{10}	Secondary of Second I. F. Transformer	10 Millihenrys
L_{11}	Plate Inductor of Oscillator	15 Microhenrys
L_{12}	Cathode Coupling Inductor of Mixer Tube	5.5 Microhenrys
L_{13}	Grid Inductor of Oscillator	158 Microhenrys
L_{14}	Demodulator Plate Radio Frequency Choke	40 Millihenrys
L_{15}	Primary of Push-Pull Input Transformer	
L_{16}	Secondary of Push-Pull Input Transformer	
L_{17}	Secondary of Push-Pull Input Transformer	
L_{18}	Primary of Push-Pull Output Transformer	
L_{19}	Secondary of Push-Pull Output Transformer	
L_{20}	Primary of Power Transformer	
L_{21}	Secondary of Power Transformer for Heaters	
L_{22}	Secondary of Power Transformer for Output Tube Filaments	
L_{23}	Secondary of Power Transformer for Plates of Rectifier Tube	
L_{24}	Secondary of Power Transformer for Rectifier Filament	
L_{25}	First Ripple Filter Inductor	
L_{26}	Second Ripple Filter Inductor	
L_{27}	Speaker Field Winding	

TABLE II. RESISTOR IDENTIFICATION

Designation	Function	Value
R_1	Grid Bias Feeder of Radio Amplifier	500 Ohms
R_2	Filter Resistor Plate Circuit of Radio Amplifier	600 Ohms
R_3	Grid Bias Feeder for Mixer of I. F. Amplifier	100,000 Ohms
R_4	Grid Bias Feeder for Mixer Tube	500 Ohms
R_5	Filter Resistor for Screen Circuits of Mixer and I. F. Amplifier	600 Ohms
R_6	Filter Resistor for Demodulator Screen Circuit	10,000 Ohms
R_7	Mid-tap Resistor Heater Circuit (at Mixer Tube)	3 Ohms
R_8	Grid Bias Feeder for Demodulator	5 Megohms
R_9	Grid Bias Feeder for Demodulator	100,000 Ohms
R_{10}	Cathode Resistor of Demodulator Tube	20,000 Ohms

TABLE II. RESISTOR IDENTIFICATION—Continued

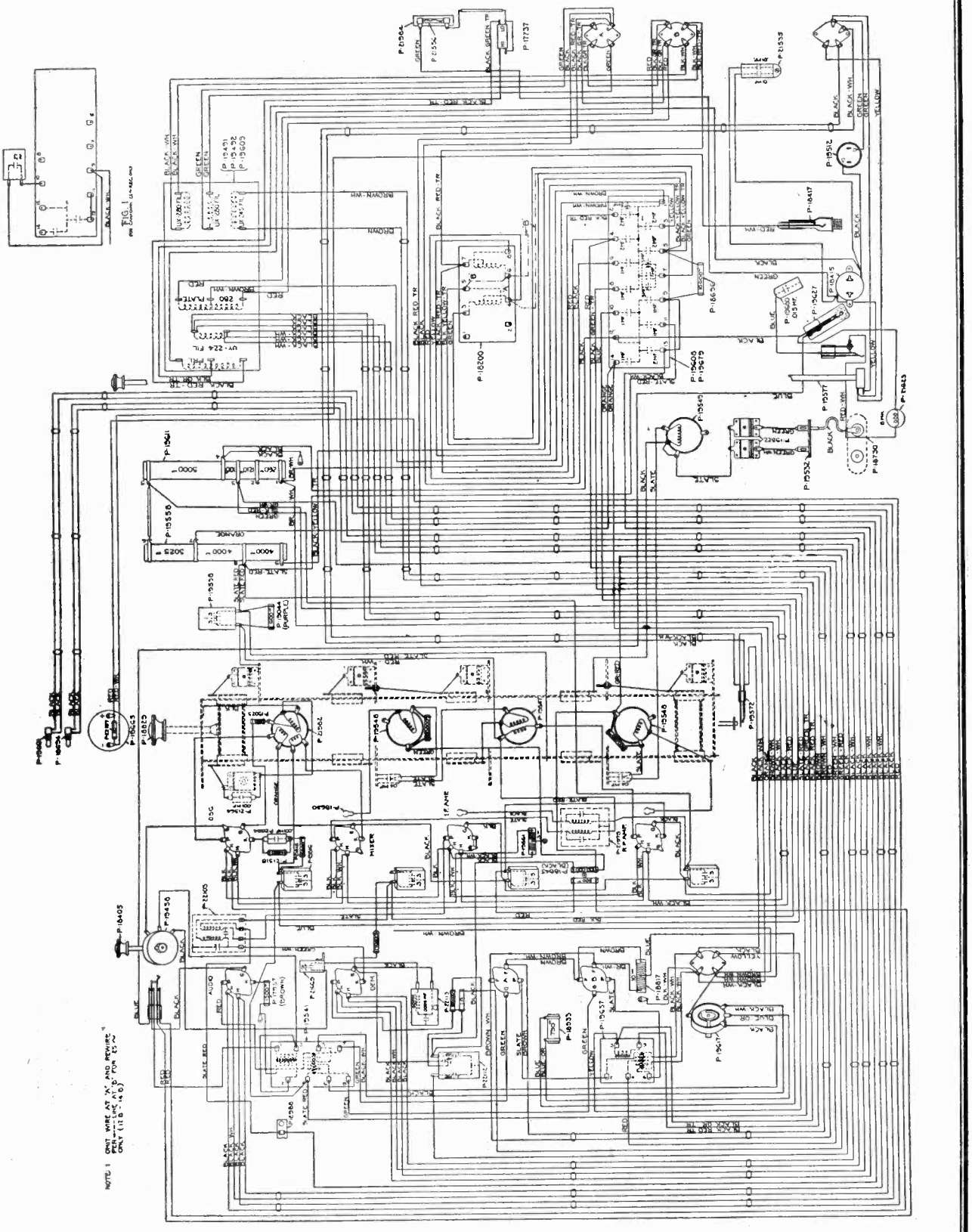
Designation	Function	Value
R_{11}	Shunt Resistor for Primary of Push-Pull Input Transformer	250,000 Ohms
R_{12}	Hum Balancer Potentiometer	400 Ohms
R_{13}	Grid Biasing Resistor at Power Output Tube	750 Ohms
R_{14}	Mid-Tap Resistor of Filament Circuit of Output Tube	10 Ohms
R_{15}	Volume Control Potentiometer	1,000 Ohms
R_{16}	Filter Resistor for Grid Bias Circuits	100,000 Ohms (40,000 Ohms 25 Cycles)
R_{17}	Filter Resistor of Screen Circuits, 25 Cycles Only	40,000 Ohms
R_{18}	Series Grid Resistor of Oscillator	500 Ohms
R_{19}	Cathode Resistor of Mixer Tube	10,000 Ohms
R_{20}	Cathode Resistor of Oscillator Tube	6,500 Ohms
R_{21}	Auxiliary Voltage Divider Resistor	350 Ohms
R_{22}	Section of Voltage Divider Resistor	780 Ohms
R_{23}	Section of Voltage Divider Resistor	100 Ohms
R_{24}	Section of Voltage Divider Resistor	5,900 Ohms
R_{25}	Section of Voltage Divider Resistor	3,200 Ohms
R_{26}	Section of Voltage Divider Resistor	4,760 Ohms
R_{27}	Filter Resistor of Demodulator Plate Circuit	40,000 Ohms

TABLE III. CAPACITOR IDENTIFICATION

Designation	Function	Value
C_1	Range Control Capacitor	.015 Mf.
C_2	"Long Antenna" Aligning Capacitor	
C_3	"Short Antenna" Aligning Capacitor	
C_4	Unit of Variable Gang Capacitor	400 Mmf. Max.
C_5	Unit of Variable Gang Capacitor	400 Mmf. Max.
C_6	Unit of Variable Gang Capacitor	400 Mmf. Max.
C_7	Unit of Variable Gang Capacitor	400 Mmf. Max.
C_8	First Bi-resonator Main Coupling Capacitor	.04 Mf.
C_9	Grid Circuit By-pass of Radio Amplifier	.3 Mf.
C_{10}	Plate Circuit By-pass of Radio Amplifier	.3 Mf.
C_{11}	Screen Circuit By-pass of Radio Amplifier	.3 Mf.
C_{12}	Second Bi-resonator Main Coupling Capacitor	.04 Mf.
C_{13}	Grid Circuit By-pass of Mixer and I. F. Amplifier	.3 Mf.
C_{14}	Aligning Capacitor for Primary of First I. F. Transformer	
C_{15}	Aligning Capacitor for Secondary of First I. F. Transformer	
C_{16}	Screen Circuits By-pass for Mixer and I. F. Amplifier	.3 Mf.
C_{17}	Grid Circuit By-pass of Demodulator	.001 Mf.
C_{18}	Aligning Capacitor for Secondary of Second I. F. Transformer	
C_{19}	"Grid Capacitor" of Demodulator	250 Mmf.
C_{20}	Cathode By-pass of Demodulator	.6 Mf.
C_{21}	Screen Circuit By-pass of Demodulator	.3 Mf.
C_{22}	Demodulator Plate Filter Capacitor	100 Mmf.

MODEL 27 AC
Chassis Wiring

STROMBERG - CARLSON TEL. MFG. CO.

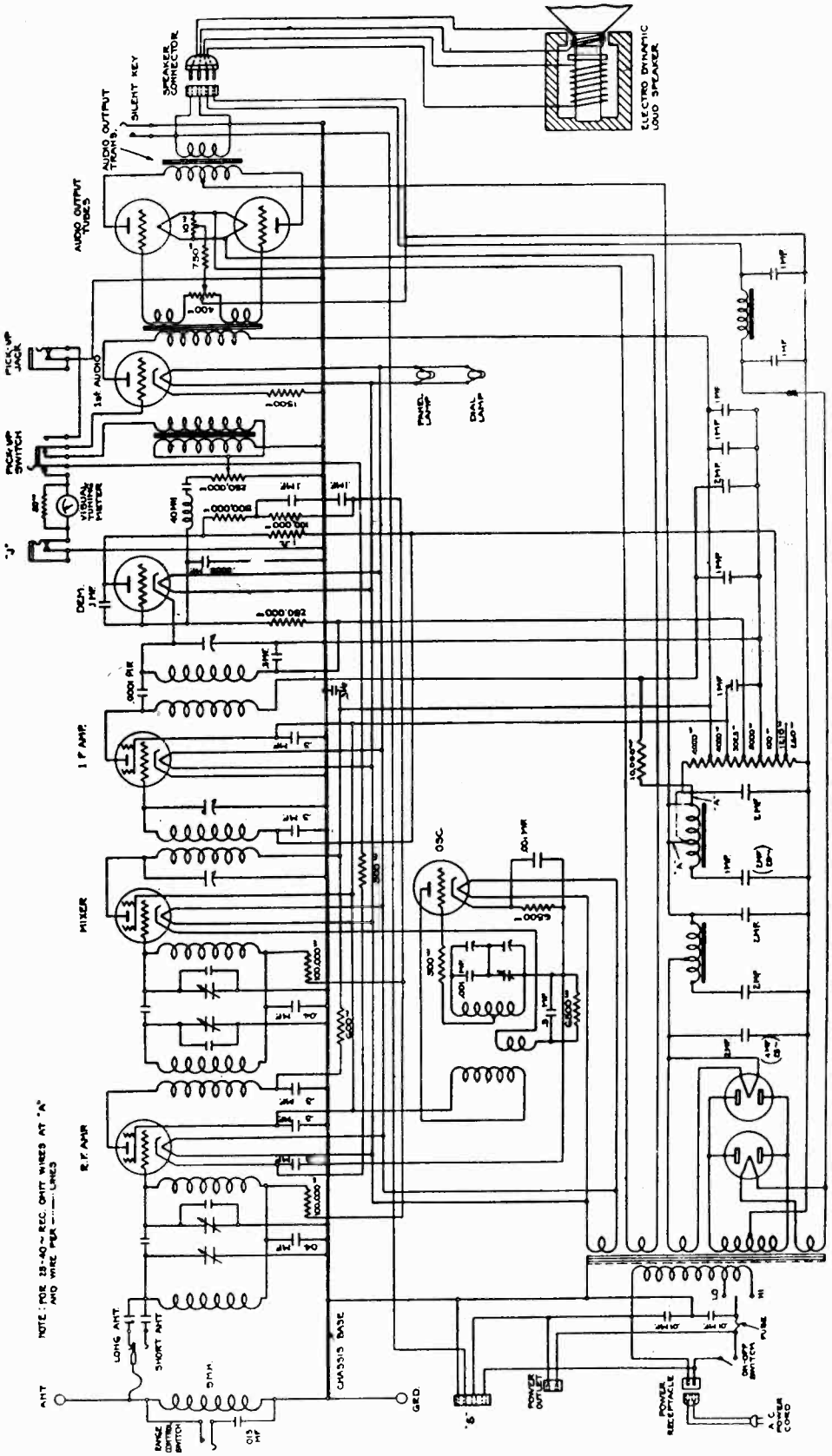


MODEL 27 AC
Schematic

STROMBERG - CARLSON TEL. MFG. CO.

Schematic Circuit of No. 27 Superheterodyne Receiver

PEAK FREQUENCY 175 KC



STROMBERG - CARLSON TEL. MFG. CO.

MODEL 27
Voltage
Parts List

Piece Number	Name of Part	Description of Part	Required per Receiver
P-18429	Knob, Station Selector	Large Moulded Knob	1
P-18467	Knob, Volume Control, On-Off and Silent Key	Small Moulded Knob	3
P-19665	Meter	Visual Tuning Meter	1
P-19735	Pick-up Head	Low Impedance Magnetic Pick-up	1
P-19656	Pin Plug Assembly	Antenna Pin Tip	1
P-19532	Pin Jack	Antenna Pin Jacks	1
List 3027	Plug	Pick-up Cord Plug	1
P-19673	Potentiometer	Phonograph Volume Control	1
P-19617	Potentiometer	Hum Balancer	1
P-18415	Receptacle, Convenience Outlet	Power Supply Outlet—Rear of Chassis	1
P-19512	Receptacle, Supply Cord	Input Power Supply Receptacle	1
P-21562	Resistor, 1 Megohm	Carbon Type, Brown-Black-Green	1
P-21697	Resistor, 500,000 ohms	Carbon Type, Green-Black-Yellow	1
P-21561	Resistor, 250,000 ohms	Carbon Type, Red-Green-Yellow	1
P-19533	Resistor, 100,000 ohms	Carbon Type, Brown-Black-Yellow	2
P-18945	Resistor, 100,000 ohms	Carbon Type, Black	1
P-18696	Resistor, 10,000 ohms	Carbon Type, Blue	1
P-21315	Resistor, 6,500 ohms	Carbon Type, Blue-Green-Red	2
P-17957	Resistor, 1,500 ohms	Carbon Type, Brown	1
P-19044	Resistor, 600 ohms	Carbon Type, Purple	1
P-19023	Resistor, 500 ohms	Carbon Type, Pink	2
P-18817	Resistor, 10 ohms	Wire Wound (mid-tap)	1
P-19561	Resistor, 3 ohms	Wire Wound (mid-tap)	1
P-19558	Resistor, 11,025 ohms	Voltage Divider (Vitreous Enameled)	1
P-19611	Resistor, 6,570 ohms	Voltage Divider (Vitreous Enameled)	1
P-18933	Resistor, 750 ohms	Vitreous Enameled Type	1
P-19572	Silent Tuning Key	Silent Tuning Key Assembly	1
P-19508	Socket	UX Type (4 Prong)	5
P-19507	Socket	UY Type (5 Prong)	7
P-19410	Speaker	Complete Assembly—10" Cone	1
P-17737	Switch	Hi-Lo Switch	1
P-19577	Switch	On-Off Switch on Local-Distance Switch Assembly	1
P-19491	Transformer, Power	60 Cycle, 110 Volt	1
P-19492	Transformer, Power	25-60 Cycle, 110 Volt	1
P-19609	Transformer, Power	25-60 Cycle, 220 Volt	1
P-18957	Transformer, Pick-up	Pick-up Input Transformer	1
P-19458	Volume Control Assembly	Volume Control and Phonograph Switch Assembly	1

Piece Number	Name of Part	Description of Part	Required per Receiver
P-19541	Audio Transformer Assembly	First Audio and Push-Pull Input Transformer	1
P-19657	Audio Output Transformer	Push-Pull Output Transformer	1
P-18730	Binding Post Assembly	Antenna and Ground Binding Post	1
P-19504	Bracket Assembly	Carbon Resistor Mounting	4
P-18961	Bracket Assembly	Pilot Lamp Socket Mounting	1
P-18691	Bracket Assembly	Voltage Divider Mounting	2
P-18937	Cap	Aligning Capacitor Covers	8
P-19522	Capacitor, Aligning	Aligning Capacitor for Bi-Resonator Circuits	3
P-19521	Capacitor, Aligning	Detector Stage Aligning Capacitor	1
P-19520	Capacitor, Aligning	Antenna Aligning Capacitor	2
P-21964	Capacitor, Aligning	Oscillator Series Tuning Capacitor	1
P-19516	Capacitor Assembly	Radio Bi-Pass Capacitors—Two .3 MF Units	4
P-19598	Capacitor Assembly	Radio Bi-Pass Capacitors—Two .3 MF Units	1
P-22112	Capacitor Assembly	Radio Bi-Pass Capacitors—Three .1 MF Units	1
P-19608	Capacitor Assembly	Filter Capacitor Block—60 Cycle	1
P-19679	Capacitor Assembly	Filter Capacitor Block—25 Cycle	1
P-19452	Capacitor	Bi-Resonator Coupling Capacitor —04 MF	1
P-19680	Capacitor	Range Control Capacitor—015 MF	1
P-21334	Capacitor	Fixed Capacitor—001 MF	1
P-21535	Capacitor	Line Filter Across A. C. Input	1
P-21364	Capacitor	Series Tuning Oscillator Tuning	1
P-19549	Coil Assembly R. F.	First Coil of First Bi-Resonator	1
P-19548	Coil Assembly R. F.	Second Coil of First and Second Bi-Resonators	2
P-19547	Coil Assembly R. F.	First Coil of Second Bi-Resonator	1
P-21982	Coil Assembly, Oscillator	Oscillator Tuning Inductor	1
P-21975	Coil and Capacitor Assembly	First I. F. Transformer	1
P-22103	Coil and Capacitor Assembly	Second I. F. Transformer	1
P-18746	Cone and Moving Coil Assembly	Moving Element of P-19410 Dynamic Speaker	1
P-19502	Cord	Power Supply Cord to Chassis	1
P-19415	Cord	Speaker Connector Cord	1
P-19629	Dial	Station Selector Dial	1
P-19486	Drive Assembly	Driving Unit for Gang Tuning Capacitor Assembly	1
P-18701	Escutcheon Assembly	Selector Dial Escutcheon	1
P-22113	Filter Assembly	Demodulator Plate Filter	1
P-19627	Frame and Spring Assembly	Pick-up Jack	1
P-19630	Grid Clip	Control Grid Clips for Tetrodes	3
P-18200	Inductor Assembly	Filter Inductor Assembly—Double "B" Choke	1
P-18417	Jack	Remote Control Jack	1

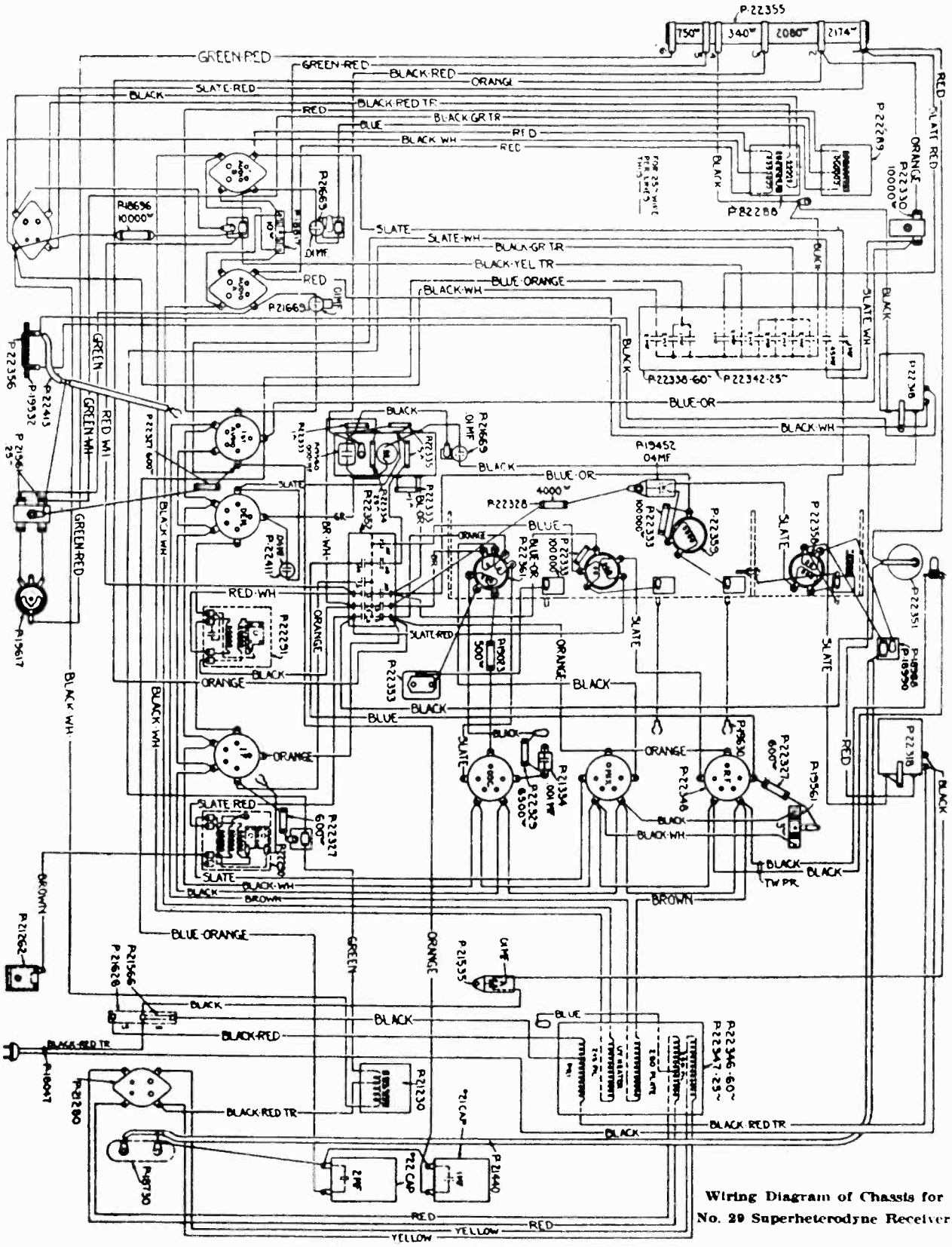
Voltage	Meter	Scale	Where Measured	Approx. Value in Volts
Heater Voltages No. 224 and 227 Tubes	A. C.	0–4	Across Heater Terminals of 224 and 227 Tube Sockets	2.4
Filament Voltages No. 245 Tubes	A. C.	0–4	Across Filament Terminals of Audio Output Sockets	2.4
Filament Voltages No. 280 Tubes	A. C.	0–8	Across Filament Terminals of Rectifier Tube Sockets	4.8
Plate Voltage R. F. Tube	D. C.	0–250	Between Plate Terminal of R. F. Amplifier Socket (+) and Chassis Base (–)	140–165
Plate Voltage Mixer Tube	D. C.	0–250	Between Plate Terminal of Mixer Socket (+) and Chassis Base (–)	140–165
Plate Voltage Oscillator Tube	D. C.	0–250	Between Plate Terminal of Oscillator Socket (+) and Chassis Base (–)	75–90
Plate Voltage I. F. Tube	D. C.	0–250	Between Plate Terminal of I. F. Socket (+) and Chassis Base (–)	210–230
Plate Voltage Demodulator Tube	D. C.	0–250	Between Plate Terminal of Demodulator Socket (+) and Chassis Base (–)	See Note A
Plate Voltage 1st A. F. Tube	D. C.	0–250	Between Plate Terminal of 1st A. F. Socket (+) and Chassis Base (–)	110–125
Plate Voltages Audio Output Tubes	D. C.	0–750	Between Plate Terminals of Audio Output Sockets (+) and Mid Tap of 10 ohm Resistor (–)	250–270
"C" Voltage R. F. Tube	D. C.	0–110	Between Cathode Terminal of R. F. Socket (+) and Chassis Base (–)	2.4
"C" Voltage Mixer Tube	D. C.	0–10	Between Cathode Terminal of Mixer Socket (+) and Chassis Base (–)	6.5
Grid Voltage Oscillator Tube	D. C.	0–250	Between Cathode Terminal of Oscillator Socket (+) and Chassis Base (–)	27–35
Control Grid Voltage I. F. Tube	D. C.	0–10	Between Control Grid Clip of I. F. Tube (–) and Cathode Terminal of I. F. Socket (+)	2.8
Grid Voltage Demodulator Tube	D. C.	0–250	Between Cathode Terminal of Demodulator Socket (+) and Chassis Base (–)	45–55
Grid Voltage 1st A. F. Tube	D. C.	0–10	Between Cathode Terminal of 1st A. F. Socket (+) and Chassis Base (–)	6.5
Grid Voltage Audio Output Tube	D. C.	0–250	Between Grid Terminals of Audio Output Sockets (–) and Mid Tap of 10 ohm Resistor (+)	40–50
Screen Voltages R. F. Mixer and I. F. Tubes	D. C.	0–250	Between Screen Terminals of R. F., Mixer and I. F. Sockets (+) and Chassis Base (–)	75–90
"B" Voltages R. F. Mixer and 1st A. F. Tubes	D. C.	0–250	Between Terminal 8 on Voltage Divider (+) and Chassis Base (–)	110–165
"B" Voltage Oscillator Tube	D. C.	0–250	Between Screen Terminal of Mixer Tube Socket (+) and Chassis Base (–)	75–90
"B" Voltage I. F. Tube	D. C.	0–250	Between Terminal 9 on Capacitor Assembly (+) and Chassis Base (–)	210–230
"B" Voltage Audio Output Tubes	D. C.	0–750	Between Terminal 1 on Output Transformer (+) and Chassis Base (–)	248–288
"C" Voltage I. F. Tube	D. C.	0–10	Between Terminals 3 (–) and 1 (+) on Voltage Divider	2.0
"C" Voltage Audio Output Tubes	D. C.	0–250	Across 750 ohm Biasing Resistor	45–55
Speaker Field Voltage	D. C.		Across Small Pins on Speaker Connector Socket	335–365
Plate Voltage A. C. Per Anode No. 280 Rectifier Tubes	A. C.	0–450	Between Plate Terminals of Rectifier Tube Sockets and Terminal 1 on Voltage Divider	330–360

NOTE "A"—No voltage can be obtained across these terminals as the Demodulator Plate is connected to the Chassis Base through 1 megohm and 100 ohm resistances.

NORMAL VOLTAGE READINGS

MODEL 29
Chassis Wiring

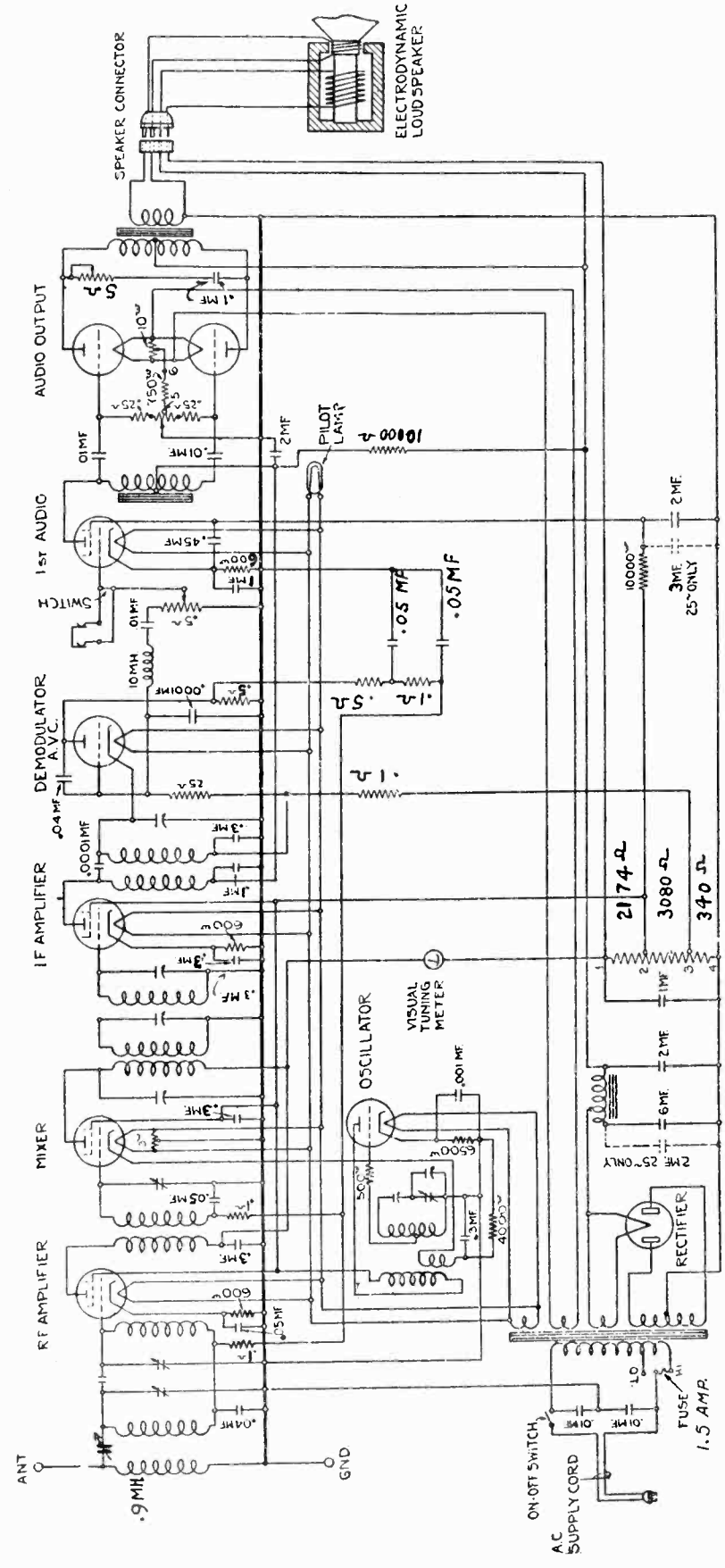
STROMBERG - CARLSON TEL. MFG. CO.



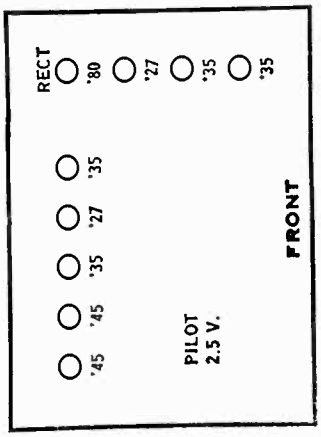
Wiring Diagram of Chassis for No. 29 Superheterodyne Receiver

MODEL 29
Schematic

STROMBERG - CARLSON TEL. MFG. CO.



Model 29 (1932)



The Stromberg-Carlson No. 29 Radio Receiver is a Superheterodyne employing nine tubes. An improved Automatic Volume Control circuit with Visual Tuning Meter is incorporated.

Four No. 235 tubes are used as R. F. Amplifier, Mixer, I. F. Amplifier, and First Audio Amplifier. Two No. 227 tubes are used as Oscillator and Demodulator-AVC. Two No. 245 tubes are used in the push-pull output stage. A No. 280 Rectifier is used in the power supply.

A Bi-resonator is used to couple the antenna to the R. F. amplifier to prevent any cross modulation. The R. F. amplifier is coupled to the mixer by an ordinary tuned R. F. transformer. This gives three tuning circuits (four gang tuning capacitor) for R. F. selectivity ahead of the mixer, thus the image response ratio is exceedingly high. The oscillator is coupled to the cathode circuit of the mixer tube in the regular manner. The I. F. output of the mixer tube is fed into a Tri-resonator (three tuned circuit transformer) and thence to the I. F. amplifier tube. This tube is coupled to the duo-diode demodulator-AVC tube by a choke-tuned circuit arrangement. The audio output of the duo-diode is fed through a radio frequency filter to the resistor unit of the Manual Volume Control which acts as a coupling resistor to the audio amplifier. The A. V. C. voltages from the other diode circuit are led back to the control grids of the first two tubes. A No. 235 screen grid tube is used in the first audio stage to obtain high amplification without distortion.

MODEL 29
Parts List
Voltage

STROMBERG - CARLSON TEL. MFG. CO.

REPLACEMENT PARTS

(See Chassis Assembly on Page 4 and Wiring Diagram on Page 2)

Piece Number	Part	Description of Part	Required per Receiver
P-22288	Audio Transformer	Audio Outpnt Transformer	1
P-22289	Audio Transformer	Push-Pull Transformer	1
P-21663	Bracket Assembly	Voltage Divider Mounting	1
P-22352	Capacitor	By-Pass Capacitor	1
P-22353	Capacitor, Aligning	Oscillator "Series Aligner"	1
P-21334	Capacitor	.001 Mfd.	1
P-21535	Capacitor	.01 Mfd.	3
P-21669	Capacitor	.01 Mfd.	1
Code No. 21	Capacitor	1 Mfd. Filter Capacitor	1
Code No. 22	Capacitor	2 Mfd. Filter Capacitor	1
P-19452	Capacitor	Bi-Resonator Coupling Capacitor .04 Mfd.	1
P-22411	Capacitor	.04 Mfd.	1
P-21262	Capacitor, Aligning	Aligner for First I. F. Transformer	1
P-22338	Capacitor Assembly	Filter Capacitor (60 Cycle)	1
P-22342	Capacitor Assembly	Filter Capacitor (25 Cycle)	1
P-22290	Coil and Capacitor Assembly	First I. F. Transformer	1
P-22291	Coil and Capacitor Assembly	Second I. F. Transformer	1
P-22358	Coil Assembly	First Coil of Bi-Resonator	1
P-22359	Coil Assembly	Second Coil of Bi-Resonator	1
P-22360	Coil Assembly	R. F. Transformer	1
P-22361	Coil Assembly	Oscillator Coil	1
P-21623	Coil Assembly	Antenna Inductor	1
P-21566	Fuse	1½ Amperes	1
P-19630	Grid Clip		4
P-21704	Grid Clip Assembly		2
P-21230	Inductor Assembly	Filter Inductor—"B" Choke	1
P-21277	Knob	Antenna Aligner	1
P-22390	Knob	Selector Knob	1
P-22391	Knob	Volume Control and Clarifier-Switch	2
P-22351	Meter	Visual Tuning Meter	1
P-19617	Potentiometer	Hum Adjuster	1
P-22318	Potentiometer and Switch	Volume Control and Phonograph Switch and Clarifier and "On-Off" Switch	2
P-19561	Resistor, 3-Ohms	Resistor across Heater of Mixer Tube	1
P-18817	Resistor, 10-Ohms	Resistor across Filament of Outpnt Tubes	1
P-19023	Resistor, 500-Ohms, "C" Type	Carbon Resistor, Green, Black, and Brown	1
P-22327	Resistor, 600-Ohms, "C" Type	Carbon Resistor, Blue, Black, and Brown	3
P-22328	Resistor, 4,000-Ohms, "C" Type	Carbon Resistor, Yellow, Black, and Red	1
P-22329	Resistor, 6,500-Ohms, "C" Type	Carbon Resistor, Blue, Green, and Red	1
P-22355	Resistor, 7,344-Ohms,	Voltage Divider	1
P-18696	Resistor, 10,000-Ohms, "B" Type	Carbon Resistor, Brown, Black, and Orange	1
P-22330	Resistor, 10,000-Ohms, "C" Type	Carbon Resistor, Brown, Black, and Orange	1
P-22333	Resistor, 100,000-Ohms, "D" Type	Carbon Resistor, Brown, Black and Yellow	4
P-21561	Resistor, 250,000-Ohms, "C" Type	Carbon Resistor, Red, Green, and Yellow	2
P-22334	Resistor, 250,000-Ohms, "D" Type	Carbon Resistor, Red, Green, and Yellow	1
P-22335	Resistor, 500,000-Ohms, "D" Type	Carbon Resistor, Green, Black, and Yellow	2
P-22344	Resistor and Coil Assembly	Demodulator Plate Filter	1
P-22346	Transformer	Power, 60 Cycle, 110 Volts	1
P-22347	Transformer	Power, 25-60 Cycle, 110 Volts	1

NORMAL VOLTAGE READINGS

These voltage readings correspond to a line voltage at 120 volts with the fuse in the "HI" position or 110 volts in the "LO" position. The fuse should be set in the proper position for the line voltage obtained before making measurements. When voltages are measured proper allowance should be made for a difference in line voltage above or below 110 or 120 volts. Be sure to make these readings with the Meter and Scale indicated, otherwise the results will not agree with those tabulated. Alternating voltages are indicated by italics.

Voltage	Meter	Scale	Where Measured	Approx. Value in Volts
Heater Voltages No. 227 and No. 235 Tubes	A. C.	0–4	Across Heater Terminals of Sockets	*2.48*
Filament Voltage No. 248 Tubes	A. C.	0–4	Across Filament of Audio Output Socket	*2.48*
Plate Voltage Radio Amplifiers	D. C.	0–250	Between Plate Terminal of R. F. Amplifier Socket (+) and Chassis Base	170
Plate Voltage Mixer Tube	D. C.	0–250	Between Plate Terminal of Mixer Socket (+) and Chassis Base (—)	170
Plate Voltage Oscillator Tube	D. C.	0–250	Between Plate Terminal of Oscillator Tube Socket (+) and Chassis Base (—)	87
Plate Voltage I. F. Tube	D. C.	0–250	Between Plate Terminal of First I. F. Socket (+) and Chassis Base (—)	220
Plate Voltage First Audio Tube	D. C.	0–250	Between Plate Terminal of First Audio Socket (+) and Chassis Base (—)	192
Plate Voltage Audio Output Tubes	D. C.	0–750	Between Plate Terminals of Audio Output Sockets (+) and Midtap 10-Ohm Resistor Midtap (—)	250
"C" Voltage R. F. Amplifier	D. C.	0–10	Between Cathode Terminal of R. F. Amplifier Socket (+) and Chassis Base (—)	3
"C" Voltage Mixer Tube	D. C.	0–10	Between Cathode Terminal of Mixer Socket (+) and Chassis Base (—)	3
"C" Voltage I. F. Amplifier	D. C.	0–10	Between Cathode Terminal I. F. Socket (+) and Chassis Base (—)	3
Grid Voltage Oscillator Tube	D. C.	0–250	Between Cathode Terminal of Oscillator Socket (+) and Chassis Base (—)	14–18
Plate Voltage Demodulator Tube	D. C.	0–250	Between Voltage Divider Terminal No. 3 (+) and Chassis Base (—)	12.5
Screen Voltages of R. F. Amplifier, Mixer, and I. F. Amplifier	D. C.	0–250	Between Screen Terminals on Sockets (+) and Chassis Base (—)	82
"B" Voltage R. F. Amplifier	D. C.	0–250	Between High Side Voltage Divider (+) and Chassis Base (—)	175
"B" Voltage I. F. Amplifier and First Audio Tube	D. C.	0–250	Between Midtap First Audio Transformer (+) and Chassis Base (—)	225
"B" Voltage Output Tubes	D. C.	0–750	Between Midtap on Output Transformer (+) and Chassis Base (—)	305
"C" Voltage First A. F. Tube	D. C.	0–10	Between Cathode of First A. F. Tube (+) and Chassis Base (—)	3
"C" Voltages Output Tubes	D. C.	0–250	Across 750-Ohm Biasing Resistor	50
Speaker Field Voltage	D. C.	0–250	Across Small Pins on Speaker Connector Socket	127.5
Plate Voltage A. C. Per Anode No. 280 Rectifier Tube	A. C.		Between Plate Terminals of No. 280 Rectifier Socket and Chassis Base	*340*
Filament Voltage No. 280 Rectifier Tube	A. C.	0–8	Between Filament Terminals of No. 280 Rectifier Socket	4.9

MODEL 38,39,40
1st Type
Schematic

STROMBERG - CARLSON TEL. MFG. CO.

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Type and Number of Tubes	4 No. 58, 2 No. 56, 2 No. 45, 1 No. 80
Voltage Rating	105–125 volts
Frequency Rating	60 cycles and 25-60 cycles
Power Consumption	110 watts
Undistorted Electrical Power Output of Chassis	3.2 watts

CIRCUIT DESCRIPTION

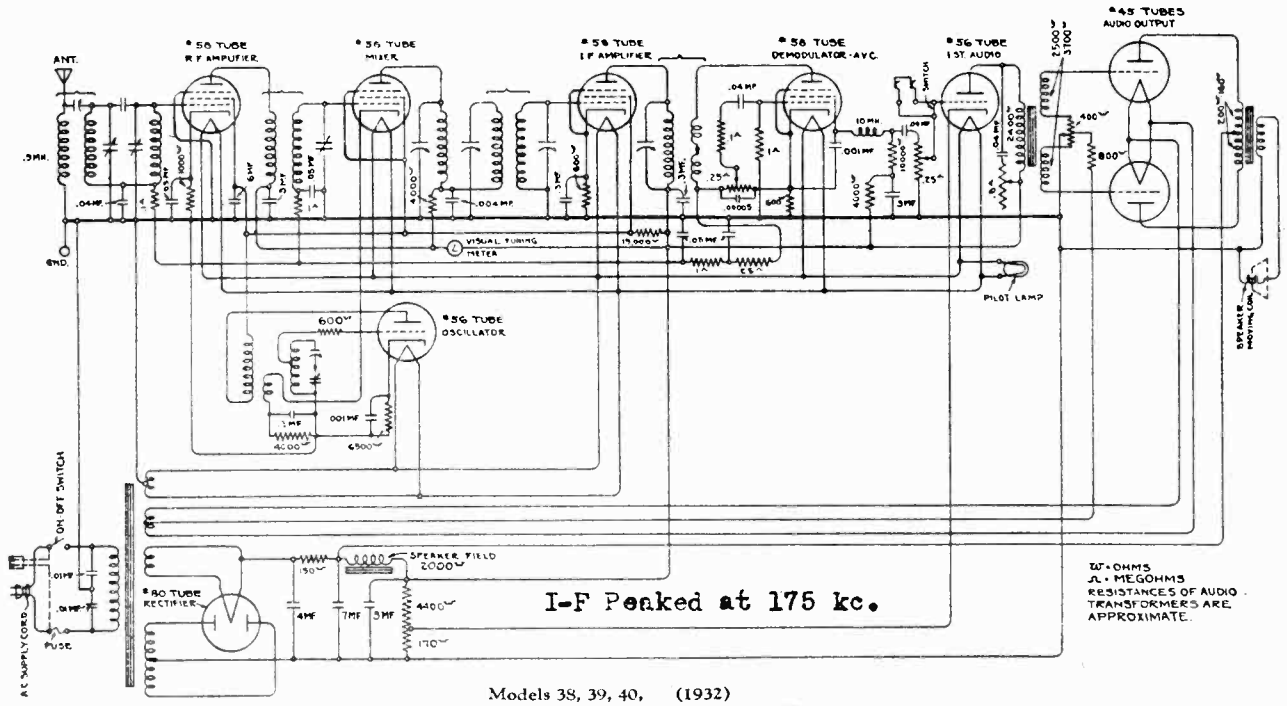
The four No. 58 triple-grid tubes are used as R. F. Amplifier, Mixer, I. F. Amplifier, and Demodulator-AVC. The two No. 56 tubes are used as Oscillator and First Audio Amplifier. The two No. 45 tubes are used in the push-pull output stage. The No. 80 is used as the rectifier in the power supply.

A Bi-resonator is used to couple the antenna to the R. F. amplifier to prevent any cross modulation. The R. F. amplifier is coupled to the mixer by an ordinary tuned R. F. transformer. This gives three tuning circuits (four gang tuning capacitor) for R. F. selectivity ahead of the mixer, thus the image response ratio is exceedingly high. The oscillator is coupled to the cathode circuit of the mixer tube in the regular manner. The I. F. output of the mixer tube is fed into a Tri-resonator (three tuned circuit transformer) and thence to the I. F. amplifier tube. This tube is coupled to the diode-triode demodulator-AVC tube by a single tuned circuit transformer.

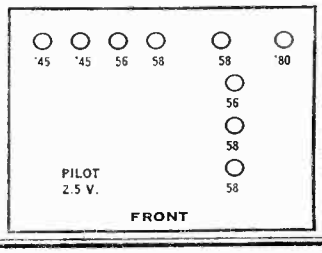
The load resistor of the diode portion of the diode-triode forms the resistor unit of the first potentiometer of the dual volume control. The AVC voltage and the rectified audio signal are built up across this resistor. The AVC voltage is fed back to the grids of the first two tubes through a suitable filter. The audio voltage is applied to the control grid of the triode portion of this system through the movable contact of the potentiometer. The screen of the tube acts as the plate of the triode portion of the system, thus forming the triode audio amplifier in conjunction with the diode rectifier.

The output of this "plate" circuit is coupled to the second unit of the dual volume control which feeds the grid of the first audio tube. The output of this first audio stage is coupled to the push-pull output triodes. The Adjustable Automatic Clarifier system is connected across the primary of the push-pull input transformer. The output transformer feeds the signal from the power triodes to the high quality electro-dynamic speaker.

The power supply system employs two stages of filter; the first being of the resistance type, and the second using the field of the speaker as a choke. The plate supply for the output tubes is tapped off between these filter sections, while the remainder of the voltages are supplied from the voltage divider resistor.



Models 38, 39, 40, (1932)



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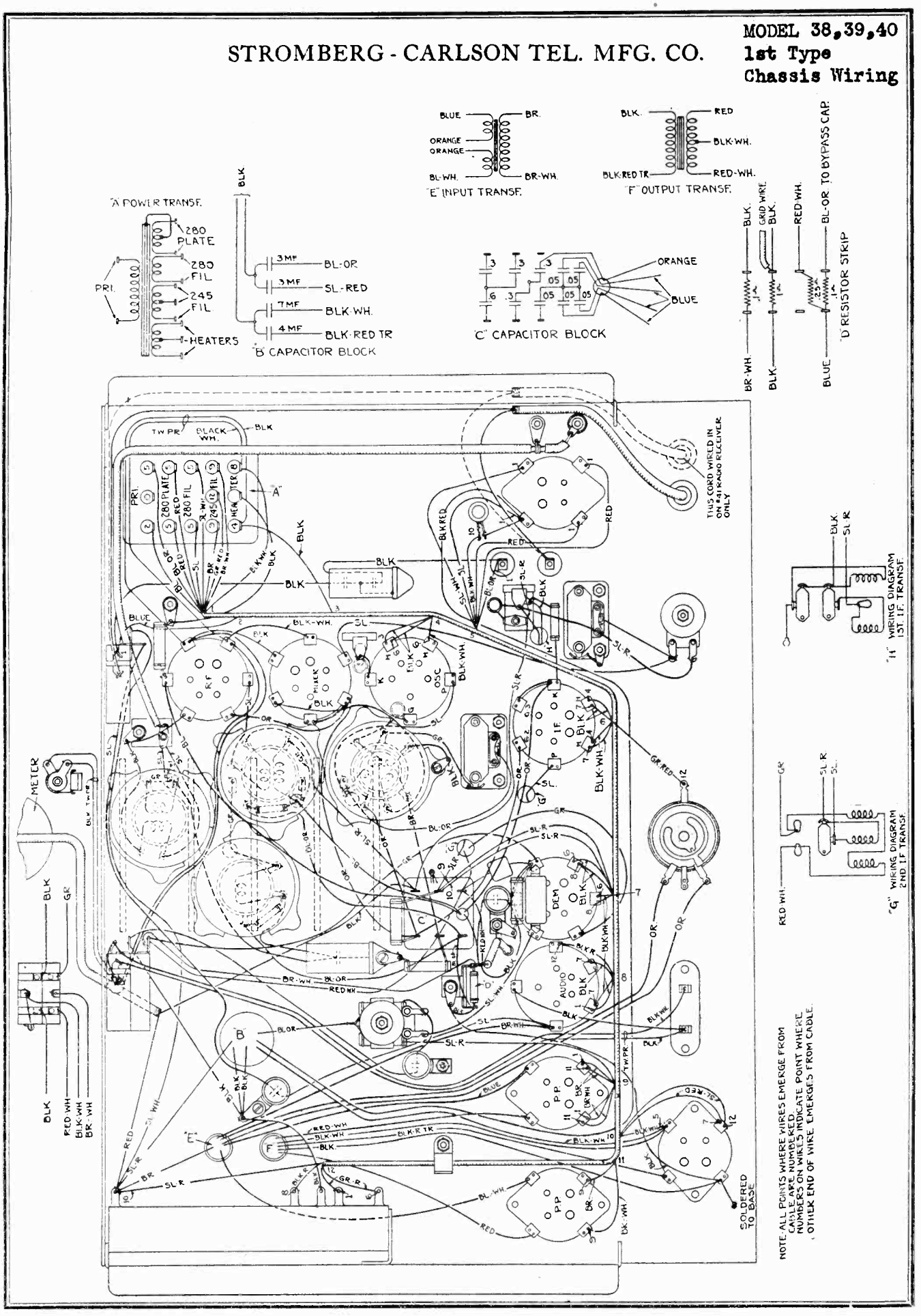
MODEL 38,39,40
1st Type
Chassis Wiring



MODEL 38,39,40
1st Type
Parts List
Voltage

STROMBERG - CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

These voltage readings correspond to a line voltage at 120 volts.

Voltage	Meter	Scale	Where Measured	Appro. Value in Volts
Heater Voltages No. 56 and No. 58 Tubes	A. C.	0–4	Across Heater Terminals of Sockets	2.5
Filament Voltages No. 245 Tubes	A. C.	0–4	Across Filament Terminals of Audio Output Sockets	2.5
Filament Voltage No. 280 Tube	A. C.	0–8	Across Filament Terminals of No. 280 Rectifier Socket	5.
Plate Voltage Radio Amplifier Tube	D. C.	0–250	Between Plate Terminal of R. F. Amplifier Socket (+) and Chassis Base (—)	165
Plate Voltage Mixer Tube	D. C.	0–250	Between Plate Terminal of Mixer Socket (+) and Chassis Base (—)	150
Plate Voltage Oscillator Tube	D. C.	0–250	Between Plate Terminal of Oscillator Socket (+) and Chassis Base (—)	80
Plate Voltage I. F. Tube	D. C.	0–250	Between Plate Terminal of I. F. Socket (+) and Chassis Base (—)	170
Plate Voltage Demodulator Tube	D. C.	0–250	Between Plate Terminal and Demodulator Socket (+) and Chassis Base (—)	0
Plate Voltage First Audio Tube	D. C.	0–250	Between Plate Terminal of First Audio Socket (+) and Chassis Base (—)	160
Plate Voltages Audio Output Tubes	D. C.	0–250	Between Plate Terminals of Audio Output Sockets (+) and Chassis Base (—)	285
"C" Voltage R.F. Amplifier Tube	D. C.	0–10	Between Cathode Terminal of R. F. Amplifier Socket (+) and Chassis Base (—)	6
"C" Voltage Mixer Tube	D. C.	0–10	Between Cathode Terminal of Mixer Socket (+) and Chassis Base (—)	8
"C" Voltage Oscillator Tube	D. C.	0–250	Between Cathode Terminal of Oscillator Socket (+) and Chassis Base (—)	25
"C" Voltage I. F. Tube	D. C.	0–10	Between Cathode Terminal of I. F. Socket (+) and Chassis Base (—)	3
"C" Voltage Demodulator Tube	D. C.	0–10	Between Cathode Terminal of Demodulator (+) and Chassis Base (—)	2.5–3
"C" Voltage First Audio Tube	D. C.	0–10	Between Cathode Terminal of First Audio Socket (+) and Chassis Base (—)	6.5
"C" Voltage Audio Output Tube	D. C.	0–250	Across 750 ohm Biasing Resistor	47
Screen Voltages R. F. Mixer and I. F. Tubes	D. C.	0–250	Between Screen Terminals on Sockets (+) and Chassis Base (—)	85
"B" Voltage R. F. Mixer, I. F. First Audio and Demodulator Tube	D. C.	0–250	Between High Side of Voltage Divider (+) and Chassis Base (—)	160
"B" Voltage Audio Output Tubes	D. C.	0–750	Between Mid-Tap of Output Transformer (+) and Chassis Base (—)	300
Speaker Field Volts	D. C.	0–250	Across Small Pins on Speaker Connector Socket	125
Plate Voltage A. C. per Anode No. 280 Rectifier Tube	A. C.		Between Plate Terminals of No. 280 Rectifier Socket and Chassis Base	340

REPLACEMENT PARTS

Piece Number	Part	Description of Part	Required per Receiver
P-22540	Audio Transformer Assembly	Input and Output Push-Pull Transformer	1
P-21663	Bracket Assembly	Voltage Divider Mounting	1
P-22353	Capacitor	Oscillator "Series Aligner"	1
P-21334	Capacitor	.001 Mfd.	2
P-22557	Capacitor	.004 Mfd.	1
P-19597	Capacitor	.04 Mfd.	1
P-21535	Capacitor	2—.01 Mfd.	1
P-22411	Capacitor	.04 Mfd.	2
P-22556	Capacitor	Aligner in Tri-Resonator	1
P-22565	Capacitor Assembly	R. F. and I. F. By-Pass Capacitors	1
P-22544	Capacitor Assembly	Filter Capacitor Assembly	1
P-22549	Coil	Tri-Resonator Circuit and Demodulator Plate Circuit	2
P-22358	Coil Assembly	First Coil of Bi-Resonator	1
P-22359	Coil Assembly	Second Coil of Bi-Resonator	1
P-22360	Coil Assembly	R. F. Transformer	1
P-22361	Coil Assembly	Oscillator Coil	1
P-21623	Coil Assembly	Antenna Inductor	1
P-21566	Fuse	1.5 Amperes	1
P-19630	Grid Clip		1
P-21704	Grid Clip Assembly		2
P-22532	I. F. Transformer	First I. F. Transformer	1
P-22533	I. F. Transformer	Second I. F. Transformer	1
P-21277	Knob	Antenna Aligner	1
P-22390	Knob	Selector Knob	1
P-22391	Knob	Volume Control and Clarifier Switch	2
P-22351	Meter	Visual Tuning Meter (Weston No. 654)	1
P-19617	Potentiometer	Hum Adjuster	1
P-22593	Potentiometer	Clarifier and On-Off Switch	1
P-22546	Potentiometer	Dual Volume Control and Phonograph Switch	1
P-22550	Resistor, 150 Ohms	Filter Resistor	1
P-22596	Resistor, 5370 Ohms	Voltage Divider	1
P-21621	Resistor, 1,000 Ohms, "C" Type	Carbon Resistor, Brown, Black and Red	1
P-22329	Resistor, 6,500 Ohms, "C" Type	Carbon Resistor, Blue, Green and Red	1
P-22327	Resistor, 600 Ohms, "C" Type	Carbon Resistor, Blue, Black and Brown	3
P-22328	Resistor, 4,000 Ohms, "C" Type	Carbon Resistor, Yellow, Black and Red	3
P-22330	Resistor, 10,000 Ohms, "C" Type	Carbon Resistor, Brown, Black and Orange	1
P-22331	Resistor, 15,000 Ohms, "C" Type	Carbon Resistor, Brown, Green and Orange	1
P-22533	Resistor, 100,000 Ohms, "D" Type	Carbon Resistor, Brown, Black and Yellow	4
P-22334	Resistor, 250,000 Ohms, "D" Type	Carbon Resistor, Red, Green and Yellow	1
P-22561	Resistor, 1 Megohm, "D" Type	Carbon Resistor, Brown, Black and Green	1
P-21280	4 Pin Socket		4
P-22570	5 Pin Socket		2
P-22571	6 Pin Socket		4
P-22529	Transformer	Power, 60 Cycle, 110 Volts	1
P-22530	Transformer	Power, 25-60 Cycles, 110 Volts	1

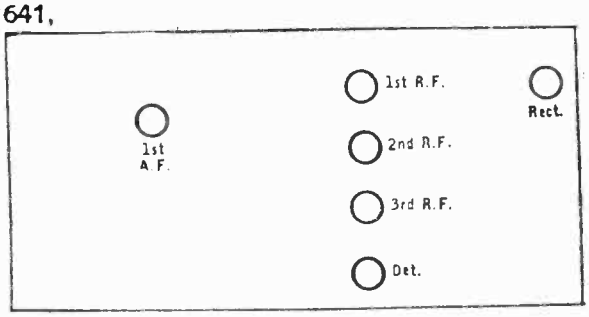
MODEL 641
Resistance Data

STROMBERG - CARLSON TEL. MFG. CO.

All tubes removed from sockets and AC plug removed from power supply lead. Speaker field disconnected. Volume control maximum unless otherwise stated. Pickup disconnected

From Chassis To	Correct		Incorrect
Aerial (V.C.Max)	17	ohms	
Aerial (V.C. Varied)	0-5000	ohms*	*Antenna volume control is 20,000 ohms
1 RF Control Grid	3.8	ohms	TC- 1 rf Cg-Y
1 RF Cathode	164	ohms	BC- 1 rfK-Y (.3 mfd)
1 RF Screen	3,781	ohms	BC- 1 rf Sg-Y (.3 mfd)
1 RF Plate	8,297	ohms	BC- 1 rf P-Y (.3 mfd)
			BC- VD-Y (1. mfd)
			BC- 2 rf P-Y (.3 mfd)
			BC- 3 rf P-Y (.3 mfd)
1 RF Plate to 2 RF Plate	34	ohms	
2 RF Control Grid	3.5	ohms	TC- 2 rf Cg-Y
2 RF Cathode	164	ohms	See 1 RF Cathode
2 RF Screen	3,781	ohms	See 1 RF Screen
2 RF Plate	8,297	ohms	See 1 RF Plate
2 RF Plate to 1 RF Plate	34	ohms	
3 RF Control Grid	3.5	ohms	TC- 3 rf K-Y
3 RF Cathode	390	ohms	BC- 3 rf K-Y (.3 mfd)
3 RF Screen	3,781	ohms	See 1 RF Screen
3 RF Plate	8,297	ohms	See 1 RF Plate
Detector Control Grid	2,000,000	ohms	Also 3.5 ohms grid winding
			Grid condenser
Detector Cathode	15,000	ohms	BC- DK-Y (1.mfd)
Detector Plate	28,000	ohms	BC-DP-Y
			BC- AF Tr-Y (1 mfd)
			See RF Screen
			FC- Filter chk-Y
Detector Plate to '80 Fil	12,720	ohms	FC- Filter chk-Y
			See Detector Plate
'45 Control Grid	9,570	ohms	
'45 Fil to chassis	1,452	ohms	
'45 Plate to 80 Fil	1,403	ohms	BC- across tone
			filter. (2-.01 mfd)
			FC- Filter chk-Y
Across Speaker Terminals	1.7	ohms	
80 Fil to chassis	16,881	ohms	See Detector Plate
			FC- Tuned Filter chk-Y

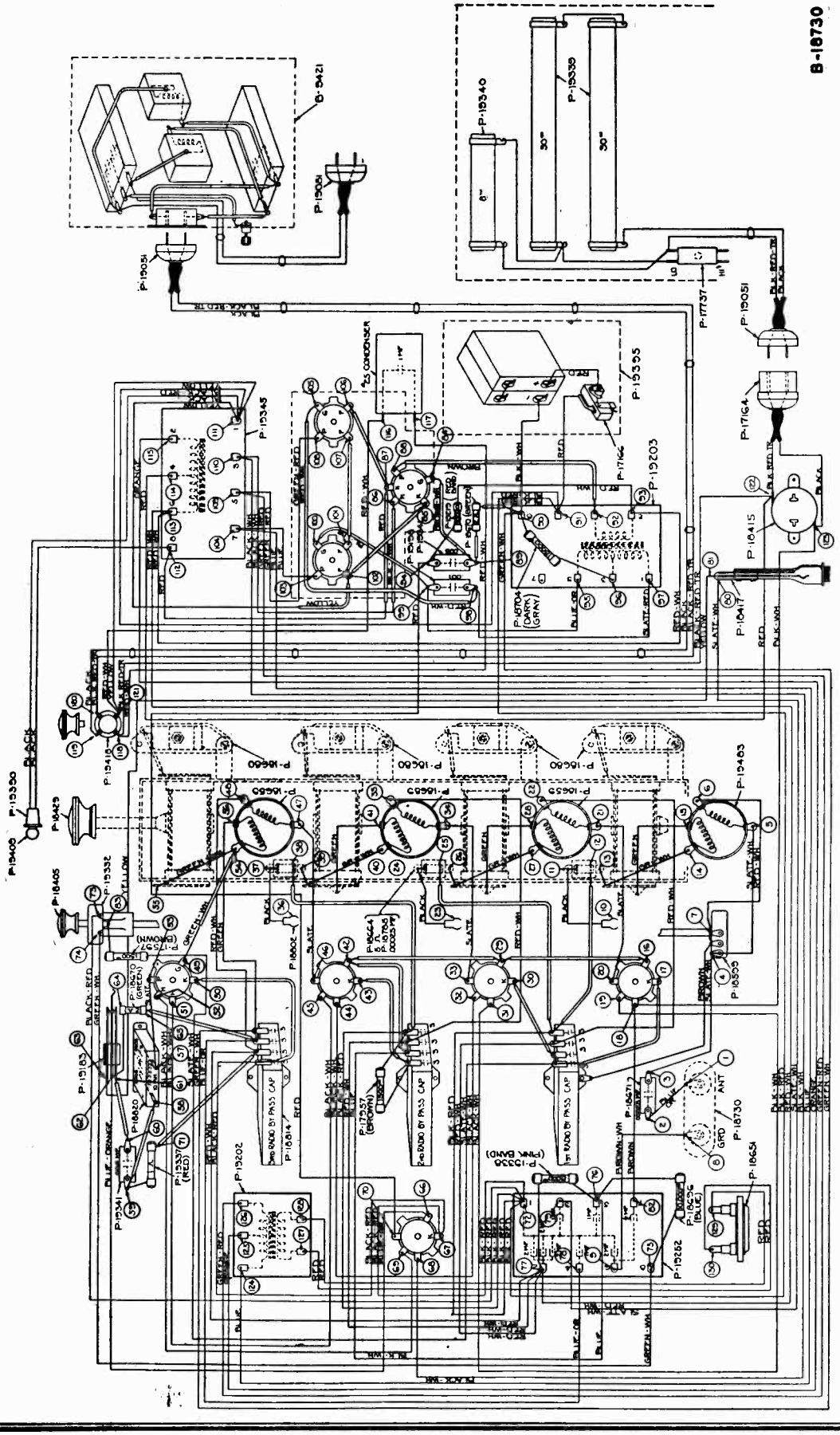
641.



STROMBERG-CARLSON—Model 641
Line Voltage 114—Set on High Volt Tap—Volume Control Position Max

TUBE NO IN ORDER	TYPE OF TUBE	POSITION OF TUBE 1ST RF DET ETC	READINGS PLUG IN SOCKET OF SET									
			TUBE OUT		TUBE IN TESTER							
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	C VOLTS CONTROL GRID	CATHODE HEATER VOLTS	NORMAL PLATE M A	PLATE M A GRID TEST	PLATE CHANGE M A	SCREEN GRID VOLTS
	224	1st RF	2.45	140	2.24	136	3.5	3.5	1.5	4	2.5	56
	224	2nd RF	2.45	140	2.24	136	3.5	3.5	1.5	4	2.5	56
	224	3rd RF	2.45	140	2.24	136	3.5	3.5	1.6	4	2.5	56
	227	Det.	2.45	278	2.24	268	3	3	1.8	–	–	–
	245	Amp.	2.45	355	2.24	338	35		30	32	2	–

MODEL 645 DC
Chassis Wiring STROMBERG-CARLSON TEL. MFG. CO.

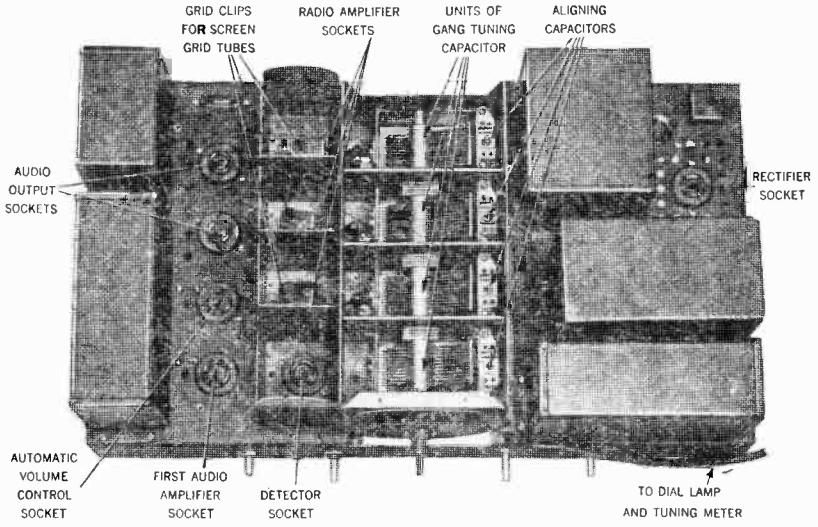


STROMBERG-CARLSON 846

All tubes removed from receiver and AC power plug disconnected from supply circuit. Pickup switch in radio position.

From Chassis To	Correct		Incorrect
Aerial (V.C.Min)	10	ohms	
Aerial (V.C.Max)	20	ohms	
Aerial (V.C. Halfway)	5,000	ohms	approx Variable antenna V.C. has a value of 20,000 ohms
1 RF Tuning Condenser Stator	3.8	ohms	TC-Y
1 RF Control Grid	5,200,000	ohms	BLC- 1 rf Cg-grid wdg BC- 5 meg unit-Y BLC- AVC P-Y (.5 mfd)
1 RF Cathode	390	ohms	BC- 1 rf K-Y (.3 mfd)
1 RF Screen	4,350	ohms	BC- 1 rf Sg-Y(.3 mfd) BC- 2 rf Sg-Y(.3 mfd) BC- 3 rf Sg-Y(.3 mfd)
1 RF Plate	10,367	ohms	BC- 1 rf P-Y (.3 mfd) BC- 2 rf P-Y (.3 mfd) BC- 3 rf P-Y (.3 mfd) FC- V D-Y (1.mfd)
2 RF Tuning Condenser Stator	3.5	ohms	TC-Y
2 RF Control Grid	5,100,000	ohms	BLC- 2 rf Cg-grid wdg BC- 5 meg unit-Y BLC- AVC P-Y (.5 mfd) See 1 RF Screen
2 RF Cathode	390	ohms*	*DC Resistance of visual tuning meter must be added BC- 2 rf K-Y (.3 mfd)
2 RF Screen	4,380	ohms	See 1 RF Screen
2 RF Plate	10,367	ohms	See 1 RF Plate
3 RF Tuning Condenser Stator	3.5	ohms	TC-Y
3 RF Control Grid	5,000,000	ohms	BLC- 3 rf Cg-grid wdg
3 RF Cathode	600	ohms	BC- 3 rf K-Y (.3 mfd)
3 RF Screen	4,350	ohms	See 1 RF Screen
3 RF Plate	10,367	ohms	See 1 RF Plate
Detector Control Grid	2,033	ohms	TC- D Cg
Detector Cg to Det F	6	ohms	
Detector Cg to Det Cathode	15,003	ohms	BC across bias unit (1 mfd)
Detector Cathode	17,030	ohms	
Detector Plate	27,830	ohms	BC D P-Y FC- AF Tr-'80 P wdg FC- 10,000 ohm unit-80 P wdg FC- Tuned Filter ohk FC- 80 F-80 P wdg
1 AF Control Grid (V.C.Max)	4,913	ohms	250,000 ohm V.C.
1 AF Cathode	1,500	ohms	
1 AF Plate	13,730	ohms	BC- AF Tr-Y (1 mfd)
2 AF Control Grid	20,840 or 11,920	ohms*	*Two windings of transformer do not have like resistance. One half has 9890 ohms and other half has 14,810 ohms
2 AF Control Grid to Control Grid	24,700	ohms	
2 AF Filament	2,755	ohms	BC-across 725 ohm unit
2 AF Plate to Plate	886	ohms	
2 AF Plate to 80 Fil	825-900-	ohms	FC-Tuned Filter chk- FC-Filter ohk-
Across speaker terminals only	1.77	ohms	
AVC Control Grid	2,002,030	ohms	BC- 2 meg unit-Y CC- AVC Cg- 3 rf P
AVC Cathode	1,700	ohms	BC- AVC K-Y
AVC Plate	200,000	ohms	BC- AVC P-Y (.5 mfd)
'80 Filament	14,200-14,300	ohms	FC
'80 Filament to 80 Anode	16,340-16,440	ohms	FC

Note* Speaker power supply checked separately



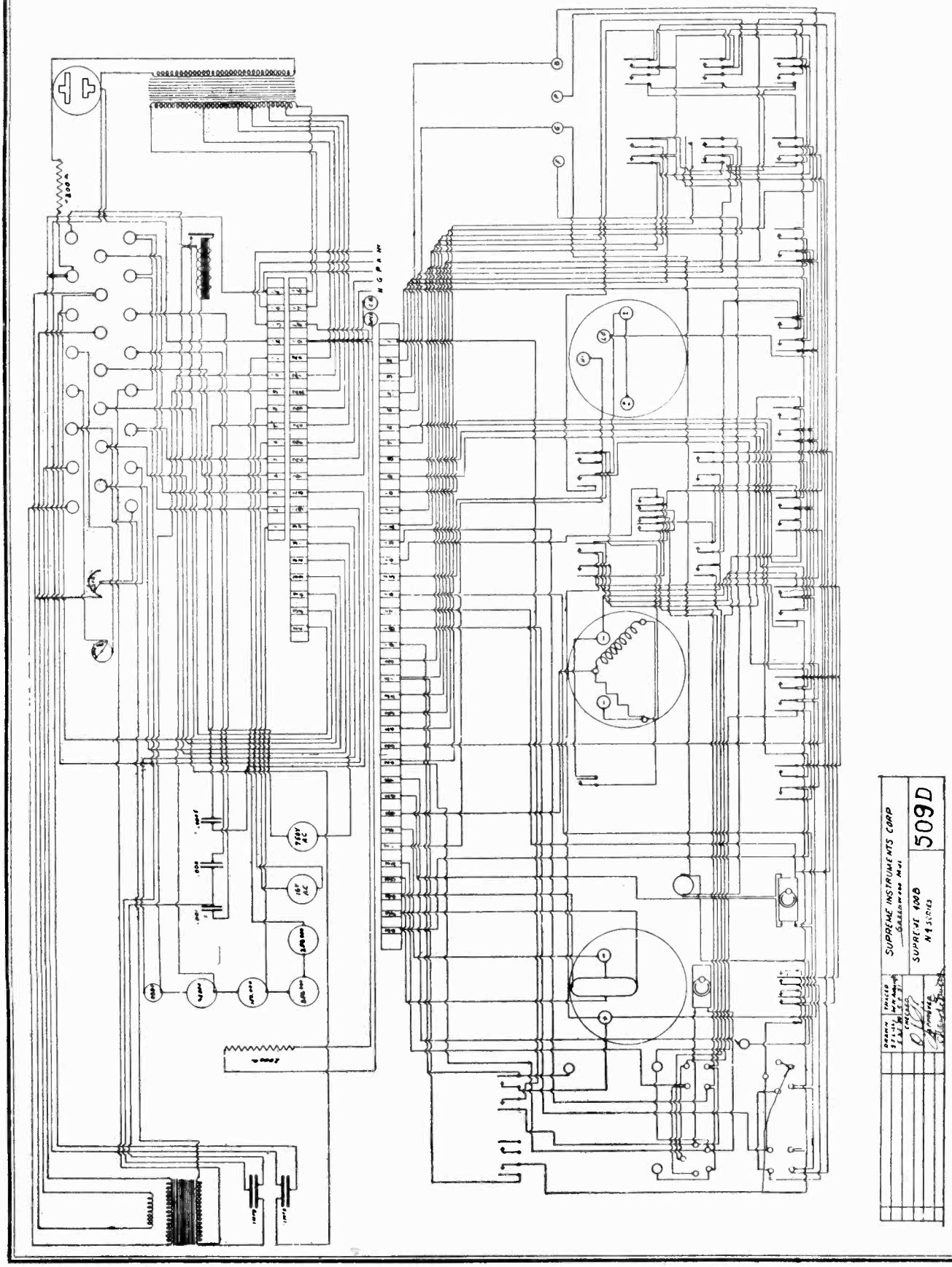
*A very slight deflection of the meter only. Readings given are for either of the 2 tubes used in Push Pull

TUBE SYMBOL OR NUMBER	TYPE OF TUBE	POSITION OF TUBE (1ST RF, DET. ETC)	READINGS PLUG-IN SOCKET OF SET: TUBE OUT — A VOLTS	TUBE OUT — B VOLTS	TUBE IN TESTER — A VOLTS	TUBE IN TESTER — B VOLTS	TUBE IN TESTER — C VOLTS (CONTROL GRID)	CATHODE (HEATER) VOLTS	NORMAL PLATE MA.	PLATE MA. (SCREEN) TEST	PLATE CHANGE MA.	SCREEN GRID VOLTS
1	224	1 R.F.	2.60	155	2.3	145	.5	.6	2.2	2.5	.3	60
2	224	2 R.F.	2.60	155	2.3	145	.5	.6	2.2	2.5	.3	60
3	224	3 R.F.	2.60	155	2.3	145	.5	.6	2.2	2.5	.3	54
4	227	Det.	2.60	265	2.3	225	27.0	2.9	2.0	2.1	.1	
5	227	1 A.F.	2.60	160	2.3	180	7.75	7.75	5.5	7.0	1.5	
6	227	V.C.T.	2.60	2	2.3	14	5.0	4.1	•	-	-	
7	245	P. P.	2.55	280	2.3	240	45.0	-	30	38	8.0	
8	245	P. P.	2.55	280	2.3	240	45.0	-	30	-	8.0	
9	280	Rect.	5.20	-	4.60	-	-	-	45	-		
10	280	Rect.	5.20	-	4.60	-	-	-	45	-		

STROMBERG - CARLSON TEL. MFG. CO.
MODEL 846
Resistance Data

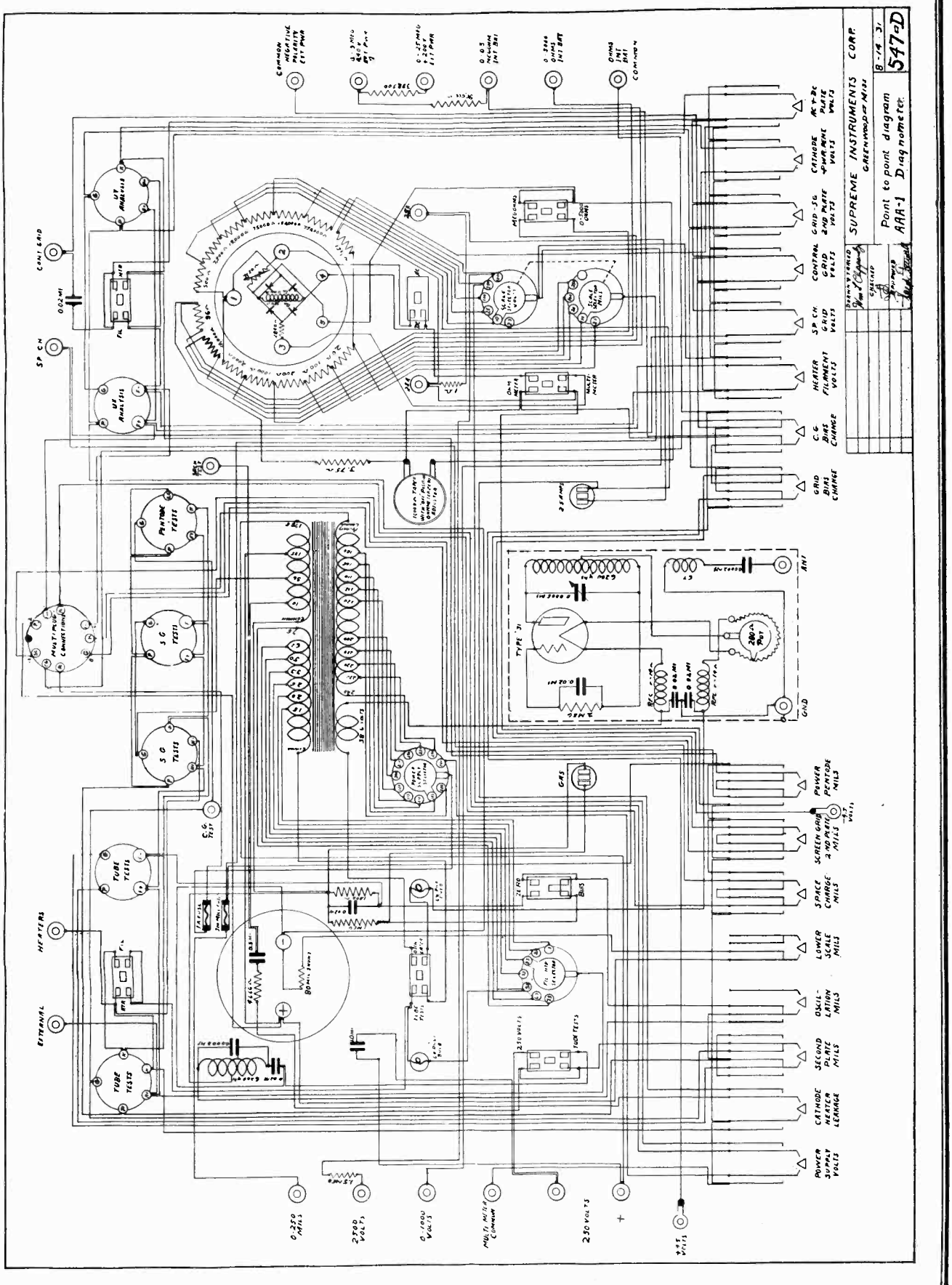
SUPREME INSTRUMENTS CORP.

MODEL 400-B
#4 Series
Diagnometer



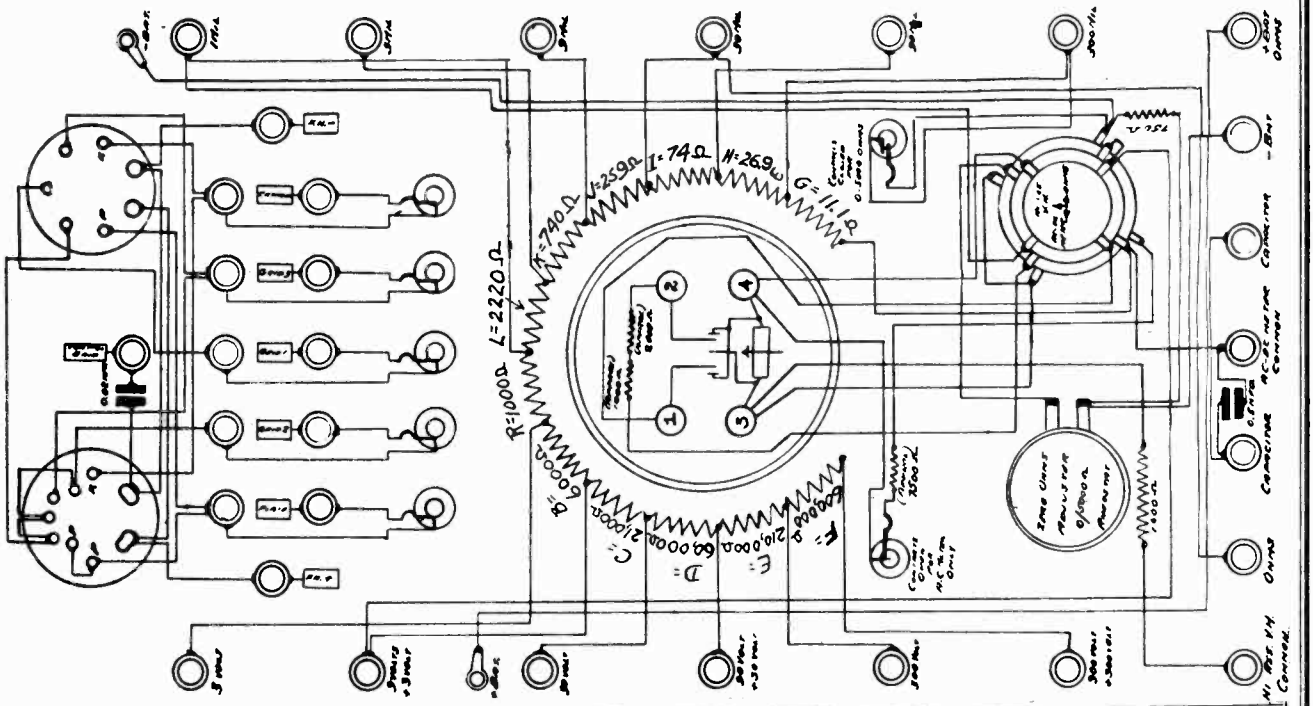
MODEL AAA-1
(8-14-31)
Diagnometer

SUPREME INSTRUMENTS CORP.



SUPREME INSTRUMENTS CORP.

MODEL 56 Analyzer
Weston Metered
MODEL 90 Analyzer
Weston Metered 6-J



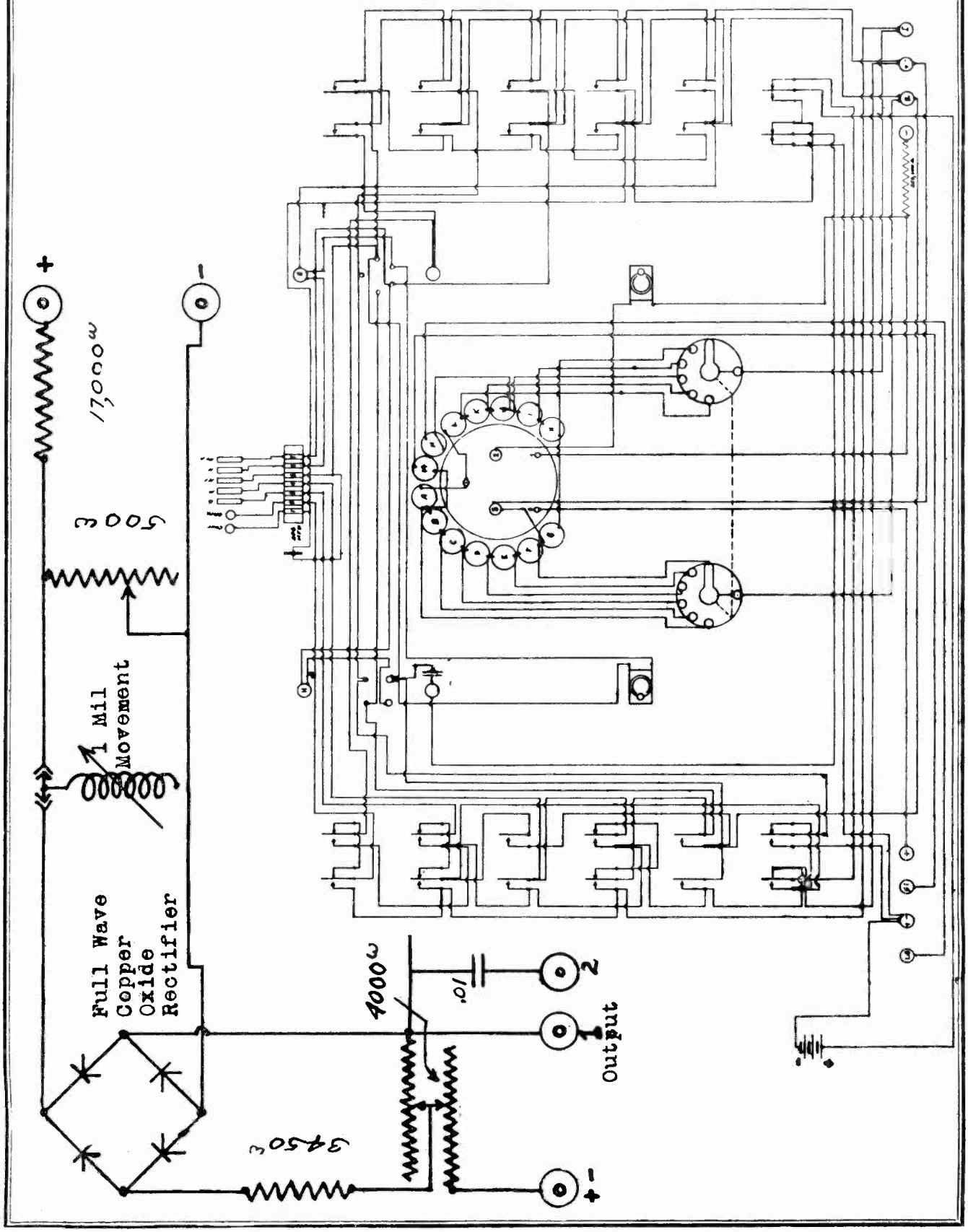
Note:- All Plugs Thus: ⊏⊐ Indicate Leads Through Adapter Cable to Analyzer Plug.

Drawn / Traced	SUPREME INSTRUMENTS CORP. GREENWOOD, MISS.	
Checked	POINT TO POINT DIAGRAM OF WESTON METERED MODEL 56 ANALYZER	Date 11/1/52
Approved		639-B

Drawn / Traced	SUPREME INSTRUMENTS CORP. GREENWOOD, MISS.	
Checked	POINT TO POINT DIAGRAM OF WESTON METERED MODEL 90 ANALYZER-SERIES 6J	Date 11/1/52
Approved		641-B

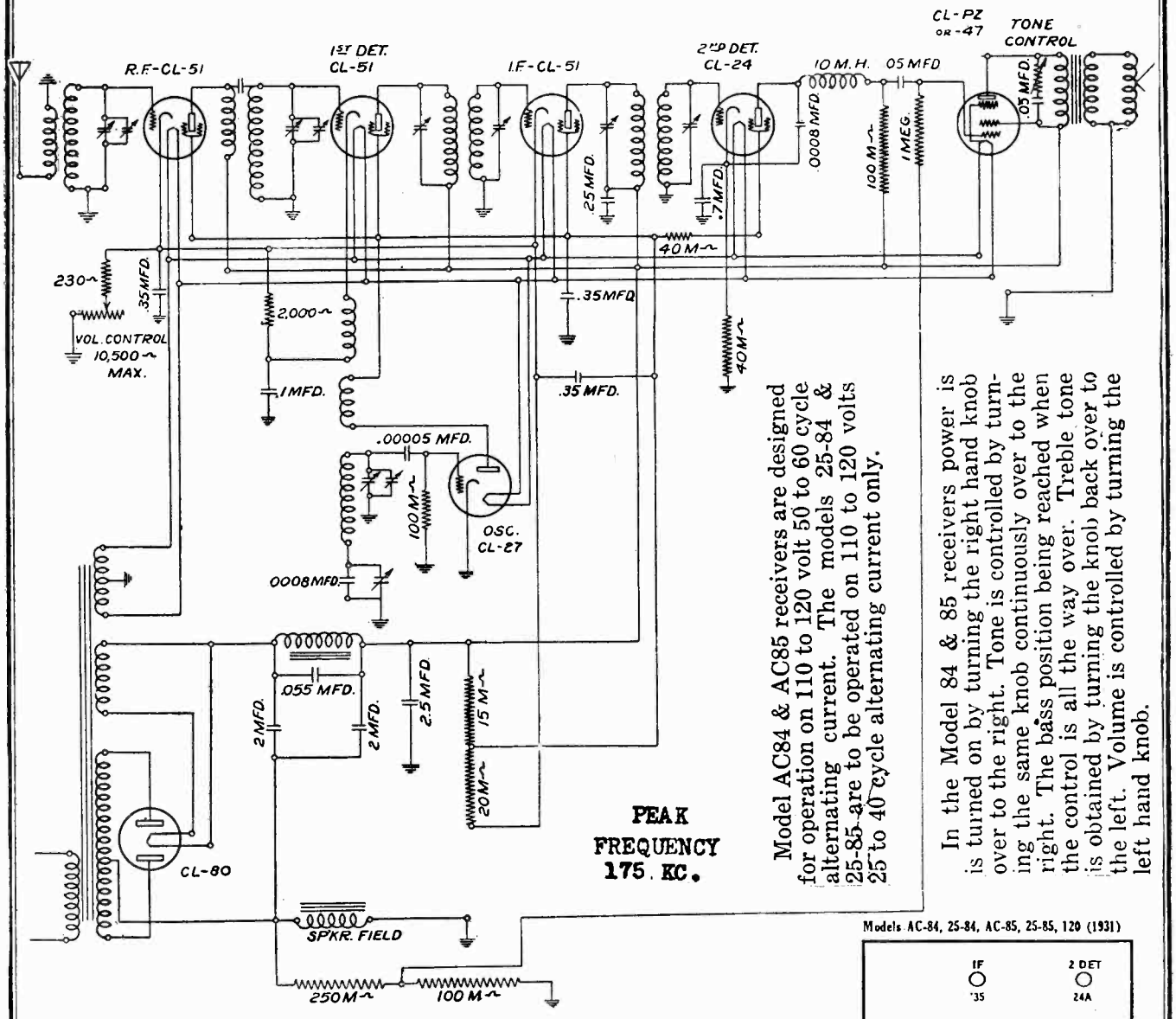
MODEL 90 Analyzer
MODEL Output Meter

SUPREME INSTRUMENTS CORP.



TRANSFORMER CORP. OF AMERICA

MODEL AC84,85
Schematic
Voltage

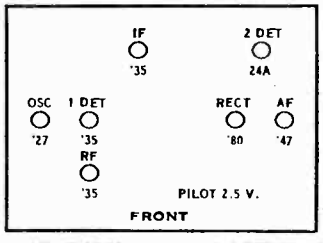


PEAK FREQUENCY 175 KC.

Model AC84 & AC85 receivers are designed for operation on 110 to 120 volt 50 to 60 cycle alternating current. The models 25-84 & 25-85 are to be operated on 110 to 120 volts 25 to 40 cycle alternating current only.

In the Model 84 & 85 receivers power is is turned on by turning the right hand knob over to the right. Tone is controlled by turning the same knob continuously over to the right. The bass position being reached when the control is all the way over. Treble tone is obtained by turning the knob back over to the left. Volume is controlled by turning the left hand knob.

Models AC-84, 25-84, AC-85, 25-85, 120 (1931)



READINGS TAKEN WITH WESTON MODEL 565 ANALYSER

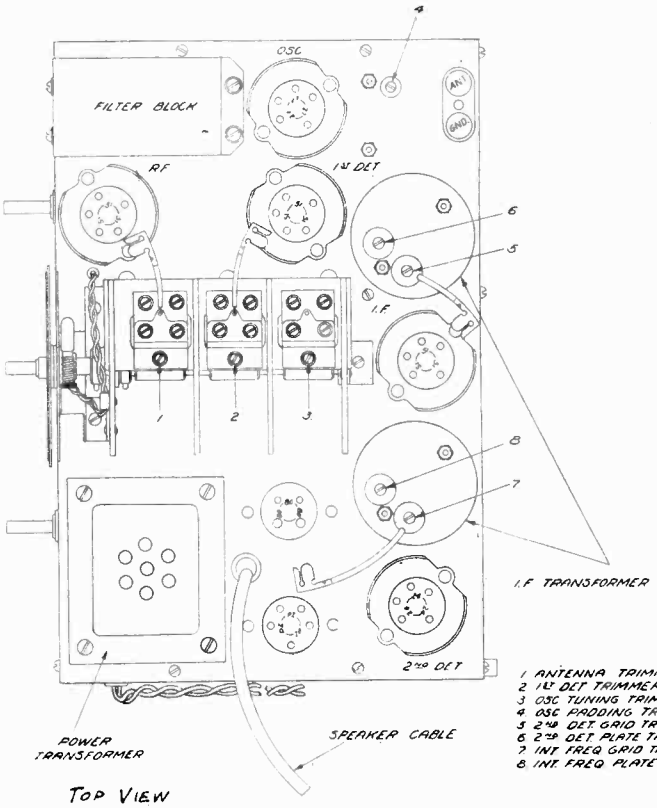
No.	Stage	Type Tube	A Volts	B Volts	Cont. Grid Volts	Cath. Volts	Ip Norm.	SG Volts
1	r. f.	51	2.1	255	3.5	3.5	3.5	.78
2	1st Det.	51	2.1	240	10.	10.	2	108
3	Osc.	27	2.1	135	0	0	6.	0
4	I. F.	51	2.1	250	3.5	3.5	3.5	77
5	2nd det.	24	2.2	190	6.0	6.0	1.2	68
6	Output	47	2.2	228	14.	0	25	255
7	Rect.	80	4.4		0	0		0

Volume control position **Full** Line Voltage **115**

Note: Since resistance tolerances in the sets are plus or minus 10%, and tubes may vary over 20%, your readings may disagree with the above by plus or minus 30%.

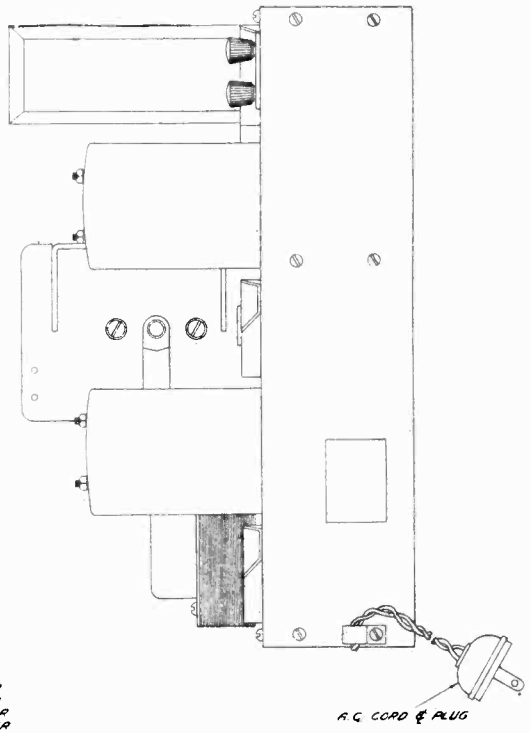
MODEL AC 84,85
Chassis Views
Speaker
MODEL AC 94,95
Speaker

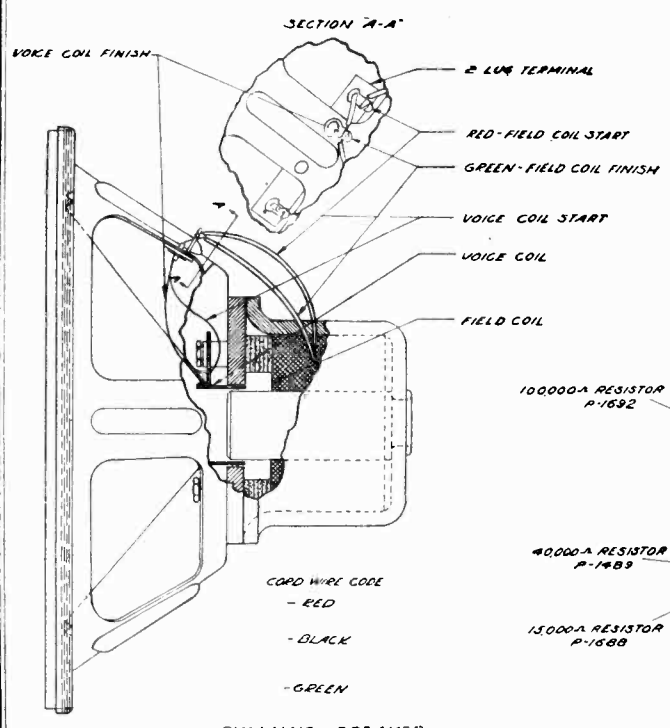
TRANSFORMER CORP. OF AMERICA



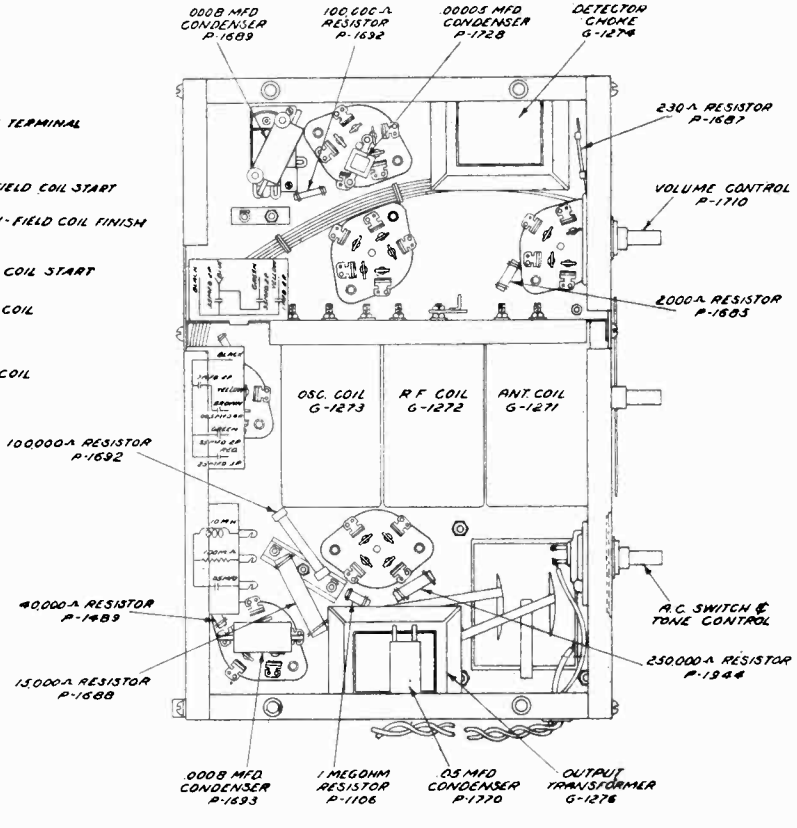
1. ANTENNA TRIMMER
2. 1st DET. TRIMMER
3. OSC. TUNING TRIMMER
4. OSC. PADDING TRIMMER
5. 2nd DET. GRID TRIMMER
6. 2nd DET. PLATE TRIMMER
7. INT. FREQ. GRID TRIMMER
8. INT. FREQ. PLATE TRIMMER

TOP VIEW





DYNAMIC SPEAKER
MODELS 84 & 85 AND 94 & 25-94



G-83 CHASSIS
BOTTOM VIEW

TRANSFORMER CORP. OF AMERICA

MODEL AC 84,85
MODEL AC 94,95
Alignment Data

CLARION
MODELS 84 & 85
MODELS 94 & 25-94

READJUSTING TRIMMERS

To readjust the trimmers on these superheterodyne receivers it will be necessary that a good design of 175 k.c. oscillator be employed and that a dependable broadcast test oscillator be on hand so that stages handling intermediate frequency and those handling radio frequency can be thoroughly checked. It is advisable to use a bakelite screw driver when making any of these adjustments.

First, connect the 175 k.c. oscillator output leads from the control grid cap of the first detector tube to ground. Do not remove any of the tubes from the sockets, and it is not necessary to disconnect the grid cap clip from the first detector tube. Reset trimmers No. 5, No. 6, No. 7 and No. 8 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect, inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k.c., and when trimmers No. 5. No. 6, No. 7 and No. 8 are set and turned for maximum output, they will be correctly adjusted.

Next, disconnect the 175 k.c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator or tune in a broadcast signal around 1400 k.c., then reset trimmer No. 2 and No. 1, respectively, for maximum output. This adjustment will track the first detector and r. f. stages.

To check calibration of the receiver, whether it be high or low, trimmer No. 3 (oscillator) should be reset until a station of known high frequency is brought in at the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal at about 1400 k.c. should be chosen. The setting of the trimmer at 1400 k.c. is more critical than it would be at 600 k.c.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instructions. We will now balance the oscillator to the r. f. and first detector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k.c., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer), at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, (as previously explained), and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.

CONTINUITY TESTS

(Applicable to completely and partially inoperative sets and circuits)

A 175 **k.c. test oscillator** should be connected to the grid cap of the first detector tube so that the modulated signal can be reproduced in the loud speaker. This indicates that the first detector and intermediate frequency stages are operating. To determine if the oscillator is working, **a broadcast test oscillator** should be connected to the grid cap of the first detector tube. No signal will come through unless the oscillator tube and stage are functioning correctly. The r. f. tube, of course, can be checked lastly by connecting the broadcast test oscillator to the antenna and ground binding posts of the receiver.

MODEL AC 84,85
Parts List
MODEL 120-139
Parts List

TRANSFORMER CORP. OF AMERICA

MODELS 84-85 (Also Series 120-139)

P-1038	Pilot lamp	.35
P-1049	Grip cap clip	.05
P-1096	A. C. cable clip	.05
P-1106	1,000,000 ohm resistor	.35
P-1354	Chassis mounting screws	2.50 C
P-1459	Tube shield base	.20
P-1472	Tube shield	.10
P-1488	20,000 ohm resistor	.35
P-1499	40,000 ohm resistor	.30
P-1593	24 socket	.20
P-1595	80 socket	.20
P-1597	27 socket	.20
P-1634	Ant. ground binding post	.25
P-1637	Escutcheon plate	.55
P-1680	Osc. padding cond.	.45
P-1682	51 socket	.20
P-1683	47 socket	.20
P-1685	2000 ohm resistor	.35
P-1687	230 ohm resistor	.20
P-1688	15,000 ohm resistor	.55
P-1689	.0008 mfd. cond., red dot	.30
P-1692	100,000 ohm resistor, R. F.	.35
P-1693	.0008 mfd. condenser	.25
P-1700	Chassis mounting strap	.15
P-1704	Knobs	.30
P-1707	Escutcheon screws	.75 C
P-1710	Volume control	1.75
P-1728	.00005 mfd. condenser	.30
P-1770	.05 tone control cond.	.25
†P-1883	10" speaker for model 84	12.50
P-1931	10" diaphragm for G-1370 speaker	.75
P-1944	250,000 ohm resistor	.35
P-1955	Tone cont. on-off switch	1.90
P-1990	10" diaphragm for P-1883 speaker	.75
P-1991	Voice coil and spider for P-1883 speaker	.65
P-3050	8" diaphragm for G-1260 speaker	.55
G-3019	Voice coil and spider for G-1260 speaker	.65
G-1220	Dial drive inc. pilot lamp socket	$ 1.50
G-1236	I. F. transformer	2.60
G-1255	Power trans., 60 cycle	4.00
G-1255A	Power trans., 25 cycle	5.85
G-1255B	Power trans., 220 volt	5.85
†G-1260	8" Speaker for model 85	12.50
G-1271	Antenna coil	1.25
G-1272	R. F. coil	1.25
G-1273	Osc. coil	1.00
G-1274	Filter choke	1.65
G-1276	Output transformer	2.00
G-1277	Detector plate choke	1.50
G-1350	Filter pack, 60 cycles	5.00
G-1350A	Filter pack, 25 cycles	6.50
G-1351	R. F. bypass cond.	1.00
G-1352	A. F. bypass cond.	1.25
G-1357	Voice coil for G-1360 and G-1370 speakers	.65
*G-1360	8" Speaker for model 85	12.50
*G-1370	10" Speaker for model 84	12.50

*Speaker number stamped on field coil pot.
†Blank—no number stamped on field coil pot.

(Be Sure to Specify As Above if Ordering Speakers or Parts of Same)

SERIES 120-139

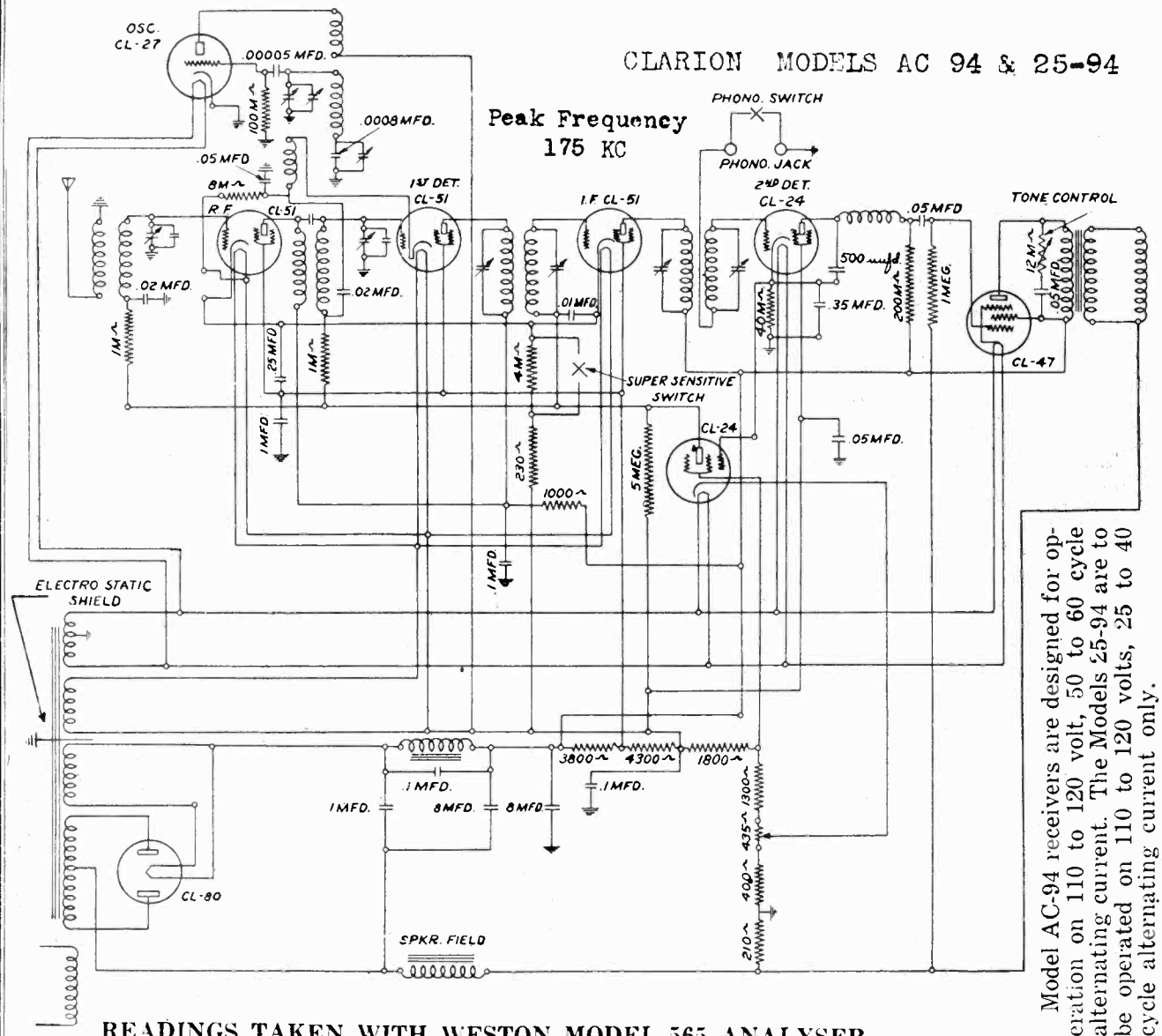
P-4033—Escutcheon Plate (replacing P-1637)	$0.55
P-4037—Large Knobs (replacing P-1704)	.30
P-4047—Small Knobs (replacing P-1704)	.25
P-4075—Tone Control (replacing P-1955)	1.90
P-4080—Volume Control (replacing P-1710)	1.75
G-1363—Oscillator Padding Condenser (replacing P-1680)	.75
G-1379—Dial and Scale Assembly (replacing G-1220)	1.50
G-1402—I. F. Transformer (replacing G-1236)	1.75

For complete parts data refer to parts list of models 84-85 above.

TRANSFORMER CORP. OF AMERICA

MODEL AC-94, 25-94
Schematic - Voltage

CLARION MODELS AC 94 & 25-94



Model AC-94 receivers are designed for operation on 110 to 120 volt, 50 to 60 cycle alternating current. The Models 25-94 are to be operated on 110 to 120 volts, 25 to 40 cycle alternating current only.

READINGS TAKEN WITH WESTON MODEL 565 ANALYSER

No.	Stage	Type Tube	A Volts	B Volts	Cont. Grid Volts	Cath. Volts	Ip' Norm.	SG Volts
1	r. f	51	2.1	178	1.5	2.5	4.5	82
2	1st det.	51	2.1	160	9.5	10.	1.2	75.
3	Osc.	27	2.05	120	0	0	10	0
4	I. F.	51	2.05	180	.6	3.	3	82.
5	2nd det.	24	2.05	220	8.	8.	.25	85.
6	A.V.C.	24	2.05	50	12.	20	0	37
7	A.F.	47	2.1	260	16.5		40	275.
8	Rect.	80	4.6	160			40	

Volume control position Full. Line Voltage 115-60 cycle.

NOTE: Filaments and cathodes of R.F., I.F., and first detector are 95 volts positive with respect to ground.
NOTE: Since resistance tolerances in the sets are plus or minus 10%, and tubes may vary over 20%, your readings may disagree with the above by plus or minus30%.

MODEL AC94, 25-94
Chassis Views
Test Data

TRANSFORMER CORP. OF AMERICA

RESISTANCE TABLE

(Using 6 volt scale, 1,000 ohms per volt; meter and 6 volt battery

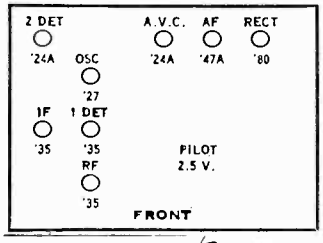
Item Tested	Description Color—Code	From To	Reads	Ohms Resistance
Osc. Grid Resistor	Brown body, black tip, yellow dot	Across Resistor	.6	100,000
1st Det. Grid Bias Resistor	Gray body, black tip, red dot	Across Resistor	3.4	8,000
Super-Sensitive Grid Bias Rest.	Yellow body, black tip, red dot	Across Resistor	4.4	4 000
R.F. and I.F. Grid Bias Resistor	Black, wire wound	Across Resistor	5.9	230
Volume Cont.	Red, wire wound	Across Resistor	5.8	400
Screen Voltage Resistor	Orange body, gray tip, red dot	Across Resistor	4.4	3,800
A.V.C. Plate Resistor	Green body, black tip, yellow dot	Across Resistor	.1	500,000
A.V.C. Screen Voltage Resist.	Brown body, gray tip, red dot	Across Resistor	5.2	1,800
A.V.C. Grid Bias Resistor	Brown body, orange tip, red dot	Across Resistor	5.3	1,300
2nd Det. Screen Voltage Resistor	Yellow body, orange tip, red dot	Across Resistor	4.2	4,300
Vol. Cont.	Front panel	Across Control	5.8	485
Tone Cont.	Front panel	Across Control	2.6	12,000
1st Det. and I.F. Plate Volt. Rest.	Wire wound on filter choke	Across Resistor	5.5	1,000
Pentode Grid Bias Resistor	Wire wound green	Across Resistor	5.9	210
Pentode Grid Coupling Resistor	Brown body, black tip, green dot	Across Resistor	.1	1,000,000
2nd Det. Plate Coupling Resistor	In det. plate choke	Across red leads on det. choke	.3	200,000
2nd Det. Grid Bias Resistor	Yellow body, black tip, orange dot	Across Resistor	1.3	40,000

CONTINUITY TEST TABLES

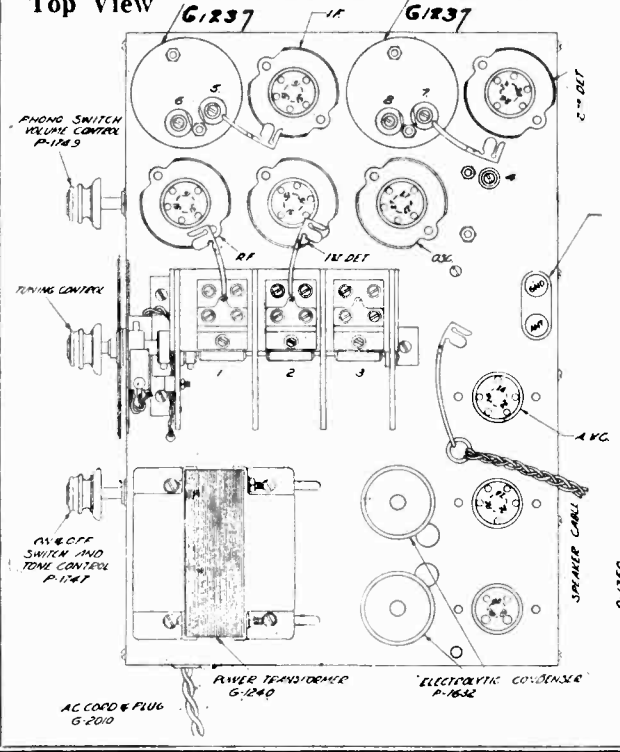
Supersensitive Switch in "Normal" Position

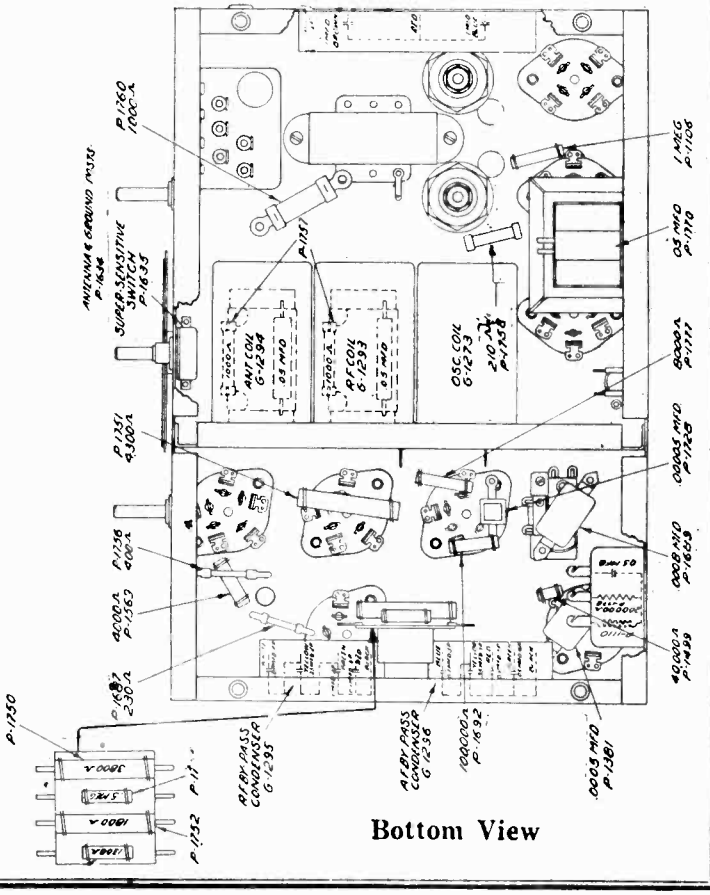
Circuit	From	To	Reading
Antenna Coil Pri.	Antenna post	Ground	6.0
R. F. Grid	Rect. fil. prong	R. F. grid cap clip	0.2
R. F. Cathode	Rect. fil. prong	R. F. cathode prong	2.7*
R. F. Screen	Rect. fil. prong	R. F. screen prong	4.2
R. F. Plate	Rect. fil. prong	R. F. plate prong	5.3
1st Det. Grid	Rect. fil. prong	1st det. grid cap clip	0.2
1st Det. Cathode	Rect. fil. prong	1st det. cathode prong	2.3
1st Det. Screen	Rect. fil. prong	1st screen prong	4.2
1st Det. Plate	Rect. fil. prong	1st det. plate prong	5.3
I. F. Grid	Rect. fil. prong	I. F. grid cap clip	0.2
I. F. Cathode	Rect. fil. prong	I. F. cathode prong	2.7*
I. F. Screen	Rect. fil. prong	I. F. screen prong	4.2
I. F. Plate	Rect. fil. prong	I. F. plate prong	5.8
A. V. C. Grid	Rect. fil. prong	A. V. C. grid clip	1.0
A. V. C. Cathode	Rect. fil. prong	A. V. C. cathode prong	2.9
A. V. C. Screen	Rect. fil. prong	A. V. C. screen prong	3.0
A. V. C. Plate	Rect. fil. prong	A. V. C. plate prong	0.2
2nd Det. Grid	Rect. fil. prong	2nd det. grid prong	3.8
2nd Det. Cathode	Rect. fil. prong	2nd det. cathode prong	1.0
2nd Det. Screen	Rect. fil. prong	2nd det. screen prong	3.3
2nd Det. Plate	Rect. fil. prong	2nd det. plate prong	0.3
Pent. Cont. Grid	Rect. fil. prong	Pent cont. grid prong	0.1
Pent. S. C. Grid	Rect. fil. prong	Pent S. C. grid prong	5.8
Pent. Plate	Rect. fil. prong	Pent plate prong	5.6
Osc. Grid	Rect. fil. prong	Osc. grid prong	0.5
Osc. Cathode	Rect. fil. prong	Osc. cathode prong	2.8
Osc. Plate	Rect. fil. prong	Osc. plate prong	3.2
Power Trans. Pri.	ACROSS	A. C plug	6.0
Power Trans. Sec.	ACROSS	280 plates	5.8
Osc. pick up coil	Black lead on Osc. trimmer	Green lead on .00005 cond.	6.0
Speaker V.C. disconnected	V.C. ground lead	V. C. black lead	6.0
Speaker field	Field red lead	Field green lead	5.6

Model AC-94, 25-94 (1931)



Top View



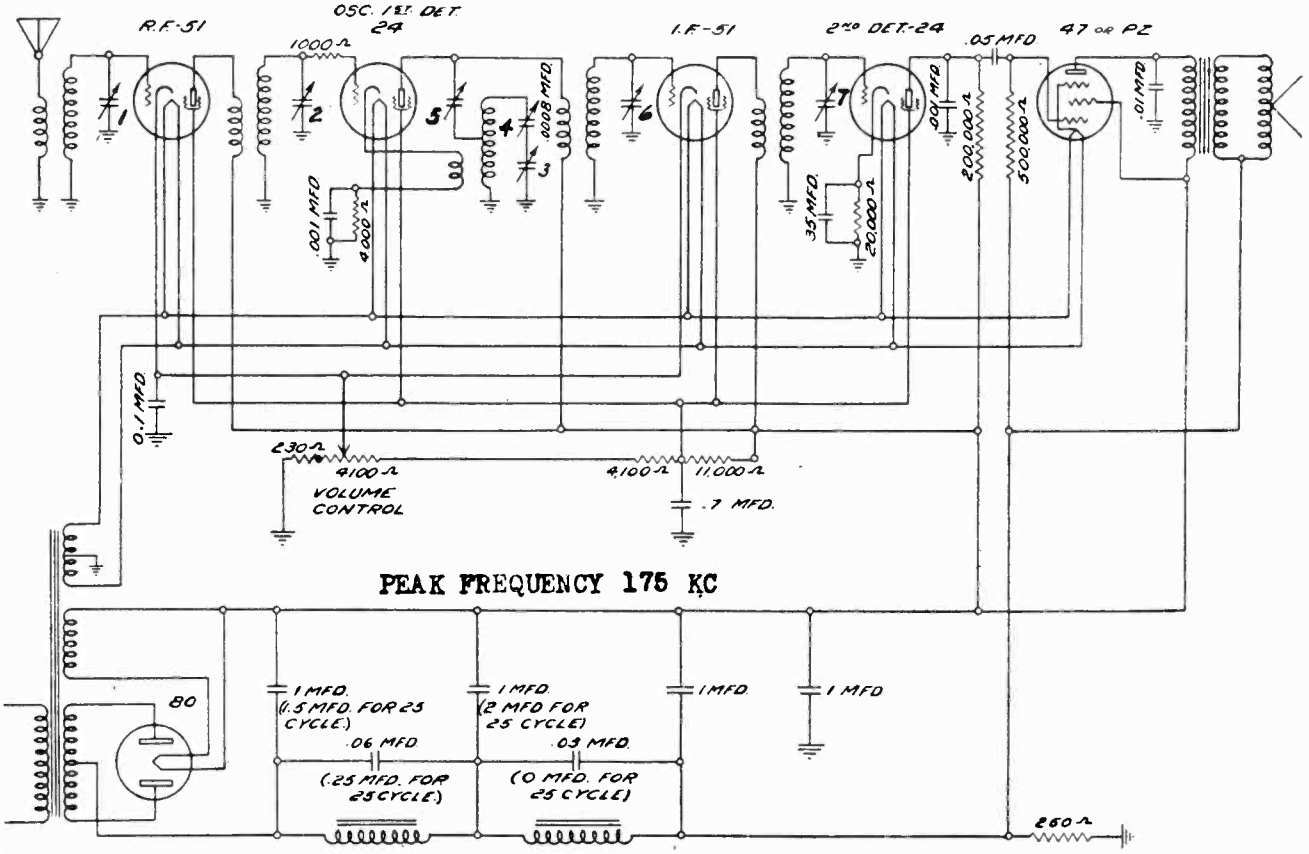


Bottom View

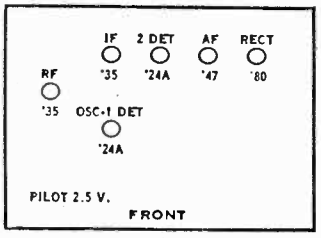
MODEL AC 100 Series
Schematic - Voltage

TRANSFORMER CORP. OF AMERICA

CLARION SERIES 100 SUPERHETERODYNE



Model AC-100, 25-100 (1931)



SCHEMATIC DIAGRAM FOR CLARION MODEL-100

READING TAKEN WITH WESTON MODEL 565 ANALYZER

MODEL No. CUSTOMER BY

No.	Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid Volt	Cath. Volts	S. G. Volts	Ip Norm.
1	R. F.	51	2.15	235	2.4	2.5	80.	5.0
.2	Autodyne	24	2.15	225	5.0	6.0	75.	3.0
3	I. F.	51	2.15	230	2.4	2.5	75.	4.0
4	2nd Det.	24	2.15	104	10.	15.	65.	0.6
5	Audio	47	2.25	250	16	0	260	30.
6	Rect.	80	4.4					57.5

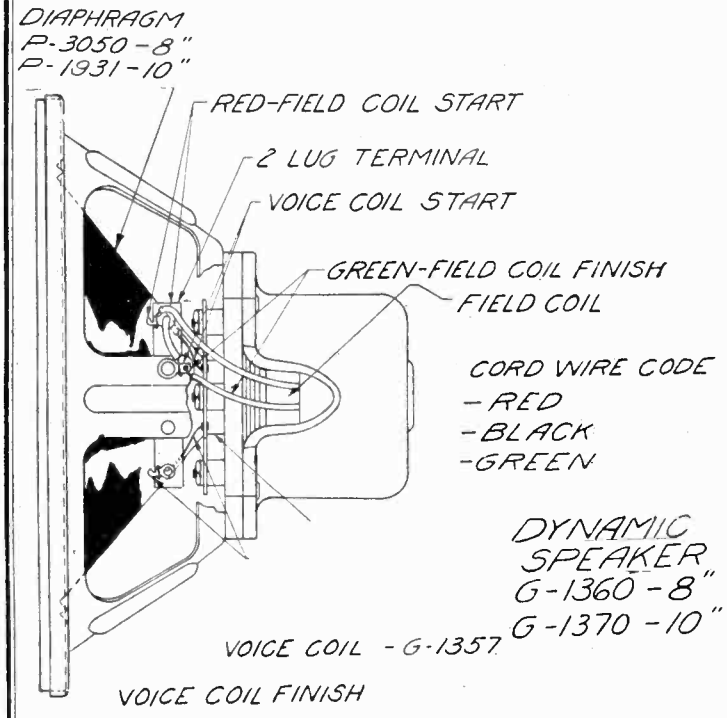
Line Voltage 115. Order of Test: 1 Rect., 2 Power, 3 Det., Etc.
Volume Control Position, Full On.

NOTE: Since resistance tolerances in the sets are plus or minus 10% and tubes may vary over 20%, your readings may disagree with the above by plus or minus 30%.

MODEL AC 100 Series
Chassis View
Data

TRANSFORMER CORP. OF AMERICA

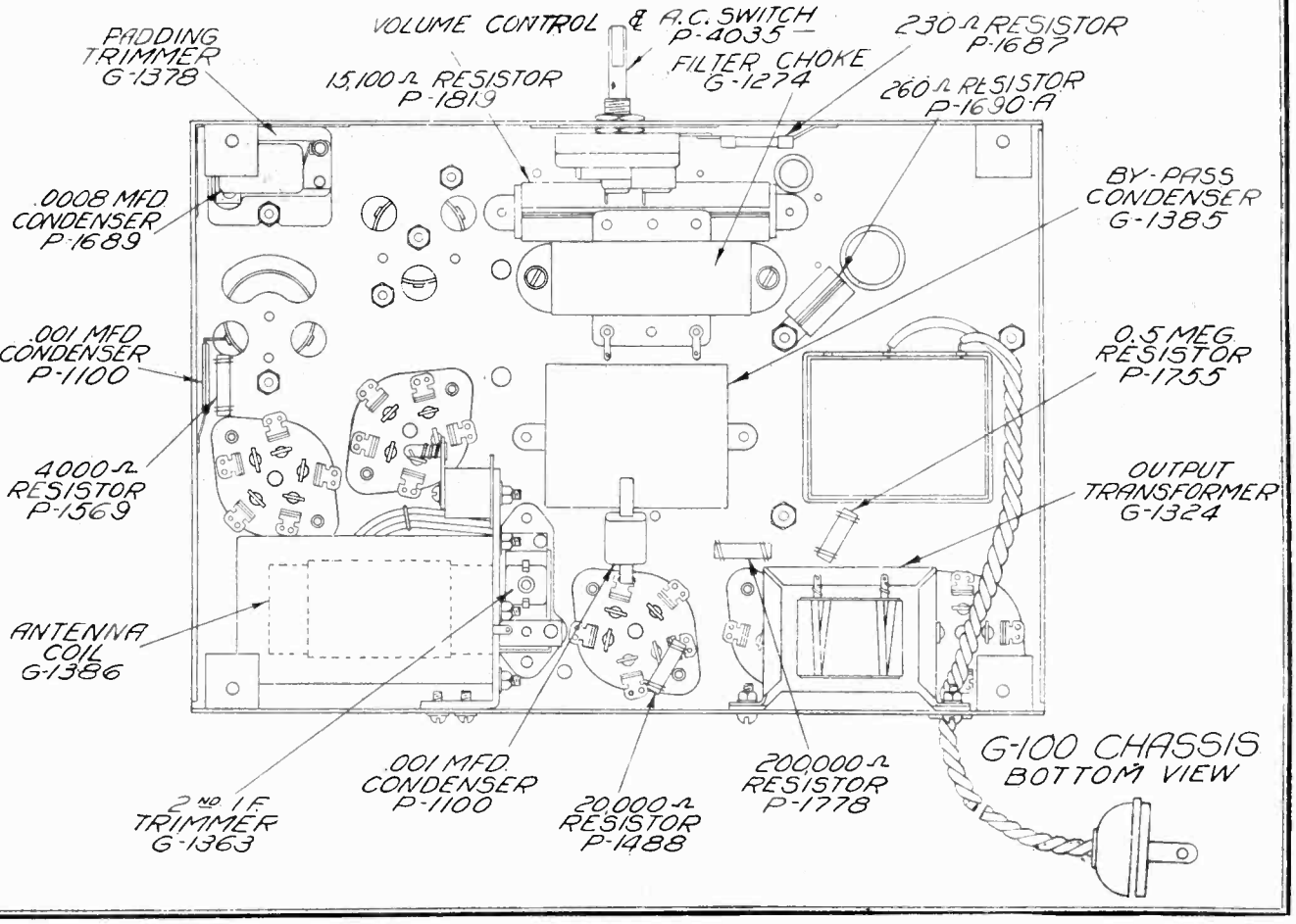
CLARION SERIES 100 SUPERHETERODYNE



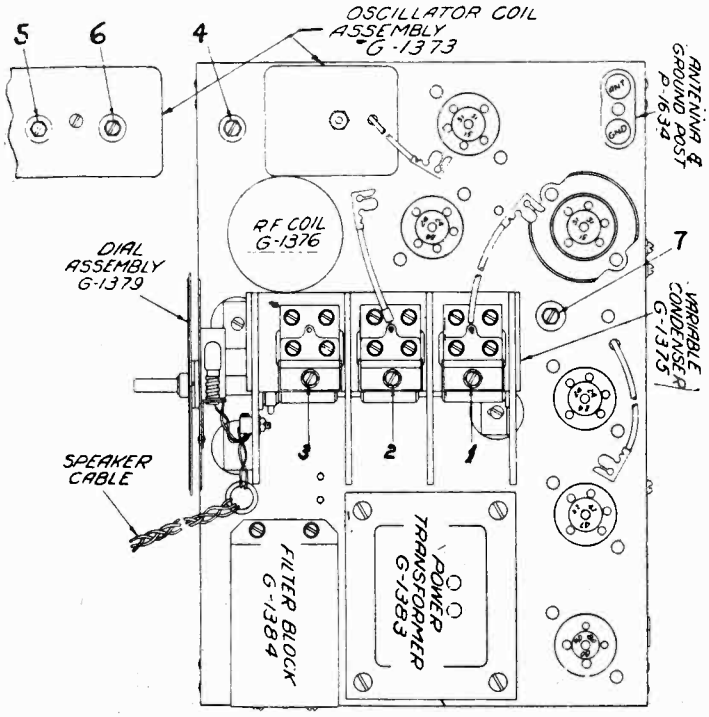
CONTINUITY TESTS

(Applicable to Completely and Partially Inoperative Sets and Circuits)

To determine which section of the receiver is defective, the second detector tube might be tapped with the finger, listening for a ringing noise in the speaker—this indicates that the audio end is O. K. *A 175 K. C. test oscillator* should be connected to the grid cap of the Super-autodyne tube so that the modulated signal can be reproduced in the loud speaker. This indicates that the Super-autodyne and intermediate frequency stages are operating. To determine if the super-autodyne is oscillating as it should be, a broadcast test oscillator should be connected to the grid cap of the super-autodyne tube. No signal will come through unless the tube is oscillating, and the stage functioning correctly. The R. F. tube, of course, can be checked, lastly by connecting the broadcast test oscillator to the antenna and ground binding posts of the receiver.



CLARION SERIES 100 SUPERHETERODYNE



READJUSTING TRIMMERS

Number 1 is the antenna trimmer.

Number 2 is the gang condenser trimmer tuning the grid of the Super-autodyne.

Number 3 is the gang condenser trimmer tuning the plate (or oscillator of the super-autodyne).

Number 4 is the oscillator padding trimmer.

Number 5 is the Super-autodyne plate trimmer.

Number 6 is the I. F grid trimmer.

Number 7 is the second detector grid trimmer.

To readjust the trimmer, it will be necessary that a good design of 175 k. c. oscillator be employed, and that a dependable broadcast test oscillator be on hand so that stages handling intermediate frequency, and those handling radio frequency can be thoroughly checked. It is advisable to use a bakelite screwdriver when making any of these adjustments.

First, connect the 175 k. c. oscillator output leads from the control grid cap of the super-autodyne tube to ground. Do not remove any of the tubes from the sockets, and it is not necessary to disconnect the grid cap clip from the tube. Reset trimmers numbers 5, 6 and 7 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect, inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k. c., and when trimmers number 5, 6 and 7 are set for maximum output, they will be correctly adjusted and should be sealed.

Next, disconnect the 175 k. c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator, or tune in a broadcast signal around 1400 k. c., then reset trimmers numbers 2 and 1 respectively for maximum output. This adjustment will track the super-autodyne grid circuit of the R. F. stage.

To check the calibration of the receiver, whether it be high or low, trimmer number 3 should be reset until a station of known nigh frequency is brought in on the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal at about 1400 k. c. should be chosen. The setting of the trimmer at 1400 k. c. is more critical than it would be at 600 k. c.; calibration, therefore more accurate.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instruction. We will now balance the oscillator to the r. f. and first detector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k.c., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer), at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, (as previously explained), and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.

P-1038	Dial light	$ 0.35
P-1049	Grid cap clip	.05
P-1100	Autodyne Cath. cond. .008	.25
P-1459	Tube shield base	.10
P-1472	Tube shield	.10
P-1569	Autodyne Cath. resistor 4000 ohms	.55
P-1593	Type 24 socket	.20
P-1595	Type 80 socket	.20
P-1634	Ant. ground binding post	.25
P-1682	Type 51 socket	.20
P-1683	Type 47 socket	.20
P-1689	Autodyne trimmer cond. .008	.30
P-1690A	260 ohm wire wound resistor	.25
P-1755	Pentode cont. grid resistor, 500,000 ohms	.35
P-1778	2nd det. plate resistor, 200,000 ohms	.30
P-1819	Voltage dividing resistor	.75
P-3050	Speaker diaphragm	.55
P-4033	Escutcheon plate	.55
P-4035	Vol. cont. and on-off switch	2.00
P-4037	Large knobs	.30
P-4045	I. F. coil (unshielded)	.60
P-4047	Small knobs	.25
P-4088	2nd det. cathode Resistor 20,000 ohms	25
G-1274	Filter choke	1.75
G-1324	Output transformer	1.50
G-1357	Voice coil and spider assembly	.75
G-1360	Speaker complete	12.50
G-1363	Trimmer condenser	.45
G-1372	Antenna and R. F. coil shield	.25
G-1373	Autodyne coil	2.00
G-1376	R. F. coil, less shield	.75
G-1378	Autodyne trimmer cond. (insulated)	.50
G-1379	Dial and scale assembly	1.50
G-1383	Power transformer 110 v. 60 cycle	3.50
G-1383A	Power transformer 110 v. 25 cycle	7.20
G-1383B	Power transformer 220 v. 60 cycle	7.20
G-1384	Filter pack, 60 cycle	3.50
G-1384A	Filter pack, 25 cycle	4.50
G-1385	By-pass condenser pack	1.50
G-1386	Antenna coil	.75

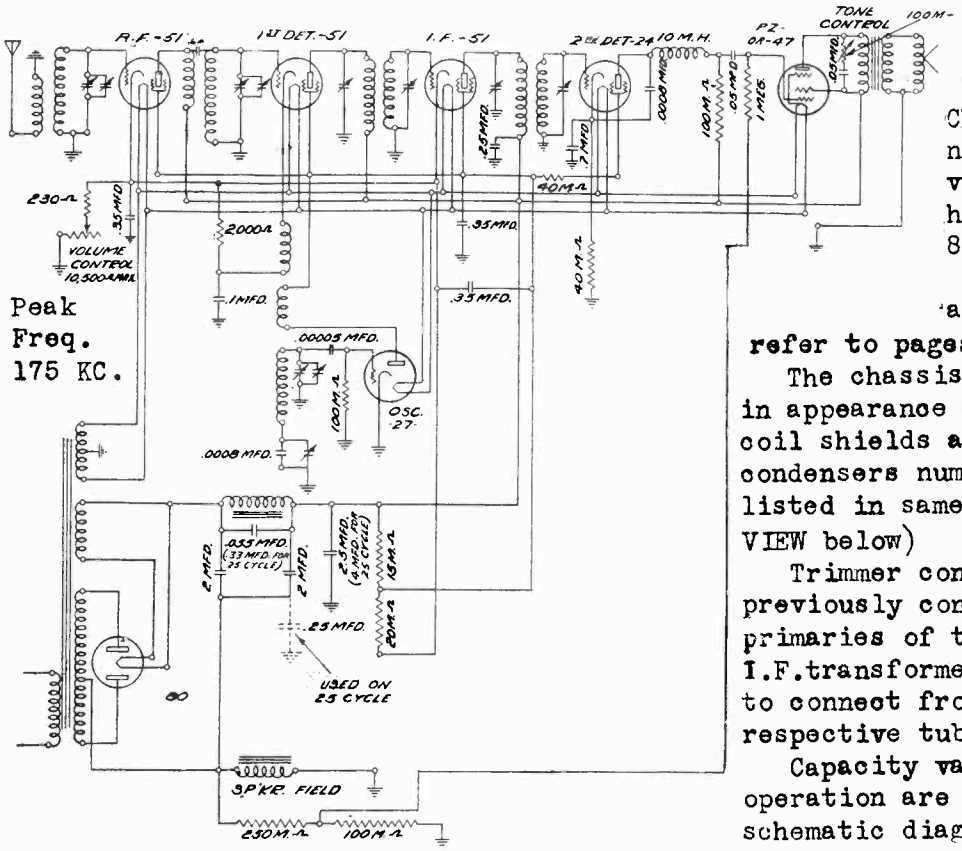
CONTINUITY TEST TABLES

Using 10 Volt Scale 1000 Ohm Per Volt Meter and 4½ Volt Battery

Circuit Tested	From	To	Readings
R. F. Grid	Rect. Fil. Prong	R. F. Grid Clip	1.5
R. F. Screen	Rect. Fil. Prong	R. F. Screen Prong	2.2
R. F. Plate	Rect. Fil. Prong	R. F. Plate Prong	4.4
R. F. Cathode	Rect. Fil. Prong	R. F. Cathode Prong	1.5
Autodyne Grid	Rect. Fil. Prong	Autodyne Grid Clip	1.5
Autodyne Screen	Rect. Fil. Prong	Autodyne Screen Prg.	2.2
Autodyne Plate	Rect. Fil. Prong	Autodyne Plate Prg.	4.5
Autodyne Cathode	Rect. Fil. Prong	Autodyne Cath. Prg.	1.3
I. F. Grid	Rect. Fil. Prong	I. F. Grid Clip	1.5
I. F. Screen	Rect. Fil. Prong	I. F. Screen Prong	2.2
I. F. Plate	Rect. Fil. Prong	I. F. Plate Prong	4.4
I. F. Cathode	Rect. Fil. Prong	I. F. Cathode Prong	1.5
2nd Det. Grid	Rect. Fil. Prong	2nd Det. Grid Clip	1.5
2nd Det. Screen	Rect. Fil. Prong	2nd Det. Screen Prg.	2.2
2nd Det. Plate	Rect. Fil. Prong	2nd Det. Plate Prong	.2
2nd Det. Cathode	Rect. Fil. Prong	2nd Det. Cath. Prong	.8
Pent. Cont. Grid	Rect. Fil. Prong	Pent. C. G. Prong	.1
Pent. Plate	Rect. Fil. Prong	Pent. Plate Prong	4.4
Pent. S. C. Grid	Rect. Fil. Prong	Pent. S. C. Grid Prg.	4.5
Ant. Pri.	Antenna Post	Gnd. Post	4.5
Pwr. Trans. Pri.	Across	A. C. Plug	4.5
Pwr. Trans. Sec.	Across	Rect. Plates	4.3
Spkr. Field	Red Lead Cable	Black Lead Cable	4.2
Spkr. V. C.	Green Lead Cable	Black Lead Cable	4.5

TRANSFORMER CORP. OF AMERICA

MODELS 120-139
(See models 84,85)



Peak
Freq.
175 KC.

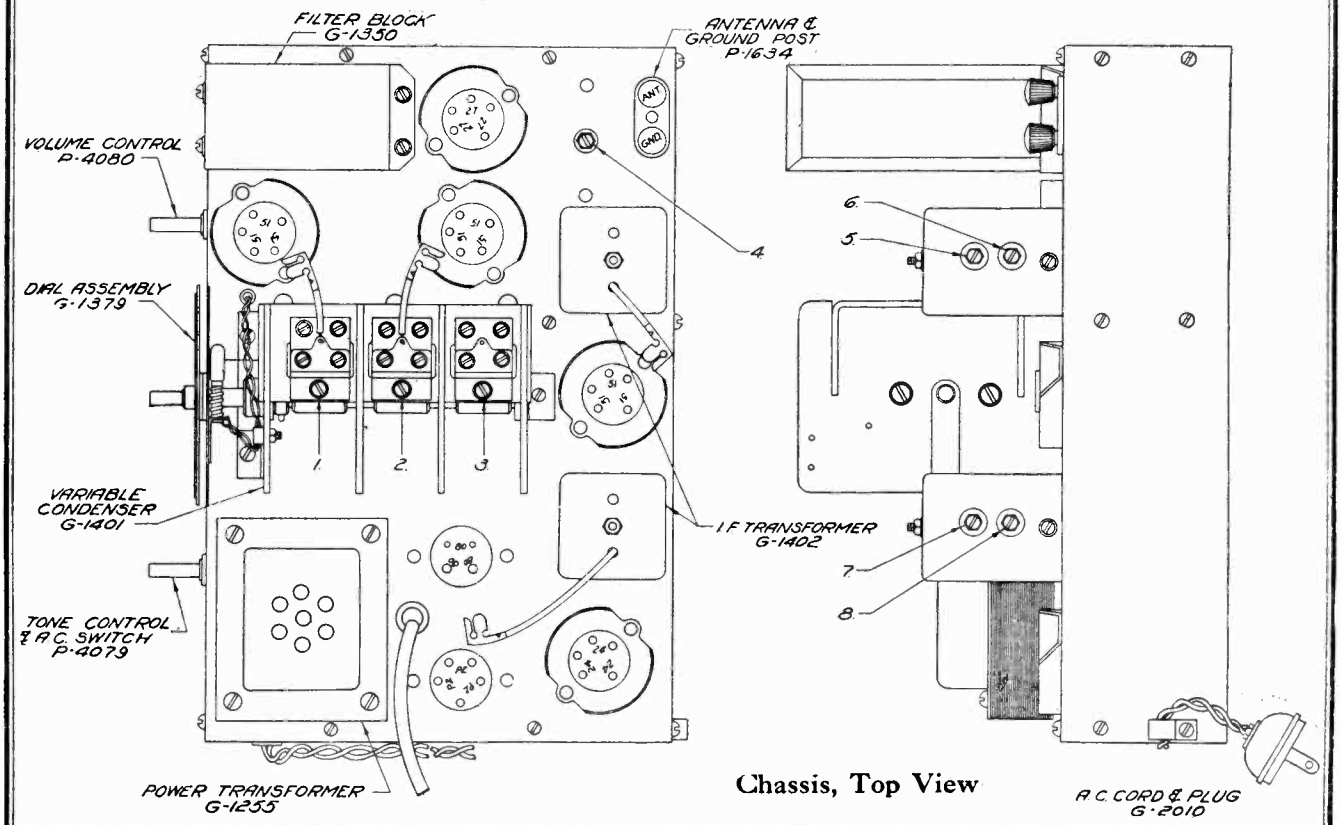
The SERIES 120-139 CHASSIS is a continuance of the previous 7 tube Superhet. chassis, Models 84 & 85.

For service data and voltage table refer to pages on models 84,85

The chassis remains the same in appearance except that I.F. coil shields are square. Trimmer condensers numbered 1 to 8 are listed in same order. (See TOP VIEW below)

Trimmer condensers which were previously connected across the primaries of the first and second I.F. transformers have been changed to connect from the plates of the respective tubes to ground.

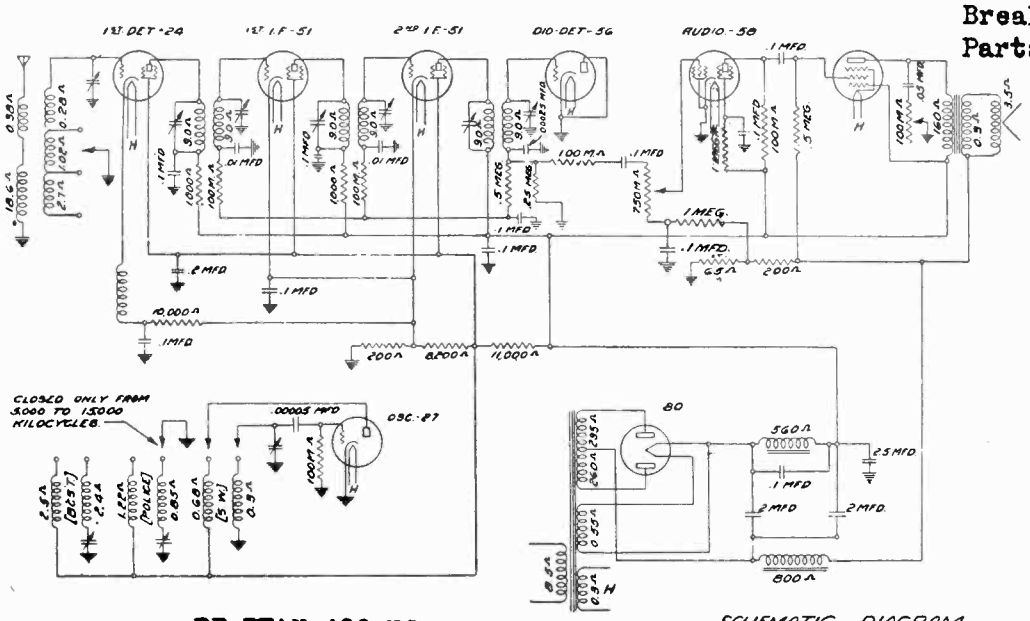
Capacity values for 25 cycle operation are also shown on the schematic diagram.



Chassis, Top View

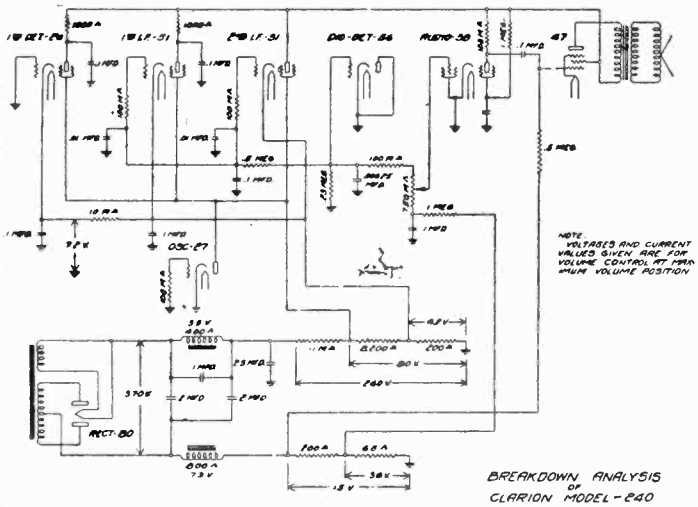
TRANSFORMER CORP. OF AMERICA

MODEL AC 240
Schematic
Chassis View
Breakdown
Parts List



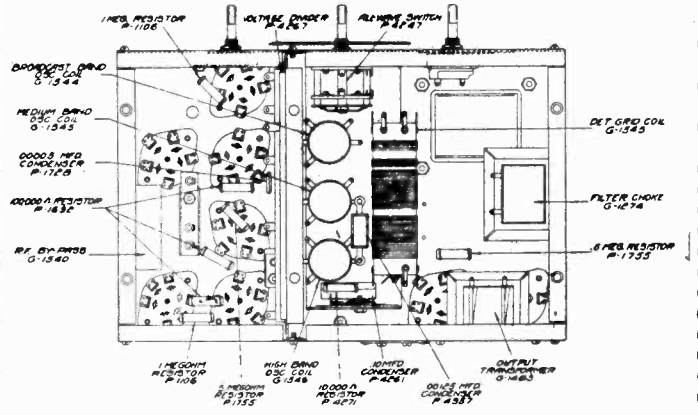
IF PEAK 490 KC

SCHEMATIC DIAGRAM
OF
CLARION - MODEL 240
DRAWN BY - L.V. CHECKED BY
APPROVED BY - DATE: 5-17-32



BREAKDOWN ANALYSIS
OF
CLARION MODEL - 240

P-1038	Pilot lamp.	$ .35
P-1049	Grid cap clip	.05
P-1106	1 megohm resistor	.35
P-1118	Chassis mounting washers. .	.03
P-1472	Tube shields.	.10
P-1518	Chassis mounting screws . .	.05
P-1593	Type 24 socket.	.20
P-1595	" 80 "	.20
P-1597	" 27 "	.20
P-1682	" 51 "	.20
P-1683	" 47 "	.20
P-1692	100,000 ohm resistor. . . .	.35
P-1728	.00005 mfd cond	.30
P-1755	500,000 ohm resistor. . . .	.35
P-4037	Knobs (large)	.30
P-4047	" (small)	.25
P-4118	1,000 ohm resistor.	.20
P-4216	Speaker diaphragm	.50
P-4229	Ant. gnd bilding post . . .	.15
P-4247	Band switch	2.50
P-4256	Escutcheon plate.	.55
P-4259	Tone control-on-off switch.	1.75
P-4260	Volume control.	1.00
P-4262	Type 56 socket.	.20
P-4264	" 58 "	.20
P-4267	Voltage div. resistor . . .	.90
P-4271	10,000 ohm resistor	.20



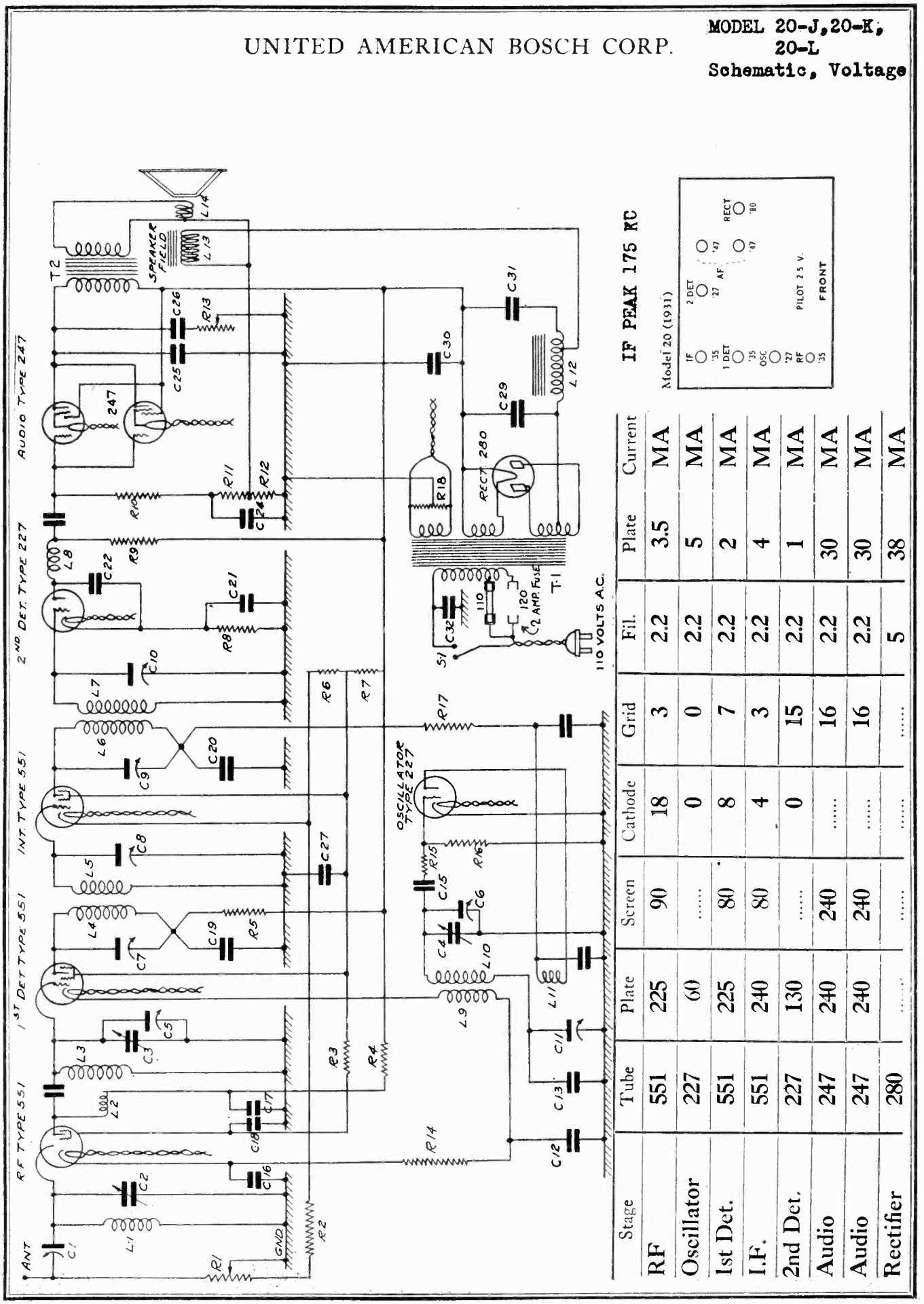
G-240 CHASSIS
BOTTOM VIEW

G-1274	Filter choke.	1.75
G-1364	Trimmer and bracket assembly. . .	.75
G-1483	Output transformer.	1.50
G-1484	Speaker voice coil.	.40
G-1502	Speaker complete.	5.00
G-1528	Power transformer 110 vo.60 cy. .	3.75
G-1528A	" " 110 " 25 " . .	5.25
G-1528B	" " 220 " 60 " . .	4.50
G-1529	Filt. pack " 110 " 60 " . .	3.50
G-1529A	" " " 110 " 25 " . .	4.50
G-1530	Dial and scale assembly	1.50
G-1531	First I. F. transformer	2.50
G-1532	Second " "	2.50
G-1533	Third " "	2.50
G-1540	Bypass cond. assembly	1.75
G-1543	Antenna coil.	1.75
G-1544	Broadcast osc. coil	1.25
G-1545	Medium osc. coil.	1.25
G-1546	High frequency osc. coil. . . .	1.25

Full List Prices - Your Regular Discount Applies

UNITED AMERICAN BOSCH CORP.

MODEL 20-J, 20-K, 20-L
Schematic, Voltage



IF PEAK 175 KC

Model 20 (1931)

Stage	Tube	Plate	Screen	Cathode	Grid	Fil.	Plate	Current
RF	551	225	90	18	3	2.2	3.5	MA
Oscillator	227	60	.....	0	0	2.2	5	MA
1st Det.	551	225	80	8	7	2.2	2	MA
I.F.	551	240	80	4	3	2.2	4	MA
2nd Det.	227	130	.....	0	15	2.2	1	MA
Audio	247	240	240	.....	16	2.2	30	MA
Audio	247	240	240	.....	16	2.2	30	MA
Rectifier	280	.....	.....	.....	.....	5	38	MA

MODEL 20-J, 20-K, 20-L

UNITED AMERICAN BOSCH CORP.

Electrical Values

Notes

Antenna Adjustment—The antenna adjustment must be made when any change is made in the antenna.

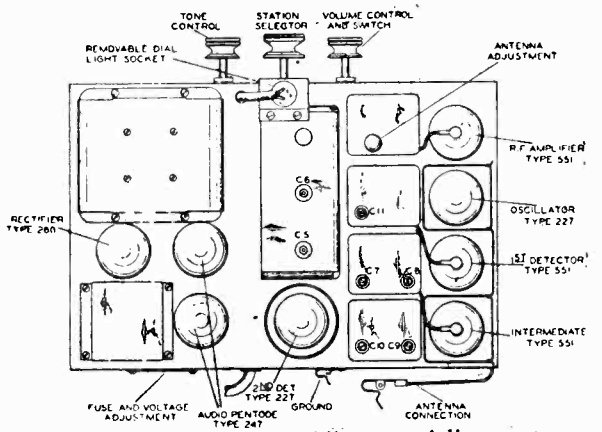
Alignment Instruction

1. Connect the 175 KC output of the oscillator to the grid cap of the 1st detector.
   - a—Align Primary of 2nd IF Transformer (C9).
   - b—Align Secondary of 2nd IF Transformer (C10).
   - c—Align Primary of 1st IF Transformer (C7).
   - d—Align Secondary of 1st IF Transformer (C8).

   (It is advisable to go over these adjustments twice to insure accuracy).

2. Reset the Oscillator for 1400 KC, connected to the 1st detector grid as before.
   - a—Align the Oscillator tuning condenser C6 by unscrewing two full turns, then turning slowly to the right until the first peak is reached.

3. Connect the 1400 KC output to the Antenna Connection of the set.
   - a—Align Antenna Trimmer and 1st detector C3.



Alignment Adjustments

4. Retune the receiver to 600 KC and set oscillator to this frequency.
   - a—Align the oscillator low frequency adjustment C11. Rotate the dial slowly back and forth over a range of perhaps ¼", at the same time rotating C11 back and forth until the maximum output is reached.

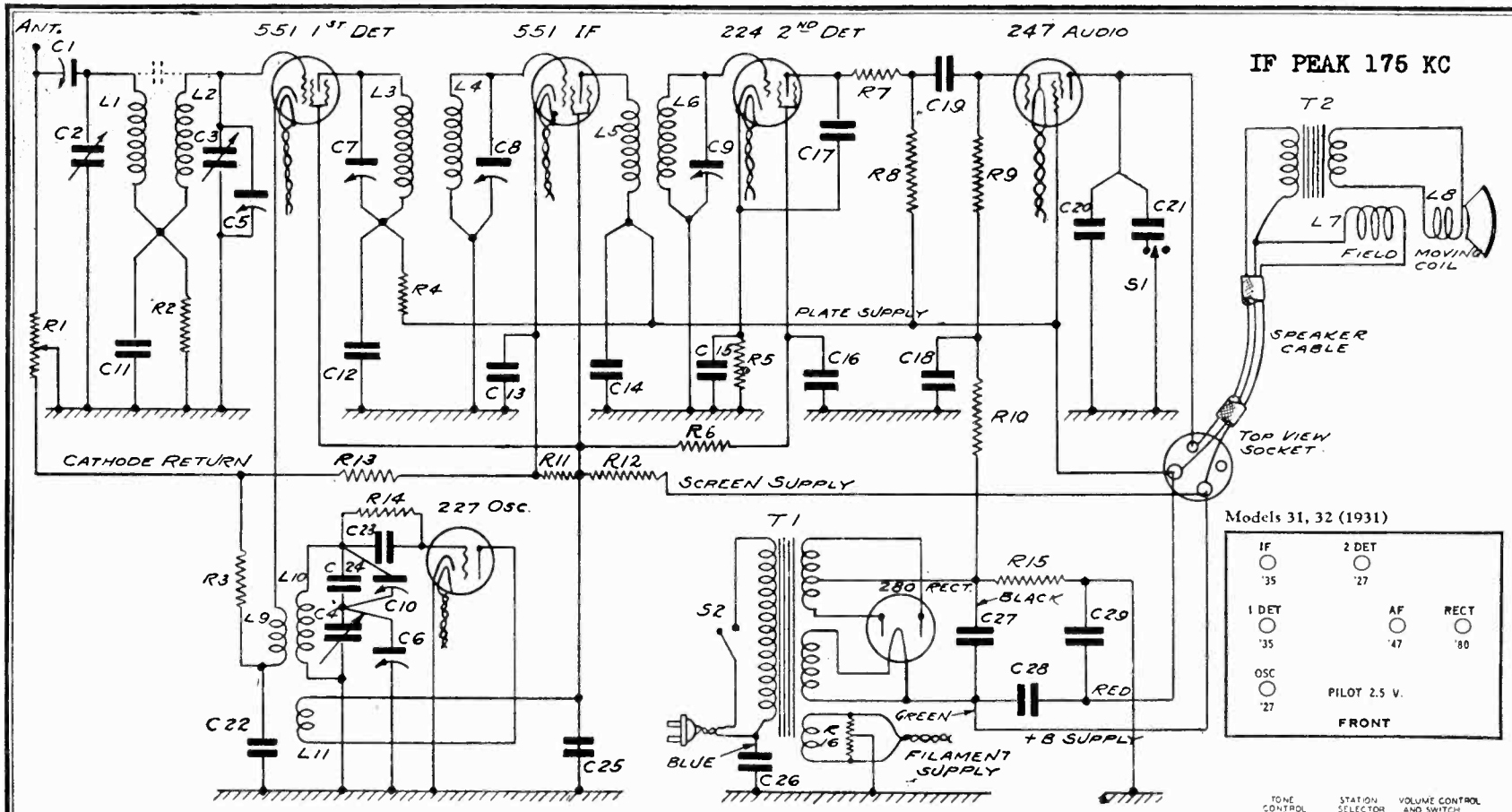
5. Return to 1400 KC (Receiver and Oscillator).
   - a—Re-align C3, C6 and the Antenna Trimmer.

C 1—Antenna Trimmer
C 2, C 3, C 4, C 5, C 6 } Tuning Condenser Gang with trimmer condensers
C 7, C 8 } Variable Condenser Unit 75 to 140 mmf.
C 9, C 10 } Variable Condenser Unit 75 to 140 mmf.
C 11—Oscillator Series Trimming Condenser
C 12—By-pass Condenser—.05 mfd.
C 13—Oscillator Series Tuning Condenser .0011 mfd.
C 14—Oscillator Plate By-pass Condenser .05 mfd.
C 15—Oscillator Grid Condenser .0001 mfd.
C 16—RF Cathode By-pass Condenser .05 mfd.
C 17—RF Screen By-pass Condenser .05 mfd.
C 18—RF Plate By-pass Condenser .05 mfd.
C 19—1st Detector Blocking Condenser .05 mfd.
C 20—IF Blocking Condenser .05 mfd.
C 21—Detector Cathode By-pass Condenser .25 mfd.
C 22—Detector Plate By-pass Condenser .0011 mfd.
C 23—Audio Coupling Condenser .05 mfd.
C 24—Audio Grid By-pass Condenser .05 mfd.
C 25—Audio Plate By-pass Condenser .02 mfd.
C 26—Tone Selector Condenser .1 mfd.
C 27—Screen By-pass Condenser .5 mfd.
C 28—Oscillator By-pass Condenser .5 mfd.
C 29—Filter Condenser 1.8 mfd.
C 30—Filter Condenser 3.5 mfd.
C 31—Filter Condenser 1.8 mfd.
C 32—Buffer Condenser .05 mfd.

R 1—Volume Control 10,000 ohms
R 2—Series Resistor 200 ohms
R 3—RF Screen Resistor 1000 ohms
R 4—RF Plate Resistor 1000 ohms
R 5—1st Detector Plate Resistor 1000 ohms
R 6—Divider Resistor 20,000 ohms
R 7—Screen Supply Resistor 25,000 ohms
R 8—2nd Detector Cathode Resistor 15,000 ohms
R 9—2nd Detector Plate Resistor 100,000 ohms
R 10—Audio Grid Resistor 250,000 ohms
R 11—Audio Grid Resistor 100,000 ohms
R 12—Audio Bias Resistor 200 ohms
R 13—Tone Control
R 14—Cathode Resistor 2000 ohms
R 15—Oscillator Grid Resistor 5000 ohms
R 16—Oscillator Grid Resistor 100,000 ohms
R 17—Oscillator Plate Resistor 40,000 ohms
T 1—Main Power Transformer
T 2—Output Transformer
S 1—Main Switch
L 1—Antenna Coil
L 2—Primary of RF Coil
L 3—Secondary of RF Coil
L 4—I.F. primary coil
L 5—I.F. secondary coil
L 6—I.F. primary coil
L 7—I.F. secondary coil
L 8—Detector plate choke
L 9—Oscillator coupling coil
L 10—Oscillator grid coil
L 11—Oscillator plate coil
L 12—Filter choke coil
L 13—Speaker Field Coil
L 14—Speaker Voice Coil

UNITED AMERICAN BOSCH CORP.

MODEL 31, 32
Schematic
Data- Socket

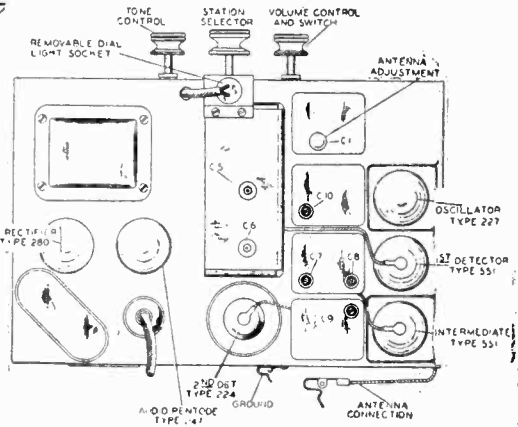


Antenna Adjustment—The antenna knob, located as shown on the drawing (figure 1) is for the purpose of obtaining the most efficient adjustment of the receiver to the antenna. Simply tune in a semi-distant broadcast station at reduced volume and turn the adjustment knob until the point of loudest reception is found. Select if possible a station received near 140 on the dial. The adjustment is permanent, and need not be disturbed unles the antenna is changed.

MODELS 31-32
Superheterodyne

Line Voltage—The model 31 receiver is designed for use on 50 to 60 cycle alternating current, 105 to 120 volts. The model 32 is designed for 25 to 50 cycle, 105 to 120 volt alternating current. If excessive line voltage is encountered, some type of series resistance or "voltage regulator" should be employed.

Tone Control—The tone is varied from treble to bass by means of a two-position snap switch operated by the right hand knob. The range of motion of this switch has been reduced from that found on previous models, and care should be taken not to force the switch beyond the stop position.



Top View of Model 31 Chassis

ALIGNMENT

The following instructions for the alignment of the condensers in the models 31 and 32 describe the operation as done with any type of special oscillator designed for the adjustment of superheterodyne receivers. Such an oscillator is essential for anyone who handles more than a small amount of service work. Such oscillators are designed to provide ordinary broadcast frequencies, and in addition, a 175 kilocycle for the alignment of the intermediate frequency (I. F.) stages.

Alignment Instructions:

1—With 175 KC on the grid of the 551 IF tube
Align C9

2—With 175 KC on the grid of the 551 1st detector
Align C7, C8 and re-check C9

Set the condenser gang at the maximum position and move the dial until the line of light indicator is ¼" to the right of the 55 division.

3—With 1400 KC on the grid of the 551 1st detector
Align C6

4—Set gang at 600 KC and with 600 KC input on grid of 1st detector

Align C10

Re-check as in 3 above.

5—Set gang at 1400 KC with input on antenna connection

Align C1 and C5

Main Filter Condenser

The main filter condenser unit contains buffer condenser C26, by-pass condensers C27 and C29, and condenser C28 which "tunes" the speaker field coil. The unit is connected as follows:

Red lead —Speaker plug socket (see wiring diagram)
Green lead—"F" terminal of 280 socket
Blue lead —110 volt terminal at main transformer
Black lead—to R15 (350 ohms) on resistor strip

Test C27 from Black to Green
Test C28 from Green to Red
Test C29 from Red to Ground
Test C26 from Blue to Ground

Main Power Transformer

The various transformer windings may be identified for testing purposes as follows: Four leads are brought out on the terminal strip side and five on the opposite side.

Primary Winding—two terminal strip terminals nearest rear of set.

551, 224, 227 Filaments—heavy wires, terminal strip side.

Plate Center Tap—terminal nearest front of set.

280 Plates—stranded wires, opposite side.

280 Filaments—solid wires, opposite side.

Resistors

The resistors used in the models 31 and 32 receivers conform to the RMA standard of marking and may be identified by the following table of value and colors

Value	*Body Color*	*Tip Color*	*Dot Color*
300 ohms	Orange	Black	Brown
350 "	Orange	Green	Brown
1000 "	Brown	Black	Red
5000 "	Green	Black	Red
10000 "	Brown	Black	Orange
20000 "	Red	Black	Orange
30000 "	Orange	Black	Orange
50000 "	Green	Black	Orange
100000 "	Brown	Black	Yellow
½ megohm	Green	Black	Yellow
1 megohm	Brown	Black	Green
2 megohm	Red	Black	Green

R1—Volume Control—10,000 ohms
R2—Coupling Resistor—1000 ohms
R3—1st Det. Cathode Resistor 5000 ohms
R4—1st. Det. Plate Resistor 1000 ohms
R5—2nd Det. Cathode Resistor—50,000 ohms
R6—2nd Det. Screen Resistor—2 megohms
R7—2nd Det. Plate Resistor—10,000 ohms
R8—2nd Det. Plate Desistor—1 megohm
R9—Audio Grid Resistor—½ megohm
R10—Audio Grid Resistor—100,000 ohms
R11—Divider Resistor—20,000 ohms
R12—Screen Supply Resistor—30,000 ohms
R13—Cathode Resistor—300 ohms
R14—Oscillator Grid Resistor—100,000 ohms
R15—Audio Bias Resistor—350 ohms
R16—Mid Tap Resistor
C1—Antenna Trimmer
C2—Tuning Condenser
C3—Tuning Condenser
C4—Oscillator Tuning Condenser
C5—Alignment Condenser
C6—Oscillator Tuning Alignment
C7—I. F. Alignment Condenser
C8—I. F. Alignment Condenser
C9—Alignment Condenser
C10—Oscillator Alignment
C11—RF Coupling Condenser .05 mfd.
C12—1st Det. Plate By-pass .05 mfd.
C13—I. F. Cathode By-pass .05 mfd.
C14—I. F. Plate By-pass .05 mfd.
C15—2nd Det. Cathode By-pass 1. mfd.
C16—2nd Det. Screen By-pass .25 mfd.
C17—2nd Det. Plate By-pass .0001 mfd.
C18—Audio De-coupling Condenser .02 mfd.
C19—Audio Coupling Condenser .006 mfd.
C20—Audio Plate Condenser .05 mfd.
C21—Tone Selector Condenser .05 mfd.
C22—Cathode By-pass Condenser .05 mfd.
C23—Oscillator Grid Condenser .0001 mfd.
C24—Oscillator Tuning Condenser .0011 mfd.
C25—Screen By-pass Condenser 8. mfd.
C26—Buffer Condenser .08 mfd.
C27—Filter Condenser 3.5 mfd.
C28—Field Coil Tuning Condenser .08 mfd.
C29—Filter Condenser 3.5 mfd.
S1—Tone Selector Switch
S2—Main Switch

T1—Power Transformer
T2—Output Transformer
L1—RF Coil
L2—RF Coil
L3—I.F. Coil (Primary)
L4—I.F. Coil (Secondary)
L5—I.F. Coil (Primary)
L6—I.F. Coil (Secondary)
L7—Speaker Field
L8—Speaker Voice Coil
L9—Oscillator Coupling Coil
L10—Oscillator Grid Coil
L11—Oscillator Plate Coil

MODEL 31,32 AC
Electrical Values
Voltage

UNITED AMERICAN BOSCH CORP.

SOCKET VOLTAGES

Stage	Tube	Plate	Screen	Cathode*	Grid	Fil.	Plate MA
1st Det.	551	260	80	10	7	2.2	2
Oscillator	227	75	..	*0	*0	2.2	5
I.F.	551	260	80	3	3	2.2	4
2nd Det.	224	50	*5	3	1	2.2	*.1
Audio	247	250	250	..	*3	2.2	32
Rectifier	280					4.8	22-22

Line voltage—115 volts

Volume control fully "on"

* These values will vary considerably with the type of test kit employed, due to the high resistance in the circuit.

MODELS 31-32 Superheterodyne

MODEL 80
Installation Notes

UNITED AMERICAN BOSCH CORP.

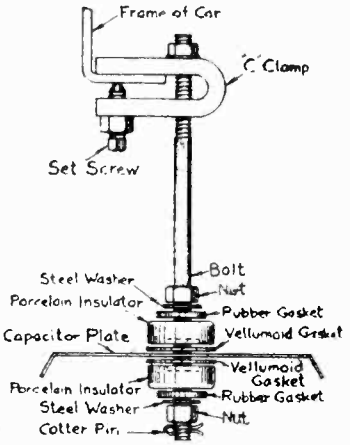


Fig. 5—Capacitor Plate.

Capacitor Plate:

In Figure 5 is shown the means by which this plate is supported underneath the chassis of the automobile. The insulation has been very carefully considered and is so designed that it is unaffected by mud, water, or dust. A location on either side of the car frame or one across the rear, parallel to the axle, will be satisfactory. The plate is adjustable and it is desirable that it be lengthened as much as is possible without interfering with the mechanism of the car. Do not, however, bring the plate too near the motor compartment. Make sure that the clamping nut of the capacitor plate supporting bolt is tightened before fastening the clamp in place on the car frame with the pointed screw. The clamping nut, besides locking the supporting bolt, also serves to reinforce the "C" clamp against any tendency to open. Complete the installation by tightening the set screw and lock nut. The capacitor plate must be mounted as low as possible without interfering with the road clearance, and not too closely to large metal objects, such as "B" battery box, muffler, or car frame.

Chassis:

The chassis mounting is a rigid frame "D" having two adjustable brackets, "C" to support it against the dash board. Refer to Figure 2. In the installation of the set these brackets are assembled and the frame work used as a template to locate the holes in the dash board for the holding bolts. The bracket must be so located that clearance will be obtained for all obstructions. On the engine side, care should be taken to avoid interference with the vacuum tank or other devices mounted there. In using this bracket as a template, do not fail to use the radio set as a guide to obtain clearance for the projection of the set and for the control shaft and the battery cable. Drill the holes as located, using a 5/16" diameter drill in order that unavoidable irregularities in the location of the holes may be taken care of when the set is screwed in place. Next, mount the chassis on its rubber cushions and secure the entire assembly in position. Drive the holding bolts from the front and pull the set securely in place. In some cases, where the dashboard is free of all obstructions, it is possible to dispense with the brackets "C" and bolt the mounting frame directly against the engine bulkhead. This type of installation provides slightly more leg room. The frame is used as a template for laying out the mounting holes as before.

Capacitor Coupler:

This unit must be mounted at the nearest convenient point to the capacitor plate. The mounting bracket is permanently fastened to the coupler and it is only necessary to bolt the bracket to the car frame. See Figure 6.

The coupler is provided with two connecting leads. The red lead should be cut to a length just sufficient to reach the capacitor plate and the spade terminal (which is shipped loosely clipped to the wire) soldered to the end. Connection is made at the capacitor plate by means of a terminal screw and clip.

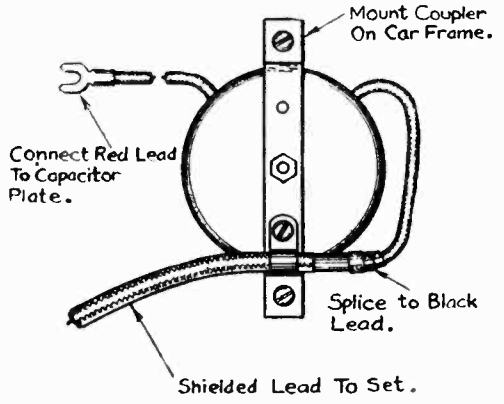


Fig. 6—Coupler.

The shielded lead from the receiver must be tightly clamped in the cable clamp provided on the coupler unit. Connect the wire in the shielded lead to the black wire from the coupler and carefully solder and tape the joint. Be careful that the woven shielding is effectively grounded through the clamp provided on the coupler, and is kept back from the joint in order to prevent a short circuit.

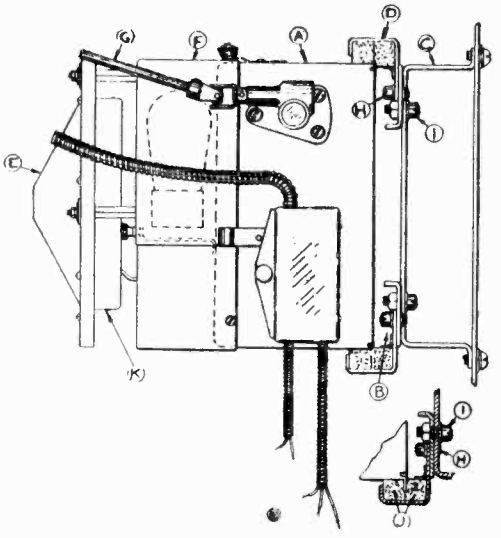


Fig. 2—Radio Chassis.

MODEL 91,92
Voltage
Values

UNITED AMERICAN BOSCH CORP.

NOMENCLATURE — MODEL 91

R 1—500,000 ohms—Grid Resistor
R 2—10,000 ohms—Grid Resistor
R 3—1,000 ohms—Plate Resistor
R 4—300 ohms—Cathode Divider Resistor
R 5—20,000 ohms—Cathode Divider Resistor
R 6—15,000 ohms—Screen Supply Resistor
R 7—20,000 ohms—Screen Resistor
R 8—25,000 ohms—Cathode Resistor
R 9—50,000 ohms—Screen Resistor
R 10—500,000 ohms—Plate Resistor
R 11—500,000 ohms—Volume Control
R 12—100,000 ohms—Grid Resistor
R 13—500,000 ohms—Tone Control
R 14—2 megohms—AVC Resistor
R 15—5,000 ohms—Cathode Resistor
R 16—100,000 ohms—Grid Resistor
R 17—Mid Tap Resistor
R 18—750 ohms—25 cycle only
R 19—200 ohms—Bias Resistor
R 20—750 ohms—Bias Resistor
R 21—350 ohms—Bias Resistor
R 22—2 megohms—Bias Resistor

L 1—Antenna Coil
L 2—1st R.F. Coil
L 3—Primary, L 4—Secondary } 1st IF Coil
L 5—Primary, L 6—Secondary } 2nd IF Coil
L 7—Cathode Winding, L 8—Plate Winding, L 9—Grid Winding } Oscillator Coil
L 10—Primary, L 11—Secondary } Output Transformer T 2
L 12—Field Coil, L 13—Voice Coil } Loud Speaker

C 1—Variable—Antenna Trimmer
C 2—Variable, C 3—Variable, C 4—Variable, C 5—Alignment, C 6—Alignment } Condenser Gang
C 7—Variable, C 8—Variable } 1st IF alignment condenser
C 9—Variable—2nd IF alignment condenser
C 10—Variable—Oscillator Series Condenser
C 11—.05 mfd.—RF coupling condenser
C 12—.05 mfd.—Plate by-pass condenser
C 13—.05 mfd.—Grid Condenser
C 14—.05 mfd.—Cathode by-pass condenser
C 15—.05 mfd.—Plate by pass condenser
C 16—.0001 mfd.—AVC condenser
C 17—.5 mfd.—Cathode by-pass
C 18—.25 mfd.—Screen by-pass
C 19—.00025 mfd.—Plate by-pass
C 20—.006 mfd.—Audio coupling condenser
C 21—.25 mfd.—Grid by-pass
C 22—.01 mfd.—Plate by-pass
C 23—.05 mfd.—Tone Control Condenser
C 24—.05 mfd.—Grid condenser
C 25—.05 mfd.—Cathode by-pass
C 26—.0011 mfd.—Oscillator series condenser
C 27—.0001 mfd.—Oscillator grid condenser
C 28—8 mfd.—Screen by-pass
C 29—.01 mfd.—Buffer condenser
C 30—16 mfd.—Filter condenser
C 31—4 mfd.—Filter condenser
C 32—.01 mfd.—Field shunt condenser

SOCKET VOLTAGES

Stage	Tube	Plate	Screen	Cathode	Grid	Fil.	Plate MA
Osc.	227	100	....	0	5	2.2	4
1st Det.	551	240	85	0	3.5	2.2	.1
IF	551	240	90	3	.5	2.2	2
2nd Det.	224	90	45	5	4	2.2	.1
AVC	224	10	50	60	.5	2.2	.1
Audio	247	240	240	....	16	2.2	30
Rect.	280	.....	.....	....	....	4.8	25

NOTE: These are average readings obtained with an ordinary set analyzer.

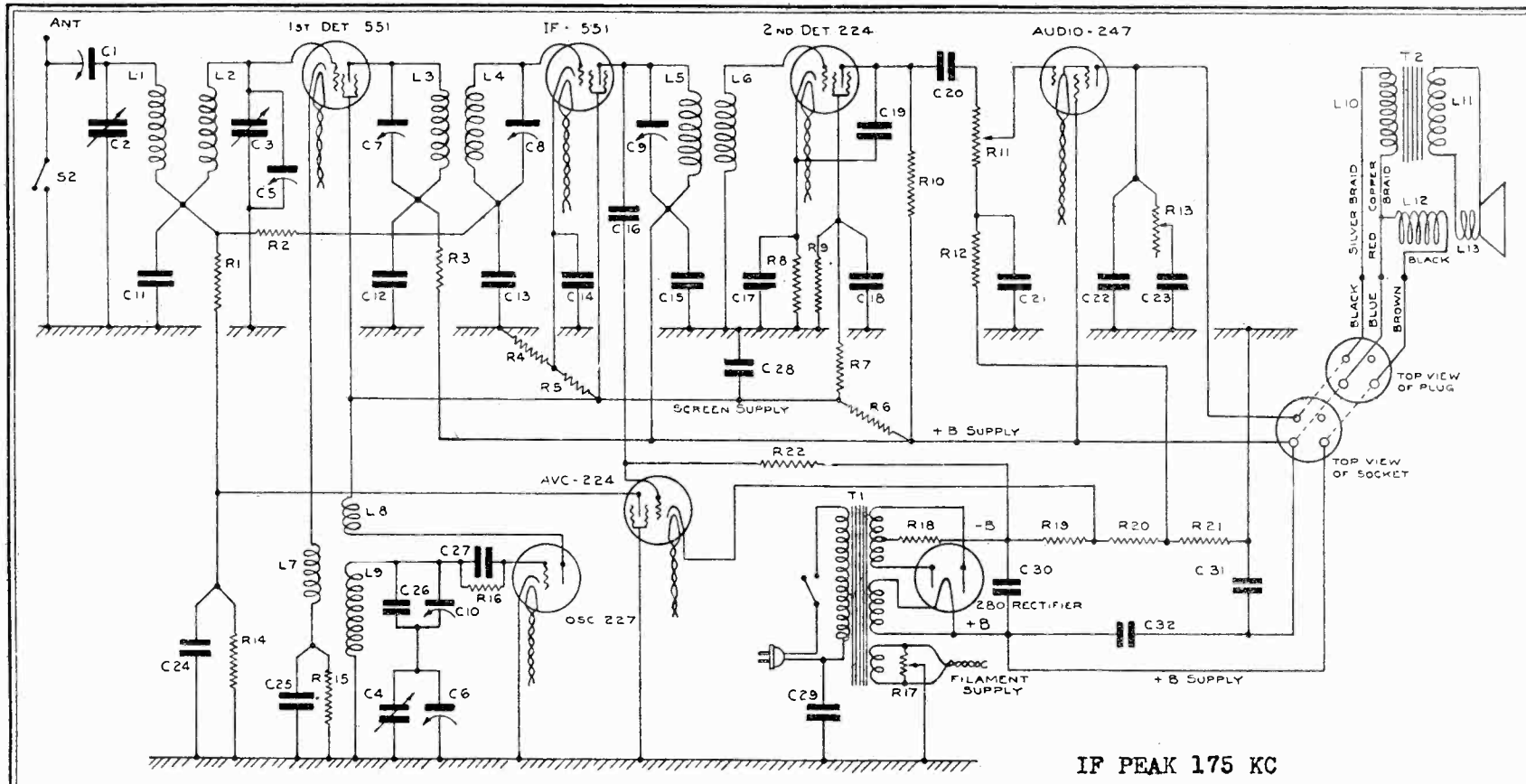
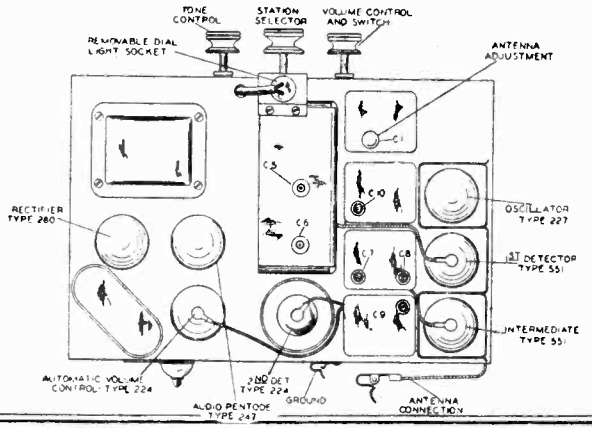


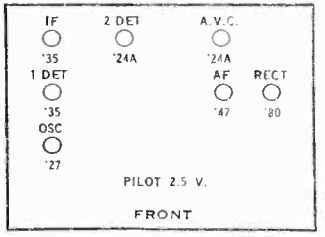
Fig. 2—Schematic Diagram — Model 91



LOCATION OF PARTS

R 9, R 11, R 13, R 17, C 11, C 19, C 22, C 23, C 28, C 32 on Chassis Base.
R 3, R 4, R 5, R 6, R 15, R 16, C 14, C 25, C 27 on Resistor Strip.
R 7, R 8, R 10, R 12, C 17, C 18, C 20, C 21 on Resistor Strip.
R 1, R 14, R 19, R 20, R 21, C 24, C 29 on Resistor Strip.
C 10, C 26, L 7, L 8, L 9 on Oscillator Coil Assembly.
R 2, C 7, C 8, C 12, C 13, L 3, L 4 on 1st IF Coil Assembly.
R 22, C 9, C 15, C 16, L 5, L 6 on 2nd IF Coil Assembly.
C 30, C 31 in Housed Filter Assembly.
C 1, C 2, C 3, C 4, C 5, C 6 on Main Tuning Condenser Gang.

Models 91, 92 (1932)



MODEL 100 Auto
Advertised 9-20
Data

UNITED AMERICAN BOSCH CORP.

MODEL 100 SUPERHETERODYNE MOTOR CAR RADIO

This is a seven tube, superneterodyne receiver with full automatic volume control, push-pull pentode output and electro dynamic speaker. The Magmotor, a source of "B" current, is supplied as an accessory.

TUBES are furnished with receiver as follows:

1 type 236, radio frequency amplifier.
1 type 237, oscillator.
1 type 236, first detector.
1 type 236, intermediate frequency amplifier.
2 type 238, as push-pull audio amplifiers.
1 type 238, diode triode which functions as a second detector, and audio-amplifier, and with its related circuit, furnishes voltage for automatic volume control.

The type 238 tubes used in the last three positions named above, are pentode power output tubes. All of the tubes used in this receiver are designed especially for automobile use to withstand the vibration and heater voltage fluctuation to which they are subjected.

CHASSIS contains the tubes, tuning condensers and elements of the electrical circuit. (See circuit diagram). It is enclosed in a metal box provided with mounting hooks for easy attachment to a MOUNTING PLATE designed to be mounted either side of the bulkhead. Shielding is complete and internal filtering is so arranged that a minimum of engine interference obtains. Speaker, battery box, control head and plate antenna, find easy attachment to the chassis through cable plug connections inserted on the under side of chassis.

CONTROL UNIT fastens to the steering column and regulates the station selection and volume level. Cable is connected internally with plug for chassis connection.

FLEXIBLE SHAFT connects control unit and chassis drive. It consists of three layers of five strands of wire wound in alternate directions, enclosed in flexible tube: provides accurate tuning unaffected by excessive vibration.

LOUD SPEAKER of electro dynamic type consumes 1¼ amperes from storage battery. Cable is connected internally with plug for chassis connection.

MAGMOTOR using permanet magnet field delivers 40 M. A. of plate current at 160 volts (at the tubes) with an "A" battery drain of 2 amperes. Self-enclosed with filtering to eliminate brush interference. Cable connected internally with plug for chassis connection.

IGNITION SUPPRESSION is accomplished through use of 9 resistors in ignition circuits and grouning of cable shields.

BATTERY BOX of heavy weather proof steel, for optional use to contain 3 special Heavy Duty automobile type "B" batteries. Battery box hangs from floor boards of car, access from the top. Cable furnished with plug for chassis connection.

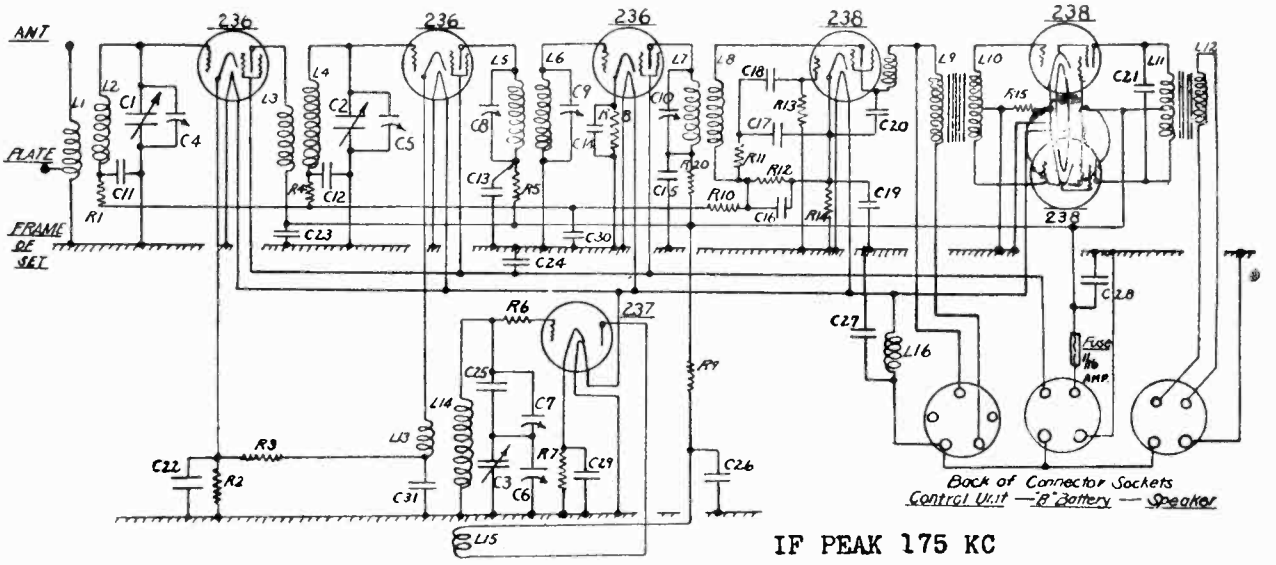
PLATE ANTENNA for optional use when there is no roof antenna in car: clamps to frame of car with hardened set screws. Step down transformer fastened to bracket; cable attached to plate with plug for chassis connection.

"B" Battery Cable

- B-	Black
+67½ B	White
+135 B	Red

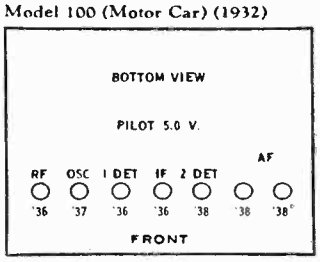
UNITED AMERICAN BOSCH CORP

MODEL 100 Auto
Advertised 9-20
Schematic
Values



IF PEAK 175 KC

Model 100 (Motor Car) (1932)



Stage	Tube	Fil.	Cathode	Grid	Screen	Plate	MA
RF	236	5.8	5	10	60	130	1
Osc	237	5.8	30	80	—	130	5
1st Det	236	5.8	90	5	55	120	1
IF	236	5.8	20	25	60	130	1.5
2nd Det	238	5.8	50	1	120	*1	*6
Audio	238	5.8	12	12	135	130	10
Audio	238	5.8	12	12	135	130	10

Note: The values in the table are only approximate, due to unavoidable differences in tubes

Symbols and Electrical Values

R1 —10,000 ohms
R2 — 3,000 ohms
R3 — 5,000 ohms
R4 —10,000 ohms
R5 — 1,000 ohms
R6 — 1,000 ohms
R7 — 3,000 ohms
R8 — 1,500 ohms
R9 — 5,000 ohms
R10— .5 megohm
R11—100,000 ohms
R12— .5 megohm
R13— .1 megohm
R14— 2,000 ohms
R15— 1,500 ohms
R16— 1,000 ohms

C1, C2, C3, C4, C5, C6 — Condenser Gang with Alignment Condensers
C7 —100 to 200 mmf.
C8 — 75 to 140 mmf.
C9 — 75 to 140 mmf.
C10— 75 to 140 mmf.
C11— .05 mfd.
C12— .05 mfd.
C13— .05 mfd.
C14— .05 mfd.
C15— .05 mfd.
C16— .00025 mfd.
C17— .0001 mfd.
C18— .01 mfd.
C19— .5 mfd.
C20— .0011 mfd.
C21— .004 mfd.
C22— .05 mfd.
C23— .05 mfd.
C24— .25 mfd.
C25—1100 mmf.
C26— .05 mfd.
C27— .25 mfd.
C28— .25 mfd.
C29— .05 mfd.
C30— .25 mfd.
C31— .05 mfd.

L1, L2, L3, L4 — Antenna Coil, Radio Frequency Coil
L5, L6 — Intermediate Coil
L7, L8 — Intermediate Coil
L9, L10 — Audio Input Transformer
L11, L12 — Audio Output Transformer
L13, L14, L15 — Oscillator Coil
L16—Filter

C1	75 to 140 mmf	Antenna Series Condenser
C2	7 to 70 mmf	Antenna Shunt Condenser
C3	75 to 140 mmf	Tuning Condenser (1st. Det.)
C4	75 to 140 mmf	Tuning Condenser (I.F.)
C5	75 to 140 mmf	Tuning Condenser (I.F.)
C6	75 to 140 mmf	Tuning Condenser (2nd Det.)
C7	100 to 280 mmf	Oscillator Tuning Condenser
C8	.05 mfd	By-pass Condenser (RF)
C9	.05 mfd	By-pass Condenser (RF)
C10	.05 mfd	By-pass Condenser (RF)
C11	.05 mfd	By-pass Condenser (1st. Det.)
C12	.05 mfd	By-pass condenser (1st. Det.)
C13	.05 mfd	By-pass Condenser (IF)
C14	.05 mfd	By-pass Condenser (IF)
C15	.25 mfd	By-pass Condenser (2nd. Det.)
C16	.25 mfd	By-pass Condenser (2nd Det.)
C17	.00025 mfd	By-pass Condenser (2nd Det.)
C18	.00025 mfd	By-pass Condenser (2nd Det.)
C19	.006 mfd	Audio Condenser
C20	.05 mfd	Audio Condenser
C21	.5 mfd	Audio Blocking Condenser
C22	.25 mfd	Heater By-pass Condenser
C23	.25 mfd	Screen By-pass condenser
C24	.0001 mfd	AVC Condenser
C25	.05 mfd	By-pass Condenser (1st. Det.)
C26	.05 mfd	By-pass Condenser (Osc.)
C27	.05 mfd	By-pass Condenser (Osc.)
C28	.25 mfd	By-pass Condenser (AVC)
C29	.25 mfd	By-pass Condenser (AVC)

R1	10,000 ohms	Grid Resistor (RF)
R2	10,000 ohms	Grid Resistor (1st. Det.)
R3	1,000 ohms	Plate Resistor (1st. Det.)
R4	1,000 ohms	Cathode Resistor (IF)
R5	1 megohm	Cathode Resistor (2nd. Det.)
R6	500,000 ohms	Screen Resistor (2nd. Det.)
R7	500,000 ohms	Plate Resistor (2nd. Det.)
R8	1 megohm	Audio Grid Resistor
R9	100,000 ohms	Plate Resistor (2nd Det.)
R10	1,000 ohms	Cathode Resistor (RF)
R11	2 megohm	AVC Grid Resistor
R12	100,000 ohms	AVC Resistor
R13	500,000 ohms	AVC Plate Resistor
R14	1,000 ohms	Oscillator Plate Resistor
R15	2,000 ohms	Oscillator Cathode Resistor
R16	20,000 ohms	1st. Det. Cathode Resistor
R17	10,000 ohms	2nd. Det. Plate Resistor

ADJUSTMENT OF THE RECEIVER.

After the receiver has been installed it is necessary to adjust it to the frequency of the transmitting station. Even if the set has been shipped with the proper setting, a slight readjustment will be necessary. The procedure is the same in both cases.

The positions of the four alignment condensers which take care of the adjustment are shown on the installation drawing. The car should be in the vicinity of the transmitting station when the alignment is made, in order to assure adequate signal strength. Proceed as follows:

1 Switch the receiver "on" and turn the volume and sensitivity control to maximum position.

2. Adjust OSCILLATOR condenser until the signal is picked up, using a special screw driver with an insulated tip. (Such an American Bosch Service Tool #432).

3. Reduce the sensitivity control until the station can just be heard, and re-adjust the OSCILLATOR until the signal is loudest.

4. Reduce the sensitivity conrol until the station can just be heard and adjust the RF alignment for maximum volume. As the volume increases, reduce the sensitivity as far as possible. This permits a sharper adjustment to be made, as the ear is more sensitive to changes in volume when the signal is faint.

5. Screw the SERIES antenna condenser in as far as possible. Pay no attention to the signal while doing this.

6. Attempt to find a poition of the SHUNT condenser which will give maximum volume Always reduce the sensitivity control when increased response of the set results from the various adjustments which you are making.

7. If no position of te SHUNT condenser will give a point of maximum volume or "peak", unscrew it as far as possible and slowly unscrew the SERIES condenser until the adjustment is obtained. Endeavor to obtain this adjustment with the SERIES condenser screwed IN as far as possible.

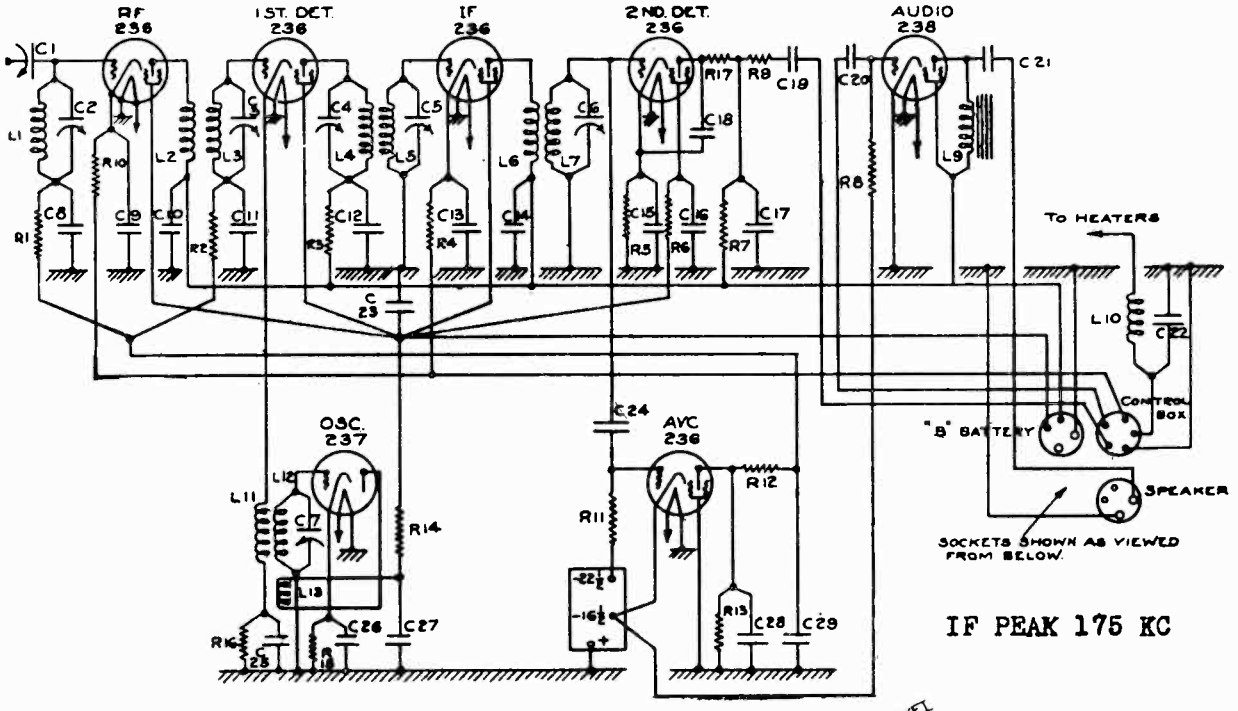
The relative position of the shunt condenser is unimportant.

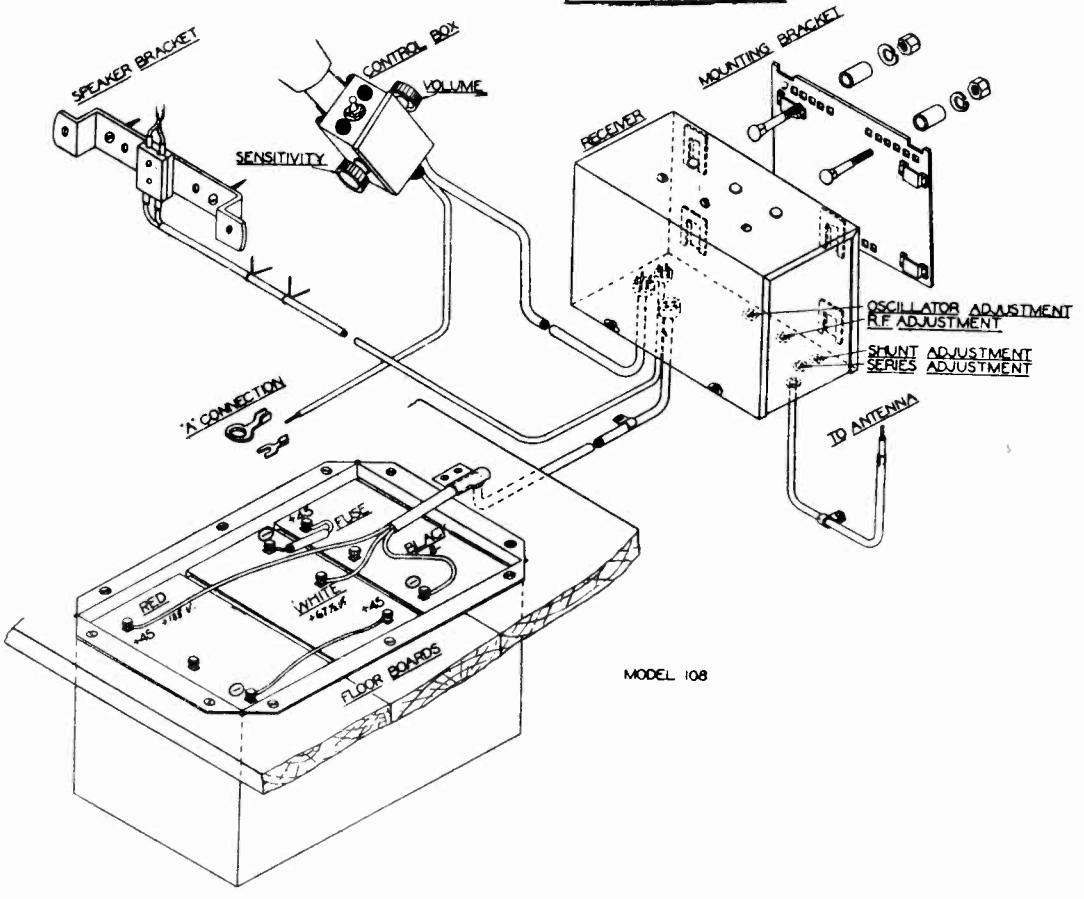
FUSES

A 1/16 ampere fuse is located in the B Battery jumper wire, as described under "B" Battery Cable". The "A" fuse is located in the control box and may be reached for replacement by simply removing the cover.

UNITED AMERICAN BOSCH CORP.

MODEL 108
Police Auto
Schematic





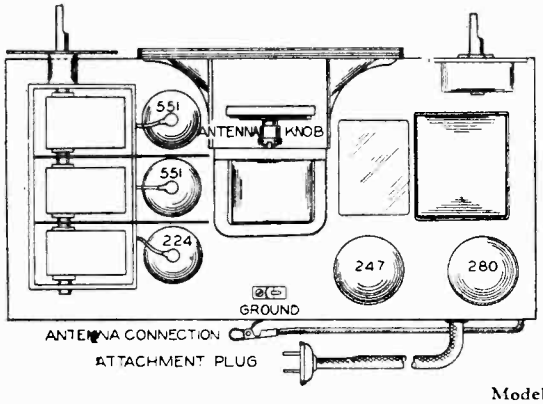
MODEL 205,206,5-A
205-A

UNITED AMERICAN BOSCH CORP.

Voltage - Data

STAGE	TUBE	FIL.	SOCKET VOLTAGES PLATE	SCREEN	CATHODE	GRID	PLATE MA.
1st RF	551	2.3	250	90	2.5	3.0	4.5
2nd RF	551	2.3	250	90	2.5	3.0	4.5
Det.	224	2.3	*150	*20	3.0	1.5	.5
Audio	247	2.3	250	250	--	*16	*32
Rect.	280	4.8		Plate current of each plate - 20			

The readings were made with the volume control in the full "on" position.
*These voltages are the correct values. The average test kit will give much lower readings, (as low as 1/10 of these values) due to the low resistance of the meters compared to the high resistance included in the detector plate and screen circuits and the audio grid circuit.

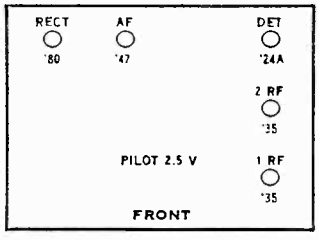


IMPORTANT

Antenna Adjustment: The small knob located on the loud speaker must be adjusted at the time of installation to obtain the best reception. Make this adjustment on a weak station which is received at some point near 30 on the dial and then re-check the adjustment at several other points to make sure that it has been accurately done.

Chassis: The chassis may be removed by pulling off the knobs and unscrewing the felt feet.

Model 5A, Edition 2 (1931)



RESISTOR COLOR CODE

200 ohms ------- Red ---- Black -- Brown	50,000 ohms ---- Green -- Black -- Orange
400 ohms ------- Yellow - Black -- Brown	100,000 ohms ---- Brown -- Black -- Yellow
10,000 ohms ---- Brown -- Black -- Orange	500,000 ohms ---- Green -- Black -- Yellow
15,000 ohms ---- Brown -- Green -- Orange	1 megohm -------- Brown -- Black -- Green
20,000 ohms ---- Red ---- Black -- Orange	2 megohms ------- Red ---- Black -- Green

TEMPORARY CONDENSED SERVICE PARTS LIST FOR TYPE R.S. 205 RADIO RECEIVER

MAIN ASSEMBLIES
103655 Chassis (with tubes)
102280 Speaker
103878 Cabinet with plates

COILS
101858 Field coil (speaker)
102438 R. F. coil complete
102243 R. F. primary coil
102439 Antenna coil

CONDENSERS
102178 By-pass assembly
102022 Antenna trimmer
101143 Fixed (.0001 mfd.)
101881 Large filter cond.
103695 Cond. (.01 mfd-4ply)
100705 Cond. (.006 mfd.)

KNOBS
102445 Volume and tuning knobs
100929 Trimmer cond. knob

MISCELLANEOUS PARTS
101895 Dial with scale
102282 Diaphragn for speaker
98713 Lamp for dial

RESISTORS
102342 Volume control & switch
102437 Volume control only
102314 Resistor (200 ohms)
102177 Resistor (400 ohms)
100825 Resistor (10,000 ohms)
101404 Resistor (15,000 ohms)
100813 Resistor (20,000 ohms)
100512 Resistor (50,000 ohms)
100727 Resistor (100,000 ohms)
100194 Resistor (1/2 megohm)
100815 Resistor (1 megohm)
100196 Resistor (2 megohms)
99412 Mid tap resistance

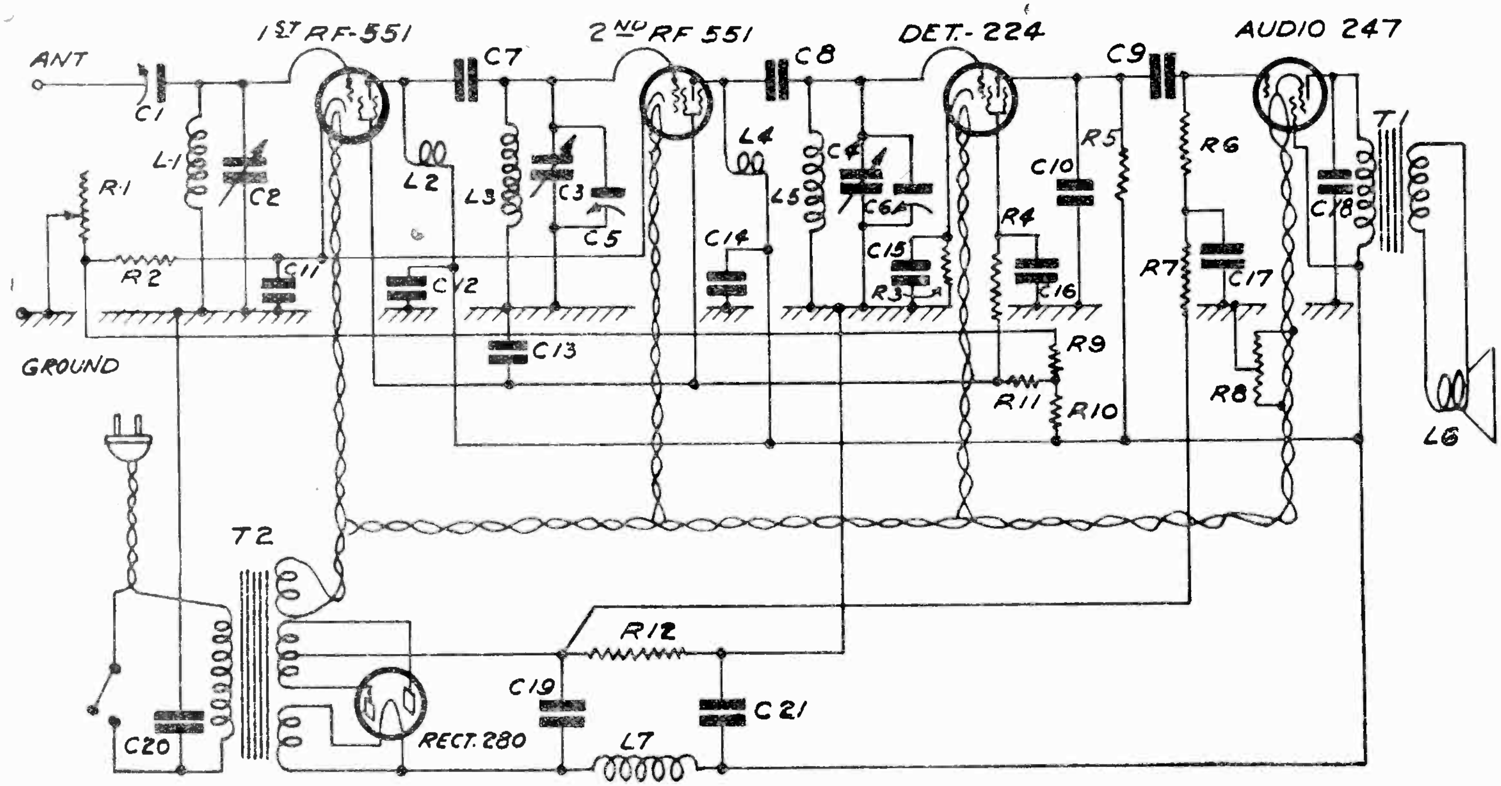
SOCKETS
101890 Dial light socket
102447 Tube socket for '24 tube
102449 Tube socket for '80 tube
102446 Tube socket for '47 tube
102448 Tube socket for '51 tube

SWITCH
101930 Switch with (2) nuts

TRANSFORMER
102551 Output transformer
101939 Power transformer

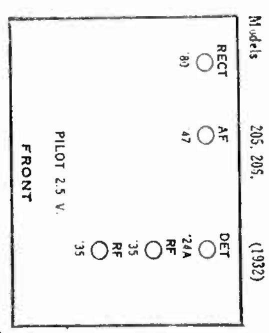
UNITED AMERICAN BOSCH CORP.

MODEL 205, 206, 5-A
205-A
Schematic - Data



ELECTRICAL VALUES

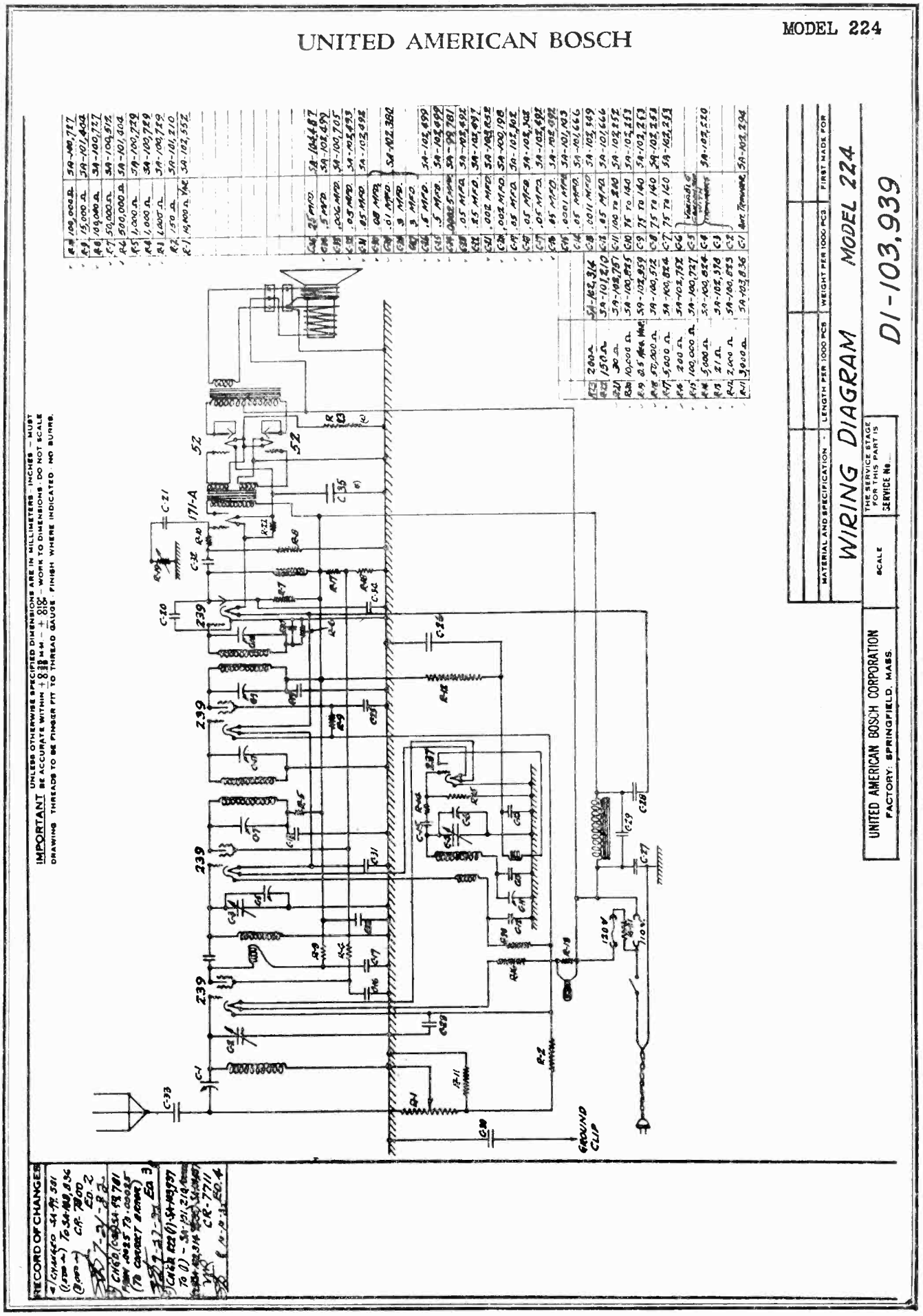
R1 - 10,000 ohms	R11 - 10,000 ohms	C9 - .006 mfd.	C19 - 8. mfd.
R2 - 200 ohms	R12 - 400 ohms	C10 - .0001 mfd.	C20 - .01 mfd.
R3 - 50,000 ohms	C1 - Trimmer	C11 - .05 mfd.	C21 - 4 mfd.
R4 - 2 megohms	C2 - Tuning	C12 - .05 mfd.	L1 - Ant. Coil
R5 - 1 megohm	C3 - Tuning	C13 - .25 mfd.	L2 - Primary
R6 - 500,000 ohms	C4 - Tuning	C14 - .01 mfd.	L3 - Secondary
R7 - 100,000 ohms	C5 - Alignment	C15 - 1. mfd.	L4 - Primary
R8 - Center Tap	C6 - Alignment	C16 - .25 mfd.	L5 - Secondary
R9 - 20,000 ohms	C7 - Coupling	C17 - .05 mfd.	L6 - Voice Coil
R10 - 15,000 ohms	C8 - Coupling	C18 - .01 mfd.	L7 - Field Coil



Note: Electrolytic filter condensers C19 and C21 are a single assembly. Condensers C11 to C18 inclusive are also a single assembly contained in the square can underneath the base plate.

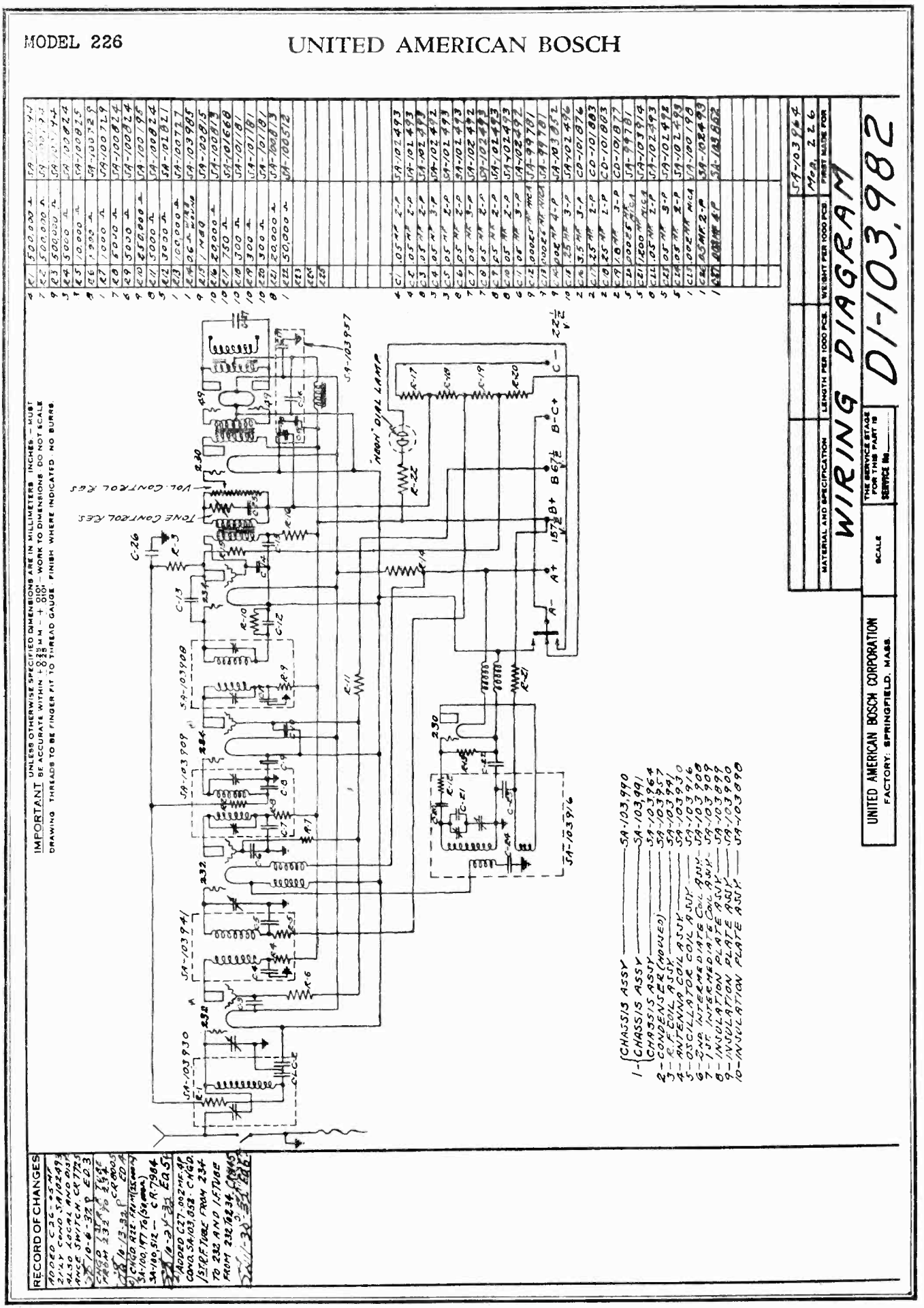
UNITED AMERICAN BOSCH

MODEL 224



MODEL 226

UNITED AMERICAN BOSCH



MODEL 312,313
Adjustments

UNITED AMERICAN BOSCH CORP.

TEST OF SENSITIVITY ON MODEL #312

NOTE While making adjustments on chassis make sure that the signal does not overload any of the tubes, otherwise incorrect adjustment will result.

I. F. ADJUSTMENT

a. Set volume control on max. tone control on treble and ground antenna lead.
b. Connect the 175 Kc. I.F. signal generator to the grid of the 1st. det.
c. Align secondary of 3rd I.F. transformer for max. output.
d. With the losser on the grid of the 2nd I.F. tube, adjust condenser on primary (front one) of 2nd I.F. coil. (e) Holding the losser on the plate side of 2nd I.F. coil, adjust the condenser on secondary (rear one) of 2nd I.F. coil.
f. With the losser on the grid of the 1st I.F. coil, adjust the condenser on secondary (front one) of 1st I.F. coil. (g) Holding the losser on the plate side of the 1st I.F. coil, adjust the condenser on secondary (rear one) of 1st. I.F. coil.
h. Check sensitivity of I.F. Sensitivity limits are 200 mv. on 1st. det. grid. 700 - 312 on 1st I.F. grid. 18,000 on 2nd I.F. grid.

OSCILLATOR ADJUSTMENT

a. Adjust pointer to mark past 550 Kc. (b) Connect ant. lead of the R.F. signal generator to grid of 1st. det. (c) Set the microvolter dial at 1400 Kc.
d. Adjust oscillator alignment condenser until max. output is obtained.
NOTE When adjusting the oscillator 2 peaks may be obtained. Set the align. condenser down tight; turn to the right, one peak at (1575 Kc.) will be noted about ½ of a turn out. Set on the (1575 Kc.) peak, otherwise the oscillator will not track in the center of the scale. (e) Connect ant. lead to microvolter. DO NOT TOUCH OSCILLATOR CONDENSER.
f. Adjust antenna, R.F. and detector alignment condensers for max. output.
g. Set the signal generator dial to 600 Kc. and pointer of the chassis to 600.
h. Adjust the condenser on the oscillator coil (on side of chassis) until max. output is obtained and note sensitivity.
NOTE Disregard the pointer reading entirely during this adjustment. This is best obtained by adjusting the trimmer, retune & noting the output, then readjust & retuning until maximum output is obtained.

R. F. ADJUSTMENT

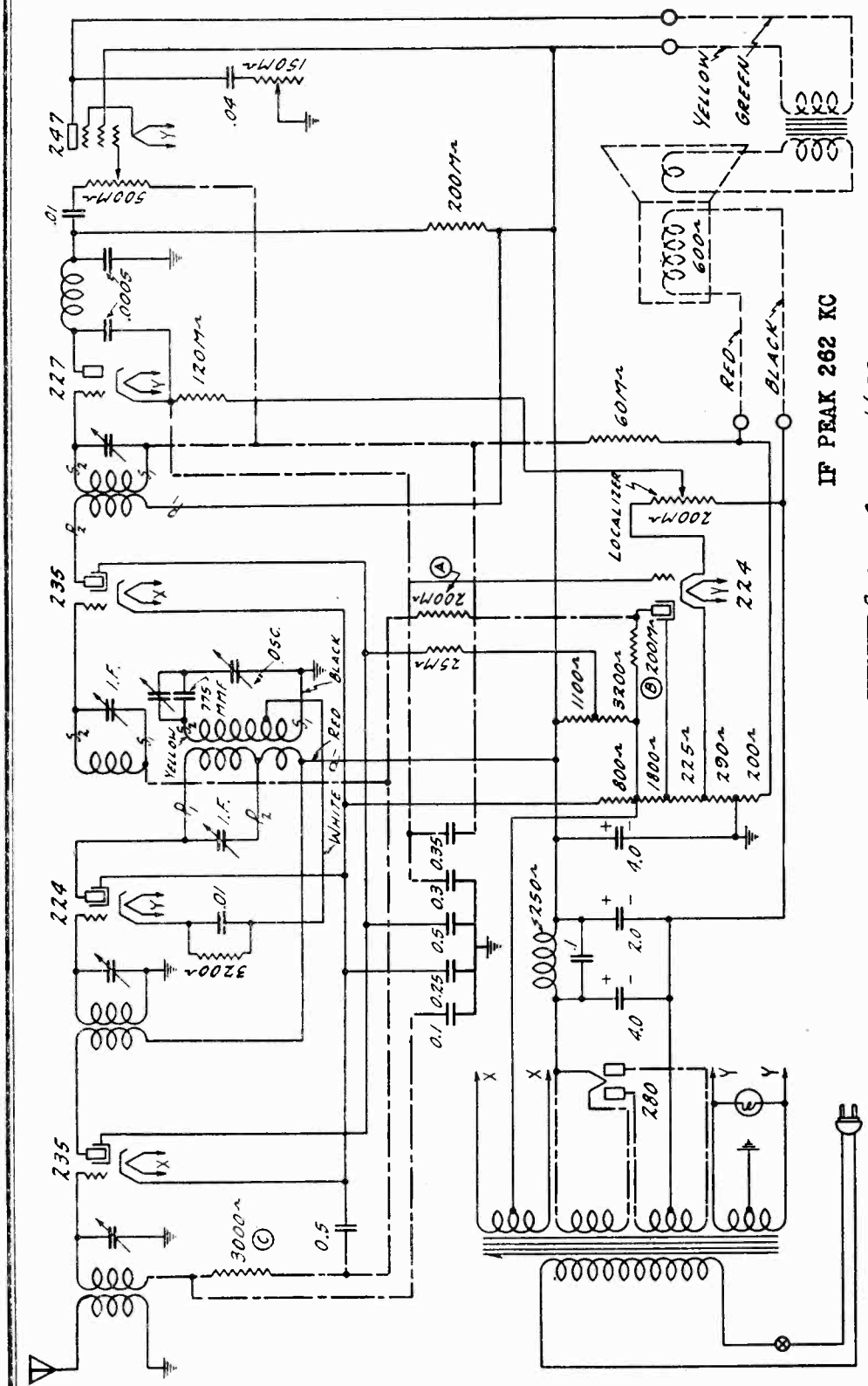
a. Set the dials at 1400 Kc. and readjust all trimmers peaking oscillator condenser first; note sensitivity at 1400, 1000, 700, 550.
limits are 7 3 3 5.
b. Check switch, volume control action and tone control. (c) Check power output. Should be 5 volts. (d) Check for hum, note any distortion while making tests.
e. Check A.V.C. action by tuning meter. Should A.V.C. at 40 mv.
f. Tap the 2nd. det. tube & check noise. (g) Check relay at 954 Kc. with control at maximum. It should release at 300 mv.

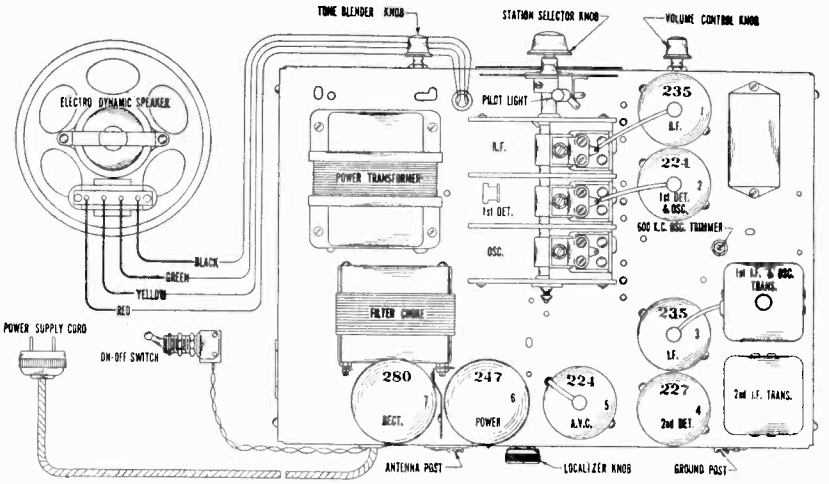
AIR TEST

a. Connect ant. lead to outdoor ant. (b) Check for tone quality and carrier hum
c. Check for selectivity & stability. (d) Check vol. control action & switch. (e) Check for power output. Should be ___ volts 10 watts. (f) Check for noise with ant. grounded.

U. S. RADIO & TELEVISION CORP.

MODEL 7
Schematic





—Top View of No. 7 Chassis showing Tube Sequence and Speaker Connections

No. 7 CHASSIS—VOLTAGES AT SOCKETS—LINE VOLTAGE 115

VOLUME CONTROL AT MAXIMUM—LOCALIZER AT NORMAL SETTING

Type of Tube	*Position of Tube*	*Function*	*Across Filament or Heater*	*Plate to Cathode*	*Grid to Cathode*	*Screen to Cathode*	*Screen MA*	*Cathode to Heater*	*Plate MA*	*Grid Test MA*
235	1	R.F.	2.35	150	4.5(1)	70(2)	.9	4.5	2.7	4.2
224	2	1st Det. & Osc.	2.35	240	6.4	93	.3	6.4	1.8	2.6
235	3	I.F.	2.35	150	4.5(1)	70(2)	.9	4.5	2.7	4.2
227	4	2nd Det.	2.35	150	12–24(3)			0–10(3)	.2–5(3)	21–51(3)
224	5	A.V.C.	2.35	60	0–15(3)	9	0 (4)	12	0 (4)	0 (4)
247	6	Power	2.35	220	16 (5)	240	6.4		34	40
280	7	Rect.	4.9						39 Per Plate	

(1) This voltage read across 800 ohm resistor.
(2) Voltage as read with 600,000 ohm meter.
(3) Varies with setting of localizer. Voltages read with high resistance meter.
(4) Current zero with no signal and localizer at normal position.
(5) The voltage read across 200 ohm section of voltage divider.

SETTING THE LOCALIZER.

Turn the localizer knob cpunterclockwise as far as it will go. Then turn the knob one quarter turn clockwise. Next tune in a fairly strong signal and reduce the volume by means of the volume control knob on the front panel. Then turn the localizer knob to the extreme clockwise position. This will cause plate current cutoff in the RF and IF tubes. Then turn the knob slowly in a counter-clockwise direction until the signal is again heard. With a slight additional turn in the same direction the signal builds up sharply to full strength and this is the correct position of the localizer setting. This adjustment should not be changed unless the set is reinstalled or the tubes are changed. Incorrect adjustment of this knob will control the action of the AVC tube in such fashion that the automatic action will commence too soon or too late.

Condenser Alignment

Aligning Intermediate Condensers—First align the intermediate condensers. A non-metallic screw driver is preferable for this. Adjust the signal generator for a signal of 262 K.C. The Localizer knob should be at the normal position as explained in the section on this control or else it may be turned to the extreme counter-clockwise position. One of the best ways of reading the output is by means of a rectifier type meter. This meter, if of low range, is connected across the secondary of the output transformer in the speaker. If it is of a high range, it may be connected across the primary of the transformer in series with a large condenser to prevent the flow of D.C. plate current through the meter. In either method of connection, opening the voice coil of the speaker will give a better deflection on the output meter.

Remove the grid cap from the grid connection of the 224 1st detector tube and connect the lead from the signal generator to the grid of the 224 1st detector. The tube shield should be on and the chassis grounded. One way to make this connection is to bring the antenna lead from the signal generator through the place in the shield through which the grid wire passes. A grid cap on the end of the antenna lead of the signal generator will facilitate making this connection. This lead, of course, should be insulated. Another way of making this connection is to cut a hole of about 1" diameter in a No. 7 chassis tube shield over the 1st detector tube. The signal generator lead can then be passed through this hole to the grid connection of the 224 tube. Connect the ground lead of the signal generator to the ground post of the chassis.

The oscillator coil must be shorted out by grounding the lead from the tap on the secondary. This can be done conveniently by connecting a jumper from ground to the lug on the 3,200 ohm resistor at the end which connects to the oscillator.

The intermediate condenser adjusting screws are reached from the bottom of the chassis. There are two on the porcelain base of the oscillator and 1st I.F. transformer assembly, Part No. 3571 and one on the porcelain base of the 2nd I.F. transformer assembly, Part No. 3644. The volume control should be at maximum setting. Attenuate the signal from the signal generator until the output is 75 volts or less in order to prevent any action of the A.V.C. Then adjust the three intermediate condenser screws until maximum output is obtained on the output meter, keeping the output at 75 volts or less. After all three have been adjusted the first time, go over them again and check the setting for maximum output.

Aligning R.F. and Oscillator Condensers—For adjusting the R.F. and oscillator condensers the signal input from the signal generator should be made to the antenna post. Adjust the signal generator for a signal of exactly 1400 K.C. Then turn the tuning condenser rotor until the pointer is at exactly 1400 on the dial scale. Then adjust the three trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first (trimmer nearest back of chassis). Turn the screws up or down until greatest deflection on output indicating meter is obtained. Keep the output below 75 volts as explained above.

The next step is to adjust the oscillator 600 K.C. trimmer condenser. The adjusting screw for this condenser is reached from the top of the chassis and is located just in front and to the side of the 1st I.F. and oscillator assembly. Adjust the signal generator for a signal of 600 K.C. and turn the tuning condenser rotor until the output is at maximum. To correctly adjust this oscillator 600 K.C. trimmer it will be necessary to turn the screw to several different positions, using a nonmetallic screw driver preferably. At every position of this adjusting screw turn the tuning condenser rotor until maximum output is obtained. For each position of the adjusting screw there will be a maximum output and the correct position of the adjusting screw is the setting at which the deflection on output indicating meter is the greatest.

Next set the signal generator again for a 1400 K.C. signal and check the adjustment of the tuning condenser trimmers at this frequency for maximum output. Then set the signal generator for a signal of 1000 K.C. and turn the tuning condenser rotor until the output indicating meter shows maximum deflection. Then bend the slotted rotor plate sections of the R.F. tuning condenser sections which are last in mesh, in or out until maximum output is obtained. In some instances it may be necessary to bend the oscillator condenser rotor plate sections also in order to get maximum output but this should be done only as the last resort as it tends to throw the dial calibration off. Tune in a signal at 750 K.C. and then at 600 K.C. and follow the same procedure bending the rotor plate sections last in mesh until maximum output is obtained. Do not change the setting of the oscillator 600 K.C. trimmer in any way after it has once been set as indicated above.

NOTE—In the No. 7 Receivers, starting approximately with Serial No. 1,074,054 the oscillator 600 K.C. trimmer is replaced by a condenser of fixed value and a different dial chart is used. The procedure for aligning the R.F. and oscillator condensers of these receivers is as follows:

Loosen the drive plate set screws and turn the tuning condenser rotor counterclockwise as far as it will go so that the rotor is completely in mesh. Turn the drive plate until the lowest frequency mark is directly under the dial pointer. Then lightly tighten one set screw.

Set the signal generator for a signal of 1400 K.C. and turn the drive plate until the 1400 K.C. mark is under the pointer. Adjust the three trimmer condensers at this frequency until maximum output is obtained, adjusting the oscillator trimmer first (trimmer nearest back of chassis).

Set the signal generator for a signal of 600 K.C. and tune the receiver exactly to this signal. Loosen the drive plate set screw and adjust dial pointer until it is at the 600 K.C. mark on the drive scale. Then tighten the drive plate set screw lightly.

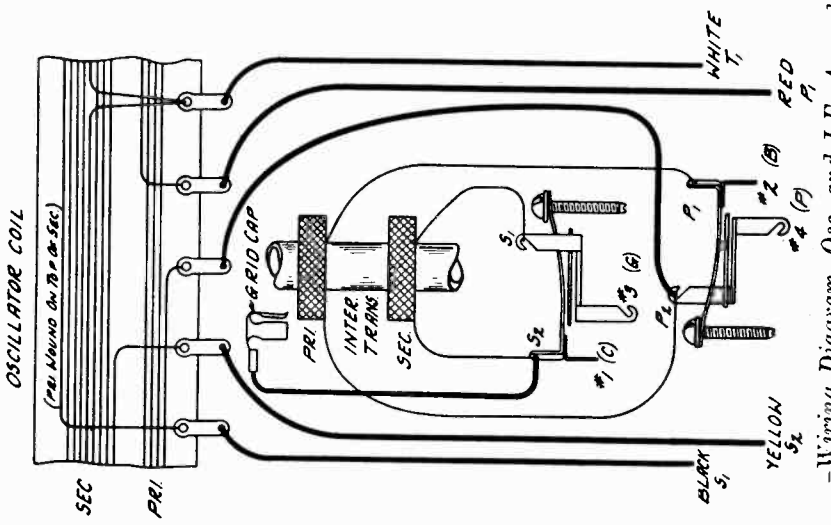
Set the signal generator again for a signal of 1400 K.C. and tune the receiver to this frequency. Readjust the trimmer condensers if necessary until the signal is received with maximum volume when the pointer is at 1400 on the dial chart.

Recheck the calibration at 600 K.C. for maximum output and if it is correct tighten both drive plate set screws firmly, care being taken that the rotor shaft does not slip.

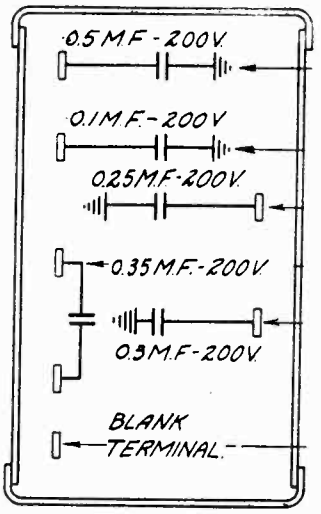
Then set the signal generator for signals of 1,000, 750 and 600 K.C. and check the two R.F. condensers for resonance. Bend the slotted rotor plate sections last in mesh of these two banks until maximum output is obtained.

U. S. RADIO & TELEVISION CORP.

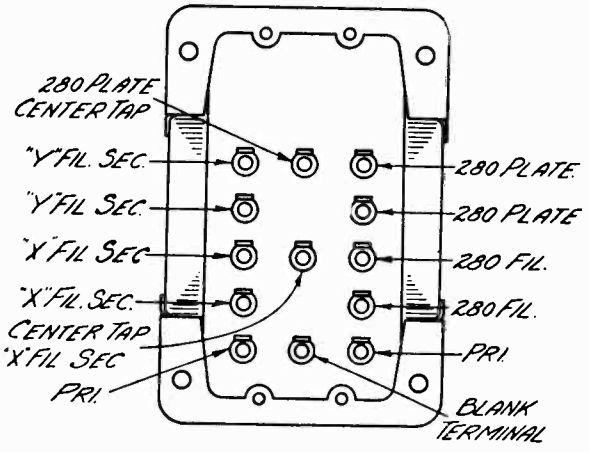
MODEL 7
Transformer
Data 25 cycle.



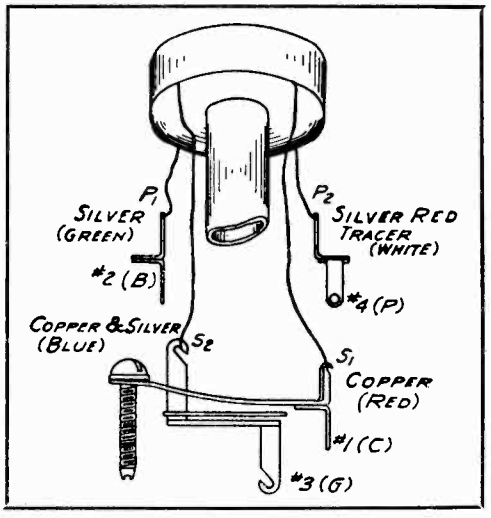
-Wiring Diagram, Osc. and I.F. Assembly



5 Section Condenser Internal Wiring



-Power Transformer Terminals



-Wiring Diagram, 2nd I.F. Assembly

No. 7X Chassis—25 Cycle, 115 Volt

Chassis No. 7X is almost identical in construction with chassis No. 7, except that it is designed for 25 cycle, 115 volt operation. All parts as used in the No. 7 chassis are used in the No. 7X chassis with the exception of the power transformer, .1 Mfd. choke tuning condenser and 2 Mfd. electrolytic filter condenser. These items are replaced by a 25 cycle power transformer, .35 Mfd. choke tuning condenser and a 4 Mfd. electrolytic filter condenser. All of these items for the 25 cycle receiver are shown in the parts list.

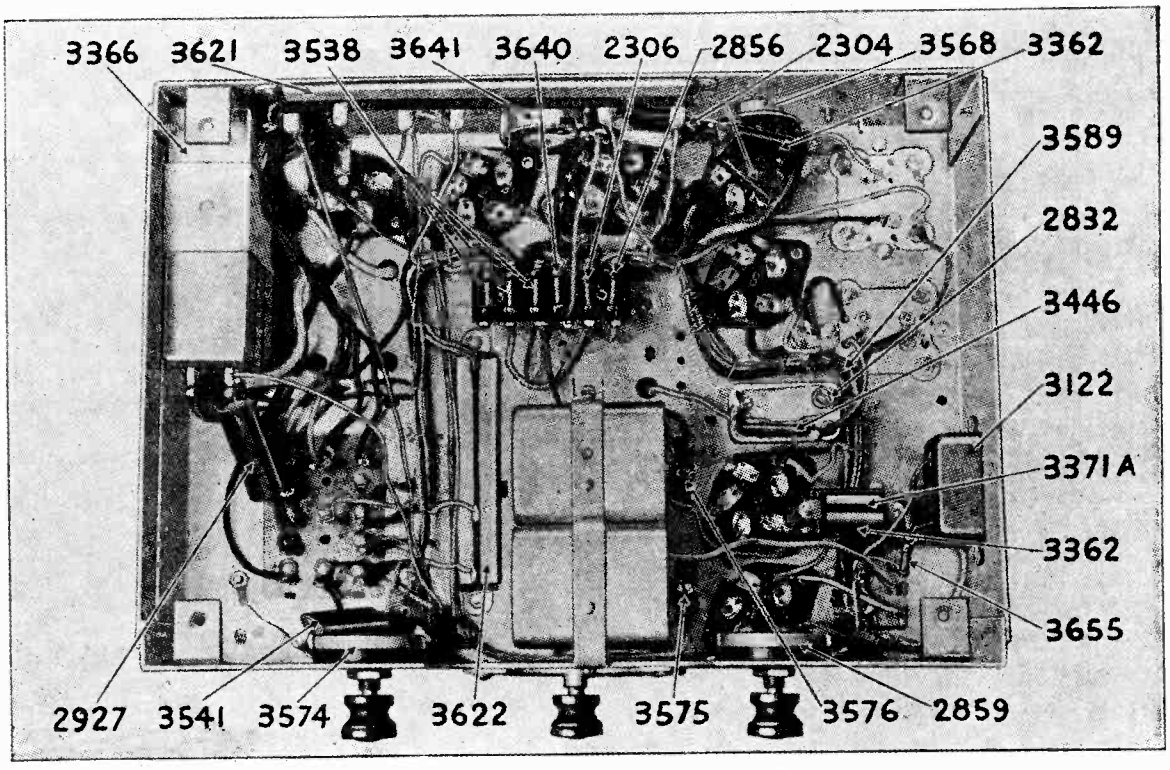
The description and testing as covered in the No. 7 Service Notes also applies to the No. 7X.

Referring to Fig. 1 it will be noted that in the 60 cycle, No. 7 chassis the filter choke is tuned with a .1 Mfd. condenser. The purpose of this condenser is to tune the choke so as to offer maximum opposition to the 120 cycle ripple component. In the No. 7X chassis a .35 Mfd. condenser is used to tune the choke so as to offer maximum opposition to the 50 cycle ripple component which is present when 25 cycle power is used. Also in the No. 7X chassis there are three 4 Mfd. filter condensers used, while the No. 7, 60 cycle chassis uses two 4 Mfd. units and one 2 Mfd. unit.

The No. 7X, 25 cycle chassis can be operated satisfactorily from a 60 cycle power supply. If there is excessive hum it will be necessary to remove the .35 choke condenser and replace it with a .1 Mfd. choke condenser, Part No. 2927. The reverse is not true, that is, the No. 7, 60 cycle receiver cannot be operated satisfactorily from a 25 cycle power supply.

MODEL 7
Chassis View
Parts List

U. S. RADIO & TELEVISION CORP.



-No. 7 Chassis, Bottom View

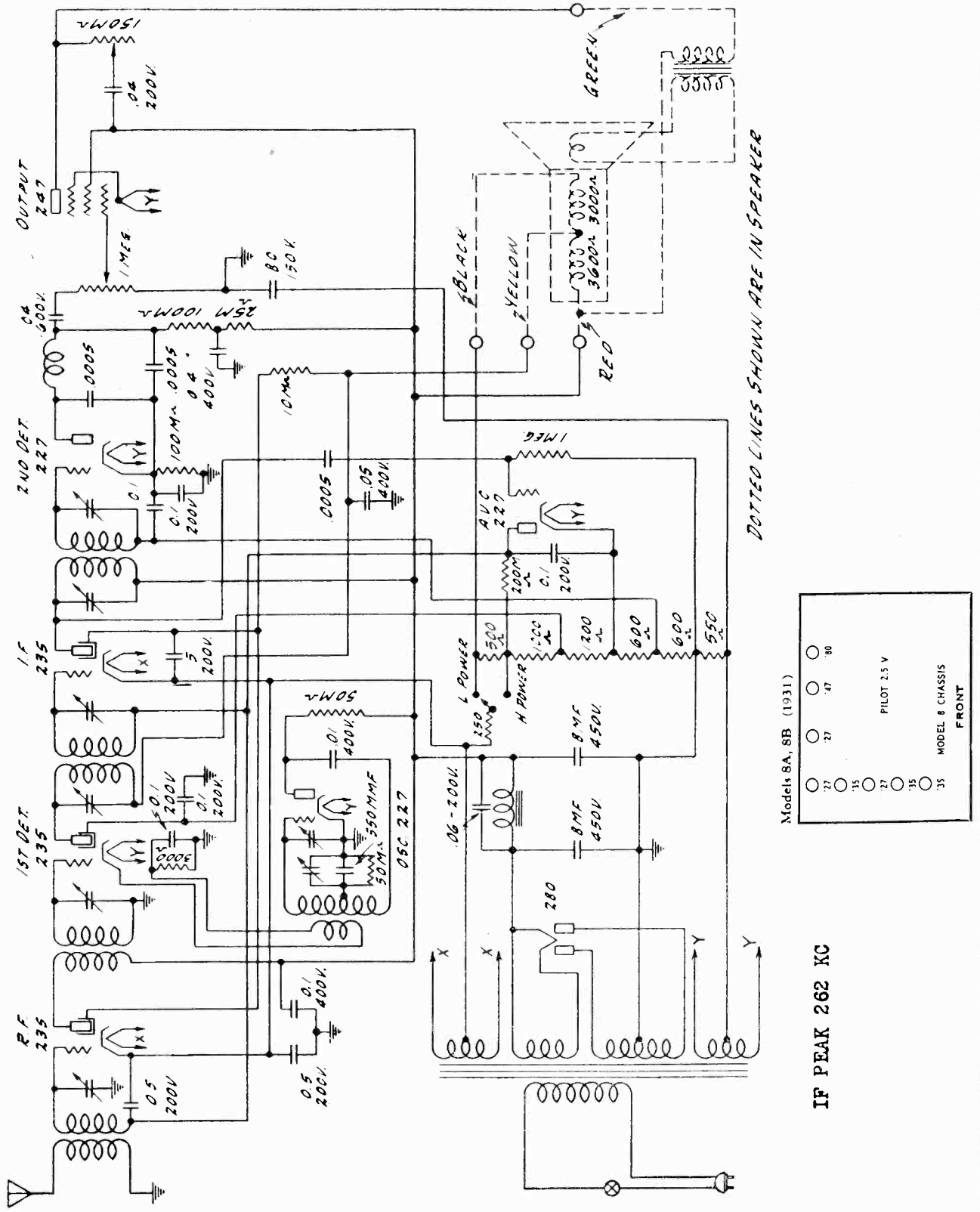
No. 7 CHASSIS REPLACEMENT PARTS

Parts orders must be accompanied by serial number and model number of chassis. Order through your distributor.

Part No.	*Description*	*No. Used in Set*	*List Price Each*
2304	.0005 Mfd. By-pass Condensers	2	$ .40
2832	Oscillator 600 K.C. Trimmer Condenser	1	.40
2927	.1 Mfd. Choke Condenser for 60 Cycle	1	.40
3683	.35 Mfd. Choke Condenser for 25 Cycle	1	.55
3122	.5 Mfd. By-pass Condenser	1	.70
3362	.01 Mfd. Coupling and By-pass Condensers	2	.30
3366	4 Mfd. Electrolytic Condenser Unit, 450 Volt	2	1.40
3529	2 Mfd. Electrolytic Condenser Unit, 450 Volt	1	1.10
3559	Clamp for Electrolytic Condenser Unit	1	.10
3446	775 Mmf. Oscillator Condenser	1	.45
3541	.04 Mfd. Tone Blender Condenser	1	.30
2306	60,000 Ohm Series Resistor, Carbon	1	.45
2856	25,000 Ohm Series Resistor, Carbon	1	.45
2859	Volume Control 0—500,000 Ohm	1	1.40
3574	Tone Blender 0—150,000 Ohm	1	1.40
3641	Localizer Resistor 0—200,000 Ohm	1	1.20
3371A	3,200 Ohm Biasing Resistor, Wire Wound	1	.40
3537	300,000 Ohm Plate Resistor, Carbon	1	.40
3538	200,000 Ohm Plate and Series Resistors, Carbon	3	.40
3621	3315 Ohm Voltage Divider Resistor, Wire Wound	1	1.10
3622	4300 Ohm Voltage Divider Resistor, Wire Wound	1	.70
3640	120,000 Ohm Bias Resistor, Carbon	1	.40
3655	3,000 Ohm R.F. Resistor, Carbon	1	.40
3575	Antenna Transformer (Sold in matched sets of two)	1	1.00
3576	1st Detector Transformer (Sold in matched sets of two)	1	.60
3562	Can for Antenna and 1st Detector Transformer	1	.65
E.P.	Escutcheon Plate (Specify Model No. of Receiver)	1	.75
3568	Detector Plate Choke Assembly complete	1	.60
3680	R.F. Choke Coil, 5 uh	1	.10
3589	Harness Cable	1	1.00

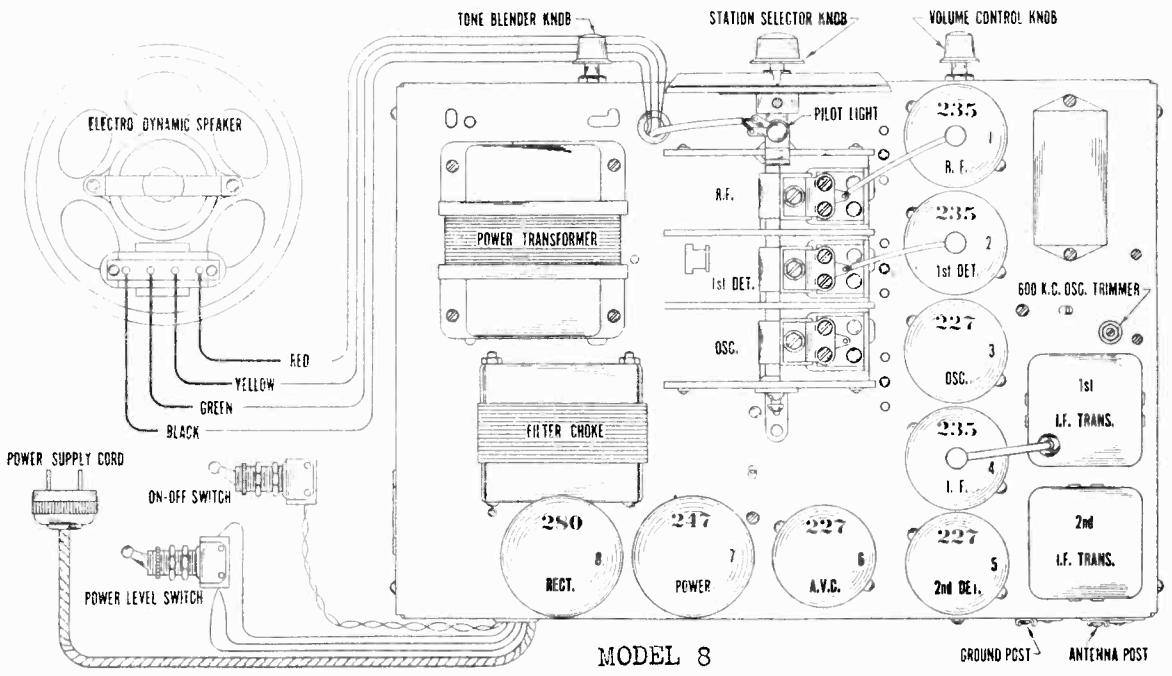
U. S. RADIO & TELEVISION CORP.

MODEL 8 Series
Schematic



MODEL 8 Series
Socket - Voltage
Condenser Data

U. S. RADIO & TELEVISION CORP.



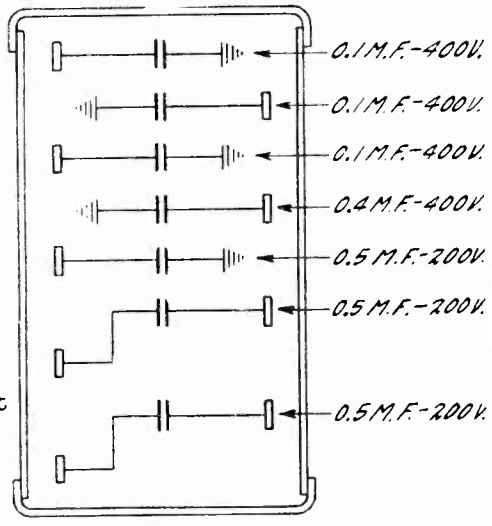
MODEL 8

Top View of Chassis Showing Tube Location and Speaker Connections

MODEL 8

Tube	A Volts	B Volts	V Volts	Scr. Volts	Plt. Crnt.
RF	2.3	190	2.3[1]	68.	3.8
1st Det	2.3	190	6.5	70.	2.0
Osc.	2.3	80	15-50[2]		4.7
IF	2.3	190	2.3[1]	68.	3.6
2nd Det	2.3	150	20.		.4
AVC	2.3	65[3]	40. [1]		0.
Power	2.35	260	20 [5]	280.	32.
Rect.	5.				41. [6]

[1] Across 250 ohm series resistor
[2] Governed by setting of tuning condenser
[3] Across 1000 and 1200 ohm sections of shunt resist
[4] Across two 600 ohm sections of shunt resistor
[5] Across 550 ohm series resistor
[6] Per Anode.

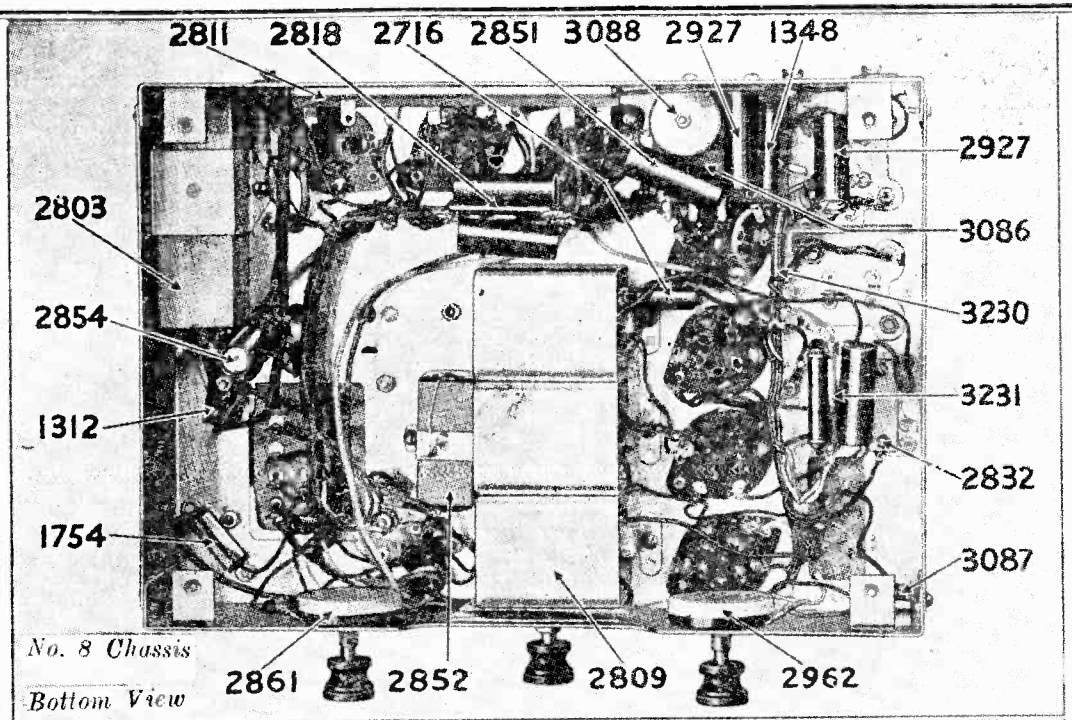


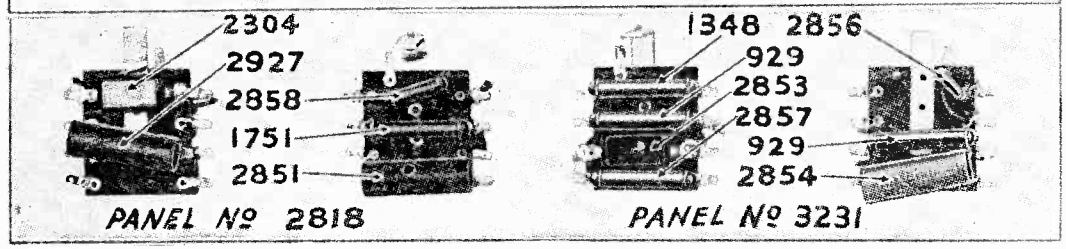
The No. 8X chassis is the same as the No. 8 except that it is intended for use on 25 cycle lines. The major difference is found in the power transformer and in the use of an untuned filter system. The.06 mfd condenser shown in the model 8 schematic connected across the filter choke is not employed in 8X. The 8X chassis may be used on a 60 cycle line. If the hum is bad, add the .06 mfd condenser.

For special service data see Heterodyne and Motorboating notes and RF, Oscillator and IF trimmer condenser data

NO. 8 CHASSIS. REPLACEMENT PARTS

Part No.	Description
929	50,000 Ohm Bias and Series Resistors, Carbon
1348	100,000 Ohm Bias and Series Resistors, Carbon
1751	200,000 Ohm Series Resistor, Carbon
1754	250 Ohm Bias Resistor, Wire Wound
2811	4450 Ohm Voltage Divider Resistor
2856	25,000 Ohm Series Resistor, Carbon
2857	10,000 Ohm Series Resistor, Carbon
2858	1 Megohm Grid Resistor, Carbon
2861	Tone Blender 0—150,000 Ohm
2962	Volume Control 0—1 Megohm
3087	3,000 Ohm Bias Resistor, Wire Wound
2304	.0005 Mfd. Coupling and By-Pass Condensers
2716	.01 Mfd. Oscillator Condenser
2803	8 Mfd. Electrolytic Condenser Unit, 450 Volts
2810	Clamp for 2803 Electrolytic Condenser Units
2852	8 Mfd. Electrolytic Condenser Unit, 150 Volts
2849	Clamp for 2852 Electrolytic Condenser Unit
2808	7-Section Condenser Block
2832	Oscillator 600 K.C. Trimmer Condenser
2851	.04 Mfd. Coupling and By-pass Condensers
2853	550 Mfd. Oscillator Condenser
2854	.06 Mfd. Choke and By-Pass Condensers
2923	3-Gang Variable Condenser Assembly Complete Less Drive
2927	.1 Mfd. By-pass Condensers
115	Pilot Light Lamp, 2.5 Volts
2946	Pilot Light Bracket with Leads
861	Attachment Cord and Plug
678	Ground Binding Post
2333	Antenna Binding Post Assembly
701	Tube Socket—280
703	Tube Socket—227
2757	Tube Socket—247
2805	Tube Socket—235
1312	Terminal Insulator
1436	On-Off Escutcheon Plate
2948	Power Level Escutcheon Plate
2881	Escutcheon Plate
2813	Antenna Transformer — Sold In Matched Sets of Three
2814	1st Detector Transformer — Sold In Matched Sets of Three
2815	Oscillator Transformer — Sold In Matched Sets of Three
2809	R.F. Transformer Shield Can
2824	Tube Shield
2879	Tube Shield Wing Nuts
2783	Power Transformer, 60 Cycle, 115 Volt
3084	Power Transformer, 25 Cycle, 115 Volt
2830	1st Intermediate Assembly Complete with Can
2831	2nd Intermediate Assembly Complete with Can
2842	Adjusting Screw for Intermediate Condenser
2850	Special Hex Nut for Intermediate Condenser
2392	On-Off Switch and Leads
2936	Power Level Switch and Leads
2883	Drive Assembly Complete with Dial Chart
2902	Dial Chart Assembly
2895	Pointer Tension Spring for Drive
2847	Chassis End Plates



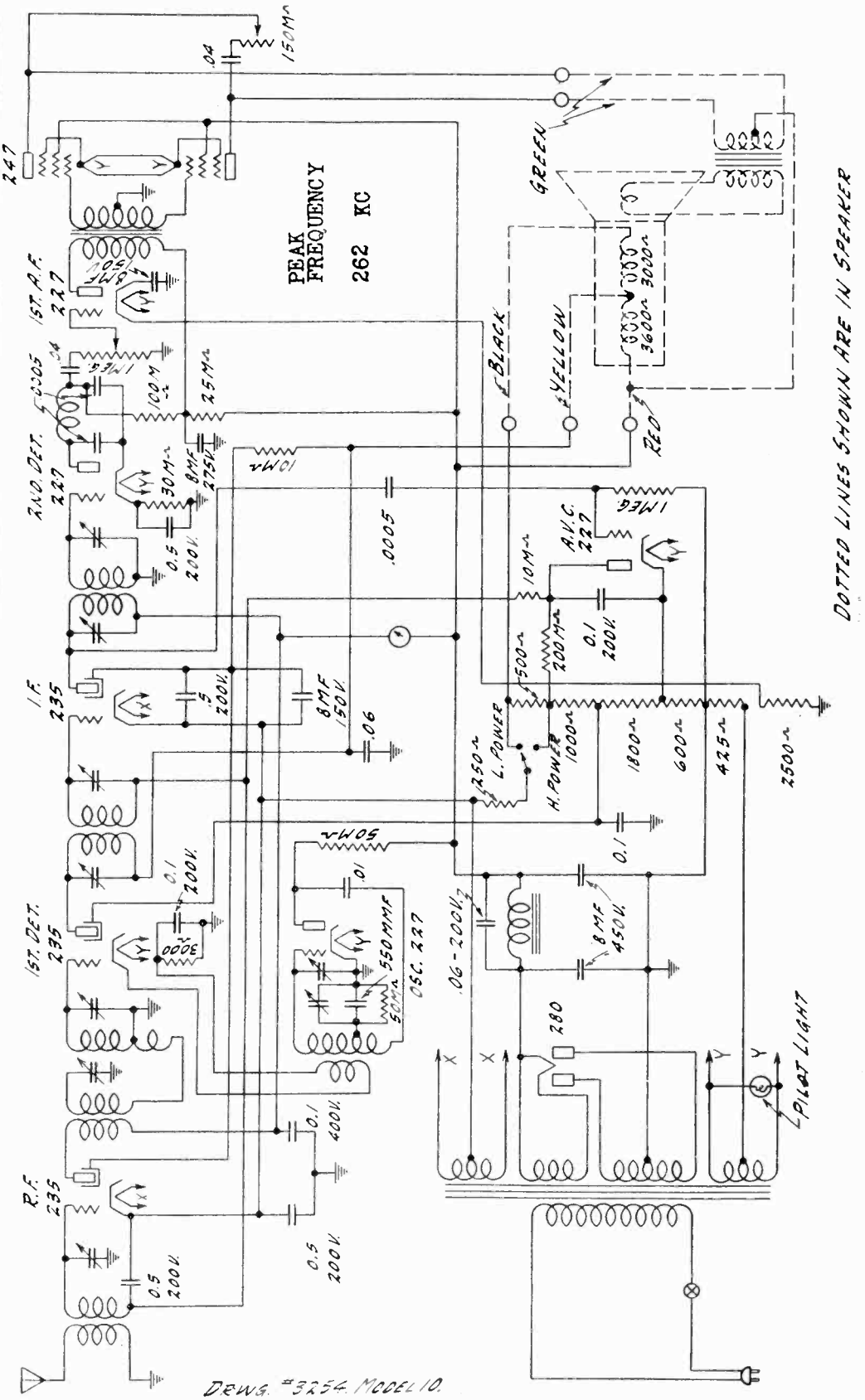


-Resistor and Condenser Panels No. 8 Chassis

2932	Filter Choke Assembly
2818	Resistor and Condenser Panel Assembly Complete
3231	Resistor and Condenser Panel Assembly Complete
3086	2nd Detector Panel Assembly Complete with Socket
1766	Detector Plate Choke Coil
3088	Shield Can for Detector Plate Choke Coil
2801	8" D.C. Electrodynamic Speaker for No. 8 Chassis
3294	Field Coil for Speaker
3298	Transformer for Speaker
2608	Terminal Strip for Speaker
3295	Terminal Strip Cover for Speaker
3296	Head Assembly Complete including Cone, Housing, Voice Coil, Spider and Pot Magnet Front Piece for Speaker
3297	Pot Magnet Back Piece for Speaker

MODEL 10
Schematic

U. S. RADIO & TELEVISION CORP.



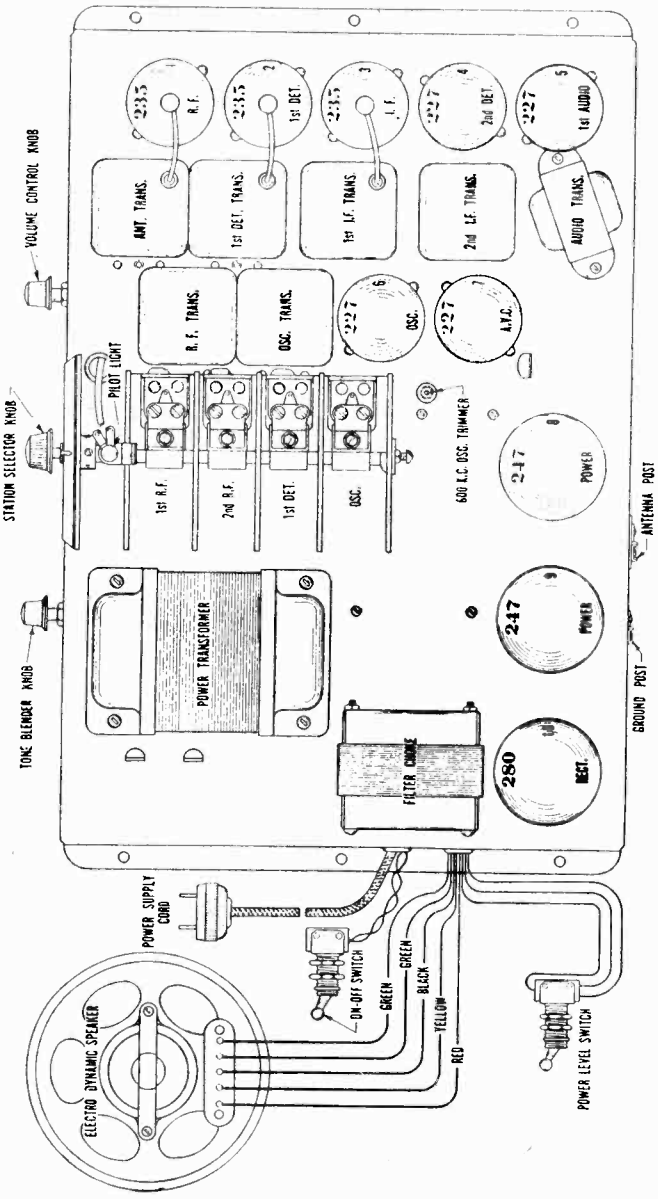
No. 10 Series
Super-Heterodyne

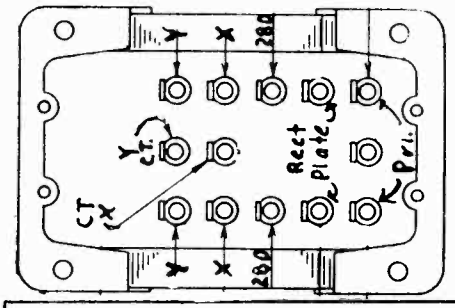
Chassis No. 10X is almost identical in construction with chassis No. 10, except that it is designed for 25 cycle, 115 volt operation. All parts as used in the No. 10 chassis are used in the No. 10X with the exception of the power transformer and .06 Mfd. choke tuning condenser. The correct power transformer for the No. 10X chassis is shown in the parts price list.

The No. 10X, 25 cycle chassis can be operated satisfactorily from a 60 cycle power supply. If there is excessive hum it will be necessary to secure a .06 Mfd. condenser, Part No. 2854, and connect it in the circuit across the filter choke. The reverse is not true, that is, the No. 10, 60 cycle receiver cannot be operated satisfactorily from a 25 cycle power supply.

U. S. RADIO & TELEVISION CORP.

MODEL 10
Voltage
Socket





Power Transformer Terminals

MODEL 10 PENTODE SUPERHETERODYNE

Tube	A Volts	B Volts	C Volts	Scr. Volts	Plt. Crnt.
RF	2.3	175.	2.3[1]	65	4.0
1st Det	2.3	185.	7.0	69	2.0
IF	2.3	175	2.3[1]	65	4.0
2nd Det	2.3	115	12.		.4
1st AF	2.3	145	11. [2]		4.6
Osc.	2.3	83	15-35[3]		4.2
AVC	2.3	89[4]	20. [5]		0.
Power	2.35	255	18.5	265	21.
Power	2.35	255	18.5	265	21. [6]
Rect.	4.9				45.

1 Across 250 ohm series resistor
2 Across 2500 ohm series resistor
3 Governed by setting of tuning condenser
4 Across 1000 and 1800 ohm sections of shunt resistor.
5 Across 600 ohm section of shunt resistor
6 Per Anode.

Heterodyne Whistle

A heterodyne whistle in the Super-heterodyne Receiver may be caused by a beat between a harmonic of the I.F. signal and an R.F. signal.

A whistle can be brought about at 786 K.C., 1048 K.C. or 1310 K.C. if the 2nd detector filter choke is shorted or if the antenna lead is under this choke. The above mentioned frequencies are harmonics of the intermediate frequency of 262 K.C. and as they fall within the broadcast band can cause an audible beat with an R.F. signal.

A whistle can also be brought about between 540 and 600 K.C. if the I.F. tuning condensers are adjusted at too high a frequency rather than at 262 K.C. If they are adjusted, for example, at 280 K.C. the second harmonic is 560 K.C. which falls within the broadcast band and can beat with an R.F. signal.

Blocking or Motorboating

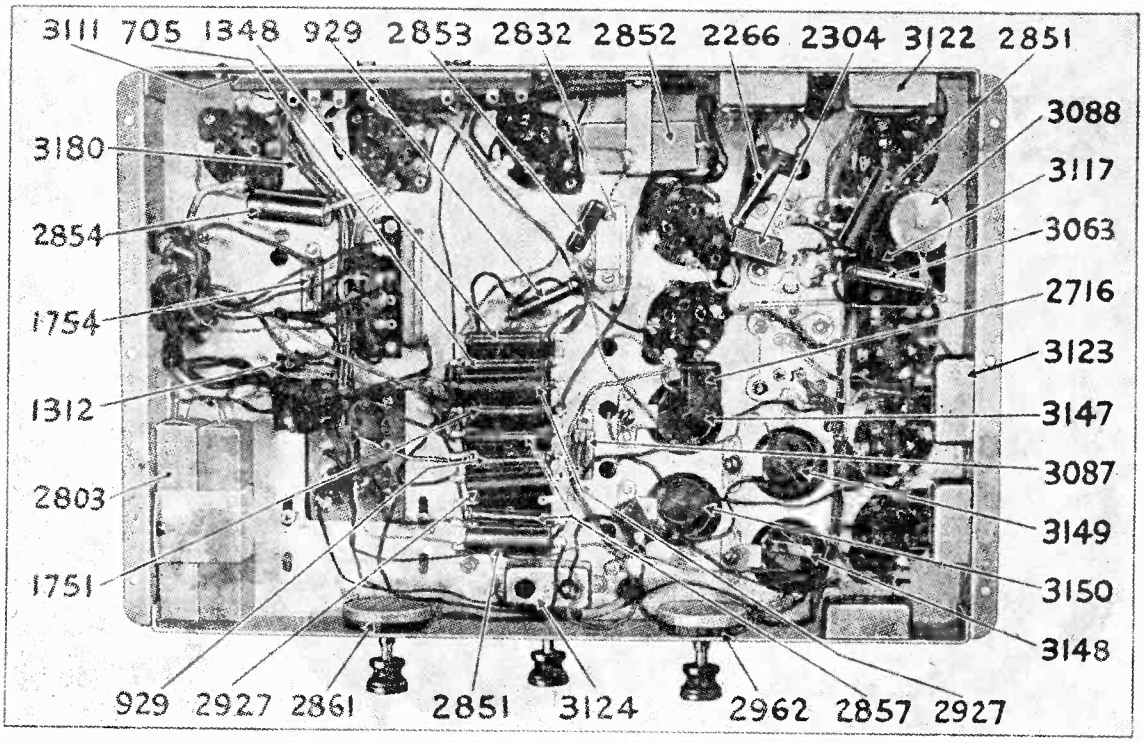
Blocking or motorboating in the No. 10 chassis may be due to an open grid in the 1st detector or I.F. stage. Check these circuits if motorboating is experienced. Motorboating may also be caused if the 10,000 ohm series resistor in the LF. and R.F. screen line is shorted.

If the A.V.C. tube is not operating properly motorboating may result. Try out a new tube and check the A.V.C. circuit. Blocking or motorboating may also be due to open R.F. and I.F. screen by-pass condenser and to various other defective filter and by pass condensers.

MODEL 10
Chassis View
Parts List

U. S. RADIO & TELEVISION CORP.

NO. 10 CHASSIS



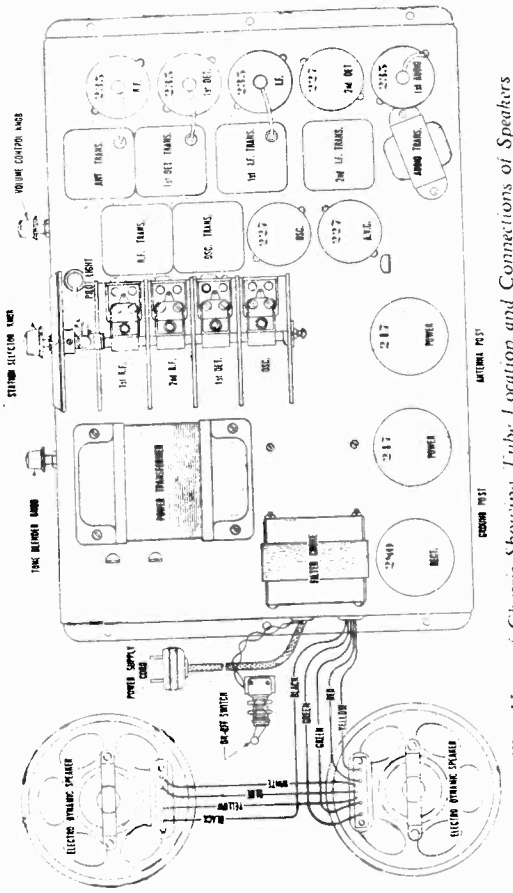
Bottom View No. 10 Chassis

No. 10 Chassis

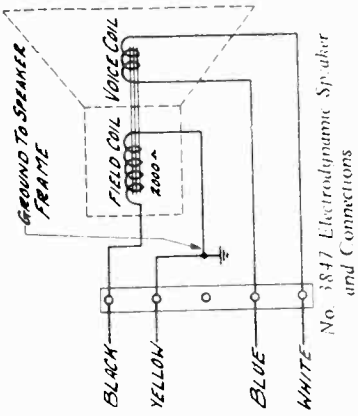
Part No.	Description	
705	25,000 Ohm Series Resistor, Carbon	
929	50,000 Ohm Bias and Series Resistors, Carbon	
1348	100,000 Ohm Series Resistor, Carbon	
1751	200,000 Ohm Series Resistor, Carbon	
1754	250 Ohm Bias Resistor, Wire Wound	
2266	1 Megohm Resistor	
2857	10,000 Ohm Series Resistors, Carbon	
2861	Tone Blender 0—150,000 Ohm	
2962	Volume Control 0—1 Megohm	
3063	30,000 Ohm Bias Resistor, Carbon	
3087	3,000 Ohm Bias Resistor, Wire Wound	
3111	6825 Ohm Voltage Divider Resistor	
2304	.0005 Mfd. Coupling and By-Pass Condensers	
2716	.01 Mfd. Oscillator Condenser	
2719	8 Mfd. Electrolytic Condenser Unit, 275 Volt	
2803	8 Mfd. Electrolytic Condenser Unit, 450 Volt	
3112	Clamp for 2803 Electrolytic Condenser Units	
2852	8 Mfd. Electrolytic Condenser Unit, 150 Volt	
3113	Clamp for 2852 Electrolytic Condenser Unit	
3190	Auxiliary Bracket for 2852 Electrolytic Condenser Unit	
2832	Oscillator 600 K.C. Trimmer Condenser	
2851	.04 Mfd. Coupling and Filter Condensers	
2853	550 Mmfd. Oscillator Condenser	
2854	.06 Mfd. Choke Condenser	
2927	.1 Mfd. By-Pass Condensers, 200 Volts	
3122	.5 Mfd. By-Pass Condensers, 200 Volts	
3123	Dual .1—.05 Mfd. Condenser, 200 Volt	
3124	1 Mfd. By-Pass Condenser, 400 Volt	
3114	Resistor and Condenser Panel Assembly, Complete	
1766	Detector Plate Choke Coil	
3088	Shield Can for Detector Plate Choke Coil	
3117	2nd Detector Panel Assembly, Complete with Socket	
678	Ground Binding Post	
2333	Antenna Binding Post Assembly	
1312	Terminal Insulators	
3148	Antenna Transformer	Sold in Matched Sets of Four
3150	R.F. Transformer	Sold in Matched Sets of Four
3149	1st Detector Transformer	Sold in Matched Sets of Four
3147	Oscillator Transformer	Sold in Matched Sets of Four
3180	Chassis Harness	
701	Tube Socket—280	
703	Tube Socket—227	
2757	Tube Socket—247	
2805	Tube Socket—235	
861	Attachment Cord and Plug	
1436	On-Off Escutcheon Plate	
2948	Power Level Escutcheon Plate	
2882	Escutcheon Plate	
2876	Walnut Knobs	
2392	On-Off Switch and Leads	
2936	Power Level Switch and Leads	
3175	4-Gang Variable Condenser Assembly Complete less Drive and Meter	
3121	Variable Condenser Shield	
2883	Drive Assembly Complete with Dial Chart	
2902	Dial Chart Assembly	
2895	Pointer Tension Spring for Drive	
2911	Tuning Meter	
3081	Bracket for Tuning Meter	
3181	Grid Cap Assembly	
2830	1st Intermediate Assembly Complete with Can	
2831	2nd Intermediate Assembly Complete with Can	
2842	Adjusting Screw for Intermediate Condensers	
2850	Special Hex Nuts for Intermediate Condensers	
2912	Power Transformer, 60 Cycles, 115 Volt	
3169	Power Transformer, 25 Cycles, 115 Volt	
2932	Filter Choke Assembly	
3100	Audio Transformer	

U. S. RADIO & TELEVISION CORP.

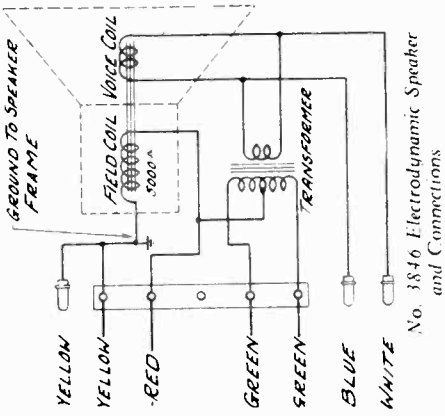
MODEL 10-C
Chassis 1000-1001
Schematic
Socket -Speaker



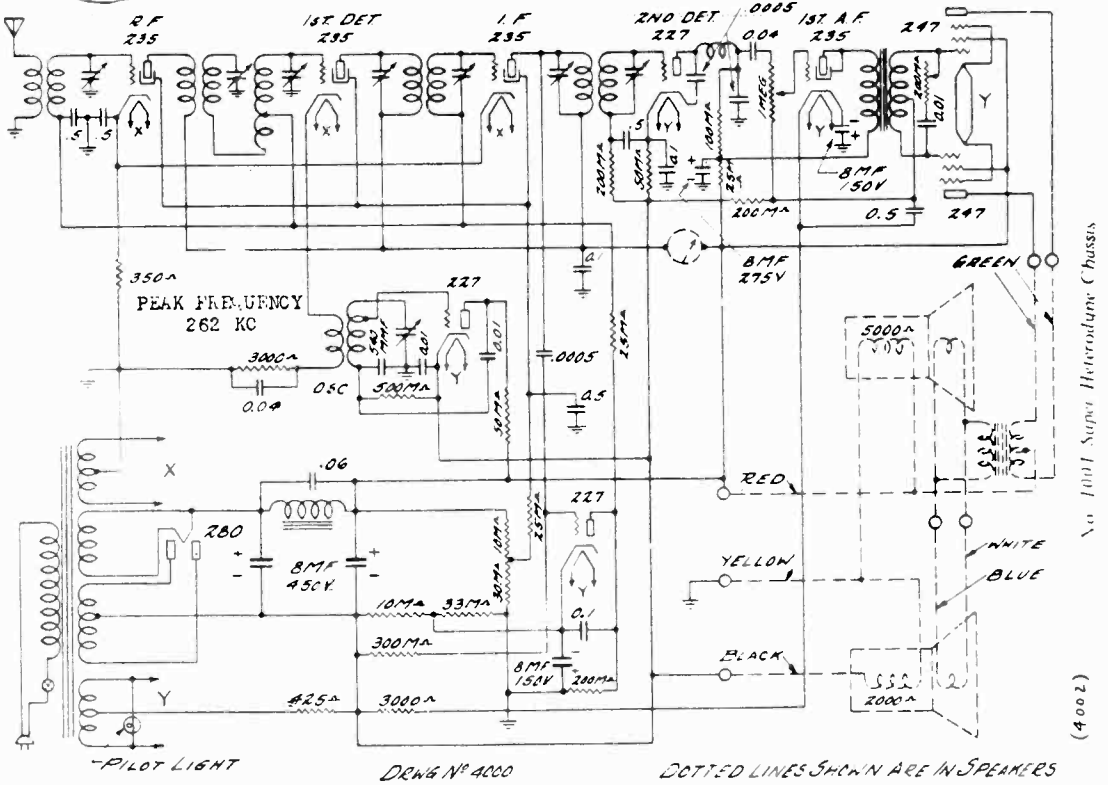
Top View of Chassis Showing Tube Location and Connections of Speakers



No. 1847 Electrodynamic Speaker and Connections



No. 1846 Electrodynamic Speaker and Connections



No. 1041 Super Heterodyne Chassis

(4002)

MODEL 10-C
Chassis 1000,1001
Voltage
Notes

U. S. RADIO & TELEVISION CORP.

SPEAKERS

The output of the receiver is fed into the primary of the transformer for the speakers. In the chassis No. 1001 matched speakers are used. Both are D.C. baffle mounting electrodynamic speakers—one having a cone diameter of 10 inches and the other an 8 inch cone.

The fields of both speakers are energized by the power system and are a part of the total resistance shunted across the power system from which the required voltages are obtained. The 5000 ohm field coil is a component part of the 10 inch speaker—Part No. 3846—as is the output transformer. The 5000 ohm field coil is above ground potential whereas the 2000 ohm field coil is below ground potential, as can be seen by referring to Fig. 1. The ground potential side of each field coil winding is grounded to the speaker frame. The voice coil of each speaker is connected in parallel across the secondary winding of the output transformer.

CAUTION—Do not use any other type of speakers with the No. 1001 chassis than the two supplied with it. It can readily be appreciated from the above that the speakers are especially designed for this chassis.

An open or shorted voice coil in either of the speakers will cause poor audio quality. Check voice coil tips (blue and white) at speaker terminal strip for good electrical contact. A shorted 2000 ohm speaker coil will cause distortion as will also an open 5000 ohm speaker coil, and in both cases, the needle of the tuning meter will swing to the extreme left.

The polarity of the leads connecting the voice coils of the two speakers in parallel should be checked. If the blue and white wires making these connections are reversed, distortion and motorboating will result, because one cone is moving out while the other is moving in, and vice versa.

ual. If one of the pilot light terminals is grounded, the second audio bias will be shorted out and there will be distortion present.

If the 2000 ohm field coil of the No. 3847 electrodynamic speaker is open lack of volume will be experienced and will be evidenced by the needle of the visual tuning meter, swinging almost to the extreme right. The same will be true if the 5000 ohm field of the No. 3846 electrodynamic speaker is open. However, in this case the needle of the tuning meter will swing to the extreme left. The yellow wire connecting the speakers to the chassis ground should be checked for good electrical connection. If this lead is making poor contact loss of volume will result. The tuning meter will register approximately a 50% reduction in swing at no signal.

MICROPHONIC HOWL

The No. 1001 Chassis is mounted in the console cabinet on sponge rubber washers to prevent any microphonic action that might otherwise arise due to vibrations set up between the speaker and tube elements.

At the time of installation of the receiver the two bolts, one at the center of the flange at each end of the chassis should be removed. These bolts are used to securely anchor the chassis to the cabinet shelf and are intended only for shipping purposes. If they are not removed vibrations of the speaker will be transmitted to the tube elements and a microphonic howl may result.

This howl may also manifest itself when the chassis and speaker are being tested on a service bench thus making it very difficult to service the unit. The chassis or speaker should be cushioned as a preventive.

No. 1001 CHASSIS—VOLTAGES AT SOCKETS—LINE VOLTAGE 115
VOLUME CONTROL AT MAXIMUM

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate MA	Grid Test MA
235	1	R.F.	2.2	160	2.8 (1)	60	.4	0.	2.7	6.1
235	2	1st Det.	2.25	160	6.5	55	.3	7.	1.8	2.4
235	3	I.F.	2.2	160	2.8 (1)	60	.4	0.	2.7	6.1
227	4	2nd Det.	2.3	105	6.			5.5	.2	.3
235	5	1st Audio	2.3	125	13. (2)			7.	2.8	3.0
227	6	Osc.	2.35	110	11-28 (3)			21.	3.4	3.5
227	7	A.V.C.	2.3	55 (4)	21. (5)			1.5	0.	0.
247	8	Power	2.3	250	20. (6)	258	4.6		20.	26.
247	9	Power	2.35	250	20. (6)	258	4.6		20.	26.
280	10	Rect.	5.0						50. Per Plate	

(1) Measured across 350 ohm bias resistor.
(2) Measured across 3000 ohm bias resistor B to Cathode.
(3) Measured across 500 M ohm osc. bias resistor. Bias voltage varies from 11 to 28 between 1500 and 550 K C. settings of tuning condenser.
(4) Measured from B- to A.V.C. plate.
(5) Measured from B- to A.V.C. Cathode.
(6) Measured across 425 ohm bias resistor B to "Y" filament

MODEL 10-C
Chassis 1000,1001
Bottom View
Notes

U. S. RADIO & TELEVISION CORP.

No. 1000X AND No. 1001X CHASSIS

Chassis No. 1000X and No. 1001X are almost identical in construction with chassis No. 1000 and No. 1001 except that they are designed for 25 cycle, 115 volt A.C. operation. The parts used in the 60 cycle chassis are also used in those chassis designed for 25 cycle operation with the exception of the power transformer and .06 Mfd. filter choke tuning condenser. The correct power transformer for the 25 cycle chassis as well as the correct filter choke tuning condenser are shown in the Parts Price List.

The description and testing as covered in the service notes for the 60 cycle chassis also applies to the 25 cycle chassis.

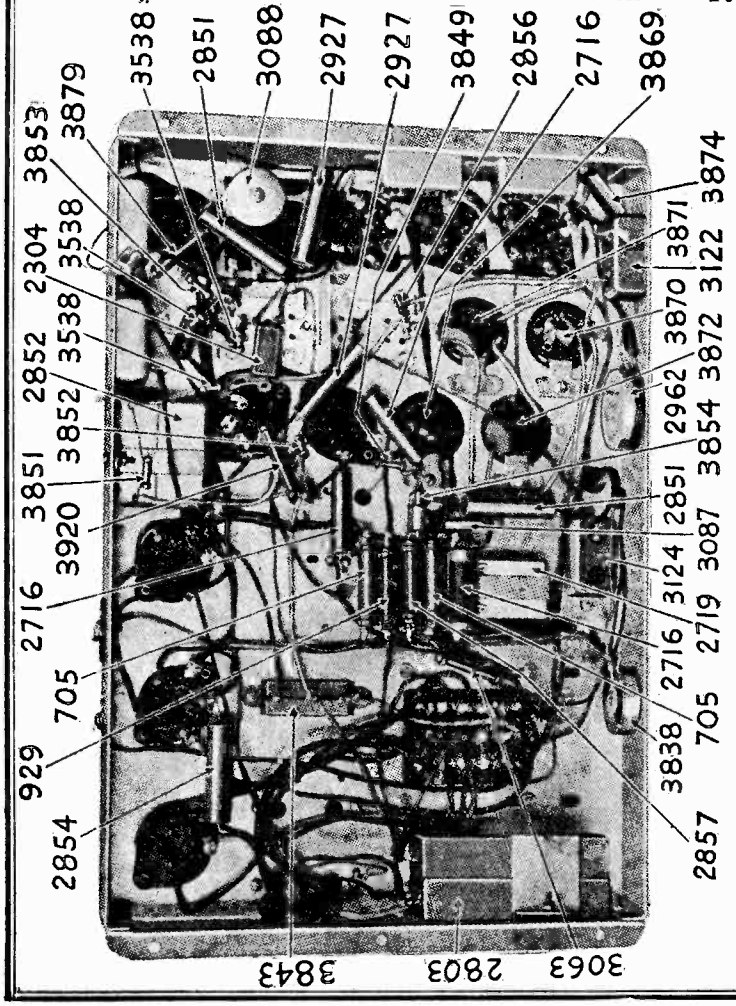
The 25 cycle chassis can be operated satisfactorily from a 60 cycle power supply. However, there may be excessive hum in which case it will be necessary to change the No. 1375 .45 Mfd. choke condenser to a No. 2854 .06 Mfd. condenser. The reverse is not true, that is, the 60 cycle chassis cannot be operated satisfactorily from a 25 cycle power supply.

SUPPLEMENTARY NOTES FOR No. 1000 CHASSIS

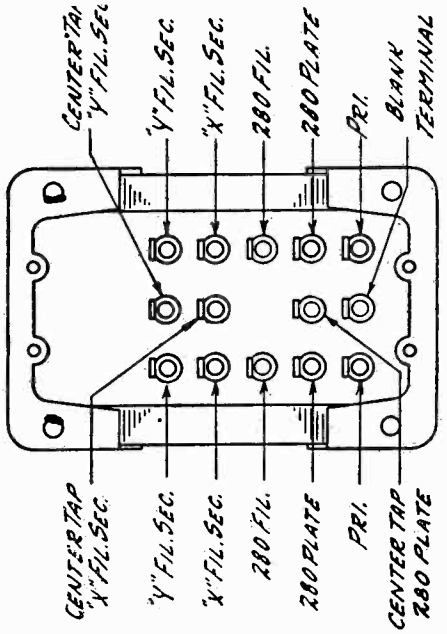
The No. 1000 and No. 1001 Chassis are identically alike as regards the schematic circuit and the electrical constants. Referring to the schematic wiring diagram it will be noted the visual tuning meter is not drawn in solid lines but instead dotted lines are used. The significance of the dotted lines is to illustrate that the tuning meter is a component part of chassis No. 1001 whereas in chassis No. 1000 the meter is omitted the electrical circuit being completed by the joining of the two leads ordinarily connected to the meter leads on the 1001 chassis.

The electrical constants of the dual speakers used with each chassis are alike, however, the 1001 chassis has one 8 inch and one 10 inch electrodynamic speaker whereas the No. 1000 chassis utilizes two 8 inch speakers. The speakers for their respective chassis carry entirely different part numbers and these dissimilarities including other changes in a few of the parts for each chassis are enumerated in the parts list to follow.

It will be noted a number of the speaker parts for the No. 1001 chassis are interchangeable with the component parts of the speakers for the No. 1000 chassis and therefore it has not been thought necessary to make a repetition of these parts numbers in the accompanying list of the changes in parts for the No. 1000 chassis.



Bottom View No. 1001 Chassis



Power Transformer Terminals

No. 1001 CHASSIS REPLACEMENT PARTS

Part No.	Description	No. Used in Set	List Price Each
678	Ground Binding Post	1	.15
705	Resistor, 25,000 Ohm, Carbon, 1 Watt	2	.50
929	Resistor, 50,000 Ohm, Carbon, 1 Watt	1	.45
1875	Choke Condenser .45 Mfd. for 25 Cycle	1	1.00
1766	Detector Plate Choke Coil	1	.60
2304	Condenser, .0005 Mfd Coupling and Bypass	3	.40
2333	Antenna Binding Post	1	.20
2716	Condenser, .01 Mfd, 400 Volt	2	.45
2719	Dry Electrolytic Condenser, 8 Mfd. 275 Volt	1	2.00
2803	Dry Electrolytic Condenser, 8 Mfd. 450 Volt	2	2.00
2851	Condenser, .04 Mfd. 400 Volt	2	.40
2852	Dry Electrolytic Condenser, 8 Mfd. 150 Volt	2	1.00
2854	Condenser, .06 Mfd, 400 Volt	1	.40
2856	Resistor, 25,000 Ohm, .1 Watt	1	.45
2857	Resistor, 10,000 Ohm, Carbon, 1 Watt	1	.45
2927	Condenser, .1 Mfd, 200 Volt	2	.40
2962	Volume Control, 0—1 Megohm	1	1.40
3063	Resistor, 30,000 Ohm, Carbon, 1 Watt	1	.45
3080	Bracket for 3854 Condenser	1	.05
3087	Resistor, 3000 Ohm, Candohm	1	.35
3088	Shield Can for Detector Plate Choke Coil	1	.15
3112	Clamp for 2803 Electrolytic Condenser	1	.05
3113	Clamp for 2852 Electrolytic Condensers	1	.05
3119	Intermediate Frequency Shield	1	.05
3122	Condenser, .5 Mfd, 200 Volts	5	.70
3124	Condenser, .1 Mfd, 400 Volts	1	.65
3358	Bakelite Terminal Insulator	3	.05
3538	Resistor, 200,000 Ohm, Carbon, .1 Watt	3	.40
3838	Tone Control, 0—200,000 Ohm	1	1.40
3843	Resistor, 425-3000 Ohm, Candohm	1	.50
3849	Resistor, 500,000 Ohm, Carbon, .1 Watt	1	.40
3851	Resistor, 33,000 Ohm, Carbon, .1 Watt	1	.40
3852	Resistor, 10,000 Ohm, Carbon, .1 Watt	1	.40
3853	Resistor, 50,000 Ohm, Carbon, .1 Watt	1	.40
3854	Condenser, 540 Mmfd	1	.50
3866A	Resistor and Condenser Panel Assembly	1	2.50
3865	2nd Detector Panel Assembly Complete with Socket	1	2.50
3869	Oscillator Transformer (SOLD IN MATCHED SETS OF FOUR)	1	.60
3870	Antenna Transformer (SOLD IN MATCHED SETS OF FOUR)	1	1.00
3871	1st Detector Transformer (SOLD IN MATCHED SETS OF FOUR)	1	.60
3872	R.F. Transformer (SOLD IN MATCHED SETS OF FOUR)	1	.60
3874	Resistor, 350 Ohm, Candohm	1	.30
3879	Resistor, 100,000 Ohm, .1 Watt	1	.40
3920	Resistor, 300,000 Ohm, .1 Watt	1	.40
115	Pilot Light Lamp	1	.25
701	Tube Socket—280	1	.35
703	Tube Socket—227	3	.35
861	Attachment Cord and Plug	1	1.00
1436	On-Off Escutcheon Plate	1	.10
2392	On-Off Switch with Leads	1	1.00
2757	Tube Socket—247	2	.35
2805	Tube Socket—235	4	.35
2830	1st Intermediate Transformer Assembly Complete with Can	1	1.80
2831	2nd Intermediate Transformer Assembly Complete with Can	1	1.80
2842	Adjusting Screw for Intermediate Condensers	4	.01
2850	Special Hex Nuts for Intermediate Condensers	4	.03
2876	Walnut Knobs	3	.30
2882	Escutcheon Plate, U.S. APEX	1	.75
2883	Drive Assembly Complete with Dial Chart	1	1.20
2895	Pointer Tension Spring for Drive	1	.15
2902	Dial Chart Assembly	1	.20
2932	Filter Choke Assembly	1	2.70
3081	Bracket for Tuning Meter	1	.10
3100	Audio Transformer	1	3.00
3108	Tube Shield	1	.80
3121	Variable Condenser Shield	1	.40
3151	Pilot Light Bracket with Leads	1	.30
3178	Shield Can for R.F. and 1st Detector Transformer	1	.75
3179	Shield Can for Oscillator and R.F. Transformer	1	.75
3181	Grid Cap with Lead	2	.05
3834	Power Transformer, 60 Cycle, 115 Volt	1	9.00
3846	10 inch D.C. Electrodynamic Speaker with Input Transformer	1	10.00
3847	8 inch D.C. Electrodynamic Speaker less Input Transformer	1	6.00
3860	Tuning Meter	1	3.50
3862	Speaker Cable	1	.65
3873	Grid Cap with Lead for 1st Audio 235	1	.05
3881	Power Transformer, 25 Cycle, 115 Volt	1	11.00
3884	4 Gang Variable Condenser Complete less Drive and Meter	1	10.00
4010	Transformer for 3846 and 3844 Speakers	1	3.00
4011	Field Coil for 3846 and 3844 Speakers—5000 Ohm	1	3.00
4012	Terminal Strip for 3846 and 3844 Speakers	1	.50
4013	Head Assembly for 3847, 3844 and 3845 Speakers	1	3.50
4015	Terminal Strip for 3847 and 3845 Speakers	1	.50
4016	Terminal Strip Cover for 3846 Speaker	1	.50
4017	Terminal Strip Cover for 3847, 3844 and 3845 Speakers	1	.50
4020	Head Assembly for 3846 Speaker	1	3.75
4021	Field Coil for 3847 Speaker, 2000 Ohm	1	2.75

No. 1000 CHASSIS REPLACEMENT PARTS (SUPPLEMENTING No. 1001 PARTS LIST)

The following parts are used in addition to the parts listed for the No. 1001 Chassis:

Part No.	Description	No. Used in Set	List Price Each
3408	Escutcheon Plate, U. S. APEX	1	.75
3789	Volume Control, 0—1 Megohm	1	1.40
3837	Tone Blender Rheostat, 0—200,000 Ohm	1	1.40
3844	8" D.C. Electrodynamic Speaker with Input Transformer	1	8.50
3845	8" D.C. Electrodynamic Speaker less Input Transformer	1	6.00
3867	Drive Assembly Complete with Dial Chart less Pilot Light	1	1.20
3873	4 Gang Variable Condenser Assembly	1	10.00
4014	Field Coil for 3845 Speaker—2,000 Ohm	1	3.00

The following parts listed for the No. 1001 Chassis are not used in the No. 1000 Chassis:

2882	Escutcheon Plate, U. S. APEX	1	.75
2883	Drive Assembly Complete with Dial Chart	1	1.20
2895	Pointer Tension Spring for Drive	1	.15
2902	Dial Chart Assembly	1	.20
2962	Volume Control, 0—1 Megohm	1	1.40
3081	Bracket for Tuning Meter	1	.10
3151	Pilot Light Bracket with Leads	1	.30
3838	Tone Blender Rheostat, 0—200,000 Ohm	1	1.40
3846	10" D.C. Electrodynamic Speaker with Input Transformer	1	10.00
3847	8" D.C. Electrodynamic Speaker less Input Transformer	1	6.00
3860	Tuning Meter	1	3.50
3884	4 Gang Variable Condenser Assembly Complete less Drive and Meter	1	10.00
4016	Terminal Strip Cover for 3846 Speaker	1	.50
4020	Head Assembly Complete for 3846 Speaker	1	3.75
4021	Field Coil for 3847 Speaker—2,000 Ohm	1	2.75

No. 20 CHASSIS—VOLTAGES AT SOCKETS—VOLUME CONTROL AT MAXIMUM LINE VOLTAGE. 115—PLUG IN SOCKET OF RECEIVER—TUBE IN TEST SET

Type of Tube	*Position of Tube*	*Function*	*"A" Volts*	*"B" Volts*	*Control Grid "C" Volts*	*Screen Volts*	*Screen Current MA*	*Cathode Volts*	*Plate MA*	*Grid Test MA*
224	1	1st Radio	2.5	196	2.2	85	1.4	2.2	5.	7.1
224	2	Detector	2.5	95(1)	2.3(2)	17(3)	.015		.1	.2
171A	3	1st Audio	5.1	191	43. (4)				18.	20.
280	4	Rectifier	5.1						23. Per Plate	

(1) (3) Computed value. Reading with volmeter will be lower.
(2) This voltage read across 55 ohm section of shunt resistor.
(4) This voltage read across 935 ohm section of speaker field and 55 ohm section of shunt resistor.

Tuning Condenser Alignment

The tuning condensers are aligned at the factory with oscillators and output meters and the receiver will not normally lose its alignment unless mishandled or tampered with. When the condenser is out of alignment one or more of the stages are not in resonance and the receiver may tune broadly, lack volume at certain parts of the broadcast band, or tune in a signal at two or more points of the dial.

The chassis should be grounded but the antenna disconnected. In case a strong enough signal is not being received from the oscillator, connect a five or six foot length of wire to the antenna post and run it over towards the oscillator.

First set the oscillator for a signal of 1,400 K.C. Then carefully tune to resonance by turning the tuning condenser rotor slowly back and forth until maximum output is obtained. Now adjust the trimmer condensers to resonance. Adjust the volume control until the pointer of the output meter is at about half scale. The oscillator signal should not be too great in intensity as distortion will be introduced. The trimmer condensers are adjusted by raising or lowering the center screw. Turn the screws down until the volume starts to drop. Then adjust the trimmers to resonance, raising or lowering the screws until maximum deflection is obtained. Adjustment may be made with a metal screw driver as the rotor is at ground potential.

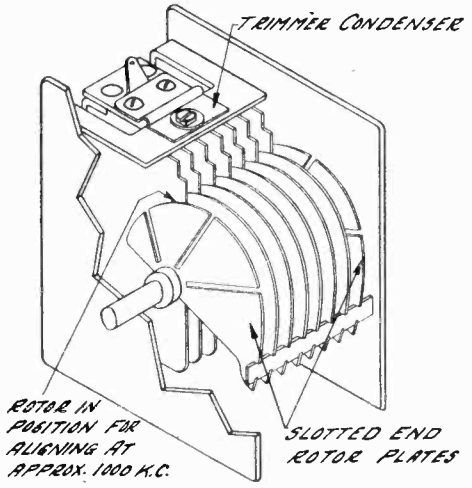
An important point to remember in adjusting the trimmer condenser is that the screws should not be turned completely down. If they are screwed in too tightly the capacity of the trimmer condenser which is added to the capacity of the tuning condenser will be so high that the receiver cannot be tuned to a high frequency signal.

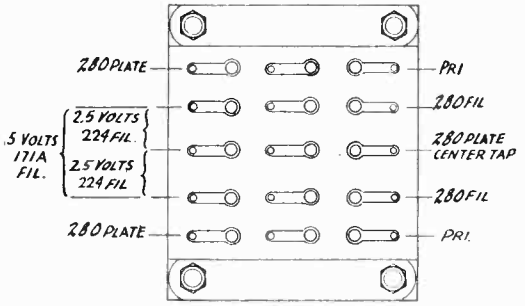
After the trimmer condensers have been adjusted at 1,400 K.C., they should not be changed in any way when aligning the tuning condensers at different frequencies as explained below.

Next set the oscillator for a signal of 1,000 K.C. Then turn the tuning condenser rotor carefully until maximum deflection is obtained on output meter. The second slotted section of the rotor will be approximately half way in mesh with the stator as shown in Fig. 3. Bend this section of the two end rotor plates of the first section of the tuning condenser in or out until maximum reading is obtained on the output meter. Follow the same procedure with section two of the tuning condenser. The corresponding slotted section on both ends of any rotor section should be bent in or out about the same amount for each adjustment.

After each material adjustment of a slotted rotor plate section, the tuning or setting of rotor for resonance should be checked. In other words, after every bending turn the tuning knob back and forth until maximum deflection of output meter is obtained before proceeding to make the next adjustment.

Next tune in a signal at 750 K.C. Follow the same procedure. Lastly, tune in a signal at 600 K.C. and again follow the same procedure. The condenser will then be properly aligned.





CENTER ROW OF LUGS USED AS WIRING TERMINALS ONLY

Power Transformer Terminals

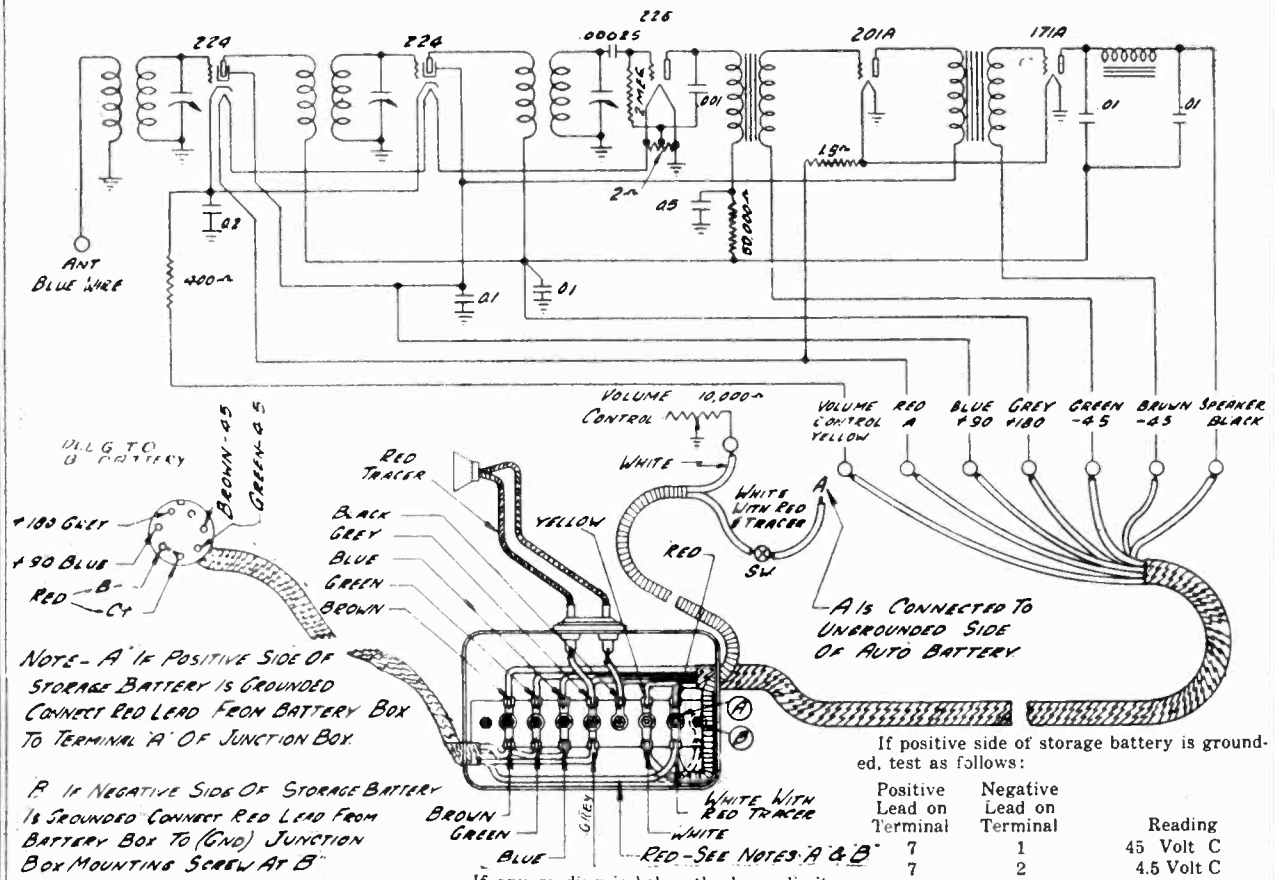
Electrodynamic Speaker

An especially designed electrodynamic speaker is supplied with the No. 20 chassis. The field of this speaker is energized by the power system of the chassis and is a part of the power system. For that reason no other speaker should be used with the No. 20 chassis than the one supplied with it.

Care should be taken in servicing the No. 20 receiver not to reverse the leads to one of the field sections as the fields will then "buck" and low signal strength will result. The field winding also acts as a filter choke.

MODEL 30 Auto Radio

U. S. RADIO & TELEVISION CORP.



If negative side of battery is grounded, test as follows:

Positive Lead on Terminal	Negative Lead on Terminal	Reading
Ground	1	45 Volt C
Ground	2	4.5 Volt C
3	Ground	90 Volt B
4	Ground	180 Volt B
7	Ground	6 Volt A

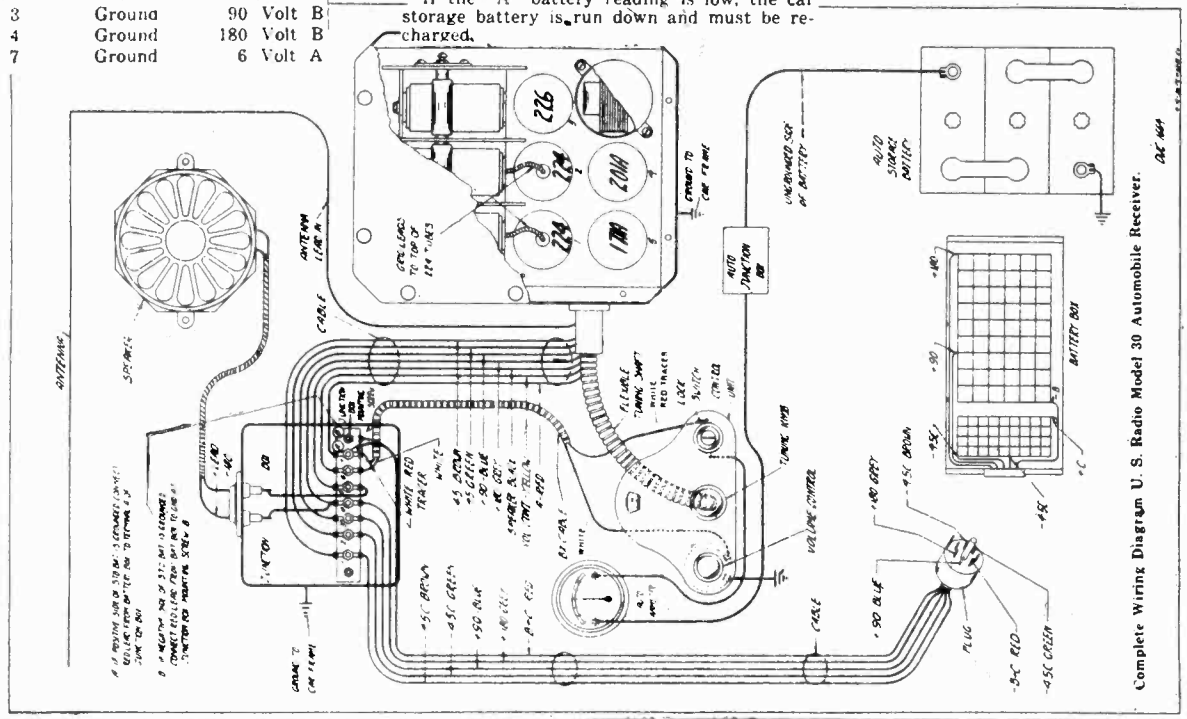
If any reading is below the lower limits as shown on the following list, a new battery box unit will be required.

Regular Rating	Lower Limit
180 Volt B	140 Volt
90 Volt B	70 Volt
45 Volt C	35 Volt
4.5 Volt C	3.5 Volt

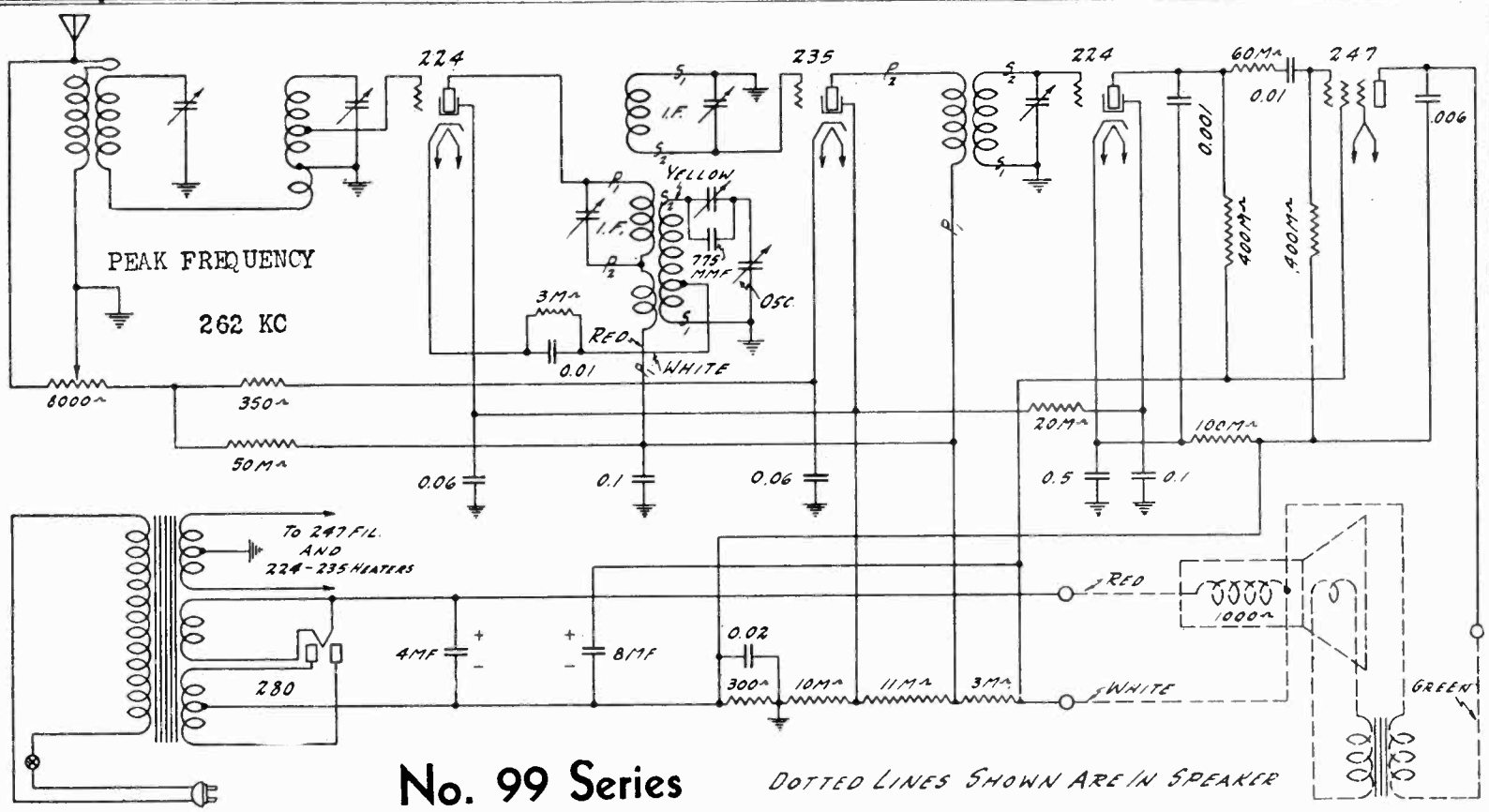
If the "A" battery reading is low, the car storage battery is run down and must be recharged.

If positive side of storage battery is grounded, test as follows:

Positive Lead on Terminal	Negative Lead on Terminal	Reading
7	1	45 Volt C
7	2	4.5 Volt C
3	7	90 Volt B
4	7	180 Volt B
Ground	7	6 Volt A



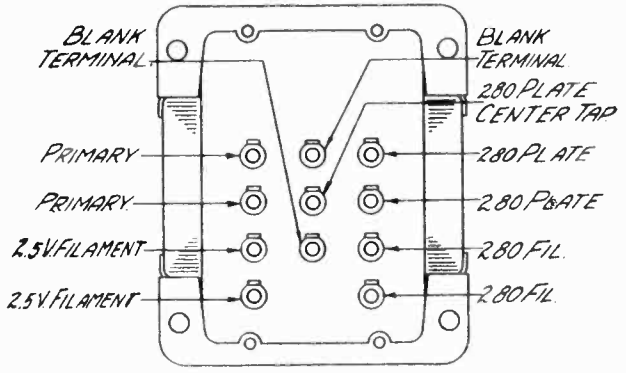
Complete Wiring Diagram U. S. Radio Model 30 Automobile Receiver.



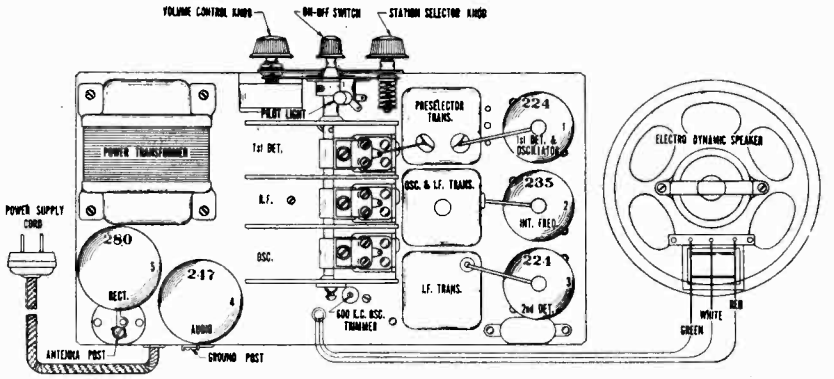
No. 99 Series

DOTTED LINES SHOWN ARE IN SPEAKER

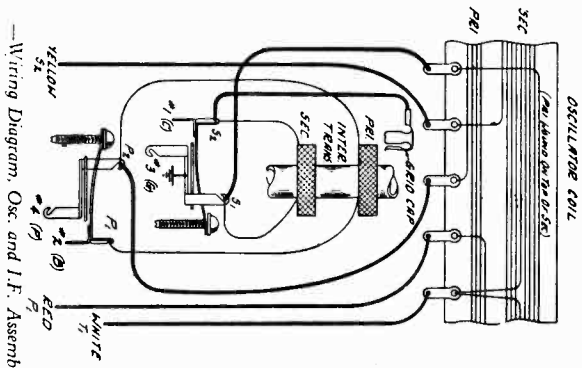
There are certain features to be noted in this receiver. The mixer is of the autodyne type, wherein it functions as a mixer (1st detector) and also as an oscillator. Also that the grid lead from the mixer tube joins the grid coil at a tap upon this winding. This tap is so apportioned that the circuit acts to suppress the transmission of image frequency signals, in this case 524 KC higher than the frequency setting of the tuned circuit. The IF transformer is also of special structure combining the coupling transformer and also the oscillator system. The structure of this transformer-oscillator is illustrated upon the next page.



Power Transformer Terminals



Top View of No. 99 Chassis showing Tube Sequence and Speaker Connections.



—Wiring Diagram, Osc. and I.F. Assembly

No. 99X CHASSIS—25 CYCLE, 115 VOLT

Chassis No. 99X is almost identical in construction with chassis No. 99, except that it is designed for 25 cycle, 115 volt operation. All parts as used in the No. 99 chassis are used in the No. 99X with the exception of the power transformer. The correct power transformer for the No. 99X chassis is shown in the parts price list.

The description and testing as covered in the No. 99 Service Notes also applies to the No. 99X chassis

No. 99 CHASSIS—VOLTAGES AT SOCKETS
LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM

Type of Tube	*Position of Tube*	*Function*	*"A" Volts*	*"B" Volts*	*Control Grid "C" Volts*	*Screen Volts*	*Screen Current MA*	*Cathode Volts*	*Plate MA*	*Grid Test MA*
224	1	1st Det. & Osc.	2.25	165	4.5-5.25(1)	65	.4	4.5-5.25(1)	1.3	2.0
235	2	I.F.	2.25	165	2.5	65	1.5	2.5	6.4	7.4
224	3	2nd Det.	2.25	128	6.5	60(2)	.05	6.5	.22	.23
247	4	Audio	2.25	205	16. (3)	225	8.0		29.	33.
280	5	Rect.	4.9						27. Per Plate	

(1) Varies with frequency setting of dial approximately as shown.
(2) Voltage as measured with 600,000 ohm meter.
(3) Measured across 300 ohm section of voltage divider resistor.

CONDENSER ALIGNMENT

No. 99 CHASSIS

Aligning Intermediate Condensers—A nonmetallic screw driver is necessary for aligning the intermediate condensers. A signal of 262 K.C. is required. Remove the grid cap from the grid connection of the 224 1st detector tube and connect the lead from the signal generator to the grid of the 224 1st detector. The tube shield should be left on. One way to make this connection is to bring the antenna lead from the signal generator through the slot in the shield for the grid wire. A grid cap on the end of the antenna lead of the signal generator will facilitate making this connection. This lead, of course, should be insulated.

The oscillator coil must be shorted out by grounding the lead from the tap on the secondary. This is the white lead which comes through the porcelain base of the oscillator and I.F. assembly. This lead terminates at a lug on a vertically mounted bakelite terminal strip. Connect the jumper from this lug to the ground Connect the ground lead from the signal generator to the ground post of the chassis.

The intermediate condenser adjusting screws are reached from the bottom of the chassis. There are two on the porcelain base of the oscillator and 1st I.F. transformer assembly, Part No. 3382 and one on the porcelain base of the 2nd I.F. transformer assembly, Part No. 3388. The volume control should be at maximum setting. Then adjust the three intermediate condenser screws until maximum output is obtained on the output meter. After all three have been adjusted the first time, go over them again and check the setting for maximum output.

Aligning R.F. and Oscillator Condensers—For adjusting the R.F. and oscillator condensers the signal input from the signal generator should be made to the antenna post. Adjust the signal generator for a signal of exactly 1400 K.C. Then turn the tuning condenser rotor until the pointer is at exactly 1400 on the dial scale. Then adjust the three trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first (trimmer nearest back of chassis). Turn the screws up or down until greatest deflection on output indicating meter is obtained.

Then set the signal generator for a signal of 600 K.C. and turn the tuning condenser rotor until the output is at maximum. The next step is to adjust the oscillator 600 K.C. trimmer condenser. The adjusting screw for this condenser is in back of the tuning condenser and is reached from the top of the chassis. To correctly adjust this oscillator 600 K.C. trimmer it will be necessary to turn the screw to several different positions using a nonmetallic screw driver. At every position of this adjusting screw turn the tuning condenser rotor until maximum output is obtained. For each position of the adjusting screw there will be a maximum output and the correct position of the adjusting screw is the setting at which the deflection on output indicating meter is the greatest.

Next set the signal generator again for a 1400 K.C. signal and check the adjustment of the tuning condenser trimmers at this frequency for maximum output. Then set the signal generator for a signal of 1000 K.C. and turn the tuning condenser rotor until the output indicating meter shows maximum deflection. Then bend the slotted rotor plate sections of each tuning condenser bank which are last in mesh, in or out until maximum output is obtained. Tune in a signal at 750 K.C. and then at 600 K.C. and follow the same procedure bending the rotor plate sections last in mesh until maximum output is obtained. Do not change the setting of the oscillator 600 K.C. trimmer in any way after it has once been set as indicated above.

FLUTTERING OR MOTORBOATING

Fluttering or motorboating may be due to an open 8 Mfd. electrolytic filter condenser or to low capacity in this condenser. It may also be due to an open or low capacity .06 Mfd. screen by-pass condenser. If the 4 and 8 Mfd. electrolytic condenser units are reversed in position fluttering may result. The correct position of these two units is shown in Fig. 1.

A 224 1st detector with characteristics varying considerably from the standard may cause fluttering. Try out some new 224 tubes in this socket. A defective oscillator and 1st I.F transformer assembly may also be responsible for this type of disturbance. If, after the tubes have been changed and the other possibilities suggested in this article have been investigated, fluttering persists, it may be advisable to secure a new oscillator and 1st I.F. transformer assembly and try it out in the receiver. Motorboating may be due to a poor grid connection to the 235 I.F. tube and to the 224 2nd detector.

ELECTROLYTIC FILTER CONDENSERS

There are two dry electrolytic condenser units in the No. 99 chassis. One of these units is an 8 Mfd., 450 volt condenser, Part No. 2803. The other unit is a 4 Mfd., 450 volt condenser, Part No. 3366.

In replacing the electrolytic condenser units great care should be taken to wire them in with the correct polarity. Tag the leads when they are taken off the old condensers. The positive terminal of the condenser is identified by a + symbol on the box. The positive lead in the chassis can be determined by referring to the schematic circuit diagram.