

For Screws, Nuts and Small Parts in Sets and Speakers, See Page 229.

<p>PAGE</p> <p>254 N and N-3 Illustrations</p> <p>254 N and N-3 Parts List</p> <p>220 N Circuit</p> <p>255 J and JB Illustrations</p> <p>255 J and JB Parts List</p> <p>241 J Circuit</p>	<p>PAGE</p> <p>236 Pick-up Circuit and Description</p> <p>237 Motor Circuit and Description</p> <p>237 Automatic Switch</p> <p>238 Motor Board Illustrations</p> <p>238 Parts List</p> <p>239 Tabulated Phonograph Data</p> <p>240</p>
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SPEAKER DATA

PHONOGRAPH DATA

SUBJECT		TYPE OF CHASSIS								
		L-1	L-2	F	F	Q-1	Q-1	Q-2	D-1	D-2
		PAGE	PAGE	PAGE	PAGE	PAGE	PAGE	PAGE	PAGE	PAGE
Top View	227	227	227	227	227	244	244	244	251	251
Bottom View	228	228	228	233	228	245	245	245	252	252
Schematic Diagram	220	221	230	231	241	241	241	246	247	247
Connection of Units	222	224	232	234	242	242	242	248	248	248
Bottom Wiring	223	225	233	235	—	243	243	250	249	249
Voltage Table	220	221	253	221	241	241	241	246	246	246
Parts List	227	227	230	231	244	244	244	253	252	252
	228	228	231	231	244	244	244	253	252	252
	229	229	239	239	245	245	245	253	252	252

CHASSIS DATA

<p>PAGE</p> <p>218 Table of Sets and Speakers</p> <p>219 Important Service Notes</p> <p>219 Synchronizing Variable Condensers</p> <p>226 Variable Condenser Unit</p>	<p>PAGE</p> <p>226 Coil Group</p> <p>254 Centering Top Pole Piece</p>
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GENERAL SERVICE DATA

TYPE L, F, P, Q AND D CHASSIS RECEIVERS
AND
TYPE N, N-3, J AND JB SPEAKERS

Service Data

AT WATER KENT RADIO

1. In the Types L, F, R, D and Q chassis receivers, it is very important to arrange the three control-grid leads to the screen-grid tubes exactly parallel to each other. If these leads are not parallel, and two of them come close together, the dial readings will not be accurate, especially at the high-frequency end of the scale.
2. When replacing a flexible resistor, care must be taken to use a resistor having the same value. In the event of any uncertainty make a continuity meter reading of a good

IMPORTANT SERVICE NOTES

1. Connect the common pick-up lead from the four R, F, oscillators to one end of a No. 812 condenser. Connect the other end of this condenser to the Long-Antenna post. Connect the oscillator container to the Ground post.
2. Connect an output measuring circuit to the set.
3. Put all tubes in the set; power switch on; volume control at maximum; local-distance switch at distance.

SYNCHRONISM.

When adjusting the trimmer condensers, it is necessary to have a four-wave oscillator, providing modulated signals at 1500, 1000, 800 and 600 kilocycles. The oscillator signals should come in at exactly these settings on two or more Type L sets THAT HAVE THE ORIGINAL FACTORY

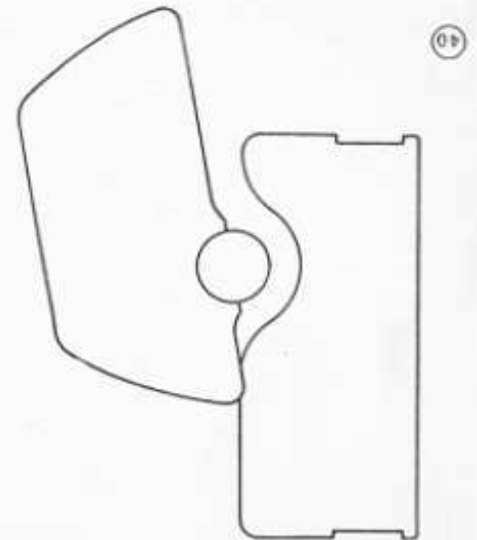
4. Turn pointer exactly to the 1500 K. C. mark. Reduce or increase the amount of pick-up from the 1500 K. C. oscillator to secure a reading of about 20 on the output meter.
5. With a screw-driver, turn the pressure screw of the 4th trimmer condenser (on front variable condenser) one way or the other, as necessary, to the point where the reading on the output meter is greatest. Repeat this process on the 3rd trimmer, then on the 2nd, and finally on the 1st. Reduce the pick-up from the oscillator if necessary in order to keep the needle of the galvanometer near the centre of its scale.

ADJUSTING TRIMMER CONDENSERS

- (1) Loosen the dial gear set screws.
- (2) Move the rotor plates to the position shown in Figure 218.
- (3) With the rotor in this position, adjust the pointer to the 1500 K. C. position and tighten the dial gear set screws.
- (4) Note how far down on the 1500 K. C. mark the pointer comes, then turn the condenser knob to the 550 K. C. mark. The pointer should come down on this mark approximately the same as on the 1500 K. C. mark. If it does not, it is an indication that the front panel is not centered.
- (5) If the front panel is not centered, loosen the screw at each end of the bottom of the front panel and shift the panel one way or another as necessary. Tighten the panel screws and then reset the pointer accurately.

When the variable-condenser unit has been replaced or adjusted in any way, it is necessary to check the alignment as follows:—

FIG. 218. POSITION OF ROTOR BLADES FOR 1500 K. C.



3. A number of different code markings may be used to identify by-pass condensers that have the same part number. If the part number is the same, the condensers are interchangeable, even though the code markings are different.
- resistor of the same type in a stock set, and then use a replacement resistor that gives the same reading on the continuity meter.

DIAGRAM

VOLTAGE TABLE FOR TYPE L-1 CHASSIS

Set in operation. Volume control at maximum.

L-D Switch at distance.

Use High Resistance D. C. Voltmeter (about 0.50-250) to Measure Plate and Grid Voltages. Use A. C. Voltmeter to Measure Filament Voltages.

APPROX. VOLTAGES, USING 120 V LINE

TUBE	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
1st-R.F.	2.4	185	6	85
2nd-R.F.	2.35	185	4.5	86
3rd-R.F.	2.35	185	4.5	86
Detector	2.35	120	12**	—
1st-A.F.	2.35	75	3.5	—
2A	2.45	265	55*	—
2Aa	2.45	265	55*	—
Rectifier	5.	—	—	—

* Use 250-volt scale.

** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 1/2.

All readings made from cathode in heater-type tubes, and from -F in plain-filament-type tubes.

In order to identify modifications of each chassis, where such modifications require new part numbers, a numeral is used after the type letter. Thus the 1st style of Type L chassis (below No. 6,234,881) is termed Type L-1, and the 2nd style (above No. 6,234,881) is termed Type L-2. This marking is for use only in Service literature and will not appear on the serial-number plates.

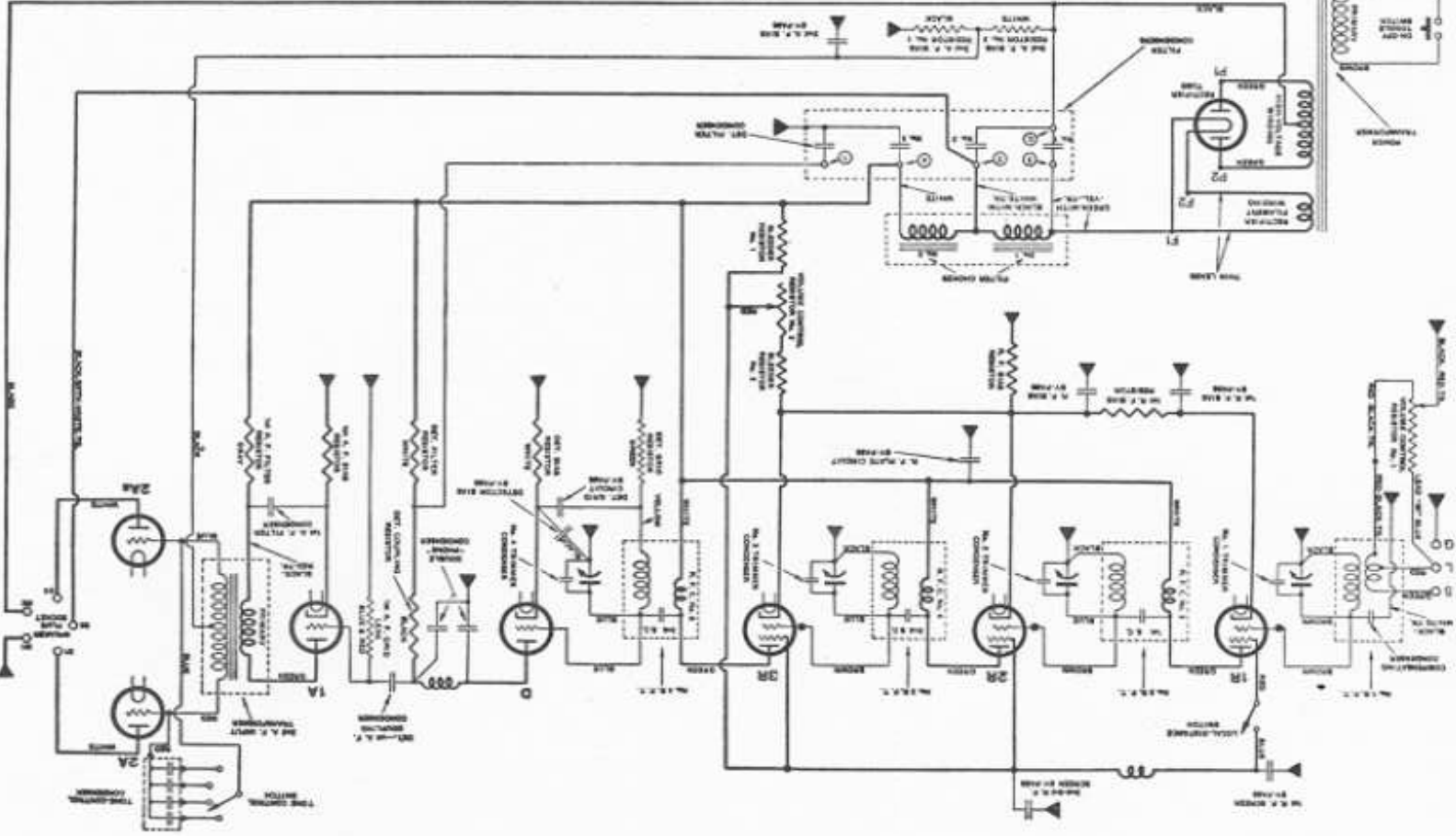
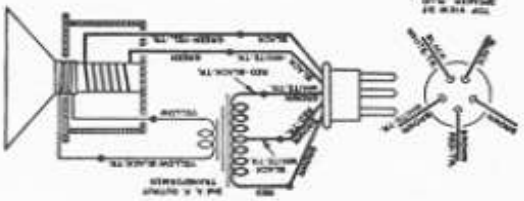
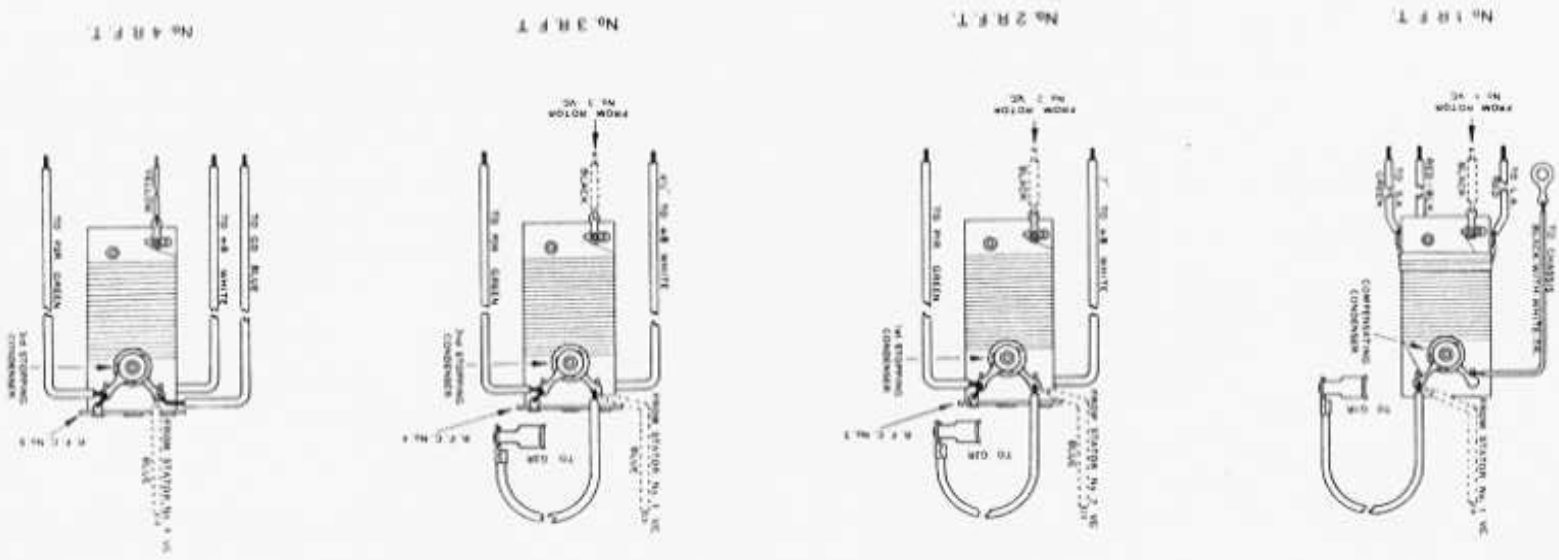


FIG. 219. DIAGRAM OF L-1 CHASSIS.



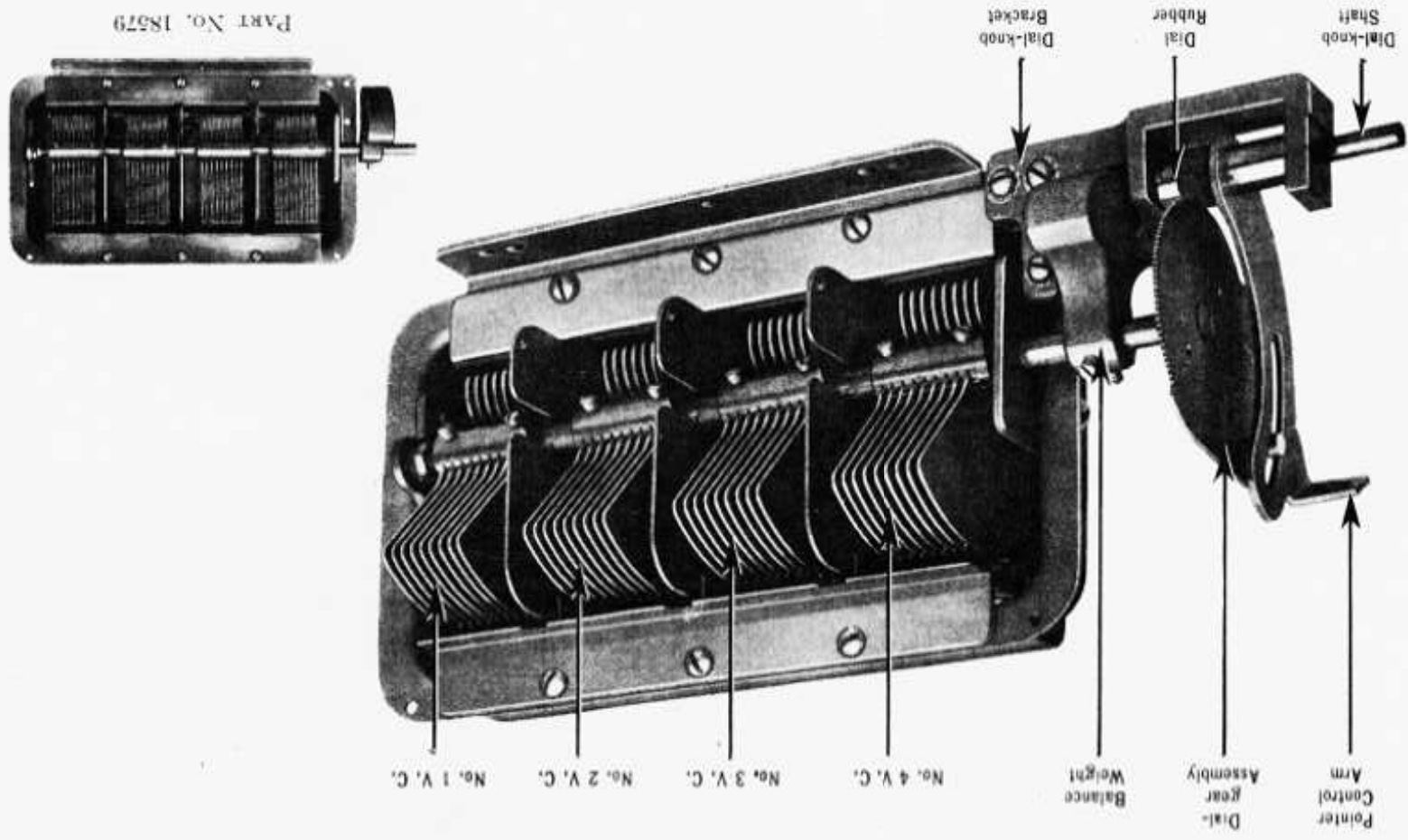
If one R. F. F. coil or R. F. C. Nos. 3, 4 or 5, is defective, the complete coil group must be replaced. If the compensating condenser or one of the stoping condensers is defective, it may be replaced without changing anything else.

FIG. 226. CONNECTIONS OF R. F. COIL GROUP IN L-2 AND F CHASSIS.



IMPORTANT: DO NOT disturb the adjustment of the rotor set-screws nor the bearing screw at the rear end of the shaft. If any section of this condenser is seriously damaged, the stator, rotor and frame (with balance weight) unit (No. 18579) should be replaced.

FIG. 225. VARIABLE-CONDENSER ASSEMBLY.



PART NO. 18579

17077	Filament shunt resistor
18236	Dial light resistor (yellow)
17090	Bleeder resistor No. 2
16320	1st-A.F. bias resistor
16320	1st-R.F. bias resistor
16350	R.F. bias resistor

FLEXIBLE RESISTORS

17345	Metal clamping strip
17342	Fibre pad
17341	Mounting bracket
15892	Detector grid resistor (green)
16724	Detector filter resistor (white)
15285	1st-A.F. filter resistor (gray)
15592	Detector coupling resistor (black)
16724	Detector bias resistor (white)
16282	1st-A.F. grid leak (blue or blue and red)

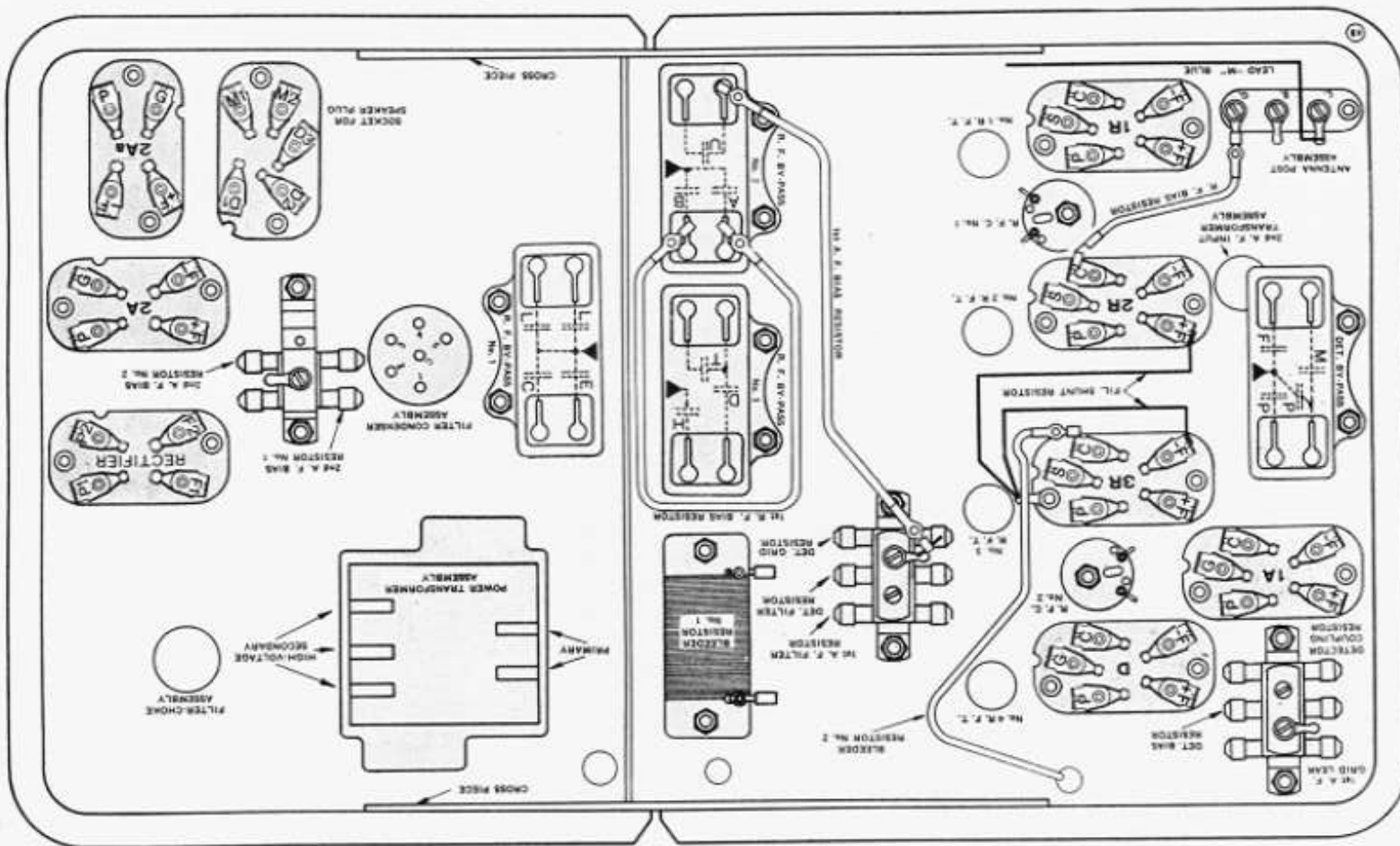
THREE-RESISTOR-GROUPS

17343	Metal clamping strip
17344	Fibre pad
17341	Mounting bracket
16724	2nd-A.F. bias resis. No. 2 (white)
15592	2nd-A.F. bias resis. No. 1 (black)

TUBULAR RESISTORS
TWO-RESISTOR GROUP

A line fuse (2-amperes) and fuse holder are mounted at the right of R.F. by-pass No. 1 in later-type sets. In L-1 chassis, the filter condenser assembly has five contacts instead of six as shown.

FIG. 228. BOTTOM VIEW OF TYPE L-2 AND P CHASSIS.



FIXED CONDENSERS

15790	R.F. by-pass No. 1
15770	R.F. by-pass No. 2
15780	R.F. by-pass No. 3
15640	Detector by-pass
16490	Tone-control condenser

SOCKETS

17518	R.F. sockets (3 used)
17519	Detector or 1st-A.F. socket (2 used)
17511	2Aa socket
17509	2A socket
17508	Rectifier socket
18007	Speaker-plug socket
17377	Socket insulator (fibre sheet) (5 used)
18016	Speaker-plug-socket insulator
18449	Fuse socket
16420	Dial-light socket and reflector, one-hole mounting (less leads)
16420-A	Dial-light socket and reflector, two-hole mounting (less leads)

Part No.

Part No.

Part No.

Part No.

Part No.

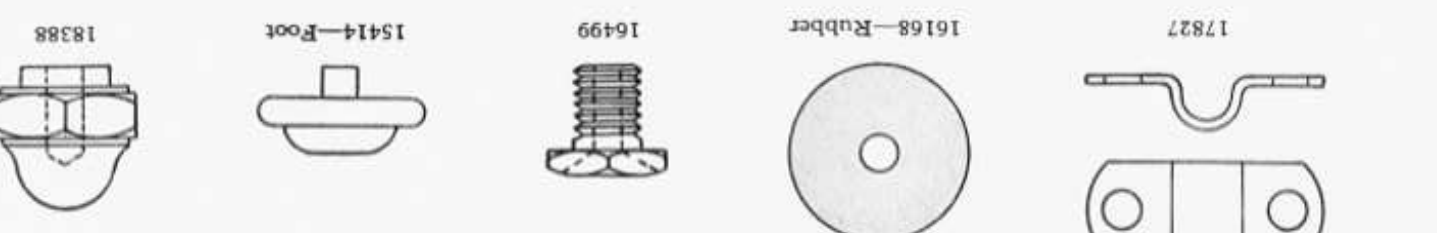
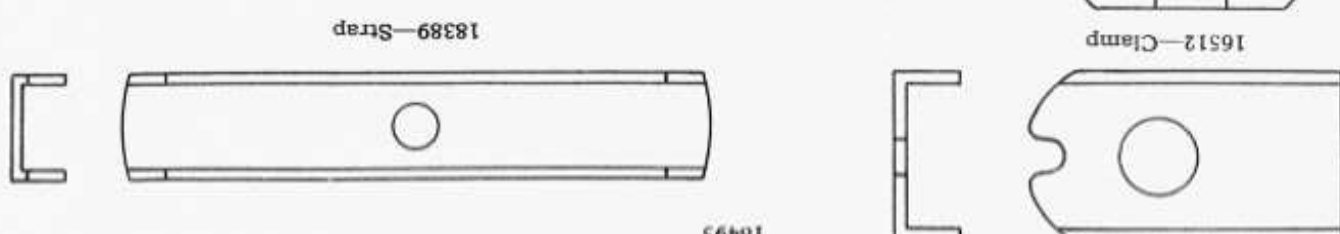
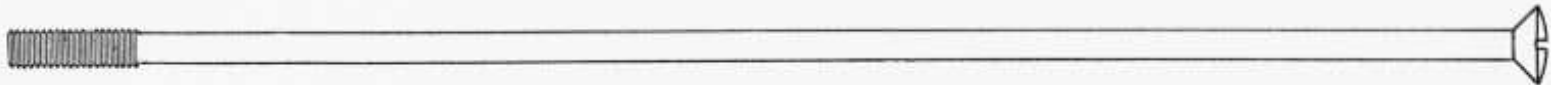
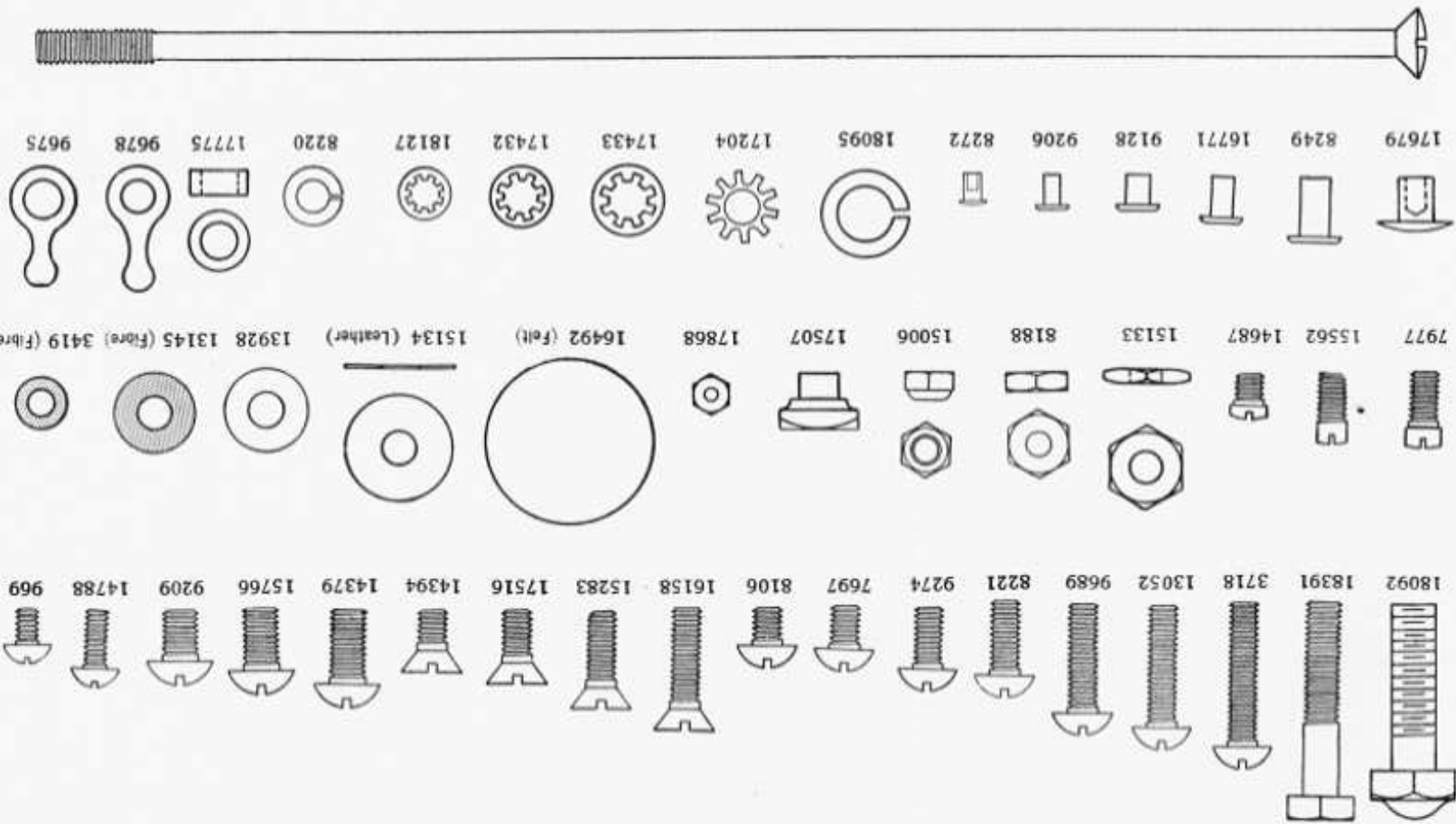
Part No.

PARTS LIST—TYPE L, No. 16000, CHASSIS (Cont'd)

MISCELLANEOUS PARTS

Part No.	Description	Part No.	Description
17524	110-volt cable with plug	15214	Tube-shield base (3 used)
8956	110-volt plug only	17326	Detector cap
16741	Insulating bushing for 110-volt cable	17223	Cross piece (10" x 1/8"—2 used)
16742	Bushing-retaining spring	17632	Detector-cap lead (brown)
17521	Antenna binding posts and base	18118	"Guide" Card (form F-680)
17323	Antenna and ground post base	18119	Log Card (form F-681)
8215	Binding post	17989	Tuned-radio-frequency name-plate
17536	Bottom plate	18534	Line fuse (2-ampere)
18117	Balance weight for variable condenser	16220	Literature assembly
13989	Ground clamp	18122	Instruction book
15213	Tube-shield (3 used)	18123	Shipping container

SMALL PARTS ON L, F, P, Q, D RECEIVERS, AND J, JB, N, N-3 SPEAKERS
ILLUSTRATIONS ARE FULL SIZE



REFER TO NUMERICAL LIST FOR PRICES.

December, 1930.

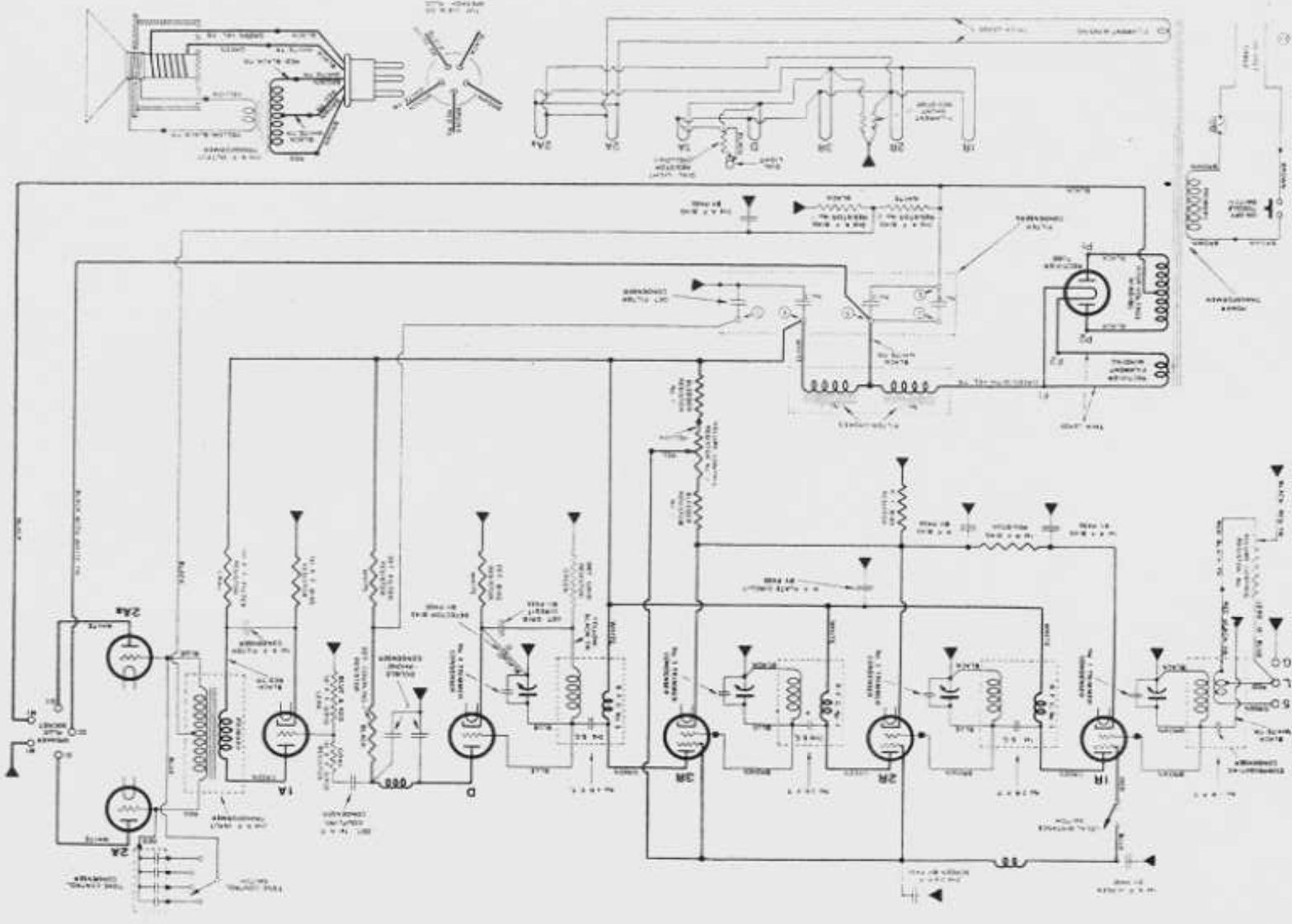
15880	Power-transformer	15790	R.F. by-pass No. 1 (before No. 5802566)
18645	Power-transformer lid with name-plate	15262	R.F. by-pass No. 1 (after No. 5802566)
16520	Filter-condenser assembly	15285	1st-A.F. grid resistor, gray (after No. 5802566)
18188	Filter-condenser case	16590	Literature assembly
17534	Filter-condenser spacer (fibre)	18256	Instruction book
16260	Filter-choke	18257	Shipping container
17302	Filter-choke lid		

PARTS LIST—TYPE F, No. 16100, CHASSIS

All parts not listed below are same as those used in Type L, No. 16000, Chassis, on Pages 227, 228 and 229.

In some early-type F chassis, a line by-pass condenser is used and the 1st-A. F. grid resistor (gray) is omitted. In later-type F chassis, the filter condenser has only four contacts, as shown on Page 232, and the top of the 1st-A. F. grid leak is connected to the opposite end of the 1st-A. F. grid resistor, as shown on Page 233.

FIG. 229. WIRING DIAGRAM OF TYPE F CHASSIS.



(For Voltage Table, See Page 253)

TYPE F CHASSIS, DIAGRAM AND PARTS LIST

TYPE F CHASSIS RECEIVER

Condensers in R.F. By-Pass No. 1

- C—2nd-A.F. bias by-pass.
- E—1st-R.F. screen by-pass.
- F—2nd-3rd-R.F. screen by-pass.

Condensers in R.F. By-Pass No. 2

- A—1st-R.F. bias by-pass.
- B—R.F. bias by-pass.
- U—1st-A.F. filter condenser.

Condensers in R.F. By-Pass No. 3

- D—Detector bias by-pass.
- H—R.F. plate-circuit by-pass.
- T—Detector grid-circuit by-pass.

Condensers in Detector By-Pass

- M—Detector-1st A.F. coupling condenser.
- P—“Phone” condenser.
- P—“Phone” condenser.
- R—Filament by-pass.

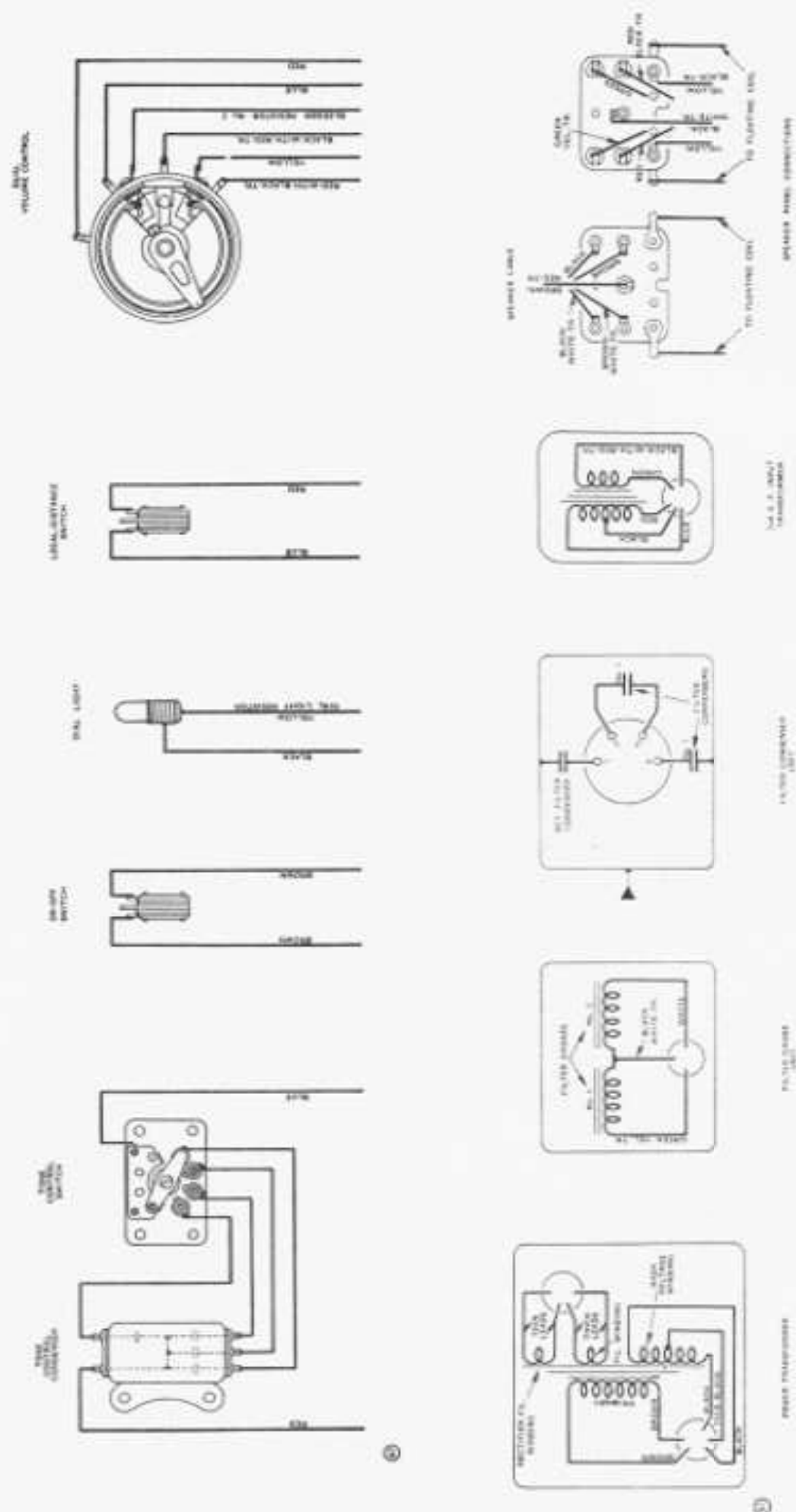


FIG. 251. CONNECTIONS OF UNITS IN TYPE F CHASSIS. In some early Type F Chassis, the filter condenser has five contacts as shown on Page 250.

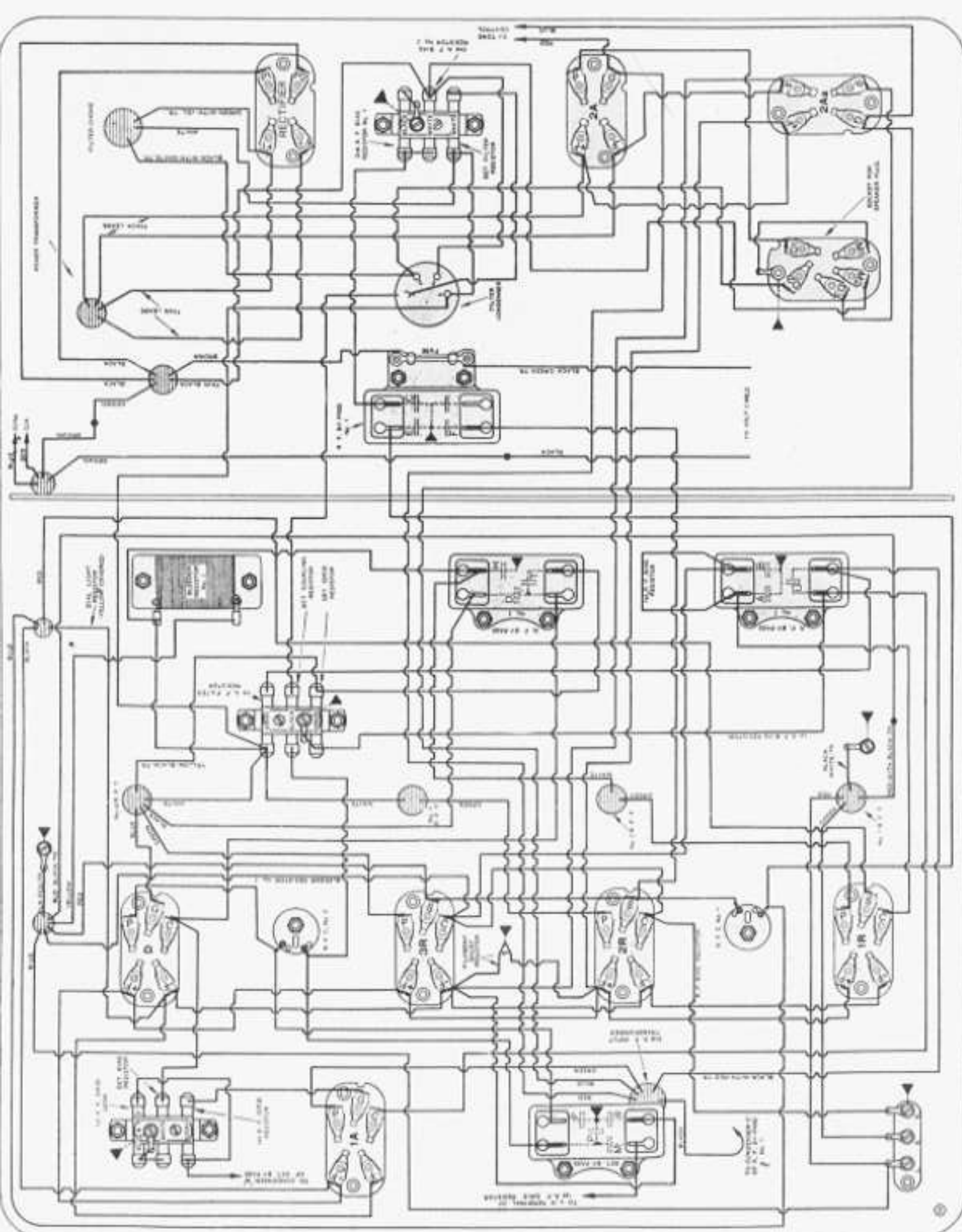


FIG. 252. BOTTOM WIRING OF TYPE F CHASSIS RECEIVER
 In some early Type F Chassis a line incandescent filament is used, and the 1A-A, F, grid (arrow) is omitted. Also, the filter condenser has five contacts as shown on Page 230.

TYPE D-1 CHASSIS, VOLTAGE TABLE AND DIAGRAM

VOLTAGE TABLE FOR TYPE D CHASSIS

Set in operation. Volume control at maximum.
L-D switch at distance.

Resistance D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages.
Use A. C. Voltmeter to Measure Filament Voltages.

APPROX. VOLTAGES, USING 120 V. LINE

FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
3.3	75	4.2	60*
3.3	75	1.3	50
3.3	75	1	50
5	20	—	—
5	45	6	—
5	75	10	—
5	80	10	—

*s made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.
It scale to measure 2nd A. F. grid voltage.
volts in D-2 chassis.

Type D Chassis (D. C. o three stages of screen-grid R cation, detector, one stage of —coupled A. F., and a “d output stage.

This set is designed for electro-dynamic type N-3 spe

The early Type D Chassis as the D-1. A later modification as the D-2. For an explanation difference between these two Page 249.

TYPE D-2 CHASSIS

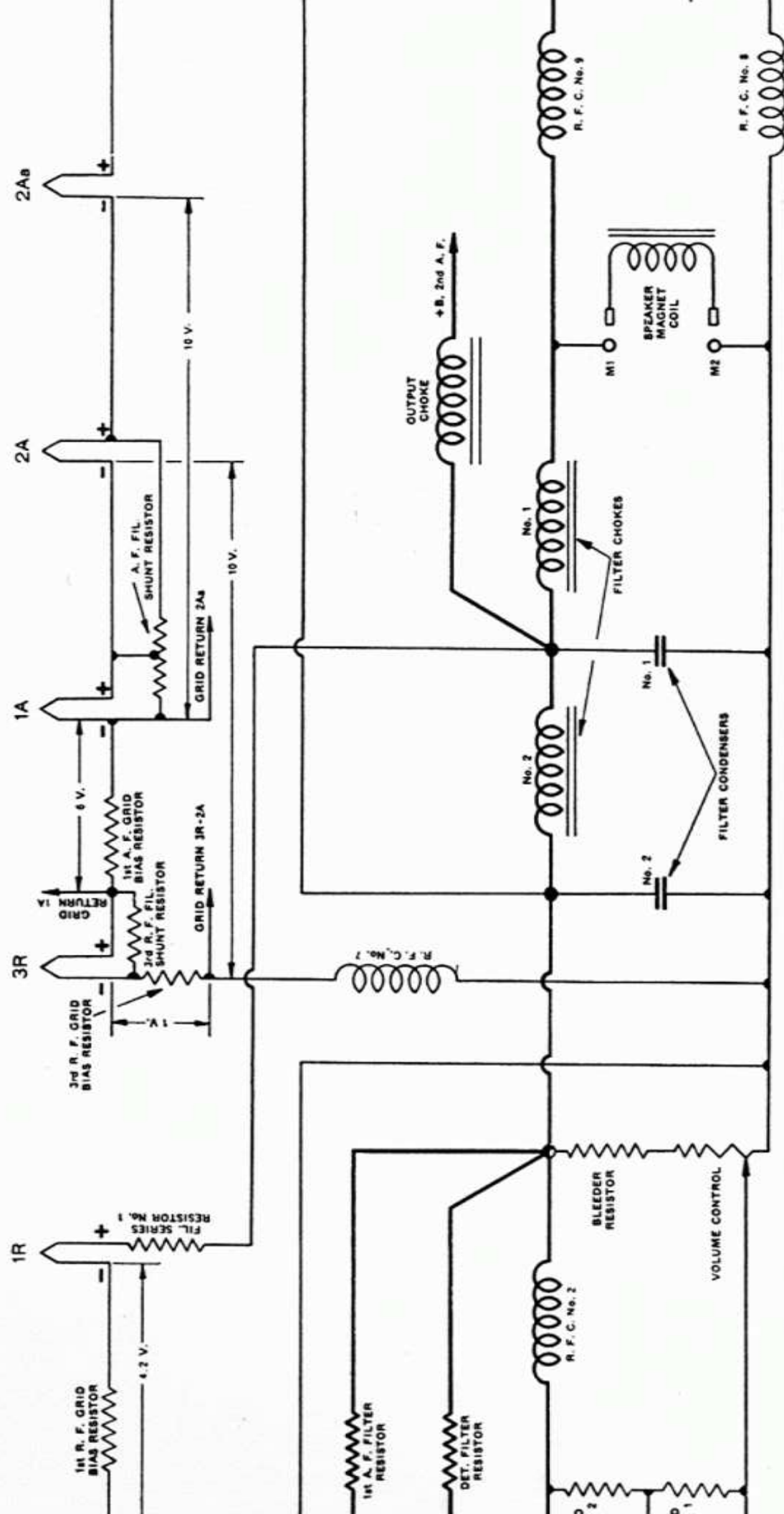


FIG. 247. SIMPLIFIED DIAGRAM OF POWER UNIT AND FILAMENT CIRCUIT IN TYPE D CHASSIS.

stage for any one tube is secured by bringing the grid-return lead of the tube to a point in the filament circuit that has the voltage with respect to the negative filament terminal of the same tube. This is clearly indicated in the above diagram.

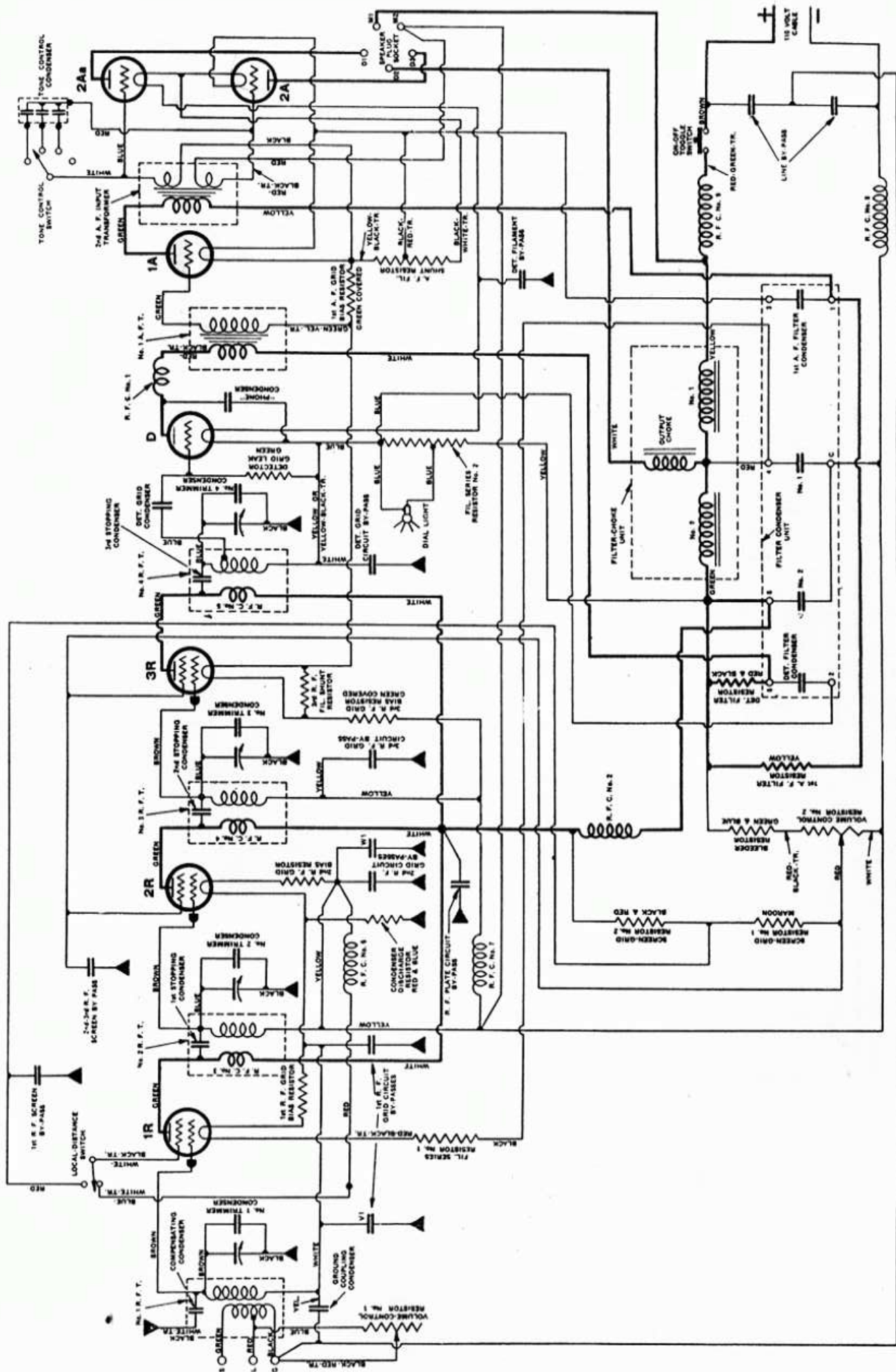


FIG. 248. SCHEMATIC DIAGRAM OF TYPE D-2 CHASSIS.

Note the addition of by-pass condensers V-1 and W-1 and the reversal of screen-grid resistors No. 1 and No. 2.

TYPE D CHASSIS RECEIVER

Condensers in R.F. By-Pass Pass No. 1

- L—Line by-pass.
- L—Line by-pass.
- U—Ground coupling condenser.

Condensers in R.F. By-Pass No. 2

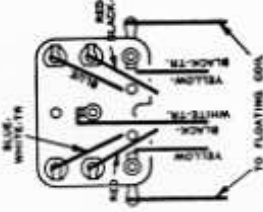
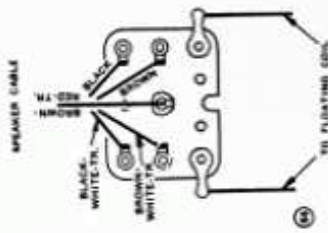
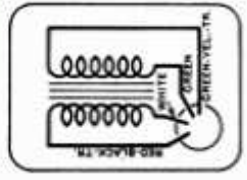
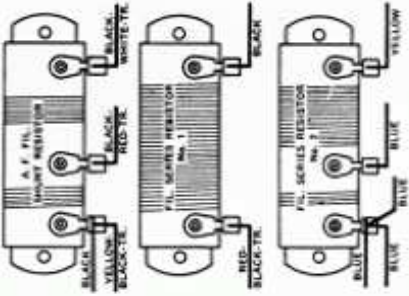
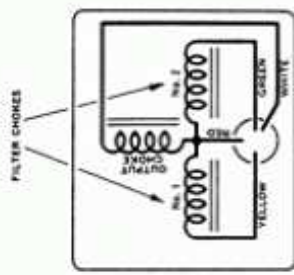
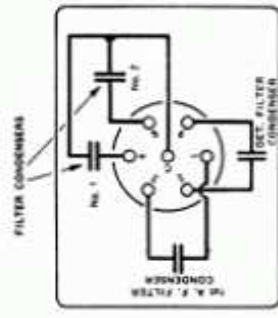
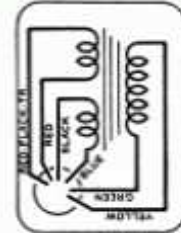
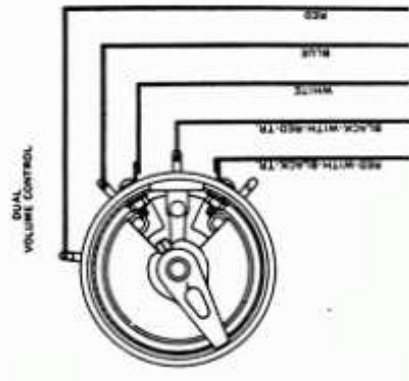
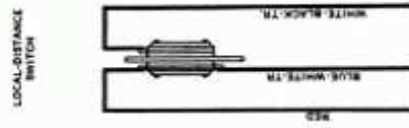
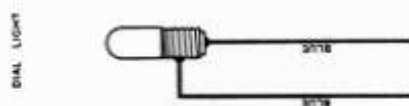
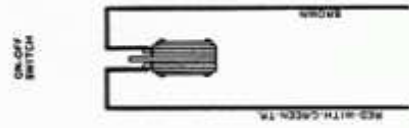
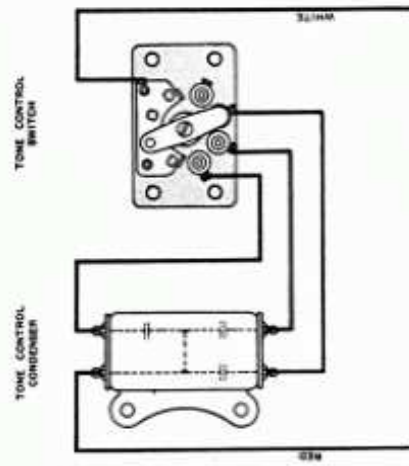
- E—1st-R.F. screen by-pass.
- F—2nd-3rd-R.F. screen by-pass.
- V₁—1st-R.F. grid-circuit by-pass.
- W₁—2nd-R.F. grid-circuit by-pass.

Condensers in R.F. By-Pass Pass No. 3

- H—R.F. plate-circuit by-pass.
- S—Detector filament by-pass.
- P—"Phone" condenser.

Condensers in R.F. By-Pass No. 4

- D—Detector grid-circuit by-pass.
- V—1st-R.F. grid-circuit by-pass.
- W—2nd-R.F. grid-circuit by-pass.
- X—3rd-R.F. grid-circuit by-pass.



2ND A.F. INPUT CONNECTIONS

FILTER CONDENSER UNIT

FILTER CHOKE UNIT

FILAMENT RESISTOR ASSEMBLY

No. 1 A.F. I.

SPEAKER PANEL CONNECTIONS

FIG. 249. CONNECTIONS OF UNITS IN TYPE D-1 AND D-2 CHASSIS.

17490 R.F. coil group.
 16360 Stopping condenser (3 used)
 16360 Compensating condenser (1 used)
 17295 R.F. coil shield (4 used)

If one R.F. coil or R.F.C. No. 3, No. 4, No. 5, is defective, the ENTIRE coil group must be replaced.

18148 Base
 18146 Shaft
 18112 Contact blade

16430 TONE-CONTROL SWITCH COM-
 PLETE

17070 No. 1 A. F. transformer
 16640 2nd-A. F. input transformer

16890 Filter-choke
 18232 Filter-choke base plate
 18638 Filter-choke lid and name-plate
 14710 Filter-condenser
 18188 Filter-condenser case
 17534 Filter-condenser spacer (fibre)

COIL GROUP

No separate parts, except those listed above will be supplied for variable-condenser unit

17962 Pointer control arm
 17961 Dial-rubber assembly
 17941 Dial-knob shaft
 17935 Dial-knob bracket support (threaded)
 Dial-knob bracket support (threaded)
 18144 Dial-knob bracket (two-hole mounting)
 17936 Dial-knob bracket (one-hole mounting)
 18615 Dial-gear
 16420-A Dial-tight socket and reflector two-hole mounting (less leads)
 16420 Dial-tight socket and reflector, one-hole mounting (less leads)
 16099 Dial light
 17291 Rotor-connection (short)
 17107 Rotor-connection (long)

VARIABLE CONDENSER STATOR, ROTOR AND FRAME (WITH LEADS AND BALANCE WEIGHT)

18579

POWER UNITS

17959 Dial pointer
 18223 Tone-control condenser clamp
 17814 Dial knob
 16576 Volume-control cover
 17876 Volume-control bracket
 16630 Volume-control
 16740 On-off switch
 16760 Local-distance switch
 17244 Volume-control or tone-control knob
 17985 Escutcheon
 17224 Front panel brace (2 used)
 18581 Front panel complete
 18085 Front panel with dial plate

FRONT PANEL ASSEMBLY

18579 VARIABLE CONDENSER STATOR, ROTOR AND FRAME (WITH LEADS AND BALANCE WEIGHT)

17107 Rotor-connection (long)
 17291 Rotor-connection (short)
 16099 Dial light
 16420 Dial-tight socket and reflector, one-hole mounting (less leads)
 16420-A Dial-tight socket and reflector two-hole mounting (less leads)
 18615 Dial-gear
 17936 Dial-knob bracket (one-hole mounting)
 18144 Dial-knob bracket (two-hole mounting)
 17935 Dial-knob bracket support (threaded)
 Dial-knob bracket support (threaded)
 17941 Dial-knob shaft
 17961 Dial-rubber assembly
 17962 Pointer control arm

Part No.

Part No.

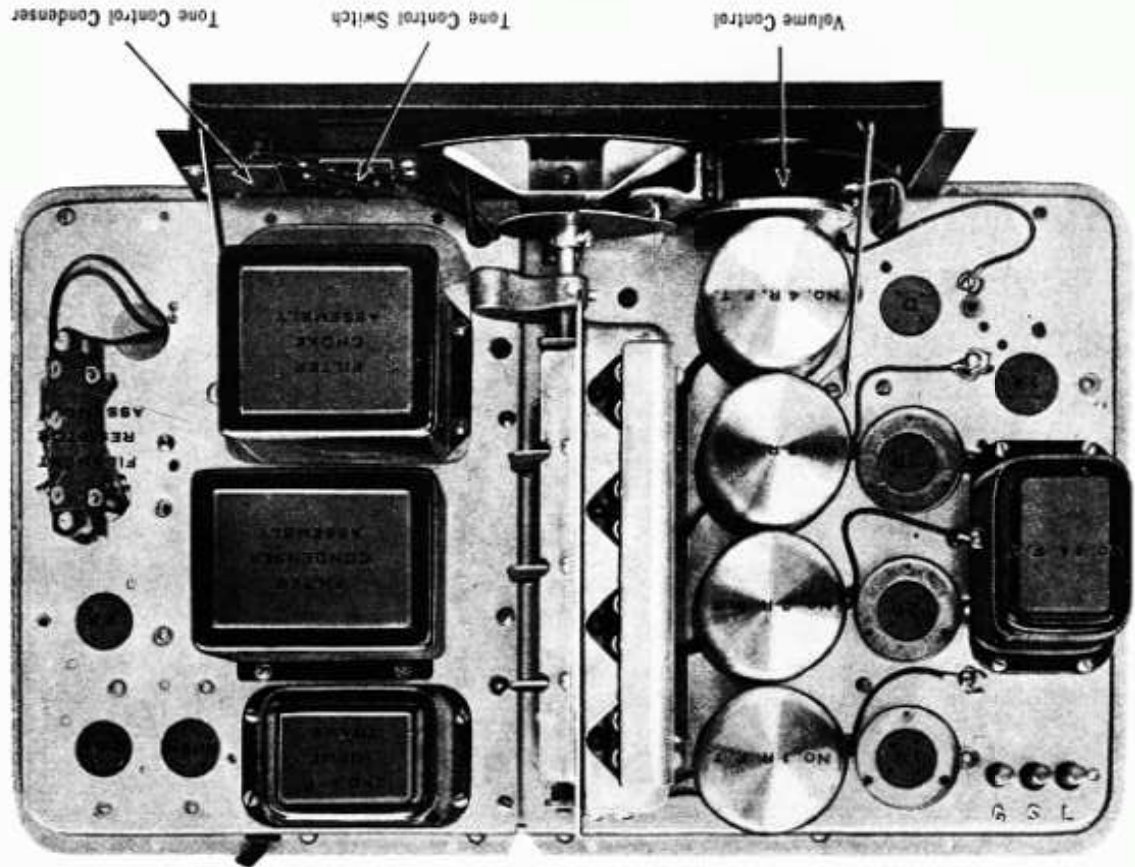


Fig. 252
TOP VIEW OF TYPE D CHASSIS.

MISCELLANEOUS PARTS

(For screws, nuts, washers and small parts—see page 229.)

17524	110-volt cable, with plug	17223	Cross piece (10" x 1/8"—2 used)
8956	110-volt plug only	17632	Detector cap lead (brown)
16741	Insulation bushing for 110-volt cable		Trimmer-condenser sealing wax
16742	Retaining spring	18118	"Guide" card (form F-680)
17521	Antenna binding posts and base	18119	Log card (form F-681)
17323	Antenna and ground post base	18113	Tuned radio-frequency name-plate
8215	Binding Post	18534	Fuse (2 amperes)
17536	Bottom Plate	18051	Instruction book
13989	Ground-clamp	15910	Literature assembly
15213	Tube-shield (3 used)	18489	Shipping container
15214	Tube-shield base (3 used)	18117	Balance weight for variable con-
17326	Detector cap		denser

VOLTAGE TABLE FOR TYPE F CHASSIS

Set in operation. Volume control at maximum.

L-D switch at distance.

Use High Resistance D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages.
Use A. C. Voltmeter to Measure Filament Voltages.

APPROX. VOLTAGES, USING 120 V. LINE

TUBE	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
1st-R.F.	2.5	180	6	92
2nd-R.F.	2.5	180	4	93
3rd-R.F.	2.5	180	4	93
Detector	2.5	117	30**	—
1st-A.F.	2.4	70	2	—
2A	2.7	250	55*	—
2Aa	2.7	250	55*	—

All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.
* Use 250-volt scale.
** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2.

Centering Top Pole Piece in Electro-Dynamic Speakers

In later-type electro-dynamic speakers, the top pole piece does not have a centering disc. For this reason it is necessary to center the top pole piece whenever this part is replaced or adjusted. This centering requires three gauges. Each gauge may be a three-inch length of No. 54 drill-rod, or if desired the shanks of three No. 54 drills may be used for the same purpose.

Procedure: (1) Loosen the nuts that clamp the top pole piece, the cone housing, and the field-coil case.

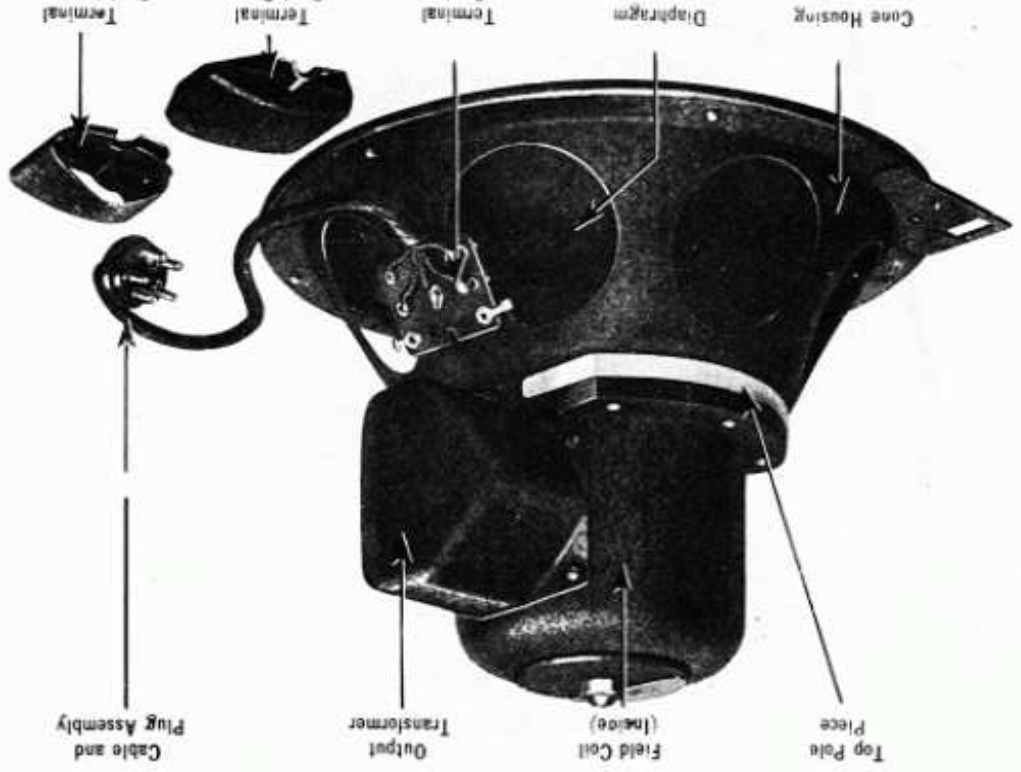
(2) Insert the three gauges in the magnet gap, as illustrated in Figure 254. Tighten the bolts very securely and then remove the gauges.

FIG. 254. (At Right.)
SHOWING GAUGES IN POSITION WHILE TIGHTENING TOP POLE PIECE.

PARTS LIST—TYPE N, N-3, CHASSIS SPEAKERS

(For screws, nuts, and small parts, see Page 229.)

Part No.	TYPE N, No. 16400	TYPE N, No. 16400 (Cont'd)
18081	Diaphragm	Cone-housing with terminal card
16410	Field coil	Terminal card
18093	Field-coil insulator	Terminal-card insulator
18075	Field-coil spacer	Terminal-card cover
18055	Top pole piece	Cable and plug assembly

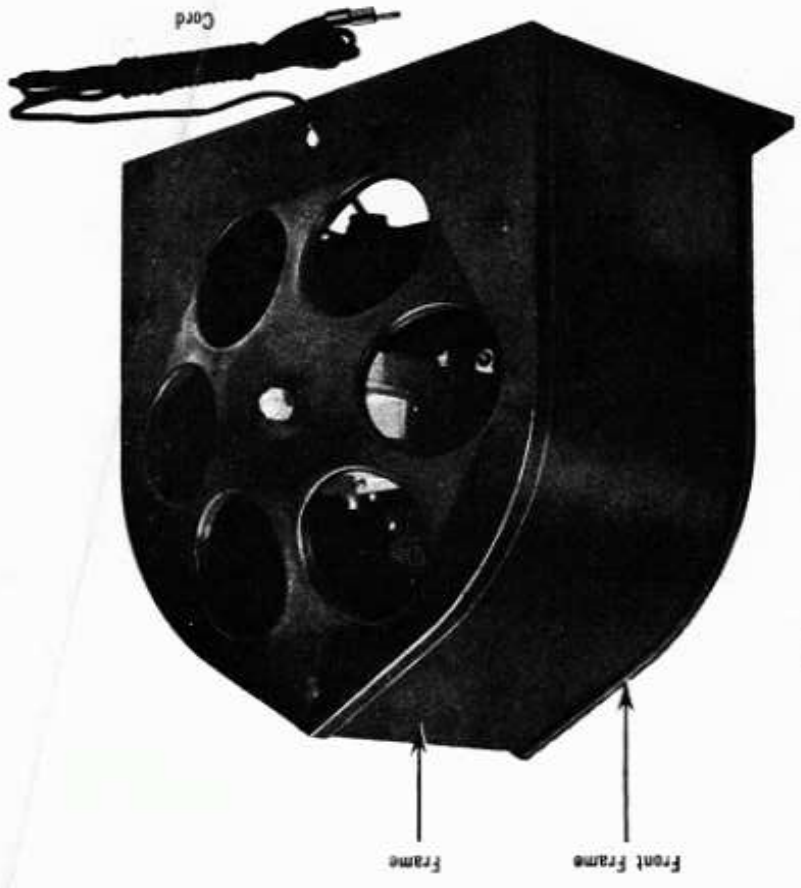


Part No.	TYPE N-3, No. 16900
17020	Field coil
16390	Output transformer (before No. 747302)
16390-A	Output transformer (after No. 747302)
5	Conductor cable
18542	Instruction sheet
15578-N-3	Shipping container

Parts not listed below are same as those used in "N" No. 16400 Chassis speaker.

REFER TO NUMERICAL LIST FOR PRICES.

Fig. 258, Type JB Speaker (Rear View).

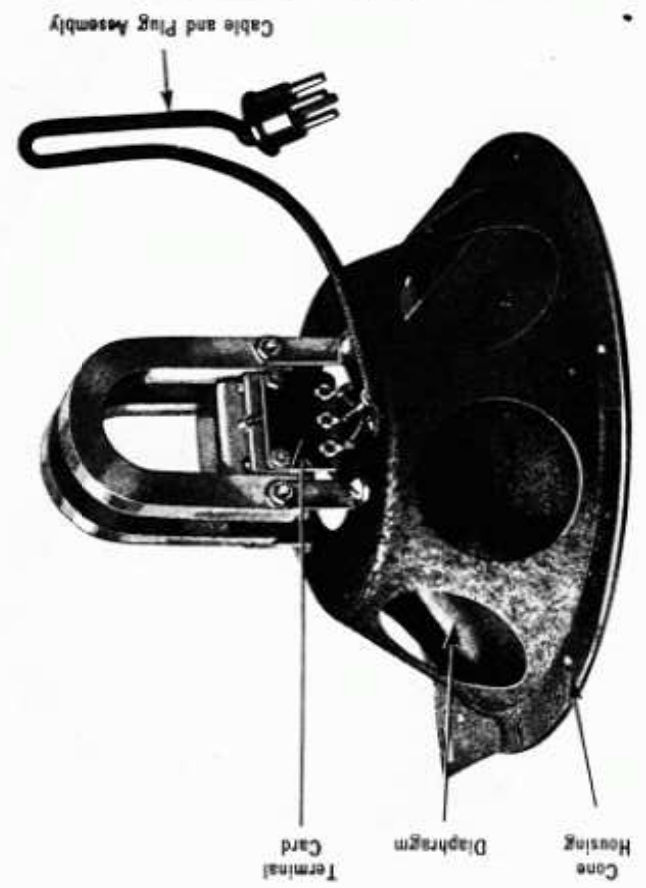


17847	Cone housing
17864-B	Sound unit, less resistor
19345	Terminal card, less resistor
19346	Resistor (green and red)
18577	Frame
18578	Felt pad (1 used)
16734	Front frame
16735	Front screen
4259	Cord
2-Conductor	Cable
18573	Instruction sheet
16695	Shipping container

NOTE:—All parts not listed below are same as used in Type "J" No. 16920 Chassis Speaker.

TYPE "JB" SPEAKER, No. 17010

Fig. 256, Type J Speaker.



No separate parts are furnished for the No. 17864 and 17864-B sound units in the type J and JB inductor speakers. If any part of the sound unit (illustrated at right) requires re- placement or adjustment, return the complete unit, exactly as shown, to your distributor.

IMPORTANT

Fig. 257, No. 17864, Sound Unit, COMPLETE.



17856	Diaphragm
17864	Sound unit complete
17862	Terminal card
17858	Cone housing
17866	Cable and plug assembly
15079	Plug only
17827	Cable clamp
14382	Steel ring (3 segments)
3-Conductor	cable
17872	Instruction sheet
19336	Shipping container

TYPE J, No. 15920, CHASSIS SPEAKER

(For screws, nuts, and small parts, see Page 229.)

INDUCTOR SPEAKERS

PARTS LIST - TYPES J AND JB