Atwater Kent

Model: 60	Chassis:	Year: Pre October 1936
Power:	Circuit:	IF:
Tubes:		
Bands:		

Resources
Riders Volume 7 - CHANGES 7-10
Riders Volume 1 - A.-K. 1-24
Riders Volume 1 - A.-K. 1-25
Riders Volume 1 - A.-K. 1-27
Riders Volume 3 - A-K 3-28

Atwater Kent 60

The first or early type of Model 60 —*see A-K page 3-29 in Rider's Volume III and page 167 in the Rider-Combination Manual*—has a single volume control and the second or late type—*see A-K page 3-31 in Rider's Volume III and page 169 in the Rider Combination Manual*—has a dual volume control made up of combined wire-wound and carbon resistors.

First or Early Type:

When replacing the bleeder resistor, use No. 16295 wire-wound resistor, 4000 ohms. When replacing the first r-f. bias resistor, use No. 16253 wire-wound resistor, 1500 ohms and replace the r-f. bias resistor with No. 16988, 160 ohms.

Second or Late Type:

The bleeder resistor No. 1 was made in two types. The first type, No. 16905, consists of two 3000-ohm wire-wound resistors riveted together and connected in series. The second type, No. 17041, is a single 6000-ohm wire-wound resistor with a tap at the center. Use No. 17041 for servicing.

In early production of the second type Model 60, bleeder resistor No. 2 was wound on the same fibre base as the first r-f. bias resistor, the part number of the combined unit being No. 16872. If either section of this combined unit is defective, remove the unit and use a No. 16253 (1500 ohms) as r-f. bias, and a No. 15660 (1050 ohms) as bleeder No. 2. Later production of the second type Model 60 used a separate No. 15660 resistor as bleeder No. 2.

In early production of the second type Model 60, the first r-f. bias resistor was wound on the same fibre base as bleeder resistor No. 2, the number of the combined unit being No. 16872. If either section of this unit is defective, remove the unit and use a No. 16253 as a first r-f. bias resistor and a No. 15660 as bleeder No. 2. Later production of the second type Model 60 used a separate No. 16253 as first r-f. bias resistor.

Use a No. 16988 resistor (160 ohms) for replacement of the r-f. bias resistor.

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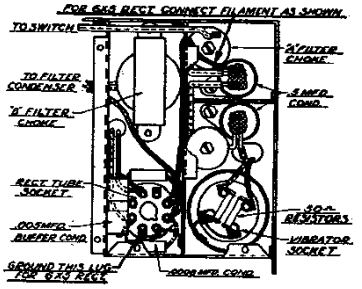
Motorola Golden Voice

We have been advised by the manufacturer that intermittent operation of their Motorola Golden Voice models, is due to low battery voltage delivered to the set from the car's battery. Check all connections between the car battery and the radio set to avoid undue voltage drop in the car wiring, as the OZ-4 rectifier tube will fail to start and fail to operate on a battery voltage of less than 5½ volts.

The OZ-4 tube requires 15 milliamperes or more of drain to produce ionization and proper rectification in this tube, and on battery voltages of less than 5½ volts the plate current drain of the receiver is insufficient to provide the 15 milliamperes starting current. Should the car wiring and the condition of the car battery indicate that at times the voltage may fall below 5½ volts, replace the OZ-4 rectifier tube with a 6X5 metal filament type rectifier.

With the exception of a few Golden Voice sets the filament contacts of the rectifier socket have been wired at the factory and the 6X5 rectifier may be plugged in the socket in place of the OZ-4. This will completely eliminate the difficulty due to low battery voltage.

On those Golden Voice sets not having the filament contacts of the rectifier socket wired, this wiring can be inserted by inverting the chassis and removing the cover from the hash compartment and connecting the filament contacts of the rectifier socket, as shown in the accompanying sketch. One contact to ground as indicated by



Connections when using a 6X5 in Motorola Golden Voice set

the heavy arrow at the bottom of the socket and the other contact to the .5 mfd. condenser as indicated by heavy arrow at the top of the sketch. When replacing cover be sure that all screws are tight.

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Federal Model K

Below will be found the voltage data for this receiver, the schematic of which appears on the following pages in *Rider's Manuals: 1-21 in the revised edition; *284 in the early edition, and 987 in the Rider-Combination Manual.*

Tube	Function	Plate to Frame	Grid to Cathode	Scr. Grid to Frame
227	1st R.F.	120	7.5	—
224	2nd R.F.	110	1.5	60
227	Det.	65	0-1	—
227	1st A.F.	135	7.5	—
171A	P.P.O.P.	205	40	—

Emerson 108, 110

The changes listed below have been made in Chassis U5A, on models bearing serial numbers above 758,100. The schematic for models 108 and 110 appeared on *Emerson page 6-17 of Rider's Volume VI.*

Resistor, R-9, changed from 500,000 ohms, Part No. KR-56, to 50,000 ohms, Part No. KR-53. Resistor, R-11, changed from 500,000 ohms to 200,000 ohms, Part No. LR-61. Resistor, R-12, changed from 500,000 ohms to 100,000 ohms, Part No. KR-54. Condenser, C-13, changed from 0.01 mf., Part No. CCC-127, to 0.02 mf., 200 volts, Part No. FC-29. Condenser, C-14, from 0.1 mf. to 0.9 mf., 200 volts, Part No. BBC-131.

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Sparton I-F. Peaks

The following receivers manufactured by Sparks Withington have an i-f. peak of 172.5 kc.:

Models 9-X, 13, 14-A, 15-X, 16-AW, 17, 25-X, 27-X, 28, 30-A, 33, 34, 35, 36, 111-X, 620-X, 750-A, 750-X, 870-A, 870-X.

The following Sparton models have an i-f. peak of 456 kc.: 71, 71-B, 81, 82, 333.

Model 60 has an i-f. peak of 900 kc.

Note: The s-w. converter in Model 16-AW operates on an intermediate frequency of 900 kc.

It is suggested that you write these i-f. peaks on the schematics for these models in your Rider Manuals.

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Atwater Kent 55 and 60

If the first a-f. bleeder resistor is defective in either of these models, replace with a No. 15660 resistor (1050 ohms).

When either the yellow (No. 15544) or the maroon (No. 15545) second a-f. bias resistor requires replacing, do not use a new yellow or maroon resistor, but follow the procedure found below.

Remove both the yellow and maroon resistors and replace the yellow one with a white resistor (No. 16724), 40,000 ohms, 1 watt, and the maroon resistor with a black (No. 15592), 65,000 ohms, 1 watt.

These changes affect only the second a-f. bias resistors in Models 55, 55C, 60 and 60C.

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Garod I-F. Peaks

The i-f. peak of the receivers of this manufacturer, that are shown in *Volume VI of Rider's Manuals*, is 456 kc.

VOLTAGE DATA FOR MODELS 60 and 60-C (1st and 2nd Types)

Line voltage 110. 120 volt line is 10 percent higher.

Tube	Filament	Plate	Grid	Screen	
R-F (1st)	2.2	160	7.3	119	119
R-F (2nd-3rd)	2.2	160	3.7	83	
Det.	2.2	101	11.		
A-F (1st)	2.2	69	1.8*		
A-F (2nd)	2.2	230	44.		
Rect.	4.5				

* Measured, not actual operating voltage.

VOLTAGE DATA FOR MODEL 60 and 60-C (3rd Type)

Line voltage 110. Volume control at minimum.

Tube	Filament	Plate	Grid	Screen
R-F	2.3	170	16.5*	142
Det.	2.3	119	1.5	
A-F (1st)	2.3	73	1.9**	
A-F (2nd)	2.3	224	36. ***	

* Local distance switch at distance

** Measured, not actual operating voltage.

*** If 2nd A-F bias resistor #1 is open, bias will be about 85 v.

Checking Sensitivity of Set

When checking the sensitivity of the set, it is necessary to use an oscillator, and a meter to indicate maximum output volume.

A local oscillator is necessary to ensure constancy of signal strength; signals from broadcast stations are not sufficiently constant for this work.

An output meter is necessary to ensure a reliable indication of output volume; the ear is not reliable enough for this purpose.

The oscillator feeds a weak signal into the receiver. The signal is amplified in the receiver and produces a reading on a meter which is connected to the output of the set. This meter indicates the strength of output volume. The reading on the output meter is greatest when all the tuned circuits in the set are adjusted to the same frequency as the oscillator signal.

1. *Oscillator.*

The oscillator must provide modulated R. F. signals at four different frequencies in the broadcast range. *These four frequencies should correspond to dial settings of 5, 45, 65 and 95 on the dial of a 3rd type Model 60-C* ***which has the original factory synchronism.***

Each of the four R. F. oscillators should have an adjustable pick-up so that the strength of each oscillator may be controlled independently of the other three.

2. *Output Measuring Circuit.*

The output measuring circuit is shown and described

Adjusting Trimmer Condensers

1. Connect the common pick-up lead from the four R. F. oscillators to one end of a No. 8112 condenser. Connect the other end of this condenser to the Long-Antenna post. Connect the oscillator container to the Ground post.
2. Put plug "A" of the output measuring circuit in the speaker-plug socket on the set. Plug an F-4 type speaker in socket "B." Throw switch "D" to the right.
3. Put all tubes in the set; power switch on; volume control at maximum; local-distance switch at distance. Break away the sealing wax on the trimmer-condenser screws
4. *Tune set exactly to 5 on dial.* Reduce or increase the amount of pick-up from the 1st 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 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 1st oscillator if necessary in order to keep the needle of the galvanometer near the centre of its scale.

This adjustment of the trimmer-condenser screws is termed the CORRECT POSITION.

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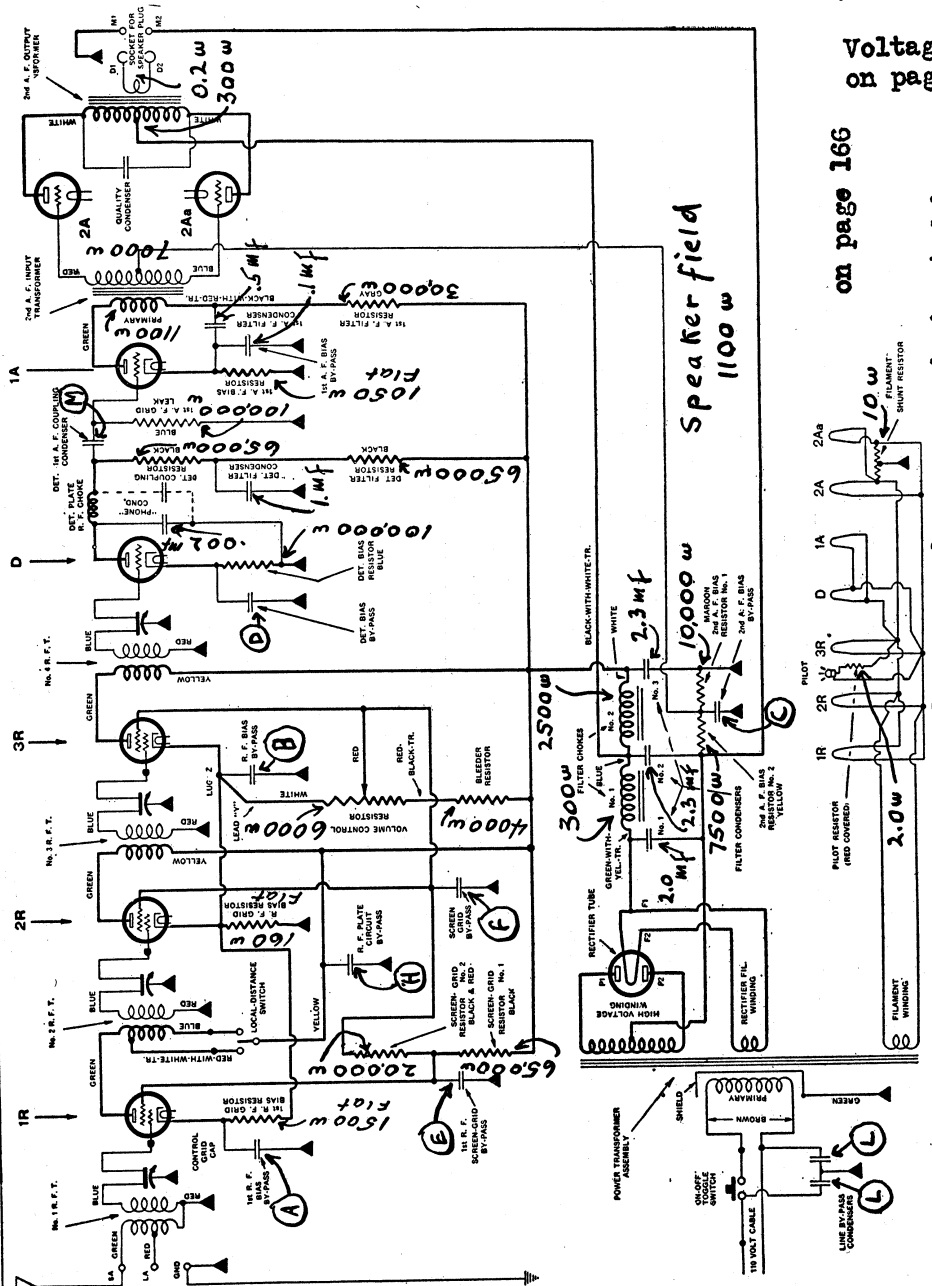
MODEL 60 and 60-C
Early
Schematic

FILTER CONDENSER CONNECTIONS. See chassis layout Data

The numbers listed as connections are marked upon the filter condenser unit and shown within the circle designating the condenser unit on the chassis layout.

1st a-f filter	.5 mfd	connected between center stud and terminal (3)
Detector filter	1. mfd	connected between terminal (4) and can
1st a-f bias	.5 mfd	connected between center stud and can
Filter #1	2.0 mfd	connected between terminals (1) and (4)
Filter #2	2.3 mfd	connected between terminals (2) and (4)
Filter #3	2.3 mfd	connected between terminals (6) and can



Voltage data on page 173

on page 166

BYPASS CONDENSER VALUES. The bypass condensers are designated by letters, exclusive of those within the filter condenser can. For bypass condensers, see schematic above and chassis layout

RF Bypass # 1	A	.1 mfd	150 volts	E	.1 mfd	150 volts
	F	.1 mfd	400 volts	H	.1 mfd	400 volts
RF Bypass #2	B	.1 mfd	150 volts	C	.1 mfd	150 volts
	L	.01 mfd	400 volts	L	.01 mfd	400 volts
Detector Bypass	D	.3 mfd	150 volts	M	.075 mfd	400 volts

EARLY-TYPE MODEL 60 AND 60-C.

Voltage reference on page 1-24.

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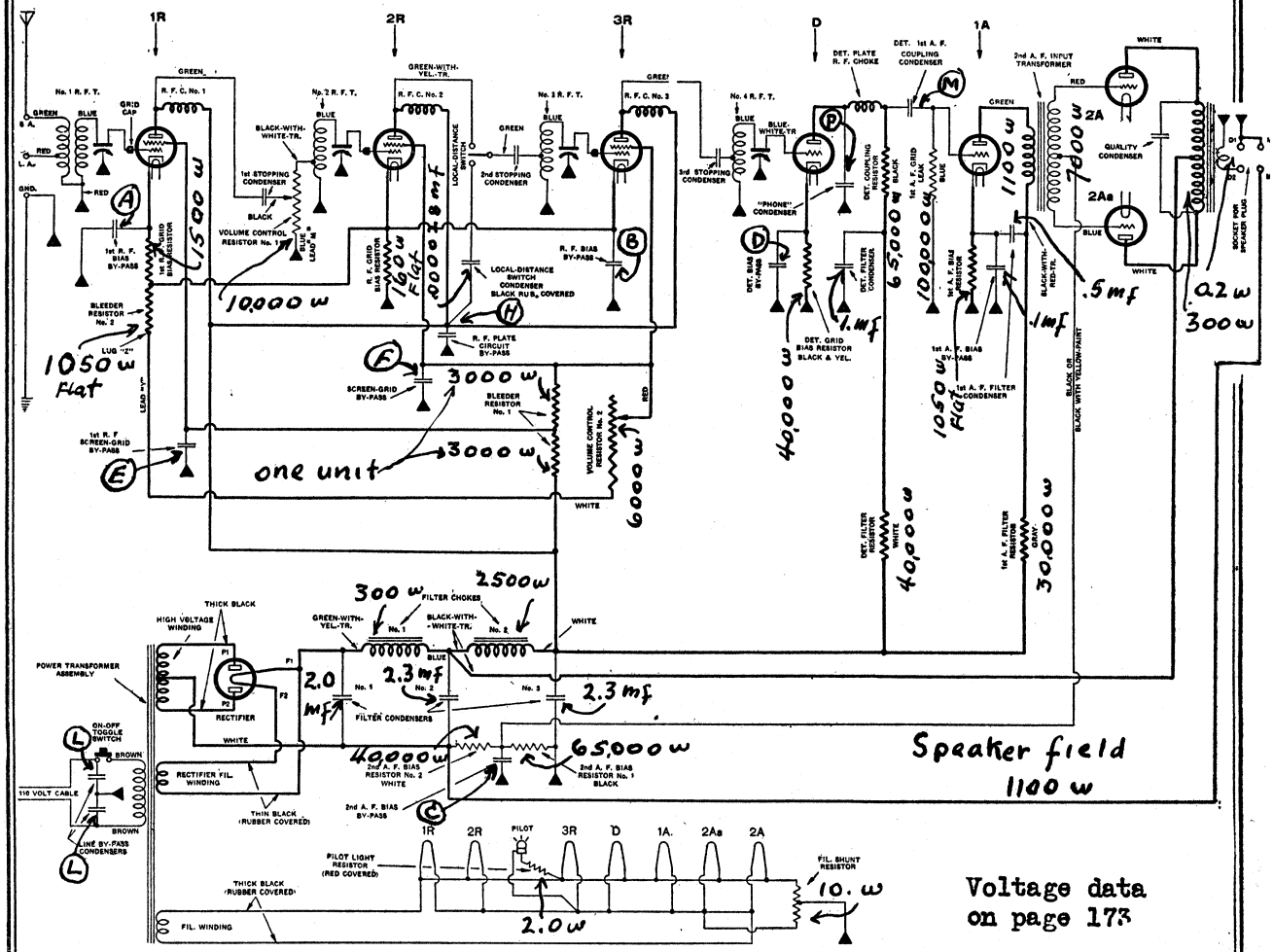
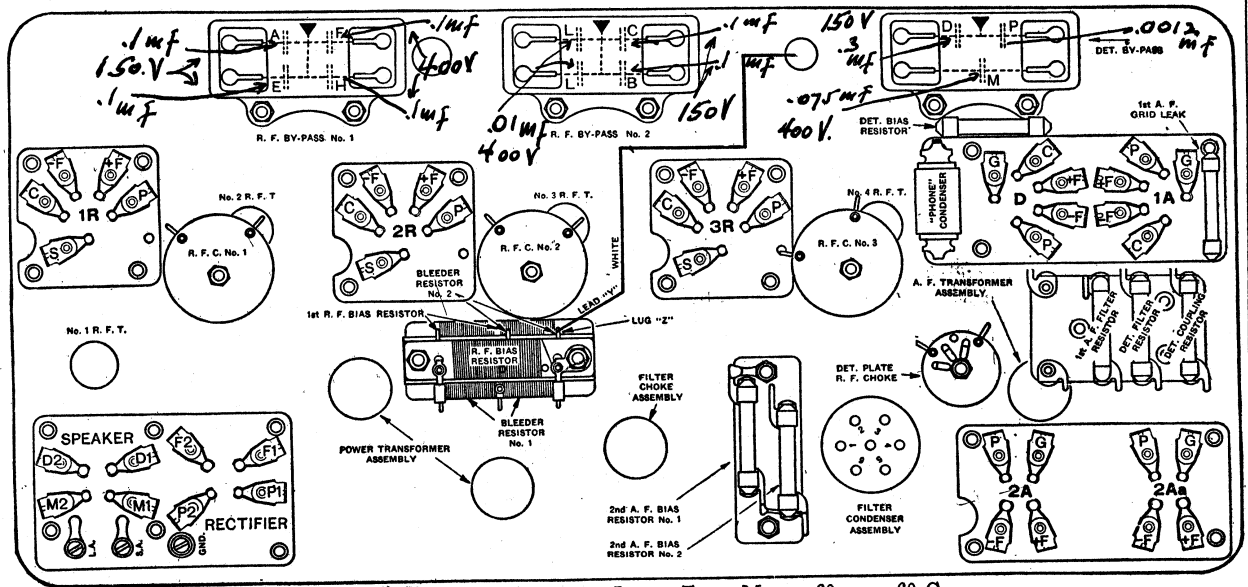
MODEL 60 and 60-C
Late
Schematic



CIRCUIT OF LATER MODEL 60 AND 60-C.



BOTTOM CHART OF LATER-TYPE MODEL 60 AND 60-C.

Voltage reference on page 1-24.

MODEL 60 and 60-C

ATWATER KENT MFG. CO.

Comparison of the Three Types of Model 60-C

	IN THE FIRST TYPE	IN THE SECOND TYPE	IN THE THIRD TYPE
VOLUME CONTROL	A **single** volume control regulates the screen-voltage	A **dual-type** volume control— 1. Regulates the amount of R.F. energy transferred from the 1st- to the 2nd-R.F. tube. 2. Regulates the screen-voltage.	A **dual-type** volume control— 1. Regulates the amount of R.F. energy transferred from the antenna circuit to the 1st-R.F. tube. 2. Regulates the R.F. control-grid voltage.
LOCAL-DISTANCE SWITCH	The local-distance switch is connected to the primary of No. 2 R.F.T. **(between the 1st and 2nd R.F. tubes).** In the distance position, the switch cuts in the entire primary of No. 2 R.F.T., thus giving three straight stages of R.F. amplification. In the local position, the switch cuts out a part of the primary of No. 2 R.F.T., thus reducing the total R.F. amplification.	The local-distance switch is connected to the 2nd stopping condenser **(between the 2nd- and 3rd-R.F. tubes).** In the distance position, the switch connects the 2nd stopping condenser to the plate of the 2nd-R.F. tube, thus giving three straight stages of R.F. amplification. In the local position, the switch connects the 2nd stopping condenser to the +B side of the plate-circuit of the 2nd-R.F. tube, thus reducing the total R.F. amplification.	The local-distance switch is connected to the secondary of No. 1 R.F.T. **(ahead of the 1st-R.F. tube).** In the distance position, the switch connects the grid-return lead of the 1st-R.F. tube to the chassis, thus giving three straight stages of R.F. amplification. In the local position,* the switch connects the grid-return lead of the 1st-R.F. tube to a coupling coil (on the 2nd-R.F. transformer) and then to the bias circuit of the 2nd-A.F. tubes. The coupling coil provides coupling between the 1st and 2nd tuned circuits, and the high negative grid bias makes the 1st-R.F. tube inoperative, thus reducing the total R.F. amplification.
R.F. TRANSFORMERS	The R.F. transformers are **inductively coupled.**	The R.F. transformers are **auto-transformer coupled.**	The R.F. transformers are **auto-transformer coupled.**
VARIABLE CONDENSERS	Both the 1st and 2nd types have four separate variable condensers controlled by pulleys and belts.		The variable condensers are of the "multiple" type, with the four rotors mounted on a common shaft.

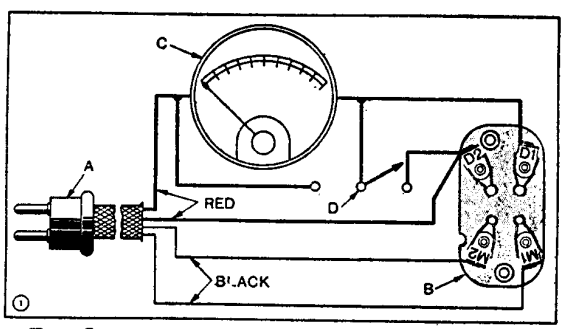
Output Measuring Circuit for Electro-Dynamic Receivers.

A—Plug-and-cord No. 14537. This is to be inserted in the speaker-plug socket of set that is being tested.

B—Speaker-plug socket No. 17512. Insert plug of correct type of electro-dynamic speaker in this socket.

C—Thermo-coupled galvanometer (115 milliamperes). This meter gives an indication of the amount of A. F. current that is flowing through the voice-coil circuit.

D—Single-pole—double-throw toggle switch No. 13678. With this switch, either the voice coil or the galvanometer may be shorted out of the circuit.



THE CONNECTIONS SHOWN IN HEAVY LINES MUST BE SHORT AND OF LOW RESISTANCE.