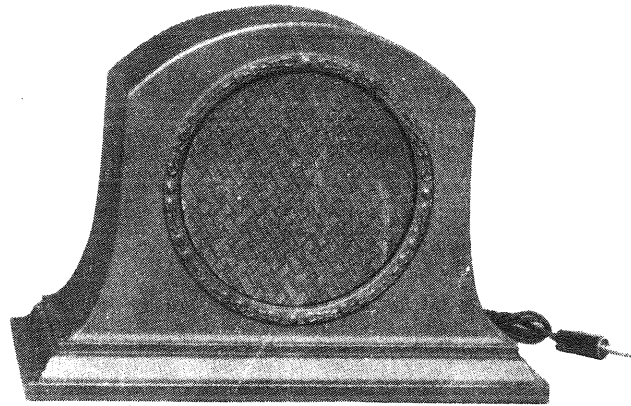


RCA LOUDSPEAKER MODEL 100A

SERVICE NOTES

100A-1

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RCA Loudspeaker Model 100A

RADIO CORPORATION OF AMERICA

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A WORD OR TWO ABOUT SERVICE

Service goes hand in hand with sales. The well informed RCA Dealer renders service at time of sale in affording information as to proper installation and upkeep. Subsequent service and repair may be required by reason of wear and tear and mishandling, to the end that RCA Loudspeaker or Radiola owners may be entirely satisfied.

Obviously this service can best be rendered at point of contact and therefore Dealers and Distributors who are properly equipped with a knowledge of the design and operation of RCA Loudspeakers and Radiolas occupy a favorable position to contract for this work.

To assist in promoting this phase of the Dealers business the Service Division of the RCA has prepared a series of Service Notes—of which this booklet is a part—containing technical information and practical helps in servicing RCA Loudspeakers and Radiolas.

This information has been compiled from experience with RCA Dealers' service problems, and presents the best practice in dealing with them. A careful reading of these Service Notes will establish their value to Dealer and Distributor, and it is suggested they be preserved for ready reference.

In addition to supplying the Service Notes the RCA, through its Service Stations, has available to Dealer and Distributor the services of engineers who are qualified to render valuable help in solving service problems.

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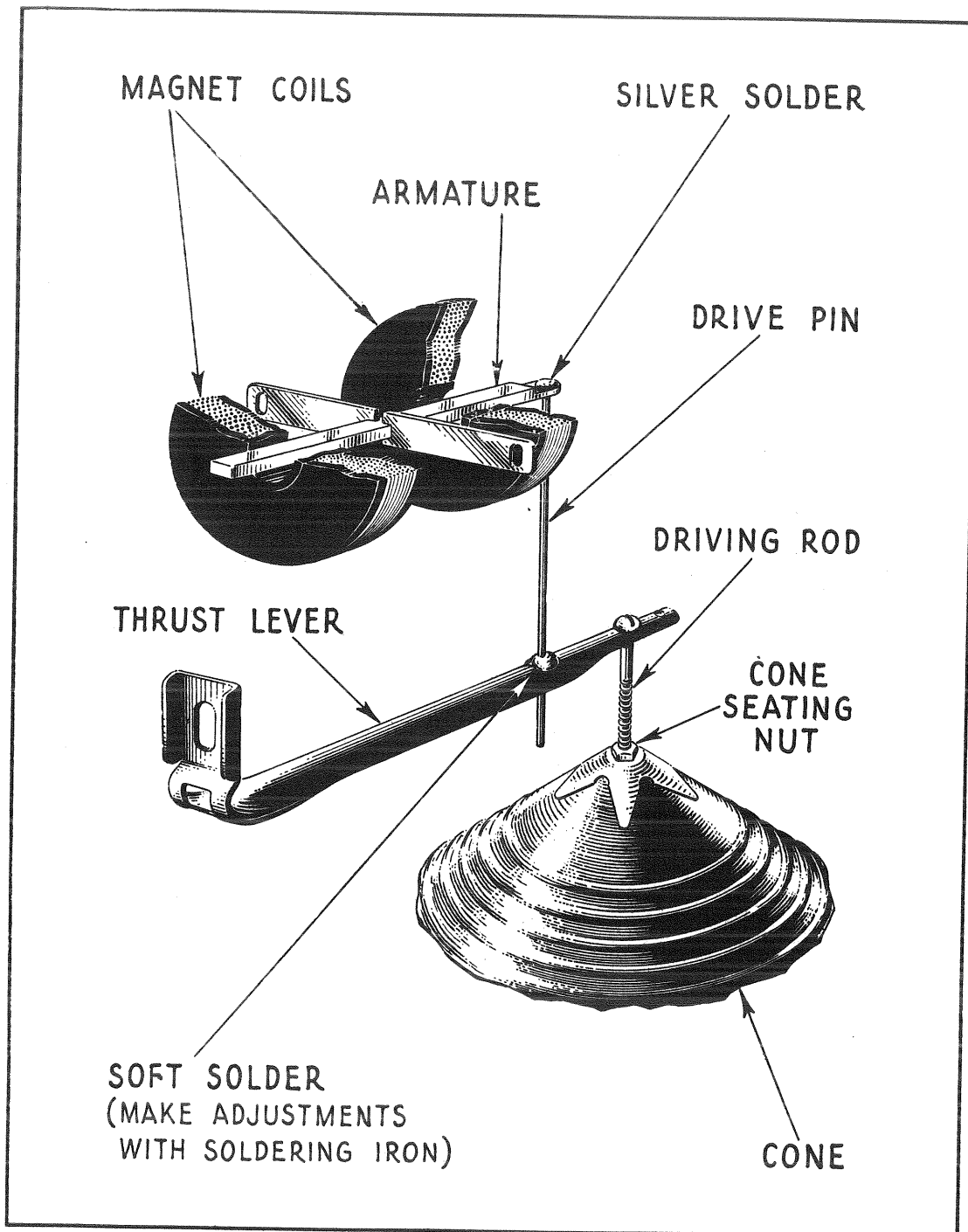


Figure 1—Diagram showing constructional details and operating principle of RCA Loudspeaker 100A

SERVICE NOTES

RCA LOUDSPEAKER MODEL 100A

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INTRODUCTION

RCA Loudspeaker, Model 100A is a new type of loudspeaker operating on the cone principle and especially designed for use with Radiolas and standard receivers. An inspection of the interior mechanism reveals a compact unit of rugged construction and simplicity of design. The loudspeaker consists essentially of a cast metal housing with an ornamental grille at the front and back, a cone, frame, magnet, motor mechanism and filter unit. The four screws on the front of the housing support the grille and mechanism assembly on the inside. This method of mounting provides easy access to the different parts.

When Loudspeaker Model 100A is used in conjunction with receivers using plate voltages passing current in excess of 10 milliamperes some method of coupling the output of the receiver to the Loudspeaker should be employed. A choke and condenser arrangement or an output transformer of proper design will function satisfactorily for this purpose. Figure 2 illustrates the correct connections for employing either of these methods.

The service data contained in the present text deals with the problems of imperfect loudspeaker reproduction generally and the cause and cure specifically as it applies to RCA Loudspeaker 100A. The simple and rugged design of RCA Loudspeaker 100A makes it practically trouble proof and permits easy and simple adjustment or replacement when necessary.

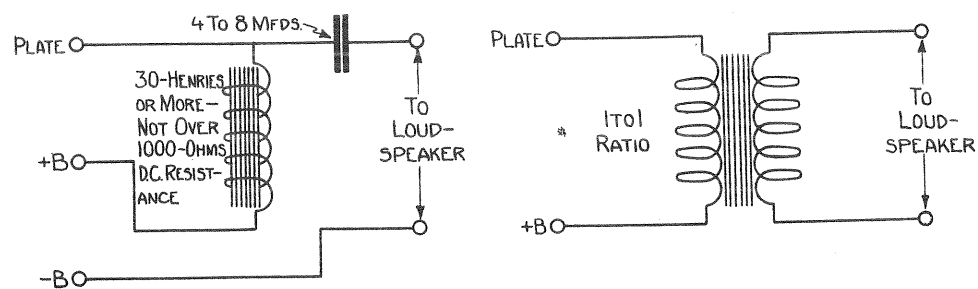


Figure 2—Typical output circuits

PART I—SERVICE DATA

The service problems of loudspeakers deal with conditions evidenced by weak reproduction, no reproduction, distortion, noise and rattle. These conditions and their attending causes, while not common to Loudspeaker 100A, are explained in the following text, and remedies noted so that service men may be provided with helpful information in any service work that may be required on Loudspeaker 100A.

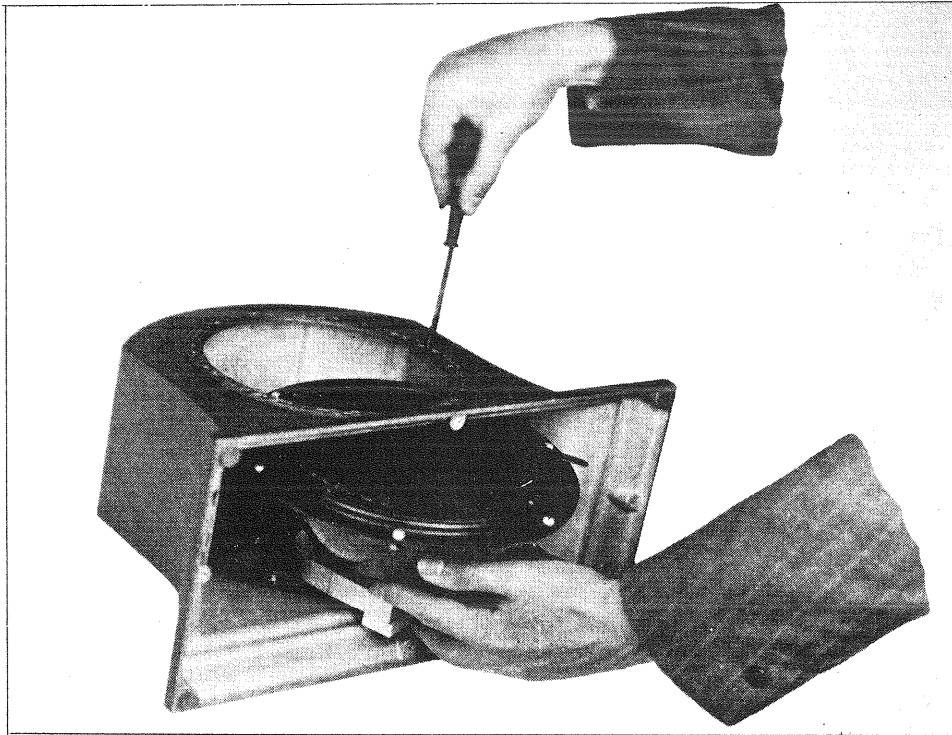


Figure 3—Removing mechanism assembly from housing

(1) RECEIVER OUTPUT

Before inspecting the loudspeaker for imperfect reproduction check the receiver output with headphones. Any distortion in the receiver will be faithfully reproduced in the loudspeaker. If a signal of good quality and volume is being delivered by the receiver the loudspeaker will have to be examined for the cause of any imperfect reproduction that may occur.

(2) PROCEDURE TO REMOVE HOUSING

To examine Loudspeaker 100A the mechanism assembly must be removed from the housing. This is accomplished by removing the four screws and the fibre sheet at the bottom of the housing. Then supporting the mechanism assembly inside of the housing with one hand loosen the four screws that hold the front grille in place. These screws also fasten the mechanism assembly. After removing the screws the unit can be lifted clear of the housing, Figure 3. The cord should be pulled inside of the housing sufficiently to allow enough slack for this operation. The cone and motor mechanism is now readily accessible for any inspection or adjustment that may be necessary.

(3) FOREIGN MATERIAL INTERFERING WITH ARMATURE ACTION

An inspection of the armature will generally disclose any foreign matter interfering with the armature action resulting in poor reproduction. A small piece of heavy paper or a piece of copper or brass not over .010" thick may be used between the armature and pole piece to remove dirt, dust or other interfering substance. The spacer tool, described in Section 4, may also be used for this purpose.

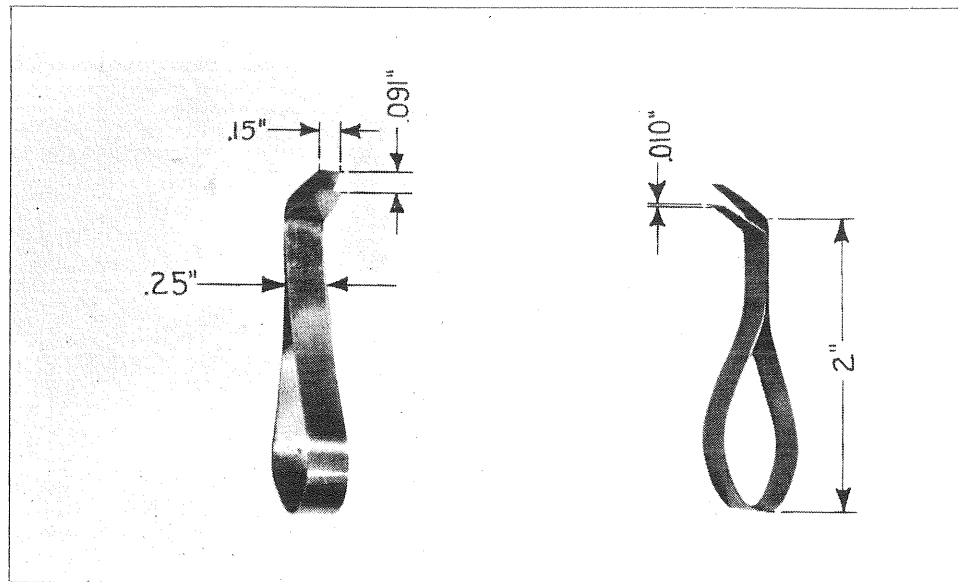


Figure 4—General appearance and correct dimensions of armature spacing tools

(4) ARMATURE STRIKING POLE PIECES

Distortion and rattle may be caused by the armature striking either or both of the pole pieces. This is generally determined by inspection, though in some cases the contact may be so slight it may be necessary to adjust the armature to check on this condition. In any case an adjustment of the armature is necessary.

To adjust the armature a set of spacer tools are necessary. Figure 4 illustrates the general appearance and correct dimensions of these spacer tools. The stock—obtainable on the open market—should be phosphorous bronze strip .010" thick and .25" wide. It is bent as illustrated and soldered to hold the opening fairly rigid. The two ends are tapered as illustrated to a .15" width at their extremities.

Two of these tools are necessary when adjusting the armature. Place one tool in the space between the armature and pole piece of the motor mechanism at the end next to the filter unit. This is shown in Figure 5. The other tool is placed at the other end of the armature a little to one side in order to clear the drive pin located at this end of the armature. By loosening screws A and B, Figure 5, any tension in either direction

that may have been on the armature is released and the spacer tools will provide the correct clearance or spacing. Now while the spacer tools are in place a hot soldering iron is applied to the drive pin thrust lever connection point C, Figure 6, and the solder heated sufficiently to allow the drive pin to find its normal position with regard to the thrust lever. The iron is now removed. Screws A and B, Figure 5, are tightened and the spacer tools removed. The armature is now correctly aligned and balanced so that no abnormal strain is being imposed upon it in any direction.

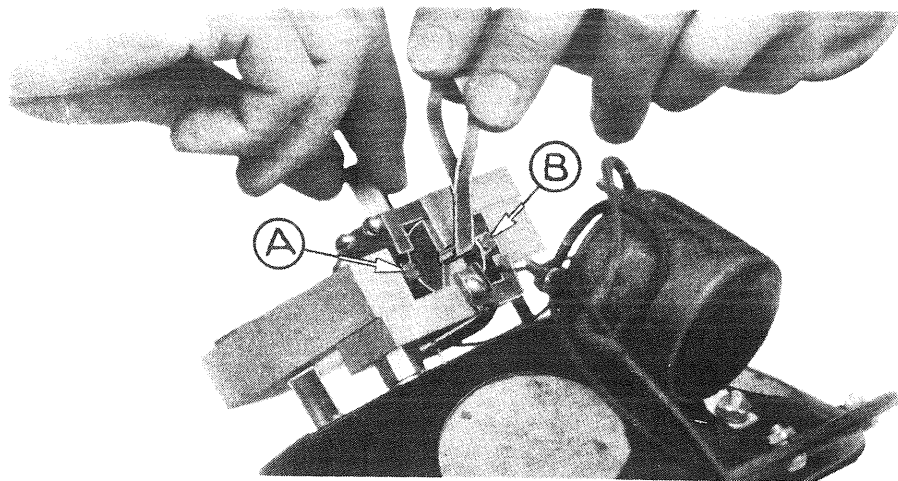


Figure 5—Armature bracket adjusting screws A and B

(5) CONE NOT PROPERLY ADJUSTED

In some cases a cone may become improperly aligned or adjusted, causing a strain to be placed on the driving rod, due to the cone not centering or seating properly. Poor reproduction is the result and inspection of the armature drive-pin may indicate a slight torque or twist. This is most likely to occur when replacing a cone. The new cone should be carefully seated by placing the cone over the driving rod and adjusting the cone seating nut located on driving rod next to thrust lever (See Figure 1, page 4). Then attach cone lock nut and washer lightly on inside of cone before fastening the edge of cone. The holes on the edge of the cone can now be lined up with those of the metal frame and the outside ring lightly attached with screws and nuts. The cone lock nut is then tightened and sealed in place with ordinary sealing wax so that the vibration of the cone will not cause it to loosen. This nut can best be tightened by means of a small socket wrench made to fit a 3/16" hex. nut (Stevens "Spintite" No. 3 can be used). The six screws at the outside edge are then seated properly. In doing this take up on each screw a little at a time causing a gradual seating of the screws.

(6) LOOSE THRUST LEVER, NUTS AND SCREWS

Rattle and noisy reception are sometimes caused by a loose thrust lever. To correct this condition tighten the thrust lever mounting screw G, Figure 9. Sometimes when this is done a readjustment of the armature, as described in Section 4, may be necessary. Any loose screw or nut in the motor mechanism may cause an audible rattle while the speaker is in operation. If any trouble is experienced along this line all the screws and nuts in the motor mechanism should be gone over and loose ones tightened.

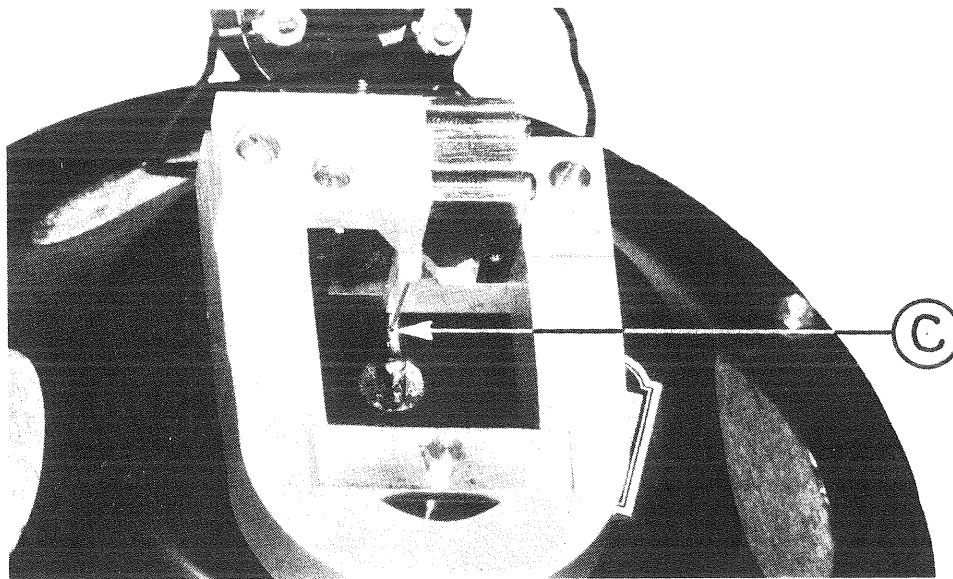


Figure 6—The drive-pin thrust-lever connecting point (C) which is soldered

(7) FILTER UNIT AND MAGNET COIL TESTS

A defective filter unit or a filter unit not properly connected in the circuit will cause distortion. Defective magnet coils will also cause imperfect reproduction. The circuit and correct connections are shown in Figure 8. The reference letters in the circuit diagram refer to the filter terminals shown in the small halftone illustration Figure 8. These should correspond electrically, otherwise distorted or no reception will result. A click test will indicate whether or not the unit is electrically O. K. The following continuity test will indicate an electrical defect either in the coils or filter unit.

A pair of headphones and a $4\frac{1}{2}$ -volt battery connected together in series or a voltmeter and sufficient battery to give a full scale deflection should be used.

FILTER UNIT CONTINUITY TEST (See Figure 8)

Disconnect Magnet Coils and Loudspeaker Cord

<i>Test</i>	<i>Correct Effect</i>	<i>Incorrect Effect Caused by</i>
L to M	Closed	Open filter coil
L to N	Open	Shorted filter condenser
M to N	Open	Shorted filter condenser

CONTINUITY TEST FOR MAGNET COILS AND LOUDSPEAKER CORD (See Figure 8)

Connect Magnet Coils and Loudspeaker Cord

Magnet coils may be tested as indicated below. A click test from one lead to the other while they are completely disconnected from the rest of the circuit is also a simple and effective method of testing.

<i>Test</i>	<i>Correct Effect</i>	<i>Incorrect Effect Caused by</i>
Jack tip to L or N	Closed	Open cord
Jack sleeve to L or N	Closed	Open cord
M to N	Closed	Open magnet coils or coil leads

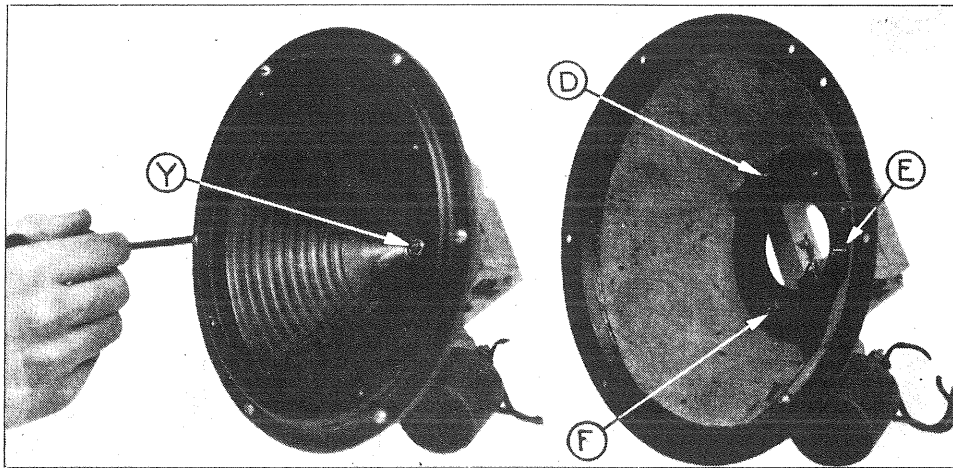


Figure 7—Cone, showing six mounting screws around edge and lock nut (Y) and motor mechanism mounting screw nuts D, E, F

(8) TESTING LOUDSPEAKER CORD AND LOUDSPEAKER CONNECTIONS

A defective connection, either in the loudspeaker cord or coil connections may cause distorted, noisy or no reproduction. As there is not much wear and tear on the coil connections, the most likely place to find trouble of this nature is in the connecting cord. The point where the cord enters the loudspeaker housing and the end on which the connecting plug is located may become frayed and worn causing a possible short or open circuit. Also the connecting lugs inside of the plug may become broken or loose after long use. If these points prove O. K. and there are no indications of any defects external to the speaker housing, the bottom fibre piece should be removed and the lugs of the cord connected to the filter unit examined. If there is no apparent defect the cord should be disconnected and tested by means of a battery and pair of phones. It should be click tested for the continuity of the leads and also for a short between the leads. Shake the cord a bit while conducting the continuity test to disclose any breaks which will be indicated by interrupted clicks.

PART II—MAKING REPLACEMENTS

(1) REPLACING MAGNET COILS

The following procedure should be used when replacing magnet coils.

- (a) Remove mechanism assembly from housing as described in Part I, Sec. 2.
- (b) Remove the cone by breaking the wax seal and releasing the cone lock nut (Y, Figure 7) and the six retaining screws with nuts and washers around the edge of cone. Then release nuts D, E, F, Figure 7, from the three magnet supporting screws.

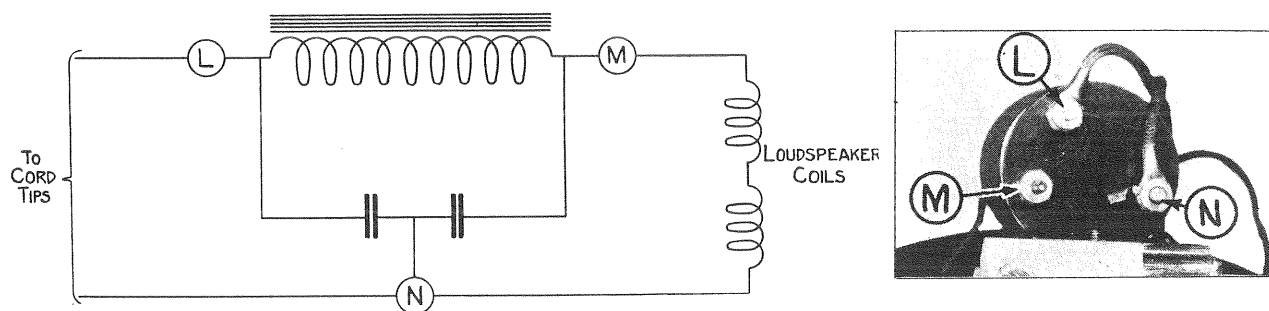


Figure 8—Schematic circuit diagram of RCA Loudspeaker Model 100A and photo of the filter unit

- (c) Disconnect magnet coil leads at filter terminals M and N, Figure 8. The magnet and motor mechanism with supporting screws S, T, V and bushings X, Z, Figure 9, may now be removed from the supporting frame and separated by releasing the bushings X, Z, and removing the supporting screws S, T, V, Figure 9. Place a large nail or soft iron bar across the poles of the permanent magnet to act as a keeper (See Figure 10).
- (d) Remove the thrust lever supporting screw G, Figure 9, and apply a hot soldering iron to thrust lever armature drive pin connection point C, Figure 6. The thrust lever and driving rod may now be removed.
- (e) Disassemble the motor mechanism by removing screw O, Figure 10, and the corresponding screw P, on the other side of the mechanism. Also remove screws A and B, Figure 10. The magnet coils may now be removed by slipping them separately off the ends of the armature, one end of which has the drive pin fastened to it.

The reassembling is a reversal of the preceding operation.

- (f) Insert the armature into the new coils in the same position occupied in old coils.
- (g) Reassemble motor mechanism and replace thrust lever. Do not solder thrust lever to armature pin at this time.
- (h) Replace motor mechanism on magnet with supporting screws and bushings; remove keeper and mount the assembly on supporting frame.

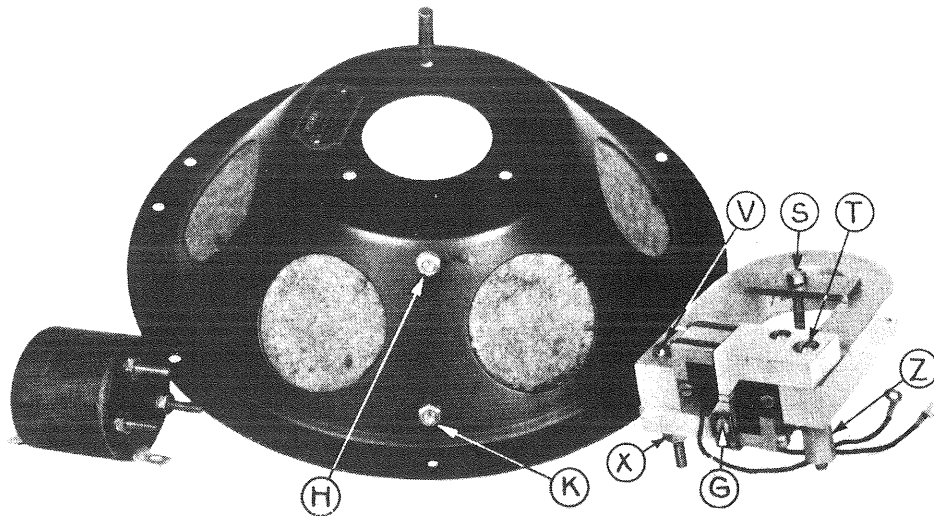


Figure 9—Loudspeaker disassembled, showing the frame, filter and motor mechanism with their respective mounting screws

- (i) Replace cone and center carefully. Replace, but do not seat screws, nuts and lock washers around edge. Tighten cone lock nut and seal with sealing wax. Seat screws around edge.
- (j) Place spacer tools in position to adjust the armature as indicated in Figure 5 and tighten screws A and B.
- (k) Resolder drive pin to thrust lever and allow it to fall in its normal position. Remove spacer tools.
- (l) Connect coil leads to filter terminals M and N, Figure 8. At this point it is good practice to test the unit on a receiver of good quality and make any further adjustments that may be necessary.
- (m) Replace mechanism assembly in housing and replace bottom fibre sheet.

(2) REPLACING ARMATURE AND DRIVE PIN

The procedure for replacing the armature and drive pin is identical with that of replacing magnet coils (Part II, Sec. 1), with the exception of the new part substituted. The new armature should be clean and free from any dust or dirt.

(3) REPLACING THRUST LEVER AND DRIVING ROD

Ordinarily the driving rod and thrust lever are not likely to become damaged or require replacement. However, should it be necessary remove the mechanism assembly from housing as described in Part I, Sec. 2. Then remove the cone, the magnet and motor mechanism and the thrust lever as described in Part II, Sec. 1.

The thrust lever and driving rod are supplied in assembled form. Attach the new thrust lever to the pole piece by means of the supporting screw G, Figure 9, and reassemble the loudspeaker as described in Part II, Sec. 1.

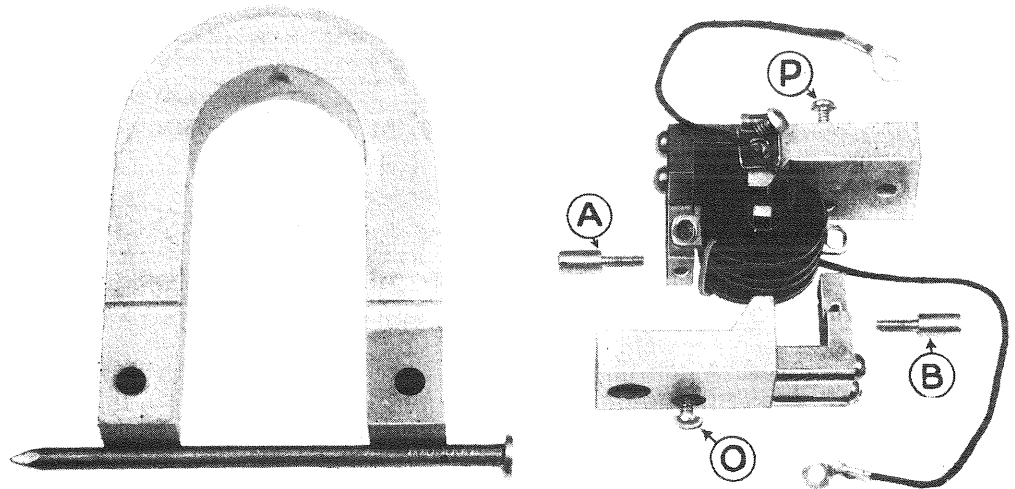


Figure 10—Motor mechanism partly exploded

Note the nail in position as keeper—it is important to place the keeper on the magnet before removing the motor mechanism and retaining it until the motor mechanism is replaced

(4) REPLACING MOTOR ASSEMBLY COMPLETE

When replacement of the complete motor mechanism is necessary remove mechanism assembly from housing as described in Part I, Sec. 2. Then remove the cone, the magnet and motor as described in Part II, Sec. 1.

The reassembly will be a reversal of the above procedure.

(5) REPLACING CONES

When replacing a cone remove the old cone as already described in Part II, Sec. 1. The replacement of the new cone is a reversal of the foregoing procedure.

- (a) Place cone over the driving rod in center.
- (b) Adjust cone seating nut (See Figure 1, page 4), so as to properly seat cone and provide clearance for thrust lever from pole piece.
- (c) Replace retaining rim over cone and replace six screws, lock washers and nuts but do not seat the screws at this time.
- (d) Replace washer and cone lock nut Y, Figure 7, on driving rod. Tighten and seal with ordinary sealing wax. Gradually seat the six retaining screws around edge of cone.

- (e) For final adjustment apply a hot soldering iron at the thrust lever armature drive pin connection point C, Figure 6, until the armature drive pin has found its new position with regard to the tension produced by the new cone.

(6) REPLACING FILTER UNITS

The following procedure is used when replacing filter units:

- (a) Remove mechanism assembly from housing as described in Part I, Sec. 2.
- (b) Disconnect all leads to filter terminals L, M and N, Figure 8, and tag each lead. This is important so that the proper connections may be made when replacing these connections on the new unit.
- (c) Remove filter mounting nuts H and K, Figure 9. The unit may now be removed and replaced with a new one.
- (d) Replace filter mounting nuts H and K, Figure 9 on the filter.
- (e) Reconnect leads to filter terminals L, M and N, Figure 8, as indicated on tags attached to same.
- (f) Place mechanism assembly in housing and replace fibre sheet on base.

(7) REPLACING FRONT OR REAR GRILLE

Grilles are furnished complete with the frame. The following procedure in replacing a grille is to be used:

Front Grille

- (a) Remove the mechanism assembly from housing as described in Part I, Sec. 2 and lift grille from mechanism assembly.
- (b) The new grille may now be placed in position occupied by the old one. Preserve the diagonal position of the cloth pattern as originally installed. The reassembly is a reversal of the foregoing procedure.

Rear Grille

To replace the rear grille the mechanism assembly and front grille is first removed from the housing as already described. Then remove the eight screws, lock washers and nuts used to fasten the rear grille to the housing.

The rear grille may now be replaced and the speaker reassembled in the reverse order.

(8) REFITTING GRILLE CLOTH

The grille cloth on the front and rear of the loudspeaker may become wrinkled and loose after considerable use or due to extreme climatic changes. A wrinkled grille presents a poor appearance and should be refitted so that it will be tight and smooth. This is a simple procedure.

- (a) Remove grille from housing, either front or rear, as described in Part II, Section 7.
- (b) Carefully hold the edges of the grille frame and press the inside clamping ring from the cloth side until the grille assembly comes apart.
- (c) Place the inside clamping ring with its rounded edge up on a table. Lay the grille cloth over this ring completely covering the edge.
- (d) Now place the protruding edge of the grille frame over the inner clamping ring resting on the table, and gently press grille frame over the cloth and ring. The grille will now be assembled with the cloth tight and smooth over its entire surface.
- (e) The entire grille assembly may now be returned to the loudspeaker housing in the usual manner.

SERVICE DATA CHART

The following table of information provides a handy reference when servicing Loudspeaker Model 100A, and a working knowledge of it will enable service men to handle service problems readily and efficiently. Column 1 headed "Indication" contains the symptom of the trouble experienced. Column 2 gives the cause. Column 3 states the remedy in brief form, and column 4 refers to detailed instructions in the Service Notes.

<i>Indication</i>	<i>Cause</i>	<i>Remedy</i>	<i>SEE SERVICE NOTES</i>	
			<i>Part I</i>	<i>Part II</i>
No Reproduc- tion	No output from receiver	Examine receiver	Sec. 1	—
	Defective coils	Replace coils	Sec. 7	Sec. 1
	Defective filter	Replace filter	Sec. 7	Sec. 6
	Defective cord	Repair or replace cord	Sec. 7-8	—
	Loose or broken connections	Repair connections	Sec. 8	—
	Drive pin not soldered	Solder drive pin	Sec. 4	Sec. 1
Weak Reproduc- tion	Weak receiver output	Examine receiver	Sec. 1	—
	Dirt interfering with arma- ture action	Remove foreign matter from mechanism	Sec. 3	—
	Loose thrust lever mounting screw	Tighten screw and resolder drive pin	Sec. 6	Sec. 3
	Improperly aligned cone	Align cone correctly	Sec. 5	—
	Drive pin poorly soldered	Solder drive pin	—	Sec. 1
	Weak magnet	Remagnetize	—	—
Distorted or noisy Reproduc- tion (Rattle)	Distorted output from re- ceiver	Examine receiver	Sec. 1	—
	Improperly adjusted cone	Adjust cone correctly	Sec. 5	Sec. 5
	Filter incorrectly connected	Connect filter correctly	Sec. 7	Sec. 6
	Filter defective	Replace filter	Sec. 7	Sec. 6
	Loose screws or nuts in as- sembly	Tighten all loose screws or nuts	Sec. 6	—
	Armature striking pole piece	Adjust armature correctly	Sec. 4	Sec. 1
	Excessive pressure on drive pin	Resolder drive pin to thrust lever	Sec. 4	Sec. 1
	Filter unit not connected	Connect filter unit	Sec. 7	Sec. 6

RCA LOUDSPEAKER 100A REPLACEMENT PARTS

<i>No.</i>	<i>Description</i>
1964	Motor mechanism complete (less magnet)
1965	Armature with mounting bracket and drive pin
1966	Magnet coils with leads
1968	Thrust lever with driving rod to cone
1969	Filter unit complete
9190	Cone
5634	Screen assembly



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