



# RCA VICTOR

960001-4

## AUTOMATIC RECORD CHANGER

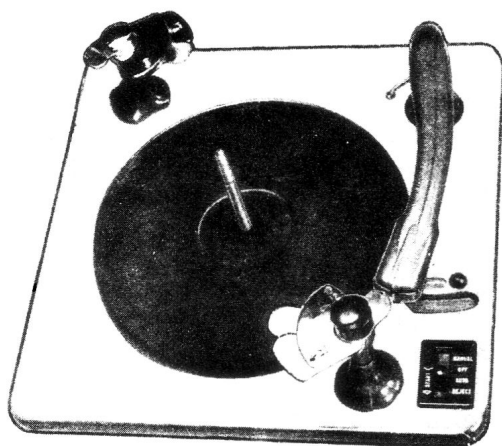
### TECHNICAL INFORMATION AND SERVICE DATA

1947—NO. 6

SERVICE DIVISION

RCA VICTOR COMPANY LIMITED

MONTREAL



#### Features

1. This record changer is a two post drop type, non-inter-mixing mechanism designed to play automatically a series of twelve 10-inch or ten 12-inch records of the standard 78 RPM type.
2. The mechanism uses a light weight, low noise, crystal pickup cartridge, equipped with a long life sapphire point.
3. The tone arm is automatically returned to the rest position and the power removed from the drive motor, after the mechanism has finished playing the last selection of the stack.
4. The changer is equipped with an eccentric and closed circle tripping device.
5. A pickup shorting switch is incorporated which shorts out the pickup during record change cycle. This prevents noise from gears, cams and other moving parts from being amplified through the reproducing system. An additional pickup shorting switch contacts roller on tone arm lever (17) and shorts out pickup while tone arm is in the rest position.
6. The mechanical linkage between record support posts makes possible a single and simple operation on the part of the operator to change from 10 to 12-inch records or vice versa.
7. This changer may be converted to 50-cycle operation by the addition of Stock No. 71137 Spring to the motor drive shaft.
8. All gears and cams are disconnected while the records are being played. This removes the load on the motor and eliminates excessive friction and noise from moving parts which otherwise have a tendency to produce wow or rumble.

#### Cautions

1. Never use force to stop or rotate turntable or any other part of the mechanism.
2. Do not play a chipped or cracked record as damage to sapphire may result.
3. Warped records may slide upon one another while playing and cause unsatisfactory reproduction.
4. Do not attempt to handle tone arm while mechanism is in cycle.
5. Do not allow records to remain on selector arms when not in use particularly in warm climate.
6. Do not allow oil or grease to come in contact with the rubber tire on drive idler or any other rubber parts.
7. Do not attempt to move the tone arm horizontally when in the rest position, unless control knob is in the manual position.

#### Manual Operation

Old, odd sized and home recording records should be played in "Manual" position.

1. Lift and turn selector arm until selector arms point outward as for unloading records.
2. Place records to be played on turntable and move control knob to "Manual" position.
3. Place pickup on record.
4. When selection is finished playing, return the tone arm to rest position and move control knob to "off" position.

Note: Do not move control knob to "off" position before placing tone arm in rest position, or cycling will result. If this should occur do not handle tone arm. Place control knob in automatic position and allow cycle to continue until tone arm comes to rest before continuing with manual operation.

#### Automatic Operation

1. Lift and turn the selector arm #1 in the front right-hand corner of the changer panel to a position engaging the slots in the selector sleeve. In so doing the arrows and numbers designating record size should be pointing toward the turntable spindle.
2. Load the records to be played on the separator arms with the desired selections upward and in the proper sequence. The last record should be on top.
3. Move control knob to "reject" position and release it. The changer will play the selections in the entire stack at which time the control knob will return to "off" position automatically.
4. Lift and turn the selector arm to facilitate the removal of records on turntable.

Note: To stop mechanism before the selections in the entire stack have been played, move the control knob to "off" position, remove records on selector arms and lift and move the tone arm to rest position.

## Functions of Main Parts

### I. Motor

The function of the motor is to serve as a power source for the changer. Power is transmitted from motor to turntable through the rubber-tired idler wheel.

### II. Control slide and associate parts

A. General function is to provide a single knob control for the various operations shown on the escutcheon plate through its interaction with the changer mechanism.

B. The power switch is mechanically operated by the control slide through a linkage to correspond to the various positions on the escutcheon plate.

#### C. Manual Reject Slide (27), fig. (3)

1. Manual position—With the control slide in the "manual" position the formed end of the reject slide (27) fig. (16) engages the clutch engagement lever (33) and holds it in an up position so that the trip mechanism is inoperative.

2. Reject position—The short formed end of the reject slide (27), near the mid-section, contacts part of trip lever (28) and trips the mechanism.

#### D. Tone Arm Latch (14), fig. (3)

1. Functions as a positive lock, fig. (12), for the tone arm whenever the latter is moved to the outside of the panel in all positions of the control slide other than "manual".

2. Also functions as a partial lock, fig. (12), or detent, for the tone arm lever (17) while the control slide is in "manual".

#### E. Manual Lock Out (4), fig. (3)

Function is to engage and retain the tone arm locator (16), fig. (15), in its outermost position while the control slide is set in the "manual" position.

#### F. 10 and 12-Inch Set Lever (19), fig. (3)

Function is to index the tone arm properly for 10 or 12-inch records, fig. (19).

### III. Spindle Housing, Gear Assembly, and Associated Parts

These two main castings are assembled with other component parts into a major sub-assembly, which includes a spindle and pinion. The assembly operates only in a counter-clockwise direction (viewed from bottom side) and provides a clutching and driving action for all automatic operation. Large gear rotates in a clockwise direction (viewed from bottom). One revolution of this large gear carries the mechanism through a complete change cycle.

#### A. Pinion Gear (37), fig. (5)

1. Operates as part of the clutch.
2. Operates as a gear to drive the main gear through a change cycle.
3. Serves as a vertical stop for the spindle to which it is pinned.

#### B. Clutch Engagement Lever (33), fig. (5)

1. Function is to engage projection on pinion gear to start change cycle.

#### C. Trip Lever Assembly (28), fig. (4)

1. Function is to hold the clutch engagement lever (33), fig. (4) in a position such that it clears the pinion gear (37), fig. (5), except when tripping for cycling.

### IV. Selector Arm and Blades

1. Function is to support the records and, together with the selector blades, to separate the lowest record of the stack and allow it to drop to the turntable during the change cycle.

### V. Tone Arm Lever and Associated Parts

#### A. Tone Arm Lever (17), fig. (3)

Controls the horizontal movement of the tone arm.

#### B. Tone Arm Locator Lever (16), fig. (3)

Function is to control the tone arm lever in determining landing position of the pickup, fig. (8).

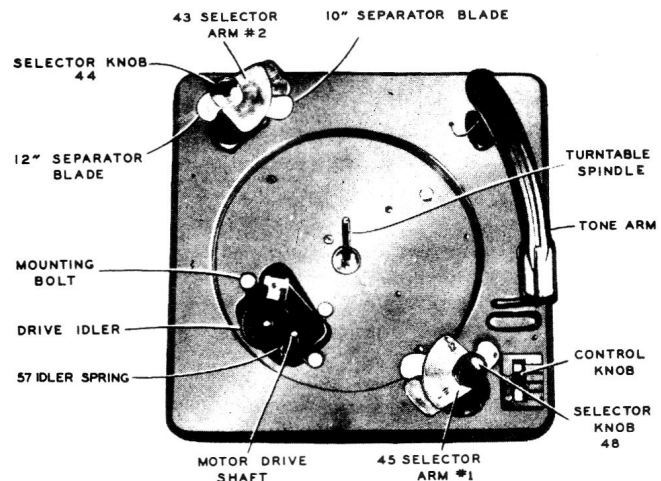


FIG. 1

#### C. Booster Spring (67), fig. (3)

A small piece of round spring wire which provides a limited amount of spring tension inward, tending to push the pickup into the starting groove.

### VI. Tone Arm Lift Pin (51), fig. (24)

Function is to control vertical motion of tone arm.

### VII. Selector or Support Arm Gears (35), (36), fig. (3)

Function is to transmit energy from drive mechanism to selector arm and knives.

### VIII. Trip Plate (Knurled) (30), fig. (3)

Contacts trip dog (31), fig. (4), for eccentric tripping.

### IX. Trip Shoe (29), fig. (3)

Functions as part of the closed circle tripping device.

### X. Segments (23), (25) and Tie Plate (24), fig. (3)

Constitute the mechanical linkage between separator arms.

### XI. Drive Gear Stop Lever (34), fig. (6)

Functions to stop and position drive gear after cycling.

### XII. Tone Arm Retard Lever (26), fig. (4)

Stabilizes horizontal movement of tone arm while in cycle.

## Miscellaneous Service Hints

### 1. Rumble

- A. Remove turntable by lifting straight up and inspect the drive mechanism for a defective idler wheel. (Rough rubber tire or very sloppy bearing.)
- B. Inspect the mounting of the changer to determine whether or not the mounting clamp nuts have been loosened.
- C. Check and replace any microphonic tubes in the reproducing system.

### 2. "Wow" or Speed Variation

- A. Make certain the turntable is free to rotate and not rubbing on motor board or portion of drive mechanism.
- B. With the mechanism out of cycle remove the turntable by lifting straight up. The spindle being disengaged from all portions of the drive mechanism should rotate freely when turned by hand.
- C. Check for badly worn idler as described in Item (1A).
- D. Check for presence of grease on rubber tire of drive idler and the inner rim of the turntable. (Naphtha or carbontetrachloride will remove harmful grease.)
- E. Bent turntable spindle.
- F. Insufficient tension of drive idler spring (57), fig. (1).

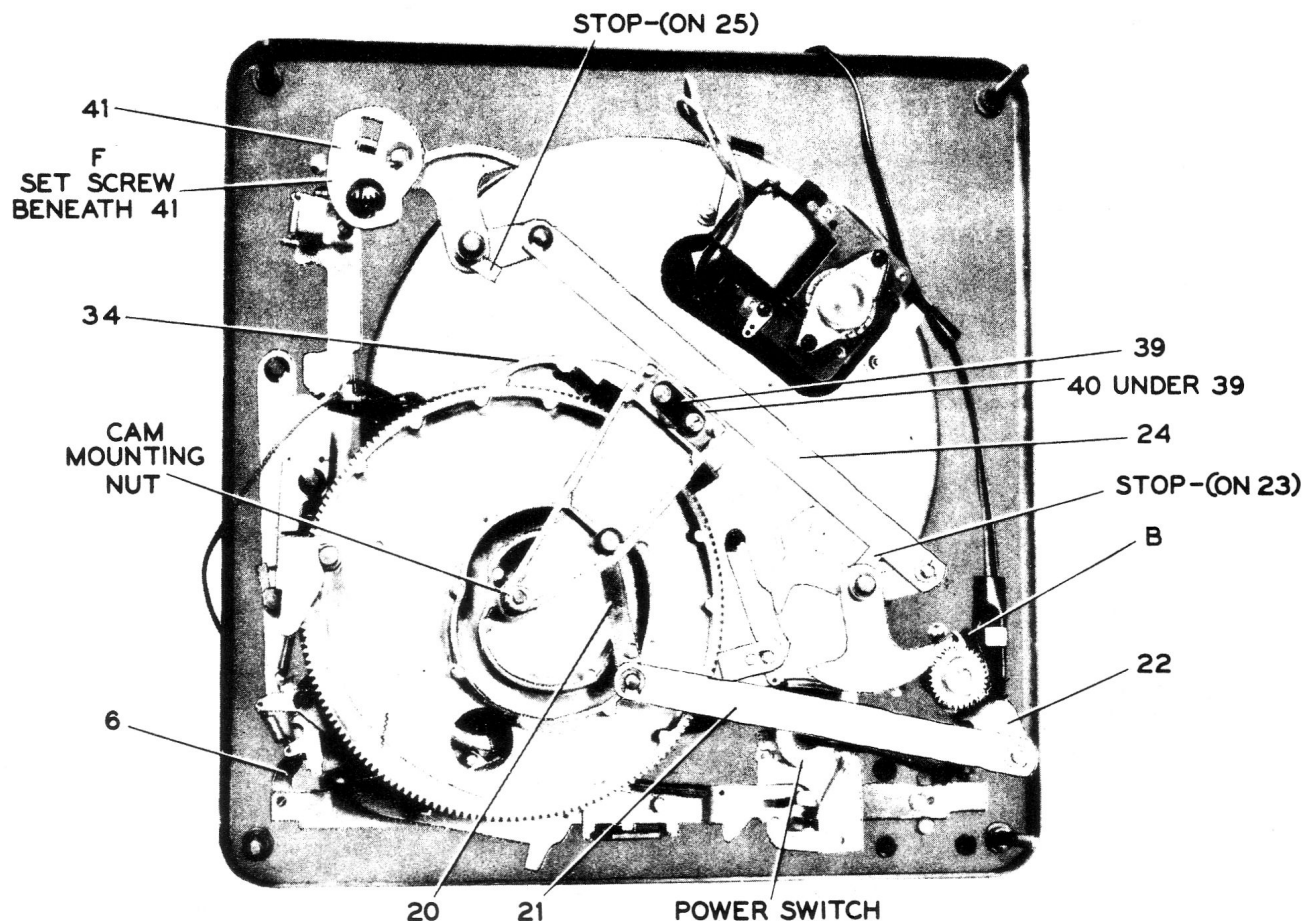
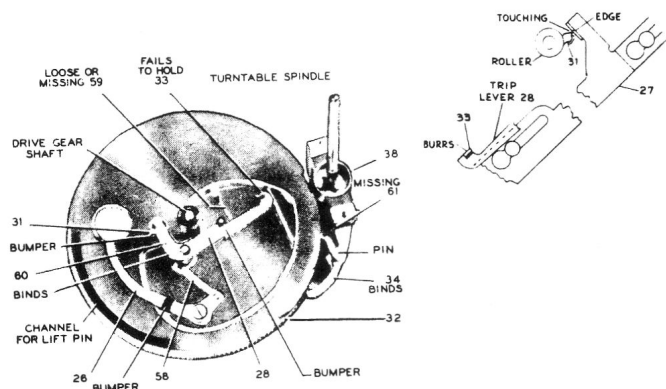


FIG. 2

### 3. Continuous Tripping (see sketches below)

- A. Trip lever (28) fails to hold clutch engagement lever (33).
  - a. Loose or missing trip lever spring (59).
  - b. Bind in trip lever bearing.
  - c. Formed edge on manual reject slide (27) touching trip dog (31) (bend away).
- B. Bind in stop lever (34), fig. (2).
- C. Missing stop lever spring (61).
- D. Control knob fails to return to automatic position due to bind in control slide, and associated parts. Missing spring (64), fig. (3).



### 4. Feed-back or Howl

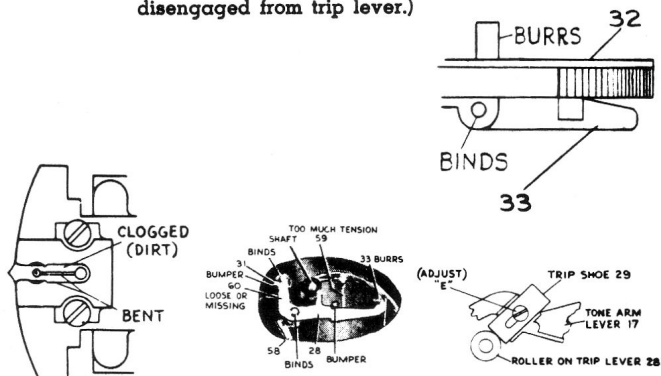
This condition is caused by sound from the speaker getting back into the input of the amplifier.

- A. Inspect motor board mounting to determine whether the clamp nuts have been loosened.

- B. Make certain no portion of the mechanism is touching the cabinet. The mechanism should be free floating on mounting springs.
- C. Check and replace any microphonic tube in reproducing system.

### 5. Failure to Trip (see sketches below)

- A. Pickup jumping grooves due to improper pickup pressure, or foreign material clogging up sapphire guard.
- B. Bind in trip dog (31), bearing or missing spring (60).
- C. Tripping adjustments improperly set.
- D. Trip lever spring (59) having too much tension.
- E. Burrs on trip lever (28).
- F. Bind in trip lever bearing.
- G. Bind in tone arm bearing.
- H. Clutch engagement lever (33) bent or binding. (It should be free to drop under its own weight when disengaged from trip lever.)



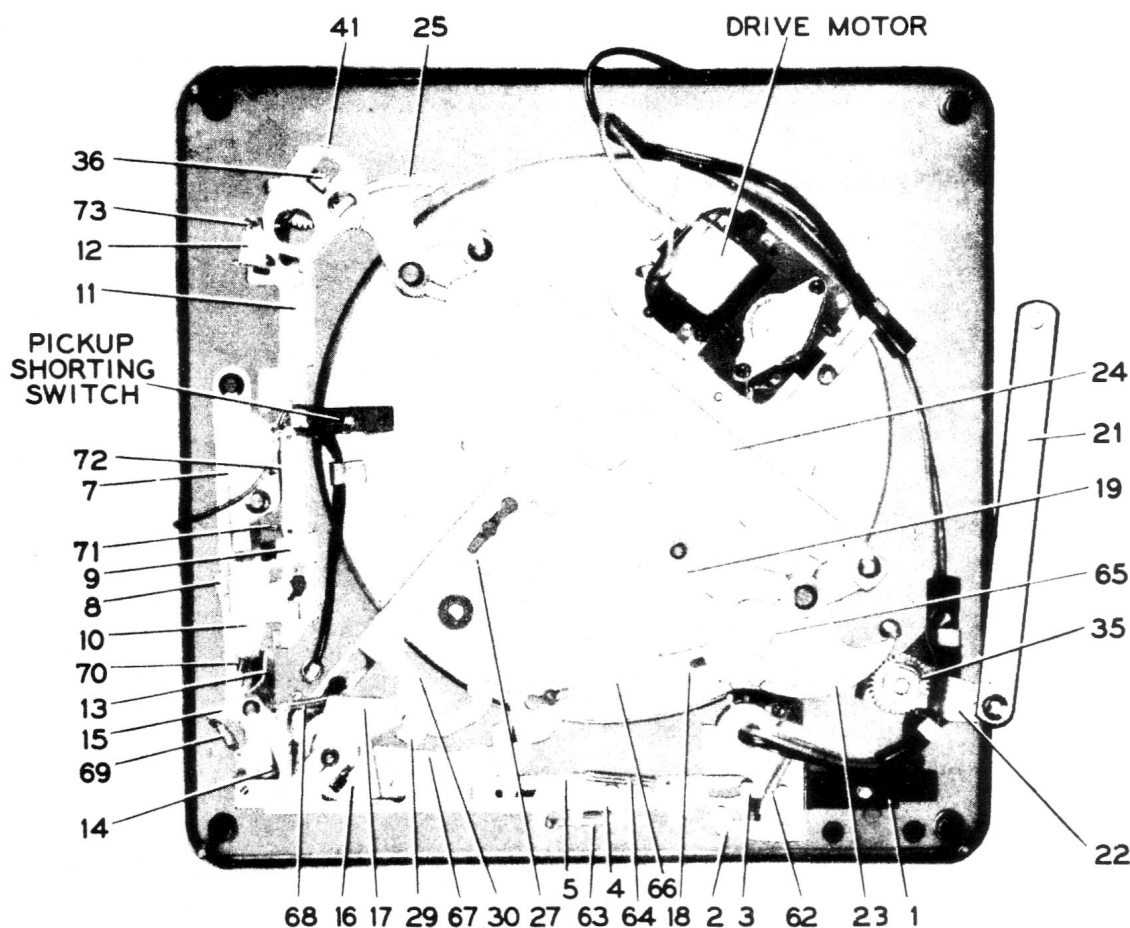
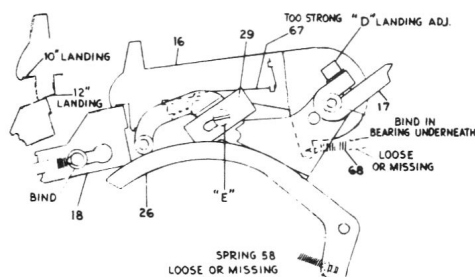


FIG. 3

## 6. Insufficient power to complete cycle.

- A. Grease or oil on inner rim of turntable and rubber tire idler.
- B. Insufficient tension of spring (57), fig. (1), on drive idler.
- C. Defective drive motor.
- D. Binding in series of levers, pivots, etc.
  - a. Drive link assembly (20), fig. (2).
  - b. Selector arm shaft assembly, fig. (1).
  - c. Drive gear (32), fig. (4), shaft.
  - d. Poor gear mesh due to misalignment or defective teeth.
  - e. Bent record separator blades causing a jam, fig. (1).

- G. Spring (66) having more tension than spring (65).
- H. Spring (67) out of position causing false edge on lever (16).
- I. Tone arm fails to move in because of bind in slide (4), or missing spring (64) keeping lever (16) latched.

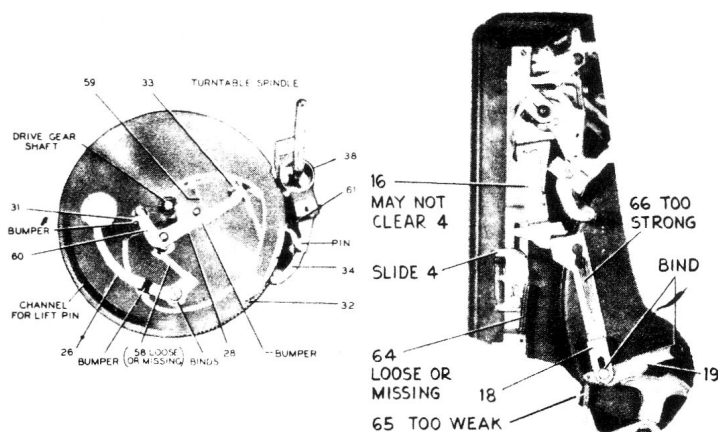


## 7. Records do not drop properly.

- A. Separator arms improperly timed. (See timing adjustments.)
- B. Bent separator blades.
- C. Bent turntable spindle.

## 8. Improper pickup landing (adjacent sketches)

- A. Landing adjustment improperly set.
- B. Bind in tone arm bearing.
- C. Bind of slide (18) and lever (19) on studs.
- D. Missing spring (65) or (66).
- E. Bent or improperly shaped lever (16).
- F. Missing or loose spring (68).



(Continued on page 8)



## Automatic Cycle of Operation

Function	Explanation
Lift and turn selector arm as required for 10- or 12-inch records. Place stack of records on arms.	<ol style="list-style-type: none"> <li>1. The rotation of selector arm #1 moves selector arm #2 through the mechanical linkage of gear (35), fig. (19), segment (23), tie plate (24), segment (25) and gear (36).</li> <li>2. Portion of segment (23), fig. (19), slides against set lever (19) thereby determining the point of contact of slide (18), fig. (8), with tone arm locator (16), which in turn governs the pickup landing position.</li> </ol>
Push control lever to reject position and release.	<ol style="list-style-type: none"> <li>1. Control slide (1), fig. (3), actuates manual reject slide (27) through coupling link (6), fig. (2).</li> <li>2. Manual reject slide (27), fig. (3), pushes against stud above small roller on trip lever (28), fig. (4).</li> <li>3. The action of trip lever (28), fig. (4), unlatches clutch engagement lever (33) allowing it to drop and engage projection on pinion gear (37), fig. (5). This engagement between lever (33) and pinion gear (37) causes the teeth of drive gear (32) to engage the teeth of pinion gear (37) starting cycle.</li> </ol>
Drive gear (32) rotates.	<ol style="list-style-type: none"> <li>1. Gear (32), fig. (6), rotates with stop lever (34), leaving notch and at the same time pickup shorting switch leaving raised portion of gear causing it to close, shorting out the pickup.</li> <li>2. Roller on drive link (20), fig. (19), follows channel in drive cam.</li> <li>3. Energy is transferred from drive link (20) to separator arm #1 through drive link (21), arm (22) and sleeve (47), fig. (17).</li> <li>4. Separator arm #1 connected to gear (35), fig. (19), starts rotating.</li> <li>5. Separator arm #2 mechanically linked through gear (35), segment (23), tie plate (24), segment (25) and gear (36) follows in rotation.</li> </ol>
Tone arm moves out.	<ol style="list-style-type: none"> <li>1. As the channel cut in rotating gear (32), fig. (9), moves, lift pin (51) rises contacting adjustment screw "A", fig. (24), on tone arm and raising tone arm.</li> <li>2. Roller located on end of tone arm lever (17), fig. (8), comes in contact with portion of cam on gear (32), fig. (4), and is pushed outward and against tone arm locator lever (16), fig. (8), which is held under tension of spring (68).</li> <li>3. Tone arm is locked by tone arm latch (14), fig. (12), and held from being pushed in by locator lever (16), fig. (8).</li> <li>4. As drive gear continues to rotate, clutch engagement lever (33), fig. (5), is returned to normal position by sliding against edge of tone arm lever (17), fig. (8), as gear supporting it passes by.</li> </ol>
Separator arms rotate and drop record to turntable.	<ol style="list-style-type: none"> <li>1. Blades separate lower record from stack and support the stack while the record is being dropped.</li> <li>2. Record drops.</li> <li>3. Tone arm lever (17) is unlatched from latch (14), fig. (7), due to latch (15) making a momentary contact with raised portion of gear.</li> </ol>
Tone arm moves in.	<ol style="list-style-type: none"> <li>1. Tone arm lever (17), fig. (8), which is connected to tone arm is being moved in by locator lever (16) which is working under the tension of spring (68). During this motion tone arm lever (17) is stabilized by tone arm retard lever (26) until locator lever (16) engages slide (18) to determine 10- or 12-inch landing position.</li> <li>2. Pickup is lowered to the record by lift pin (51), fig. (9), moving into channel in gear.</li> <li>3. An instant before rotating gear comes to the rest position and stop lever (34), fig. (4), engages notch in gear (32), the pickup shorting switch is opened due to the blade coming in contact with raised portion of gear (32).</li> <li>4. As pickup is landing and gear is returning to normal position the stud located on underside of gear (32) pushes shut-off bracket (10), fig. (13), outward. The action at this point is not transferred since shut-off dog (8), fig. (10), and shut-off trip (9) are not latched thereby allowing shut-off bracket (10) to slip by over the curved portion of the shut-off dog (8). If shut-off bracket (10) should contact straight edge of shut-off dog (8) as it does when latched to shut-off trip (9), shut-off lever (7) would pull slide (1), fig. (3), and remove power from drive motor.</li> <li>5. The instant pickup lands, feed-in spring (67), fig. (8), pushes pickup into starting groove.</li> </ol>

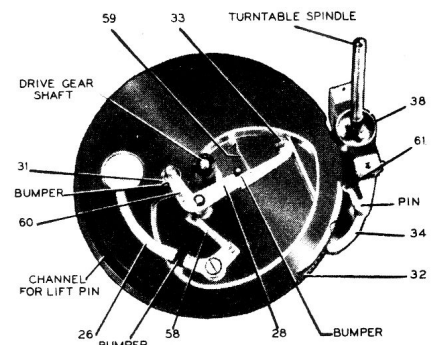


FIG. 4

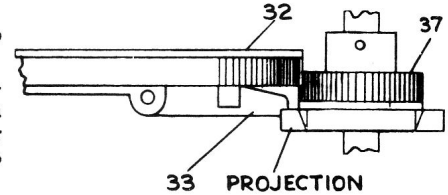


FIG. 5

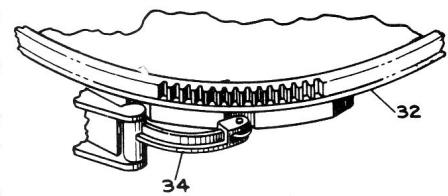


FIG. 6

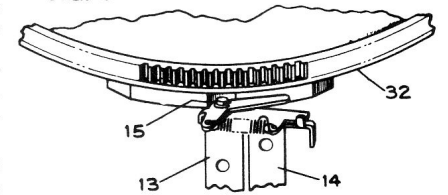


FIG. 7

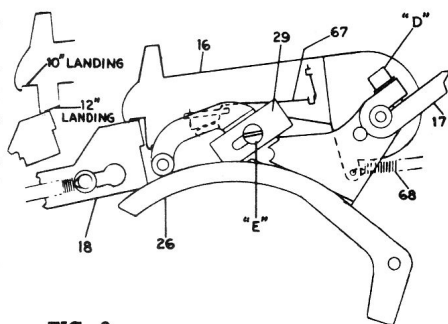


FIG. 8

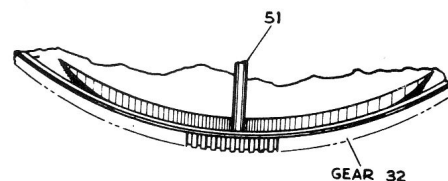


FIG. 9

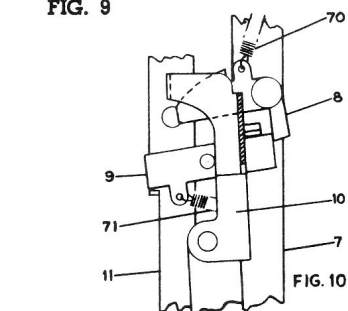


FIG. 10

Function	Explanation
Record plays.	<ol style="list-style-type: none"><li>Pickup moves toward center of record and into trip groove.</li><li>In the case of an eccentric groove the tone arm lever (17), fig. (3), moves in and the trip plate (30), fig. (4), engages trip dog (31) moving trip lever (28) and starting cycle.</li><li>In the case of a record with a closed circle trip the trip shoe (29), fig. (23), pushes against roller on trip lever (28), fig. (4), thus starting cycle.</li></ol>
Mechanism plays entire stack automatically.	Separating and dropping records, tripping, etc.
Last record has dropped and record plays.	<ol style="list-style-type: none"><li>Up to this time shut-off cam (41), fig. (21), located on bottom end of selector arm #2 has been held up by weight of records on selector arm applying pressure on the small raised portion of shut-off selector bracket (50), fig. (20), which is protruding through selector arm.</li><li>Pickup moves into trip, and drive gear (32), fig. (4), starts rotating.</li><li>Since cam (41), fig. (11), has dropped and is rotating with selector arm #2 its surface contacts stud on shut-off slide bracket (12). This transmits energy to shut-off slide (11), fig. (14), which permits shut-off dog (8) and shut-off trip (9) to latch.</li><li>Shut-off slide (11), fig. (12), locks tone arm latch (13) during the time, portion of the rotating drive gear is contacting tone arm latch (15), fig. (7), and tending to unlatch it. The tone arm remaining latched, prevents it from being pushed in by locator lever (16), fig. (8).</li><li>Tone arm is lowered to rest as lift pin (51), fig. (9), goes into channel in gear (32).</li><li>As gear (32) comes to rest stud, fig. (13), located on underside of gear (32) contacts and pushes shut-off bracket (10) outward. Since shut-off dog (8), fig. (14), and shut-off trip (9) are latched, shut-off bracket (10) contacts flat surface of shut-off dog (8) pushing shut-off lever (7) outward.</li><li>Shut-off lever (7) in its outward movement contacts lip on slide (1), fig. (3), pulling control knob to "off" position, cutting off the power to the drive motor. During this action, shut-off dog (8), fig. (14), and shut-off trip (9) are unlatched.</li></ol>

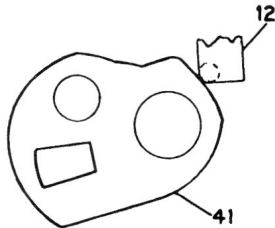


FIG. 11

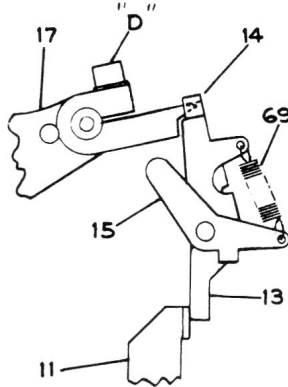


FIG. 12

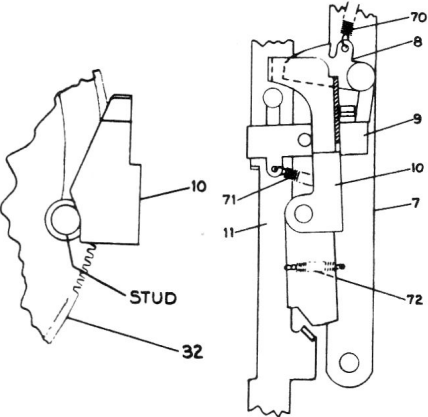


FIG. 13

FIG. 14

## Manual Cycle

Function	Explanation
Push control knob to manual.	<ol style="list-style-type: none"><li>Slide (1), fig. (3), supporting-control knob moves and positions "manual" lock-out slides (4) and (5), fig. (15), so as to have slide (4) engage and hold tone arm locator (16) and prevent it from pushing tone arm lever (17), fig. (8), in for pickup landing.</li><li>Slide (1), fig. (3), also energizing manual reject slide (27), fig. (16), so as to have the lip on slide (27) push against tone arm latch (14), moving the point of contact on tone arm lever (17) to the very edge. This permits tone arm lever (17) to slip by when tone arm is moved manually.</li><li>The movement of manual reject slide (27) has so positioned the slide so as to lock the clutch engagement lever (33) and prevent it from engaging offset in pinion gear (37), fig. (5), when trip lever (28), fig. (16), is moved.</li><li>All portions of the cycling mechanism are locked during manual operation and remain stationary with the pickup shorting switch in the off position at all times, excepting Models -2 and -3 which have an additional switch, shorting out pickup when tone arm is in the rest position.</li></ol> <p>Note: When operating manually the tone arm should always be returned to rest position before moving control knob to the off position. If this procedure is not followed the trip lever (28) may not hold the clutch engagement lever (33) allowing it to drop and start cycle.</p>

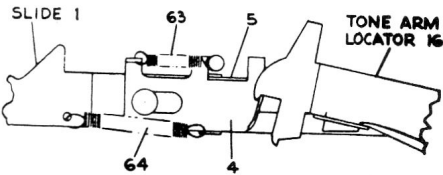


FIG. 15

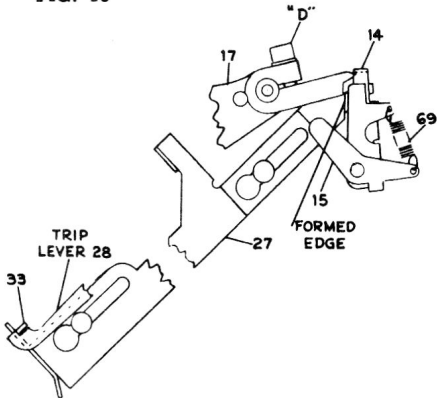


FIG. 16

Allen wrenches required for adjustments.

3/32 in. between flats, for Allen wrenches required for adjustments on set screws #10 and 12, stock #22111.

5/32 in. between flats, for 5/16 in. set screws, stock #22113.

3/16 in. between flats, for 3/8 in. set screws, stock #26581.

## Check on Timing Adjustments

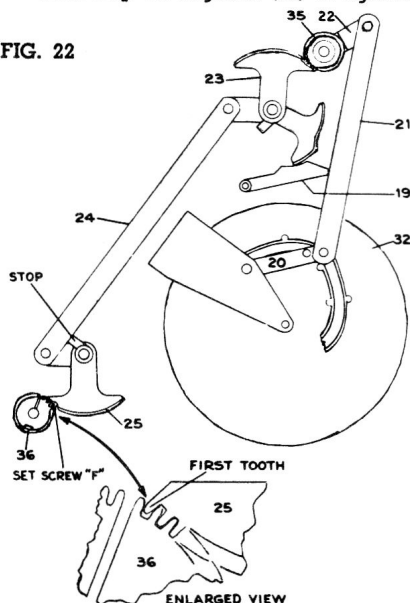
A quick check for correct timing of mechanism can be made by:

1. Have mechanism out of cycle.
2. Lift and turn separator arm #1 to 10 in. position and place a 10 in. record on arms.
3. The 10 in. separator blade should have a definite relation to record as illustrated in fig. (18) when segment (23) is against tie plate (24) as illustrated in fig. (19). If so, selector arm #1 is correctly timed.
4. If the 10 in. blades of both arms have the same distance from the record, remove record and lift and turn selector arm #1 counterclockwise as far as it will go (viewed from top).
5. Segment (25) should be against tie plate (24) when the teeth of segment (25) and gear (36) are meshed as shown in fig. (22). If this exists, timing of selector arm #2 is correct.

## Timing Adjustments for Record Separators

1. Make certain mechanism is out of cycle and all parts in their proper place by comparing the mechanism with sketches and photographs.
2. Remove "C" washer on bearing of segment (23), fig. (19), and disengage the teeth of segment (23) and selector arm gear (35).
3. Selector arm #1, fig. (17), should be in place with the pin of selector shaft engaged in the large slot of selector arm and the small projection of selector arm sleeve (47) engaged in the small slot of the selector arm. Arm (22), fig. (19), should also be in place and connected to the drive link (20) and drive link connecting rod (21).
4. Loosen set screw "B", fig. (17), and wedge some object such as a screw driver in the clamp of arm (22) so as to allow free movement of selector arm sleeve (47).
5. Place 10-inch record on selector arms and turn selector arm #1, fig. (18), until the 10-inch blade is approximately  $\frac{1}{4}$  inch from the edge of the record.
6. Tighten set screw "B", fig. (17).
7. Rotate the disengaged segment (23), fig. (19), clockwise until tie plate (24) comes against stop on segment (23). Hold in this position while engaging teeth of segment (23) and teeth of gear (35).
8. Replace "C" washer on segment (23).
9. Remove "C" washer on rod (41), fig. (21) (under selector arm #2) and remove cam and rod (41).
10. Remove "C" washer on bearing of segment (25), fig. (22), and disengage teeth of segment (25) and gear (36).
11. Lift and rotate selector arm #1, fig. (22), counter-clockwise until stop on segment (25) is against tie plate (24).

FIG. 22



12. Engage teeth of segment (25) and gear (36) so as to have the first tooth of segment gear (25) engage the gear (36) between the first and second tooth next to slot as shown in sketch, fig. (22). Replace "C" washer or bearing of segment (25).
13. Loosen set screw "F" and rotate selector arm #2 until ten-inch separator blade is the same distance from the edge of the record as selector arm #1, fig. (18).
14. Tighten set screw "F", fig. (22).

Note: Do not try to position separator arm #2 by loosening small set screws on arm proper. The factory has countersunk the shaft, seating the set screws.

15. Replace cam (41), fig. (21), with the end going up through hole in plate (50), fig. (20). Insert "C" washer, fig. (21), to hold in place.

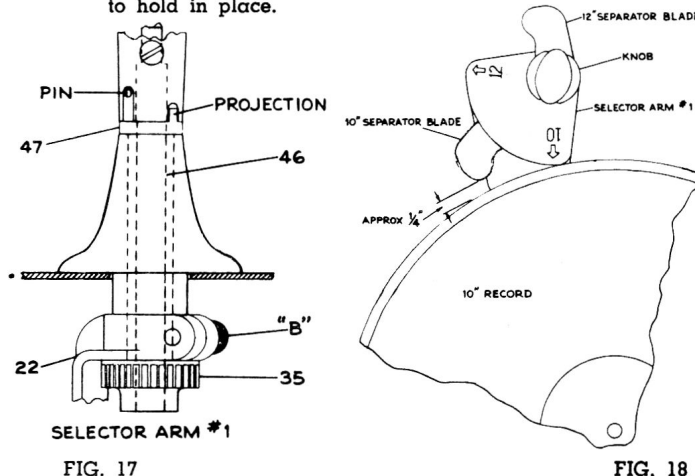


FIG. 17

FIG. 18

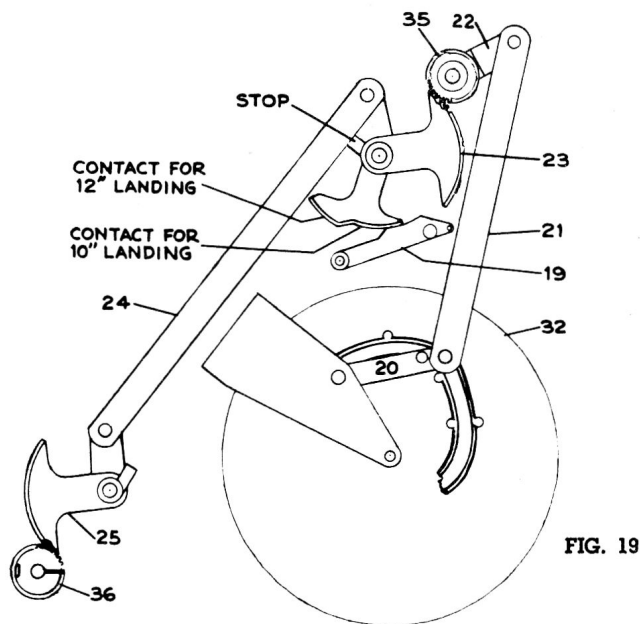


FIG. 19

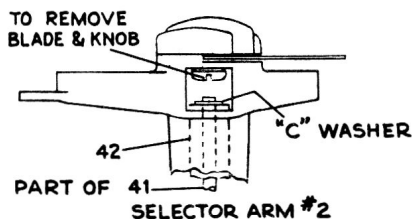


FIG. 21

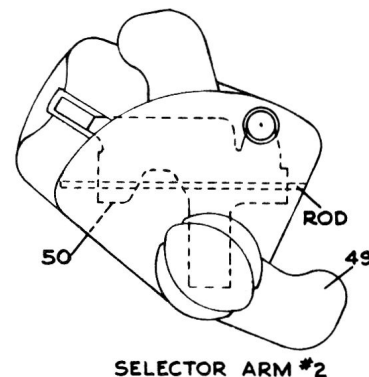


FIG. 20

## Tripping Adjustment

No eccentric tripping adjustment is necessary. It is automatically adjusted when landing adjustment is made.

For closed circle trip, loosen set screw "E", fig. (23), and set trip shoe (29) so as to contact roller on trip lever (28) when the sapphire is approximately  $1\frac{5}{8}$ " from side of turntable spindle.

## Tone Arm Height Adjustment

1. The height of the tone arm while in the rest position is that which will allow the bottom edge of the tone arm and cartridge to clear the turntable surface by  $\frac{1}{16}$ ".

The height is adjusted by bending the formed edge on lower half of tone arm bracket fig. (24).

2. Tone arm height adjustment screw "A", fig. (24), should be so adjusted to allow a clearance of  $\frac{1}{16}$  inch between tone arm and record on selector arm while mechanism is in cycle.

## Pickup Pressure Adjustment

By the use of a pocket postal scale hooked on the sapphire end of the tone arm, loosen set screw "G", fig. (24), and move slide until tension of spring (56) allows  $1\frac{1}{2}$  to  $1\frac{3}{4}$  oz. pickup force

## Landing Adjustment

1. With the power removed from the mechanism, place a 10-inch record on the turntable and turn the selector c.m. to 10-inch position.
2. Push selector knob to reject and release.
3. Push down on the small section of lever (50), fig. (20), which protrudes through selector arm #2 and rotate turntable by hand until the pickup is about to land.
4. Loosen set screw "D", fig. (25).
5. Hold tone arm lever (17) against tone arm locator (16) with just enough force so as not to have tone arm locator (16) move away from slide (18).
6. While holding the position as stated in "5," move pickup to the landing point on the record. Leave very little vertical play in tone arm bearing but just enough to have free motion of tone arm. Tighten set screw "D".
7. Apply power to mechanism and test by playing through a stack of records.

Note: Twelve-inch record landing will automatically be adjusted while adjusting 10-inch landing.

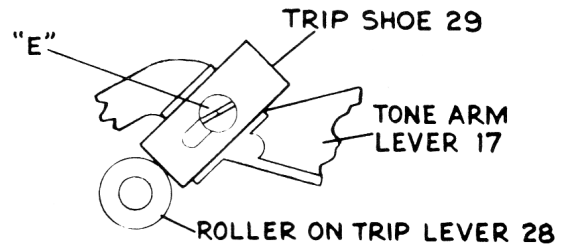


FIG. 23

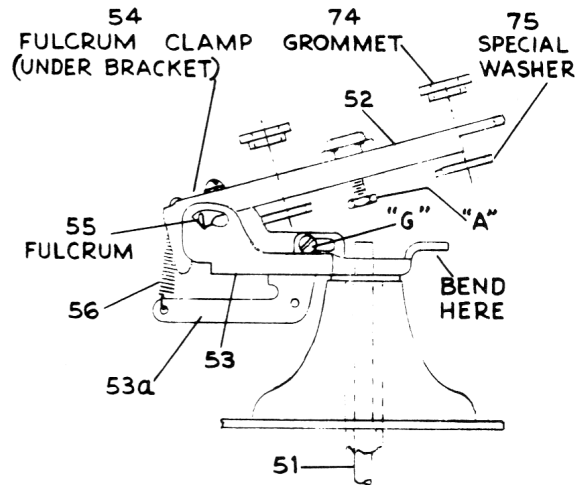


FIG. 24

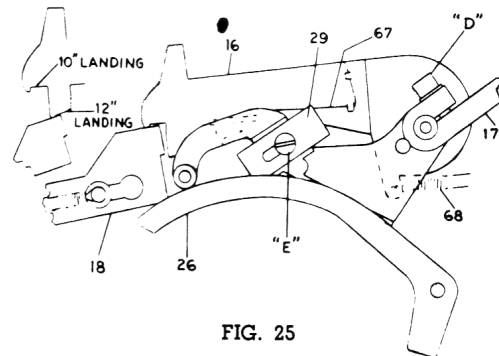


FIG. 25

## Miscellaneous Service Hints—(Continued from page 4)

### 9. Repeating grooves (see sketches below)

A. Insufficient pickup pressure.

B. Bind in tone arm pivot.

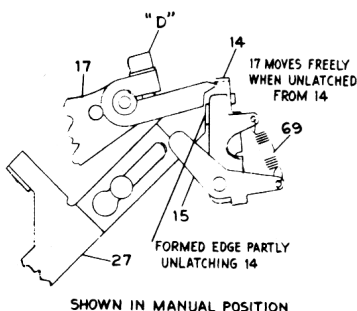
Place control knob in "manual" position and move tone arm in toward spindle and back. After the end of the tone arm lever (17) (functioning as a detent) leaves latch (14) the tone arm should have free and smooth action.

(If latch (14) is too positive, bend formed edge on manual reject slide (27) which contacts latch (14).)

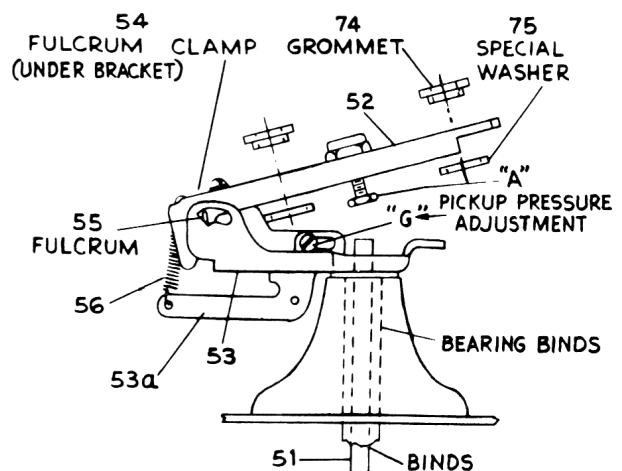
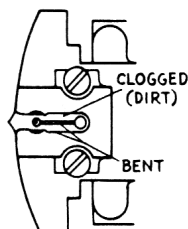
C. Check for bind in tone arm lift pin (51).

D. Sapphire shield filled with foreign material, preventing sapphire from setting into grooves.

E. Bent sapphire mounting thereby allowing sapphire guard to ride on record.



SHOWN IN MANUAL POSITION



**10. Premature tripping.**

- A. Defective record.
- B. Trip shoe (29), fig. (3), improperly set.
- C. Trip lever spring (59), fig. (4), insufficient tension.
- D. Bind in trip dog (31), fig. (4), pivot.

**11. Noise coming from speaker during record change cycle.**

Pickup shorting switch failing to short out pickup.

**12. No output.**

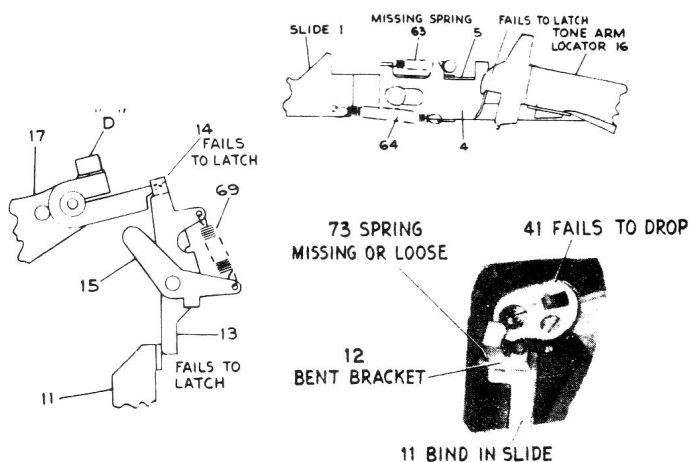
- A. Defective crystal cartridge.
- B. Broken or bent sapphire mounting.
- C. Broken or shorted pickup cable.
- D. Pickup shorting switch making contact.
- E. Inoperative reproducing system.

**13. Distorted output.**

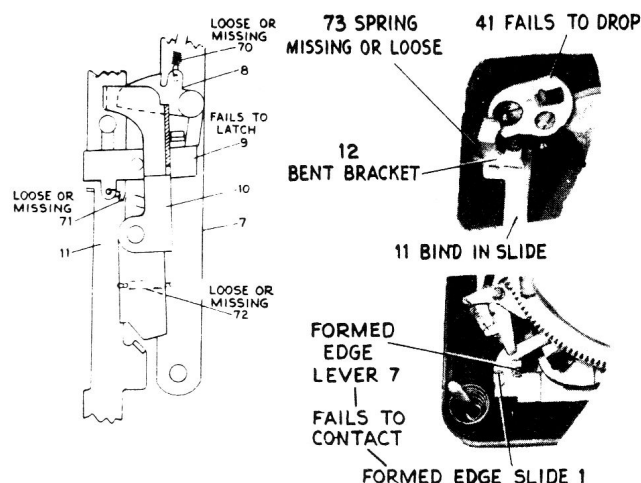
- A. Defective pickup cartridge.
- B. Bent or loose sapphire mounting, allowing sapphire to ride irregular in groove.
- C. Sapphire guard filled with foreign material such as dust and lint which accumulates on the records while in storage.  
(Remove with small brush.)

**14. Tone arm fails to go to rest position at the finish of the last selection (see sketches below)**

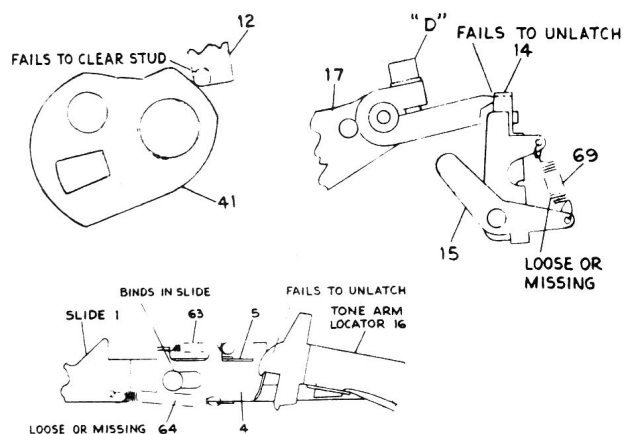
- A. Control knob fails to return automatically to "off" position.
  1. Cam (41) fails to drop down, thereby preventing stud on stop bracket (12) from contacting it.
  2. Missing stop bracket spring (73).
  3. Missing stud on bracket (12).
  4. Bind in shut off dog (8), fig. (3), and trip (9).
  5. Formed edge on slide (11) not locking tone arm latch (13).
  6. Tone arm latch (14) bent thereby not locking tone arm and allowing it to be pushed in by lever (16).

**15. Turntable fails to stop at the end of the last selection (see sketches below)**

- A. Defective motor switch.
- B. Bind in levers actuating drive motor power switch, fig. (2).
- C. Control lever fails to move automatically to "off" position as described in 14A—one to five.
- D. Small formed edge on lever (7) may fail to contact formed edge on slide (1) thereby not pulling slide (1) and not moving control to "off" position.

**16. Pickup fails to move in for landing (see sketches below)**

- A. Tone arm locator (16) lever fails to unlatch from slide (4).
- B. Tone arm lever (17) fails to unlatch from tone arm latch (14).
- C. Missing spring (69).
- D. Bent shut off slide bracket (12) which may allow cam (41) to contact at incorrect time.
- E. Weak or missing spring (73), fig. (3), thus allowing slide (11) to move in and lock latch (13).

**17. Power is removed from motor as pickup lands on record.**

- A. Shut off slide bracket (12), fig. (3), may be bent.
- B. Low tension or missing spring (73), fig. (3).

**Removing Main Assemblies****Removing Turntable**

To remove turntable, lift straight up with a rotary motion.

**Removing Separator Arms**

To remove separator arm, loosen set screws and lift off.

**Removing 12 in. Separator Blade**

Remove Separator arm and by the use of a small screw driver remove the small screw up inside the separator sleeve (see fig. (21)). This removes the knob and 12 in. blade. The 10 in. blade is not removable.

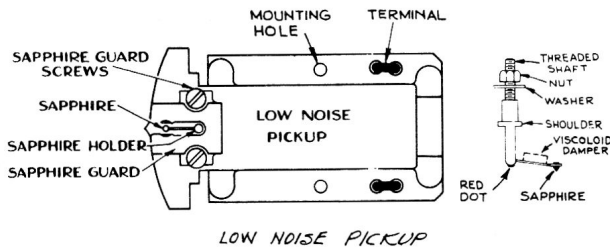
**Removing Sub-assembly**

To remove the large gear sub-assembly, remove the turntable and remove the two small screws on either side of the turntable spindle. Also remove the large nut holding the gear shaft. The entire gear bracket, etc., can be removed easily.

**Removing Tone Arm**

To remove the tone arm from the mounting bracket, it is necessary to remove the two screws located under the pivot end of the tone arm. These screws are more accessible if the bracket and shaft are removed by loosening bolt "D" as indicated in fig. (16).





**Note:** Stock #39851 has red dot on bottom of sapphire holder, 13.5 mil. dia. sapphire mounting wire, but no viscoloid damper.

## Lubrication

1. GREASE—Gears, all cams on large gear, tapered end of tone arm latch and tone arm lever with Lupriplate No. 105.
  2. OIL—All shafts before inserting into bearing and all moving parts, except those to be greased, with a good, light machine oil.
- NOTE:** Keep grease and oil away from rubber parts such as drive idler, bumpers, etc. Do not oil or grease clutch engagement lever.

## Replacement of Sapphire

**Caution:** Never bend the sapphire support wire.

The nut on the sapphire holder assembly is locked by a light cement (such as Glyptal). Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and push the shaft through the hole in the mounting until the sapphire holder assembly comes free.

Use of a drop or two of acetone will facilitate the removal of the nut and shaft. Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through mounting and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little. Apply a drop of light cement (such as Glyptal) to the sapphire nut holder.

## REPLACEMENT PARTS FOR MODEL 960001-4

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK NO.	DESCRIPTION	STOCK NO.	DESCRIPTION
<b>PICKUP AND ARM ASSEMBLIES</b>			
71294	Arm-Pickup arm shell only.....	71381	Arm-Selector arm #2 and blade (10 in.) assembly (43), Fig. (1) (minus knob).....
71311	Bracket-Hinge bracket and shaft assembly (53) Fig. (24).....	71357	Blade-Pickup shorting switch blade assembly Fig. (3).....
71327	Bracket-Tone arm bracket assembly (52) Fig. (24).....	71379	Blade-Selector blade, 12 in.(49), Fig. (20).....
72507	Cable-Shielded pickup cable(crystral pickup to terminal board)...	71344	Bracket-Shutoff bracket (10), Fig. (3).....
71325	Clamp-Fulcrum clamp (54),Fig.(24).	71383	Bracket-Shutoff selector bracket assembly (50) Fig. (20).....
39851	Crystal-Pickup crystal cartridge..	71337	Bracket-Shutoff slide bracket assembly (12) Fig. (3).....
71326	Fulcrum-Tone arm fulcrum (55), Fig. (24).....	71314	Bumper-Retard lever rubber bumper (on lever 26) Fig. (4).
31048	Plug-Pin plug for pickup cable....	71359	Bumper-Tone arm rubber bumper(on motor board).....
39863	Sapphire-Sapphire and holder for 39851.....	71317	Bumper-Trip dog rubber bumper(on trip dog 31) Fig. (4).....
71312	Slide-Counter balance adjusting slide (53a), Fig. (24).....	71318	Bumper-Trip lever rubber bumper, Fig. (4).....
71307	Spring-Counter balance spring (56) Fig. (24).....	39386	Cable-Shielded pickup cable complete with pin plug (terminal board to radio chassis).....
<b>MOTOR ASSEMBLIES</b>		71373	Cam-Shutoff cam shaft assembly (41) Fig. (21) or Fig. (3)....
S-3951	Motor-Motor 105/125 volt 25 cycle complete.....	71330	Cover-Switch Cover.....
71960	Motor-Motor 105/125 volt 60 cycle complete.....	71331	Escutcheon-Control escutcheon...
71137	Spring-Spring to convert 60 cycle motor to 50 cy.....	71365	Gear-Pinion gear (37), Fig. (5).
71412	Spring-Idler wheel tension spring.	71386	Gear-#1 post gear (35),Fig. (3).
71411	Wheel-Idler wheel.....	71388	Gear-Drive gear sub-assembly(32), Fig. (4).....
4577	Plug-Power cord connector.....	71374	Gear-Post gear #2 (36), Fig.(22) and Fig. (3).....
<b>OPERATING MECHANISM</b>		71328	Grommet-Rubber mounting grommet (motor) (3 required).....
71353	Arm-Detent arm assembly(2)Fig.(3).	71321	Grommet-Tone arm mounting grommet (74), Fig. (24).....
71375	Arm-Drive arm assembly(22)Fig.(3).	71363	Housing-Spindle housing and bushing assy.(38), Fig. (4)...
71377	Arm-Selector arm #1 and blade (10 in.) assy. (45) Fig. (1)(minus knob).....		

# REPLACEMENT PARTS FOR MODEL 960001-4

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK NO.	DESCRIPTION	STOCK NO.	DESCRIPTION
	<u>OPERATING MECHANISM - Continued.</u>		
71335	Hub-Tone arm locator hub (die cast hub bolted to motor board beneath tone arm bearing).....	71361	Segment-Segment #2 assembly (25), Fig. (3).....
71329	Insulator-Switch cover insulator..	71366	Shaft-Drive gear shaft, Fig. (4)...
71334	Knob-Control knob assembly.....	71371	Shaft-Selector shaft #1 assembly (46), Fig. (17).....
71378	Knob-Selector arm knob #1 assembly (48), Fig. (1).....	71380	Shaft-Selector shaft #2 (42), Fig. (21).....
71382	Knob-Selector arm knob #2 (44), Fig. (1).....	71313	Shoe-Trip shoe (29), Fig. (3).....
71346	Latch-Tone arm latch (center) (13), Fig. (12).....	71372	Sleeve-Selector shaft sleeve (47), Fig. (17).....
71347	Latch-Tone arm latch (inner)(14), Fig. (12).....	71333	Slide-Manual reject slide (27), Fig. (3).....
71348	Latch-Tone arm latch (outer)(15), Fig. (12).....	71338	Slide-Shutoff slide (11),Fig. (3)..
71350	Lever-Reset lever assembly (18 and 19), Fig. (3).....	71364	Spindle-Turntable spindle assembly.
71305	Lever-Drive gear stop lever assembly (34), Fig. (4).....	71355	Spring-Detent arm spring (62), Fig. (3).....
71340	Lever,Shutoff lever assembly (7), including shutoff dog (8), Fig. (3).....	71308	Spring-Manual lockout spring(inner) (64), Fig. (3).....
71358	Lever-Tone arm lever assembly (17), including roller and knurled edge (30), Fig. (3).....	71296	Spring-Manual lockout spring(outer) (63), Fig. (3).....
71369	Lever-Trip lever assembly (28), including trip dog (31) and roller, Fig. (4).....	71299	Spring-12 in. reset slide spring (66), Fig. (3).....
71370	Lever-Tone arm retard lever (26), Fig. (4).....	71351	Spring-Reset lever spring (65),Fig. (3).....
71368	Lever-Clutch engagement lever(33), Fig. (5).....	71345	Spring-Shutoff bracket spring (72), Fig. (3) or Fig. (14).....
71309	Link-Connecting link (6), Fig. (2)	71341	Spring-Shutoff lever spring (70), Fig. (3).....
71367	Link-Drive link assembly (20), Fig. (2).....	71339	Spring-Shutoff slide spring (73), Fig. (3).....
71336	Locator-Tone arm locator (16), Fig. (3).....	71343	Spring-Shutoff trip spring (71), Fig. (3).....
71332	Lockout-Manual lockout assembly (4 and 5), including slide (1), Fig. (3).....	71300	Spring-Stop lever spring (61), Fig. (4).....
70546	Mounting Kit, Motorboard.....	71293	Spring-Tone arm booster spring (67), Fig. (3).....
71319	Pin-Stop lever pivot pin (mounting pin) Fig. (4).....	71349	Spring-Tone arm latch spring (outer) (69),Fig.(3) or Fig.(12).....
71316	Pin-Tone arm lift pin (51),Fig. (24).....	71306	Spring-Tone arm locator and latch spring (68), Fig. (3).....
71362	Plate-Segment tie plate (24), Fig. (3).....	71301	Spring-Trip dog spring (60),Fig.(4)
71352	Plate-Switch plate assembly.....	71304	Spring-Trip lever spring (59),Fig. (4).....
71297	Plate-Thrust plate (39), Fig. (2).	71302	Spring-Retard lever spring (58), Fig. (4).....
71376	Rod-Drive link connecting rod(21), Fig. (2).....	71356	Strip-Contact mounting strip assembly (part of pickup shorting switch), Fig. (3).....
71315	Roller-Drive link roller on link (20), Fig. (2).....	71320	Switch-Power switch, Fig. (2).....
71303	Screw-Retard lever screw (mounting screw for lever (26) Fig. (4)...	71342	Trip-Shutoff trip assembly (9),Fig. (3).....
71360	Segment-Segment #1 assembly (23), Fig. (3).....	71385	Turntable-Turntable Assembly.....
		71322	Washer-Tone arm special washer (75), Fig. (24).....
		71298	Wafer-Thrust wafer (40),Fig.(2)....
		71292	Washer-"C" washer (large).....
		71295	Washer-"C" washer (small).....

All prices and parts are subject to change or withdrawal without notice.