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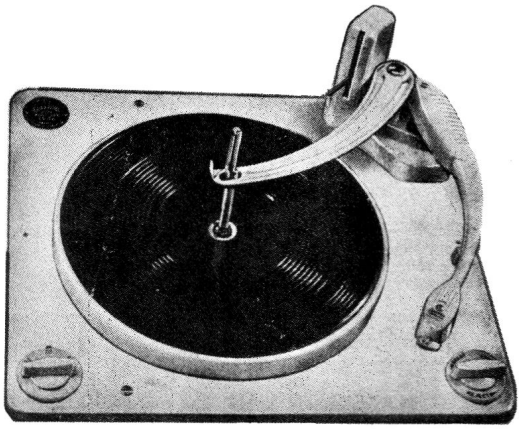


COLLARO
RC-54

HI-FIDELITY RECORD CHANGER

Model Collaro RC-54

SERVICE DATA

— 1955 No. 23 —

ISSUED BY

GENERAL SERVICE DEPARTMENT
RCA VICTOR COMPANY, LTD.
MONTREAL, CANADA

General Description

The Model RC-54 record changer is a three speed record changer designed to play in automatic sequence a stack of 7 inch, 10 inch and 12 inch records intermixed and to shut off automatically after the last record.

Controls

The record changer is provided with two control dials. The motor speed control is located on the left hand corner of the motor board and the start-stop-reject control is located on the Right hand corner of the motor board.

Turning the start control gently to the left, will cause the turntable to start rotating, at this time the control may be released.

The motor speed control makes possible the selection of the three speeds, 33 1/3, 45, 78 RPM by rotating the knob to the desired position.

GENERAL INFORMATION.—Apart from faults arising directly from the Pickup, the satisfactory reproduction of records is basically dependent upon the maintenance of correct and uniform speed. In order to achieve this, it is obviously necessary to maintain correct and uniform speed of the Turntable itself, but it is important to remember that uneven speed of the record track as it passes the stylus may arise from other causes such as:—

1. Enlarged centre holes in records resulting in eccentric rotation, causing excessive sideways swing of the Pickup Head.
2. Warping of records causing excessive up and down movement of the Pickup Head.
3. High Spots on records or distortion, resulting in failure of the records to drive each other when used more than one at a time on Record Changers.

Before proceeding to investigate any faults on the basis of the information which follows, it is essential to eliminate the above three possible sources. For this purpose the Service man is recommended to select and carefully preserve a set of test records in which he knows these defects to be wholly absent.

It is also important to make sure that the drive to the Turntable is not slipping, due to the presence of grease or oil on the driving surfaces of the Pulleys or the inside rim of the Turntable (See instructions for cleaning in Section IX).

It will be of great assistance to the Service Engineer when tracing the source of "Wow" to remember that defects in the Turntable itself will, in general, cause "Wow" to occur regularly at Turntable speed, whilst defects in the Idler Wheel will generally cause it to occur at approximately four times Turntable speed. These are not invariable rules; for example, the Turntable bearing may have tight spots in two diametrically opposite positions, thus causing "Wow" at twice Turntable speed.

CONDITIONS ESSENTIAL FOR SATISFACTORY OPERATION OF MOTOR UNIT.—The information given in the following Pages is based on the tolerances and precautions actually observed in manufacture and assembly. While the Service man may not always have means at his disposal for checking all the tolerances quoted, the information will, nevertheless, give a useful indication of the degree of accuracy considered necessary to ensure satisfactory reproduction of records, and so help him in the diagnosis of any faults encountered.

SWITCHING ON.—Normally the "START" control should be turned gently to the left until the turntable starts to rotate, when it may be released. Stalling of the machine is unlikely to occur unless the main supply is interrupted or disconnected at certain critical points in the change cycle. In all cases normal working may be restored by operating the "START" control to the extreme of its movement, and holding there for a few moments before gently releasing.

Failure to start may be caused by bent or damaged switch contacts. These may be inspected under working conditions by removal of the switch cover, taking care to avoid touching the contacts unless main supply has first been disconnected.

TO ADJUST OR CHECK ADJUSTMENT

(I) Remove all records and disconnect Main Supply.
(II) Loosen set bolt (38) two or three turns.
(III) Operate start control.
(IV) Turn large Gear Wheel (39) in direction indicated by arrow in Fig. 2 until Record Dropping Lever (40) is moved to its extreme position. The Roller (41) will then be behind and covered by the Operating Bar (42).
(V) Tighten set bolt (38) securely.
(VI) Reconnect Main supply and test with full load of 12" records.

RECORD DROPPING.—Adjustment of the mechanism should not normally be necessary unless the machine has been partially dismantled to make replacements.

Instructions

IX. GENERAL INSTRUCTIONS FOR MAINTENANCE OF MOTOR AND TURNTABLE DRIVE.—No lubrication of the motor is normally required as it is fitted with self-oiling bearings. The only maintenance necessary consists in occasional removal of the turntable to clean its inner rim and the driving surfaces of the Motor Pulley (4) and Idler Wheel (29), by wiping a clean petrol-moistened rag. The thrust washers and ball race fitted underneath the turntable bearing should also be examined, and if necessary, washed clean with petrol and relubricated with a small amount of soft grease. When carrying out these operations, carefully observe all instructions given in Section I concerning removal and replacement of the Turntable.

Dismantling of the main motor assembly, beyond the stage depicted in Item 7 of the Drawing, is not recommended as it is difficult to reassemble the Motor satisfactorily without special equipment, and noisy running and uneven speed may result.

X. ADJUSTMENTS NECESSARY IN THE EVENT OF CHANGES IN VOLTAGE AND/OR PERIODICITY OF SUPPLY.—Each Motor carries an engraved plate giving details of the periodicity and voltage of the supply which it may be used.

XI. AUTOMATIC TRIP.—This is of the "Velocity Trip" variety and is designed to be extremely light and sensitive in operation. No adjustment is provided, and the only likely cause of failure is if the curved end of the Feed Lever (49) has been accidentally bent upwards or downwards so that the end of the Striker Arm (46) cannot work freely in the aperture in the side of the Diecast Housing carrying the turntable bearing, etc. Both the Feed Lever (49) and the Striker Arm (46) must be absolutely free on their respective pivots, and note that the long Pin (50) must always lie within the forked end of the Feed Lever (51) as shown in Fig. 2.

XII. STOP CONTROL.—This movement should be operated firmly to its full extent to the right and released gently. Letting the knob fly back out of the fingers may in extreme cases cause failure of the machine to switch off, and another record may be played as if the "REJECT" control has been used.

XIII. AUTOMATIC STOP.—Any failure of the Automatic Stop (i.e. the automatic switching off of the machine after playing the last record) will be best diagnosed from the following description of the various functions performed by the mechanism.

The automatic stop is brought into operation after the last record has been played by reason of the Record Balancing Arm (69) having dropped to its fullest extent. This depresses the Auto Stop Lever (52) which in turn allows the Auto Stop Catch Plate (53) to fall and retain the Pick-up Return Lever (54) in the position shown in Fig. 3. The Pick-up Arm is thus not returned inwards over the records, but subsides on to its rest at the end of the change cycle. At the same time the Pick-up Return Lever (54) through the medium of the Switch-off Plate (55) restrains the Switch-off Link (56) in the position shown in Fig. 3. against the pull of the Spring (57). The turned up end of the Switch-off Link is thus held in the path of the Peg (58) and at the end of the cycle, the notch in the Switch Pawl (59) is disengaged from the Peg (60), and the Spring (61) holds the motor switch open and simultaneously retracts the Rubber Idler Wheel (70) through the medium of the Lever (62) and the Link (71).

The Record Spindle, Dropping Mechanism, and Turntable Spigot Bearing Housing are built as a pre-adjusted unit. UNDER SO CIRCUMSTANCES SHOULD THE NUT (43) OR THE STOP (44) BE DISTURBED FROM THEIR ORIGINAL SETTING. If damage has occurred or the adjustment has been disturbed, it is recommended that this unit should be replaced as a whole.

TO REMOVE SPINDLE UNIT FROM MACHINE:

(I) Remove Circlip (45) and Auto-trip Striker Arm (46).

(II) Withdraw Split Pin (47).

(III) Disengage Motor Switch Lead from Tal.

(IV) Remove Turntable (See Section 1 on reverse of this sheet).

(V) Remove 3 screws (68).

(VI) Disengage slot in Record Dropping Slide (48) peg in Record Dropping Lever (40), after which spindle unit may be withdrawn.

TO ASSEMBLE REPLACEMENT UNIT TO MACHINE.—Reverse above procedure taking care that the various parts are arranged exactly as shown in Fig. 2. When replacing Auto-trip Striker Arm (46) note that the rubber roller must face upwards towards the underside of the unit plate. After assembly is complete, adjust Record Dropping Roller (41) as indicated at beginning of this Section.

NOTE.—If records fail to drop. Worn or chipped centre holes can be the cause, and the use of records damaged in this way should be avoided. If failure occurs when using undamaged records, check adjustment of record dropping mechanism as indicated at the beginning of this Section.

If more than one record drops at a time. Worn or chipped centre holes may also be the cause. Also make sure that the small sliding member housed in the top of the spindle drops perfectly freely under its own weight. If it does not do so, it is probable that some foreign matter has become lodged between the slide and side of the grove in which it works, and this may best be dislodged by means of a thin razor blade. Grease or oil on the slide may also be the cause to its failure to drop freely, and consequently great care should be exercised if the turntable is removed to avoid depositing on the slide any grease or oil from the turntable bearing. Carbon tetrachloride or other solvent applied with a small brush should be used to clean the parts if this cause of failure is suspected.

On switching on again, the Control Lever (63) disengages the turned-up end of the Switch-off Link (56) from the Peg (58) thus allowing the notch in the Switch Pawl (59) to engage with the Peg (60) so holding the motor switch closed and at the same time holding the Rubber Idler Wheel (70) in contact between the Motor Pulley and the Turntable Rim. If, at the same time, one or more records have been leaded on to the machine, the Auto-Stop Lever (52) will lift under the influence of its spring (72) as soon as the Pick-up Return Lever (54) is moved momentarily out of the nitch in the Auto-Stop Catch Plate (53) during the change cycle. This removes all restraints on the various parts of the mechanism, and the cycle. This removes all restraints on the various parts of the mechanism, and the cycle is completed in the normal way. If, however, no records have been loaded on to the machine and the Record Balancing Arm (69) remains dropped to its fullest extent, the Pick-up Return Lever (54) will not be released, and the Pick-up Arm will again subside on to its rest and the machine will switch-off at the completion of the cycle.

The purpose of the small Pawl 9 (64) attached to the Auto-Stop Catch Plate (53) is to prevent the Pick-up Return Lever (54) being restrained as the last record falls, which would cause the machine to switch off without playing the last record. This Pawl (64) thus delays the restraint of the Pick-up Return Lever until the next cycle, i.e., after the playing of the last record is completed.

For satisfactory working it is essential that all the parts mentioned above should work absolutely freely, and that the Spring (72), should positively actuate the Auto-Stop Lever (52) lifting the Auto-Stop Catch Plate (53) with it. At the same time the Spring (72) must not be so strong as to prevent the weight of the Record Balancing Arm fully depressing the Auto Stop Lever (52).

Instructions

XIV. CONTINUOUS OPERATION ON CHANGE CYCLE.—If the change mechanism operates continuously without allowing each record to play to the end the cause can be:

(I) Weakening or displacement of Spring (65).

(II) Drive Withdrawel Pawl (66) being stiff on its pivot (73).

(III) Auto-Trip Lever (74) being stiff on its pivot.

All the above causes may have the effect of preventing the Drive Withdrawal Pawl being properly picked up by the Pin (67) in the Operating Gear (39).

XV. PICK-UP SETTING DOWN POSITION.—If positions are erratic, check first of all that the nut shown at D (Fig. 1) is securely tightened.

The position at which the stylus alights on the record may be adjusted, if necessary, by means of the two screws A and B (Fig. 1). To bring position further in, loosen screw A and tighten Screw B the same amount. To bring position further out, loosen screw B and tighten screw A the same amount.

NOTE—This adjustment is very sensitive; turn the screws only a small fraction of a turn at a time until the desired adjustment is obtained, and finally check that position is correct after both screws have been firmly tightened. AVOID EXCESSIVE FORCE when tightening these screws.

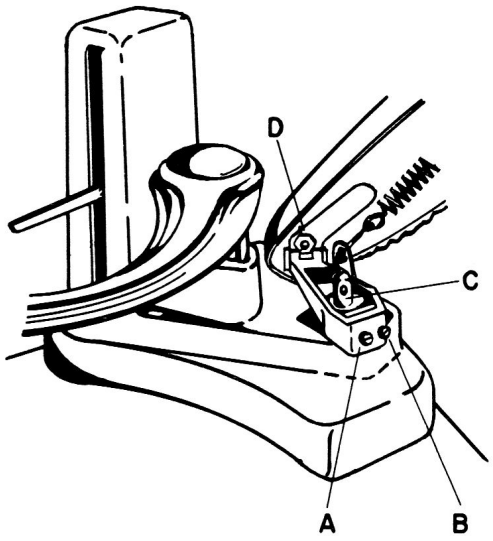
The machine gives automatic positioning for 7", 10" and 12" records and the above adjustment affects all positions equally. The design of the mechanism ensures that when the 7" setting down position is correctly adjusted the 10" and 12" positions will be correct also in accordance with the following table based on the standards laid down by the principal record manufacturers:

STANDARD SETTING-DOWN POSITIONS	Measured from turntable centre	Measured from side of record spindle
for 7" Records -----	3.11/32"	3.13/64"
for 10" Records -----	4.13/16"	4.43/64"
for 12" Records -----	5.13/16"	5.43/63"

All machines are adjusted in accordance with the above at the factory.

XVI. PICK-UP HEIGHT ADJUSTMENT.—The height to which the pick-up arm lifted during the change cycle is controlled by a simple self-locking adjustment shown at C (Fig. 1). To make adjustment, if necessary, switch off the main supply during the change cycle at the point where the pick-up arm has just swung outwards over its rest. The spindle C may then be screwed up or down as required by inserting any suitable pin into the transverse hole drilled near its projecting rounded end. Correct adjustment is when the pick-up arm clears the top of its rest by 1/8" approximately. Finally switch on main supply again.

If machine does not start up and complete the change cycle when mains supply is re-connected, turn the control knob fully to the "start" position and hold there for a few moments before gently releasing.



VIEW OF PICK-UP HOUSING WITH PICK-UP ARM RAISED TO REVEAL ADJUSTMENTS FOR PICK-UP POSITIONS AND HEIGHT.

Fig. 1

XVII

Diagnosis of Faults and Suggested Remedies

Condition	Defect Produced by Non-compliance with Condition	Probable Causes of Defect
MOTOR		
1. Motor must spin freely. 2. Motor must run quietly.	Slow running. Uneven Speed. Noisy running. Background Rumble.	Bearings out of alignment. (Tap Motor lightly on all sides whilst running to line up bearings.). Rotor not central in tunnel of Stator. (To centralize (1) loosen 6 Clamp Bolts (heads on underside of Motor Frame); (2) insert 2 shims 1" wide x .010" thick between Stator and Rotor; (3) tighten 6 Clamp Bolts; (4) withdraw shims).
TURNTABLE		
3. Inside of rim must run concentric within .006", and be free from all irregularities.	Wow.	(1) Distorted Turntable. (2) Foreign matter adhering to inside of rim.
4. Face (near rim) must run true within .010". (Test with truly flat disc 10" dia. on Turntable.).	Wow.	(1) Distorted Turntable. (2) Displacement of Rubber Mat.
5. Turntable bearing, with Circlip in place, must have small amount of end play. (.015" max.).	Slow running. Noisy running. Wow. Background Rumble.	Extra steel or neoprene washers, or incorrect washers, fitted under turntable bearing, (If from this cause, fault will disappear if wire circlip is removed from centre of Turntable).
6. Turntable must spin freely without any trace of a tight spot (a tight spot is indicated by a tendency to come to rest predominantly in on position—to test mark edge of Turntable with chalk or gummed paper.)	Wow. Slow running.	(1) Dirty or dry bearing. (2) damaged steel thrust washer. (3) Damaged ball in thrust race. (4) Ball binding in Thrust Cage. (5) Damaged ball cage contracting thrust washer or binding on spigot. (6) No end Play in bearing (See Condition 5).

Diagnosis of Faults and Suggested Remedies (Cont'd)

7. Bearing must run silently and smoothly.	Noisy Running Rumble	(I) Dirty or dry bearing. (II) Damaged steel thrust washer. (III) Damaged ball in thrust race. (IV) Ball binding in thrust cage. (V) Omission of neoprene cushion washer. (VI) Damaged ball cage, contracting thrust washer or binding on spigot. (VII) No end play in bearing (See condition 5.).
MOTOR PULLEY (4)		
8. Driving surfaces must run concentric within .002" and be free from flats or other irregulations.	Flutter. Cross Modulation	(I) Bent motor spindle (II) Enlarged bore in pulley. (III) Burr on motor spindle.
9. Must be close sliding fit on Motor Spindle without perceptible play.	Noisy running (Probably in form of intermittent light rattling.).	(I) Enlarged bore in pulley (II)undersize Motor Spindle.
10. Must be set at correct working level, (Level is controlled by position of Fan on Motor Spindle—See SECTION V) and must engage Idler Wheel correctly (See Condition 16).	Wow. Slow running	(I) Idler Wheel overlapping flange of Motor Pulley at 78 r.p.m. (II) Face of Idler Wheel contracting flange of Motor Pulley on either 33 r.p.m. or 45 r.p.m.
IDLER WHEEL (29)		
11. Rim must run concentric within .002" and be free from flats or other irregularities.	Wow. Noisy running (Probably in form of regular low thumping).	(I) Distorted Idler Wheel (II) Rubber damaged at rim. (III) Boss loosened in Idler Wheel. (IV) Foreign matter adhering to rim.
12. Face (near rim) must run true within .010".	Wow. (caused by rim overriding 78 r.p.m. flange of Motor Pulley or intermittently touching face of 78 r.p.m. flange when operating on 33-1/3 or 45 r.p.m.	(I) Distorted Idler Wheel. (II) Boss loosened in Idler Wheel.
13. Wheel must spin freely without trace of tight spots (with retaining washer and screw in place.).	Wow. Slow running	
14. Bearing must have end play (.005" max.) (with retaining washer and screw in place).	Wow Slow running	(I) Washer omitted (above or below bearing) causing excessive end play, permitting rim of wheel to override flange of Motor Pulley. (See Condition 10.). (II) Extra washer or incorrect washer fitted causing lack of end play and possibly tightness.
15. Plane of Wheel must be square to Motor Spindle.	Slow running (Accompanied by scurfing of the rubber rim).	Distorted Idler Swivel Arm (31).
16. Wheel must be set at correct working level (i.e., centrally disposed relative to largest flange of Motor Pulley when operating on 78 r.p.m.).	Slow running. Wow. Failure of drive to engage on 45 r.p.m.	(I) Rim of Idler Wheel overriding 78 r.p.m. flange of Motor Pulley. (II) Face of Idler Wheel touching face of 78 r.p.m. flange of Motor Pulley when operating on 33-1/3 or 45 r.p.m. (III) Idler Swivel Arm (31) fouling Motor Frame. Correct above faults by adjusting Nut (22) after first checking that Motor Pulley is at correct level. (See notes at end of SECTION IV).
17. Wheel must clear top of Spindle when operating on 45 r.p.m.	No drive or uneven speed on 45 r.p.m.	(I) Incorrect setting of Spindle (11). (See SECTION VII) (II) Incorrect adjustment of Nut (22). (See 16 above).
IDLER SLIDE ARM (35)		
18. Must pivot absolutely freely on Idler Slide Arm (35). (End play should not exceed .005".).	Low or uneven Turntable does not rotate (due to Idler Wheel failing to engage).	(I) Holes in Idler Slide Arm (35) through which Spindle (34) passes out of line (due to distortion of Idler Slide Arm). (II) Spindle (34) bent. (III) Forks of Idler Slide Arm (35) bent or twisted and pinching boss or Idler Swivel Arm (31). (IV) Grubscrew (32) insecure, allowing Spindle (34) to drop out of engagement with top fork of Idler Slide Arm (35). NOTE—Spindle (34) is made fast to Idler Swivel Arm (31) by the Grubscrew (32) and must be able to turn absolutely freely in the forks of Idler Slide Arm (35). See SECTION VI for instruction on setting.
IDLER SLIDE ARM (35)		
19. Must pivot and slide absolutely freely on Spindle (11) and be freely actuated by Spring (36), when machine is switched on.	Low or uneven Turntable speed. Turntable does not rotate (due to Idler Wheel failing to engage).	(I) Holes in Idler Slide Arm (35) through which Spindle (11) passes out of line (due to distortion of Idler Slide Arm) (II) Spindle (11) bent.
20. Spindle (11) must be set at correct level in Motor Frame. (See SECTION VII).	Uneven speed on 45 r.p.m. setting. Turntable does not rotate when on 45 r.p.m. setting.	Contact between top of Spindle (11) and Idler Wheel (29) when on 45 r.p.m. setting. Check operating level of both these components (See SECTION VII and SECTION XVII (11)-(17) inclusive).

INSTRUCTIONS FOR DISMANTLING, RE-ASSEMBLING AND SERVICING 3-SPEED MOTOR UNITS

Removal

Replacement

I. TURNTABLE.—Remove wire circlip from centre of Turntable. Turntable should then be lifted right off spindle with a small to and fro rotary movement.

1. Check that Ball Thrust Cage and Washers are free from foreign matter and lubricated with a small quantity of light grease. Ball Race Cage must be replaced open side downwards with steel thrust washer immediately below and another immediately above it. Resilient washers of neoprene are fitted below and above the steel thrust washers, the upper neoprene washer having a larger centre hole and locating in the recessed end of the turntable boss to which it should be fitted before replacing Turntable.
2. Check that the Fan (6) and Motor Pulley (4) are correctly located on the Motor Spindle in accordance with instructions given in Section IV and V.
3. Check that the Idler Wheel (29) also the rubber wheel which drives the Change mechanisms are in their retracted positions clear of the turntable rim.
4. Replace Turntable on spigot, fit the retaining wire circlip and check that Turntable spins quite freely.

IMPORTANT NOTE.—Take great care to avoid depositing grease or oil on the Motor Pulley (4), the Idler Wheel (29), or the inside rim of the turntable, as even a minute trace will cause the drive to slip. As a precaution against this, it is advisable to wipe these parts with a clean petrol-moistened rag immediately prior to re-assembly. In case of record changers, also avoid depositing grease or oil on the sliding member in the top of the record spindle, as this may prevent it falling freely under its own weight, causing records to drop more than one at a time.

II. IDLER WHEEL (29)

1. Remove Screw (27) and Fibre Washer (28).
2. Withdraw Idler Wheel (29) upwards from its spindle.

1. Reverse procedure given opposite, taking care that all washers are correctly in place.
2. Check that Idler Wheel spins freely and runs true within the limits specified in the tabulated information given in SECTION XVII(11)-(17) inclusive.

IMPORTANT NOTES.—

1. Most machines have one or two Fibre Washers (30) fitted under the Idler Wheel (29), but some have no washers in this position. When fitted, these Washers generally adhere to the boss of the Idler Wheel when it is withdrawn. Be sure to replace Washers exactly as found when dismantling. Do not confuse Washer (28) - small hole, with Washer (30) - large hole.
2. Do not over tighten Screw (27) as this may distort Fibre Washer (28), causing the Idler Wheel (29) to be stiff on its bearing.

III. MOTOR UNIT (as a whole)

1. Disconnect main lead supplying motor.
2. Remove Turntable. (See Section 1).
3. Remove Switch Cover and slide the two spring contacts off the lugs which locate them in the Switch base, taking care not to distort the contacts.
4. Uncouple the speed control link by removing the Circlip (18).
5. Remove Idler Wheel (See Section II).
6. Detach Spring (36) from post in Idler Slide Arm (35), lift Idler Withdrawal Link (37) from post and swing clear.
7. Remove three screws (1), (3) and (33) which secure the motor frame to the base plate. NOTE — A shakeproof washer (2) is used under the head of the screw nearest the turntable centre, and must be replaced in that position.

Reverse procedure given opposite, taking all precautions given in Sections II and I when replacing Idler Wheel and Turntable respectively. Check also that the Fan (6) and Motor Pulley (4) are correctly located on the Motor Spindle, in accordance with instructions in Sections IV and V.

IV. MOTOR PULLEY (4)

1. Hold Cooling Fan (6) stationary by inserting finger tip between the blades.
2. Grip the Motor Pulley (4) with thumb and finger of the other hand, and turn it in an anti-clockwise direction, at the same time pulling it gently upwards. The coupling spring (5), usually comes away with the Pulley, but in any case should be removed from the Fan Boss for purposes of re-assembly.

1. Press Motor Pulley (4) into coupling Spring (5) with a left hand twisting movement until the end coil of the Spring sits firmly against the shoulder of the Pulley.

NOTE—The end of the Spring without the projecting tail should be next to the Pulley.

2. Hold Cooling Fan (6) stationary by inserting finger tip between the blades.
3. Slide Pulley (with Spring attached) on to the Motor Spindle so that the open end of the Spring engages with the neck of the Fan Boss. Grip Pulley with thumb and finger, turn it in an anti-clockwise direction, at the same time pressing it gently downwards. When properly located the bottom of the Pulley should butt firmly against the top of the Fan Boss.

Removal

IV. MOTOR PULLEY (Cont'd)

IMPORTANT NOTES.—

1. Take care not to distort Fan Blades (see Section V).
2. Cooling Fan (6) is a drive fit on Motor Spindle, and is set so that the Motor Pulley (4) will be at correct level when butting against it. Do not push Motor Pulley forcibly downwards when replacing, as this may disturb location of the Fan on the Spindle. (Refer to Section V for instructions on checking and setting level of Cooling Fan).
3. As a ready means of checking correct working level of the Motor Pulley (4) the Service men should equip himself with a straight strip of metal 3-1/2" long, 11/32" wide. This should be used by laying edgewise on top of the Unit Plate, so as to bridge the aperature through which the Motor Pulley protrudes. The upper edge should just pass under the largest flange of the Motor Pulley.

Replacement

4. Check that Motor spins freely and that Motor Pulley runs true within limits specified in the tabulated information given in SECTION XVII (8), (9) and (10).

V. COOLING FAN (6)

First remove Idler Wheel (29) and Motor Pulley (4) as described in Sections II and IV respectively. The Cooling Fan (6) may then be pried off the Motor Spindle, taking great care to avoid bending the Motor Spindle. For this purpose a pair of suitable bent levers should be used simultaneously on opposite sides, taking care to pry directly on the underside of the Fan Boss to avoid distorting the blades.

If necessary, pinch the split neck of the Fan Boss to make it a tight drive fit on the Motor Spindle. Do not close in too much as undue force may then be necessary to push it on to the Motor Spindle. If over-tight, a length of 3/16" diameter rod with a tapered end, should be driven through the Boss before attempting to push it on to the Motor Spindle.

To push the Fan into position on the Motor Spindle, it is convenient to use a short length of tube 9/32" diameter bore. This should be gently tapped down until the top of the split neck of the Fan Boss is 7/16" above the flat face of the motor frame. If set too low, rise upwards as described opposite.

Finally, check that all six fan blades have adequate clearance, setting any blades that are out of line. The lower edge of each blade should be parallel to the face of the motor frame with a gap of about 1/16".

VI. IDLER SWIVEL ARM (31)

1. Remove Idler Wheel (29) as described in Section II.
2. Loosen Set Screw (32) two or three turns.
3. Withdraw Spindle (34) upwards, thus enabling the Idler Swivel Arm (31) to be withdrawn sideways from between the forks of the Idler Slide Arm (35).

Reverse procedure given opposite. Take care to replace Spindle (34) so that the recessed portion engages with the Set Screw (32). The Spindle (34) should be set so that each of its ends is slightly proud of the outside faces of the forks of the Idler Slide Arm (35). Tighten Set Screw (32) securely and check that the Swivel Arm (31) swings quite freely on the Slide Arm (35).

NOTE—The lug "X" of the Swivel Arm (31) must be assembled so as to engage with the recess "X" of the Slide Arm (35).

VII. IDLER SLIDE ARM (35)

NOTE—Idler Swivel Arm (31) may be left attached to the Slide Arm (35) during this operation, or alternatively it may be separately removed, as discribed in Section VI.

1. Remove Idler Wheel (29). See Section (II).
2. Detach Spring (36) from Post in Idler Slide Arm (35), lift Idler Withdrawal Link (37) from post and swing clear.
3. Loosen Set Screw (8) two or three turns.
4. Withdraw Spindle (11) upwards, thus enabling the Slide Arm (35) to be detached.

NOTE—Withdrawal of the Spindle (11) also releases the Thrust Collar (13).

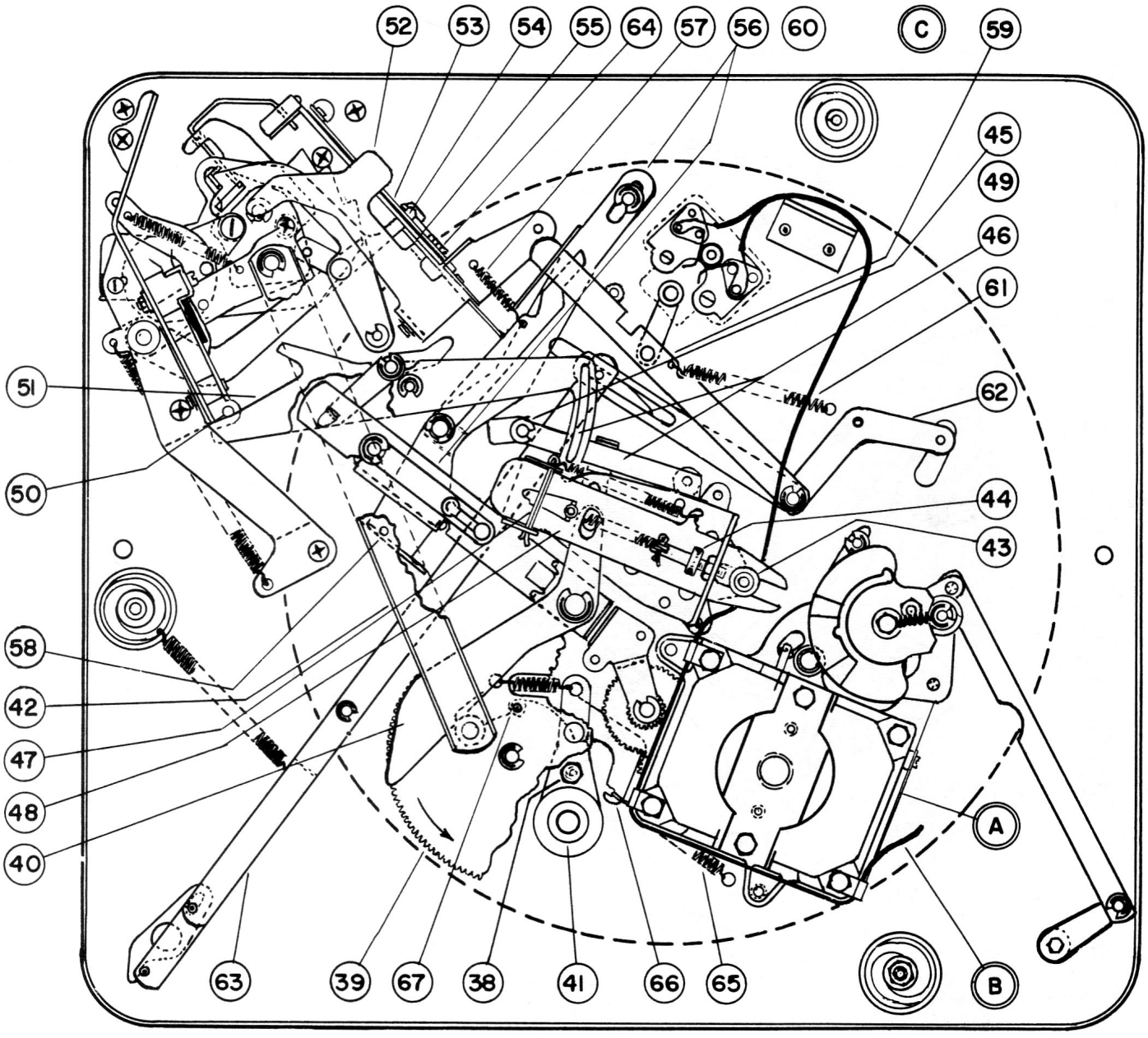
Reverse procedure given opposite. Take care to replace Spindle (11) so that the recessed portion is engaged by the Set Screw (8).

Thread the Thrust Collar (13) on to the lower end of the Spindle (11), with its bevelled end downwards in contact with the upper face of the 3-speed Control Cam (19). The Spindle (11) should then be set so that its upper end projects 21/32" above the flat face of the motor frame, and the Set Screw (8) tightened securely.

VIII. 3-SPEED CONTROL CAM (19) IDLER WITHDRAWAL LEVER (24) ETC.

1. Remove Circlip (18) and swing Control Link clear.
2. Detach Spring (23).
3. Remove Self Locking Nut (22). All items numbered 13 to 26 inclusive can then be detached.

1. Assemble items 24, 25, 26 together, and assemble to Motor Frame, taking care to locate the limb "A" of the Idler Withdrawal Lever (24) behind the peg "A" projecting from the bottom member of the Idler Slide Arm (35).
2. Slide Thrust Collar (13) on to lower end of Spindle (11) with its bevelled end downwards.
3. Slide Spring (14) on to the plain portion of the Spindle with the threaded end projecting downwards from the motor frame.
4. Assemble items 15, 16, 17, 19, 20 together and slide on to the spindle with the threaded end, followed by the Washer (21), Self Locking Nut (22) and Spring (23). Make sure that the Flange of the Roller (25) over-rides the top face of the 3-speed Control Cam (19).
5. Adjust working level of 3-speed Control Cam (19) by means of the Self Locking Nut (22)



LARGER COMPONENTS ARE SHOWN CUT AWAY TO REVEAL MECHANISM UNDERNEATH

Fig. 2—View of Underside of Record Changer

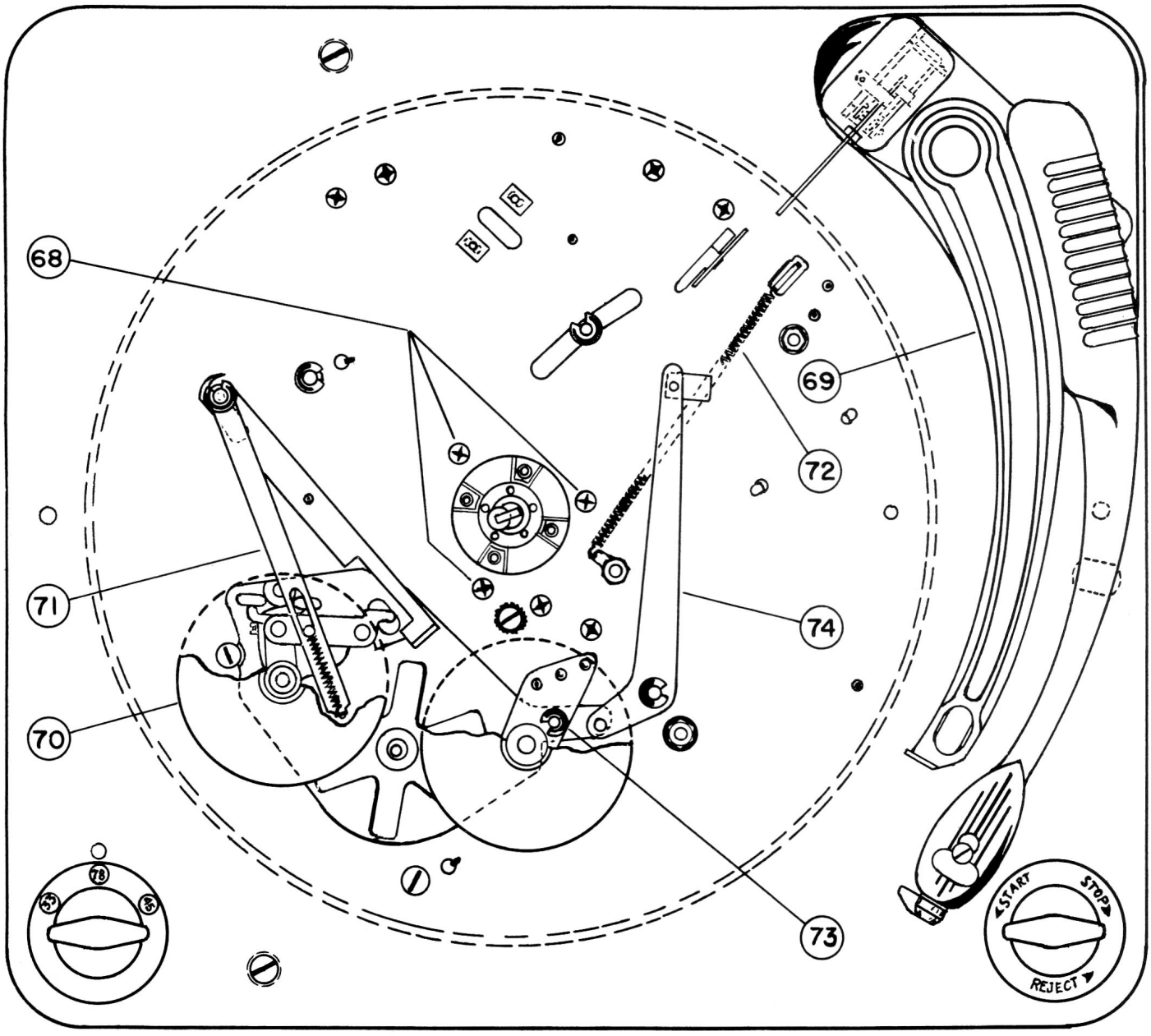


Fig. 3—Top View of Record Changer with Turntable Removed

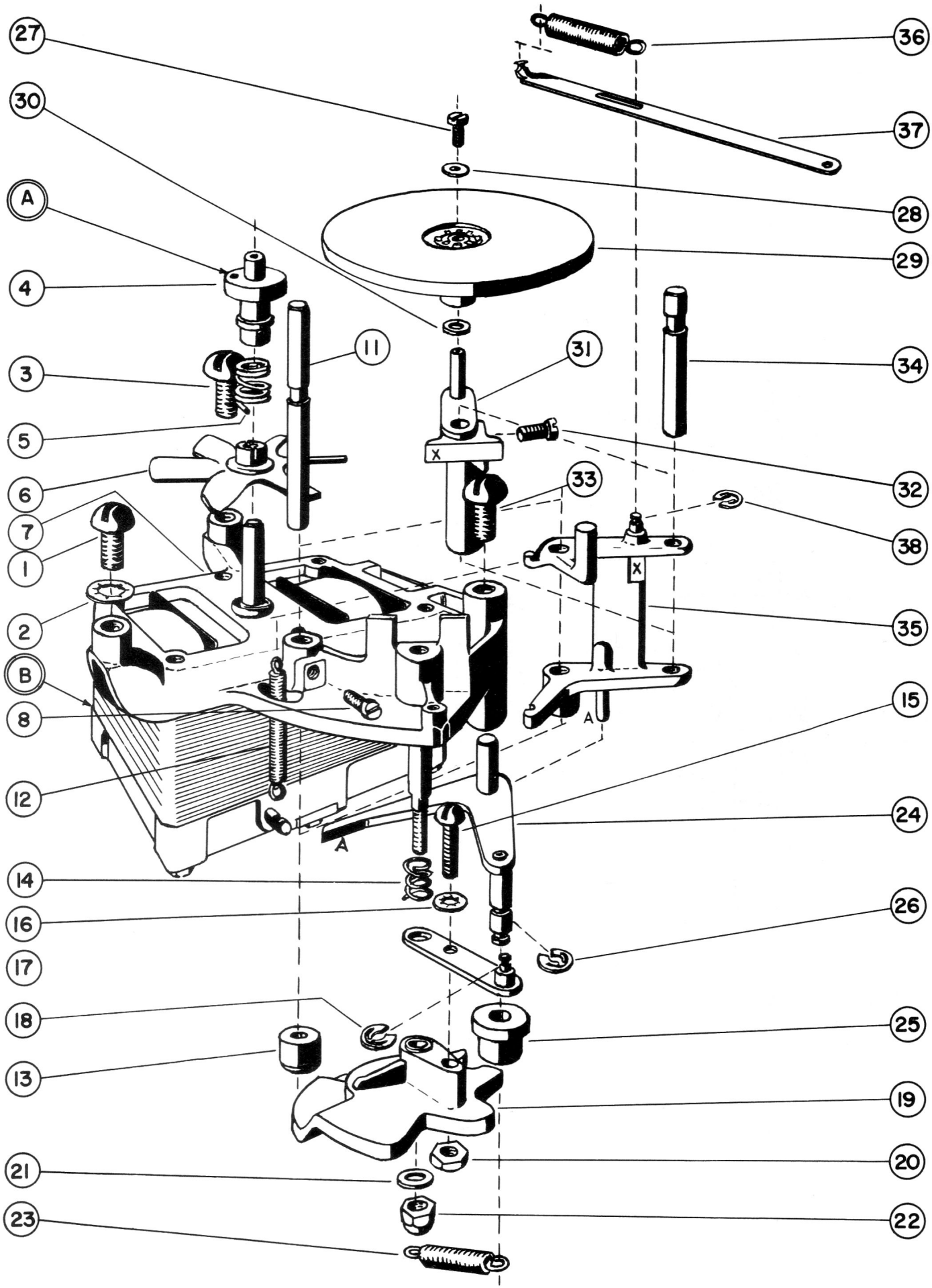


Fig. 4—Mechanism — Exploded View

REPLACEMENT PARTS

Ill. No.	Stock No.	DESCRIPTION
1	S-20752	Screw
2	S-20753	Shake-proof washer
3	S-20754	Screw
4	S-20755	Motor Pulley for 60 cycle
4	S-20756	Motor Pulley for 50 cycle
4	S-20757	Motor Pulley for 25 cycle
5	S-20758	Coupling Spring
6	S-20759	Cooling Fan
7	S-20760	Frame
8	S-20761	Set Screw
9		
10		
11	S-20761	Spindle
12	S-20762	Spring
13	S-20763	Trust Collar
14	S-20764	Slide Spring
15	S-20765	Screw
16	S-20766	Lock Washer
17	S-20830	Control Link
18	S-20767	Circlip
19	S-20768	3 speed Control Cam
20	S-20769	Nut
21	S-20770	Washer
22	S-20771	Self Locking Nut
23	S-20772	Spring
24	S-20773	Idler Withdrawal Lever
25	S-20774	Roller
26	S-20775	Circlip
27	S-20776	Screw
28	S-20777	Fibre Washer (Small
29	S-20778	Idler Wheel
30	S-20779	Fibre Washer (Large)
31	S-20780	Idler Swivel Arm
32	S-20782	Set Screw
33	S-20783	Screw
34	S-20784	Spindle
35	S-20785	Idler Slide Arm
36	S-20786	Spring
37	S-20787	Idler Withdrawal Link
38	S-20788	Set Bolt
39	S-20789	Gear Wheel
40	S-20790	Record Dropping Lever
41	S-20791	Record Dropping Roller
42	S-20792	Operating Bar
43	S-20793	Nut
44	S-20794	Nut Stop
45	S-20795	Circlip
46	S-20796	Auto trip - Pickup Arm
47	S-20797	Split pin
48	S-20798	Record Dropping Slide
49	S-20799	Feed Lever
50	S-20800	Pin
51	S-20801	Feed Lever
52	S-20802	Auto Stop Lever
53	S-20803	Auto Stop Catch Plate
54	S-20804	Pick-up return lever
55	S-20805	Switch off plate
56	S-20806	Switch off link
57	S-20807	Spring
58	S-20808	Peg
59	S-20809	Switch Panel
60	S-20810	Peg
61	S-20811	Spring
62	S-20812	Lever
63	S-20813	Control Lever
64	S-20814	Panel
65	S-20815	Spring
66	S-20816	Frame Withdrawal Panel
67	S-20817	Pin
68	S-20818	Screws
69	S-20819	Record Balancing Arm
70	S-20820	Rubber Idler Wheel
71	S-20821	Link
72	S-20822	Auto Stop Lever Spring
73	S-20823	Drive Withdrawal Panel Pivot
74	S-20824	Auto Trip Lever
	S-20825	Turntable
	S-20826	Motor - 60 cycle
	S-20827	Motor - 50 cycle
	S-20828	Motor - 25 cycle
	S-20829	Record Release Arm
	S-20831	Tone Arm
	S-20832	Spindle - 78 RPM Spindle
	S-20833	Spindle - 45 RPM Spindle

Apply to your RCA Distributor for Prices of Replacement Parts

REPLACEMENT PARTS LIST

Insist on Genuine Factory Tested Parts, which are readily identified and may be purchased from Authorized Dealers.

SYMBOL	STOCK NO.	DESCRIPTION
1	*S-21772	Record Balancing Arm
2	S-21175	Turntable Retainer
3	S-20825	Turntable Assembly (Rubber Mat and Turntable Hub.)
4	S-21162	Pick-Up Base and Set Down Selector Housing
5	S-21557	Pick-Up Arm Mounting Bracket
6	S-21558	Hinge Pin
7	S-21176	Pick-Up Arm Hinge
8	S-21560	Set Down Positioning Shim
9	S-21561	Pick-Up Arm Mounting Screw (4BA x 1/2")
10	S-21562	Pick-Up Arm Shell
11	S-21563	Weight Compensating Link
12	S-21188	Weight Compensating Spring
13	*S-21712	Weight Compensating Control
14		Flat Washer
15	S-21566	Weight Compensating Control Adj. Screw (4BA x 1/4"
16	S-21580	Turntable Bearing Washers (Steel)
17	S-21164	Bearing (Ball Race)
18	S-21579	Neoprene Washer (9/16" I.D.)
19	*S-21713	Pick-Up Arm Lift Pin
20	*S-21714	Pick-Up Tripping Arm
21		Flat Washer (Steel, 1/4" I.D.)
22	*S-21715	Lift Pin Lift Spring
23	*S-21716	Pick-Up Arm Mounting Base
24		Clutch Washer (Felt)
25	S-21570	Record Gate Finger Lift Spring
26	S-21165	Record Gate Cam and Finger
27	S-21571	Record Gate Lever Actuating Spring
28	S-21572	Record Gate Lever
29	S-21573	Record Gate Assembly Mounting Bracket
30	S-21166	Set Down Positioning Lever
31	S-21167	Rest Post and Lock Assembly
32	S-21168	Start-Stop-Reject Knob
33	*S-21717	Balancing Arm Column
34	*S-21718	Idler Wheel Mounting Screw
35		Flat Washer (Fibre)
36	S-20778	Motor Idler Wheel
37	*S-21719	Idler Wheel Retracting Link
38	S-21196	Speed Control Knob
39	S-21170	Retracting Link Spring
40	*S-21720	Cycle Delay Lever
41	S-21578	Cycle Drive Wheel
42		Drive Wheel Mounting Screw (6BA hd)
43	S-21171	Drive Wheel Swing Bracket
44	S-21172	Drive Wheel Mounting Shaft and Gear
45	*S-21721	Automatic Trip Lever
46	S-20822	Automatic Stop Lever Spring
47		Baseplate
48	*S-21723	Speed Control Crank
49	S-21586	Mounting Spring
50	S-21173	Cycle Drive Wheel Actuating Spring
51	*S-21724	Speed Control Lever
52	*S-21725	Main Gear Release Lever
53	S-21589	Intermediate Cycling Gear
54	*S-21726	Dropping Stud Stabilizing Plate
55	*S-21727	Record Dropping Lever Mounting Stud
56	S-21590	Start-Stop-Reject Shaft and Cam
57	*S-21728	Reject Lever
58	*S-21729	Stop Lever
59	S-21174	Reject Lever Return Spring
60	*S-21730	Intermediate Cycling Gear Mounting Bracket
61	*S-21731	Idler Wheel Actuating Link
62	*S-21732	Idler Wheel Actuating Lever
63	S-21190	Switch Actuating Cam
64	S-21191	On-Off Switch
65	*S-21733	Switch Pawl
66	S-21173	Switch and Idler Wheel Actuating Spring
67	*S-21734	Switch-Off Link
68	*S-21735	Switch-Off Link Pivot Bracket
69	*S-21736	Spindle Deactivating Lever
70	S-21591	Set Down Selector Wire
71	*S-21737	Selector Wire Mounting Bracket
72	*S-21738	Manual Stop Actuating Lever
73	*S-21739	Spindle Deactivating Link
74	*S-21740	Plate Guide Spacer
75	*S-21741	Switch-Off Link
76	S-20807	Switch-Off Link Spring
77	*S-21742	Striker Arm
78	S-21592	Trip Feed Lever
79	S-21192	Switch Cover
80	S-20832	Spindle Body
81	*S-21743	Turntable A x le
82	*S-21744	Record Dropping Adj. Screw
83	S-21594	Compression Spring
84	S-21595	Shoulder Washer
85	*S-21745	Record Selector Pawl
86	S-21597	Locknut (4BA- Self-Lock)
87	S-21174	Spindle Slide Plate Return Spring
88	S-21177	Selector Pawl Return Spring
89	*S-21746	Spindle Slide Plate
90		Cotter Key
91	*S-21747	Record Dropping Lever
92	S-21178	Compression Spring
93	S-20789	Main Drive Gear
94	*S-21748	Pick-Up Arm Positioning Plate
95	*S-21749	Positioning Plate Guide
96	S-21179	Positioning Plate Lift Spring
97	*S-21750	Spring Cup
98	*S-21751	Left Pin Mounting Bracket
99	S-21603	Pick-Up Arm Lateral Lever
100	S-21180	Pick-Up Arm Return Lever Spring
101	*S-21752	Pick-Up Arm Return Lever
102	*S-21753	Record Gate Reset Lever
103	S-21181	Positioning Plate Guide
104	*S-21754	Record Gate Reset Lever Spring
105	*S-21755	Pick-Up Arm Actuaing Lever
106	*S-21756	Mounting Stud
107	*S-21757	Operating Bar
108	*S-21758	Switch-Off Plate
109	*S-21759	Strengthener
110	S-21607	Auto-Stop Lever Mounting Bracket
111	S-21608	Auto-Stop Lever
112	S-21609	Auto-Stop Catch Plate
113	*S-21760	Muting Switch Mounting Bracket
114	*S-21761	Lift Pin and Muting Switch Actuating Link
115	*S-21762	Lift Pin and Muting Switch Actuating Lever Assembly
116	S-21193	Muting Switch Assembly
117	S-20826	Motor Assembly (60 cycle)Consists of.
118	*S-21718	Idler Wheel Mounting Screw
119		Fibre Washer
120	S-20777	Idler Wheel
121	S-21182	Motor Pulley (60 cycle)
122	S-21183	Coupling Spring
123		Motor Mounting Screw
124	*S-21763	Fan
125	S-21663	Idler Slide Arm Spindle
126	*S-21764	Idler Swivel Arm
127		Swivel Arm Set Screw
128	*S-21765	Slide Arm Moving Spindle
129	*S-21766	Idler Slide Arm
130	S-21185	Slide Arm Return Spring
131		Slide Arm Set Screw
132	S-21767	Cam Lever
133		Control Link Mounting Screw
134	S-21186	Compression Spring
135	S-21768	Speed Control Link
136	S-21769	Thrust Collar
137	S-21770	Cam Index Roller

* Indicates New Stock Items. **Only items listed under stock numbers are available as Replacement Parts.**

All parts subject to change or withdrawal without notice.

REPLACEMENT PARTS LIST

Insist on Genuine Factory Tested Parts, which are readily identified and may be purchased from Authorized Dealers.

SYMBOL	STOCK NO.	DESCRIPTION
138	S-21771	Speed Control Cam
139		Locknut
140		Hex Nut
141	S-21194	Index Spring
		MISCELLANEOUS COMPLEMENTARY PARTS
3A	S-21187	Rubber Mat for Turntable
10A	S-20831	Pick-Up Arm Shell Assembly
10B	S-21620	Pick-Up Head Shell Assembly (Ivory)
	S-21621	Pick-Up Head Shell Assembly (Maroon)
	S-21622	Pick-Up Head Connection Assembly
	100653	Cartridge
	S-21624	Cartridge Mounting Bracket
	S-21625	Rubber Stopper
	S-20833	45 R. P. M. Spindle
	S-20756	Motor Pulley (50 cycle)
	S-20686	RC-54 Changer Complete

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