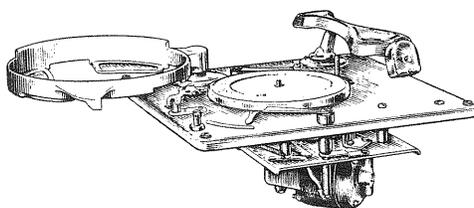


RCA Victor

Automatic Record Changing Mechanism

SERVICE NOTES



RCA Victor Automatic Record Changing Mechanism

[First Edition—20M
Copyright, November, 1931]

SERVICE DIVISION

RCA Victor Company, Inc.
Camden, N.J.

A RADIO CORPORATION OF AMERICA SUBSIDIARY

REPRESENTATIVES IN PRINCIPAL CITIES

CONTENTS

Installation.....	3
Speed Variations.....	5
Adjustment of Magazine Roller.....	5
Failure of Needle to lower properly.....	6
Failure of Needle to lower onto record surface.....	6
Needle fails to clear record after playing.....	6
Failure of record to deposit on turntable.....	7
Records discharge improperly from turntable.....	7
Failure to trip on eccentric groove.....	8
Inability to set for manual operation.....	8
Failure to stop.....	8
Continued tripping of mechanism.....	8
Clutch slipping.....	8
Retiming the mechanism.....	9
Removing the motor board.....	9

ILLUSTRATIONS

Schematic diagram.....	3
Adjusting height of tone arm.....	4
Adjusting elevator pad.....	4
Adjustment of damper pads.....	5
Adjusting position of tone arm.....	6
Adjusting tone arm locating screw.....	6
Adjusting tone arm cable tension screw.....	7
Adjusting spindle height.....	7
Magazine adjustments.....	7
Record transfer lever adjustment.....	7
Method of checking transfer lever lateral adjustment.....	8
Adjusting height of elevator shaft.....	8
Timing position.....	9
Motor parts.....	10
Bottom view of mechanism.....	10
Top view of mechanism showing parts.....	11
Top view of mechanism with plate removed.....	11

SERVICE NOTES

for

RCA Victor Automatic Record Changing Mechanism

The RCA Victor Automatic Record Changing Mechanism is used in RCA Victor Models RAE-26, RAE-59 and RAE-79. Except for the finish of exposed parts, these units are identical. This mechanism is of simple, fool-proof design and will perform efficiently with a minimum of service requirements. Features of this mechanism are; continuous playing of one side of ten 10-inch records, operation at either $33\frac{1}{3}$ or 78 R.P.M. for playing standard or Program Transcription records manually or automatically, a special clutch to prevent jamming in case of failure of a part and a heavy duty motor operating at synchronous speed thereby eliminating any need for regulating devices. A general view of the mechanism is shown on the cover page. Figure 1 shows the schematic wiring diagram.

The Replacement Parts for this mechanism are listed in the Service Notes on each individual instrument. The identification nomenclature given on pages 10 and 11, will be found useful in identifying parts. Where parts are identical in all models the Stock Number of each part is given in addition to its name.

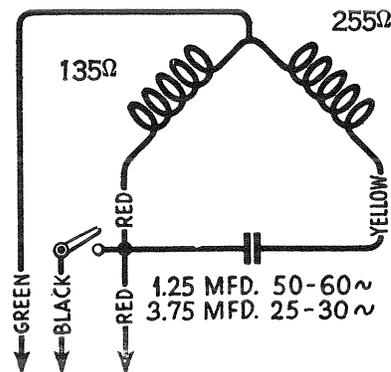


Figure 1—Schematic Diagram

INSTALLATION

After unpacking the instruments in which this mechanism is used, it is imperative that certain preliminary checks be made before they are placed in operation. These checks should be performed in the order given and any adjustments found necessary must be made.

1. When installing the instrument it is advisable to see that all parts are properly lubricated without excessive grease or oil on any parts. This is especially important in the speed reducing unit. A lack of oil in the spindle bearings or between the sprocket and the surface upon which it rests, may be the cause of a "wow" at slow speed. Also excessive grease on the gears or on the damper pads may cause this same condition. The motor should be lubricated with light oil once every six months. Oil holes are provided at each end of the motor. Once a year the turntable and speed reducing unit should be removed and all exposed gears thoroughly cleaned and lubricated with light grease. All bearings should be lubricated with oil. Be careful not to lose the spiral spring in the end of the spindle or the washers under the turntable and speed reducing unit.

2. The motor board must be level. This should be checked both ways by means of a small spirit level. Placing the cabinet legs on the same surface will usually insure the motor board being level.
3. A small spring is located in the center of the turntable spindle. Be sure that this is in position before placing the turntable on the spindle. After placing the turntable on the spindle make sure that the spindle nose may be easily depressed. If it is not, then remove the turntable and turn the spindle upside down or replace it with a new spring.

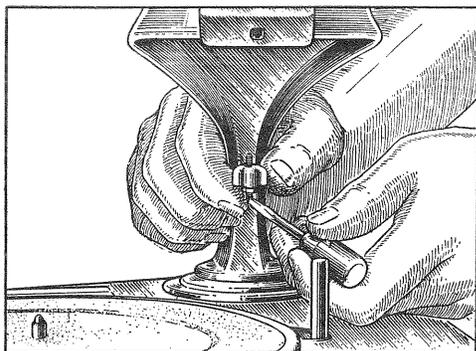


Figure 2—Adjusting height of tone arm

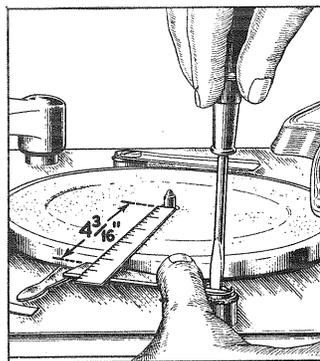


Figure 3—Adjusting elevator pad

4. Examine the wire cable that is attached to the back of the tone arm. It should be seated on the small pulleys over which it passes.
5. Place a Home Recording needle into the pickup as far as it will go. Then lower the pickup on the side of the turntable. The needle should extend from $\frac{1}{32}$ " to $\frac{1}{16}$ " below the top of the metal edge of the turntable. If it does not, an adjustment can be made by means of a screw located under the tone arm. Lifting the arm provides accessibility to the screw. See Figure 2.
6. If when starting the automatic mechanism, the needle lowers onto the smooth outer rim of the record but fails to swing into the first groove, it may be caused by the following:
 - (a) Cabinet not level. Check as indicated in Paragraph 1.
 - (b) Weak tension in spring. A flat spring presses against the tone arm lever on the under side of the motor board. See Figure 17 Page 11. Bending it so as to increase its tension against the tone arm lever will cause the needle to swing into the first record groove. Be careful not to bend it too much as excessive tension will cause the needle to skip several grooves.
7. After the instrument has completed one record changing operation, a ten inch record should extend about three-quarters way over each elevator pad. If this condition does not exist, an adjustment can be made by means of the screws that hold the pads in position. A pair of pliers heavily padded with cloth or other soft material should be used to hold the elevator shafts while loosening and tightening the screws. The distance from the closest part of either pad to the edge of the spindle is approximately $4\frac{3}{16}$ ". Figure 3 shows the method of making this adjustment.

If any adjustments are necessary other than the foregoing, a reference to the Service Date section of this booklet should be made.

Remember That the Control Lever Can Be Changed from Automatic to Manual Only When the Mechanism is Not Changing Records

SERVICE DATA

The following Service information will be found useful in making any adjustments or correction of any irregular operation that may be necessary. All the major adjustments are accessible from the rear of the cabinet. For the sake of clearness the illustrations in this text do not show the cabinet background.

No special tools are required other than a small offset screw driver. (Stock No. 2930) A stand consisting of three Stock No. 7203 will be found useful in supporting the mechanism should removal from the cabinet be required.

(1) SPEED VARIATIONS (WOW)

A variation in the speed of the turntable evidenced by distortion on long sustained notes when playing Program Transcription records may be caused by any of the following:

- (a) Improper operation. It is very important when changing the speed shift lever from 78 R.P.M. operation to $33\frac{1}{3}$ R.P.M. operation, to place the hand on the turntable and hold it until it is positively engaged by the driving mechanism.

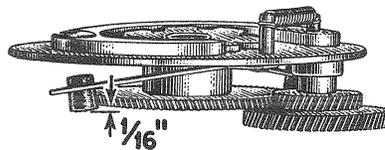


Figure 4—Adjustment of damper pads

- (b) Lack of proper lubrication. It is important that excessive grease on the gear reducing mechanism be avoided and that sufficient oil is present between the ratchet and the surface upon which it rests. Also clean and oil the spindle bearing and wipe off any excess lubricant that may be on the damper pads or the drive gear upon which it rests.
- (c) Improper Adjustment of the Damper Pads. The damping pads with the necessary springs are provided to place a load on the $33\frac{1}{3}$ R.P.M. driving gear at all times while it is in operation. Placing such a load on the gear takes up any possible play and reduces the possibility of a "wow" during operation at the slower speed. Adjust these pads by slipping each spring to one side and bend them until they are $\frac{1}{16}$ " beyond the opposite surface upon which they rest. (See Figure 4).
- (d) Washers Not in Place. A metal washer is placed directly under the speed reducing mechanism and a leather washer directly over it, both washers being over the spindle. These washers must be in their proper position. Also if the leather washer has become hard it must be replaced.
- (e) In some cases, removing the speed reducing mechanism and turning it approximately 90° and then replacing it, may eliminate a "wow" caused by improper meshing of the gears.

(2) ADJUSTMENT OF MAGAZINE ROLLER

The magazine roller should be set in such a position that the plane of the roller is 90° to a line drawn from the center of the magazine bearing to the center of the roller. The height should be adjusted so that it will just touch the magazine when it is empty.

(3) FAILURE OF NEEDLE TO LOWER PROPERLY

Failure of the needle to lower onto the smooth outer rim of the 10-inch records when the instrument is playing automatically may be caused by:

- (a) **Improper Tone Arm Setting.** Loosen the set screws as shown in Figure 5. With the mechanism out of its cycle, press the locating lever at a point near the flat spring until the lever strikes the stop screw. Holding the locating lever, Figure 17, in this position, move the front portion of the trip lever, Figure 15, until the pin against which the flat spring presses, is making contact with the locating lever. Holding the two levers in this position, move the pickup arm until the needle is $\frac{1}{16}$ " from the first groove of a standard 10-inch record. Now retighten the two set screws shown in Figure 5.

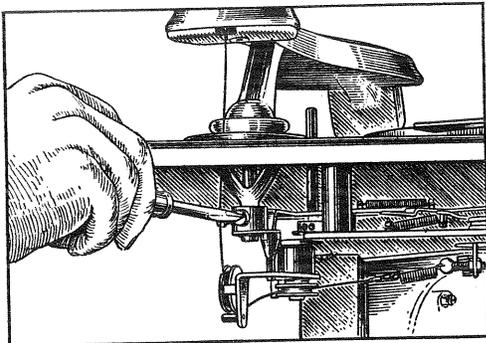


Figure 5—Adjusting position of tone arm

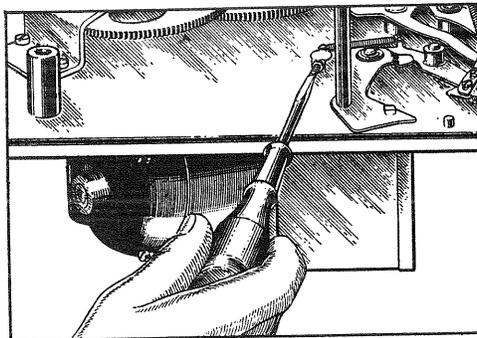


Figure 6—Adjusting tone arm locating screw

- (b) **Improper adjustment of tone arm locating screw.** This adjustment, shown in Figure 6, can be used to make a substitute adjustment for that described in (a), when the mechanism is out of the cabinet. Make the adjustment so that the needle will lower exactly $\frac{1}{16}$ " from the first groove on a standard 10-inch record. Loosen the lock nut on the adjusting screw by means of a No. 4 Spintite wrench on which the shoulder has been ground sufficiently thin for clearance. *Do not attempt to make this adjustment without first loosening the lock nut.* Tighten the lock nut when the proper adjustment has been made.

(4) FAILURE OF NEEDLE TO LOWER ONTO RECORD SURFACE

Failure of the needle to lower onto the record surface may be caused by:

- (a) **Cable out of pulley.** Examine the tone arm cable and ascertain that it is seated in the pulley.
- (b) **Shielded pickup wire improperly placed.** Examine the shielded lead coming out of the tone arm base and make sure that it is free from the moving parts of the mechanism.
- (c) **Incorrect setting of tone arm lowering screw.** Check the position of the tone arm as described in Paragraph 5, Page 4.
- (d) **Turntable washer not in place.** A leather washer is supplied to fit under the turntable. If this part is not in place, the turntable will be too low, and may cause the needle not to lower onto the record.
- (e) **Incorrect adjustment of cable tension screw.** The cable tension screw shown in Figure 7 should be so adjusted that the needle will lower smoothly onto the record without dropping. When this adjustment is obtained, the cable will be slightly loose when the needle is lowered onto a record. Loosen the lock nuts, turn the screw to the right or left as required and retighten the lock nut. Check the adjustment to make sure that the needle clears the record on the return of the tone arm. The needle should rise $\frac{1}{16}$ " from the record before any horizontal motion takes place.

(5) NEEDLE FAILS TO CLEAR RECORD AFTER PLAYING

Failure of the needle to clear the record surface on the return of the tone arm is caused by too loose adjustment of the cable tension. Adjust this tension as described in Section 4, Paragraph (e).

(6) FAILURE OF RECORD TO DEPOSIT ON TURNTABLE

Incorrect lowering of the record onto the turntable may be caused by:

- (a) Improper turntable spindle height. The height of the turntable spindle nose should be approximately $\frac{1}{32}$ " above the inside bottom surface of the record magazine. Adjustment of this height made by means of the screw at the bottom of the motor. (See Figure 8).

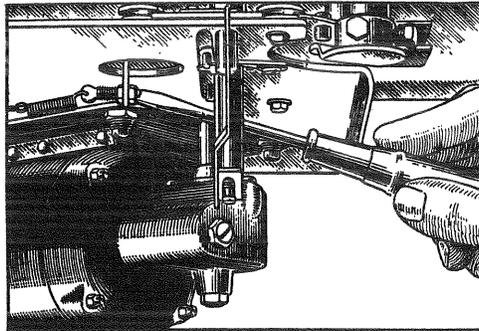


Figure 7—Adjusting tone arm cable tension screw

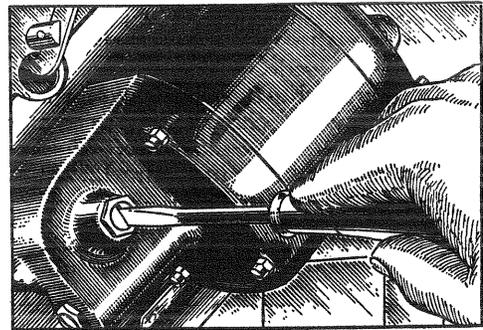


Figure 8—Adjusting spindle height

- (b) Improper setting of magazine. The horizontal swing of the magazine should be so adjusted when the mechanism is out of cycle that the outer surface at its nearest point to the nearest side of the turntable spindle is $5\frac{1}{32}$ ". This can be done by loosening the two screws as shown in Figure 9, moving the magazine to its correct position and retightening the screws.
- (c) Improper height of record transfer lever. The small plate on top of the motor board at the left side of the turntable should be so adjusted that it will depress approximately $\frac{1}{32}$ " when the magazine swings over the turntable. When this adjustment is made correctly, the transfer lever will engage the bottom record in the magazine as the latter is swinging back into the playing position. A small adjusting screw and lock nut are provided for this adjustment. See Figure 10.
- (d) Improper Position of Record Transfer Lever. When a ten-inch record is placed so that its edge touches both pins on the record transfer lever, a line drawn from the center of the hole of the lever to the center of the record hole should pass directly over the center of the spindle. See Figure 11. The two record transfer lever mounting screws can be loosened and the lever shifted until this condition exists. Also when a record is on the turntable it should just clear this lever. Unless this adjustment is properly made the record may not center properly over the spindle.

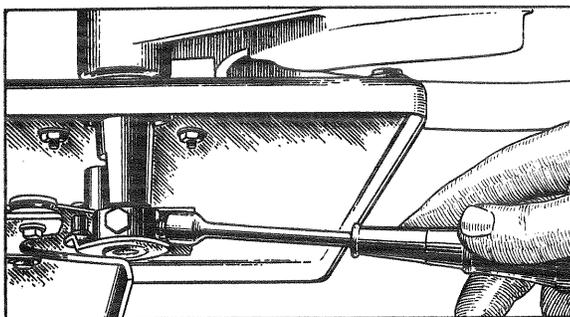


Figure 9—Magazine adjustments

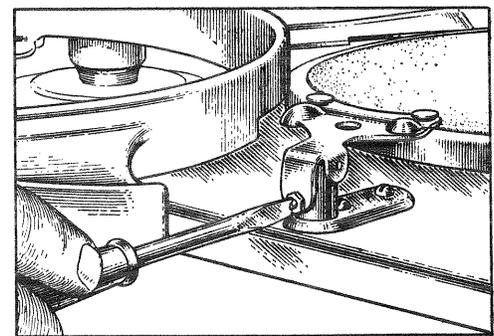


Figure 10—Record transfer lever adjustment

- (e) Weak spring in turntable spindle. The spring inside the turntable spindle which holds up the spindle nose will cause the records to align improperly with the turntable spindle if the spring tension is too weak or if the spindle nose is sticking inside the spindle. Access to the spring for stretching the coils or for replacement can be obtained by removing the turntable.

(7) RECORDS DISCHARGED IMPROPERLY FROM TURNTABLE

Failure of the Record on the turntable to be removed and placed in the magazine can be caused by:

- (a) Improper horizontal adjustment of elevator pads. The elevator pads Figure 16, should be so adjusted that the inside of the pad flange is $4\frac{3}{16}$ " from the nearest side of the turntable spindle. See Figure 3. Loosen the screw on top of the elevator shaft, move the pad to its correct position, holding both the pad and the elevator shaft in position and tighten the screw. Care should be observed that the ridge in the elevator shaft is not turned against the slot in the elevator shaft actuating lever so as to cut the latter. Grip the shaft with padded pliers while this adjustment is being made in order to prevent the shaft from turning. If for any reason the elevator pads have been removed, always place the one with the rubber surface toward the front of the mechanism when replacements are being made.
- (b) Improper adjustment of elevator shaft. The elevator shafts should rise to such a height as to give $\frac{1}{16}$ " clearance between the lowest surface of the elevator pad bottom and the top of the empty magazine. This adjustment can be made by means of the screw and lock nut as shown in Figure 12.

(8) FAILURE TO TRIP ON ECCENTRIC GROOVE

Failure of the mechanism to change records when the eccentric groove is reached may be caused by:

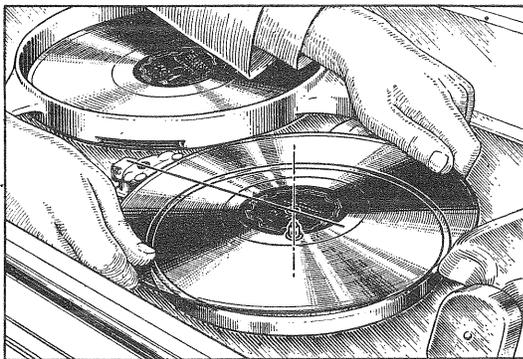


Figure 11—Method of checking transfer lever lateral adjustment

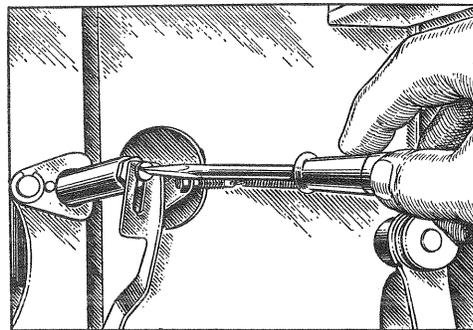


Figure 12—Adjusting height of elevator shaft

- (a) Improper setting of the latch plate. Adjust the latch plate, Figure 17, by means of a small offset screw driver such as Stock No. 2930, until it makes proper contact with the latch trip when the eccentric groove is reached.
- (b) Weak spring on trip lever. A weak spring on the latch trip lever will be a cause of failure to trip.

(9) INABILITY TO SET FOR MANUAL OPERATION

The manual operation lever should set in its back position so as to free the tone arm and prevent the mechanism from tripping. *This change from automatic to manual operation should be made only when the mechanism is out of its cycle, otherwise the mechanism will reject continuously.* The back position of the lever should be such that the end of the lever causes the latch trip to clear the latch plate by $\frac{1}{32}$ ". An incorrect setting of the latch plate may cause the trip lever to clear the plate at one position of the tone arm, but to make contact with the plate at some other position of the tone arm. Check this point when adjusting the latch plate.

(10) FAILURE TO STOP

Failure of the mechanism to stop after the "off" button has been pressed, and the mechanism has completed its cycle is caused by improper setting of the secondary stop switch. See Figure 17. The switch body should be so mounted that the contacts will open $\frac{1}{32}$ " when the cycle is completed, but will close as soon as the mechanism has tripped.

(11) CONTINUED TRIPPING OF MECHANISM

This condition may be caused by:

- (a) Manual operation lever set for non-automatic operation during cycle.
- (b) Improper setting of latch plate.
- (c) Improper timing of gears and associated parts. See Section 13 for the correct method of retiming.

(12) CLUTCH SLIPPING

Slipping of the clutch when the mechanism is passing through the cycle causing a loud clicking noise, may be caused by:

- (a) Weak spring on pawl carrier. Remove the pawl spring Figure 17, and increase its tension by removing two or three coils.

- (b) Turntable spindle shaft too low. This condition will cause binding between the pawl carrier and the clutch wheel. Raise the spindle as shown in Figure 8.
- (c) Binding in any of the moving parts. Such binding may be in the slide, the magazine, the elevator shaft or the gears. The slide rollers at the left are mounted on eccentric shafts for adjustment of play. These may be so regulated as to cause excessive binding of the slide. Examine all of these parts carefully, and take any necessary steps to relieve the binding.

(13) RETIMING THE MECHANISM

Should it be necessary to retime the mechanism after replacing parts, or because of continued tripping proceed in the following manner:

- (a) Allow the mechanism to operate until the slide Figure 17 is in its extreme forwarding position. When this setting is reached the straight side of the cam, Figure 17, will be parallel with the side of the slide.

Check the position of the trip lever and roller at this time to see that they are approximately as shown in Figure 13. If the various parts are not in their proper relation, the mechanism should be retimed.

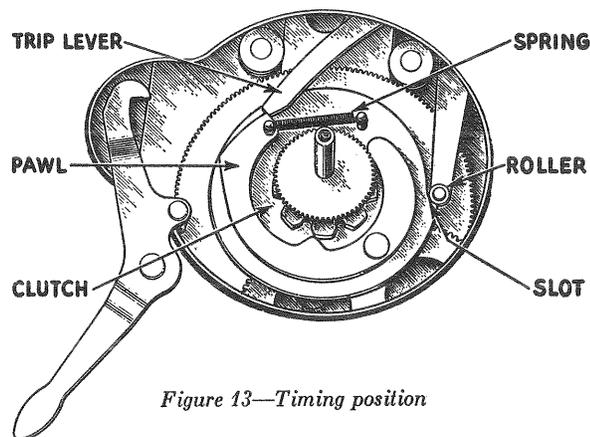


Figure 13—Timing position

- (b) Loosen the set screw in the clutch wheel and lift the wheel from the turntable spindle.
- (c) Lift the pawl carrier until it disengages from the gear.
- (d) Lower the pawl carrier into mesh with the gears so that the trip lever is touching the end of the pawl as shown in Figure 13, when the cable lever roller is engaged in the slot on the side of the pawl carrier as shown.
- (e) Recheck to see that the straight side of the cam is parallel with the slide.
- (f) Replace the clutch wheel and retighten the set screw, making sure that the set screw fits into the spot on the turntable spindle.

(14) REMOVING MOTOR BOARD

Should it be necessary to remove the motor board from the mechanism for replacement of any of the parts, the following procedure should be used:

- (a) Remove nuts and washers from the bolts which hold the motor board to the cabinet, and disconnect the pickup leads and power wiring to the mechanism. Then lift the mechanism from the cabinet.
- (b) Loosen the two set screws and remove the magazine lever Figure 9.
- (c) Lift out magazine.
- (d) Unhook tone arm cable from spring.
- (e) Loosen the two set screws in the tone arm lever.
- (f) Remove the three small screws in the tone arm base, taking care not to lose the lock nuts.
- (g) Disengage the tone arm lever from the tone arm shaft and carefully lift the tone arm from the motor board, bringing the tone arm lever and the shielded cable up through the tone arm base hole in the motor board.
- (h) Remove the screw and lock nuts in the bottom of the elevator shaft.
- (i) Lift elevator shaft from mechanism.
- (j) Unfasten wires from motor board.
- (k) Remove the four motor board screws which support the bottom plate.
- (l) Carefully lift the motor board from the mechanism.

Access can now be had to all the parts on the bottom plate. The parts can be assembled in the reverse order from that given above. It will then be necessary to make various adjustments after the parts have been reassembled.

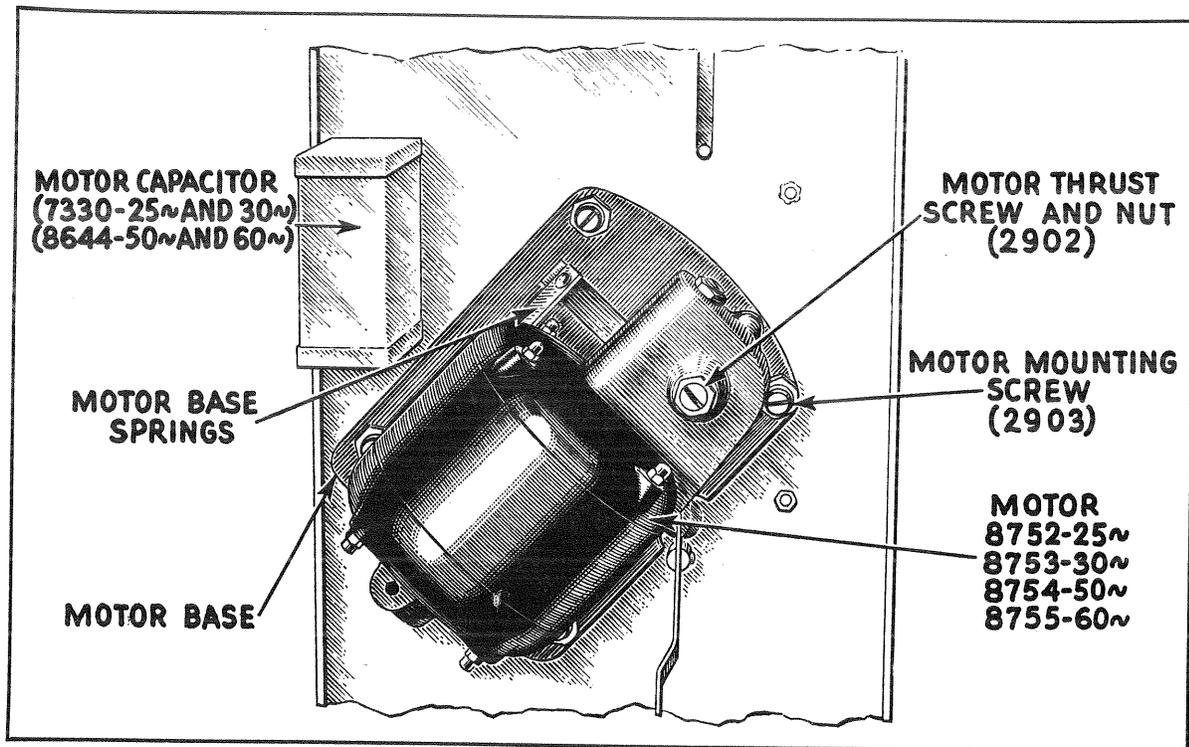


Figure 14—Motor parts

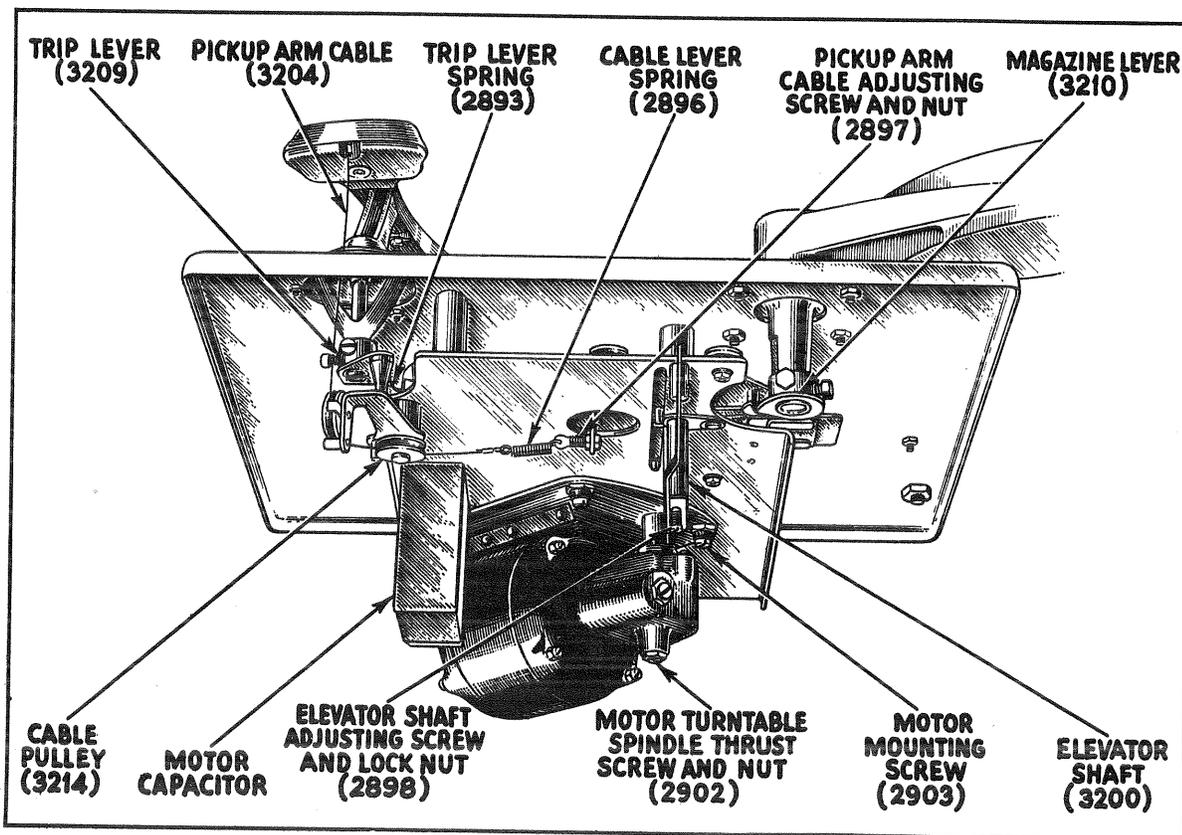


Figure 15—Bottom view of mechanism showing parts

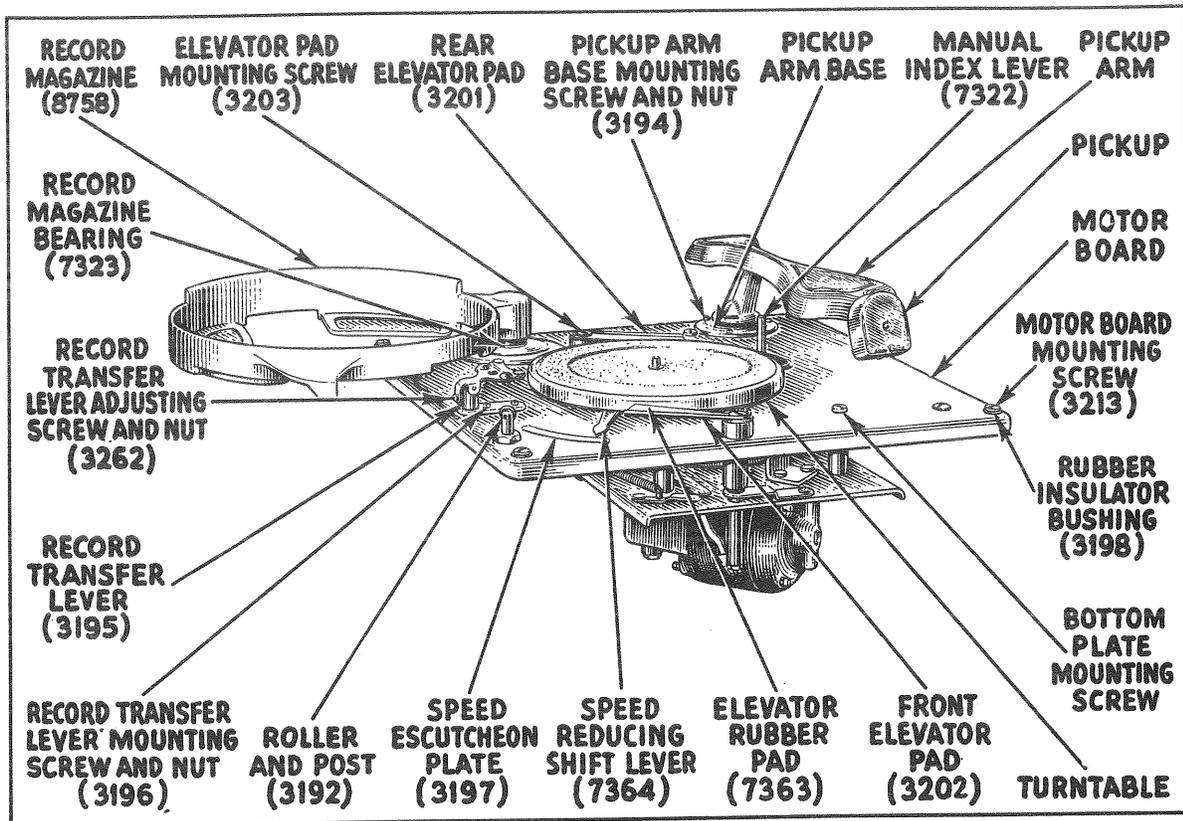


Figure 16—Top view of mechanism showing parts

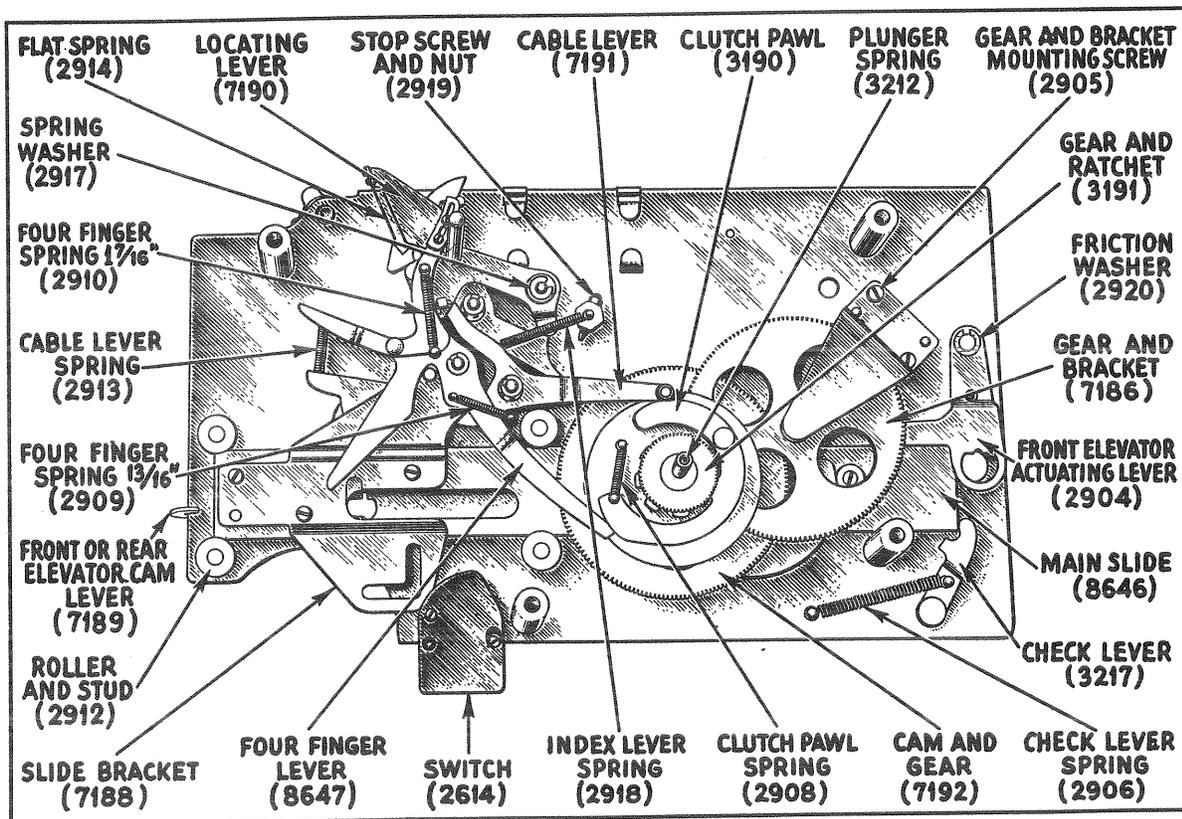


Figure 17—Top view of mechanism with plate removed

