COLLARO
MODEL RC-456

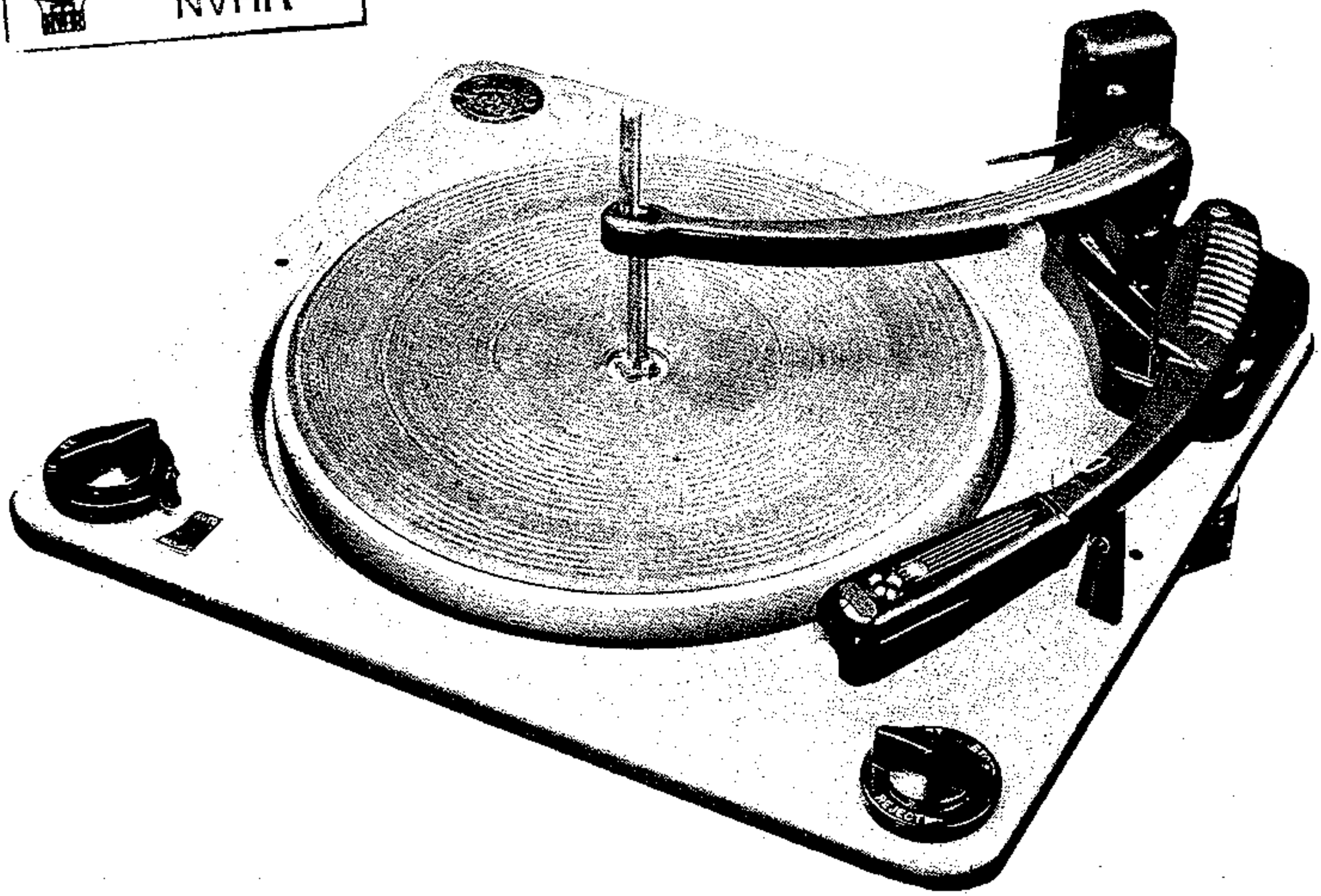

FIGURE 1
GENERAL INFORMATION

The Collaro Model RC . 456 Record Changer is designed to give entirely automatic pick-up arm positioning for 7", 10" and 12" records, which (providing they are of the same speed and same type of groove) may be intermixed in any order.

Turntable Speed ---------- 16, 33 1/3, 45 or 78 R. P. M.

Record Capacity ---------- Ten 7", 10", or 12" records.

The tripping method used in the velocity in which the striker arm engages a projection on the turntable hub to start the mechanism into cycle.

Record separation is accomplished by movement of a finger in the center spindle. This finger directly separates records having a 1/4" center hole.

Model RC . 456 automatically shuts off after the last record has been played.

Connect this changer to an outlet supplying 100-125 volts, 60 cycle AC only, unless otherwise specified.

Distributed in U. S. by:

Rockbar Corporation
211 East 37th Street
New York 16, N. Y.

Manufactured by:

Collaro Limited
Ripple Works, By-Pass Road
Barking, Essex

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	56-1	Record Balancing Arm
2	56-2	Turntable Retainer
3	56-3	Turntable Assembly
4	56-4	Rubber Mat
5	56-5	Pick-up Base & Set-Down Selector Housing
6	56-6	Pick-up Arm Depth Adj. Screw
7	56-7	Pick-up Arm Mounting Bracket
8	56-8	Hinge Pin
9	56-9	Pick-up Arm Hinge
10	56-10	Set-Down Positioning Shim
11	56-11	Needle Set Down Adj. Screws
12	56-12	Pick-up Arm Mounting Screw
13	56-13	Pick-up Arm Shell
14	56-14	Weight Compensating Link
15	56-15	Weight Compensating Spring
16	56-16	Weight Compensating Control
17	56-17	Lockwasher
18	56-18	Weight Compensating Control Adj. Screw
19	56-19	Rubber Washer
20	56-20	Turntable Bearing Washers (Steel)
21	56-21	Bearing (Ball Race)
22	56-22	Neoprene Washer
23	56-23	Pick-up Arm Lift Pin
24	56-24	Pick-up Tripping Arm
25	56-25	Flat Washer (Steel)
26	56-26	Lift Pin Lift Spring
27	56-27	Pick-up Arm Mounting Base
28	56-28	Clutch Washer (Felt)
29	56-29	Record Gate Finger Lift Spring
30	56-30	Record Gate Cam & Finger
31	56-31	Record Gate Lever Actuating Spring
32	56-32	Record Gate Lever
33	56-33	Record Gate Assy. Mtg. Brkt.
34	56-34	Lock Assembly
35	56-35	Set-Down Positioning Lever
36	56-36	Rest Post
37	56-37	Start-Stop-Reject Knob
38	56-38	Balancing Arm Column
39	56-39	Idler Wheel Mounting Pin
40	56-40	"C" Washer
41	56-41	Motor Idler Wheel
41A	56-41A	Washer
42	56-42	Idler Wheel Retracting Link
43	56-43	Speed Control Knob
44	56-44	Auto-Manual Lever
45	56-45	"C" Washer
46	56-46	Cycle Delay Lever
47	56-47	Cycle Drive Wheel
48	56-48	Drive Wheel Mtg. Screw
49	56-49	Drive Wheel Swing Bracket
50	56-50	Drive Wheel Mtg. Shaft & Gear
51	56-51	"C" Washer
52	56-52	Automatic Trip Lever
53	56-53	Automatic Stop Lever Spring
54	56-54	Screw
55	56-55	Baseplate
56	56-56	Start-Stop-Reject Shaft & Cam
57	56-57	Reject Lever
58	56-58	Dropping Stud Stabilizing
59	56-59	Record Dropping Lever Mtg. Stud
60	56-60	Stop Lever
61	56-61	Idler Wheel Actuating Link
62	56-62	Switch-Off Link
63	56-63	Set-Down Selector Wire
64	56-64	Selector Wire Mounting Brkt.
65	56-65	Manual Stop Actuating Lever
66	56-66	Spindle Deactivating Link
67	56-67	Trip Feed Lever
68	56-68	Pick-up Arm Positioning Plate
69	56-69	Pick-up Arm Lateral Lever
70	56-70	Spring
71	56-71	Spacer
72	56-72	Record Gate Reset Lever
73	56-73	Positioning Plate Spring
74	56-74	Pick-up Arm Actuating Lever
75	56-75	Mounting Stud
76	56-76	Spring
77	56-77	Pick-up Arm Return Lever Spring
78	56-78	Strengthener
79	56-79	Auto-Stop Lever
80	56-80	Auto-Stop Catch Plate
81	56-81	Muting Switch Mtg. Bracket
82	56-82	Switch-Off Link Pivot Bracket
83	56-83	Spacer
84	56-84	Spring
85	56-85	Pressure Lever Adj. Screw
86	56-86	Spacer
87	56-87	Pressure Lever
88	56-88	Lift Pin Mtg. Bracket
89	56-89	Pick-up Arm Return Lever
90	56-90	Spring
91	56-91	Operating Bar
92	56-92	Switch-Off Plate
93	56-93	Lift Pin & Muting Switch Actuating Link
94	56-94	"C" Washer
95	56-95	Lift Pin & Muting Switch Actuating Lever Assembly
96	56-96	Muting Switch Assembly
97	56-97	Lockwasher
98	56-98	Hex Nut
99	56-99	Screw
100	56-100	Spindle Deactivating Lever
101	56-101	Switch-off Lever
102	56-102	Switch-off Link
103	56-103	"C" Washer
104	56-104	Main Drive Gear
105	56-105	Main Drive Gear Spring
106	56-106	Compression Spring
107	56-107	"C" Washer
108	56-108	Auto-Stop Lever Mtg. Bracket
109	56-109	Spindle Deactivating Slide Plate
110	56-110	Switch Actuating Cam
111	56-111	On-Off Switch
112	56-112	Switch-off Link
113	56-113	Switch-off Link Spring
114	56-114	Turntable Axle
115	56-115	Record Dropping Adj. Screw
116	56-116	Compression Spring
117	56-117	Cotter Key
118	56-118	Shoulder Washer
119	56-119	Record Selector Pawl
120	56-120	Spindle Slide Plate
121	56-121	Selector Pawl Return Spring
122	56-122	Spindle Slide Plate Return Spring
123	56-123	Locknut
124	56-124	Motor Assembly

MECHANICAL PARTS LIST (CON'T.)

Ref. No.	Part No.	Description
125	56-125	Idler Wheel Actuating Link
126	56-126	Mounting Spring
127	56-127	Switch Pawl
128	56-128	Switch & Idler Wheel Actuating Spring
129	56-129	Switch Cover
130	56-130	Spindle Body
131	56-131	Screw
132	56-132	"C" Washer
133	56-133	Cycle Drive Wheel Actuating Spring
134	56-134	Speed Control Crank
135	56-135	Auto & Manual Actuating Link
136	56-136	Main Gear Release Lever
137	56-137	Intermediate Cycling Gear
138	56-138	Idler Wheel Actuating Lever
139	56-139	Auto & Manual Actuating Lever
140	56-140	Speed Control Lever
141	56-141	"C" Washer
142	56-142	Motor Pulley
143	56-143	Coupling Spring
144	56-144	Motor Mtg. Screw
145	56-145	Fan
146	56-146	Motor Screw
147	56-147	Spindle
148	56-148	Idler Swivel Arm
149	56-149	Swivel Arm Set Screw
150	56-150	Idler Slide Arm Spindle
151	56-151	Idler Slide Arm
152	56-152	Motor
153	56-153	Slide Arm Return Spring
154	56-154	Slide Arm Set Screw
155	56-155	Compression Spring
156	56-156	Speed Control Link
157	56-157	Thrust Collar
158	56-158	Speed Control Cam
159	56-159	Locknut
160	56-160	Cam Lever
161	56-161	Control Link Mtg. Screw
162	56-162	"C" Washer
163	56-163	Cam Index Roller
164	56-164	Hex Nut
165	56-165	Index Spring
166	56-166	Record Dropping Lever

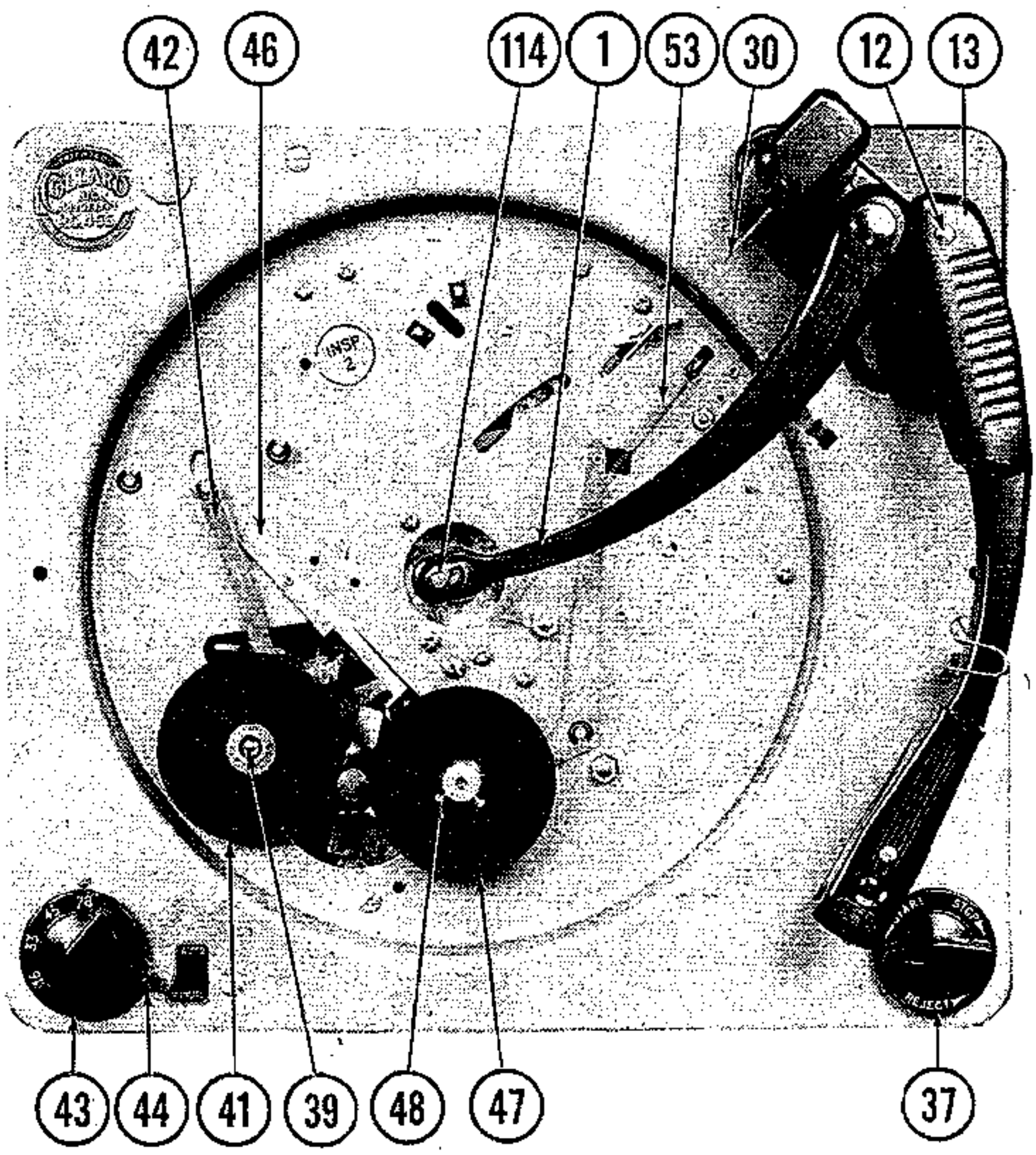

FIGURE 2

OPERATING INSTRUCTIONS

Loading-

1. Hold record balancing arm (1) by the metal clip, lift clear of spindle and swing out over pick-up arm. Place records on spindle and lower to offset step. Holding records level, replace record balancing arm on spindle.

NOTE: 7", 10", and 12" records can be intermixed on this changer, but be certain that they are of the same playing speed and have the same type of groove.

Starting-

To start the machine, after checking that stylus and speed controls are properly set, turn main control (37) to the left and release when the turntable starts to rotate. The changer will operate automatically until the last record has been played, at which time the pick-up arm is returned to its rest and the supply to the motor is switched off.

Manual Operation-

Manual operation is accomplished by moving Auto-Manual lever (44) to the "Manual" position. The purpose of the manual control is to disconnect the changing mechanism so that single records can be played as on a single record player. The pickup will then be free on its rest and can be used as a single record player.

Rejecting-

A record may be rejected at anytime by turning main control (37) fully to the left and releasing. The pick-up arm will immediately lift from the record and the next record will drop to the turntable and commence to play.

Stopping-

The changer may be stopped at any time by turning main control (37) fully to the right and releasing. The pickup arm will immediately lift from the record and return to its rest position, then the supply to the motor will be automatically switched off.

SPECIAL FEATURES

Muting-

The pick-up cartridge is muted during the change cycle, thus avoiding reproduction of undesirable noise during the interval between records, and also avoiding the unpleasant "running down" effect due to slowing of the turntable when a record is rejected or when the "Stop" control is operated.

Retractable Drive-

Rubber tired drive wheels (41 and 47) are automatically retracted when the unit is switched off. The development of flats on the tires, due to prolonged contact under pressure during periods of disuse Noisy running and unevenness of turntable speed is thus avoided.

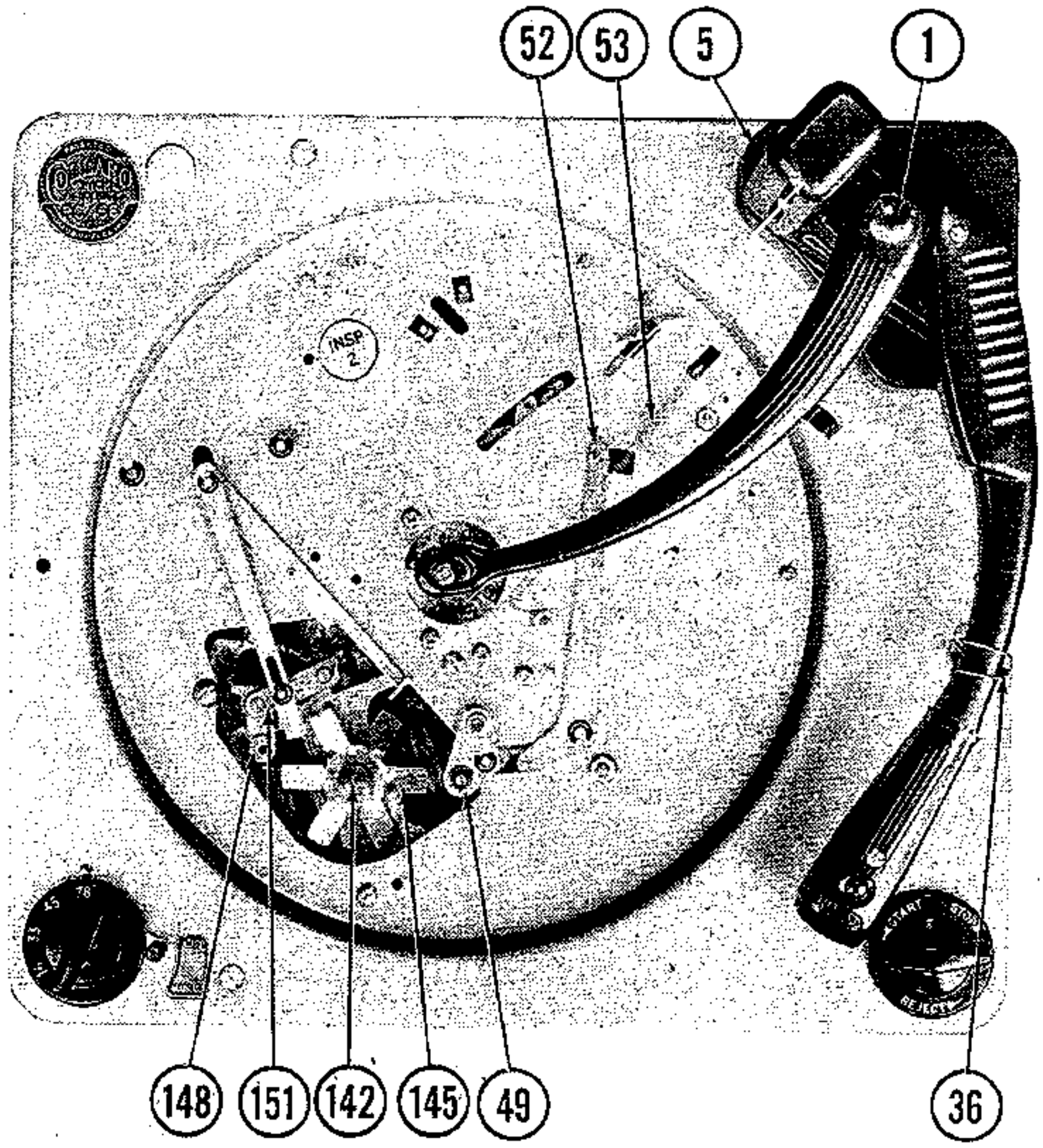

FIGURE 3

CHANGE CYCLE

It is recommended that the change cycle operation be observed by rotating the turntable by hand. The action described below can then be readily followed and the function of each part more easily understood. This changer is provided with what is known as a "Velocity Trip" mechanism. The change cycle is started by the faster inward motion of the pick-up arm when the needle enters the lead-out grooves at the end of a record.

The pick-up arm assembly and the pick-up tripping arm (24) pushes trip feed lever (67), which, striker arm (102) in toward the turntable hub. Striker arm (102) is fed inward by the friction provided by its own weight resting on the curved end of trip feed lever (67).

While a record is playing, the slight movement of striker arm (102) is not sufficient to trip the mechanism because, on each revolution of the turntable, the wiping action by the turntable hub projection (point "A" on exploded view) moves striker arm (102) back far enough to clear the hub projection.

When the needle enters the lead-out grooves of a record, causing the pick-up arm to advance rapidly toward the spindle, striker arm (102) is moved fast enough and far enough to definitely engage the turntable hub projection (point "A" on exploded view). As the hub projection engages with striker arm (102), the striker arm is pushed away from the turntable hub (toward the pick-up arm) far enough to cause gear release lever actuating link (52) to pivot in such a manner so as to release main gear release lever (136) from the pin located on top of main gear (104). This causes two things to happen. First, it unlocks main gear (104) from its out of cycle position. Secondly, it permits cycle drive wheel (47) and its associated gear train to be pulled into contact with the motor shaft by action of spring (133), thus being in position to drive the mechanism through the change cycle.

As main drive gear (104) starts to rotate, operating bar (91) which is secured in an eccentric position on main drive gear (104), is pulled toward the front of the changer. The pick-up arm actuating lever (74) moves to the front along with operating bar (91) and in so doing, relieves all pressure from the lift pin and muting switch link (93), and from the lift pin and muting switch lever (95). This action permits the lift pin lift spring (26) to raise the lift pin (23), which in turn, raises the pick-up arm from the record.

At the same time, muting switch assembly (96) is closed, shorting out the pickup cartridge, thus preventing any undesirable noises from coming through the amplifier while the mechanism is in cycle.

Simultaneously, the pick-up arm positioning plate (68) moves into contact with the pick-up tripping arm (24). This is the connection that directs the pick-up arm inward, through a friction clutch arrangement, when that phase of the change cycle is reached.

The pick-up arm lateral lever (69) is now pulled forward by the pick-up arm actuating lever (74),

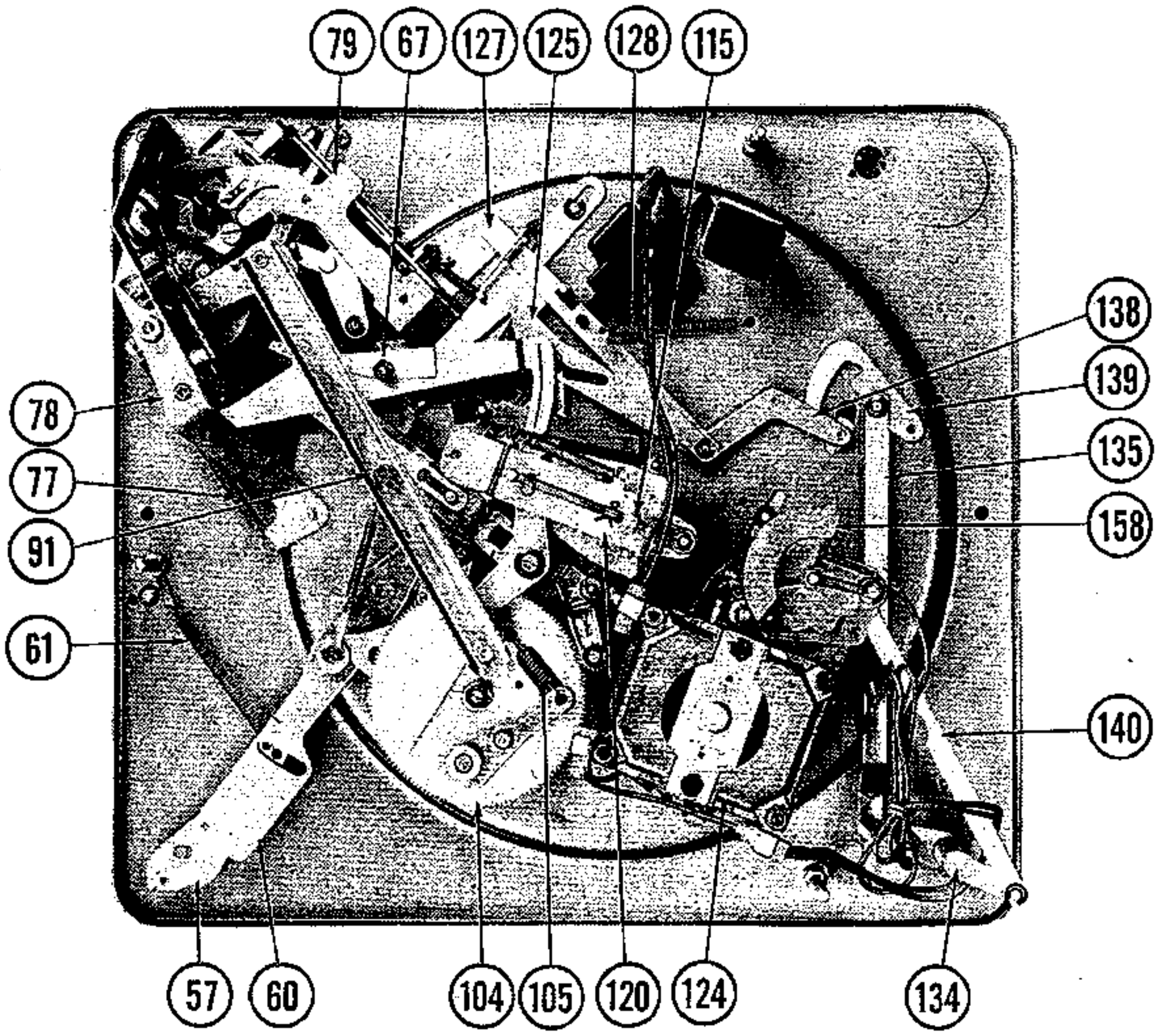

FIGURE 4

swinging the pick-up arm clear of the turntable.

At this time, the roller on the bottom of main drive gear (104) actuates the record dropping lever (166) which in turn, moves the spindle slide plate (120) in such a manner so as to actuate the record selector pawl (119). Selector pawl (119) moves upward until its upper end engages the center hole of the lower-most record in the stack and then moves sideways sufficiently to push the record off the spindle shelf.

The main drive gear (104) has rotated far enough that operating bar (91) has reached its maximum forward travel and now starts moving toward the rear of the changer. As this takes place, the pick-up arm actuating lever (74), which is connected to operating bar (91), also moves toward the rear of the changer. This releases the pick-up arm return lever (89) and through action of the pick-up arm return spring (77) pivots to the rear and in so doing carries the pick-up arm positioning plate (68) with it, which in turn, through the friction clutch arrangement between positioning plate (68) and pick-up tripping arm (24) moves the pick-up arm in over the record.

The mechanism is automatically indexed for the pick-up arm to land on either a 7", 10" or 12" record. This is accomplished by the record gate finger (30). This finger has three positions, upper for 7" set-down, middle for 10" set-down, and lower for 12" set-down. Each time the mechanism goes through a change cycle the pick-up arm lands in the 7" position, unless a 10" or 12" record contacts record gate finger (30). Consequently, the set-down positioning lever (35) blocks the pick-up arm positioning plate (68) at one of three positions, depending on the size record which has been dropped from the spindle shelf.

When the pick-up arm is positioned directly over the record lead-in groove, the pick-up arm actuating lever (74) actuates the lift pin and muting switch link (93), which in turn, pivots the lift pin and muting switch lever (95) downward to lower the pick-up arm to the record.

During the preceding sequence of lowering the arm to the record, muting switch (96) opens and the pick-up cartridge becomes "live" again.

The pin located on top of main drive gear (104) now moves against the main gear locking lever (136) and locks the main gear in the out of cycle position. This action also draws the cycle drive wheel (47) away from the motor shaft, completing the change cycle.

AUTOMATIC STOP

The automatic stop is brought into operation after the last record has been played by reason of the record balancing arm (1) having dropped to its fullest extent. This depresses the auto-stop lever (79) which in turn allows the auto-stop catch plate (80) to fall and retain the pick-up arm return lever (89). The pick-up arm is thus not returned inward over the records, but subsides on to its rest at the end of the change cycle. At the same time the pick-up arm return lever (89), through the medium of the switch-off plate (92), restrains the switch-off link (92) against the pull of

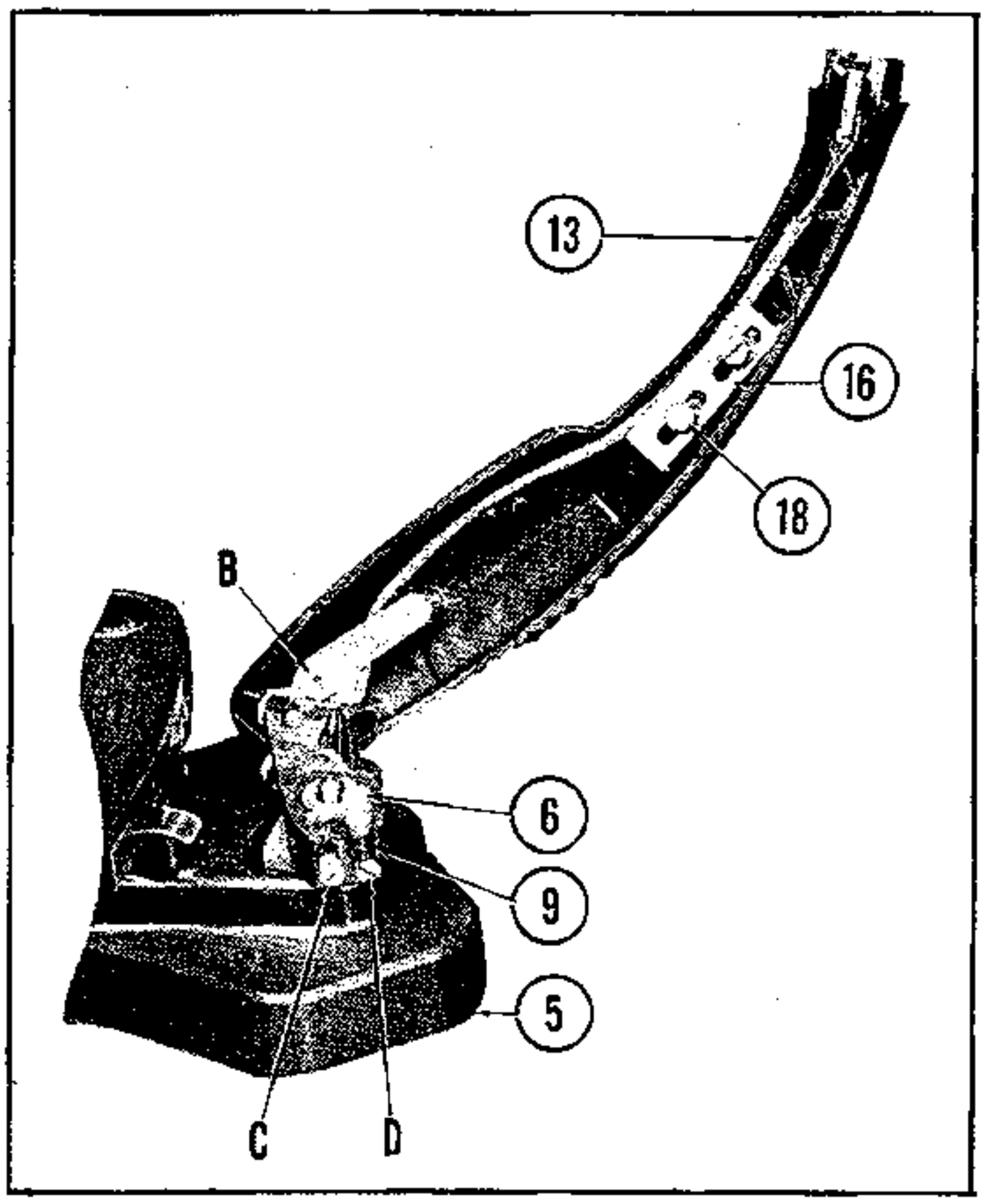

FIGURE 5

spring (113). The turned up end of the switch-off link (82) is thus held in the path of the stud, located on top of operating bar (91), and at the end of the cycle the notch in the switch pawl (127) is disengaged and the switch actuating spring (128) holds the motor switch open and simultaneously retracts idler wheel (41) through the medium of actuating lever (138) and link (42).

On switching on again, stop lever (60) disengages the turned-up end of the switch-off link (82) from the stud on top of operating bar (91) thus allowing the notch in the switch pawl (127) to engage with the pin on the underside of the baseplate so holding the motor switch closed and at the same time holding idler wheel (41) in contact between the motor pulley and turntable rim. If, at the same time, one or more records have been loaded on to the machine, the auto-stop lever (79) will lift under the influence of its spring (53) as soon as the pick-up arm return lever (89) is moved momentarily out of the notch in the auto-stop catch plate (80) during the change 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 (1) remains dropped to its fullest extent, the pick-up arm return lever (89) 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 attached to the auto-stop catch plate (80) is to prevent the pick-up arm return lever (89) from being restrained as the last records falls, which would cause the machine to switch off without playing the last record. This pawl thus delays the restraint of the pick-up arm return lever (89) until the next cycle, i.e., after the playing of the last record is completed.

For satisfactory operation it is essential that all parts mentioned above should work absolutely freely, and that spring (53) should positively actuate the auto-stop lever (79) lifting the auto-stop catch plate (80) with it. At the same time, spring (53) must not be so strong as to prevent the weight of the record balancing arm (1) fully depressing the auto-stop lever (79).

ADJUSTMENTS

Needle Set Down-

If set down positions are erratic, check first of all that the nut shown at point B (Figure 5) is securely tightened.

The position at which the stylus alights on the record may be adjusted, if necessary, by means of the two screws C and D (Figure 5). To bring position in, loosen screw C and tighten screw D 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 tighten. Avoid excessive force when tightening these screws.

This machine gives automatic positioning for 7", 10", and 12" records and the above adjustment effects all positions equally. The design of the mechanism ensures that when the 7" setting down position is correctly adjusted the 10" and 12" position will also be correct.

Pick-Up Arm Height Adjustment-

The height to which the pick-up arm is lifted during the change cycle is controlled by the lift pin (23). To make adjustment, if necessary, switch off the power during the change cycle at the point where the pick-up arm has just swung outward over its rest. The lift pin (23) may then be screwed up or down as required by inserting any suitable pin into the hole drilled near the top of the pin (round projecting end). Correct adjustment is when the pick-up arm clears the top of its rest by approximately 1/8".

Record Dropping Adjustment-

This adjustment should not normally be necessary unless the machine has been dismantled to make replacements. To replace or check adjustment:

1. Remove all records and switch off power.

2. Loosen hex head screw, located on bottom of main gear (104), two or three turns.

3. Operate start control.

4. Turn main drive gear (104), by hand, until record dropping lever (166) is moved to its extreme position. The roller on the bottom of main drive gear (104) will then be behind and covered by operating bar (91).

5. Tighten the hex. head screw, located on the bottom of main gear (104), securely.

6. Reconnect power and test with a full load of 12" records.

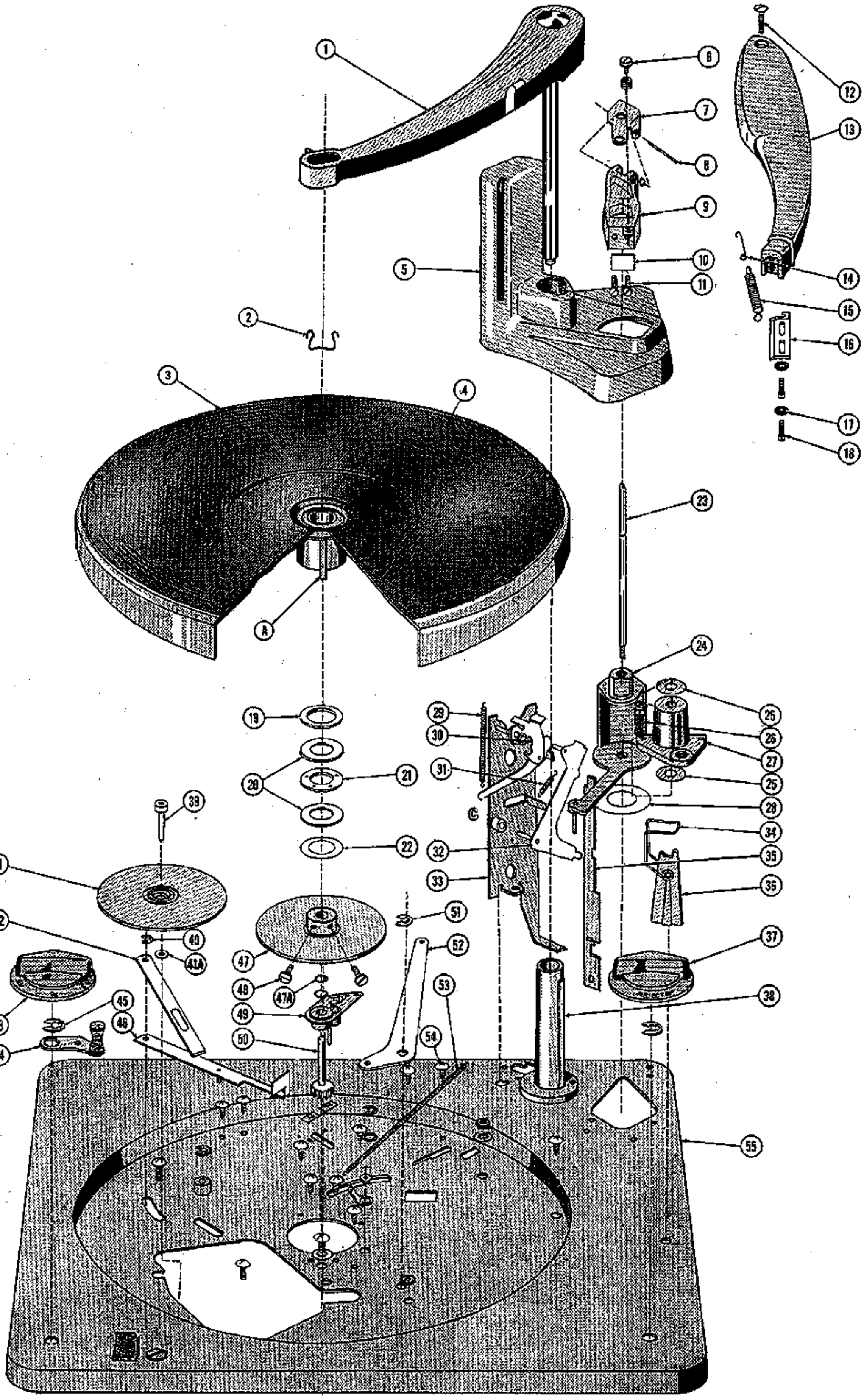

FIGURE 6A. EXPLODED VIEW OF PARTS ABOVE BASEPLATE.

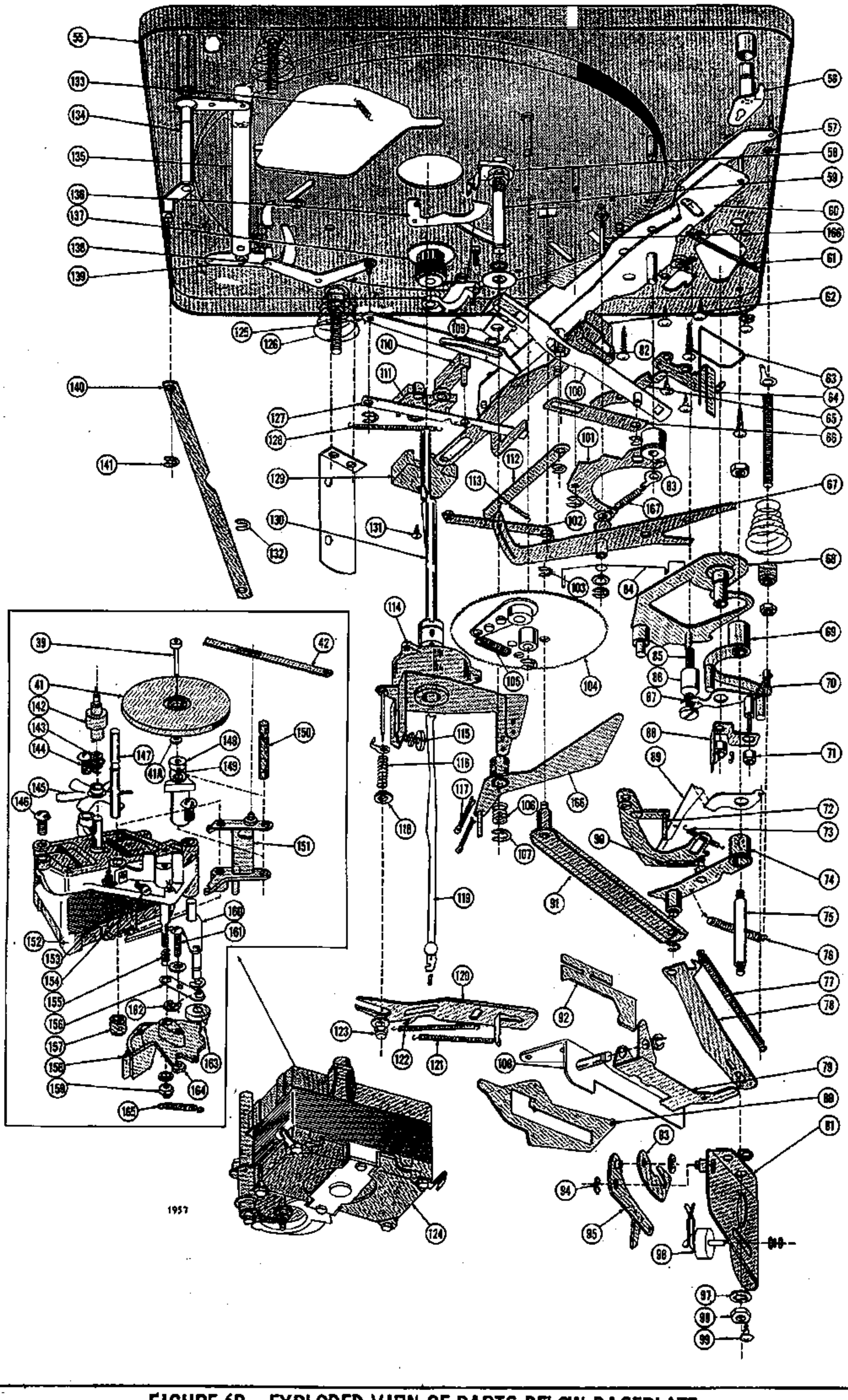

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FIGURE 6B. EXPLODED VIEW OF PARTS BELOW BASEPLATE.

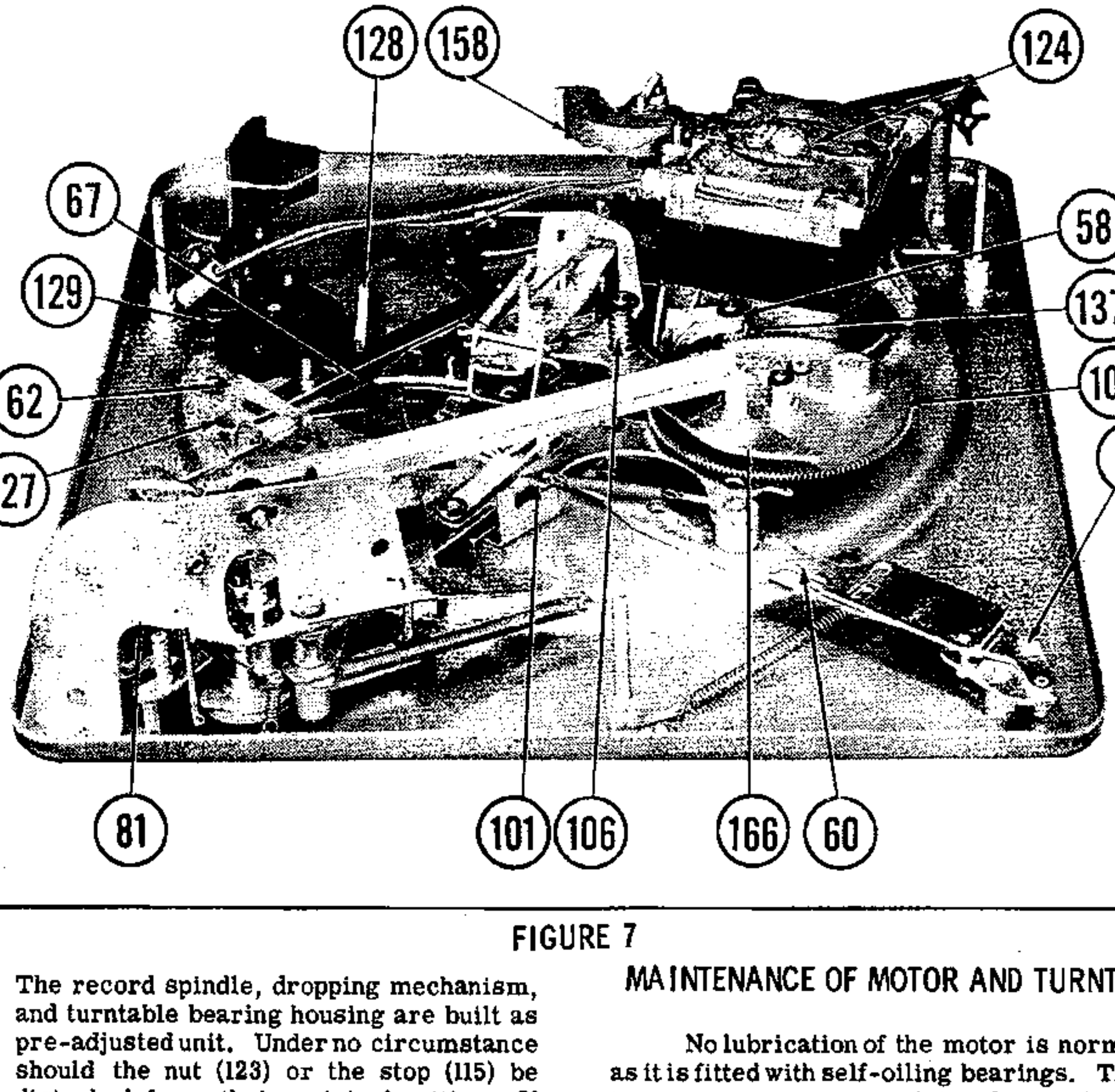


FIGURE 7

CAUTION: The record spindle, dropping mechanism, and turntable bearing housing are built as pre-adjusted unit. Under no circumstance should the nut (123) or the stop (115) be disturbed from their original setting. If damage has occurred or the adjustment disturbed, it is recommended that this mechanism be replaced as a unit.

Automatic Trip Adjustment-

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 of the cruved end of the feed lever (67) has been accidentally bent upwards or downward so that the end of the striker arm (102) cannot work freely in the aperture in the side of the diecast housing carrying the turntable bearing, etc. Both the feed lever (67) and striker arm (102) must be absolutely free on their respective pivots. It is also worthy to note that the long pin on the front of pick-up tripping arm (24) must always lie within the forked end of trip feed lever (67).

Needle Pressure Adjustment-

Set the weight compensating control (16) in the "LP" position. Use a suitable gram scale and check the needle pressure at the point where the needle lands on the record. When the needle pressure is obtained for the "LP" position, the pressure for the "Std." position will also be correct.

(Refer to Figure 5) loosen screws (18) and move weight compensating control (16) back or forward to obtain the desired pressure.

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 of occasional removal of the turntable to clean its inter rim and the driving surfaces of the motor pulley and idler wheel, by wiping with a clean solvent-moistened rag. The thrust washers and ball race located under the turntable should also be examined, and if necessary, washed clean with a petroleum solvent and relubricated with a small amount of soft grease.

TROUBLES AND REMEDIES

If records fail to drop from the spindle shelf, worn or chipped center 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 described under "Record Dropping Adjustment."

More Than One Record Drops At A Time-

Worn or chipped center holes may be the cause. Also make sure that the small sliding member housed in the top of the spindle drops freely under its own weight. If not, it is probable that some foreign matter has become lodged between the slide and side of the groove in which it works, and this may best be dislodged by means of a razor blade. Grease or oil on the slide may also be the cause of its failure to drop freely, and consequently great care should be exercised if the turntable is removed to avoid depositing any oil on the slide from the turntable bearing. A petroleum solvent applied with a small brush should be used to clean the parts if this cause of failure is suspected.

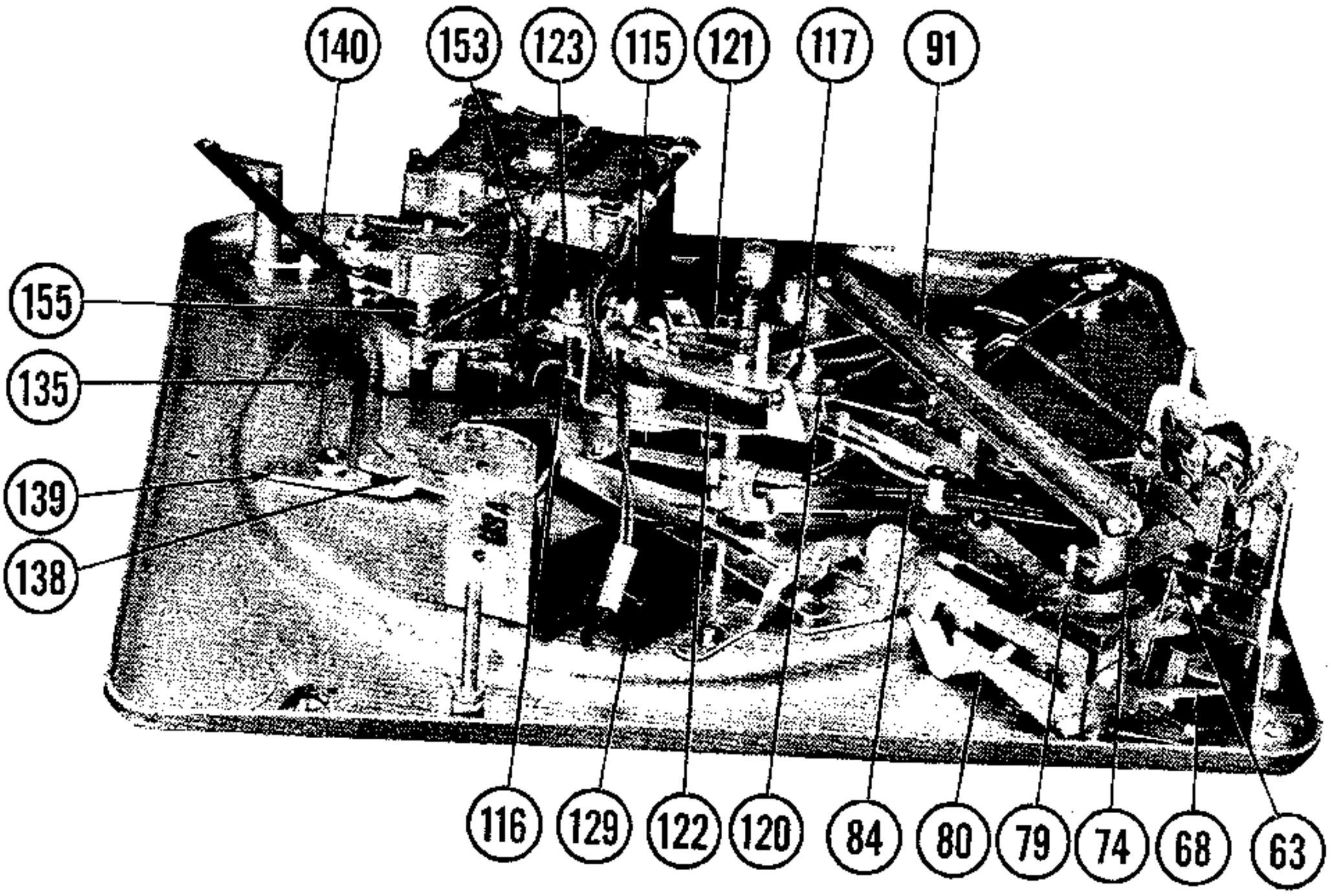


FIGURE 8

Changer Fails To Shut-Off After Last Record Has Been Played-

1. Record balancing arm (1) is not falling to its fullest extent and making contact with auto-stop lever (79). This could be due to the balancing arm shaft (1) sticking in its housing, and this should be freed by cleaning thoroughly. Remove the shaft, if necessary, by first removing the "C" washer at the bottom of the shaft. Do not lubricate.

Check that parts (62, 112, 79 and 80) are free on their respective pivots.

Pick-Up Arm Does Not Track Across Record Properly-

1. Needle worn or clogged by an accumulation of lint, dirt, etc.

2. Make certain that the proper needle is used for the type record being played.

3. Check that the pick-up arm pivots freely and that its movement is not retarded by pick-up leads which are too tight.

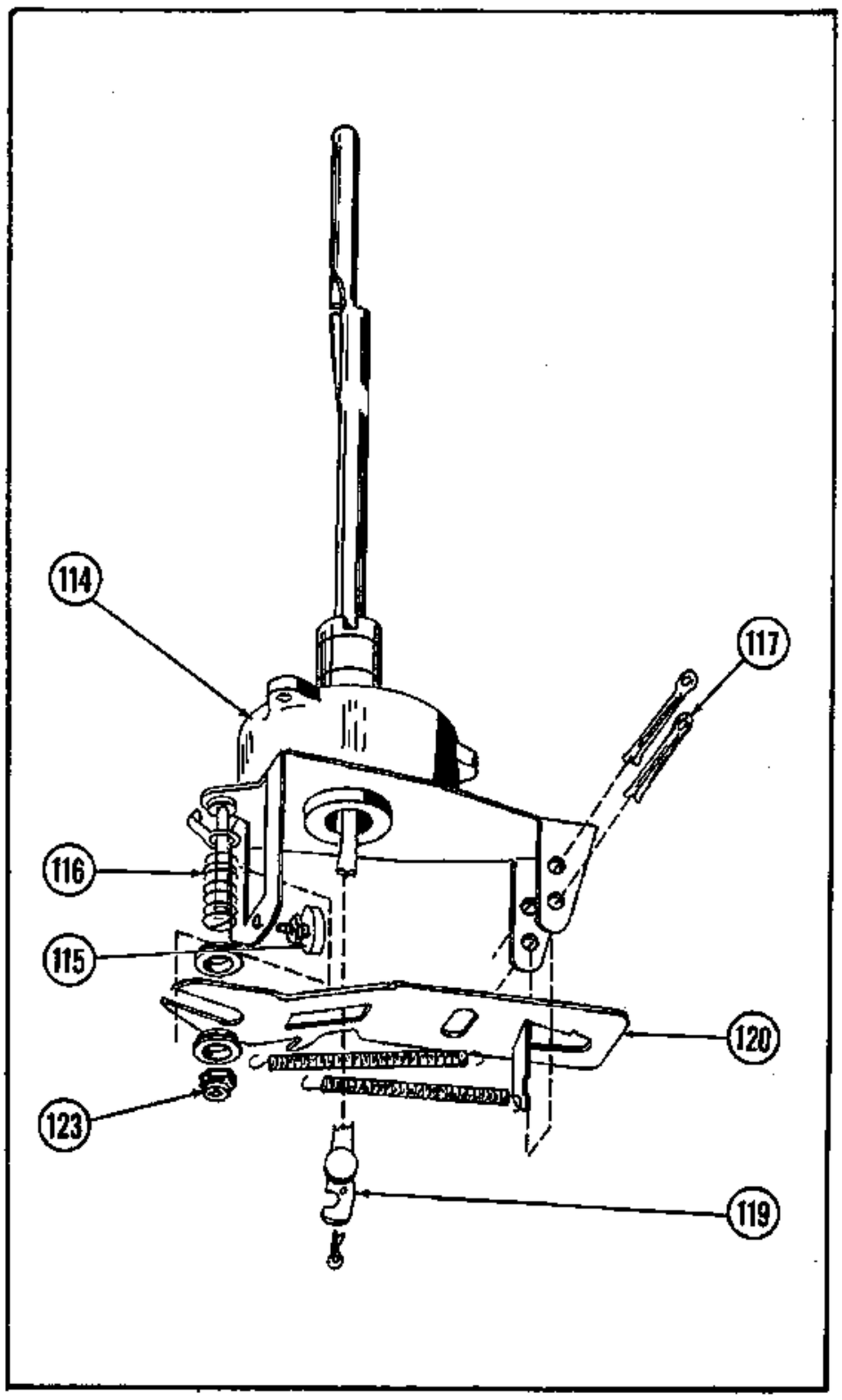
Continuous Operation Of Change Cycle-

If the change mechanism operates continuously without allowing each record to play to the end the cause can be:

1. Weakening or displacement of spring (133).

2. Main gear release lever (136) being stiff on its pivot.

3. Automatic trip lever (52) being stiff on its pivot.



RECORD DROPPING MECHANISM