

Service Manual

Dual 1009

**General Information**

The Dual 1009 is a hi-fi stereo, manual record player with automatic record changing mechanism.

When used as a manual record player, the tonearm can be placed manually on the record while at standstill or in motion. For use as a completely automatic unit, the record size selector switch (7", 10" and 12") is provided. In both manual or automatic operation the tonearm automatically returns to its rest position at the end of the record, the drive wheel disengages and the unit shuts off.

The changer mechanism of the Dual 1009 is adjusted for 7", 10" and 12" records. The record size is set by a sliding key. Up to 10 records of the same size and speed may be stacked for automatic play. At the end of the last record, the tonearm returns automatically to its rest position, the drive wheel disengages and the unit shuts off. The drive wheel also disengages when the tonearm is manually returned to its resting position.

When used as a changer, the records are held by an exchangeable, self-stabilizing, 1/4" diameter automatic spindle; for 7" records with large center hole, the 45 rpm spindle AS 6 (separate accessory) is used.

The controls of the Dual 1009 for Start, Stop, Record Size and Speed, have been designed as exceptionally free-moving, horizontally sliding levers. This avoids jolting the mechanism, which is mounted on three extremely resilient spring shock mounts, during operation.

The tonearm of the Dual 1009 is balanced in all planes. The tracking pressure of the arm is adjustable by means of a spiral spring, from 0—7 g. The mechanism of the unit still functions perfectly at a tracking pressure of 0.5 g.

The turntable weighs 7 lbs, is made of heavy non-magnetic material and is driven by a magnetically-shielded, 4-pole, induction motor, shockmounted to the base plate. The four speeds, 16²/₃, 33¹/₃, 45 and 78 rpm can be varied within a range of ± 3% by means of a mechanical fine adjustment, without loss of energy.

Wow and flutter and signal to noise ratio are of an order of magnitude usually found in professional equipment.

Exceptional freedom from acoustic feedback is achieved by the unit's extremely low resonance and a new type of friction damping. Isolation of mechanical noises is accomplished by spring suspension from the deck plate and by a "shock absorber" on the tonearm.

DUAL · GEBRÜDER STEIDINGER · 7742 ST. GEORGEN / SCHWARZWALD



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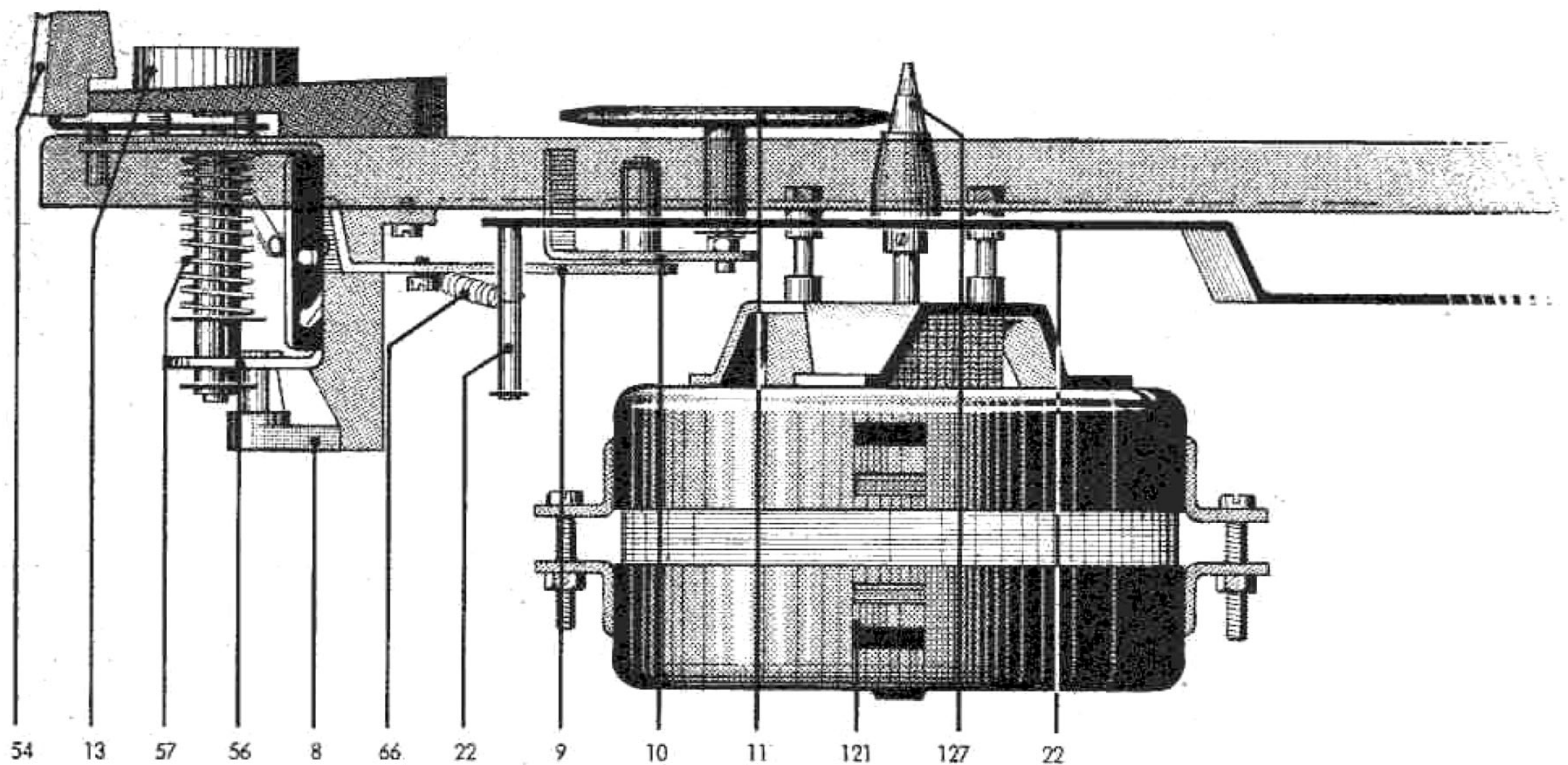
2. Technical Data

Line voltage:	110 / 220 v. AC
Line frequency:	50 or 60 cps
Drive:	Four-pole induction motor with low stray magnetic field
Power consumption:	7 watts, approx.
Turntable speeds:	78, 45, 33 $\frac{1}{3}$ and 16 $\frac{2}{3}$ rpm
Fine speed adjustment:	Adjusts all speeds through 6 % range
Turntable:	Diameter — 11" Weight — 7 lbs / 6 oz.
Wow and flutter:	max. \pm 0.1% weighted
Signal to noise ratio:	at 100 cps relative to 1.4 cm/s equal or better than 50 db
Tonearm:	will accept all cartridges with $\frac{1}{2}$ " mounting
Weight of unit:	15 lbs (less packaging)

We reserve the right to make changes in price and design

3. Function

Fig. 1



Motor

The turntable and change cycle are driven by a 4-pole, induction motor (121) which has an extremely low stray magnetic field and is vibration-free.

Motor speed is constant within line voltage variation of $\pm 10\%$. Deviations occur depending on, and in proportion to, the line frequency. Adjustment for line frequencies of 50 or 60 cps is effected by use of replaceable motor pulleys (127).

Motor pulley 50 cps Part No. 31 N - U 20 ÷ U 27

Motor pulley 60 cps Part No. 31 N - U 28 ÷ U 35

The motor pulley is held on the motor shaft by a set screw. When replacing a motor pulley, the proper height must be determined (gauge KDW 177 is available for this purpose).

Turntable Drive and Change Cycle

The turntable is driven via the drive wheel (11) which, to preserve its friction surface, disengages automatically in "off" position.

Speed selection of $16\frac{2}{3}$, $33\frac{1}{3}$, 45 and 78 rpm, is obtained by raising or lowering the drive wheel to the corresponding diameter of the motor pulley.

Moving the slide key (54) rotates the switch segment (56). This moves the rocker assembly (9), mounted within the switching assembly. The drive wheel in turn is vertically lifted off the motor pulley and moved to the desired position.

Fine Speed Adjustment

For turntable speeds of $16\frac{2}{3}$, $33\frac{1}{3}$, 45 and 78 rpm, a fine speed control is provided, which allows speed changes of $\pm 3\%$.

By turning the control knob (13) the switching segment (56) with its rocker assembly (9) is vertically shifted. The vertical movement alters the position of the drive wheel on the conical motor pulley, to effect the speed variation within the $\pm 3\%$ range.

Fig. 2

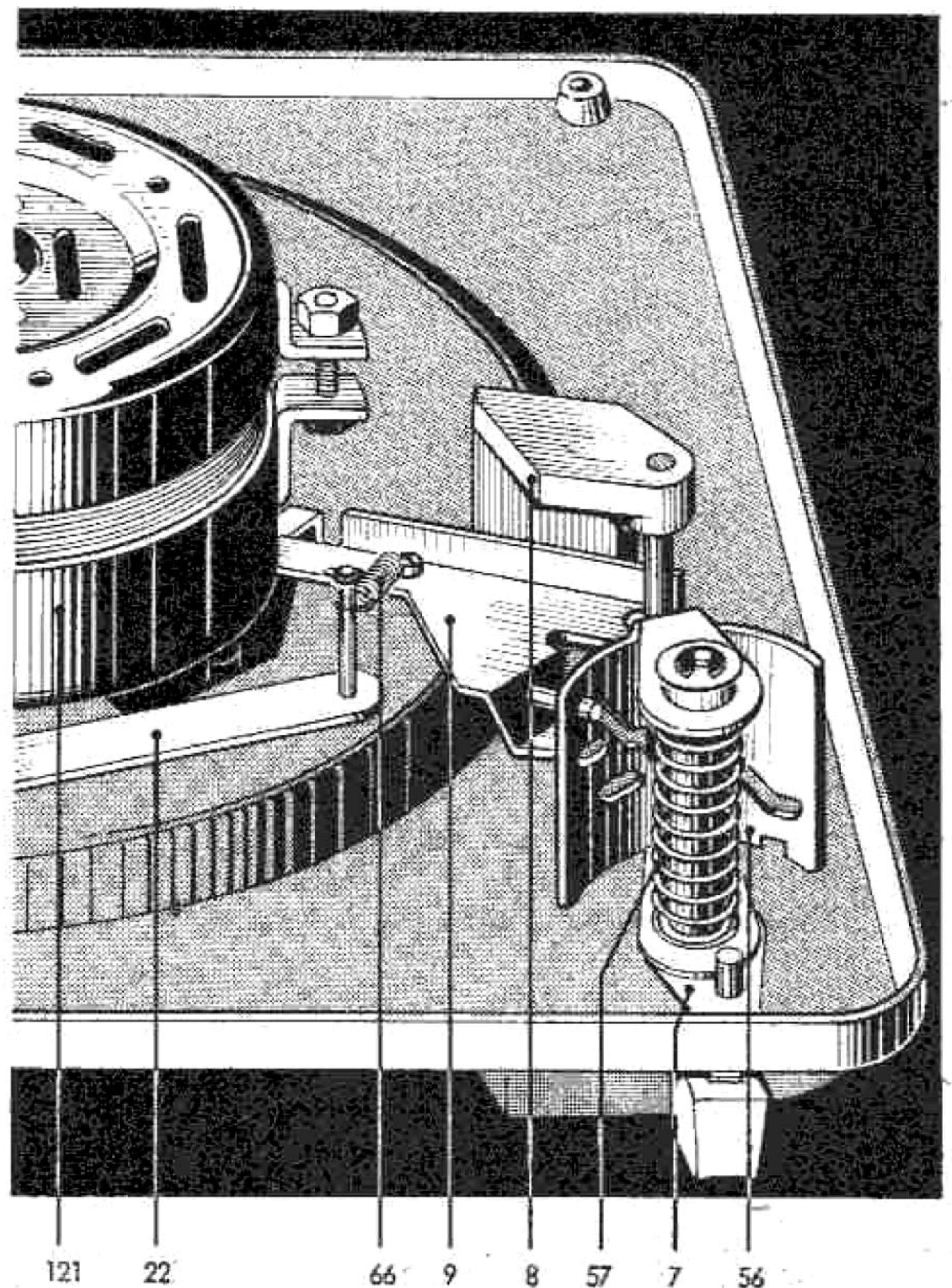


Fig. 3

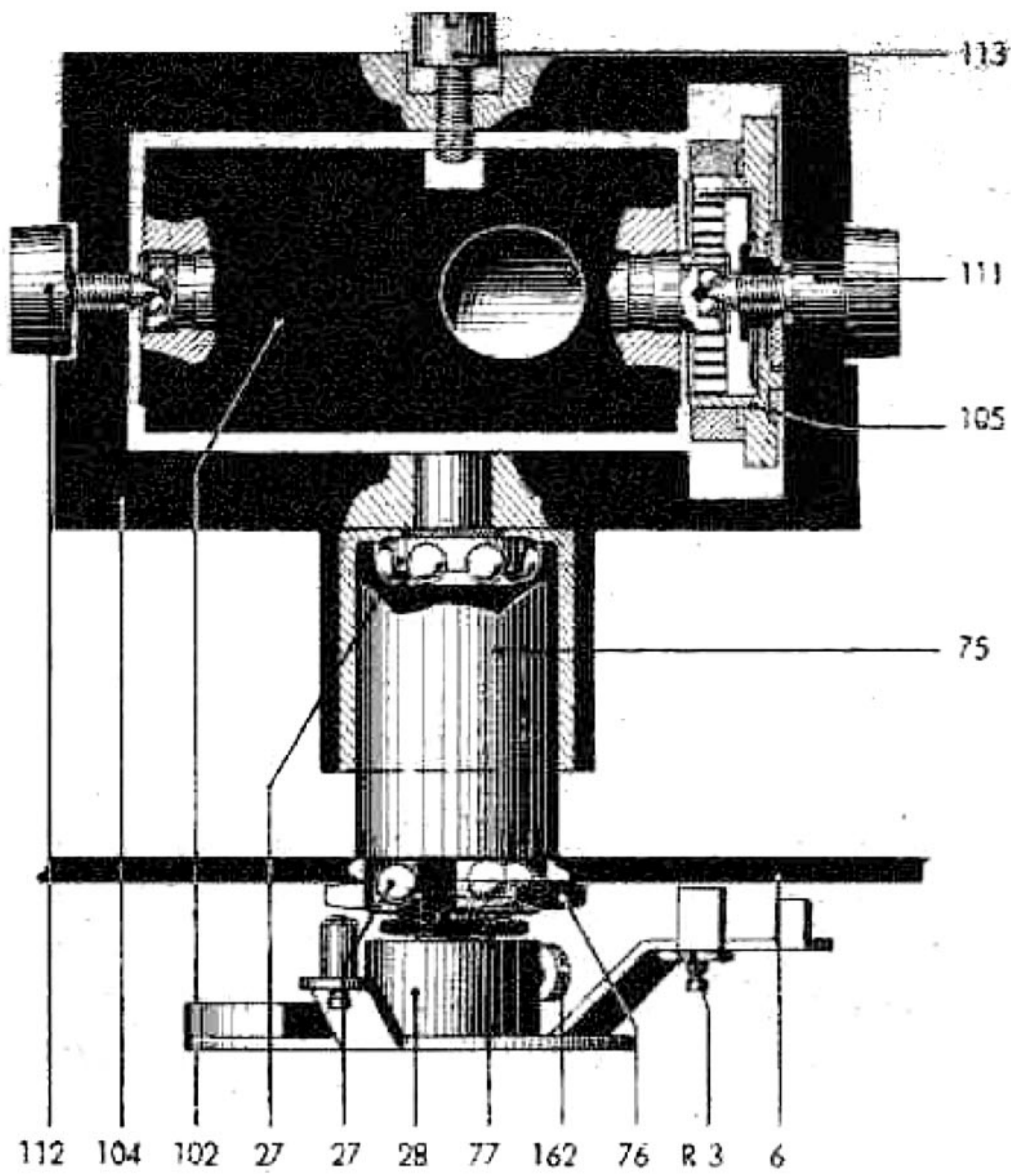


Fig. 4

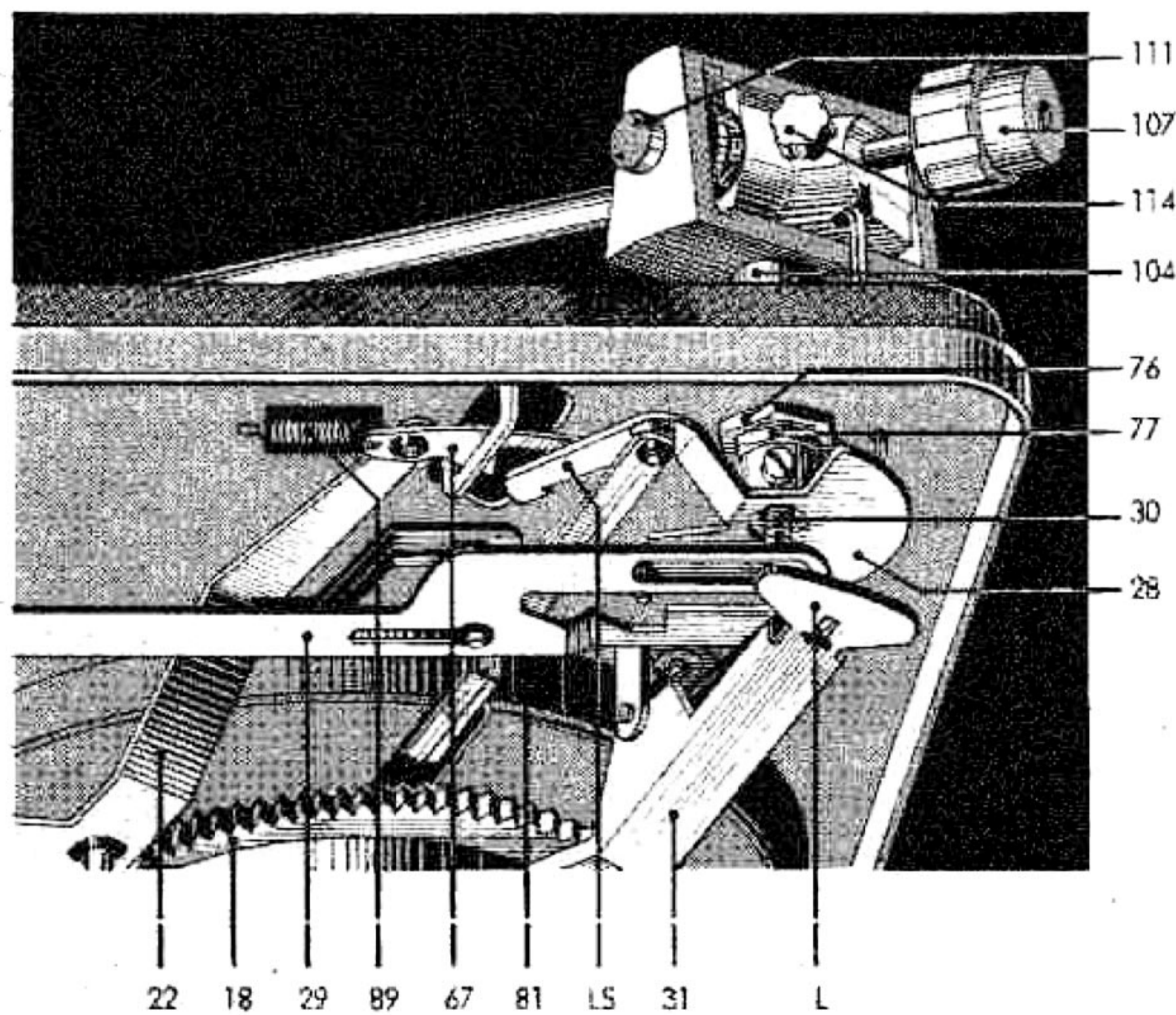
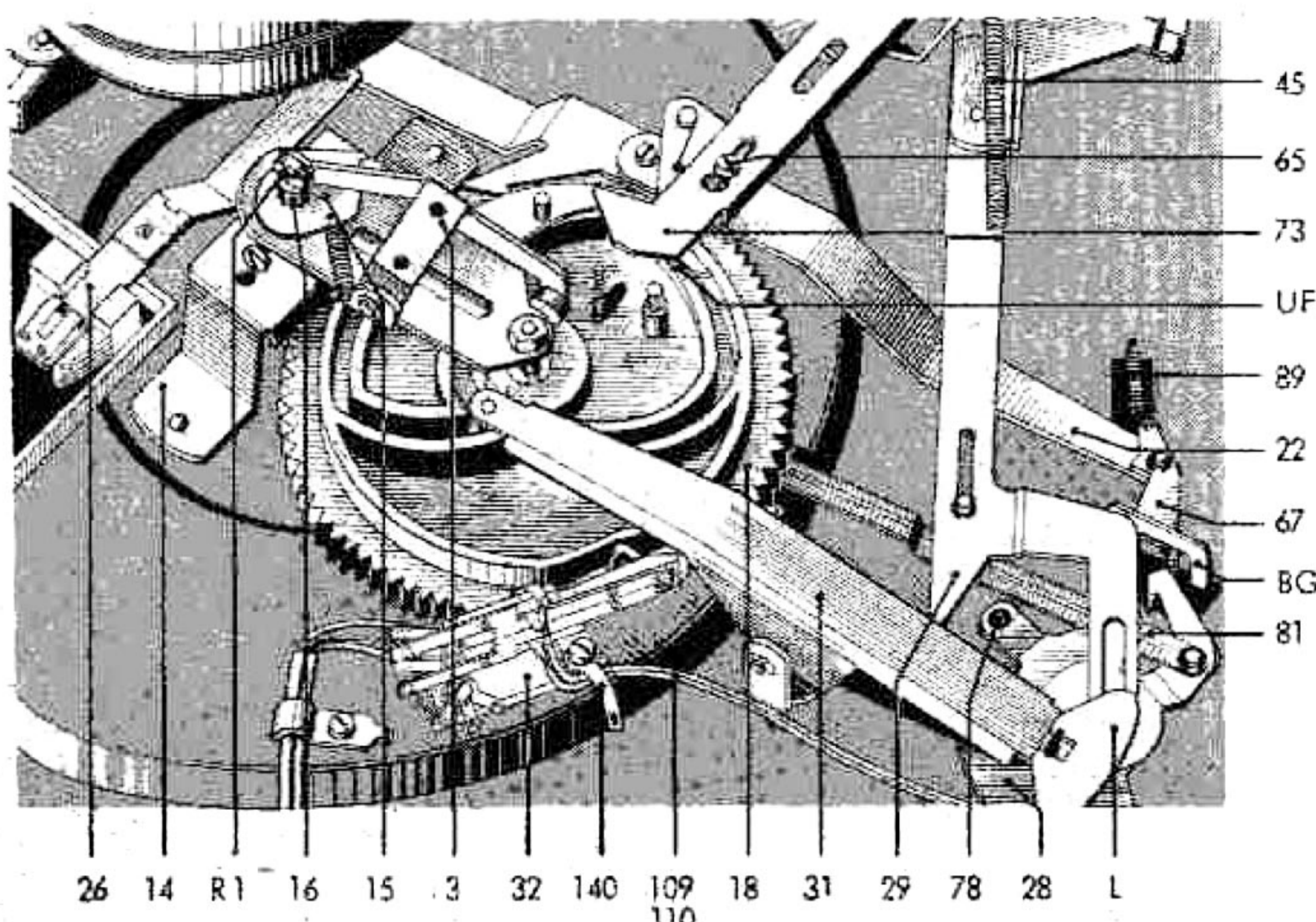


Fig. 5



Tonearm Suspension — Tonearm Tracking Pressure

The metal tonearm of the Dual 1009 is not only vertically, but also horizontally pivoted on precision ball bearings, and thus assures extremely favorable tracking conditions.

Before adjusting tonearm tracking pressure, the arm must be balanced. Coarse adjustment is made by sliding the counterweight on the tonearm shaft. Fine adjustment is made by rotating the counter-balance weight (107). Before balancing, the scale of the arm weight control must be set at "0".

Setting of tracking pressure is made by rotating the spring housing which has a built-in scale, to increase or decrease the tension of the coil spring. This construction definitely eliminates shifting of center of gravity which must occur by other methods. The scale is calibrated from 0—7 grams and allows exact settings from 0.5 gram by 0.5 gram increases over the above range.

Tonearm Movements

For automatic lift-off and set-down the 360° rotation of the cam, located on the underside of the cam wheel (18), controls the tonearm. The main lever assembly (31) and the lift screw assembly (30) raise and lower the tonearm. The main lever (31) with arm segment assembly (28) control horizontal movement.

Slide-switch (85 a, Fig. 6) adjusts unit for playing records of 7", 10" and 12" diameter.

The set down point of the tonearm is determined by the eccentric on the arm positioning slide assembly (29) contacting the record size selector lever (68, Fig. 7). The horizontal movement of the tonearm is limited by the arm segment assembly (28) touching the arm positioning slide (29). During the change cycle, only, this is lifted by the main lever assembly (31) and brought within reach of spring pin (78) of the arm segment.

Once the stylus has set down on the record (i. e. change cycle completed), the arm positioning slide (29) is freed and returns to its normal position. It thus moves out of reach of spring pin (78), so that during play, the horizontal movement of the tonearm is not impeded.

Start Cycle

By pushing the start key (85 b) the switch lever assembly (23) is moved in the direction of the cam wheel. This in turn actuates the following processes:

- a) The set screw (71), mounted on the switch lever, turns switch arm assembly (22) mounted on grooved shaft (65). By means of a tension spring, this in turn brings the rocker assembly (9, Fig. 1) and thus the drive wheel (11, Fig. 1) against the motor

pulley and turntable. Simultaneously the switch slide assembly (26, Fig. 5) actuates the power switch and the turntable starts moving.

- b) The switch spring (UF) mounted on switch lever (23) is brought within reach of cam follower assembly (19), so that it is pushed into its change position after rotation of cam wheel assembly.

Pushing the switch key also frees start lever (73) which is pulled towards the cam by means of a tension spring (89). Thus the shut-off lever (21, Fig. 10) is brought within reach of dog (M) on turntable gear, by means of coil spring (64, Fig. 9) and drives the cam wheel.

To avoid errors in operation, the start key is locked in position during the start cycle (rotation of cam wheel). Just before "0" position of the cam wheel is reached (at end of change cycle), the start lever is pushed away by means of the start pin (SB) of the cam wheel and the start key and switch lever are returned to their original position.

Stop Switching

By placing the switch key in "stop" position the switch spring (UF) and switch lever (23) are moved towards the cam wheel as in start cycle, but only half the distance.

The cam wheel thus pushes the cam follower (19), to one side, into its stop position.

Manual Operation

By placing the switch key in "manual" position, the switch lever (23) is moved towards cam wheel (as in start operation) and the following processes occur:

- a) Set screw (71) mounted on switch lever (23) rotates switch arm (22) mounted on the grooved shaft (65).
- b) By means of a tension spring and switch arm (22) the cam follower lever (9, Fig. 1) and with it the drive wheel (11, Fig. 1) engage the motor pulley and turntable.
- c) The power switch is actuated by means of switch slide assembly (26, Fig. 5) of switch arm and the turntable is brought into motion.
- d) Latch (67), fastened to the switch arm, rests in a guard (BG, Fig. 5) provided in deck plate and keeps switch arm in this position and the drive wheel engaged in the turntable.

Upon reaching the shut-off groove, the tonearm returns to its rest position automatically and the unit is shut off. (See shut-off mechanism.)

However, should the tonearm be lifted off before the end of the record and manually returned to its support, the latch (67) is released from the guard by tab of arm segment assembly (28). Tension spring (89) returns the switch arm (22) to its start position. Power supply is cut off by the power switch and the drive wheel is disengaged.

Fig. 6

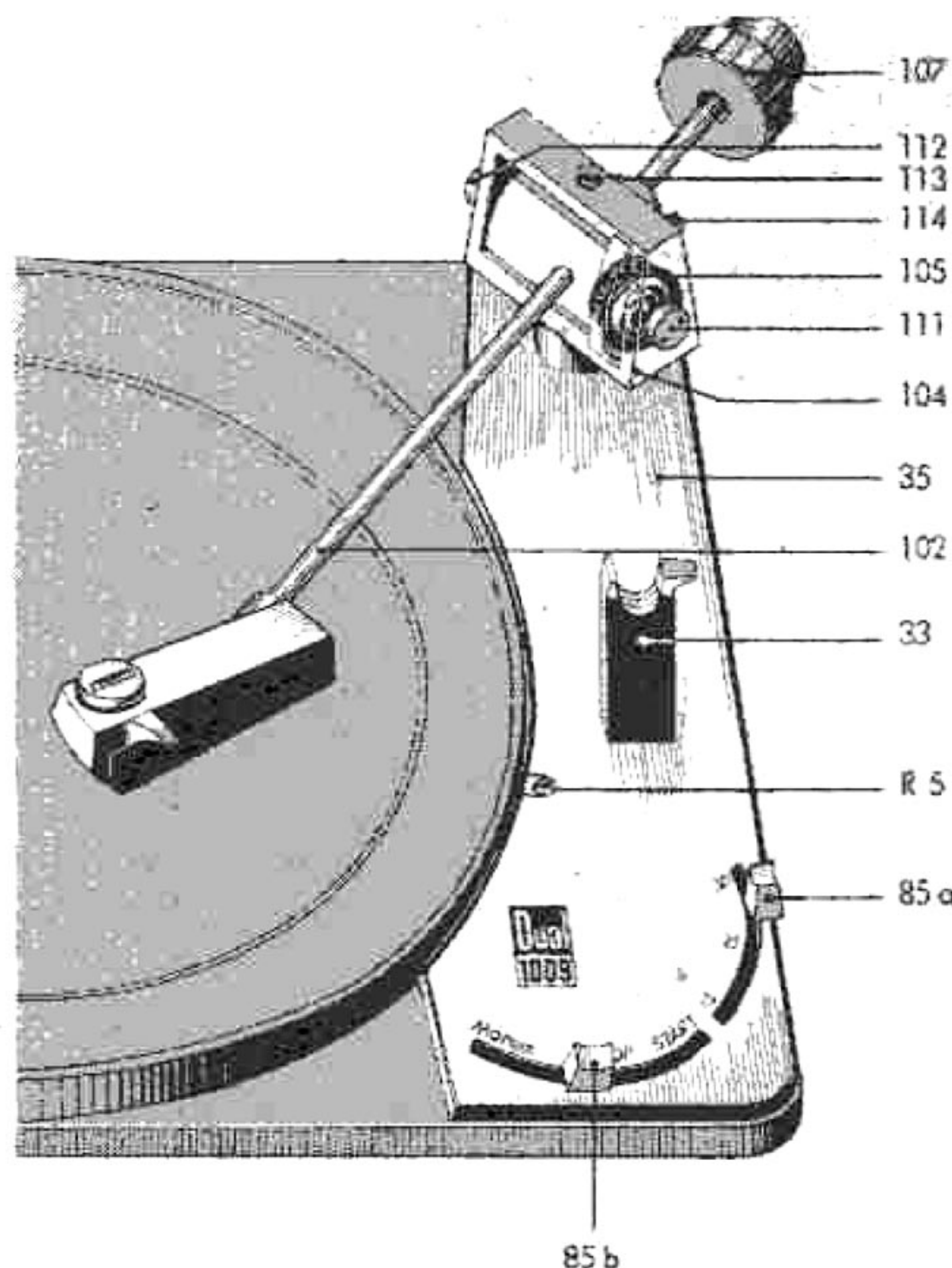


Fig. 7

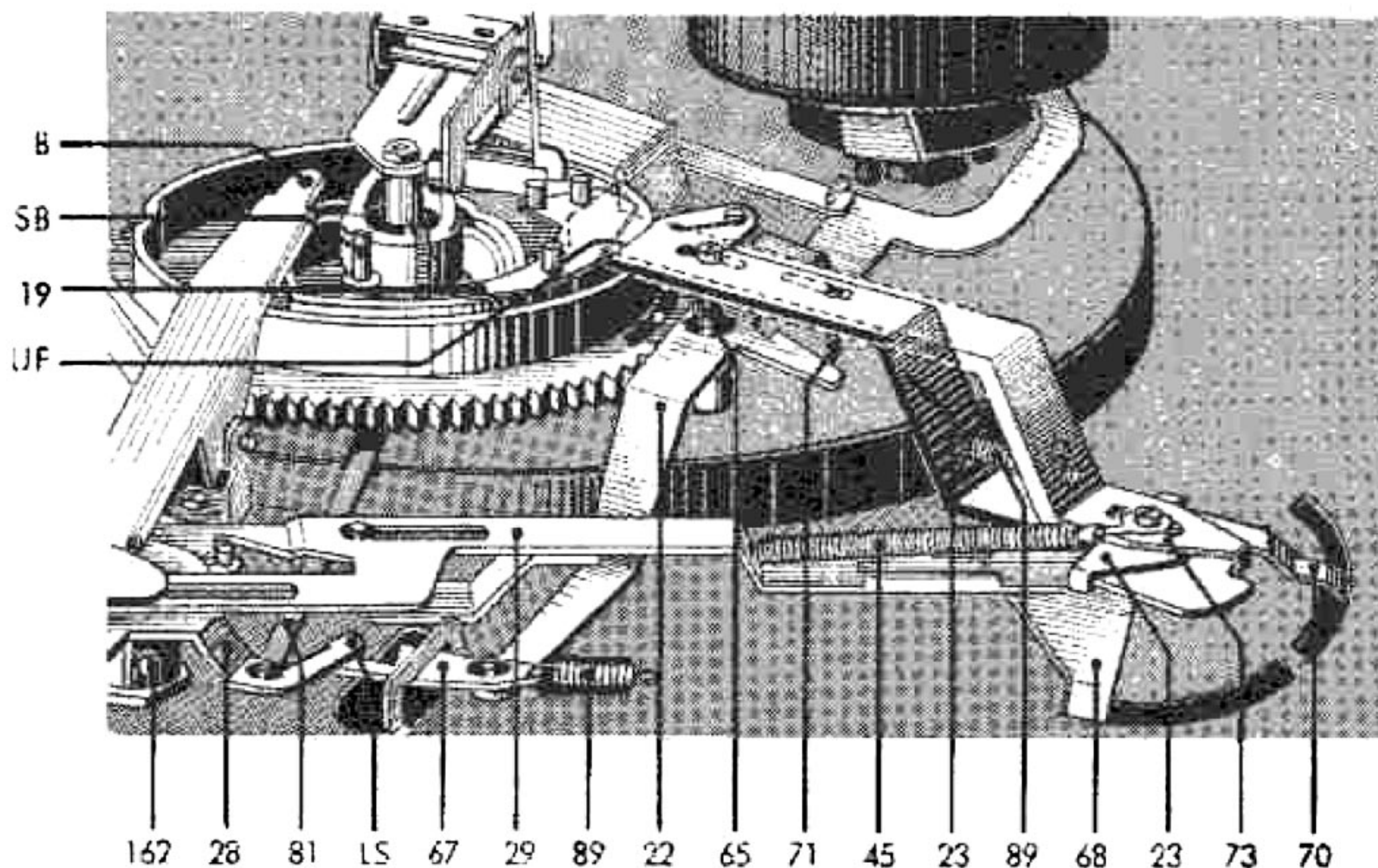


Fig. 8

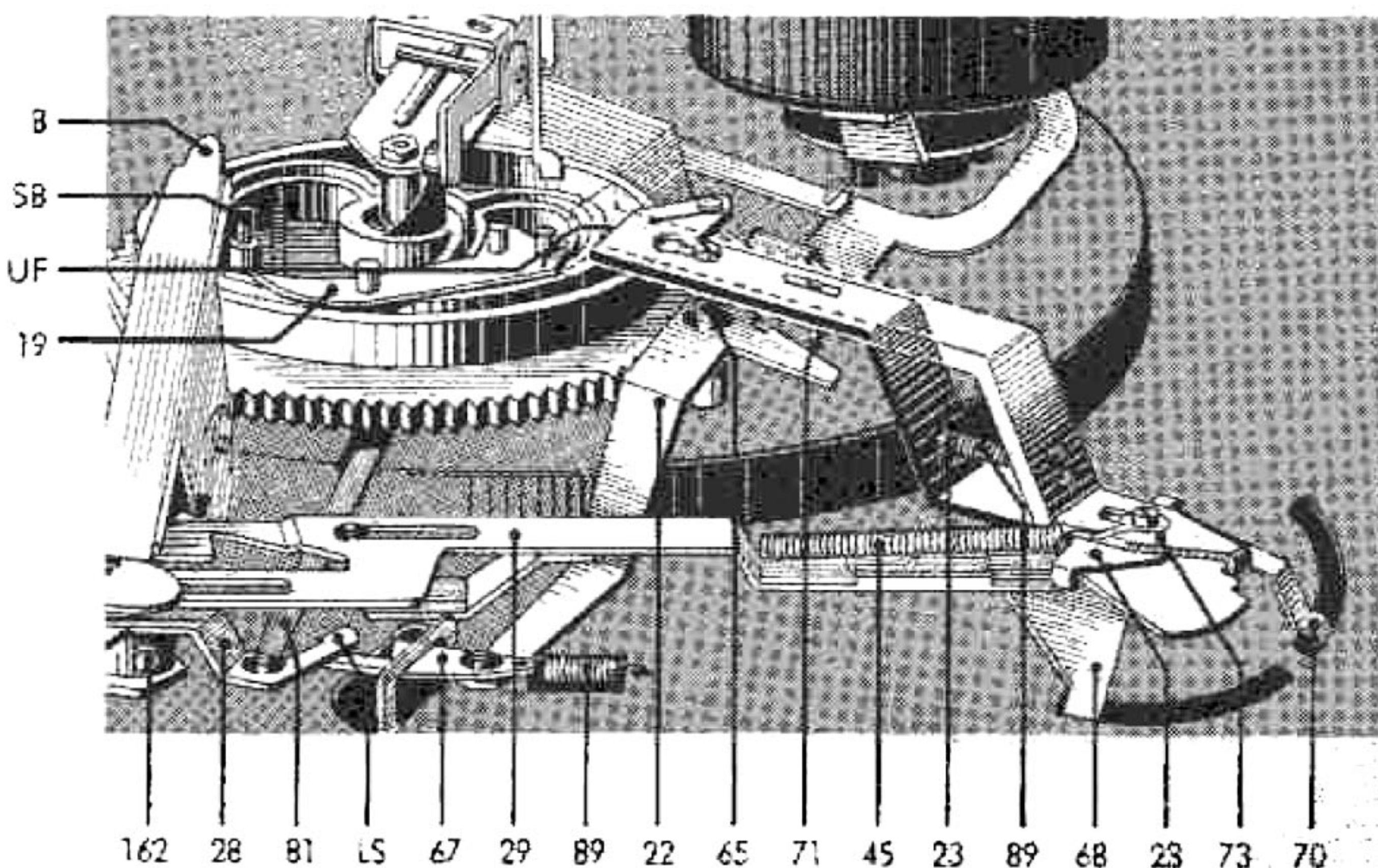


Fig. 9

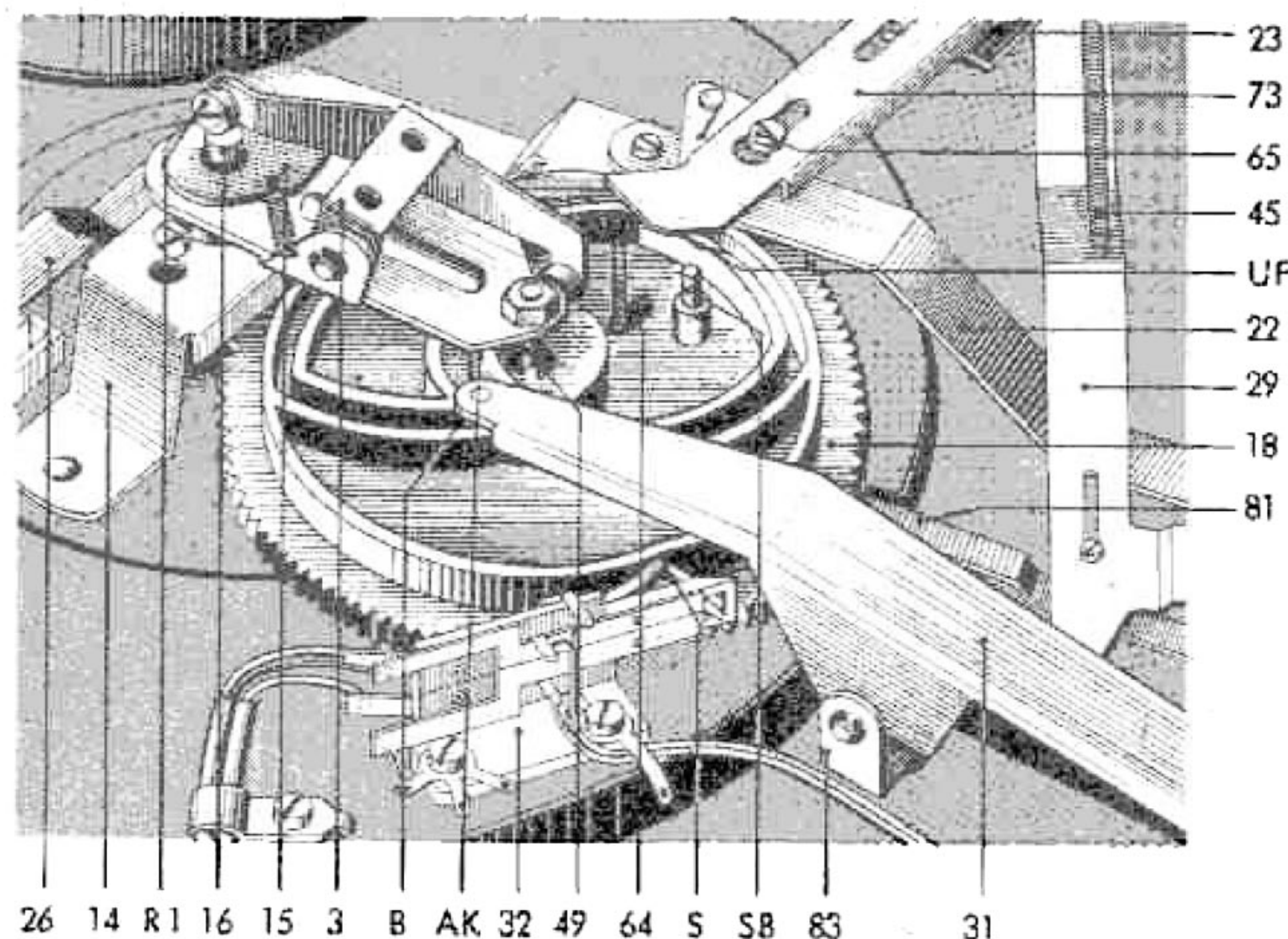
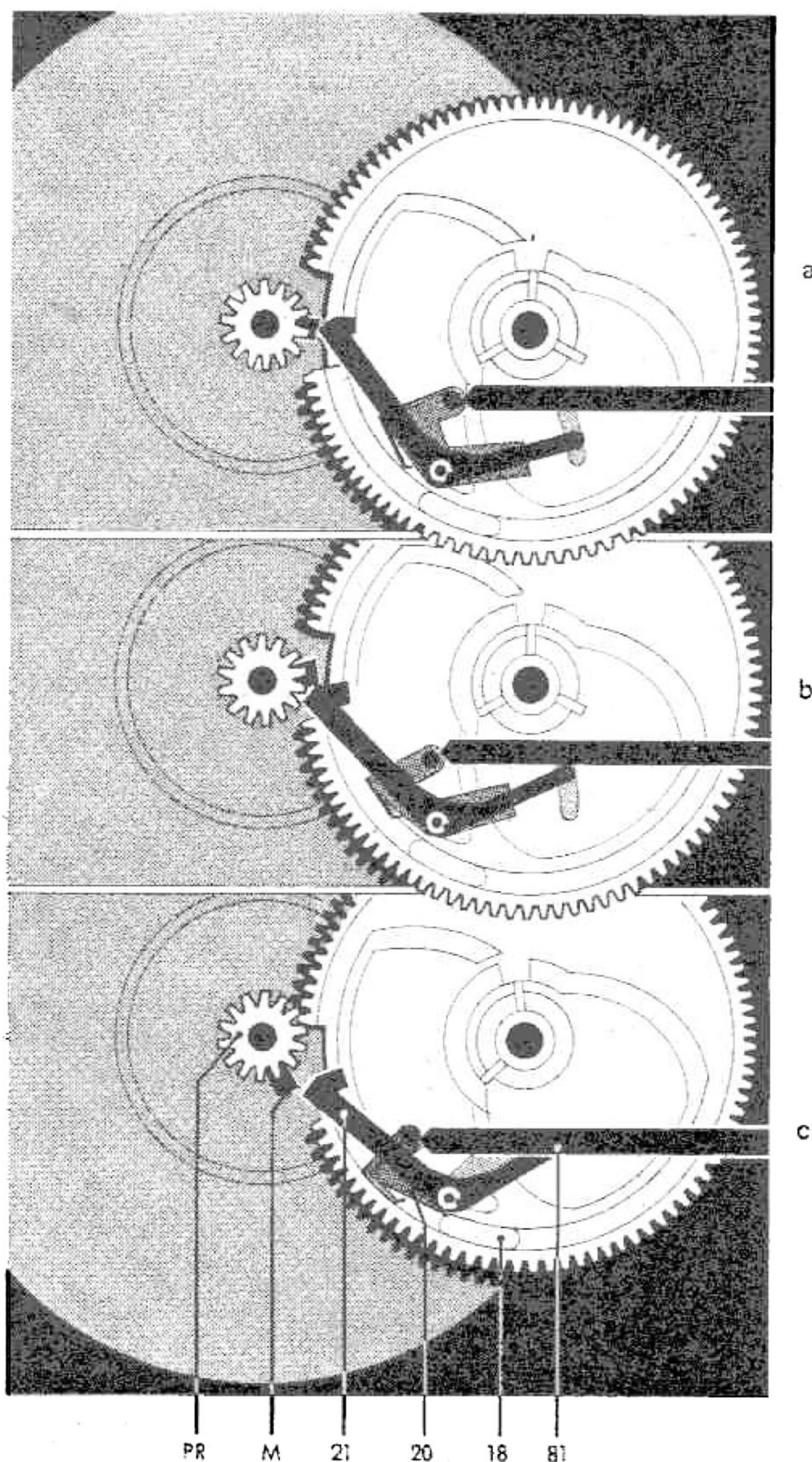


Fig. 10



Muting Switch

To eliminate extraneous noise during change cycle and during automatic raising and lowering of the tonearm, a muting switch (32) is provided.

The switch springs (S) for both channels are actuated by the cam wheel. In stop position the muting switch opens.

Record Drop

For stacking and dropping the records, changer spindle (AW 2) or 45 rpm spindle (AS 6) are available. The drop mechanism is actuated by rotation of the cam wheel (18) whose cam (AK) guides the cam rocker (3) and the change actuator screw (16).

The actuator screw, thus pushed, initiates the record drop by means of the center spindle. The changer cam is so arranged on the cam wheel that a record can only be dropped when the tonearm is situated above the tonearm rest, which means outside the range of the largest diameter record.

Shut-off and Changer Operation

The change cycle at the end of a record, and the final shut-off after the last record of a stack, are actuated by dog (M) on the turntable gear (PR) and the shut-off lever (21).

The shut-off lever is brought close to the dog by the motion of the tonearm during play, by means of the shut-off slide (81). The eccentrically mounted dog (M) pushes the shut-off lever back at each revolution, as long as the advance of the tonearm is only the width of one groove (Fig. 10 a).

The shut-off groove with its greater pitch brings the shut-off lever with greater feed towards the dog (M) so that it engages and is carried along with the shut-off (Fig. 10 b).

The cam wheel (18) is thus engaged from its "0" position with the turntable gear (Fig. 10 c).

Shut-off

Shut-off and change functions are determined by the position of cam follower lever assembly (19, Fig. 7, 8). After drop of last record in stack, the change lever (15) guides the cam follower lever.

To initiate shut-off:

Change lever brings cam follower lever into shut-off position with longer end towards center of cam wheel.

Tonearm swings out over its rest so that guide post (B) of the main lever (31) extends into the outside curve of the cam wheel (18).

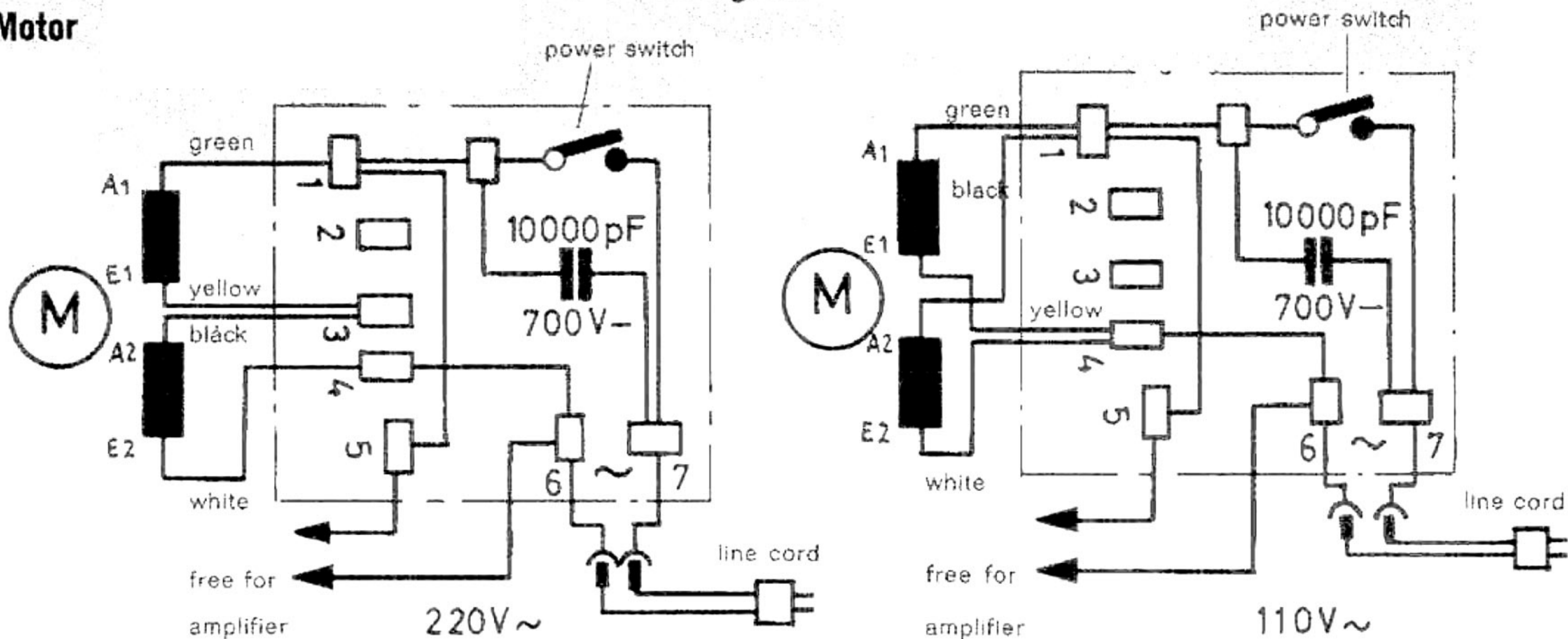
Tonearm is thus pushed back over its rest and lowered onto its rest.

Change cycle is completed and unit shuts off.

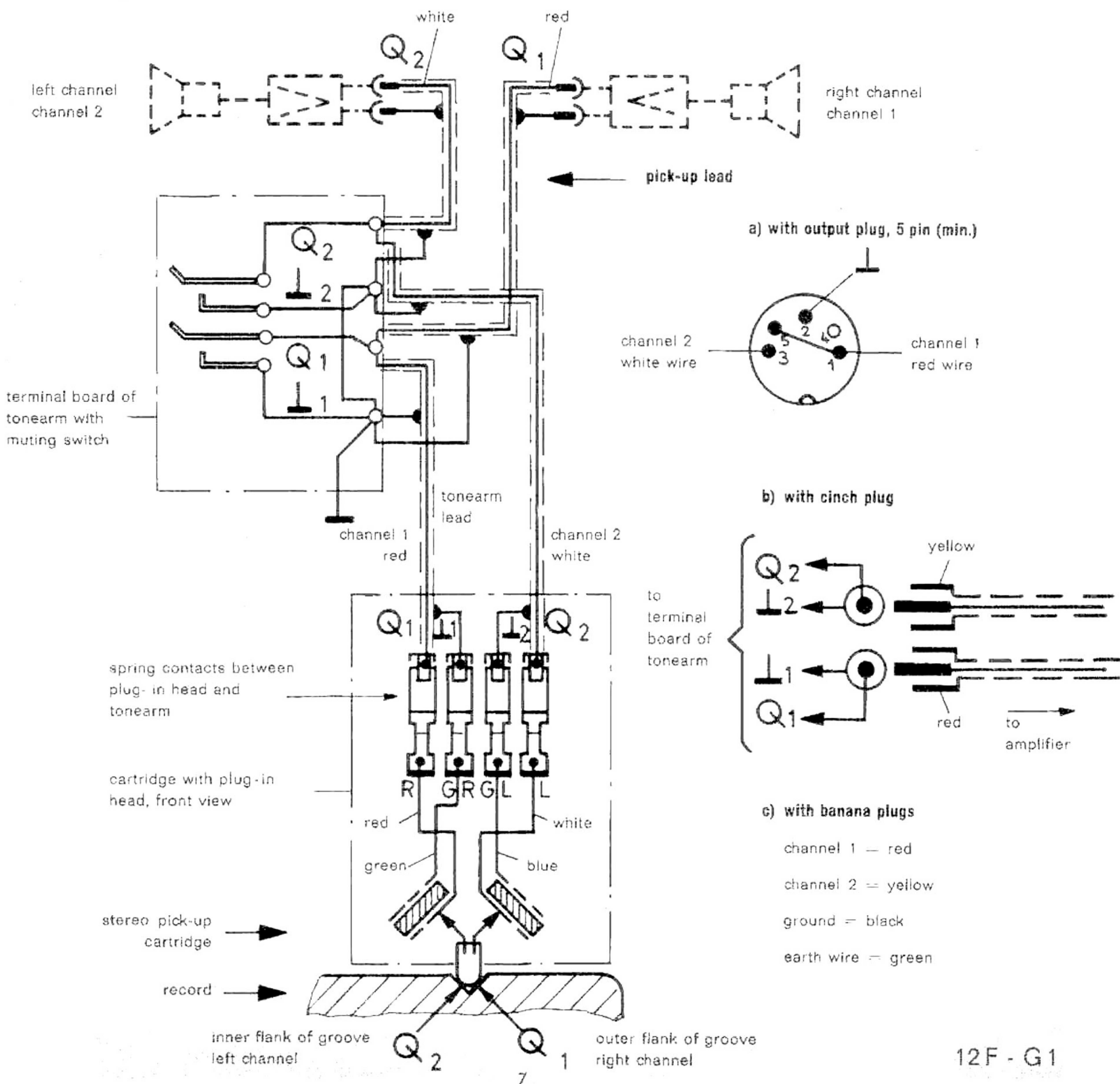
Fig. 11

Motor

4. Circuit Diagram



Pick-up



3. ADJUSTMENT INSTRUCTIONS

Reference numbers refer to Figs. 9, 10, 15 and 16.

- Drive wheel height** By rotating drive wheel shaft (58).
Adjustment is correct when speed selected coincides with the middle of the regulating range.
- Travel of change pin (for record drop)** By means of eccentric screw (R 1) on cam rocker.
Adjustment is correct when the 3 supports of the changer spindle are completely retracted and on further rotation of the cam wheel an overlap of approx. $\frac{1}{8}$ " occurs between cam and roller of the cam rocker.
- Cam follower lever** By set screw (71).
Adjustment is correct when in "manual" position switch key latch (67) overlaps guard (BG) by approx. $\frac{1}{32}$ ".
After adjustment, tighten nut (155) of set screw (71).
- Tonearm height** By means of screw (113).
Adjustment is correct when tonearm extends $\frac{1}{16}$ " over its support (33).
- Tonearm set-down point (on the record)** For 7" records use eccentric screw (R 5).
Adjustment is correct when tonearm is $\frac{1}{16}$ " from record rim.
- Tonearm clutch (brake)** In "0" position of cam wheel (18) bend leaf spring (BF) on main lever.
Adjustment is correct when in "0" position of cam wheel the distance between guide mark (in leaf spring) and arm segment assembly (28) is approx. $\frac{1}{32}$ ".
- Tonearm position (over tonearm rest)** Rotate arm segment (28) after loosening screws (162, R1).
Adjustment is correct when tonearm lowers unhampered to tonearm rest (33).
After adjustment check vertical play of tonearm (see tonearm bearing).
- Vertical tonearm suspension** Adjust bearing with positioning screw (77, Fig. 3).
Adjustment is correct when positioning screw (77, Fig. 3) is sufficiently tight so that play in bearing is very small (use key wrench KDW 175).
- Horizontal tonearm suspension** Adjust bearing with bearing screw (112).
Adjustment is correct when bearing screw (112) allows minimal play (bearing friction: 0.1 g max.).
Use wrench KDW 173.
- Actuating position of shut-off** With eccentric screw (R 3) on arm segment (28).
Adjustment is correct, when unit shuts off within $4\frac{1}{2}$ " to 5" range of record diameter.
To check this adjustment, a special record such as Deutsche Grammophon Gesellschaft No. 329 013 is recommended.
- Shut-off** By banding change lever assembly (15).
Adjustment is correct when change lever with record on and spindle locked, passes approx. $\frac{1}{64}$ " away from the guide post of the cam follower lever (in change cycle), i. e. without record it should engage at $\frac{1}{32}$ " (shut-off).

Fig. 12, Top view (with turntable removed)

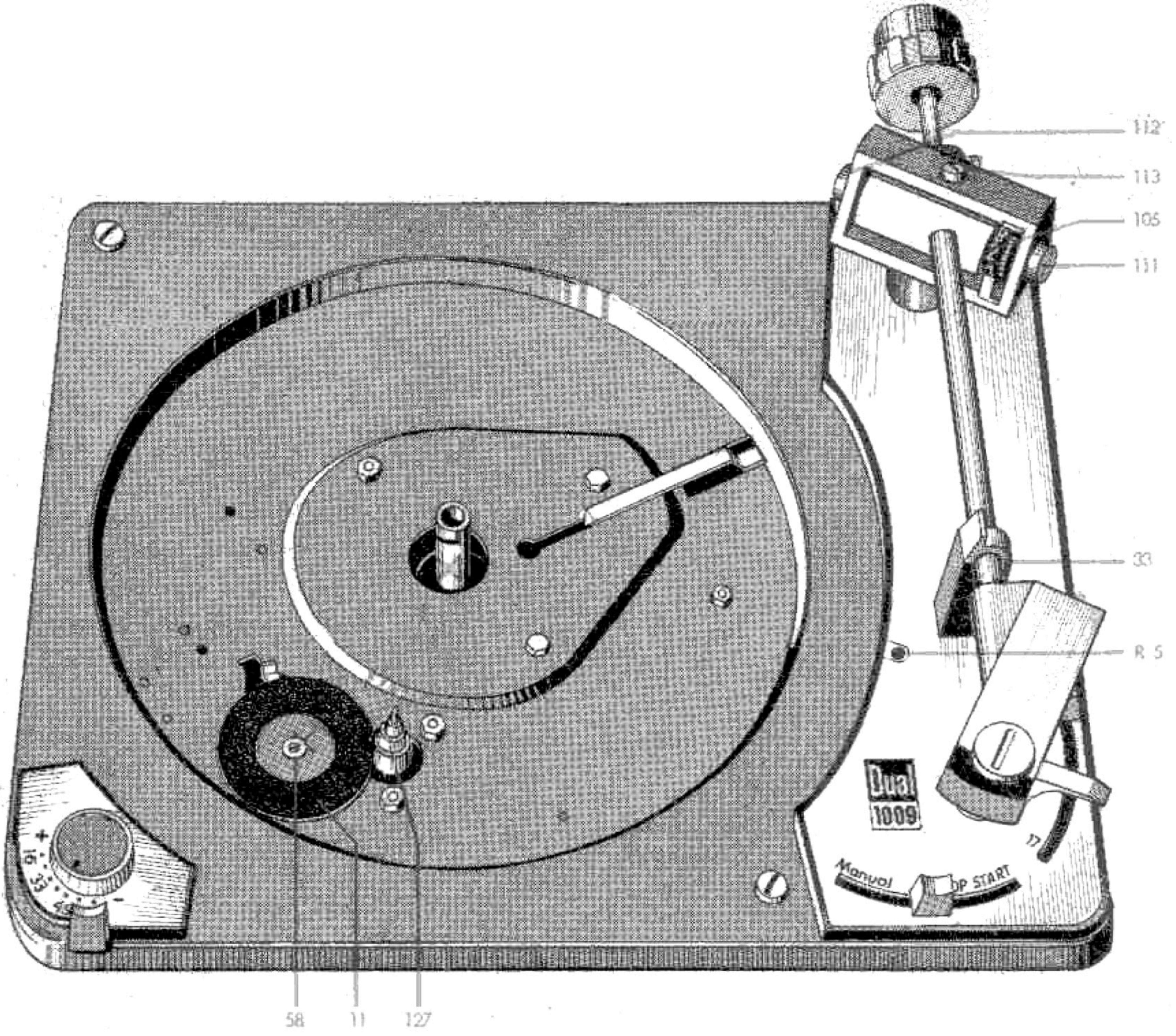
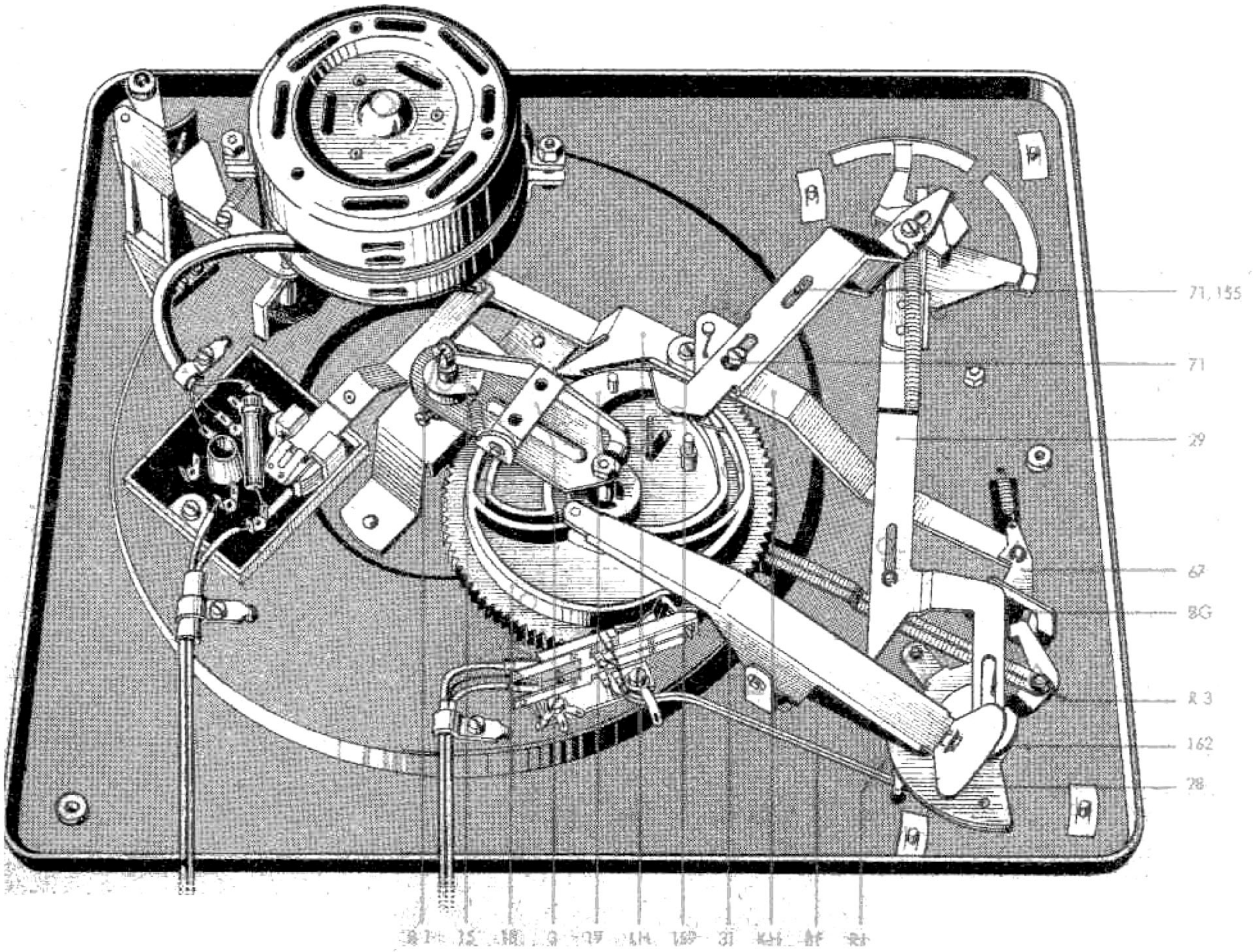


Fig. 13, Bottom view



6. Lubrication

All bearings and sliding points have been properly lubricated during assembly. Relubrication is not necessary for about 2 years (during normal use) since all important bearings are provided with oil retainers and sintered bearings.

Lubrication should be applied sparingly. It is of primary

importance that no oil or grease should get onto the driving surfaces of the motor pulley (underneath the turntable) or the motor shaft, since in that event, drive slippage will result.

For relubrication use the following lubricants:

- Fine bearing oil shell AB 11 (or equivalents) for motor bearings and sintered bearings
- Thicker non-gumming oil (Calypsol WIK 700) (or equivalents) for sliding points and bearings
- Adhesive oil - Renotac (or equivalents)
- Molykote paste G for points where greater pressure and friction occur (or equivalents)
- Silicon grease

When mixing various lubricants it is possible to cause chemical disintegration. In order to avoid lubrication break-

down, we recommend that the above mentioned lubricants be used.

7. Mounting Instructions

Figures see page 11.

The Dual 1009 can be mounted from the top. It does not require any underneath fastening to the mounting board. It is advisable to establish the electrical connections prior to mounting the unit.

The minimum mounting board dimensions are $15\frac{3}{4}" \times 13\frac{7}{8}"$ (400 x 345 mm); maximum thickness $\frac{5}{8}"$ (16 mm).

In order to retain the removeability of the tonearm-counterbalance once the unit is built into the cabinet, one should not go below the minimum mounting board dimensions.

The turntable chassis is equipped with a unique spring suspension system that provides for the isolation of the mechanism from shock and vibration and avoids acoustic feedback. When mounting the unit, the three spring cups are placed into the holes drilled into the mounting board for this purpose (Fig. 1).

In order to avoid damaging the built-in unit during shipment, and to keep it anchored during play, the Dual 1009 is equipped with two transport safety screws. Fig. 3—5 indicate their multiple functions.

Fig. 3 — Shipping Position

Press unit plate against mounting board, lift screws and keep turning counterclockwise until unit plate is tightly secured to mounting board.

Fig. 4 — Playing Position

Turn transport safety screws clockwise as far as they will go. This releases the spring suspension and at the same time anchors the unit to the mounting board.

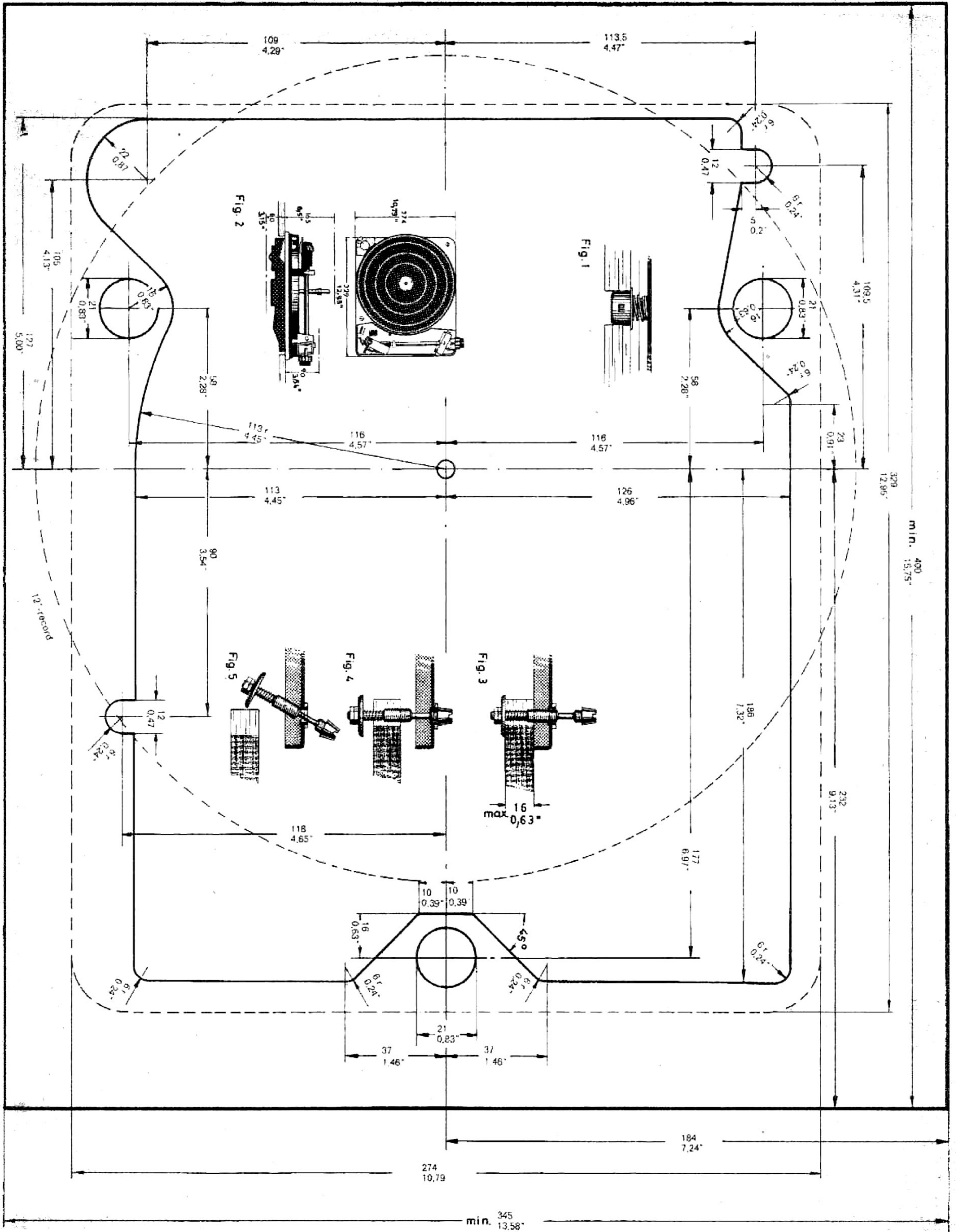
Fig. 5 — Mounting or Removing Position

Lift screws halfway up and tilt them towards the edge of the chassis. Take off turntable before mounting or removing the unit.

When mounting the unit, special care should be taken that the unit rides freely on its spring suspension system and that no part touches the mounting board cut-out during play. In case there are any wood splinters on the mounting board, remove them before setting up the unit.

Consult the operating instructions for proper connections to the AC line and amplifier as well as the correct use of the unit.

Fig. 14, Mounting template



8. Trouble Chart

Reference numbers refer to the following parts list and exploded views.

Trouble	Cause	Remedy
Change cycle does not start when plugged in and when start switch is activated	<ul style="list-style-type: none"> a) Current to motor interrupted b) Drive wheel (11) fails to engage turntable c) Motor pulley (127) loose 	<ul style="list-style-type: none"> a) Check connections in switch plate b) Check rocker assembly (9) c) Tighten motor pulley (127)
Records do not drop	<ul style="list-style-type: none"> a) Travel of cam rocker (3) too short b) Changer spindle is not locked c) Spindle defective 	<ul style="list-style-type: none"> a) Re-adjust eccentric (R 1) b) Rotate spindle, after inserting into hole, to its stop c) Replace spindle
Turntable slows down when record drops	Travel of cam rocker (3) too far	Re-adjust eccentric (R 1)
Turntable does not come up to required speed	<ul style="list-style-type: none"> a) Different line frequency b) Slippage on drive wheel (11) and motor pulley (127) c) Friction in motor bearings 	<ul style="list-style-type: none"> a) Check line frequency. Try larger or smaller motor pulley b) Clean drive wheel (11) surface c) Clean motor bearings and lubricate according to lubricating directions
After activating stop switch and after restarting, records drop each time	Normal	See "Function"
Tonearm does not lower into starting groove	<ul style="list-style-type: none"> a) Wrong record size selected b) Record is not standard size c) Some lubricant on friction surface of tonearm clutch set-down d) Tonearm position inaccurately adjusted 	<ul style="list-style-type: none"> a) Use key (85) to select proper size b) Use standard records c) Clean friction surface d) Adjust with set screw (R 5). See adjustment instructions
Unit shuts off while tracking in grooves between program selections	Shut-off mechanism actuates too soon	Eccentric (R 3) must be adjusted. See adjustment instructions
Tonearm strikes record stack during change cycle	Tonearm height out of adjustment	Adjust with set screw (113) according to adjustment instructions
Tonearm misses tonearm rest (33) on returning	Segment (28) not correctly positioned on bearing frame	Loosen screw, correct segment position. After this check vertical bearing play. See adjustment instructions
Tonearm continues running in shut-off groove after record finished playing	Eccentric shut-off groove missing or faulty	Replace record
Last record of stack repeats	Engagement of change lever (15) and cam follower lever (19) insufficient	Readjust change lever (15) according to adjustment instructions
Tonearm returns to rest position after each record	Too much engagement between change lever (15) and cam follower (19)	Straighten change lever (15) as in adjustment instructions

Trouble	Cause	Remedy
Turntable stops moving after automatic lowering of tonearm on record	Switch arm (22) not locking with latch (67)	Adjust switch arm (22) per adjustment instructions
Turntable stops after activating manual switch	Set screw (71) position inaccurate	Adjust set screw (71) according to adjustment instructions
Speed is outside the range of fine adjustment	Position of drive wheel in relation to motor pulley is inaccurate	Adjust drive wheel position with set screw (58). See adjustment instructions
Needle slips out of groove	<ul style="list-style-type: none"> a) Tonearm unbalanced b) Tonearm tracking pressure insufficient c) Stylus point worn or broken d) Too much friction in tonearm bearings e) Main lever is not raised by segment (28) in play position f) Bail bearing for shut-off slide (81) missing 	<ul style="list-style-type: none"> a) See operating instructions b) Adjust tracking pressure with spring housing (scale 105) to value specified by cartridge manufacturers c) Replace stylus d) Check tonearm bearings e) Adjust position of leaf spring per adjustment instructions f) Replace ball bearing (136)
Tonearm binds vertically on set down	Friction in tonearm bearings	Adjust bearing screw (112) with wrench KDW 173

Tonearm suspension

Both bearings must have some play. Adjust horizontal bearing with left bearing screw (112) only; adjust vertical bearing with positioning nut (77).

9. Exploded View

Fig. 15, showing parts above the baseplate

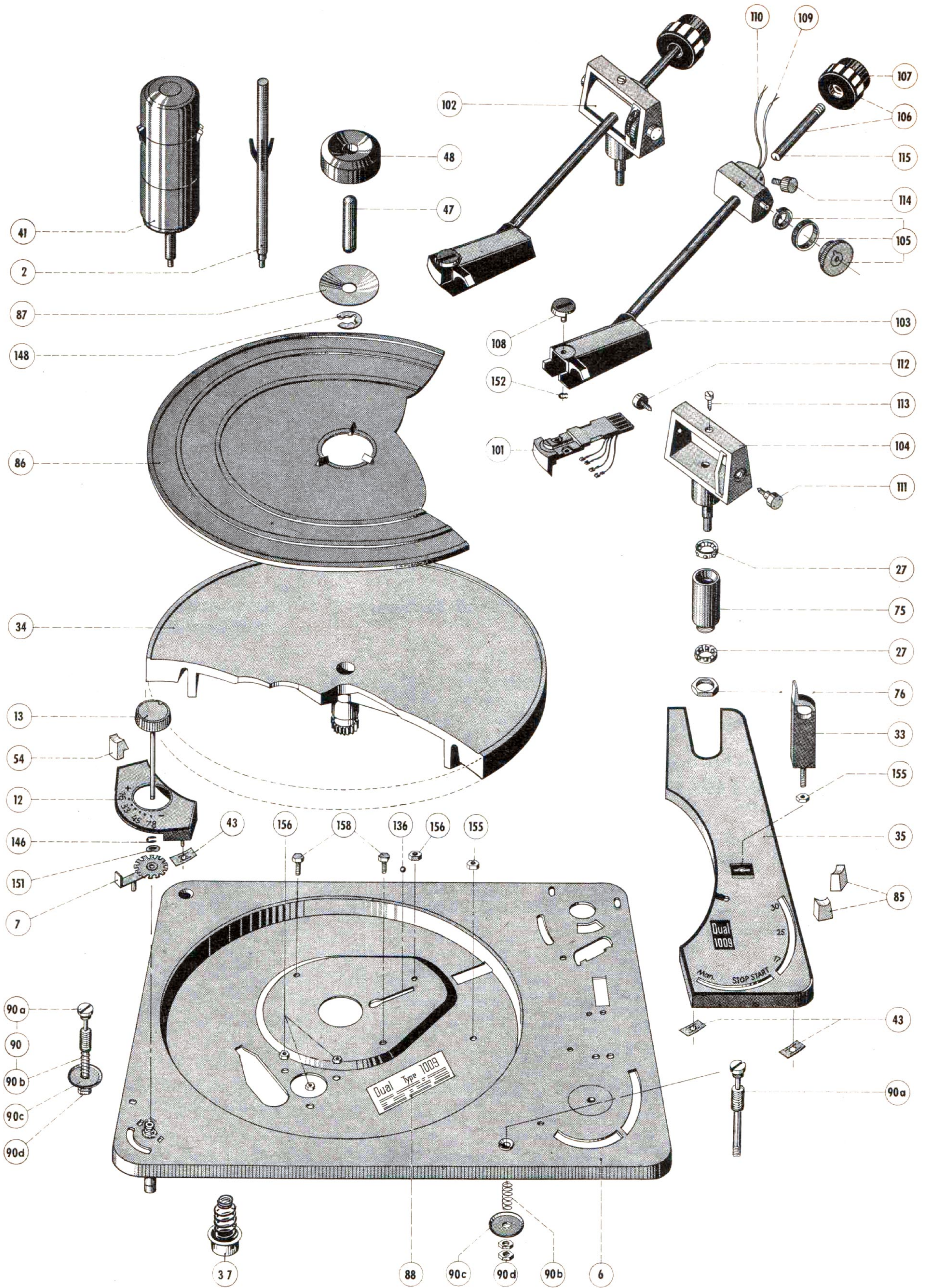
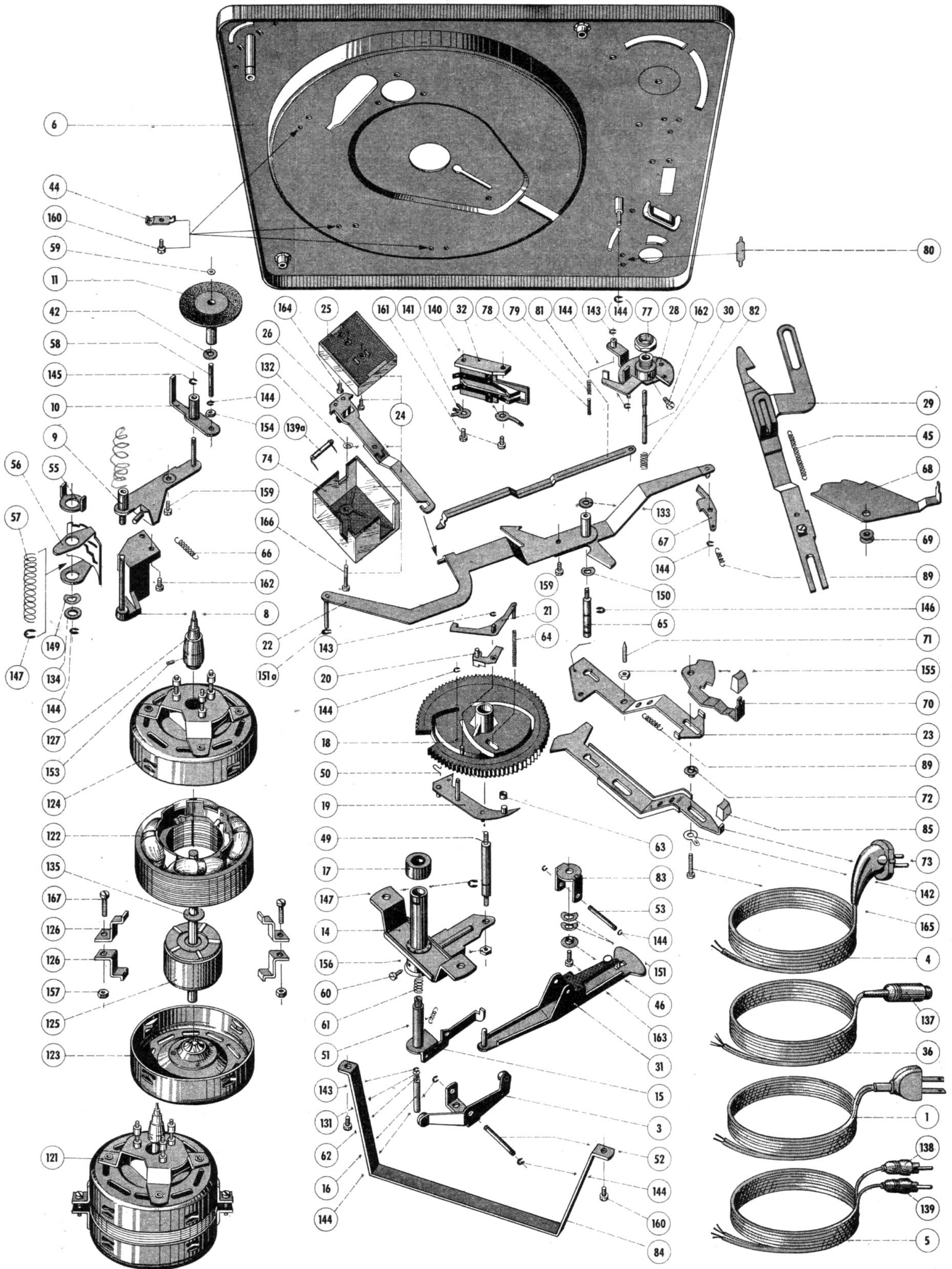


Fig. 16, parts below the baseplate



10. Replacement parts

Ref. No.	Part No.	Description	Quantity
		Top plate and changer	
1 *	12 F - U 175	line cord, American plug	1
2	12 C - U 208	automatic spindle ass'y AW 2	1
3	12 D - U 60	cam rocker	1
4 *	12 F - U 184	line cord, European plug	1
5 *	12 F - U 127	audio cable, cinch plug, plug-in	1
6	12 F - U 2	base plate ass'y	1
7	12 F - U 4	speed change lever ass'y	1
8	12 F - U 8	support ass'y	1
9	12 F - U 10	rocker assembly	1
10	12 F - U 12	lever and stud ass'y	1
11	12 F - U 13	drive wheel ass'y	1
12	12 F - U 17	switch escutcheon and control knob	1
13	12 F - U 18	control knob 207280	1
14	12 F - U 22	turntable bearing support ass'y	1
15	12 F - U 24	change lever assembly	1
16	12 F - U 26	change actuator screw	1
17	12 F - U 28	ball bearing ass'y	1
18	12 F - U 31	cam wheel ass'y	1
19	12 F - U 36	cam follower lever ass'y	1
20	12 F - U 40	friction plate ass'y	1
21	12 F - U 42	shut-off lever ass'y	1
22	12 F - U 43	switch arm ass'y	1
23	12 F - U 53	switch lever ass'y	1
24	12 F - U 52	line switch ass'y, slide and cover	1
25	12 F - U 54	switch plate ass'y	1
26	12 F - U 56	switch slide ass'y	1
27	12 F - U 60	ball bearing race	2
28	12 F - U 61	arm segment ass'y	1
29	12 F - U 64	arm positioning slide ass'y	1
30	12 F - U 70	lift screw ass'y	1
31	12 F - U 72	main lever ass'y	1
32	12 F - U 75	muting switch ass'y	1
33	12 F - U 78	tonearm rest	1
34	12 F - U 94	turntable ass'y with mat	1
35	12 F - U 90	dress-up cover; metric	1
	12 F - U 92	dress-up cover, inch markings	1
36 *	12 F - U 133	audio cable, min. plug (plug-in)	1
37	12 F - U 134	spring suspension mount (1 set - 3 pieces)	1
41	13 D - Ausf. A	45 automatic spindle (extra accessory)	1
42	11 C - 138	washer	1
43	12 A - 92	spring retainer	6
44	12 A - 325	cable clamp	3
	4170 / 18	clamp (60 cps only)	1
45	12 A - 452	tension spring, arm positioning slide	1
46	12 B - 50	spacer washer	1
47	12 F - 246	manual spindle	1
48	12 D - U 440	45 centering disc	1
49	12 D - 36	bearing post, cam wheel	1
50	12 D - 57	snap spring	1
51	12 D - 96	tension spring, change lever	1
52	12 D - 102	shaft, cam rocker	1
53	12 D - 212	shaft, main lever	1
54	12 E - 216	slide key 207255	1
55	12 F - 14	speed control actuator	1
56	12 F - 16	switch segment	1
57	12 F - 18	compression spring, switch segment	1
57 a	12 F - 24	compression spring	1
58	12 F - 40	shaft, drive wheel	1
59	12 F - 45	washer	1
60	12 F - 61	screw	1
61	12 F - 64	compression spring	1
62	12 F - 68	compression spring, change actuator screw	1
63	12 F - 84	rubber grommet	1
64	12 F - 98	coiled spring	1
65	12 F - 100	grooved shaft	1
66	12 F - 112	tension spring, drive wheel	1
67	12 F - 114	latch	1
68	12 F - 118	record size selector lever	1
69	12 F - 120	spacer, short	1
70	12 F - 122	manual and automatic lever	1
71	12 F - U 51	set screw	1
72	12 F - 132	spacer, long	1
73	12 F - 134	start lever	1
74	12 F - 152	cover, line switch	1
75	12 F - 154	bearing housing	1
76	12 F - 156	hex.-nut	1
77	12 F - 166	positioning nut	1
78	12 F - 168	spring pin	1
79	12 F - 170	compression spring	1
80	12 F - 172	spring retainer, audio cable	1
81	12 F - 174	shut-off slide	1
82	12 F - 194	compression spring, lift screw	1
83	12 F - 196	bearing support, main lever	1
84	12 F - 217	stand	1
84 a *	12 F - U 160	stand with cinch plug sockets assembly	1
85	12 F - 234	switch knob 207354	2
86	12 F - U 155	turntable mat	1

Ref. No.	Part No.	Description	Quantity
87	12 F - 250	turntable washer	1
88	12 F - 260	name plate, 50 cycle	1
	12 F - 262	name plate, USA version	1
	12 F - 263	name plate, Canada version	1
	12 F - 264	name plate, 60 cycle	1
89	11 A - 10	tension spring	2
90		shipping screw assembly:	
90 a	12 F - 252	shoulder screw	2
90 b	12 F - 290	compression spring	2
90 c	12 F - 255	washer	2
90 d	M 4 / 2	hex.-nut	4
91 *	4018 / 5	4-pole receptacle, line cable	1
92 *	4018 / 6	4-pole plug, line cable, w/contact springs	1
93 *	12 F - D 2	instruction manual, German issue	1
	12 F - D 3	instruction manual, English issue	1
	12 F - D 17	instruction manual, American issue	1
Tonearm			
101	15 L - U 22	plug-in head with plug connection (TAK O 12a)	1
102	15 N - U 1	tonearm with bearing assembly	1
103	15 N - U 3	tonearm assembly	1
104	15 N - U 10	bearing frame assembly	1
105	15 N - U 14	spring housing assembly	1
106	15 N - U 18	counterbalance weight with spindle	1
107	15 N - U 20	counterbalance weight assembly	1
108	15 L - 32	latching screw	1
109	15 N - 22	tonearm lead (right channel)	1
110	15 N - 26	tonearm lead (left channel)	1
111	15 N - 46	bearing screw, long	1
112	15 N - 48	bearing screw, short	1
113	15 N - 52	set screw	1
114	15 N - 54	tension screw	1
115	15 N - 68	spindle	1
Motor			
121	31 N - Ausf. A	motor assembly, less motor pulley	1
122	31 N - U 1	stator assembly	1
123	31 N - U 5	lower end bell	1
124	31 N - U 6	upper end bell	1
125	31 N - U 15	rotor assembly	1
126	31 N - 40	retainer brackets	4
127	31 N - U 20 ÷ U 27	stepped motor pulley, 50 cycle	1
	31 N - U 28 ÷ U 35	stepped motor pulley, 60 cycle	1
128 *	10 - 27	strobo disc, 50/60 cycle	1
129 *	4090 / 127	touch-up paint, light grey for top plate (20 z. can)	
	4090 / 132	touch-up paint, black for top plate (20 z. can)	
Standard parts			
131	2,1 / 5 / 0,5 St.	washer, galvanized	1
132	2,8 / 8 / 0,2 PS	washer	1
132 a	3,2 / 6 / 0,5 St.	washer, galvanized	1
133	3,2 / 8 / 0,5 St.	washer, galvanized	1
134	3,2 / 10 / 0,5 St.	washer, galvanized	1
134 a *	5,1 / 10 / 0,2 St.	washer, galvanized	1
135	5,3 / 10 / 2 F	washer	1
136	4000 / 400	steel ball, 4 diameter	1
137	4012 / 21	output plug for tone arm cable, 5 pin (min.)	1
138	4012 / 22	cinch plug, yellow, for tone arm cable	1
139	4012 / 23	cinch plug, red, for tone arm cable	1
139 a	4020 / 82	condenser, 10.000 pF., 700 v.	1
140	4103 / 27	solder lug	1
141	4103 / 29	solder lug	1
142	4103 / 32	solder lug	1
143	4650 / 1,5	"C" ring	4
144	4650 / 2,3	"C" ring	10
145	4650 / 3,2	"C" ring	1
146	4650 / 4	"C" ring	2
147	4650 / 6	"C" ring	2
148	4650 / 9 a	"C" ring for turntable	1
149	4680 / 3,2 / 8 c	bowed washer	1
150	4680 / 5,2 / 8	bowed washer	1
151	4680 / 5,2 / 10 a	bowed washer	3
151 a	4693 / 3	grip ring	1
152	4693 / 4	grip ring	1
153	G 2.6 / 4	set screw, galvanized	1
154	M 3 / 4	hex. nut, galv.	1
155	M 3 / 7 a	hex. nut, galv.	3
156	M 4 / 2	hex. nut, galv.	5
157	M 4 / 7	hex. nut, galv.	2
158	6 k 4 / 4	hex. nut, galv.	2
159	Z 3 / 3 c	machine screw, galv.	2
160	Z 3 / 4 d	machine screw, galv.	5
161	Z 3 / 4,5 a	machine screw, galv.	2
162	Z 3 / 5 a	machine screw, galv.	3
163	Z 3 / 5,5 a	machine screw, galv.	1
164	Z 3 / 7 a	machine screw, galv.	2
165	Z 3 / 12 a	machine screw, galv.	1
166	Z 3 / 30 a	machine screw	1
167	Z 4 / 10	machine screw, galv.	2

*) not illustrated



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