

# Dual

## Service Manual Dual 1009 SK



First Edition E 9 SK

### Technical Data:

<b>Current:</b>	Alternating, 50 or 60 cycle, with appropriate motor pulleys
<b>Line voltage:</b>	selector for 110 or 220 volts (see schematic P. 4)
<b>Drive:</b>	four-pole, single-phase, induction motor
<b>Power consumption:</b>	6.5 watts approximately
<b>Current requirements:</b>	50 ma maximum at 220 V, 50 cycle; 90 ma. maximum at 117 V, 60 cycle
<b>Turntable speeds:</b>	78, 45, 33 $\frac{1}{3}$ and 16 $\frac{2}{3}$ r.p.m.
<b>Turntable:</b>	non-magnetic, 4 lb., Hi-Fi turntable
<b>Wow and Flutter:</b>	Less than $\pm 0.12\%$
<b>Rumble:</b>	less than 38 db below signal level *
<b>Signal-to-Noise Ratio:</b>	less than 56 db below signal level *
<b>Tonearm:</b>	balanced on all three axes, extremely low mass, and precision, friction-free suspension (vertical and horizontal friction bearing friction less than 0.05 gm)
<b>Pickup cartridge:</b>	tonearm will accept all cartridges with $\frac{1}{2}$ " mounting and weighing from 1—12 gms.
<b>Weight:</b>	11 lbs. without packing
<b>Dimensions and Mounting Cutouts:</b>	see installation instructions

\* In accordance with DIN 45500

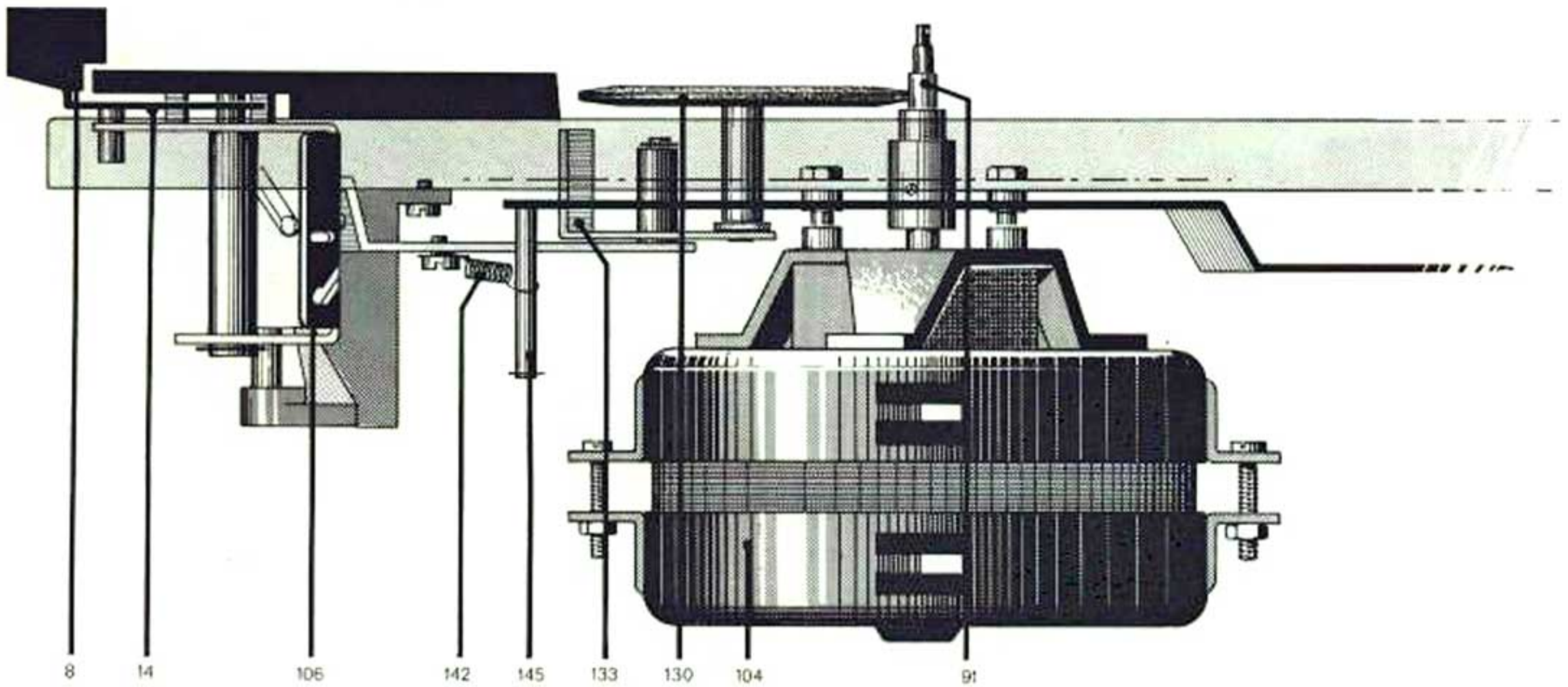
**DUAL GEBRÜDER STEIDINGER · 7742 ST. GEORGEN / SCHWARZWALD**



<b>Contents</b>	<b>Page</b>
<b>Technical Data</b>	1
<b>Tonearm hook-up schematic</b>	2
<b>Motor and drive</b>	4
Turntable does not turn when unit plugged in and "Start" button operated	5
Turntable does not come up to speed	5
Assembly noise	5
<b>Tonearm and suspension</b>	6
<b>Tonearm anti-skating mechanism</b>	7
Needle slides out of groove	7
Tonearm sets down beside arm-rest (83)	7
Horizontal friction too great	7
Arm set-down not free	7
<b>Tonearm movements</b>	8
<b>Tonearm set-down and lift</b>	8
Tonearm does not move onto record when drop cycle actuated	9
Tonearm lowers too quickly onto record when drop cycle actuated	9
Tonearm misses edge of record	9
Tonearm strikes record during change cycle	9
<b>Start Cycle</b>	10
<b>Manual Operation</b>	10
<b>Stop switching</b>	11
<b>Record Drop</b>	11
<b>Shut-off</b>	12
<b>Shut-off and change cycle</b>	12
Tonearm returns to arm rest immediately after being manually placed on record	13
Turntable stops after automatic set-down of Tonearm	13
Tonearm returns to its rest after each record	13
Turntable does not turn in Manual position	13
Last record keeps repeating	13
Record drops after "Stop", then "Start" buttons are depressed	13
Records do not drop	13
Noise during change cycle, arm set-down and lift-off	13
No sound	13
Muting switch remains closed	13
Motor continues to run after tonearm returns to its rest	14
Turntable slows down as record drops	14
Acoustic feedback	14
<b>Replacement parts and exploded view</b>	14—20
<b>Lubrication</b>	20—21



Fig. 2 Motor suspension and turntable drive



### Motor and Drive

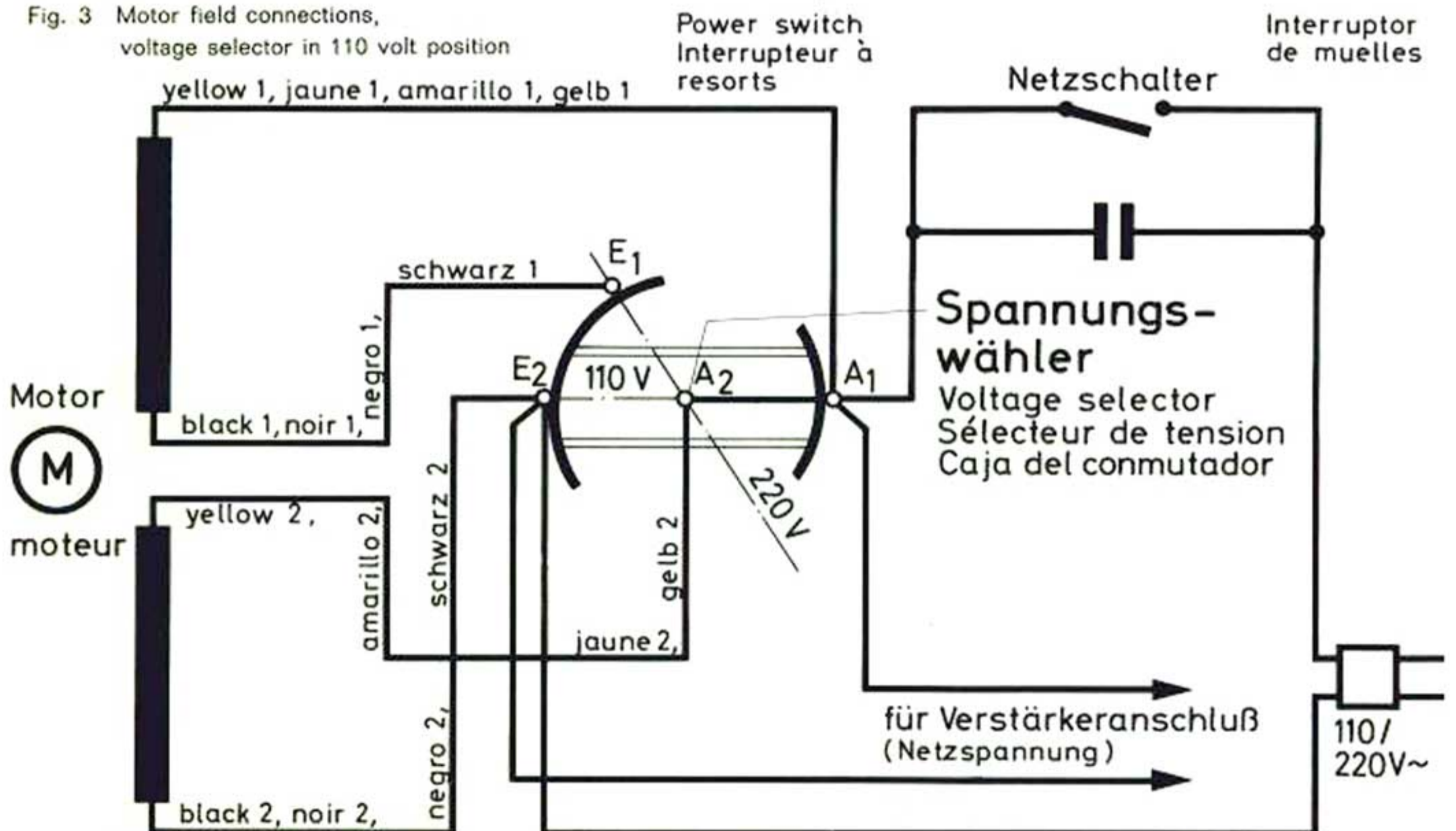
The Turntable and Change Cycle are driven by a four-pole induction motor (104) with an extremely low magnetic field and vibration-free drive.

Motor speed is constant for line variations of  $\pm 10\%$ . Motor speed is dependent on, and proportional to line frequency. Adapting for operation at line frequencies of 50 or 60 cycle is accomplished by the use of replaceable Motor Pulleys (91).

1009 SK	Motor Pulley, 50 cycle	Part No. 31 N - U 45
	Motor Pulley, 60 cycle	Part No. 31 N - U 54
1016	Motor Pulley, 50 cycle	Part No. 31 R - U 44
	Motor Pulley, 60 cycle	Part No. 31 R - U 54

The Motor Pulley is secured to the motor shaft by means of a set screw. When changing pulleys, care must be taken that it is set at the correct height.

Fig. 3 Motor field connections, voltage selector in 110 volt position



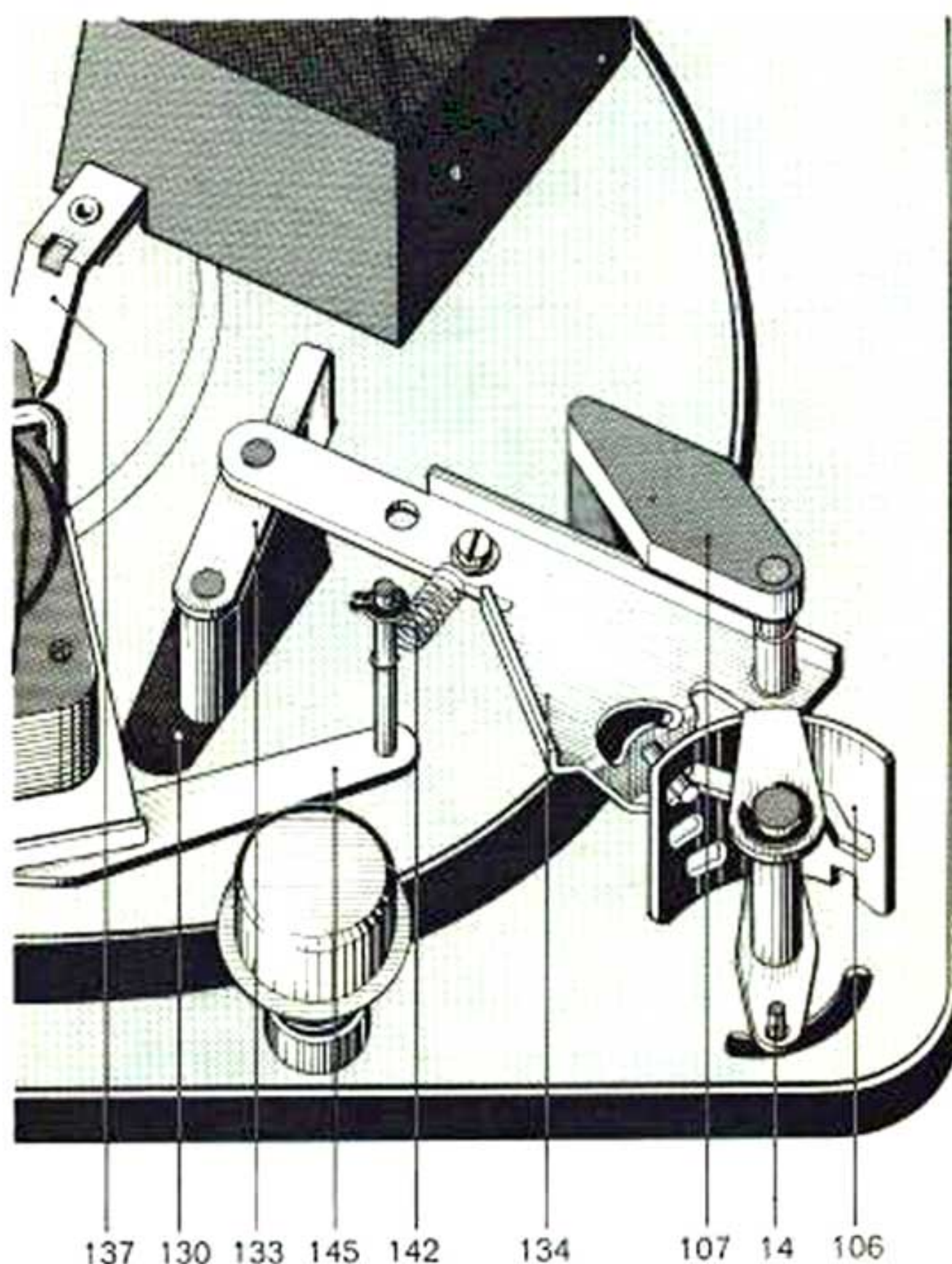


The turntable is driven by means of the Drive Wheel (130) which, to prevent damage to its friction surfaces, automatically disengages in the "Off" position.

Setting the turntable speed to  $16\frac{2}{3}$ ,  $33\frac{1}{3}$ , 45 and 78 r.p.m. is accomplished by raising or lowering the drive wheel to the corresponding step of the motor pulley.

Similarly, moving the Speed Change Knob (8) causes the Switch Segment (106) to rotate. The grooves in the Switch Segment guide the Rocker Assembly (134) on which the Drive Wheel is mounted. The Drive Wheel is thus lifted vertically from the motor pulley and placed in the desired position.

Fig. 4 Turntable speeds and drive wheel shift mechanism



## Trouble shooting:

Symptom	Cause	Remedy
Turntable does not run when unit plugged in and "Start" button operated	a) Current path to motor interrupted	a) Check connection at switch plate and voltage selector
	b) Drive wheel (130) not in contact with turntable	b) Check rocker assembly (134)
	c) Motor pulley (91) loose	c) Tighten motor pulley (91)
Turntable does not come up to speed	a) Motor pulley does not correspond to local line frequency	a) Change motor pulley
	b) Slippage between motor pulley (91), drive wheel (130) and turntable	b) Clean friction surface of drive wheel (130) and motor pulley. Change drive wheel, if necessary
	c) Motor bearing friction	c) Clean motor bearings and re-lubricate from lubrication chart
Noise during change cycle, arm set-down and lift-off	Worn drive wheel	Replace drive wheel (130). Clean friction surfaces of turntable and motor pulley thoroughly with a grease-free cloth. After cleaning, take care not to touch the inner rim or motor pulley.



Fig. 5 Tonearm suspension

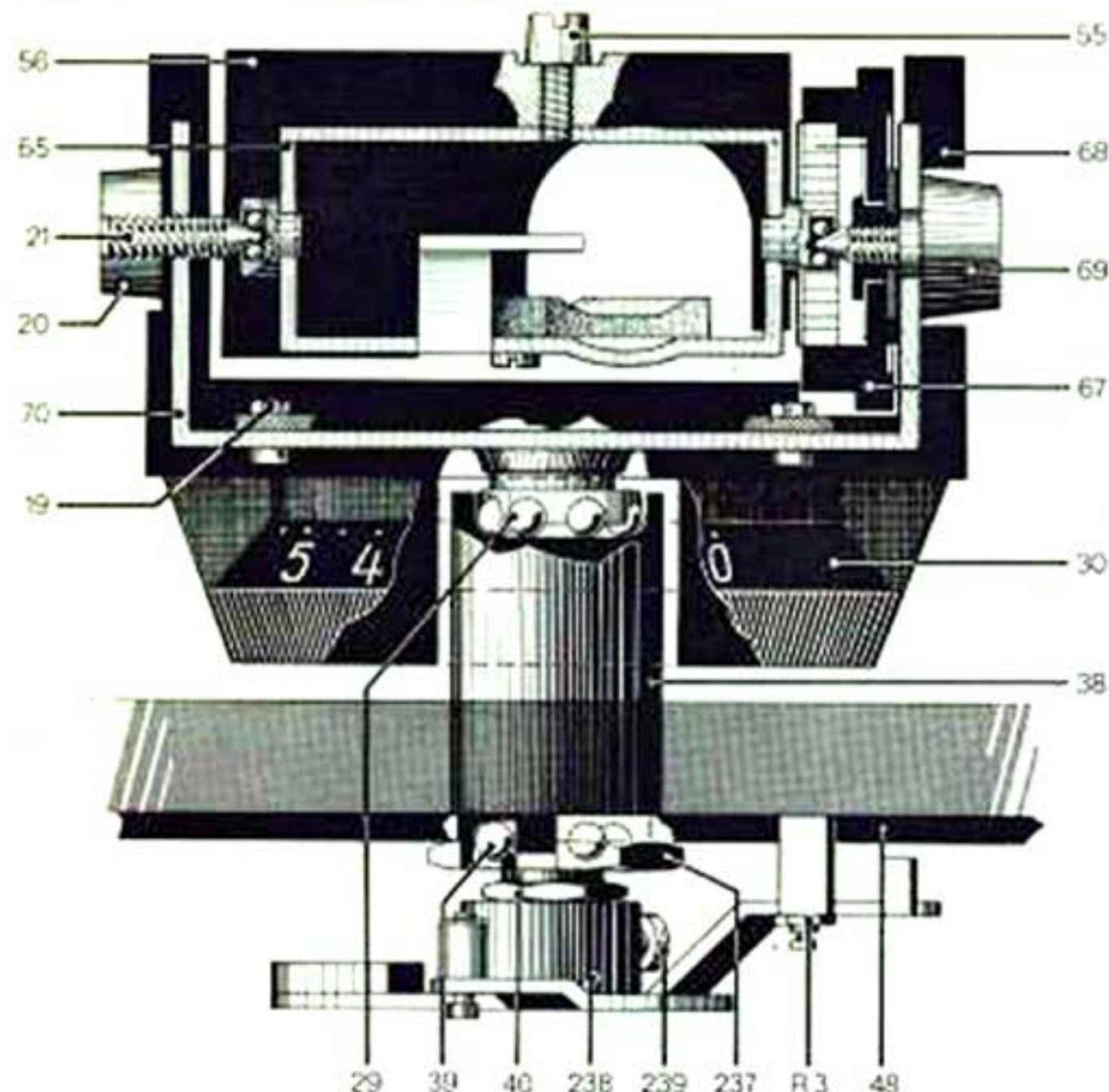


Fig. 6 Tonearm suspension with anti-skating compensation

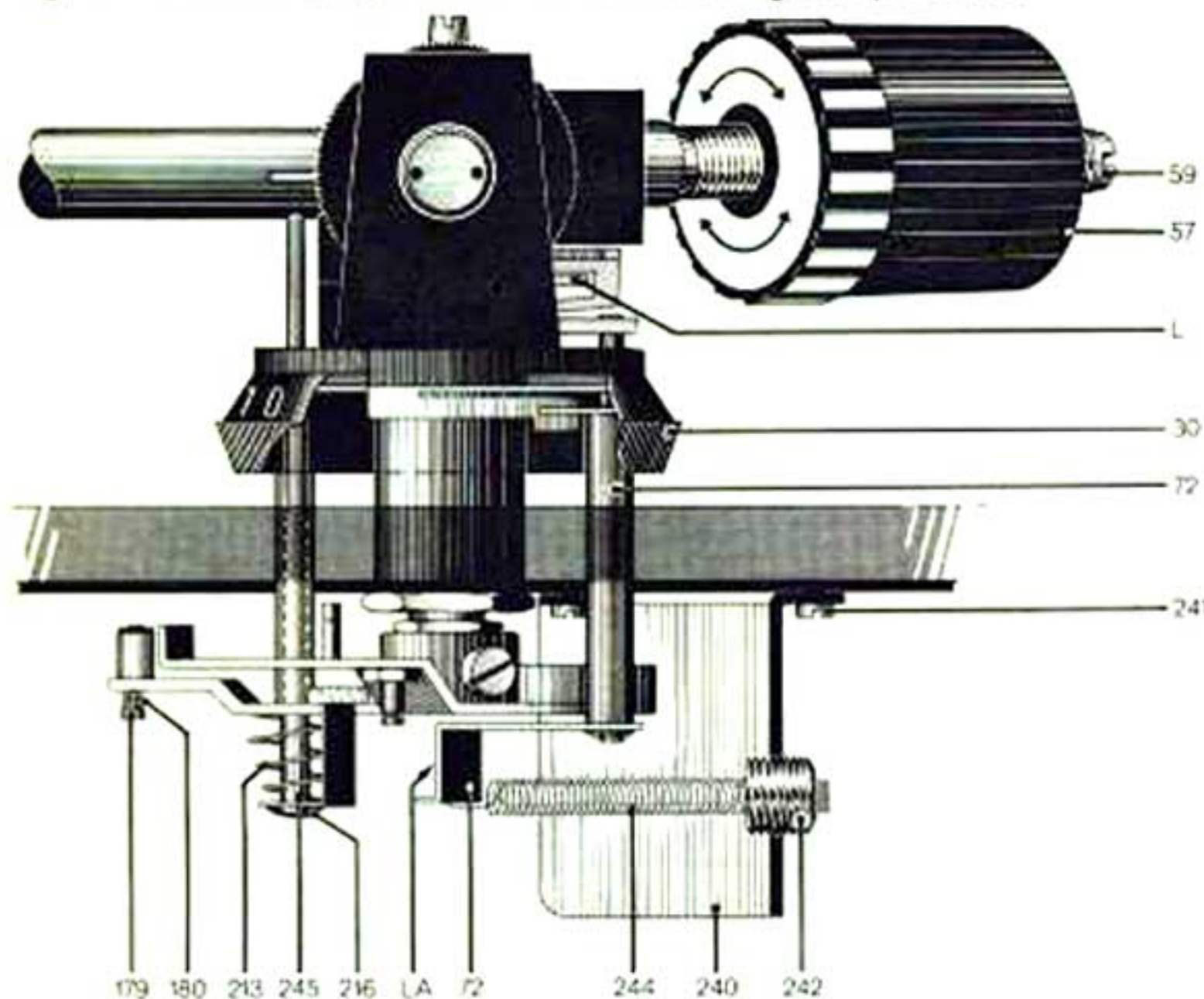
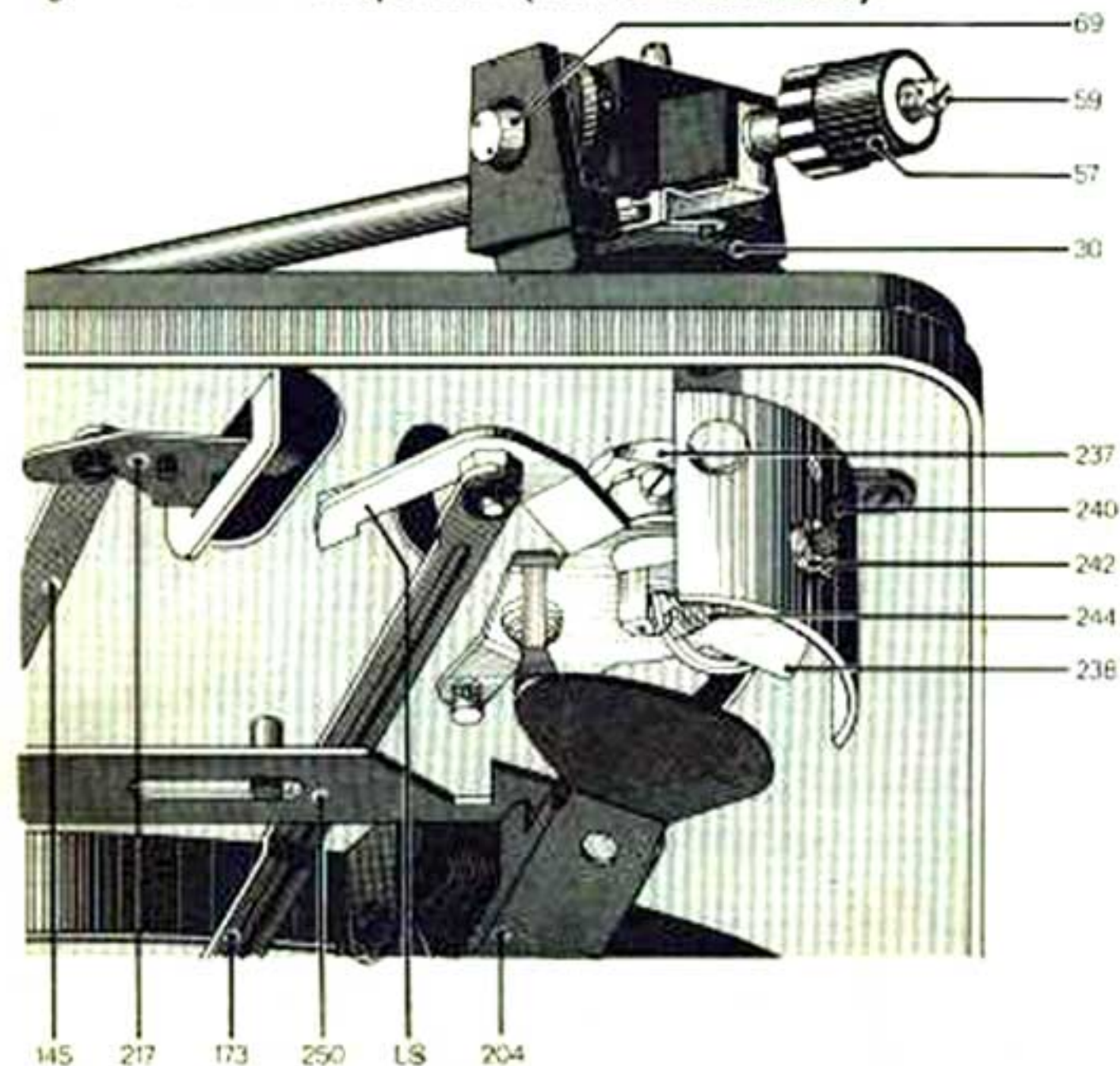


Fig. 7 Tonearm suspension (viewed from below)



## Tone arm and its suspension

The Hi-Fi tonearm of the Dual 1009 SK employs precision ball bearings for both horizontal and vertical movements.

Vertical bearing friction is less than 0.04 gms.

Horizontal bearing friction is less than 0.04 gms.

Especially favorable conditions for pickup are thus provided.

Before setting the tracking pressure corresponding to the cartridge used, set the scale to zero and balance the arm.

The counterbalance weight is such that cartridges weighing from 1 to 12 gms. can be balanced by rotating the counterbalance weight (57) on its spindle. Two spindles are available — Part No. 12 L - U 117 for cartridges weighing between 1 and 8 gms. and Part No. 12 L - U 118 for cartridges weighing up to 13 gms.

In order to absorb shocks (sharp blows), the counterbalance weight is mounted on the threaded spindle (59) by means of an elastic coupling. This also prevents the counterbalance from turning during ordinary handling.

The cartridge head will accept all cartridges with the international  $\frac{1}{2}$ " standard mount. Tracking force is set by turning the spring housing (67) with its scale divisions and thus tightening or loosening the internal spiral spring. Scale markings are for an adjustment range of 0—5 gms. with **exact settings from 0.5 gms. by  $\frac{1}{2}$  gm. steps.**

To replace the tonearm assembly and suspension, the following procedure is recommended:

1. Set tracking force scale to "0".
2. Unsolder the tonearm lead.
3. Remove main lever (204) and connecting lever (226).
4. Remove "C" ring and washer of the shut-off slide (173) from the arm segment.
5. Unhook tension spring (244) and loosen screws (236, 239).
6. Place adjusting ring (30) of the "Anti-Skating" mechanism in the "5.5" position.
7. Lift off arm segment (238) and remove lift screw (245).

To loosen the nut (237), hold the bearing housing (38), between the base plate (48) and adjusting ring (30), with a suitable tool (such as flat pliers). Carefully take out the tonearm, taking care not to bend the spring lever (72).

To re-install the tonearm, the reverse procedure is followed. Before tightening screws (236, 239), check the tonearm position over the arm rest, so that tonearm lowers onto the rest without binding.

When installed, moving the tonearm in and out, when the adjustment ring (30) is in its "0" position, should not cause the tension spring (244) to move. If necessary, the setting can be corrected by means of the tabs (LS) of the spring lever (72).

Similarly, after re-installing the retaining spring for the tonearm leads, care must be taken the arm segment (238) is not impeded by the tonearm leads.

To remove the tonearm from the bearing frame, unsolder tonearm leads, place spring housing in its zero position, loosen lock-nut (20) and remove set screw (21). Then carefully take tonearm out of the bearing frame.

When re-installing tonearm, make certain that the angle formed in the end of the spiral spring engages the slot in the tonearm bearing housing. Then screw in set screw (21) and tighten lock nut. Check that bearing play, after tightening, is barely noticeable.



## Tonearm Anti-Skating Mechanism

The tendency of a Tonearm to slide across the record is caused by the tonearm geometry. In the Dual 1009 SK, this is virtually eliminated by a precision anti-skating mechanism.

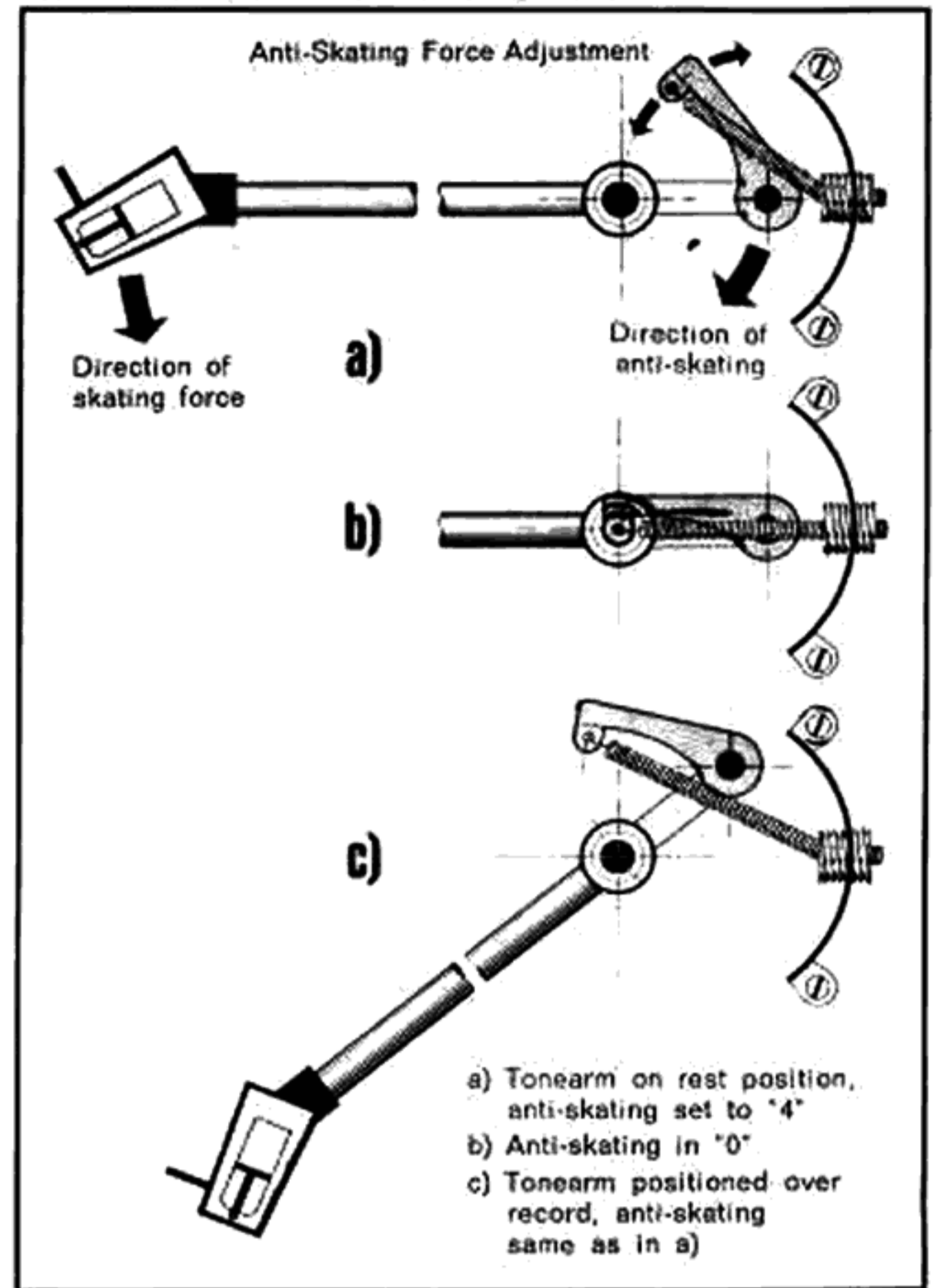
Skating force is caused by friction between record and stylus, and to a less extent by the geometry of the tonearm and the physical properties of the material from which the record is made. Skating force increases with increasing tracking pressure and with decreasing stylus radius.

The resulting skating effect pulls the tonearm towards the center of the record. This occurs not only on the eccentric shut-off grooves but also causes unequal contact with the groove sides. The anti-skating mechanism tends to minimize these effects when playing valuable Hi-Fi records.

Rotating the adjustment ring of the anti-skating mechanism moves the spring lever (72) by means of the curved track inside the adjustment ring, and the tension spring (244) transmits the counter-moment to the tonearm.

The optimum adjustment of the anti-skating mechanism is obtained with a needle curvature of  $0.7\frac{1}{4}$  0.1 mil. The adjusting screw (threaded bushing) is sealed with glyptol after setting. A special Dual-Skate-O-Meter and standard record L 096 are required for readjustment, which should only be performed by an authorized service station.

Fig. 8 Skating and anti-skating force

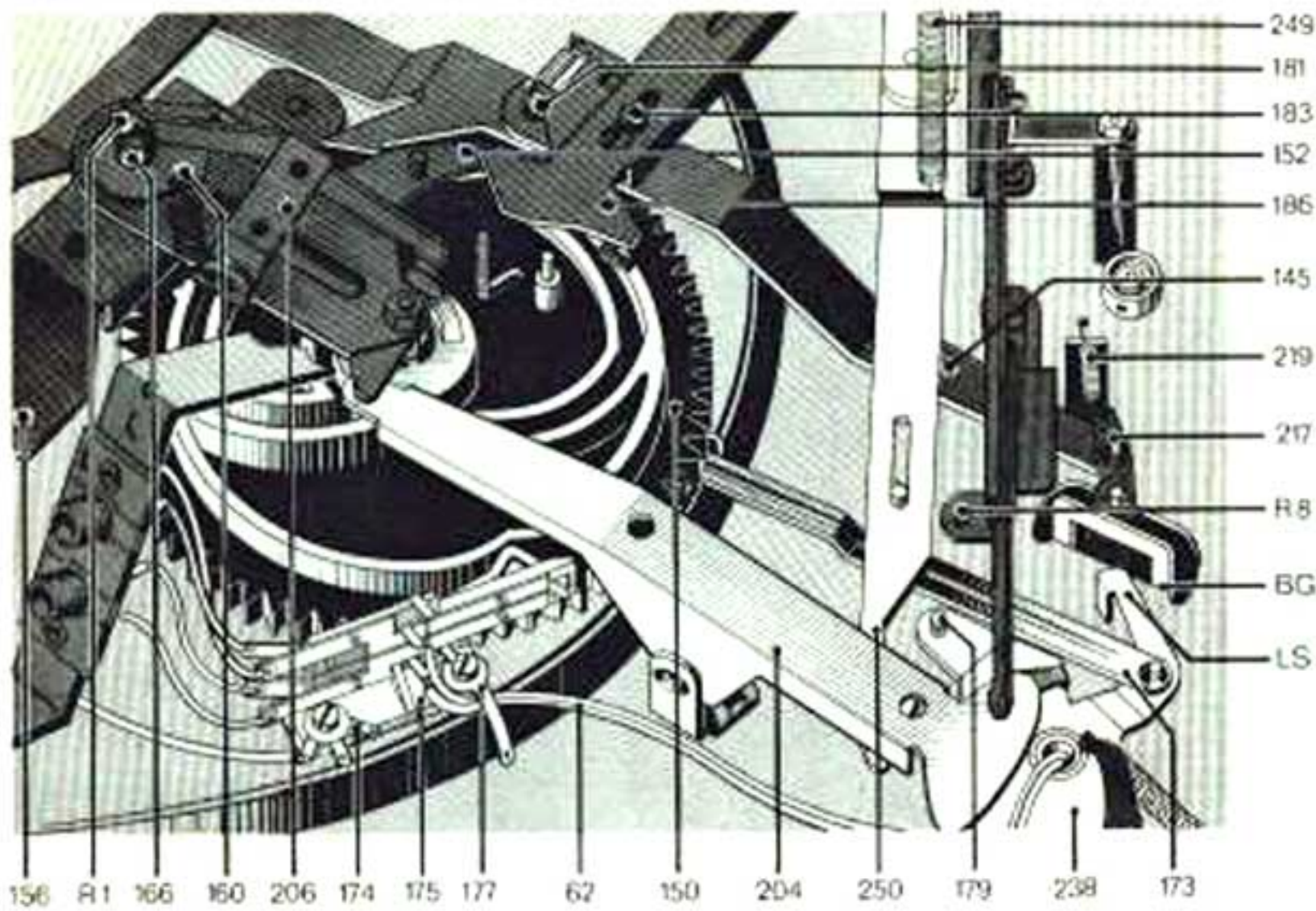


## Trouble shooting:

Symptom	Cause	Remedy
<b>Tonearm suspension</b>		
Both bearings require a small, barely noticeable, amount of play. Only the left bearing screw is adjustable for the horizontal bearings. The vertical bearing adjustment is made by means of the stop nut (40).		
Needle slides out of record groove	<ul style="list-style-type: none"> <li>a) Tonearm not balanced</li> <li>b) Tonearm tracking force too light</li> <li>c) Needle defective</li> <li>d) Tonearm bearing friction too high</li> <li>e) Ball missing from shutoff rail (173)</li> </ul>	<ul style="list-style-type: none"> <li>a) See operating instructions</li> <li>b) Adjust with spring housing (barrel spring 67) to correct pressure for particular cartridge</li> <li>c) Replace needle</li> <li>d) Check tonearm bearing</li> <li>e) Install ball (33 or 193)</li> </ul>
Tonearm lands beside tonearm rest (83)	<ul style="list-style-type: none"> <li>a) Arm segment assembly (238) out of position</li> <li>b) The latch (217) presses against the tabs (LS) of the arm segment during the change cycle</li> </ul>	<ul style="list-style-type: none"> <li>a) Loosen the machine screws (236, 239) and rotate the arm segment assembly (238). Then tighten screw (239) and re-check adjustment. Adjustment is correct when tonearm lowers onto arm rest (83) without binding. Finally, tighten screw.</li> <li>b) Loosen screw (181). Turn the short arm on the long switch arm piece to correct switch arm position. Turn the main cam by hand, and adjust so that when the tonearm lowers onto the arm rest, clearance of about <math>\frac{1}{64}</math>" is obtained between latch and segment tabs (LS).</li> </ul>
Horizontal bearing friction too high	Tonearm is set too high on the arm lift. Main lever jams against the guide pin of the lift screw assembly	Pickup needle should not be farther from the record than $\frac{1}{4}$ ". Adjust by turning screw (R 8, Fig. 12).
Vertical movement of tonearm is impeded during set down cycle	<ul style="list-style-type: none"> <li>a) Bearing friction too high</li> <li>b) Lift screw (245) jams in guide sleeve of the arm segment (238)</li> </ul>	<ul style="list-style-type: none"> <li>a) Check bearing set screw (21) and arm balance</li> <li>b) Remove and clean lift screw</li> </ul>



Fig. 9 Tonearm guide mechanism



## Tonearm Movements

A guide groove located on the underside of the main cam (150) controls automatic lift-off and set-down of the tonearm as the main cam rotates 360°.

## Tonearm Lift

The tonearm lift permits the tonearm to be safely set down at any desired position of the record (except in the shut-off area).

Pushing the lift handle towards the front, turns the drive washer (229). This, in turn, moves the connecting lever (226), main lever (204), and lift screw (245) to raise the tonearm.

After swinging the tonearm to the desired spot of the record,

Tonearm raising and lowering, as well as horizontal movements, are controlled by main lever (204) and lift screw (245).

Setting the unit for playback of 7", 10" and 12" records is accomplished by means of the switch button (87, fig. 12). The set-down point of the tonearm is determined by the eccentric of the arm positioning slide (250) contacting the record size selector lever (247, fig. 13).

Horizontal movement of the tonearm is limited by the arm segment (238) striking the arm positioning slide (250). During the change cycle, the main lever (204) raises the arm positioning slide bringing it within reach of the spring stud (179). On completion of the change cycle (i. e., set-down of the tonearm on the record), the arm positioning slide is again released and returns to its normal position. It thus moves out of reach of the spring stud (179) permitting the tonearm to move horizontally without hindrance, while playing a record.

Fig. 10 Tonearm lift (tonearm raised)

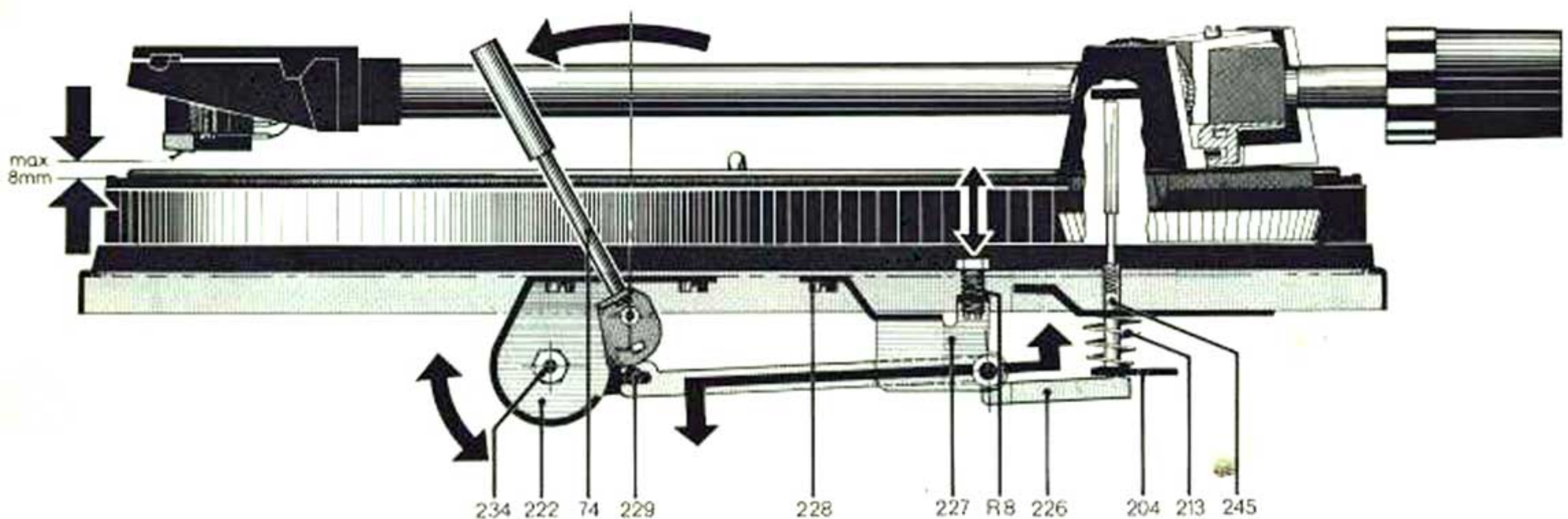
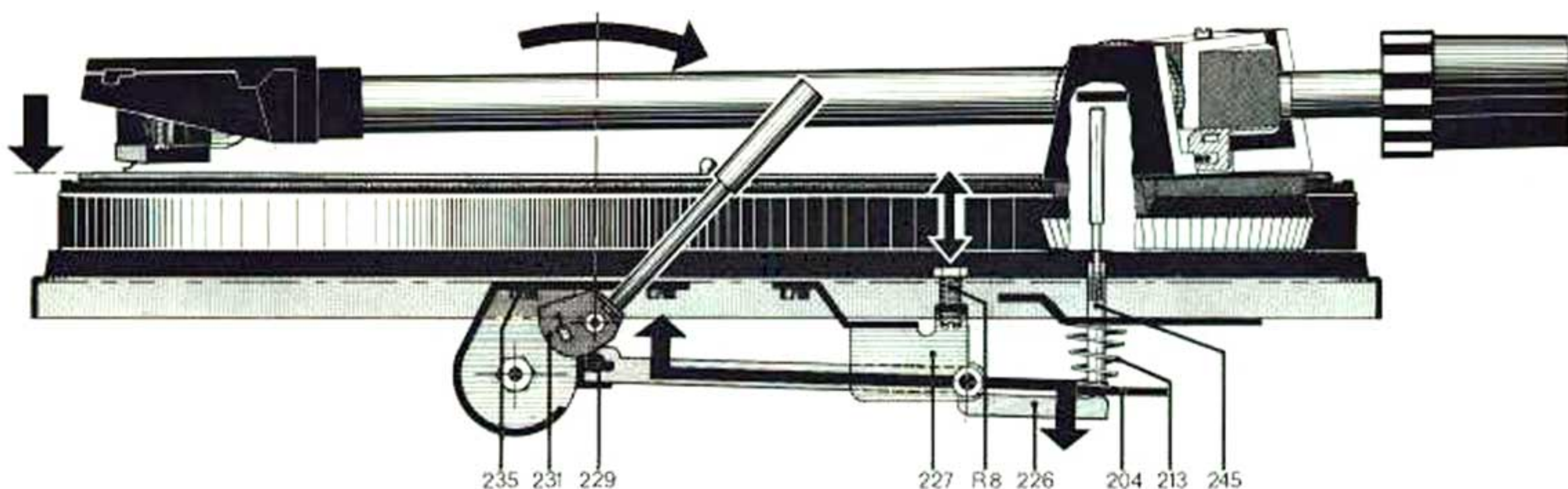




Fig. 11 Tonearm lift in rest position

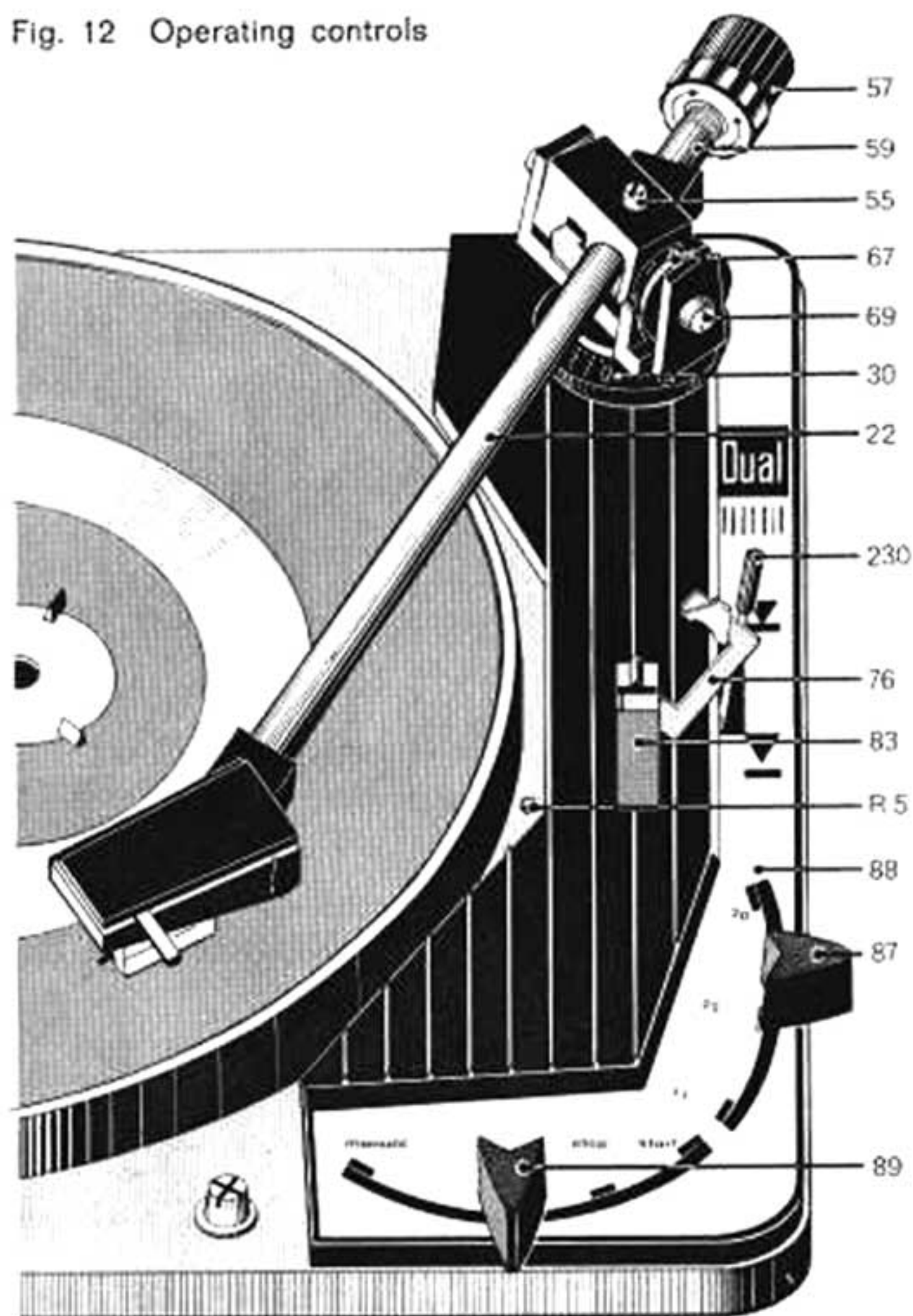


## Trouble shooting:

Symptom	Cause	Remedy
Tonearm does not move onto record when drop cycle actuated	Damping too great. Drive washer dirty.	Loosen nut (234). Remove cover washer (233) and drive washer (229). Clean thoroughly. Smear silicone grease evenly on both sides of the drive washer. Reassemble and wipe off excess grease.
Tonearm lowers too quickly onto record when drop cycle is actuated	Too little damping	Loosen nut (234). Remove cover washer (233) and drive washer (229). Clean thoroughly. Smear silicone grease evenly on both sides of the drive washer. Reassemble and wipe off excess grease.
Tonearm misses edge of record	a) Wrong record size selected  b) Set-down incorrectly adjusted  c) Record not of standard size  d) Tonearm clutch surfaces contaminated	a) Select correct record size with record size button  b) Adjust for 7" record by turning eccentric screw R 5, so that tonearm sets down about $\frac{3}{16}$ " from edge of record. (Adjustment is made only for 7" records; 10" and 12" adjustment being then automatically correct.  c) Use standard records  d) Clean clutch surfaces
Tonearm strikes record during change cycle	Tonearm height incorrectly set	Bend tab (L) towards or away from bearing plate (65). When correctly adjusted, the pickup needle is $\frac{1}{64}$ " above the dress-up plate (88) when removed from the arm rest.



Fig. 12 Operating controls



## Start cycle

Operating the start button (89, fig. 12) moves the switch lever (254) towards the main cam, initiating the following sequences:

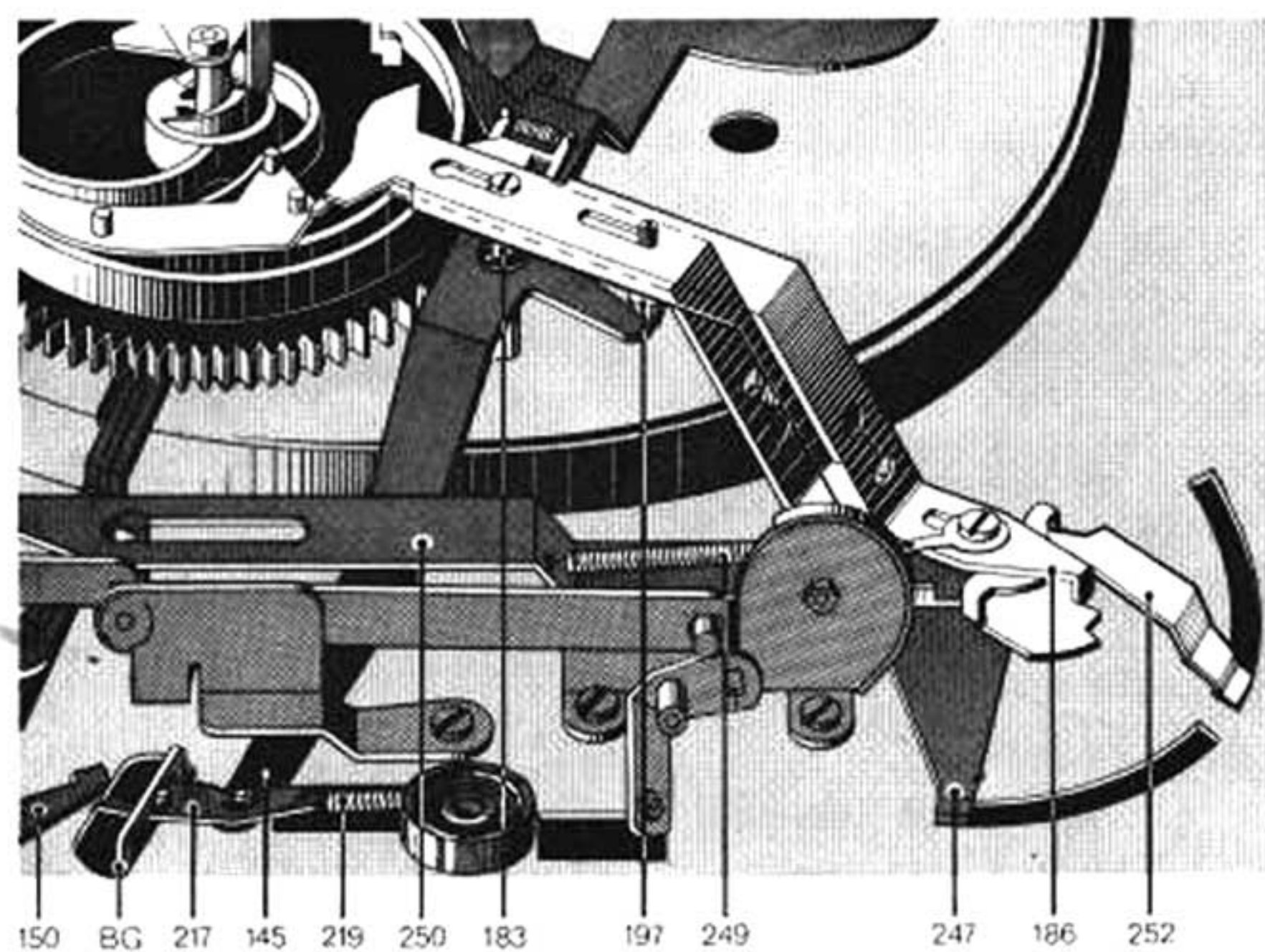
- The set screw (197) of the switch lever assembly turns the switch arm (145) mounted on the grooved shaft (183). The rocker assembly (134) moves the drive wheel (130, fig. 2) into contact with the motor pulley and turntable, by means of a tension spring. At the same time, the switch slide (137, fig. 15) actuates the line switch through the switch arm, and the turntable begins to turn.
- The switch angle (UW) mounted on the switch lever assembly (254) is brought within range of the cam follower lever (152) so that it is pushed into the change position after the rotation of the main cam (fig. 14).

Operating the start button also releases the start lever (186) pulling it towards the main cam by means of the tension spring (253). This causes the coiled spring (185, fig. 15) to bring the shut-off lever (147, fig. 18) within range of the main cam dog. Thus the shut-off lever drives the main cam.

To prevent mis-operation, the start button is locked during the start cycle (i. e. when the main cam is turning). Just before the main cam reaches its null position (at the end of the change cycle), the start lever is pushed clear of the main cam by means of the start pin (SB) of the main cam. This, in turn, restores the switch lever and start button to their original positions.

After installing and also after moving the record changer, the unit should be operated with the tonearm locked. This will automatically re-adjust the shut-off lever which may have shifted out of position.

Fig. 13 Start position



## Manual operation

Placing the switch button in "Manual" position initiates the start cycle. The switch lever assembly (254) is pushed towards the main cam and the following sequence is set up:

- Set screw (197) mounted on the switch lever (254) rotates the switch arm (145) which is mounted on the grooved shaft (183).
- The rocker assembly (134) then moves the drive wheel (130) into contact with the motor pulley and turntable by means of a tension spring.



c) At the same time, the switch slide (137, fig. 15) actuates the line switch and the turntable begins to rotate.

d) The switch arm latch (217) rests in the support (BG, fig. 14) in the base plate, locking the switch arm in position to keep the drive wheel in contact with the turntable.

On reaching the shut-off groove, the tonearm automatically returns to its rest position and the unit shuts off (see shut-off mechanism). However, should the tonearm be lifted off manually and returned to the tonearm rest, the tabs of the arm segment (238) release the latch (217). The tension spring (219) then returns the switch arm (145) to its initial position, opening the line switch and disengaging the drive wheel.

Fig. 14 Stop position

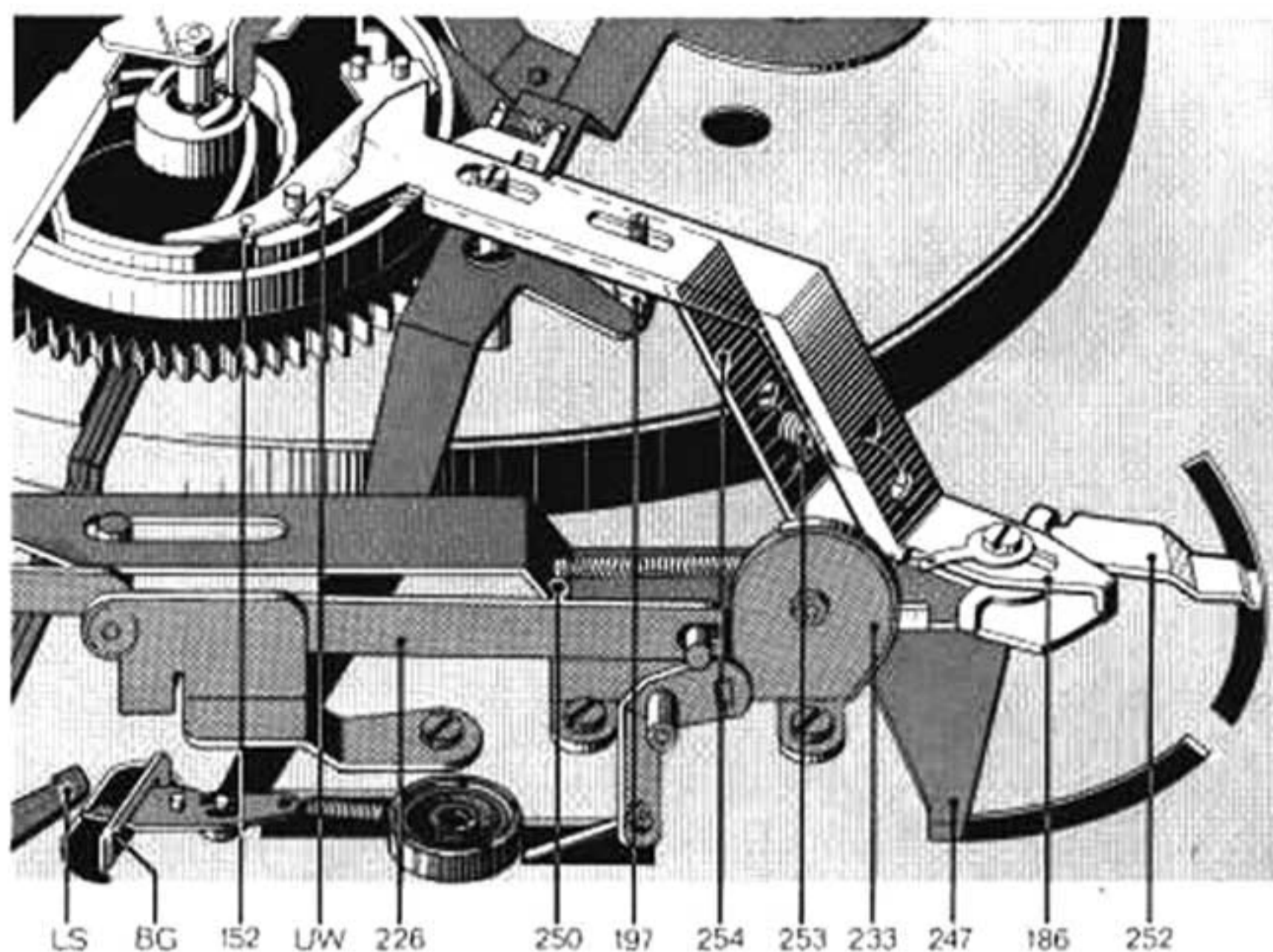
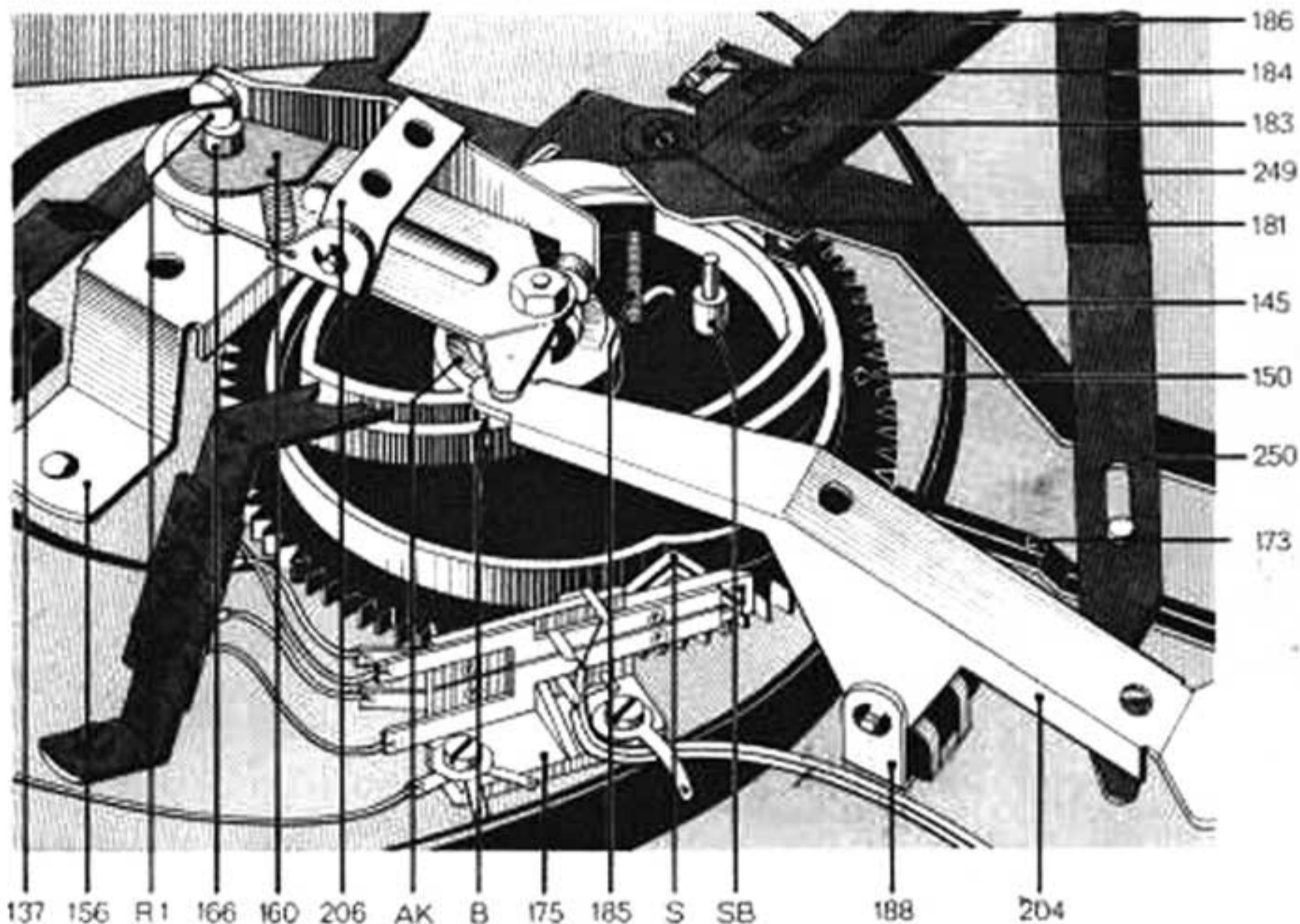


Fig. 15 Record drop



## Stop switching

Placing the switch button in "Stop" position moves the switch lever (254) and switch angle (UW) towards the main cam, as in the start cycle, but only half as far. This causes the main cam to push the cam follower lever (152) to the side, into its stop position.

## Record drop

Records to be played are stacked on the appropriate record spindle — AW 2 for standard records, AS 9 for 45 r.p.m. records. Records are dropped by the rotation of the main cam (150) whose cam (AK) guides the cam rocker (206), pushing the change actuator stud (166) and releasing a record by means of the automatic spindle.

The design of the main cam is such that a record can only

drop when the tonearm is above the tonearm rest — where it cannot interfere with the largest possible record (12" dia.).

A muting switch (175) is provided to prevent change cycle noises from being picked up by the tonearm cartridge. The switch springs (S) for both channels are actuated by the main cam (150). In the rest position, the muting switch opens.



Fig. 16 Change cycle

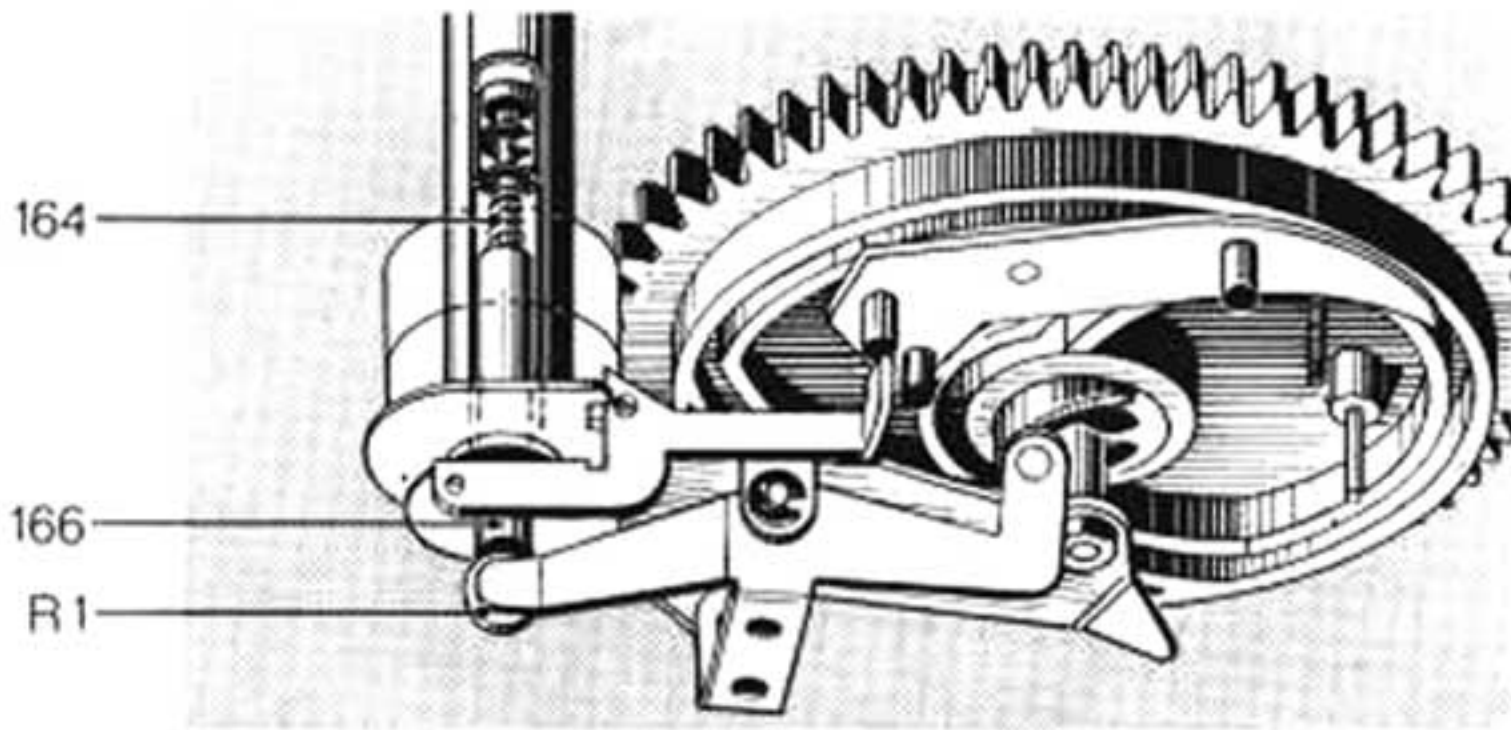


Fig. 17 Shut-off position

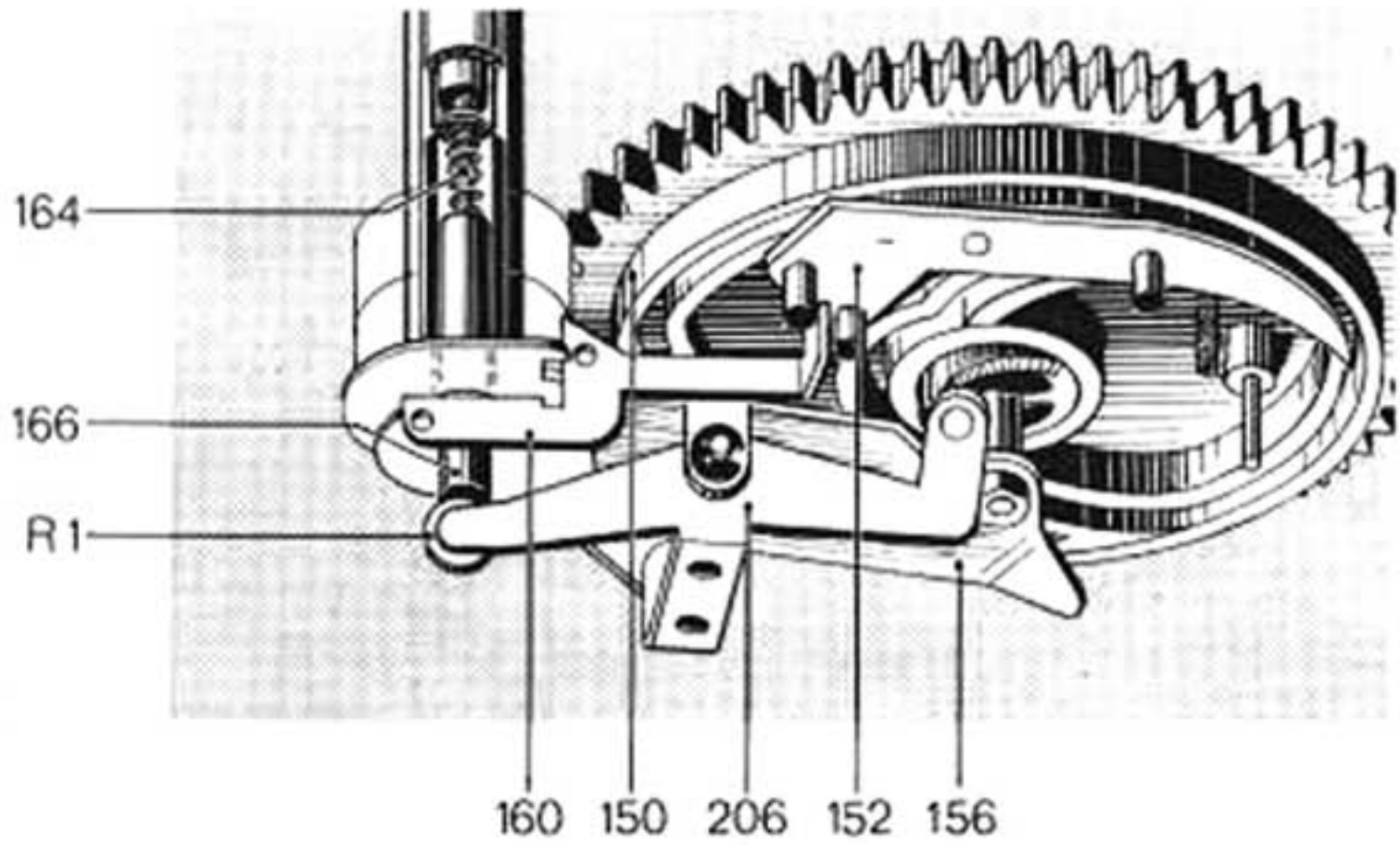
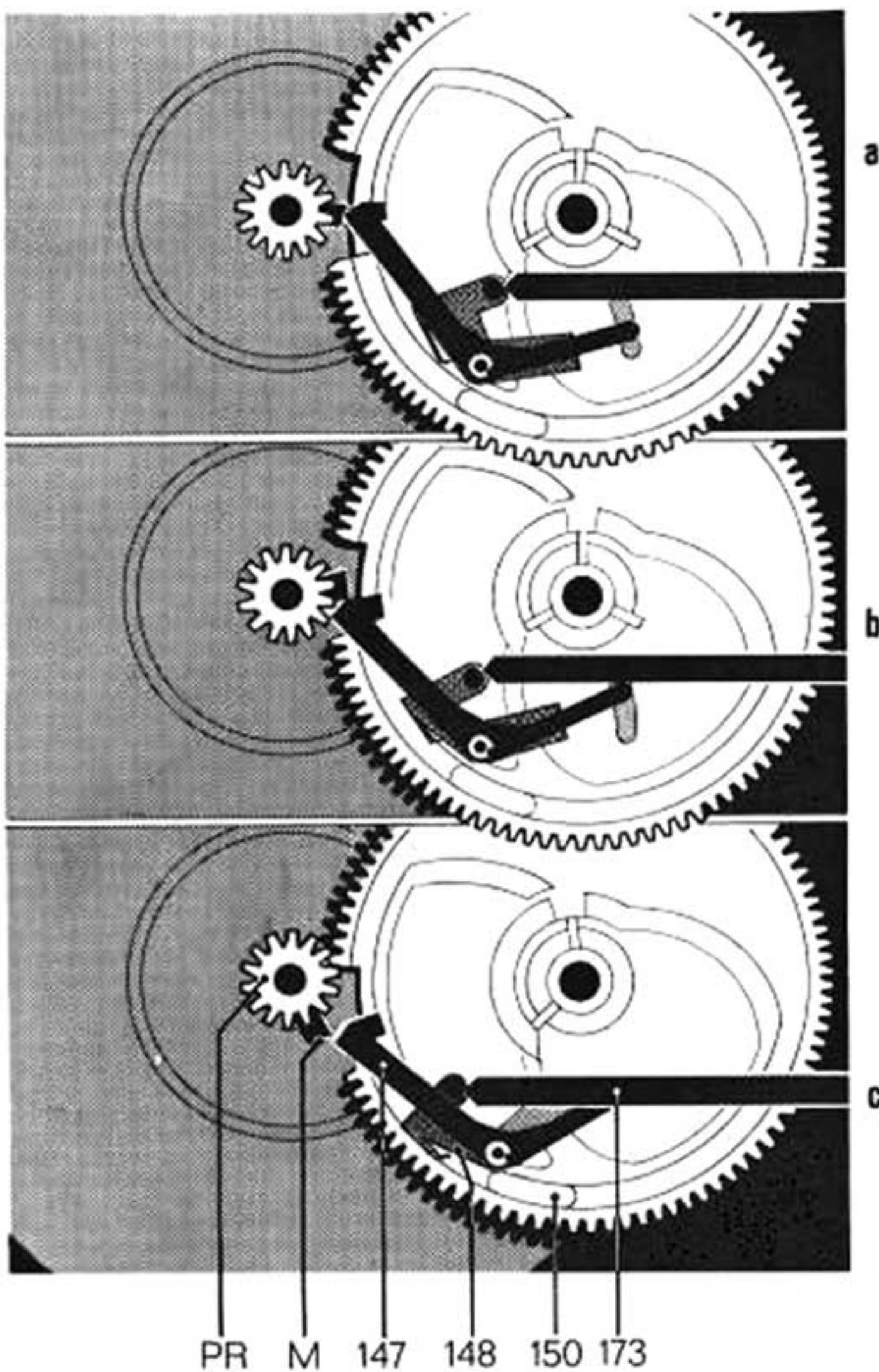


Fig. 18 Actuating "Change" or "Shut-off"



## Shut-off

Shut-off and change functions are determined by the position of the cam follower lever (152, fig. 17). After the last record of the stack drops, the change lever (160) guides the cam follower lever.

To initiate shut-off, the cam follower lever is brought into position (longer end towards the center of the main cam) by the change lever. After the tonearm has swung over the tonearm rest, the guide post (B, fig. 15) of the main lever (204) contacts the outside of the main cam (150) whose vertical profile causes the tonearm to lower onto its support. The traversing of the tonearm releases the latch (217) from its support (BG). However, the main cam keeps the switch arm (145) in its "play" position until the end of the change cycle. When the main cam returns to its null position, the switch arm drops into the cut-out in the main cam, the line switch is operated and the drive wheel is disengaged.

## Shut-off and change cycle

The dog (M) on the turntable gear (PR) and the shut-off lever (147) actuate both the change cycle at the end of the record as well as the shut-off after the last record of a stack.

As a record is played, the tonearm moves towards the center of the record, dependent on the pitch of the record groove. This motion carries the shut-off lever towards the dog by means of the shut-off slide (173). The eccentric dog pushes the shut-off lever back at each revolution, as long as the tonearm advance is only one record groove (fig. 18a). The shut-off groove with its greater pitch brings the shut-off lever against the dog with greater force (fig. 18b). The shut-off lever then engages and causes the main cam (150) to be driven by the turntable gear out of its null position (fig. 18c).



## Trouble shooting:

Symptom	Cause	Remedy
Tonearm returns to arm rest immediately, after being manually placed on record	Shut-off mechanism shifted out of position during shipping	Whenever unit is moved, before using, push selector button to "Start" position
Turntable stops after automatic set-down of the tonearm	Switch arm (145) fails to engage latch (217)	Loosen screw (181) and turn the short arm piece on the long switch-arm piece. Turn the main cam to its null position and adjust for about $\frac{1}{64}$ " play between the tabs (L) and the arm segment, when the tonearm drops onto the arm rest
Tonearm returns to its rest position after each record	Engagement between change lever (160) and cam follower (152) is too great	Re-adjust change lever (160) so that with record on, and spindle locked, there is about $\frac{1}{64}$ " clearance between change lever and the guide post of the cam follower lever (152). With no record loaded, engagement should be about $\frac{1}{32}$ ", to obtain shut-off
Turntable stops in manual position	Switch lever assembly out of adjustment	Re-adjust with set screw (197) so that in manual position, the latch (217) overtravels the support (BG) about $\frac{1}{64}$ ". Secure adjustment with locknut
Last record keeps repeating	Too little engagement between change lever (160) and cam follower (152)	Re-adjust change lever (160) so that with record on and spindle locked, there is about $\frac{1}{64}$ " clearance between change lever and guide pin of the cam follower lever (152). With no record loaded, engagement should be about $\frac{1}{32}$ ", to obtain shut-off
Record drops after stop, then start buttons are depressed	Normal operation	
Records do not drop	<p>a) Travel of cam rocker (206) too short</p> <p>b) Automatic spindle not locked in position</p> <p>c) Spindle is defective</p>	<p>a) Re-adjust eccentric R 1 so that when the 3 supports of the automatic spindle are completely retracted, further rotation of the main cam causes over-travel of about <math>\frac{1}{64}</math>" between the cam and the follower of the cam rocker</p> <p>b) After inserting spindle, rotate to its stop</p> <p>c) Replace spindle</p>
Noise during change cycle, arm set-down and lift-off	Muting switch mis-adjusted. Clearance between switch spring (S) and switch leaf is too great	Bend switch spring (S) so that with main cam (150) in null position, there is about $\frac{1}{64}$ " clearance between the switch spring (S) and the contact leaves of the muting switch. Spray contacts (e. g. contact 61) with contact cleaner and check muting switch adjustment
No sound. Muting switch remains closed	Too little clearance between switch spring (S) and contact leaves of muting switch	Bend switch spring (S) so that with main cam (150) in null position, there is about $\frac{1}{64}$ " clearance between the switch spring (S) and the contact leaves of the muting switch



## Trouble shooting:

Symptom	Cause	Remedy
Motor continues to run after tonearm returns to its rest	Capacitor (138), 10,000 pF, 700 V. shorted	Replace RF interference capacitor with new 10,000 pF, 700 V. (see also fig. 3)
Turntable slows down as record drops	Travel of cam rocker (206) too long	Re-adjust eccentric R 1 so that when the three supports of the automatic spindle are completely retracted, further rotation of the main cam causes over-travel of about $\frac{1}{64}$ " between cam and roller of the cam rocker
Acoustic feedback	a) Parts of the chassis (e. g. junction board touching the mounting board) b) Connecting leads pulled too tight	a) Correct cut-out according to installation instructions b) Loosen or lengthen leads

## Replacement parts

Ref. No.	Part No.	Description	Number per unit
1	13 E - Ausf. A	45 automatic spindle (accessory)	1
2	12 C - U 208	Automatic spindle AW 2	1
3	12 K - 196	Turntable washer	1
4	12 E - 214	Retaining ring	1
5	12 M - 22	Facing ring for turntable mat	1
6	12 L - U 113	Turntable mat assembly for 1016	1
	12 M - U 36	Turntable mat assembly	1
7	12 L - U 111	Turntable and mat assembly for 1016	1
	12 M - U 34	Turntable and mat assembly	1
8	12 L - 26	Speed change knob	1
9	12 J - U 101	Switch plate assembly	1
10	12 A - 92	Spring washer	4
11	4650/4	"C" ring	3
12	5,1/10/1 St	Washer	1
13	4680/5,2/10a	Bowed lockwasher	2
14	12 F - U 4	Speed change lever	1
15	12 K - U 341	Shipping screw assembly	1
16		Tonearm assembly with bearings	1
17	12 K - U 327	Centering disc for 45 records	1
18	12 K - U 337	Manual spindle	1
19	M 3/7a	Hex nut	4
20	12 J - 46	Stop nut	1
21	12 J - 44	Set screw	1
22	12 J - U 103	Tonearm assembly	1
23	12 K - 36	Tonearm lift	1
24	4680/4,2/8d	Tonearm handle	1
25	4,2/8/0,5 St	Washer	1
26	4693/4	Grip ring	1
27	12 K - U 270	Retainer	1
28	12 K - 314	Shield	1
29	12 F - U 60	Ball bearing race	2
30	12 J - U 121	Adjusting ring with guide ring assembly	1
31	6 k 4/4	Hex nut	2



Ref. No.	Part No.	Description	Number per unit
32	6 k 4/4	Hex nut . . . . .	2
33	4000/400	Steel ball . . . . .	1
34	M 4/2	Hex nut . . . . .	6
35	M 3/7a	Hex nut . . . . .	4
36	4680/5,2/10a	Bowed lockwasher . . . . .	2
37	12 L - 20	Positioning screw . . . . .	1
38	12 K - 69	Bearing housing . . . . .	1
39	12 F - U 60	Ball bearing race . . . . .	2
40	12 K - 71	Lock nut . . . . .	1
41	M 4/2	Hex nut . . . . .	6
42	12 F - U 136	Suspension spring (3 pcs to a set) . . . . .	1
43	12 F - 303	Rubber sleeve . . . . .	3
44	12 F - 300	Cup . . . . .	3
45	12 F - 314	Compression spring . . . . .	3
46	12 F - 298	Threaded disc . . . . .	3
47	12 M - 2	Name plate, 110/220 V, 50 cycle . . . . .	1
	12 M - 4	Name plate, 110/125 V, 60 cycle . . . . .	1
	12 M - 6	Name plate, Canada, 60 cycle . . . . .	1
	12 M - 8	Name plate, U. L., 60 cycle . . . . .	1
	12 M - 10	Name plate, 110/220 V, 60 cycle . . . . .	1
48	12 J - U 3	Baseplate assembly . . . . .	1
49	12 F - 255	Washer . . . . .	2
	12 N - 88	Rubber washer . . . . .	2
50	12 F - 254	Spring cup . . . . .	2
	M 4/2	Hex nut . . . . .	4
51	12 F - 249	"C" ring . . . . .	2
52	12 F - 291	Compression spring . . . . .	2
53	4,2/7/0,3 St	Washer . . . . .	2
54	4650/4	"C" washer . . . . .	3
55	12 J - 26	Screw . . . . .	1
56	12 J - 24	Dress-up cover . . . . .	1
57	12 K - U 320	Counterweight assembly . . . . .	1
58	12 L - U 105	Counterweight assembly with spindle (short) . . . . .	1
	12 L - U 106	Counterweight assembly with spindle (long) . . . . .	1
59	12 L - U 117	Spindle, short . . . . .	1
	12 L - U 118	Spindle, long . . . . .	1
60	12 J - 42	Washer . . . . .	1
61	12 L - 38	Threaded stud . . . . .	1
62	12 K - U 333	Contact block assembly with tonearm leads . . . . .	1
63	12 J - 12	Fastener . . . . .	1
64	12 J - 18	Spacing block . . . . .	1
65	12 J - U 16	Bearing plate assembly . . . . .	1
66	12 L - 36	Hex-head screw . . . . .	1
67	12 K - U 311	Spring barrel . . . . .	1
68	12 J - 32	Dress-up cover . . . . .	1
69	12 L - U 14	Bearing screw assembly, long . . . . .	1
70	12 L - U 12	Bearing post . . . . .	1
71	12 L - U 109	Bearing frame assembly . . . . .	1
72	12 K - U 46	Spring lever . . . . .	1
73	4650/2,3	"C" ring . . . . .	9
74	12 K - U 78	Arm lift lever . . . . .	1
75	M 2/4	Hex nut . . . . .	1
76	12 K - U 54	Arm latch assembly . . . . .	1
77	12 K - 104	Mounting screw . . . . .	1
78	12 K - 102	Tensioning block . . . . .	1
79	12 K - U 335	Tonearm rest assembly with arm latch . . . . .	1
80	4680/3,7/7b	Bowed lockwasher . . . . .	1
81	M 2,6/4b	Hex nut . . . . .	1
82	12 K - U 52	Bearing holder . . . . .	1
83	12 K - 106	Tonearm rest . . . . .	1
84	M 3/7a	Hex nut . . . . .	4
85	12 F - 245	Special screw (threaded) . . . . .	2
	12 F - 239	Special screw (pierced) . . . . .	2
86	12 K - 95	Damping block . . . . .	1
87	12 L - 28	Switch button . . . . .	2
88	12 L - U 101	Dress-up plate, inch markings, (1016) . . . . .	1
	12 L - U 103	Dress-up plate, metric markings, (1016) . . . . .	1
	12 M - U 30	Dress-up plate, metric markings . . . . .	1
	12 M - U 32	Dress-up plate, inch markings . . . . .	1
89	12 L - 28	Switch button . . . . .	2
90	12 A - 92	Spring washer . . . . .	4
	Z 3/4,5a	Machine screw . . . . .	4
*	12 J - U 119	Assortment of spacers, screws, and nuts . . . . .	1
*	12 L - U 115	Shipping carton assembly . . . . .	1
*	12 P - 114	Underpad . . . . .	2
*	12 K - 206	Gauge for mounting the cartridge . . . . .	1
*	4170/23	Plastic Shell . . . . .	1
*	12 K - D 25	Mounting template . . . . .	
*	12 M - D 2	Operating instructions . . . . .	



Fig. 19 Exploded view, parts above base plate

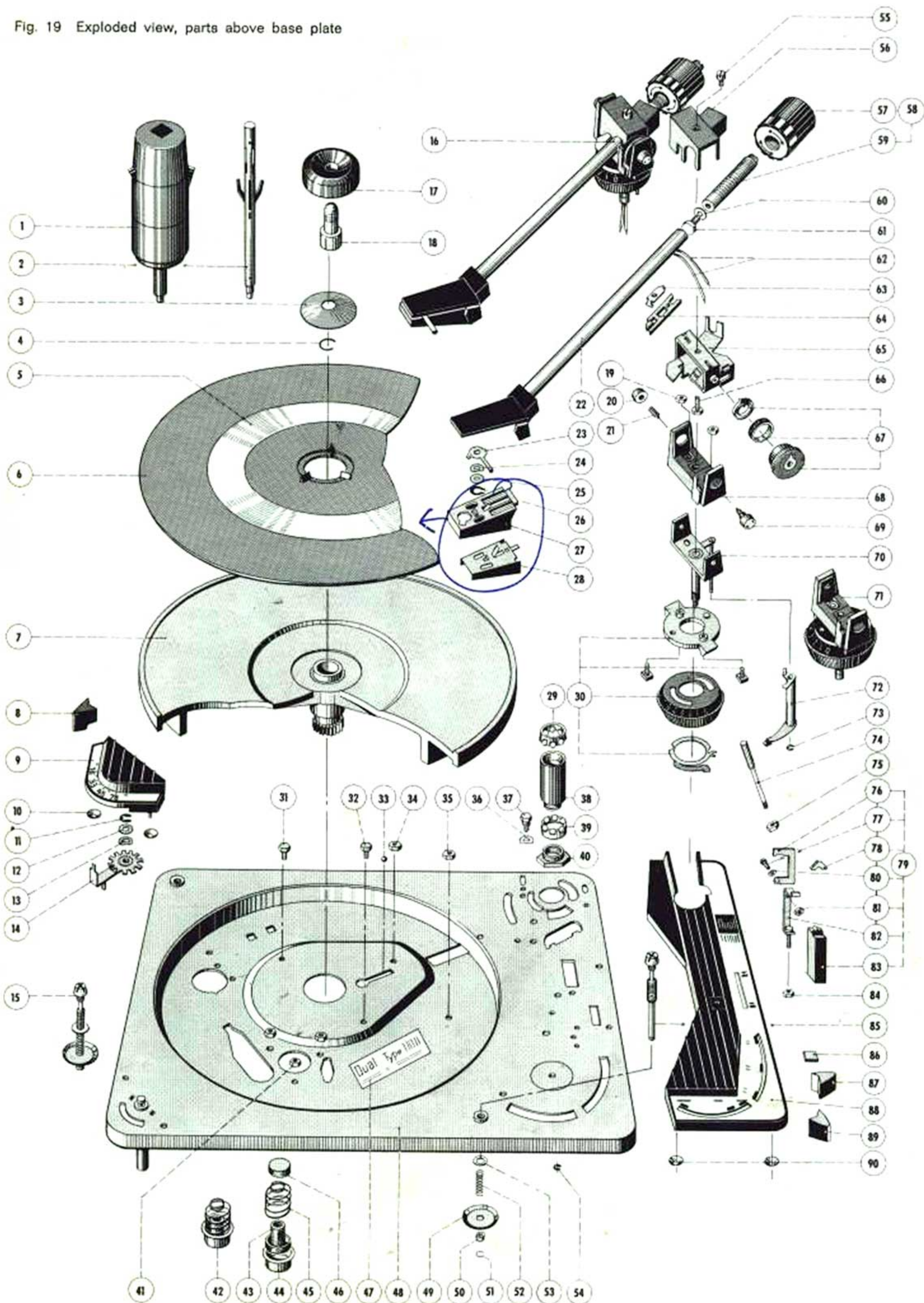
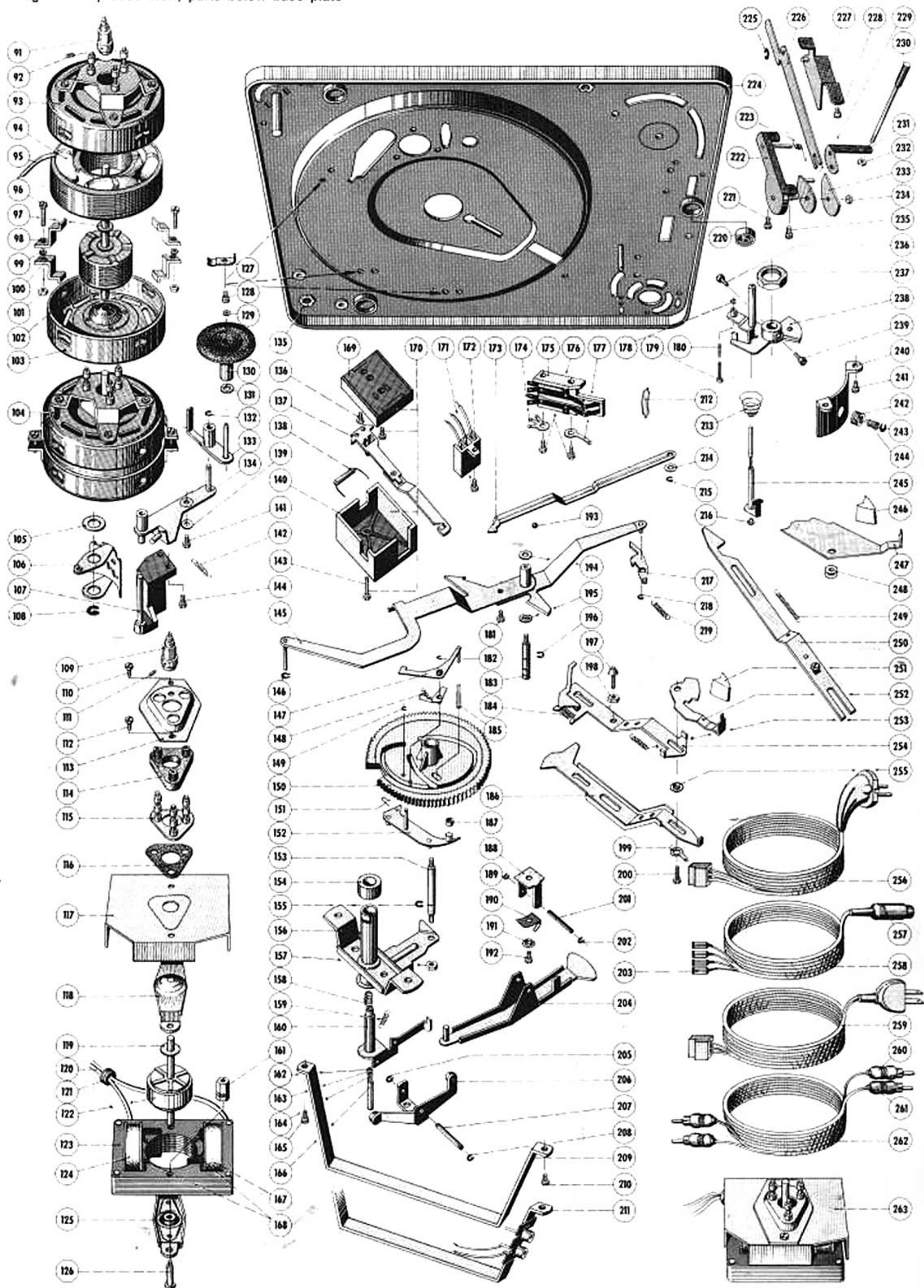




Fig. 20 Exploded view, parts below base plate





Ref. No.	Part No.	Description	Number per unit
91	31 N - U 45	Motor pulley, 50 cycle	1
	31 N - U 54	Motor pulley, 60 cycle	1
92	G 2,6/3,5	Set screw	1
93	31 N - U 6	Upper end-bell assembly	1
94	31 N - U 1	Stator assembly	1
95	J 07 nf/150	Insulating sleeve	1
96	Z 4/12a	Machine screw	2
97	5,3/10/2 F	Washer	1
98	31 N - 40	Retaining bracket	4
99	4670/51	"C" ring	2
100	31 N - 40	Retaining bracket	4
101	M 4/7	Hex nut	1
102	31 N - U 15	Rotor assembly	1
103	31 N - U 5	Lower end-bell assembly	1
104	31 N - U 10	Motor assembly, less motor pulley	1
105	8,1/15/0,5 St	Washer	1
106	12 G - 6	Switch segment	1
107	12 F - U 8	Support assembly	1
108	4650/6	"C" ring	2
109	31 R - U 44	Motor pulley, 50 cycle	1
	31 R - U 54	Motor pulley, 60 cycle	1
110	Z 3,5/8a	Machine screw	2
111	G 2,6/3,5	Set screw	1
112	Z 3,5/8a	Machine screw	2
113	31 R - 44	Dress-up cover	1
114	31 R - 40	Rubber top	1
115	31 R - U 34	Insert plate assembly	1
116	31 R - 36	Rubber bottom	1
117	31 R - 34	Hum shield	1
118	31 R - U 28	Upper end-bell assembly	1
119	31 F - 78	Washer	1
120	J 60 tr/95	Insulating sleeving	2
121	4040/46	Grommet	1
122	31 R - U 22	Rotor assembly	1
123	31 R - U 3	Stator assembly	1
124	31 R - U 15	Motor field coil 110/220 V	2
	31 R - 22	Leafspring for field coil	4
125	31 R - U 24	Lower end-bell assembly	1
126	31 F - 59	Mounting screw	2
127	12 A - 325	Cable clamp	3
128	Z 3/4d	Machine screw	4
129	12 B - 86	Lockwasher	1
130	12 N - U 123	Idler wheel	1
131	11 C - 138	Washer	1
132	4650/3,2	"C" ring	1
133	12 G - U 4	Lever and stud assembly	1
134	12 F - U 7	Rocker assembly	1
	12 F - 24	Rocker assembly	1
135	12 F - 8	Threaded bushing	2
136	Z 3/8a	Machine screw	2
137	12 F - U 57	Switch slide	1
138	4020/83	Capacitor, 10,000 pF, 700 V	1
139	3,2/6/0,5 St	Washer	1
140	12 F - 152	Power switch cover	1
141	Z 3/3c	Machine screw	5
142	12 F - 112	Drive wheel spring	1
143	Z 3/30a	Machine screw	1
144	Z 3/5a	Machine screw	2
145	12 F - U 43	Switch arm	1
146	4693/3	Grip ring	1
147	12 F - U 42	Shut-off lever	1
148	12 F - U 40	Friction plate assembly	1
149	4650/2,3	"C" ring	9
150	12 K - U 303	Main cam	1
151	12 D - 57	Snap ring	1
152	12 H - U 11	Cam follower lever	1
153	12 D - 36	Main cam bearing post	1
154	12 F - U 28	Ball bearing assembly	1
155	4650/6	"C" washer	2
156	12 G - U 10	Bearing housing assembly	1
157	M 4/2	Hex nut	6
158	12 F - 64	Compression spring	1
159	12 D - 96	Change lever tension spring	1
160	12 G - U 12	Change lever	1
161	11 K - 100	Bearing post for 1016	2
162	4650/1,5	"C" washer	2
163	2,1/5/0,5 St	Washer	1
164	12 F - 68	Compression spring	1



Ref. No.	Part No.	Description	Number per unit
165	Z 3/4d	Machine screw . . . . .	4
166	12 G - U 14	Change actuator stud assembly . . . . .	1
167	31 R - U 15	Field coil 110/220 V for 1016 . . . . .	2
	31 R - 22	Lead spring for field coil for 1016 . . . . .	4
168	4281/10	Connector for 1016 . . . . .	4
169	12 G - U 28	Switch plate with voltage selector . . . . .	1
	12 F - U 54	Switch plate less voltage selector . . . . .	1
170	12 G - U 77	Power switch with voltage selector . . . . .	1
	12 F - U 52	Power switch with slide and cover . . . . .	1
171	Z 3/6	Machine screw . . . . .	2
172	12 F - U 163	4-pin connector w/breakaway power cord . . . . .	1
173	12 F - 174	Shut-off slide . . . . .	1
174	12 F - 213	Angle . . . . .	1
175	12 F - U 75	Muting switch . . . . .	1
176	Z 3/4,5a	Machine screw . . . . .	4
177	4103/27	Solder lug . . . . .	1
178	4650/1,5	"C" washer . . . . .	2
179	12 F - 168	Spring stud . . . . .	1
180	12 K - 120	Compression spring . . . . .	1
181	Z 3/3c	Machine screw . . . . .	5
182	4693/2	Grip ring . . . . .	1
183	12 F - 100	Grooved shaft . . . . .	1
184	12 F - 137	Tension spring . . . . .	1
185	12 F - 98	Coiled spring . . . . .	1
186	12 F - 135	Start lever . . . . .	1
187	12 F - 84	Rubber bumper . . . . .	1
188	12 K - 140	Main lever bearing support . . . . .	1
189	4650/2,3	"C" washer . . . . .	9
190	12 K - 142	Lead spring . . . . .	1
191	12 B - 50	Spacer . . . . .	1
192	Z 3/6b	Machine screw . . . . .	1
193	4000/400	Steel ball . . . . .	1
194	3,2/7/0,5 St	Washer . . . . .	1
195	4680/5,2/8	Bowed lockwasher . . . . .	1
196	4650/4	"C" washer . . . . .	3
197	12 F - U 51	Set screw . . . . .	1
198	M 3/4b	Hex nut . . . . .	1
199	4103/32	Solder lug . . . . .	1
200	Z 3/12a	Machine screw . . . . .	1
201	12 D - 212	Main lever shaft . . . . .	1
202	4650/2,3	"C" washer . . . . .	9
203	4012/40	Blade connector . . . . .	4
204	12 K - U 325	Main lever . . . . .	1
205	4650/2,3	"C" washer . . . . .	9
206	12 D - U 60	Cam rocker . . . . .	1
207	12 D - 102	Cam rocker shaft . . . . .	1
208	4650/2,3	"C" washer . . . . .	9
209	12 K - 180	Stand . . . . .	1
210	Z 3/7a	Machine screw . . . . .	2
211	12 K - U 100	Stand with phono jacks . . . . .	1
212	12 F - 172	Audio cable, spring retainer . . . . .	1
213	12 K - 128	Helical spring . . . . .	1
214	12 K - 144	Washer . . . . .	1
215	4650/2,3	"C" washer . . . . .	9
216	12 D - 209	Guide pin . . . . .	1
217	12 K - U 18	Latch . . . . .	1
218	4650/2,3	"C" washer . . . . .	9
219	11 A - 10	Tension spring . . . . .	2
220	12 F - 298	Threaded bushing . . . . .	3
221	Z 3/3c	Machine screw . . . . .	5
222	12 K - U 70	Support bracket with drive washer . . . . .	1
223	12 K - 162	Torsion spring . . . . .	1
224	12 J - U 3	Base plate assembly . . . . .	1
225	4650/2,3	"C" washer . . . . .	9
226	12 K - 176	Connecting lever . . . . .	1
227	12 K - U 80	Bearing support, connecting lever . . . . .	1
228	Z 3/5,5	Machine screw . . . . .	1
229	12 K - U 74	Drive washer . . . . .	1
230	12 K - U 78	Arm lift rod . . . . .	1
231	12 K - U 76	Drive cam assembly . . . . .	1
232	M 2/4	Hex nut . . . . .	1
233	12 K - 160	Cover washer . . . . .	1
234	M 4/2	Hex nut . . . . .	6
235	Z 3/3c	Machine screw . . . . .	5
236	Z 3/6c	Machine screw . . . . .	1
237	12 F - 156	Hex nut . . . . .	1
238	12 L - U 108	Arm segment assembly . . . . .	1



Ref. No.	Part No.	Description	Number per unit
239	Z 3/6	Machine screw . . . . .	2
240	12 K - 130	Spring post . . . . .	1
241	Z 3/3c	Machine screw . . . . .	5
242	12 K - 132	Threaded bushing . . . . .	1
243	12 K - 136	Positioning washer . . . . .	1
244	12 K - 134	Tension spring . . . . .	1
245	12 K - U 60	Lift screw . . . . .	1
246	12 L - 28	Switch button . . . . .	2
247	12 F - 118	Record size selector lever . . . . .	1
248	12 F - 120	Spacer, short . . . . .	1
249	12 A - 452	Tension spring . . . . .	1
250	12 K - U 64	Arm positioning slide . . . . .	1
251	12 L - 28	Switch button . . . . .	2
252	12 F - 123	Manual / automatic selector . . . . .	1
253	11 A - 10	Tension spring . . . . .	2
254	12 F - U 41	Switch lever assembly . . . . .	1
255	12 F - 132	Spacer, long . . . . .	1
256	12 F - U 184	Power cord, European . . . . .	1
257	4012/21	Miniature 5-pin plug . . . . .	1
258	12 F - U 133	Plug-in output cable . . . . .	1
259	12 F - U 175	Power cord, American . . . . .	1
260	4012/22	Phono plug (yellow) for output cable . . . . .	2
261	4012/23	Phono plug (red) for output cable . . . . .	2
262	12 F - U 127	Output cable, phono connector . . . . .	1
263	31 R - U 1	Motor assembly less pulley for 1016 . . . . .	1

\* not illustrated

Alteration reserved

Fig. 21 Chassis with turntable removed





## Lubrication

All bearings and sliding points have been properly lubricated during assembly. Re-lubrication is normally not necessary for about two years since all important bearings are provided with oil retainers and sintered bearings.

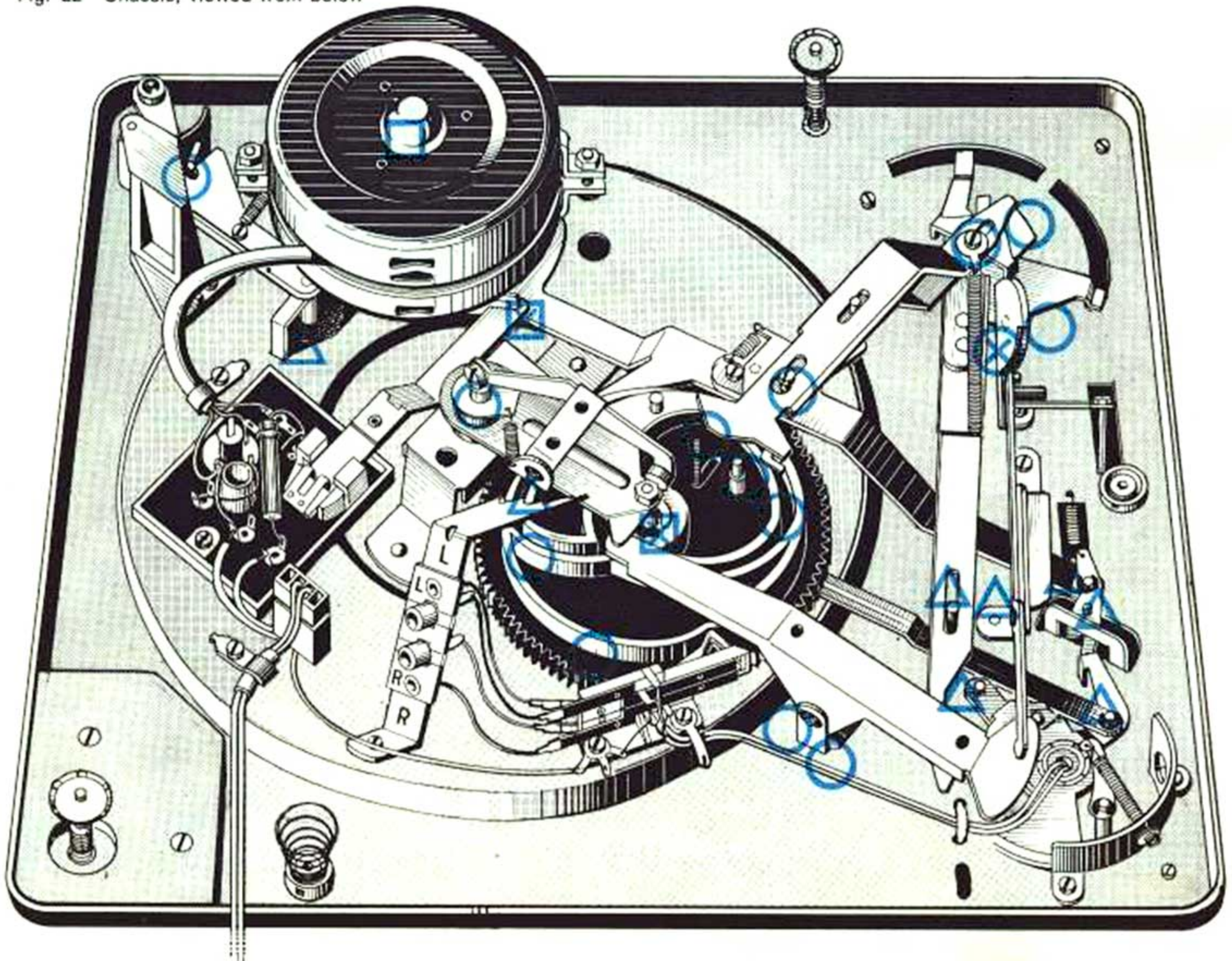
Lubrication should be applied sparingly. It is of primary

importance that no oil or grease should get onto the friction surfaces of the drive wheel, motor pulley or turntable, to avoid slippage. For the same reason, avoid touching these parts.

Use the following lubricants:

- Fine bearing oil, Shell Clavus 17, for motor bearings and sintered bearings.
- × Adhesive oil, Renotac, for turntable and drive wheel.
- Molycote paste G, where greater pressure or friction occur.
- ⊕ Silicone rubber grease, for the drive washer of the tonearm lift.
- ⊗ Silicone grease.
- △ Thicker, non-gumming oil, Calypsol WIK 700, for other sliding and bearing points.

Fig. 22 Chassis, viewed from below







**Dual Gebrüder Steidinger · 7742 St. Georgen/Schwarzwald**