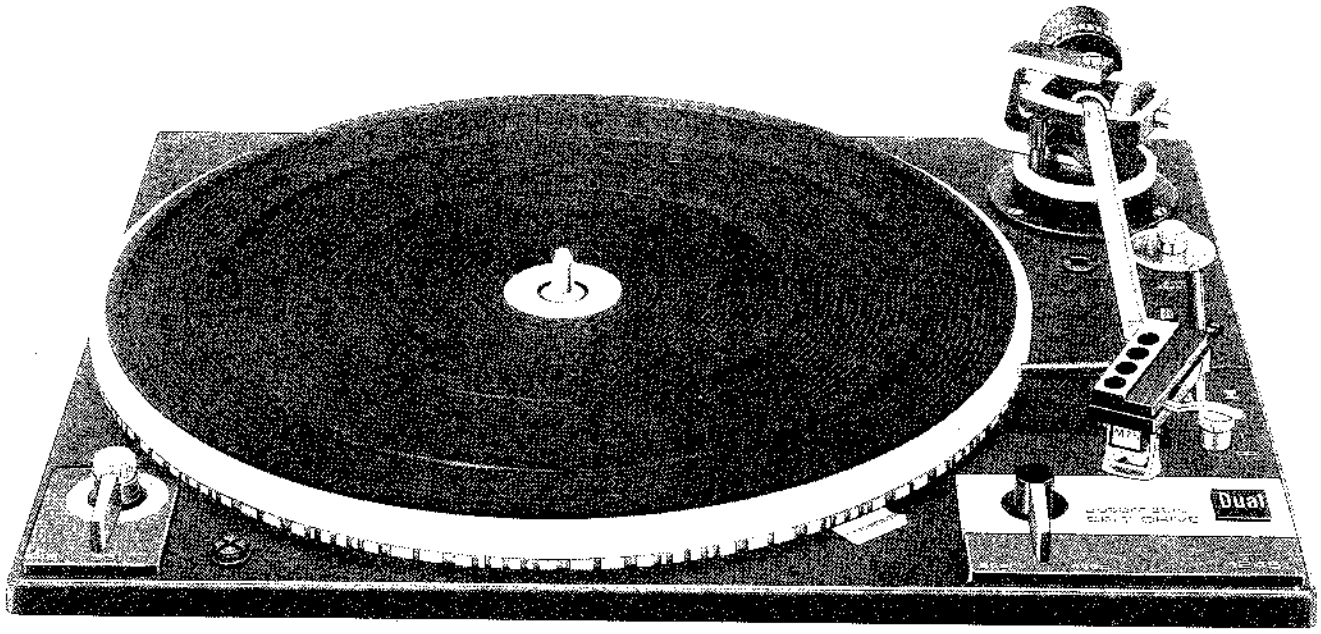
Dual

1245

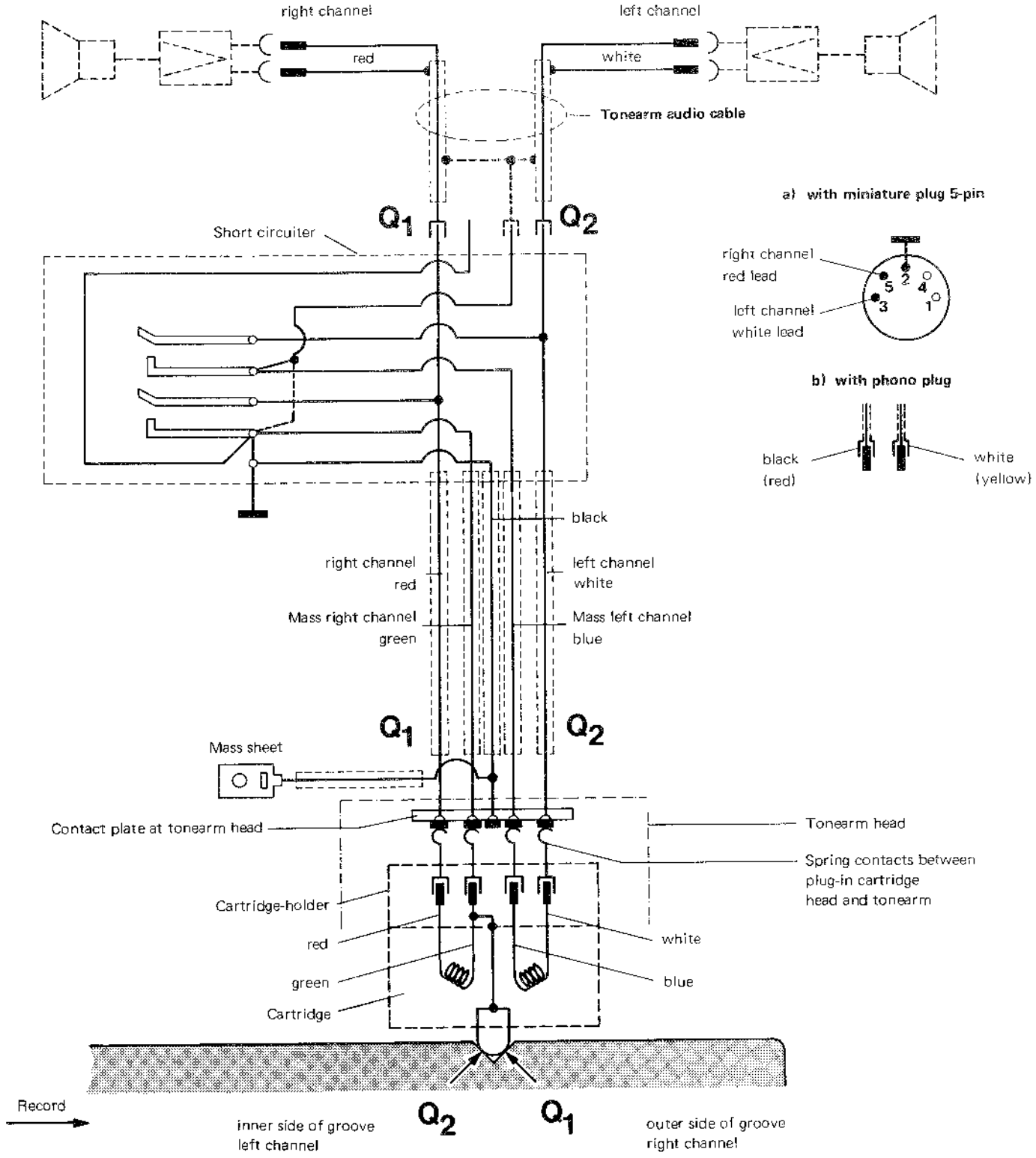
Edition December 1977



Service Manual

Dual Gebrüder Steidinger 7742 St[illegible]chwarzwald

Fig. 1 Pick-up Connection Diagram



Contents

Specification

Current	AC 50 or 60 Hz, Changeable by changing motor pulley
Line Voltage	110 – 130 V or 220 – 240 V, switchable
Drive	Dual 8-pole synchronous motor: flat belt for flywheel drive
Power consumption	approx. 10 watts
Starting Time	(to reach nominal speed) approx. 2 seconds at 33 1/3 rpm
Power consumption	at 220 V, 50 Hz: approx. 75 mA at 117 V, 60 Hz: approx. 140 mA
Platter Speeds	Non-magnetic, dynamically balanced, detachable, 1.3 kg, 300 mm ϕ, total speed load of drive system (Platter with flywheel drive) 2.1 kg
Platter Speeds	33 1/3 and 45 rpm, Automatic tonearm set-down coupled with speed adjustment
Total Wow and Flutter	According to DIN 45 507 (German Industry Standard) $< \pm$ 0.09 %
Rumble	Unweighted $>$ 42 dB Weighted $>$ 63 dB
(according to DIN 45 500)	
Tonearm	Torsion-resistant tubular aluminum tonearm in four-point gimbal
Effective Length of Tonearm	22 mm
Offset Angle	24° 4'
Tangential Tracking Error	0.16° /cm
Tonearm Bearing Friction	Vertical $<$ 0.07 mN (0.007 g) Horizontal $<$ 0.16 mN (0.016 g)
(related to stylus tip)	
Stylus pressure	(0 - 30 g) operable from 2.5 mN (0.25 g) stylus pressure up
Cartridge Holder	Removable, accepting any cartridges with 1/2". mounting and a weight from 5.5 to 10 g (including mounting hardware)
Adjustable Overhang	5 mm
Weight	approx. 4.6 kg

For dimensions and cutout refer to installation Instructions

Fig. 2 Motor and drive

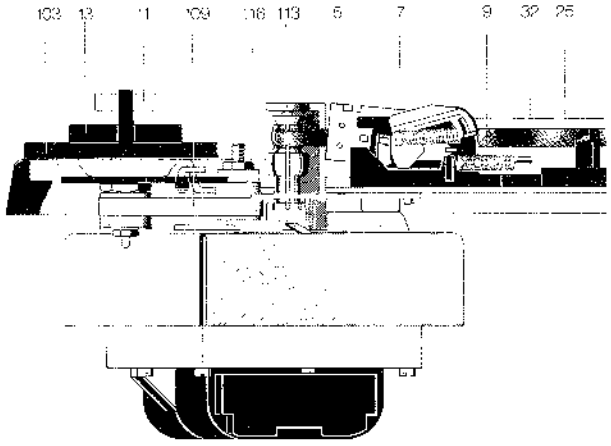


Fig. 3

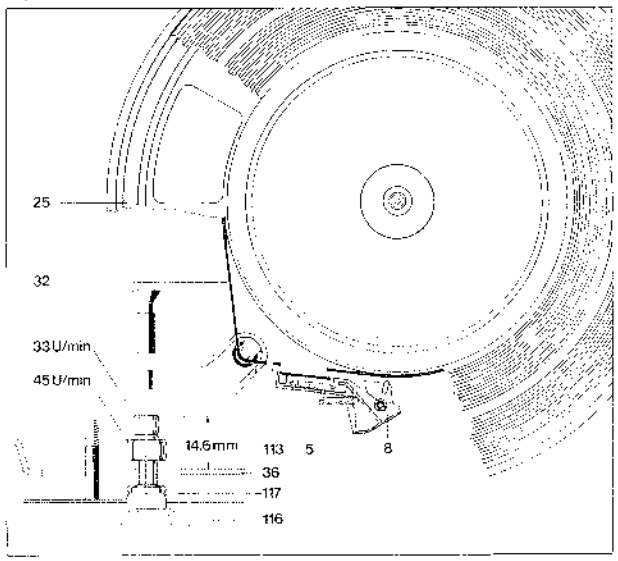
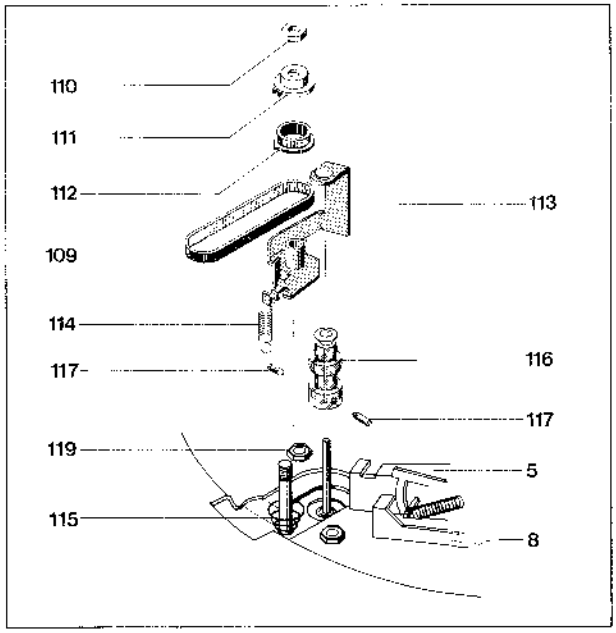


Fig. 4



Motor and Drive

Power for the turntable platter and the changing mechanism is supplied by a split eight pole synchronous motor suspended by radially located elastic mounts and having a very small stray magnetic field as well as little vibration.
The speed of the motor is independent of line voltage, temperature or load variations. Speed is dependent on and proportional to power line frequency. The motor is adapted to 50 or 60 cycle (Hz) power line frequencies by the correct choice of the motor pulley.

Pulley for 50 Hz Art.-No. 234 453
Pulley for 60 Hz Art.-No. 243 454

The drive is transmitted to the platter by means of the flat belt (32).

Speed Changeover

Platter speeds of 33 1/3 and 45 rpm are adjusted by linking the flat belt (32) to the corresponding step of the drive pulley (116) (Fig. 3).

The speed switch lever is brought into the required position (33 or 45 rpm) by means of the speed selection lever (11), the switch lever (101) and the spring lever of the switch levers. If the machine is switched off, then the switch lever is interlocked by the stop lever (81). The speed is only preselected in this way. The stop lever (84) is only released when the platter (25) turns. This then moves the flat belt (32) onto the required step of the drive pulley (116).

Platter

The platter (25) is held in position by the platter locking lever (23). When removing the platter, lift the platter covering over one of the cutouts and rotate the platter until the cutout is above the drive pulley. Detach the flat belt (32) from the drive pulley (116) and lay it on the running surface of the platter.

Flat Belt

The exchanging of the flat belt is described above with the platter to be removed. Fit the new belt to the running surface of the platter (25).

Changing the drive pulley

1. Remove the flat belt (32) from the drive pulley (116) and take off the platter (25). Remove the toothed belt (109).
2. Detach tension spring (114) from screening sheet (122).
3. Remove the hexagonal screw (110), remove the adjustment cam (111), the belt pulley (112) as well as the counter bearing (113).
4. Loosen set screws (117) and remove motor pulley (116). Place complete replacement motor pulley on motor axle. Remove conical sleeve. Be careful with the interior distance bushing. Adjust motor pulley vertically (see Fig. 3) and tighten set screws (117) uniformly. Place conical sleeve into the motor pulley (116).
5. Outer counter bearing (113), belt pulley 2 (112) and adjustment cam (102) should now be fitted and the hexagonal head mounting screws tightened (111). Replace the tension spring and toothed belt (109). Install the platter (25). Fit the flat drive belt (32) onto the drive pulley (116).
6. Setting up the rotational speed: set the regulator knob (11) to its central position. By loosening or tightening the hexagonal nut (110) adjust the rotational speed.

Stroboscope

Accurate setting of the platter speed 33 1/3 rpm can be checked during play with the aid of the stroboscope device.
When the platter (25) is rotating at exactly 33 1/3 rpm the lines of the stroboscope appear to stand still. If the lines of the stroboscope move in the direction of rotation of the platter, the platter speed is too high. If the lines move backwards, the platter is rotating more slowly than the nominal speed.
Adjustment is carried out with the "pitch" knob (11).
Strobe markings for 50 or 60 Hz are provided on the platter rim.
When echanging the lamp the strobe must be removed from the base plate (134). After removal of the stroboscope housing (244) the lamp (245) may be exchanged.

Fig. 5

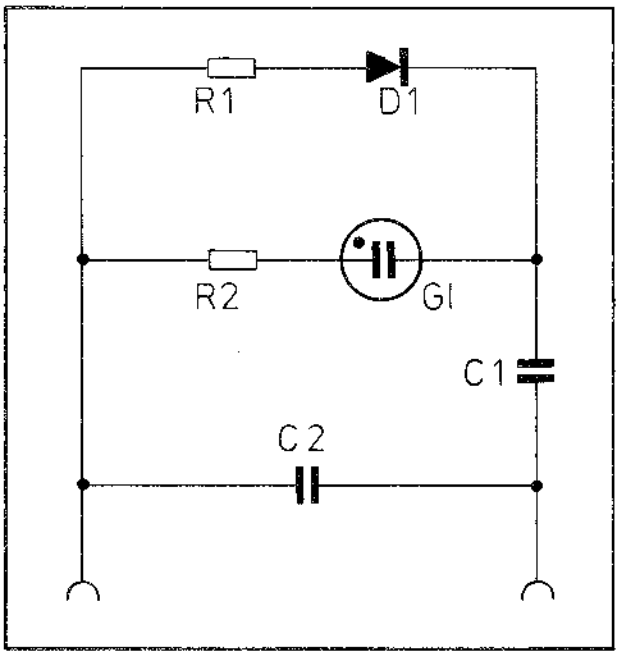
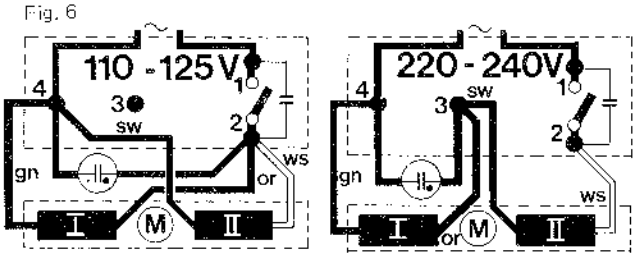


Fig. 6



Pitch Control

The unit has a separately adjustable pitch control the two standard speeds 33 1/3 rpm and 45 rpm can be varied by approximately 6 % (1 semitone).

By turning the fine speed adjustment knob (11) the belt pulley 2 (112) is moved. This rotation is transferred by means of the toothed belt (109) to the drive pulley 1 (105). (Fig. 9) thus moving the counter bearing (113) upwards or downwards. The taper bush of the drive pulley is designed to vary the diameter of the drive pulley thus varying the nominal speed within the tolerance of ± 3 %.

Fig. 7

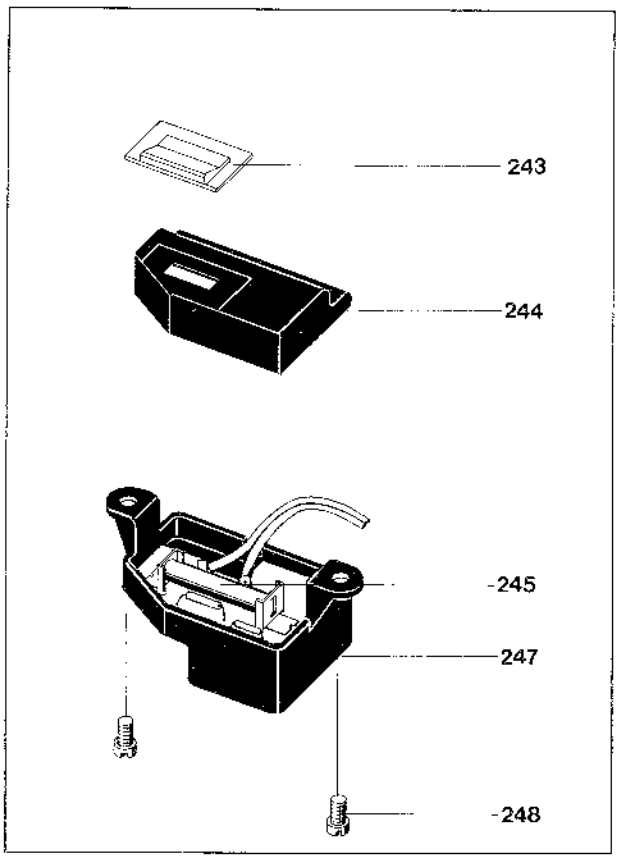


Fig. 8

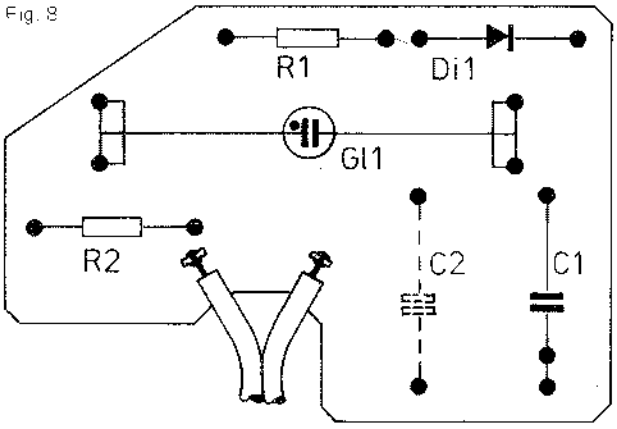


Fig. 9

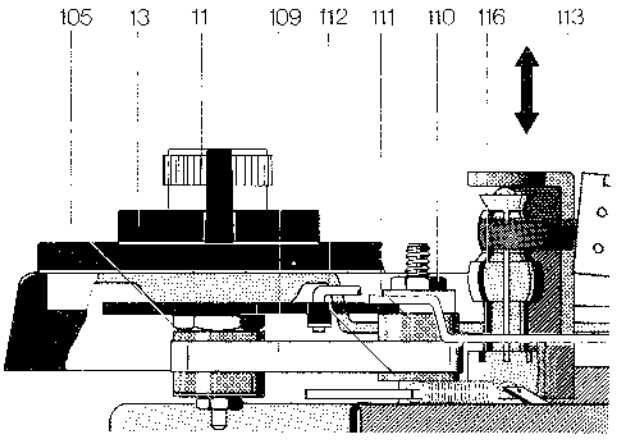
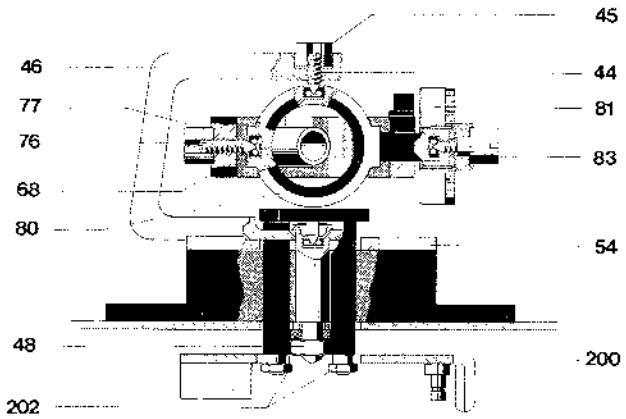


Fig. 10



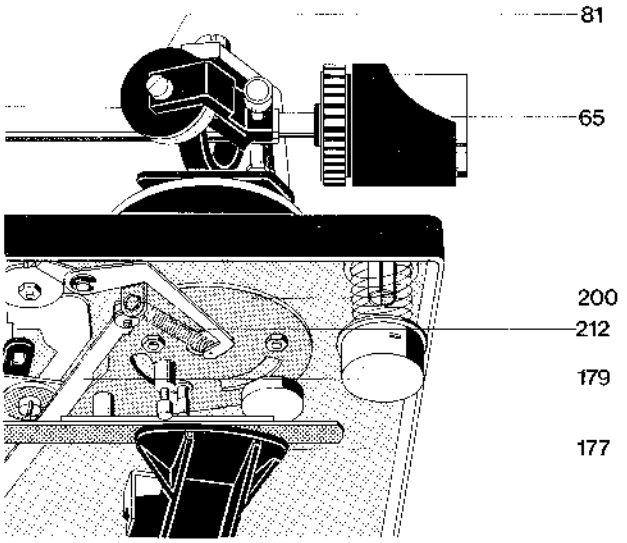
Tonearm and Tonearm Bearing

The Dual 1245 has a feather-light, extremely torsion-resistant all-metal tonearm which is suspended in a gimbal. Suspension is by means of 4 hardened and precision polished steel points which rest in precision ball bearings. Tonearm bearing friction is thus reduced to a minimum.

Bearing friction vertical $< 0{,}07$ mN (0,007 g)
Bearing friction horizontal $< 0{,}16$ mN (0,016 g)

As a result, it ensures most favourable pick-up conditions. Before adjusting the pick-up force to suit the built-in pick-up cartridge the tonearm is balanced with the scale set to zero. Coarse adjustment is caried out by moving the weight with the pin (65) the subsequent fine adjustment by turning the weight. The balance weight is designed such that pick-up cartridges having a deadweight (incl. hardware) of 5.5 - 10 g can be balanced. The tracking force is adjusted by turning the graduated spring housing (81) incorporating a coil spring. The scale has markings for a range of adjustment from 0 to 30 mN (0 to 3 g) which permit accurate adjustment of the tracking force.

Fig. 11



Removing the tonearm from the bearing frame

1. Clamp unit in the repair stand. Remove the counter-weight (65), remove clamp screw (71). Set spring housing scale (81) to zero.
2. Turn the unit over and remove the screening sheet (149). Unsolder the tonearm connections on the muting switch (146).
3. Turn the unit back to normal position. Turn the two fixing screws (75) — SW 4,5 — anti-clockwise into the bearing frame (68). Slide tonearm (63) backwards and lift tonearm from bearing frame (68).

   Reverse this procedure when reassembling.

Removing the tonearm from the bearing frame

1. Clamp unit in the repair stand. Remove the counter-weight (65), remove clamp screw (71). Set spring housing scale (81) to zero.
2. Turn the unit over and remove the shield (149). Unsolder the tonearm connections on the muting switch (146).
3. Remove main lever (177) and lock washer (242). Turn adjustment screw (42) until guide bearing (241) and positioning slide (204) are free. Remove lock wahser (228) and positioning slide (204).
4. Unlook tension spring (212). Loosen lock washer (216) and remove skating lever (215).
5. Remove lock washers (205 + 206) and take stop lever (179) away from segment (200).
6. Remove hex nut (202) and take off segment (200).
7. Hold tonearm (63). Remove hex nut (48) and washer (47) a well as tonearm cpl with tonearm bearing.

Reverse this procedure when reassembling.

Replacing spring housing

Remove tonearm (63) from bearing frame (68) as described above. Loosen lock nut (77) and threaded pin (76). Unscrew bearing screw (83). Lift bearing frame (68). Remove spring housing (81) and washer. When installing note that the helical spring catches the bearing frame. And tighten bearing screw (83). Reinstall tonearm (63). Set bearing play as described below using threaded pin (76) and lock nut (77).

Adjusting the tonearm bearing

First balance tonearm exactly. Both bearings must have slight, just perceptible play.
The horizontal tonearm bearing is correctly adjusted when at anti-skating settings "0.5" and being touched it slides in without resistance.: The vertical tonearm bearing is correctly adjusted when it swings in after being touched. The play of the horizontal tonearm bearing should be adjusted with threaded pin (76).

Antiskating Device

The adjustment of the antiskating force is made by turning the indicator disc located on the supporting back. The skating lever (215) is displaced from the tonearm fulcrum by an amount depending on the setting of this control. The antiskating force is transmitted to the tonearm (63) via the tension spring (212) and segment (210).

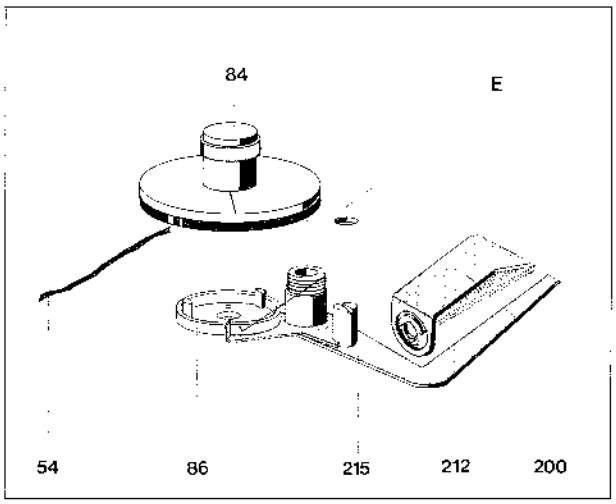
Optimum adjustment is carried out at the works for styli with a tip radius of 15 µm (spherical), 5/6 and 18/22 µm (elliptical), and CD 4-cartridges.

Any alteration can only be carried out with the aid of a Dual Skate-0-Meter and a test record and should only be done by an authorized service station.

Any check may be carried out as follows:

Balance tonearm (68) exactly. Set pointer washer (84) to zero position. The tonearm is now to stop at any point of its turning range. The boring of the skating lever (215) is to vanish towards the center axle of the tonearm – adjustable with the accenter (E). This part is accessible with the aid of the boring in the back cover (54) (Fig. 12).
Set pointer washer (84) to "0,5". Now the tonearm must slide back from the platter centre to its rest position (61) without braking.

Fig. 12



Tonearm lift

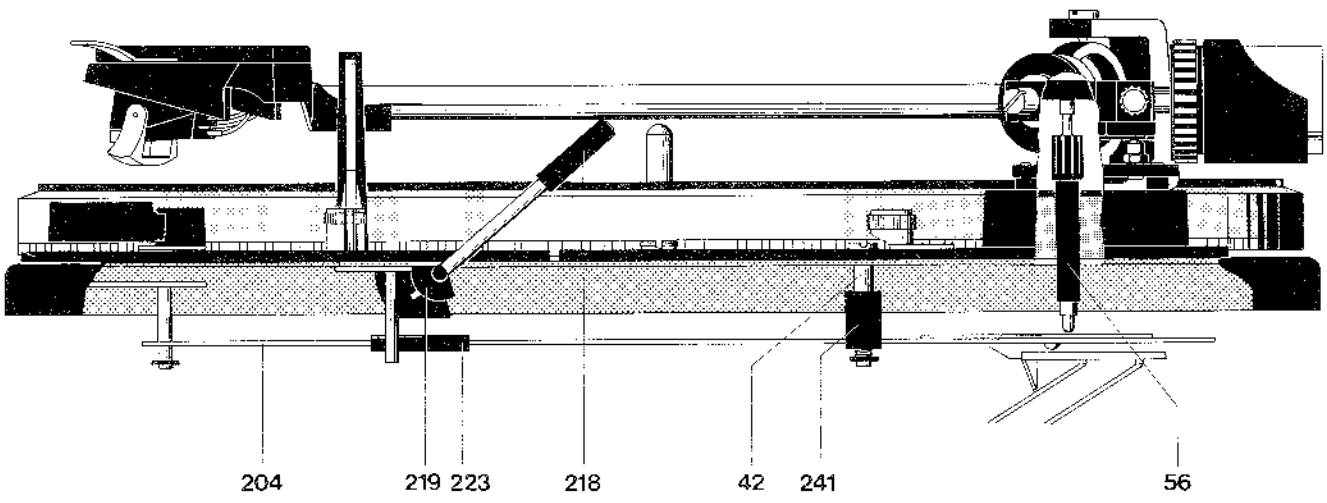
Raising the lever (218) to position " ▼ " or " ▼ " moves the lift cam (219) and the setting rail (204) so that the tonearm is raised from the record (or lowered onto it). If the unit is started with the arm lever in the " ▼ " position, then the tonearm is guided over the record by the set-down mechanism. Only when the lever (218) is brought to the position " ▼ " will the tonearm be lowered onto the record. The vertical lift height can be adjusted by means of the locating screw (42) and should be 3 – 5 mm.

Adjustment of lifting Bolt

1. Remove tonearm cpl. with tonearm bearing as described on page 5).
2. Remove guide (52) on lifting bolt. Remove lock washer (51), adjusting sleeve (52) and second lock washer (51).
3. Remove lifting bolt (52) and compression spring (55).

Before reassembling clean lifting bolt and lift tube with wacker silicone oil AW 300 000.

Fig. 13



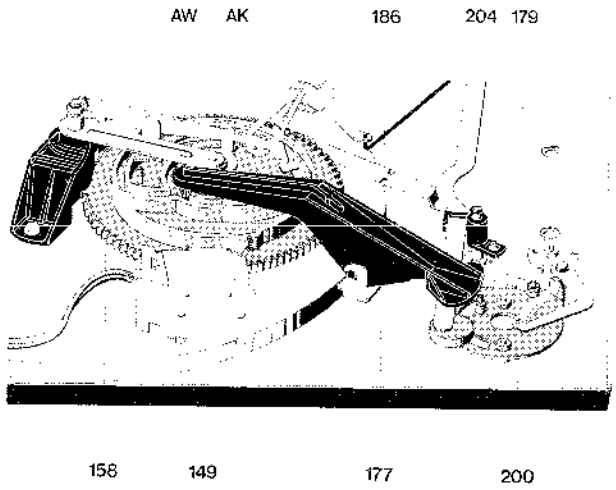
Tonearm Control

Automatic movement of the tonearm is initiated by the control cams on the inside of the cam whel (158) on rotating through 360°.

The control elements for raising and lowering are the main lever (177) and lift pin (256), for horizontal movement the main lever (177) with segment (200).

The automatic tonearm set down is designed for 30 cm and 17 cm records and is coupled to the platter speed changeover. The set-down points of the tonearm are determined by the spring pin of segment (200) contacting the setting rail (204). Limitation of the horizontal movement of the tonearm is produced by the pin of segment contacting the stop attached to the setting rail. Only during set-down does main lever (177) lift the slide bar and the stop attached to it which, as a result, moves into the swivel range of the stop pin fitted on the segment. After completion of set down (lowering of the tonearm onto the record) the setting rail (204) is released again and returns to neutral position. As a result the stop moves out of the swivel range of the stop pin so that unimpeded horizontal movement of the tonearm is possible for playing.

Fig. 14



Start

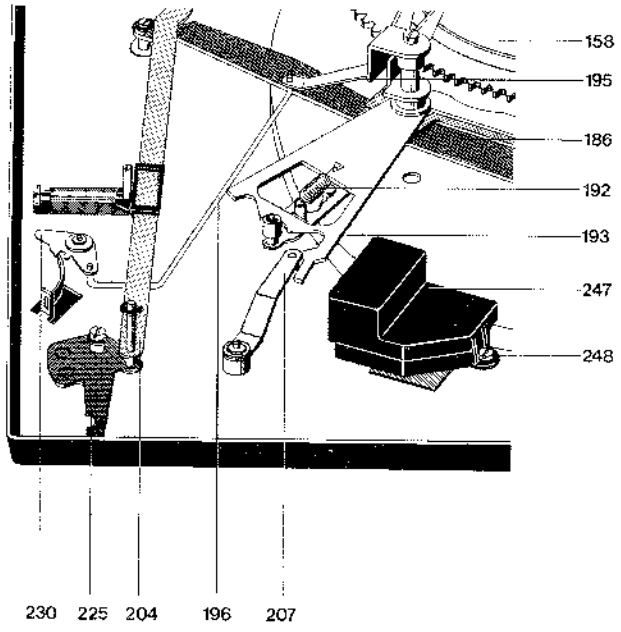
Switching the start/stop lever (58) into the "start" position initiates the following sequence:

a) The start lever (207) rotates the switch lever (193) which is pivoted about the notched stud. At the same time, the switch arm is moves and the motor (132), via the mains switch (135), and the platter starts turning.

b) Operating the start/stop lever (58) also releases the start slide (191) which is drawn toward the cam by means of the tension spring (192). This causes the shut-off lever to engage with the drive pinion and the cam turns.

c) Moving the switch lever (58) releases the start ankle (191) which is pulled towards the cam wheel by means of the tension spring (192). As a renult, the shut-off lever is transported to the range of the dog on the platter (PR), thus driving the cam wheel.

Fig. 15



Manual start

The latch (236) which is connected to the switch arm (186) engages in the four-sided plate when the tonearm is moved manually. The switch arm connects the mains supply to the motor via the power switch and the platter rotates. When the run-out of the record is reached, the tonearm is lifted and the motor is switched off automatically. If the tonearm is lifted off the record before the run-out, and returned by hand to the pillar, then the bolt on the segment (200) engages the latch (236) so that the switch arm is returned to its starting position. This switches off the mains supply.

Continuous play

Continuous play is switched on by means of turning the rotary knob (92) which turns the switch angle (236). The switch lever (207) then forces the cam follower lever to start position.

After the record has been played the tonearm is guided back and again set onto the record at its edge. This procedure is repeated – also when using the changer facility – until the switch lever (58) is taken to "stop" position or the rotary knob (92) to position one.

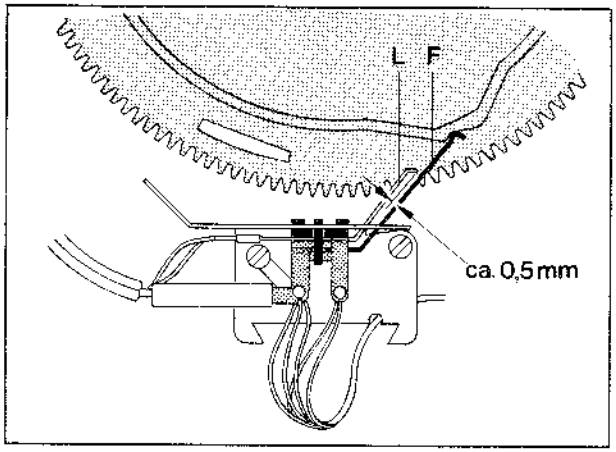
Short Circuiter

To prevent disturbing noises during automatic operation of the tonearm the unit is fitted with a short circuiter. Control of the switch springs for both channels is effected by the camwheel. With the unit in neutral state the short circuit of the pick-up leads is eliminated.

Adjustment

In zero position of the cam there should be a clearance of approximately 0.5 mm between the contacts of the short ciruiter. This clearance should be adjusted by bending the short circuit contact. The contacts should be sprayed with a suitable cleaning agent.

Fig. 16

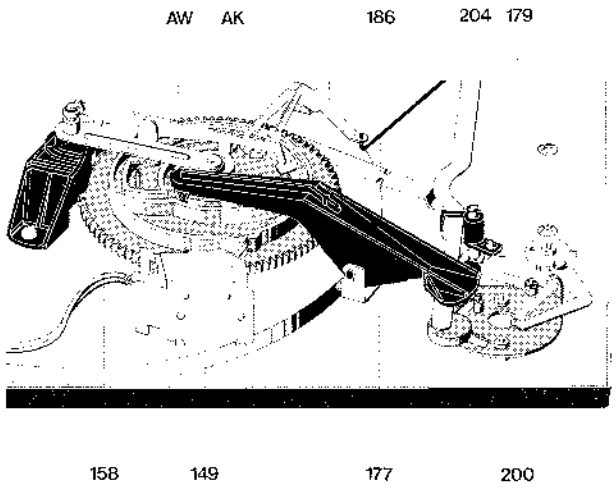


Record drop

Insert the appropriate spindle – AW 3 for standard records (7 mm or 1/4" center hole) or AS 12 for 45 rpm records (38 mm or 1 1/2" center hole).

The record drop is initiated by the cam wheel (158) whose drop cam surface (AK) controls the release rocker (AW) and the changer actuator rod.

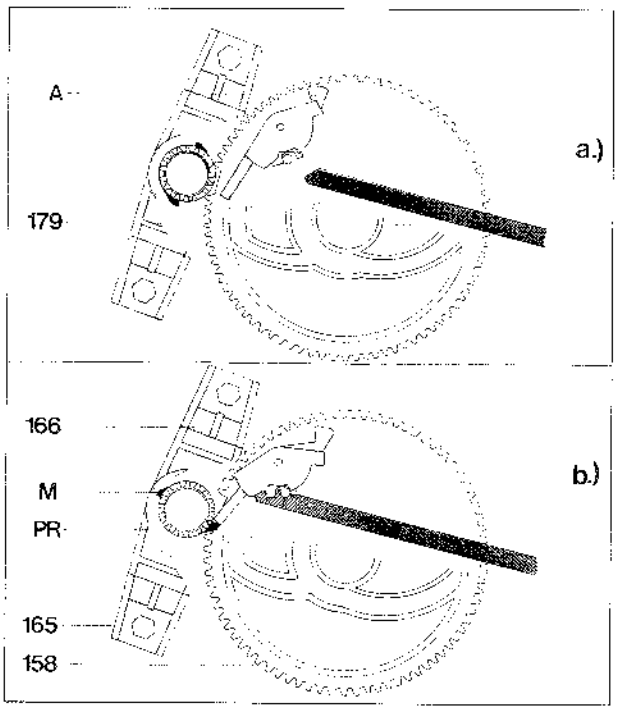
Fig. 17



Stopping

When control lever is set to "stop" position the start lever which is pulled towards the cam by means of tension, is feed. As a result, the shut-off lever is moved into the range of dogs cam. The cam follower lever remains in its stop position.

Fig. 18



Shut-off and change cycle

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

At the end of a record, the tonearm moves towards the center at an accelerated rate due to the increased pitch of the grooves. This motion carries the shut-off lever (A) towards the dog by means of the stop lever (179). The eccentric dog pushes the shut-off lever (A) back at each revolution as long as the tonearm advance is only one normal record groove (Fig. 18 a).

The run-out groove with its steeper pitch moves the shut-off lever against the dog with greater force, engaging the shut-off lever (A) and causing the main cam wheel (158) to be driven out of its neutral position by the turntable platter gear (Fig. 18 b).

Shut-off mechanism

Shut-off and change functions are determined by the position of the cam follower lever (U). After every start or recorddrop, the cam follower lever is brought to its stop position by the main lever (longer end towards the center of the main cam). As the record is dropped the cam follower lever (U) is turned to its start position by the cam rocker, so that the tonearm can swing in toward the record and be lowered on to it. If there are no more records on the spindle, and the cam rocker cannot turn the cam follower lever, the lever remains in its stop position and allows the tonearm to swing to its rest position.

When the main cam wheel (158) returns to its neutral position, the switch arm (186) drops into a cut-out in the main cam, opening the power switch (135) and disengaging the drive idler.

Tonearm set down point

Lift Dual loge (88) sligthely in left bottom corner and turn outside. There is one of the adjustment screws (Fig. 19) in the opening now visible.

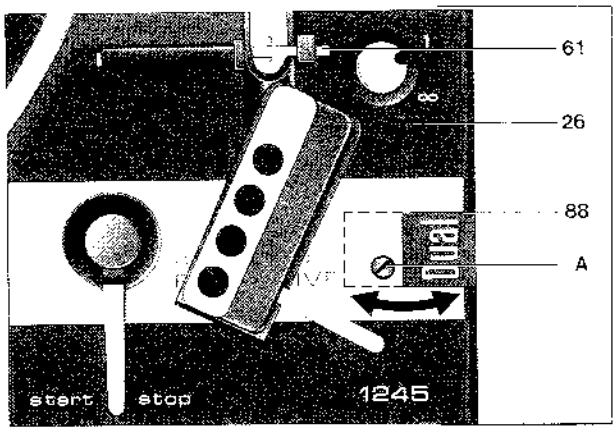
Set-down point for 30 cm records

Set adjustment knob (11) to "45" and adjust setting with a suitable screwdriver. If the stylus sets down too far inside, turn adjustment screw clockwise, if the stylus sets down outside the 30 cm record turn adjustment screw anti-clockwise.

Set-down point for 17 cm records

Set adjustment knob (11) to "33" and proceed by turning the screw as described above.

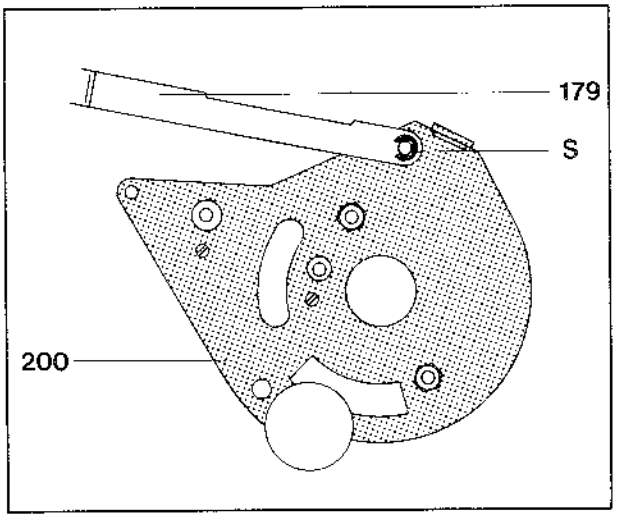
Fig. 19



The switch off position

With the tonearm on the pillar, the eccentric (8) can be adjusted to alter the switch-off position.

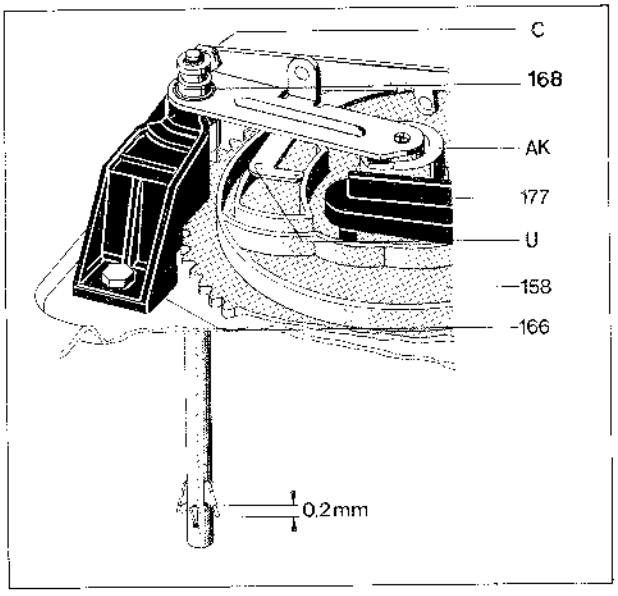
Fig. 20



Release rocker

The eccentric screw (c) is used to alter the travel of the changing bolt (168). The setting is correct when at the rest position of the cam wheel (158) and with interlocked changer spindle, the changing bolt (168) has a travel of 0.2 mm (Fig. 21).

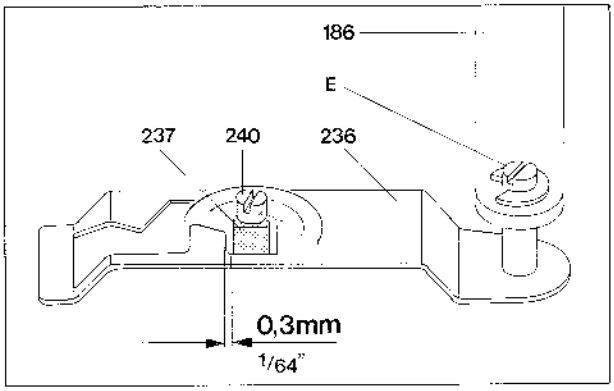
Fig. 21



Pawl

The play of the pawl (236) may be adjusted with the eccentric screw (E).
Pull out mains plug and turn unit over. Turn tonearm in until pawl is caught. Turn cam wheel (158) out of "zero" position. There should be about 0.3 mm play between pawl (236) and square section. If necessary turn eccentric screw (E) to left or right.

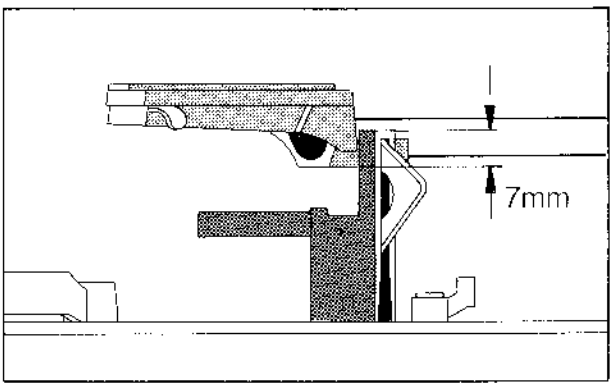
Fig. 22



Tonearm vertical lift

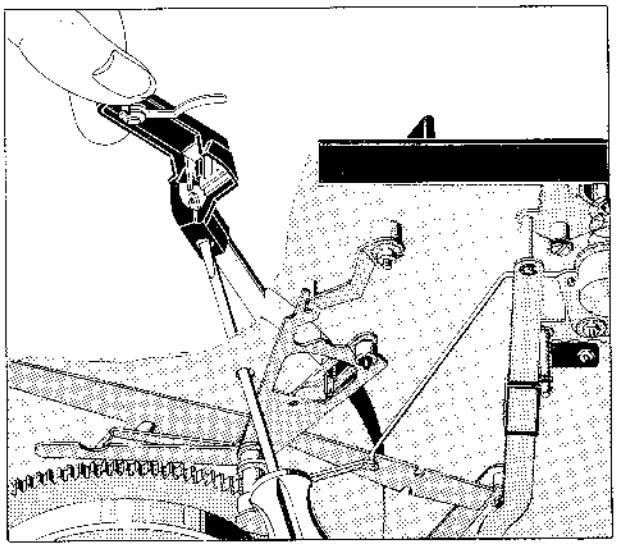
The adjustable sleeve (52) is used to adjust the tonearm vertical lift (for automatic operation). Pull out the mains plug, unlock the tonearm, turn the cam wheel (159) until the tonearm reaches its highest point of travel. The tonearm should now be approximately 7 mm above the pillar stop (see Fig. 19). Adjust by means of sleeve (52).

Fig. 23



Defect	Cause	Repair
Rotational speed lies at limit of adjustment range.	Bad adjustment of bearing	Set control knob (11) to its central position, loosen or tighten the hexagonal nut (110) to set up the correct rotational speed.
Platter does not the after switching unit on and moving tonearm inside	a) Beel not mounted	a) Mount belt
	b) Power supply to motor interupted	b) Check connecting at switch plate and power play.
	c) Motor pulley is loose	c) Fix Motor pulley
Platter does not come up to its required speed.	a) Drive pulley is not correct for local line frequency	a) Renew drive pulley
	b) Slippage between flat belt and drive pulley or between flat belt and flywheel rotor	b) Clean friction surface of flat belt, drive pulley and flywheel rotor. Renew flat belt if necessary. Once the flywheel rotor has been cleaned do not touch it with your fingers.
	c) Excessive friction in Motor bearing or flywheel rotor bearing assembly	c) Clean and oil bearings
Stylus slips out of playing groove	a) Excessive bearings friction in tonearm bearing.	a) Check tonearm bearings
	b) Steel ball (178) of shut-off bar missing	b) Renew steel ball (178)

Fig 24



Defect

Tonearm head not parallel to platter.

Cause

Seat of tonearm head on the tonearm tube has changed during

Remedy

Remove platter. Insert screwdriver through the hole in the chassis mounting plate. Align tonearm head and retighten screw.

Replacement parts

Pos.	Part. No.	Qty.	Description	
1	215 470	1	Automatic spindle	AS 12
2	213 895	1	Automatic spindle	AW 3
3	220 213	1	Centering piece	
4	201 101	1	Centering pin	
5	234 428	1	Support compl.	
6	210 472	8	Machine screw	AM 3 x 4
7	232 086	1	Tension spring	
8	234 430	1	Stop lever	
9	241 414	1	Tension spring	
10	210 194	1	Ring	G 2 x 0.6
11	234 912	1	Adjustment knob	
12	232 078	1	Bearing bush	
13	234 910	1	Speed lever	
14	237 222	1	Speed cover	
15	213 260	3	Pin	
16	239 414	3	Shipping screw compl.	
17	210 146	6	Lock washer	3.2
18	201 632	3	Rubber washer	
19	237 117	3	Washer	
20	237 118	3	Lock washer	
21	237 668	3	Special screw	
22	238 434	1	Washer	
23	200 543	1	Lock washer	
24	242 092	1	Platter sandwich compl.	
25	242 588	1	Platter compl. with sandwich	
26	236 895	1	Tonearm head compl.	
27	237 223	1	Contact plate compl.	
28	234 611	1	Handle	
29	210 182	1	Lock washer	
30	210 630	1	Washer	4.2/6/0.5
31	210 197	1	"C" clip	
32	234 435	1	Flat belt	
33	236 242	1	Holder	TK 24
34	210 472	8	Machine screw	AM 3 x 4
35	234 599	1	Pin	
36	242 589	1	Mounting plate compl.	
37	237 226	1	Spring mount compl. (tonearm side front)	
	237 227	2	Spring mount compl. (motor side)	
	237 228	1	Spring mount compl. (tonearm side back)	
38	230 529	4	Grub screw	
39	236 710	1	Compression spring (tonearm side front)	
	236 711	2	Compression spring (motor side)	
	236 712	1	Compression spring (tonearm side back)	
40	200 723	4	Rubber damping	
41	200 722	4	Steel cup	
42	240 069	1	Adjustment screw	
44	230 063	1	Threated piece	
45	234 635	2	Stop nut	
46	242 590	1	Frame compl.	

Pos.	Part. No.	Qty.	Description	
47	210 643	1	Washer	4.2/12/1
48	210 366	1	Hex nut	M 4
49	237 738	1	Fillister screw	M 3 x 8
50	237 660	1	Guide	
51	210 143	2	Lock washer	1.5
52	218 318	1	Adjusting sleeve	
53	241 930	2	Fillister screw	M 3 x 5
54	242 591	1	Cover back compl.	
55	216 853	1	Compression spring	
56	240 054	1	Lifting bolt	
57	200 444	2	Spring washer	
58	240 062	1	Switch lever right compl.	
59	242 592	1	Cover front compl.	
60	200 444	4	Spring washer	
61	236 911	1	Support compl.	
62	210 362	1	Hex nut	M 3
63	242 593	1	Tonearm compl.	
65	236 904	1	Weight compl.	
67	236 160	2	Supporting plate	
68	242 595	1	Bearing frame compl.	
71	236 051	1	Clamb belt	
72	239 741	1	Pointer	
75	234 617	2	Fixing screw	
76	235 634	1	Grub screw	
77	234 635	2	Lock nut	
78	242 131	1	Adjustment screw	
80	242 596	1	Frame compl.	
81	236 907	1	Spring housing	
83	235 637	1	Bearing screw	
84	239 582	1	Pointer washer	
85	216 867	1	Lock washer	5.2/10
86	225 176	1	Curve washer	
87	210 362	1	Hex nut	M 3
88	234 533	1	Dual emblem	
89	222 279	1	Washer	4.2/10/0.3
90	218 894	1	Lock washer	3.2/8
91	210 196	1	"C" clip	3 x 0.6
92	240 151	1	Rotary knob	
93	210 586	1	Washer	3.2/7/0.5
100	210 146	6	Lock washer	3.2
101	232 096	1	Switch lever	
102	232 071	1	Special spring	
103	232 094	1	Connecting part	
104	232 079	1	Special nut	
105	232 097	1	Belt rad II	
106	240 035	1	Washer	
107	210 607	1	Washer	3.2/10/0 5
108	210 362	1	Hex nut	M 3

Fig. 25 Exploded view 1

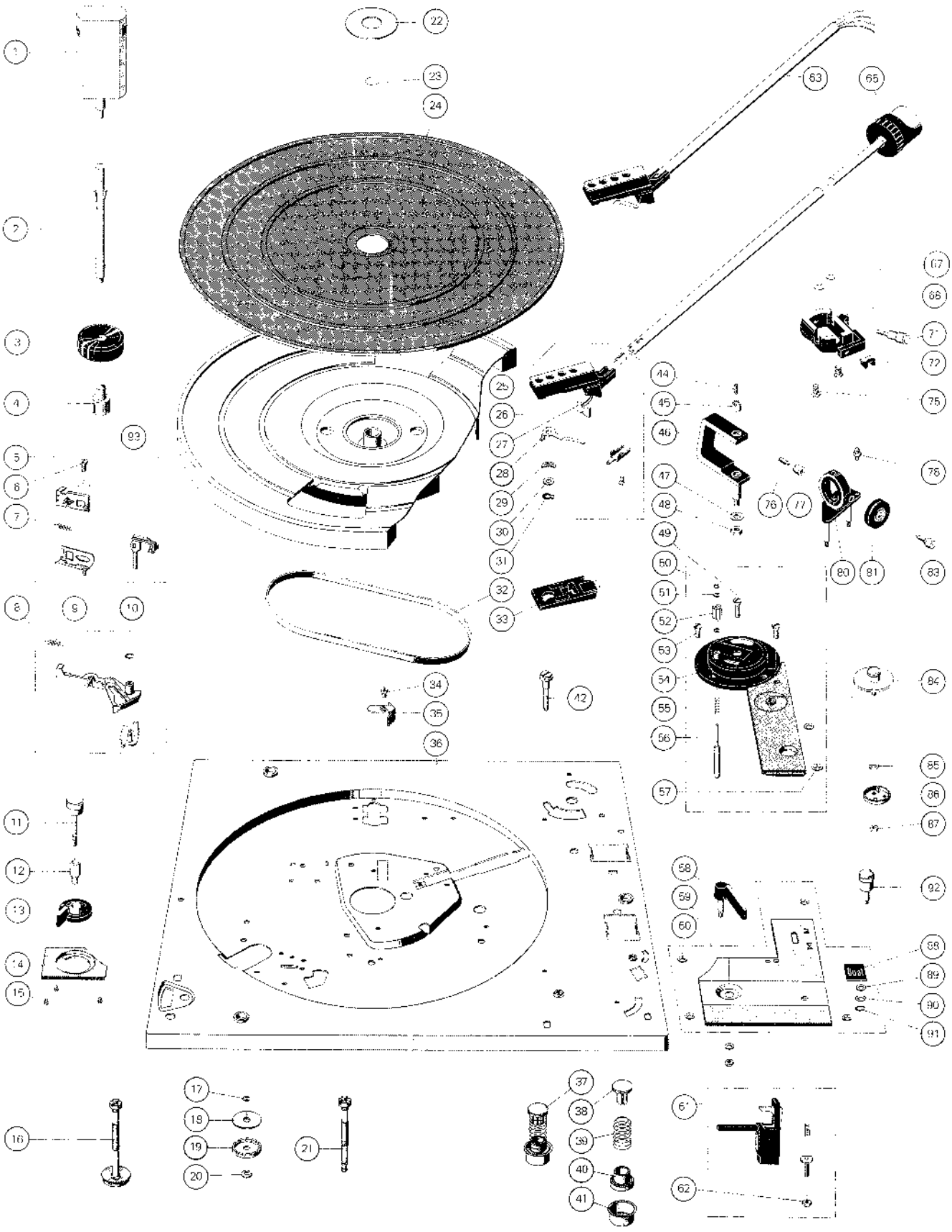
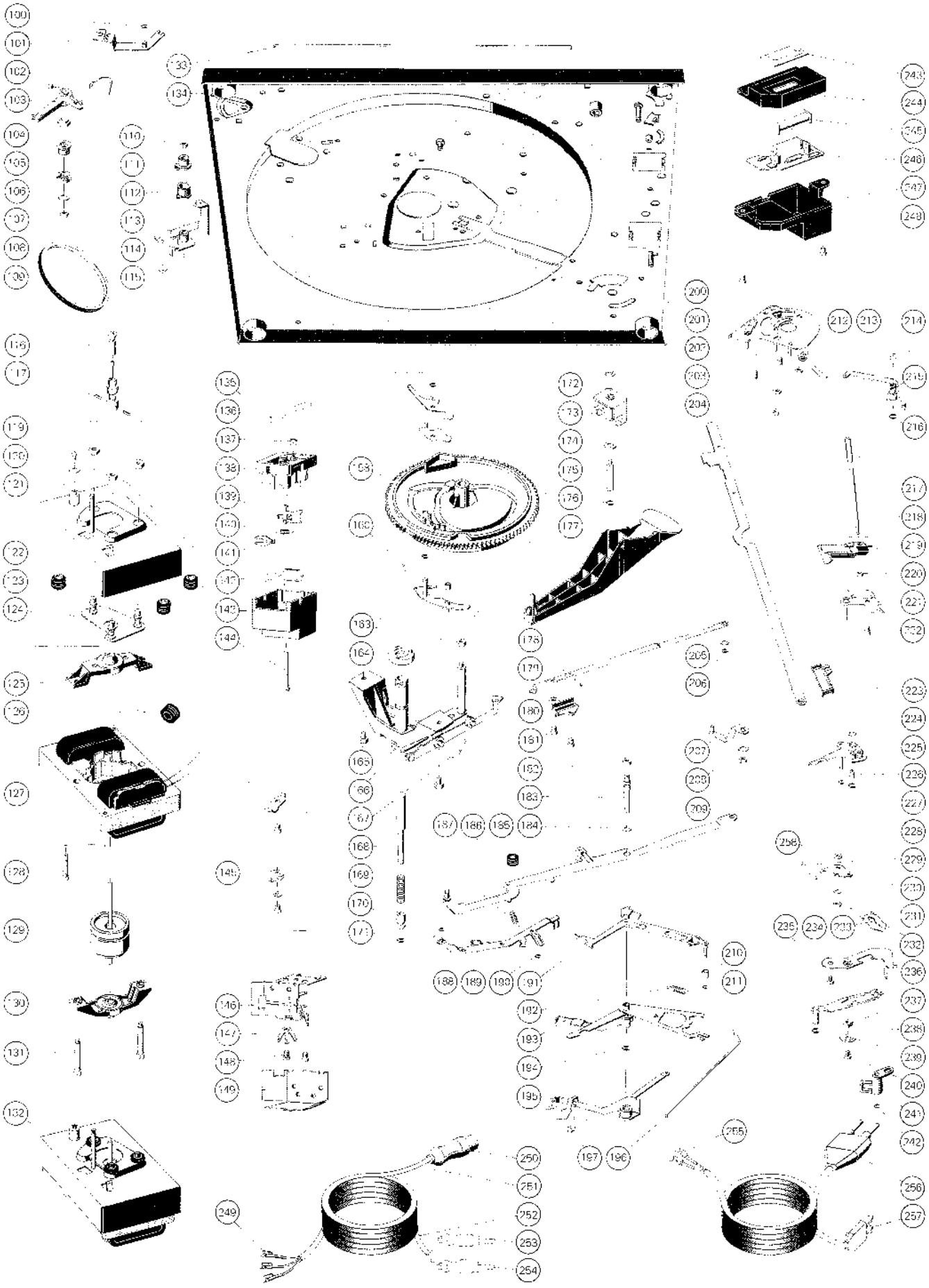


Fig. 26 Exploded view 2



Pos.	Part. No.	Qty.	Description	
109	232 076	1	Toothed belt	
110	222 200	1	Hex nut	M 3.5
111	241 641	1	Lockating curve	
112	241 642	1	Belt rad I	
113	241 644	1	Conter bearing	
114	233 777	1	Tension spring	
115	232 615	1	Compression spring	
116	234 453	1	Drive roll 50 Hz compl.	
	234 454	1	Drive roll 60 Hz compl.	
117	233 137	2	Grub screw	M 2.5 x 3
119	210 366	3	Hex nut	M 4
120	210 480	1	Machine screw	AM 3 x 6
121	210 609	1	Washer	3.2/10/1
122	241 328	1	Screening plate compl.	
123	232 841	3	Rubber damping	
124	232 840	1	Inlayer compl.	
125	241 570	1	Top bearing compl.	
126	209 939	1	Sleeve	
127	241 569	1	Stator 110/220 V	
128	233 815	1	Machine screw	AM 2.5 x 18
129	241 571	1	Anker compl.	
130	241 572	1	Bottom bearing bracket compl.	
131	210 525	2	Machine screw	AM 4 x 25
132	242 076	1	Motor SM 860-1 compl.	
133	234 592	1	Switch lever	
134	242 598	1	Mounting plate compl.	
135	242 580	1	Power switch compl.	
	242 583	1	Power switch compl.	
136	236 335	1	Sliding	
137	200 444	1	Spring washer	
138	233 012	1	Switch plate compl.	
139	230 148	1	Switch slide	
140	239 732	1	Tension spring	
141	219 200	1	Snab spring	
142	241 883	1	Capacitor 10 nF/1000 V/10 %	
	230 355	1	Capacitor 68 nF/ 250 V/20 %	
143	242 095	1	Power switch cover	
144	210 498	1	Machine screw	M 3 x 28
145	231 079	1	Cable holder compl.	
146	232 987	1	Muting switch compl.	
147	239 562	1	Soldering lug	
148	210 472	8	Machine screw	AM 3 x 4
149	232 084	1	Screening plate	
158	236 912	1	Curve rad compl.	
160	200 522	1	Snap spring	
163	210 366	1	Hex nut	M 4
164	229 754	1	Ball	
165	218 155	2	Hex screw	M 4 x 6
166	242 100	1	Bearing bridge compl.	
167	234 576	1	V-spring	
168	234 577	1	Spindle	
169	213 920	1	Compression spring	
170	213 921	1	Bush	
171	210 145	6	Lock washer	2.3
172	210 587	1	Washer	3.2/7/1
173	234 677	1	Bearing	
174	210 667	1	Washer	5.3/10/0.5
175	234 676	1	Screw spindle	
176	210 147	2	Lock washer	4
177	236 914	1	Lever compl.	
178	211 718	1	Ball	ϕ 3
179	234 668	1	Stop lever	
180	234 558	1	Ball bearing	
181	210 472	8	Machine screw	AM 3 x 4
182	210 362	1	Hex nut	M 3
183	234 544	1	Spindle	
184	210 586	1	Washer	3.2/7/0.5
185	236 950	1	Stop	
186	234 542	1	Switch lever	
187	229 686	1	Tension spring	
188	210 144	1	Lock washer	1.9
189	234 579	1	Shut-off lever	
190	210 145	6	Lock washer	2.3
191	234 545	1	Start	
192	229 698	1	Tension spring	
193	234 550	1	Change lever	
194	210 146	6	Lock washer	3.2

Pos.	Part. No.	Qty.	Description	
195	234 555	1	Selector lever compl.	
196	234 598	1	Switch slide	
197	236 095	1	V-spring	
200	242 597	1	Segment compl.	
201	234 026	2	Grub screw	M 2.5 x 4
202	210 362	2	Hex nut	M 3
203	223 777	1	Guide	
204	240 060	1	Positioning slide	
205	201 187	1	Slip plate	
206	210 145	6	Lock washer	2.3
207	234 583	1	Switch lever	
208	210 641	1	Washer	4.2/10/1
209	210 362	1	Hex nut	M 3
210	234 548	1	Roll	
211	210 143	3	Lock washer	1.5
212	218 591	1	Tension spring	
213	201 184	1	Adjustment washer	
214	229 688	1	V-spring	
215	240 086	1	Skating lever compl.	
216	210 146	6	Lock washer	3.2
217	237 543	1	Rubber sleeve	
218	237 541	1	Handle lever compl.	
219	240 063	1	Lift plate	
220	210 353	1	Hex nut	M 2
221	240 066	1	Bearing plate	
222	210 469	2	Machine screw	AM 3 x 3
223	234 674	1	Stop piece	
224	210 587	1	Washer	3.2/7/1
225	234 588	1	Adjustment lever	
226	230 087	1	Screw spindle	
227	210 146	6	Lock washer	3.2
228	210 145	6	Lock washer	2.3
229	232 545	1	Leaf spring	
230	234 593	1	Switch angle	
231	203 477	1	Washer	2.7/8/1
232	210 353	1	Hex nut	M 2
233	239 810	1	Securing spring	
234	240 070	1	Intermediate plate	
235	210 469	8	Machine screw	AM 3 x 3
236	232 599	1	Pawl	
237	240 071	1	Square section	
238	210 145	6	Lock washer	3.2
239	229 704	1	Washer	3.2/13/0.5
240	210 472	8	Machine screw	AM 3 x 4
241	229 362	1	Guide bearing	
242	210 145	6	Lock washer	2.3
243	234 700	1	Stroboscope trimplate	
244	236 916	1	Stroboscope housing	
245	225 321	1	Lamp	
246	236 917	1	Switch plate compl.	
C 1	225 322	1	Foil	68 nF/400 V/10 %
C 2	224 886	1	Foil	47 nF/250 V/20 %
D 1	225 247	1		BY 183/300
R 1	232 402	1		22 kΩ/0.25 W/5 %
R 2	232 401	1		12 kΩ/0.125 W/5 %
247	236 918	1	Cover	
248	210 469	2	Machine screw	AM 3 x 3
249	209 436	3	Flat connector	
250	209 424	1	5 pole plug	
251	207 303	1	Audio cable compl.	
252	207 301	1	Audio cable compl. with cynch-a and flat plug	
253	209 425	1	Cynch plug white	
254	209 426	1	Cynch plug black	
255	214 602	1	AMP-connector	
256	232 996	1	Power cable compl. europa	
257	232 995	1	Power cable compl. america	
258	210 586	1	Washer	3.2/7/0.5
***	214 120	1	Distance roll and screws for cartridge mounting	
***	241 299	1	Operating instruction 1245	
***	241 657	1	Operating instruction 1245 UAP	
***	241 300	1	Mounting instruction	
***	240 971	1	Shipping carton	
***	241 177	1	Shipping carton CS	

*** not illustratet

Modification reserved!

Lubrication

All bearing and friction points of the unit are adequately lubricated at the works. Replenishment of oil and grease is only necessary after approximately 2 years of normal use of the record player as the most important bearing points (motor bearings) have sintered metal bushes.

Bearing points and friction faces should be lubricated sparingly rather than generously.

It is important that no oil grease should come in contact with the friction faces of the felt belt, drive pulley and flywheel rotor, otherwise slip will occur.

When using different lubricants, chemical decomposition can often take place. To prevent lubrication failure we recommend using the original lubricants stated below.

Fig. 27

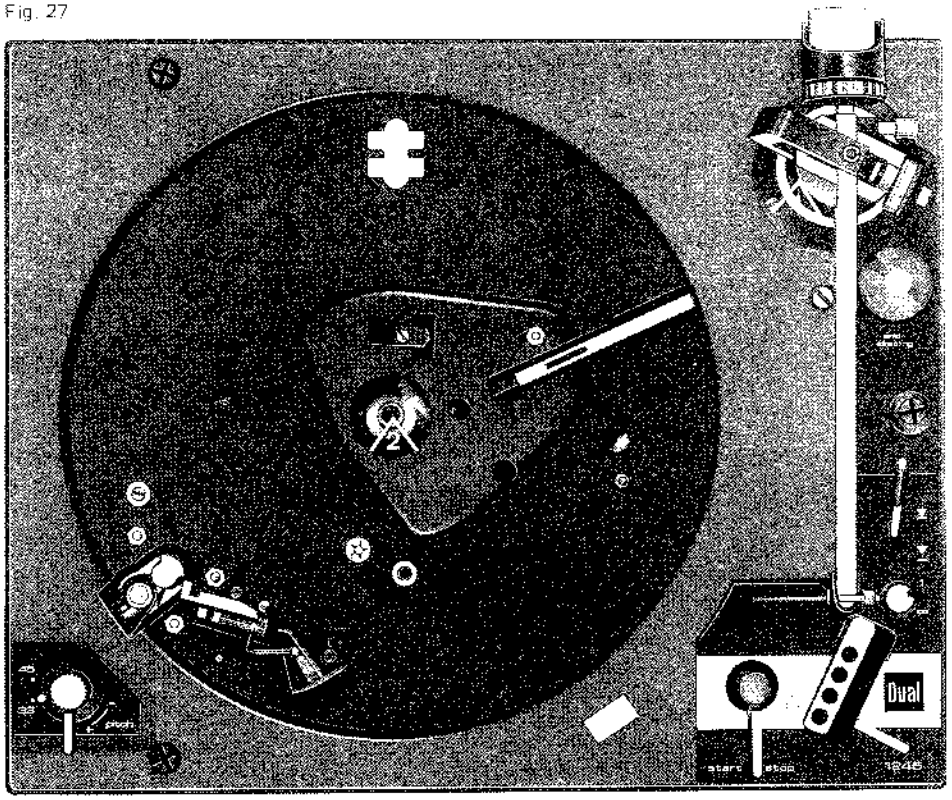
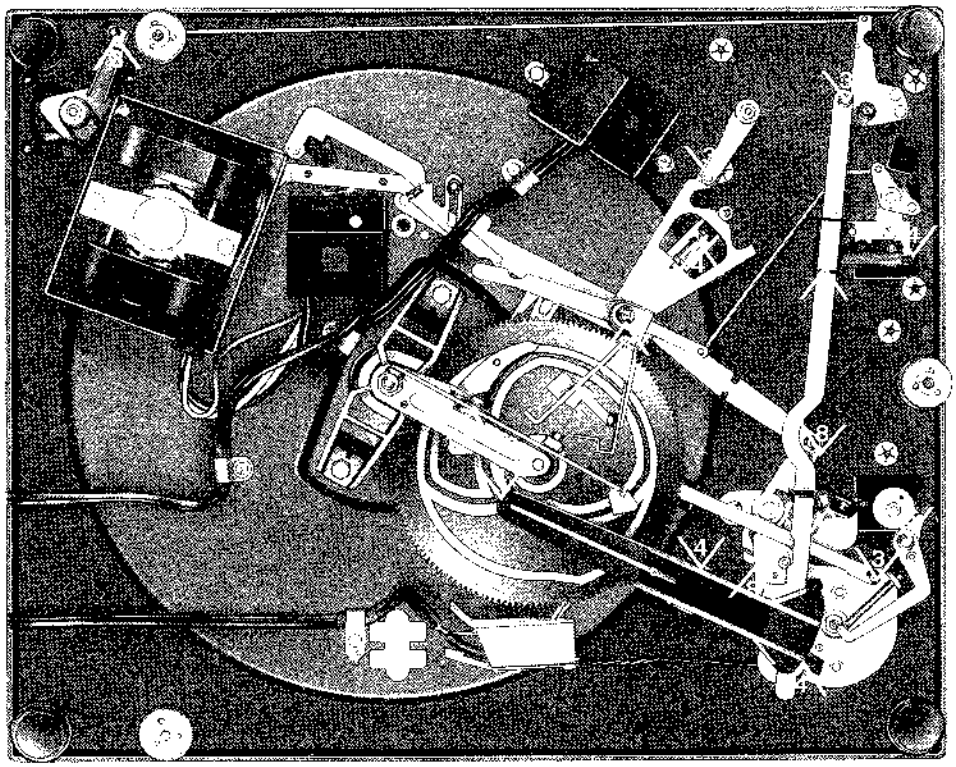


Fig. 28



1 Wacker Siliconöl AK 300 000

2 Haftöl Renotac No. 343

3 BP Supper Viscostatik 10 W/40

4 Shell Alvania No. 2

5 Isoflex PDP 40

8 Molykote

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