

PARTS LIST (CONTINUED)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
58	A102595	Washer	111	A106749	Lug (2 req'd)
59	A104584	Screw, Shipping (MD-500 only) (2 req'd)	112	A105263	Screw, Type Z, 6 x 3/8" BH
	A104189	Screw, Transit (UA70 only) (2 req'd)	113	B106119	Slide, Reject
60	A100762	"E" Washer (5 req'd)	114	A106193	Plate, Reject
61	A101620	Washer, Idler Pulley (2 req'd)	115	B106143	Slide, Selector
62	A101623	Pulley, Idler	116	A106134	Link, Reject
63	A101646	Washer (3 req'd)	117	A106067	Lever, Reject
64	A102181	Grommet, Rubber Mounting (3 req'd)	118	A105825	Spring
65	A102616	Jack, Dual	119	A103558	Clip
66	A102166	Clip, Retaining (2 req'd)	120	A102595	Washer
67	B106190	Baseplate Assembly	121	A106398	Spring
68	A106559	Nameplate, McDonald (MD-500 only)	122	A106171	Selector Lever
69	A106565	Escutcheon (MD-500 only)	123	A101646	Washer
70	A106090	Spring, Mounting (4 req'd)	124	A106170	Plate, Detent
71	A106089	Cup, Spring (4 req'd)	125	A106747	Setscrew, 4BA x 3/16", Allen
72	B106117	Escutcheon	126	A106221	Counterweight
73	A106176	Trim, Small	127	A100785	"C" Washer (4 req'd)
74	B106122	Knob (3 req'd)	128	A102132	Pawl, Actuating
75	A106177	Trim, Large	129	A102110	"E" Ring (2 req'd)
76	C106115	Cover, Control	130	A102133	Gear, Cam
77	A106179	Plate, 16 33 45 78	131	A101506	Washer (2 req'd)
78	A106180	Plate, OFF ON REJ	132	A101649	Ball Race Assembly
79	A106178	Plate, 12 10 7	133	A102058	Washer, Damping
80	A106510	Screw, Type Z, 6 x 1/4" BH (7 req'd)	134	C106187	Main Sub Plate Assembly
81	A106116	Clip, Tone Arm Rest	135	A104882	Spring, Retaining
82	A106173	Spring, Tone Arm Rest	136	A106413	Spring
83	A106114	Rest, Tone Arm	137	A105849	Spring
84	A105677	Collar, Damping (2 req'd)	138	A105660	Washer, Control
85	A106507	Screw, Type 25, 6-20 x 3/4" BH	139	A106627	Spring, Detent
86	B106405	Link, Switch	140	A102126	Lug
87	A106129	Lever, Switch	141	A105982	Shaft, Selector Arm
88	A105826	Spring, Switch Lever	142	A105985	Spring, Control Arm Spindle
89	A102588	Eyelet (2 req'd)	143	A104861	Spacer
90	B106118	Slide, Speed Change	144	A106615	Stop Latch Assembly
91	A105267	Screw, Type 25, 4-24 x 5/16" BH (3 req'd)	145	A105981	"C" Washer
92	A106513	Sleeving, 5mm P.V.C. (3" Long)	146	B105592	Lever, Cut Off
93	A102718	Clamp, Cable	147	A101526	"E" Ring
94	A105263	Screw, Type 25, 6-20 x 3/8" BH	148	A102251	Clip, Retaining
95	B106113	Cam, Speed Change	149	A105901	Spring, Actuating Slide
96	A105965	Arm, Idler Pulley	150	A105961	Actuating Slide Assembly
97	A105824	Spring, Idler Pulley	151	B106189	Quadrant Assembly
98	A105619	Screw, Height Adjust	152	A105609	Support, Spring
99	A106068	Arm, Speed Change	153	A104384	Spring, Leaf
100	A106034	Bracket, Speed Change	154	A102237	Washer
101	A105733	Spindle, Cam	155	A106511	Screw, Type 25, 4-24 x 1/2" BH
102	A105831	Spring, Cam Spindle	156	A105825	Spring (2 req'd)
103	MD-10063	Clamp, Plastic	157	A106408	Tone Arm Raising Spindle Assembly
104	B106715	Pulley, Motor, 60 Hz	158	A105839	Spring, Operating Plate
	B106714	Pulley, Motor, 50 Hz	159	B105959	Operating Plate Assembly
105		Motor, F.P. 10	160	A105827	Spring, Link Return
106	A105472	Nut, Wire Connector (2 req'd)	161	B105597	Link, Feed Lever
107	B106016	Switch	162	A106968	Spring, Feed Lever Link
108	A106512	Screw, Type 25, 4-24 x 5/8" BH (2 req'd)	163	A106066	Strap
109	A103092	Insulator	164	A105610	Toggle
110	A103096	Connector, 4-Contact, Amplok	165	A102623	Spring

Idler Pulley Ref. No. 62 — WALSCO Part No. 1499-45

When ordering a part that may differ in color (such as Tone Arm, Knobs, etc.) the correct suffix number (i.e., -1, -2, etc.) listed below must be added to the part number to indicate desired color.

-1 Brown
-2 Grey
-3 Black
-4 Beige
-5 Pearl Grey
-6 Off-White
-7 Gold
-8 Silver

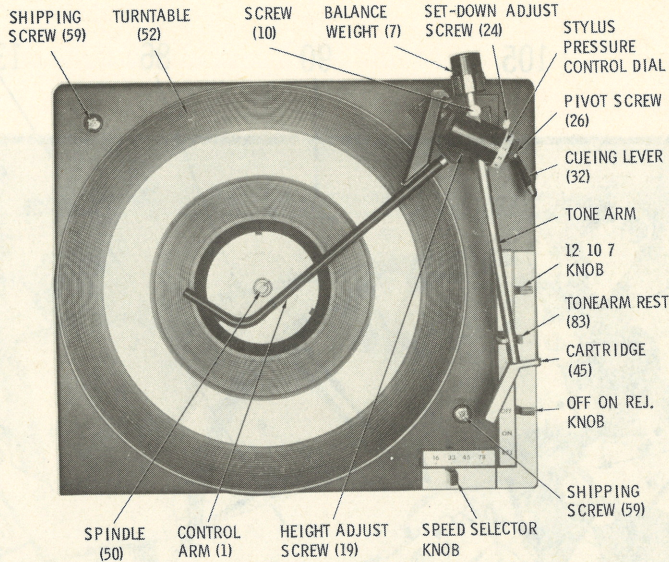
-9 Platinum
-10 Light Grey
-11 Tan
-12 Lustre Aluminum
-13 Blue
-14 Sepia
-15 Slate
-16 Warm White

-17 Ochre
-18 Charcoal
-19 Khaki
-20 Azure
-21 Chocolate
-22 Ivory
-23 Pewter
-24 Warm Grey
-25 Blue Grey

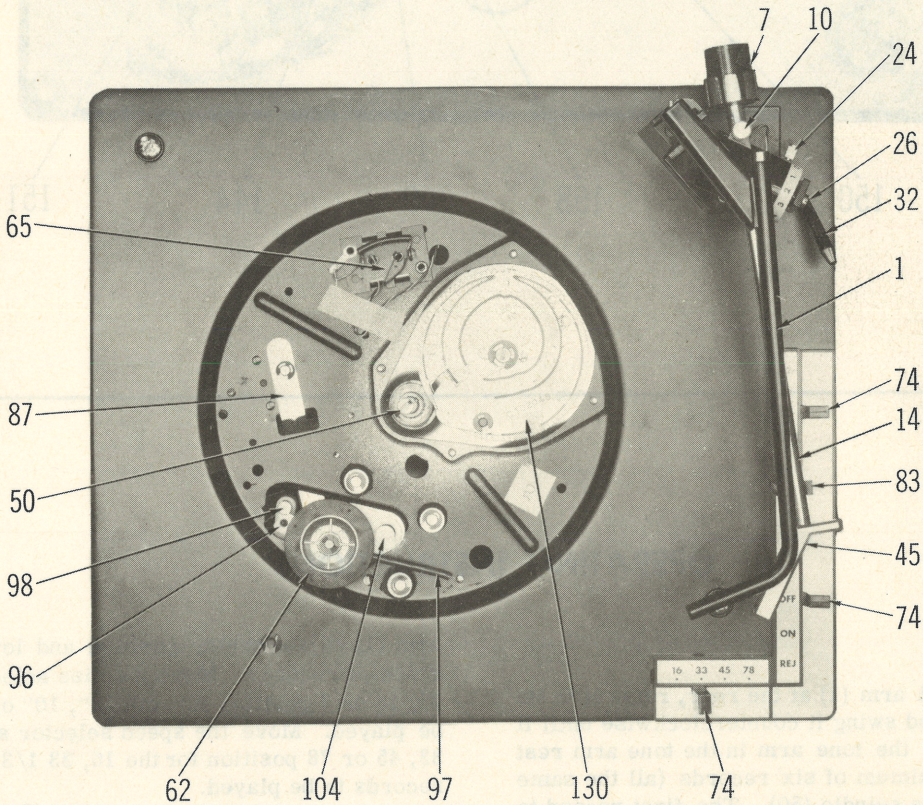
SET 921 FOLDER 4

BSR MODELS
UA70 Series, McDONALD 500

PHOTOFACT® Folder



TRADE NAME: BSR Models UA70 Series, McDonald 500
SUPPLIER: For Current Address, See Annual Index
TYPE SET: 4-Speed Automatic Record Changer
POWER SUPPLY: 110 - 120 Volts AC, 60 Cycles



HOWARD W. SAMS & CO., INC. Indianapolis, Indiana 46206

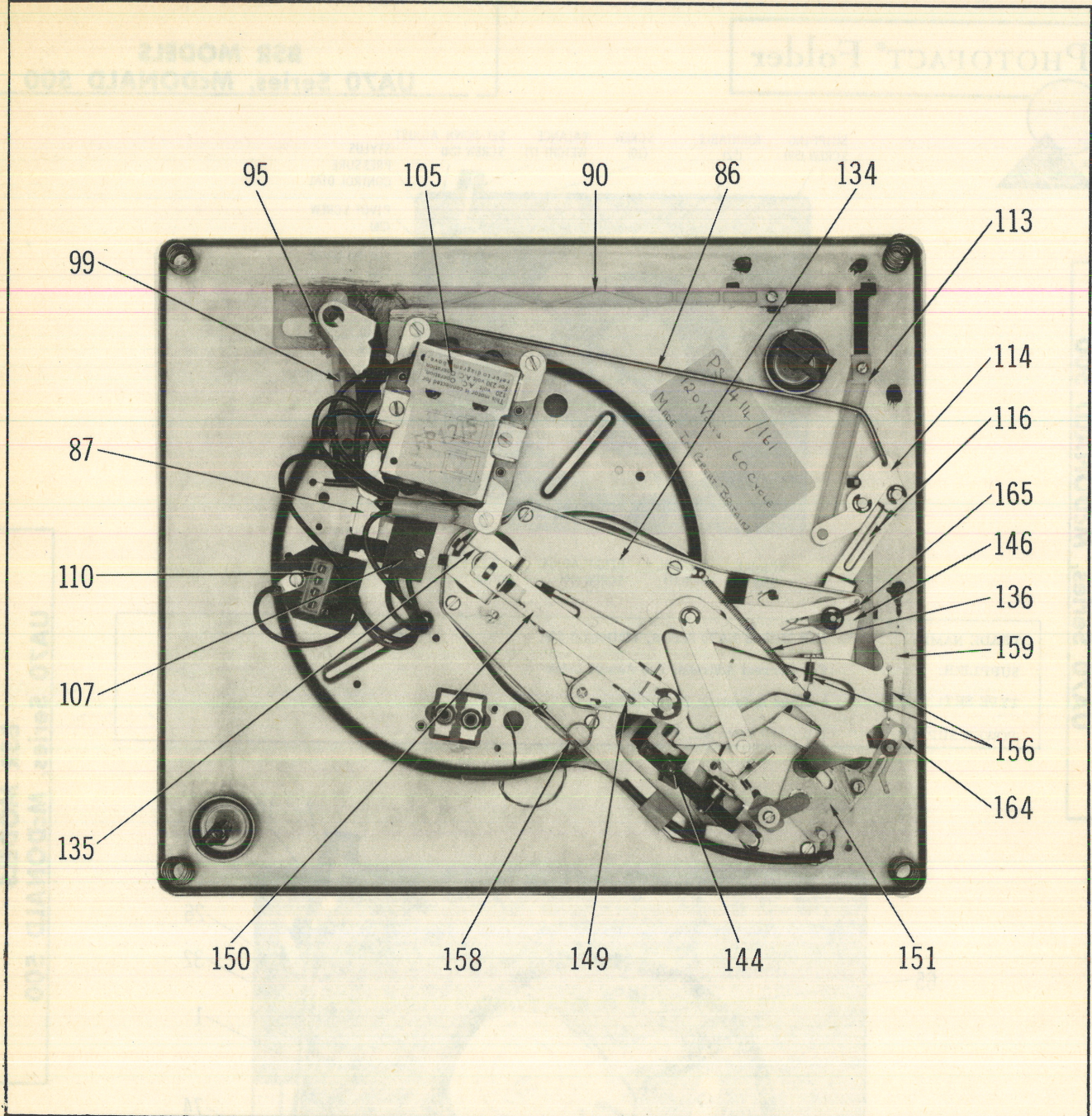
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DATE 11 -67 SET 921 FOLDER 4

BSR MODELS
UA70 Series, McDONALD 500

SET 921 FOLDER 4



OPERATING INSTRUCTIONS

Automatic Play

Grasp control arm (1) at the rear, raise it to its highest position and swing it counterclockwise until it is positioned over the tone arm in the tone arm rest (83). Place a maximum of six records (all the same size and speed) on spindle (50). The first record to be played must be located carefully on the ledge of spindle (50) and held in place until the rest of the records are placed on spindle (50). Return control

arm (1) to its center position and lower it onto the stack of records. Move the size selector knob to the 12, 10 or 7 position for the 12", 10" or 7" records to be played. Move the speed selector switch to the 16, 33, 45 or 78 position for the 16, 33 1/3, 45 or 78 RPM records to be played.

If the cartridge is equipped with more than one stylus, be sure the correct one is in position for the records to be played.

TROUBLE CHART (Continued)

Symptom	Cause	Remedy
Changer fails to shut off after last record has played and tone arm has returned to rest.	1. Switch (107) fouled by AC leads.	1. Move leads clear of switch (107).
	2. Faulty switch (107).	2. Replace switch (107).
Noise during playing of record.	1. Motor rumble.	1. Motor (105) must float freely on mounting grommets (64). Replace grommets (65) if necessary. Motor leads must be positioned to allow free movement of motor (105).
	2. Turntable (52) bearings and ball race (132).	2. Clean and lubricate bearings. Replace ball race (132) if necessary. Use light machine oil on bearing of turntable (52), and medium grade grease on ball race (132).
	3. Defective idler pulley (147).	3. Replace idler pulley (147).
Gram indicator loose.	1. Retaining clip (15) loose or missing.	1. Reposition or replace clip (15).
Tone arm moves into center and returns to 45 rpm setdown and plays record.	1. Spring (156) loose or missing.	1. Reposition or replace spring (156).

PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	B106188	Control Arm Assembly	30	A106474	Lever, Cueing
2	A102096	Pin, Control Arm	31	A106472	Cap, Knob
3	A106575	Weight, Balance (MD-500 only)	32	A106471	Knob, Cueing Lever
4	A106702	Weight, Ring (MD-500 only)	33	A106473	Spring
5	A106746	Screw, 4BA x 1/8" (MD-500 only)	34	A105258	Screw, 6BA x 1/4" CS Phillips (MD-500 only)
6	A100785	"C" Washer (4 req'd)	35	B106264	Head, Tone Arm (MD-500 only)
7	A106397	Weight, Balance (MD-500 only)	36	A102128	"C" Washer (3 req'd)
	A106320	Weight, Balance (UA70 only)	37	A104964	Lift, Finger (MD-500 only)
8	A106182	Washer, Rubber	38	A106745	Cable, 5-wire (MD-500 only)
9	A106157	Screw, Weight Adjust	39	A104306	Sleeve, Insulating (MD-500 only) (4 req'd)
10	A106158	Screw, Weight Clamping	40	A103587	Lug, Solder (MD-500 only)
11	A106500	Ball, 1/16" Bearing (2 req'd)	41	A102720	Terminal, Cartridge Connecting (MD-500 only) (4 req'd)
12	A106394	Spring, Pivot Bearing	42	A105155	Plate, Cartridge Adaptor (MD-500 only)
13	B106441	Tone Arm Body Assembly	43	A106570	Screw, Type Z, 2 x 1/4" CS Phillips (MD-500 only) (2 req'd)
14	B106175	Tube, Tone Arm	44	A106506	Screw, Type Z, 2 x 1/8" PH (MD-500 only) (2 req'd)
15	A106399	Spring, Retaining	45		Cartridge, TETRAD (UA70 only)
16	A106502	Screw, Type 25, 4-24 x 3/16" (2 req'd)	46		Trim (Part of Item No. 44) (UA70 only)
17	A106413	Spring, Stylus Pressure	47	A106493	Clip, Ground (UA70 only)
18	A100807	Spring	48		Cable, 4-wire (UA70 only)
19	A106153	Screw, Height Adjust	49		Connector, 4-contact (UA70 only)
20	A106195	Tone Arm Hinge Assembly	50	A104842	Spindle, Automatic
21	A106503	Nut	51	A106174	Spindle, Manual
22	A106133	Lever, Set-down Adjust	52	B106195	Turntable Assembly Complete
23	A106395	Spring	53	C106112	Mat, Turntable (Part of Item No. 52)
24	A106156	Screw, Set-down Adjust	54	B106139	Ring, Turntable Trim (Part of Item No. 52)
25	A102109	"E" Ring (10 req'd)	55	C106194	Turntable (Part of Item No. 52)
26	A106159	Screw, Tone Arm Pivot	56	B106024	Disc, Turntable Center
27	C106138	Housing, Control	57	A105678	"E" Washer
28	A106120	Pad, Raising			
29	A106505	Setscrew			

TROUBLE CHART (Continued)

Symptom	Cause	Remedy
Tone arm does not track correctly across record.	1. Stylus may be clogged with an accumulation of dust, or stylus may be badly worn or broken.	1. Clean foreign material from around stylus. Replace stylus if badly worn or broken.
	2. Tone arm leads too tight.	2. Give tone arm leads enough slack to allow tone arm to move freely across record.
	3. Changer not level.	3. See that changer is level before operating.
	4. Insufficient stylus pressure.	4. Adjust stylus pressure as described under "ADJUSTMENTS."
	5. Record with worn or damaged grooves.	5. Replace record.
	Lateral friction caused by:	
	6. Excessive tension on leaf spring (153).	6. Bend leaf spring out slightly to release tension.
	7. Weak leaf spring (153).	7. Bend leaf spring inwards.
	8. Screw (155) on leaf spring (153) loose.	8. Tighten screw.
	9. Counter weight (126) loose.	9. Adjust counter weight (126) to clear swing of tone arm.
	10. Counter weight binds against screw (80).	10. Adjust counter weight (126) to clear screw (80).
Unit will not re-cycle at end of record.	11. Actuating pawl assembly (128) sticking.	11. Release or replace actuating pawl (128).
	1. Tripping pawls assembly (128) binding.	1. Check for friction and free movement.
	2. Needle setdown inside music groove.	2. Adjust needle to set down at center of lead-in groove.
Vertical friction of tone arm.	1. Balance spring (17) bent.	1. Replace.
	2. Bearings (11) or spring (12) missing.	2. Replace.
	3. Tone arm hinge assembly (20) tight on pivots.	3. Adjust hinge to relieve pressure over pivot points.
Two records drop together.	1. Hole in record too large.	1. Replace record.
	2. Control arm (1) not fully down (possibly due to incorrectly loaded records).	2. Carefully clean shaft of control arm (1) and remove burrs, if any. Do not oil shaft. Control arm (1) should fall in position from own weight.
	3. Control arm (1) not holding records level.	3. Gently twist control arm (1) until it will hold record stack parallel to the top surface of turntable (52).

If 45 RPM (large center hole) records without center hole adaptors are to be played, slip the 45 RPM adaptor spindle over automatic spindle (50). The arrow on the top of the 45 RPM adaptor spindle must point toward the front left corner of the changer.

Starting

To start, move the OFF ON REJ knob to the REJ position and release, allowing the knob to move back to the ON position. The turntable will revolve, the first (bottom) record will drop to the turntable and the tone arm will place the stylus in the starting groove to play the record.

Rejecting

To reject a record at any time while the changer is in operation, move the OFF ON REJ knob to REJ and release. If the record being played was not the last one in the stack, the next record will be dropped and played. If the record being played was the last record in the stack, the tone arm will move to the tone arm rest and the changer will shut off.

Stopping

The changer can be stopped at any time by moving the OFF ON REJ knob to the OFF position. If the changer is stopped during the "change cycle," it must be allowed to complete the cycle (by manual rotation of the turntable, if necessary) before moving the tone arm and removing the records.

During normal automatic operation, with the control arm in the center position, the changer will stop automatically after the last record has been played.

Unloading

To unload the changer, raise the control arm to its highest position and swing it into position over the tone arm. Using both hands, grasp the edge of the bottom record and gently lift the record stack straight up and off the spindle.

After unloading a stack of 45 RPM records, with large center holes, make sure the 45 RPM adaptor spindle is properly seated before playing additional 45 RPM records.

Semi-Automatic Play

For semi-automatic play and repeat of a single record, lift the control arm, move it to its position

over the tone arm and leave it there. Remove the automatic spindle (50) by pulling up and turning clockwise to release it, and then lifting it up and out of the center hole of the turntable. Insert manual spindle (51) in the center hole.

Place the record on the turntable and set the controls for correct record size and speed. Select correct stylus.

To start, move the OFF ON REJ knob to REJ and release. The tone arm will move to the starting groove and the record will be played and repeated automatically until the OFF ON REJ knob is moved to OFF.

If the control arm is returned to the center position over the turntable, after the stylus is in the starting groove, the tone arm will be returned to the tone arm rest and the changer shut off automatically at the end of the record.

Manual Play

To manually play a record, move the selector arm to its position over the tone arm. With the manual spindle inserted in the turntable and correct speed and stylus selected, the record is placed on the turntable and the control arm moved to the center position.

The OFF ON REJ knob is moved to the ON position to start the turntable.

Using the finger lift, raise the tone arm from the rest and move it to playing position on the record.

At the end of the record, the tone arm will return to the tone arm rest and the changer will turn off automatically.

Cueing Lever

Raising or lowering the cueing lever (32) raises or lowers the tone arm, under positive control, from any point on or off the record. Lift the cueing lever and the tone arm is lifted into position where it can be moved manually to any position over the record and then lowered gently to the selected groove by lowering the cueing lever.

To pause while playing, raise the cueing lever to lift the stylus from the record for the desired length of time and then lower the cueing lever to return the stylus to the same record groove.

The cueing lever must be in the lowered position during automatic operation of the changer.

CHANGE CYCLE

mined by the setting of the 12 10 7 knob, where it is lowered to the lead-in groove of the record.

When the needle reaches the end of the music grooves and enters the fast-finish groove at the end of the record, the tone arm movement toward the spindle accelerates rapidly to actuate the velocity trip mechanism.

BSR MODELS
UA70 Series, McDONALD 500

FOLDER 4

ism. The tone arm is lifted and returned to a position over the tone arm rest, and the bottom record on the spindle drops into playing position on the turntable. The tone arm returns to the starting point of the record and is lowered to the lead-in groove.

The previously described action takes place each time the end of a record is reached until the last record has played. At this time, the velocity trip mechanism starts another change cycle and the tone arm returns to its position over the tone arm rest. The tone arm is then lowered to the tone arm rest and automatic shutoff occurs.

NOTE: The following is a description of the functions that the various parts perform during a change cycle. Observe the change cycle operation while slowly rotating the turntable by hand. The following description can then be readily followed and the function of each part more easily understood.

Speed Change Mechanism

Model UA-70 is driven by a 4-pole motor (105) through the 4-step pulley (104) attached to its shaft. Power is transmitted to turntable (52) by the idler pulley (62) pressing against the driving rim of turntable (52) and against one of the four steps of motor pulley (104).

When the speed selector knob is moved to the 78 position, idler pulley (62) is positioned to engage the largest diameter step on motor pulley (104). As the speed control knob is moved to the 45, 33 and 16 positions, idler pulley (62) is progressively positioned to engage smaller diameter steps on motor pulley (104) for slower speeds.

Starting the Change Cycle

As OFF ON REJ knob is moved to the ON position, reject selector slide (113) turns reject plate (114) to allow spring (82) to release latch (81) on tone arm rest (83) and release tone arm. Switch link (86) pulls switch lever (87) to release speed change arm (99) and permit spring (97) to pull idler pulley (62) against motor pulley (104) and driving rim of turntable (52). At the same time, switch lever (87) trips switch (107) to start motor (105). Reject plate (114) also moves reject link (116) to move reject lever (117) and drop the pin of reject lever (117) into the detent slot in main subplate (134) to hold the OFF ON REJ knob in the ON position.

When the OFF ON REJ knob is moved to the REJ position, reject lever (117) moves in the slot in main subplate (134) to push actuating slide (150) against actuating pawl (128) on cam gear (130). The actuating pawl (128) is moved into the path of the projection on the turntable hub and gear. The actuating slide (150) moves back to its rest position when the OFF ON REJ knob is released to return to the ON position. Since turntable (52) is rotating clockwise, the projection on the turntable hub and gear strikes actuating pawl (128) to move cam gear (130) far enough to mesh with the turntable gear. This action rotates cam gear (130) counterclockwise to start the change cycle.

Tone Arm Action and Record Drop

The stud and roller on operating plate (159) follow the eccentric groove in the bottom of revolving cam gear (130). The resulting pivoting action of operating plate (159) controls the vertical and horizontal movements of the tone arm.

As operating plate (159) pivots, tone arm raising spindle (157) rides up the inclined portion of operating plate (159) to lift the tone arm from tone arm rest (83). As operating plate (159) continues to pivot, feed lever link (161) retracts the feed lever in automatic spindle (50) to slide the bottom record off the spindle (50) ledge so the record will drop to the turntable (52).

The tone arm set-down point depends on the position of the 12 10 7 knob. When the 12 10 7 knob is moved to the desired position, selector slide (115) moves detent plate (124) to hold selector stop (122) in position to stop the pivoted pawl, riveted to main subplate (134), in position to fit into correct notch of quadrant (151) for tone arm set-down for the record size selected.

As operating plate (159) continues to pivot during change cycle, toggle (164) grips pin on underside of quadrant (151). Operating plate (159) then pivots in the opposite direction, pulling toggle (164) and quadrant (151). The movement of the quadrant (151) is stopped when the appropriate notch meets the pivoted pawl on the main subplate. Since tone arm hinge (20) is mounted on spindle of quadrant (151), the tone arm is now located at the set-down point for the record size selected by the 12 10 7 knob. Some time after set-down point is reached, depends on position of 12 10 7 knob, toggle (164) slips off pin on quadrant (151). Operating plate (159) is now moving far enough in its cycle, and in the right direction, to allow tone arm raising spindle (157) to ride down inclined portion of operating plate (159) and lower the tone arm to the surface of the record at the set-down point.

After the tone arm is in place on the record, operating plate (159) continues to move, pushing the pivoted pawl clear of quadrant (151). This allows quadrant (151) and the tone arm to move freely as the stylus follows the record grooves. The operating plate (159) now stops since the cam gear (130), which drives it, has made a complete revolution and, being no longer meshed with the turntable gear, has stopped.

Velocity Trip

After a record has been played, a velocity type trip mechanism initiates a new change cycle. This is due to the accelerated inward movement of the tone arm upon the stylus entering the trip groove at the end of the record.

While the record is playing, the tone arm moves slowly toward the spindle (50). Actuating slide (150) is moved by the pin on quadrant (151) to make contact with actuating pawl (128). As the record continues to play, actuating slide (150) moves the actuating pawl (128) toward the turntable (52) hub and gear. On each revolution of turntable (52), the projection on turntable (52) hub pushes actuating pawl (128) out of the way to prevent a premature change cycle. This is

TROUBLE CHART (Continued)

Symptom	Cause	Remedy
Turntable speed too slow.	1. Tight motor (105) bearings.	1. Lightly tap side of motor (105) laminations to free self-aligning bearings.
	2. Binding turntable (52) bearing.	2. If turntable (52) does not turn freely when idler pulley (62) is disengaged, remove turntable (52) and clean turntable bearing. Lubricate bearing with light machine oil.
	3. Idler pulley (62) slips.	3. Idler arm (96) must pivot freely in speed change arm (99). Check tension of spring (97). Replace spring (97) if necessary.
	4. Wire loose at connector nut (106).	4. Check wires inside connector nut (106) for positive contact.
	5. AC line voltage too low.	5. Line voltage should not be less than 100V when motor (105) is wired for 100/125 volt operation and not less than 200V when wired for 200/240 volts.
	6. Operating temperature too low.	6. Prolonged exposure to temperatures below 45° F. will cause slow initial speed.
Record fails to drop when changer cycles.	1. Spindle (50) not fully inserted in center of turntable (52).	1. Make certain spindle (50) is fully engaged and locked in place.
	2. Bent record feed lever in spindle (50).	2. Replace spindle (50).
	3. Spring (160) missing or detached from link feed lever (161).	3. Replace or reposition.
	4. Spring (162) missing from link feed lever (161).	4. Replace.
Tone arm strikes under side of record on ledge of spindle (50), or stylus catches on top of last record while moving into playing position.	1. Incorrect tone arm height adjustment.	1. Adjust screw (19) as described under "ADJUSTMENTS."
Tone arm does not locate correctly on record.	1. Tone arm set-down not adjusted correctly.	1. Adjust screw (24) as described under "ADJUSTMENTS."

Idler Pulley

Disconnect changer from AC source and remove turntable (52). Set speed selector knob on 33 and OFF ON REJ knob to ON so idler pulley (62) rests against 33 RPM step on motor pulley (104). Using a

screwdriver, turn adjustment screw (98) until idler pulley (62) is centered on the 33 RPM step of motor pulley (104). Check alignment of idler pulley (62) at all speeds and readjust if necessary. Move OFF ON REJ knob to OFF and replace turntable (52) taking care to not damage idler pulley (62).

LUBRICATING

The mechanism has been thoroughly lubricated at the factory and under normal use should not require additional lubrication for at least a year. However, after prolonged use, it may be necessary to lubricate parts as specified.

Use a medium grade grease only on these parts:

- 1. Speed change arm (99).
- 2. Idler pulley arm (96).
- 3. Bearing surfaces of operating plate (159).
- 4. Gear teeth, bearing and cam track on cam gear (130).

- 5. Ball race (132).

Use a light machine oil on these parts:

- 1. Tone arm raising spindle (157).
- 2. Idler pulley spindle on pulley arm (96).
- 3. Upper and lower bearings of motor (105).

NOTE: Oil or grease should never be applied to or allowed to collect on the rubber tire of the idler pulley (62), the inside surface of the driving rim of turntable (52) or on motor pulley (104).

TROUBLE CHART

Symptom	Cause	Remedy
Turntable does not revolve when OFF ON REJ knob is moved to ON.	1. No current to motor (105).	1. Make sure that current is reaching AC leads. Check switch (107) and connector (110). Replace if necessary. Check wire connection at connector nut (106).
	2. Defective motor (105).	2. Remove turntable (52) and check motor (105). Repair or replace motor (105).
	3. Idler pulley (62) not engaging driving rim of turntable (52).	3. Connect or replace spring (97). Check that idler arm (96) pivots freely.
	4. Idler pulley (62) not driving.	4. Clean idler pulley (62) and driving rim of turntable (52) to ensure that driving surfaces are free from oil and dirt.
Turntable (52) revolves when OFF ON REJ knob is moved to REJ but tone arm does not leave rest (83).	1. Tone arm not adjusted for correct height.	1. Adjust screw (19) as described under "ADJUSTMENTS."
	2. Spring (149) of actuating slide (150) bent or missing.	2. Adjust or replace.
Turntable stops or slows down in middle of change cycle.	1. Idler pulley (62) slips.	1. Clean inside of driving rim of turntable (52) and rubber tire of idler pulley (62) to remove any oil or dirt.
		2. Check tension of spring (97) and replace if necessary.
Tone arm does not move to playing position on record during change cycle.	1. Toggle (164) does not grip pin on quadrant (151).	1. Spring (156) defective, unhooked or missing. Connect or replace spring (156).
		2. Toggle (164) defective. Replace toggle (164).

possible because of the slow movement of the tone arm while the record is playing. When the stylus enters the record lead-out groove, the tone arm accelerates rapidly and actuating pawl (128) is moved far enough to definitely engage the projection on the turntable (52) hub. The contact between actuating pawl (128) and turntable (52) hub projection gives the necessary push for the teeth in cam gear (130) to mesh with the teeth on the turntable (52) gear and initiate a change cycle.

Automatic Shut-Off

When the last record drops to turntable (52), control arm (1) drops below the ledge of automatic spindle (50). The spindle of control arm (1) pivots stop latch (144) against selector stop (122) to move selector stop (122) up out of the path of the pivoted pawl on main subplate (134) during the next change cycle. At the end of the last record, the changer goes into a change cycle and the tone arm is lifted from the record and

DISASSEMBLY / ASSEMBLY

Standard Automatic Spindle

To remove standard automatic spindle (50) pull spindle (50) straight up, turn clockwise to release from retaining spring (135) and lift out of center hole in turntable (52).

To install standard automatic spindle (50), insert spindle (50) into center hole of turntable (52). Rotate spindle (50) until the projecting lug on side of spindle (50) enters the slot in the turntable bearing and is locked in position by retaining spring (135).

Turntable Assembly

Lift tabs in turntable mat (53) and remove center disc (56) from turntable (52). Move OFF ON REJ knob to OFF. Remove "E" ring (57) and lift turntable (52) off changer. When replacing turntable (52) make certain the OFF ON REJ knob is in the OFF position

moved to its position over tone arm rest (83). As operating plate (159) moves and the tone arm reaches the position over rest (83), the pivoted pawl on main subplate (134) is released. Since the pivoted pawl is not stopped by selector stop (122), spring (156) pulls the pawl into the position where, as operating plate (159) changes direction, it blocks quadrant (151) and holds the tone arm in the rest position during the remainder of the change cycle. Operating plate (159) continues to move in this direction until cam gear (130) is unmeshed from the gear on turntable (52). Before it stops, the moving operating plate (159) lowers the tone arm to rest (83) and the released pivoted pawl is pushed against cut off lever (146). Cut off lever (146) moves reject lever (117) and reject link (116) to turn reject plate (114). When reject plate (114) turns, switch link (86) pushes on switch lever (87) to turn off switch (107) and moves speed change arm to retract idler pulley (62) from turntable (52) driving rim and motor pulley (104). Reject plate (114) also pulls on reject selector slide (113) to return OFF ON REJ knob to OFF position.

and that idler pulley (62) is not damaged by the driving rim of turntable (52).

Control Arm Assembly

To remove control arm (1), remove "E" ring (25), spacer (143), control arm spindle spring (142) and pull control arm (1) up and out of control housing (27).

Tone Arm Assembly

To remove the complete tone arm assembly, first unsolder cable (38) leads at dual jack (65) and release cable (38) from all fastenings. Unhook stylus pressure spring (17) from hook on tone arm hinge (20). Remove tone arm pivot screw (26) to release tone arm from hinge (20). Take care to not lose the two 1/16" bearing balls (11) out of tone arm body (13). Remove nut (21) and lift tone arm hinge (20) and tone arm from spindle of quadrant assembly (151).

ADJUSTMENTS

Tone Arm Balance

Coarse and fine adjustments of balance weight (7) are made to obtain exact balance of the tone arm on its vertical pivot. To balance the tone arm, first rotate the stylus pressure control dial, on tone arm body (13), to 0. Then loosen screw (10), slide balance weight (7) to position where tone arm floats freely and tighten screw (10) to hold this coarse adjustment. For fine adjustment, rotate balance weight (7) until tone arm is in exact balance.

Stylus Pressure

Stylus pressure, from 0 to 6 grams, is obtained in steps of 1/3 gram by rotating the stylus pressure control dial on tone arm body (13). After the tone arm has been balanced, turn the stylus pressure control

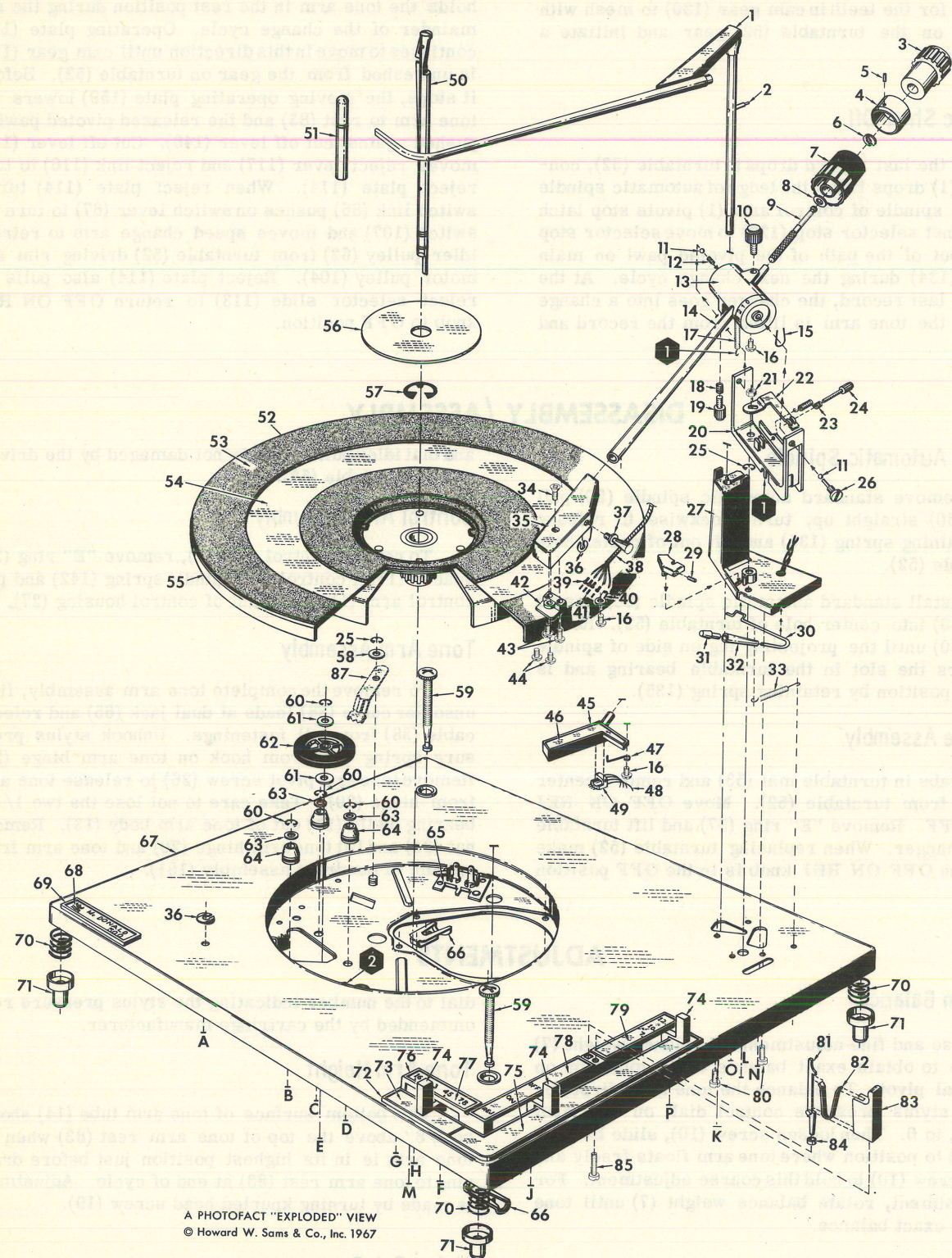
dial to the number indicating the stylus pressure recommended by the cartridge manufacturer.

Tone Arm Height

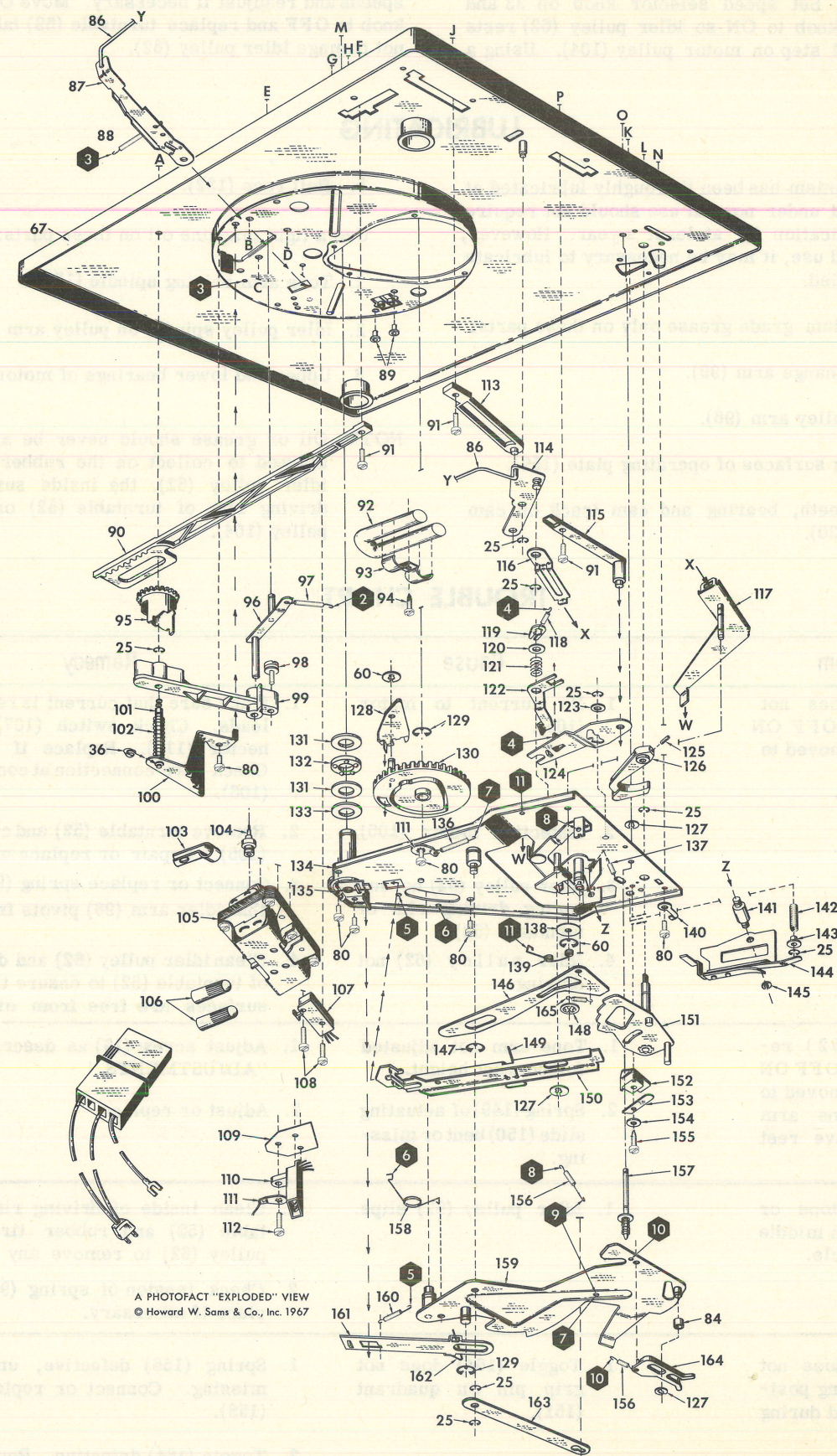
The bottom surface of tone arm tube (14) should be 1/8" above the top of tone arm rest (83) when the tone arm is in its highest position just before dropping to tone arm rest (83) at end of cycle. Adjustment is made by turning knurled head screw (19).

Stylus Set-Down

With a 12" record on turntable (52), adjust screw (24) so the stylus sets down 1/8" in from edge of record when changer cycles. Set-down will be correct for 10" and 7" records when 12" set-down is correct.



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