

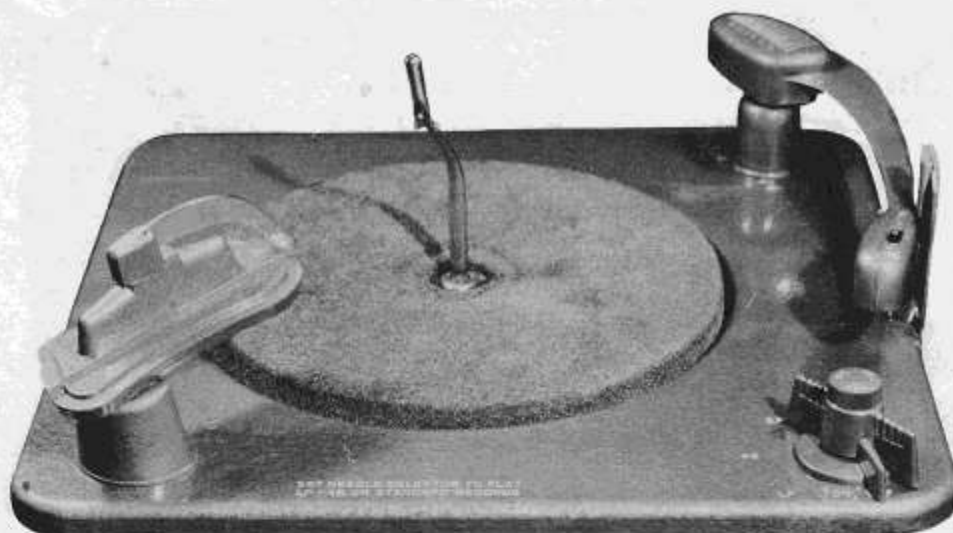
PHILCO
MODEL M-22

Figure 1

GENERAL INFORMATION

The Philco Model M-22 is a three-speed Automatic Record Changer. It is designed to play automatically up to ten - 12", twelve - 10" records, or twelve - 7" (children's records with the lead-in and eccentric trip groove) at 78 RPM; ten - 12" records, twelve - 10" records, or twelve - 7" records at 33-1/3 RPM; twelve - 7" 45 RPM records with the adapter inserted.

NOTE: Do not, in any case, intermix records.

The changer will continue to play the last record until it is turned off. A safety feature is employed in the pickup mechanism to prevent damage to the mechanism if, at any time, the arm is held during the change cycle.

Non-standard, home recordings, and badly warped records should be played in the "Manual" position.

A single pickup cartridge is used, which is pivoted in the tone arm (as indicated on the tone arm), to play the 78 RPM and 45-33-1/3 RPM records.

Power supply is 117 volts, 60 cycles AC. If operation is desired on a 50-cycle supply, the 50-60 cycle motor, Part No. 35-1462, must be used, with the springs supplied in the conversion kit, Part No. 40-7848.

Manufactured by:

Philco Corporation
Tioga & "C" Streets
Philadelphia, Pennsylvania

PHILCO
MODEL M-22

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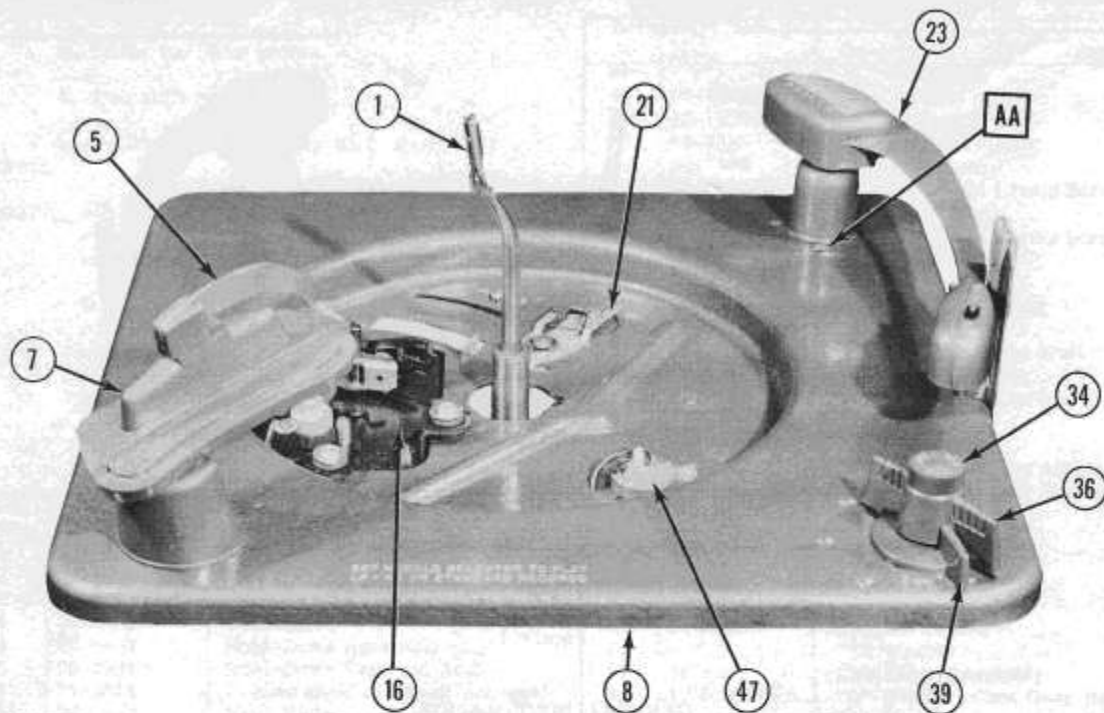


Figure 2

AUTOMATIC OPERATION

Loading and Starting the Changer -

1. Make sure the changer is out of cycle; then place the pickup arm on the rest post.
2. Rotate the record shelf (7) to the proper position, depending upon the size of record to be played.
3. Set the speed control knob (36) to the speed corresponding to the type record to be played.
4. Place the records over the spindle, allowing them to rest on the spindle step and the edge of the record shelf (7).
5. Place the hold-down arm (5) over the stack of records.
6. Move the cartridge knob to "45-LP" or "SP", depending upon the type of records to be played.
7. Turn the "On-Off" knob (39) to the "On" position.
8. Turn the "Man.-Aut.-Rej." knob (34) to "Reject" and release.

The changer will then play the entire stack of records, repeating the last record until turned off.

MANUAL OPERATION

1. To play records manually, turn the "Man.-Aut.-Rej." knob (34) to "Man."

2. Set the speed selector knob (36) to "SP-45" or "LP", depending upon type of record to be played.

3. Rotate the record shelf to the 12" position. This is for clearance only in order to easily place records on the turntable.

4. Move the cartridge knob to "45-LP" or "SP", depending upon the type of record to be played.

5. Place the record on the turntable.

6. Move the "On-Off" knob (39) to the "On" position.

7. Place the pickup arm on the record. When the record is finished playing, move the pickup arm to the arm rest, turn the "On-Off" control to "Off", and remove the record from the turntable.

NOTE: When the "Man.-Aut.-Rej." knob (34) is moved to the "Man." position, the reject lever (21) is moved against the reset arm (89A). This prevents the trip plate assembly (89) from releasing the dog latch (69L), preventing the changer from cycling.

CHANGE CYCLE

To start the change cycle, rotate the "Man.-Aut.-Rej." knob (34) to "Rej." This actuates the "Reject" link (46), "Reject" lever (21), and the trip plate assembly (89), which, in turn, releases the dog latch (69L). This allows the dog latch (69L) to engage the spur of the turntable hub gear, which rotates the cam gear (69), allowing the teeth of the cam gear and hub gear to engage.

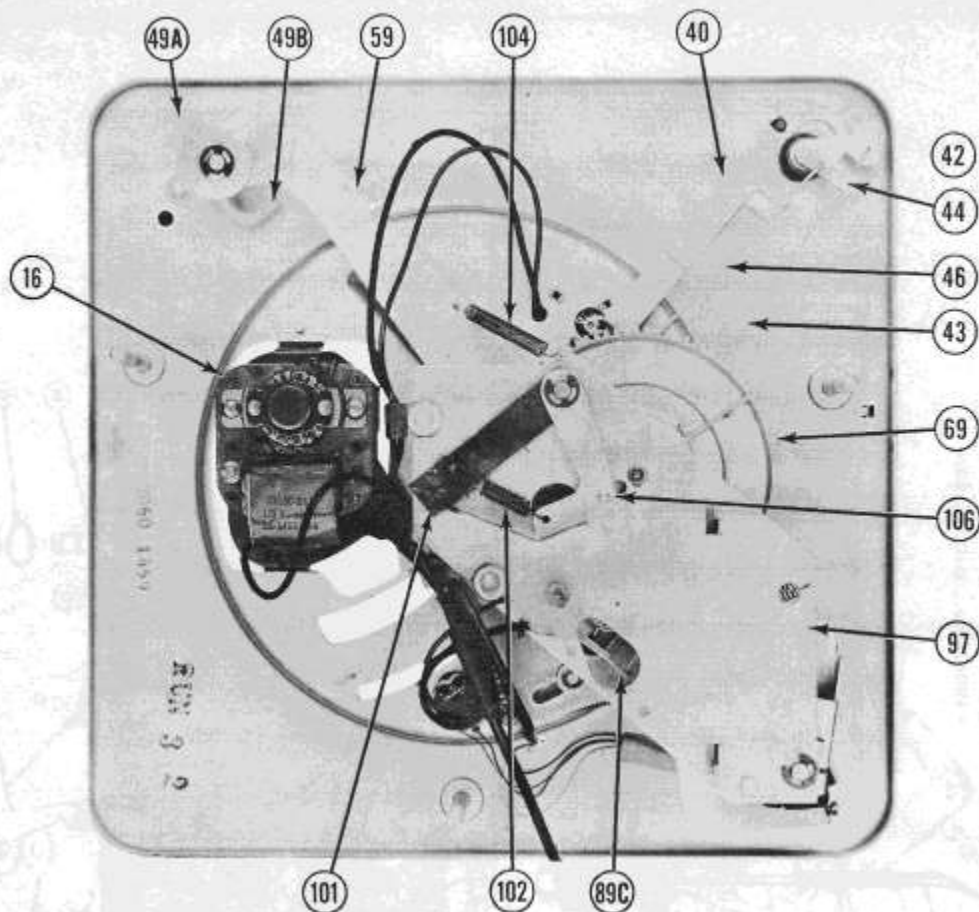


Figure 3

As the cam gear rotates, the lift lever (88) rides down the incline cam on the bottom of the cam gear (69), due to the spring (85). This action causes the lift lever (88) to pull on the pull cord (29) raising the tone arm from the record. At approximately the same time, the tone arm actuating lever (61), motivated by cam "A" on the cam gear (69), contacts the trip arm stud (79) and swings the tone arm against the rest post. The push-off lever (106) is now actuated by the cam follower "X" of the push-off lever, which rides in the cam groove on the bottom of the gear (69). This action moves the spindle back and forth, thus selecting and dropping a record to the turntable.

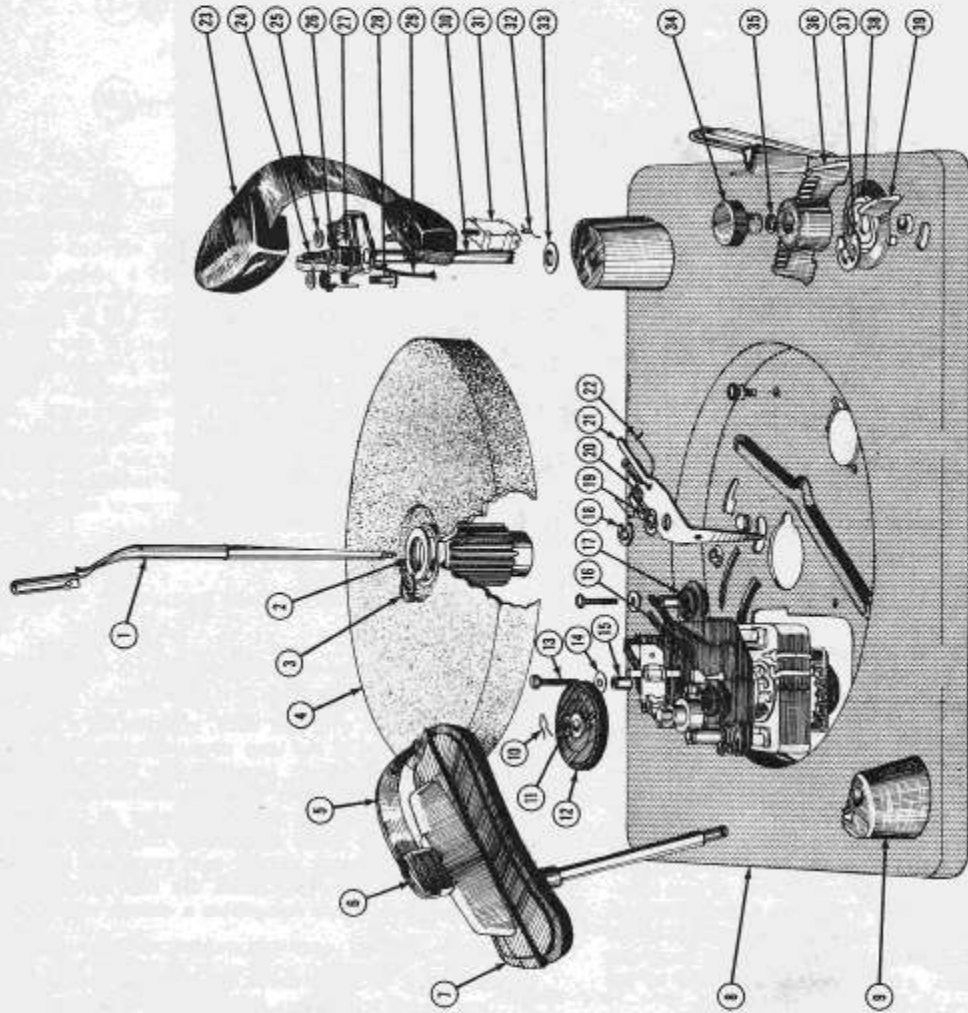
As the cam continues to turn, the return lever (53) engages the trip arm stud (79), due to the return lever roller following cam (B) and the tension of spring (54). The tone arm is now controlled by the actuator (61) and return lever (53), which are in contact with the stud of the trip arm (79). The return lever (53) swings the tone arm inward until it is stopped by the set-down lever (59), whose position is determined by the setting of the record shelf (7). This indexes the tone arm for proper set-down. The lift lever now rides up the cam gear incline, which, in turn, lowers the tone arm to the record. The actuator lever moves outward and away from the trip arm stud; however,

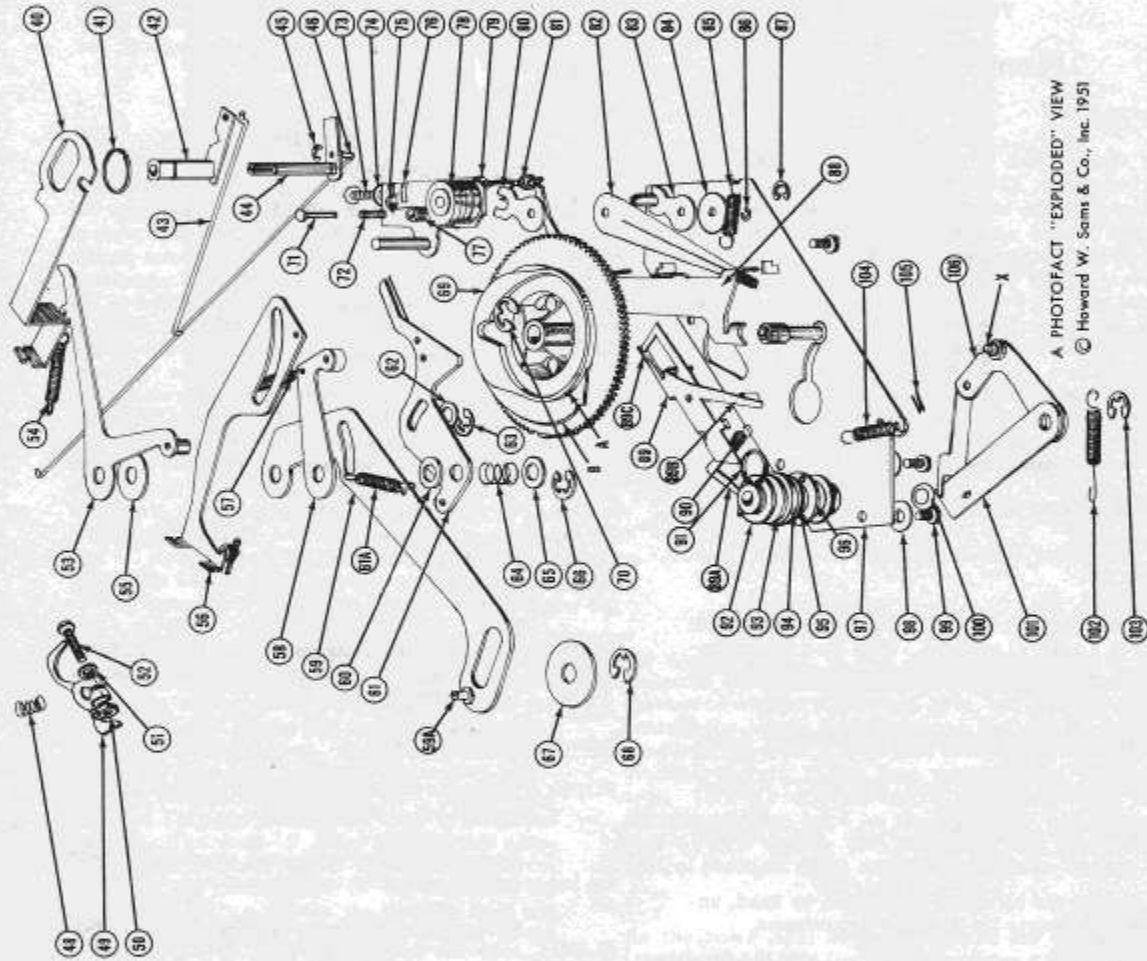
the spring portion of the actuator momentarily remains in contact with the stud, eliminating a sudden release of control of the tone arm, and thereby, preventing the needle from jumping into the modulated grooves. The return lever (53) then moves away from the stud, thereby giving free movement to the tone arm. The trip plate supporting finger (89B) now engages the dog latch on the cam gear, and the cam gear index lever (58) locks the cam gear into a neutral position. This completes a change cycle.

As the tone arm advances toward the spindle, the friction clutch trip finger (82) engages a finger of the trip plate (89), moving the trip plate. While a record is playing, the small motion of the trip plate (89) is not sufficient to cycle the mechanism because, on each revolution, the reset cam resets the trip plate into full engagement with the dog latch and, at the same time, slips the friction finger (82) slightly.

In the first revolution of the turntable, during which the pickup arm advances rapidly, the velocity of the friction finger is increased. This causes the disengagement of the dog latch and trip plate before their position can be restored by the reset cam (92). The spur of the turntable hub gear now engages the dog latch starting a new change cycle.

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A PHOTOFACT "EXPLODED" VIEW
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PHILCO
MODEL M-22

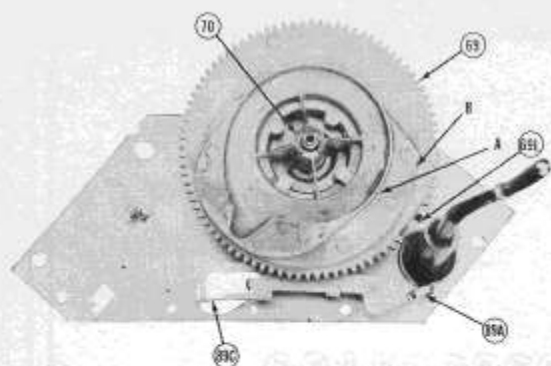


Figure 4

ADJUSTMENTS

Tone Arm Height -

With the changer out of cycle, place the tone arm over the baseplate. Check the clearance between the needle point and the baseplate. Correctly adjusted, there should be a clearance of $1/8" \pm 1/16"$. To make the proper adjustment, bend the protruding ear of the swivel of the shaft and swivel assembly (30). Bending the ear upward decreases the clearance, downward increases the clearance. Raise the tone arm to its maximum height and move it against the rest post. There should be a clearance of approximately $3/32"$ between the lower edge of the tone arm and the rest post hook. Bend the ear of the swivel to obtain the most satisfactory adjustment of both the rest post and the baseplate clearances.

Tone Arm Set-Down -

1. Rotate the record shelf (7) to the 12" position.
2. Turn the eccentric set-down adjustment stud (59A) to a neutral position. This stud is accessible through a hole in the baseplate near the push-off saddle (9).
3. Place a 7" record on the turntable.
4. Rotate the record shelf (7) to the 7" position.
5. Turn the control knob (34) to "Rej." and release.
6. Rotate the turntable clockwise, by hand, until the tone arm starts its downward movement.
7. Loosen the hex head screw (73) on the trip arm and position the tone arm so that the needle will be $1/8"$ in from the edge of the record.
8. Tighten the clamp screw (73). Check the adjustment by playing several 7" records and observing the landing of the tone arm. If the set-down point is slightly incorrect, it may be adjusted by the eccentric set-down adjustment screw (59A). When tightening clamp screw (73), make sure the trip arm (79) is positioned vertically so that the friction finger (82) is midway between the baseplate and the lifter lever.

NOTE: The record shelf (7) must always be rotated to the 12" position so that the eccentric ad-

justment stud (69A) will line up with the hole in the baseplate. In this way, the eccentric stud (69A) may be adjusted from the top.

For 10" positioning, place a 10" record on the turntable and set the record shelf (7) to the 10" position. Trip the mechanism; then rotate the turntable clockwise, by hand, until the tone arm starts its downward move. If the needle is not $1/8"$ in from the edge of the record, bend the ear of the set-down cam (49A) which is in contact with the eccentric adjusting stud. (See Figure 3.)

Position 12" set-down by placing a 12" record on the turntable, and rotate the record shelf (7) to the 12" position. Repeat the adjustment as in 10" positioning, with the exception of making the adjustment by bending ear (49B) on the set-down cam instead of ear (49A).

TRIP ADJUSTMENT

The correct position for the trip mechanism is as follows: With the changer out of cycle and with the ear of the reset arm (89A) contacting the peak of the reset cam (92), the dog latch on the cam should engage approximately $1/2$ the width of the supporting finger (89B) of the trip plate. If this condition is not true, it may be corrected by bending the ear (89C) of the trip plate. This adjustable ear is made accessible through a large hole in the bridge (97). (See "Exploded view and Figure 3.") If this does not remedy the trouble, the friction clutch can be adjusted, although this should not normally be necessary. To make this adjustment, place the tone arm on the arm rest and adjust the screw (77), which is accessible through the hole (AA) in the baseplate. (See Figure 2.) Turn this screw counterclockwise until the clutch is just snug (do not tighten); then loosen one turn. Check the adjustment by rejecting several records and observing the tripping mechanism. Readjust, if necessary.

CAUTION: Too much engagement will prevent tripping, while too little engagement causes pre-tripping.

Record Shelf Adjustment -

NOTE: The record shelf adjustment is made with the changer out of cycle.

1. Loosen the two hex head screws that hold the record shelf assembly to the baseplate.
2. Place the Philco record shelf gauge, No. 45-6647, over the spindle, allowing it to rest on the spindle step and ledge of record shelf.
3. Adjust the record shelf until edge of the gauge fits snugly against the edge of the raised portion of the shelf, without flexing the spindle.
4. Tighten the two hex head screws.

TROUBLES

Changer Fails to Trip -

1. Trip mechanism out of adjustment. (See "Trip Adjustment.")

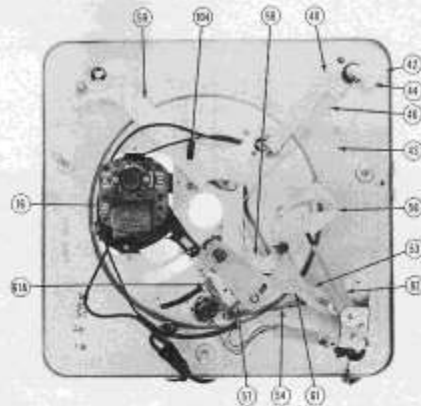


Figure 5

2. Trip plate assembly (89) binding, thereby not being actuated by the friction trip finger (82).

Changer Cycles Continually -

1. Trip mechanism out of adjustment. (See "Trip Adjustment.")

Changer Trips Before Reaching End of Record -

1. Trip plate spring (90) loose or missing. Replace spring.

2. Trip mechanism out of adjustment. (See "Trip Adjustment.")

Tone Arm Fails to Raise -

1. Lift lever spring (85) loose, thereby not holding the lift lever (88) in contact with cam on the cycle gears (69).

2. Pull cord (81) loose or broken.

Tone Arm Does not Move in Over Record but Remains in Outward Position -

1. Return lever spring (54) loose or missing.

Tone Arm Fails to Swing Outward During Change Cycle -

1. Tone arm actuator spring (61A) loose.

Irregular Tone Arm Set-Down -

1. Set-Down lever spring (104) loose or missing.

LUBRICATION

The Philco Model M-22 changer has been well lubricated at time of manufacture and should so remain indefinitely. However, in case of extreme usage, high operating temperatures, or the replacement of parts, the changer should be cleaned with carbon tetrachloride and lubricated as follows:

Use a good motor cup grease on the following parts:

1. All cam surfaces and gear teeth of the cam gear (69).

NOTE: Do not lubricate the dog latch.

2. Push-off lever assembly (106) where it slides on the bridge (97), at the pivot pin, and where the stud rides in the slot of the bridge.

3. The "On-Off" switch lever (40) where it slides on the baseplate and where the ears of the switch lever ride in guide slot.

4. The motor speed shift plate (56) sliding surfaces.

5. Tone arm actuator lever where it contacts the stud of the trip arm assembly (79) and the slot of the lever (61).

6. Record shelf shaft bearing.

7. Hold-down shaft.

8. Detents for record shelf.

Use SAE #20 oil on the following:

1. Cam gear spindle.

2. Control knob shafts.

3. Index (58) roller.

4. Reject lever (21) pivot.

Lubricate the motor as follows:

Use grease on:

1. Cam surfaces of idler wheel lifter.

2. Detent surfaces.

3. Guide slots of shifter plate.

4. Extension of idler shaft in contact with lower shifter plate.

5. Retaining ear of speed shift lever.

Use oil on:

1. Idler assembly pivot shaft.

2. Idler wheel shaft.
3. Slider bar, four points.
4. Two shift roller pins.
5. Pulley shaft (wipe dry and apply only one drop).

NOTE: When lubricating motor, use grease or oil very sparingly. Excessive lubrication will cause erratic operation.

Do not allow any oil or grease to come in contact with any of the drive surfaces of the motor or the turntable rim, as this will cause uneven turntable speed or the changer to stall during the change cycle. If grease or oil comes in contact with any of these parts, clean them with carbon tetrachloride.

PARTS LIST (Continued)

Ref. No.	Part No.	Description
1	76-5909	Spindle
2	56-8096	Washer, Turntable
3	56-8097	Retainer, Turntable
4	35-2711	Turntable
5	76-5897	Hold-Down Assembly
6	56-8301	Hold-Down Fulcrum Arm
7	76-5914	Record Shelf and Shaft Assembly
8	76-5892	Base Plate, Tone Arm Rest, and Tone Arm Stanchion
9	56-8078	Push-Off Saddle
10		Hairpin Clip
11		Cloth Washer
12	76-5267	Idler Wheel
13	1W21561FA3	Motor Mounting Screw (3 req.)
14		Washer
15	56-49261FA3	Motor Mounting Spacer (3 req.)
16	35-1451	Motor Assembly
17	54-4501	Motor Mounting Grommet
18		"C" Washer
19		Spring Washer
20	56-8080	Reject Spring
21	56-8079	Reject Lever
22	56-8081	Detent Spring
23	35-2707	Tone Arm Shell
24	56-8124	Needle Pressure Spring
25		Washer (3 req.)
26	54-4729	Rubber Grommet
27	56-8123	Shaft and Swivel Mounting Bracket
28	56-7408-1	Swivel Mounting Shoulder Screw
29	76-2982-4	Vertical Timing Pull Cord (Same as 81)
30	76-5911	Shaft and Swivel Assembly
31	76-4649	Cartridge
32	45-9588	Needle
	45-9589	Needle, Sapphire Tips
33	54-8103	Friction Washer
34	76-5901	Knob, Man.-Aut.-Rej.
35	1W42295FE7	Reject Shaft Retaining Ring
36	54-4767	Speed Control Knob
37	1W60980FE5	"C" Washer
38		Spring Washer
39	54-4786	On-Off Knob
40	56-8090	On-Off Switch Lever
41	1W42253FE7	Switch Lever Retaining Ring
42	76-5899	Speed Change Shaft and Bar Assembly
43	56-8091	Link, Speed Change
44	76-5900	Shaft and Crank Assembly
45		"C" Washer
46	56-8084	Link, Reject
47	42-1867	On-Off Switch
48	56-8088	Record Shelf Spring
49	56-8149	Set-Down Cam
50	56-7042	Set-Down Cam Clamp Screw Nut
51		Washer
52		Set-Down Cam Clamp Screw, 10-32 x 7/8
53	76-5893	Return Lever
54	56-8092	Return Lever Spring
55		Spacer Washer
56	56-8083	Plate, Motor Speed Shift
57	56-8094	Index Lever Spring
58	76-5895	Cam Gear Index Lever
59	76-5894	Set-Down Lever
60		Spacer Washer
61	76-6502	Tone Arm Actuator Assembly
61A	56-3095	Tone Arm Actuator Spring
62		Washer
63	1W60977FE7	"C" Washer
64	56-8087	Compression Spring
65		Washer
66	1W60980FE5	"C" Washer
67	56-8089	Cupped Washer
68		"C" Washer
69	76-5905	Cam Gear Assembly
70	1W60980FE5	"C" Washer, Cam Gear Retainer
71	56-8110	Plunger
72	56-8111	Friction Trip Adjustment Spring
73		Clamp Screw, 10-32 x 1
74		Washer
75	56-8108	Friction Screw Lock Spring
76	56-7042	Clamp Screw Nut
77	56-8109	Friction Trip Adjustment Screw
78	8W52297	Lead Washer (4 used)
79	76-5910	Trip Arm Assembly
80	54-8142	Friction
81	76-2982-4	Vertical Timing Pull Cord (Same as 29)
82	56-8112	Friction Trip Finger
83	54-8142	Friction Clutch Washer
84	56-8113	Washer
85	56-8133	Lift Lever Spring
86		"C" Washer
87	1W60980FE5	"C" Washer, Tone Arm Retainer
88	56-8132	Lift Lever
89	76-5906	Trip Plate Assembly
90		Trip Plate Spring
91	1W42311FE7	Retaining Ring
92	54-8139	Trip Reset Cam
93	54-8140	Neoprene Washer
94	56-8129	Bearing Cover
95	56-8127	Bearing Washer
96	5W2017	Ball Bearing
97		Bridge Assembly
98		Washer
99		Bridge Mounting Screw and Lockwasher
100		Spring Washer
101	56-8130	Spindle Lever
102	56-8131	Spindle Spring
103	1W60980FE5	"C" Washer, Push-Off and Spindle Lever Retainer
104	56-8093	Set-Down Lever Spring
105		Trip Plate Retainer
106	76-5908	Push-Off Lever Assembly