DE LUXE INTER-MIX RECORD CHANGERS

PART NOS. 35-1234 AND 35-1236; MODELS 41-611 AND 41-616

The De Luxe record changer automatically plays fifteen 10" records or thirteen 12" records at one setup or fourteen 10" and 12" records intermixed. Each of the three posts has three plates. The lower one on which the records rest is the shelf plate; the upper one is the selector plate which takes from the bottom of the stack the next record to be played and releases it to the turntable. The action of the center plate is to lift a 12" inch record up from a 10" record when the mechanism is loaded with intermixed records. To load for automatic operation see that all three shelf plates are turned down towards the turntable, then place the stack of records to be played over the turntable shaft so that they rest on the three shelf plates. Then see that pointer on control switch is set on "A," automatic, and press push button to put changer in operation.

To reject a record (or to start a change cycle as for testing purposes) simply press the push button at any time while light beam jewel is upon a record. To play manually, turn shelf plates up, set control pointer (9) on "M," for manual, then place a record on turntable and press button to switch on motor then lift pick-up into position on record. The changer can be turned off at any time by pressing down on pickup rest.

NOTE—In Model 41-616 the reject push-button on the changer is not used. To reject a record in this model press the "phono" push button on the Radio, this operates the reject relay.

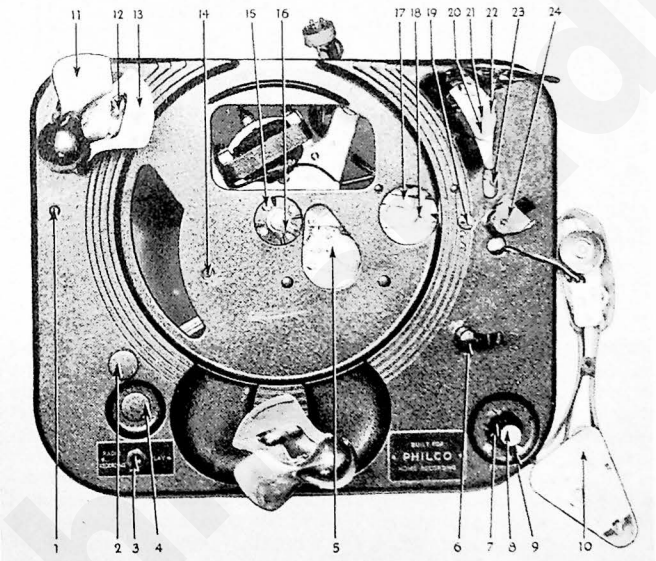


FIGURE 1

SCHEM. No.	DESCRIPTION	PART No.
1	Plug Button	35-2386
2	Plug Button	35-2385
3	Radio Recording Switch	
4	Plug Button	
5	Cam Latch and Trigger Assembly.	35-2342
	Spring	35-2477
6	Tone Arm Rest (41-616)	35-2362
	Tone Arm Rest (41-611)	35-2467
7	Switch Knob	35-2343
8	Push-button	35-2344
9	Pointer	35-2343
10	Light Beam Pick-up Assembly	35-2209
11	Upper Plate	
12	Center Plate	
13	Lower Plate	
	Changer Plate Assembly (Master Post)	35-2339
	(Plain Post)	35-2505
14	Recorder Mounting Screw Hole	
15	(4) Spindle Housing Mtg. Screws.	W-150
16	Turntable Spindle & Cone Assem.	35-2514
17	Trip Arm Assembly	35-2341
17A	Pulsating Lever	35-2478
	Spring	35-2510
18	Trip Lever Assembly	35-2340
19	Trip Adjusting Hole	
20	No Record Pin	35-2481
21	Center Blade Lift Pin	35-2308
	(Top Pin)	35-2338
	(Lower Pin)	35-2504
22	Selector Plate Lift Pin	
	Adjusting Screw (Long)	35-2503
	Adjusting Screw (Short)	35-2502
23	Jewel Landing Adjusting Hole	
24	Light Beam Pick-up Mounting Bracket and Swivel	35-2364
	Ball Race	35-2365
	Washer	35-2500
	Swivel Clamp Sleeve	35-2506
	Swivel Clamp	35-2507
	Screw	W-2158

PART DIFFERENCES, CHANGERS NOS. 35-1234, 35-1236

Mechanical operations of the record changers, Part Number 35-1234 (Model 41-611) and Part Number 35-1236 (Model 41-616) are identical. The record changer No. 36-1236 (Model 41-616), however, has additional equipment which is controlled by Wireless remote control and push button control. These parts are indicated in figure 1, page 153. The parts are numbered and shown on the schematic diagram for Model 41-616 and are as follows: Number 147, reject relay; number 154, reject series switch; number 148, cycling switch; and number 149, radio recording switch.

GENERAL DESCRIPTION OF CHANGE CYCLE

An automatic record player for records of two sizes has three principal duties to perform. These duties are here performed by three mechanisms interconnected and built together but largely separate in their operation. The motion for each is originated in one central cam gear which has three different and individual cam surfaces. The cam gear is normally at rest while a record is being played, but is put into operation by contact of a latch lever (located on the cam gear) with the teeth of an intermediate drive gear. This motion only takes place when the unit is put into a change cycle. The cam gear then makes one full revolution to complete the change cycle and then comes to rest in a normal position.

(1) The record changing mechanism is brought into operation by a segment (or lever) with a roller at one end which runs in a cam groove in the cam gear which drives with an oscillating motion the three pulleys by means of a metal tape or belt. The pulleys are fastened to the lower ends of the changer shafts which in turn transmit their motion to the changer plates which are fastened with set screws to the upper ends of the shafts. When the changer plate assembly is revolved the record resting on the shelf plate is then dropped to the turntable.

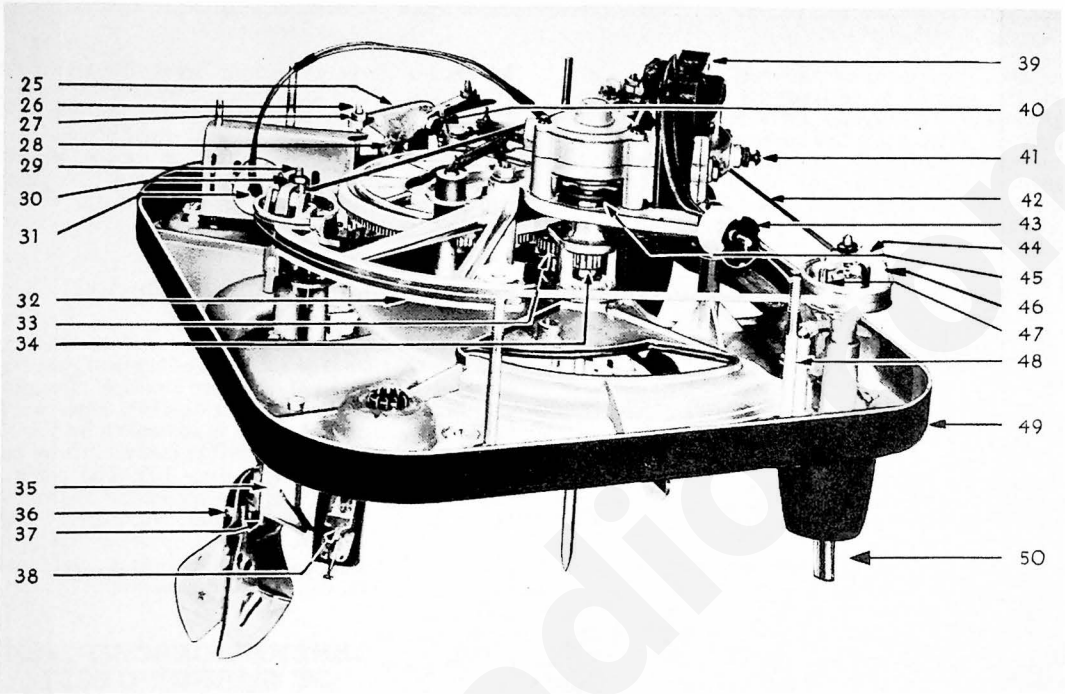


FIGURE 2

SCHEM. No.	DESCRIPTION	PART No.
25	Raising Lever Assembly (41-611)	35-2331
	Raising Lever Assembly (41-616)	35-2497
	Spring	35-2304
26	Raising Lever Adjusting Screw	35-2332
27	Nut (Adjusting Screw)	W-317
28	Roller	
29	Set Screw	35-2332
30	Nut Cop.	W-317
31	A. C. Switch (Model 41-611 only) See Fig. 4 for Model 41-616	35-2333
32	Tape Segment Assembly	35-2334
33	Intermediate Gear Assembly	35-2335
	Thrust Washer	35-2380
34	Drive Pinion Gear	35-2336
	Gears, Spindle & Housing Assem.	35-2387
35	Changer Blade Bracket	
36	Blade Hinge Pin	35-2337
37	Blade Lifting Pin	35-2338
38	Light Beam Pick-up	35-2209
39	Motor (115 volt, 60 cycle)	35-1252
	Motor (115 volt, 50 cycle)	35-1251
40	Raising Lever Trunnion	35-2325
41	Motor Rotor Adjusting Screw	
42	Tape	35-2326
43	Motor Connecting Plug	
44	Center Blade Lifter Assembly	35-2329
45	Coupling Assembly	35-2220
46	Blade Lifter Pin	35-2328
47	Blade Lifter Spring	35-2330
48	Mounting Stud	35-2461
49	Main Plate	
50	Blade Post Stem	35-2441

(2) The pickup operating mechanism is likewise brought into operation originally by the cam surface on the cam gear which operates a raising lever which receives a rocking motion from the cam gear through a roller which is part of the raising lever assembly. The flat spring on the opposite end of this lever is carried upward against a lifter pin which raises the pickup thus lifting the light beam jewel from the record. This motion also moves the hollow pickup shaft upward, pressing together the stop plate, the cork friction disc, and clutch bracket. While the light beam jewel is raised from the record, the clutch bracket receives an angular or swinging motion from the cam gear to a lever and link assembly and carries with it the locating plate which is directly connected to the pickup. The pickup is thus carried out beyond the turntable while the changer plates drop a record and is then brought back to the proper position to start playing. If there is no record on top of changer plates when the cycle starts, the pickup arm will then remain out beyond the turntable and descend on the pickup rest automatically shutting off the motor after the last record has been played.

(3) Mechanism for bringing light beam jewel into correct starting position on the record. This mechanism must operate fairly accurately for both 10" and 12" records. Partly due to this requirement, the starting position is not determined by the cam action, as the cam surface on the cam gear is so designed that the movement of the lever and link assembly would normally carry the pickup arm farther toward the turntable shaft than would ever be desirable as a starting adjustment. Therefore, the travel of the pickup arm toward the turntable is stopped at the proper point for lowering onto the record by two eccentric adjusting studs on the locater plate which comes into contact with the stop arm which is automatically preset by the record which is about to be dropped from the changer plates to the turntable. If a 12" record is about to be played it rests on the center changer plate of the master changer post (which is located directly behind the pickup) causing same to push downward on center pin which in turn pushes downward on the center blade lifter lever which is pivoted on a hinge pin in the pulley. This brings the upper end of center blade lifter toward the pulley hub. When the pulley is oscillated or driven by the tape, the upper end of this lever will travel on the inside of the crescent shaped cam. This will move the setting lever (which is fastened

to the same hub as the stop lever) in such a position that stop lever will contact the 12" eccentric adjusting stud on the locating plate which accurately measures the starting point of the needle on a 12" record. A 10" record which is about to be played will not rest on the center plate, therefore the center plate and center pin and lever will be held upward by a spring on the pulley. The upper end of the center blade lifter lever will therefore be further away from the upper pulley and will travel on the outside of the crescent shaped cam moving the setting lever and stop lever in such a position that stop lever will touch the 10" eccentric adjusting stud also on the locating plate which accordingly measures the starting point of the needle on a 10" record. After the last record has been dropped from the changer plates and played, the lower changer blade is pushed upward by a spring which pushes up the no record control pin. The no record control lever is also carried up so that when pulley is oscillated the no record lever sweeps the setting lever and stop lever to the position where the stop lever engages with a heel on the locating

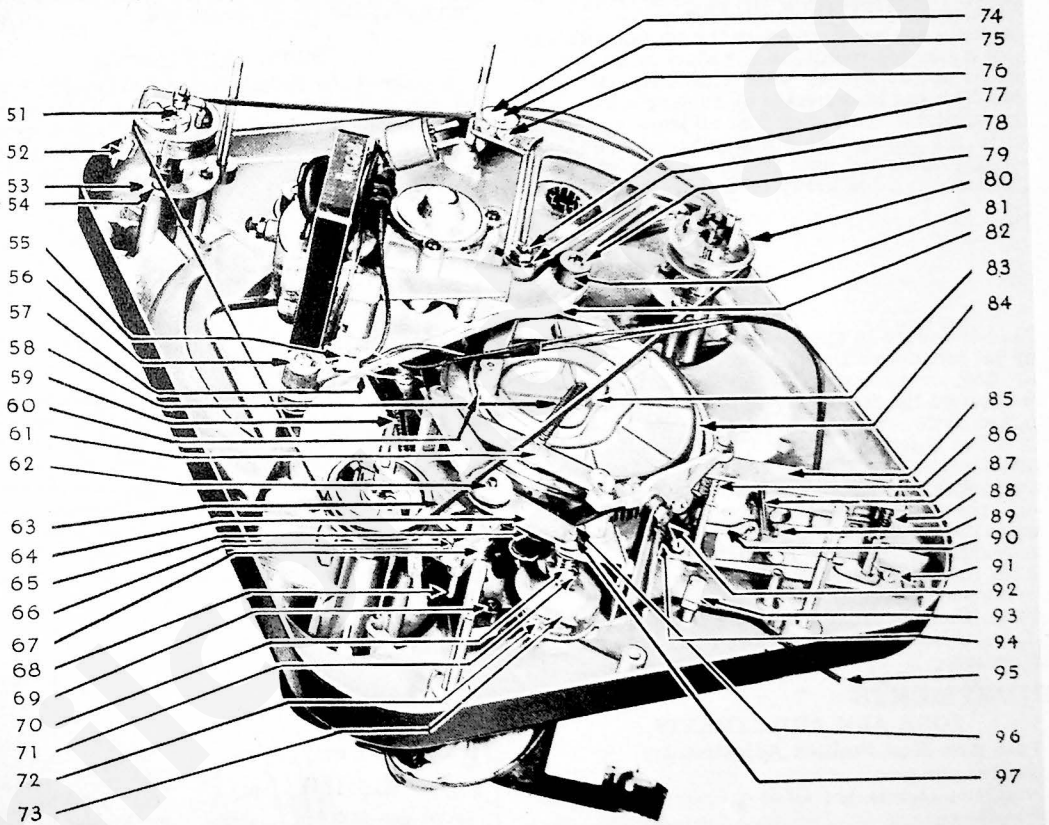


FIGURE 3

SCHEM. No.	DESCRIPTION	PART No.
51	Center Blade Raising Pin	35-2308
52	Center Blade Lifter Plate	35-2329
53	Center Arm Lifter Cam	35-2309
54	8—32x5/16 R. H. Self Tap Screw	
55	Cord Clamp	
56	Ground Lead Assembly	
57	Washer	
58	Swing Lever Spring	35-2310
59	Trip Arm Spring	35-2311
60	Roller	
61	Swing Lever and Bracket Assembly	35-2312
62	Starting Lever Thumb Nut	35-2313
	Rubber Washer	35-2499
63	Trip Lever Spring	35-2314
64	Swing Bracket Support Assembly	35-2315
65	Clutch Brake Spring	35-2316
66	No Record Selector Lever	35-2317
67	Setting Cam Assembly	35-2318
68	Adjusting Screw	
69	Clutch Index Lever and T. A. Shaft Spring	35-2307 35-2513
70	Clutch Spring	35-2320
	Washer	35-2498
71	T. A. Pressure Release Sleeve	35-2321
	Thrust Washer	35-2496
	Washer	35-2373
72	Cork Friction Disc (Small)	35-2322
	Cork Friction Disc (Large)	35-2634
73	Clutch (Complete)	35-2319
	Washer (Top of Clutch)	35-2508
	Upper Bracket	35-2509
74	Spring Retainer	35-2295
75	6—32-1/4 Self Tapping Binder Head	
76	8—32-1/4 Binder Head Screw	
77	1/4-20 Hex. Nut	
78	Washer	
79	10—32-1-1/4 Mounting Screw	
80	Post Pulley	35-2296
	Post Pulley Assembly (Master)	35-2297
	Post Pulley Assembly (Plain)	35-2635
	Post Shaft	35-2441
	Clamp (Tape)	35-2501
81	Rubber Grommet	35-2298
82	Motor Mounting Plate	
83	1/4-20 Hex. Nut	
84	Cam Gear Assembly	35-2299
85	Switch Assembly (41-611)	35-2366
	Switch Assembly (41-616)	35-2511
86	Tone Arm Rest Shaft Spring	35-2300
	Pin	35-2480
87	Switch Latch Spring	35-2301
88	Push-button Stem Spring	35-2302
89	Roller and Lever	35-2455
90	Switch Latch	35-2303
91	8—32x1/4 Mounting Screw	
92	10—32 Hex. Nut	
	Lever Trunnion	35-2325
93	Cord Clamp	
94	Raising Lever Spring	35-2304
95	Pick-up Cord (Give Model No.)	35-2305
96	Tone Arm Elevator Pin	35-2306
97	Tone Arm Shaft	35-2307

lever and holds pickup out beyond the turntable. Then when the pickup descends it depresses the pickup rest, thereby tripping switch and shutting off the motor.

OILING

The changer should be lubricated once a year with a few drops of good light machine oil at each of the following points:

No. 1. Three holes in motor gear housing.

No. 2. Turntable spindle bearings.

No. 3. All other bearing points. (Caution. **Never oil the friction clutch (72) at any time as it will cause slippage.)**

TO CHECK OILING

If squeaks are heard, compare the squeak with and without a load of records, as any stack of records in motion is apt to squeak with a pin through their centers. This can be corrected by rubbing a little wax on the turntable shaft. See that all three ¼" round wicks in the motor frame are in position and are thoroughly saturated with oil (as it may not be if insufficient oil or too heavy oil has been used.) Lift out all three motor wicks with tweezers. See if old oil has become "gummy" (commonly due to use of low grade oil or low viscosity oil.) **If necessary clean gummed up wicks with kerosene.** See that each is saturated with good oil, then before replacing them drop a little oil into the holes. The gear box of the motor is packed with a semi-fluid grease at the factory and it should never be necessary to take it apart for lubrication purposes. However, if at any time it is necessary to take the motor apart or remove the transmission cover from the motor frame, be sure that motor is not in a position so that when transmission cover is removed the grease will not run out of the transmission case.

REPLACING MOTOR

In case of any serious fault within motor, it should be removed from the changer and replaced with a new motor. See that motor frame is well grounded by wire, soldered to lug on Sub-plate. (In ordering a replacement motor, specify the power supply and give model number.)

CHANGER ADJUSTMENTS

TROUBLES

Cases of failure to operate satisfactorily will generally be found due to either to neglect of proper lubrication, or to tampering with the mechanism after it leaves the factory, or to injuries accidentally sustained as by external vibration or by impact of some heavy object. In addition, there is always the possibility that any kind of spring may "go dead" (cease to operate without any visible breakage) even though the utmost factory precautions are taken against it — or that set screws may work loose due to some external vibration. For tightening set screws an Allen (hexagon) wrench is required. Be sure that set screws are properly seated on the holes or flat provided. Damage from tampering is likely to take the form of bent parts. Never bend any part during examination.

ADJUSTMENTS

TONE ARM ADJUSTMENTS

A. Tone Arm Rest Position Adjustment

1. Start change cycle.

2. Then stop changer just before the tone arm starts to lower on the rest.

3. In this position the outer edge of the pickup should clear the hook of the rest (6) by 1/16 of an inch.

4. If it does not position properly on the rest make adjustments as follows: Hold clutch index lever (69) which moves with the tone arm, against the index hook sleeve (67). Then loosen the clamp screw on pickup mounting and move tone arm so that it sets down into the pickup rest.

B. Tone Arm Height Adjustment

The tone arm when lifted to its maximum height, the light-beam jewel should clear fifteen 12" records on the turntable, by at least 1/16 of an inch. If it does not clear records at this distance then the adjustment screw underneath the tone arm directly above the plunger in the pickup mounting bracket should be turned out to the proper distance required.

C. Adjusting Tone Arm to Index on 10 and 12-inch Records

Adjusting landing position of light beam jewel on the record. The position at which light beam jewel lowers to record can be adjusted by inserting screw driver through hole (23) just in back of tone arm shown in Fig. 5. For adjusting the 10" set-down, insert screw driver into the inside eccentric adjusting stud. For adjusting the 12" setdown, insert screw driver into the outside slotted stud. Turn very slightly clockwise or counterclockwise to move light beam jewel landing in or out. The factory adjustment for the light beam jewel landing on the record is ⅛" in from the outer edge.

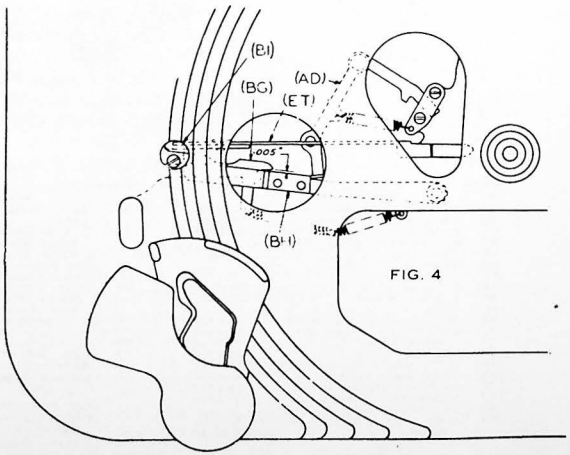


FIG. 4

D. Reject Adjustment — Fig. 4

Insert screw driver through hole (BI) in main plate and locate it into slotted stud. Adjust eccentric cam so that the distance between the trip lever (BG) and trip arm (BH) is approximately .005. This can best be done by first adjusting the trip eccentric cam at (BI) so that there is no clearance or gap, then back off very slightly until trip lever (BG) is free to pulsate with the clutch motion or action of the release lever (ET). If the gap is not sufficient between the trip lever (BG) and trip arm (BH) the pulsating motion of the clutch release lever (ET) will gradually cause the trip lever to move the trip arm enough to trip the trigger (AD) and start a change cycle. If gap is too great the trip lever will not move far enough to start a change cycle at the end of a record.

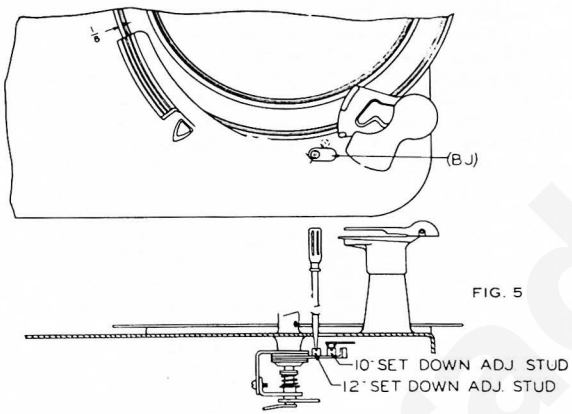


FIG. 5

GAUGING AND SYNCHRONIZING RECORD SELECTOR BLADES

To gauge and synchronize the record blades so that they will select 10" and 12" records properly proceed as follows:

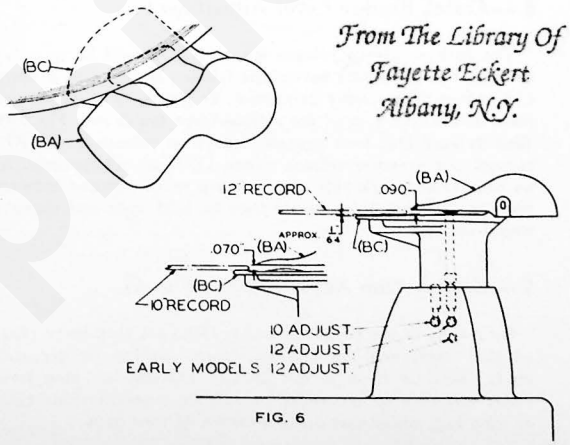


FIG. 6

1. — Adjusting Selector Blade Clearance

To adjust the distance between the selector plate (BA) and the shelf plate (BC) for 10" records, first select a 10" record that is approximately .070" thick. Then position it on changer and start a change cycle to revolve changer plates. Stop the turntable by hand just as the selector plate (BA) is about to touch the record, and shut off the motor (see Fig. 6). Then slowly revolve the turntable by hand, allowing selector plates to contact edge of record so that it just slides over the record, touching the surface lightly. Check all three selector plates and if any adjustment is necessary, it can be done by inserting a No. 10 Allen wrench in the set screw holes located in the sides of the changer posts. Turn set screw slightly clockwise to raise the selector plate and counter-clockwise to lower it. The set screw for adjusting the 10" record setting, and the one for 12" record setting is shown above in Fig. 6. To adjust for 12" records, select a 12" record that is approximately .090" thick, then follow same procedure as for adjusting 10" records.

The following adjustments cannot be made from above, and therefore it may be necessary due to position of changer to remove it from cabinet.

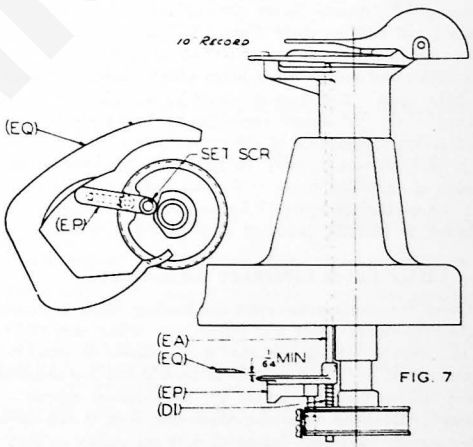


FIG. 7

2 — No-Record Selecting Lever Adjustment

First be sure that spring tension on spring (DI) is strong enough to lift the center blade raising pin (EA) properly and fully, but not so strong that one 10" record will not fully depress pin and lever (see Fig. 7). Then with set screw loose in no-record selecting lever (EP) see Fig. 7, and pin held down by weight of one 10" record, slide no-record selecting lever (EP) into position so that it will just clear under edge of the lower cam setting lever (EQ) by approximately 1/64" clearance (see Fig. 7). Then tighten set screw and check adjustment with and without a record, also be sure that without a record, the fin on no-record selecting lever (EP) swings above cam setting lever (EQ) and portion of lever (EP), indicated by arrow on Fig. 7, sweeps stop lever (EQ) on cam setting into position shown in Fig. 12.

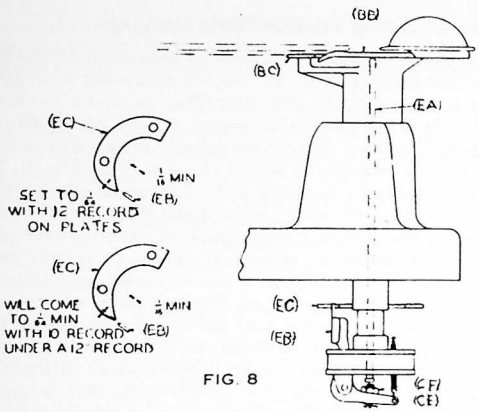


FIG. 8

3 — Lifter Lever Differential Adjustment

Place a 12" record over the turntable spindle so that the record rests on the shelf plates. Then check the center plate lifter lever (EB) and see that point of this lever will just slide inside of center arm lifter cam (EC) see Fig. 8. Then place a 10" record under the 12" record so that the 10" record will rest on shelf plate (BC) and the 12" record will then touch center plate (BB) which presses down center pin (EA) and moves lifter plate (EB) closer to outside face of lifter cam (EC) than it would be without the 12" record on top of the 10" record (see Fig. 8). The lever (EB) should then follow the outside of the center arm lifter cam (EC) see Fig. 8. If it is necessary to readjust, this can be done by means of adjusting screw (CE) and lock nut (CF) to balance out the contact of lever (EB) on both sides of cam (EC) in relation to starting point of cam (see Fig. 8).

4 — Lifter Lever Clearance Adjustment

Check the distance between the leading edges of the center plate lifter lever (EB) and center arm lifter cam (EC) with a 12" record resting on the shelf plates. It should be a minimum of 1/16". See Fig. 8. It should not be necessary to check this adjustment unless the tape clamp screws on the pulley (FG) have been loosened. See Fig. 9. To re-adjust after screws have been loosened, first set pulley so that when the slack in the tape line is taken up in the direction of forward motion of the tape segment (CH), there will be the necessary 1/16" clearance as mentioned above.

Note: If this adjustment is "Off" most likely changer plate synchronization will also be off. Check Adjustment No. 5.

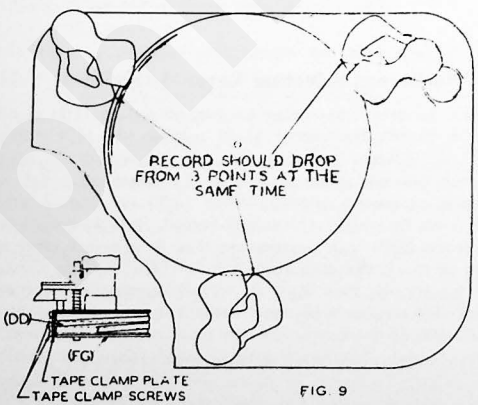


FIG. 9

5 — Changer Plate Synchronization

The synchronization of changer plates can be checked by placing one 10" record on the shelf plates. Then start a change cycle allowing it to continue until plates are just about ready to release the record. It can then be determined which plate is either slow or fast (see Fig. 9). This plate can then be adjusted by loosening the screws on the tape clamp which hold the tape (DD) from slipping in the pulley (FG) see Fig. 9. Then slightly move changer plate whatever is necessary to synchronize it with the other two plates so that record will drop evenly. Then tighten tape clamp screws securely. (Also check adjustment No. 4). Note — tape line should have a very slight amount of slack. Check by grasping tape line with thumb and index finger and moving it in and out approximately 5/8" with a moderate pressure.

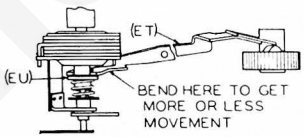


FIG. 10

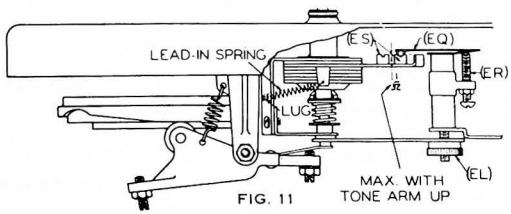


FIG. 11

6 — Clutch Release Lever Adjustment

The fork on clutch release lever (ET) should be adjusted so that it only slightly moves the friction clutch with a sharp kick rather than a wavy movement. To get more or less movement of the clutch, bend the release lever (as shown, Fig. 10). Also be sure that both prongs of fork on release lever (ET) contact the pressure release sleeve (EU) simultaneously. At no time should fork ride the pressure release sleeve between impulses, as the clutch would then be held open and changer would not trip.

7 — Setting Cam Adjustment — Fig. 11

By means of the adjusting screw (ER) set stop lever (EQ) so that there will be 1/32" maximum overlap on eccentric studs (ES). If there is not enough overlap, the stop lever (EQ) will slide off instead of holding on eccentric studs (ES) on stop lug, while measuring setdown of tone arm.

8 — Slide-in Adjustment

To adjust the power of the Tone Arm Lead-in, bend the lug on Lead-in spring to give it more or less tension, too much tension may cause needle to slide in on record. (See Fig. 11). The knurled nut (EL) adjusts the distance Tone Arm will swing in, before clutch is disengaged. If clutch is still engaged after needle lands on record it may cause slide-in. Turning nut (EL) clockwise should correct "slide-in" if lead-in spring tension is correct.

9 — Tone Arm Swing Adjustment

First raise tone arm (AG) by hand and slightly loosen clamp screw on tone arm shaft head (see Fig. 13). Then start a change cycle and shut off power supply to motor when tone arm (AG) is being held in stop position above the tone arm rest (AH) and stop lever (EQ) (on setting cam assembly) is contacting stop lug on locator plate (which is part of the tone arm shaft assembly) see Fig. 12. Then insert a 5/64" shim between tone arm shaft head and bearing race to set vertical clearance (which must be approximately 5/64") so that clutch will be engaged for moving trip lever when tone arm is down on record and align tone arm (AG) flush with tone arm rest (AH) as shown in Fig. 12. Tighten clamp screw securely and remove 5/64" shim, then check action of tone arm and adjust needle landing as in adjustment C, Tone Arm Adjustments.

10 — Raising Lever Pressure Adjustment

To make this adjustment, first put unit into change cycle, then stop it when roller (CD) is at the highest point on the cam (FK), then loosen lock nut and turn screw under flat lifter spring clockwise until tone arm elevating pin (FW) and shaft (FX) are completely raised and flat springs contacts the tone arm shaft (FX) holding clutch assembly firmly in the high position against tone arm swing bracket (FY) and only slightly deflecting the flat spring (see Fig. 13). Then tighten lock nut securely.

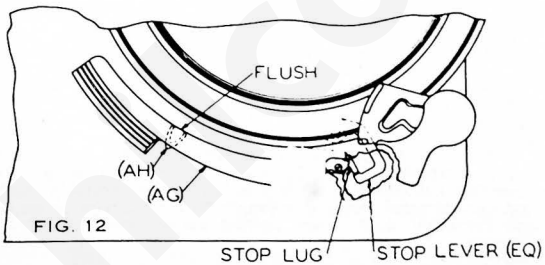


FIG. 12

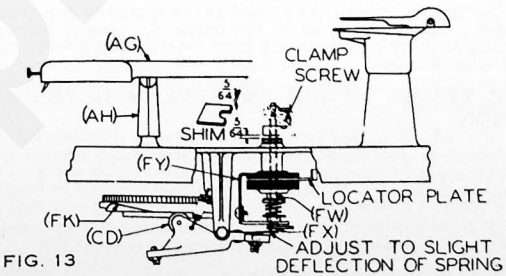


FIG. 13

11 — Switch Shut-off Adjustment

Start a change cycle by pressing push button (AK) so that roller (FP) holds switch latch (FQ) in a loaded position. Then stop turntable by hand when cam gear is in position (shown below) and pin on rest shaft is sliding down decline from shoulder on cam gear, allow the rest shaft (FM) to come down gradually and when switch latch (FQ) trips, hold rest shaft in that position and adjust screw (CB) to within approximately 1/32" from end of shaft (FM), tighten lock nut (CC) securely and check operation.

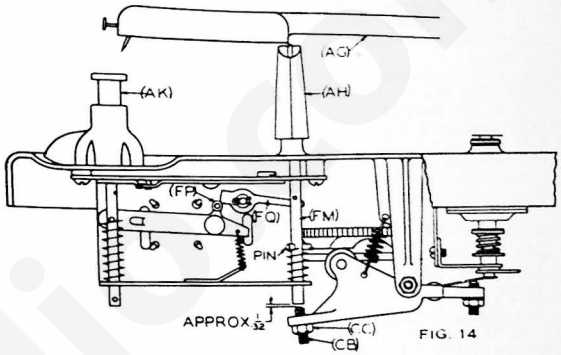


FIG. 14

TROUBLES. Numbers in following items refer to figures 1, 2, 3.

Among the principal trouble symptoms to which such cause may give rise, are the following:

1. MECHANISM IS SLOW IN STARTING, OR MOTOR GETS HOT

May be caused by:

a. Failure to lubricate properly. Oil **thoroughly.** See oiling instructions.

b. Check voltage. Line voltage may be abnormally low or high.

c. Motor windings damaged. If windings are found damaged, remove motor and return it to factory for repair.

2. MOTOR FAILS TO RUN, EVEN WHEN IT IS ENTIRELY DISCONNECTED FROM OTHER WIRING AND PROPER VOLTAGE IS APPLIED DIRECTLY TO THE TWO ENDS OF ITS WINDINGS

This indicates trouble in motor windings. Unless the damage is easily seen and repaired, replace motor, as above described.

3. MOTOR IS SLOW IN STARTING

a. **Check oiling** as directed above. It may not have been properly done; old oil may have become gummy.

b. Changer may have been in a very cold place, and may not yet have reached room temperature. Give it a fair chance to get warmed up before concluding that motor is defective. The changer is equipped with a constant-speed self-starting motor. Under all normal conditions it starts automatically and runs at correct speed.

4. SQUEAKS OR OTHER NOISES, DURING PLAYING OF RECORDS

Check oiling as directed above. (If squeaks are heard, they will usually be found to come from the records — not from the mechanism.)

5. CHANGER IS NOISY WHEN IN CYCLE

Check oiling. Also see if any part has become loose or bent and is rubbing against a moving part.

Numbers in paragraphs below refer to Fig. 1, Page 145; Fig. 2, Page 146; Fig. 3, Page 147.

6. MOTION OF PICKUP TOWARD RECORD PIN WILL NOT TRIP CHANGER MECHANISM

a. See that control switch pointer (9) is not set on "M," manual.

b. Check friction clutch assembly (72) to be sure that parts are not disengaged. Also check for binding, bent or loose parts.

c. Can also be caused by too much clearance between trip lever (18) and trip arm (17). There should be a few thousandths clearance between them. This can be adjusted by the eccentric screw on the trip arm (17) through hole in main plate (19). See D — Reject Adjustment, page 149.

7. PRESSING PUSH BUTTON DOES NOT TRIP CHANGER MECHANISM

a. See that control switch pointer is not set on "M," manual.

b. Check control switch unit to see whether there is an obstruction or a bent or loose part. Also check for loose set screws.

c. Follow through on action from the push button to cam latch (90) and see that every part is in proper working order.

d. If the mechanism will not reject when the push button is pressed look for trouble in the reject push button mechanism such as binding, or bent parts. In the Model 41-616 changer the push button is not used, but the mechanism is actuated by the reject relay. If the trouble develops in this changer look for open coil or parts that are binding.

8. SETTING POINTER ON "M," MANUAL, FAILS TO PUT CHANGER MECHANISM OUT OF ACTION, SO AS TO ENABLE MANUAL OPERATION

a. Check for loose set screws in control switch.

b. Also check for loose or bent parts and be sure that manual latch (at 90) is holding the trip link rod to keep it from moving.

c. When the reject button is pressed with the selector switch in the "M" position the trip lever (17) must not bind or be under strain. The clearance at the rod hole on the end of the trip lever should be just taken up so that the shelf plate on the trip lever is not pushed off when the reject button is pushed down.

There should also be at least a few thousandths of an inch clearance between the trip lever (18) and the trip arm (17), otherwise the tone arm will backtrack and the tone arm shaft will bind due to the tension of the trip arm pushing the reject adjusting screw eccentric washer on the trip lever (18) against the fork lever (70) mounting bracket.

9. TRIPS TOO SOON OR BEFORE RECORD HAS FINISHED PLAYING

a. Not enough clearance between the trip lever (18) and trip arm (17). There should be a few thousandths clearance at this point. To get more clearance adjust eccentric by turning it slightly in a clockwise direction through hole in main plate (19).

b. Can also be caused by not enough clutch action (72). Bend forked release lever (70) slightly to increase clutch action. See paragraph 6, page 150.

c. Also check for loose parts.

10. TONE ARM FALLS OFF RECORD OR WILL NOT SWING INTO GROOVE OF RECORD

a. Light beam jewel sets down too close to edge of record. Not adjusted in far enough.

b. Can also be caused by too much clearance between cork clutch disc (72) and tone arm swing bracket (96). This can be adjusted by the thumb nut (62) being turned counter-clockwise. Also it may be necessary to add more tension to the flat spring by turning the adjusting screw (65) ¼ turn or whatever is necessary to assure satisfactory operation.

c. 1. To adjust the tone arm for proper swing-in after the light beam jewel lands on the record make the following adjustment:

With the mounting pivot of the tone arm just starting to come down after the light beam jewel lands on the record, the top cork of the clutch (72) should still be tight against the tone arm swing bracket (96). In this position the 10 or 12-inch index eccentric adjusting screw, depending on record used should be against the hook stop lever (68). This prevents the tone arm from swinging in further when the clutch cork is under pressure.

2. As the mounting pivot of the tone arm drops further to the point of where the eccentric adjusting screw just is slipping off the hook stop lever (68) the tone arm swing bracket (96) should continue to swing slowly and pull the tone arm inward. If it does not do this, more pressure is required and is obtained by tightening the spring (65) by the adjusting screw.

3. The distance of the swing-in after the indexing screws leaves the stop lever (68) is determined by the length of time the clutch cork remains in contact with the tone arm swing bracket (96). To obain further swing-in loosen thumb screw (62). To shorten the amount of swing-in tighten thumb screw (62).

4. After the tone arm swings into the groove of the record there should be a clearance between the top clutch cork (72) and the tone arm swing-in bracket (96) of 1/16 of an inch. At this point there should be a clearance between the clutch indexing lever (69) and the hook stop lever (68) of about 3/64 of an inch. See also items 6 and 7, page 150; 8 and 9, page 151.

11. TONE ARM VARIES WHEN SET DOWN ON RECORD

a. Check for loose parts or loose set screws or possibly the swivel shaft head (24) may be loose on the swivel shaft.

b. Be sure that hook stop lever (68) engages the eccentric adjusting cams (69) for both 10" and 12", holding them securely until light beam jewel has set down on record. Height of stop lever is adjusted by screw (at 68).

12. TONE ARM SETS DOWN TOO FAR IN

a. Due to not measuring properly (see paragraph 11b).

b. Out of adjustment. Probably due to tone arm being held, while in motion, from its original position on the swivel shaft. Also check for loose or bent parts.

13. LIGHT-BEAM JEWEL LANDS PROPERLY ON RECORD, BUT FAILS TO MOVE OVER INTO STARTING GROOVE

a. See 8 — Slide-in Adjustments, page 151.

14. LIGHT-BEAM JEWEL LANDS PROPERLY ON RECORD BUT SLIDES IN A FEW LINES ON RECORD

a. Turning thumb screw (62) slightly in a clockwise direction will probably correct this condition which necessitates a reverse adjustment for the condition in paragraph 10.

15. CHANGER CONTINUES CYCLING

a. No clearance between trip lever (18) and trip arm (17). To correct this condition adjust as in paragraph 9.

b. Also check for binding or bent parts.

16. "WOW" IN RECORD REPRODUCTION

a. Record is warped or otherwise defective or instrument is not being operated at normal room temperature, 70° F.

b. Motor mounting plate being bent will cause "wow". Straighten it if possible or replace with new plate if too badly bent to warrant straightening. This is only found where rough handling is evident.

c. Motor shaft out of alignment with turntable shaft (Also due to rough handling.) To correct move the motor on its mounting till motor shaft is parallel to the turntable shaft and the universal coupling is exactly at right angles to motor and turntable shaft. Then tighten motor mounting screws securely.

17. TURNTABLE IS TIGHT

a. This turntable is assembled to the turntable spindle cone with a taper lock to fit in the center. To remove turntable grasp with both hands at the same time pulling upward while it is revolving.

18. THUMP HEARD IN RECORD REPRODUCTION

a. Probably caused by excessive motion of the friction clutch when it is momentarily released by the clutch release lever (71) which in turn is actuated by the two high spots on the intermediate gear. If thump is objectionable, it can be lessened by slightly bending the clutch release lever (71) so that the motion of this lever is lessened to allow only a slight amount of motion of the friction clutch. See item 6, page 150.

SERVICE NOTES

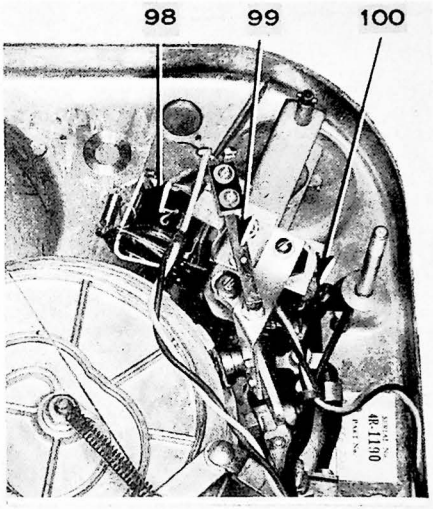


FIGURE 1

MODEL 41-616 REJECT RELAY AND CYCLING SWITCH LOCATIONS

98	Reject Relay	42-1631
99	Reject Relay Switch	42-1630
100	Cycling Power Switch	42-1633

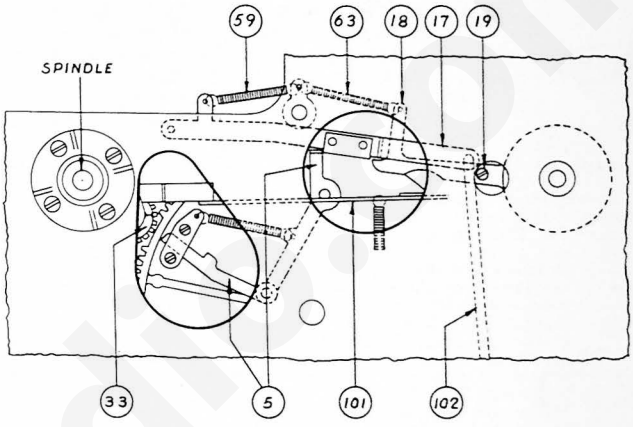


FIGURE 2

5	Cam Latch and Trigger Assembly	33	Intermediate Gear Assembly
17	Trip Arm Assembly	59	Trip Arm Spring
18	Trip Lever Assembly	63	Trip Lever Spring
19	Trip Adjusting Cam	101	Clutch Release Lever
		102	Trip Lock Rod

TONE ARM DRAG

Tone arm drag may be responsible for poor tone quality as well as faulty operation of the automatic record changer mechanism. With too much drag on the tone arm, the tone arm will not be free to follow the groove in the record and the sapphire will be pulled out of line and will turn the mirror so that the light beam is deflected from the light sensitive cell.

Too much drag on the tone arm may cause the changer mechanism to fail to trip at the end of the record. If the drag is too heavy, the sapphire will leave the spiral groove at the end of the record, when set for automatic operation. When set for manual operation, the friction of the clutch will cause the sapphire to jump from the trip groove at the end of the record, which is normal.

Since the grooves in the home recorded records are much lighter than the grooves in the commercial records, tone arm drag will cause the sapphire to jump out of the groove when playing home recordings.

The tone arm drag should be less than 1/10th of an ounce. To check this, the changer mechanism should be stopped with the clutch members disengaged, i. e. — with the clutch release lever 101 on a high spot on the cam on the intermediate gear 33. The record changer must be set for manual operation.

Block up the tone arm by inserting a piece of cardboard between the adjusting screw on the light beam pick-up mounting bracket and the tone arm. With a spring scale (Philco Part No. 45-2851) measure the tone arm drag. Attach the spring scale to the head end of the tone arm and measure the tone arm by pulling the head toward the turntable spindle. The drag should not be greater than 1/10th of an ounce. If the drag is greater it is caused by: —

(a) Insufficient clearance between the clutch members.
Watch the clutch assembly while swinging the tone arm back and forth. The two moving members of the clutch must not transmit any motion to the other two clutch plates. If the clutch is not opening enough, bend the forked end of the release lever 101 slightly to give greater opening between the clutch plates.

SERVICE NOTES

(b) Friction in the tone arm spindle assembly.
The tone arm shaft and the tone arm elevator pin must be free to lift up and down and must seat freely. If the spindle binds at any point it may be due to insufficient clearance in the hole in the end of the swing bracket 64, or the shaft or pin may be bent. If the shaft or pin is bent, it will be necessary to replace it. If there is insufficient clearance in the hole in the bracket, the stud at the other end of the bracket should be bent in the direction to give the proper clearance.

(c) Insufficient clearance between the trip lever 18 and the trip arm 17.
There must be a perceptible clearance between the trip arm 17 and the trip lever 18. With the changer set for manual operation, the trip lever 18 must pulse freely without rubbing on the trip arm while the motor is turning over. Also, the trip arm 17 must have a small amount of play and must not bind on the cam trigger 5.
This is covered under Trip Sensitivity, since these adjustments likewise affect the Trip Sensitivity adjustments.

TRIP SENSITIVITY

In addition to tone arm drag, other conditions affecting trip operation are: —

(a) Too little tension or too much friction in the trip mechanism.
To check trip sensitivity, the motor should be stopped and the clutch plates engaged, i. e. — with the clutch release arm 101 on a low spot on the cam on the intermediate gears and with the master gear in the playing position. With the changer set for automatic operation, measure the pull of the tone arm required to trip the cam latch and trigger assembly. It should be between ⅜ and ⅝ ounces.
If the cam latch is released with less than ⅜ ounce tension, the mechanism will be too sensitive and will pre-trip operation.
If more than ⅝ ounce is required to trip the cam latch, it is quite possible that the mechanism will fail to trip on an oscillating groove in a record. The amount of pull required to trip the cam latch can be adjusted by stretching or shortening the spring 59 on the trip arm, provided, however, there is no friction or binding of parts which is making the trip mechanism too insensitive.

With the motor stopped, change the control to the manual setting. There must be a small amount of play between trip arm 17 and the cam trigger 5. This can be obtained by bending the end of the trip arm 17 with a pair of pliers, twisting it toward the switch knob assembly. This is equivalent to lengthening the trip lock rod 102. There should not be so much play that the cam trigger 5 can be tripped by the movement of the trip arm 17 while in the manual position. After this adjustment has been properly made, there will be no apparent movement of the trip arm when changing from the manual to automatic setting.

There must be a perceptible clearance (.005") between the trip arm 17 and the trip lever 18 so that the trip lever will pulse freely while the motor is running and with the mechanism set for manual operation. This can be obtained by adjusting the cam 19.

The spring 59 must have sufficient tension to return the trip arm to its normal position after the change cycle has started. If it does not, the trouble is probably caused by too much friction somewhere along the trip lock rod, 102, which locks the trip arm and prevents it from operating when the mechanism is in the manual position. If this rod and the switch latch are absolutely free and do not bind whatever, and the switch arm still does not reset itself, then the trip arm spring 59 requires shortening.

HOW TO OVERCOME FLUTTER, RUMBLE, DISTORTION AND MISTRACKING ON PHILCO RADIO COMBINATIONS

1 — Rumble and mistracking may be due to not enough head weight or pressure where the jewel rides in the record groove. The weight or pressure can be increased to 1½ oz. maximum. The counterweight in the heel of the tone arm should be moved toward the spindle as far as possible and holes should be drilled in the counterweight to lighten it so that the weight or pressure of the head is increased. The head weight should be checked using the Philco Scale Part No. 45-2851.

2 — Viscaloid strips ½" x 1" can be obtained from the Service Department. They should be folded in half and forced between the tone arm mounting bracket and the tone arm shell, one on each side. Touching the viscaloid with a hot soldering iron will fasten it to the metal. This is an excellent cure for flutter and rumble. The viscaloid dampens the vibrations to the tone arm which might cause flutter and rumble. (Part No. 27-9838.....02 list).

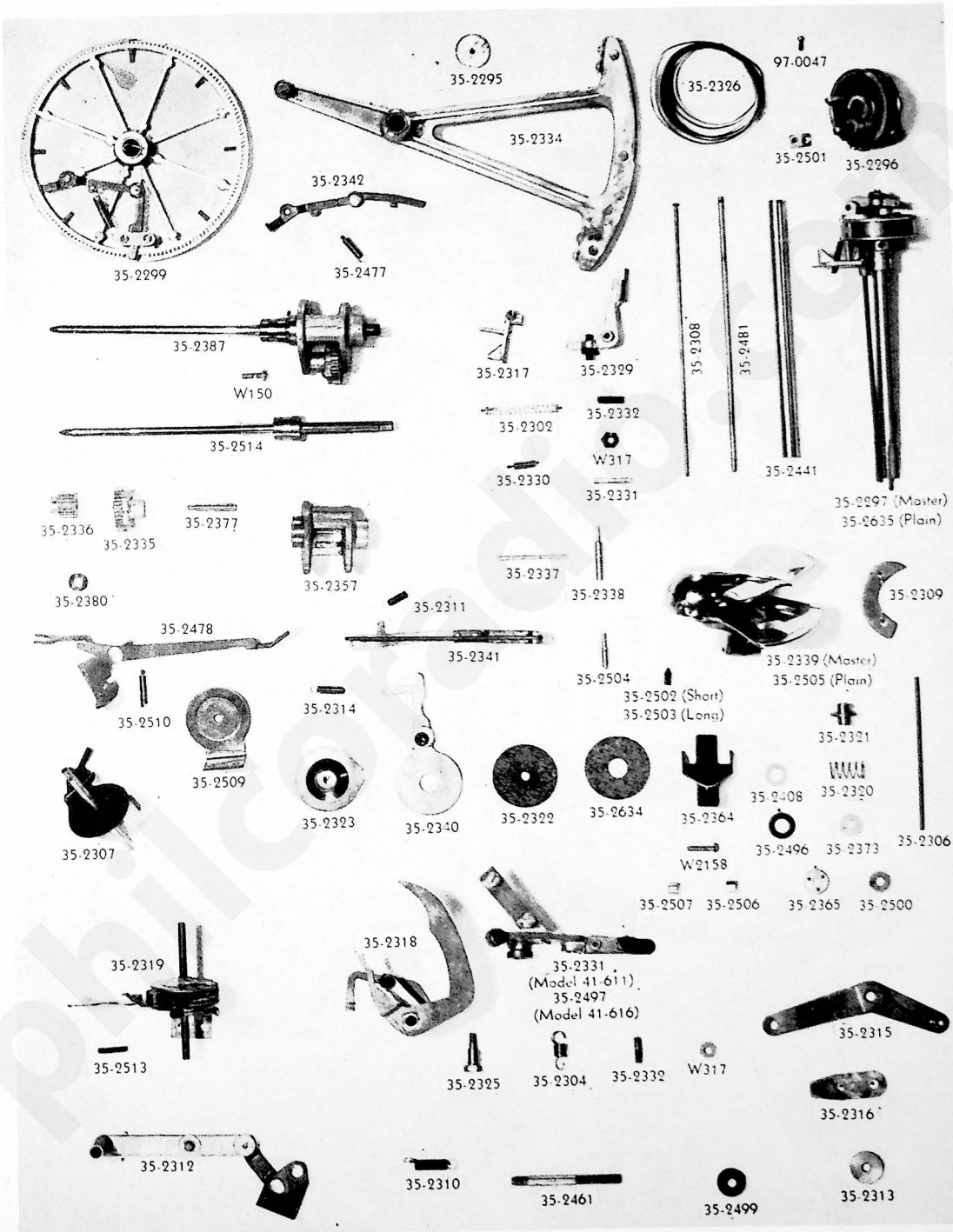
3 — Theoretically, the light beam is properly set when it is half "on" and half "off" the photoelectric cell. Due to the slight variations in the cell sensitivity there may be distortion in some exereme cases and it may be necessary to readjust the light beam to approximately one-third "on" the cell and two-thirds "off." This should only be done in cases of distortion. If this adjustment does not correct the trouble, the light beam should be set back again to half "on" and half "off."

4 — Flutter, mistracking, rumble and distortion can all be caused by a stiff mirror and jewel assembly. Check the flexibility of this assembly. With the record changer stopped and the clutch opened, put a record on a turntable and place the tone arm on the record. Open the peep hole in the pick-up cover — the light beam should be 5/32" wide and should be half "on" and half "off" the photo-electric cell. Hook the Philco Scale, Part No. 45-2851, under the cover at the nose and pull laterally, first toward the spindle and then away from the spindle. The jewel assembly should be sufficiently flexible to allow the light beam to be pulled completely off the cell and completely on the cell with less than 1 oz. of lateral pull — from ½ oz. to ¾ oz. is the most desirable. Replace the mirror and jewel assembly if more than 1 oz. pull is required.

5 — The jewel normally extends 1/32" below the guard. It should be vertical with respect to the surface of the record when viewed from in front of the pick-up head. When viewed from the side, the jewel is at quite an angle to the surface of the record. Do not attempt to change this angle. It permits the jewel to track in the groove with a minimum of surface noise. Any change from the original setting will affect the frequency response.

6 — While playing a record, observe the light beam through the peep hole in the cover to determine whether the tone arm drag is pulling the light beam "off" the photo-electric cell. There will be a noticeable pulsing due to the clutch action, but if the light beam is pulled "off" the cell, the tone arm should be checked for drag and the clutch checked for proper opening.

7 — When replacing a mirror and jewel assembly or an exciter lamp, the light beam should be centered vertically and should not extend to the top nor to the bottom edge of the frame around the photo-electric cell. It may be necessary to use paper shims under the mirror and jewel assembly to line it up properly.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35-2317
35-2329
35-2308
35-2481
35-2514
35-2302
35-2332
W317
35-2330
35-2331
35-2441
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35-2635 (Plain)
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35-2505 (Plain)
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35-2503 (Long)
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(Model 41-611)
35-2497
(Model 41-616)
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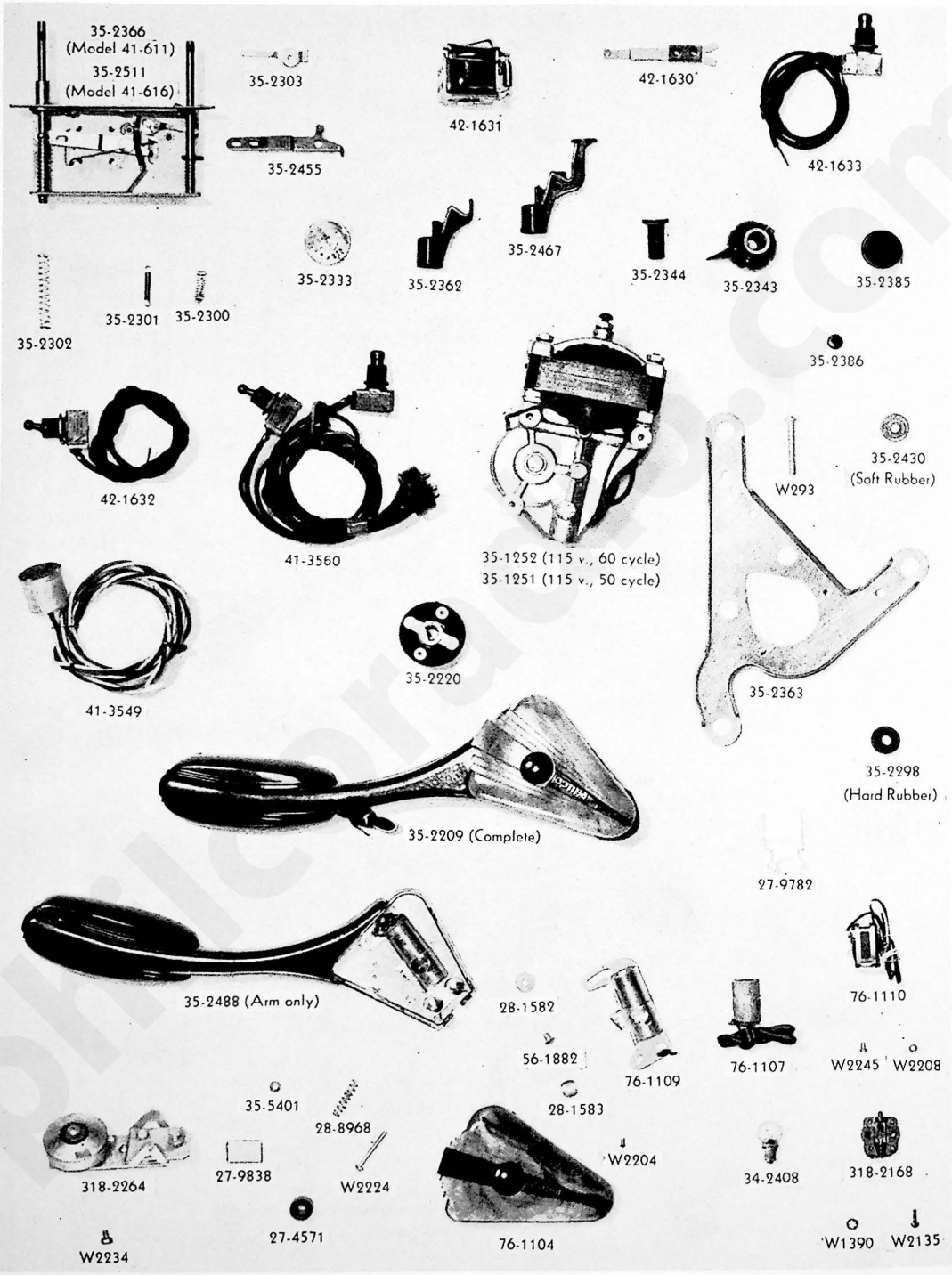
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(Model 41-616)
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35-2302
35-2301
35-2300
35-2386
42-1632
41-3560
35-1252 (115 v., 60 cycle)
35-1251 (115 v., 50 cycle)
W293
35-2430
(Soft Rubber)
41-3549
35-2220
35-2363
35-2298
(Hard Rubber)
35-2209 (Complete)
27-9782
35-2488 (Arm only)
28-1582
76-1110
56-1882
76-1109
76-1107
W2245
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