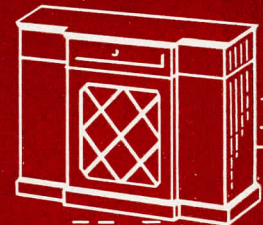


PHILCO SERVICE



FEBRUARY, 1945



SERVICE MANUAL 1942 PHILCO AUTOMATIC RECORD CHANGER

Introduction

THIS manual includes complete service information for the 1942 PHILCO AUTOMATIC RECORD CHANGER. The contents are arranged to provide you with a logical, systematic reconditioning procedure. It is clearly illustrated. It is factory-proved.

The 1942 PHILCO AUTOMATIC RECORD CHANGER is a precision-built mechanism. If it requires service, a half-way job is not good enough. The only way to guarantee your work is to follow a complete reconditioning procedure.

While this procedure is not new, the material in this manual has been prepared to give you a definite, step-by-step working guide. The purpose of this guide is to emphasize the need for a careful, overall reconditioning of all record changers that require service.

In this manual, the overall reconditioning procedure is given under the heading of MAINTENANCE. This is the most important section in the book. It will aid you in giving GUARANTEED SERVICE, for it is complete with drawings, photographs, and text in detail. Reconditioning of the 1942 PHILCO AUTOMATIC RECORD CHANGER may be done in the shop or home. Where it is done is not important, but how it is done is paramount.

Read this manual; study it. It is your insurance against call-backs and frequent servicing.

This service manual covers the following three models of changers:

<i>Changer Part No.</i>	<i>Used in Philco Models</i>
35-1285 (Standard)	42-1008, 42-1009, 42-1010, 42-1011, 42-1012, 42-1013
35-1286 (Deluxe)	42-1016
35-1289 (Deluxe)	42-1015

These record changers are identical as to operation and servicing. The differences are of a minor nature, such as the color of the mounting plate, plating of the parts on top of the changers, color of the turntable flocking, and electrical wiring circuits for operation. The differences are indicated in the replacement parts list, page 34, and the electrical wiring diagrams, pages 23 and 24.

SERVICE DIVISION

PHILCO RADIO and TELEVISION CORPORATION

PHILADELPHIA

PENNSYLVANIA

GENERAL INFORMATION

PRINCIPLES OF OPERATION

THIS record changer is designed to play, automatically, either twelve 10" records or ten 12" records.

A 117-volt a-c motor drives the turntable at the desired speed by means of two friction drives between the motor shaft and the rim of the turntable.

When a record is placed on the turntable and the pick-up is placed on the record, the pick-up jewel follows the groove as it varies according to the modulation placed on it when it is recorded. A small pivoted mirror is attached to the flexible jewel mount, and is driven back and forth from center as the jewel follows the modulated record groove.

A lamp supplies a beam of light which, reflected from the mirror, is focused onto the photo-electric cell. As the mirror moves back and forth, the light beam varies its area on the cell. The photo cell generates current when

exposed to light, and this current is proportional to the amount of light. Thus, the variation of the jewel in the record groove varies the photo-cell output, which is fed to the input of the audio amplifier of the radio. The lamp is energized by an oscillator, in the radio, whose frequency is approximately 1800 kc. The brilliance of the lamp is adjusted by a control on the radio chassis.

When the trip solenoid is energized, a sawtooth gear, fixed to the turntable, is engaged with a similar gear on the spindle and, through an intermediate gear, rotates a cam gear one revolution. A guide pin, riding on the cam, raises the tone arm clear of the record. The guide pin then enters a groove in the top side of the cam, causing the tone arm to swing clear of the turntable. After the tone arm has cleared the turntable, a crown on the bottom side of the cam strikes a roller, moving the record shelf

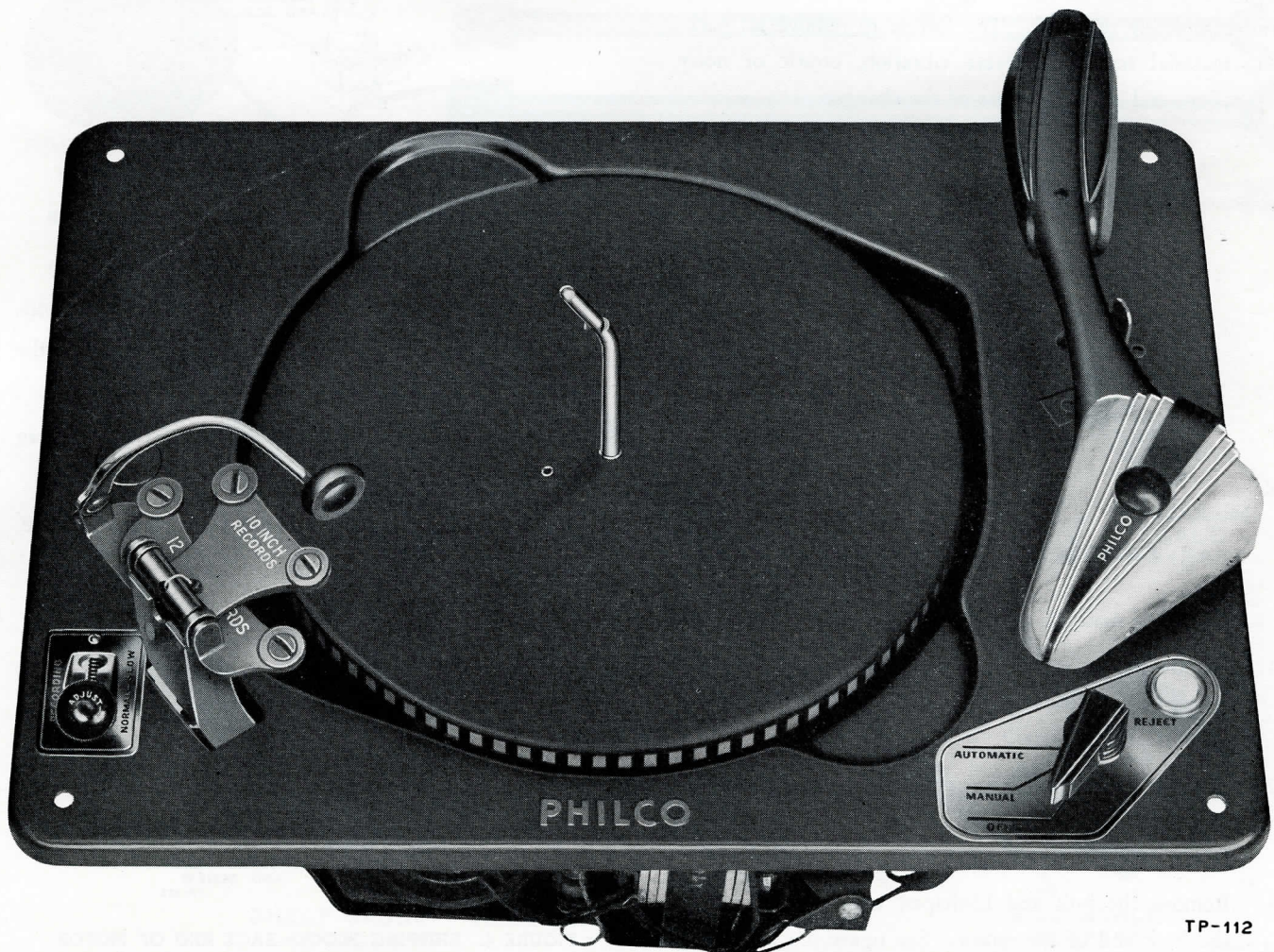


FIGURE 1. TOP VIEW OF CHANGER—TURNTABLE ON

TP-112

toward the spindle and dropping a record on the turntable. The cam, continuing its revolution, causes the tone arm to swing in to the outer edge of the record, and the lift pin is allowed to lower the tone arm. The cam gear has now completed its revolution and remains inoperative while the record is being played. If it is desired to reject the record, the REJECT switch button is pressed. This energizes the trip solenoid, and repeats the change cycle.

An automatic trip switch energizes the solenoid when the tone arm enters the eccentric finishing groove of the record. This energizing of the solenoid is accomplished by the tone arm gaining speed of travel toward the spindle because of the increase in distance between the

record grooves. A trip operating on this principle is of the velocity type. When the operating switch is placed in the MANUAL position, the automatic trip cannot energize the solenoid.

The top of the cam gear has two grooves so that, when 10" records are played, the tone-arm guide pin rides in the inside groove; when 12" records are played, the outside groove is in use. The proper groove for the guide pin is selected by a guide segment on top of the cam. This guide segment is controlled by a trip spring, which is actuated through a cord by movement of the 10" record shelf.

INSTALLATION

It is very important that all packing used for shipping purposes be removed to obtain satisfactory operation of this record changer. This point is stressed here, because it has been found that in some changers all packing material was not completely removed. The failure to remove all packing material results in severe vibration, erratic or noisy operation, and excessive wear of the changer.

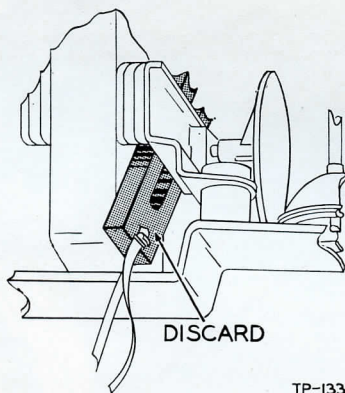


FIGURE 2. FIBRE WEDGE ON MOTOR

All packing material must be removed as follows:

1. Remove the fibre wedge from the drive end of the motor between the end of the armature and the bearing support. See figure 2.
2. Remove the bolt and wooden block from the front of the motor-mounting plate. *Leave the bolt out.* See figure 3.
3. Remove the bolt and U-shaped wooden block from the back end of the motor. See figure 4.

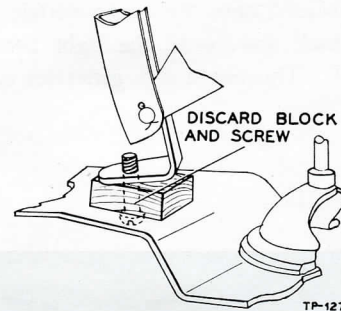


FIGURE 3. SHIPPING BLOCK—FRONT END OF MOTOR

4. Completely loosen, but do not remove, the four bolts, one at each corner of the changer base plate, so the changer floats freely on the springs.
5. Remove all packing material, packing tags, etc., from the tone arm and cabinet.
6. Remove all packing material from the turntable spindle.

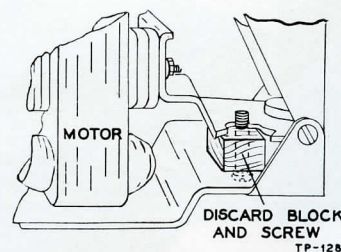


FIGURE 4. SHIPPING BLOCK—BACK END OF MOTOR

SPECIAL TOOLS AND EQUIPMENT

PHILCO has developed special tools which must be used by the serviceman to perform an efficient reconditioning of this automatic record changer. Some of these tools are available as a kit, Philco Part No. 45-2691, or may be purchased individually as needed.

Below are the Philco part numbers, names, illustration, and a brief mention of the uses of each tool:

5973, Allen wrench; used to loosen the two Allen-head, set screws holding the trip arm to the tone-arm assembly.

45-2953, pendulum scale; used to measure the horizontal friction or drag of the tone arm.

45-2958, 2-oz. scale; used to measure the vertical friction and weight of the tone arm.

55-0332, $\frac{1}{16}$ " gauge; used to measure the clearance between the motor-drive disc and bell drive.

45-2957, 8" reshaping tool; used to reshape the trunnion-bearing support and motor-mounting plate.

45-2948, 6" reshaping tool; used for reshaping the clutch bracket.

45-2959, shelf gauge; used to test push-off adjustments for both 10" and 12" positions.

45-2851*, 8-oz. scale; used to measure pull of the clutch release.

56-6202, adapter; used with 8-oz. scale to measure the end thrust of motor.

45-6219*, Prony brake; used on turntable to measure torque (used in conjunction with 8-oz. scale).

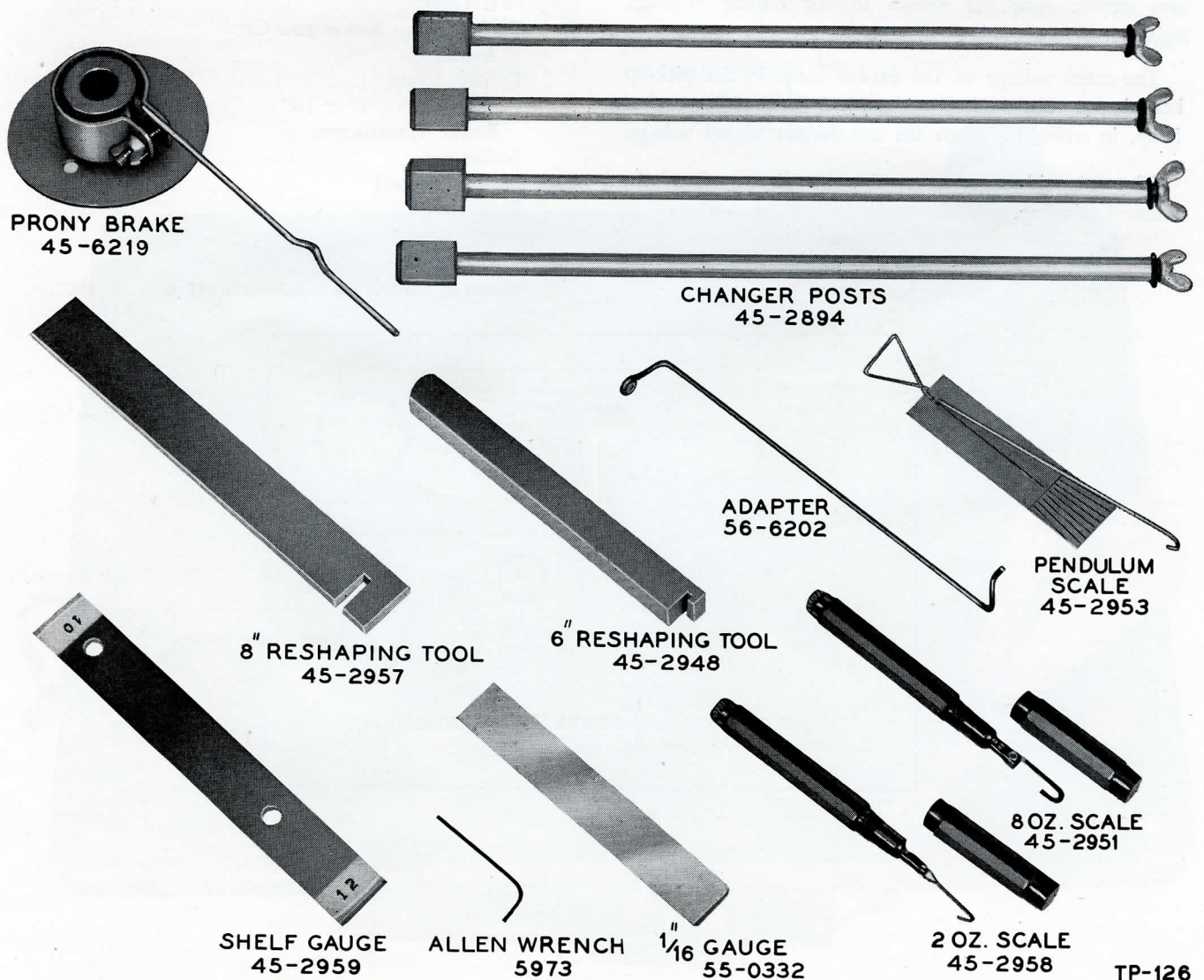


FIGURE 5. SPECIAL TOOLS

TP-126

45-2894*, changer support post (4 required); used to support the changer while removed from cabinet.

45-2954, special oil; used as specified in this manual for lubrication.

Crocus cloth; used for dressing bearing surfaces.

Miscellaneous tools required include a thickness gauge, a flat file (for dressing the bell-drive tire and turntable

drive wheel), a soldering iron, pliers, and screwdrivers.

All tools must be kept in good condition, especially the gauges and scales, so that their accuracy can be depended upon. Having good tools will pay large dividends.

*These items are not included in the Special Tools Kit, but are furnished individually.

AUXILIARY POWER SUPPLY

A power adapter for the 1942 Philco Automatic Record Changer that will enable the repairman to obtain the proper voltages for the motor, solenoid and exciter lamp through the connectors on the changer can be quickly assembled.

Any small power transformer with one 6.3-volt filament winding, such as Part No. 32-7842, will be satisfactory. The filament winding is employed to energize the solenoid and exciter lamp, as shown in the wiring diagram, figure 6.

The rated voltage of the exciter lamp in the pick-up head is 3.3 volts, so it is necessary to add another exciter lamp, in series, to reduce the transformer output voltage.

The solenoid operates on 6 volts directly from the filament winding.

Voltage for the motor is obtained by a direct connection to the power-transformer primary. *CAUTION—Be sure to tape the high-voltage secondary terminals.*

The power adapter may be assembled on any suitable chassis or may be housed in a U-shaped case, bent from a 4" x 10" metal panel.

POWER ADAPTER PARTS LIST

Description	Philco Part No.
A-C Cord	L-2028
Exciter Lamp Socket and Cord Assembly	41-3593
Exciter Lamp	34-2478
Panel 3/32" x 4" x 10"	
Power Transformer	32-7842
Socket	76-1212
Socket (Power)	27-6182
Switch	42-1632

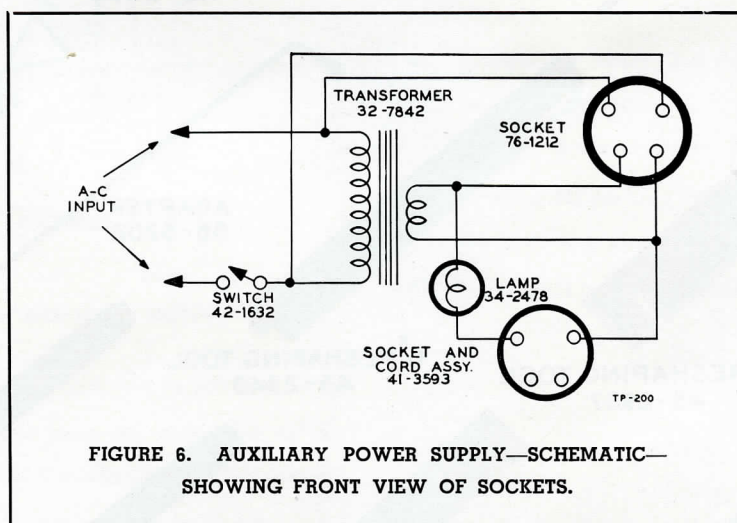


FIGURE 6. AUXILIARY POWER SUPPLY—SCHEMATIC—
SHOWING FRONT VIEW OF SOCKETS.

MAINTENANCE

CLEANING AND LUBRICATION

LUBRICATION of the Philco record changer is one of the most important steps of the reconditioning procedure and must be done carefully at least once a year. The lubrication is included in the complete reconditioning procedure of the changer, because it requires the removal of various parts which have to be adjusted when replaced.

The entire changer, including the turntable hub, all bearing surfaces, shafts and rollers, should be cleaned with carbon tetrachloride. Use an old tooth brush and cloth to remove the grease, oil and dust. Avoid splashing the solution on the solenoid, motor or rubber drives.

After cleaning the record changer, all removed parts should be placed on a clean cloth until reassembled. This allows the excess carbon tetrachloride to drain from the internal surfaces, and greatly aids in the identification of the parts when reassembling.

The lubricants specified in this section are the results of

exhaustive tests at the factory and may be used on all Philco record changers. Philco has prepared a special oil, Part No. 45-2954, to be used on any record changer. This oil will not run off the surfaces, thin out or congeal excessively. Your success in record-changer reconditioning will depend directly upon careful, thorough lubrication. Over-oiling will not correct a changer that is operating improperly, so **USE LUBRICANTS SPARINGLY.**

If oil is dropped on a rubber drive, it must be removed immediately with carbon tetrachloride. Failure to do this will allow the lubricant to penetrate the rubber and soften it, requiring the replacement of the part or the removal of the portion of the rubber drive that is affected.

Lubriplate must be applied to the turntable hub where the pulsating roller contacts the hub surface. **GREASE OR LUBRIPLATE MUST NOT BE APPLIED TO ANY OTHER POINT ON THE CHANGER.**

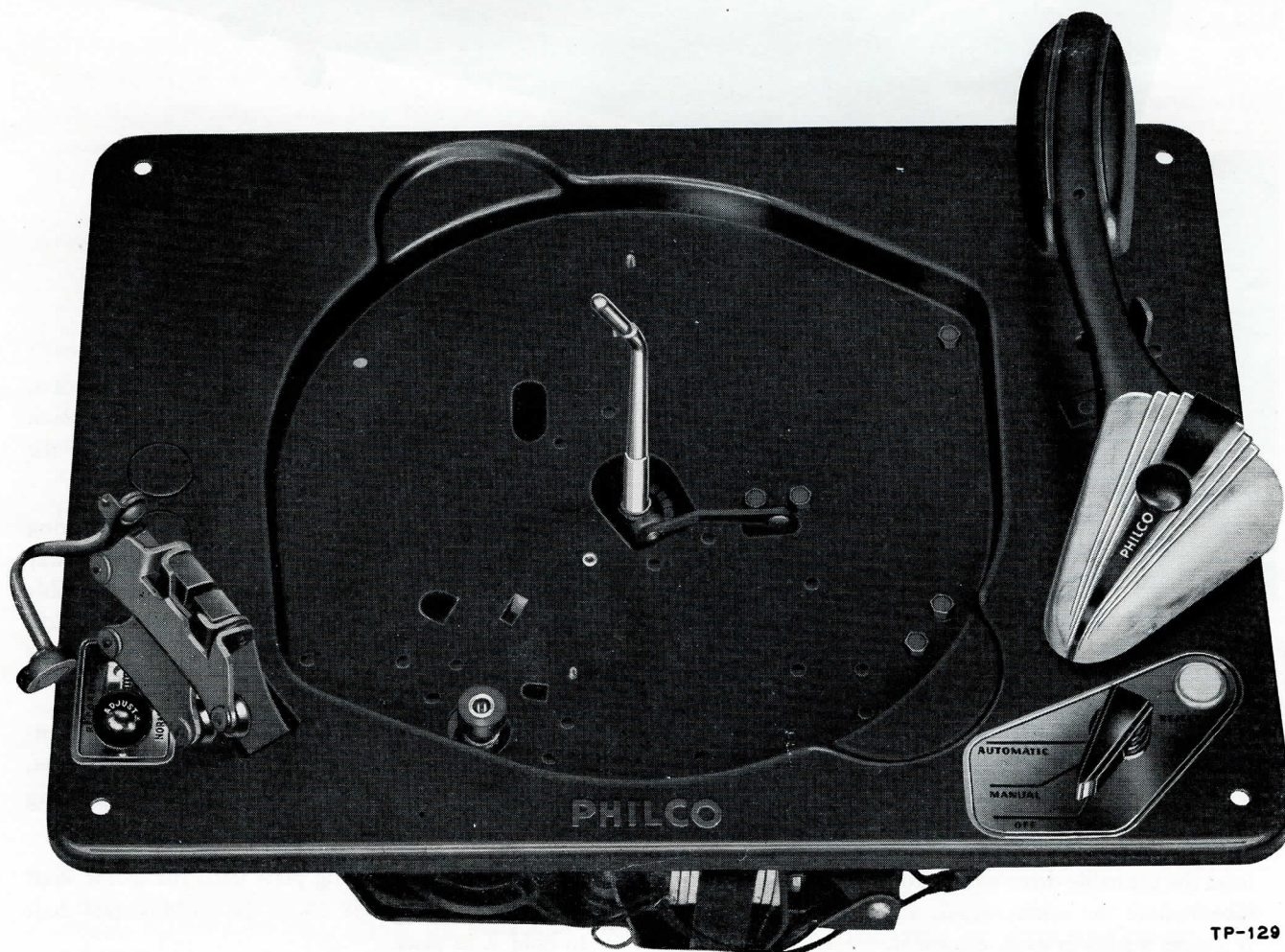


FIGURE 7. TOP VIEW OF CHANGER—TURNTABLE REMOVED

TP-129

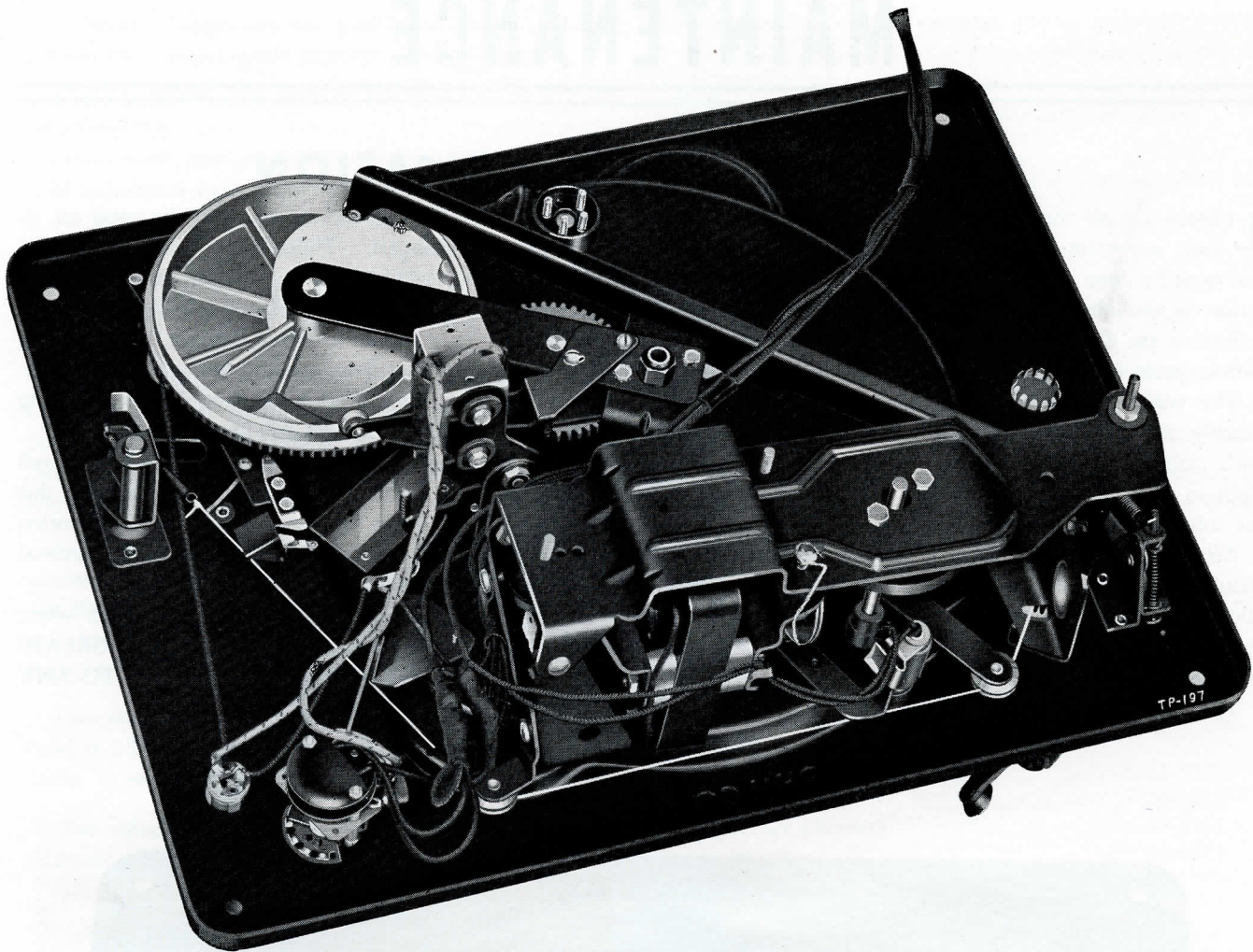


FIGURE 8. BOTTOM VIEW OF CHANGER

SPEED ADJUSTMENTS

NOTE

Slight movement of the stroboscope lines during long periods of operation is not an indication of trouble. This movement represents a variation in turntable speed of only a fraction of one r.p.m. It is caused by minute thermal and electrical fluctuations and has no effect on record reproduction.

Step No.

1. Place the tone arm on its support and turn the record pressure arm and the 10" and 12" record shelves to the unload position.
2. Remove the turntable.
3. Loosen the retaining screw of the turntable drive wheel three turns, tap the head of the screw lightly to release the turntable drive wheel from the tapered shaft, then remove the screw, wheel, and the flat washers. If a steel washer is used, discard it.
4. Pull the neon-lamp socket from its mounting bracket, hold the speed-control shaft with pliers, and loosen the two lower motor-control adjusting nuts on the speed-control shaft, figure 9.
5. Remove the two nuts, lower the motor-mounting plate, push the motor-drive disc to the right (away from the bell drive), and lift the bell-drive assembly from the trunnion bearing. Be careful to avoid nicking the bell-drive tire on the cone end of the motor shaft.
6. Tighten the motor-lamination bolts, the motor-mounting screws, the motor-mounting-plate hinge screws, and place *ten drops* of oil on each motor-bearing wick if needed. See figure 41.
7. Raise the motor-mounting plate until the motor shaft is horizontal, using one nut on the speed-control shaft to hold it in place.

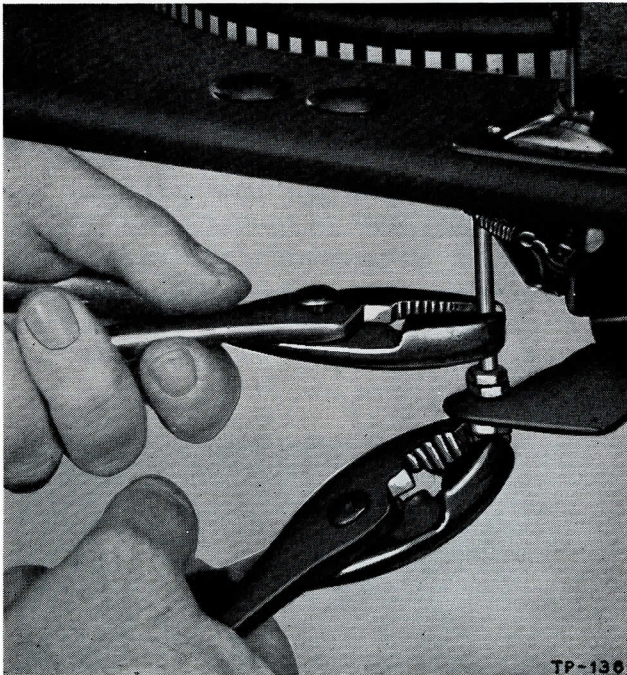
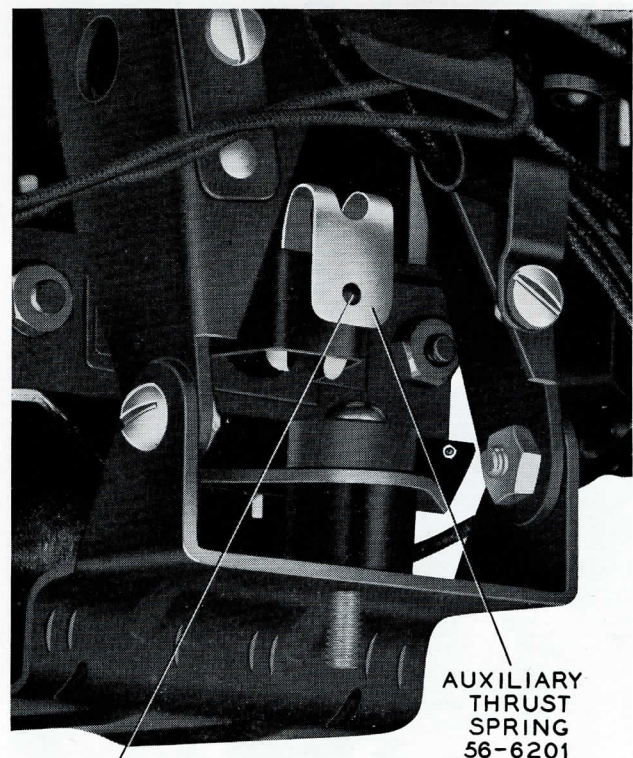


FIGURE 9. LOOSENING MOTOR-CONTROL ADJUSTING NUTS

8. Rock the motor to test the resilience of the rubber mounting grommets. Any play between the rubber grommets and the motor-mounting feet indicates hardened grommets that must be replaced. Use the dark-colored grommets, Part No. 217-1391, below the motor-mounting feet and the light-colored grommets, Part No. 217-1390, above.
9. Remove the auxiliary spring, if used; pull the fibre end-piece from its slot in the rear motor-bearing support, figure 10, to remove the end thrust, and rotate the motor-armature and disc assembly, under pressure, to position the self-aligning bearings. Spin the motor armature to make sure it turns freely.
10. Connect the power cord to the radio chassis, or the auxiliary power supply, and turn the operating switch to **MANUAL**. Check for excessive motor vibration by holding the motor laminations lightly between the fingers. An unbalanced armature or a bent shaft will cause a low-frequency vibration that can be easily distinguished from the normal vibration, or hum, resulting from the a-c power. The proper "feel" of a good motor can be obtained only through experience. Check for wobble of the motor-drive disc by holding the tip of a lead pencil so that it just touches the face of the disc near the outer edge. Replace any motor which has an unbalanced armature, a bent shaft, or wobble in the drive disc. Dress the surface of the drive disc with crocus cloth.

11. Disconnect the power cord, lower the motor-mounting plate, and replace the fibre end-piece in its slot in the rear motor-bearing support.
12. Remove the washers and collar from the upper end of the shaft of the bell-drive assembly and clean all the parts thoroughly with carbon tetrachloride. If a steel washer and coil spring are used above the collar, discard them.
13. Dress the upper and lower bearing surfaces of the bell-drive-assembly shaft with No. 0000 sandpaper and finish with crocus cloth.
14. Examine the inner surface of the upper bearing and the trunnion bearing. If scored, the surface must be polished by rolling a small piece of crocus cloth until it fits tightly in the bearing. Polish by turning the crocus cloth in the direction it would tend to unroll. Replace the bearing on the bell-drive shaft without oiling. The bearing must spin freely, and, if it does not, the polishing operation must be repeated.
15. Dress the lip of the upper bearing support and its point of contact on the base plate with No. 0000 sandpaper and finish with crocus cloth. Clean the bearing support and the surrounding area with carbon tetrachloride.



FIBRE END PIECE

AUXILIARY THRUST SPRING 56-6201

FIGURE 10. LOCATION OF AUXILIARY THRUST SPRING AND FIBRE END-PIECE

TP-144

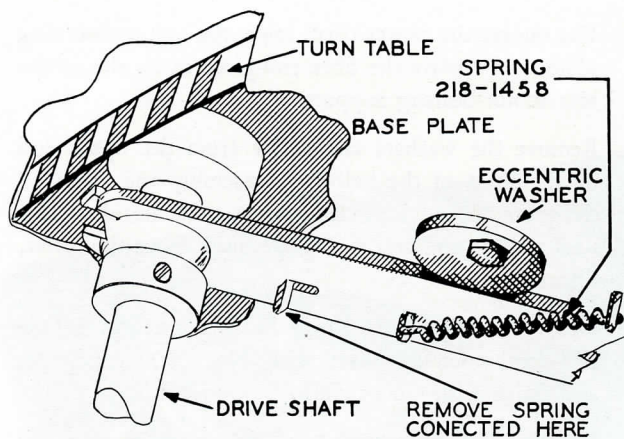


FIGURE 11. UPPER BEARING SUPPORT

16. Place two drops of oil on the back rivet on the lip of the upper bearing support. If there are two springs on the upper bearing support, remove and discard the one nearest the bearing, figure 11. Check to see that the upper bearing support moves freely.
17. Test the trunnion-bearing action. The trunnion bearing should swing freely in its support and must be replaced if it binds.

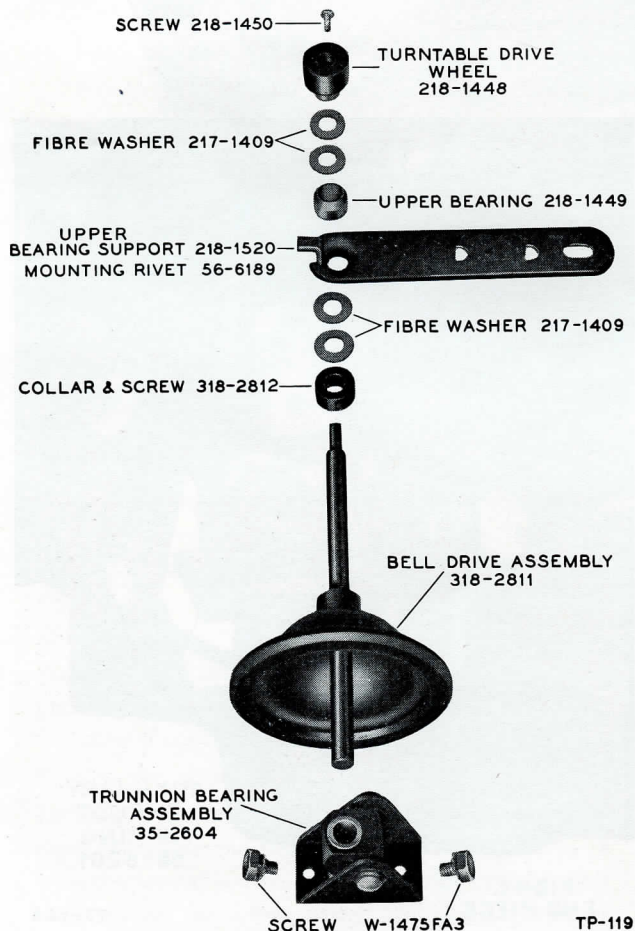


FIGURE 12. CORRECT ASSEMBLY OF BELL DRIVE

18. Slip the collar on the upper shaft of the bell-drive assembly and place two fibre washers above the collar. Apply a small amount of oil to the lower end of the shaft of the bell-drive assembly and place it in the trunnion bearing while holding the motor-drive disc to the right.
19. Raise the bell-drive assembly to its approximate operating position and lift the motor-mounting plate while guiding the upper end of the bell-drive shaft through the upper bearing support. Place one nut on the speed-control shaft to hold the motor-mounting plate in position.

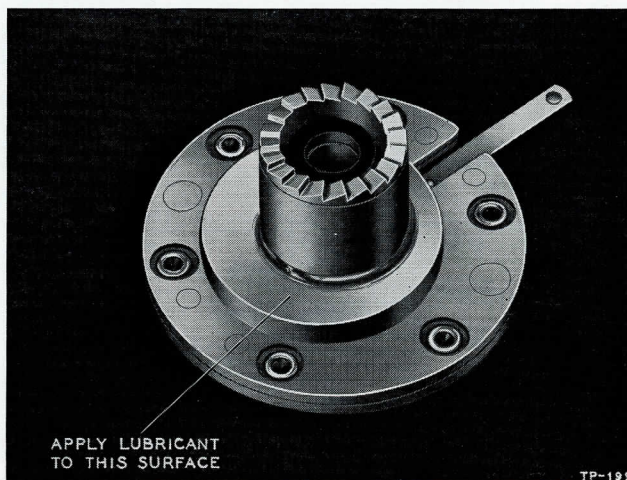


FIGURE 13. LUBRICATION OF TURNTABLE CAM

20. If the top end of the upper bearing is worn so that the surface is greater than the bottom end, replace it with a new bearing, Part No. 218-1449. Slip the bearing in place on the shaft and put two or three drops of oil on the shaft at the top of the bearing.
21. Place two fibre washers over the upper bearing, put the turntable drive wheel on the shaft, and fasten with the retaining screw.
22. Slip the collar upward on the shaft, leaving 1/32" clearance between the collar and the bottom fibre washer, and tighten the collar set-screw. Correct assembly of the bell drive is shown in figure 12.
23. Clean the turntable cam and sawtooth gear with carbon tetrachloride. Dress the cam surface and the inside of the turntable rim with No. 0000 sandpaper. If the rim of the turntable has been bent, even slightly, replace it with a new one. *Do not attempt to straighten a bent rim.* Put a thin coat of Lubriplate on the surface of the turntable cam, as indicated in figure 13.
- 24a. If an early type spindle is used, remove the spindle lock plate and unscrew and remove the spindle. Re-

move the brass cone and all washers. See figure 14. Be sure to discard the ball-bearing assembly, if used. Carefully disengage the top of the clutch-release spring from the shoulder on the spindle sleeve and remove the spring and the clutch gear. Clean the parts thoroughly with carbon tetrachloride and examine the teeth of the clutch gear for burrs or roughness. If the teeth are burred or rough, replace with a new clutch gear, Part No. 218-1401.

- b. If a late type spindle is used, it is not necessary to remove the spindle in order to remove the clutch-release spring and clutch gear. Remove the washers, clutch-release spring, and clutch gear as above, and clean thoroughly.

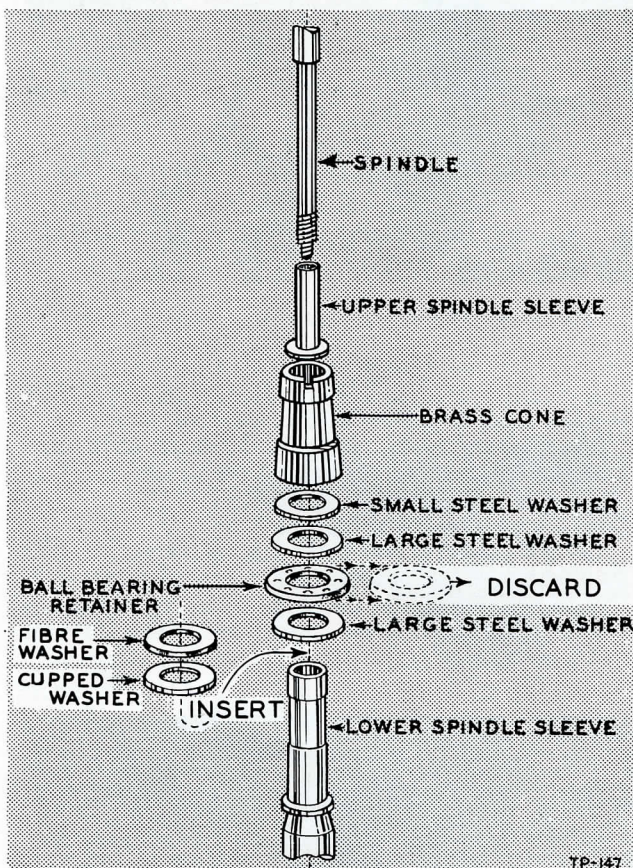
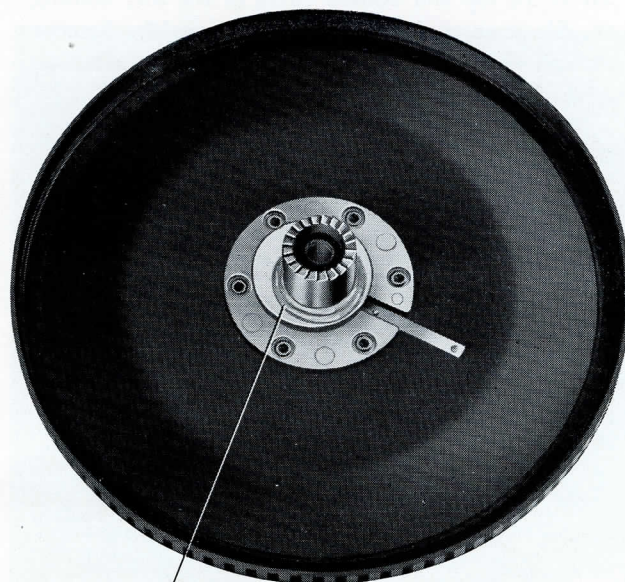


FIGURE 14. MODIFICATION OF EARLY TYPE SPINDLE ASSEMBLY.

25. Reinstall the parts and place two or three drops of oil inside the clutch gear. Make sure the cupped washer is installed arched side up and put two or three drops of oil on the fibre washer. The correct assembly of the late type spindle is shown in figure 44.
26. If the fixed roller on the pulsating-plate-lever assembly is worn flat, replace the assembly with a new one, Part No. 318-2785.
27. Turn the operating switch to MANUAL, push the bell-drive assembly toward the spindle so that the



GREASE TRACK ON CAM
 TP-116
 FIGURE 15. PULSATING-PLATE FIXED-ROLLER TRACK

turntable rim will not damage the turntable drive wheel as it drops in place, replace the turntable, and spin it by hand. It should turn freely and come to a smooth stop.

28. Turn the operating switch to AUTOMATIC and rotate the turntable several revolutions by hand. Turn the operating switch to OFF, remove the turntable, and observe the track made in the Lubriplate by the pulsating-plate-lever-assembly fixed roller. If the track made by the roller is not in the center of the cam, figure 15, dress the roller arm so that the track will be in the center.
29. Connect the power cord, turn the operating switch to MANUAL and test the trueness of the rubber tire, on the bell drive, with a pencil, or other smooth object. If irregularities are present, hold a sharp file lightly against the rubber tire and dress it just enough to remove any flat spots or bumps, as shown in figure 16.

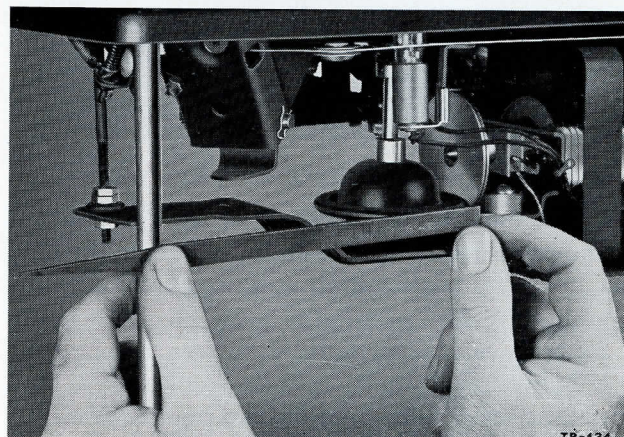


FIGURE 16. DRESSING BELL-DRIVE TIRE

30. Dress the top and bottom edges of the tire, holding the file at an angle, as shown in figure 17. Remove enough of the rubber to leave $1/32''$ flat surface on edge of the tire.

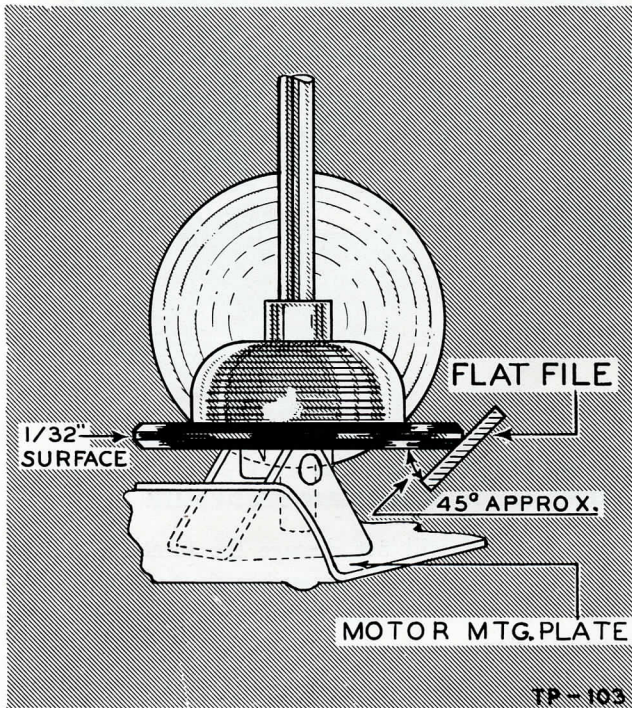


FIGURE 17. POSITION OF FILE FOR DRESSING BEVEL

31. Dress the turntable drive wheel with the file held lightly against it, as shown in figure 18. Dress it just enough to remove any flat spots or bumps. Turn the operating switch to OFF, and replace the turntable.

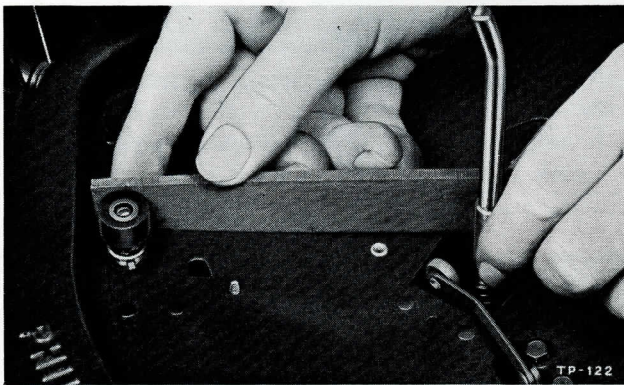


FIGURE 18. DRESSING TURNTABLE DRIVE WHEEL

32. Loosen the two screws holding the trunnion-bearing support to the motor-mounting plate and place the $1/16''$ gauge between the bell-drive assembly and the motor-drive disc, as shown in figure 19. Then push the trunnion bearing toward the motor, moving the bell-drive assembly, gauge, and motor-drive disc to the extreme right, and tighten the two trunnion-bearing-support screws and remove the gauge.

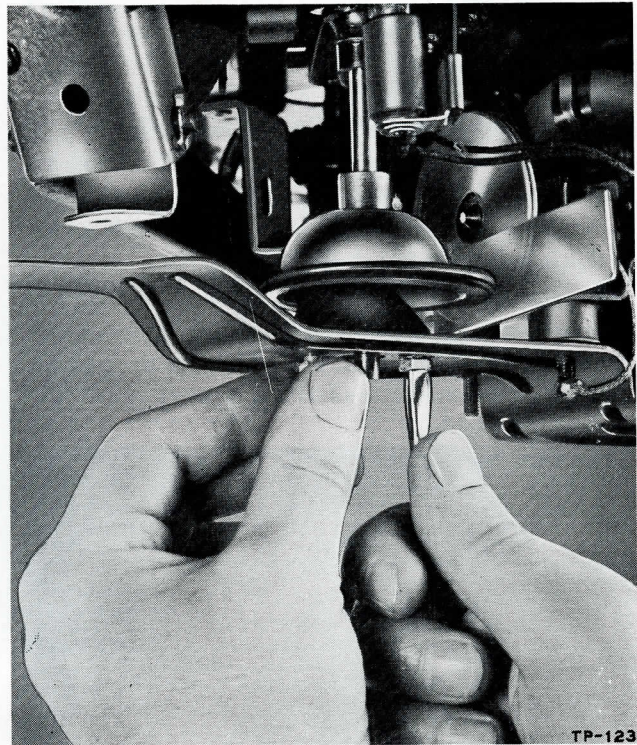


FIGURE 19. ADJUSTING CLEARANCE OF BELL DRIVE

33. Replace the neon-lamp socket on its bracket, turn the operating switch to MANUAL, set the speed ADJUST knob to the NORMAL position, and raise or lower the motor-mounting plate by means of the nuts on the speed-control shaft until the stroboscope lines appear to stand still.
34. Using the adapter and 8-oz. scale, as shown in figure 20, measure the pressure required to start the bell-drive tire slipping on the motor-drive disc. Slippage will be indicated by the stroboscope lines apparently moving to the right. If this pressure is less than 3

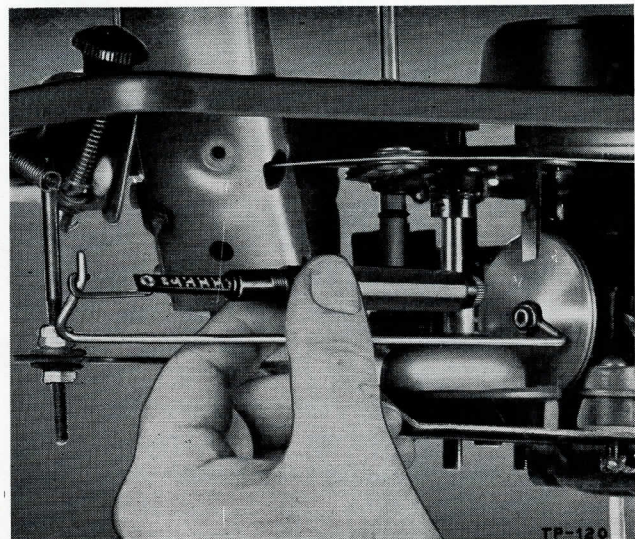
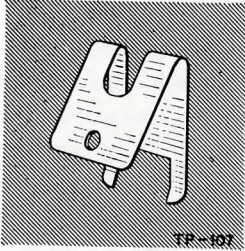


FIGURE 20. MEASURING END-THRUST PRESSURE



ozs., install an auxiliary end-thrust spring, Part No. 56-6201, as shown in figure 10, bending the spring, as necessary, to provide a pressure between 3 and 5 ozs.

35. Remove the neon-lamp socket, set the speed ADJUST knob to the SLOW position, and while the motor is running, loosen the screw holding the eccentric washer, figure 11, which determines the position of the upper bearing support. Turn the washer until the shaft of the bell-drive assembly is approximately vertical, as viewed from the front and end; tighten the screw. See figure 21.
36. Replace the neon-lamp socket and return the speed ADJUST knob to NORMAL.
37. Rock the motor slowly back and forth while listening for the "scrub" of the bell-drive tire against the motor-drive disc. Reshape the motor-mounting plate, as shown in figure 22, to hold the motor in the position that produces minimum scrub.

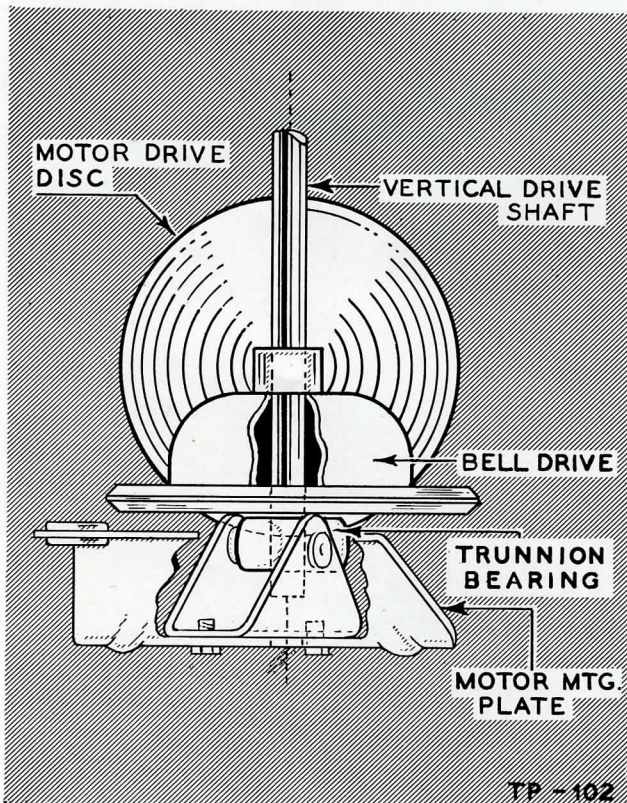


FIGURE 21. CORRECT POSITION OF BELL-DRIVE SHAFT—END VIEW

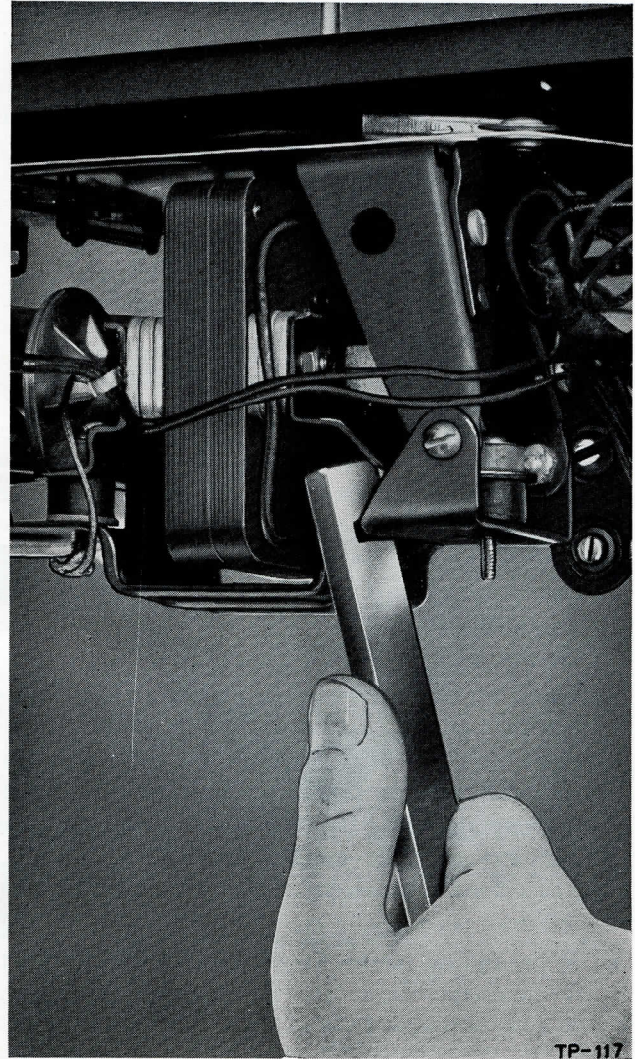


FIGURE 22. RESHAPING MOTOR-MOUNTING PLATE

38. Set the speed ADJUST knob for minimum speed in its NORMAL position and adjust the motor-control adjusting nuts until the stroboscope lines appear to move slowly to the right. Tighten the adjusting nuts and turn the speed ADJUST knob until the stroboscope lines appear to stand still, indicating the proper speed of 78 r.p.m.
39. Check the clearance between the motor laminations and changer base plate while rotating the speed ADJUST knob through its entire range. If the motor laminations touch the changer base plate at any point, the motor-mounting plate must be reshaped, as shown in figure 22. If reshaping is necessary, repeat step 38.

TRIP-ARM ADJUSTMENTS

Step No.

1. Remove and discard the lead-in spring and clip from the trip and positioning assembly, as shown in figure 23.

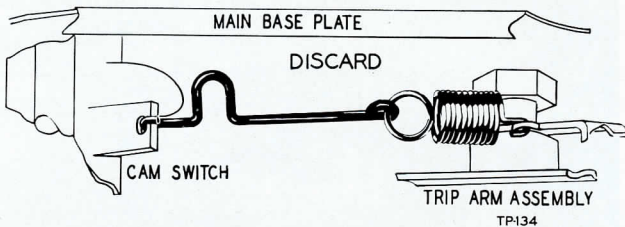


FIGURE 23. LOCATION OF LEAD-IN SPRING AND LINK

2. The lower half of the tone-arm bracket is riveted to the shaft but should be tested for looseness by holding the trip-arm and positioning assembly and swinging the tone arm. Looseness between the bracket and shaft can be corrected by scraping away the finish around the junction of the two parts and soldering the shaft to the bracket.
3. Check the vertical friction in the tone arm by attaching the 2-oz. scale, Part No. 45-2958, to the pick-up plastic cover, as shown in figure 24, and raising the scale and tone arm $1\frac{1}{4}$ " above the turntable. Observe the reading during this operation. Lower the tone arm with the scale attached and note the reading. The difference in weight is the vertical friction, and this must not exceed $\frac{1}{4}$ oz.
4. If the vertical friction is greater than $\frac{1}{4}$ oz., inspect the tone-arm bracket and the lift pin for binding. A drop of Special Philco Oil, Part No. 45-2954, ap-

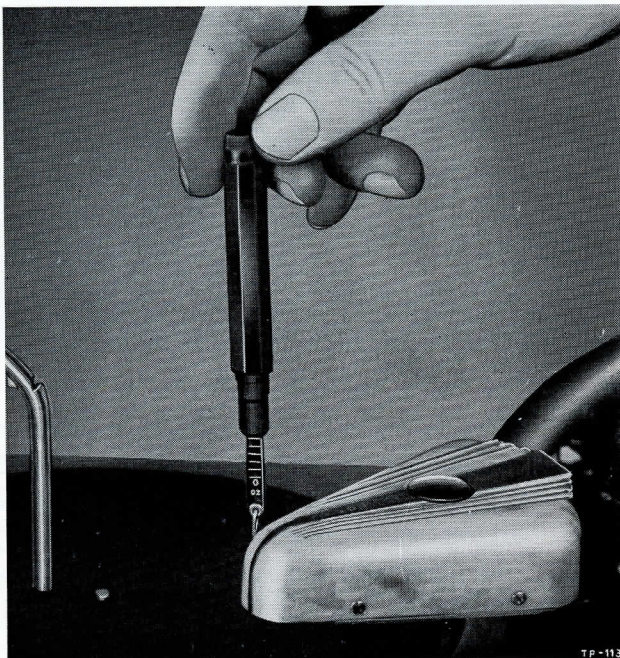


FIGURE 24. MEASURING TONE-ARM WEIGHT AND VERTICAL FRICTION

plied to the bracket arms and lift pin will reduce excessive friction. If the tone-arm bracket is bent, it should be disassembled, carefully inspected, and all damaged parts replaced.

5. The movement of the tone arm must not be restricted by tight or tangled wiring. Should the wiring come loose from the base plate, it should be repositioned and fastened with scotch or adhesive tape.
6. The guide pin that engages the main cam to raise the tone arm during the change cycle must not touch the cam throughout the travel of the tone arm across a record. To check, make sure that the pin can be depressed slightly before it touches the cam. If it does not have this clearance, bend the stop which protrudes through the trip arm until it has approximately $\frac{1}{32}$ " clearance over the entire area.
7. Check the horizontal friction with the changer disconnected from the power source and the control switch in the MANUAL position. Attach the pendulum scale, Part No. 45-2953, to the pick-up plastic cover, as shown in figure 25.

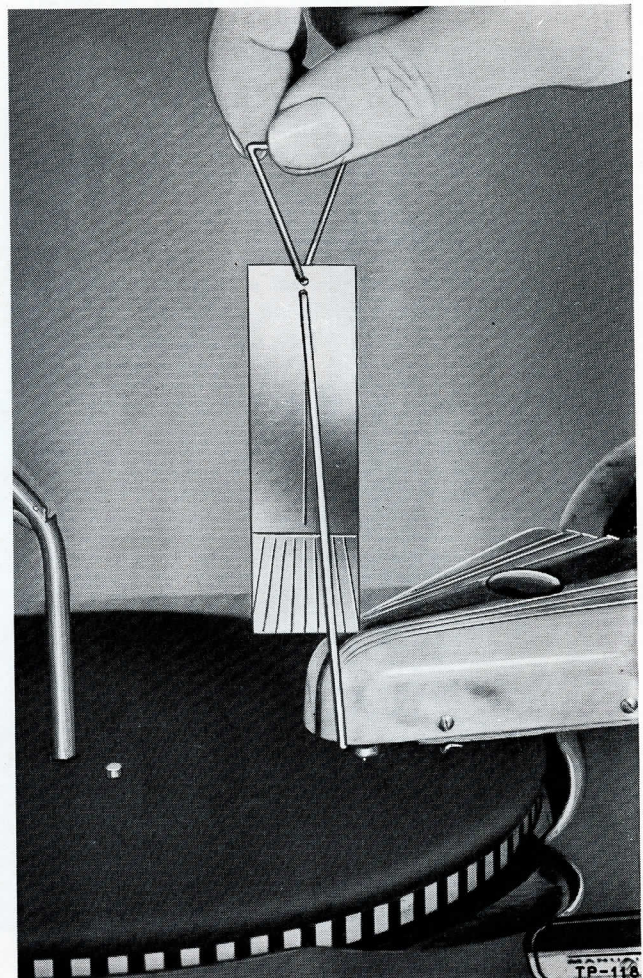


FIGURE 25. MEASURING TONE-ARM HORIZONTAL FRICTION

8. Move the attached scale and tone arm from the support towards the spindle and note the reading, as shown in figure 25. The tone arm must be moved over the entire area travelled during the reproduction of a record.
9. Move the pendulum scale and tone arm away from the spindle to the support and note the reading. The pendulum scale is graduated in 1/16-oz. divisions, and the average reading must not exceed two divisions ($\frac{1}{8}$ oz.).
10. Excessive friction is caused by a bent or binding tone-arm-shaft assembly, or incorrect assembly of the tone-arm shaft, figure 26. Check the clearance between the lower ball-bearing race and the base-plate bushing. The correct clearance is .005".
11. The trip and positioning assembly is fastened to the tone-arm shaft with two Allen screws, which may score or burr the tone-arm shaft. Should the removal of the tone-arm shaft be necessary, loosen the two

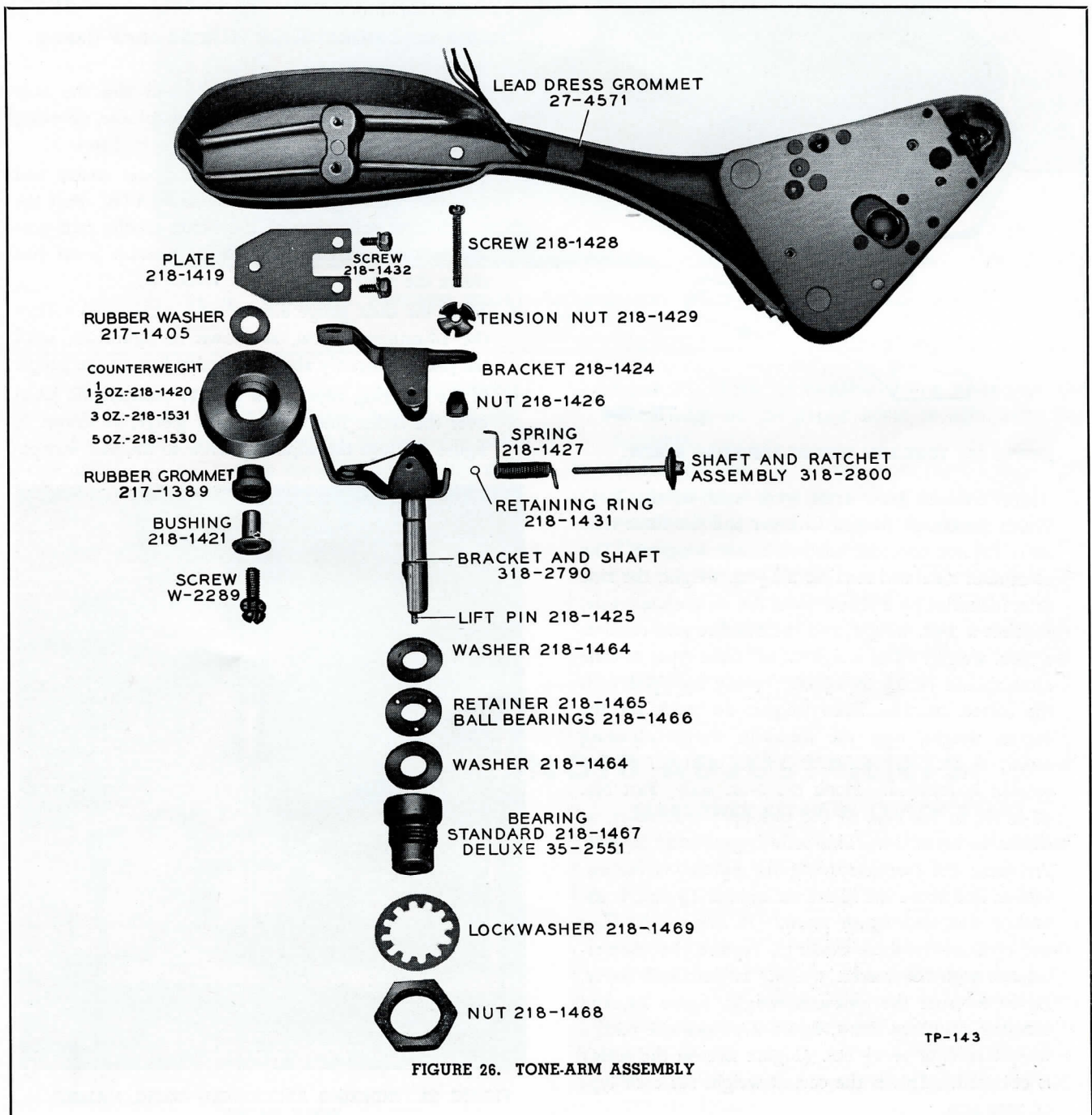
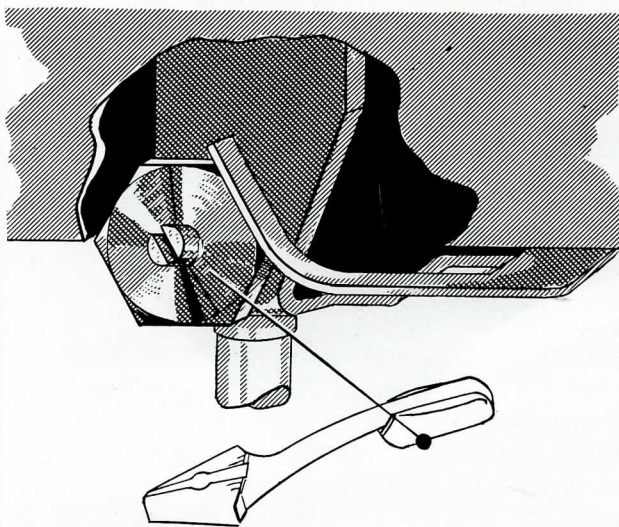


FIGURE 26. TONE-ARM ASSEMBLY

Allen screws and remove the trip and positioning assembly. Remove the large nut and lock washer from the base-plate bushing and remove the tone arm, bracket, shaft and bushing simultaneously. File off the burrs on the tone-arm shaft before further disassembly. Should the shaft be drawn through the base-plate bushing without smoothing, it will ruin the bearing surface.

12. Apply one drop of Special Philco Oil, Part No. 45-2954, to all bearing surfaces, including washers, to prevent rusting and reduce friction.

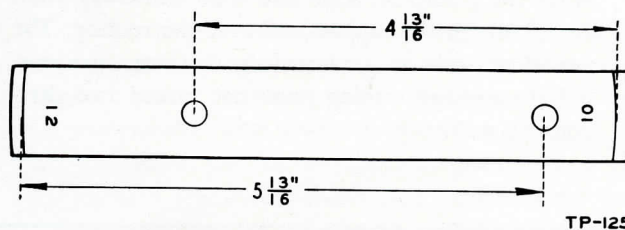


TP-104

FIGURE 27. TONE-ARM WEIGHT-ADJUSTING SCREW.

13. Three different tone arms were used in the 1942 Philco Automatic Record Changer and the three tone arms require different counterbalance weights. The aluminum tone arm requires a $1\frac{1}{2}$ -oz. weight, the zinc arm, identified by a yellow paint dot on the underside, requires a 5-oz. weight, and the bakelite arm requires a 3-oz. weight. The weight of all three types of tone arms should be $1\frac{1}{2}$ to $1\frac{5}{8}$ ozs., when equipped with the correct counterbalance weight. To check for the correct weight, turn the tone-arm weight-adjusting screw, figure 27, counterclockwise until all spring tension is released. Hook the 2-oz. scale, Part No. 45-2958, to the nose of the pick-up plastic cover, as shown in figure 24. This scale is graduated in $\frac{1}{8}$ -oz. divisions; the correct reading for $1\frac{1}{2}$ ozs. is the unbroken line above the figure six and for $1\frac{5}{8}$ ozs., is the broken line and figure seven. If the weight does not conform to these readings, replace the counterbalance with the correct weight, as described above.
14. Again measure the tone-arm weight, figure 24, and turn the adjusting screw, figure 27, clockwise until a weight reading of $1\frac{1}{4}$ ozs. (Figure five on the scale) is obtained. This is the correct weight for each type of tone arm.

15. Test the indexing of the tone arm by marking a line on each end of the shelf push-off gauge, Part No. 45-2959, as shown in figure 28. These lines are to be used as a standard for all indexing adjustments on the 1942 Philco Automatic Record Changer.



TP-125

FIGURE 28. DIMENSIONS FOR MARKING SHELF GAUGE

16. Turn back the 10" record shelf and slip the hole nearest the end, marked 10, over the spindle, allowing it to rest on the turntable, as shown in figure 29.
17. Disconnect the changer from the power source and turn the operating switch to AUTOMATIC. Pull the clutch-lever roller out of the notch on the cam gear and rotate the turntable until the pick-up jewel just clears the shelf gauge on the turntable.
18. Move the shelf gauge directly under the jewel. Turn the adjustment screw, as shown in figure 29, until the jewel is directly above the index line on the gauge.
19. If the indexing adjustment fails to position the jewel over the index line on the shelf gauge, as shown in figure 29, turn the adjusting screw to the half way po-

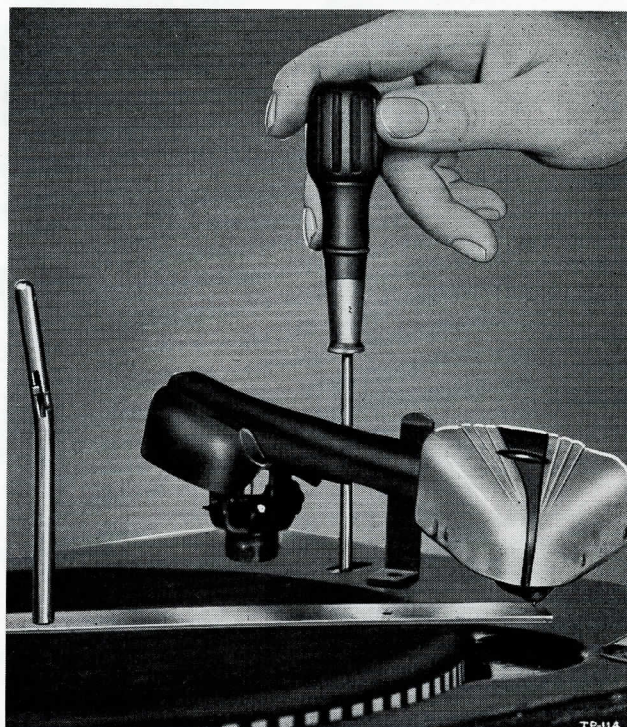


FIGURE 29. INDEXING ADJUSTMENT—USING MARKED SHELF GAUGE

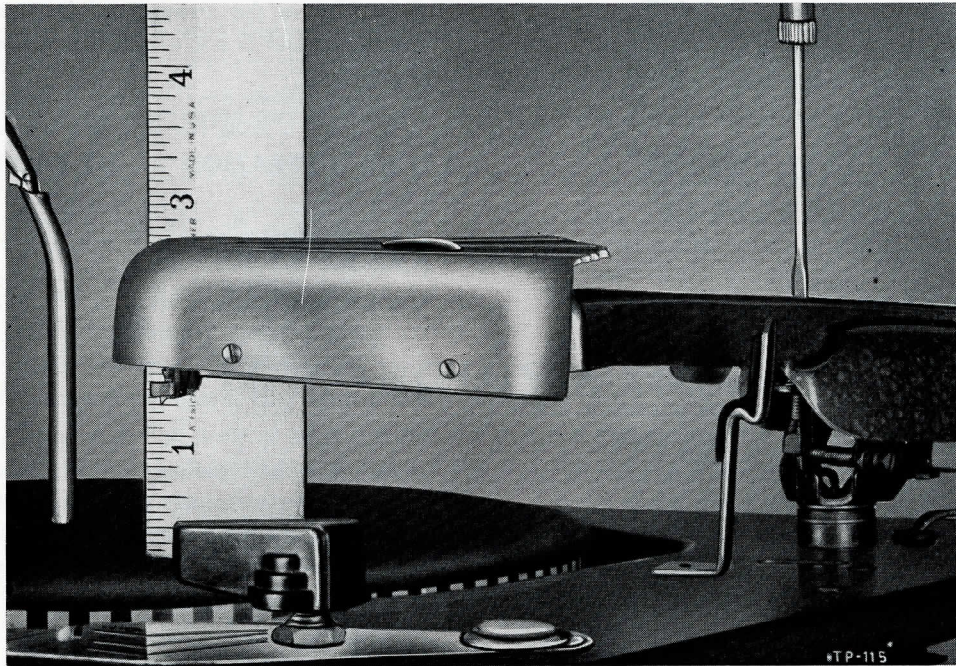


FIGURE 30. ADJUSTING TONE-ARM HEIGHT—MEASUREMENT MADE FROM TURNTABLE TO LOWER EDGE OF COVER

sition of its range. Place the tone arm on its support and loosen the two Allen screws holding the trip and positioning assembly. Move the assembly until its guide pin just touches the outer edge of the cam gear. Tighten the Allen screws. Repeat steps 17 and 18.

20. To make the tone-arm height adjustment, place the operating switch in AUTOMATIC and manually cycle the changer until the tone arm is raised to its maximum height above the turntable. Place a ruler on the turntable and measure to the lower edge of the nose of the pick-up plastic cover, as shown in

figure 30. Turn the height-adjusting screw until the lower edge of the plastic cover is $1\frac{5}{8}$ " above the turntable.

21. Manually finish the change cycle, place a record on the turntable, and set the pick-up on the record. Observe the lift pin and lift-pin guides on the tone arm. The height-adjusting nut must just clear both the lift pin and lift-pin guides. If this clearance is not present, or if the pick-up jewel fails to set down on the record, the top of the lift pin may be bent down and must be reshaped. If reshaping is necessary, repeat the adjustment in step 20.

CLUTCH AND SOLENOID ADJUSTMENTS

Before any adjustments of the solenoid or clutch are attempted, make the following observations:

Check the two fingers on the forked end of the clutch lever. If either of the fingers is bent, remove the solenoid coil and clutch lever and straighten the two fingers on a flat surface. Before reinstalling, examine the solenoid armature for any burrs, and check the ease with which the armature can be inserted and removed from the solenoid core. If there is any binding or rubbing, replace with a new solenoid assembly, Part No. 318-2875. Reinstall the solenoid assembly.

CLEARANCE BETWEEN CLUTCH GEARS

As the next operation, check the clearance of the teeth on the lower and upper clutch gears.

Step No.

1. With the clutch lever in its normal position, that is, with the roller in the recess of the cam, the clearance between the teeth of the two gears must be $1/16$ ", figure 31. The proper clearance is obtained by reshaping the clutch-lever bracket, as shown in figure 32.
2. Start a change cycle by disengaging the clutch-lever roller from the cam recess, and revolve the turntable a few revolutions.

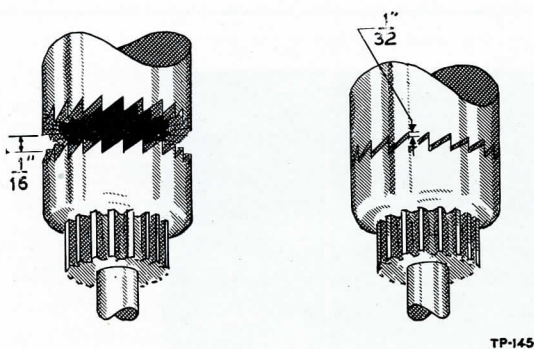


FIGURE 31. CLUTCH-GEAR CLEARANCES

3. With the roller in this position, the upper and lower clutch gears are in mesh. As it is very important that they do not interlock too tightly, there should be a clearance of approximately $1/32''$, as shown in figure 31. The reason for the clearance is to prevent the two gears from jamming and then hanging together after the change cycle is completed. The clearance also prevents the turntable from being lifted during the operation of the solenoid.

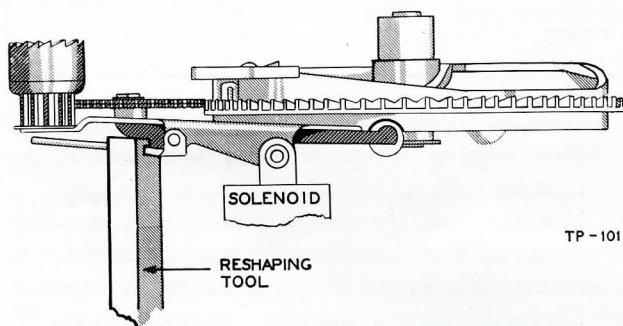


FIGURE 32. RESHAPING CLUTCH-LEVER ASSEMBLY

4. If an adjustment is necessary, reshape the clutch-lever bracket directly under the forked end of the lever. Do not attempt to reshape the fingers individually. If the adjustment is made correctly, the roller may be pulled down $1/32''$ from the cam edge before the gears are fully meshed.
5. Recheck the clearance between the two gears with the clutch-lever roller in the cam recess.

BOTTOMING OF SOLENOID

Do not make this adjustment until you are sure the clutch-gear adjustments are correct.

Step No.

1. Disengage the clutch-lever roller from the cam recess and rotate the turntable until the roller rides the outside edge of the cam.
2. Loosen the two upper screws on the solenoid bracket.

3. Raise the solenoid until the armature just touches the bottom of the solenoid. You will observe there is a slight play in the armature pivot; this play must be maintained and is not to be taken up when bottoming is complete.
4. Tighten the two bracket screws.

TESTING OPERATION — SOLENOID ASSEMBLY

Step No.

1. Place the operating switch in MANUAL with the power on.
2. Use the 8-oz. scale, Part No. 45-2951, and measure the pull, in ozs., required to disengage the clutch-lever roller from the recess in the cam gear, figure 33. The correct pull should be between 5 and 8 ozs.
3. If more than an 8-oz. pull is required to disengage the roller, excessive friction in the solenoid assembly is indicated. As previously stated, the armature unit must not rub or bind when drawn into the solenoid. If the armature is suspected, reshape the solenoid bracket slightly to center the armature.

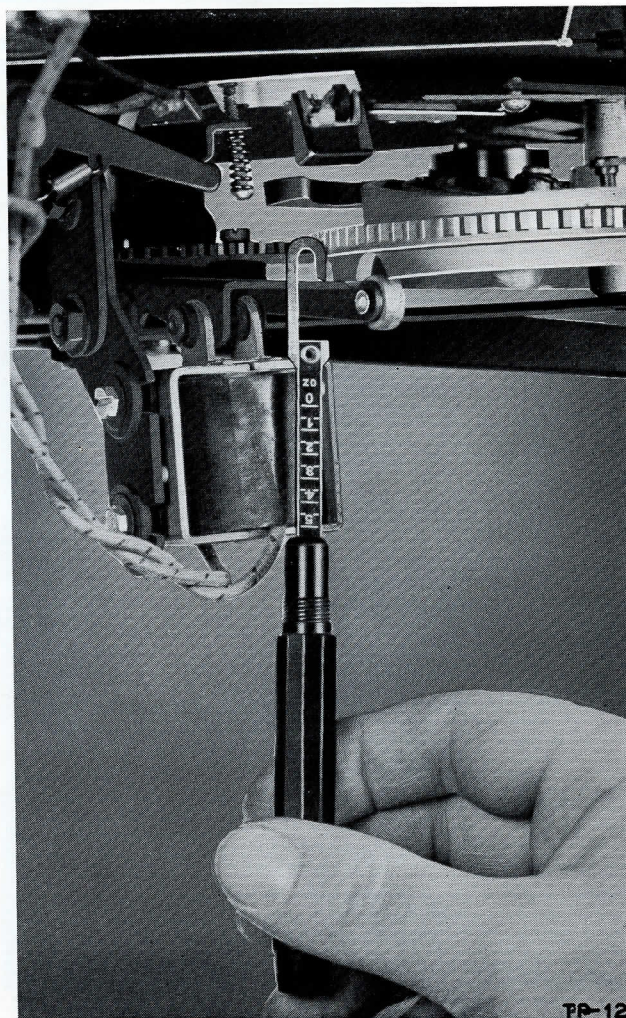


FIGURE 33. MEASURING CLUTCH-RELEASE PRESSURE

4. Turn the operating switch to AUTOMATIC and repeat the procedure in step 2.
5. If the solenoid and armature work freely but drag still persists, check the clearance between the clutch gear and the intermediate gear. There should be a slight amount of play between the two gears.

If binding is apparent, loosen the intermediate-gear mounting-bracket screws, place a screwdriver between the spindle nut and the hole in the bracket and push

- the bracket toward the cam gear; hold the bracket in position and tighten the mounting screws.
6. If the pull required to disengage the roller is less than 5 ozs., replace the clutch-release spring, Part No. 218-1403, on the spindle assembly.
7. To test the overall operation of the solenoid assembly, it will be necessary to start playing a record with the operating switch in AUTOMATIC and to press the REJECT button. This operation will test the solenoid assembly under actual operating conditions.

TRIP ADJUSTMENTS

NOTE

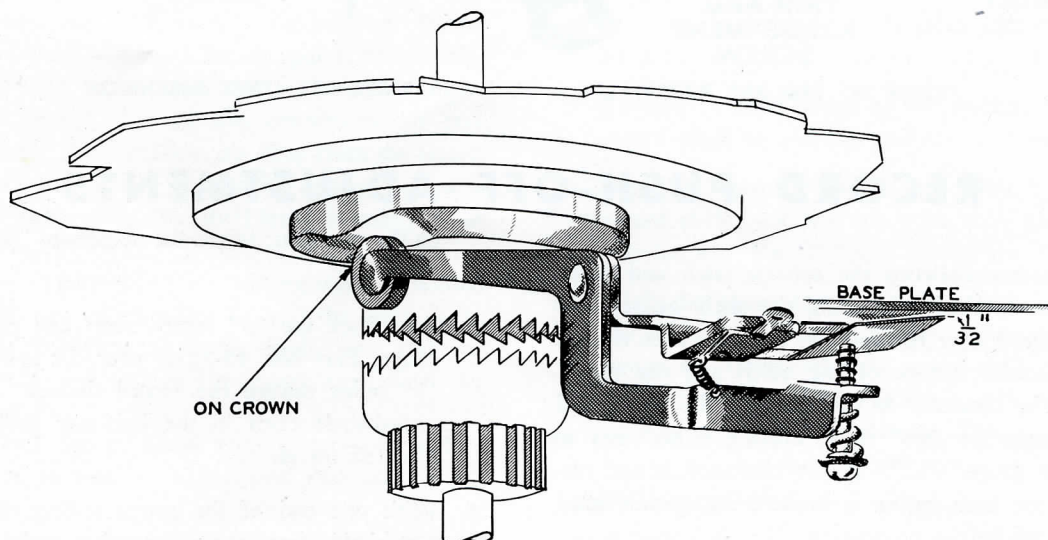
The adjustment of the pulsating-plate and roller contact is very important and all worn or damaged parts must be replaced. Start with an inspection of the fixed roller on the arm of the pulsating-plate assembly. If the roller turns in its mounting, replace the pulsating-plate and lever assembly, Part No. 318-2785. A spring, Part No. 28-8919, must be connected between the terminal on the pulsating-plate support and the adjusting screw. The spring maintains the adjustment of the pulsating arm and may be seen in figure 34. If it is not on the assembly, add it, before making the adjustments. Then proceed with the following steps.

Step No.

1. Disconnect the changer from the power source and place the operating switch in AUTOMATIC. With

the tone arm on its support, rotate the turntable until the fixed roller on the pulsating-plate and lever assembly is on the crown of the turntable cam, as shown in figure 34.

2. Check the position of the pulsating plate by backing out the plate adjusting screw. The pulsating plate should bend down approximately 30° from the changer base plate. If the pulsating plate does not assume this position, it should be removed from the changer and bent until it does take this 30° position.
3. Examine carefully the pulsating-plate contact surface. If it is discolored, clean with carbon tetrachloride. If the silvered surface is pitted, the pulsating-plate and lever assembly, Part No. 318-2785, must be replaced. A pitted plate surface is caused by arcing, due to previous improper adjustment of the pulsating plate, or roller contact. Do not use crocus cloth to clean a pulsating plate, as it will remove the silver plating. Reinstall the pulsating-plate and lever assembly.



TP - 108

FIGURE 34. ADJUSTMENT OF PULSATING-PLATE CLEARANCE

4. Check the movement of the bucket contact by placing the tone arm near its support and swinging it gently back and forth. The bucket contact must swing freely during this operation. If the bucket contact tends to bind or "hang", the trip and positioning assembly, Part No. 318-2786, must be replaced.
5. With the operating switch in the AUTOMATIC position, manually rotate the turntable until the fixed roller on the pulsating arm is on the crown on the turntable hub (pulsed position). Adjust the pulsating plate with its adjusting screw until the edge of the plate is $1/32''$ from the changer base plate. See figure 34.
6. Adjust the screw on the trip-arm and positioning assembly, figure 35, until the rubber roller just clears the pulsating plate. Swing the arm over its entire travel and observe the uniformity of the distance between the roller and plate. If the distance is not uniform, bend the plate-supporting springs slightly.

NOTE

The positioning plate on the operating switch must be reshaped if the MANUAL switch lever fails to move the pulsating plate away from the roller on the trip arm, when the operating switch is placed in MANUAL, and also if the lever does not allow the pulsating plate to engage the roller in AUTOMATIC.

7. With the fixed roller on the pulsating arm off the turntable-hub crown (unpulsed position) and the operating switch in AUTOMATIC, attach the pendulum scale, Part No. 45-2953, to the plastic cover on the tone arm, as shown in figure 25. Measure the horizontal drag of the tone arm over the area of travel while the rubber roller on the bucket contact and the pulsating plate are engaged. The correct reading should be $\frac{1}{2}$ oz. The scale has a maximum calibration of $\frac{1}{4}$ oz.; therefore the $\frac{1}{2}$ -oz. reading must be determined by the amount of off-scale reading. If the reading is greater than $\frac{1}{2}$ oz., the adjusting screw on the trip and positioning assembly must be turned out slightly to reduce the pressure until $\frac{1}{2}$ oz. is obtained.

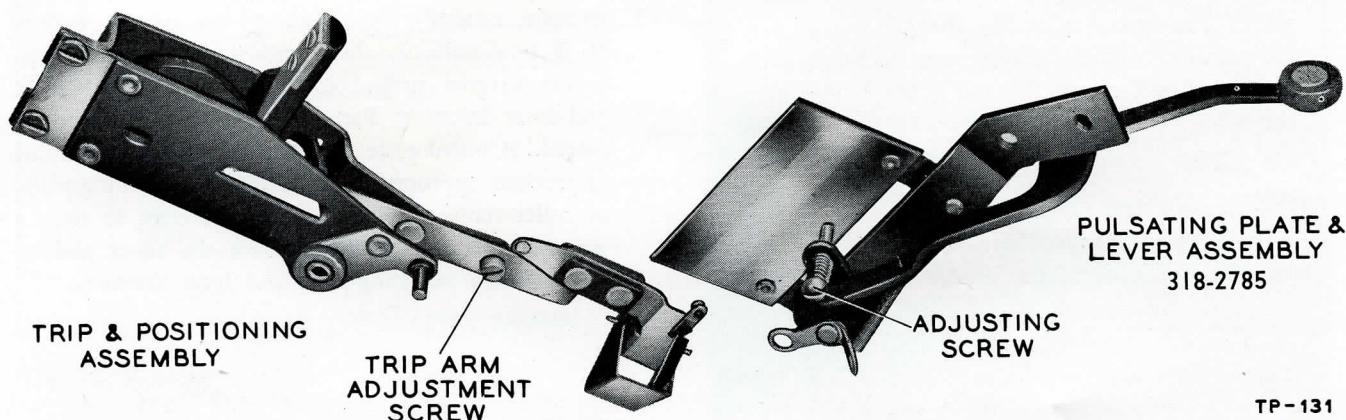


FIGURE 35. TRIP AND POSITIONING — PULSATING-PLATE AND LEVER ASSEMBLIES

RECORD PUSH-OFF ADJUSTMENTS

Step No.

1. The clearance between the spindle latch and notch should be checked by placing the shelf gauge, Part No. 45-2959, over the spindle, allowing it to rest on the horizontal surface of the notch and the record shelf. The clearance to be measured is $.105''$. All shelf gauges are $.093''$ thick, making it necessary to shim the gauge $.012''$. If the clearance is not correct, or the latch spring is broken, the spindle must be replaced before proceeding.
2. Manually start a change cycle and turn the turntable until the shelf-lever roller is on the top of the crown

on the cam gear; this is the maximum "push" position, figure 36.

3. Turn back the 10" record shelf and place the shelf gauge, Part No. 45-2959, over the spindle with the 12" index toward the record shelves. Set both 12" record-shelf cams in the half-way position of their eccentric travel.
4. With one end of the gauge resting on one of the 12" shelf cams, move the other end up and down on the spindle below the notch. Raising the gauge until it is level with the spindle notch should require

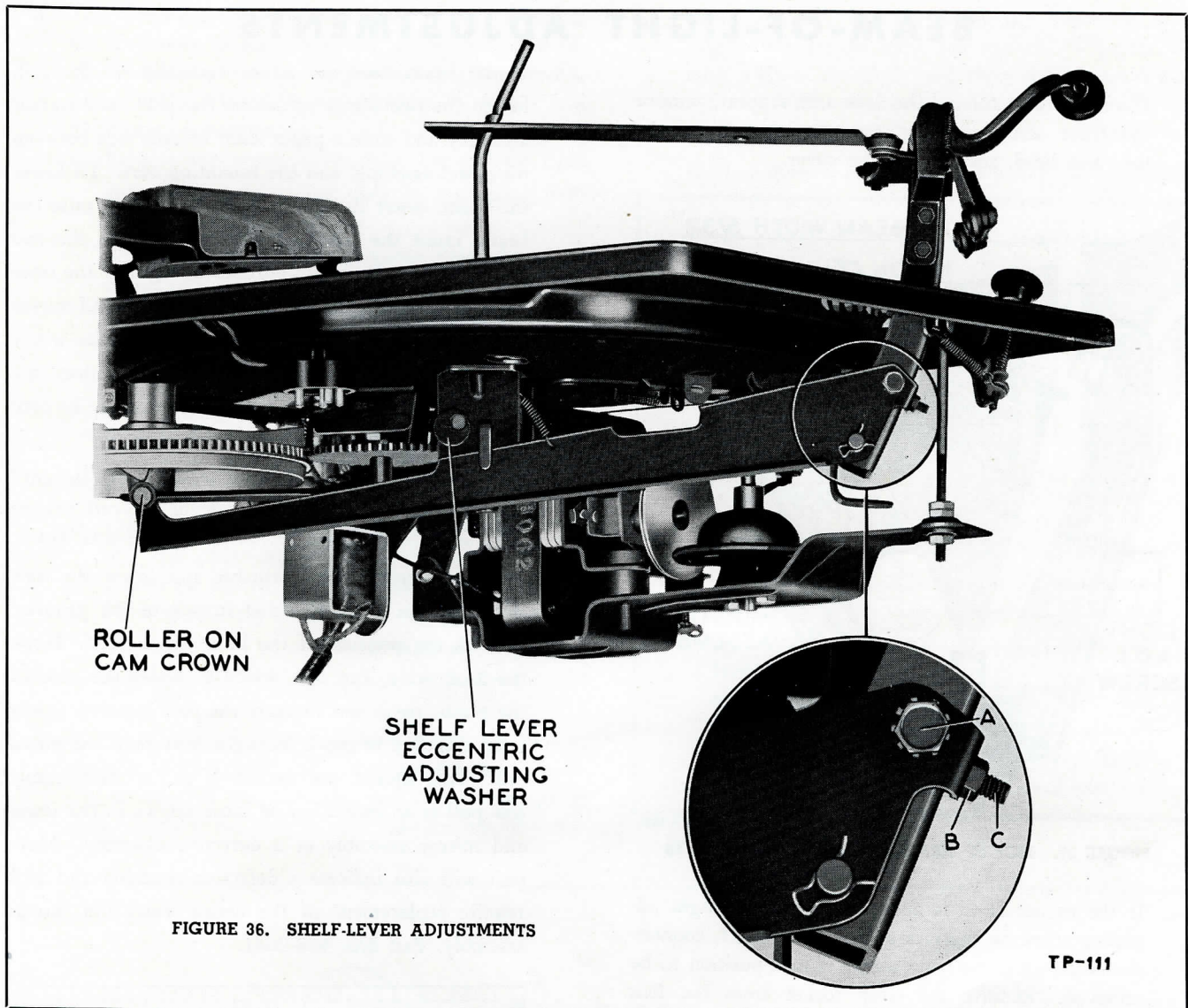


FIGURE 36. SHELF-LEVER ADJUSTMENTS

TP-111

firm pressure, but there must be no binding. If the gauge does bind, or if it fits loosely against the spindle, adjust the 12" record shelf cams until the proper conditions prevail. During this adjustment, all play in the spindle must be taken up away from the record shelves. If the correct adjustment cannot be made with the shelf cams, the shelf-lever assembly must be reset.

5. Referring to figure 36, loosen locking screw A, loosen lock nut B, and adjust screw C until the shelf gauge fits snugly between the record-shelf cam and the spindle, with the top of the gauge even with the spindle notch.
6. Tighten lock nut B, while holding screw C with a screwdriver so that its adjustment will not be disturbed.
7. Tighten locking screw A, while exerting a slight pressure on the shelf assembly in a direction away from the spindle.

8. Move the shelf gauge to the other 12" shelf cam and set it to correspond to the first one.
9. Reverse the shelf gauge on the spindle, turn the 10" record shelf to playing position, and set both cams.
10. Manually complete the change cycle, turn the 10" record shelf back, and place the shelf gauge over the spindle, with the 12" index toward the record shelves.
11. With the gauge resting on the spindle notch, adjust the shelf-lever eccentric washer, figure 36, so that the gauge fits freely onto the record-shelf cam. During this adjustment, all play in the spindle must be taken up toward the record shelves. This adjustment will be correct also for the 10" record shelf and should not be repeated.
12. Examine the record pressure arm with it in playing position. The arm should be in line with the center of the record shelf and spindle. Reshape, if necessary.

BEAM-OF-LIGHT ADJUSTMENTS

Step No.

1. Place the tone arm on the tone-arm support, remove the three screws holding the plastic cover on the tone-arm head, and remove the cover.

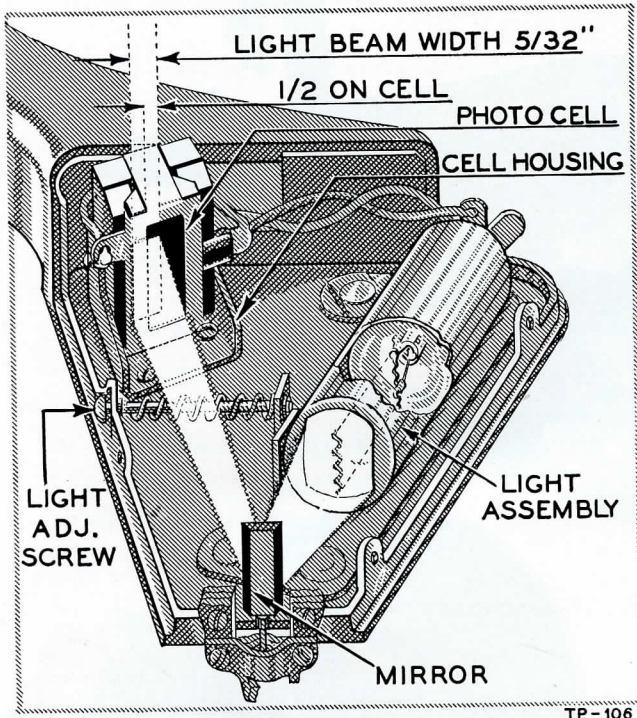


FIGURE 37. PICK-UP HEAD ASSEMBLY ADJUSTMENTS

2. If the exciter lamp is burned out, turn the light adjusting screw on the pick-up head, figure 37, counter-clockwise, until the lamp socket is in a position to be removed. Remove the lamp socket from the lens barrel, being careful not to break the fibre ends of the socket.
3. When replacing the lamp socket in the lens barrel, twist the socket slightly to prevent creeping of the rubber bushing.
NOTE: Always hold the lens barrel with the thumb when inserting or adjusting the lamp.
4. Turn the light-beam adjusting screw clockwise to center the beam within the cell frame. If the beam cannot be drawn to the center of the cell, remove the exciter lamp and rotate it 180° or, as an alternate method, replace it with a new exciter lamp, Part No. 34-2478. The beam should be 5/32" wide. If adjustment is necessary, back the lamp socket out of the lens barrel approximately 1/4" then slowly press the socket back in until a clear sharp focus is obtained. Should the beam be focused at an angle on the cell, turn the fibre portion of the socket until the beam is vertical.

5. If the beam does not center vertically on the cell, loosen the two center screws on the jewel and mirror assembly and slide a paper shim in each side between the jewel assembly and the mounting ears. To lower the beam, insert the shims at the bottom; to raise the beam, insert the shims at the top. Tighten the two center screws. If shimming does not correct the trouble, it will be necessary to replace the jewel and mirror assembly, Part No. 318-2641. In extreme cases where replacing the jewel and mirror assembly does not produce the desired results, the tone arm may be bent and will have to be replaced.
6. Turn the light-beam adjusting screw clockwise until one half the beam is on the side of the cell nearest the spindle. See figure 37. Replace the plastic cover.
7. Place a record on the turntable and lower the tone arm until the jewel is seated in one of the grooves. Recheck the position of the beam on the cell. Hook the 2-oz. scale, Part No. 45-2958, under the nose of the plastic cover and measure the pull required (away from spindle) to move the light fully onto the photo cell. This should not exceed 5/8 oz.; a considerably less pull is an indication of loose screws in the jewel and mirror assembly or a defective assembly. More pull will also indicate a defective assembly and will require replacement of the entire jewel and mirror assembly, Part No. 318-2641.

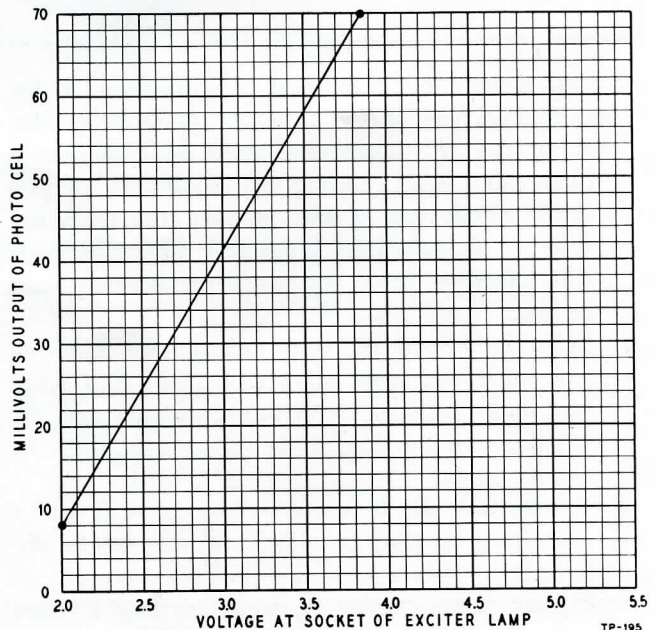


FIGURE 38. PHOTO-CELL OUTPUT CHART

8. The following test procedure is a method for testing the sensitivity of the photo cell in the pick-up head. The meter employed to compile the chart, figure 38, is the Philco Circuit Tester, Model 020, which is a 5000 ohms-per-volt meter.

- a. Remove the plastic cover from the pick-up head and energize the exciter lamp by connecting it to the auxiliary power supply.
- b. Be sure light beam is correctly focused on the photo cell, as shown in figure 37. Measure the exciter lamp voltage and carefully note the reading.
- c. Obtain an output reading of the photo cell by connecting the millivoltmeter across the photo-cell terminals. **CAUTION:** The a-c voltmeter used to measure the exciter lamp voltage must remain connected to the exciter lamp socket throughout the test.
- d. Compare the reading of the exciter lamp voltage and the photo-cell output with the chart. The figures on the chart are the **MINIMUM** readings for a satisfactory photo cell.

EXAMPLE: The minimum millivolt output for a photo cell with the exciter lamp operating at 3 volts, is 42.

9. If the photo-cell output is low, clean the holder contacts of the photo cell. Remove the two mounting screws, lift the assembly, and release the spring clips holding the cell to the bakelite mount. Re-

move the cell, holding it by the edges to avoid fingerprints on the sensitized surface. Wipe the cell with a clean, dry cloth, and clean the contact spring.

CAUTION: Carbon tetrachloride will ruin the cell.

Replace the cell on the bakelite mount, and fasten the assembly in place with the two screws.

10. If the output of the cell is still low, replace with a new cell, Part No. 56-1883.
11. Replace the plastic cover and tighten the three mounting screws.

NOTE

Do not, under any circumstances, attempt to adjust the angle of the jewel which normally extends $1/32''$ below the guard. The jewel should be vertical, with respect to the record surface, when viewed from the front of the pick-up head. With one record on the turntable, the jewel will be at an angle of approximately 13° , when viewed from the side. *Do not attempt to change the angle*, as the surface noise is reduced to minimum by this position of the jewel in the record groove. Any change from the original setting will also affect the frequency response and cause excessive record wear. Replace the jewel and mirror assembly, Part No. 318-2641, if the angle of the jewel has been altered.

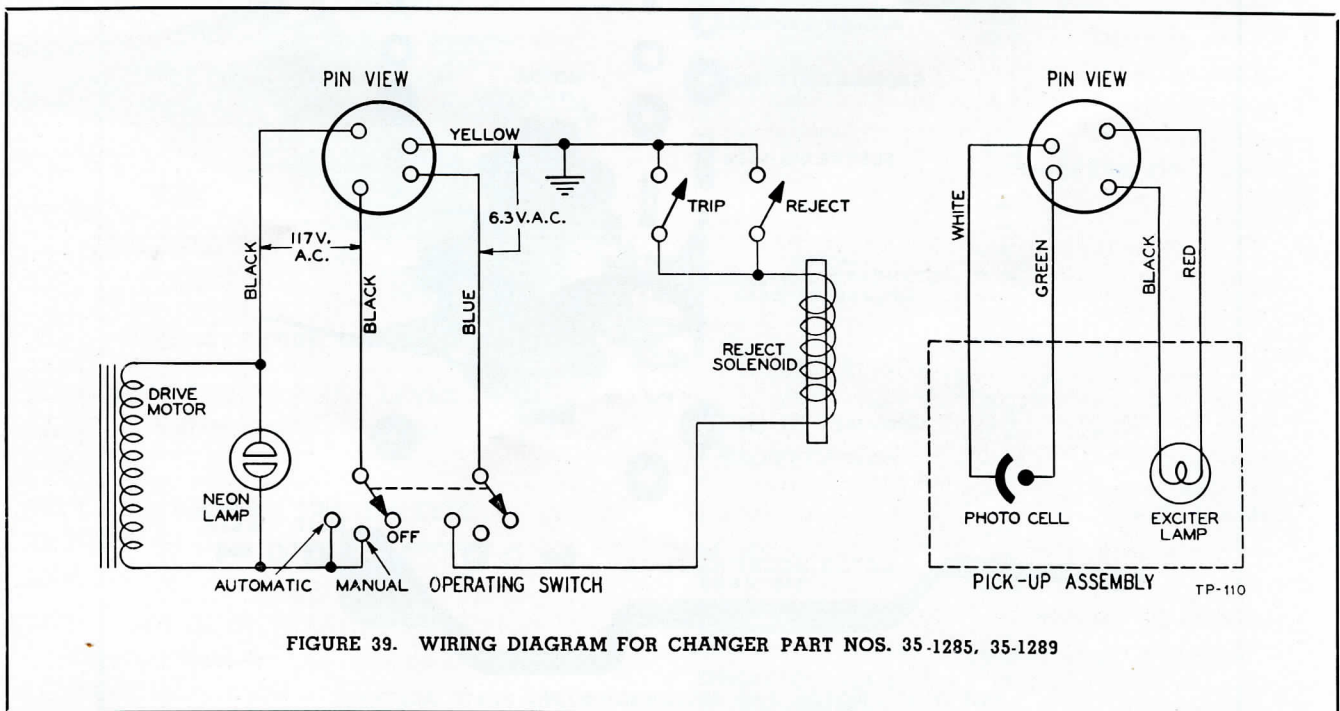
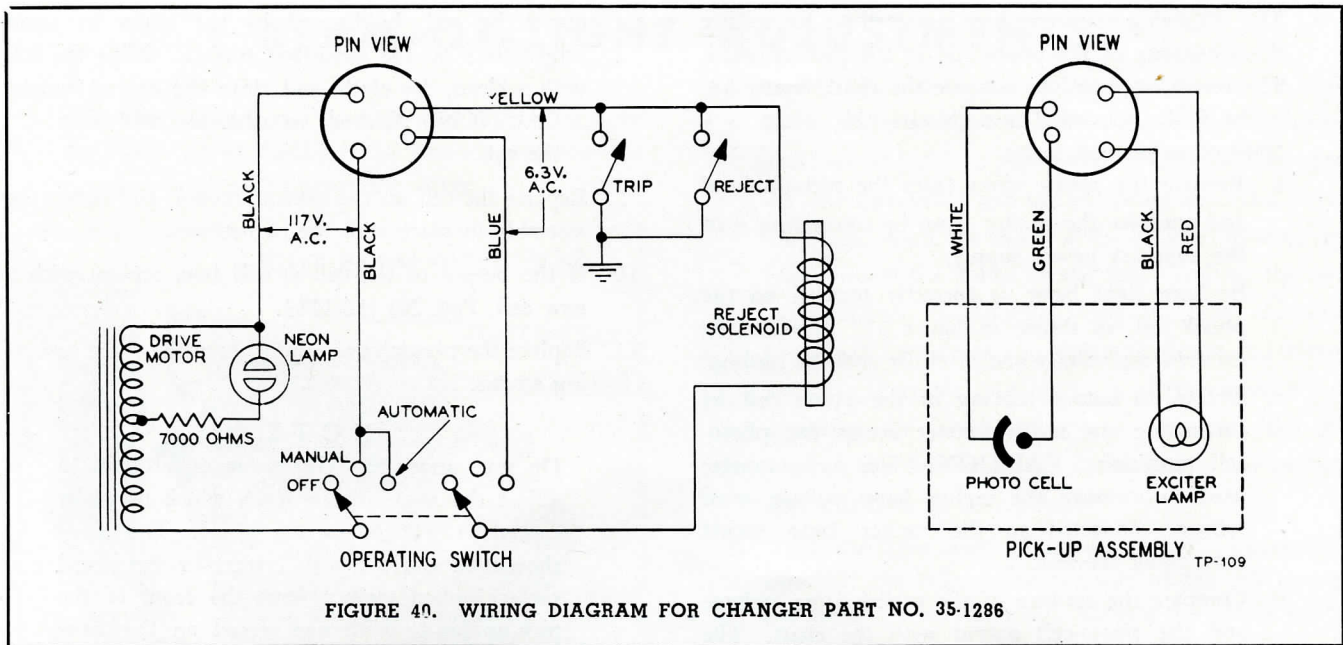
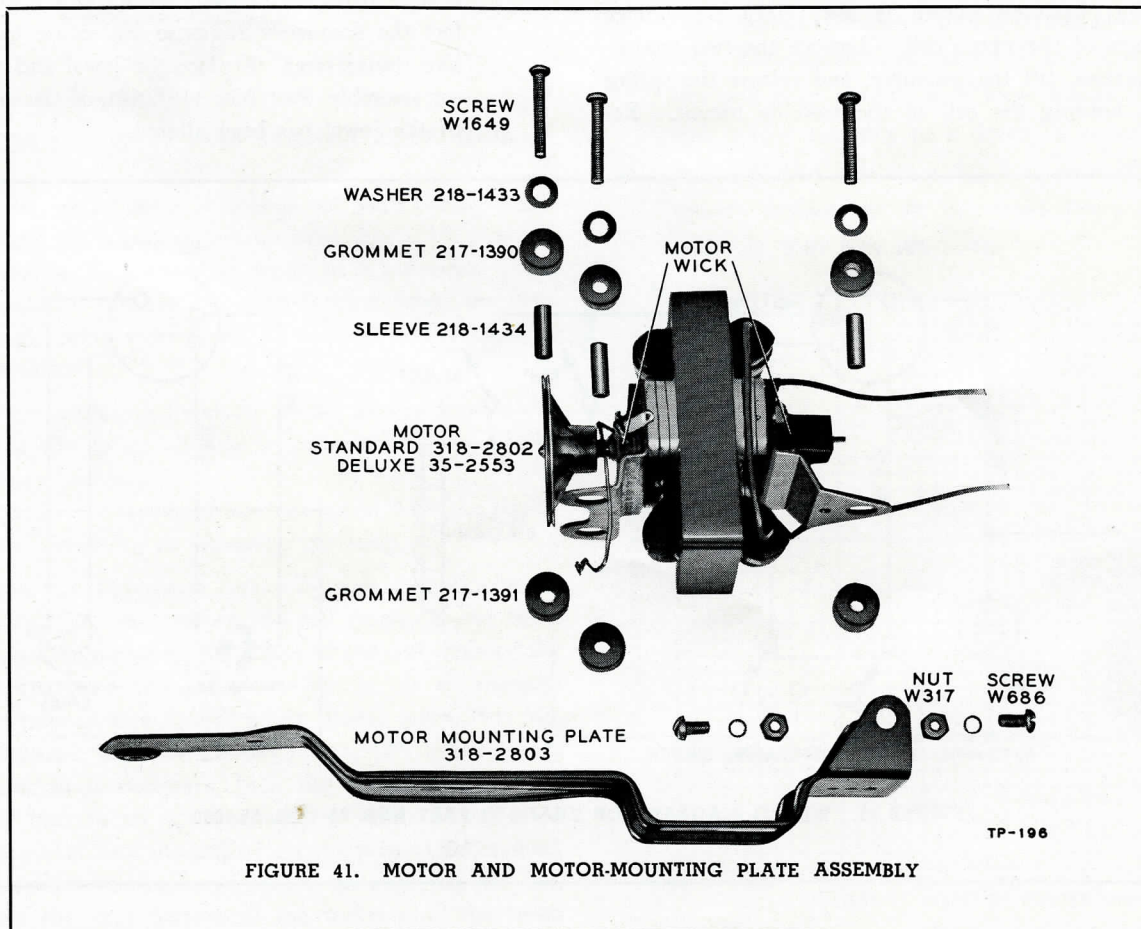


FIGURE 39. WIRING DIAGRAM FOR CHANGER PART NOS. 35-1285, 35-1289



REPLACEMENT OF PARTS AND ASSEMBLIES

1. EXCITER LAMP, figure 37. Refer to page 22, steps 2-7.
2. MOTOR ASSEMBLY, figure 41. The motor has often been replaced unnecessarily, because certain minor



troubles led the serviceman to believe the motor was at fault. Replacement should be made only after the reconditioning procedure fails to overcome the defect. Troubles which will necessitate replacement of the motor are: shorted or open field winding; bent or excessively worn armature shaft; unbalanced armature; or a defective drive disc. To replace the motor, follow, in order, the steps below.

- a. Remove the neon-lamp socket from its bracket, remove the neon-lamp lead from the dress lug on the motor-lamination bolt, and disconnect the motor leads.
 - b. Remove the bell-drive assembly, as directed on page 8, steps 3-4-5.
 - c. Remove the two bottom motor-control adjusting nuts and lower the motor-mounting plate.
 - d. Remove the three motor-mounting screws, noting the position of the rubber grommets.
 - e. Install the new motor by following the above steps in reverse order.
 - f. Adjust the bell-drive assembly, as directed on page 12, step 32, and page 13, step 35.
3. PHOTO CELL ELEMENT, figure 37. Refer to page 23, step 9.

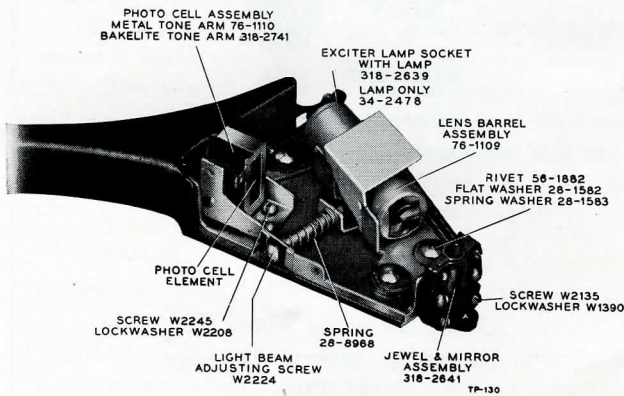


FIGURE 42. PICK-UP HEAD ASSEMBLY

4. PULSATING-PLATE AND LEVER ASSEMBLY, figure 35. Follow complete trip adjustment procedure page 19.
5. SPINDLE ASSEMBLY (EARLY TYPE)
To replace the early type spindle assembly, follow, in order, the steps below.
 - a. Turn back the record pressure arm and both record shelves. Place the tone arm on its support and remove the turntable.
 - b. Remove the spindle lock plate, figure 43, and unscrew and remove the spindle with its upper sleeve.

- c. Remove the brass cone and all washers, remove the large nut from the lower spindle sleeve, and remove the sleeve with the clutch-release spring and clutch gear. Remove the two steel washers, one on each side of the clutch-lever-assembly fork.

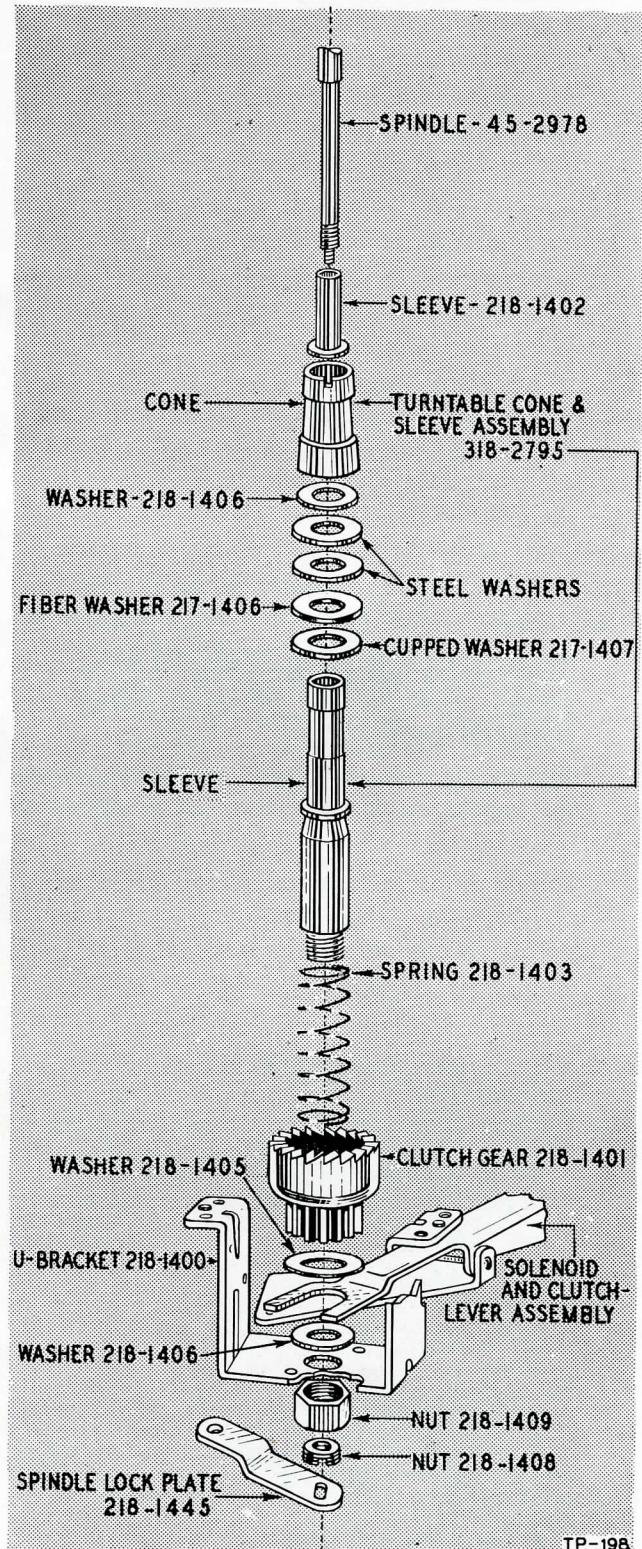


FIGURE 43. SPINDLE ASSEMBLY (EARLY TYPE)

NOTE

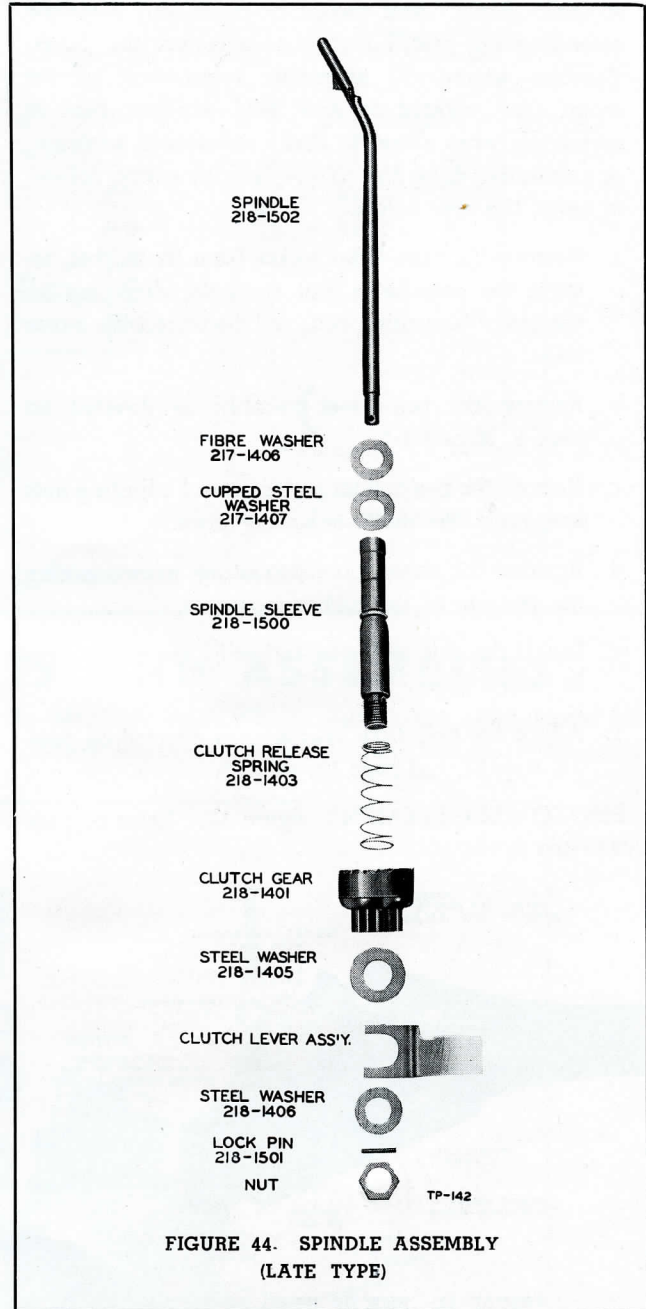
Do not attempt to force or bend the fork on the clutch-lever assembly, when removing the spindle sleeve. Before reassembling, examine the fork and straighten the fingers, if necessary, so that equal pressure will be exerted on both sides of the clutch-gear washer.

- d. Reassemble the lower spindle sleeve, as shown in figure 43, and fasten with the large nut. Reassemble the washers and brass cone in the correct order.
 - e. Screw the small spindle-sleeve nut into the large nut until their lower ends are flush. Insert the spindle and the upper sleeve into the lower sleeve, and screw the spindle into the small sleeve nut until it is snug, making sure the small sleeve nut does not turn.
 - f. Unscrew the spindle *at least* $\frac{1}{2}$ turn, line up the spindle with the record shelves, and replace the lock plate. The spindle should be free to move slightly.
6. **SPINDLE ASSEMBLY (LATE TYPE)**
To replace the late type spindle, follow, in order, the steps below.
- a. Turn back the record pressure arm and both record shelves. Place the tone arm on its support and remove the turntable.
 - b. Remove the fibre and cupped steel washers from the spindle sleeve and remove the spindle-sleeve nut. See figure 44.
 - c. Pull the clutch-lever roller out of its notch on the main cam gear to raise the clutch gear and remove the spindle lock pin with long-nose pliers.
 - d. Remove the spindle, spindle sleeve, clutch-release spring, and clutch gear. Remove the two steel washers, one on each side of the clutch-lever-assembly fork.

NOTE

Do not attempt to force or bend the fork on the clutch-lever assembly when removing the spindle sleeve. Before reassembling, examine the fork and straighten the fingers, if necessary, so that equal pressure will be exerted on both sides of the clutch-gear washer.

- e. Reassemble, as shown in figure 44, following the above steps in reverse order.



7. **TONE-ARM ASSEMBLY**, figure 26. Refer to page 15, steps 10 and 11; page 16, steps 12 and 13.
8. **TRIP AND POSITIONING ASSEMBLY**, figure 35. Follow complete trip adjustment procedure, page 19.

FINAL TEST (IN SHOP)

After assembly of the changer is complete make the following tests:

1. SPEED

Start the changer by turning the operating switch to MANUAL. The turntable should reach the proper speed in approximately one revolution when the speed control is set in the NORMAL position. It is a normal condition if the stroboscope lines appear to drift very slightly in either direction. This would mean a difference of only a fraction of one in 78 revolutions. Before making any adjustment, refer to page 8-13.

2. INDEXING

Place a good record on the turntable. Turn the operating switch to AUTOMATIC. Press the REJECT button and observe the point of contact where the jewel first touches the record. For a 10" record, the distance between the spindle and jewel, at the point of contact with the record, should be $4\frac{13}{16}$ ". For a 12" record the distance should be $5\frac{13}{16}$ ". See figure 26. For the indexing adjustment, refer to page 16, steps 16-19.

3. TONE-ARM HEIGHT

Place a full stack of either 10" or 12" records on the changer. Place the operating switch in AUTOMATIC and start the change cycle with the REJECT button. Make sure that, while the bottom record is being played, a slight clearance is present between the nut on the height-adjusting screw and the lift pin and lift-pin guides. Reject another record and watch the tone arm. It must not rise to a height where it will touch the bottom record of the unplayed stack. Continue to reject the entire stack and make sure the head rises high enough to play the full stack. Refer to page 17, steps 20-21, before making any adjustments.

4. TRIPPING

To test the tripping action, select a good record and place it on the turntable. Move the operating switch to AUTOMATIC and play the record through several times. If the adjustments are correct, the tripping action will be smooth and quiet. Should any further adjustments be necessary, refer to pages 19-20.

5. PUSH OFF

When making this test, select records that are in very good condition. Load the changer to capacity with either 10" or 12" records. Start the change cycle, by moving the operating switch to AUTOMATIC and press the REJECT button. The bottom record should fall into playing position on the turntable. Continue to reject each record until all are in playing position. Remove the records and repeat the above operation 3 or 4 times. If the push-off adjustments are correct, each record will drop individually. Should two records drop at the same time, or should records wedge against the spindle, refer to pages 20-21, before making any adjustments.

6. PICK-UP

Depress the small plastic button on the tone-arm cover, and push it to one side. This will provide a means for viewing the photo cell while the changer is in operation. Play several records through for a quality test. Listen particularly for flutter or distortion. If flutter or distortion is encountered, it may be the result of vibration in the changer unit, tone-arm drag, or a defective jewel assembly. It is suggested that the serviceman review, in sequence, speed adjustments, tone-arm adjustments and beam-of-light adjustments.

An alternate method of testing speed adjustments is to apply the torque test, using the Prony brake, Part No. 45-6219, and the 8-oz. scale, Part No. 45-2851, as shown in figure 45, and proceed as follows:

Place the Prony-brake hub over the spindle and onto the turntable, allowing the hole in the brake hub to engage the home-recording pin in the turntable. Unscrew the wing nut on the brake collar and slide the felt lining down over the hub. With the turntable revolving freely, adjust for maximum speed (in NORMAL position). Tighten the wing nut until the stroboscope lines come to a stop, indicating 78 r.p.m. Hook the 8-oz. scale onto the indent, provided on the brake arm, and pull away from the record push-off post. This reading should not be less than 2.5 ozs. and should not exceed 3.5 ozs. The distance from the point of application of the scale is 5" from the spindle; therefore 5 times the pull, in ounces, equals the oz.-inches of torque. The torque should be not less than 12.5 oz.-inches nor more than 18 oz.-inches. This measurement is an indication of the usable power available at the turntable. Anything less than 12.5 oz.-inches of torque indicates that power from the motor is being lost through excessive friction in the drive system. Before making any further adjustments, refer to pages 8-13.

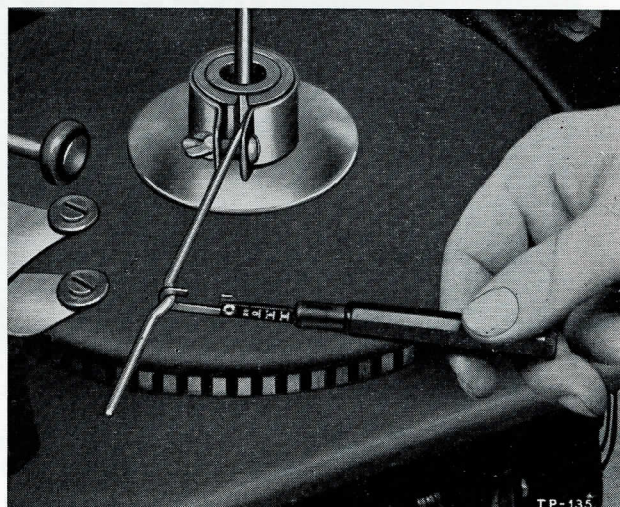


FIGURE 45. MEASURING TORQUE WITH PRONY BRAKE

TRANSPORTING RECONDITIONED CHANGER

Unless particular care is used when handling the changer after it leaves the shop, the work and time involved are wasted. It is imperative that the changer posts, Part No. 45-2894, or a carrying case similar to that shown in figure 46, be used for transporting or storage of the changer.

The case can be constructed of any available material that is strong enough to protect the changer. Regardless of the means employed to transport the changer, the power cables, turntable and tone arm must be securely tied or fastened to the base plate.

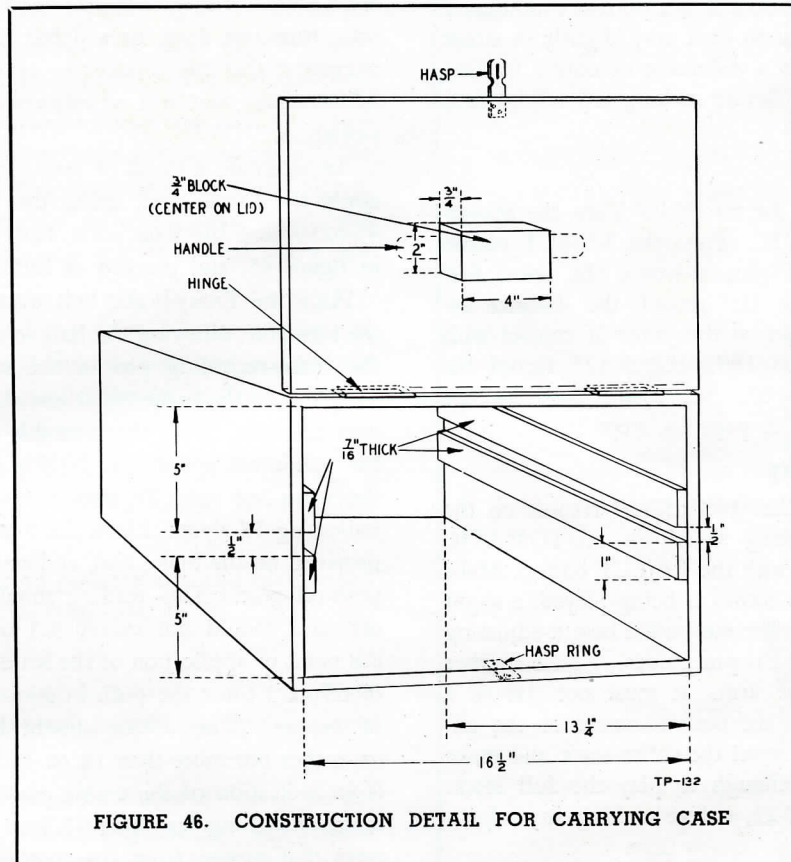


FIGURE 46. CONSTRUCTION DETAIL FOR CARRYING CASE

FINAL TEST (IN HOME)

When making the final test in the home, keep in mind that the owner is quick to notice the care with which you handle his property and the confidence with which you go about your work. Have a well planned routine prepared in advance for each operation and the order in which it is to be done. Any hesitation or doubt shown by the serviceman will create an unfavorable impression. After numerous interviews with successful servicemen, the procedure outlined below was finally adopted.

Be sure that the changer mechanism is transported as recommended under the heading "Transporting Reconditioned Changer". Carry the changer and its support into the house and do not remove it from its case or stand until you are ready to transfer it directly into the cabinet.

NOTE

A reconditioned changer should never be set down when out of its carrying support.

If this procedure is not followed, the serviceman runs the risk of throwing the changer out of adjustment.

Always carry demonstration records in both 10" and 12" sizes. These may be Philco Demonstration or good commercial recordings. It is very important that the serviceman be familiar with the correct reproduction of these records.

1. Unhook the tilt front of the cabinet and gently lower it to the floor. If the front does not reach the floor, do not force it. It is suggested that the front be supported with books, or any available article that will not scratch the cabinet.

2. Slide the mounting forward. Examine the shock-absorbing springs in each corner of the mounting to see that they are securely locked in place.

3. Install the changer in the cabinet, making certain that the changer is properly seated on the four shock-absorbing springs. Replace the four corner bolts but do not tighten. Securely fasten the cables in their original positions.

4. Place several of your test records in loading position on the record shelf and turn the operating switch to AUTOMATIC.

5. Start a change cycle by pressing the REJECT button.

6. After a reasonable warm-up period, adjust the speed-control knob until the movement of the stroboscope lines is at a minimum.

Explain to the owner that a slight movement of the stroboscope lines in either direction does not mean that the changer is not operating properly. As a matter of fact, a slight movement of the lines constitutes a change in the

speed, in either direction, of only a fraction of one revolution, which even the most sensitive ear cannot detect.

7. Allow several of the records to play through to check the indexing and trip adjustments; listen particularly for any flutter or distortion. Also observe the action of the push-off mechanism.

8. Carefully slide the complete unit into the cabinet and hook the tilt front.

9. As the last operation, play some of the owner's records and note any that may cause faulty operation of the changer. Do not be hasty in condemning the owner's records. Prove the poor condition of his records by playing both the bad and the good for comparison.

10. Certain troubles in the radio can cause poor record reproduction without having any effect on radio reception. Other Philco publications thoroughly cover the receiver circuits, and they should be referred to for troubles of that nature.

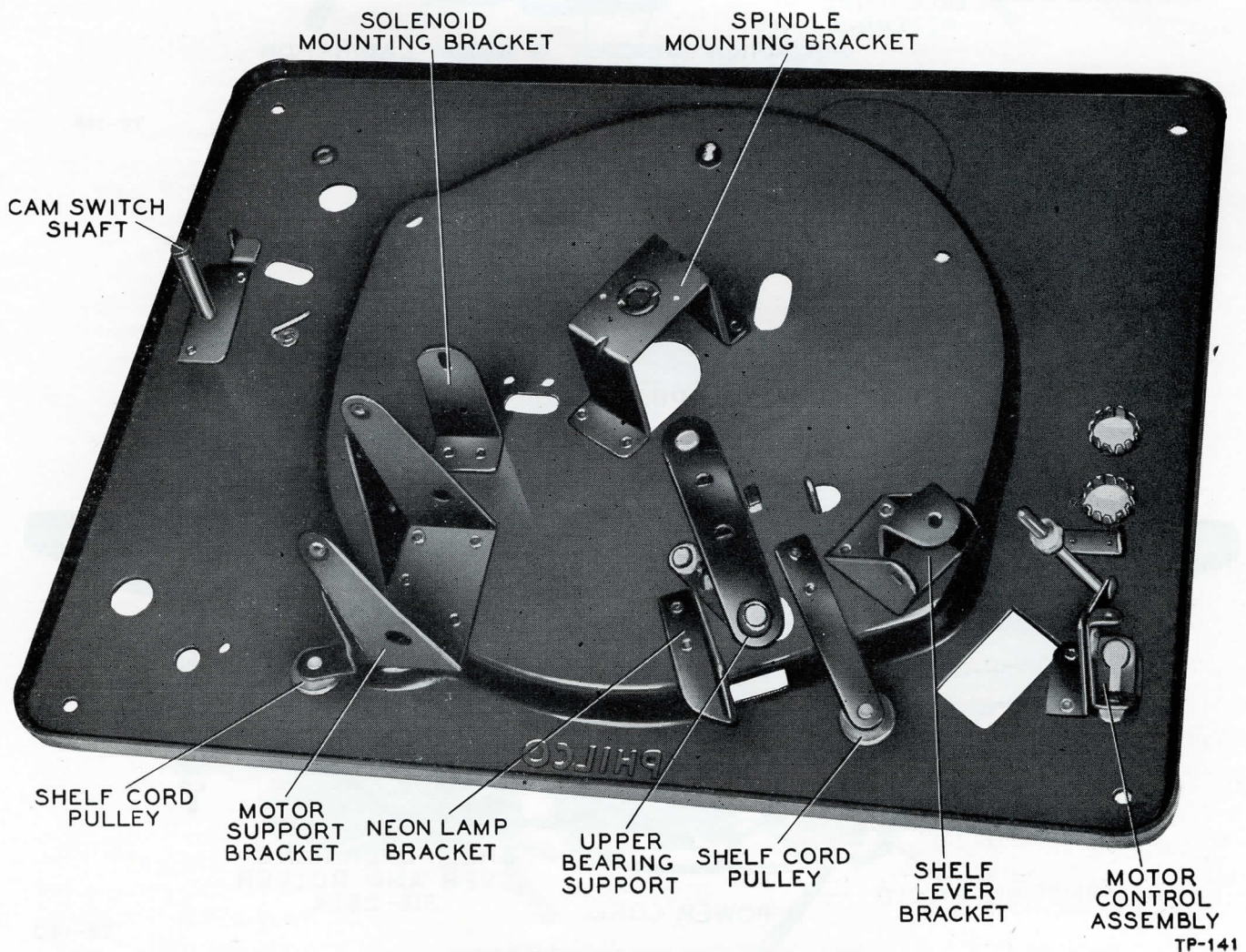


FIGURE 47. RIVETED ASSEMBLIES ON CHANGER BASE PLATE

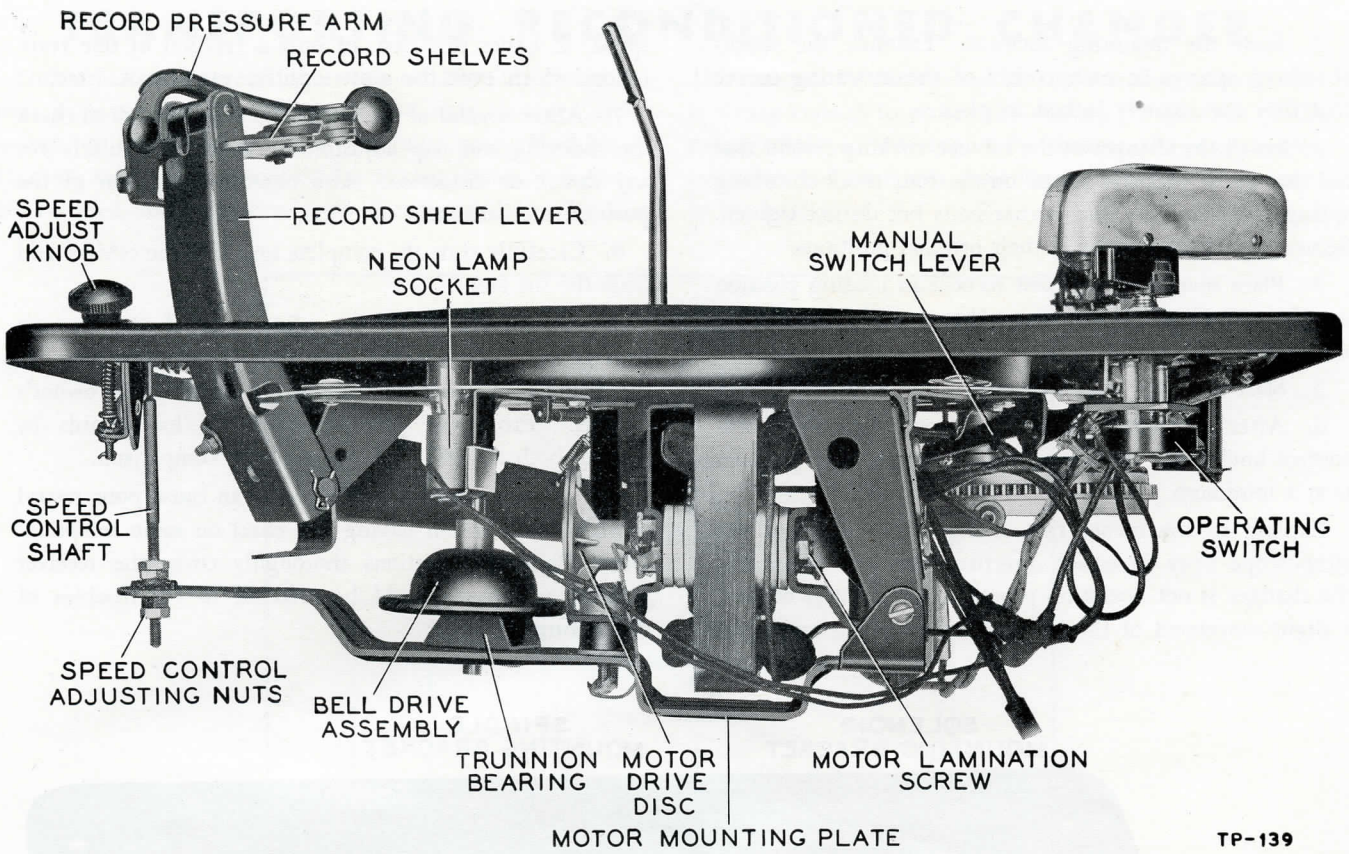


FIGURE 48. FRONT VIEW OF CHANGER

TP-139

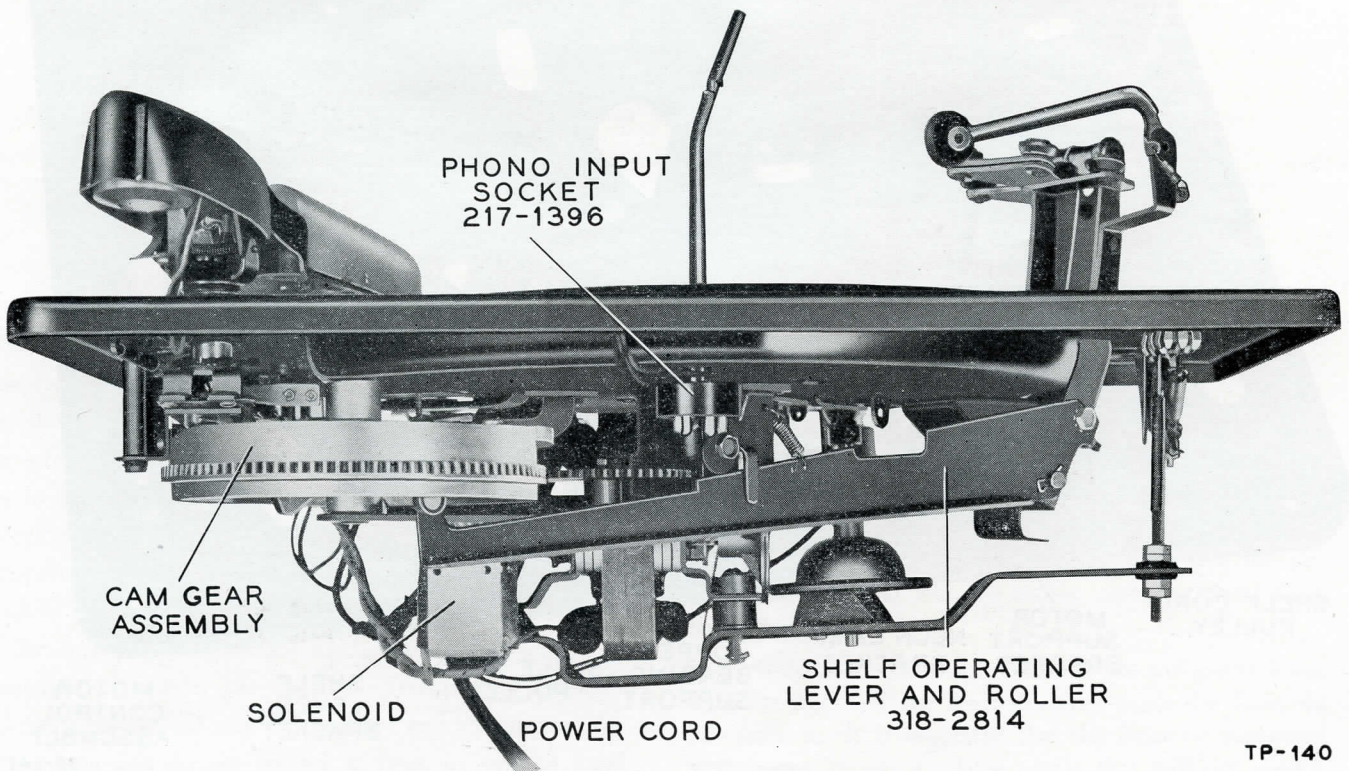
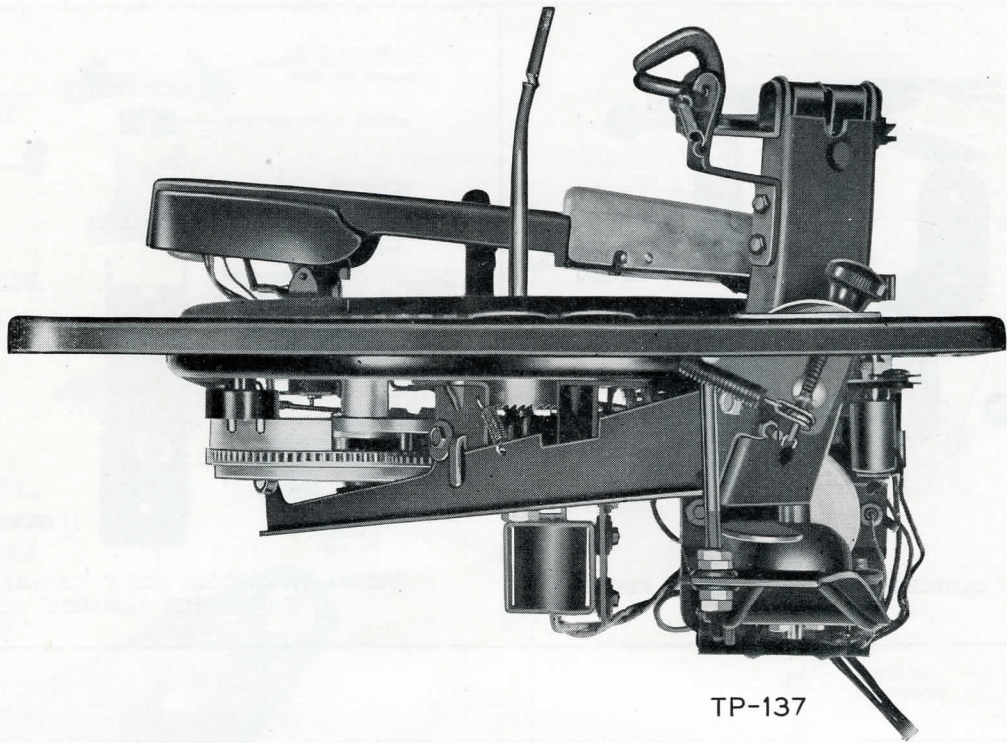


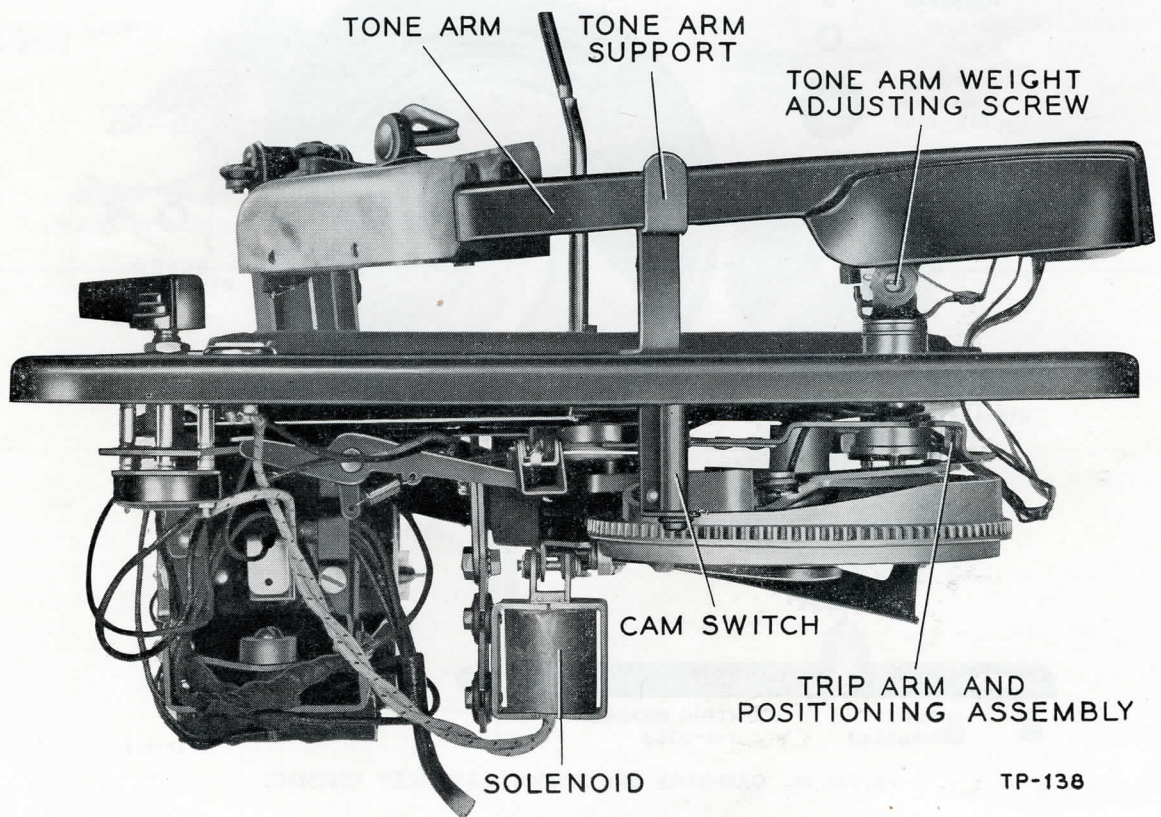
FIGURE 49. REAR VIEW OF CHANGER

TP-140



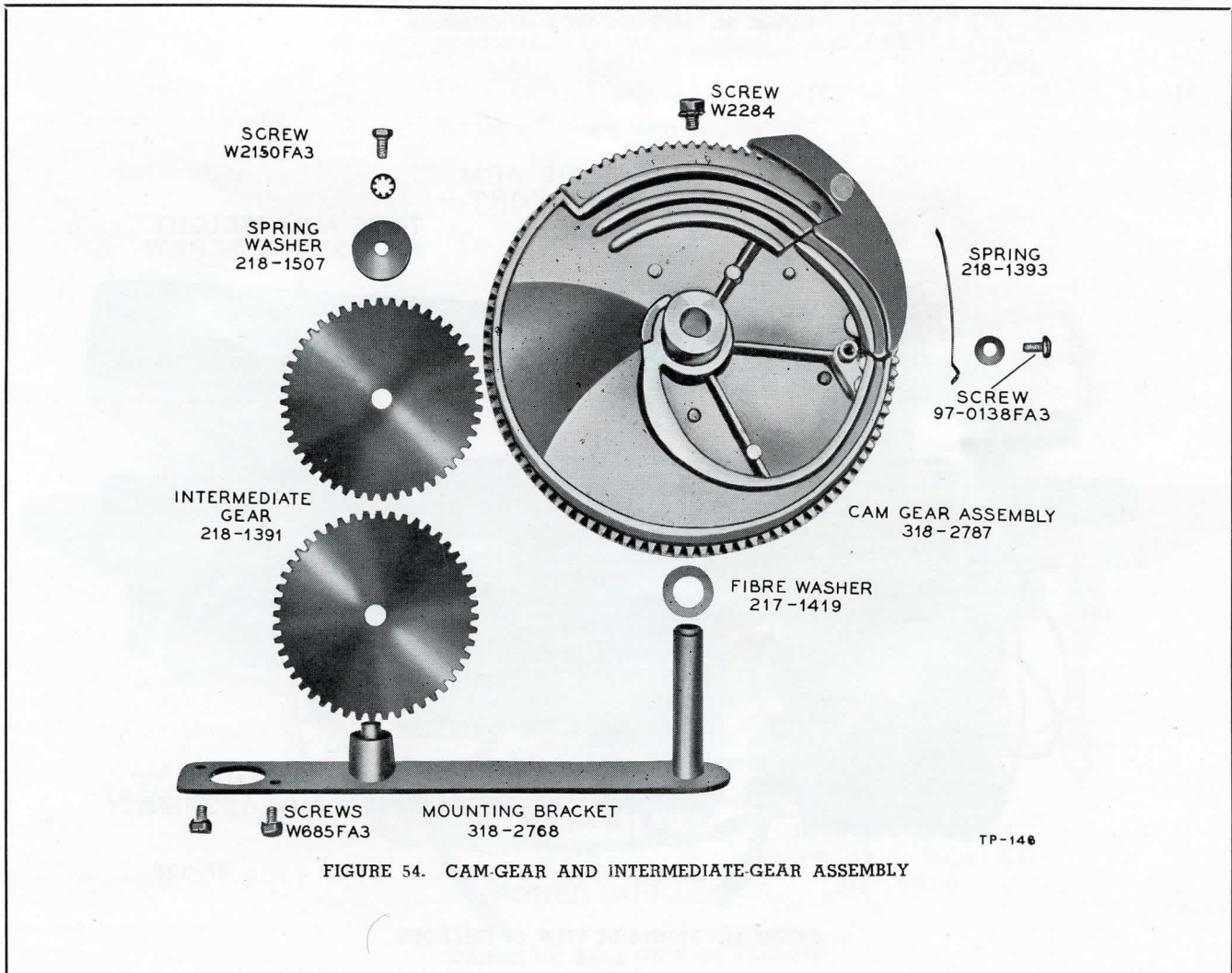
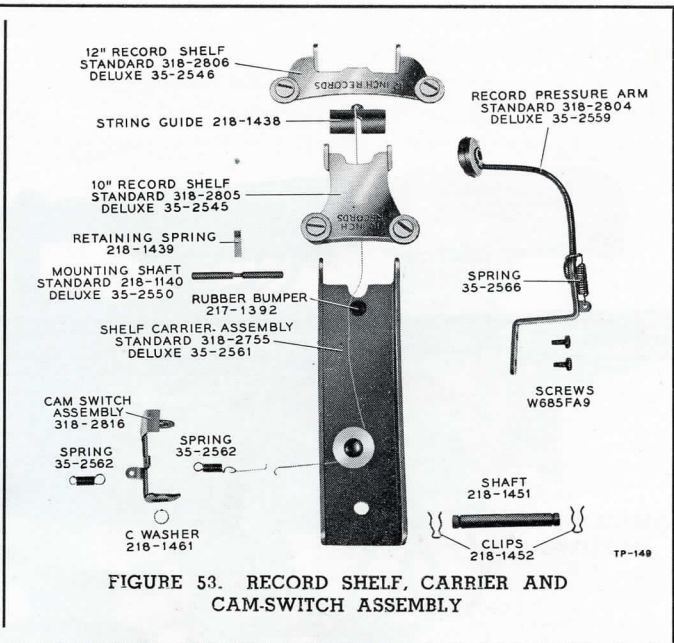
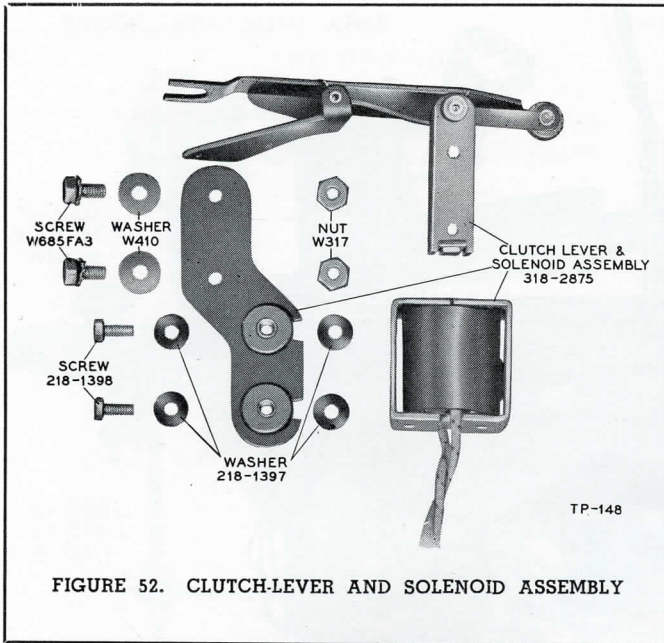
TP-137

FIGURE 50. LEFT-SIDE VIEW OF CHANGER



TP-138

FIGURE 51. RIGHT-SIDE VIEW OF CHANGER



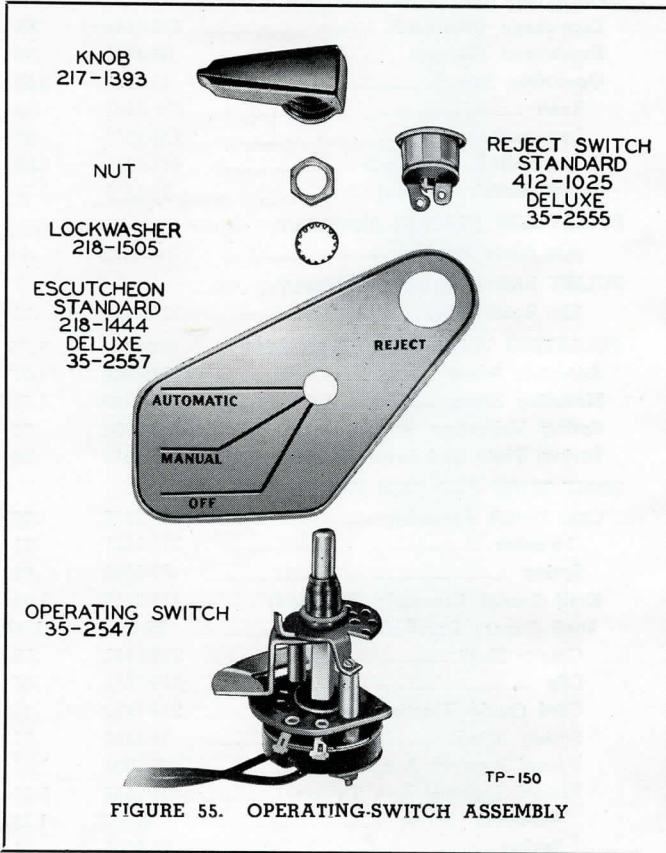


FIGURE 55. OPERATING-SWITCH ASSEMBLY

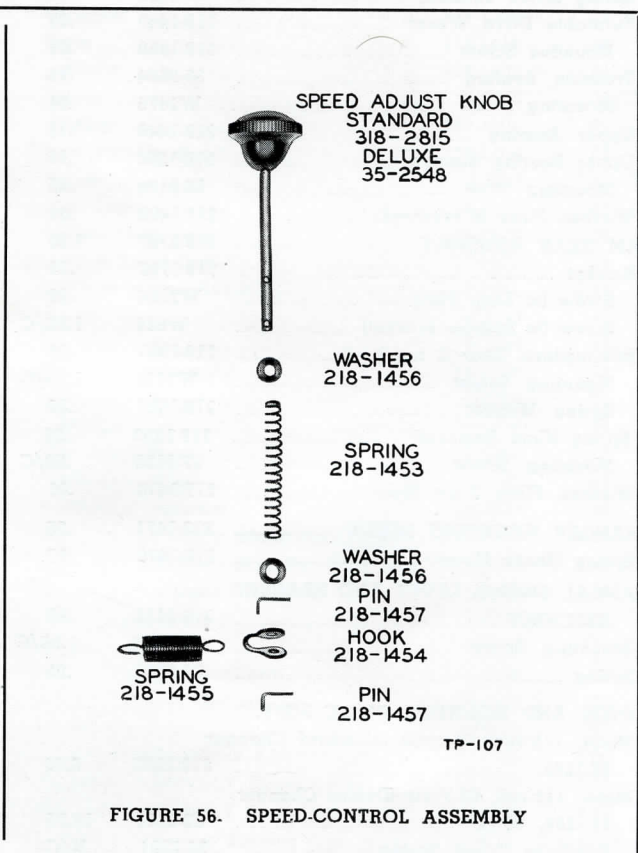


FIGURE 56. SPEED-CONTROL ASSEMBLY

REPLACEMENT PARTS LIST

(All prices are subject to change without notice)

DESCRIPTION	PHILCO PART NO.	LIST PRICE	DESCRIPTION	PHILCO PART NO.	LIST PRICE
BELL DRIVE ASSEMBLY	318-2811	.75	NEON LAMP SOCKET	318-2808	.30
Collar and Screw	318-2812	.20	Neon Lamp	34-2482	1.00
Spring (Drive Tension)	218-1458	.04	OPERATING AND REJECT SWITCH ASSY.		
Turntable Drive Wheel	218-1448	.35	Escutcheon (Standard)	218-1444	.60
Mounting Screw	218-1450	.01	Escutcheon (Deluxe)	35-2557	.75
Trunnion Bearing	35-2604	.75	Operating Switch	35-2547	2.50
Mounting Screw	W1475	.01	Knob	217-1393	.10
Upper Bearing	218-1449	.15	Lockwasher	218-1505	.01
Upper Bearing Support	218-1520	.15	Reject Switch (Standard)	412-1025	1.00
Mounting Rivet	56-6189	.05	Reject Switch (Deluxe)	35-2555	1.10
Washer, Fibre (4 required)	217-1409	.01	PULLEY AND BRACKET ASSEMBLY		
CAM GEAR ASSEMBLY	318-2787	3.50	(On Motor Bracket)	318-2798	.35
Bracket	318-2768	.75	PULLEY AND BRACKET ASSEMBLY		
Screw (to Base Plate)	W2284	.02	(On Base Plate)	318-2822	.15
Screw (to Spindle Bracket)	W685	1.25/C	PULSATING PLATE AND LEVER ASSY.	318-2785	1.75
Intermediate Gear (2 required)	218-1391	.25	Adjusting Screw	218-1384	.01
Mounting Screw	W2150	1.75/C	Mounting Screw	W2150	1.75/C
Spring Washer	218-1507	.03	Spring (Adjusting Screw)	218-1382	.02
Spring (Cam Segment)	218-1393	.05	Spring (Plate and Lever Tension)	28-8919	.04
Mounting Screw	97-0138	.50/C	SHELF LEVER AND CAM SWITCH ASSY.		
Washer, Fibre (Cam Hub)	217-1419	.01	Cam Switch Assembly	318-2816	.60
CHANGER MOUNTING SCREW	218-1471	.05	C-washer	218-1461	.01
Spring (Shock Mount)	218-1470	.50	Spring	35-2562	.05
MANUAL SWITCH LEVER AND BRACKET ASSEMBLY	318-2813	.60	Shelf Carrier Assembly (Standard)	318-2755	1.00
Mounting Screw	W2150	1.75/C	Shelf Carrier Assembly (Deluxe)	35-2561	1.00
Spring	35-2565	.05	Carrier Shaft	218-1451	.15
MOTOR AND MOUNTING PLATE ASSY.			Clip	218-1452	.05
Motor, 115-volt, 60-cycle (Standard Changer 35-1285)	318-2802	8.00	Cord Guide (Plastic)	218-1438	.20
Motor, 115-volt, 60-cycle (Deluxe Changer 35-1286, 35-1289)	32-2553	10.75	Spring (Cord)	35-2562	.05
Auxiliary Thrust Spring	56-6201	N/C	Record Pressure Arm (Standard)	318-2804	1.25
Grommet (light color)	217-1390	.05	Record Pressure Arm (Deluxe)	35-2559	1.50
Grommet (dark color)	217-1391	.10	Mounting Screw	W685	1.25/C
Screw (Motor Mtg.)	W1649	.60/C	Spring	35-2566	.05
Sleeve (Motor Mtg.)	218-1434	.05	Record Shelf—10" (Standard)	318-2805	3.00
Washer (Motor Mtg.)	218-1433	.01	Record Shelf—10" (Deluxe)	35-2545	3.50
Motor Mounting Plate	318-2803	1.40	Record Shelf—12" (Standard)	318-2806	2.50
Nut (Plate to Bracket)	W317	.40/C	Record Shelf—12" (Deluxe)	35-2546	3.00
Screw (Plate to Bracket)	W686	.35/C	Shelf Mounting Shaft (Standard)	218-1440	.25
MOTOR CONTROL ASSEMBLY			Shelf Mounting Shaft (Deluxe)	35-2550	.10
Bracket and Shaft	318-2820	.75	Spring (Shaft Retaining)	218-1439	.03
Adjusting Nut (Shaft)	W317	.40/C	Rubber Bumper	217-1392	.02
Spring (Lever Tension)	218-1455	.05	SHELF OPERATING LEVER AND ROLLER ASS'Y	318-2814	.50
Washer (Shaft)	218-1442	.03	Eccentric Washer	218-1404	.03
Escutcheon (Standard)	218-1473	.45	Mounting Screw	W453	1.80/C
Escutcheon (Deluxe)	35-2558	.50	Screw (Adjusting)	35-2567	.03
Mounting Drive Screw	218-1474	.60/C	Locking Nut	35-2568	.01
Knob and Shaft (Standard)	318-2815	.25	Screw (Lever Mounting)	W1475	.01
Knob and Shaft (Deluxe)	35-2548	.50	Spring	35-2603	.05
Hook (Speed Control)	218-1454	.03	SOLENOID AND CLUTCH LEVER ASSY.	318-2875	2.25
Pin	218-1457	.01	Screw (to Base Plate Bracket)	W686	1.25/C
Spring	218-1453	.02	Nut	W317	.40/C
Washer	218-1456	.01	Washer	W410	.15/C
			Screw (Solenoid Mounting)	218-1398	.03
			Washer	218-1397	.01

REPLACEMENT PARTS LIST — *Continued*

DESCRIPTION	PHILCO PART NO.	LIST PRICE	DESCRIPTION	PHILCO PART NO.	LIST PRICE
SPINDLE ASSEMBLY					
Complete Assembly (Early Type)	318-2794	2.75	Nut (Tension)	218-1429	.03
Complete Assembly (Late Type)	318-2839	4.75	Nut	218-1426	.06
Clutch Gear (Bakelite)	218-1401	.35	Counterweight (1½-oz.)	218-1420	.15
Lock Pin (Late Type)	218-1501	.02	Counterweight (3-oz.)	218-1531	.25
Lock Plate (Early Type)	218-1445	.07	Counterweight (5-oz.)	218-1530	.35
Sleeve (Late Type)	218-1500	1.50	Bushing	218-1421	.07
Sleeve and Cone, Lower (Early Type)....	318-2795	2.00	Grommet	217-1389	.04
Nut (Large)	218-1409	.10	Plate	218-1419	.12
Nut (Small)	218-1408	.10	Screw	218-1432	.01
Sleeve, Upper (Early Type)	218-1402	.25	Screw	W2289	1.75/C
Spindle Only (Early Type)	45-2978	1.75	Washer	217-1405	.02
Spindle Only (Late Type)	218-1502	1.75	Cover (Pick-Up Head)	76-1104	.75
Spring (Clutch Release)	218-1403	.02	Screw	W2204	1.50/C
U-Bracket (Spindle Mtg.)	218-1400	.60	Exciter Lamp	34-2478	.45
Washer (Cupped)	217-1407	.06	Socket (with Lamp)	318-2639	1.00
Washer (Fibre)	217-1406	.03	Grommet (Lead Dress)	27-4571	.04
Washer (Large Flat)	218-1405	.03	Jewel and Mirror Assembly	318-2641	5.25
Washer (Small Flat)	218-1406	.03	Screw	W2135	.45/C
TONE ARM ASSEMBLY			Washer	W1390	.50/C
Arm Complete (Standard)	35-2518	17.50	Lens Barrel Assembly	76-1109	1.75
Arm Complete (Deluxe)	35-2519	17.50	Adjusting Screw	W2224	.01
Arm Complete (Bakelite)	35-2540	17.50	Spring	28-8968	.01
Arm Only (Bakelite)	54-4145	1.00	Mounting Rivet	56-1882	.05
Bracket and Shaft	318-2790	.75	Washer (Flat)	28-1582	.01
Bearing (Shaft) (Standard)	218-1467	.50	Washer (Spring)	28-1583	.02
Bearing (Shaft) (Deluxe)	35-2551	.35	Photo Cell Assembly (Metal Tone Arm)....	76-1110	4.50
Lockwasher	218-1469	.03	Photo Cell Assembly (Bakelite Tone Arm)	318-2741	4.50
Nut	218-1468	.10	Photo Cell (Element Only)	56-1883	3.00
Bearing Retainer	218-1465	.03	Lockwasher	W2208	.75/C
Ball Bearing	218-1466	.01	Screw	W2245	.70/C
Bearing Race	218-1464	.04	Tone-Arm Support (Standard)	318-2796	.20
Lift Pin	218-1425	.10	Tone-Arm Support (Deluxe)	35-2549	.20
Shaft and Ratchet	318-2800	.35	Rivet	W2293	.03
Retaining Ring	218-1431	.01	TRIP AND POSITIONING ASSEMBLY	318-2766	4.00
Spring	218-1427	.12	TURNTABLE ASSEMBLY (Early Type)	318-2807	3.75
Bracket (Tone Arm)	218-1424	.15	TURNTABLE ASSEMBLY (Late Type)	318-2838	3.75
Screw (Height Adjusting)	218-1428	.01	For part numbers of Special Tools, refer to page 5. For prices, consult your distributor.		