

# PHILCO



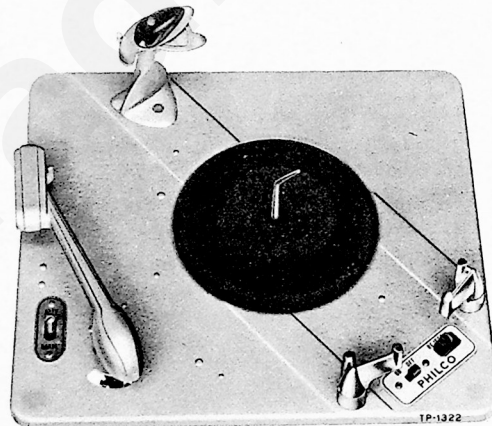
# SERVICE

## HOME RADIO

*SERVICING ... 1946*

### PHILCO AUTOMATIC RECORD CHANGER

Models D-10 and D-10A



**SERVICE DIVISION**

PHILCO RADIO AND TELEVISION CORPORATION

PHILADELPHIA, PENNA.

# INTRODUCTION

## PHILCO AUTOMATIC RECORD CHANGER MODELS D-10 and D-10A

The Philco Automatic Record Changer, Models D-10 and D-10A, is designed for smooth, quiet, and efficient automatic playing of records, and is used in several 1946 Philco Radio-Phonograph combinations.

These models are mechanically identical, the only difference being in the tone arm. This difference can be seen in figures 1 and 2. The tone arm on the D-10 employs a crystal pickup, while the tone arm on the D-10A is equipped with a dynamic pickup.

The changer operates on 117 volts, 60 cycles, a.c., and will play, automatically, either ten 12" records or twelve 10" records. Provision is also made for manual operation.

Both models are equipped with semi-permanent type needles, affording long needle and record life. Both types of needles are easily replaceable if necessary.

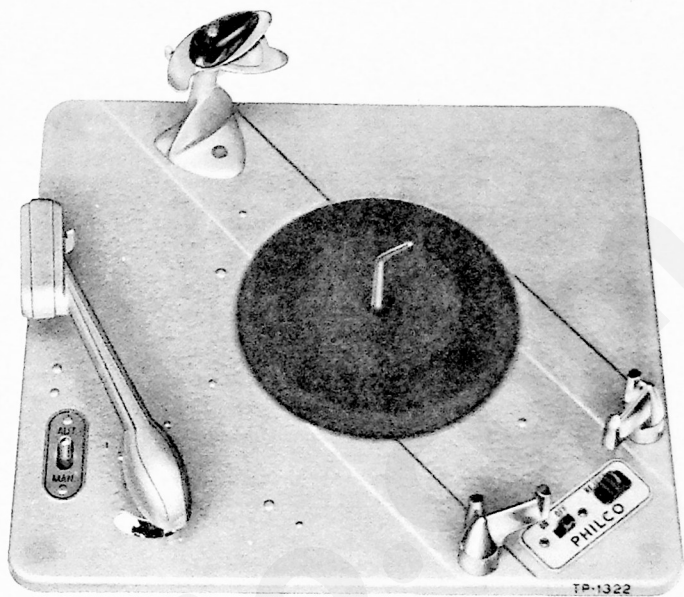


Figure 1. PHILCO RECORD CHANGER MODEL D-10, TOP VIEW



Figure 2. PHILCO RECORD CHANGER MODEL D-10A, TOP VIEW

# PREPARATION FOR USE

**UNPACKING**—Remove all cardboard or other packing material found on and around the turntable. Remove the tape used to tie the tone arm to the tone-arm rest. Remove any other packing material designated as such on the packing tags.

The changer is spring-mounted in the cabinet and is shipped from the factory in operating condition. No attempt should be made to loosen or remove the four corner bolts except to remove the changer from the cabinet for servicing.

**OPERATING CHECKS**—The following is a logical series of checks to be performed before the instrument is delivered to the owner. Should any of these checks reveal faulty operation, the correct adjustment will be found in the **SERVICING** section of this manual.

1. Without using a record, place the tone arm on its rest, set both record support levers and the record-separator post to their 12" positions, as shown in figure 3. Set the manual-automatic lever to **AUT**. Turn the motor **ON** and operate the **REJECT** control; the changer should go through its cycle. Watch the tone arm swing out; it should clear the arm rest. At the completion of the cycle, the point of the needle should clear the changer base plate by  $\frac{3}{32}$ ".

2. Place a good 12" record over the spindle and onto the record support levers and separator post. Operate the **REJECT** control and observe the action of the separator. The record should drop smoothly and evenly onto the turntable. The pickup should lower (index) so that the needle strikes the record approximately  $\frac{1}{8}$ " in from the outside edge.

3. Allow the record to play through and, when the needle enters the eccentric finishing groove, observe the tripping action; it is normal for the tone arm to

ride the eccentric groove for three or four revolutions of the turntable.

4. Load the changer to capacity by placing nine more 12" records on the supports. Reject each record with the **REJECT** control. The separator should select each record individually and each should drop smoothly. The tone arm, in its elevated position, should not strike the bottom of the remaining stack of records. After the full stack of records has dropped onto the turntable, the tone arm should lift high enough to clear the top record by  $\frac{1}{8}$ ".

5. Place the manual-automatic lever at **MAN**; place the tone arm on its rest; shut off the motor and unload the changer.

6. Set the record support levers and record separator post in the 10" position, as shown in figure 4. Place a good 10" record over the spindle and onto the support levers and separator post. Set the manual-automatic lever to **AUT**, turn on the motor and operate the **REJECT** control. The record should drop smoothly and the tone arm should lower so that the needle strikes the record approximately  $\frac{1}{8}$ " in from the outside edge.

7. Allow the record to play through and observe the tripping action. Again, it should be smooth and positive.

8. Load the changer to capacity with eleven more 10" records. Reject each record with the **REJECT** control, making certain that each record drops smoothly and individually. When the full stack has dropped onto the turntable, place the manual-automatic lever at **MAN** and play one record through to determine that the automatic mechanism is disengaged.

9. Turn the changer off as before, and unload.

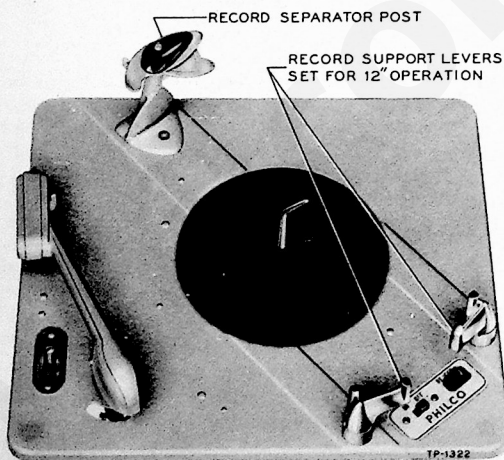


Figure 3. CHANGER SET FOR 12" AUTOMATIC OPERATION

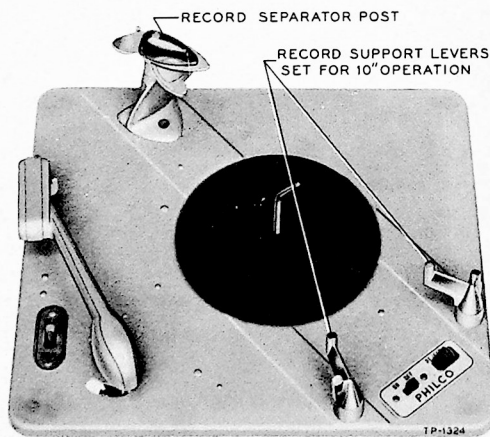


Figure 4. CHANGER SET FOR 10" AUTOMATIC OPERATION

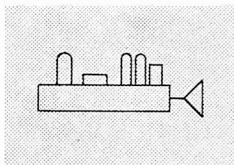
# PHILCO RADIO-PHONOGRAPH TROUBLE-SHOOTING PROCEDURE

The following tests are given for quickly localizing trouble in a Philco radio-phonograph. Be sure to make each test, in the order given, *before* removing the record changer from the cabinet.

If the trouble is found to be in the audio amplifier, refer to the radio service manual for the particular model under test. If the trouble is in some part of the record changer, refer to the **SERVICING** section of this record-changer manual.

## 1. AUDIO-AMPLIFIER TEST

The audio amplifier is common to both the radio and phonograph sections of the combination. With a station tuned in, check the audio amplifier by noting the tonal quality and volume of the speaker output.

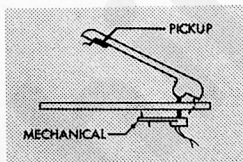


On models using the D-10A record changer, also check the phonograph pre-amplifier stage by applying a weak audio signal to the grid of the first audio tube of the radio; the signal should be just strong enough to be barely audible through the speaker. Then apply the same signal to the grid of the phonograph pre-amplifier tube. If the pre-amplifier stage is normal, an appreciable increase in volume will be noticed. An output meter connected across the output of the audio amplifier would normally indicate a gain of approximately five times.

If trouble is found in the audio amplifier, refer to the service manual for the particular model under test.

## 2. TONE-ARM TESTS

### a. Pickup Test



Play a familiar record on the radio-phonograph, and listen to the reproduction. If the audio amplifier was found to be normal in the first test, distortion or low volume indicates trouble

in the pickup or in the connecting leads to the radio chassis. Try a new needle if the output is distorted. If the pickup is found to be faulty, refer to page 267 of this manual.

**NOTE:** It is advisable that a familiar record be carried as a regular part of the serviceman's test equipment.

### b. Indexing and Tripping Test

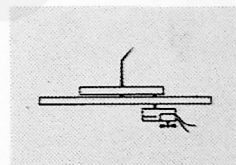
Set the record separator post to the 12" position and place a good 12" record on the turntable. Set the manual-automatic lever to AUT, turn on the motor, and operate the REJECT control. Observe the action of the tone arm. It should rise and travel over to the record, with the needle making contact approximately  $\frac{1}{8}$ " in from its outside edge. After the record has played through, tripping of the mechanism should occur during three or four revolutions of the turntable.

Set the record separator post to the 10" position and, using a 10" record, repeat the procedure.

If the tone arm does not index or trip properly, refer to page 265 of this manual.

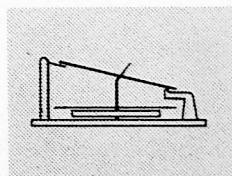
## 3. TURNTABLE AND MOTOR TEST

Set the manual-automatic lever to MAN. Load the turntable with ten 12" records and place the tone arm on the top record. Place a stroboscope disc, such as Philco Part No. 45-2900, on the record, and illuminate the disc with a lamp (preferably a neon bulb) operated on 60-cycle a.c. The dots in the row calibrated for 78 r.p.m. should appear to remain stationary, or drift slowly but smoothly forward or backward. Erratic motion of the dots indicates trouble in the drive mechanism.



If the speed of the turntable is incorrect, refer to page 268 of this manual.

## 4. RECORD-SEPARATOR TEST



Set the record separator post and the support levers to the 12" position and load the changer with ten 12" records. Set the manual-automatic lever to AUT, turn on the motor, and operate the REJECT control. Observe the action of the separator and the motion of the record as it drops. Repeat the operation of the REJECT control to drop each record in turn. The records should be released smoothly, one at a time.

Set the record separator post and the support levers to the 10" position and, using twelve 10" records, repeat the procedure.

If the records do not drop properly, an adjustment of the separator post or an alignment of the spindle may be necessary. Refer to page 267 of this manual.



# SERVICING

**DESCRIPTION OF OPERATING CYCLE**—Power for the motor is supplied from the power line through the ON-OFF switch. The turntable is rim-driven by a rubber-tired idler wheel between the motor shaft and turntable rim. A small gear, cast as part of the turntable at its hub, drives a larger composition gear to furnish power to the main cam of the changer mechanism through a pinion gear. The pinion gear is engaged with the main cam gear through action of the trip mechanism. The changer is so designed that the tone arm and record separator post mechanisms operate by levers in contact with the various surfaces of the main cam. The trip mechanism is operated by a pawl and ratchet assembly and starts the change cycle when the needle travels the eccentric finishing groove of the record. The trip mechanism is locked in a disengaged position when the manual-automatic lever is in MAN position.

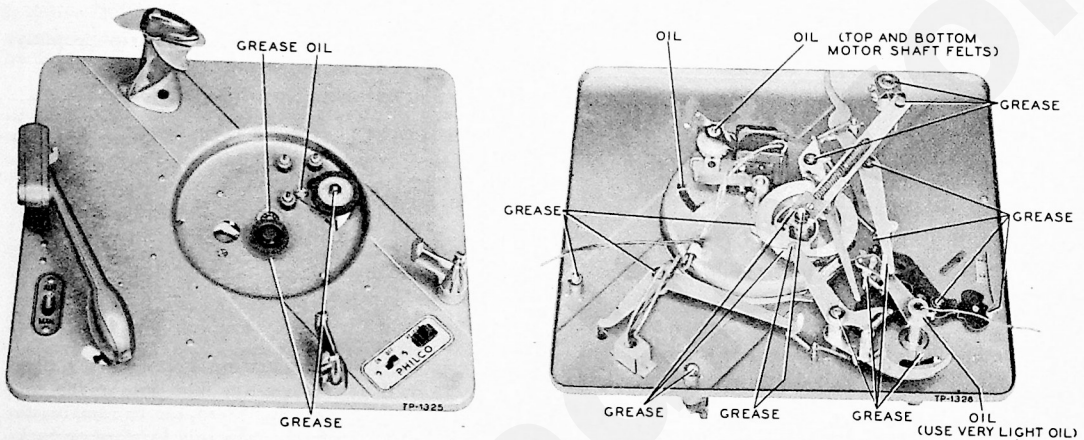


Figure 5. CHANGER LUBRICATION POINTS

**CLEANING AND LUBRICATION** — Cleaning and lubrication of the record changer should be done periodically or when a major part or assembly is replaced. Carbon tetrachloride or other similar cleaning fluid may be used to remove dirt, old oil or grease. All lubrication points are shown in figure 5.

**PARTS NOT TO BE LUBRICATED**—The following parts should not be lubricated at any time:

- Separator
- Trip pawl and ratchet (serrated surface)
- Sliding segment on top of main cam.

**PARTS TO BE GREASED**—Using a light grease of the vaseline type, lubricate the following parts:

- All studs with moving parts attached.
- Elevating lever where it contacts tone-arm lift rod.
- Locating and tone-arm levers where they contact stud on trip arm.
- Detent spring on manual lever.
- Idler-wheel bearing stud.
- Manual lever where it contacts trip-pawl stud in manual position.

- Separator lever (both ends).
- Main cam gear and pinion gear.
- All shafts (except tone-arm shaft).
- Record-separator-post shaft.
- Record supports (under posts).
- Turntable hub and composition drive gear.
- Turntable bearing and ball bearings under turntable.

**PARTS TO BE OILED**—Using a good grade of light machine oil, lubricate the following parts:

- Idler-wheel lever assembly.

**CAUTION:** Do not get oil on rubber tire, if so, remove immediately with carbon tetrachloride.

- Motor-shaft felt oil retainers (top and bottom).
- Tone-arm shaft (use very light oil).

Some parts and assemblies may have to be removed for proper lubrication. The correct procedure for the removal and re-installation of these parts and assemblies will be found in the REPLACEMENT OF PARTS AND ASSEMBLIES section of this manual.

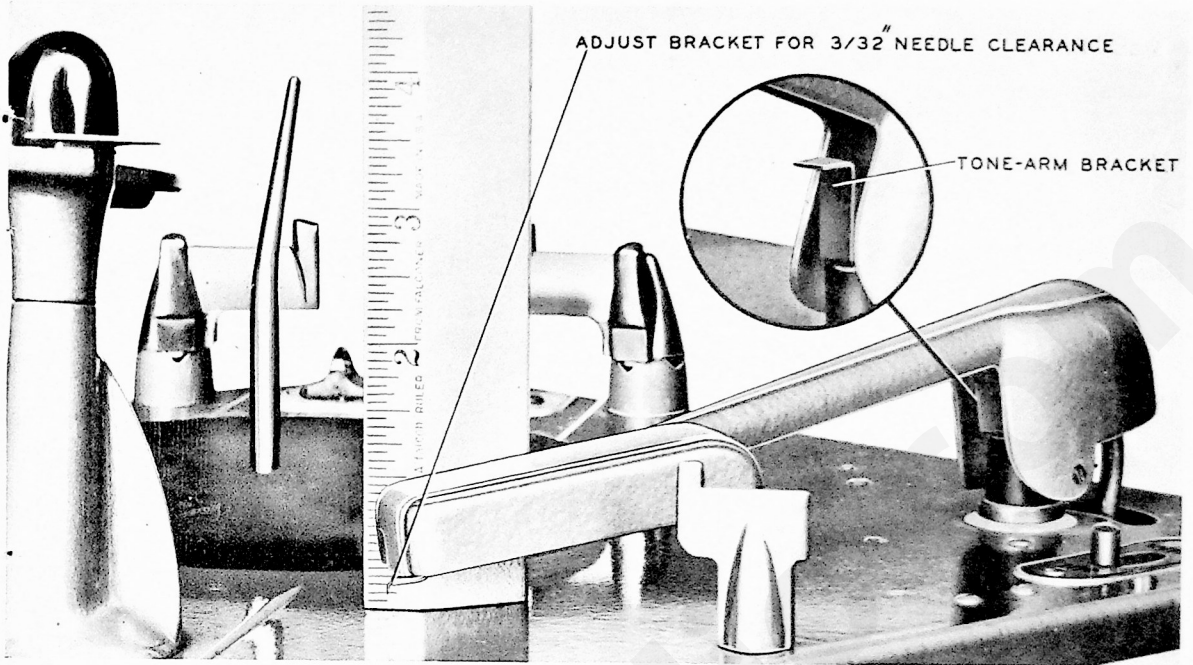


Figure 6. TONE-ARM BASE-PLATE CLEARANCE

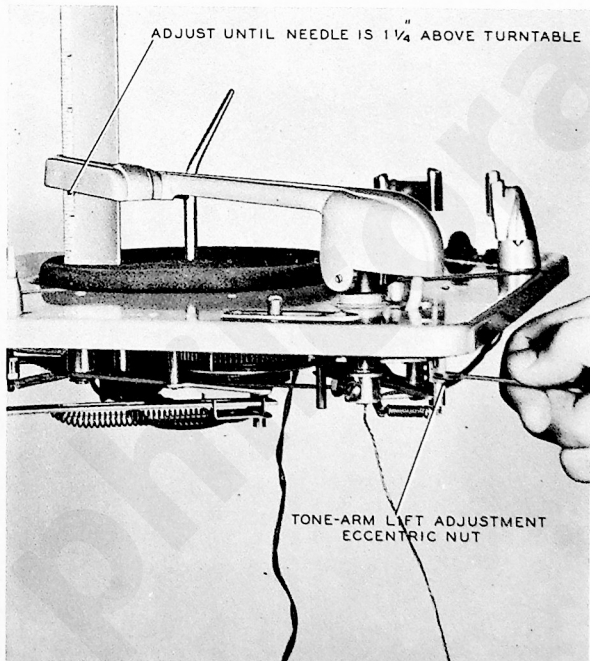


Figure 7. TONE-ARM LIFT ADJUSTMENT

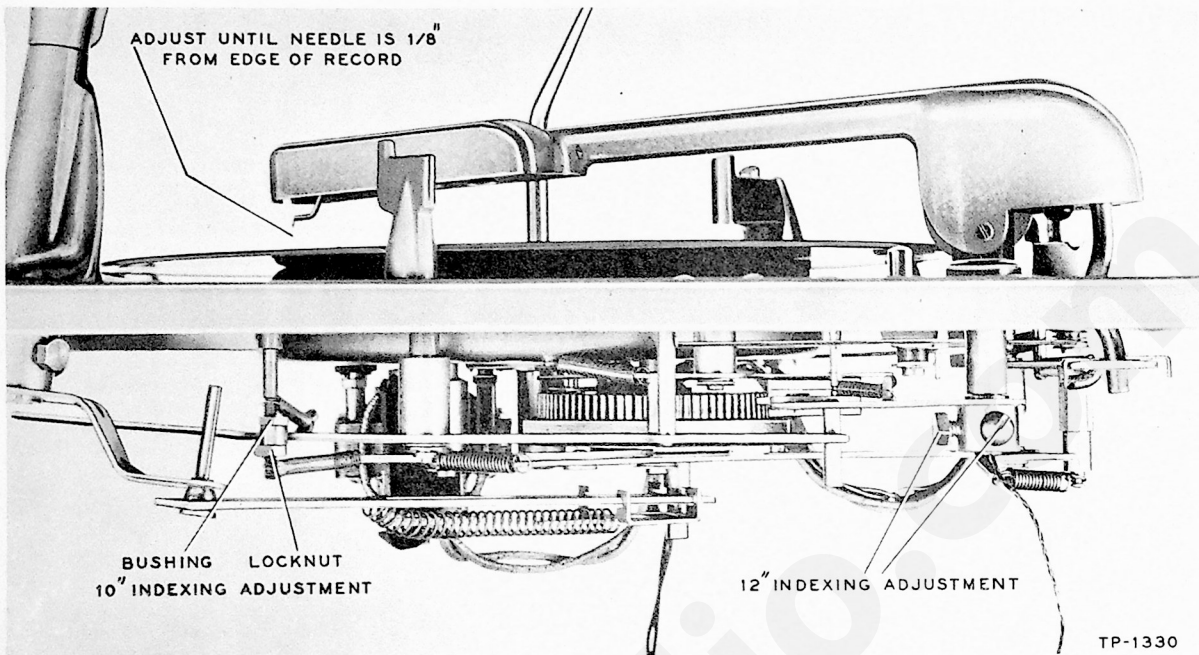
**TONE-ARM BASE-PLATE CLEARANCE** — Without a record on the turntable and the changer out of cycle (playing position), the needle point should clear the changer base plate by  $\frac{3}{32}$ ". To adjust, shape the tone-arm bracket, when necessary, as shown in figure 6.

**TONE-ARM LIFT ADJUSTMENT**—Without using a record, place the changer in automatic position; do not turn the motor on. Bring the tone arm into the center to actuate the trip. Manually revolve the turntable  $1\frac{1}{4}$  turns. At this point, the needle should be  $1\frac{1}{4}$ " above the turntable. Adjustment is made by turning the eccentric nut on the tone-arm elevating assembly, figure 7, until the proper height is obtained.

#### 12" INDEXING ADJUSTMENT

**NOTE:** As the 12" indexing adjustment affects the 10" indexing, any changes made in the 12" adjustment must be followed by an adjustment for 10" indexing. The 12" adjustment must be made first.

With the changer set for 12" operation, place a good 12" record on the changer and cycle the changer. Shut off the motor and stop the turntable when the needle is approximately  $\frac{1}{4}$ " above the record. Loosen the two setscrews (one has a flat end, the other a cone-pointed end) on the trip-lever assembly attached to the tone-arm vertical shaft. See figure 8. Holding the trip lever lightly against the stop, move the tone arm until the needle point is approximately  $\frac{1}{8}$ "



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Figure 8. 12" AND 10" INDEXING ADJUSTMENTS

in from the outer edge of the record. Using a shim to provide .003" to .005" end play of the tone-arm post, first tighten the flat-end setscrew. Cycle the changer a few times to make sure the adjustment is correct; then tighten the cone-pointed setscrew.

**10" INDEXING ADJUSTMENT**—With the changer set for the 10" operation, place a good 10" record on the changer and cycle the changer. Shut off the motor and stop the turntable when the needle is approximately  $\frac{1}{4}$ " above the record. Referring to figure 8, loosen the locknut and turn the eccentric bushing directly above until the needle is approximately  $\frac{1}{8}$ " in from the outside edge of the record. Tighten locknut. Cycle changer a few times to make certain the adjustment is correct.

### TONE-ARM NEEDLE PRESSURE AND VERTICAL FRICTION

With a 2 oz. postal-type scale, similar to Philco Part No. 45-2958, hooked under the front edge of the tone arm, as shown in figure 9, lift the arm while noting the reading; lower the arm, again noting the reading. The difference in these two readings represents the vertical friction; this friction should not exceed  $\frac{3}{16}$  ounce. The reading midway between the two readings taken is the needle pressure. The crystal tone arm should have a needle pressure between 1 and  $1\frac{1}{4}$  ounces. The needle pressure of the dynamic tone arm should be between  $\frac{3}{4}$  and 1 ounce. If the tone arm pivot screw is too tight, excessive friction will result. Loosen lock screw, adjust the pivot screw, and re-tighten the lock screw. If the pivot screw is too loose, trip failure on some records is likely.

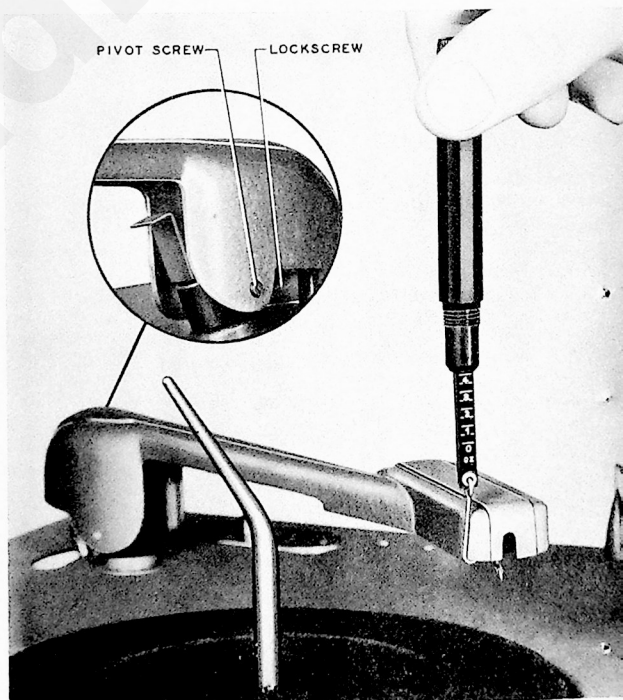


Figure 9. CHECKING TONE-ARM NEEDLE PRESSURE AND VERTICAL FRICTION



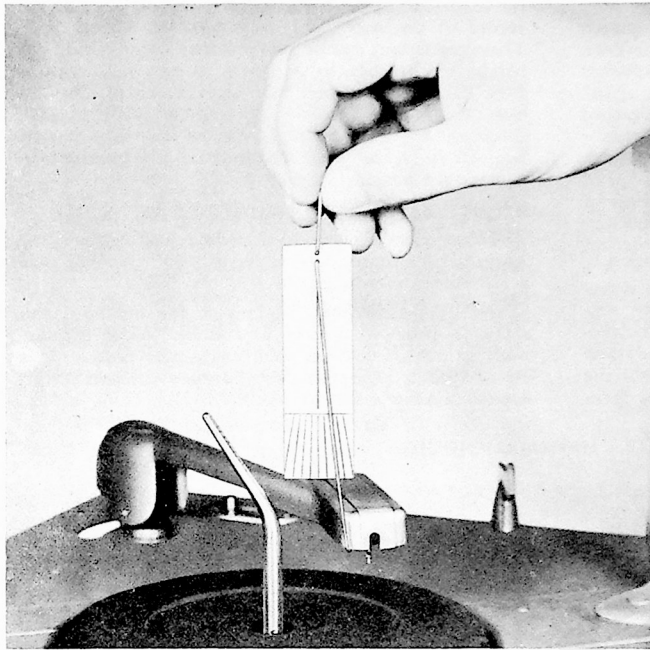


Figure 10. CHECKING TONE-ARM HORIZONTAL FRICTION

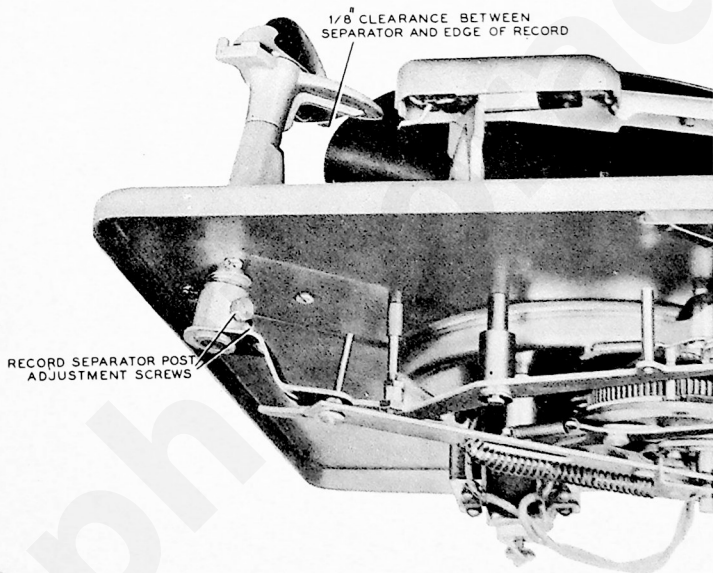


Figure 11. RECORD-SEPARATOR-POST ADJUSTMENT

## TONE-ARM HORIZONTAL FRICTION AND TRIP SENSITIVITY

Set the changer for manual operation, and hook a pendulum scale, Philco Part No. 45-2953, under the front edge of the tone arm, as shown in figure 10. Move the tone arm with scale slowly toward the spindle, and back to the outer edge of the record. The pendulum scale is calibrated in  $\frac{1}{4}$ -ounce divisions, with 0 center. The average of both readings should not exceed  $\frac{1}{8}$  ounce. Unlatch the trip; over the same range the average should not exceed  $\frac{1}{4}$  ounce. With the trip latched, the horizontal reading in the direction toward the spindle should not exceed  $\frac{3}{16}$  ounce. In the reverse direction, the trip should unlatch with a reading not exceeding  $\frac{1}{2}$  ounce. If these specifications are met, many records which may be considered to have defective trip grooves will play and trip satisfactorily.

## PICKUP TEST

### D-10

The D-10 pickup may be checked simply, provided performance of the radio-phonograph is normal in the radio position, by playing a familiar record and listening to the tone quality and volume. If there is no reproduction, check for a short or open circuit in the shielded-wire pickup lead before replacing the pickup unit.

### D-10A

The D-10A pickup may also be checked by the same listening test described for the D-10 pickup, provided radio performance is good and the pre-amplifier checks normal. If there is no reproduction, or if the reproduction is weak or distorted, check for a short or open circuit in the connecting leads and phono input transformer before replacing the pickup unit. The primary of the transformer should measure .1 ohm, and the secondary 7000 ohms.

### D-10 or D-10A

If reproduction with either the D-10 or D-10A pickup is weak, but the leads and transformer check normal, replace the pickup unit as directed under REPLACEMENT OF PARTS AND ASSEMBLIES. If the reproduction is distorted, try a new needle before replacing the pickup unit.

## RECORD-SEPARATOR-POST ADJUSTMENT

There are wide variations in records with respect to outside diameter, size of center hole, and thickness; we urge, therefore, that the record separator post adjustment never be made to any record, unless it has been carefully chosen to meet industry center-line specifications, as follows: For the



10" record—outside diameter,  $9\frac{7}{8}$ "; center hole,  $.286$ "; thickness,  $.080$ "; for the 12" record—outside diameter,  $11\frac{7}{8}$ "; center hole,  $.286$ "; thickness,  $.090$ ". However, with an average record, observations can be made that should indicate a normal adjustment. With a 10" record placed on the separator post and both record supports, and with the record held on the separator post as far as the spindle will permit, the separator blade should not touch the record; the outer edge of the record should rest approximately in the center of the record supports. When held away from the separator base, the distance from the edge of the record to the separator tip should not exceed  $\frac{1}{8}$ ". With a 12" record placed on the separator post and both record supports, and with the record held on the separator post as far as the spindle will permit, the separator blade should not touch the record; the outer edge of the record should rest approximately in the center of the record supports. When held away from

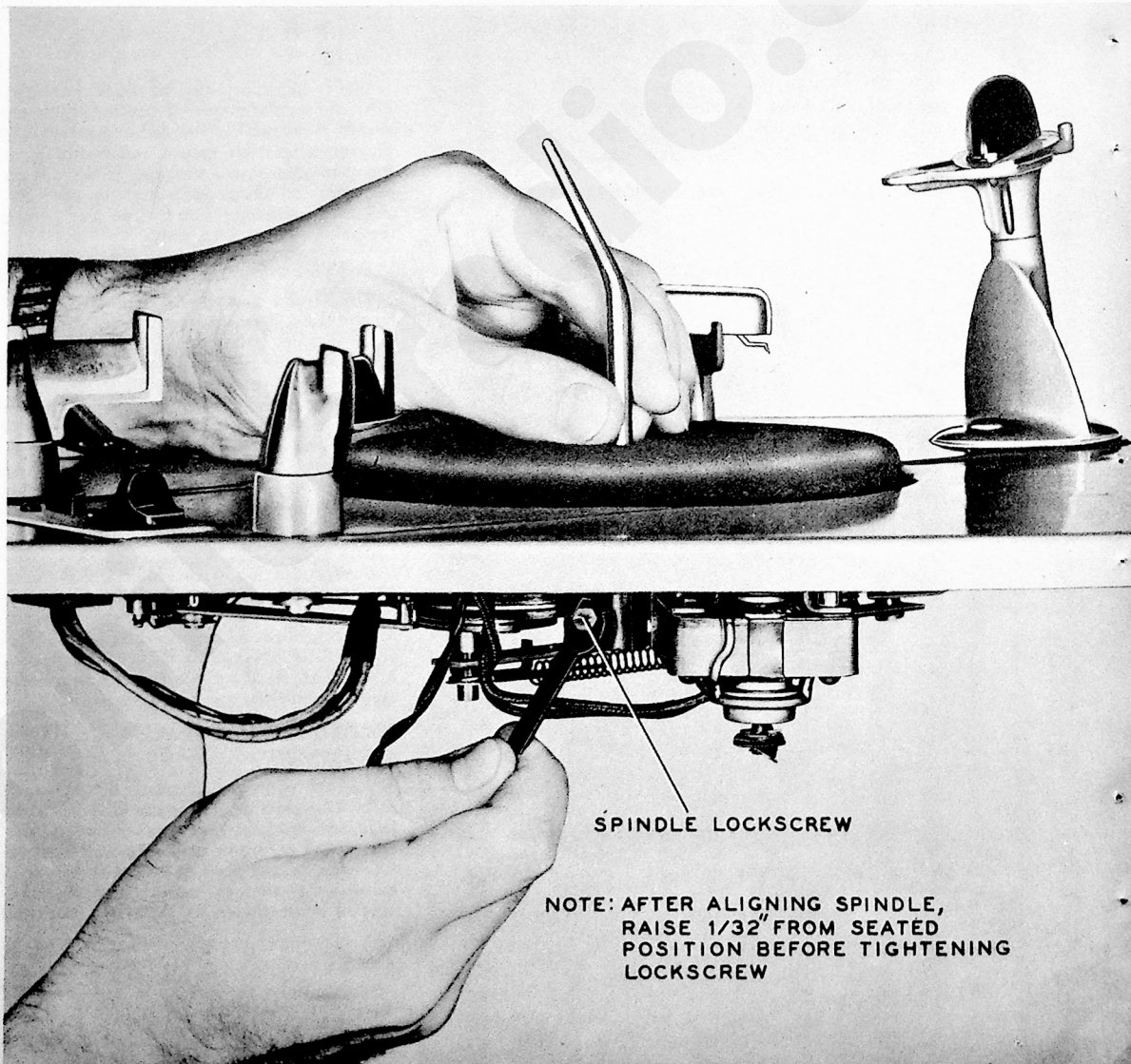
the separator base, the distance from the edge of the record to the separator tip should not exceed  $\frac{1}{16}$ ". These conditions can be met precisely by adjusting the height of the spindle as shown in figure 12. However, the spindle should not be adjusted too low, as binding of the turntable will reduce speed. If the spindle is adjusted too high, the ball bearings may be allowed to escape, and the cleats on the spindle will damage the bottom record.

#### RECORD-SEPARATOR HEIGHT ADJUSTMENT

The changer is adjusted so that the separator blade engages a 10" record at a height of  $.060 \pm .002$ ", and a 12" record at a height of  $.070 \pm .002$ ".

**SPINDLE ALIGNMENT**—Loosen the hex-head set-screw in collar at bottom of spindle. Align spindle, with its top away from record separator post, so that tip of spindle points midway between the two record support levers.

Figure 12. SPINDLE ALIGNMENT



# REPLACEMENT OF PARTS AND ASSEMBLIES

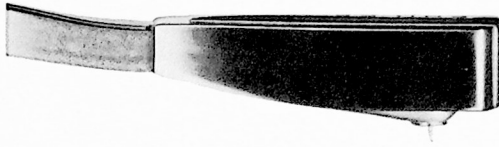


Figure 13. NEEDLE POSITION IN D-10A PICKUP

Whenever a part or assembly is found to be defective, or it becomes necessary to remove parts for lubrication, the following procedures are recommended. The part should be replaced by reversing the order of removal and adjusted according to the directions given in the SERVICING section of this manual. Be certain that the changer is out of cycle (playing position) before removing any parts or assemblies.

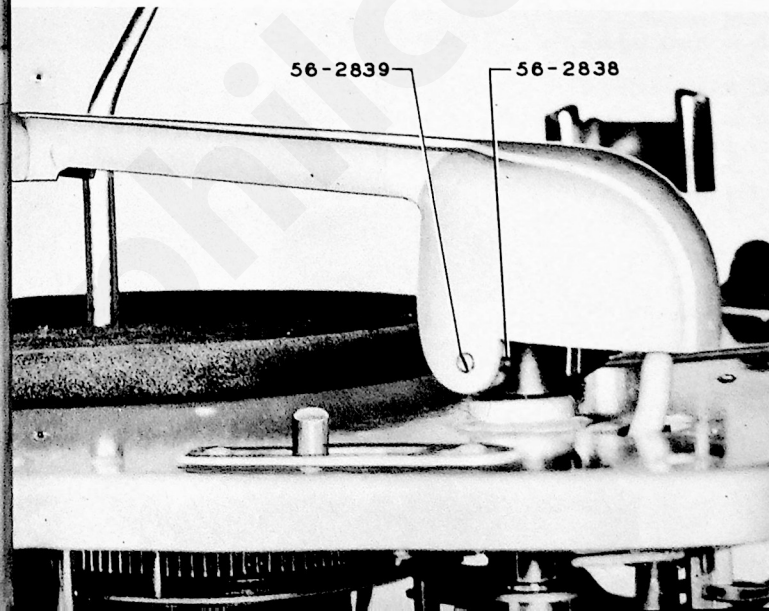
## 1. NEEDLE

- The needle used with the crystal pickup in the D-10 changer may be replaced by loosening the setscrew at the front end of the crystal cartridge.
- The needle used with the D-10A changer should be pulled straight out with the fingers. There are no setscrews or locking devices. When replacing the needle, make sure that the needle is placed so that its bend is in the direction of record rotation. See figure 13. Push the needle in place, using finger pressure only.

## 2. CRYSTAL

- Remove tone arm, by loosening lock screw and pivot screw. See figure 14. It is not necessary to un-

Figure 14. TONE-ARM LOCKSCREW AND PIVOT SCREW



solder the shielded cable, as there is generally enough slack to allow the arm to be turned over.

- Remove the two screws and lockwashers which hold crystal to arm. See figure 15.

- Lift out crystal cartridge and remove two jacks from end, as shown in figure 15.

## 3. DYNAMIC HEAD

- Remove tone arm, by loosening lock screw and pivot screw. See figure 14. It is not necessary to unsolder the shielded cable at the radio, as there is usually enough slack to allow the arm to be turned over.

- Unsolder the wires from the head at points shown in figure 16.

- Remove the bolt holding the head to the arm, and lift off head.

**CAUTION:** Do not place head where it may pick up iron filings or dirt. This head contains a powerful magnet which will attract and hold any small particles of magnetic material, and a delicate mechanism which will be damaged by any foreign material.

## 4. TONE-ARM ASSEMBLY

- Unsolder end of the shielded cable which is soldered directly to a terminal panel in table model sets, and to a plug in floor models.
- Loosen lock screw and pivot screw. See figure 14.
- Lift out tone arm.

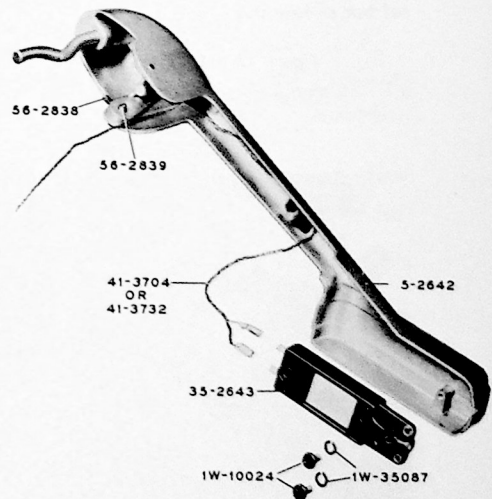


Figure 15. CRYSTAL CARTRIDGE REMOVED

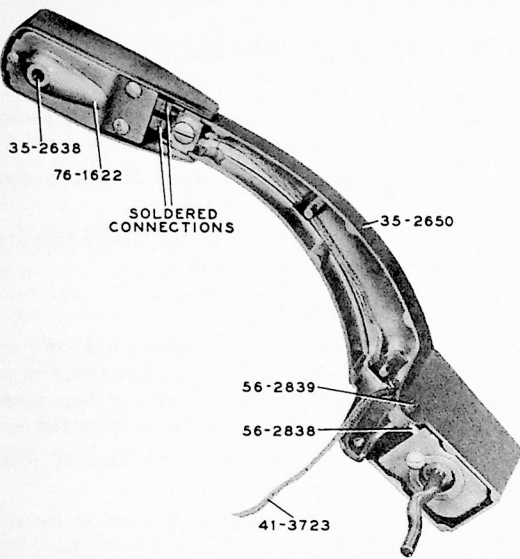


Figure 16. D-10A PICKUP, BOTTOM VIEW

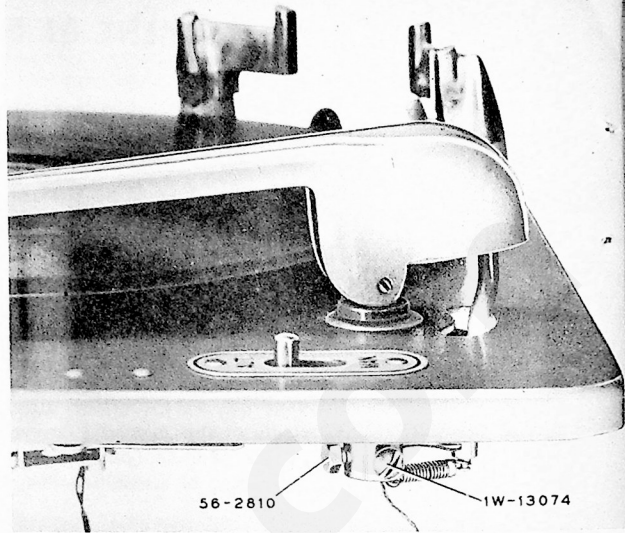


Figure 17. TONE-ARM-POST SETSCREWS

## 5. TONE-ARM AND POST ASSEMBLY

a. Unsolder the end of the shielded cable which is soldered to a terminal panel in table model sets, and to a plug in floor models.

b. Loosen the cadmium-plated and bronze setscrews, figure 17, which hold the trip-lever assembly to the tone-arm post and remove trip-lever assembly.

c. Dress setscrew burrs from tone-arm-post shaft with a fine file to prevent damage to tone-arm bearing bushing. If these are thoroughly removed, the post will pass through the bearing freely.

d. Lift out tone-arm and post assembly, being careful not to lose the single ball bearing on top of bush-

ing. The proper sequence of parts is shown in figure 18.

## 6. TURNTABLE

**CAUTION:** Be careful not to lose the eleven ball bearings and two thrust washers under the turntable gear. To prevent loss of the bearings when removing the turntable and spindle, place hand on container under spindle opening to catch any ball bearings that may fall out. These parts are shown in their proper relationship in figure 19.

a. Loosen setscrew 56-2810 in turntable-bearing bushing 56-2814, figure 20, and lift out spindle.

b. Lift off turntable.

Figure 18. TONE-ARM REMOVAL

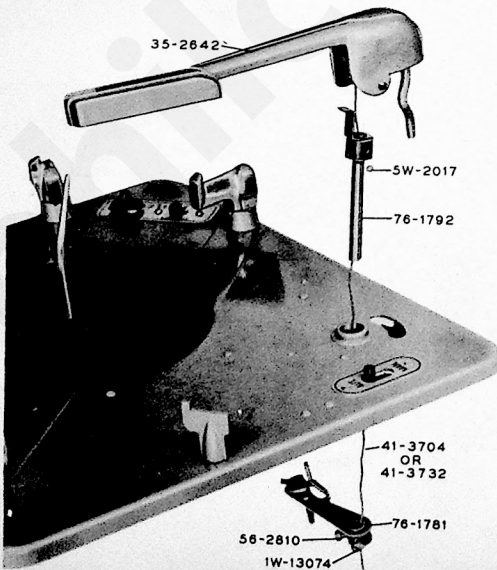
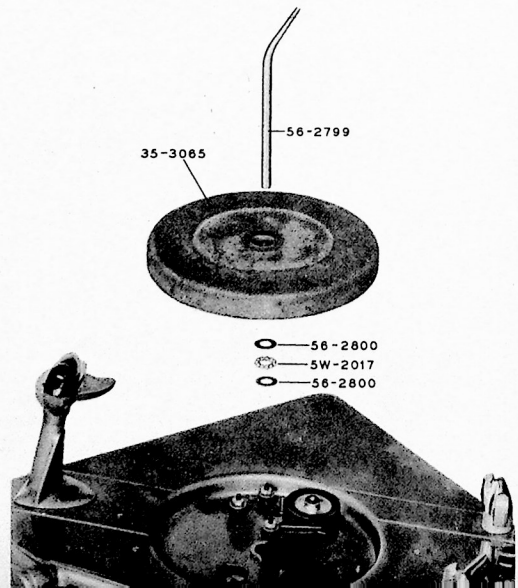


Figure 19. TURNTABLE REMOVAL



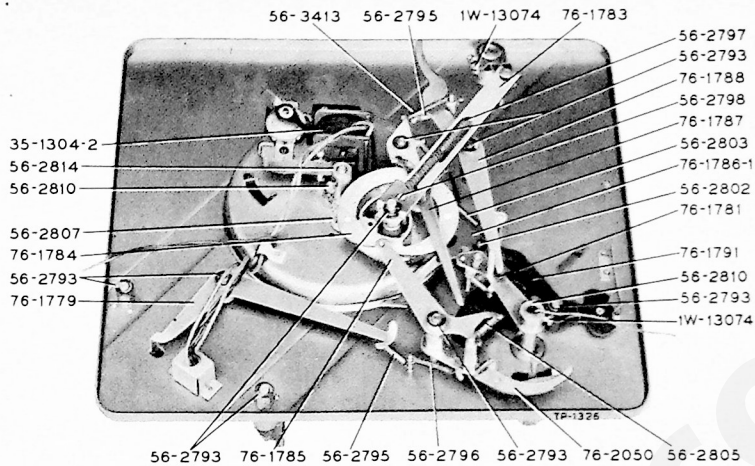


Figure 20. BOTTOM VIEW OF CHANGER

c. Use grease on ball bearings, as directed in the **CLEANING AND LUBRICATION** paragraph of this manual, when replacing bearings. This will hold bearings in place for reassembly and will provide proper lubrication.

d. After replacing turntable, adjust height of spindle, as directed in the **SERVICING** section of this manual.

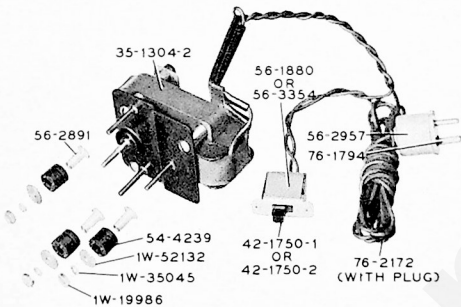


Figure 21. MOTOR REMOVAL

## 7. MOTOR

a. Remove turntable, as directed in paragraph 6.

b. Remove two screws from ON-OFF switch, and remove switch from base plate.

c. Loosen sheet-metal screw from clamp which holds wires against base plate, and lift wires from under clamp.

d. Remove three nuts from motor mounting bolts. Be sure there are three lockwashers, three flat washers, three rubber grommets, and three spacers, as shown in figure 21.

e. Lift out motor.

## 8. IDLER WHEEL

a. Remove turntable, as directed in paragraph 6.

b. Remove "C" washer with long-nose pliers.

c. Remove flat washer and idler wheel. See figure 22. Do not get grease or oil on rubber tire.

## 9. CAM-GEAR DRIVE-GEAR ASSEMBLY

a. Remove turntable, as directed in paragraph 6.

b. Drive out tapered pin in white metal pinion gear 56-2807 under base plate. See figure 20.

c. Remove lower (white metal) and upper (composition) gears.

## 10. SEPARATOR

a. Remove Phillips-head screw from plastic handle.

b. Remove plastic handle and separator. See figure 23.

## 11. SEPARATOR-POST ASSEMBLY

a. Loosen cadmium-plated and bronze setscrews in separator-lever assembly, figure 24, and remove separator lever from separator post.

b. Lift out post. See figure 23.

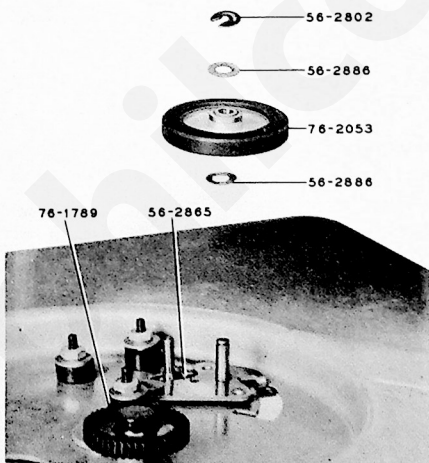


Figure 22. IDLER-WHEEL REMOVAL



## 12. SEPARATOR-LEVER ASSEMBLY

- a. Loosen cadmium-plated and bronze setscrews at separator-post end, figure 24.
- b. Remove "C" washer and flat washer at cam-gear end and lift off lever.

## 13. TONE-ARM ACTUATING-LEVER ASSEMBLY

- a. Remove separator-lever assembly at cam-gear end.
- b. Remove tension spring 56-3413 from stud at short end of tone-arm actuating-lever assembly 76-1787. See figure 20.
- c. Remove "C" washer and flat washer, and lift off lever.

## 14. TONE-ARM LOCATING-LEVER ASSEMBLY

- a. Remove separator-lever assembly at cam-gear end.
- b. Remove tension spring 56-3413 from tone-arm actuating lever 76-1787. See figure 20.
- c. Remove tension spring 56-2795 from tone-arm locating lever 76-1788. See figure 20.
- d. Remove "C" washer and flat washer and lift off lever.

## 15. TONE-ARM ELEVATING-LEVER ASSEMBLY

- a. Remove lower tension spring 56-3414 from lower tone-arm elevating lever 76-1785. See figure 20.
- b. Remove upper tension spring 56-2796 from upper tone-arm elevating lever 76-2050. See figure 20.
- c. Remove "C" washer and flat washer and lift out both levers.

## 16. CAM-GEAR ASSEMBLY

- a. Remove separator-lever assembly at cam-gear end.
- b. Remove lower tension spring from tone-arm elevating levers and move lower tone-arm elevating lever away from cam gear.
- c. Remove tension spring from stud at short end of tone-arm lever.
- d. Remove "C" washer and flat washer from stud holding cam gear.
- e. Lift tone-arm lever over stud on trip-lever assembly and hold away from cam gear with one hand while removing cam gear with the other hand, as shown in figure 25.

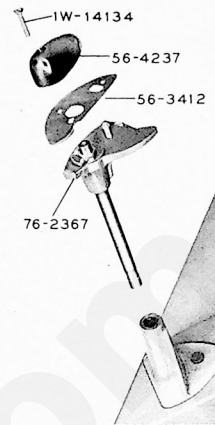


Figure 23.  
SEPARATOR-POST-ASSEMBLY  
REMOVAL

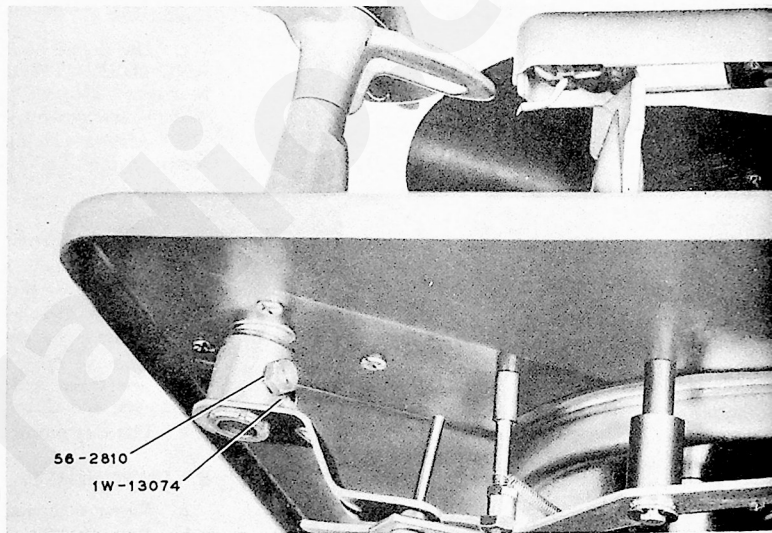
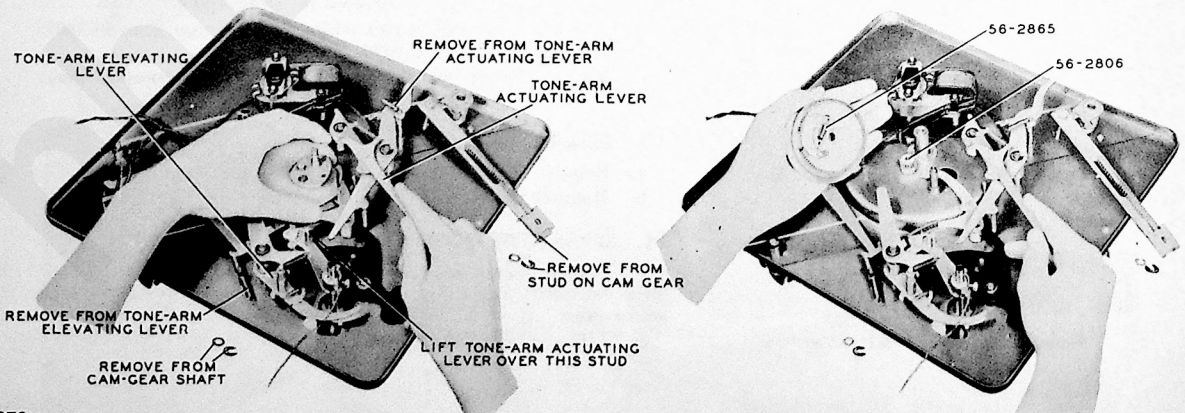


Figure 24. SEPARATOR-LEVER SETSCREWS

Figure 25. CAM-GEAR REMOVAL



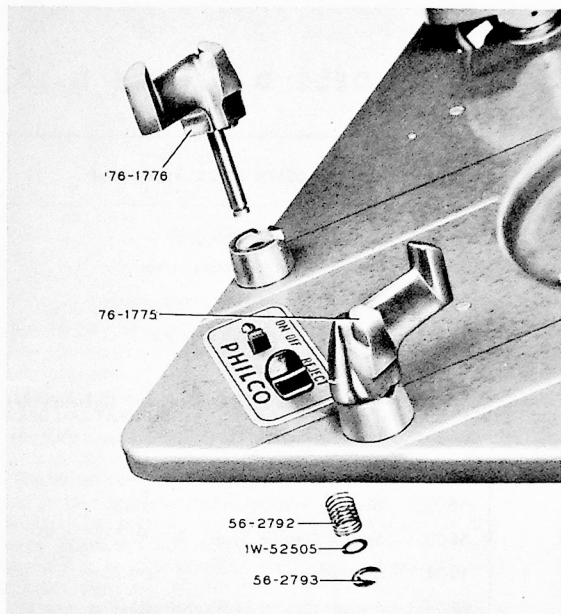


Figure 26. SUPPORT-LEVER REMOVAL

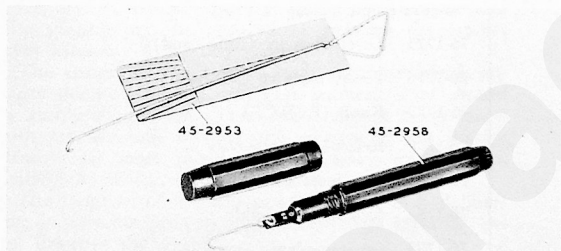


Figure 27. PENDULUM AND 2-OZ. SCALES

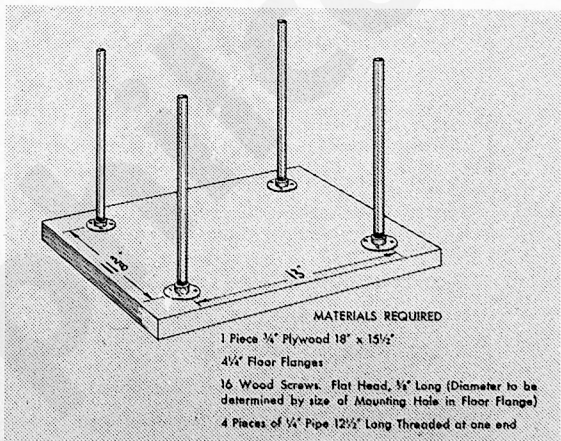


Figure 28. CONSTRUCTION OF STAND FOR SERVICING CHANGER

## 17. RATCHET-LEVER ASSEMBLY

- a. Remove cam-gear assembly, as directed in paragraph 16.
- b. Remove tension spring 56-2803 from ratchet lever 76-1786. See figure 20.
- c. Remove "C" washer and flat washer and lift off assembly.

## 18. MANUAL-LEVER ASSEMBLY

- a. Remove trip-lever assembly, as directed in paragraph 8.
- b. Remove "C" washer and flat washer, and position manual-lever assembly so that it may be removed.

## 19. REJECT-LEVER ASSEMBLY

- a. Pry off REJECT knob.
- b. Remove tension spring 56-2795. See figure 20.
- c. Remove "C" washer and flat washer and lift out lever.

## 20. RECORD-SUPPORT LEVER

- a. Remove "C" washer on under side of base plate with long-nose pliers.
- b. Remove flat washer and spring.
- c. Lift out support lever. Proper relationship of parts for reassembly is shown in figure 26.

## SPECIAL TOOLS

All adjustments and repairs to the Philco D-10 and D-10A changers may be made with the tools usually found in the serviceman's tool kit, and the two scales illustrated in figure 27. The use of these scales is not absolutely necessary, but will aid in determining if there is abnormal binding in the tone arm and tone-arm post.

The pendulum scale, Philco Part No. 45-2953, may be used to measure the horizontal friction or drag of the tone arm.

The 2-oz. scale, Philco Part No. 45-2958, may be used to measure the vertical friction and weight of the tone arm.

When it is necessary to remove the changer from the cabinet to make repairs, a stand similar to the one shown in figure 28 may be used. This stand is constructed from easily obtainable parts, listed in the figure, and is a convenient addition to any repair shop which expects to recondition record changers.

If it is not convenient to construct a stand to support the changer, changer support posts, Philco Part No. 45-2894 (4 required) may be purchased.

# REPLACEMENT PARTS LIST . . MODELS D-10 and D-10A

SERVICE PART NO.	DESCRIPTION
27-6209	Socket, cable plug (D-10A)
35-1304-2	Motor (can be used on either model)
35-2641	Tone-arm assembly (D-10)
35-2642	Tone arm (D-10)
35-2643	Cartridge, pickup (D-10)
35-2648	Tone-arm assembly (D-10A)
35-2650	Tone arm (D-10A)
35-3065	Turntable
35-5077	Plate, base, with mounting studs and name plate
41-3704	Cable, shielded, tone-arm (D-10)
41-3723	Cable, shielded, tone-arm (D-10A)
41-3732	Cable, shielded, tone-arm (double conductor used on a-c and d-c sets)
42-1750-1	Switch, ON-OFF
45-1515	Gear, pinion, assembly*
45-1534	Needle (D-10)—card of 12 needles, 45-1530
45-1552-1	Needle (D-10A)
54-4235	Bumper (record)
54-4236	Knob (REJECT control)
54-4237	Cap, separator
54-4239	Grommet, rubber (motor mounting)
56-1880	Cover (Stackpole switch)
56-2027	Plug (shielded cable D-10)
56-2448	Cover, socket (D-10A)
56-2792	Spring, compression (record-support lever)
56-2793	Washer, "C"
56-2794	Nameplate (ON-OFF—REJECT)
56-2795	Spring, tension (reject lever and locating lever)
56-2796	Spring, tension (upper elevating lever)
56-2797	Spring, compression (separator lever)
56-2798	Slide, separator-lever
56-2799	Spindle, turntable†
56-2800	Washer, bearing (turntable bearings)
56-2801	Washer (ratchet lever)
56-2802	Washer, "C" (ratchet lever and drive wheel)
56-2803	Spring, tension (ratchet lever)
56-2805	Spring, tension (lower elevating lever)
56-2806	Pin, pinion (pinion gear)
56-2807	See 45-1515
56-2809	Nameplate (AUT-MAN)

SERVICE PART NO.	DESCRIPTION (Continued)
56-2810	Setscrew (hex head)
56-2823	Spring, detent (manual lever)
56-2838	Screw, pivot-locking (tone arm)
56-2839	Screw, pivot-point (tone arm)
56-2851	Spring (trip pawl)
56-2865	Spring, tension (idler wheel and segment gear)
56-2891	Bushing (motor mounting)
56-2957	Cover (a-c plug)
56-3023	Bushing, eccentric (10" indexing)
56-3074	Spring (feed-in lever)
56-3412	Separator
56-3413	Spring, tension (tone-arm actuating lever)
56-3414	Spring, tension (tone-arm elevating lever)
76-1622-1	Unit, pickup (D10-A)
76-1775	Lever, support (right-hand)
76-1776	Lever, support (left-hand)
76-1777	Knob (REJECT)
76-1779	Reject-lever assembly
76-1781	Trip-lever assembly
76-1782	Separator assembly
76-1783	Separator-lever assembly
76-1784	Cam assembly
76-1785	Tone-arm elevating-lever assembly (lower)
76-1786-1	Ratchet-lever assembly †
76-1787	Tone-arm actuating-lever assembly
76-1788	Tone-arm locating-lever assembly
76-1789	Fibre Gear Assembly
76-1791	Manual-lever assembly
76-1792	Tone-arm shaft assembly
76-1794	Plug (a-c)
76-2050	Tone-arm elevating-lever assembly (upper)
76-2053	Wheel, idler
76-2172	Cable, a-c (with plug)
76-2252	Stud and lever assembly (idler wheel)
1W-14134	Screw, Phillips-head (separator cap)
5W-2017	Bearing, ball (turntable and tone-arm)

\*Pinion gear assembly 45-1515 consists of fibre gear assembly 76-1789 with matched pinion gear and pinion pin 56-2806.

†Refer to GENERAL INFORMATION ON D-10 AND D-10A RECORD CHANGERS.



## GENERAL INFORMATION ON D-10 AND D-10A CHANGERS

Erratic tripping may be caused by grease accidentally applied to the pawl. Visual inspection should reveal this condition. Clean with carbon tetrachloride. Do not lubricate.

Loose tone-arm pivot screws or loose staking may cause trip trouble; any play in the tone-arm mounting assembly can be felt. Do not tighten screws enough to cause excess vertical friction.

Burrs on the pawl or trip-lever assembly may prevent the proper motion of the pawl. This trouble may be detected by pressing the pawl down against the trip-lever assembly and rotating the pawl, to determine whether it is smooth. Remove burrs and smooth with crocus cloth.

Improper tripping will result if the spacing between the pawl and the "washboard" on the ratchet lever is too great. The pawl should just clear the washboard when the AUT-MAN lever is in the manual position. The spacing may be reduced by twisting the ratchet lever assembly (76-1786) slightly.

The corner of the ratchet lever assembly which engages the stud on the cam gear segment lever should be absolutely smooth. This corner should be polished with crocus cloth just enough to remove die marks. Remove no more metal than necessary, and do not destroy the sharpness of the corner.

The loose fit of the trip pawl on its rivet is deliberate; it prevents pre-tripping on off-center records. Do not improve the fit.

There is considerable variation in the characteristics of eccentric grooves on records. It is quite possible for the groove to be less eccentric than the amount required for proper trip action. The minimum eccentricity for proper operation is  $3/32$ ".

### CORRECTING PRE-TRIPPING

The playing groove in many records is sufficiently eccentric to cause pre-tripping. The changer may be made to play these records by cutting  $3/8$ " off the washboard. The changer will then trip satisfactorily, except when the eccentric groove is farther than 2 inches from the spindle; this condition is found on very few records.

If it is not desirable to make this correction, the new-type ratchet lever assembly (see next paragraph) may be installed.

### NEW RATCHET LEVER ASSEMBLY

A new ratchet lever assembly, designed to provide freedom from pre-tripping, has been developed. This new ratchet lever assembly, 76-1786-1, having a small washboard, should be used in place of the old assembly, 76-1786. The new assembly may be substituted for the old-style assembly, to correct pre-tripping.

### IMPROVED BALL RACE AND SPINDLE

The new spindle, 56-2799-1, with which the spindle height is more readily adjusted, is an improvement on the early type of spindle; the small cleats on the end have been removed.

The improved ball bearing assembly, 76-3164, is used in place of the separate balls, to prevent the balls from becoming disengaged when the turntable is raised. When the original spindle is replaced with the new-type spindle, the new bearing assembly should be installed. These new parts are incorporated in all D-10 and D-10A changers after Serial No. 241400.

### BREAKING OF FIBRE GEARS

Sometimes when a set is unpacked, the turntable is found to be stuck. If force is applied to the turntable, by hand, to correct the binding, the fibre gear, 76-1789, may be broken. In any case of binding, the correct procedure is to find the cause. Sometimes the upper tone-arm elevating lever, 76-1785 (see figure 20) changes position during shipment, causing the cam follower to jam inside the cam gear, 76-1784. Shifting of the upper tone-arm elevating lever can also cause the lower tone-arm elevating lever, 76-2050, to shift, and to become jammed between the changer base plate and the cabinet.

If a binding condition is encountered, inspect the mechanism and correct any binding of the levers and studs involved.