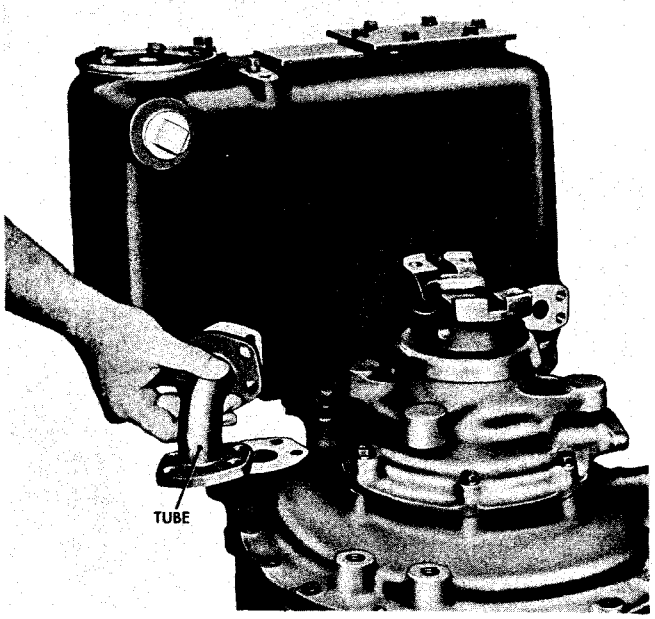


Fig VI-74. Removing or installing output driven oil pump suction tube

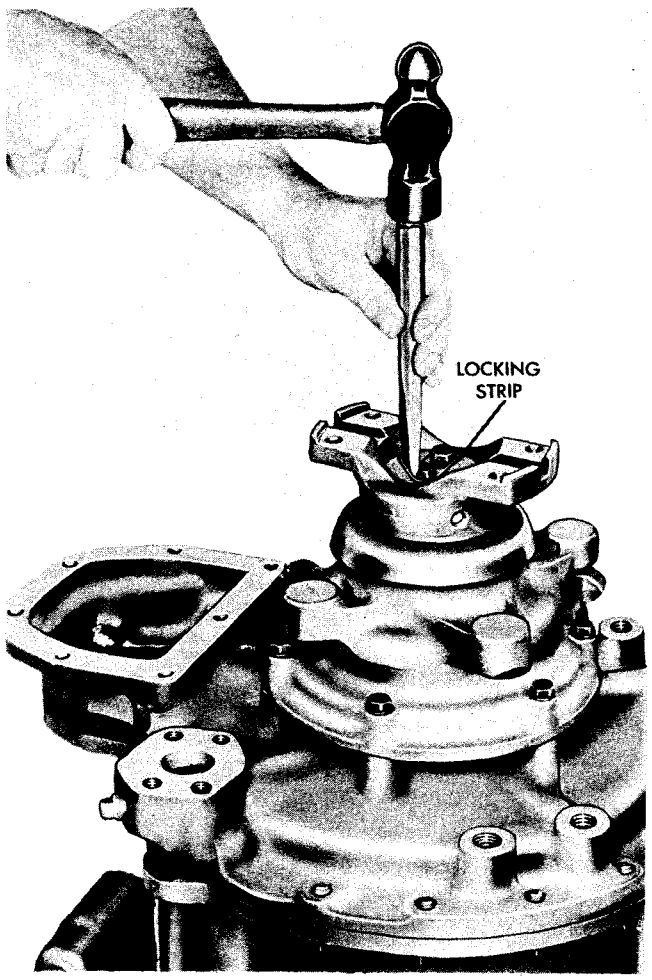


Fig VI-75. Using a hammer and a chisel to bend down ears of locking strip

oil sump to the adapter. Remove the oil sump and gasket (fig VI-83).

c. REMOVING FLANGE, BEARING RETAINER, OUTPUT DRIVEN OIL PUMP ASSEMBLY, ADAPTER, AND OUTPUT SHAFT

(1) Using a hammer and a chisel, bend down the ears of the locking strip (fig VI-75). Remove the two bolts, locking strip, retaining washer and output flange.

(2) If the transmission has a speedometer drive, remove two bolts and lock washers and remove the sleeve (54, fig XIII-1), gasket (53), seal (52), washer (51), and shaft (50).

(3) Remove the bolts that secure the bearing retainer to the adapter. Remove the retainer (fig VI-82). If the transmission has a speedometer drive, do not remove the speedometer drive shaft bushing from the retainer unless replacement is necessary.

(4) Remove the spacer (fig VI-76). If the transmission has a speedometer drive, the speedometer drive gear replaces this spacer.

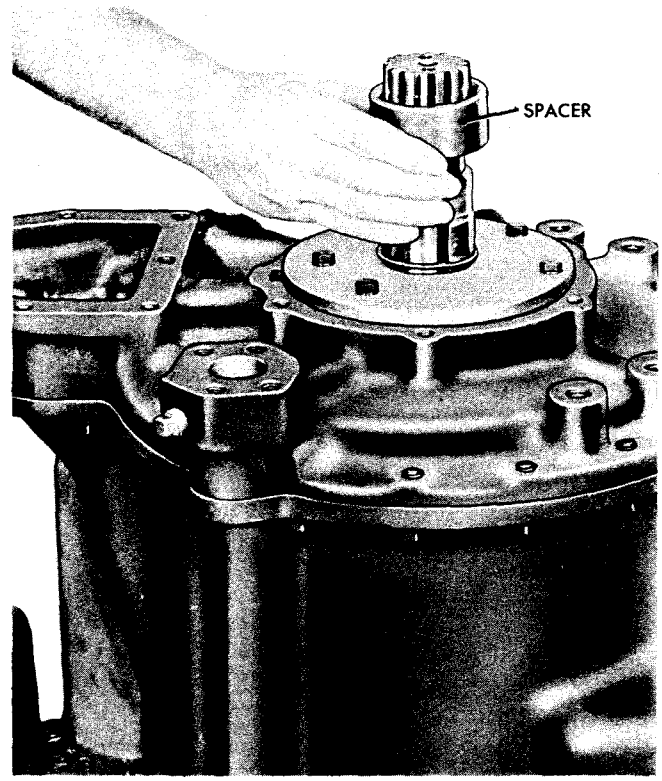


Fig VI-76. Removing or installing spacer

(5) Remove the snap ring from the output shaft (fig VI-77).

(6) The transmission may not be equipped with an output driven oil pump assembly. In this case remove the bolts and lock washers from the spacer that takes the place of the output driven oil pump assembly (fig VI-77). Remove the spacer.

(7) If the transmission is equipped with an output driven oil pump, remove the oil pump body (fig VI-78). Remove the oil pump gears (fig VI-78). Remove the oil pump cover (fig VI-81).

(8) Remove the bolts that secure the sump adapter to the transmission housing. Remove the adapter (fig VI-80).

(9) Remove the output shaft (fig VI-79).

6. ASSEMBLY OF MODEL CRT-3330-3 TRANSMISSION

a. BASIC SIMILARITIES. The Model CRT-3330-3 transmission is assembled as

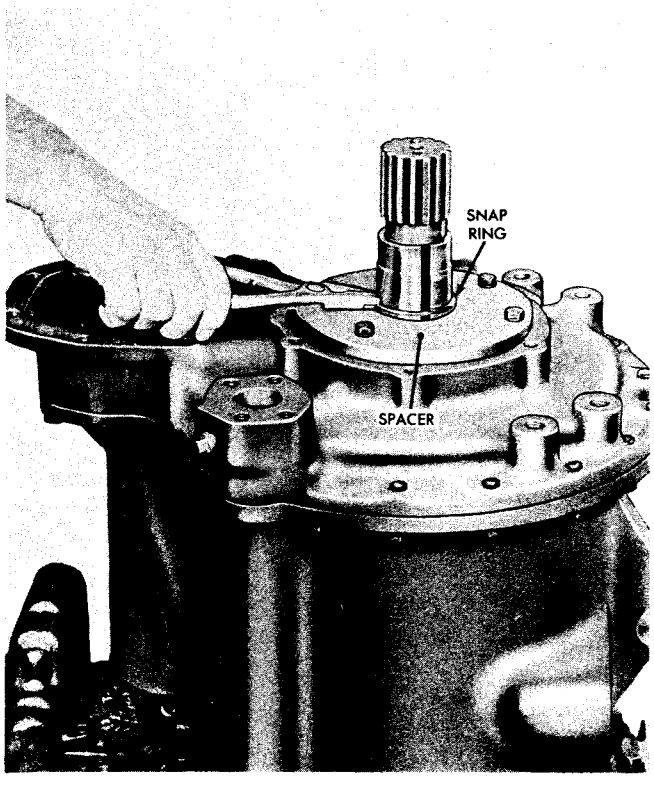


Fig VI-77. Removing or installing snap ring from output shaft

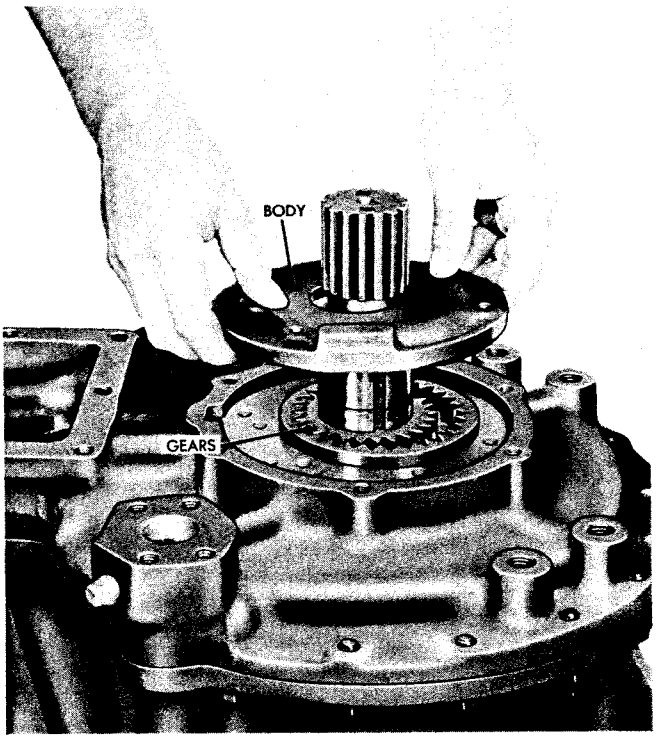


Fig VI-78. Removing or installing output oil pump body

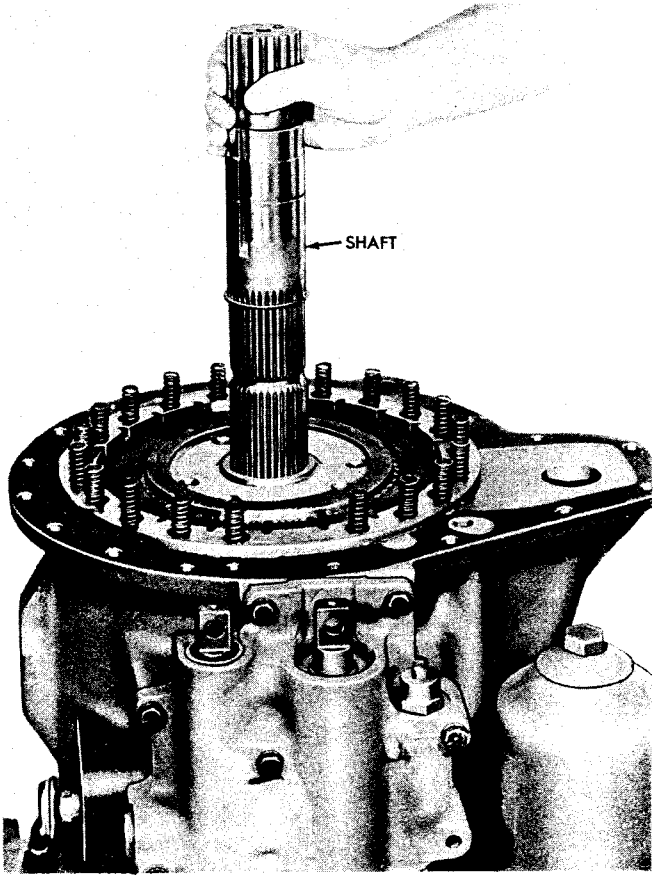


Fig VI-79. Removing or installing output shaft

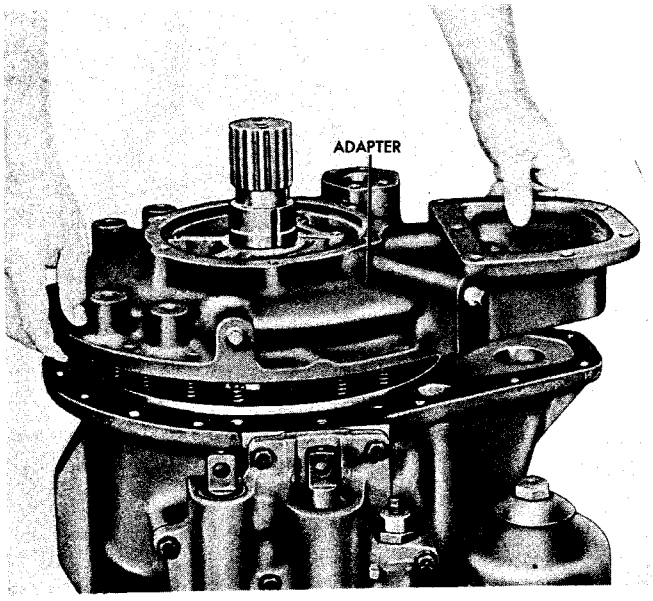


Fig VI-80. Removing or installing adapter

outlined in section VI, paragraph 4 with the exception of the installation of the oil sump adapter, oil sump, and related parts, which is outlined in b and c below.

b. INSTALLING OUTPUT SHAFT, OIL SUMP ADAPTER, OUTPUT DRIVEN OIL PUMP ASSEMBLY, BEARING RETAINER, AND FLANGE

(1) Install the output shaft (fig VI-79). The snap ring on the shaft should seat against the low-range planetary carrier.

(2) Install the adapter on the transmission housing (fig VI-80). Install the bolts and lock washers through the transmission housing into the adapter.

(3) Install the spacer that takes the place of the oil pump assembly if the transmission is so equipped (fig VI-77). Secure the spacer with five bolts and lock washers.

(4) If the transmission is equipped with an output driven oil pump, install the oil pump cover (fig VI-81). Install the oil pump gears

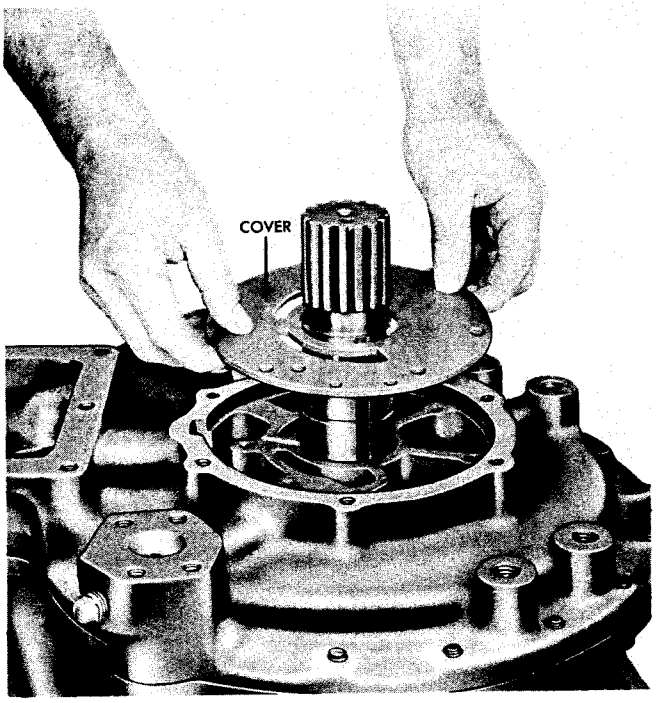


Fig VI-81. Removing or installing oil pump cover

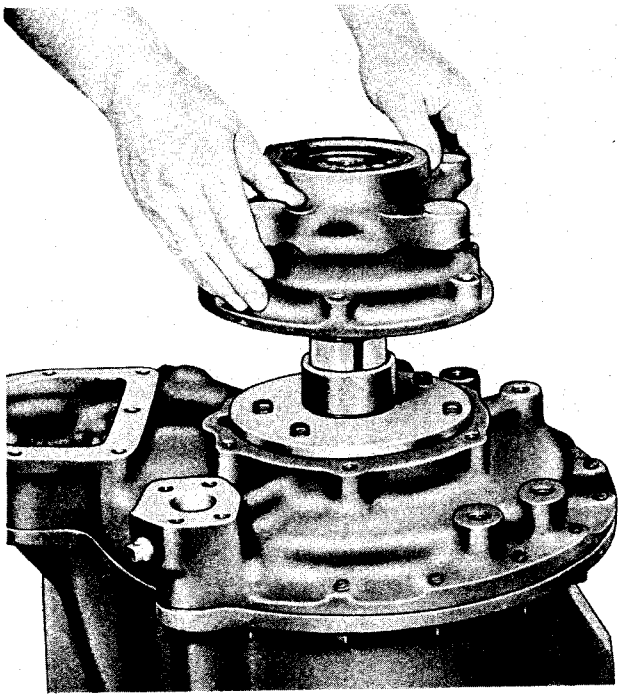


Fig VI-82. Removing or installing bearing retainer

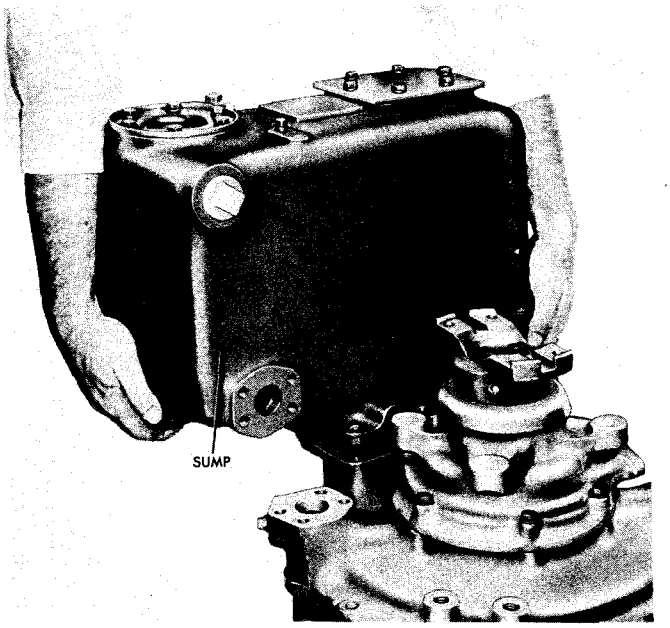


Fig VI-83. Removing or installing oil sump

(fig VI-78). Install the oil pump body (fig VI-78). Secure the cover with five bolts and lock washers.

(5) Install the snap ring on the output shaft (fig VI-77).

(6) Install the spacer on the output shaft (fig VI-76). If the transmission has a speedometer drive, the speedometer drive gear replaces this spacer.

(7) Install the bearing retainer (fig VI-82). Install the bolts and lock washers that secure the bearing retainer to the adapter.

(8) If the transmission has a speedometer drive, install as an assembly the shaft (50, fig XIII-1), washer (51), seal (52), gasket (53), and sleeve (54) into the retainer.

(9) Install the output flange, the retaining washer, the locking strip and two bolts. Bend the ears of the locking strip around the bolt heads.

c. INSTALLING OIL SUMP, OUTPUT DRIVEN OIL PUMP SUCTION TUBE AND OIL DRAIN TUBE

(1) Install the oil sump and gasket (fig VI-83). Install the bolts and lock washers that secure the oil sump to the adapter.

(2) Install the oil pump suction tube and gaskets (fig VI-74). Install the bolts and lock washers that secure the suction tube to the oil sump and the adapter.

(3) Install the oil drain tube and gaskets (fig VI-73). Install the bolts and lock washers that secure the oil drain tube to the oil sump, the selector valve body assembly and the input pressure and scavenge oil pump assembly.

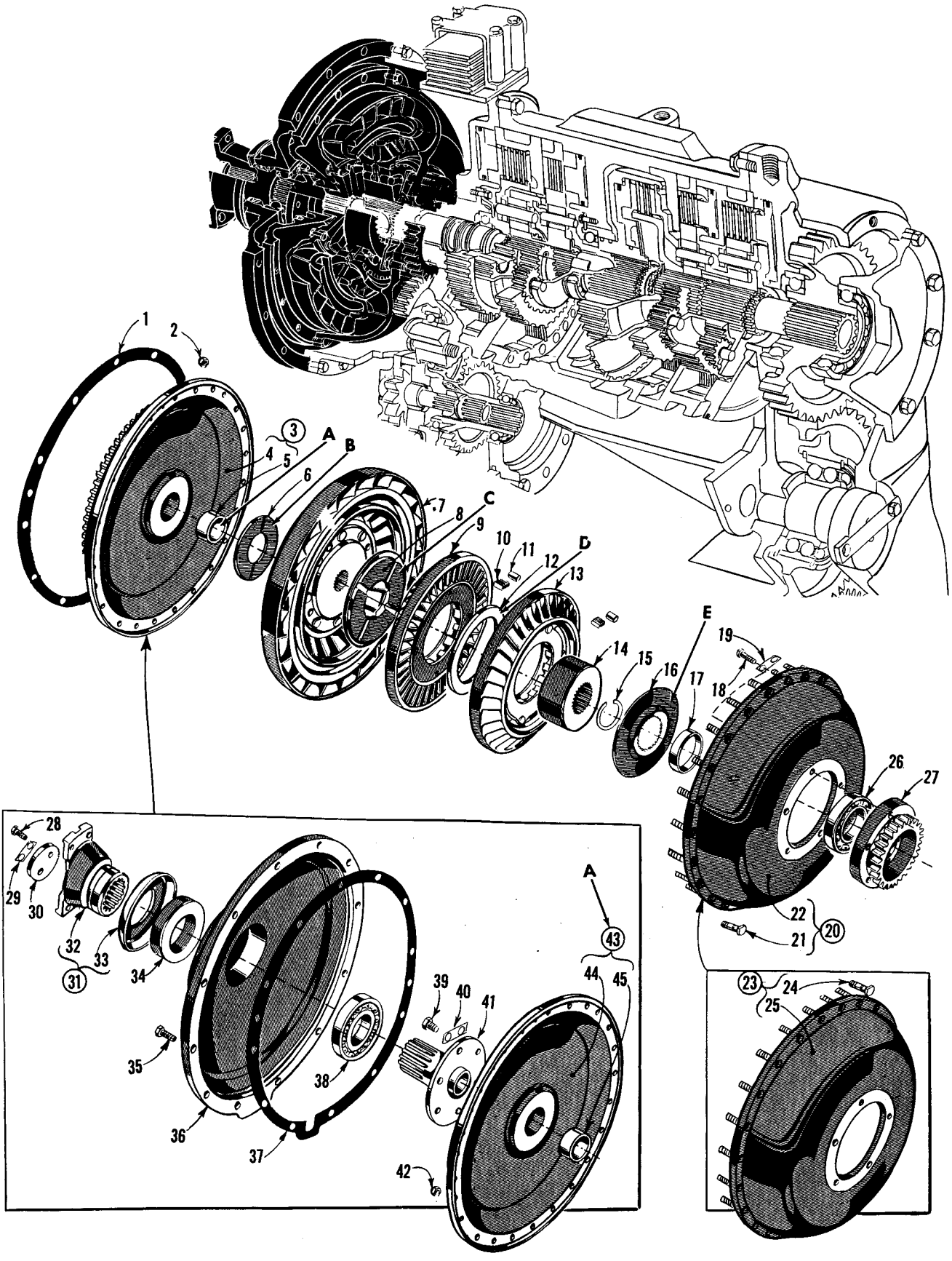


Fig VII-1. Torque converter group, exploded view

SECTION VII TORQUE CONVERTER GROUP REBUILD

1. CONVERTER PUMP COVER (FIG VII-1)

a. DISASSEMBLY. Remove bushing (5) from cover (4) only if replacement is necessary. When replacing, cut the bushing out of the cover. Be careful not to damage the bore in the cover.

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, e, g, h, and j for cleaning and inspection procedures, and paragraph 6 for wear limits information.

c. ASSEMBLY. If the bushing was removed, install the new bushing. Refer to section VI, paragraph 4j (13) for assembly of the pump cover into the transmission.

2. TRANSMISSION FRONT COVER

a. DISASSEMBLY (FIG VII-1)

(1) Remove bearing assembly (38) from converter drive shaft (41).

(2) Remove the six bolts and locking strips from the converter drive shaft. Remove the converter drive shaft.

(3) Remove oil seal (34) from the transmission front cover only if replacement is

---

1 - Converter pump cover gasket
2 - Nut
3 - Converter pump cover assembly
4 - Converter pump cover
5 - Bushing
6 - Washer
7 - Turbine
8 - Stator thrust washer
9 - First stator
10 - Freewheel roller spring
11 - Freewheel roller
12 - Spacing washer
13 - Second stator
14 - Freewheel race
15 - External snap ring
16 - Stator spacer
17 - Pump spacer
18 - Bolt — 1/2" - 20 x 1 1/4"
19 - Locking strip
20 - Converter pump assembly (TC-320 Converter performance)
21 - Bolt - 5/16" - 24 x 1.30" long
*22 - Converter pump
23 - Converter pump assembly (TC-370 Converter performance)
24 - Bolt — 5/16" - 24 x 1.30" long
*25 - Converter pump
26 - Double row ball bearing assembly
27 - Input accessory drive gear
28 - Hexagon head bolt — 3/8" - 24 x 1 1/8"
29 - Locking strip
30 - Flange retainer washer
31 - Flange assembly — Mechanics 6C
*32 - Flange
33 - Dust shield
34 - Seal
35 - Hexagon head bolt — 3/8" - 24 x 1 1/2" long
36 - Transmission front cover
37 - Transmission front cover gasket
38 - Single row ball bearing assembly
39 - Hexagon head bolt — 1/2" - 13 x 1 1/8"
40 - Locking strip
41 - Converter drive shaft
42 - Hexagon lock nut — 5/16" - 24
43 - Converter pump cover assembly
*44 - Converter pump cover
45 - Bushing

A - Cover bushing bore point of measurement for wear limit (See Wear Limits Chart)
B - Washer thickness point of measurement for wear limit (See Wear Limits Chart)
C - Washer thickness point of measurement for wear limit (See Wear Limits Chart)
D - Washer thickness point of measurement for wear limit (See Wear Limits Chart)
E - Washer thickness point of measurement for wear limit (See Wear Limits Chart)

*Serviced in assembly only — not as a detail part.

Fig VII-1. Torque converter group, exploded view, legend

necessary When replacing, press the oil seal from the cover.

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, c, d, e, f, h, and j for cleaning and inspection procedures.

c. ASSEMBLY

(1) Press a new oil seal into the transmission front cover if the seal was removed.

(2) Install the converter drive shaft on the converter pump cover and install six bolts and locking strips. Bend up the tabs of the locking strips to secure the bolts.

(3) Press the bearing assembly on the converter drive shaft. Refer to section VI, paragraph 4j (13) and (14) for assembly procedures.

3. CONVERTER PUMP

a. DISASSEMBLY (FIG VII-1)

(1) Remove six bolts (18) and three locking strips (19) from the converter pump (20).

(2) Remove input accessory drive gear (27) and double row ball bearing assembly (26) from the converter pump.

(3) Press the double row ball bearing assembly from the input accessory drive gear.

b. CLEANING, INSPECTION, AND WEAR LIMITS. Refer to section IV, paragraphs 5b, c, d, e, f, and i for cleaning and inspection procedures.

c. ASSEMBLY

(1) Press the double row ball bearing assembly (26, fig VII-1) in the input accessory drive gear (27, fig VII-1).

(2) Install the input accessory drive gear and double row ball bearing on the converter pump.

NOTE

If a converter housing seal diaphragm (70), figure VIII-1, is used, install seal ring (72), figure VIII-1 in the groove on the accessory drive gear.

(3) Install six bolts and three locking strips in the converter pump. Bend the corners of the locking strips to lock the bolts. Refer to section VI, paragraph 4j (1) for assembly procedures.

4. CONVERTER STATORS

a. DISASSEMBLY (FIG VII-1)

(1) If the rolls of shim stock which were used to retain the rollers during disassembly of the converter are still in the bores of the stator assemblies, remove them and remove rollers (11) and springs (10).

b. CLEANING, INSPECTION, AND WEAR LIMITS

(1) Refer to section IV, paragraphs 5b, e, g, and j for cleaning and inspection procedures.

(2) Do not remove the rivets from the stator assemblies. If any part of a stator assembly is worn or damaged, the assembly must be replaced.

(3) Inspect the roller ramps on each stator cam for wear, pits and scores. If one of these conditions is found, the stator assembly should be replaced.

(4) Inspect the stator blades for dents, nicks and burrs. If such defects are found, remove them with a fine file and smooth stone. If there are dents that can not be removed with a file or if there are cracks, replace the stator assembly.

(5) Inspect the freewheel rollers for nicks, burrs, excessive wear, and signs of galling. If these conditions cannot be corrected with crocus cloth, replace the rollers.

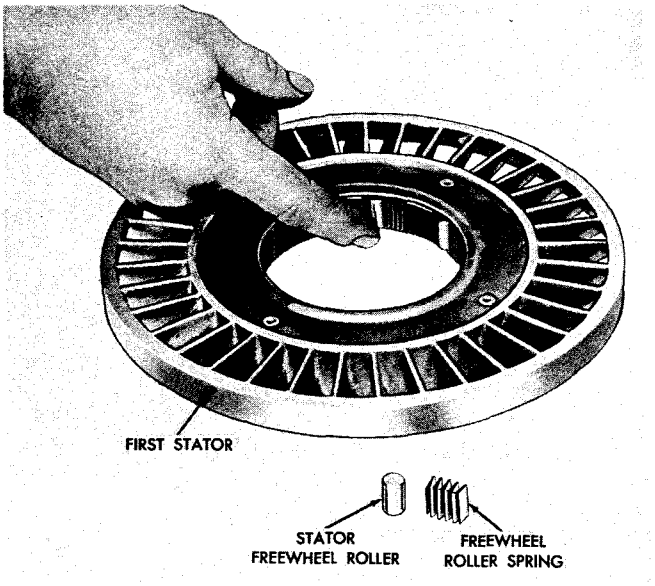


Fig VII-2. Installing stator rollers and springs in stator

(6) Inspect the freewheel roller springs for distortion. Replace them if they are distorted.

(7) Make sure the freewheel rollers do not bind or drag in the roller slots.

(8) Inspect the thrust washers (6), (8), (12), and freewheel race (14), figure VII-1.

c. ASSEMBLY

(1) Be sure to note which end of the cam pocket in the cam ring is the shallowest. Place a quantity of good quality, mineral base, heavy grease in each pocket of the cam. The grease retains the freewheel roller and the freewheel roller spring in the cam pocket before assembly on the freewheel roller race.

(2) Place a roller in the shallowest part of a cam pocket Place a spring in the deepest part of the cam pocket, making certain it is all the way back in the cam pocket (open ends of the spring when installed should be toward the bore in the stator). It might be necessary to hold the roller in position with a finger or the flat side of a small screw driver while pushing the spring into position (fig VII-2).

(3) Install the other seven rollers and springs in the same manner. Refer to section VI, paragraph 4j (6) through (9) for assembly procedures. See figure VII-3.

5. CONVERTER TURBINE

a. REPLACING TURBINE. The turbine assembly is a riveted assembly consisting of a hub, turbine and rivets. If one of these parts needs replacing, replace the entire assembly.

b. CLEANING AND INSPECTION. Refer to section IV, paragraph 5b, e, and j for cleaning and inspection procedures.

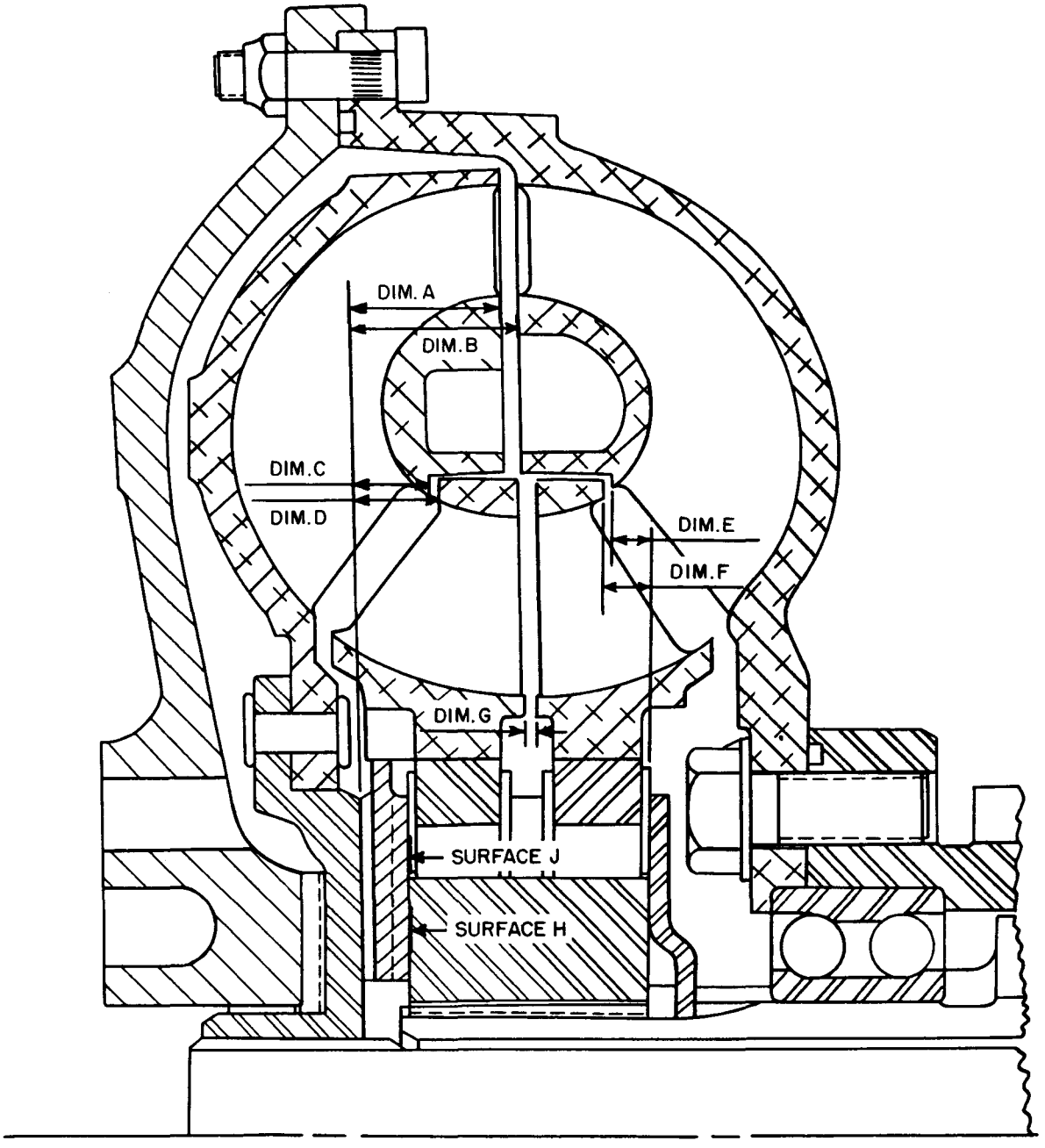


Fig VII-3. Model CRT-3330 Torqmatic converter cross section showing wear limits points of measurement.

With stator pack installed, end of roller race (surface H) shall be .007 inch or more beyond stator side plate (surface J). Dimension B minus dimension A shall not be less than .005 inch. Dimension D minus dimension C shall not be less than .010 inch. Dimension G shall not be less than .005 inch. Dimension F minus dimension E shall not be less than .005 inch.

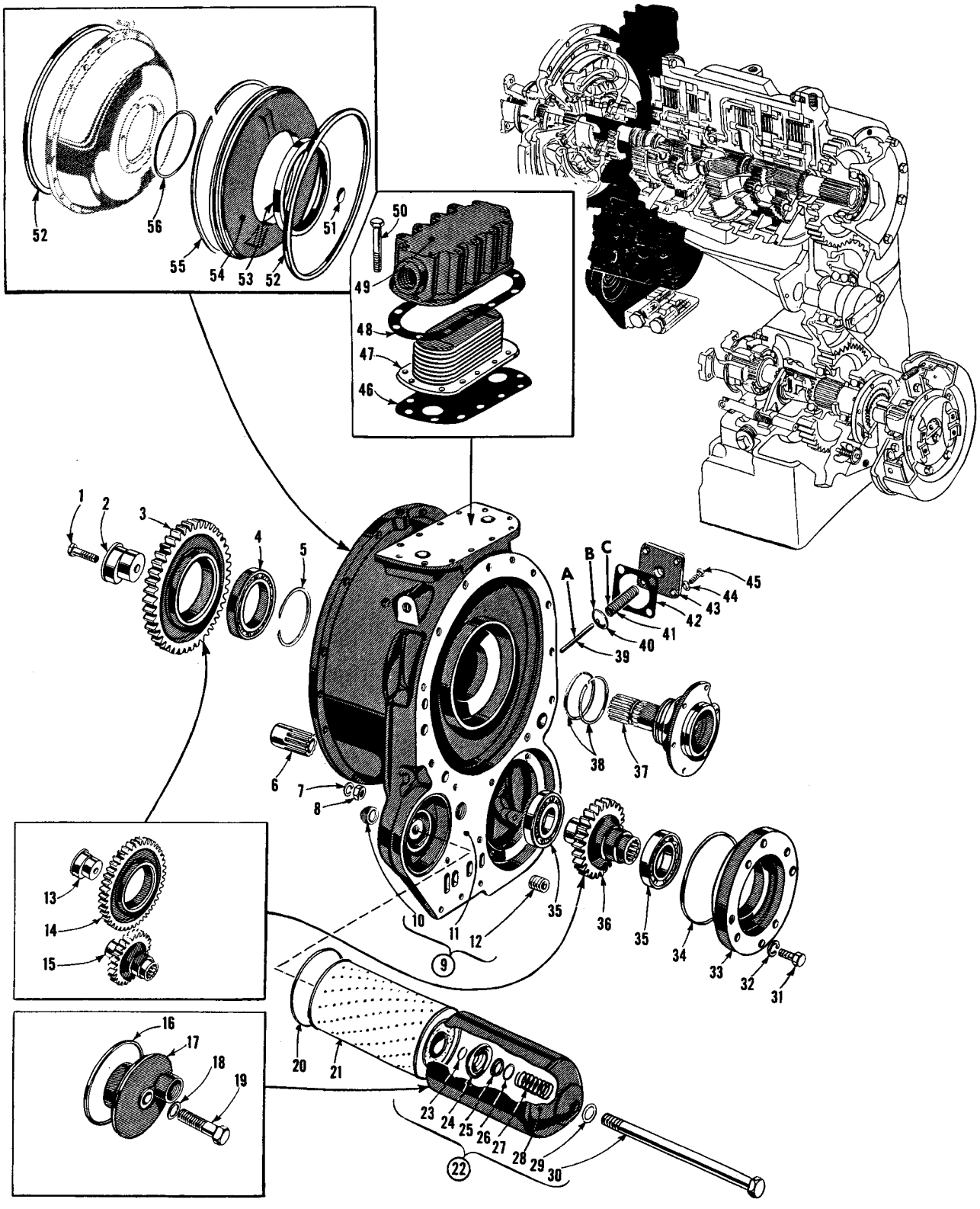


Fig VIII-1. Torque converter housing group, exploded view

SECTION VIII CONVERTER HOUSING ASSEMBLY REBUILD

1. CONVERTER HOUSING (FIG VIII-1)

a. DISASSEMBLY

(1) Remove four bolts and lock washers from the lube pressure regulator valve cover. Remove the cover, gasket, spring, lube pressure regulator valve, and pin (fig VIII-2).

(2) Loosen the converter ground sleeve by tapping against the shaft end. Remove the sleeve (fig VIII-3). Remove the two hook-type seal rings from the ground sleeve.

(3) If the converter housing is equipped with a converter housing seal diaphragm (70, fig VIII-1), remove internal snap ring (71). Remove the diaphragm. Remove seal (68) from the diaphragm. Remove seal (69) only if replacement is necessary.

b. CLEANING, INSPECTION AND WEAR LIMITS.

Refer to section IV, paragraph 5b, e, h, j, l and m for the cleaning and inspection procedures, and 6 for wear limits.

---

1 - Hexagon head bolt — 7/16" - 14 x 1 3/4"
2 - Accessory drive idler gear spindle
3 - Accessory drive idler gear (1.27 to 1 ratio)
4 - Single row ball bearing assembly
5 - Internal snap ring
6 - Oil pump drive coupling
7 - Lock washer — 3/8"
8 - Nut — 3/8" - 24
9 - Torque converter housing assembly
10 - Plug
11 - Torque converter housing
12 - Plug
13 - Accessory drive idler gear spindle
14 - Accessory drive idler gear (1 to 1 ratio)
15 - Oil pump and implement pump drive gear (1 to 1 ratio)
16 - Oil filter adapter gasket
17 - Remote oil filter adapter
18 - Filter adapter bolt gasket
19 - Filter adapter bolt — 11/16" - 12 x 2 13/'6" long
20 - Oil filter shell gasket
21 - Oil filter element
22 - Oil filter shell assembly
23 - External snap ring
24 - Retainer
25 - Seal
26 - Washer
27 - Spring
28 - Shell
29 - Gasket
30 - Bolt
31 - Hexagon head bolt — 1/2" - 13 x 1 3/8"
32 - Lock washer — 1/2"
33 - Bearing retainer
34 - Seal ring
35 - Single row ball bearing assembly
36 - Oil pump and implement pump drive gear (1.27 to 1 ratio)
37 - Torque converter ground sleeve
38 - Hook-type seal ring
39 - Pin
40 - Lube pressure regulator valve
41 - Spring
42 - Regulator valve cover gasket
43 - Lube pressure regulator valve cover
44 - Lock washer — 3/8"
45 - Hexagon head bolt — 3/8" - 16 x 1 1/8"
46 - Oil cooler gasket
47 - Oil cooler core assembly
48 - Oil cooler cover gasket
49 - Oil cooler cover
50 - Hexagon head bolt — 5/16" x 3 3/4"
51 - Expansion plug — 1"
52 - Seal ring — 13.7" I.D.
53 - Seal — 5 1/2" I.D.
54 - Converter housing seal diaphragm
55 - Internal snap ring
56 - Seal ring — 4.98" dia

A - Valve guide clearance point of measurement for wear limit (See Wear Limits Chart)
B - Valve clearance point of measurement for wear limit (See Wear Limits Chart)
C - Spring operating height point of measurement for wear limit (See Wear Limits Chart)

*Serviced in assembly only — not as a detail part.

Fig VIII-1. Torque converter housing group, exploded view, legend

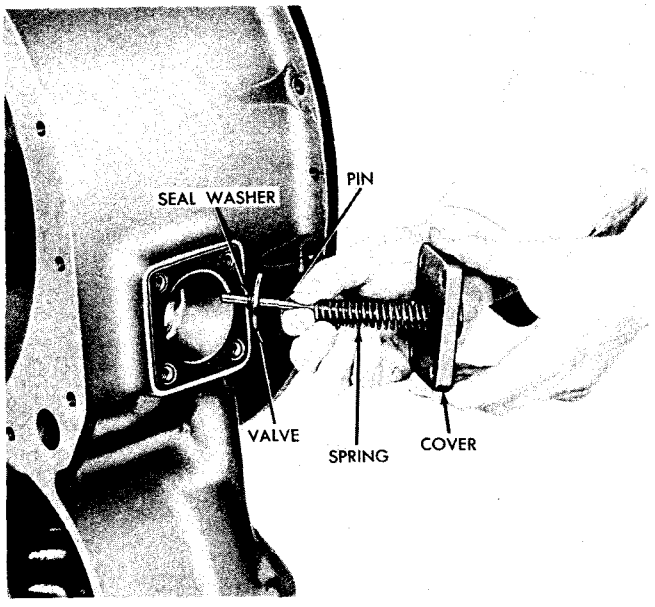


Fig VIII-2. Removing or installing lube pressure regulator valve, pin, seal washer, spring and cover

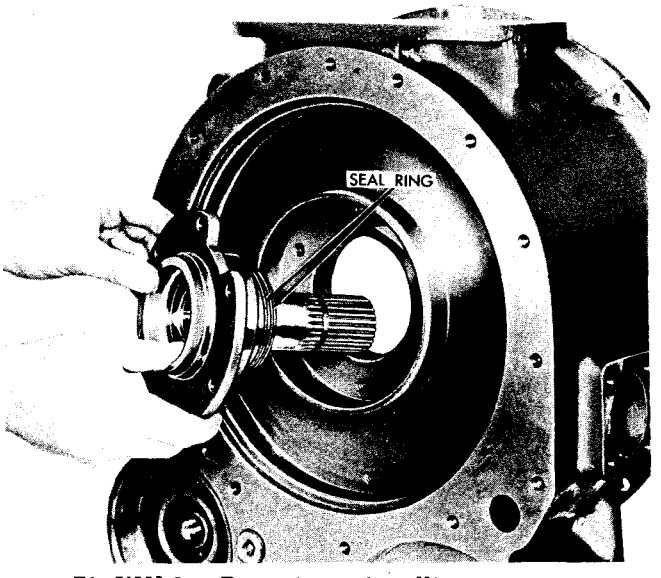


Fig VIII-3. Removing or installing converter ground sleeve

c. ASSEMBLY

(1) If the converter housing is equipped with a converter housing seal diaphragm, install seal (69, fig VIII-1) if it was removed from the diaphragm. Install seal (68). Install the diaphragm in the converter housing. Install the internal snap ring to retain the diaphragm.

(2) Install the converter ground sleeve (fig VIII-3). Tap the sleeve into position. Be sure to align the holes and the oil passage on the flange of the ground sleeve.

(3) Install the pin, lube pressure regulator valve, seal washer, spring, cover, and gasket (fig VIII-2). Install four bolts and lock washers. Refer to section VI, paragraph 4i, j, and l (4) and (5) for assembly procedures.

2. OIL FILTER AND REMOTE OIL FILTER ADAPTER (FIG VIII-1)

a. DISASSEMBLY

(1) Remove oil filter element (37).

(2) Remove snap ring (39) from long bolt (46).

(3) Remove retainer (40), seal (41), washer (42) and spring (43) from the long bolt.

(4) Remove long bolt (46) and gasket (45) from shell (44).

(5) The remote oil filter adapter is not disassembled any further, once it is removed from the housing.

b. CLEANING, INSPECTION, AND WEAR LIMITS. Refer to section IV, paragraph 5b, e, h, k, l, and m for cleaning and inspection procedures, and 6 for wear limits.

c. ASSEMBLY

(1) Install gasket (45) on long bolt (46).

(2) Install the long bolt and the gasket in shell (44).

(3) Install spring (43) on the long bolt.

(4) Install washer (42), seal (41), retainer (40) and external snap ring (39) on the long bolt.

(5) Install a new oil filter element (37) on the long bolt. Refer to section VI, paragraph 4m (2) for assembly procedures.

3. OIL COOLER

No rebuild of the oil cooler is necessary. Refer to section IV, paragraphs 5b, e, and h for cleaning and inspection procedures. Refer to section VI, paragraph 4m (6) for assembly of the oil cooler.

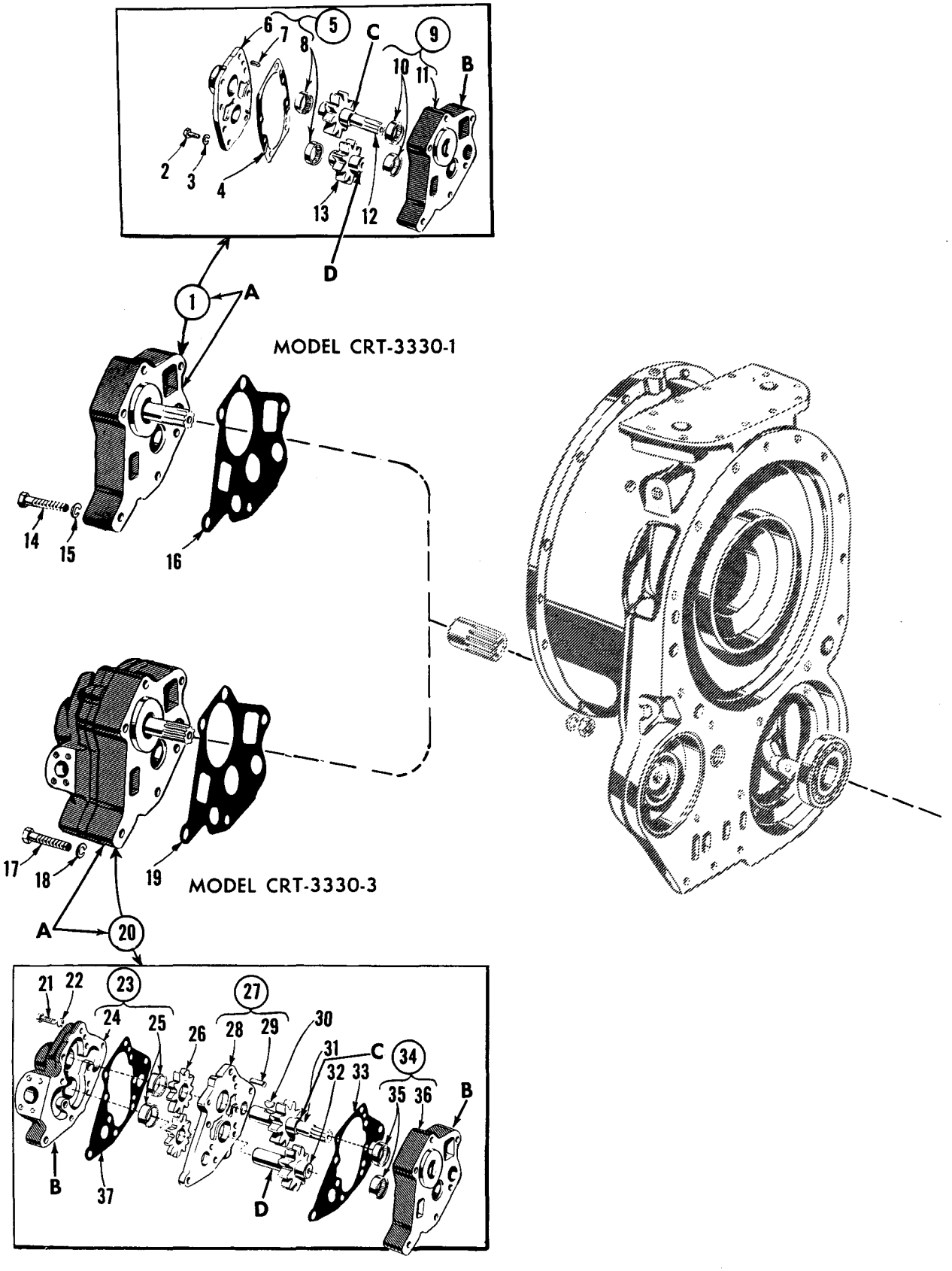


Fig IX-1. Input pressure and scavenge oil pump assembly and input driven charging oil pump assembly, exploded view

SECTION IX INPUT DRIVEN CHARGING OIL PUMP ASSEMBLY AND INPUT PRESSURE AND SCAVENGE OIL PUMP ASSEMBLY REBUILD

1. INPUT DRIVEN CHARGING OIL PUMP (MODEL CRT-3330-1) (FIG IX-1)

a. DISASSEMBLY

(1) Remove four bolts and lock washers from the charging oil pump cover assembly. Remove the cover assembly (fig IX-2).

(2) Remove the oil pump drive gear and the oil pump idler gear.

(3) Do not remove the needle bearing assemblies from the oil pump cover assembly or the body unless replacement is necessary. When replacing, press the needle bearing assembly from the body. The needle bearing assemblies in the cover assembly must be collapsed or pried out.

b. CLEANING, INSPECTION AND WEAR LIMITS.

Refer to section IV, paragraph 5b, c, d, e, f, i and j for cleaning and inspection procedures and to paragraph 6 for wear limits.

c. ASSEMBLY

(1) If the needle bearing assemblies were removed, install new bearings. Be sure to press only on the end that has the manufacturer's name.

(2) Install the oil pump drive gear and the oil pump idler gear.

(3) Install the oil pump cover assembly (fig IX-2). Install four bolts and lock washers. Refer to section VI, paragraph 4j (16) and (17) for assembly procedures.

---

1 - Input driven charging oil pump assembly
2 - Hexagon head bolt — 3/8" - 16 x 1"
3 - Lock washer — 3/8"
4 - Oil pump cover gasket
5 - Oil pump cover assembly
*6 - Oil pump cover
*7 - Dowel pin
8 - Needle bearing assembly
9 - Input charging oil pump body assembly
10 - Needle bearing assembly
*11 - Oil pump body
12 - Oil pump drive gear
13 - Oil pump idler gear
14 - Hexagon head bolt — 3/8" - 16 x 2 3/4"
15 - Lock washer — 3/8"
16 - Oil pump gasket
17 - Hexagon head bolt — 3/8" - 16 x 3 3/4"
18 - Lock washer — 3/8"
19 - Oil pump gasket
20 - Input pressure and scavenge oil pump assembly
21 - Hexagon head bolt — 3/8" - 16 x 2 1/4"
22 - Lock washer — 3/8"
23 - Scavenge oil pump body assembly
24 - Scavenge oil pump body
25 - Needle bearing
26 - Scavenge gear
27 - Plate assembly
28 - Plate
29 - Dowel
30 - Woodruff key
31 - Oil pump drive gear
32 - Oil pump idler gear
33 - Oil pump body gasket
34 - Input pressure oil pump body assembly
35 - Needle bearing
36 - Pressure oil pump body
37 - Oil pump body gasket

A - Gear end clearance with unit assembled point of measurement for wear limit (See Wear Limits Chart)
B - Body 2.758 in. dia. bore point of measurement for wear limit (See Wear Limits Chart)
C - Shaft 1.000 in. dia. point of measurement for wear limit (See Wear Limits Chart)
D - Shaft 1.000 in. dia. point of measurement for wear limit (See Wear Limits Chart)

*Serviced in assembly only — not as a detail part.

Fig IX-1. Input pressure and scavenge oil pump assembly and input driven charging oil pump assembly, exploded view, legend

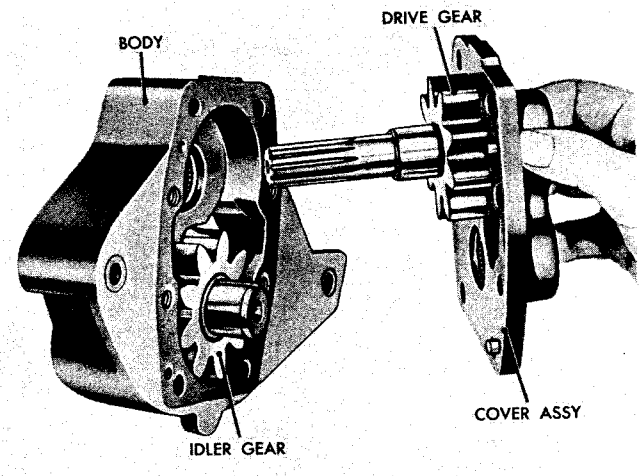


Fig IX-2. Removing or installing oil pump cover assembly

2. INPUT PRESSURE AND SCAVENGE OIL PUMP ASSEMBLY (MODEL CRT-3330-3) (FIG IX-1)

a. DISASSEMBLY

(1) Remove four bolts (21) and lock washers from scavenge oil pump body assembly (23).

(2) Remove body assembly (23).

(3) Remove scavenge gears (26).

(4) Remove woodruff key (30).

(5) Remove plate assembly (27).

(6) Remove oil pump idler gear (32).

(7) Remove oil pump drive gear (31).

(8) Remove the needle bearing assemblies from the oil pump body assemblies only if replacement is necessary.

b. CLEANING, INSPECTION AND WEAR LIMITS.

Refer to section IV, paragraph 5b, c, d, e, f, i and j for cleaning and inspection procedures and to paragraph 6 for wear limits.

c. ASSEMBLY

(1) If the needle bearing assemblies were removed, install new bearings. Be sure to press only on the end that has the manufacturer's name.

(2) Install oil pump drive gear (31) in the input pressure oil pump body assembly (34).

(3) Install oil pump idler gear (32) in body assembly (34).

(4) Install plate assembly (27).

(5) Install woodruff key (30) in the shaft of drive gear (31).

(6) Install scavenge gears (26) on the shafts of the oil pump drive and oil pump driven gears (31) and (32).

(7) Install the gasket and the scavenge oil pump body assembly (23) and secure it with four bolts (21) and lock washers. Refer to section VI, paragraph 4j (16) and (17) for assembly procedures.

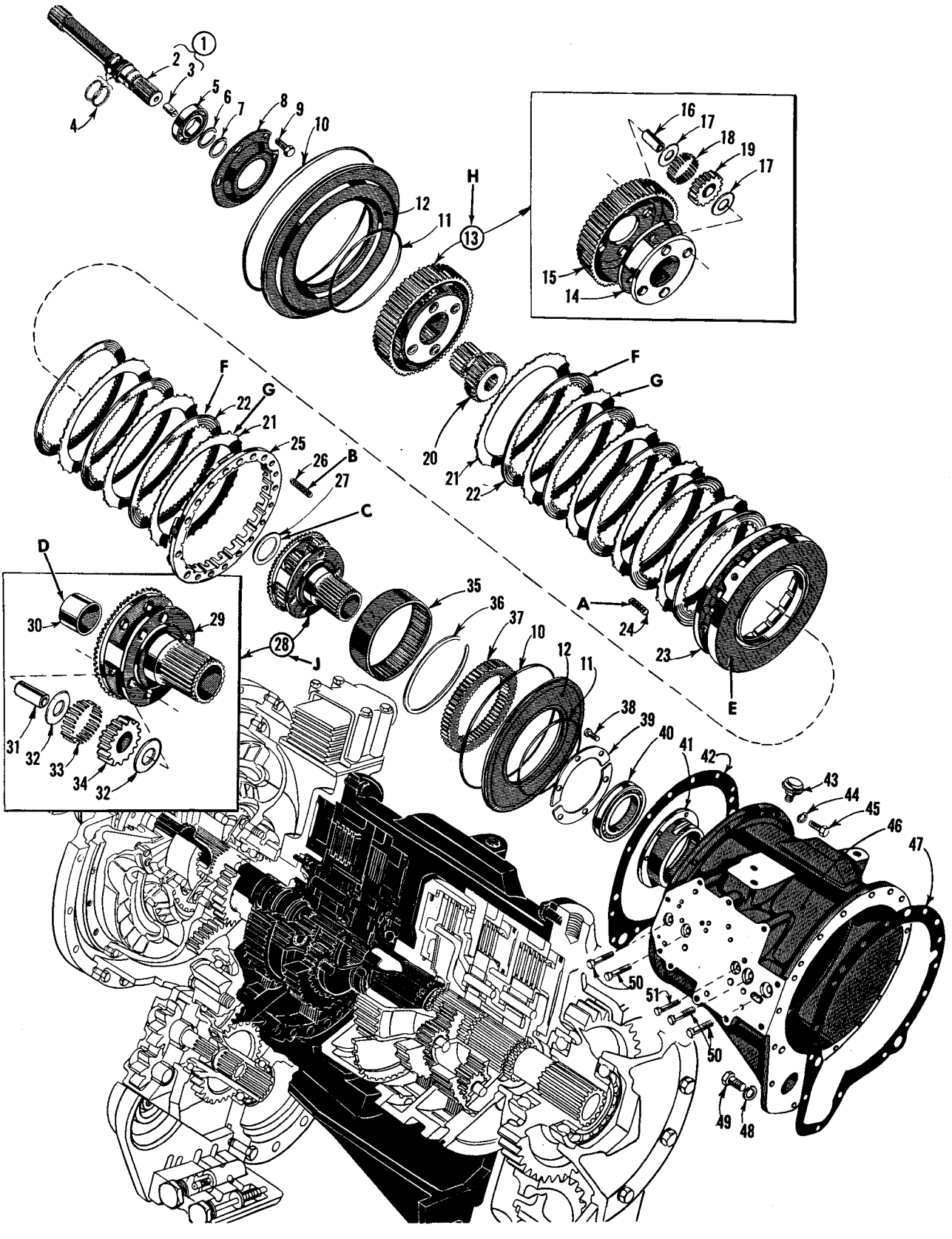


Fig X-1. Forward and reverse planetary carrier assemblies and transmission housing group, exploded view

SECTION X FORWARD AND REVERSE PLANETARY UNITS, CLUTCH PLATES, CONVERTER OUTPUT SHAFT AND HOUSING REBUILD

1. PLANETARY UNITS (FIG X-1)

a. DISASSEMBLY

(1) Disassemble the reverse planetary carrier assembly or the forward planetary carrier assembly only if replacement of parts is necessary. To disassemble the carrier assemblies press planetary spindle pins (16) and (31) from the planetary carriers.

1 - Converter shaft assembly
*2 - Converter shaft
*3 - Lube orifice plug
4 - Hook-type seal ring
5 - Single row ball bearing assembly
6 - External snap ring
7 - External snap ring
8 - Bearing retainer
9 - Hexagon head bolt — 3/8" - 16 x 7/8"
10 - Seal ring
11 - Seal ring
12 - Clutch apply piston
13 - Reverse planetary carrier assembly
14 - Reverse planetary carrier
15 - Reverse clutch hub
16 - Planetary spindle pin
17 - Pinion thrust washer
18 - Planetary pinion roller
19 - Reverse planetary pinion
20 - Forward and reverse sun gear
21 - External splined clutch plate
22 - Internal splined clutch plate
23 - Reverse clutch anchor
24 - Reverse piston return spring
25 - Forward clutch anchor
26 - Forward clutch piston spring
27 - Thrust washer
28 - Forward planetary carrier assembly
29 - Forward planetary carrier
30 - Bushing
31 - Planetary spindle pin
32 - Pinion thrust washer
33 - Planetary pinion roller
34 - Forward planetary pinion
35 - Reverse ring gear
36 - Internal snap ring
37 - Forward ring gear
38 - Hexagon head bolt — 3/8" - 16 x 7/8"
39 - Bearing retainer
40 - Single row ball bearing assembly
41 - Oil transfer hub
42 - Converter housing gasket
43 - Breather
44 - Lock washer — 7/16"
45 - Bolt — 7/16" - 14 x 1 1/4"
46 - Transmission housing
47 - Transmission housing gasket
48 - Lock washer — 7/16"
49 - Hexagon head bolt — 7/16" - 14 x 1 3/8"
50 - Hexagon head bolt — 1/2" - 20 x 2"
51 - Hexagon head bolt — 3/8" - 24 x 1 1/2"

A - Spring point of measurement for wear limit (See Wear Limits Chart)
B - Spring operating height point of measurement for wear limit (See Wear Limits Chart)
C - Washer thickness point of measurement for wear limit (See Wear Limits Chart)
D - Bushing clearance point of measurement for wear limit (See Wear Limits Chart)
E - Anchor reaction surface point of measurement for wear limit (See Wear Limits Chart)
F - Friction plate thickness and cone point of measurement for wear limit (See Wear Limits Chart)
G - Reaction plate thickness and cone point of measurement for wear limit (See Wear Limits Chart)
H - Gear end clearance with unit assembled point of measurement for wear limit (See Wear Limits Chart)
J - Gear end clearance with unit assembled point of measurement for wear limit (See Wear Limits Chart)

*Serviced in assembly only — not as a detail part.

Fig X-1. Forward and reverse planetary carrier assemblies and transmission housing group, exploded view, legend

(2) Remove planetary pinions (19) and (34), planetary pinion rollers (18) and (33) and planetary thrust washers (17) and (32).

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraph 5b, g, i, and j for cleaning and inspection procedures and paragraph 6 for wear limits.

c. ASSEMBLY

(1) Grease pinion thrust washers (17) and (32) and install them on planetary pinions (19) and (34).

(2) Grease the bores of planetary pinions (19) and (34) and install rollers (18) and (33) in the bores of the planetary pinions. An aligning tool placed in the bore of the gear will facilitate this installation. An aligning tool can be made by grinding a discarded spindle to 0.005 undersize.

(3) Install the planetary pinions, planetary pinion rollers, and pinion thrust washers in the planetary carriers (14) and (29).

(4) Align the bores in the planetary pinions with the bores in the planetary carriers and press the planetary spindle pins in the carriers. If facilities are available, shrink the spindles with dry ice for approximately an hour before installing.

(5) Swage the ends of the planetary spindle pins.

(6) Stake the forward planetary spindle pins with a 0.406 inch square punch. Stake both ends of each. Check the planetary pinions after staking to make sure the pinions run freely.

(7) Stake the reverse planetary spindle pins with a 0.594-inch square punch. Stake both ends of each pin. Check the planetary pinions after staking to make sure the pinions run freely. Refer to section VI, paragraph 4e (2) through (4) and l (2) for assembly procedures.

2. CLUTCH PLATES, ANCHORS AND SPRINGS (FIG X-1)

Refer to section VI, paragraphs 3b and 3j for disassembly procedures. Refer to section IV, paragraph 5b, e, j and m for cleaning and inspection procedures and paragraph 6 for wear limits. Refer to section VI, paragraph 4e for assembly procedures.

3. CLUTCH PISTONS (FIG X-1)

a. DISASSEMBLY. Remove seal rings (10) and (11) from pistons (12).

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraph 5b, e, and h for cleaning and inspection procedures and paragraph 6 for wear limits.

c. ASSEMBLY. Install the seal rings (10) and (11) on the pistons (12). Refer to section VI, paragraph 4e, step (1), and paragraph 4i step (1) for assembly procedures.

4. CONVERTER SHAFT ASSEMBLY (FIG X-1)

a. DISASSEMBLY. Remove seal rings (4) from the shaft. Remove two snap rings, (6) and (7). Press bearing (5) toward the orifice end of the shaft.

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraph 5b, e, and j for cleaning and inspection procedures.

c. ASSEMBLY

(1) Install two seal rings (4) on the shaft.

(2) Press bearing (5) onto the shaft, positioning it against the shoulder on the shaft.

(3) Install snap rings (6) and (7).

(4) Refer to section VI, paragraph 4i (2) for assembly procedures.

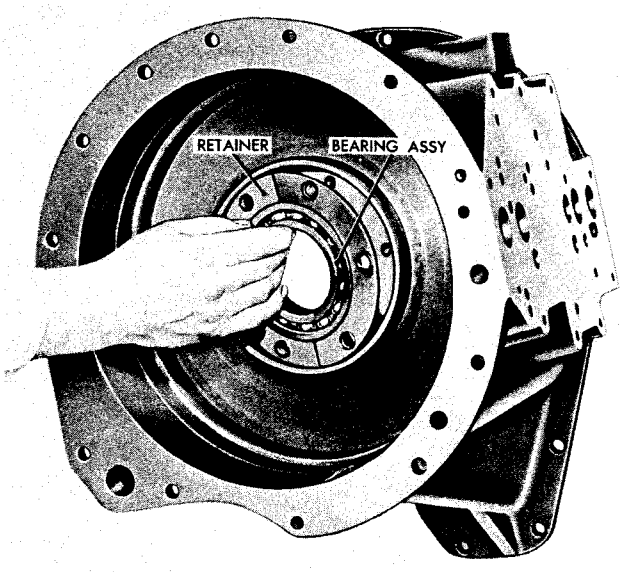


Fig X-2. Removing or installing split bearing retainer and single row ball bearing assembly from transmission housing

5. TRANSMISSION HOUSING (FIG X-1)

a. DISASSEMBLY

(1) Remove six bolts (38) that secure split bearing retainer (39) and single row ball bearing assembly (40) to the transmission housing (46).

(2) Remove the split retainer and the bearing by tapping with a drift and hammer (fig X-2).

(3) Remove the split retainer from the bearing.

(4) Remove oil transfer hub (41) from the transmission housing. It may be necessary to tap the hub with a soft drift and a hammer.

b. CLEANING, INSPECTION AND WEAR LIMITS.

Refer to section IV, paragraph 5b, c, d, e, and f for cleaning and inspection procedures.

c. ASSEMBLY

(1) Install oil transfer hub (41) in the transmission housing. If necessary, tap the hub with a soft drift and a hammer to seat the hub.

(2) Install split bearing retainer (39) on single row ball bearing assembly (40) and install the retainer in the transmission housing (fig X-2).

(3) Install six bolts to secure the split bearing retainer to the transmission housing.

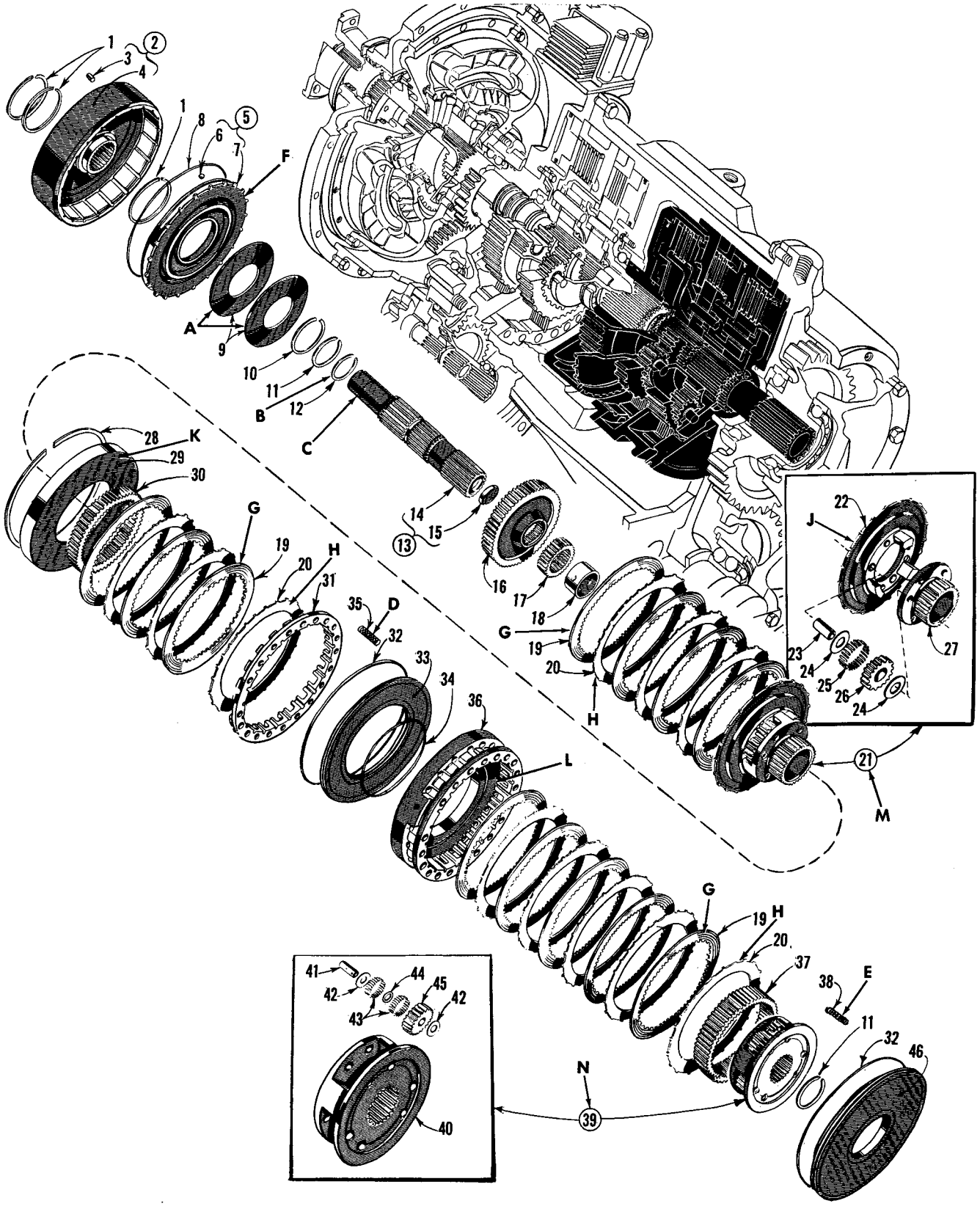


Fig XI-1. Intermediate-, high-, and low-range clutches, high- and low-range planetary carrier assemblies, and intermediate-range clutch drum, exploded view

SECTION XI INTERMEDIATE-, HIGH-, AND LOW-RANGE PLANETARY UNITS, TRANSMISSION SHAFT AND CLUTCH PLATES REBUILD

1 - Hook-type seal ring
2 - Intermediate-range clutch drum assembly
*3 - Pin — 1/4" x 1/4"
*4 - Clutch drum
5 - Intermediate-range clutch piston assembly
*6 - Ball
*7 - Clutch piston
8 - Seal ring
9 - Intermediate-range piston return spring
10 - Spring retainer snap ring
11 - Drum retainer snap ring
12 - External snap ring (for -3 model snap ring replaced by thrust washer)
13 - Transmission shaft assembly
*14 - Transmission shaft
15 - Cup plug
16 - Intermediate-range clutch hub
17 - High-range sun gear
18 - Spacer
19 - Internal splined clutch plate
20 - External splined clutch plate
21 - High-range planetary carrier assembly
22 - Planetary carrier
23 - Planetary pinion pin
24 - Pinion thrust washer
25 - Planetary pinion roller
26 - Planetary pinion
27 - Low-range sun gear
28 - Internal snap ring
29 - High-range clutch reaction plate
30 - High-range ring gear
31 - High-range clutch anchor
32 - Seal ring
33 - High-range clutch piston
34 - Seal ring
35 - High-range piston return spring
36 - High-range piston and low-range anchor housing
37 - Low-range ring gear
38 - Low-range piston return spring
39 - Low-range planetary carrier assembly
40 - Planetary carrier
41 - Planetary pinion pin
42 - Pinion thrust washer
43 - Planetary pinion roller
44 - Spacer
45 - Planetary pinion
46 - Low-range clutch piston

A - Belleville spring free height point of measurement for wear limit (See Wear Limits Chart)
B - Washer thickness point of measurement for wear limit (See Wear Limits Chart)
C - Shaft clearance point of measurement for wear limit (See Wear Limits Chart)
D - Spring operating height point of measurement for wear limit (See Wear Limits Chart)
E - Spring operating height point of measurement for wear limit (See Wear Limits Chart)
F - Piston face wear point of measurement for wear limit (See Wear Limits Chart)
G - Friction plate thickness and cone point of measurement for wear limit (See Wear Limits Chart)
H - Reaction plate thickness and cone point of measurement for wear limit (See Wear Limits Chart)
J - Planetary carrier reaction surface wear point of measurement for wear limit (See Wear Limits Chart)
K - Reaction plate reaction surface wear point of measurement for wear limit (See Wear Limits Chart)
L - Housing reaction surface wear point of measurement for wear limit (See Wear Limits Chart)
M - Gear end clearance with unit assembled point of measurement for wear limit (See Wear Limits Chart)
N - Gear end clearance with unit assembled point of measurement for wear limit (See Wear Limits Chart)

*Serviced in assembly only — not as a detail part.

Fig XI-1. Intermediate-, high-, and low-range clutches, high- and low-range planetary carrier assemblies, and intermediate-range clutch drum, exploded view, legend

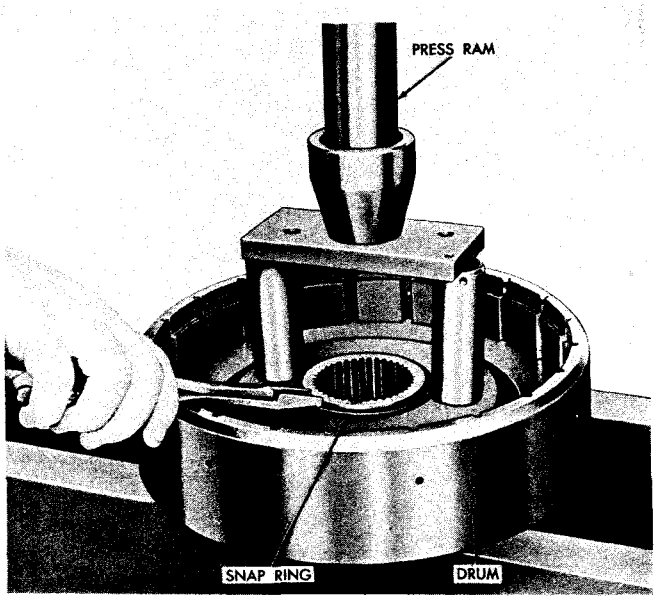


Fig XI-2. Removing or installing snap ring from intermediate-range clutch drum

1. INTERMEDIATE-RANGE CLUTCH DRUM ASSEMBLY (FIG XI-1)

a. DISASSEMBLY

(1) Use a press to hold down the intermediate-range piston return springs (fig XI-2). Remove the snap ring (fig XI-2).

(2) Remove the intermediate-range piston return springs (fig XI-3).

(3) Remove the intermediate-range clutch piston assembly (fig XI-4). Remove the seal ring from the piston.

(4) Remove the hook-type seal ring from the drum (fig XI-4).

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, e, h, j, l and m for cleaning and inspection procedures and paragraph 6 for wear limits.

c. ASSEMBLY

(1) Install the hook-type seal ring in the drum (fig XI-4).

(2) Install the seal ring on the piston. Install the intermediate-range clutch piston assembly (fig XI-4).

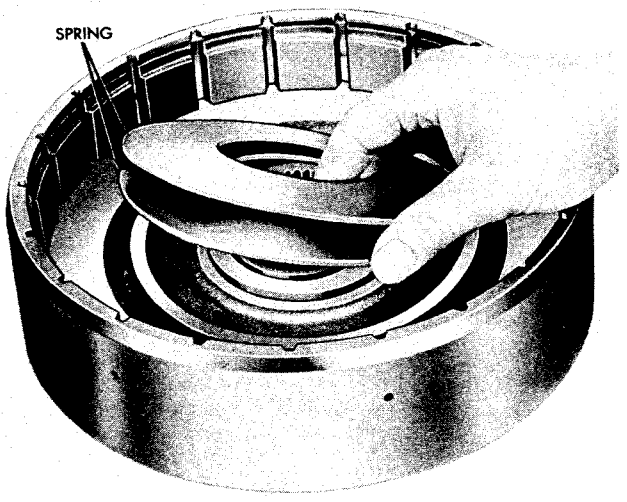


Fig XI-3. Removing or installing intermediate-range piston return springs

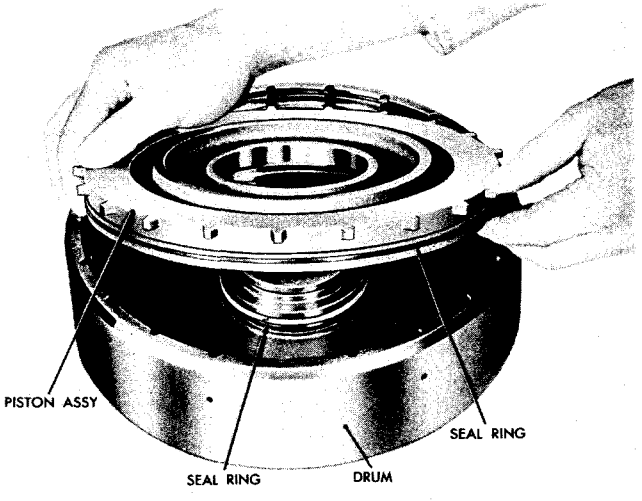


Fig XI-4. Removing or installing intermediate-range clutch piston assembly

(3) Install the intermediate-range piston return springs (fig XI-3).

(4) Using a press, hold down the intermediate-range piston return springs and install the snap ring (fig XI-2).

2. TRANSMISSION SHAFT ASSEMBLY (FIG XI-1)

a. MODEL DIFFERENCES. Transmissions with a governor drive do not have cup plug (15) in the transmission shaft (14). Transmissions without a governor drive have

a cup plug in the splined end of the transmission shaft.

b. DISASSEMBLY. Refer to section VI, paragraph 3i(3) for removal of the shaft from the transmission. Remove snap ring (12) from the Model CRT-3330-1 shaft. The Model CRT-3330-3 shaft has a thrust washer at this location in place of the snap ring.

c. CLEANING, INSPECTION, AND WEAR LIMITS. Refer to section IV, paragraphs 5b, e, and j for cleaning and inspection procedures and paragraph 6 for wear limits.

d. ASSEMBLY. Install snap ring (12) on the Model CRT-3330-1 shaft. The Model CRT-3330-3 shaft uses a thrust washer at this location in place of the snap ring. Refer to section VI, paragraph 4f, step (3) for assembly into the transmission.

3. HIGH-RANGE PLANETARY CARRIER ASSEMBLY (FIG XI-1)

a. DISASSEMBLY

(1) Disassemble the high-range planetary carrier assembly only if replacement of parts is necessary. To disassemble it, press planetary spindle pins (23) from the planetary carrier.

(2) Remove planetary carrier pinions (26), planetary pinion rollers (25) and pinion thrust washers (24).

b. CLEANING AND INSPECTION. Refer to section IV, paragraphs 5b, c, d, e, g, and i for cleaning and inspection procedures and paragraph 6 for wear limits.

c. ASSEMBLY

(1) Grease pinion thrust washers (24) and install them on planetary pinions (26).

(2) Grease the bores of planetary pinions (26) and install rollers (25) in the bores of the high-range planetary carrier pinions. If available, place an aligning tool in the bore of the gear to hold the rollers in place. An aligning tool can be made by grinding a discarded spindle to 0.005 undersize.

(3) Install the planetary pinions, planetary pinion rollers, and pinion thrust washers in planetary carriers (22).

(4) Align the bores in the planetary pinions with the bores in the planetary carrier and press the planetary spindle pins into the carrier. If facilities are available, shrink the pins with dry ice for approximately an hour before installing.

(5) Swage the ends of the planetary spindle pins.

(6) Stake the pins with a 0.406-inch square punch. Stake both ends of each pin. Check the planetary pinions after staking to make sure the pinions run freely.

4. LOW-RANGE PLANETARY CARRIER ASSEMBLY (FIG XI-1)

a. DISASSEMBLY

(1) Disassemble the low-range planetary carrier assembly only if replacement of parts is necessary. To disassemble it, press planetary spindle pins (41) from the planetary carrier.

(2) Remove planetary carrier pinions (45), planetary pinion rollers (43), pinion thrust washers (42) and spacers (44).

b. CLEANING AND INSPECTION. Refer to section IV, paragraphs 5b, e, g and i for cleaning and inspection procedures, and paragraph 6 for wear limits.

c. ASSEMBLY

(1) Grease pinion thrust washers (42) and install them on planetary pinions (45).

(2) Grease the bores of planetary pinions (45) and install one set of rollers (43) in the bores of the planetary carrier pinions. Install spacer (44) against the rollers. Install a second row of rollers in the bores of the pinions. If available, place an aligning tool in the bore of the gear to hold the rollers in place while installing. An aligning tool can be made by grinding a discarded spindle 0.005 undersize.

(3) Install the planetary pinions, planetary pinion rollers, and pinion thrust washers in planetary carrier (40).

(4) Align the bores in the planetary pinions with the bores in the planetary carrier and press the planetary spindle pins into the carrier. If facilities are available, shrink the spindles with dry ice for approximately one hour before installing.

(5) Swage the ends of the planetary spindle pins.

(6) Stake the planetary spindle pins with a 0.406-inch square punch. Stake both ends of each pin. Check the planetary pinions after staking to make sure the pinions run freely.

5. CLUTCH PLATES, ANCHORS AND SPRINGS (FIG XI-1)

Refer to section VI, paragraphs 4f, g, h, and k for cleaning and inspection procedures. and paragraph 6 for wear limits. Refer to section VI, paragraphs f, g, h, and k for installation of the clutch plates, anchors, and piston return springs.

6. CLUTCH PISTONS (FIG XI-1)

a. DISASSEMBLY. Remove external and internal seal rings (32) and (34) from high-range clutch piston (33) and low-range clutch piston (46).

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, e, and h for cleaning and inspection procedures and paragraph 6 for wear limits.

c. ASSEMBLY. Install the external and the internal seal rings of the high-range clutch piston and the low-range clutch piston.

7. PLANETARY RING GEARS (FIG XI-1)

Refer to section VI, paragraphs 3g and 3h for disassembly procedures. Refer to section IV, paragraphs 5b, e, i and j for cleaning and inspection procedures. Refer to section VI, paragraphs 4g and h for installation of the planetary ring gears.

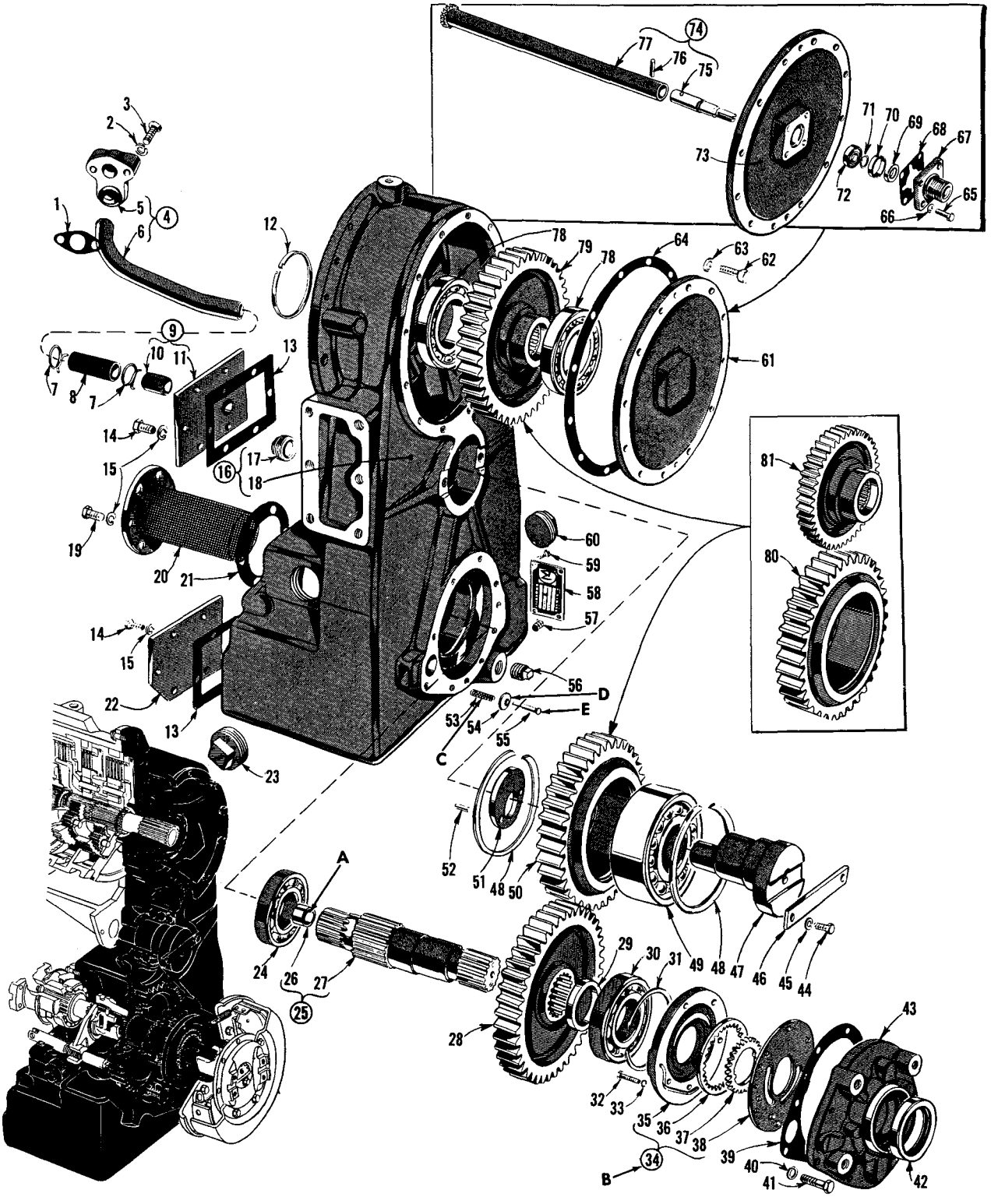


Fig XII-1. Model CRT-3330-1 transfer gear housing group, exploded view

SECTION XII TRANSFER GEAR HOUSING GROUP AND GOVERNOR DRIVE REBUILD (MODEL CRT-3330-1)

1 - Converter housing drain tube gasket
2 - Lock washer — 3/8"
3 - Hexagon head bolt — 3/8" - 16 x 2"
4 - Converter housing drain tube assembly
*5 - Drain tube flange
*6 - Drain tube
7 - Hose clamp — type E
8 - Converter housing drain hose
9 - Inspection and converter drain cover assembly
*10 - Nipple
*11 - Cover
12 - Hook-type seal ring
13 - Inspection cover gasket
14 - Hexagon head bolt — 3/8" - 16 x 1"
15 - Lock washer — 3/8"
16 - Transfer gear housing assembly
*17 - Pipe plug — 1"
*18 - Transfer gear housing
19 - Hexagon head bolt — 3/8" - 16 x 7/8"
20 - Oil strainer
21 - Oil strainer gasket
22 - Inspection cover
23 - Pipe plug — 2"
24 - Single row ball bearing assembly
25 - Rear output shaft assembly
26 - Bushing
27 - Rear output shaft
*28 - Output driven gear
29 - Output driven gear spacer
30 - Single row ball bearing assembly
31 - External snap ring
32 - Hexagon head bolt — 5/16" - 18 x 1 3/8"
33 - Lock washer — 5/16"
34 - Output driven oil pump assembly
*35 - Oil pump body
*36 - Oil pump driven gear
*37 - Oil pump drive gear
*38 - Oil pump cover
39 - Oil pump housing gasket
40 - Lock washer — 3/8"
41 - Hexagon head bolt — 3/8" - 16 x 1 1/2"
42 - Oil seal
43 - Output oil pump housing
44 - Hexagon head bolt — 3/8" - 16 x 1"
45 - Washer
46 - Spindle retainer
47 - Output idler gear spindle
48 - External snap ring
49 - Double row ball bearing assembly
50 - Output idler gear — 1 to 1 ratio
51 - Spacer
52 - Pin
53 - Check valve spring
54 - Check valve
55 - Check valve guide
56 - Square head pipe plug — 3/4"
57 - Square head pipe plug — 1/4"
58 - Transmission name plate
59 - Drive screw
60 - Oil filler hole plug
61 - Output drive gear cover
62 - Hexagon head bolt — 3/8" - 16 x 1 1/4"
63 - Lock washer — 3/8"
64 - Output drive gear cover gasket
65 - Hexagon head bolt — 5/16" - 18 x 1 7/8"
66 - Washer — 5/16"
67 - Governor drive adapter
68 - Adapter gasket
69 - Seal
70 - Spacer
71 - External snap ring
72 - Single row ball bearing
73 - Output drive gear cover
74 - Governor drive shaft assembly
75 - Accessory drive coupling
76 - Spring pin — 1/8" x 7/8"
*77 - Drive shaft
78 - Single row ball bearing assembly
79 - Output drive gear — 1 to 1 ratio
80 - Output idler gear — 1.62 to 1 ratio
81 - Output drive gear — 1.62 to 1 ratio

A - Bushing clearance point of measurement for wear limit (See Wear Limits Chart)
B - Gear end clearance with unit assembled and gear O.D. clearance point of measurement for wear limit (See Wear Limits Chart)
C - Spring operating height point of measurement for wear limit (See Wear Limits Chart)
D - Valve clearance point of measurement for wear limit (See Wear Limits Chart)
E - Valve guide clearance point of measurement for wear limit (See Wear Limits Chart)

*Serviced in assembly only — not as a detail part.

Fig XII-1. Model CRT-3330-1 transfer gear housing group, exploded view, legend

1. HOUSING (FIG XII-1)

Refer to section VI, paragraphs 3k, l, m and n for disassembly procedures. Refer to section IV, paragraphs 5b and e for cleaning and inspection procedures and paragraph 6 for wear limits. Refer to section VI, paragraphs 4a, b, c, and d for assembly or the transfer gear housing.

2. GOVERNOR DRIVE (FIG XII-1)

a. DISASSEMBLY

(1) Remove four bolts (65) and lock washers from adapter (67). Remove the adapter, gasket, and seal. Do not remove the seal from the adapter unless replacement is necessary. If the seal is replaced, install a new seal with the spring loaded side next to the inside of the transmission.

(2) Remove snap ring (71) from the governor drive coupling. Remove the governor drive shaft assembly.

(3) Remove spring pin (76) from governor drive shaft assembly (74). Remove governor drive coupling (75) from shaft (77).

(4) Press bearing (72) and spacer (70) from output drive gear cover (73).

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, c, d, e, f, h, j, k, and l for cleaning and inspection procedures.

c. ASSEMBLY

(1) Install governor drive shaft (77) on the governor drive coupling (75). Install spring pin (76) in the governor drive shaft assembly.

(2) Press bearing (72) and spacer (70) in output drive gear cover (73).

(3) Install governor drive coupling (75) in the bearing. Install snap ring (71) on the coupling.

(4) Install adapter (67), gasket (68), and seal (69) on output drive gear cover (73). Install four bolts (65) and lock washers in the adapter.

3. TRANSFER GEARS AND REAR OUTPUT SHAFT (FIG XII-1)

a. DISASSEMBLY

(1) Using a bearing puller, remove one single row ball bearing assembly (78) from output drive gear (79).

(2) Remove the other bearing assembly the same way.

(3) Press rear output shaft (27) from bearing assembly (30) and spacer (29).

(4) If replacement of bushing (26) is necessary, cut out the bushing.

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, c, d, e, f, g, i, j, and l for cleaning and inspection procedures.

c. ASSEMBLY

(1) If bushing (26) was removed, press in a new bushing.

(2) Press rear output shaft (27) in bearing assembly (30) and spacer (29).

(3) Press single row ball bearing assemblies (78) on output drive gear (79).

4. OUTPUT DRIVEN OIL PUMP ASSEMBLY (FIG XII-1)

a. DISASSEMBLY

(1) Remove five bolts (32) and lock washers from output oil pump body (35).

(2) Remove the ouptut oil pump body, oil pump driven gear and oil pump drive gear from the oil pump housing (fig XII-2).

(3) Remove the driven gear and the drive gear from the pump body (fig XII-2).

(4) Remove the oil pump cover from the pump housing.

NOTE

Do not remove seal (42) from

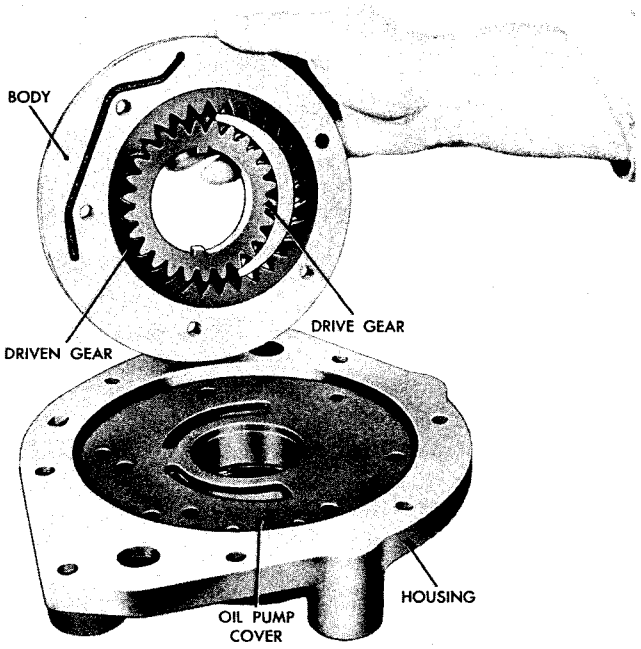


Fig XII-2. Removing or installing output oil pump body, oil pump driven gear and oil pump drive gear from output oil pump housing

pump housing (43) unless replacement of parts is necessary. When replacing the seal, press out the old seal.

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, e, h, and i for cleaning and inspection procedures and paragraph 6 for wear limits.

c. ASSEMBLY

(1) If the seal was removed from the output oil pump housing, press the new seal in the housing with the spring side of the seal toward the oil to be sealed in.

(2) Install the oil pump cover in the output oil pump housing.

(3) Install the driven gear and the drive gear in the pump body.

(4) Install the output oil pump body, driven gear and drive gear in the output oil pump housing (fig XII-2). Install five bolts and lock washers in the output oil pump body.

5. OIL STRAINER (FIG XII-1)

No rebuild of the oil strainer is necessary. Refer to section IV, paragraphs 5b, e and h for cleaning and inspection procedure. Refer to section VI, paragraph 4b (4) for installation of the oil strainer.

6. CONVERTER HOUSING DRAIN TUBE ASSEMBLY (FIG XII-1)

No rebuild of the drain tube assembly is necessary. Refer to section IV, paragraphs 5b and e for cleaning and inspection procedures. Refer to section VI, paragraph 4m, (3) for installation of the tube assembly.

7. FRONT OUTPUT SHAFT AND FLANGES (FIG XII-3)

a. DISASSEMBLY. Press the front output shaft (13) from the single row ball bearing assembly (12).

b. CLEANING, INSPECTION, AND WEAR LIMITS. Refer to section IV, paragraphs 5b, c, d, e, f, h, and j for cleaning and inspection procedures and paragraph 6 for wear limits.

c. ASSEMBLY. Press the front output shaft into the single row ball bearing.

d. FLANGES. No rebuild of the flanges is necessary. Refer to section IV, paragraphs 5b, e, and j for cleaning and inspection procedures.

8. FRONT OUTPUT DISCONNECT CLUTCH (FIG XII-3)

a. DISASSEMBLY

(1) Remove disconnect clutch coupling (20), two disconnect clutch detent balls (19), and disconnect clutch detent spring (18) from front output shaft (13).

(2) Press the front ouptut shaft from single row ball bearing assembly (12).

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, c, d, e, f, h, j and m for cleaning and inspection procedures and paragraph 6 for wear limits.

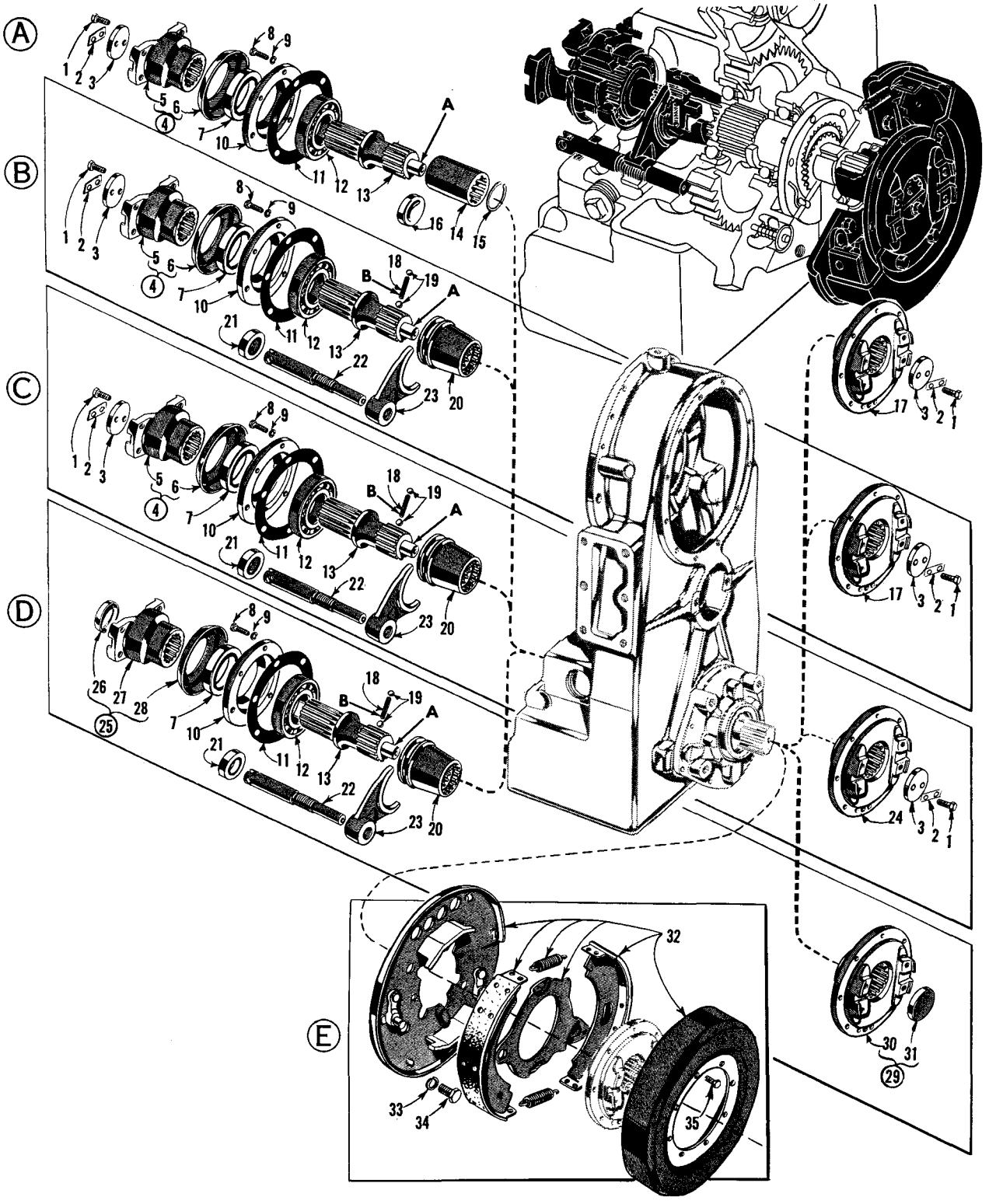


Fig XII-3. Front output shaft, disconnect flanges, and parking brake, exploded view

c. ASSEMBLY

(1) Press the front output shaft into the single row ball bearing assembly.

(2) Install spring (18) and two balls (19) in the hole drilled through front output shaft (13). Place one disconnect clutch detent ball (19) on each end of the disconnect clutch detent spring.

(3) Slide disconnect clutch coupling (20) over the spring and two balls to the point where the balls drop into the detent on the coupling.

9. PARKING BRAKE

Refer to section VI, paragraph 3k. Refer to section IV, paragraph 5b, e, and m for cleaning and inspection procedures. Refer to section VI, paragraph 4d for installation of the parking brake.

---

1 - Hexagon head bolt — 3/8" - 24 x 1 1/8"
2 - Locking strip
3 - Flange retainer washer
4 - Front output flange assembly
*5 - Front output flange
6 - Dust shield
7 - Oil seal
8 - Hexagon head bolt — 3/8" - 16 x 1"
9 - Lock washer — 3/8"
10 - Bearing retainer
11 - Bearing retainer gasket
12 - Single row ball bearing assembly
13 - Front output shaft
14 - Coupling
15 - Internal snap ring
16 - Plug
17 - Brake mounting flange
18 - Disconnect clutch detent spring
19 - Disconnect clutch detent ball — 3/8"
20 - Disconnect clutch coupling
21 - Shifter fork shaft oil seal
22 - Shifter fork shaft
23 - Shifter fork
24 - Brake mounting flange
25 - Front output flange assembly
26 - Dust cup
*27 - Front output flange
28 - Dush shield
29 - Brake mounting flange assembly
30 - Brake mounting flange
31 - Dust cup
32 - Parking brake assembly — 13 3/8" dia
33 - Washer — 5/8"
34 - Hexagon head bolt — 5/8" - 11 x 1 1/4"
35 - Hexagon head bolt — 3/8" - 24 x 3/4"

A - Shaft clearance point of measurement for wear limit (See Wear Limits Chart)
B - Spring operating height point of measurement for wear limit (See Wear Limits Chart)

*Serviced in assembly only — not as a detail part.

Fig XII-3. Front output shaft, disconnect clutch, flanges, and parking brake, exploded view, legend

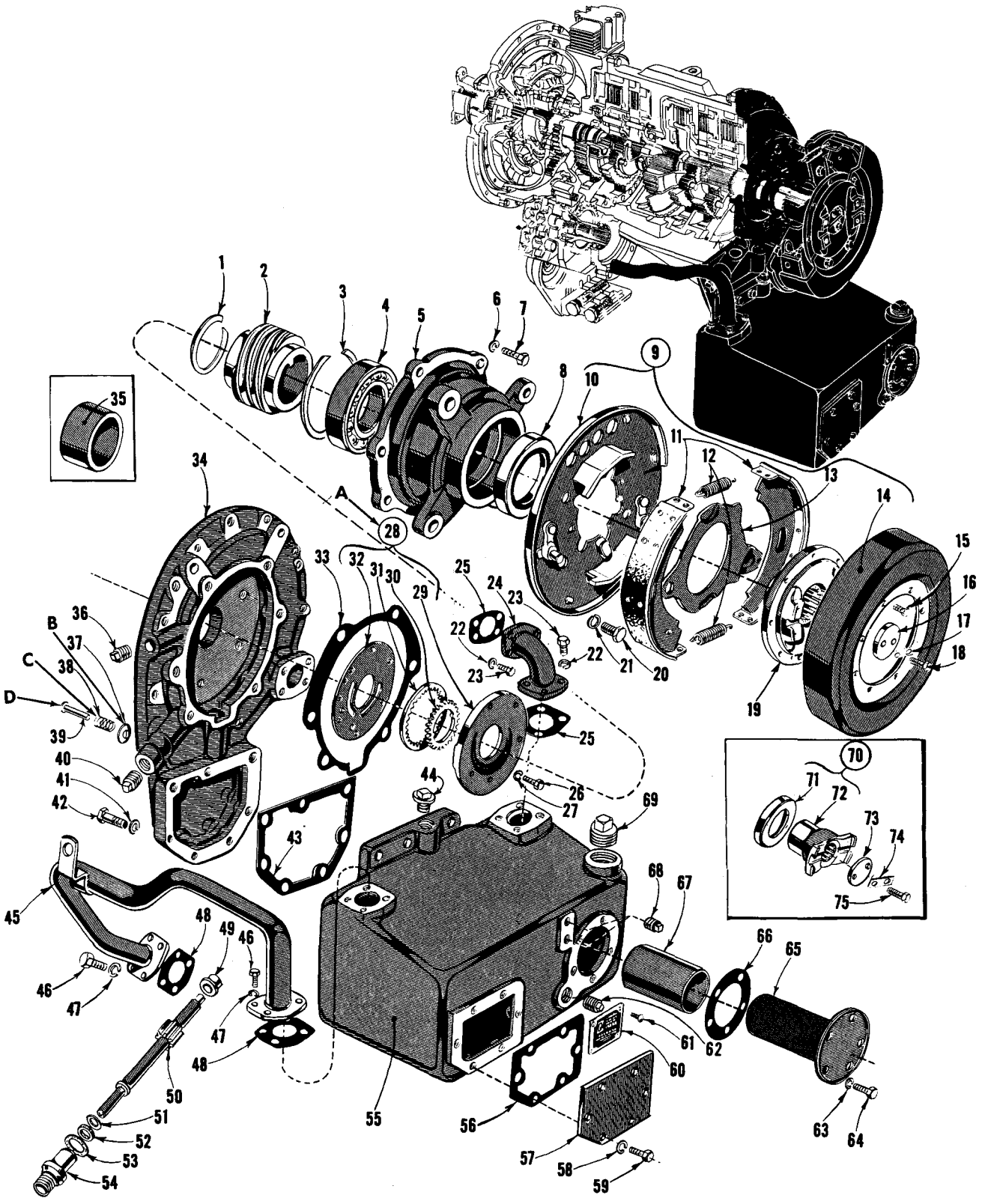


Fig XIII-1. Model CRT-3330-3 oil sump adapter, output driven oil pump assembly, parking brake assembly, and oil sump, exploded view

SECTION XIII OIL SUMP ADAPTER, OIL SUMP, AND RELATED PARTS REBUILD (MODEL CRT-3330-3)

1 - External snap ring
2 - Speedometer drive gear
3 - Internal snap ring — 4.140 O.D.
4 - Single row ball bearing assembly
5 - Bearing retainer
6 - Lock washer
7 - Hexagon head bolt
8 - Oil seal
9 - Parking brake assembly — 13 3/8" dia
*10 - Brake backing plate
11 - Shoe and lining assembly
12 - Brake shoe return spring
13 - Operating cam lever
14 - Brake drum
15 - Hexagon head bolt — 3/8" - 24 x 3/4"
16 - Flange retainer washer
17 - Locking strip
18 - Hexagon head bolt
19 - Brake mounting flange
20 - Hexagon head bolt — 5/8" - 11 x 1 1/4"
21 - Lock washer — 5/8"
22 - Lock washer
23 - Hexagon head bolt
24 - Output driven oil pump suction tube
25 - Suction tube gasket
26 - Hexagon head bolt
27 - Lock washer
28 - Output driven oil pump assembly
29 - Oil pump body
30 - Oil pump drive gear
31 - Oil pump driven gear
32 - Oil pump cover
33 - Bearing retainer gasket
34 - Oil sump adapter
35 - Spacer (For use on models not requiring speedometer drive)
36 - Plug
37 - Check valve
38 - Spring
39 - Guide
40 - Plug
41 - Lock washer
42 - Hexagon head bolt
43 - Sump gasket
44 - Plug
45 - Oil drain tube
46 - Hexagon head bolt
47 - Washer
48 - Gasket
49 - Bushing
50 - Shaft
51 - Washer
52 - Seal
53 - Gasket
54 - Sleeve
55 - Oil sump
56 - Inspection and cleanout cover gasket
57 - Inspection and cleanout cover
58 - Lock washer
59 - Hexagon head bolt
60 - Transmission name plate
61 - Drive screw
62 - Sump drain plug
63 - Lock washer
64 - Hexagon head bolt
65 - Oil strainer assembly
66 - Oil strainer gasket
67 - Oil strainer shield
68 - Oil level check plug
69 - Oil filler plug
70 - Output flange assembly
71 - Dust shield
72 - Flange
73 - Flange retaining washer
74 - Locking strip
75 - Hexagon head bolt

A - Gear end clearance with unit assembled and gear O.D. clearance point of measurement for wear limit (See Wear Limits Chart)
B - Valve clearance point of measurement for wear limit (See Wear Limits Chart)
C - Spring operating height point of measurement for wear limit (See Wear Limits Chart)
D - Valve guide clearance point of measurement for wear limit (See Wear Limits Chart)

*Serviced in assembly only — not as a detail part.

Fig XIII-1. Model CRT-3330-3 oil sump adapter, output driven oil pump assembly, parking brake assembly, and oil sump, exploded view, legend

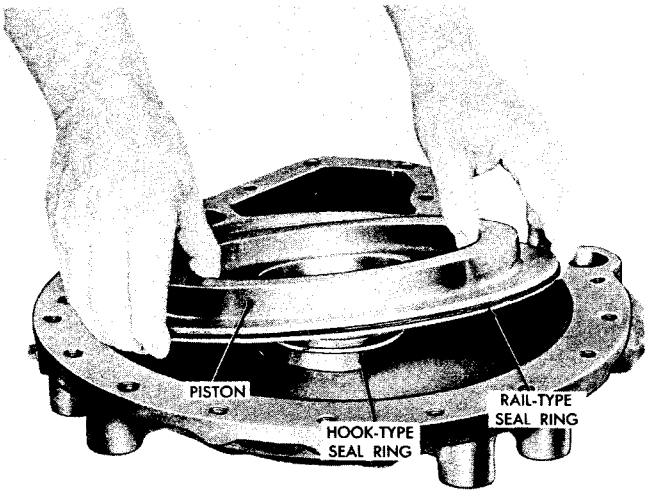


Fig XIII-2. Removing or installing low-range piston from adapter

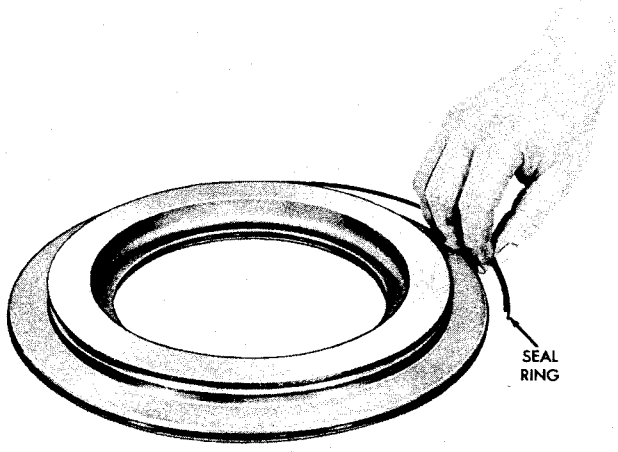


Fig XIII-3. Removing or installing external seal ring from piston

1. OIL SUMP ADAPTER (FIG XIII-1)

a. DISASSEMBLY

(1) Remove the low-range piston from the adapter (fig XIII-2).

(2) Pry out one rail-type seal ring. Refer to figure XIII-3. Remove the other three rail-type seal rings. Remove the expander ring. Refer to figure XIII-4.

(3) Remove the hook-type seal ring from the adapter (fig XIII-2).

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, e, and h for cleaning and inspection procedures.

c. ASSEMBLY

(1) Install the hook-type seal ring on the adapter (fig XIII-2).

(2) Install the expander ring. Refer to figure XIII-4. Install four seal rings, one at a time. Refer to figure XIII-3. Space the rings so that the openings on the rings will be staggered approximately two inches apart.

(3) Install the low-range piston in the adapter (fig XIII-2).

2. BEARING RETAINER (FIG XIII-1)

a. DISASSEMBLY

(1) Remove the snap ring from the bearing retainer (fig XIII-5).

(2) Remove the single row ball bearing assembly from the bearing retainer.

(3) Do not remove the oil seal from the bearing retainer unless replacement of parts is necessary. If replacement is needed, press the seal out of the retainer.

b. CLEANING AND INSPECTION. Refer to section IV, paragraphs 5b, c, d, e, f, h, and l for cleaning and inspection procedures.

c. ASSEMBLY

(1) If the old oil seal was removed, install the new seal in the bearing retainer. The spring side of the seal goes toward the oil to be sealed in.

(2) Install the ball bearing assembly in the bearing retainer.

(3) Install the snap ring in the bearing retainer (fig XIII-5).

3. OIL SUMP (FIG XIII-1)

a. INPUT PRESSURE AND SCAVENGE OIL PUMP ASSEMBLY. Refer to section IX, paragraph 2 for rebuild of the scavenge pump.

b. DISASSEMBLY

(1) Remove the bolts that secure the oil strainer assembly to the oil sump. Re-

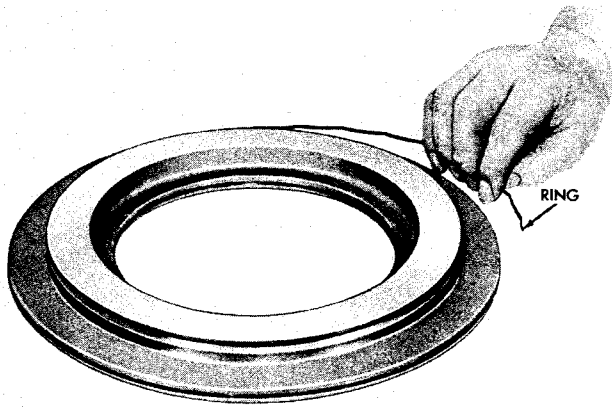


Fig XIII-4. Removing or installing expander ring from piston

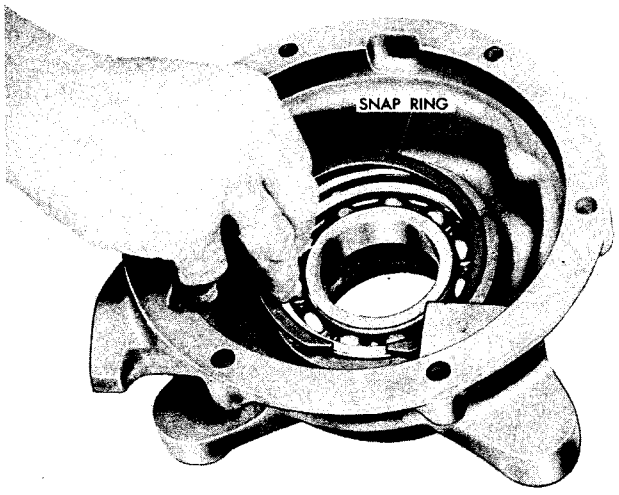


Fig XIII-5. Removing or installing snap ring from bearing retainer

move the oil strainer assembly (fig XIII-6).

(2) Remove the bolts that secure the inspection and cleanout cover to the oil sump. Remove the cover (fig XIII-6).

(3) Remove the oil filler plug, oil level check plugs, and the sump drain plug.

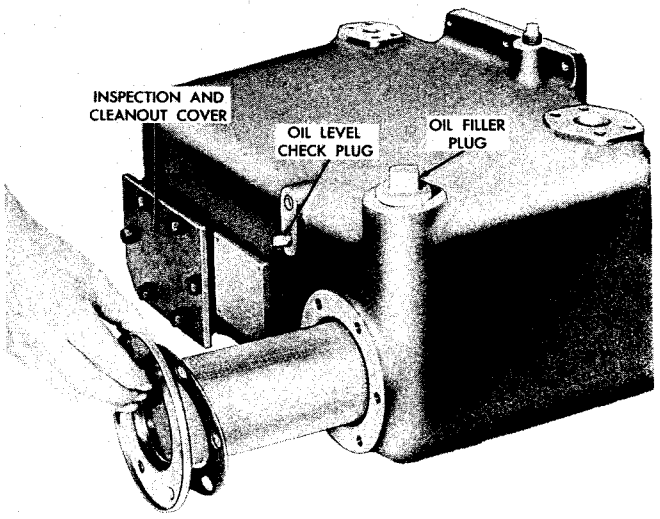


Fig XIII-6. Removing or installing oil strainer assembly

c. CLEANING AND INSPECTION. Refer to section IV, paragraphs 5b, e, and k for cleaning and inspection procedures.

d. ASSEMBLY

(1) Install the filler plug, the sump drain plug, and the oil level check plugs.

(2) Install the inspection and cleanout cover (fig XIII-6). Install the cover bolts.

(3) Install the oil strainer assembly (fig XIII-6). Install the oil strainer bolts.

4. SPEEDOMETER DRIVE (CRT-3330-3 MODEL) (FIG XIII-1)

Refer to section VI, paragraph 5c (2) for disassembly procedure. Refer to section IV, paragraph 5b, e, g, h, and i for cleaning and inspection procedures. Refer to the note in section VI, paragraph 6b (8) for assembly of the speedometer drive.

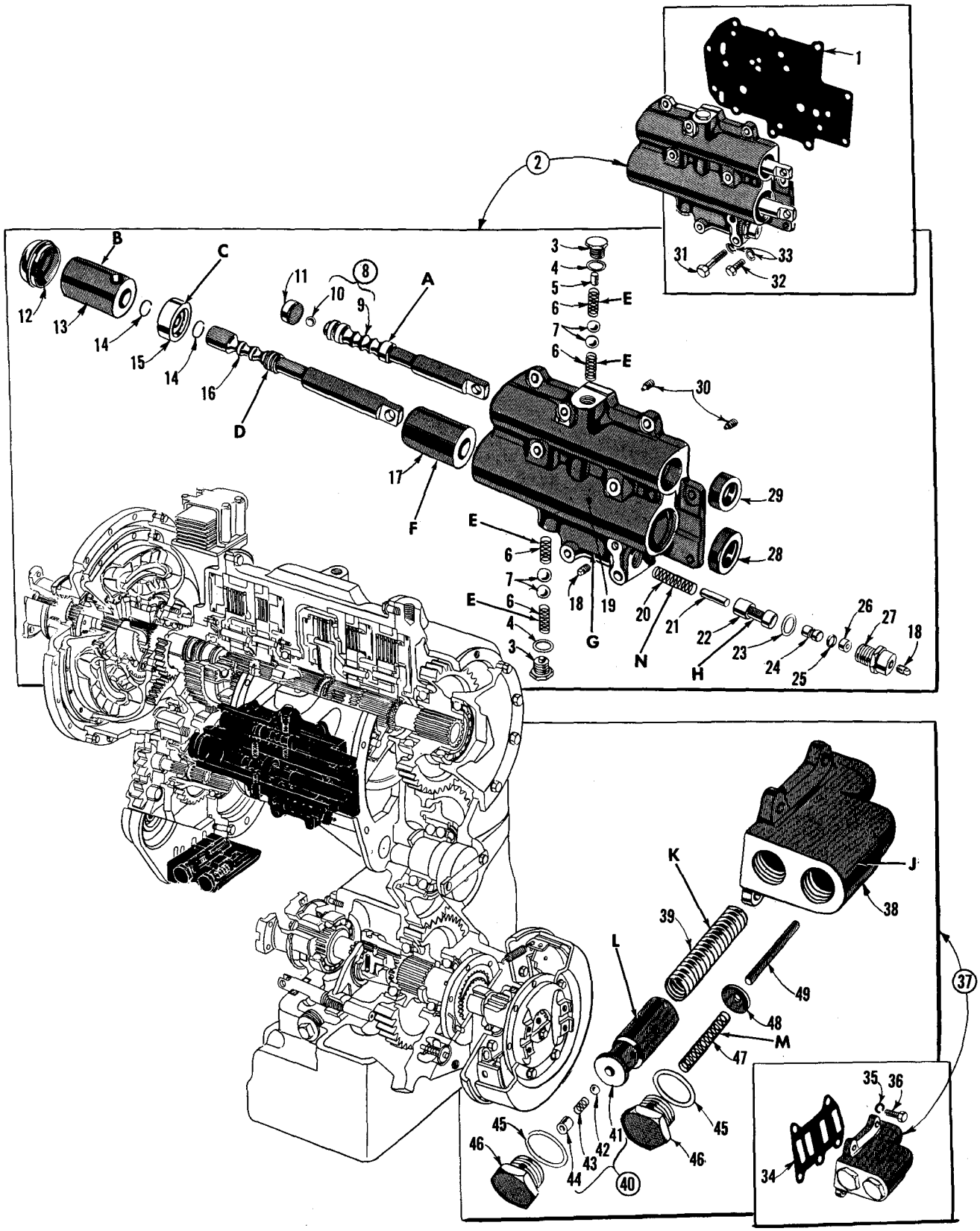


Fig XIV-1. Valve body group, exploded view

SECTION XIV PRESSURE REGULATOR AND SELECTOR VALVE BODIES REBUILD

1. PRESSURE REGULATOR VALVE BODY (FIG XIV-1)

a. DISASSEMBLY

(1) Remove plug (46) and gasket from pressure regulator valve body (38).

(2) Remove the main pressure regulator valve assembly and the spring from the pressure regulator valve body (fig XIV-2).

1 - Selector valve body gasket
2 - Selector valve body assembly
3 - Plug
4 - Annular gasket
5 - Pin
6 - Spring
7 - Ball
8 - Range selector valve assembly
*9 - Range selector valve
10 - Ball
11 - Plug
12 - Plug
13 - Reverse shift sleeve
14 - Internal snap ring
15 - Forward and reverse valve piston
16 - Forward and reverse valve
17 - Forward shift sleeve
18 - Pipe plug — 1/8"
19 - Selector valve body
20 - Spring
21 - Pin — 3/8" x 1 3/8"
22 - Clutch cutoff valve
23 - Annular gasket — 7/8"
24 - Clutch cutoff valve plug
25 - Seal ring
26 - Clutch cutoff valve piston cup
27 - Cutoff valve retainer plug
28 - Seal
29 - Seal
30 - Hexagon socket head screw — 3/8" - 16 x 3/4"
31 - Hexagon head bolt — 3/8" - 16 x 3"
32 - Hexagon head bolt — 3/8" - 16 x 1 1/4"
33 - Washer
34 - Pressure regulator valve body gasket
35 - Lock washer — 3/8"
36 - Hexagon head bolt — 3/8" - 16 x 1 1/4"
37 - Pressure regulator valve body assembly
38 - Pressure regulator valve body
39 - Spring
40 - Main pressure regulator valve assembly
*41 - Main pressure regulator valve
*42 - Ball
*43 - Spring
*44 - Dash pot spring retainer
45 - Gasket
46 - Plug
47 - Spring
48 - Oil filter check valve
49 - Oil filter check valve guide

A - Valve clearance point of measurement for wear limit (See Wear Limits Chart)
B - Sleeve clearance point of measurement for wear limit (See Wear Limits Chart)
C - Piston clearance point of measurement for wear limit (See Wear Limits Chart)
D - Valve clearance point of measurement for wear limit (See Wear Limits Chart)
E - Spring operating height point of measurement for wear limit (See Wear Limits Chart)
F - Sleeve clearance point of measurement for wear limit (See Wear Limits Chart)
G - Body clearance point of measurement for wear limit (See Wear Limits Chart)
H - Valve clearance point of measurement for wear limit (See Wear Limits Chart)
J - Body clearance point of measurement for wear limit (See Wear Limits Chart)
K - Spring operating height point of measurement for wear limit (See Wear Limits Chart)
L - Valve clearance point of measurement for wear limit (See Wear Limits Chart)
M - Spring operating height point of measurement for wear limit (See Wear Limits Chart)
N - Spring operating height point of measurement for wear limit (See Wear Limits Chart)

*Serviced in assembly only — not as a detail part.

Fig XIV-1. Valve body group, exploded view, legend

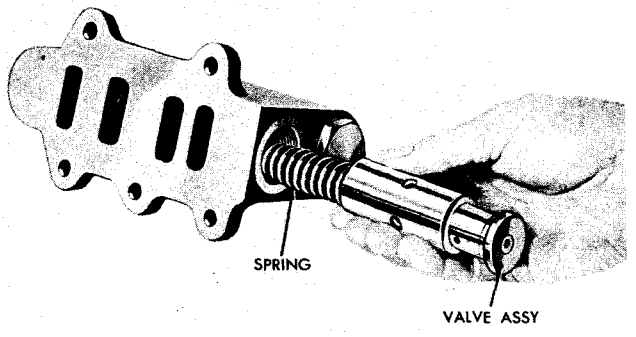


Fig XIV-2. Removing or installing main pressure regulator valve assembly and spring

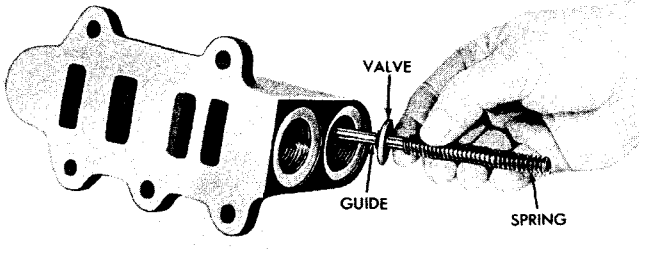


Fig XIV-3. Removing or installing spring, oil filter check valve, and check valve guide

(3) Remove plug (46) and the gasket from the pressure regulator valve body.

(4) Remove the spring, oil filter check valve, and check valve guide (fig XIV-3).

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, e, and m for cleaning and inspection procedures and paragraph 6 for wear limits.

c. ASSEMBLY

(1) Install the check valve guide, oil filter check valve, and spring in the pressure regulator valve body (fig XIV-3).

(2) Install the plug and the gasket in the pressure regulator valve body.

(3) Install the main pressure regulator valve assembly and the spring in the pressure regulator valve body (fig XIV-2).

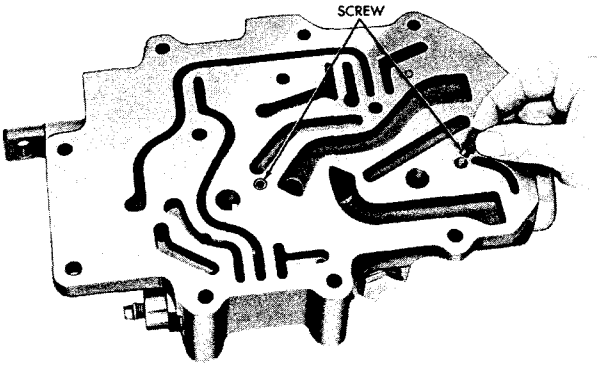


Fig XIV-4. Removing or installing socket head screws from range selector valve body

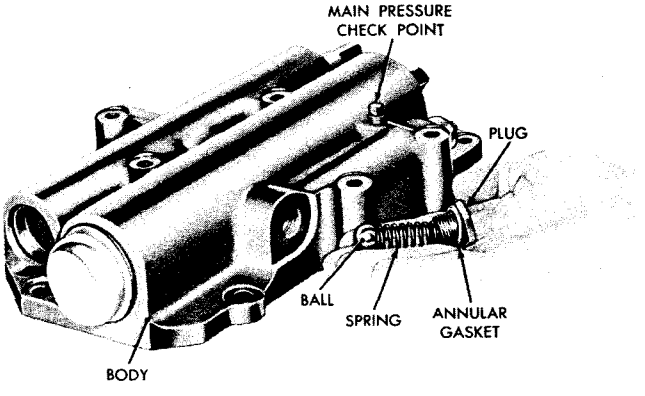


Fig XIV-5. Removing or installing plug, annular gasket, spring, and ball from range selector valve body

(4) Install plug (46) and gasket in the pressure regulator valve body.

2. SELECTOR VALVE BODY (FIG XIV-1)

a. DISASSEMBLY

(1) Remove two socket head screws from the body (fig XIV-4).

(2) Remove the plug, annular gasket, spring and ball from the body (fig XIV-5).

(3) Remove the plug from the body (fig XIV-6).

(4) Using a hammer and a drift (fig XIV-7) loosen the forward and reverse valve, seal, forward shift sleeve, and forward and

reverse valve piston. Remove these parts (fig XIV-8).

(5) Remove the remaining spring and ball from the body (fig XIV-9).

(6) Remove the reverse shift sleeve (fig XIV-10).

(7) Remove the plug, annular gasket, pin, spring, and ball from the body (fig XIV-11).

(8) Remove the range selector valve (fig XIV-12).

(9) Remove the remaining spring and ball from the body (fig XIV-13).

(10) Remove the cutoff valve retainer plug, annular gasket, clutch cutoff valve, spring and pin (fig XIV-14).

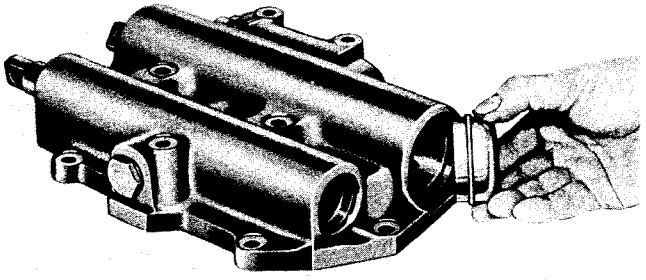


Fig XIV-6. Removing or installing plug from range selector valve body

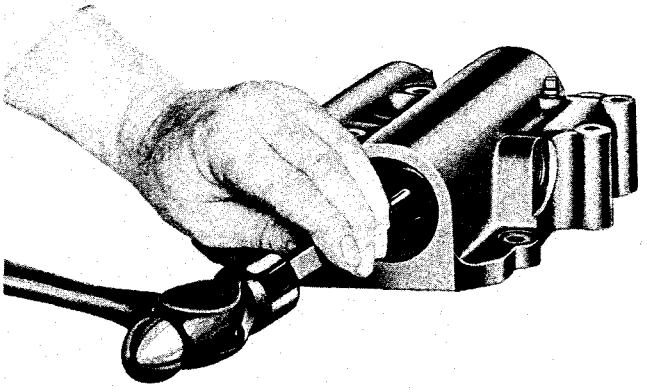


Fig XIV-7. Using hammer and drift to remove forward and reverse valve, seal, forward shift sleeve, and forward and reverse valve piston

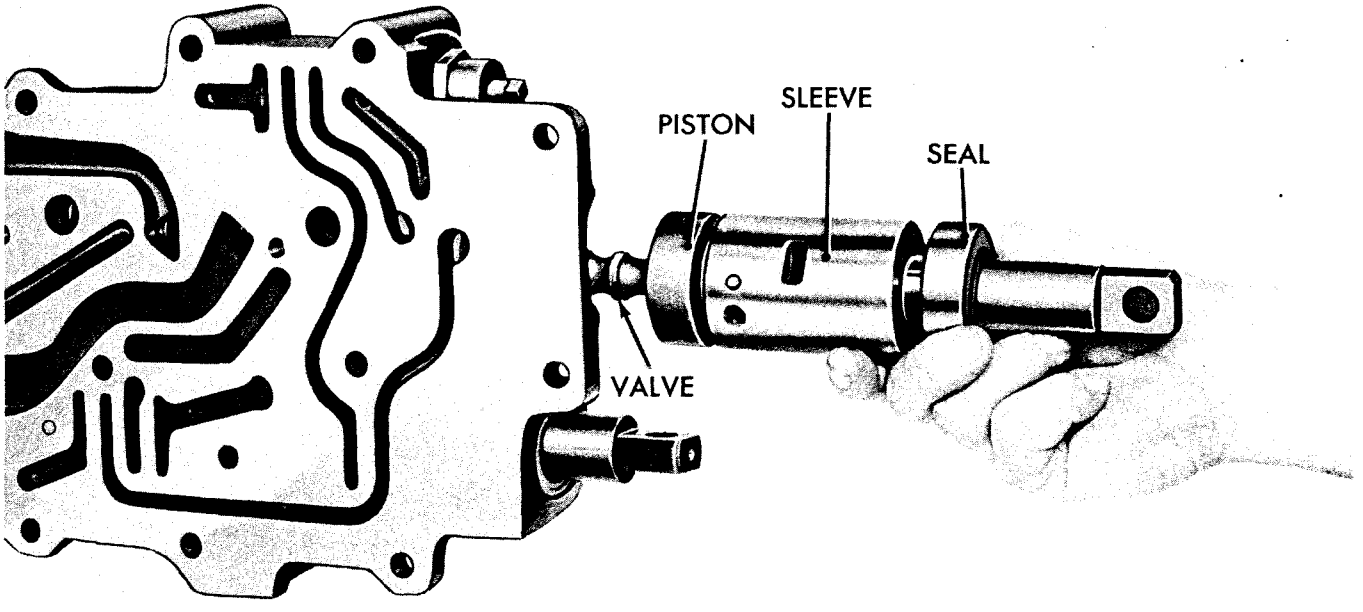


Fig XIV-8. Removing or installing forward and reverse valve, seal, forward shift sleeve, and forward-and-reverse-valve piston

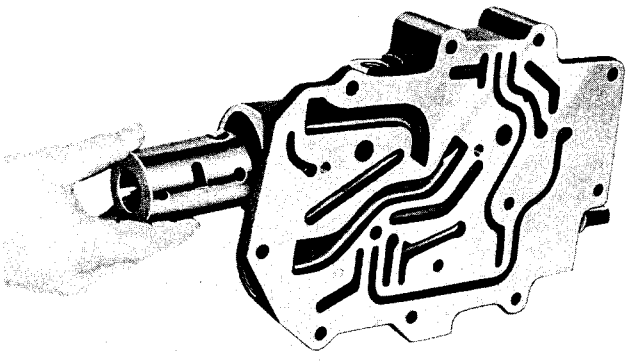


Fig XIV-9. Removing or installing spring and ball from range selector valve body

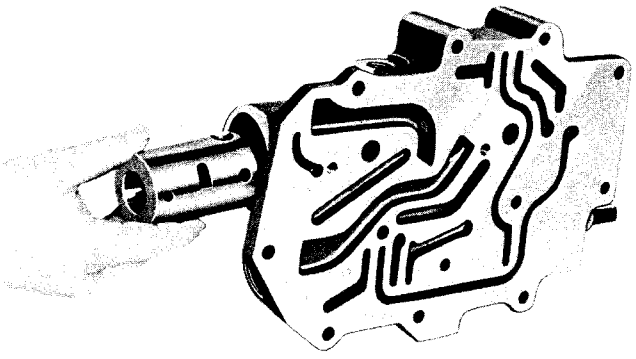


Fig XIV-10. Removing or installing reverse shift sleeve

(11) Remove pipe plug (18), clutch cutoff valve plug (24), seal ring (25), clutch cutoff valve piston cup (26) from cutoff valve retainer plug (27).

(12) Remove seal (28), forward shift sleeve (17), snap ring (14) and forward and reverse valve piston (15) from forward and reverse valve (16).

b. CLEANING, INSPECTION AND WEAR LIMITS. Refer to section IV, paragraphs 5b, e, h, l, and m for cleaning and inspection procedures and paragraph 6 for wear limits.

c. ASSEMBLY

(1) Install forward and reverse valve piston (15), snap ring (14), forward shift sleeve (17), and seal (28) on forward and reverse valve (16).

(2) Install the clutch cutoff valve piston cup (26), seal ring (25, fig VII, exp. view), clutch cutoff valve plug (24) and pipe plug (18) in cutoff valve retainer plug (27).

(3) Install the pin, spring, clutch cutoff valve, annular gasket and the cutoff valve retainer plug (fig XIV-14).

(4) Install the spring and the ball in the body (fig XIV-13).

(5) Push the ball and the spring down with a soft drift and install the range selector valve. Refer to figure XIV-12.

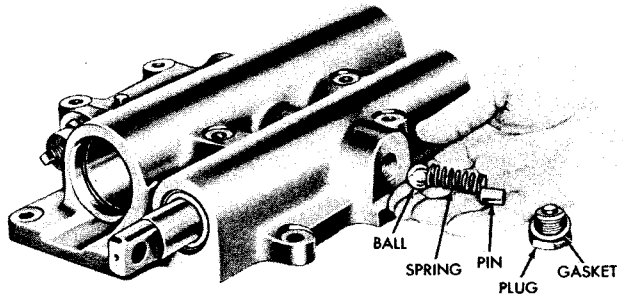


Fig XIV-11. Removing or installing plug, pin, annular gasket, spring, and ball from selector valve body assembly

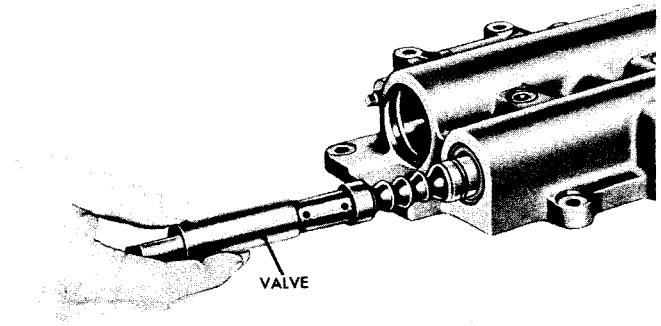


Fig XIV-12. Removing or installing range selector valve

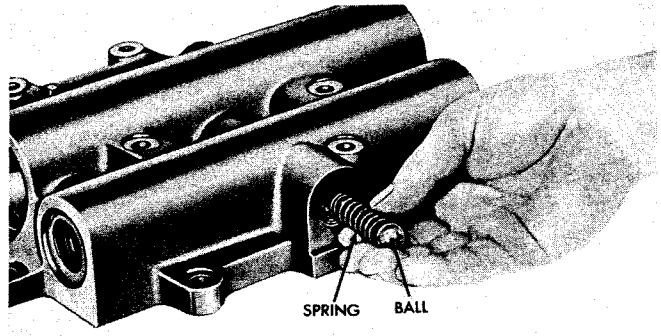


Fig XIV-13. Removing or installing spring and ball from selector valve body assembly

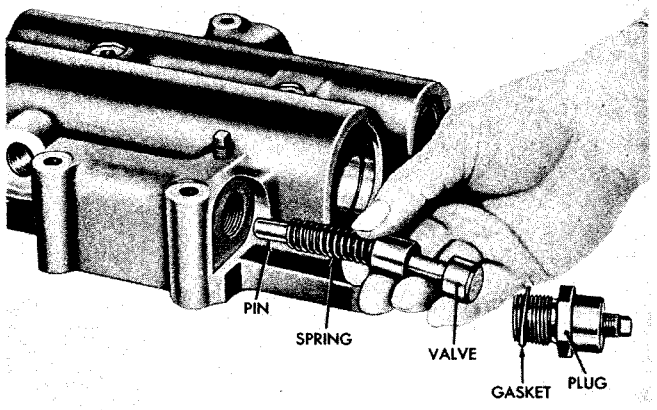


Fig XIV-14. Removing or installing cutoff valve retainer plug, annular gasket, clutch cutoff valve, spring, and pin

(6) Install the ball, spring, pin, plug, and annular gasket in the body (fig XIV-11).

(7) Align the sleeve with the valve body as illustrated and install the reverse shift sleeve (fig XIV-10). Secure the sleeve with a socket head set screw. Refer to figure XIV-4.

(8) Install the spring and the ball in the body (fig XIV-9) and compress the spring while the forward and reverse valve, seal, forward shift sleeve, and forward and reverse valve piston are installed (fig XIV-8). Align the sleeve with the valve body as illustrated, and secure the sleeve with a socket head set screw. Refer to figure XIV-4.

(9) Install the plug in the body (fig XIV-6).

(10) Install the ball, spring, annular gasket and the plug in the body (fig XIV-5).

INDEX

CYCLE CONTROLLED HORSEPOWER

TORQMATIC drive speeds the job cycle

TORQMATIC Drive provides "cycle controlled" horsepower.
No matter at what phase of the job cycle,
TORQMATIC Drive fits the engine speed and torque to the job—instantly.
Your "power dollar" goes farther with TORQMATIC Drive.

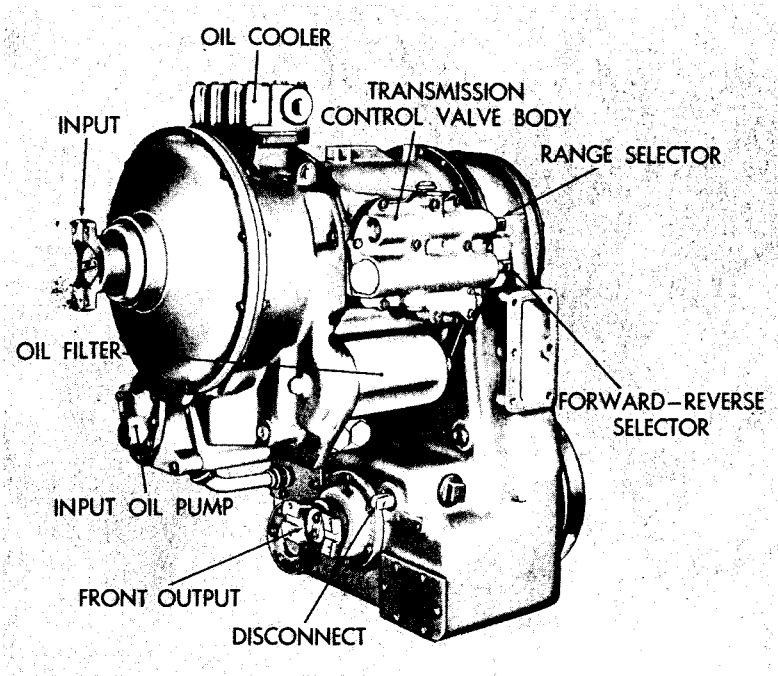
OPERATIONAL ADVANTAGES

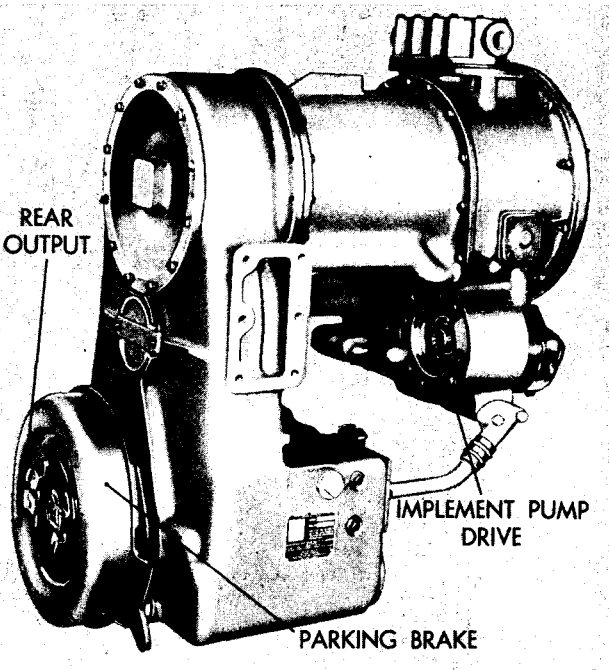
- SENSE-FEEL* hydraulic control for "feeling" the load pick-up
- Quick-shift at full power—forward or reverse
- Easier to operate—less operator fatigue
- Permits full engine power at implement pump
- No stalled engine when the going is rough
- Starts and accelerates heavy loads easily—smoothly
- Permits "inching" the load

ECONOMIC ADVANTAGES

- Speeds job cycle
- Eliminates shock load damage to engine and drive train components
- Prevents harmful engine lugging
- Permits engine to operate at maximum efficiency
- Increases equipment availability
- Cuts operator training time
- Provides more effective horsepower

* *SENSE-FEEL hydraulic control is an exclusive feature developed by Allison for enabling the operator to "feel the load" pick-up as in the engagement of a conventional mechanical clutch.*





More than 55,000 TORQMATIC Drives have been built to date. The various models are providing *cycle controlled horsepower* in loaders, graders, heavy duty off-highway trucks, earth movers, scrapers, tractors, rollers, drag lines, cranes, shovels, locomotives, rail cars, oil field servicing rigs, ski tows, tanks and atomic gun carriers.

Whatever your power-drive requirements, investigate TORQMATIC Drive. There is a Torqmatic converter to fit your heavy-duty needs from 40 to 400 horsepower—and a Torqmatic transmission—TG series or CT series from 70 to 300 horsepower. Bulletins and brochures on these other models are furnished free on request.

Allison TORQMATIC Drives

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