

(13) Install the second-stator assembly, flat side up, on the ground sleeve (fig. VI-9). Rotate the stator clockwise as it is lowered to keep the rollers from locking on the ground sleeve.

(14) Install the thrust washer (fig. VI-9).

(15) Install the first-stator assembly, flat side down, on the ground sleeve (fig. VI-8). Rotate the stator clockwise as it is lowered to keep the rollers from locking on the ground sleeve.

Caution: Make sure the stators can freewheel clockwise after installation and will lock up when rotated counterclockwise.

(16) Install the thrust washer (fig. VI-7).

(17) Install the snap ring that locates the turbine (fig. VI-7).

(18) Install the turbine assembly. Refer to fig. VI-6.

(19) Install the flywheel bearing inner race on the output shaft (fig. VI-5).

(20) Install the snap ring on the end of the output shaft (fig. VI-5).

#### e. Installing Flywheel Assembly.

(1) Install a new seal ring on the converter pump flange (fig. VI-4).

(2) Install an eyebolt into the end of the output shaft or tie a sling onto the converter housing and hoist the converter above the flywheel (fig. VI-3).

(3) Lower the converter, guiding the inner race of the pilot roller bearing into the bearing. After the inner race slides into the bearing, align the bolt holes in the converter pump with the holes in the flywheel. Lower the converter until the converter pump makes contact with the flywheel.

Caution: If the flywheel is equipped with a lockup clutch, make sure that the splined clutch drive plate, which

is riveted to the turbine, is engaged with the splined clutch friction plate.

(4) Working through the converter housing cover opening, install four self-locking bolts in the pump. Space the bolts 90 degrees apart (fig. VI-2).

(5) Tighten the bolts evenly to draw the flywheel onto the pilot.

Caution: If the flywheel becomes cocked on the pilot, remove the flywheel and repeat steps (3) through (5), above.

(6) Install the remaining 32 self-locking bolts.

#### f. Installing Charging Oil Pump.

(1) Install the oil pump body gasket and oil pump on the converter housing (fig. VI-1).

(2) Secure the pump to the converter housing with six lock washers and six bolts.

Caution: Be sure the oil pump turns freely after it is bolted to the converter housing.

(3) Install the converter housing cover gasket and the converter housing cover onto the converter housing. Secure the cover to the housing with two bolts and lock washers.

### 4. DISASSEMBLY OF TC MODELS (AUTOMOTIVE SHAFT)

a. Basic Similarities. These models are disassembled as outlined in par. 2, above, with the exception of the removal of the output shaft, which is outlined below.

#### b. Removing Torqmatic Converter Output Shaft (Automotive Shaft).

(1) Remove the bolt, lock washer, washer, and output flange from the output shaft.

(2) Remove six bolts and lock washers from the bearing retainer. Using jackscrews if necessary, remove the bearing retainer (fig. VI-21).

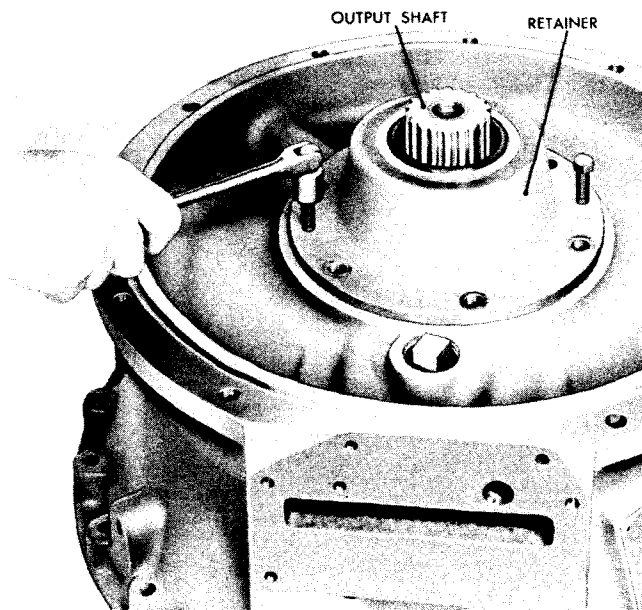


Fig VI-21. Removing bearing retainer

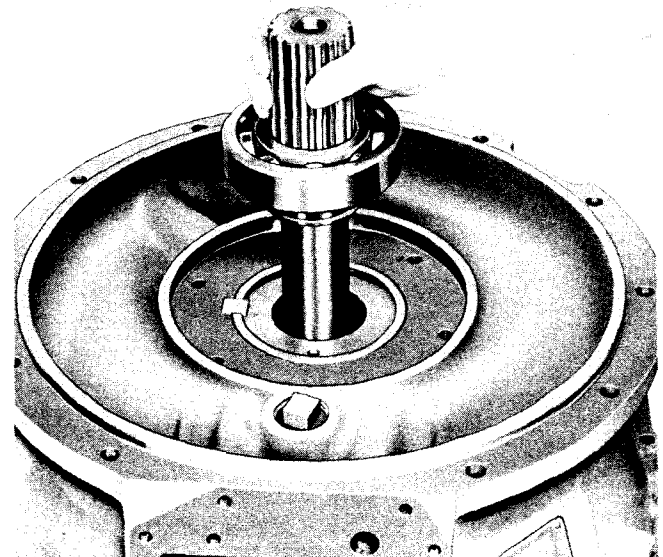


Fig VI-22. Removing (or installing) output shaft and bearing

(3) Remove the output shaft and bearing (fig. VI-22).

#### 5. ASSEMBLY OF TC MODELS (AUTOMOTIVE SHAFT)

a. Basic Similarities. These models are assembled as outlined in par. 3, above, with the exception of the installation of the converter output shaft which is outlined below.

##### b. Installing Torqmatic Converter Output Shaft (Automotive Type).

(1) Install a new bearing retainer gasket on the rear of the converter housing.

(2) Lower the output shaft and bearing into the ground sleeve (fig. VI-22).

(3) Install the bearing retainer and secure the retainer to the converter housing with six bolts and lock washers (fig. VI-21).

(4) Install the output flange, output-flange washer, plain lock washer and hexagon-head bolt into the end of the shaft.

(5) Torque the bolt to 120-130 pound-feet.

#### 6. DISASSEMBLY OF TCA MODELS (ACCESSORY DRIVE)

a. Basic Similarities. These models are disassembled as outlined in par. 2, above, with the exception of the removal of the output shaft which is outlined below.

##### b. Removing Torqmatic Converter Output Shaft (Accessory Drive).

(1) Remove the four bolts and the lock washers from the accessory drive adapter. Remove the adapter and gasket (fig. VI-23).

(2) Remove the eight bolts and lock washers from the bearing retainer (fig. VI-24).

(3) Using jackscrews, remove the retainer and the shims from the bearing housing (fig. VI-24).

(4) Using pliers, remove the accessory drive adapter shaft (fig. VI-23).

(5) Install a slide hammer puller into the accessory drive shaft (fig. VI-25). Remove the accessory drive spacer, accessory drive sleeve coupling, accessory drive shaft

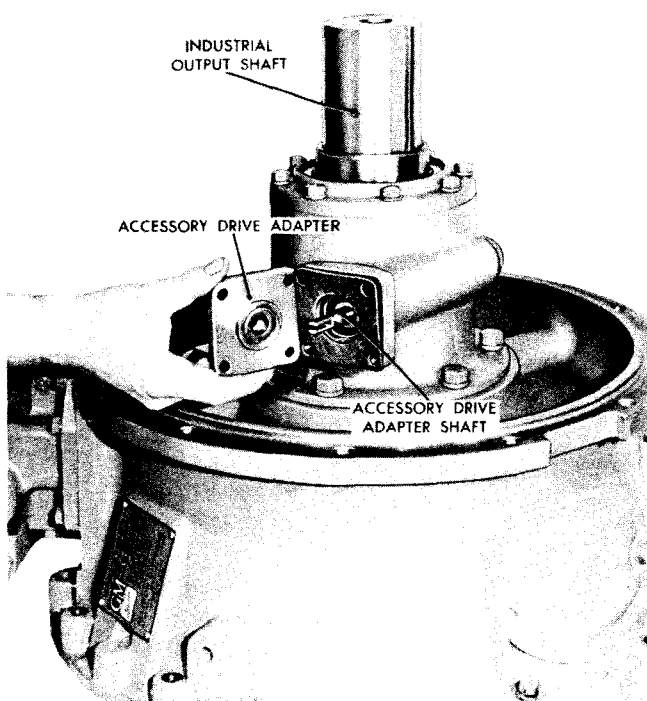


Fig VI-23. Removing accessory drive adapter

and single-row ball bearing assembly from the bearing housing by tapping lightly with the puller.

(6) Remove the six bolts and lock washers from the bearing housing. Before removing the bearing housing, place index marks on the bearing housing and converter housing so that the original position of the bearing housing will be retained.

(7) Using jackscrews, remove the bearing housing from the converter housing (fig. VI-26).

(8) Remove the output shaft by pulling it from the rear of the converter housing. A sleeve, two roller bearing assemblies, and the accessory drive gear will come off with the shaft.

(9) Remove the outer race of the rear roller bearing assembly and the spacer from the bearing housing.

(10) Remove the bearing housing gasket.

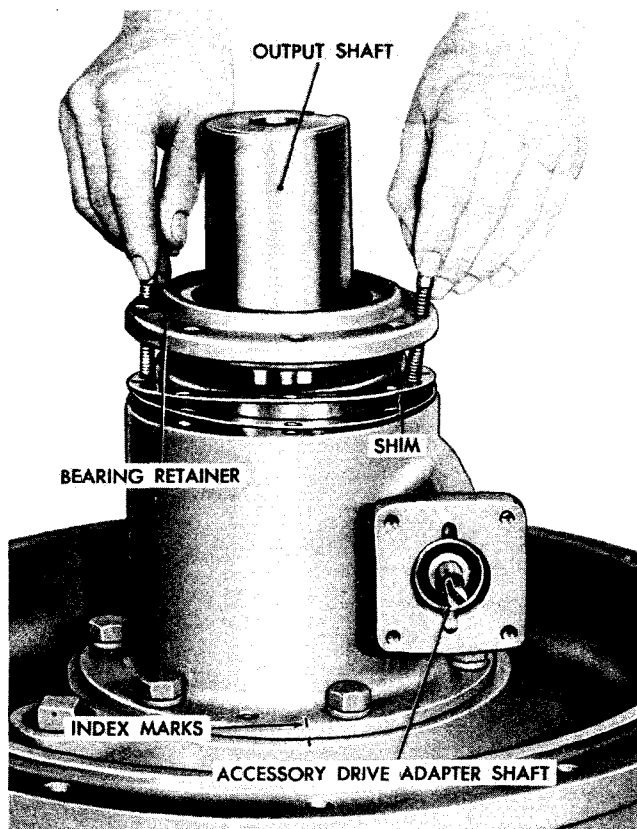


Fig VI-24. Removing bearing retainer and shims

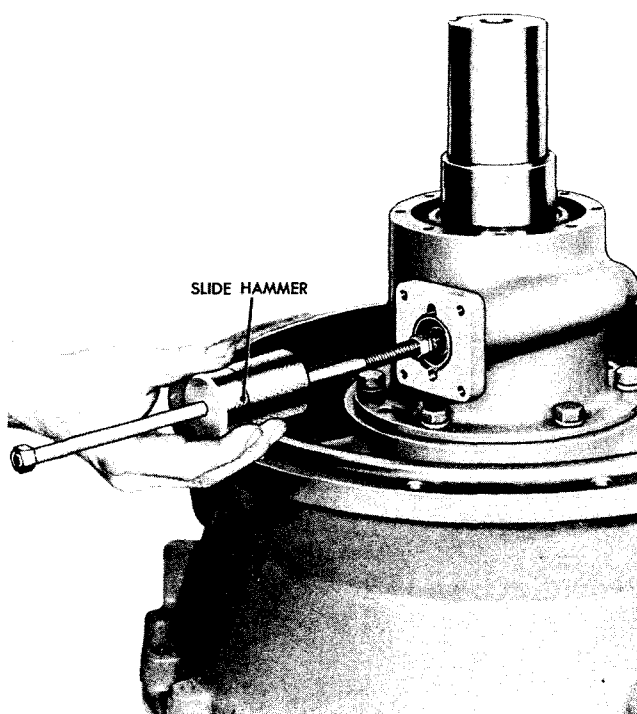


Fig VI-25. Removing accessory drive shaft

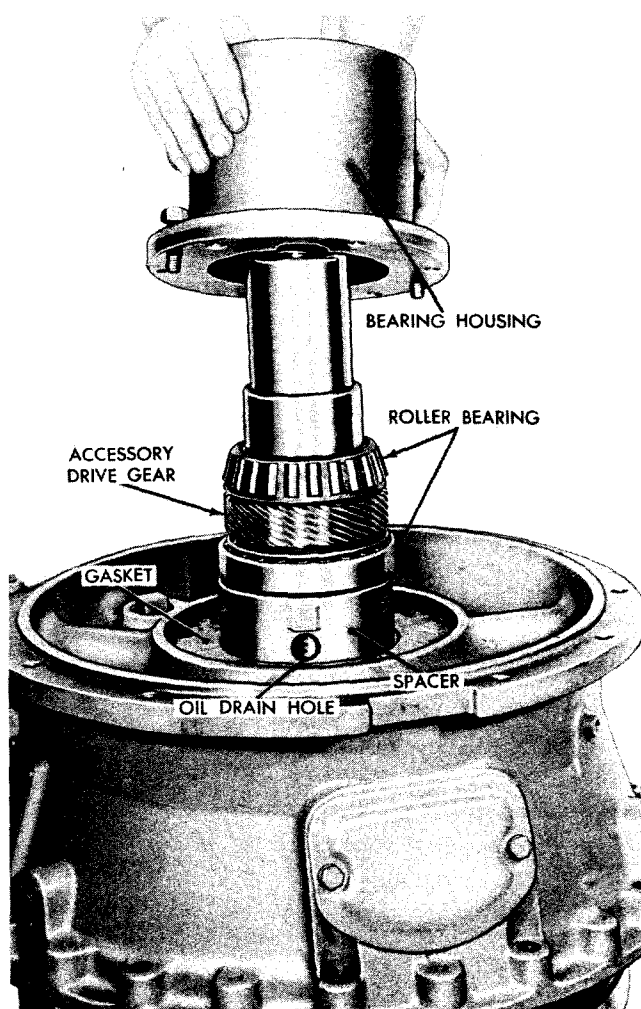


Fig VI-26. Removing bearing housing from converter housing

## 7. ASSEMBLY OF TCA MODELS (ACCESSORY SHAFT)

a. Basic Similarities. These models are assembled as outlined in par. 3, above, with the exception of the installation of the converter output shaft which is outlined below.

### b. Installing Bearing Housing and Output Shaft (Accessory Drive).

(1) Position the converter housing assembly, rear end up, on the disassembly table.

(2) Place the spacer (fig. VI-26) so that it rests against the end of the ground sleeve and then place the bearing outer race so that it rests against the spacer. Position the spacer so that the oil drain hole is next to the ground sleeve.

(3) Install the output shaft in the ground sleeve so that the front roller bearing engages with its outer race.

(4) Install the bearing housing gasket on the rear of the converter housing.

(5) Install the bearing housing on the rear of the converter housing, making sure that any oil drain holes in the bearing housing align with the holes in the converter housing.

Note: Be sure to align the index marks (fig. VI-24) made on the bearing housing and the converter housing during disassembly.

(6) Secure the bearing housing to the converter housing with six lock washers and six bolts.

(7) If the outer race of the rear roller bearing was removed, install it, thin edge down, in the bearing housing.

c. Installing Bearing Retainer. Install the bearing retainer the same as in par. 3b, above.

d. Checking End Play. Check end play same as par. 3c, above.

### e. Installing Accessory Drive Shaft, Spacer, Adapter.

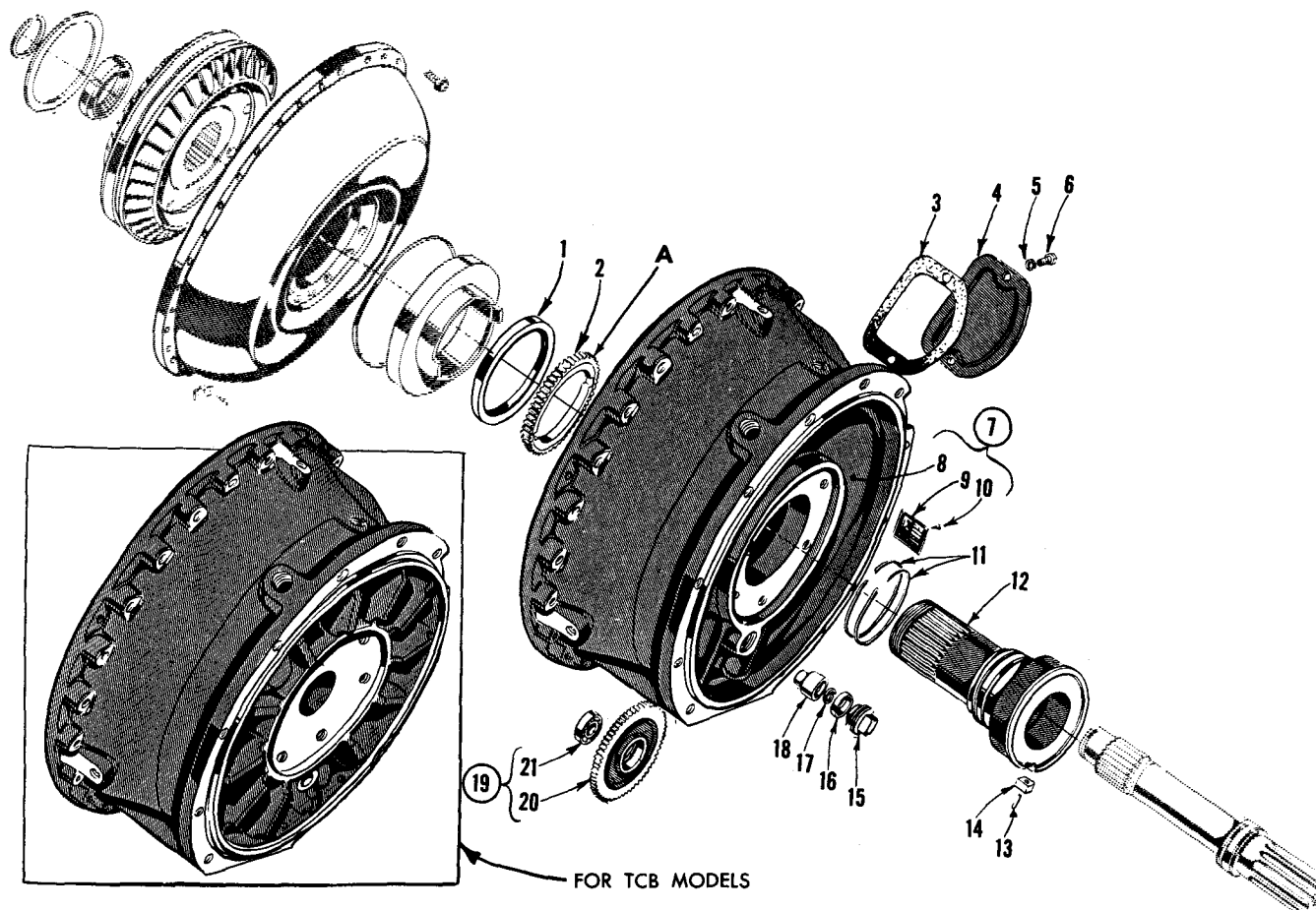
(1) Install the accessory drive shaft, the sleeve coupling, and the ball bearing as an assembly.

(2) Install the spacer in the bearing housing.

(3) If the converter is equipped with an accessory drive adapter, install the adapter shaft, adapter gasket, and adapter.

(4) Secure the adapter to the bearing housing with four lock washers and four 5/16-18 bolts. Torque the bolts 15 to 18 pound-feet.

(5) Install the key in the output shaft.



- |  |   |
|--|---|
| 1 - Converter pump hub oil seal —<br>4 3/4 I. D. | 11 - Hook-type seal ring — 4 3/16 bore  |
| 2 - Oil pump drive gear                          | 12 - Converter ground sleeve            |
| 3 - Converter housing cover gasket               | 13 - Dowel pin — 1/4 dia x 1 1/8        |
| 4 - Converter housing cover                      | 14 - Converter ground sleeve key        |
| 5 - Plain lock washer — 3/8                      | 15 - Square-head plug — 1 1/2-8 NPT     |
| 6 - Hexagon-head bolt — 3/8                      | 16 - Seal ring — .101 x 29 x 1.10 I. D. |
| 7 - Converter housing assembly                   | 17 - Plain lock washer — 1/2            |
| 8 - Converter housing                            | 18 - Oil pump idler gear shaft          |
| 9 - Torqmatic converter name plate               | 19 - Oil pump idler gear assembly       |
| 10 - Round-head drive screw — 4 x 1/4            | 20 - Oil pump idler gear                |
|  | 21 - Single-row ball bearing assembly   |

See Wear Limits Chart for the following point of measurement:

A - Oil pump drive gear bore and thickness

Fig VI-27. Housing — exploded view

## 8. HOUSING REBUILD

### a. Disassembly (fig. VI-27).

(1) Remove the square-head plug, seal ring, and lock washer from the rear of the converter housing (fig. VI-28).

(2) Install the slide hammer remover J 3187 and adapter J 4857 (fig. IV-1) in the threaded hole in the oil pump idler gear shaft (fig. VI-29).

(3) Remove the shaft, being careful that the oil pump idler gear does not drop out of the housing.

(4) Remove the oil pump idler gear assembly (fig. VI-30). Do not remove the ball bearing from the gear.

(5) Oil pump drive gear (2, fig. VI-27) and converter pump hub oil seal (1) generally are not removed. If either the gear or seal needs to be replaced, collapse the oil seal with a drift and hammer and remove the oil seal. The gear can then be removed.

(6) Ordinarily, converter ground sleeve (12, fig. VI-27) is not removed. If it needs to be replaced, position the converter housing in a press, front side up, and press the ground sleeve out of the housing (fig. VI-31). Remove the ground sleeve key and dowel pin from the ground sleeve.

b. Cleaning, Inspection, Wear Limits. Refer to sec. IV, pars. 5b, c, d, e, f, h, i, j and k for cleaning and inspection procedures, and par. 6 for wear limits information.

### c. Assembly (fig. VI-27).

(1) If the ground sleeve was removed, install dowel pin (13) in ground sleeve key (14) and install the key on the new ground sleeve so that the end of the key is flush with the face of the ground sleeve. Notice that the dowel pin hole in the key is off center. Press the ground sleeve and the key into the housing (fig. VI-32).

(2) If oil pump drive gear (2, fig. VI-27) and converter pump hub oil seal (1) were re-

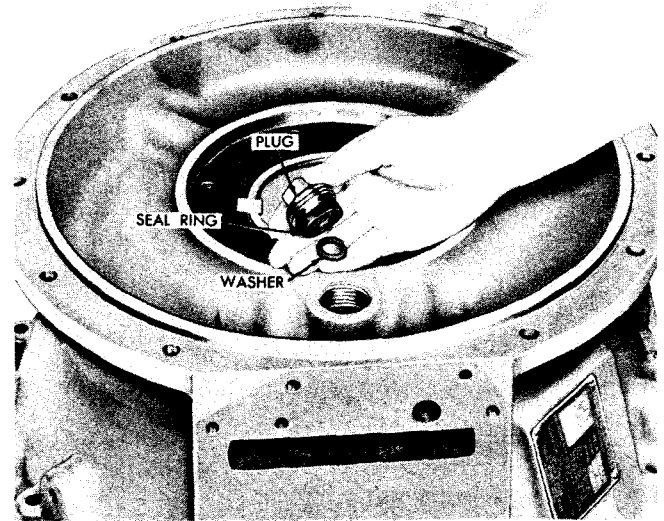


Fig VI-28. Removing (or installing) square-head plug, seal ring and lock washer from converter housing

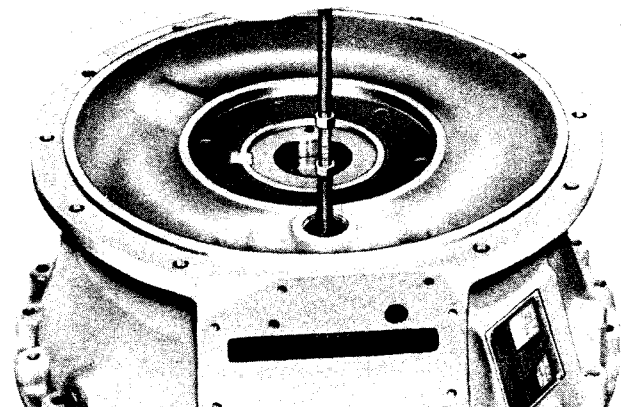
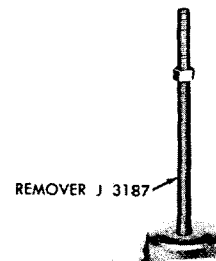


Fig VI-29. Removing charging oil pump idler gear

moved, install the gear. Install the oil seal with the spring side toward the gear using replacer J 7475 (fig. IV-1).

(3) Position the converter on the table with the rear end up.

(4) Install the charging oil pump idler gear assembly by positioning the gear in the

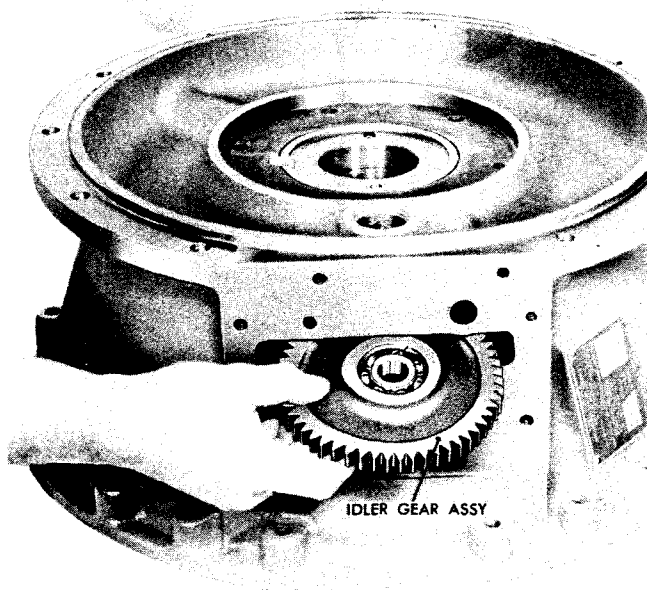


Fig VI-30. Removing (or installing) oil-pump idler gear assembly

housing bore (fig. VI-30), and installing oil pump idler gear shaft (18, fig. VI-27) in its bore. Use a soft drift or a bolt of the proper size threaded into the shaft and tap the shaft into place.

(5) Install the lock washer, seal ring and square-head plug (fig. VI-28) into the oil pump idler gear shaft bore.

## 9. CONVERTER PUMP AND HUB ASSEMBLY REBUILD

### a. Disassembly (fig. VI-33).

(1) The converter pump was removed when the converter was disassembled into subassemblies (see par. 1c, above). No further disassembly of the pump is necessary.

(2) Press double-row ball bearing (4) out of converter pump hub (10).

### b. Cleaning, Inspection. Refer to sec.

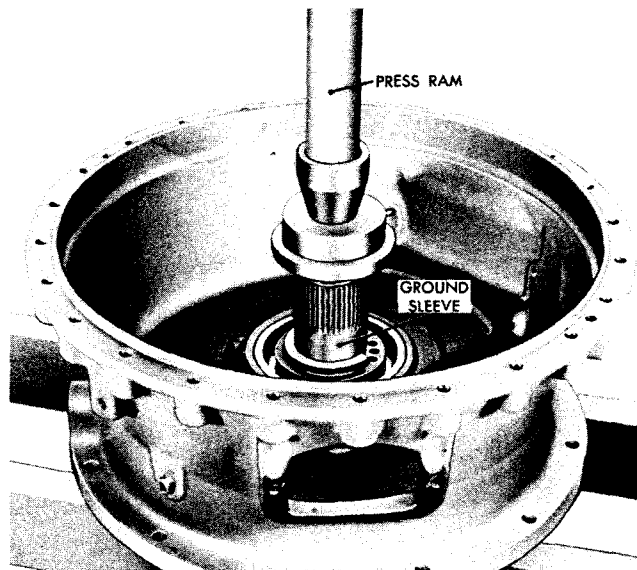


Fig VI-31. Removing ground sleeve from housing

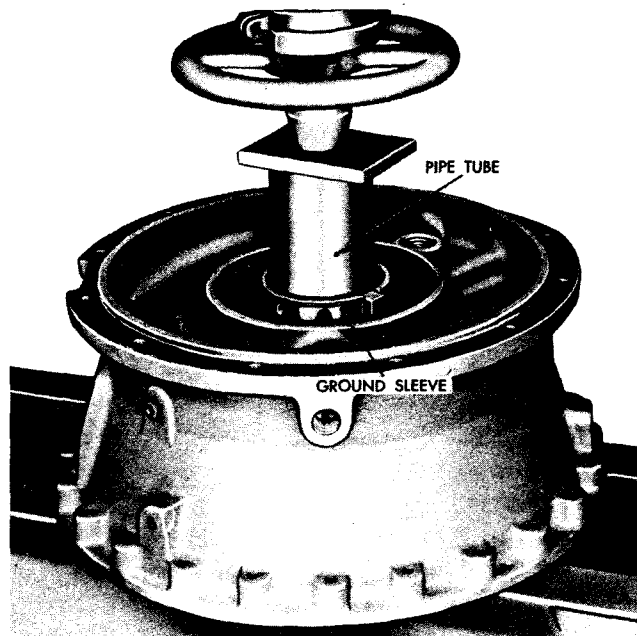
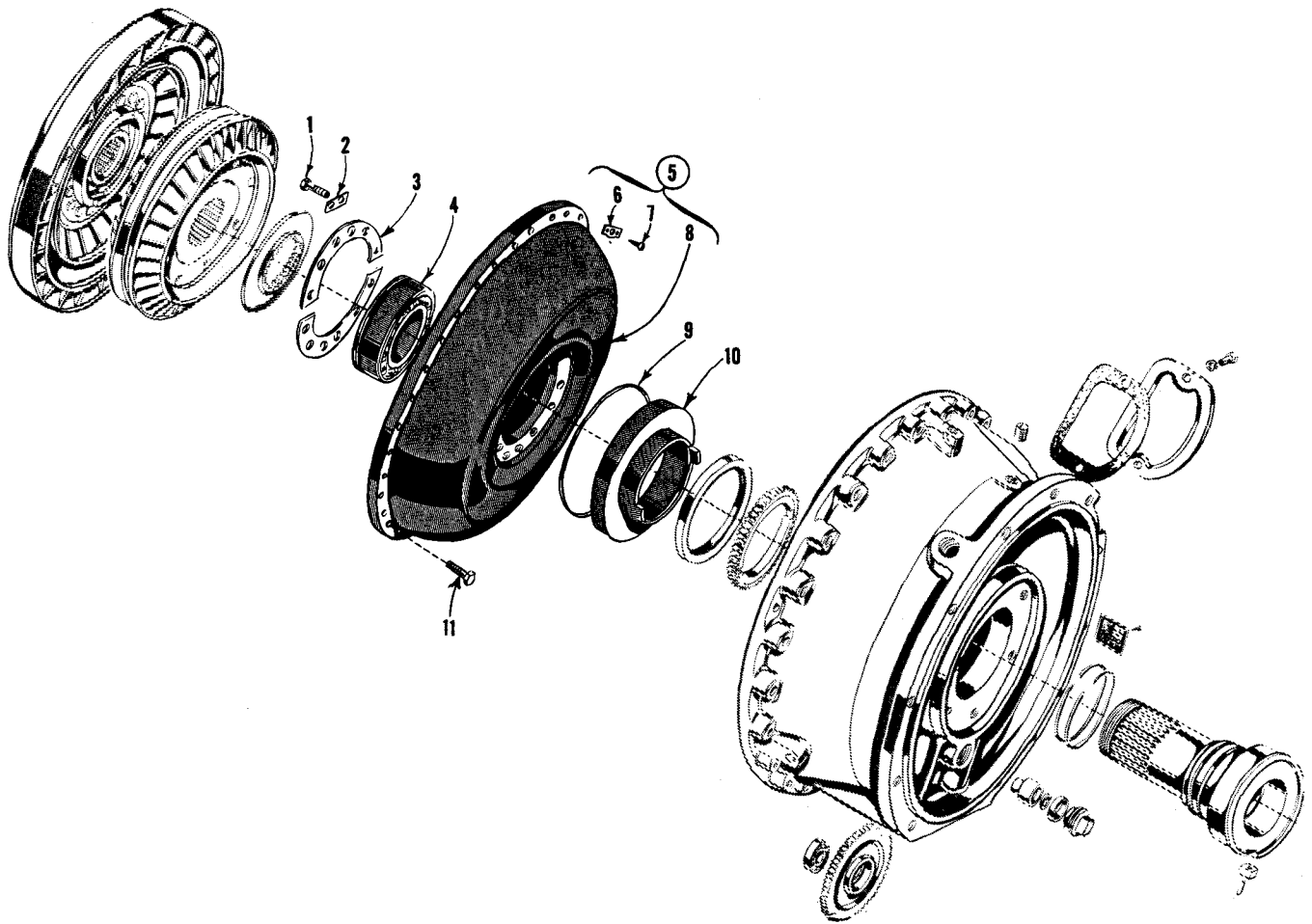


Fig VI-32. Installing ground sleeve

IV, pars. 5b, c, d, e, f, h, and k for cleaning and inspection procedures.

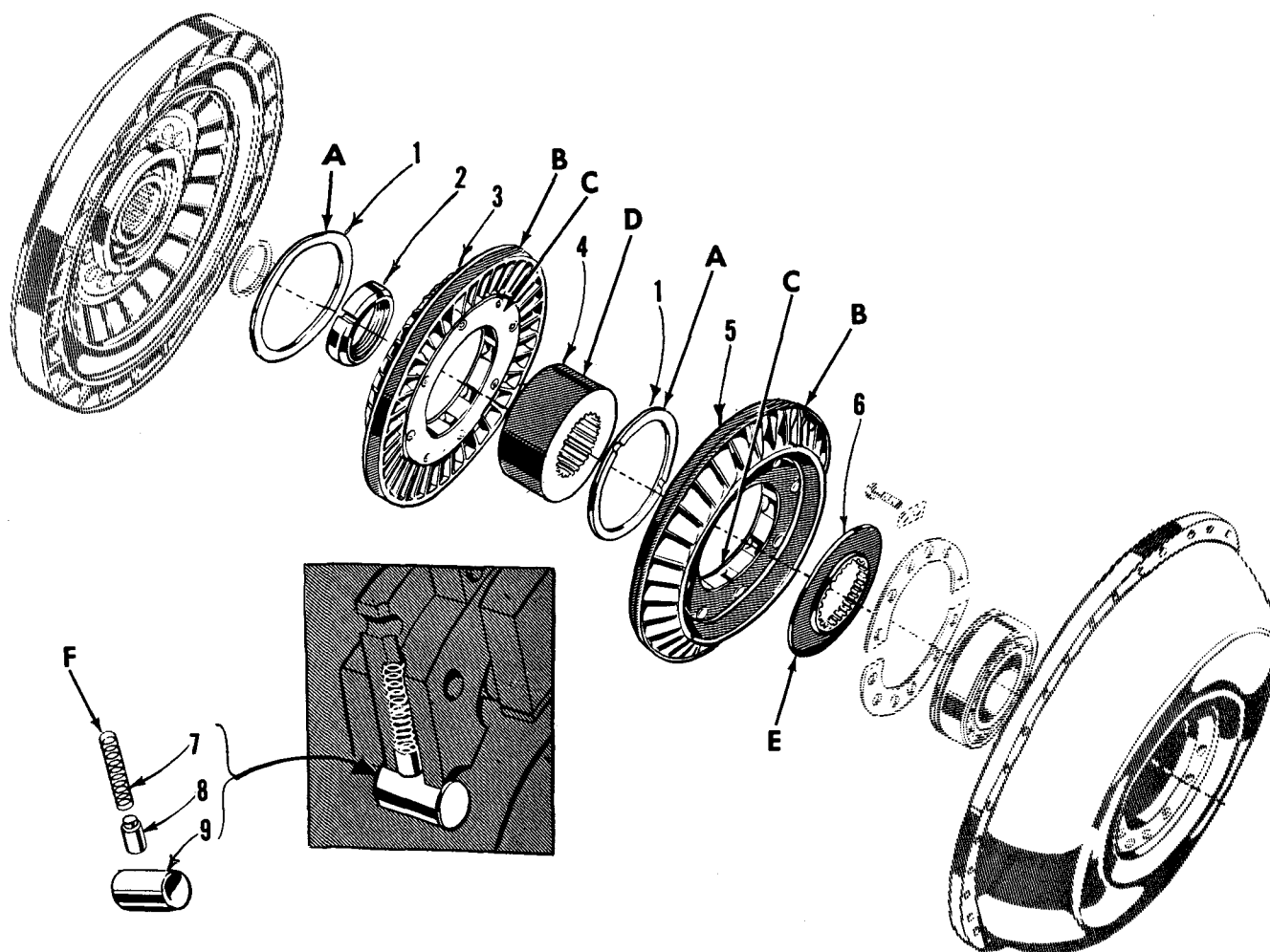
c. Assembly (fig. VI-33). Press double-row ball bearing (4) into the converter pump hub (10).



- 1 - Hexagon-head bolt — 3/8-24 x 1 1/8
- 2 - Lock strip
- 3 - Bearing retainer
- 4 - Double-row ball bearing assembly
- 5 - Converter pump assembly
- 6 - Converter balance weight,
  - 1 oz-in correction
  - 2 oz-in correction
  - 4 oz-in correction
- 7 - Round-head drive screw — 6 x 3/8 long
- 8 - Converter pump
- 9 - Seal ring
- 10 - Converter pump hub
- 11 - Hexagon-head, self-locking bolt — 3/8

Fig VI-33. Torqmatic converter pump — exploded view





- 1 - Thrust washer -- 5.260 I.D.
- 2 - Nut
- 3 - First stator
- 4 - Stator freewheel
- 5 - Second stator
- 6 - Stator back plate
- 7 - Freewheel roller spring
- 8 - Pin -- .250 dia x .70
- 9 - Stator freewheel roller

See Wear Limits Chart for the following points of measurement:

- A - Thrust washer
- B - Stator assembly bore
- C - Stator side washer thickness
- D - Stator race O.D.
- E - Stator back plate thickness
- F - Spring operating height

Fig VI-34. Torqmatic converter stators — exploded view

## 10. STATOR ASSEMBLIES REBUILD

a. Disassembly (fig. VI-34). Remove rollers (9), springs (7) and spring pins (8) from the stators.

b. Cleaning, Inspection, Wear Limits.

(1) Refer to sec. IV, pars. 5b, e, and m for cleaning and inspection procedures, and par. 6 for wear limits information.

(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, or scores. If any of these conditions are found, the stator assembly should be replaced.

(4) Inspect the stator blades for dents, nicks, or burs. If these conditions are found, remove them with a fine file and smooth stone. If there are dents that cannot be removed with a file or if there are cracks, replace the stator assembly.

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

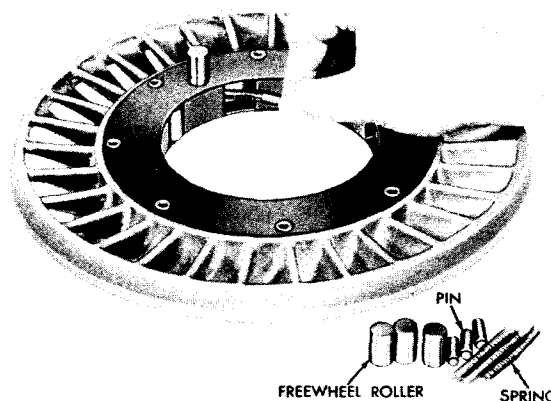
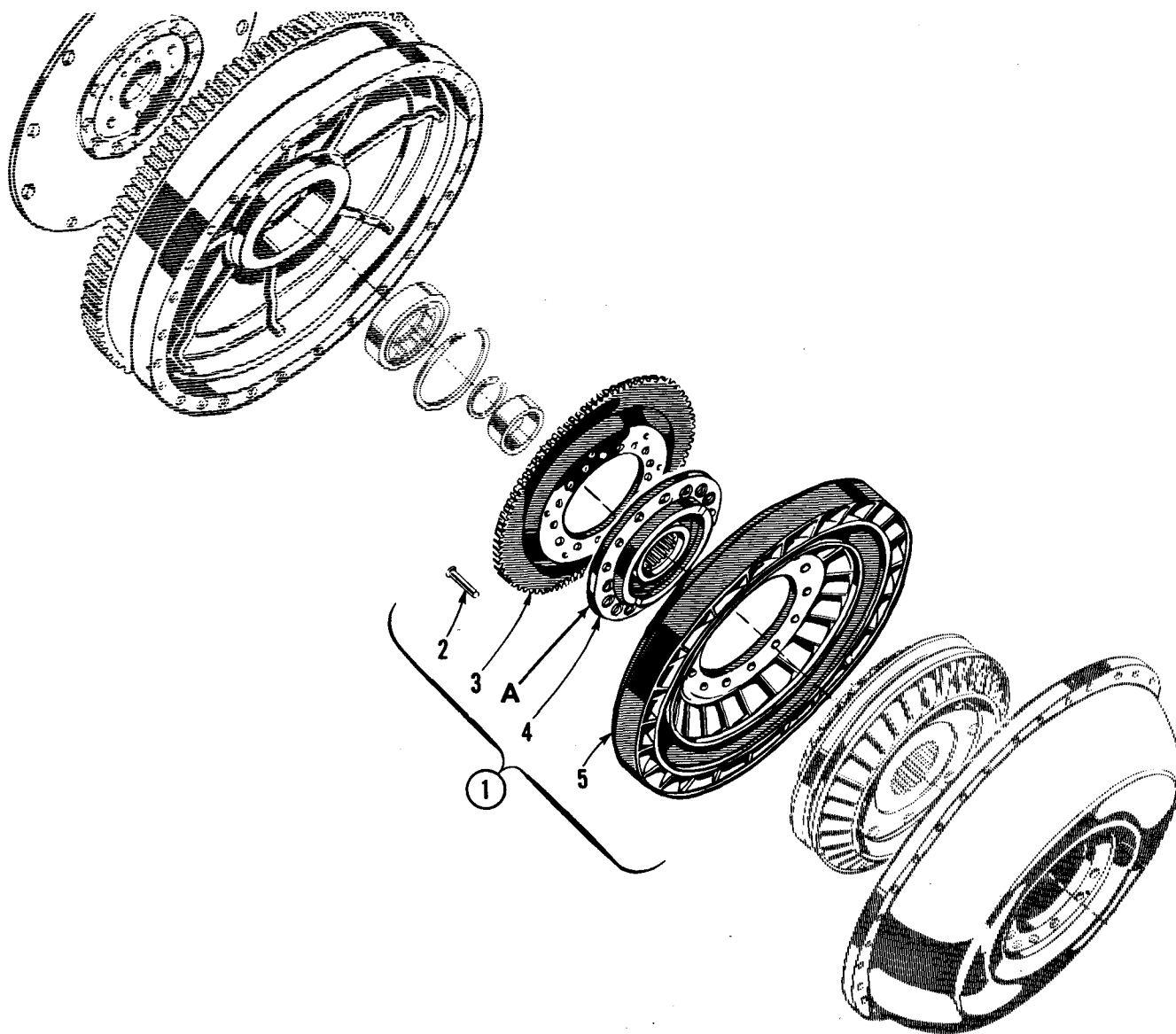


Fig VI-35. Installing freewheel roller spring and spring pin into stator

(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.

c. Assembly. Install the freewheel roller springs on the spring pins and insert them into their bore in the stator (fig. VI-35). Install the freewheel rollers. See fig. IV-4 for points of measurements.



- 1 - Converter turbine assembly
- 2 - Rivet
- 3 - Clutch drive plate
- 4 - Converter turbine hub
- 5 - Converter turbine

See Wear Limits Chart for following point of measurement:

A - Hub

Fig VI-36. Torqmatic converter turbine — exploded view

# 11. CONVERTER TURBINE ASSEMBLY REBUILD

a. Replacing Turbine. The turbine assembly is a riveted assembly consisting of a hub, turbine, and rivets (fig. VI-36). If the converter being rebuilt is equipped with a lockup clutch, the turbine assembly will also

include a lockup clutch drive plate which is riveted to the turbine. If any of these parts need replacing, replace the entire assembly.

b. Cleaning, Inspection, Wear Limits. Refer to sec. IV, pars. 5b, e, and j for cleaning and inspection procedures and par. 6 for wear limits information.

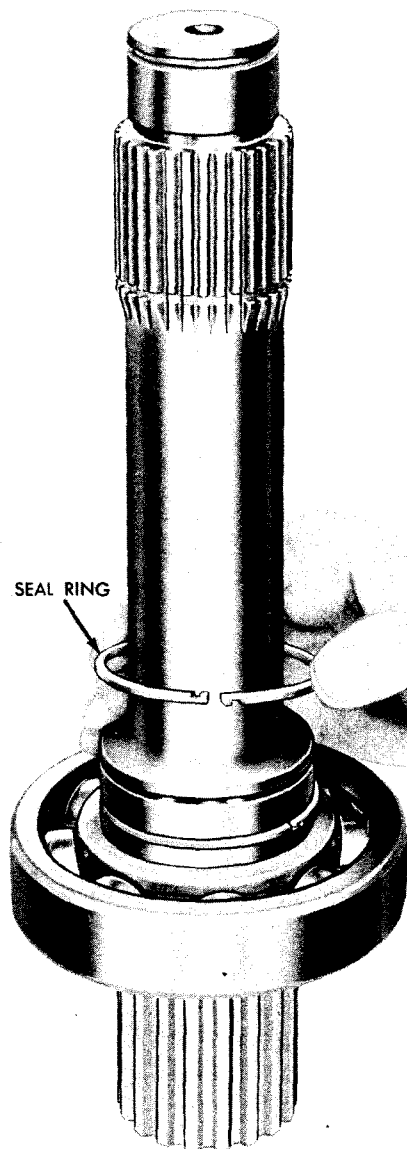


Fig VI-37. Removing (or installing) hook-type seal rings from output shaft

## 12. OUTPUT SHAFT (AUTOMOTIVE) AND FLANGE ASSEMBLY REBUILD

### a. Disassembly.

(1) Remove the two hook-type seal rings from the output shaft (fig. VI-37).

(2) To remove the ball bearing from the shaft, support the bearing and shaft assembly, rear end up, on the bearing inner race. Press the shaft out of the bearing, using an arbor press (fig. VI-38).

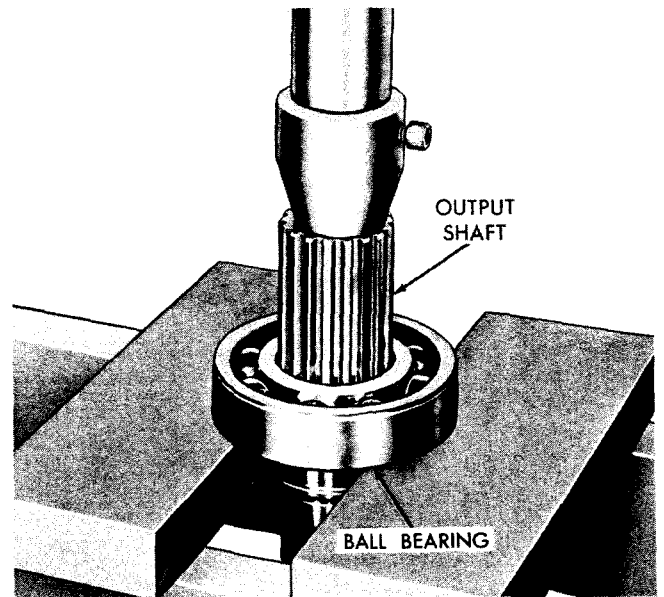


Fig VI-38. Pressing output shaft from bearing

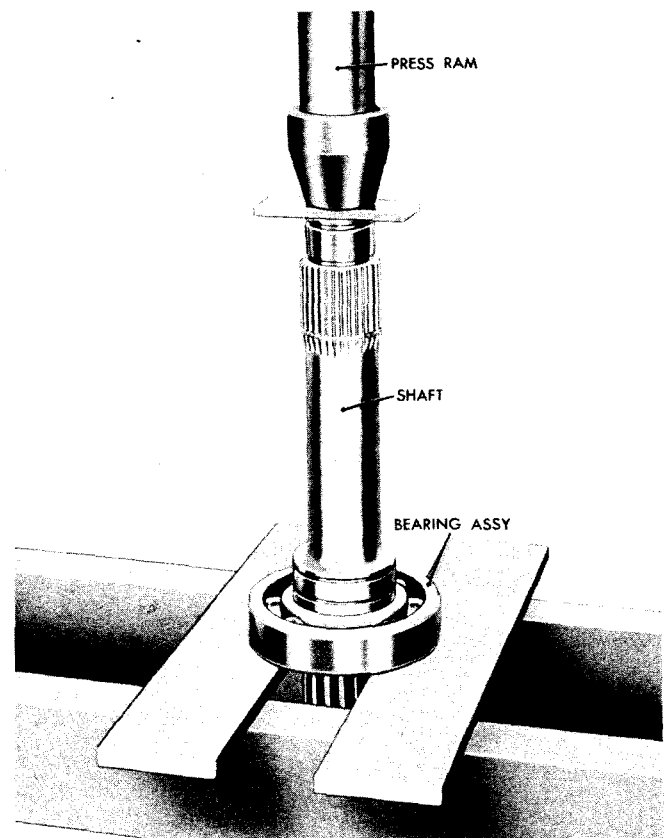


Fig VI-39. Pressing output shaft into bearing

(3) Output-flange dual oil seal (8, fig. VI-40) is not ordinarily removed unless replacement is necessary. When replacing, press the seal out of the bearing retainer.



- 



b. Cleaning and Inspection. Refer to sec. IV, pars. 5b, c, d, e, f, h and j for cleaning and inspection procedures.

c. Assembly.

(1) Press the ball bearing on the shaft, using an arbor press. Be certain to press only on the bearing inner race (fig. VI-39).

Note: The bearing must be seated against the shoulder on the shaft.

(2) Install two hook-type seal rings (fig. VI-37).

(3) If output-flange dual oil seal (8, fig. VI-40) was removed, press the new seal in output bearing retainer (5) from the front (chamfered end) of the bearing retainer bore using No. 3 Permatex or shellac, between the seal outside diameter and the bore of the retainer. The spring side of the seal must be toward the front of the retainer.

### 13. OUTPUT SHAFT (INDUSTRIAL) REBUILD

a. Disassembly of Output Shaft  
(fig. VI-40).

(1) Remove two hook-type seal rings (10) from output shaft (11).

Note: For the rebuild of an output shaft with accessory drive, refer to par. 17, below.

(2) When it is necessary to replace roller bearings (9), support the shaft and bearing assembly, front end up, on two steel plates in an arbor press. The plates must be placed between the two bearings, making certain that only the inner race of the bearing rests on the

plates. Press the shaft out of the front roller bearing.

(3) If the rear bearing must be removed, use a hammer and chisel to crack sleeve (13) over the keyway slot. This will loosen the sleeve so that it can be removed. Then place the shaft, rear end up, in a press. Place the bearing inner race on the plates and press the shaft out of the sleeve and the rear-output bearing.

(4) If it is necessary to replace output-flange dual oil seal (19), press it out of output-shaft bearing retainer (20).

b. Cleaning, Inspection. Refer to sec. IV, pars. 5b, c, d, e, f, h, j and k for cleaning and inspection procedures.

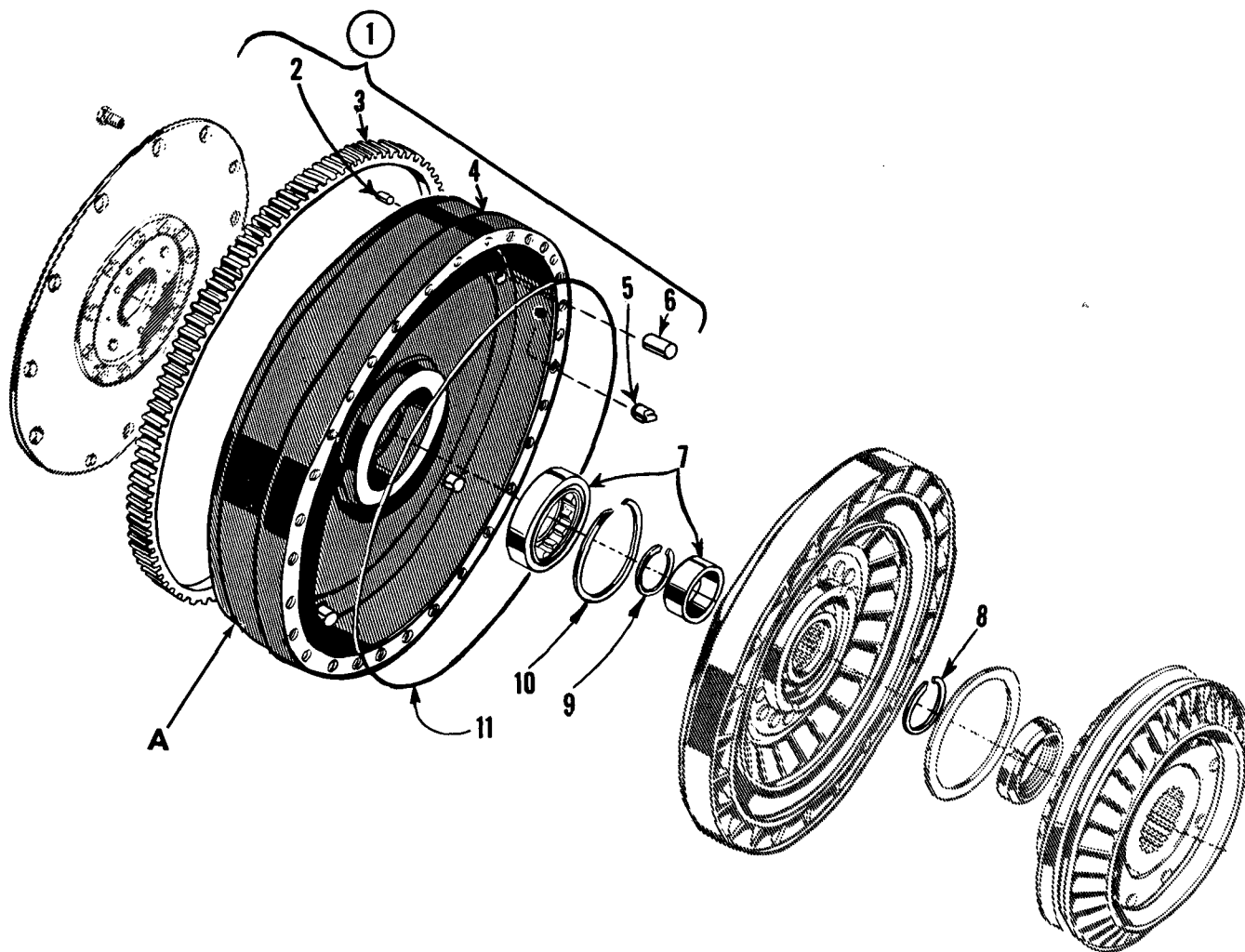
c. Assembly (fig. VI-40).

(1) If output-flange dual oil seal (19) was removed, press in the new seal from the front (chamfered end) of the bearing retainer bore using No. 3 Permatex or shellac between the seal outside diameter and the bore of the retainer. The spring side of the seal must face the chamfered end of retainer (20).

(2) If roller bearings (9) were removed, support the shaft, front end up, in an arbor press. Install a roller bearing on the shaft so that the thick side of the inner race is down. Press the bearing onto the shaft so that it seats against the shoulder on the shaft.

(3) Turn the shaft end for end and press the other roller bearing onto the shaft in the same manner. Heat sleeve (13) to approximately 350° F. and press it onto the shaft until it is seated against the bearing.

(4) Install two hook-type seal rings (10) on the output shaft.



- 1 - Flywheel assembly
- 2 - Flywheel flex disk indexing dowel
- 3 - Flywheel ring gear
- 4 - Flywheel
- 5 - Lockup clutch reaction plate lock pin
- 6 - Lockup clutch piston stop dowel
- 7 - Roller bearing assembly
- 8 - External-snap ring — 1.977 I.D.
- 9 - External-snap ring — 1.614 I.D.
- 10 - Internal-snap ring
- 11 - Seal ring — 17 1/2 ID x 1/8 dia

See Wear Limits Chart for following point of measurement:

A - Converter flywheel

Fig VI-41. Torqmatic converter flywheel — exploded view

## 14. FLYWHEEL ASSEMBLY REBUILD

### a. Disassembly (fig. VI-41).

(1) Remove the snap ring that retains the flywheel roller bearing (fig. VI-42). Remove the roller bearing.

(2) The flywheel ring gear is not ordinarily disassembled from the flywheel. If it needs replacement, press or drive the ring gear off of the flywheel.

Note: Be sure to note the exact mounting position of the damaged ring gear before removal. The new gear must be assembled in the same manner.

(3) For the rebuild of a flywheel with a hydraulic input-lockup clutch assembly, refer to sec. VII.

### b. Cleaning, Inspection, Wear Limits.

(1) Refer to sec. IV, pars. 5b, c, d, e, f, h, i, and k for further cleaning and inspection procedures and par. 6 for wear limits information.

(2) The torque converter flywheels, which contain a stamped insert with vanes on the rear side, will accumulate debris behind the insert when a converter failure occurs. Since all foreign particles must be removed before the converter is reassembled, it is necessary to remove the vane insert to clean behind it sufficiently. After the insert is removed, grind all weld deposits off the flywheel.

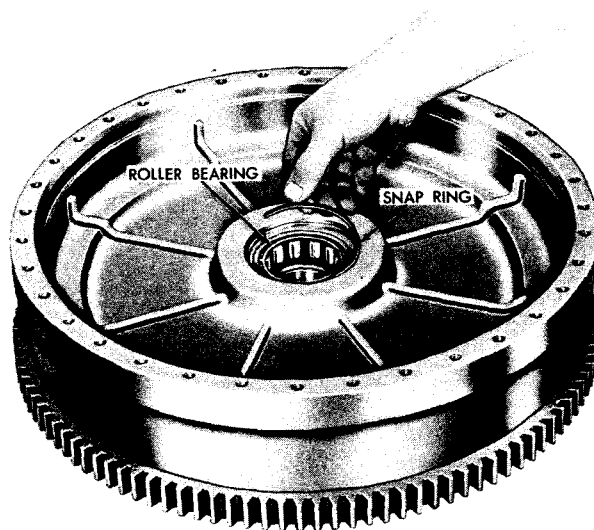


Fig VI-42. Removing (or installing) flywheel roller bearing snap ring

Thoroughly clean the flywheel. Obtain fixture 6769154 and Service Kit 6769992. The Service Kit, illustrated in the latest TC-500 Parts Catalog, contains a new insert, welding rod and instructions for installing the insert.

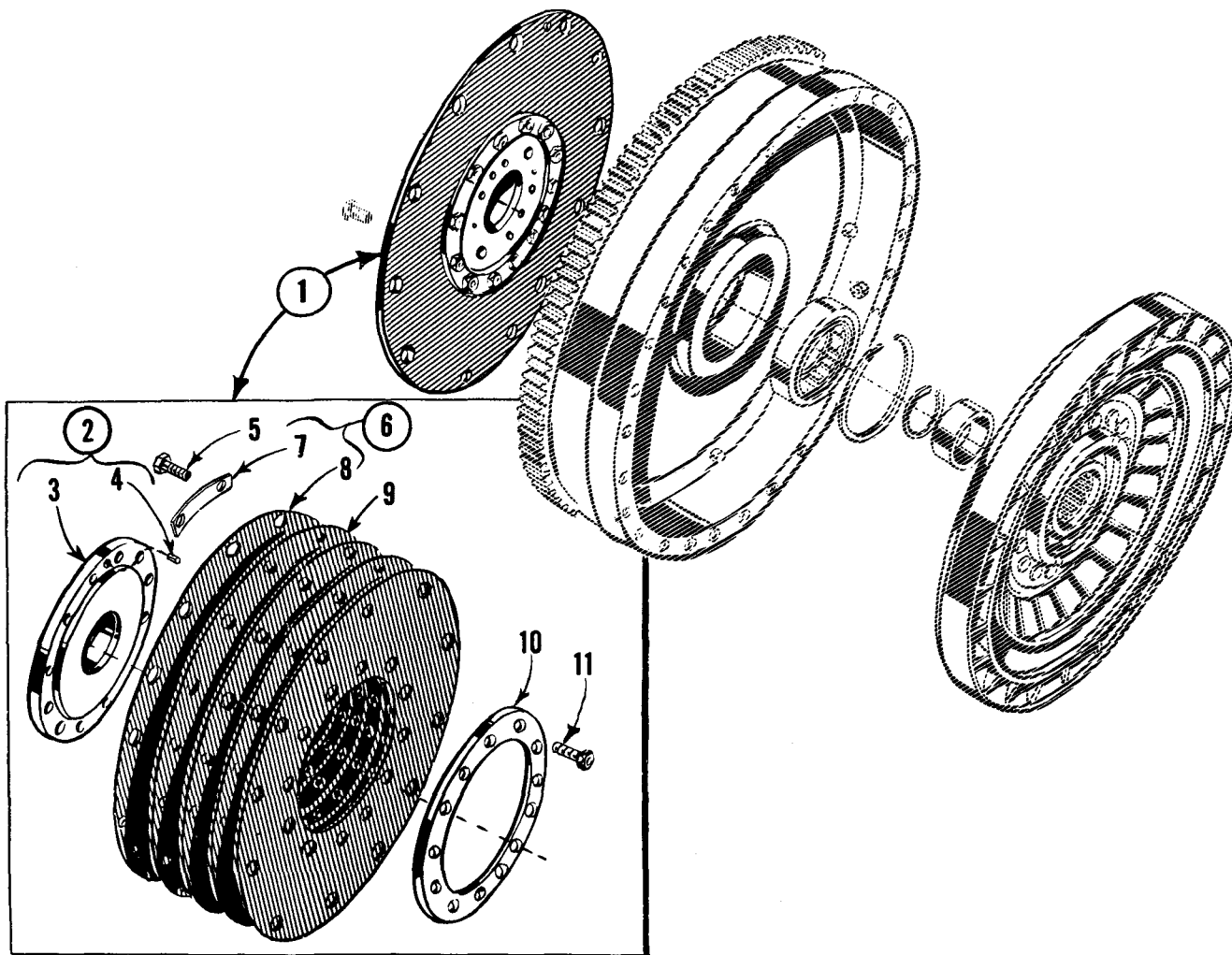
### c. Assembly (fig. VI-41).

(1) To install a ring gear on the flywheel, heat the ring gear and press or drive it onto the flywheel.

Note: Be careful not to drive or press on the ring gear teeth when installing the ring gear. Do not heat the ring gear to more than 400° F.

(2) Install the roller bearing in the flywheel bore. Install the snap ring (fig. VI-42).





- 1 - Flexible flywheel disk assembly
- 2 - Flexible flywheel disk hub assembly
- 3 - Flexible flywheel disk hub
- 4 - Dowel pin
- 5 - Hexagon-head, self-locking bolt —  
1/2-20 x 3/4
- 6 - Flexible flywheel disk and washer  
assembly
- 7 - Flexible flywheel disk washer
- 8 - Flexible flywheel disk
- 9 - Flexible flywheel disk
- 10 - Flexible flywheel disk plate
- 11 - Hexagon-head, self-locking bolt — 1/2

Fig VI-43. Torqmatic converter flexible flywheel disk assembly — exploded view

## 15. FLEXIBLE FLYWHEEL DISK ASSEMBLY REBUILD

### a. Disassembly (fig. VI-43).

(1) The flexible flywheel disk assembly is bolted to the engine crankshaft on all models except TCD (Manual Input-Disconnect Clutch). The disk assembly is bolted to the disconnect clutch shaft on TCD (spring-loaded) models. This assembly is not ordinarily disassembled unless replacement of parts is necessary.

(2) To disassemble the flywheel disk assembly on all models except TCD, remove the lock wire from the bolts that secure the disk assembly to the crankshaft and remove the bolts. Remove the disk assembly from the crankshaft. Using a 3/4-inch wrench, remove the bolts that remain in disk assembly.

(3) To disassemble the flywheel disk assembly on TCD (spring-loaded) models, remove the converter disconnect clutch shaft with the disk assembly. Remove the bolts that secure the disk assembly to the converter disconnect clutch shaft.

b. Cleaning, Inspection. Refer to sec-IV, pars. 5b, e, and k for cleaning and inspection procedures.

### c. Assembly (fig. VI-43).

(1) On all models except TCD, place flexible flywheel disk hub (2) on the table with the flat side down (shoulder side up).

(2) On TCD (spring-loaded) models, support the input-disconnect clutch shaft in a vertical position, splined end down.

(3) Install flexible flywheel disk and washer assembly (6) on the hub, washer side down, alining the hole in the disk with the alining pin in the hub.

(4) Place the remaining four disks on the hub and aline the holes with the alining pin.

(5) Install flywheel disk plate (10).

(6) Install twelve 1/2-20 x 3/4 long self-locking bolts into the plate. Torque the bolts 96 to 115 pound-feet.

(7) On all models except TCD, install the flexible flywheel disk assembly onto the engine crankshaft and install the bolts. If the hub of the disk assembly has an "O" index mark stamped on it, aline this mark with the matching mark stamped on the crankshaft. Tighten the bolts and lock with locking wire.

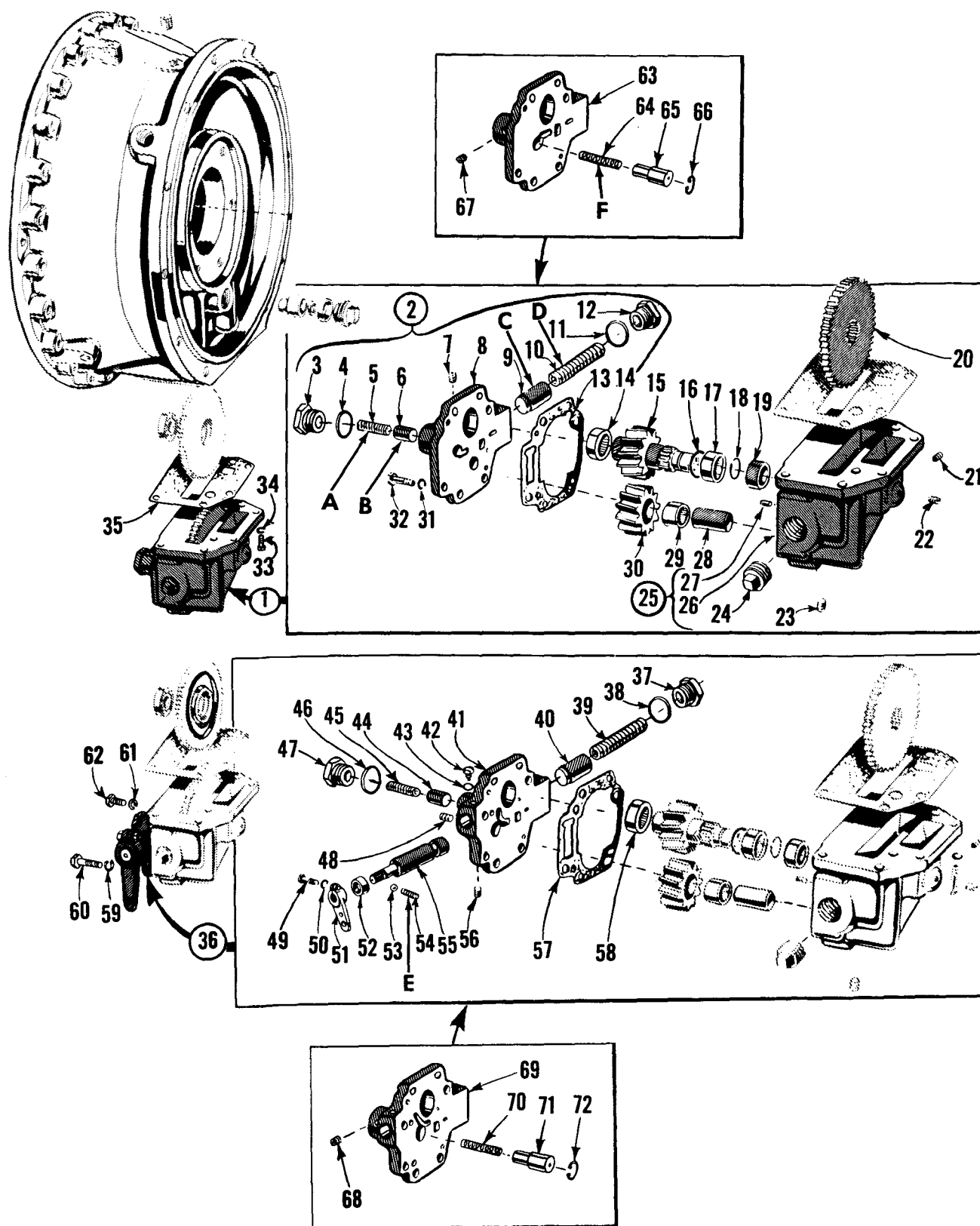


Fig VI-44. Torqmatic converter charging oil pump — exploded view

- |  |   |
|--|---|
| 1 - Charging oil pump assembly (type B)      | 37 - Plug - 1 1/4-12 x 9/16               |
| 2 - Charging oil pump body cover assembly    | 38 - Annular gasket                       |
| 3 - Plug - 1/4-12 x 9/16                     | 39 - Converter pressure regulating spring |
| 4 - Shim                                     | 40 - Converter pressure regulating valve  |
| 5 - Clutch pressure regulating spring        | 41 - Charging oil pump body cover         |
| 6 - Clutch pressure regulating valve         | 42 - Selector valve locating screw        |
| 7 - Pipe plug - 1/2                          | 43 - Flat washer - 5/16                   |
| 8 - Oil pump body cover                      | 44 - Clutch pressure regulating valve     |
| 9 - Converter pressure regulating valve      | 45 - Clutch pressure regulating spring    |
| 10 - Converter pressure regulating spring    | 46 - Shim                                 |
| 11 - Annular gasket                          | 47 - Plug - 1 1/4-12 x 9/16               |
| 12 - Plug - 1 1/4-12 x 9/16                  | 48 - Plug - 1/4                           |
| 13 - Oil pump body cover gasket              | 49 - Hexagon-head bolt - 3/8-16 x 2 1/4   |
| 14 - Needle bearing assembly                 | 50 - Lock washer - 3/8                    |
| 15 - Oil pump driving gear shaft             | 51 - Selector valve lever                 |
| 16 - Seal ring                               | 52 - Oil seal - 1/2 I.D.                  |
| 17 - Needle bearing assembly                 | 53 - Ball - 1/2 dia                       |
| 18 - Input-shaft seal ring                   | 54 - Detent spring                        |
| 19 - Oil pump bearing sleeve                 | 55 - Selector valve                       |
| 20 - Oil pump driving gear                   | 56 - Plug - 1/4                           |
| 21 - Hexagon-head socket pipe plug - 1/8 NPT | 57 - Oil pump body cover gasket           |
| 22 - Hexagon-socket pipe plug - 1/8 NPT      | 58 - Needle bearing assembly              |
| 23 - Countersunk headless pipe plug - 3/8    | 59 - Lock washer - 3/8                    |
| 24 - Pipe plug - 3/4 NPTF                    | 60 - Hexagon-head bolt - 3/8-16 x 2 1/4   |
| 25 - Oil pump body assembly                  | 61 - Lock washer - 3/8                    |
| 26 - Oil pump body                           | 62 - Hexagon-head bolt - 3/8-16 x 1 3/8   |
| 27 - Dowel                                   | *63 - Oil pump body cover                 |
| 28 - Oil pump driven gear shaft              | *64 - Clutch pressure regulator spring    |
| 29 - Needle bearing assembly                 | *65 - Clutch pressure regulator valve     |
| 30 - Oil pump driven gear                    | *66 - Snap ring                           |
| 31 - Lock washer - 3/8                       | *67 - Pipe plug - 1/16 NPTF               |
| 32 - Hexagon-head bolt - 3/8-16 x 1 3/8      | *68 - Pipe plug - 1/16 NPTF               |
| 33 - Hexagon-head bolt - 3/8-16 x 1 3/8      | *69 - Oil pump body cover                 |
| 34 - Lock washer - 3/8                       | *70 - Clutch pressure regulator spring    |
| 35 - Charging oil pump body gasket           | *71 - Clutch pressure regulator valve     |
| 36 - Oil pump body cover assembly            | *72 - Snap ring                           |

\*Used after S/N 28039

See Wear Limits Chart for following points of measurement:

- A - Spring operating height
- B - Valve clearance
- C - Valve clearance
- D - Spring operating height
- E - Spring operating height
- F - Spring operating height

Fig VI-44. Torqmatic converter charging oil pump — exploded view, legend

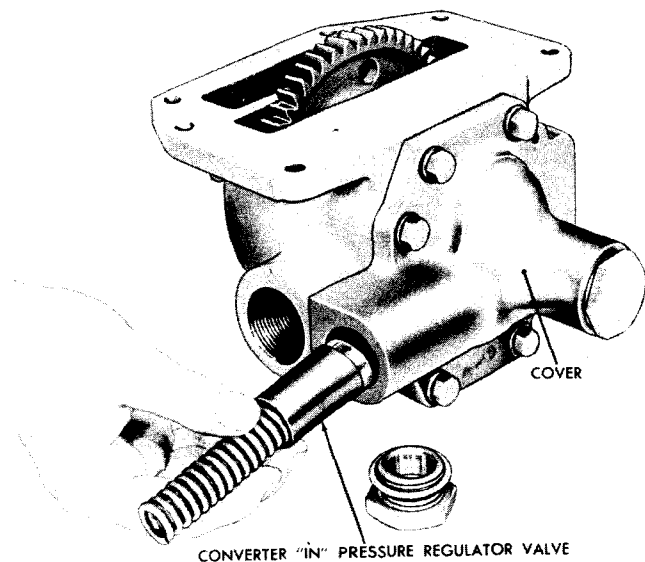


Fig VI-45. Removing (or installing) converter "IN" pressure regulator valve

## 16. CHARGING OIL PUMP ASSEMBLY REBUILD

### a. Disassembly of Oil Pump Assembly (Models TC, TCA, TCRD, TCD, and TCB) (fig. VI-44).

(1) Remove plug (12) and annular gasket (11) from the oil pump cover.

(2) Remove the converter pressure regulating spring. Remove the converter "IN" pressure regulator valve (fig. VI-45).

(3) Prior to S/N 28039: Remove the remaining plug, shims, spring and valve (fig. VI-46).

(4) Remove the six bolts and lock washers that secure the cover to the body, and remove the cover and gasket (fig. VI-44).

**Note:** If the Torqmatic converter being rebuilt is equipped with a lock-up clutch, there will be a detent ball (53, fig. VI-44) and spring (54) in the oil pump body. Be careful not to lose the ball as the cover is removed. Remove the ball and spring.

(5) After S/N 28039: Remove the snap ring, valve, and spring from the cover (fig. VI-47).

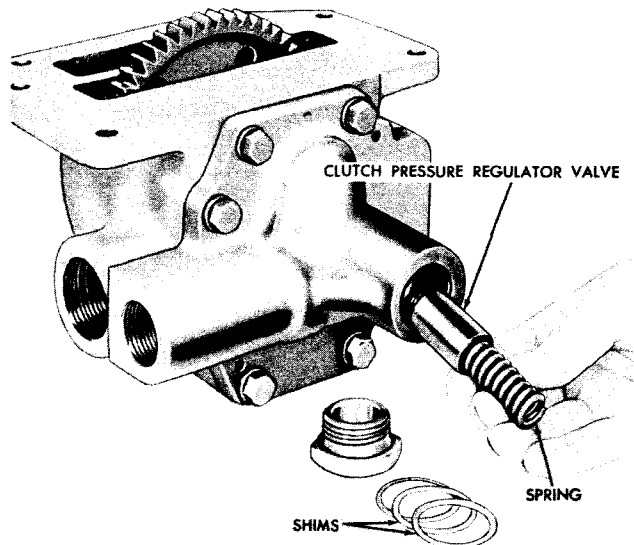


Fig VI-46. Removing (or installing) clutch pressure regulator valve

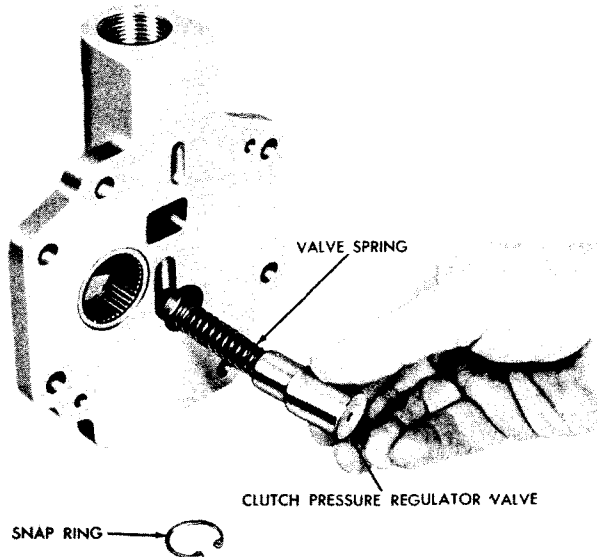


Fig VI-47. Removing (or installing) clutch pressure regulator valve

(6) Remove the oil pump driven gear and bearing as an assembly (fig. VI-48).

(7) Remove the oil pump driving gear shaft (fig. VI-49).

(8) Remove the driven gear needle bearing only if replacement is necessary. When replacing, press the bearing out of the gear.

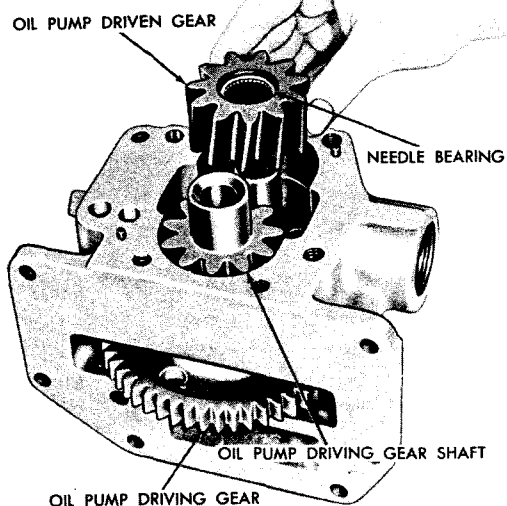


Fig VI-48. Removing (or installing) oil pump driven gear

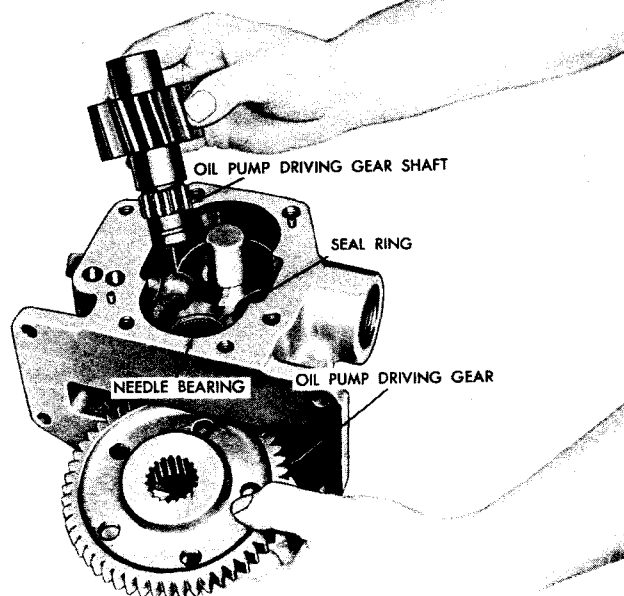


Fig VI-49. Removing (or installing) oil pump driving gear and shaft

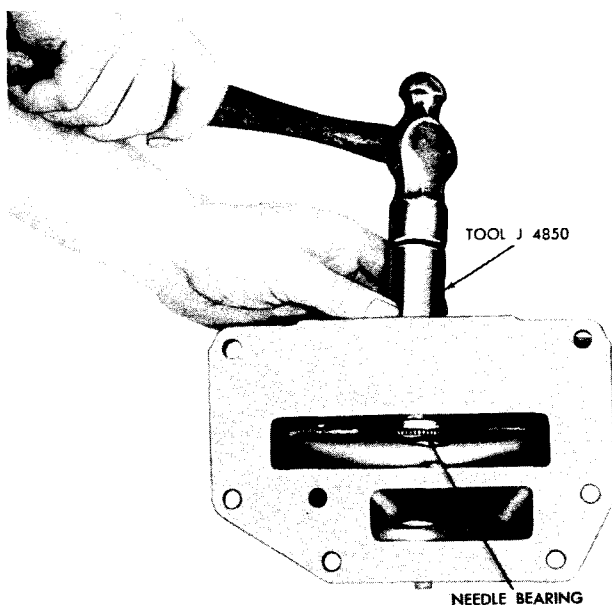


Fig VI-50. Removing needle bearing from oil pump body

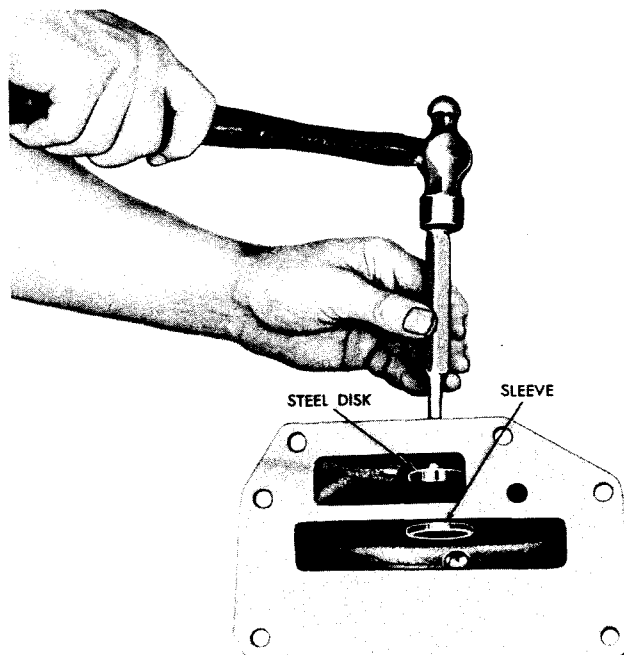


Fig VI-51. Removing oil pump bearing sleeve from pump body

(9) Remove the seal ring and needle bearing that supports the driving gear shaft in the pump body only if replacement is necessary (fig. VI-49). When replacing, use tool J 4850 (fig. IV-1) and press or drive the seal ring and bearing out of their bore into the pump driving gear pocket in the pump body (fig. VI-50).

(10) Ordinarily the oil pump bearing sleeve is not removed. If inspection shows that replacement is necessary, it may be removed. Use tool J 4852 (fig. IV-1). If this tool is not available, then obtain a steel disk 1/8-inch to 1/4-inch thick x 1.370-inch in diameter. Remove the pipe plug from the rear of the pump body. Place the disk in the

slot behind the sleeve, aligning the disk with the sleeve. Insert a drift through the pipe plug hole in the rear of the pump body and place the drift against the disk. Press or drive the sleeve out of its bore and into the driving gear pocket (fig. VI-51).

(11) Do not remove the needle bearing from the oil pump body cover unless replacement is necessary. When replacing, collapse the needle bearing cage with a hammer and punch, and remove it from the cover.

b. Disassembly of Oil Pump Assembly (Model TCL) (fig. VI-44).

(1) Refer to a, above, and follow the procedure given. The steps below are in addition because of the lockup selector valve.

(2) Remove screw and washer (42 and 43, fig. VI-44) that retain the lockup clutch selector valve assembly.

(3) Secure the selector valve lever in a vise. Grasp the pump body cover and tap lightly on it with a soft hammer in such a manner that the cover will separate from selector valve (55).

(4) Remove the bolt and lock washer from the selector valve lever. Scribe an index mark on the lever and on the splined end of the valve.

(5) Tapping lightly on the selector valve lever with a soft hammer, remove the lever from the valve. Next, remove the oil seal from the valve.

c. Cleaning, Inspection, Wear Limits.

(1) Refer to sec. IV, pars. 5b, c, d, e, f, g, h, i, j, k, and m for cleaning and inspection procedures and par. 6 for wear limits information.

(2) Inspect the driven gear shaft for galling or scores. If scores or galling cannot be removed with crocus cloth, pull the shaft out of the pump body. If the shaft cannot be removed, replace it and the oil pump body.

(3) Inspect the oil pump bearing sleeve

for scores or galling. If these conditions cannot be removed with fine crocus cloth, replace the sleeve.

(4) Smooth out any rough spots on the oil pump or pump body cover which may have been caused by the pump gears.

d. Assembly of Oil Pump Assembly (Models TC, TCA, TCD and TCB) (fig. VI-44).

(1) If the needle bearing in the oil pump body cover was removed, install new needle bearing in its bore in the pump body cover, using an arbor press and tool J 4850 (fig. IV-1). Press only on the numbered end of the bearing.

(2) If the oil pump bearing sleeve (19, fig. VI-44) was removed, install a new sleeve in its bore in the pump body, using an arbor press and tool J 4850.

(3) Using tool J 4523-A (fig. IV-1), press needle bearing (17, fig. VI-44) into its bore in the pump body, being careful to press only on the numbered end of the bearing. Using the same tool, press seal ring (16) into the bore, lip of seal toward the bearing. Seal edge should be 1/32 below surface.

(4) If driven-gear needle bearing (29) was removed, place the gear on an arbor press so that the beveled edge of the bearing bore is up. Using tool J 4850 (fig. IV-1), press the new needle bearing into the bore of the gear. Press only against the numbered edge of the bearing cage.

(5) Press new driven gear shaft (28) into the pump body, if the shaft has been removed.

(6) Install hook-type seal ring (18) on driving gear shaft (15).

(7) Place the driving gear in its pocket and install the driving gear shaft in the pump and through the driving gear (fig. VI-49). The seal ring should slip easily into the bearing sleeve because the sleeve is beveled to receive the seal ring.

(8) Install the oil pump driven gear and needle bearing assembly on the driven-gear shaft (fig. VI-48).

(9) Prior to S/N 28039: Install the oil pump body cover gasket and the cover on the pump body (fig. VI-47). If the converter is equipped with a lockup clutch, install spring (54, fig. VI-44) and detent ball (53) in the oil pump body before installing the pump body cover.

(10) After S/N 28039: Install the clutch pressure regulator spring, valve, and snap ring into the cover (fig. VI-47). Then proceed as in (9), above.

(11) Install six bolts and lock washers in the pump cover.

(12) Install the converter pressure regulating valve (fig. VI-45).

(13) Install the spring. Install the annular gasket on the plug and install the plug in the converter pressure regulating valve bore, making certain that the valve spring is properly seated in the plug.

(14) Prior to S/N 28039: Install the clutch pressure regulator valve (closed end first) and spring (fig. VI-46). Replace the same shims removed at disassembly and the plug.

Note: After rebuild, the clutch pressure must be checked to make sure it is within 140 to 175 psi. Check the pressure at the 3/4-inch tapped open-

ing on the pump body, into which plug (24, fig. VI-44) fits. This check should be made whether or not a transmission is used in conjunction with the converter. Removing shims increases pressure; adding them reduces it.

(15) With the oil pump completely assembled, turn the oil pump driving gear to make sure that the pump gears do not bind.

#### e. Assembly of Oil Pump Assembly (Model TCL).

(1) Install lockup clutch selector valve (55, fig. VI-44) in the oil pump cover bore.

(2) Install oil seal (51) on the small end of the valve, being careful that the splines do not cut the lip of the oil seal. The lip must point toward the large diameter of the valve. Press the seal into the valve bore, using a 7/8-inch socket as a replacer. The seal should be pressed in so that it is flush with the edge of the bore.

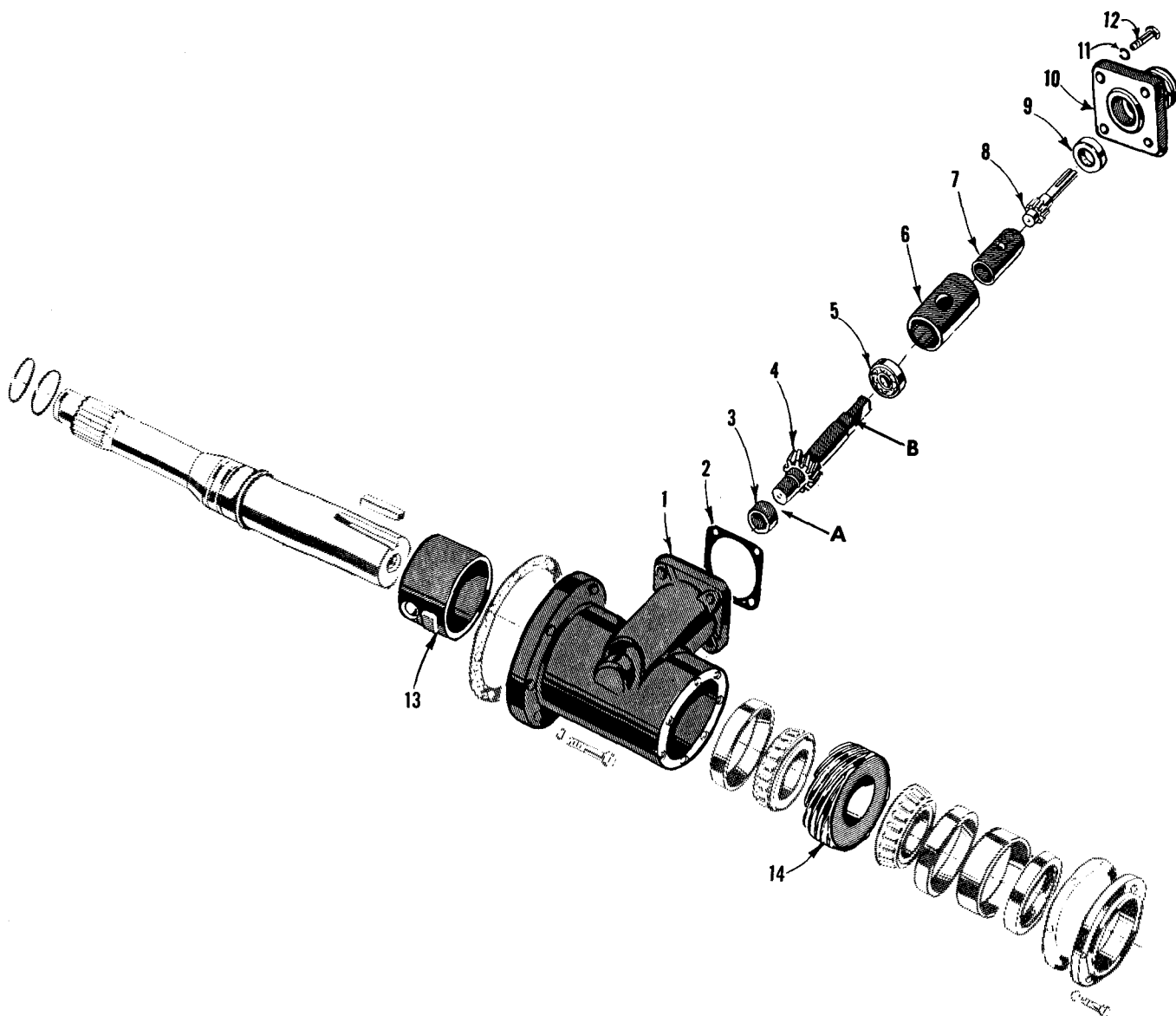
(3) Install washer (43) and selector-valve locating screw (42).

(4) Install selector valve lever (51) on the valve, alining the index mark on the lever with the index mark on the valve.

(5) Install the bolt and lock washer on the lever.

(6) Assemble the balance of the oil pump according to d, above, steps (1) through (15).





- |   |                                     |
|---|-------------------------------------|
| 1 - Bearing housing   | 7 - Accessory drive sleeve coupling |
| 2 - Accessory drive adapter gasket                          | 8 - Accessory drive adapter shaft   |
| 3 - Bushing — 5/8 I.D. x 7/8 O.D. x 1 lg                    | 9 - Oil seal — .50 I.D.             |
| 4 - Accessory drive shaft                                   | 10 - Accessory drive adapter        |
| 5 - Single-row ball bearing assembly                        | 11 - Plain lock washer — 5/16       |
| 6 - Accessory drive spacer — 1.38 O.D. x .06 wall x 2.16 lg | 12 - Hexagon-head bolt — 5/16       |
|   | 13 - Spacer                         |
|   | 14 - Accessory drive gear           |

See Wear Limits Chart for following points of measurement:

A - Bushing bore  
B - Shaft O.D.

Fig VI-52. Torqmatic converter accessory drive — exploded view

## 17. ACCESSORY DRIVE REBUILD

a. Removal from Converter. The accessory drive was removed from the converter during the disassembly of the converter and further disassembly ordinarily is not necessary (sec. VI, par. 6).

b. Cleaning, Inspection, Wear Limits. Refer to sec. IV, pars. 5b, c, d, e, f, g, h, i, j, k and l for cleaning and inspection procedures; par. 6 for wear limits information.

### c. Disassembly of Accessory Drive (fig. VI-52).

(1) Using an arbor press, remove accessory drive shaft (4) from bearing (5) and sleeve coupling (7).

(2) If bushing (3) in the bearing housing is worn, it may be drilled out.

(3) With a chisel and a hammer, crack the sleeve over the keyway. This will loosen the sleeve so that it can be removed.

(4) Using a press, remove the roller bearings, the accessory drive gear and the sleeve from the output shaft. Be sure to support the inner race of the front roller bearing.

To do so, the splined end of the shaft should be down.

### d. Assembly of Accessory Drive (fig. VI-52).

(1) Press bearing (5) onto the accessory drive shaft so that the bearing is seated against the shoulder.

(2) Press sleeve coupling (7) onto the shaft with the splined end inside the coupling away from the bearing.

(3) If bushing (3) in the bearing housing was removed, use an arbor press to install a new bushing.

(4) To install the roller bearings, accessory drive gear, and sleeve on the output shaft, install one bearing so that the thin side of the inner race is against the shoulder of the shaft. Then install the accessory drive gear and the other bearing so that the thick side of the bearing inner race is against the gear. Heat a new sleeve to approximately 350° F. and press the sleeve onto the shaft until the sleeve is against the inner race.

e. Installing on Converter. Refer to sec. VI, par. 7.

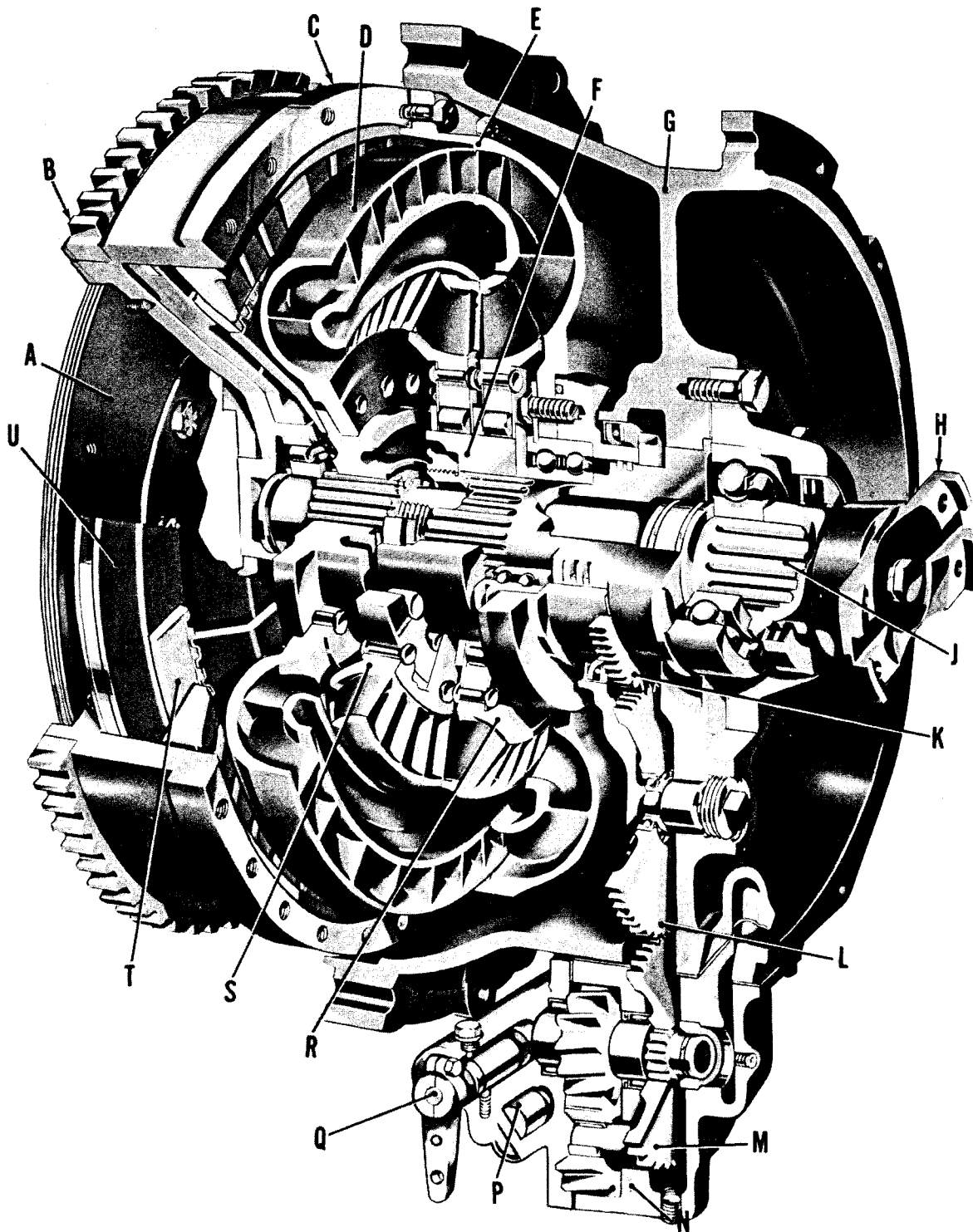


Fig VII-1. Torqmatic converter with lockup — cutaway view

## SECTION VII HYDRAULIC INPUT-LOCK UP CLUTCH (TCL)

### 1. SCOPE

This section contains overhaul information on the hydraulic input-lockup clutch portion of the Torqmatic converter (figs. VII-1 and 5). For overhaul of the main portion of the Torqmatic converter, refer to sec. VI.

### 2. HYDRAULIC INPUT-LOCKUP CLUTCH REBUILD

#### a. Disassembly of Hydraulic Input-Lockup Clutch.

(1) Install two eyebolts in the threaded holes provided in the lockup clutch reaction plate (fig. VII-2).

(2) Lift the reaction plate out of the flywheel.

(3) Remove the piston release spring (fig. VII-3) and the clutch friction plate.

Note: Beginning with S/N 1300, piston release spring (5, fig. VII-5) is no longer used. However, in earlier

- A - Flexible flywheel disk assembly
- B - Flywheel ring gear
- C - Flywheel
- D - Converter turbine assembly
- E - Converter pump assembly
- F - Stator freewheel roller race
- G - Converter housing assembly
- H - Output flange (automotive)
- J - Converter output shaft (automotive)
- K - Oil pump drive gear
- L - Oil pump idler gear assembly
- M - Oil pump driving gear
- N - Charging oil pump assembly
- P - Converter pressure regulating valve
- Q - Selector valve
- R - Second-stator assembly
- S - First-stator assembly
- T - Clutch friction plate
- U - Lockup clutch piston

Fig VII-1. Torqmatic converter with lockup — cutaway view, legend

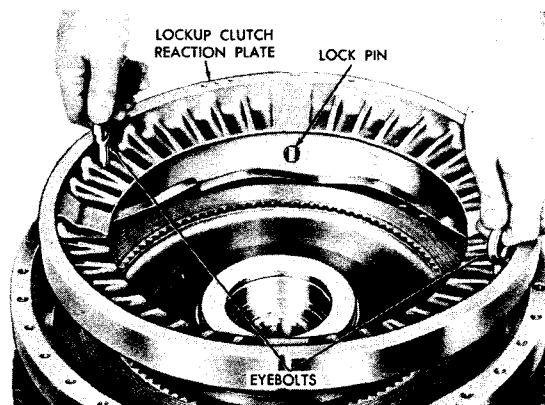


Fig VII-2. Removing (or installing) lockup clutch reaction plate

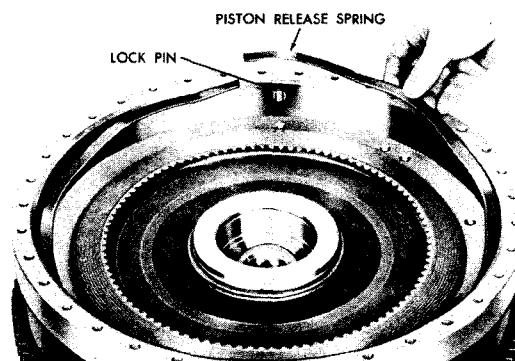


Fig VII-3. Removing (or installing) piston release spring

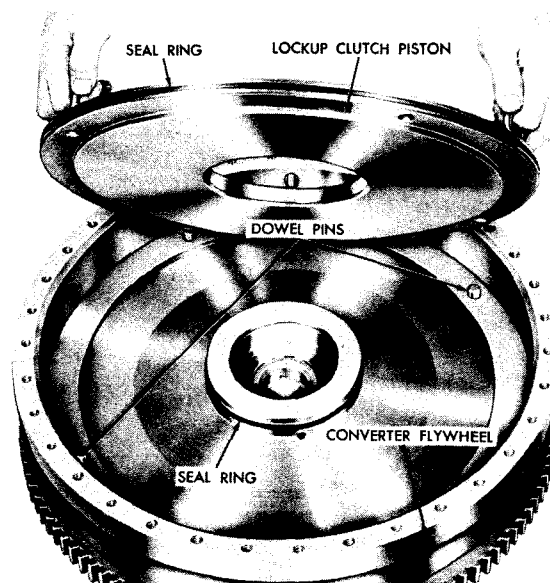
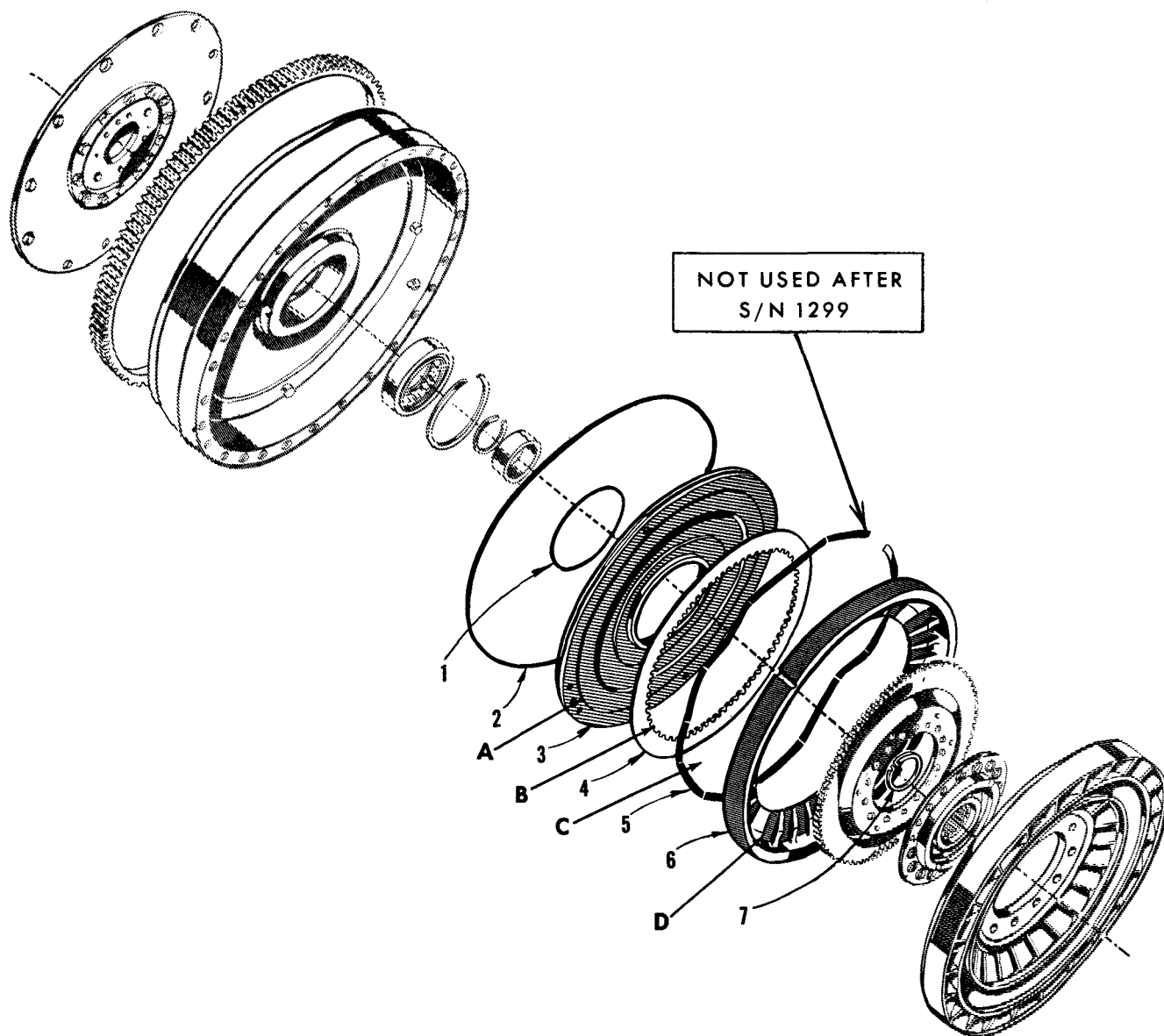


Fig VII-4. Removing (or installing) lockup clutch piston



- 1 - Seal ring
- 2 - Seal ring
- 3 - Lockup clutch piston
- 4 - Clutch friction plate

- 5 - Piston release spring
- 6 - Lockup clutch reaction plate
- 7 - Hook-type seal ring

See Wear Limits Chart for following points of measurement:

- A - Piston face wear
- B - Plate thickness
- C - Spring operating height
- D - Plate face wear

Fig VII-5. Hydraulic input-lockup clutch — exploded view

converters the spring must be continued in use unless lockup clutch piston (3) is modified. To modify the piston, drill one 3/32-inch hole through it at a point 5/16 inch from the extreme outside diameter (or at a radius of 8 1/2 inches from the piston center). This hole must not be nearer to any 17/32-inch dowel recess than 1/4 inch. Further explanation of this change is in Service Information Letter 391, available in the current parts catalog or from your Allison dealer.

(4) Install two eyebolts in the threaded holes provided in the lockup clutch piston (fig. VII-4).

(5) Lift the piston out of the flywheel, tilting it to clear the reaction plate lock pin.

(6) Remove the seal rings from the piston and flywheel hub.

b. Cleaning, Inspection, Wear Limits. Refer to sec. IV, par. 5b, e, h, j and m for cleaning and inspection procedures and par. 6 for wear limits information. Additional inspection procedures are as follows.

(1) Inspect the clutch plate for warping, distorted splines, flaking on the friction sur-

faces and excessive wear on the friction surfaces or the splines. If any one of these conditions is found, replace the plate.

(2) If the piston release spring is cracked, replace it.

Note: Refer to note following par. 2a(3), this section.

c. Assembly of Hydraulic Input-Lockup Clutch.

(1) Install the seal rings on the piston and on the flywheel hub (fig. VII-4). Make sure the seals are installed in their normal position and are not rolled.

(2) Oil the outside diameter of the piston, the flywheel hub and the inside diameter of the flywheel. Install the piston in the flywheel, making certain that the piston is properly seated on the four dowel pins (fig. VII-4).

(3) Install the clutch plate and the piston release spring (fig. VII-3).

Note: Refer to note following par. 2a(3), this section.

(4) Install the reaction plate in the flywheel, aligning the groove in the plate with the locating pin (fig. VII-2).

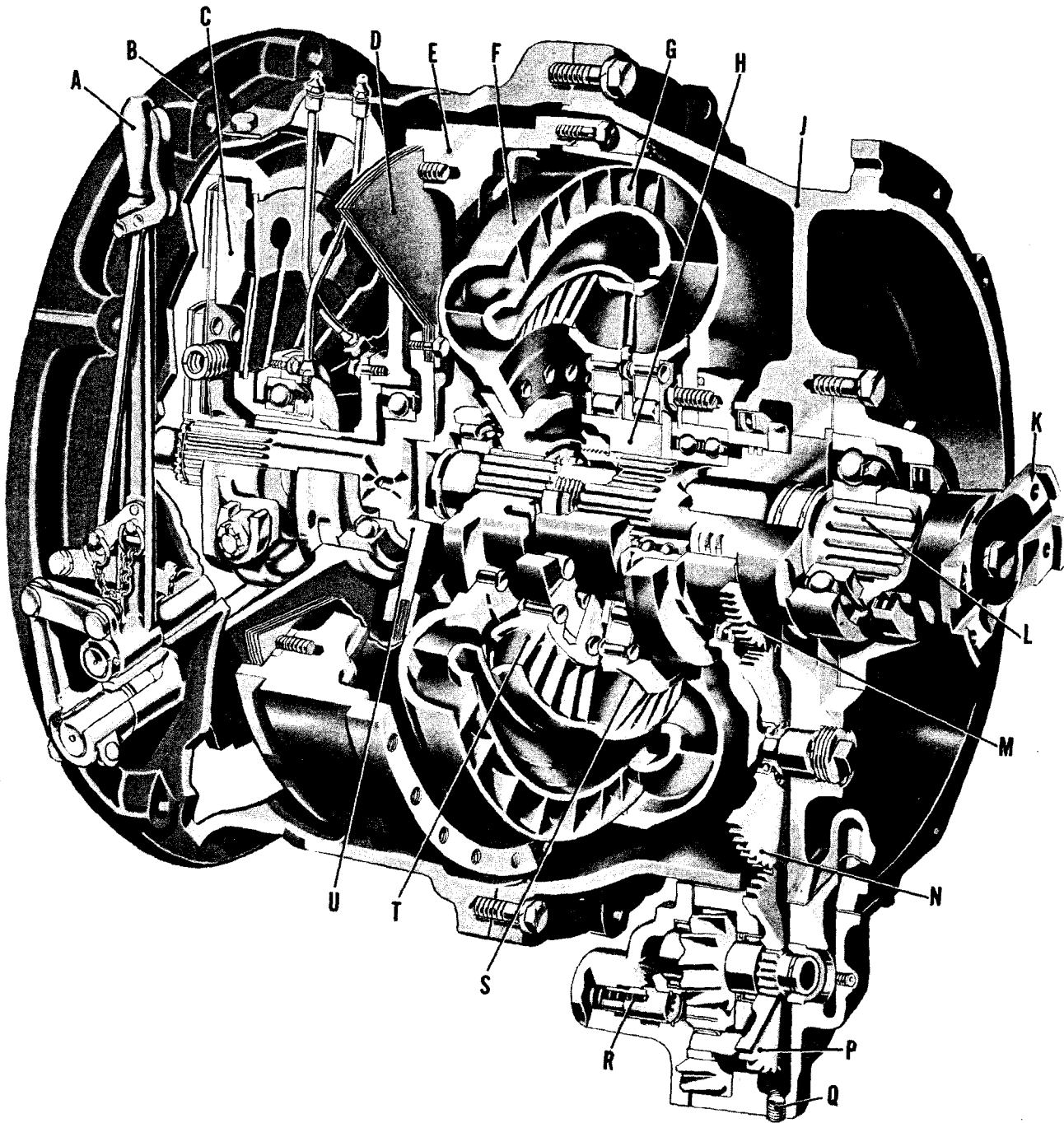


Fig VIII-1. Torqmatic converter, with manual input-disconnect clutch — cutaway view

## SECTION VIII MANUAL INPUT-DISCONNECT CLUTCH ASSEMBLY

### 1. SCOPE

This section contains overhaul information on two types of manual, input-disconnect

- A - Clutch control hand lever assembly
- B - Disconnect clutch housing
- C - Clutch assembly
- D - Flexible flywheel disk assembly
- E - Flywheel
- F - Converter turbine assembly
- G - Converter pump assembly
- H - Stator freewheel roller race
- J - Converter housing assembly
- K - Output flange (automotive)
- L - Converter output shaft (automotive)
- M - Oil pump drive gear
- N - Oil pump idler gear assembly
- P - Oil pump driving gear
- Q - Charging oil pump assembly
- R - Clutch pressure regulating valve
- S - Second-stator assembly
- T - First-stator assembly
- U - Converter disconnect clutch shaft

Fig VIII-1. Torqmatic converter, with manual input disconnect clutch, cutaway view, legend

clutch options for the Torqmatic converter. The two types covered are the manual, spring-loaded, input-disconnect clutch (figs. VIII-1 and -3) and the manual, overcenter, input-disconnect clutch (figs. VIII-10 and 11). For overhaul of the main portion of the Torqmatic converter, refer to sec. VI. For removal and replacement of TCD models in the equipment drive line, refer to sec. V, pars. 4 through 7. Refer to sec. III, pars. 7 and 8 for lubrication and adjustment instructions for TCD models.

### 2. MANUAL, SPRING-LOADED, INPUT-DISCONNECT CLUTCH REBUILD

#### a. Removing Clutch Shifter Shaft, Lever.

(1) Using a 5/8-inch wrench, remove two bolts that hold the clutch shifter yoke (fig. VIII-2) in position on the clutch shifter shaft.

(2) Using a 3/4-inch wrench, remove bolt, plain lock washer, and thrust washer (64, 65 and 66, fig. VII-3) from the end of

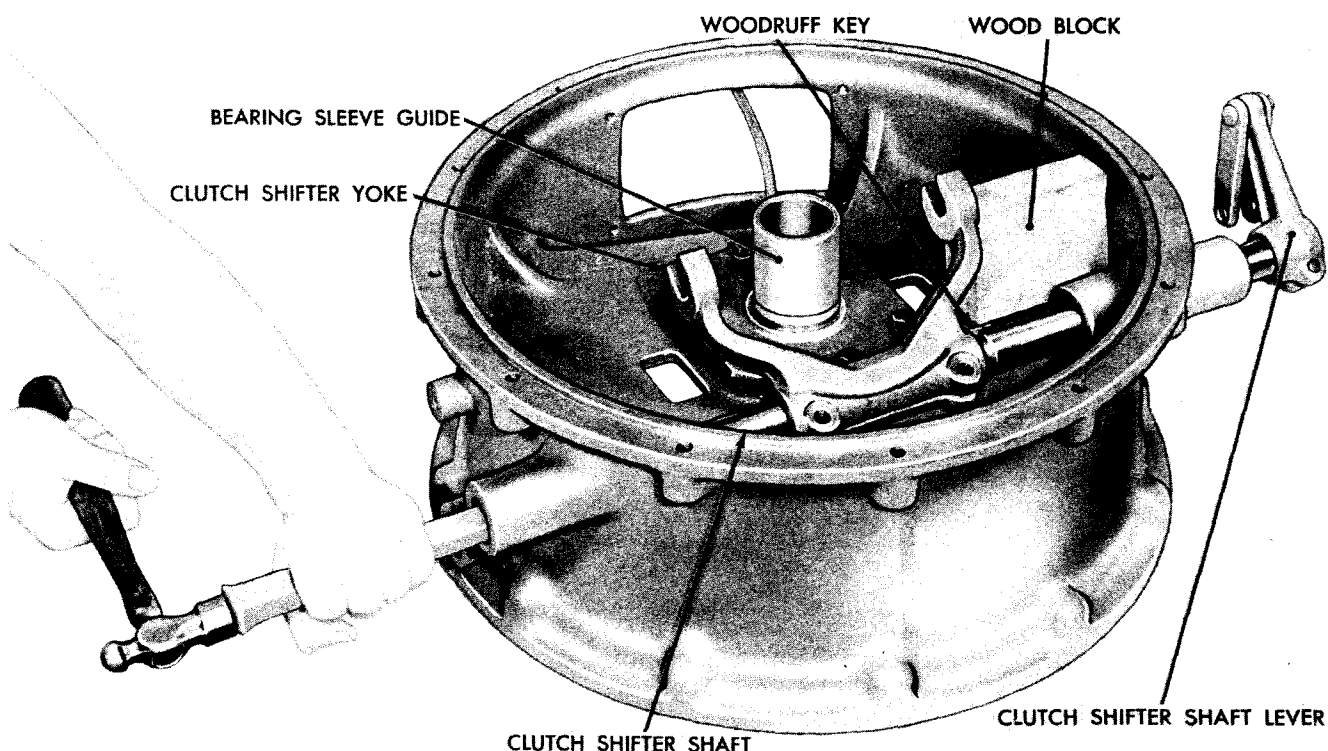


Fig VIII-2. Removing clutch shifter shaft



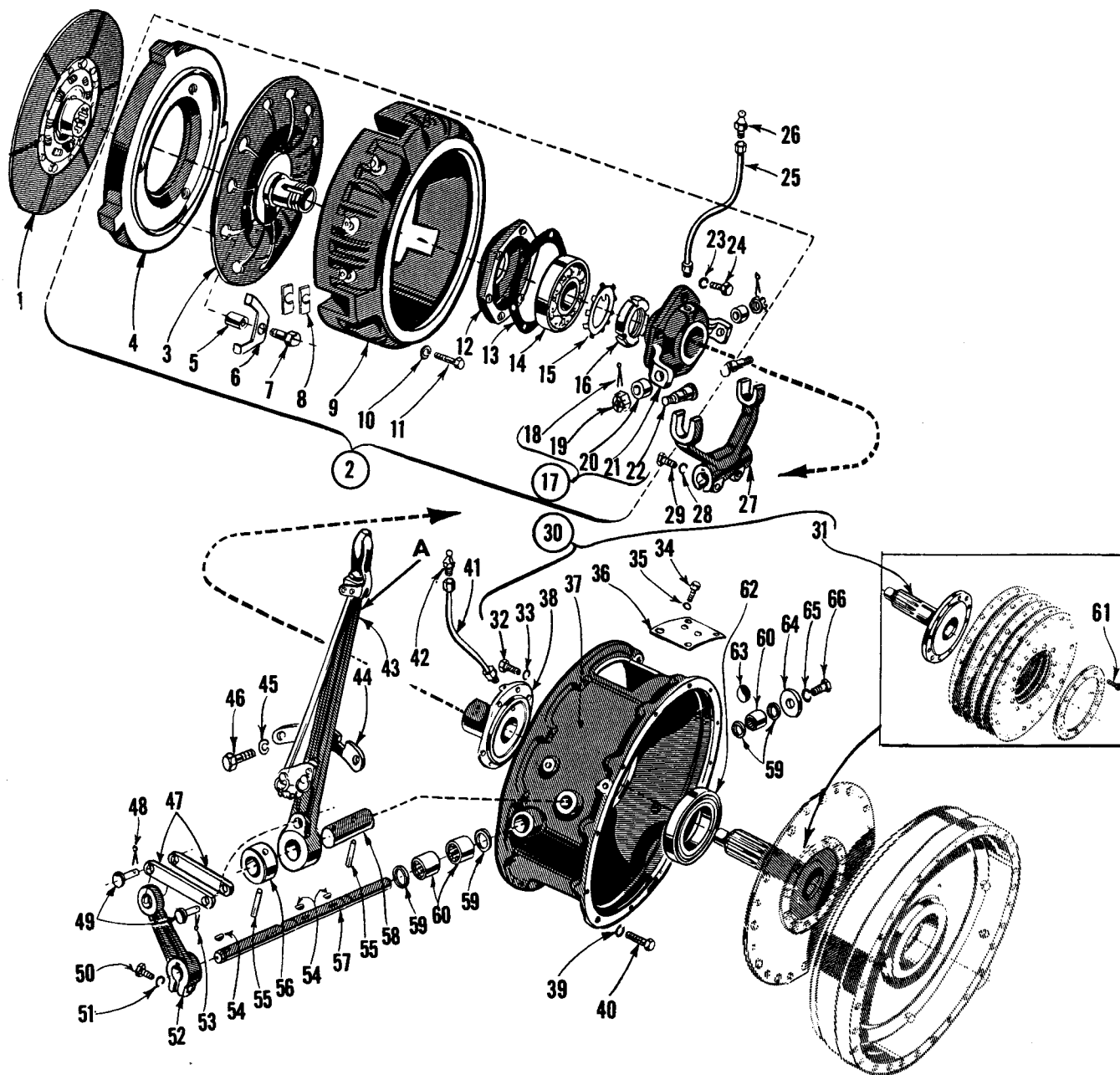


Fig VIII-3. Manual input-disconnect clutch — exploded view

- |  |   |
|--|---|
| 1 - Clutch-driven disk assembly  | 34 - Hexagon-head bolt — 5/16   |
| 2 - Clutch assembly  | 35 - Plain lock washer — 5/16   |
| 3 - Spring and hub assembly  | 36 - Disconnect clutch housing cover                                      |
| 4 - Clutch pressure plate  | 37 - Disconnect clutch housing  |
| 5 - Pressure plate release spring spacer                                 | 38 - Clutch release bearing sleeve guide                                  |
| 6 - Pressure plate release spring  | 39 - Plain lock washer — 3/8  |
| 7 - Pressure plate release spring bolt                                   | 40 - Hexagon-head bolt — 3/8  |
| 8 - Clutch shim  | 41 - Lube tube assembly   |
| 9 - Clutch cover plate   | 42 - Grease fitting, (type C, straight lubrication) — 1/8 PTF extra short |
| 10 - Plain lock washer — 5/16  | 43 - Clutch control hand lever assembly                                   |
| 11 - Bolt — 5/16   | 44 - Clutch control left-lever quadrant                                   |
| 12 - Clutch release bearing sleeve cover                                 | 45 - Plain lock washer — 3/8 (quadrant to TC housing)                     |
| 13 - Clutch release bearing sleeve cover gasket                          | 46 - Hexagon-head bolt — 3/8 (quadrant to TC housing)                     |
| 14 - Clutch release bearing  | 47 - Clutch control hand lever link                                       |
| 15 - Lock washer   | 48 - Cotter pin — 3/32 dia x 7/8 lg                                       |
| 16 - Clutch release bearing nut  | 49 - Clevis pin — 1/2   |
| 17 - Clutch release bearing sleeve assembly                              | 50 - Hexagon-head bolt — 7/16   |
| 18 - Cotter pin  | 51 - Plain lock washer — 7/16   |
| 19 - Nut   | 52 - Clutch shifter shaft lever   |
| 20 - Clutch release bearing sleeve bushing                               | 53 - Cotter pin — 3/32 dia x 7/8 lg                                       |
| 21 - Clutch release bearing sleeve                                       | 54 - Woodruff key   |
| 22 - Clutch release bearing sleeve pin                                   | 55 - Grooved taper pin — 7/32 dia x 1 1/2 lg                              |
| 23 - Plain lock washer — 5/16  | 56 - Collar — 1 in I.D.   |
| 24 - Bolt — 1/4  | 57 - Clutch shifter shaft   |
| 25 - Lube tube assembly  | 58 - Clutch release lever shaft   |
| 26 - Grease fitting (type C, straight lubrication) — 1/8 PTF extra short | 59 - Seal ring — 1 1/8 x 1/8 x .375                                       |
| 27 - Clutch shifter yoke   | 60 - Needle bearing assembly  |
| 28 - Plain lock washer — 7/16  | 61 - Hexagon-head, self-locking bolt — 1/2                                |
| 29 - Hexagon-head bolt — 7/16  | 62 - Single-row shielded ball bearing assembly                            |
| 30 - Disconnect clutch package unit housing assembly                     | 63 - Expansion plug — 1 3/16 dia (type A)                                 |
| 31 - Converter disconnect clutch shaft                                   | 64 - Clutch shifter shaft thrust washer                                   |
| 32 - Hexagon-head bolt — 7/16  | 65 - Plain lock washer — 1/2  |
| 33 - Plain lock washer — 7/16  | 66 - Hexagon-head bolt — 1/2  |

See Wear Limits Chart for following point of measurement:

A - Spring operating height

Fig VIII-3. Manual input-disconnect clutch — exploded view, legend

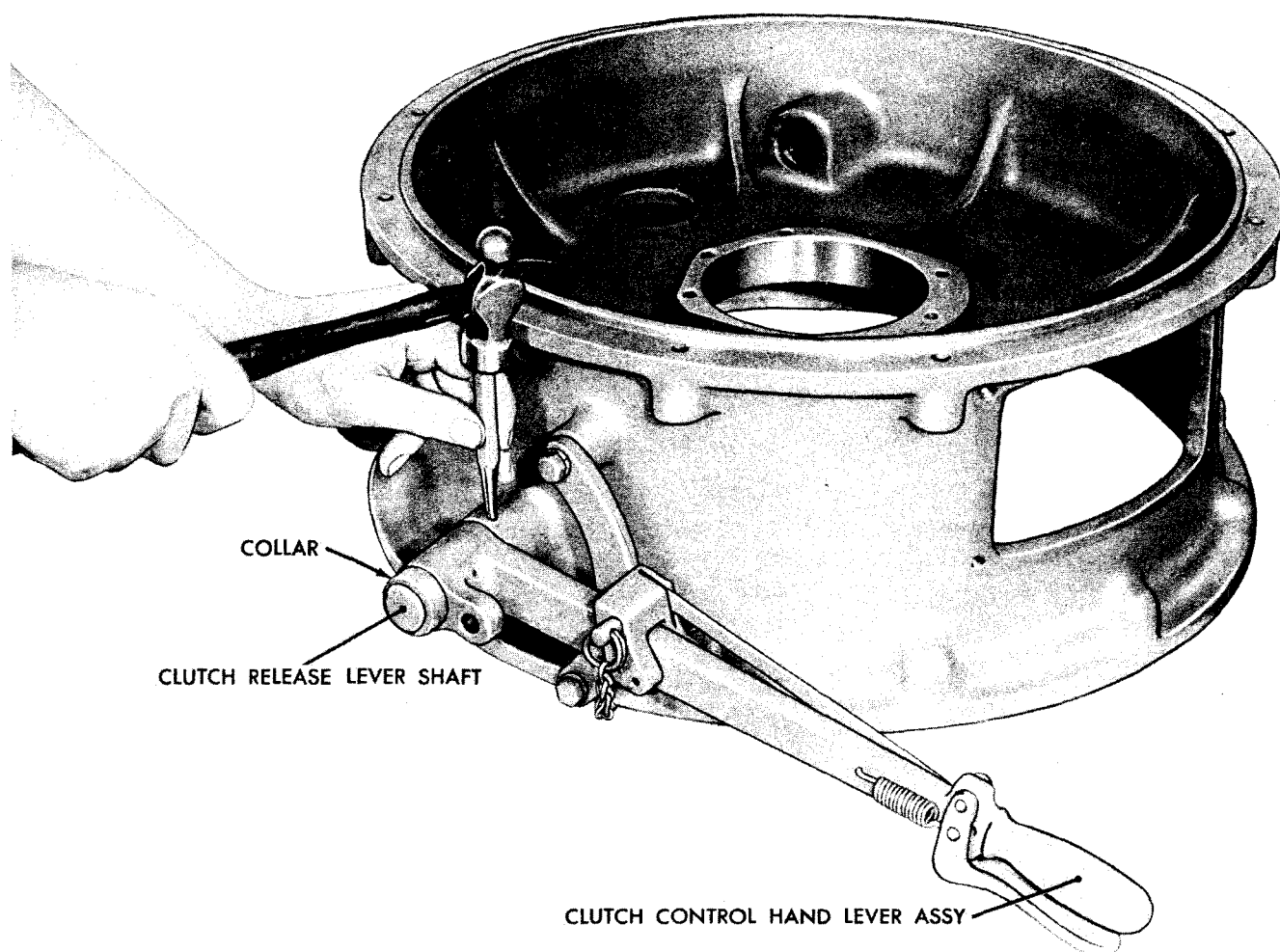


Fig VIII-4. Removing pin

clutch shifter shaft (57) opposite clutch shifter shaft lever (52). Disconnect the clutch shifter shaft lever from clutch control hand lever assembly (43) by removing a cotter pin and pin from one end of the links (47).

(3) Using a drift slightly smaller in diameter than the shifter shaft, and, with a block of wood between the housing and the shifter yoke, drive the shifter shaft out far enough to remove one Woodruff key (fig. VIII-2).

(4) Remove the Woodruff key and continue driving the shifter shaft out until the second Woodruff key can be removed.

(5) Remove the second Woodruff key and remove the shifter shaft.

(6) Do not remove three needle bearings

(60, fig. VIII-3) and four seals (59) unless they need replacing. When necessary to remove them, use a drift slightly smaller than the bore in the housing.

(7) Using a 7/16-inch wrench, remove the bolt and lock washer from the clutch shifter shaft lever (fig. VIII-2). Remove the clutch shifter shaft lever and Woodruff key.

#### b. Removing Clutch Release Bearing Sleeve Guide.

(1) Using a 9/16-inch wrench, remove six bolts and lock washers from the clutch release bearing sleeve guide (fig. VIII-2).

(2) Remove the clutch release bearing sleeve guide and remove flexible lube tube (41, fig. VIII-3) from the guide.

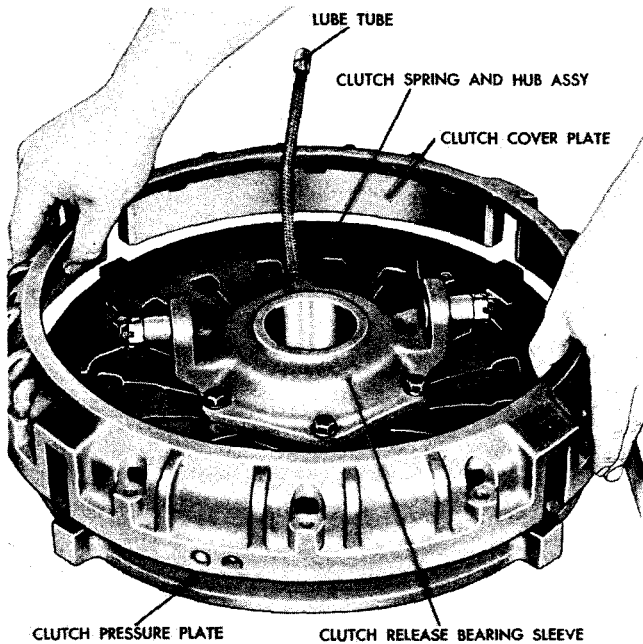


Fig VIII-5. Removing (or installing) clutch cover plate

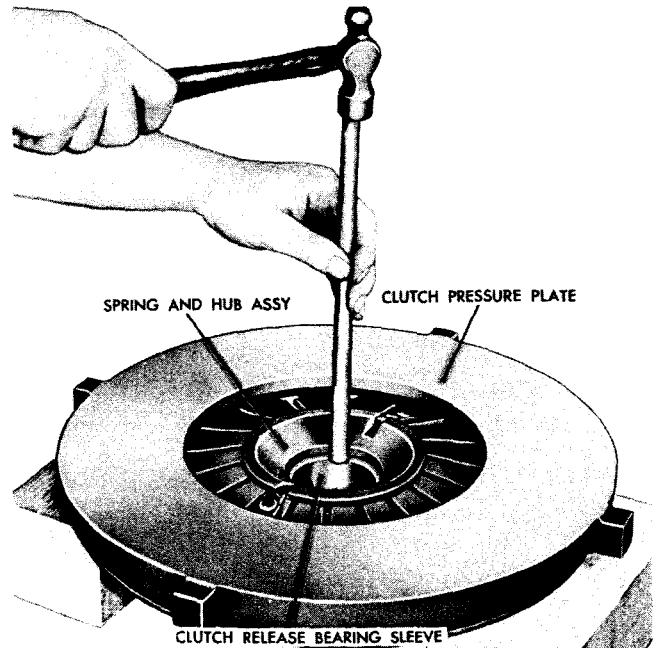


Fig VIII-6. Removing sleeve from spring and hub assembly

c. Removing Clutch Release Lever, Shaft.

(1) Using a drift, remove the pin holding the clutch release lever shaft in the housing (fig. VIII-4).

(2) Remove the shaft. It may be neces-

sary to use a drift and hammer to remove the shaft. The hand lever will slip off after the shaft is removed from the housing.

(3) Do not remove pin (55, fig. VIII-3) that holds the collar onto the clutch release lever shaft.

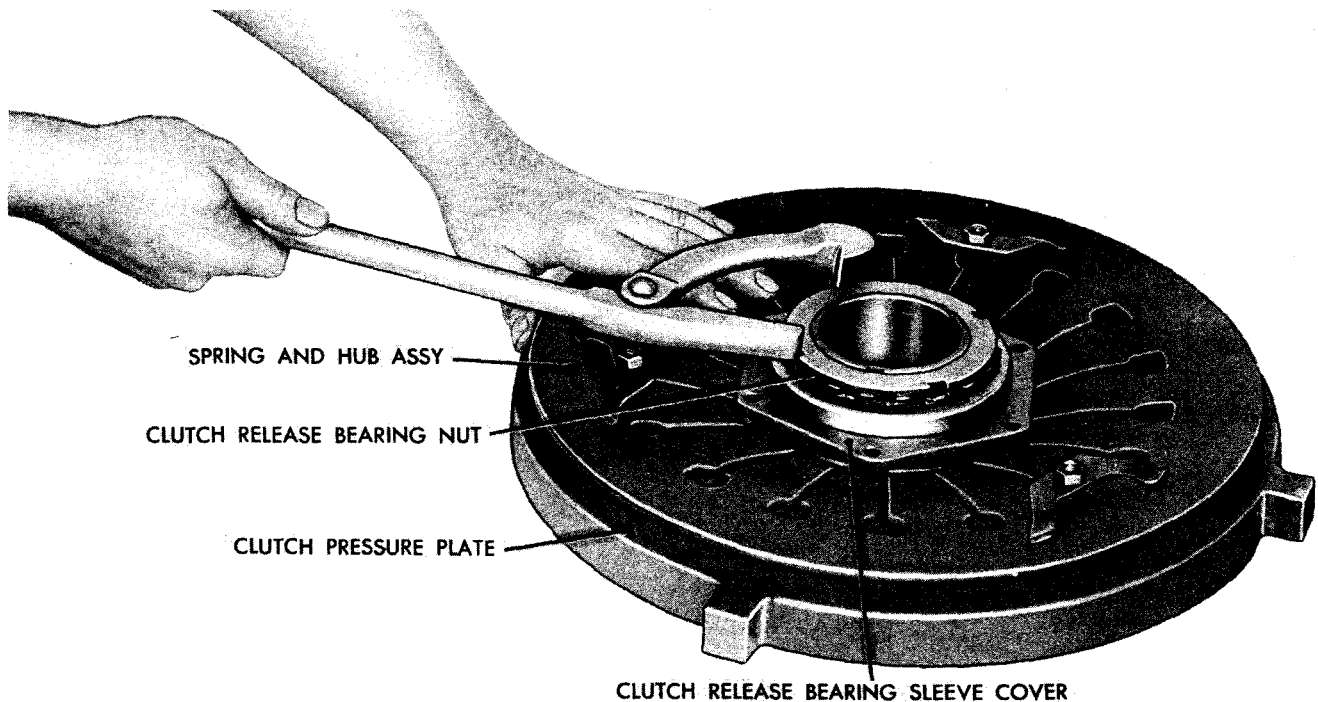


Fig VIII-7. Removing clutch release bearing nut

d. Removing Clutch Cover Plate, Clutch Release Bearing Sleeve.

(1) Remove the clutch cover plate from the spring and hub assembly and the clutch pressure plate (fig. VIII-5).

(2) Using a 1/2-inch wrench, remove six cap screws and lock washers and remove the clutch release bearing sleeve (fig. VIII-5), from the bearing on the spring and hub assembly.

(3) To remove the sleeve from the bearing, turn the spring and hub assembly over, place it on blocks, and drive the sleeve out using a soft drift and hammer (fig. VIII-6).

e. Removing Spring, Hub Assembly.

(1) Bend down the tabs on the lock washer and, using an adjustable spanner wrench, remove the clutch release bearing nut from the stub shaft (fig. VIII-7).

(2) Using a bearing puller, remove the clutch release bearing sleeve cover together with the clutch release bearing (fig. VIII-8).

(3) Using a 9/16-inch wrench, remove three pressure plate release spring bolts and remove the pressure plate release springs and release spring spacers (fig. VIII-9). The spring and hub assembly can then be lifted off the pressure plate.

f. Cleaning, Inspection and Wear Limits. Refer to sec. IV, pars. 5b, c, d, e, f, g, h, j, k and m for cleaning and inspection procedure; par. 6 for wear limits information.

g. Installing Spring, Hub Assembly.

(1) Place the spring and hub assembly on the clutch pressure plate (fig. VIII-9).

(2) Install the pressure plate release springs and spacers and secure them with three self-locking bolts (fig. VIII-9).

(3) Place clutch release bearing sleeve cover (12, fig. VIII-3) and gasket (13) onto the stub shaft of the spring and hub assembly.

(4) Support the center of the spring and

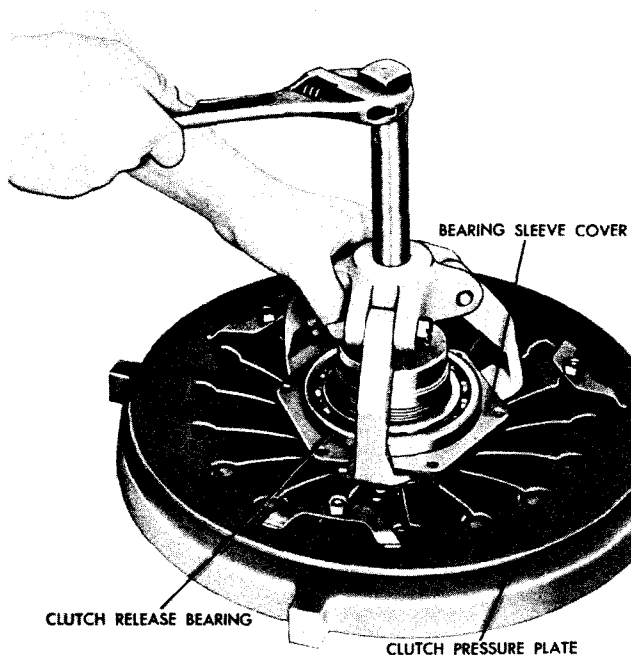


Fig VIII-8. Removing clutch release bearing sleeve cover and clutch release bearing

hub assembly and press the ball bearing down onto the hub. Refer to fig. VIII-8 showing removal.

(5) Install the lock washer and clutch release bearing nut. Refer to fig. VIII-7 showing removal of the nut. Tighten the nut and bend a tab from the lock washer into a slot in the nut.

h. Installing Clutch Release Bearing Sleeve, Clutch Cover Plate.

(1) Drive the clutch release bearing sleeve (fig. VIII-5) onto the spring and hub assembly with a soft hammer and secure the sleeve to the sleeve cover (fig. VIII-7) with six bolts and lock washers.

(2) Install clutch release bearing lube tube assembly (25, fig. VIII-3) onto the clutch release bearing sleeve if it was removed.

(3) Install the clutch cover plate over the spring and hub assembly and the clutch pressure plate (fig. VIII-5).

i. Installing Clutch Release Lever, Shaft.

(1) Install the clutch release lever shaft (fig. VIII-4) into the clutch control hand lever

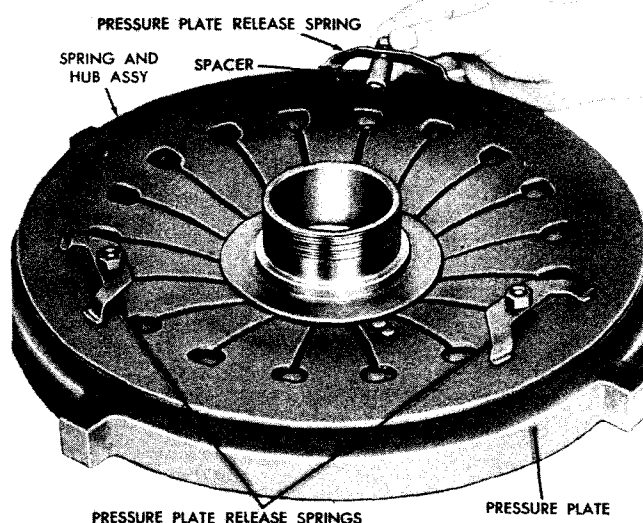


Fig VIII-9. Removing (or installing) pressure plate release spring

assembly and install the shaft into the input-disconnect clutch housing.

(2) Aline the holes in the shaft and housing and drive in the grooved taper pin. Refer to fig. VIII-4 showing removal of the pin.

**j. Installing Clutch Release Bearing Sleeve Guide.**

(1) Install converter disconnect clutch shaft bearing lube tube (41, fig. VIII-3) onto clutch release bearing sleeve guide (38).

(2) Secure the sleeve guide to the housing with six bolts and lock washers.

**k. Installing Clutch Shifter Shaft, Lever.**

(1) If the four oil seals (59, fig. VIII-3) and three needle bearings (60) were removed from the input-disconnect clutch housing,

press in the bearings, using the proper size replacer against the lettered side of bearings.

(2) Install the oil seals so that the concave sides are next to the bearings.

(3) Start shifter shaft (57) into the housing so that the end with the threaded hole goes in last. Push the shaft in until the end extends into the housing.

(4) Place clutch shifter yoke (27) onto the shaft and place a block of wood between the yoke and the side of the housing.

(5) Aline the key slots in the shaft with those in the shifter yoke and push the shaft in until the first key slot is almost into the yoke.

(6) Install a Woodruff key and drive the shaft in until the second slot is almost in the yoke. Install the second Woodruff key and drive the shaft in until the end of the shaft that has the threaded hole is flush with the housing.

(7) Install a lock washer (65) onto 1/2-20 x 1-inch bolt (66) and install the clutch shifter shaft thrust washer (64) onto the bolt.

(8) Install the bolt into the threaded hole in the end of the shaft.

(9) Install the Woodruff key in the slot in the end of the shifter shaft and install the clutch shifter shaft lever (52).

(10) Secure the clutch shifter shaft lever with a 7/16-14 x 1 5/8-inch bolt. Connect clutch shifter shaft lever (52) to the clutch control hand lever assembly (43) with two links (47) and two pins (49). Install cotter pins in the two pins.

(11) Install two 7/16-14 x 1 1/2-inch bolts (29) and lock washers (28) into the clutch shifter yoke. Refer to sec. V, par. 5 for installation instructions.

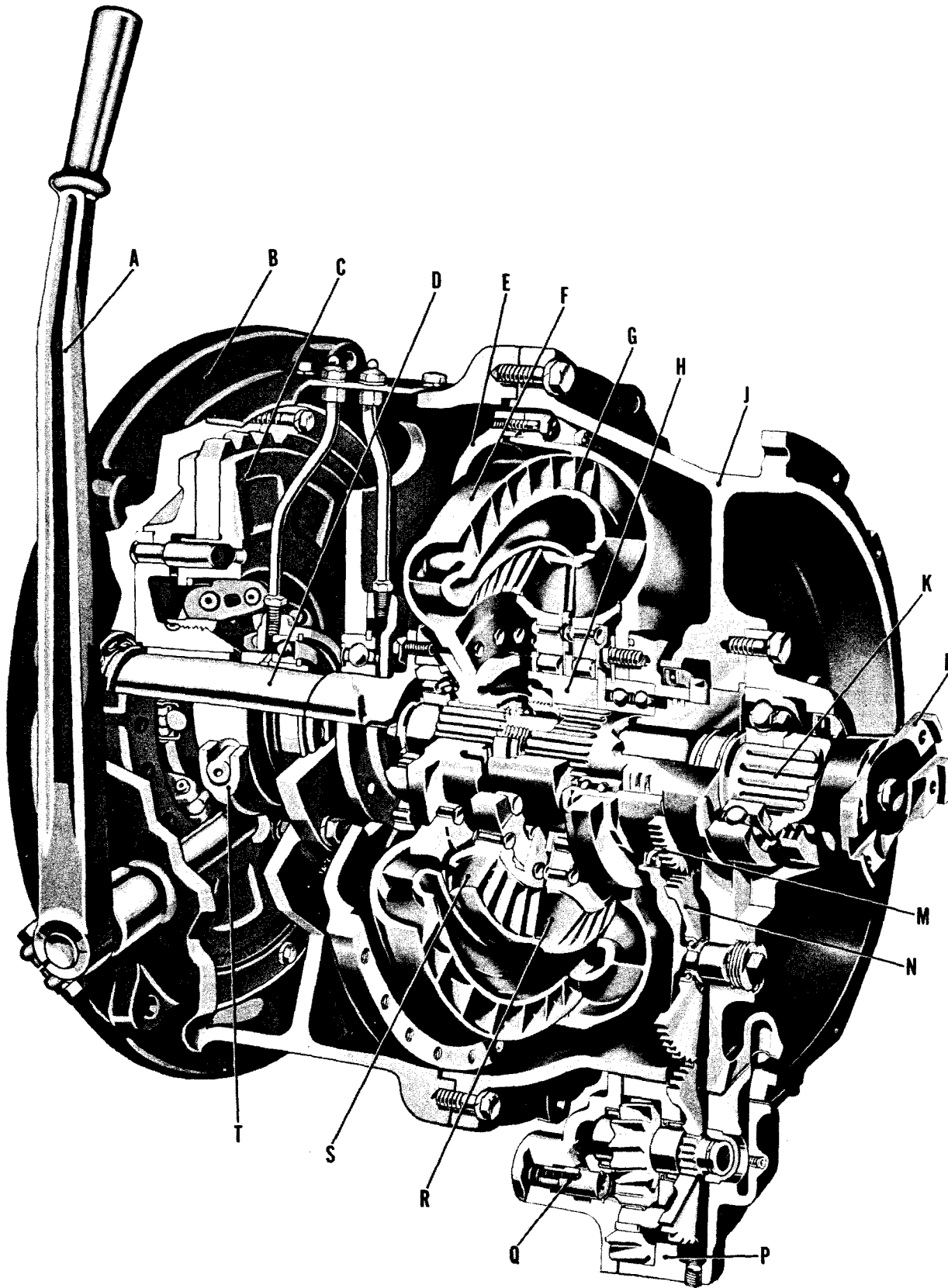


Fig VIII-10. Torqmatic converter, with manual, overcenter, input-disconnect clutch — cutaway view

### 3. MANUAL, OVERCENTER, INPUT-DISCONNECT CLUTCH REBUILD

#### a. Removing Converter Drive Housing Assembly (fig. VIII-11).

(1) Using a bearing puller, remove ball bearing (37), from the front end of converter drive shaft (18).

(2) Remove four bolts and lock washers securing clutch housing cover (11).

(3) Disconnect two grease fittings and flat washers from the bearing lube tubes (7), and remove the housing cover.

(4) Using wrench TSD20230 (fig. IV-3), remove spanner lock nut (1, fig. VIII-11) from the front end of the converter drive shaft.

(5) Using caution not to damage the bearing diameter, drive or press converter drive shaft (18) rearward out of overcenter clutch assembly (4) and sealed ball bearing (12). Remove converter drive housing assembly (14), but DO NOT disassemble the drive shaft from the drive housing, since it is partially machined after assembly.

(6) Remove key (2), overcenter clutch assembly (4), attached bearing lube tube (7).

- A - Clutch control hand lever
- B - Disconnect clutch housing
- C - Overcenter disconnect clutch assembly
- D - Converter drive shaft
- E - Converter drive housing
- F - Converter turbine assembly
- G - Converter pump assembly
- H - Stator freewheel roller race
- J - Converter housing assembly
- K - Converter output shaft (automotive)
- L - Converter output flange (automotive)
- M - Oil pump drive gear
- N - Oil pump idler gear
- P - Charging oil pump assembly
- Q - Clutch pressure regulating valve
- R - Second-stator assembly
- S - First-stator assembly
- T - Clutch shifter yoke

Fig VIII-10. Torqmatic converter, with manual, overcenter, input-disconnect clutch — cutaway view, legend

#### b. Removing Sealed Ball Bearing (fig. VIII-11).

(1) Remove eight bolts and lock washers from bearing retainer (13).

(2) Remove the bearing retainer and attached bearing lube tube (7).

(3) Remove sealed ball bearing (12) from the clutch housing.

(4) Remove the bearing lube tube from the bearing retainer.

#### c. Removing Clutch Shifter Mechanism (fig. VIII-11).

(1) Remove the nut, lock washer and bolt from clutch shifter lever (27).

(2) Remove the clutch shifter lever from shifter shaft (25).

(3) Loosen two bolts and lock washers in clutch shifter yoke (32).

(4) Slide the clutch shifter shaft out of the shifter yoke and clutch housing. Remove two Woodruff keys and the shifter yoke.

#### d. Cleaning, Inspection, Wear Limits.

(1) Refer to sec. IV, pars. 5 and 6 for cleaning, inspection and wear limits.

(2) Inspect the three-section clutch friction plate for wear and evidence of overheating or grease saturation.

#### e. Installing Clutch Shifter Mechanism (fig. VIII-11).

(1) Hold clutch shifter yoke (32) in position inside the housing. Slide shifter shaft (25) into the clutch housing and insert two Woodruff keys (31) in their slots in the shaft. Slide the shaft into the yoke and into position in the housing.

(2) Position the yoke centrally over the Woodruff keys and tighten the retaining bolts on the yoke.



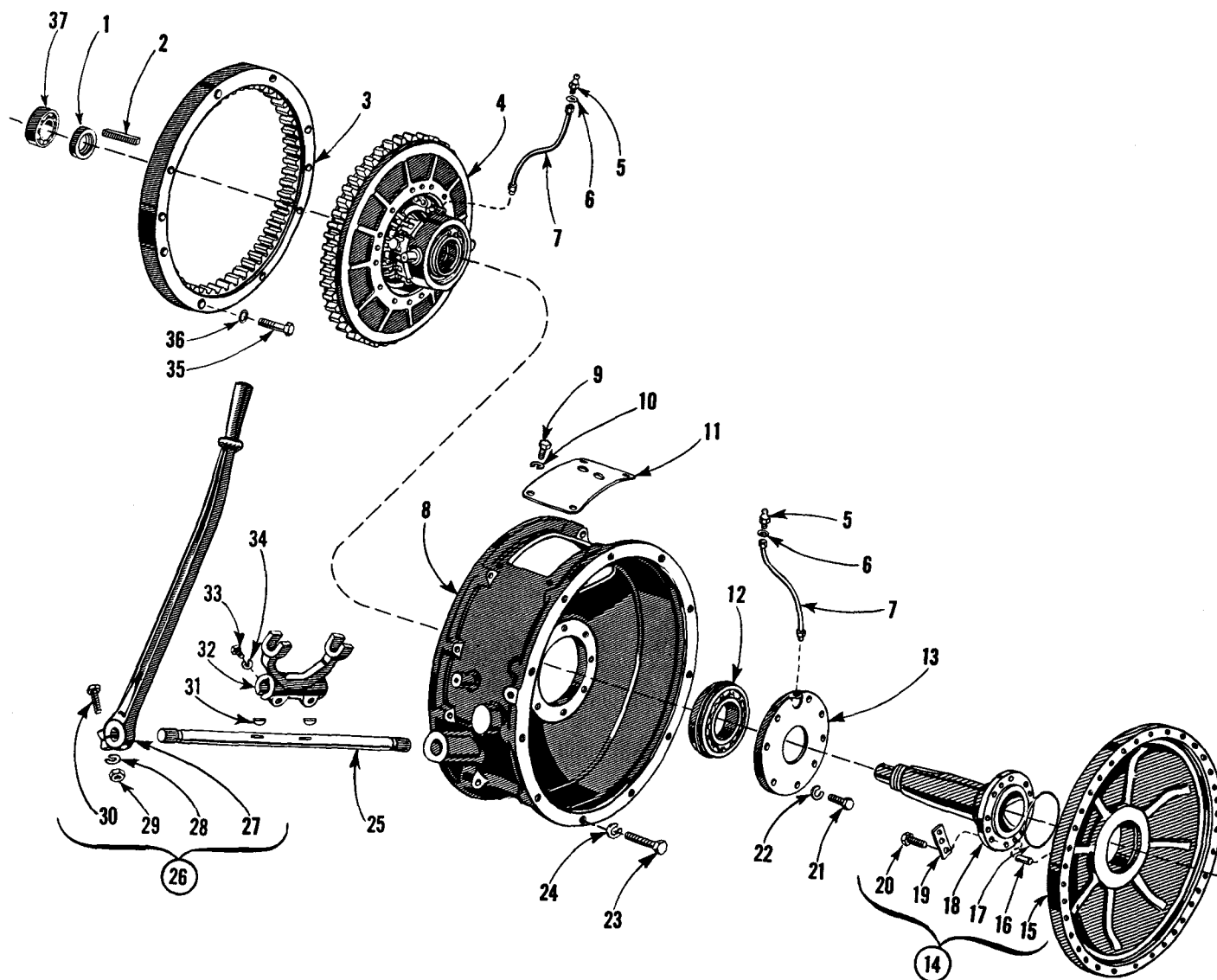


Fig VIII-11. Manual, overcenter, input-disconnect clutch — exploded view

(3) Place clutch shifter lever (27) in position on the shifter shaft. Install the retaining bolt, lock washer and nut.

f. Installing Sealed Ball Bearing (fig. VIII-11).

(1) Install bearing lube tube (7) on bearing retainer (13).

(2) Install sealed ball bearing (12) in the housing.

(3) Secure the bearing retainer to the housing with eight bolts and lock washers.

g. Installing Converter Drive Housing Assembly and Overcenter Clutch Assembly (fig. VIII-11).

(1) Press or drive converter drive housing assembly (14) into the retainer side of the sealed ball bearing until the shoulder of the shaft protrudes through the bearing approximately 1/8 inch. Be careful not to damage the bearing diameter while pressing on its end.

(2) Install overcenter clutch assembly (4), engaging the throw-out bearing tangs in the shifter yoke as the clutch assembly is slid into place. Be sure to place bearing lube tube (7) toward the clutch housing cover opening.

(3) Install key (2) between the clutch assembly and the converter drive shaft.

(4) Install spanner lock nut (1) and torque to 250 to 300 foot-pounds, using spanner wrench TSD20231. Bend a section of the lock nut into the shaft groove.

(5) Place two grease fittings (5) through flat washers and the housing cover, and screw them into grease lube tubes (7).

(6) Secure the housing cover with four bolts and lock washers.

(7) Press single-row ball bearing (37), with numbered side out, onto the converter drive shaft.

- 1 - Spanner lock nut
- 2 - Key
- 3 - Clutch drive gear
- 4 - Overcenter clutch assembly
- 5 - Grease fitting
- 6 - Flat washer - 15/32
- 7 - Bearing lube tube
- 8 - Disconnect clutch housing
- 9 - Hexagon-head bolt - 5/16-18 x 1/2
- 10 - Lock washer - 5/16
- 11 - Housing cover
- 12 - Sealed ball bearing
- 13 - Bearing retainer
- 14 - Converter drive housing assembly
- 15 - Converter drive housing
- 16 - Seal ring
- 17 - Pin
- 18 - Converter drive shaft
- 19 - Lock strip

- 20 - Hexagon-head bolt - 3/8-24 x 1 1/4
- 21 - Hexagon-head bolt - 3/8-16 x 1 1/4
- 22 - Lock washer - 3/8
- 23 - Hexagon-head bolt - 7/16-14 x 2 1/4
- 24 - Lock washer - 7/16
- 25 - Clutch shifter shaft
- 26 - Clutch shifter lever assembly
- 27 - Clutch shifter lever
- 28 - Lock washer - 1/2
- 29 - Nut - 1/2-20
- 30 - Hexagon-head bolt - 1/2-20 x 2
- 31 - Key
- 32 - Clutch shifter yoke
- 33 - Hexagon-head bolt - 7/16-20 x 1 1/2
- 34 - Lock washer - 7/16
- 35 - Hexagon-head bolt - 1/2-13 x 2 1/4
- 36 - Lock washer - 1/2
- 37 - Single-row ball bearing

Fig VIII-11. Manual, overcenter, input-disconnect clutch — exploded view, legend

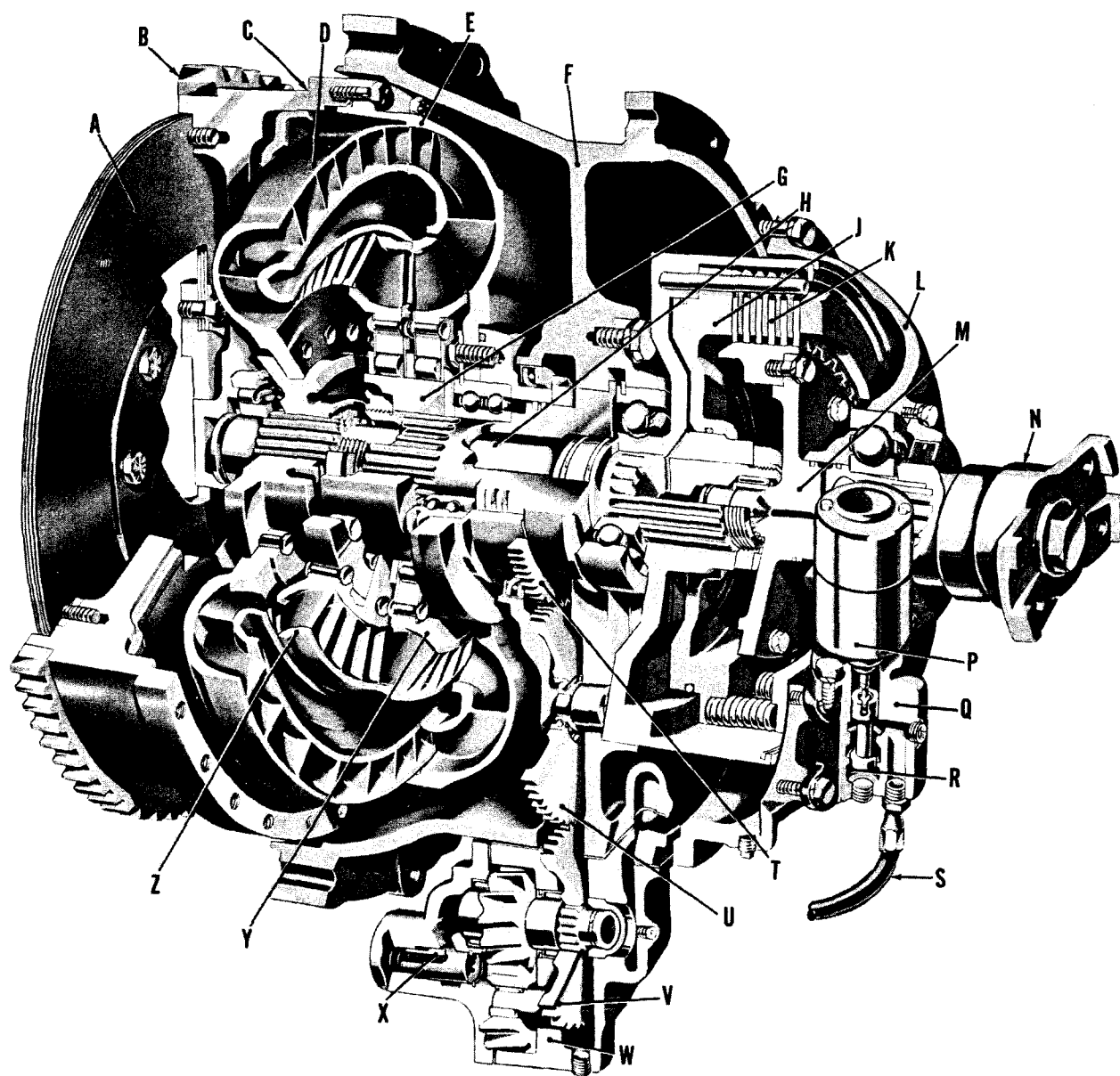


Fig IX-1. TCRD Torqmatic converter with hydraulic rear-disconnect clutch — cutaway view

## SECTION IX HYDRAULIC REAR-DISCONNECT CLUTCH ASSEMBLY

- A - Flexible flywheel disk assembly
- B - Flywheel ring gear
- C - Flywheel
- D - Converter turbine assembly
- E - Converter pump assembly
- F - Converter housing assembly
- G - Stator freewheel roller race
- H - Converter output shaft
- J - Clutch piston
- K - Clutch reaction, clutch friction plates
- L - Disconnect clutch housing
- M - Clutch shaft
- N - Output flange (automotive)
- P - 24-volt solenoid
- Q - Disconnect valve body
- R - Disconnect valve assembly
- S - Hose assembly
- T - Oil pump drive gear
- U - Oil pump idler gear assembly
- V - Oil pump driving gear
- W - Charging oil pump assembly
- X - Clutch pressure regulating valve
- Y - Second-stator assembly
- Z - First-stator assembly

Fig IX-1. TCRD Torqmatic converter with hydraulic rear-disconnect clutch — cutaway view, legend

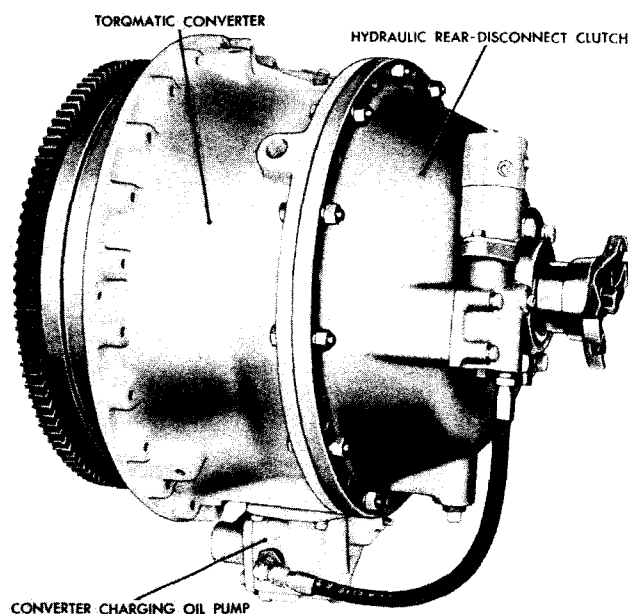


Fig IX-2. TCRD Torqmatic converter and hydraulic rear-disconnect clutch

## 1. SCOPE

The procedure outlined in pars. 2 and 4, below, applies to the separation of a rear-disconnect clutch from, and assembly to, a converter that has already been removed from the drive line. If it is desired to remove the rear-disconnect clutch only from the drive line, the same procedure will apply with only a few exceptions because of the difference in position of the converter. For removal and installation of the Torqmatic converter with clutch attached, refer to sec. V. For overhaul of the mainportion of the Torqmatic converter, refer to sec. VI. Refer to figs. IX-1 and IX-3 for cutaway and exploded views.

## 2. REMOVING CLUTCH FROM CONVERTER

### a. Preliminary Disassembly.

(1) Lay the converter and the rear-disconnect clutch on the flywheel end.

**Note:** When removing the rear-disconnect clutch only from drive line, disregard this step and instead, disconnect the flange from the drive line and all external lines.

(2) Remove the two bolts that secure the solenoid to the disconnect valve body. Remove solenoid, gasket, valve (fig. IX-4).

(3) Remove hose assembly (fig. IX-4).

(4) Remove four bolts from the disconnect valve body (fig. IX-4). Remove the body and gasket.

### b. Separating Clutch from Converter.

(1) Remove 11 bolts, nuts and lock washers that secure the disconnect clutch housing to the converter housing.

**Note:** When removing the rear-disconnect clutch only from the drive line, support the clutch housing in a suitable lifting sling before removing the 11 bolts, nuts and lock washers.

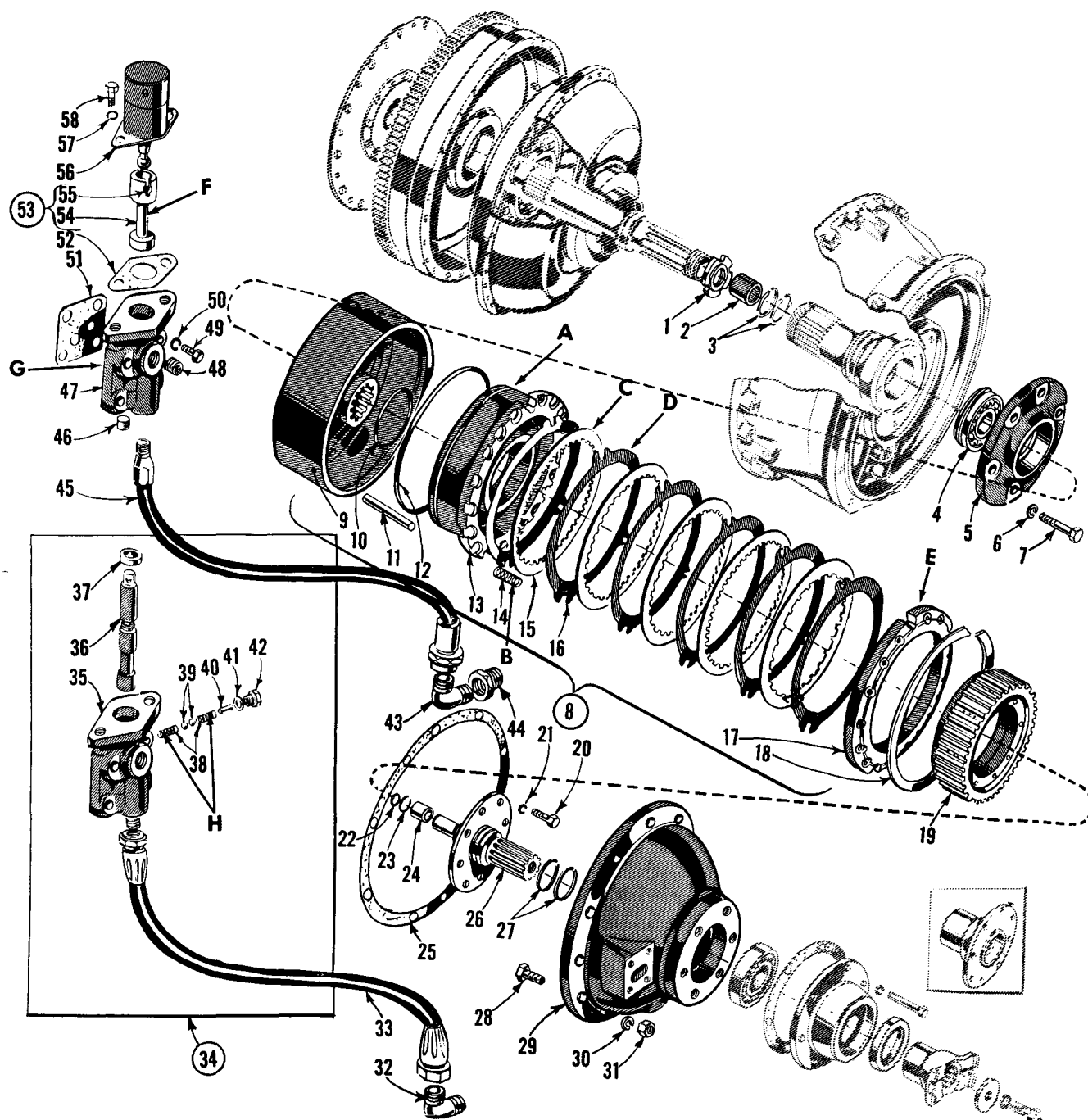


Fig IX-3. Hydraulic rear-disconnect — exploded view

- |   |  |
|---|--|
| 1 - Lock nut — 2-18 x .62 wide                              | 29 - Disconnect clutch housing             |
| 2 - Needle bearing (open end) — 1 1/4 x 1 1/2 O.D. x 1 wide | 30 - Lock washer — 1/2                     |
| 3 - Hook-type seal ring — 2 3/4 bore                        | 31 - Nut — 1/2-20                          |
| 4 - Single-row ball bearing assembly                        | 32 - Elbow — 3/8                           |
| 5 - Bearing retainer  | 33 - Hose assembly                         |
| 6 - Plain lock washer — 1/2                                 | 34 - Manual disconnect valve body assembly |
| 7 - Hexagon-head bolt — 1/2                                 | 35 - Manual disconnect valve body          |
| 8 - Disconnect clutch assembly                              | 36 - Manual disconnect valve               |
| 9 - Clutch drum   | 37 - Oil seal                              |
| 10 - Seal ring — 3.125 I.D. x .140 wide x 1.40 thick        | 38 - Spring                                |
| 11 - Clutch pin   | 39 - Ball                                  |
| 12 - Seal ring — 8 25/32 I.D. x 5/32 wide x 13/64 thick     | 40 - Straight pin — 3/16 x 3/4             |
| 13 - Clutch piston  | 41 - Gasket                                |
| 14 - Clutch release spring                                  | 42 - Plug                                  |
| 15 - Clutch friction plate                                  | 43 - Elbow — 3/8 x 5/8-18                  |
| 16 - Clutch reaction plate                                  | 44 - Reducer bushing                       |
| 17 - Clutch back plate                                      | 45 - Hose assembly                         |
| 18 - Internal-snap ring — 12 O.D.                           | 46 - Plug — 3/8                            |
| 19 - Clutch hub   | 47 - Disconnect valve body                 |
| 20 - Hexagon-head bolt — 3/8-24 x 1 1/8                     | 48 - Dryseal pipe plug — 3/4 short         |
| 21 - Lock washer — 3/8                                      | 49 - Hexagon-head bolt — 3/8-16 x 2        |
| 22 - Input-shaft seal ring                                  | 50 - Lock washer — 3/8                     |
| 23 - External snap ring                                     | 51 - Disconnect valve body gasket          |
| 24 - Sleeve   | 52 - Solenoid valve gasket                 |
| 25 - Disconnect clutch housing gasket                       | 53 - Disconnect valve assembly             |
| 26 - Clutch shaft   | 54 - Disconnect valve                      |
| 27 - Hook-type seal ring — 2 3/4 bore                       | 55 - Solenoid valve bushing                |
| 28 - Hexagon-head bolt — 1/2-20 x 2 1/4                     | 56 - Solenoid — 24 volt                    |
|   | 57 - Lock washer — 5/16                    |
|   | 58 - Hexagon-head bolt — 5/16-18 x 1 3/8   |

See Wear Limits Chart for following points of measurement:

- A - Piston face wear
- B - Spring operating height
- C - Plate thickness
- D - Plate thickness
- E - Plate thickness
- F - Valve clearance
- G - Body clearance
- H - Spring operating height

Fig IX-3. Hydraulic rear-disconnect clutch — exploded view, legend

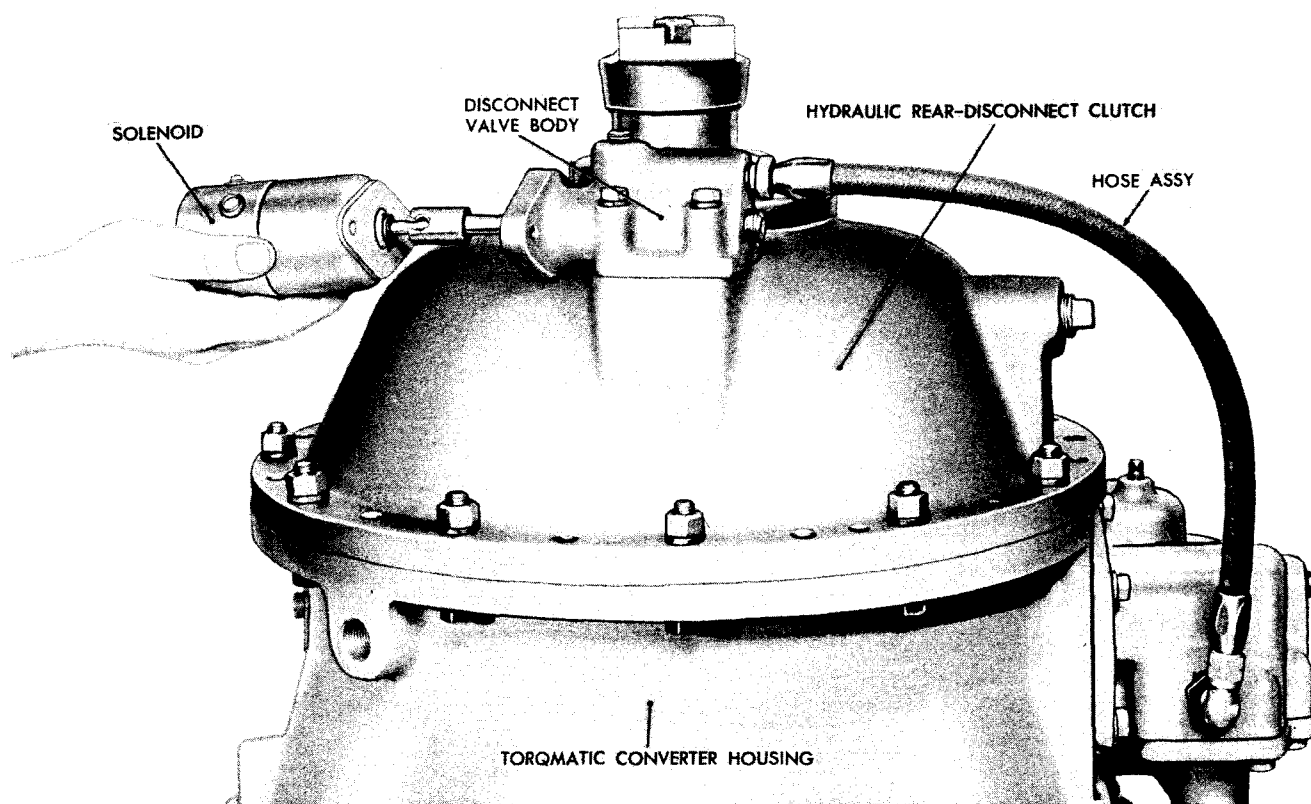


Fig IX-4. Removing (or installing) solenoid

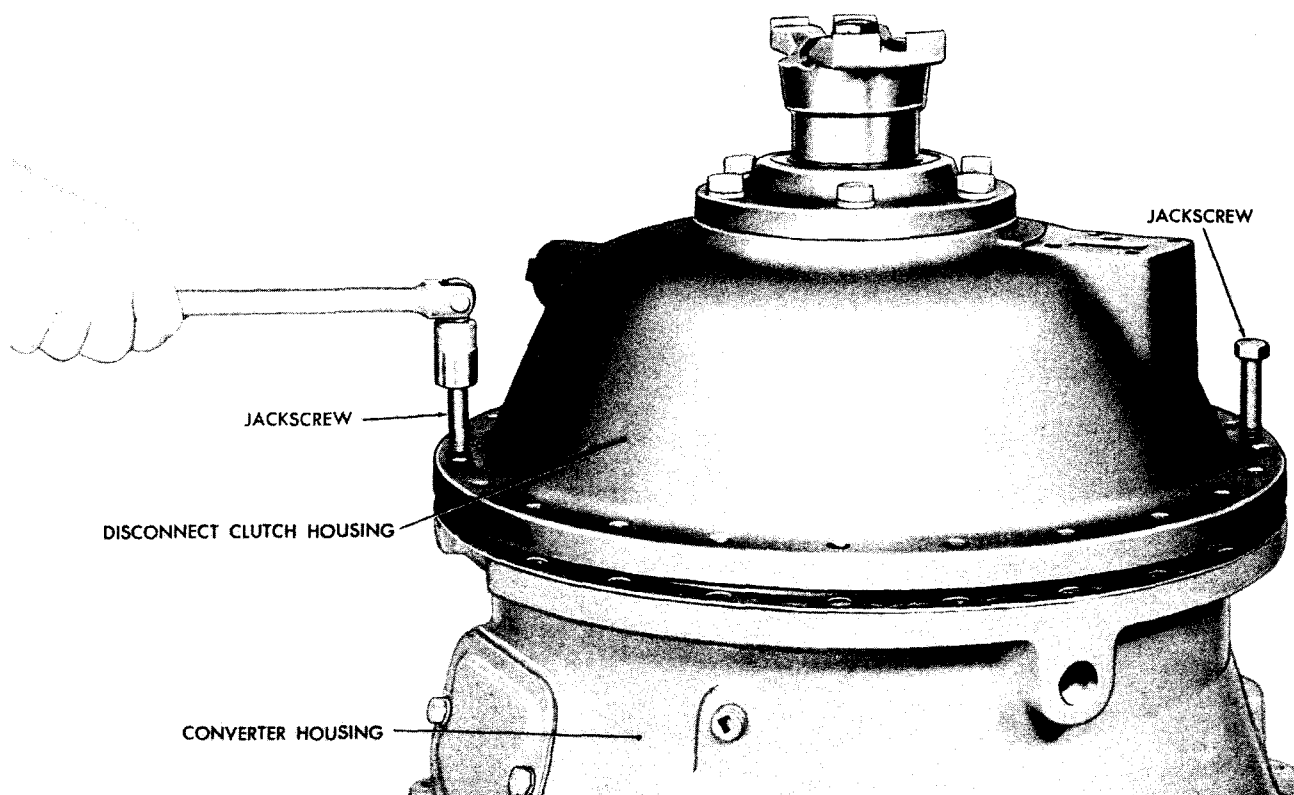


Fig IX-5. Using jackscrews to remove disconnect clutch assembly

(2) Using jackscrews, loosen the rear-disconnect assembly from the converter (fig. IX-5).

(3) Remove the bolt, lock washer, output flange washer and flange. Install an eyebolt and remove the clutch housing, shaft, hub, ball bearing and retainer (fig. IV-6).

**Note:** When removing the rear-disconnect clutch only from drive line, use a suitable lifting sling instead of an eyebolt.

(4) Straighten the portion of the lock nut that is bent into the shaft recess.

(5) Using a spanner wrench, remove the lock nut from the converter output shaft (fig. IX-7).

(6) Remove the clutch assembly (fig. IX-8).

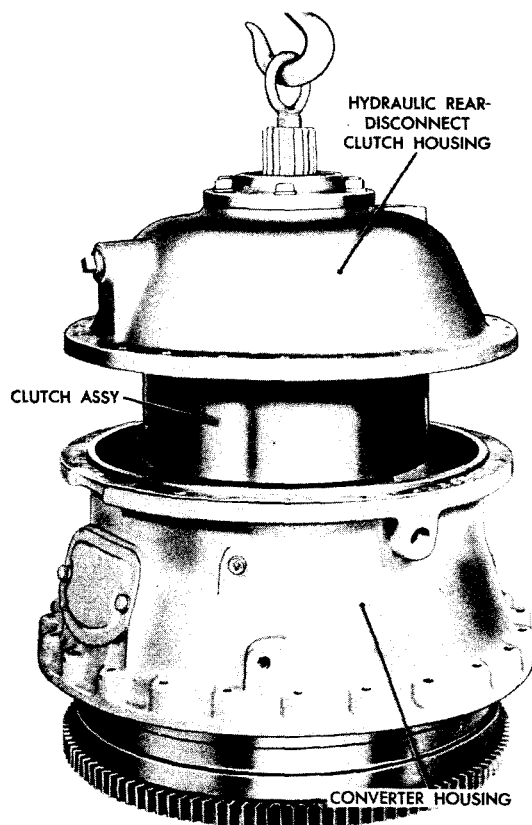


Fig IX-6. Removing (or installing) disconnect clutch housing

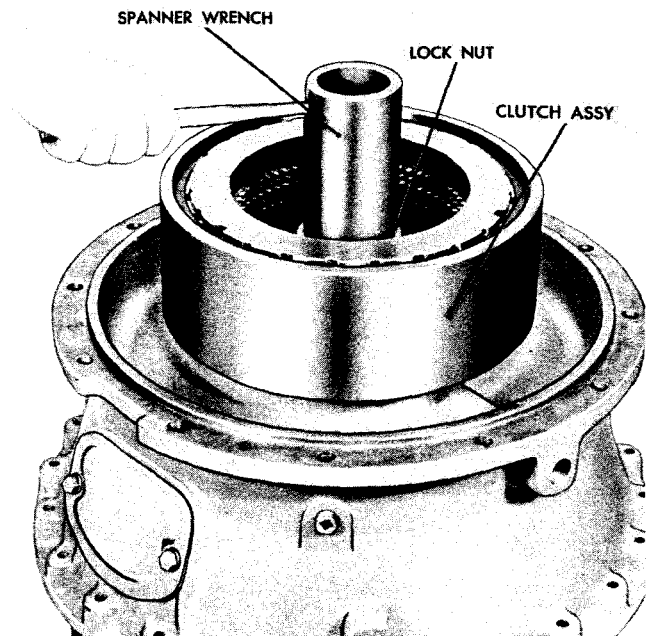


Fig IX-7. Removing (or installing) lock nut

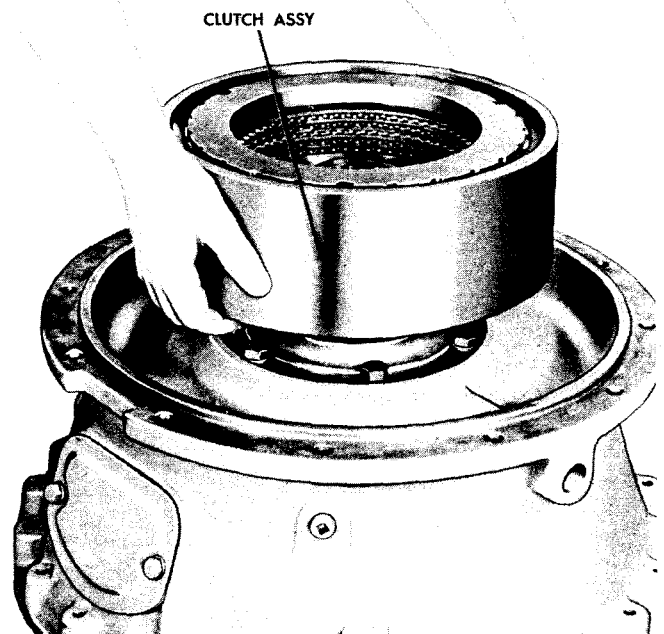


Fig IX-8. Removing (or installing) clutch assembly

### 3. REBUILD OF HYDRAULIC REAR-DISCONNECT CLUTCH

#### a. Disassembly of Rear-Disconnect Clutch.

(1) Do not remove the ball bearing from the output shaft unless replacement of parts is necessary. When replacing, remove the six bolts and lock washers that secure the



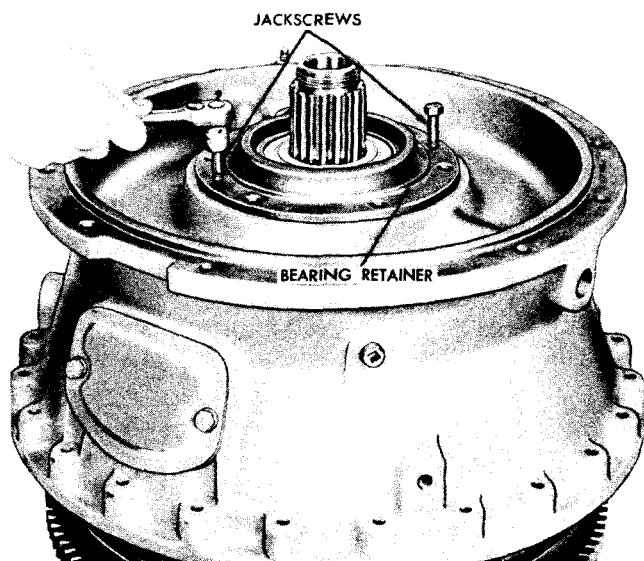


Fig IX-9. Loosening bearing retainer with jackscrews

bearing retainer and gasket to the converter housing.

(2) Use jackscrews to remove the retainer (fig. IX-9). Remove the bearing.

(3) Place the clutch assembly in a press, and press down on the clutch back plate. Remove the internal-snap ring with a screwdriver while the clutch back plate is depressed (fig. IX-10).

(4) Remove the clutch back plate (fig. IX-11), the clutch reaction plates, the clutch friction plates, the clutch release springs, and the clutch piston (fig. IX-12).

(5) Press the clutch shaft out of the bearing (fig. IX-13).

(6) Using a 3/4-inch wrench, remove the six bolts and lock washers. Remove the bearing retainer, gasket, and the ball bearing.

(7) The oil seal is ordinarily not removed from the bearing retainer unless replacement is necessary. When necessary, press the oil seal out of retainer and press a new seal into retainer with spring-loaded side toward the ball bearing.

(8) Remove the input shaft seal ring (fig. IX-14).

(9) Remove the external-snap ring and sleeve (fig. IX-14).

(10) Remove the two hook-type seal rings (fig. IX-15).

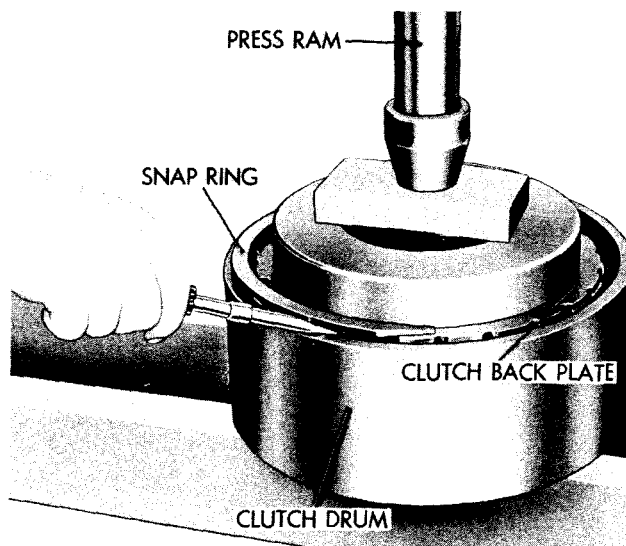


Fig IX-10. Removing (or installing) internal-snap ring

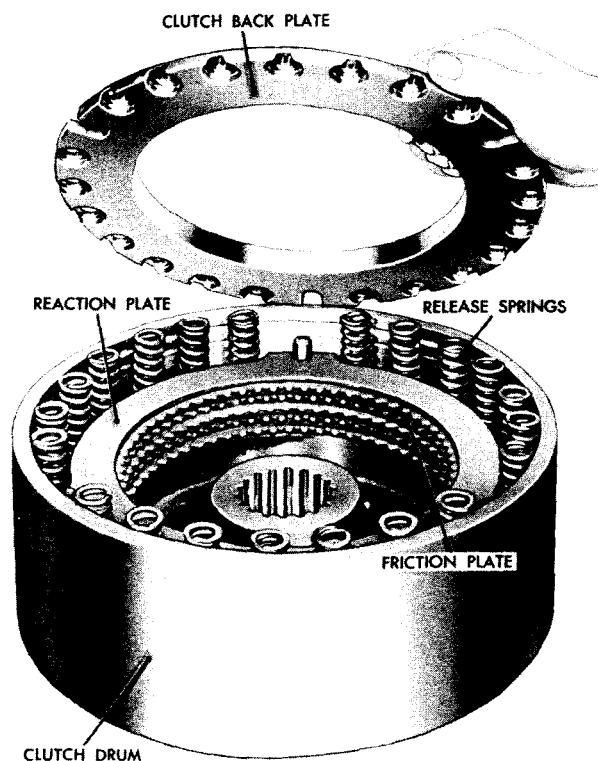


Fig IX-11. Removing (or installing) clutch reaction plate

(11) Remove eight bolts and lockwashers from the clutch shaft. Remove the clutch hub (fig. IX-15).

b. Cleaning, Inspection, Wear Limits.  
Refer to sec. IV, par. 5b, c, d, e, f, h, j, k, l and m for cleaning and inspection procedures and par. 6 for wear limits.

c. Assembly of Rear-Disconnect Clutch.

(1) Install the clutch shaft into the clutch hub (fig. IX-15) and install eight 3/8-24 bolts and lock washers. Torque the bolts 33 to 40 pound-feet.

(2) Install the two hook-type seal rings (fig. IX-15).

(3) Install the external-snap ring and sleeve (fig. IX-14).

(4) Install the input-shaft seal ring (fig. IX-14).

(5) Lower the disconnect clutch housing onto the clutch shaft (fig. IX-15).

(6) Press the ball bearing into place against the shoulder on the clutch shaft (fig. IX-15).

(7) Install the bearing retainer and gasket. Secure it with six bolts and lock washers.

(8) If the hydraulic rear-disconnect assembly is to be installed on the converter while the converter is out of the drive line, install an eyebolt in the rear end of the clutch shaft. If the converter was not removed from

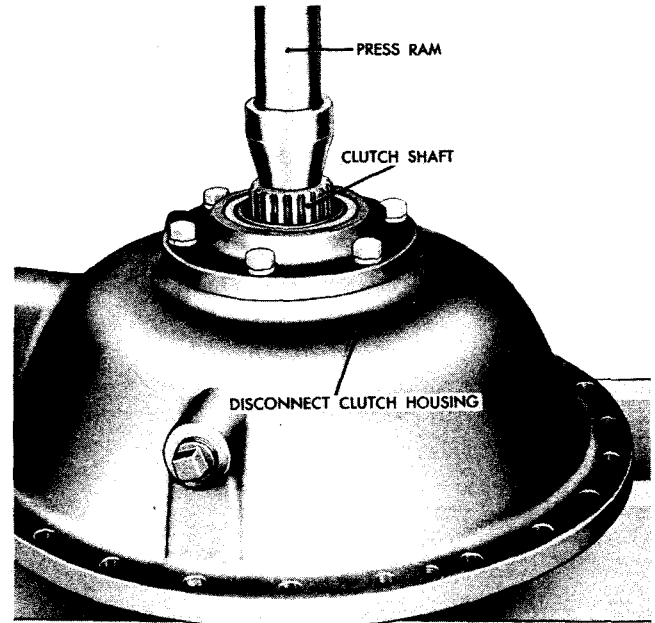


Fig IX-13. Removing clutch shaft

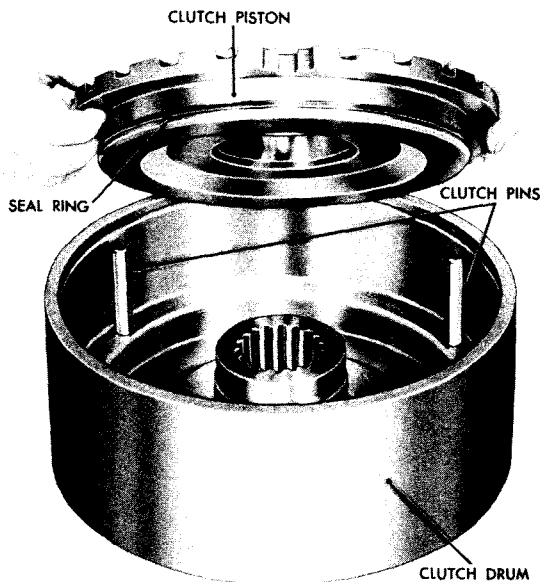


Fig IX-12. Removing (or installing) clutch piston

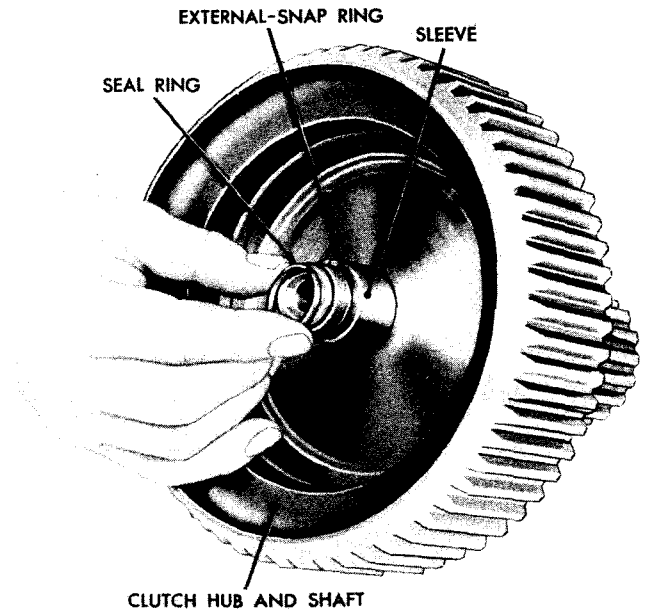


Fig IX-14. Removing (or installing) input-shaft seal ring

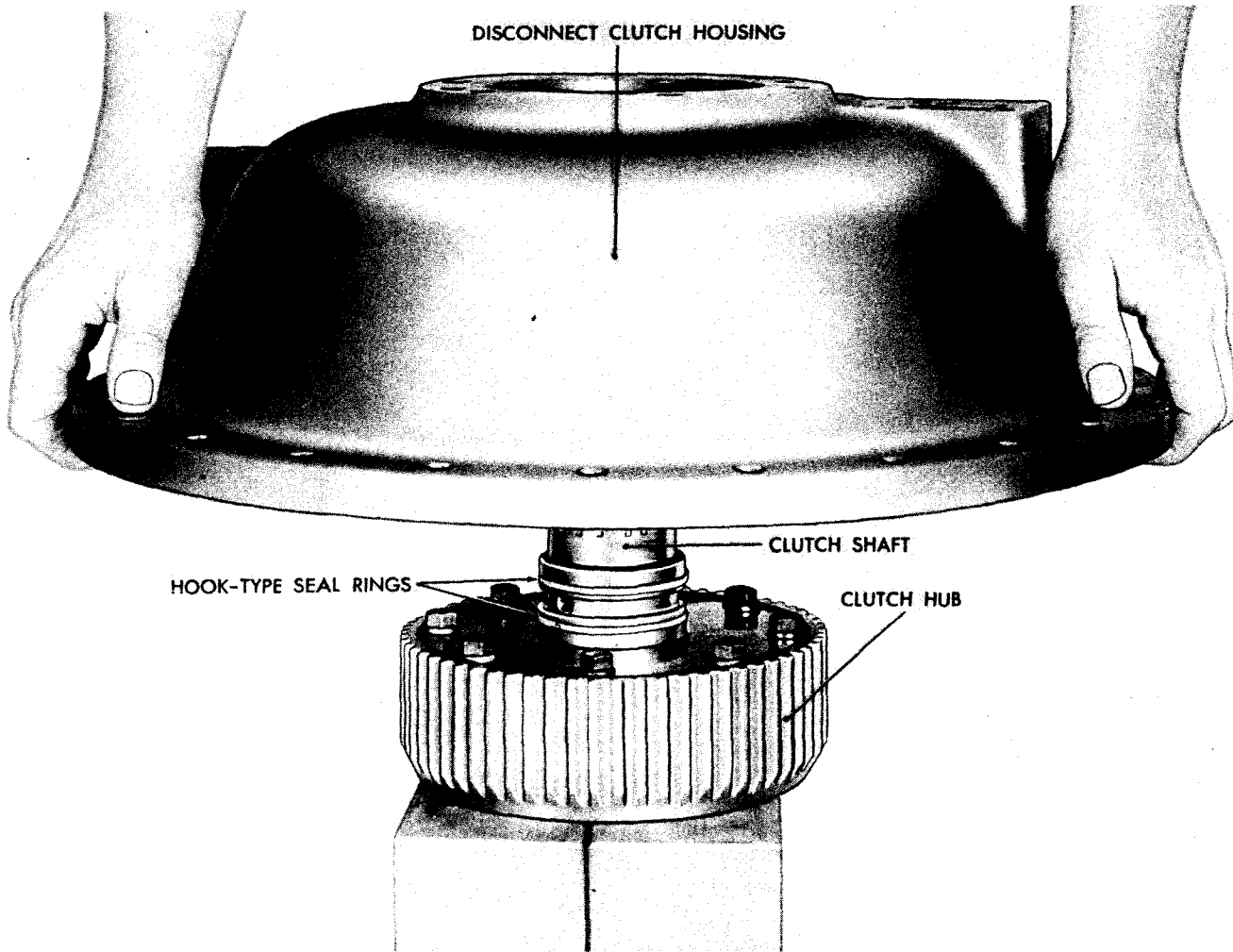


Fig IX-15. Installing disconnect clutch housing on clutch shaft and hub

the engine, install the flange, output flange washer, lock washer, and bolt on the clutch shaft. Torque the bolt 120 to 140 pound-feet.

(9) Install the clutch piston with the seal rings in the groove of the piston and the groove of the clutch drum (fig. IX-12).

(10) Install six clutch reaction plates alternated with five clutch friction plates, beginning with a reaction plate (fig. IX-11).

(11) Install 21 clutch release springs in the clutch piston (fig. IX-11).

(12) Install the clutch back plate (fig. IX-11).

(13) Place the disconnect clutch assembly in a press, and press down on the clutch

back plate and install the internal-snap ring (fig. IX-10).

#### 4. INSTALLING DISCONNECT CLUTCH ON CONVERTER.

##### a. Installing Clutch on Converter.

(1) If ball bearing (4, fig. IX-3) on the converter output shaft was removed, install the bearing with the snap ring adjacent to the converter housing.

(2) Install bearing retainer (5) and gasket and secure the retainer with six bolts and lock washers.

(3) Install the clutch assembly on the converter output shaft (fig. IX-8).

(4) Install the lock nut, flat side next to clutch hub, and tighten it (fig. IX-7). Lock the nut to the shaft by bending a portion of the shoulder on the nut into the recess provided in the shaft. Place a gasket on the housing split line.

(5) Install an eyebolt in the end of the clutch shaft and, using a hoist, position the shaft, housing and related parts above the disconnect clutch assembly (fig. IX-6). If the clutch only is being installed in the drive line, use a suitable lifting sling under the housing, instead of an eyebolt, in the end of the clutch shaft.

(6) Lower the clutch shaft assembly into the disconnect clutch assembly, rotating the clutch shaft as it is lowered so as to engage the splines on the clutch hub with the splines on the clutch friction plates. If the clutch only is being installed in the drive line, move the disconnect clutch housing toward

the disconnect clutch assembly, rotating the clutch shaft so as to allow the clutch hub to engage the splines on the clutch friction plates.

(7) Align the holes and install 11 bolts, nuts and lock washers.

(8) Install the disconnect valve body and gasket. Refer to fig. IX-4. Secure the valve body with four bolts and washers.

b. Installing Minor Subassemblies.

(1) Install the hose assembly. Refer to fig. IX-4.

(2) Install the solenoid plunger into the slot in the valve as shown in fig. IX-4 and install the valve, gasket, and solenoid. Install two bolts and lock washers in the solenoid.

(3) If the clutch only is being installed in the drive line, connect the solenoid wires, all oil lines, and the automotive flange.

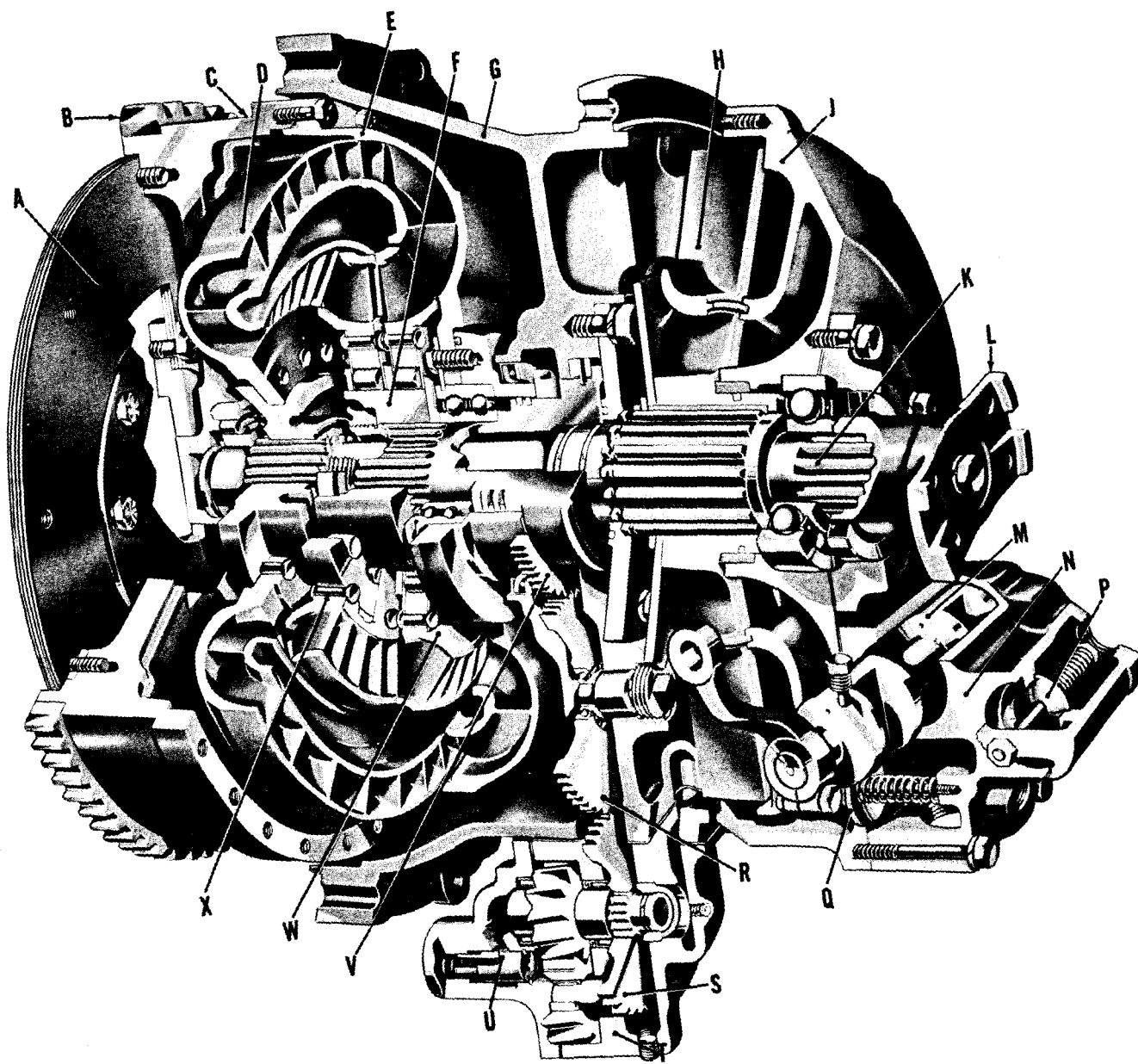


Fig X-1. TCB Torqmatic converter retarder — cutaway view

## SECTION X TORQMATIC RETARDER

### 1. SCOPE

The procedure outlined in pars. 2 and 4, below, applies to separation of a Torqmatic retarder from a Torqmatic converter whether the retarder is installed in the drive line or has been removed as a unit with the converter (fig. X-1). The same procedure will apply with only a few exceptions because of the difference in position of the converter. It is not necessary to remove the converter from the drive line if only the retarder is to be overhauled. For removal and installation of the Torqmatic converter with retarder attached, refer to sec. V. For overhaul of the main portion of the Torqmatic converter, refer to sec. VI. Figs. X-2 and X-3 are an exploded view and an overall view of the Torqmatic converter with Torqmatic retarder.

### 2. TORQMATIC RETARDER DISASSEMBLY

#### a. Removing Valve Body Assembly.

(1) Remove the bolt, lock washer, output flange washer, and output flange (fig. X-2).

- A - Flexible flywheel disk assembly
- B - Flywheel ring gear
- C - Flywheel
- D - Converter turbine assembly
- E - Converter pump assembly
- F - Stator freewheel roller race
- G - Converter housing assembly
- H - Hydraulic retarder rotor
- J - Hydraulic retarder housing
- K - Converter output shaft
- L - Output flange (automotive)
- M - Hydraulic retarder valve
- N - Retarder valve body
- P - Converter-out bypass valve
- Q - Retarder oil valve
- R - Oil pump idler gear assembly
- S - Oil pump driving gear
- T - Charging oil pump assembly
- U - Clutch pressure regulating valve
- V - Oil pump drive gear
- W - Second-stator assembly
- X - First-stator assembly

Fig X-1. TCB Torqmatic converter retarder — cutaway view, legend

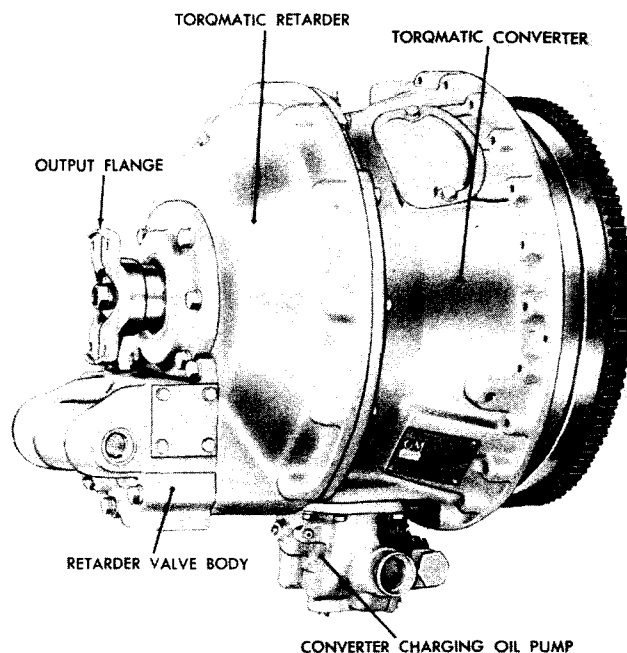


Fig X-2. Torqmatic converter with Torqmatic retarder, right-rear view

(2) Remove five bolts and lock washers that secure the valve body assembly to the retarder housing (fig. X-2). Remove the valve body assembly.

#### b. Removing Retarder Housing, Related Parts (fig. X-3).

(1) Remove six bolts and lock washers from output-shaft bearing retainer (19) and remove the retainer, gasket, and output-flange oil seal (22). If the oil seal needs to be replaced, remove the seal and press in a new seal, spring-loaded side toward the retarder housing.

(2) Use a hoist and a suitable lifting sling to support the retarder housing.

(3) Remove the 11 bolts and lock washers which secure the retarder housing to the converter housing.

(4) Use jackscrews to remove the housing from the converter housing.

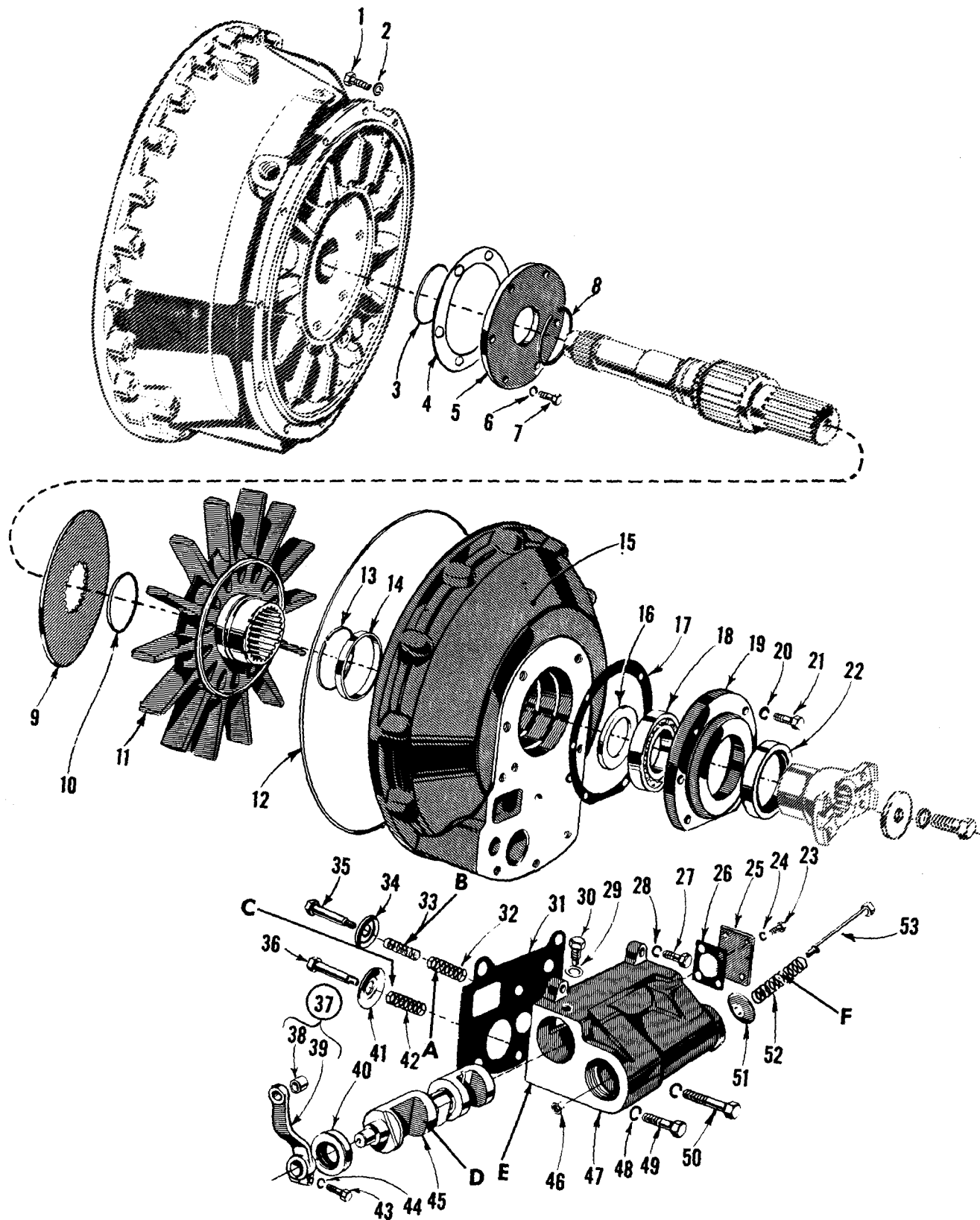


Fig X-3. Torqmatic retarder — exploded view

- |   |   |
|---|---|
| 1 - Hexagon-head bolt — 1/2                       | 27 - Hexagon-head bolt — 1/2                |
| 2 - Plain lock washer — 1/2                       | 28 - Plain lock washer — 1/2                |
| 3 - Seal ring — 2.850 I.D. x .210 dia             | 29 - Plain washer — 3/16 O.D.               |
| 4 - Bearing retainer gasket                       | 30 - Selector valve locating screw          |
| 5 - Ground sleeve retainer                        | 31 - Retarder valve body gasket             |
| 6 - Plain lock washer — 1/2                       | 32 - Torque limit valve spring              |
| 7 - Hexagon-head bolt — 1/2                       | 33 - Torque limit valve spring              |
| 8 - External-snap ring                            | 34 - Torque limit valve                     |
| 9 - Baffle plate                                  | 35 - Torque limit pilot                     |
| 10 - Seal ring — 3.125 I.D. x .210 dia            | 36 - Retarder oil pilot                     |
| 11 - Hydraulic retarder rotor                     | 37 - Lever assembly                         |
| 12 - Seal ring — 16 I.D. x .125 wide x .125 thick | 38 - Bushing                                |
| 13 - Hook-type seal ring                          | 39 - Lever                                  |
| 14 - Retarder housing bushing                     | 40 - Seal — 2.50 O.D. x 1.25 I.D. x 50 wide |
| 15 - Hydraulic retarder housing                   | 41 - Retarder oil valve                     |
| 16 - Spacer                                       | 42 - Retarder oil valve spring              |
| 17 - Bearing retainer gasket                      | 43 - Hexagon-head bolt — 3/8                |
| 18 - Output-single-row ball bearing assembly      | 44 - Plain lock washer — 3/8                |
| 19 - Output-bearing retainer                      | 45 - Retarder control valve                 |
| 20 - Plain lock washer — 1/2                      | 46 - Lock nut — 5/16-24                     |
| 21 - Hexagon-head bolt — 1/2                      | 47 - Retarder valve body                    |
| 22 - Output-flange dual oil seal — 3 I.D.         | 48 - Plain lock washer — 1/2                |
| 23 - Hexagon-head bolt — 5/16                     | 49 - Hexagon-head bolt — 1/2                |
| 24 - Plain lock washer — 5/16                     | 50 - Hexagon-head bolt — 1/2                |
| 25 - Retarder valve cover                         | 51 - Converter "OUT" bypass valve           |
| 26 - Retarder valve cover gasket                  | 52 - Converter "OUT" bypass valve spring    |
|   | 53 - Converter "OUT" bypass pilot           |

See Wear Limits Chart for the following points of measurement:

- A - Spring operating height
- B - Spring operating height
- C - Spring operating height
- D - Valve clearance
- E - Body clearance
- F - Spring operating height

Fig X-3. Torqmatic retarder — exploded view, legend



(5) While removing the retarder housing, tap on the end of the output shaft. This presses ball bearing (18) from the output shaft.

(6) Remove the ball bearing from the housing.

(7) Remove large seal ring (12) from the converter housing split line.

(8) Remove spacer (16), rotor (11), seal ring (10), and baffle plate (9) from the output shaft. Remove hook-type seal ring (13) from the rotor hub.

(9) The snap ring remaining on the output shaft need not be removed unless replacement is necessary.

(10) If ground sleeve retainer (5) needs to be removed, the converter will have to be disassembled enough that the output shaft can be removed. Refer to sec. VI, par. 4. After removing the output shaft, remove the six bolts and lock washers that secure the retainer and remove the retainer, gasket, and seal ring.

(11) If retarder housing bushing (14) needs replacing, remove the bushing and press in a new bushing, chamfered side toward the rotor cavity.

c. Cleaning, Inspection, Wear Limits.  
Refer to sec. IV, par. 5b, c, d, e, f, h, j, k, l and m for cleaning and inspection procedures and par. 6 for wear limits.

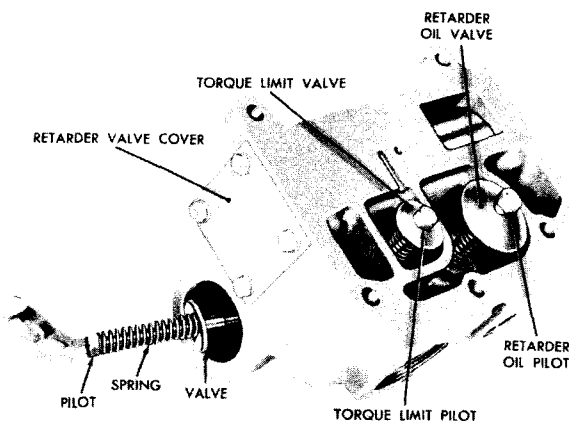


Fig X-4. Removing (or installing) converter "OUT" bypass valve, spring, and pilot

### 3. VALVE BODY REBUILD

#### a. Disassembly of Valve Body Assembly.

(1) To disassemble the valve body assembly into individual parts, use a 9/16-inch wrench to loosen the converter "OUT" bypass valve pilot while holding the nut on the pilot with a 1/2-inch wrench. Remove the converter "OUT" bypass pilot, spring, valve, and nut (fig. X-4).

(2) Remove the retarder oil pilot, valve, and spring from the retarder valve body. Refer to fig. X-4.

(3) Remove the torque limit pilot, valve, and springs from the retarder valve body. Refer to fig. X-4.

(4) Remove the bolt and lock washer that retain lever (37, fig. X-3) on hydraulic brake valve (45). Remove the lever from the retarder valve. If replacement of the bushing in the lever is necessary, remove the old bushing and press in a new bushing.

(5) Using a 1/2-inch wrench, remove the four bolts and washers that secure the retarder valve cover to the retarder valve body (fig. X-4). Remove the cover and gasket.

(6) Remove hydraulic retarder valve locating screw (30, fig. X-3) and washer (29).

(7) Remove the hydraulic retarder valve from the retarder valve body (fig. X-5).

(8) Do not remove the oil seal in the

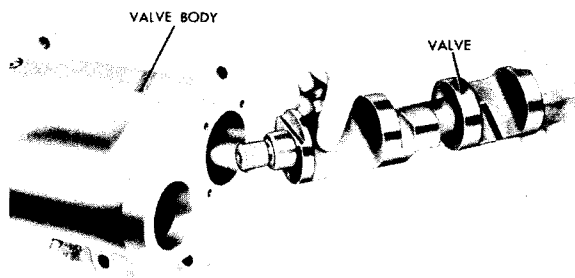


Fig X-5. Removing (or installing) the hydraulic brake valve in the brake valve body

retarder valve body unless replacement is necessary. When necessary, press out the old seal and press in the new seal with the spring-loaded side toward the valve.

b. Assembly of Valve Body Assembly.

(1) Install the hydraulic retarder valve into the retarder valve body (fig. X-5).

(2) Install hydraulic retarder valve locating screw (30, fig. X-3) and plain washer (29) into the valve body, alining the slot on the end of the valve with the locating screw.

(3) Install the retarder valve cover and gasket (fig. X-4). Secure the cover to the valve body with four bolts and lock washers.

(4) Install lever (37, fig. X-3) onto the retarder valve and secure the lever with a bolt and lock washer.

(5) Install the torque limit springs, valve, and pilot into the valve body. Refer to fig. X-4.

(6) Install the retarder oil spring, valve, and pilot into the retarder valve body. Refer to fig. X-4.

(7) Install the converter "OUT" bypass valve, spring, pilot, and nut (fig. X-4).

#### 4. TORQMATIC RETARDER ASSEMBLY

a. Installing Retarder Housing, Related Parts (fig. X-3).

(1) Install the baffle plate (9) against

the external-snap ring on the output shaft. Install seal ring (10) on the output shaft.

(2) Install hook-type seal ring (13) on the rotor hub and install rotor (11) on the output shaft.

(3) Install spacer (16) on the output shaft.

(4) Install large seal ring (12) on the converter housing split line.

(5) Install brake housing (15) on the converter housing and secure it with 11 bolts and lock washers.

(6) Install ball bearing (18) on the output shaft and into the housing. To do this, start the bearing on the shaft and then install the output flange against the bearing. Install the flange retaining washer against the flange and install the bolt in the end of the output shaft. Tighten the bolt until the bearing is located against the spacer. Remove the bolt, washer, and flange.

(7) Lubricate the lips of oil seal (22) with high-temperature grease. Install output-shaft bearing retainer (19) and gasket on the retarder housing. Secure the retainer with six bolts and lock washers.

b. Installing Valve Body Assembly.

(1) Install the retarder valve body assembly and gasket to the retarder housing and install five bolts and washers (fig. X-2).

(2) Install the output flange, flange retaining washer, lock washer and bolt. Torque the bolt 120 to 140 pound-feet.

## *Service Information Notes*