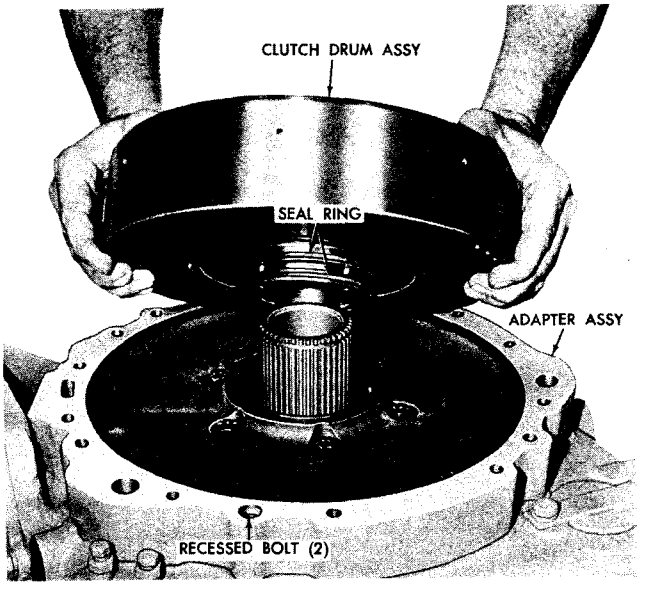


Fig. 5-44. Removing low-range clutch drum (-3 overdrive model)

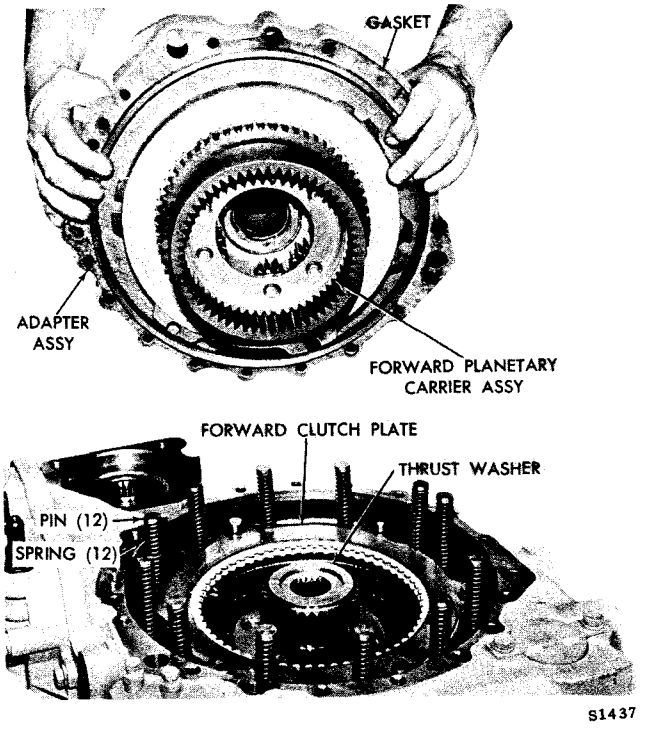


Fig. 5-45. Removing adapter assembly and attached parts (-3 overdrive model)

NOTE

The adapter compresses the forward and reverse clutch springs and must be held downward while loosening the bolts.

h. Removal of Adapter Assembly, Forward Planetary and Clutch (TRT 2220-3, 2420-3 overdrive models)

(1) Remove the adapter assembly and its attached parts (fig. 5-45). Remove the adapter gasket and sun gear thrust washer (if it remained in the forward planetary carrier).

(2) Remove the forward and reverse planetary sun gear and thrust washer (fig. 5-45). Remove twelve piston return springs and pins.

(3) Remove four forward clutch plates remaining in the transmission (fig. 5-45).

(4) Remove six self-locking bolts 29 (B, foldout 9). Remove adapter assembly 25. Refer to paragraph 6-19 for rebuild of the rear housing adapter assembly.

(5) Remove forward clutch piston 21 (B, foldout 9) with sealrings and expanders, items 17 thru 20. Refer to paragraph 6-11 for rebuild of the clutch piston.

(6) Remove bearing 23 (B, foldout 9) by using a puller bolted to retainer 22.

(7) Remove ring gear 14 (B, foldout 9) and two clutch plates 15 and 16. Remove snap-ring 11 and separate ring gear 1 from carrier assembly 31. Refer to paragraph 6-13 for rebuild of the planetary carrier assembly.

i. Removal of Reverse Planetary and Clutch

(1) Remove the bolt and flat washer which were installed temporarily when the control valve assembly was removed (refer to paragraph 5-3f(2).

(2) Remove the forward and reverse clutch anchor assembly 20 (B, foldout 8). Refer to paragraph 6-16 for rebuild of the clutch anchor assembly.

(3) Remove the reverse planetary carrier assembly and one clutch plate as a unit. Separate the clutch plate from the planetary carrier. Refer to paragraph 6-12 for rebuild of the planetary carrier assembly.

(4) Remove the five external-tanged clutch plates 6 (B, foldout 8) and four internal-splined clutch plates 7 from the transmission.

(5) Remove the reverse clutch piston assembly (fig. 5-46). Refer to paragraph 6-11 for rebuild of the clutch piston.

j. Removal of Oil Pump Assembly. The oil pump assembly on -3 models is identical to that on -1 models. Refer to paragraph 5-5f, above, for removal instructions. Refer to paragraph 6-26 for rebuild of the oil pump assembly. Refer to paragraph 6-24 for rebuild of the transmission housing assembly.

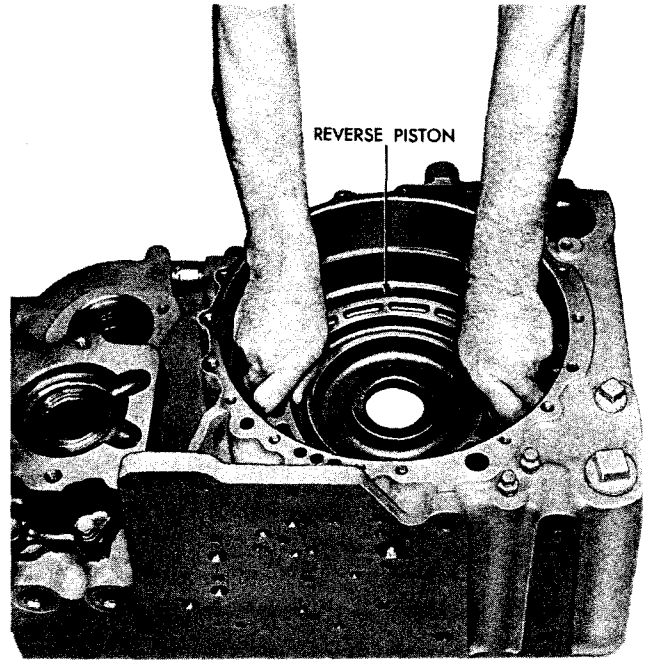


Fig. 5-46. Removing reverse clutch piston assembly (-3 model)

Section 6. REBUILD OF SUBASSEMBLIES

6-1. SCOPE OF SECTION 6

This section contains the rebuild procedures for the subassemblies which were removed in Section 5.

6-2. GENERAL INFORMATION FOR SUBASSEMBLY REBUILD

a. Tools, Parts, Methods. Refer to paragraphs 4-3 through 4-5.

b. Cleaning, Inspection. Refer to paragraph 4-6.

c. Torque Specifications. Refer to paragraph 4-11 for torque specifications. Refer also to figure 6-32 at the end of this section.

d. Wear Limits. Refer to Section 8 for wear limits information.

e. Spring Information. Refer to Section 8 for spring identification and specifications.

6-3. TRANSMISSION FRONT COVER

a. Disassembly (A, foldout 5)

(1) If replacement is necessary, drive oil seal 10 out of the front of front cover 12.

(2) Clean the bore from which oil seal 10 was removed.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (A, foldout 5)

(1) Coat the outer diameter of seal 10 with nonhardening sealer and install, spring-loaded lip first, straight into the bore of cover 12.

(2) Using a tool which completely covers the oil seal, press the seal until it bottoms lightly against the counterbore in cover 12.

6-4. FIRST- AND SECOND-TURBINE ASSEMBLY

a. Disassembly (A, foldout 6)

(1) Locate the index marks (V-groove) in the outer rims of the first-turbine support and the first turbine (fig. 6-1). Make sure the groove is well defined in both mating parts. Deepen the groove to 0.040 inch (maximum) if it is not prominent.

(2) Drive the six pins (nine in TRT 2400 models) inward until they clear the holes in the first-turbine support (fig. 6-1).

(3) Remove the first turbine from the support (fig. 6-1).

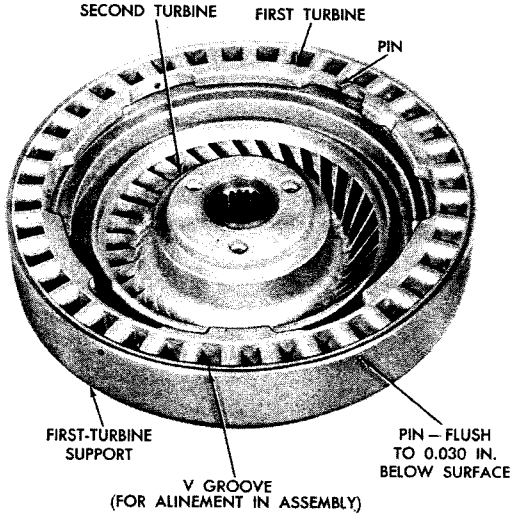


Fig. 6-1. First- and second-turbine assembly

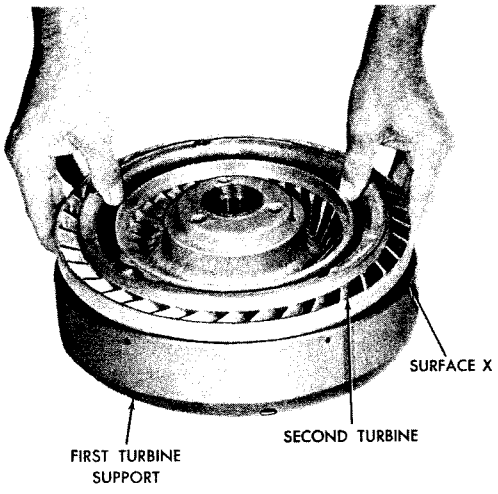


Fig. 6-2. Removing (or installing) second-turbine assembly

(4) Remove the second turbine and its bearing from the first-turbine support (fig. 6-2).

(5) If replacement is necessary, remove bearing 6 (A, foldout 6) from turbine 8. Three push-out holes are provided in the hub of turbine 8. Remove snapring 7 from second turbine 8 only if replacement is necessary. On earlier models, snapring 7 is not used.

(6) If replacement is necessary, bearing 1 may be removed from support 3 by pressing through the four holes provided in the hub of support 3.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (A, foldout 6)

(1) If bearing 1 was removed from support 3, install its replacement. Position the bearing, manufacturer's identification outward, and press it to a firm seat on the hub.

(2) If bearing 6 was removed from turbine 8, install its replacement, manufacturer's mark outward. If snapring 7 was removed, install its replacement. (On earlier models, snapring 7 was not used.)

(3) Install the second turbine and its bearing into first-turbine support (fig. 6-2).

(4) Install the first turbine into the first-turbine support and aline the V-groove marks (fig. 6-1).

(5) Drive the spring pins outward until they are flush with, or within 0.030 inch of, the outer surface of the first-turbine support (fig. 6-1).

6-5. TORQUE CONVERTER PUMP ASSEMBLY

a. Disassembly (A, foldout 6)

(1) Flatten lockstrips 13 which lock bolts 12. Remove bolts 12, lockstrips 13 and retainer 14.

(2) Remove accessory drive gear 19 and bearing 18 from pump assembly 15. Remove gasket 17.

(3) If replacement is required, remove defective bolts 16 by pressing them from pump flange.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (A, foldout 6)

(1) If bolts 16 were removed from pump assembly 15, install new bolts. Aline the flat side of the bolt head next to the pump and press the new bolt into place.

(2) Install double-row ball bearing 18, loader notch toward front of transmission, into accessory drive gear 19. Install gasket 17 onto gear 19 and aline the bolt holes in both.

(3) Install pump assembly 15 onto the bearing and gear, alining the bolt holes in the pump, gasket and gear.

(4) Install pump bearing retainer 14, six lockstrips 13 and twelve 1/4-28 x 1 1/4, self-locking bolts 12. Tighten the bolts to 10 to 12 pound feet torque. Bend a corner of each lockstrip against each bolt head.

6-6. CONVERTER HOUSING ASSEMBLY

a. Disassembly (B, foldout 6)

(1) If the transmission has a "dry" converter housing, it will have a pressed steel diaphragm and oil seal (fig. 6-3). These must be removed before the accessory gearing can be removed. Removal destroys both the diaphragm and oil seal.

(2) To remove the diaphragm, cut a slit through the diaphragm as shown in figure 6-3. Insert a hooked tool into the slit and pry the metal above the slit outward. This will push the metal below the slit inward. Deforming the diaphragm in this way will reduce the outside diameter and the diaphragm can be lifted out.

(3) Clean the bore into which the diaphragm fits. A smooth, clean bore will prevent leakage around the new diaphragm installed.

(4) Only "dry" housings require the welch plug in the housing below the diaphragm (fig. 6-3). Do not remove the plug unless replacement is necessary. If the plug is removed, clean the bore.

(5) At the rear of the housing (fig. 6-4), remove the snapring from the accessory driven gear bearing. Tap the accessory driven gear forward and remove it and the attached parts from the housing.

(6) Press bearing 14 (B, foldout 6) from gear 2. Remove snapring 13 and bearing 12.

(7) On transmissions equipped with an accessory drive gear, remove the snapring from the accessory drive bearing (fig. 6-4). Tap the accessory drive gear forward and remove it and the attached parts from the housing.

(8) Remove snapring 7 (B, foldout 6) and bearing 6 from gear 1.

(9) Remove four bolts 16 which retain the ground sleeve in the converter housing.

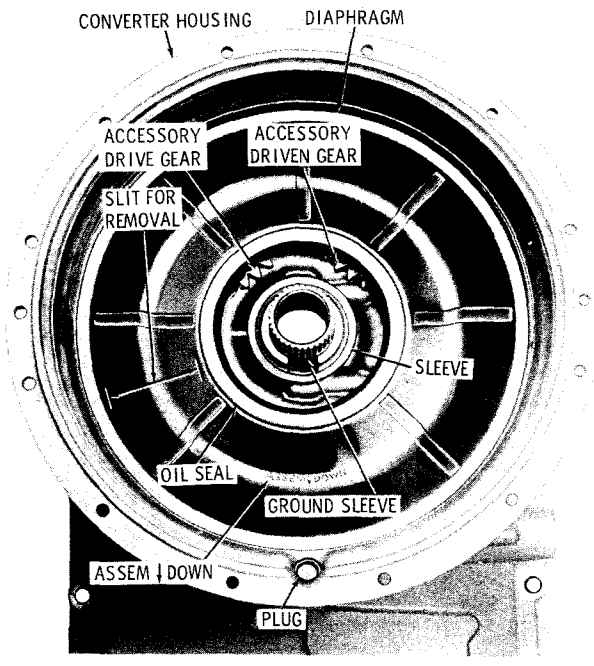


Fig. 6-3. Torque converter housing assembly—front view

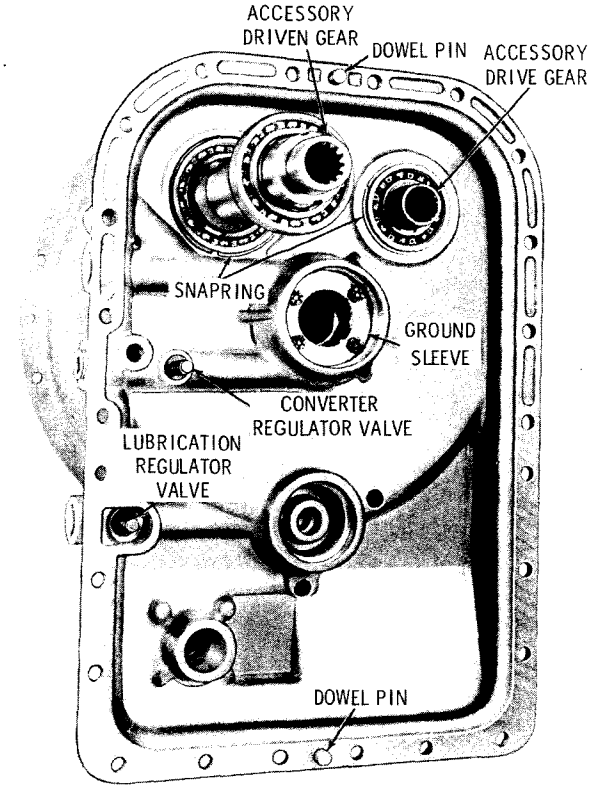


Fig. 6-4. Torque converter housing assembly—rear view

(10) Position the housing, rear downward, and press the ground sleeve out of the housing. Use care during this operation to prevent damage to the pressure regulator valves.

(11) Remove step-joint sealring 20 (A, foldout 6) from the converter housing sleeve. Remove converter housing sleeve 37 (B, foldout 6) from the front of the housing.

(12) If the converter regulator valve components 24, 25 and 26 or lubrication regulator valve components 21, 22 and 23 require replacement, remove them by twisting pins 21 or 24 out of the housing.

(13) Do not remove plugs 34 and 38 except for cleaning or replacement. Do not remove dowel pins 39, except for replacement.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 6)

(1) If lubrication regulator valve was removed, install spring 22 and valve 23 onto pin 21. Press the pin into housing 35 until it is flush with, to 0.010 inch below, the rear mounting surface of the housing.

(2) If converter pressure regulator valve was removed, install spring 25 and valve 26 onto pin 24. Press pin 24 into housing 35 until it is 1.19 inch above the valve seat surface of the housing.

(3) If plugs 34 and 38 were removed, coat them with nonhardening sealer and install them. Plugs 38 are installed, flat side first, 0.030 inch minimum below the top surface of the housing.

(4) If converter housing sleeve 37 was removed, position a new sleeve, sealring groove toward the front, and press it onto the hub of the housing. Seat it firmly against the shoulder of the housing. Install step-joint sealring 20 (A, foldout 6) into the groove in the converter housing sleeve.

(5) If ground sleeve 15 (B, foldout 6) was removed, chill the replacement sleeve in dry ice for at least 1 hour. Aline the bolt holes in the ground sleeve with those in housing 35 and press the sleeve to a firm seat against the rear of the housing. Install four 5/16-18 x 3/4 inch, self-locking bolts 16 and tighten them to 17 to 20 pound feet torque.

(6) On transmissions equipped with an accessory drive gear, press bearing 6, snapring groove away from the gear, onto gear 1 and install snapring 7.

(7) Press gear 1 and bearing (large snapring removed) into the front of housing 35. Install the snapring into the groove in the outer race of the bearing.

(8) Press bearing 12, snapring groove away from the gear, onto gear 2 and install snapring 13. Press bearing 14 onto the rear of gear 2.

(9) Press gear 2 and bearings (large snapring removed) into the front of housing 35. Install the snapring into the groove in the outer race of bearing 12.

NOTE

If the transmission has a "dry-type" converter housing, continue assembly procedures, as described in (10) through (12), below.

(10) Coat the outer diameter of diaphragm assembly 13 (B, foldout 5) with nonhardening sealer, and start it, convex side first, and arrow pointing toward bottom of transmission, into the front of the converter housing. Using two soft hammers (one driving against the other) drive the diaphragm until it seats in the housing. Move evenly around the housing, driving it only slightly at each position.

(11) If an older diaphragm is used (seal not factory installed), coat the outer diameter of lip-type oil seal 14 (B, foldout 5) with nonhardening sealer. Press the seal, spring-loaded lip first, into the front of converter diaphragm 15. Seat the seal lightly in the diaphragm. Install the diaphragm as described in (10), above, except that the indexing (arrow) is not required.

(12) If plug 16 (B, foldout 5) was removed, coat the outer diameter of the new plug with nonhardening sealer. Drive plug 16, flat side first, into the converter housing, and seat it against the shoulder in the bore.

6-7. SECOND-TURBINE DRIVE GEAR

a. Disassembly (B, foldout 6)

(1) On earlier model transmissions, if replacement is necessary, remove snapring 17 from the splined end of drive gear 20.

(2) Remove step-joint Teflon sealring 18 from gear 20.

(3) Using a puller, remove ball bearing 19 from gear 20.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 6)

(1) Press ball bearing 19, manufacturer's marks outward, onto gear 20. Seat the bearing firmly against the gear shoulder.

(2) Install step-joint Teflon sealring 18 into the groove in the shaft of gear 20. It may be necessary to roll the sealring into a smaller circle for a few seconds before it will retain its proper diameter. Use oil-soluble grease to help retain it in its groove.

(3) On earlier models, install snapring 17 into the groove at the splined end of drive gear 20.

6-8. CONVERTER DRIVEN GEARS, FREEWHEEL ASSEMBLY

a. Disassembly (A, foldout 7) (prior to S/N 10426)

(1) Press second-turbine driven gear assembly out of the assembled unit (fig. 6-5). This will free spacers 16 (A, foldout 7) and 18 and bearing 19 which may be removed. Remove fifteen rollers 23, also freed. Refer also to figure 6-6.

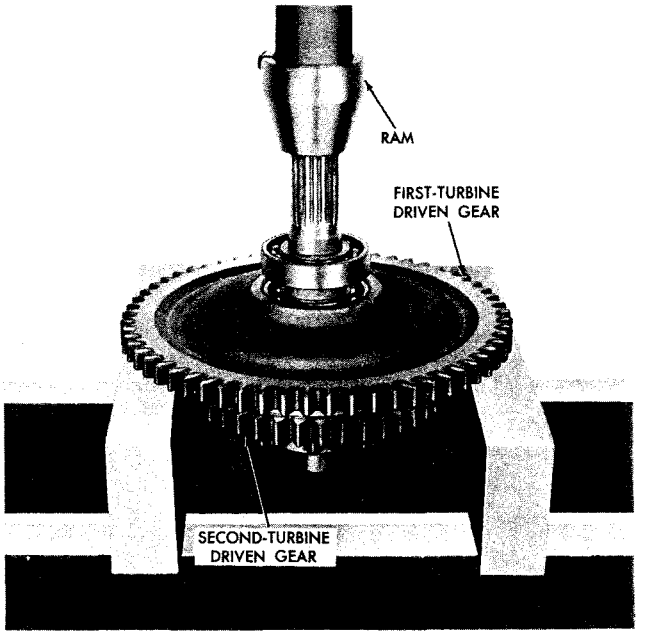


Fig. 6-5. Pressing second-turbine driven gear out of first turbine driven gear

(2) Remove bearing 17 (A, foldout 7) from gear 15. Remove twelve nuts 2 from bolts 14.

(3) Using a screwdriver, pry cam 24 away from gear 3. Remove spring retainer plate 21, three springs 20, roller cage 22, cam 24, bolts 14 and retainer plate 13.

(4) If replacement is necessary, remove bearings 1 and 4 from gear 3.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (A, foldout 7) (prior to S/N 10426)

(1) If bearings 1 and 4 were removed from gear assembly 3, install by pressing them against shoulders on gear 3.

(2) Assemble cam 24, retainer plate 13, and bolts 14, as shown in figure 6-7. Stretch a rubber band around the circle of bolts as shown in figure 6-8, to retain the bolts.

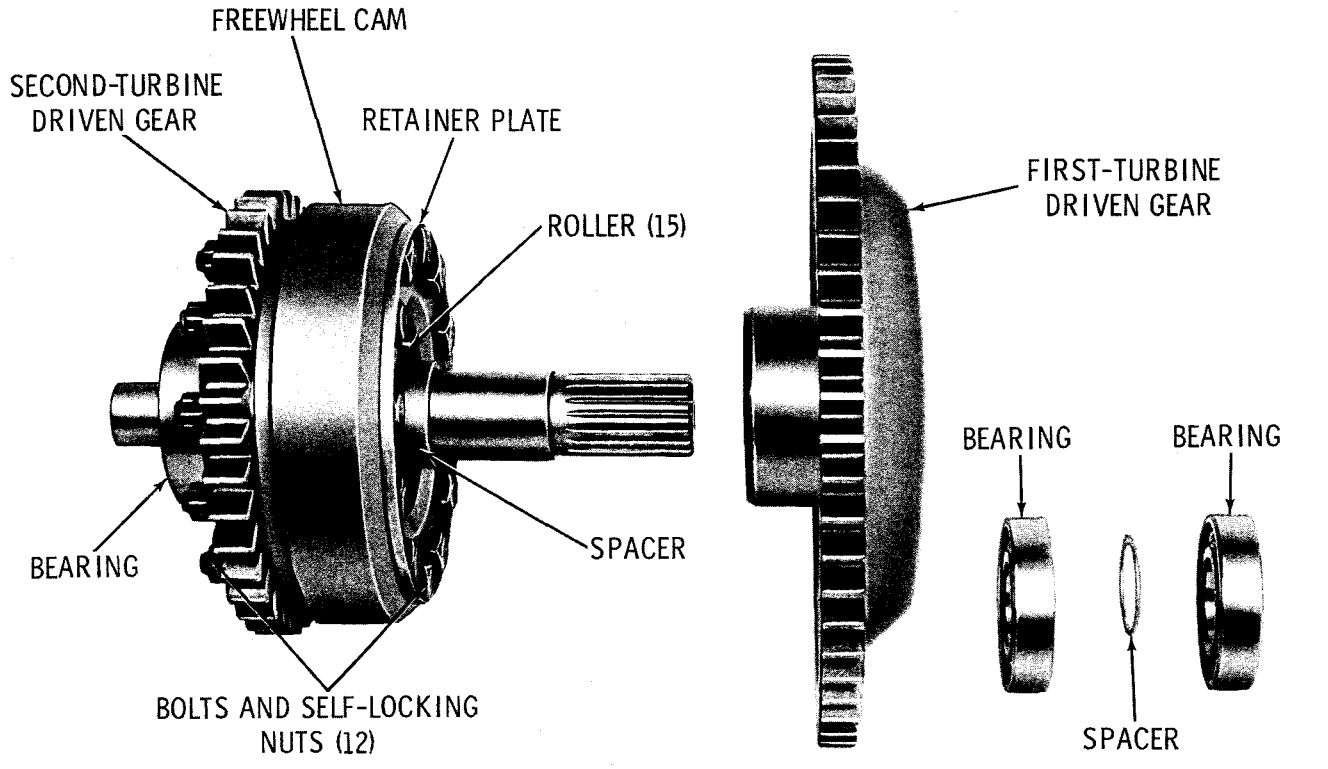


Fig. 6-6. Turbine driven gear and freewheel components

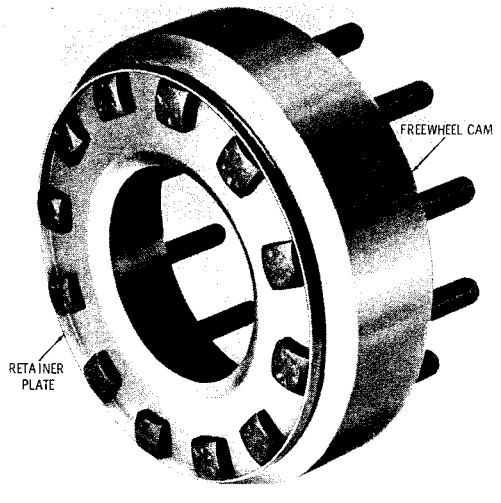


Fig. 6-7. Retainer plate installed on freewheel cam—below S/N 10426

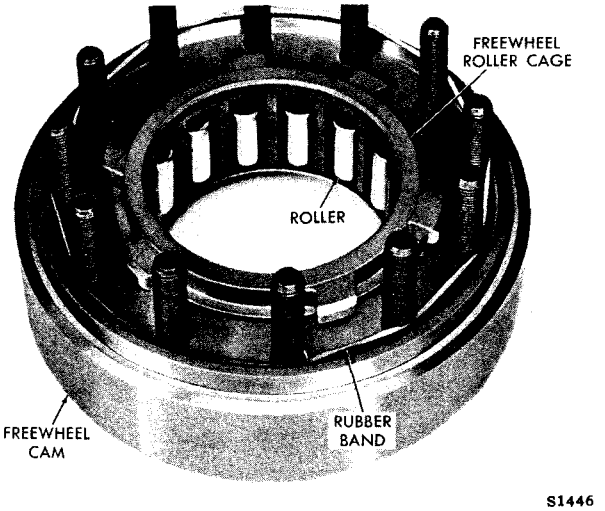


Fig. 6-8. Roller cage and rollers installed in cam—below S/N 10426

(3) Install rollers 23 (A, foldout 7) into the pockets of roller cage 22.

NOTE

If necessary, to retain the rollers during assembly, use a small quantity of oil-soluble grease (petroleum jelly) having a low melting point.

Aline the "X" on roller cage 22 with the "X" on cam 24 and install the cage and rollers into the cam. (Refer to fig. 6-9 for "X" alinement.)

(4) Position gear 15 (A, foldout 7), long hub upward, on a level surface. Care-

fully lift the assembly, shown in figure 6-8, and install it onto gear 15 (A, foldout 7). Remove the rubber band.

NOTE

Make sure that all bolts 14 are in place and will not rotate.

(5) Install spring plate 21 and three springs 20. The X on the spring plate must aline with X marks on both cage 22 and cam 24, as shown in figure 6-9.

(6) Install gear 3 (A, foldout 7), with bearings 1 and 4, splined end first, into the assembly, shown in figure 6-9, engaging the bolts which project through spring plate 21 (A, foldout 7). Install twelve nuts 2, and tighten them to 41 to 49 pound feet torque.

(7) Turn the assembly over and install spacer 16, bearing 17, spacer 18 and bearing 19. Press them firmly into place while supporting gear 3. See also figure 6-10.

NOTE

Spacer 18 (A, foldout 7) must be accurately centered to prevent hanging on the shaft shoulder of gear 3.

c. Disassembly (A, foldout 7) (S/N 10426 and above)

(1) Press second-turbine driven gear assembly out of the assembled unit (fig. 6-5). This will free spacers 16 (A, foldout 7) and 18 and bearing 19 which may be removed. Remove fifteen rollers 9, also freed. Refer also to figure 6-6.

(2) Remove bearing 17 (A, foldout 7) from gear 15. Remove twelve nuts 2 from bolts 14.

(3) Using a screwdriver, pry cam 10 away from gear 3. Remove spring plate 5 and roller cage 8. Remove three spring pins 6 and springs 7 from the roller cage. Remove bolts 14 and retainer plate 13. Remove roll pin 11 from cam 12.

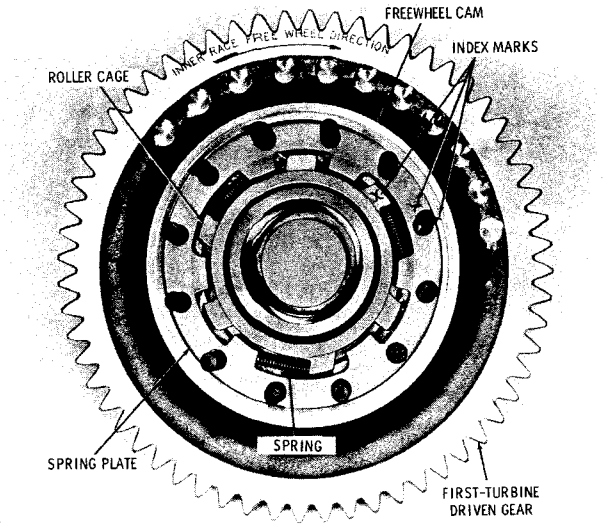


Fig. 6-9. Freewheel clutch assembled to first-turbine driven gear—below S/N 10426

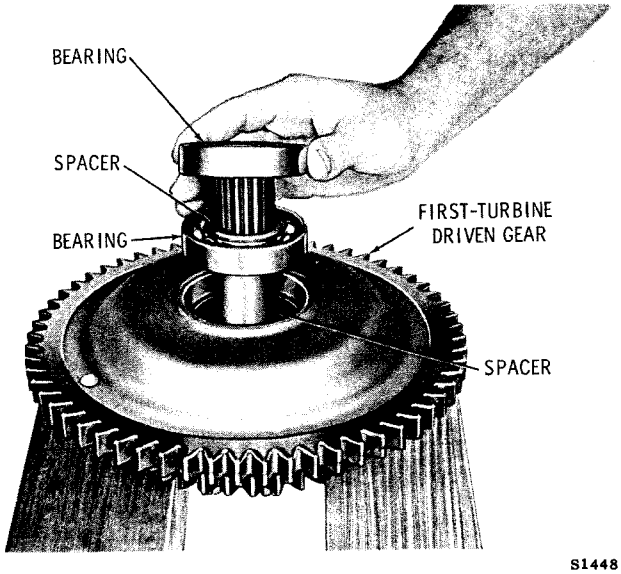


Fig. 6-10. Installing spacers and bearings into first-turbine driven gear

(4) If replacement is necessary, remove bearings 1 and 4 from gear 3.

NOTE

Refer to paragraph 6-2, above.

d. Assembly (A, foldout 7) (S/N 10426 and above)

(1) If bearings 1 and 4 were removed from gear 3, install the bearings by pressing them against the shoulders on the gear.

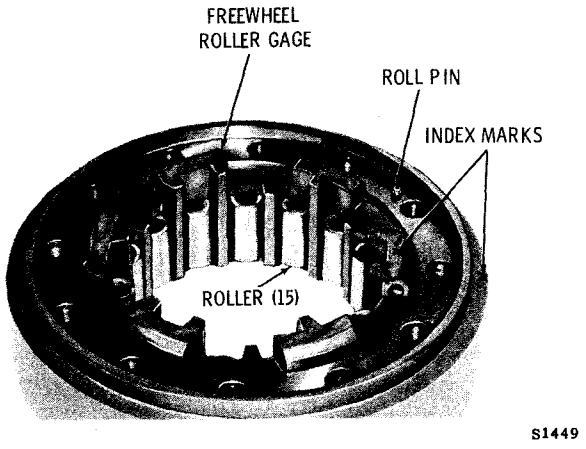


Fig. 6-11. Freewheel roller cage and rollers installed in freewheel cam—S/N 10426 and above

(2) Install the roll pin into the cam and press it to the bottom of the bore (fig. 6-11).

(3) Alining the index mark (X) on the roller cage with the index mark (X) on the cam, insert the cage into the cam (fig. 6-11). Install the fifteen rollers into the cage pockets. If necessary, use oil-soluble grease to retain the rollers in the cage.

(4) Install the replacer sleeve (refer to para 4-3c) to retain the rollers during subsequent assembly operations (fig. 6-12). Install the three springs and spring guide pins into the bored ears of the roller cage.

(5) Install the spring retainer plate onto the cam (fig. 6-12). Rotate the retainer plate slightly in a counterclockwise direction until the roll pin engages the small hole in the plate.

(6) Install retainer plate 13 (A, foldout 4), flat side first, against the rear face of cam assembly 10, and install twelve bolts 14. Make sure each bolt head is secure against the flange of the retainer plate (see fig. 6-7). Stretch a rubber band around the circle of bolts to temporarily retain them while the assembly is repositioned (fig. 6-13).

(7) Position the first-turbine driven gear, long hub upward, on a level surface (fig. 6-13). Install the assembled parts onto the first-turbine driven gear, allowing the gear hub to push the replacer sleeve from the assembly.

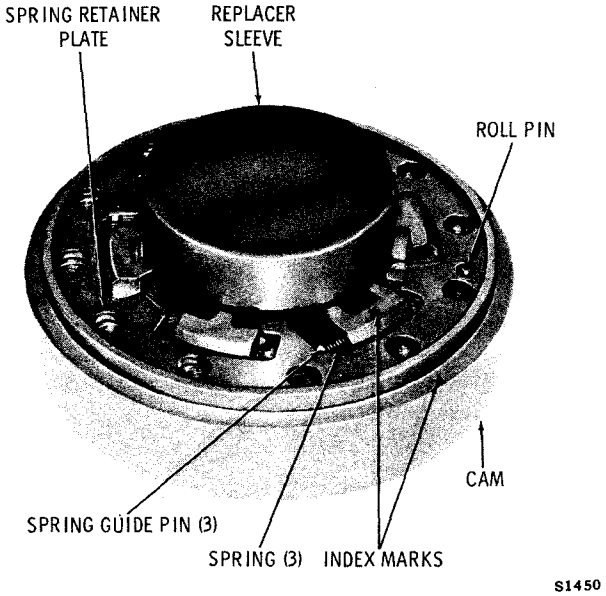


Fig. 6-12. Freewheel rollers retained with replacer sleeve—S/N 10426 and above

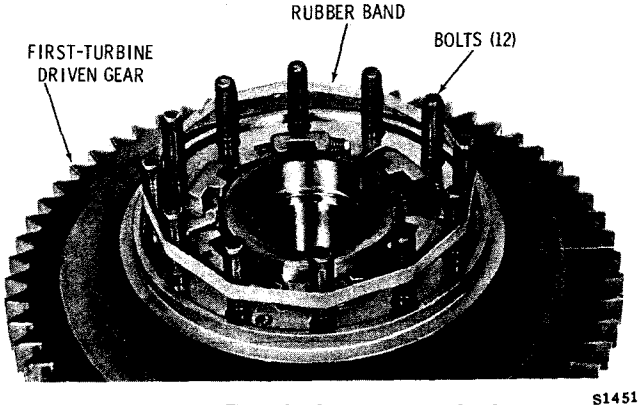


Fig. 6-13. Freewheel clutch assembled onto first-turbine driven gear—S/N 10426 and above

(8) Remove the rubber band and recheck to insure that all bolt heads are still contained within the flange of the retainer plate — bolts cannot be rotated when bolt heads are in place.

(9) Install gear 3 (A, foldout 7), with bearings 1 and 4, splined end first, into the assembly, shown in figure 6-13. Install twelve nuts 2 and tighten them to 41 to 49 pound feet torque.

(10) Turn the assembly over and install spacer 16, bearing 17, spacer 18 and bearing 19 (see fig. 6-10). Press them firmly into place while supporting the first-turbine driven gear.

NOTE

Spacer 18 (A, foldout 7) must be accurately centered to prevent hanging on the shaft shoulder of gear 3.

6-9. TRANSMISSION HOUSING AND OUTPUT DRIVE COMPONENTS (-1 models)

a. Disassembly (B, foldout 7 and A, foldout 14)

(1) Remove plug 7 (B, foldout 7). Do not remove plug 6 except when replacement is necessary. If removal is necessary, measure and record depth of installed plug 6, prior to its removal.

(2) Remove breather 9.

(3) If transmission is equipped with an accessory drive gear, remove oil seal 10.

(4) If transmission is not equipped with an accessory drive gear, remove orifice cup 11 if replacement is necessary. Earlier transmissions may have a cover and gasket, retained by two bolts.

(5) Remove six bolts 12 (B, foldout 7) and lockwashers 13 that retain cover 14 and gasket 15. Remove the cover and gasket.

(6) Remove oil check plugs 25 and 28, and oil level tubes 26 and 27 (if used).

(7) Using a puller, remove the oil seal from the front of the transmission housing (fig. 6-14).

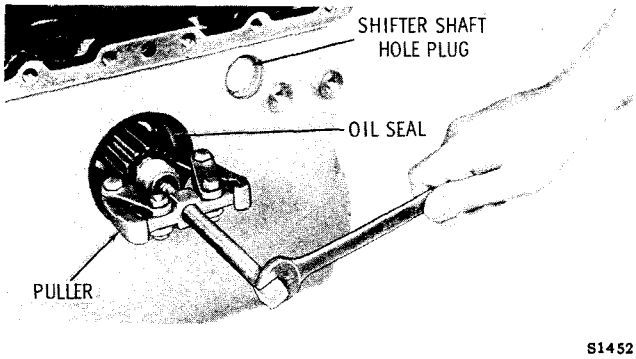


Fig. 6-14. Removing output shaft front oil seal

(8) Remove the snapring that retains the output shaft bearing in the housing bore (fig. 6-15).

(9) On models having a 1-piece output shaft, use a soft hammer to drive the output shaft forward until the front bearing is free from the housing bore (fig. 6-16). Remove the shaft and bearing, as an assembly from the housing. Remove bearing 6 (A, foldout 14) from the shaft.

(10) On models having a 1-piece output shaft, removal of the output shaft will free the transfer driven gear and spacer 22 (A,

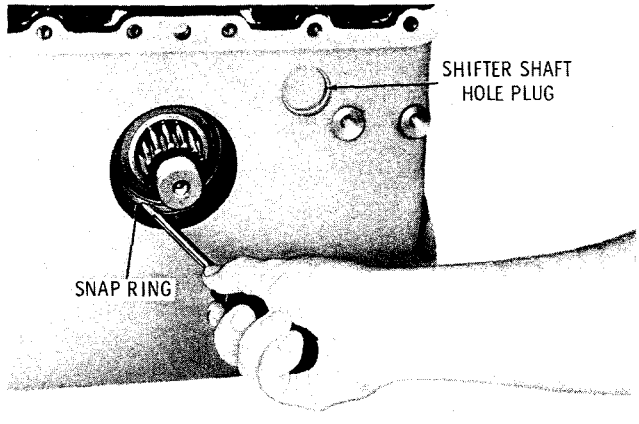


Fig. 6-15. Removing output shaft front bearing snapring

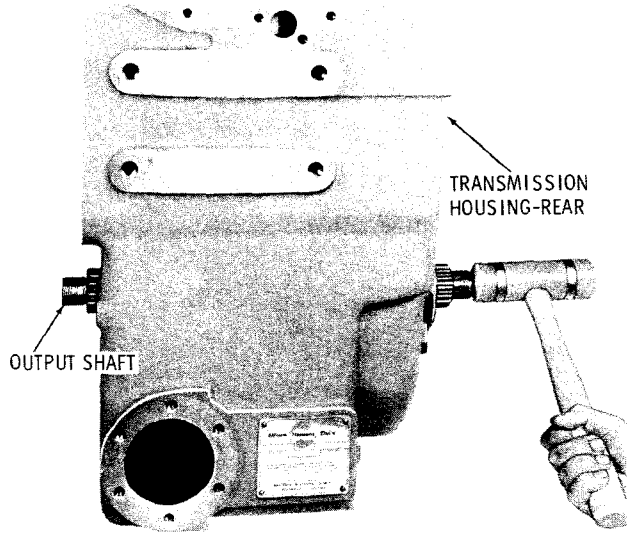


Fig. 6-16. Loosening 1-piece output shaft front bearing

foldout 14). Remove the transfer driven gear (fig. 6-17) and remove the spacer from the sump area. Remove lip-type oil seal 25 (A, foldout 14) and snapring 24, if present, from the rear of the housing. Remove the output shaft rear bearing from its bore (fig. 6-17). This completes the disassembly procedures for models with a 1-piece output shaft.

(11) On models having a front output disconnect, proceed as outlined in (12) through (20), below.

(12) Rotate shifter fork shaft counterclockwise to remove it from the front of the transmission housing (fig. 6-18). Removal of the shifter fork shaft will allow the shifter fork to fall into the sump area. Remove the shifter fork. Remove shifter shaft oil seal 13 (A, foldout 14) only if replacement is necessary.

(13) Using a puller, remove oil seal 25 (A, foldout 14) from the rear of the transmission housing. Remove flange spacer 26, if present.

(14) Remove snapring 24 that retains the rear bearing in the housing bore.

(15) Using a soft hammer, drive the front output shaft rearward until the bearing on the rear output shaft is free from the housing bore (fig. 6-19). Remove the rear output shaft and the attached bearing and spacer as an assembly. Remove the bearing only if replacement of the bearing or spacer is necessary. Do not remove bushing 20 (A, foldout 14) from rear output shaft 21 unless replacement is necessary.

(16) Removal of the rear output shaft from the transmission housing will free trans-

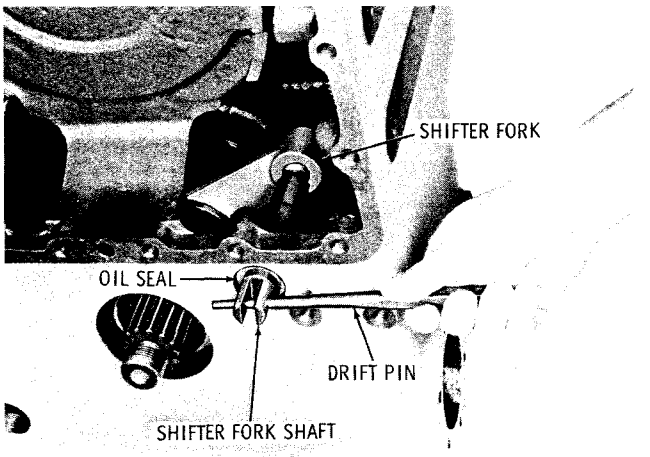


Fig. 6-18. Removing disconnect shifter shaft

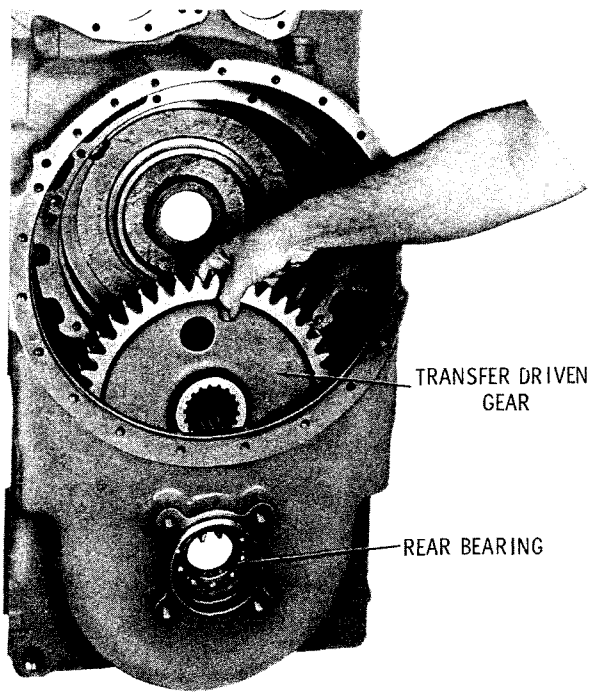


Fig. 6-17. Removing transfer driven gear (1-piece shaft)

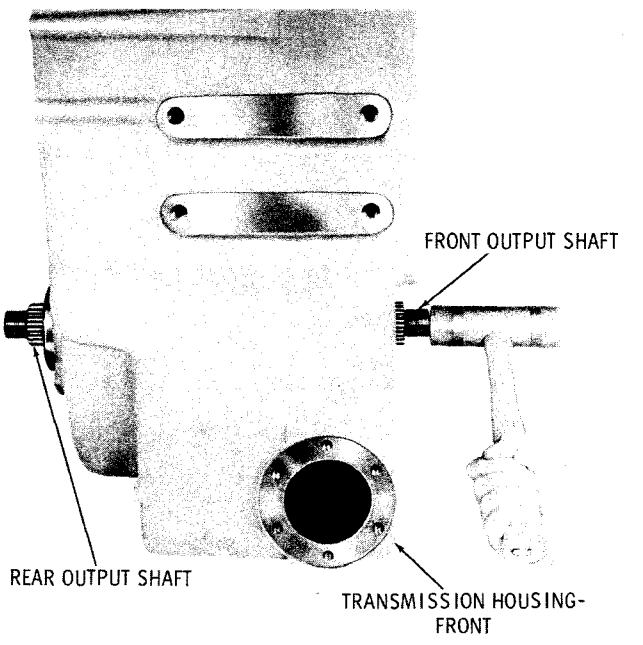


Fig. 6-19. Driving 2-piece output shaft rearward for removal

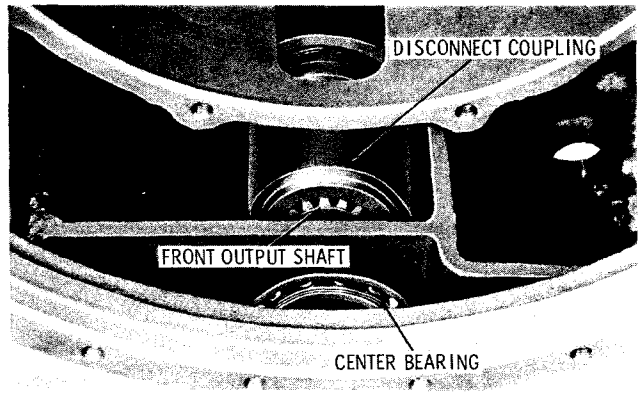


Fig. 6-20. Disconnect coupling, front output shaft and center bearing

fer driven gear 18 and allow spacer 17 to fall into the sump area. Remove the transfer driven gear and remove the fallen spacer from the sump.

(17) Remove the center bearing from its bore in the housing web (fig. 6-20).

(18) Remove the front output shaft and disconnect coupling as an assembly.

NOTE

A spring and two detent balls will be released when the disconnect coupling is removed from the front output shaft. Drape a shop towel over the assembly to prevent possible loss of the balls.

(19) Remove the disconnect coupling from the front output shaft, and place the two detent balls and spring in a parts receptacle.

(20) Using a puller which will apply its force to the rear surface of the outer race of bearing 6 (A, foldout 14), draw the bearing from its bore. If a puller is not available, use a drift and tap evenly around the outer race to drive the bearing forward.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 7 and A, foldout 14)

(1) Models having a front output disconnect, proceed as outlined in (3) through (15), below. Then continue with (26) through (31). On models with a 1-piece output shaft, begin with (16), below and continue through (31).

(2) If the front output shaft bearing 6 (A, foldout 14) was removed, replace the bearing, shield side last, into the housing bore. Seat the front bearing firmly against the shoulder in the bore, and install snapring 5 against the bearing outer race.

NOTE

On earlier models, the front bearing is not shielded. Use care not to interchange the earlier front bearing with the rear bearing. The rear bearing has a loading groove.

(3) If lip-type oil seal 4 (A, foldout 14) was removed, apply nonhardening sealant onto the outside diameter of a new seal. Install the seal, spring-loaded lip first, and press it squarely into the bore until it is lightly seated against the counterbore shoulder.

(4) If shifter shaft oil seal 13 (A, foldout 14) was removed, apply nonhardening sealant onto the outside diameter of a new seal. Install the seal, spring-loaded lip first, and press it squarely into the bore at the front of the housing, until it is lightly seated against the counterbore shoulder.

(5) Install one ball 9 (A, foldout 14), spring 10, and other ball 9 into front output shaft 8. While holding these balls against spring pressure, slide disconnect coupling 11, grooved end first, onto shaft 8 until the rear end of the coupling is flush with the shaft rear splines (disengaged position).

(6) Install the front output shaft and assembled disconnect coupling, threaded end first, into the rear output shaft bearing bore. Support the inner race of the front output shaft bearing and seat the shoulder of the front output shaft against the bearing.

(7) Install the output shaft center bearing 16 (A, foldout 14), shield side first, into the web of the transmission housing. Press or tap on the bearing outer race to seat it against the shoulder in the housing web bore.

(8) Install the transfer driven gear into the housing (refer to fig. 6-17).

(9) If bushing 20 (A, foldout 14) was removed from rear output shaft 21, install a new bushing. Press the bushing into the front bore of the shaft until it is recessed 0.160 to 0.200 inch below the shaft end surface.

(10) Install spacer 22 and ball bearing 23, shield side last, onto the rear output shaft. Seat the bearing firmly against the spacer.

(11) Place the spacer at the front side of the transfer driven gear hub (fig. 6-21). Install the assembled rear output shaft, splined end first, through the splined hub of the gear, the spacer, and the center support bearing.

(12) Support the transfer driven gear and drive the rear output shaft assembly and bearing forward. If necessary, reseat the rear bearing by driving on its inner race until the outer race clears the snapring groove in the bore.

(13) Install snapring 24 (A, foldout 14), and tap progressively around its circumference until it snaps into place against the bearing.

(14) Apply nonhardening sealant onto the outside diameter of a new lip-type oil seal 25 (A, foldout 14). Install the new seal, spring-loaded lip first, and press it squarely into the bore until it is lightly seated against the counterbore shoulder.

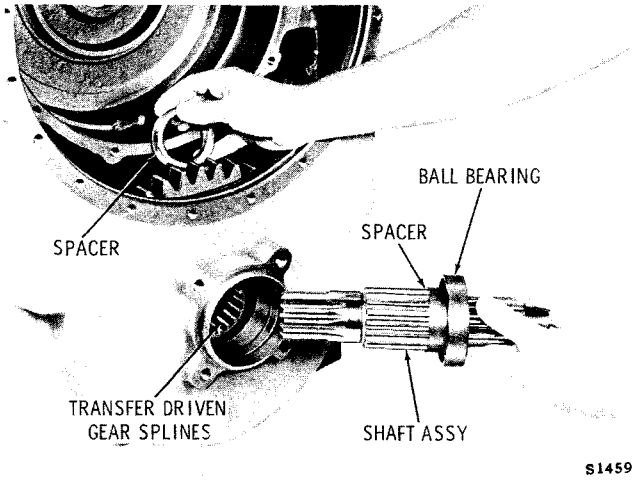


Fig. 6-21. Installing rear output shaft assembly

(15) Position the disconnect shifter fork 15 (A, foldout 14) in the groove of the disconnect coupling. While holding the fork in position, install the shifter fork shaft, threaded end first, through the oil seal in the front of the housing and fully engage the threads in the shifter fork (fig. 6-18). Refer to paragraph 3-8c for final adjustment of the shifter fork shaft.

(16) On models having a 1-piece output shaft, install the transfer driven gear into the rear of the housing.

(17) Install the output shaft, double-splined end first, through the front of the housing and the splined hub of the transfer driven gear.

(18) Start bearing 6 (A, foldout 14), shield side last, into front bore of the housing.

NOTE

On earlier models, front bearing 6 is not shielded. Use care not to interchange the earlier front bearing with rear bearing 23. The rear bearing has a loading groove.

(19) Install the spacer 22 onto the rear end of the output shaft. Start rear bearing 23, loading groove first, into its bore in the housing, pushing the spacer toward the transfer gear hub.

(20) Supporting the shaft at the front end surface, drive the rear bearing and spacer forward until they are firmly seated against the transfer gear hub.

(21) At the front of the transmission housing, drive the bearing rearward and seat it firmly against the shoulder in the bore. Install snapring 5 (A, foldout 14) to retain the bearing.

(22) Reseat the rear bearing, if necessary. Install snapring 24 (A, foldout 14) into the rear bore of the housing. Later transmissions do not include the rear snapring.

(23) Apply nonhardening sealant onto the outside diameter of lip-type oil seal 4 and install the seal, spring-loaded lip first into the front output bore. Press or drive the seal squarely and lightly against the counterbore in the housing.

(24) Apply nonhardening sealant onto the outside diameter of lip-type oil seal 25, and install the seal, spring-loaded lip first, into the rear output bore. Press or drive the seal squarely and lightly against the counterbore in the housing.

(25) If shifter shaft hole plug 12 was removed, install a new plug. Apply nonhardening sealant onto the outside diameter of the new plug. Install the plug, closed end first, and seat it against the shoulder in the housing bore.

(26) Install oil level tubes 26 (B, foldout 7) and 27 (if used) and oil check plugs 25 and 28. If removed, install oil drain plug 16.

(27) Install gasket 15 and cover 14. Retain with six 3/8-16 x 7/8 bolts 12 and lockwashers 13. Tighten the bolts to 26 to 32 pound feet torque.

(28) Coat the outer diameter of new seal 10 with nonhardening sealer and install, spring-loaded side first, into the rear of housing 8. Press the seal in until it seats lightly against the shoulder in the housing.

(29) If the transmission is not equipped with an accessory drive gear, install new orifice cup 11 (if removed). Earlier transmissions use a cover, gasket, and two bolts with lockwashers.

(30) Install breather 9.

(31) If plug 6 (B, foldout 7) was removed, coat the outer diameter of a new plug with nonhardening sealer and install, closed end first, into the passage at the left-top of the housing. Press the plug to the exact depth recorded when it was removed (a(1), above). Install plug 7.

6-10. TRANSMISSION HOUSING (-3 models)

a. Disassembly (A, foldout 8)

(1) Remove plug 7. Remove plug 6 only if replacement is necessary. If plug 6 must be removed, measure accurately the depth at which it is installed and record the depth.

(2) Remove breather 8.

(3) If the transmission is equipped with an accessory drive gear, remove oil seal 12. If the transmission is not equipped with an accessory drive gear, remove orifice cup 11 if replacement is necessary. Earlier models use a cover and gasket, retained by two bolts.

(4) Remove oil check plugs 18 and 19 (A, foldout 8), and oil level tubes 20 and 21 (if used).

(5) Remove plugs 22, 23 and 27 from the transmission housing.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (A, foldout 8)

(1) Install two plugs 27 (A, foldout 8), plug 22 and plug 23 into the transmission housing.

(2) Install oil level tubes 20 and 21, if used.

(3) Install oil check plugs 18 and 19 (A, foldout 8) into the transmission housing.

(4) Coat the outer diameter of new oil seal 12 with nonhardening sealer and install, spring-loaded lip first, into the rear of the housing 26. Press the seal until it seats lightly against the shoulder in the housing bore.

(5) If the transmission is not equipped with an accessory drive gear, install new orifice cup 11 (if removed). Earlier models use a gasket and cover, retained by two bolts with lockwashers.

(6) Install breather 8.

(7) If plug 6 (A, foldout 8) was removed, coat the outer diameter of a new plug with nonhardening sealer and install, closed end first, into the top of housing 26. Press the plug to the exact depth recorded when it was removed (a(1), above). Install plug 7.

6-11. CLUTCH PISTON ASSEMBLIES

NOTE

All clutch piston assemblies are essentially alike. However, some do not include the inner diameter sealring and expander. Because of the similarity of all assemblies, only one rebuild procedure is given. The instructions may be followed as applicable to the assembly being rebuilt.

a. Disassembly

(1) Do not use sharp edged or pointed tools to remove Teflon sealrings. Rather, slip a very thin, flat blade into the piston groove, between the sealring and side of the groove and work the seal out of the groove until it can be grasped with the fingers.

(2) Remove sealrings 2 (B, foldout 8) and 4 from piston 1.

(3) Remove sealring expanders 3 and 5 from the piston. Clean the sealring grooves thoroughly and remove any nicks, burs or rough spots.

NOTE

Refer to paragraph 6-2, above.

b. Assembly

(1) Coil the expanders as shown in figure 6-22. Inspect the expander ends for curvature toward the bottom of the sealring grooves (inward for external grooves; outward for internal grooves).

(2) Install sealring expanders 3 (B, foldout 8) and 5 into the groove of piston 1.

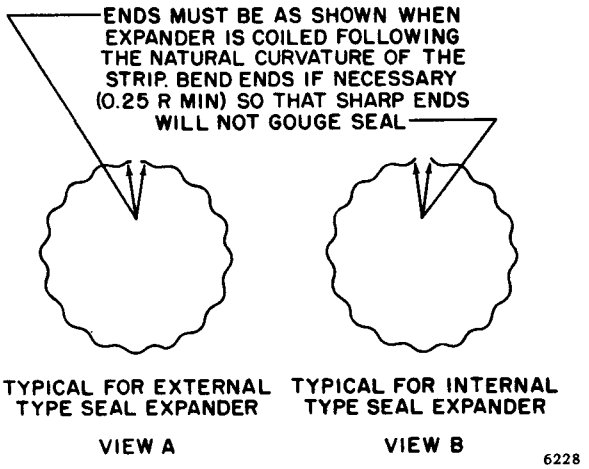


Fig. 6-22. Teflon sealring expanders

(3) Starting at a point opposite the open ends of the expander, install the Teflon sealring 2 (B, foldout 8). Do not stretch or deform the sealring more than absolutely necessary for installation. Work both directions from the starting point until the sealring is completely installed. Do not use tools to force the sealring — use fingers only.

(4) Lubricate the sealring and center it radially in respect to the piston or part on which it is installed.

(5) Install sealring 4, as outlined in (3) and (4), above.

6-12. REVERSE PLANETARY CARRIER ASSEMBLY

a. Disassembly (B, foldout 8)

(1) Disassemble the reverse planetary carrier assembly only if there is evidence of damage or undue wear. The failure of one pinion requires the replacement of all pinions in the carrier assembly.

(2) Drill into the ends of the pinion spindles to weaken the swaging. Use a 3/4-inch drill at the ends opposite clutch hub 11 (B, foldout 8).

CAUTION

Do not drill into the carrier. The spindles are slightly larger than 3/4 inch. Centering the drill accurately will prevent drilling into the carrier.

(3) Position the carrier assembly, hub 11 downward, in a press. Press out four spindles 15.

(4) Remove carrier 10 from hub 11. Remove the four pinion, roller and thrust washer groups and place them in separate containers.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 8)

NOTE

Chill spindles 15 in dry ice for at least 1 hour before installing them.

(1) Make a pinion alining tool by chamfering or rounding one end of a 6-inch length of 3/4-inch cold rolled steel shafting.

(2) Install a thrust washer 12 (B, foldout 8) onto the alining tool.

(3) Coat the bore of a pinion 13 with oil-soluble grease. Install the pinion on the alining tool.

(4) Install twenty-two rollers 14 into the space between the alining tool and pinion 13. Install thrust washer 16 onto pinion 13.

(5) Position carrier 10, beveled edge downward, and install the assembled pinion group in the carrier. Insert the alining tool through the carrier and pinion group to aline the pinion group with the spindle bore in the carrier.

(6) Assemble and install the three remaining pinion groups as outlined in (2) through (5), above.

(7) Position the carrier and pinion groups, beveled edge of carrier downward, in a press. Install hub 11 (B, foldout 8) onto carrier 10. Center it with the carrier and aline the spindle bores.

(8) Install new spindles 15, pressing them to the 0.14-inch dimension shown in figure 6-23.

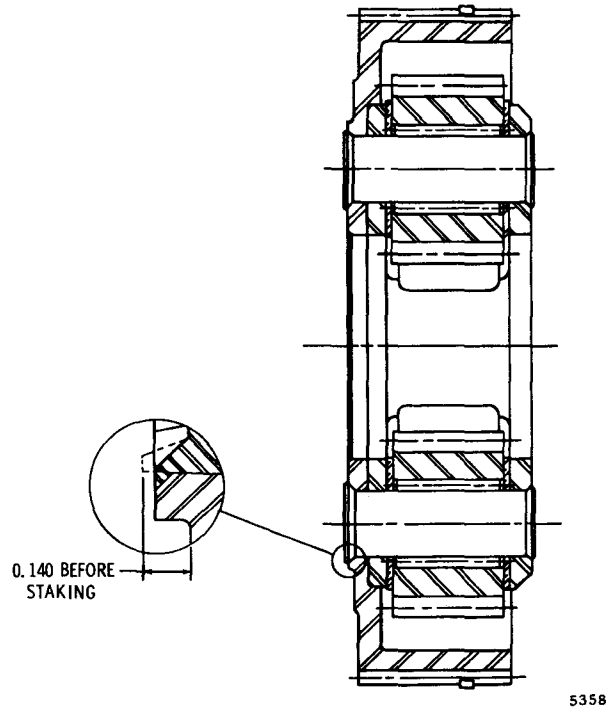


Fig. 6-23. Reverse planetary carrier assembly—cross section

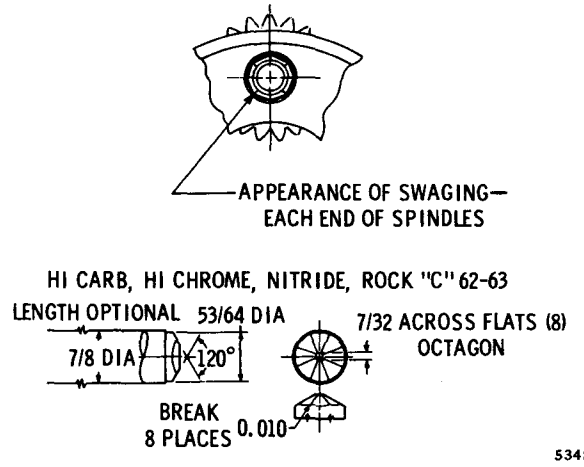


Fig. 6-24. Swaging tool for reverse pinion spindles

(9) Using a swaging tool as shown in figure 6-24, while supporting the opposite ends of the spindles, press both ends of the spindles to the form shown in figure 6-24.

NOTE

The pinions must rotate freely after the spindles are swaged.

6-13. FORWARD PLANETARY CARRIER ASSEMBLY

NOTE

Although forward carrier assemblies differ among transmission models, all have identical pinions, rollers, thrust washers and spindles. The procedures below include instructions for all models. Features applicable to specific models are indicated.

a. Disassembly (A and B, foldout 9; and A, foldout 10)

(1) Disassemble the forward planetary carrier assembly only if there is evidence of damage or undue wear. The failure of one pinion requires the replacement of all pinions in the carrier assembly.

(2) Drill into the ends of the pinion spindles to weaken the swaging. Use a 1/2-inch drill at the spindle end which is most accessible.

CAUTION

Do not drill into the carrier. The diameter of the spindles is slightly more than 1/2 inch. Centering the drill accurately will prevent drilling into the carrier.

(3) Position the carrier, drilled end of spindles upward, in a press. Press the six spindles out of the carrier.

(4) Remove pinion, roller and thrust washer groups and put each in a separate container.

(5) On TRT 2220-3, 2420-3 models, if bushing 4 or 32 (B, foldout 9) requires replacement, remove it from the carrier.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (A and B, foldout 9; A, foldout 10)

NOTE

Chill spindles in dry ice for at least 1 hour before installing them.

(1) In TRT 2220-3, 2420-3 models, if bushing 4 or 32 (B, foldout 9) was removed, install a new bushing into the carrier assembly. Press it to the 0.28- to 0.32-inch dimension shown in figure 6-25.

(2) Make a pinion alining tool by chamfering or rounding the end of a 6-inch length of 1/2-inch cold rolled steel shafting.

(3) Install a thrust washer 7 (B, foldout 9) onto the alining tool.

(4) Coat the inside diameters of pinions 9 with oil-soluble grease. Install a pinion onto the alining tool.

(5) Install twenty rollers 8 into the space between the bore of pinion 9 and the alining tool. Install a second thrust washer 10 onto pinion 9.

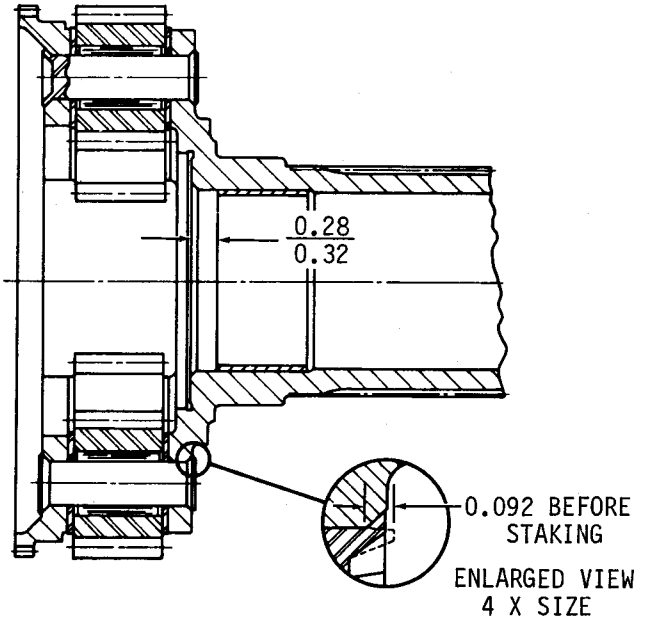


Fig. 6-25. Forward planetary carrier assembly, showing bushing and spindle installation dimensions—cross section

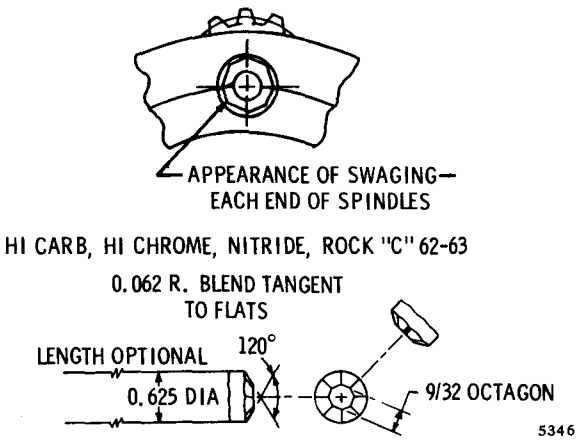


Fig. 6-26. Swaging tool for forward, low- and high-range pinion spindles

(6) Install the assembled pinion group into carrier 5.

(7) Assemble and install the five remaining pinion groups as outlined in (3) through (6), above. Aline the groups with the spindle bores in the carrier.

(8) Position the carrier assembly, hub or shaft upward, in a press and install spindles 6 (B, foldout 9) to the 0.092 dimension shown in figure 6-25.

(9) Using a swaging tool as shown in figure 6-26, press both ends of the spindles to the form shown, while supporting the opposite ends.

NOTE

Pinions must rotate freely in the carrier after the spindles are swaged.

6-14. HIGH-RANGE PLANETARY CARRIER ASSEMBLY (-1 models), or LOW-RANGE PLANETARY CARRIER ASSEMBLY (-3 underdrive models)

a. Disassembly (A, foldout 11)

(1) Disassemble the low-range planetary carrier assembly only if there is evidence of damage or undue wear. The failure of one pinion will require the replacement of all the pinions in the assembly.

(2) Drill into the ends of spindles 9 (A, foldout 11) to weaken the staking. Use a 1/2-inch drill at the ends of the spindles nearer the carrier hub.

CAUTION

Do not drill into the carrier. The diameter of the spindles is slightly more than 1/2 inch. Centering the drill accurately will prevent drilling into the carrier.

(3) Position the carrier, drilled ends of spindles upward, in a press. Press the six spindles 9 (A, foldout 11) out of the carrier.

(4) Remove the six pinion, roller and thrust washer groups, and place them in separate containers.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (A, foldout 11)

NOTE

Chill spindles 9 in dry ice for at least 1 hour before installing them in the carrier.

(1) Install a thrust washer 6 onto the alining tool made for assembling the forward carrier (para 6-13b(2), above).

(2) Coat the bores of pinions 7 (A, foldout 11) with oil-soluble grease. Install a pinion onto the alining tool.

(3) Install sixteen rollers 8 into the space between the bore of pinion 7 and the alining tool. Install a second thrust washer 10 onto the pinion.

(4) Install the assembled pinion group into carrier 5, positioned flat side downward. Aline the pinion group with the spindle bore in the carrier.

(5) Assemble and install the five remaining pinion groups as outlined in (1) through (4), above.

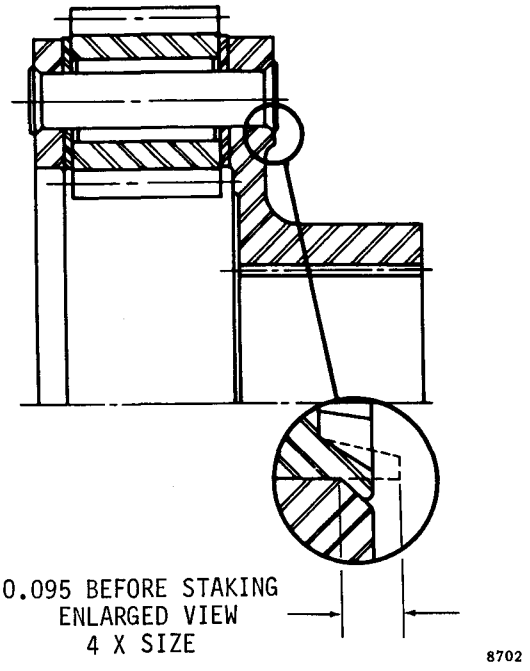


Fig. 6-27. Low-range planetary carrier assembly, showing spindle installation dimension—cross section

(6) Position the carrier assembly, flat side downward, in a press. Install six spindles 9 (A, foldout 11) to the 0.095-inch dimension, shown in figure 6-27.

(7) Using a swaging tool, as shown in figure 6-26, press both ends of spindles to the form shown, while supporting the opposite ends.

NOTE

Pinions must rotate freely in the carrier after the spindles are swaged.

6-15. HIGH-RANGE PLANETARY CARRIER ASSEMBLY (TRT 2220-3, 2420-3 overdrive models)

a. Disassembly (B, foldout 12)

(1) The high-range planetary carrier assembly should be disassembled only if there is evidence of damage or undue wear. Failure of one pinion will require the replacement of all six pinions as a set.

(2) Drill into the ends of spindles 20 (B, foldout 12) to weaken the staking. Use a 1/2-inch drill at the ends of the spindles which are opposite the splined hub of the carrier.

CAUTION

Do not drill into the carrier. The diameter of the spindles is slightly more than 1/2 inch. Centering the drill accurately will prevent drilling into the carrier.

(3) Position the carrier, drilled ends of spindles upward, in a press. Press six spindles 20 (B, foldout 12) out of the carrier.

(4) Remove the six pinion, roller and thrust washer groups and place them in separate containers.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 12)

NOTE

Chill spindles 20 (B, foldout 12) in dry ice for at least 1 hour before installing them in the carrier.

(1) Install a thrust washer 24 onto the pinion alining tool made for assembling the forward carrier (6-13b(2), above).

(2) Coat the bores of pinions 23 with oil-soluble grease. Install a pinion onto the alining tool.

(3) Install twenty rollers 22 into the space between the bore of pinion 23 and the alining tool. Install a second thrust washer 21 onto the pinion.

(4) Install the assembled pinion group into carrier 19. Aline the pinion groups with the spindle bores in the carrier.

(5) Assemble and install the five remaining planetary pinion groups as outlined in (1) through (4), above.

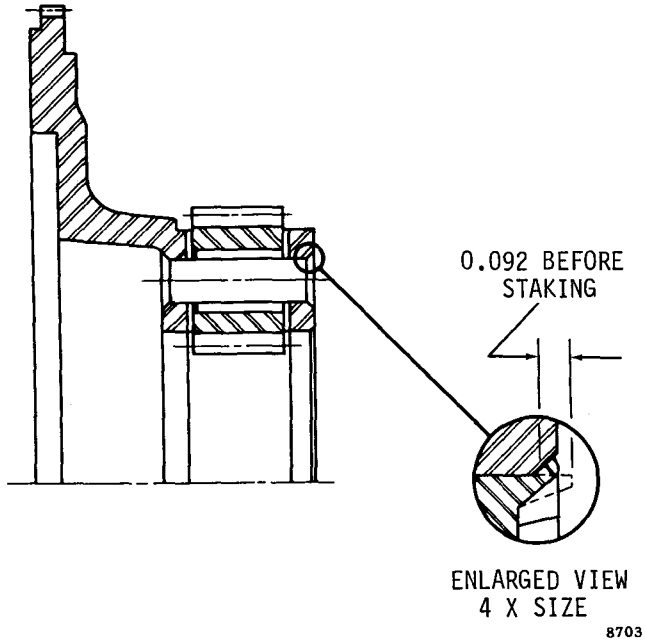


Fig. 6-28. High-range planetary carrier assembly, showing spindle installation dimension—cross section

(6) Position the carrier assembly, splined hub downward, in a press. Install six spindles 20 to the 0.092-inch dimension shown in figure 6-28.

(7) Using a swaging tool, as shown in figure 6-26, press both ends of the spindles to the form shown, while supporting the opposite ends.

NOTE

Pinions must rotate freely in the carrier after the spindles are swaged.

6-16. FORWARD, REVERSE CLUTCH ANCHOR ASSEMBLY

a. Disassembly (B, foldout 8)

(1) Disassemble clutch anchor assembly 20 only if parts replacement is necessary.

(2) Press pins 22 out of anchor 21, toward the flat (front) side of the anchor.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 8)

NOTE

Chill pins 22 in dry ice at least 1 hour before installing them in the anchor.

(1) Position anchor 21, flat (front) side upward in a press.

(2) Press pins 22 into anchor 21 until they project 1.55 inches above the flat surface of the anchor.

6-17. HIGH-RANGE CLUTCH ANCHOR ASSEMBLY (-1 models), or LOW-RANGE CLUTCH ANCHOR ASSEMBLY (-3 underdrive models)

a. Disassembly (A, foldout 11 or A, foldout 12)

(1) Disassemble anchor assembly 12 (A, foldout 11) only if parts replacement is necessary.

(2) Position the assembly, pins downward, in a press. Press pins 14 and 15 out of anchor 13.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (A, foldout 11 or A, foldout 12)

NOTE

Chill pins 14 and 15 (A, foldout 11) in dry ice for at least 1 hour before installing them in anchor 13.

(1) Position anchor 13, flat (rear) side upward, in a press. Install two (longer) pins 15 at each side of the large cutout in the outer perimeter of anchor 13. Press the pins in until they project 1.56 inches above the flat surface of the anchor.

NOTE

Longer pins 15 project slightly at the front side of anchor 13. They prevent snapring 11 from rotating.

(2) Press four (shorter) pins 14 into the remaining holes. Leave them projecting 1.56 inches above the flat surface of anchor 13.

6-18. HIGH-RANGE CLUTCH ANCHOR ASSEMBLY (-3 overdrive models)

a. Disassembly (A, foldout 13)

(1) Disassemble anchor assembly 3 only if parts replacement is necessary.

(2) Position the anchor assembly, pins downward, in a press. Press pins 5 and 6 out of anchor 4.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (A, foldout 13)

NOTE

Chill pins 5 and 6 in dry ice for at least 1 hour before installing them in anchor 4.

(1) Position anchor 4, flat (front) side downward, in a press.

(2) Press two (longer) pins 5 into the holes at each side of the large cutout in anchor 4 which is nearer the clutch anchor pin slot. Leave the pins projecting 1.56 inches above the surface into which they are installed.

NOTE

Longer pins 5 project slightly at the front of anchor 4. They prevent snapring 2 from rotating.

(3) Press four (shorter) pins 6 into the remaining holes. Leave the pins projecting 1.56 inches above the surface into which they are installed.

6-19. REAR HOUSING ADAPTER ASSEMBLY

NOTE

Both -1 and -3 models are covered below.

a. Disassembly (B, foldout 9 and B, foldout 10)

(1) Remove two plugs 26 (B, foldout 9) from adapter 27 (-3 models only).

(2) Remove sleeve 28 from adapter 27 only if replacement is necessary.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 9 and B, foldout 10)

(1) If the sleeve was removed from the center bore of the adapter, install a new one as outlined in (2) through (4), below.

(2) Position sleeve 28 (B, foldout 9), internal chamfer first, into the front (ball bearing bore side) of adapter 27.

(3) Rotate the sleeve until its oil hole is alined with the cavity in the adapter bore into which the sleeve is to be installed. This cavity connects with a radial oil passage in the adapter.

(4) Press the sleeve in (rearward) until its forward (unchamfered) end is flush with, or to 0.010 inch below, the shoulder against which the ball bearing assembly 23 seats.

(5) Install two plugs 26 into adapter 27 (-3 models only).

6-20. OUTPUT TRANSFER DRIVE GEAR (-1 models)

a. Disassembly (B, foldout 10)

(1) Remove the bearings from gear 3 only if parts replacement is necessary.

(2) Remove the snapring from bearing assembly 1. Using a bearing puller, remove bearings 1 and 4 from gear 3.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 10)

(1) Press bearing 4, manufacturer's number outward, onto the splined hub of gear 3. Seat it firmly against the hub shoulder.

(2) Press bearing 1, outer snapring groove toward gear, onto the smooth-bore hub of gear 3. Seat it firmly against the hub shoulder.

(3) Install the external snapring into the groove in the outer race of bearing assembly 1.

6-21. CLUTCH DRUM ASSEMBLY

NOTE

Although this assembly differs dimensionally among models, arrangement and procedures are identical.

a. Disassembly (B, foldout 10; B, foldout 11; B, foldout 12)

(1) Position the drum assembly in a press. Depress the inner diameter of the piston return spring. Remove the snapring which retains the spring (fig. 6-29). Remove the spring.

(2) Remove the clutch piston assembly (fig. 6-29).

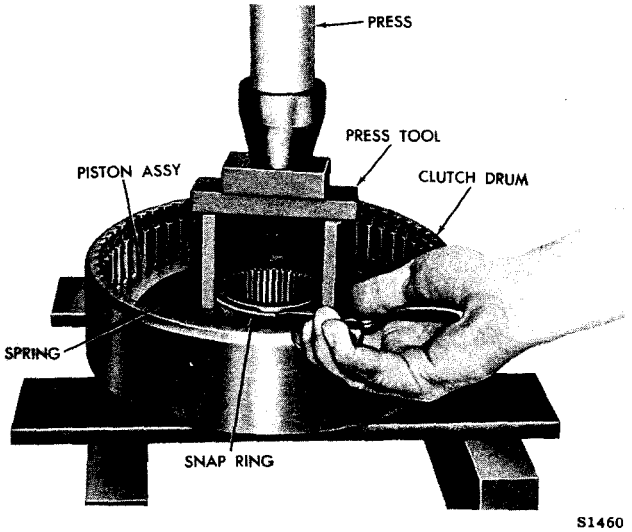


Fig. 6-29. Removing (or installing) piston return spring

(3) Rebuild the clutch piston assembly, as outlined in paragraph 6-11, above.

(4) Remove hook-type sealring 18 (B, foldout 10) from the hub of drum 15.

(5) Do not remove dowel pins 14 from drum 15.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 10; B, foldout 11; B, foldout 12)

(1) Install hook-type sealring 18 (B, foldout 10) onto the hub of drum 15.

(2) Install piston 19, as assembled in paragraph 6-11, above.

(3) Position the clutch drum in a press and install the piston return spring, cupped side first, onto clutch drum hub (fig. 6-29).

(4) Depress the inner diameter of the piston return spring and install the snapring (fig. 6-29).

6-22. TRANSFER DRIVE GEAR SLEEVE ASSEMBLY

a. Disassembly (B, foldout 10)

(1) Disassemble sleeve assembly 22 only if parts replacement is necessary.

(2) Remove bushing 23 from sleeve 24. If the bushing must be cut out, do not damage the sleeve bore.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 10)

(1) Install bushing 23 into the larger bore of sleeve 24. Press it in until the front (outer) end of the bushing is 0.30 inch below the end (front) of sleeve 24.

(2) The bushing is prebored to give the proper inside diameter when installed.

6-23. TRANSMISSION REAR HOUSING ASSEMBLY (TRT 2220-1, 2420-1)

a. Disassembly (B, foldout 13)

(1) The only operations required are the removal, if replacement is necessary, of welch plug 13 and pipe plug 14.

(2) To remove plug 13, insert a punch from the inside of housing 2, through the clutch anchor pin hole, and drive out plug 13. Clean the bore from which it was removed.

NOTE

Refer to paragrah 6-2, above.

b. Assembly (B, foldout 13)

(1) If welch plug 13 was removed, coat the outer circumference of a new plug with nonhardening sealer. Press or drive the plug, closed end first, into the housing until its outer end is even with the inner end of the chamfer in the clutch anchor pin bore in housing 2.

(2) If plug 14 was removed, install it into the threaded opening in the housing.

6-24. TRANSMISSION REAR HOUSING ASSEMBLY (TRT 2220-3, 2420-3)

a. Disassembly (C, foldout 13)

(1) Remove oil seal 11 and internal snapring 9.

(2) Using a soft hammer, drive output shaft 5 or 7 rearward and out of housing 2.

(3) Remove snapring 6 (-3 overdrive models only).

(4) Remove bearing 8 from shaft 5 or 7, if replacement is necessary.

(5) If replacement is necessary, remove plug 13 by inserting a punch through the clutch anchor pin bore inside housing 2 and driving the plug out.

(6) Remove pipe plug 14, and plug 15 (if used).

b. Assembly (C, foldout 13)

(1) Install pipe plug 14, and plug 15 (if used).

(2) If plug 13 was removed, coat the outer circumference of a new plug with nonhardening sealer. Install it, closed end first, into the clutch anchor pin bore in housing 2. Press or drive the plug in until its outer end is even with the inner end of the chamfer in the clutch anchor pin bore in housing 2.

(3) Install bearing 8 onto shaft 5 or 7 and seat it firmly against the shaft shoulder.

(4) Install snapring 6 onto shaft 7 (-3 overdrive models only).

(5) Install the assembled output shaft and bearing, unsplined end first, into the rear of housing 2. Tap on the outer race of bearing 8 to seat it against the housing shoulder. Install snapring 9.

(6) Coat the outer circumference of a new oil seal 11 with nonhardening sealer and start it, spring-loaded lip first, into the rear bore of housing 2. Seat it lightly against the shoulder in the housing bore.

6-25. TRANSMISSION REAR HOUSING ASSEMBLY (TRT 2210-3, 2410-3)

a. Disassembly (D, foldout 13)

(1) Remove baffle 6 (not used on some assemblies).

(2) Remove oil seal 7.

(3) Remove tube 8 only if replacement is necessary (not used on some assemblies).

(4) Remove snapring 23 (A, foldout 10) and bearing 24.

(5) Remove plug 2 (D, foldout 13).

NOTE

Refer to paragraph 6-2, above.

b. Assembly (D, foldout 13)

(1) Install plug 2 into housing 9.

(2) Install bearing 24 (A, foldout 10) and snapring 23 into the housing.

(3) If tube 8 (D, foldout 13) was removed, coat the larger end of the tube with nonhardening sealer and install it, smaller end first, through the rear bore of housing 9. Press the tube into its bore until the upper end of the tube is even with the lower edge of the countersink in the tube bore in housing 9 (tube not used in some assemblies).

(4) Coat outer circumference of a new oil seal 7 with nonhardening sealer. Press it, spring-loaded lip first, into the rear of housing 9. Seat it lightly against the shoulder in the housing bore.

(5) Coat the outer circumference of baffle 6 (not used in some models) and install it, cupped side outward, into the housing. Press it into the housing bore until the baffle outer (rear) end is 0.060 to 0.090 inch below the rear surface of housing 9.

6-26. OIL PUMP ASSEMBLY

a. Disassembly (fig. 6-30)

(1) Remove the pump cover and the cover gasket.

(2) Remove the drive gear and driven gear assembly.

(3) Inspect the needle bearings. If replacement is necessary, remove them from the driven gear.

(4) Inspect dowel pin which is pressed into the pump body. Remove it only if replacement is necessary.

NOTE

The dowel pin can be removed by clamping it in a vise and twisting the pump body.

(5) Inspect the oil seal. If replacement is necessary, remove the seal by driving or pressing it toward the rear (accessory mounting face) of the pump. If the driven gear shaft, pump body, drive gear or driven gear require replacement, a new pump assembly must be used.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (fig. 6-30)

(1) If the oil seal was removed, coat the outer circumference of the new seal with nonhardening sealer. Install the seal, spring-loaded lip first, into the rear of the pump body. Press the seal until it seats lightly on the shoulder in the body bore.

(2) If the dowel pin was removed, press a new pin into pump body. The pin is properly installed when it projects 0.41 to 0.43 inch above the front surface of the pump body.

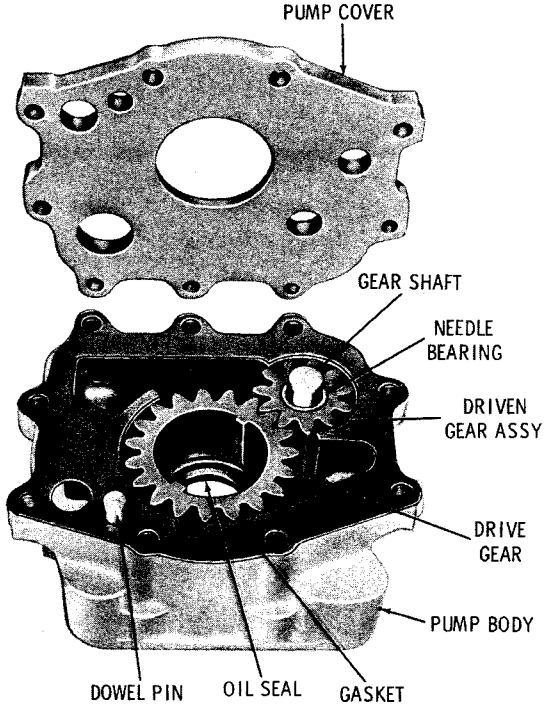


Fig. 6-30. Oil pump assembly

(3) If the needle bearing(s) were removed from the driven gear, install new bearing(s) so that the replacer tool rests against the part number end of bearing race. Press each bearing flush with, to 0.020 inch below, the end surface of the driven gear.

(4) Install the driven gear assembly over the gear shaft and into the pump body. Also install the drive gear into the pump body.

NOTE

When properly installed, end faces of both gears will project 0.002 to 0.003 inch above the front surface of the pump body. If end faces of the gears are below the flush line of the pump body, the pump will not perform satisfactorily and should be replaced.

(5) Fill the pump assembly with transmission oil, and install the cover gasket and cover. Position the pump assembly front upward, until ready for installation onto the transmission housing.

6-27. CONTROL VALVE ASSEMBLY

NOTE

A variety of valve assemblies are used among the various models. Procedures below which are not common to all models are indicated by notes preceding the procedures.

a. Disassembly (B, foldout 15)

(1) Remove plug 6 and gasket 7. Remove main-pressure regulator valve 8.

(2) Remove plug 19 and gasket 18. Remove trimmer plug 17, springs 16 and 15, and retainer 14.

(3) Remove plug 36. Remove plug 35 and gasket 34.

(4) On models having clutch cutoff control (items 20 through 26, and 47, 48) follow the procedures outlined in (5) through (8), below.

(5) Remove plug 26 (B, foldout 15) (hydraulic brake actuated) or plug 48 (air brake actuated) and gasket 24.

(6) Remove plug 22 (hydraulic brake actuated) with sealring 23 and cup 25. Separate these parts.

(7) Remove plug 47 (air brake actuated) with sealring 23. Remove the sealring from plug 47.

(8) Remove clutch cutoff valve 21 and spring 20.

(9) On models having inching control (items 37 through 46), follow the procedures outlined in (10) through (15), below.

(10) Remove valve stop 37 (B, foldout 15). Clean paint and dirt away from the valve body in the area of oil seal 46.

(11) Insert a bolt through the linkage pin hole in inching control valve 42. Grasp the bolt in a vise. Using a soft hammer, drive the control valve body off the valve. This will remove the valve and items 43 through 46.

(12) Clean the outer end of valve 42 (B, foldout 15) to permit seal 46 and plug 45 to be easily removed. Remove seal 46, plug 45, sealring 44 and spring 43.

(13) Remove spring 41 from control valve body 9.

(14) Insert a small screwdriver, from the inner (mounting) side of the valve body assembly and push inching regulator valve 39 forward to release valve stop 40. Remove valve stop 40.

(15) Remove inching regulator valve 39 and spring 38.

(16) Clean the stem of selector valve 29 to permit it to easily pass through oil seal 28.

(17) Remove plug 31, gasket 32, one spring 33 and one ball 30.

(18) At inner (mounting) side of valve body 9, remove valve stop 13 (2-speed models) or two valve stops 13 (1-speed models).

(19) Push selector valve 29 (B, foldout 15) forward in valve body 9, and withdraw it from the front of the valve body. This will free the remaining ball 30 and spring 33. Remove these.

(20) Do not remove oil seal 28 unless replacement is necessary.

(21) Do not remove orifice plug 10 (if present), ball 11 or ball retainer 12 from valve body 9 unless parts replacement is necessary.

NOTE

Refer to paragraph 6-2, above.

b. Assembly (B, foldout 15)

(1) If orifice plug 10 was removed (not used in later models) from valve body 9, install a new plug, cupped side outward, and press it in until it is flush with, or to 0.010 inch below, the surface surrounding it.

(2) If ball 11 and retainer 12 were removed, install a new ball and retainer. The cupped side of the retainer must be outward. Press the retainer in until it is flush with, to 0.010 inch below, the surrounding surface.

(3) If oil seal 28 was removed, coat the outer circumference of a new seal with nonhardening sealer and install it, spring-loaded lip first, into valve body 9. Press it in until it is flush with, or to 0.030 inch below, the surrounding surface.

(4) Install one spring 33 and one ball 30. Depress the ball against the spring and install selector valve 29, stem first, into the front of valve body 9. Work the stem of the valve carefully through oil seal 28 to avoid damaging the seal.

(5) Install the remaining ball 30 and spring 33. Install gasket 32 and detent plug 31.

(6) Install gasket 34, plug 35 and plug 36.

(7) Position selector valve 29 at neutral (central) position and install valve stop 13 at location(s) shown in figure 6-31.

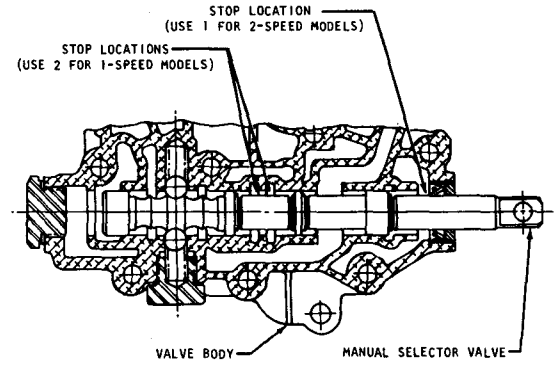


Fig. 6-31. Manual selector valve, showing proper location of valve stops for various models

(8) Install main-pressure regulator valve 8 (B, foldout 15), gasket 7 and plug 6.

(9) Install spring retainer 14, cupped side first, onto the rear stem of valve 8. Install springs 15 and 16.

(10) Install trimmer plug 17, gasket 18 and plug 19.

(11) In assemblies having clutch cutoff control (items 20 through 27, and 47 and 48), follow the procedures outlined in (12) through (15), below.

(12) Install spring 20 (B, foldout 15) and valve 21.

(13) Install sealring 23 and cup 25, cupped side out, onto plug 22 (hydraulic brake-actuated cutoff valve).

(14) Install plug 22, cup first, into the front (smooth bore) of plug 26 (hydraulic brake-actuated cutoff valve). Install plug 26 and gasket 24 into valve body 9.

(15) On models which have air brake-actuated cutoff valve, install sealring 23 onto plug 47. Install plug 47, grooved end first, into the front (smooth bore) of plug 48. Install gasket 24 and plug 48 into valve body 9.

(16) In assemblies having inching control (items 37 through 46), follow the procedures outlined in (17) through (21), below.

(17) Install spring 38 and valve 39 (B, foldout 15). Using a small screwdriver, push

valve 39 forward and install valve stop 40 to retain valve 39 against spring 38.

(18) Install valve 42 and spring 43.

(19) Install sealring 44 onto plug 45.

(20) Install plug 45, larger bore first, over the stem of valve 42. Push plug 45 in until it seats, hold it against spring 43 and install stop 37 to retain plug 45.

(21) Coat the outer circumference of a new oil seal 46 with nonhardening sealer and install it, spring-loaded lip first, over the stem of valve 42. Press the seal in until it is flush with, to 0.030 inch below, the rear surface of valve body 9.

6-28. TORQUE VALUES — ILLUSTRATED

Figure 6-32, which follows, shows the torque values for threaded fasteners visible in the illustration.

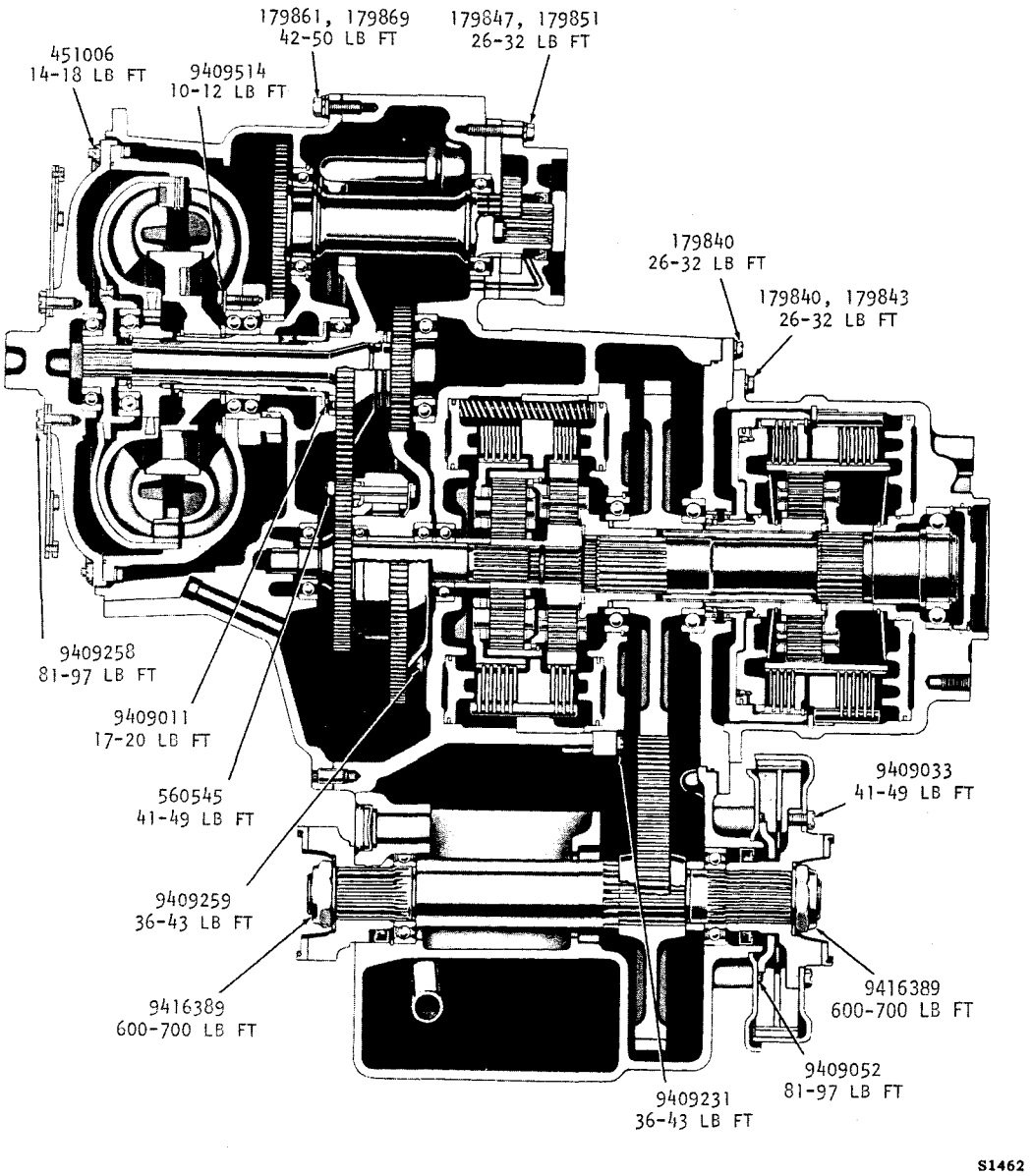


Fig. 6-32. Typical transmission, showing torque used to tighten bolts

Section 7. ASSEMBLY OF TRANSMISSION FROM SUBASSEMBLIES

7-1. SCOPE OF SECTION 7

a. Models Covered. The procedures in this section describe the assembly of all TRT 2000 transmissions from the parts removed in Section 5 and the subassemblies rebuilt in Section 6.

b. Assembly Sequence. This section is divided into groups. Each group is identified with the models to which the procedures apply. Procedures not applicable to the transmission being assembled may be disregarded and assembly continued with the next applicable procedure.

7-2. DIVISION BY MODELS

a. Paragraph 7-3, below, outlines the initial assembly procedures, for TRT 2220-1 and 2420-1 models, required to build up the transmission to the point where the remaining assembly procedures are common to all models.

b. Paragraph 7-4, below, outlines the initial assembly procedures, for TRT 2210-3, 2410-3, 2220-3 and 2420-3 models, required to build up the transmission to the point where the remaining assembly procedures are common to all models. Options and features which differ within the -3 models are noted and may be passed over when not applicable.

c. Paragraph 7-5, below, outlines the assembly and installation of the torque converter gearing, converter housing, converter, and input drive components for all models.

d. Paragraph 7-6, below, outlines the installation of external components and subassemblies and the completion of the assembly of all models.

e. Paragraph 7-7, below, outlines certain procedures and methods which must be applied when the reverse-clutch and planetary are installed while the transmission (any model) is in the vehicle.

7-3. INITIAL ASSEMBLY OF TRT 2220-1 AND 2420-1 TRANSMISSIONS

a. Installation of Forward, Reverse Clutches and Planetaries

(1) Install the reverse clutch piston assembly, flat side first, after checking to insure that both inner and outer sealrings are in place (fig. 7-1).

Fig. 7-1. Installing reverse clutch piston assembly

(2) Refer to the note following (4), below. Beginning with an external-tanged plate, and alternating with internal-splined plates, install five external-tanged and four internal-splined reverse clutch plates (fig. 7-2).

(3) Install the remaining internal-splined plate onto the reverse planetary carrier assembly, behind the positioning ring on the clutch hub. Install the carrier assembly (fig. 7-2), engaging the hub splines in the internal-splined plates installed in (2), above.

(4) Install the clutch anchor pin (fig. 7-3). Leave the anchor pin projecting from the housing (so that the anchor assembly may be rotated).

NOTE

The anchor pin may be installed at the inside of the transmission housing prior to operation (2), above, if the control valve assembly is in place.

(5) Install the forward and reverse clutch anchor assembly, longer ends of pins first. Engage the pins with the slots in the tangs of the reverse clutch plates (fig. 7-3). Aline the anchor pin slot with the anchor pin. Be sure that all five external-tanged plates are engaged with the pins. Push the anchor pin into the housing to engage the anchor assembly.

(6) Install the forward and reverse sun gear 17 (B, foldout 8) into the reverse planetary carrier assembly.

(7) Beginning with an internal-splined plate and alternating with external-tanged plates, install two internal-splined plates 12 (A, foldout 9) and two external-tanged plates 13. The external tangs must engage the clutch anchor pins.

(8) Install carrier assembly 3 into ring gear 1 and retain it with snapring 11.

(9) Install sun gear thrust washer 2 (A, foldout 9) into the forward carrier assembly, using oil-soluble grease to retain it.

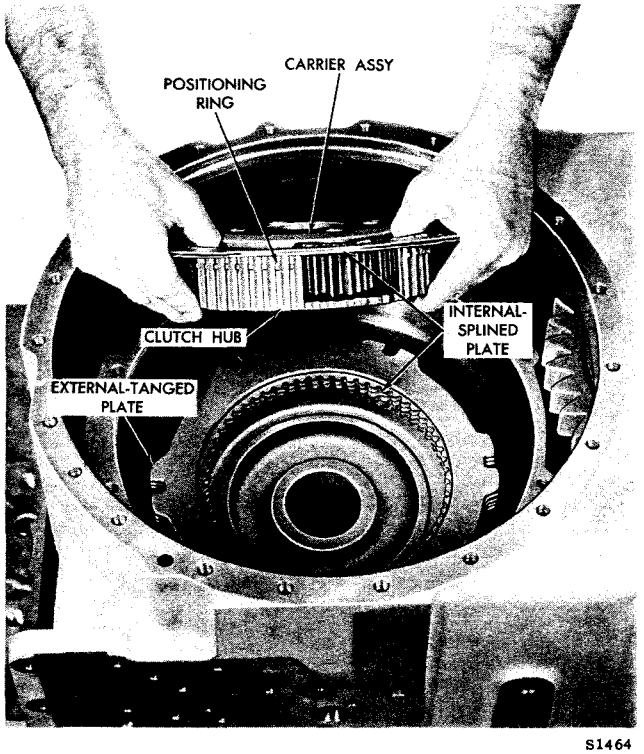


Fig. 7-2. Installing reverse clutch plates and planetary carrier assembly

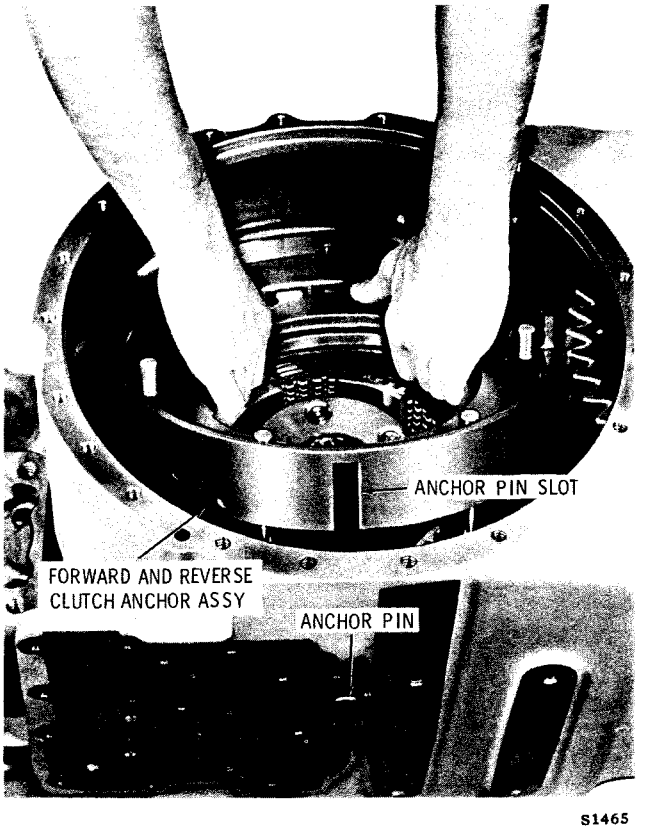


Fig. 7-3. Installing forward and reverse clutch anchor assembly

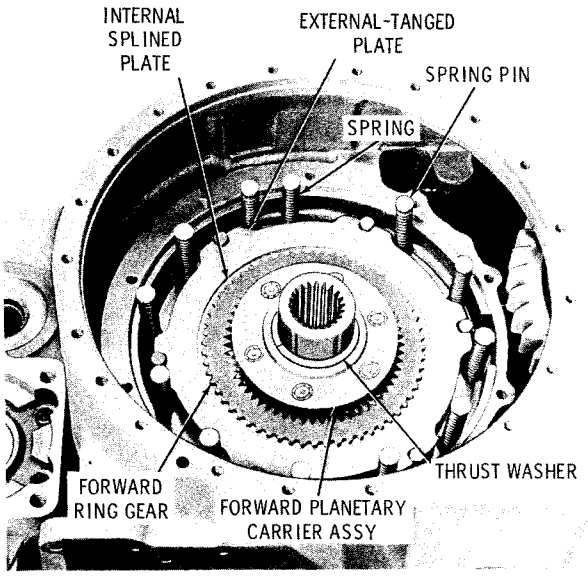


Fig. 7-4. Forward clutch and planetary and clutch piston springs and pins installed

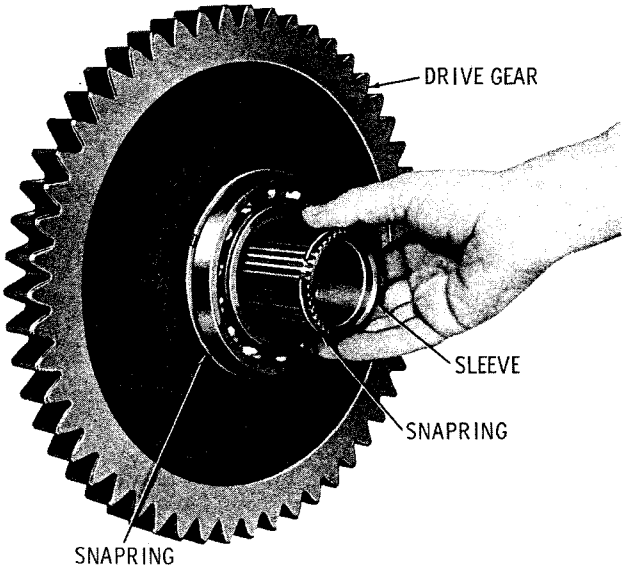


Fig. 7-5. Installing high-range sun gear sleeve into transfer drive gear

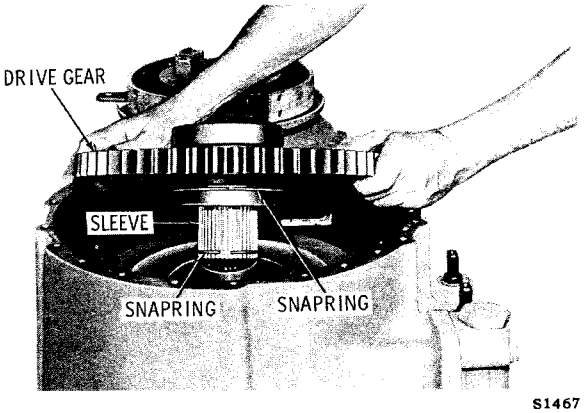


Fig. 7-6. Installing transfer drive gear assembly

(10) Install the parts assembled in (8) and (9), above, meshing the reverse ring gear with the reverse pinions (fig. 7-4). Install ring gear 14 (A, foldout 9), longer ends of external splines first (toward front of transmission), onto the forward carrier assembly. The external splines of the ring gear must engage the internal-splined plates installed in (7), above.

(11) Install the remaining internal-splined clutch plate and then the remaining external-tanged plate (fig. 7-4).

(12) Install the thrust washer onto the hub of the forward planetary carrier (fig. 7-4).

(13) Install twelve clutch piston return springs and pins (springs first) into openings around the forward clutch plates (fig. 7-4).

b. Installation of Forward Piston Housing, Transfer Drive Gear and Adapter Assembly

(1) Install forward clutch piston 21 (A, foldout 9), with sealrings and expanders, into housing 22. Check to insure that plug 24 is in place in housing 22.

(2) Install the forward clutch piston housing and retain it with ten 3/8-16 x 1 1/2-inch, self-locking bolts 23. Tighten the bolts to 26 to 32 pound feet torque.

(3) Install the snapring into the groove nearer the end of the high-range sun gear splined sleeve. Install the sleeve into the transfer drive gear assembly at the side which has a smooth bore in the hub (fig. 7-5).

(4) Install the transfer drive gear and splined sleeve, bearing with snapring first, onto the forward planetary carrier (fig. 7-6).

(5) Install the gasket and sealring onto the rear housing adapter assembly. Install the adapter assembly (fig. 7-7).

(6) Install the sixteen 3/8-16 x 1 1/8 bolts, with lockwashers, to retain the adapter (fig. 7-8). Tighten the bolts to 26 to 32 pound feet torque.

c. Installation of Low-range Clutch, High-range Planetary

(1) Install two Teflon step-joint sealrings 12 (B, foldout 10) into the grooves in the front hub of low-range clutch drum 15. Use oil-soluble grease to retain them.

NOTE

New Teflon sealrings may require forming by hand to help retain their proper circular shape. Wrap them in a circle around an object about two-thirds the diameter of the groove they fit.

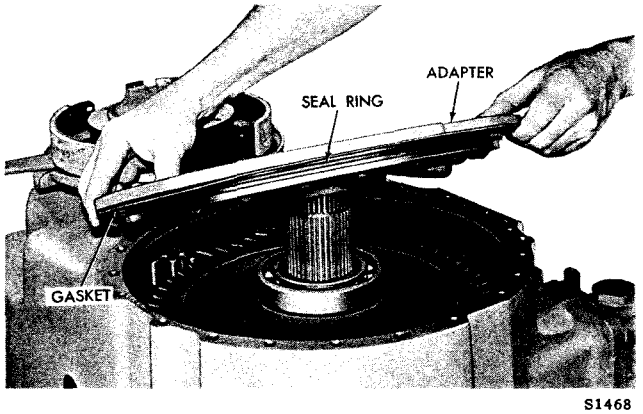


Fig. 7-7. Installing rear housing adapter (-1 model)

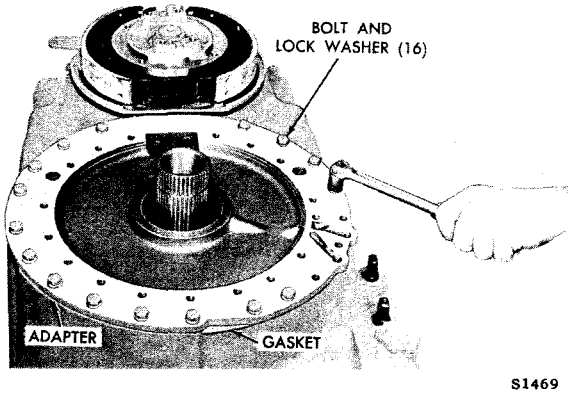


Fig. 7-8. Installing rear housing adapter bolts (-1 model)

(2) Install low-range clutch drum assembly 13 onto the high-range sungear splined sleeve (fig. 5-24).

(3) Install snapring 25 (B, foldout 10) into the groove in the high-range sun gear splined sleeve.

(4) Install one low-range, internal-splined clutch plate into the low-range clutch drum (fig. 7-9). Install the high-range ring gear, positioning ring first, into the clutch plate splines.

(5) Beginning with an external-splined plate, alternately install three external- and three internal-splined, low-range clutch plates (fig. 7-10).

(6) Install the low-range clutch back plate, flat side first, into the low-range clutch drum (fig. 7-10).

(7) Install the internal snapring which retains the clutch back plate (fig. 7-11).

(8) Install the high-range planetary sun gear, thrust washer upward, onto the splines of the sun gear sleeve (fig. 7-11).

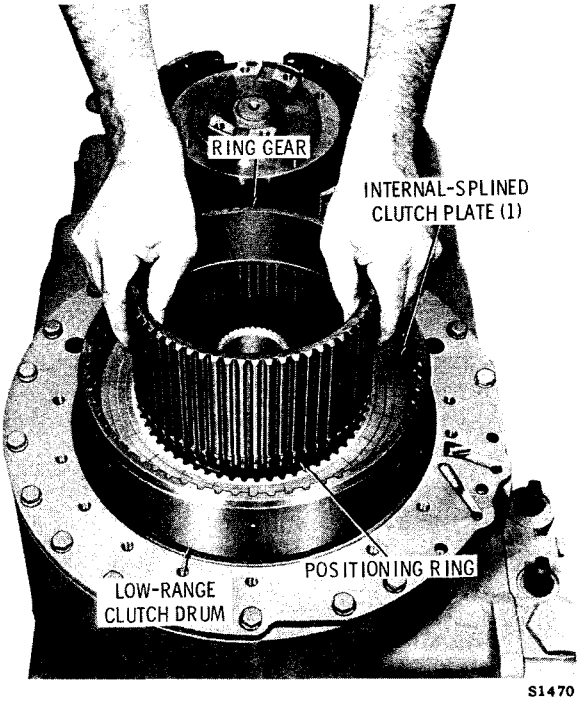


Fig. 7-9. Installing high-range ring gear (-1 model)

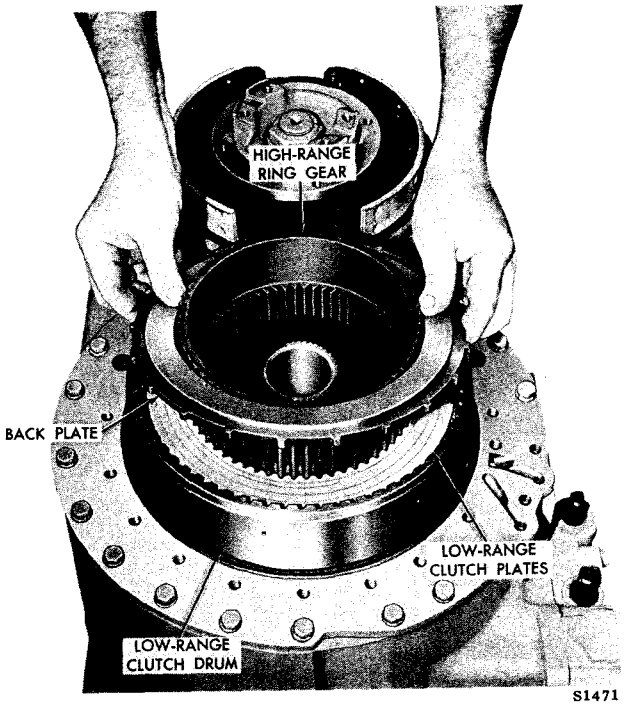


Fig. 7-10. Installing low-range clutch back plate (-1 model)

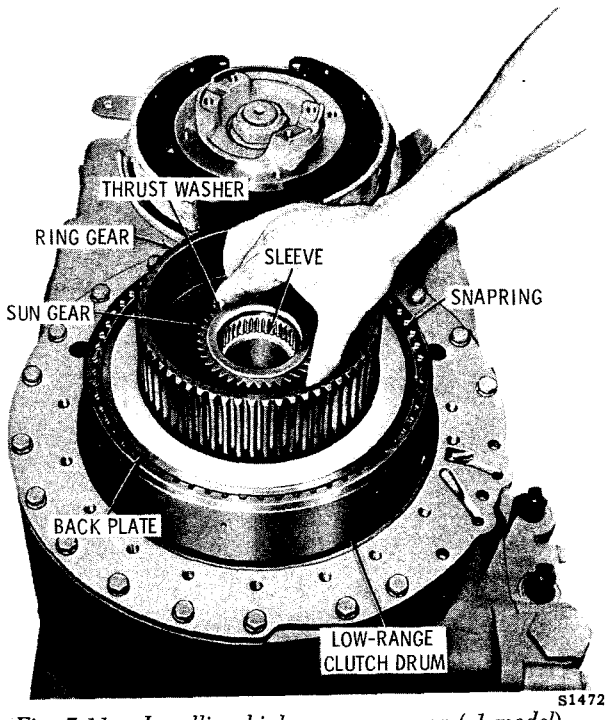


Fig. 7-11. Installing high-range sun gear (-1 model)

(9) Install high-range planetary carrier assembly into high-range ring gear.

d. Installation of High-range Clutch, Rear Housing

(1) Install the high-range clutch piston, with sealrings and expanders, flat side first, into the rear housing assembly (fig. 7-12).

(2) Install the piston return spring, cupped side first. Depress the inner diameter of the spring and install the snapring which retains it (fig. 7-12).

(3) Install the clutch anchor pin, leaving the flat-milled end extending at the inside of the housing (fig. 7-12).

(4) Position the high-range clutch anchor assembly 12 (A, foldout 11), pins upward on a flat surface. Beginning with an internal-splined clutch plate, alternately install five internal-splined and five external-tanged, high-range clutch plates. Engage the external tangs with the clutch anchor pins.

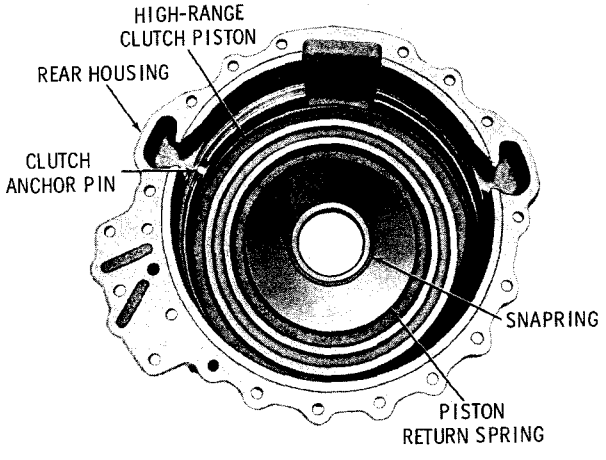


Fig. 7-12. Rear housing and piston assembly (-1 model)

(5) Grasp the entire anchor and plate assembly to hold the parts together. Install the anchor and plates into the rear housing, alining the anchor pin slot with the clutch anchor pin (fig. 7-13).

(6) Install the heavy internal snapring which retains the clutch anchor (fig. 5-18). Note the position of the ends of the snapring in relation to the two slightly extended pins in the anchor.

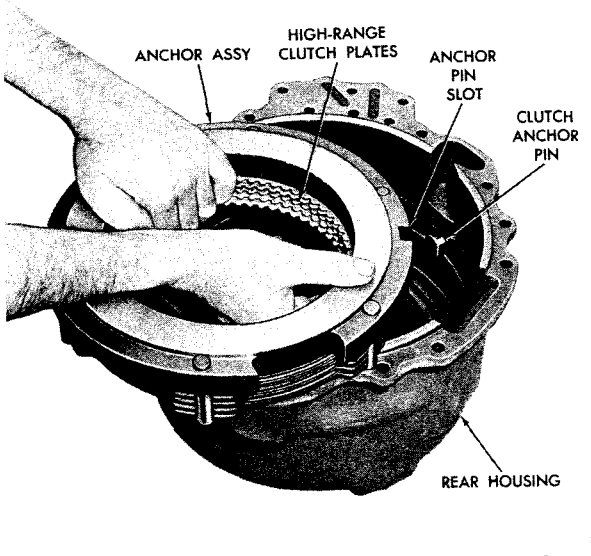


Fig. 7-13. Installing high-range clutch anchor and plates (-1 model)

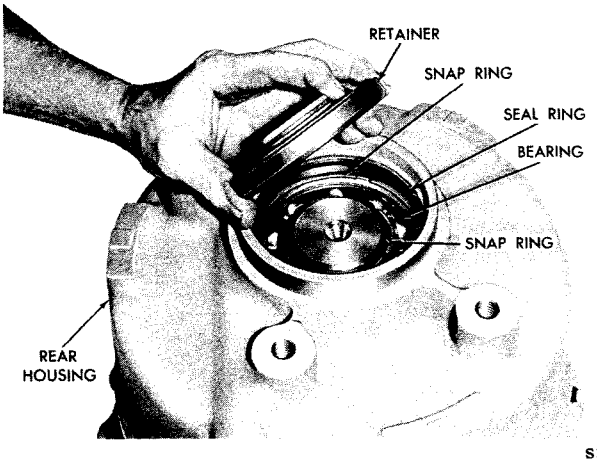


Fig. 7-14. Installing oil retainer (-1 model)

(7) If bearing 6 (B, foldout 13) was removed from shaft 5, install the bearing and snapring 7. Press the assembled shaft and bearing, splined end first, into the rear of housing 2. Seat the bearing against the shoulder in the housing.

(8) Install the internal snapring which retains the shaft rear bearing (fig. 7-14).

(9) Install the sealring into the groove in the rear bore of the rear housing (fig. 7-14). Install the retainer, chamfered side first.

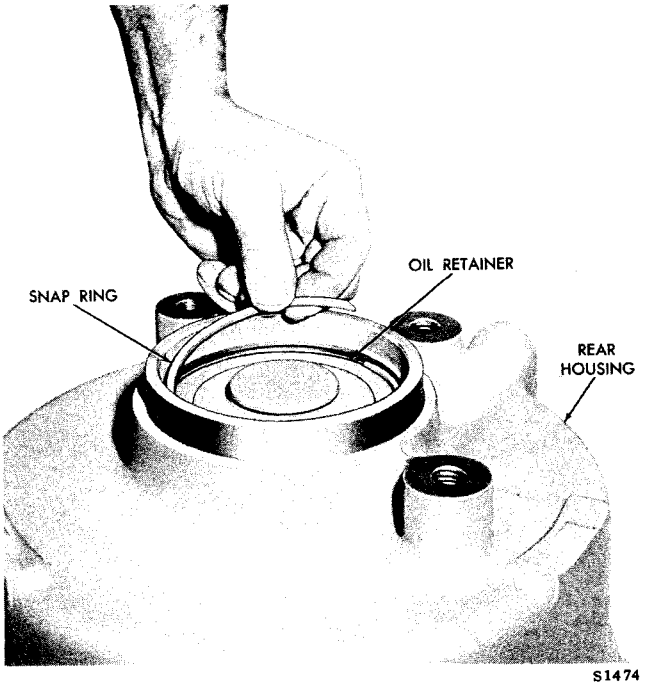


Fig. 7-15. Installing oil retainer snapring (-1 model)

(10) Install the snapring which holds the oil retainer in the rear of the rear housing (fig. 7-15).

(11) Install the rear housing gasket onto the rear housing, using oil-soluble grease to retain it. Install the rear housing onto the transmission (fig. 5-17).

NOTE

Rotate the transmission output shaft slowly to engage the splines of the high-range clutch plates with the splines of the high-range ring gear.

(12) Install three 3/8-16 x 1 1/2-inch bolts and lockwashers, and seventeen 3/8-16 x 1 1/8-inch bolts and lockwashers to retain the rear housing on the adapter (fig. 5-16). Tighten the bolts to 26 to 32 pound feet torque.

e. Installation of Oil Suction Tube, Converter Transfer Gears and Freewheel Clutch

(1) Position the transmission, rear downward and block in a level position. Install bearing 11 (B, foldout 6) onto shaft assembly 8. Install the shaft into the transmission housing (fig. 7-16).

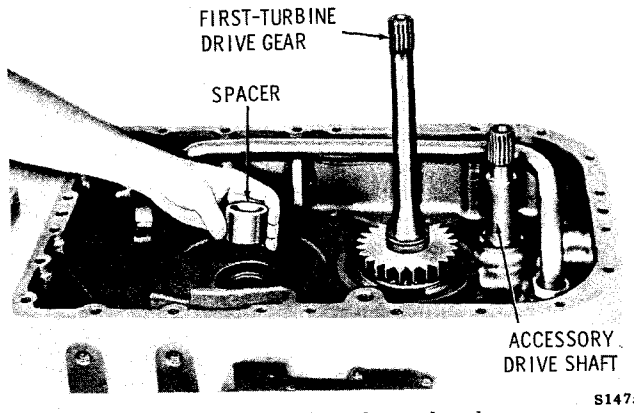


Fig. 7-16. Installing forward and reverse sun gear spacer (-1 model)

(2) Install nut 3 (B, foldout 7) and seal onto the upper end of suction tube 2. Install the tube into the housing. Tighten the nut 3 to 40 to 60 pound feet torque. Install one 3/8-16 x 5/8-inch, self-locking bolt 1 to secure the suction tube to the housing. Tighten the bolt to 36 to 43 pound feet torque.

(3) If removed, install bearing 32 (B, foldout 6) onto first-turbine drive gear 31. Install first-turbine drive gear and bearing as a unit (fig. 7-16).

(4) Install the forward and reverse sun gear spacer (fig. 7-16).

NOTE

After installation, the end of the spacer should be flush with the bearing bore seat (shoulder) in the transmission housing. If the spacer is above the shoulder, this indicates the forward-reverse sun gear thrust washer is not seated properly. To reseat the thrust washer, remove the spacer and use a suitable probe through the forward-reverse sun gear to relocate (center) the thrust washer. Reinstall the spacer.

(5) Install the assembled freewheel unit and converter driven gears (fig. 7-17).

(6) Install the thicker thrust race, roller bearing, and then the thinner thrust race, flat side first, onto the first-turbine drive gear (fig. 7-17). Install the step-joint sealring into the groove in the drive gear shaft. Refer to the note following c(1), above.

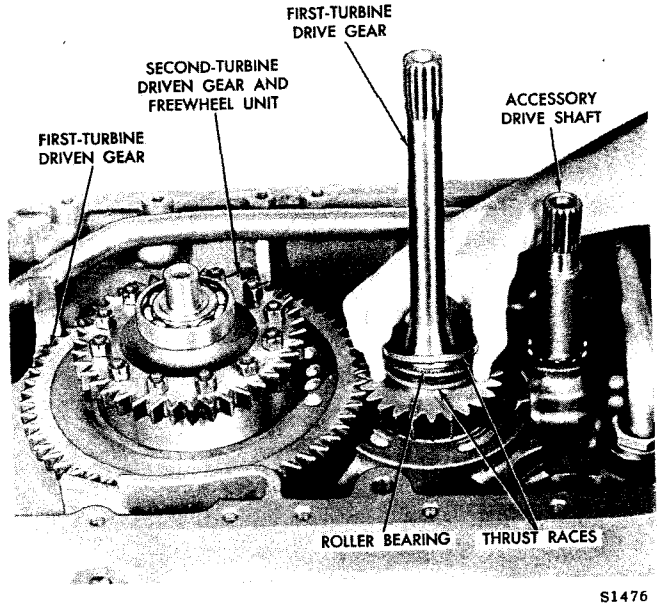


Fig. 7-17. Installing thrust washer and bearing onto first-turbine drive gear (-1 model)

(7) Install the assembled second-turbine drive gear onto the first-turbine drive gear. Be sure the step-joint sealring is in place on the shaft of the gear.

NOTE

Continue assembly of TRT 2220-1 and 2420-1 transmissions with paragraph 7-5, below.

7-4. INITIAL ASSEMBLY OF TRT 2210-3, 2410-3, 2220-3 AND 2420-3 TRANSMISSIONS

a. Installation of Reverse Clutch and Planetary (all -3 models)

(1) Follow the instructions in 7-3a(1) through (4), above. Install the clutch anchor pin, letting it project from the housing (so that anchor can be rotated).

(2) Install forward and reverse clutch anchor assembly, longer ends of pins first. Engage the pins with the slots in the external-tanged clutch plates. Aline the slot in the anchor with the clutch anchor pin (fig. 7-18). Push the anchor pin inward, to engage the slot in the anchor.

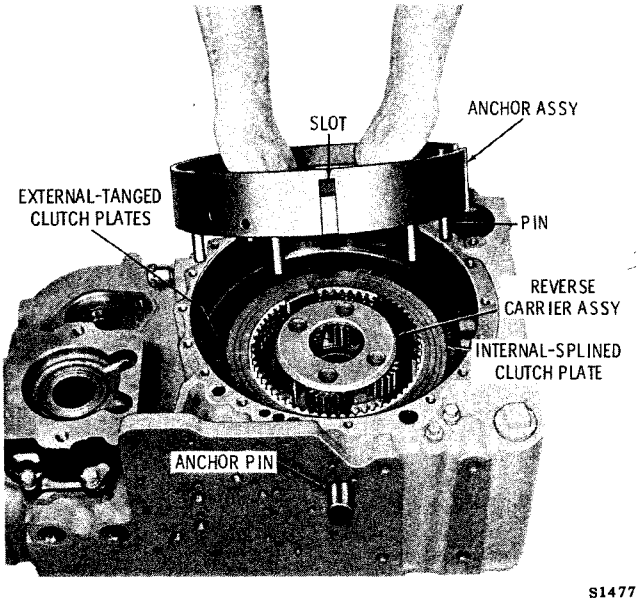


Fig. 7-18. Installing forward and reverse clutch anchor assembly (-3 model)

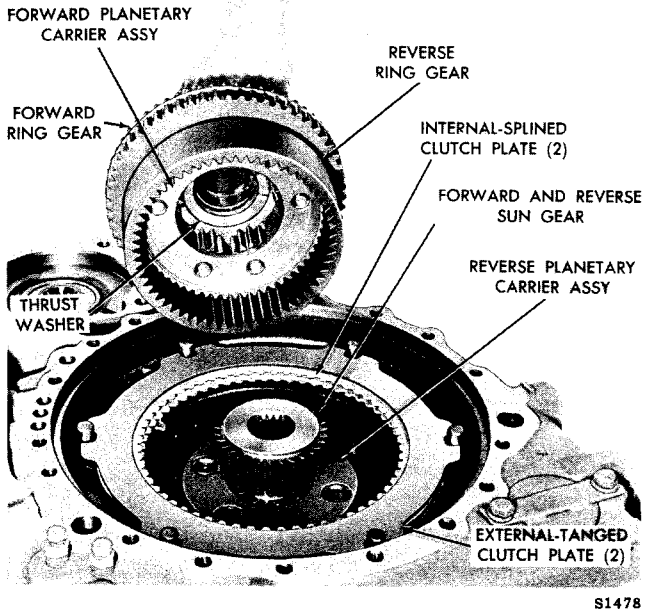


Fig. 7-19. Installing forward planetary carrier assembly and attached parts (-3 model)

b. Installation of Forward Clutch, Planetary and Adapter Assembly (TRT 2220-3, 2420-3 overdrive models)

(1) Beginning with an internal-splined clutch plate, alternately install two internal-splined plates and two external-tanged plates (fig. 7-19).

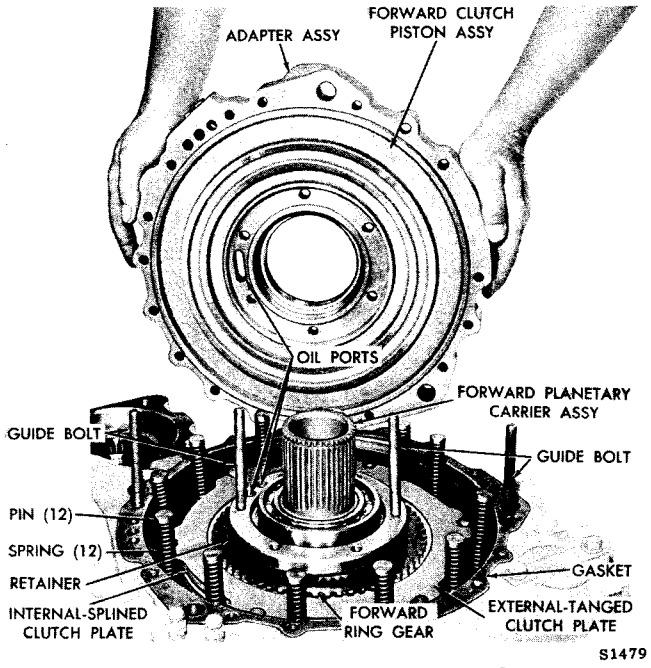


Fig. 7-20. Installing rear housing adapter assembly (-3 overdrive model)

(2) Install the forward and reverse sun gear into the reverse planetary carrier assembly (fig. 7-19).

(3) Install ring gear 1 (B, foldout 9) onto carrier assembly 31. Retain it with snapring 11. Install ring gear 14, longer ends of external splines first, onto carrier assembly 31.

(4) Install retainer 22, flat side first, onto the rear of carrier assembly 31. Install bearing assembly 23 against the shoulder at rear of carrier assembly 31.

(5) Install the thrust washer into the forward carrier assembly, using oil-soluble grease to retain it (fig. 7-19).

(6) Install the forward carrier assembly, as assembled in (3), (4) and (5), above, meshing its teeth with those of the reverse carrier pinions and the forward sun gear (fig. 7-19). Also, mesh the external splines of the forward ring gear with the installed internal-splined clutch plates.

(7) Next, install another internal-splined clutch plate and another external-tanged plate above the positioning ring on the forward ring gear (fig. 7-20).

(8) Install twelve clutch piston return springs and twelve pins (fig. 7-20).

(9) Install the adapter gasket onto the transmission housing (fig. 7-20). Install headless guide bolts at the four positions shown in figure 7-20.

(10) Install forward clutch piston, with expanders and sealrings, flat side first, into the rear housing adapter assembly (fig. 7-20).

(11) Install adapter assembly, alining oil ports in the adapter and retainer (fig. 7-20).

(12) Install two 3/8-16 x 2 3/4-inch bolts temporarily to pull adapter assembly down against piston return springs (fig. 7-21).

(13) Install two 3/8-16 x 1 3/4-inch, 12-point-head bolts into the recessed holes at each edge of the adapter assembly (fig. 7-21). Remove the two outer guide bolts and the temporary pull-down bolts. Tighten the 12-point-head bolts to 26 to 32 pound feet torque.

(14) Install six 3/8-24 x 1 1/4-inch, self-locking bolts into the inner circle of bolt holes. Remove the two inner guide bolts to install the last two bolts. Tighten the bolts to 36 to 43 pound feet torque.

c. Installation of Low-range Clutch, High-range Planetary (TRT 2220-3, 2420-3 overdrive models)

(1) Install two step-joint sealrings 1 (B, foldout 12) into the grooves in the hub of low-range clutch drum assembly 2. Use oil-soluble grease to retain them. Refer to the note following paragraph 7-3c(1), above.

(2) Install the low-range clutch drum assembly.

(3) Install the snapring which retains the clutch drum assembly on the forward carrier (fig. 7-22). Install two bearing races and bearing assembly (fig. 7-22). The thinner, lipped race is installed, flat side first, against the forward carrier hub.

(4) Beginning with an internal-splined clutch plate, alternately install five internal-splined and four external-splined clutch plates (fig. 7-23).

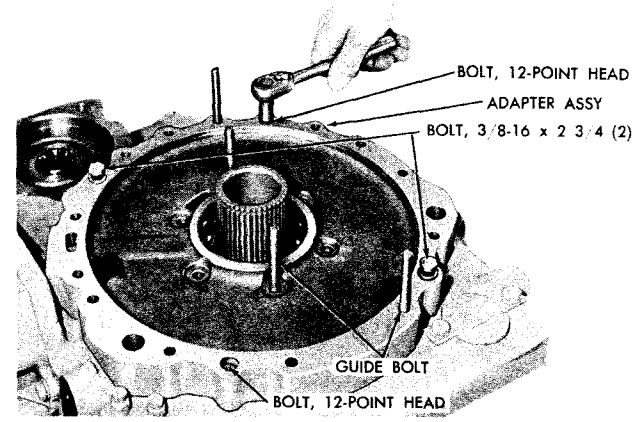


Fig. 7-21. Installing adapter assembly bolts (-3 overdrive model)

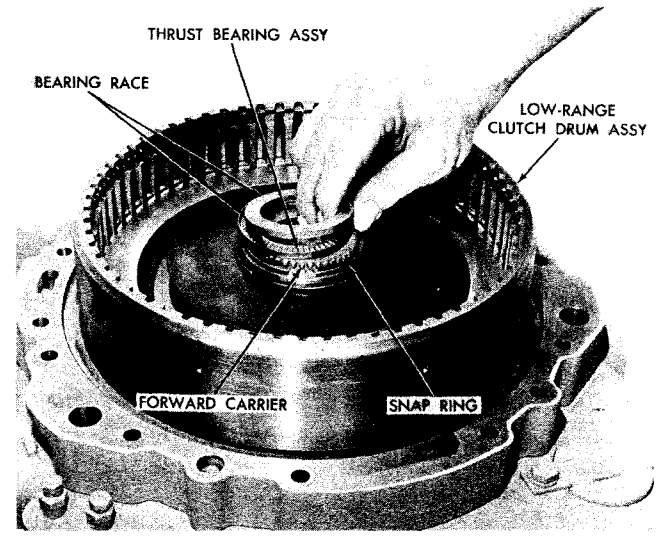


Fig. 7-22. Installing needle roller thrust bearing assembly (-3 overdrive model)

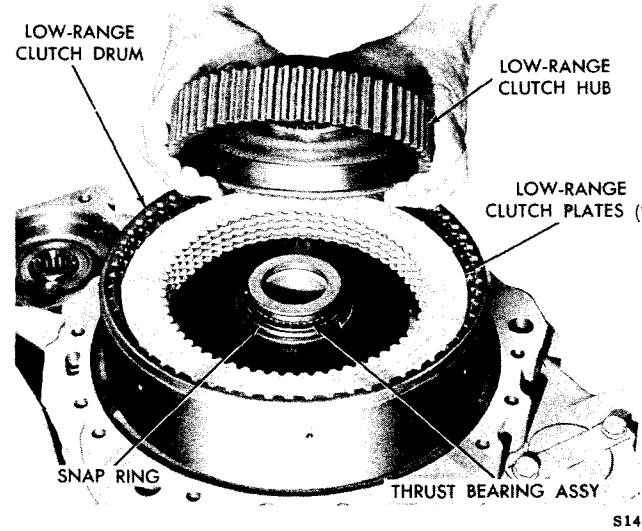


Fig. 7-23. Installing low-range clutch hub. (-3 overdrive model)

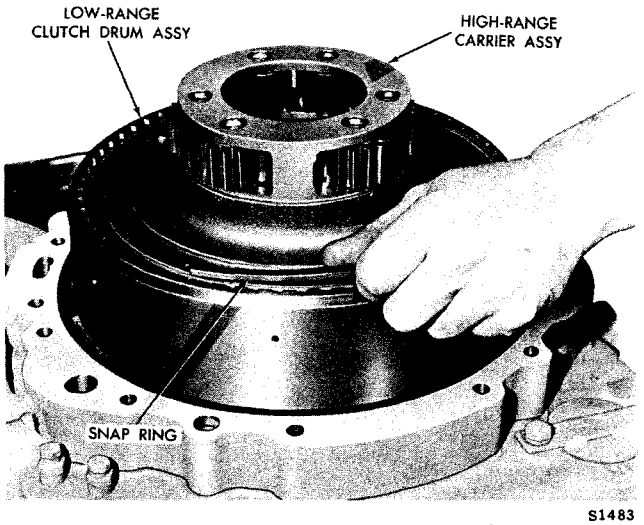


Fig. 7-24. Installing snapring retaining high-range planetary carrier assembly (-3 overdrive model)

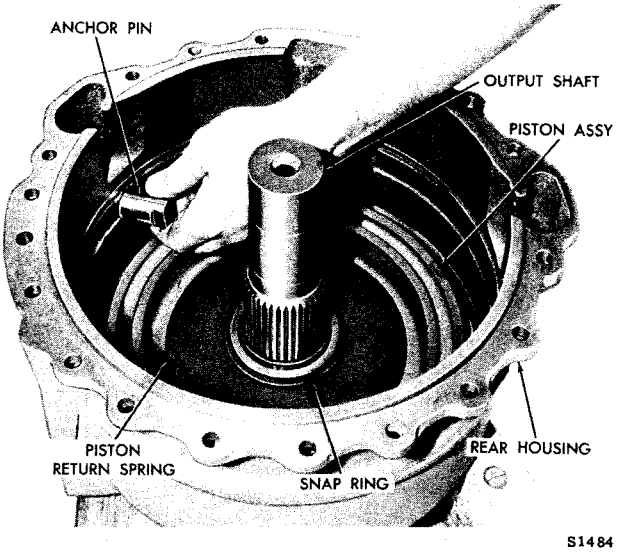


Fig. 7-25. Installing clutch anchor pin (-3 overdrive model)

(5) Install the low-range clutch hub, engaging its splines with those of the internal-splined clutch plates (fig. 7-23). Rotate the hub until it is engaged with all five internal-splined plates.

(6) Install the high-range planetary carrier assembly and retain it with an internal snapring (fig. 7-24).

(7) Install high-range planetary sun gear 1 (A, foldout 13), meshing its teeth with the high-range planetary pinions.

d. Installation of High-range Clutch, Rear Housing (TRT 2220-3, 2420-3 overdrive models)

(1) Position rear housing, rear downward, on blocks. Install the high-range clutch piston, with expanders and sealrings, flat side first, into the rear housing (fig. 7-25).

(2) Install the piston return spring, cupped side first, onto the piston. Depress the inner diameter of the spring and install the snapring which retains it (fig. 7-25).

(3) Install clutch anchor pin (fig. 7-25).

(4) Position the high-range clutch anchor assembly, pins upward, on a level surface. Beginning with an internal-splined clutch plate, install alternately two internal-splined and two external-tanged plates (fig. 7-26).

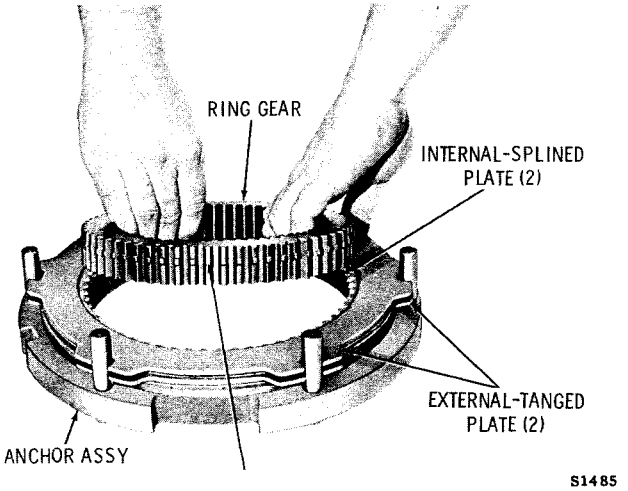


Fig. 7-26. Assembling high-range clutch and anchor (-3 overdrive model)

(5) Install the high-range planetary ring gear, longer ends of external splines first, into the internal-splined clutch plates (fig. 7-26).

(6) Install another internal-splined and another external-tanged clutch plate onto the assembly made in (4) and (5), above.

(7) Grasp the entire clutch assembly, invert it, and install it into the rear housing (fig. 7-27). Engage the slot in the anchor with the anchor pin in the housing.

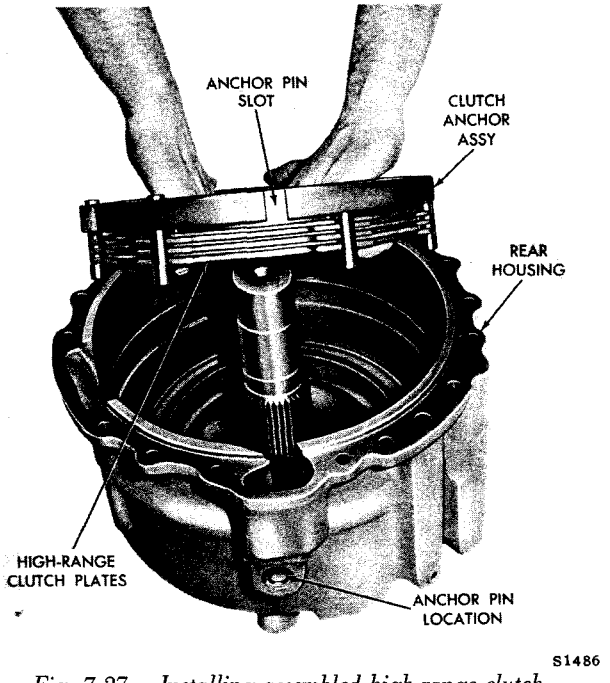


Fig. 7-27. Installing assembled high-range clutch (-3 overdrive model)

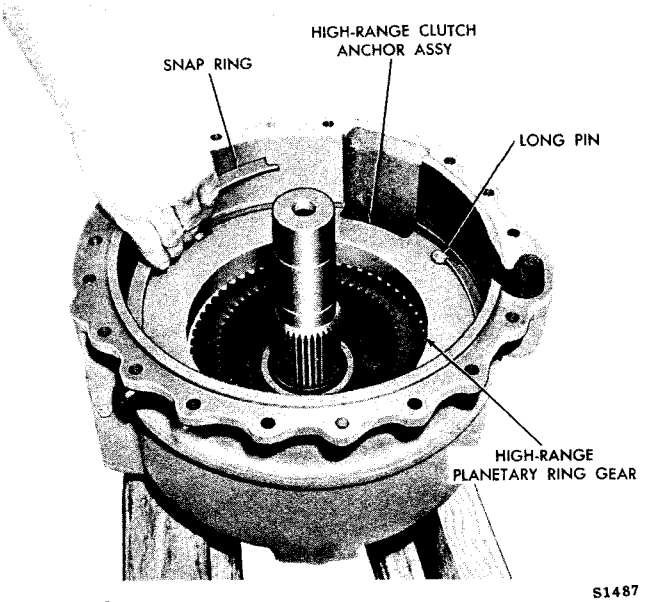


Fig. 7-28. Installing clutch anchor snapring (-3 overdrive model)

(8) Install the heavy internal snapring to retain the high-range clutch anchor assembly (fig. 7-28). Note the relation of the ends of the snapring to the two long pins extending through the anchor.

(9) Suspend the assembled rear housing on a hoist and install the gasket, using oil-soluble grease to retain it (fig. 5-41).

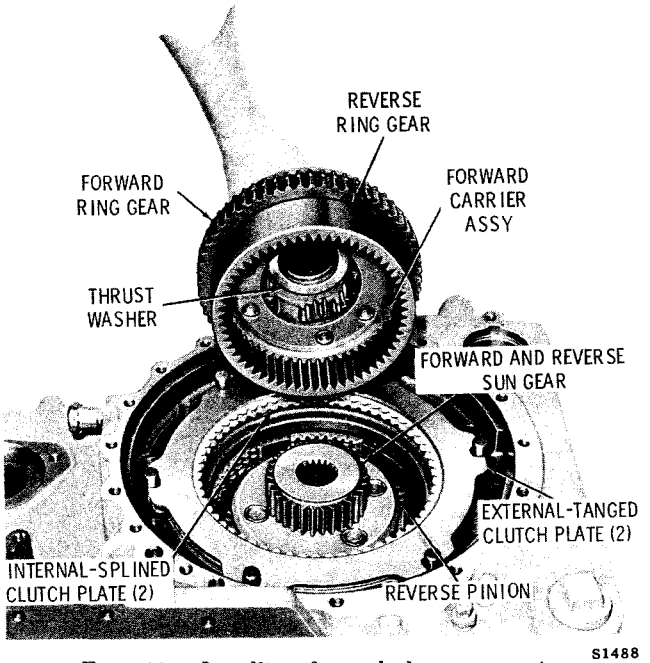


Fig 7-29. Installing forward planetary carrier assembly and attached parts (-3 overdrive model)

(10) Install the rear housing assembly, rotating the output shaft to aline splines and gear teeth. Install fifteen 3/8-16 x 2 3/4-inch bolts 4 (C, foldout 13) with lockwashers 3 to retain the housing and adapter. Tighten the bolts to 26 to 32 pound feet torque.

e. Installation of Forward Clutch, Planetary, and Adapter Assembly (TRT 2220-3, 2420-3 underdrive models)

(1) Beginning with an internal-splined clutch plate, alternately install two internal-splined plates and two external-tanged plates (fig. 7-29).

(2) Install the forward and reverse sun gear into the reverse planetary carrier assembly (fig. 7-29).

(3) Install ring gear 1 (B, foldout 9) onto carrier assembly 3. Retain it with snapring 11. Install ring gear 14, longer ends of external splines first, onto carrier assembly 3.

(4) Install retainer 22, flat side first, onto the rear of carrier assembly 3. Install bearing assembly 23 against the shoulder at the rear of carrier assembly 3.

(5) Install the thrust washer into the forward planetary carrier assembly, using oil-soluble grease to retain it (fig. 7-29).

(6) Install the forward carrier assembly and attached parts (fig. 7-29). Rotate the carrier and ring gears until all gear teeth and clutch plate splines are engaged.

(7) Install another internal-splined, and another external-tanged clutch plate onto the forward ring gear, above the positioning ring (fig. 7-30).

(8) Install twelve clutch piston return springs and pins (fig. 7-30). Install the adapter gasket.

(9) Install headless guide bolts into the retainer and transmission housing as shown in figure 7-30.

(10) Install the forward clutch piston, with expanders and sealrings, flat side first, into the adapter assembly (fig. 7-30).

(11) Install the adapter assembly, alining the oil ports in the retainer and adapter (fig. 7-30).

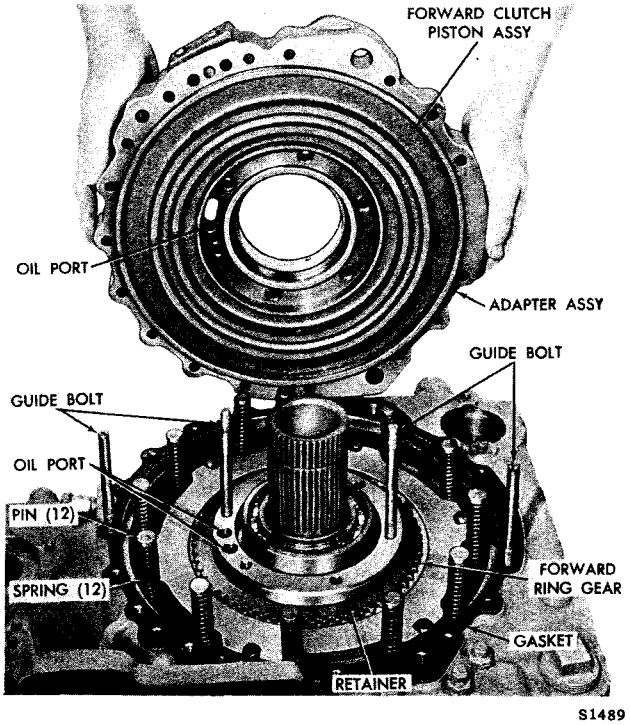


Fig. 7-30. Installing rear housing adapter assembly (-3 underdrive model)

(12) Install two 3/8-16 x 2 3/4-inch bolts at opposite sides of the adapter assembly to pull the adapter down against the clutch piston return springs. Install the two 3/8-16 x 1 3/4-inch, 12-point-head bolts (fig. 7-31). Tighten the bolts to 26 to 32 pound feet torque.

(13) Remove the two outer guide bolts and 3/8-16 x 2 3/4-inch pulldown bolts which were temporarily installed in (12), above. Install the six 3/8-24 x 1 1/4-inch, self-locking bolts 29 (B, foldout 9) into the inner bolt circle. (Remove the inner guide bolts to install the last two self-locking bolts.) Tighten the bolts to 36 to 43 pound feet torque.

f. Installation of High-range Clutch, Low-range Planetary (TRT 2220-3, 2420-3 underdrive models)

(1) Install the two step-joint sealrings 1 (B, foldout 11) into the grooves in the hub of the high-range clutch drum assembly (fig. 5-38). Use oil-soluble grease to retain the sealrings. Refer to the note following paragraph 7-3c(1), above.

(2) Install the high-range clutch drum assembly 2 (B, foldout 11) onto the forward planetary carrier.

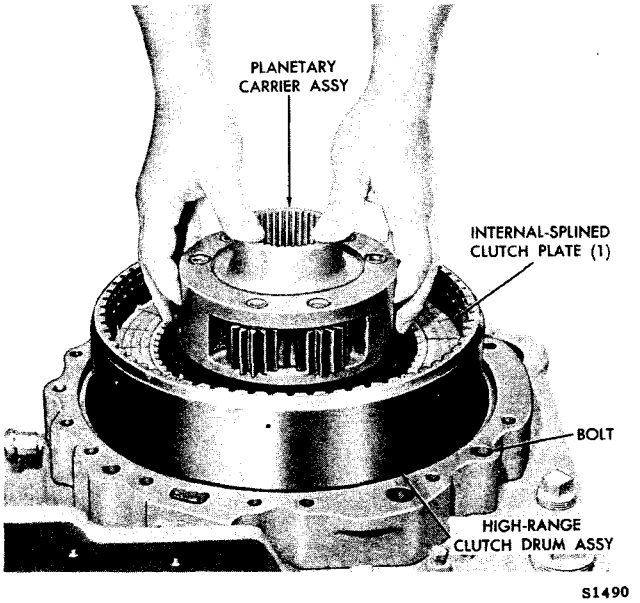


Fig. 7-31. Installing low-range planetary carrier assembly (-3 underdrive model)

(3) Install the snapring which retains the high-range clutch drum on the forward planetary carrier.

(4) Install the low-range planetary sun gear, thrust washer upward, onto the forward planetary carrier.

(5) Install one internal-splined clutch plate (fig. 7-31). Install the low-range planetary carrier assembly.

(6) Install the low-range ring gear, positioning ring first, into the clutch plate installed in (5), above. (Also see fig. 7-31.)

(7) Install two external-splined and two internal-splined, low-range clutch plates, stacked alternately as shown in figure 7-32.

(8) Install the high-range clutch back plate, flat side first. Retain it with the large internal snapring.

g. Installation of Low-range Clutch, Rear Housing Assembly (-3 underdrive models)

(1) Install the low-range clutch piston 23 (A, foldout 12), with expanders and sealrings, flat side first, into the rear housing.

(2) Install piston return spring 19 (A, foldout 12), cupped side first, depress its inner diameter and install snapring 18, which retains it.

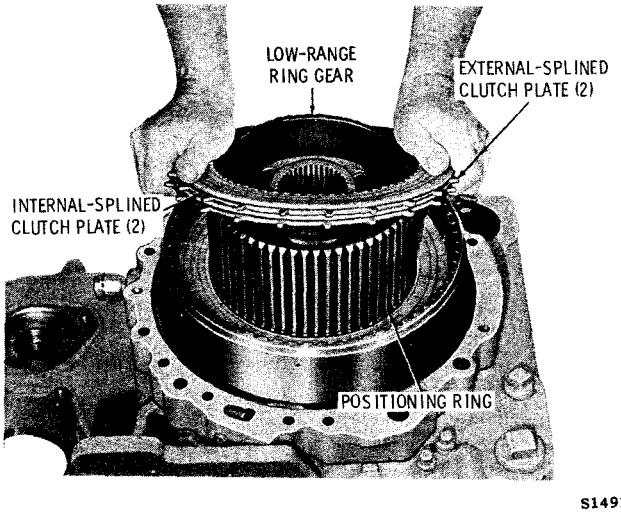


Fig. 7-32. Installing high-range clutch plates (-3 underdrive models)

(3) Install the clutch anchor pin into the rear housing.

(4) Beginning with an external-tanged clutch plate, alternately stack five external-tanged and five internal-splined plates on the face of the low-range clutch piston in the housing (fig. 7-33).

(5) Install the low-range clutch anchor assembly, engaging the anchor pins with the slots in the external-tanged clutch plates, and the slot in the anchor with the anchor pin in the rear housing (fig. 7-33).

(6) Install the heavy internal snapring which retains the low-range clutch anchor assembly. Note the relation of the ends of the snapring to the two anchor pins which extend slightly above the anchor surface (fig. 7-28).

(7) Suspend the assembled housing on a hoist and install the rear housing gasket. Use oil-soluble grease to retain the gasket (fig. 7-34).

(8) Install the rear housing assembly onto the adapter assembly (fig. 7-34). To aline gear teeth and clutch plate splines, rotate the output shaft while lowering the assembly.

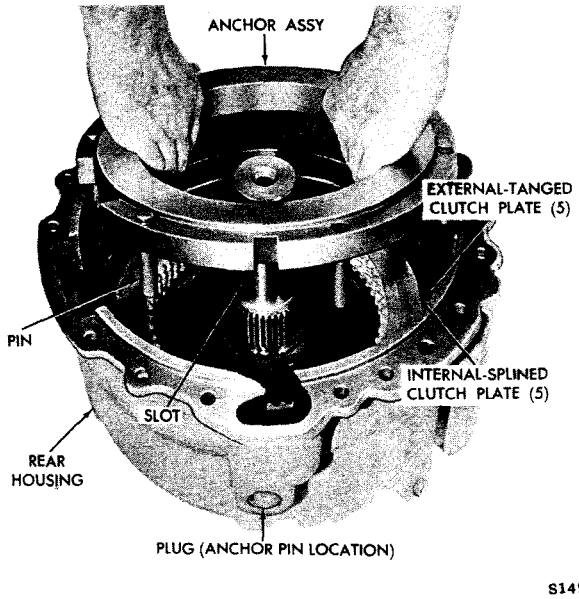


Fig. 7-33. Installing low-range clutch anchor assembly (-3 underdrive model)

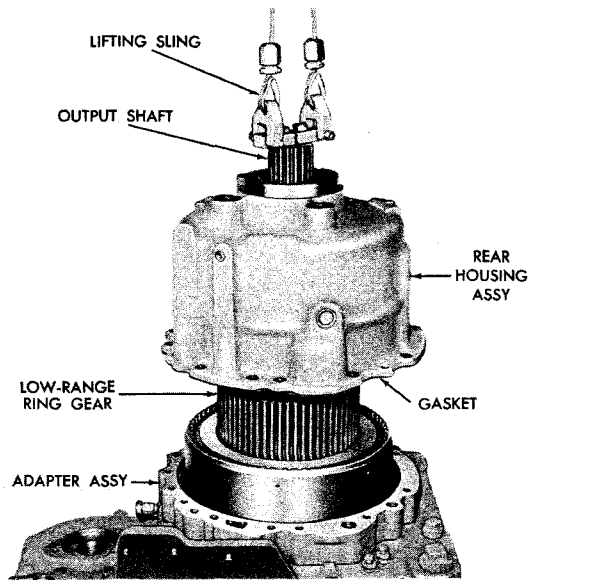


Fig. 7-34. Installing rear housing assembly (-3 underdrive model)

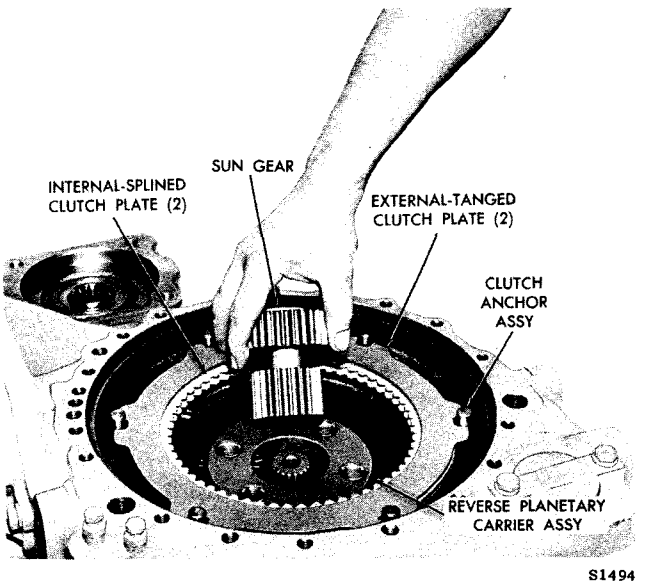


Fig. 7-35. Installing forward and reverse sun gear (-3 model)

(9) Install fifteen 3/8-16 x 2 3/4-inch bolts 4 (C, foldout 13) and lockwashers 3 to retain the rear housing and adapter. Tighten the bolts to 26 to 32 pound feet torque.

h. Installation of Forward Planetary, Clutch, Rear Housing (TRT 2210-3, 2410-3 models)

(1) Beginning with an internal-splined forward clutch plate, alternately install two internal-splined plates and two external-tanged plates onto the forward and reverse clutch anchor assembly (fig. 7-35).

(2) Install the forward and reverse sun gear into the reverse planetary carrier assembly (fig. 7-35).

(3) Install ring gear 1 (A, foldout 10) onto carrier assembly 3. Retain it with snap-ring 10.

(4) Install bearing 11 onto the rear of carrier assembly 3, pressing it to seat on the shoulder of the carrier.

(5) Install bearing spacer 12 against bearing 11.

(6) Install thrust washer 2 into the front of carrier assembly 3, retaining it with oil-soluble grease.

(7) Install the carrier assembly, as assembled in (3) through (6), above, into the transmission. Rotate the carrier shaft and forward ring gear to aline gears and clutch plate splines.

(8) Install one internal-splined clutch plate 16 (A, foldout 10) and then one external-tanged clutch plate 17 onto those previously installed.

(9) Install twelve clutch piston return springs 23 (B, foldout 8) and twelve pins 24 into the circle of holes in the forward and reverse clutch anchor assembly.

(10) Install forward clutch piston 22 (A, foldout 10), with expanders and sealrings 18 through 21, flat side first, into housing assembly 5 (D, foldout 13).

(11) Install gasket 1 (D, foldout 13) onto the front flange of housing 9.

(12) Install housing assembly 5 onto the transmission and retain it with eighteen 3/8-16 x 1 3/4-inch bolts and lockwashers. Tighten the bolts to 26 to 32 pound feet torque.

i. Installation of Oil Suction Tube, Converter Transfer Gears and Freewheel Clutch (all -3 models)

(1) If the transmission is equipped with an accessory drive, install bearing 11 (B, foldout 6) onto shaft assembly 8. Install the assembled unit into the transmission housing.

(2) Install ball bearing 32 (B, foldout 6) onto first-turbine drive gear 31. Install the assembled bearing and drive gear (fig. 7-36).

(3) Install the step-joint sealring into the groove in the hub of the first-turbine drive gear (fig. 7-36). Refer to the note following 7-3c(1), above.

(4) Install the forward and reverse sun gear spacer (fig. 7-36). Center the spacer on the sun gear.

NOTE

After installation, the end of the spacer should be flush with the bearing bore seat (shoulder) in the transmission housing. If the spacer is above the shoulder, this indicates the forward-reverse sun gear thrust washer is not seated properly. To reseat the thrust washer, remove the spacer and use a suitable probe through the forward-reverse sun gear to relocate (center) the thrust washer. Reinstall the spacer.

(5) Install the assembled freewheel clutch and the turbine driven gear assembly (fig. 7-36).

(6) Install baffle plate 28 (A, foldout 8) and retain with three 5/16-18 x 5/8-inch, self-locking bolts 29. Tighten the bolts to 17 to 20 pound feet torque.

(7) Install sealring 2, nut 3 and sealring 4 onto oil suction tube 1. Install the tube and assembled parts into the transmission housing and retain it with one 5/16-18 x 5/8-inch self-locking bolt 30. Tighten the bolt to 17 to 20 pound feet torque. Tighten nut 3 to 40 to 60 pound feet torque.

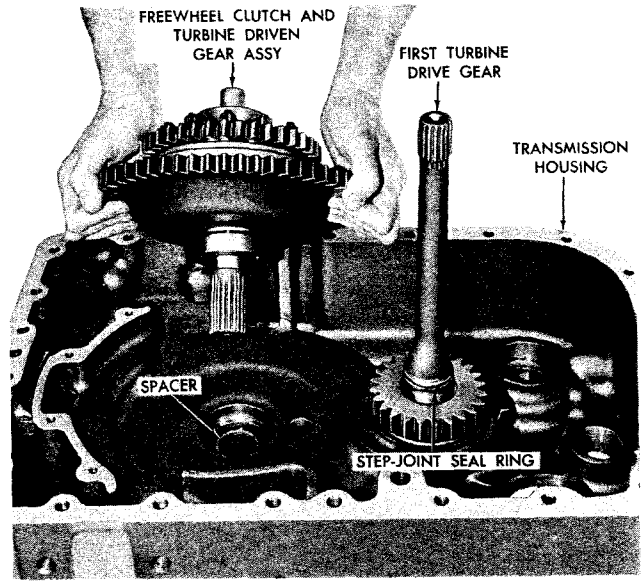


Fig. 7-36. Installing freewheel clutch and turbine driven gear assembly (-3 model)

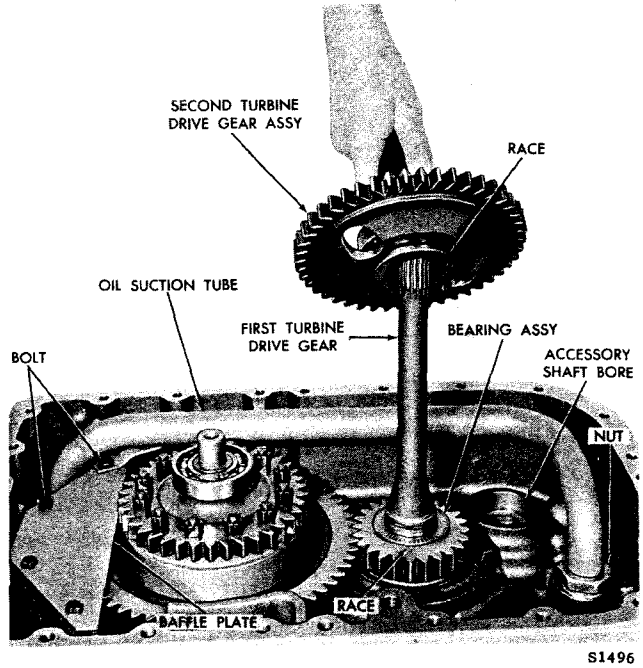


Fig. 7-37. Installing second-turbine driven gear assembly (-3 model)

(8) Install the thicker thrust bearing race and needle thrust bearing assembly onto the first-turbine drive gear (fig. 7-37).

(9) Install the thinner thrust bearing race, cupped side first, onto the second-turbine drive gear (fig. 7-37). Use oil-soluble grease to retain it.

(10) Install the second-turbine drive gear assembly onto the first-turbine drive gear (fig. 7-37). Be sure that the step-joint sealring is in its groove on the shaft of the gear.

NOTE

Continue assembly of TRT 2210-3, 2410-3, 2220-3 and 2420-3 transmissions with paragraph 7-5, below.

7-5. INSTALLATION OF CONVERTER HOUSING, CONVERTER AND INPUT COMPONENTS (ALL MODELS)

a. Installation of Torque Converter Housing

NOTE

Before installing the housing, be certain that the step-joint sealring is in place on the shaft of the second-turbine drive gear.

(1) Install the gasket onto the converter housing splitline. Use oil-soluble grease to retain the gasket during installation of the housing (fig. 7-38). Attach a sling to the housing front flange and, while lowering the converter housing onto the transmission housing, guide the accessory driven gear past the second-turbine drive gear. Seat the converter housing and remove the sling.

(2) Retain the converter housing with one 7/16-14 x 2 3/4-inch bolt 42 (B, foldout 6), twenty three 7/16-14 x 1 3/8-inch bolts 3, twenty four 7/16-inch flatwashers 5 and 40, and twenty four 7/16-inch lockwashers 4 and 41. Tighten the bolts to 42 to 50 pound feet torque.

b. Installation of Torque Converter Components

(1) Check to be sure that step-joint sealring 20 (A, foldout 6) is in its groove in sleeve 37 (B, foldout 6). Install the torque converter pump assembly, meshing the accessory drive gear with the driven gear. Use a sleeve over the ground sleeve, against the inner race of the pump bearing to seat the bearing.

(2) Install the stator spacer and stator, hub projection first, onto the ground sleeve (fig. 7-39).

(3) Install the snapring onto the converter ground sleeve to retain the stator (fig. 7-40). Install the first- and second-turbine assembly onto the turbine drive gear shafts.

(4) If the transmission is equipped with a dry converter housing, install the sealring into the groove in the converter pump splitline (fig. 7-41).

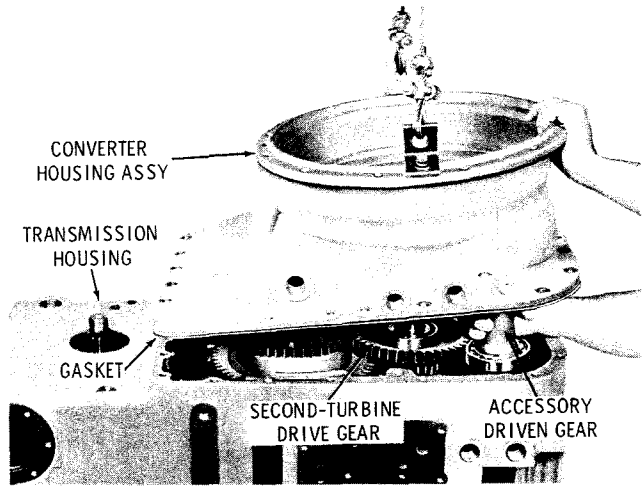


Fig. 7-38. Installing torque converter housing assembly

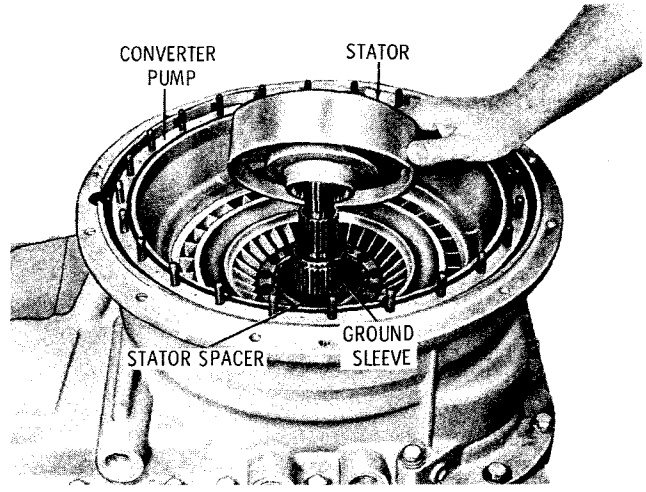


Fig. 7-39. Installing torque converter stator

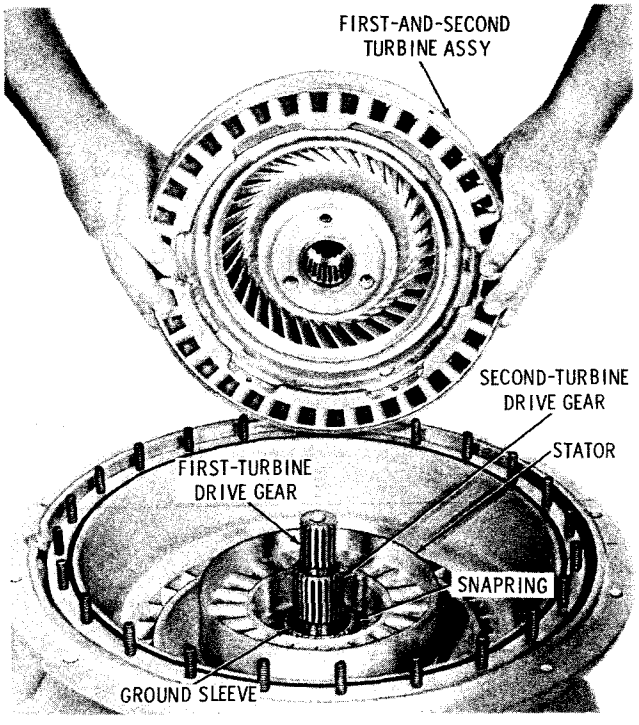


Fig. 7-40. Installing first- and second-turbine assembly

c. Installation of Input Drive Components (direct mount)

(1) Install the torque converter drive cover (fig. 7-41).

(2) Install twenty four 5/16-24, self-locking nuts 4 (B, foldout 5) to retain the cover. Tighten the nuts to 14 to 18 pound feet torque.

(3) There are two types of direct-mount drives. One type employs a flex disk (items 6 through 9 in B, foldout 5). The other type employs a drive ring (items 1, 2 and 3 in B, foldout 5). For the flex disk, follow (4), below. For the drive ring, follow (5) and (6), below.

(4) Install flex disk assembly 9 (B, foldout 5), attached nuts first (toward rear). Install three flex disks 8. Aline the holes in all disks and install the flex disk plate 7. Retain the assembled parts with six 1/2-13 x 7/8-inch, self-locking bolts 6 and tighten them to 81 to 97 pound feet torque.

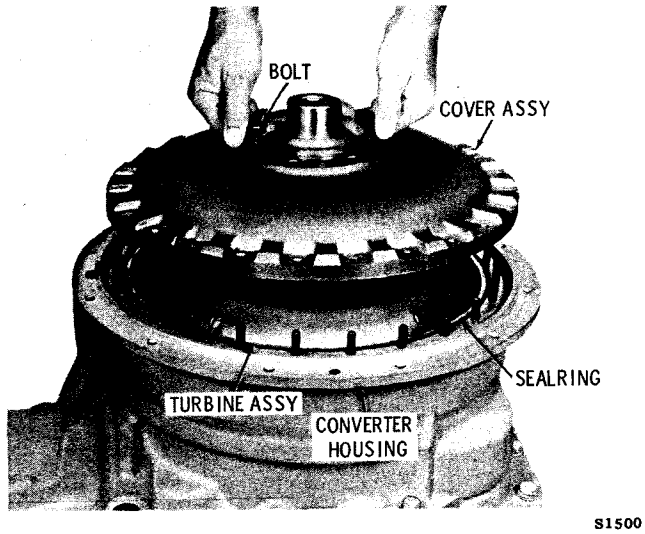


Fig. 7-41. Installing torque converter cover assembly

(5) Install sealring 3 (B, foldout 5) onto drive cover 5 (after lubricating it with grease specified in (6), below). The seal fits into a groove behind the drive teeth. Apply sealer (Permatex no. 3 or equivalent to drive ring 1 and to the drive ring mounting face on the engine flywheel or drive disk (also to gasket, if used). Bolt drive ring 1 to the engine flywheel or drive disk, using eight bolts 2. Tighten the bolts to 36 to 43 pound feet torque.

(6) Pack the spaces between the internal teeth of drive ring 1 with a high quality molybdenum disulphide grease (Allison P/N 6769877 or equivalent). Fill the teeth completely, but do not use an excessive amount of grease.

NOTE

The grease used must not attack Buna or Polyacrylate (seal material). Mobil-Grease Special with molybdenum disulphide, or equivalent, is recommended.

d. Installation of Input Drive Components (remote mount)

(1) Install the torque converter drive cover 19 or 23 (A, foldout 5) onto the torque converter pump. Retain it with twenty four 5/16-24 self-locking nuts 18. Tighten the nuts to 14 to 18 pound feet torque.

(2) Press bearing 14, shield side up, onto input shaft 17 or 22 against the shaft shoulder.

(3) Install the assembled input shaft onto the torque converter drive cover. Install three lockstrips 16 (A, foldout 5) and six 1/2-13 x 1 1/8-inch bolts 15 to retain the input shaft. Tighten the bolts to 67 to 80 pound feet torque. Bend corners of lockstrips against each bolt head.

(4) Install gasket 13 onto the converter housing front flange.

(5) Install transmission front cover 12 (A, foldout 5) with seal 10, onto the converter housing. Install twelve 3/8-24 x 2-inch bolts 11, from front to rear and retain them with twelve 3/8 lockwashers 20 and twelve 3/8-24 nuts 21. Tighten the nuts to 33 to 40 pounds feet torque.

(6) Install coupling assembly 3 (A, foldout 5) or flange 4 and retain with washer 2 and nut 1. While holding the flange or coupling to prevent it from rotating, tighten nut 1 to 600 to 700 pound feet torque. Refer to 4-8b.

(7) If shaft 22 (A, foldout 5) is used, the flange is retained by a washer having two holes, a lockstrip, and two 3/8-24 x 1 1/8-inch bolts. Install these parts and tighten the bolts to 41 to 49 pound feet torque. Bend a corner of the lockstrip against each bolt head, to lock the bolt.

7-6. INSTALLATION OF EXTERIOR COMPONENTS (ALL MODELS)

a. Installation of Oil Pump

(1) Install the oil pump assembly, filled with transmission fluid, and oil pump gasket onto the pump mounting pad (fig. 7-42).

(2) Retain the pump with seven 3/8-16 x 2-inch bolts 3 (A, foldout 15), two 3/8-16 x 3 bolts 5 and nine lockwashers 2 and 6. Tighten the bolts to 26 to 32 pound feet torque.

NOTE

Some transmissions use six short, and three long bolts to retain the pump.

(3) If the transmission is equipped with adapter drive coupling 4 (A, foldout 15), apply molybdenum disulfide grease (Molykote Type G or equivalent) onto the coupling splines and the mating splines of the pump. Install the drive coupling into the pump and retain it temporarily with a strip of tape.

b. Installation of Control Valve

(1) Remove the temporarily installed bolt and washer from the valve body mounting pad. Install the valve body gasket and retain it with oil-soluble grease (fig. 7-43). Install the control valve body assembly.

(2) Install fifteen 3/8-16 x 2 1/2-inch bolts 4 (B, foldout 15), one 3/8-16 x 1-inch bolt 3, and sixteen 3/8 lockwashers 2. Progressing from the center of the valve body outward, tighten the bolts evenly to 26 to 32 pound feet torque.

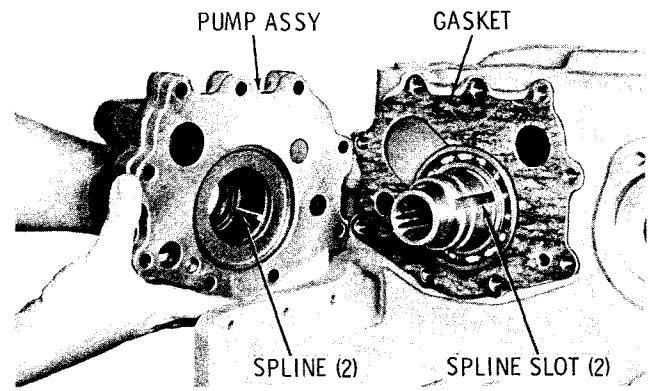


Fig. 7-42. Installing all pump assembly

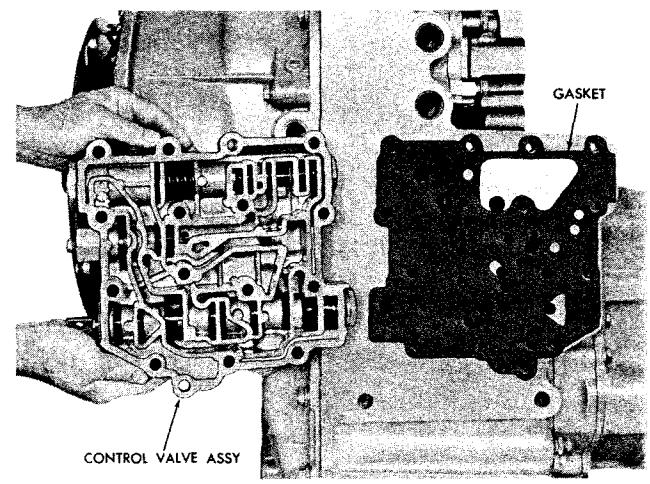


Fig. 7-43. Installing control valve assembly

c. Installation of Flanges, Parking Brake (-3 models)

(1) Install back plate assembly 2 (C, foldout 14). Retain with three 5/8-11 x 1 1/4-inch bolts 15 and lockwashers 16. Tighten the bolts to 117 to 140 pound feet torque.

(2) Install roller 3 and apply lever 6.

(3) Install brake shoes 4 (C, foldout 14) and springs 5 and 7.

(4) Install spacer 25 (A, foldout 10) on TRT 2210-3 or 2410-3 models or spacer 10 (C, foldout 13) on TRT 2220-3 or 2420-3 models.

(5) Install rear output flange 14 (C, foldout 14). Refer also to paragraph 4-8b for flange installation procedures.

NOTE

On some transmissions with a parking brake, the brake drum must be attached to the front of the output flange prior to installing the flange.

(6) On TRT 2220-3 and 2420-3 models only, install shims 10 (C, foldout 14) as required, flange washer 11, lockstrip 13 and two 1/2-20 x 1 1/4-inch self-locking bolts 12. Tighten the bolts to 96 to 115 pound feet torque. Bend the corner of lockstrip 13 against the heads of bolts 12. Refer also to paragraph 4-8b for flange installation.

(7) On TRT 2210-3 and 2410-3 models only, install flange washer 11, lockstrip 13 and two 3/8-24 x 1 1/8-inch self-locking bolts 12. Tighten the bolts to 41 to 49 pound feet torque. Bend a corner of lockstrip 13 against the head of each bolt 12.

(8) Install brake drum 8 (C, foldout 14) and retain with eight 3/8-24 x 3/4-inch self-locking bolts 9. Tighten the bolts to 41 to 49 pound feet torque.

d. Installation of Flanges, Parking Brake (-1 models)

(1) Install back plate 2 (B, foldout 14) and retain with four 1/2-13 x 7/8-inch self-locking bolts. Tighten the bolts to 81 to 97 pound feet torque.

(2) Install roller 3 (B, foldout 14) and apply lever 6.

(3) Install brake shoes 4 and springs 5.

(4) On models that do not have a parking brake, install spacer 26 (A, foldout 14).

(5) Install rear output flange 11 (B, foldout 14). Refer also to paragraph 4-8b for flange installation procedures.

NOTE

Some models require that the brake drum be installed on the flange, before the flange is installed. For these models, install flange 11 (B, foldout 14) into brake drum 7 and retain with four 3/8-24 x 5/8-inch, self-locking bolts. Tighten the bolts to 41 to 49 pound feet torque and install the assembled flange and drum onto the output shaft.

(6) Apply molybdenum disulfide grease (Molykote Type G or equivalent) onto the threads of 1 1/4-12 flange retaining nut 9 (B, foldout 14) and install washer 10 and nut 9 onto the output shaft. Attach an improvised holder to the flange and tighten the nut to 600 to 700 pound feet torque.

(7) Install brake drum 7 (B, foldout 14) onto the output flange and retain it with four 3/8-24 x 5/8-inch, self-locking bolts. Tighten the bolts to 41 to 49 pound feet torque.

(8) Install front output flange 3 (A, foldout 14). Refer to paragraph 4-8b for flange installation procedures.

(9) Apply molybdenum disulfide grease (Molykote Type G or equivalent) onto the threads of 1 1/4-12 flange retaining nut 1 (A, foldout 14) and install washer 2 and nut 1 onto the front output shaft. Attach an improvised holder to the flange and tighten the nut to 600 to 700 pound feet torque.

e. Installation of Oil Strainer

(1) On -3 model transmissions, install the oil strainer 13 (A, foldout 8). Install

the sealring 14 onto the oil strainer cover 15. Install the cover and retain with two 3/8-16 x 3/4-inch bolts 17 and lockwashers 16. Tighten the bolts evenly to 26 to 32 pound feet torque.

(2) On -1 model transmissions, install gasket 22 (B, foldout 7) and oil strainer 21. Install six 3/8-16 x 7/8-inch bolts 19 and lockwashers 20. Tighten the bolts to 26 to 32 pound feet torque.

7-7. INSTALLATION OF REVERSE CLUTCH, PLANETARY (TRANSMISSION IN VEHICLE)

a. Installation into TRT 2220-1, 2420-1 Transmissions

(1) Install the reverse clutch piston, with expanders and sealrings, flat side first, into the rear of the transmission (fig. 7-44).

(2) Install the anchor pin into the anchor pin hole at the inside of transmission housing (fig. 7-44).

(3) Position the forward and reverse clutch anchor assembly 20 (B, foldout 8), the longer ends of the pins (front) upward. Install one internal-splined clutch plate 19, and then one external-tanged clutch plate 18.

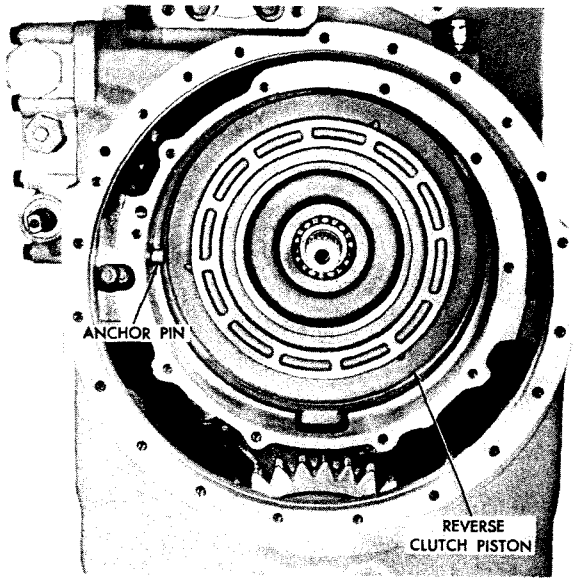


Fig. 7-44. Reverse piston and clutch anchor pin, installed

(4) Install the reverse planetary carrier assembly 9, open (rear) side first, onto the two clutch plates. Install the remaining four internal-splined and four external-tanged plates 6 and 7 alternately, beginning with plate 7.

(5) The assembly outlined in (3) and (4), above, results in the clutch and planetary unit shown in figure 7-45.

(6) Using two wires or cords, tie the clutch plates to the clutch anchor assembly by passing the wires or cords over opposite tangs of the clutch plates, around the inner sides of pins, and through the adjacent holes in the anchor. Twist the wire ends or tie the cord ends at the under (rear) side of the clutch anchor (fig. 7-45).

(7) Install the entire unit, clutch plates first, into the rear of the transmission, engaging the anchor pin slot with the anchor pin in the transmission.

(8) Install forward and reverse sun gear spacer 8 (B, foldout 8) over the splined shaft at the center of the installed clutch and planetary unit.

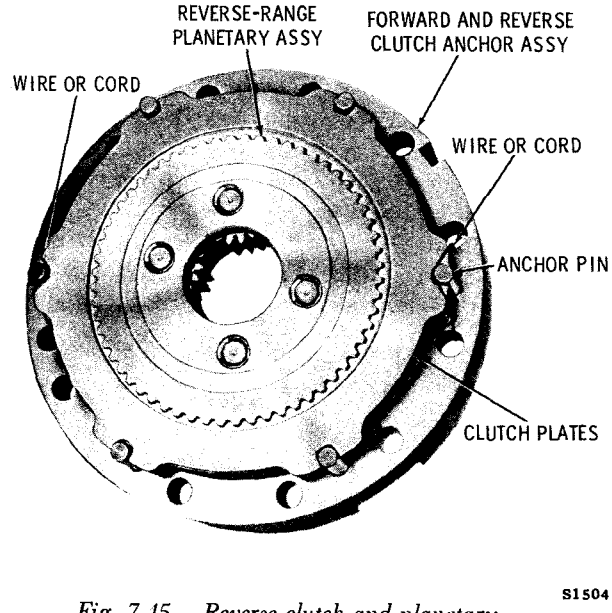


Fig. 7-45. Reverse clutch and planetary assembled for installation into transmission in vehicle

(9) Remove the wires or cords which held the assembly together during installation.

NOTE

After the procedures in (1) through (9), above, continue with assembly as outlined in the paragraph applicable to the model being serviced.

b. Installation of Clutch and Planetary Components into Other Models. Figures 7-44 and 7-45 and a, above, cover procedures specifically for TRT 2220-1 and 2420-1 transmissions. For all other TRT models, follow the same procedures, although the appearance may differ slightly.

Section 8. WEAR LIMITS AND SPRING DATA

8-1. WEAR LIMITS DATA

a. Maximum Variations. The wear limits information in this section shows the maximum wear at which components are expected to function satisfactorily.

b. Cleaning, Inspection. Parts must be clean to permit effective inspection for wear or damage. Refer to paragraph 4-6.

c. Bearings, Bearing Journals, Bores. The application of bearings to any product is based on the recommendations of the bearing manufacturer. Therefore, no diametral dimensional deviation should be permitted in the bearing or mated parts. Bearings should be carefully checked for signs of distress before reinstalling in the transmission.

d. Gears. Gears should be inspected for load pattern and signs of distress. Any distress indicates a possible future failure, and the reuse of such gears should be the decision of the individual customer, based on experience. Backlash cannot be used to establish critical wear of a gear. The backlash tolerances are of such nature that a gear usually pits, scuffs, scores, or galls long before the gear wear becomes critical.

e. Splines. Unless severe, spline wear is not considered detrimental except where it affects tightness of an assembly such as driveline flanges. Here, again, backlash cannot be used to establish critical wear because both mating parts must be concentrically located to obtain accurate measurement of backlash.

f. Hook-type Sealrings. Sides of the sealring should be smooth (maximum wear 0.005 inch). The sides of the groove into which the sealrings fit should be smooth (50 microinch equivalent), and square with the axis of rotation within 0.002 inch. A new sealring should be installed if grooves are reworked, or sealring outside diameter wear causes the possibility of a closed gap between sealring hooks when the ring is installed.

8-2. WEAR LIMITS CHART

The chart which follows lists the wear limits data and is referenced to the exploded views (foldouts 5 through 15) in the back of the manual.

8-3. SPRING DATA

Springs must be clean to permit effective inspection. Springs should be replaced if there are signs of overheating, wear due to rubbing adjacent parts, or permanent set. Discard springs which do not meet the load-height specifications in the spring chart.

8-4. SPRING CHART

Inspection criteria (load versus height) and identification characteristics of springs are presented in the chart following the wear limits chart. The spring chart data are keyed to the exploded views (foldouts 5 through 15) in the back of the manual.

WEAR LIMITS CHART

Illustration	Description	Part Number	Dimension	Wear Limit	Cone (max)
B, foldout 6	TORQUE CONVERTER HOUSING AND TURBINE DRIVE GEARS				
28	Thrust bearing race thickness	8619652	0.030/0.032	0.028	
30	Thrust bearing race thickness	8619650	0.123/0.126	0.120	
A, foldout 7	TURBINE DRIVEN GEARS AND FREEWHEEL CLUTCH				
9, 23	*Freewheel roller diameter	7451288	0.4988	0.4980	
12, 24	*Freewheel cam surface wear	6834209 6774678	—		
15	*First-turbine driven gear hub outside diameter	6774671	3.0427/3.0437	0.003 3.0377	
B, foldout 8	REVERSE-RANGE CLUTCH AND PLANETARY				
6, 18	Clutch plate thickness	6833930	0.107/0.123	0.097	0.030
7, 19	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
13	Pinion end play in carrier 16	6769716		0.055	
21	Clutch anchor face wear (front or rear)	6773498		0.020	
	Minimum clutch pack thickness			1.185	
A, foldout 9	FORWARD CLUTCH AND PLANETARY (TRT 2220-1, 2420-1)				
2	Thrust washer thickness	6776578	0.130/0.135	0.125	
7	Pinion end play in carrier 9	6769715		0.055	
10	Thrust washer thickness	6776877	0.092/0.094	0.089	
12, 15	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
13, 16	Clutch plate thickness	6833930	0.107/0.123	0.097	0.030
	Minimum clutch pack thickness			0.691	
B, foldout 9	FORWARD CLUTCH AND PLANETARY (TRT 2220-3, 2420-3)				
2	Thrust washer thickness	6757233	0.090/0.100	0.087	
9	Pinion end play in carrier 5	6769715		0.055	
12, 15	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
13, 16	Clutch plate thickness	6833930	0.107/0.123	0.097	0.030
37	Pinion end play in carrier 33	6769715		0.055	
	Minimum clutch pack thickness			0.691	

*Total wear of freewheel parts (2 x roller wear + sum of cam surface wear at two opposing points + gear hub wear) must not exceed 0.010 inch. (Determine cam surface wear by measuring depth of groove caused by roller contact in the cam pocket.)

WEAR LIMITS CHART — Continued

Illustration	Description	Part Number	Dimension	Wear Limit	Cone (max)
A, foldout 10	FORWARD CLUTCH AND PLANETARY (TRT 2210-3, 2410-3)				
2	Thrust washer thickness	6776578	0.130/0.135	0.125	
8	Pinion end play in carrier 4	6769715		0.055	
13, 16	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
14, 17	Clutch plate thickness	6833930	0.107/0.123	0.097	0.030
	Minimum clutch pack thickness			0.691	
B, foldout 10	LOW-RANGE CLUTCH AND TRANSFER DRIVE GEAR				
19	Clutch piston face wear	6768283		0.010	
26, 29	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
27, 30	Clutch plate thickness	6759509	0.107/0.123	0.097	0.030
31	Backplate face wear	6775481		0.010	
	Minimum clutch pack thickness			0.841	
A, foldout 11	HIGH-RANGE CLUTCH AND PLANETARY				
1	High-range sun gear assy thickness	6775804	1.720/1.728	1.718	
7	Pinion end play in carrier 5	6771478		0.055	
13	Anchor face wear (rear)	6775494		0.020	
16	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
17	Clutch plate thickness	6833930	0.107/0.123	0.097	0.030
	Minimum clutch pack thickness			1.135	
B, foldout 11	HIGH-RANGE CLUTCH, LOW-RANGE RING GEAR				
8	Clutch piston face wear	6768283		0.010	
12, 15	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
13, 16	Clutch plate thickness	6759509	0.107/0.123	0.097	0.030
17	Back plate face wear	6775481		0.010	
	Minimum clutch pack thickness			0.595	

continued on next page

WEAR LIMITS CHART — Continued

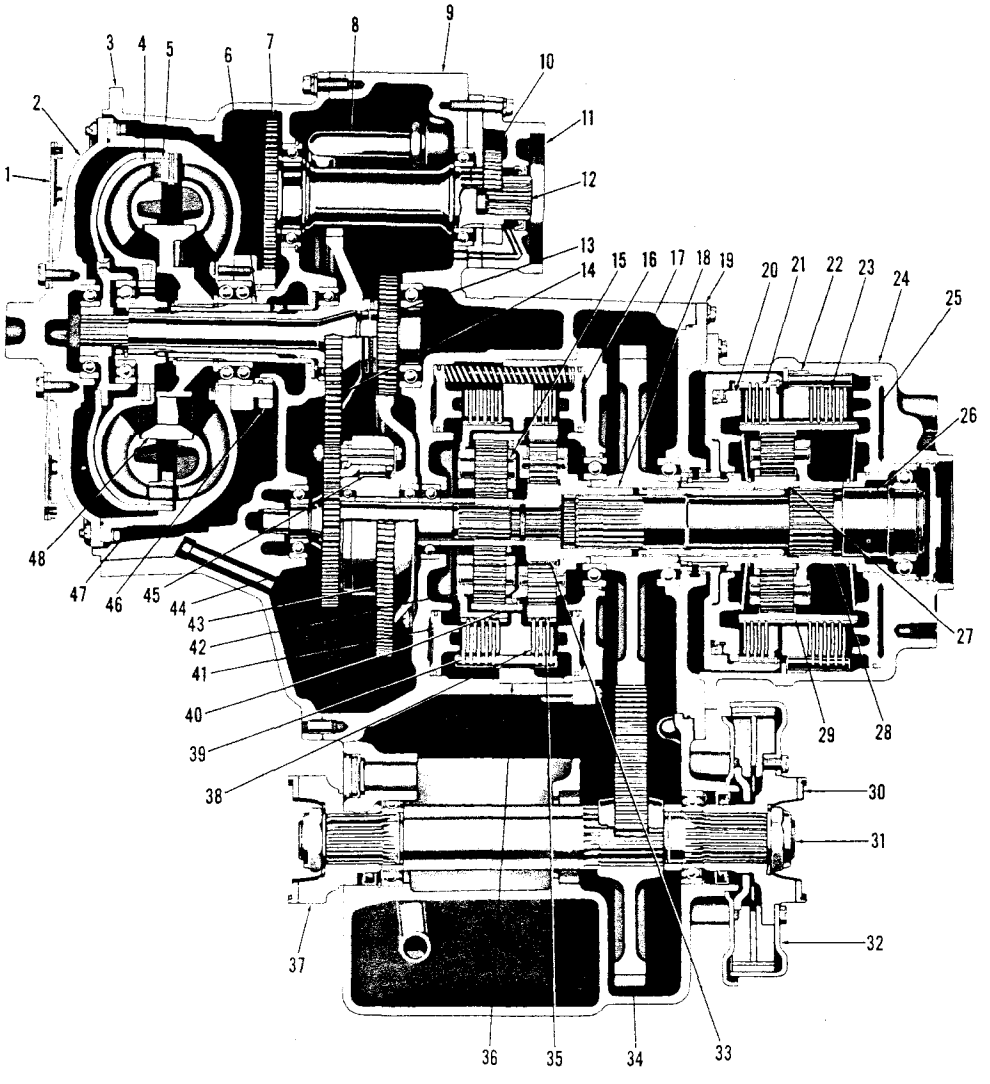
Illustration	Description	Part Number	Dimension	Wear Limit	Cone (max)
A, foldout 12	LOW-RANGE CLUTCH AND PLANETARY				
1	Low-range sun gear assy thickness	6775804	1.720/1.728	1.718	
7	Pinion end play in carrier 5	6771478		0.055	
13	Clutch anchor face wear (rear)	6775494		0.020	
16	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
17	Clutch plate thickness	6833930	0.107/0.123	0.097	0.030
	Minimum clutch pack thickness			1.185	
B, foldout 12	LOW-RANGE CLUTCH, HIGH-RANGE PLANETARY				
8	Clutch piston face wear	6770894		0.010	
16	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
17	Clutch plate thickness	6759509	0.107/0.123	0.097	0.030
19	Carrier face wear (front)	6777030		0.010	
23	Pinion end play in carrier 18	6769715		0.055	
	Minimum clutch pack thickness			1.108	
A, foldout 13	HIGH-RANGE CLUTCH, PLANETARY SUN AND RING GEARS				
4	Clutch anchor face wear (rear)	6777035		0.020	
7, 10	Clutch plate thickness	6775541	0.150/0.156	0.130	0.012
8, 11	Clutch plate thickness	6833930	0.107/0.123	0.097	0.030
	Minimum clutch pack thickness			0.721	
A, foldout 15	OIL PUMP ASSEMBLY				
17	Driven gear shaft diameter	6776428	0.7495/0.7500	0.749	
B, foldout 15	VALVE BODY ASSEMBLIES				
8	Valve clearance in body 9	6831187		0.004	
17	Plug clearance in body 9	6834961		0.0035	
21	Valve clearance in body 9	6774262		0.004	
22	Valve plug clearance in plug 26	6771914		0.004	
29	Valve clearance in body 9	6831188		0.003	
39	Valve clearance in body 9	6774599		0.003	
42	Valve clearance in body 9	6774598		0.003	
47	Valve plug clearance in plug 48	6758305		0.004	

Model TRT 2000

SPRING CHART

Fold-out	Ref	Spring	Part No.	No. coils	Diameter of wire	Outside diameter	Free length	under load Length	under load Pounds
B, 6	22	Lubrication regulator valve	6773689	13.5	0.0475	0.403	1.440	1.00	5.58 to 6.82
B, 6	25	Converter regulator valve	6773551	10	0.080	0.468	1.206	1.00	23.4 to 28.6
A, 7	7	Freewheel clutch	6835343	27	0.033	0.185	1.500	1.140	6.59 to 6.71
	7		6833973	26	0.033	0.175	1.408	1.140	6.05 to 7.25
A, 7	20	Freewheel clutch	6774681	19	0.041	0.251	1.220	1.00	5.22 to 6.38
B, 8	23	Forward, reverse clutch	*6775437	37.5	0.105	0.625	6.127	4.80	45.1 to 49.9
		piston return	6772068	37	0.105	0.625	5.507	4.72	26.6 to 29.4
B, 10	20	Low-range clutch piston return	6759491	Belleville spring		6.700	0.269		
A, 11	19	High-range clutch piston return	6759491	Belleville spring		6.700	0.269		
B, 11	9	High-range clutch piston return	6759491	Belleville spring		6.700	0.269		
A, 12	19	Low-range clutch piston return	6759491	Belleville spring		6.700	0.269		
B, 12	9	Low-range clutch piston return	6777032	Belleville spring		6.700	0.267		
A, 13	13	High-range clutch piston return	6777032	Belleville spring		6.700	0.267		
A, 14	10	Disconnect detent	6773464	14	0.0625	0.353	1.320	1.150	11.88 to 14.52
B, 15	15	Main-pressure regulator valve	6834941	17	0.125	0.768	3.62	2.50	90.0 to 102.0
			6833211	18.5	0.1275	0.733	3.62	2.50	90.0 to 102.0
			6830363	17	0.1205	0.759	3.65	2.50	86.0 to 94.0
			6776957	19.5	0.0865	0.690	3.245	1.89	28.0 to 29.0
B, 15	16	Trimmer	6830365	8	0.128	1.11	2.58	1.43	72.2 to 82.2
			6773593	10	0.1313	1.120	2.90	1.45	72.0 to 88.0
B, 15	20	Clutch cutoff valve	6765710	18.5	0.080	0.625	3.035	2.08	18.9 to 23.1
			6758503	20	0.091	0.625	3.200	2.38	27.9 to 34.1
B, 15	33	Selector valve detent	6770253	11	0.054	0.480	1.236	0.78	7.84 to 8.16
			6769251	10	0.625	0.480	1.14	0.78	13.60 to 14.0
B, 15	38	Inching regulator front spring	6770298	14.6	0.041	0.384	1.280	0.78	3.93 to 4.07
B, 15	41	Inching regulator valve rear	6774595	21.5	0.072	0.585	3.800	2.00	25.2 to 27.8
			6776838	21.1	0.0828	0.585	2.950	2.00	25.2 to 27.8
B, 15	43	Inching valve return	6774594	17	0.120	1.105	5.750	4.04	28.5 to 31.5

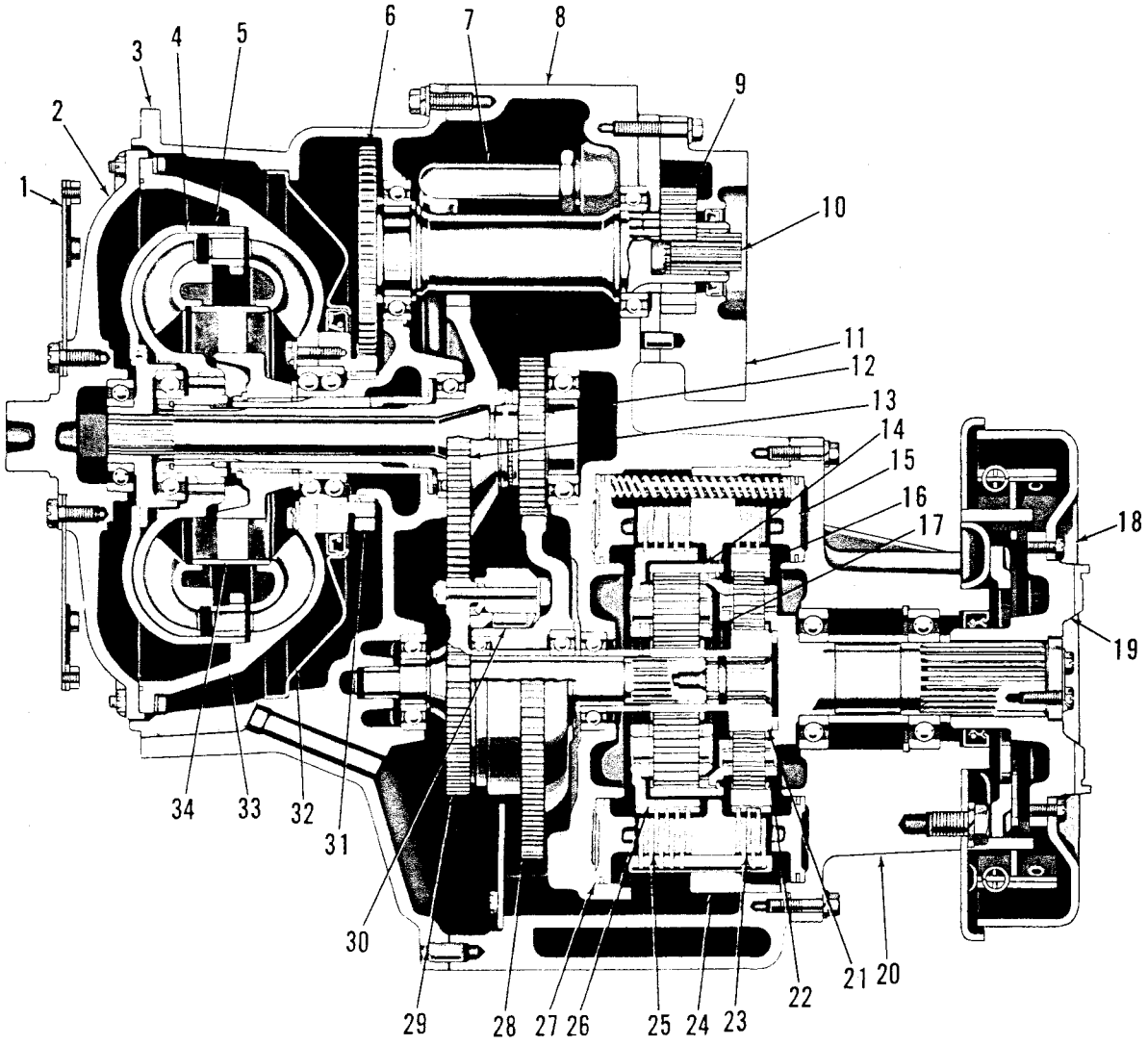
1 - Flex disk drive
2 - Torque converter cover
3 - Converter housing
4 - Second turbine
5 - First turbine
6 - Converter ground sleeve
7 - Accessory driven gear
8 - Oil suction tube
9 - Transmission housing
10 - Oil pump drive gear
11 - Accessory mounting pad
12 - Accessory drive splines
13 - First-turbine drive gear
14 - Second-turbine drive gear
15 - Reverse planetary carrier
16 - Forward clutch piston
17 - Transfer drive gear
18 - Forward planetary carrier
19 - Adapter
20 - Low-range clutch piston
21 - Low-range clutch
22 - High-range clutch anchor
23 - High-range clutch
24 - Rear housing
25 - High-range clutch piston
26 - Output shaft
27 - High-range sun gear
28 - High-range planetary carrier
29 - High-range ring gear
30 - Rear output flange
31 - Transmission output shaft
32 - Parking brake
33 - Forward, reverse sun gear
34 - Transfer driven gear
35 - Forward ring gear
36 - Forward, reverse clutch anchor
37 - Front output flange
38 - Forward clutch
39 - Reverse clutch
40 - Reverse ring gear
41 - Reverse clutch piston
42 - Reverse clutch hub
43 - First-turbine driven gear
44 - Second-turbine driven gear
45 - Freewheel clutch
46 - Accessory drive gear
47 - Converter pump
48 - Converter stator



81505

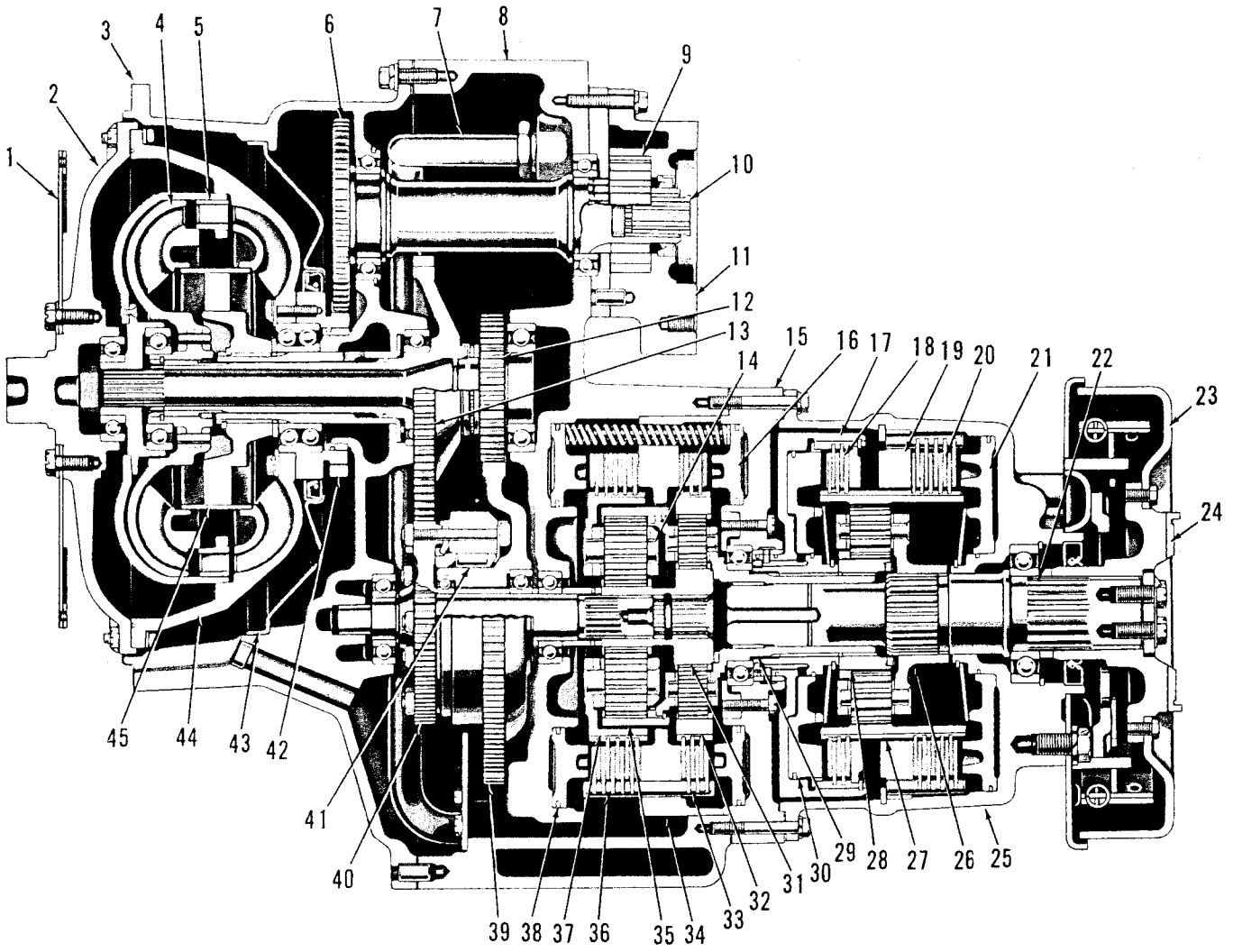
Foldout 1. TRT 2420-1 Powershift transmission—cross-section view

1 - Flex disk drive
2 - Converter cover
3 - Converter housing
4 - Second turbine
5 - First turbine
6 - Accessory driven gear
7 - Oil suction tube
8 - Transmission housing
9 - Oil pump drive gear
10 - Accessory drive coupling
11 - Accessory mounting pad
12 - First-turbine drive gear
13 - Second-turbine drive gear
14 - Reverse ring gear
15 - Forward clutch piston
16 - Forward ring gear
17 - Reverse planetary carrier
18 - Parking brake
19 - Output flange
20 - Rear housing
21 - Forward, reverse sun gear
22 - Forward planetary carrier
23 - Forward clutch
24 - Forward, reverse clutch anchor
25 - Reverse clutch
26 - Reverse clutch hub
27 - Reverse clutch piston
28 - First-turbine driven gear
29 - Second-turbine driven gear
30 - Free wheel clutch
31 - Accessory drive gear
32 - Diaphragm
33 - Converter pump
34 - Converter stator



Foldout 2. TRT 2210-3 Powershift transmission—cross-section view

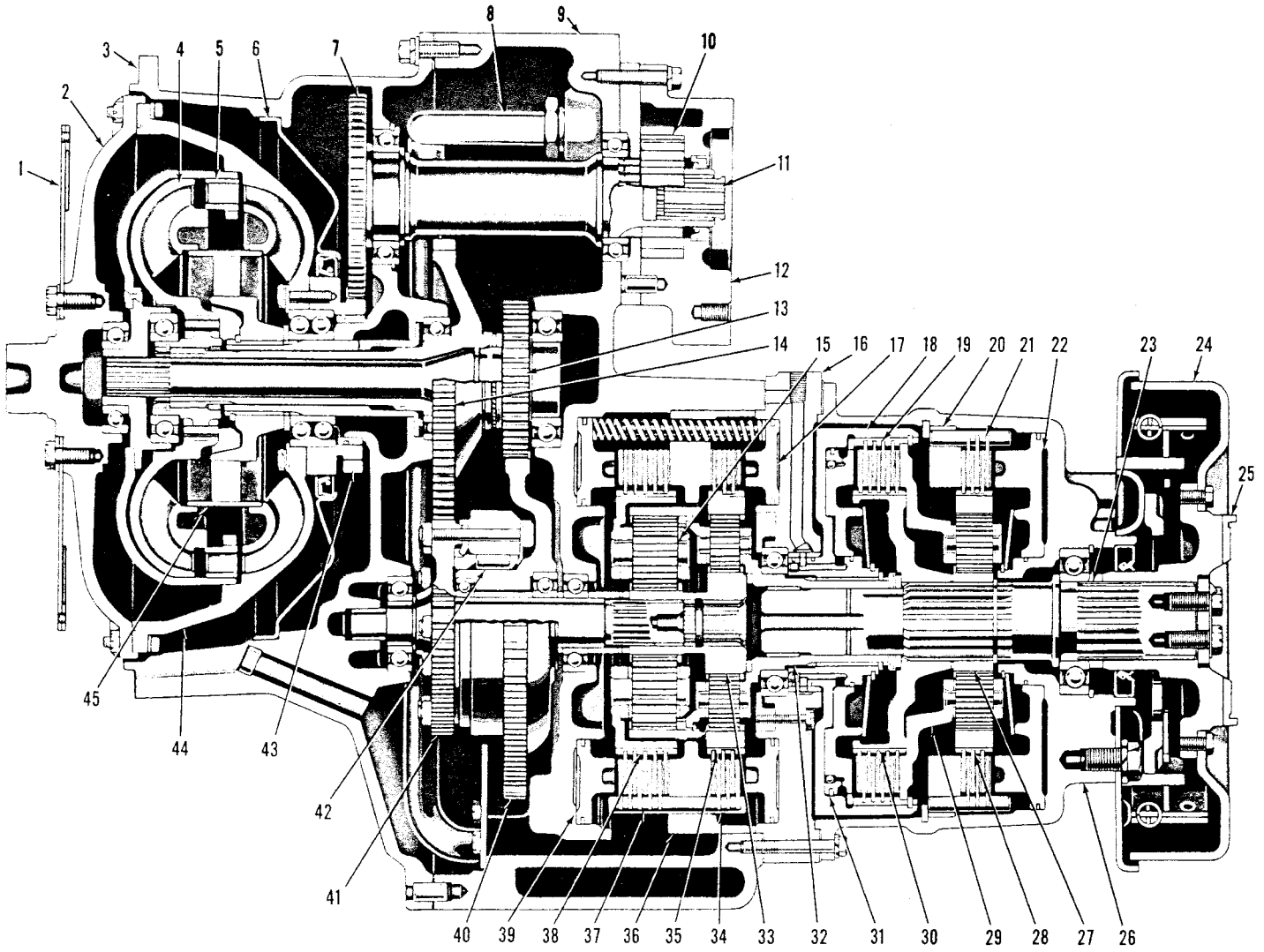
1 - Flex disk drive
2 - Converter cover
3 - Converter housing
4 - Second turbine
5 - First turbine
6 - Accessory driven gear
7 - Oil suction tube
8 - Transmission housing
9 - Oil pump drive gear
10 - Accessory drive coupling
11 - Accessory mounting pad
12 - First-turbine drive gear
13 - Second-turbine drive gear
14 - Reverse planetary carrier
15 - Rear output housing adapter
16 - Forward clutch piston
17 - High-range clutch drum
18 - High-range clutch
19 - Low-range clutch anchor
20 - Low-range clutch
21 - Low-range clutch piston
22 - Transmission output shaft
23 - Parking brake
24 - Output flange
25 - Rear housing
26 - Low-range planetary carrier
27 - Low-range ring gear
28 - Low-range sun gear
29 - Forward planetary carrier
30 - High-range clutch piston
31 - Forward, reverse sun gear
32 - Forward ring gear
33 - Forward clutch
34 - Forward, reverse clutch anchor
35 - Reverse ring gear
36 - Reverse clutch
37 - Reverse clutch hub
38 - Reverse clutch piston
39 - First-turbine driven gear
40 - Second-turbine driven gear
41 - Freewheel clutch
42 - Accessory drive gear
43 - Diaphragm
44 - Converter pump
45 - Converter stator



S1507

Foldout 3. TRT 2220-3 Powershift transmission (underdrive)—cross-section view

1 - Flex disk drive
2 - Torque converter cover
3 - Converter housing
4 - Second turbine
5 - First turbine
6 - Diaphragm
7 - Accessory driven gear
8 - Oil suction tube
9 - Transmission housing
10 - Oil pump drive gear
11 - Adapter coupling
12 - Accessory mounting pad
13 - First-turbine drive gear
14 - Second-turbine drive gear
15 - Reverse planetary carrier
16 - Adapter
17 - Forward clutch piston
18 - Low-range clutch drum
19 - Low-range clutch
20 - High-range clutch anchor
21 - High-range clutch
22 - High-range clutch piston
23 - Output shaft
24 - Parking brake
25 - Output flange
26 - Rear housing
27 - High-range sun gear
28 - High-range ring gear
29 - High-range planetary carrier
30 - Low-range clutch hub
31 - Low-range clutch piston
32 - Forward planetary carrier
33 - Forward, reverse sun gear
34 - Forward clutch
35 - Forward ring gear
36 - Forward, reverse clutch anchor
37 - Reverse clutch
38 - Reverse clutch hub
39 - Reverse clutch piston
40 - First-turbine driven gear
41 - Second-turbine driven gear
42 - Freewheel clutch
43 - Accessory drive gear
44 - Torque converter pump
45 - Torque converter stator



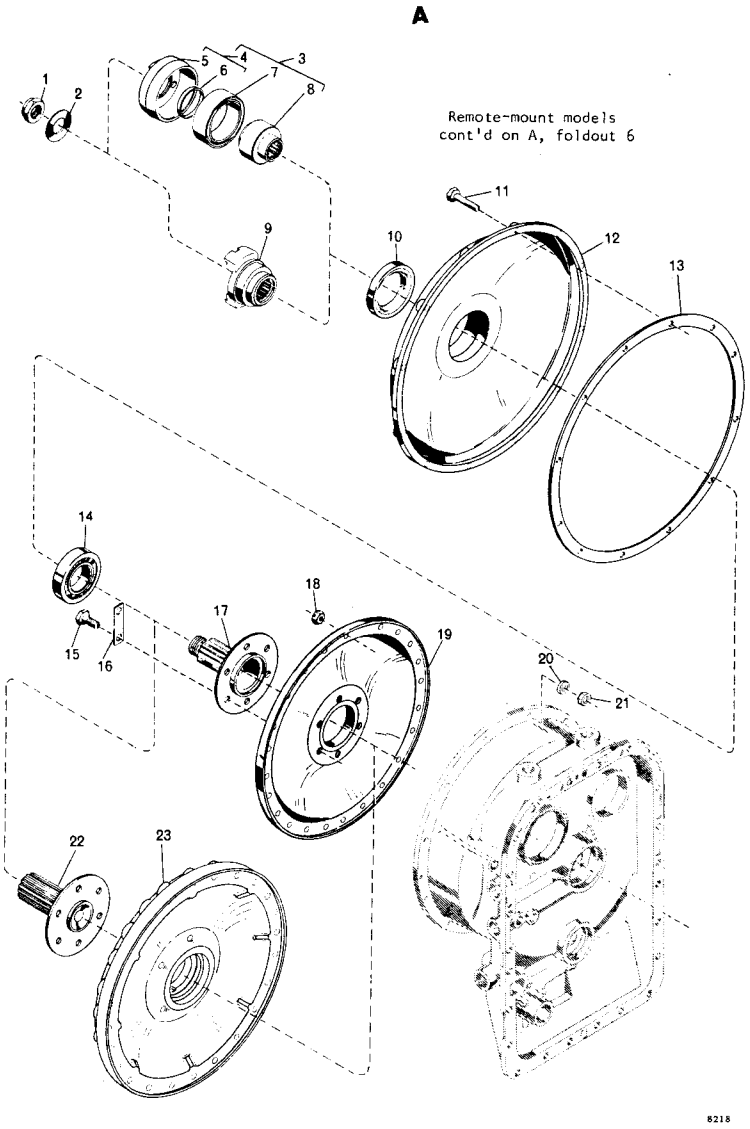
Foldout 4. TRT 2220-3 Powershift transmission (overdrive)—cross-section view

A

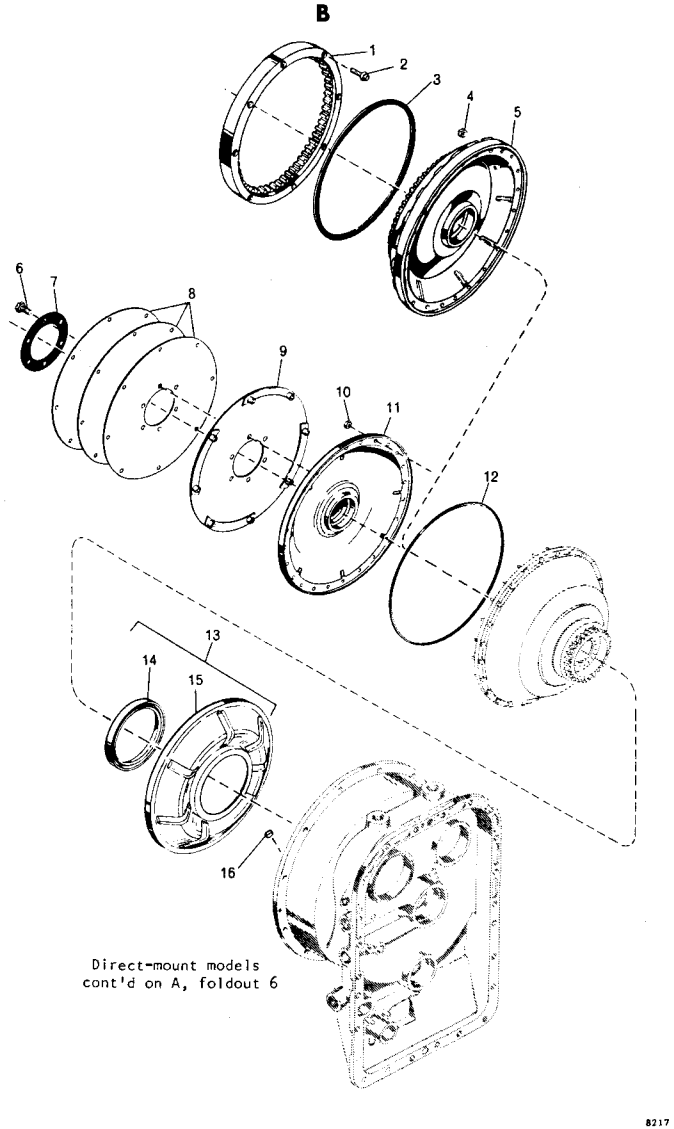
1 - Flange retaining nut
2 - Flange washer
3 - Torqmatic coupling assembly
4 - Flange assembly
5 - Flange
6 - Bushing
7 - Coupling
8 - Hub
9 - Flange
10 - Seal
11 - Bolt, 3/8-24 x 2 (12)
12 - Transmission front cover
13 - Front cover gasket
14 - Ball bearing
15 - Bolt, 1/2-13 x 1 1/8 (6)
16 - Lockstrip (3)
17 - Input shaft, external threaded
18 - Self-locking nut, 5/16-24 (24)
19 - Torque converter cover
20 - Lockwasher, 3/8 (12)
21 - Nut, 3/8-24 (12)
22 - Input shaft, internal threaded
23 - Torque converter cover

B

1 - Converter drive ring
2 - Twelve-point bolt, 3/8-16 x 1 1/4 (8)
3 - Sealring
4 - Nut, 5/16-24 (24)
5 - Torque converter cover
6 - Self-locking bolt, 1/2-13 x 7/8 (6)
7 - Flex disk plate
8 - Flex disk (3)
9 - Flex disk assembly
10 - Nut, 5/16-24 (24)
11 - Torque converter cover
12 - Sealring
13 - Converter diaphragm assembly
14 - Oil seal
15 - Converter diaphragm
16 - Plug



A, foldout 5. Transmission front cover and remote input drive—exploded view



B, foldout 5. Gear and flex disk input drives and diaphragm—exploded view

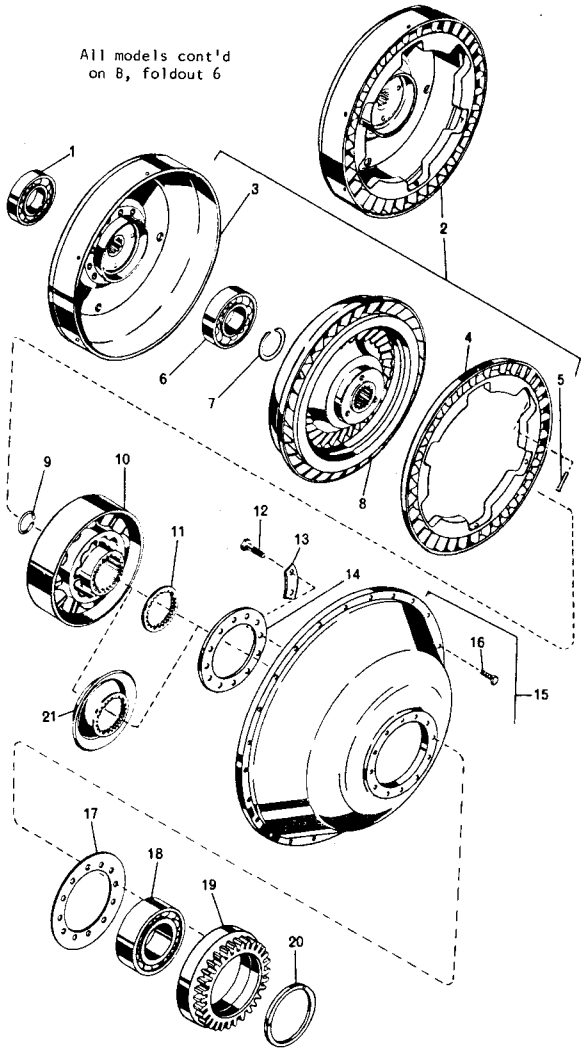
A

1 - Ball bearing
2 - First- and second-turbine assembly
3 - First-turbine support
4 - First turbine
5 - Pin:
    TRT 2200 models (6)
    TRT 2400 models (9)
6 - Ball bearing
7 - Internal snapring (later models)
8 - Second turbine
9 - External snapring
10 - Torque converter stator
11 - Spacer (later models)
12 - Bolt, 1/4-28 x 1 1/4 (12)
13 - Lockstrip (6)
14 - Torque converter pump bearing retainer
15 - Torque converter pump assembly
16 - Bolt, 5/16-24 x 1.30 (24)
17 - Torque converter pump gasket
18 - Double-row ball bearing
19 - Input accessory drive gear
20 - Step-joint sealring
21 - Spacer (earlier models)

B

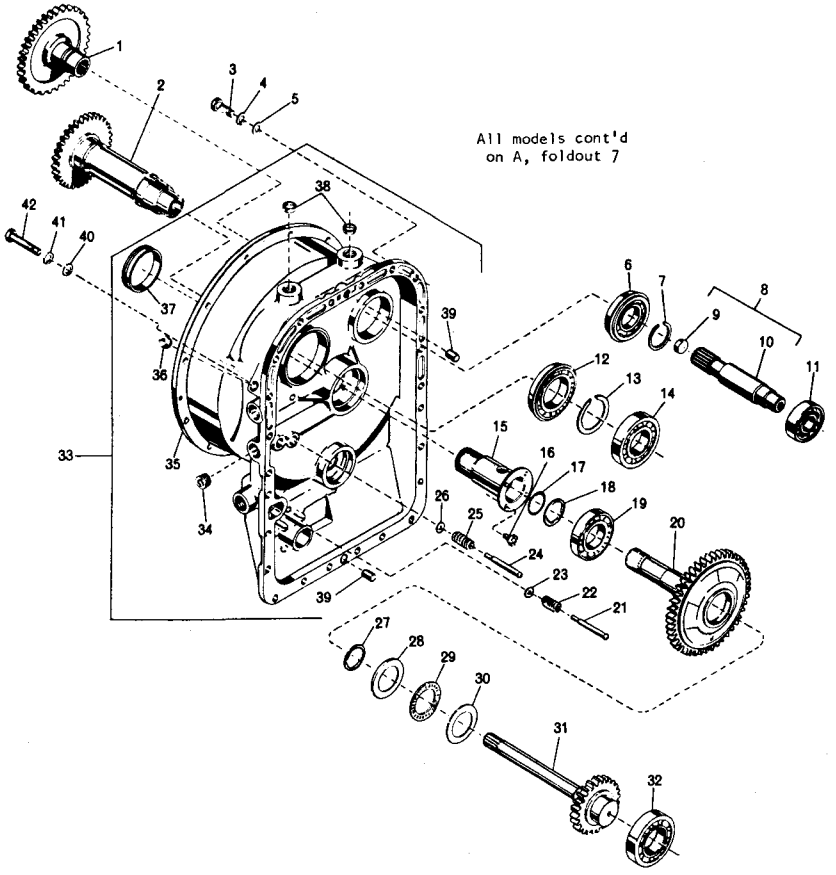
1 - Accessory drive gear
2 - Accessory driven gear
3 - Bolt, 7/16-14 x 1 3/8 (23)
4 - Lockwasher, 7/16 (23)
5 - Flat washer, 7/16 (23)
6 - Ball bearing
7 - External snapring
8 - Accessory drive shaft assembly
9 - Plug
10 - Accessory drive shaft
11 - Ball bearing
12 - Ball bearing
13 - External snapring
14 - Ball bearing
15 - Converter ground sleeve
16 - Self-locking bolt, 5/16-18 x 3/4 (4)
17 - External snapring (earlier models)
18 - Step-joint sealring
19 - Ball bearing
20 - Second-turbine drive gear
21 - Valve guide pin
22 - Lubrication regulator valve spring
23 - Lubrication regulator valve
24 - Valve guide pin
25 - Converter pressure regulator valve spring
26 - Converter pressure regulator valve
27 - Step-joint sealring
28 - Thrust race
29 - Thrust roller bearing
30 - Thrust race
31 - First-turbine drive gear
32 - Ball bearing
33 - Converter housing assembly
34 - Pipe plug, 3/4 NPTF
35 - Converter housing
36 - Plug, 1/2-14 PTF
37 - Converter housing sleeve
38 - Plug (2) (earlier models)
39 - Converter housing dowel pin (2)
40 - Flat washer, 7/16
41 - Lockwasher, 7/16
42 - Bolt, 7/16-14 x 2 3/4

A



A, foldout 6. Torque converter—exploded view

B



B, foldout 6. Torque converter housing—exploded view

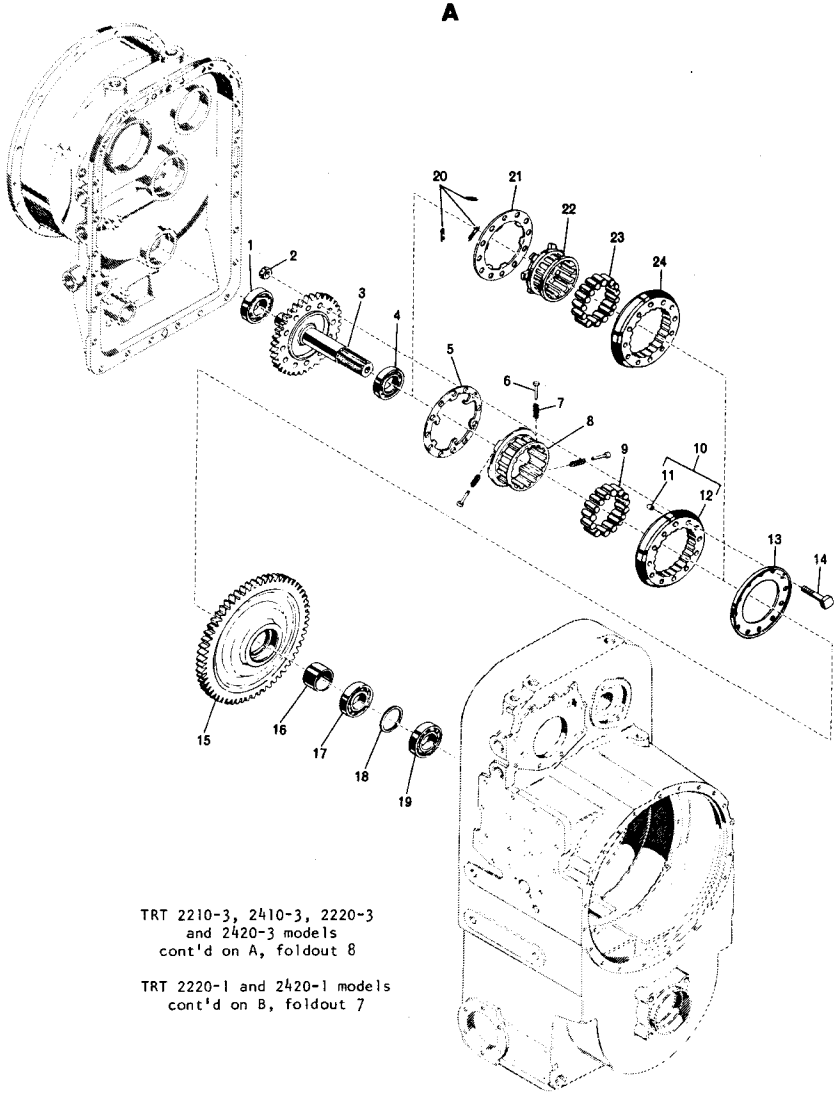
A

1 - Ball bearing
2 - Self-locking nut, 3/8-24 (12)
3 - Second-turbine driven gear
4 - Ball bearing
5 - Spring retainer plate
6 - Spring guide pin (3)
7 - Spring (3)
8 - Freewheel roller cage
9 - Freewheel roller (15)
10 - Freewheel cam assembly
11 - Index pin
12 - Freewheel cam
13 - Retainer plate
14 - Square-head bolt, 3/8-24 x 3 (12)
15 - First-turbine driven gear
16 - Bearing spacer
17 - Ball bearing
18 - Bearing spacer
19 - Ball bearing
20 - Spring (3)
21 - Spring retainer plate
22 - Freewheel roller cage
23 - Freewheel roller (15)
24 - Freewheel cam

B

1 - Self-locking bolt, 3/8-16 x 5/8
2 - Suction tube
3 - Male nut, 1 3/4-14
4 - Sealring
5 - Transmission housing gasket
6 - Remote filter plug
7 - Plug, 3/4-14 NPTF
8 - Transmission housing
9 - Breather
10 - Oil seal
11 - Accessory drive orifice cup
12 - Bolt, 3/8-16 x 7/8 (6)
13 - Lockwasher, 3/8 (6)
14 - Core hole cover
15 - Gasket
16 - Drain plug, 3/4-14 NPTF
17 - Drive screw, no. 4 x 1/4 (4)
18 - Nameplate
19 - Bolt, 3/8-16 x 7/8 (6)
20 - Lockwasher, 7/8 (6)
21 - Oil strainer assembly
22 - Gasket
23 - Anchor pin
24 - Oil filler plug
25 - Oil level add plug
26 - Oil level tube
27 - Oil level tube
28 - Oil level full plug

A



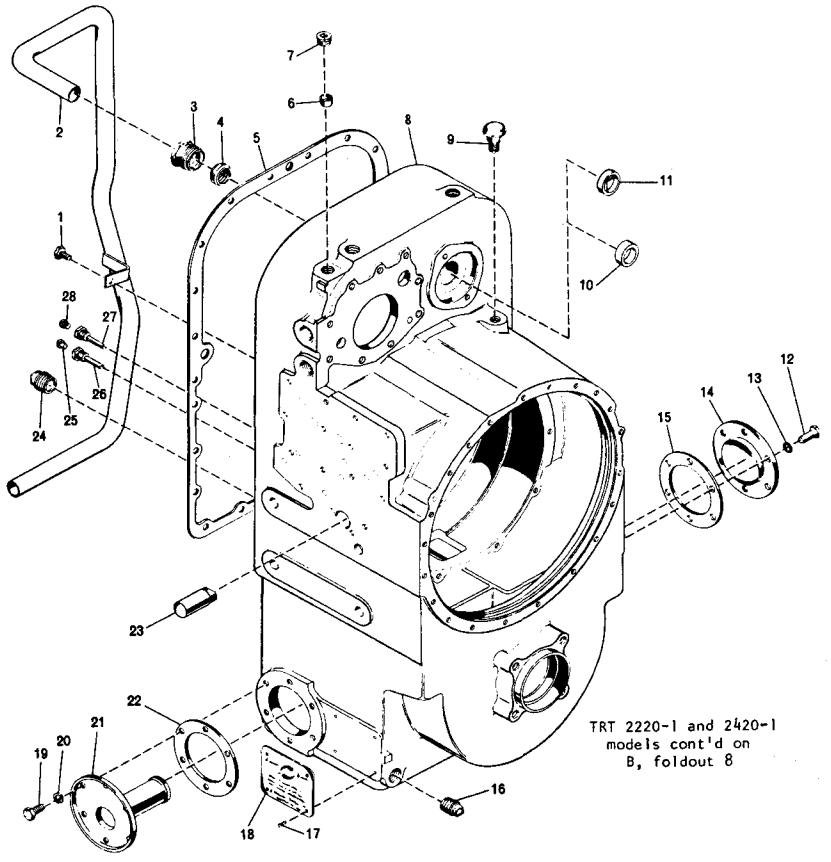
TRT 2210-3, 2410-3, 2220-3 and 2420-3 models cont'd on A, foldout 8

TRT 2220-1 and 2420-1 models cont'd on B, foldout 7

6622A

A, foldout 7. Turbine driven gears and freewheel unit—exploded view

B



TRT 2220-1 and 2420-1 models cont'd on B, foldout 8

6382

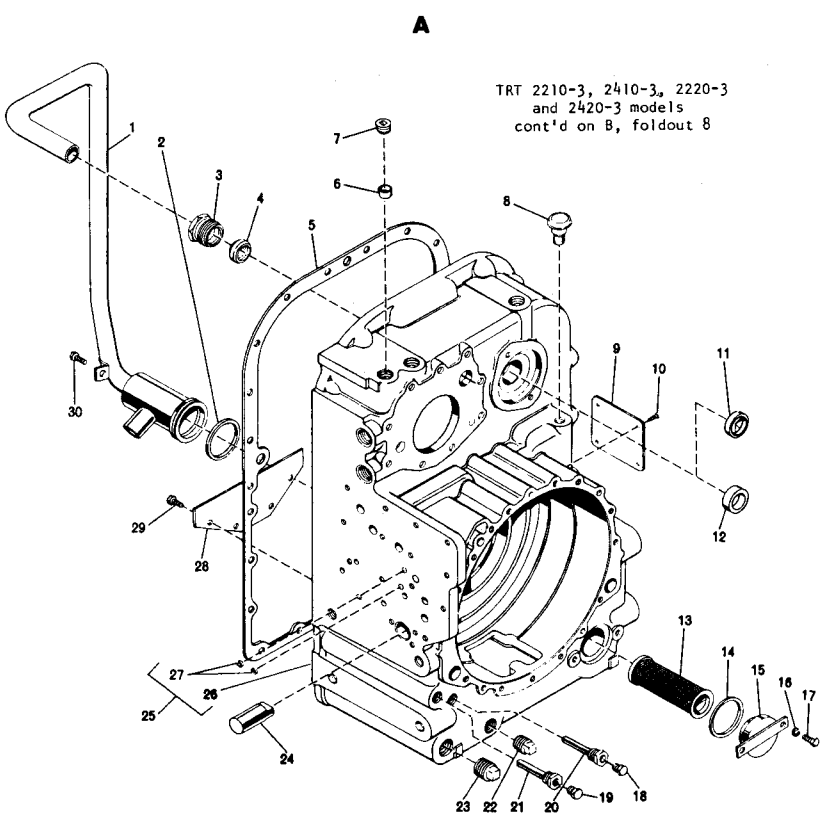
B, foldout 7. Transmission housing (-1 model)—exploded view

A

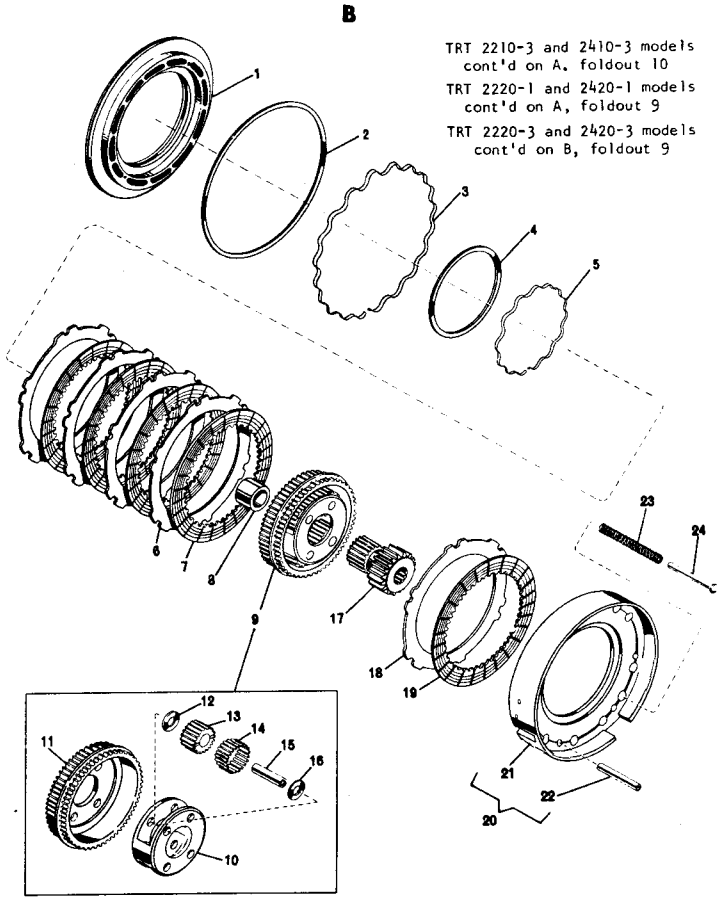
1 - Oil suction tube
2 - Sealring
3 - Male nut
4 - Sealring
5 - Transmission housing gasket
6 - Remote filter plug
7 - Plug, 3/4-14 NPTF
8 - Breather
9 - Nameplate
10 - Drive screw, no. 4 x 1/4 (4)
11 - Accessory drive orifice cup
12 - Oil seal
13 - Oil strainer
14 - Sealring
15 - Oil strainer cover
16 - Lockwasher, 3/8 (2)
17 - Bolt, 3/8-16 x 3/4 (2)
18 - Oil level add plug
19 - Oil level full plug
20 - Oil level tube
21 - Oil level tube
22 - Oil drain plug, 3/4 NPTF
23 - Oil filler plug
24 - Anchor pin
25 - Transmission housing assembly
26 - Transmission housing
27 - Plug (2)
28 - Baffle plate
29 - Self-locking bolt, 5/16-18 x 5/8 (3)
30 - Self-locking bolt, 5/16-18 x 5/8

B

1 - Reverse clutch piston
2 - Clutch piston outer sealring
3 - Sealring expander
4 - Clutch piston inner sealring
5 - Sealring expander
6 - External-tanged clutch plate (4)
7 - Internal-splined clutch plate (4)
8 - Spacer
9 - Reverse planetary carrier assembly
10 - Carrier
11 - Reverse clutch hub
12 - Thrust washer (4)
13 - Pinion (matched set of 4)
14 - Roller (88)
15 - Spindle (4)
16 - Thrust washer (4)
17 - Forward and reverse sun gear
18 - External-tanged clutch plate
19 - Internal-splined clutch plate
20 - Forward and reverse clutch anchor assembly
21 - Anchor
22 - Pin (6)
23 - Piston return spring (12)
24 - Return spring pin (12)



A, foldout 8. Transmission housing (-3 model)—exploded view



B, foldout 8. Reverse clutch and planetary—exploded view

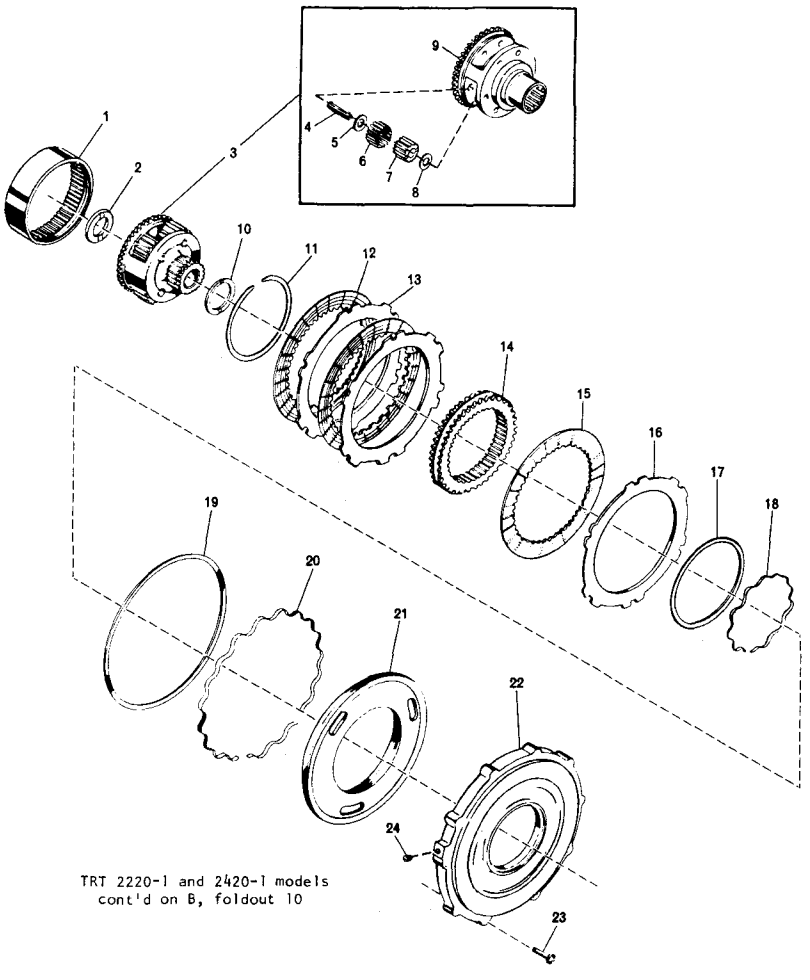
A

1 - Reverse planetary ring gear
2 - Thrust washer
3 - Forward planetary carrier assembly
4 - Spindle (6)
5 - Thrust washer (6)
6 - Roller (120)
7 - Pinion (matched set of 6)
8 - Thrust washer (6)
9 - Carrier
10 - Thrust washer
11 - Internal snapring
12 - Internal-splined clutch plate (2)
13 - External-tanged clutch plate (2)
14 - Forward planetary ring gear
15 - Internal-splined clutch plate
16 - External-tanged clutch plate
17 - Clutch piston inner sealring
18 - Sealring expander
19 - Clutch piston outer sealring
20 - Sealring expander
21 - Forward clutch piston
22 - Forward clutch piston housing
23 - Self-locking bolt, 3/8-16 x 1 1/2 (10)
24 - Plug, 1/8

B

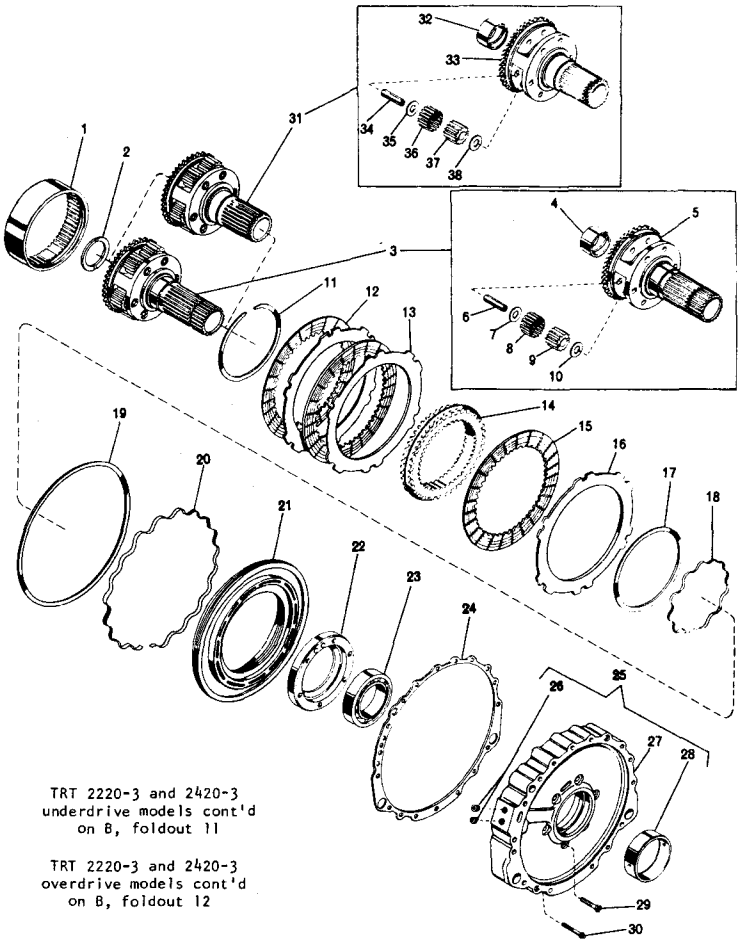
1 - Reverse planetary ring gear
2 - Thrust washer
3 - Forward planetary carrier assembly (underdrive model)
4 - Bushing
5 - Carrier
6 - Spindle (6)
7 - Thrust washer (6)
8 - Roller (120)
9 - Pinion (matched set of six)
10 - Thrust washer (6)
11 - Internal snapring
12 - Internal-splined clutch plate (2)
13 - External-tanged clutch plate (2)
14 - Forward planetary ring gear
15 - Internal-splined clutch plate
16 - External-tanged clutch plate
17 - Clutch piston inner sealring
18 - Sealring expander
19 - Clutch piston outer sealring
20 - Sealring expander
21 - Forward clutch piston
22 - Bearing retainer
23 - Ball bearing
24 - Adapter gasket
25 - Adapter assembly
26 - Plug, 1/4 (2)
27 - Adapter
28 - Sleeve
29 - Self-locking bolt, 3/8-24 x 1 1/4 (6)
30 - Twelve-point bolt, 3/8-16 x 1 3/4 (2)
31 - Forward planetary carrier assembly (overdrive model)
32 - Bushing
33 - Carrier
34 - Spindle (6)
35 - Thrust washer (6)
36 - Roller (120)
37 - Pinion (matched set of six)
38 - Thrust washer (6)

A



A, foldout 9. Forward clutch and planetary (-1 model)—exploded view

B



B, foldout 9. Forward clutch and planetary (TRT 2220-3, 2420-3)—exploded view

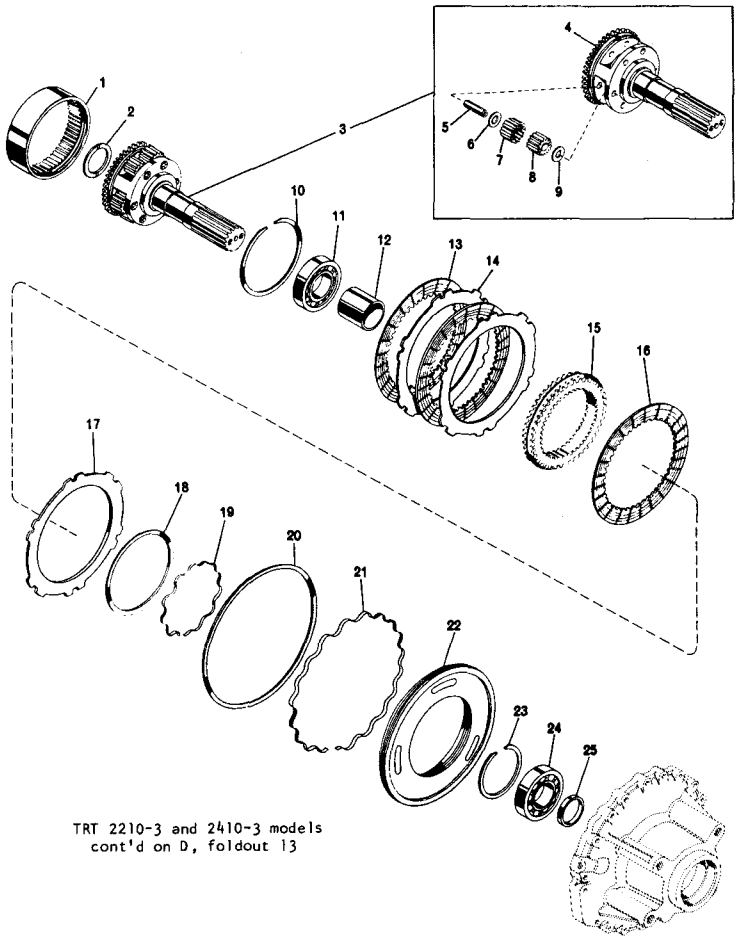
A

1 - Reverse planetary ring gear
2 - Thrust washer
3 - Forward planetary carrier assembly
4 - Carrier
5 - Spindle (6)
6 - Thrust washer (6)
7 - Roller (120)
8 - Pinion (matched set of six)
9 - Thrust washer (6)
10 - Internal snapring
11 - Ball bearing
12 - Spacer
13 - Internal-splined clutch plate (2)
14 - External-tanged clutch plate (2)
15 - Forward planetary ring gear
16 - Internal-splined clutch plate
17 - External-tanged clutch plate
18 - Clutch piston inner sealring
19 - Sealring expander
20 - Clutch piston outer sealring
21 - Sealring expander
22 - Forward clutch piston
23 - Internal snapring
24 - Ball bearing
25 - Spacer

B

1 - Ball bearing
2 - External snapring
3 - Transfer drive gear
4 - Ball bearing
5 - Adapter gasket
6 - Adapter sealring
7 - Adapter assembly
8 - Adapter
9 - Sleeve
10 - Bolt, 3/8-16 x 1 1/8 (16)
11 - Lockwasher, 3/8 (16)
12 - Sealring (2)
13 - Low-range clutch drum assembly
14 - Pin (4)
15 - Clutch drum
16 - Sealring expander
17 - Clutch piston outer sealring
18 - Clutch piston inner sealring
19 - Low-range clutch piston
20 - Clutch piston return spring
21 - External snapring
22 - Sleeve assembly
23 - Bushing
24 - Sleeve
25 - External snapring
26 - Internal-splined clutch plate
27 - External-splined clutch plate
28 - High-range clutch ring gear
29 - Internal-splined clutch plate (3)
30 - External-splined clutch plate (2)
31 - Low-range clutch back plate
32 - Internal snapring

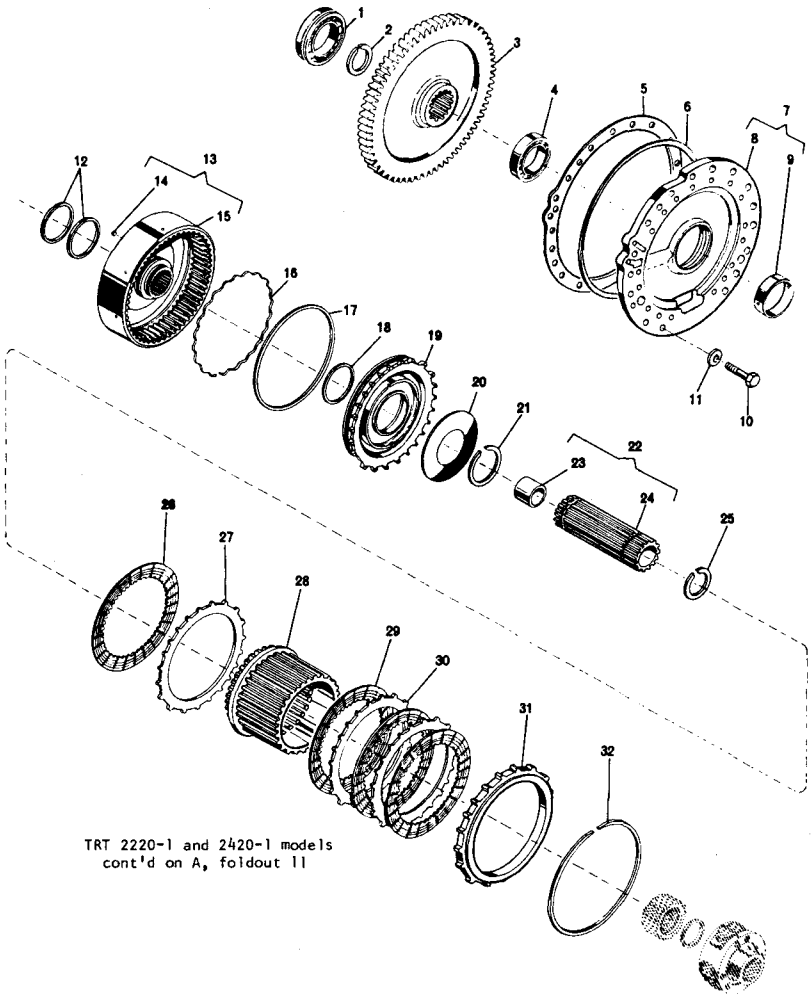
A



4294

A, foldout 10. Forward clutch and planetary (TRT 2210-3, 2410-3)—exploded view

B



4359

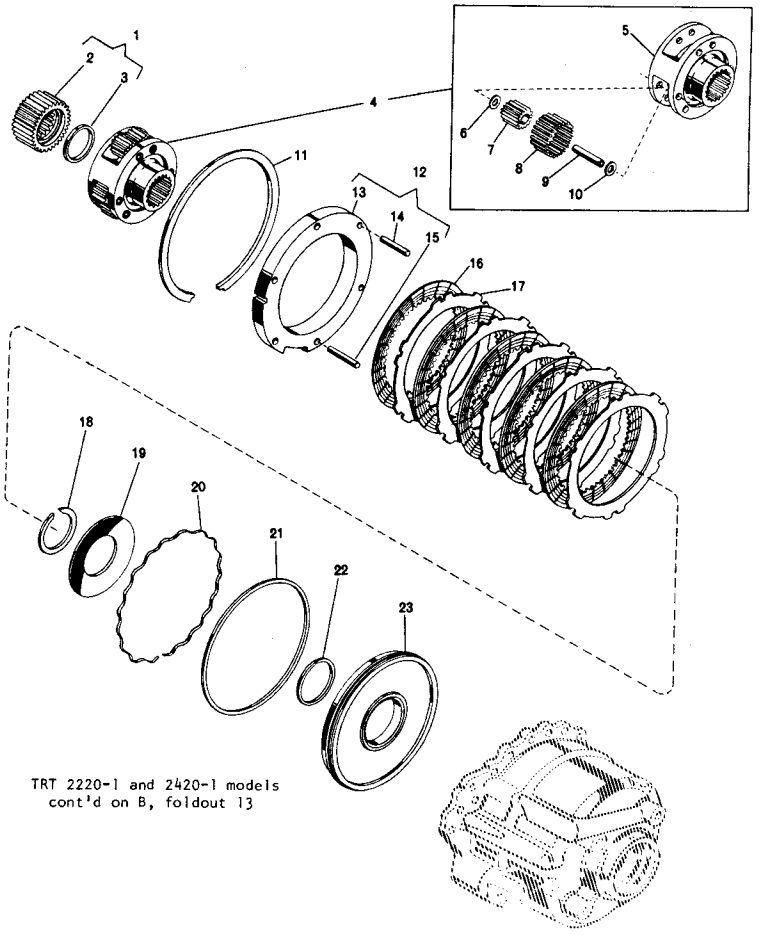
B, foldout 10. Low-range clutch and transfer drive gear (-1 model)—exploded view

A

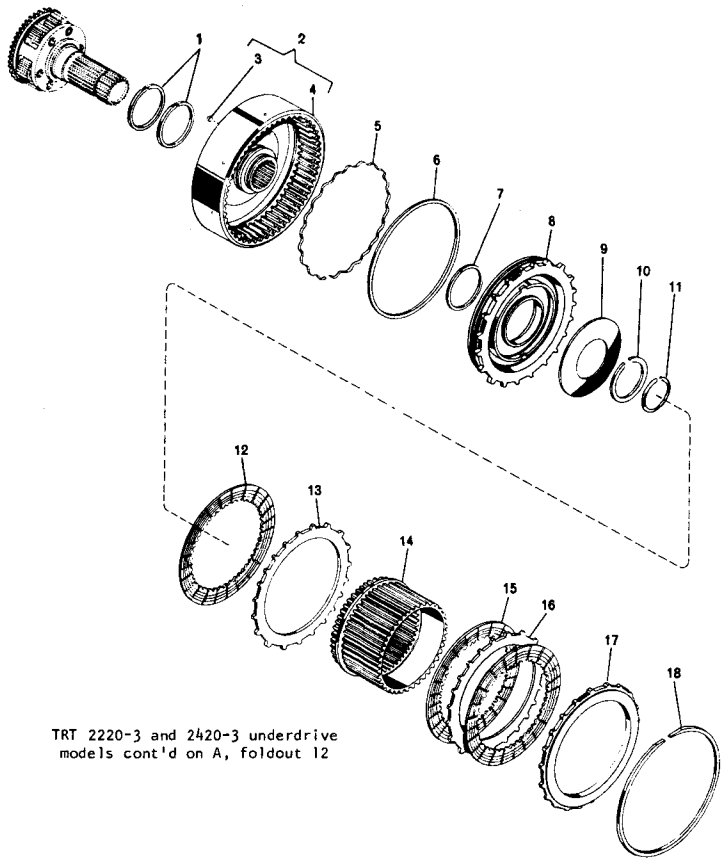
1 - High-range planetary carrier sun gear assembly
2 - Sun gear
3 - Thrust washer
4 - High-range planetary carrier assembly
5 - Carrier
6 - Thrust washer (6)
7 - Pinion (matched set of six pinions)
8 - Roller (96)
9 - Spindle (6)
10 - Thrust washer (6)
11 - Internal snapring
12 - High-range clutch anchor assembly
13 - Anchor
14 - Pin (short) (4)
15 - Pin (long) (2)
16 - Internal-splined clutch plate (5)
17 - External-tanged clutch plate (5)
18 - External snapring
19 - Clutch piston return spring
20 - Sealring expander
21 - Clutch piston outer sealring
22 - Clutch piston inner sealring
23 - High-range clutch piston

B

1 - Sealring (2)
2 - High-range clutch drum assembly
3 - Pin (4)
4 - Clutch drum
5 - Sealring expander
6 - Clutch piston outer sealring
7 - Clutch piston inner sealring
8 - High-range clutch piston
9 - Clutch piston return spring
10 - External snapring
11 - External snapring
12 - Internal-splined clutch plate
13 - External-splined clutch plate
14 - Low-range clutch ring gear
15 - Internal-splined clutch plate (2)
16 - External-splined clutch plate
17 - High-range clutch back plate
18 - Internal snapring



A, foldout 11. High-range clutch and planetary (-1 model)—exploded view



B, foldout 11. High-range clutch, low-range ring gear (TRT 2220-3, 2420-3 underdrive model)—exploded view

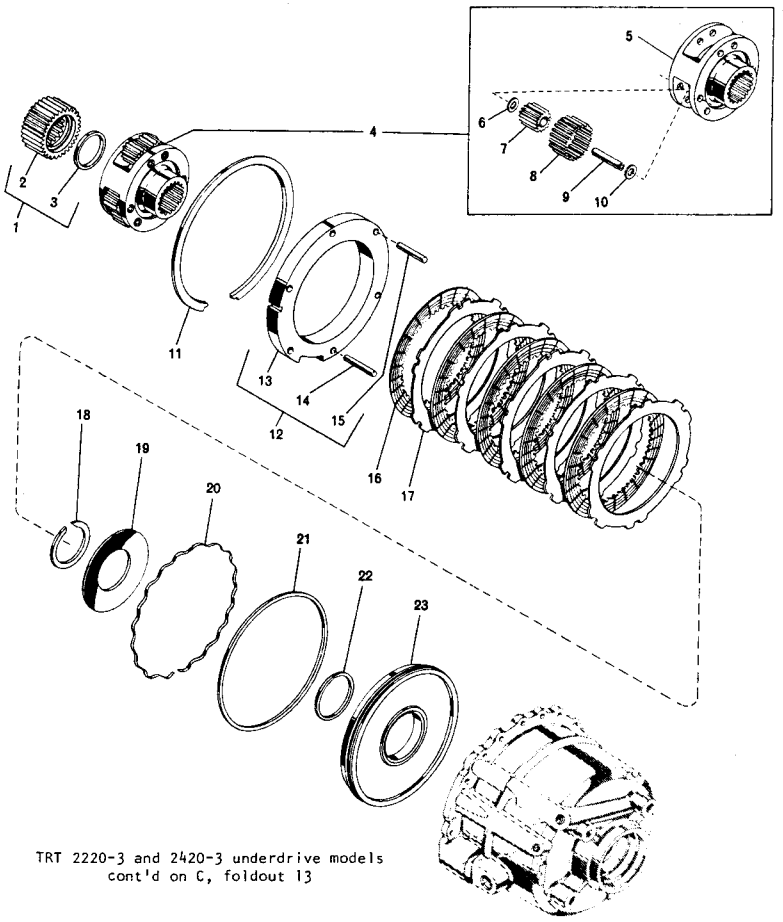
A

1 - Low-range planetary carrier sun gear assembly
2 - Sun gear
3 - Thrust washer
4 - Low-range planetary carrier assembly
5 - Carrier
6 - Thrust washer (6)
7 - Pinion (matched set of six pinions)
8 - Roller (96)
9 - Spindle (6)
10 - Thrust washer (6)
11 - Internal snapring
12 - Low-range clutch anchor assembly
13 - Anchor
14 - Pin (long) (2)
15 - Pin (short) (4)
16 - Internal-splined clutch plate (5)
17 - External-tanged clutch plate (5)
18 - External snapring
19 - Clutch piston return spring
20 - Sealring expander
21 - Clutch piston outer sealring
22 - Clutch piston inner sealring
23 - Low-range clutch piston

B

1 - Sealring (2)
2 - Low-range clutch drum assembly
3 - Pin (4)
4 - Clutch drum
5 - Sealring expander
6 - Clutch piston outer sealring
7 - Clutch piston inner sealring
8 - Low-range clutch piston
9 - Clutch piston return spring
10 - External snapring
11 - External snapring
12 - Bearing front thrust race
13 - Roller thrust race
14 - Bearing rear thrust race
15 - Low-range clutch hub
16 - Internal-splined clutch plate (5)
17 - External-splined clutch plate (4)
18 - High-range planetary carrier assembly
19 - Carrier
20 - Spindle (6)
21 - Thrust washer (6)
22 - Roller (120)
23 - Pinion (matched set of six pinions)
24 - Thrust washer (6)
25 - Internal snapring

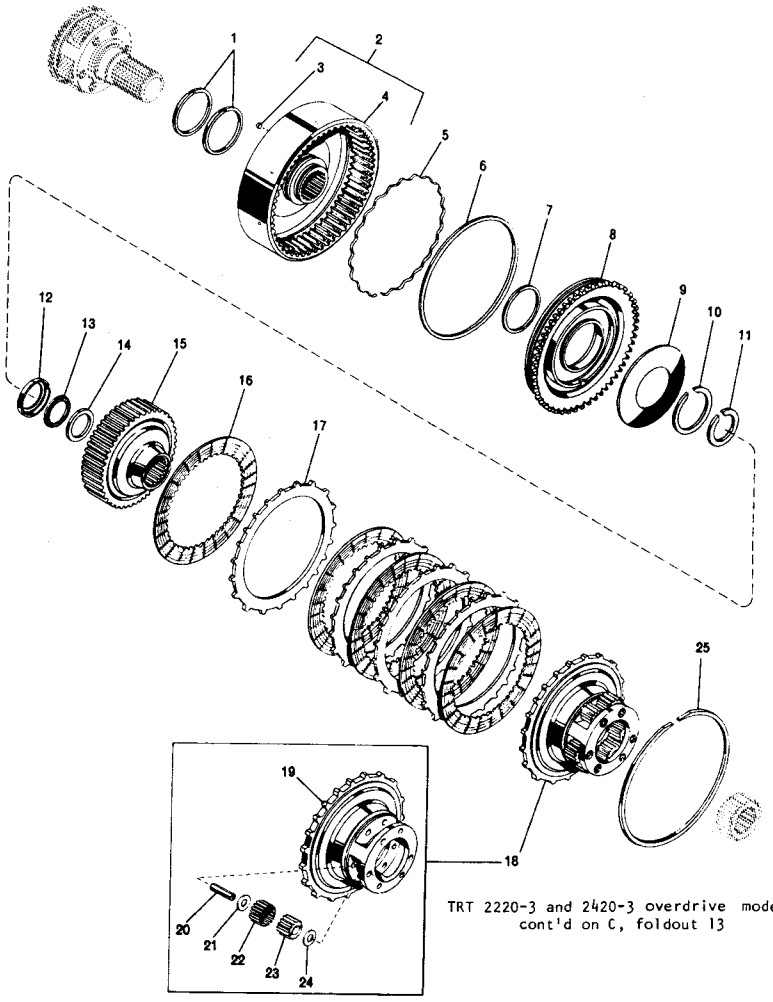
A



4358A

A, foldout 12. Low-range clutch and planetary (-3 underdrive model)—exploded view

B



4297

B, foldout 12. Low-range clutch, high-range planetary (-3 overdrive model)—exploded view

A

1 - High-range planetary sun gear
2 - Internal snapring
3 - High-range clutch anchor assembly
4 - Anchor
5 - Pin (long) (2)
6 - Pin (short) (4)
7 - Internal-splined clutch plate (2)
8 - External-tanged clutch plate (2)
9 - High-range planetary ring gear
10 - Internal-splined clutch plate
11 - External-tanged clutch plate
12 - External snapring
13 - Clutch piston return spring
14 - Sealring expander
15 - Clutch piston outer sealring
16 - Clutch piston inner sealring
17 - High-range clutch piston

B

1 - Rear housing gasket
2 - Rear housing
3 - Lockwasher, 3/8 (17)
4 - Bolt, 3/8-16 x 1 1/8 (17)
5 - High- and low-range input shaft
6 - Rear bearing
7 - External snapring
8 - Internal snapring
9 - Sealring
10 - Oil retainer
11 - Internal snapring
12 - Clutch anchor pin
13 - Welch plug
14 - Plug, 1/4
15 - Bolt, 3/8-16 x 1 1/2 (3)
16 - Lockwasher, 3/8 (3)

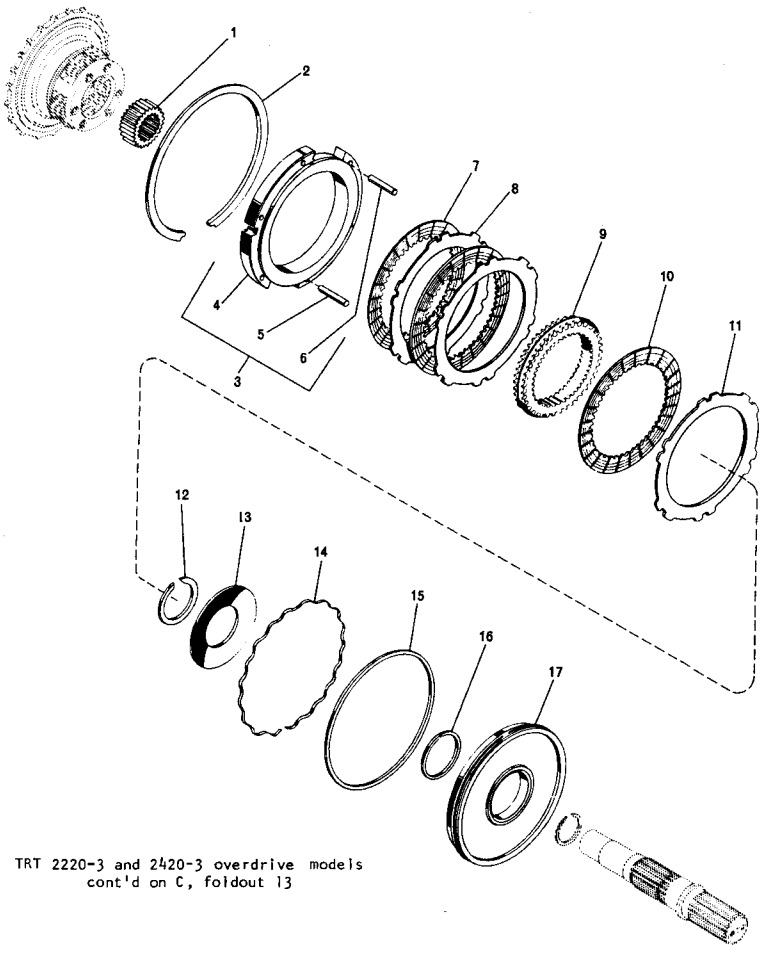
C

1 - Rear housing gasket
2 - Rear housing
3 - Lockwasher, 3/8 (15)
4 - Bolt, 3/8-16 x 2 3/4 (15)
5 - Output shaft (underdrive models)
6 - External snapring
7 - Output shaft (overdrive models)
8 - Rear bearing
9 - Internal snapring
10 - Spacer
11 - Oil seal
12 - Clutch anchor pin
13 - Welch plug
14 - Plug, 1/4
15 - Plug, 3/8

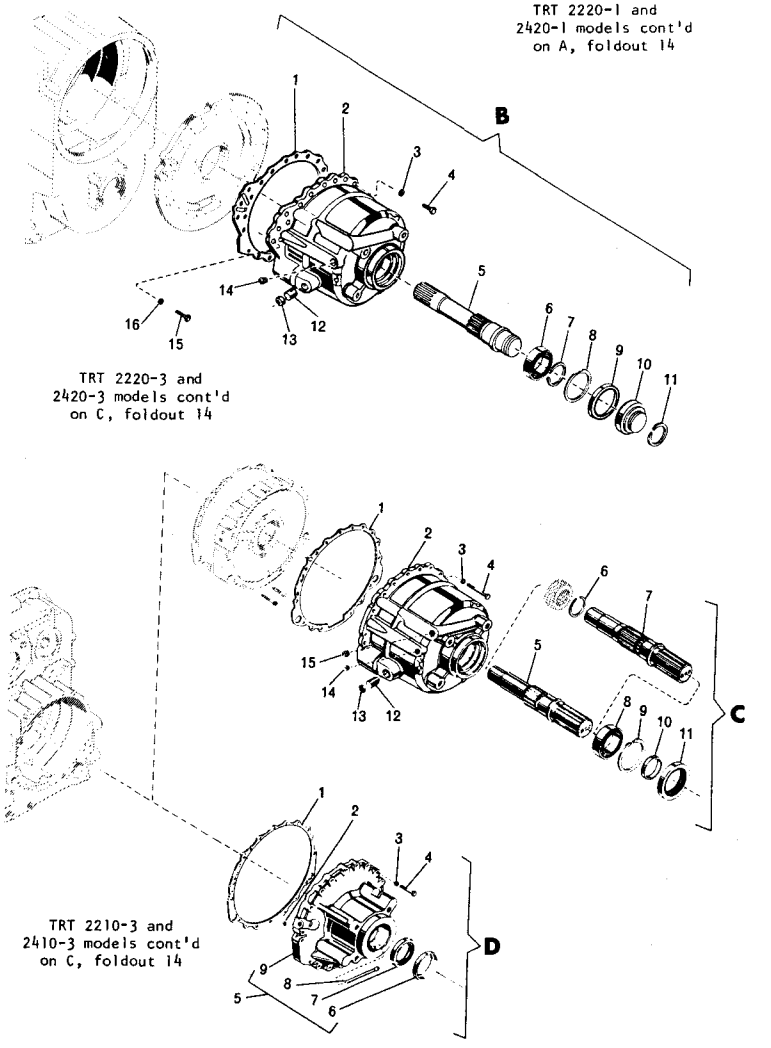
D

1 - Rear housing gasket
2 - Plug, 1/8
3 - Lockwasher, 3/8 (18)
4 - Bolt, 3/8-16 x 1 3/4 (18)
5 - Rear housing assembly
6 - Baffle
7 - Oil seal
8 - Oil drain tube
9 - Rear housing

A



A, foldout 13. High-range clutch, planetary sun and ring gears (-3 overdrive model)—exploded view



B, C, D, foldout 13. Rear housings and output shafts

A

1 - Flange nut
2 - Flange washer
3 - Front output flange
4 - Oil seal
5 - Internal snapring
6 - Front bearing
*7 - Output shaft
**8 - Front output shaft
**9 - Detent ball (2)
**10 - Detent spring
**11 - Disconnect coupling
*12 - Welch plug
**13 - Oil seal
**14 - Disconnect shaft
**15 - Disconnect shifter fork
**16 - Center bearing
**17 - Spacer
18 - Transfer driven gear
**19 - Rear output shaft assembly
**20 - Bushing
**21 - Rear output shaft
22 - Spacer
23 - Rear bearing
24 - Internal snapring
25 - Oil seal
26 - Spacer
27 - Front output orifice plug

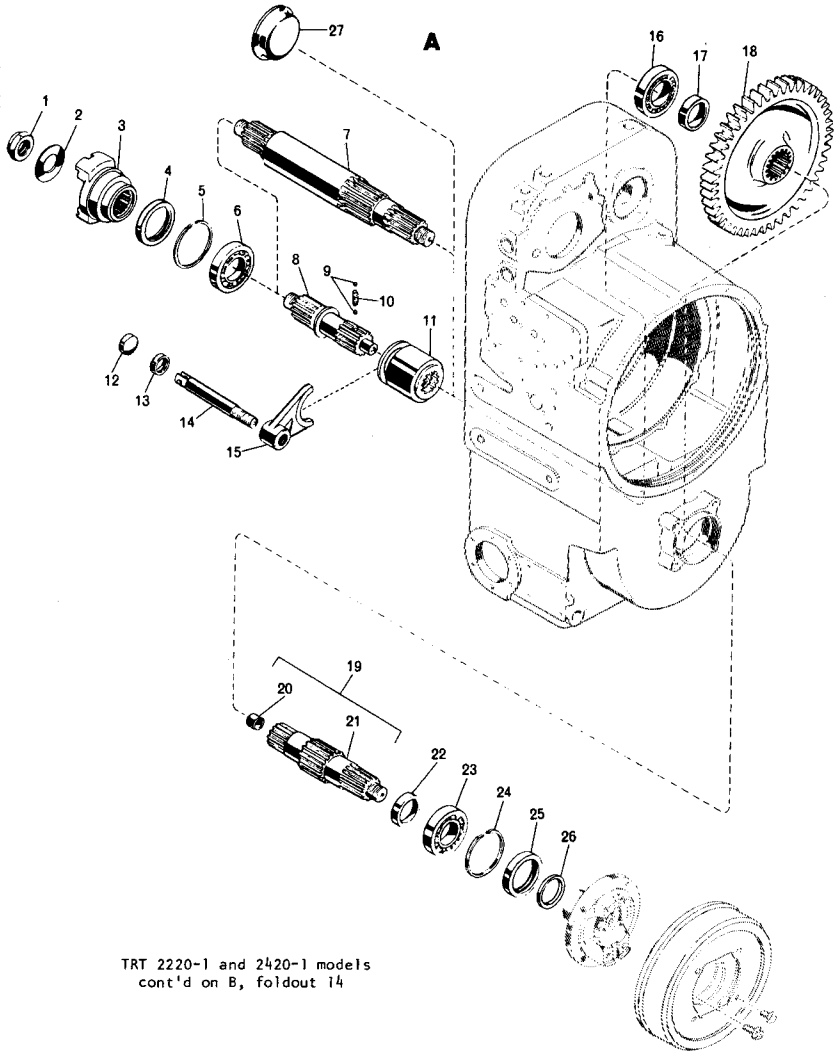
*Used only on models without output disconnect
**Used only on models with output disconnect

B

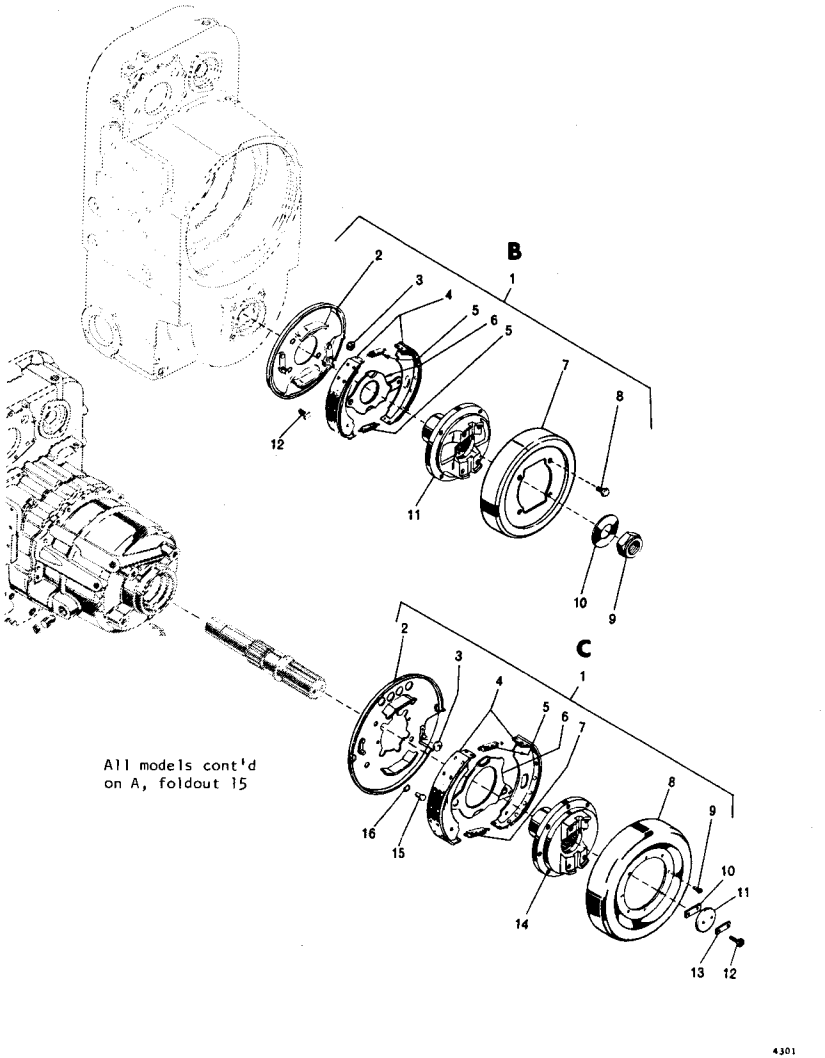
1 - Brake assembly (10 x 1 1/2)
2 - Back plate
3 - Roller
4 - Shoe assembly (2)
5 - Spring (2)
6 - Apply lever
7 - Brake drum
8 - Self-locking bolt, 3/8-24 x 5/8 (4)
9 - Flange nut
10 - Flange washer
11 - Output flange
12 - Self-locking bolt, 1/2-13 x 7/8 (4)

C

1 - Brake assembly (13 x 2 3/8)
2 - Back plate assembly
3 - Roller
4 - Shoe assembly (2)
5 - Spring
6 - Apply lever
7 - Spring
8 - Brake drum
9 - Self-locking bolt, 3/8-24 x 3/4 (8)
10 - Shim, 0.005 or 0.025 thk (AR)
(TRT 2220-3 and 2420-3)
11 - Flange washer
12 - Self-locking bolt, 3/8-24 x 1 1/8 (2)
(TRT 2210-3 and 2410-3);
Self-locking bolt, 1/2-20 x 1 1/4 (2)
(TRT 2220-3 and 2420-3)
13 - Lockstrip
14 - Output flange
15 - Bolt, 5/8-11 x 1 1/4 (3)
16 - Lockwasher, 5/8 (3)



A, foldout 14. Output shafts, transfer driven gear and disconnect control (-1 model)—exploded view



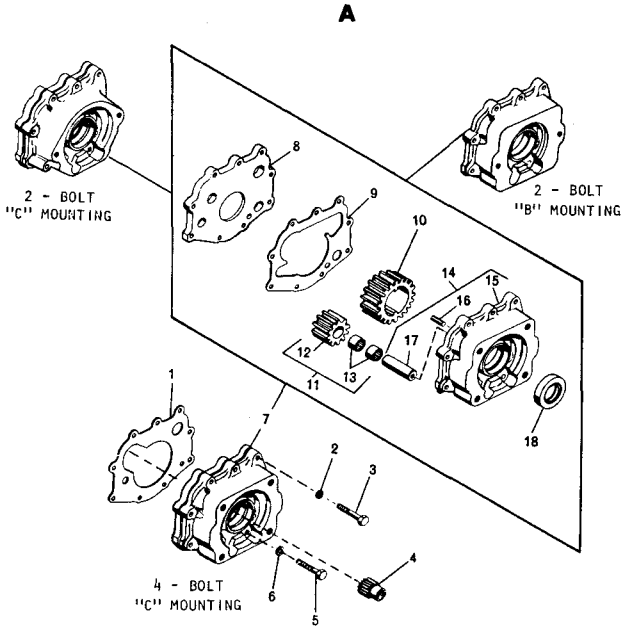
B, C, foldout 14. Brake assemblies—exploded view

A

1 - Oil pump mounting gasket
2 - Lockwasher, 3/8 (7)
3 - Bolt, 3/8-16 x 2
    4-bolt, C pad (7)
    2-bolt, B pad (7)
    2-bolt, C pad (6)
4 - Adapter coupling
5 - Bolt, 3/8-16 x 3
    4-bolt, C pad (2)
    2-bolt, B pad (2)
    2-bolt, C pad (3)
6 - Lockwasher, 3/8 (2)
7 - Oil pump assembly
8 - Cover
9 - Cover gasket
10 - Drive gear
11 - Driven gear assembly
12 - Driven gear
13 - Needle bearing assembly (2)
14 - Oil pump body assembly
15 - Body
16 - Dowel pin
17 - Driven gear shaft
18 - Oil seal

B

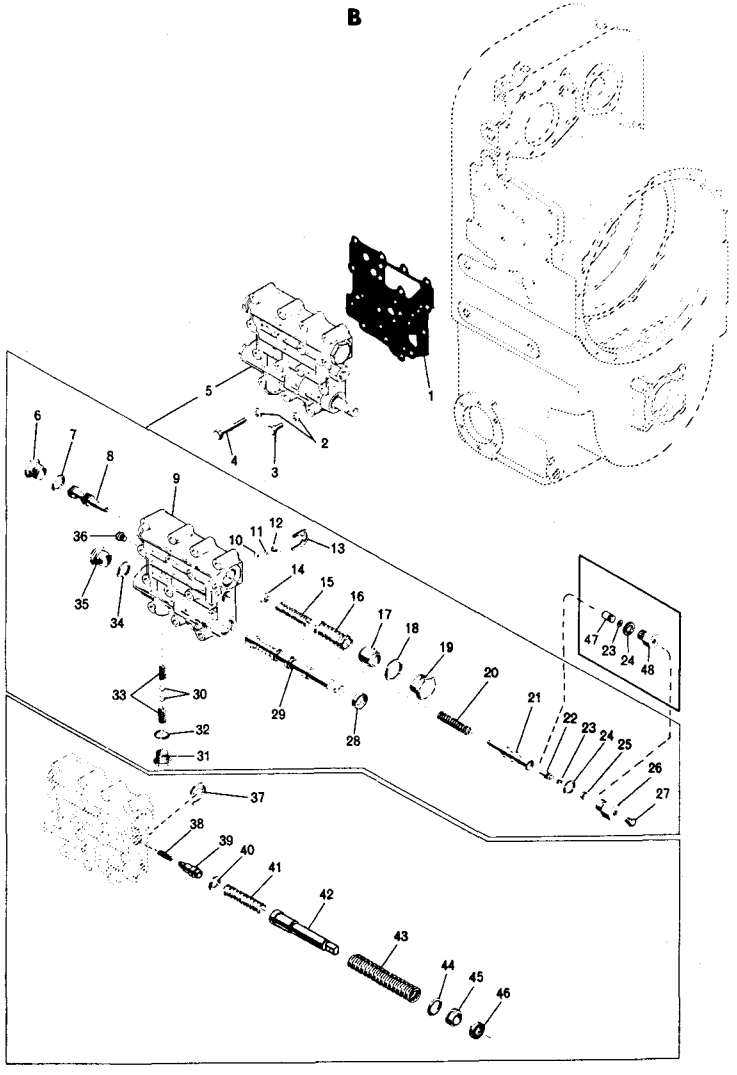
1 - Valve body mounting gasket
2 - Lockwasher, 3/8 (16)
3 - Bolt, 3/8-16 x 1
4 - Bolt, 3/8-16 x 2 1/2 (15)
5 - Control valve assembly
6 - Plug
7 - Gasket
8 - Main-pressure regulator valve
9 - Valve body
10 - Orifice plug (not used in later models)
11 - Ball
12 - Ball retainer
13 - Valve stop (1) in TRT 2220-1, 2420-1, 2220-3 and 2420-3 models; (2) in TRT 2210-3 and 2410-3 models
14 - Spring retainer
15 - Main-pressure regulator spring
16 - Trimmer spring
17 - Trimmer plug
18 - Gasket
19 - Plug
20 - Clutch cutoff valve spring
21 - Clutch cutoff valve
22 - Cutoff valve plug (hydraulic actuated)
23 - Sealring
24 - Gasket
25 - Cup (hydraulic actuated)
26 - Retainer plug (hydraulic actuated
27 - Plug, 1/8
28 - Oil seal
29 - Manual selector valve
30 - Detent ball (2)
31 - Plug
32 - Gasket
33 - Detent spring (2)
34 - Gasket
35 - Plug
36 - Plug, 1/8
37 - Inching valve stop
38 - Spring
39 - Inching regulator valve
40 - Regulator valve stop
41 - Inching regulator valve spring
42 - Inching control valve
43 - Valve return spring
44 - Sealring
45 - Plug
46 - Oil seal
47 - Cutoff valve plug (air actuated)
48 - Retainer plug (air actuated)



All models cont'd
on B, foldout 15

5269

A, foldout 15. Oil pump assembly—exploded view



B, foldout 15. Valve body assembly—exploded view