

## REBUILD OF SUBASSEMBLIES

cutoff valve plug 21, sealring 22 and cup 24 from the retainer plug. Remove plug 50 from plug 25 only if necessary.

(4) On models equipped with pneumatic-actuated clutch cutoff, remove retainer plug 49 and gasket 23 from the control valve body. Remove cutoff valve plug 48 and sealring 22' from the retainer plug.

(5) Remove cutoff valve 20 and spring 19 from the control valve body bore.

(6) Remove plug 6 and gasket 7 from the control valve body. Remove main pressure regulator valve 8.

(7) Remove plug 18 and gasket 17 from the control valve body. Remove trimmer plug 16, trimmer spring 15, main pressure regulator spring 14 and spring retainer 13, if present, from the valve body bore.

(8) Remove ball retainer 11 and ball 10 only if replacement is necessary.

(9) Remove reverse-signal tap plug 34 and pressure tap plug 37.

### NOTE

Refer to paragraph 6-2.

#### b. Disassembly (inching control models) (B, foldout 7)

(1) Follow steps 6-4a (1) and (2) and steps (6) through (9).

(2) Remove inching valve stop 38 from plug 46.

(3) Clean paint and dirt from area around oil seal 47.

(4) Insert a bolt through the linkage pin hole in inching control valve 43 and secure the bolt in a vise. Use a soft hammer and drive the control valve body off the inching valve. Freeing the inching valve will also remove seal 47, plug 46 with sealring 45, and spring 44. Separate these parts. Remove inching regulator valve rear spring 42.

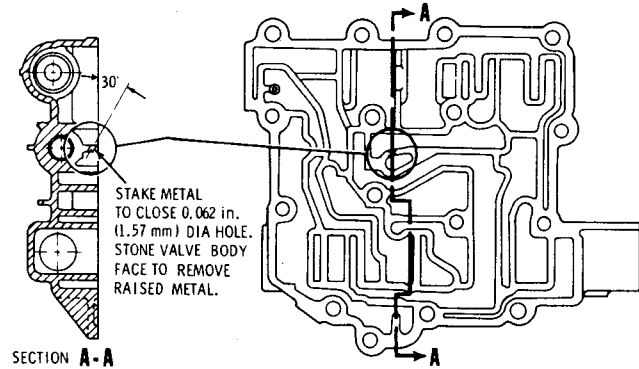


Fig. 6-4. Modification of valve body (clutch cutoff models)

16089

(5) Using a screwdriver, push inching regulator valve 40 against spring 39 (forward), and remove regulator valve stop 41 from the control valve body. Remove inching regulator valve 40 and spring 39.

### NOTE

Refer to paragraph 6-2.

#### c. Assembly (clutch cutoff models) (B, foldout 7)

(1) Check the valve body for the presence of a 0.062 inch (1.57 mm) hole (fig. 6-4). If the hole is present, stake it closed as illustrated in fig. 6-4. Be careful to remove all debris after staking. This modification will improve cooler oil flow and increase equipment performance.

(2) Refer to figure 6-5. If main-pressure regulator valve 8 (B, foldout 7) is of the earlier design, spring retainer 13 must be used. If valve 8 is of the later design, no spring retainer is used. If a later design replacement valve is to be used in an earlier valve body, rework is required (fig. 6-5).

(3) If ball retainer 11 and ball 10 were removed, install the ball and press the retainer, flat end first, flush to 0.010 inch (0.25 mm) below the surface of control valve body 9.

(4) If required, install retainer 13, convex side first, onto one end of main

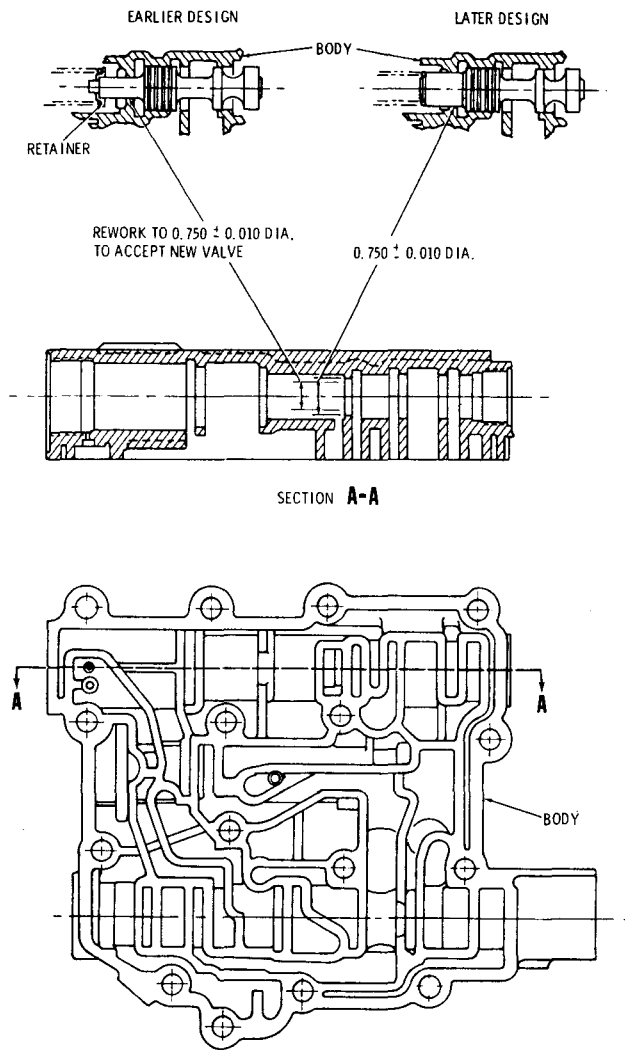


Fig. 6-5. Control valve body rework area (earlier models with new valve)

pressure regulator spring 14, and install the spring (and retainer, if present) into the inner diameter of trimmer spring 15. Install the assembled springs into the bore of control valve body 9. Install trimmer plug 16 into the same bore, and install gasket 17 and plug 18. Tighten the plug to 80-90 lb ft (109-122 N·m).

(5) Install main pressure regulator valve 8, stem end first, into the opposite end of the same bore in the valve body. Make certain the small diameter on the stem end of the valve is properly seated in retainer 13. Install gasket 7 and plug 6. Tighten the plug to 80-90 lb ft (109-122 N·m).

(6) Install clutch cutoff valve spring 19 into the middle bore of the valve body. Install clutch cutoff valve 20, stem end first, into the same bore.

(7) On models equipped with pneumatic-actuated clutch cutoff, install sealring 22 onto cutoff valve plug 48. Lubricate the sealring with transmission fluid, and install the assembled parts, sealring end first, into retainer plug 49. Install gasket 23 and plug 49 (assembled) into the control valve body. Tighten the plug to 60-70 lb ft (82-94 N·m).

(8) On models equipped with hydraulic-actuated clutch cutoff, install sealring 22 and cup 24 (flat side first) onto cutoff valve plug 21. Lubricate the cup and sealring with transmission fluid, and install the assembled parts, cup first, into retainer plug 25. Install gasket 23 and plug 25 into the control valve body. Tighten the plug to 60-70 lb ft (82-94 N·m). If removed, install plug 50 into plug 25. Tighten the plug to 10-12 lb ft (14-16 N·m).

(9) Install one detent spring 31 and one detent ball 28 into the detent bore in the valve body. Depress the detent ball, and install manual selector valve 27, linkage end toward the rear of the control valve body. Position the selector valve within the bore so that the detent ball engages a detent groove of the valve. Install the remaining detent ball and spring, and retain them with gasket 30 and plug 29. Tighten the plug to 60-70 lb ft (82-94 N·m). Install valve stop 12 in the position shown in figure 6-3.

(10) Install gasket 35 (B, foldout 7) and plug 36. Tighten the plug to 80-90 lb ft (109-122 N·m). Install washer seal 33 and plug 32 (or customer-supplied neutral start switch and spacer). Tighten the plug (or switch) to 30-40 lb ft (41-54 N·m).

(11) Coat oil seal 26 with Loctite Retaining Compound No. 75, or equivalent, (to prevent leakage) and install it over the selector valve shaft and into the valve body bore. Press the seal into the bore until it is flush to 0.010 inch (0.25 mm) from the bottom of the chamfer of the valve body bore.

## REBUILD OF SUBASSEMBLIES

(12) Install reverse-signal tap plug 34 and pressure tap plug 37. Tighten the plugs to 10-12 lb ft (14-16 N·m).

d. Assembly (inching control models)  
(B, foldout 7)

(1) Follow steps 6-4c(2) through (5), and (9) through (12).

(2) Place spring 39 onto the stem of inching regulator valve 40, and install both items, spring first, into the middle bore of the valve body. Using a small screwdriver, push the regulator valve against the spring, and install valve stop 41 onto the regulator valve.

(3) Install spring 42 into inching control valve 43, and install both items, spring end first, into the middle bore. Check to ensure that spring 42 fits over the end of valve 40. Install spring 44 onto the inching control valve.

(4) Install sealing 45 onto plug 46. Lubricate the sealing with transmission fluid, and install the assembled parts, larger end first, into the middle bore. Using a small screwdriver, push plug 46 against its spring, and install valve stop 38 onto the smaller end of plug 46.

(5) Coat oil seal 47 with Loctite Retaining Compound No. 75, or equivalent, (to prevent leakage and install it over the inching control valve shaft and into the valve body bore. Press the seal into the bore until it is flush to 0.010 inch (0.25 mm) from the bottom of the chamfer of the valve body bore.

**6-5. TORQUE CONVERTER COVER ASSEMBLY**

a. Disassembly (A, foldout 2)

(1) Using a puller, remove bearing 9 from input shaft 11.

(2) Remove six self-locking bolts 10 and remove input shaft 11 from torque converter cover 13.

**NOTE**

Refer to paragraph 6-2.

b. Assembly (A, foldout 2)

(1) Install input shaft 11 onto torque converter cover 13, aligning the bolt holes.

(2) Install six (or eight) 1/2-13 x 1-1/8 self-locking bolts 10 to secure the shaft to the cover. Tighten the bolts to 81-97 lb ft (110-131 N·m).

(3) Install bearing 9 onto input shaft 11. Using the proper size replacer sleeve, press the bearing against its seat on the input shaft.

**6-6. FIRST-AND-SECOND TURBINE ASSEMBLY**

a. Disassembly (A, foldout 3)

(1) Locate the index marks (V-groove) in the outer rims of the first turbine support and the first turbine (fig. 6-6). Make sure the index marks are well defined in both parts. If these marks are not prominent, deepen them to 0.040 inch (1 mm) maximum before disassembly.

(2) Drive the nine retaining pins inward (toward the hub) until they clear the holes in the first turbine support. Remove the first turbine from its support.

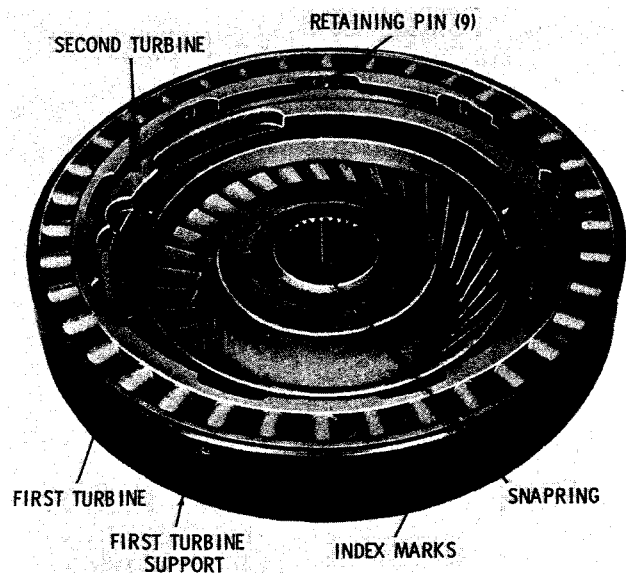


Fig. 6-6. First-and-second turbine assembly

51863

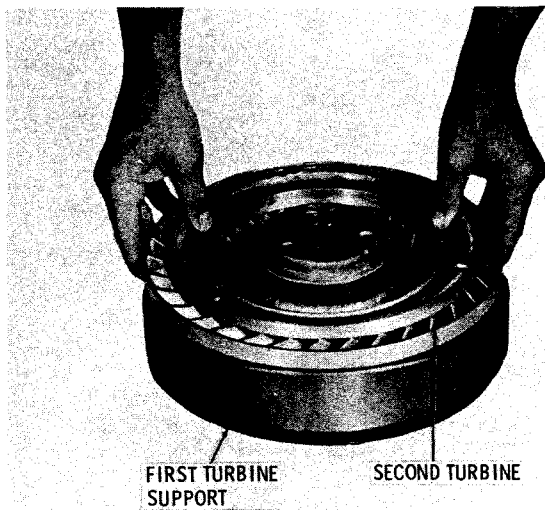


Fig. 6-7. Installing second turbine

S1440

(3) Remove the second turbine and its bearing from the first turbine support (fig. 6-7).

(4) For TRT 4821 models, proceed to step (5). For TRT 4820 models, do not remove internal snapping 8 (A, foldout 3) from the second turbine unless replacement is necessary. If bearing 7 must be replaced, press the bearing off by pressing through the three push-out holes provided in the hub of second turbine 6. Proceed to step (6).

(5) For TRT 4821 models, if bearing 7 must be replaced, flatten the ends of lockstrips 21. Remove ten bolts 22 and five lockstrips 21. Separate hub 19 and bearing 7 from second turbine 20. Press bearing 7 off hub 19 by pressing through the five push-out holes provided in the hub.

(6) For all models, if bearing 1 must be replaced, press the bearing out by pressing through the three push-out holes in the hub of first turbine support 3.

#### NOTE

Refer to paragraph 6-2.

#### b. Assembly (A, foldout 3)

(1) If bearing 1 was removed from first turbine support 3, install a new bearing by pressing on the lettered side of the bearing until it is firmly seated.

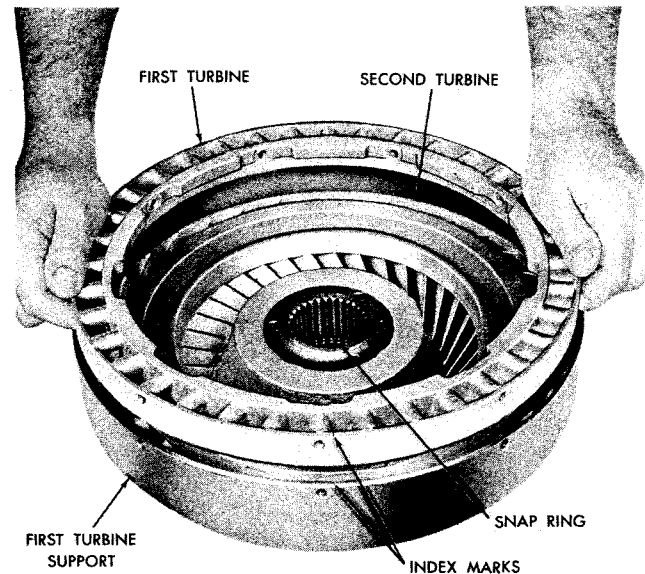


Fig. 6-8. Installing first turbine

S1865

(2) For TRT 4820 models, proceed to step (3). For TRT 4821 models, if hub 19 was removed from second turbine 20, install the hub into the front of turbine 20, splined end of hub to the front. Install five lockstrips 21 and ten 7/16-20 x 3/4 bolts 22. Tighten the bolts to 64-77 lb ft (87-104 N·m). Lock each bolt head by bending a corner of the lockstrip against it.

(3) For all models, if bearing 7 was removed, install a new bearing by pressing on the lettered side of the bearing until it is firmly seated.

(4) For TRT 4821 models, proceed to step (5). On TRT 4820 models, if snapping 8 was removed, install a new snapping into the hub of second turbine 6.

(5) For all models, install the second turbine (and bearing) into the first turbine support (fig. 6-7).

(6) Install the first turbine into the first turbine support and align the V-groove index marks (fig. 6-8).

(7) Drive the nine retaining pins outward until they are flush to 0.030 inch (0.76 mm) below the outer surface of the first turbine support (fig. 6-6).

## REBUILD OF SUBASSEMBLIES

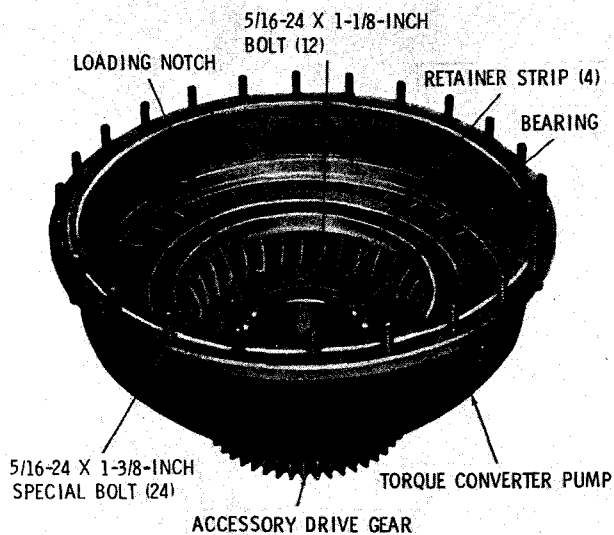


Fig. 6-9. Torque converter pump and accessory drive gear

51866

### 6-7. TORQUE CONVERTER PUMP ASSEMBLY

#### a. Disassembly (fig. 6-9)

(1) Remove the twelve self-locking bolts that attach the four retainer strips and accessory drive gear to the torque converter pump. Remove the four retainer strips, accessory drive gear, and ball bearing.

(2) Inspect the twenty-four special bolts around the circumference of the converter pump. Remove the damaged or defective bolts.

(3) Remove the sealring (later models).

#### NOTE

Refer to paragraph 6-2.

#### b. Assembly (fig. 6-9)

(1) Install a new sealring (later models).

(2) If any of the special bolts were removed from the converter pump, install new bolts, flat sides of the heads against the pump, and press them in until seated firmly.

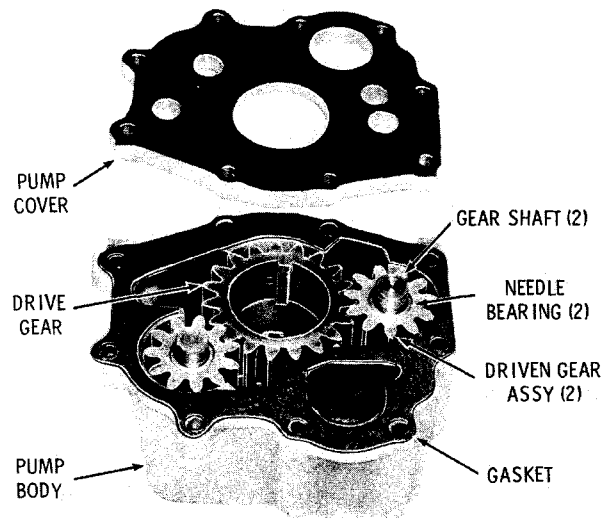


Fig. 6-10. Oil pump assembly

53341

(3) Install the double-row ball bearing, loading notch upward, into the accessory drive gear.

(4) Install the converter pump onto the bearing and accessory drive gear, aligning the bolt holes.

(5) Position the four retaining strips onto the converter pump and install twelve 5/16-24 x 1-1/8-inch, self-locking bolts. Tighten the bolts to 19-23 lb ft (26-31 N·m).

### 6-8. OIL PUMP

#### a. Disassembly (fig. 6-10)

(1) Remove the pump cover and the cover gasket from the pump body. Remove the drive gear and the two driven gear assemblies.

(2) If replacement of the needle bearings is necessary, remove them from the driven gears.

(3) If the pump is equipped with lip-type oil seal 16 (A, foldout 8), remove and discard the seal.

(4) If the gear shafts, pump body, driven gears, or drive gear requires replacement, a new pump assembly must be used.

#### NOTE

Refer to paragraph 6-2.

#### b. Assembly

(1) If oil seal 16 (A, foldout 8) was removed, do not install a new seal. It is not required.

(2) If the needle bearings (fig. 6-10) were removed from the driven gears, install new bearings. Position each bearing so that the replacer tool drives against the numbered end of the bearing cage. Press each bearing flush to 0.020 inch (0.51 mm) below the end surface of the gear.

(3) Install each driven gear assembly onto a gear shaft, making sure they are properly seated in the pump body. Install the drive gear.

#### NOTE

The end faces of the three gears must project 0.002-0.003 in. (0.05-0.07 mm) above the front surface of the pump body (measured before gasket is installed). If the end faces are below the flush line of the pump body, the pump will not perform satisfactorily, and should be replaced. Refer also to paragraph 4-60.

(4) Apply a liberal amount of transmission fluid onto the pump gears, and install the cover gasket and cover. Position the pump assembly front upward until ready for installation onto the transmission housing.

### 6-9. TORQUE CONVERTER HOUSING

#### a. Disassembly (B, foldout 3)

(1) Remove the two self-locking bolts that attach the lubrication regulator valve cover, and remove the cover (fig. 6-11).

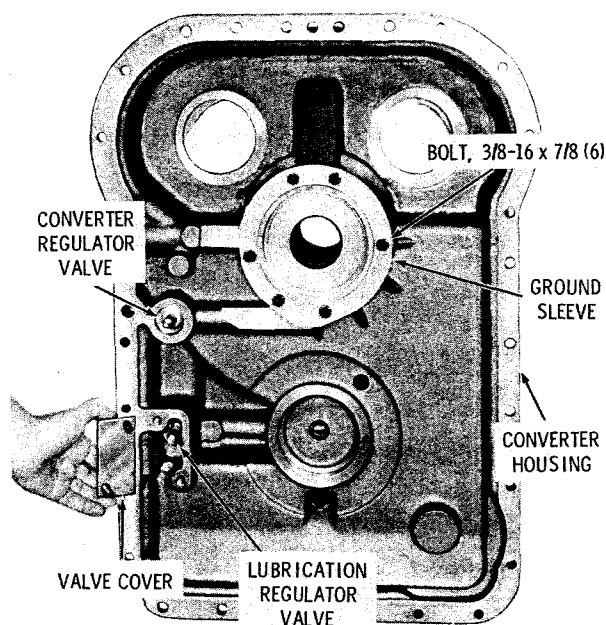


Fig. 6-11. Torque converter housing assembly

53342

(2) If the components of the lubrication pressure regulator valve or converter pressure regulator valve require replacement, remove the affected valve guide pin. For assemblies prior to S/N 9659, to remove the pin, apply a pull force while twisting the pin away from the housing. When the pin is free, remove the spring and valve.

#### NOTE

Removal of a valve guide pin from the converter housing may be difficult. If necessary, a 3/16-inch diameter hole can be drilled from the opposite side of the housing at the areas illustrated in figure 6-12. Drill to the end of the guide pin. Then, using a pin drift, drive the guide pin out of the housing. (Assemblies after S/N 9658 already have the converter housing drilled.) Be careful to remove all debris from the housing after drilling.

(3) It is recommended that earlier model converter ground sleeves (item 22; B, foldout 3) be reworked to improve lubrication. This rework can be done without

## REBUILD OF SUBASSEMBLIES

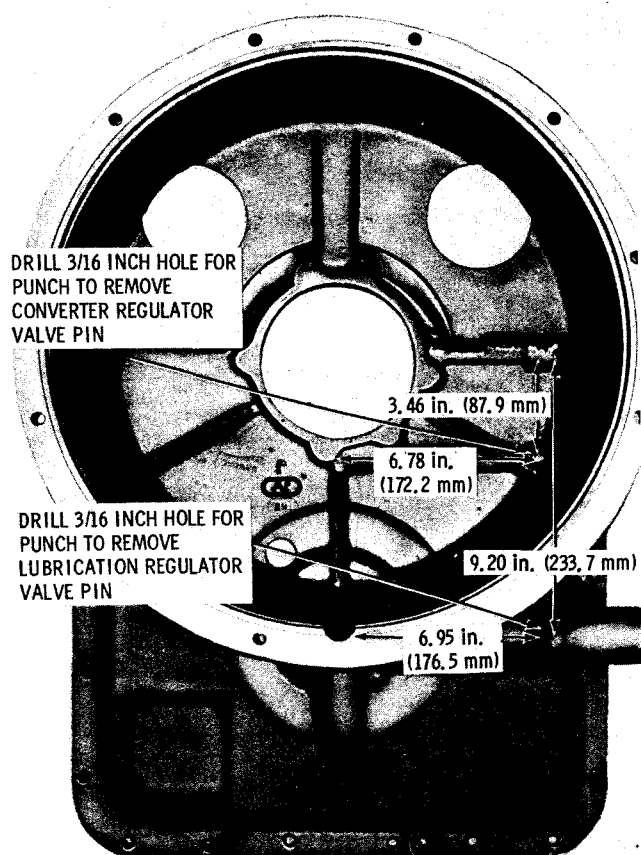


Fig. 6-12. Location of holes for removal of lubrication and converter regulator valve pins

removing the ground sleeve from the converter housing if proper precautions are taken to avoid any drill debris remaining in the transmission assembly. Use grease on the drill bit during drilling to collect the chips and then thoroughly flush the orifice. See figure 6-13.

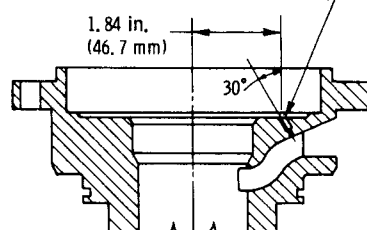
(4) Remove the converter ground sleeve only if replacement is necessary (fig. 6-11). If necessary, remove the six self-locking bolts that attach the ground sleeve to the housing. Then position the housing, rear downward, and press the ground sleeve from the housing.

(5) Remove plug 15 (B, foldout 3) only if necessary for replacement or cleaning the oil passage.

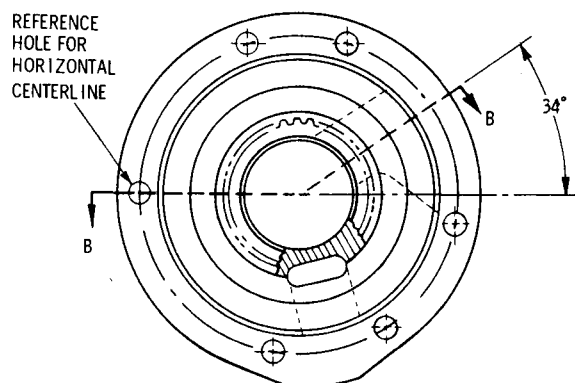
### NOTE

Refer to paragraph 6-2.

1. DRILL A 0.090 in. (2.29 mm) DIA. HOLE (29/32 DRILL) TO A MAXIMUM DEPTH OF 0.300 in. (7.62 mm)
2. DRILL AT THE SAME LOCATION A 0.031 in. (0.79 mm) DIA HOLE (1/32 DRILL) THROUGH ONE WALL.



SECTION B-B



BE SURE TO REMOVE ALL BURRS AND DEBRIS FROM THE REWORK AREA

16246

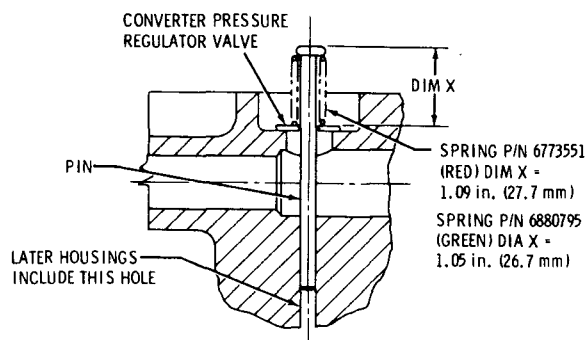
Fig. 6-13. Converter ground sleeve rework

### b. Assembly (B, foldout 3)

(1) If plug 15 was removed, replace it. Tighten the plug to 33-37 lb ft (45-50 N·m).

(2) If the converter ground sleeve (fig. 6-11) was removed, see rework procedures in paragraph 6-9a(3). Chill the replacement sleeve in dry ice for several hours prior to installation. Install two headless guide bolts (3/8-16 x 2-1/2-inch) into the ground sleeve mounting pad to maintain alignment during installation. Install the ground sleeve and press it firmly into the converter housing. Remove the guide bolts and install the six bolts 23 (B, foldout 3) to retain the sleeve. Tighten the bolts to 36-43 lb ft (49-58 N·m).

(3) If the converter pressure regulator valve components were removed, install spring 10 (B, foldout 3) and valve 9 onto guide pin 11. Press the guide pin (with assembled parts) into the housing as shown in fig. 6-14.



16090

Fig. 6-14. Installation of converter pressure regulator valve components

(4) If the lubrication pressure regulator valve components were removed, install spring 13 and valve 14 onto guide pin 12. If removal hole is drilled through the housing, apply a nonhardening sealer into the pin bore prior to installing the pin. Press the guide pin into the housing until the top of the pin is 1.13 inches (28.70 mm) above the top surface of the valve.

(5) Install the lubrication pressure regulator valve cover (fig. 6-11), and retain it with the two 3/8-16 x 3/4-inch self-locking bolts. Tighten the bolts to 36-43 lb ft (49-58 N·m).

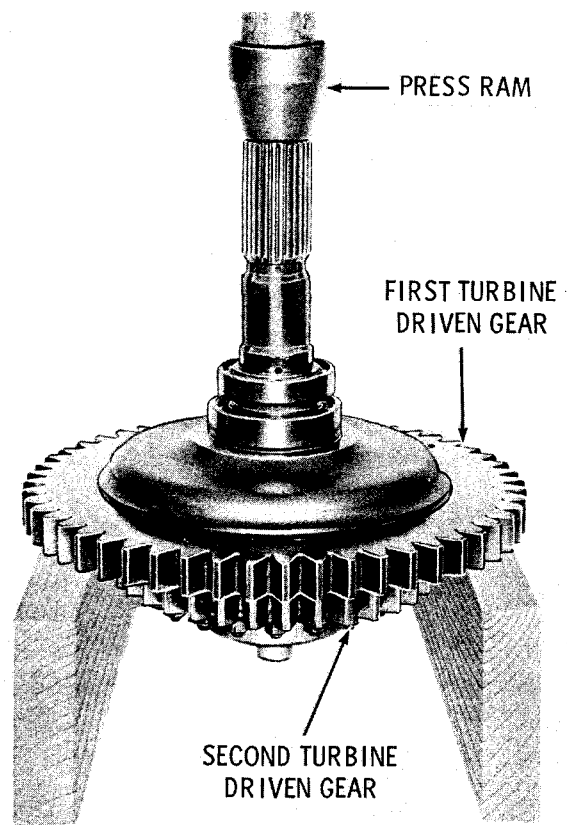
#### 6-10. TURBINE DRIVEN GEARS, FREEWHEEL CLUTCH

##### a. Disassembly (A, foldout 4)

(1) Press the second turbine driven gear assembly from the assembled unit (fig. 6-15). This will free spacers 22 and 24 (A, foldout 4), bearings 23 and 25, and twenty-one freewheel rollers 15 which can be removed. Also remove notched spacer 20 from the shaft of the second turbine driven gear.

(2) Remove snapping 19 and bearing 21 from the hub of first turbine driven gear 18.

(3) Remove twenty-one self-locking nuts 2 and twenty-one square-head bolts 17. If the transmission is equipped with driven gear shaft 7, removal of the nuts and bolts will free driven gear 6. Using a screwdriver, pry freewheel cam 16 (and



S3343

Fig. 6-15. Pressing second turbine gear from freewheel clutch assembly

assembled parts) away from second turbine driven gear 4 or shaft 8. Remove bearings 1 and 10 from the second turbine driven gear (or shaft 8) only if replacement is necessary.

#### NOTE

Observe the small index marks (X) on the spring plate and roller cage (fig. 6-19). If necessary, rescribe these marks for positive identification during reassembly.

(4) Remove spring plate 11 (A, foldout 4), three spring pins 12 and springs 13 from roller cage 14. Separate the roller cage from freewheel cam 16.

(5) Remove bushing 5 (or 9) from its bore only if replacement is necessary.

#### NOTE

Refer to paragraph 6-2.



## REBUILD OF SUBASSEMBLIES

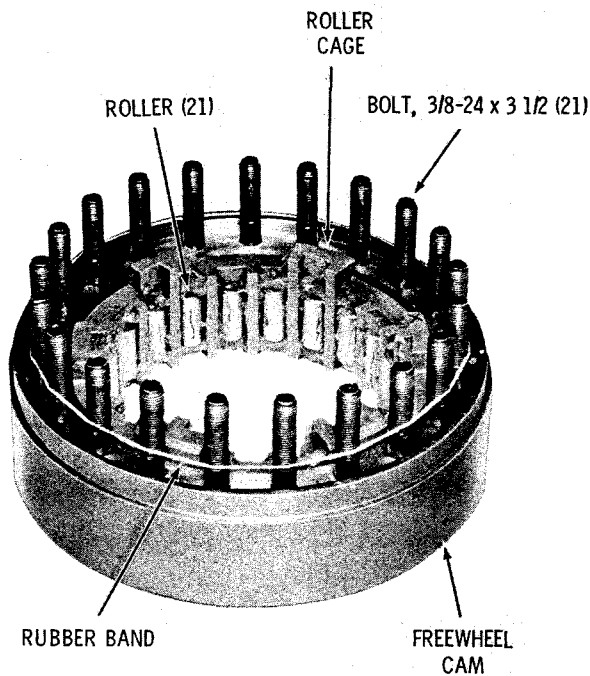


Fig. 6-16. Assembled freewheel cam, cage and rollers

### b. Assembly (A, foldout 4)

(1) If bearings 1 and 10 were removed from gear 4 or shaft 8, install new bearings by pressing on the numbered side of the inner race until each is firmly seated.

(2) If bushing 5 (or 9) was removed, install a new one. Press it to 0.12-0.16 inch (3.0-4.1 mm) below the shaft end surface.

(3) Install the twenty-one bolts into the freewheel cam (fig. 6-16) and stretch a rubber band around the circle of bolts to retain them. Position the cam and bolts as shown in figure 6-16, and install the roller cage. Install the twenty-one rollers, using a sufficient amount of oil-soluble grease to retain them in the pockets. Install a suitable dummy race (table 4-1) to retain the rollers during subsequent assembly operations.

(4) Position the first turbine driven gear, hub upward, and install snapping 19 (A, foldout 4). Install the freewheel cam (as

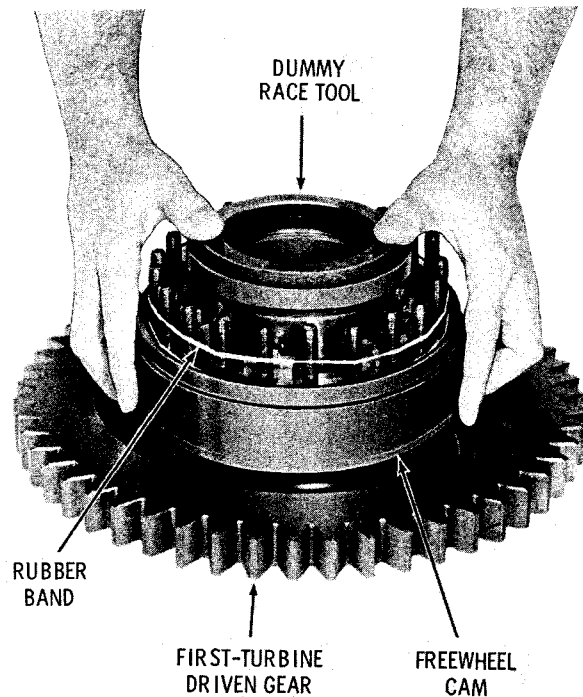


Fig. 6-17. Installing assembled cam onto first turbine driven gear

assembled in the preceding step) onto the hub of the driven gear (fig. 6-17). Allow the gear hub to push the dummy race from the assembled parts, and remove the dummy race. Remove the rubber band.

### NOTE

Make sure all the bolt heads are in place and will not rotate.

(5) Install three springs and guide pins into the drilled ears of the roller cage (fig. 6-18).

(6) Align the index marks (X) on the spring retainer plate and roller cage, and install the retainer plate (fig. 6-19). Using a small screwdriver against the guide pin, compress the spring sufficiently to allow the guide pin to act against the tang of the retainer plate. Repeat the operation for the remaining two springs and guide pins, making sure that each guide pin is firmly against the tang of the retainer plate.

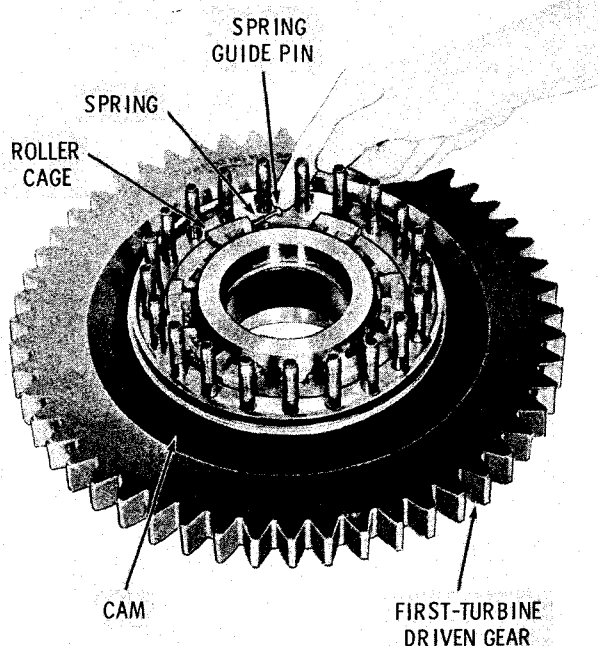


Fig. 6-18. Installing spring and guide pin into roller cage

53346

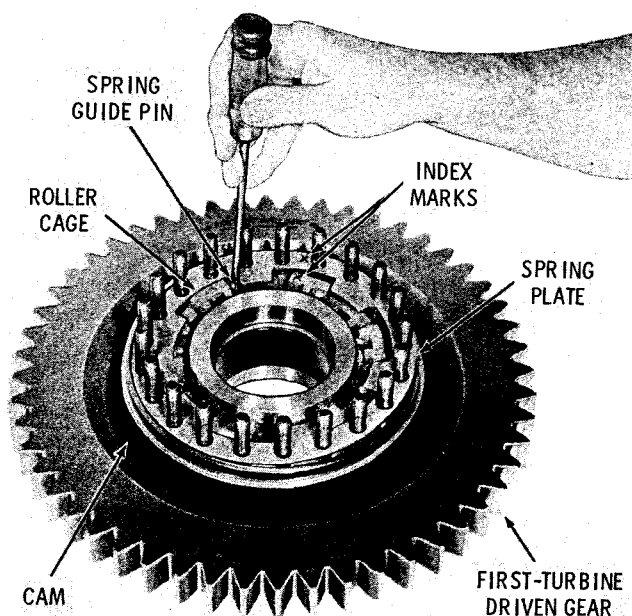


Fig. 6-19. Seating spring guide pin against plate

53347

(7) Install gear assembly 3 (A, fold-out 4) or driven gear shaft assembly 7, splined end first, into the assembly shown in figure 6-19. Press the gear into the assembly until bearing 10 is firmly seated against snapping 19. If gear shaft 8 is used, install driven gear 6. Install twenty-one self-locking nuts 2 onto bolts 17. Tighten the nuts to 41-49 lb ft (56-66 N·m).

(8) Turn the assembly over and install notched spacer 20 and bearing 21, shielded side first, onto the shaft. Install spacer 22 and bearing 23, shielded side first, onto the shaft. On later models, bearing 23 is not shielded, but does have a loading notch. Install the later bearing, notch last, onto the shaft. Install spacer 24 and bearing 25.

#### 6-11. CLUTCH PISTON ASSEMBLIES (foldouts 5 and 6)

##### NOTE

Warming Teflon sealrings in oil at 150°F (65°C) will make them easier to remove and install.

##### 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 the side of the groove, and work the seal out of the groove until it can be grasped with the fingers.

(2) Remove and discard the sealrings from the pistons.

(3) Remove the expanders from the grooves in the high-range (earlier models) and low-range clutch pistons.

(4) Check three holes in the reverse and forward clutch pistons. One hole in each piston should be clear. The other two holes have ball check valves. The balls should be clean and seat properly, and should be free to move but held by a retainer.

## REBUILD OF SUBASSEMBLIES

(5) If the balls need replacement, pry out and discard the retainer plug from the piston using a pointed instrument. Remove and discard the nylon ball.

### NOTE

Refer to paragraph 6-2.

#### b. Assembly

(1) If removed, replace the balls in the reverse and forward clutch pistons, as instructed in check ball kit P/N 6884500.

(2) Install the sealring expanders into the grooves in the high-range (earlier models) and low-range clutch pistons. Make sure the free ends of the expanders turn away from the sealrings. The ends of some expanders may require additional bending to ensure that they turn toward the bottom of the groove (fig. 6-20).

(3) Oil the installed expanders and sealrings. Start each sealring into the piston groove at a point directly opposite the gap in the expander.

(4) Carefully work the sealring into the groove, compressing the expander while moving both directions from the starting point to the expander gap location. Do not stretch or distort the sealring more than absolutely necessary.

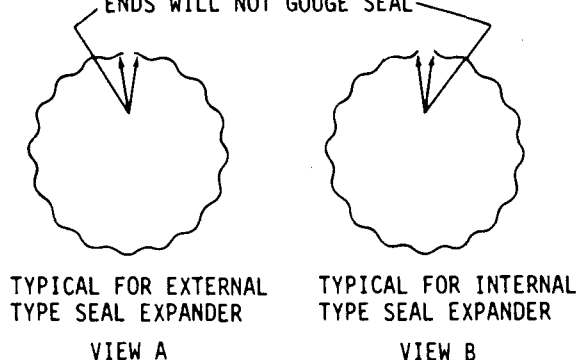
(5) Install lip-type sealrings (no expanders required) into the grooves of the forward- and reverse-clutch and high-range (later models) pistons. Make sure the lip of each sealring is toward the proper direction -- refer to A and B, foldout 5 for illustration of lip directions.

### CAUTION

Improperly installed sealrings (lip in wrong direction) will cause improper clutch application or leakage.

(6) After installation, adjust the sealrings in their grooves to center them radially in the piston.

ENDS MUST BE AS SHOWN WHEN EXPANDER IS COILED FOLLOWING THE NATURAL CURVATURE OF THE STRIP. BEND ENDS IF NECESSARY (0.25 IN. [6 mm] R MIN) SO THAT SHARP ENDS WILL NOT GOUGE SEAL



6228B

Fig. 6-20. Typical expanders for Teflon sealrings

#### 6-12. TRANSFER DRIVE GEAR

a. Disassembly (B, foldout 6). Position transfer drive gear assembly 9 in a press, pins downward, and press pins 10 from gear 11.

b. Assembly (B, foldout 6). For earlier models, place transfer drive gear 11 in a press so that the side marked -- INSTALL PINS THIS SIDE -- is upward. On later models, a specific side of the gear is not identified; the pins can be installed in either side. Press pins 10 into the gear until each pin protrudes 1.740-1.760 inches (44.20-44.45 mm) above the gear face.

#### 6-13. LOW-RANGE CLUTCH HUB

a. Disassembly (B, foldout 6)

(1) Remove plug 15 from low-range clutch hub 16 only if replacement is necessary.

(2) If the model is equipped with a speedometer drive, remove sealring 28 from speedometer drive shaft 27. Remove drive pin 26 from clutch hub 16, and remove the speedometer drive shaft. Remove sealring 17 from the clutch hub.

(3) Check to ensure that the four bleed balls in the low-range clutch hub move freely and that the hub is securely staked to retain the balls.

NOTE

Refer to paragraph 6-2.

b. Assembly (B, foldout 6)

(1) If plug 15 was removed from clutch hub 16, install a new plug, orificed end first, into the shaft bore. Press the plug into the bore until it is 0.12-0.16 inch (3.0-4.1 mm) below the end face of the shaft.

(2) If the model is equipped with a speedometer drive, install speedometer drive shaft 27 into the clutch hub, and align the pin holes in the shaft with those in the hub. Press pin 26 through the hub and drive shaft until the pin is flush with or below the hub surface. Be careful that the pin does not protrude below the opposite side of the hub and shaft. Install hook-type sealring 28 onto the drive shaft. Apply oil-soluble grease to the sealring.

6-14. HIGH-RANGE CLUTCH ANCHOR

a. Disassembly (A, foldout 6). Remove eight anchor pins 30 and seven spring guide pins 31 from high range clutch anchor 32 only if replacement is necessary.

NOTE

Refer to paragraph 6-2.

b. Assembly (A, foldout 6). If either anchor pins 30 or spring guide pins 31 were removed, install new pins. Position high-range clutch anchor 32, flat side downward, in a press. Press each new pin into the anchor until the bottom of the pin is flush to 0.030 inch (0.76 mm) beyond the bottom surface of the anchor.

6-15. HIGH-RANGE PLANETARY CARRIER

NOTE

Planetary pinions are a matched set. If one pinion requires replacement, the remaining pinions must be replaced. Also, new needle bearings, thrust washers, and spindles should be installed any time a planetary carrier assembly is being rebuilt.

a. Disassembly (A, foldout 6)

(1) Remove four self-locking bolts 16, and remove washers 15 from the notches in spindles 14. Place the carrier assembly in a press, notched end of spindles downward, and press the spindles from the carrier.

(2) Remove the pinion parts (items 8 through 13 or 8, 9, 13, and 17) as a unit. Remove thrust washers 8 and 13, needle bearings 10 and 12 or 17, and spacer 11, if present, from pinion 9. Remove and separate the remaining three pinion groups in the same manner.

NOTE

Refer to paragraph 6-2.

b. Assembly (A, foldout 6)

(1) Chill new spindles 14 in dry ice for one hour, or heat carrier 7 in an oil bath or oven to 300°F (149°C).

(2) For earlier models, install a needle bearing 10, spacer 11, and needle bearing 12 into pinion 9. Or, for later models install needle bearing 17 into pinion 9. Assemble thrust washers 8 and 13 onto opposite faces of the pinion and retain them with oil-soluble grease.

## REBUILD OF SUBASSEMBLIES

(3) Position carrier 7, recessed face downward, in a press. Install the previously assembled pinion parts group.

### NOTE

An aligning tool can be made by grinding a used spindle to 0.005 inch (0.13 mm) undersize.

(4) Insert an aligning tool through the carrier and pinion group to maintain alignment during installation of the spindle. Leave the aligning tool in place.

(5) Install spindle 14, notched end upward, and align the notch so that it will be engaged by washer 15 (when installed). Press the spindle into the carrier (allowing the spindle to displace the aligning tool) until the lower edge of the notch is flush to 0.010 inch (0.25 mm) below the washer mounting surface. Install the remaining three pinion parts groups and spindles in the same manner.

(6) Install four washers 15, engaging the slots of the spindles, and secure each washer with a 3/8-24 x 1/2-inch self-locking bolt 16. Tighten the bolts to 41-49 lb ft (56-66 N·m).

(7) If chilled spindles were installed, apply a coating of oil around the spindles to inhibit rust.

### 6-16. FORWARD PLANETARY CARRIER

### NOTE

Planetary pinions are a matched set. If one pinion requires replacement, the remaining pinions must be replaced. Also, new needle bearings, thrust washers, and spindles should be installed any time a planetary carrier assembly is being rebuilt.

#### a. Disassembly (B, foldout 5)

(1) Place forward planetary carrier assembly 18, splines upward, on a press bed, and press six spindles 19 from carrier 20.

(2) Remove the pinion parts (items 21 through 26 or 21, 22, 26, and 27) as a unit. Remove thrust washers 21 and 26, needle bearings 23 and 25, or 27, and spacer 24, if present, from pinion 22. Remove and separate the remaining five pinion groups in the same manner.

### NOTE

Refer to paragraph 6-2.

#### b. Assembly (B, foldout 5)

(1) Chill new spindles 19 in dry ice for one hour, or heat carrier 20 in an oil bath or oven to 300°F (149°C).

(2) For earlier models, install a needle bearing 23, spacer 24, and needle bearing 25 into pinion 22. Or, for later models, install needle bearing 27 into pinion 22. Assemble thrust washers 21 and 26 onto opposite faces of the pinion and retain them with oil-soluble grease.

(3) Position carrier 20 in a press, splines downward, and install the previously assembled pinion parts group.

### NOTE

An aligning tool can be made by grinding a used spindle to 0.005 inch (0.13 mm) undersize.

(4) Insert an aligning tool through the carrier and pinion group to maintain alignment during installation of the spindle. Leave the aligning tool in place.

(5) Install spindle 19, notched end upward, and align the notch so that it will be engaged by locking plate 28 (when installed).

(6) Press the spindle into the carrier (allowing the spindle to displace the aligning tool) until the lower edge of the notch is flush to 0.010 inch (0.25 mm) below the locking plate mounting surface. Install the remaining five pinion groups and spindles in the same manner.

(7) If chilled spindles were installed, apply a coating of oil around the spindles to inhibit rust.

#### 6-17. REVERSE-AND-FORWARD CLUTCH ANCHOR

a. Disassembly (A, foldout 5). If pins 23 require replacement, place clutch anchor assembly 21, flat side upward, in a press. Press the pins from the anchor.

#### NOTE

Refer to paragraph 6-2.

b. Assembly (A, foldout 5). If pins 23 were removed from clutch anchor 22, place the clutch anchor, flat side upward, in a press. Press each pin into the anchor until 2.066 inches (52.47 mm) of the pin remain above the anchor flat face.

#### 6-18. REVERSE PLANETARY CARRIER

#### NOTE

Planetary pinions are a matched set. If one pinion requires replacement, the remaining pinions must be replaced. Also, new needle bearings, thrust washers, and spindles should be installed any time a planetary carrier assembly is being rebuilt.

a. Disassembly (A, foldout 5)

(1) Remove four self-locking bolts 16 and washers 15 from carrier 14. Place the carrier assembly in a press, notched end of spindles 17 downward, and press the spindles from the carrier.

(2) Remove the pinion parts (items 8 through 13 or 8, 9, 13, and 18) as a unit. Remove washers 8 and 13, needle bearings 10 and 12 or 18, and spacer 11, if present, from pinion 9. Remove and separate the remaining three pinion groups in the same manner.

#### NOTE

Refer to paragraph 6-2.

b. Assembly (A, foldout 5)

(1) Chill new spindles 17 in dry ice for one hour or heat carrier 14 in an oil bath or oven to 300°F (149°C).

(2) For earlier models, install a needle bearing 10, spacer 11, and needle bearing 12 into pinion 9. Or, for later models, install needle bearing 18 into pinion 9. Assemble washers 8 and 13 onto opposite faces of the pinion and retain them with oil-soluble grease.

(3) Position carrier 14 in a press, full splines upward, and install the previously assembled pinion parts group.

#### NOTE

An aligning tool can be made by grinding a used spindle to 0.005 inch (0.13 mm) undersize.

(4) Insert an aligning tool through the carrier and pinion group to maintain alignment during installation of the spindle. Leave the aligning tool in place.

(5) Install spindle 17, notched end upward, into the carrier. Align the notch in the spindle so that it will be engaged by washer 15 when it is installed.

(6) Press the spindle into the carrier (allowing the spindle to displace the aligning tool) until the lower edge of the notch is flush to 0.010 inch (0.25 mm) below the surface on which the washer will be mounted. Install the remaining three pinion groups and spindles in the same manner.

(7) Install four washers 15, engaging the slots of the spindles, and secure each washer with a 3/8-24 x 1/2-inch self-locking bolt 16. Tighten the bolts to 41-49 lb ft (56-66 N·m).

## REBUILD OF SUBASSEMBLIES

(8) If chilled spindles were installed, apply a coating of oil around the spindles to inhibit rust.

### 6-19. TRANSMISSION HOUSING

#### a. Disassembly (B, foldout 4)

(1) Remove breather 33, elbow 32, and nipple 34 from housing 14.

(2) Remove plug 12. Do not remove plug 13 unless replacement is necessary or for removing obstructions from the oil passage. Prior to removal of plug 13, measure and record the installed depth of the plug.

(3) Remove dowel pins 11 and 15 only if replacement is necessary.

(4) If the transmission is equipped with a PTO at the accessory drive pad, remove oil seal 36. If no PTO is available at the drive pad, remove plugs 37 and 35 only if replacement is necessary.

(5) Remove three self-locking bolts 4 and self-locking bolts 44 and 6, and remove oil suction tube 5. Remove sealring 7 from the top end of the tube. Remove self-locking bolt 8, and remove lubrication pressure tube 9.

(6) If it is necessary to remove drain tube 1 (B, foldout 8) drive the tube toward the output shaft bore in the housing. When the tube is free, remove it.

(7) Remove orifice plugs 20 and 21 (B, foldout 4) only if necessary for replacement or cleaning oil passage.

(8) Remove orifice plugs 17, 18 and 19 only if replacement is necessary.

(9) On later models, remove 18 bolts 24 and washers 25 that retain plate 23 and gasket 22 to the bottom of the housing. Remove the plate and gasket.

(10) If not previously removed, remove drain plug 26.

(11) Remove drive screws 30 and nameplate 31 only if required. Be sure the replacement nameplate has information identical to the nameplate that was removed. Refer to paragraph 1-3a.

#### NOTE

Refer to paragraph 6-2.

#### b. Assembly (B, foldout 4)

(1) If removed, install nameplate 31 and drive screws 30. Tighten the screws securely.

(2) Install drain plug 26. Tighten the plug to 33-37 lb ft (45-50 N·m).

(3) If orifice plug 20 was removed, install a new plug. Tighten it to 10-12 lb ft (14-16 N·m). If orifice plug 21 was removed, install a new plug. Tighten it to 42-50 lb ft (57-67 N·m).

(4) If drain tube 1 (B, foldout 8) was removed, install a new tube, smaller end first, into the housing bore. Drive the tube into the bore until the larger end is firmly seated against the bore shoulder.

(5) Install lubrication pressure tube 9 (B, foldout 4), and retain it with a 3/8-16 x 5/8-inch self-locking bolt 8. Tighten the bolt to 36-43 lb ft (49-58 N·m). Install sealring 7 onto the top (flange) end of oil suction tube 5, and install the suction tube. Install three 3/8-16 x 3/4-inch self-locking bolts 4 to secure the flange end of the tube, one 3/8-16 x 3/4-inch bolt 6 to secure the center bracket, and one 3/8-16 x 3/4-inch bolt 44 to secure the bottom. Tighten all five bolts to 36-43 lb ft (49-58 N·m).

(6) If oil seal 36 was removed from the PTO location (refer to paragraph 4-6f for seal preparation), press a new seal into the bore until it seats lightly against the bore shoulder. If plug 35 was removed, install a new plug, closed end first, into the bore.

## TRT 4820, 4821 TRANSMISSIONS

Drive the plug inward until it is flush to 0.020 inch (0.50 mm) below the surface. If plug 37 was removed, apply nonhardening sealer onto the outer circumference of the new plug and install it, closed end first, into the bore. Drive the plug inward against the shoulder in the bore.

(7) If dowel pins 11 or 15 were removed, install new dowel pins. Press the pins into the housing until they protrude 0.44 inch (11.2 mm) from the splitline surface.

(8) If plug 13 was removed, press a new plug, closed end first, into the passage to the depth recorded prior to removal. Install plug 12. Tighten it to 33-37 lb ft (45-50 N·m).

(9) Install pipe nipple 34, elbow 32, and breather 33. Tighten each component to 14-16 lb ft (19-21 N·m).

(10) If orifice plug 17, 18 or 19 was removed, install a new threaded plug. If the transmission housing opening is not tapped to accept a threaded plug, drill a 21/32-inch (16.667 mm) diameter hole through one wall and tap it for 0.500-14 dryseal NPTF.

(11) Be sure to thoroughly clean all drill and tap debris from transmission housing internally and from the passageway rework area.

(12) Tighten plug 17 to 23-27 lb ft (32-36 N·m). Tighten plug 18 to 42-50 lb ft (57-67 N·m). Tighten plug 19 to 10-12 lb ft (14-16 N·m).

(13) If the model is equipped with a sump plate, install the plate gasket and sump plate. Retain the plate with eighteen 3/8-16 x 1-inch bolts 24 and lockwashers 25. Tighten the bolts to 26-32 lb ft (35-43 N·m).



## Section 7. ASSEMBLY OF TRANSMISSION

### 7-1. SCOPE OF SECTION 7

a. The procedures in this section describe the assembly of the transmission from the parts removed in Section 5 and the sub-assemblies rebuilt in Section 6.

b. When a procedure does not apply to the assembly being serviced, go to the next procedure which does apply.

c. Illustrations may not, in some areas, show the specific model being serviced. However, the procedure represented will be correct.

### 7-2. GENERAL INFORMATION FOR FINAL ASSEMBLY

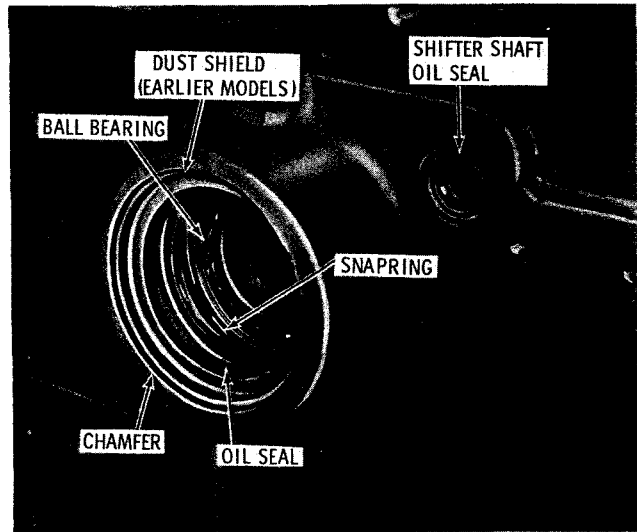
a. General Information. Refer to Section 4 for general information for overhaul, cleaning, and inspection of the transmission.

b. Torque Specifications. The torque value for each threaded fastener is specified in the assembly step. Torque values are also presented on the exploded-view foldouts at the back of this manual.

### 7-3. INSTALLATION OF OUTPUT COMPONENTS, TRANSFER DRIVEN GEAR

#### a. Two-Piece Shaft, Disconnect Coupling (A, foldout 7)

(1) Install a new shifter shaft oil seal (see para 4-6f for seal preparation). Install the seal, lip inward, and press it lightly against the shoulder in the bore (fig. 7-1). Install the output shaft front bearing and retain it with the snapping. Install a new front flange oil seal (see para 4-6f for seal preparation). Press or drive the seal squarely into the bore until its front (outer) face is 1.12-1.16 inches (28.4-29.4 mm) inward from the inner edge of the bore chamfer. For some earlier models, install the dust shield, flat side first, into the bore. Press or drive the dust shield rearward until its front



51878

Fig. 7-1. Output shaft front bearing, oil seal and dust shield

(outer) edge is 0.014 inch (0.36 mm) beyond the inner edge of the bore chamfer. A dust shield is not required on later models.

(2) Install detent spring 14 (A, foldout 7) and two detent balls 13 into front output shaft 12. Compress the spring by forcing the balls into the shaft holes, and install disconnect coupling 15, outer-grooved end first, onto the shaft. Push the coupling against the shaft shoulder. Install the assembled shaft and coupling into the transmission housing. Drive the shaft into the front bearing while supporting the bearing inner race.

(3) Install bearing 19 into its bore in the support web within the housing.

(4) If sleeve bearing 22 was removed from rear output shaft 23, install a new sleeve bearing. Press the sleeve bearing into the bore until it is recessed 0.16-0.20 inch (4.1-5.1 mm) below the end surface of the shaft.

(5) If bearing 24 was removed from rear output shaft 23, install a new bearing. Press the shaft into the bearing, and seat the bearing against the shaft shoulder.

## TRT 4820, 4821 TRANSMISSIONS

(6) Install transfer driven gear 20 into the housing. Install the rear output shaft and bearing into the housing bore and through the splined hub of the transfer driven gear. When all components are aligned, use a soft hammer to drive the shaft forward until seated lightly against bearing 19.

(7) Install snapping 25 to retain the rear bearing. Install a new oil seal 27 (see para 4-6f for seal preparation). Press or drive the seal squarely into the bore until its rear (outer) face is 1.53-1.57 inches (38.9-39.8 mm) inward from the chamfer in the rear output bore. Install dust shield 28, flat side first, driving it squarely into the bore until the rear surface of the inner lip is 0.92-0.96 inch (23.4 to 24.3 mm) inward from the chamfer in the rear output bore.

### NOTE

Be certain the dust shield does not block the oil drain hole in the lower side of the housing bore. Also check to ensure that the oil drain tube is open.

(8) Install the disconnect shifter fork, as shown in figure 7-2. While holding the fork in position, install the shifter fork shaft through the oil seal at the front of the housing and thread it into the fork. Refer to paragraph 3-8c for adjustment of the shifter fork shaft.

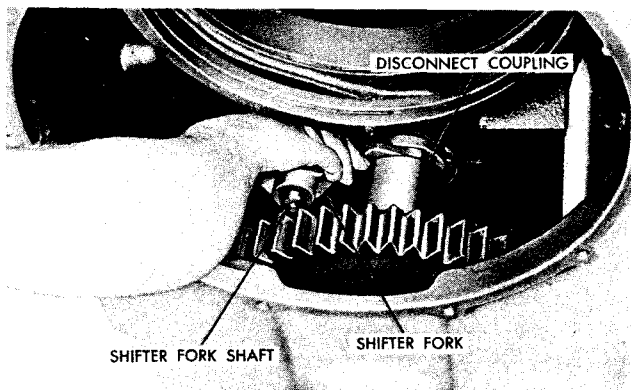


Fig. 7-2. Installing disconnect shifter fork and shaft

### b. One-Piece Shaft (A, foldout 7)

(1) Install transfer driven gear 20 into the transmission housing, and install bearing 24, to a depth of three inches, into the rear output shaft bore of the housing.

(2) Install a new oil seal 27 (see para 4-6f for seal preparation). Press or drive the seal squarely into the bore until its rear (outer) face is 1.53-1.57 inches (38.9-39.8 mm) inward from the chamfer in the rear output bore. Install dust shield 28, flat side first, driving it squarely into the bore until the rear surface of the inner lip is 0.92-0.96 inch (23.4-24.3 mm) inward from the chamfer in the rear output bore.

### NOTE

Be certain the dust shield does not block the oil drain hole in the bottom of the housing bore. Also check to ensure that the oil drain tube is open.

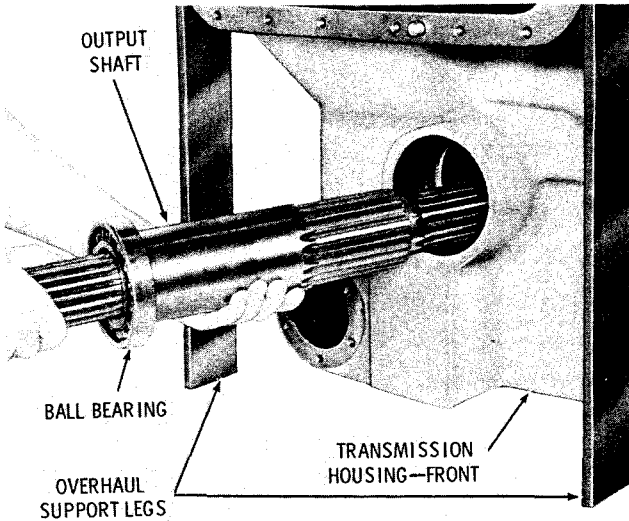
(3) If bearing 10 was removed from output shaft 11, install a new bearing. Press the shaft into the bearing, and seat the bearing against the shaft shoulder.

(4) Install the assembled shaft and bearing into the front output shaft bore (fig. 7-3). Engage the shaft splines with those in the transfer gear hub, and guide the shaft through the rear output shaft bearing. Seat the front bearing against the shoulder in the housing bore and install snapping 9 (A, foldout 7) to retain the bearing.

(5) If removed, install cap 34 (A, foldout 7) into the housing.

(6) Install a new oil seal 7 (refer to paragraph 4-6f for seal preparation). Press or drive the seal squarely into the bore until its front (outer) face is 1.12-1.16 inches (28.4-29.4 mm) inward from the inner edge of the bore chamfer. For some earlier models, install dust shield 6, flat side first, into the bore. Press or drive the dust shield rearward until its front (outer) edge is 0.014 inch

## ASSEMBLY OF TRANSMISSION



53349

Fig. 7-3. Installing one-piece output shaft

(0.36 mm) beyond the inner edge of the bore chamfer. The dust shield is not required on later models.

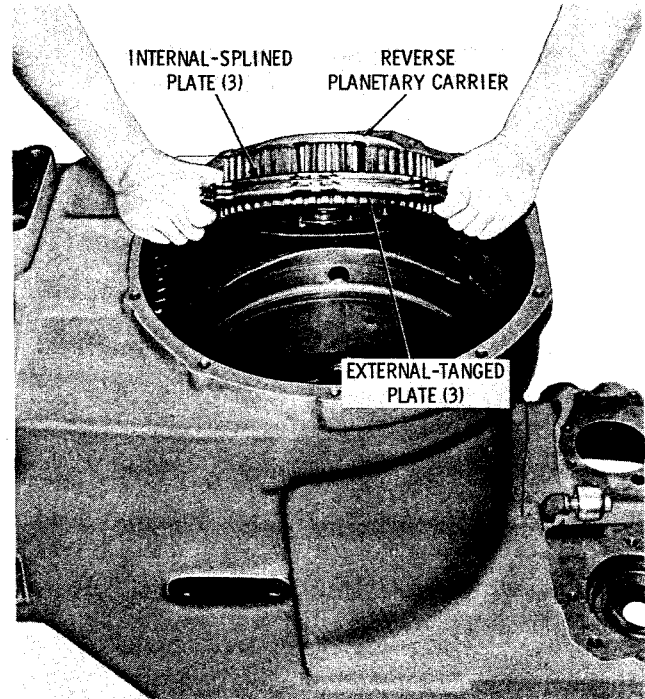
(7) Seat bearing 24 lightly against the spline end face (shoulder) on the output shaft.

### 7-4. INSTALLATION OF RANGE GEARING, PISTONS, CLUTCHES

#### a. Reverse Piston, Clutch, and Planetary (A, foldout 5)

(1) Position the transmission housing, front downward, on wood blocks. Oil the piston seals and install reverse piston 4 (as assembled in para 6-11) into the transmission housing.

(2) Beginning with an internal-splined clutch plate 6, alternately install three internal-splined plates 6 and three external-tanged plates 5 onto the full-splined end (front) of reverse planetary carrier 7. Install the assembled six clutch plates and carrier onto the reverse piston (fig. 7-4). Beginning with an external-tanged plate 19, alternately install four external-tanged plates 19 and four internal-splined plates 20 onto reverse planetary carrier 7.



53380

Fig. 7-4. Installing reverse planetary and six clutch plates

(3) Carefully align the tangs of the seven external-tanged plates, and install the reverse-and-forward clutch anchor (fig. 7-5). Engage the slotted tangs with the protruding anchor pins when all seven plates are engaged, approximately 2.56 inches (65 mm) clearance will exist between the top (rear edge) of the anchor and the closer snapping groove in the housing. Install anchor pin 41 (B, foldout 4) milled end first into the transmission housing. Engage the milled flats of the pin with the slot in the reverse-and-forward clutch anchor. Install anchor plug 42 (in earlier models). Temporarily install a flat washer and 3/8-16 x 3/4-inch bolt to retain the plug and pin (fig. 7-8).

#### b. Forward and High-Range Planetaries

(1) If the bearing was removed from the forward-and-reverse sun gear, install a new bearing (fig. 7-6). Install the sun gear and bearing into the forward planetary carrier assembly.

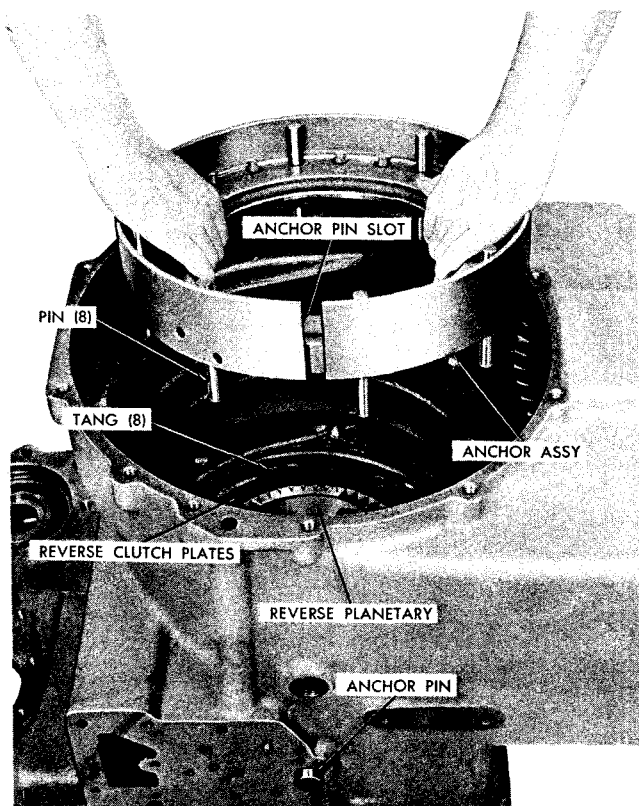


Fig. 7-5. Installing reverse-and-forward clutch anchor assembly

51888

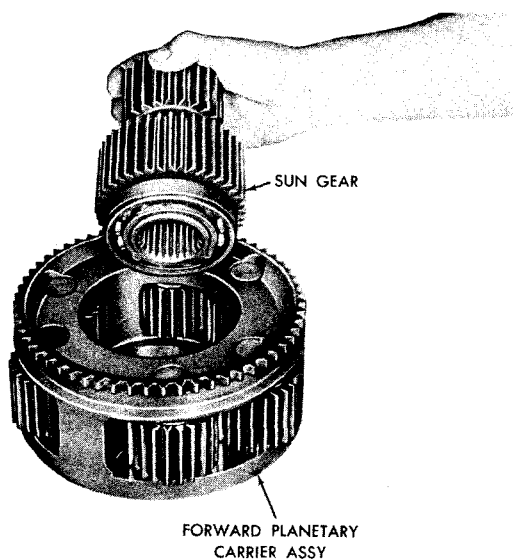


Fig. 7-6. Installing forward-and-reverse sun gear

51889

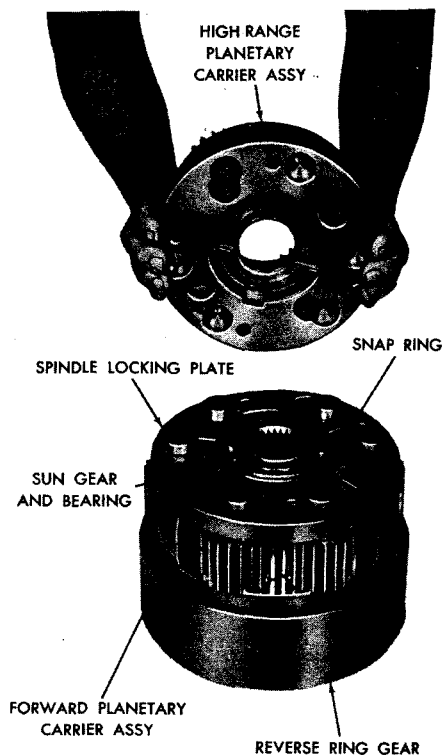


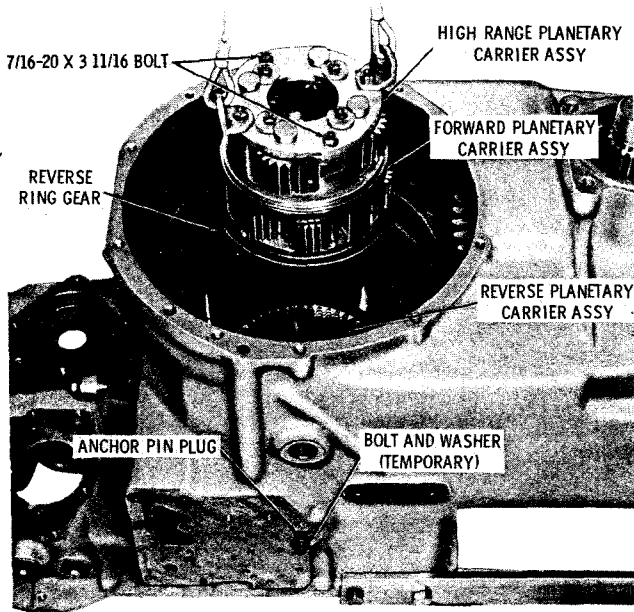
Fig. 7-7. Assembling forward and high-range planetary carrier assemblies

51890

(2) Install the snapping into the bearing groove to retain the sun gear in the carrier (fig. 7-7). Install the reverse ring gear onto the carrier, and retain the ring gear with a snapping. Install the spindle locking plate and lock it in place by driving it counterclockwise against the spindles. Place the high-range carrier assembly onto the forward carrier assembly so that the protruding spindles of the forward carrier engage the recesses in the high-range carrier. Check to ensure that the high-range carrier is firmly engaged and square with the forward carrier.

(3) Install two of four 7/16-20 x 3-11/16-inch self-locking bolts to attach the high-range planetary carrier to the forward planetary carrier (fig. 7-8). Attach a sling and install the assembled unit onto the reverse planetary carrier. It may be necessary to rotate the unit to align reverse ring gear teeth with the pinions in the reverse planetary (refer to foldout 1, items 47 and 50).

## ASSEMBLY OF TRANSMISSION



S3381

Fig. 7-8. Installing forward and high-range planetary carrier assemblies

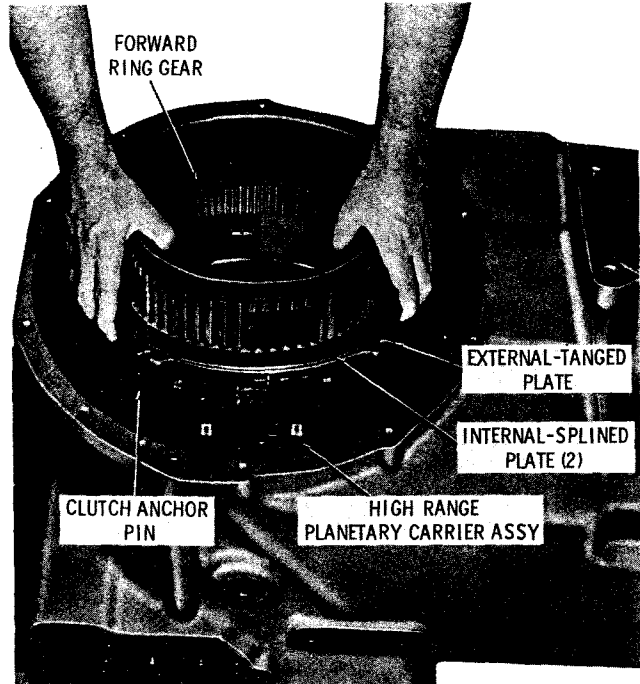
(4) Remove the sling and install the remaining two 7/16-20 x 3-11/16-inch self-locking bolts. Tighten the four bolts to 64-77 lb ft (87-104 N·m).

### c. Forward Clutch, Forward-and-High Range Piston Housing, and High-Range Clutch

(1) Place an external-tanged plate between two internal-splined plates and install these onto the short-spline end of the forward ring gear (fig. 7-9). Install the assembled clutch plates and ring gear as a unit, engaging the external-tanged plate with the clutch anchor pins. Also engage the forward planetary pinions with the inner teeth of the forward ring gear.

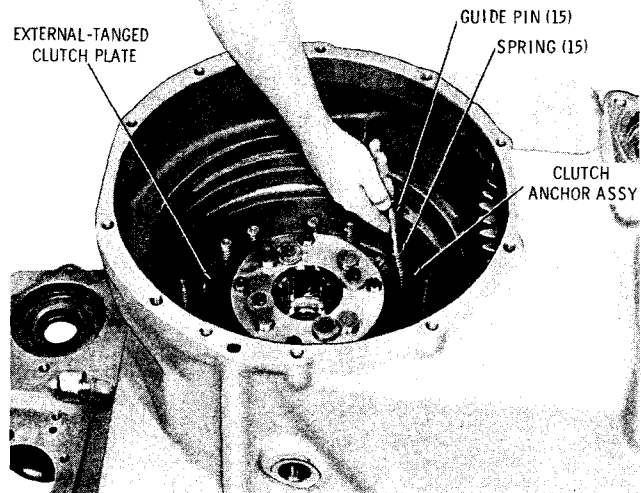
(2) Beginning with an external-tanged plate 7 (B, foldout 5), alternately install seven external-tanged plates 7 and six internal-splined plates 8 onto the forward ring gear. Engage seven clutch plates 7 on the anchor pins and six clutch plates 8 on the outer splines of the forward ring gear.

(3) Install the fifteen piston return springs and guide pins into the clutch anchor assembly (fig. 7-10).



S3382

Fig. 7-9. Installing forward ring gear and clutch plates



S3383

Fig. 7-10. Installing piston return springs and guide pins

(4) Install the two sealrings and inserts into the outer circumference of the forward-and-high range piston housing (fig. 7-11). Oil the piston seals and install the forward piston (as assembled in para 6-11) into the piston housing. Oil the piston seals

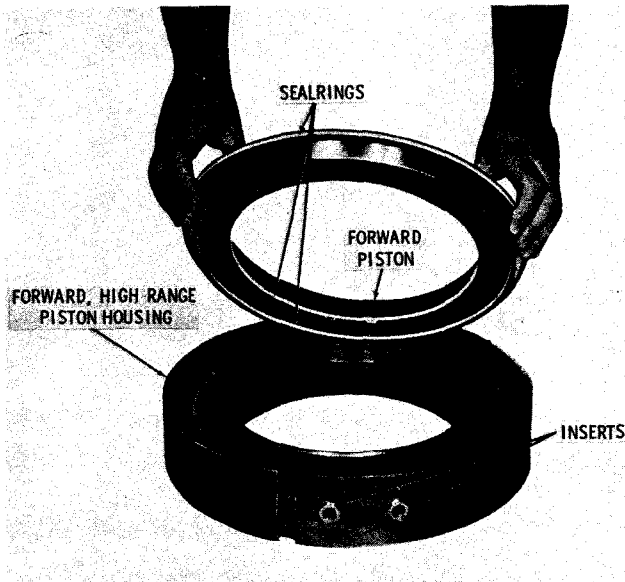


Fig. 7-11. Installing forward piston into piston housing

53384

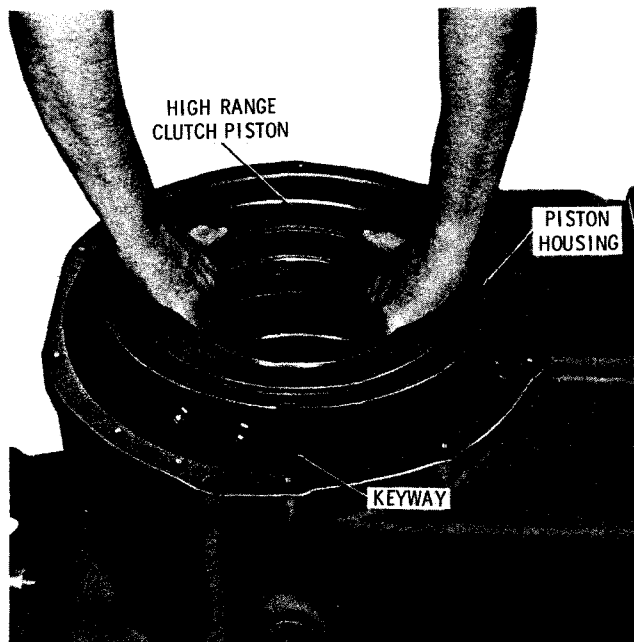
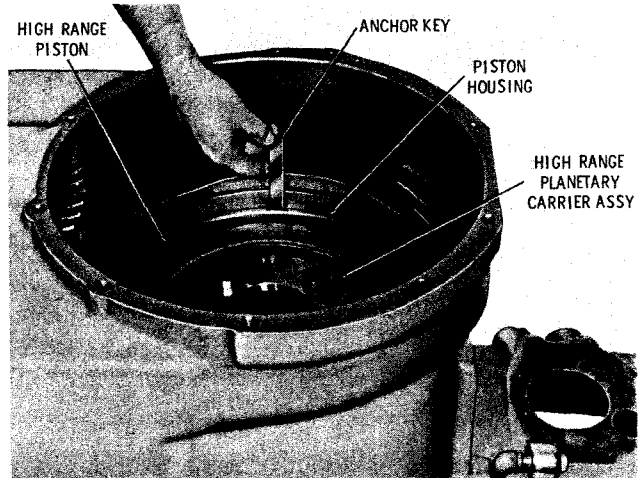


Fig. 7-12. Installing forward-and-high range clutch piston housing (pistons in place)

53385

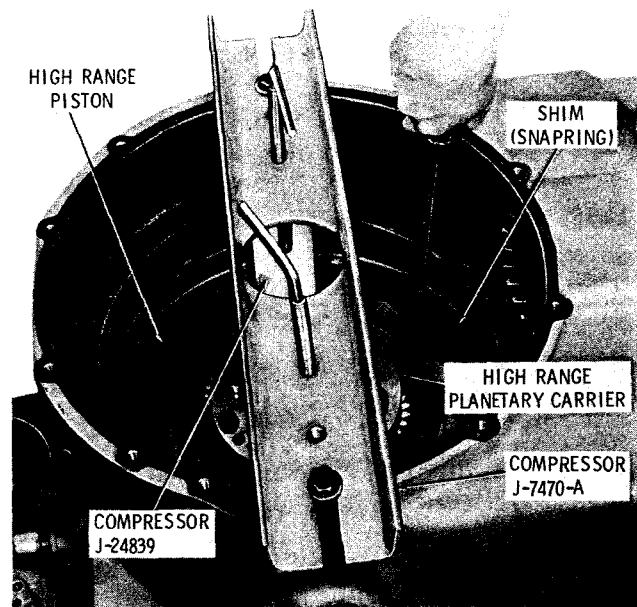
and install the high-range piston (as assembled in para 6-11) into the bore in the opposite side of the housing.

(5) Align the keyway in the piston housing with the keyway in the clutch anchor, and install the assembled pistons and housing to a seat on the piston return spring pins (fig. 7-12).



53386

Fig. 7-13. Installing piston housing anchor key



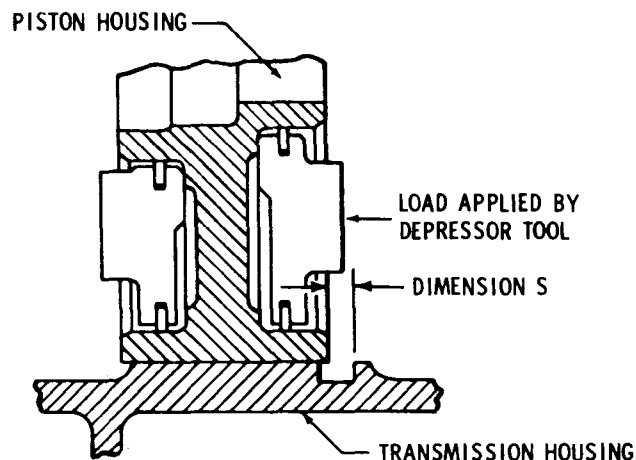
53373

Fig. 7-14. Installing piston housing snapping

(6) Install the piston housing anchor key, engaging both the piston housing and clutch anchor (fig. 7-13). When correctly installed, the top (rear) of the key will be below the top edge of the piston housing.

(7) Using compressor J-7470-A and compressor J-24839, depress the piston housing until it is firmly seated against the flange of the reverse-and-forward clutch anchor (fig. 7-14).

## ASSEMBLY OF TRANSMISSION



IF DIMENSION S IS:	SNAPRING SELECTION		COLOR CODE-PART NO.	
	INSTALL SNAPRING			
0.203 - 0.209 in. (5.16-5.31 mm)	0.198 - 0.202 in. (5.03-5.13 mm)	GREEN	6830339	
0.196 - 0.203 in. (4.98-5.16 mm)	0.191 - 0.195 in. (4.85-4.95 mm)	BLUE	6830338	
0.190 - 0.196 in. (4.83-4.98 mm)	0.185 - 0.189 in. (4.70-4.80 mm)	PLAIN	6839007	
0.183 - 0.190 in. (4.65-4.83 mm)	0.178 - 0.182 in. (4.52-4.62 mm)	WHITE	6830337	
0.177 - 0.183 in. (4.50-4.65 mm)	0.172 - 0.176 in. (4.37-4.47 mm)	RED	6830336	

Fig. 7-15. Selection of piston housing snapping

### NOTE

If a new reverse-and-forward clutch anchor, forward-and-high range piston housing, or transmission housing has been installed, proceed to step (8). Otherwise, proceed to step (9).

(8) Using a feeler gage, determine dimension S as shown in figure 7-15, and select the corresponding snapping.

(9) Install the special snapping to retain the piston housing. Remove the compressors.

(10) Position high-range ring gear 25 (A, foldout 6) short splines upward on a work surface. Beginning with an internal-splined plate 24, alternately install three internal-splined plates 24 and three external-tanged plates 23.

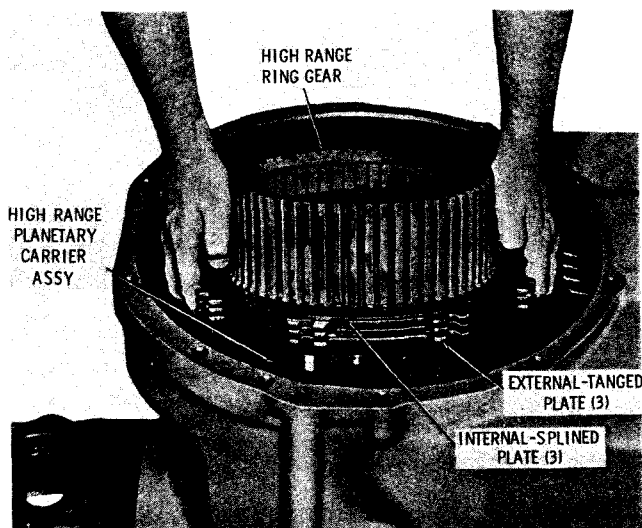


Fig. 7-16. Installing high-range ring gear and assembled clutch plates

53387

(11) Invert the assembled ring gear and six plates and install them as a unit onto the high-range planetary carrier and piston in the transmission housing (fig. 7-16).

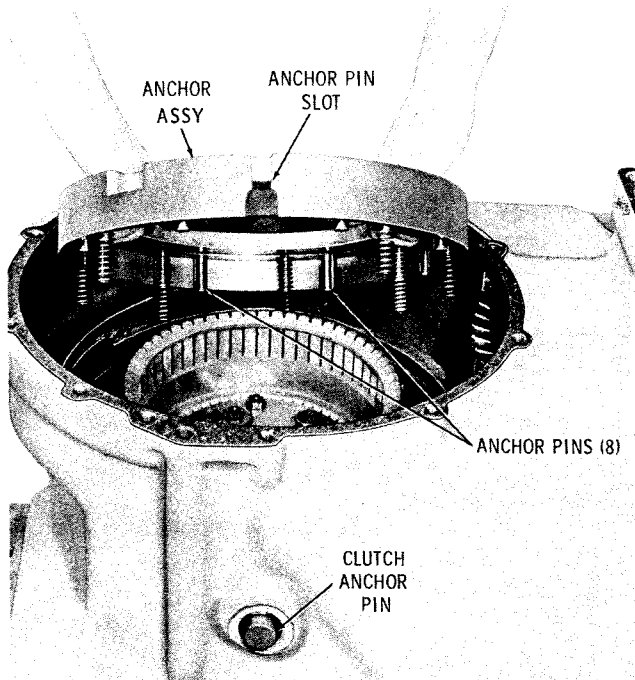
(12) Install the remaining four high range clutch plates 26 and 27 (A, foldout 6), beginning with an external-tanged plate 26. Carefully align the tangs of the five external-tanged plates to accept the eight anchor pins when the anchor is installed.

(13) Install seven springs 28 onto the pins in high-range clutch anchor assembly 29. Seat the springs in the recesses at the base of the pins (fig. 7-17). Install the high-range clutch anchor assembly, springs first, engaging the slots of the external-tanged plates with the eight anchor pins. Install the clutch anchor pin, flat-milled end first, engaging the slot in the anchor assembly.

### CAUTION

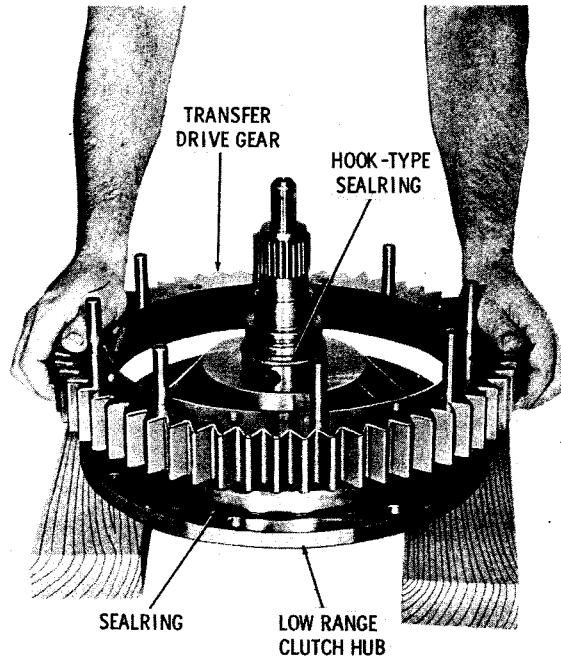
Use extreme care to ensure that the bottom clutch plate is engaged by the eight anchor pins. If an abnormal amount of force is required to install the anchor, the anchor pins may not have engaged the bottom plate. Remove the anchor assembly and realign the external tanged plates.





53388

Fig. 7-17. Installing high-range clutch anchor assembly



53389

Fig. 7-19. Installing transfer drive gear onto low-range clutch hub

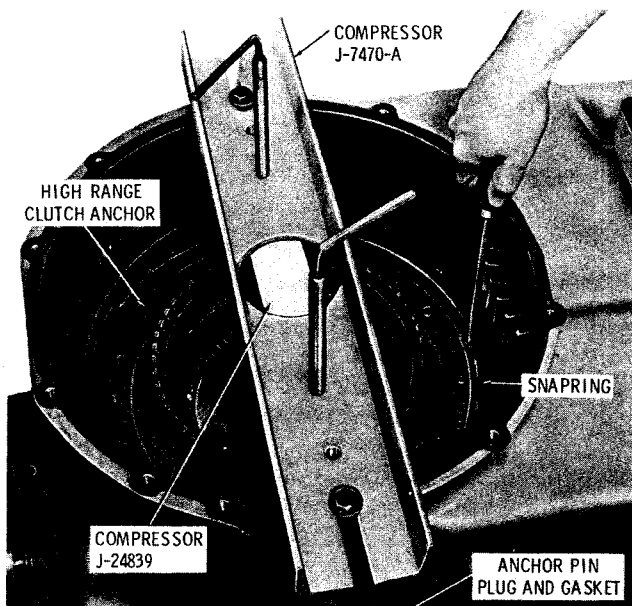
gasket. Tighten the plug to 100-250 lb ft (136-389 N·m). Remove the compressors..

## 7-5. INSTALLATION OF LOW-RANGE CLUTCH, TRANSFER DRIVE GEAR, REAR COVER

### a. Low-Range Clutch

(1) Position the low-range clutch hub (as assembled in para 6-13) in a press, splined shaft downward and install inner race and rollers 39 (B, foldout 6), pressing against the numbered side of the race.

(2) Position the low-range clutch hub, splined shaft upward, on wood blocks (fig. 7-19). Install the hook-type sealring and the large sealring onto the clutch hub. Lubricate the large sealring with transmission fluid, and apply oil-soluble grease to the hook-type sealring. On later models, install spacer 22 (A, foldout 6). Install the transfer drive gear assembly (as assembled in para 6-12), pins upward, onto the clutch hub. Align the bolt holes and seat the gear firmly against the hub flange (fig. 7-19).



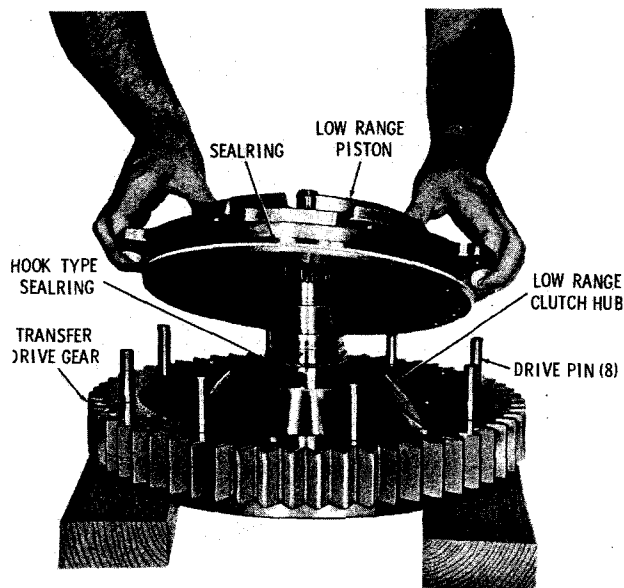
53371

Fig. 7-18. Installing high-range clutch anchor assembly snapping

(14) Using compressor J-7470-A and compressor J-24839, slightly depress the anchor assembly, and install the snapping (fig. 7-18). Install the anchor pin plug and



## ASSEMBLY OF TRANSMISSION



S3390

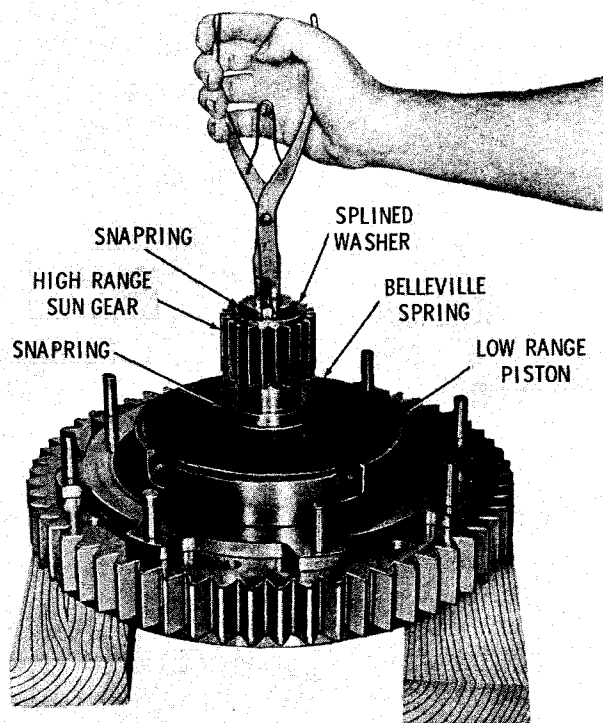
Fig. 7-20. Installing low-range clutch piston into transfer drive gear

(3) Check to ensure that the piston sealrings are uniformly centered in their grooves. Oil the piston seals and install the low-range clutch piston (fig. 7-20). Engage the drilled tabs of the piston with the drive pins in the transfer gear.

(4) Install the Belleville spring so that its outer circumference rests on the piston face (fig. 7-21). Depress the Belleville spring sufficiently to expose the snapping groove, and install the snapping to retain the spring. Install the high-range sun gear, counterbored end first, onto the clutch hub shaft. Install the splined washer onto the sun gear; retain both with the snapping.

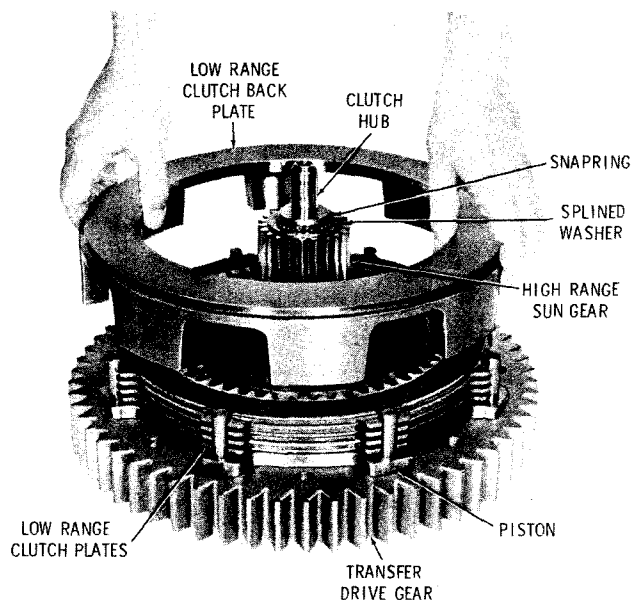
(5) Beginning with an internal-splined clutch plate 2 (B, foldout 6) alternately install five plates 2 and four external-tanged plates 3 onto low range clutch piston 6. Install the low-range clutch backplate onto the assembled unit (fig. 7-22).

(6) Invert the assembled unit, and install six 1/2-20 x 3-inch bolts 20 (B, foldout 6) and lock tabs 19 (sling to be attached at two opposite holes) into the transfer drive gear. Tighten the bolts to 96-115 lb ft (131-155 N·m). Bend each lock tab against a flat on the bolt head.



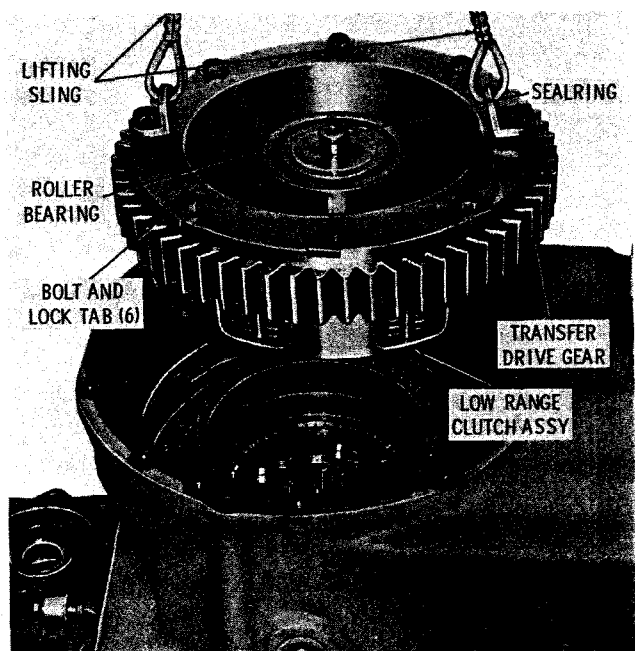
S3391

Fig. 7-21. Installing high-range sun gear snapping



S3368

Fig. 7-22. Installing low-range clutch backplate



S3367

Fig. 7-23. Installing transfer drive gear and low-range components

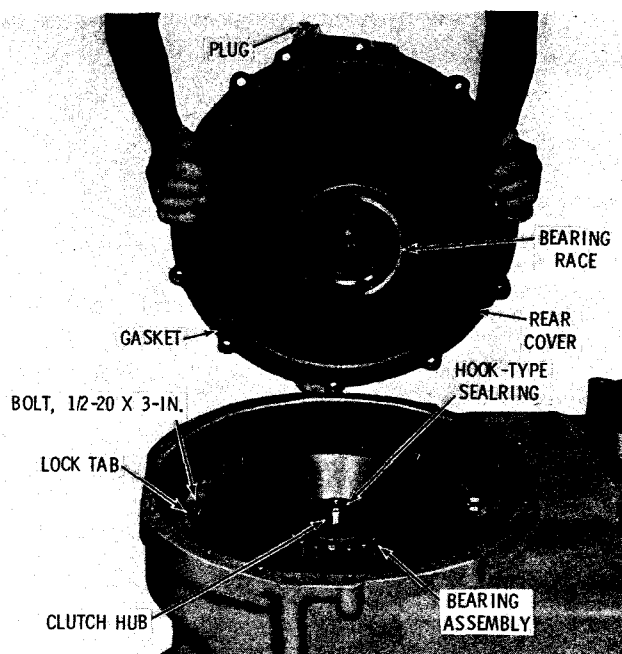
(7) Attach a sling and install the assembled unit (fig. 7-23), engaging the high-range sun gear with the high-range pinions and the low-range clutch plate splines with those of the high-range ring gear (refer to foldout 1, items 25, 29, 30 and 31). The unit is correctly installed when the transfer drive gear is approximately flush with the transfer driven gear (fig. 7-24). Remove the sling and install the remaining two 1/2-20 x 3-inch bolts and lock tabs. Tighten the bolts and bend the tabs as described in step (6).

(8) Install the hook-type sealring onto the rear of the clutch hub (fig. 7-24).

#### b. Rear Cover

(1) If the plug was removed from the rear cover, replace the plug (fig. 7-24). Tighten the plug to 14-16 lb ft (19-21 N·m). The plug should be 2-3 threads below the surface of the rear cover. Install the bearing outer race, inner lip first, into the rear cover.

(2) Install the gasket onto the rear cover and install the rear cover (fig. 7-24). Retain the cover with eleven 7/16-14 x 1-1/4-inch bolts and lockwashers. Tighten the bolts to 42-50 lb ft (57-67 N·m).



S3392

Fig. 7-24. Installing rear cover and gasket

(3) If the transmission is equipped with a speedometer drive (B, foldout 6) install a new cork washer 35 and lip-type oil seal 34 (refer to para 4-6f for seal preparation) into speedometer drive 36. Install gasket 30, speedometer drive adapter 31, gasket 32, and speedometer drive sleeve assembly 33 onto the rear cover. Secure these components with two 5/16-18 x 2-1/4-inch bolts 38 and lockwashers 37. Tighten the bolts to 13-16 lb ft (18-21 N·m).

### 7-6. INSTALLATION OF CONVERTER GEARING, OIL PUMP, FREEWHEEL CLUTCH

#### a. First Turbine Drive Gear

(1) Attach support legs (refer to Table 4-1) and position the transmission housing upright. If support legs are not available, block the transmission securely to maintain the upright position.

(2) If ball bearing 34 (B, foldout 3) was removed from first turbine drive gear 33, install a new bearing. For later models, install thrust washer 49 (B, foldout 4). Install the bearing and gear into the transmission

## ASSEMBLY OF TRANSMISSION

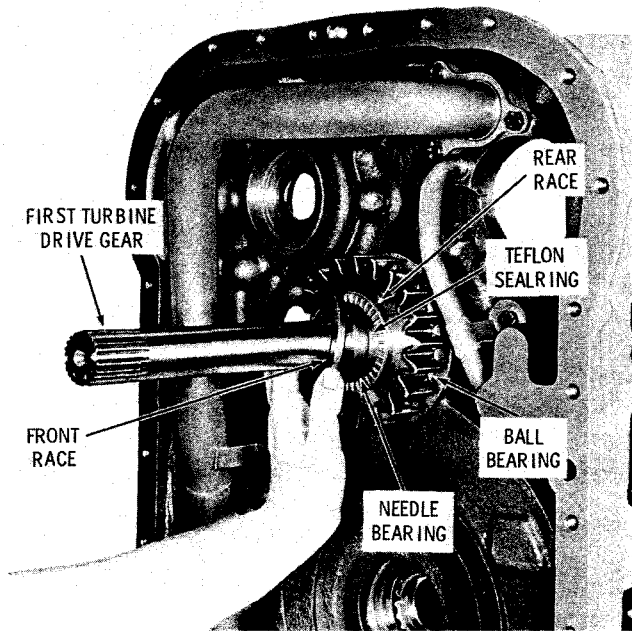


Fig. 7-25. Installing first turbine drive gear components

housing against thrust washer 49, if present (fig. 7-25). Install the needle bearing rear race with the inner lip away from the gear, and install the needle bearing. Install the Teflon sealring and retain it in its groove with oil-soluble grease. Install the front race with the outer lip toward the needle bearing.

### b. Oil Pump

(1) Install the gasket onto the oil pump (as assembled in para 6-8) and install the oil pump (fig. 7-26). Retain the pump with seven 3/8-16 x 4-inch bolts 18 (A, foldout 8) and lockwashers 17 and two 3/8-16 x 2-inch bolts 20 and lockwashers 21. Leave the bolts slightly loose at this time. (It may be desirable to use two headless guide bolts to support the pump during installation.)

(2) Install bearing race 20 (B, foldout 3), inner lip side against the pump, into the bore indicated in figure 7-26.

c. Freewheel Clutch. Using a sling and hoist, install the turbine-driven gears and freewheel clutch assembly (fig. 7-27) as

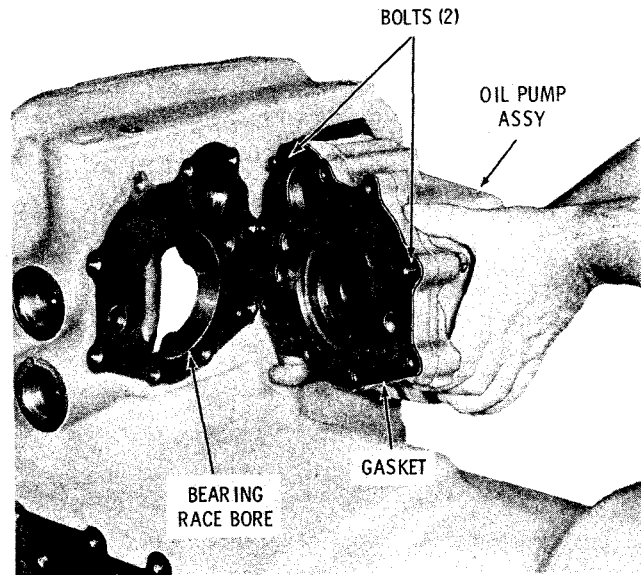


Fig. 7-26. Installing oil pump assembly and gasket

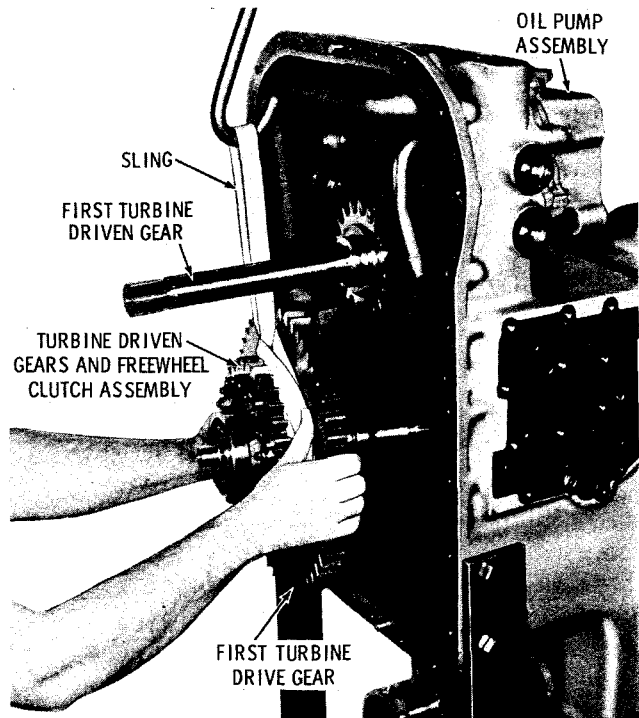


Fig. 7-27. Installing freewheel clutch and turbine driven gears

rebuilt in paragraph 6-10. The assembly is properly seated when the first turbine drive and driven gears are in full mesh.

d. Converter Housing Gearing

(1) If the transmission is equipped with accessory drive gear components (1, 2, and 3, B, foldout 4) and if these items were disassembled, reassemble them. Install bearing 1, snapping toward gear 2, and seat the bearing inner race against the hub shoulder. Install bearing 3, and seat the inner race against the shoulder on the shaft of the gear.

CAUTION

Outer race 20 of bearing assembly 18 (B, foldout 3) must be omitted when the inner race and rollers 19 are installed onto gear 17. The outer race was installed in paragraph 7-6b(2).

(2) If bearings 16 and 19 (B, foldout 3) were removed from oil pump driven gear 17, install new bearings. Install bearing 16, snapping toward gear 17, and seat the bearing inner race against the hub shoulder. Install bearing 19 inner race and rollers, without race 20, and seat the inner race against the shoulder on the shaft of the gear.

(3) If ball bearing 25 was removed from second turbine drive gear 28, install a new bearing. Seat the bearing inner race against the shoulder on the shaft of the gear. Install Teflon sealring 24 into the groove in the shaft, and retain it with oil-soluble grease.

(4) Position the converter housing to rest on wood blocks, and install the assembled oil pump driven gear (and accessory driven gear) as shown in figure 7-28. Install the second turbine drive gear.

**7-7. INSTALLATION OF TORQUE CONVERTER HOUSING, CONVERTER**

a. Torque Converter Housing

(1) Install the converter housing gasket onto the transmission housing (fig. 7-29). Attach a sling as shown, and install the assembled converter housing, while

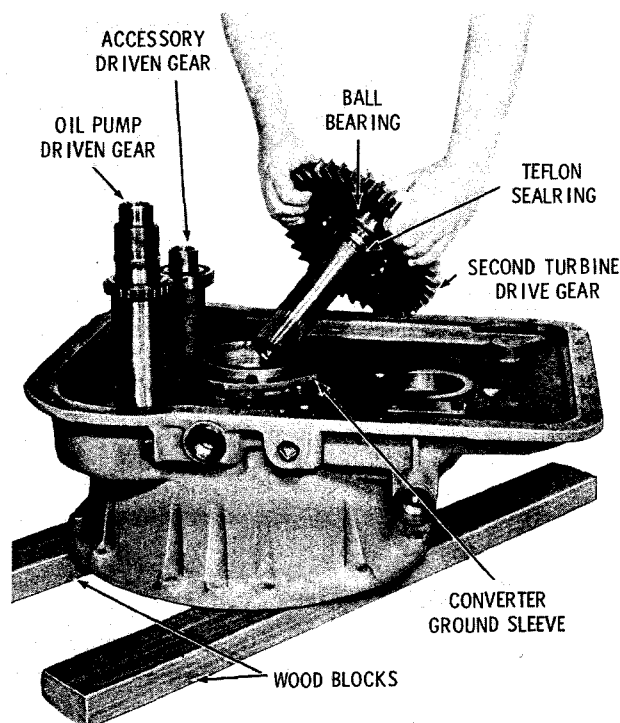


Fig. 7-28. Installing second turbine drive gear

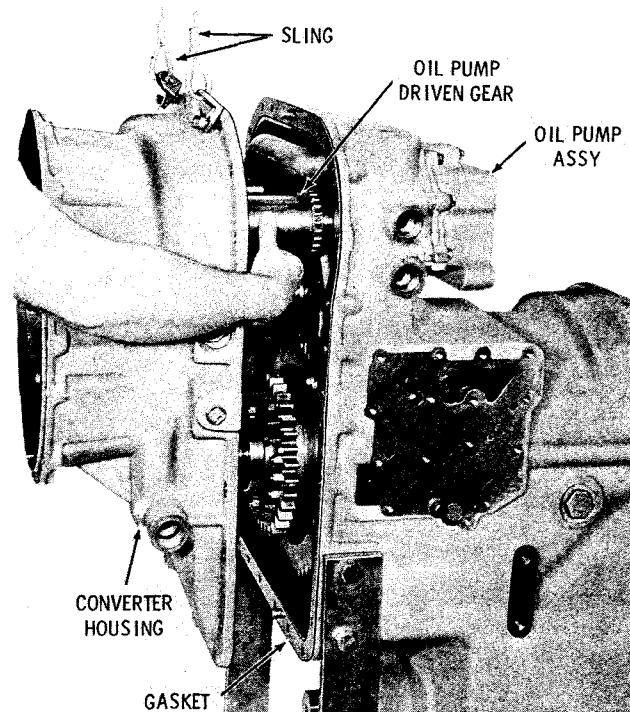
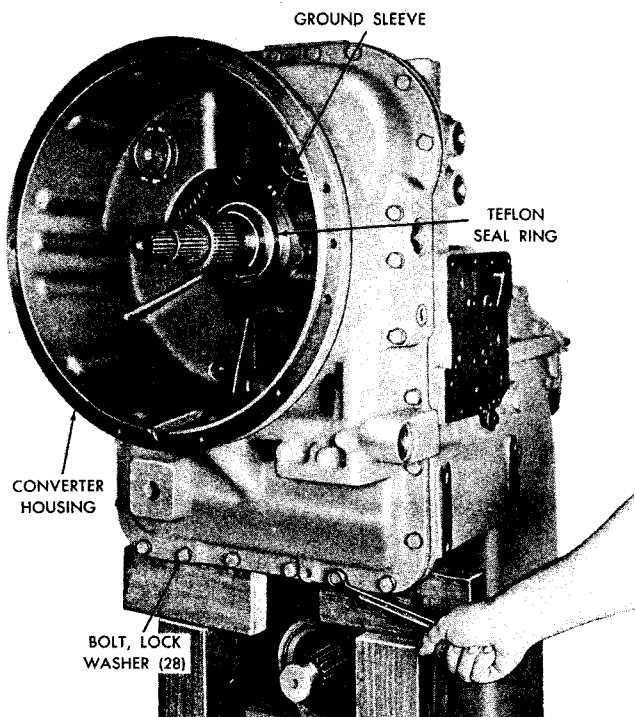


Fig. 7-29. Installing converter housing

guiding the oil pump driven gear (and accessory driven gear) into place in the transmission housing.

## ASSEMBLY OF TRANSMISSION



S2088

Fig. 7-30. Installing converter housing bolts

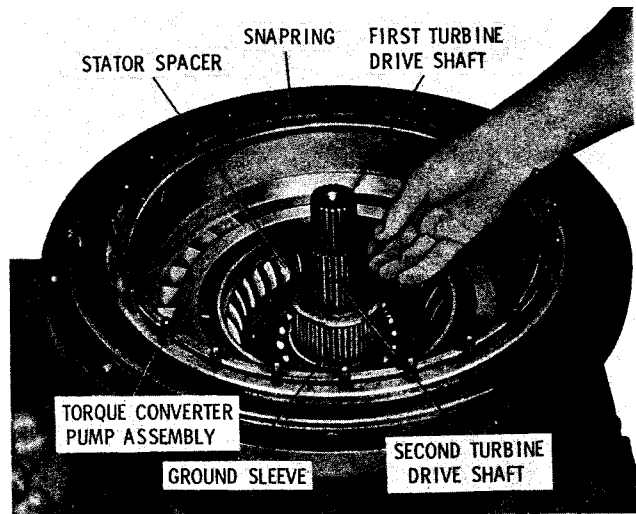
(2) Install the following bolts and lockwashers to retain the converter housing: three 7/16-14 x 3-inch bolts (B, foldout 3) and lockwashers 2, four 7/16-14 x 1-3/4-inch bolts 3 and lockwashers 4, and twenty-one 7/16-14 x 1-1/4-inch bolts 5 and lockwashers 6. Tighten all these bolts to 42-50 lb ft (57-67 N·m).

(3) Tighten the nine bolts retaining the oil pump assembly to 26-32 lb ft (35-43 N·m).

### b. Converter Components

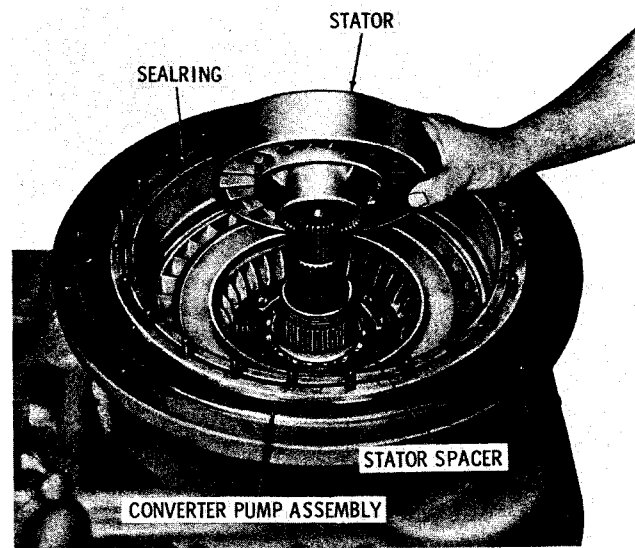
(1) Install the Teflon sealing onto the converter ground sleeve, and retain it in its groove with oil-soluble grease (fig. 7-30).

(2) Position the transmission, rear downward, on blocks. Install the torque converter pump assembly (as rebuilt in para 6-7) onto the converter ground sleeve, seating the inner race of the ball bearing against the shoulder on the ground sleeve (fig. 7-31). Install the stator spacer onto the ground sleeve.



S1834

Fig. 7-31. Installing converter stator spacer



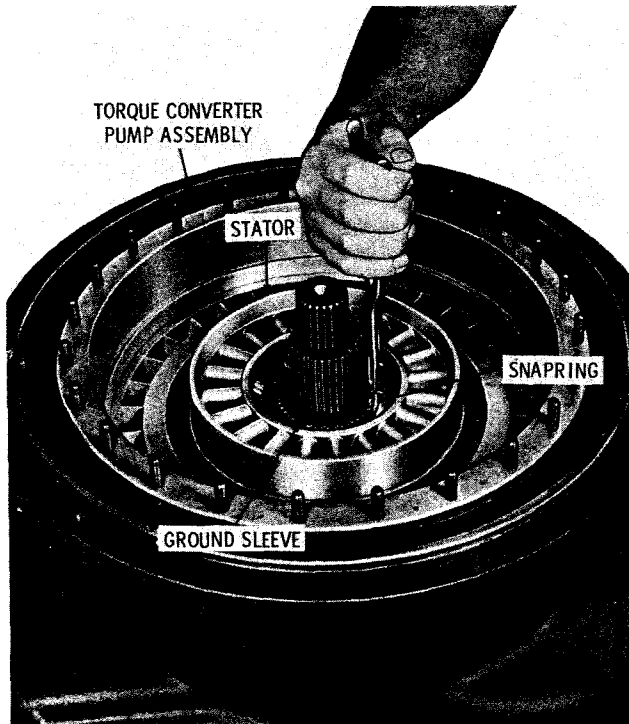
S1907

Fig. 7-32. Installing converter stator

(3) Install the torque converter stator, long hub downward, and seat it on the stator spacer (fig. 7-32).

(4) For TRT 4821 models, proceed to step (5). For TRT 4820 models, install stator snapping 9 (A, foldout 3) into the groove in the ground sleeve (fig. 7-33). Proceed to step (6).

(5) On TRT 4821 models, install snapping 23 into the groove in the second



S1833

Fig. 7-33. Installing stator snapping (TRT 4820 models)

turbine drive gear shaft. Install locknut 24 on the end of the ground sleeve. Using spanner wrench J-6534-02, tighten the locknut to 275-325 lb ft (373-431 N·m). Stake the locknut into one of the slots on the end of the ground sleeve.

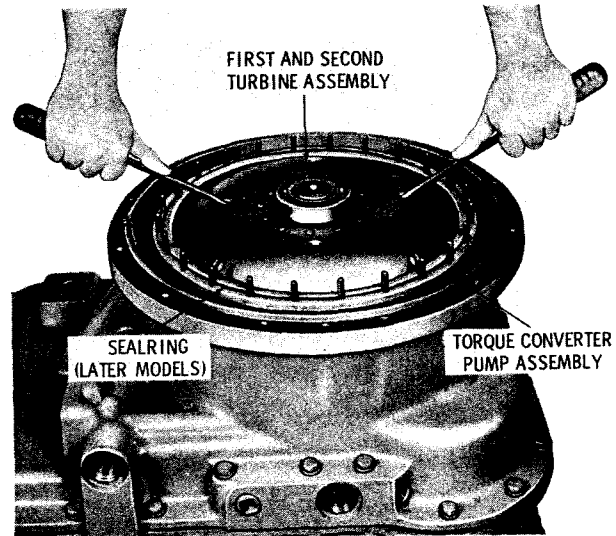
(6) For all models, install the first and second turbine (as rebuilt in para 6-6) onto the converter pump assembly (fig. 7-34).

## 7-8. INSTALLATION OF INPUT COMPONENTS

### a. Direct Mount

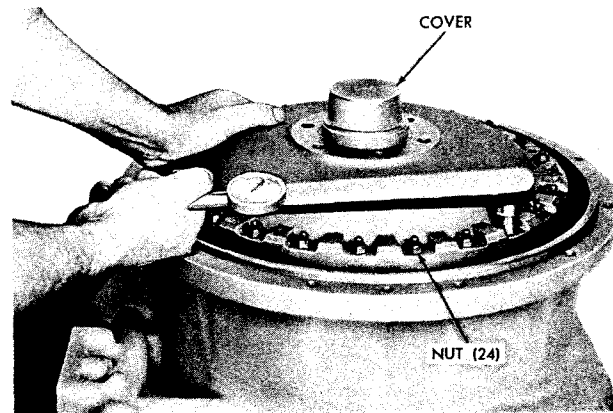
(1) Lubricate the splitline sealring (later models), and install the torque converter cover (as assembled in para 6-5). Retain the cover with twenty-four new 5/16-24 self-locking nuts (fig. 7-35). Tighten the nuts evenly to 14-17 lb ft (19-23 N·m).

(2) Install the disk and washer assembly, threaded nuts downward, onto the



S1832

Fig. 7-34. Installing first-and-second turbine assembly



S2105

Fig. 7-35. Installing converter cover nuts (direct mount)

converter cover (fig. 7-36). Install four flex disks (three used for some 14-inch drives) and align the holes in the disks with the disk and washer assembly. Install the flex disk plate, and align its holes with the installed disks and the tapped holes in the converter cover. Install twelve 1/2-13 x 1-1/4-inch self-locking bolts (six 1/2-13 x 1-inch self-locking bolts for 14-inch drives) to attach the assembled disks to the converter cover. Tighten the bolts to 81-97 lb ft (110-131 N·m).

## ASSEMBLY OF TRANSMISSION

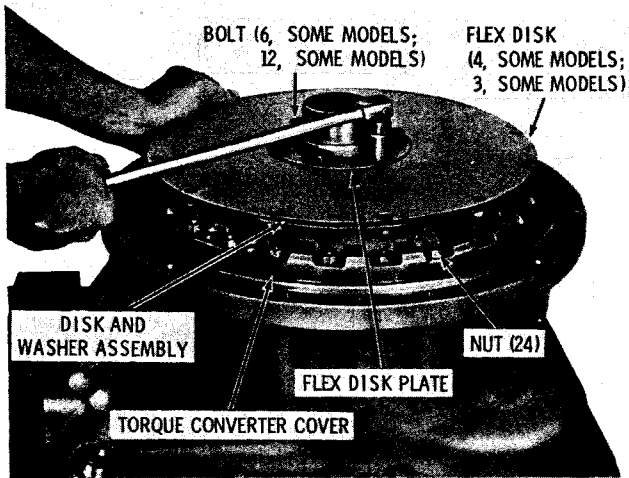


Fig. 7-36. Installing flex disk assembly

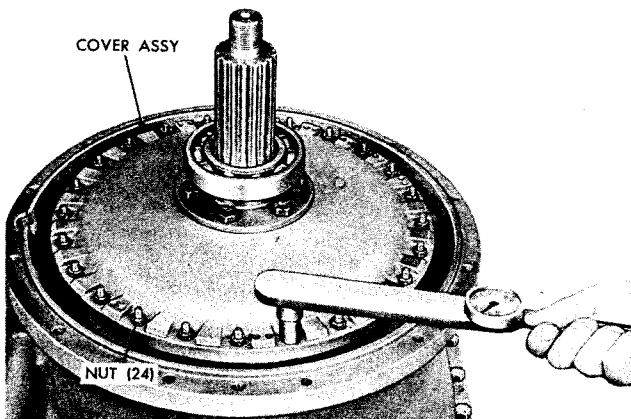


Fig. 7-37. Installing converter cover nuts (remote mount)

### b. Remote Mount

(1) Lubricate the splitline sealring (later models), and install the torque converter cover assembly (as assembled in para 6-5). Retain the cover with twenty-four new 5/16-24 self-locking nuts (fig. 7-37). Tighten the nuts evenly to 14-17 lb ft (19-23 N·m).

(2) Install a new oil seal into the transmission front cover (fig. 7-38). Prepare the oil seal as described in paragraph 4-6f. Press the oil seal, spring-loaded lip first, into the front of the cover. Locate the front

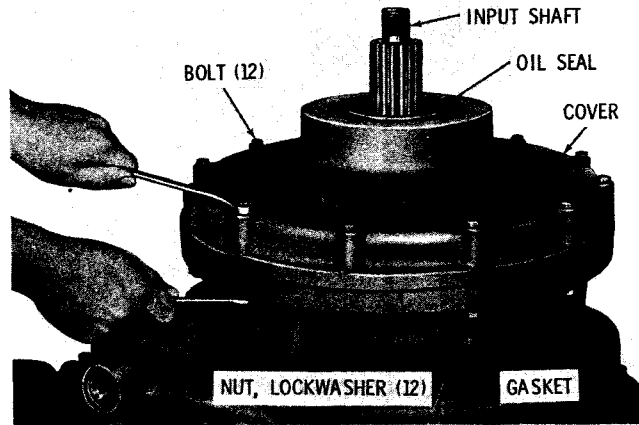


Fig. 7-38. Installing transmission front cover bolts

edge of the oil seal metal shell 0.280-0.340 inch (7.11-8.64 mm) beyond the inner edge of the chamfer. The seal must be square with the input shaft.

(3) Install the gasket and transmission front cover, and retain it with twelve 3/8-24 x 3-3/4-inch bolts, lockwashers, and nuts (fig. 7-38). Tighten the nuts to 31-37 lb ft (43-50 N·m).

(4) Refer to paragraph 4-7 and install the front input flange (or Torqmatic coupling) onto the input shaft (fig. 7-39).

(5) Coat the shaft threads lightly with molybdenum disulfide grease (such as Molykote Type G, or equivalent). Install the retaining washer and nut to retain the flange or Torqmatic coupling (fig. 7-39). Using a 2-3/4-inch thin-wall socket and torque wrench, tighten the nut to 450-700 lb ft (610-949 N·m) while holding the flange (or coupling) against rotation with holding tool J-3453.

## 7-9. INSTALLATION OF EXTERIOR COMPONENTS

### a. Output Flanges, Parking Brake

(1) Install front output flange spacer 8 (A, foldout 7). Refer to paragraph 4-7 and install flange 4, 5 or 33. Install sealring 3 making sure that it is seated in the



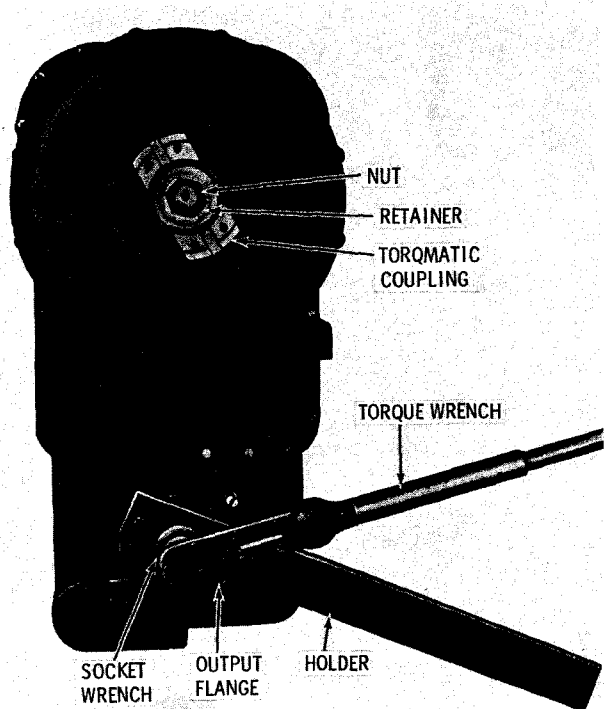


Fig. 7-39. Tightening front output flange nut

cavity between the shaft and the flange. Install flange retaining washer 2. Apply a light coat of molybdenum disulfide grease (such as Molykote Type G, or equivalent) onto the shaft threads, and install flange retaining nut 1. Tighten the nut to 500-750 lb ft (678-1017 N·m) while holding the flange against rotation (fig. 7-39).

(2) Install flange spacer 26 (A, foldout 7) onto the rear output shaft (fig. 7-40). Install the parking brake assembly (fig. 7-41).

(3) Attach the parking brake to the housing with four 5/8-11 x 1-3/8-inch bolts and internal-tooth washers (fig. 7-41). Tighten the bolts to 164-192 lb ft (223-260 N·m). Refer to paragraph 4-7 and install the output flange onto the rear output shaft.

(4) Install the shaft sealing, making sure that it is well seated in the cavity between the shaft and the flange (fig. 7-41). Install the flange retaining washer. Apply a

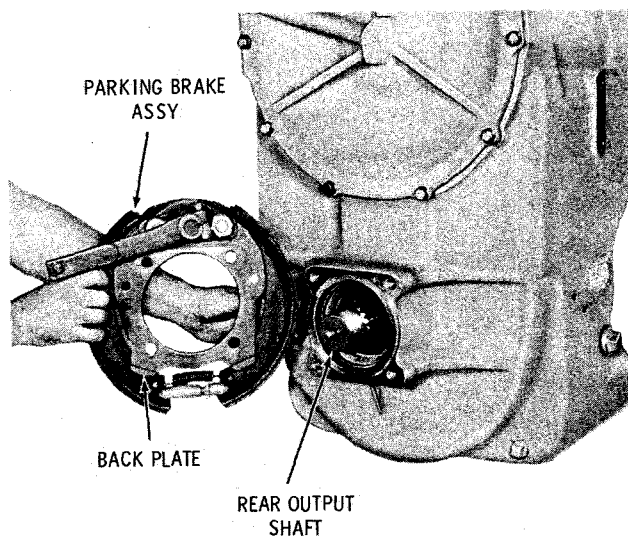


Fig. 7-40. Installing parking brake assembly

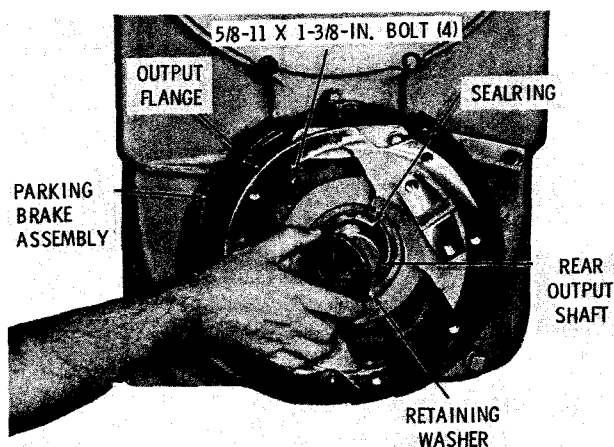


Fig. 7-41. Installing flange retaining washer

light coat of molybdenum disulfide grease (such as Molykote Type G, or equivalent) onto the shaft threads, and install the flange retaining nut. Tighten the nut to 500-750 lb ft (678-1017 N·m) while holding the flange against rotation.

(5) Install the brake drum and retain it with eight 1/2-20 x 1-inch bolts and lockwashers (fig. 7-42). Tighten these bolts to 83-100 lb ft (113-135 N·m). Refer to paragraph 3-8d for brake adjustment procedures.



## ASSEMBLY OF TRANSMISSION

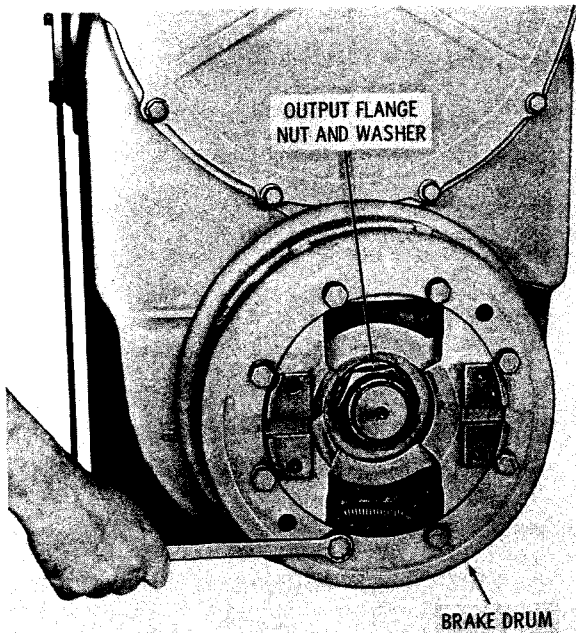


Fig. 7-42. Installing parking brake drum

### b. Oil Strainer, Plugs

(1) Install the gasket and oil strainer assembly (fig. 7-43). The strainer is off-center and must be toward the bottom of the transmission. Install six 3/8-16 x 7/8-inch bolts and lockwashers. Tighten the bolts to 26-32 lb ft (36-43 N·m).

(2) Install the FULL and ADD oil level check plugs (fig. 7-43). Install the plug or any other fittings required at the oil filler opening.

### c. Control Valve Body Assembly

(1) Remove the temporarily installed bolt and washer from the valve body mounting pad. (Refer to fig. 7-8.)

(2) Install the control valve body gasket and retain it with oil-soluble grease (fig. 7-44). Install the control valve body

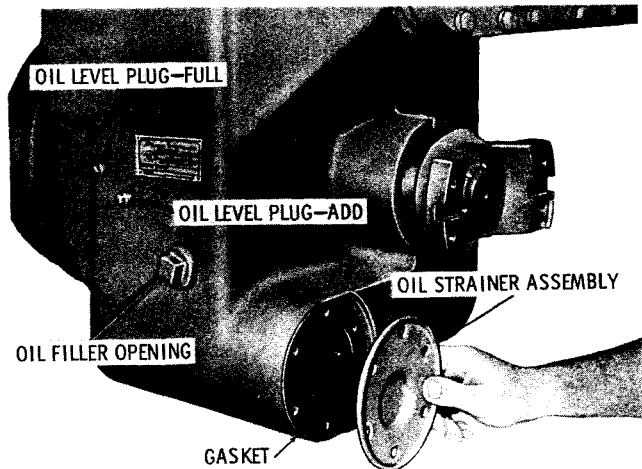


Fig. 7-43. Installing oil strainer and gasket

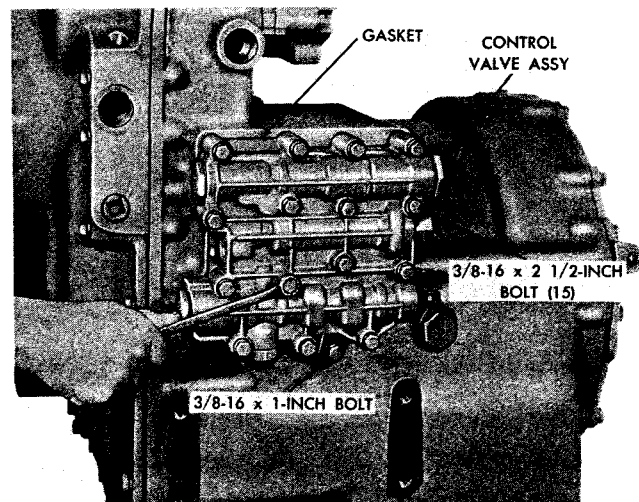


Fig. 7-44. Installing control valve body assembly bolts

assembly (as assembled in para 6-4), and retain it with fifteen 3/8-16 x 2-1/2-inch bolts, one 3/8-16 x 1-inch bolt and sixteen 3/8-inch lockwashers. Progressing outward from the center of the valve body, tighten the bolts evenly to 26-32 lb ft (36-43 N·m).

## 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. Table 8-1 lists the wear limits data and is referenced to the exploded views (foldouts 3 through 8) in the back of this manual.

b. Cleaning, Inspection. Parts must be clean to permit effective inspection. Refer to paragraph 4-5.

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

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. 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 drive-line flanges. 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 sealrings should be smooth with maximum wear of 0.005 inch (0.13 mm). The sides of the grooves into which the sealrings fit should be smooth (50 microinch (1.25 micrometers) equivalent), and square with the axis of rotation within 0.002 inch (0.05 mm). A new sealring should be installed if the groove is reworked, or if there is wear on the sealring outside diameter.

### 8-2. SPRING DATA

a. 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 Spring Data Table 8-2.

b. Inspection criteria (load vs height) and identification characteristics of the springs are presented in Table 8-2. The spring data are keyed to the exploded views (foldouts 3 through 8) in the back of this manual.

#### NOTE

When more than one spring part number is listed for the same location, refer to parts catalog SA 1158 to determine which spring is used in your specific assembly number.

# TRT 4820, 4821 TRANSMISSIONS

Table 8-1. WEAR LIMITS

<u>Illustration</u>	<u>Description</u>	<u>Wear Limit</u>	
		<u>in.</u>	<u>mm</u>
B, Foldout 3	TORQUE CONVERTER HOUSING		
30	Thrust bearing race thickness, min	0.028	0.71
32	Thrust bearing race thickness, min	0.028	0.71
A, Foldout 4	TURBINE-DRIVEN GEARS AND FREEWHEEL UNIT		
15	Freewheel roller diameter*, min	0.4980	12.649
16	Freewheel cam surface wear**, max	0.005	0.13
18	First turbine driven gear hub OD, min	4.448	112.98
A, foldout 5	REVERSE CLUTCH AND PLANETARY		
5, 19	Clutch plate thickness, min	0.1066	2.708
	cone, max	0.015	0.38
6, 20	Clutch plate thickness, min	0.130	3.30
	cone, max	0.010	0.25
8, 13	Thrust washer thickness, min	0.060	1.52
	cone, max	0.005	0.13
9	Pinion end play in carrier 14, max	0.050	1.27
22	Clutch anchor face wear		
	Reverse face, max	0.010	0.25
	Low-range face, max	0.010	0.25

\* Total wear of freewheel parts (2 X roller wear + cam surface wear (sum of opposite wear points) + gear hub wear) must not exceed 0.010 inch (0.25 max).

\*\* Determine wear by measuring depth of groove caused by roller contact in the cam pocket.

## WEAR LIMITS AND SPRING DATA

Table 8-1. WEAR LIMITS (cont)

<u>Illustration</u>	<u>Description</u>	<u>Wear Limit</u>	
		<u>in.</u>	<u>mm</u>
B, foldout 5	FORWARD CLUTCH AND PLANETARY		
4, 8	Clutch plate		
	thickness, min	0.130	3.30
	cone, max	0.010	0.25
5, 7	Clutch plate		
	thickness, min	0.1066	2.708
	cone, max	0.015	0.38
21, 26	Thrust washer		
	thickness, min	0.060	1.52
	cone, max	0.005	0.13
22	Pinion end play in carrier 20, max	0.050	1.27
A, foldout 6	HIGH RANGE CLUTCH AND PLANETARY		
8, 13	Thrust washer		
	thickness, min	0.060	1.52
	cone, max	0.005	0.13
9	Pinion end play in carrier 7	0.050	1.27
20	Splined thrust washer		
	thickness, min	0.089	2.26
	cone, max	0.005	0.13
23, 26	Clutch plate		
	thickness, min	0.1066	2.708
	cone, max	0.015	0.38
24, 27	Clutch plate		
	thickness, min	0.130	3.30
	cone, max	0.010	0.25
32	Clutch anchor face wear, max	0.010	0.25
B, foldout 6	LOW RANGE CLUTCH AND PISTON		
1	Clutch backplate face wear, max	0.010	0.25
2	Clutch plate		
	thickness, min	0.130	3.30
	cone, max	0.010	0.25
3	Clutch plate		
	thickness, min	0.1066	2.708
	cone, max	0.015	0.38
6	Piston face wear, max	0.010	0.25

# TRT 4820, 4821 TRANSMISSIONS

Table 8-1. WEAR LIMITS (cont)

<u>Illustration</u>	<u>Description</u>	<u>Wear Limit</u>	
		<u>in.</u>	<u>mm</u>
A, foldout 7	OUTPUT SHAFTS AND DISCONNECT ASSEMBLY		
12	Max diametral clearance between:		
22	Front output shaft and Bushings in output shaft 23	0.010	0.25
B, foldout 7	CONTROL VALVE BODY ASSEMBLY		
8	Valve clearance in body 9, max	0.004	0.10
16	Trimmer plug clearance in body 9, max	0.0035	0.088
20	Valve clearance in body 9, max	0.004	0.10
21	Valve plug clearance in plug 25, max	0.004	0.10
27	Valve clearance in body 9, max	0.004	0.10
40	Valve clearance in body 9, max	0.003	0.07
43	Valve clearance in body 9, max	0.003	0.07
48	Valve plug clearance in plug 49, max	0.004	0.010
A, foldout 8	OIL PUMP ASSEMBLY*		
13, 14	Driven gear shaft OD, min	0.749	19.02

\*No scoring or wearing permissible

# WEAR LIMITS AND SPRING DATA

Table 8-2. SPRING DATA

Foldout	Ref.	Spring	Part No.	No. Coils	Wire dia in. (mm)	Spring OD in. (mm)	Free length in. (mm)	Length under load in. (mm)	lb (N)
B, 3	10	Converter-out regulator valve	16773551	10	0.080 (2.03)	0.468 (11.89)	1.21 (30.7)	1.00 (25.4)	23.4-28.6 (103-127)
			26880795	12	0.067 (1.70)	0.434 (11.02)	1.55 (39.4)	1.02 (25.9)	28.3-34.5 (126-153)
B, 3	13	Lubrication regulator valve	76776495	15	0.054 (1.37)	0.378 (9.60)	1.34 (34.0)	1.01 (25.7)	8.3-10.1 (36-44)
A, 4	13	Freewheel clutch	76838744	22.5	0.041 (1.04)	0.225 (5.72)	1.48 (37.6)	1.24 (31.5)	7.0-8.6 (31-38)
A, 5	24	Reverse forward clutch piston return	76838677	37.5	0.106 (2.69)	0.625 (15.88)	7.35 (186.7)	6.02 (152.9)	45.1-49.9 (201-221)
A, 6	28	High-range piston return	76776549	17.5	0.092 (2.34)	0.622 (15.80)	2.78 (70.6)	1.94 (49.3)	33.3-40.7 (148-181)
			76777841	13	0.120 (3.05)	0.622 (15.80)	2.05 (52.1)	1.96 (49.8)	18-22 (81-97)
B, 6	5	Low-range piston return	76776539	Belleville Spring		8.04 (204.2)	0.40 (10.2)		
			76835399	Belleville Spring		8.04 (204.2)	0.37 (9.4)		
A, 7	14	Disconnect detent	76769532	22	0.063 (1.60)	0.350 (8.89)	2.11 (53.6)	1.80 (45.7)	13.5-16.5 (60.73)
B, 7	14	Main pressure regulator valve	76774715	15.5	0.086 (2.18)	0.690 (17.53)	3.00 (76.2)	2.70 (68.6)	7.5-8.3 (33-37)
			36776957	19.5	0.086 (2.18)	0.690 (17.53)	3.24 (82.3)	2.87 (72.9)	7.5-8.3 (33-37)
			46830292	16	0.086 (2.18)	0.690 (17.53)	3.18 (80.8)	2.87 (72.9)	7.5-8.3 (33-37)
			36830916	16.5	0.125 (3.18)	0.768 (19.56)	3.65 (92.7)	2.50 (63.5)	100-110 (444-489)
			76835705	16	0.125 (3.18)	0.768 (19.56)	3.64 (92.5)	2.50 (63.5)	100-110 (444-489)
			56885165	17.6	0.128 (3.25)	0.777 (19.81)	3.66 (93.0)	2.50 (63.5)	100-110 (444-489)
B, 7	15	Trimmer	76773593	10	0.131 (3.33)	1.120 (28.45)	2.90 (73.7)	2.38 (60.5)	25.6-31.2 (114-138)
			76830365	8	0.128 (3.25)	1.110 (28.19)	2.58 (65.5)	1.43 (36.2)	72.2-82.2 (321-365)

COLOR CODE: - No Color

1 Solid red, white stripe

2 Solid light blue

3 White stripe

4 Blue stripe

5 Solid white

# TRT 4820, 4821 TRANSMISSIONS

Table 8-2. SPRING DATA (cont)

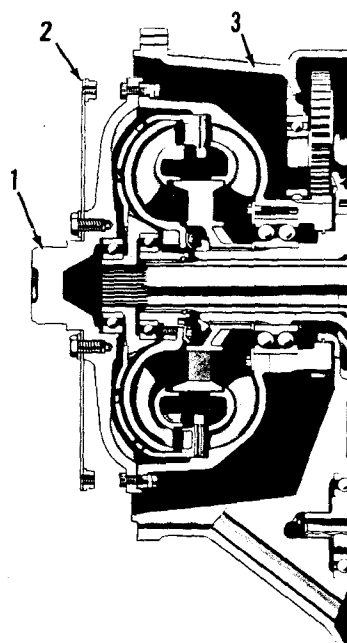
<u>Foldout</u>	<u>Ref.</u>	<u>Spring</u>	<u>Part No.</u>	<u>No. Coils</u>	<u>Wire dia in. (mm)</u>	<u>Spring OD in. (mm)</u>	<u>Free length in. (mm)</u>	<u>Length under load in. (mm)</u>	<u>lb (N)</u>
B, 7	19	Clutch cutoff valve	76765710	18.5	0.080 (2.03)	0.625 (15.88)	3.04 (77.2)	2.08 (52.8)	18.9-23.1 (84-103)
B, 7	31	Selector valve detent	36770253	11	0.054 (1.37)	0.480 (12.19)	1.24 (31.5)	0.78 (19.8)	7.6-8.4 (34-37)
B, 7	39	Inching regulator valve (front)	76770298	14.6	0.041 (1.04)	0.384 (9.75)	1.28 (32.5)	0.78 (19.8)	3.93-4.07 (17-18)
B, 7	42	Inching regulator valve (rear)	76774595	21.5	0.072 (1.83)	0.585 (14.86)	3.80 (96.5)	2.00 (50.8)	25.2-27.8 (112-124)
			76838473	26.4	0.090 (2.29)	0.620 (15.75)	4.29 (109.0)	2.50 (63.5)	41.9-55.1 (186-245)
B, 7	44	Inching valve return	76774594	17	0.120 (3.05)	1.105 (28.07)	5.75 (146.1)	4.04 (102.6)	28.5-31.5 (126-140)
B, 8	14	Parking brake shoe-to-shoe	62344799	17.5	0.106 (2.69)	0.641 (16.28)	3.62 (91.9)	3.94 (100.1)	26-44* 116-195)
B, 8	19	Parking brake anchor pin-to-shoe	72399048	8.2	0.120 (3.05)	0.810 (20.57)	2.98 (75.7)	3.25 (82.6)	45-55* (201-244)

COLOR CODE:    -    No Color  
                   3    White stripe  
                   6    Solid red  
                   7    Solid black

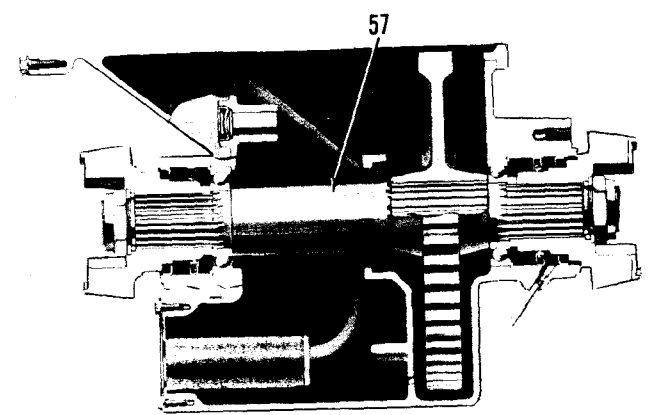
\*Tension spring

1. Torque converter drive cover
2. Flex disk drive assembly
3. Torque converter housing
4. Input flange (Torqmatic coupling)
5. Input shaft
6. Transmission front cover
7. Torque converter drive cover
8. Torque converter second turbine
9. Torque converter first turbine
10. Torque converter housing
11. Torque converter ground sleeve
12. Accessory and oil pump driven gear
13. Transmission housing
14. Oil suction tube
15. Oil pump assembly
16. First turbine drive gear
17. Second turbine drive gear
18. Reverse planetary carrier
19. Reverse clutch
20. Forward clutch
21. Forward-and-reverse sun gear
22. Forward planetary carrier
23. High-range clutch
24. High-range planetary carrier
25. Low-range clutch
26. Low-range clutch piston
27. Transmission rear cover
28. Low-range clutch hub
29. High-range sun gear
30. High-range pinion gear
31. High-range ring gear
32. Transfer drive gear
33. Parking brake
34. Rear output flange
35. Rear output shaft
36. Oil drain tube
37. Transfer driven gear
38. Disconnect coupling
39. Oil strainer
40. Front output shaft
41. Disconnect shifter shaft
42. Front output flange
43. High range clutch piston
44. Forward-and-high range clutch piston housing
45. Forward clutch piston
46. Forward ring gear
47. Reverse ring gear
48. Reverse clutch piston
49. Forward planetary pinion gear
50. Reverse planetary pinion gear
51. First turbine driven gear
52. Second turbine driven gear
53. Freewheel clutch
54. Torque converter pump
55. Accessory drive gear
56. Torque converter stator
57. Output shaft

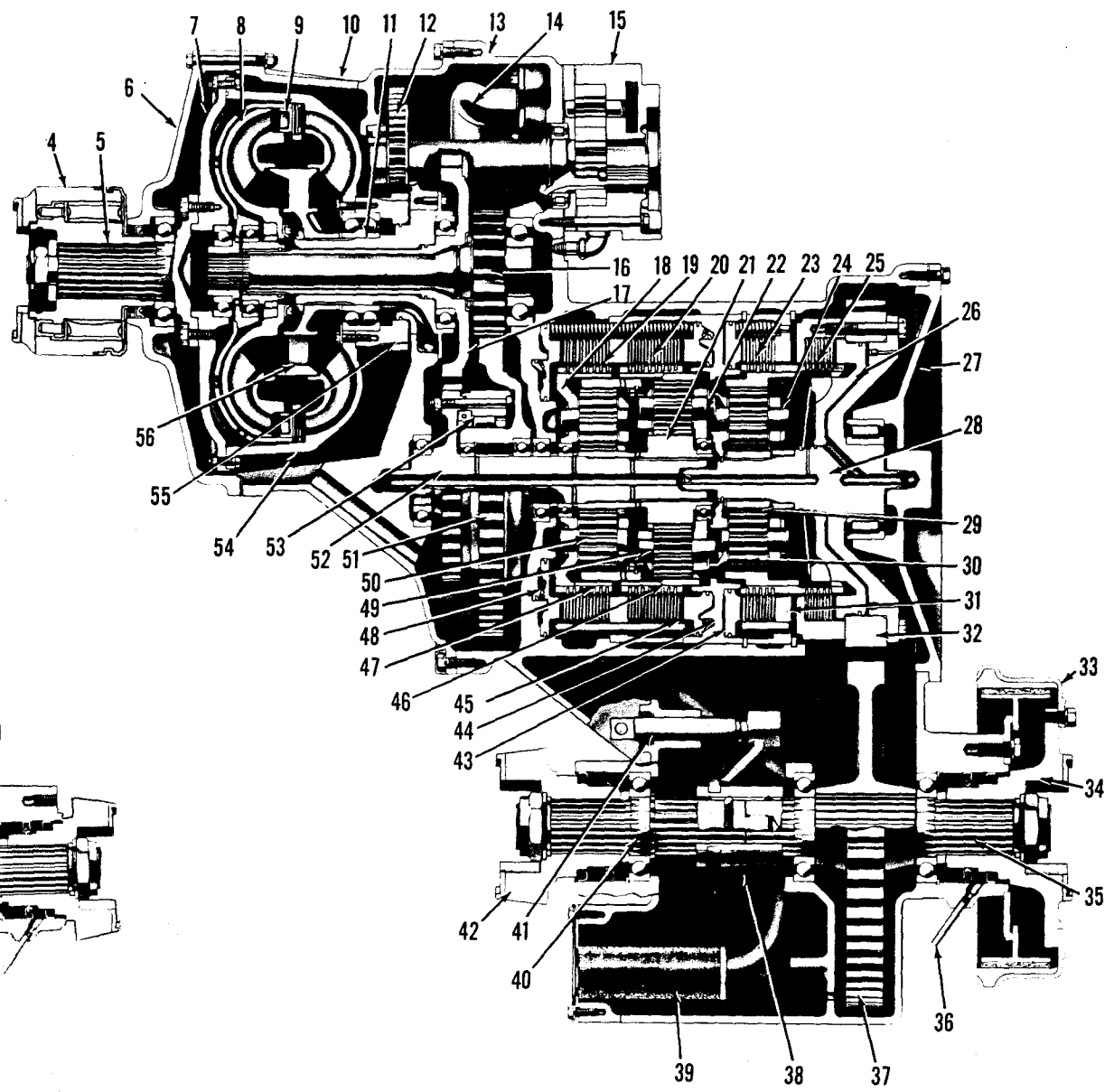




REMOTE MOUNT



ONE-PIECE OUTPUT SHAFT



Foldout 1. TRT 4821 transmission -- cross section

## A

1. Flange retaining nut A
2. Flange retaining washer
3. Input flange
4. Torqmatic coupling assembly
5. Oil seal
6. Bolt, 3/8-24 x 3-3/4 in. (12) B
7. Transmission front cover
8. Front cover gasket
9. Single-row ball bearing
10. Self-locking bolt, 1/2-13 x 1-1/8 in. C  
(6) (400 Series converter)  
(8) (600 Series converter)
11. Input shaft\*
12. Self-locking nut, 5/16 x 24 (24) D
13. Torque converter drive cover\*
14. Lockwasher, 3/8 in. (12)
15. Nut, 3/8-24 (12) B

\* 400 series converter -- drilled for 6 bolts  
600 series converter -- drilled for 8 bolts

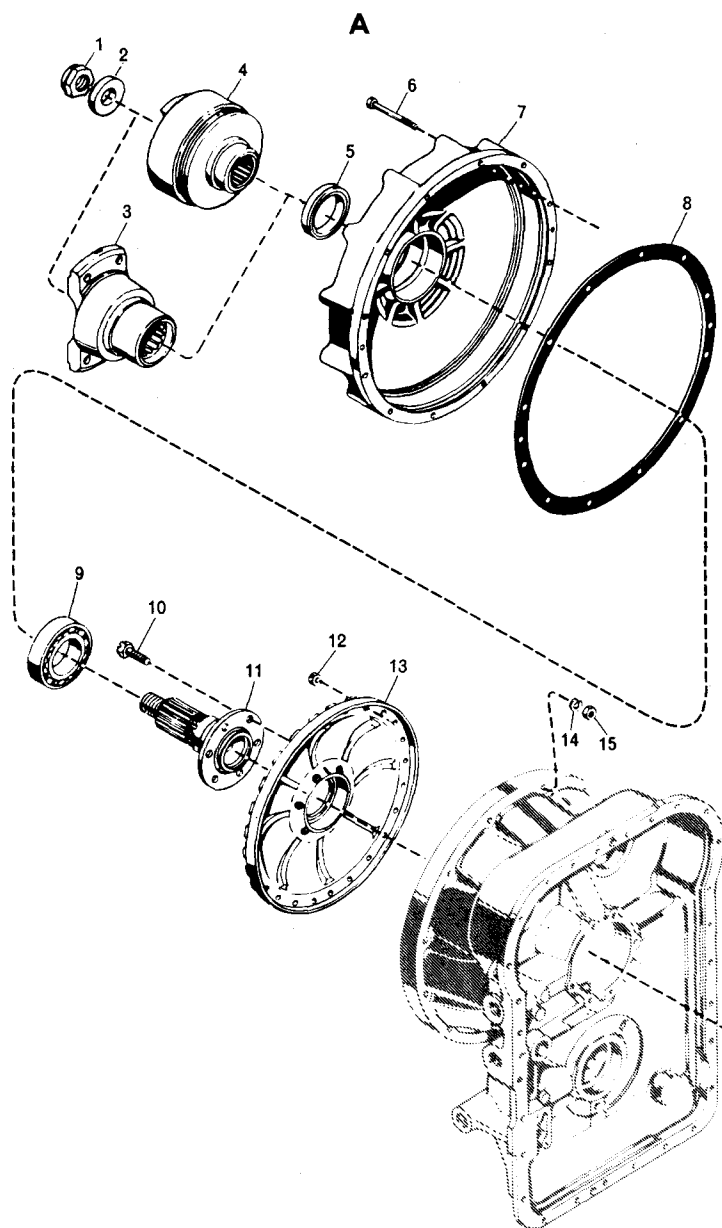
<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	450-700	610-950
<u>B</u>	31-37	42-50
<u>C</u>	81-97	110-131
<u>D</u>	14-17	19-23

## B

1. Self-locking bolt,  
1/2-13 x 1 in. (6, some models) A  
1/2-13 x 1-1/4 in. (12, some models) A
2. Flex disk plate
3. Flex disk (4) (3, some models)
4. Flex disk and washer assembly\*
5. Self-locking nut, 5/16-24 (24) B
6. Torque converter drive cover\*
7. Converter housing gasket

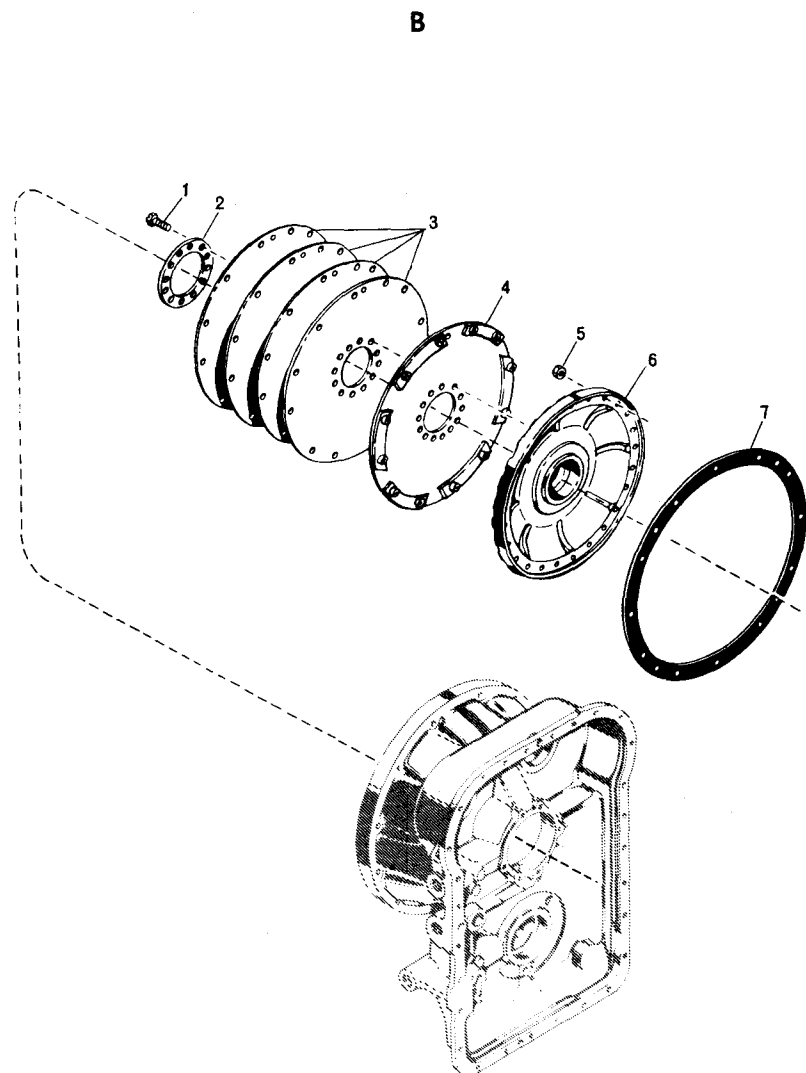
\* Some models drilled for 6 bolts  
Some models drilled for 12 bolts

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	81-97	110-131
<u>B</u>	14-17	19-23



A, Foldout 2. Front cover and input components -- remote mount

10710A



B, Foldout 2. Flex disk and input components -- direct mount

16234A

## A

1. Single-row ball bearing
2. First turbine and support assembly
3. First turbine support
4. First turbine
5. First turbine retaining pin (9)
6. Second turbine\*
7. Single-row ball bearing
8. Internal snapping\*
9. External snapping\*
10. Torque converter stator
11. Splined spacer
12. Self-locking bolt, 5/16-24 x 1-1/8 in. (12) A
13. Pump retainer strip (4)
14. Torque converter pump assembly
15. Torque converter pump
16. Special bolt, 5/16-24 x 1-3/8 in. (24) A
17. Double-row ball bearing

18. Input accessory drive gear
19. Second turbine hub\*\*
20. Second turbine\*\*
21. Lockstrip (5)\*\*
22. Bolt, 7/16-20 x 3/4 in. (10) B\*\*
23. External snapping\*\*
24. Locknut C\*\*
25. Sealring (later models)

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	19-23	26-31
<u>B</u>	64-77	87-104
<u>C</u>	275-325	373-431

\* TRT 4820

\*\* TRT 4821

## B

1. Bolt, 7/16-14 x 3 in. (3) A
2. Lockwasher, 7/16 in. (3) A
3. Bolt, 7/16-14 x 1-3/4 in. (4) A
4. Lockwasher, 7/16 in. (4) A
5. Bolt, 7/16-14 x 1-1/4 in. (21) A
6. Lockwasher, 7/16 in. (21) A
7. Torque converter housing assembly
8. Torque converter housing
9. Converter pressure regulator valve
10. Spring
11. Guide pin
12. Lubrication pressure regulator valve spring guide pin
13. Spring
14. Lubrication pressure regulator valve
15. Socket head plug, 3/4-14 NPTF B
16. Single row ball bearing
17. Accessory and oil pump driven gear
18. Roller bearing assembly
19. Inner race
20. Outer race and roller assembly
21. Teflon step-joint sealring
22. Converter ground sleeve\*

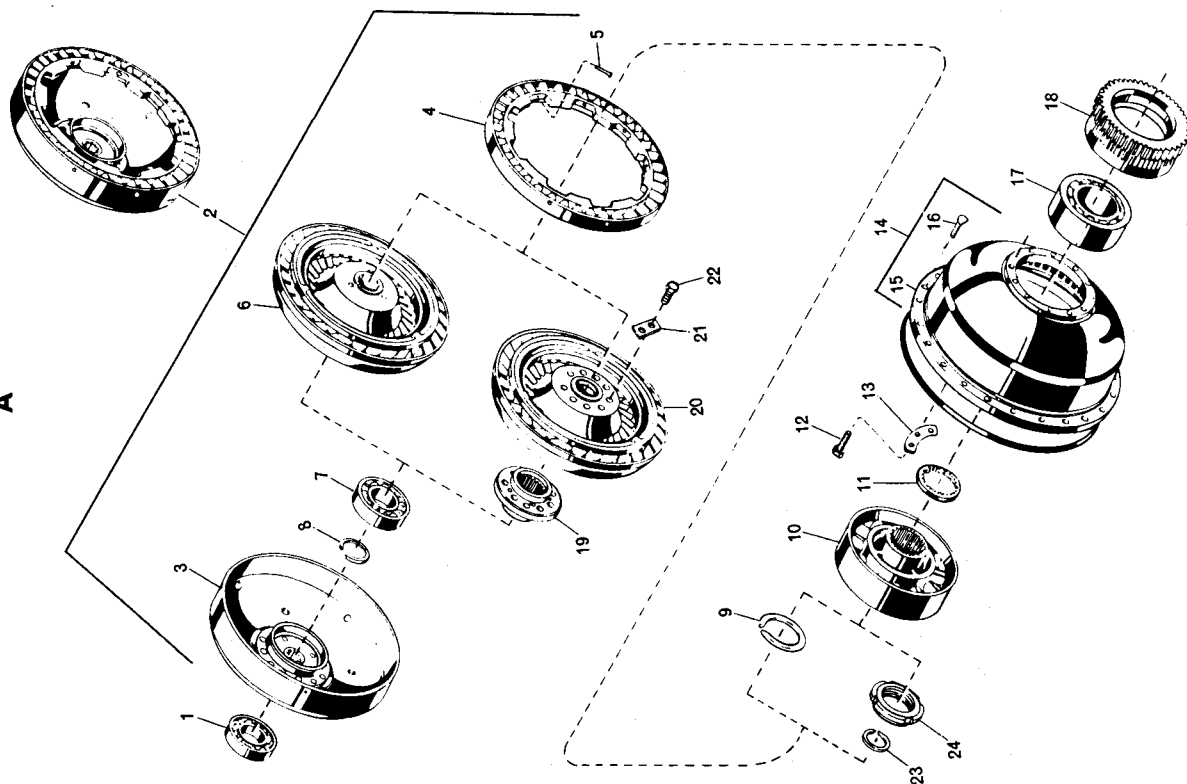
23. Self-locking bolt, 3/8-16 x 7/8 in. (6) C\* (earlier models)  
Self-locking bolt, 3/8-16 x 1 in. (6) C\* (later models)  
3/8-16 x 1-1/4 in. (6) C\*\*
24. Teflon step-joint sealring
25. Single row ball bearing
26. Lubrication pressure regulator valve cover
27. Self-locking bolt, 3/8-16 x 3/4 in. (2) C
28. Second turbine drive gear
29. Teflon step-joint sealring
30. Needle bearing front race
31. Needle bearing assembly
32. Needle bearing rear race
33. First turbine drive gear
34. Single row ball bearing
35. Converter ground sleeve\*\*

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	42-50	57-67
<u>B</u>	33-37	45-50
<u>C</u>	36-43	49-58

\* TRT 4820

\*\* TRT 4821

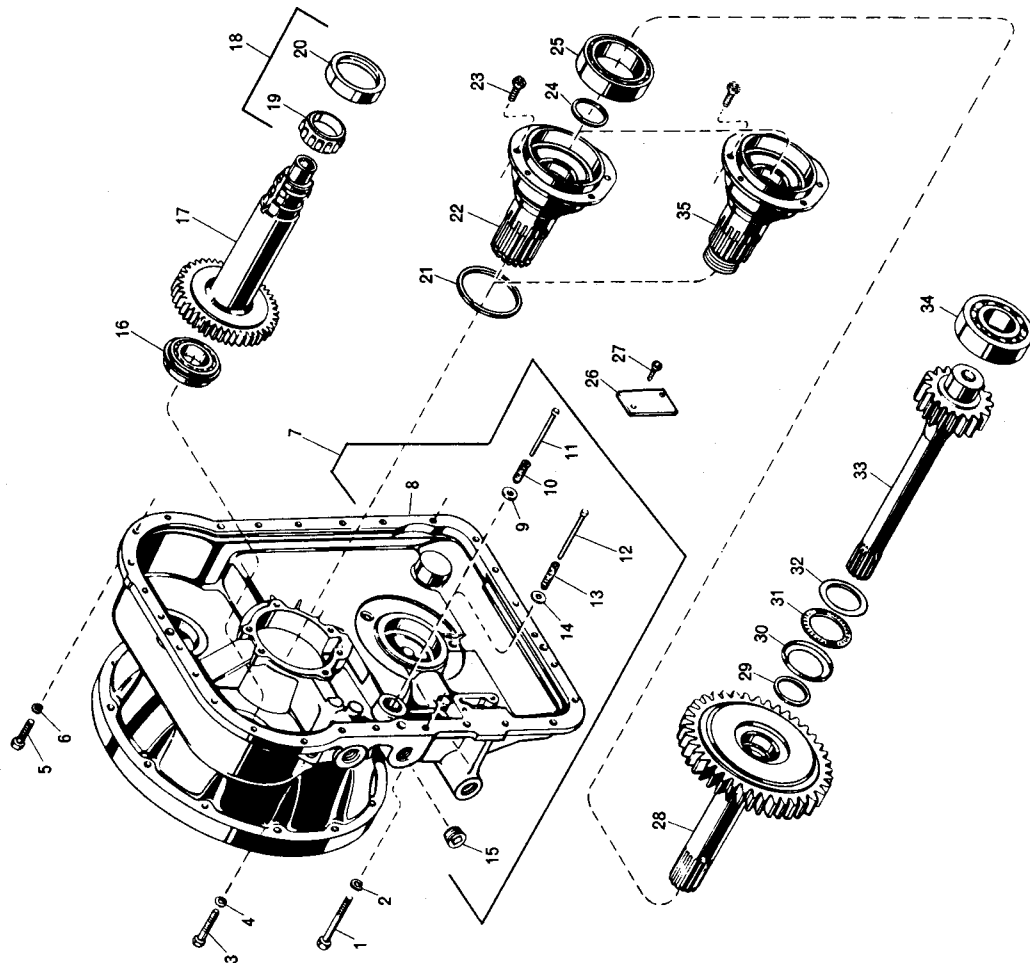
A



A, Foldout 3. Torque converter

17280A

B



B, Foldout 3. Torque converter housing and drive gears

10700A

## A

1. Single-row ball bearing
2. Self-locking nut, 3/8-24 (21) A
3. Second-turbine driven gear assembly
4. Second-turbine driven gear
5. Bushing
6. Second-turbine driven gear
7. Second-turbine driven gear shaft assembly
8. Second-turbine driven gear shaft
9. Bushing
10. Single-row ball bearing
11. Spring retainer plate
12. Spring guide pin (3)
13. Spring (3)
14. Freewheel roller cage
15. Freewheel roller (21)

16. Freewheel cam
17. Square-head bolt, 3/8-24 x 3-1/2 in. (21)
18. First-turbine driven gear
19. Internal snapping
20. Bearing spacer
21. Single-row ball bearing (shielded)
22. Bearing spacer
23. Single-row ball bearing (shielded)
24. Bearing spacer
25. Single-row ball bearing

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	41-49	56-66

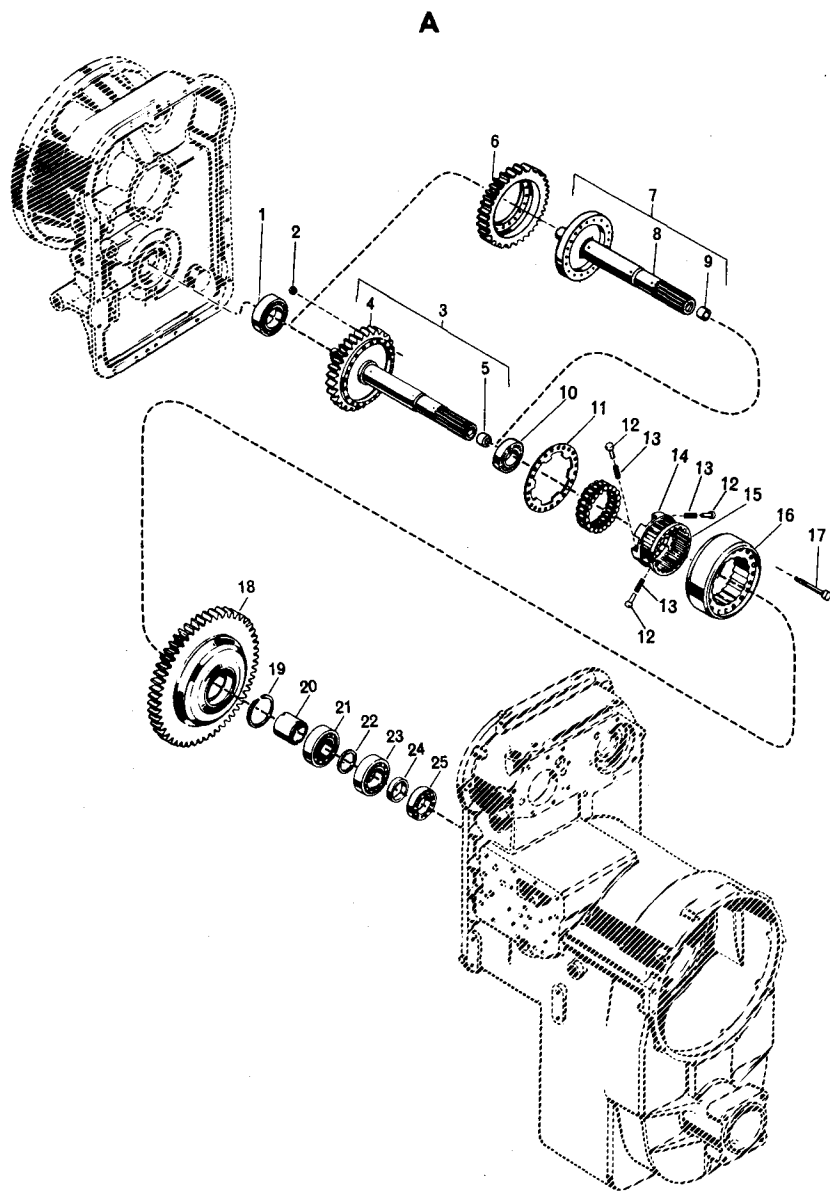
## B

1. Single-row ball bearing
2. Accessory driven gear
3. Single-row ball bearing
4. Self-locking bolt, 3/8-16 x 3/4 in. (3) A
5. Oil suction tube assembly
6. Self-locking bolt, 3/8-16 x 3/4 in. A
7. Sealing
8. Self-locking bolt, 3/8-16 x 3/4 in. A
9. Lubrication pressure tube assembly
10. Transmission housing assembly
11. Dowel pin
12. Plug B
13. Plug
14. Transmission housing
15. Dowel pin
16. Shifter shaft hole cap
17. Plug C
18. Screw plug D
19. Orifice plug E
20. Orifice plug E
21. Screw plug D
22. Gasket
23. Sump cover
24. Bolt, 3/8-16 x 1 in. (18) F
25. Lockwasher, 3/8 in. (18) F
26. Drain plug, 3/4 in. B
27. Oil level ADD plug in. G
28. Oil level FULL plug G
29. Filler hole plug, 1-1/4 in. H
30. Drive screw, no. 4 x 1/4 in.
31. Name plate
32. Elbow G

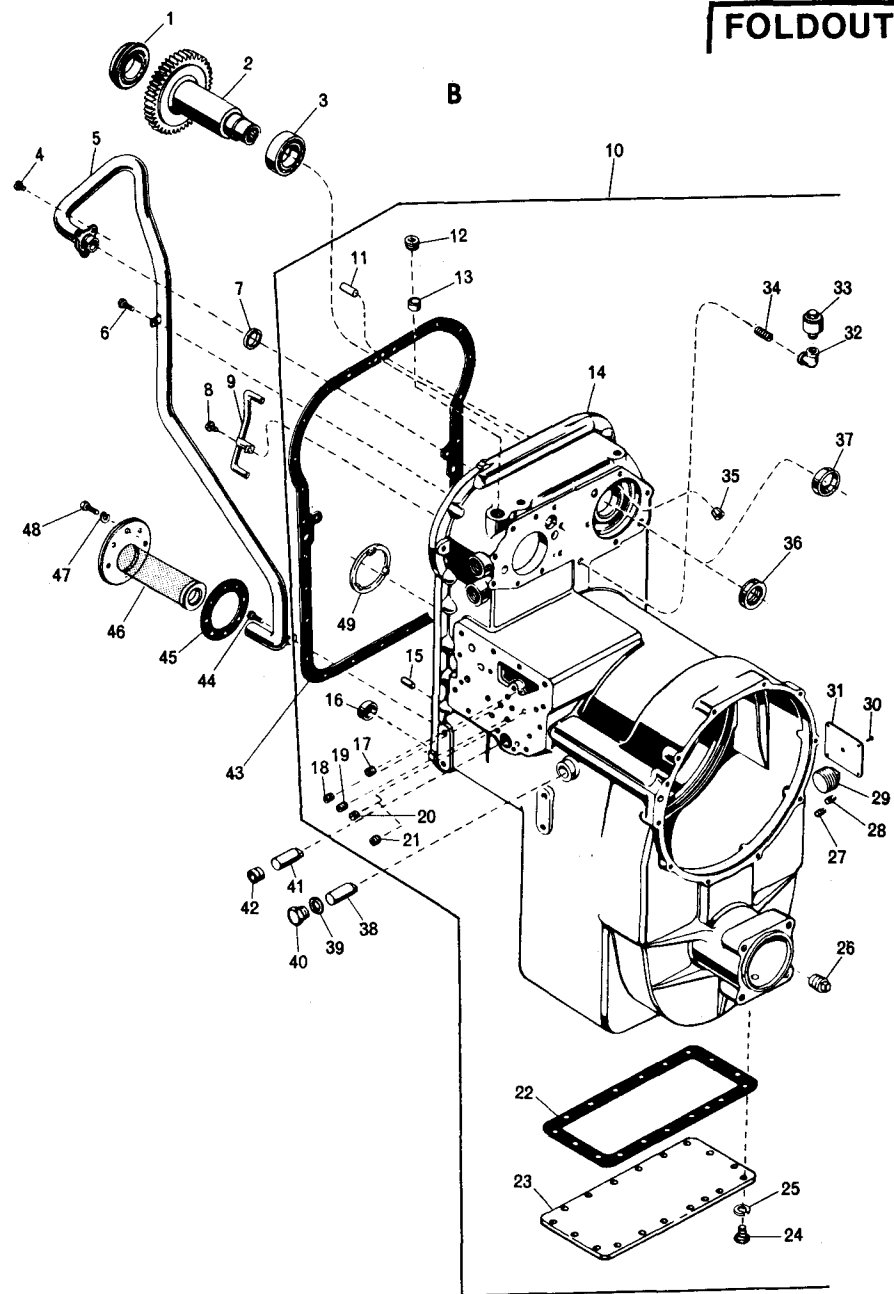
33. Breather G
34. Nipple G
35. Plug\*
36. Oil seal
37. Plug\*
38. Anchor pin
39. Gasket
40. Plug J
41. Anchor pin
42. Anchor plug (earlier models)
43. Gasket
44. Self-locking bolt, 3/8-16 x 3/4 in. A
45. Gasket
46. Oil strainer assembly
47. Lockwasher, 3/8 in. (6)
48. Bolt, 3/8-16 x 7/8 in. (6) E
49. Thrust washer (later models)

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	36-43	49-58
<u>B</u>	33-37	45-50
<u>C</u>	23-27	32-36
<u>D</u>	42-50	57-67
<u>E</u>	10-12	14-16
<u>F</u>	26-32	35-43
<u>G</u>	14-16	19-21
<u>H</u>	95-105	129-142
<u>J</u>	100-250	136-389

\*Models without PTO



A, Foldout 4. Turbine driven gears and freewheel clutch



B, Foldout 4. Transmission housing

10902

16235A

## A

1. Piston sealring
2. Piston sealring
3. Piston sealring
4. Reverse clutch piston assembly
5. External-tanged clutch plate (3)
6. Internal-splined clutch plate (3)
7. Reverse planetary carrier assembly
8. Thrust washer (4)
9. Planetary pinion (4)
10. Needle bearing assembly (4)\*
11. Spacer (4)\*
12. Needle bearing assembly (4)\*
13. Thrust washer (4)
14. Reverse planetary carrier
15. Flat washer, 3/8 in. (4)
16. Self-locking bolt, 3/8-24 x 1/2 in. (4) A
17. Spindle (4)
18. Needle bearing assembly (4)\*\*
19. External-tanged clutch plate (4)

20. Internal-splined clutch plate (4)
21. Reverse and forward clutch anchor assembly
22. Reverse and forward clutch anchor
23. Anchor pin (8)
24. Piston return spring (15)
25. Piston return spring guide pin (15)
26. Check ball and plug kit
27. Plug
28. Check ball

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	41-49	56-66

\* Earlier models

\*\* Later models

## B

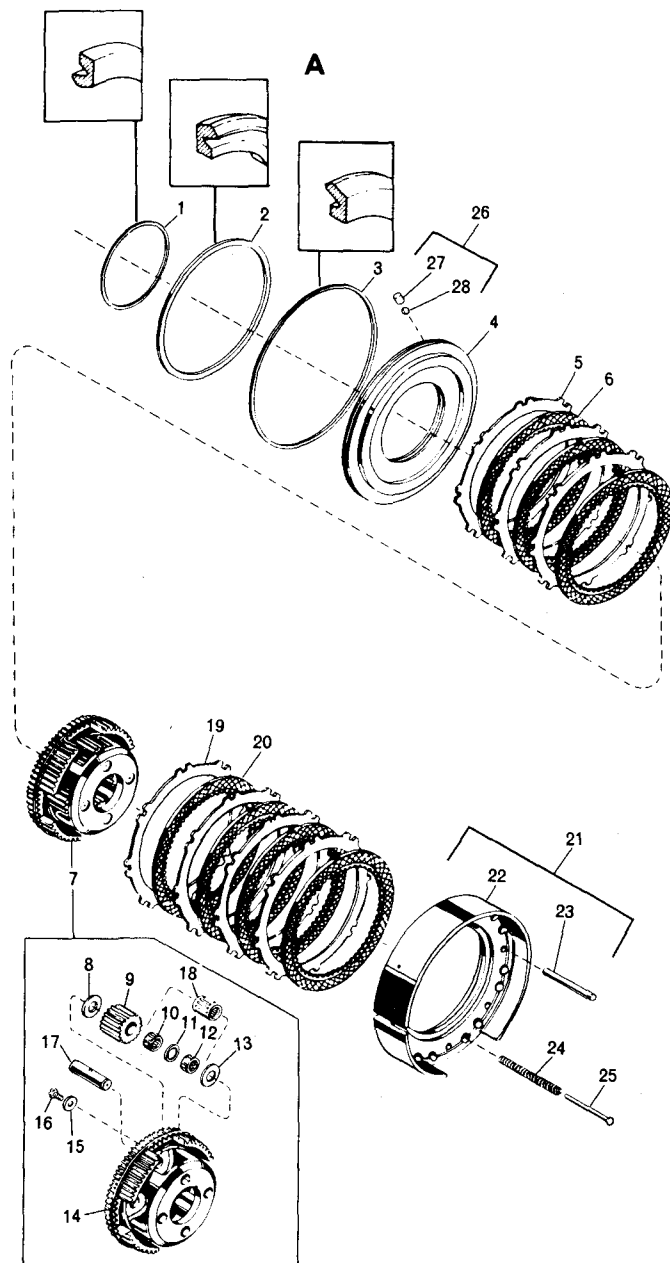
1. Forward and reverse sun gear
2. Reverse ring gear
3. Internal snapping
4. Internal-splined clutch plate (2)
5. External-tanged clutch plate (1)
6. Forward ring gear
7. External-tanged clutch plate (7)
8. Internal-splined clutch plate (6)
9. Forward clutch piston
10. Piston sealring
11. Piston sealring
12. Piston sealring
13. Clutch piston housing anchor key
14. Clutch housing insert (2)
15. Insert sealring (2)
16. Forward and high range clutch piston housing
17. Internal snapping shim (ar) (selective)
18. Forward planetary carrier assembly
19. Pinion spindle (6)

20. Forward planetary carrier
21. Thrust washer (6)
22. Planetary pinion (6)
23. Needle bearing (6)\*
24. Spacer (6)
25. Needle bearing (6)\*
26. Thrust washer (6)
27. Needle bearing assembly (6)\*\*
28. Spindle locking plate
29. Single-row ball bearing and snapping assembly
30. Bearing
31. Snapping
32. Check ball and plug kit
33. Plug
34. Check ball

\* Earlier models

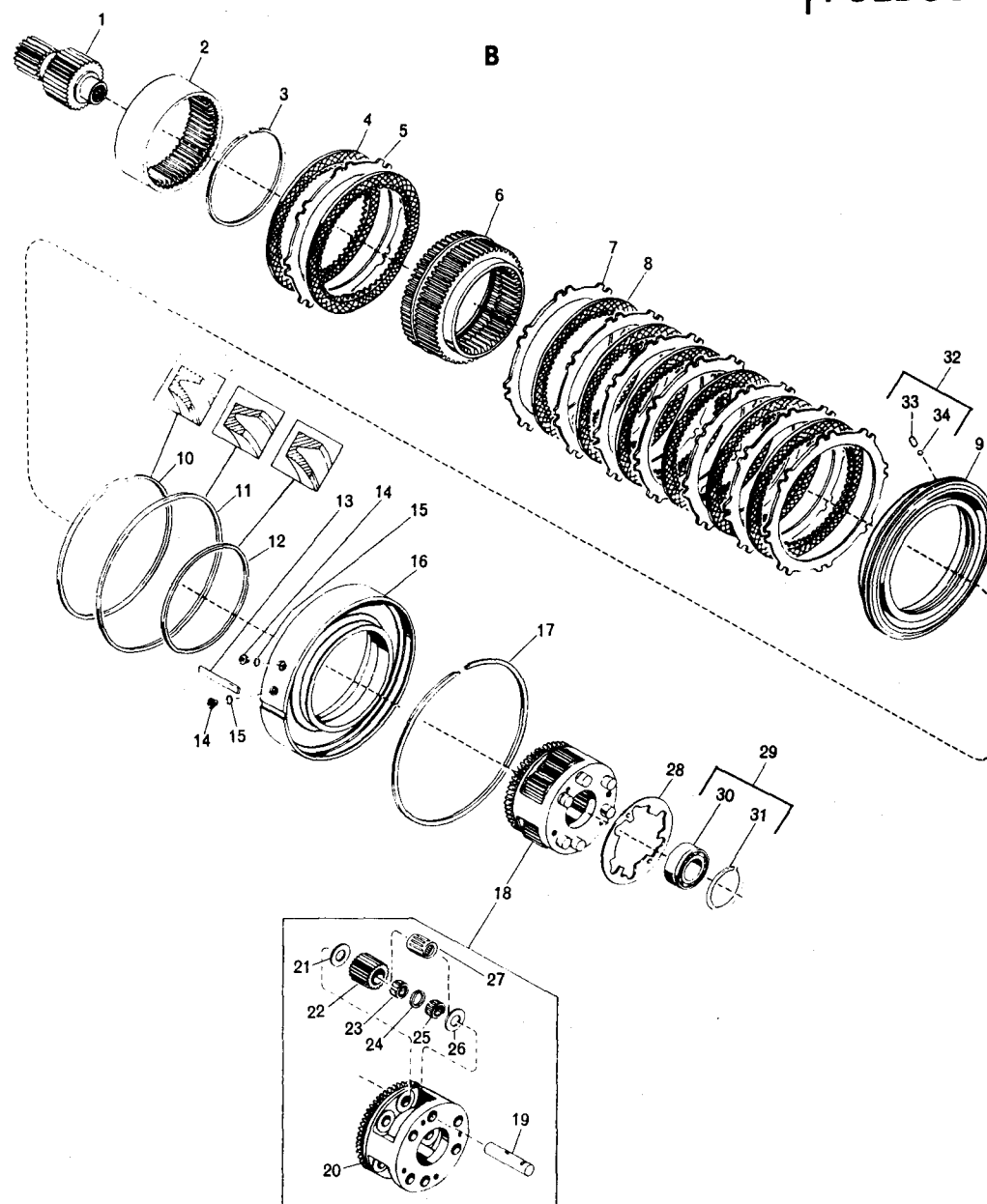
\*\* Later models





A, Foldout 5. Reverse clutch and planetary

106338



B, Foldout 5. Forward clutch and planetary

106378

## A

1. High range clutch piston
2. Piston sealring\*
3. Sealring expander\*
4. Piston sealring\*
5. Sealring expander\*
6. High-range planetary carrier assembly
7. High-range planetary carrier
8. Thrust washer (4)
9. Planetary pinion (4)
10. Needle bearing (4)\*
11. Spacer (4)\*
12. Needle bearing (4)\*
13. Thrust washer (4)
14. Spindle (4)
15. Washer, 3/8 in. (4)
16. Self-locking bolt, 3/8-24 x 1/2 in. (4) A
17. Needle bearing assembly (4)\*\*
18. Self-locking bolt, 7/16-20 x 3-11/16 in. (4) B
19. External snapping
20. Splined thrust washer
21. High-range sun gear
22. Spacer\*

23. External-tanged clutch plate (3)
24. Internal-splined clutch plate (3)
25. High range clutch ring gear
26. External-tanged clutch plate (2)
27. Internal-splined clutch plate (2)
28. Piston return spring (7)
29. High-range clutch anchor assembly
30. Anchor pin (8)
31. Return spring guide pin (7)
32. High range clutch anchor
33. Internal snapping
34. Lip-type sealring\*\*
35. Lip-type sealring\*\*

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	41-49	56-66
<u>B</u>	64-77	87-104

\* Earlier models

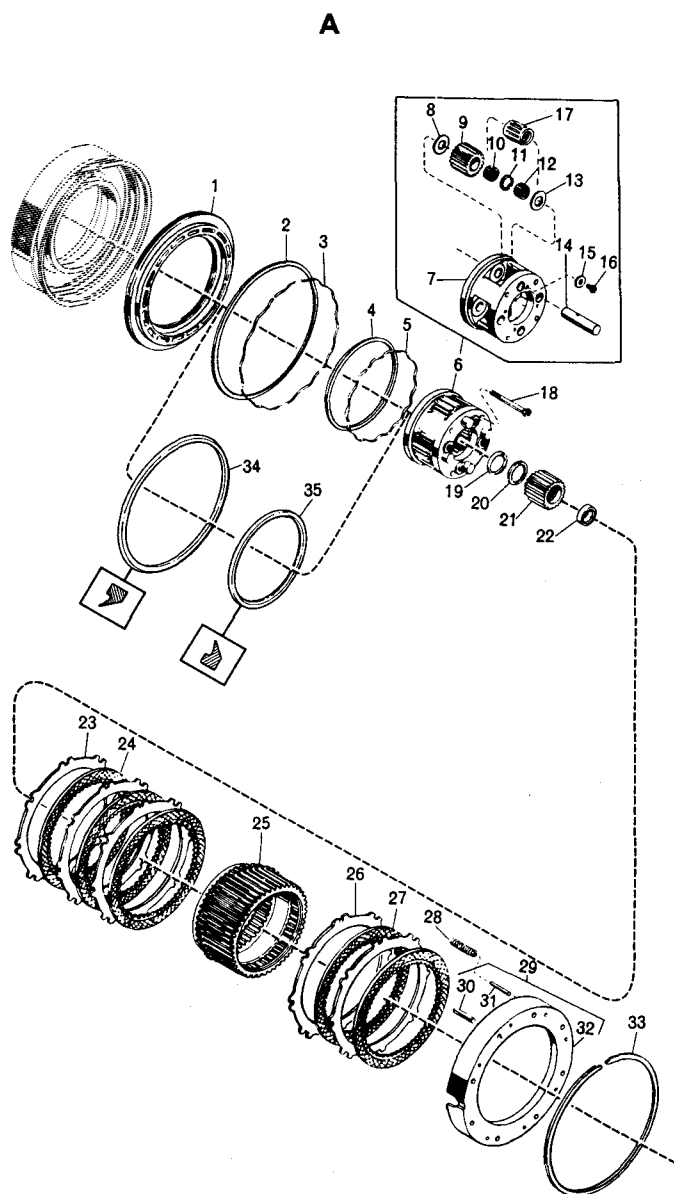
\*\* Later models

## B

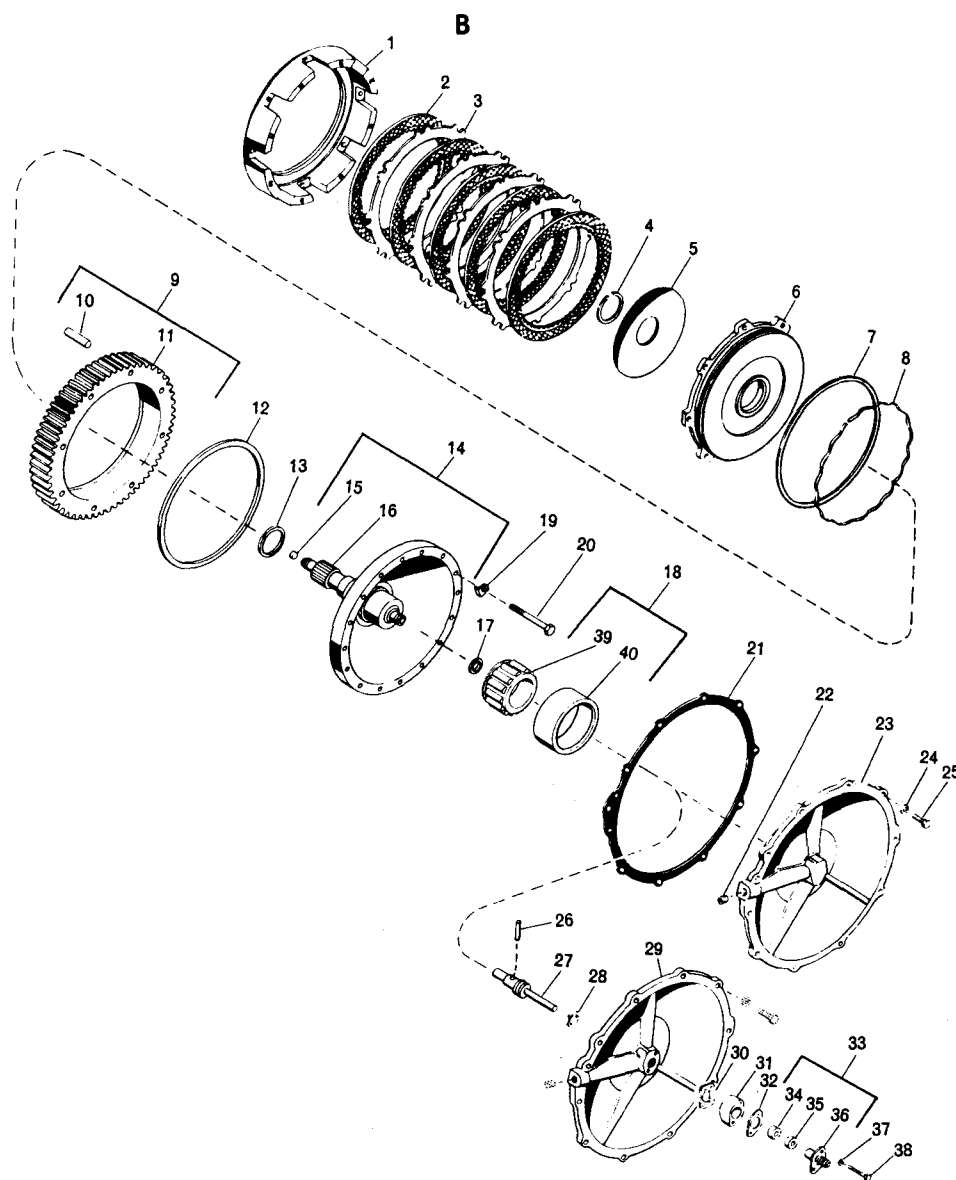
1. Low-range clutch backplate
2. Internal-splined clutch plate (5)
3. External-tanged clutch plate (4)
4. External snapping
5. Piston return spring (Belleville)
6. Low-range clutch piston
7. Piston sealring
8. Sealring expander
9. Transfer drive gear assembly
10. Pin (8)
11. Transfer drive gear
12. Sealring
13. Piston hook-type sealring
14. Low-range clutch hub assembly
15. Orifice plug
16. Low-range clutch hub
17. Hook-type sealring
18. Roller bearing
19. Lock tab (8)
20. Bolt, 1/2-20 x 3 in. (8) A
21. Transmission rear cover gasket
22. Socket head plug B
23. Transmission rear cover
24. Lockwasher, 7/16 in (11).

25. Bolt, 7/16-14 x 1-1/4 in. (11) C
26. Pin
27. Speedometer drive shaft
28. Hook-type sealring
29. Transmission rear cover
30. Speedometer drive adapter gasket
31. Speedometer drive adapter
32. Sleeve assembly gasket
33. Speedometer drive sleeve assembly
34. Oil seal
35. Washer
36. Speedometer drive sleeve
37. Lockwasher, 5/16 in. (2)
38. Bolt, 5/16-18 x 2-1/4 in. (2) D
39. Bearing inner race and rollers
40. Bearing outer race

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	96-115	131-155
<u>B</u>	14-16	19-21
<u>C</u>	42-50	57-67
<u>D</u>	13-16	18-21



A, Foldout 6. High-range clutch and planetary



B, Foldout 6. Low-range clutch, transfer drive gear, and end cover

1. Flange retaining nut A
2. Flange retaining washer
3. Sealring
4. Output flange (Spicer 1800 or Mechanic 7C)
5. Output flange (Mechanic 7C or 8C)
6. Dust shield (earlier models)
7. Oil seal
8. Spacer
9. Internal snapping
10. Single-row ball bearing
11. One-piece output shaft
12. Front output shaft
13. Detent ball (2)
14. Detent spring
15. Disconnect coupling
16. Shifter fork
17. Shifter fork shaft
18. Oil seal
19. Single-row ball bearing (used only with two-piece output shaft)
20. Transfer driven gear

1. Control valve body assembly gasket
2. Bolt, 3/8-16 x 1 in. A
3. Bolt, 3/8-16 x 2-1/2 in. (15) A
4. Lockwasher, 3/8 in. (16)
5. Control valve body assembly
6. Plug B
7. Gasket
8. Main-pressure regulator valve
9. Control valve body
10. Ball
11. Ball retainer
12. Valve stop
13. Spring retainer (earlier models)
14. Main-pressure regulator spring
15. Trimmer spring
16. Trimmer plug
17. Gasket
18. Plug C
19. Clutch cutoff valve spring
20. Clutch cutoff valve
21. Cutoff valve plug (hydraulic actuated)
22. Sealring
23. Gasket
24. Cup (hydraulic actuated)
25. Retainer plug (hydraulic actuated) D
26. Oil seal
27. Manual selector valve
28. Detent ball (2)
29. Plug D
30. Gasket

## A

21. Rear output shaft assembly (used only with Shaft 12)
22. Sleeve bearing
23. Rear output shaft
24. Single-row ball bearing
25. Internal snapping
26. Spacer
27. Oil seal
28. Dust shield
29. Output flange (Mechanics 7C or 8C)
30. Sealring
31. Flange retaining washer
32. Flange retaining nut A
33. Output flange (Yolk-type 7N)
34. Cap (used with shaft 11)
35. Output flange (Spicer 1800 or Mechanics 7C)
36. Output flange (Yolk-type 7N)

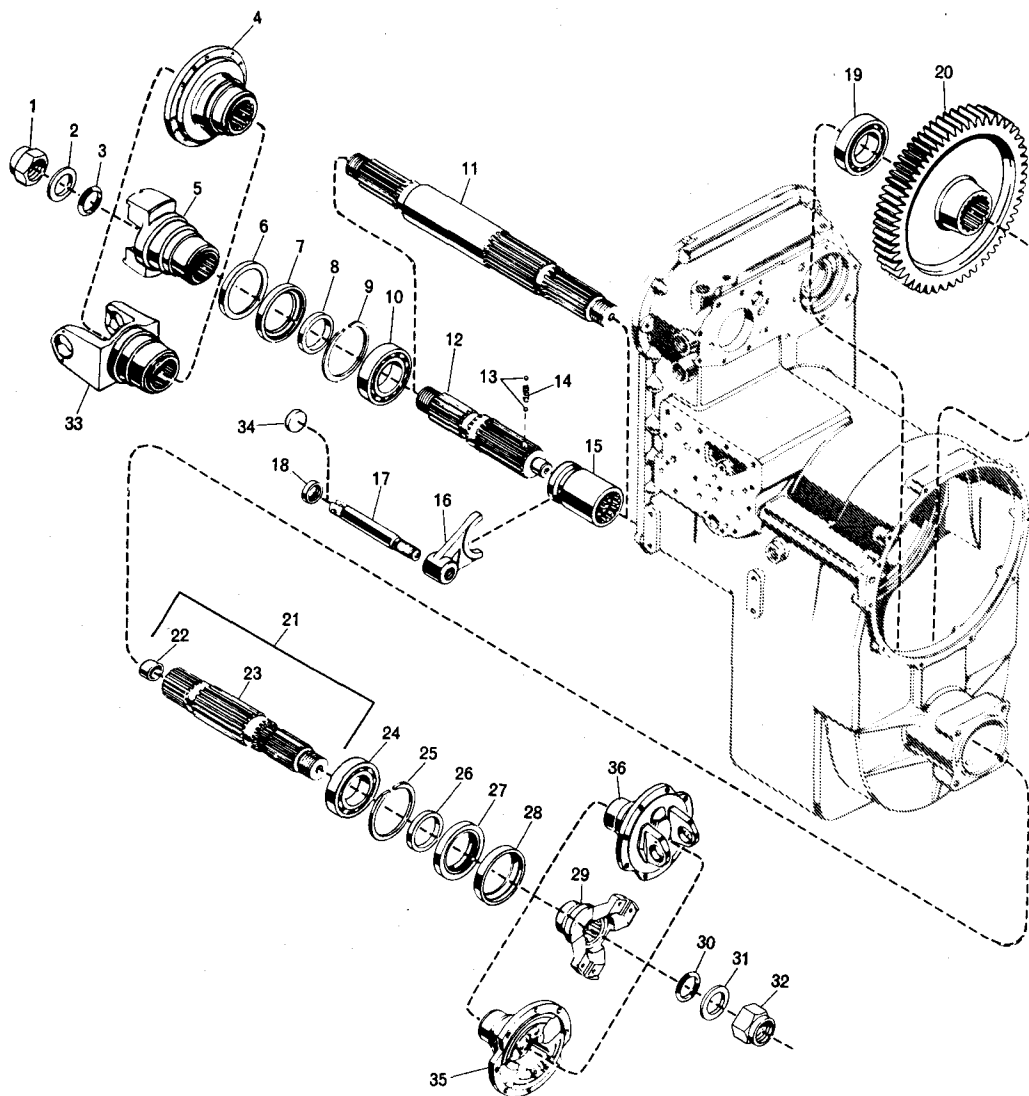
<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	500-750	687-1016

## B

31. Detent spring (2)
32. Plug (neutral switch hole) E
33. Washer seal
34. Plug (reverse signal tap) F
35. Gasket
36. Plug B
37. Plug (main-pressure tap) F
38. Inching valve stop
39. Inching regulator valve front spring
40. Inching regulator valve
41. Regulator valve stop
42. Inching regulator valve rear spring
43. Inching control valve
44. Valve return spring
45. Sealring
46. Plug
47. Oil seal
48. Cutoff valve plug (pneumatic actuated)
49. Retainer plug (pneumatic actuated) D
50. Plug (hydraulic actuated models) F

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	26-32	35-43
<u>B</u>	80-90	109-122
<u>C</u>	90-100	123-135
<u>D</u>	60-70	82-94
<u>E</u>	30-40	41-54
<u>F</u>	10-12	14-16

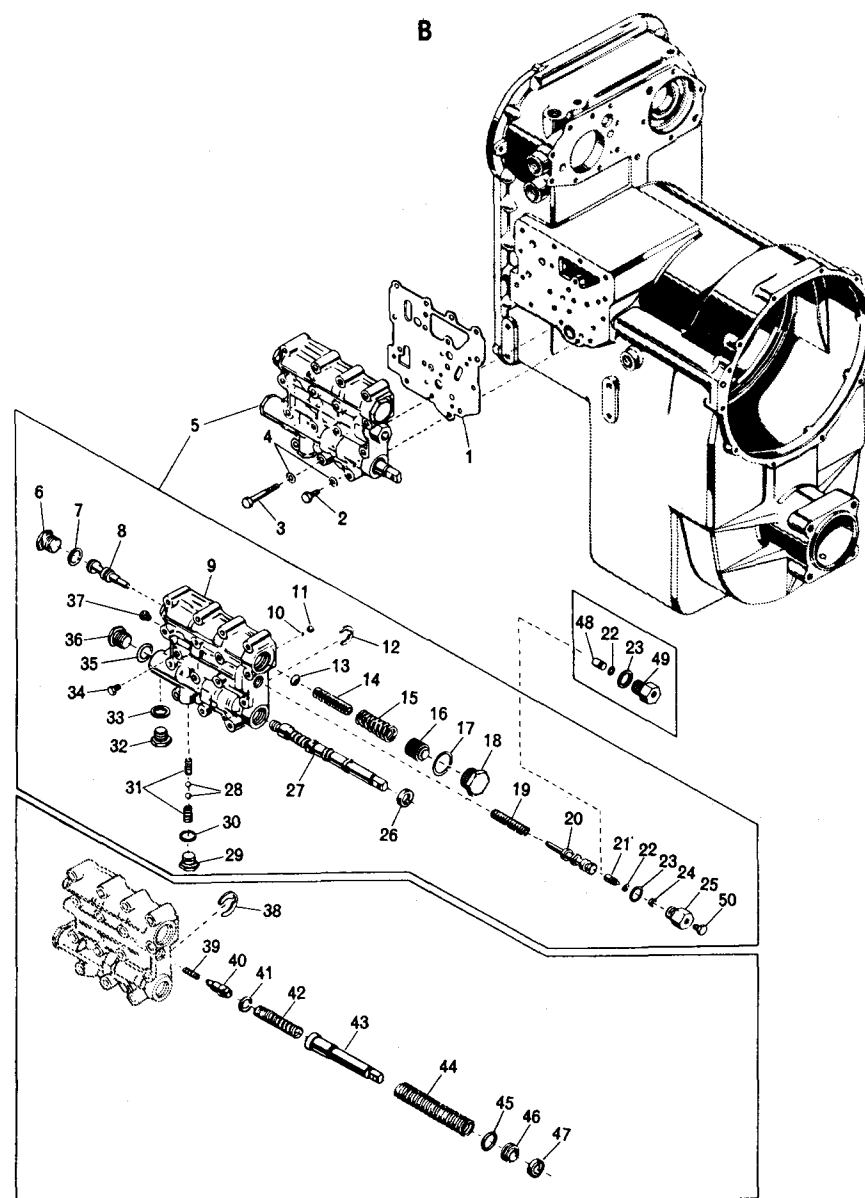
A



10706A

A, Foldout 7. Output shafts and disconnect components

B



10701A

B, Foldout 7. Control valve body assemblies

## A

1. Oil pump gasket
2. Oil pump assembly
3. Oil pump cover
4. Oil pump cover gasket
5. Driven gear assembly
6. Driven gear
7. Needle bearing (2)
8. Drive gear
9. Driven gear assembly
10. Driven gear
11. Needle bearing (2)
12. Oil pump body assembly
13. Driven gear shaft

14. Driven gear shaft
15. Oil pump body
16. Oil seal (earlier models)
17. Lockwasher, 3/8 in. (7)
18. Bolt, 3/8-16 x 4 in. (7) A
19. Implement drive coupling (some models)
20. Bolt, 3/8-16 x 2 in. (2) A
21. Lockwasher, 3/8 in. (2) A

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	26-32	35-43

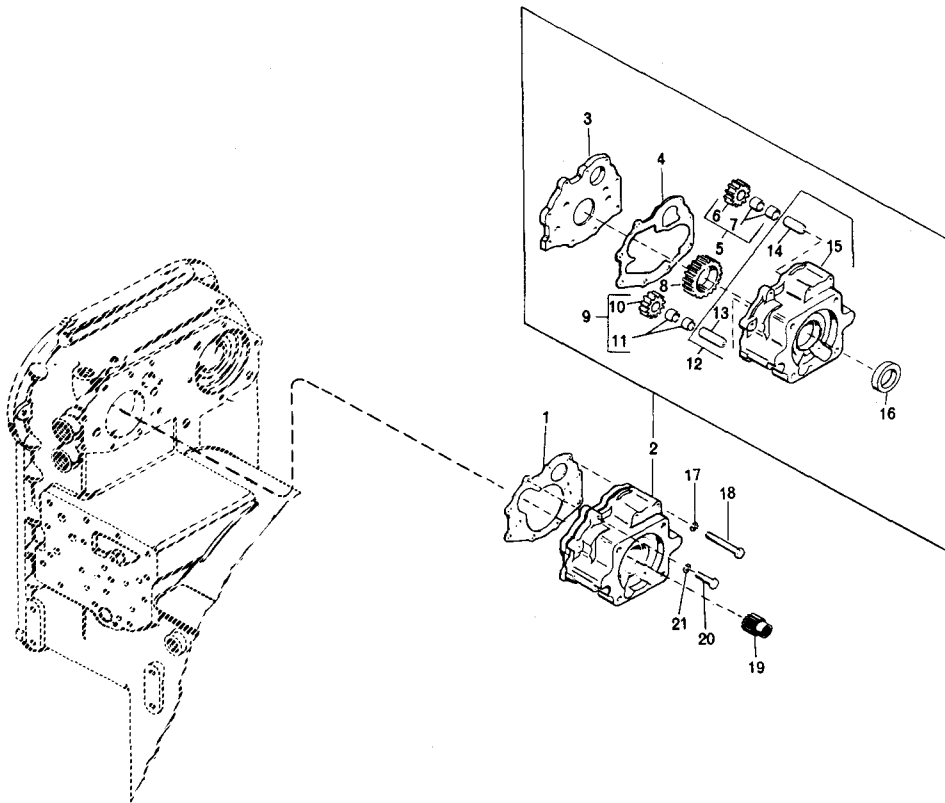
## B

1. Drain tube
2. Brake and lever assembly
3. Lever assembly (with clamp bolt) A
4. Brake assembly
5. Spring (some models)
6. Washer
7. Nut, 3/4-16 (2) B
8. Lockwasher, 3/4 in. (2)
9. Bracket
10. Support plate
11. Socket
12. Star-wheel adjusting screw
13. Nut
14. Spring
15. Shoe and lining (2)
16. Cam shaft

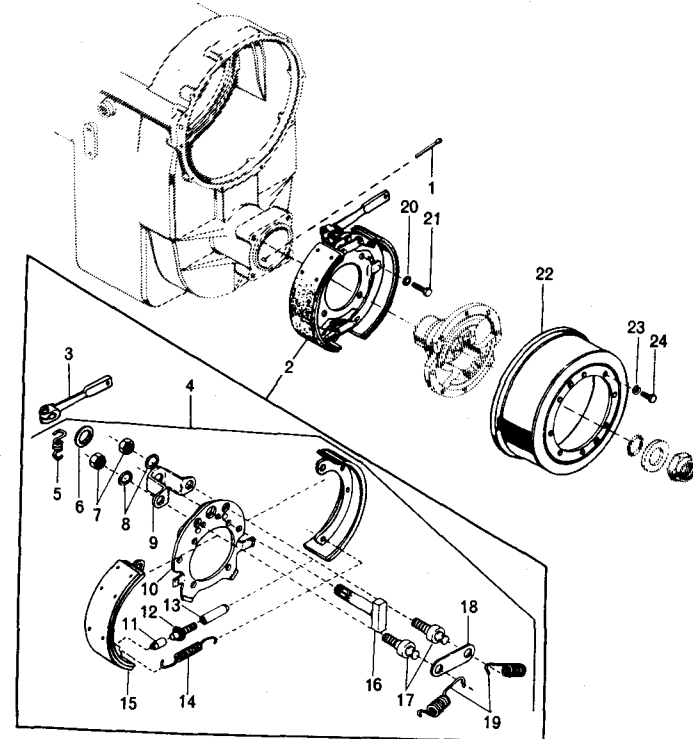
17. Anchor pin
18. Anchor pin brace
19. Retraction spring (2)
20. Internal-tooth lockwasher, 5/8 in. (4)
21. Bolt, 5/8-11 x 1-3/8 in. (4) C
22. Brake drum
23. Lockwasher, 1/2 in. (8)
24. Bolt, 1/2-20 x 1 in. (8) D

<u>Torque</u>	<u>lb ft</u>	<u>N·m</u>
<u>A</u>	26-32	35-43
<u>B</u>	1500-2000 lb in.	170-225
<u>C</u>	164-192	223-260
<u>D</u>	83-100	113-135

**A**



A, Foldout 8. Oil pump

**B**

B, Foldout 8. Parking brake