

3. DISASSEMBLY OF CRT 3531-3 TRANSMISSION

a. Basic Similarities

(1) Because the CRT 3531-1, CRT 3630-1 and the CRT 3531-3 models have major features which are identical in each model, most of the disassembly instructions in para 2, above (CRT 3531-1 and CRT 3630-1) apply to the CRT 3531-3. All three models are identical (in disassembly procedures) forward of their mounting to the output section, except for the input pressure pump and method of draining the torque converter housing explained in (2) below.

(2) Instead of gravity oil drains from the torque converter housing as used in the -1 model (transfer case), the input pressure pump on the -3 models includes a scavenge pump section which returns excess oil to the transmission sump through a return tube (fig. I-4).

b. Differences in Output Sections. Because of the differences in construction between the -1 (transfer case) models, and the -3 models, additional instructions for the disassembly of the output section of the -3 model are provided below. Therefore, the instructions in para 2, above, generally apply to the -3 model also. Where they do not apply, proper instructions are given in c, below.

c. Disassembly Steps. To disassemble a -3 model (fig. I-4), follow the steps given below. Although the references to disassembly steps, para 2, above, refer to the -1 model, the referenced procedures apply equally to the -3 model.

(1) Follow the instructions given in steps 1 and 2, para 2, above.

(2) Remove four bolts 37 and lock washers 38 (A, foldout 14) which retain tube 36. Remove two hose clamps 34. Remove the tube and hose 35 as a unit. Remove gasket 39.

(3) Follow steps 4 through 30, para 2, above.

Note: In step 10, the transmission will be rested on the sump adapter instead of the transfer case.

(4) Attach a lifting sling to the output section and raise the section. Remove split line gasket 6 (A, foldout 10), piston return springs 2 and spring guide pins 3 (B, foldout 11).

(5) Remove spacer 7 (A, foldout 14) from the transmission main shaft.

(6) Follow steps 32 through 45, para 2, above.

(7) Remove the low-range clutch piston assembly from adapter 4 (A, foldout 14) and position the adapter, front side downward, and remove eight bolts 15 and lock washers 14.

(8) Remove retainer 13 and gasket 12. Do not remove seal 16 unless replacement is necessary.

Note: Pin 11 may have fallen out of sleeve 10. Locate the pin and remove it.

(9) Remove sleeve 10, bearing 9 and thrust washer 8 from adapter 4.

(10) Remove crown nut 32, washer 31. Remove cover 30, gasket 29, retainer 28 and oil screen 27 from sump 33.

(11) Remove two nuts 1 and lock washers 2 from bolts 19 which retain plate 18.

(12) Remove three bolts 22 and lock washers 21.

(13) Remove four bolts 40 and lock washers 41.

(14) Remove sump 33 and gasket 20.

(15) Remove seal 17, plate 18 and bolts 19 from adapter 4 or sump 33.

Section VI. REBUILD OF SUBASSEMBLIES

1. CONTROL VALVE ASSEMBLY (earlier style inching control with clutch cutoff feature)

a. Disassembly (item 5, A, foldout 15)

(1) Remove plug 6, gasket 7, spring 9, pin 8 and detent ball 10 (lower group).

(2) Remove cup 28 from valve body 34.

(3) Clean the stem of the forward and reverse valve 27 to remove rust, paint, dirt and rough spots.

(4) Remove valve 27 by pushing it forward (toward the end of the valve body from which cup 28 was removed).

(5) Remove remaining detent ball 10 and spring 9, which were freed by removal of valve 27.

(6) Position the valve body, flat side upward, on the work bench. Remove spring pin 11.

Note: The spring pin may be removed by using an extractor such as an "Easy-out," or by threading the inside of pin 11 with a 1/4-20 tap and installing a bolt to pull the pin out.

(7) Using a soft metal drift or hardwood dowel, drive sleeve 24 and seal assembly 13 out of valve body 34. Drive against the sleeve, which will force the seal out.

(8) Remove plug 6, gasket 7, spring 9, pin 8 and detent ball 10 (upper group).

(9) Pull range selector valve 32 out of the valve body. Use a knife blade or other small tool to spread the inner lip of seal 12 when shoulders on the valve tend to hang on the seal.

(10) Remove remaining detent ball 10 and spring 9 from valve body 34.

(11) Remove oil seal 12 from valve body 34. Do not remove cap 29 unless replacement is necessary. If cap 29 must be removed, use a hardwood dowel, inserted through the valve bore, to drive it out.

(12) Remove plug 23 from valve body 34.

(13) Bushings 26 and 33 may be removed from valves 27 and 32 if replacement is necessary.

(14) Remove plug 15 and gasket 19. Plug 18 and cup 16 will be inside plug 15 and removed with it.

Note: Air-actuated valve does not include cup 16.

(15) Insert a small drift or pin punch into the internal-threaded end of plug 15. Push out plug 18 and remove cup 16 and seal ring 17 from it.

Note: Air-actuated valve does not include cup 16.

(16) Remove valve 20, spring 22, and pin 21 from the valve body.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (item 5, A, foldout 15)

(1) Install pin 21 into spring 22. Install the spring and pin into the recessed end of valve 20.

(2) Install the assembled valve, spring and pin, spring first, into the valve body (fig. VI-1).

(3) Install seal ring 17 and cup 16 onto plug 18. Install plug 18, cup-end first, into retainer plug 15.

Note: Air-actuated valve does not include cup 16.

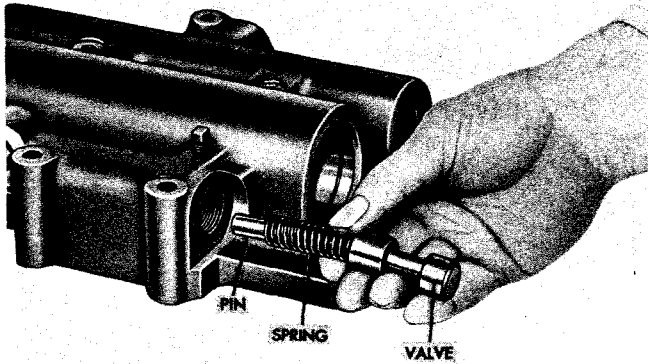


Fig. VI-1. Installing clutch cutoff valve components—early model

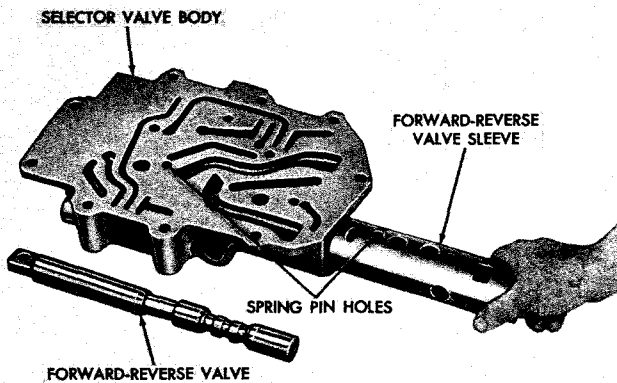


Fig. VI-2. Installing forward, reverse valve sleeve—early model

(4) Install gasket 19 onto retainer plug 15. Install retainer plug 15 into the valve body.

(5) If bushings 26 or 33 were removed from valves 27 or 32, install new bushings. Press the bushings into the valve stems until they are flush with, or below, the surface of the stems.

(6) Install plug 23 into valve body 34.

(7) Install spring 9 and detent ball 10 (upper group) into valve body 34.

(8) Depress the ball and spring, and install the range selector valve 32, notched-end first, into the rear of the valve body bore. Push the valve into the bore until it catches detent ball 10. Remove the tool with which the detent ball was depressed, and push the valve to a detent position.

(9) Install remaining detent ball 10, spring 9, pin 8, gasket 7 and plug 6 (upper group).

(10) Install the forward-reverse valve sleeve 24 into the valve body as shown in fig. VI-2. Note the relative positions of the valve body and sleeve, and the openings in the sleeve. The spring pin holes in the body and sleeve must be aligned.

(11) Install spring pin 11. Drive it into the valve body until it seats in the valve sleeve.

(12) Install spring 9 and detent ball 10 (lower group) into the valve body.

(13) Depress the ball and spring, and install the forward-reverse control valve assembly 25, notched end first, into the rear of the valve body. Push the valve into the bore until it catches detent ball 10. Remove the tool with which the detent ball was depressed, and push the valve to a detent position.

(14) Install remaining detent ball 10, spring 9, pin 8, gasket 7, and plug 6 (lower group).

(15) Install seal 12, spring-loaded side inward, onto the range selector valve stem.

Note: Optional types of seals are furnished. One type is entirely metal at its outside diameter. The other type has rubber extending to its outside diameter. The depths to which the two types are installed differ.

Press the metal outside diameter seal into the valve body until it bottoms. Press the rubber outside diameter seal into the valve body until its outer (rubber) edge is even with the inner end of the valve body chamfer or lacks up to 0.060 inch reaching the inner end of the chamfer.

(16) Install seal 13, spring-loaded side inward, onto the forward-reverse control valve. Press the seal into the valve body until it is 0.400 to 0.460 inch below the end surface of the valve body.

PARA 1-2

(17) Press plug 29, closed end first, into the front of the valve body until it bottoms.

(18) Press plug 28 into the front of the valve body until it seats.

2. CONTROL VALVE ASSEMBLY (later style with inching control)

a. Disassembly (item 6, B, foldout 15)

(1) Remove the inching valve stop from the valve body (fig. VI-3).

(2) Anchor the inching valve to a drift or bolt held in a vise (fig. VI-4). Support the valve body horizontally and, with a mallet or soft hammer, drive the valve body off the valve. This will remove seal 45, plug 43 with seal ring 44, valve 42 and spring 41. Separate these parts.

Note: Clean the stem of the valve to permit easy removal of the seal and plug.

(3) Using a small screwdriver, push the inching regulator valve forward in the valve body and remove washer 37 retaining it (fig. VI-5).

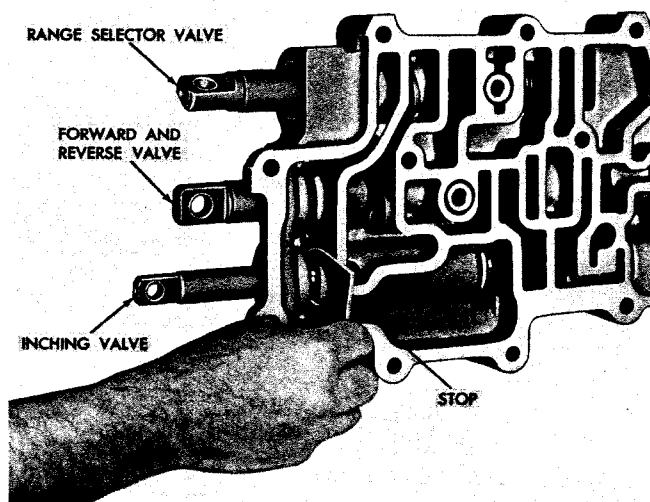


Fig. VI-3. Removing (or installing) inching valve stop—later model

(4) Remove the inching regulator valve and spring (fig. VI-6).

(5) Remove two spring retainers from the valve body (fig. VI-6). Remove the two springs and detent balls which are under the retainers.

(6) Remove two valve stops (fig. VI-6).

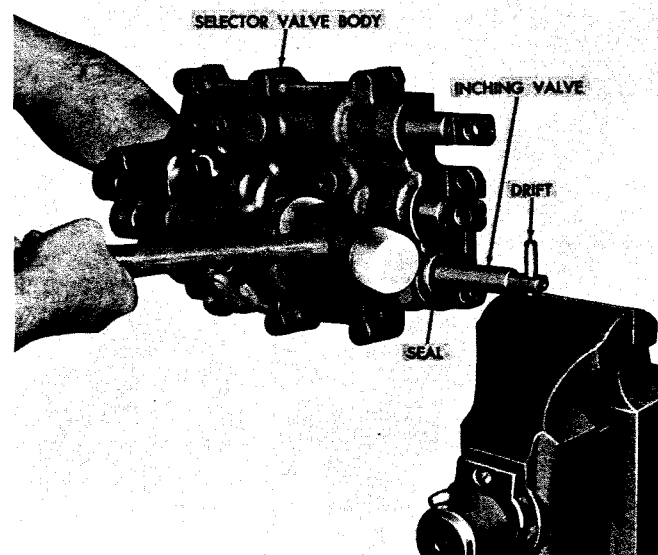


Fig. VI-4. Removing inching control valve—later model

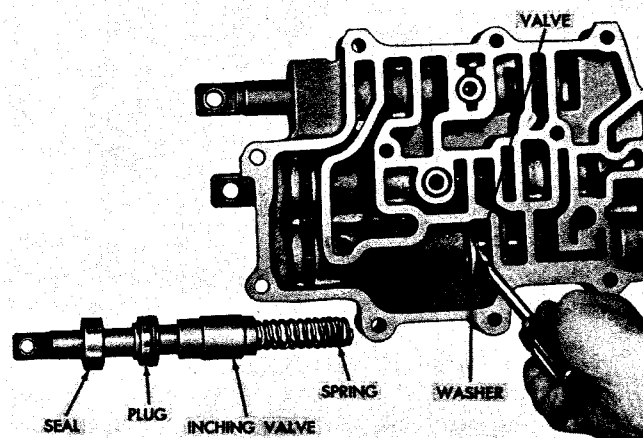


Fig. VI-5. Removing (or installing) inching valve washer—later model

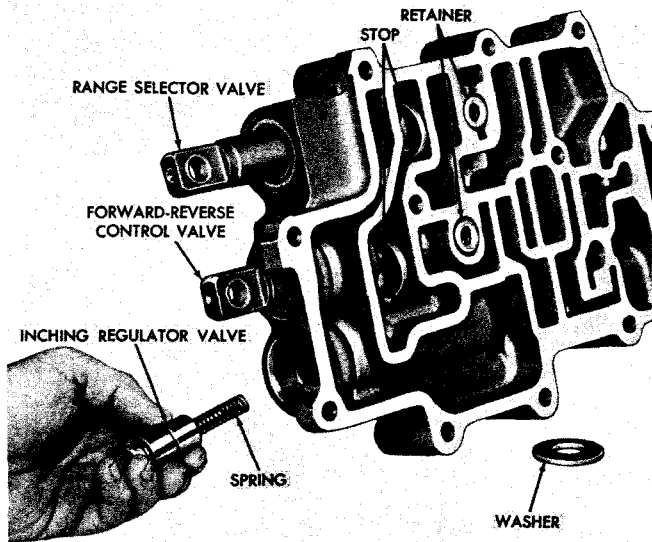


Fig. VI-6. Removing (or installing) inching regulator valve and spring—later model

(7) Remove the range selector valve and the forward-reverse control valve (fig. VI-6). The valves may be removed by inserting a pin or rod through the linkage pinhole in the stem of each valve. Pull the valves out of their bores, using a small screwdriver or other tool to spread the inner lips of the oil seals when the valve shoulders tend to hang on them.

(8) Remove the remaining detent ball and spring from each valve bore.

(9) Remove the valve stem oil seals (fig. VI-6).

(10) Remove two plugs 23 (B, foldout 15).

(11) Remove bushings 8 and 35 from valves 9 and 34 if parts replacements are necessary.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (item 6, B, foldout 15)

(1) If bushings 8 and 35 were removed from valves 9 and 34, install new bushings. Press the bushings into the valve stems until they are flush with, or below, the surface of the stems.

(2) Install two plugs 23 into control valve body 24.

(3) Position the valve body, mounting side upward, and install spring 29 and detent ball 28. The hole into which these parts install intersects the range selector valve bore.

(4) Insert a small punch or pin to depress the ball and spring. Install range selector valve assembly 32, removing the holding tool when the end of the valve catches the detent ball. Push valve to a detent position.

(5) Install remaining detent ball 28 and spring 29. Install retainer 27, pressing it to flush with, or 0.020 inch below the mounting surface of the valve body.

(6) Install spring 26, detent ball 25, forward-reverse control valve assembly 7, remaining spring 26, remaining detent ball 25, and remaining retainer 27. Use the same procedures outlined in (3) through (5), above.

(7) Install the valve stops on the range selector and forward-reverse control valves (fig. VI-6).

(8) Install seal 31 (B, foldout 15), with spring-loaded side inward, onto the range selector valve stem.

Note: Optional types of seals are furnished. One type is entirely metal at its outside diameter. The other type has rubber extending to its outside diameter. The depths to which the two types are installed differ. Press the metal outside diameter seal into the valve body until it is flush with, or to 0.030 inch below the end surface of the valve body. The rubber outside diameter seal may be installed to flush or 0.060 inch above the surface.

(9) Install seal 10 onto the stem of the forward-reverse control valve and press it into the valve body as outlined in (8), above. Seal 10 is identical to seal 31 and installation is identical.

(10) Install the inching regulator valve spring and valve (fig. VI-6).

PARA 2-4

(11) Push the inching regulator valve forward against the spring and install the washer which retains it (fig. VI-5).

(12) Install seal ring 44 (B, foldout 15) onto plug 43. Install the plug, flat side first, onto the stem of the inching control valve.

(13) Install spring 41 into the recessed end of the valve.

(14) Install the inching control valve, spring and plug into the valve body. Push plug 43 into its bore in the valve body (fig. VI-5) and install valve stop 38 (B, foldout 15).

(15) Install oil seal 45, spring-loaded side inward and press it flush to 0.030 inch below the end-surface of the valve body.

3. CONTROL VALVE ASSEMBLY (later style with hydraulic-operated clutch cutoff valve)

a. Disassembly (B, foldout 15)

(1) Remove the cutoff valve retainer plug, gasket, and cutoff valve (fig. VI-7).

(2) Remove the clutch cutoff valve plug from the retainer plug. Remove the cup and seal from the valve plug (fig. VI-8).

(3) Complete the disassembly by following instructions in para 2a(5) through (11), above.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (items 17 thru 22, B, foldout 15)

(1) Follow instructions in para 2c(1) through (9), above.

(2) Install seal ring 19, into the groove on plug 18. Install cup 20 onto the projection on plug 18. Install the valve plug, with cup and seal, into retainer plug 22. Fig. VI-8 shows the proper relation of parts.

(3) Install the clutch cutoff valve, small diameter first, into the valve body. Install the assembled valve plug, seal, cup retainer plug, and gasket into the valve body (fig. VI-7).

4. CONTROL VALVE ASSEMBLY (later style with air-operated clutch cutoff valve)

The rebuild of this assembly (items 12 thru 16, B, foldout 15) is identical to that outlined in para 3, above, except that no cup is used with the clutch cutoff valve plug. There are minor differences in the clutch cutoff valve plug and retainer plug used in this assembly. Use items 13 and 16 instead of items 18 and 22. Cup 20 is not used in this assembly.

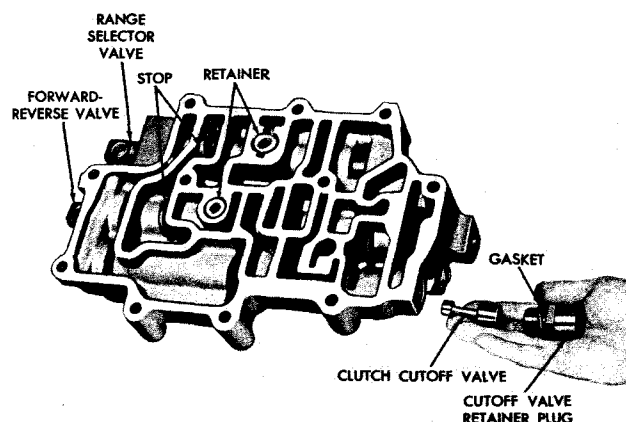


Fig. VI-7. Removing (or installing) clutch cutoff valve components—later model

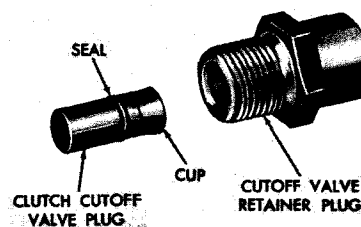


Fig. VI-8. Clutch cutoff valve plug and associated components (hydraulic type)—later model

5. MAIN-PRESSURE REGULATOR VALVE ASSEMBLY (without bypass valve)

Note: Although there are some minor differences between valve body assemblies having different pressure ranges, the rebuild procedures are identical.

a. Disassembly (items 5 thru 10, C, foldout 15)

(1) Remove plug 5 and gasket 6 from valve body 10.

(2) Remove valve assembly 7 and spring 9. Remove the spring from the valve assembly and remove shims 8 from the recess from which the spring came.

Note: Shims are used in the quantity required to adjust main pressure.

(3) Do not disassemble regulator valve assembly 7. If damaged or worn, replace the assembly.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (items 5 thru 10, C, foldout 15)

(1) Install shims 8 into the recessed end of valve assembly 7.

Note: The number of shims required to properly adjust main pressure cannot be determined until final assembly and test of the transmission. However, for initial operation, install the shims (if any) which were removed during disassembly. Refer to the note under sect. III, para 5a.

(2) Install spring 9 into the recessed end of valve assembly 7.

(3) Install the assembled valve, shims and spring, spring first, into the valve body.

(4) Install gasket 6 and plug 5 into valve body 10. Torque plug 90 to 100 pound feet.

6. MAIN-PRESSURE REGULATOR VALVE ASSEMBLY (with bypass valve)

Note: Although there are some minor differences between valve body assemblies having different pressure ranges, the rebuild procedures are identical.

a. Disassembly (items 10 thru 16, C, foldout 15)

(1) Remove plug 16 and gasket 15 from valve body 10.

(2) Remove spring 13, tube 14 and valve 12 from valve body 10.

(3) Remove pin 11, which is a slip fit in body 10.

(4) Complete the disassembly by following instructions in para 5a(1) through (3), above.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (items 10 thru 16, C, foldout 15)

(1) Follow instructions in para 5c(1) through (4), above.

(2) Install pin 11 into valve body 10.

(3) Install valve 12, convex side first, onto pin 11.

(4) Install tube 14 and spring 13 onto pin 11.

(5) Install gasket 15 and plug 16 into valve body 10. Torque plug 90 to 100 pound feet.

7. INPUT PRESSURE OIL PUMP (without auxiliary drive)

a. Disassembly (item 4, C, foldout 16)

(1) Remove four bolts 5 and lock washers 6 which retain cover assembly 7.

(2) Tap, with a soft hammer or mallet, on the pump drive splines to loosen cover assembly 7.

(3) Remove cover assembly 7 and gasket 11.

(4) Remove gears 12 and 13.

(5) Do not remove the needle bearing assemblies 10 from cover assembly 7 or body assembly 14 unless replacement is necessary. If bearing removal is necessary, bearings 15 may be pressed out of body assembly 14. Bearings 10, in cover assembly 8, must be destroyed and their outer shells collapsed before removal.

(6) Do not remove dowel pins 9 from cover assembly 7 unless replacement is necessary. To remove each pin, grasp the pin in a vise and rotate the cover while pulling it from the pin.

b. Cleaning, Inspection, Wear Limits.
Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (item 4, C, foldout 16)

(1) If dowel pins 9 were removed from cover 8, press new pins into the cover until they project 0.190 inch above the cover flat surface.

(2) If bearings 10 were removed from cover 8, press in new bearings. Press on the end of the bearing which has the part number. Press the bearings to 0.090 inch below the cover flat surface.

(3) If bearings 15 were removed from body 16, press in new bearings. Press on the end of the bearing which has the part number. Press the bearings to 0.090 inch below the body inner flat surface.

(4) Install drive gear 12, splined shaft first, into body assembly 14.

Note: Drive gear 12 must be installed at the thicker end of pump body 16.

(5) Install driven gear 13 into body assembly 14. Lubricate the pump gears thoroughly with transmission fluid.

(6) Install gasket 11 onto cover assembly 7. Install the cover assembly onto the gears and pump body assembly. Tap the cover until it seats evenly.

(7) Install four bolts 5 and lock washers 6 to retain the cover assembly.

Note: The pump must rotate without excessive binding after assembly. If it can be rotated by twisting the splined drive gear by hand, it is satisfactory.

8. INPUT PRESSURE OIL PUMP (with auxiliary drive)

a. Disassembly (item 4, B, foldout 16)

(1) Remove four bolts 17 and lock washers 16 which retain cover assembly 6.

(2) Remove cover assembly 6 and gasket 10.

(3) Remove gears 11 and 12 from body assembly 13.

(4) Do not remove components from cover assembly 6 unless parts replacement is necessary. If dowel pins 8 must be removed, grasp each pin in a vise and rotate the cover while pulling it off the dowel pin.

(5) If oil seal 5 must be removed, punch it out, toward the front of the cover assembly.

(6) If upper bearing 9 must be removed, it can be pressed out of the cover assembly, toward the rear of the cover. If lower bearing 9 must be removed, remove its rollers and collapse the outer shell.

(7) Do not remove bearings 14 from body assembly 13 unless replacement is necessary. They may be removed by pressing them out the front of the body.

b. Cleaning, Inspection, Wear Limits.
Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (item 4, B, foldout 15)

(1) If bearings 14 were removed from body 15, install new bearings. Press on the end of the bearing which has the part number. Press the bearings into the body, to 0.090 inch below the body inner surface.

(2) If dowel pins 8 were removed from cover 7, press new pins into the cover until they project 0.190 inch above the cover flat surface.

(3) If bearings 9 were removed from cover 7, install new bearings. Press on the ends of the bearings which have the part number. Press the bearings to 0.090 inch below the cover flat surface.

(4) If oil seal 5 was removed from cover 7, install a new seal. Install the seal, spring-loaded side first, and press it until it bottoms lightly on the shoulder in the cover bore.

(5) Install drive gear 12, larger splined end first into body assembly 13.

Note: Drive gear 12 must be installed at the thicker end of pump body 15.

(6) Install driven gear 11 into pump body 15.

(7) Lubricate the pump gears thoroughly with transmission fluid.

(8) Install gasket 10 onto cover assembly 6.

(9) Install cover assembly 6 onto body assembly 13. Tap the cover assembly lightly until it seats evenly on the body assembly.

(10) Install four bolts 17 and lock washers 16 to retain the cover assembly.

Note: The pump must rotate without excessive binding after assembly. If it can be rotated by twisting the splined drive gear by hand, it is satisfactory.

9. INPUT PRESSURE AND SCAVENGE OIL PUMP

a. Disassembly (item 5, A, foldout 16)

(1) Remove four bolts 6 and lock washers 7.

(2) Remove body assembly 8 and gasket 19.

(3) Remove upper scavenge gear 10 and roller 13. Remove lower scavenge gear 10.

(4) Remove separator plate assembly 11 and gasket 16.

(5) Remove drive gear 14 and driven gear 15 from pressure pump body assembly 17.

(6) Do not remove bearings 9 from body assembly 8 unless replacement is necessary. If bearings must be removed, remove the rollers and collapse the bearing outer shells.

(7) Do not remove dowel pins 12 from plate assembly 11 unless replacement is necessary. If the pins must be removed, press them out of the plate.

(8) Do not remove bearings 18 from body assembly 17 unless replacement is necessary. If the bearings must be removed, they may be pressed out of the front (inner side) of the body.

b. Cleaning, Inspection, Wear Limits.
Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (item 5, A, foldout 16)

(1) If bearings 9 were removed from body assembly 8, install new bearings. Press on the ends of the bearings which have part numbers. Press the bearings to 0.090 inch below the flat inner surface of the pump body.

(2) If dowel pins 12 were removed from plate assembly 11, install new dowel pins. Press them into the plate until each pin projects 0.190 inch from either side of the plate.

(3) If bearings 18 were removed from body assembly 17, install new bearings. Press on the ends of the bearings which have part numbers. Press each bearing to 0.090 inch below the inner flat surface of the body.

(4) Install drive gear 14, splined end first, into the thicker end of pressure pump body assembly 17.

(5) Install driven gear 15, shorter shaft-end first, into pressure pump body assembly 17. Lubricate the gears with transmission fluid.

(6) Install gaskets 16 and 19 onto separator plate assembly 11.

(7) Install plate assembly 11 onto pump body assembly 17. Tap the plate until it seats evenly on the body.

(8) Install roller 13 into the groove in the shaft of drive gear 14. Use oil-soluble grease to retain it.

(9) Install upper gear 10 onto the shaft of drive gear 14, engaging its internal groove with roller 13.

(10) Install lower gear 10 onto the shaft of driven gear 15. Lubricate the gears with transmission fluid.

(11) Install body assembly 8 onto gasket 19 and separator plate assembly 11. Tap the body assembly until it seats evenly on the gasket and plate.

(12) Install four bolts 6 and lock washers 7 to retain the body assembly.

Note: The pump must rotate without excessive binding after assembly. If it can be rotated by twisting the splined drive gear by hand, it is satisfactory.

10. TRANSMISSION FRONT COVER (remote mount)

a. Disassembly (B, foldout 6)

(1) Press seal 1 toward the front of cover 3.

(2) Remove bearing 5 from shaft 8.

(3) Flatten the corners of lock strip 7. Remove six bolts 6 and three lock strips 7. Remove shaft 8 from cover 10.

b. Cleaning, Inspection. Refer to sect. IV, para 6.

c. Assembly

(1) Install shaft 8 onto cover 10. Install three lock strips 7 and six bolts 6 into the hub of shaft 8 and into cover 10. Bend the corners of lock strips 7 against the bolt heads.

(2) Install bearing 5 onto shaft 8.

(3) Press new seal 1, spring-loaded lip first, into the front of cover 3.

11. TRANSMISSION FRONT COVER (direct mount)

a. Disassembly, Flex Disk Drive (A, foldout 7)

(1) Remove six bolts 2 that secure plate 3. Remove three flexible disks 4, and disk and washer assembly 5 from cover assembly 7.

(2) Remove twenty-four nuts 6 and remove cover assembly 7 from the transmission.

b. Disassembly, Grease Ring Drive (A, foldout 7)

(1) Remove eight bolts 9 from the engine and remove ring 8.

(2) Remove seal ring 10 from cover 12.

(3) Remove twenty-four nuts 11 from cover 12. Remove cover 12 from the transmission.

c. Cleaning, Inspection. Refer to sect. IV, para 6.

d. Assembly, Flex Disk Drive (A, foldout 7)

(1) Install cover assembly 7 onto the transmission and secure it with twenty-four nuts 6. Torque the nuts 17 to 24 pound feet.

PRESS BEARING IN UNTIL THE
TOP OF THE OUTER SHELL
IS 0.030 ABOVE THE SHOULDER
IN THE SIDE PLATE

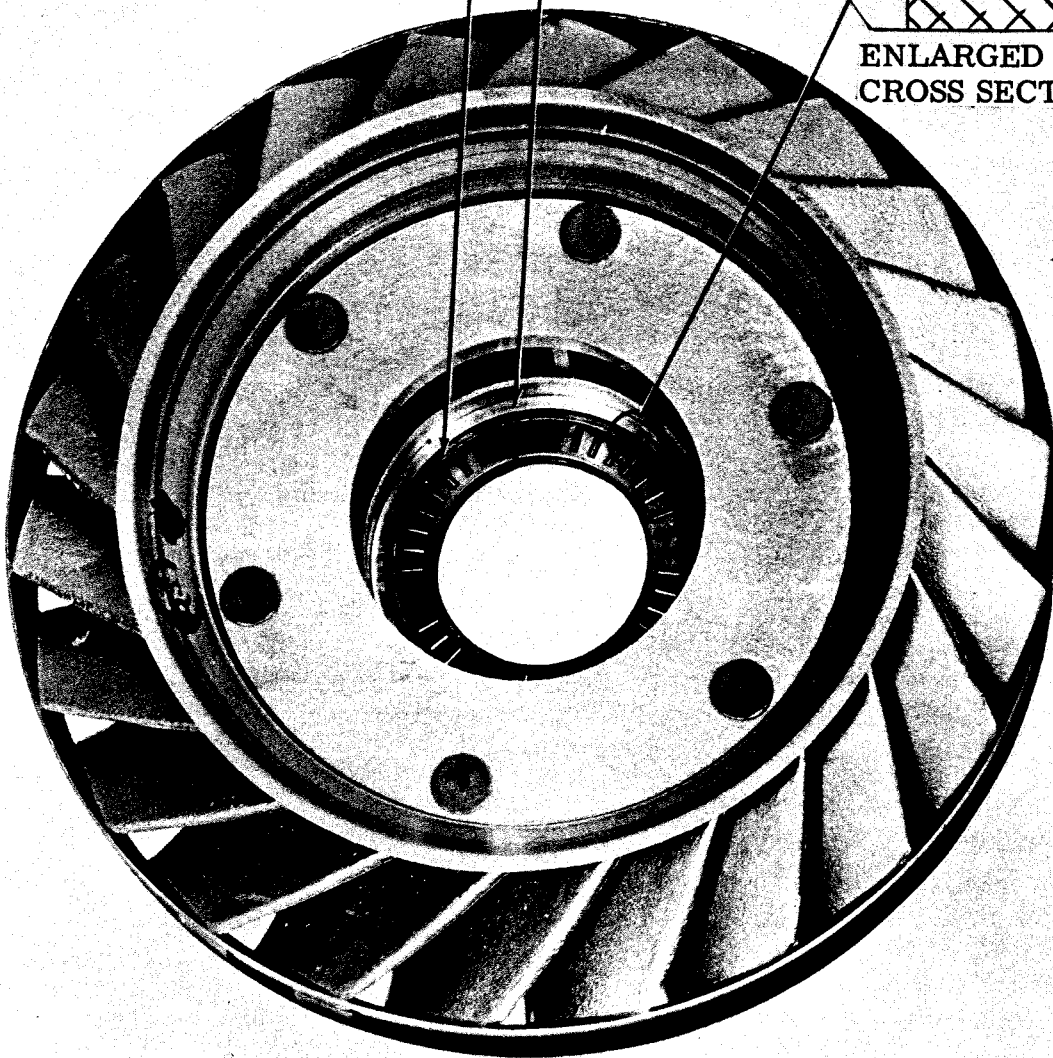
ASSEMBLY LOAD TO BE
APPLIED IN THIS AREA
ON OUTER SHELL ONLY

.025
.035

SHOULDER IN SIDE PLATE

BEARING OUTER SHELL

ENLARGED VIEW OF
CROSS SECTION



NEW BEARING INSTALLED
IN STATOR AND CAM ASSY.

Fig. VI-9. Installation of thrust bearing assembly in stator

(2) Install disk and washer assembly 5 and three flexible disks 4 onto the transmission aligning the bolt holes.

(3) Install plate 3 and six bolts 2.

e. Assembly, Grease Ring Drive
(A, foldout 7)

(1) Install cover 12 and secure it with twenty-four nuts 11. Torque the nuts 17 to 24 pound feet.

(2) Install ring 10 onto its groove on the front side of cover 12.

(3) Install ring 8 onto the engine and secure it with eight bolts 9.

12. TORQUE CONVERTER STATOR ASSEMBLY

a. Disassembly (item 4, B, foldout 7)

(1) Remove any springs 7 and rollers 6 from the stator assembly, which remained after removal from the transmission.

(2) Do not remove thrust bearing assembly 5 unless replacement is necessary.

Note: After thorough cleaning, and lubrication with transmission fluid, freewheel roller race 8 can be installed to check for roughness of bearing 5. Install roller race 8, shouldered side first, and rotate it while pressing it against bearing assembly 5. If roughness is felt, the bearing should be replaced.

(3) If the bearing must be replaced, remove it carefully to avoid nicking the aluminum bore which holds it.

(4) Do not disassemble stator assembly further. If inspection reveals damage or excessive wear, replace the entire assembly.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

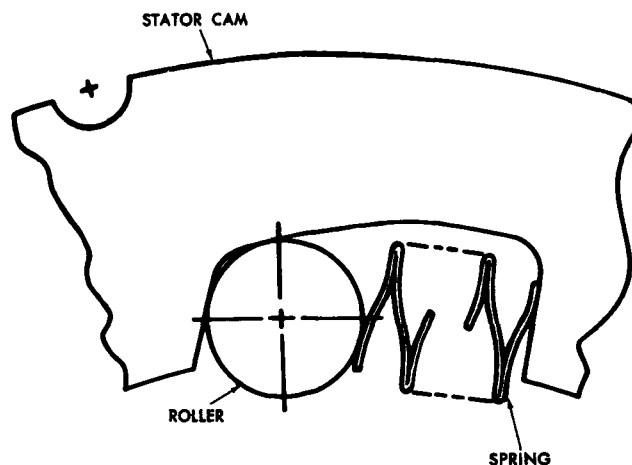


Fig. VI-10. Spring and roller positions in stator cam

c. Assembly (item 4, B, foldout 7)

(1) If bearing assembly 5 was removed, install a new bearing assembly. The bearing assembly must be installed as shown in fig. VI-9. A special tool (fig. IV-4) should be used to insure proper assembly.

(2) Coat the cam pockets in the stator cam with oil-soluble grease. Install ten rollers 6 (B, foldout 7) into the shallow ends of the cam pockets. Install the ten springs 7 into the deep ends of the pockets. Fig. VI-10 shows the proper ends of the rollers and springs in the stator cam.

(3) Install freewheel roller race 8 (B, foldout 7) into the stator assembly. Rotate the race clockwise while installing it. This will roll the rollers toward the deep ends of the cam pockets, allowing the race to enter the bore of the stator assembly.

(4) When the race is seated against the thrust bearing, twist it firmly to the left (counterclockwise) to lock it in place. Lay the assembled stator aside, roller race upward, until ready for installation into the transmission.

13. TORQUE CONVERTER PUMP ASSEMBLY

a. Disassembly (item 15, B, foldout 7)

(1) Do not disassemble the pump assembly unless parts replacement is necessary.

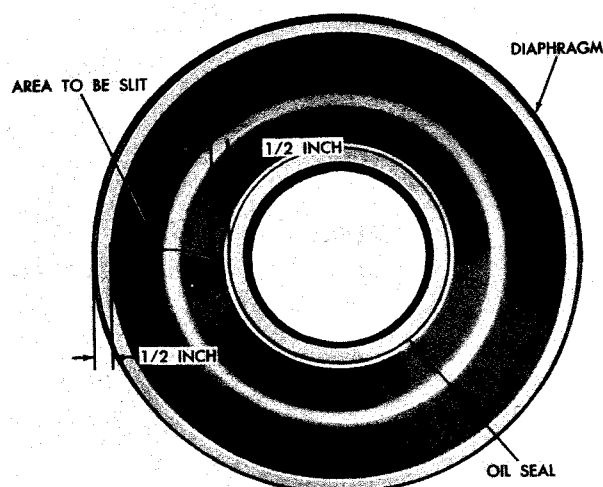


Fig. VI-11. Diaphragm slit for removal from "dry" converter housing

pressed steel diaphragm 3 and seal 2 must be removed. Using a sharp chisel, cut a slit in the diaphragm (fig. VI-11). The slit should extend from within approximately 1/2 inch of the seal seat to within approximately 1/2 inch of the diaphragm outside diameter. Insert a hooked tool into the slit and pry the surface above the slit outward. This will push the surface below the slit inward. The diameter of the diaphragm will be reduced as the diaphragm is deformed and it can be lifted out. Discard the diaphragm and seal.

(2) Remove the spindle retainer bolt, spindle, and idler gear as outlined in sect. V, para 2, step 23.

(3) Do not remove bearing 13 from gear 14 unless replacement is necessary.

(2) If bolts 16 must be replaced, press the old bolts out.

Caution: Balance weights must remain in their original locations. If weights are lost or must be replaced, the new weights must be the same weight and be installed in the same locations.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (item 15, B, foldout 7)

(1) Install any balance weights removed. Refer to caution following a(2), above.

(2) Install new bolts by pressing them into the rear of the pump outer flange. Seat the heads of the bolts against the flange (or balance weights).

14. IMPLEMENT PUMP DRIVE, DRY CONVERTER HOUSING

a. Disassembly (A, foldout 8)

(1) If the transmission has a "dry converter housing" (refer to sect. II, para 2c),

Note: In earlier transmissions, bearing 13 was retained in gear 14 by two snap rings or by staking with a sharp tool. Later, the bearing was retained by staking with a blunt tool or by rivets. When the bearing is retained by sharp staking, the bearing and gear must be replaced as a unit; others by removing a snap ring, removing the displaced metal of the gear or by removing the rivets 12.

b. Cleaning, Inspection. Refer to sect. IV, para 6 for cleaning and inspection procedures.

c. Assembly (A, foldout 8)

(1) Refer to the note in para a(1), above. If the idler gear bearing 13 (A, foldout 8) was removed, replace it according to the applicable method. When the bearing is retained by blunt staking, use a blunt chisel and restake the gear 14 metal over the bearing at three points 120° apart. Do not restake at the same points previously used. Do not deform the metal enough to cramp the bearing, causing it to bind the inner race. When the bearing is retained by three rivets 12, a flat washer 15 is

PARA 14-15

installed at each end of the rivets. Refer to fig. VI-12 for the direction and dimension of rivet installation.

Warning: Gear assembly 11 (A, fold-out 8) must be installed in the converter housing as shown in fig. VI-12. Failure to face the gear in the proper direction will cause the gear to interfere with the housing. Be certain the gear will rotate freely after installation.

(2) Coat the outer diameter of a new oil seal 2 with Permatex and install it into a new diaphragm 3. Coat the outer diameter of diaphragm 3 with Permatex.

(3) Position the torque converter housing 34 (B, foldout 8) on the work table with the front side up. Install the seal and diaphragm into the housing. Place a soft hammer on the shoulder near the outer diameter of the diaphragm and tap on the hammer to start the diaphragm (fig. VI-13). Move the hammers around the circle of the diaphragm until the diaphragm is seated.

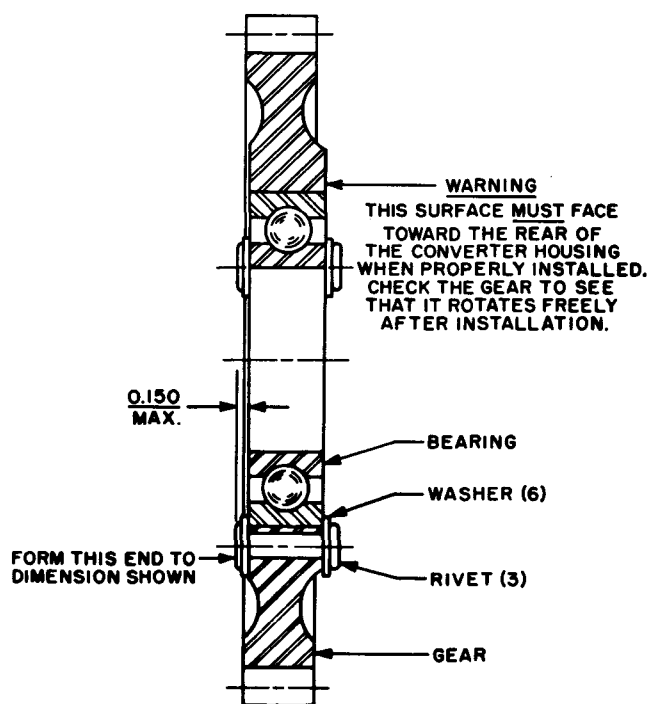


Fig. VI-12. Accessory drive idler gear assembly and installation—cross section

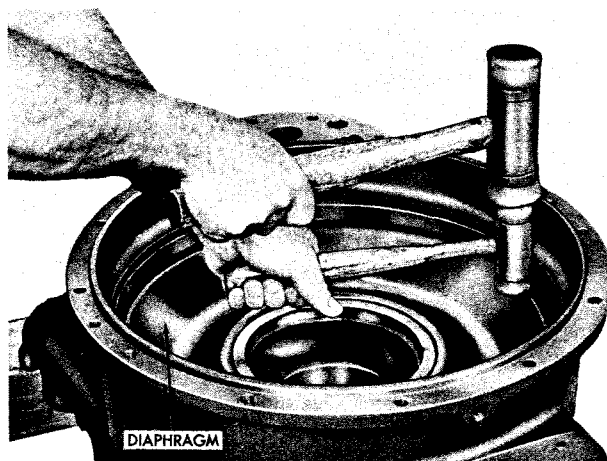


Fig. VI-13. Installing diaphragm into converter housing

15. TORQUE CONVERTER HOUSING

a. Disassembly (B, foldout 8)

(1) If necessary for parts replacement, remove converter ground sleeve 20 from housing 34 by pressing the sleeve toward the rear of the housing (fig. VI-14). Be sure to press on the shoulder of the ground sleeve.

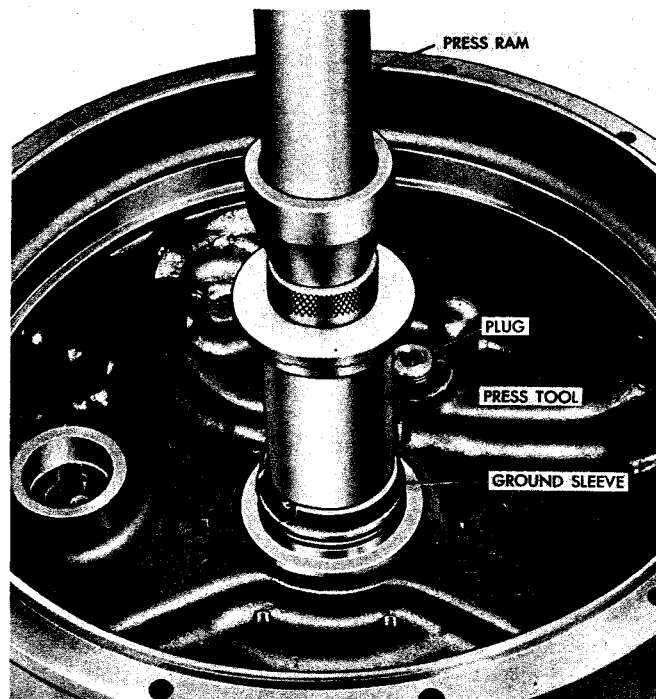


Fig. VI-14. Removing converter ground sleeve

(2) If necessary for parts replacement, remove bearings 31 (B, foldout 8) and 32 from gear 10 (A, foldout 8).

Note: Some assemblies do not include oil seal 27 and seal ring 29 (B, foldout 8).

(3) Remove components as necessary from the bearing retainer. Do not remove lip-type oil seal 27 unless replacement is necessary.

(4) If a remote-mount oil filter tube is used with the transmission, remove tube 33.

(5) On 3531-3 transmission, remove two bolts 13, lock washers 14, cover 12 and gasket 10.

b. Cleaning, Inspection. Refer to sect. IV, para 6 for cleaning and inspection procedures.

c. Assembly (B, foldout 8)

(1) If converter ground sleeve 20 was removed, chill the sleeve in dry ice for one or two hours and install into the rear of converter housing 34. Secure the ground sleeve with six bolts (fig. VI-15).

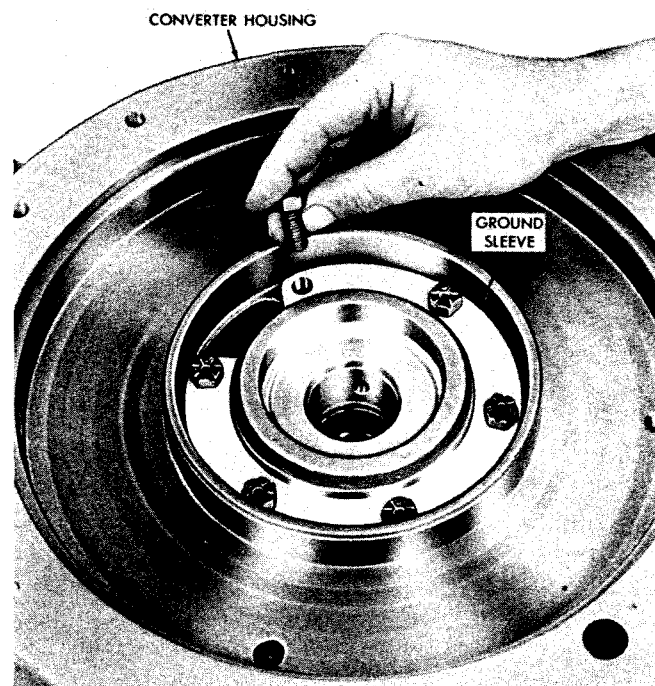


Fig. VI-15. Installing converter ground sleeve bolts

(2) If bearings 31 and 32 (B, foldout 8) were removed, install bearing onto gear 10 (A, foldout 8).

Note: Check plug 1 (B, foldout 8) in the converter housing. It should be oil tight. It should be located in the forward (outer) hole (sect. V, para 2, step 23, for hole location) if the transmission is a "wet" converter housing. It should be in the rear (inner) hole if the transmission has a "dry" converter housing.

(3) If tube 33 were removed (for cleaning) install the tube into the rear of the converter housing. Refer also to fig. III-7. If no filter is used, no tube is used and the opening at the front of the housing, as well as the three openings at the rear of the housing, are plugged.

(4) On 3531-3 transmission, install gasket 10 (B, foldout 8), cover 12 and two bolts 13 with lock washers 14.

16. REVERSE PLANETARY AND CLUTCH

a. Disassembly (A, foldout 9 and fig. VI-16)

(1) Position the carrier assembly 7, hub assembly 8 upward, on a drill press table.

(2) Using a 3/4-inch twist drill, centered accurately, drill the end of each pinion spindle 10 to weaken the staking.

Caution: Do not drill into the metal of the hub assembly.

(3) Support the carrier assembly, at each spindle bore, on a press bed.

(4) Press the four spindles 10 out of carrier. Discard the spindles.

Note: Handle the assembly carefully after the first spindle is removed to avoid dropping the pinion components which are freed.

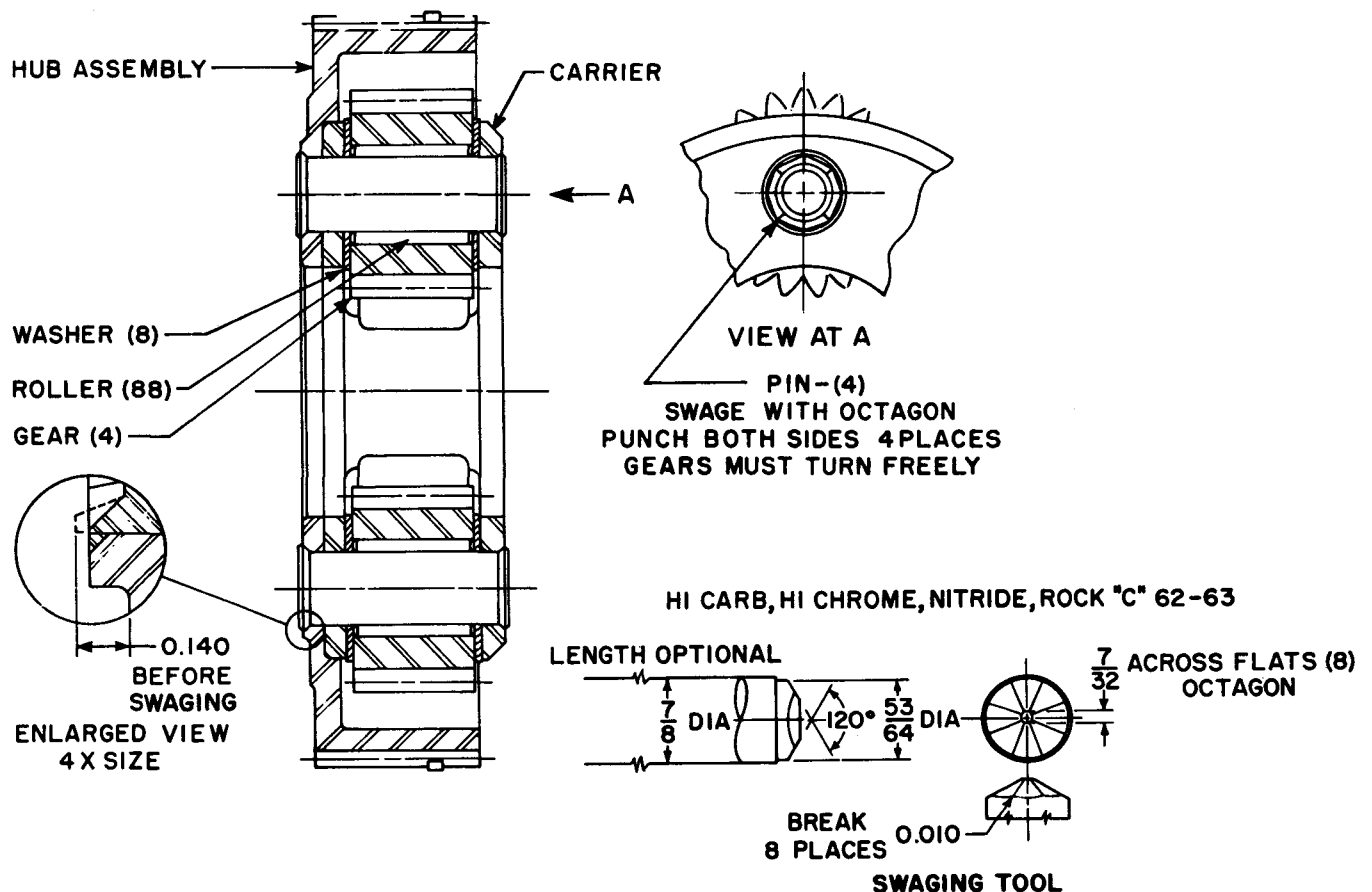


Fig. VI-16. Reverse planetary carrier assembly

(5) Remove the hub assembly 8 from carrier 13.

(6) Remove pinion 12, two thrust washers 11, and 22 rollers 9 from each of the four pinion locations.

Note: Put each pinion group into a separate container and identify it with the location from which it was removed.

(7) Earlier model transmissions are equipped with polyacrylate piston seals. Remove seals 3 and 4 from piston 2. Later model transmissions (beginning with S/N 34480) are equipped with Teflon piston seals.

Note: Piston seals (polyacrylate) which do not have seal expanders may be replaced by identical seals or by Teflon seals and expanders. Teflon

seals which have expanders under them must be replaced by Teflon seals and expanders.

(8) On later models, remove seal ring 3 and expander 18 from the outside diameter of piston 2. Remove seal ring 4 and expander 19 from the inside diameter of the piston. Discard the seal rings and expanders.

Caution: Do not dispose of Teflon seal rings by burning. Toxic gases are produced.

(9) Do not disassemble clutch anchor assembly 17 unless parts replacement is necessary.

(10) If parts replacement is necessary, position the anchor, flat side upward, in a press and press the six dowel pins from the anchor.

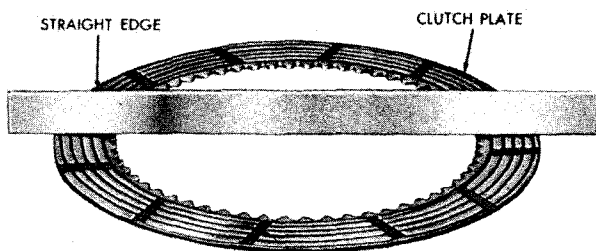


Fig. VI-17. Method of determining amount and direction of clutch plate cone

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information. All clutch plates should be inspected to determine the amount and direction of the cone. Place the clutch plate on a flat surface and lay a straightedge across the plate (fig. VI-17). Measure the amount of cone by placing a thickness gage between the straightedge and the inside diameter of the plate. When assembling the plates, make sure that each is installed so that the cone is in the same direction.

c. Assembly (A, foldout 9, and fig. VI-16)

(1) Make a pinion pin alining tool by grinding or turning a chamfer on one end of a 6-inch length of 3/4-inch, cold-rolled steel shafting.

(2) Coat the bore of each pinion 12 (A, foldout 9) with oil-soluble grease.

(3) Holding the alining tool in one hand, install one thrust washer 11 and then a pinion 12 onto the alining tool.

Note: Pinions must be replaced only in matched sets. Never mix new pinions with used pinions.

(4) Install 22 rollers 9 into the bore of the pinion 12.

(5) Install a second thrust washer 11, onto the pinion.

(6) Grasp the assembled pinion group at the washers and withdraw the alining tool.

(7) Slip the assembled pinion group into its proper location in the carrier.

Note: The carrier should be positioned front (flat) side downward at this time.

(8) Repeat procedures (3) through (7), above, for the remaining pinion groups.

(9) Position the hub assembly 8, front side downward, and install the carrier assembly 13 into it. Aline the spindle bores of the carrier and hub 8, and the pinion groups, by inserting the alining tool at each spindle location.

(10) Press new pinion spindles 10 through the carrier, pinions, and hub assembly until they project 0.140 inch from the hub assembly (see inset detail of fig. VI-16).

(11) Stake both ends of the spindles into the countersinks of the carrier and the hub. Refer to fig. VI-16 for the details of fabricating the staking punch.

Note: Check the pinions for free rotation after the spindles are staked. The pinions must not bind.

(12) On assemblies which use Teflon seal rings and expanders, coil the expanders as shown in fig. VI-18 to make sure that the sharp ends are turned away from the seal.

Note: Refer to a(7) and Note, above.

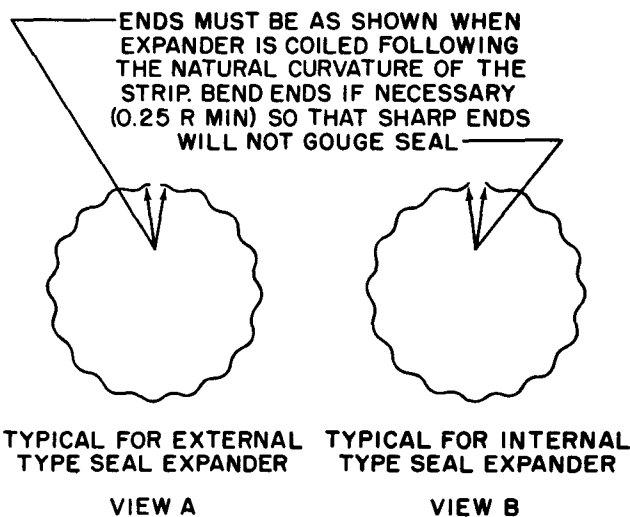


Fig. VI-18. Typical expanders for Teflon seal rings

(13) Install expanders 18 and 19 (A, foldout 9) into their respective grooves in piston 2. Make sure that each piston groove is clean and free of burrs and sharp edges.

(14) Starting at a point opposite to the open end of the expander, install seals 3 and 4 into their respective grooves in piston 2.

Caution: When Teflon seal rings are used, it will be necessary to stretch the outside diameter of seal 18 slightly to get it into the groove. Do not stretch the seals more than necessary. The use of tools is not desirable. Use care not to scratch, nick or distort a Teflon seal.

(15) If the six dowel pins were removed from anchor 17, install new pins by placing anchor 17, flat side up, on a press bed.

(16) Coat the pin holes with white lead and press six pins into anchor 17 until they project 0.960 inch above the flat surface of the anchor.

17. FORWARD PLANETARY AND CLUTCH

a. Disassembly (B, foldout 9, and fig. VI-19)

(1) Position the carrier assembly 5 (B, foldout 9), hub upward, on a drill press table.

(2) Using a 1/2-inch twist drill, centered accurately, drill the end of each pinion pin 11 to weaken the staking.

Caution: Do not drill into the metal of the carrier.

(3) Support the carrier assembly at each spindle bore, on a press bed.

(4) Press the six pins out of the carrier. Discard the spindles.

(5) Remove a pinion 9, two thrust washers 10, and twenty rollers 6 from each of the six pinion locations.

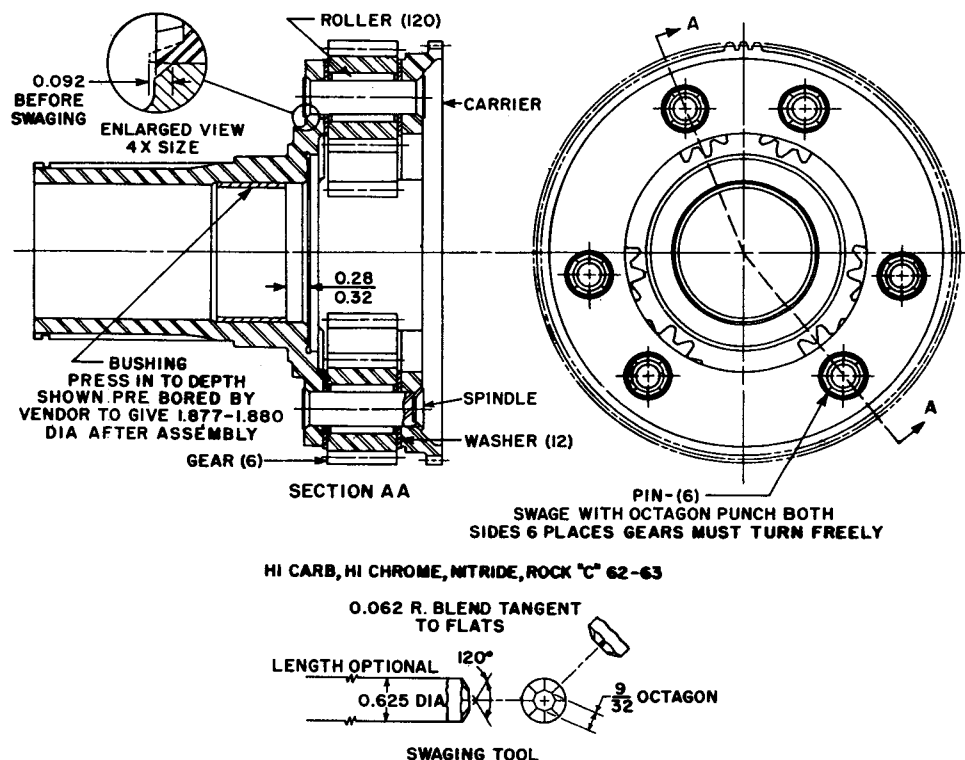


Fig. VI-19. Forward planetary carrier assembly—cross section

(6) Remove seals 14 and 16 (and expanders 21 and 22 on later models) from forward piston 15. Refer to para 16a(7) and (8), above.

(7) If bushing 7 requires replacement, press or drive the bushing out, toward the flat end of the carrier.

Note: Put each pinion group into a separate container and identify it with the location from which it was removed.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information. Refer to para 16b, above, for clutch plate information.

c. Assembly (B, foldout 9, and fig. VI-19)

(1) If bushing 7 (B, foldout 9) was removed, press a new bushing into the carrier to the 0.28 to 0.32 dimension shown in fig. VI-19.

(2) Make a pinion alining tool by grinding or turning a chamfer on one end of a 6-inch length of 1/2-inch, cold-rolled steel.

(3) Coat the bore of each pinion 9 (B, foldout 9) with oil-soluble grease.

(4) Holding the alining tool in one hand, install a thrust washer 10 and then a pinion 9 onto the alining tool.

Note: Pinions must be replaced only in matched sets. Never mix new pinions with used pinions.

(5) Install twenty rollers 6 into the bore of the pinion.

(6) Install a second thrust washer 10, onto the pinion.

(7) Grasp the assembled pinion group at the thrust washers and withdraw the alining tool.

(8) Slip the assembled pinion group into its proper location in the carrier.

Note: The carrier should be positioned hub upward at this time.

(9) Repeat procedures (4) through (8), above, for the remaining pinion groups. Aline the pinion groups in the carrier by inserting the alining tool in each spindle bore.

(10) Press new spindles through the carrier and pinions until they project 0.092 inch from the inner ends of the countersinks in the pinion bores at the rear of the carrier (see inset detail of fig. VI-19).

(11) Stake both ends of the spindles into the countersinks of the carrier. Refer to fig. VI-19 for details of fabricating the staking punch.

(12) Install seals 14 and 16 (and expanders 21 and 22 on later models) onto forward piston 15. Refer to para 16c(12) through (14), above, for piston seal and expander installation.

18. INTERMEDIATE-RANGE CLUTCH

a. Disassembly (B, foldout 10)

(1) Remove two hook-type seal rings 1, from the hub of clutch drum 2.

(2) Improvise a puller (or use a press) which will depress the piston return spring 6. Remove snap ring 7 which retains the spring (fig. VI-20).

(3) Remove the piston return spring and the piston assembly (fig. VI-21). The piston assembly can be dislodged by bumping the clutch drum on a flat wood surface.

Note: Refer to para 16c(12) through (14), above, for rebuild of the piston assembly. Only the outer seal ring 4 (B, foldout 10) has an expander 18. Earlier models use no expander.

(4) Remove the hook-type seal ring from the inner hub of the clutch drum (fig. VI-21).

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV,

para 7 and to sect. VIII for wear limits information. Refer to para 16b, above, for clutch plate information.

c. Assembly (B, foldout 10)

(1) Install the hook-type seal ring onto the inner hub of the clutch drum (fig. VI-21).

(2) After installing the outer seal ring 4 (B, foldout 10) and expander 18 (if used), lubricate the hook-type seal ring and the outer circumference of the piston. Install the piston assembly, flat side first, into the clutch drum (fig. VI-21).

(3) Install the piston return spring, concave (cupped) side first, onto the piston (fig. VI-20).

(4) Improvise a puller (or use a press) to depress the clutch spring. Install the snap ring (fig. VI-20).

(5) Install two hook-type seal rings 1 (B, foldout 10) into the grooves on the front hub of clutch drum 2.

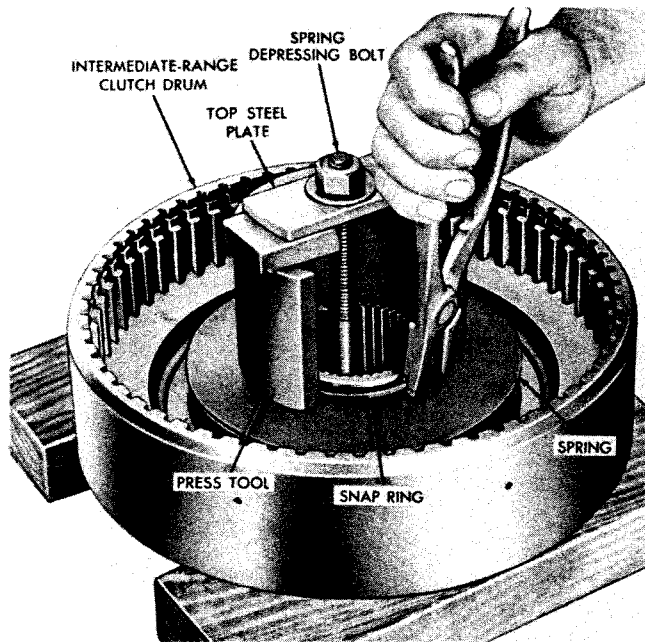


Fig. VI-20. Removing (or installing) return spring snap ring

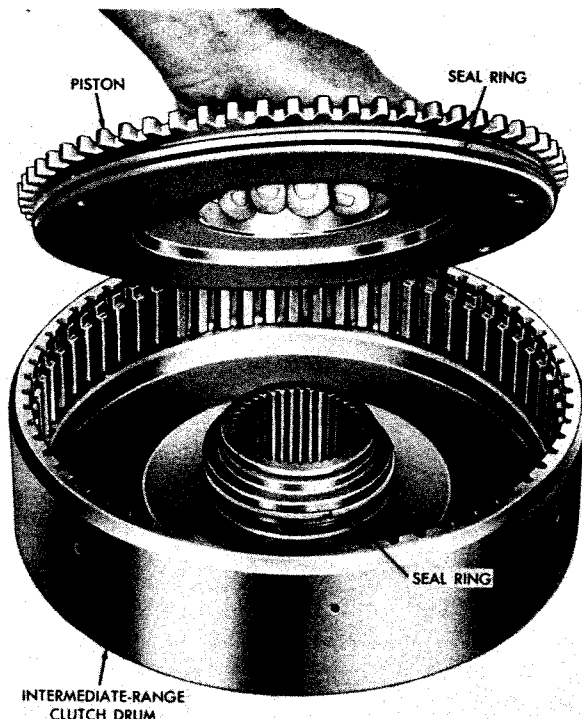


Fig. VI-21. Removing (or installing) intermediate-range clutch piston assembly

19. HIGH-RANGE PLANETARY AND CLUTCH

a. Disassembly (A, foldout 11, and fig. VI-22)

(1) Position carrier assembly 1 (A, foldout 11), hub upward, on a drill press table.

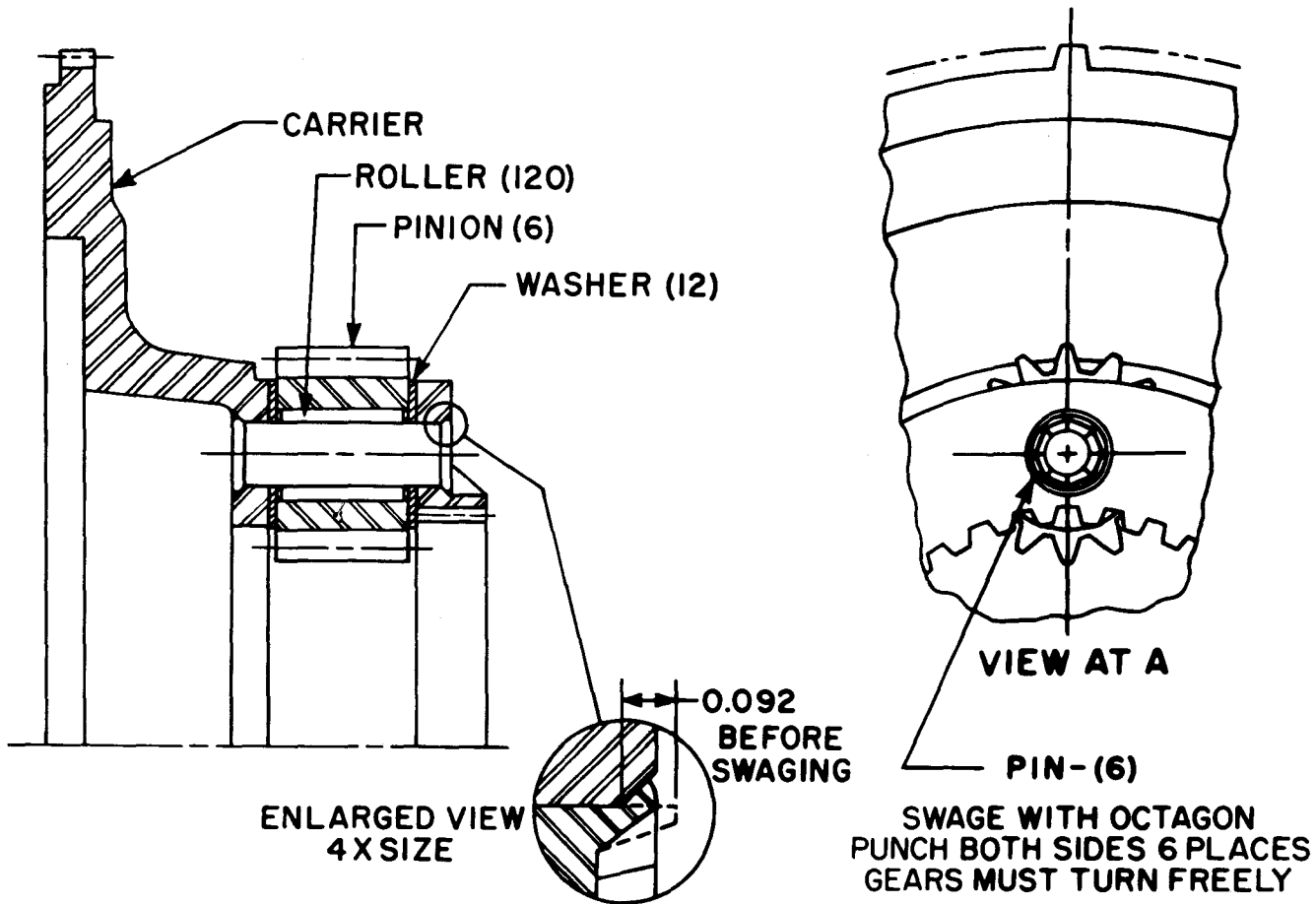
(2) Using a 1/2-inch twist drill, centered accurately, drill the end of each pinion spindle 3 to weaken the staking.

Caution: Do not drill into the metal of the carrier.

(3) Support the carrier assembly at each spindle bore, on a press bed.

(4) Press the six pins 3 out of the carrier. Discard the pins.

(5) Remove a pinion 5, two thrust washers 4, and twenty rollers 2 from each of the six pinion locations.



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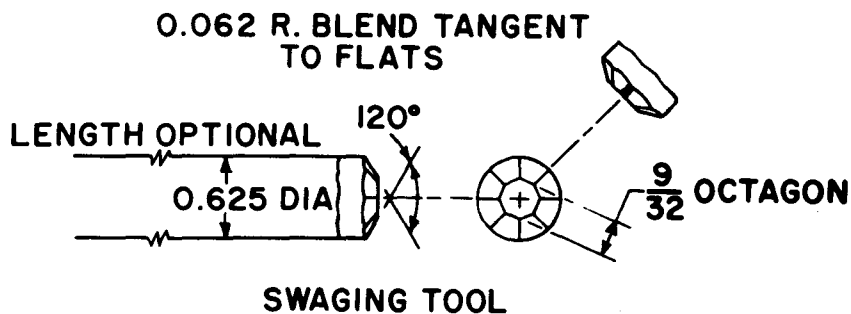


Fig. VI-22. High-range planetary carrier assembly—cross section

(6) Remove seals 10 and 12 (and expanders 16 and 17 on later models) from piston 11. Refer to para 16a(7) and (8), above.

Note: Put each pinion group into a separate container and identify it with the location from which it was removed.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information. Refer to para 16b, above, for clutch plate information.

c. Assembly (A, foldout 11, and fig. VI-22)

PARA 19-20

(1) A pinion alining tool as described in 17c(2), above, is required for operations outlined below.

(2) Coat the bore of each pinion with oil-soluble grease.

(3) Holding the alining tool in one hand, install a thrust washer 4 (A, foldout 11) and then pinion 5 onto the alining tool.

Note: Pinions must be replaced only in matched sets. Do not mix new pinions with used pinions.

(4) Install twenty rollers 2 into the bore of the pinion.

(5) Install a second thrust washer 4, onto the pinion.

(6) Grasp the assembled pinion group at the thrust washers and withdraw the alining tool.

(7) Slip the assembled pinion group into its proper location in carrier 6.

Note: The carrier should be positioned, splined flange downward, at this time.

(8) Repeat procedures (3) through (7), above, for the remaining pinion groups. Align the pinion groups in the carrier by inserting the alining tool into each spindle bore.

(9) Press new spindles through the carrier and pinions until they project 0.092 inch from the inner ends of the countersinks at the rear of the carrier (see inset detail of fig. VI-22).

(10) Stake both ends of the spindles into the countersinks of the carrier. Refer to fig. VI-22 for details of fabricating the staking punch.

Note: Check the pinions 5 (A, foldout 11) for free rotation after the spindles are staked. The pinions must not bind.

(11) Install seals 10 and 12 (and expanders 16 and 17 on later models) onto the piston 11. Refer to para 16c(12) through (14), above, for seal and expander installation.

20. LOW-RANGE PLANETARY AND CLUTCH

a. Disassembly (B, foldout 11, and fig. VI-23)

(1) Position carrier assembly 8 (B, foldout 11), flat side down, on a drill press table.

(2) Using a 1/2-inch twist drill, centered accurately, drill the end of each pinion pin 12 to weaken the staking.

Caution: Do not drill into the metal of the carrier.

(3) Support the carrier assembly at each spindle pin bore, on a press bed.

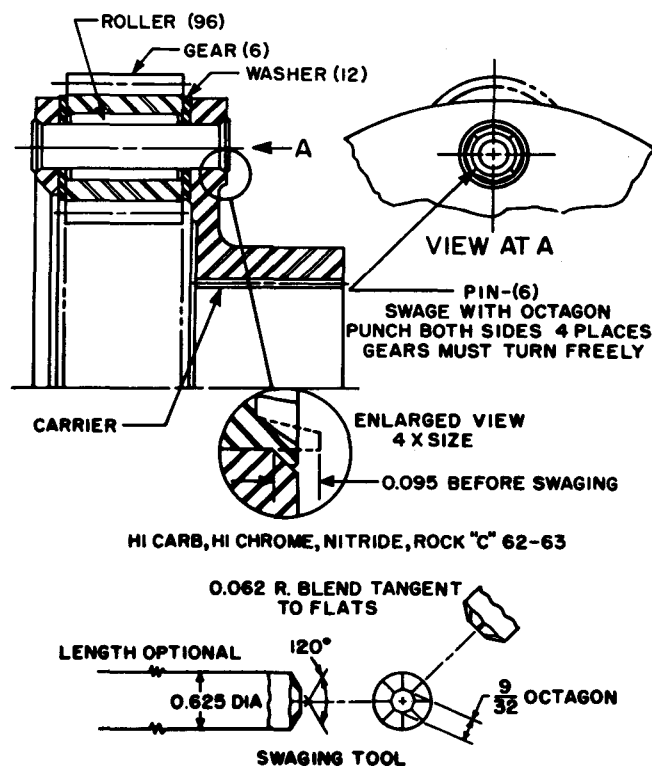


Fig. VI-23. Low-range planetary carrier assembly—cross section

(4) Press the six pins 12 out of the carrier. Discard the pins.

(5) Remove a pinion 10, two thrust washers 9 and sixteen (twenty-one rollers in CRT 3630) rollers 11 from each of the six pin locations.

Note: Place each pinion group in a separate container and identify it with the location from which removed.

(6) Remove seal 15 (and expander 18, if used) from piston 16. Refer to para 16a(7) and (8), above.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information. Refer to para 16b, above, for clutch plate information.

c. Assembly (B, foldout 11, and fig. VI-22)

(1) A pinion alining tool described in 17c(2), above, is required for operations described below.

(2) Coat the bore of each pinion with oil-soluble grease.

(3) Holding an alining tool in one hand, install a thrust washer 9 (B, foldout 11) and then pinion 10 onto the alining tool.

Note: Pinions must be replaced in matched sets. Do not mix new pinions with used pinions.

(4) Install sixteen (twenty-one rollers in CRT 3630-1) rollers 11 into the bore of each pinion.

(5) Install a second thrust washer 9 onto the pinion.

(6) Grasp the assembled pinion group and the thrust washers and withdraw the alining tool.

(7) Slip the assembled pinion group into its proper location in carrier 13.

Note: The carrier should be positioned in a press, with the flat side down (webbed side up) at this time.

(8) Repeat procedures (3) through (7), above, for the remaining pinion groups. Aline the pinion groups in the carrier by inserting the alining tool into each spindle bore.

(9) Press new spindles through the carrier and pinions until they project 0.095 inch from the inner ends of the countersinks at the rear (webbed side) of the carrier (see inset detail of fig. VI-23).

(10) Stake both ends of the spindles into the countersinks of the carrier. Refer to fig. VI-23 for details of fabricating the staking punch.

(11) Install seal 15 (and expander 18 on later models) onto piston 16. Refer to para 16c(12) through (14), above, for piston seal and expander installation.

21. TRANSFER GEARS AND REAR OUTPUT SHAFT

a. Disassembly (A, foldout 13)

(1) Remove bearings 1 and 3 from drive gear 2.

(2) On CRT 3531-1 models prior to S/N 39334, remove snap ring 18 from idler gear 16. Remove bearing 17 from gear 16. Do not remove snap ring 14 unless replacement is necessary. On CRT 3531-1 models beginning with S/N 39334, and all CRT 3630-1 models, remove bearing assemblies 9 and spacer 12.

(3) Press seal 30 from bearing retainer 27 (or 31).

(4) Remove bearing 25 from shaft 34. Remove spacer 24 from shaft 34.

(5) If bushing 35 must be replaced, collapse the bushing and remove it from shaft 34.

Caution: Do not damage the bushing bore in the shaft.

b. Cleaning, Inspection, Wear Limits. Refer to sect. IV, para 6 for cleaning and inspection procedures. Refer to sect. IV, para 7 and to sect. VIII for wear limits information.

c. Assembly (A, foldout 13)

(1) If bushing 35 was removed, press a new bushing into the front of shaft 34. Press the bushing to 0.160 to 0.200 inch below the extreme front surface of the shaft.

(2) Install transfer driven gear spacer 24 onto shaft 34. Install bearing 25 onto shaft 34 and press it until it seats hard against the spacer.

(3) Press oil seal 30 into the rear (chamfered end) of retainer 27 (or 31). The seal is installed, spring-loaded side first, and pressed to seat lightly in the retainer.

(4) On CRT 3531-1 models prior to S/N 39334, if snap ring 14 was removed, install it into idler gear 16. Install transfer idler gear bearing 17 into gear 16. Secure the bearing with snap ring 18. On CRT 3531-1 models beginning with S/N 39334, and all CRT 3630-1 models, install bearing assemblies 9 and spacer 12 into gear 10.

(5) Install bearings 1 and 3 onto the hubs of gear 2. Press on the inner races, seating them hard against the gear hub.

22. SPEEDOMETER DRIVE (B, foldout 13)

a. Disassembly

(1) Remove four bolts 12 and lock washers 11.

(2) Remove adapter 10 and gasket 7. Remove seal 9 from adapter 10.

(3) Remove, as a unit, speedometer drive shaft assembly 1, bearing 5, snap ring 6 and spacer 8.

(4) Remove the spacer from drive shaft 3. Remove the snap ring from the drive shaft. Remove the bearing and pin 2 from shaft 3.

b. Cleaning and Inspection. Refer to sect. IV, para 6 for cleaning and inspection procedures.

c. Assembly (B, foldout 13)

(1) Install pin 2 into shaft 3. Install bearing 5, snap ring 6 and spacer 8 onto shaft 3.

(2) Install above components into the front (split line side) of cover 4.

(3) Install seal 9, lip side toward cover 4, into adapter 10. Install gasket 7 and adapter 10 onto the rear of cover 4. Secure the cover with four bolts 12 and lock washers 11.

Section VII. ASSEMBLY OF TRANSMISSION FROM SUBASSEMBLIES

1. PRELIMINARY ASSEMBLY

a. Scope of Section VII

(1) This section covers the assembly of the transmission from subassemblies. Rebuild of the subassemblies is covered in Section VI.

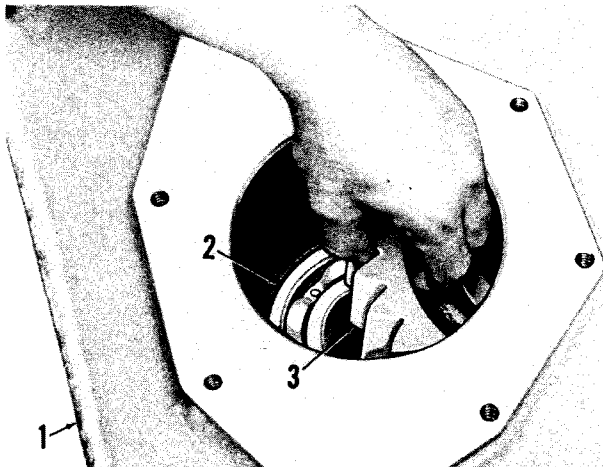
(2) Refer to the cross-section drawings for the functional location of parts (foldouts 1 and 2, at the end of this manual). Refer to exploded views (foldouts 6 through 16) for parts identification.

b. Model Variation. The assembly procedures will vary according to the models (CRT 3531-1, CRT 3630-1 or CRT 3531-3)

and options. Assembly of the CRT 3531-1 and CRT 3630-1 is covered in para 2, below. Assembly of the CRT 3531-3 is covered in para 3, below.

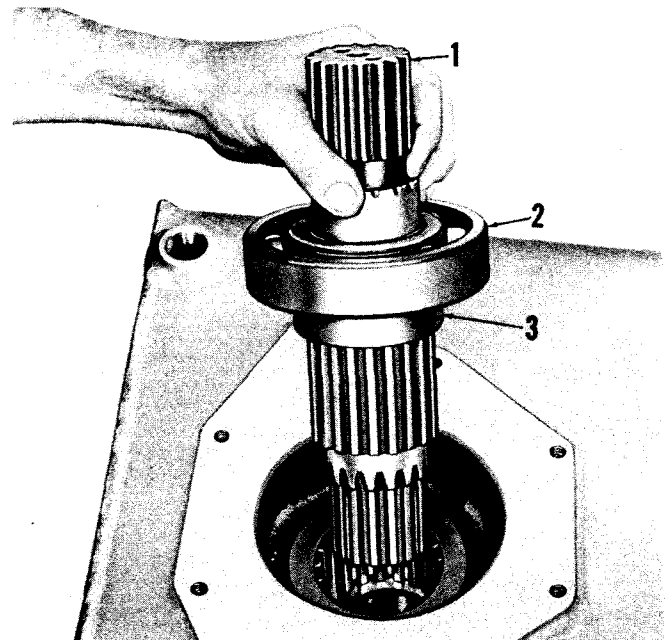
2. ASSEMBLY OF CRT 3531-1 OR CRT 3630-1 TRANSMISSIONS

The steps which follow apply to Models CRT 3531-1 or CRT 3630-1 remote mount.



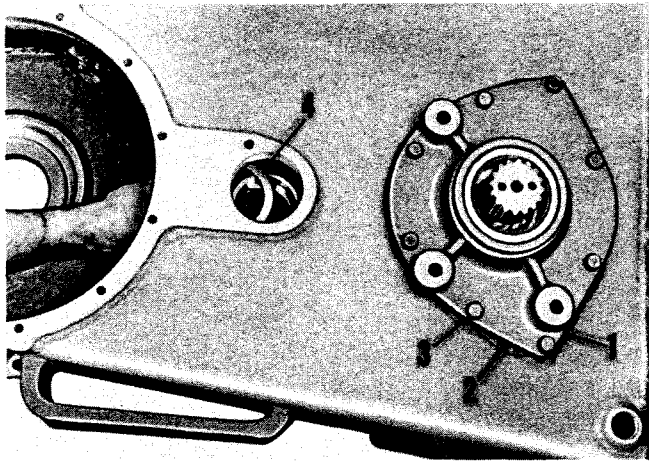
STEP 1

Position transfer gear housing 1 on work table with the front surface down and install bearing 2. Install transfer driven gear 3 into the housing with the long hub toward the front of the housing. Aline the bores of the gear and bearing.



STEP 2

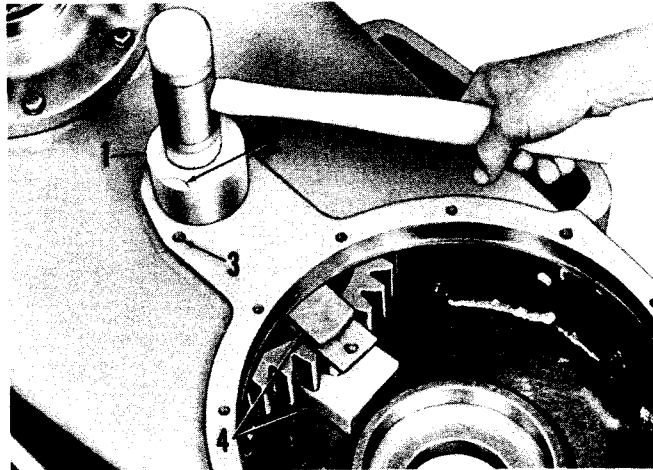
Install rear-output shaft 1, bearing 2 and spacer 3, as a unit, into the rear of the transfer gear housing. Aline the shaft splines with the gear splines.



STEP 3

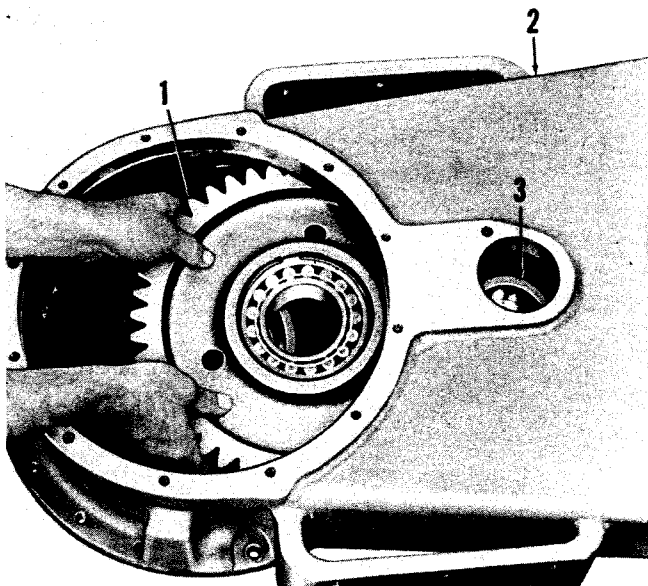
Install rear-output bearing retainer 1 and gasket 2. Secure the retainer with eight (six on some models) bolts and lock washers 3. Install transfer idler gear spacer 4 into the housing. Aline it with the spindle bore in the housing.

Note: On CRT 3531-1 assemblies beginning with S/N 39334, and on all CRT 3630-1 transmissions, the arrangement of the idler gear bearings is different from that of earlier model CRT 3531-1 transmissions. Refer to items 8 through 13 on A, foldout 13.



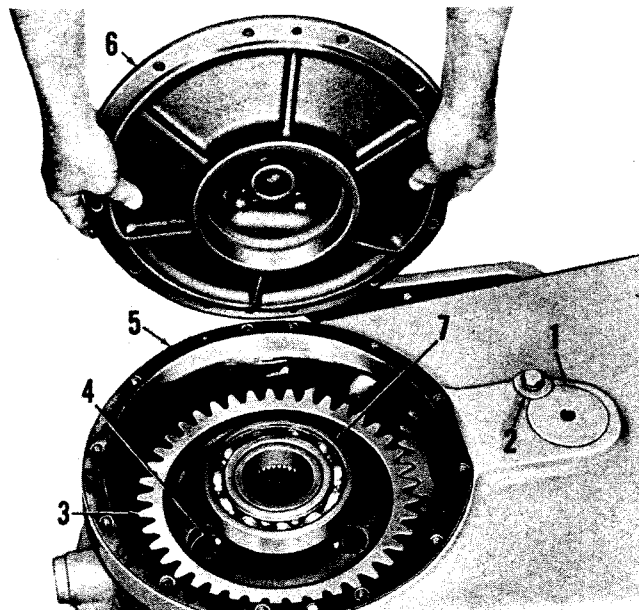
STEP 5

Install transfer idler gear spindle 1 into its bore, alining recess 2 in the spindle with bolt hole 3 in the housing. Use a soft hammer to seat the spindle. If necessary, use blocks 4 between the transfer idler gear and the housing to prevent the housing from springing when driving spindle into place. Remove blocks 4.



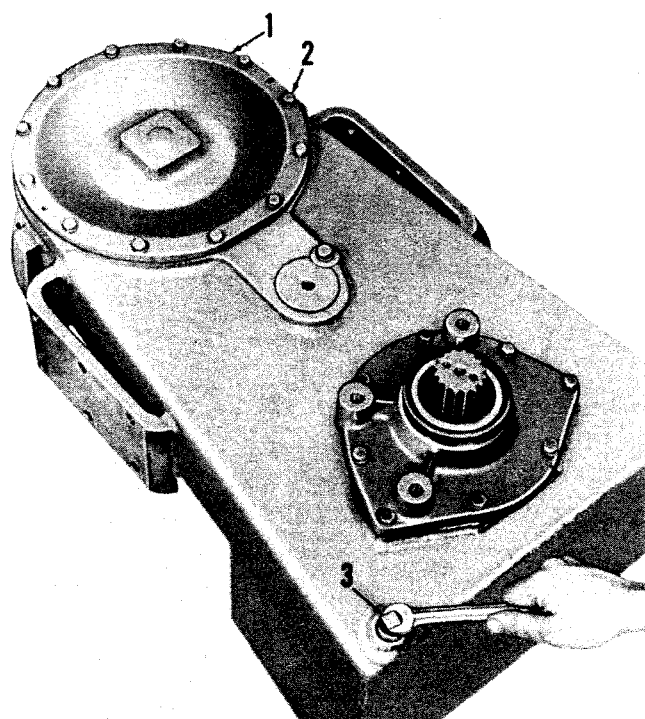
STEP 4

Install transfer idler gear assembly 1 into housing 2. Aline the gear and spacer 3 with the spindle bore in housing 2. Chill the transfer idler gear spindle in dry ice for an hour or longer (several hours, if convenient).



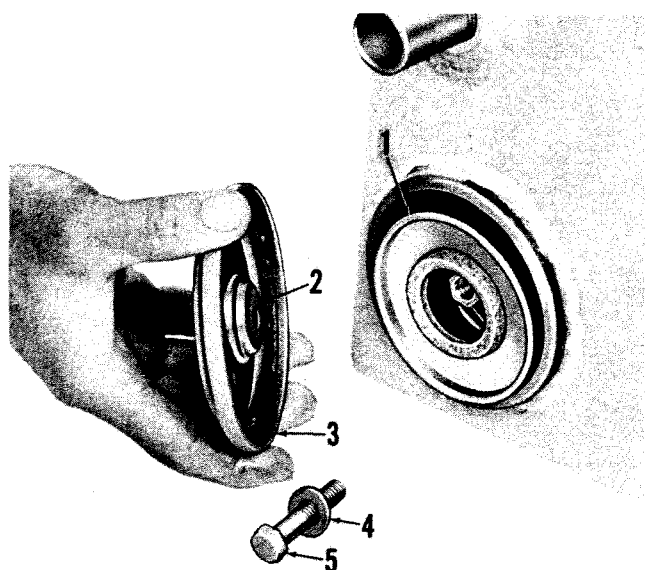
STEP 6

Secure spindle 1 with retainer, bolt and lock washer 2. Install transfer drive gear assembly 3. Tap bearing 4 to seat it in its bore. Install gasket 5 and transfer gear cover 6, alining the bolt holes. Tap cover 6 to seat it on bearing 7.



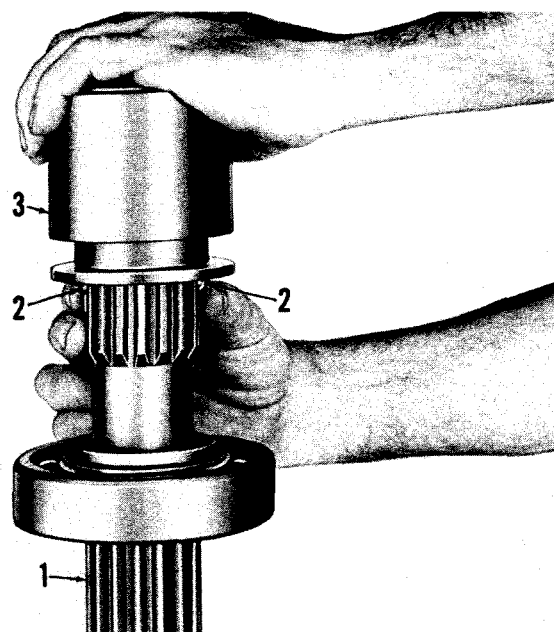
STEP 7

Secure transfer gear cover 1 with twelve bolts and lock washers 2. Install oil drain plug 3.



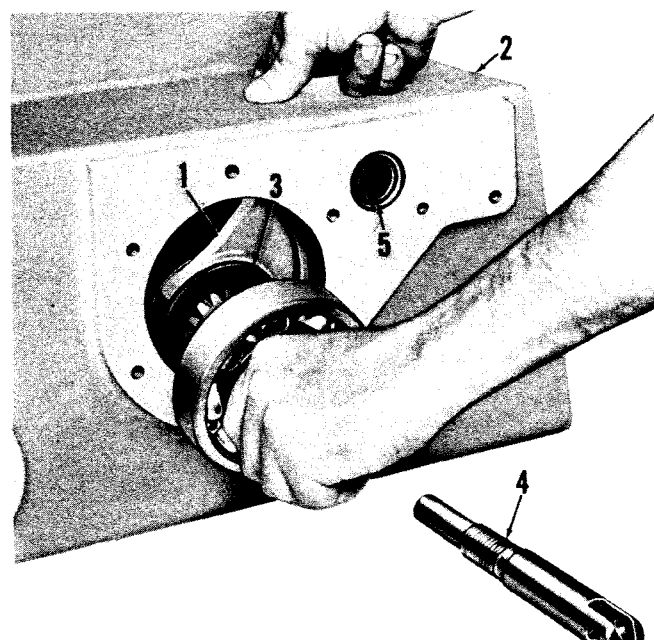
STEP 8

Position transfer gear housing assembly up-right and install oil screen assembly 1, retainer 2 and cover and gasket 3. Install bolt 5 (8 to 10 pound feet torque) and washer 4. Make sure washer 4 is in good condition to prevent oil or air leakage.



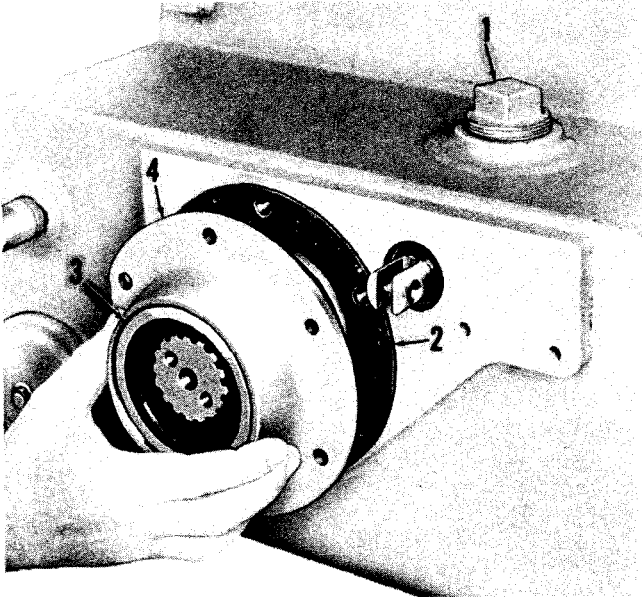
STEP 9

Holding front-output shaft 1 with one hand, install detent spring and two balls 2 into the shaft. Holding the balls to compress the spring, install coupling 3 onto the shaft with the groove toward the bearing. Engage the coupling at the first detent position.



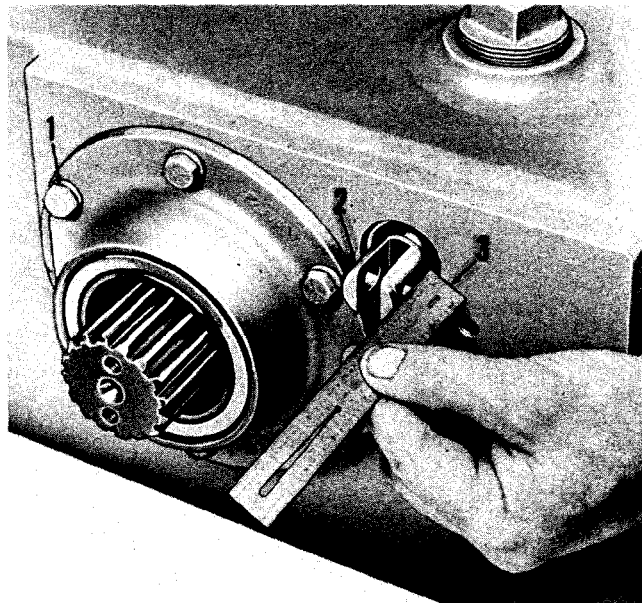
STEP 10

Install shifter fork 1 into housing 2. Install front-output shaft and coupling 3, engaging fork 1 in the coupling groove. Continuing to hold fork 1 in position, install shifter shaft 4 into its bore 5 and thread it into fork 1.



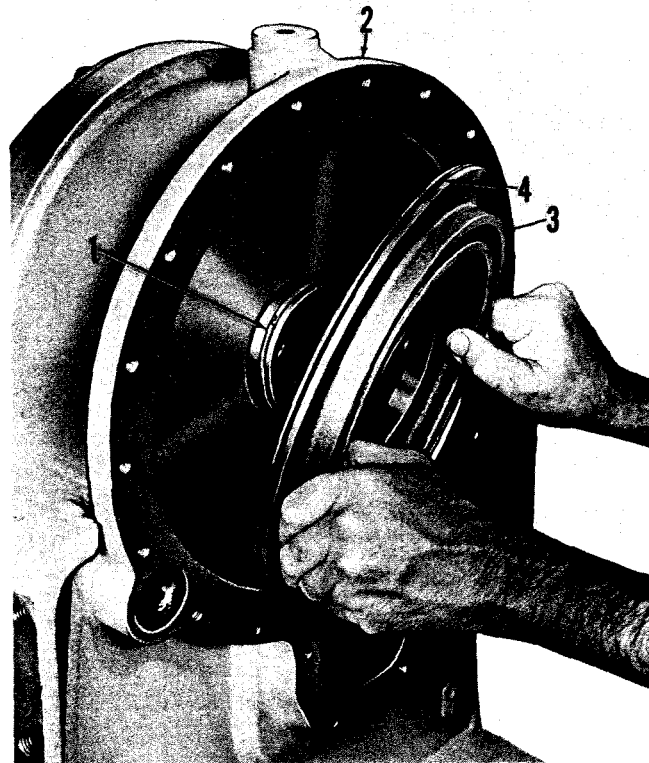
STEP 11

Install pipe plug 1 and gasket 2. Install seal 3 into the front of bearing retainer 4. Install the retainer.



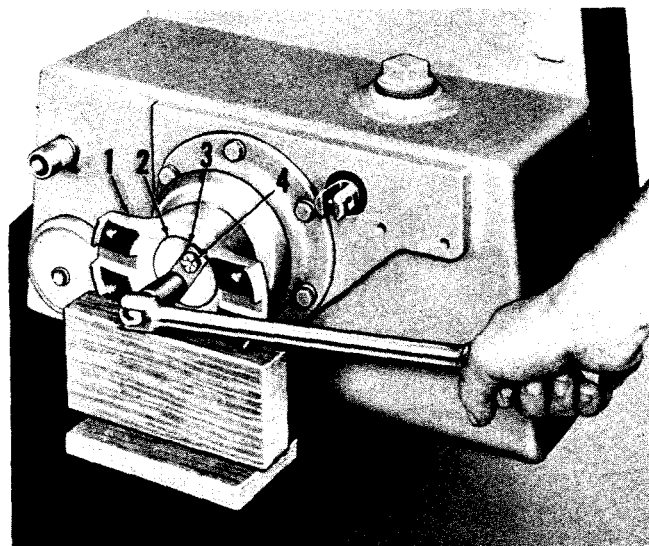
STEP 12

Secure the retainer with six bolts and lock washers 1. With shifter shaft 2 pushed all the way in, check the shaft adjustment by placing scale 3 against the face of the transfer gear housing and measuring to the center of the linkage hole in shaft 2. Rotate shaft 2 until the measurement is 0.610 to 0.650 (approximately 5/8) inch.



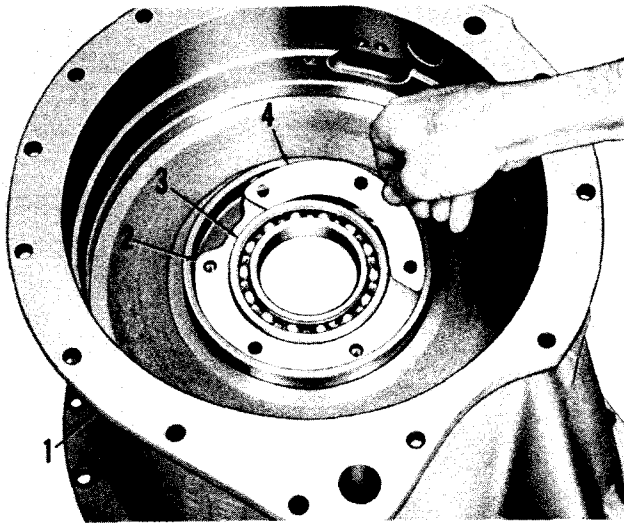
STEP 13

Install hook-type seal ring 1 into groove on transfer gear housing 2. Install the assembled piston 3, with seal ring 4 into the housing.



STEP 14

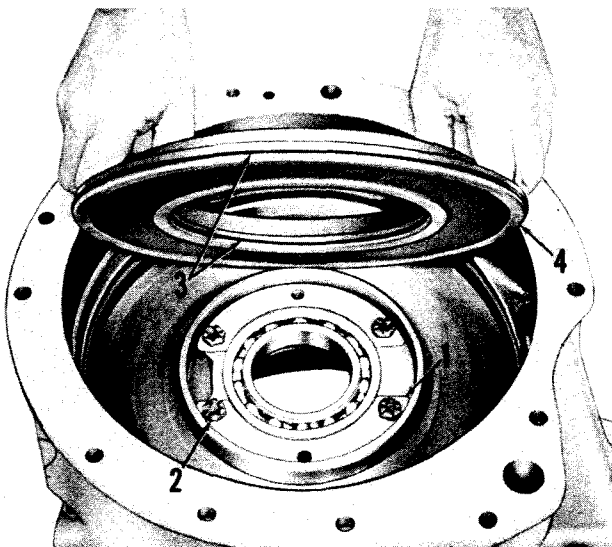
Install front-output flange 1 onto the front-output shaft. Secure flange 1 with flange retainer washer 2, lock strip 3 and two self-locking bolts 4. Bend the corners of the lock strip against the bolt heads. Refer to sect. IV, para 8b for tight-fit flange installation.



STEP 15

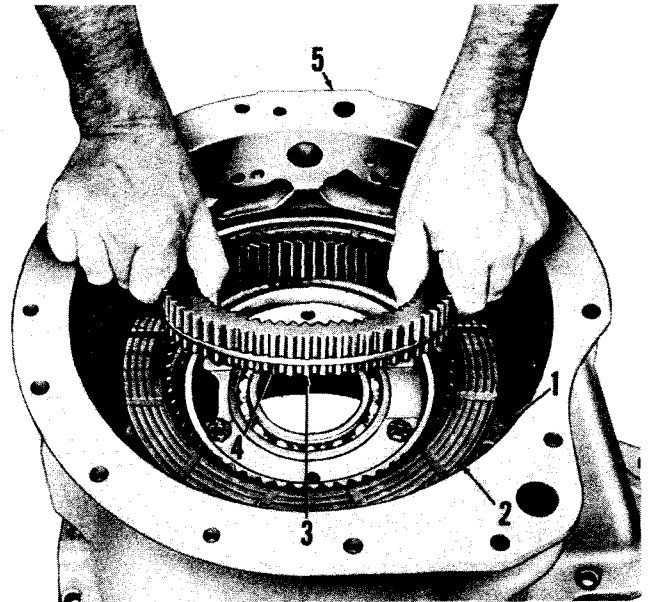
Position transmission housing 1, front end up, on wooden blocks. If hub 2 and bearing 3 were removed, press hub 2 and bearing 3 toward the rear of housing 1 aligning the bolt holes. Install two bearing retainers 4.

Note: Check retainers 4 for bending or damage incurred during removal of forward carrier assembly.



STEP 16

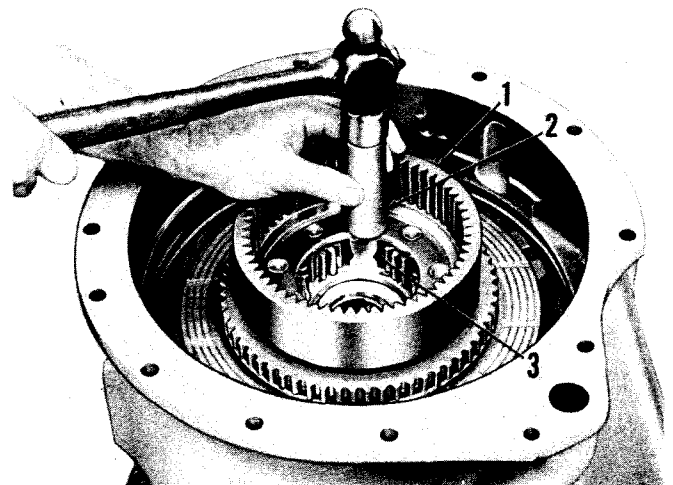
Secure both retainers 1 with four self-locking bolts 2 in the holes shown. Oil piston seal rings 3 and install the forward piston 4.



STEP 17

Install one external-tanged 1 and one internal-splined 2 forward clutch plates. Install forward ring gear 3 with positioning ring 4 toward the rear of housing 5.

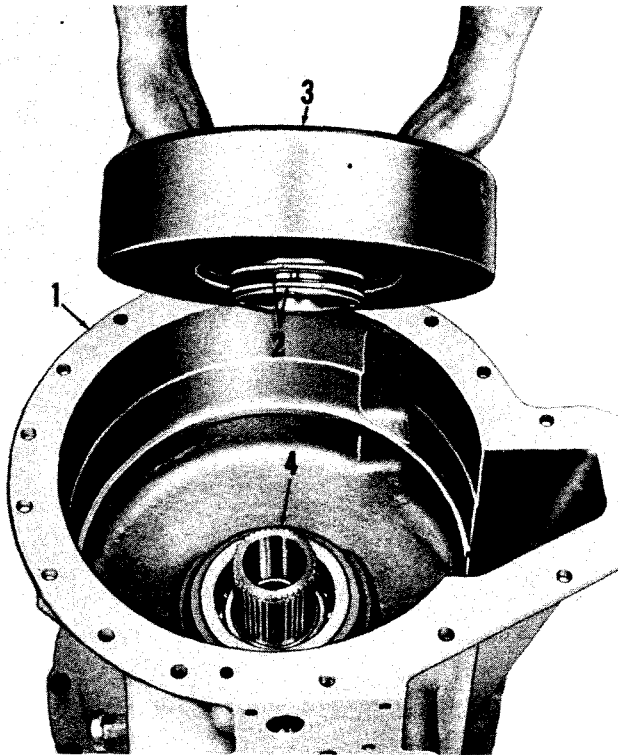
Note: Pre-soak clutch plates 2 in type C-1 transmission oil before installation.



STEP 18

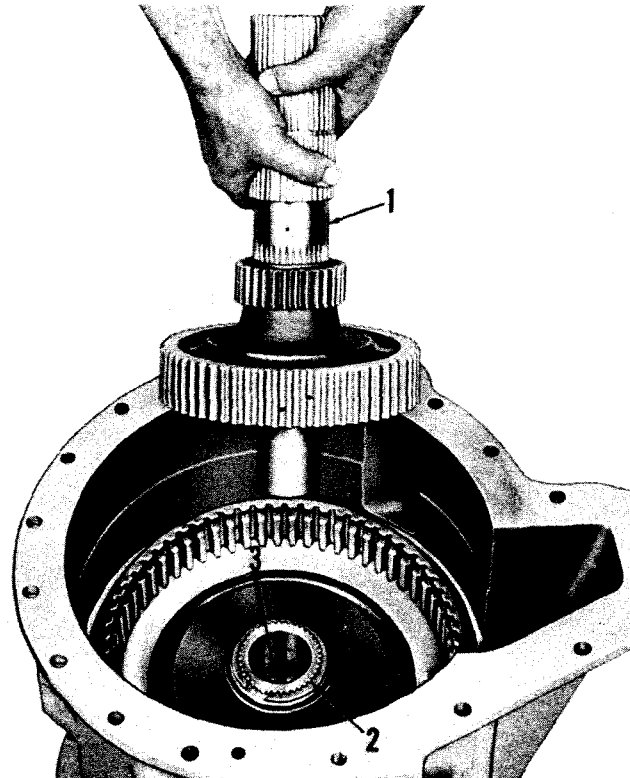
Install forward carrier assembly 1 aligning the pinions with the internal splines of the forward ring gear. Using soft drift 2 on carrier web 3, seat carrier 1 in its bearing.

Note: Support the inner race of the carrier bearing to prevent damaging the bearing and retainers.



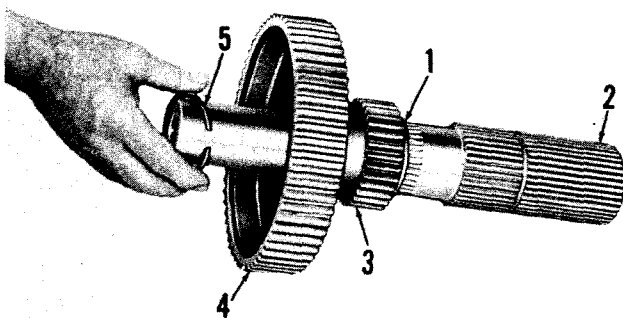
STEP 19

Turn transmission housing 1 over to rest on its front surface. Grease hook-type seal rings 2. Install intermediate-range clutch drum 3 onto forward carrier hub 4. Secure the drum with a snap ring.



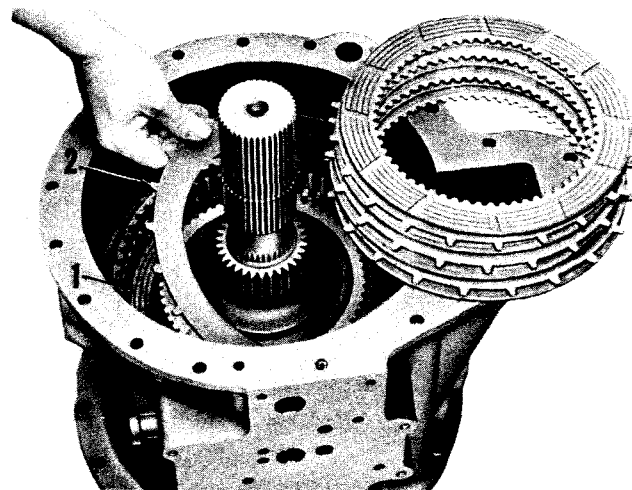
STEP 21

Install transmission main shaft and attached parts 1 into forward carrier hub 2. Be careful not to damage bushing 3.



STEP 20

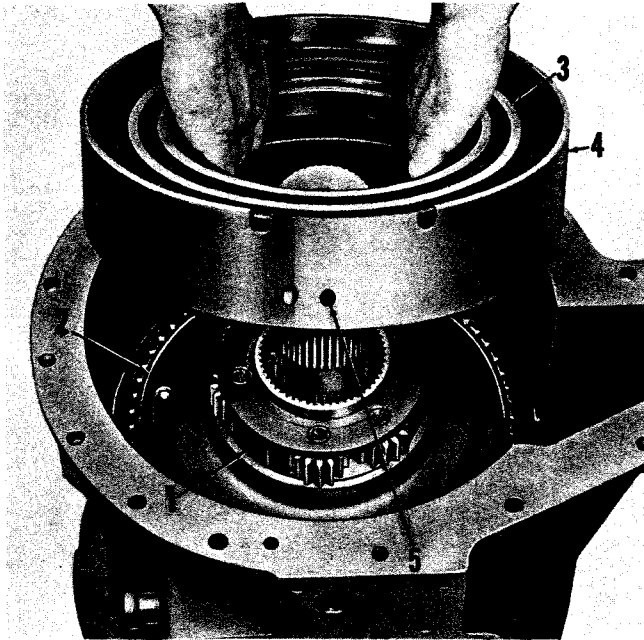
Install snap ring 1 on transmission main shaft 2. Install high-range sun gear 3 and intermediate-range clutch hub 4. Secure the hub with snap ring 5.



STEP 22

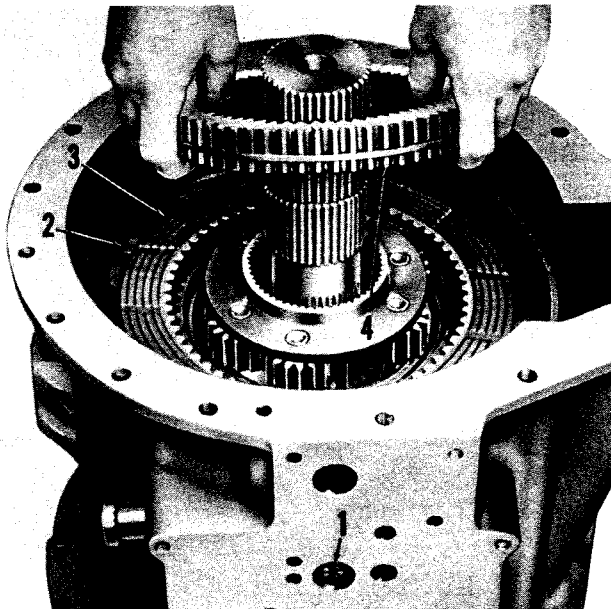
Beginning with an internal-splined plate 1, alternately install five internal-splined 1 and four external-tanged 2 intermediate-range clutch plates.

Note: Pre-soak clutch plates 1 in type C-1 transmission oil before installation.



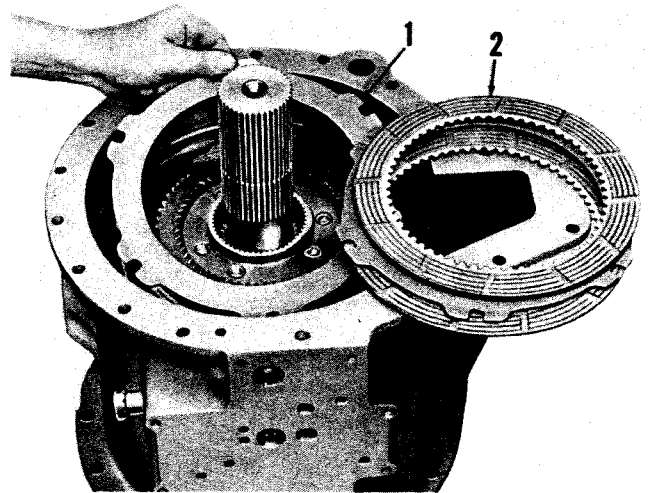
STEP 23

Install high-range carrier assembly 1 and secure it with internal-snap ring 2. Install high-range piston 3 (with seal rings assembled) into piston housing 4. Align threaded hole 5 with the bolt hole in the housing. Install housing 4.



STEP 24

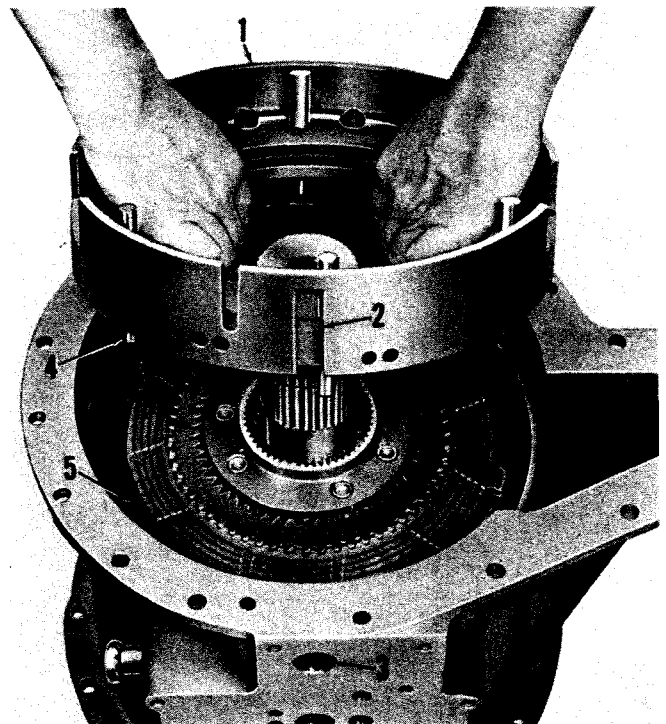
Install high-range piston housing retainer bolt 1. Install one external-tanged 2 and one internal-splined 3 high-range clutch plates. Install high-range ring gear 4 with the short ends of the external splines down.



STEP 25

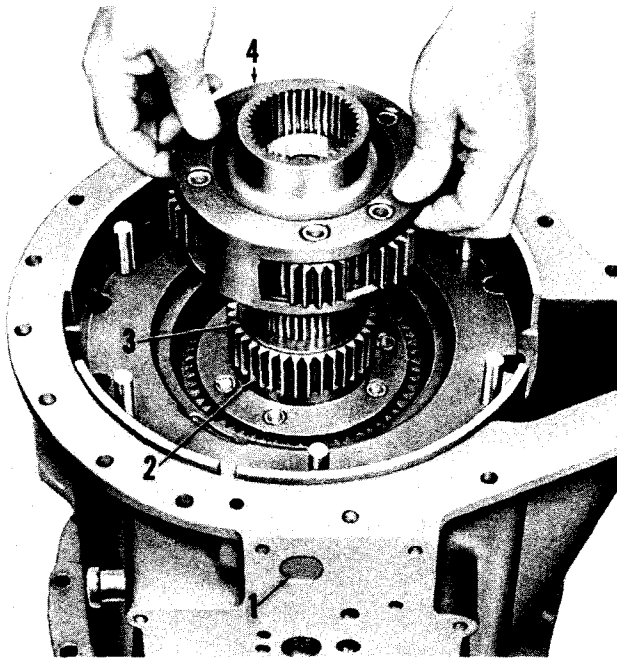
Beginning with an external-tanged plate 1, alternately install two external-tanged and two internal-splined 2 high-range clutch plates. Align the tangs of plates 1.

Note: Pre-soak clutch plates 2 in type C-1 transmission oil before installation.



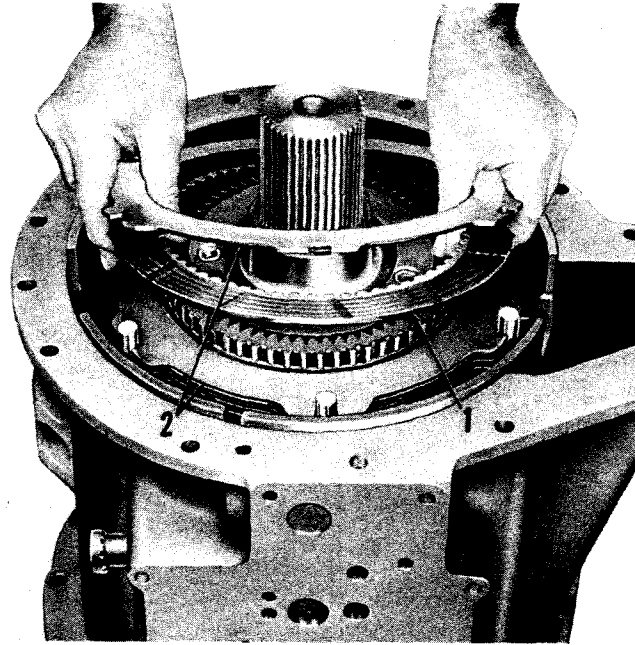
STEP 26

Install high- and low-range clutch anchor 1, aligning slot 2 with hole 3. Make sure pins 4 engage the slots in tangs 5.



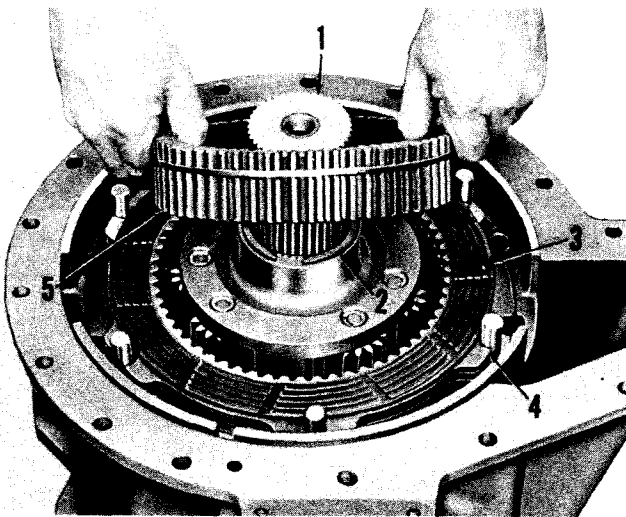
STEP 27

Install clutch anchor pin 1. Install low-range sun gear 2, thrust washer 3 and low-range planetary carrier assembly 4, aligning the carrier pinions with sun gear 2.



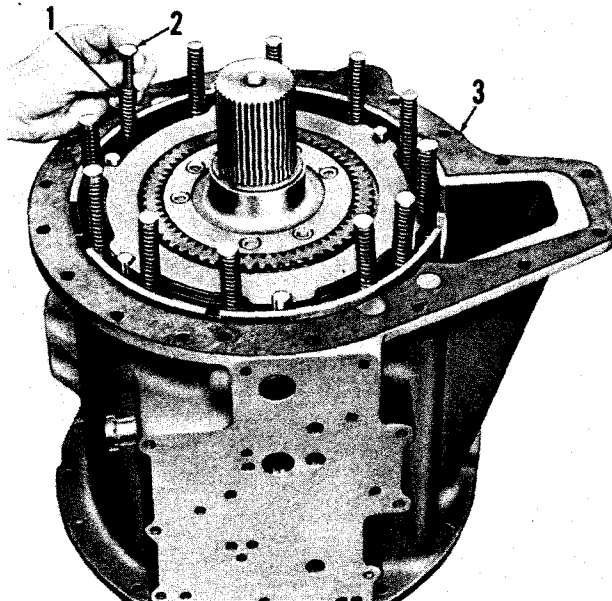
STEP 29

Install the remaining internal-splined 1 and two external-tanged 2 low-range clutch plates.



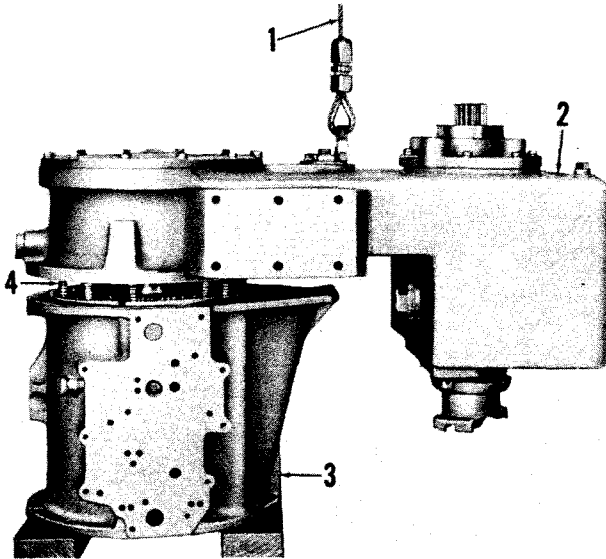
STEP 28

Grasp shaft 1 and pull upward to install snap ring 2. Beginning with an internal-splined plate, alternately install four internal-splined 3 and three external-tanged 4 low-range clutch plates. Install low-range ring gear 5 with the short ends of external splines up.



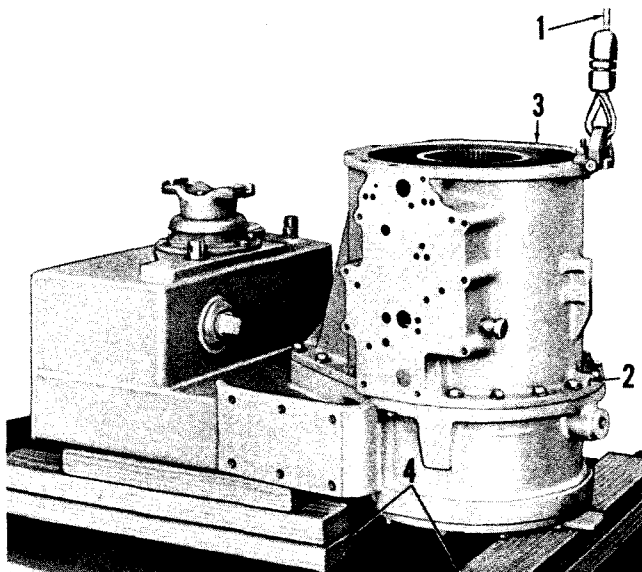
STEP 30

Install twelve clutch return springs 1 and guide pins 2 into their recesses in the high- and low-range clutch anchor. Install gasket 3. All springs 1 should be of equal height. If they are not, an external-tanged plate is out of position.



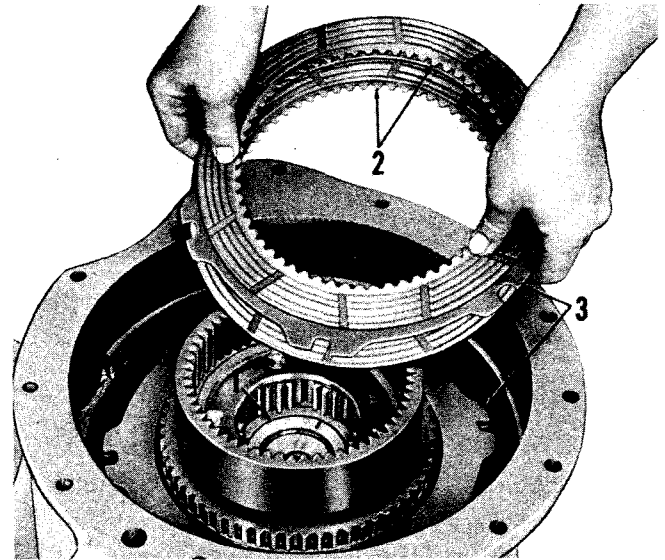
STEP 31

Attach lifting sling 1 to center of transfer gear housing 2 and lower it onto transmission housing 3, making sure springs 4 remain straight and that the bolt holes are alined. Install 18 bolts and lock washers at the split line. Place wood blocks under housing 2 to prevent the assembly tipping when the hoist is removed.



STEP 32

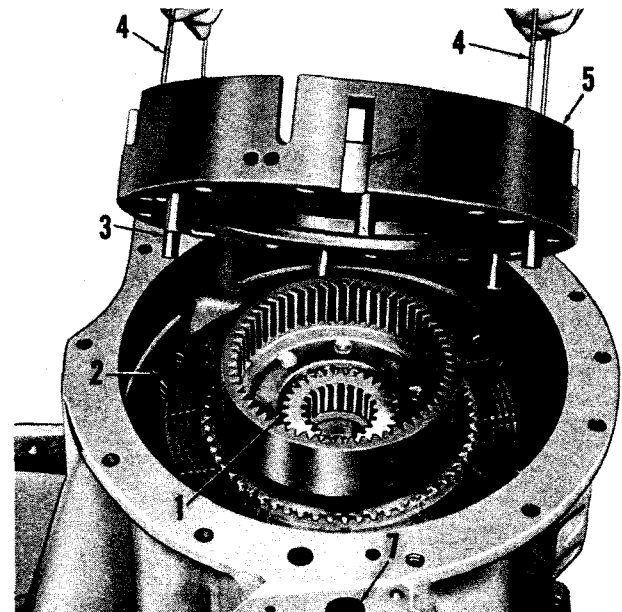
First, attach lifting sling 1 to rear lifting hole 2, raise the transmission to a vertical position and block it. Next, attach lifting sling 1 to front split line 3 and lower the transmission to rest on its rear surface. Use wooden blocks 4 to level the transmission.



STEP 33

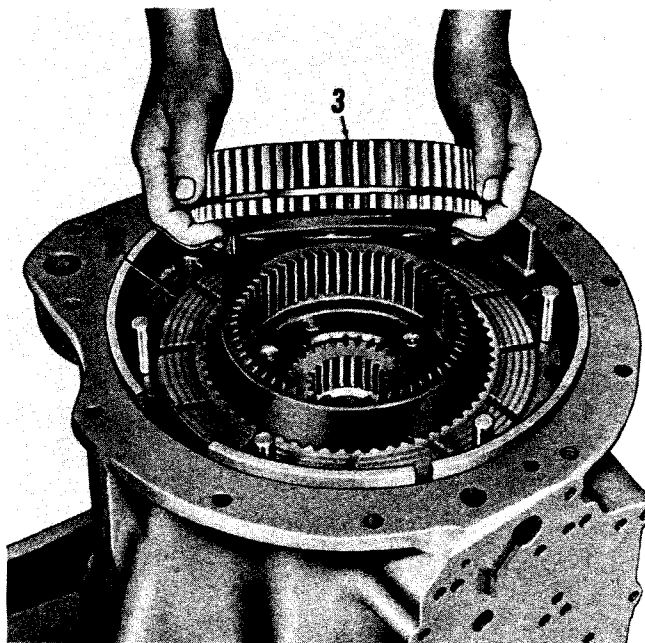
Install thrust washer 1 inside the forward carrier. Beginning with an external-tanged clutch plate, alternately install two internal-splined 2 and two external-tanged 3, forward clutch plates.

Note: Pre-soak clutch plates 2 in type C-1 transmission oil before installation.



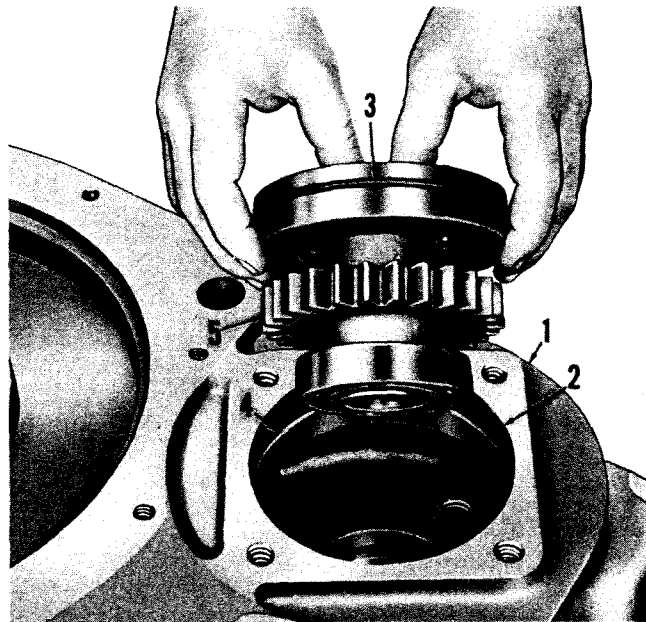
STEP 34

Install forward sun gear 1, flat side up. Aline clutch plate tangs 2 with anchor pins 3. Using wire lifting hooks 4, install the forward and reverse clutch anchor 5, alining pin slot 6 with hole 7.



STEP 35

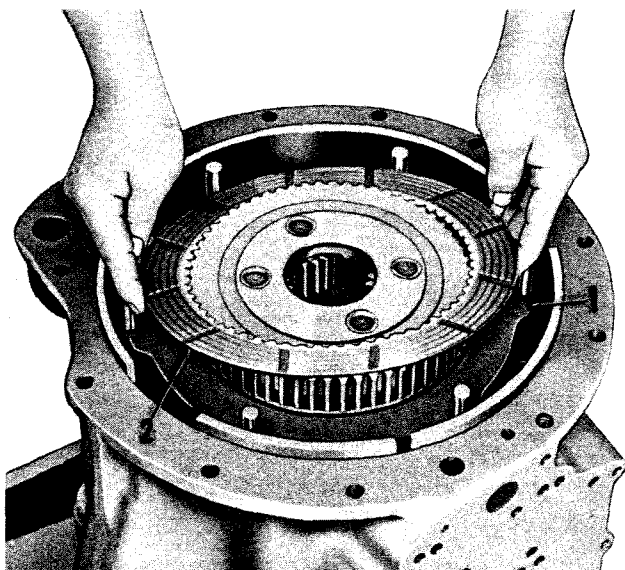
Install clutch anchor pin 1. Install one internal-splined, reverse clutch plate 2. Install reverse carrier assembly 3 with the short ends of external splines down.



STEP 37

Position converter housing assembly 1 to rest on its front surface. Grease bore 2 so that seal ring 3 will not be damaged by snap ring groove 4. Fill the groove completely, with hard cup grease. Install seal ring 3. Install, as a unit, implement pump gear, bearing and bearing retainer 5. Tap on the unit to seat the bearing.

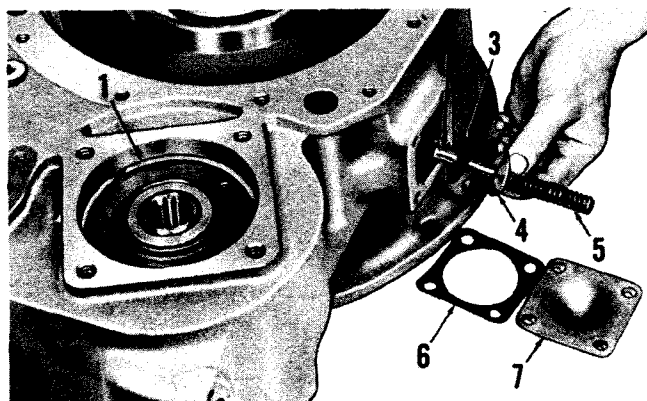
Note: Some assemblies do not include seal ring 3.



STEP 36

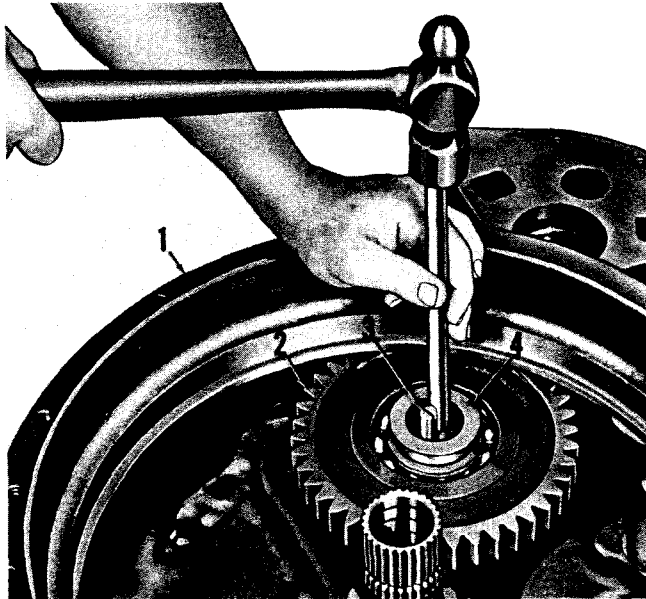
Beginning with an external-tanged plate, alternately install five external-tanged 1 and four internal-splined 2, reverse clutch plates.

Note: Pre-soak clutch plates 2 in type C-1 transmission oil before installation.



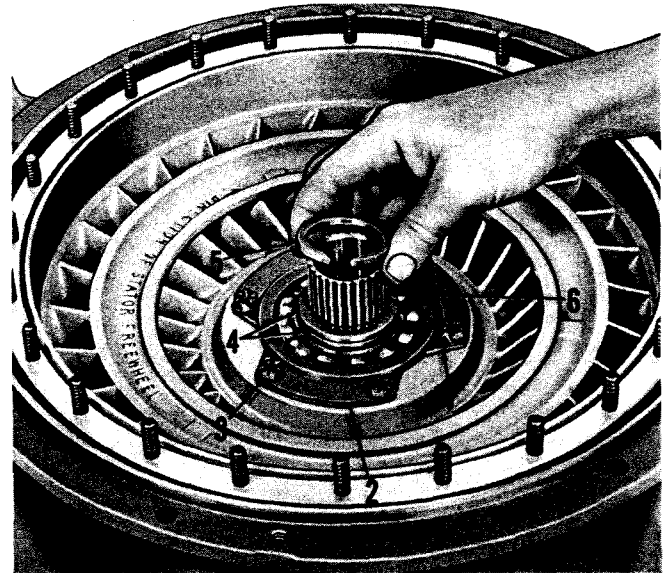
STEP 38

Install snap ring 1. Install, as a unit, pin 2, washer 3, lube valve 4, and spring 5. Install gasket 6 and cover 7. Secure the cover with four bolts and lock washers.



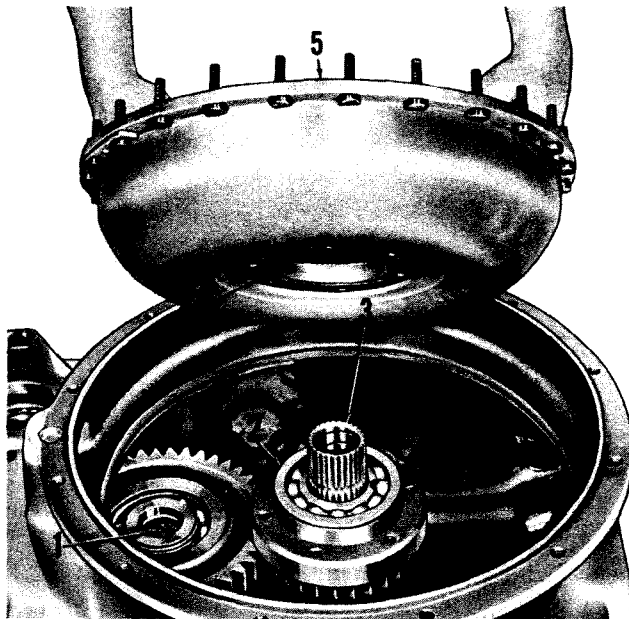
STEP 39

Position converter housing 1 to rest on its rear surface and install idler gear and bearing 2 with the hub side down. Using guide bolt 3, install idler gear spindle 4. Tap on spindle 4 to seat it in its bore. Remove guide bolt 3. Refer to fig. VI-12.



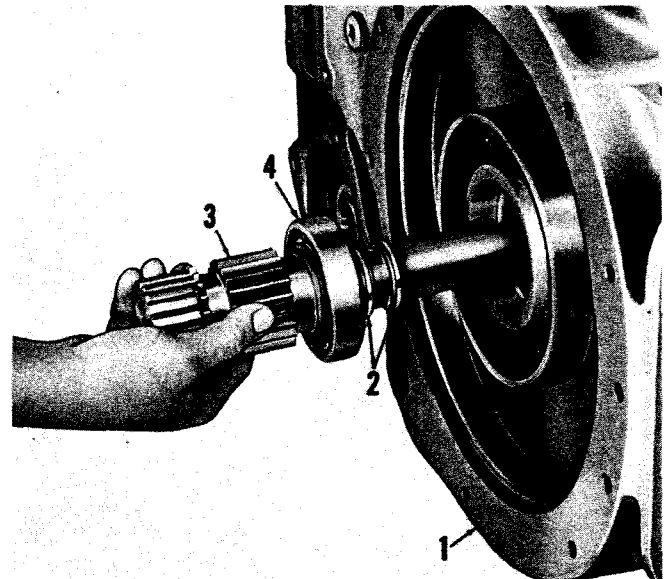
STEP 41

Install three bearing retainers 1, three lock strips 2 and six self-locking bolts 3. Bend the corners of the lock strips against the bolt heads. Install two internal-splined spacers 4 and snap ring 5 on ground sleeve 6.



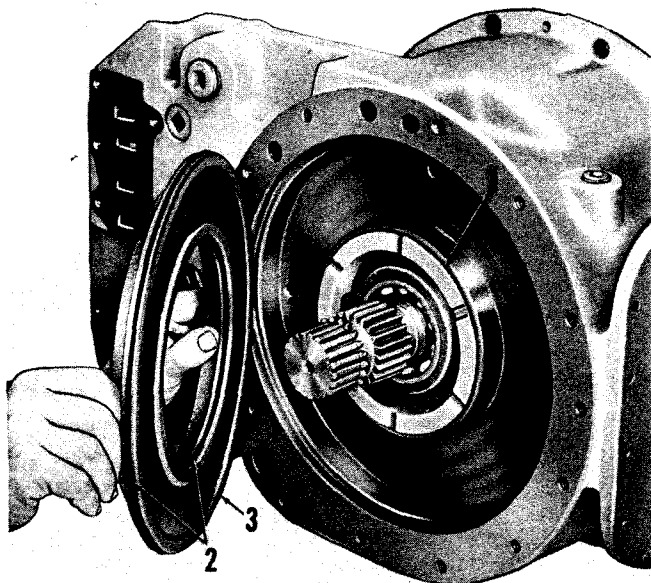
STEP 40

Install idler gear spindle retainer bolt 1. Install pump drive gear and bearing assembly 2 onto converter ground sleeve 3. Install gasket 4, using oil-soluble grease to retain it. Install converter pump assembly 5, aligning the bolt holes. Refer to sect. VI, para 14.



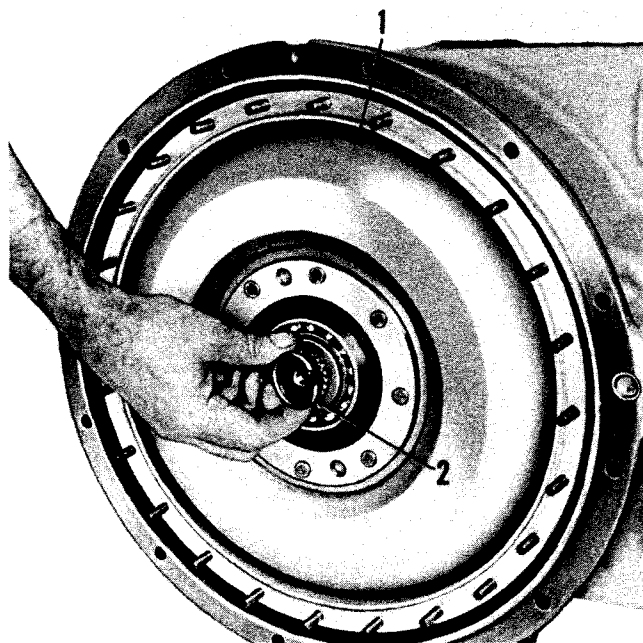
STEP 42

Position converter housing 1 to rest on its right side. Install hook-type seal rings 2 onto converter shaft 3. Install bearing 4, if it was removed. Install the shaft assembly into the rear of housing 1 and tap on the outer race of bearing 4 to seat it in its bore.



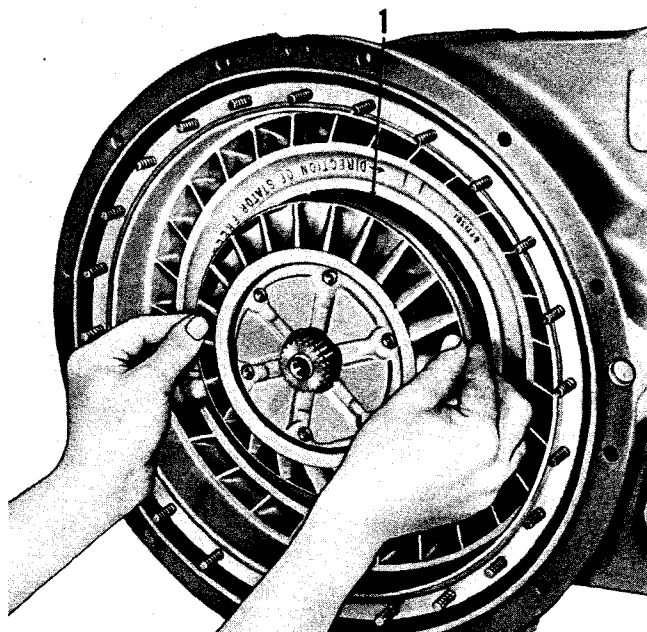
STEP 43

Grease spacer 1 with oil-soluble grease and install it with the recesses clearing the ground sleeve bolt heads. Grease seal rings 2. Install reverse-range piston 3 into the converter housing.



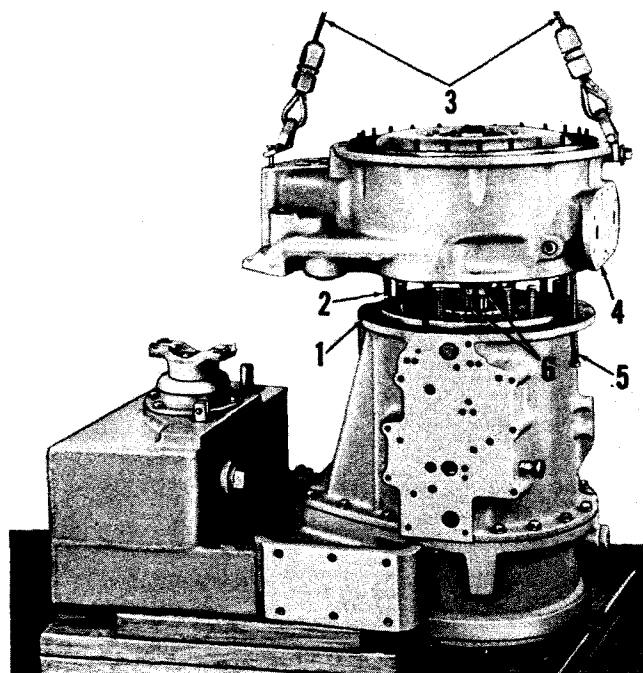
STEP 45

Install turbine assembly 1 and secure it with snap ring 2.



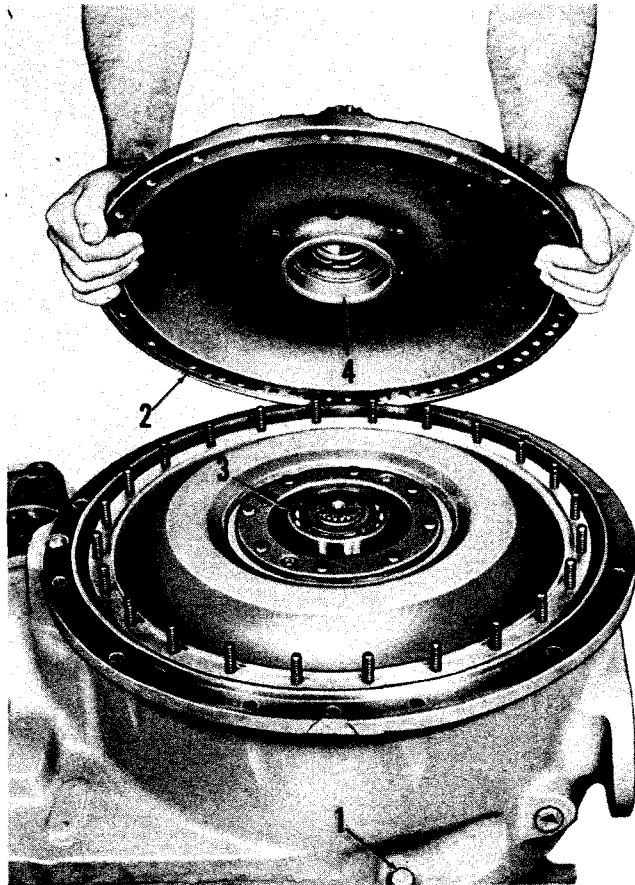
STEP 44

Grasp stator assembly 1. Hold freewheel roller race in position. Turn stator 1 on edge and install it onto the ground sleeve 6 (step 41).



STEP 46

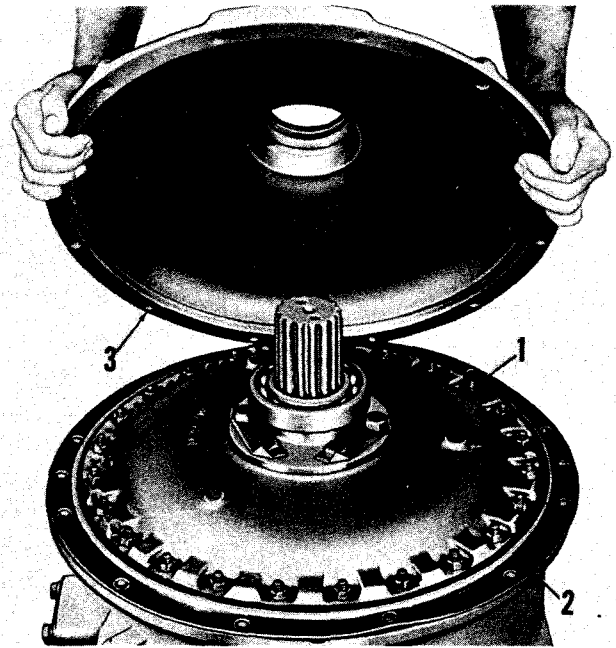
Install gasket 1. Install twelve piston return springs and spring guides 2. Attach lifting sling 3 to converter housing 4 and lower it into position. Use guide bolt 5 to aline bolt holes. If necessary, rotate the turbine to aline the turbine shaft splines 6 with forward-range sun gear and the reverse-range pinions.



STEP 47 (remote mount, only)

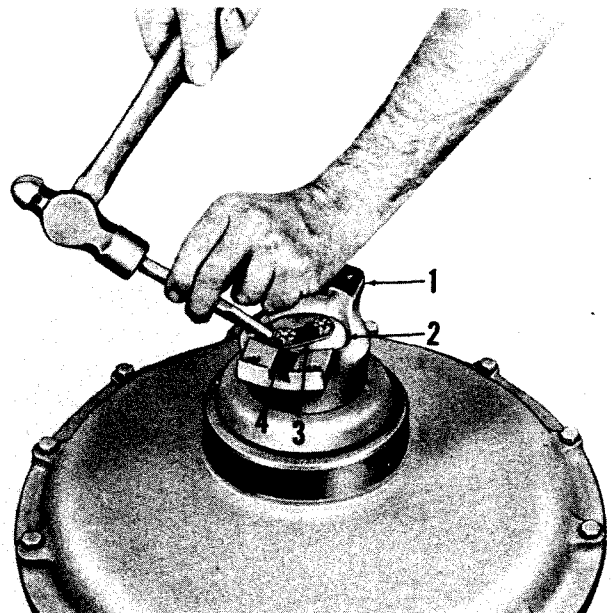
Secure converter housing with 13 bolts and lock washers 1. Install converter pump cover assembly 2. Using a soft hammer, tap on cover 2 to seat bearing 3 in its bore 4.

Note: For assembly of direct-mount front cover, refer to sect. VI, para 11d or e.



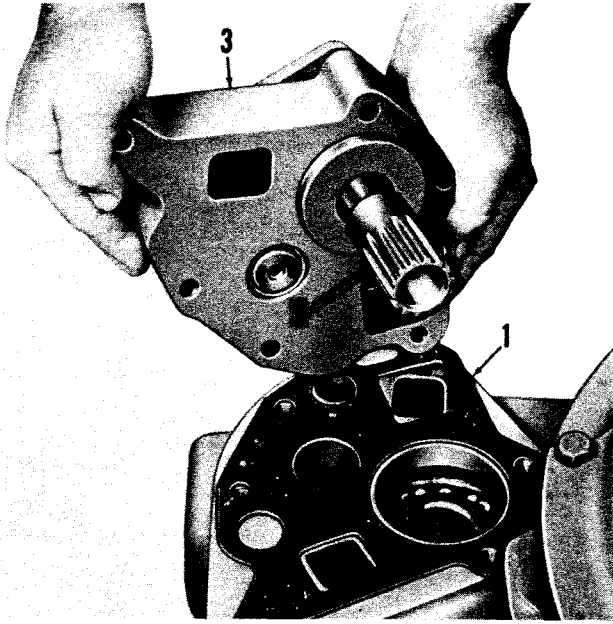
STEP 48 (remote mount, only)

Install 24 self-locking nuts 1. Install gasket 2 and transmission front cover assembly 3.



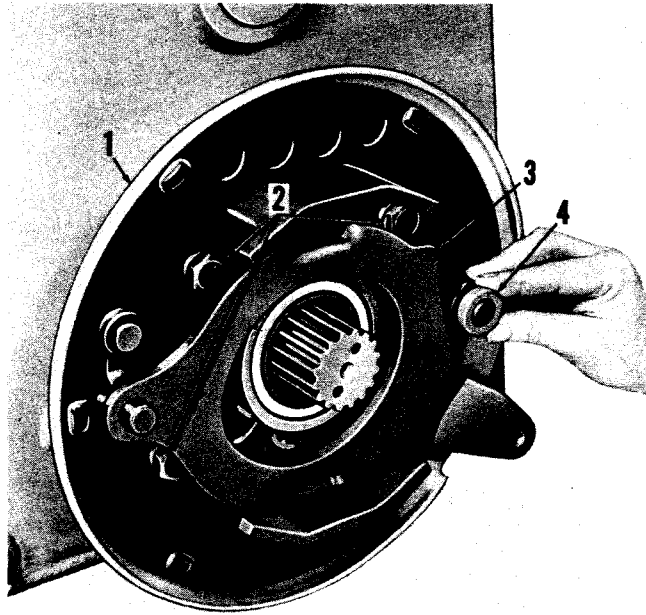
STEP 49 (remote mount, only)

Install input flange 1 onto the converter drive shaft. Install flange retainer washer 2 with the machined side next to the shaft. Install lock strip 3 and two self-locking bolts 4. Bend the ends of lock strip 3 around bolts 4. Refer to sect. IV, para 8b for tight-fit flange installation.



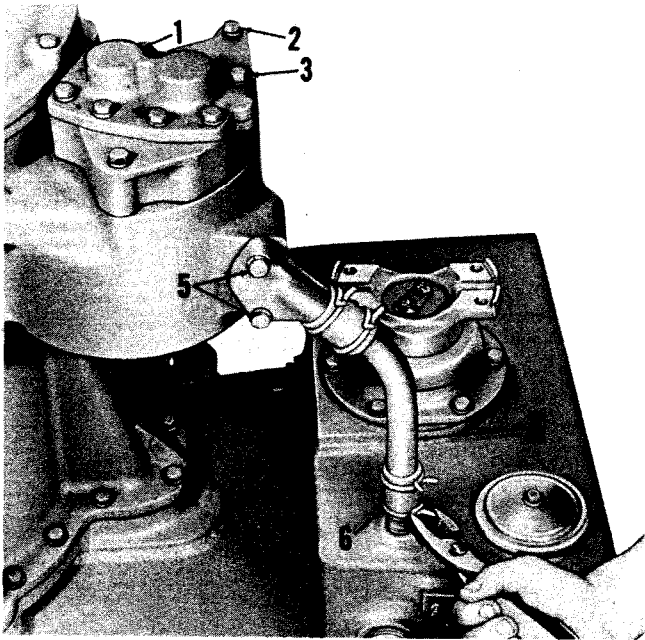
STEP 50

Install pump gasket 1. Install coupling 2 on the pump shaft and install input charging oil pump assembly 3.



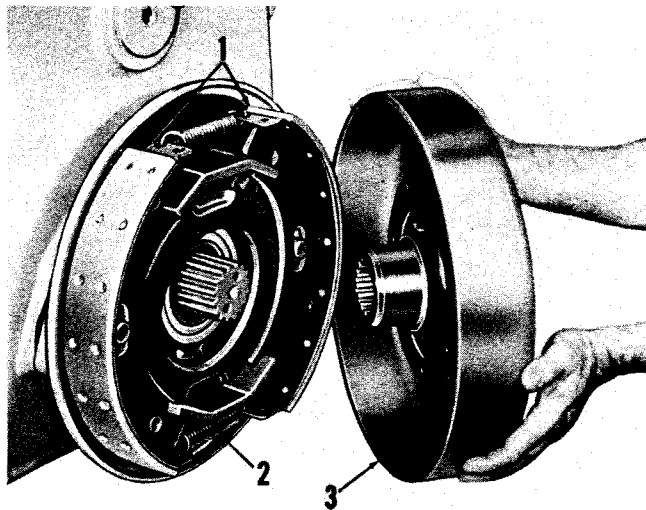
STEP 52

Attach a lifting sling to the front lifting hole in the top of the converter housing and raise the transmission to a vertical position. Install brake back plate 1 and secure it with three bolts and lock washers 2. Install brake lever 3 and brake roller 4.



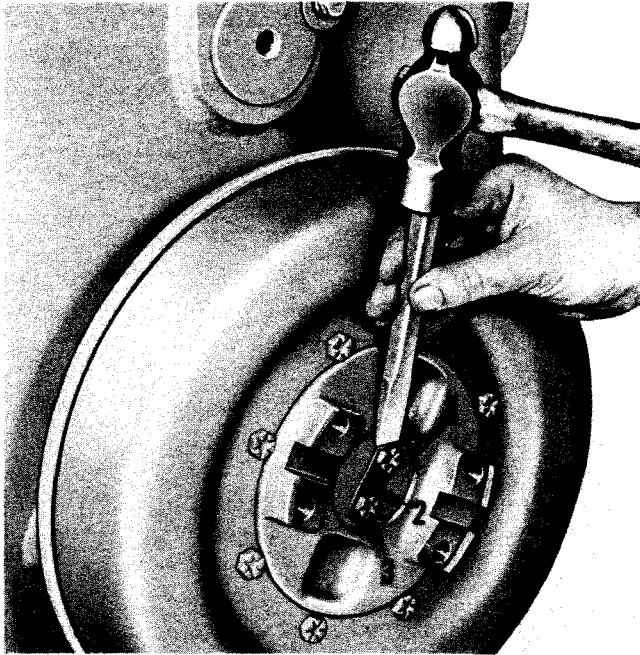
STEP 51

Secure oil pump 1 with two short bolts and lock washers 2 and four long bolts and lock washers 3. Assemble oil drain tube assembly 4 and install it on the transmission. Secure the assembly with two bolts and lock washers 5 and hose clamp 6. Be sure there is a gasket under the converter drain tube flange.



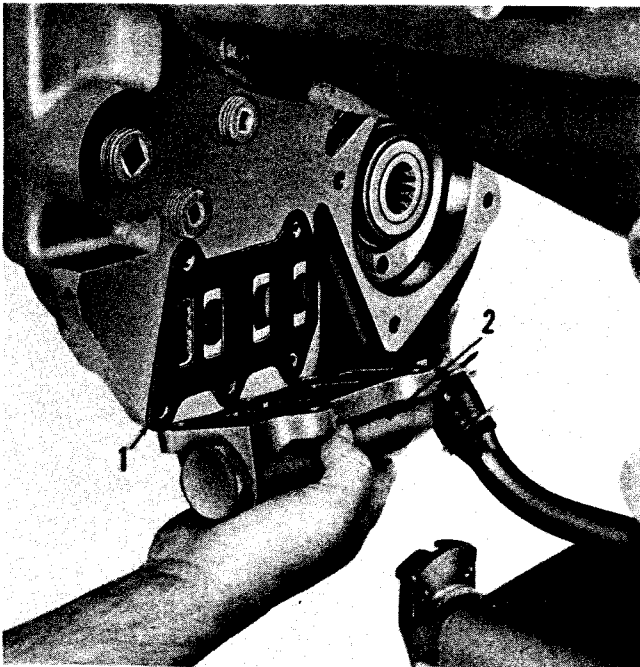
STEP 53

Install two brake shoe assemblies 1 and two springs 2. Install brake drum and flange assembly 3 onto the rear-output shaft. Refer to sect. IV, para 8b for instructions on installing tight-fit flanges.



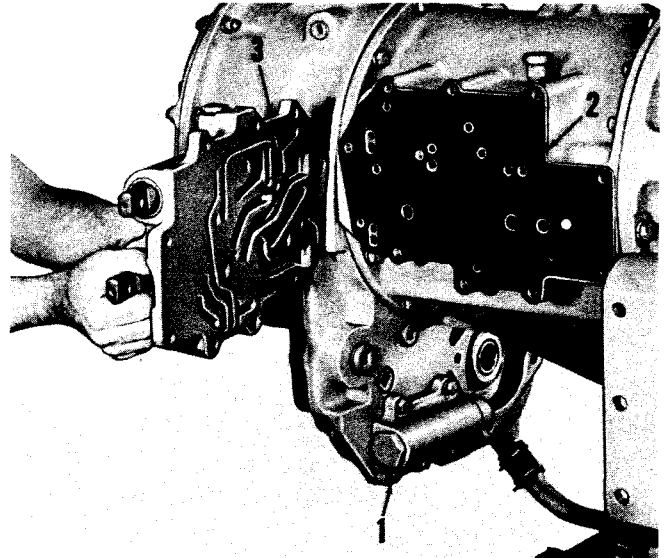
STEP 54

Install flange retainer washer 1 with the machined surface toward the flange. Install lock strip 2 and two self-locking bolts 3. Bend the corners of the lock strip against the bolt heads.



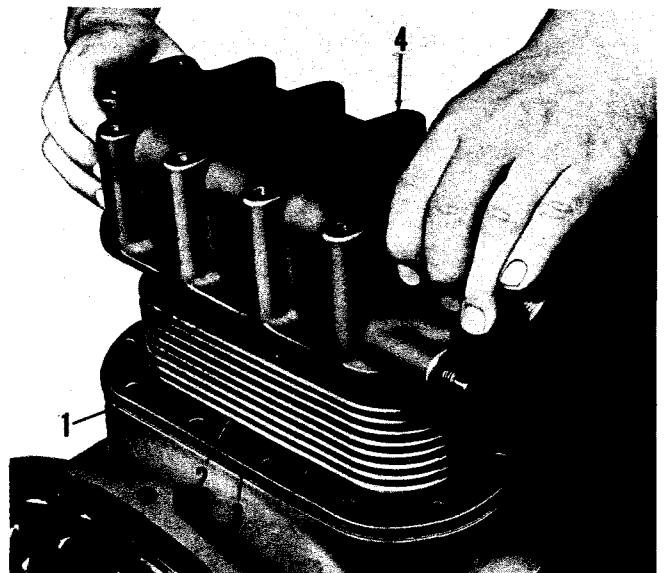
STEP 55

Install gasket 1 and pressure regulator valve body assembly 2 onto the lower rear surface of the torque converter housing.



STEP 56

Install five pressure regulator valve body bolts and lock washers 1. Using oil-soluble grease, install gasket 2. Install selector valve body assembly 3 and secure the valve with eleven bolts and lock washers.



STEP 57

Install gasket 1 and oil cooler core 2 onto the top of the converter housing. Install gasket 3 and oil cooler cover 4 onto the top of core 3. Secure cover 4 with twelve bolts.

Note: Drain plug on cover 4 is located toward the left side of the transmission.

3. ASSEMBLY OF CRT 3531-3
TRANSMISSION

a. Basic Similarities. Refer to sect. V para 3a for a description of basic similarities of the -1 model and the -3 model.

b. Differences in Output Sections. Refer to sect. V, para 3b for a description of the differences in output sections between the -1 model and the -3 model.

c. Assembly Steps. To assemble a -3 model (fig. I-3), follow the steps given below. Although references to assembly steps, para 2 above, refer to the -1 model, the referenced procedures apply equally to the -3 model.

(1) Install seal 17, plate 18 and two bolts 19 (A, foldout 14) into the lower-right rear of adapter 4.

(2) Install sump 33 and gasket 20 onto the rear of adapter 4. Secure the sump with three bolts 22, lock washers 21 and four bolts 40 and lock washers 41.

(3) Install two nuts 1 and lock washers 2 onto bolts 19.

(4) Install oil screen 27, retainer 28, gasket 29 and cover 30 into sump 33. Secure the cover with washer 31, and crown nut 32. Torque the nut to 8 to 10 pound feet.

(5) Install thrust washer 8, bearing 9 and sleeve 10 into the rear of adapter 4. Install the sleeve with the wide diameter facing to the rear.

(6) Grease pin 11 with oil-soluble grease and install it into its groove in sleeve 10.

(7) If seal 16 was removed from retainer 13, install a new seal with the lip facing inward.

(8) Install gasket 12 and retainer 13 onto the rear of adapter 4. Secure the adapter with eight bolts 15 and lock washers 14.

(9) Install hook-type seal ring 17 (B, foldout 11) onto the front hub of adapter 4 (A, foldout 14).

(10) Install the low-range piston assembly with outer seal ring into the front side of adapter 4.

(11) Follow steps 15 through 30, para 2, above.

(12) Attach lifting sling to the oil sump adapter assembly and lower it onto the transmission housing.

(13) Follow steps 32 through 50, para 2, above.

(14) Secure oil pump assembly 5 (A, foldout 16) with two short bolts 1, with lock washers 2, and four long bolts 3 with lock washers 4.

(15) Install gasket 39, tube 36 and hose 35 onto the oil pump body. Secure the tube with four bolts 37 and lock washers 38. Install clamps 34 on each end of the hose.

(16) Follow steps 53 through 57, para 2, above.

Note: Series 3531-3 transmissions may require shims 7 (A, foldout 6). These shims are to be installed as required to bring their rear surface within 0.008 to 0.012 inch of the front (inside) face of retainer washer 3 (before tightening bolts 1). Shims 7 are available in 0.005 and 0.025-inch thicknesses.

Section VIII. WEAR LIMITS AND SPRING DATA

1. KEYED TO EXPLODED VIEWS

The wear limits and spring data, below, are keyed to the parts exploded views (foldouts 6 through 16) in the back of this manual.

2. MAXIMUM VARIATIONS

The wear limits data in the chart below show the maximum wear at which the components are expected to function satisfactorily. The wear limits do not include an additional life factor for further periods of operation without replacing the worn component.

3. CLEANING, INSPECTION IMPORTANT

Thorough cleaning, and inspection for faults other than wear, are important in determining if a component is satisfactory for continued use. Refer to cleaning and inspection procedures in sect. IV, para 6.

4. COMPONENT WEAR LIMITS

a. Bearings, Journals, Bores. The application of bearings to any product is based on the recommendations of the bearing manufacturer. Therefore, no diametral dimensional deviation is permitted for the bearing or its mating pieces. Bearings should be carefully checked for signs of failure before reuse.

b. Gears. Gears should be rigidly inspected before re-use. Further use of a gear

showing signs of distress should be the decision of the user, based upon previous experience. Backlash cannot be used to establish critical wear of a gear.

c. Splines. Unless severe, spline wear cannot be considered detrimental except where tight fits are affected, as in drive flanges. As in gears, backlash is not sufficient indication of spline wear.

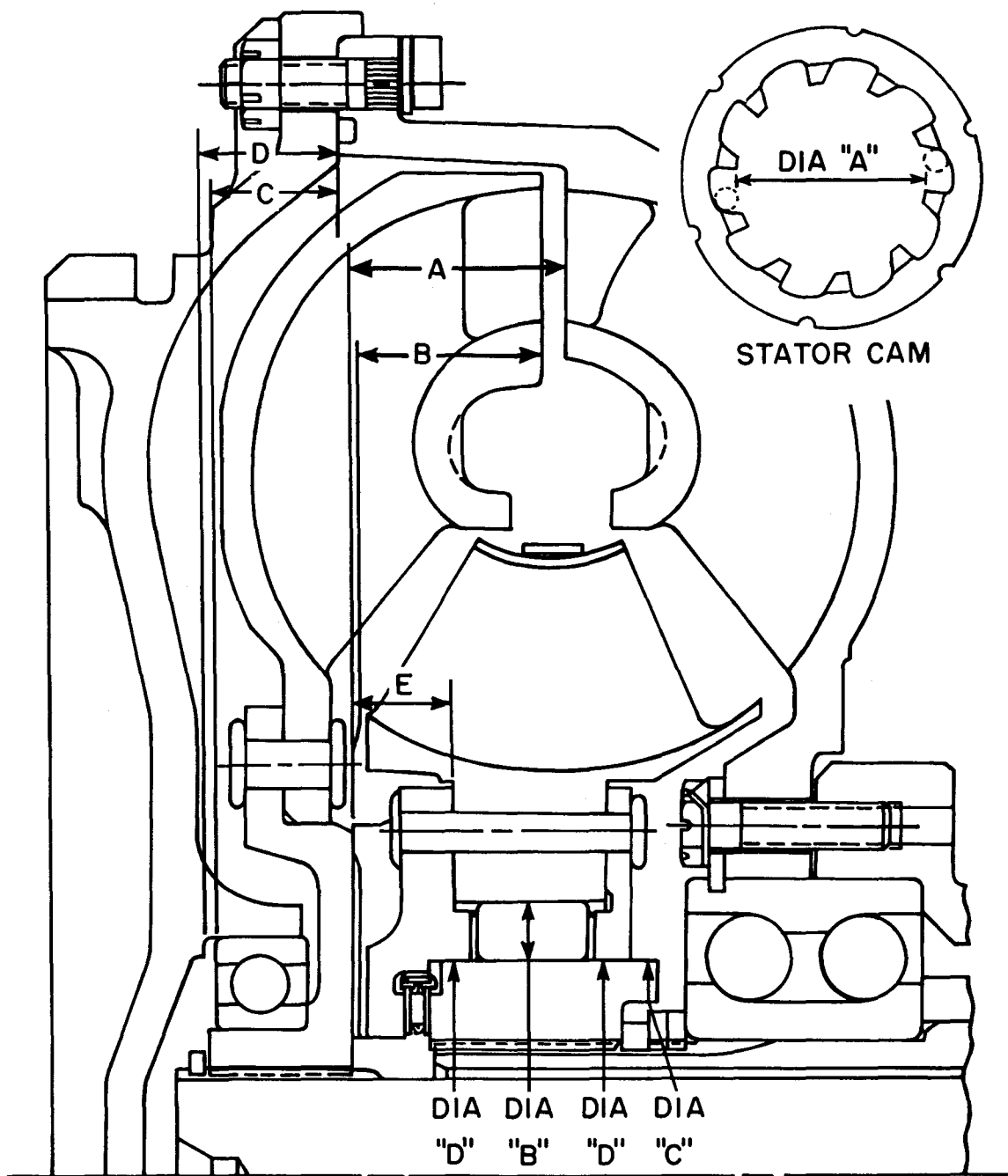
d. Springs. Springs should be replaced if there are signs of overheating, permanent set, or wear due to scuffing adjacent parts.

e. Piston-type Seal Rings. The sides of the seal ring should be smooth; maximum wear 0.005 inch. The sides of the groove in which the seal ring runs should be smooth (50 micro-inch equivalent), and square with the axis of rotation within 0.002 inch. A new seal ring should be installed if shaft grooves are re-worked, or if seal ring wear threatens to close the gap between the hooks when the ring is installed.

5. WEAR LIMITS AND SPRING CHART

a. The following chart is a tabulation of wear limits keyed to parts exploded views (foldouts) in the back of this manual. Figure VIII-1 illustrates the wear limit points of measurement for the TORQUE CONVERTER section of the chart.

b. The spring chart at the end of this section gives dimensions and data which will aid in the identification and inspection of springs used in the transmission.



Dimension A (measured from front of stator thrust washer to front of pump vanes) minus dimension B (measured from rear of turbine hub to rear of turbine vanes) - 0.0095 min.

minus dimension C (measured from mounting face of converter pump to front surface of turbine bearing) - 0.005 min.

Dimension D (measured from mounting face of converter cover to bearing bore depth)

Dimension E (stator thrust washer thickness) - 0.688 to 0.692.

Fig. VIII-1. Torque converter wear limits, points of measurement.

WEAR LIMITS

PARA 5

SECT.VIII, PAGE 3

WEAR LIMITS CHART

<u>Item</u>	<u>Description</u>	<u>Dimension</u>	<u>Wear Limit</u>	<u>Cone</u>
B, foldout 7	TORQUE CONVERTER (refer fig. VIII-1)			
4	Thrust washer (thickness)	0.688-0.692	0.655 min	
4	Thrust washer (inner dia D)	2.849-2.853	2.839	
4	Thrust washer (inner dia D)	2.849-2.853	2.839	
4	Cam (dia A between rollers)	2.798-2.800	2.788	
6	Roller (dia B)	0.3748-0.3750	0.3743	
8	Race (outer dia C)	2.8430-2.8435	2.833	
	Total wear over race 8 and two rollers 6—0.010 max			
	Total wear between outside diameter of race 8 and inside diameter of either stator thrust washer—0.010 max			
A, foldout 9	REVERSE PLANETARY AND CLUTCH			
5	External-splined plate	0.107-0.123	0.097	0.030 max
*6	Internal-splined plate	0.150-0.156	0.130	0.012 max
17	Clutch anchor (front)	Face wear	0.020	
	Total clutch wear permissible		0.307	
B, foldout 9	FORWARD PLANETARY AND CLUTCH			
*1	Internal-splined plate	0.150-0.156	0.130	0.012 max
2	External-splined plate	0.107-0.123	0.097	0.030 max
7	Bushing	Clearance with shaft 13, 16, 17		
		B, foldout 10	0.010	
(A, foldout 9)				
17	Clutch anchor (rear)	Face wear	0.020	
	Total clutch wear permissible		0.162	
B, foldout 10	INTERMEDIATE-RANGE CLUTCH AND TRANSMISSION MAIN SHAFT			
13, 16, 17	Shaft	Clearance with bushing 7, B, foldout 9	0.010	
*14	Internal-splined plate	0.150-0.156	0.130	0.012 max
15	External-splined plate	0.107-0.123	0.097	0.030 max
(A, foldout 11)				
6	High-range carrier (front)	Face wear	0.010	
(B, foldout 10)				
5	Piston	Face	0.010	
	Total clutch wear permissible		0.080	

* Groove depth should not be less than 0.005 inch.

(Continued on next page)

WEAR LIMITS CHART - Continued

<u>Item</u>	<u>Description</u>	<u>Dimension</u>	<u>Wear Limit</u>	<u>Cone</u>
A, foldout 11	HIGH-RANGE PLANETARY AND CLUTCH			
13	External-splined plate	0.107-0.123	0.097	0.30 max
*14	Internal-splined plate	0.150-0.156	0.130	0.012 max
(B, foldout 11)				
1	Clutch anchor (front)	Face wear	0.020	
	Total clutch wear permissible		0.062	
B, foldout 11	LOW-RANGE PLANETARY AND CLUTCH			
1	Clutch anchor (rear)	Face wear	0.020	
4	External-splined plate	0.107-0.123	0.097	0.30 max
*5	Internal-splined plate	0.150-0.156	0.130	0.012 max
	Total clutch wear		0.134	
B, foldout 12	FRONT OUTPUT SHAFT AND RELATED PARTS			
7	Front output shaft	Clearance with bushing 19, A, foldout 13	0.010	
A, foldout 13	TRANSFER GEARS AND REAR OUTPUT SHAFT			
35	Bushing	Clearance with shaft 7 B, foldout 12	0.010	
A, foldout 14	OIL SUMP ADAPTER AND SUMP			
8	Thrust washer	0.0298 thickness	0.290	
A, foldout 15	EARLY INCHING CONTROL VALVE BODIES			
20	Valve clearance in body 34		0.004 max	
24	Sleeve clearance in body 34		0.004 max	
27	Valve clearance in body 34		0.004 max	
32	Valve clearance in body 34		0.004 max	
34	Body bore clearance with valves 20, 27, 32 and sleeve 24		0.004 max	

* Groove depth should not be less than 0.005 inch.

(Continued on next page)

WEAR LIMITS

PARA 5

SECT.VIII, PAGE 5

WEAR LIMITS CHART - Continued

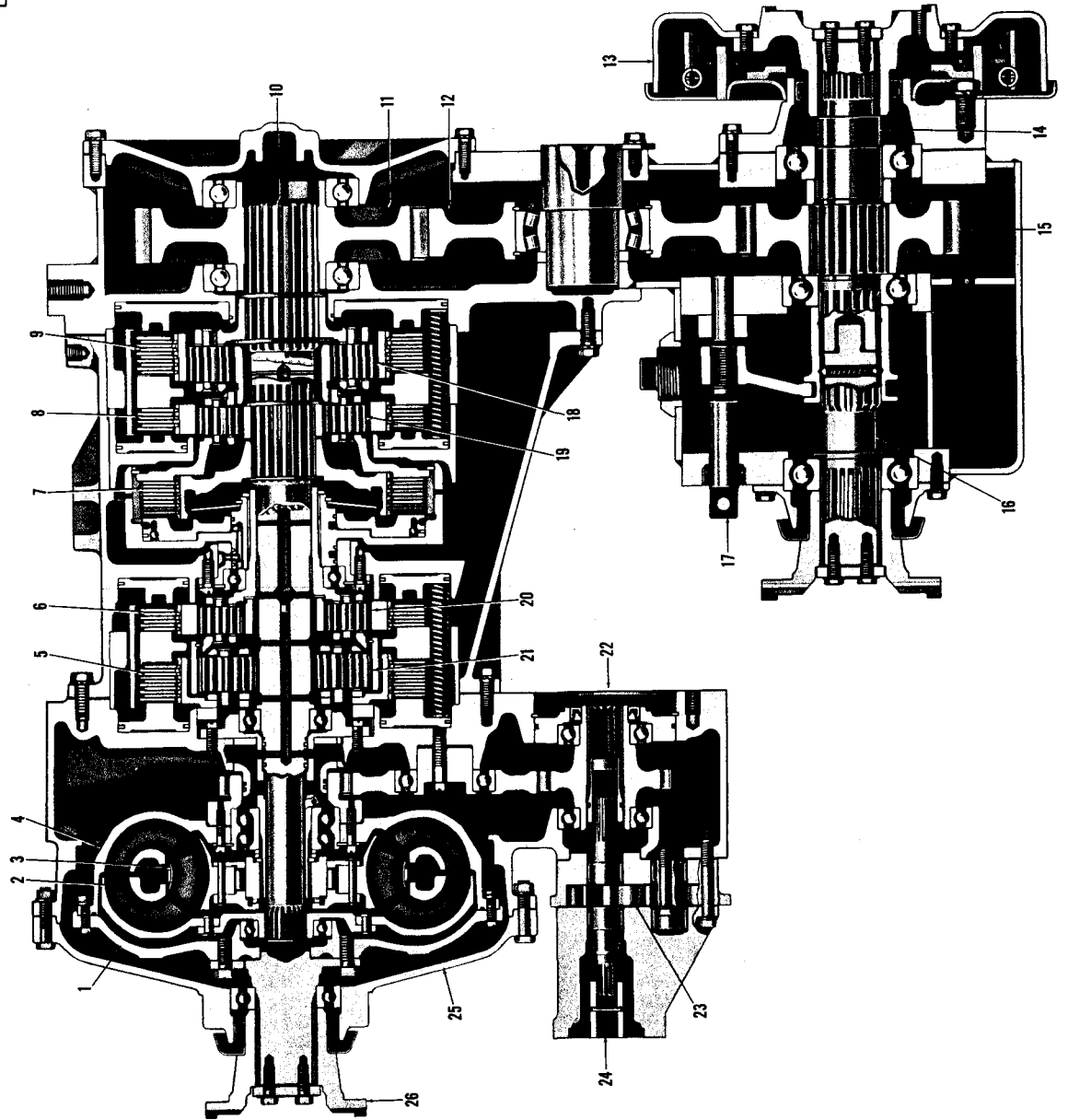
<u>Item</u>	<u>Description</u>	<u>Dimension</u>	<u>Wear Limit</u>	<u>Cone</u>
B, foldout 15	LATER CONTROL VALVE BODIES			
9	Valve clearance in body 24		0.004 max	
12	Valve clearance in body 24		0.004 max	
17	Valve clearance in body 24		0.004 max	
24	Body bore clearance with valves 9, 12, 17 and 34		0.004 max	
34	Valve clearance in body 24		0.004 max	
36	Body bore clearance with valves 40 and 42		0.004 max	
40	Valve clearance in body 36		0.004 max	
42	Valve clearance in body 36		0.004 max	
C, foldout 15	MAIN PRESSURE REGULATOR VALVE BODY ASSEMBLY			
7	Valve clearance in body 10		0.004 max	
10	Body bore clearance with valve 7		0.004 max	
B, foldout 16	INPUT PRESSURE AND SCAVENGE OIL PUMP			
11, 12	Pump gears	Gear end clearance	0.010 max	
11	Shaft OD at bearing	1.000	0.9975	
12	Shaft OD at bearing	1.000	0.9975	
15	Pump body bore at gear	2.758	2.768	
C, foldout 16	INPUT PRESSURE OIL PUMP			
12, 13	Pump gear	Gear end clearance	0.010 max	
12	Shaft OD at bearing	1.000	0.9975	
13	Shaft OD at bearing	1.000	0.9975	
16	Pump body bore at gear	2.758	2.768	

Transmission assy. all

[illegible]

- 1 - Converter pump cover
- 2 - Converter turbine
- 3 - Stator
- 4 - Converter pump
- 5 - Reverse clutch
- 6 - Forward clutch
- 7 - Intermediate-range clutch
- 8 - High-range clutch
- 9 - Low-range clutch
- 10 - Transmission main shaft
- 11 - Transfer drive gear
- 12 - Transfer idler gear
- 13 - Parking brake
- 14 - Rear-output shaft
- 15 - Transfer driven gear
- 16 - Front-output shaft
- 17 - Front-output disconnect
- 18 - Low-range planetary
- 19 - High-range planetary
- 20 - Forward planetary
- 21 - Reverse planetary
- 22 - Implement pump drive
- 23 - Input pump assembly
- 24 - Steer pump adapter
- 25 - Transmission front cover
- 26 - Input flange

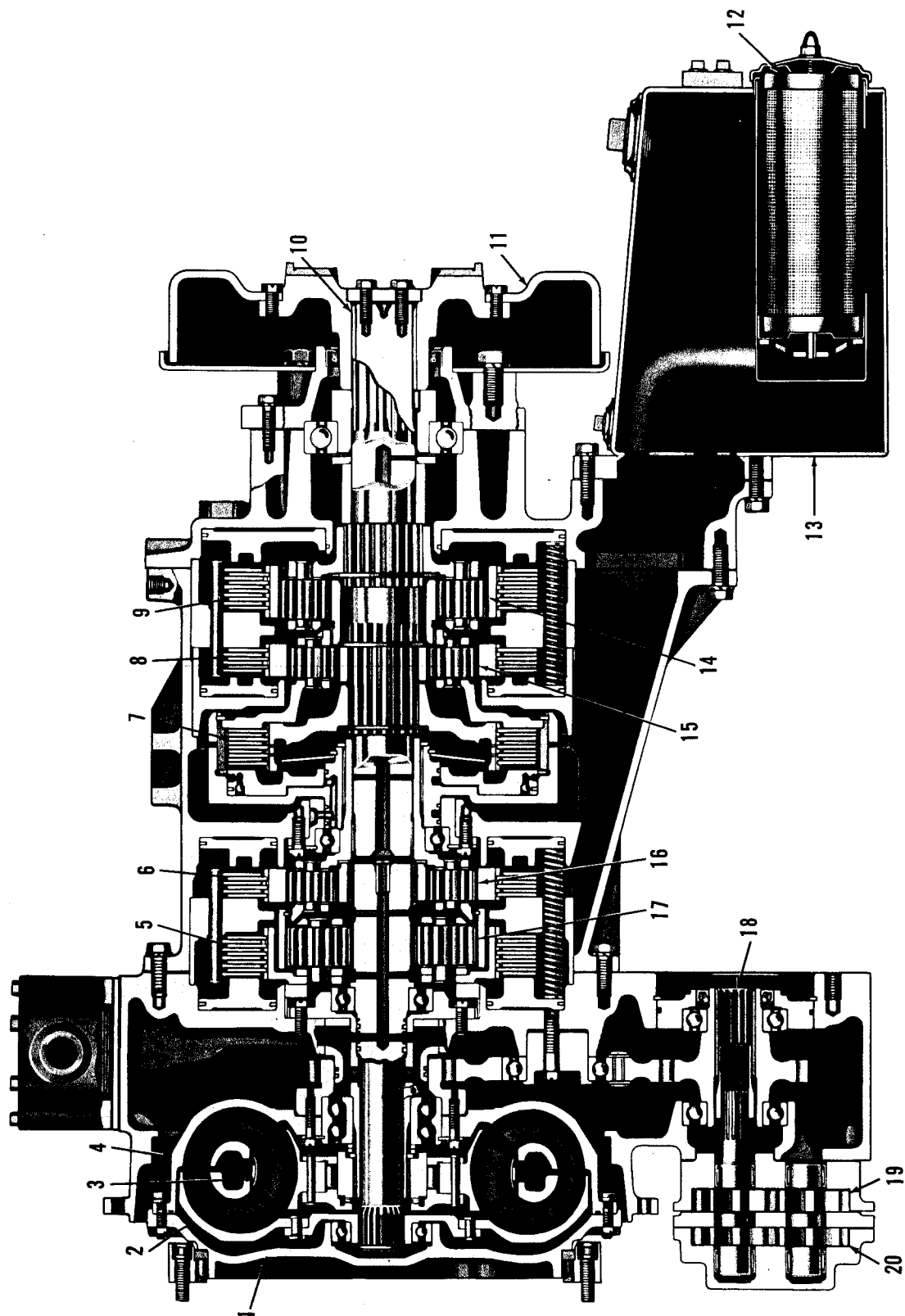
FOLDOUT 1



Foldout 1. CRT 3531-1 transmission—cross-section view

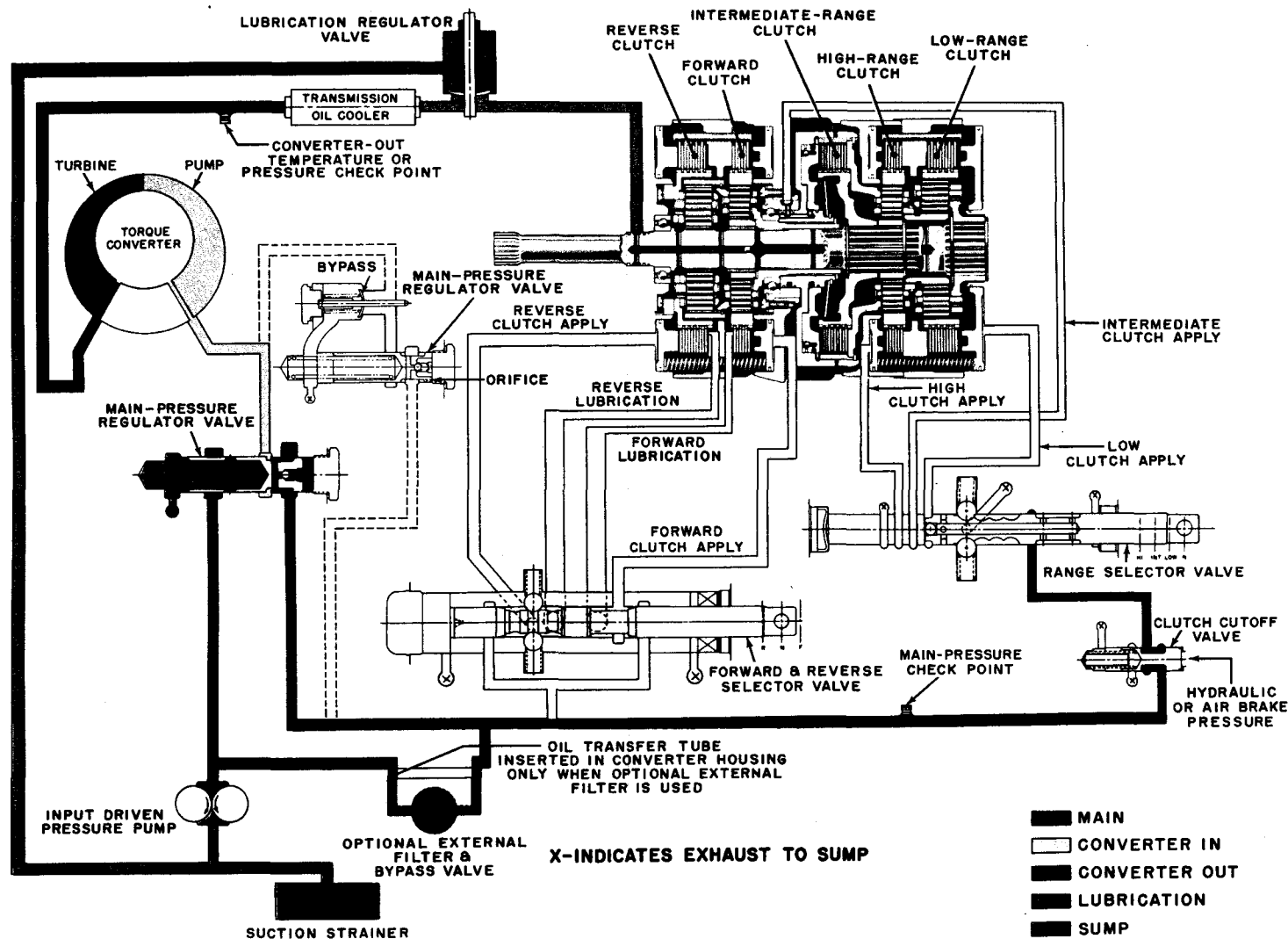
- 1 - Converter pump cover
- 2 - Converter turbine
- 3 - Stator
- 4 - Converter pump
- 5 - Reverse clutch
- 6 - Forward clutch
- 7 - Intermediate-range clutch
- 8 - High-range clutch
- 9 - Low-range clutch
- 10 - Transmission main shaft
- 11 - Parking brake
- 12 - Oil screen
- 13 - Oil sump adapter
- 14 - Low-range planetary
- 15 - High-range planetary
- 16 - Forward planetary
- 17 - Reverse planetary
- 18 - Implement pump drive
- 19 - Input oil pump
- 20 - Scavenge oil pump

FOLDOUT 2



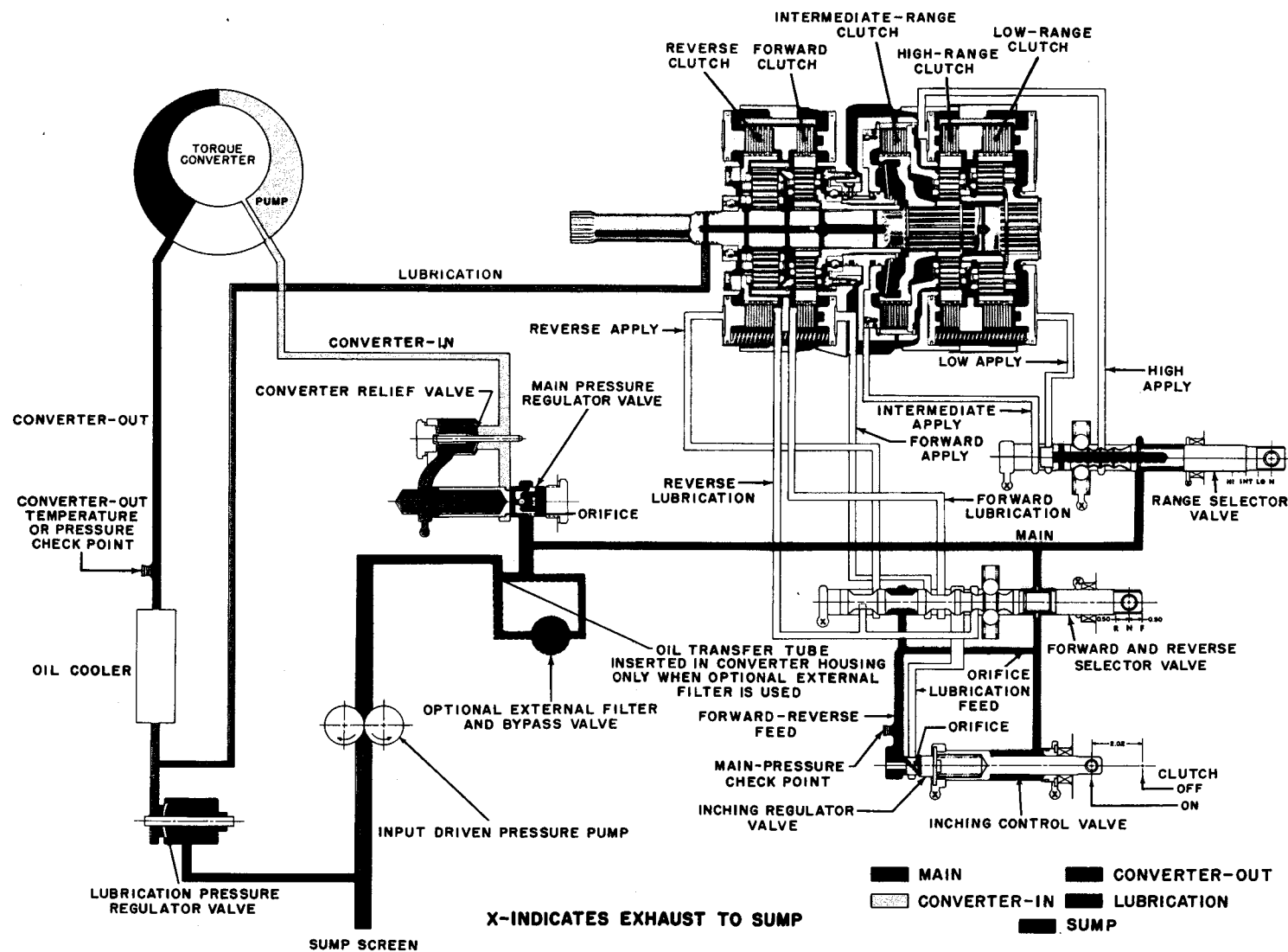
Foldout 2. CRT 3531.3 transmission—cross-section view

FOLDOUT 3



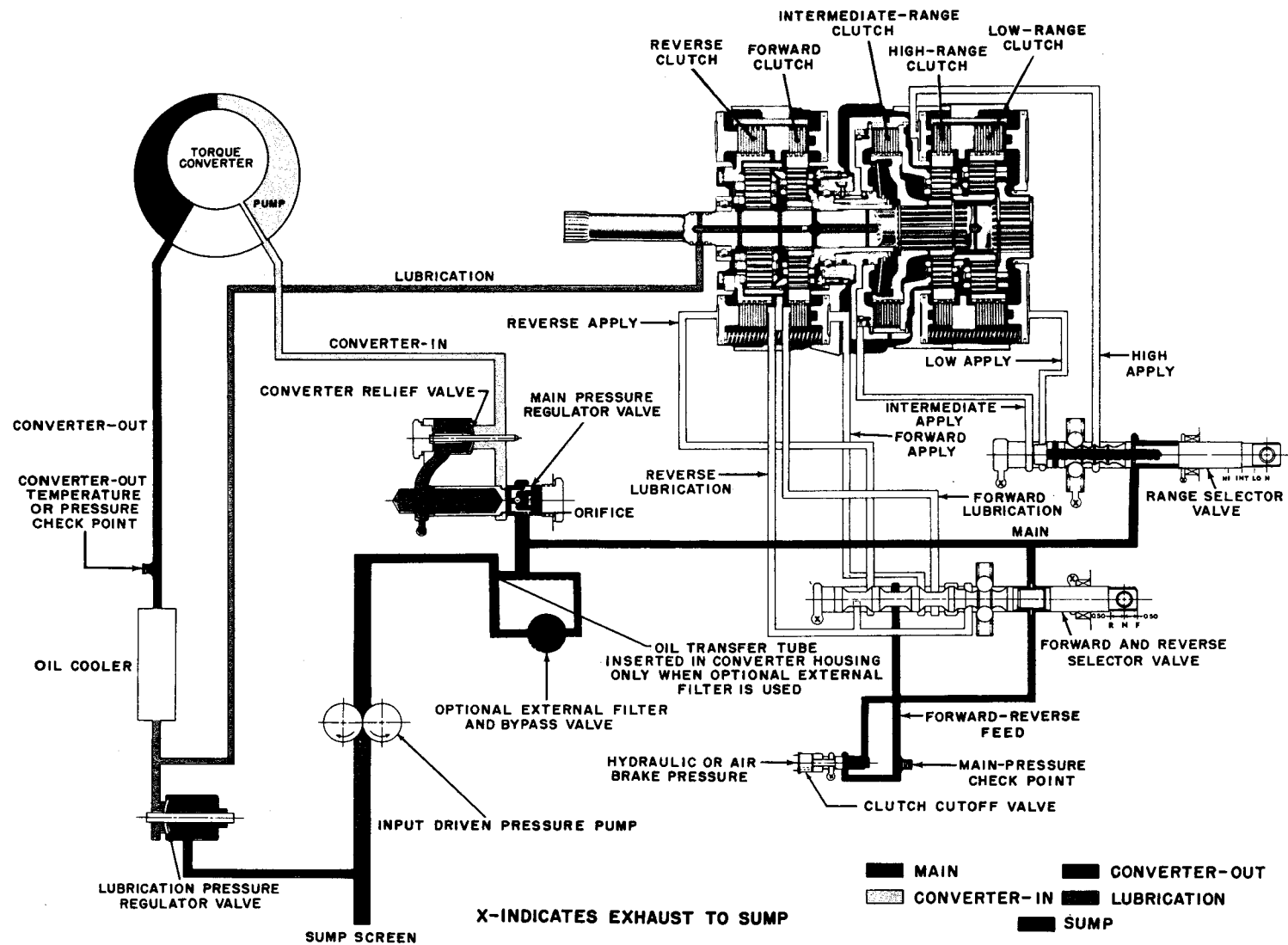
Foldout 3. Transmission hydraulic system, including earlier style inching control valve and clutch cutoff valve—schematic view

FOLDOUT 4



Foldout 4. Transmission hydraulic system, including later inching control valve—
schematic view

FOLDOUT 5



Foldout 5. Transmission hydraulic system, including later clutch cutoff valve—
schematic view

A

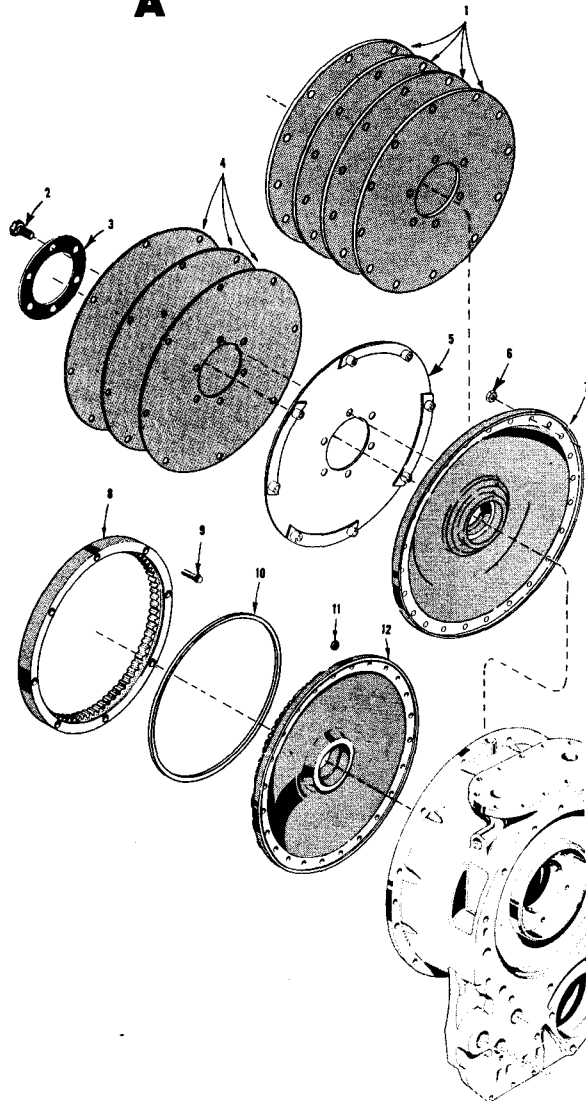
- 1 - Bolt, 3/8-24 x 1 1/8 (2)
- 2 - Lock strip
- 3 - Flange retaining washer
- 4 - Flange
- 5 - Flange
- 6 - Flange
- 7 - Shim, 0.025 in. or 0.005 in. (AR)
- 8 - Flange
- 9 - Flange
- 10 - Flange
- 11 - Lock washer
- 12 - Nut, 3/8-24
- 13 - Flange
- 14 - Flange
- 15 - Torqmatic coupling

B

- 1 - Lip-type oil seal
- 2 - Bolt, 3/8-24 x 2 (12)
- 3 - Transmission front cover
- 4 - Gasket
- 5 - Bearing
- 6 - Bolt, 1/2-13 x 1 1/8 (6)
- 7 - Lock strip (3)
- 8 - Converter drive shaft
- 9 - Nut, 5/16-24 (24)
- 10 - Converter pump cover
- 11 - Lock washer, 3/8 (12)
- 12 - Nut, 3/8-24 (12)

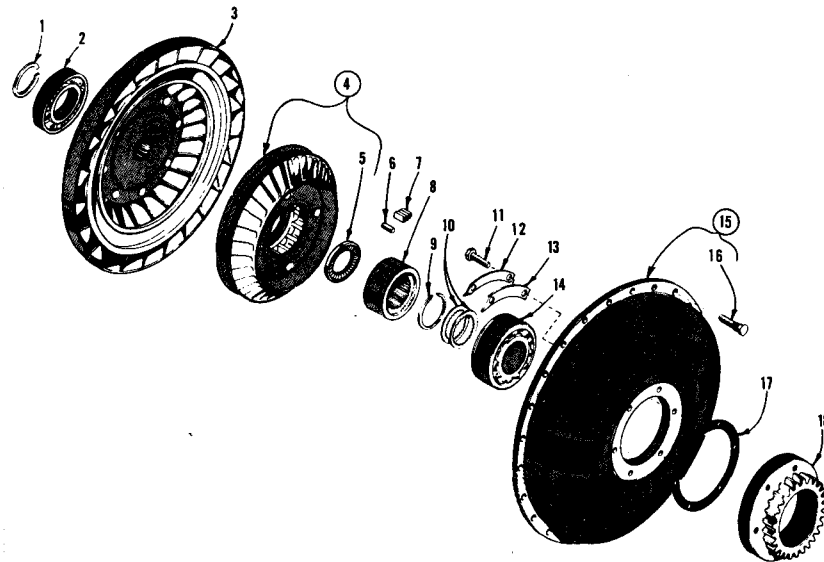
FOLDOUT 7

A



Foldout A, 7. Torque converter drives—exploded view

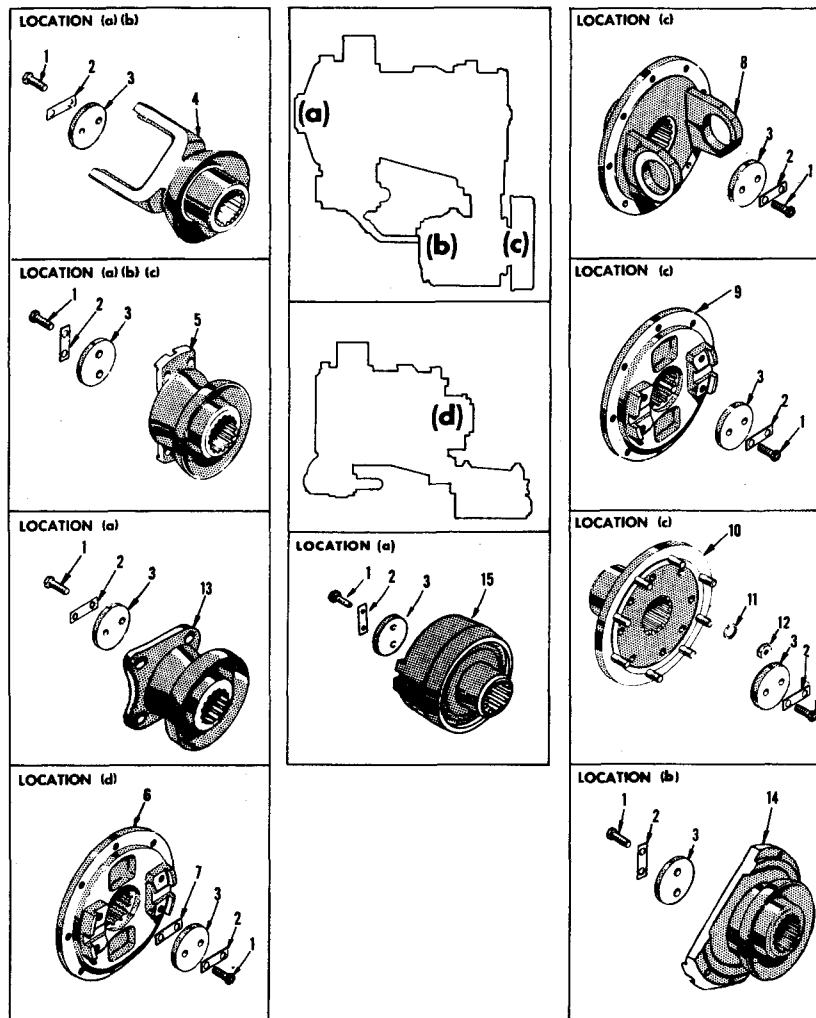
B



Foldout B, 7. Torque converter—exploded view

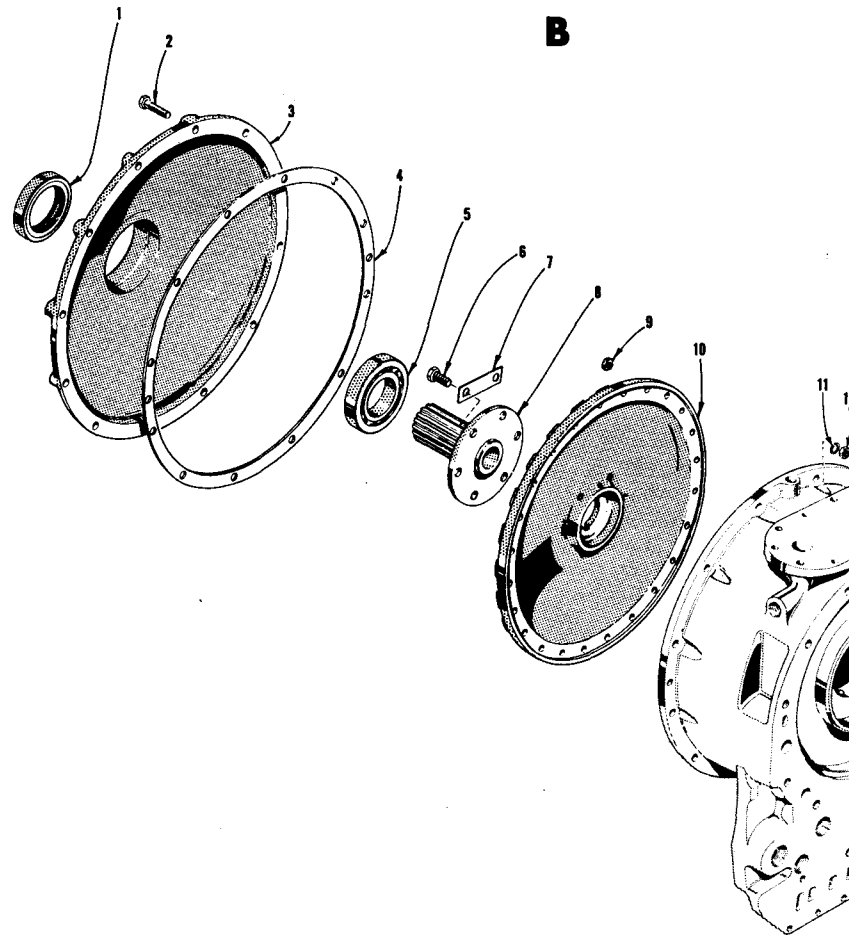
FOLDOUT 6

A



Foldout A, 6. Flanges—exploded view

B



Foldout B, 6. Transmission front cover—exploded view

A

- 1 - Flexible flywheel disk (4)
- 2 - Bolt, 1/2-13 x 1 (6)
- 3 - Disk retainer plate
- 4 - Flexible flywheel disk (3)
- 5 - Flexible disk and washer assembly
- 6 - Nut, 5/16-24 (24)
- 7 - Converter pump cover (for flex disk drive)
- 8 - Converter drive ring
- 9 - Bolt, 3/8-16 x 1 1/4 (8)
- 10 - Drive ring seal
- 11 - Nut, 5/16-24 (24)
- 12 - Converter pump cover (for toothed drive)

B

- 1 - Snap ring
- 2 - Bearing
- 3 - Turbine
- 4 - Stator assembly
- 5 - Needle bearing
- 6 - Freewheel roller (10)
- 7 - Freewheel roller spring (10)
- 8 - Freewheel roller race
- 9 - Snap ring
- 10 - Freewheel roller race spacer (2)
- 11 - Bolt, 5/16-24 x 1 1/4 (6)
- 12 - Lock strip (3)
- 13 - Bearing retainer (3)
- 14 - Bearing
- 15 - Pump assembly
- 16 - Bolt, 5/16-24 x 1.30 (24)
- 17 - Drive gear gasket
- 18 - Accessory drive gear

A

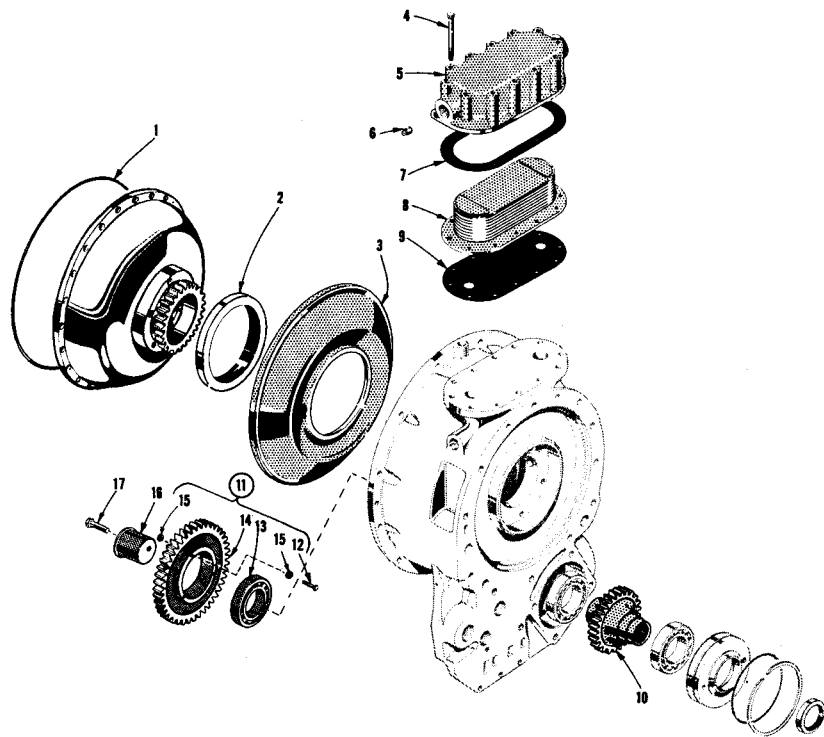
- 1 - Converter seal ring
- 2 - Oil seal
- 3 - Diaphragm
- 4 - Bolt, 5/16-18 x 3 3/4 (12)
- 5 - Oil cooler cover
- 6 - Plug
- 7 - Gasket
- 8 - Core assembly
- 9 - Gasket
- 10 - Oil pump drive gear
- 11 - Accessory drive idler gear assy
- 12 - Rivet (3)
- 13 - Single-row ball bearing
- 14 - Gear
- 15 - Washer (6)
- 16 - Accessory drive idler spindle
- 17 - Bolt, 7/16-14 x 1 3/4

B

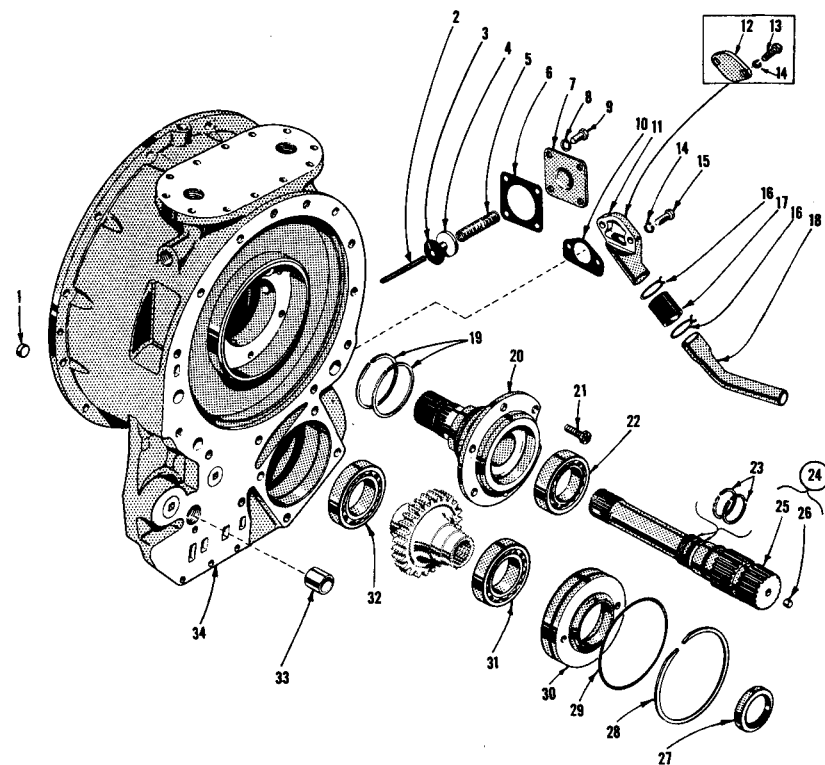
- 1 - Expansion plug
- 2 - Lubrication pressure regulator valve guide pin
- 3 - Lubrication pressure regulator valve washer
- 4 - Lubrication pressure regulator valve
- 5 - Lubrication pressure regulator valve spring
- 6 - Valve cover gasket
- 7 - Valve cover
- 8 - Lock washer, 3/8 (4)
- 9 - Bolt, 3/8-16 x 3/4 (4)
- 10 - Drain tube flange gasket
- 11 - Drain tube flange
- 12 - Converter housing drain cover
- 13 - Bolt, 3/8-16 x 7/8
- 14 - Lock washer, 3/8 (2)
- 15 - Bolt, 3/8-16 x 2 1/2 (2)
- 16 - Clamp (2)
- 17 - Drain tube hose
- 18 - Drain tube
- 19 - Hook-type seal ring (2)
- 20 - Converter ground sleeve
- 21 - Self-locking bolt, 3/8-16 x 7/8 (6)
- 22 - Bearing
- 23 - Hook-type seal ring (2)
- 24 - Turbine shaft assembly
- 25 - Turbine shaft (with integral reverse sun gear)
- 26 - Lubrication orifice plug
- 27 - Lip-type oil seal
- 28 - Internal-snap ring
- 29 - O-type seal ring
- 30 - Bearing retainer
- 31 - Bearing
- 32 - Bearing
- 33 - Oil transfer tube
- 34 - Converter housing assembly

FOLDOUT 8

A



Foldout A, 8. Oil cooler, implement pump drive, "dry" converter components—exploded view

B

Foldout B, 8. Torque converter housing—exploded view

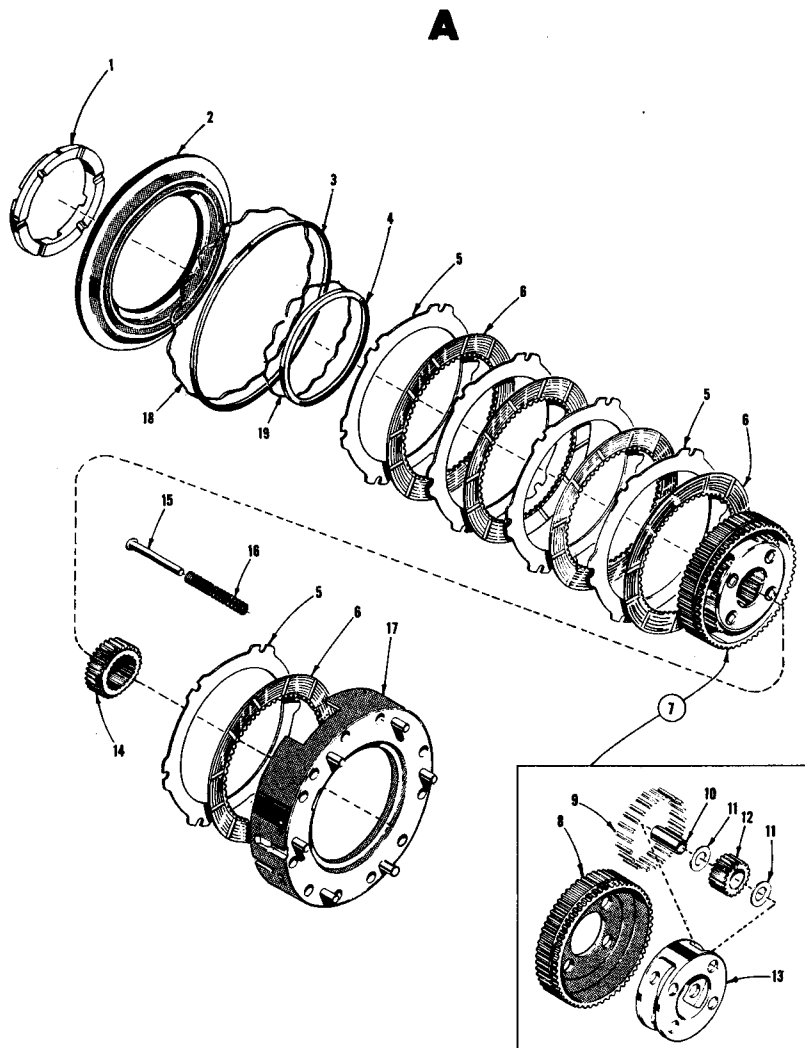
A

- | | |
|---------------------------------------|---|
| 1 - Spacer | 11 - Pinion thrust washer (8) |
| 2 - Reverse clutch piston | 12 - Pinion (matched set of 4) |
| 3 - Outer seal ring | 13 - Reverse planetary carrier |
| 4 - Inner seal ring | 14 - Forward sun gear |
| 5 - External-tanged clutch plate (5) | 15 - Spring guide pin (12) |
| 6 - Internal-splined clutch plate (5) | 16 - Piston return spring (12) |
| 7 - Reverse carrier assembly | 17 - Forward and reverse clutch anchor assembly |
| 8 - Reverse planetary hub | 18 - Outer-seal ring expander |
| 9 - Planetary pinion roller (88) | 19 - Inner-seal ring expander |
| 10 - Pinion spindle pin (4) | |

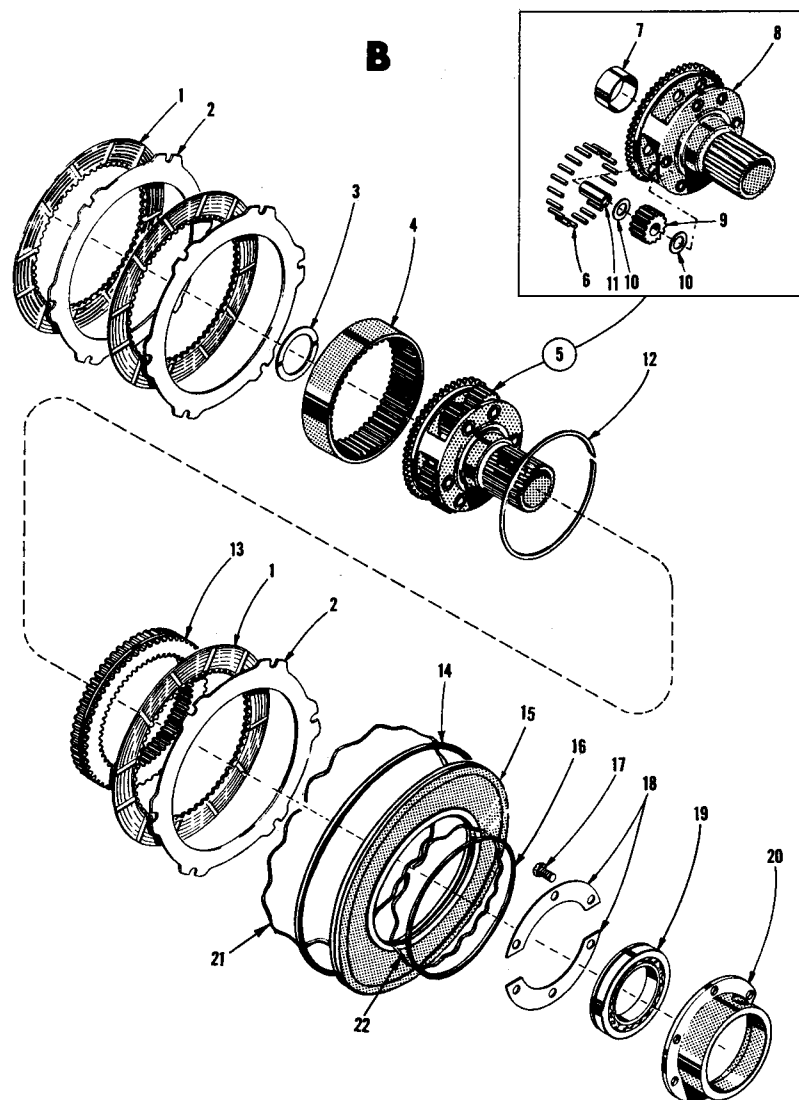
B

- | | |
|---|-------------------------------|
| 1 - Internal-splined forward clutch plate (3) | 12 - Internal-snap ring |
| 2 - External-tanged forward clutch plate (3) | 13 - Forward ring gear |
| 3 - Thrust washer | 14 - Outer seal ring |
| 4 - Reverse ring gear | 15 - Forward clutch piston |
| 5 - Forward planetary carrier assembly | 16 - Inner seal ring |
| 6 - Planetary pinion roller (120) | 17 - Bolt, 3/8-16 x 7/8 (4) |
| 7 - Bushing | 18 - Bearing retainer (2) |
| 8 - Forward planetary carrier | 19 - Bearing |
| 9 - Pinion (matched set of 6) | 20 - Oil transfer hub |
| 10 - Pinion thrust washer (12) | 21 - Outer seal ring expander |
| 11 - Pinion spindle pin (6) | 22 - Inner seal ring expander |

FOLDOUT 9



Foldout A, 9. Reverse planetary and clutch—exploded view



Foldout B, 9. Forward planetary and clutch—exploded view

A

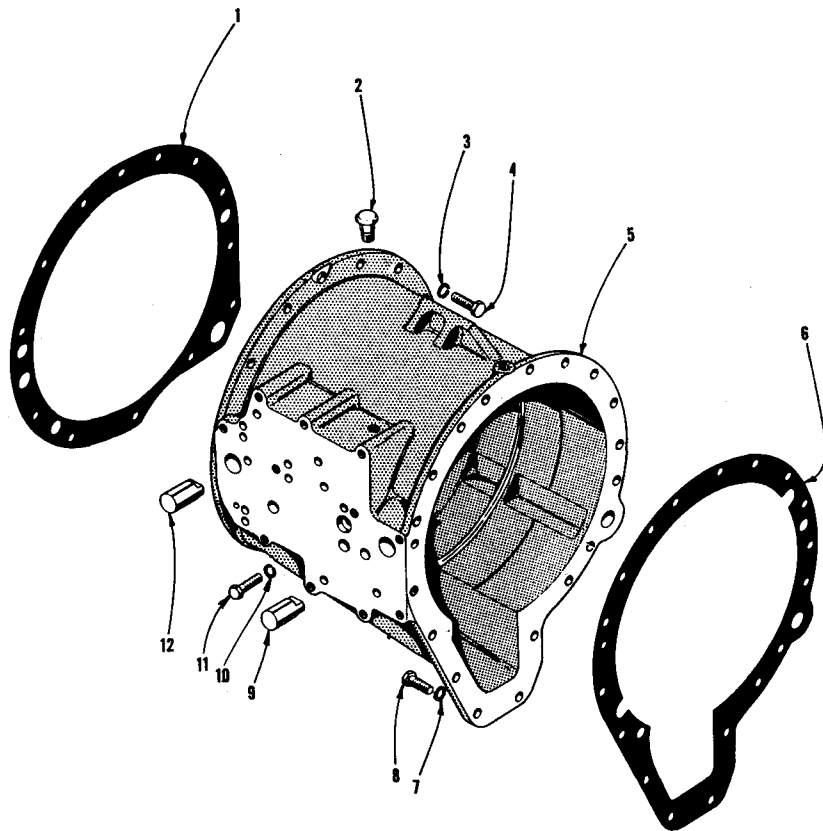
- 1 - Converter housing gasket
- 2 - Breather
- 3 - Lock washer, 7/16 (13)
- 4 - Bolt, 7/16-14 x 1 3/8 (13)
- 5 - Transmission housing
- 6 - Gasket
- 7 - Lock washer, 7/16 (18)
- 8 - Bolt, 7/16-14 x 1 3/8 (18)
- 9 - Low- and high-range clutch anchor pin
- 10 - Lock washer, 3/8
- 11 - Bolt, 3/8-16 x 1 1/2 (high-range clutch)
- 12 - Forward and reverse clutch anchor pin

B

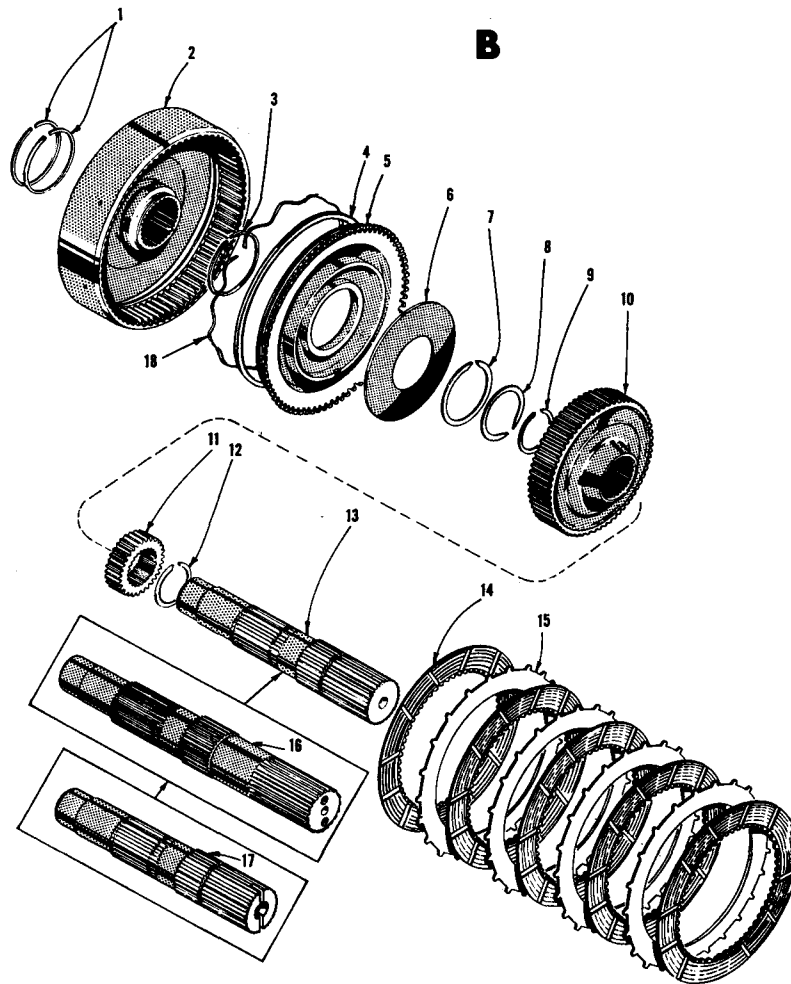
- 1 - Hook-type seal ring (2)
- 2 - Intermediate-range clutch drum
- 3 - Piston hook-type, inner seal ring
- 4 - Piston outer seal ring
- 5 - Intermediate-range clutch piston
- 6 - Piston (Belleville type) return spring
- 7 - Spring retainer external snap ring
- 8 - Drum retainer external snap ring
- 9 - Hub retainer external snap ring
- 10 - Intermediate-range clutch hub
- 11 - High-range sun gear
- 12 - Sun gear snap ring
- 13 - Transmission main shaft (-1 model)
- 14 - Internal-splined clutch plate (5)
- 15 - External-splined clutch plate (4)
- 16 - Transmission main shaft (-3 model)
- 17 - Transmission main shaft (-1 model
with speedometer drive)
- 18 - Outer seal ring expander

FOLDOUT 10

A



B



Foldout A, 10. Transmission housing and related parts—exploded view

Foldout B, 10. Intermediate-range clutch and transmission main shaft—exploded view

A

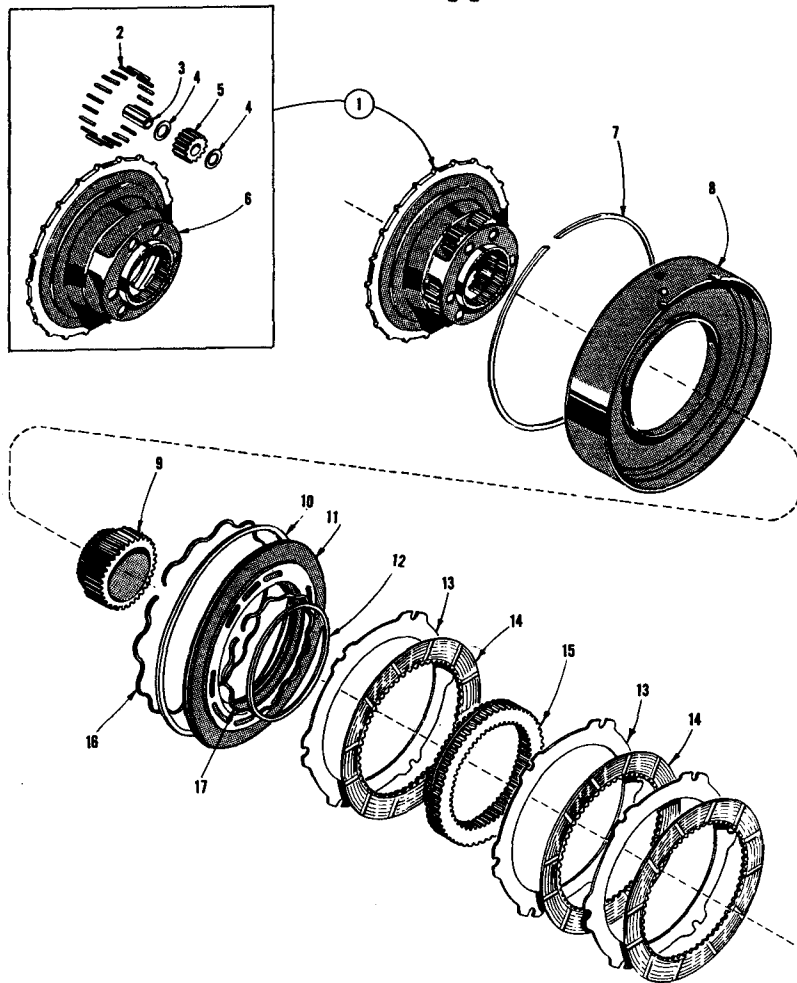
- 1 - High-range planetary carrier assembly
- 2 - Planetary pinion roller (120)
- 3 - Pinion spindle pin (6)
- 4 - Pinion thrust washer (12)
- 5 - Pinion (matched set of 6)
- 6 - High-range planetary carrier
- 7 - Internal snap ring
- 8 - High-range clutch piston housing
- 9 - Low-range sun gear
- 10 - Outer seal ring
- 11 - High-range clutch piston
- 12 - Inner seal ring
- 13 - External-tanged clutch plate (3)
- 14 - Internal-splined clutch plate (3)
- 15 - High-range planetary ring gear
- 16 - Outer seal ring expander
- 17 - Inner seal ring expander

B

- 1 - High- and low-range clutch anchor assembly
- 2 - Piston return spring (12)
- 3 - Spring guide pin (12)
- 4 - External-tanged, low-range clutch plate (5)
- 5 - Internal-splined, low-range clutch plate (5)
- 6 - Low-range planetary ring gear
- 7 - Thrust washer
- 8 - Low-range planetary carrier assembly
- 9 - Pinion thrust washer (12)
- 10 - Pinion (matched set of 6)
- 11 - Planetary pinion roller (96)
- 12 - Pinion spindle pin (6)
- 13 - Low-range planetary carrier
- 14 - Snap ring
- 15 - Outer seal ring
- 16 - Low-range clutch piston
- 17 - Hook-type seal ring
- 18 - Outer seal ring expander

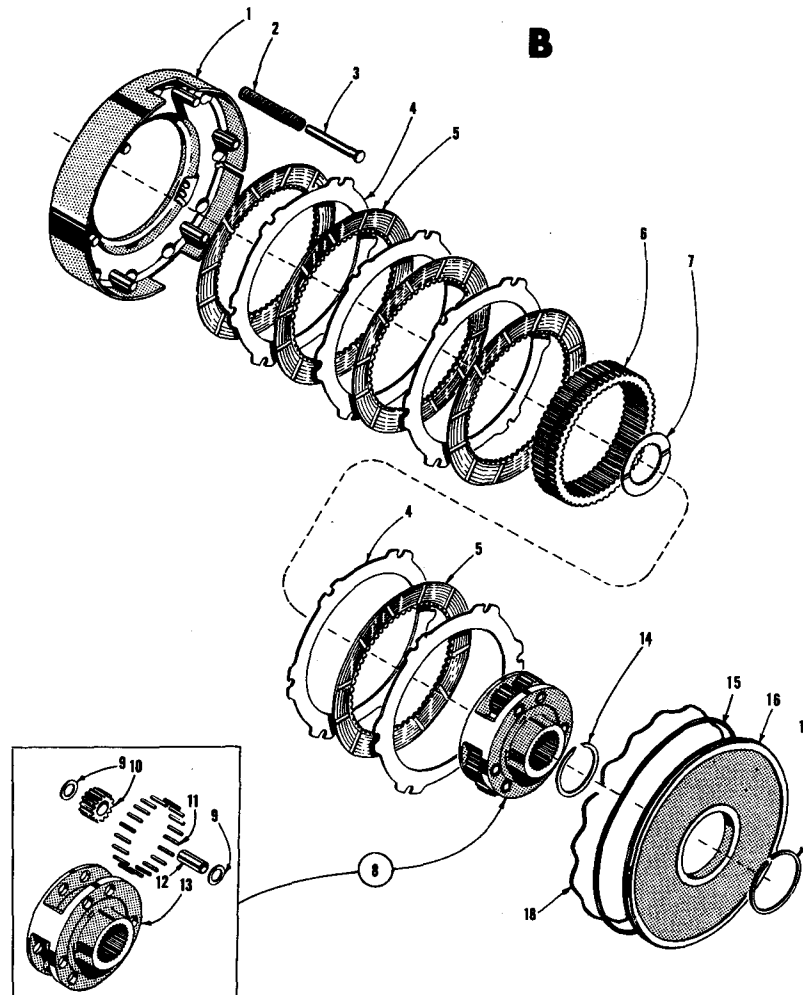
FOLDOUT 11

A



Foldout A, 11. High-range planetary and clutch—exploded view

B



Foldout B, 11. Low-range planetary and clutch—exploded view

A

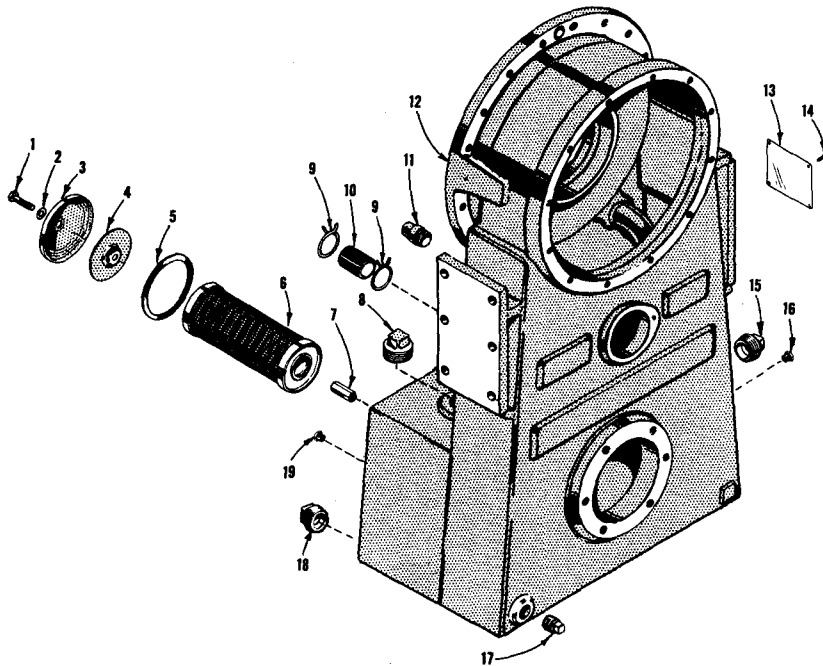
- | | |
|--------------------------------------|--------------------------------|
| 1 - Oil screen bolt, 5/16-24 x 1 1/2 | 11 - Nipple, 3/4 NPTF |
| 2 - Washer, 11/32 x 11/16 x 0.065 | 12 - Transfer gear housing |
| 3 - Oil screen cover | 13 - Name plate |
| 4 - Oil screen retainer | 14 - Drive screw (4) |
| 5 - Oil screen cover gasket | 15 - Oil filler plug, 1 1/4 |
| 6 - Oil screen | 16 - Oil level check plug, 1/4 |
| 7 - Oil screen coupling | 17 - Sump drain plug, 3/4 |
| 8 - Pipe plug, 1 1/2 | 18 - Oil filler plug, 1 1/4 |
| 9 - Hose clamp (2) | 19 - Oil level check plug, 1/4 |
| 10 - Converter housing drain hose | |

B

- | | |
|-----------------------------------|--|
| 1 - Flange oil seal | 10 - Detent ball, 3/8 (2) |
| 2 - Bolt, 3/8-16 x 1 (6) | 11 - Detent spring |
| 3 - Lock washer, 3/8 (6) | 12 - Shifter fork shaft (later models) |
| 4 - Front output bearing retainer | 13 - Shifter fork shaft seal |
| 5 - Bearing retainer gasket | 14 - Shifter fork shaft (earlier models) |
| 6 - Bearing | 15 - Shifter fork (earlier models) |
| 7 - Front-output shaft | 16 - Front-output shaft coupling (no disconnect) |
| 8 - Front-output shaft coupling | 17 - Internal snap ring |
| 9 - Shifter fork (later models) | 18 - Shifter fork shaft cup (no disconnect) |

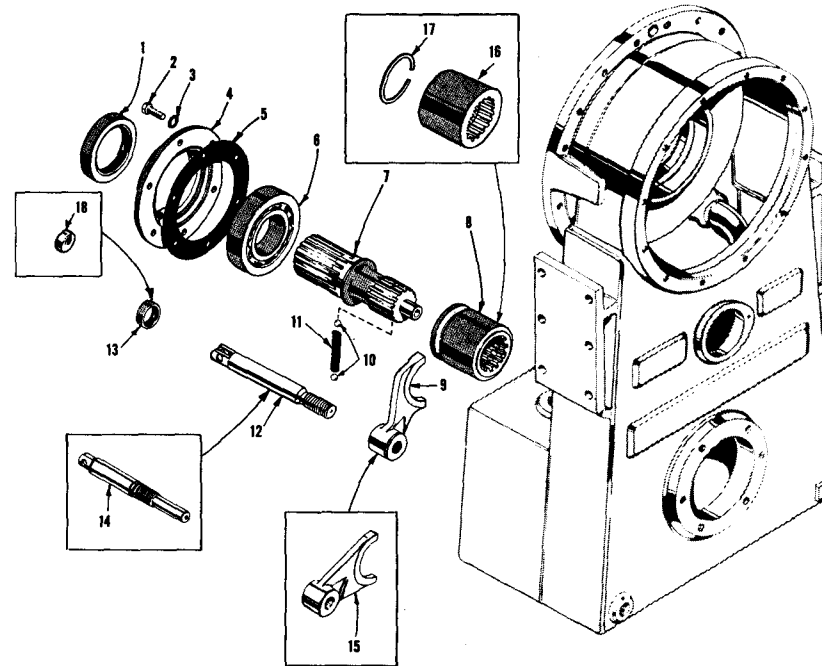
FOLDOUT 12

A



Foldout A, 12. Transfer gear housing—exploded view

B



Foldout B, 12. Front output shaft and related parts—exploded view

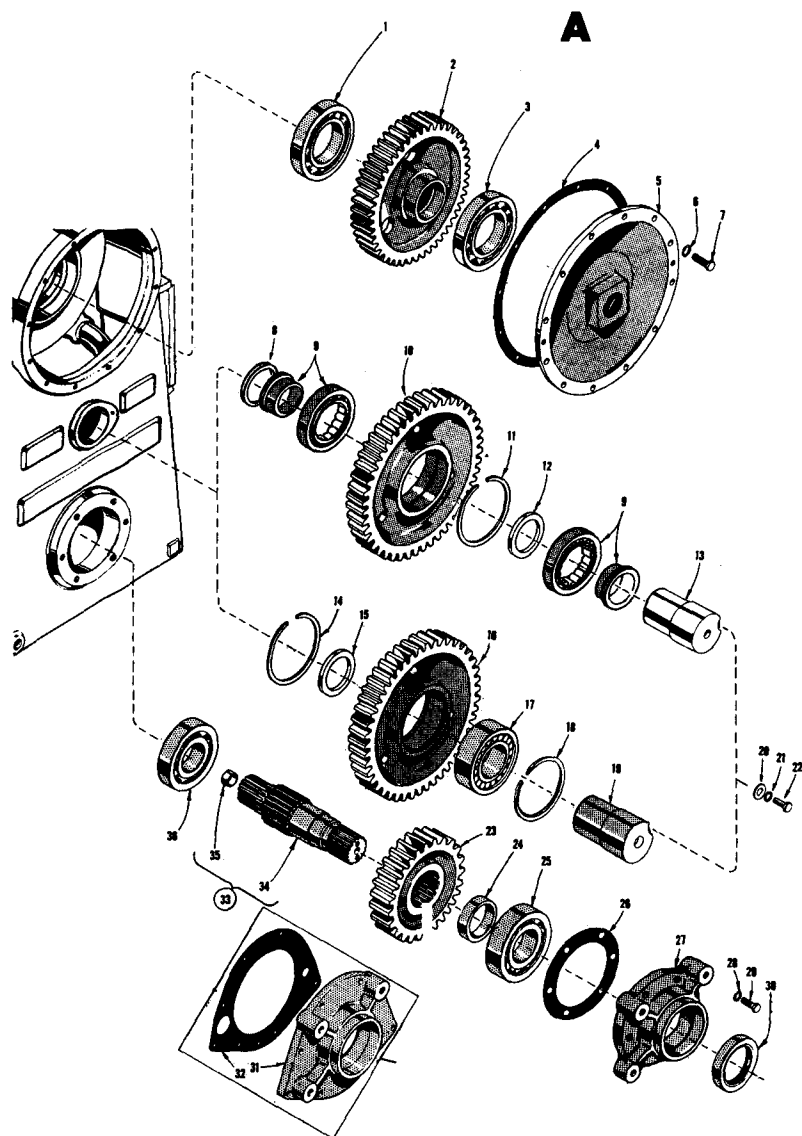
A

- | | |
|--|----------------------------------|
| 1 - Bearing | 18. Internal snap ring |
| 2 - Transfer drive gear | 19. Idler gear spindle |
| 3 - Bearing | 20. Washer |
| 4 - Drive gear cover gasket | 21. Lock washer, 7/16 |
| 5 - Drive gear cover | 22. Bolt, 7/16-14 x 7/8 |
| 6 - Lock washer, 3/8 (12) | 23. Transfer driven gear |
| 7 - Bolt, 3/8-16 x 1 1/8 (12) | 24. Spacer |
| 8 - Spacer | 25. Ball bearing |
| 9 - Roller bearing assembly (2) | 26. Rear bearing retainer gasket |
| 10 - Transfer idler gear (one snap ring groove) | 27. Rear bearing retainer |
| 11 - Internal snap ring | 28. Lock washer, 1/2 (6) |
| 12 - Spacer | 29. Bolt, 1/2-13 x 1 3/8 (6) |
| 13 - Idler gear spindle | 30. Rear oil seal |
| 14 - Internal snap ring | 31. Rear bearing retainer |
| 15 - Spacer | 32. Rear bearing retainer gasket |
| 16 - Transfer idler gear (two snap ring grooves) | 33. Rear output shaft assembly |
| 17 - Roller bearing assembly | 34. Rear output shaft |
| | 35. Bushing |
| | 36. Ball bearing |

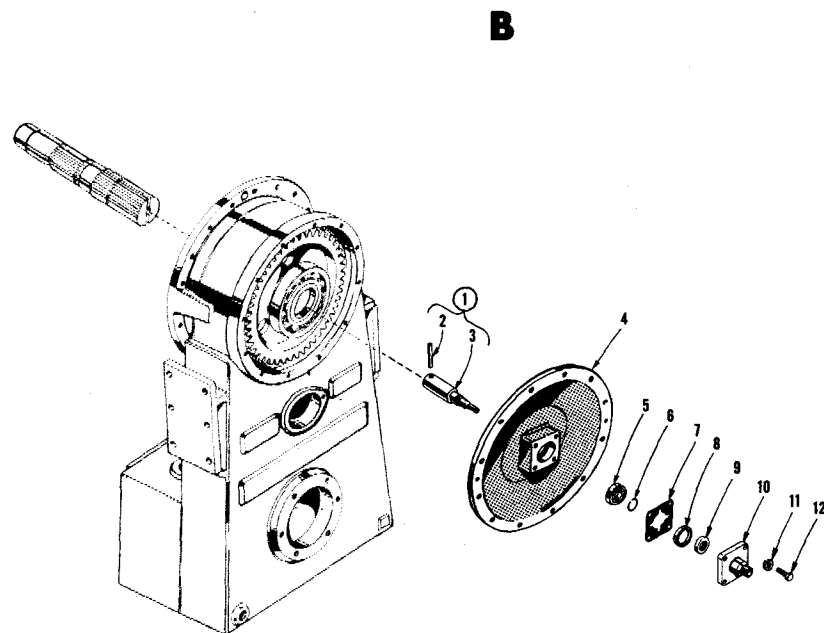
B

- | | |
|--------------------------------------|--------------------------------------|
| 1 - Speedometer drive shaft assembly | 7 - Speedometer drive adapter gasket |
| 2 - Dowel pin | 8 - Bearing spacer |
| 3 - Speedometer drive shaft | 9 - Speedometer drive oil seal |
| 4 - Transmission rear cover | 10 - Speedometer drive adapter |
| 5 - Bearing | 11 - Lock washer, 5/16 (4) |
| 6 - Snap ring | 12 - Bolt, 5/16-18 x 1 1/8 (4) |

FOLDOUT 13



Foldout A, 13. Transfer gears and rear output shaft—exploded view



Foldout B, 13. Speedometer drive—exploded view

A

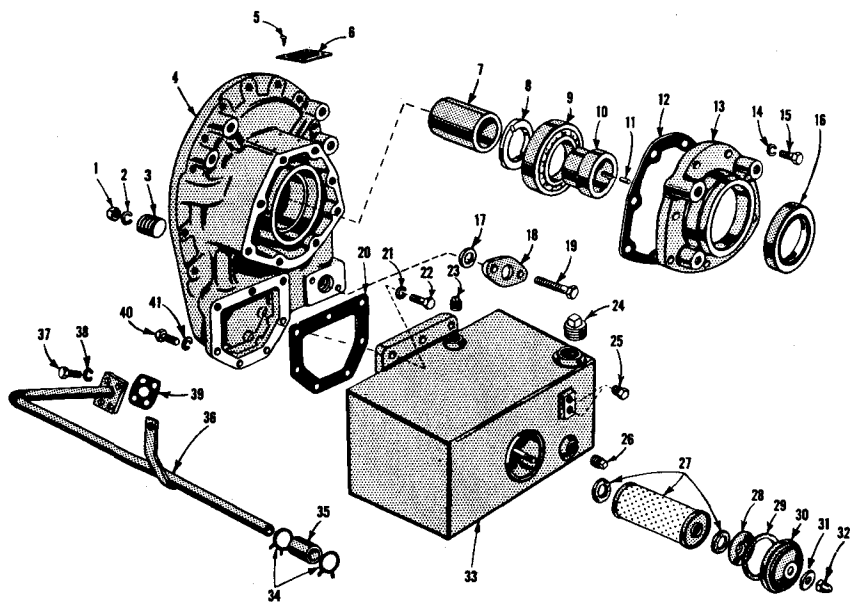
- 1 - Nut, 7/16-20 (2)
- 2 - Lock washer, 7/16 (2)
- 3 - Plug, 1 1/4
- 4 - Transmission sump adapter
- 5 - Drive screw (4)
- 6 - Transmission name plate
- 7 - Spacer
- 8 - Thrust washer
- 9 - Bearing
- 10 - Sleeve
- 11 - Sleeve retaining pin
- 12 - Rear bearing retainer gasket
- 13 - Rear bearing retainer
- 14 - Lock washer, 3/8 (8)
- 15 - Bolt, 3/8-16 x 1 3/8 (8)
- 16 - Output flange oil seal
- 17 - Pump suction seal
- 18 - Seal retainer plate
- 19 - Bolt, 7/16-20 x 3 1/2 (2)
- 20 - Sump gasket
- 21 - Lock washer, 7/16 (3)
- 22 - Bolt, 7/16-14 x 1 1/2 (3)
- 23 - Plug, 3/8
- 24 - Oil filler plug, 1 1/4
- 25 - Oil level check plug, 1/4 (2)
- 26 - Sump drain plug, 3/4
- 27 - Oil screen assembly
- 28 - Oil screen retainer
- 29 - Oil screen cover gasket
- 30 - Oil screen cover
- 31 - Plain washer, 11/32 x 11/16 x 0.065
- 32 - Crown nut, 5/16
- 33 - Transmission oil sump
- 34 - Hose clamp (2)
- 35 - Pump tube hose
- 36 - Scavenge pump return tube
- 37 - Bolt, 3/8-16 x 1 (4)
- 38 - Lock washer, 3/8 (4)
- 39 - Pump tube gasket
- 40 - Bolt, 7/16-20 x 1 1/4 (4)
- 41 - Lock washer, 7/16 (4)

B

- 1 - Parking brake assembly
- 2 - Back plate
- 3 - Roller
- 4 - Shoe and lining (2)
- 5 - Brake shoe return spring (2)
- 6 - Operating cam lever
- 7 - Brake drum
- 8 - Self-locking bolt, 3/8-24 x 3/4 (8)
- 9 - Bolt, 5/8-11 x 1 1/4 (3)
- 10 - Lock washer, 5/8 (3)

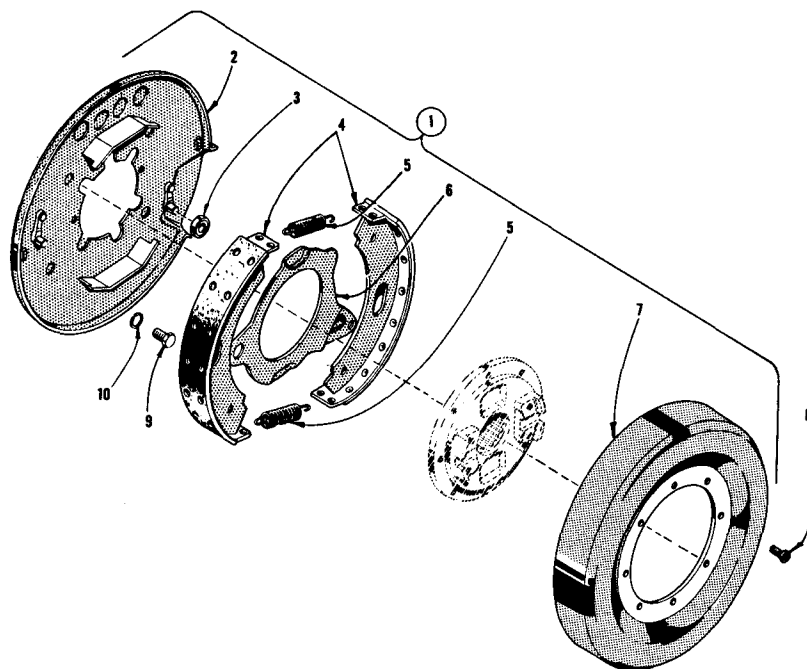
FOLDOUT 14

A



Foldout A, 14. Oil sump adapter and sump—exploded view

B



Foldout B, 14. Parking brake—exploded view

A

- 1 - Gasket
- 2 - Lock washer, 3/8 (11)
- 3 - Bolt, 3/8-16 x 1 1/4 (6)
- 4 - Bolt, 3/8-16 x 3 (5)
- 5 - Selector valve body assembly
- 6 - Plug, 3/4-16 UNF (2)
- 7 - Copper gasket (2)
- 8 - Pin, 3/8 x .535 (2)
- 9 - Spring (4)
- 10 - Ball, 5/8 (4)
- 11 - Spring pin
- 12 - Oil seal
- 13 - Oil seal
- 14 - Pipe plug, 1/8
- 15 - Cutoff valve retainer plug
- 16 - Clutch cutoff valve plug cup
- 17 - Seal ring
- 18 - Clutch cutoff valve plug
- 19 - Annular gasket, 7/8
- 20 - Clutch cutoff valve
- 21 - Pin, 3/8 x 1 3/8
- 22 - Spring
- 23 - Pipe plug, 1/8
- 24 - Forward and reverse shift sleeve
- 25 - Forward and reverse valve assembly
- 26 - Bushing
- 27 - Forward and reverse valve
- 28 - Cup
- 29 - Range selector valve cap
- 30 - Range selector valve assembly
- 31 - Ball, 15/32 dia
- 32 - Range selector valve
- 33 - Bushing
- 34 - Selector valve body

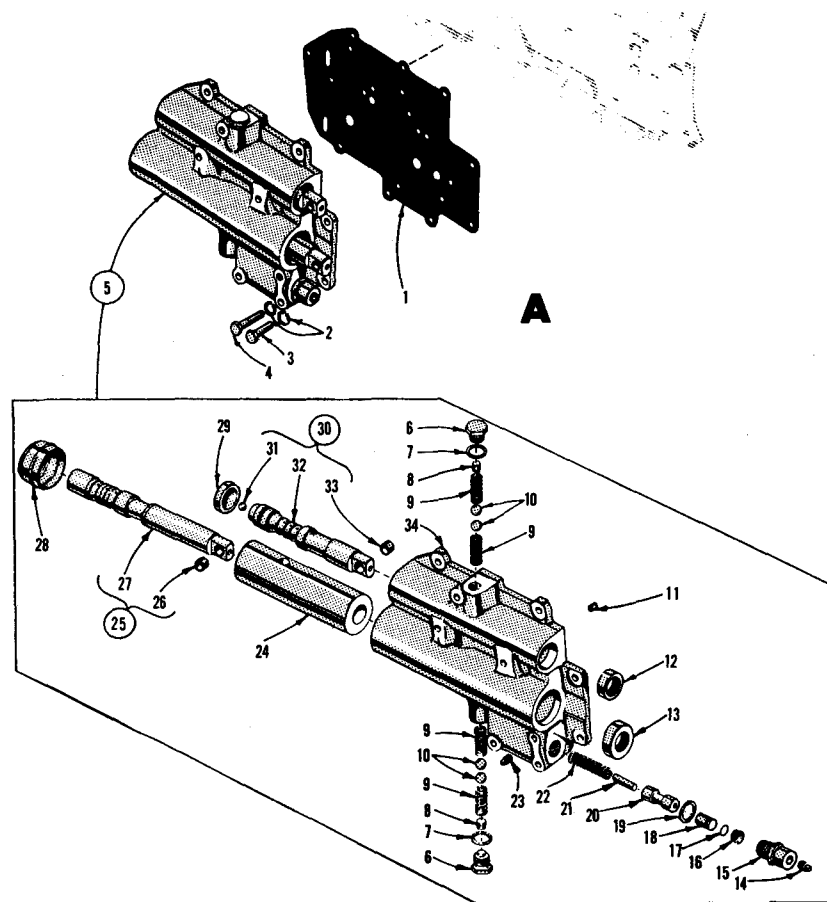
B

- 1 - Gasket
- 2 - Lock washer, 3/8 (11)
- 3 - Bolt, 3/8-16 x 1 1/4 (2)
- 4 - Bolt, 3/8-16 x 2 1/2 (6)
- 5 - Bolt, 3/8-16 x 3 1/2 (3)
- 6 - Control valve assembly
- 7 - Forward and reverse valve assembly
- 8 - Valve bushing
- 9 - Forward and reverse valve
- 10 - Oil seal
- 11 - Plug, 1/8
- 12 - Clutch cutoff valve (air actuated)
- 13 - Valve plug
- 14 - Cutoff valve plug seal ring
- 15 - Gasket
- 16 - Cutoff valve retainer plug
- 17 - Clutch cutoff valve (hydraulic actuated)
- 18 - Clutch cutoff valve plug
- 19 - Seal ring
- 20 - Cup
- 21 - Plug gasket
- 22 - Clutch cutoff valve retainer plug
- 23 - Plug, 3/8 (2)
- 24 - Control valve body (clutch cutoff type)
- 25 - Range selector valve detent ball (2)
- 26 - Range selector detent spring—2 red coils (2)
- 27 - Spring retainer (2)
- 28 - Forward and reverse valve detent ball (2)
- 29 - Forward and reverse detent spring—2 yellow coils (2)
- 30 - Valve stop (2)
- 31 - Oil seal
- 32 - Range selector valve assembly
- 33 - Ball
- 34 - Range selector valve
- 35 - Valve bushing
- 36 - Control valve body (inching type)
- 37 - Inching valve washer
- 38 - Inching valve stop
- 39 - Inching regulator valve spring
- 40 - Inching regulator valve
- 41 - Inching valve spring
- 42 - Inching control valve
- 43 - Inching valve plug
- 44 - Seal ring
- 45 - Oil seal

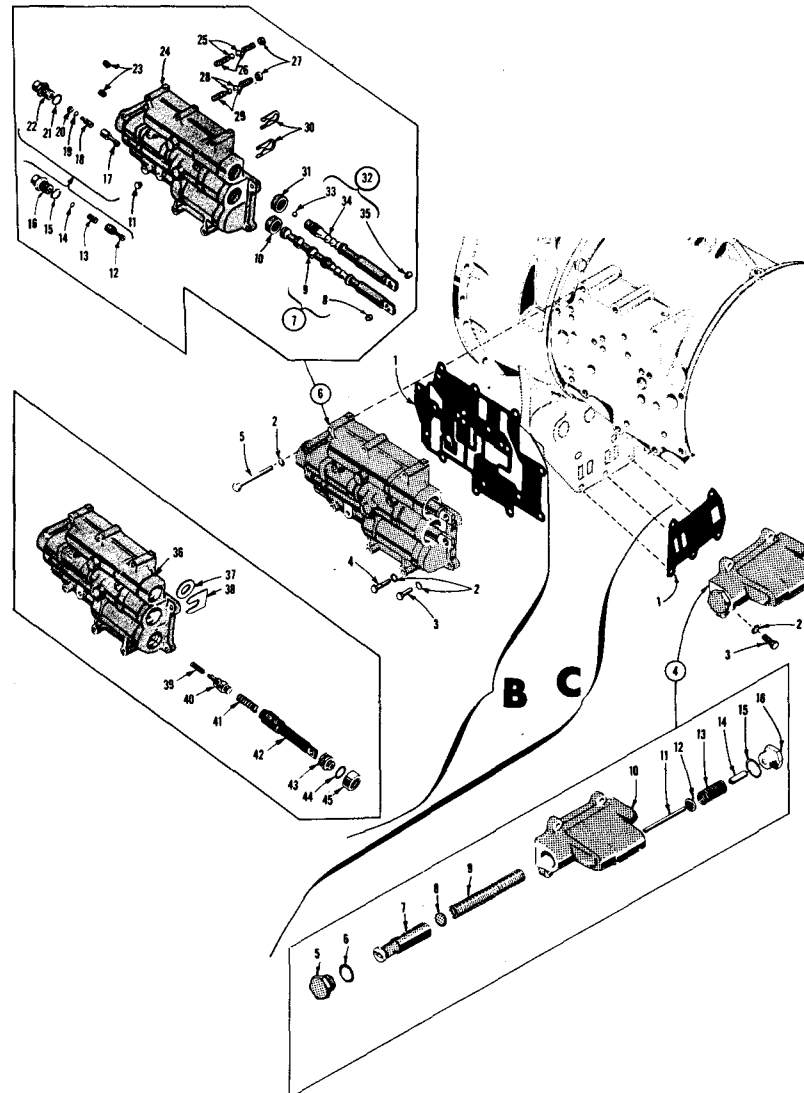
C

- 1 - Gasket
- 2 - Lock washer, 3/8 (5)
- 3 - Bolt, 3/8-16 x 1 1/4 (5)
- 4 - Pressure regulator valve body assembly
- 5 - Plug, 1 1/4 -12
- 6 - Gasket
- 7 - Main-pressure regulator valve assembly
- 8 - Main-pressure regulator shim (AR)
- 9 - Pressure regulating spring—2 yellow coils
- 10 - Pressure regulator valve body
- 11 - Valve guide pin
- 12 - Pressure relief valve
- 13 - Pressure relief valve spring
- 14 - Spring guide tube
- 15 - Gasket
- 16 - Plug, 1 1/4-12

FOLDOUT 15



Foldout A, 15. Earlier inching control valve assembly—exploded view



Foldout B, 15. Later control valve assemblies—exploded view

Foldout C, 15. Main-pressure regulator valve assembly—exploded view

A

- | | |
|---|--|
| 1 - Bolt, 3/8-16 x 2 1/4 (2) | 13 - Roller |
| 2 - Lock washer, 3/8 (2) | 14 - Oil pump drive gear |
| 3 - Bolt, 3/8-16 x 2 3/4 (4) | 15 - Oil pump idler gear |
| 4 - Lock washer, 3/8 (4) | 16 - Oil pump gasket |
| 5 - Input pressure and scavenge oil pump assembly | 17 - Input pressure oil pump body assembly |
| 6 - Bolt, 3/8-16 x 2 1/4 (4) | 18 - Needle bearing (2) |
| 7 - Lock washer, 3/8 (4) | 19 - Scavenge pump gasket |
| 8 - Scavenge oil pump body assembly | 20 - Pump mounting gasket |
| 9 - Needle bearing (2) | 21 - Oil pump drive coupling assembly |
| 10 - Scavenge pump gear (2) | 22 - Seal ring |
| 11 - Plate assembly | 23 - Coupling |
| 12 - Dowel (2) | 24 - Plug |

B

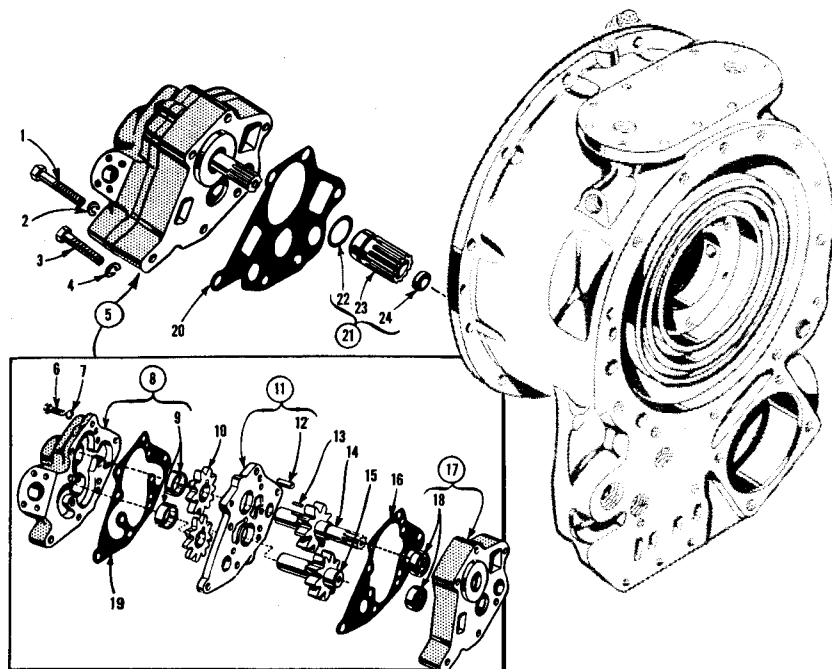
- | | |
|--|--|
| 1 - Auxiliary drive coupling assembly | 14 - Needle bearing (2) |
| 2 - Pin | 15 - Oil pump body |
| 3 - Auxiliary drive coupling | 16 - Lock washer, 3/8 (4) |
| 4 - Input pressure oil pump with auxiliary drive (-1 model, remote mount only) | 17 - Bolt, 3/8-16 x 1 (4) |
| 5 - Oil seal | 18 - Gasket |
| 6 - Oil pump cover assembly | 19 - Input pressure oil pump coupling assembly |
| 7 - Oil pump cover | 20 - O-type seal ring |
| 8 - Dowel pin (2) | 21 - Coupling |
| 9 - Needle bearing (2) | 22 - Plug |
| 10 - Gasket | 23 - Lock washer, 3/8 (6) |
| 11 - Pump driven gear | 24 - Bolt, 3/8-16 x 1 3/4 (5) |
| 12 - Pump drive gear | 25 - Bolt, 3/8-16 x 2 1/4 |
| 13 - Oil pump body assembly | |

C

- | | |
|---|---------------------------------------|
| 1 - Bolt, 3/8-16 x 2 1/4 (2) | 10 - Needle bearing (2) |
| 2 - Bolt, 3/8-16 x 1 3/4 (4) | 11 - Gasket |
| 3 - Lock washer, 3/8 (6) | 12 - Drive gear |
| 4 - Input pressure oil pump assembly (-1 model, remote or direct mount) | 13 - Driven gear |
| 5 - Bolt, 3/8-16 x 1 (4) | 14 - Body assembly |
| 6 - Lock washer, 3/8 (4) | 15 - Needle bearing (2) |
| 7 - Cover assembly | 16 - Body |
| 8 - Cover | 17 - Gasket |
| 9 - Dowe pin (2) | 18 - Input pressure oil pump coupling |

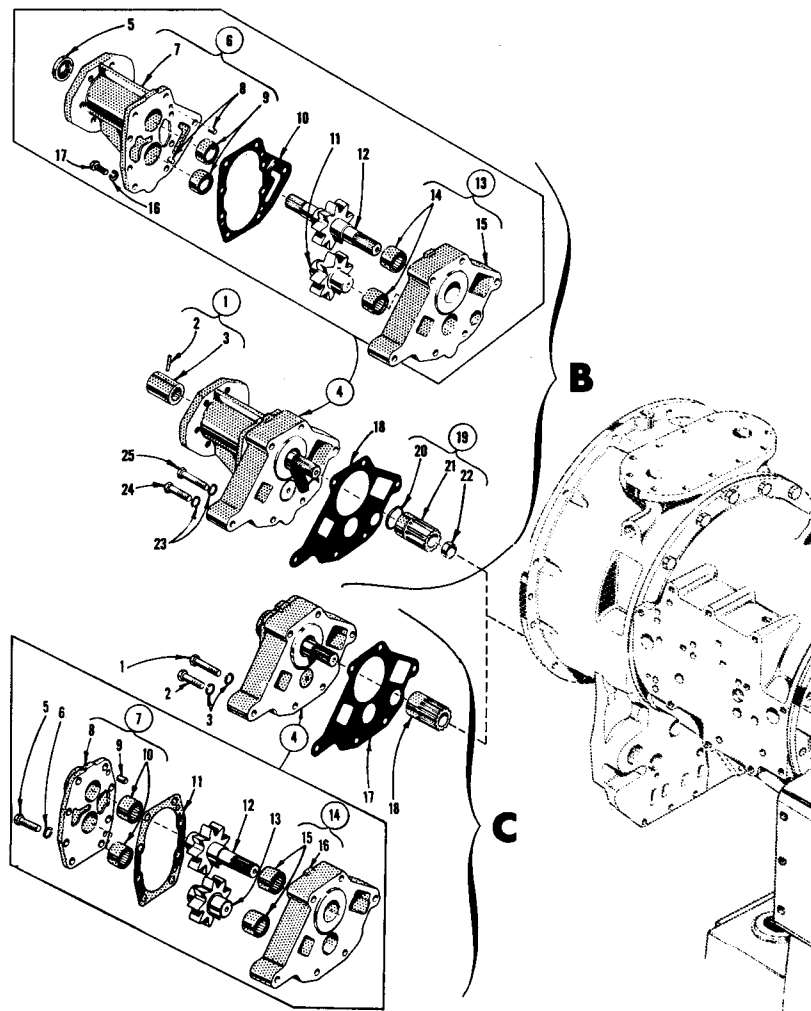
FOLDOUT 16

A



Foldout A, 16. Input pressure and scavenge oil pump (-3 model)—exploded view

B



Foldout B, 16. Input pressure oil pump with auxiliary drive (-1 model, remote mount only)—exploded view

C

Foldout C, 16. Input pressure oil pump (-1 model remote or direct mount)—exploded view