GROUP 21

TRANSMISSION

PART 1 - MANUAL TRANSMISSION

CONTENTS

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1A — 3-SPEED HEAVY DUTY MANUAL TRANSMISSION

SPECIFICATIONS

THREE SPEED HEAVY DUTY MANUAL TRANSMISSION

Model Application	VC-1	VC-2
Engine Displacement (Cu. In.)	361-383	
RATIO		
First	2.55 to 1	
Second	1.49 to 1	
Direct	1.00 to 1	
Reverse	3.34 to 1	
LUBRICANT		
Capacity	Approximately 5 Pints	
Type	Automatic Transmission Fluid Type "A" Suffix "A"	
Gears	Helical	
TOLERANCES		
Clutch Housing	.006 inch Maximum	
Clutch Housing Bore Runout	.008 inch Maximum	
Countershaft End Play	.0045 to .028 inch	
Second Speed Gear End Play	.002 to .014 inch	

SPECIAL TOOLS

C-3281	Brake Drum Wrench
C-3834	Cluster Gear Arbor
C-3765	Detent Ball Holding Tool
C-3806	Engine Support Fixture
C-3837	Mainshaft Seal Driver
C-748	Mainshaft Seal Puller
C-452	Parking Brake Drum Puller
C-3789	Pinion Seal Retainer Driver
C-464	Reverse Idler Arbor
C-3650	Shifter Shaft Seal Driver
C-3767	Shifter Shaft Seal Protector
C-3638	Shifter Shaft Seal Puller
C-3301	Snap Ring Pliers
C-484	Snap Ring Pliers

TORQUE REFERENCE

Heavy Duty Three Speed Manual Transmission	Foot-Pounds	Inch-Pounds
Front Bearing Retainer Bolts	—	360
Extension Housing Bolts	50	—
Nuts	50	—
Gearshift Operating Lever Nuts	—	216
Mainshaft Flange Nut	175	—
Transmission to Clutch Housing Bolts	50	—
Transmission Cover Retaining Bolts	—	144
Transmission Drain Plug	—	300

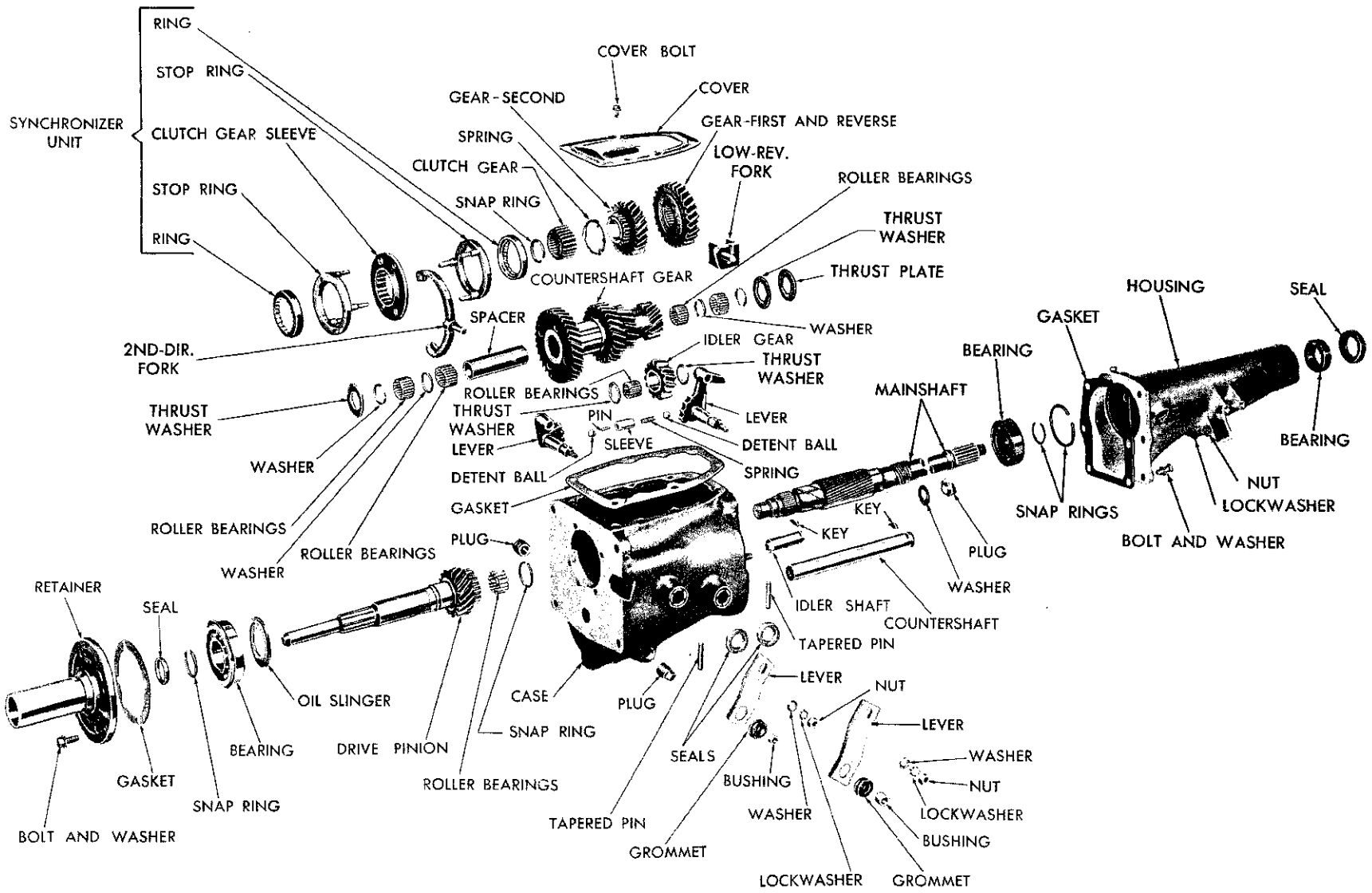

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Fig. 1—Heavy Duty Transmission (Disassembled View)

PART 1A THREE SPEED HEAVY DUTY MANUAL TRANSMISSION

The heavy duty three speed manual transmission (Figs. 1 and 2) is of the synchromesh type with helical cut gears to provide silent operation. The countershaft gear is in constant mesh and is supported by two rows of needle type bearings at each end. The mainshaft is supported by ball bearings at each end of the extension housing. The speedometer drive gear is integral with the mainshaft.

SERVICE PROCEDURES

1. REMOVING THE TRANSMISSION (From the Vehicle)

(1) Drain the lubricant from the transmission.

(2) Disconnect the propeller shaft, speedometer cable and housing and the gearshift control rods.

CAUTION: Remove the speedometer cable (pinion comes out with the cable) with hand so that housing is not crushed.

(3) Remove the back-up light switch leads (if so equipped).

(4) Install the engine support fixture Tool C-3806, mounting hooks firmly into the holes in the side frame members with the support ends up against the underside of the oil pan flange.

(5) Adjust the fixture to support the weight of the engine, then raise the engine slightly and remove the rear support crossmember attaching bolts.

(6) Support the transmission, using a suitable jack, remove the bolts that attach the transmission to the clutch housing.

(7) Slide the transmission rearward until the pinion shaft clears the clutch disc before lowering the transmission. (This precaution will avoid damaging the clutch disc.)

(8) Lower the transmission and remove from under the vehicle.

(9) Mount the transmission in repair stand DD-1014.

2. DISASSEMBLY OF THE TRANSMISSION COMPONENTS PARTS (Fig. 1)

(1) Using flange holding Tool C-3281, remove the flange retaining nut and washer.

(2) If necessary, attach puller Tool C-452, and remove the flange assembly.

(3) Remove the bolts that attach the cover to the case. Remove the cover and discard the gasket.

(4) Using a pair of feeler gauges, measure the synchronizer "float." The measurement of the "float" should be taken before any further disassembly of the transmission is attempted.

(5) The synchronizer "float" should be between .050 and .090 inch which measured between the synchronizer outer ring pin and the opposite synchronizer outer ring. The measurement must be made on two pins, 180 degrees apart with equal gap on both pin ends for "float" determination, as shown in Figure 3.

(6) There should be a snug fit between the pins and the outer ring, similar to that obtained when measuring with a micrometer.

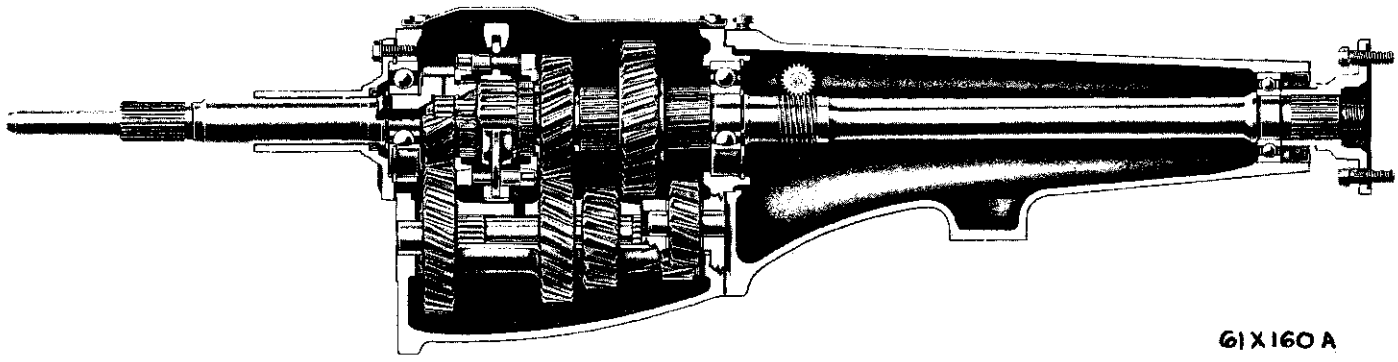

Fig. 2—Heavy Duty Transmission (Sectional View)

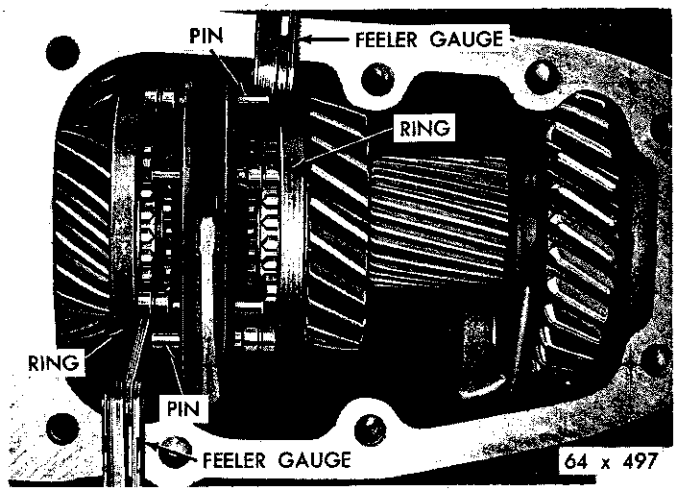

Fig. 3—Measuring the Synchronizer "Float"

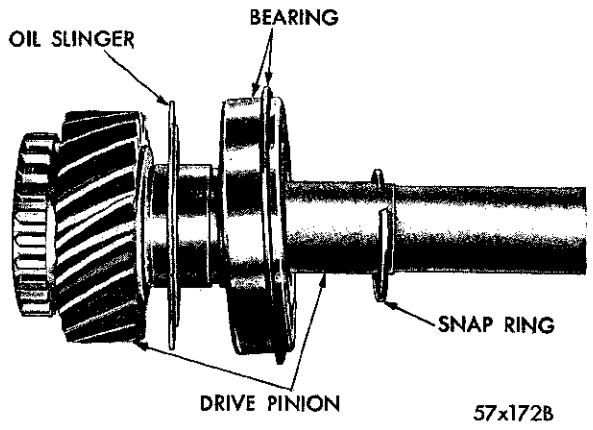

Fig. 5—Drive Pinion Assembly

Extension Housing

(1) Remove the bolts and one stud nut that attaches the extension housing to the transmission case. Slide the extension off the main shaft. Discard the gasket. Remove the oil seal, using Tool C-748.

(2) Remove the extension housing and the mainshaft bearing.

Drive Pinion

(1) Remove the bolts that attach the main drive pinion bearing retainer, then slide the retainer off the pinion. Discard the gasket and drive the seal out of the retainer, using a suitable drift.

(2) When removing the drive pinion and the bearing assembly from the transmission case, slide the synchronizer front inner stop ring from the short splines on the pinion as the assembly is being removed from the case, as shown in Figure 4.

(3) Remove the snap ring which locks the main drive pinion bearing on the pinion shaft, using a snap ring pliers. Carefully press the pinion shaft out of the bearing, using an arbor press. Remove the oil slinger (Fig. 5).

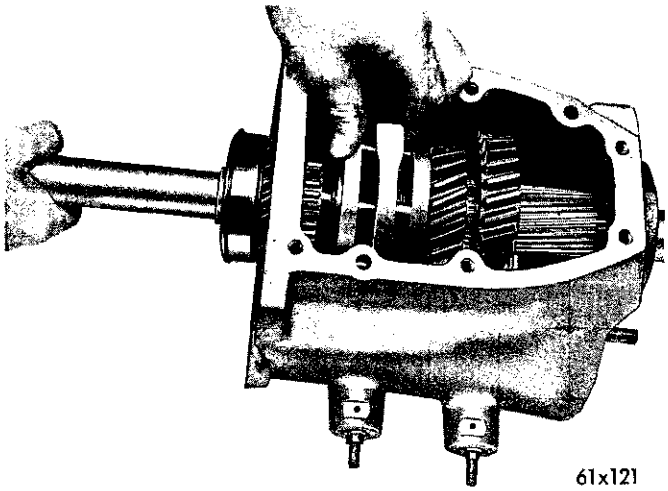

Fig. 4—Removing the Drive Pinion Assembly

(4) Remove the 15 rollers from the cavity in the end of the drive pinion gear, using a hook.

Mainshaft

(1) Remove the mainshaft rear bearing snap ring from the groove in the mainshaft rear bearing bore in the case.

(2) Slide the mainshaft and rear bearing assembly to the rear, until the rear bearing is out of the case.

(3) Remove the synchronizer assembly (Fig. 6) from the mainshaft and out of the case.

(4) Remove the second and third speed shift fork.

(5) Remove the synchronizer clutch gear snap ring using Tool C-484.

(6) Remove the synchronizer clutch gear, second speed gear and first and reverse sliding gear from the mainshaft.

NOTE: If the synchronizer clutch gear cannot be removed easily from the mainshaft, position the low and reverse fork and sliding gear to the rear of the

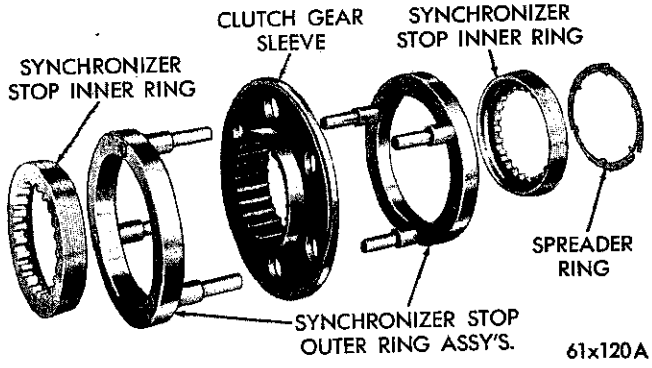

Fig. 6—Synchronizer Assembly

case and, using a plastic hammer, gently tap the mainshaft back out of the synchronizer clutch gear.

(7) Remove the mainshaft and bearing out through the rear of the case (Fig. 7).

(8) Remove the low and reverse shift fork from the case.

Countershaft

CAUTION: Do not drive the countershaft toward the front of the transmission case.

(1) Using a feeler gauge, measure the countershaft end play. The measurement should be from .0045 to .028 inch. (This will determine if new thrust washers are to be installed at reassembly.)

(2) Using the countershaft bearing arbor Tool C-3834, drive the countershaft toward the rear of the case until the small key can be removed from the countershaft.

(3) Drive the countershaft the remaining way out of the case, keeping arbor tight against the end of the countershaft to prevent loss of the roller bearings.

(4) Remove the cluster gear, thrust washers and the thrust plate from the case.

(5) Remove the (88) roller bearings, (4) washers and the center spacer from the cluster gear.

Reverse Idler Gear

(1) Using a blunt drift, drive the reverse idler shaft toward the rear of the case far enough to remove the key from the shaft.

(2) Drive the shaft the remaining way out of the case, and remove the idler gear and the bearing assembly using reverse idler assembly arbor Tool C-464.

(3) Remove the thrust washers and the 22 roller bearings.

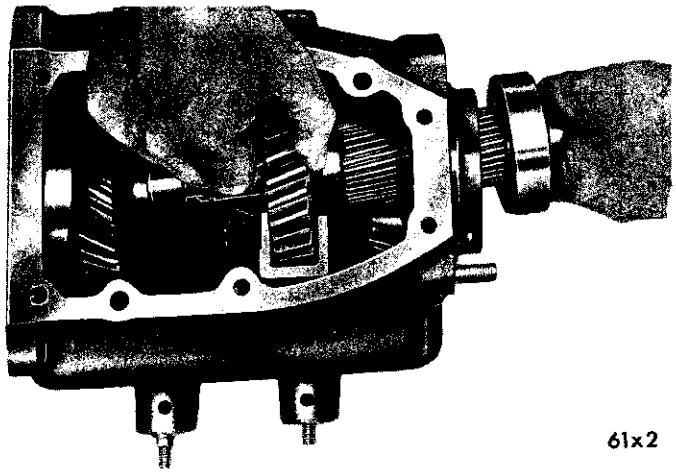

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Fig. 7—Removing or Installing the Mainshaft Assembly

Gearshift Mechanism

NOTE: This operation need only be done if the seals are leaking.

(1) If necessary, remove both of the lever shaft seals, using Tool C-3638.

(2) Using a small punch, remove the low and reverse gear lever shaft tapered lock pin by driving it toward the top of the transmission case.

(3) Remove the second and third gear lever shafts in the same manner.

(4) Remove the lever shafts from the transmission case, taking care not to lose the spring loaded detent balls.

(5) Remove the interlock sleeve, spring pin and detent balls.

Cleaning and Inspection

(1) Before inspecting, wash each part thoroughly in a suitable solvent, then dry. Clean mainshaft, drive pinion shaft end bearings. Dry by applying compressed air directly through the bearing. **Never spin bearings with compressed air.** Apply a little oil and turn the bearing several times by hand.

(2) Inspect the bearings for looseness or noise by comparing with a new bearing. (Be sure to wash the lubricant from the new bearing, then apply a little oil before making the comparison test.)

(3) Inspect the fit of the bearings on their respective shafts and in the bores.

(4) Inspect the bearings, shaft, and case for wear. If installation of a new bearing does not correct conditions, install a new shaft or repair case as required.

(5) Inspect the mainshaft splines for galling or scoring. Inspect bearing mounting surfaces and snap ring groove. Slight nicks or burrs can be stoned off. Replace the damaged parts.

(6) Inspect the gear teeth and threads on the inner synchronizer rings and synchronizer clutch gear sleeve. If there is evidence of chipped or excessively worn teeth, replace the part. Make sure the synchronizer clutch sleeve slides freely on the clutch gear.

(7) Inspect the pins of the outer synchronizer stop ring assembly for straightness and tightness. Replace stop ring if pins are bent or loose.

(8) Replace the countershaft cluster gear if any of its gear teeth are broken, chipped or excessively worn. Small nicks or burrs can be stoned off.

(9) Inspect the roller bearing and countershaft for pits and scoring.

(10) Inspect the condition of the thrust washers, and replace if wear is excessive.

(11) Inspect the clutch teeth of the drive pinion. If excessively worn, broken or chipped, install a new pinion.

(12) Inspect the mainshaft pilot roller bearings in drive pinion for pitting or scoring. If either of these conditions exist, replace all roller bearings.

(13) Inspect the case at the gearshift bosses and operating levers. Replace rubber lip seals if worn or torn.

(14) Inspect the interlock sleeve for free movement in its bore. Examine interlock balls for corrosion. If operating lever shaft detents show signs of wear, replace shaft. Inspect shift fork for free movement.

(15) Inspect the general condition of the transmission case, extension housing and the front bearing retainer.

(16) Inspect all the threaded holes and plugs for stripped or pulled threads.

(17) Inspect the case for small cracks and sand holes.

(18) Inspect all mating and gasket surfaces for roughness and scratches.

3. ASSEMBLY OF THE TRANSMISSION (Refer to Figs. 1 and 2)

Drive Pinion and Bearing Assembly

(1) Place the oil slinger on the main drive pinion with the offset outer portion next to the drive pinion teeth (Fig. 5).

(2) Place the main drive pinion bearing on the pinion shaft with the outer snap ring away from the pinion gear.

(3) Press the bearing into position so it is seated firmly against the oil slinger and pinion gear.

(4) Install the bearing retaining snap ring on the pinion shaft, using snap ring pliers Tool C-3301. Be sure the snap ring is seated in its groove. (The snap ring should be selected to eliminated end play.)

(5) Coat the 15 pilot roller bearings with heavy lubricant and install them in the cavity at the rear of the main drive pinion.

Countershaft

(1) Place the bearing spacer in the center of the bore in the cluster gear and use arbor Tool C-3834 to assist in assembling the roller bearings.

(2) Install a row of 22 roller bearings next to one end of the spacer, using heavy lubricant to help hold them in position.

(3) Place one of the 4 bearing washers next to the row of rollers, and install another row of 22 roller bearings next to the washer.

(4) Install another washer at the other end of the second row of roller bearing.

(5) At the opposite end of the cluster gear bore, install the remaining washers and roller bearings in the same sequence, as listed in steps (2), (3) and (4).

(6) With a small amount of lubricant to hold it in place, install the front thrust washer on the arbor at the front end of the cluster gear, with the tabs outward.

(7) Install the tabbed rear thrust washer on the arbor against the rear of the cluster gear with the tabs positioned in the grooves provided in the cluster gear.

(8) Install the remaining rear thrust washer plate on the rear of the gear and arbor with the step in the washer facing upward as viewed from the rear.

NOTE: The rear thrust washer must be installed with step on O.D. of washer engaged on the ledge inside the rear of the case, thus preventing rotation of the thrust washer plate.

(9) Align the tabs of the front thrust washer vertically to index with the notches in the transmission case, and with the step in the rear thrust washer positioned upward. Position the cluster gear and arbor assembly in the transmission case. Make sure the thrust washers are not dislodged from the arbor, and engage the thrust washer tabs in the case grooves, while sliding the assembly into position.

(10) Measure the end play of the countershaft gear. End play should be from .0045 to .028 inch.

(11) Using the countershaft and a soft hammer, drive the arbor forward out of the cluster gear and through the bore in the front of the case. Before driving the countershaft all the way into the case, be sure keyway is positioned in line with the key recess provided in the rear of the case. Insert the shaft key and continue to drive the countershaft forward in the case until the key is bottomed in the recess.

Reverse Idler Gear

(1) Position an arbor Tool C-464 in the reverse idler gear and, using heavy lubricant install the 22 roller bearings in the gear.

(2) Place the front and rear thrust washers at each end of the reverse idler gear, and position the assembly in the transmission case with the chamfered end of the gear teeth toward the front.

(3) Insert the reverse idler shaft into the bore

at the rear of the case with keyway to the rear, pushing the arbor toward the front of the transmission.

(4) With the keyway aligned with the recess in the case, drive the shaft forward, inserting the key before the keyway is obscured. Continue driving the shaft forward until the key seats in the recess.

Gearshift Mechanism (Fig. 8)

(1) Install two new lever shaft seals in the transmission case, using seal driver Tool C-3650.

(2) Install the 2nd and 3rd speed lever shaft in the bore provided in the transmission case.

(3) Install the 2nd and 3rd speed lever shaft lock pin in the hole in the case boss (after coating with a suitable sealer) starting the pin at the top of the hole and driving it downward. While the lever shaft lock pins must be driven in firmly to prevent leakage or loss of the pin, some caution must be exercised to avoid driving the pin in too tightly, causing distortion or mushrooming of the pin. This could result in much difficulty if it is necessary to remove the pin at a later date.

(4) Place the interlock parts in position in the case in the following order: ball, sleeve, spring, pin and ball.

(5) While using the detent ball installer Tool C-3765, as shown in Figure 9, to depress the detent ball against the spring tension, push the low and reverse lever shaft firmly into position so it engages the detent ball.

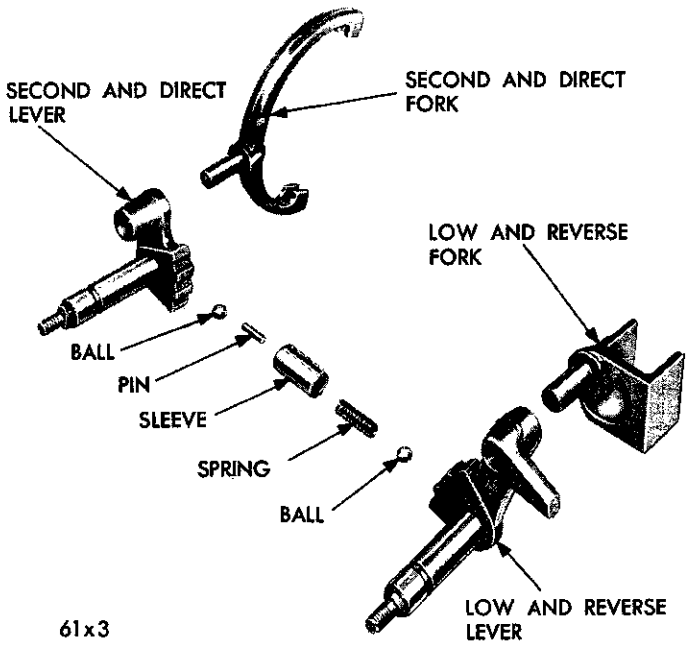


Fig. 8—Gearshift Forks and Shafts

(6) Remove the detent ball installing tool.

(7) Install the low and reverse lever shaft lock pin in the case, driving it down firmly from the top using the caution as stated above.

(8) Place the low and reverse fork in the lever shaft, with the offset toward the rear of transmission (Fig. 8).

Mainshaft

(1) While holding the low and reverse sliding gear in position in the fork, with the hub extension to the rear, insert the mainshaft with the rear bearing through the rear of the case and into the sliding gear.

(2) Place the synchronizer stop ring spring, and then the rear stop ring on the synchronizer splines of the 2nd speed gear. Install the 2nd speed gear on the mainshaft.

In cases where the synchronizer "float" measurement was above .090 inch, synchronizer shims, Part No. 2464724 should be installed to reduce the "float" to .090 inch or less. Install the shim on the shoulder of the second speed gear before the spreader spring is installed, as shown in Figure 10.

If the synchronizer "float" is below .050 inch, material should be removed from the ends of all six synchronizer pins an equal amount until the synchronizer "float" is above the .050 inch dimension.

(3) Install the synchronizer clutch gear on the mainshaft with the shoulder to the front.

(4) Install the synchronizer clutch gear snap ring in the mainshaft. Make certain the snap ring is bottomed all the way around in the groove.

(5) Measure the clearance between the clutch gear and the 2nd speed gear. The clearance should be .004 to .014 inch. End play in excess of .014 inch may cause the 2nd speed gear to "jump out" of gear.

(6) Hold the synchronizer clutch gear sleeve and

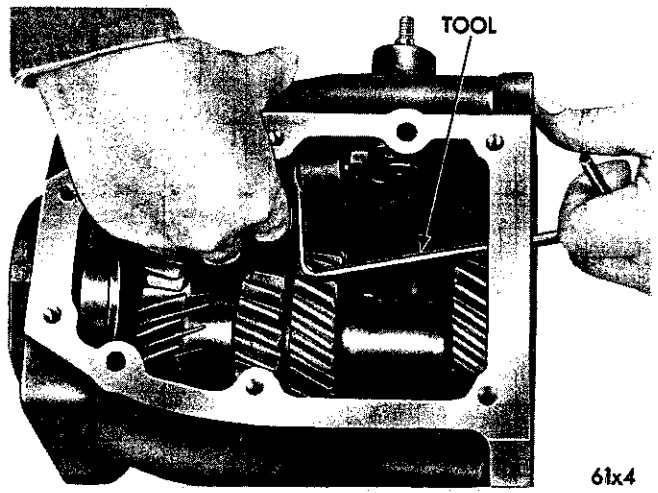


Fig. 9—Installing Detent Balls

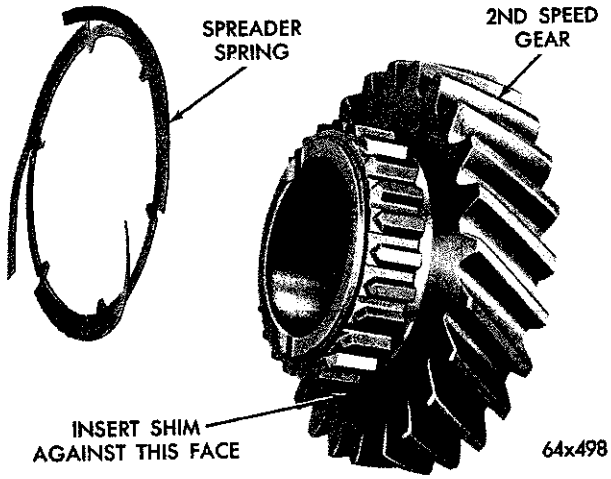


Fig. 10—Sychronizer "Float" Shim Location

two outer rings together with pins properly entered in the holes in the clutch gear sleeve and with the clutch gear sleeve engaged in the groove of the 2nd and 3rd speed shift fork, position the fork in the 2nd and 3rd speed lever shaft.

(7) While holding the synchronizer parts and fork in position, slide the mainshaft forward, entering the synchronizer clutch gear into the clutch gear sleeve and at the same time entering the mainshaft rear bearing in the case bore.

NOTE: If the synchronizer parts are not positioned as described in steps 6 and 7, it will not be possible to place them in position after mainshaft is fully in position, due to interference with countershaft drive gear.

(8) While continuing to hold the synchronizer parts in position, tap the mainshaft forward until the rear bearing bottoms in the case bore.

(9) Install the mainshaft rear bearing snap ring into place in the groove in the case bore.

Drive Pinion

(1) Install the new seal in the retainer using Tool C-3789 until it bottoms on the seat of the counterbore. Synchronizer front inner ring must be positioned as outlined in steps 2 and 3 while installing the drive pinion, since it will not clear the countershaft drive gear teeth when attempting to install the drive pinion with the inner ring installed on the drive pinion splines.

(2) Place the synchronizer front inner ring in position in the front outer ring, and enter the main drive pinion through the case bore.

(3) Engage the splines on the rear of the pinion with the inner stop ring, and tap the drive pinion into the transmission case until the outer snap ring on the pinion bearing is against the transmission case.

(4) Place the drive pinion bearing retainer, without a gasket, over the pinion shaft, and against the transmission case. While holding the retainer with hand pressure against the transmission case, measure the clearance between the retainer and case, using a feeler gauge.

(5) Select a gasket .003 to .005 inch thicker than the clearance found. This eliminates end play of the front bearing in the transmission case and also eliminates the distortion of the bearing outer race due to excess pressure.

(6) Install and tighten the front bearing retainer attaching bolts to 360 inch-pounds torque.

Extension Housing

(1) Install a new seal in the extension housing, using Tool C-3837.

(2) Install the extension housing. Tighten the mounting bolts and nuts to 50 foot-pounds torque.

(3) Install the mainshaft flange. Install the washer and nut and tighten to 175 foot-pounds torque, using the flange holding Tool C-3281.

(4) Install the drain plug in the transmission case.

(5) Install the gearshift operating levers with a flat washer and lockwasher under each nut, and tighten to 144 inch-pounds torque.

(6) Install the plug with gasket, or back-up light switch (if so equipped), tightening securely.

(7) Install the speedometer cable and drive gear pinion.

4. INSTALLATION OF THE TRANSMISSION (In the Vehicle)

A measurement of the clutch housing bore and the face alignment should be made before installation. Refer to "Clutch" Group 6 for procedure. An old transmission drive pinion shaft may be used to measure the clutch disc alignment.

Place a small amount of short fibre wheel bearing lubricant around the inner end of the drive pinion shaft pilot bushing. A sufficient amount will be left at this location after pressing the excess out of the crankshaft cavity. Do not lubricate the bushing or the end of the transmission pinion shaft, the clutch disc splines or clutch release levers.

(1) Remove the transmission from the repair stand and install the rear crossmember and support, then roll transmission under the vehicle using a suitable jack.

(2) Raise the transmission until the main drive pinion is centered in the clutch housing bore.

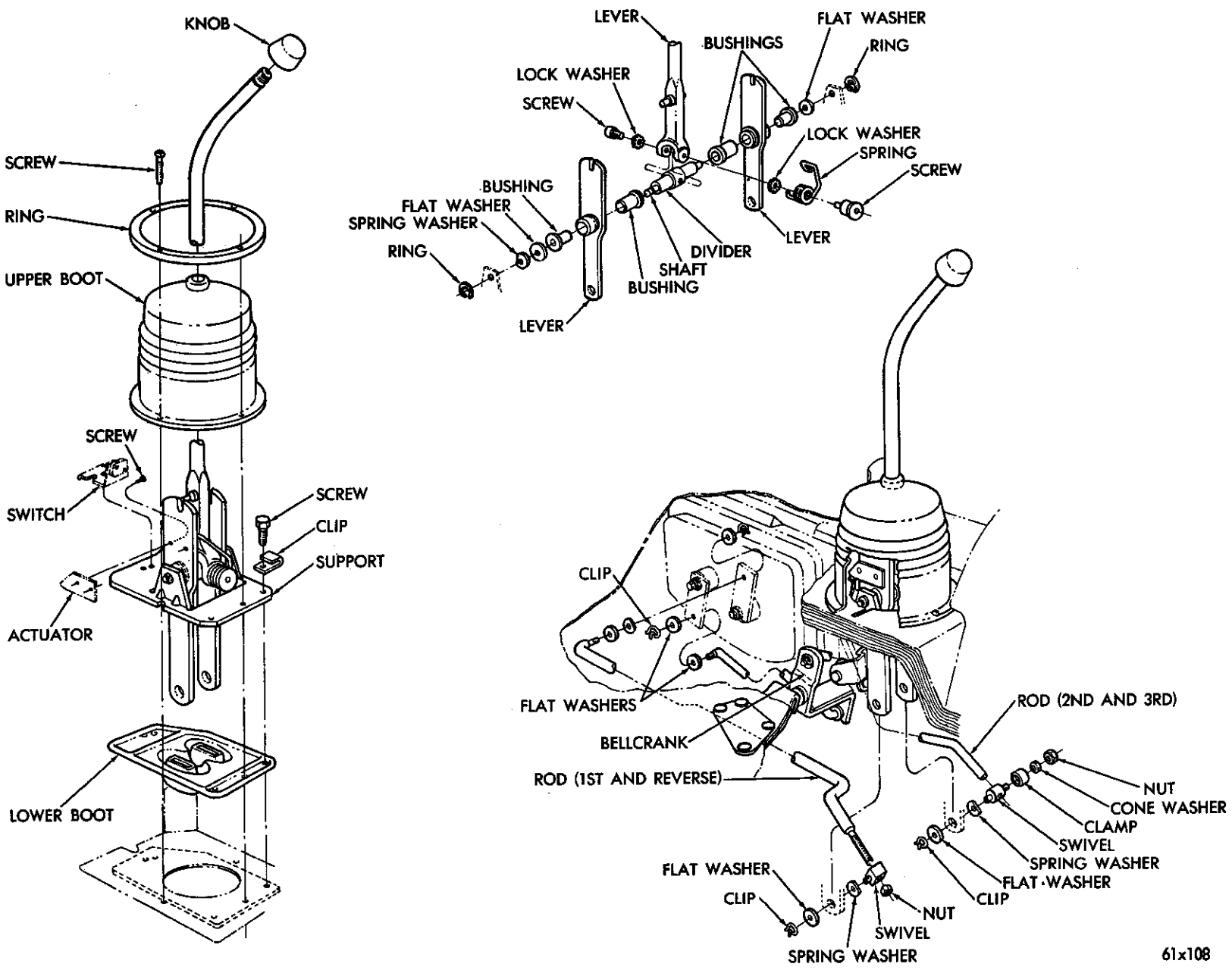


Fig. 11—Gearshift Assembly (Disassembled View)

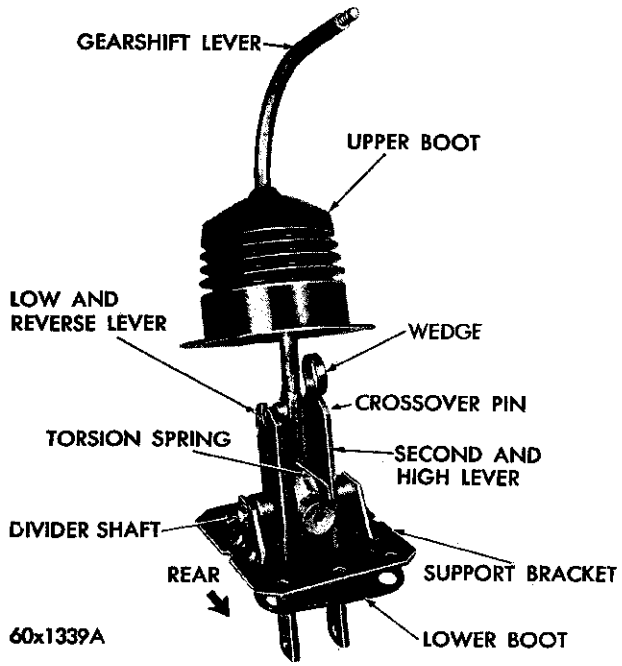


Fig. 12—Positioning the Crossover Pin

(3) Move the transmission slowly forward until the pinion shaft enters the clutch disc. Turn the pinion shaft until the splines are aligned, then push the transmission forward until seated against the clutch housing.

NOTE: Do not allow the transmission to "hang" after the pinion has entered the clutch disc.

(4) Install the transmission attaching bolts and tighten to 50 foot-pounds torque.

(5) Using a pointed drift, align the crossmember bolt holes and install the attaching bolts. Tighten to 50 foot-pounds torque.

(6) Remove the engine support fixture and disengage the hooks from the holes in the frame side rails.

(7) Install the back up light switch wires (if so equipped).

(8) Reconnect the speedometer cable, the gearshift control rods, and the propeller shaft.

(9) Fill the transmission with 5 pints of lubricant.

(10) Road test the vehicle, making sure the transmission shifts smoothly and operates quietly.

(11) If the shaft linkage requires adjustment, refer to the procedure outlined in Paragraph "Gearshift Linkage Adjustments."

5. GEARSHIFT ASSEMBLY

Removal

(1) Disconnect the first and reverse, second and third shift rods from the shift levers. (Note position of the wave washers.)

(2) Remove the screws that attach the upper boot retainer to the floor pan. Remove the retainer, and slide the boot up on the hand lever to expose the gearshift mounting bolts.

(3) Remove the bolts that attach the gearshift assembly to the floor pan.

(4) Remove the gearshift assembly (and lower boot) from the vehicle. Slide the lower boot off the shift levers.

(5) Using a ¼-inch Allen wrench, remove the torsion spring retaining screw. Slide the star washer out from under the spring.

(6) Using a screwdriver, pry the lower end of the spring out of its hole in the divider shaft, then disengage the upper loop of the spring from the shift lever.

(7) Again using an Allen wrench, remove the remaining screw and star washer that holds the shifter fork to the divider. Slide the gearshift lever fork from the divider shaft and the shift levers.

(8) Remove the lock ring from each end of the divider shaft, and push the divider shaft out of the gearshift support.

(9) Pull the levers, dividers and bushing assembly from the gearshift support.

NOTE: The flat washers between the outer bushings and gearshift support will drop out at this time.

(10) Separate the levers from the divider and remove the nylon bushings.

Inspect all the parts for wear or damage and install new parts if required. At reassembly, apply Lubriplate on the cross over pin and all moving parts that pivot.

Assembly (Fig. 11)

(1) Slide each lever on the divider with the narrow shoulder (and nylon bushing bearing surface) down against the shoulder.

(2) Slide the outer bushings into position against the outer shoulders, then place the lever assembly in position in the gearshift support bracket.

(3) Slide the spacer washers (spring washer on 1st reverse side) between the support bracket and the nylon bushing shoulders, then align the divider.

(4) Slide the divider shaft into the support through the shaft lever assembly and out of the support of the other side, far enough to install the retaining lock rings. Install the retaining rings.

(5) Position the shift fork screw holes (in the divider, parallel with the center line of the divider

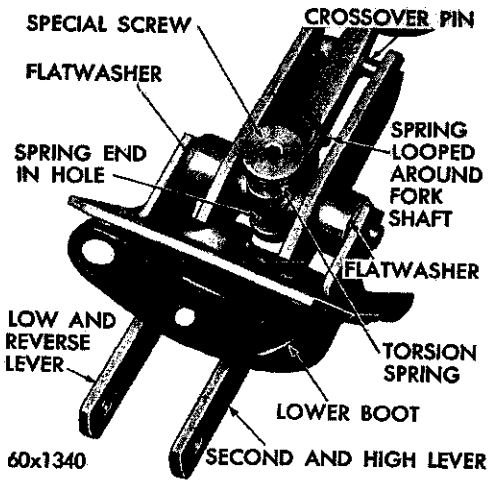


Fig. 13—Lever Torsion Spring (Installed)

shaft). Slide the gearshift fork and shaft down into position on the divider shaft with the gearshift knob facing to the rear and the three holes in the support plate (Fig. 12).

(6) Install the shift fork retaining screw and lockwasher (front). Do not tighten at this time.

(7) Engage the loop of the torsion spring with the gearshift fork shaft, and slide the other end into the hole at the bottom of the divider, as shown in Figure 13.

(8) Install the spring retaining screw and lockwasher, tighten both screws securely.

(9) Slide the lower boot up over the shift levers, being sure the screw holes are aligned.

(10) Slide the tool wedge between the second and high lever and the gearshift fork, as described in Paragraph "Gearshift Linkage Adjustments," then install gearshift assembly in the vehicle.

(11) Install the attaching bolts and tighten to 150 inch-pounds torque.

(12) Adjust the linkage as outlined in Paragraph 6. After readjustment has been made, reinstall boot and retainer and secure with screws.

6. GEARSHIFT LINKAGE ADJUSTMENTS

(1) Remove the screws that hold the upper boot and retaining ring to the floor pan.

(2) Remove the retaining ring and slide the boot up on the gearshift lever far enough to expose the shift mechanism.

(3) Disconnect the first and reverse shift rod by removing the spring clip, flat washer and the wavewasher. Disengage rod from lever.

(4) Disconnect the second and high shift rod by removing the spring clip, flatwasher and the wavewasher. Disengage the rod from the lever.

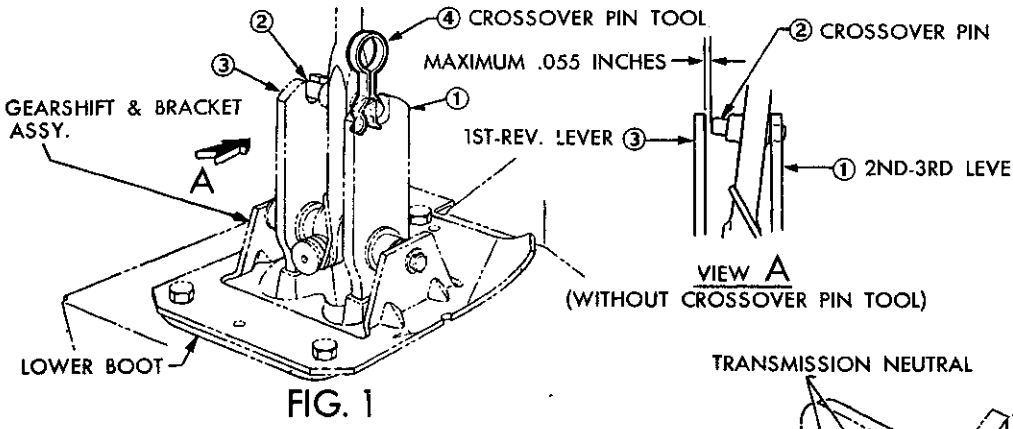


FIG. 1

1. WITH CROSSOVER PIN ENGAGED IN THE 2ND-3RD LEVER, THE GAP FROM CROSSOVER PIN TO 1ST-REV. LEVER SHOULD NOT EXCEED .055 INCHES. (SEE VIEW A.)
2. WITH BOTH GEARSHIFT & BRACKET ASSEMBLY AND LOWER BOOT INSTALLED, CLIP THE CROSSOVER PIN TOOL OVER 2ND-3RD END OF CROSSOVER PIN SO THAT PIN ENGAGES BOTH LEVERS. (SEE FIG. 1.)
3. PRESET THE LENGTH OF THE 1ST-REV. SHIFT ROD, BY ADJUSTING THE SWIVEL, AND INSTALL IT SO THAT THE TRANSMISSION WILL BE IN NEUTRAL AND THE SHIFT LEVERS VERTICAL. (SEE FIG. 2.)
4. INSTALL 2ND-3RD FRONT SHIFT ROD, BELLCRANK, AND 2ND-3RD REAR SHIFT ROD, IN THAT ORDER, AS SHOWN IN FIG. 2. WITH TRANSMISSION IN NEUTRAL, TIGHTEN SWIVEL NUT TO 20 LBS. PER INCH TORQUE.
5. REMOVE CROSSOVER PIN TOOL.

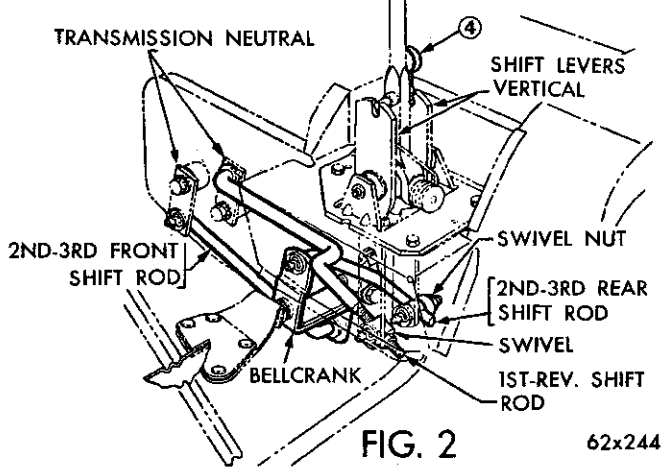


FIG. 2 62x244

Fig. 14—Gearshift Linkage Adjustment

(5) Place the transmission shift levers in the neutral position and refer to Figure 14 for the linkage adjustment.

7. TRANSMISSION REAR OIL SEAL

Removal and Assembly

(1) Disconnect the propeller shaft at the transmission flange. Secure the shaft.

(2) Use wrench, Tool C-3281, to hold the mainshaft, while removing the mainshaft flange nut. Remove the mainshaft nut and washer.

(3) Install puller, Tool C-452, on the mainshaft and the flange. Pull the flange from the mainshaft.

CAUTION: Never use a hammer to drive the flange from the mainshaft as the splines may be damaged.

(4) Drive the seal from the extension using a suitable chisel.

NOTE: Do not use puller Tool C-748. The mainshaft must not be forced forward.

(5) When installing a new oil seal, be sure to use special drift, Tool C-3105, which automatically locates the seal in its proper position.

(7) Reinstall the flange.

(8) Install washer (convex side towards nut). Tighten nut to 175 foot-pounds torque.

(9) Reconnect the propeller shaft and tighten stud nuts to 30 foot-pounds torque.

SPEEDOMETER PINION USAGE CHART
(3 Speed-Heavy Duty Manual Transmission)

Tire Size	Axle Ratio	Output Shaft Teeth	Pinion Teeth	Pinion Color
8.00x14	3.23:1	8	19	Red
8.50x14	3.23:1	8	19	Red

1B - 4 FORWARD SPEED MANUAL TRANSMISSION

SPECIFICATIONS

Transmission Make	Chrysler
Model Application	VC-1, VC-2
Engine Displacement (Cu. In.)	361, 383, 413
Gear Ratio	
First	2.66
Second	1.91
Third	1.39
Fourth	1.00
Reverse	2.58
Rear Axle Ratios	
Standard	3.23
*Optional	3.23
Sure-Grip	3.23
Lubricant	
Capacity (pints)	7½
Type	Automatic Transmission Fluid Type "A", Suffix "A"
Gear Type	
All Gears (except reverse)	Helical
Tolerances	
Clutch Housing Face Runout	.006"
Clutch Housing Bore Runout	.008"
Countershaft Gear (cluster) End Play	.0045 to .028"

*Gear Sets available through MoPar 2.93, 3.55, 3.91, 4.1, 4.3, 4.56, 4.89.

SPECIAL TOOLS

C-452 . . . . . Flange Holder
C-748 . . . . . Oil Seal Remover
C-3487 . . . . . Fixture, Engine Support
C-3789 . . . . . Seal Installer
C-3837 . . . . . Oil Seal Installer
C-3938 . . . . . Countershaft Arbor
C-3951 . . . . . Lever Aligning Tool

TORQUE REFERENCE

	Foot-Pounds	Inch-Pounds
Extension Housing to Case Bolts	55-45	—
Main Drive Pinion Bearing Retainer Bolts	15-20	—
Transmission to Clutch Housing Bolts	50	—
Crossmember Attaching Bolts	50	—
Shift Mechanism Pivot Bolt	55	—
Shift Lever Bolts	30	—
Companion Flange Nut	175	—
Gearshift Housing Bolts	—	144
Gearshift Operating Lever Nuts	—	216
Transmission Drain Plug	—	300

1B - 4 FORWARD SPEED MANUAL TRANSMISSION

The four forward speed synchromesh transmission shown in Figure 1, consists of a series of helical gears designed for high torque capacity and with teeth so proportioned as to operate at high speeds without excessive friction loss or heat generation. The shafts, bearings, synchronizers and other precision parts are held to close tolerances to provide durability during extended heavy operation.

The main drive pinion is supported by a heavy duty ball bearing at the rear, and an Oilite bushing pressed into the end of the crankshaft. The main shaft front end is piloted in 16 needle type roller bearings, located in a cavity in the end of the main drive pinion (Fig. 2) and is supported by a heavy duty ball bearing in the center of the case. The rear end of the mainshaft is supported by a ball bearing pressed on the end of the mainshaft and a snug fit in the end of the extension housing, as shown in Figure 2.

The countershaft gear (cluster) is supported by a double row of needle type roller bearings (38) at each end and the thrust is taken on thrustwashers between the ends of the gear and the transmission case. The alignment of the needle type roller bearings within the gear are maintained by 4 thrust washers (one being used between the rows of roller bearings and one at each end. Fig. 2).

The reverse idler gear is supported on a bronze bushing, pressed into the gear.

The gearshifting is manually operated through shift control rods to the transmission (Fig. 1). Any forward gear may be engaged while the vehicle is in motion through the use of synchronizing clutches (Fig. 2).

The transmission may be used as an aid to deceleration by downshifting in sequence without double clutching or gear clashing, due to the fact that all forward speeds are synchronized. **(The reverse speed gear is not synchronized).**

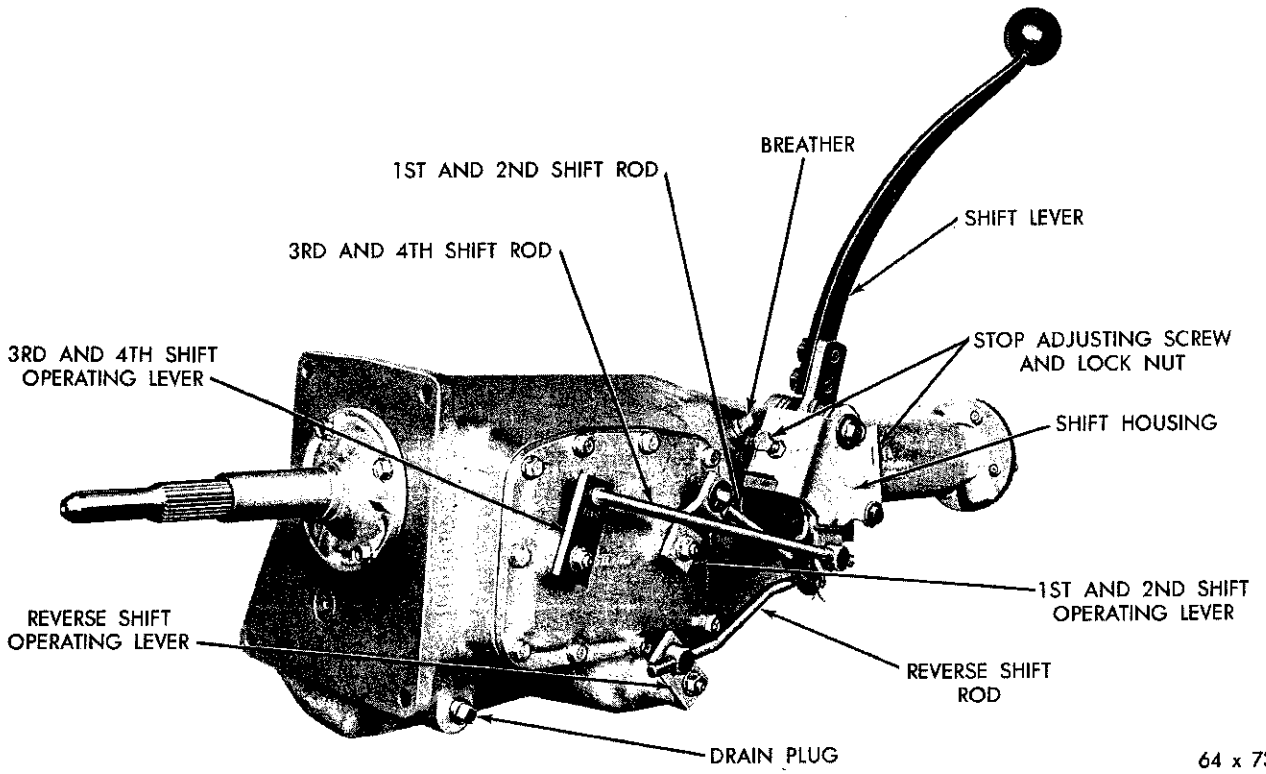


Fig. 1—Four Forward Speed Transmission Assembly

SERVICE PROCEDURES

1. ADJUSTING THE SHIFT LINKAGE

(1) Remove the shift boot attaching screws and slide the boot up on the shift lever (Fig. 3). Check to be sure the pivot bolt is tightened securely (55 foot-pounds). Check to be sure shift lever bolts are tightened securely (30 foot-pounds).

(2) Disconnect all the shift rods from the levers at the adjusting swivels by removing the spring clip retainers and flat washers.

(3) Slide Tool C-3951 over the levers, inserting center pin through the first two levers. Tighten set screw securely. (This aligns the 3 levers in the gear shift control assembly, and holds them in the neutral position, as shown in Figure 3.)

(4) Adjust the length of the three shift rods, by

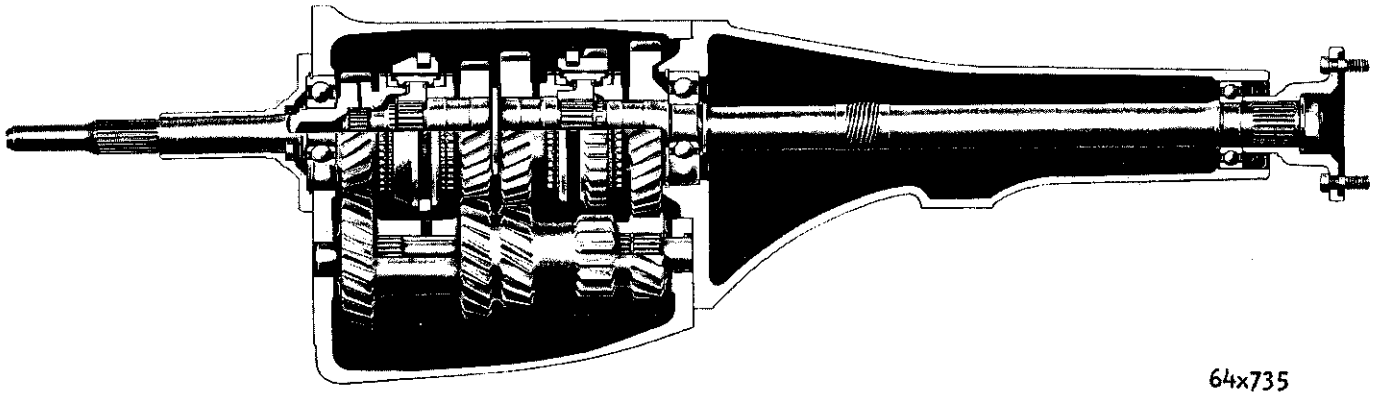


Fig. 2—Four Forward Speed Transmission (Sectional View)

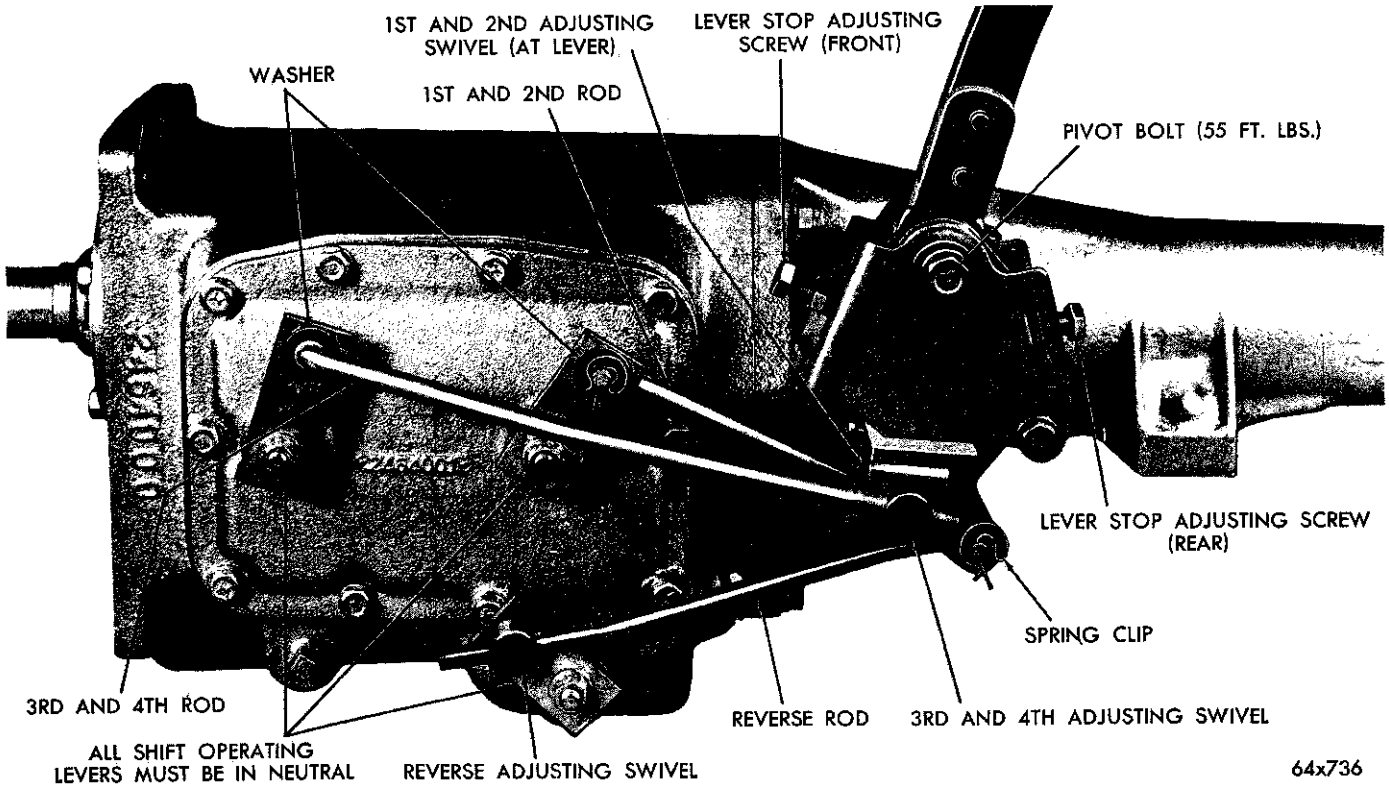


Fig. 3—Gearshift Linkage Adjustments

turning the swivels either **in** or **out** until the swivel stub shafts match the control rod lever holes (Transmission shift operating levers must be in the neutral detent position during this Adjustment.) Install the swivel stub shafts and secure the flat washers and spring clip retainers.

(5) Remove the lever aligning tool.

(6) With the transmission hand shift lever in the third or fourth speed detent position, adjust the lever stop screw (front and rear) to provide from .020 to .040 inch clearance between the lever and the stops. When this adjustment has been made, tighten the adjusting screw locknuts securely.

(7) Inspect the linkage for ease of shifting into all gears and for smoothness of crossover and handshift lever clearances.

CAUTION: Because there is no reverse gear interlock, it is very important that the transmission linkage adjustments are correctly performed in order to prevent the possibility of engagement into two gears at the same time.

(8) Slide the boot down the shift lever shaft to the floor pan and secure with attaching screws.

2. TRANSMISSION

Removal from the Vehicle

(1) Remove the shift lever boot attaching screws and slide the boot up on the shift lever. Remove the lever attaching bolts and remove the shift lever and boot from the stub lever of the shift housing.

(2) Drain the lubricant from the transmission.

(3) Disconnect the propeller shaft, speedometer cable, and pinion. **When removing the speedometer cable, care should be used, so as not to crush the housing. Remove by hand.**

(4) Disconnect the left hand exhaust pipe (dual exhaust) from the exhaust manifold.

(5) Disconnect the parking brake control cable.

(6) Disconnect the back-up light switch leads at the connector. (If so equipped.)

(7) Install the engine support fixture C-3487 (or a suitable jack) engaging the hooks in the holes in the frame side members. Be sure the support ends are up against the underside of the oil pan flange.

(8) Adjust the fixture (or jack) to support the weight of the engine, then raise the engine slightly and remove the rear crossmember attaching bolts. Remove the crossmember.

(9) Support the transmission, then remove the transmission attaching bolts.

(10) Rotate the transmission until the shift housing and stub lever clear, then slide the transmission toward the rear until the main drive pinion shaft clears the clutch disc, before lowering the transmis-

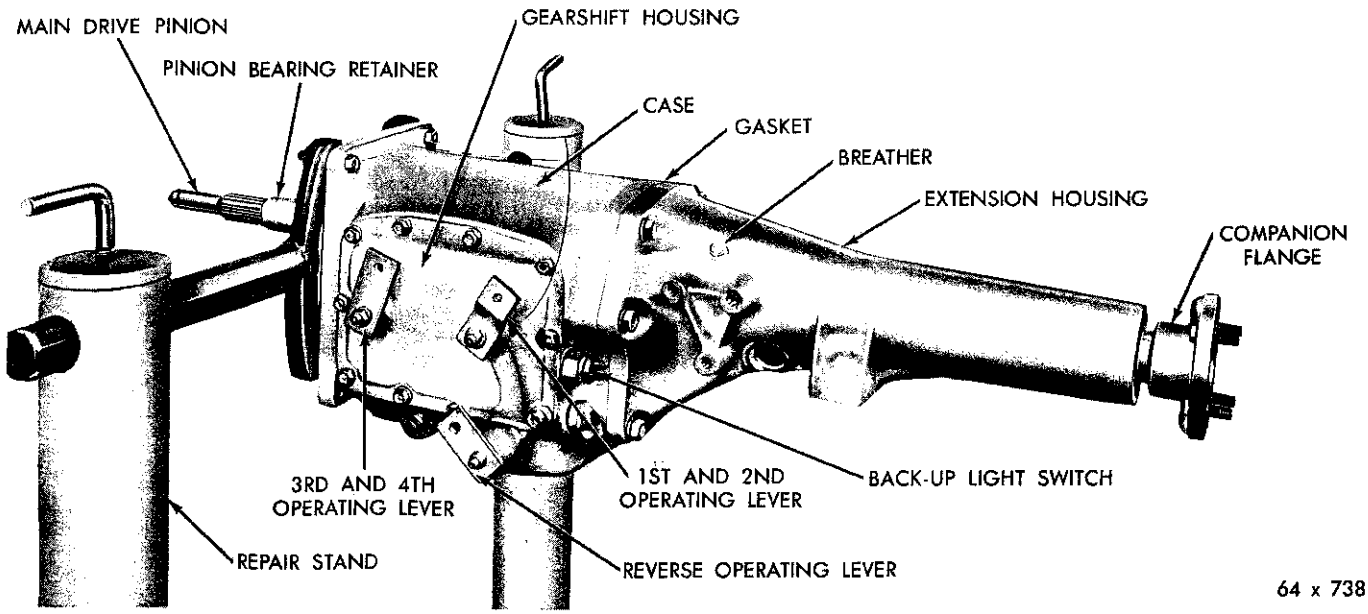


Fig. 4—Four Forward Speed Transmission in Repair Stand

sion. (This will avoid damaging the clutch disc.)

(11) Lower the transmission and remove from under the vehicle. Clean the outside of the case before disassembling.

3. DISASSEMBLING THE TRANSMISSION

To disassemble the transmission for repair or overhaul, refer to Figures 1, 3, 4, 5 and 6.

(1) Mount the transmission in repair stand DD-1014, then disconnect the gearshift control rods from the shift control levers and the transmission operating levers, by removing the spring retainer clips and the flatwashers.

(2) Remove the two gearshift control housing mounting bolts, then remove the gearshift control housing from the transmission extension housing or mounting bracket (if so equipped). Remove the gearshift control housing mounting bracket bolts and remove bracket. (If so equipped.)

(3) Remove the back-up light switch. (If so equipped.)

(4) Using a suitable holding tool, remove the companion flange attaching nut and washer, then slide the flange from the end of the mainshaft (output).

(5) Remove the bolts that attach the gearshift housing to the transmission case. With all the levers in the neutral detent position, pull the housing out and away from the case. (The first and second, third and fourth shift fork may remain in engagement with the synchronizer sleeves.) Work the forks out of the sleeves and remove from the case. Discard the housing gasket.

The following three steps need only be done, if oil leakage is visible around the gearshift lever shafts.

(6) Remove the nuts, lockwashers and flatwashers that attach the first and second, third and 4th speed shift operating levers to the shafts. Disengage the shift levers from the flats on the shafts and remove.

(7) Carefully push the gearshift lever shafts out of the housing, allowing the detent balls to fall free. Remove the seals and discard.

(8) Slide the gearshift interlock sleeve, interlock pin and spring out of the housing (Fig. 5).

(9) Remove the main drive pinion bearing retainer attaching bolts, then slide the retainer and gasket from the main drive pinion shaft. Remove the pinion oil seal.

(10) Remove the bolts that attach the extension housing to the transmission case.

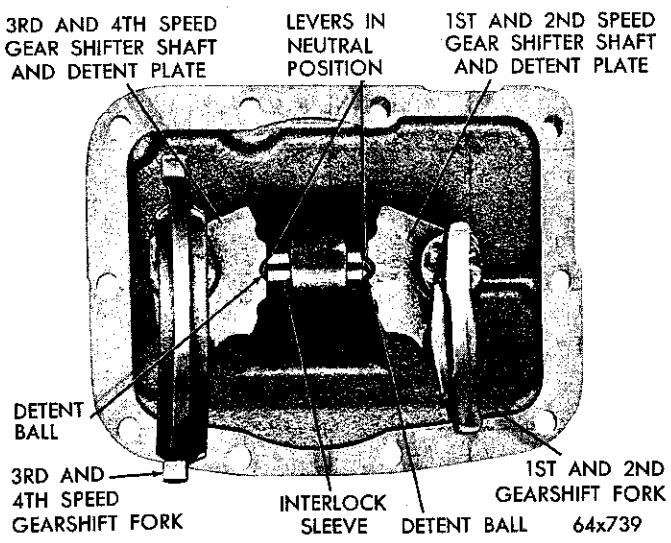


Fig. 5—Transmission Shift Housing Assembly

1. Bearing Retainer
2. Bearing Retainer Gasket
3. Bearing Retainer Oil Seal
4. Snap Ring, Bearing (Inner)
5. Snap Ring, Bearing (Outer)
6. Pinion Bearing
7. Transmission Case
8. Filler Plug
9. Gear, 2nd Speed
10. Stop Ring
11. Shift Plate Springs
12. Clutch Gear
13. Shift Plates (3)
14. Shift Plate Spring
15. Snap Ring
16. 1st and 2nd Clutch Sleeve Gearing
17. Stop Ring
18. 1st Speed Gear
19. Bearing Retaining Ring
20. Center Bearing
21. Snap Ring
22. Gasket, Case to Extension Housing
23. Lockwasher
24. Bolt
25. Extension Housing
26. Mainshaft Rear Bearing
27. Rear Bearing Oil Seal
28. Companion Flange
29. Washer
30. Nut
31. Main Drive Pinion
32. Oil Slinger
33. Needle Bearing Rollers
34. Snap Ring
35. Stop Ring
36. Snap Ring
37. Shift Plate Spring
38. Clutch Gear
39. Shift Plate Spring
40. Clutch Sleeve
41. Stop Ring
42. 3rd Speed Gear
43. Speedometer Drive Pinion
44. Speedometer Drive Clip
45. Speedometer Drive Pinion Seal
46. Mainshaft (Output)
47. Shift Plates (3)
48. Woodruff Key
49. Countershaft
50. Thrustwasher, Gear (1)
51. Thrustwasher, Needle Roller Bearing
52. Needle Bearing Rollers
53. Bearing Spacer
54. Countershaft Gear (Cluster)
55. Needle Bearing Rollers
56. Thrustwasher, Needle Roller Bearing (2)
57. Thrustwasher, Gear (1)
58. Backup Light Switch
59. Backup Light Switch Gasket
60. Plug
61. Retainer, Reverse Detent Ball Spring
62. Gasket
63. Spring, Reverse Detent Ball
64. Ball, Reverse Detent
65. Woodruff Key
66. Reverse Slider Gear Shaft
67. Bushing, Reverse Slider Gear
68. Gear, Reverse Slider
69. Fork, Reverse Shifter
70. Reverse Lever
71. Oil Seal, Reverse Lever Shaft
72. Reverse Operating Lever
73. Flatwasher
74. Lockwasher
75. Nut
76. Gearshift Control Housing
77. 1st and 2nd Operating Lever
78. Flatwasher
79. Lockwasher, Lever
80. Nut, Lever
81. Lockwasher, Lever
82. Flatwasher, Lever
83. 3rd and 4th Operating Lever
84. Detent Ball
85. Detent Ball Spring
86. Detent Ball Sleeve
87. Detent Ball Spring
88. Detent Ball
89. Oil Seal (2)
90. 3rd and 4th Lever
91. 1st and 2d Lever
92. 3rd and 4th Speed Fork
93. 1st and 2nd Speed Fork
94. Drain Plug
95. Gasket, Shift Control Housing

64x740

Fig. 6—Transmission Assembly (Diassembled View)

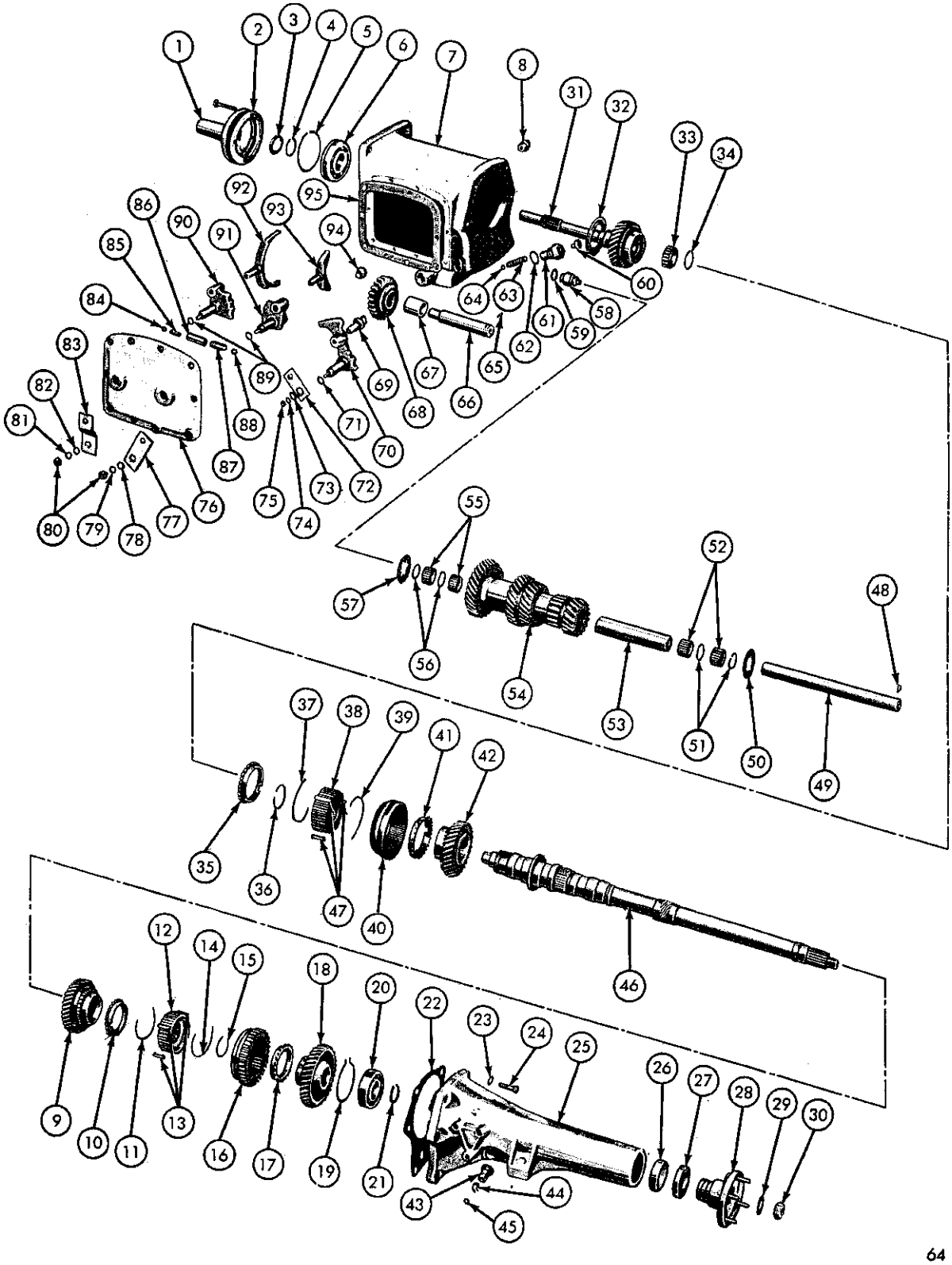


Fig. 6—Transmission Assembly (Disassembled View)

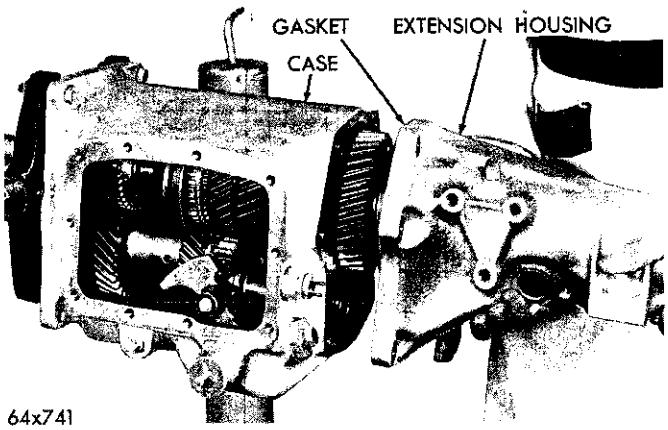


Fig. 7—Removing or Installing the Extension Housing and Mainshaft Assy.

(11) Slide the third and fourth synchronizer sleeve slightly forward, then using a soft hammer, tap on the extension housing (in a rearward direction). Slide the housing and mainshaft assembly out and away from the case, as shown in Figure 7.

(12) Refer to Figure 8 for location of the various gears, synchronizer sleeves and clutches before disassembling the mainshaft.

Disassembling the Mainshaft (Fig. 9)

(1) Using a pair of snap ring pliers, remove the snap ring that retains the 3rd and 4th synchronizer clutch gear and sleeve, slide 3rd and 4th synchronizer assembly off the end of the mainshaft.

(2) Slide the 3rd speed gear and stop ring off the mainshaft. (Do not separate the 3rd and 4th speed synchronizer clutch gear, sleeve, shift plates or springs unless inspection reveals a replacement part is required.)

(3) Using a suitable pair of long nose pliers, compress the snap ring that retains the mainshaft center

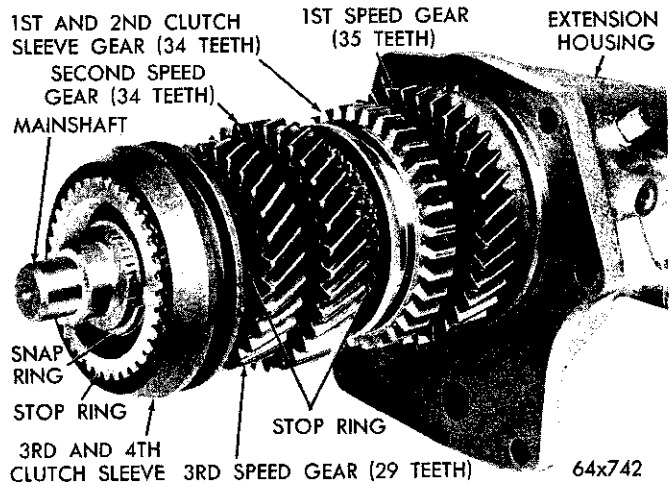


Fig. 8—Mainshaft Gear Identification

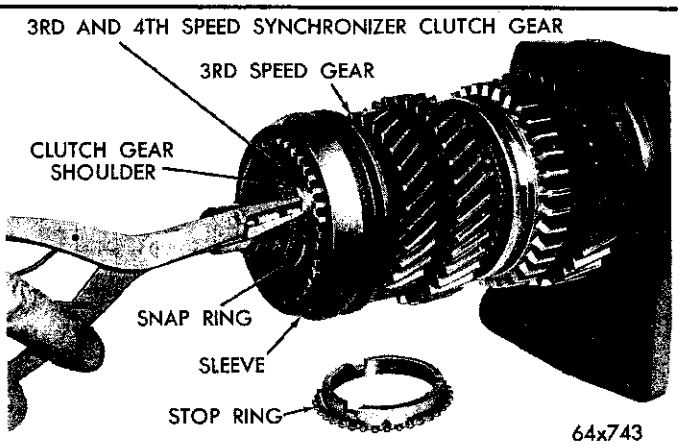


Fig. 9—Disassembling the Transmission Mainshaft

bearing in the extension houisng, as shown in Figure 10.

(4) Holding the snap ring compressed, pull the mainshaft assembly and bearing out of the extension housing, as shown in Figure 11. Remove the rear oil seal from the extension housing. Discard the seal.

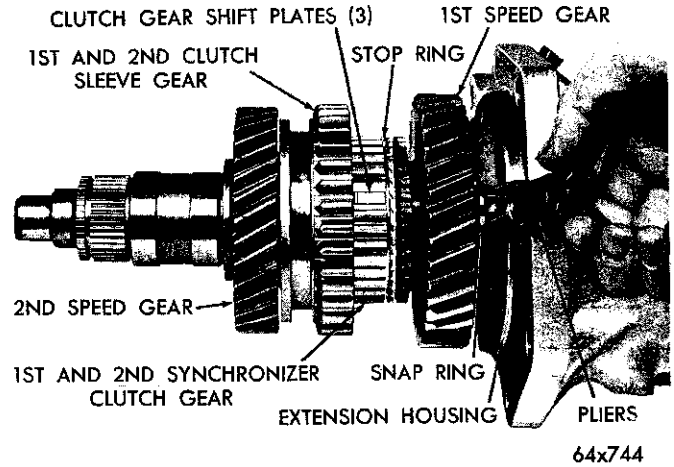


Fig. 10—Removing or Installing Center Bearing Snap Ring

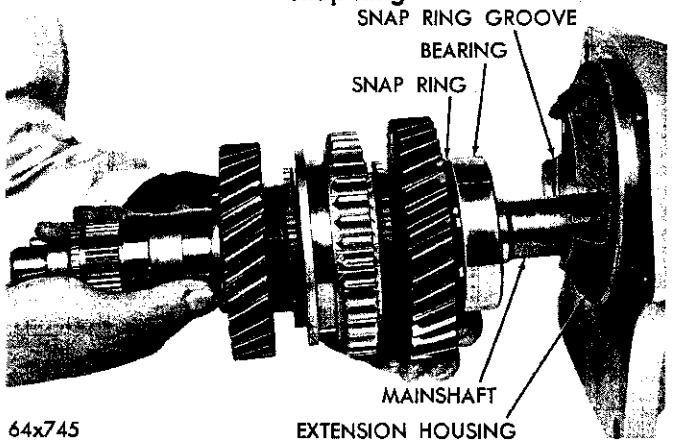


Fig. 11—Removing or Installing the Mainshaft

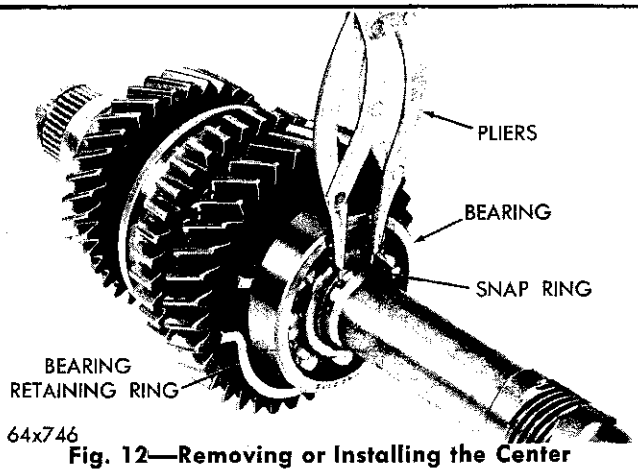


Fig. 12—Removing or Installing the Center Bearing Snap Ring

(5) Remove the rear bearing from the mainshaft by inserting steel plates on the front side of the 1st speed gear, then using an arbor or hammer, press or drive the rear bearing off the mainshaft. (Be careful not to damage the gear teeth.)

(6) Using snap ring pliers, remove the snap ring that retains the mainshaft bearing on the shaft, as shown in Figure 12. Remove the bearing, bearing retainer ring, 1st speed gear, and first speed stop ring.

(7) Again using snap ring pliers, remove the snap ring that retains the 1st and 2nd clutch sleeve gear and clutch to the mainshaft, as shown in Figure 13. Slide the 1st and 2nd clutch sleeve gear and clutch from the mainshaft. (Do not separate the clutch sleeve gear and the clutch, unless inspection reveals a replacement part is required.)

Figure 14 shows the various mainshaft bearing surfaces of the gears. Inspect these surfaces for signs of wear, scoring, or any condition that would not allow the shaft to be used at reassembly. (See Cleaning and Inspection.)

Figure 15 shows the reverse gear shift fork, the reverse sliding gear, the reverse sliding gear shaft and the cluster gear.

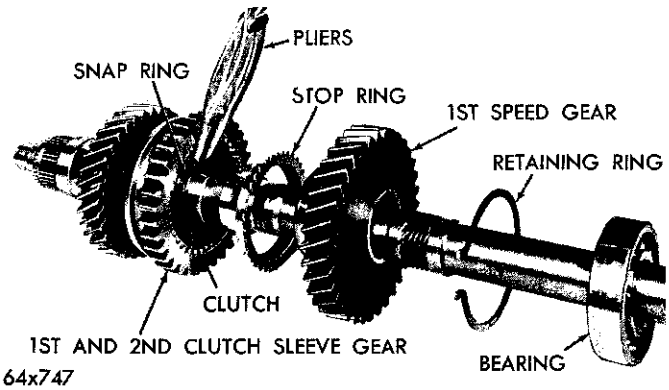


Fig. 13—Removing or Installing Clutch Gear Snap Ring

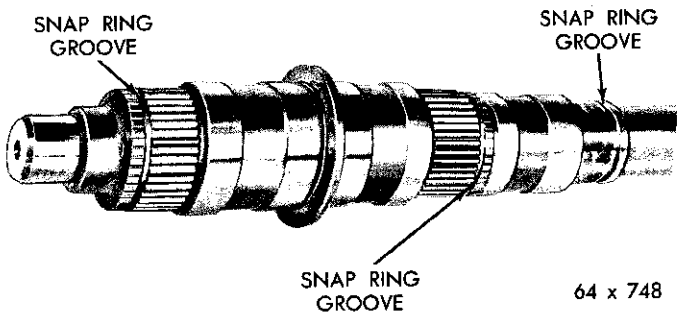


Fig. 14—Mainshaft Bearing Surfaces

(8) Using a shim stock feeler gauge, measure the end play of the countershaft gear, by inserting the gauge between the thrust washer and the gear, as shown in Figure 16. This measurement should not exceed .0045 to .028". If measurement is greater than that specified, new thrust washers must be installed at reassembly.

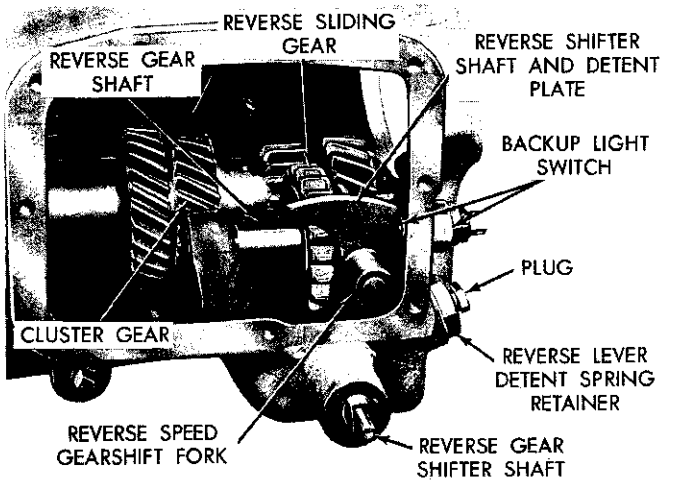


Fig. 15—Gear, Shaft and Lever Identification

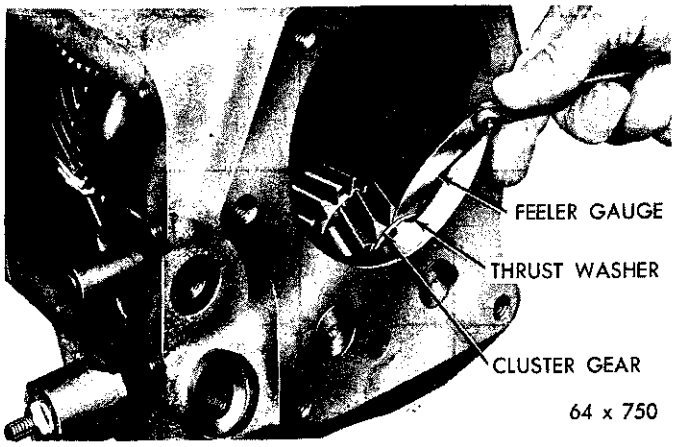


Fig. 16—Measuring the Cluster (Countershaft) Gear End Play

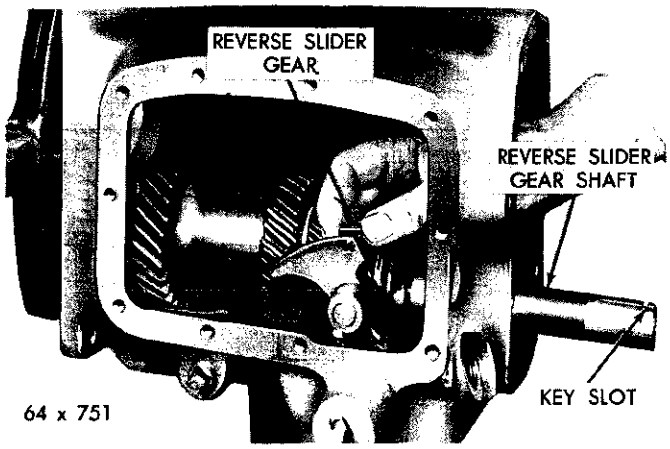


Fig. 17—Removing or Installing the Reverse Slider Gear

(9) Using a suitable drift, drive the reverse slider gear shaft (from front to rear) far enough out of the case to remove the reverse slider gear, as shown in Figure 17. Remove the woodruff key from the shaft. Remove the shaft from the case.

(10) Remove the reverse gearshift lever detent spring retainer, gasket, plug and detent ball spring from the rear of the case (Fig. 15).

The following step need only be done if oil leakage is visible around the reverse gearshift lever shaft.

(11) Carefully push the reverse gearshift lever shaft into the case, and remove from the case, as shown in Figure 18. Lift out the detent ball from the bottom of the case. Remove the shift fork from the shaft and detent plate.

(12) Using countershaft arbor C-3938, and a plastic hammer, drive the countershaft out of the case, allowing the countershaft gear to be lowered to the bottom of the case. (This will permit the removal of the main drive pinion.)

(13) Using a pair of snap ring pliers, remove the main drive pinion bearing outer snap ring, using a plastic hammer, drive the main drive pinion into the case and remove.

(14) Using snap ring pliers, remove the main drive pinion bearing inner snap ring. Using an arbor press, remove the bearing from the main drive pinion.

(15) Remove the countershaft gear (cluster) from the bottom of the case, as shown in Figure 19.

(16) Remove the arbor and the 76 needle type bearings, thrust washers and spacer, from the center of the countershaft gear.

Cleaning and Inspection
Transmission Case

Clean the transmission case thoroughly, using a suitable solvent, dry with compressed air. Inspect the case for cracks, stripped threads in the various bolt holes and the machined mating surfaces for burrs, nicks or any condition that would render the case unfit for further service. The front mating surface should be smooth; if any burrs are present, dress them off with a fine mill file. If threads are stripped, install Helicoil inserts.

Ball Bearings

Wash the ball bearing, using a clean solvent and blow dry with compressed air.

CAUTION: Do not spin the bearings with air pressure; turn slowly by hand. Spinning unlubricated bearings may cause damage to the races and the balls. Be sure the ball bearings are clean, then lubricate them with light grade engine oil. Inspect the bearings for roughness. This can best be determined by slowly turning the outer race by hand. Measure the fit of the bearings on their respective shafts.

Needle Type Bearing Rollers and Spacers

Inspect the main drive pinion and countershaft gear bearing rollers for flat spots or brinelling. Inspect the countershaft bearing roller spacers for signs of wear or galling. Install new parts as required.

Gears

Inspect the gear teeth on the synchronizer clutch gears and stop rings. If there is evidence of chipping or excessively worn teeth, install new parts at reassembly. Be sure the clutch sleeve slides easily on the clutch gear. Inspect the teeth on the second and third speed gears and the first speed gear for chipped or broken teeth, or showing signs of excessive wear. Small nicks or burrs must be stoned off.

Inspect the teeth on the main drive pinion. If excessively worn, broken or chipped, a new pinion

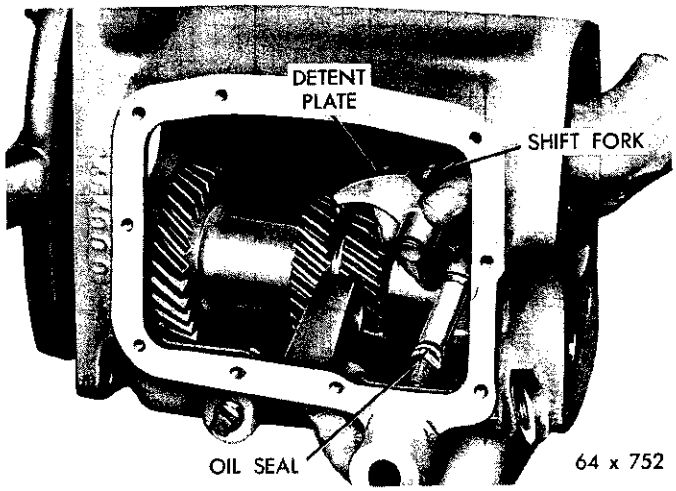


Fig. 18—Removing or Installing the Reverse Shift Fork and Lever

should be installed.

Test the interlock sleeve and pin for free movement in the bore of the shift housing. Examine the detent balls for signs of brinelling. If the lever detents show signs of excessive wear to the extent of not locking in gear, install a new part. Inspect the shift forks for wear on the shanks and pads.

Synchronizer Stop Rings

Inspect the stop rings for cracks at the corners of the shift plate indexing slots. If the rings are cracked or show signs of extreme wear on the threaded bore, install new rings at reassembly.

Mainshaft (Output)

Refer to Figure 14 and inspect the mainshaft gear and bearing mating surfaces. If the gear contact surfaces show signs of galling or excessively worn, a new mainshaft should be installed.

Inspect the snap ring grooves for burred edges. If rough or burred, remoge the condition using a fine file or crocus cloth. Inspect the synchronizer clutch gear teeth on the shaft for burrs.

4. ASSEMBLING THE TRANSMISSION

To reassemble the transmission, refer to Figures 1, 4 and 6.

Countershaft Gear (Cluster) (Fig. 6)

(1) Using heavy grease, coat the inside of the bore of the gear at each end, then install the roller bearing spacer; centered. Insert arbor Tool C-3938, into the gear and through the spacer. Center the arbor.

(2) Coat the needle type roller bearings with heavy grease, then at each end of the gear, install 19 rollers, followed by a spacer ring and 19 more roller bearings and 1 spacer ring. (Refer to Fig. 2.)

(3) Coat the thrustwasher with heavy grease and install them over the arbor with the tang side toward the case boss, as shown in Figure 20.

(4) Install the countershaft gear assembly into the case, as shown in Figure 19. Allow the gear assembly to rest on the bottom of the case. (Be sure the thrustwashers stay in position.)

Mainshaft

(1) Slide the second speed gear over the mainshaft (synchronizer cone toward the rear) and down into position against the shoulder on the shaft (See Figure 13).

(2) Slide the first and second clutch sleeve gear assembly including 2nd gear stop ring) over the mainshaft (with the shift fork slot toward the front) and down into position against the second speed gear. (Be sure the stop ring is indexed with the shift plates.) Install a new snap ring to secure. (Fig. 13).

(3) Slide the low gear stop ring over the shaft and down into position and index with the shift plates.

(4) Slide the first speed gear (synchronizer cone toward the clutch sleeve gear just installed) over the mainshaft and down into position against the clutch sleeve gear.

(5) Install the mainshaft bearing retaining ring, followed by the mainshaft center bearing. Using an arbor and a suitable tool, drive or press the bearing down into position. Install a new snap ring to secure (refer to Figure 12).

(6) Slide the rear bearing over the mainshaft and drive or press into position.

(7) Install the partially assembled mainshaft into the extension housing far enough to engage the retaining ring in the slot in the extension housing (See Figure 11). Compress the retaining ring and at the same time seat the mainshaft in the extension housing. (Refer to Figure 10.) (Be sure retaining ring is seated all around its slot.)

(8) Slide the third speed gear over the mainshaft (with the synchronizer cone toward the front) followed by the third gear stop ring.

(9) Install the third and fourth speed synchronizer clutch gear assembly (including sleeve, shift plates and springs) on the mainshaft (shift fork slot toward the rear) down against the third speed gear. Be sure and index the rear stop ring with the clutch gear shift plates (Refer to Figure 9).

(10) Install the retaining snap ring as shown in Figure 9, then, using heavy grease, position the front stop ring over the clutch gear, again indexing the ring slots with the shift plates. (Refer to Fig. 8.)

CAUTION: It is very important that the index-

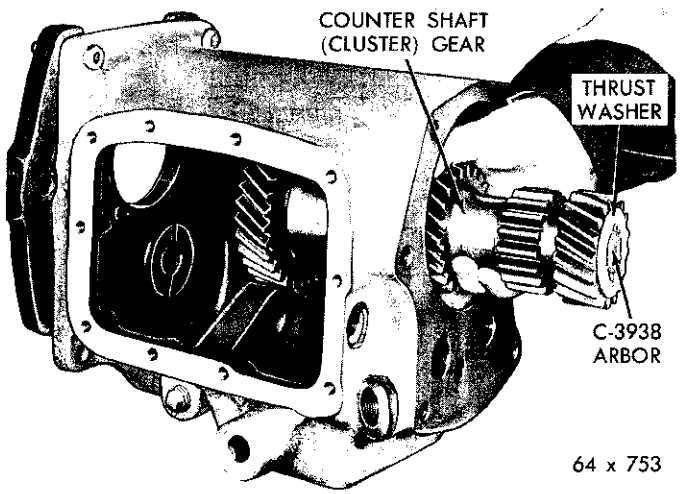


Fig. 19—Removing or Installing the Cluster Gear and Arbor

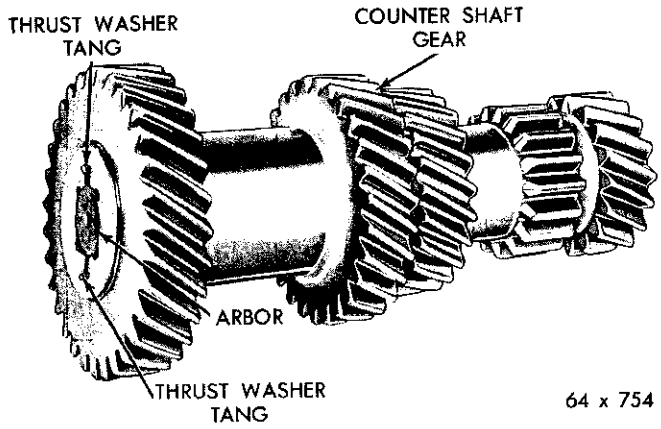


Fig. 20—Cluster Gear and Arbor Assembly

ing of all stop rings and the positioning of the gears and clutches on the mainshaft be correct, or the mating of the extension housing to the case will not be possible without damage.

Main Drive Pinion (Fig. 21)

(1) Slide the bearing oil slinger over the main drive pinion shaft, then press the main drive pinion bearing on the pinion shaft. (Be sure the outer snap ring groove is toward the front.) Seat the bearing fully against the shoulder on the gear.

(2) Install a new inner snap ring into the groove to retain the bearing. Be sure the snap ring is seated.

(3) Install the main drive pinion and bearing in the case and into position in the front bore. Tap lightly into place, using a plastic hammer. Install the outer snap ring in the bearing groove.

(4) Start the countershaft in its bore at the rear of the case. Raise the countershaft gear until the teeth mesh with the main drive pinion gear. (Be sure the thrust washers remain in position on the ends of the arbor and the tangs aligned with the slots in the case.)

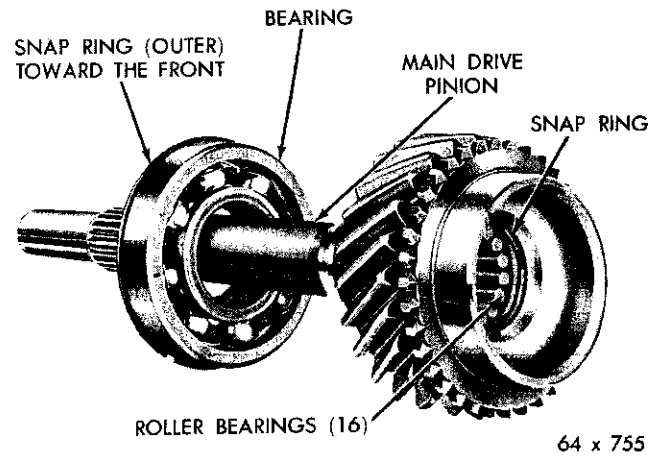


Fig. 21—Main Drive Pinion and Bearing Assembly

(5) Align the countershaft arbor with the bores in the case, then drive or press the countershaft into the gear. Install the woodruff key. Continue to press the shaft into the case until the end of the shaft is flush with the rear face of the case. Remove arbor Tool C-3938.

Testing the Countershaft Gear End Play

Using a shim stock feeler gauge, measure the end play of the countershaft by inserting the feeler gauge between the thrust washer and the gear (Fig. 16). This measurement should not exceed .0045 to .028 inch.

The following step need only be done if the reverse shaft was removed because of oil leak.

(1) Install a new oil seal on the reverse gearshift lever shaft and coat with Lubriplate. Carefully install the lever shaft into the bore in the case and position (Fig. 18). Install the reverse fork in the lever.

(2) Install the reverse shift detent ball and spring. Install the reverse detent ball spring retainer gasket and retainer. Tighten securely.

(3) Position the reverse slider gearshaft in position in the end of the case, and drive in far enough to position the reverse slider gear on the protruding end of the shaft with the shift slot toward the rear (Fig. 17). At the same time, engage the slot with the reverse shift fork.

(4) With the reverse slider gear correctly positioned, drive the reverse gear shift into the case far enough to be able to install the woodruff key. Drive the shaft into position, flush with the end of the case (Fig. 15).

(5) Install the back-up light switch and gasket (if so equipped), and tighten securely.

Installing the Extension Housing and Mainshaft Assembly

(1) Coat a new extension housing to case gasket with grease (both sides) then place in position on the case.

(2) Center the reverse slider gear on its shaft, then carefully insert the mainshaft assembly into the case (Fig. 7). Be sure the third and fourth speed stop ring is indexed with the shifter plates.

(3) Move the third and fourth speed clutch sleeve slightly toward the front and at the same time align the end of the mainshaft with the main drive pinion. Push in on the extension housing and bottom against the case and gasket.

(4) Install the attaching bolts and tighten securely.

(5) Move the reverse slider gear ahead to the neutral position.

Transmission Gearshift Housing

The following 4 steps need only be done if the gearshift housing was disassembled previously because of leaking seals.

(1) Slide the interlock sleeve into position in the housing. Coat a new seal with Lubriplate, then slide over a shift shaft and down into its groove.

(2) Install the gearshift lever shaft in position in the housing, then install the gearshift operating lever on the flats of the shaft (lever pointing upward, refer to Figure 1). Install a flat washer, lock washer and nut. Tighten securely.

(3 Place a detent ball in the sleeve, followed by the poppet spring and interlock pin. Start the remaining lever shaft into the housing, after installing the shaft seal as mentioned previously. Install the operating lever on the flats of the shaft (lever pointing upward) and secure with flatwasher, lockwasher and nut. Tighten the nut securely.

(4) Place the remaining detent ball on the poppet spring, then compress the ball and the spring, using a small screwdriver. Push the shafts in until seated. Turn the shafts until the balls drop into the neutral position detent. (See Fig. 5.)

(5) Place the transmission assembly on its side with the gearshift housing cover opening up. Install a shift fork in each synchronizer sleeve collar, and with both sleeves in the neutral position, install the shift housing and a new gasket. (Line up the shift fork ends with the shaft in the housing.)

(6) Install the attaching bolts and tighten evenly to avoid distortion of the housing (center bolt on each side are pilot bolts and should be installed first).

(7) Using Tool C-3789, install a new oil seal in the retainer bore. Install the main drive pinion bearing retainer and gasket. Install the attaching bolts and tighten from 30 to 35 foot-pounds torque.

(8) Install the gearshift control assembly and the shift rods (Fig. 3), in correct position and secure with washers and clips.

(9) Install the propeller shaft companion flange on end of mainshaft. Install washer and nut and tighten to 175 foot-pounds torque.

5. INSTALLING THE TRANSMISSION

Before installing the transmission, a test of the clutch housing bore and face alignment should be made. (Refer to the "Clutch" Group 6 for the service procedure.)

Place a small amount of short fibre wheel bearing lubricant around the inner end of the main drive pinion shaft pilot bushing in the flywheel and on the pinion bearing retainer release bearing sleeve area.

NOTE: Do not lubricate the end of the pinion shaft, the clutch disc splines or the clutch release levers.

(1) Remove the transmission from the repair stand and install the rear crossmember and support, then roll under the vehicle, using a suitable transmission jack.

(2) Raise the transmission until the main drive pinion is centered in the clutch housing bore.

(3) Roll the transmission slowly forward until the pinion shaft enters the clutch disc, then drop the jack. Turn the pinion shaft until the splines are aligned, then work the transmission forward until seated against the clutch housing.

NOTE: Do not allow the transmission to "hang" after the pinion shaft has entered the clutch disc.

(4) Install the transmission attaching bolts and tighten to 50 foot-pounds torque.

(5) Using a pointed drift, align the crossmember bolt holes and then install the attaching bolts. Tighten to 50 foot-pounds torque.

(6) Remove the engine support fixture and disengage the hooks from the holes in the frame side rails.

(7) Install the speedometer drive pinion and cable. Connect the back-up light switch wires (if so equipped).

(8) Reconnect the parking brake cable and propeller shaft.

(9) Reconnect the exhaust pipes (if removed). Tighten bolts securely.

(10) Fill the transmission with 7½ pints of Type "A" Suffix "A" lubricant or until the oil just dribbles out of the filler hole.

(11) Install the gearshift lever (and boot) to the stub lever on the shift housing and secure with bolts. Tighten securely.

(12) Slide the boot down the shift lever to the floor pan and secure with screws.

(13) Road test the vehicle to make sure the transmission shifts smoothly and operates quietly.

6. SERVICING THE REAR OIL SEAL

(1) Disconnect the propeller shaft at the transmission flange and secure the shaft to the frame member for working clearance.

(2) Hold the mainshaft with Tool C-3281, then remove the flange nut and washer.

(3) Remove the transmission flange, using Tool C-452 if necessary.

(4) Remove the oil seal, using Tool C-748.

(5) Drive a new seal into the extension housing, using Tool C-3837.

(6) Install the transmission flange, washer and nut. Tighten nut to 175 foot-pounds torque.

(7) Reconnect the propeller shaft and tighten the flange nuts to 30 foot-pounds torque.

SPEEDOMETER PINION USAGE CHART

(4 Forward Speed Manual Transmission)

Tire Size	Axle Ratio	Output Shaft Teeth	Pinion Teeth	Pinion Color
8.00x14	2.93	8	17	Orange
	3.23	8	19	Dark Blue
8.50x14	2.93	8	17	Orange
	3.23	8	19	Dark Blue

IC-SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
Hard Shifting	(a) Incorrect clutch adjustment.	(a) Refer to the Clutch Group 6 for corrections.
	(b) Improper cross-over adjustment.	(b) Perform the cross-over adjustment as outlined in Paragraph 2 "Gearshift Linkage Adjustments".
	(c) Synchronizer clutch sleeve damaged.	(c-d-e) Causes noted can only be corrected by disassembling the transmission and replacing damaged or worn parts.
	(d) Synchronizer spring improperly installed.	
	(e) Broken or worn synchronizer stop rings.	
Transmission Slips Out of Gear	(a) Linkage interference.	(a) Inspect and remove all linkage interferences.
	(b) Gearshift rods out of adjustment.	(b) Adjust the gearshift rods as outlined in Paragraph 2 "Gearshift Linkage Adjustments".
	(c) Second or direct speed gear synchronizer clutch teeth worn.	(c) Disassemble the transmission and replace parts as necessary.
	(d) Clutch housing bore or face out of alignment.	(d) Refer to the "Clutch" Group 6 for correction procedures.
Transmission Noises Backlash Noise	(a) Excessive end play in the cluster gear.	(a) Replace the worn gear.
	(b) Loose synchronizer hub spline fit on mainshaft.	(b) Inspect the mainshaft and synchronizer hub and replace parts as necessary.
	(c) Loose spline fit on low speed sliding gear to mainshaft spline.	(c) Inspect the low idle speed sliding gear and mainshaft. Replace parts as necessary.
	(d) Loose spline fit of rear mainshaft flange.	(d) Inspect the mainshaft and flange splines. Replace parts as necessary.
	(e) Damaged, broken or excessively worn gear teeth.	(e) Replace the worn gears.
	(f) Drive pinion bearing worn.	(f) Replace the worn bearing.

PART 2 - TORQUEFLITE TRANSMISSION (TORQUE CONVERTER)

2A-SPECIFICATIONS

TORQUEFLITE TRANSMISSION	
TYPE	Automatic Three Speed with Torque Converter
TORQUE CONVERTER	
Diameter	11¾ inches
OIL CAPACITY—TRANSMISSION AND TORQUE CONVERTER	20 pts. Automatic Transmission Fluid Type "A", Suffix "A"
COOLING METHOD	Water-Heat Exchanger
LUBRICATION	Pump (Rotor Type)
CLUTCHES	
Number of Front Clutch Plates	4
Number of Front Clutch Discs	4
Number of Rear Clutch Plates	3
Number of Rear Clutch Discs	4
GEAR RATIOS	
1—Low	2.45 to 1
2—Second	1.45 to 1
D—Drive	1 to 1
R—Reverse	2.20 to 1
N—Neutral	—
FRONT-REAR PUMPS	
Type	Gear (Rotary)
End Clearance	.001 to .0025 inch
DRIVE TRAIN END PLAY	.030 to .069 inch
CLUTCH PLATE CLEARANCE	
Front Clutch	.024 to .123 inch
Rear Clutch	.026 to .054 inch
SNAP RINGS	
Front and Rear Clutches	
Rear Snap Ring (Selective)	.060 to .062 inch .074 to .076 inch .088 to .090 inch
Output Shaft Bearing	.086 to .088 inch
THRUST WASHERS	
Reaction Shaft Support to Front Clutch Retainer (Selective)	.043 to .045 inch (Natural) .061 to .063 inch (Green) .084 to .086 inch (Red)
Output Shaft to Input Shaft	.062 to .064 inch
Sun Gear Driving Shell Thrust Plate (Steel)	.034 to .036 inch
Rear Planetary Gear to Driving Shell	.062 to .064 inch
Front Planetary Gear to Annulus Gear Support	.062 to .064 inch
Front Annulus Gear Support to Driving Shell	.062 to .064 inch
Front Clutch Retainer to Rear Clutch Piston Retainer	.061 to .063 inch (Green)

SPECIAL TOOLS

C-452 . . . . . Puller—Companion Flange
C-484 . . . . . Pliers—Snap Ring
C-748 . . . . . Remover—Output Shaft Oil Seal
C-763 . . . . . Switch—Remote Control Starter
C-3203A . . . . . Jack—Transmission
C-3204 . . . . . Driver—Output Shaft Bearing
C-3229 . . . . . Pliers—Snap Ring
C-3275 . . . . . Remover—Output Shaft Bearing
C-3281 . . . . . Wrench—Companion Flange Holding
C-3288 . . . . . Studs—Pilot
C-3292 . . . . . Gauge—Low Pressure
C-3293 . . . . . Gauge—High Pressure
C-3335 . . . . . Straight Edge
C-3339 . . . . . Dial Indicator
C-3422 . . . . . Compressor—Engine Valve Spring
C-3487 . . . . . Fixture—Engine Support
C-3705 . . . . . Adapter—Transmission Band Adjuster (Use with C-3380 Torque Wrench)
C-3749 . . . . . Stand—Valve Body
C-3752 . . . . . Remover—Front Oil Pump and Reaction Shaft Support
C-3763 . . . . . Gauge—Throttle Pressure Setting
C-3765 . . . . . Installer—Shifter Shaft Detent Ball
C-3837 . . . . . Driver—Output Shaft Oil Seal
C-3860 . . . . . Driver—Front Pump Oil Seal
C-3861 . . . . . Remover—Front Pump Oil Seal
C-3863 . . . . . Compressor—Front Clutch Piston Spring Installer—Overrunning Clutch Cam
C-3864 . . . . . Aligning Sleeve—Rear Oil Pump Cover
C-3881 . . . . . Aligning Tool—Front Oil Pump Rotor
C-3882 . . . . . Adapter Kit—Use with C-3750 Transmission Stand
C-3887 . . . . . Kit—Service Bushing Removing and Installing

TORQUE REFERENCE

TORQUEFLITE TRANSMISSION	Foot-Pounds	Inch-Pounds
Kickdown Band Adjusting Screw Lock Nut	29	
Kickdown Lever Shaft Plug		150
Reverse Band Adjusting Screw Lock Nut	35	
Cooler Line Fitting		75
Control Cable Adjusting Wheel Bolt		40
Converter Drain Plug	14	
Converter Drive Plate to Crankshaft Bolt	55	
Converter Drive Plate to Torque Converter Bolt		270
Extension Housing to Transmission Case Bolt	24	
Extension Housing to Insulator Mounting Bolt	35	
Extension Housing—Crossmember to Frame Bolt	75	
Front Oil Pump Housing to Transmission Case Bolt		150
Governor Body to Support Bolt		100
Neutral Starter Switch—Initial Contact + ¼ to ⅜ Turn	60 Max.	
Neutral Starter Switch (Console Shift Only)	25-35	
Oil Filler Tube Bracket Bolt		150
Oil Pan Bolt		150
Overrunning Clutch Cam Set Screw		40
Output Shaft Flange Nut	175	
Parking Lock Cable Locking Bolt		10
Parking Lock Cover Bolt		150
Pressure Test Take-off Plug		75
Reaction Shaft Support to Front Oil Pump Bolt		150
Rear Oil Pump Cover Bolt		140
Transmission to Engine Bolt	25-30	
Valve Body Screw		28
Valve Body to Transmission Case Bolt		100
Speedometer Cable Clamp Screw		150

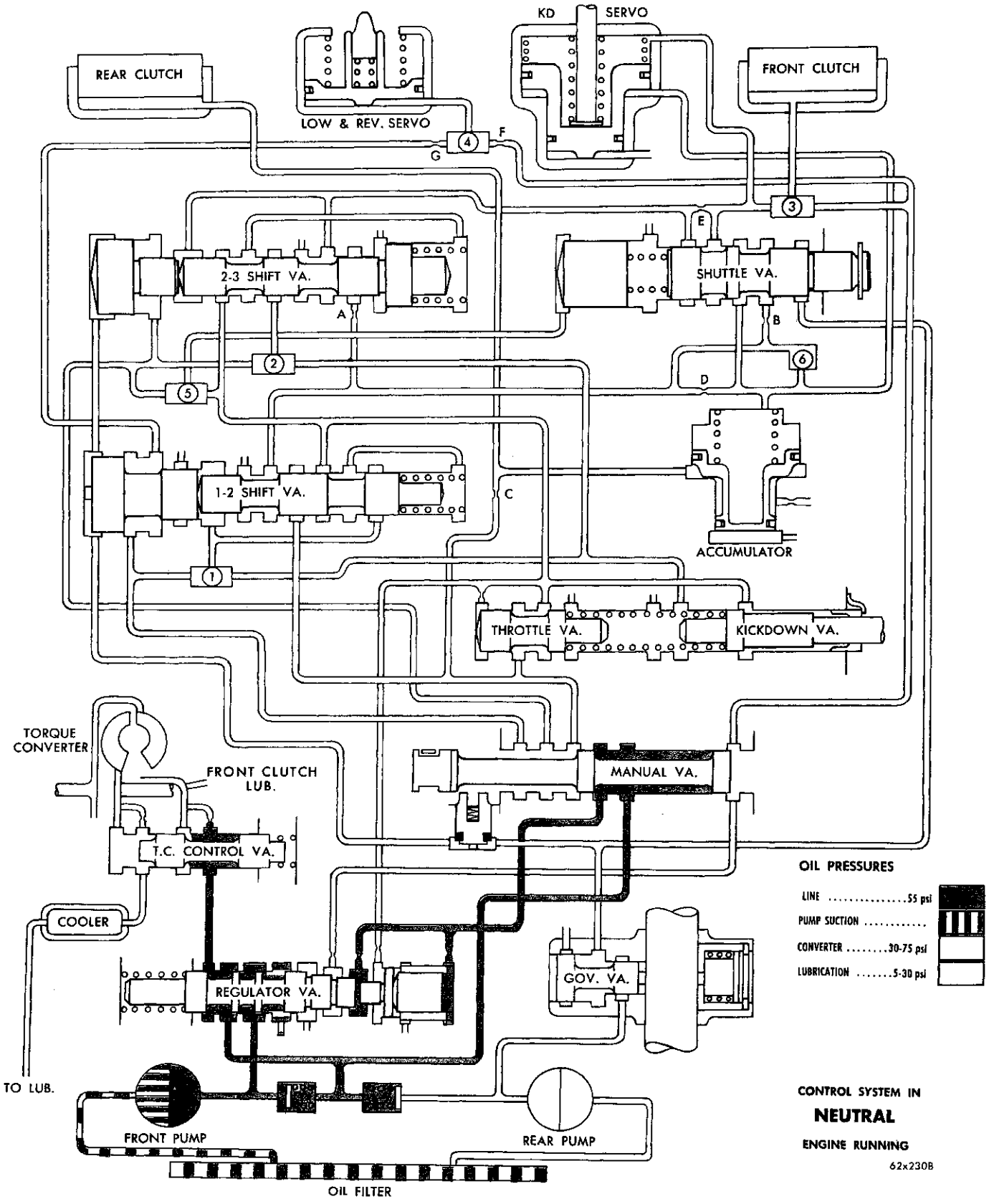


Fig. 1—Neutral Hydraulic Circuits

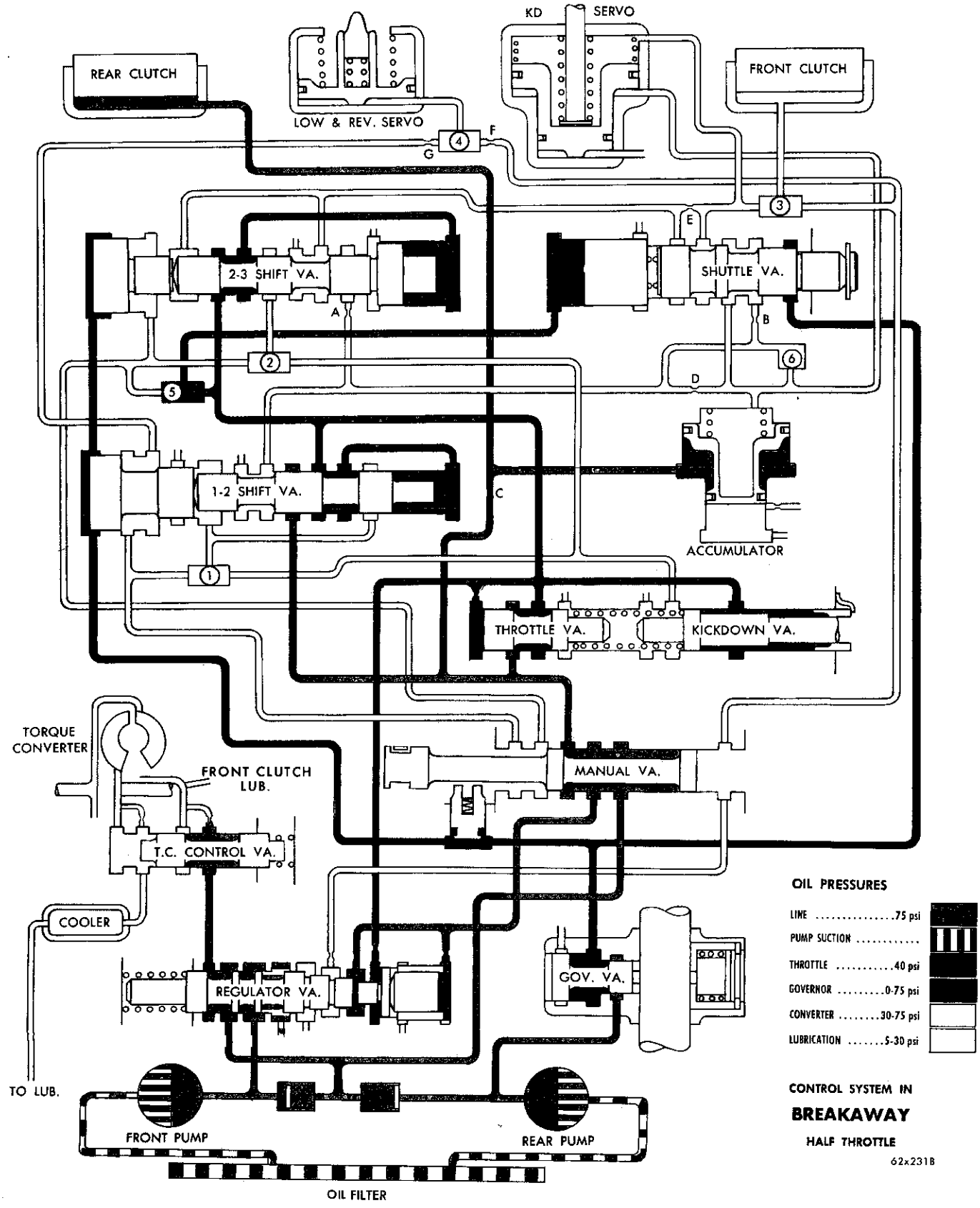


Fig. 2—Drive-Breakaway Hydraulic Circuits

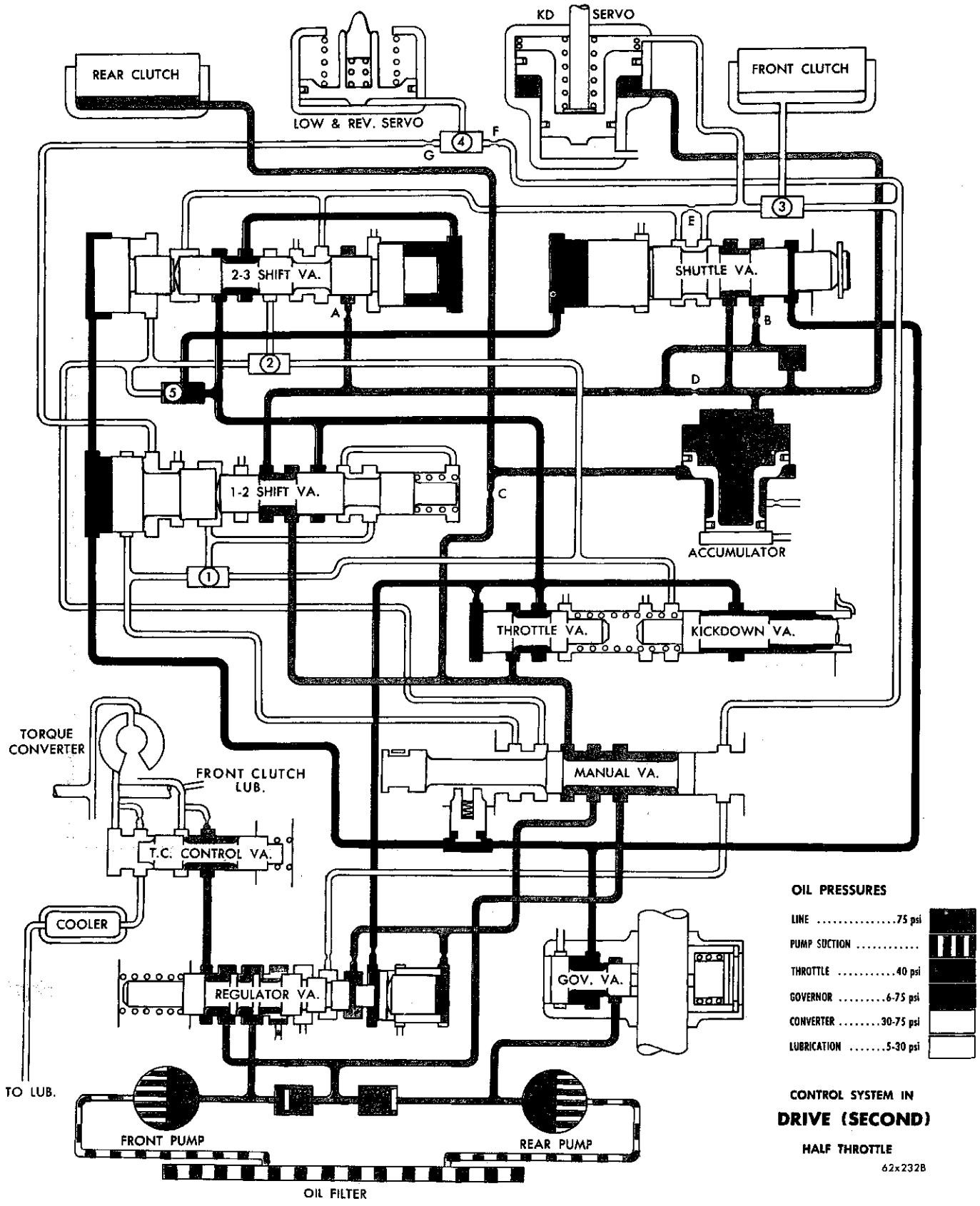


Fig. 3—Drive-Second Hydraulic Circuits

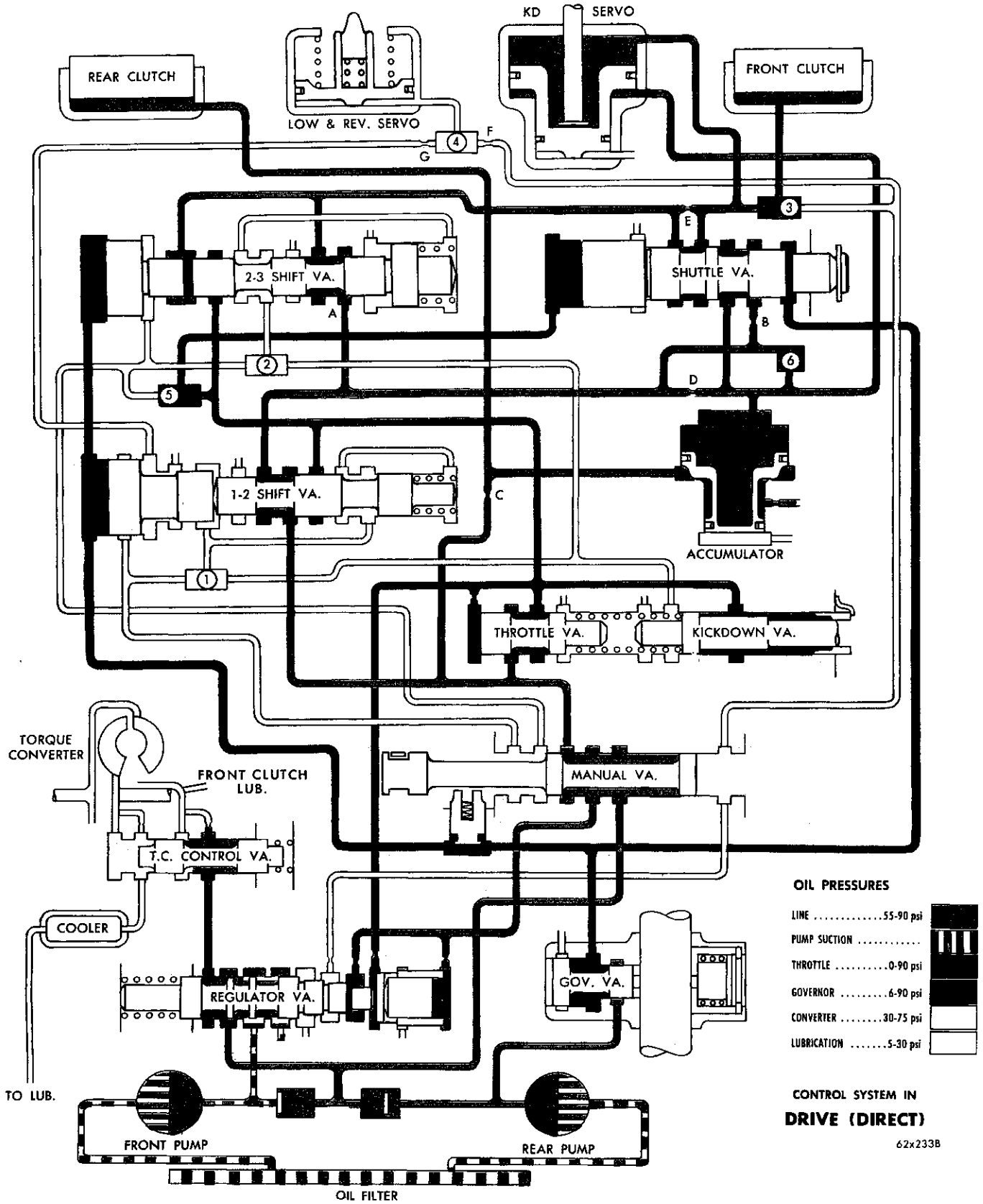


Fig. 4—Drive-Direct Hydraulic Circuits

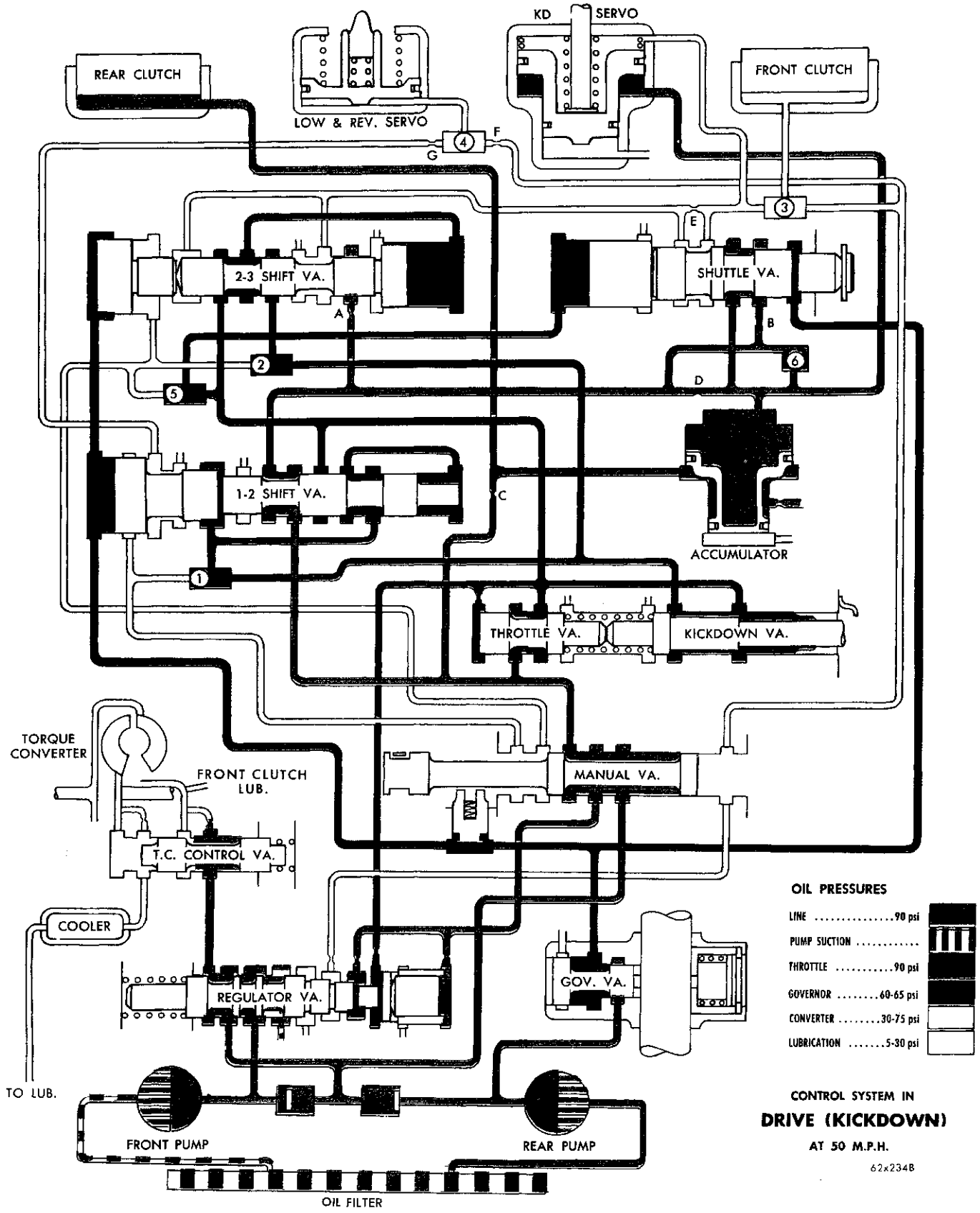


Fig. 5—Drive-Kickdown Hydraulic Circuits

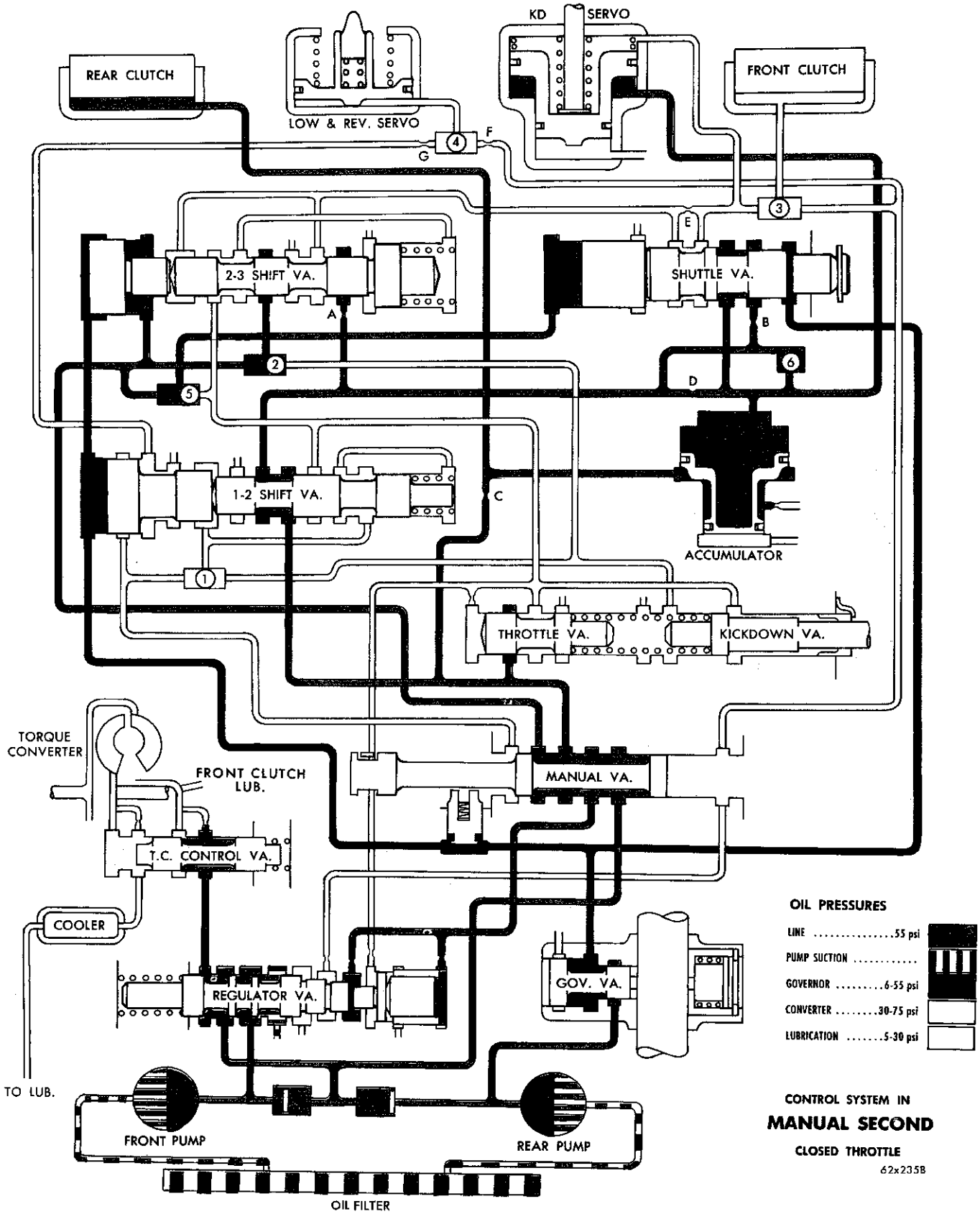


Fig. 6—Manual Second Hydraulic Circuits

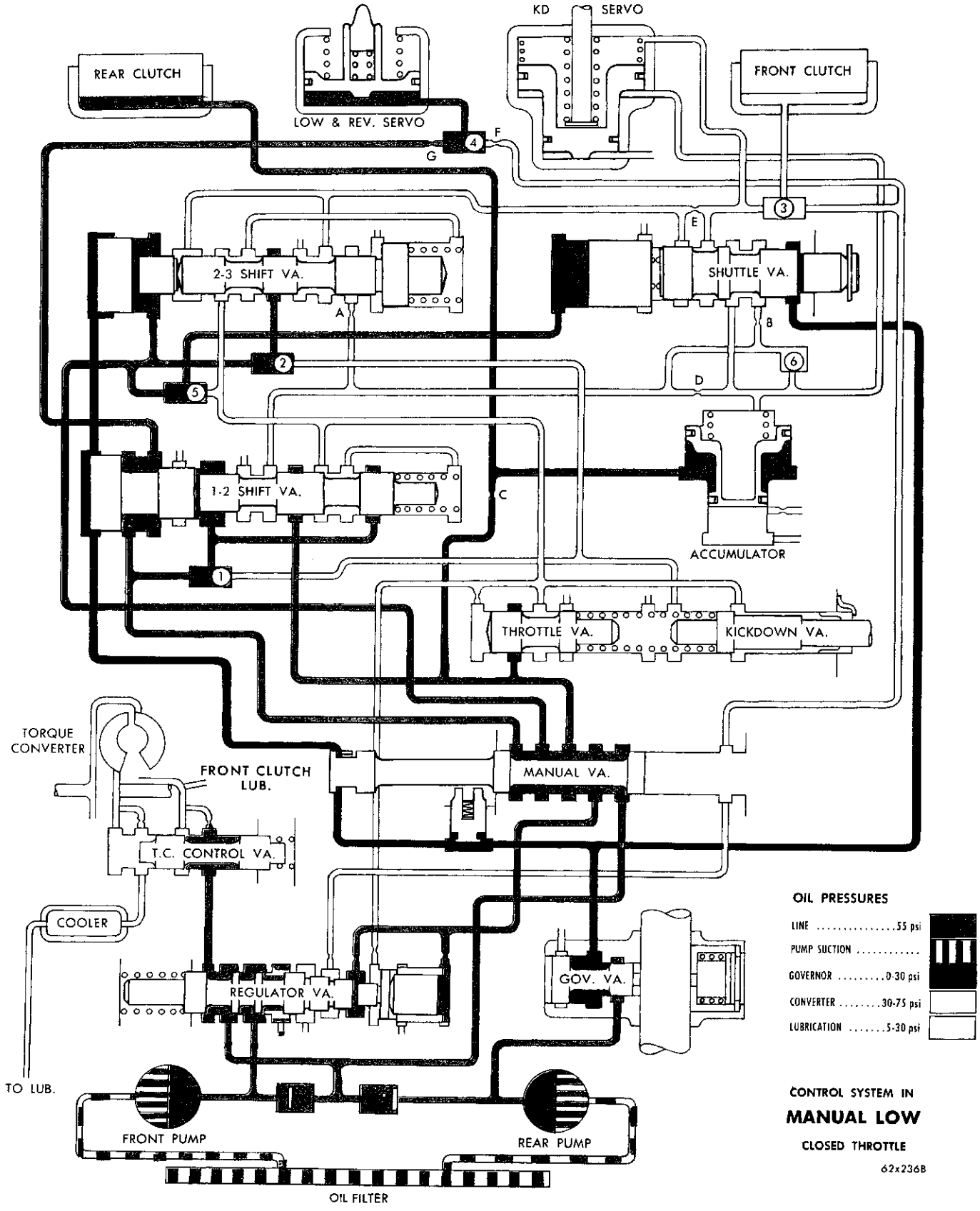


Fig. 7—Manual Low Hydraulic Circuits

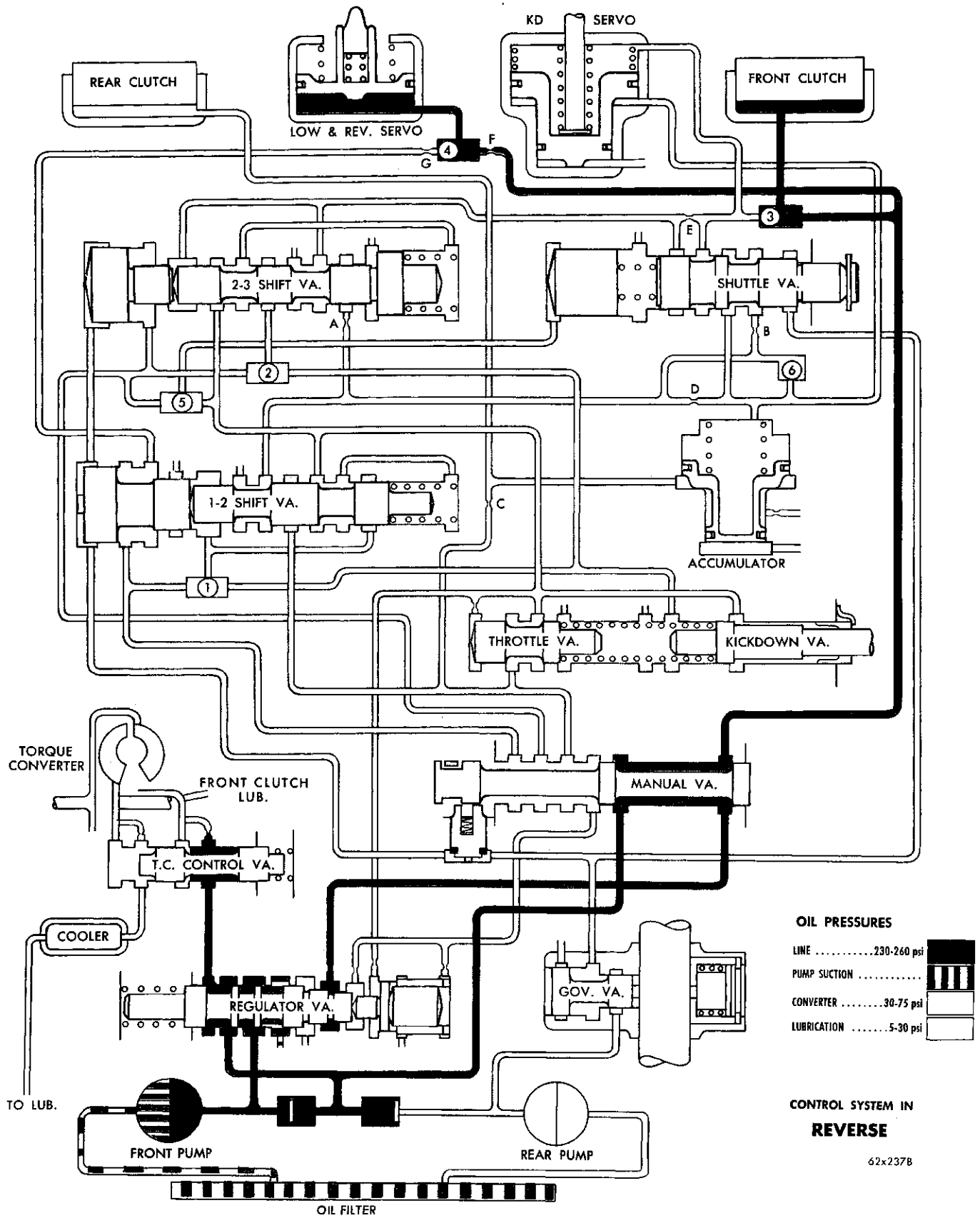


Fig. 8—Reverse Hydraulic Circuits

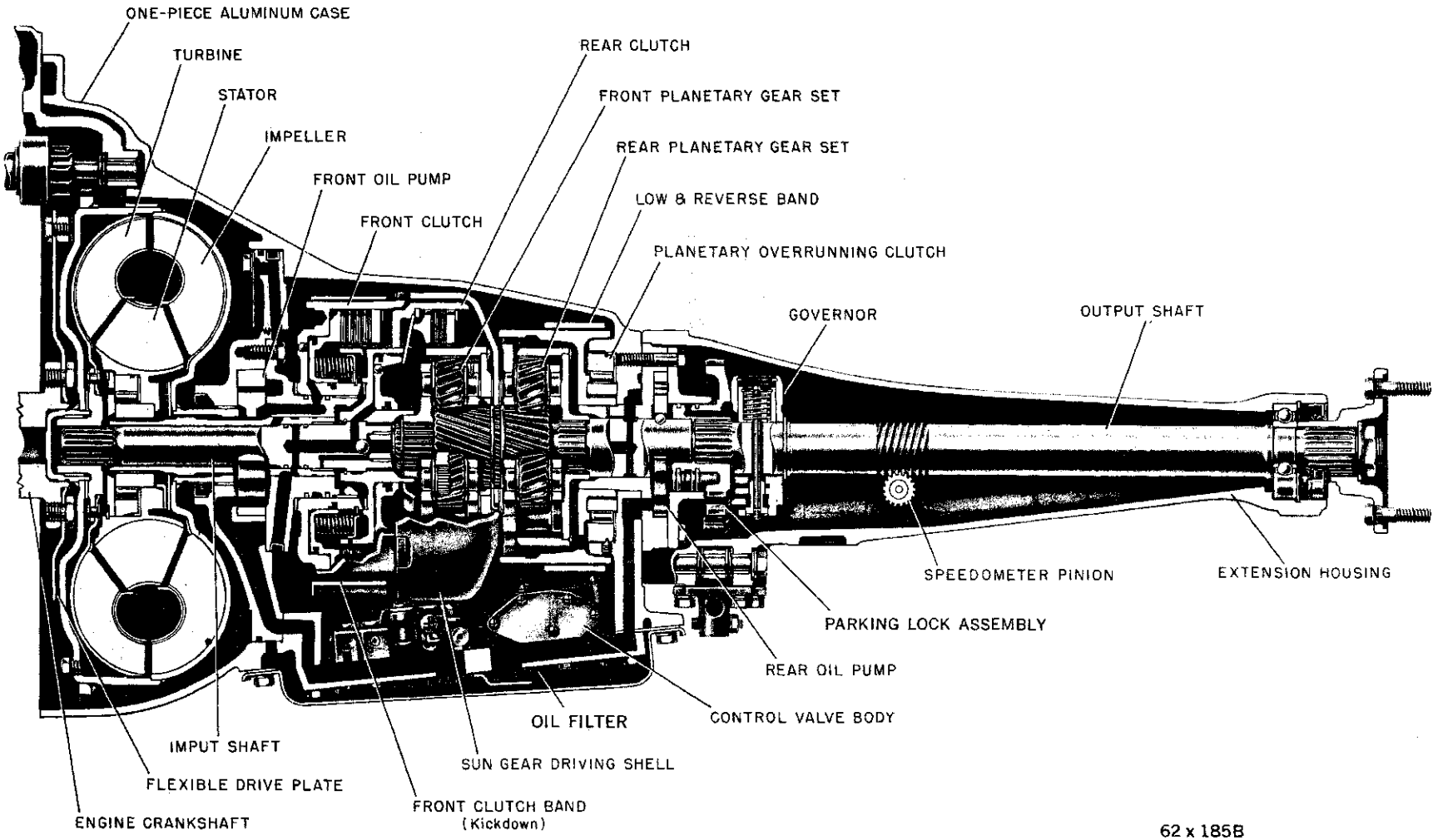


Fig. 9—TorqueFlite Transmission and Torque Converter

PART 2 - TORQUEFLITE TRANSMISSION (TORQUE CONVERTER)

The TorqueFlite Transmisssion combines a torque converter with a fully-automatic 3-speed gear system (Fig. 9). The torque converter housing and transmission case are an integral aluminum casting. The transmission consists of two multiple disc clutches, an overrunning clutch, two servos and bands, and two planetary gear sets to provide three forward ratios and a reverse ratio. The common sun gear of the planetary gear sets is connected to the front clutch by a driving shell which is splined to the sun gear and to the front clutch retainer. The hydraulic system consists of a front and rear pump, and a single valve body which contains all of the valves except the governor valve.

Venting of the transmission is accomplished by a drilled passage through the upper part of the front oil pump housing.

The torque converter is attached to the crankshaft through a flexible driving plate. Cooling of the converter is accomplished by circulating the transmission fluid through an oil-to-water type cooler, located in the radiator lower tank. The torque converter assembly is a sealed unit which cannot be disassembled.

The transmission fluid is filtered by an internal

CLUTCH ENGAGEMENT AND BAND APPLICATION CHART

BUTTON POSITION AND DRIVE CONDITION	FRONT CLUTCH	REAR CLUTCH	FRONT (KICKDOWN) BAND	REAR (LOW-REV) BAND	OVERRUNNING CLUTCH
N NEUTRAL	DISENGAGED	DISENGAGED	RELEASED	RELEASED	NO MOVEMENT
D-DRIVE (DIRECT) 1.00 to 1	ENGAGED	ENGAGED	RELEASED	RELEASED	OVER RUNS
D-DRIVE (BREAKAWAY) 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	RELEASED	HOLDS
D-DRIVE KICKDOWN (TO SECOND) 1.45 to 1	DISENGAGED	ENGAGED	APPLIED	RELEASED	OVER RUNS
2-SECOND 1.45 to 1	DISENGAGED	ENGAGED	APPLIED	RELEASED	OVER RUNS
2-SECOND KICKDOWN (TO LOW) 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	RELEASED	HOLDS
1-LOW 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	APPLIED	PARTIAL HOLD
1-LOW (RETARDING) 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	APPLIED	NO MOVEMENT
R-REVERSE 2.20 to 1	ENGAGED	DISENGAGED	RELEASED	APPLIED	NO MOVEMENT

"Dacron Type" filter attached to the lower side of the valve body assembly.

Engine torque is transmitted to the torque converter then, through the input shaft to the multiple disc clutches in the transmission. The power flow depends on the application of the clutches and bands. Refer to "Clutch Engagement and Band Application Chart."

The TorqueFlite Transmission servicing procedures are the same for all Chrysler and Imperial Models. However, when a 383 or 413 cubic inch (Hi-Performance) engine is used in a Chrysler Police car, the governor spring is lighter to provide higher shift speeds. When a 413 cubic inch engine with ram manifold and two four-barrel carburetors is used in a 300K model, there are several parts that are different due to the high performance of this vehicle. The main differences are as follows:

(1) Governor Spring (lighter spring).

(2) Governor Inner Weight (lighter weight).

(3) Kickdown Servo Spring (only one spring used).

(4) Kickdown Band (heavy duty friction material).

(5) Kickdown Lever (higher lever ratio).

(6) Front Clutch Disc (heavy duty friction material).

These special parts are listed in the 1964 Parts Catalog; therefore, be sure they are used when replacement is necessary.

1. HYDRAULIC CONTROL SYSTEM

Figures 1 through 8 shows the position of the various valves with color coded passages to indicate those under hydraulic pressure for all operations of the transmission.

The hydraulic control system makes the transmission fully automatic, and has four important functions to perform. In a general way, the components of any automatic control system may be grouped into the following basic groups:

The pressure supply system, the clutches and band servos, the pressure regulating valves and the flow control valves.

Taking each of these basic groups or systems in turn, the control system may be described as follows:

Pressure Supply System

The pressure supply system consists of a front pump driven by the engine through the torque converter, and a rear pump driven by the transmission output shaft.

Pressure Regulating Valves

The pressure regulating valves consist of a regulator valve which controls line pressure at a value dependent on throttle opening.

The torque converter control valve maintains torque converter operating pressure and transmission lubricating pressure.

The governor valve transmits regulated pressure to the transmission (in conjunction with throttle pressure) to control upshift and downshift speeds.

The throttle valve transmits regulated pressure to the transmission (in conjunction with governor pressure) to control upshift and downshift speeds.

Flow Control Valves

The rear pump check valve prevents loss of front pump pressure through the rear pump circuit during reverse operation. The front pump check valve prevents loss of rear pump pressure through the front pump circuit when the front pump flow is recirculating.

A check valve is incorporated in the rear oil pump cover to prevent air from entering the system during reverse operation.

The manual valve obtains the different transmission drive ranges as selected by the vehicle operator.

The reverse blocker valve mechanically blocks the manual valve from moving into reverse position above approximately 20 mph.

The 1-2 shift valve automatically shifts the transmission from low to second or from second to low depending on the vehicle operation.

The 2-3 shift valve automatically shifts the transmission from second to direct or from direct to second depending on the vehicle operation.

The kickdown valve makes possible a forced downshift from direct to second-second to breakaway or direct to breakaway (depending on vehicle speed) by depressing the accelerator pedal past the detent "feel" near wide open throttle.

The shuttle valve has two separate functions and performs each independently of each other. The first is that of providing fast release of the kickdown band, and smooth front clutch engagement when the driver makes a "lift-foot" upshift from second to direct. The second function of the shuttle valve is to regulate the application of the kickdown servo and band when making direct to second kickdowns.

Clutches, Band Servos and Accumulator

The front and rear clutch pistons, and both servo pistons are moved hydraulically to engage the clutches and apply the bands. The pistons are released by spring tension when hydraulic pressure is released. On the 2-3 upshift, the kickdown servo piston is released by spring tension and hydraulic pressure.

The accumulator controls the hydraulic pressure

on the apply side of the kickdown servo during the 1-2 shift; thereby, cushioning the kickdown band application at any throttle position.

2. GEARSHIFT AND PARKING LOCK CONTROLS

The push button gearshift control unit is essentially the same on all vehicles. The parking lock lever is attached to the left side of the push button unit. When the parking lock is applied, the transmission is automatically shifted to the neutral position by the control unit.

Some vehicles are equipped with a "lever type" console gearshift control. The transmission and parking lock control cables are the same type as used with the push button control. The parking lock is applied by moving the selector lever past a gate to the PARK position.

CAUTION: Never apply the parking lock until the vehicle has stopped; otherwise, a severe ratcheting noise will occur.

3. OPERATING INSTRUCTIONS

The transmission will automatically upshift and downshift at approximately the miles per hour given in the Shift Pattern Summary Chart.

NOTE: All shift speeds given in the "Shift Pattern Summary Chart" may vary somewhat due to production tolerances and rear axle ratios. This is not too important; however, the quality of the shifts is very important. All shifts should be smooth, responsive, and with no noticeable engine runaway.

Mountain Driving

When driving in the mountains with either heavy loads or when pulling trailers, the 2 (second) or 1 (low) position should be selected on upgrades which requires heavy throttle for ½ mile or more. Lower ratios reduces the possibility of overheating the transmission and converter under these conditions. 1 (low) position is for severe operation or to obtain better control.

Push Starting

If the engine fails to start in the normal manner, it may be started by pushing. **Towing the vehicle to start is not recommended due to the sudden surge of power when the engine starts.**

Turn the ignition on, then push the 1 (low) button in, or move the selector lever to the low position and depress the accelerator pedal slightly. After the vehicle has been pushed to a speed of 15 to 25 mph (approximately) the transmission will drive the engine.

Towing Vehicle

Transmission Inoperative: Tow the vehicle with a rear end pickup or remove the propeller shaft.

Transmission Operating Properly: The vehicle may be towed safely in N (neutral) at moderate speeds. For long distance towing (over 100 miles), the propeller shaft should be removed.

SHIFT PATTERN SUMMARY CHART

Condition	Vehicle Speed to Axle Ratios		
	NEWPORT, NEW YORKER	300, 300 With "K" Engine	IMPERIAL
	2.76-1	3.23-1	2.93-1
Closed Throttle 1-2 Upshift	8-15	7-13	8-15
Closed Throttle 2-3 Upshift	14-20	12-17	14-20
Wide Open Throttle 1-2 Upshift	35-49	40-53	35-49
Wide Open Throttle 2-3 Upshift	75-87	74-84	74-86
3-2 Kickdown Limit	64-80	65-78	64-79
3-1 Kickdown Limit	32-41	28-47	32-41
Closed Throttle Downshift	6-14	5-12	6-14

2B — SERVICE- MAINTENANCE, ADJUSTMENTS AND TESTS

SERVICE PROCEDURES

While in the process of making adjustments and tests, do not stall test the torque converter. For safety reasons and because damage to the transmission may occur, wide open throttle stall operation should be avoided.

4. LUBRICATION

The transmission fluid and the oil filter should provide satisfactory lubrication and protection to the automatic transmisssion and no change is recommended in vehicles used in normal service. Regularly scheduled oil and filter changes, therefore will not be required in these vehicles, except when the operation of the vehicle is classified as severe.

If the regular operation of the vehicle is classified as severe, the transmission should be adjusted and the fluid and the oil filter changed approximately every 32,000 miles, according to any of the following:

Police or taxicab operation

Frequent towing of trailers

Continuous operation at higher than normal loading and/or temperature.

The transmission should not be idled in gear for long periods.

Fluid Level

Inspect the fluid level every 6 months (more often if conditions warrant) with the engine and transmission at normal operating temperature. Refer to "Lubrication and Maintenance", Group 0.

Drain and Refill

(1) Raise the vehicle on a hoist. Place a drain container with a large opening, under the transmission oil pan.

(2) Loosen the pan bolts, tap the pan to break it loose allowing the fluid to drain, then remove the oil pan.

(3) Remove the access plate from in front of the converter, remove the drain plug allowing the fluid to drain (Fig. 10). Install and tighten the converter drain plug to 14 inch-pounds torque, and install the access plate.

(4) If necessary, adjust the reverse band. Refer to Paragraph 12.

(5) Install a new oil filter on the bottom on the valve body. Be sure to use a new gasket and tighten the retaining screws to 28 inch-pounds torque.

(6) Clean the oil pan, and reinstall using a new gasket. Tighten the oil pan bolts to 150 inch-pounds torque.

(7) Pour eight quarts of Automatic Transmission Fluid, Type "A" Suffix "A" into the transmission.

(8) Start the engine and allow to idle for at least two minutes. With the parking brake on, depress each push button momentarily, ending with the N (Neutral) button pushed in, or move the selector lever to each position ending in the neutral position.

(9) Add sufficient fluid to bring fluid level to the "ADD ONE PINT" mark. (Approximately 2 quarts.)

(10) Recheck the fluid level after the transmission is at normal operating temperature. The level should be between the "FULL" mark and the "ADD ONE PINT" mark. (Fig. 11).

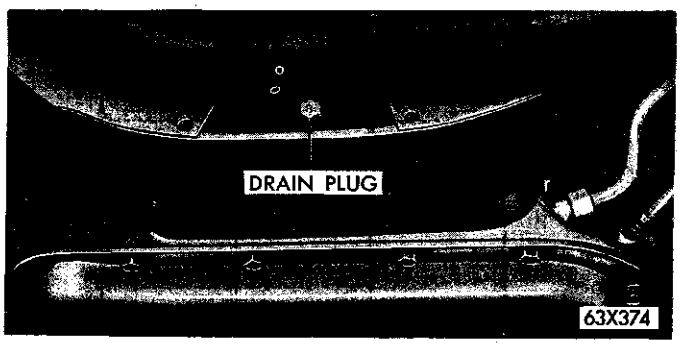


Fig. 10—Converter Drain Plug

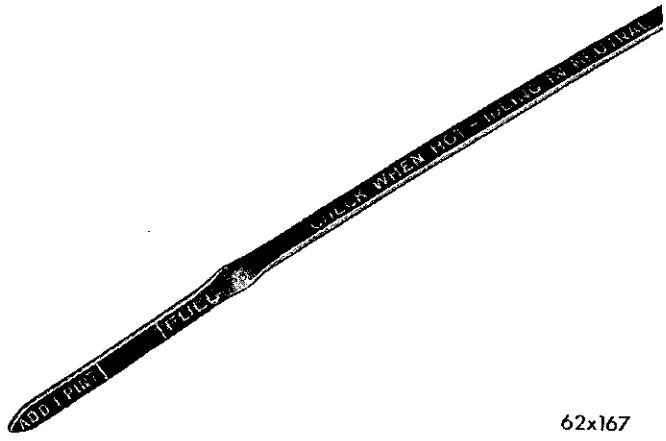


Fig. 11—Dip Stick Markings

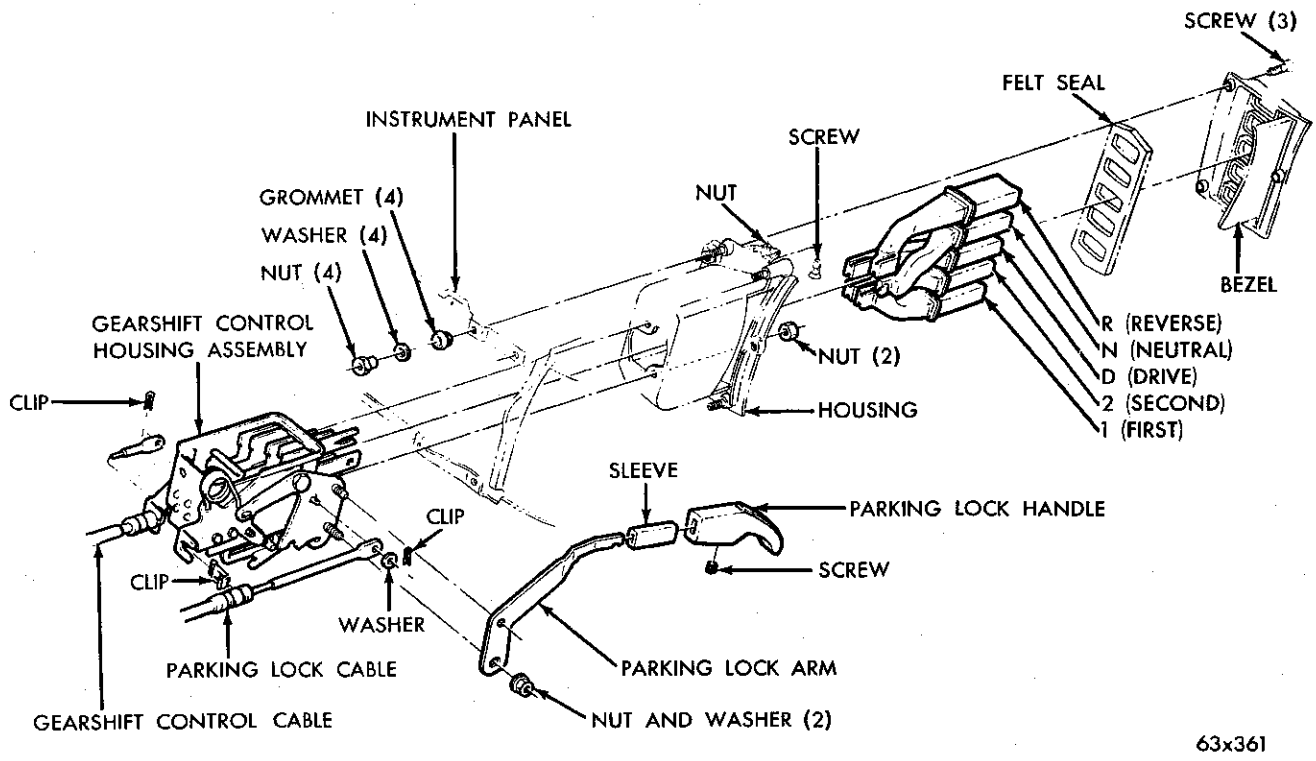


Fig. 12—Removing or Installing Gearshift Control Unit (Chrysler)

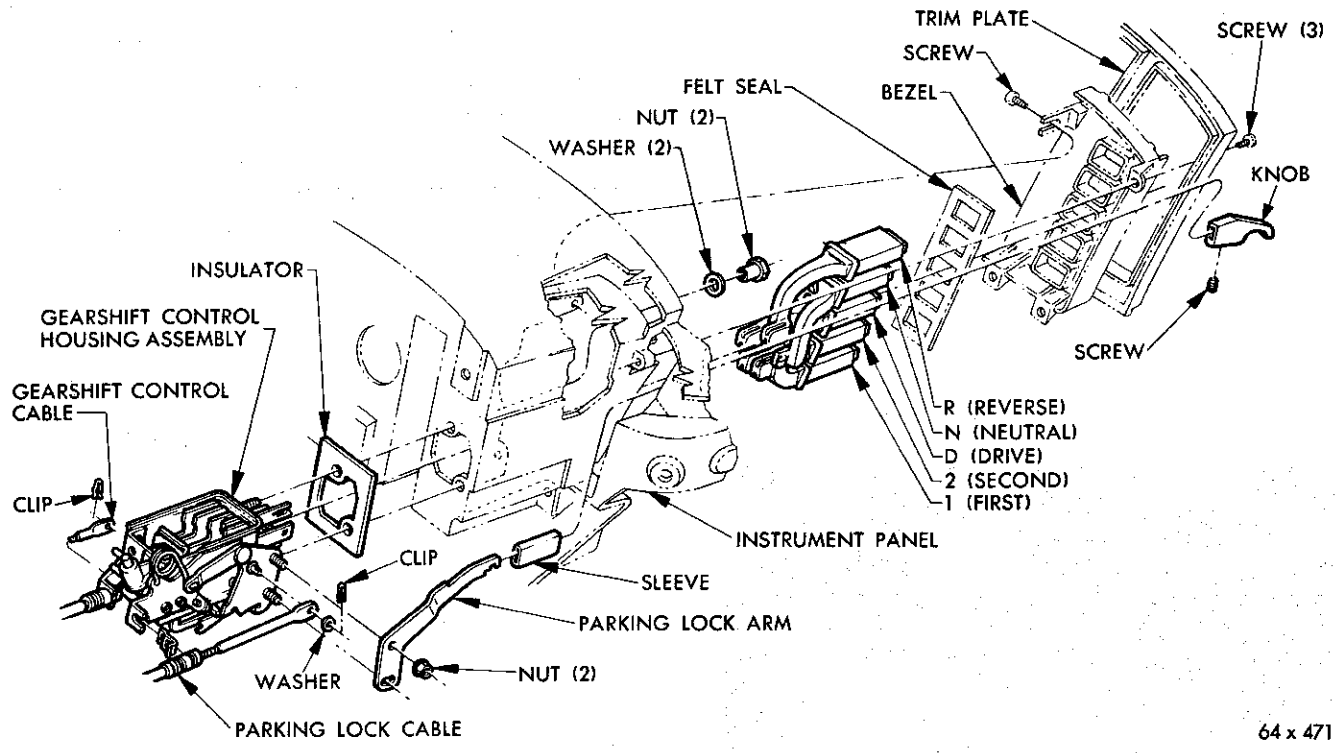


Fig. 13—Removing or Installing Gearshift Control Unit (Imperial)

CAUTION: To prevent dirt from entering the transmission, make certain that the dip stick cap is fully seated onto the filler tube.

Periodic Adjustments

The following adjustments should be performed at 32,000 mile intervals or more frequent under severe operating conditions.

(1) Adjust the kickdown band. Refer to Paragraph 12.

(2) Adjust the gearshift control cable. Refer to Paragraph 9.

(3) Adjust the engine idle in neutral. Refer to the Fuel System, Group 14.

(4) Adjust the transmission and carburetor throttle linkage to obtain the proper shift pattern. Refer to Paragraph 13.

5. PUSH BUTTON CONTROL UNIT

Removal

(1) Disconnect the negative (ground) cable from the battery.

(2) Disconnect the back-up lamp switch wire connector from the switch (if so equipped).

(3) **Chrysler Models:** Remove the parking lock handle from the arm (Fig. 12). Remove the retaining screws and remove the plate beneath the instrument cluster hood; the chrome moulding from the left side of the instrument panel, and the push button bezel and light seal.

Imperial Models: Remove the heater temperature and parking lock control handles (Fig. 13). Remove seven screws from the face of the instrument cluster chrome trim plate, carefully remove the plate.

Depress the spring lock on the light switch and pull out the switch knob and shaft. Loosen the set screw and remove the wiper control knob. From the back remove the two nuts securing the left switch panel, and name plate, carefully remove the switch panel and foam rubber light seal.

Remove the four screws from the outer corners of the push button bezel, carefully slide the lens and bezel assembly off the push buttons.

(4) Remove all the push buttons (except neutral button) by pulling them off the control actuator slides.

(5) Using a socket and long extension through the push button opening, remove the two nuts securing the control assembly to the mounting bracket. Carefully work the assembly rearward out of the cluster.

(6) Remove the neutral push button, and disconnect the gearshift and parking lock cables from the control unit.

Control Unit Adjustment

The following procedures describe the gearshift control unit adjustments. If the transmission fails to shift into NEUTRAL when the parking lock is applied, inspect the parking lock lever travel in the instrument panel slot and the parking lock cable adjustment at the transmission before adjusting the control unit. Refer to Paragraph 10.

(1) Remove the overcenter spring and back off the lever stop screw (Fig. 14). Make sure no binding exists in the neutral slide, neutral slide pin and bushing, cam pivot, and that they are adequately lubricated.

(2) Hold the neutral slide in against the rocker bar with about 5 to 10 pound load.

(3) Loosen the lock nut and rotate the cam so the lever nose just touches the neutral slide pin as it passes over the pin when moving the parking lock lever from the **OFF** to **ON** position. Only light contact should occur so the lever does not hang up on the pin. Hold the cam in this position and tighten the lock nut to 95 inch-pounds torque. Install overcenter spring.

(4) Adjust the lever stop screw to obtain .010 inch clearance between the neutral slide pin and the lever heel (Fig. 15). Tighten the lever stop screw lock nut securely.

Installation

(1) Connect the gearshift and parking lock cables to the control unit. Secure the cable housings by clamping them in the control brackets.

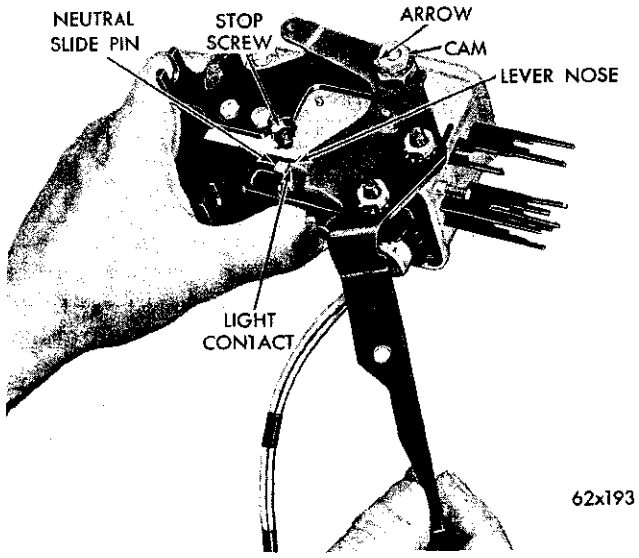


Fig. 14—Adjusting Lever Nose Contact at Neutral Slide Pin

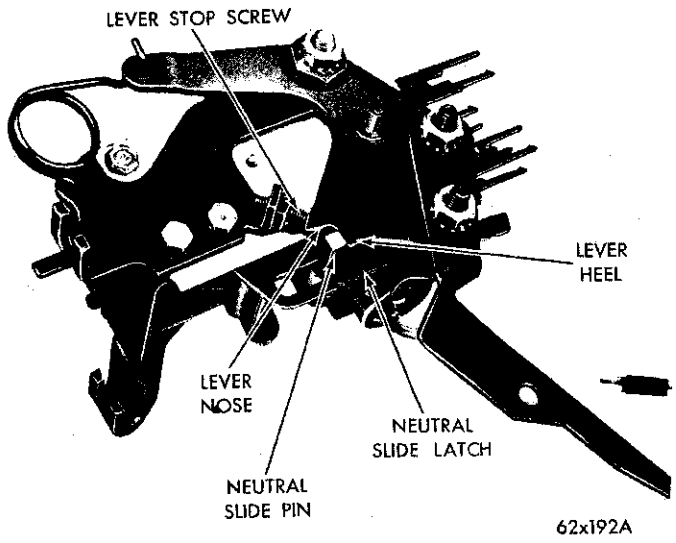


Fig. 15—Adjusting Lever Heel to Neutral Slide Pin Clearance

(2) Install the neutral push button on the neutral actuator slide. Carefully guide the control unit into position from the rear of the instrument cluster. Install the two retaining nuts and tighten securely.

(3) Install the other push buttons in proper order on the control actuator slides.

(4) **Chrysler Models:** Install the push button light seal and bezel. Install and tighten the retaining screws. Make sure the push buttons do not bind in the bezel.

Install the chrome moulding on the left side of the instrument panel and, then the plate beneath the instrument cluster hood. Install and tighten the retaining screws. Install the parking lock control handle.

Imperial Models: Place the felt seal, push button lens and bezel over the push buttons. Install and tighten the four retaining screws at the outer corners of the bezel. Make sure the push buttons do not bind in the lens or plate.

Install the foam rubber light seal and left switch panel, secure the panel with the two retaining nuts. Install the wiper control and light switch knobs.

Carefully install the instrument cluster chrome trim plate and secure with the seven screws. Install the heater temperature and parking lock control handles.

(5) Connect the back-up lamp switch wire connector (if so equipped) . . . Connect the battery ground cable.

6. CONSOLE GEARSHIFT UNIT (Fig. 16)

Removal

(1) Remove the gearshift and parking lock cables from the transmission. Refer to Paragraphs 9 and 10.

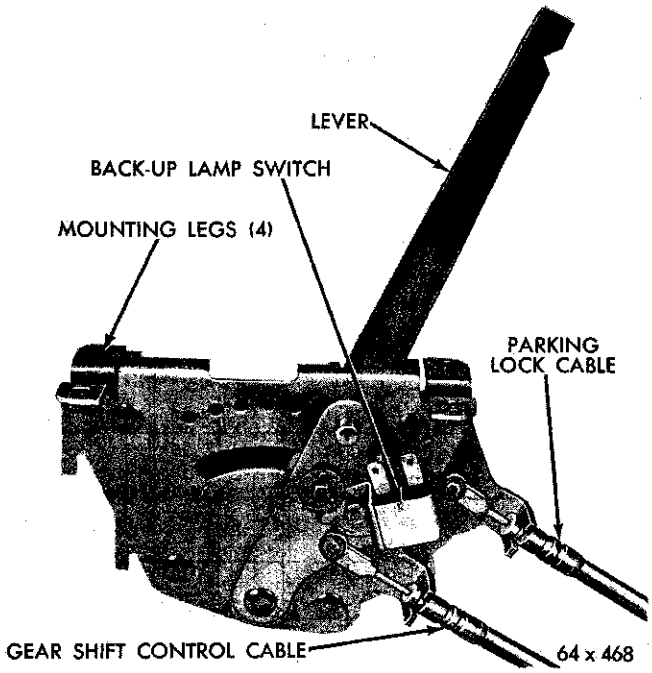


Fig. 16—Console Gearshift Unit

Remove the adjusting wheel from the gearshift cable.

(2) Remove the set screw from the gearshift lever knob and remove the knob.

(3) Remove four screws from inside the ash tray and lift out the ash tray assembly.

(4) Remove the two side mouldings from the top of the console. They are retained by clips at the top and two screws under the console lid.

(5) Lift off the finish plate, bezel and rubber light seal assembly.

(6) Remove the four inner bolts securing the gearshift unit to the mounting plate.

(7) Remove the five screws from the outer edge of the mounting plate and remove the plate.

(8) Attach a piece of soft wire about four feet long to the lower end of each cable. Lift the gearshift unit out of the console, then carefully pull the cables through the floor openings, under the floor mat and out through the console.

Disconnect and leave the wires in the floor to route the cables during reinstallation.

Installation

(1) Attach the wires securely to the end of the cables. Guide the cables and gearshift unit into the console while an assistant pulls on the wires, threading the cables under the mat and through the floor openings.

(2) Position the mounting plate over the shift lever,

install and tighten the four mounting plate to gearshift unit screws.

(3) Align the mounting plate in the console, install and tighten the five screws at the outer edge of the plate.

(4) Place the finish plate, bezel and rubber light seal assembly in proper position over the shift lever.

(5) Install the two side mouldings on top of the console, be sure to install the two screws under the console lid.

(6) Install the ash tray and secure with the four screws inside the tray.

(7) Install the shift lever knob and secure with the set screw.

(8) Inspect the cables for proper routing. Make sure there are no sharp kinks or interference with the other parts.

(9) Install the adjusting wheel on the gearshift cable. Install the cables in the transmission and adjust as outlined in Paragraphs 9 and 10.

7. BACK-UP LAMP SWTICH REPLACEMENT

(1) **Push Button Type:** Remove the push button gearshift and parking lock control unit. Straighten the four tabs that hold the switch to the switch bracket and separate the switch from the bracket.

To install, place the switch in position on the switch bracket and bend over the four tabs. Reinstall the push button gearshift and parking lock control unit.

(2) **Console Lever Type:** Refer to Paragraph 6 and perform steps 2 through 7 under "Removal".

Disconnect the switch wires and remove the screw attaching the switch to the side of the gearshift unit.

To install, attach the switch to the side of the gearshift unit and tighten the retaining screw. Connect the wires and test the back-up light for proper operation. Refer to Paragraph 6, and perform steps 2 through 7 under "Installation".

8. PUSH BUTTON AND CONSOLE SHIFT LAMP REPLACEMENT

The Chrysler push button lamp is located approximately in the center of the push button cluster. To replace the bulb, refer to Paragraph 5 and perform steps 1 through 4. Slide a short piece of tight fitting rubber hose over the bulb to remove it from the socket.

The Imperial push button lamp is located in the back inner side of the control unit mounting bracket. The bulb can be replaced by removing the bulb socket from the bracket.

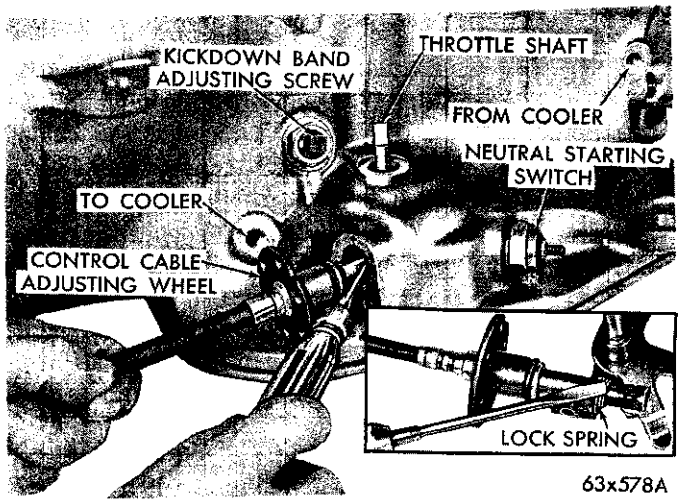


Fig. 17—Removing Gearshift Control Cable

The console selector lever dial lamp is located in the left side of the console. To replace the bulb, unsnap and remove the left side trim panel, and remove the socket and bulb.

9. GEARSHIFT CONTROL CABLE (Transmission End)

Removal

(1) Raise the vehicle on a hoist.

(2) Remove the gearshift control cable to transmission adjusting wheel lock screw. Pull the cable outward just enough to allow the fluid to drain into a container.

(3) Pull the cable out of the transmission case as far as possible, back off the adjusting wheel a few turns if necessary.

(4) Insert a small screw driver above and slightly to the right of the cable (Fig. 17). Disengage the cable adapter lock spring by pushing the screw driver handle to the right while pulling outward on the cable.

Installation

(1) **Push Button Type:** With the parking lock lever in the **OFF** position, have an assistant engage the (R) button and hold it firmly engaged until the cable attachment operation is completed.

Console Lever Type: Place the selector lever in the **PARK** position.

(2) Back the adjustment wheel off on the cable housing (counter-clockwise) until two or three threads are showing on the guide behind the wheel.

(3) Lubricate the cable housing with transmission fluid, insert the cable in the transmission case, push inward on the cable making sure the lock-spring engages the cable.

Adjustment

NOTE: Inspect the wheel for free turning on the guide; remove any dirt or burrs in the threads of the cable guide that may interfere. Lubricate the cable guide threads with a few drops of transmission fluid.

(4) **Push Button Type:** Have an assistant hold the (R) button firmly depressed. Hold the control cable guide centered in the hole of the transmission case and apply only enough inward force (approximately two pounds) to bottom the assembly in the reverse detent. While holding the cable bottomed, rotate the adjustment wheel **clockwise** until it just contacts the case squarely.

Turn the wheel **clockwise** just enough to make the adjustment hole in the wheel line up with the screw hole in the case. Counting this hole as number one, continue turning the wheel **clockwise** until the fifth hole lines up with the screw hole in the case.

(5) **Console Lever Type:** Have an assistant hold the selector lever firmly in the 1 (low) position. Hold the control cable centered in the hole of the transmission case and pull the cable outward (approximately two pounds) to bottom the assembly in the low detent. While holding the cable outward, rotate the adjustment wheel **clockwise** until it just contacts the case squarely.

Turn the wheel **counter-clockwise** just enough to make the next adjustment hole in the wheel line up with the screw hole in the case. Counting this hole as number one, continue turning the wheel **counter-**clockwise until the fifth hole lines up with the screw hole in the case.

(6) Push the cable and adjusting wheel tight against the case then install the lock screw and tighten to 75 inch-pounds torque.

(7) Refill the transmission with Automatic Transmission Fluid Type "A" Suffix "A" to proper level. Refer to Paragraph 4.

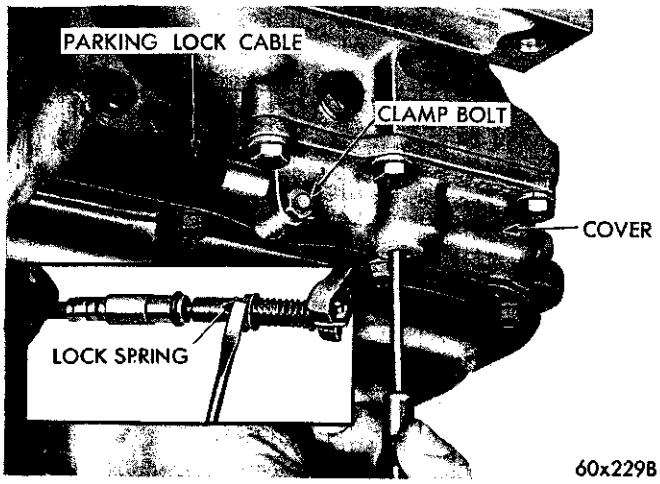


Fig. 18—Removing Parking Lock Cable

10. PARKING LOCK CABLE (Transmission End)

Removal

(1) Loosen the parking lock cable clamp bolt where the cable enters the housing cover (Fig. 18). Tap the end of the clamp bolt tightly to release its hold on the cable. Remove the housing cover lower plug.

(2) With a screw driver inserted through the plug opening, push gently against projecting portion of the cable lock-spring, then withdraw the lock cable. **Do not use pliers or similar tool to withdraw cable from adapter cover as the cable cover might be damaged causing an oil leak.**

Installation

(1) Place the push button parking lock lever in the OFF position, or place the console selector lever in the NEUTRAL position.

(2) Insert a screw driver through the plug opening and position it behind the cable adapter stop washer (Fig. 19). Hold the adapter outward while pushing the cable in as far as possible, making sure the lock-spring engages the cable.

(3) Gently pull outward on the cable housing to its limit of travel, release and then tighten the clamp bolt to 10 inch-pounds torque. Reinstall the plug in the cover and tighten to 75 inch-pounds torque.

Adjustment—Parking Lock Lever (Push Button Control Only)

(1) Operate the parking lock lever from one end of the slot in the instrument panel to the other. The lever should have clearance at both ends. One hole in the parking lock arm is slotted to permit parking lock lever adjustment (Fig. 12 or 13). If adjustment of the lever is required, first loosen the cable clamp bolt on the transmission, making sure the cable housing is free to move in the parking sprag cover hole.

(2) To adjust, move the lever to the fully OFF po-

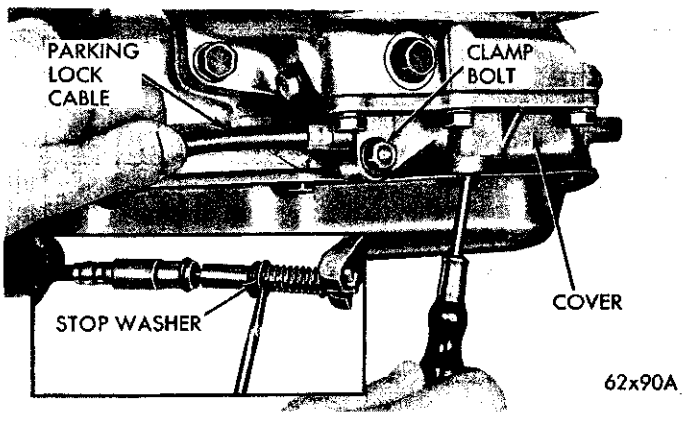


Fig. 19—Installing Parking Lock Cable

sition. Loosen the two nuts attaching the lock arm to the pushbutton housing. Loosen the nuts just enough to free up the lock arm.

(3) Block the locking lever 1/16 inch from the OFF end of the lever slot, then tighten the two nuts on the pushbutton housing. Inspect the lever travel to be certain that clearance exists at both ends of the lever travel.

(4) Place the parking lock lever (on instrument panel) in the OFF position.

Adjustment—Transmission Cable End (Push Button and Console Shift)

(5) IF not performed in step 1, loosen the clamp bolt securing the cable housing in the parking lever cover on bottom on the transmission extension housing. Tap the end of clamp bolt lightly to release its hold on the cable.

(6) Gently pull outward on the cable housing to its limit of travel, release and then tighten the clamp bolt to 10 inch-pounds torque. **Do not use pliers or similar tool to pull outward on the cable as the cable cover might be damaged causing an oil leak.**

(7) Inspect the adjustments by allowing the vehicle to roll slowly on a slight incline. The parking sprag should fully engage the parking gear with the lever in ON position, and there should be no ratcheting noise with the lever in the OFF position.

11. NEUTRAL STARTING SWITCH

Adjustment and Test (Push Button Control Only)

(1) With the proper control cable adjustment assured, depress the N (neutral) push button.

(2) Raise the vehicle on a hoist, loosen the neutral starting switch allowing the fluid to drain into a container.

(3) Unscrew the neutral starting switch from the transmission case and inspect to see that the switch operating lever finger is aligned in the center of the switch opening in the case.

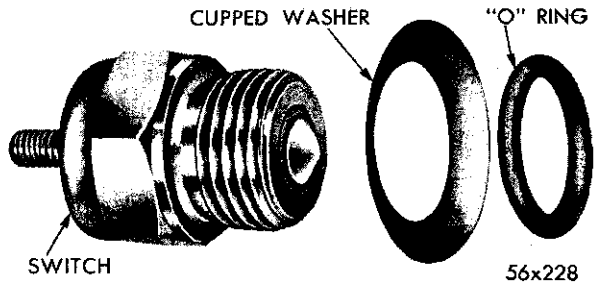


Fig. 20—Neutral Starting Switch

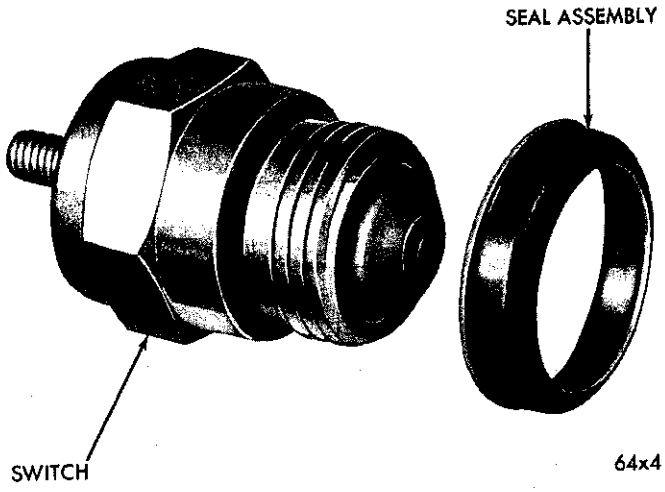


Fig. 21—Neutral Starting Switch

(4) Place the cupper washer and "O" ring over the threads of the switch (Fig. 20), then screw the switch into the transmission case a few turns.

(5) Connect one lead of a test lamp to the battery current and the other lead to the switch terminal. Screw the switch into the transmission case until the lamp lights, then tighten switch an additional ¼ to ⅜ turn.

NOTE: The switch must be tight enough to prevent oil leakage. If not, add a thin washer and readjust the switch. Do not tighten over 60 foot-pounds torque.

(6) Remove the test lamp and connect the wire to the switch.

(7) Add fluid to the transmission to bring up to the proper level. Refer to Paragraph 4.

Adjusment and Test (Console Shift Only)

The neutral starting switch (Fig. 21) should operate in both the **PARK** and **NEUTRAL** selector lever positions.

(1) To test the switch, disconnect the wire from the switch.

(2) Connect one lead of a test lamp to the battery current and the other lead to the switch terminal. If the test lamp does not light, the switch may be faulty, out of adjustment, or the gearshift control cable may be improperly adjusted.

(3) Unscrew the switch from the transmission case allowing the fluid to drain into a container. Move the selector lever to the **PARK** and then to the **NEUTRAL** positions, and inspect to see that the switch

operating lever fingers are centered in the switch opening in the case.

(4) Screw the switch into the transmission case and tighten 25 to 35 foot-pounds torque. Retest the switch with the test lamp.

(5) Add fluid to the transmission to bring up to the proper level. Refer to Paragraph 4.

NOTE: Test the starter for operating in all push button or selector lever positions. If it should operate in any position other than push button neutral or selector lever park and neutral, readjust the gearshift control cable. Refer to Paragraph 9. In some case may be necessary to align the valve body neutral and/or park fingers with the switch plunger. Refer to Paragraph 24.

12. BAND ADJUSTMENTS

Kickdown Band

The kickdown band adjusting screw is located on the left side of the transmission case near the throttle lever shaft (Fig. 17).

(1) Loosen the lock nut and back off approximately five turns. Inspect the adjusting screw for free turning in the transmission case.

(2) Using wrench, Tool C-3380 with adapter C-3705, tighten the band adjusting screw 47 to 50 inch-pounds torque. If adapter C-3705 is not used, tighten the adjusting screw to 72 inch-pounds which is the true torque.

(3) Back off the adjusting screw 2 turns. Hold the adjusting screw in this position and tighten the lock nut to 29 foot-pounds torque.

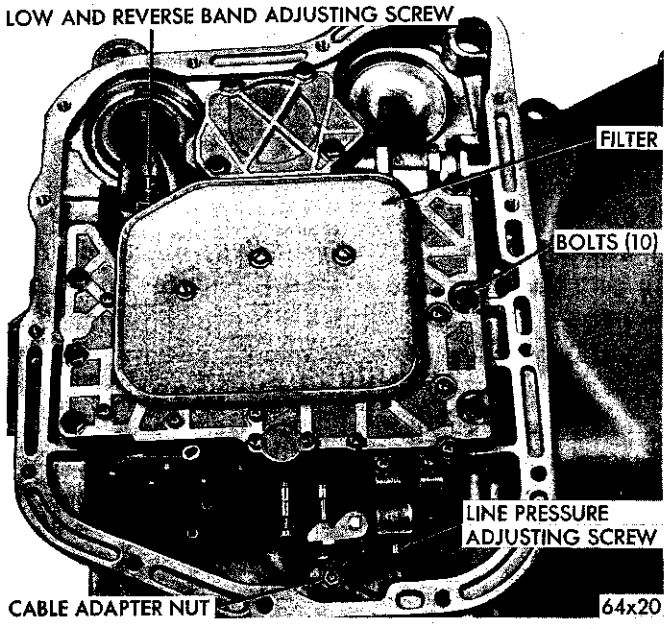


Fig. 22—Bottom View of Transmission (Pan Removed)

Low and Reverse Band

(1) Raise the vehicle, drain the transmission fluid and remove the oil pan.

(2) Loosen the adjusting screw lock nut and back off the nut approximately five turns (Fig. 22). Inspect the adjusting screw for free turning in the lever.

(3) Using wrench, Tool C-3380 with adapter C-3705, tighten the band adjusting screw to 47 to 50 inch-pounds torque. If adapter C-3705 is not used, tighten the adjusting screw to 72 inch-pounds which is the true torque.

(4) Back off the adjusting screw 3 turns. Hold the adjusting screw in this position and tighten the lock nut to 35 foot-pounds torque.

(5) Reinstall the oil pan using a new gasket. Tighten the oil pan bolts to 150 inch-pounds torque.

(6) Fill the transmission with Automatic Transmission Fluid Type "A", Suffix "A". Refer to Paragraph 4.

13. THROTTLE LINKAGE ADJUSTMENT

(1) With the engine at normal operating temperature, carburetor off the fast idle cam and choke valves open, adjust the idle speed to 500 rpm for Chrysler and Imperial—900 rpm for 300 with "K" engine (use tachometer).

(2) **Chrysler and Imperial:** Adjust the throttle linkage as outlined and illustrated in Figure 23 and 24.

(3) **Model 300 with "K" engine:** Refer to Figure 25. Loosen the locking nuts "A" and "B" (accelerator shaft to throttle shaft lever rod).

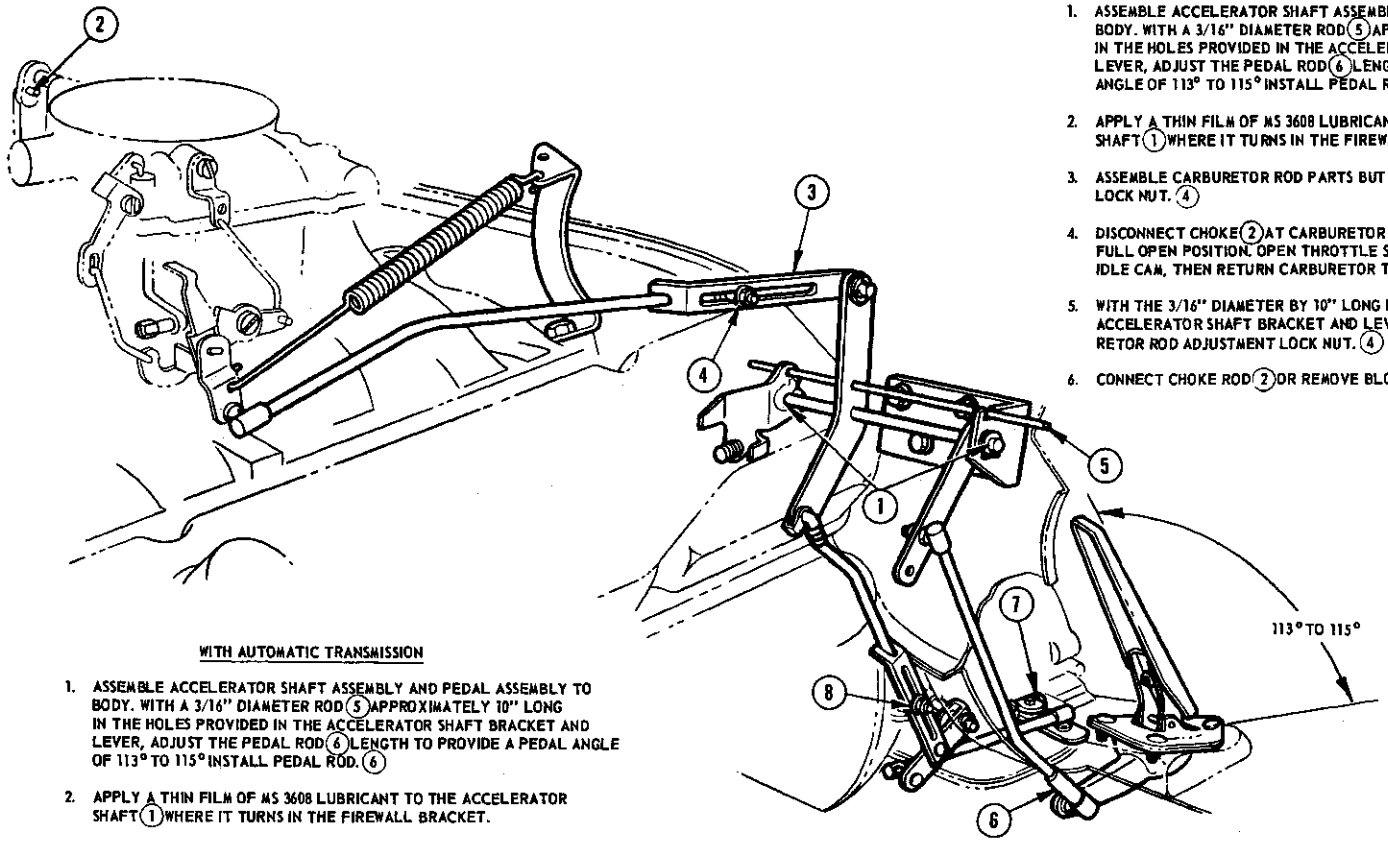
(a) Insert a piece of $\frac{3}{16}$ inch drill rod, 10 inches long into the accelerator shaft bracket and through the hole in the lever.

(b) Move the transmission throttle control lever forward against its stop, then tighten the locknut "A" securely. This positions the accelerator shaft.

(c) Unsnap the accelerator pedal to shaft rod. Turn the threaded end of the rod either in or out until an angle measurement of 114 degrees is obtained between the floor of vehicle and the flat face of the accelerator pedal. Use a protractor to obtain the angle. Reconnect the rod and remove the locating drill rod.

(d) Inspect each carburetor to be sure the choke valves are open; that the fast idle cams are released and the throttle valves are closed.

(e) Loosen the locking nuts "C" and "D" (left and right bank carburetor rods).



WITH AUTOMATIC TRANSMISSION

1. ASSEMBLE ACCELERATOR SHAFT ASSEMBLY AND PEDAL ASSEMBLY TO BODY. WITH A 3/16" DIAMETER ROD (5) APPROXIMATELY 10" LONG IN THE HOLES PROVIDED IN THE ACCELERATOR SHAFT BRACKET AND LEVER, ADJUST THE PEDAL ROD (6) LENGTH TO PROVIDE A PEDAL ANGLE OF 113° TO 115° INSTALL PEDAL ROD. (6)
2. APPLY A THIN FILM OF MS 3608 LUBRICANT TO THE ACCELERATOR SHAFT (1) WHERE IT TURNS IN THE FIREWALL BRACKET.
3. ASSEMBLE CARBURETOR ROD PARTS BUT DO NOT TIGHTEN ADJUSTMENT LOCK NUT. (4)
4. DISCONNECT CHOKE (2) AT CARBURETOR OR BLOCK CHOKE VALVE IN FULL OPEN POSITION. OPEN THROTTLE SLIGHTLY TO RELEASE FAST IDLE CAM, THEN RETURN CARBURETOR TO CURB IDLE.
5. WITH THE TRANSMISSION ROD ASSEMBLY AND TRANSMISSION THROTTLE LEVER IN PLACE, MOVE THE TRANSMISSION THROTTLE LEVER (7) FORWARD AGAINST THE STOP AND TIGHTEN TRANSMISSION ROD ADJUSTMENT LOCK NUT. (8) REMOVE 3/16" DIAMETER ROD (5) FROM ACCELERATOR SHAFT BRACKET.
6. MOVE REAR PORTION OF CARBURETOR ROD ASSEMBLY (3) REARWARD UNTIL TRANSMISSION THROTTLE LEVER (7) STOP IS CONTACTED. TIGHTEN CARBURETOR ROD ADJUSTMENT LOCK NUT. (4)
7. CONNECT CHOKE ROD (2) OR REMOVE BLOCKING FIXTURE.

WITH MANUAL TRANSMISSION

1. ASSEMBLE ACCELERATOR SHAFT ASSEMBLY AND PEDAL ASSEMBLY TO BODY. WITH A 3/16" DIAMETER ROD (5) APPROXIMATELY 10" LONG IN THE HOLES PROVIDED IN THE ACCELERATOR SHAFT BRACKET AND LEVER, ADJUST THE PEDAL ROD (6) LENGTH TO PROVIDE A PEDAL ANGLE OF 113° TO 115° INSTALL PEDAL ROD. (6)
2. APPLY A THIN FILM OF MS 3608 LUBRICANT TO THE ACCELERATOR SHAFT (1) WHERE IT TURNS IN THE FIREWALL BRACKET.
3. ASSEMBLE CARBURETOR ROD PARTS BUT DO NOT TIGHTEN ADJUSTMENT LOCK NUT. (4)
4. DISCONNECT CHOKE (2) AT CARBURETOR OR BLOCK CHOKE VALVE IN FULL OPEN POSITION. OPEN THROTTLE SLIGHTLY TO RELEASE FAST IDLE CAM, THEN RETURN CARBURETOR TO CURB IDLE.
5. WITH THE 3/16" DIAMETER BY 10" LONG ROD (5) IN PLACE IN THE ACCELERATOR SHAFT BRACKET AND LEVER ASSEMBLY, TIGHTEN CARBURETOR ROD ADJUSTMENT LOCK NUT. (4)
6. CONNECT CHOKE ROD (2) OR REMOVE BLOCKING FIXTURE.

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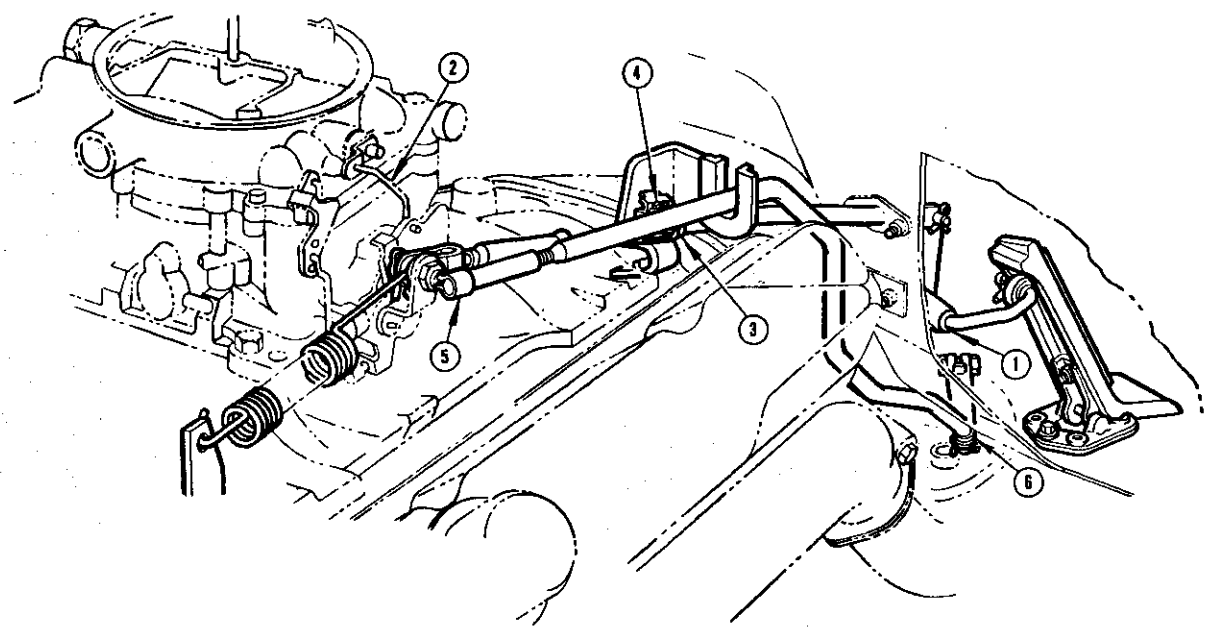
Fig. 23—Throttle Linkage Adjustment (Chrysler)



1. ASSEMBLE TRANSMISSION CONTROL LINKAGE PARTS IN PLACE BUT DO NOT ASSEMBLE TRANSMISSION ROD BALL SOCKET (5) TO BALL END.

2. APPLY A THIN FILM OF MS 3701 LUBRICANT TO THE ACCELERATOR SHAFT (1) WHERE IT TURNS IN THE BRACKET.

3. DISCONNECT CHOKE (2) AT CARBURETOR OR BLOCK CHOKE VALVE IN FULL OPEN POSITION, OPEN THROTTLE SLIGHTLY TO RELEASE FAST IDLE CAM, THEN RETURN CARBURETOR TO CURB IDLE.

4. HOLD THE TRANSMISSION LEVER (6) FORWARD AGAINST ITS STOP AND ADJUST THE LENGTH OF THE TRANSMISSION ROD BY MEANS OF THE THREADED ADJUSTMENT (5) AT THE UPPER END. THE BALL SOCKET MUST LINE UP DIRECTLY WITH THE BALL END WITHOUT EXERTING ANY FORWARD FORCE ON THE ROD. THE BALL SOCKET MUST BE AT THE SAME HEIGHT AS THE BALL END WHEN CHECKING ROD LENGTH.

5. LENGTHEN ROD BY ONE TURN OF THE ADJUSTMENT. (5)

6. ASSEMBLE BALL SOCKET (5) TO BALL END. WHEN THE CARBURETOR THROTTLE IS OPENED, THE TRANSMISSION SHOULD BEGIN ITS TRAVEL AT THE SAME TIME WITH NO VERTICAL MOVEMENT OF THE LEVER OR VERTICAL MOVEMENT OF THE ROD IN THE LEVER.

7. ASSEMBLE REMAINDER OF THE LINKAGE PARTS IN PLACE. WITH THE CABLE CLAMP NUT (4) LOOSE, ADJUST THE POSITION OF THE CABLE HOUSING FERRULE (3) IN THE CLAMP SO THAT ALL SLACK IS REMOVED FROM THE CABLE WITH THE CARBURETOR AT CURB IDLE. TO REMOVE SLACK FROM THE CABLE, MOVE THE FERRULE (3) IN THE CLAMP IN THE DIRECTION AWAY FROM THE CARBURETOR LEVER.

8. BACK OFF FERRULE (3) 1/2" THIS PROVIDES 1/2" FREE PLAY BETWEEN THE REAR SURFACE OF THE ACCELERATOR BRKT. AND THE FRONT EDGE OF ACCELERATOR SHAFT LEVER. TIGHTEN CLAMP NUT (4)

9. ROUTE CABLE SO THAT IT DOES NOT INTERFERE WITH THE TRANSMISSION ROD THROUGHOUT ITS FULL TRAVEL.

10. CONNECT CHOKE ROD (2) OR REMOVE BLOCKING FIXTURE.

64 x 422

Fig. 24—Throttle Linkage Adjustment (Imperial)

(f) Pivot bellcrank until a piece of 3/16 inch drill rod, 3 inches long can be inserted through the bellcrank hole and locating hole in the manifold. Tighten locking nuts "C" and "D" securely, and remove the locating drill rod from the bellcrank.

(g) Push rearward on the accelerator shaft to throttle shaft lever rod adjusting link, until the transmission stop is reached, then tighten locking nut "B" securely.

(h) Make sure the idle speed is adjusted to 700 rpm with the engine at normal operating temperature.

14. HYDRAULIC CONTROL PRESSURE TESTS

Line Pressure and Front Servo Release Pressure

Line pressure and front servo release pressure tests must be made in D (drive) position with the rear wheels free to turn. The transmission fluid must be at operating temperature (150° F to 200° F).

(1) Install an engine tachometer, raise the vehicle on a hoist and position the tachometer so it can be read under the vehicle.

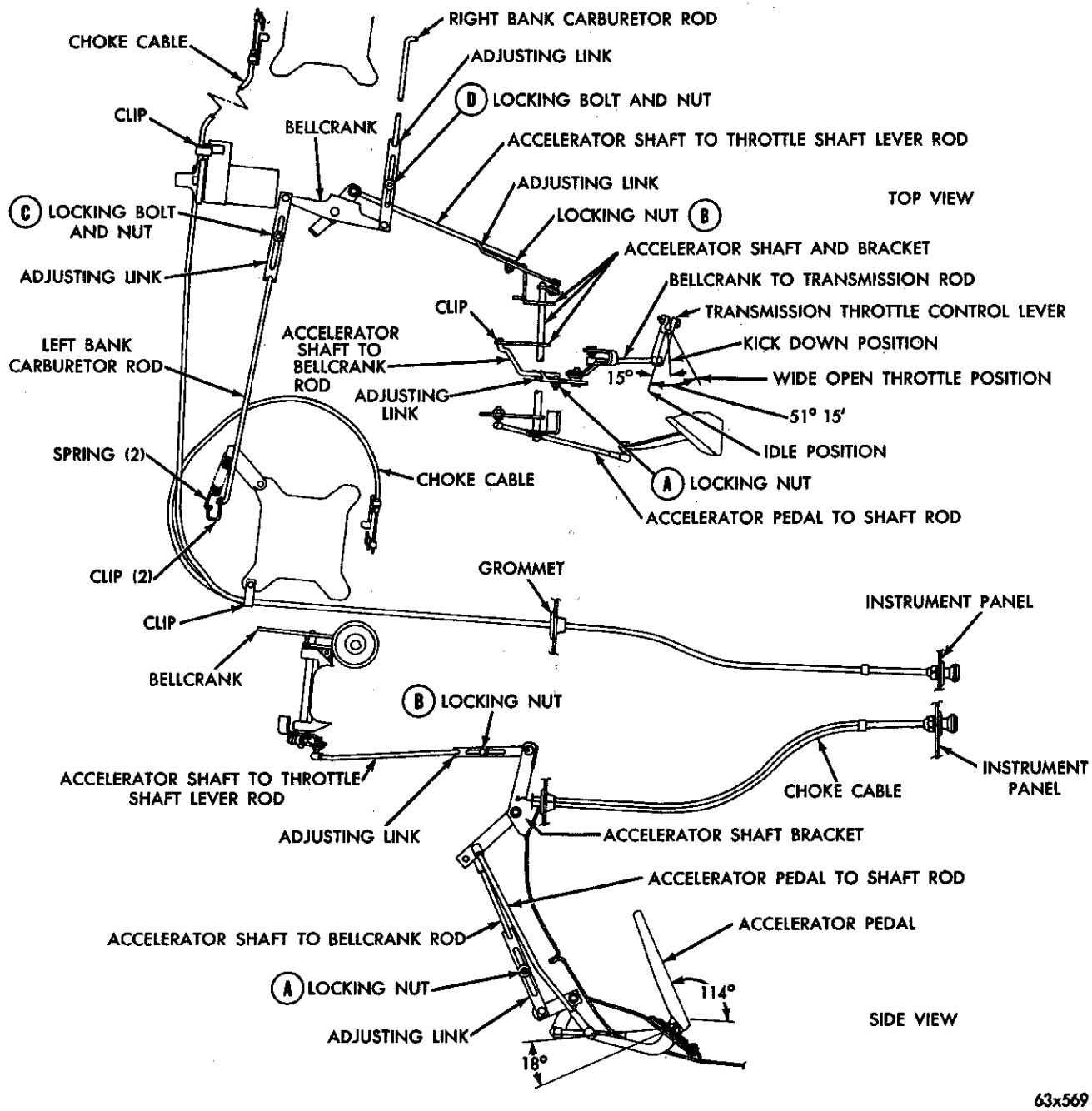


Fig. 25—Throttle Linkage Adjustment (C-300K)

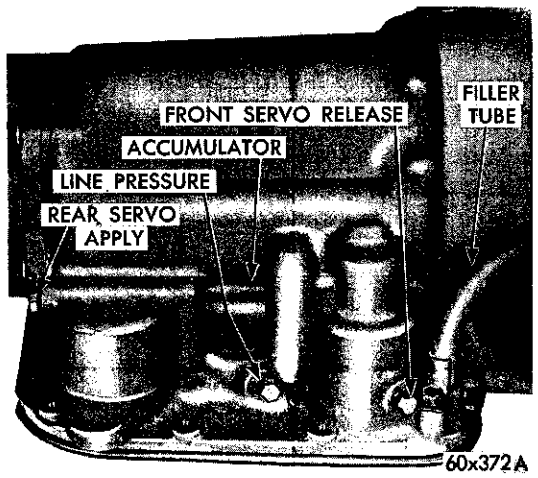


Fig. 26—Pressure Test Locations (Right Side of Case)

(2) Connect two 0-100 psi pressure gauges, Tool C-3292 to pressure take-off-points at the side of the accumulator and at the front servo release (Fig. 26).

(3) With the control in D (drive) position, speed up the engine slightly until the transmission shifts into direct. (Front servo release will be pressurized in direct). Reduce engine speed slowly to 1,000 rpm. Line pressure at this time (1,000 rpm) must be 54-60 psi, and the front servo release pressure must not be more than 3 psi below line pressure.

(4) Disconnect the throttle linkage from the transmission throttle lever and move the throttle lever gradually to full throttle position. Line pressure must rise to a maximum of 90-96 psi just before or at kickdown into low gear. Front servo release pressure must follow line pressure up to the kickdown point and should not be more than 3 psi below line pressure.

If line pressure is not 54-60 psi at 1,000 rpm, adjust the pressure as outlined in Paragraph 15.

If front servo release pressures are less than pressure specified and line pressures are within limits, there is excessive leakage in the front clutch and/or front servo circuits.

CAUTION: Always inspect the external transmission throttle lever for looseness on the valve body shaft when making the pressure tests.

Lubrication Pressures

The lubrication pressure test should be made at the same time that line pressure and front servo release pressures are tested.

(1) Install a "tee" fitting between the cooler return line fitting and fitting hole in the transmission case at rear of the left side of the transmission case (Fig. 27). Connect a 0-100 psi pressure gauge, Tool C-3292 to the "tee" fitting.

(2) At 1,000 engine rpm, with the throttle closed and the transmission in direct, the lubrication pressure should be 5-15 psi. Lubrication pressure will be approximately doubled as the throttle is opened to the maximum line pressure.

Rear Servo Apply Pressure

(1) Connect a 0-300 psi pressure gauge, Tool C-3293 to the apply pressure take-off point at the rear servo (Fig. 27).

(2) With the transmission control in R (reverse) position and the engine speed set at 1600 rpm, the reverse servo apply pressure should be 240-280 psi.

Governor Pressure

(1) Connect a 0-100 psi pressure gauge, Tool C-3292 to the governor pressure take-off point, located at lower left side of the extension near the mounting flange (Fig. 27).

(2) Governor pressures should fall within the limits given in the "Governor Pressure Chart."

If governor pressures are incorrect at the given vehicle speeds, the governor valve and/or weights are probably sticking.

GOVERNOR PRESSURE CHART

VEHICLE SPEED TO AXLE RATIOS					PRESSURE
VC-1	VC-2	VC-3	300 with "K" Engine	VY-1	LIMITS*
2.76-1	3.23-1	2.76-1	3.23-1	2.93-1	PSI
20-22	17-19	20-23	17-20	20-23	15
44-53	37-45	45-54	50-56	44-53	50
73-80	62-69	75-82	73-80	74-81	75

*The governor pressure should respond smoothly to changes in m.p.h. and should return to 0 to 1½ psi when the vehicle is stopped. High pressure at standstill (above 2 psi) will prevent the transmission from downshifting.

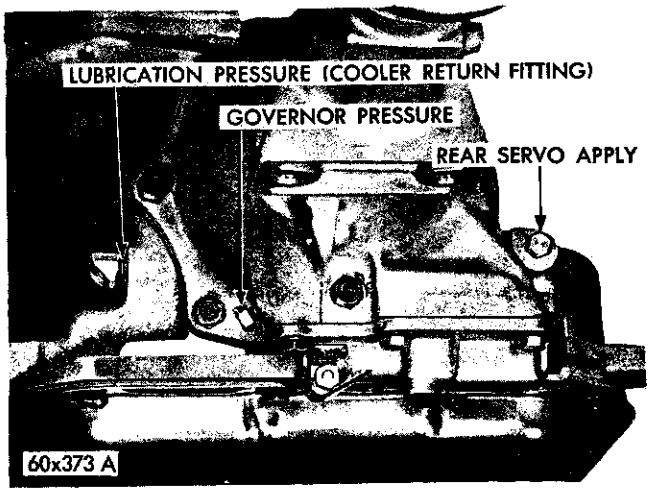


Fig. 27—Pressure Test Locations (Rear End of Case)

Throttle Pressure

No provisions are made to test the throttle pressure. Incorrect throttle pressure should only be suspected if the part throttle shift speeds are either very delayed or occur too early in relation to vehicle speeds. In which case, the throttle linkage should be adjusted before throttle pressure setting is adjusted. Refer to Paragraphs 13 and 15.

15. HYDRAULIC CONTROL PRESSURE ADJUSTMENTS

Line Pressure

An incorrect throttle pressure setting will cause incorrect line pressure readings even though the line pressure adjustment is correct. Always inspect and correct the throttle pressure adjustment before adjusting the line pressure.

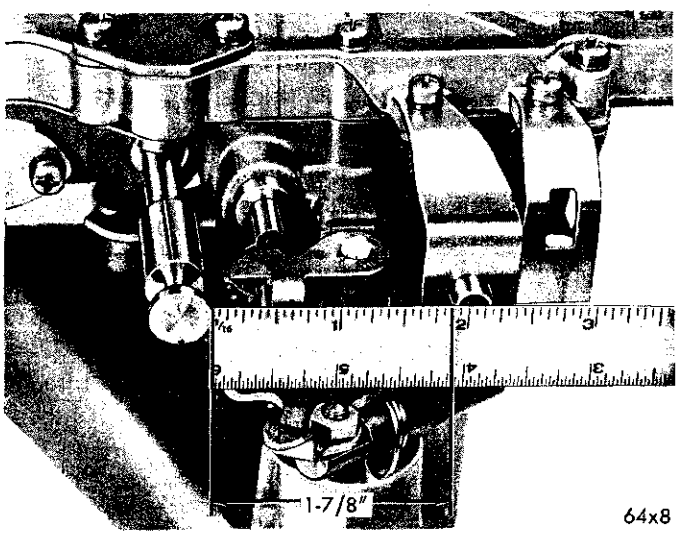


Fig. 28—Measuring Spring Retainer Location

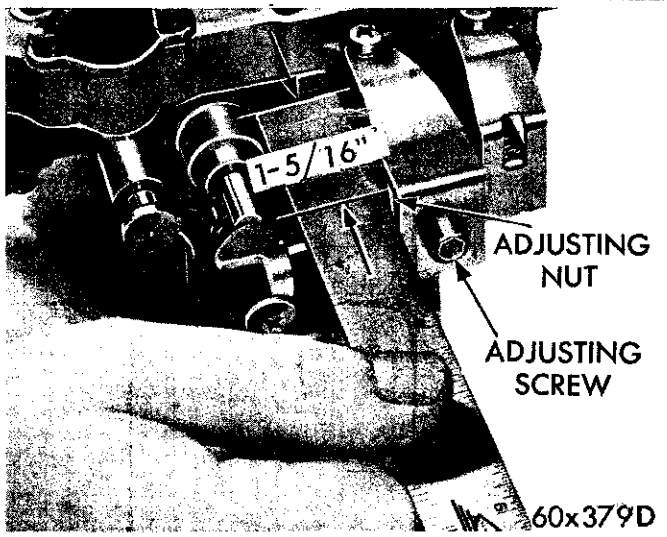


Fig. 29—Line Pressure Adjustment

NOTE: Before adjusting the line pressure, measure the distance between the manual valve (valve in 1-low position) and line pressure adjusting screw (Fig. 28). This measurement must be 1⅞ inches; correct by loosening the spring retainer screws and repositioning the spring retainer. The regulator valve may cock and hang up in its bore if the spring retainer is out of position.

If the line pressure is not correct, it will be necessary to remove the valve body assembly to perform the adjustment. Refer to Paragraph 24.

The approximate adjustment is $1\frac{5}{16}$ inches, measured from the valve body to the inner edge of the adjusting nut (Fig. 29). However, due to manufacturing tolerances, the adjustment can be varied to obtain the specified line pressure.

The adjusting screw may be turned with an Allen wrench. One complete turn of the adjusting screw changes closed throttle line pressure approximately $1\frac{2}{3}$ psi. Turning the adjusting screw counterclockwise increases pressure, and clockwise decreases the pressure.

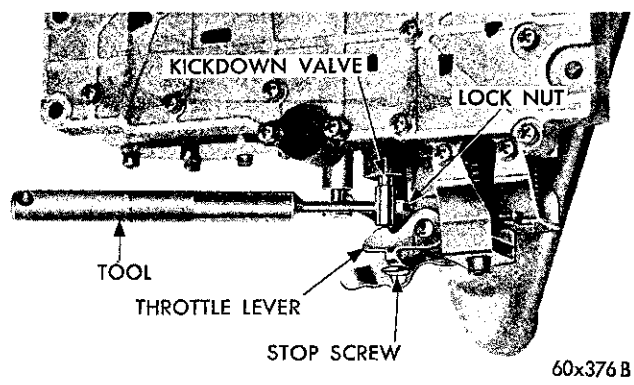


Fig. 30—Throttle Pressure Adjustment

Throttle Pressure

Throttle pressure cannot be tested accurately: therefore, the adjustment should be inspected if a malfunction is evident.

(1) Remove the valve body assembly from the transmission to perform the adjustment. Refer to Paragraph 24.

(2) Loosen the throttle lever stop screw lock nut and back off approximately five turns (Fig. 30).

(3) Insert the gauge pin of Tool C-3763 between the throttle lever cam and the kickdown valve.

(4) By pushing in on the tool, compress the kickdown valve against its spring so the throttle valve is completely bottomed inside the valve body.

(5) As force is being exerted to compress the spring, tighten the throttle lever stop screw finger tight against the throttle lever tang with the throttle lever cam touching the tool and the throttle valve bottomed. **Be sure the adjustment is made with the spring fully compressed and the valve bottomed in the valve body.**

(6) Remove the tool and tighten the stop screw lock nut securely.

16. AIR PRESSURE TESTS

A "NO DRIVE" condition might exist even with correct fluid pressure, because of inoperative clutches or bands. The inoperative units, clutches, bands and servos can be located through a series of tests by substituting air pressure for the fluid pressure (Fig. 31). The front and rear clutches, kickdown servo, and low-reverse servo may be tested by applying air pressure to their respective passage after the valve body assembly had been removed. Refer to Paragraph 24. To make the air pressure tests, proceed as follows:

CAUTION: Compressed air supply must be free of all dirt or moisture. Use a pressure of 30 to 100 psi.

Front Clutch

Apply air pressure to the front clutch "apply" passage and listen for a dull "thud" which indicates that the front clutch is operating. Hold the air pressure on for a few seconds and inspect the system for excessive oil leaks.

Rear Clutch

Apply air pressure to the rear clutch "apply" passage and listen for a dull "thud" which indicates that the rear clutch is operating. Also check for excessive oil leaks.

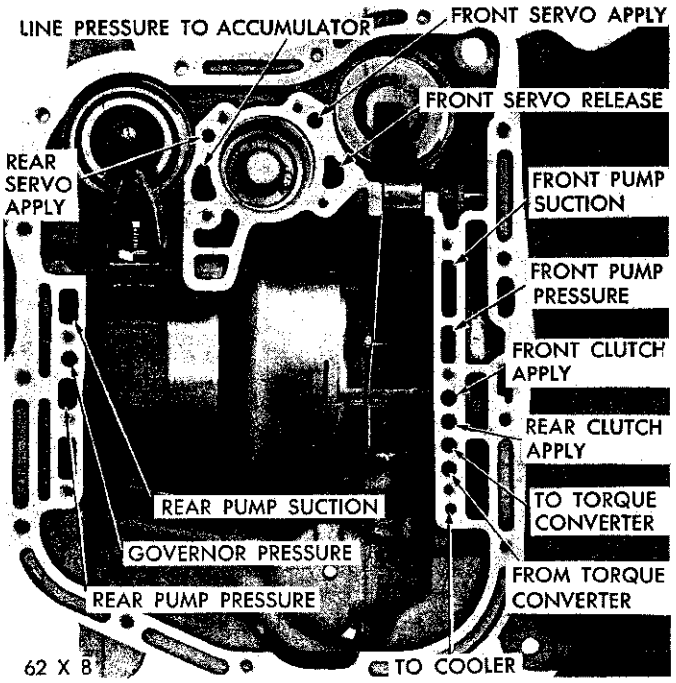


Fig. 31—Air Pressure Tests

NOTE: If a dull "thud" cannot be heard in the clutches, place the finger tips on the clutch housing and again apply air pressure. Movement of the piston can be felt as the clutch is applied.

Kickdown Servo

Direct air pressure into the front servo "apply" passage. Operation of the servo is indicated by a tightening of the front band. Spring tension on the servo piston should release the band.

Low and Reverse Servo

Direct air pressure into the rear servo "apply" passage. Operation of the servo is indicated by a tightening of the rear band. Spring tension on the servo piston should release the band.

If the clutches and servos operate properly; no upshift or erratic shift conditions indicate that the malfunction exists in the control valve body assembly.

Governor

Governor operating failures can generally be diagnosed by a road test or hydraulic pressure tests. Refer to Paragraph 14.

SERVICING OPERATIONS WITH TRANSMISSION IN VEHICLE

Various transmission components can be removed for repairs without removing the transmission from the vehicle. The removal, reconditioning and installation procedures for these components are covered here, except valve body reconditioning, which is described in Paragraph 31.

Heli-Coil inserts are recommended for repairing damaged, stripped or worn threads in aluminum parts. Refer to Paragraph 27.

17. SPEEDOMETER PINION

Removal and Installation

(1) Remove screw and retainer securing the speedometer cable to the extension housing. Carefully work the pinion and sleeve assembly out of the housing (Fig. 32).

(2) To replace the pinion and/or oil seal, pry the clip off the pinion and slide the pinion assembly off the cable. Install a new seal on the cable housing.

(3) If transmission fluid is found in the cable housing, replace the seal inside the pinion bore (Fig. 33). Pry the old seal out of the pinion bore. Place a new seal on the end of the cable with its lip toward the cable, then slide the pinion over the seal and cable. Secure with the spring clip.

(4) To install, push the pinion and sleeve assembly into the extension housing so the sleeve flange is tight against the housing, then install the retainer and screw. Tighten the screw to 150 inch-pounds torque.

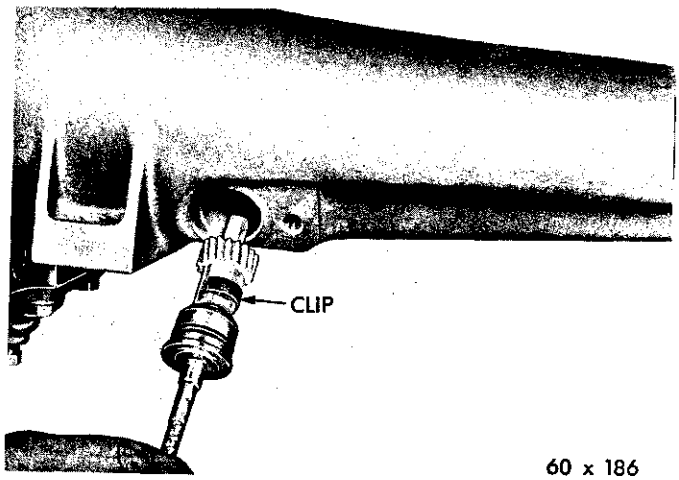


Fig. 32—Removing or Installing Speedometer Pinion

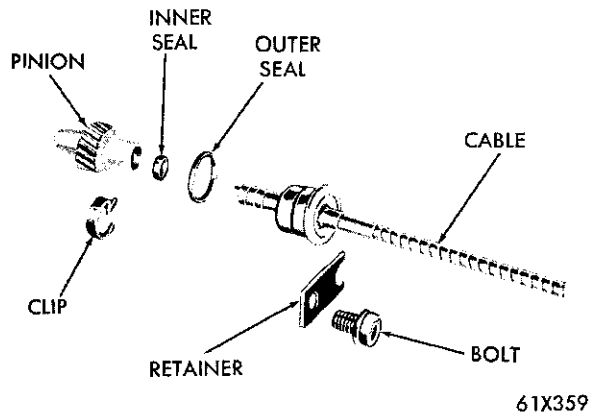


Fig. 33—Speedometer Pinion (Disassembled)

18. OUTPUT SHAFT OIL SEAL

Replacement

(1) Disconnect the propeller shaft at the transmission flange.

(2) Hold the transmission flange with Tool C-3281 and remove the retaining nut and washer (Fig. 34). Slide the flange off the output shaft. (Use puller Tool C-452 if necessary).

(3) Screw the taper threaded end of Tool C-748 into the seal (Fig. 35) then tighten the screw of the tool to remove the seal.

(4) To install a new seal, position seal in the opening of the extension housing with lip of seal facing inward. Drive the seal into the housing with Tool C-3837 (Fig. 36).

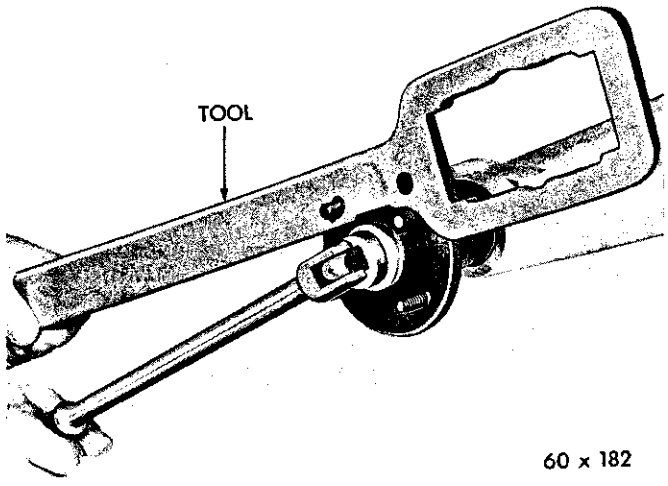


Fig. 34—Removing or Installing Output Shaft Flange Nut

SPEEDOMETER PINION USAGE CHART

Tire Size	Axle Ratio	Output Shaft	Pinion No. Teeth	Pinion Color
8.00-14	2.76:1	8 Teeth	16	Brown
	3.23:1	8 Teeth	19	Dark Blue
8.50-14	2.76:1	8 Teeth	16	Brown
	3.23:1	8 Teeth	19	Dark Blue
9.00-14	2.76:1	8 Teeth	16	Brown
	3.23:1	8 Teeth	18	Dark Purple
7.10-15	3.23:1	8 Teeth	19	Dark Blue
7.60-15	3.23:1	8 Teeth	18	Dark Purple
8.20-15	2.93:1	8 Teeth	16	Brown

(5) Install the transmission output shaft flange. Install washer with its three projections toward the flange and the nut with its convoluted surface contacting the washer. Hold the flange with Tool C-3281, and tighten the nut to 175 foot-pounds torque.

(6) Connect the propeller shaft to the transmission flange.

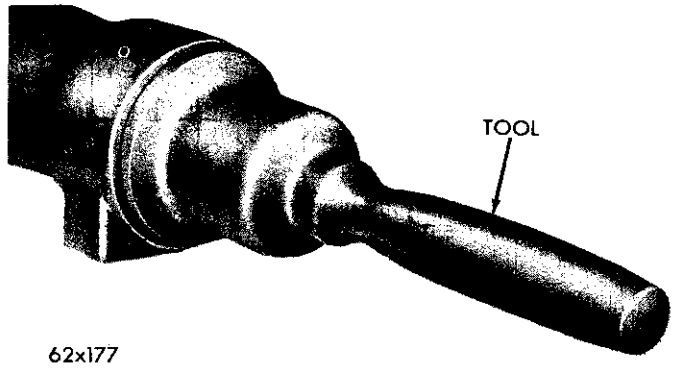


Fig. 36—Installing Output Shaft Oil Seal

19. EXTENSION HOUSING

Removal

(1) Remove the speedometer drive pinion and sleeve assembly. See Paragraph 17.

(2) Remove the transmission flange. See Paragraph 18.

(3) Drain approximately two quarts of fluid from the transmission.

(4) Loosen the parking lock cable clamp bolt where cable enters the housing cover. Refer to Figure 18. Tap the end of clamp bolt lightly to release its hold on the cable. Remove the housing cover lower plug. Insert a screw driver through the hole, then while exerting pressure against projecting portion of the cable lock-spring, withdraw the lock cable.

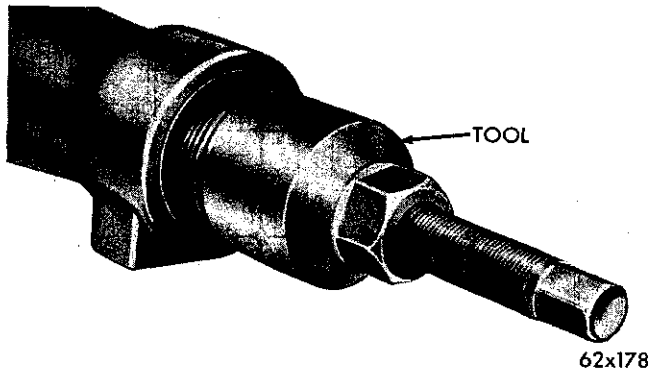


Fig. 35—Removing Output Shaft Oil Seal

(5) Remove two bolts securing the extension housing to the crossmember insulator.

(6) Raise the transmission slightly to clear the crossmember with a service jack, Tool 3203A. Remove crossmember attaching bolts and remove the crossmember, insulator and spring assembly.

(7) Remove the extension housing to transmission bolts, tap the housing lightly with a soft mallet to

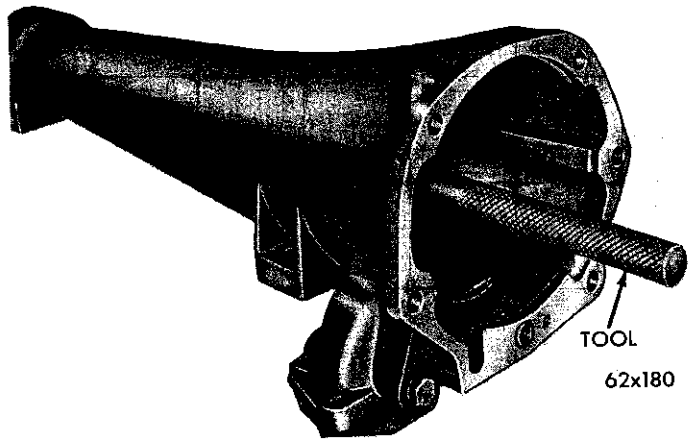


Fig. 37—Removing Output Shaft Bearing

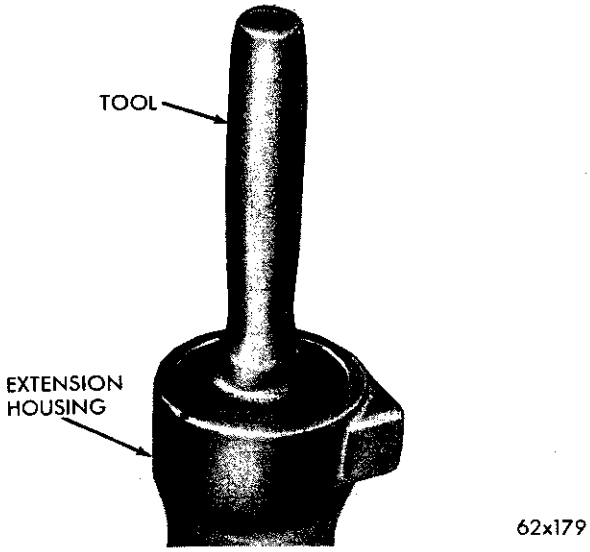


Fig. 38—Installing Output Shaft Bearing

break it loose from the transmission, then remove the housing.

Bearing Replacement

(1) Pry or drive the oil seal out of the extension housing with a long blunt drift. Be sure not to mar the oil seal surface in the housing.

(2) Remove the bearing snap ring from the extension housing. Drive the bearing rearward out of the housing with Tool C-3275 (Fig. 37).

(3) Place a new bearing in the opening of the extension housing. Using Tool C-3204 drive the bearing into the housing (Fig. 38). Install the bearing retaining snap ring.

(4) Place a new seal in the opening of the extension housing (lip of seal facing inward). Using Tool C-3837, drive the seal into housing until the tool bottoms (Fig 36).

Installation

(1) Using a new gasket, carefully slide the extension housing into place, install the retaining bolts and washers, tighten bolts to 24 foot-pounds torque.

(2) Install the crossmember, insulator and spring assembly. Tighten the crossmember attaching bolts to 75 foot-pounds torque. Lower the transmission so the extension housing rests on, and is aligned with the insulator. Install insulator to extension housing bolts and tighten to 35 foot-pounds torque.

(3) Install and adjust the parking lock cable. Refer to Paragraph 10.

(4) Install the transmission flange and connect the propeller shaft. Refer to Paragraph 18, step 5.

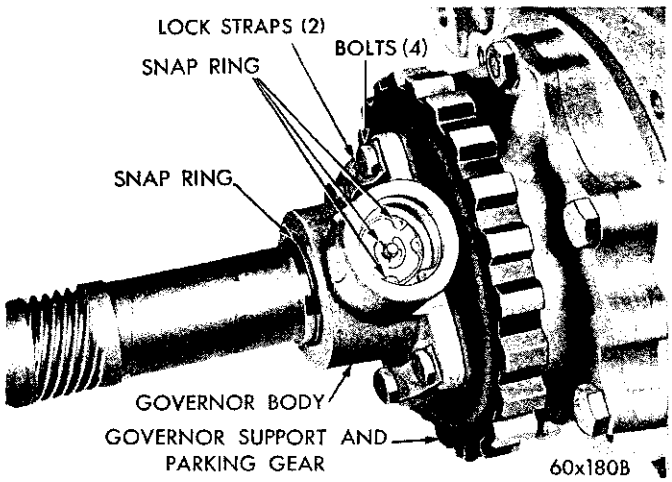


Fig. 39—Governor Shaft and Weight Snap Rings

(5) Install the speedometer drive pinion and sleeve.

(6) Add fluid to the transmission to bring up to the proper level. Refer to Paragraph 4.

20. GOVERNOR

Removal

(1) Remove the extension housing. See Paragraph 19.

(2) Using a screw driver, carefully pry the snap ring from the weight end of governor valve shaft (Fig. 39). Slide the valve and shaft assembly out of the governor body.

(3) Remove the large snap ring from the weight end of the governor body, lift out the governor weight assembly.

(4) Remove the snap ring from inside the governor weight, remove the inner weight and spring from the outer weight. Figure 40 shows a disassembled view of the governor assembly.

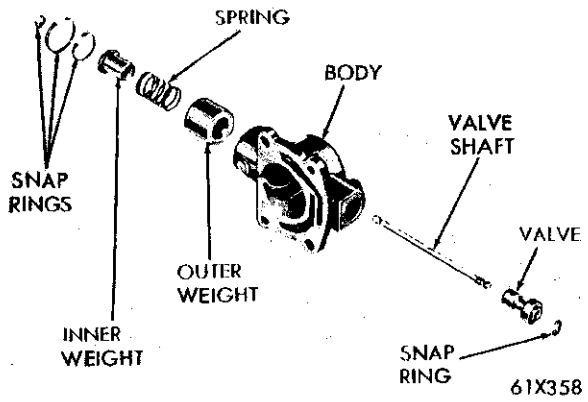


Fig. 40—Governor Assembly (Disassembled)

(5) Remove the snap ring from behind the governor body, then slide the body and support assembly off the output shaft. If necessary remove four bolts and separate the governor from the support.

Cleaning and Inspection

The primary cause of governor operating failure is due to a sticking governor valve or weights. Rough surfaces may be removed with crocus cloth. Thoroughly clean all parts in clean solvent and inspect for free movement before assembly.

Installation

(1) Assemble the governor body to the support (if disassembled) and tighten the bolts finger tight. Make sure oil passage of governor body aligns with passage in the supporrt.

(2) Position the support and governor assembly on output shaft. Align the assembly so the governor valve shaft hole in the governor body aligns with the hole in the output shaft, then slide the assembly into place. Install snap ring behind the governor body (Fig. 39). Tighten body to support bolts to 100 inch-pounds torque. Bend ends of lock straps over the bolt heads.

(3) Assemble the governor weights and spring, and secure with snap ring inside of the large governor weight. Place the weight assembly in the governor body and install the snap ring.

(4) Place the governor valve on the valve shaft, insert the assembly into the body and through the governor weights. Install the valve shaft retaining snap ring. Inspect the valve and weight assembly for free movement after installation.

(5) Install the extension housing, transmission flange and connect the propeller shaft.

(6) Connect and adjust the parking lock cable. Refer to Paragraph 10.

21. REAR OIL PUMP

Removal

(1) Remove the extension housing. See Paragraph 19.

(2) Remove the governor and support. See Paragraph 20.

(3) Unscrew the rear oil pump cover retaining bolts and remove the cover.

(4) The oil pump inner rotor is keyed to the output shaft by a small ball, therefore, use care in sliding out the inner rotor so as not to lose the ball (Fig. 41). Remove the outer rotor from the pump body.

NOTE: If the rear oil pump body requires replacement, it will be necessary to disassemble the transmission as the pump body must be driven rearward out of the case with a wood block.

Inspection

Inspect the oil pump body and cover machine surfaces for nicks and burrs. Inspect the rotors for scoring or pitting. With the gears cleaned and installed in the pump body, place a straight edge across the face of the rotors and the pump body. Using a feeler gauge, measure the clearance between the straight edge and the face of the rotors. The clearance limits are from .0015 to .003 inch.

Installation

(1) Place the outer rotor in the pump body.

(2) Turn the output shaft so the inner rotor driving ball pocket is up. Install the ball and slide the inner

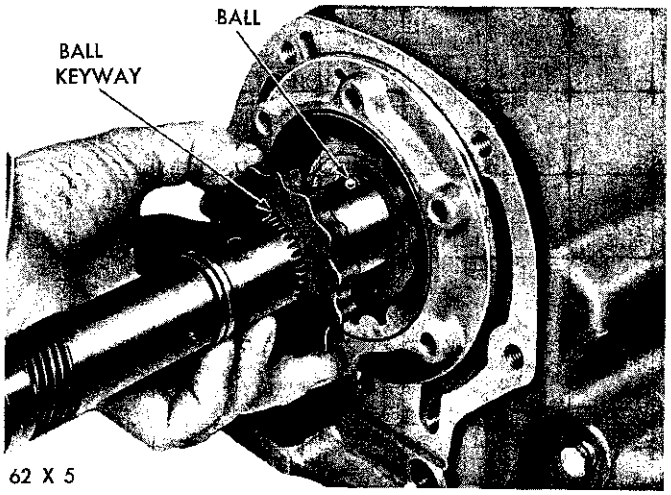


Fig. 41—Removing or Installing Rear Oil Pump Inner Rotor

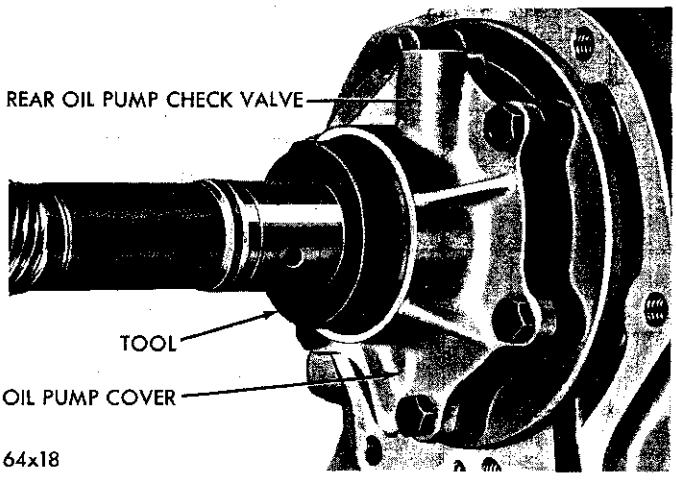


Fig. 42—Aligning Rear Oil Pump Cover

rotor on the output shaft in alignment with the ball and outer rotor (Fig. 41).

(3) Install the oil pump cover with the retaining bolts threaded in a few turns. Slide the aligning fixture Tool C-3864 all the way in until it bottoms against the rotors (Fig. 42), then retighten the cover bolts evenly to 140 inch-pounds torque.

(4) Install the governor and support. See Paragraph 20.

(5) Install the extension housing, transmission flange and connect the propeller shaft.

(6) Connect the parking lock cable.

22. PARKING LOCK COMPONENTS

Removal

(1) Remove the extension housing. See Paragraph 19.

(2) To replace the governor support, refer to Paragraph 20.

(3) Remove the parking lock cable adapter cover from the bottom of the extension housing.

(4) Remove the plug from the extension housing, slide out the shaft to remove the parking lock lever, spacer and cable adapter (Fig. 43). Replace the adapter spring if it is distorted.

(5) Slide the bushing sleeve out of the housing to remove the parking sprag and spring (Fig. 44).

Installation

(1) Position the sprag and spring in the housing and insert the bushing sleeve (Fig. 44). Make sure the square lug on the sprag is toward the gear and the spring is positioned so as to lift the sprag away from the parking gear.

(2) Position the lock lever, spacer and cable adapter assembly in the extension housing and install the lever shaft (Fig. 43). The lever roller must be on top of the sprag so as to push it into engagement with the parking gear. Install and tighten the plug to 150 inch-pounds torque.

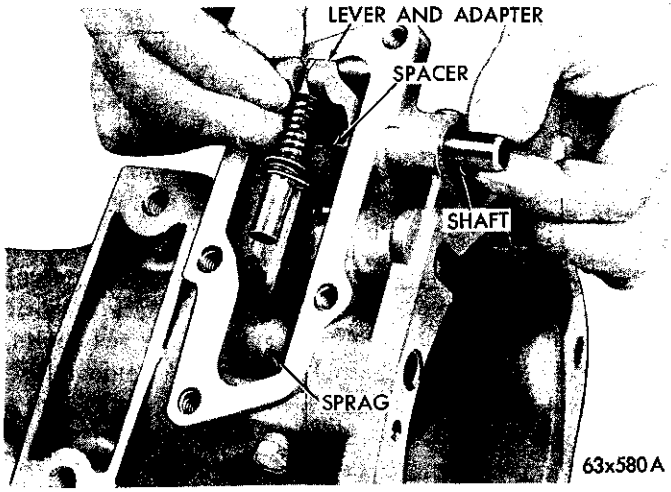


Fig. 43—Removing or Installing Parking Lock Lever and Cable Adapter

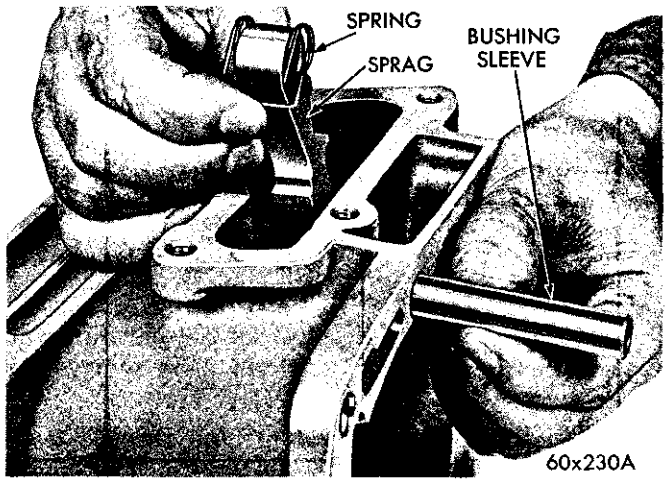


Fig. 44—Removing or Installing Parking Sprag

(3) Insert a small punch through the cable opening in the adapter cover and into the end of the adapter. Carefully lower the cover into position, feeding the adapter into the cable opening in the cover. Install the cover retaining screws and tighten to 150 inch-pounds torque.

(4) Install the extension housing, transmission flange and connect the propeller shaft.

(5) Connect the parking lock cable. See Paragraph 10.

23. NEUTRAL STARTING SWITCH

Replacement

(1) Disconnect the wire from the switch, unscrew the switch allowing the fluid to drain into a container.

(2) **Push Button Control:** Place the cupped washer and "O" ring over the threads of the switch (Fig. 20), then screw the switch into the transmission case a few turns. Refer to Paragraph 11 for complete Adjustment and Test.

(3) **Console Shift:** Place the seal assembly over the threads of the switch (Fig. 21), then install and tighten the switch 25 to 35 foot-pounds torque. Refer to Paragraph 11 for complete Adjustment and Test.

(4) Add fluid to the transmission to bring up to the proper level. Refer to Paragraph 4.

NOTE: Test the starter for operating in all push button or selector lever positions. If it should operate in any position other than push button neutral or selector lever park and neutral, readjust the gearshift

control cable. Refer to Paragraph 9. In some cases, it may be necessary to align the valve body neutral and/or park fingers with the switch plunger. Refer to Paragraph 24.

24. VALVE BODY ASSEMBLY AND ACCUMULATOR PISTON

Removal

(1) Raise the vehicle on a hoist.

(2) Loosen the oil pan bolts, tap the pan to break it loose allowing the fluid to drain, then remove the oil pan.

(3) Loosen clamp bolt and lift the throttle lever and washer off the transmission throttle lever shaft.

(4) Disconnect the gearshift control cable. Refer to Paragraph 9. Shift the valve body manual lever to the 1 (low) position to expose the nut securing the cable adapter to the lever (Fig. 22). Remove the nut and disengage the cable adapter from the manual lever.

(5) Place a drain pan under the transmission, then remove the ten hex-head valve body to transmission case bolts. Hold the valve body in position while removing the bolts.

(6) Lower the valve body assembly down out of the transmission, being careful not to cock the throttle lever shaft in the case hole or lose the accumulator spring.

(7) Withdraw the accumulator piston from the transmission case. Inspect the piston for scoring, and the rings for wear or breakage. Replace as required.

NOTE: Servicing the valve body assembly is outlined in Paragraph 31.

Installation

(1) Clean mating surfaces and inspect for burrs on both the transmission case and the valve body steel plate.

(2) Install the accumulator piston in the transmission case.

(3) Position the accumulator spring on the valve body.

(4) Carefully position the valve body assembly in the transmission case, install the retaining bolts and tighten finger tight. With the neutral starting switch installed, place the manual valve in the neutral position. Shift the valve body if necessary to center the neutral finger over the neutral switch plunger. Snug the bolts down evenly, then tighten to 100 inch-pounds torque.

(5) Connect the control cable adapter to the valve body manual lever and install the retaining nut. Connect the gearshift control cable. Refer to Paragraph 6.

(6) Install the seal, flat washer and throttle lever on throttle shaft. Tighten the clamping bolt. Test the throttle lever for looseness by forcing it in both directions.

(7) Install the oil pan, using a new gasket.

(8) Add fluid to the transmission to bring it up to proper level. Refer to Paragraph 4.

25. TRANSMISSION AND CONVERTER

The transmission and converter must be removed and installed as an assembly; otherwise, the converter drive plate, front pump bushing, and oil seal will be damaged. The drive plate will not support a load; therefore, none of the weight of the transmission should be allowed to rest on the plate during removal or installation.

Removal

(1) Connect a Remote Control Starter Switch, Tool C-763 to the starter solenoid and position the switch so the engine can be rotated from under the vehicle.

(2) Disconnect the secondary (high tension) cable from the ignition coil.

(3) Place the parking lock lever if so equipped in the OFF position, then raise the vehicle on a hoist or support with stands.

(4) Remove the cover plate from in front of the converter assembly to provide access to the converter drain plug and mounting bolts.

(5) Rotate the engine with the Remote Control Switch to bring the drain plug to the "6 o'clock" position. Drain the torque converter and transmission.

(6) Mark the converter and drive plate to aid in reassembly. The crankshaft flange bolt circle, the inner and outer circle of holes in the drive plate, and the four tapped holes in the front face of the converter all have one hole offset so these parts will be installed in the original position. This maintains the balance of the engine and converter.

(7) Rotate the engine with the Remote Control Switch to locate two converter to drive plate bolts at "5 and 7 o'clock" positions. Remove the two bolts, rotate the engine with the switch and remove the other two bolts. **Do not rotate the converter or drive plate by prying with a screw driver or similar tool as the drive plate might become distorted. Also, the starter should never be engaged if the drive plate is not attached to the converter with at least one bolt or**

if the transmission case to engine block bolts have been loosened.

(8) Disconnect the negative (ground) cable from the battery.

(9) Remove the starting motor assembly.

(10) Disconnect the wire from the neutral starting switch.

(11) Remove the gearshift control cable to transmission adjusting wheel lock screw. Pull the gearshift cable out of the transmission case as far as possible, back off the adjusting wheel a few turns if necessary.

(12) Insert a small screwdriver above and slightly to the right of the gearshift cable (Fig. 17). Disengage the cable adapter lock spring by pushing the screwdriver handle to the right while pulling outward on the cable.

(13) Disconnect the throttle rod from the relay lever at the left side of the transmission.

(14) Disconnect the oil cooler lines at the transmission and remove the oil filler tube.

(15) Remove the speedometer pinion and sleeve assembly from the transmission (Fig. 32).

(16) Loosen the transmission parking lock cable clamp bolt where the cable enters the cover (Fig. 18). Tap the end of clamp bolt lightly to release its hold on the cable. Remove the housing cover lower plug. Insert a screw driver through the hole, then gently exert pressure against the projecting portion of the cable lock-spring and withdraw the lock cable.

(17) Disconnect the front universal joint and support the propeller shaft out of the way.

Imperial Models: Remove the propeller shaft center bearing housing bolts. Slide the front propeller shaft rearward to disengage the front universal joint from the front flange.

(18) Remove the engine rear mount insulator to extension housing bolts.

(19) Install engine support fixture, Tool C-3487 and raise the engine slightly.

(20) Remove the crossmember attaching bolts and remove the crossmember.

(21) Place a transmission service jack under the transmission to support the assembly.

(22) Attach a small "C" clamp to the edge of the converter housing to hold the converter in place during the removal of the transmission.

(23) Remove the converter housing retaining bolts. Carefully work the transmission rearward off the engine block dowels and disengage the converter hub from the end of the crankshaft (Fig. 45).

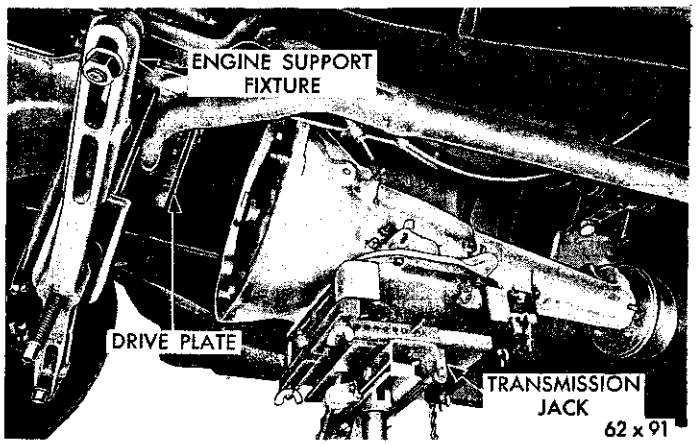


Fig. 45—Removing or Installing Transmission and Converter Assembly

(24) Lower the transmission jack and remove the transmission and converter assembly.

(25) To remove the converter assembly, remove the "C" clamp from the edge of the housing, then carefully slide the assembly out of the transmission.

Converter Installation

(1) Rotate the front pump rotors with Tool C-3881 until the two small holes in the handle of Tool are vertical (Fig. 46).

(2) Carefully slide the converter assembly over the input shaft and reaction shaft. Make sure the converter impeller shaft slots are also vertical and fully engage the front pump inner rotor lugs.

Inspect for full engagement by placing a straightedge on the face of the case (Fig. 47). The surface of the converter front cover lug should be at least ½ inch to the rear of the straightedge when the converter is pushed all the way into the transmission.

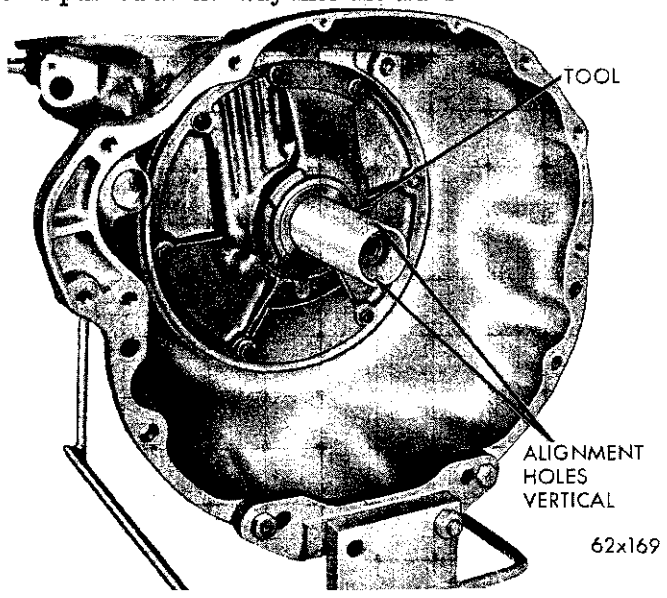


Fig. 46—Aligning Front Pump Rotors

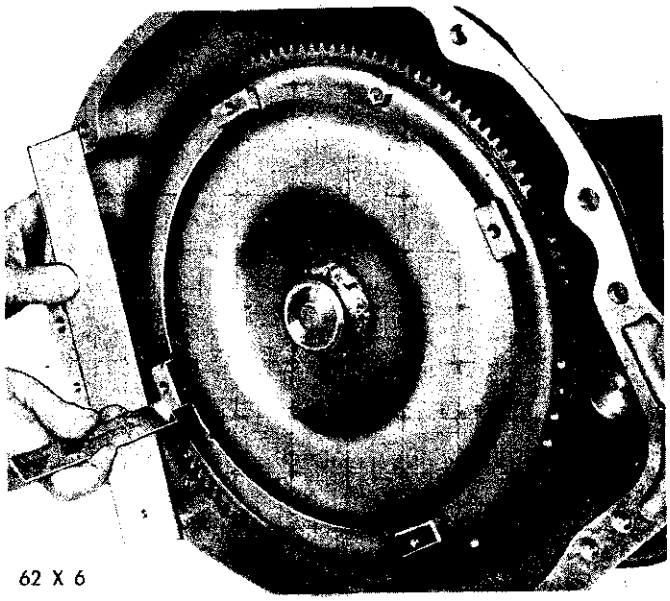


Fig. 47—Measuring Converter for Full Engagement in Transmission

(3) Attach a small "C" clamp to the edge of the converter housing to hold the converter in place during transmission installation.

Installation

(1) Inspect the converter drive plate for distortion or cracks and replace if necessary.

(2) Coat the converter hub hole in the crankshaft with wheel bearing lubricant. Place the transmission and converter assembly on a service jack and position the assembly under the vehicle for installation. Raise or tilt as necessary until the transmission is aligned with the engine.

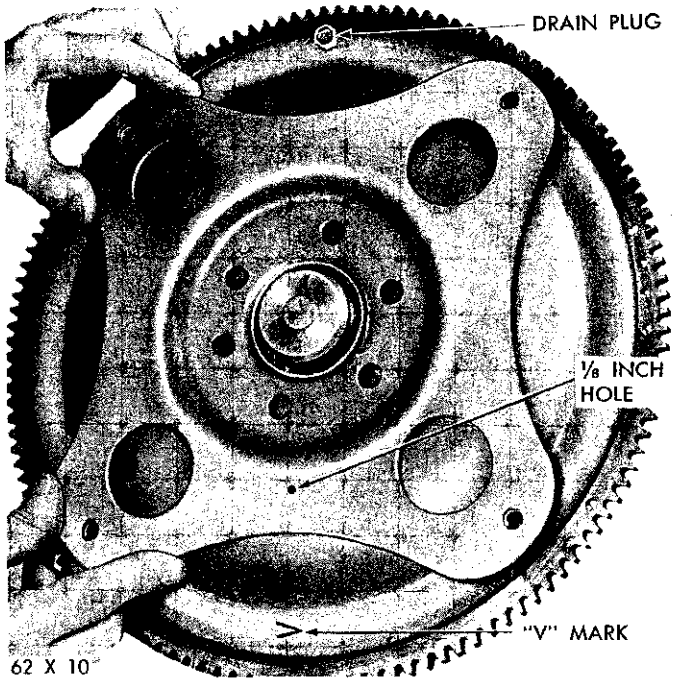


Fig. 48—Converter and Drive Plate Markings

(3) Rotate the converter so mark on converter (made during removal) will align with mark on drive plate. The offset holes in the plate are located next to the ⅛ inch hole in the inner circle of the plate. A stamped V mark identifies the offset hole in the converter front cover (Fig. 48). Carefully work the transmission assembly forward over the engine block dowels with the converter hub entering the crankshaft opening.

(4) After the transmission is in position, install the converter housing bolts and tighten 25 to 30 foot-pounds torque.

(5) Install and tighten the two lower drive plate to converter bolts and tighten to 270 inch-pounds torque.

(6) Install the starting motor and connect the battery ground cable.

(7) Rotate the engine with the Remote Control Switch and install the other two drive plate to converter bolts. Tighten bolts to 270 inch-pounds torque.

(8) Install the crossmember and tighten attaching bolts securely. Lower the transmission so the extension housing is aligned and rests on the insulator. Install bolts and tighten to 35 foot-pounds torque.

(9) Insert a screw driver through parking lock cover plug opening and position it behind the cable adapter stop washer (Fig. 19). Hold the adapter outward while pushing the cable in as far as possible, making sure lockspring engages cable. Gently pull outward on the cable housing to its limit of travel, then tighten the clamp bolt to 10 inch-pounds torque. Remove the screw driver and reinstall the plug in the cover.

(10) Connect the propeller shaft to the front flange. Tighten the flange nuts to 35 foot-pounds torque.

Imperial Models: Place the propeller shaft center bearing housing shims under the housing, install the retaining bolts and tighten to 35 foot-pounds torque.

(11) Install the speedometer drive pinion and sleeve.

(12) Connect the oil cooler lines to the transmission. Install the oil filler tube.

(13) Connect the throttle rod to the relay lever at the left side of the transmission.

(14) Have an assistant engage and hold in firmly, the R (reverse) button or place the console selector lever in the park position. Insert the control cable in the transmission case, push inward on the cable making sure the lock spring engages the cable. Install the control cable adjusting wheel lock screw.

(15) Connect the wire to the neutral starting switch.

(16) Install the cover plate in front of the converter assembly.

(17) Refill the transmission with Automatic Transmission Fluid, Type "A" Suffix "A".

NOTE: To completely adjust the throttle linkage, gearshift control cable, and neutral starting switch, refer to "Maintenance, Adjustments and Tests". Paragraphs 9, 11 and 13.

RECONDITION TRANSMISSION UNIT OUT OF VEHICLE

The following reconditioning paragraphs cover the removal, disassembly, inspection, repair, assembly and installation procedures for each sub-assembly in detail.

In the event that any part has failed in the transmission, the torque converter should be flushed to insure that fine metal particles are not later transferred back into the reconditioned transmission.

SERVICE PROCEDURES

26. FLUSHING THE TORQUE CONVERTER

The torque converter **must be removed** from the vehicle for flushing, as the converter should never be rotated by the starter with the transmission removed.

(1) Place the torque converter in an upright position and pour two quarts of new clean solvent or kerosene into the converter through the impeller hub.

(2) Turn and shake the converter so as to swirl the solvent through the internal parts. Turning the turbine and stator with transmission input and reaction shafts will aid in dislodging foreign material.

(3) Position the converter in its normal operating position with drain plug at the lowest point. Remove the drain plug and drain the solvent. Rotate the turbine and stator, and shake the converter while draining to prevent dirt particles from settling.

(4) Repeat the flushing operation at least once, or as many times as required until the solvent or kerosene drained out is clear.

(5) After flushing, shake and rotate the converter several times with the drain plug out to remove any residual solvent and dirt. Flush any remaining solvent from the converter with two quarts of new transmission fluid. This will prevent any adverse effect the solvent may have on the transmission seals. Reinstall the drain plug and tighten to 14 foot-pounds torque.

27. ALUMINUM THREAD REPAIR

Damaged or worn threads in the aluminum transmission case and valve body can be repaired by the use of Heli-Coils. Essentially, this repair consists of drilling out the worn or damaged threads, tapping the hole with a special Heli-Coil Tap, and installing a Heli-Coil insert into the tapped hole. This brings the hole back to its original thread size.

The chart lists the threaded hole sizes which are used in the aluminum case and valve body, and the necessary tools and inserts for the repair of damaged or worn threads. Heli-Coil tools and inserts are readily available from most automotive parts jobbers.

28. FRONT PUMP OIL SEAL

Replacement

The front pump oil seal can be replaced without

	HELI-COIL INSERT		DRILL	TAP	INSERTING TOOL	EXTRACTING TOOL
Thread Size	Part No.	Insert Length	Size	Part No.	Part No.	Part No.
10-24	1185-3	.285"	13/64" (.203")	3 CPB	528-3N	1227-6
1/4-20	1185-4	3/8"	17/64" (.265")	4 CPB	528-4N	1227-6
5/16-18	1185-5	15/32"	Q (.332")	5 CPB	528-5N	1227-6
3/8-16	1185-6	9/16"	X (.397")	6 CPB	528-6N	1227-6
7/16-14	1185-7	21/32"	29/32" (.453")	7 CPB	528-7N	1227-16

NOTE: Some thread drag may occur in screwing a bolt into the installed Heli-Coil insert. Therefore, a torque reading should be taken of the thread drag with an inch-pound torque wrench and added to the specified bolt torque, so that all bolts securing a particular part will be tightened to the same torque.

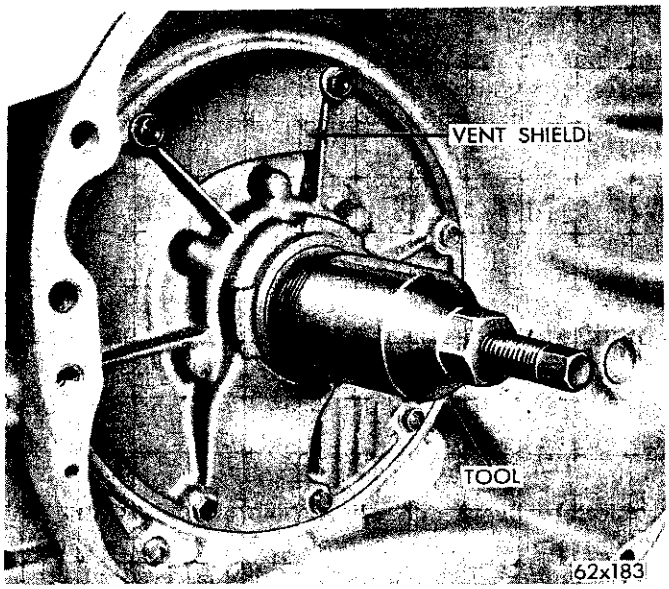


Fig. 49—Removing Front Pump Oil Seal

removing the front pump and reaction shaft support assembly from the transmission case.

(1) Screw seal remover, Tool C-3861 into the seal (Fig. 49). Tighten the screw portion of tool to withdraw the seal.

(2) To install a new seal, place the seal in the opening of the pump housing (lip side facing inward). Using Tool C-3860, drive the seal into the housing until the tool bottoms (Fig. 50).

29. REMOVAL OF SUB-ASSEMBLIES

Prior to removing any of the transmission subassemblies, plug all openings and thoroughly clean the exterior of the unit, preferably by steam. Cleanliness through the entire disassembly and assembly cannot be over-emphasized. When disassembling, each part should be washed in a suitable solvent, then dried by compressed air. **Do not wipe parts with shop towels.** All of the mating surfaces in the transmission are accurately machined; therefore, careful handling of the parts must be exercised to avoid nicks or burrs.

Oil Pan

(1) Place the transmission assembly in repair stand, Tool C-3750 with adapter C-3882 (Fig. 51).

(2) Unscrew the oil pan bolts and remove the oil pan and gasket.

Valve Body Assembly

(1) Unscrew the retaining nut and remove the control cable adapter from the valve body manual lever (Fig. 22).

(2) Remove the ten hex-head valve body assembly to transmission case bolts (Fig. 22). Hold the valve body in position while removing the bolts.

(3) Lift the valve body assembly out of the transmission case, being careful not to cock the throttle lever shaft.

Accumulator Piston and Spring

(1) Lift the spring off the accumulator piston and withdraw the piston from the case.

Measuring Drive Train End Play

Measure the drive train end play before removal of

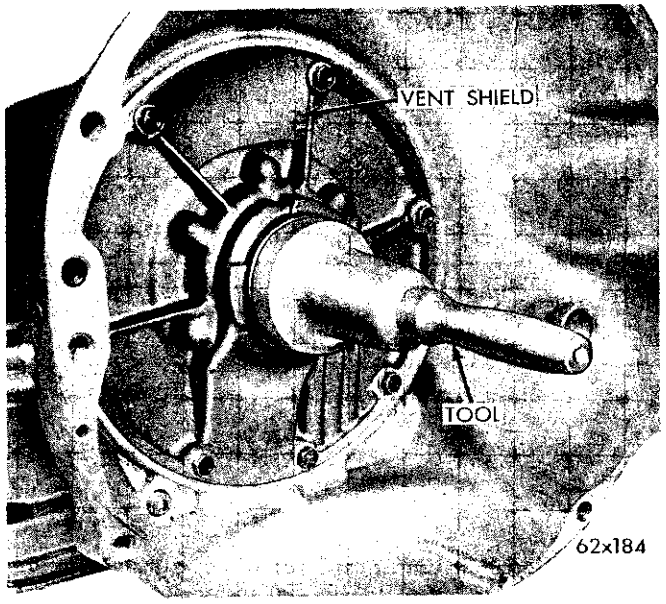


Fig. 50—Installing Front Pump Oil Seal

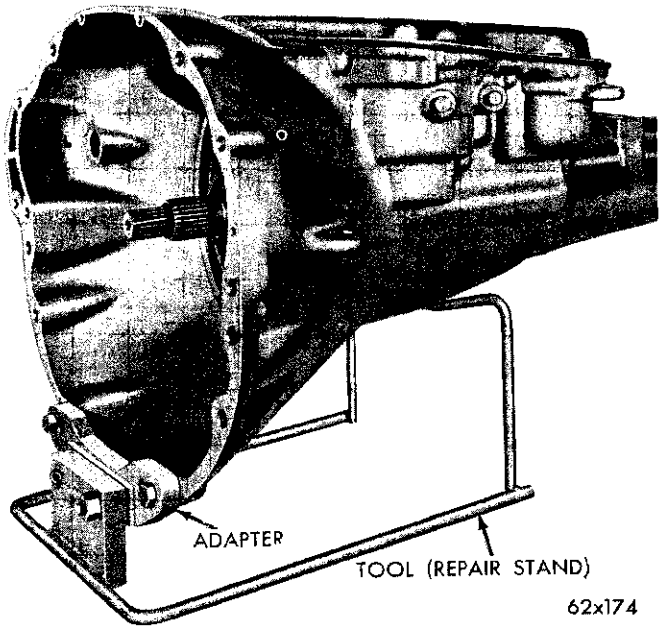


Fig. 51—Transmission Installed in Repair Stand

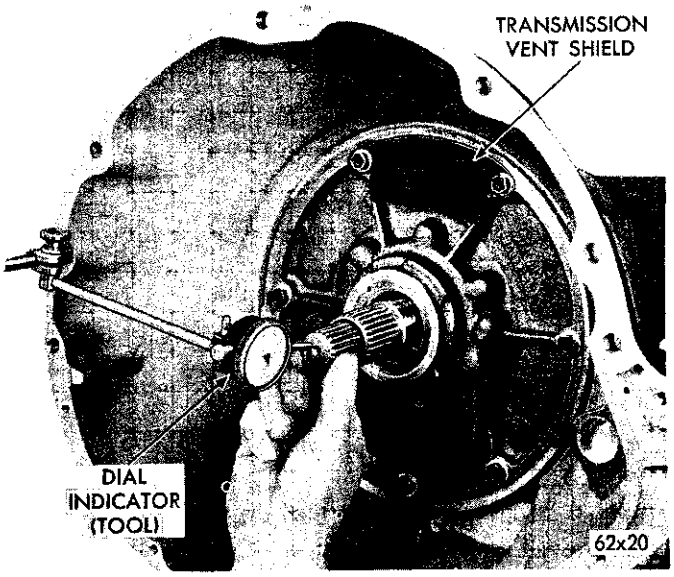


Fig. 52—Measuring Drive Train End Play

the output shaft universal joint flange. This will usually indicate when a change in the thrust washer between the reaction shaft support and front clutch retainer is required to properly adjust end play during assembly (except when major parts are replaced).

(1) Attach a dial indicator to the transmission bell housing with its plunger seated against the end of input shaft (Fig. 52).

(2) Chuck the input shaft in and out to obtain the end play reading.

(3) Record the indicator reading for reference when reassembling the transmission. The end play specifications are .030-.069 inch.

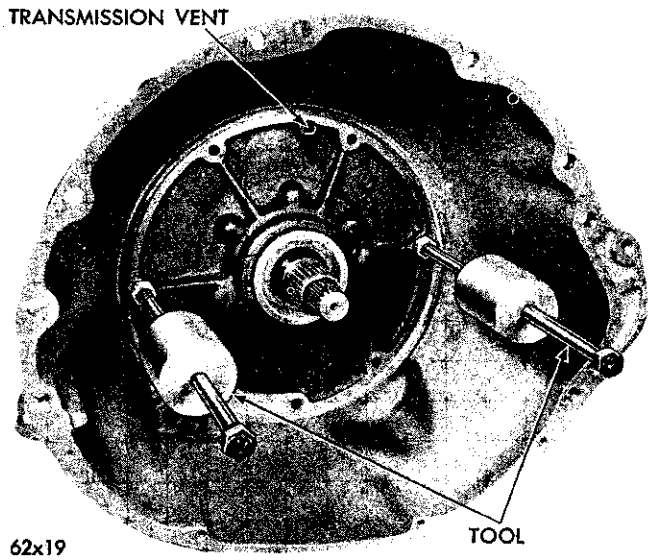


Fig. 53—Removing Front Oil Pump and Reaction Shaft Support Assembly

Extension Housing

(1) Hold the transmission flange with Tool C-3281, and remove the retaining nut and washer (Fig. 34). Slide the flange off the output shaft. (Use puller, Tool C-452 if necessary).

(2) Remove the extension housing to transmission bolts, tap the housing lightly with a soft mallet to break it loose from the transmission, then carefully remove the housing.

Governor and Support

(1) Using a screw driver, carefully pry the snap ring from the weight end of the governor valve shaft (Fig. 39). Slide the valve and shaft assembly out of the governor body.

(2) Remove the snap ring from behind the governor body, then slide the governor body and support assembly off the output shaft.

Rear Oil Pump

(1) Unscrew the rear oil pump cover retaining bolts and remove the cover.

(2) The oil pump inner rotor is keyed to the output shaft by a small ball. Therefore, (use care in sliding out the inner rotor so as not to lose the ball (Fig. 41). Remove the outer rotor from the pump body.

NOTE: If replacement of the rear oil pump body is required, drive it rearward out of the case with a wood block after the transmission has been disassembled.

Front Oil Pump and Reaction Shaft Support

(1) Remove the front oil pump housing retaining bolts.

(2) Tighten the front band adjusting screw until the band is tight on the front clutch retainer. This prevents the clutch retainer from coming out with the pump which might cause unnecessary damage to the clutches.

(3) Attach Tool C-3752 to the pump housing flange as shown in Figure 53, thread the screws of the tool into the flange holes at 9 and 3 o'clock locations.

(4) Bump outward evenly on the two "knocker weights" to withdraw the oil pump and reaction shaft support assembly from the case.

Front Band and Front Clutch

(1) Loosen the front band adjuster, remove the band strut and slide the band out of the case.

(2) Slide the front clutch assembly out of the case.

Input Shaft and Rear Clutch

(1) Grasp the input shaft, and slide the input shaft and rear clutch assembly out of the case.

CAUTION: Be careful not to lose the thrust washer located between the rear end of input shaft and forward end of output shaft.

Planetary Gear Assemblies, Sun Gear, Driving Shell

(1) While supporting the output shaft and driving shell, carefully slide the assembly forward and out through the case.

CAUTION: Be very careful not to damage the ground surfaces on the output shaft during removal.

Rear Band and Low-Reverse Drum

(1) Remove the low-reverse drum, then loosen the rear band adjuster, remove the band strut and remove the band from the case.

Overrunning Clutch

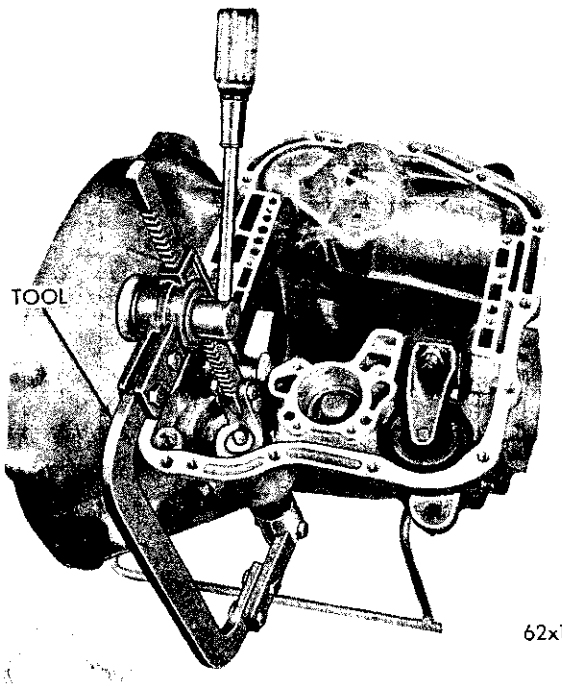
(1) Note the position of the overrunning clutch rollers and springs before disassembly to assist in reassembly.

(2) Carefully slide out the clutch hub and remove the rollers and springs.

NOTE: If the overrunning clutch cam and/or roller spring retainer are found damaged or worn, refer to Paragraph 41 for replacement procedures.

Kickdown Servo

(1) Compress the kickdown servo spring by using engine valve spring compressor Tool C-3422, then remove the snap ring (Fig. 54).



-Compressing Kickdown Servo Spring

(2) Remove the rod guide, springs and piston rod from the case. Be careful not to damage the piston rod or guide during removal.

(3) Insert Tool C-484 inside piston and withdraw the piston from the transmission case.

Low and Reverse Servo

(1) Compress the low and reverse servo piston spring by using engine valve spring compressor Tool C-3422, then remove the snap ring.

(2) Remove the spring retainer, spring, and servo piston and plug assembly from the case.

30. RECONDITION SUB-ASSEMBLIES

The following procedures cover the disassembly, inspection, repair, and assembly of each sub-assembly as removed from the transmission.

Pre-sized service bushings are available for replacement for most all bushings in the TorqueFlite transmission. The two bushings in the sun gear are not serviced because of the low cost of the sun gear assembly. If the bushings are found worn or scored, they should be replaced as outlined in the following reconditioning procedures.

The bushing replacement tools listed by "SP" numbers are part of Tool Kit C-3887.

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on valves, use extreme care to avoid rounding off the sharp edges. The sharp edge is vitally important to this type valve. Sharp edges prevent dirt and foreign matter from getting between the valve and body, thus reducing the possibilities of sticking. When it becomes necessary to recondition the transmission, and vehicle has accumulated considerable mileage, install new seal rings on parts requiring their usage.

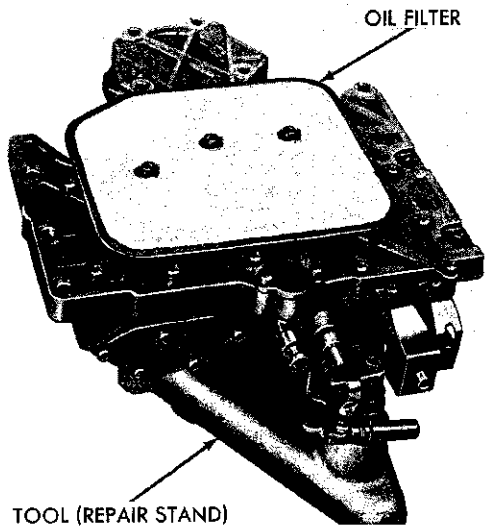


Fig. 55—Removing or Installing Oil Filter

NOTE: Coat each part with Automatic Transmission Fluid—Type "A", Suffix "A" during assembly.

31. VALVE BODY ASSEMBLY

Disassembly

NOTE: Never clamp any portion of the valve body or transfer plate in a vise. Any slight distortion of the aluminum body or the transfer plate will result in sticking valves, excessive leakage or both. When removing or installing valves or plugs, slide them in or out carefully. Do not use force.

(1) Place the valve body assembly on a repair stand, Tool C-3749 (Fig. 55). Remove three screws from the oil filter and lift off the filter and gasket.

(2) While holding the spring retainer bracket firmly against the spring force, remove the three bracket retaining screws (Fig. 56).

(3) Remove the spring bracket, torque converter control valve spring, and the regulator valve spring with line pressure adjusting screw assembly.

NOTE: Do not alter the setting of the line pressure adjusting screw and nut. The nut has an interference thread and does not turn easily on the screw.

(4) Slide the regulator valve out of the valve body. Slide the torque converter control valve out of the valve body.

(5) Remove the 14 transfer plate retaining screws. Carefully lift the transfer plate and steel plate assembly off the valve body.

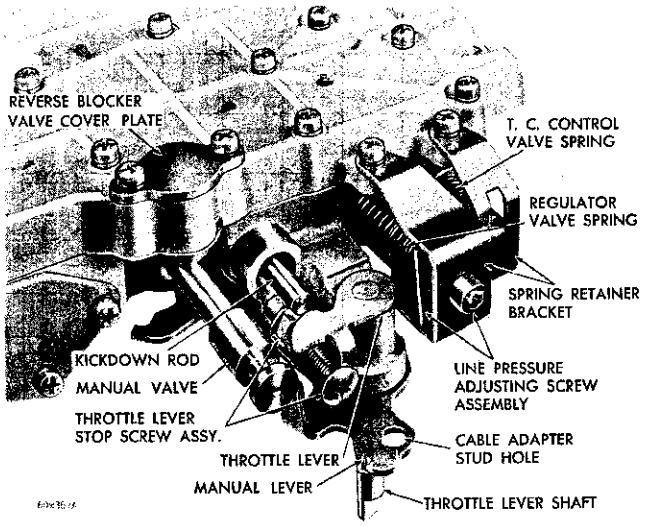


Fig. 56—Regulator and Converter Control Valves (Assembled View)

(6) Invert the transfer plate assembly and remove the stiffener plate. Remove remaining screws securing the steel plate to the transfer plate, and carefully lift off the steel plate (Fig. 57). Remove the rear pump check valve and spring.

(7) Remove the reverse blocker valve cover and lift out the spring and valve.

(8) Note location of the six steel balls in the valve body, one of them is larger than the other five and is in the larger chamber (Fig. 58). Remove the steel balls, front pump check valve and spring.

(9) Invert the valve body and lay it on a clean cloth or paper. Remove E-clip from the throttle lever

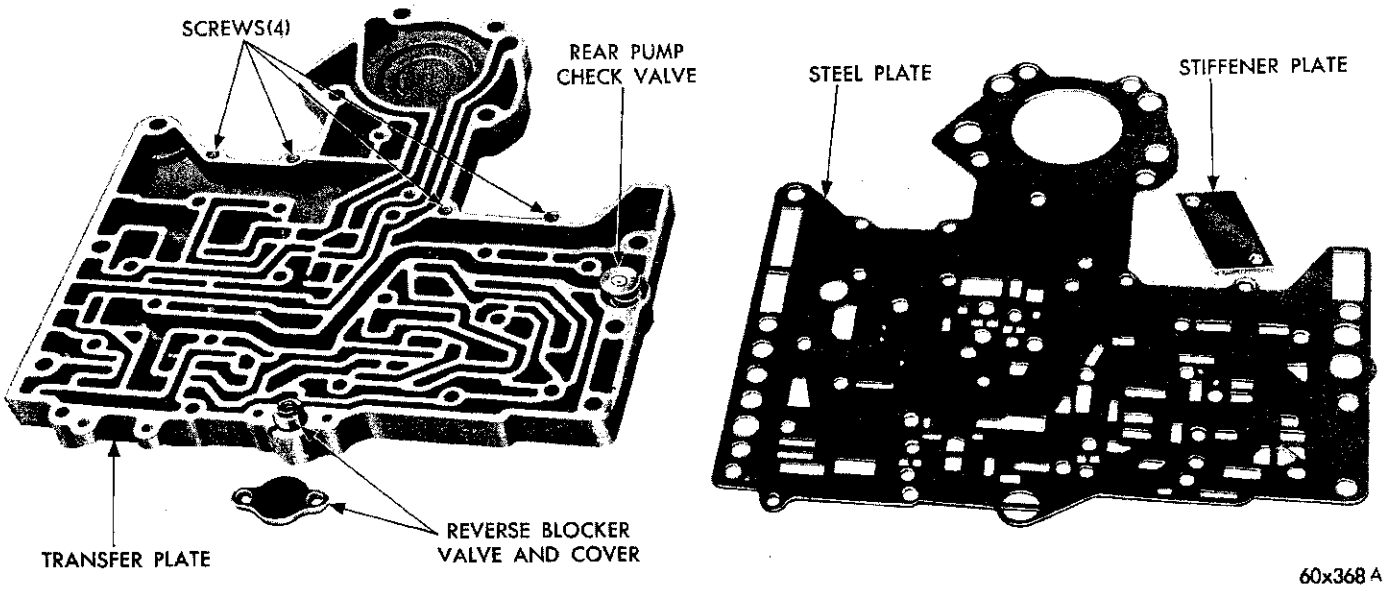


Fig. 57—Transfer and Steel Separator Plate Assembly

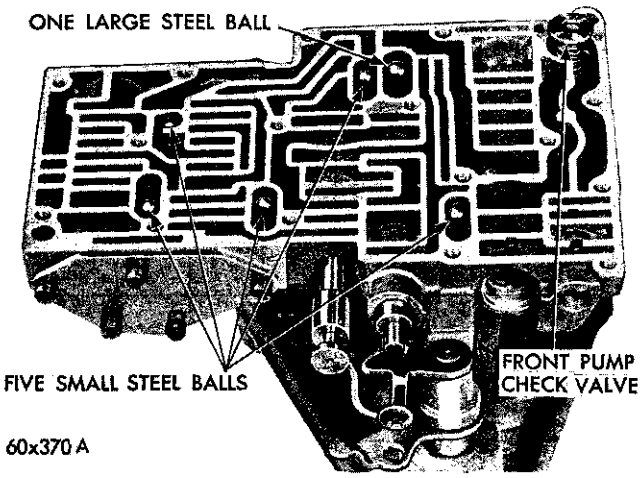


Fig. 58—Front Pump Check Valve and Steel Ball Location

shaft (Fig. 59). Remove any burrs from the shaft, then while holding the manual lever detent ball and spring in their bore with Tool C-3765 or similar tool, slide the manual lever off the throttle shaft. Remove the detent ball and spring.

(10) Remove the manual valve, carefully slide it out of the valve body with a rotating motion.

(11) Remove the throttle lever and shaft from the valve body.

(12) Remove the shuttle valve cover plate (Fig. 59). Remove the E-clip from the exposed end of the shuttle valve.

(13) Remove the throttle lever stop screw assembly (Fig. 60), being careful not to disturb the setting any more than is necessary.

(14) Remove the kickdown detent, kickdown valve, throttle valve spring and the throttle valve (Fig. 60).

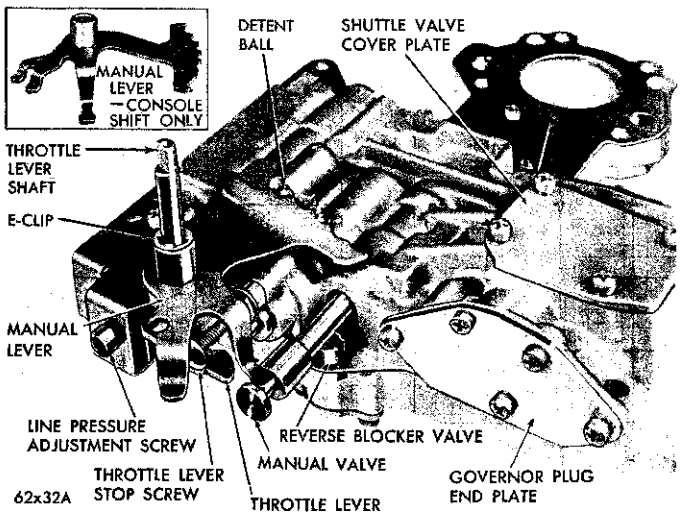


Fig. 59—Valve Body Controls (Assembled View)

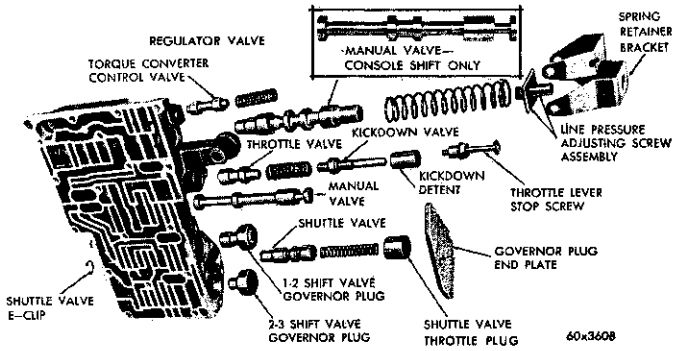


Fig. 60—Valve Body—Lever Side (Disassembled)

(15) Remove the governor plug end plate (Fig. 60). Tip up the valve body to allow the shuttle valve, throttle plug, spring, shuttle valve, and the shift valve governor plugs to slide out into your hand.

Note the longer stem on the 1-2 shift valve plug as a means for identification.

(16) Remove the shift valve end plate (Fig. 61) and slide out the two springs and valves.

(17) Remove the regulator valve end plate. Slide the regulator valve line pressure plug, sleeve, and

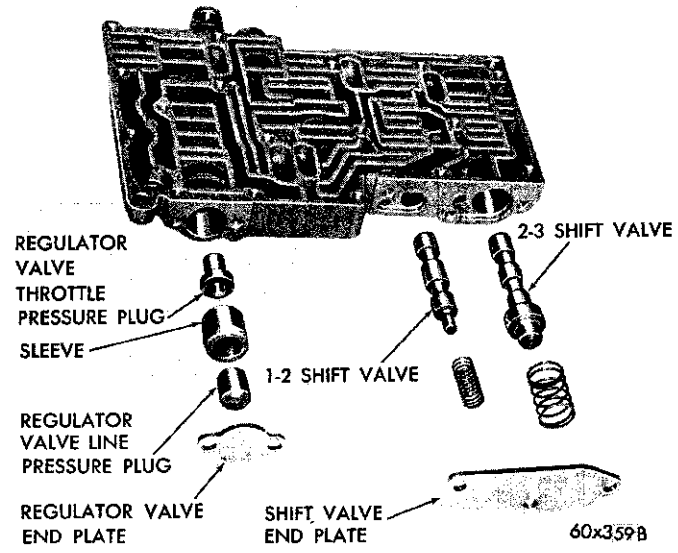


Fig. 61—Valve Body—Shift Valve Side (Disassembled)

the regulator valve throttle pressure plug out of the valve body.

Cleaning and Inspection

Allow all parts to soak a few minutes in a suitable clean solvent. Wash thoroughly and blow dry with compressed air. Make sure all passages are clean and free from obstructions.

Inspect the manual and throttle valve operating levers and shafts for being bent, worn or loose. If a lever is loose on its shaft, it may be **silver soldered** only, or the lever and shaft assembly should be replaced.

CAUTION: Do not attempt to straighten bent levers.

Inspect all mating surfaces for burrs, nicks and scratches. Minor blemishes may be removed with crocus cloth, using only a very light pressure. Using straightedge, Tool C-3335, inspect all mating surfaces for warpage or distortion. Slight distortion may be corrected, using a surface plate. Make sure all metering holes in the steel plate are open. Using a pen light, inspect bores in the valve body for scores, scratches, pits and irregularities.

Inspect all valve springs for distortion and collapsed coils. Inspect all valves and plugs for burrs, nicks and scores. Small nicks and scores may be removed with crocus cloth, providing extreme care is taken not to round off sharp edges. The sharpness of these edges is vitally important because it prevents foreign matter from lodging between the valve and the valve body, thus reducing the possibility of sticking. Inspect all valves and plugs for freedom of operation in the valve body bores. When bores, valves and plugs are clean and dry, the valve and plugs should fall freely in the bores.

NOTE: The valve body bores do not change dimensionally with use. Therefore, a valve body that was functioning properly when the vehicle was new, will operate correctly if it is properly and thoroughly cleaned. There is no need to replace the valve body unless it is damaged in handling.

Assembly

(1) Place the rear pump check valve and spring in the transfer plate (Fig. 57). Position the steel plate on the transfer plate, hold the rear pump check valve in its bore with a thin steel scale, and install four steel plate to transfer plate retaining screws. Make sure bolt holes in the steel plate and transfer plate are aligned, then tighten the screws evenly to 28 inch-pounds torque. Inspect the rear pump check valve for free movement in the transfer plate. Install the stiffener plate and tighten retaining screws to 28 inch-pounds torque.

(2) Turn transfer plate over and install the reverse blocker valve spring and valve (Fig. 57). Rotate the valve until it seats through the steel plate. Hold the valve down and install blocker valve cover plate. Tighten the two retaining screws to 28 inch-pounds torque.

(3) Place the 1-2 and 2-3 shift valve governor plugs in their respective bores (Fig. 60). Install the shuttle valve, spring and shuttle valve throttle plug. Install the governor plug end plate and tighten the five retaining screws to 28 inch-pounds torque.

(4) Install E-clip on the end of the shuttle valve (Fig. 60). Install the shuttle valve cover plate and tighten the four retaining screws to 28 inch-pounds torque.

(5) Install the 1-2 and 2-3 shift valves and springs (Fig. 61). Install the shift valve end plate and tighten the three retaining screws to 28 inch-pounds torque.

(6) Install the regulator valve throttle pressure plug sleeve, and the line pressure plug (Fig. 61). Install the regulator valve end plate and tighten the two retaining screws to 28 inch-pounds torque.

(7) Install the throttle valve and spring (Fig. 60). Slide the kickdown detent on the kickdown valve (counterbore side of detent toward valve), then install the assembly in the valve body.

(8) Install the throttle lever stop screw (Fig. 60), and tighten lock nut finger tight.

(9) Install the manual valve in the valve body (Fig. 60).

NOTE: The insert in Figure 60 shows the manual valve used in the transmissions with the console shift.

(10) Install the throttle lever and shaft on the valve body (Fig. 62). Insert the detent spring and ball in its bore in the valve body. Depress the ball and spring with Tool C-3765 or similar tool and slide the manual lever over the throttle shaft so that it engages the manual valve and detent ball. Install the retaining E-clip on the throttle shaft.

NOTE: The insert in Figure 59 shows the manual lever used in the transmissions with the console shift.

(11) Position the valve body assembly on the repair stand.

(12) Place the six steel balls in the valve body chambers with the large ball in the large chamber (Fig. 58). Place the front pump check valve and spring in the valve body.

(13) Position the transfer plate assembly on the valve body. Hold the front pump check valve in its

bore with a thin steel scale. Install the 14 retaining screws, starting at the center and working outward, tighten the screws to 28 inch-pounds torque.

(14) Install the torque converter valve and the regulator valve. (Fig. 60).

(15) Position the torque converter valve spring and regulator valve spring over the ends of their respective valves. Place the line pressure adjusting screw assembly on the end of the regulator valve spring with long dimension of nut at right angles to the valve body.

(16) Install the spring retainer bracket, making sure the converter valve spring is engaged on the tang and position squarely in the bracket. Tighten the three bracket retaining screws to 28 inch-pounds torque.

NOTE: Measure and if necessary, align the spring retainer bracket as described in Paragraph 15.

(17) Install the oil filter and gasket and tighten the three retaining screws to 28 inch-pounds torque.

NOTE: After the valve body has been serviced and completely assembled, adjust the throttle and line pressures as outlined in Paragraph 15. However, if pressures were satisfactory prior to disassembly, use original settings.

32. ACCUMULATOR PISTON AND SPRING

Inspection

Inspect the two seal rings for wear and make sure they turn freely in the piston grooves. It is not necessary to remove rings unless condition warrants. Inspect the piston for nicks, burrs, scores and wear. Inspect the piston bore in the case for scores or other damage and the piston spring for distortion. Replace parts as required.

33. EXTENSION HOUSING BEARING AND OIL SEAL

Replacement

(1) Pry or drive the oil seal out of the extension housing with a long blunt drift. Be sure not to mar the oil seal surface in the extension housing.

(2) Remove the bearing snap ring from the extension housing.

(3) Drive the bearing rearward out of the extension housing with Tool C-3275 (Fig. 37).

(4) Place a new bearing in opening of the extension housing. Using Tool C-3204, drive the bearing into the housing (Fig. 38). Install the bearing retaining snap ring.

(5) Place a new oil seal in the opening of the extension housing (lip of seal facing inward). Using Tool C-3837, drive the seal into the housing until the tool bottoms (Fig. 36).

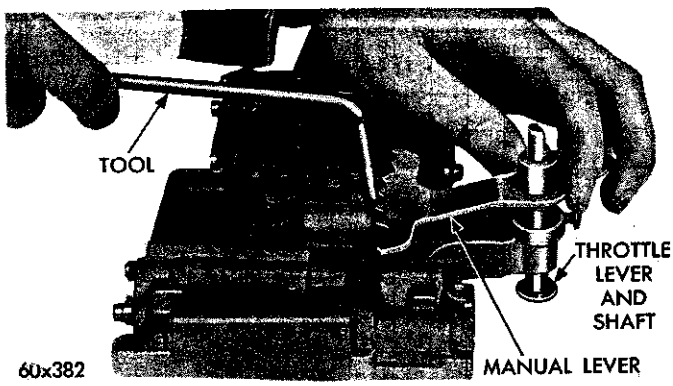


Fig. 62—Installing Detent Ball, Spring and Manual Lever

34. PARKING SPRAG AND LEVER

Disassembly

(1) Remove the parking lock cable adapter cover from the bottom of the extension housing.

(2) Remove the plug and slide the shaft out of the extension housing to remove the parking lock lever, adapter and spacer (Fig. 43).

(3) Slide the bushing sleeve out of the housing to remove the sprag and spring (Fig. 44).

Inspection

Figure 63 shows the parking sprag and lever disassembled.

Inspect the bushing sleeve and shaft for scores and free movement in the housing, and in the sprag and

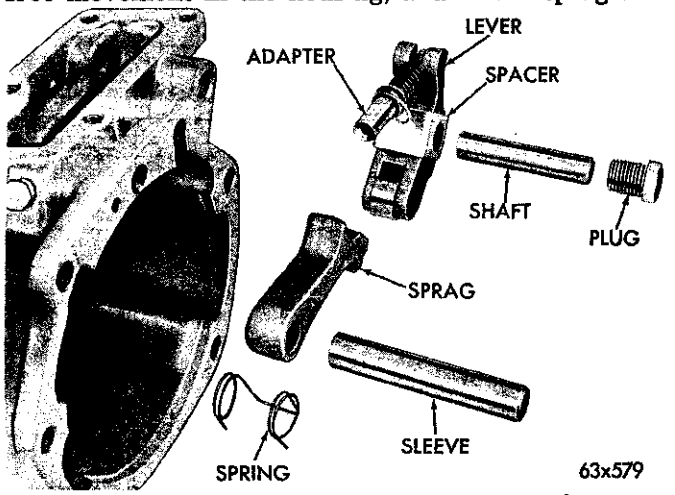


Fig. 63—Parking Lock Lever, Sprag and Cable Adapter (Disassembled)

lever. Inspect the roller for nicks, burrs, and free turning. Inspect the square lug on the parking sprag for broken edges or other damage. Replace as required.

Assembly

(1) Position the parking sprag and spring in the housing and insert the bushing sleeve (Fig. 44). Make sure the square lug on the sprag is toward the support gear, and the spring is positioned so as to lift the sprag away from the gear.

(2) Position the lock lever, adapter and spacer in the housing and install the lever shaft (Fig. 43). The lever roller must be on top of the sprag so as to push it into engagement with the gear.

(3) Place a new adapter cover gasket on the extension housing, then insert a small punch through the cable opening in the adapter cover and into the end of the adapter. Carefully lower the cover into position, feeding the adapter into the cable opening in the cover. Install the cover retaining screws and tighten to 150 inch-pounds torque.

35. GOVERNOR AND SUPPORT

Disassembly

(1) Remove the large snap ring from the weight end of the governor body and lift out the weight assembly.

(2) Remove the snap ring from inside the governor weight, remove the inner weight and spring from the outer weight.

(3) If the lugs on the parking gear are damaged, remove the four bolts and separate the support from the governor body.

Cleaning and Inspection

Figure 40 shows a disassembled view of the governor assembly.

Inspect all parts for burrs and wear. Inspect the inner weight for free movement in the outer weight, and outer weight for free movement in the governor body. Inspect the valve for free movement in the governor body. The weights and valve should fall freely in the bores when clean and dry. Rough surfaces may be removed with crocus cloth.

Inspect the governor weight spring for distortion. Inspect the lugs on the parking gear for broken edges or other damage. Thoroughly clean all governor parts in clean solvent and inspect for free movement before assembly.

Assembly

(1) If the support was separated from the governor body, assemble and tighten the bolts finger tight. Make sure the oil passage of the governor body aligns with the passage in the support.

(2) Assemble the governor weights and spring, and secure with snap ring inside of the large governor weight. Place the weight assembly in the governor body and install the snap ring.

36. REAR OIL PUMP

Inspection

Inspect the oil pump body and cover machined surfaces for nicks and burrs. Inspect the rotors for scoring or pitting. With the rotors cleaned and installed in the pump body, place a straight edge across the face of the rotors and pump body. Using a feeler gauge, measure the clearance between the straight edge and face of the rotors. The clearance limits are from .0015 to .003 inch.

Rear Oil Pump Body Replacement

If replacement of the rear oil pump body is required, drive it rearward out of the case with a wood block and hammer. The following procedures must be followed when installing a new rear oil pump body or reinstalling the original pump body to prevent pump body distortion.

(1) Screw two pilot studs, Tool C-3288 into the case to guide the pump body during installation.

(2) Chill the pump body in cold water or with ice. Quickly position the body over the pilot studs, and drive it firmly into the case with a wood block and hammer. Remove the pilot studs.

37. FRONT OIL PUMP AND REACTION SHAFT SUPPORT

Disassembly

Figure 64 shows the front oil pump and reaction shaft support disassembled.

(1) Remove bolts from the rear side of the reaction shaft support, remove the vent baffle and lift the support off the oil pump.

(2) Remove the rubber seal ring from the front pump body flange.

(3) Drive out the oil seal with a blunt punch.

Inspection

Inspect the interlocking seal rings (Fig. 64) on the reaction shaft support for wear or broken locks, make sure they turn freely in the grooves. Do not remove rings unless conditions warrant. Inspect the pump body and reaction shaft support bushings for wear or scores. Inspect machined surfaces on the oil pump body and reaction shaft support for nicks and burrs. Inspect the oil pump rotors for scoring or pitting. With the rotors cleaned and installed in the pump body, place a straightedge across the face of the rotors and

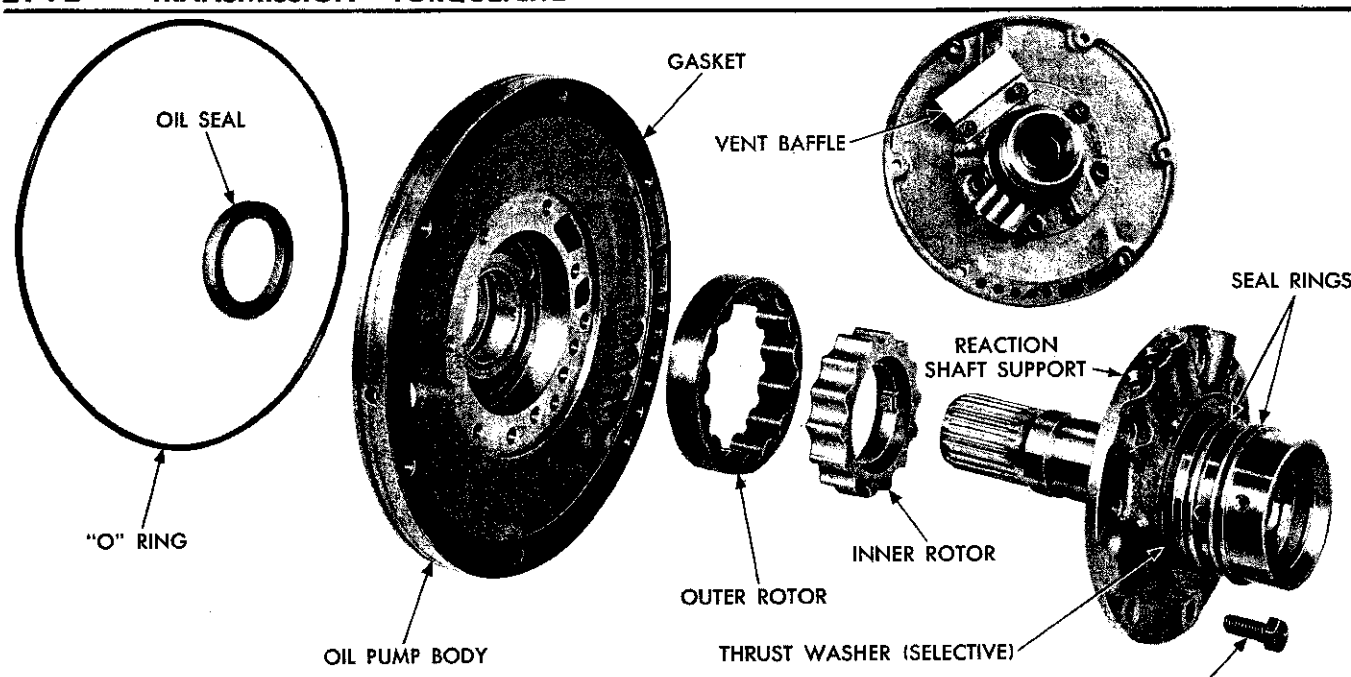


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Fig. 64—Front Oil Pump and Reaction Shaft Support (Diassembled)

pump body. Using a feeler gauge, measure the clearance between the straight edge and face of the rotors. Clearance limits are from .001 to .0025 inch. Also, with a feeler gauge, measure the rotor tip clearance between the inner and outer rotor teeth. Clearance limits are from .007 to .012 inch.

Front Pump Bushing Replacement

(1) Place the front pump housing on a clean smooth surface with the rotor cavity down.

(2) Place the removing head Tool SP-3550 in the bushing, and install the handle Tol SP-3549 in the removing head (Fig. 65).

(3) Drive the bushing straight down and out of the bore. Be careful not to cock the tool in the bore.

(4) Position a new bushing on the installing head Tool SP-3625.

(5) With the pump housing on a smooth clean surface (hub end down), start the bushing and installing head in the bushing bore. Install the handle Tool Sp-3549 in the installing head (Fig. 65).

(6) Drive the bushing into the housing until the tool bottoms in the pump cavity. Be careful not to cock the tool during installation.

(7) Stake the bushing in place by using a blunt punch or similar tool (Fig. 66). A gentle tap at each stake slot location will suffice.

(8) Using a narrow-bladed knife or similar tool, remove the high points or burrs around the staked area (Fig 66). Do not use a file or similar tool that will remove more metal than is necessary.

(9) Thoroughly clean the pump housing before installation.

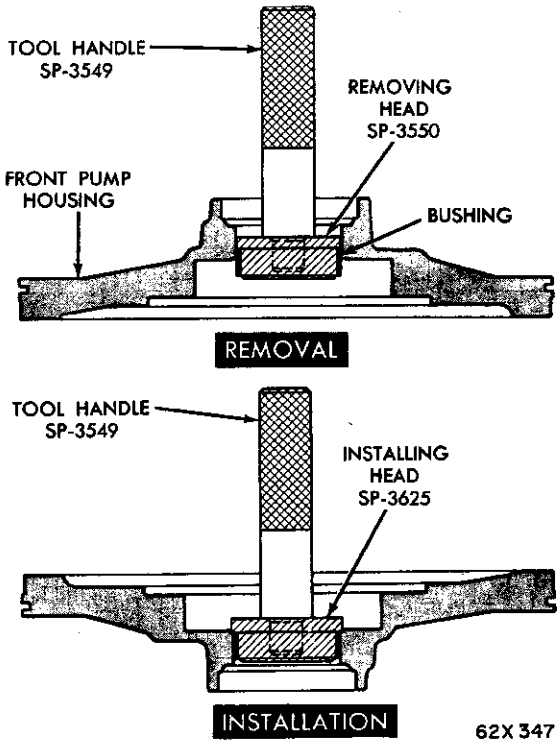

Fig. 65—Replacing Front Pump Bushing

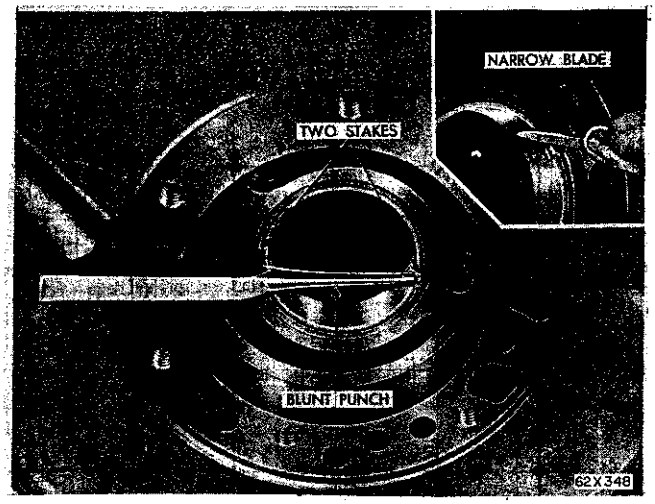

Fig. 66—Staking Front Pump Bushing

Reaction Shaft Bushing Replacement

(1) Assemble the remover Tool SP-3632, the cup Tool SP-3633, and the hex nut Tool SP-1191.

CAUTION: Do not clamp any part of the reaction shaft or support in a vise.

(2) With the cup held firmly against the reaction shaft, thread the remover into the bushing as far as possible by hand (Fig. 67).

(3) Using a wrench, screw the remover into the bushing 3 to 4 additional turns to firmly engage the threads in the bushing.

(4) Turn the hex nut down against the cup to pull the bushing from the reaction shaft. Thoroughly clean the reaction shaft to remove the chips made by the remover threads.

(5) Lightly grip the bushing in a vise or with pliers and back the tool out of the bushing. Be careful not to damage the threads on the bushing remover.

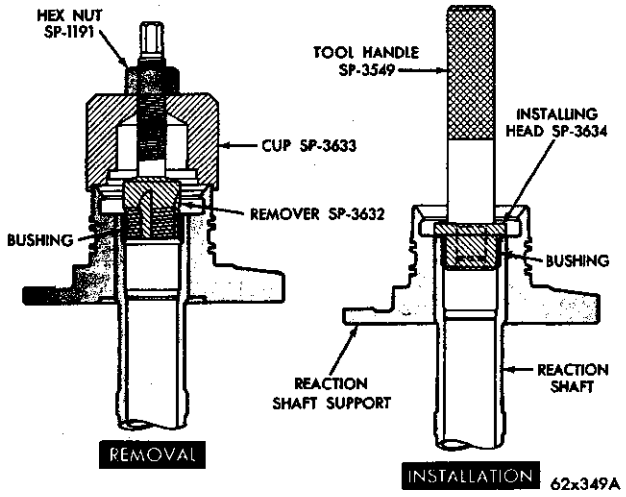

Fig. 67—Replacing Reaction Shaft Bushing

(6) Slide a new bushing (chamfered end first) on the installing head Tool SP-3634, and start them in the bore of the reaction shaft.

(7) Support the reaction shaft upright on a clean smooth surface and install handle Tool SP-3549 in the installing head (Fig. 67). Drive the bushing into the shaft until the tool bottoms.

(8) Thoroughly clean the reaction shaft support assembly before installation.

Assembly

(1) Assemble the pump rotors in the pump housing (Fig. 64).

(2) Install the reaction shaft support and position the vent baffle over the vent opening. Install the retaining bolts and tighten to 150 inch-pounds torque.

(3) Place a new oil seal in the opening of the front oil pump housing (lip of seal facing inward) using Tool C-3860 drive the seal into housing until the tool bottoms.

38. FRONT CLUTCH

Disassembly

Figure 68 shows a disassembled view of the front clutch assembly.

(1) Using a screw driver, remove the large snap ring that secures the pressure plate in the clutch piston retainer. Lift the pressure plate and clutch plates out of the retainer.

(2) Install compressor, Tool C-3863 over the piston spring retainer, as shown in Figure 69. Compress the springs and remove the snap ring, then slowly release the tool until the spring retainer is free of the hub. Remove the tool, retainer and springs.

(3) Invert the clutch retainer assembly and bump on a wood block to remove the piston. Remove the seals from the piston and clutch retainer hub.

Inspection

Inspect the facing material on all driving discs. Replace discs that are charred, glazed or heavily pitted Discs should also be replaced if they show evidence of material flaking off or if the facing material can be scraped off easily. Inspect the driving disc splines for wear or other damage. Inspect the steel plate and pressure plate surfaces for burning, scoring or damaged driving lugs. Replace if necessary.

Inspect the steel plate lug grooves in the clutch retainer for smooth surfaces, plates must travel freely in the grooves. Inspect the band contacting surface on the clutch retainer for scores. Note the ball

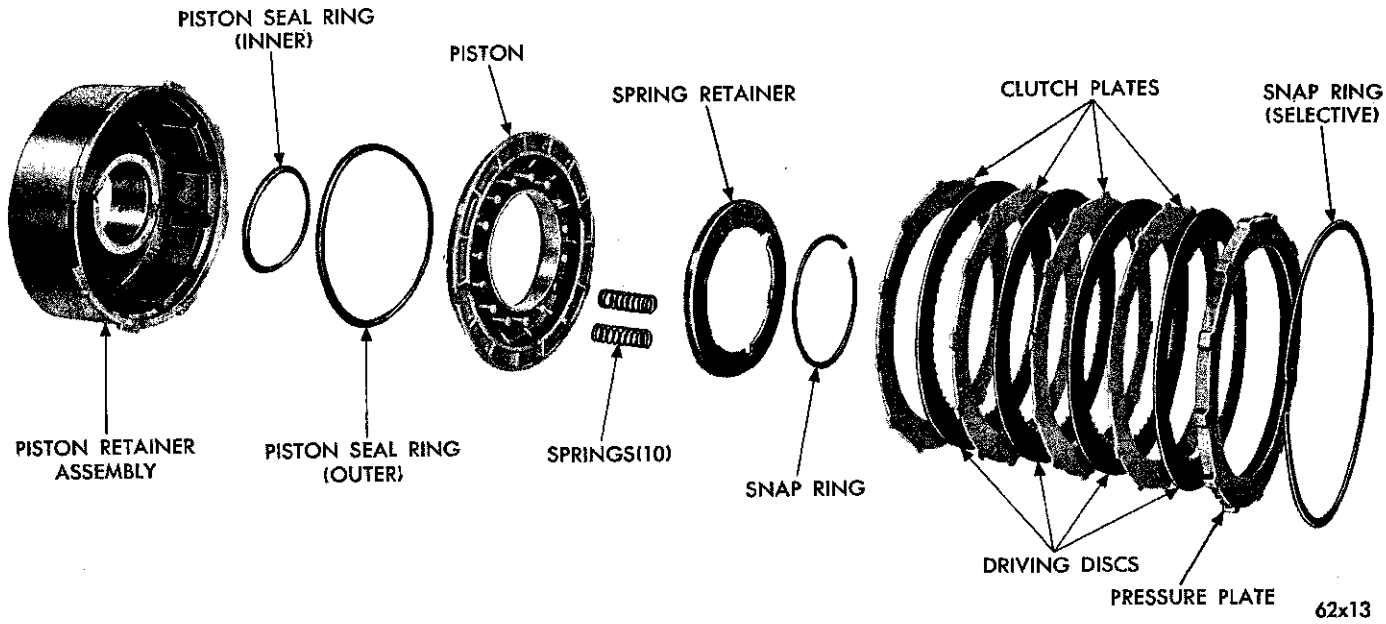

Fig. 68—Front Clutch Assembly (Disassembled)

check in the clutch retainer, make sure the ball moves freely. Inspect the seal surfaces in the clutch retainer for nicks or deep scratches, light scratches will not interfere with sealing of neoprene rings. Inspect the clutch retainer bushing for wear or scores.

Inspect the inside bore of the piston for score marks, if light, remove with crocus cloth. Inspect the seal grooves for nicks and burrs. Inspect the neoprene seals for deterioration, wear, and hardness, and the piston springs, retainer and snap ring for distortion.

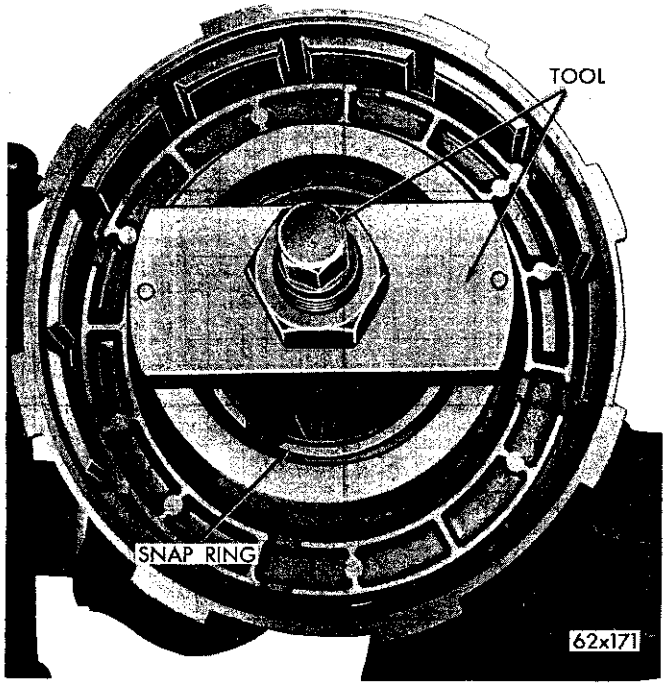

Fig. 69—Removing or Installing Front Clutch Spring Retainer Snap Ring

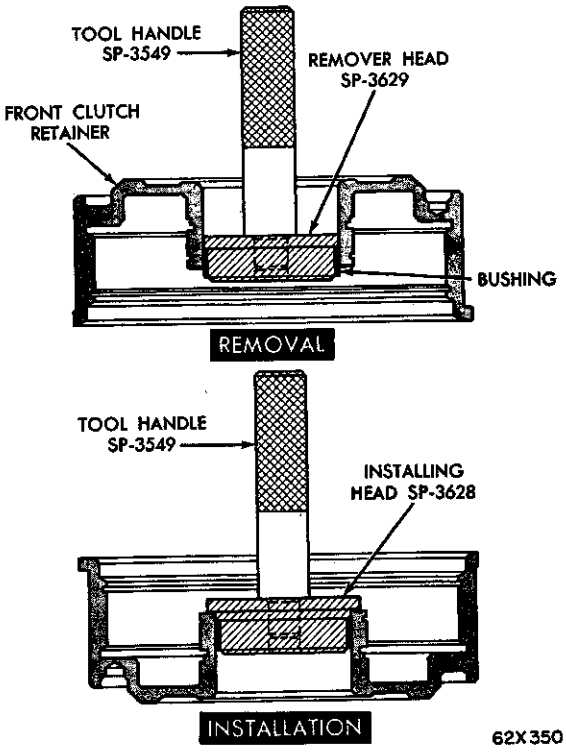

Fig. 70—Replacing Front Clutch Retainer Bushing

Front Clutch Retainer Bushing Replacement

(1) Lay the clutch retainer (open end down) on a clean smooth surface and place the removing head Tool SP-3629 in the bushing. Install the handle Tool SP-3549 in the removing head (Fig. 70).

(2) Drive the bushing straight down and out of the clutch retainer bore. Be careful not to cock the tool in the bore.

(3) Lay the clutch retainer (open end up) on a clean smooth surface. Slide a new bushing on the installing head Tool SP-3628, and start them in the clutch retainer bore.

(4) Install handle Tool SP-3549 in the installer (Fig 70). Drive the bushing into the clutch retainer until the tool bottoms.

(5) Thoroughly clean the clutch retainer before assembly and installation.

Assembly

(1) Lubricate and install the inner seal on hub of the clutch retainer. Make sure lip of the seal faces down and is properly seated in the groove.

(2) Install the outer seal on the clutch piston, with lip of seal toward bottom of the clutch retainer. Apply a coating of "Door Ease" to the outer edge of the seal for easier installation of the piston assembly. Place the piston assembly in retainer and carefully seat the piston in the bottom of the retainer.

(3) Place the 10 springs on the piston hub exactly as shown in Figure 71. Position the spring retainer and snap ring on the springs. Compress springs with Tool C-3863 (Fig. 69), and seat snap ring in the hub groove. Remove the compressor tool.

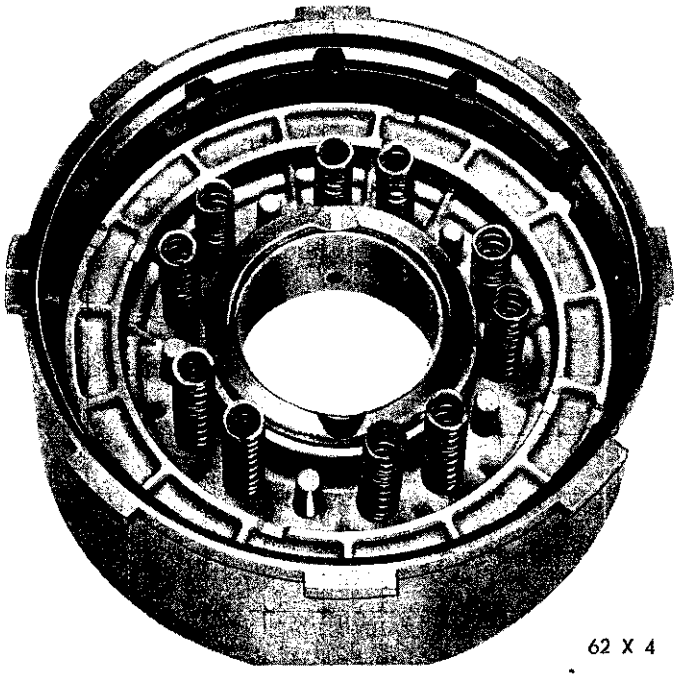

Fig. 71—Front Clutch Piston Return Spring—Location

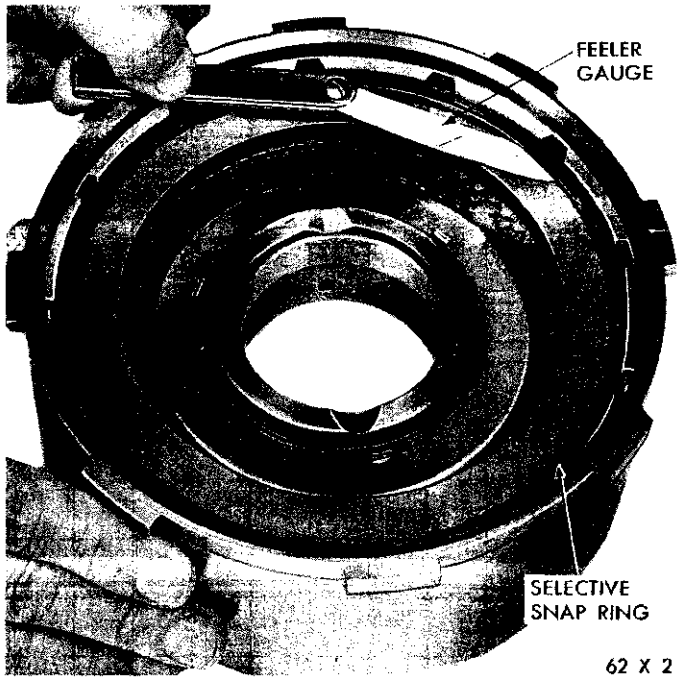

Fig. 72—Measuring Front Clutch Plate Clearance

(4) Lubricate all clutch plates, install one steel plate followed by a lined plate until all plates are installed. Install the pressure plate and snap ring. Make sure the snap ring is properly seated.

(5) With the front clutch completely assembled, insert a feeler gauge between the pressure plate and snap ring (Fig. 72). The clearance should be .024 to .123 inch. If not, install a snap ring of proper thickness to obtain the specified clearance.

NOTE: Snap rings are the same as that used in the rear clutch and are available in .060-.062, .074-.076 and .088-.090 inch thickness.

39. REAR CLUTCH

Disassembly

Figure 73 shows a disassembled view of the rear clutch assembly.

(1) Using a screw driver, remove the large snap ring that secures the pressure plate in the clutch retainer. Lift the pressure plate, clutch plates, and inner pressure plate out of the retainer.

(2) Remove the piston spring snap ring and remove the spring.

(3) Invert the clutch piston retainer assembly and bump on a wood block to remove the piston. Remove seals from the piston.

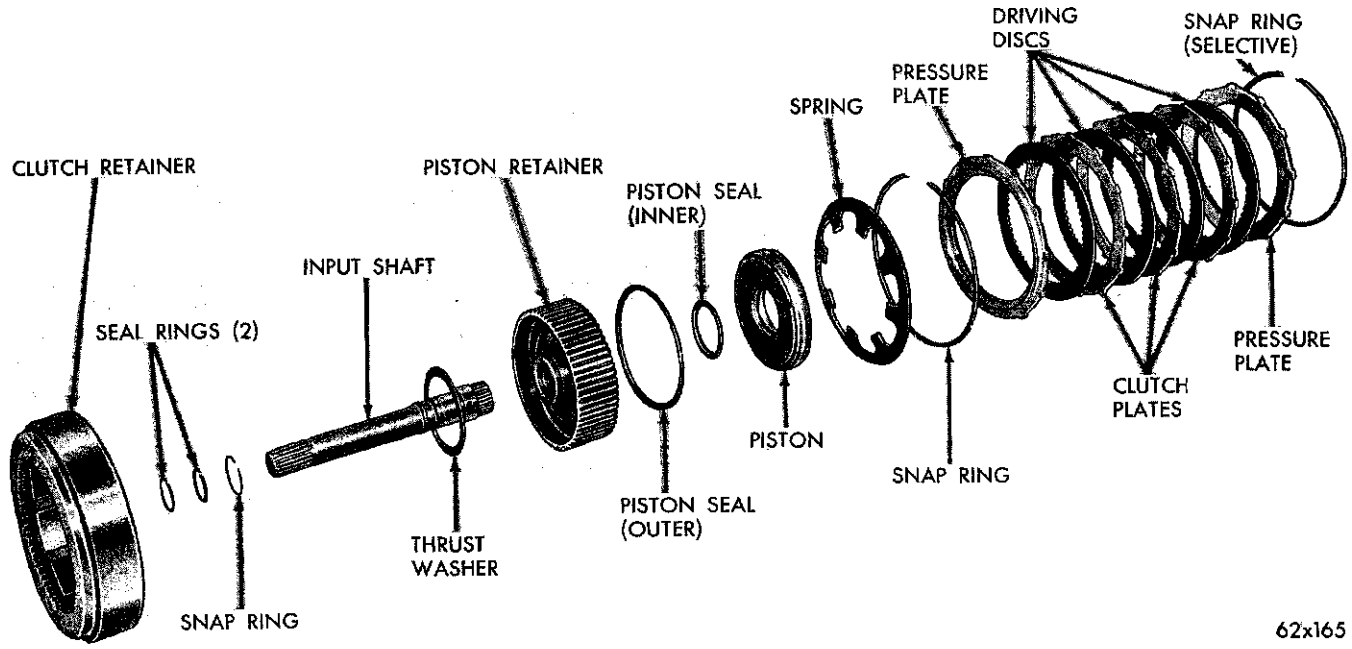

Fig. 73—Rear Clutch Assembly (Disassembled)

(4) If necessary, remove the snap ring and press the input shaft from the clutch piston retainer.

Inspection

Inspect the facing material on all driving discs. Replace discs that are charred, glazed or heavily pitted. Discs should also be replaced if they show evidence of material flaking off or if the facing material can be scraped off easily. Inspect the driving disc splines for wear or other damage. Inspect the steel plate and pressure plate surfaces for burning, scoring or damaged driving lugs. Replace if necessary.

Inspect the steel plate lug grooves in the clutch retainer for smooth surfaces, plates must travel freely in grooves. Note the ball check in the piston, make sure the ball moves freely. Inspect the seal surfaces in the clutch retainer for nicks or deep scratches, light scratches will not interfere with sealing of neoprene seals. Inspect the neoprene seals for deterioration, wear, and hardness, and the piston spring and snap rings for distortion.

Inspect the interlocking seal rings (Fig. 73) on the input shaft for wear or broken locks, make sure they turn freely in the grooves. Do not remove the rings unless conditions warrant. Inspect the bushing in the input shaft for wear or scores. Inspect the rear clutch to front clutch thrust washer for wear. Washer thickness should be .061 to .063 inch, replace if necessary.

Input Shaft Bushing Replacement

(1) Clamp the input shaft in a vise with soft jaws, being careful not to clamp on the seal ring lands or journals.

(2) Assemble the remover Tool SP-3630, the cup Tool SP-3633, and the hex nut Tool SP-1191.

(3) With the cup held firmly against the clutch piston retainer, thread the remover into the bushing as far as possible by hand (Fig. 74).

(4) Using a wrench, screw the remover into the bushing 3 to 4 additional turns to firmly engage the threads in the bushing.

(5) Turn the hex nut down against the cup to pull the bushing from the input shaft.

(6) Thoroughly clean the input shaft to remove the chips made by the remover threads. Make certain

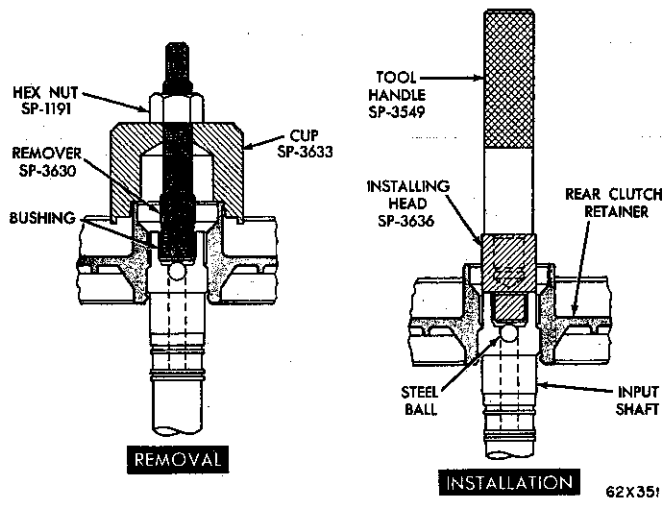

Fig. 74—Replacing Input Shaft Bushing

the small lubrication hole next to the ball in the end of the shaft is not plugged with chips. Be sure no chips are lodged next to the steel ball.

(7) Slide a new bushing on the installing head Tool SP-3636, and start them in the bore of the input shaft.

(8) Stand the input shaft upright on a clean smooth surface and install handle Tool SP-3549 in the installing head (Fig. 74). Drive the bushing into the shaft until the tool bottoms.

(9) Thoroughly clean the input shaft and clutch piston retainer before assembly and installation.

Assembly

(1) If removed, press the input shaft into the clutch piston retainer and install the snap ring.

(2) Lubricate and install the inner and outer seal rings on the clutch piston. Make sure lip of seals face toward head of the clutch retainer, and are properly seated in the piston grooves.

(3) Place the piston assembly in the retainer and, with a twisting motion, seat the piston in bottom of the retainer.

(4) Position the clutch retainer over the piston retainer splines and support the assembly so the clutch retainer remains in place.

(5) Place spring over the piston with outer edge of spring positioned below the snap ring groove. Start one end of snap ring in the groove, make sure the spring is exactly centered on the piston, then progressively tap the snap ring into the groove. (Fig. 75). Be sure the snap ring is fully seated in the groove.

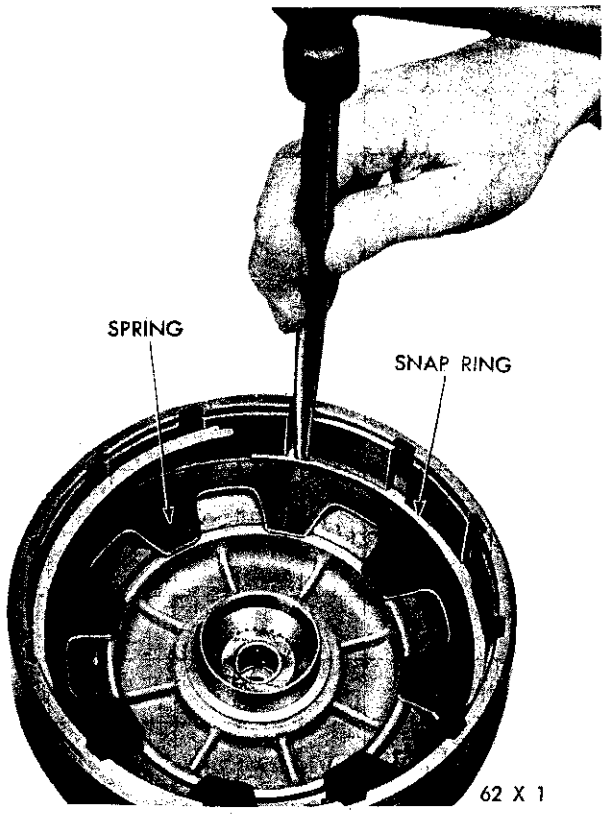

Fig. 75—Installing Rear Clutch Spring and Snap Ring

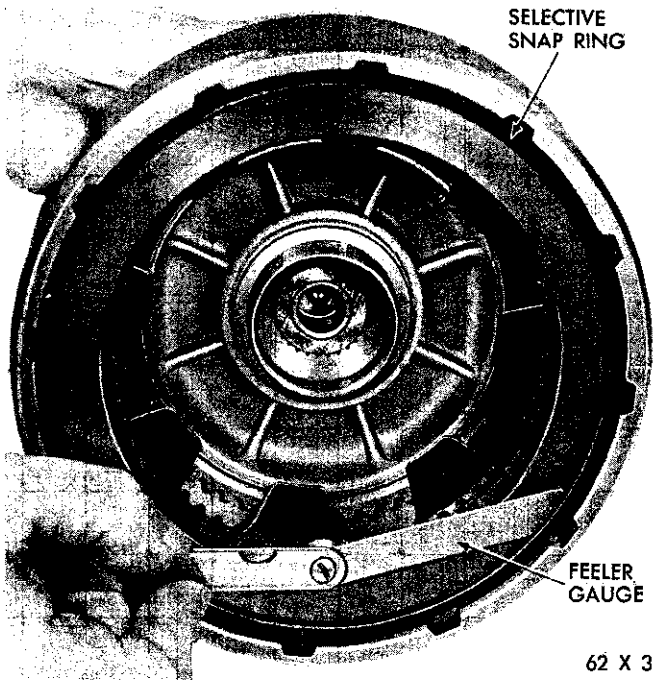

Fig. 76—Measuring Rear Clutch Plate Clearance

(6) Install the inner pressure plate in the clutch retainer with raised portion of plate resting on the spring.

(7) Lubricate all clutch plates, install one lined plate followed by a steel plate until all plates are installed. Install the outer pressure plate and snap ring.

(8) With the rear clutch completely assembled, insert a feeler gauge between the pressure plate and snap ring (Fig. 76). The clearance should be .026-.054 inch. If not, install a snap ring of proper thickness to obtain the specified clearance. Low limit clearances are desirable.

NOTE: Rear clutch plate clearance is very important in obtaining proper clutch operation. The clearance can be adjusted by the use of various thickness outer snap rings. Snap rings are available in .060-.062, .074-.076 and .088-.090 inch thickness.

40. PLANETARY GEAR ASSEMBLIES, SUN GEAR, DRIVING SHELL

Measure the end play of the planetary gear assemblies, sun gear and driving shell before removing these parts from the output shaft. With the assembly in an upright position, push the rear annulus gear support downward on the output shaft. Insert a feeler

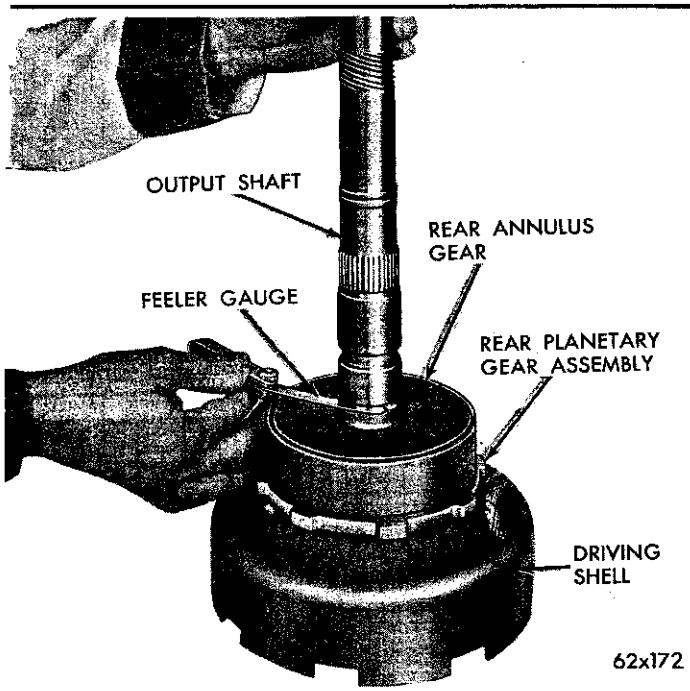

Fig. 77—Measuring End Play of Planetary Gear Assembly, Sun Gear and Driving Shell

gauge between the rear annulus gear support hub and the shoulder on the output shaft (Fig. 77). The clearance should be .010 to .039 inch.

Disassembly

(1) Remove the thrust washer from the forward end of the output shaft (Fig. 78).

(2) Remove the snap ring from the forward end of the output shaft, then slide the front planetary assembly off the shaft.

(3) Slide the front annulus gear off the planetary gear set (Fig. 78). Remove the thrust washer from the rear side of the planetary gear set.

(4) Slide the sun gear, driving shell and rear planetary assembly off the output shaft.

(5) Lift the sun gear and driving shell off the rear planetary gear assembly. Remove the thrust washer from inside the driving shell. Remove snap ring and steel washer from the sun gear (rear side of driving shell) and slide the sun gear out of the shell. Remove the front snap ring from the sun gear if necessary. Note that the front end of the sun gear is longer than the rear.

(6) Remove the thrust washer from the forward side of the rear planetary gear assembly, remove the planetary gear set from the rear annulus gear.

Inspection

Inspect the bearing surfaces on the output shaft for nicks, burrs, scores or other damage. Light scratches, small nicks or burrs can be removed with crocus cloth or a fine stone. Inspect the speedometer drive gear for any nicks or burrs, and remove with a sharp edged stone. Make sure all oil passages in the shaft are open and clean.

Inspect the bushings in the sun gear for wear or scores, replace the sun gear assembly if bushings are damaged. Inspect all thrust washers for wear and scores, replace if damaged or worn below specifications. Inspect the thrust faces of the planetary gear carriers for wear, scores or other damage, replace as required. Inspect the planetary gear carrier for cracks and pinions for broken or worn gear teeth and for

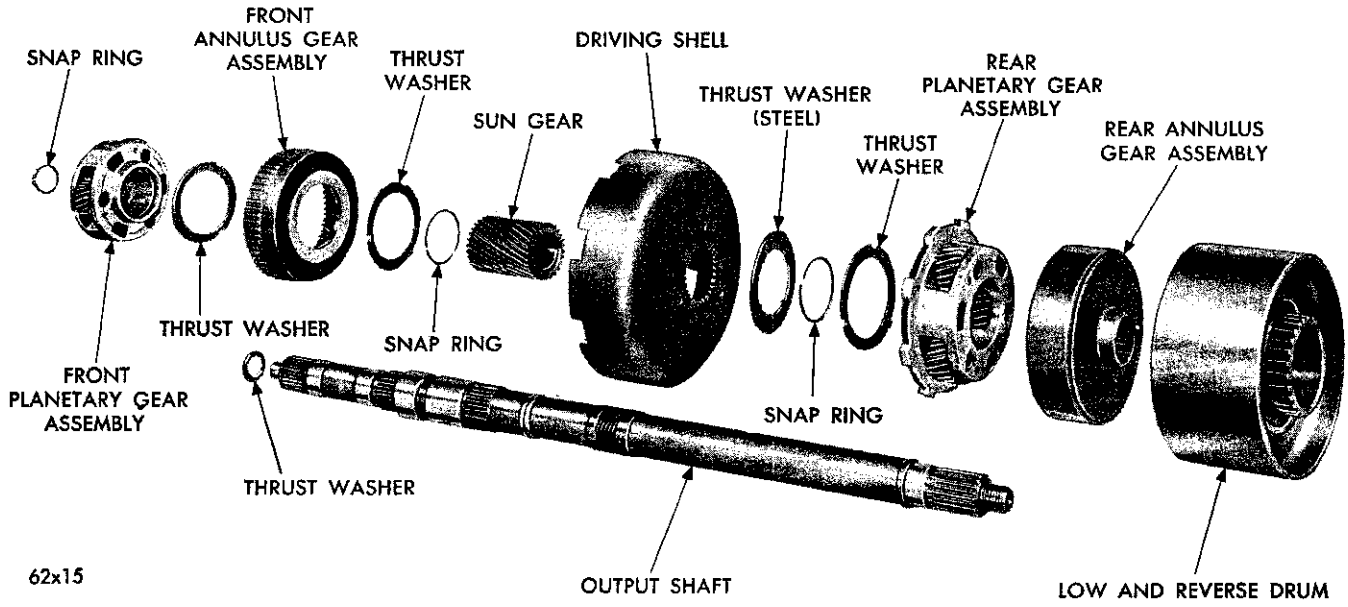

Fig. 78—Planetary Gear Assemblies, Sun Gear, Driving Shell, Low and Reverse Drum and Output Shaft (Disassembled)

broken pinion shaft lock pins. Inspect the annulus gear and driving gear teeth for damage. Replace distorted lock rings.

Assembly

Refer to Figure 78 for parts reference.

(1) Position the rear planetary gear assembly in the rear annulus gear. Place the thrust washer on front side of the planetary gear assembly.

(2) Insert the output shaft in rear opening of the rear annulus gear. Carefully work the shaft through the annulus gear and planetary gear assembly. Make sure the shaft splines are fully engaged in splines of the annulus gear.

(3) Install the snap ring in the front groove of the sun gear (long end of gear). Insert the sun gear through the front side of the driving shell, install the rear steel washer and snap ring.

(4) Carefully slide the driving shell and sun gear assembly on the output shaft, engaging sun gear teeth with the rear planetary pinion teeth. Place thrust washer inside the front of the driving shell.

(5) Place thrust washer on the rear hub of the front planetary gear set, then slide the assembly into the front annulus gear.

(6) Carefully work the front planetary and annulus gear assembly on the output shaft, meshing planetary pinions with the sun gear teeth.

(7) With all components properly positioned, install retaining snap ring on the front end of the output shaft. Re-measure the end play of the assembly.

41. OVERRUNNING CLUTCH

Inspection

Inspect the clutch rollers for smooth round surfaces, they must be free of flat spots and chipped edges. Inspect the roller contacting surfaces in the cam and race for brinelling. Inspect the roller springs for distortion, wear or other damage. Inspect the cam set screw for tightness. If loose, tighten and restake the case around the screw.

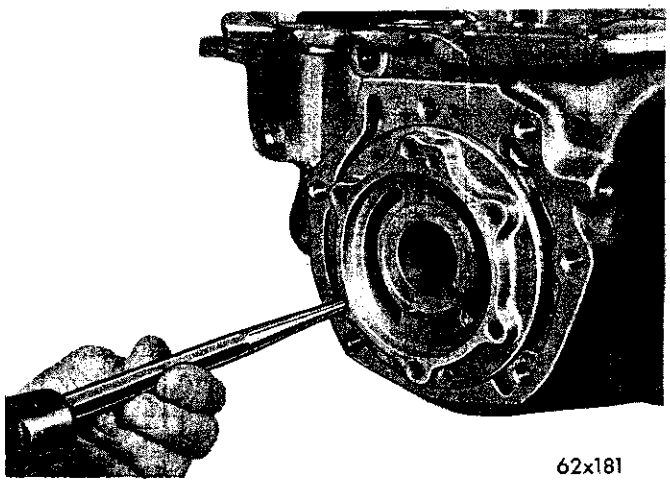

Fig. 79—Removing Overrunning Clutch Cam

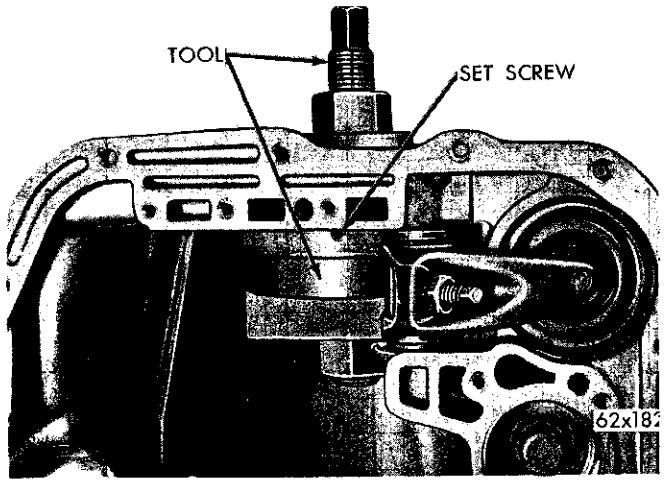

Fig. 80—Installing Overrunning Clutch Cam

Overrunning Clutch Cam Replacement

If the overrunning clutch cam and/or the roller spring retainer are found damaged, replace the cam and spring retainer in the following manner:

(1) Remove set screw from the case below the clutch cam.

(2) Insert a punch through the pump body bolt holes and drive the cam from the case (Fig. 79). Alternate the punch from one bolt hole to another so the cam will be driven evenly from the case.

(3) Clean all burrs and chips from the cam area in the case.

(4) Place the spring retainer on the cam, making sure the retainer lugs snap firmly into the notches on the cam.

(5) Position the cam in the case with the cam serrations aligned with those in the case. Tap the cam **evenly** into the case as far as possible with a soft mallet.

(6) Install Tool C-3863, as shown in Figure 80, tighten nut on the tool to seat the cam into the case. Make sure the cam is firmly bottomed, then install the cam retaining set screw. Stake the case around the set screw to prevent it from coming loose.

42. KICKDOWN SERVO AND BAND

Inspection

Figure 81 shows a disassembled view of the kickdown servo assembly.

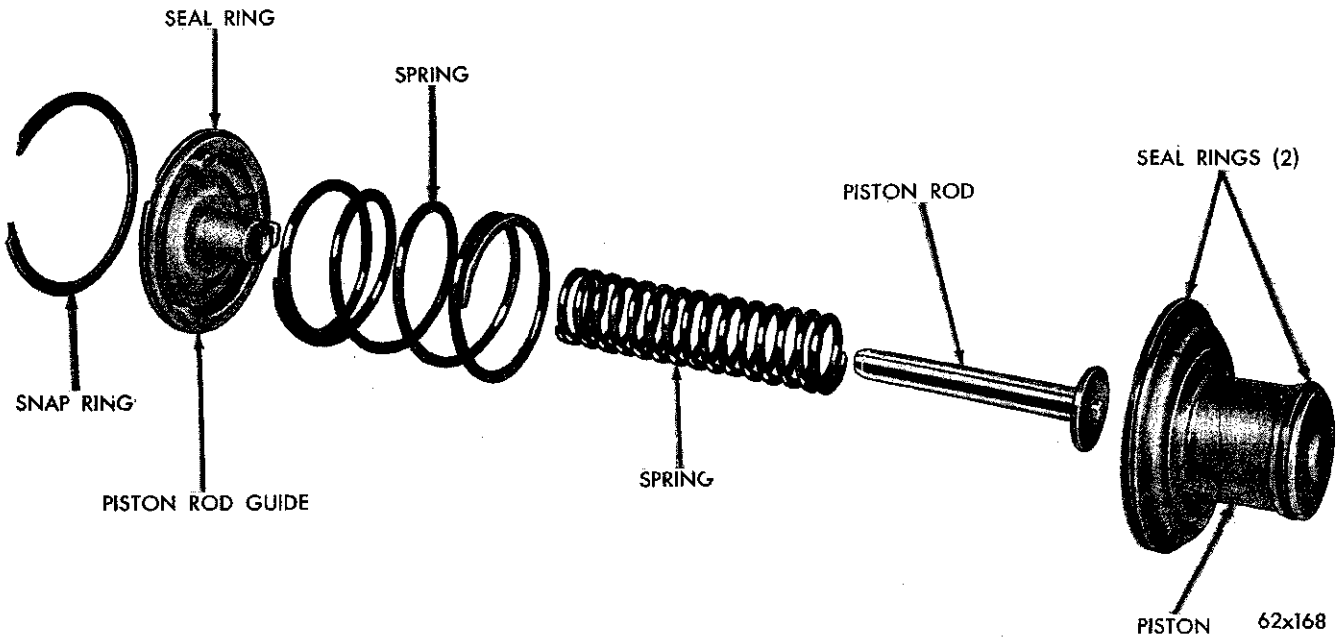

Fig. 81—Kickdown Servo (Disassembled)

NOTE: The large outer spring shown in Figure 81 is not used in the 300 with "K" engine.

Inspect the piston and guide seal rings for wear, and make sure they turn freely in the grooves. It is not necessary to remove the seal rings unless conditions warrant. Inspect the piston for nicks, burrs, scores and wear and the piston bore in the case for scores or other damage. Inspect the fit of the guide on the piston rod and the piston spring for distortion.

Inspect the band lining for wear and bond of lining to the band and the lining for black burn marks, glazing, non-uniform wear pattern and flaking. If the lining is worn so grooves are not visible at the ends or any portion of the band, replace the band. Inspect the band for distortion or cracked ends.

43. LOW AND REVERSE SERVO AND BAND

Disassembly

(1) Remove the snap ring from the piston and remove the piston plug and spring (Fig. 82).

Inspection

Inspect the seal for deterioration, wear and hardness and the piston and piston plug for nicks, burrs, scores and wear; piston plug must operate freely in the piston. Inspect the piston bore in the case for scores or other damage and the springs for distortion. Inspect the band lining for wear and bond of lining to the band. If the lining is worn so grooves are not visible at the ends or any portion of the band,

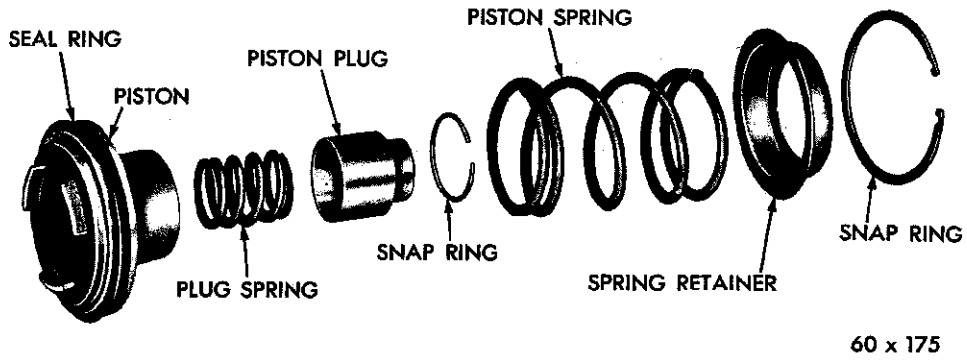

Fig. 82—Low and Reverse Servo (Disassembled)

replace the band. Inspect the band for distortion or cracked ends.

Assembly

(1) Lubricate and insert the piston plug and spring in the piston, and secure with the snap ring.

44. INSTALLATION OF SUB-ASSEMBLIES

The assembly procedures given here include the installation of sub-assemblies in the transmission case and adjusting drive train end play. Do not use force to assemble mating parts. If the parts do not assemble freely, investigate the cause, and correct the trouble before proceeding with the assembly procedures. Always use new gaskets during the assembly operations.

IMPORTANT: Use only Automatic Transmission Fluid Type "A", Suffix "A" to lubricate transmission parts during assembly.

Overrunning Clutch

(1) With the transmission case in an upright position, insert the clutch race inside the cam. Install the overrunning clutch rollers and springs exactly as shown in Figure 83.

Low and Reverse Servo and Band

(1) Carefully work the servo piston assembly into the case with a twisting motion. Place the spring, retainer and snap ring over the piston (Fig. 82).

(2) Compress the low and reverse servo piston spring by using the engine valve spring compressor Tool C-3422, then install the snap ring.

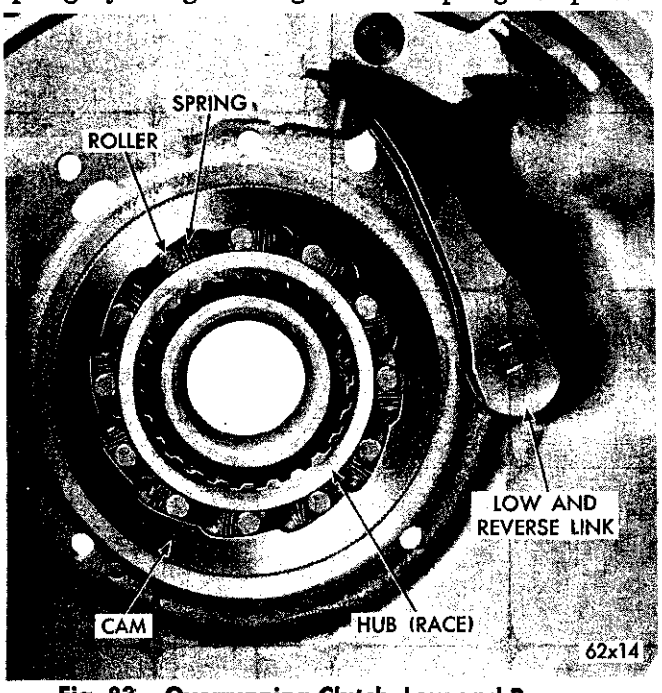

Fig. 83—Overrunning Clutch, Low and Reverse Band Link

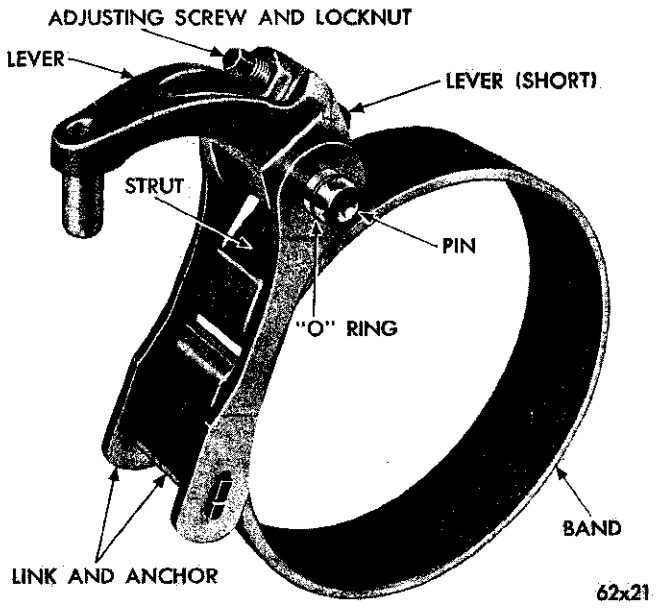

Fig. 84—Low-Reverse Band and Linkage

(3) Position the rear band in the case, install the short strut, then connect the long lever and strut to the band (Fig. 84). Screw in the band adjuster just enough to hold the struts in place. Be sure the long lever and strut assembly is installed, as shown in Figure 83 to provide a running clearance for the low and reverse drum. Install the low-reverse drum.

Kickdown Servo

(1) Carefully push the servo piston into the case bore. Install the piston rod, the two springs and the guide (Fig. 79).

NOTE: The 300 with "K" engine uses only one small inner spring in the kickdown servo.

(2) Compress the kickdown servo springs by using eninge valve spring compressor Tool C-3422, then install the snap ring.

Planetary Gear Assemblies, Sun Gear, Driving Shell

(1) While supporting the assembly in the case, insert the output shaft through the rear pump housing. Carefully work the assembly rearward engaging the rear planetary carrier lugs into the low-reverse drum slots.

CAUTION: Be very careful not to damage the ground surfaces on the output shaft during installation.

(2) Apply a coat of lubricant on the input to output shaft thrust washer (Fig. 78), and install washer on the front end of the output shaft.

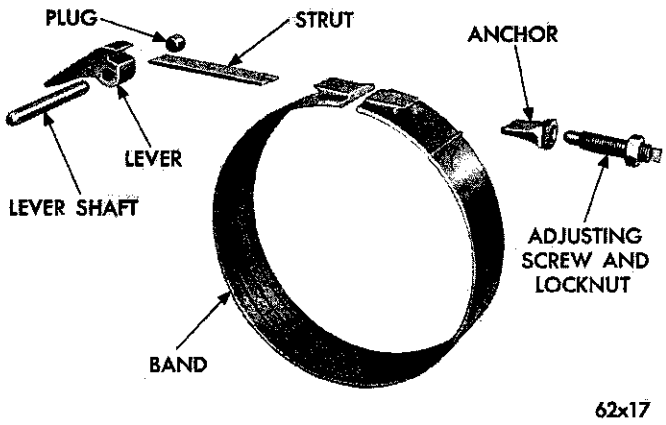

Fig. 85—Kickdown Band and Linkage (Disassembled)

Input Shaft and Rear Clutch

(1) Invert the transmission and support in an upright position with the output shaft downward.

(2) Align the rear clutch plate inner splines, lower the input shaft and clutch assembly into position in the case.

(3) Carefully work the clutch assembly in a circular motion to engage the clutch splines over splines of the front annulus gear.

(4) Coat one side of the fiber thrust washer with heavy grease, then position the washer in the recess on the front face of the rear clutch piston retainer.

Front Clutch

(1) Align the front clutch plate inner splines, lower the clutch assembly into position in the case.

(2) Carefully work the clutch assembly in a circular motion to engage the clutch splines over splines of the rear clutch piston retainer. Make sure the front clutch driving lugs are fully engaged in the slots in the driving shell.

Front Band

Figure 85 shows a disassembled view of the kickdown band assembly.

(1) Slide the band over the front clutch assembly.

(2) Install the band strut, screw in adjuster just enough to hold the strut and anchor in place.

Front Oil Pump and Reaction Shaft Support

If difficulty was encountered in removing the front oil pump assembly due to an exceptionally tight fit in the case, it may be necessary to expand the case with heat during the pump installation. Using a suitable heat lamp, heat the case in the area of the front pump for a few minutes prior to installing the front pump and reaction shaft support assembly.

NOTE: If the drive train end play was not within specifications (.030-.069 inch) when measured in Paragraph 29, replace the thrust washer on the reaction shaft support hub with one of the proper thickness.

The following selective thrust washers are available:

Thickness	Color
.043-.045 inch	Natural
.061-.063 inch	Green
.084-.086 inch	Red
.102-.014 inch	Yellow

(1) Screw two pilot studs, Tool C-3288 in the front oil pump opening in the case (Fig. 86). Install a new gasket over the pilot studs.

(2) Place a new rubber seal ring in the groove on the outer flange of the oil pump housing. Make sure the seal ring is not twisted. Coat the seal ring with grease for easy installation.

(3) Insert aligning Tool C-3881 through the pump body and engage with the inner rotor.

(4) Install the assembly in the case, tap lightly with a soft mallet if necessary. Place the deflector over the vent opening and install four pump body bolts, remove pilot studs and install the remaining bolts. Snug bolts down evenly, then tighten to 150 inch-pounds torque.

(5) Rotate the pump rotors with Tool C-3881 until the two small holes in handle of the tool are vertical (Fig. 46). This will locate the inner rotor so the converter impeller shaft will engage the inner rotor lugs during installation.

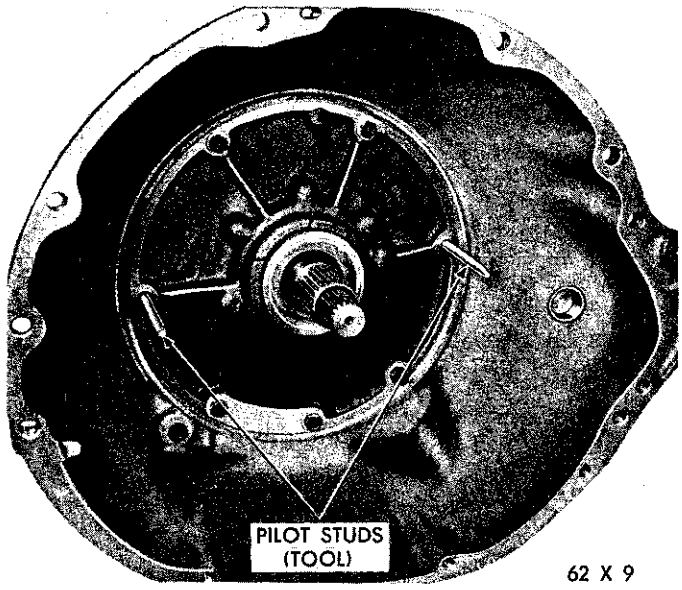

Fig. 86—Installing Front Pump and Reaction Shaft Support Assembly

Rear Oil Pump

(1) Place the outer rotor in the pump body.

(2) Turn the output shaft so the inner rotor driving ball pocket is up. Install the ball and slide the inner rotor on the output shaft in alignment with the ball (Fig. 41).

(3) Install the oil pump cover with the retaining bolts threaded in a few turns. Slide aligning sleeve, Tool C-3864 all the way in until it bottoms against the rotors (Fig. 42), then tighten the cover bolts evenly to 150 inch-pounds torque.

Governor and Support

(1) Position the support and governor body assembly on the output shaft. Align the assembly so the governor valve shaft hole in the governor body aligns with the hole in the output shaft, then slide the assembly into place. Install the snap ring behind the governor body. Tighten the housing to the support bolts to 100 inch-pounds torque. Bend ends of the lock straps against the bolt heads.

(2) Place the governor valve on the valve shaft, insert the assembly into the body and through the governor weights. Install the valve shaft retaining snap ring.

Extension Housing

(1) Using a new gasket, carefully slide the extension housing into place. Install the retaining bolts and washers, tighten bolts to 24 foot-pounds torque.

(2) Install the transmission flange, install washer with its three projections toward the flange and the nut with its convoluted surface contacting the washer. Hold flange with Tool C-3281, and tighten the nut to 175 foot-pounds torque.

IMPORTANT: Measure the drive train end play as described in Paragraph 29. Correct if necessary.

Valve Body Assembly and Accumulator Piston

(1) Clean the mating surfaces and inspect for burrs on both the transmission case and valve body steel plate.

(2) Install the accumulator piston in the transmission case and place the piston spring on the accumulator piston.

(3) Carefully position the valve body assembly in the transmission case, install the retaining bolts and tighten finger tight. With the neutral starting switch installed, place the manual valve in the neutral position. Shift the valve body if necessary to center the neutral finger over the neutral switch plunger. Snug the bolts down evenly, then tighten to 100 inch-pounds torque.

(4) Connect the control cable adapter to the manual lever and install the retaining nut.

(5) Install the seal, flat washer and throttle lever on the throttle shaft. Tighten the clamp bolt.

(6) Adjust the kickdown, and low-reverse bands as described in Paragraph 12.

(7) Install the oil pan, using a new gasket. Tighten the pan bolts to 150 inch-pounds torque.

45. STARTER RING GEAR REPLACEMENT

The starter ring gear is mounted directly on the outer diameter of the torque converter front cover. With the torque converter removed from the vehicle, replacement of the gear is as follows:

Removing Ring Gear

(1) Cut through the weld material at the rear side of ring gear with a hack saw or grinding wheel (Fig. 87). Be careful not to cut or grind into the front cover stamping.

(2) Scribe a heavy line on the front cover next to the front face of the ring gear to aid in locating the new gear.

(3) Support the converter with the four lug faces resting on blocks of wood. **The converter must not rest on the front cover hub during this operation.** Using a blunt chisel or drift and hammer, tap downward on the ring gear near the welded areas to break any remaining weld material (Fig. 87). Tap around the ring gear until it comes off the converter.

(4) Smooth off weld areas on the cover with a file.

Installing Ring Gear

Any of the following methods may be used to heat and expand the starter ring gear for installation on the converter.

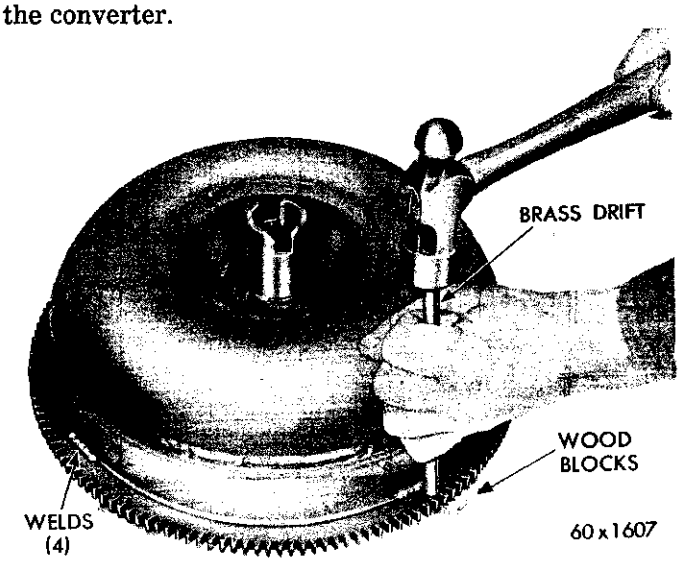

Fig. 87—Removing Starter Ring Gear

Oven: Place the ring gear in Oven C-794 and set temperature at 200 degrees F. Allow the ring gear to remain in the oven for 15 to 20 minutes.

Boiling Water: Place the ring gear in a shallow container, add water, and heat for approximately eight minutes after the water has come to a boil.

Steam: Place the ring gear on a flat surface and direct a steam flow around the gear for approximately two minutes.

Flame: Place the ring gear squarely on a flat surface. Using a medium size tip, direct a slow flame evenly around the inner rim of the gear. **Do not apply flame to the gear teeth.** Place a few drops of water on the face of gear at intervals during the heating process. When the gear is hot enough to just boil the water, installation of the gear on the torque converter can be made.

(1) After the ring gear is expanded by heating, place the gear in position on the converter front cover. Tap the gear on the cover evenly with a plastic or rawhide mallet until the front face of the gear is even with the scribed line (made during removal) on the front cover. Make sure the gear is even with a cover.

(2) Reweld the ring gear to the torque converter front cover, being careful to place, as nearly as possible, the same amount of weld material in exactly the same location as was used in the original weld. This is necessary in order to maintain proper balance of the unit. Place the welds alternately on opposite sides of the converter to minimize distortion.

(3) The following suggestions are offered as an aid in making the weld:

a. Do not gas weld.

b. Use a D.C. welder that is set at straight polarity or an A.C. welder if proper electrode is available.

c. Use a ⅛ inch diameter welding rod, and a welding current of 80 to 125 amps.

d. Direct the arc at the intersection of the gear and front cover from an angle of 45 degrees from the rear face of the gear.

(4) Inspect the gear teeth and remove all nicks where metal is raised, weld metal splatter, etc., in order to ensure quiet starter operation.

2C—SERVICE DIAGNOSIS

NOTE: The transmission should not be removed nor disassembled until a careful diagnosis is made the definite cause determined and all possible external corrections performed. In diagnosing any abnormal shift condition, always make the hydraulic pressure tests before disassembly or replacement of parts.

Condition	Possible Cause	Correction
Harsh Engagement in D, 1, 2 and R	(a) Engine idle speed too high.	(a) Adjust the engine idle speed to 500 rpm. Readjust throttle linkage.
	(b) Hydraulic pressures too high or low.	(b) Inspect the fluid level, then perform hydraulic pressure tests and adjust to specifications.
	(c) Low-reverse band out of adjustment.	(c) Adjust the low-reverse band.
	(d) Valve body malfunction or leakage.	(d) Perform pressure tests to determine cause and correct as required.
	(e) Accumulator sticking, broken rings or spring.	(e) Inspect the accumulator for sticking, broken rings or spring. Repair as required.
	(f) Low-reverse servo, band or linkage malfunction.	(f) Inspect the servo for damaged seals, binding linkage or faulty band lining. Repair as required.
	(g) Worn or faulty front and/or rear clutch.	(g) Disassemble and inspect clutch. Repair or replace as required.

SERVICE DIAGNOSIS—(Continued)

Condition	Possible Cause	Correction
Delayed Engagement in D, 1, 2 and R	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Incorrect control cable adjustment.	(b) Adjust the control cable.
	(c) Oil filter clogged.	(c) Replace the oil filter.
	(d) Hydraulic pressures too high or low.	(d) Perform the hydraulic pressure tests and adjust to specifications.
	(e) Valve body malfunction or leakage.	(e) Perform pressure tests to determine cause and correct as required.
	(f) Accumulator sticking, broken rings or spring.	(f) Inspect the accumulator for sticking, broken rings or spring. Repair as required.
	(g) Clutches or servos sticking or not operating.	(g) Remove the valve body assembly and perform air pressure tests. Repair as required.
	(h) Faulty front pump.	(h) Perform the hydraulic pressure tests. Adjust or repair as required
	(i) Worn or faulty front and/or rear clutch.	(i) Disassemble and inspect clutch. Repair or replace as required.
	(j) Worn or broken input shaft and/or reaction shaft support seal rings.	(j) Inspect and replace seal rings as required, also inspect respective bores for wear. Replace the parts as required.
	(k) Aerated fluid.	(k) Inspect for air leakage into the front pump suction passages.
Runaway or Harsh Upshift and 3-2 Kickdown	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Incorrect throttle linkage adjustment.	(b) Adjust the throttle linkage.
	(c) Hydraulic pressures too high or low.	(c) Perform the hydraulic pressure tests and adjust to specifications.
	(d) Kickdown band out of adjustment.	(d) Adjust the kickdown band.
	(e) Valve body malfunction or leakage.	(e) Perform pressure tests to determine cause and correct as required.
	(f) Governor malfunction.	(f) Inspect the governor and repair as required.
	(g) Accumulator sticking, broken rings or spring.	(g) Inspect the accumulator for sticking, broken rings or spring. Repair as required.
	(h) Clutches or servos sticking or not operating.	(h) Remove the valve body assembly and perform the air pressure tests. Repair as required.
	(i) Kickdown servo, band or linkage malfunction.	(i) Inspect the servo for sticking, broken seal rings, binding linkage or faulty band lining. Repair as required.
	(j) Worn or faulty front clutch.	(j) Disassemble and inspect the clutch. Repair or replace as required.
	(k) Worn or broken input shaft and/or reaction shaft support seal rings.	(k) Inspect and replace seal rings as required, also inspect the respective bores for wear. Replace parts as required.

SERVICE DIAGNOSIS—(Continued)

Condition	Possible Cause	Correction
No Upshift	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid Type "A", Suffix "A".
	(b) Incorrect throttle linkage adjustment.	(b) Adjust the throttle linkage.
	(c) Kickdown band out of adjustment.	(c) Adjust the kickdown band.
	(d) Hydraulic pressures too high or low.	(d) Perform the hydraulic pressure tests and adjust to specifications.
	(e) Governor sticking.	(e) Remove and clean the governor. Replace parts if necessary.
	(f) Valve body malfunction or leakage.	(f) Perform pressure tests to determine cause and correct as required.
	(g) Accumulator sticking, broken rings or spring.	(g) Inspect accumulator for sticking, broken rings or spring. Repair as required.
	(h) Clutches or servos sticking or not operating.	(h) Remove the valve body assembly and perform the air pressure tests. Repair as required.
	(i) Faulty rear oil pump.	(i) Perform the hydraulic pressure tests, adjust or repair as required.
	(j) Kickdown servo, band or linkage malfunction.	(j) Inspect the servo for sticking, broken seal rings, binding linkage or faulty band lining. Repair as required.
	(k) Worn or faulty front clutch.	(k) Disassemble and inspect clutch. Repair or replace as required.
	(l) Worn or broken input shaft and/or reaction shaft support seal rings.	(l) Inspect and replace the seal rings as required, also inspect the respective bores for wear. Replace parts as required.
No Kickdown or Normal Downshift	(a) Incorrect throttle linkage adjustment.	(a) Adjust the throttle linkage.
	(b) Incorrect control cable adjustment.	(b) Adjust the control cable.
	(c) Kickdown band out of adjustment.	(c) Adjust the kickdown band.
	(d) Hydraulic pressures too high or low.	(d) Perform the hydraulic pressure tests and adjust to specifications.
	(e) Governor sticking.	(e) Remove and clean the governor. Replace parts if necessary.
	(f) Valve body malfunction or leakage.	(f) Perform pressure tests to determine cause and correct as required.
	(g) Accumulator sticking, broken rings or spring.	(g) Inspect the accumulator for sticking, broken rings or spring. Repair as required.
	(h) Clutches or servos sticking or not operating.	(h) Remove the valve body assembly and perform the air pressure tests. Repair as required.
	(i) Kickdown servo, band or linkage malfunction.	(i) Inspect the servo for sticking, broken seal rings, binding linkage or faulty band lining. Repair as required.
	(j) Overrunning clutch not holding.	(j) Disassemble the transmission and repair the overrunning clutch as required.

SERVICE DIAGNOSIS—(Continued)

Condition	Possible Cause	Correction
Shifts Erratic	(a) Low fluid level.	(a) Refill to the correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Aerated fluid.	(b) Inspect for air leakage into the front pump suction passages.
	(c) Incorrect throttle linkage adjustment.	(c) Adjust the throttle linkage.
	(d) Incorrect control cable adjustment.	(d) Adjust the control cable.
	(e) Hydraulic pressures too high or low.	(e) Perform the hydraulic pressure tests and adjust to specifications.
	(f) Governor sticking.	(f) Remove and clean the governor. Replace parts if necessary.
	(g) Oil filter clogged.	(g) Replace the oil filter.
	(h) Valve body malfunction or leakage.	(h) Perform pressure tests to determine cause and correct as required.
	(i) Clutches or servos sticking or not operating.	(i) Remove the valve body assembly and perform air pressure tests. Repair as required.
	(j) Faulty rear and/or front oil pump.	(j) Perform the hydraulic pressure tests, adjust or repair as required.
	(k) Worn or broken input shaft and/or reaction shaft support seal rings.	(k) Inspect and replace the seal rings as required, also inspect respective bores for wear. Replace the parts as required.
Slips in Forward Drive Positions	(a) Low fluid level.	(a) Refill to the correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Aerated fluid.	(b) Inspect for air leakage into the front pump suction passages.
	(c) Incorrect throttle linkage adjustment.	(c) Adjust the throttle linkage.
	(d) Incorrect control cable adjustment.	(d) Adjust the control cable.
	(e) Hydraulic pressures too low.	(e) Perform the hydraulic pressure tests and adjust to specifications.
	(f) Valve body malfunction or leakage.	(f) Perform pressure tests to determine cause and correct as required.
	(g) Accumulator sticking, broken rings or spring.	(g) Inspect the accumulator for sticking, broken rings or spring. Repair as required.
	(h) Clutches or servos sticking or not operating.	(h) Remove the valve body assembly perform air pressure tests. Repair as required.
	(i) Worn or faulty front and/or rear clutch.	(i) Disassemble and inspect clutch. Repair or replace as required.
	(j) Overrunning clutch not holding.	(j) Disassemble the transmission and repair the overrunning clutch as required.
	(k) Worn or broken input shaft and/or reaction shaft support seal rings.	(k) Inspect and replace the seal rings as required, also inspect the respective bores for wear. Replace parts as required.

SERVICE DIAGNOSIS—(Continued)

Condition	Possible Cause	Correction
Slips in Reverse Only	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Aerated fluid.	(b) Inspect for air leakage into front pump suction passages.
	(c) Incorrect control cable adjustment.	(c) Adjust the control cable.
	(d) Hydraulic pressures too high or low.	(d) Perform the hydraulic pressure tests and adjust to specifications.
	(e) Low-reverse band out of adjustment.	(e) Adjust the low-reverse band.
	(f) Valve body malfunction or leakage.	(f) Perform pressure tests to determine cause and correct as required.
	(g) Front clutch or rear servo, sticking or not operating.	(g) Remove the valve body assembly and perform air pressure tests. Repair as required.
	(h) Low-reverse servo, band or linkage malfunction.	(h) Inspect the servo for damaged seals, binding linkage or faulty band lining. Repair as required.
	(i) Faulty front oil pump.	(i) Perform the hydraulic pressure tests, adjust or repair as required.
Slips in All Positions	(a) Low fluid level.	(a) Refill to the correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Hydraulic pressures too low.	(b) Perform the hydraulic pressure tests and adjust to specifications.
	(c) Valve body malfunction or leakage.	(c) Perform pressure tests to determine cause and correct as required.
	(d) Faulty front oil pump.	(d) Perform the hydraulic pressure tests, adjust or repair as required.
	(e) Clutches or servos sticking or not operating.	(e) Remove the valve body assembly and perform air pressure tests. Repair as required.
	(f) Worn or broken input shaft and/or reaction shaft support seal rings.	(f) Inspect and replace the seal rings as required, also inspect respective bores for wear. Replace the parts as required.
No Drive in Any Position	(a) Low fluid level.	(a) Refill to the correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Hydraulic pressures too low.	(b) Perform the hydraulic pressure tests and adjust to specifications.
	(c) Oil filter clogged.	(c) Replace the oil filter.
	(d) Valve body malfunction or leakage.	(d) Perform pressure tests to determine cause and correct as required.
	(e) Faulty front oil pump.	(e) Perform the hydraulic pressure tests, adjust or repair as required.
	(f) Clutches or servos sticking or not operating.	(f) Remove the valve body assembly and perform air pressure tests. Repair as required.

SERVICE DIAGNOSIS—(Continued)

Condition	Possible Cause	Correction
No Drive in Forward Drive Positions	(a) Hydraulic pressures too low.	(a) Perform the hydraulic pressure tests and adjust to specifications.
	(b) Valve body malfunction or leakage.	(b) Perform pressure tests to determine cause and correct as required.
	(c) Accumulator sticking, broken rings or spring.	(c) Inspect the accumulator for sticking, broken rings or spring. Repair as required.
	(d) Clutches or servos, sticking or not operating.	(d) Remove the valve body assembly perform air pressure tests. Repair as required.
	(e) Worn or faulty rear clutch.	(e) Disassemble and inspect clutch. Repair or replace as required.
	(f) Overrunning clutch not holding.	(f) Disassemble the transmission and repair overrunning clutch as required.
	(g) Worn or broken input shaft and/or reaction shaft support seal rings.	(g) Inspect and replace the seal rings as required, also inspect the respective bores for wear. Replace parts as required.
No Drive in Reverse	(a) Incorrect control cable adjustment.	(a) Adjust the control cable.
	(b) Hydraulic pressures too low.	(b) Perform the hydraulic pressure tests and adjust to specifications.
	(c) Low-reverse band out of adjustment.	(c) Adjust the low-reverse band.
	(d) Valve body malfunction or leakage.	(d) Perform pressure tests to determine cause and correct as required.
	(e) Front clutch or rear servo, sticking or not operating.	(e) Remove the valve body assembly and perform air pressure tests. Repair as required.
	(f) Low-reverse servo, band or linkage malfunction.	(f) Inspect the servo for damaged seals, binding linkage or faulty band lining. Repair as required.
	(g) Worn or faulty front clutch.	(g) Disassemble and inspect clutch. Repair or replace as required.
Drives in Neutral	(a) Incorrect control cable adjustment.	(a) Adjust the control cable.
	(b) Valve body malfunction or leakage.	(b) Perform pressure tests to determine cause and correct as required.
	(c) Rear clutch inoperative.	(c) Inspect the clutch and repair as required.
Drags or Locks	(a) Kickdown band out of adjustment.	(a) Adjust the kickdown band.
	(b) Low-reverse band out of adjustment.	(b) Adjust the low-reverse band.
	(c) Kickdown and/or low-reverse servo, band, linkage malfunction.	(c) Inspect the servo for sticking, broken seal rings, binding linkage or faulty band lining. Repair as required.
	(d) Front and/or rear clutch faulty.	(d) Disassemble and inspect clutch. Repair or replace as required.
	(e) Planetary gear sets broken or seized.	(e) Inspect the condition of the planetary gear sets and replace as required.
	(f) Overrunning clutch worn, broken or seized.	(f) Inspect the condition of the overrunning clutch and replace parts as required.

SERVICE DIAGNOSIS—(Continued)

Condition	Possible Cause	Correction
Grating, Scraping or Growling Noise	(a) Kickdown band out of adjustment.	(a) Adjust the kickdown band.
	(b) Low-reverse band out of adjustment.	(b) Adjust the low-reverse band.
	(c) Output shaft bearing damaged.	(c) Remove the extension housing and replace the bearing.
	(d) Governor support binding or broken seal rings.	(d) Inspect the condition of the governor support and repair as required.
	(e) Front and/or rear oil pump scored or binding.	(e) Inspect the condition of the pump and repair as required.
	(f) Front and/or rear clutch faulty.	(f) Disassemble and inspect clutch. Repair or replace as required.
	(g) Planetary gear sets broken or seized.	(g) Inspect the condition of the planetary gear sets and replace as required.
	(h) Overrunning clutch worn, broken or seized.	(h) Inspect the condition of overrunning clutch and replace parts as required.
Buzzing Noise	(a) Low fluid level.	(a) Refill to the correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Pumps sucking air.	(b) Inspect the pumps for nicks or burrs on mating surfaces, porous casting, and/or excessive rotor clearance. Replace the parts as required.
	(c) Valve body malfunction.	(c) Remove and recondition the valve body assembly.
	(d) Overrunning clutch inner race damaged.	(d) Inspect and repair the clutch as required.
Hard to Fill, Oil Flows out Filler Tube	(a) High fluid level.	(a) Drain the fluid to the correct level.
	(b) Breather clogged.	(b) Inspect and clean breather vent opening in front pump housing.
	(c) Oil filter clogged.	(c) Replace the oil filter.
	(d) Aerated fluid.	(d) Inspect for air leakage into front pump suction passages.
Transmission Overheats	(a) Low fluid level.	(a) Refill to the correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Kickdown band adjustment too tight.	(b) Adjust the kickdown band.
	(c) Low-reverse band adjustment too tight.	(c) Adjust the low-reverse band.
	(d) Faulty cooling system.	(d) Inspect the transmission cooling system, clean and repair as required.
	(e) Faulty rear and/or front oil pump.	(e) Inspect the oil pump for incorrect clearance, repair as required.
	(f) Insufficient clutch plate clearance in front and/or rear clutches.	(f) Measure the clutch plate clearance and correct with the proper size snap ring.

SERVICE DIAGNOSIS—(Continued)

Condition	Possible Cause	Correction
Impossible to Push Start	(a) Low fluid level.	(a) Refill to the correct level with Automatic Transmission Fluid, Type A, Suffix A.
	(b) Low-reverse band slipping.	(b) Adjust the low-reverse band.
	(c) Valve body malfunction or leakage.	(c) Remove and recondition the valve body assembly.
	(d) Rear oil pump faulty.	(d) Inspect and repair the rear oil pump as required.
	(e) Low-reverse servo, band or linkage malfunction.	(e) Inspect the servo for damaged seals, binding linkage or faulty band lining. Repair as required.
	(f) Worn or faulty rear clutch.	(f) Disassemble and inspect clutch. Repair or replace as required.
	(g) Worn or broken input shaft and/or reaction shaft support seal rings.	(g) Inspect and replace the seal rings as required, also inspect respective bores for wear. Replace the parts as required.
Starter Will Not Energize in Neutral	(a) Incorrect control cable adjustment.	(a) Adjust the control cable.
	(b) Faulty or incorrectly adjusted neutral starting switch.	(b) Test the operation of the switch with a test lamp. Adjust or replace as required.
	(c) Broken lead to neutral switch.	(c) Inspect the lead and test with a test lamp. Repair the broken lead.