

SECTION 7

TRANSMISSION

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3-SPEED TRANSMISSION

The three-speed transmission utilized with the Corvette is as described in the 1961 Passenger Car Shop Manual. General Description and Service Operations

apply as noted. Adjustments, Removal, and Installation differ from those enumerated in referenced manual and are accomplished as follows.

SERVICE OPERATIONS

SHIFT LINKAGE ADJUSTMENT

In cases where the gearshift linkage has been disconnected, or if improper shift pattern is encountered, it should be adjusted as follows:

1. Set levers (A), (B), and (C) (fig. 1) in neutral detent position.

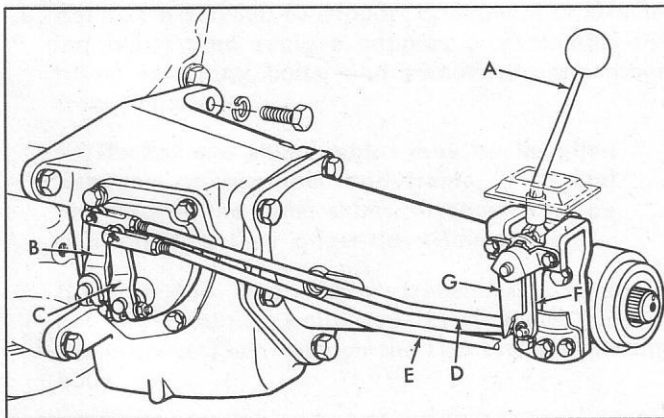


Fig. 1—Shift Linkage Adjustment

2. Install rod (D) on lever (F) and install clip.
3. Adjust clevis until clevis pin can be freely admitted through holes in clevis and lever (B).
4. Install clevis pin and cotter pin.
5. Move lever (A) to engage first and reverse lever (G) while maintaining lever (A) in neutral detent position.
6. Install rod (E) on lever (G) and insert clip.

7. Adjust clevis on rod (E) until clevis pin can be freely admitted through holes in clevis and lever (C).
8. Install clevis pin and cotter pin. Tighten jam nuts at clevis on rods (D) and (E).
9. Check shift pattern for proper operation.

TRANSMISSION REMOVAL

1. Raise vehicle to desired working height.
2. Disconnect speedometer cable from speedometer driven gear fitting and disconnect rods (D) and (E) (fig. 1) at transmission shift shafts (levers (B) and (C)).
3. Disconnect control lever and bracket assembly at transmission extension, and tie out of the way.
4. Remove propeller shaft assembly as outlined in Section 4.
5. Support engine at oil pan rail with a jack or other suitable brace capable of supporting the engine when the transmission is removed.
6. Remove transmission extension-to-support cross-member retaining bolts and then remove support crossmember-to-frame attaching bolts. Remove crossmember from vehicle.

NOTE: Use care to remove any shims which may be installed between the extension cross-member and frame. It is vital that exactly the same number of shims, or equivalent, be re-installed as these shims affect drive line angles.

7. Remove the two top transmission-to-clutch housing retaining bolts, and insert two transmission guide pins in these holes. Then remove the two lower retaining bolts.
8. Slide the transmission straight back on guide pins until the input shaft is free of splines in the clutch disc.

NOTE: The use of the two guide pins during transmission removal will support the transmission and prevent damage to the clutch disc through springing.

9. Slide the transmission rearward to allow sufficient clearance of input shaft and clutch housing. Then tilt input shaft end of transmission downward and withdraw transmission from vehicle.

TRANSMISSION INSTALLATION

1. Install guide pin in upper right transmission-to-clutch housing bolt hole.
2. Raise transmission and position extension between underbody and frame "X" member. Slide transmission forward and index upper right bolt hole on guide pin.
3. Rotate transmission as necessary and start input shaft into clutch disc and slide transmission forward until it bottoms against clutch housing.

4. Install the two lower transmission-to-clutch housing retaining bolts.
5. Remove the guide pin and install the two upper transmission-to-clutch housing retaining bolts. Torque all four retaining bolts to 40-50 ft. lbs.
6. Position support crossmember to frame (install the same shims removed, or an equivalent amount) and loosely install the support-to-frame retaining bolts. Then install the support-to-extension bolts.
7. Tighten support crossmember-to-frame retaining bolts securely, then remove temporary support from engine and torque the support-to-extension retaining bolts.
8. Install propeller shaft as outlined in Section 4.
9. Connect speedometer cable to driven gear fitting and tighten securely.
10. Install control lever and bracket assembly to transmission extension and connect shift linkage to shift levers.
11. Fill transmission to proper level with correct lubricant.
12. Lower vehicle and check shift pattern—adjust linkage as required.

4-SPEED TRANSMISSION

Service procedures for the four-speed, synchromesh transmission are basically the same as those outlined in the 1961 Passenger Car Shop Manual.

Minor revisions have been incorporated in the 1962 transmission.

- Addition of bosses to accept the lower two extension attaching bolts. These bolts formerly attached directly to the rear bearing retainer. In the 1962 transmission all five bolts attach the extension and retainer directly to the case.

Use of the above bosses makes the self-locking rear bearing retainer-to-case attaching bolt unnecessary and it is therefore not found in the 1962 transmission.

- In the mainshaft assembly procedure, reference is made to the grooves in the first speed gear thrust washer. In the 1962 transmission this washer contains no grooves. The grooves are instead found on the rear face of the first speed gear.

SERVICE OPERATIONS

TRANSMISSION REMOVAL

1. Raise vehicle to desired working height and drain transmission lubricant.
2. Disconnect the speedometer cable from speedometer driven gear fitting and disconnect shift control rods from the shifter levers at the transmission.
3. Remove propeller shaft as outlined in Section 4, then support engine at the oil pan rail with a jack or other suitable support capable of supporting the engine when transmission is removed.
4. Disconnect shift lever and bracket assembly. Tie bracket and linkage out of the way.
5. Remove extension-to-support crossmember attaching bolts, then remove support crossmember-to-frame attaching bolts, and remove crossmember from vehicle.

NOTE: Remove shims which may be installed between crossmember and frame. It is vital that exactly the same shims, or equivalent, be reinstalled as they affect drive line angle.

6. Remove the two upper transmission-to-clutch housing retaining bolts and install guide pins in these holes. Then remove the two lower retaining bolts.
 7. Slide the transmission straight back on guide pins until the input shaft is free of splines in the clutch disc.
- NOTE:** The use of the guide pins during transmission removal will support the transmission and prevent damage to the clutch disc through springing.
8. Slide the transmission rearward to allow sufficient clearance of input shaft and clutch housing. Then tilt input shaft end of transmission downward and withdraw transmission from vehicle.

TRANSMISSION INSTALLATION

1. Install guide pin in upper right transmission-to-clutch housing bolt hole.
2. Raise transmission and position extension between underbody and frame "X" member. Slide transmission forward and index upper right bolt hole on guide pin.
3. Rotate transmission as necessary and start input shaft into clutch disc and slide transmission forward until it bottoms against clutch housing.
4. Install the two lower transmission-to-clutch housing retaining bolts.
5. Remove the guide pin and install the two upper transmission-to-clutch housing retaining bolts. Torque all four retaining bolts to 40-50 ft. lbs.
6. Position support crossmember to frame (install the same shims removed, or an equivalent amount) and loosely install the support-to-frame retaining bolts. Then install the support-to-extension bolts.
7. Tighten support crossmember-to-frame retaining bolts securely, then remove temporary support from engine, and torque the support-to-extension retaining bolts.
8. Install propeller shaft as outlined in Section 4.
9. Connect speedometer cable to driven gear fitting and tighten securely.
10. Install control lever and bracket assembly to transmission extension and connect shift linkage to shift levers.
11. Fill transmission to proper level with correct lubricant.
12. Lower vehicle and check shift pattern — adjust linkage as required.

CAST IRON POWERGLIDE

The cast iron Powerglide transmission will not be available as the automatic transmission option for Corvette in 1962. Therefore service operations common to both Passenger Car and Corvette will be accom-

plished as outlined in the 1961 Passenger Car Shop Manual. Service operations pertaining to Corvette only are covered in this section.

SERVICE OPERATIONS

ADJUSTMENTS

Two adjustments are required for Corvettes equipped with the optional cast iron Powerglide transmission:

SHIFT LINKAGE ADJUSTMENT

1. Check shift linkage for proper adjustment as follows: With the engine stopped, move the selector lever to the position where transmission DRIVE detent is felt. Slowly release the lever to feel if the shaft lever tang freely enters the lock plate. Check REVERSE range in a similar manner. If the tang does not freely enter the lock plate in both DRIVE and REVERSE ranges, it will be necessary to perform the linkage adjustment.
2. Remove the clevis pin at bell crank (U) and set bell crank in park position (fig. 2).

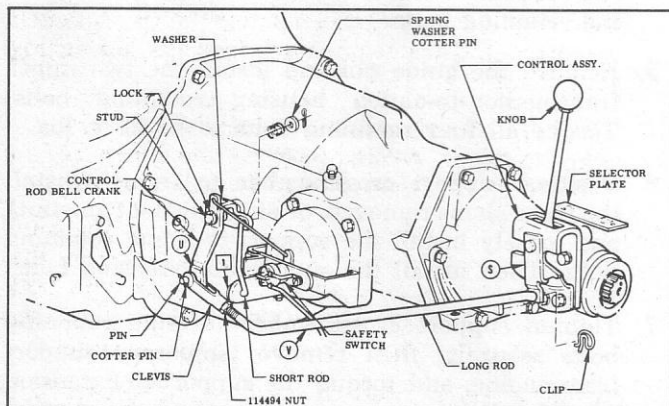


Fig. 2—Shift Linkage Adjustment

3. Set control shaft lever (S) in park position.
4. Loosen the clevis check nut on rod (V), and adjust clevis so that free entry of clevis pin through bell crank (U) and clevis on rod (V) is obtained. Make sure that lever (S) and bell crank (U) are both in park position.
5. Install spring washer, clevis pin, and cotter pin to bell crank (U) and clevis. Then tighten clevis check nut securely.
6. Check shift pattern as indicated in Step 1.

THROTTLE VALVE LINKAGE ADJUSTMENT

1. Disconnect rods (G) and (E) at bell crank (F) (fig. 3).

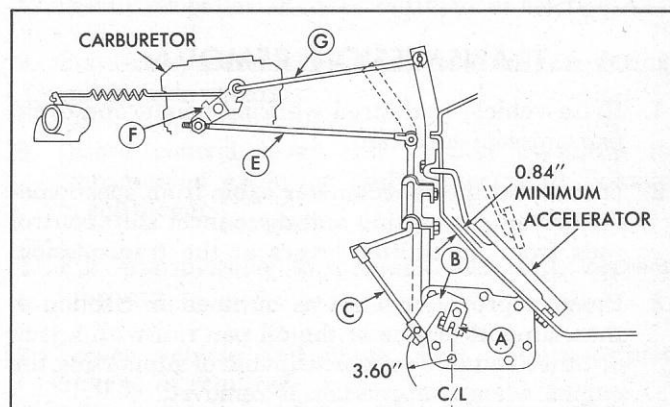


Fig. 3—Throttle Valve Linkage Adjustment

2. Disconnect rod (C) at lever (B) and loosen bolt securing clamp (A) to lever (B).
3. Insert Tool J-5906 between transmission left hand side cover lower front bolt and hole in lever (B). (Refer to Figure 5, Page 13-5, of 1961 Passenger Car Shop Manual.) Distance between hole center lines is 3.60". With J-5906 in place and holding clamp (A) counterclockwise, in full detent position, tighten lever (B) to clamp (A). Remove J-5906.
4. Install rod (C) in lever (B).
5. Position bell crank (F) so that carburetor throttle is in the wide open position and adjust swivel on rod (G) for free entry into bell crank (F). Secure swivel in bell crank (F).

NOTE: If vehicle is equipped with dual carburetors, adjust rear carburetor linkage, then adjust linkage at front carburetor to obtain wide open throttle position.

6. Remove carpeting from area around accelerator pedal. Depress accelerator pedal until bell crank is in wide open position, clearance between lowest point on accelerator pedal and toe panel should be a minimum of 0.84". If clearance is less than 0.84", repeat Step 5.

7. Place bell crank (F) in wide open position and pull rod (E) forward until it is stopped by transmission internal stop. Adjust swivel on rod (E) for easy entry into bell crank (F). Readjust the swivel three turns, lengthening the rod by that quantity. Secure swivel in bell crank (F).
8. Check the adjustment by releasing linkage to its idle position, then rotate throttle bell crank (F) to the wide open position. While holding linkage in this attitude, press downward on lever (B). If rod (C) deflects, repeat Step 6.

TRANSMISSION REMOVAL

1. Raise vehicle to desired working height, remove drain plug and drain transmission.
2. Remove transmission filler pipe.
3. Disconnect neutral safety switch at quick-disconnect located on transmission support crossmember, and remove wiring from clips on crossmember.
4. Disconnect linkage at throttle valve actuating lever and position linkage out of the way.
5. Remove speedometer cable at fitting on transmission extension, and disconnect vacuum modulator pipe at modulator extension.
6. Disconnect transmission shift linkage and shift lever bracket at transmission. Tie assembly out of the way.
7. Disconnect and remove propeller shaft as outlined in Section 4.
8. Install suitable transmission lift equipment to jack or other suitable lifting device and attach to transmission.
9. Disconnect engine rear mount on transmission extension, then remove transmission support crossmember.

NOTE: Use care to remove any shims which may be installed between crossmember and frame. It is vital that exactly the same shims, or equivalent, be reinstalled as these affect drive line angles.

10. Remove flywheel cover, then using a jumper to turn the engine, remove the flywheel-to-converter attaching bolts.
11. Lower the transmission slightly so that the upper transmission housing-to-engine attaching bolts can be reached using a universal socket and a long extension.

CAUTION: Care must be taken not to lower rear of transmission too far as the distributor housing may be forced against the dash causing damage to the distributor. It is advisable to have an assistant observe clearance of all upper

engine components while the transmission is being lowered.

12. Support the engine at the oil pan rail with a jack or other support capable of supporting the engine when transmission is removed.
13. Remove transmission housing-to-engine attaching bolts.
14. Move transmission slightly rearward and observe converter. If converter does not move with transmission, pry it free so that it can be removed with transmission.
15. Install converter holding Tool J-5384 as soon as transmission has been lowered sufficiently.
16. Lower transmission and, at the same time, observe component clearances. Remove transmission from lifting equipment.

TRANSMISSION INSTALLATION

1. Secure transmission on transmission lifting equipment installed on jack or other lifting device.
 2. Raise transmission as close as possible to desired position before removing holding Tool J-5384.
 3. Raise transmission into place at rear of engine and install transmission housing-to-engine attaching bolts.
 4. Remove support from beneath engine, then raise rear of transmission to final position and install transmission support crossmember to transmission extension and frame. Remove transmission lifting equipment.
- NOTE:** Install same shims, or equivalent, between transmission crossmember and frame as removed to maintain correct drive line angle.
5. With the flywheel cover removed, match the blue stripe on the converter to the white stripe on the flywheel, then align flywheel bolt holes with bolt holes on converter. Install converter-to-flywheel attaching bolts using a jumper to turn engine.
 6. Install propeller shaft as outlined in Section 4.
 7. Connect neutral safety switch wiring and position in retaining clips at crossmember.
 8. Insert and secure transmission filler pipe.
 9. Connect throttle valve linkage, install vacuum modulator pipe to modulator extension, and connect speedometer cable to fitting on transmission extension.
 10. Install transmission shift lever linkage and shift lever bracket assembly.
 11. Lower vehicle to floor. Check and, if necessary, adjust shift linkage and throttle valve linkage. Fill transmission to proper level with correct fluid.

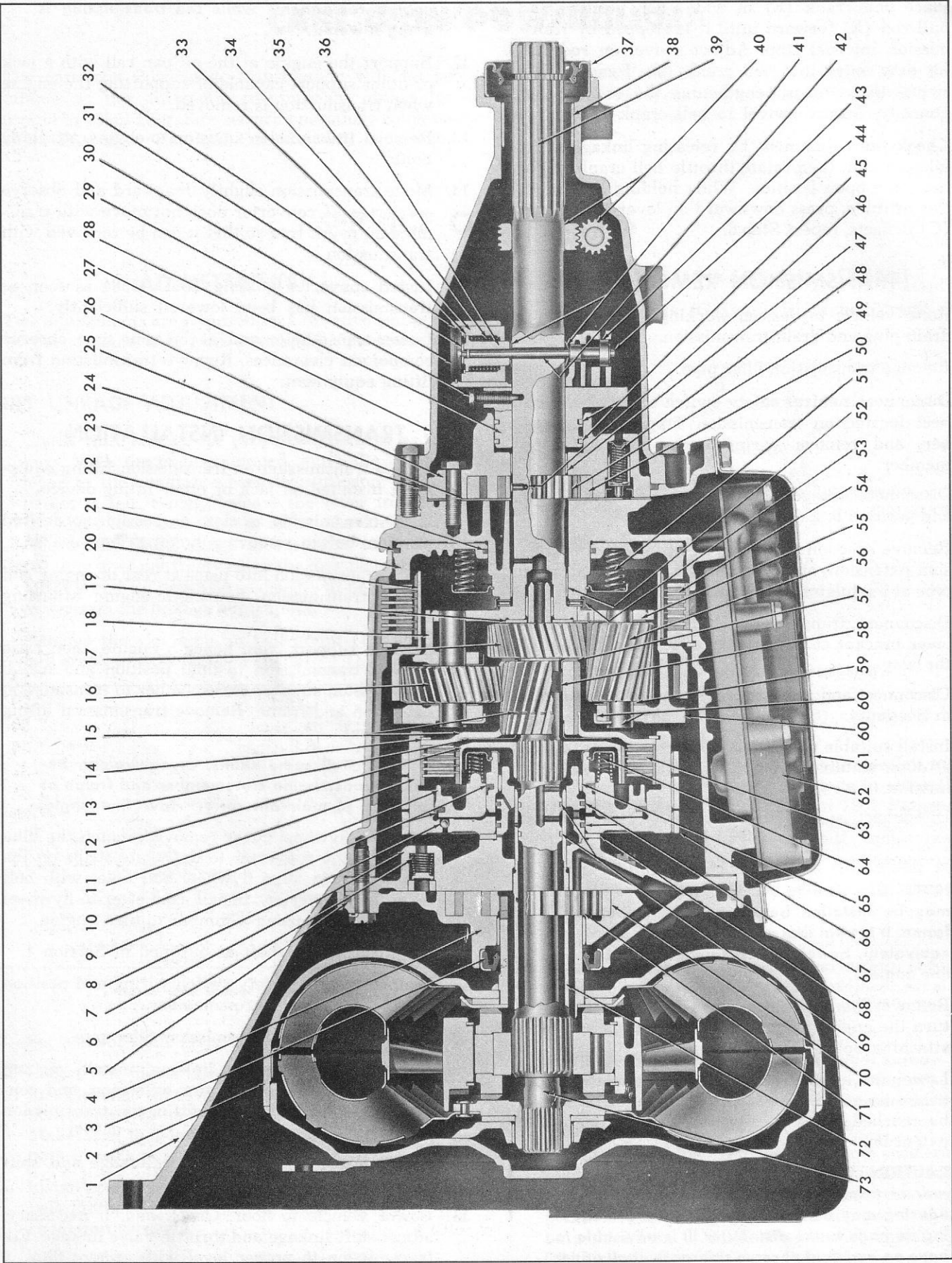


Fig. 4—Aluminum Powerglide—Sectional View

ALUMINUM POWERGLIDE

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| 2. Welded Converter | 21. Reverse Piston | 41. Governor Shaft | 57. Low Sun Gear Thrust Washer |
| 3. Front Oil Pump Seal Assembly | 22. Reverse Piston Outer Seal | Belleville Springs | 58. Low Sun Gear Bushing (Splined) |
| 4. Front Oil Pump Body | 23. Reverse Piston Inner Seal | 42. Governor Shaft | 59. Pinion Thrust Washer |
| 5. Front Oil Pump Body Square Ring Seal | 24. Extension Seal Ring | 43. Governor Valve | 60. Parking Lock Gear |
| 6. Lube Relief Valve | 25. Rear Pump Wear Plate | 44. Governor Valve Retaining Clip | 61. Transmission Oil Pan |
| 7. Front Oil Pump Cover | 26. Rear Pump | 45. Governor Hub Seal Rings | 62. Valve Body |
| 8. Clutch Relief Valve Ball | 27. Extension | 46. Rear Pump Drive Pin | 63. High Clutch Pack |
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| 17. Planet Input Sun Gear | 36. Governor Inner Weight | 55. Pinion Thrust Washer | 72. Stator Shaft |
| 18. Planet Carrier | 37. Extension Rear Oil Seal | | 73. Input Shaft |
| 19. Planet Input Sun Gear Thrust Washer | 38. Extension Rear Bushing | | |
| | 39. Output Shaft | | |

Fig. 4—Aluminum Powerglide—Sectional View

GENERAL DESCRIPTION

The new Aluminum Powerglide transmission, available as the automatic transmission option, is a new transmission which embodies many proven features of the familiar Powerglide, the discontinued Turboglide and the Corvair Powerglide transmissions. The new unit effects a weight savings of about 35% over the regular Powerglide due to the use of a one-piece cast aluminum case and an aluminum extension.

Driving characteristics remain the same as found in the regular Powerglide with the single shift occurring between low and drive. However, design and appearance of the internal components are somewhat changed. The conventionally arranged torque converter is a welded unit, eliminating the possibility of internal servicing. Low (band) and drive (disc clutch) functions are performed by a new clutch drum assembly which differs from the regular Powerglide primarily in that multiple release springs are incorporated in place of the large single spring. The planetary gearset, while greatly strengthened, operates in the same man-

ner as the regular Powerglide gearset. The reverse clutch is of the disc type operated by a reverse clutch piston and incorporating multiple return springs. The governor is radically different from that used in the regular Powerglide, completely encircling the output shaft and spinning with the shaft. The valve body has been relocated to the bottom of the case where service operations on it may be performed without the necessity of removing the transmission from the vehicle. A parking lock similar to that found in the Turboglide is used.

As in the regular Powerglide, the converter, bolted to the engine flywheel, drives through the two-speed planetary gearset. Maximum converter multiplication is 2.10:1 at stall, reducing to 1:1 at fluid coupling (cruise). The planet gearset ratios are 1.76:1 in low and 1:1 in drive. Transmission output torque converter torque times gearset ratio) therefore ranges from 3.68:1 at stall to 1:1 at cruise.

MAINTENANCE AND ADJUSTMENTS

OIL LEVEL

The transmission oil level should be checked every 1,000 miles. Oil should be added only when the level is near the "ADD" mark on the dip stick with oil hot or at operating temperature. The oil level dip stick is located at the right rear of the engine compartment.

In order to check oil level accurately, the engine should be idled with the transmission oil hot and the control lever in neutral (N) position.

It is important that the oil level be maintained no higher than the "FULL" mark on the transmission oil level gauge. DO NOT OVERFILL, for when the oil level is at the full mark on the dip stick, it is just slightly below the planetary gear unit. If additional oil is added, bringing the oil level above the full mark, the planetary unit will run in the oil, foaming and aerating the oil. This aerated oil carried through the various oil pressure passages (low servo, reverse servo, clutch apply, converter, etc.) may cause malfunction of the transmission assembly, resulting in cavitation noise in the converter and improper band or clutch application.

If the transmission is found consistently low on oil, a thorough inspection should be made to find and correct all external oil leaks. Transmission oil leakage is now easily identified as all automatic transmission fluid used in Chevrolet production is dyed red. The mating surfaces of servo cover, converter housing, transmission case and transmission case extension should be carefully examined for signs of leakage. The vacuum modulator must also be checked to insure that the diaphragm has not ruptured as this would allow transmission oil to be drawn into the intake manifold.

Usually, the exhaust will be excessively smoky if the diaphragm ruptures due to the transmission oil added to the combustion. The transmission case extension rear oil seal should also be checked. All test plugs should be checked to make sure that they are tight and that there is no sign of leakage at these points. The converter underpan should also be removed. Any appreciable quantity of oil in this area would indicate leakage at the front pump square seal ring, front pump seal assembly, or front pump bolt "O" ring seals.

DRAINING AND REFILLING

Transmission fluid installed at the assembly plant is good for the life of the vehicle. It is not necessary to replace the fluid except to make additions when needed to bring it to the proper level.

When the transmission is to be removed from the vehicle for repairs, drain and refill as follows:

To drain the transmission, carefully loosen the oil pan bolts. Position a pan or can to catch the draining oil. If the transmission is to be removed from the vehicle for repairs, the draining operation may be performed after removal if desired.

To refill the transmission, remove dipstick from oil filler tube and refill transmission with Automatic Transmission Fluid Type A with an AQ-ATF-A mark using filler tube and funnel J-4264. Then, after shifting into all ranges at idle speed to fill all oil passages, the engine should be run at 800-1000 rpm with the transmission in Neutral until the oil warms up, then add

oil as required to raise the fluid level to the full mark on the dipstick.

ADJUSTMENTS

Service adjustments consist of shift linkage adjustment and throttle valve linkage adjustment. If incorrect linkage adjustment is suspected as being the cause of improper shifting (see "Diagnosis Guide"), check and adjust linkage as follows:

SHIFT LINKAGE

1. Check shift linkage for proper adjustment as follows: With the engine stopped, move the selector lever to the position where transmission DRIVE is felt. Slowly release the lever to feel if the shaft lever tang freely enters the lock plate. Check REVERSE range in a similar manner. If the tang does not freely enter the lock plate in both DRIVE and REVERSE ranges, it will be necessary to perform the linkage adjustment.
2. Disconnect control rod (V) (fig. 5) at control shaft lever (S) by removing clip retainer from control rod. Loosen clevis nut at bell crank end of control rod.
3. Set control rod bell crank (U) in park position.
4. Set control shaft lever (S) in park position.

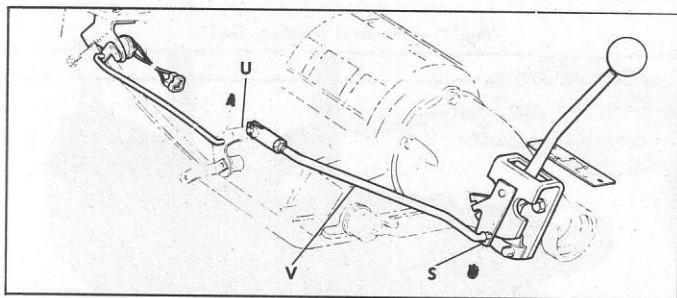


Fig. 5—Shift Linkage Adjustment

5. With both bell crank and lever held in park position, adjust control rod (V) at clevis so that easy entry into lever (S) is obtained.

6. Tighten nut at clevis, and install retaining clip at lever.
7. Check shift pattern as indicated in Step 1.

THROTTLE VALVE LINKAGE

1. Place lever (F) (fig. 6) in wide open position and pull rod (E) forward until it is stopped by transmission internal stop. Adjust swivel on rod (E) for easy entrance into lever (F), and then readjust the swivel three turns, lengthening the rod by that quantity. Secure swivel in lever (F).

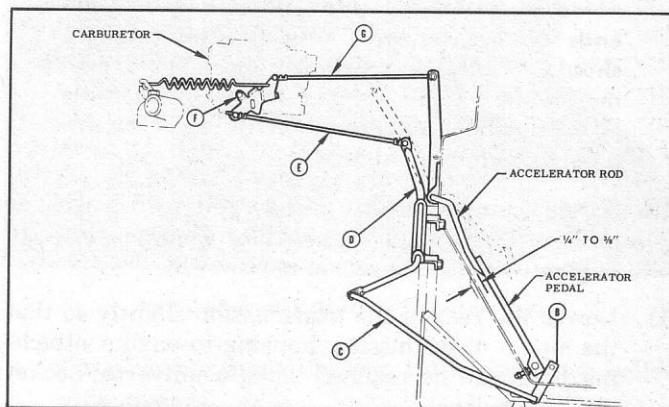


Fig. 6—Throttle Valve Linkage Adjustment

2. Remove carpeting from toe panel. Depress accelerator pedal so that lowest point on accelerator rod is $\frac{1}{4}$ " to $\frac{3}{8}$ " above toe panel. With pedal depressed and lever (F) rotated to wide open position, adjust swivel on rod (G) for free entry into lever (F) before securing swivel to lever (F).
3. Check adjustment by placing linkage in idle position, then return to wide open position by rotating lever (F). Push downward on lever (B) and note if rod (E) deflects. If rod (E) deflects, or lever (F) will not reach wide open position, repeat adjustment 1.
4. Check adjustment by releasing, then depressing accelerator pedal. Check lever (F) for wide open position. If lever (F) will not reach wide open position, repeat adjustment 2.

SERVICE OPERATIONS

TRANSMISSION REMOVAL

1. Disengage neutral safety switch wiring at quick-disconnect mounted on dash wall near steering column.
2. Raise vehicle to desired working height.
3. Disconnect vacuum modulator line and the speedometer drive cable fitting at the transmission. Tie lines out of the way.
4. Disconnect transmission shift linkage and shift

lever bracket at transmission. Tie bracket and linkage out of the way.

5. Disconnect throttle valve linkage at valve actuating lever.
6. Disconnect propeller shaft and remove from vehicle.
7. Install suitable transmission lift equipment to jack or other suitable lifting device and secure to transmission.

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8. Disconnect engine rear mount on transmission extension; then remove the transmission support crossmember.

NOTE: Remove shims which may be installed between crossmember and frame. It is vital that exactly the same shims, or equivalent, be reinstalled as they affect drive line angle.

9. Remove converter underpan, scribe flywheel-converter relationship for installation, then remove the flywheel-to-converter attaching bolts.

NOTE: The "light" side of the converter is denoted by a "blue" stripe painted across the ends of the converter housing. This marking should be aligned as closely as possible with the "white" stripe painted on the engine side of the flywheel outer rim (heavy side of the engine) to maintain balance.

10. Support engine at the oil pan rail with a jack or other suitable support capable of supporting the engine when transmission is removed.
11. Lower the rear of the transmission slightly so that the upper transmission housing-to-engine attaching bolts can be reached using a universal socket and extension.

CAUTION: Care must be taken not to lower rear of transmission too far as the distributor housing may be forced against the dash. It is advisable to have an assistant observe clearance of all upper engine components while the transmission rear end is being lowered.

12. Remove all transmission housing-to-engine attaching bolts. Tie throttle valve linkage out of the way. Position crankcase ventilation tube out of the way.
13. Clean the area around filler tube at transmission case, and remove filler tube from transmission. Cover opening in transmission case to prevent foreign matter from entering.
14. Remove the transmission by moving it slightly rearward and downward.

NOTE: Observe converter when moving transmission rearward. If converter does not move with the transmission, pry it free of flywheel before proceeding.

CAUTION: Keep front of transmission upward to prevent the converter from falling out. Install Tool J-9549 (or a similar tool constructed as shown in Figure 7, or, in an emergency, a length of strong wire may be used) immediately after separation from the engine.

Disassembly

1. Place transmission in holding fixture J-3289-01 and adapters J-9506 (fig. 8).

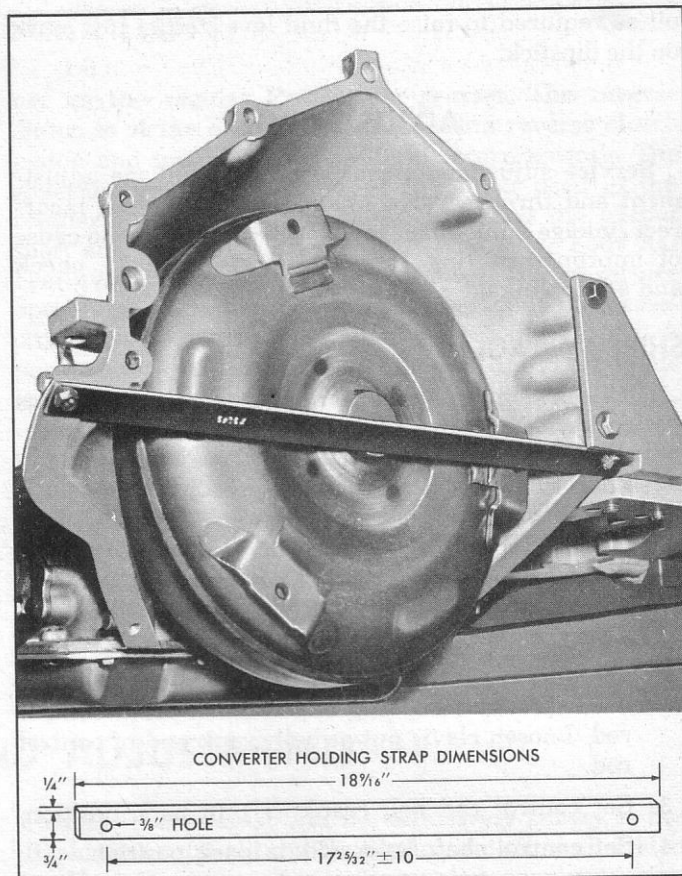


Fig. 7—Converter Holding Tool

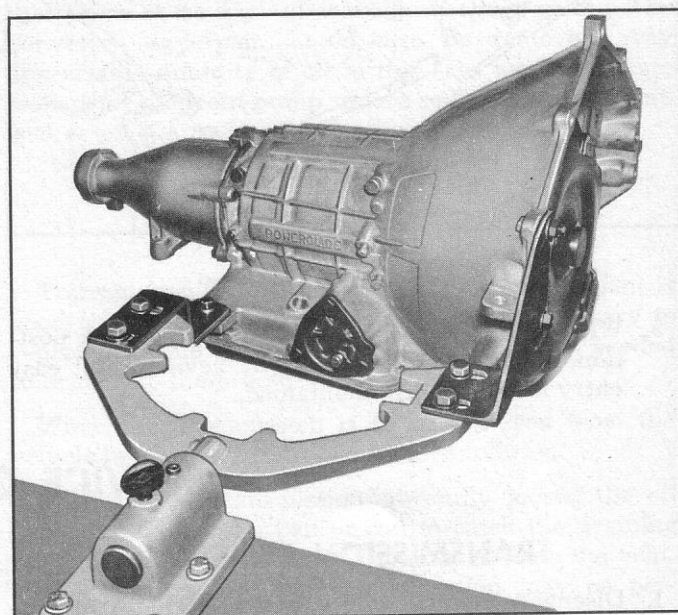


Fig. 8—Transmission Mounted in Fixture

NOTE: Cleanliness is an important factor in the overhaul of the transmission. Before attempting any disassembly operation, the exterior of the case should be thoroughly cleaned to prevent the possibility of dirt entering the trans-

mission internal mechanism. During disassembly, all parts should be thoroughly cleaned in cleaning fluid and then air dried. Wiping cloths or rags should not be used to dry parts as lint may be deposited on the parts which may cause later trouble.

CAUTION: Do not use solvents which could damage rubber seals or clutch plate facings.

2. Remove converter holding tool previously installed and remove converter assembly.

EXTENSION, GOVERNOR AND REAR OIL PUMP

3. If replacement is necessary, remove speedometer driven gear. Loosen capscrew and retainer clip holding speedometer driven gear in extension and remove gear.
4. Remove transmission extension by removing five bolts retaining extension to case. Note seal ring on rear pump body.
5. Remove the speedometer drive gear from output shaft, using J-5814 (fig. 9).
6. Remove the "E" ring from the governor shaft on the weight side of the governor, then remove the shaft and governor valve from the opposite side of

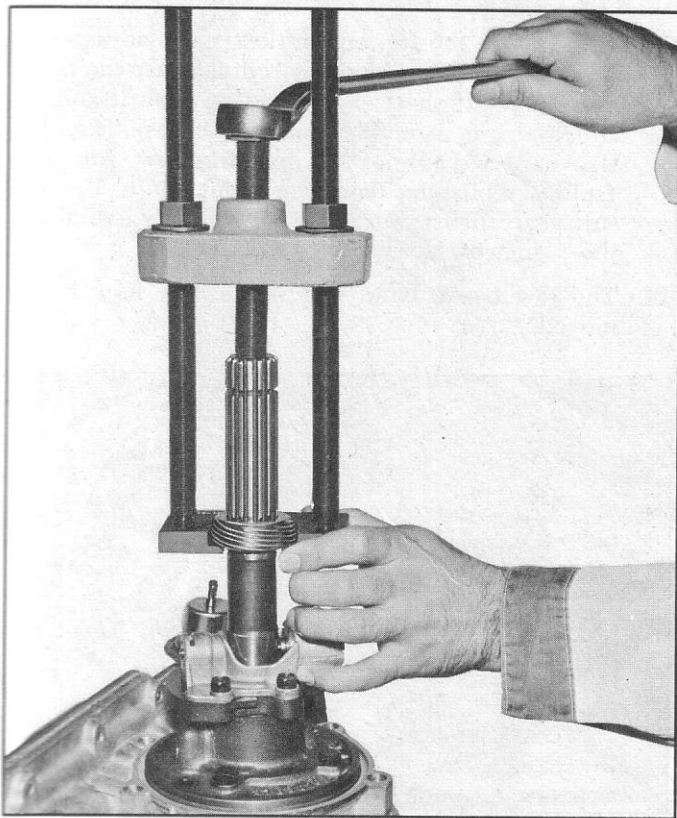


Fig. 9—Removing Speedometer Drive Gear

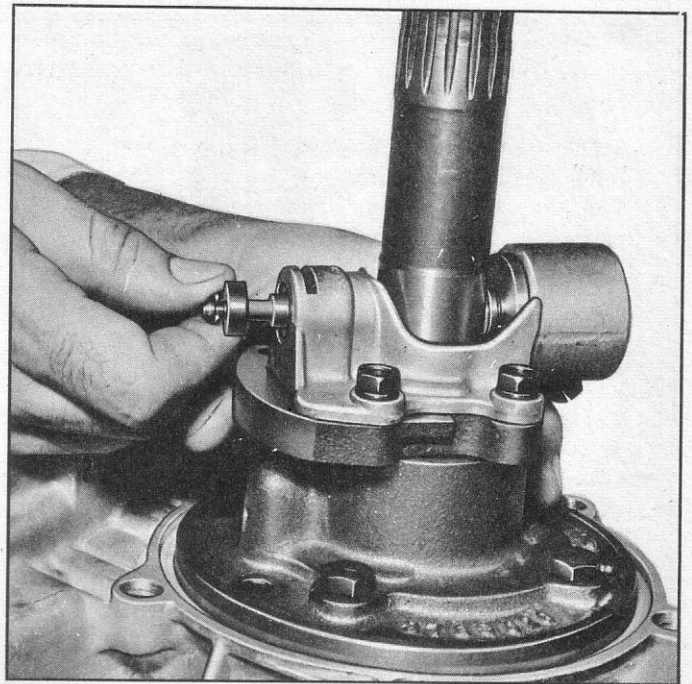


Fig. 10—Removing Governor Valve and Shaft

the governor assembly (fig. 10) and the two Belleville springs.

7. Loosen the governor drive screw and remove the governor assembly over the end of the output shaft (fig. 11).
 8. Remove the four bolts retaining the rear oil pump to the transmission case and remove the pump body, and drain back baffle extension seal ring, drive and driven gears.
- CAUTION:** When the drive gear is removed, the drive pin may fall out if the hole is on the bottom of the shaft and the shaft is horizontal.
9. Remove the oil pump drive pin (fig. 12). This is of extreme importance. Do not fail to remove this drive pin.
 10. After removing the drive pin, remove the rear pump wear plate.

TRANSMISSION INTERNAL COMPONENTS

11. Rotate the holding fixture until the front of the transmission is pointing up and remove the seven front oil pump bolts. The bolt holes are offset to facilitate proper location upon installation.
12. Remove the front oil pump and stator shaft assembly and the selective fit thrust washer using J-9539 (or two 3-8"—16 x 10" stove bolts) and the

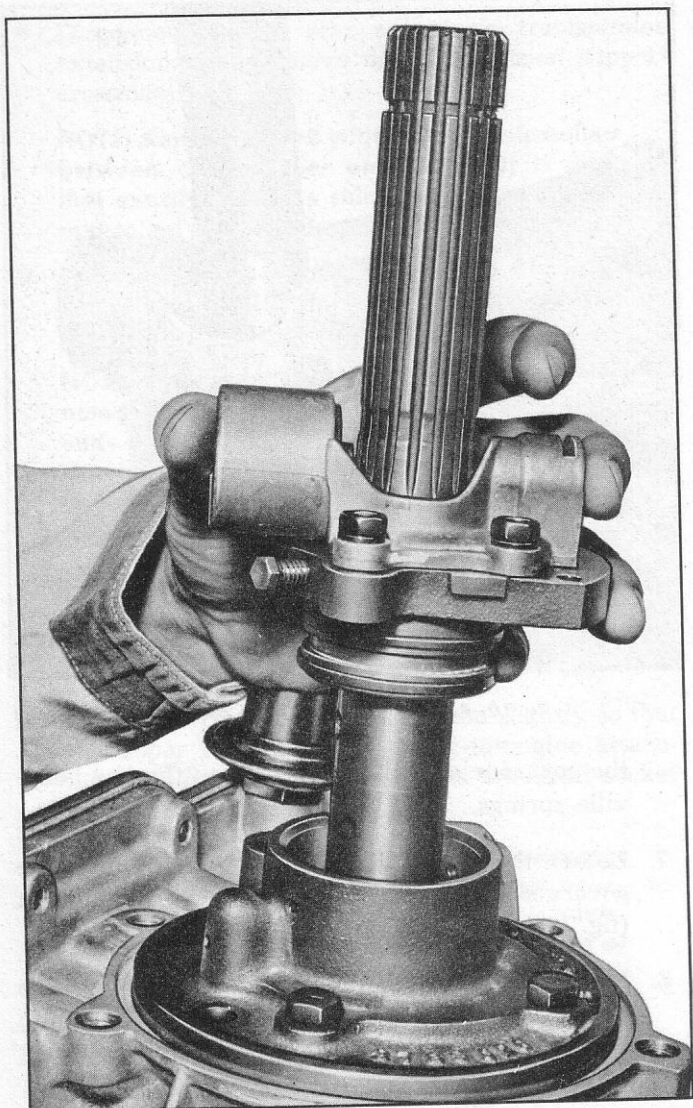


Fig. 11—Removing Governor Assembly

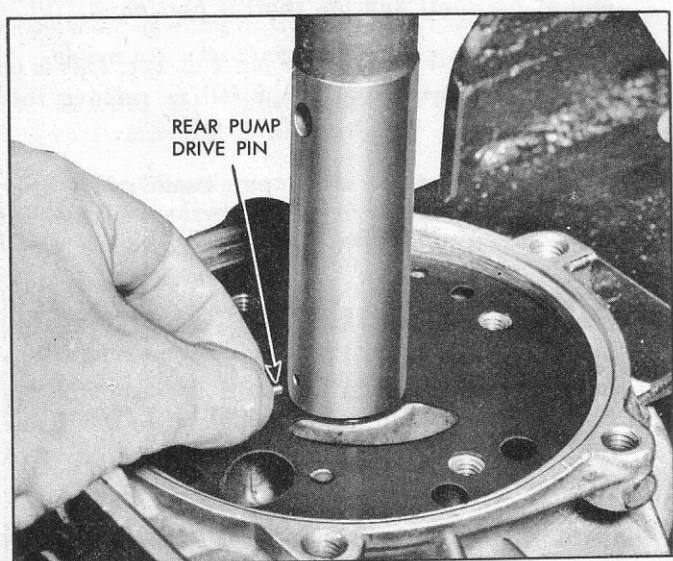


Fig. 12—Removing Rear Oil Pump Drive Pin

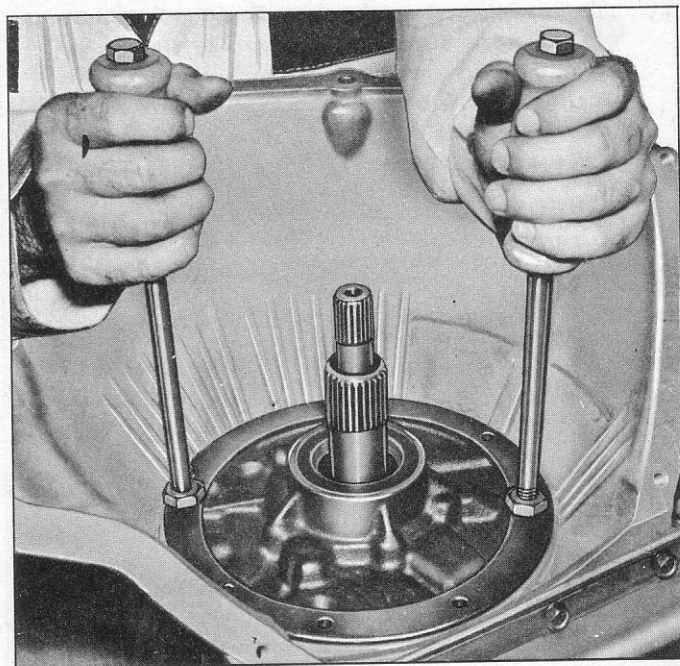


Fig. 13—Removing Front Oil Pump

slide weights from Tool J-6565 (fig. 13). Note the two threaded holes in the pump to mount the pullers. Remove the front pump ring seal and gasket.

NOTE: The front pump bolts have special "O" rings which must be in place upon installation.

13. Release the tension on the low band adjustment, then, with transmission horizontal, grasp the transmission input shaft and carefully work it and the clutch drum assembly out of the case (fig. 14). Use care so as not to lose the low sun gear (splined) bushing from the input shaft. The low sun gear thrust washer will probably remain in the planet carrier.
14. The low brake band and struts may now be removed.

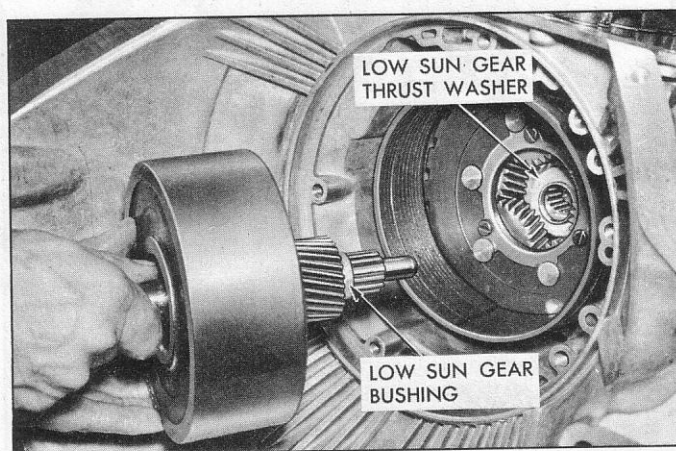


Fig. 14—Removing Clutch Drum and Input Shaft

15. Make certain that the rear pump drive pin has been removed (Step 9 above), then remove the planet carrier and the output shaft thrust caged bearing from the front of the transmission.
16. Remove the reverse ring gear if it did not come out with the planet carrier.
17. Using a large screwdriver, remove the reverse clutch pack retainer ring and then lift out the reverse clutch plates.

NOTE: If difficulty is experienced in getting the snap ring past the shoulder on the reverse pack pressure plate, a feeler gauge may be used as a guide.

18. Install Tool J-9542 through the rear bore of the case with the flat plate on the rear face of the case and turn down the wing nut to compress the rear piston spring retainer and springs, then, remove the snap ring (fig. 15). Tool J-8039 may be used to remove the snap ring if desired.

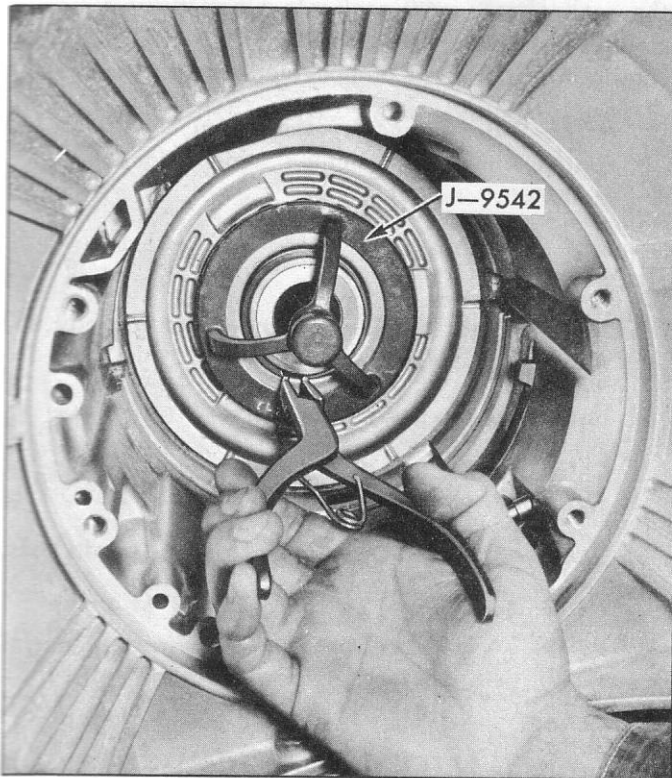


Fig. 15—Removing Rear Piston Spring Retainer Snap Ring

19. Remove Tool J-9542, the reverse piston spring retainer and the 17 piston return springs.
20. Remove the rear piston by applying air to the reverse port in the rear of the transmission case as shown in Figure 16. Remove the inner and outer seals.
21. Remove the three servo cover bolts, servo cover, piston and spring.

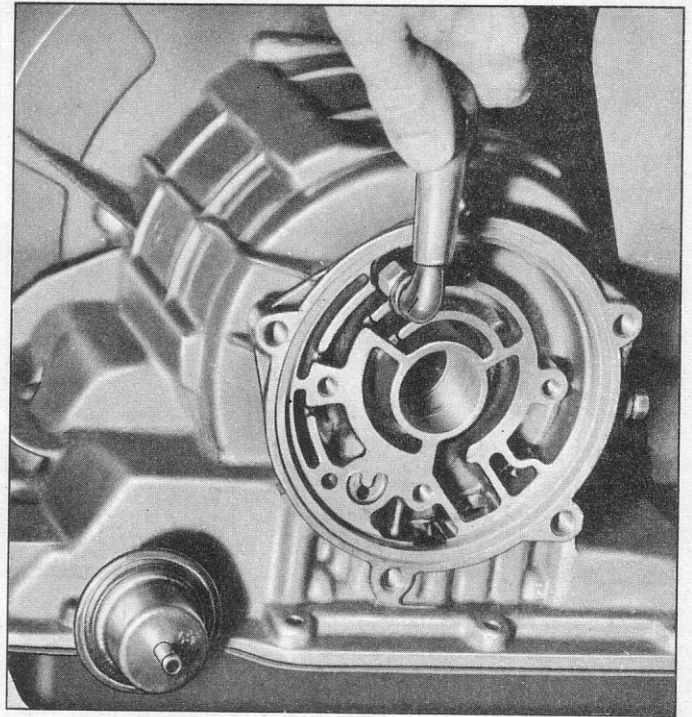


Fig. 16—Applying Air to Remove Rear Piston

OIL PAN AND VALVE BODY

NOTE: The oil pan and valve body may be serviced without the necessity of removing the extension and internal components covered in the preceding steps.

22. Rotate the holding fixture until the transmission is upside down and the oil pan is at the top. Remove the oil pan attaching bolts, oil pan and gasket.
23. Remove the vacuum modulator and gasket, and the vacuum modulator valve (fig. 17).

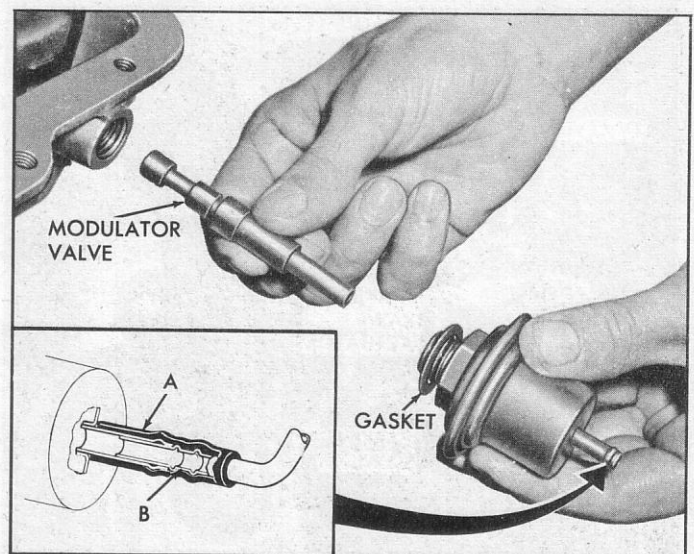


Fig. 17—Vacuum Modulated, Gasket and Valve

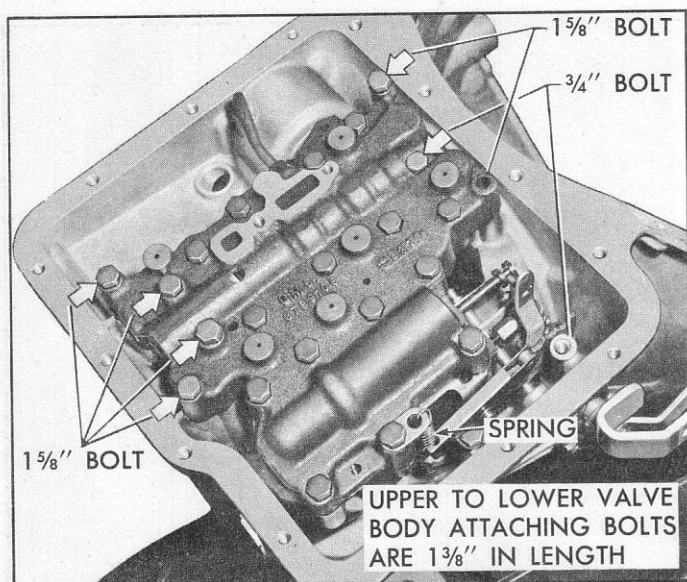


Fig. 18—Valve Body Removal

24. Remove the two bolts attaching the detent guide plate to the valve body and the transmission case. Remove the guide plate and the range selector detent roller spring.
25. Remove the remaining valve body-to-transmission case attaching bolts (indicated by arrows in Figure 18) and carefully lift out the valve body and gasket, disengaging the servo apply tube from the transmission case as the valve body is removed.
26. If necessary, the TV, shift and parking actuator assembly levers, and the parking pawl and bracket (fig. 19) may be removed.

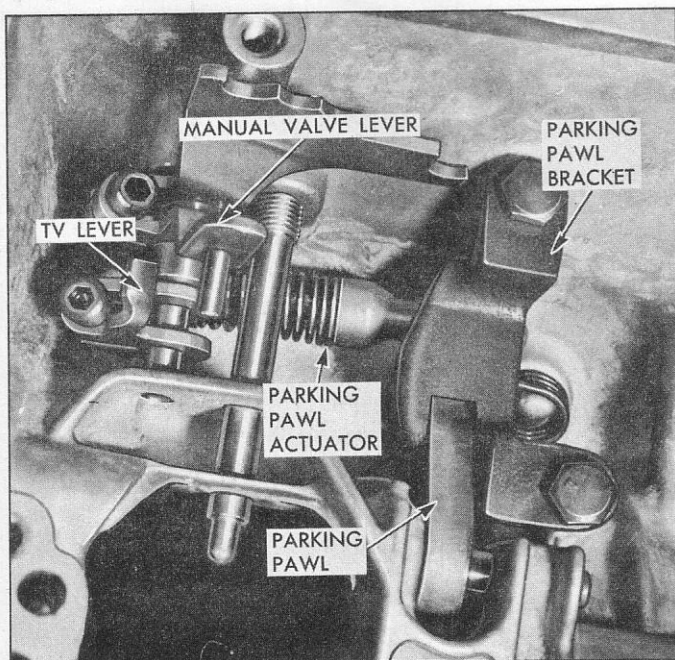


Fig. 19—Inner Control Levers, Parking Pawl and Bracket

This completes the entire transmission disassembly procedure. Component parts disassembly and repair procedures will be found in succeeding parts of this manual.

OVERHAULING UNIT ASSEMBLIES

CONVERTER AND STATOR

The converter is a welded assembly and no internal repairs are possible. Check the seams for stress or breaks and replace converter if necessary.

FRONT PUMP

Seal Replacement

If the front pump seal requires replacement, remove the pump from the transmission, pry out and replace the seal. (Drive new seal into place, fully seated in counterbore, using J-6839.) Then, if no further work is required on the front pump, reinstall it in the case.

NOTE: Outer diameter of the seal should be coated with non-hardening sealer prior to installation.

Disassembly

1. Remove bolts attaching pump cover to body and remove the cover.
2. Remove pump gears from body.

CAUTION: Do not drop or nick gears. These gears are not heat treated.

3. Remove the rubber seal ring from the pump body.

NOTE: See Figure 21 for a layout of pump parts.

Inspection

1. Wash all parts in cleaning solvent and blow out all oil passages. **DO NOT USE RAGS TO DRY PARTS.**

CAUTION: Some solvents may be harmful to rubber seals.

2. Inspect pump gears for nicks or damage.
3. Inspect body and cover faces for nicks or scoring.
4. Check operation of the priming valve and replace if necessary.

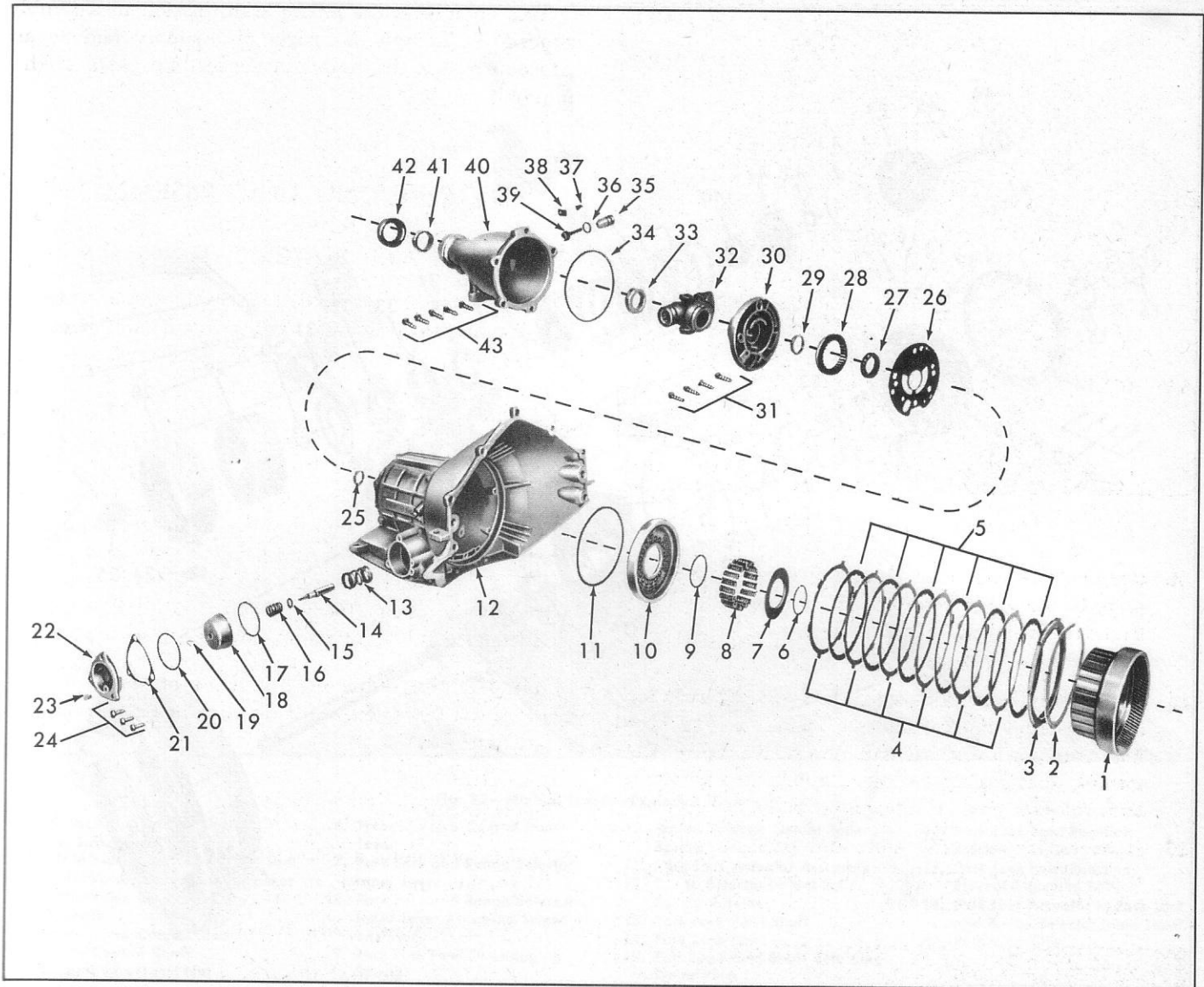


Fig. 20—Transmission Case—Exploded View

- | | | |
|--|--------------------------------------|--|
| 1. Reverse Ring Gear | 14. Servo Piston Rod | 30. Rear Pump Body |
| 2. Reverse Clutch Pack Snap Ring | 15. Servo Piston Apply Spring Seat | 31. Rear Pump Assembly to Case Attaching Bolts |
| 3. Reverse Clutch Pressure Plate | 16. Servo Piston Apply Spring | 32. Governor Assembly |
| 4. Reverse Clutch Reaction Plates | 17. Servo Piston Seal Ring | 33. Speedometer Drive Gear |
| 5. Reverse Clutch Drive Plates | 18. Servo Piston | 34. Rear Pump Seal |
| 6. Reverse Clutch Piston Return Springs Retainer Snap Ring | 19. Servo Piston Rod Spring Retainer | 35. Speedometer Shaft Fitting |
| 7. Reverse Clutch Piston Return Springs Retainer | 20. Servo Cover Seal | 36. Speedometer Shaft Fitting Oil Seal |
| 8. Reverse Clutch Piston Return Springs | 21. Servo Cover Gasket | 37. Lock Plate Attaching Screw |
| 9. Reverse Clutch Piston Inner Seal | 22. Servo Cover | 38. Lock Plate |
| 10. Reverse Clutch Piston | 23. Servo Cover Plug | 39. Speedometer Driven Gear |
| 11. Reverse Clutch Piston Outer Seal | 24. Servo Cover Bolts | 40. Transmission Extension |
| 12. Transmission Case | 25. Transmission Case Bushing | 41. Extension Bushing |
| 13. Servo Piston Return Spring | 26. Rear Pump Wear Plate | 42. Extension Oil Seal |
| | 27. Rear Pump Drive Gear | 43. Extension to Case Attaching Bolts |
| | 28. Rear Pump Driven Gear | |
| | 29. Rear Pump Body Bushing | |

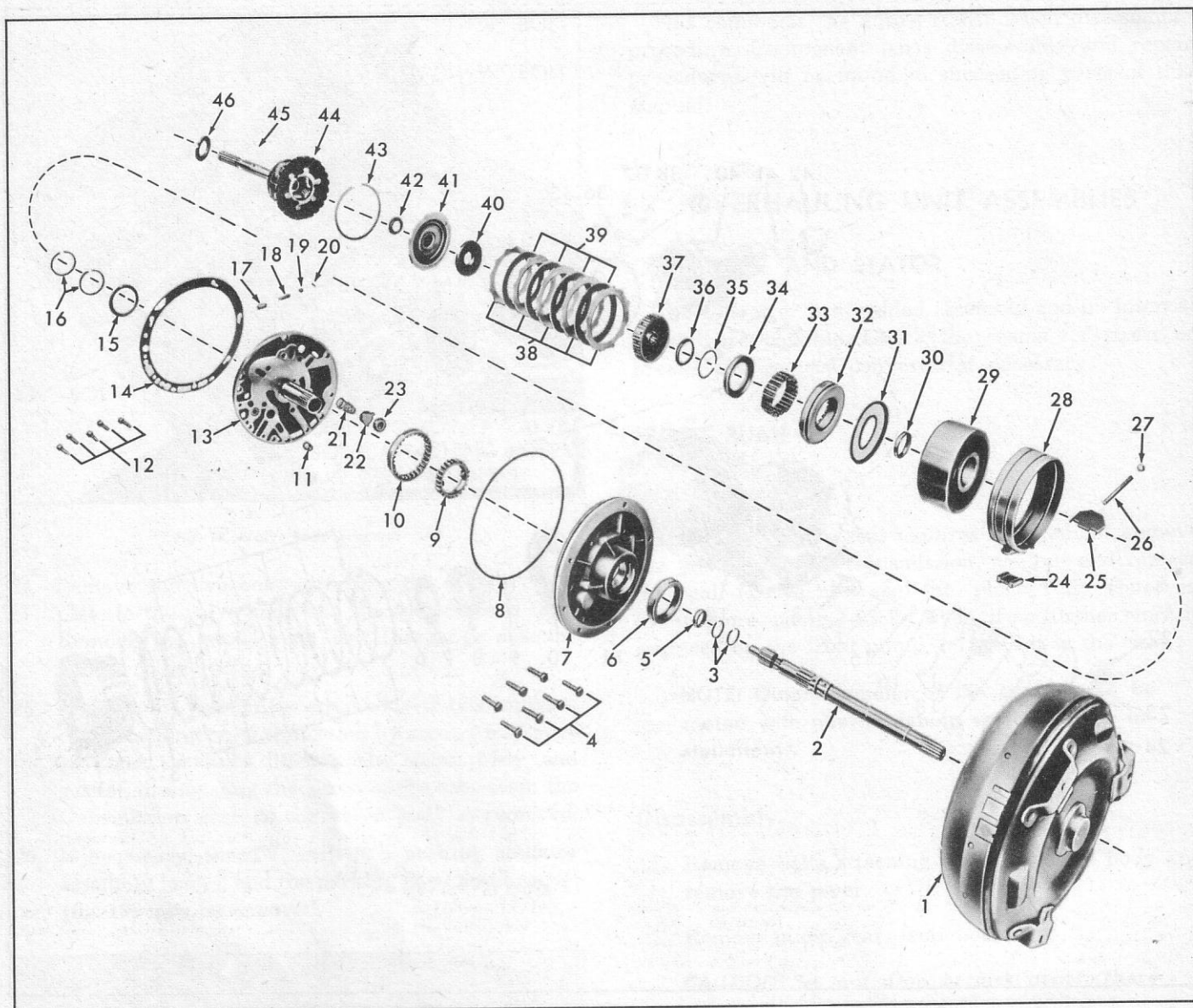


Fig. 21—Internal Mechanism—Exploded View

1. Converter Housing and Pump
2. Input Shaft
3. Input Shaft Oil Seals
4. Front Pump to Case Attaching Bolts
5. Low Sun Gear Bushing
6. Front Pump Oil Seal
7. Front Pump Body
8. Front Pump to Case Oil Seal
9. Front Pump Drive Gear
10. Front Pump Driven Gear
11. Low Speed Downshift Timing Valve
12. Front Pump Cover to Pump Body Attaching Screws
13. Front Pump Cover and Converter Stator Shaft
14. Front Pump Gasket
15. Clutch Drum Thrust Washer

16. High Clutch Seal Rings
17. Front Pump Priming Valve
18. Front Pump Priming Valve Spring
19. Front Pump Priming Valve Spring Washer
20. Front Pump Priming Valve Spring Retaining Pin
21. Lube Pressure Relief Valve Spring
22. Lube Pressure Relief Valve
23. Lube Pressure Relief Valve Seat
24. Band Apply Strut
25. Band Anchor Strut
26. Band Anchor Adjusting Screw
27. Band Anchor Adjusting Screw Nut
28. Low Brake Band
29. Clutch Drum

30. Clutch Drum Bushing
31. Clutch Piston Outer and Inner Seals
32. Clutch Piston
33. Clutch Return Springs
34. Clutch Spring Seat
35. Clutch Spring Snap Ring
36. Clutch Hub Front Thrust Washer
37. Clutch Hub
38. Clutch Driven Plates (Flat)
39. Clutch Drive Plates (Waved)
40. Clutch Hub Rear Thrust Washer
41. Low Sun Gear and Clutch Flange Assembly
42. Low Sun Gear Thrust Washer
43. Clutch Flange Retaining Ring
44. Planet Carrier and Output Shaft Assembly
45. Rear Pump Drive Pin
46. Output Shaft Thrust Bearing

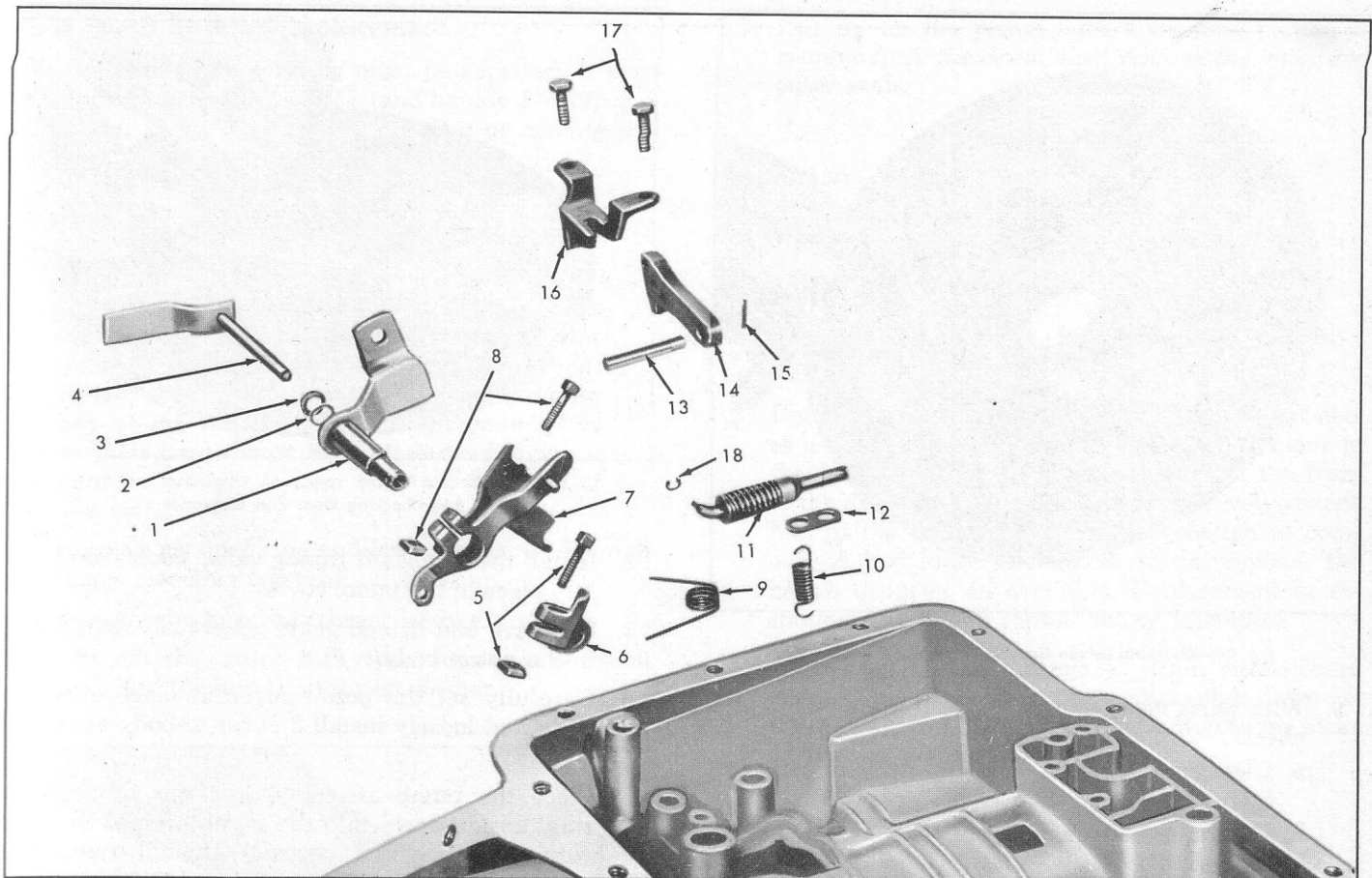


Fig. 22—Manual Levers—Exploded View

- | | | | |
|--|---|--|---|
| 1. Park Lock and Range Selector Outer Lever and Shaft | 6. Throttle Valve Control Inner Lever | 10. Range Selector Detent Roller Spring | 16. Park Lock Pawl Reaction Bracket |
| 2. Throttle Valve Control Shaft Oil Seal | 7. Park Lock and Range Selector Inner Lever | 11. Park Lock Actuator Assembly | 17. Park Lock Pawl Reaction Bracket Attaching Bolts |
| 3. Throttle Valve Control Shaft Washer | 8. Park Lock and Range Selector Inner Lever Attaching Screw and Nut | 12. Range Selector Detent Roller Spring Retainer | 18. Park Lock Actuator to Park Lock and Range Selector Inner Lever Retaining Clip |
| 4. Throttle Valve Control Lever and Shaft | 9. Park Lock Pawl Disengaging Spring | 13. Park Lock Pawl Shaft | |
| 5. Throttle Valve Control Inner Lever to Control Shaft Attaching Screw and Nut | | 14. Park Lock Pawl | |
| | | 15. Park Lock Pawl Shaft Retaining Pin or Ring | |

5. Inspect body bushing for galling or scoring. Check clearance between body bushing and converter pump hub (fig. 23). Maximum clearance is .005". If the bushing is damaged, the front pump body should be replaced.
6. Inspect converter housing hub O.D. for nicks or burrs which might damage front pump seal or bushing. Repair or replace as necessary.
7. If oil seal is damaged or is leaking (and the pump body is otherwise suitable for reuse), pry out and install a new seal, fully seated in counterbore, using seal driver J-6839.

NOTE: Outer diameter of seal should be coated with a non-hardening sealer prior to installation.

8. Check condition of lube relief valve, and replace if valve leaks excessively.

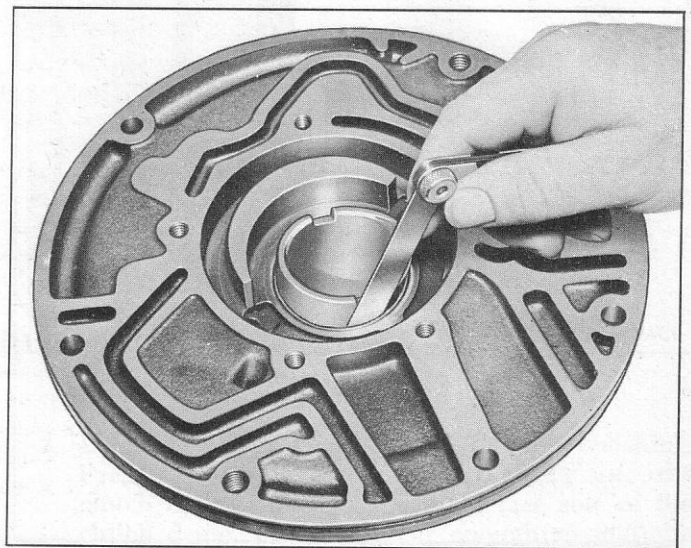


Fig. 23—Checking Pump Body Bushing to Converter Pump Hub Clearance

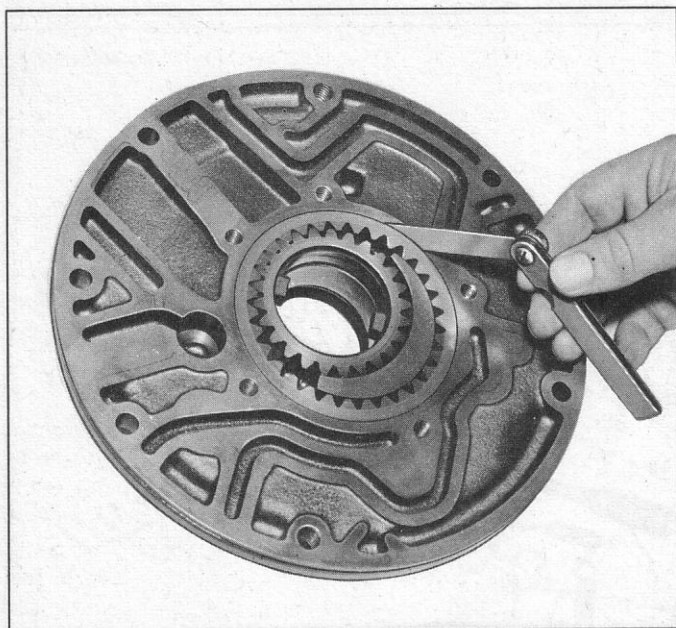


Fig. 24—Checking Driven Gear to Pump Body Clearance

9. With parts clean and dry, install pump gears and check:
 - a. Clearance between O.D. of driven gear and body should be .0035"-.0065" (fig. 24).
 - b. Clearance between I.D. of driven gear and crescent should be .003"-.009" (fig. 25).
 - c. Gear end clearance (fig. 26) should be .0005"-.0015".

Assembly

With the transmission facing up, proceed as follows:

1. Remove the input shaft, clutch drum, low band and struts as outlined under "Transmission-Disassembly."

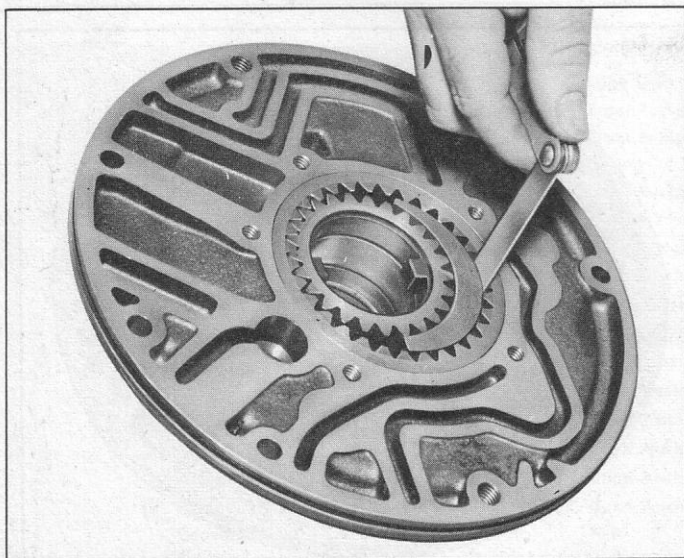


Fig. 25—Driven Gear to Crescent Clearance

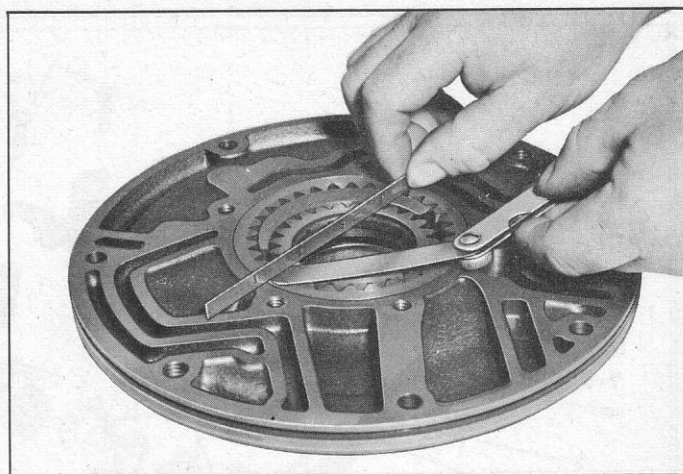


Fig. 26—Checking Gear End Clearance

2. Install the downshift timing valve, conical end out, into place in the pump cover.
 3. Oil drive and driven gears generously and install in the pump body.
 4. Carefully set the pump cover in place over the body and loosely install 2 cover-to-body attaching screws.
 5. Place the pump assembly, less the rubber seal ring, upside down into the pump bore of the case (use guide pins if desired). Install remaining cover-to-body attaching screws and torque to 15 to 20 ft. lbs.
 6. Remove pump assembly from case bore. Replace the clutch drum and input shaft, low band and struts as outlined under "Transmission-Assembly."
- NOTE:** If necessary, remove two bolts and use J-6585 pullers and J-6585 adapters to remove pump assembly. Replace and re-torque bolts.
7. Replace rubber seal ring in its groove in the pump body and install the pump assembly properly in place in the case bore, using a new gasket, being sure that the selective fit thrust washer is in place.
 8. Install the attaching bolts, using new bolt "O" rings if necessary.

REAR PUMP

The rear pump is removed and disassembled as described in the "Transmission-Disassembly" procedures earlier in this section. General cleaning and clearance check information will remain the same as for the front pump. Assembly of the rear pump is described in the "Transmission-Assembly" procedure later in this section.

NOTE: When reinstalling the rear pump priming valve, retain the washer, spring and valve in the bore with the retaining seat, installed small hole first.

Rear Pump Bushing Replacement

If the rear pump bushing must be replaced, it may be removed using Tool J-9557 (and handle J-7079) and reinstalled using Tool J-6582, pressing or driving the bushing in from the front of the pump.

CLUTCH DRUM

Disassembly

CAUTION: When working with the clutch drum, use extreme care that the machined face on the front of the drum (fig. 21) not be scratched, scored, nicked or otherwise damaged during any of the following service operations. This machined face must be protected whenever it must be brought to bear on a press or tool of any sort.

1. Remove retainer ring and low sun gear and clutch flange assembly from the clutch drum.
2. Remove the hub rear thrust washer.
3. Lift out the clutch hub, then remove the clutch pack and the hub front thrust washer.

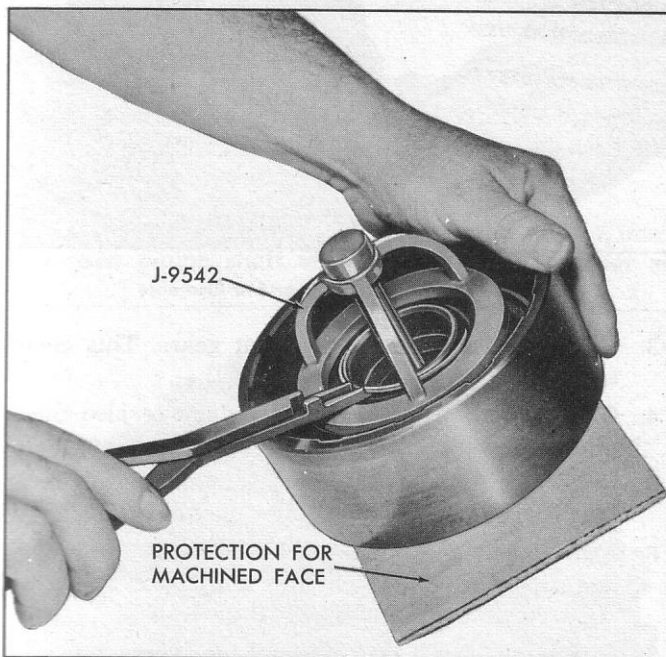


Fig. 27—Removing Clutch Spring Retainer Snap Ring

4. Remove the spring retainer using J-9542 as shown in Figure 27, or if using an arbor press, use J-5133 and J-7782 adapter ring. Compress the springs far enough to allow removal of the retainer snap ring; then, releasing pressure on the springs, remove the retainer and the 24 springs.

NOTE: When using J-9542, place a piece of cloth or cardboard between the tool and the front side of the clutch drum as protection for the machined face.

5. Lift up on the piston with a twisting motion to remove from the drum, then remove the inner and outer seals.

Inspection

1. Wash all parts in cleaning solvent (air dry).

CAUTION: Do not use rags to dry parts.

2. Check drum bushing for scoring or excessive wear.
3. Check the steel ball in the clutch drum that acts as a relief valve. Be sure that it is free to move in the hole and that the orifice leading to the front of the drum is open. If the clutch relief valve check ball in the clutch drum is loose enough to come out or not loose enough to rattle, replace the clutch drum as an assembly. Replacement or re-staking of the ball should not be attempted.
4. Check fit of clutch flange in drum slots. There should be no appreciable radial play between these two parts. Also check low sun gear for nicks or burrs and bushing for wear.
5. Check clutch plates for burning and wear.

Bushing Replacement (fig. 28)

1. Remove the old bushing with Tool J-9546 using care not to damage the bushing bore or the machined face on the front of the clutch drum.

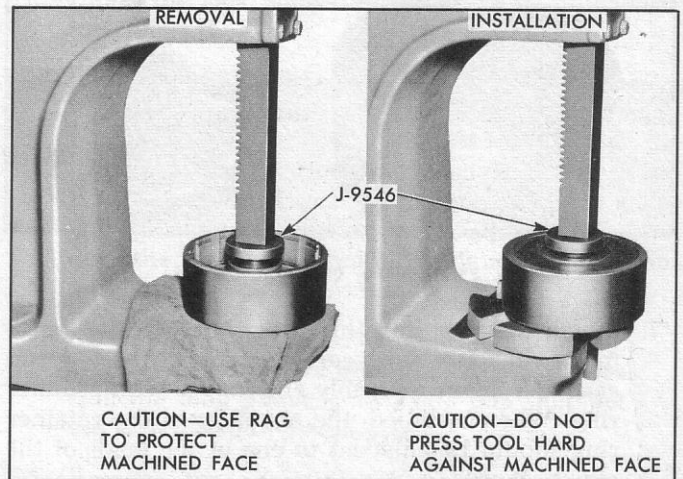


Fig. 28—Removing and Installing Clutch Drum Bushing

2. Use the same tool to install the new bushing. Press (do not hammer) the bushing into the clutch drum from the machined face side of the clutch drum. Press only far enough so that the tool meets the clutch drum. Do not force the tool against the clutch drum machined face.

Assembly

1. Install new piston inner seal in hub of clutch drum with seal lip downward (toward front of transmission).
2. Install a new piston seal in clutch piston. Seal lips must be pointed toward the clutch drum (front of transmission). Lubricate seals generously and install piston in clutch drum with a twisting motion.
3. Place the 24 springs in position on the piston, then place the retainer in place on the springs.
4. Using Tools J-5133 and J-7782 and a press, or J-9542 as a hand operation, depress the retainer plate and springs far enough to allow installation of the spring retainer snap ring in its groove on the clutch drum hub.
5. Install the hub front washer with its lip toward the clutch drum, then install the clutch hub.
6. Install the five steel reaction plates and four faced plates alternately, beginning with a steel reaction plate (fig. 29).

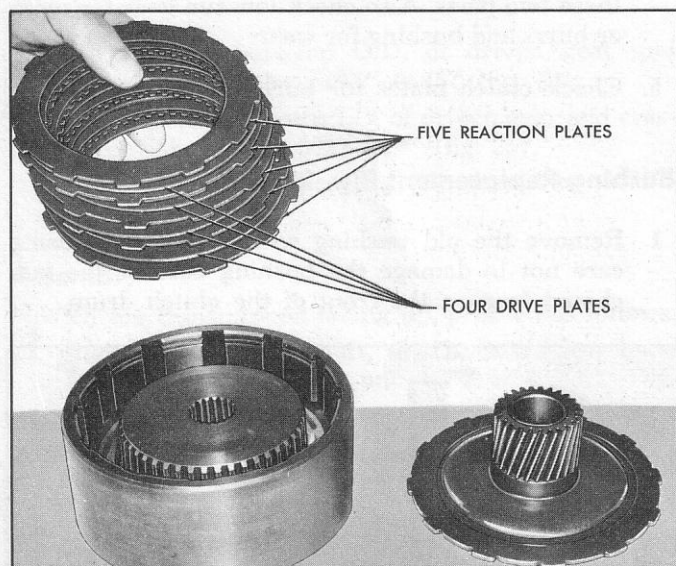


Fig. 29—Installing Clutch Drum Plates

7. Install the rear hub thrust washer with its flange toward the low sun gear, then install the low sun gear and flange assembly and secure with retainer ring. When installed, the openings in the retainer ring should be adjacent to one of the lands of the clutch drum.
8. Check the assembly by turning the clutch hub to be sure it is free to rotate.

LOW BAND

The brake band used in the Aluminum Powerglide transmission has bonded linings which, due to the transmission characteristics and band usage, should

require very little attention. However, whenever a transmission is disassembled the band should be cleaned of metal particles and inspected.

1. Check lining for evidence of scoring or burning.
2. Check band and lining for cracks.
3. Check all band linkage for excessive wear

PLANET ASSEMBLY AND INPUT SHAFT

Inspection

1. Wash planet carrier and input shaft in cleaning solvent, blow out all oil passages and air dry.

CAUTION: Do not use rags to dry parts.

2. Inspect planet pinions for nicks or other tooth damage.

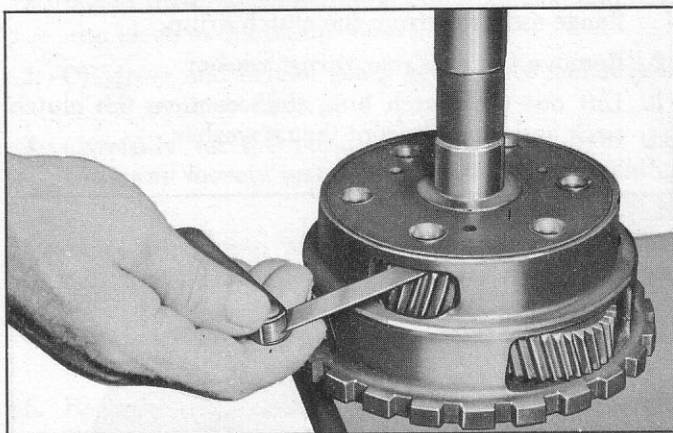


Fig. 30—Checking Planet Gear End Clearance

3. Check end clearance of planet gears. This clearance should be .006"-.030" (fig. 30).
4. Check input sun gear for tooth damage, also check input sun gear rear thrust washer for damage.
5. Inspect output shaft bearing surface for nicks or scoring and inspect input pilot bushing.
6. Inspect input shaft splines for nicks or damage and check fit in clutch hub and input sun gear. Also check fit of splines in turbine hub.
7. Check oil seal rings for damage; rings must be free in input shaft ring grooves. Remove rings and insert in stator support bore and check to see that hooked ring ends have clearance. Replace rings on shaft.

Repairs

Planet Carrier Assembly—Overhaul

If during inspection, the planet pinions, pinion needle bearing, pinion thrust washers, input sun gear, and/or input sun gear thrust washer should show evidence of excessive wear or damage, they should be replaced using the following procedure:

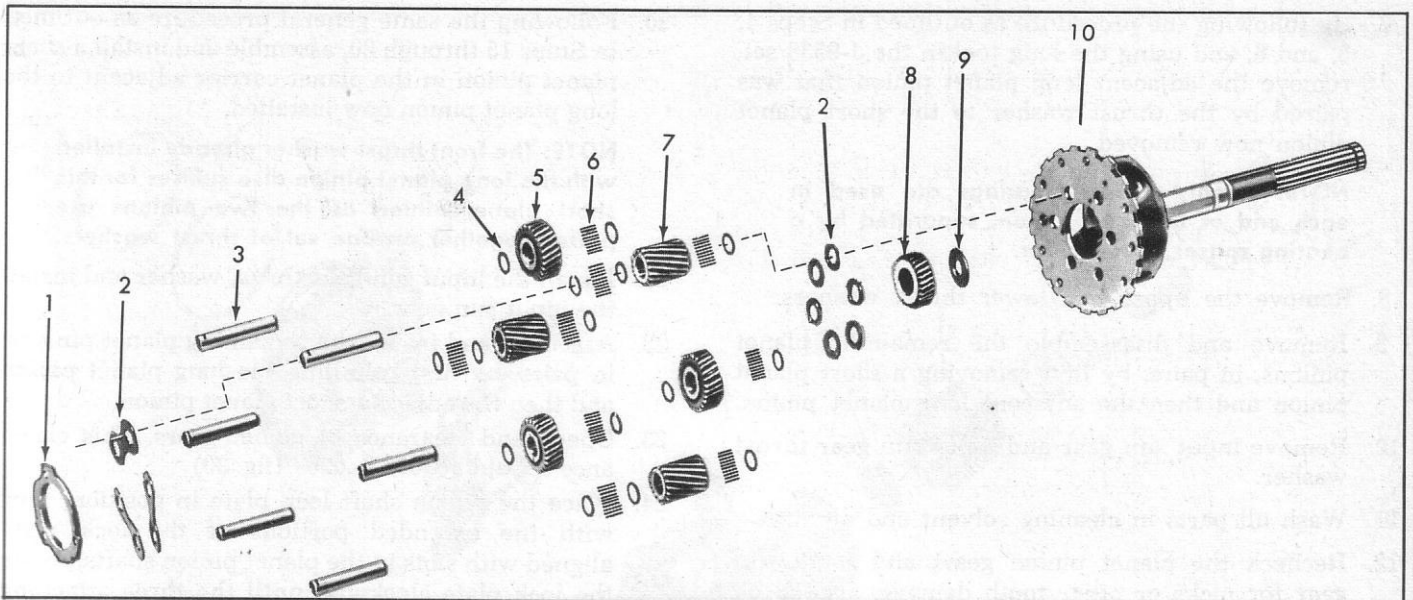


Fig. 31—Planet Carrier Assembly—Exploded View

1. Pinion Shaft Lock Plate
2. Pinion Thrust Washer
3. Pinion Shaft

4. Needle Bearing Washer
5. Short Planet Pinion Gear
6. Needle Bearings

7. Long Planet Pinion Gear
8. Input Sun Gear

9. Input Sun Gear Thrust Washer
10. Carrier and Output Shaft

Refer to Figure 31.

1. Place the planet carrier assembly in a fixture or vise so that the front (parking lock gear end) of the assembly faces up.
2. Using prick punches or other similar means, mark each pinion shaft and also the planet carrier as-

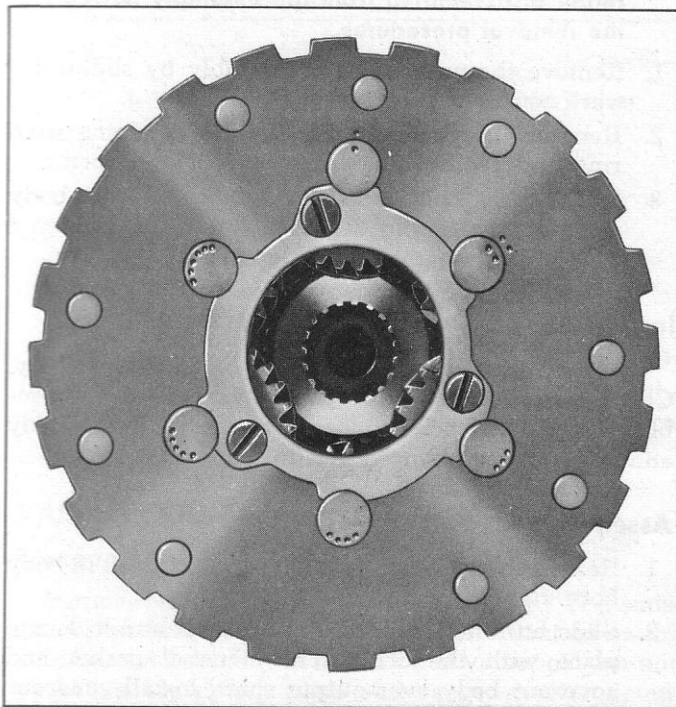


Fig. 32—Suggested Pinion Shaft Markings

sembly (fig. 32), so that reassembling, each pinion shaft will be reinstalled in the same location from which it was removed.

NOTE: The pinion shafts are not selectively fit but it is good practice to reinstall them in their original locations.

3. Remove the pinion shaft lock plate screws and rotate the lock plate counterclockwise sufficiently to remove it.
4. Starting with a short planet pinion, and using a soft steel drift, drive on the lower end of the pinion shaft until the pinion shaft is raised above the press fit area of the output shaft flange. Feed J-9538 into the short planet pinion from the lower end, pushing the planet pinion shaft ahead of it until the tool is centered in the pinion and the pinion shaft is removed from the assembly.

NOTE: Planet pinion remover and replacer tool, J-9538, comes in two pieces, one long for use with the long pinion gears, and one short for use with the short pinion gears.

5. Remove the short planet pinion from the assembly.
6. Remove J-9538, needle bearings and needle bearing spacers (2) from short planet pinion.

CAUTION: Use care so as not to lose any of the planet pinion needle bearings. Twenty needle bearings are used with a bearing spacer at each end.

7. By following the procedure as outlined in Steps 4, 5, and 6, and using the long tool in the J-9538 set, remove the adjacent long planet pinion that was paired by the thrust washer to the short planet pinion now removed.

NOTE: Twenty needle bearings are used in each end of the long pinion, separated by a bearing spacer in the center.

8. Remove the upper and lower thrust washers.
9. Remove and disassemble the remaining planet pinions, in pairs, by first removing a short planet pinion and then the adjacent long planet pinion.
10. Remove input sun gear and input sun gear thrust washer.
11. Wash all parts in cleaning solvent and air dry.
12. Recheck the planet pinion gears and input sun gear for nicks or other tooth damage; also check the planet pinion thrust washers and input sun gear thrust washer. Replace worn or damaged parts.
13. Inspect the planet pinion needle bearings closely and if excessive wear shows, all the needle bearings must be replaced. Also inspect pinion shafts closely and if worn replace the worn shafts.
14. Inspect the input shaft bushing installed in the base of the output shaft. If damaged, it may be removed by threading Tool J-9534 into the bushing and pulling the bushing out using slide hammer J-6585. New bearing can be installed by pressing in flush or below thrust surface with the pilot end of input shaft as press tool.
15. Using J-9538, assemble needle bearing spacer and needle bearings (20 in each path) in one of the long planet pinions (fig. 31). Use petroleum jelly to aid in assembling and holding the needle bearings in position.
16. Position the long planet pinion with J-9538, centered in the pinion assembly and with thrust washers at each end, in the planet carrier. Oil grooves on thrust washers must be toward gears.
NOTE: The long planet pinions are located opposite the closed portions of the carrier, while the short planet pinions are located in the openings.
17. Select the proper pinion shaft, as marked in Step 2, lubricate the shaft and install it from the top, pushing the assembling tools ahead of it. As the tool is pushed down, check that it picks up the lower thrust washer.
18. Turn the pinion shaft so that the slot or groove at the upper end faces the center of the assembly.
19. With a brass or soft steel drift, drive the pinion shaft in until the lower end is flush with the lower face of the planet carrier.

20. Following the same general procedure as outlined in Steps 15 through 20, assemble and install a short planet pinion in the planet carrier adjacent to the long planet pinion now installed.

NOTE: The front thrust washer already installed with the long planet pinion also suffices for this short planet pinion as the two pinions are paired together on one set of thrust washers.

21. Install the input sun gear thrust washer and install the input sun gear.
22. Assemble and install the remaining planet pinions, in pairs, by first installing the long planet pinion and then the adjacent short planet pinion.
23. Check end clearance of planet gears. This clearance should be .006"-.030" (fig. 30).
24. Place the pinion shaft lock plate in position, then with the extended portions of the lock plate aligned with slots in the planet pinion shafts, rotate the lock plate clockwise until the three attaching screw holes are accessible.
25. Install the pinion shaft lock plate attaching screws and tighten to 2½-3 ft. lbs.

GOVERNOR

The governor assembly is a factory balanced unit. If body replacement is necessary, the two sections must be replaced as a unit. Remove the governor as outlined under "Transmission—Disassembly."

Disassembly

NOTE: The governor valve and shaft were already disassembled from the assembly during the removal procedures.

1. Remove the outer weight assembly by sliding toward center of body.
2. Remove the smaller inner weight retaining snap ring and remove the inner weight and spring.
3. If it is considered necessary, remove the four body assembly bolts and separate the body, hub and gasket. Remove the two seal rings.

Inspection

Clean all parts thoroughly in a solvent and air dry. Check condition of all component parts of the assembly. Replace any bent, damaged or scored parts. Body and hub must be replaced as a unit.

Assembly

1. Reassemble governor weights and reinstall in body bore. Replace seal rings on hub.
2. Slide hub into place on output shaft and lock into place with the drive screw. Install gasket and governor body over output shaft, install governor shaft, line up properly with output shaft and install body attaching bolts. Torque to 6 to 8 ft lbs.

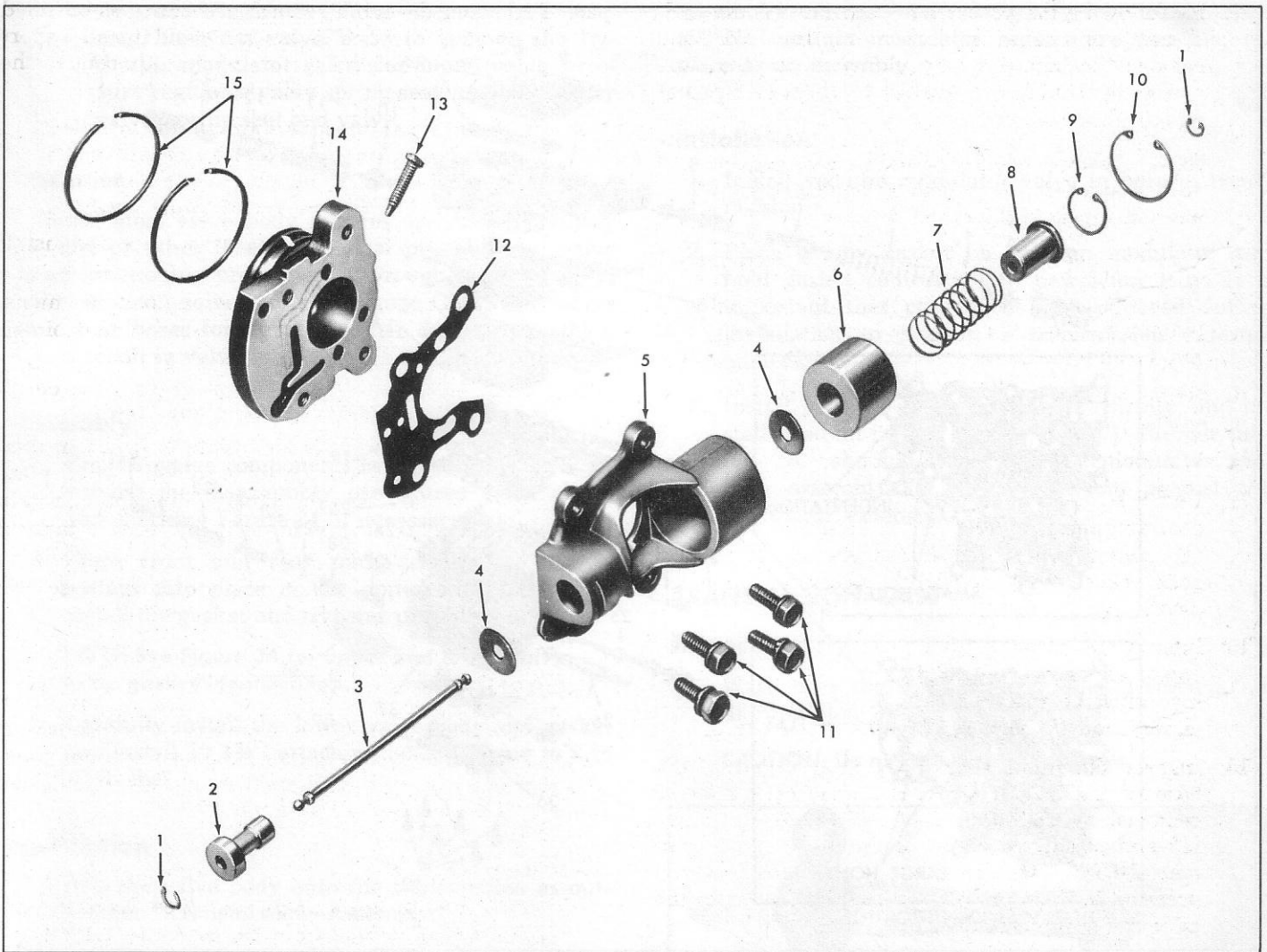


Fig. 33—Governor—Exploded View

- | | | | |
|---|--------------------|---|------------------------|
| 1. Valve to Shaft and Inner Weight to Shaft Retaining Snap Ring | 4. Damping Springs | 9. Inner Weight Retaining Snap Ring | 12. Gasket |
| 2. Valve | 5. Body | 10. Outer Weight Retaining Snap Ring | 13. Hub Drive Screw |
| 3. Shaft | 6. Outer Weight | 11. Body to Hub Screws and Lock Washers | 14. Hub |
| | 7. Spring | | 15. Hub Oil Seal Rings |
| | 8. Inner Weight | | |

NOTE: Place transmission selector lever in **PARK** to keep shaft from turning while tightening these bolts.

3. Check the governor weight for free fit in body after the four attaching bolts are torqued. If the weight sticks or binds, loosen the bolts and re-torque.

VALVE BODY

Removal

Remove valve body as described under "Transmission—Disassembly." If performing the operation on the vehicle, the vacuum modulator and valve, oil pan and gasket, guide detent plate and range selector detent roller spring need to be removed in order to remove the valve body from the transmission.

Disassembly

1. Remove the manual valve, suction screen and gasket.
2. Remove valve body bolts and carefully remove lower valve body and transfer plate from upper valve body. Discard gaskets.
3. Remove the front and rear pump check valves and springs.
4. From the upper valve body, remove the TV and detent valves and the downshift timing valve as follows:
 - a. TV and Detent Valve—Remove the retaining pin by wedging a thin screwdriver between its head and the valve body, then remove the detent valve assembly and throttle valve

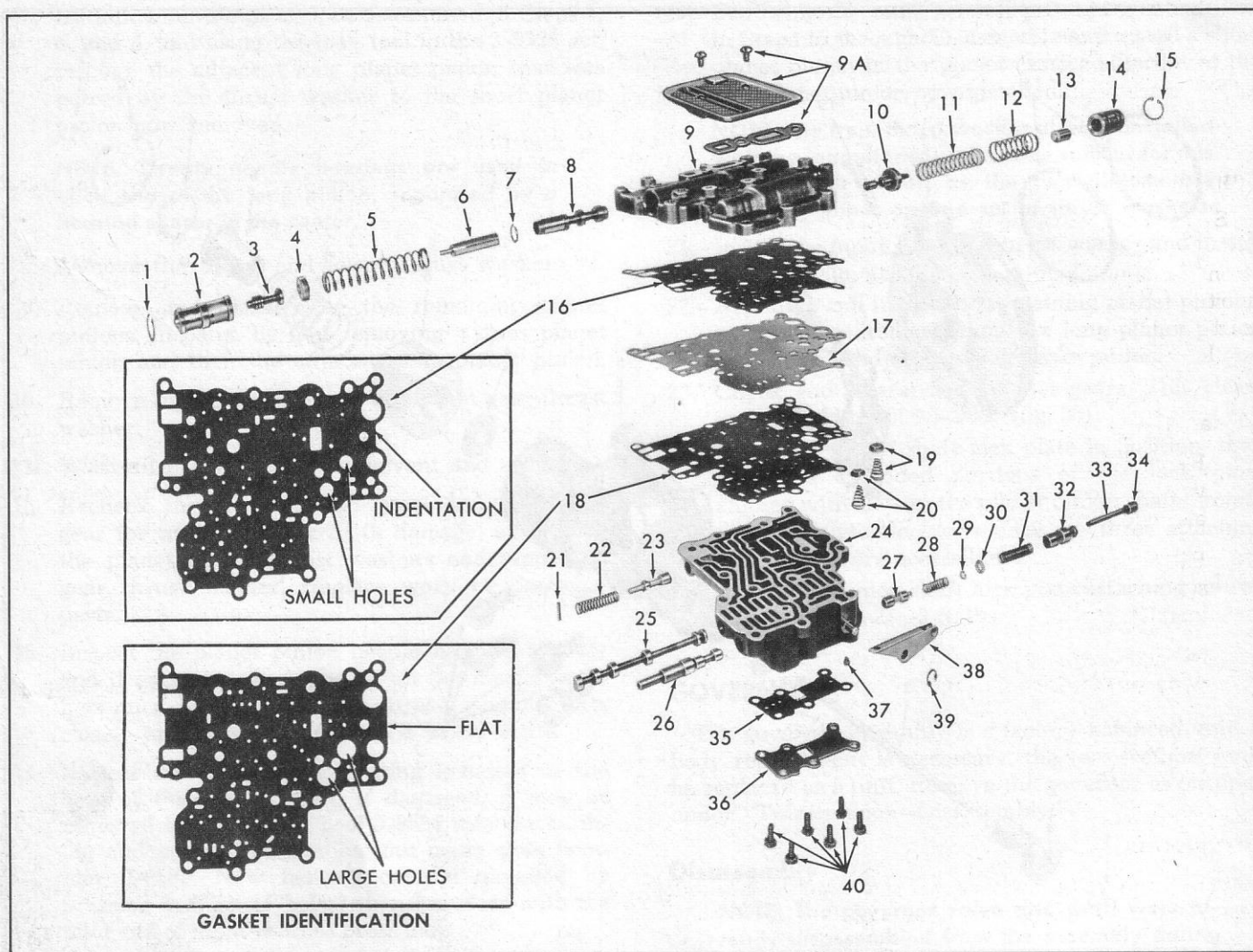


Fig. 34—Valve Body—Exploded View

- | | | | |
|---|--|---|--|
| 1. Snap Ring | 11. Low and Drive Valve Inner Spring | 20. Rear Pump Check Valve and Spring | 30. Throttle Valve Spring Regulator Guide Washer |
| 2. Hydraulic Modulator Valve Sleeve | 12. Low and Drive Valve Outer Spring | 21. High Speed Down Shift Timing Valve Stop Pin | 31. Detent Valve Spring |
| 3. Hydraulic Modulator Valve Retainer | 13. Low and Drive Regulator Valve | 22. High Speed Down Shift Timing Valve Spring | 32. Detent Valve |
| 4. Pressure Regulator Spring Retainer | 14. Low and Drive Regulator Valve Sleeve and Cap | 23. High Speed Down Shift Timing Valve | 33. Throttle Valve Spring Regulator Nut |
| 5. Pressure Regulator Spring | 15. Snap Ring | 24. Upper Valve Body | 34. Throttle Valve Spring Regulator Nut |
| 6. Pressure Regulator Damper Assembly | 16. Transfer Plate to Lower Valve Body Gasket | 25. Manual Control Valve | 35. Upper Valve Body Plate Gasket |
| 7. Pressure Regulator Damper Valve Spring Seat | 17. Transfer Plate | 26. Vacuum Modulator Valve | 36. Upper Valve Body Plate |
| 8. Pressure Regulator Valve | 18. Transfer Plate to Upper Valve Body Gasket | 27. Throttle Valve | 37. Detent Valve and Spring Retaining Stud |
| 9. Lower Valve Body | 19. Front Pump Check Valve and Spring | 28. Throttle Valve Spring | 38. Range Selector Detent Lever |
| 9A. Suction Screen, Gasket and Attaching Screws | | 29. Throttle Valve Spring Seat | 39. Snap Ring |
| 10. Low and Drive Valve | | | 40. Upper Valve Body Plate to Upper Valve Body Attaching Bolts and Washers |

spring. Tilt the valve body to allow the throttle valve to fall out. If necessary, remove the "C" clip and disassemble the detent valve assembly.

CAUTION: Do not disturb the setting of the adjustment hex nut on the detent valve assembly. This is a factory adjustment and should not normally be changed. However, some adjustment is possible if desired. See "Throttle Valve Adjustment."

- b. Downshift Timing Valve—Drive out the roll pin, remove the valve spring and the downshift timing valve.
5. From the lower valve body, remove the low-drive shift valve and the pressure regulator valve as follows:
 - a. Low-Drive Shift Valve—Remove the snap ring and tilt the valve body to remove the low-drive regulator valve sleeve and valve assembly, valve springs and the shifter valve.

- b. Pressure Regulator Valve—Remove the snap ring, then tilt valve body to remove the hydraulic modulator valve sleeve and valve, pressure regulator valve spring seat, spring, damper valve, spring seat and valve.

Inspection

Since most valve body failures are caused initially by dirt or other foreign material preventing a valve from functioning properly, a thorough cleaning of all parts in clean solvent is mandatory. Check all valves and their bores for burrs or other deformities which could result in valve hang-up.

Assembly

1. Replace valve components in the proper bores, reversing the disassembly procedures given above and checking Figure 34, if necessary.
2. Place front and rear pump check valves and springs into place in the upper valve body and install the gasket and transfer plate.

NOTE: See Figure 34 for upper and lower valve body gasket identification.

3. Carefully install the lower valve body and gasket and install 15 13/8" attaching bolts. Torque to 8 to 11 ft. lbs.

Installation

Install the valve body onto the transmission as outlined under "Transmission—Assembly."

VACUUM MODULATOR

The vacuum modulator is mounted on the left rear of the transmission and can be serviced from beneath the vehicle.

Removal

1. Remove the vacuum line at the vacuum modulator.
2. Unscrew the vacuum modulator from the transmission using J-9543, if available, on any thin 1" tappet type wrench.
3. Remove the vacuum modulator valve (fig. 17) from the transmission case.

Inspection and Repairs

Check the vacuum modulator valve for nicks and burrs. If such cannot be repaired with a slip stone, replace the valve.

The vacuum modulator can be checked with a vacuum source for leakage. However, leakage normally results in transmission oil pull-over and results in

oil smoky exhaust and continually low transmission oil. No vacuum modulator repairs are possible; replace as an assembly.

Installation

1. Install vacuum modulator valve in bore in transmission.
2. Place a new gasket on vacuum modulator and hold gasket centered with petroleum jelly. It is important that gasket be held centered during installation to prevent a transmission external oil leak.
3. Install vacuum modulator, tighten firmly, and install vacuum line as follows (fig. 17): Rubber tubing "A" should bottom against modulator can. Pipe assembly "B" should bottom against the modulator extension.

TRANSMISSION CASE

Inspection

1. Wash case thoroughly with cleaning solvent, air dry and blow out all oil passages.

CAUTION: Do not use rags to dry parts.

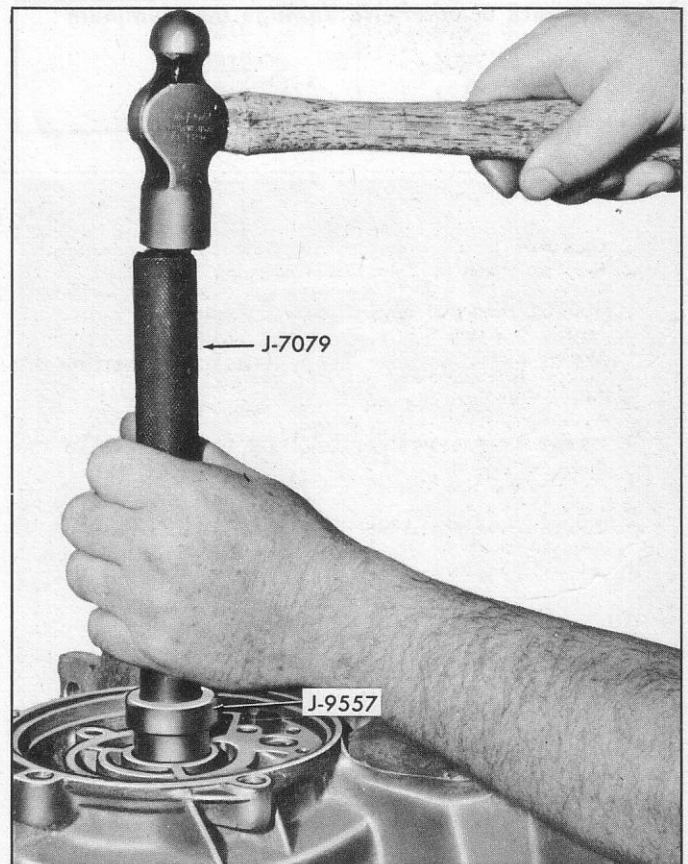


Fig. 35—Installing Case Rear Bushing

2. Inspect case for cracks which may contribute to leakage.
3. Inspect case rear bushing for damage or excessive wear.

NOTE: This is a precision bushing and if damaged or worn excessively must be replaced.

4. Check shifter shaft seal. If it shows signs of damage or leaking, pry it out and install a new seal. The new seal must be firmly seated in case counterbore.

Repairs

Rear Bushing—Replacement

Transmission case rear bushing is a precision bushing which requires no reaming or finishing after assembly.

1. Remove bushing by driving or pressing from within case using J-9557 and handle J-7079.
2. To install new bushing, drive or press bushing into place from rear of case using Tool J-9557 and handle J-7079 (fig. 35).

CAUTION: Install bushing only until shoulder of J-9557 contacts the rear face of the case. Excessive force, either hammering or pressing, may crack or otherwise damage the aluminum case.

TRANSMISSION EXTENSION

Inspection

1. Wash extension thoroughly with cleaning solvent and air dry.

CAUTION: Do not use rags to dry parts.

2. Inspect extension for cracks that may contribute to leakage.
3. Inspect extension rear bushing for damage or excessive wear.
4. Inspect rear oil seal and replace if damaged or worn.

Repairs

Rear Bushing—Replacement

For service, the transmission extension rear bushing is of a precision type which requires no reaming or finishing after installation.

1. Place transmission extension in an arbor press rear end up.
2. Using J-5778, press old bushing from extension.

3. Place new bushing on pilot end of J-5778 and press it into place.
4. Replace extension rear oil seal.

TRANSMISSION

Assembly

NOTE: Use only transmission oil or petroleum jelly as lubricants or to retain bearings or races during assembly. Lubricate all bearings, seal rings and clutch plates prior to assembly.

If removed, assemble manual linkage to case as described in Steps 1-7.

1. Install the parking lock pawl and shaft and insert a new retaining roll pin into the shaft (early production transmissions) or "E" ring (later production transmissions).
2. Install the parking lock pawl pull-back spring over its boss to the rear of the pawl. The short leg of the spring should locate in the hole in the parking pawl.
3. Install the parking lock pawl reaction bracket with its two bolts.
4. Fit the actuator assembly between the parking lock pawl and the bracket.
5. Insert the outer shift lever into the case being careful of the shaft seal, and pick up the inner shift lever and parking lock assembly and tighten allen head screw.
6. Insert outer TV lever and shaft, special washer and "O" ring into case and pick up inner TV lever. Tighten allen head nut.

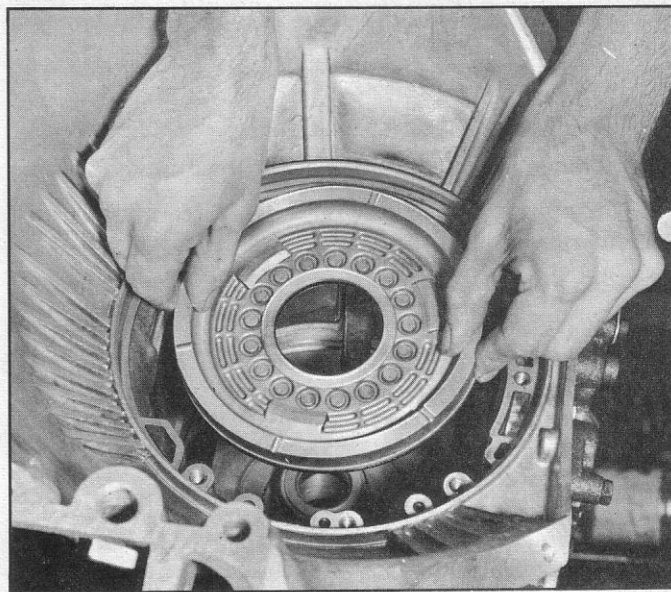


Fig. 36—Installing Reverse Piston

7. Thread the low band adjusting screw into case.

NOTE: The above internal components are shown in their proper relationship in Figure 22.

TRANSMISSION INTERNAL COMPONENTS

8. Install the inner and outer rear piston seals on the reverse piston and, lubricating the piston and case with transmission oil, install the piston into the case (fig. 36). If necessary, carefully slide a feeler gauge around the outer diameter of the piston to start the seal ring into the bore.
9. With the support fixture turned so that the transmission case is facing up, install the 17 reverse piston return springs and their retainer ring.
10. Carefully install Tool J-9542 over the retainer ring and through the rear bore of the case. With the flat plate on the rear face of the case, turn down on the wing nut to compress the return springs and allow the retaining ring snap ring to be installed. Remove Tool J-9542.

CAUTION: Use care when performing this operation that the spring retainer is correctly guided over the case internal hub and is not damaged by catching on the edge of the hub or in the snap ring groove.

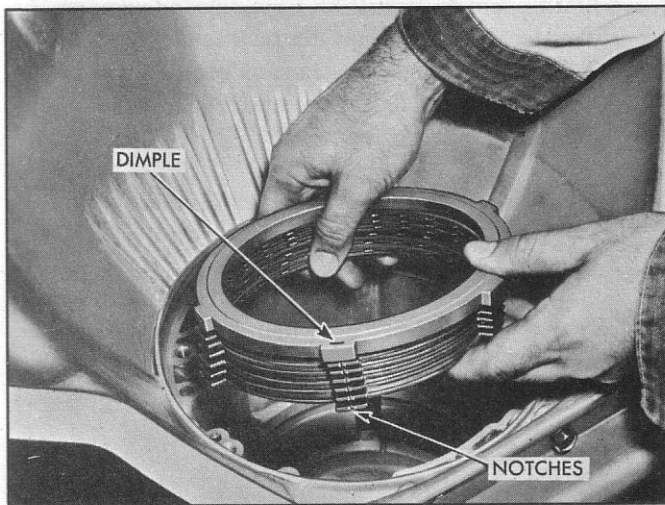


Fig. 37—Installing Clutch Plates

11. Lubricate and install the reverse clutch pack (fig. 37) beginning with a reaction (spacer) plate and alternating with the drive plates (faced) until the six reaction plates and six drive plates are in place. The notched lug on each reaction plate is installed in the groove at the 7 o'clock position in the case. Then install the thick pressure plate which has a "dimple" in one lug to align with the same slot in the case as the notched lugs on the other reaction plates.

NOTE: The rearmost reaction plate is of selective fit.

12. Install the clutch plate retainer ring.
13. Check for correct selective reverse reaction spacer plate running clearance as follows:
 - a. Position the transmission fixture so that the case is horizontal.
 - b. Using feeler gauges, measure the clearance between any reaction plate and adjacent faced plate. Because the faced plate is waved, it will be necessary to slide the feeler gauges in an arc of several inches to get an average reading.
 - c. If the proper selective reverse reaction spacer is installed, gauge measurement will be .025" to .060".
 - d. If the clearance is not within limits, it will be necessary to remove the reverse clutch pack and install a thicker or thinner selective reverse plate, as required, next to the piston. Then recheck running clearance. Three sizes of reverse spacers are available as shown in the following table:

| Part Number | Plate Thickness |
|-------------|-------------------|
| 3799210 | .070" \pm .002" |
| 3799212 | .102" \pm .002" |
| 3799214 | .134" \pm .002" |

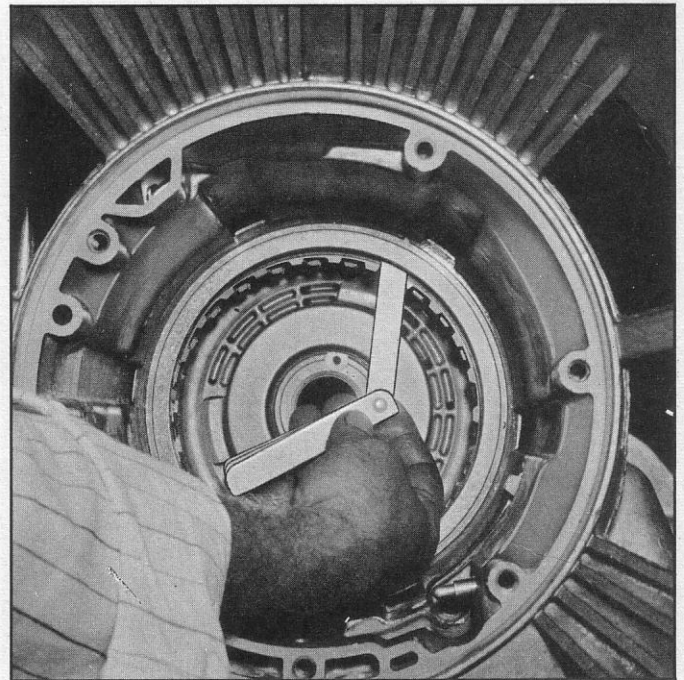


Fig. 38—Measuring Reverse Clutch Running Clearance

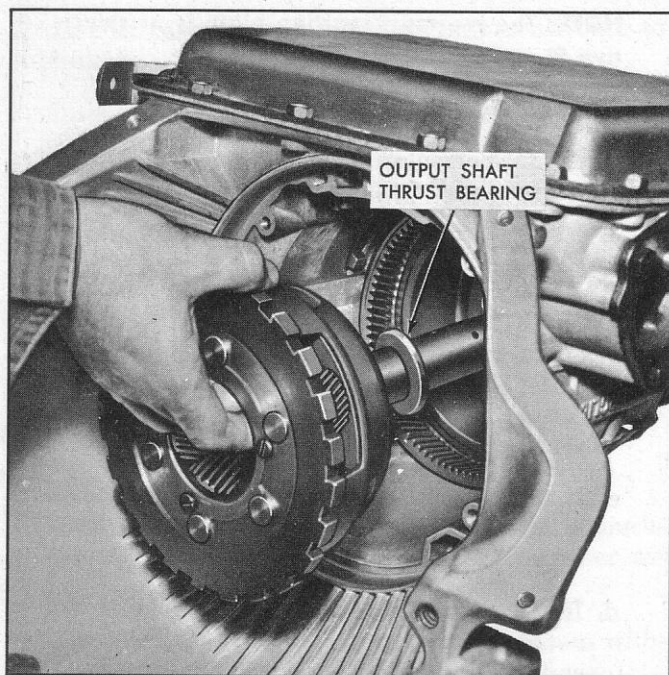


Fig. 39—Installing Gearset

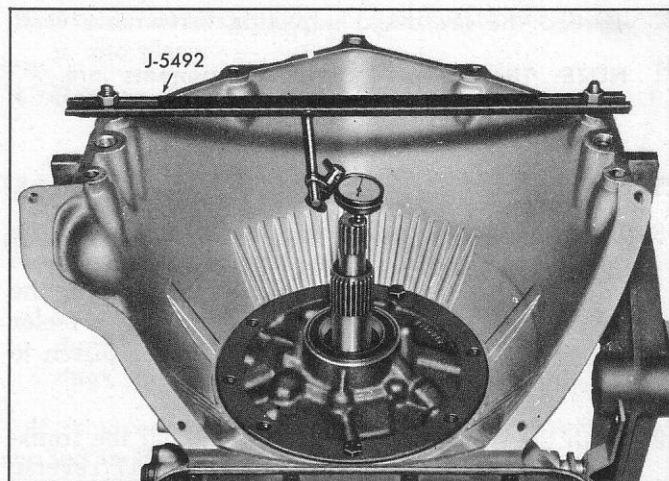


Fig. 40—Checking End Play for Proper Thrust Washer Selection

14. With the rear of the transmission case downward, align the internal lands and grooves of the reverse clutch pack faced plates, then engage the reverse ring gear with these plates. This engagement must be made by "feel" while jiggling and turning the ring gear.
15. Place the output shaft thrust bearing over the output shaft and install the planetary carrier and output shaft into the transmission case (fig. 39).
16. Install the low sun gear thrust washer on the sun gear in the planetary gear set with the flange of the thrust washer toward the front of the transmission. A small amount of petroleum jelly will keep the thrust washer in place.
17. Move the transmission into a horizontal position. The two input shaft seal rings should be in place on the shaft. Install the clutch drum (machined face first) onto the input shaft and install the low sun gear bushing (splined) against shoulder on shaft.
18. Install clutch drum and input shaft assembly into case, aligning thrust washer on input shaft and indexing low sun gear with the short pinions on the planet carrier.
19. Remove the rubber seal ring from the front pump body and, using guide studs from J-3387 set, install front pump and gasket and selective fit thrust washer into case. Install two pump-to-case bolts.
20. To check for correct thickness of the selective fit thrust washer, move transmission so that output shaft points down and proceed as follows:

- a. Mount a dial indicator so that plunger of indicator is resting on end of the input shaft. J-5492 may be used to support the dial indicator as shown in Figure 40. Zero the indicator.
- b. Push up on the transmission output shaft and observe the total indicator movement.
- c. The indicator should read .030" to .054". If the reading is within limits, the proper selective fit washer is being used. If the reading is not within limits, it will be necessary to remove the front pump, change to a thicker or thinner selective fit thrust washer, as required to obtain the specified clearance, and repeat the above checking procedure.

NOTE: Selective fit washers are available in thicknesses of .061", .078", .092" and .106".

21. Install the servo piston, piston ring, and spring into the servo bore. Then, using a new gasket and "O" ring, install the servo cover. See that gasket is properly aligned with the three bolt holes and the drain passage in the case.
22. Remove the front pump and the selective fit washer from the case, and install the low brake band, anchor and apply struts into the case. Tighten the low band adjusting screw enough to prevent struts from falling out of case.
23. Place the seal ring in the groove around front pump body and the two seal rings on the pump cover extension. Install the pump, gasket and thrust washer into case. Remove guide pins and install all pump bolts, replacing any damaged bolt "O" rings necessary and torque bolts to 13-17 ft. lbs.

EXTENSION, GOVERNOR AND REAR OIL PUMP

24. Turn transmission so that output shaft points upward. Install rear pump wear plate, drive pin, and drive gear, indexing gear to drive pin.
25. Install rear pump body and driven gear drain back baffle, and pump to case attaching bolts. Bolt holes are positioned so that the pump may be assembled only in the proper position.
26. Install governor over output shaft. (See "Governor-Assembly" for body to hub installation.) Install governor shaft and valve, two Belleville washers (concave side of washers against output shaft), and retaining "E" rings. Center shaft in output shaft bore and tighten governor hub drive screw.
27. Using Tool J-5814, install speedometer gear into output shaft.
28. Place extension seal ring over rear pump body and install transmission extension and five retaining bolts.
29. If removed, replace speedometer driven gear.

OIL PAN AND VALVE BODY

30. With transmission upside down, and manual linkage installed as previously described, and the selector lever detent roller installed, install the valve body (servo apply tube installed) and a new gasket. Carefully guide the servo apply line into its boss in the case as the valve body is set into place (fig. 41). Install six mounting bolts and range selector detent roller spring shown in Figure 18.

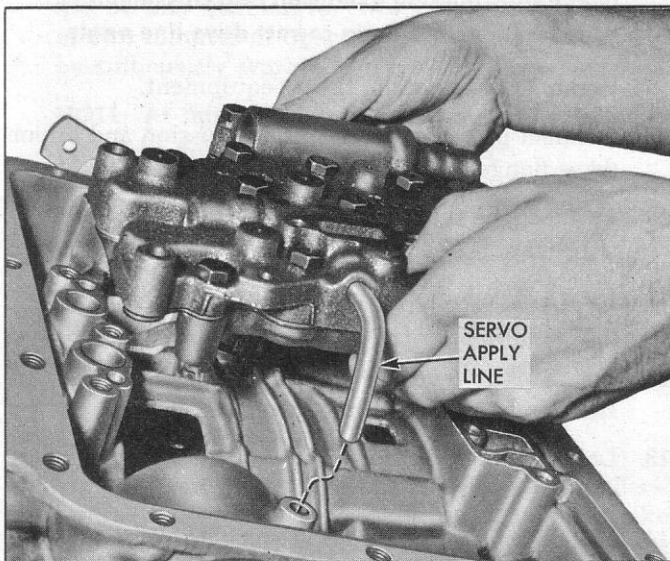


Fig. 41—Installing Valve Body

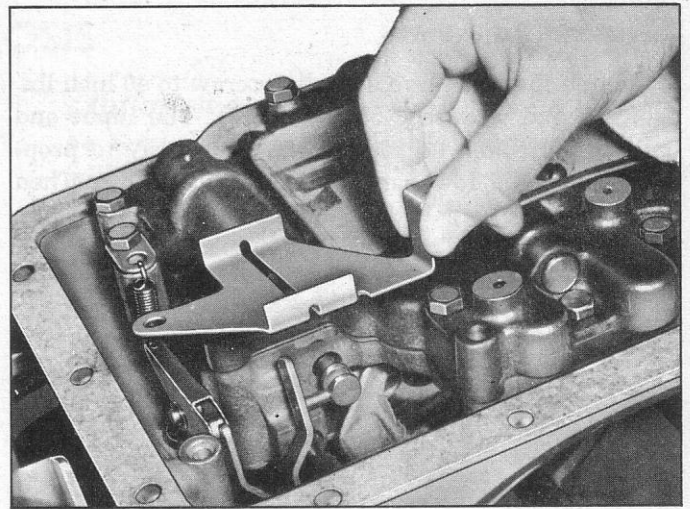


Fig. 42—Installing Detent Guide Plate

NOTE: Position the manual valve actuating lever fully forward when installing valve body to more easily pick up the manual valve.

31. Install the guide plate (fig. 42) making sure that the inner lever properly picks up the manual valve. Install attaching bolts.
32. Install the vacuum modulator valve and the vacuum modulator and gasket.
33. Install the oil pan, using a new gasket, and the oil pan attaching bolts.
34. Install converter and safety holding strap J-5949 or a suitable substitute.

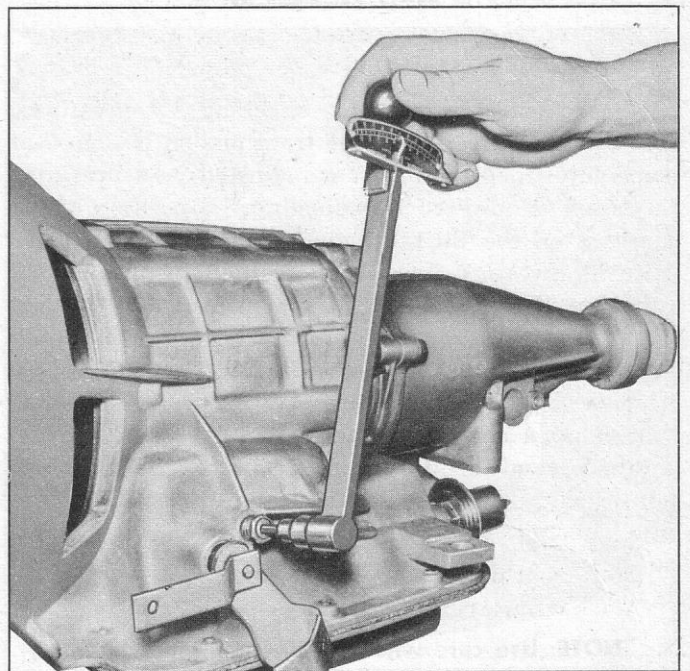


Fig. 43—Low Band Adjustment

Low Band Adjustment

Tighten the low servo adjusting screw to 40 inch lbs. using torque wrench J-5853 (fig. 43). The input and output shaft must be rotated simultaneously to properly center the low band on the clutch drum. Then back off four (4) complete turns, and tighten the lock nut.

CAUTION: The amount of back-off is not an approximate figure, it must be exact.

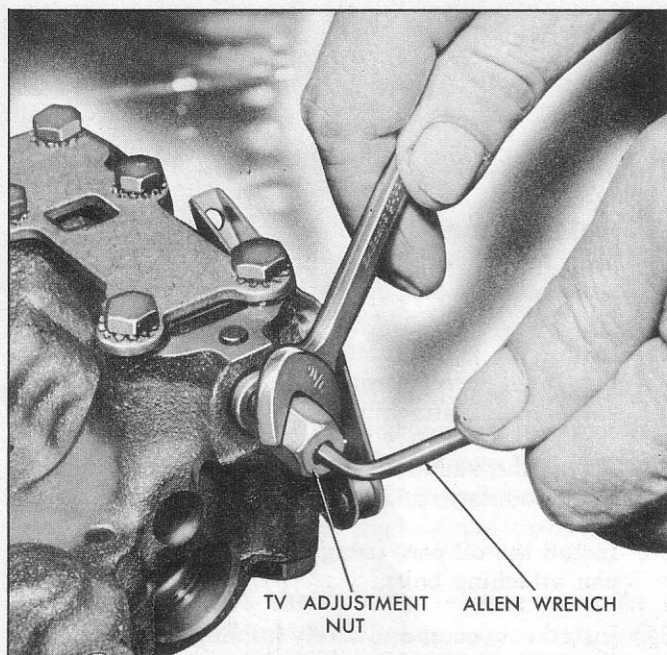


Fig. 44—TV Adjustment Nut

Throttle Valve Adjustment

No provision is made for checking TV pressures. However, if operation of the transmission is such that some adjustment of the TV is indicated, pressures may be raised or lowered by adjusting the position of the jam nut on the throttle valve assembly (fig. 44). To raise TV pressure 3 psi, back-off the jam nut one (1) full turn. This increases the dimension from the jam nut to the throttle valve assembly stop. Conversely, tightening the jam nut one (1) full turn lowers TV pressure 3 psi. A difference of 3 psi in TV pressure will cause a change of approximately 2 to 3 mph in the wide open throttle upshift point. Smaller pressure adjustments can be made by partial turns of the jam nut. The end of TV adjusting screw has an allen head so the screw may be held stationary while the jam nut is moved.

NOTE: Use care when making this adjustment since no pressure tap is provided to check TV pressure.

TRANSMISSION INSTALLATION

NOTE: The "light" side of the converter is denoted by a "blue" stripe painted across the ends of the converter cover and housing. This marking should be aligned as closely as possible with the "white" stripe painted on the engine side of the flywheel outer rim, denoting the "heavy" side of the engine.

1. Secure transmission on transmission lifting equipment installed on jack or other lifting device.
2. Remove converter holding tool.

CAUTION: Do not permit converter to move forward after removal of holding tool.

3. Raise transmission into place at rear of engine. Position filler tube, crankcase breather tube, and throttle valve bracket to transmission case and install transmission housing-to-engine mounting bolts. Torque bolts to 25-30 ft. lbs.
4. Remove support from beneath engine, then raise rear of transmission to final position.
5. Through flywheel cover opening align as closely as possible the "white" flywheel balance mark stripe and the "blue" painted stripe on end of converter cover and housing. If scribed during removal, align scribe marks on flywheel and converter cover. Install converter-to-flywheel attaching bolts. Torque bolts to 15-20 ft. lbs.
6. Install converter underpan.
7. Install transmission support crossmember to transmission extension and frame.

NOTE: Install same shims, or equivalent, between transmission extension and crossmember as removed to maintain correct drive line angle.

8. Remove transmission lifting equipment.
9. Connect propeller shaft to transmission and pinion drive flange.
10. Connect the throttle valve linkage to valve actuating lever.
11. Install speedometer drive cable fitting and vacuum modulator line.
12. Install shift lever bracket to transmission extension, and connect linkage to range lever.
13. Lower vehicle to floor and connect neutral safety switch wiring.
14. Check transmission for external leaks and for proper operation. Check, and if necessary, adjust throttle valve and shift linkage.

DIAGNOSIS

Proper operation of the Powerglide transmission may be affected by a number of factors, all of which must be considered when trouble in the unit is diagnosed.

Proper trouble diagnosis can only be accomplished when performed in a thorough step by step procedure. The following procedure has been devised and tested and is recommended for all trouble diagnosis complaints and if the service man will follow this checking procedure, accurate and dependable diagnosis may be accomplished. This will result in a savings of time, not only to the service man, but to the customer as well.

WARMING UP TRANSMISSION

Before attempting to check and/or correct any complaints on the Powerglide transmission, it is absolutely essential that the oil level be checked and corrected if necessary. An oil level which is either too high or too low can be the cause of a number of abnormal conditions from excessive noise to slippage in all ranges.

It must be remembered that cold oil will slow up the action of the hydraulic controls in the transmission. For this reason a trouble or oil leak diagnosis should not be attempted until the transmission has been warmed up by either of the following procedures:

Shop Warm Up

1. Connect tachometer to engine.
2. Set parking brake tight and start engine.
3. Place selector lever in "D" (drive) range.
4. Adjust carburetor idle speed adjusting screw to run engine at approximately 750 rpm and operate in this manner for two minutes. At the end of two minutes of operation, the transmission will be sufficiently warmed up for diagnosis purposes.

NOTE: At this point, readjust the engine idle speed to 450-475 rpm in "D" range.

Road Warm Up

Drive the car approximately 5 miles with frequent starts and stops.

NOTE: At this point, make sure the engine idle speed is set to 450-475 rpm in "D" range.

CHECKING FLUID LEVEL

After the transmission has been warmed up, check the fluid level with the engine idling, parking brake set and control lever in "N" (neutral). If the fluid level is low, add fluid to bring level up to the full mark on gauge rod.

CAUTION: If fluid level is too high, fluid may be aerated by the planet carrier. Aerated fluid will cause turbulence in the converter which will result in lost power, lower stall speed and lower pressures in control circuits. Lower fluid level to full mark, then shut off engine to allow air bubbles to work out of fluid.

BASIC PRESSURE CHECKS

Four basic pressure checks are used for diagnosis and operational checks of the Aluminum Powerglide transmission. All checks should be made only after thoroughly warming up the transmission.

- Wide Open Throttle Upshift Pressure.
- Idle Pressure in "Drive" Range.
- Manual "Low" Range Pressure.
- "Drive" Range Overrun (Coast) Pressure.

It is not recommended that stall tests be conducted which would result in engine vacuum falling below 10" Hg.

Pressure gauge hose connection should be made at the low servo apply (main line) test point (fig. 45). Run the gauge line into the driving compartment by removing shift lever seal. Tie line out of the way of the drivers feet and connect to gauge set J-4872-A.

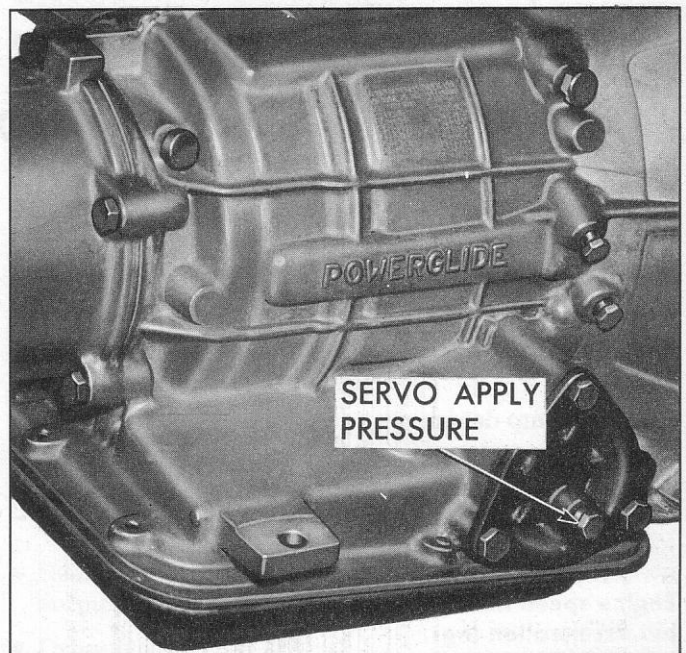


Fig. 45—Pressure Test Plug

● Wide Open Throttle Upshift Pressure Check

Wide open throttle upshift should occur at 85-95 psi as indicated on the low servo apply (main line) gauge.

● Idle Pressure in "Drive" Range

In addition to the oil pressure gauge, a vacuum gauge is needed for this check.

With the parking brake applied and the shift selector lever in "Drive", low servo apply (main line) pressure should be as follows:

| Vacuum | Low Servo Apply (Mainline) Pressure |
|---------|--|
| 16" Hg. | 62 - 73 |
| 10" Hg. | 85 - 95 |

If pressures are not within these ranges, the following items should be checked for oil circuit leakage:

1. Pressure regulator valve stuck.
2. Vacuum modulator valve stuck.
3. Hydraulic modulator valve stuck.
4. Leak at low servo piston ring (between ring and bore).
5. Leak at low servo piston rod (between rod and bore).
6. Leak at valve body to case gasket.
7. Leak at valve body gaskets.
8. Front pump clearances.
9. Check passages in transmission case for porosity.

● Manual "Low" Range Pressure Check

Connect a tachometer, apply the parking brake, place the selector lever in "Low" range, and adjust the engine speed to 1000 rpm. with the car stationary.

Low servo apply (main line) pressure should be 126-131 psi.

Pressures not within this range can indicate the following possibilities:

1. Partially plugged oil suction screen.
2. Broken or damaged ring in low servo.
3. Pressure regulator valve stuck.
4. Leak at valve body to case gasket.
5. Leak between valve body gaskets.
6. Leak at servo center.
7. Front pump clearances.

● Drive Range Overrun (Coast) Pressure

With the vehicle coasting in "Drive" range at 20-25 mph with engine vacuum at approximately 20" Hg., low servo apply (main line) pressure should be 48-54 psi.

POWERGLIDE SHIFT POINTS

| 327 CU. IN. ENGINE | 3.36:1 | AXLE |
|--------------------|--------|-------|
| Throttle Position | Up | Down |
| Closed | 12-15 | 11-14 |
| Detent Touch | 50-62 | 16-26 |
| Through Detent | 61-68 | 58-65 |

NOTE: Shift points as indicated on the speedometer are not affected by tire size.

DIAGNOSIS GUIDE

No drive in any selector position; cannot load engine.

- Low oil level.
- Clogged oil suction screen.
- Defective pressure regulator valve.
- Front pump defective.
- Input shaft broken.
- Front pump priming valve stuck.

Engine speed flares on standstill starts but acceleration lags.

- Low band partially applied:

- a. Low oil level.
- b. Clogged oil suction screen.
- c. Improper band adjustment.
- d. Servo apply passage blocked.
- e. Servo piston ring broken or leaking.
- f. Band facing worn.
- g. Low band apply linkage disengaged or broken.
- h. Converter stator not holding (rare).

Engine speed flares on upshifts.

- Low oil level.

- Improper band adjustment.
- Clogged oil suction screen.
- High clutch partially applied—blocked feed orifice.
- High clutch plates worn.
- High clutch seals leak.
- High clutch piston hung up.
- High clutch drum relief ball not sealing.
- Vacuum modulator line plugged.

Transmission will not upshift.

- Low band not releasing, probably due to:
 - a. Stuck low-drive valve.
 - b. Defective governor.
 - c. No rear pump output caused by stuck priming valve, sheared drive pin or defective pump.
 - d. Throttle valve stuck or maladjusted.
 - e. Maladjusted manual valve lever.

Upshifts harsh.

- Incorrect carburetor-to-transmission TV rod adjustment.
- Improper low band adjustment.
- Vacuum modulator line broken or disconnected.
- Vacuum modulator diaphragm leaks.
- Vacuum modulator valve stuck.
- Hydraulic modulator valve stuck.

Closed throttle (coast) downshifts harsh.

- Improper low band adjustment.
- High engine idle speed.
- Downshift timing valve malfunction.
- High mainline pressure. Check:
 - a. Vacuum modulator line broken or disconnected.
 - b. Modulator diaphragm ruptured.
 - c. Sticking Hydraulic Modulator valve, pressure regulator valve or vacuum modulator valve.

Will not downshift.

- Sticking low-drive shift valve.

- Low-drive shift plug stuck.
- High governor pressure.
- Low TV pressure.

Clutch failure—burned plates.

- Low band adjusting screw backed off more than specified.
- Improper order of clutch plate assembly.
- Extended operation with low oil level.
- Clutch drum relief ball stuck.
- Abnormally high speed upshift:
 - a. Improper governor action.
 - b. Transmission operated at high speed in manual "low".

Car creeps excessively in Drive.

- Idle speed too high.

Car Creeps in Neutral

- Incorrect manual valve lever adjustment.
- High clutch or low band not released.

No drive in Reverse.

- Incorrect manual valve lever adjustment.
- Reverse clutch piston stuck.
- Reverse clutch plates worn out.
- Reverse clutch leaking excessively.
- Blocked reverse clutch apply orifice.

Improper shift points (see Chart).

- Incorrectly adjusted carburetor-to-transmission linkage.
- Incorrectly adjusted throttle valve.
- Governor defective.
- Rear pump priming valve stuck.

Unable to push start.

- Rear pump drive gear not engaged with drive pin on output shaft.
- Drive pin sheared off.
- Rear pump priming valve not sealing.

Oil leaks.

- Transmission case and extension.
 - a. Extension oil seal.
 - b. Shifter shaft oil seal.
 - c. Speedometer driven gear fitting.
 - d. Pressure taps.
 - e. Vacuum modulator assembly and case.

A very smoky exhaust indicates a ruptured vacuum modulator diaphragm.

- Transmission oil pan gasket.

- Converter cover pan.
 - a. Front pump attaching bolts.
 - b. Front pump seal ring.
 - c. Front pump oil seal.
 - d. Oil drain in front pump plugged.
 - e. Porosity in transmission case.

Oil forced out of filler tube.

- Oil level too high, aeration and foaming caused by planet carrier running in oil.
- Water in oil.
- Leak in pump suction circuits.

TORQUE SPECIFICATIONS

| | | | |
|---|-------------------|--|-------------------|
| Transmission Case to Engine | 25 to 30 ft. lbs. | Rear Pump to Transmission | |
| Transmission Oil Pan to Case | 6 to 9 ft. lbs. | Case Bolts | 8 to 11 ft. lbs. |
| Transmission Extension to Case | 20 to 30 ft. lbs. | Valve Body to Transmission | |
| Speedometer Gear Housing Retainer ... | 3½ to 5 ft. lbs. | Case Bolts | 8 to 11 ft. lbs. |
| Servo Cover to Transmission | | Valve Body Suction Screen | |
| Case Bolts | 15 to 20 ft. lbs. | Attaching Screws | 2½ to 3½ ft. lbs. |
| Front Pump to Transmission | | Upper Valve Body Plate Bolts | 3½ to 5 ft. lbs. |
| Case Bolts | 13 to 17 ft. lbs. | Lower to Upper Valve Body | |
| Front Pump Cover to Body | | Attaching Bolts | 8 to 11 ft. lbs. |
| Attaching Bolts | 15 to 20 ft. lbs. | Inner Control Lever Allen Head Nuts... | 6 to 8 ft. lbs. |
| Pinion Shaft Lock Plate | | Parking Lock Pawl Reaction Bracket | |
| Attaching Screws | 2½ to 3 ft. lbs. | Attaching Bolts | 8 to 11 ft. lbs. |
| Governor Body to Hub Attaching Bolts .. | 6 to 8 ft. lbs. | Pressure Test Point Plug | 5 to 7 ft. lbs. |
| Governor Hub Drive Screw | 6 to 8 ft. lbs. | Low Band Adjustment Lock Nut | 13 to 17 ft. lbs. |
| | | Converter to Engine Bolts | 15 to 20 ft. lbs. |

SPECIAL TOOLS

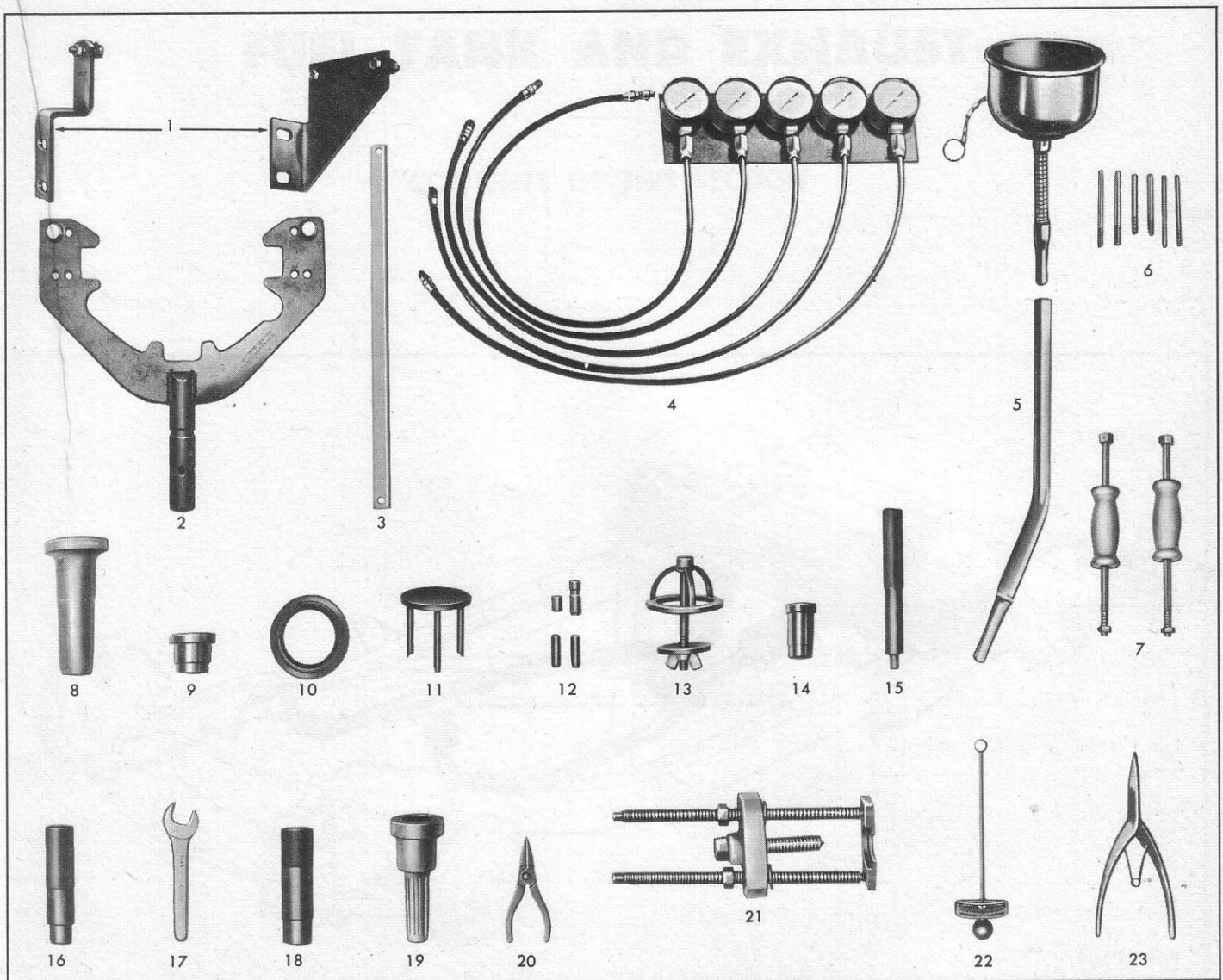


Fig. 46—Aluminum Powerglide Special Tools

- | | | | |
|--------------|--|--------------|--|
| 1. J-9506 | Holding Fixture Adapters | 15. J-7079 | Handle |
| 2. J-3289-01 | Holding Fixture (Use with J-3289-20 Base) | 16. J-6582 | Rear Pump Bushing Installer |
| 3. J-9549 | Converter Safety Strap | 17. J-9543 | Vacuum Modulator Wrench |
| 4. J-4872-A | Transmission Pressure Gauges | 18. J-5778 | Extension Bushing Remover and Installer |
| 5. J-4264-A | Oil Filler Tube and Funnel | 19. J-5154-A | Extension Oil Seal Installer |
| 6. J-3387 | Pilot Stud Set | 20. J-5403 | Snap Ring Pliers |
| 7. J-9539 | Front Pump Puller Bolts (Use with weights from Slide Hammers J-6585) | 21. J-5814-A | Speedometer Drive Gear Remover and Installer |
| 8. J-6839 | Front Pump Seal Driver | 22. J-5853 | Torque Wrench |
| 9. J-9546 | Clutch Drum Bushing Remover and Installer | 23. J-8039 | Snap Ring Pliers |
| 10. J-7782 | Clutch Spring Compressor Adapter Plate | J-8001 | Dial Indicator (Not Illustrated) |
| 11. J-5133 | Clutch Spring Compressor | J-5492 | Dial Indicator Support Strap (Not Illustrated) |
| 12. J-9538 | Planet Pinion Assembly Tool Set | J-6585 | Slide Hammers (Not Illustrated) |
| 13. J-9542 | Reverse Piston Spring Compressor | J-6585-3 | Slide Hammer Adapters (Not Illustrated) |
| 14. J-9557 | Transmission Case Rear Bushing Remover and Installer and Rear Pump Bushing Remover | J-9534 | Bushing Remover (Not Illustrated) |