# SECTION 6E

# AUTOMATIC TRANSMISSION

## CONTENTS OF THIS SECTION



## INDEX



## GENERAL DESCRIPTION

The 1961 Corvair Powerglide incorporates the following design revisions:

- Rear pump check valve now embodies an oil bleed poppet to prevent air entrainment in the hydraulic circuit when operating in Reverse.
- The line-pressure limiting valve is deleted.
- Facing material deleted from front face of the thick reverse clutch reaction plate.
- Faced plates in drive clutch now waved and steel reaction plates flat for better heat dissipation.

The "Corvair" Powerglide (fig. 6E-1) consists of an air cooled, three element torque converter which drives through an automatic shift, two-speed planetary transmission.

As illustrated, the Powerglide transmission is integrated to the differential carrier to form a Transaxle. As a result, the converter is remote from the main transmission assembly, being separated by the differential carrier. Two shafts run axially through the hollow pinion shaft; one from the converter cover hub to the front pump and the other from the turbine to the input sun gear to transmit converter torque to the transmission gear box.

Excepting the converter location, mechanical components of the "Corvair" Powerglide are generally scaled-down versions of comparable parts in conventional Powerglides. The use of a plate-type reverse clutch and a welded converter with integral starter driven gear are obvious exceptions. Gear ratios are 1.82:1 in low and reverse and 1:1 in high gear. Automatic low is also 1.82:1.

Selector lever positions from top to bottom are Reverse, Neutral, Drive and Low. No Park position is provided. Power flow sequences in each range are identical to conventional Powerglide transmissions.

Two innovations have been added to the Low range in this design, these being the addition of a manual low inhibitor and an extended part throttle downshift.

The manual low inhibiting feature is designed to protect the transmission from damage which could result from moving the selector lever into Low while the vehicle is traveling more than approximately 45 mph. For example, if the driver moved the selector lever into "low" at 70 mph, the transmission would remain in "high" until vehicle speed was reduced to approxi-

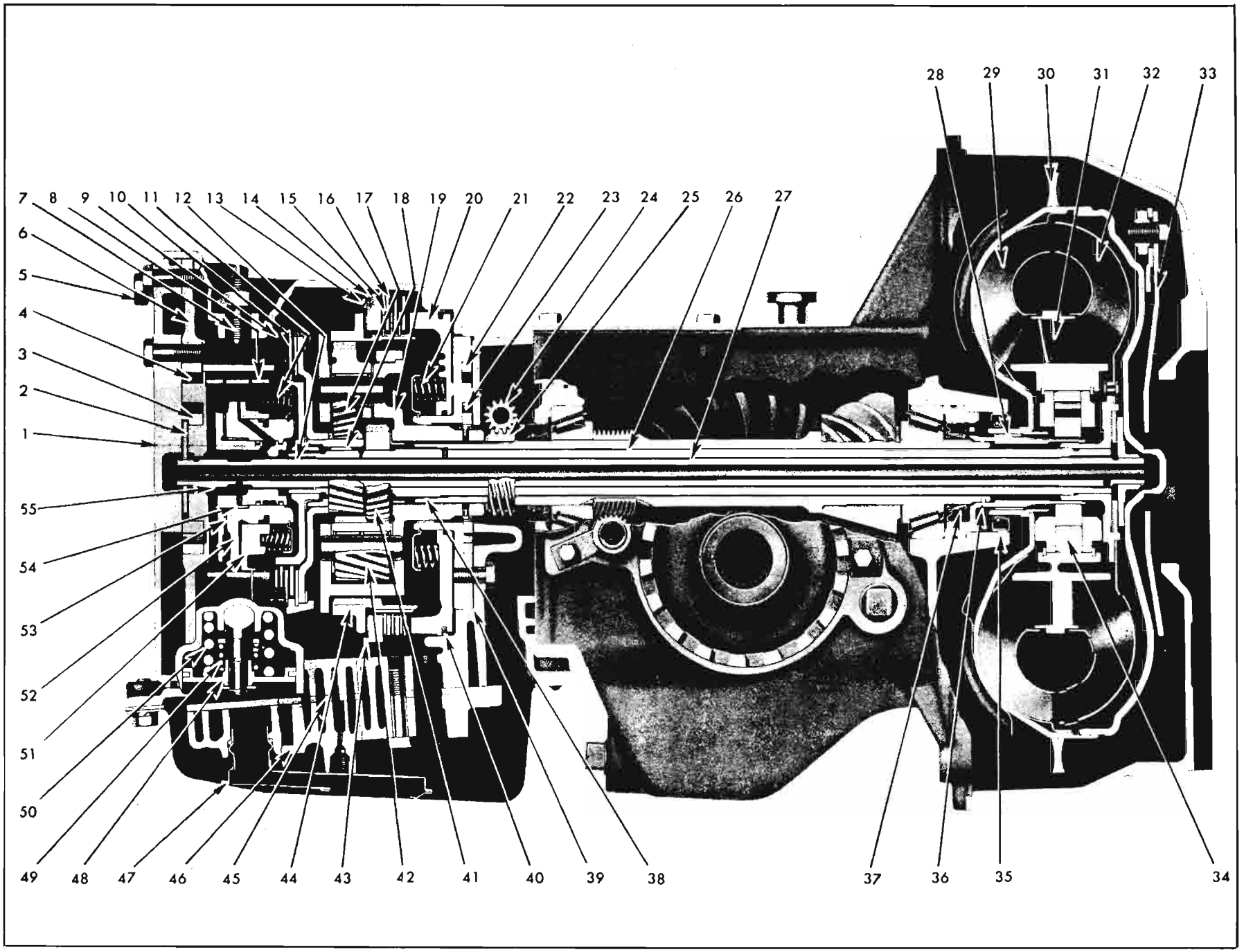


Fig. 6E-1—"Corvair" Powerglide—Cross Sectional View

mately 45 mph, and then the downshift would occur.

Part throttle downshifts are provided to provide better low speed acceleration characteristics. At speeds below 25 mph, a downshift to Low will occur if the accelerator is moved to one-half throttle or more. The subsequent upshift will occur at 34-41 mph. As with the conventional Powerglide, wide-open throttle downshifts are possible with the speed limitations being 38-44 mph.

# MAINTENANCE AND ADJUSTMENTS

## OIL REQUIREMENTS

The Powerglide transmission requires an oil known as Automatic Transmission Fluid, "Type A" bearing a "AQ-ATF" mark. This oil is available through Chevrolet dealers and oil company filling stations in sealed containers.

## OIL LEVEL

The transmission oil level should be checked every 1000 miles. Oil should be added only when the level is near the "ADD" mark on the dip stick with oil at normal operating temperature. The oil level dip stick is located in the right-front of the engine compartment.

**NOTE: The difference in oil level between Full and Add is one (1) pint.**

In order to check oil level accurately, the engine should be idled with the transmission oil at normal temperature 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 oil is added which brings the oil level above the full mark, the planetary unit will run in the oil, foaming and aerating the oil. This may cause malfunction of the transmission assembly due to improper application of the band or clutches.

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 easily identified as all automatic transmission fluid used in Chevrolet production is dyed red.

All mating surfaces such as the front pump, oil pan rail, filler tube, governor, and the attachment to the differential carrier 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.

## DRAINING AND REFILLING

No periodic draining of the transmission oil is recommended.

When the transmission requires repair, drain the oil by loosening the filler tube attaching nut in the oil pan and allow oil to drain; no drain plug is provided.

To refill the transmission, tighten the filler tube attaching nut and add four (4) pints transmission fluid using J-4264 filler tube and funnel. Start engine and allow engine to idle in Neutral 3 - 5 minutes to warm oil, then check oil and add as required to raise to the level of the "FULL" mark. Assuming that the converter was not drained (since it is welded) and allowing for a nominal spillage or draindown, approximately six (6) pints of oil will be required for refill.

***CAUTION: Do not over-fill!***

The dry capacity of the transmission, including converter, is 12 pints. Normal refills require 6 pints.

## SHIFT LINKAGE CHECK AND ADJUSTMENT

### Check

If improper shift linkage adjustment is suspected, a check can be made quickly without any disassembly as described below:

1. Start engine. If job is cold, allow 2 - 3 minutes for

Fig. 6E-1—Powerglide Transaxle—Cross Sectional View

1. Front Pump Cover
2. Front Pump Shaft Drive Hub
3. Front Pump Drive Gear
4. Front Pump Driven Gear
5. Transmission Vent
6. Front Pump Body
7. Low Band Adjusting Screw and Lock Nut
8. Low Band
9. Clutch Drum Reaction Plate (3 Used)
10. Clutch Drum Faced Plate (2 Used)
11. Clutch Piston Return Spring (15 Used)
12. Turbine Shaft Front Bushing
13. Reverse Clutch Retaining Ring Clip
14. Reverse Clutch Front Reaction Plate (Thick)
15. Reverse Clutch Faced Plates (3 Used)
16. Reverse Clutch Reaction Plate (3 Used)
17. Short Pinion
18. Low Sun Gear Bushing
19. Planet Carrier Hub (Transmission Output)
20. Reverse Piston
21. Reverse Piston Return Spring (17 Used)
22. Rear Pump Driven Gear
23. Rear Pump Drive Geor
24. Gavernor Driven Gear
25. Gavernor Drive Gear
26. Turbine Shaft
27. Front Pump Shaft
28. Converter Hub Bushing
29. Converter Pump
30. Starter Gear
31. Stator
32. Turbine
33. Engine Flex Plate
34. Stator Cam Race
35. Converter Hub Seal
36. Stator Shaft
37. Pinion Shaft Rear Oil Seal
38. Pinion Shaft Bushing
39. Rear Pump Wear Plate
40. Reverse Piston Outer Seal
41. Planet Carrier Input Sun Gear
42. Long Pinion Gear
43. Reverse Clutch Plate Retaining Ring
44. Ring Gear
45. Valve Body Ditch Plate
46. Valve Body
47. Oil Pick-up Pipe
48. Low Servo Piston
49. Low Servo Piston Cushion Spring
50. Low Servo Piston Return Spring
51. Clutch Drum Piston
52. Clutch Drum Hub
53. Clutch Drum Selective Thrust Washer
54. Clutch Drum Bushing
55. Front Pump Body Bushing

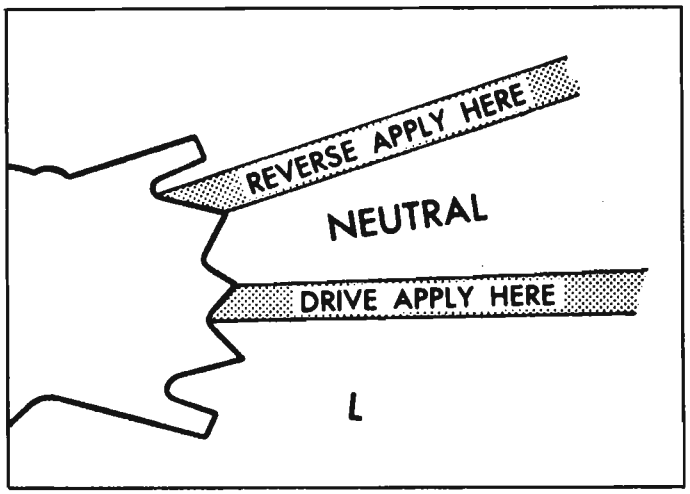


Fig. 6E-2—Shift Linkage Check Diagram

the transmission fluid to warm-up.

2. With engine at normal idle speed, then very slowly move the range selector lever up from "N" toward "R" and note by feel the point at which the reverse clutch applies. Properly adjusted, the reverse clutch should apply within the band from the tooth peak to full Reverse detent (fig. 6E-2).
3. Make the same check as in step 2 above while moving the selector lever from "N" toward "D". Properly adjusted, the low band should apply as the selector lever follower is felt to be between the tooth peak separating Neutral from Drive and full Drive detent.
4. Unless the shifts are obtained at the points illustrated in Figure 6E-2, the shift linkage should be adjusted with gauge J-8365.

### Adjustment

Adjustment of the manual valve linkage should be checked after any transmission overhaul or control cable, or range selector control assembly replacement, as described below:

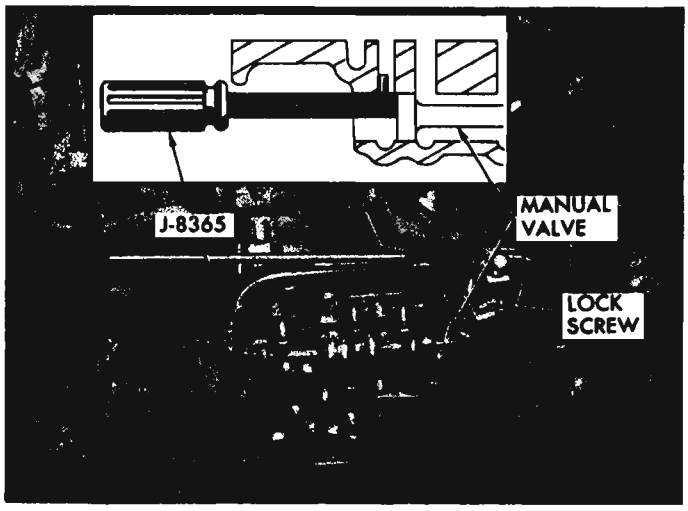


Fig. 6E-3—Adjusting Manual Valve Linkage with J-8365

1. If necessary, drain oil from transmission by unscrewing filler tube nut, then remove oil pan.
2. Place the range selector lever in the driving compartment in "D" (Drive).
3. Insert J-8365 into manual valve bore as shown (Fig. 6E-3) with tab of gauge upward so it engages to forward port of the valve body as shown in the inset, Figure 6E-3.
4. With J-8365 in place, push forward on the manual valve levers as shown. Properly adjusted, J-8365 will be held in place horizontally without being supported.
5. If readjustment is required, loosen lock screw (fig. 6E-3), push the manual valve levers forward so that J-8365 is held in this attitude. Recheck adjustment as described in Step 4.
6. When satisfactory adjustment is obtained, install oil pan and filler tube, then refill transmission with oil as described earlier in this section.

## NEUTRAL SAFETY SWITCH ADJUSTMENT

Properly adjusted, the neutral safety switch (fig. 6E-4) should prevent engine cranking when the ignition switch is turned to "Start" with the transmission selector lever in any position other than "N" (Neutral). If engine cranks with selector lever in a position other than "N", adjust the switch position by loosening the two switch mounting screws, placing the range selector in Neutral, and turning the ignition switch to "START". Shift the switch fore and aft until engine cranking begins, then secure switch in that position.

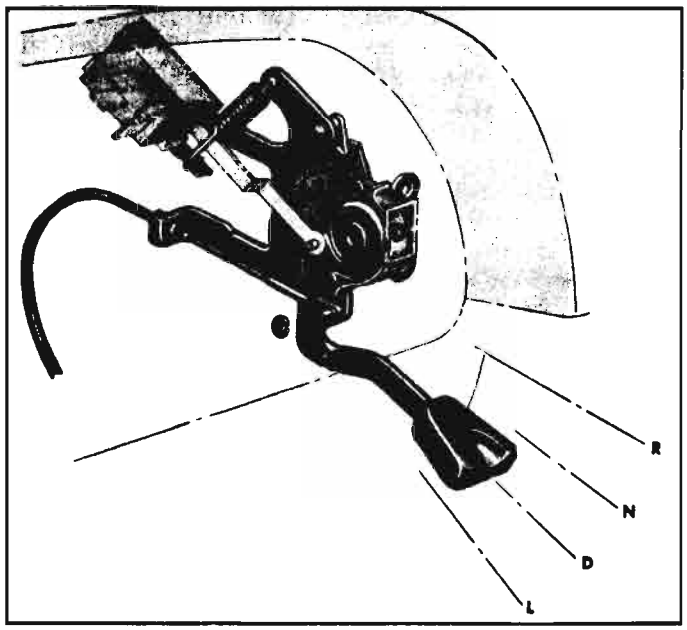


Fig. 6E-4—Neutral Safety Switch

## THROTTLE VALVE LINKAGE ADJUSTMENT

Correct throttle valve (TV) linkage adjustment is necessary to provide the correct shift schedule.

As special linkage is not used to actuate the transmission TV, refer to Section 9 of this Manual for the adjustment procedures.

### LOW BAND ADJUSTMENT

While no periodic adjustment of the low band is recommended, access to the adjusting screw has been provided from inside of the vehicle via the parcel compartment area behind the rear seat.

To gain access to the low band, remove the parcel shelf and remove the plug covering the access hole in the floor pan.

Adjustment of the low band requires an improvised tubular hex ¾" socket approximately 12"-14" long. Probably the simplest way to fabricate such a tool would be to weld a ¾" tubular stamped steel spark plug socket to each end of an 8" length of ¾" ID tubing or pipe.

To adjust, loosen the lock nut and tighten the adjusting screw to 40 ± 5 in.-lbs. torque, then back-off four (4) full turns exactly. While holding the adjusting screw stationary by means of a socket and extension inserted through the improvised wrench, tighten the adjusting screw lock nut securely.

Insert plug in the access hole and install the parcel compartment shelf. Specific instructions for installation of this shelf are carried in Section 10 of this manual.

## SERVICE OPERATIONS

Service operations on the "Corvair" Powerglide fall into two categories defined by the attitude of the transmission relative to the vehicle and power train:

1. *Service Operations—Transmission in Vehicle*
2. *Service Operations—Power Train Removed from Vehicle.*

*In-vehicle* service operations cover those operations which can be performed without removal of the power train from the vehicle. Conversely, those components which require dropping the power train from the vehicle are listed under *Service Operations—Power Train Removed from Vehicle.*

*Service Operations—Power Train Removed from Vehicle* is further defined by division into two categories: *Transmission Assembled to Power Train* and *Transmission Separated from Power Train.*

Transmission repairs listed under *Transmission Assembled to Power Train* are most economically completed by performing the repair with the transmission left assembled to the power train and, if possible, without removal of the power train from its removal fixture.

*Service Operations — Transmission Separated from Power Train* is a further breakdown of the latter category and covers those components which are inaccessible unless the automatic transmission is literally separated from the power train after its removal from the vehicle. These operations should be performed with the transmission bench mounted in J-7896 holding fixture.

The following *Service Reference Guide* is provided in order to aid the serviceman to determine quickly whether power train removal and transmission separation is necessary for the repair intended.

### SERVICE REFERENCE GUIDE

| POWER TRAIN IN VEHICLE | POWER TRAIN REMOVED FROM VEHICLE | |
|---|---|---|
| | Transmission Assembled to Power Train | Transmission Separated from Power Train |
| Range Selector Assembly | Front Pump | Rear Pump and Reverse Piston Assembly |
| Control Cable | Clutch Drum | Rear Pump Wear Plate |
| Vacuum Modulator | Low Band | Governor Drive Gear |
| Governor | Planet Carrier | Converter Assembly |
| Valve Body | Turbine Shaft | Transmission Case |
| Low Servo Piston | Pump Shaft | |
| Throttle and Manual Valve Levers | | |

**NOTE: Above guide shows Transmission—Power Train—Vehicle relationship required to perform indicated service operations.**

## SERVICE OPERATIONS—TRANSMISSION IN VEHICLE

### RANGE SELECTOR ASSEMBLY

#### Removal

1. Remove the "E" retainer (fig. 6E-4) and disconnect the control cable from the range selector assembly.
2. Remove the nut securing the control cable to its attaching bracket on the range selector and free the cable from the range selector.
3. Remove the instrument cluster as described in Section 8 of this manual.
4. Disconnect electrical leads to the neutral safety

switch, then complete removal by removing two screws attaching range selector assembly to instrument cluster and removing the quadrant light from its clip on the selector.

5. If range selector is to be replaced, remove the neutral safety switch.

### Repairs

The range selector assembly is serviced only as an assembly.

### Installation

1. If a new range selector assembly is being installed, loosely attach the neutral safety switch. Specific instructions for this installation are in Section 8.
2. Secure the range selector assembly to the instrument cluster with two screws and insert the quadrant light in its bracket.
3. Install the instrument cluster in the instrument panel as described in Section 8.
4. Insert the shift cable into its mounting bracket on the range selector. The attachment of the cable to the bracket is critical, so be sure that the flat on the cable sheath is flush when the cable is installed (fig. 6E-4). Holding the sheath nut with a wrench, install the sheet metal nut on the threaded portion of the sheath to secure the cable to the range selector bracket.
5. Insert the cable eye onto the actuating post on the range selector lever and secure with the "E" retainer.
6. After a range selector removal or replacement, check the shift linkage and neutral safety switch adjustments as described in "Adjustments" earlier in this section.

## CONTROL CABLE ASSEMBLY

### Removal

1. Disconnect the control cable from the range selector as described in steps 1 and 2 of "Range Selector Assembly."
2. Remove tunnel covers.
3. At front of vehicle, remove cable from the multiple clip (fig. 6E-5) at the toe-pan and remove the upper toe-pan clip.
4. Remove cable from the three clips in the tunnel.
5. Remove the grommet plate at the rear of the tunnel, free the cable sheath from the plate, and remove the clip in the underbody kick-up area.
6. Disconnect the throttle rods from the TV lever on the transmission.
7. Complete cable removal by rotating the transmission TV lever its full limit counterclockwise to free the cable ball from the inner manual valve lever slot in transmission and withdraw the cable. Bow cable towards center line of vehicle to guide cable through hole in engine front support.

### Repairs

The transmission manual valve cable assembly with its two captive grommets are serviced only as an assembly.

### Installation

1. With the tunnel covers removed, lay the cable out beneath the car in its correct relationship.
2. Insert front of cable up into passenger compartment. Cable must then be routed **under** the parking brake cable and then **over** the brake pipe to prevent the possibility of the brake cable riding against the shift cable and establishing a sawing action.

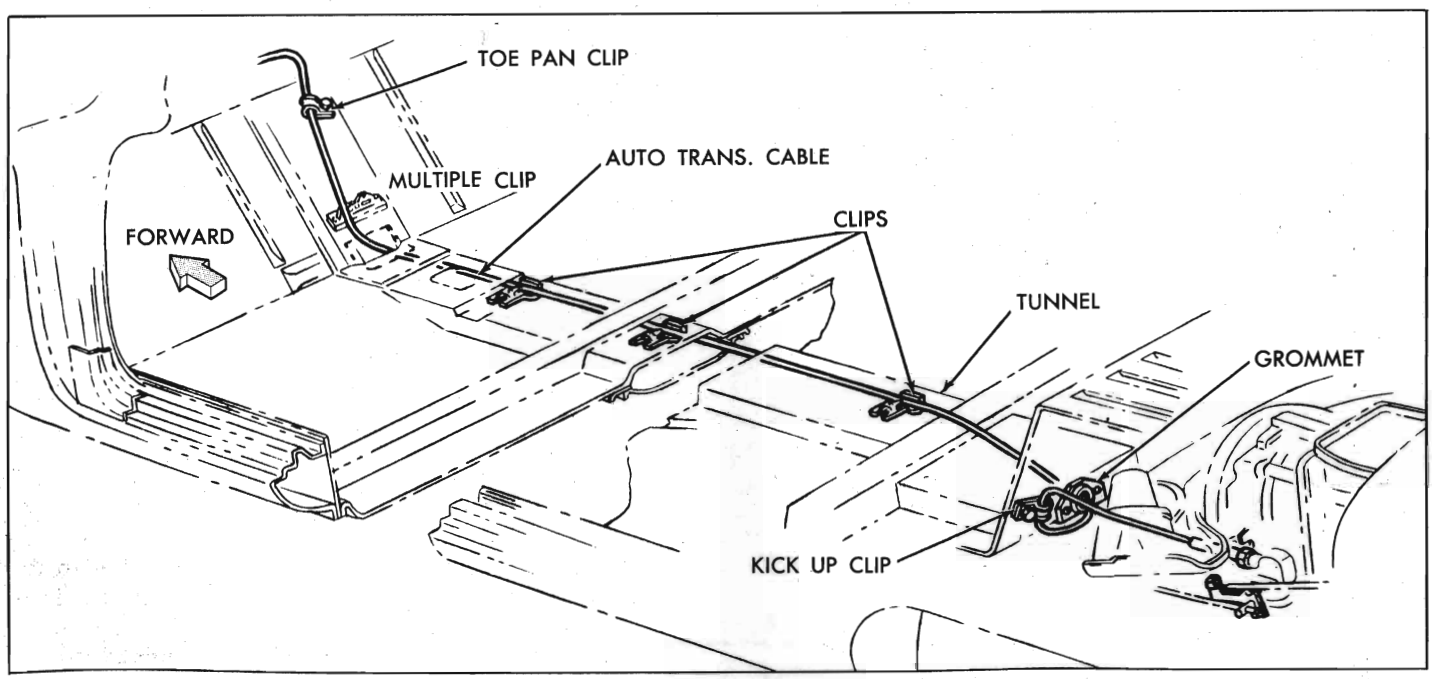


Fig. 6E-5—Shift Control Cable Routing

3. After the cable routing is satisfactory, connect the shift cable to the range selector as described under "Range Selector Assembly," **Installation** steps 3 and 4.
4. Shift range selecter to "D" (drive), then the cable upper clip in the toe-pan and secure the cable in the multiple clip at the base of the toe-pan. Be sure the rubber protector is installed on the clip to protect the cable sheath.
5. Secure the cable with the three clips provided in the tunnel area. Bow cable towards center line of vehicle to guide cable through hole in engine front support.
6. Install "O" ring seal (fig. 6E-6) on cable, Lubricate "O" ring lightly with Lubriplate.

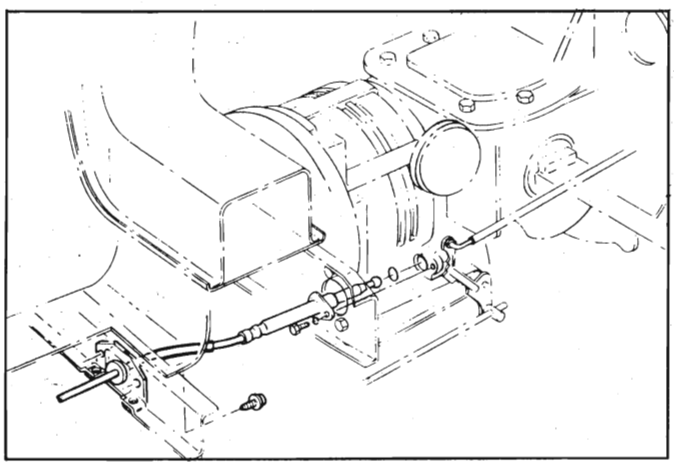

Fig. 6E-6—Cable-to-Case Installation

7. With throttle rods disconnected from the throttle valve (TV) lever on the transmission, rotate the TV lever its full limit counterclockwise and insert cable ball into the slot of the manual valve lever.
8. Fully seat "O" ring and secure installation by installing cap screw and lockwasher.
9. Correctness of installation is easily checked. Once fully tightened, exert a slight hand pressure in the counterclockwise direction and check that the hole in the notched arm of the TV lever is **below** the transmission oil pan rail (fig. 6E-7). If hole is above pan rail, cable installation is faulty and must be re-checked.
10. Install the cable rear grommet (fig. 6E-5) in the grommet plate, then install the grommet plate in the rear of the tunnel.
11. Install clip on cable in rear kick-up area (fig. 6E-5).
12. Check shift linkage for proper operation as described under "Adjustments" in this section.

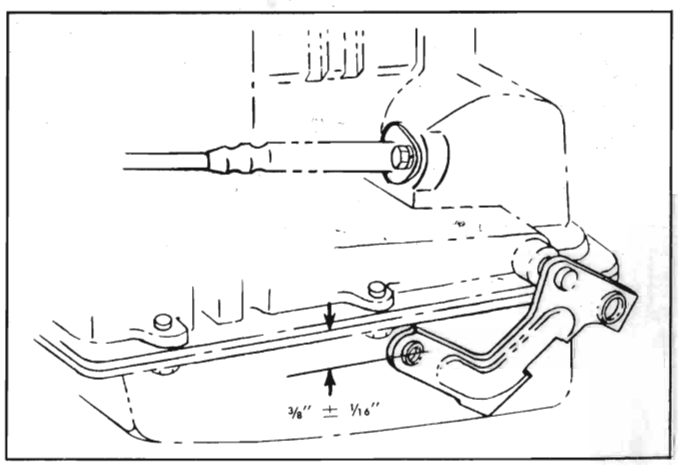


Fig. 6E-7—Cable Installation Check Diagram

## VACUUM MODULATOR

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

### Removal

1. Remove the vacuum hose at the vacuum modulator which runs from the engine vacuum balance tube.
2. Unscrew the vacuum modulator from the transmission using channel lock pliers or a thin 1" wrench, if available.
3. Remove the vacuum modulator valve (fig. 6E-8) from the transmission case.

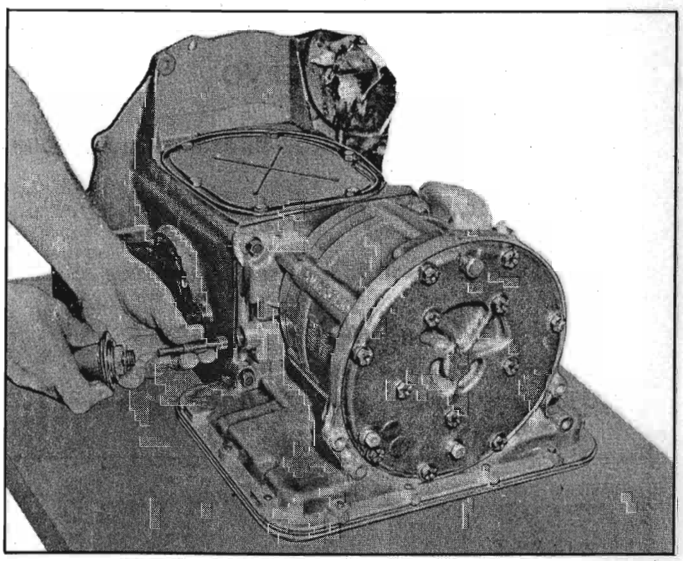

Fig. 6E-8—Removing Vacuum Modulator and Valve

### 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 smokey 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 hose from engine balance tube.

## GOVERNOR

The governor is accessible from beneath the vehicle and is mounted on the left side.

### Removal

Unscrew the lock screw securing the governor tab to the case, then pull the governor from the transmission.

### Repairs

The only part replaceable on the governor is the driven gear. To remove drive out roll pin with a punch and pull out old gear. Drill a new hole in the governor 90 degrees from the original, then insert new gear and reinstall roll pin.

### Installation

Install new "O" ring seal on governor, then insert governor into transmission with a slight twist to engage gear teeth. Secure installation with lock bolt.

## VALVE BODY AND LOW SERVO

### Removal

1. Loosen oil filler nut in order to drain transmission oil, then remove filler pipe from oil pan.
2. Disconnect throttle valve rods from TV lever on transmission.
3. Remove 14 bolts and lockwashers securing oil pan and remove oil pan and gasket.
4. Remove oil pick-up pipe (fig. 6E-10).
5. Make an improvised sheet metal strap (see fig. 6E-11), and loosely install with one pan bolt.

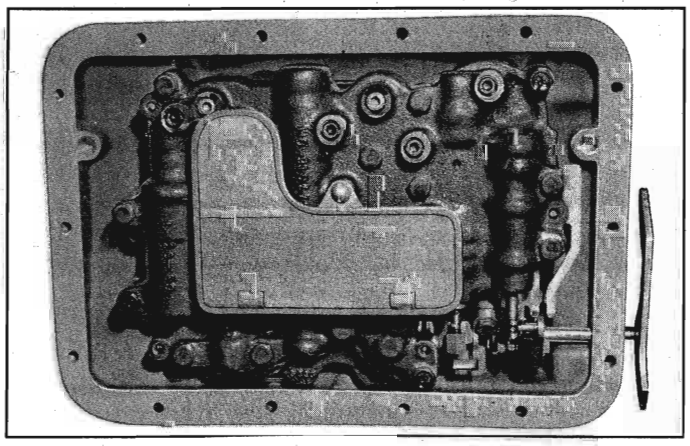

Fig. 6E-9—Valve Body Installed

6. Remove bolts securing valve body to transmission, tap valve body lightly with a soft hammer to loosen from its dowels in the transmission case, then carefully lower the valve body about $\frac{1}{16}$", then rotate improvised strap into place so it spans the servo piston hub and secure strap with pan bolt. This eliminates possibility of servo piston slipping down out of its bore and the loss of low band engagement with its apply components.
7. To remove the low servo piston, pull downward on the hub of the piston shaft with a screwdriver.

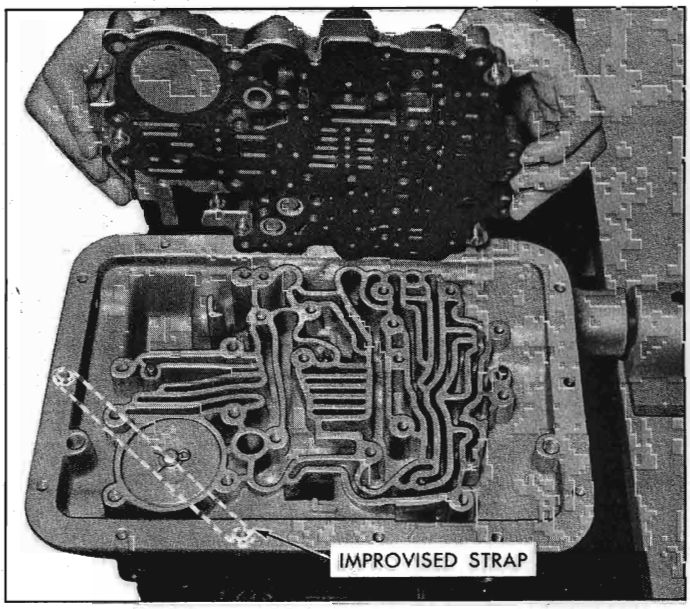


Fig. 6E-10—Removing Valve Body

***CAUTION: Do not remove piston in vehicle unless low band screw is first tightened fully!***

### Disassembly—Valve Body

**NOTE: All references are to figure 6E-11.**

1. If installed, remove manual valve (24).
2. Remove two clutch head screws (1) attaching hydraulic modulator valve body (16) and separate modulator body from main valve body (5).

***CAUTION: Modulator body should be held during removal of screws as it is under spring pressure from the pressure regulator valve spring (19).***

3. Remove pressure regulator valve spring retainer (18), spring (19), and pressure regulator valve (20).
4. From the hydraulic modulator body (16), remove the rear pump priming ball (15) and the front and rear pump check valves and springs (13 and 14). Also remove the hydraulic modulator valve (17). It will be noted that the rear pump check valve (14) embodies an air bleed pin.

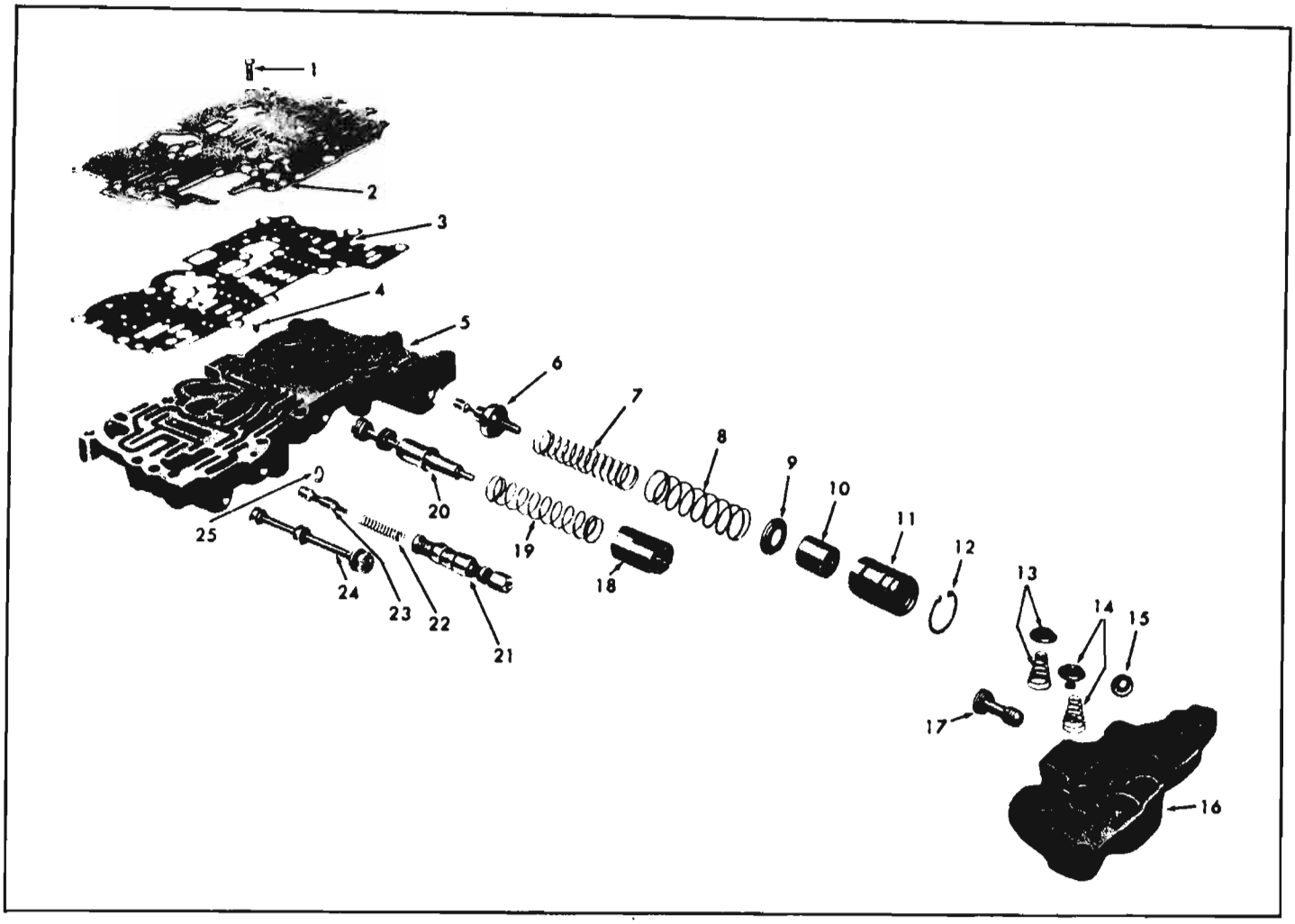


Fig. 6E-11—Corvair Powerglide Valve Body—Exploded View

1. Valve Body-to-Transfer Plate Attaching Screws (4)
2. Transfer Plate
3. Transfer Plate-to-Main Valve Body Gasket
4. Throttle Valve Assembly Retaining Pin
5. Main Valve Body
6. Low-Drive Shift Valve
7. Low-Drive Valve Inner Spring
8. Low-Drive Valve Outer Spring
9. Spring Seat
10. Low-Drive Regulator Valve
11. Low-Drive Regulator Valve Sleeve
12. Retainer Ring
13. Front Pump Check Valve and Spring
14. Rear Pump Check Valve and Spring
15. Rear Pump Priming Ball
16. Hydraulic Modulator Valve Body
17. Hydraulic Modulator (Booster) Valve
18. Pressure Regulator Valve Spring Retainer
19. Pressure Regulator Valve Spring
20. Pressure Regulator Valve
21. Detent Valve Assembly
22. Throttle Valve Spring
23. Throttle Valve
24. Manual Valve
25. Throttle Valve Locating Ring

5. Remove the two remaining clutch head screws (1), then separate the transfer plate (2) and gasket (3) from the main valve body (5).
6. To remove the low drive shift valve components, remove retainer ring (12) with Truarc pliers while exerting a downward force, then release the pressure and remove low drive regulator valve sleeve (11), regulator valve (10), spring seat (9), and inner and outer springs (7 and 8). Lightly tap main valve body with a plastic hammer to remove the low drive shift valve (6) from its bore.
7. To remove the TV valve components, remove retaining pin (4) by wedging a thin screwdriver between its head and the surface of the main valve body, then remove detent valve assembly (21) and throttle valve spring (22). Complete disassembly of the valve body by removing the "E" ring (25) from the throttle valve, then remove throttle valve (23) from main valve body by tapping valve body with a plastic hammer.

### Inspection—Valve Body

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

### Assembly—Valve Body

1. Install hydraulic modulator valve (17) in its bore in modulator valve body (16).
2. Place rear pump priming ball (15) into hydraulic modulator valve body (16), then place front and

rear pump check valves and springs (13 and 14) into modulator body. Be sure the rear pump check valve (14), which contains the poppet, is installed in the outboard bore.

3. Carefully lower transfer plate (2) onto assembled components in hydraulic modulator valve body (16) so as not to knock front and rear pump check valves (13 and 14) from their springs, then secure transfer plate to modulator valve body (16) with two clutch head screws (1). Tighten screws to 38-50 inch pounds.
4. Install the low drive shift valve components in the main valve body (5). Place the low drive shift valve (6) into its main valve body bore, then assemble the inner and outer low drive springs (7 and 8) and place them in the bore. Insert the low drive regulator valve (10) into regulator valve sleeve (11), then place spring seat (9) over open end of regulator valve sleeve (11), and insert this assembly into bore in main valve body, compressing the inner and outer springs and secure by installing retainer ring with Truarc pliers.
5. Install throttle valve (23) into its bore in the main valve body (5), then install locating ring (25) in groove in throttle valve. Be sure throttle valve (26) is fully seated in its bore as locating ring (28) must be installed in throttle valve via third port from left of valve body as viewed in Figure 6E-11.
6. Place throttle valve spring (22) and detent valve assembly (21) in throttle valve bore, then depress detent valve assembly (21) and secure to valve body by tapping retaining pin (4) into main valve body (5).
7. Using a new transfer plate-to-main valve body gasket (3) apply a light coat of petroleum jelly to main valve body (5) and install gasket onto valve body. The purpose of petroleum jelly is to retain valve body and gasket alignment when transfer plate is installed.
8. Install pressure regulator valve (20) in the main valve body with spring (19) and spring retainer (18). Fully compress pressure regulator valve spring (19) so that spring retainer (18) enters bore of main valve body. Then position main valve body onto assembled transfer plate-hydraulic modulator body, align mounting screw holes in transfer plate and main valve body, and secure with two remaining clutch head screws (1). Tighten screws to 38-50 inch pounds.
9. Install manual valve (24) in main valve body, then check shift cable adjustment as described earlier in this section.

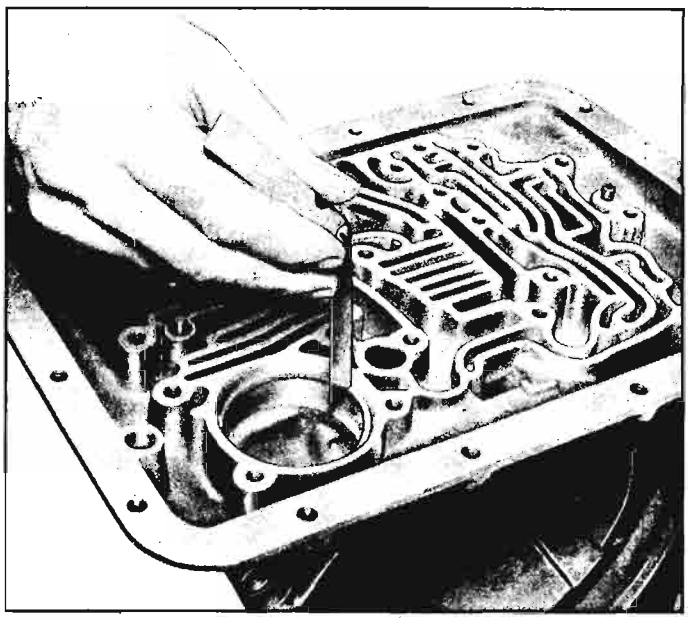

Fig. 6E-12—Measuring Low Servo Piston Ring Gap

**Inspection and Repairs—Low Servo Piston**

To disassemble the low servo piston, remove the hairpin retainer securing the piston to the piston rod and separate all components. The cushion spring tension on this piston is relatively slight; no press is required.

Remove piston ring from the piston and install it in the low servo bore as illustrated in Figure 6E-12, then measure the ring gap. If within limits ring gap will be .002″-.012″.

Assemble ring to piston, then measure clearance between ring and one wall of the piston groove (fig. 6E-13). Clearance should be .0005″-.005″.

To assemble the low servo, place the spring seat on the piston shaft, then install the cushion spring. Complete assembly by compressing cushion spring slightly with piston and secure piston to shaft with hairpin retainer.

**Valve Body and Low Servo—Installation**

1. Install low servo piston and return spring (fig. 6E-14) in bore in transmission and engage notch in piston shaft with low band apply strut, loosening low band screw slightly to permit piston ring to seat in case bore.
2. If low band was fully tightened to permit removal of low servo, install valve body in transmission

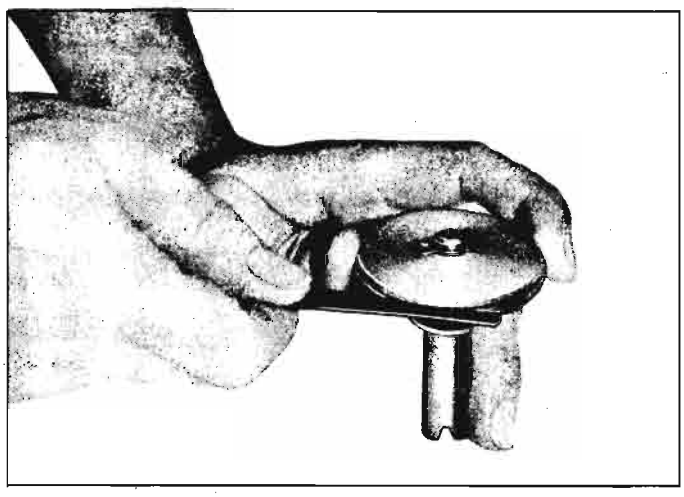

Fig. 6E-13—Measuring Piston-to-Ring Clearance

while simultaneously loosening low band screw until it is possible to index the valve body on the dowels in case. If only valve body was removed and an improvised strap was employed, raise the valve body almost onto mating surface on case, then rotate improvised strap (fig. 6E-10) out of the way and secure valve body. If manual valve is installed index it with a manual valve lever in the case, then secure the valve body with 20 bolts (fig. 6E-15). Tighten bolts to 9-11 lbs. torque.

3. Install "O" ring seal in valve body, then install oil pickup pipe and secure with screw (fig. 6E-16).
4. Using a new pan gasket install transmission oil pan and torque pan attaching bolts to 3-4 ft. lbs. It is important that an even torque be applied to the pan bolts to prevent leakage between the oil pan and transmission case pan rail.
5. Tighten filler tube attaching nut, then refill transmission with oil as described under "Periodic Maintenance" earlier in this section.
6. If low band adjustment was disturbed, readjust low band as described earlier in this Section.

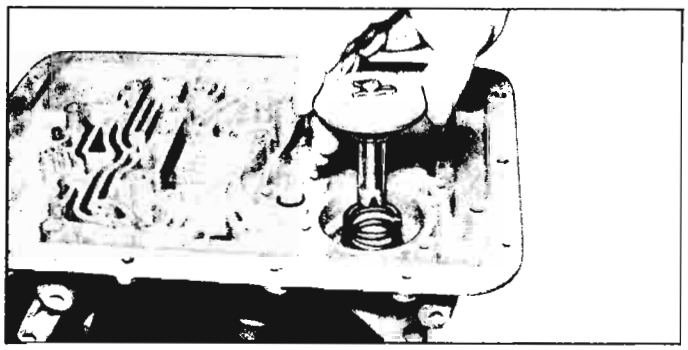

Fig. 6E-14—Installing Low Servo Piston and Return Spring

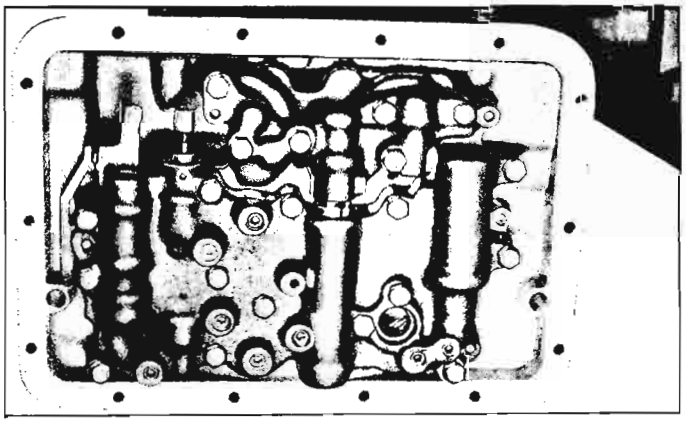

Fig. 6E-15—Valve Body Attaching Bolts

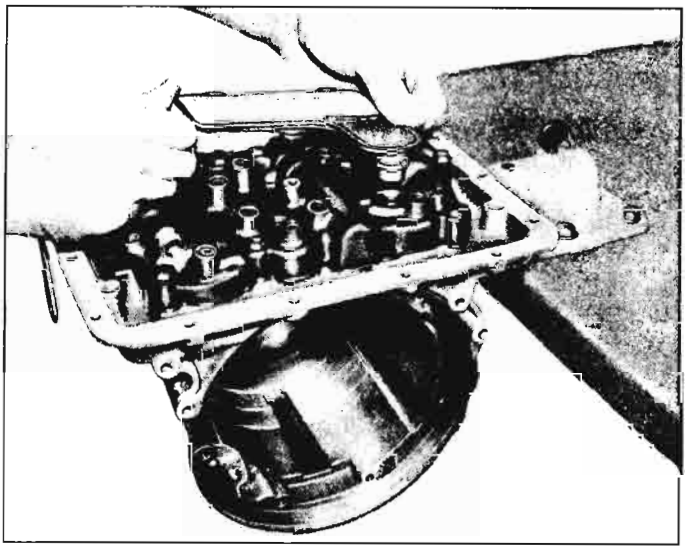

Fig. 6E-16—Installing Oil Pickup in Valve Body

## TRANSMISSION REMOVAL AND INSTALLATION

The removal and installation of the "Corvair" Powerglide from the vehicle requires the removal of the Power Train as a unit. Removal and installation procedures for the power train are covered in Section 6.

Separation of the Powerglide from the engine and axle is also provided in Section 6.

## SERVICE OPERATIONS—POWER TRAIN REMOVED FROM VEHICLE

All following service operations can be performed with the power train (transmission, axle, and engine) removed from the vehicle but not separated into individual assemblies. In fact, considerable time can be saved by performing these operations while the power train is on its removal fixture.

For photographic convenience, operational illustrations have been taken with the transmission separated and bench mounted in holding fixture J-7896 (fig. 6E-17).

### DISASSEMBLY OF TRANSMISSION

1. If overhaul is being performed with transmission separated from power train, mount transmission in J-7896 holding fixture (fig. 6E-17). If assembled to power train, loosen the filler tube nut to allow oil to drain, then remove filler tube.
2. Remove the 12 bolts securing the front pump to the transmission case (fig. 6E-18).
3. If overhaul is being made with transmission installed on power train, loosen the low band adjusting screw jam nut and **fully** tighten the adjusting screw. This will prevent case components from being pulled out when the front pump is removed.
4. Using slide hammers J-6585 and front pump adapters J-8365, free the front pump from the case as shown (fig. 6E-19). Adapters can be installed in

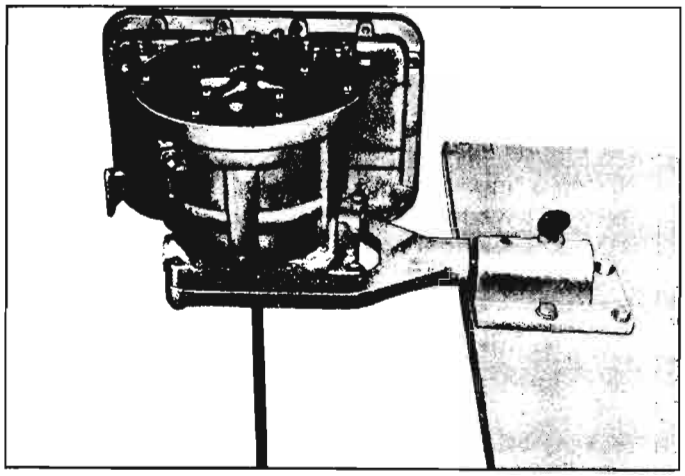

Fig. 6E-17—Transmission in Holding Fixture J-7896

any of five inner mounting bolts holes as these connect the pump cover to the pump.

5. Remove the front pump cover (fig. 6E-20), then remove the pump shaft (fig. 6E-21). Use care in pump removal not to damage bushings in front pump body and turbine shaft with the pump shaft splines.
6. Remove the front pump body from the transmission case. Use care not to drop pump gears.
7. Remove the front pump gasket.
8. To remove the clutch drum, loosen the low band adjusting screw and remove the low band, apply strut, and reaction strut (fig. 6E-22).
9. Remove the clutch drum (fig. 6E-23).

***CAUTION: If operations are being performed with the transmission on the power train, care should be taken not to disengage the ring gear from the reverse clutch face plates unless replacement of either the ring gear or reverse plates is anticipated. Engagement of the reverse plates and ring gear in the horizontal position is generally difficult and should not be attempted unnecessarily.***

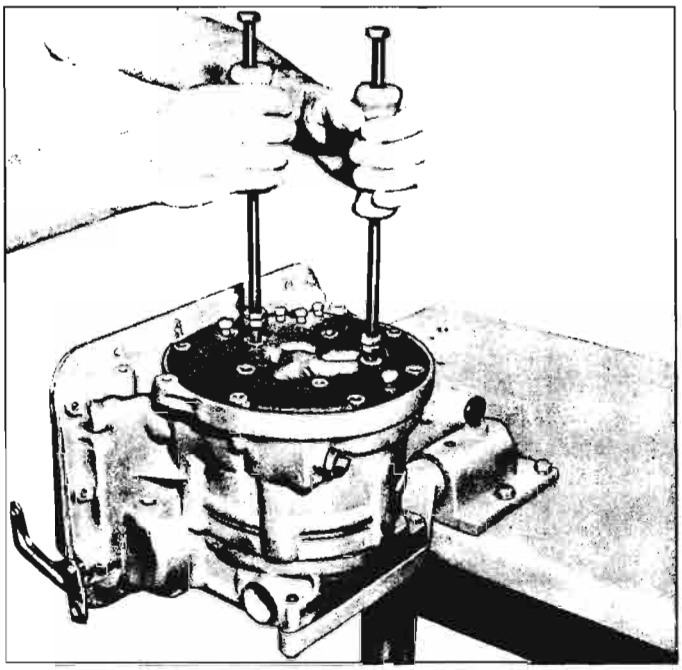

Fig. 6E-19—Removing Front Pump with Slide Hammers J-6585 and Adapters J-8365

10. Remove the planet carrier from the ring gear and remove the turbine shaft. On disassemblies made with the transmission separated from the axle, the turbine shaft is removed with the separation of the two components.

This concludes extent of disassembly which should be attempted with the transmission assembled to the engine and differential. Although the reverse clutch

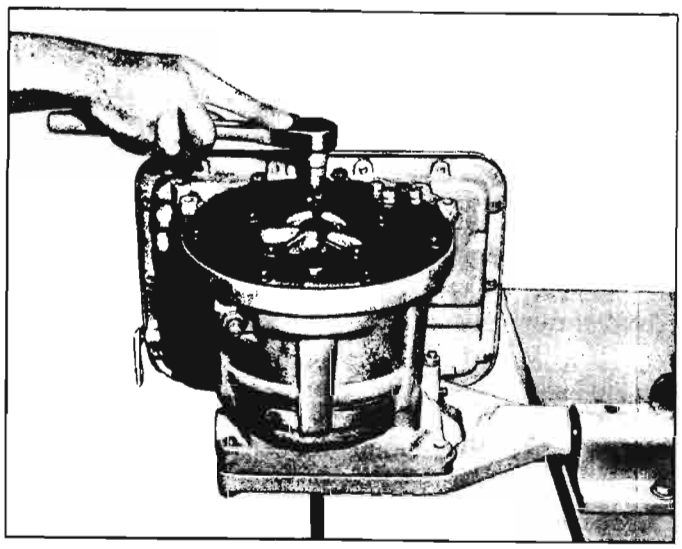

Fig. 6E-18—Removing Front Pump Bolts

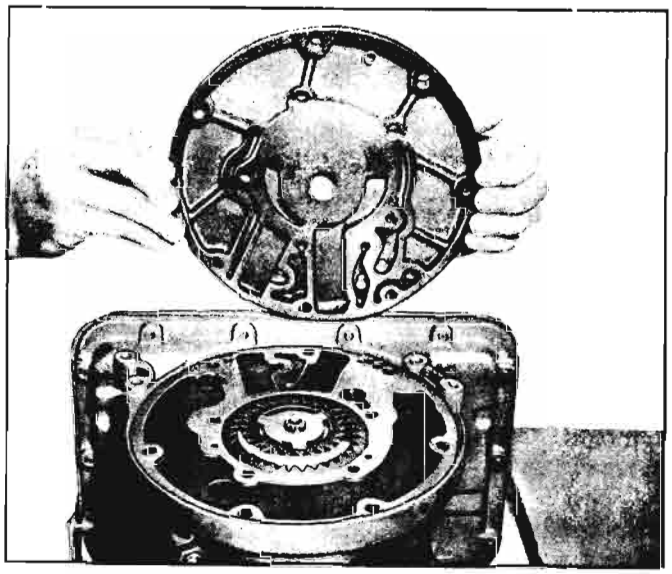

Fig. 6E-20—Removing Front Pump Cover

plates are accessible without further tear-down, any failure of these plates can reasonably be assumed to be caused by malfunction of the reverse clutch, access to which requires removal of the transmission from the power train.

The remaining disassembly operations can only be performed with the transmission separated from the power train.

11. Remove the ring gear (fig. 6E-24) from its engagement to the reverse clutch plates.
12. Remove the clip (fig. 6E-25) mounted on the thick reverse reaction plate between the ends of the reverse clutch snap ring, then remove the snap ring.
13. Remove the thick reverse reaction plate, the three drive plates (faced), and the thin reaction plates (steel) (fig. 6E26).
14. Remove the rear pump and reverse piston mounting bolt (fig. 6E-27) which are accessible from the rear (differential carrier side) of the transmission case.
15. Remove the rear pump and reverse piston assembly (fig. 6E-28) by pulling forward with a twisting action.
16. Remove the rear pump wear plate (fig. 6E-28) from the rear of the transmission case.

This completes disassembly.

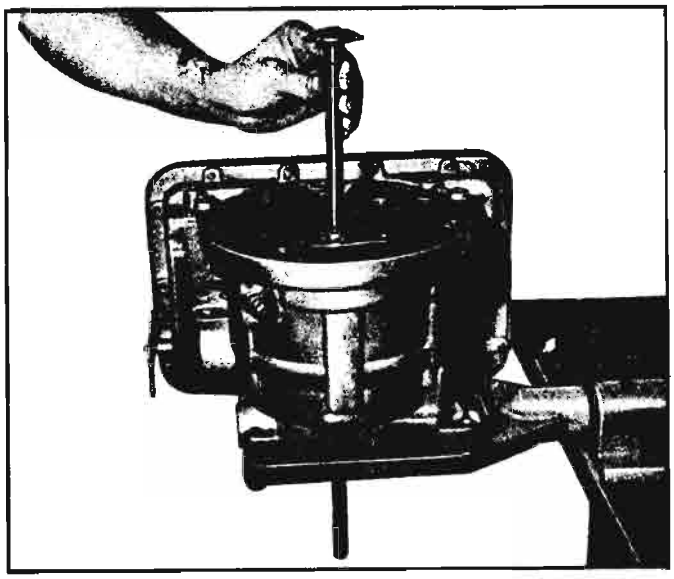

Fig. 6E-21—Removing Front Pump Drive Shaft

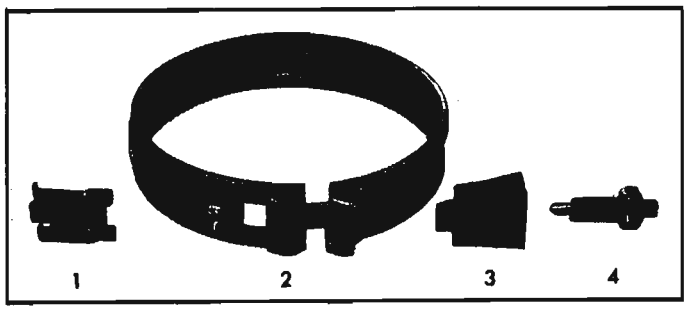


Fig. 6E-22—Low Band Components

1. Low Servo Piston Apply Strut
2. Low Band
3. Reaction Strut
4. Low Band Adjusting Screw and Lock Nut

## INSPECTION AND REPAIR OF TRANSMISSION COMPONENTS

**NOTE: All components in the following descriptions are shown in Figure 6E-29.**

1. Wash all parts with solvent and dry with compressed air. Handle transmission case carefully to avoid damaging its finished surfaces as such damage could result in oil leakage.
2. Inspect all mating surfaces of the transmission case for nicks and other malfunctions and repair as required. Be especially careful to check the area around the manual shift cable as over-tightening


Fig. 6E-23—Removing Clutch Drum

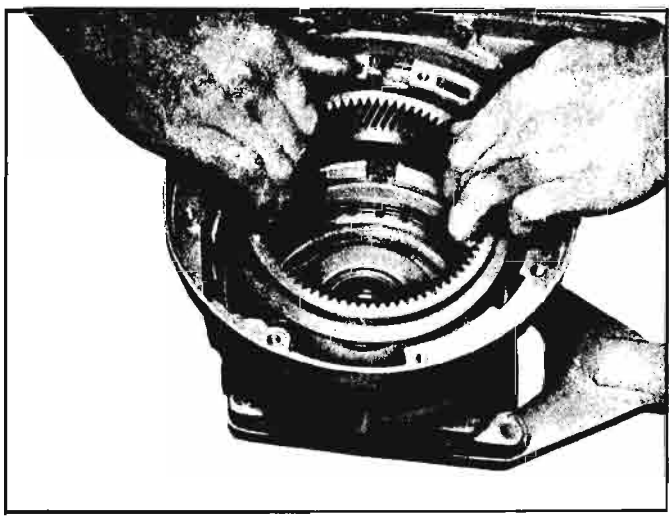

Fig. 6E-24—Removing Ring Gear

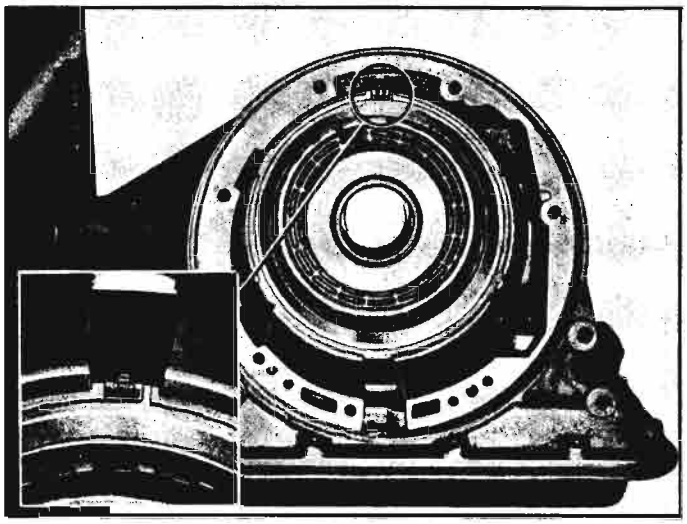

Fig. 6E-25—Reverse Clutch Pack Retainer Ring and Clip

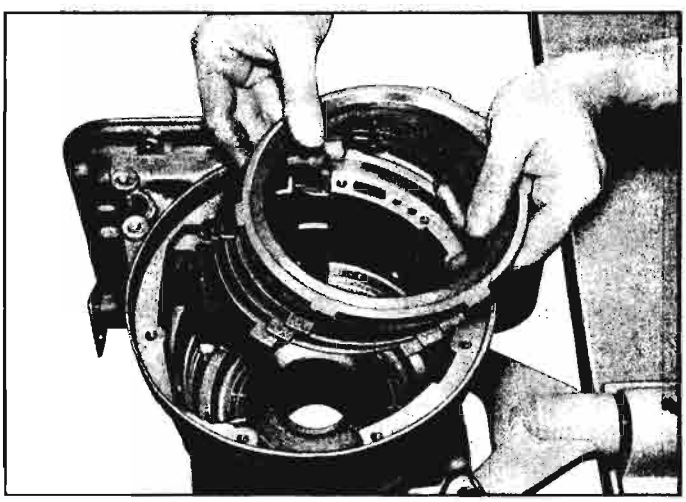

Fig. 6E-26—Removing Reverse Clutch Plates

the cable nut could possibly crack the case at this point. Check case bores for wear and grooves.

3. Inspect condition of the ring gear teeth and splines. Replace if damaged.

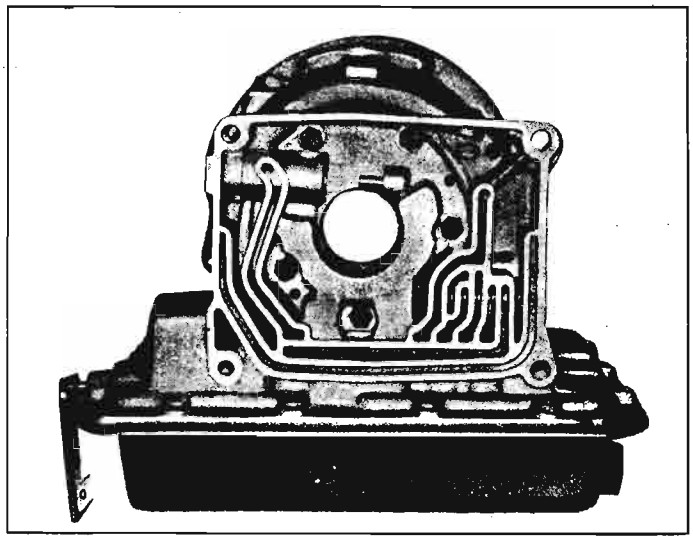

Fig. 6E-27—Rear Pump Mounting Bolts

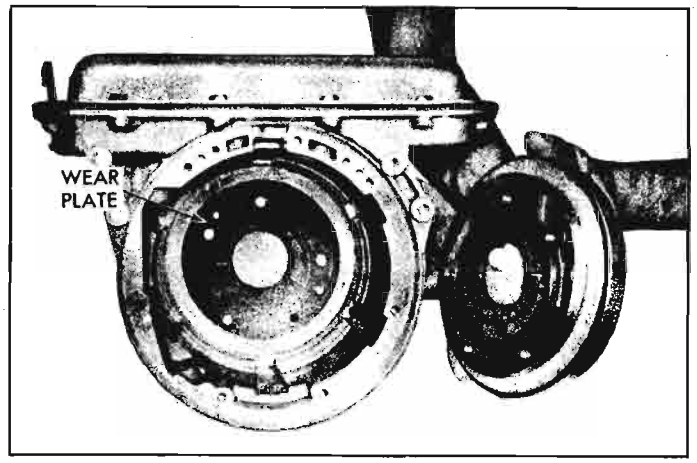


Fig. 6E-28—Removing Rear Pump and Reverse Piston Assembly

4. Inspect the governor drive gear, splines and teeth for wear and replace if necessary. Inspect rear pump wear plate for wear and abrasion; replace as required.

Fig. 6E-29—Corvair Powerglide—Exploded View

1. Front Pump Mounting Bolts
2. Front Pump Cover
3. Front Pump Seal Ring
4. Front Pump Shaft Drive Hub and Retaining Rings
5. Front Pump Driven Gear
6. Front Pump Drive Gear
7. Front Pump Gasket
8. Front Pump Body
9. Front Pump Body Bushing
10. Clutch Drum Selective Thrust Washer
11. Front Pump Body Hub Iron Seal Rings
12. Clutch Drum Assembly
13. Low Sun Gear-to-Input Sun Gear Thrust Washer
14. Low Band Reaction Strut
15. Low Band
16. Low Band Apply Strut
17. Planet Carrier Assembly
18. Ring Gear
19. Reverse Clutch Plates Retaining Ring
20. Reverse Clutch Front Reaction Plate (Thick)
21. Reverse Clutch Reaction Plates
22. Reverse Clutch Faced Plates
23. Rear Pump and Reverse Piston Assembly
24. Rear Pump Wear Plate
25. Low Band Adjusting Screw and Lock Nut
26. Governor Driven Geor and Retaining Pin
27. Governor "O" Ring Seal
28. Governor Assembly
29. Transmission Throttle Valve Lever Shaft Seal
30. Transmission Thrattle Valve Lever and Shaft
31. Manual Valve Lever
32. Transmission Throttle Valve Inner Lever
33. Governor Gear Thrust Spacer
34. Governor Drive Gear
35. Turbine Shaft Front Bushing
36. Turbine Shoft
37. Turbine Shaft Rear Bushing
38. Converter Assembly
39. Converter Hub Bushing
40. Rear Pump and Reverse Piston Assembly Attaching Screws
41. Valve Body Assembly
42. Oil Pick-up Pipe "O" Ring Seal
43. Oil Pick-up Pipe Assembly
44. Oil Pan Gasket
45. Oil Pan
46. Oil Pan Attaching Screws
47. Oil Pick-up Pipe Attaching Screw
48. Low Servo Piston Retaining Clip
49. Low Servo Piston
50. Low Servo Piston Ring
51. Low Servo Piston Cushion Spring
52. Low Servo Piston Cushion Spring Seat
53. Low Servo Piston Shaft
54. Relief Ball Spring Retainer
55. Low Servo Piston Return Spring
56. Relief Ball
57. Vacuum Madulatar Valve
58. Vacuum Modulator Gasket
59. Vacuum Modulator

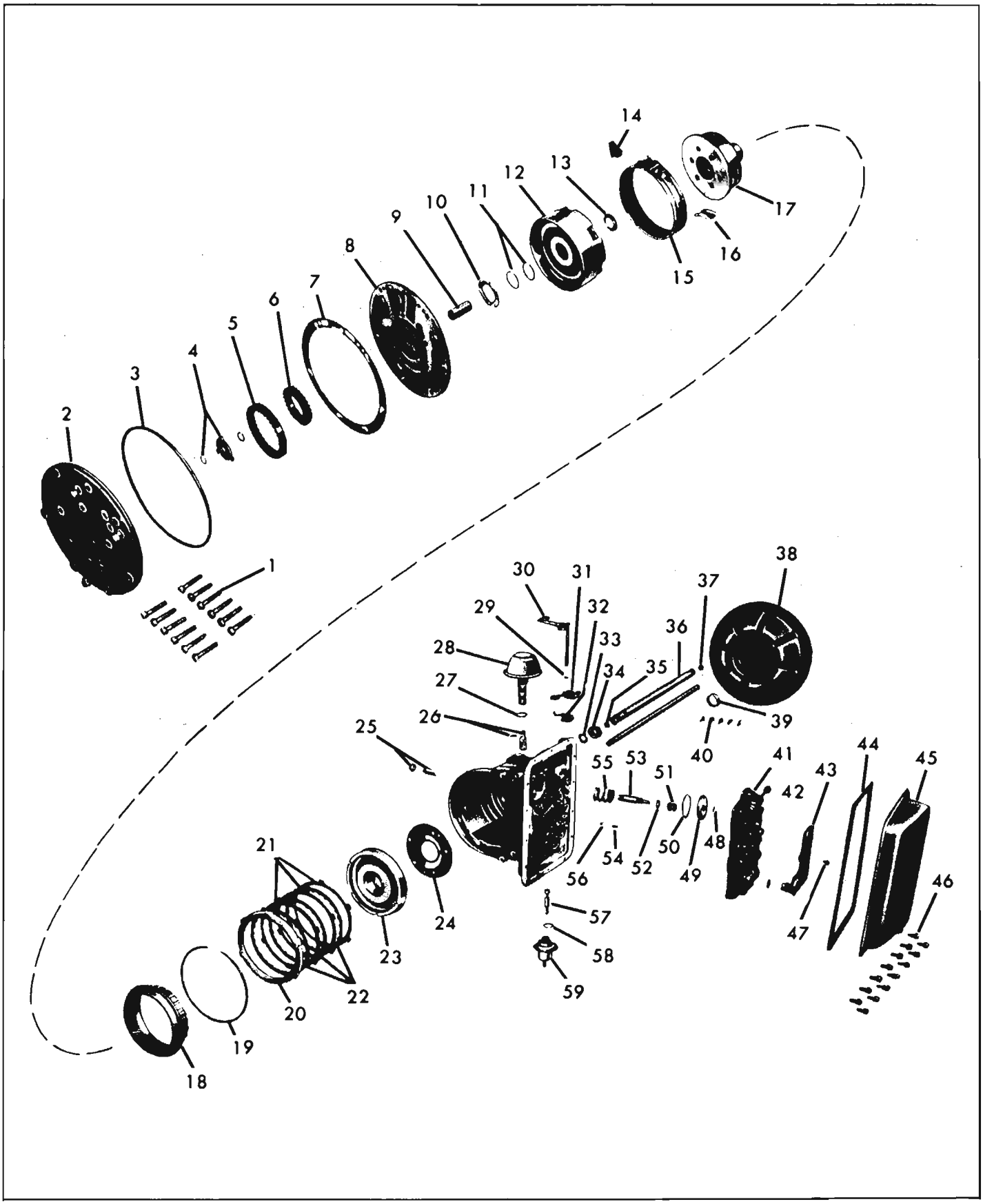


Fig. 6E-29—"Corvair" Powerglide—Exploded View

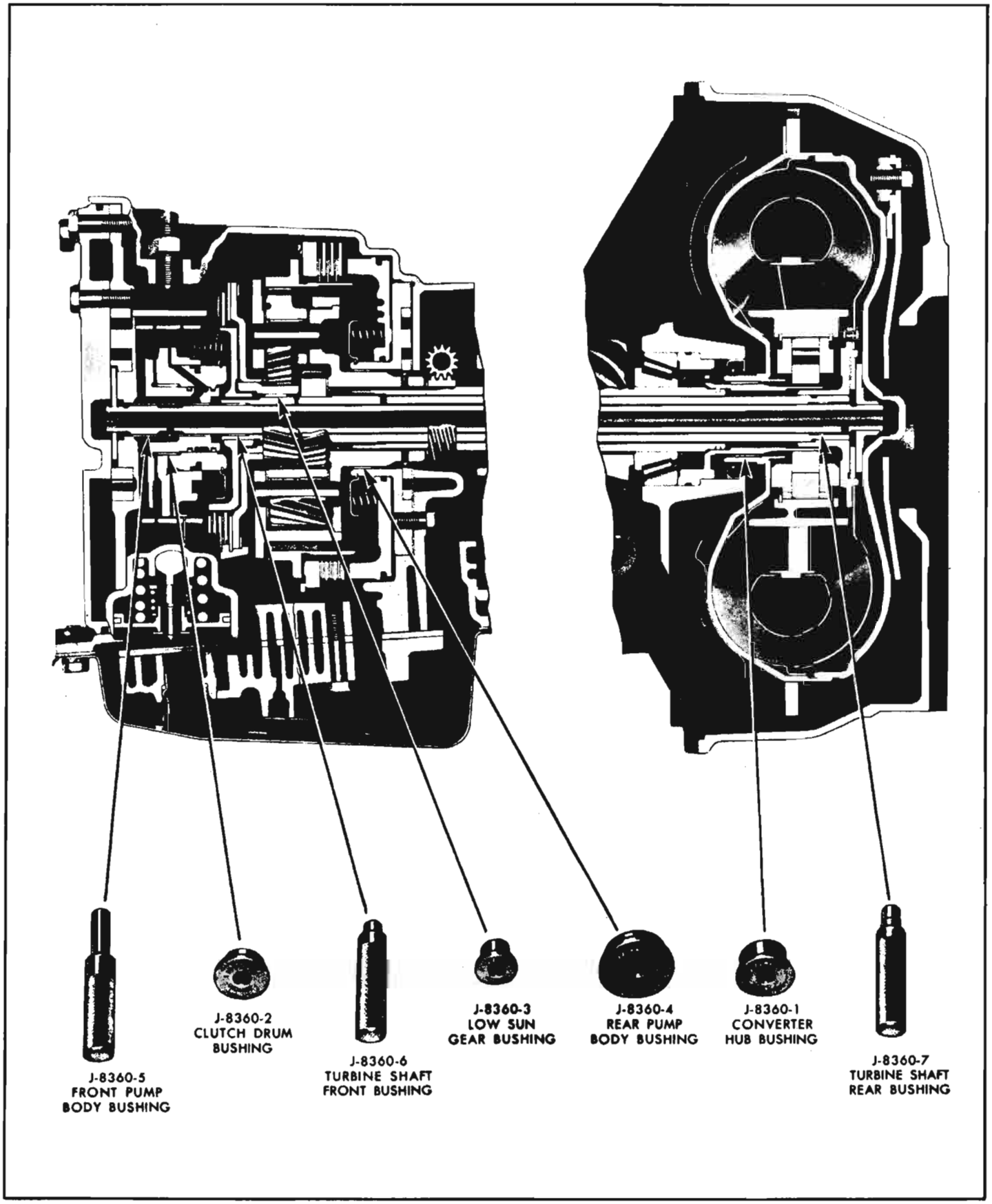


Fig. 6E-30—Powerglide Bushings and Installers

5. Inspect the condition of the reverse clutch drive plates (faced) and the reverse reaction plates (steel). If drive plate facing is worn or shows sign of intensive heat (which generally results in brittleness), replace. Reaction plates, unless external tangs are peened or damaged are generally serviceable even after failure of the drive plate.
6. In the valve body area of the transmission case, check that the priming ball is retained by its wire retainer and check that the ball and its seat in the transmission case is not deformed. Repair any seat deformation and if ball is damaged or deformed, replace.
7. Check manual valve and TV valve linkage. If damaged replace as required.
8. If necessary, remove the valve body oil pick-up tube and clean the screen. Also check that the "O" ring seal used between the pick-up and the valve body is in good condition.
9. Inspect the condition of the low brake band. If band shows sings of excessive heat, brittleness of the facing can be expected and the band should be replaced.
10. Individual inspection and repair procedures are provided for the remaining transmission components. Check the applicable listing for inspection and repair of components not herein listed. The seven (7) bushings used in the transmission are called out in Figure 6E-30 and the applicable bushing installer is shown.

## FRONT PUMP

### Inspection

1. Wash all parts in cleaning solvent and blow out all oil passages.

   ***CAUTION: Do not use rags to dry parts.***

2. Inspect pump gears for nicks or damage. Check gear for wear at its bearing surface on the inner diameter where it mates with the pump journal.
3. Inspect cover face for nicks or scoring.
4. Inspect pump body for nicks or scoring.
5. With parts clean and dry, install pump gears and check:
   a. Clearance between OD of driven gear and body should be .0025"-.005" (fig. 6E-31).
   b. Clearance between driven gear and crescent should be .003"-.009" (fig. 6E-32).
   c. With scale and feeler gauge check gear end clearance. This clearance should be .0005" to .0015" (fig. 6E-33).
   d. Inspect pump drive gear teeth for interference between tops of gear teeth and the crescent in the pump.
6. Replace gasket and square cut seal ring in OD of front pump cover. Also check condition of cast iron seal rings on pump body hub; replace as necessary.

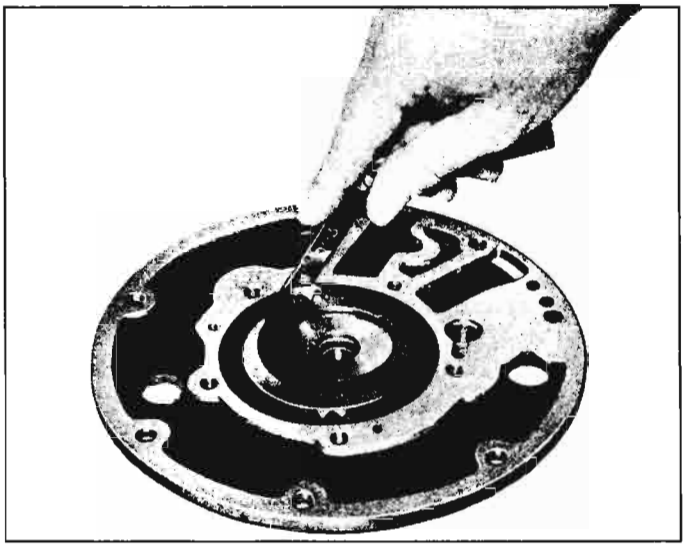

Fig. 6E-31—Checking Driven Gear-to-Pump Body Clearance

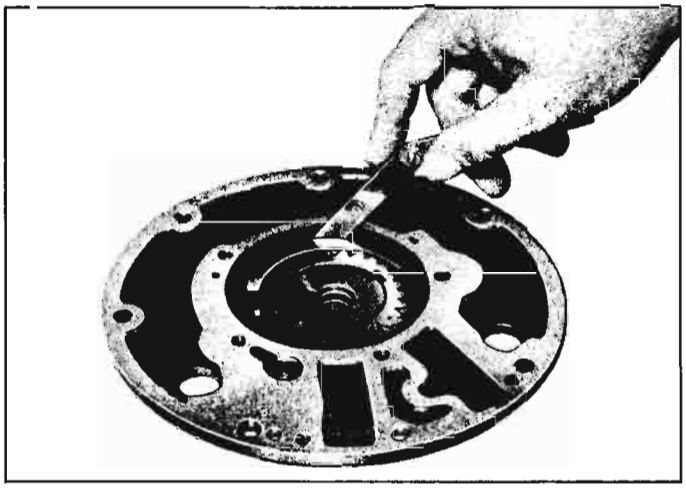

Fig. 6E-32—Checking Driven Gear-to-Crescent Clearance

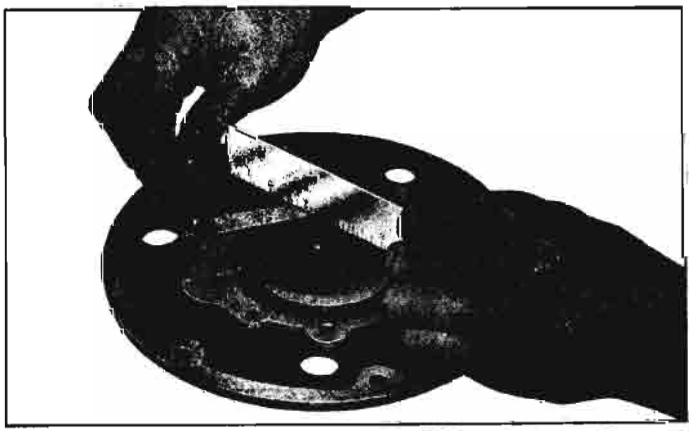

Fig. 6E-33—Checking Front Pump Gear End Clearance

7. Check the condition of the front pump body bushing. If worn or damaged, replace as described in the following procedure.

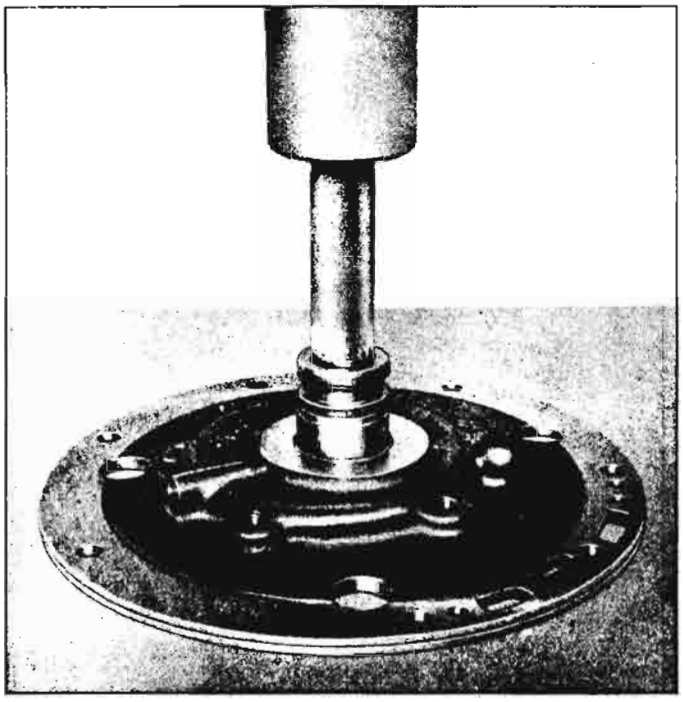

Fig. 34—Installing Front Pump Bushing with J-8360-5

**Front Pump Body Bushing Replacement**

1. Remove bushing with a chisel or other suitable tool. Use care not to damage pump body bore.
2. Install new pump body bushing as illustrated (fig. 6E-34) using J-8360-5.

## CLUTCH DRUM

**Disassembly**

**NOTE: All number references are to figure 6E-37.**

1. Remove retainer ring (15) securing the low sun gear and clutch flange assembly (14) to the clutch drum (2).
2. Remove the low sun gear and clutch flange (14) and hub rear thrust washer (13).
3. Lift out clutch hub (12), then remove the nested drive and reaction plates (9 and 10) and the hub front thrust washer (11).
4. To remove the spring retainer (7), place the clutch drum in a press and compress the springs using J-7782 adapter ring and J-5133 as shown (fig. 6E-38). Then remove snap ring (8) with Truarc pliers.
5. Carefully release pressure on press, then remove spring retainer (7) and return springs (6).
6. To remove clutch piston (5) pull upward with a

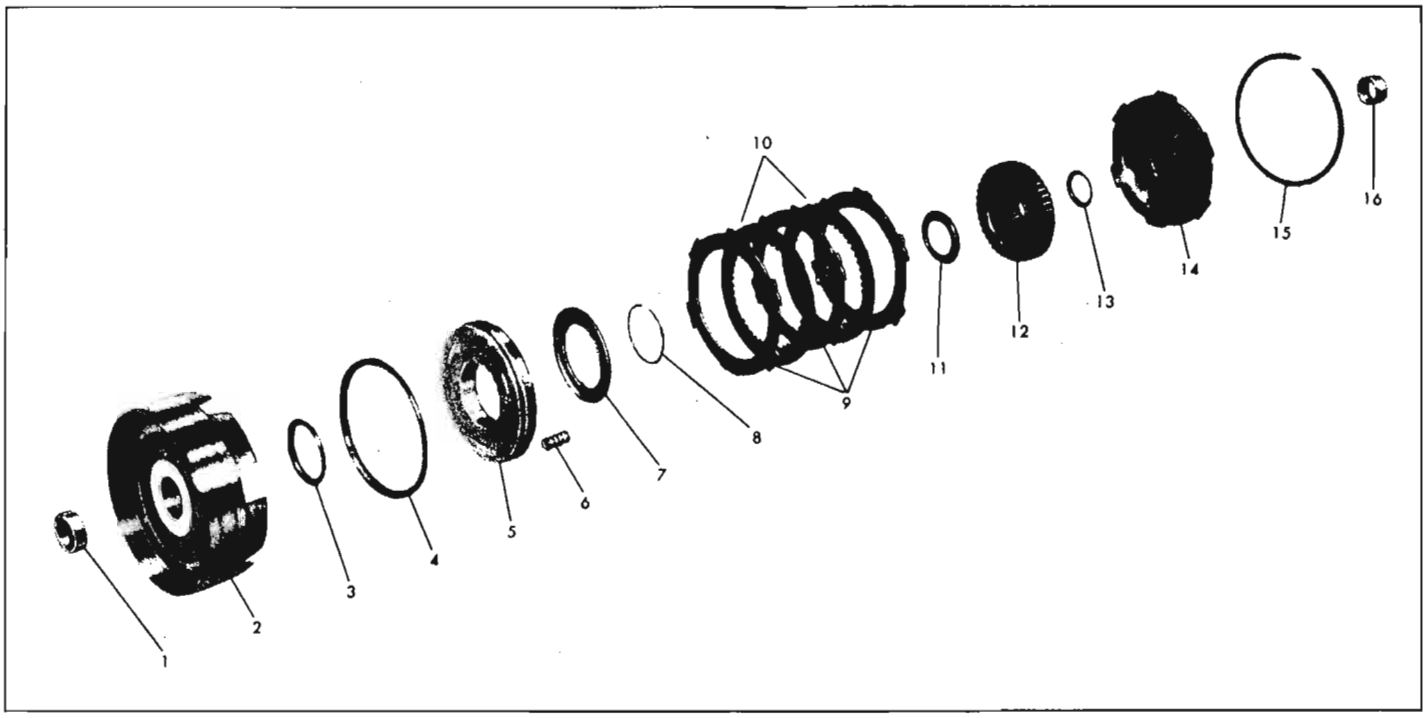


Fig. 6E-35—Clutch Drum—Exploded View

1. Clutch Drum Bushing
2. Clutch Drum
3. Clutch Drum Hub Seal (Lip Type)
4. Clutch Piston Seal (Lip Type)
5. Clutch Piston
6. Clutch Piston Return Spring (15 Used)
7. Return Spring Retainer
8. Return Spring Retainer Snap Ring
9. Reaction Plates (flat)
10. Face Plates (waved)
11. Clutch Hub Thrust Washer
12. Clutch Hub
13. Clutch Hub-to-Clutch Flange Thrust Washer
14. Clutch Flange and Low Sun Gear Assembly
15. Clutch Flange Retaining Ring
16. Low Sun Gear Bushing

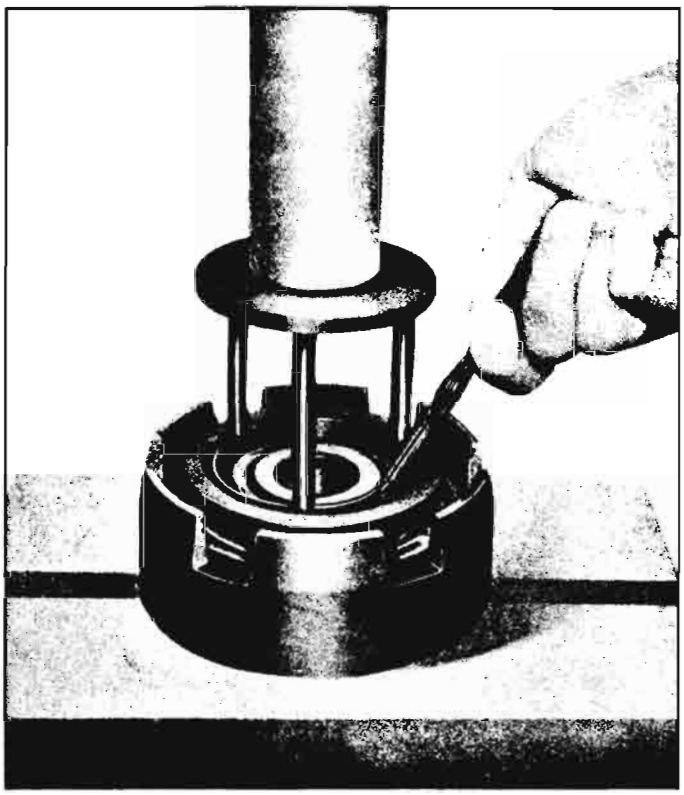

Fig. 6E-36—Removing Clutch Drum Spring Retainer with J-5133 and J-7782

twisting motion on the center, then remove piston seal (4).

7. To complete disassembly, remove piston inner seal (3) from hub of clutch drum (2).

### Inspection

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

   ***CAUTION: Do not use rags to dry parts.***

2. Inspect drum brake band surface for excessive scoring or burning. Also, 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 restaking 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. The faced plates are now symmetrically waved and the steel reaction plates are flat. These new design service plates are identified by a green dye stripe.

   ***CAUTION: Do not use the new waved face plates with the waved steel plates used formerly.***

### Clutch Drum Bushing Replacement

1. Remove the old bushing with a chisel or other suitable tool using care not to damage the bushing bore.
2. Install new bushing with J-8360-2 (fig. 6E-30).

### Low Sun Gear Bushing Replacement

1. Remove old bushing with a chisel or other suitable tool using care not to damage the bushing bore.
2. Install new bushing with J-8360-3 (fig. 6E-30).

### Assembly

**NOTE: All numbers references are to Figure 6E-35.**

1. Install piston inner seal (3) in hub of clutch drum (2). Be sure seal lips are downward (or toward the front of the transmission).
2. Install a new piston seal (4) in clutch piston (3). Be sure seal lips are toward front of transmission (clutch drum) when installed. Lubricate both the piston inner seal (3) and the piston seal (14), then install clutch piston (5) in clutch drum with a twisting motion.
3. Place the 15 return springs (6) in position on the clutch piston, then place the spring retainer (7) on the springs.
4. Place the clutch drum in a press, position the snap ring (8) on the clutch drum hub, then compress the springs, using J-5133 and J-7782 as previously

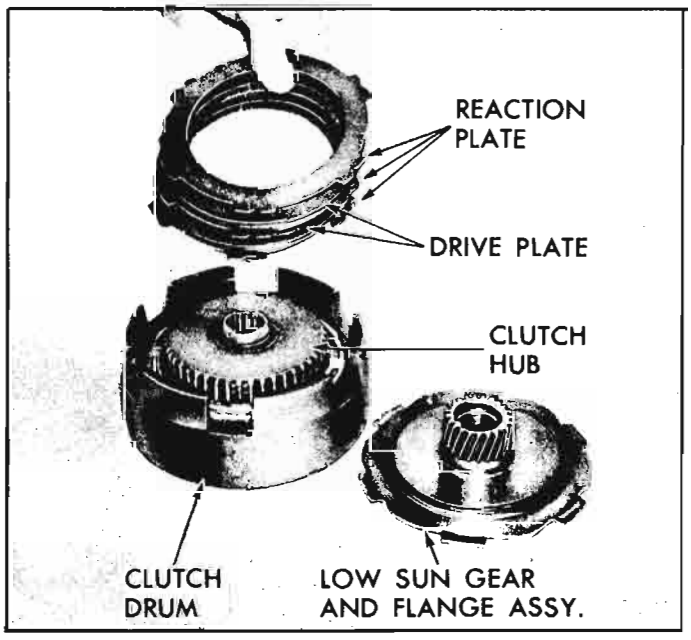


Fig. 6E-37—Installing Clutch Drum Plates

illustrated in Figure 6E-36. With springs fully compressed, install snap ring (8) in groove on clutch drum hub with Truarc pliers.

5. Install hub front thrust washer (11) with its lip toward the clutch drum, then install the clutch hub (12).
6. Install three steel reaction plates (9) and two faced drive plates (10) alternately starting with a steel reaction plate (fig. 6E-37).

   **NOTE: It is not necessary to stack face plates so waved areas match.**
7. Install the hub rear thrust washer (13) with its flange toward the low sun gear, then install the low sun gear and clutch flange assembly (14) and secure with retainer ring (15). Finally installed openings of retainer ring (15) should be adjacent to one of the lands of the clutch drum as illustrated in Figure 6E-38.
8. Check the assembly by turning the clutch hub to insure it is free to rotate.

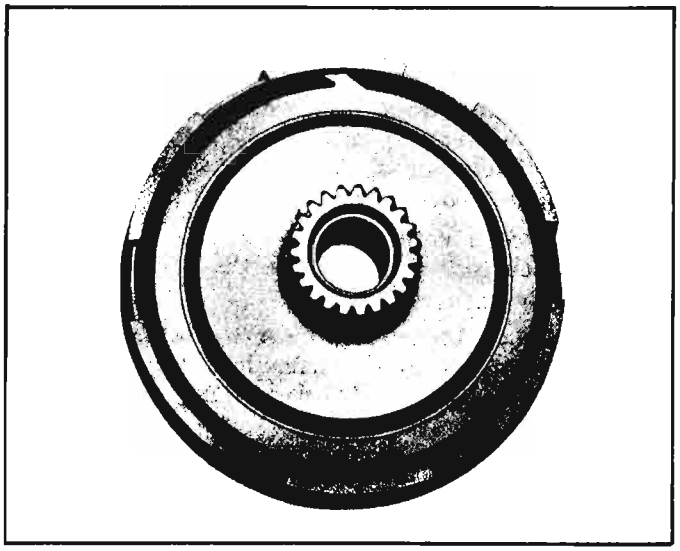

Fig. 6E-38—Clutch Flange and Low Sun Gear Retainer Ring Installation

## PLANET CARRIER

Currently, no service operations are recommended for the planetary carrier. If a component fails, replace the planet carrier as an assembly.

## TURBINE SHAFT

### Inspection

Check the shaft for nicks and cracks and check the splined areas for wear. Check that the two lube holes are open. Also inspect the bushings for condition, and if necessary, replace as described below.

### Bushing Replacement

The two bushings used in the turbine shaft are identical, however, the depth to which they are installed varies. Figure 6E-30 illustrates the bushing installer to be used at each location.

1. To remove the old bushing, cut it out with a chisel or suitable tool. Use care not to damage the bore.
2. Install new bushing as illustrated:
   a. The front bushing should be installed with J-8360-6. The front is the end of the shaft with the two splined areas.
   b. The rear bushing should be installed with J-8360-7.

## PUMP SHAFT

### Inspection

Check the splines at the converter end of the shaft for wear or damage. Inspect the bronze faced drive lugs for peened edges and wear of its splined connection to the shaft by twisting to check for looseness. Be especially careful to check that the drive hub is tightly retained by the snap ring.

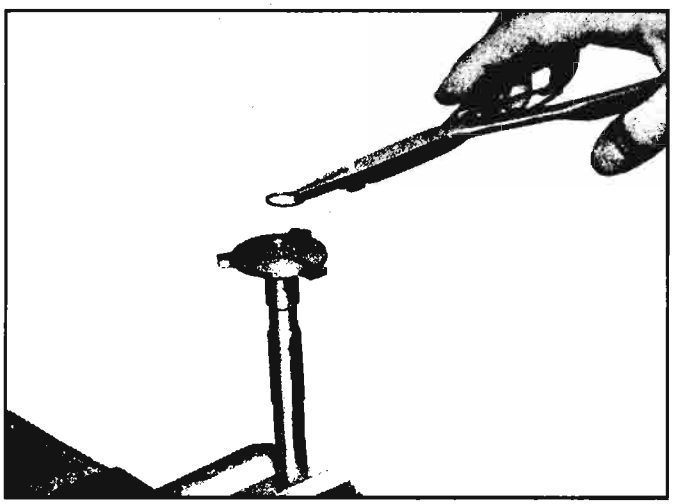

Fig. 6E-39—Installing Front Pump Shaft Hub Snap Ring

### Repairs

If bronze drive hub is worn, remove the top snap ring (fig. 6E-39) and replace the hub.

## REAR PUMP AND REVERSE PISTON ASSEMBLY

### Disassembly

**NOTE: All number references in this procedure are to Figure 6E-40.**

1. Remove the drive gear (9) and driven gear (10) from pump body (8).
2. Place the assembly in a press with the pump body on wood or other soft material, then compress the spring retainer (2) with J-7782 and J-5133 as illustrated in Figure 6E-41.
3. With spring retainer (2) compressed until springs bottom, remove snap ring (1). Carefully release pressure, then remove spring retainer (2) and return springs (4).
4. In order to remove the reverse piston (5), it is

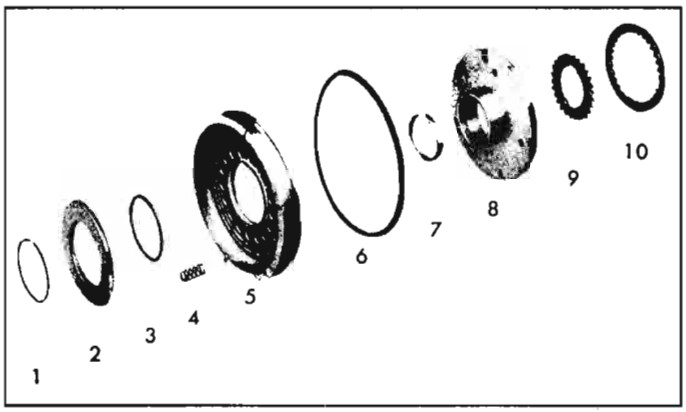


Fig. 6E-40—Rear Pump and Reverse Piston—Exploded View

1. Spring Retainer Snap Ring
2. Spring Retainer
3. Reverse Piston Inner Seal
4. Reverse Piston Return Springs (17 Used)
5. Reverse Piston
6. Reverse Piston Outer Seal (Lip Type)
7. Rear Pump Body Bushing
8. Rear Pump Body
9. Rear Pump Drive Gear
10. Rear Pump Driven Gear

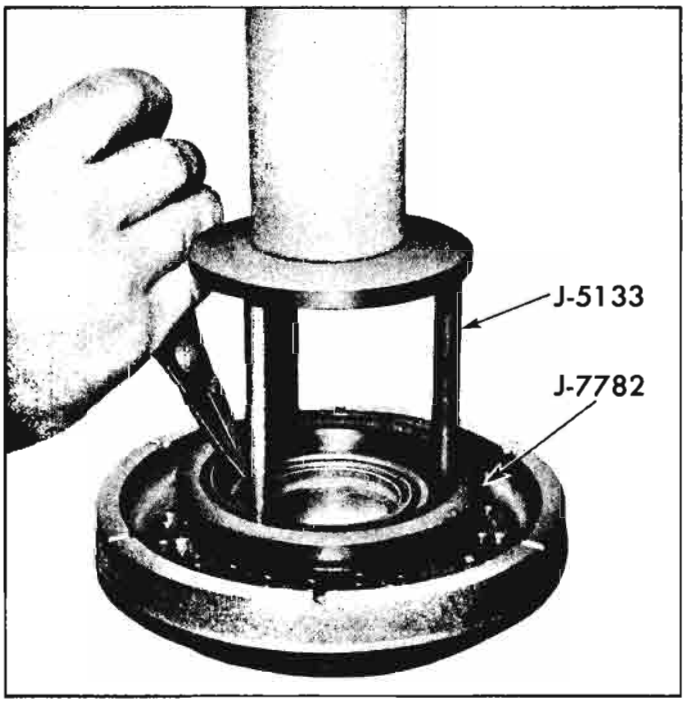


Fig. 6E-41—Removing Reverse Piston Return Spring Retainer with J-5133 and J-7782

necessary to fill the groove for snap ring (1) in the hub of the rear pump body with string, a small rubber band or a similar size "0" ring. Once the groove is filled, the rear pump body (8) can be pushed out of the reverse piston bore.

5. Remove the square cut piston inner seal (3) and piston outer seal (6). Seal should be discarded and new seal installed at reassembly.

### Inspection

1. Wash all parts in clean solvent and dry with compressed air.
2. Check fit of rear pump drive and driven gears as described earlier in this section under "Front Pump Overhaul." Fits and tolerances of the rear pump gears are identical to those of the front pump.
3. Inspect pump body for leaks and scoring. Check hub of pump body for smoothness. Any burrs on this surface would cause leakage and could result in a jammed reverse piston.
4. Check for broken piston return springs and make a comparative check of spring heights by standing all of the springs in a row. If appreciable variance in spring height is noticed, replace springs.
5. Check condition of rear pump body bushing. If scored or worn, replace.

### Rear Pump Body Bushing Replacement

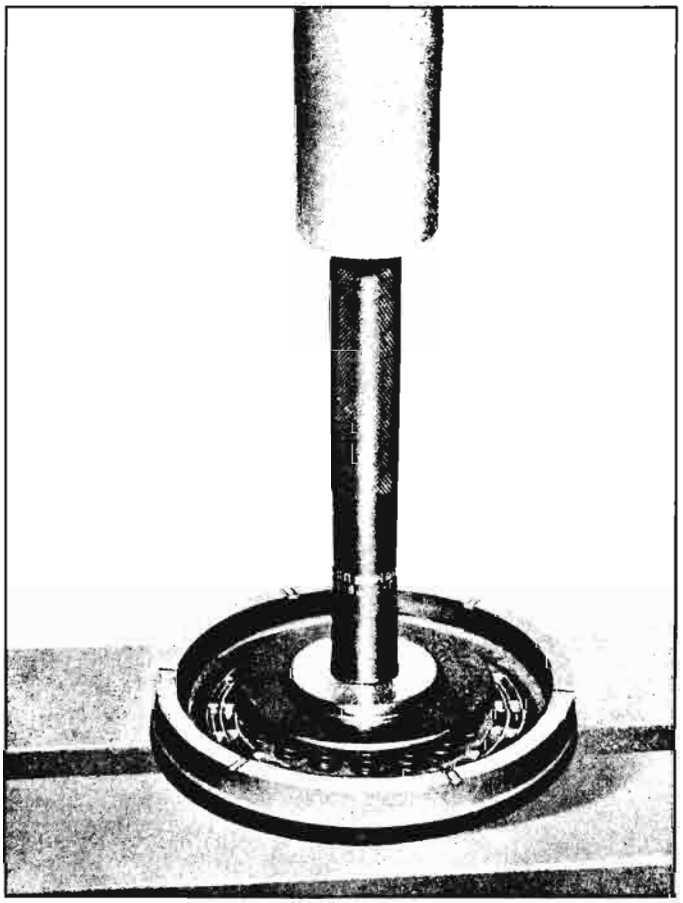

Fig. 6E-42—Installing Rear Pump Body Bushing with J-8360-4 and Handle J-7079-2

1. Remove old bushing with a chisel or suitable tool, using care not to damage pump body bore.
2. Install new bushing as illustrated in Figure 6E-42, using J-8360-4.

### Assembly

**NOTE: All number references in this procedure are to Figure 6E-40.**

1. Install piston inner seal (3) in reverse piston (5).
2. Install piston outer seal (6) in piston (5) with lip of seal toward pump body (opposite from spring seats in piston).
3. Install reverse piston (5) on rear pump body (8). It is not necessary to fill snap ring groove on pump body hub for installation of piston. Pitch of groove for snap ring (1) is favorable for installation.
4. Position 17 return springs (4) in their seats on the reverse piston (5), then place spring retainer on springs.
5. Place unit in a press with wood or other soft material between the press bed and the rear pump body (8), place snap ring (1) on hub of rear pump body, then compress springs using J-7782 and J-5133 as previously illustrated in Figure 6E-41.
6. With springs fully compressed, install snap ring (1) in its groove in the rear pump body (8).
7. Complete assembly by installing drive gear (9) and driven gear (10) in their respective bores in the pump body (8). It is advisable to apply a small amount of petroleum jelly to the gears to prevent their being dropped from the pump body.

## CONVERTER

### Inspection

**NOTE: It is unnecessary to drain converter as it is welded and no internal repairs can be made.**

1. Check starter gear for worn or broken teeth and for broken welds at its attachment to the converter assembly. If starter gear is undamaged but welds are loose or broken, reweld is required.
2. Check converter seams for stress or breaks and either replace converter or repair welds as required. If welds are repaired, keep added material to a minimum by carefully chipping off all scale and filing away any unnecessary weld to retain converter balance as close to original as possible. Replace the converter if roughness due to unbalance is noted after reassembly to the engine.

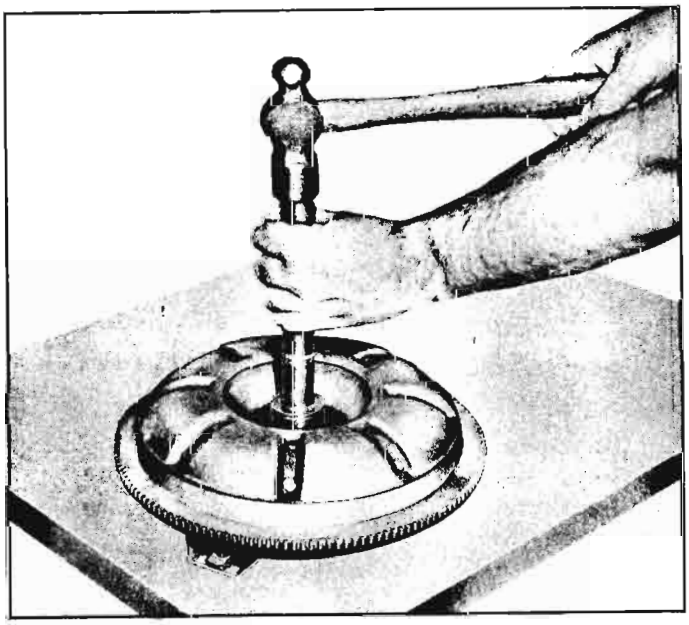

Fig. 6E-43—Installing Converter Hub Bushing with J-8360-1 and Handle J-7079-2

### Converter Bushing Replacement

1. Remove old bushing with a chisel or other suitable tool, using care not to damage converter bore.
2. Install new bushing, using J-8360-1 as illustrated (fig. 6E-43).

## ASSEMBLY OF TRANSMISSION

**NOTE: The following steps apply only if the transmission is separated from the Power Train.**

1. Install transmission case in holding fixture J-7896 (fig. 6E-44).

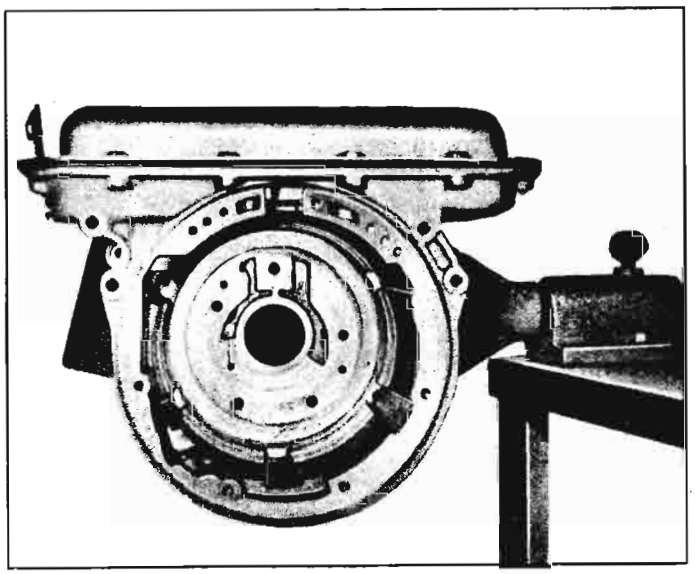

Fig. 6E-44—Transmission Case Installed in Holding Fixture J-7896

2. Install two improvised guide pins of approximately 2½" to 3" in rear pump bolt holes (5/16"-18), then install rear pump wear plate on guide pins, using a small amount of petroleum jelly to hold wear plate in place.
3. Insert rear pump and reverse piston with guide pins into case, then insert a length ½" to ¾" wide of .010"-.015" shim stock between piston outer seal and case. With rear of case downward, running the shim stock around the entire diameter of the seal will seat the seal quickly.

   Remove the guide pins and install five rear pump mounting bolts (fig. 6E-45), securing to 9-11 ft. lbs.
4. Install the reverse clutch drive and reaction plates (fig. 6E-46) alternately starting with a reaction plate (steel) and finishing with a drive plate (faced). The notched lug in each steel reaction plate is installed so it is at the **top** of the groove at the 4 o'clock position in the case. Then install

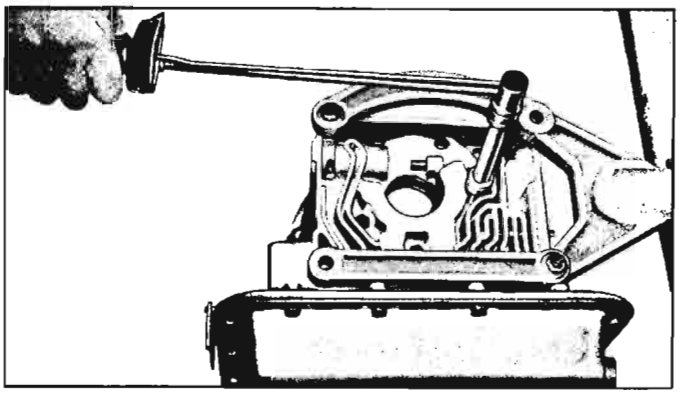

Fig. 6E-45—Measuring Rear Pump and Reverse Piston Bolt Torque

the thick reaction plate. It has a square "dimple" on its lug which engages the 4 o'clock case groove.

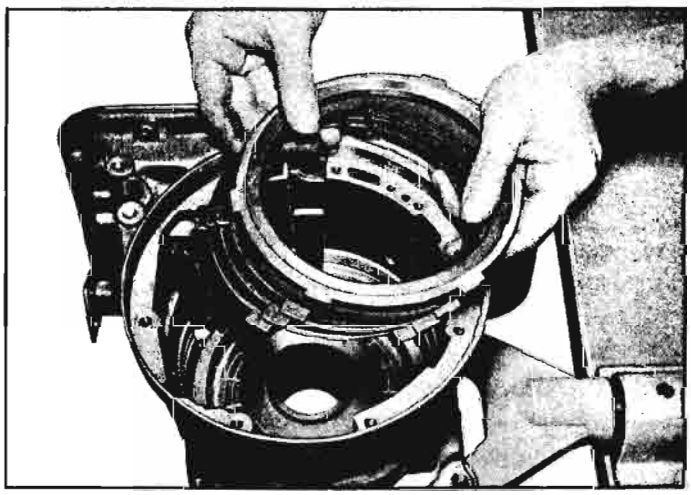

Fig. 6E-46—Installing Reverse Clutch Plates

5. Install reverse clutch plate retainer ring in such a manner so that the open ends of the ring are at the 12 o'clock position, then install the retainer ring clip (inset, fig. 6E-47) on thick reaction plate between ends of snap ring.
6. With the rear of the transmission case downward, align the internal lands and grooves of the reverse face plates.
7. Engage the ring gear to the reverse drive plates as illustrated in Figure 6E-48. Engagement must be made by "feel" while jiggling the drive plates laterally.
8. On assembles being performed with the transmission installed on the Power Train, install the turbine shaft at this point. Be sure to **fully** engage splines of the turbine shaft to those in converter turbine.
9. Install the planetary unit with a slight twist to engage planet gears with ring gear. Be sure to engage the two rear pump drive lugs on planet hub with grooves in rear pump drive gear.

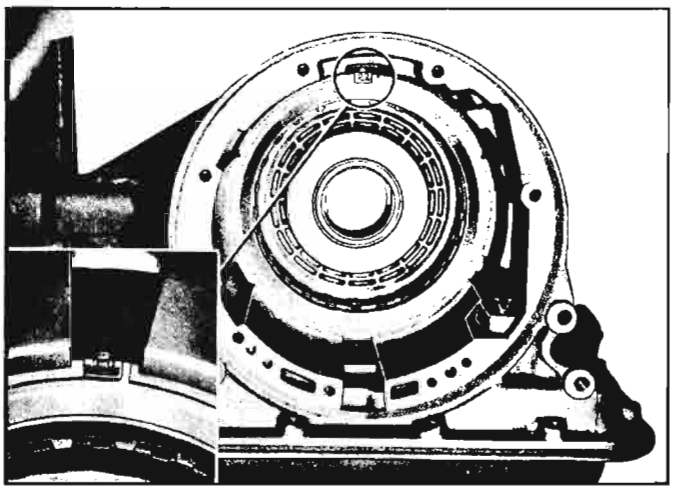

Fig. 6E-47—Reverse Clutch Pack Retaining Ring and Clip Installation

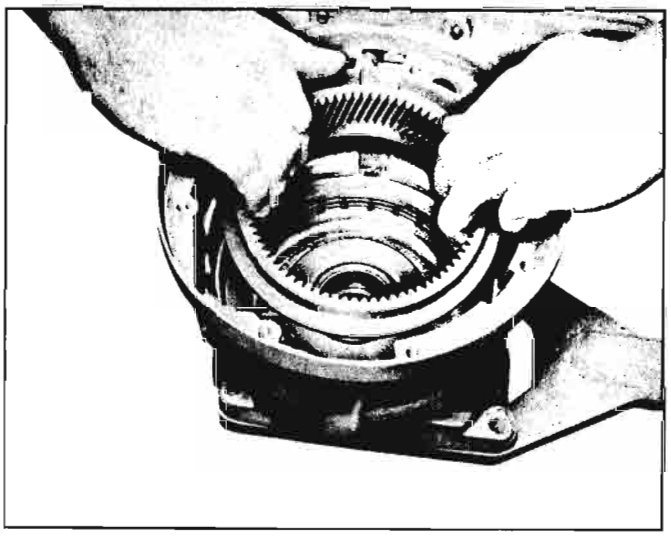

Fig. 6E-48—Installing Ring Gear


Fig. 6E-49—Installing Clutch Drum

10. Install thrust washer on captive input sun gear in planetary gear set with flange of thrust washer toward the front of the transmission. If necessary, apply a small amount of petroleum jelly to keep thrust washer centered, especially if the assembly is being performed with the transmission assembled to the Power Train.
11. Install the clutch drum assembly (fig. 6E-49), using a slight twist to engage the low sun gear to the planet gears in the planetary gear set.
12. If the overhaul is being performed with the transmission mounted in the holding fixture J-7896, turn transmission to a horizontal position, then install the low band, apply strut, and reaction strut (fig. 6E-50). When the low band linkage is all installed, snuggly tighten the low band adjusting screw to prevent struts from falling out of place. Then jiggle the clutch drum slightly to center the band and linkage.

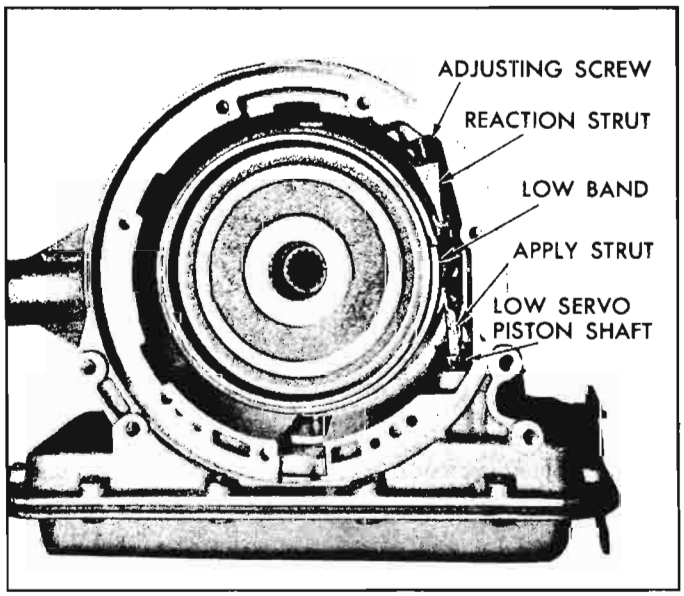


Fig. 6E-50—Low Band Components Installed

13. **Front Selective Thrust Washer Determination.** Prior to reinstallation of the front pump when overhauling the "Powerglide" while assembled to the differential carrier and engine, determine the front selective thrust washer to be installed with J-8371 as described below.

***CAUTION: Use of J-8371 and the following procedure is absolutely limited to overhauls performed while the transmission is assembled to the differential carrier. At this point during overhauls performed with the transmission separated from the differential carrier, install the original (unless necessary to replace) thrust washer on the front pump hub without gauging, and complete transmission assembly. Final end play adjustment would then be made at the rear (governor gear) as described in Section 6, "Power Train."***

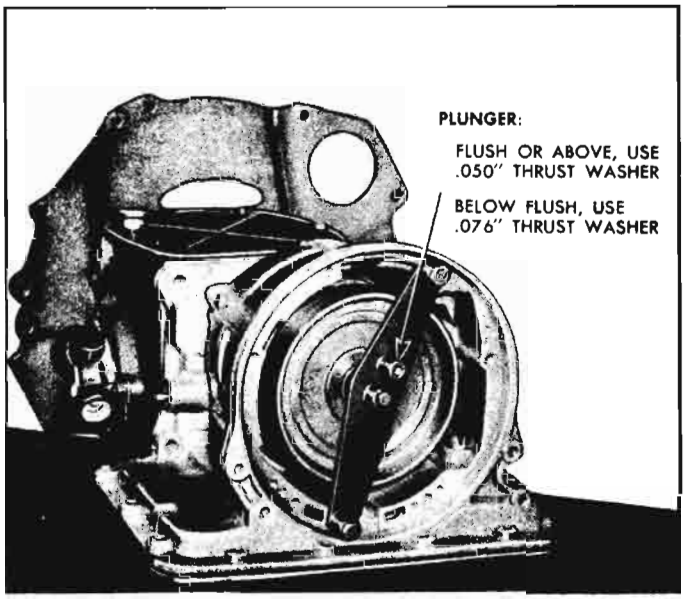


Fig. 6E-51—Gauging Clutch Drum Thrust Washer with J-8371

a. Insert the pilot of J-8371 into bore of clutch drum and secure J-8371 to case with two front pump mounting bolts (fig. 6E-51). Tighten bolts fully to compress pilot spring.
b. Check that plunger (fig. 6E-51) is fully seated, then observe plunger position:
   If plunger is *below flush*, .076" thrust washer is required.
   If plunger is *flush or above*, .050" thrust washer is required.
c. Remove J-8371 and install thrust washer (fig. 6E-52) selected on front pump hub.

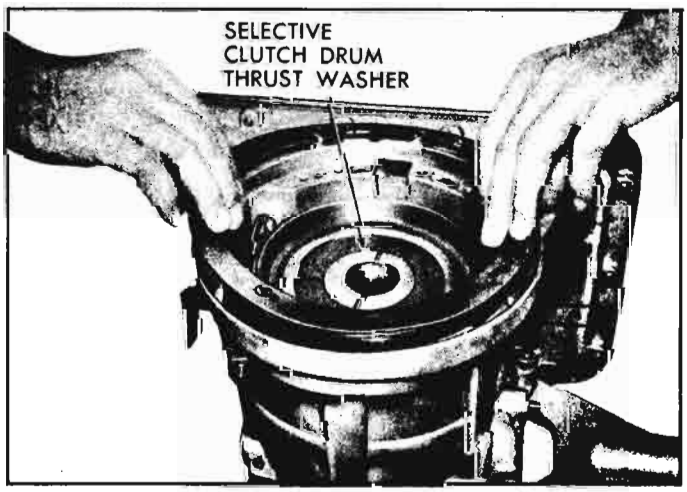


Fig. 6E-52—Installing Front Pump Gasket

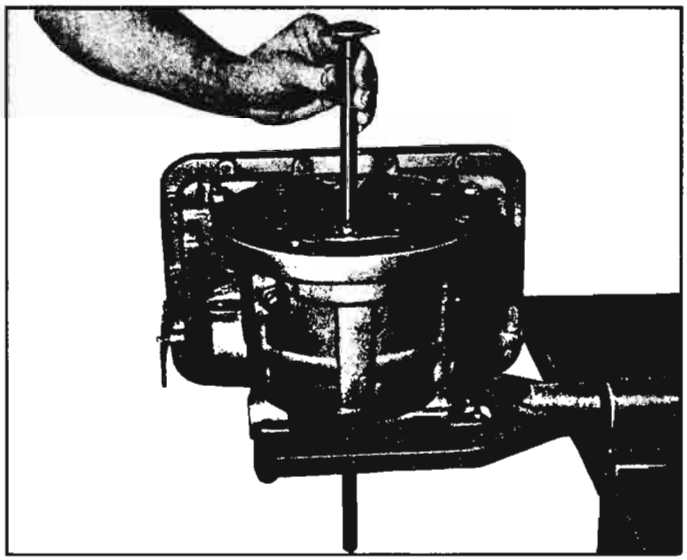

Fig. 6E-53—Installing Front Pump Drive Shaft

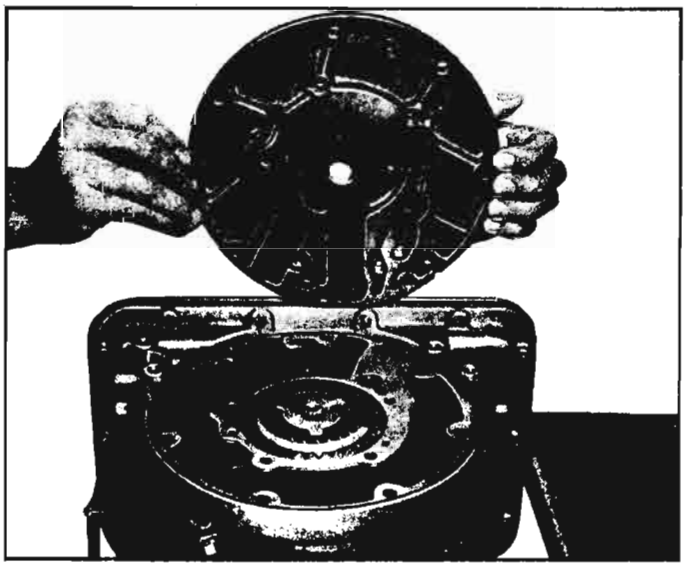

Fig. 6E-54—Installing Front Pump Cover

14. Install a new front pump gasket (fig. 52), then install the front pump body, being careful not to break cast iron oil ring on pump body hub when they are indexed to the clutch drum.

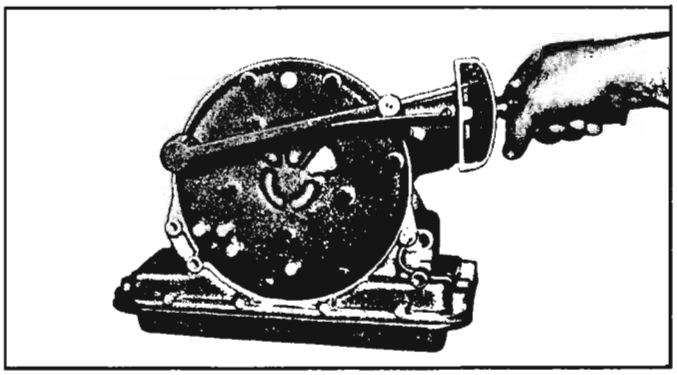

Fig. 6E-55—Measuring Front Pump Bolt Torque

15. Install front pump drive shaft (fig. 6E-53). Use care when inserting pump shaft not to damage bushings of transmission components already installed.

16. Install a new square cut seal ring in front pump cover (fig. 6E-54) then position front pump cover, dip bolt heads in oil impervious sealer such as used on Turboglide front pump bolts and install mounting bolts loosely. Tighten outer bolts in a criss-cross pattern to 18-20 ft. lbs. torque, then tighten five inner bolts to same torque (fig. 6E-55). By using this sequence, the chance of cocking the front pump which would bind the pump hub to the front pump shaft is virtually eliminated.

17. Adjust the low band by first tightening the adjusting screw to 40 $\pm$ 5 inch-lbs., then back off four (4) full turns exactly. Hold the adjusting screw and lock the adjustment by fully tightening the lock nut.

If assembly of transmission has been performed with the transmission separated in the Power Train, it will be necessary to determine the thickness required in selective spacers to be installed at the governor gear location prior to reassembly of the transmission to the differential carrier. This procedure is provided earlier in this manual in Section 6, "Power Train" where the instructions for assembly of the Powerglide to the rear axle are provided.

# TROUBLE SHOOTING

## HYDRAULIC PRESSURE DATA

### Pressure Tap Locations

Two pressure tap plugs in the front pump cover are accessible via holes in the engine front mount; front pump pressure is at the 6 o'clock position and throttle valve (TV) pressure is at the 8 o'clock position.

### Test Preparation

All tests can be made without driving the vehicle by simply raising the wheels 3-5 inches from the floor on stand jacks. With pressure gauges installed, perform the following preliminary steps:

- Establish pressure gauges indicator needle rest positions at zero pressure
- Thoroughly warm-up transmission
- Check transmission oil level
- Check linkage adjustment

| FRONT PUMP PRESSURES (PSI) | | | | |
|---|---|---|---|---|
| Condition | Range Selector Position | | | |
| | R | N | D | L |
| At idle (16" Hg) | 81-98 | 47-57 | 47-57 | 71-82 |
| At idle, with vacuum hose disconnected at balance tube | 140-157 | 71-82 | 71-82 | 71-82 |

Absence of front pump pressures results in no drive in any range *(see Diagnosis Guide)* as this pressure is required to apply the applicable clutch for a given range. Common causes would be stuck pressure regulator valve, broken or disengaged front pump shaft, or missing plug from front end of front pump shaft which would divert converter "in."

Moderately low front pump pressures in all ranges would indicate a restricted front pump "in."

Failure of pressure to raise when disconnecting the vacuum hose (or high pressures with the hose connected) would indicate a stuck vacuum modulator valve, defective vacuum modulator, or collapsed hose.

### Rear Pump Check

With the rear wheels raised, place the selector in "D" and accelerate the engine. Front pump pressure should drop to approximately 0-5 psi at approximately 20 mph. If pressure does not drop, rear pump is disengaged or clogged, or rear pump check ball not seating.

| THROTTLE VALVE (TV) PRESSURES (PSI) | | | | |
|---|---|---|---|---|
| Condition | R | N | D | L |
| Disconnect TV rod at carburetor and vacuum hose at balance tube. Depress accelerator to W.O.T.* | 0 | 0 | 52-54 | 66-77 |

*By disconnecting TV rod at carburetor, engine remains at idle speed throughout test.

Throttle valve pressure tests are of value in cases where the transmission shift points are not in accordance with the "Shift Point—MPH Chart." If pressures are not as prescribed, they may be raised or lowered by adjusting the position of the jam nut on the throttle valve assembly (fig. 6E-11). 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. 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.

# DIAGNOSIS GUIDE

**No drive in any selector position; cannot load engine.**

- Low oil level.
- Clogged oil section pipe screen.
- Broken or disconnected manual valve cable.
- Defective pressure regulator valve.
- Defective line pressure limit valve.
- Front pump defective.
- Rear pump check valve, check valve poppet, or rear pump priming ball not seating. Both must occur for possible malfunction.
- Front pump shaft disengaged at either converter or pump gear.
- Front pump priming ball not seating.

**Engine speed flares on standstill starts but acceleration lags.**

- Low Band Partially Applied:
  a. Low oil level.
  b. Clogged pickup pipe screen.
  c. Improper band adjustment.
  d. Servo piston 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 upshift.**

- Low oil level.
- Clogged oil section screen or pipe.
- High clutch partially applied—blocked feed orifice.
- Clutch plates worn.
- Clutch seals leak.
- Clutch piston hung up.
- Clutch drum relief ball not seating.
- Vacuum modulator hose collapsed.

**Transmission will not upshift.**

- Low band not releasing, probably due to:
  a. Stuck low-drive valve.
  b. Defective governor.
  c. No rear pump output such as stuck priming ball, drive pins not engaged, or defective pump.
  d. TV valve stuck or maladjusted.
  e. Maladjusted manual valve lever.

**Upshifts harsh.**

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

**Closed throttle (coast) downshifts harsh.**

- Improper low band adjustment.
- Vacuum modulator hose disconnected, broken.
- Vacuum modulator diaphragm ruptured.
- Vacuum modulator valve stuck.
- Engine idle speed too high.
- Sticking valves in valve body (pressure regulator or hydraulic modulator valves).

**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.**

- Manual valve lever improperly adjusted.
- Cable linkage adjustment.
- Reverse clutch piston stuck.
- Reverse clutch plates worn out.
- Reverse clutch leaking excessively.
- Blocked reverse clutch apply orifice.

**Improper shift points (see Shift-MPH Chart).**

- Incorrectly adjusted carburetor-to-transmission.
- Incorrectly adjusted TV valve.
- Governor defective.
- Rear pump priming ball stuck.

**Oil forced out of filler tube.**

- Oil level too high causing planet carrier to run in oil and cause foam.
- Oil pickup pipe split or not sealed causing air entrainment.

**Unable to push start.**

- Rear pump drive gear not engaged with drive pins on planet carrier hub.
- Rear pump defective.
- Rear pump priming ball not seating.

## CORVAIR POWERGLIDE SHIFT POINT—MPH CHART

| UPSHIFTS | MPH |
|---|---|
| Minimum Throttle | 10-12½ |
| Full Throttle | 41-47 |
| Part Throttle (Detent Touch) | 34-41 |
| **DOWNSHIFTS** | |
| Closed Throttle | 8-12 |
| Full Throttle | 38-44 |
| Part Throttle (Detent Touch) | 23-30 |
| Manual Low (Inhibited) | 41-46 |

# CORVAIR 95 AND GREENBRIER—1200 SERIES

With the following exceptions, the Powerglide transmission used in 1200 Series vehicles is identical to that used in Corvair Passenger Cars.

- A transmission oil cooler (fig. 6E-56) is used and is mounted in the left wheel house compartment.
- A different front pump assembly is used to provide cooler "in" and "out" (fig. 6E-57) connections to the transmission oil supply.
- Front pump body incorporates a cooler bypass (fig. 6E-58) provision to allow oil to recirculate within the transmission in the event of any restriction which creates a pressure build-up of more than 15 psi.

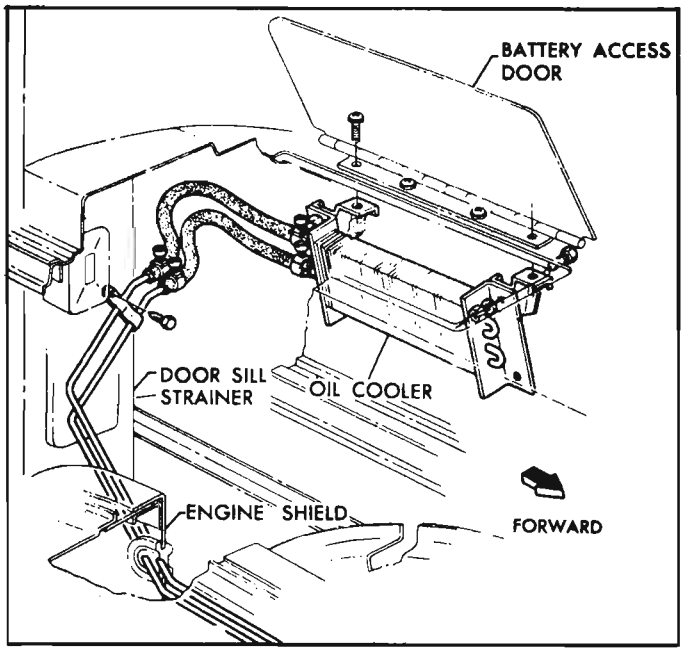


Fig. 6E-56—Transmission Oil Cooler

## TRANSMISSION OIL COOLER REPLACEMENT

To remove the transmission oil cooler (fig. 6E-56) which is located in the left rear wheel housing, first disconnect the two hose connections by loosening the hose clamps, then remove the two cross recess head screws and nuts securing the cooler bracket. It should be noted that the same two screws are used to attach the ends of the battery access door hinge.

To install the oil cooler reverse the above procedure.

## FRONT PUMP BODY TEST PLUG AND OIL COOLER CONNECTIONS

The test plugs for the throttle valve (TV) and front pump pressure are located at 8 o'clock and 6 o'clock

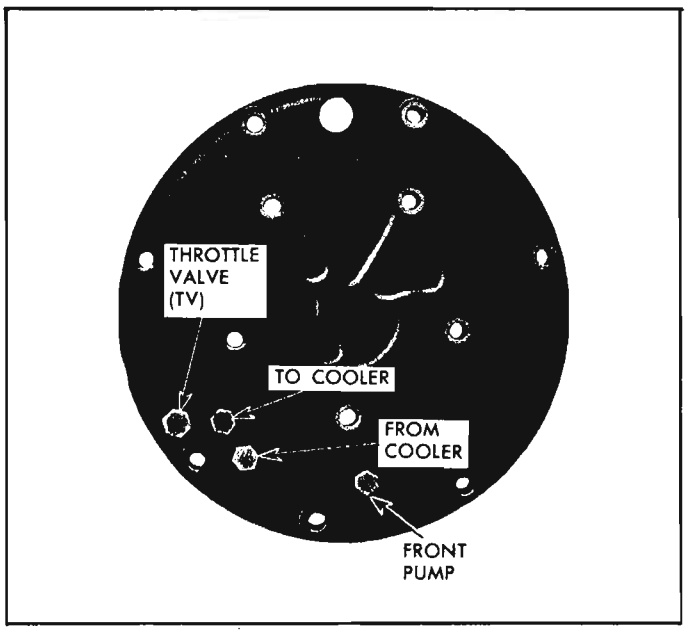


Fig. 6E-57—Front Pump Cover Plugs Identification

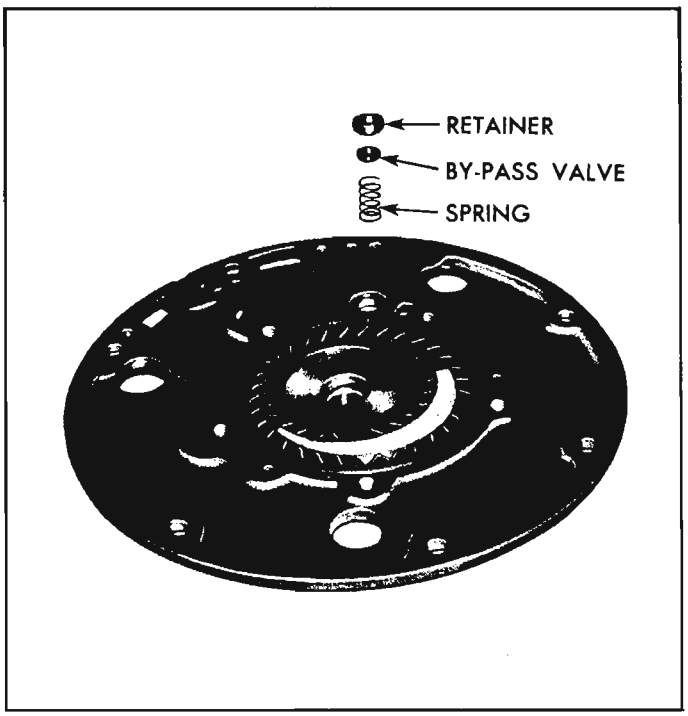


Fig. 6E-58—Front Pump Body Oil Cooler Bypass Valve

respectively (fig. 6E-57). The return oil line from the transmission cooler taps into the front pump cover immediately inboard from the TV. Hot oil is delivered to the cooler from the plug just below the cooler return line. Hydraulically, oil is delivered to the cooler from the torque converter "in" circuit, returned to the front pump, and then delivered to the torque converter feed

passage. As mentioned, in the event of a blockage within the oil cooler or its lines which would create a pressure build-up in excess of 15 psi, a small poppet valve located in the front pump body will be opened by the oil pressure allowing the oil to be fed directly to the converter.

## OIL COOLER BYPASS VALVE REPLACEMENT

In the event of an oil cooler bypass valve failure, pry the valve retainer from the front pump body and remove and discard the bypass valve, spring, and retainer (Inset, fig. 6E-58). The valve, spring, and retainer are serviced only as a package. Use care in removing the retainer not to damage the surrounding surface of the pump body.

Place the new spring and valve in front pump body bore, then press retainer into bore until its top edge is flush with the machined face of the front pump body. Check that valve is free to operate and valve shoulders seat in bore of valve retainer.

**NOTE: The 1200 Series front pump valve body and cover embodying the cooler bypass valve and provision for cooler lines are used as service replacement parts for the Corvair Passenger Car transmission. Bypass valve need not be removed for 500, 700, and 900 series, but cover holes must be tightly plugged.**

# SPECIFICATIONS

All specifications for the Corvair Powerglide transmission are carried in Section 12.

# SPECIAL TOOLS

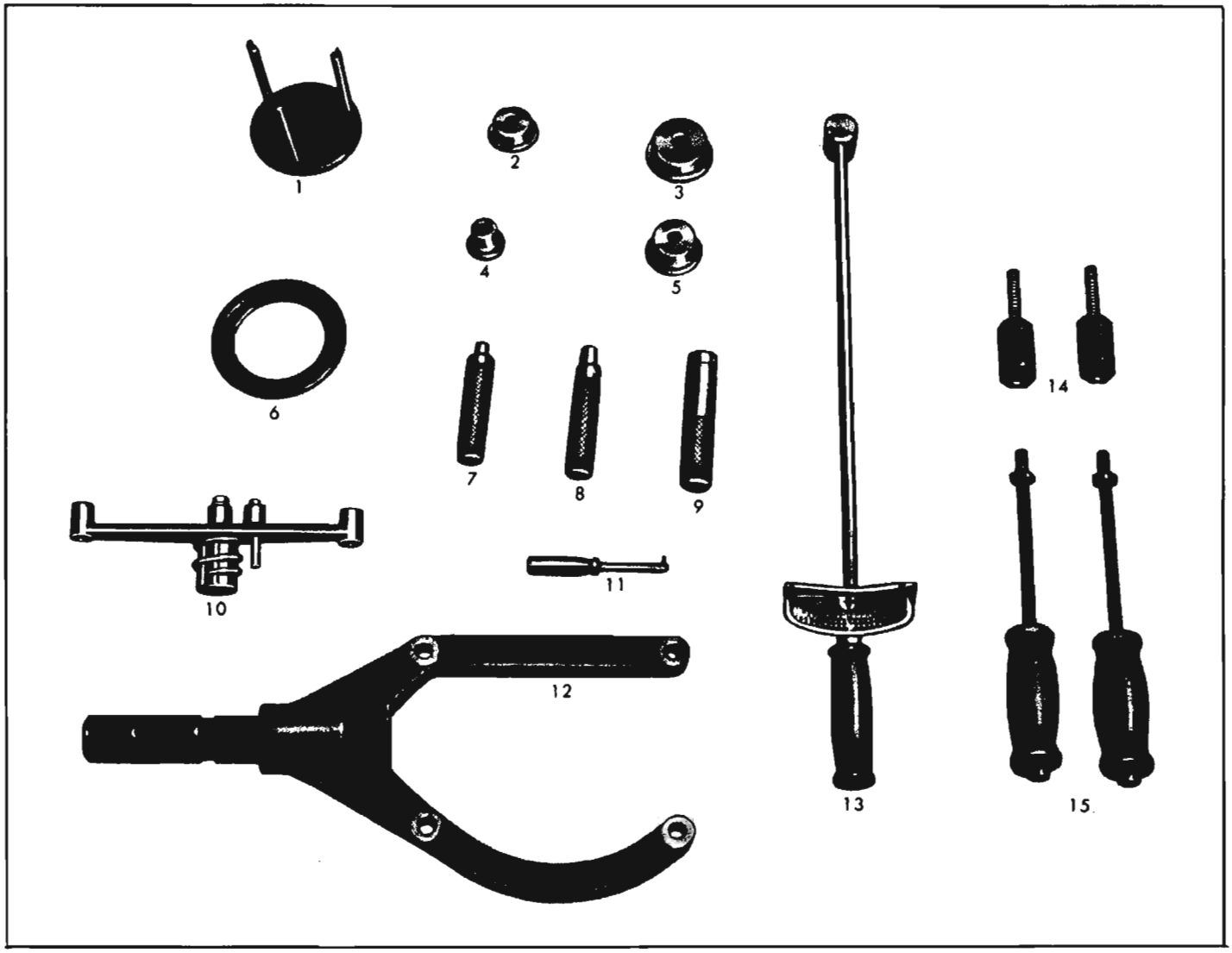


Fig. 6E-59—"Corvair" Powerglide Special Tools

1. J-5133 Clutch Spring Compressor
2. J-8360-2 Clutch Drum Bushing Installer
3. J-8360-4 Rear Pump Body Bushing Installer
4. J-8360-3 Low Sun Gear Bushing Installer
5. J-8360-1 Converter Hub Bushing Installer
6. J-7782 Piston Spring Compressor
7. J-8360-7 Turbine Shaft Rear Bushing Installer
8. J-8360-5 Front Pump Body Bushing Installer
9. J-8360-6 Turbine Shaft Front Bushing Installer
10. J-8371 Front Thrust Washer Selector Gauge
11. J-8365 Manual Valve Lever Gauge
12. J-7896 Transmission Holding Fixture
13. J-1264 0-200 Ft-Lbs Torque Wrench
14. J-6585-3 Front Pump Slide Hammer Adapters
15. J-6585 Slide Hammers