Section XI

TRANSMISSION

DATA AND SPECIFICATIONS

STANDARD 3-SPEED TRANSMISSION

	C-67
GEARSHIFT TYPE	Remote Control Manually Operated
TYPE OF GEARS	Helical
END PLAY:	
Countershaft Gear	.002 to .008″
Second Speed Gear	.003 to .008″
GEAR RATIO:	
1st	2.57 to 1
2nd	1.83 to 1
3rd	1.00 to 1
Reverse	3.48 to 1
SPEEDOMETER GEAR:	
Number of Teeth	6
LUBRICANT CAPACITY (pints)	2¾
VISCOSITY (S.A.E.)	SAE 10W

POWERFLITE TRANSMISSION

	C-67	C-68	C-69	C-70	C-300
GENERAL DATA					
Torque Converter Diameter (Ins.)	11¾	12½	12½	12½	12½
Type of Cooling	Air	Water	Water	Water	Water
Number of Clutch Discs	6	6	6	6	7
Stall Speed at Sea Level (± 50 rpm)	1380	1540	1540	1540	1540
Capacity (Transmission and Torque Converter) (Pts.)	20	22	22	22	22

POWERFLITE TRANSMISSION (Cont'd)

NOTE

These dimensions and clearances are for new parts. Allowance should be made for normal wear, unless the part is suspected of giving trouble.

FITS AND CLEARANCES

Front Pump—Pinion and Gear End Clearance In Body	.0012 to .0022"
Front Pump Drive Sleeve and Front Pump Housing Bushing—Clearance	.0030 to .0045"
Front Pump Drive Sleeve Rear Diameter	1.8745 to 1.8750"
Front Pump Pinion Inside Pilot Diameter	1.876 to 1.877"
Input Shaft and Mating Surface That Enters Kickdown Carrier Assembly Bushing—Clearance	.0016 to .0029"
Rear Pump—Pinion and Gear End Clearance In Body	.0012 to .0027"
Rear Pump—Inside Diameter That Governor Support Seal Rings Contact	2.000 to 2.002"
Governor Valve—Clearance Between Valve and Body	.0005 to .0020"
Direct Clutch Retainer Assembly and Torque Converter Reaction Shaft—Clearance	.0015 to .0030"
Direct Clutch Piston—Inside Diameter	2.437 to 2.438"
Direct Clutch Retainer and Piston Inside Diameter—Clearance	.004 to .006"
Planet Pinion Carrier Housing Inside Diameter and Output Shaft Support Bearing Surface—Clearance	.006 to .009"
Reverse Annulus Gear Outside Journal Diameter and Mating Bearing Surface On Output Shaft Support—Clearance	.002 to .004"
Kickdown Planet Pinion Carrier Thrust Washer	.124 to .126"
Reverse Planet Pinion Carrier Thrust Washer	.124 to .126"
Planet Pinion Carrier Housing Thrust Washer	.124 to .126"
Kickdown Planet Carrier Snap Ring	.062 to .064"
Output Shaft Support Smallest Inside Diameter	1.376 to 1.377"
Extension—Inside Diameter At Bearing	2.4402 to 2.4410"

TRANSMISSION SPEEDOMETER PINION CHART

Model	Tire size	Axle Ratio	Number of Pinion Teeth
C-67	7.60 x 15	3.73 (Std. Trans.)	16
		3.54 (PowerFlite Trans.)	17
C-68	8.00 x 15	3.36	16
C-69	8.20 x 15	3.54	17
C-70	8.90 x 15	3.54	16
C-300	8.00 x 15	3.54	17

ESSENTIAL TOOL LIST

STANDARD TRANSMISSION

C-430 or 435	Set—Dial Indicator
C-452	Puller—Universal Joint Flange
C-497	Puller—Transmission Oil Seal
C-549	Puller—Pinion and Transmission Companion Flange or Yoke
C-578	Arbor—Countershaft Removing-Installing
C-579	Drift—Oil Seal Installing
C-604	Puller—Transmission Reverse Idler Gear Shaft
C-860	Reamer—Transmission Housing Dowel Hole
C-870	Arbor—Transmission Housing Aligning
DD-999	Installer—Pinion and Companion Flange
DD-1014	Stand—Transmission Repair

DESIRABLE

C-464	Arbor—Reverse Idler Gear and Shaft Installing
C-590	Studs—Transmission Locating Pilot

POWERFLITE TRANSMISSION

C-430	Set—Dial Indicator, Clamp, Swivel and Attaching Rods
C-452	Puller—Universal Joint Flange
C-484	Pliers—Snap Ring—Removing Servo Body
C-496	Tool—Universal Joint Flange Installing
C-589	Wrench—Torque Converter to Crankshaft Stud Nut
C-685	Wrench—Inch-Pound Torque
C-748	Puller—Output Shaft Rear Bearing Oil Seal
C-760	Pliers—Governor Weight Snap Ring
C-811	Wrench—Torque Converter to Crankshaft Stud Nut
DD-1150	Tachometer
C-3105	Driver—Rear Oil Seal
C-3204	Driver—Rear Bearing in Extension Housing
C-3229	Pliers—Governor Secondary Weight and Servo Piston Valve Spring Snap Ring
C-3245	Fixture—Engine Support
C-3275	Driver—Bearing from Transmission Extension
C-3276	Pilots—Transmission to Torque Adapter Plate
C-3277	Installer—Manual Valve Lever Shaft Oil Seal
C-3278	Driver—Front Pump Housing Dust Seal
C-3279A	Wrench—Throttle Adjusting Screw
C-3280	Stand—Transmission Repair Bench (not required if DD-1014 is available)

ESSENTIAL TOOL LIST (Cont'd)

POWERFLITE TRANSMISSION (Continued)

C-3281	Wrench—Flange Holding (not required if C-784 is available)
C-3282	Remover—Extension
C-3283	Pilots—Extension to Transmission Case
C-3284	Adapter—For C-496 Universal Joint Flange Puller
C-3285	Fixture—Output Shaft Support
C-3287	Puller—Front Pump Housing and Regulator Body
C-3288	Pilots—Front and Rear Pump Housing
C-3289	Fixture—Compressing Servo Springs
C-3291	Tool—Kickdown Band Adjusting
C-3292	Gauge—Pressure Checking (100 lbs.)
C-3293	Gauge—Pressure Checking (300 lbs.)
C-3294	Stand—Valve Body
C-3295	Pilots—Valve Body and Transfer Plate
C-3297	Tool—Remover and Installer—Reaction Shaft
C-3301	Pliers—Snap Ring
C-3302	Compressor—Clutch Spring
C-3335	Brown & Sharpe—Parallel Bar No. 920, ¾ x 1 x 12"
C-3339	Set—Dial Indicator
C-3380	Wrench—Band Adjusting (sensory)

DESIRABLE

C-3201	Lo-Jack—Hydraulic Powered
C-3203	Hi-Jack—Hydraulic Powered
C-3502	Adapter—Transmission Jack

TIGHTENING REFERENCE

	FOOT-POUNDS TORQUE
3-SPEED STANDARD TRANSMISSION	
Transmission to Clutch Housing Nut	50
Transmission to Clutch Housing Bolt	50
Transmission Cover Bolt	15
Transmission Extension to Case Bolt	35
Transmission Pinion Bearing Retainer Bolt	15
Transmission Pilot Valve Bolt	15
Transmission Companion Flange Nut	104

TIGHTENING REFERENCE (Continued)

	FOOT-POUNDS TORQUE
POWERFLITE TRANSMISSION	
Back-Up Light Switch	25
Companion Flange Nut	160
Extension Breather	12
Front Oil Pump Housing	17
Governor Locating Screw	4
Governor Oil Pressure Take-Off Plug	12
Kickdown Band Adjusting Screw Nut	40
Kickdown Band Lever Shaft Plug	35
Neutral Starter Switch	25
Oil Pan Drain Plug	25
Oil Pan Filler Tube Nut	40
Oil Pressure Line Take-Off Plug	12
Regulator Valve Spring Retainer	50
Reverse Band Lever Adjusting Screw Nut	35
Speedometer Pinion Sleeve Assembly	45
Throttle Oil Pressure Take-Off Plug	12
Throttle Valve Adjusting Screw Plug	25
Torque Converter Drain Plug	50
Torque Converter Oil Cooling Line Fitting	7
Adapter Plate to Engine Block Screws ... $\frac{7}{16}$ x 14	50
$\frac{3}{8}$ x 16	30
Torque Converter Housing to Adapter Plate Screws	30
Output Shaft Support to Case Screw	30
Governor Body Screws	10
Oil Strainer Support Screws	17
Oil Pan Screws	17
Rear Oil Pump Housing Screw	20
Transmission Extension Housing Screws	30
Transfer Plate Cover Screws	50
Transfer Plate to Case Screws	17

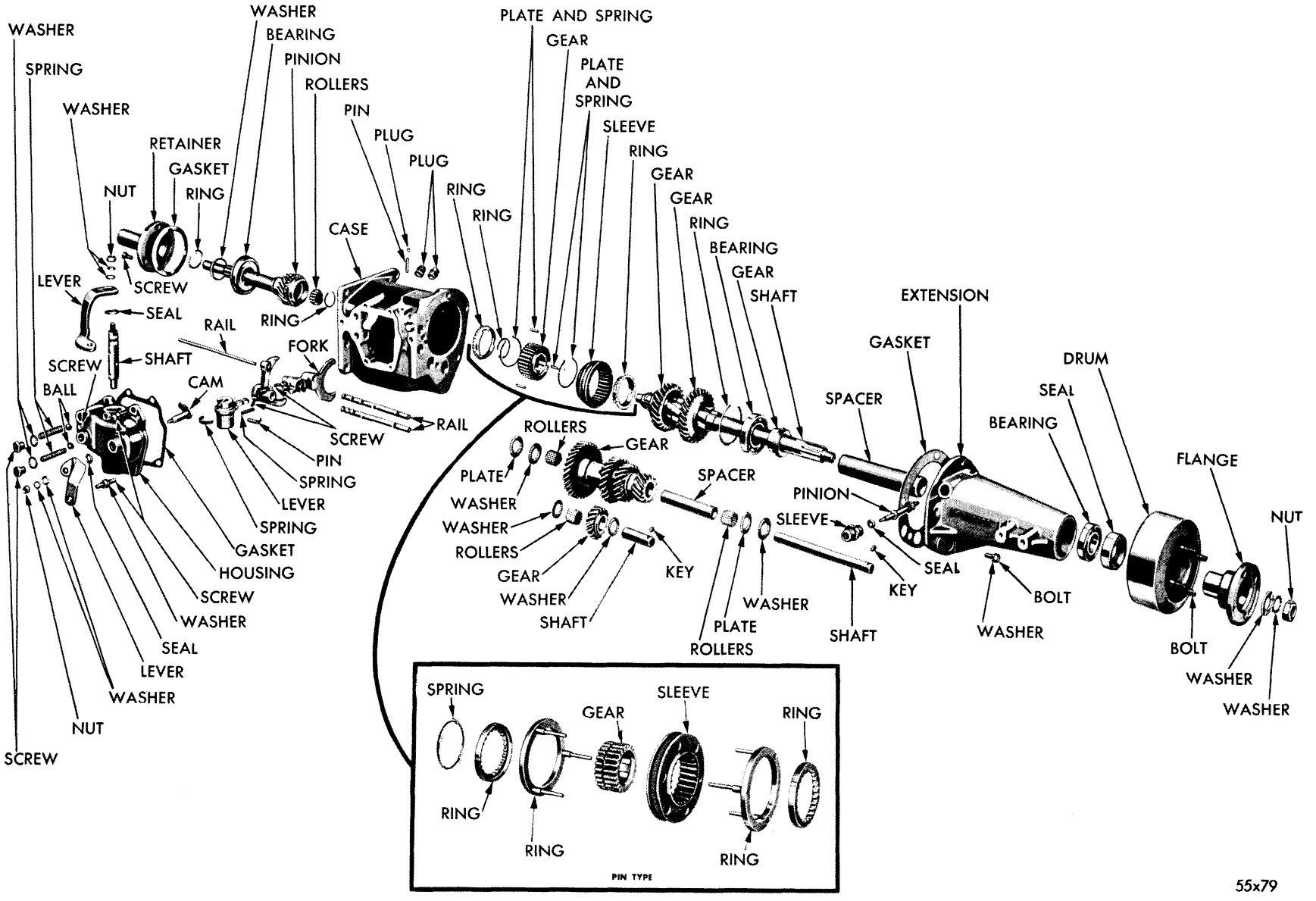

Fig. 1—Standard 3-Speed Transmission (C-67) (Disassembled View)

Section XI
TRANSMISSION
(STANDARD TYPE)

1. DESCRIPTION

The transmission (Fig. 1) is the silent shifting type, with three forward speeds and one reverse speed. The rear end of the main drive pinion (clutch shaft) is mounted on a ball bearing. The transmission mainshaft is mounted in a pilot roller bearing at the front and a ball bearing at the rear. The countershaft gear set runs on straight roller bearings over the countershaft. The countershaft is locked rigidly in the transmission case, therefore, it cannot rotate.

SERVICE PROCEDURES

2. REMOVAL AND INSTALLATION

a. Removal

(1) Raise car at front and place floor jacks under lower control arms.

(2) Disconnect propeller shaft at front end and loosen companion flange nut.

(3) Disconnect speedometer cable and hand brake cable at brake band.

(4) Disconnect gearshift and gearshift selector control rods at transmission.

(5) Remove cap screws and nuts holding transmission to clutch housing.

(6) Remove transmission assembly by pulling it back, down and out of car.

CAUTION

Do not disengage clutch or otherwise move clutch or clutch disc after removing transmission.

b. Installation

When installing the transmission on the car, use pilot studs to avoid springing the clutch disc. After the transmission has been installed, make sure it is properly lubricated. Check the clutch pedal and readjust if necessary.

3. DISASSEMBLY AND INSPECTION OF TRANSMISSION

a. Disassembly (Refer to Fig. 1)

After draining thoroughly, clean transmission case and proceed with disassembly by removing speedometer drive pinion.

(1) Remove two screws on transmission cover which retain detent springs and balls for shifter rails.

(2) Remove transmission cover and gear selector assembly.

(3) Remove nut, flat washer, and lockwasher from rear of transmission mainshaft and pull off universal companion flange and brake drum assembly. Use puller, Tool C-452, for removal.

Never drive flange off with hammer.

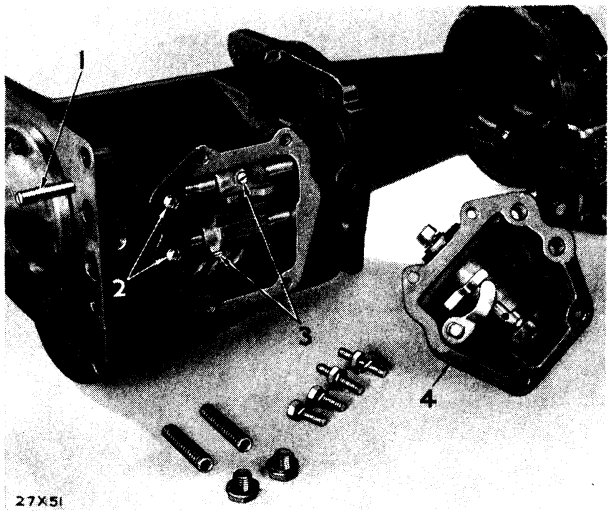

Fig. 2—Removing Manual Remote Gearshift Rails

1—Gearshift fork guide rail 3—Gearshift fork lock screws
2—Gearshift selector balls 4—Gearshift housing assembly

(4) Unscrew and pull out shifter fork guide rail (Fig. 2) from front of transmission case.

(5) With transmission gears in neutral position, remove two lock screws which hold shifter forks to shifter rails.

(6) Remove welch plug for lower shifter rail by collapsing plug with a center punch.

(7) Remove upper and lower shifter rails by sliding them out through front of transmission case. When assembling transmission, install a new welch plug for lower shifter rail. **Make sure welch plug does not leak, as this point is below lubricant level.** Lift out shifter forks. Care must be taken not to drop detent balls into transmission case.

(8) Remove cap screws which hold extension housing to transmission.

(9) Remove extension and mainshaft from transmission, being careful not to disassemble synchronizer clutch assembly.

A shifter rail selector plug is located in vertical drilled hole on top of rear of transmission case. Hole is sealed by a cupped plug. Drive it down into selector plug hole with a punch, and remove selector plug. Remove synchronizer retaining snap ring, synchronizer unit, second speed gear, and low speed gear. Before removing pin type synchronizer, mark the clutch gear sleeve and clutch gear so they can be indexed in their original position. Remove transmission center bearing snap ring. Transmission mainshaft may now be pulled out of extension housing.

(10) Remove transmission mainshaft bearing, spacer, and speedometer drive gear.

Transmission extension mainshaft bearing and oil seal may now be removed from extension housing. Bearing is pressed in rear end of case and has no snap ring. It is held in place by bearing spacer and propeller shaft companion flange. Remove main drive pinion retainer sleeve from front end of transmission case and pull out main drive pinion and bearing assembly. Drive countershaft toward rear and out of transmission case. A key in rear end of countershaft prevents shaft from turning. Pick out this key as soon as shaft has been driven far enough to reach it. Leave countershaft gears and thrust washers in bottom of case. Use special arbor, Tool C-578, and a soft hammer for driving out countershaft.

Main drive pinion and mainshaft bearings are held in place by snap rings. They are removed by removing snap ring which holds bearing thrust washer in place. Use new snap rings when installing these bearings.

To insure proper fit, snap rings of various thicknesses are obtainable from the MOPAR Motor Parts Corporation. Remove thrust washer and pull ball bearing off shaft. Remove snap ring from rear end of shaft and pick out bearing rollers. Lift out countershaft gear set, thrust washer plates, bearing spacer, and bearing rollers. With an arbor, drive reverse idler gear shaft toward rear of case. As soon as locking key can be reached, pick it out of keyway. Finish driving out shaft and lift out reverse idler gear and bearing assembly.

b. Inspection

Check each part of the transmission for proper fit. Check end play where applicable. Inspect all parts for wear or damage. Clean and inspect mainshaft bearings. If a bearing is scored or worn on outer case, excessively loose or noisy, or fits loosely on mainshaft, it must be replaced.

If inspection reveals that a new bearing does not fit properly on mainshaft or in transmission retainer, replace shaft or rear bearing retainer, as needed. Inspect backlash between synchronizer sleeve and clutch gear. If splines or teeth of clutch gear are worn, replace complete gear

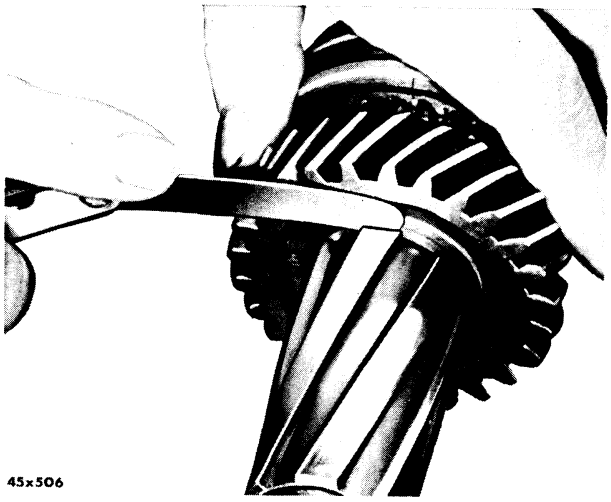

Fig. 3—Checking Second Speed Gear End Play

assembly. **Clutch gear and sleeve are available only in matched sets, in order to hold backlash to maximum of .0025 inch.**

Check backlash between synchronizer assembly and mainshaft. If backlash is excessive, check shaft with a new clutch gear before discarding old synchronizer assembly. Check end play of second speed gear. (Fig 3.) Excessive end play (more than .008 inch) may be caused by clutch gear end play (no end play is permitted), wear on thrust faces of second speed gear, or worn ends of mainshaft spiral splines. Replace worn parts if noise is objectionable, or gear disengagement is encountered. Remove synchronizer assembly and inspect fit of second speed gear on shaft. If fit is excessively loose, check with a new gear before discarding old one. Inspect first and reverse sliding gear. It should move smoothly and freely on mainshaft. If fit is loose, check with a new gear before discarding old one.

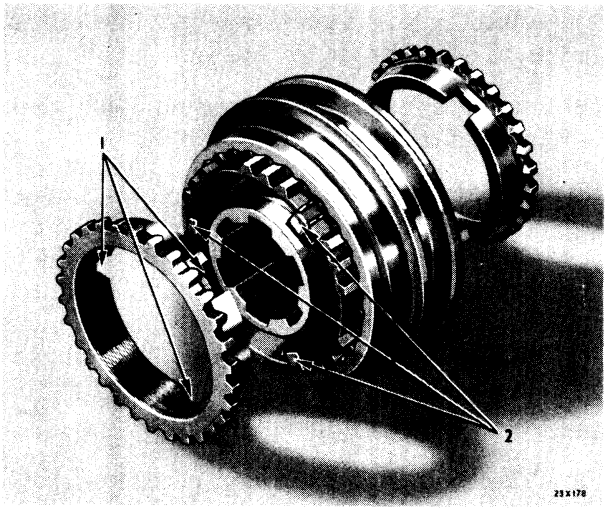

Fig. 4—Clutch Gear Synchronizer Shifting Plates and Stop Rings

1—Slots in synchronizer stop rings 2—Synchronizer shifting plates

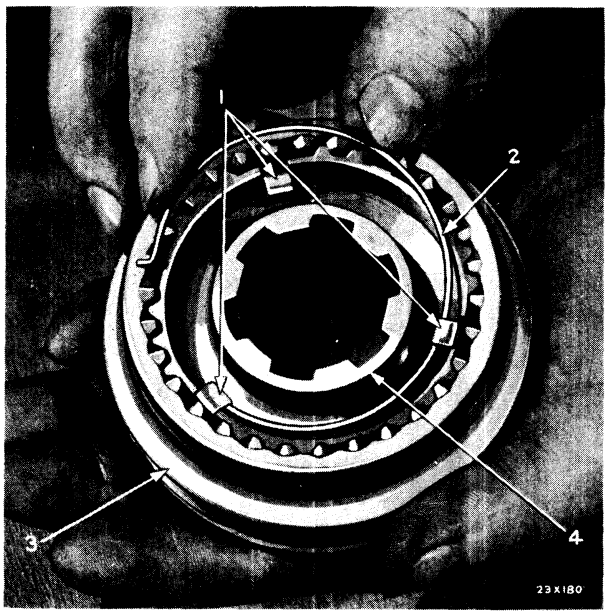

Fig. 5—Installing Synchronizer Shifting Plates

1—Synchronizer shifting plates
2—Synchronizer spreader spring
3—Clutch gear sleeve
4—Clutch gear

4. SERVICING THE SYNCHRONIZER

a. Strut Type (Refer to Fig. 4)

Check teeth on stop rings for excessive wear. Check synchronizer ring by installing it on pinion shaft. With slight pressure and by turning the ring clockwise one-quarter turn, it should adhere to pinion when pinion is held in vertical position. Install new stop rings if wear is noted. Inspect shifting plates. (Fig. 5.) If they are worn or damaged, install new ones, using the solid type rather than the pressed-steel type.

b. Pin Type (Refer to Fig. 6)

Before removing the synchronizer, mark the clutch gear sleeve and clutch gear so that they can be indexed in their original positions.

Inspect the gear teeth and threads on the inner and outer synchronizer stop rings. Check the gear teeth on the clutch gear and sleeve.

If there is evidence of chipped or excessively worn gear teeth, replace the part. Check the pins of the inner and outer synchronizer stop ring assembly for straightness and length.

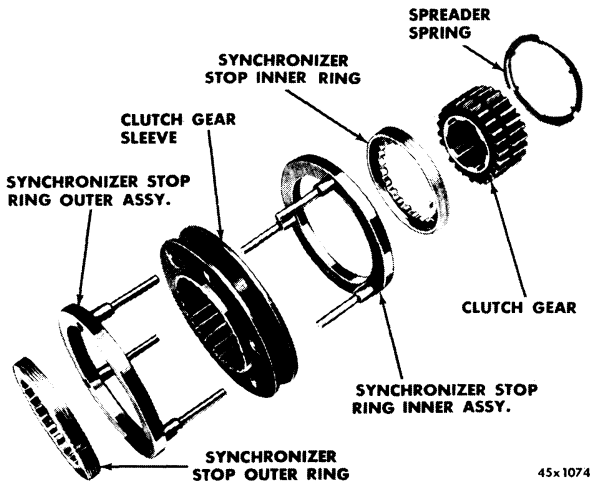

Fig. 6—Pin Type Synchronizer

5. ASSEMBLY OF TRANSMISSION (REFER TO FIG. 1)

Cleanliness is important! Before assembly, the transmission should be cleaned inside and out. Each individual part should also be thoroughly cleaned.

The synchronizer unit should be assembled exactly, as shown in Figures 5 or 6, as indicated by type of synchronizer unit.

When assembling countershaft gear set, it is important that steel thrust washer plates be placed next to each end of the gear set, and thrust washers next to transmission case at each end of shaft (refer to Fig. 1). Install reverse idler gear and shaft. Use arbor Tool C-464. Install countershaft bearing spacer in countershaft gear, together with countershaft gear installing arbor, Tool C-578.

Fig. 7—Checking Countershaft End Play

(1) Insert bearing rollers in forward end of countershaft gear. End of gear should be packed with a high medium cup grease to hold rollers in place.

(2) Place countershaft gear and thrust washers in position after they have been coated with cup grease. While holding plate and washer in position, turn gear over and stand it on its forward end.

(3) Insert bearing rollers in rear, holding them in position with cup grease. Place steel thrust washer plate in position.

(4) With transmission case on a bench, place countershaft gear assembly in bottom of case and install drive pinion.

(5) Lift up countershaft gear set. Insert key and countershaft from rear end of case, driving it into position with a rawhide mallet. At the same time, force countershaft installing arbor out of case.

(6) Check countershaft end play (Fig. 7), by prying gears toward front end and inserting feeler gauge between thrust washer and case in rear. This end play should not be less than .002 inch or more than .008 inch. Thrust washers are available in three different thicknesses, marked "A", "B", and "C". The letter "A" indicates the thinnest washer. Proper end play can easily be obtained by use of these washers in combinations of different thicknesses.

(7) Install transmission extension shaft bearing and oil seals.

(8) When installing new leather oil seals, make certain that the leather is in good condition —soft and pliable. New oil seals should be soaked in thin oil for about 30 minutes. Leather should be worked by rolling seal with smooth bar before installing. Oil seal should be installed in case with drift, Tool C-579, as shown in Fig. 8.

(9) Press seal in ½ inch and permit approximately ¼ inch of seal to protrude from case. This is important because a seal can be driven in too far. This may result in damage to the seal itself. It may also cause leakage

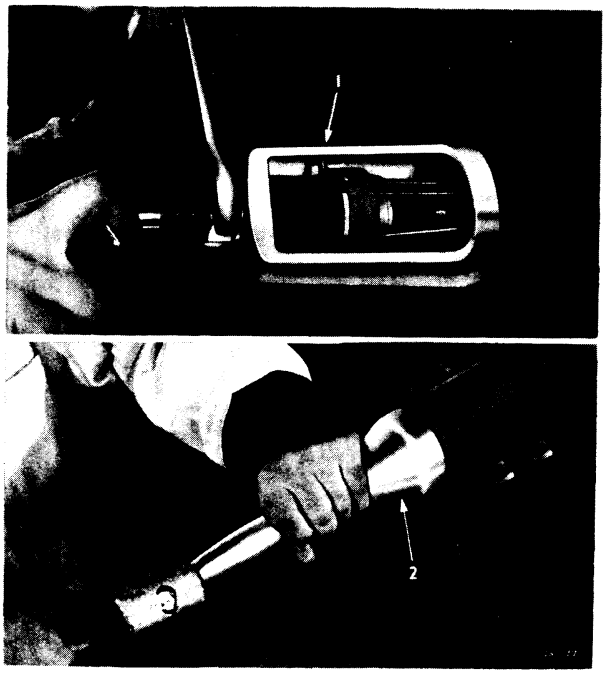

Fig. 8—Removing and Installing Oil Seal
1—Puller (Tool C-497) 2—Installing drift (Tool C-579)

as the seal may ride on the radius of the companion flange.

(10) Install mainshaft rear bearing, speedometer drive gear, and bearing spacer on transmission mainshaft.

(11) Place this assembly in transmission extension housing, locking it with a new snap ring in front of mainshaft center bearing.

(12) Install low speed gear which has a maximum backlash of .006 inch, measured at the pitch line of the gear teeth.

(13) Install second speed gear and synchronizing unit on mainshaft and lock with a snap ring in front of synchronizing unit. Extension housing, mainshaft, and its component parts may now be assembled to the transmission proper, being careful not to disturb synchronizing unit. Use a new gasket.

(14) Place shifter forks in position and insert shifter fork guide rail. Install two shifter rails.

(15) The two shifter rails (Fig. 9) are similar in appearance, except that the first and reverse shifter rail has detent grooves farthest apart. This rail should be installed

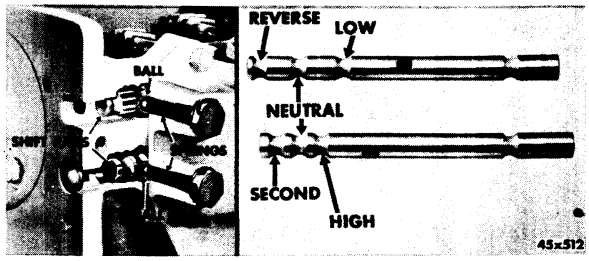

Fig. 9—Assembly of Shifter Rails

on top. The gear shifter rail interlock plug is located in a vertical drilled hole at rear of transmision case and must be installed between shifter rails. This hole is plugged by a cup-shaped plug at top of transmission case. Drive plug in place with a hammer.

(16) Install new welch plug in front of case at lower shifter rail.

(17) After placing shifter rails in neutral position and installing transmission cover locating pilots, Tool C-590 (Fig. 10), install cover and gear selector assembly, making sure that gearshift lever enters gear shifter fork slots. Install two cover cap screws. Remove pilots and install the other two cap screws. This will insure proper alignment and easier shifting.

(18) Install detent balls, springs, and retainer cap screws. Fill case to correct level with proper grade of lubricant specified in Lubrication Section.

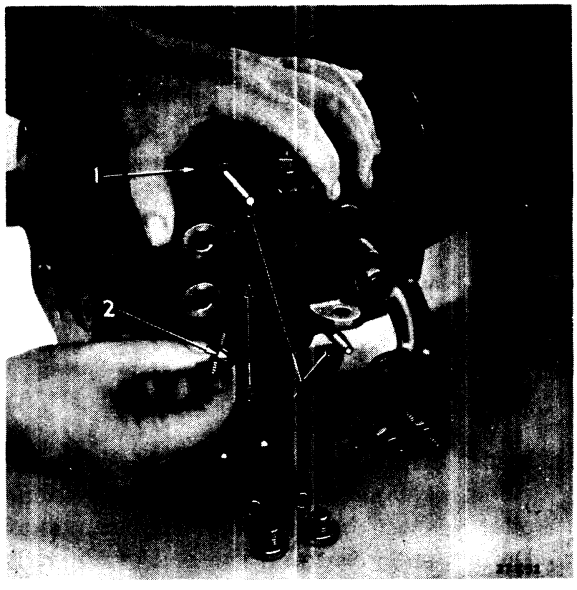

Fig. 10—Installing Gearshift Housing Assembly
1—Gearshift housing gasket 3—Gearshift housing assembly
2—Gearshift housing screw 4—Pilot stud (Tool C-590)

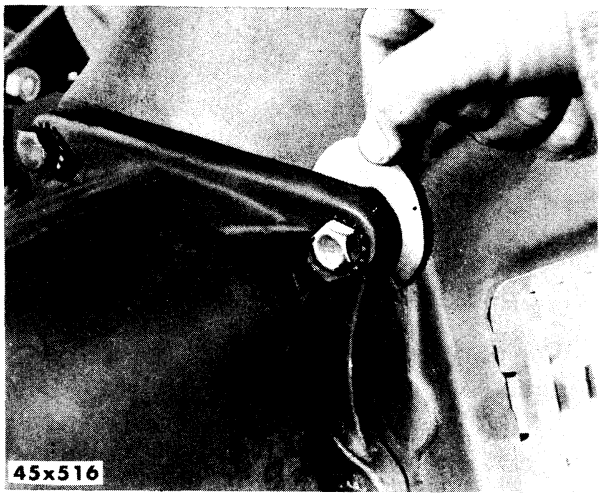

Fig. 11—Installing Shim Between Transmission and Clutch Housing

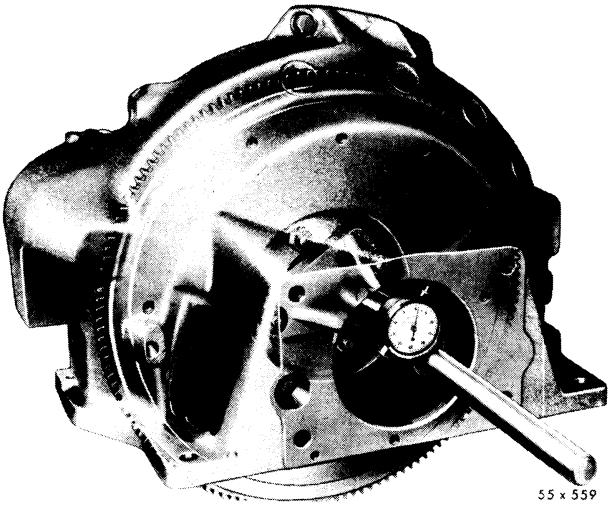

Fig. 12—Typical Method of Attaching Fixture C-780 (To Check Clutch Housing Bore)

6. INSTALLATION AND ALIGNMENT

a. Clutch Housing Alignment

If transmission has been jumping out of gear, check clutch housing face alignment with housing aligning arbor, Tool C-870, and indicators C-430 or C-435 before installing transmission in car. Runout on this surface should not exceed .003 inch total indicator reading. To correct excessive runout, place proper thickness of shim stock between transmission and clutch housing. (See Fig. 11.)

(1) Check runout of housing bore. (See Fig. 12.) Bore should not be off center more than .005 inch total indicator reading.

(2) If necesary to correct bore alignment, tap out dowels that align clutch housing to engine. Loosen mounting bolts slightly and tap housing to line it up with crankshaft.

(3) Tighten bolts to 35 foot-pounds torque and recheck alignment. Ream out dowel holes with special reamer, Tool C-860, and install .010 inch oversize dowels (Part No. 1316146).

b. Installing Transmission

(1) Insert about ½ teaspoonful of short-fibre wheel bearing grease in the drive pinion pilot bushing in the end of the crankshaft. Do not put grease on the end of the drive pinion. Be careful not to get any grease on the clutch facing or flywheel as this will cause clutch disc slippage and chattering.

(2) Be sure the clutch disc is properly aligned. Use extreme care when installing the transmission to avoid springing the clutch disc.

(3) Tighten the transmision case-to-clutch housing screws to 50 foot-pounds torque.

(4) Tighten the mainshaft flange nut to 105 foot-pounds torque, using the hand brake to facilitate the operation.

(5) Always check clutch pedal adjustment after installing transmission.

(6) Adjust the shifter linkage with the transmission in the neutral position.

7. REPLACING TRANSMISSION REAR OIL SEAL

a. Removal

(1) Remove propeller shaft, nut, flat washer, and lockwasher from rear end of transmission mainshaft.

(2) Pull off universal joint companion flange and brake drum assembly. Use special puller, Tool C-452. **Never drive flange off with hammer.**

(3) Insert fingers of special oil seal puller, Tool C-497, behind oil seal. A finger will fit in every other spline of mainshaft. Pull the oil seal by tightening puller nut. (Fig. 8.)

b. Installation

When installing a new oil seal, be sure to use special drift, Tool C-579, which automatically locates the seal in proper position. Press seal in ½ inch and permit approximately ¼ inch to protrude from case.

LINKAGE ADJUSTMENTS

8. GEARSHIFT CONTROL ADJUSTMENT (FIGS. 13 AND 14)

Set the gearshift rod or tube in its normal fully-returned position before making the cross-over adjustment.

Adjust the cross-over linkage to secure 3/8 to 5/8 inch free play cross-over movement of the gearshift knob, when transmission is in the high gear position. Make the cross-over adjustment at the selector rod and swivel. The adjustment should be made so that selector rod swivel pivot end can be placed freely into selector lever hole (when the selector lever is approximately 1/32 inch back from contact with shift fork) with no tension or compression on selector rod.

9. DISASSEMBLY OF GEARSHIFT CONTROL AND CONTROL ROD LEVER

(1) Remove the horn-blowing ring horn wire and steering wheel.

(2) Disconnect the selector rod, gear shift rod, and shifter rod end and remove the lever from the lower end.

(3) Remove screws which fasten the upper end of the control rod to the steering column and pull out the control rod and lever.

(4) Remove the lever bearing and screw and depress lever downward to remove it from the rod.

10. ADJUSTMENT OF GEARSHIFT CONTROL ROD

Loosen the stud nut on the upper lever at lower end of the steering column. Make certain that the transmission gears are in neutral position and that the gearshift lever is set at a horizontal position before tightening nut.

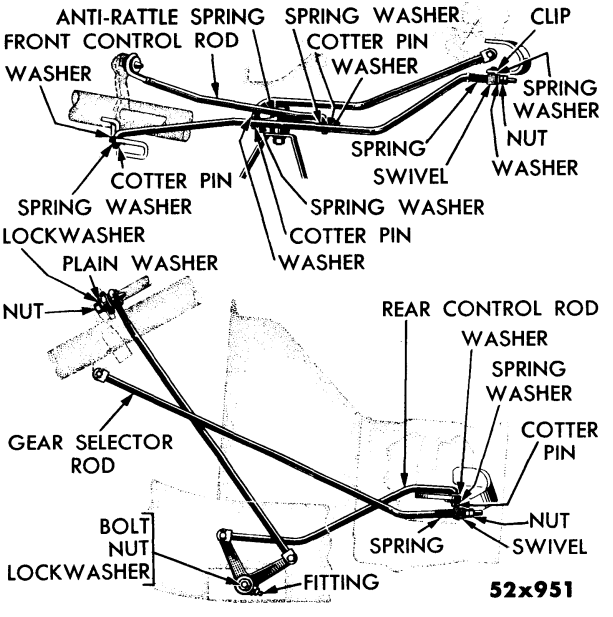

Fig. 13—Gearshift Control Rods

11. ADJUSTING GEARSHIFT SELECTOR ROD

The gearshift lever should be in a horizontal position when the transmission is in neutral. If it is not horizontal, it can be positioned by moving the lever to the horizontal and readjusting the clevis on the end of the control rod.

A borderline selector rod adjustment, which will allow shifting into low, may still prevent shifting into reverse. Start the adjustment by putting the transmission in neutral. Check the adjusting nut on the rear of selector rod at the selector lever. If a shift cannot be made into low and reverse, the nut is too loose. Tighten it until there is no play in the rod. Back it off 1/2 turn and tighten the lock nut. Make sure the adjusting nut is not too tight, or it will not shift into second or high.

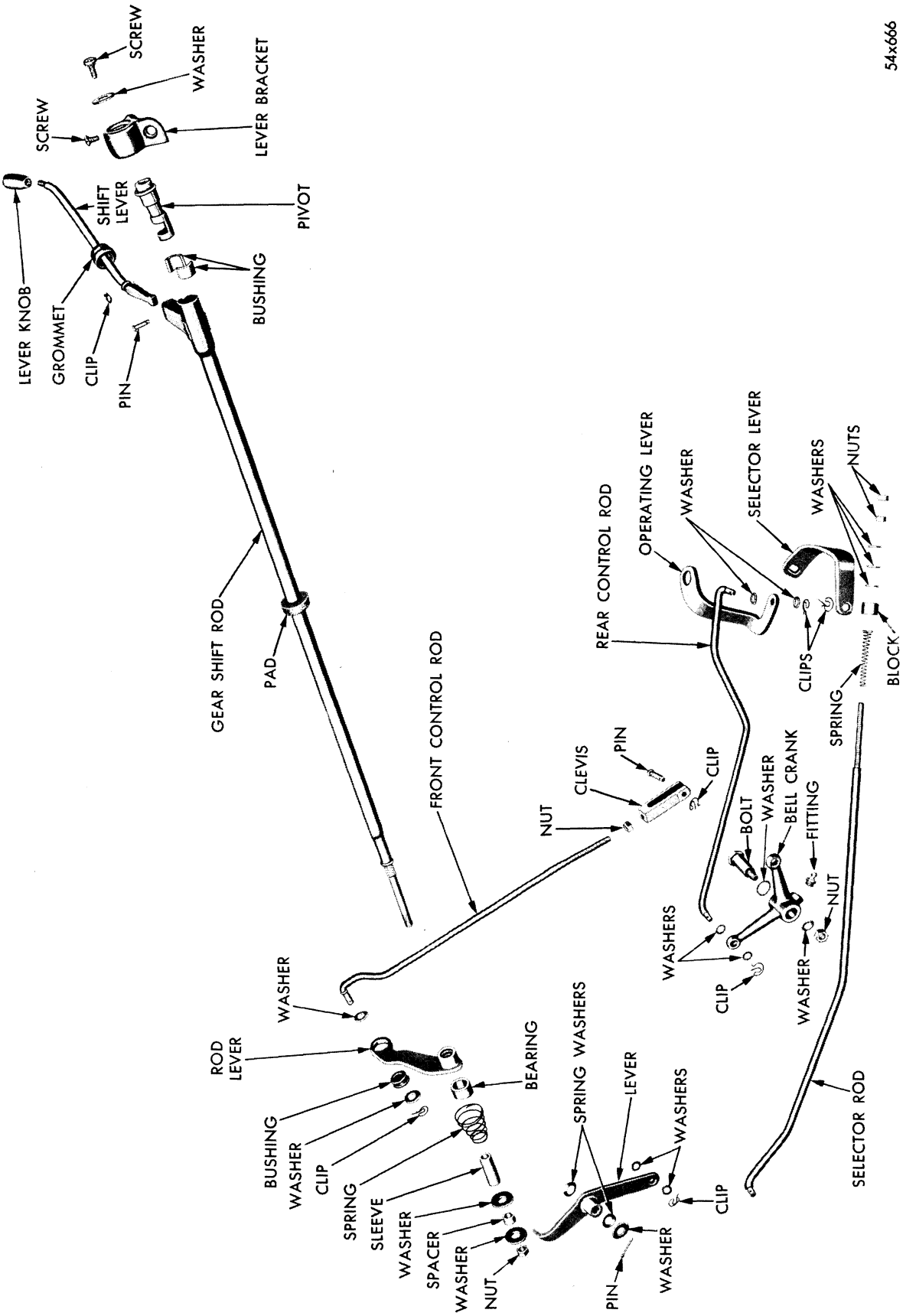

Fig. 14—Transmission Shifting Mechanism (Disassembled View)

SERVICE DIAGNOSIS

12. HARD SHIFTING

Possible Causes:

a. Improper selector rod adjustment.

b. Synchronizer shifting plate (or plates) damaged or broken.

c. Synchronizer spring improperly installed.

d. Broken or worn synchronizer stop rings.

e. Absence of gearshift rail interlock.

f. Remote control gearshift rod bushings out of alignment or too tight, causing the rod to bind.

g. Improper clutch adjustment.

h. Bellcrank tight on mounting bolt at frame (no end play).

Remedies:

a. Place the transmission gears in neutral position. Loosen the lock nut on the front end of the selector rod and tighten adjusting nut until all end play is removed from the rod. Back off the adjusting nut ½ turn for clearance and tighten lock nut.

b, c, d and **e.** Causes can only be corrected by disassembling transmission, inspecting parts referred to, and replacing parts if necessary.

f. Disconnect linkage at bottom of gearshift rod and check the lever for binding. If the lever operates exceptionally hard, replace the selector rod bushings, or align the bushing brackets—whichever is required.

g. Refer to Clutch Section for correction of this condition.

h. Correct condition as necessary. Bellcrank should have end play.

13. TRANSMISSION SLIPS OUT OF GEAR

Possible Causes:

a. Second or direct speed gear synchronizer clutching teeth worn.

b. Gearshift fork lock screw loose.

c. Clutch housing bore or face out of alignment.

Remedies:

a. Disassemble and repair transmission. Replace parts as required.

b. Remove shift cover and tighten gearshift fork lock screw securely.

c. Refer to Clutch Section for correction of this condition.

14. TRANSMISSION NOISES

Backlash Noise

Possible Causes:

a. Excessive end play in cluster gear.

b. Loose synchronizer hub spline fit on mainshaft.

c. Loose spline fit on low speed sliding gear to mainshaft spline (exceeding .006 inch measured at pitch line of low gear).

d. Loose spline fit of rear mainshaft flange.

Continuous Noise

Possible Causes:

a. Damaged, broken, or excessively worn gear teeth.

b. Drive pinion bearing worn.

Remedies:

a. Replace worn gears.

b. Replace worn bearing.

c., d. If on examination it is found that any of these conditions exist, the remedies will be self-evident. Perform corrective operation as required.

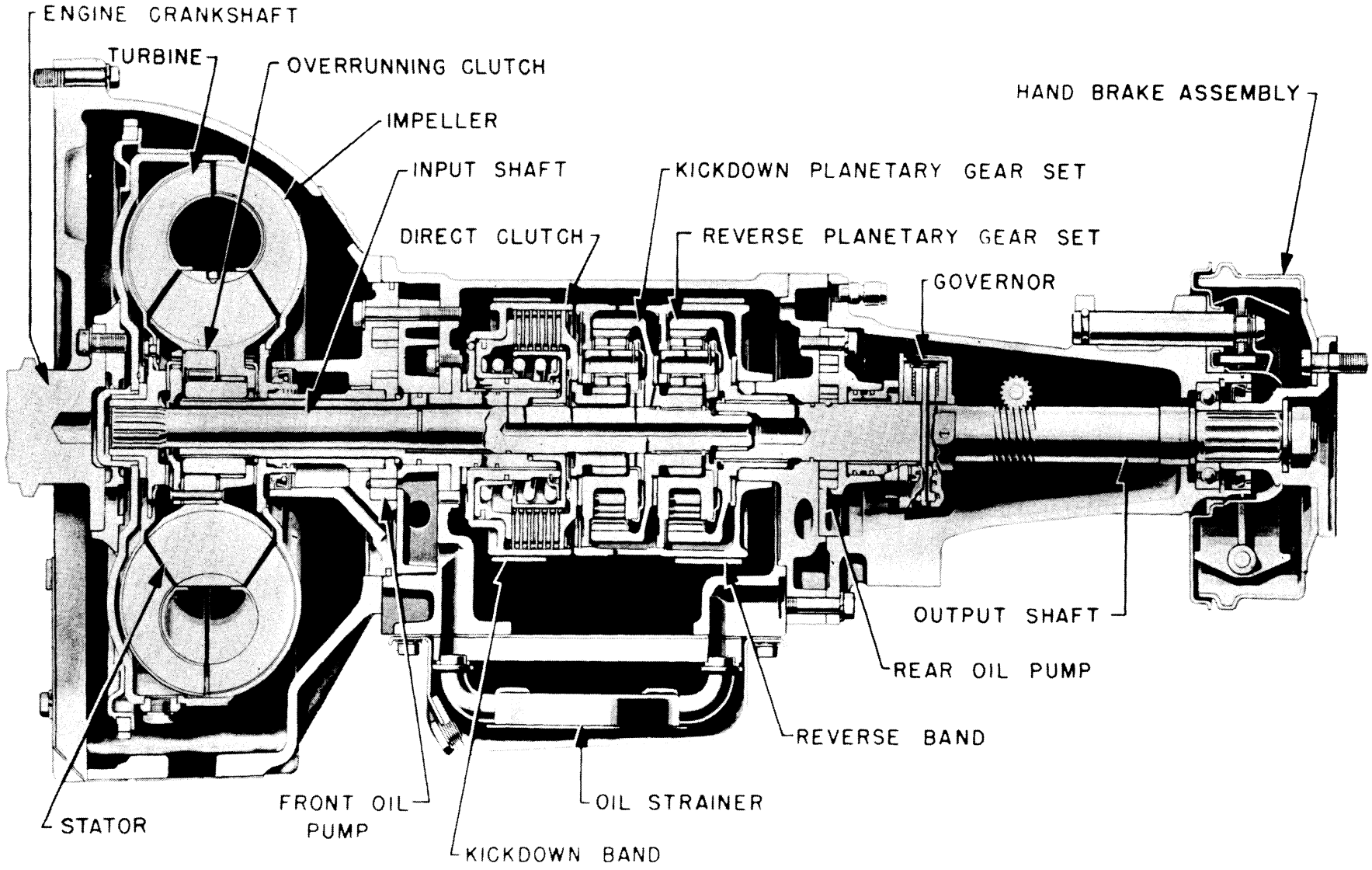

Fig. 15—Typical PowerFlite Transmission and Torque Converter (Sectional View)

POWERFLITE TRANSMISSION

15. DESCRIPTION (FIG. 15)

The PowerFlite Transmission combines a high performance torque converter and a simple, automatic two-speed planetary gearbox. The transmission provides simplified, smooth, flexible performance throughout the entire speed range. The driver need only select the desired driving range, and depress the accelerator to start. Shifting between ranges is accomplished with a selector lever. The shift is a fully automatic power shift, allowing the driver to leave his foot on the accelerator pedal at all times. If additional acceleration is desired while driving in direct drive, the transmission may be downshifted into low gear by merely pressing the accelerator pedal to the floor. This kickdown feature insures rapid acceleration when needed. A low range is also provided, which retains low gear operation when required.

Normal starts are made in the drive range to combine a 2.6 to 1 (stall) torque converter ratio and a 1.72 to 1 gear ratio for rapid acceleration. As the car speed increases, the transmission smoothly shifts into direct drive at the proper time.

The torque converter continues to be effective for acceleration when cruising in direct gear at lower speeds. However, even greater acceleration is available to the driver for quick, safe passing when the accelerator pedal is pushed to the floor. This kickdown action causes the transmission to downshift, bring the 1.72 to 1 ratio back into operation. Kickdown is accomplished almost instantaneously in the automatic transmission at any speed up to approximately 60 mph.

POWERFLITE OPERATING INFORMATION

16. SELECTOR LEVER POSITIONS

The PowerFlite Transmission has a selector lever which controls the drive ranges in the transmission. The lever has four positions, identified by the letters (R) reverse, (N) neutral, (D) drive, and (L) low. The selector lever movement is "gated' so that neutral (N) and the drive range (D) can be easily obtained by moving the dash-mounted selector lever, up or down to the end of travel.

By moving the dash-mounted selector lever to the left, the "gate" is passed and the extremes of lever movements provide reverse (R) and low (L).

This shift pattern permits rapid selection of low (L) and reverse (R) for rocking the car when mired. Similarly, the selection of neutral (N), reverse (R), and drive (D) during the operation of starting and backing the car can be made quickly without the necessity of watching a pointer. Furthermore, it is not necessary to go through a forward gear to obtain reverse.

17. STARTING WITH POWERFLITE TRANSMISSION

a. Normal Starting

When starting in extremely cold weather, allow the engine and transmission to warm up while in the neutral (N) position. If the engine is cold (engine on fast idle), apply the foot brake lightly to prevent a creep tendency when putting the selector in drive (D) or reverse (R) positions.

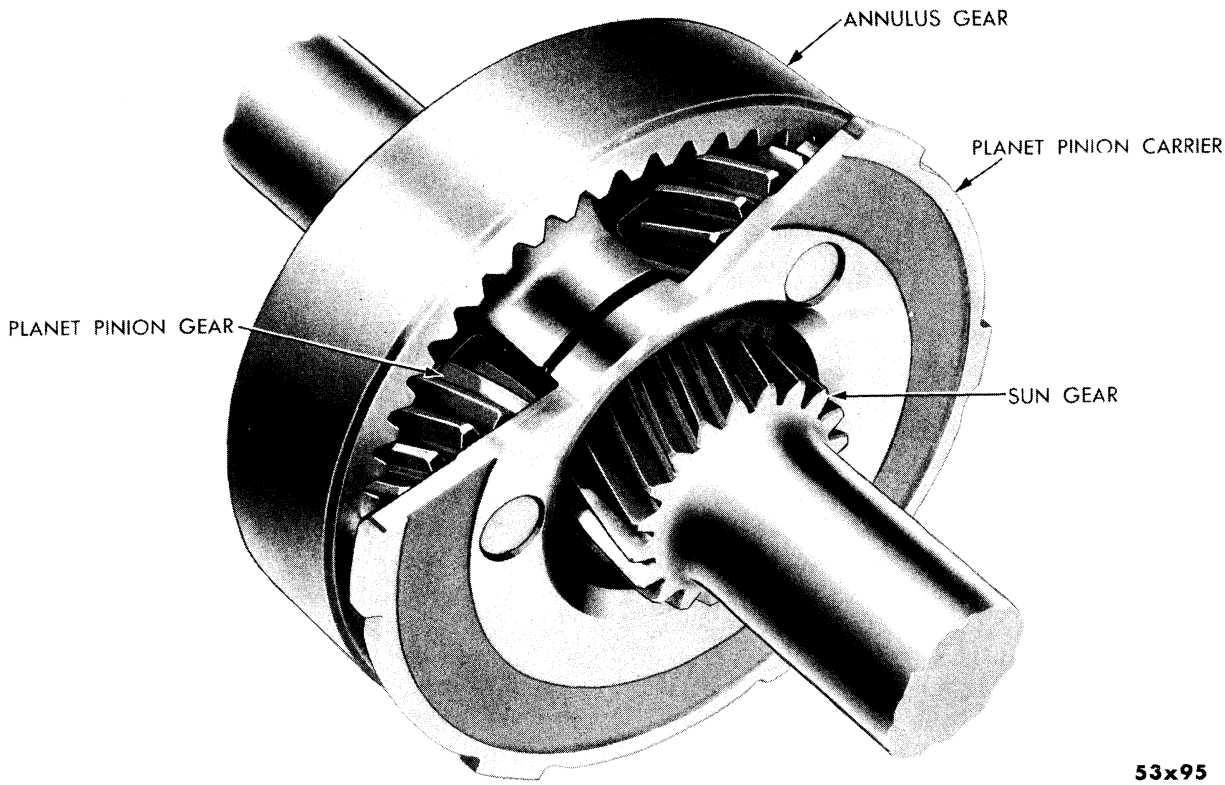

Fig. 16—Planetary Gear Set

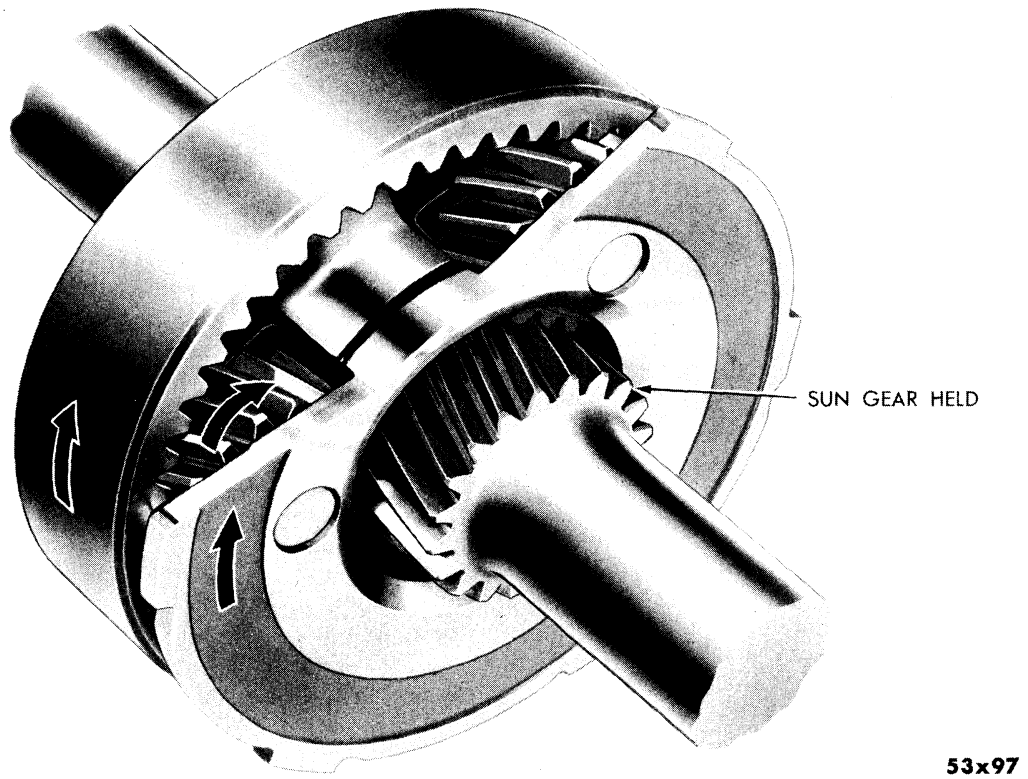

Fig. 17—Planetary Gear Set (Sun Gear Held)—Downshift—Breakaway

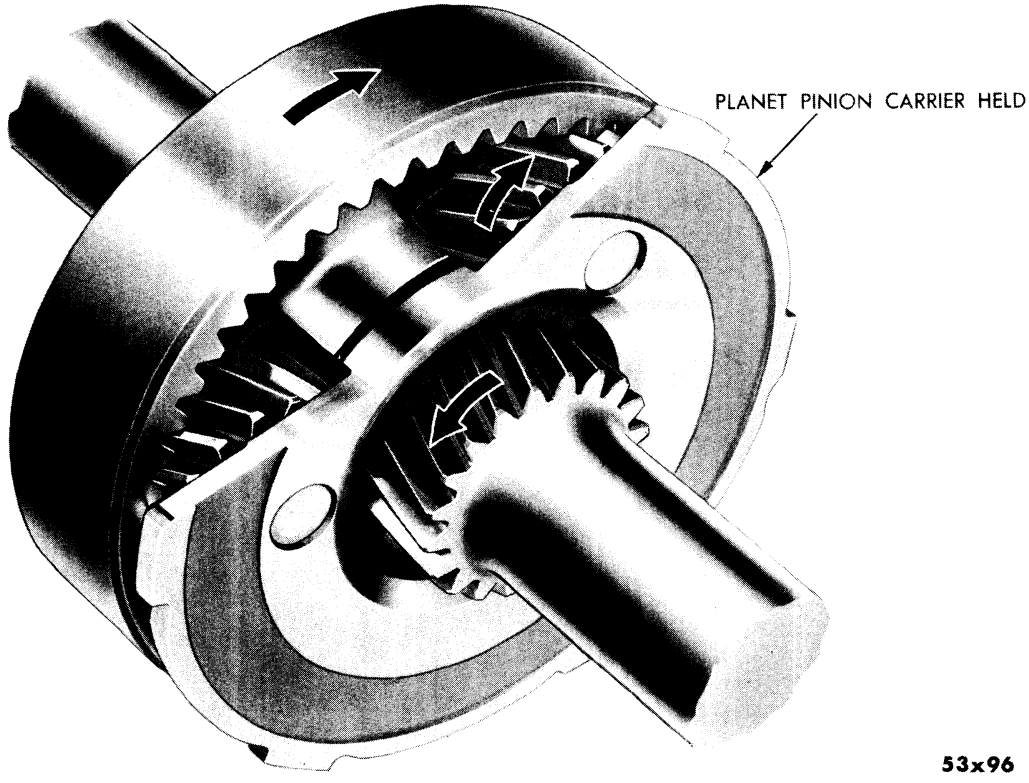

Fig. 18—Planetary Gear Set (Planet Pinion Carrier Held)—Reverse

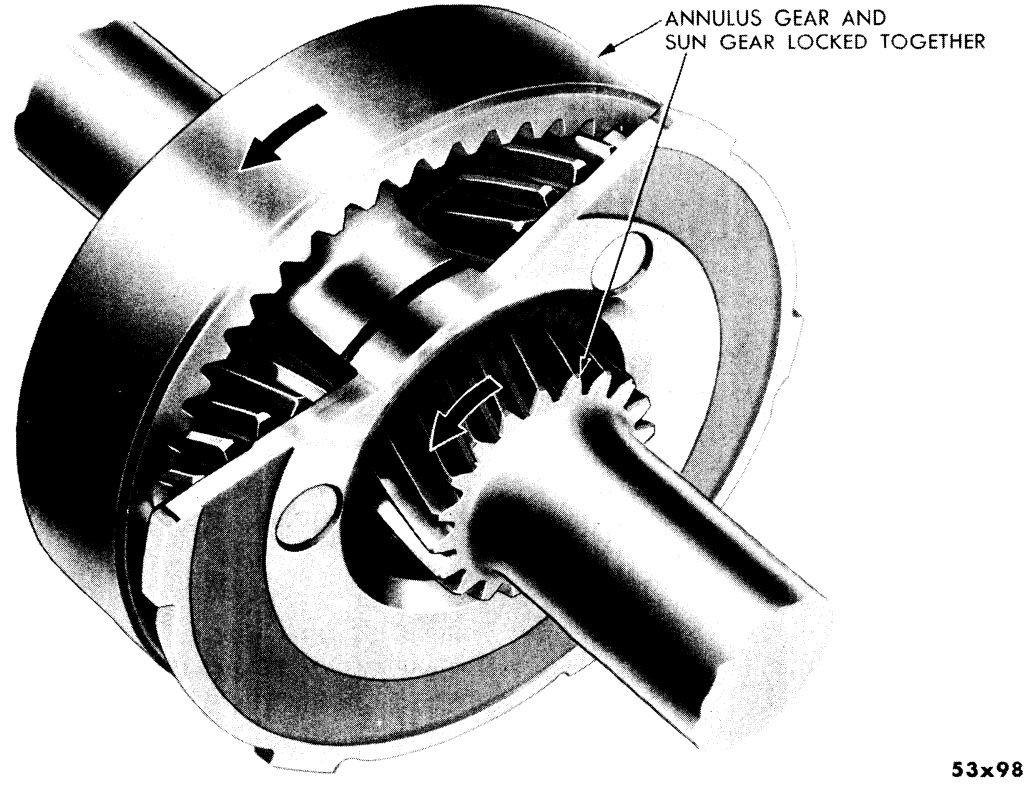

Fig. 19—Planetary Gear Set (Annulus and Sun Gear Locked)—Direct

The starting motor is wired in such a way that the engine cannot be started unless the selector lever is in the neutral (N) position.

In order to start the engine, apply hand brake or foot brake. Put selector lever in neutral (N) position and depress accelerator pedal slightly.

Turn ignition key to extreme clockwise position until the engine starts. If engine fails to start, repeat procedure.

b. Push Starting

If the engine fails to start in the normal manner, it may be started by pushing.

NOTE

Towing the car to start the engine is not recommended because of the sudden surge of power when the engine starts.

To start the engine by pushing, turn the ignition switch "On" and place the selector lever in neutral (N) position. After the car has been pushed to a speed of (approximately) 25 mph. shift to the low (L) position. This will allow the transmission to drive the engine.

18. DRIVING WITH POWERFLITE TRANSMISSION

All normal forward driving will be done in drive (D) range. The vehicle will have a slight tendency to creep after moving the selector lever from neutral (N) to drive (D) at idle. This can be prevented by applying the foot brake lightly. As soon as the accelerator is depressed, the vehicle will move forward in the drive (breakaway) range. The transmission will upshift to direct drive automatically. The speed at which the upshift is made is dependent upon the amount the accelerator is depressed. When slowing the car down at throttle openings short of wide open, the transmission will automatically downshift at approximately 11 mph.

Low (L) provides driving characteristics similar to drive (D), except that the transmission will not upshift into drive (direct) at any car speed. This position provides excellent handling ease in mountain driving and superior pulling qualities in sand and snow. It is possible to move the selector lever from low (L) to drive (D) and drive (D) to low (L) at any speed.

CAUTION

Damage may result if a shift from drive (D) to low (L) is made above 65 mph.

To shift into reverse (R), stop the vehicle and, with foot brake lightly applied, move the selector lever to reverse (R) position. Upon depressing the accelerator the vehicle will move in the reverse direction.

CAUTION

Damage may result if the selector is shifted to the reverse (R) position when the car is moving forward at a speed above 5 mph.

While operating in drive (D), at speeds below those shown in the following chart, maximum acceleration can be obtained for passing or climbing a steep grade by pressing the accelerator to the floor. This will cause the transmision to downshift. It will automatically upshift to direct if the accelerator opening is reduced or when the car reaches the wide open throttle upshift speed shown in the chart.

SHIFT SUMMARY (2-STAGE GOVERNOR)

	C-67	C-68	C-69	C-70	C-300
Kickdown Limit	42-58†	45-63†	43-60†	45-63†	N/A
Wide Open Throttle Upshift	52-69 51-61*	56-74 55-65*	54-71 53-63*	56-74 55-65*	N/A N/A
Closed Throttle Upshift	13-16	15-18	14-17	15-18	N/A
Closed Throttle Downshift	10-12	10-12	10-12	10-12	N/A

**Transmission equipped with three-stage governor.*
†Same for three-stage governor.

NOTE

The speeds listed are true car speeds in mph and do not allow for normal speedometer error.

19. TOWING POWERFLITE EQUIPPED VEHICLE

Transmission Inoperative—Tow the car with a rear end pickup or remove the propeller shaft.

Transmission Operating Properly—The car may be towed safely in neutral (N) at speeds not exceeding 35 mph. As a safety precaution, it is

recommended that the selector lever be held in neutral (N) by securing it in that position at the gate. For long distance towing (over 100 miles), the propeller shaft should be removed. **Note: Should car be towed with selector lever in any of the driving ranges, unnecessary damage to the transmission may result.**

20. THE PLANETARY GEAR SET

As can be seen from Figure 15, the drive consists of a torque converter and a two-speed, hydraulically-controlled, automatic transmission. The forward and reverse gear ratios are obtained by two planetary gear sets.

a. Construction

A planetary gear set consists of the following parts (Fig. 16): an annulus or internal gear, a planet pinion carrier with three planet pinion gears, and a sun gear.

The annulus gear surrounds the planet pinion gears and is meshed with them. The planet pinion gears are free to rotate on the planet pinion shafts which are fastened in the planet pinion carrier. The sun gear rotates inside and is also meshed with the planet pinions.

b. Operation

A planetary gear set may be used to increase torque and reduce speed. This can be accomplished by holding the sun gear from rotating and driving the annulus gear. (Fig. 17.) The annulus gear will turn the planet pinion gears on their shafts and, at the same time, cause the planet pinion gears to move around the sun gear. The planet pinion carrier will, therefore, be forced to rotate in the same direction as the annulus, but at a slower speed. The gear set in this case operates as a speed-reducing, torque-increasing device.

In addition, the direction of rotation may be reversed by use of a planetary gear set. By holding the planet pinion carrier stationary and driving the sun gear, the planet pinion gears will rotate on their shafts. (Fig. 18.) Because the planet pinion carrier cannot move, the planet pinion gears operate as idlers and transmit the torque to the annulus gear. This drives the annulus gear in the reverse direction at a reduced speed, but with increased torque.

If any two members of a planetary gear set are locked together, such as the annulus gear and sun gear, in the case illustrated in Figure 19, a direct, or 1 to 1, drive is obtained. There is no movement **between** the gears.

If no two members are locked together and no member is held from rotating, no torque will be transmitted. This provides the neutral operation.

21. POWER FLOW OF THE CHRYSLER POWERFLITE TRANSMISSION

The automatic transmission gear train is a combination of two simple planetary gear sets which provides neutral, direct drive, one forward gear ratio, and a reverse gear ratio. All engine torque must go through the torque converter.

a. Drive (D) (Breakaway)

At low speeds in the drive (D) range, the transmission is downshifted and the gear ratio and converter ratio are both effective. The power flow is from the torque converter turbine, through the input shaft, to the annulus gear of the kickdown (front) planetary set and to the sun gear of the reverse (rear) planetary set. The kickdown (front) band is applied, which holds the sun gear of the kickdown (front) planetary set stationary. The annulus gear drives the kickdown planet pinions in the same direction as the input shaft. The kickdown planet pinions are meshed with the stationary kickdown sun gear; therefore, they walk around this gear and exert force through the pinion shafts to rotate the carrier. The carrier moves at a slower speed than the annulus gear.

The pinion carrier of the rear planetary set is forced to rotate at this same speed, since both carriers are lugged to the reverse band drum. Because the sun gear of the rear planetary set is turning at input shaft speed, the planet pinions rotate backward on their shafts, causing the annulus gear (splined to the output shaft) to rotate more slowly in a forward direction than the carriers. This provides a speed decrease and torque increase of 1.72 to 1. The over-all ratio (the converter ratio of 2.6 to 1 times the gear ratio of 1.72 to 1) equals 4.47 to 1 at stall. This gradually diminishes to 1.72 to 1 at a car speed of approximately 55 mph where the converter no longer provides any torque multiplication. (Fig. 20.)

b. Drive (D) (Direct)

In this range the power flow from the torque

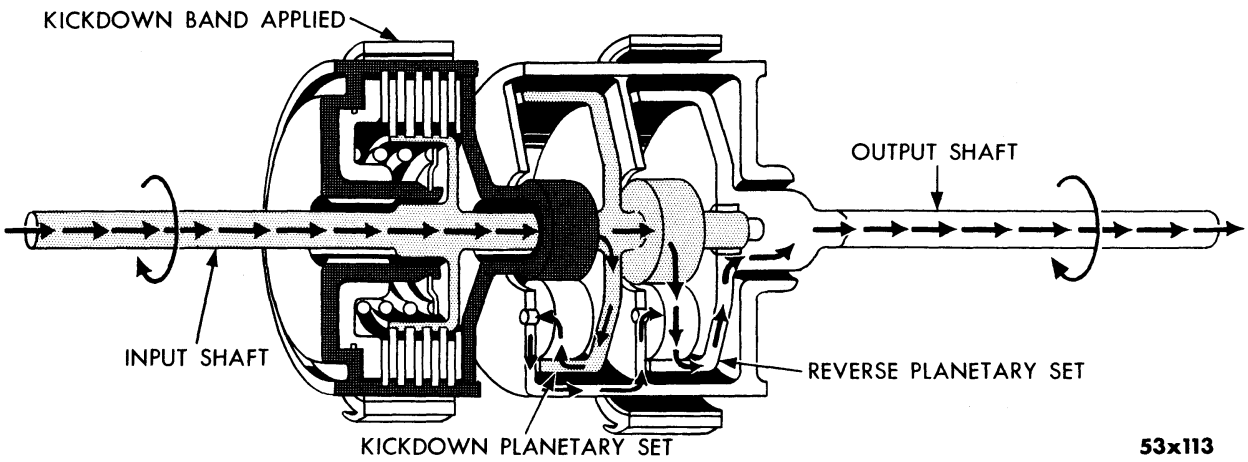

Fig. 20—Power Flow-Drive (D) (Breakaway), Kickdown (Forced Downshift) and Low (L)

converter goes directly through the transmission, because the planetary elements of the gear train are locked up by the multiple disc clutch and both bands are released. The converter provides all of the torque multiplication. (Fig. 21.)

c. Low (L)

In the low (L) position, the power flow is the same as drive (D) (breakaway), but here the 1.72 to 1 gear ratio remains in action at all speeds. (Fig. 20.)

d. Kickdown (Forced Downshift)

At speeds below those specified in chart on page 463, in drive (D) (after the transmission has upshifted to direct) maximum acceleration can be obtained by pressing the accelerator to the floor. This will force the transmission to downshift, and the power flow will be the same as drive (D) (breakaway). It will automatically upshift to direct if the accelerator is partially released or a speed, as specified in chart on page 463, is reached. (Fig. 20.)

e. Reverse (R)

In reverse, the rear band is engaged and all other friction elements released. The power flow is through the torque converter to the sun gear of the reverse (rear) planetary set. The carrier of the reverse (rear) planetary gear set is held stationary by the reverse band and, hence, the set acts as a simple reverse train to the reverse annulus and provides a further torque multiplication of 2.39 to 1, as shown in Figure 22.

f. Neutral (N)

In neutral all friction elements are released; therefore, there is no connection between the engine and the rear wheels.

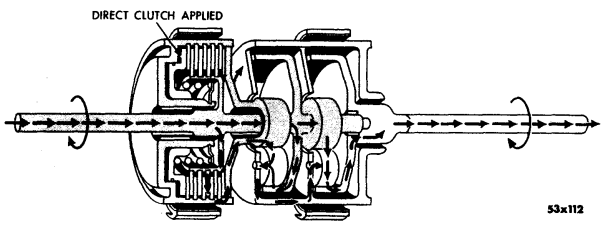

Fig. 21—Power Flow—Direct (D)

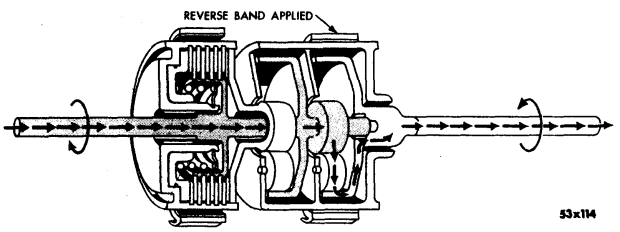

Fig. 22—Power Flow—Reverse (R)

g. Power Flow Summary

RANGE	ELEMENT APPLIED
Drive (Breakaway)	Front Band
Kickdown (Forced Downshift) and Low	Front Band
Drive (Direct)	Direct Clutch
Reverse	Rear Band
Neutral	No Band or Clutch

HYDRAULIC CONTROL SYSTEM

22. DESCRIPTION

If the PowerFlite Transmission did not operate automatically, the driver would be responsible for deciding when to shift gear, which band or clutch to apply, and when to apply it. The hydraulic control system replaces the driver in making these decisions and carrying them out.

To perform its functions, the hydraulic control system must furnish oil under pressure and route it at the proper time and rate to the proper controlling device for putting the transmission in the desired gear.

Figures 23 through 28 are schematic diagrams of the hydraulic circuit showing the positions of the various valves and passages (color coded) to indicate those under hydraulic pressure. These diagrams show the conditions of neutral, breakaway, direct, kickdown, low, and reverse respectively.

Following the diagrams, each part of the control system is discussed in detail as to its particular function. By referring back occasionally to the schematic diagrams, the operation of the control system, as a whole, can be understood.

a. Front Pump

Under all normal operating conditions up to forward speeds of about 35 mph, the front pump, driven at engine speed, provides oil needed by the transmission for torque converter pressure, control pressures, cooler flow (if so equipped), and lubrication.

The front pump is designed to deliver oil at 90 psi to fulfill the above conditions and, also to satisfy the normal amount of internal leakage in the transmission at all engine speeds above approximately 700 rpm. In reverse the front pump pressure is boosted to 250 psi.

b. Front Pump Check Valve

The front pump check valve allows oil to flow from the front pump into the control system of the transmission. It does not allow back flow however, from line pressure into the pressure side of the pump, when the pump is either stationary or merely circulating oil at very low pressure.

c. Rear Pump

The rear pump, smaller than the front pump but similar in design, is capable of furnishing all of the oil required by the transmission in normal driving at all car speeds above approximately 35 mph.

d. Rear Pump Check Valve

The rear pump check valve allows oil to flow from the rear pump into the control system of the

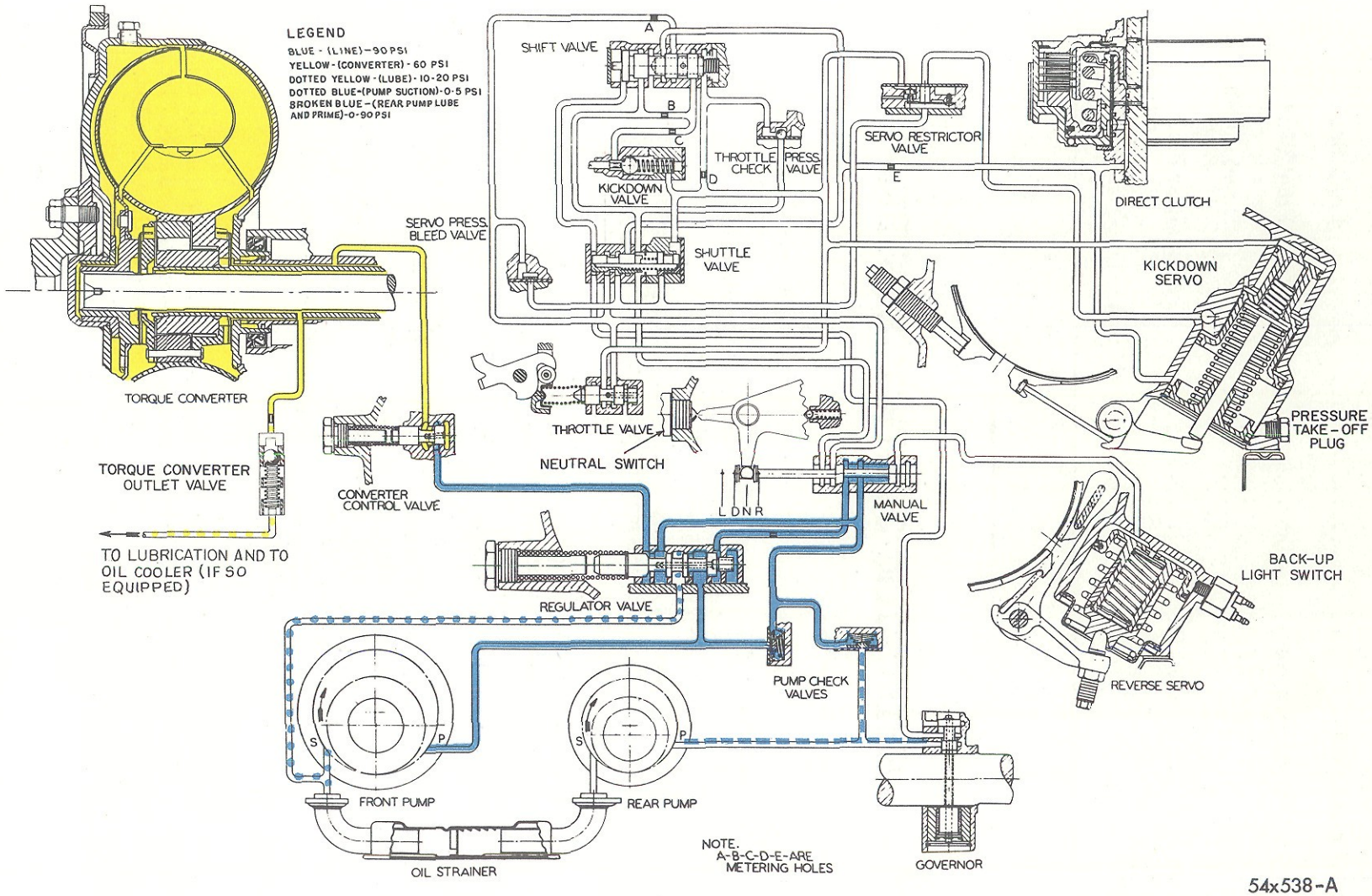

Fig. 23—Hydraulic Circuit—Neutral

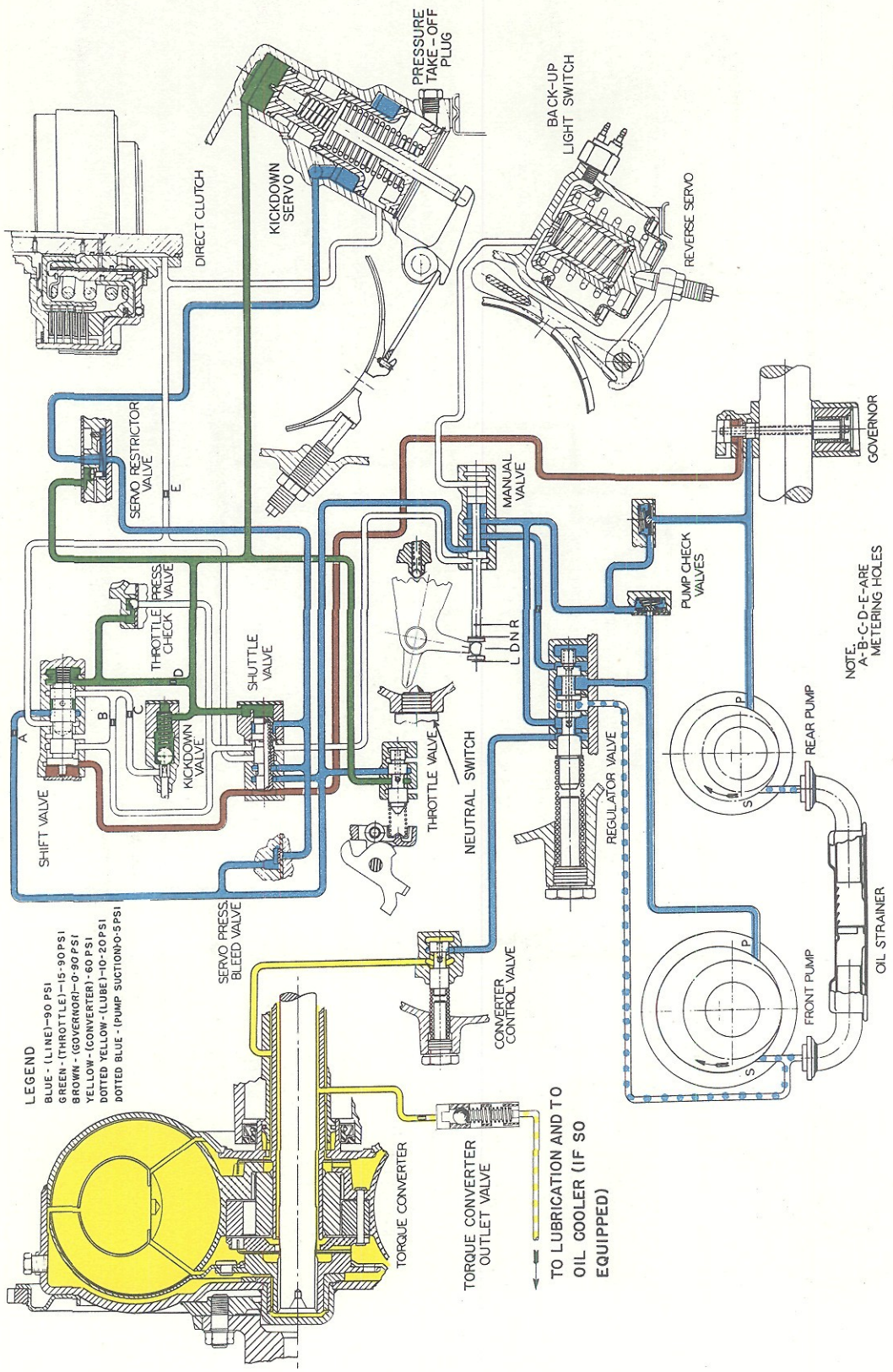

Fig. 24—Hydraulic Circuit—Breakaway

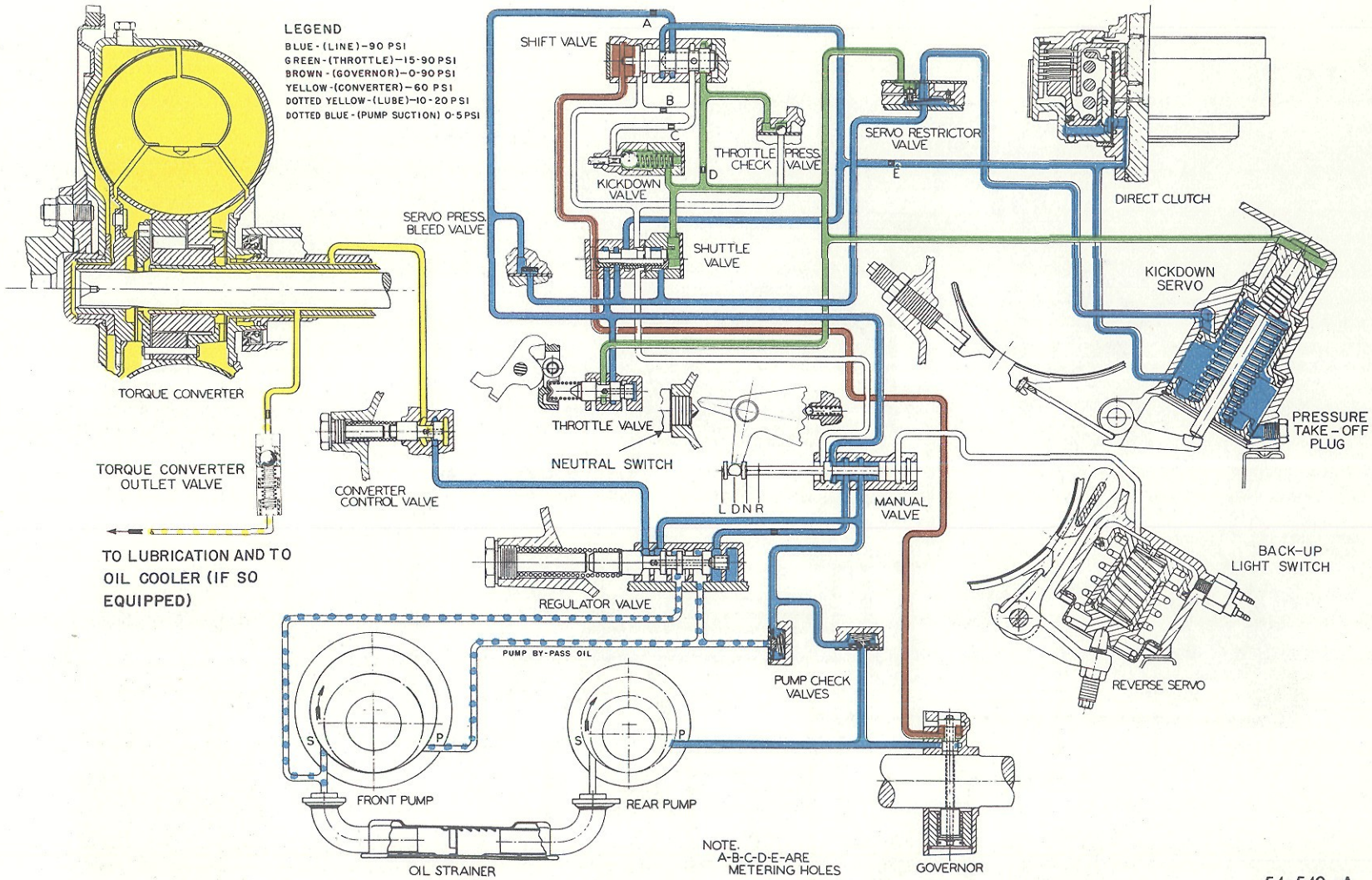

Fig. 25—Hydraulic Circuit—Direct

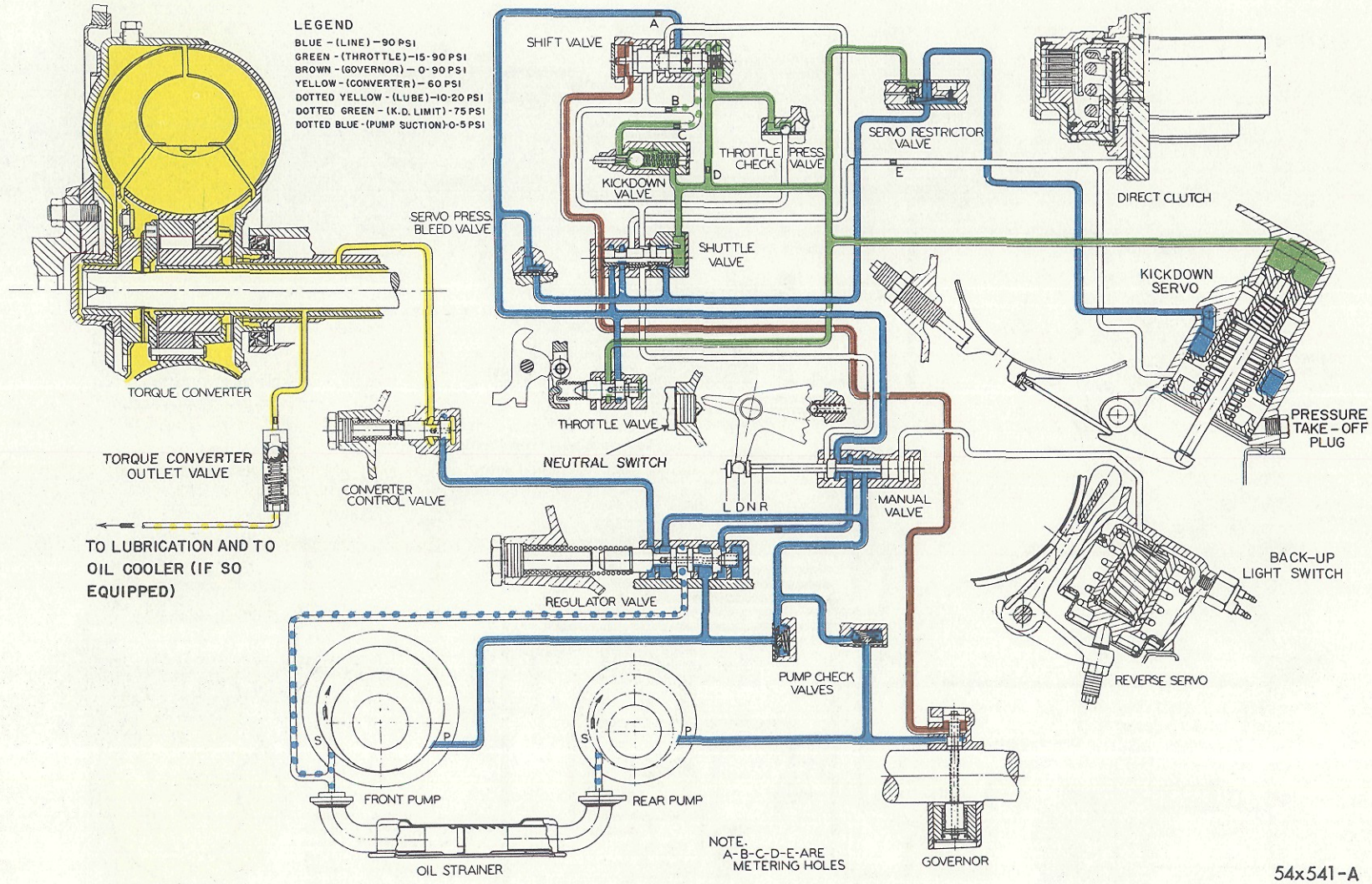

Fig. 26—Hydraulic Circuit—Kickdown

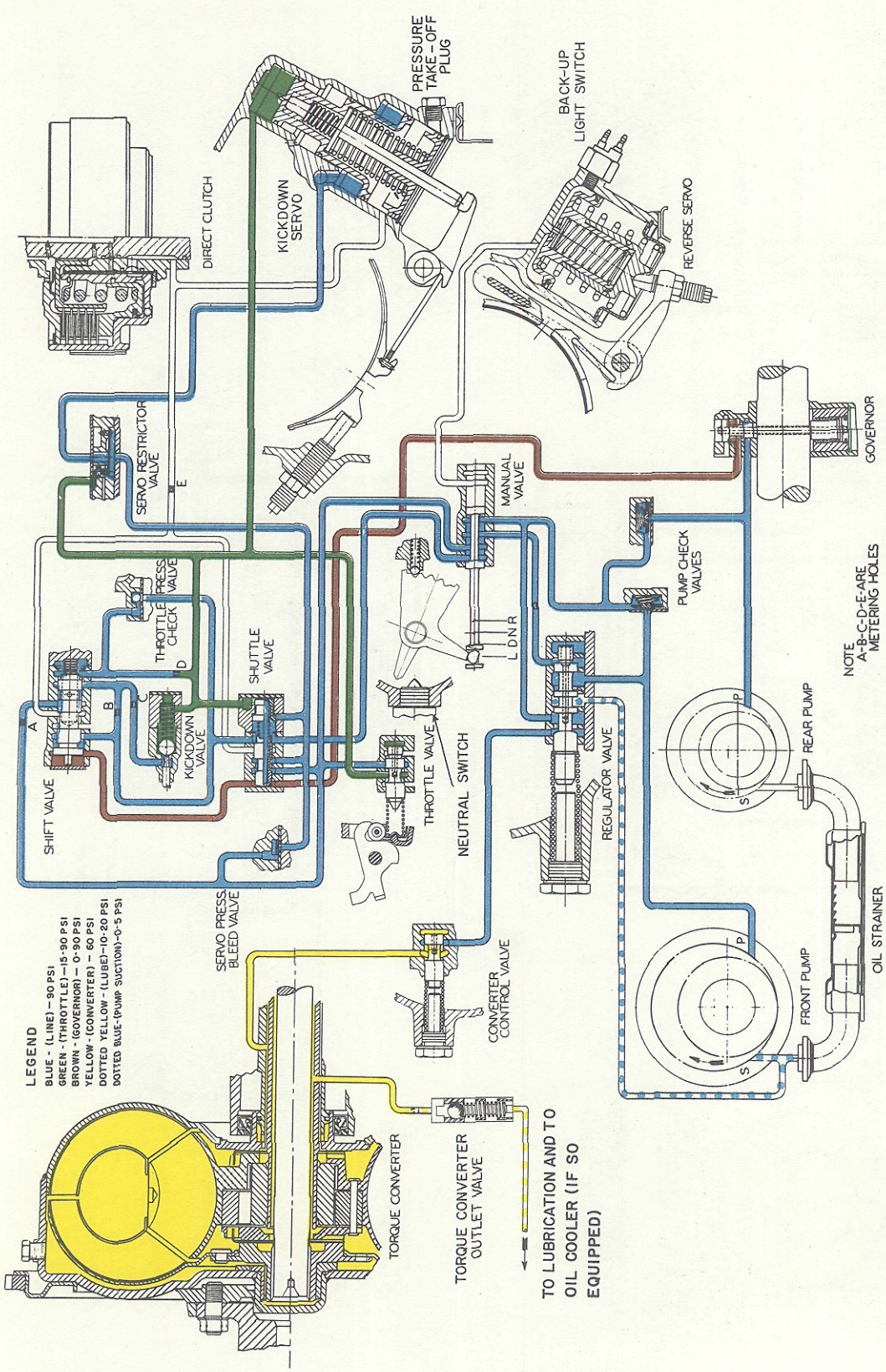

Fig. 27—Hydraulic Circuit—Low

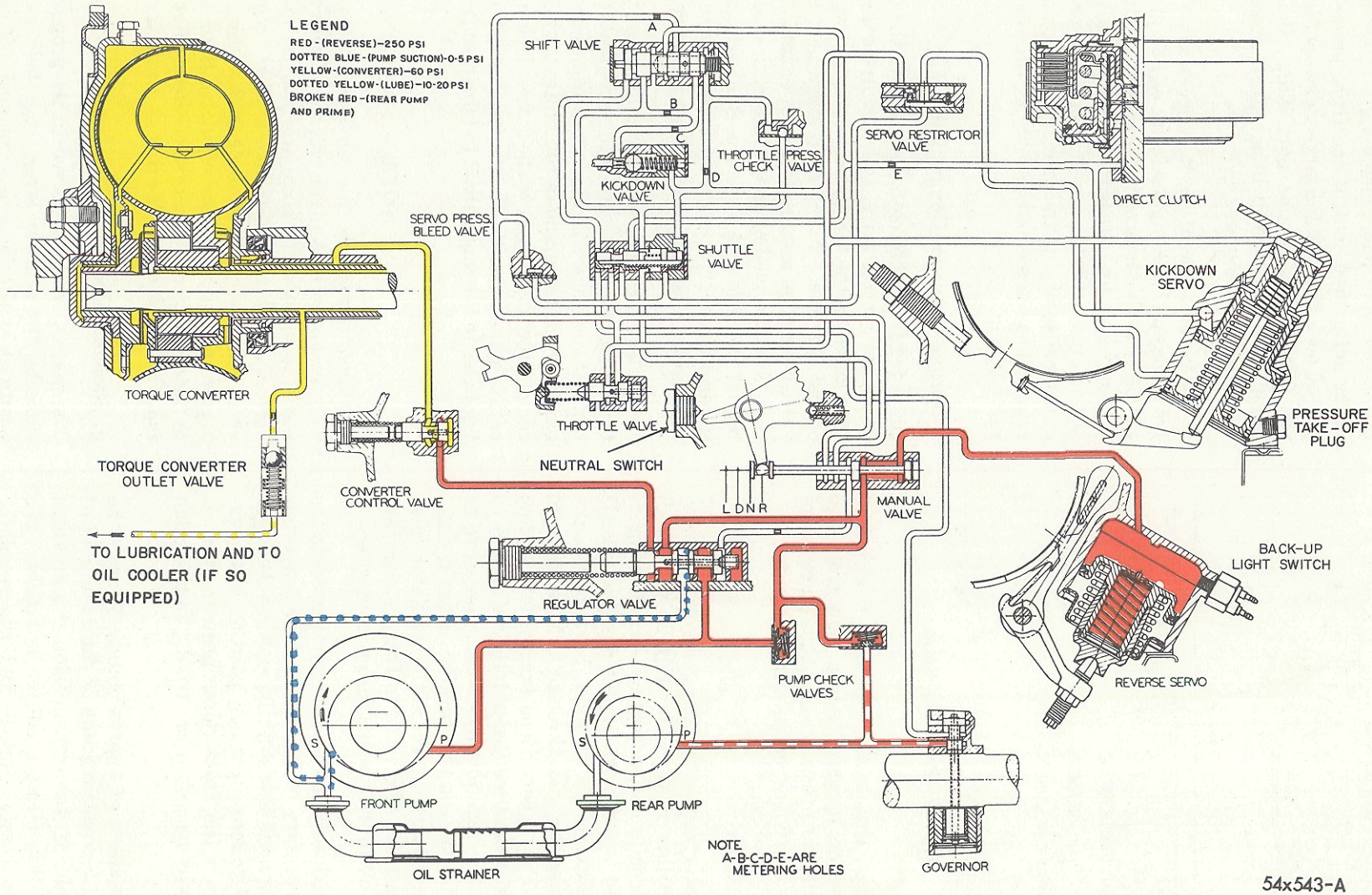

Fig. 28—Hydraulic Circuit—Reverse

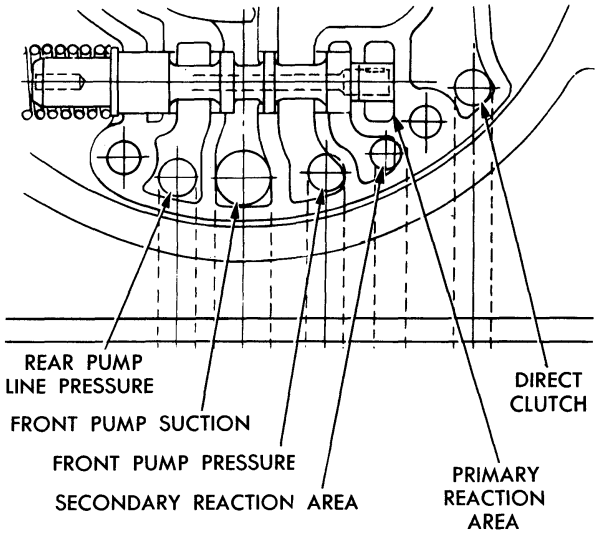

Fig. 29—Regulator Valve

transmission. Due to the metering hole in the valve, however, it restricts back flow from line pressure into the pressure side of the pump when the pump is stationary or rotating backwards.

e. Regulator Valve

The regulator valve (Fig. 29) controls line pressure at a value of approximately 90 psi for all operating conditions, except reverse. Line pressure, which is fed by the front pump at speeds under approximately 35 mph, is routed to the primary reaction area through a drilled hole in the valve. For all conditions except reverse, line pressure is also routed through the valve body to the secondary reaction area. A line pressure of 90 psi acting on the two reaction areas is sufficient to overcome the force of the regulator valve spring and move the valve to the position that will allow oil to flow to the torque converter.

If the oil flow from the front pump exceeds the amount necessary to feed the torque converter, line pressure will rise slightly, causing the regulator valve to move to a new position where excess oil from the front pump pressure port is allowed to by-pass into the front pump suction port.

Above a speed of approximately 35 mph the rear pump becomes capable of furnishing all of the oil needed by the transmission at a pressure of 90 psi. When this condition is reached, the pressure increases slightly and the regulator valve moves over to a new position where the excess flow is by-passed from the line pressure port into the front pump suction port. Under this condition the front pump check valve closes and all of the oil pumped out of the front pump is by-passed back through the large valve opening into the front pump suction port. Thus, the front pump turns with very little effort, since it is operating at a low pressure.

For reverse operation, it is necessary for the transmission to be supplied with oil at a pressure of 250 psi. This is accomplished by shutting off the source of line pressure to the secondary reaction area, with the result that a line pressure of 250 psi applied to the primary reaction area is required to overcome the force of the regulator valve spring.

f. Torque Converter Control Valve

Oil is fed from the regulator valve to the torque converter control valve, which controls the pressure entering the torque converter at a value of 60 psi. Torque converter pressure acts on the valve's reaction area so that if it exceeds 60 psi the valve is moved against the spring load, closing off the feed line pressure. Similarly, a drop in torque converter pressure causes the valve to open to increase the feed of line pressure.

Oil leaving the torque converter passes through a restricting hole in the regulator valve body. It also passes through the torque converter outlet check valve and is routed through the oil cooler (if so equipped) to the transmission lubrication system, where it escapes through metering holes in the input shaft to lubricate the gear set.

NOTE

A recent change in the regulator valve body, torque converter control valve and spring has made it possible to eliminate the torque converter outlet valve assembly. The regulator valve body is changed so that the torque converter control valve now regulates the pressure in the converter as it returns instead of regulating it before it enters the torque converter.

g. Manual Valve

The manual valve is moved to its proper positions by the selector lever. It is held in these positions by the force of a spring-loaded detent ball.

With the selector lever in neutral, the manual valve is positioned so that line pressure from the regulator valve is routed to the secondary reaction area of the regulator valve. Line pressure is therefore 90 psi, but neither of the bands nor the clutch are applied.

With the selector lever in reverse, the manual valve shuts off pressure to the secondary reaction area of the regulator valve and routes line pressure (at 250 psi) to the reverse servo.

With the selector lever in drive, the manual valve is positioned to route line pressure to the following places:

1. The secondary reaction area of the regulator valve (making line pressure 90 psi).

2. Through the servo pressure bleed valve to the line pressure port of the shuttle valve plug and the servo pressure port of the shuttle valve. Also, on through the servo restrictor valve to the line pressure area of the kickdown servo.

3. The line pressure port of the shuttle valve.

4. The line pressure port of the throttle valve.

5. Through metering hole "A" to the line pressure port of the shift valve.

With the selector lever in low, the manual valve routes line pressure to the same places as in Drive and to the following additional places:

1. The low port of the shuttle valve.

2. The low port of the shift valve.

3. Through metering hole "B" to the kickdown port of the shift valve.

4. Around the throttle pressure check valve ball to the throttle port of the shift valve.

h. Kickdown Servo (Fig. 30)

The kickdown piston is hydraulically applied in drive (breakaway) and low by two controlled pressures—line pressure and throttle pressure—acting on separate areas. The kickdown piston actuates the kickdown band through the kickdown lever and strut to hold the sun gear of the front planetary set stationary, resulting in a forward ratio of 1.72 to 1 through both gear sets.

In neutral and reverse, the kickdown piston is held released by the kickdown piston spring, there being no pressure applied to the kickdown piston at these times. In the drive range, however, for the automatic upshift to direct drive the kickdown piston is released by controlled pressure acting on the "off" area of the kickdown piston. The force of the pressure on the "off" area, assisted by the kickdown piston spring, is sufficient to overcome the forces of line pressure and throttle pressure acting on the apply side of the kickdown piston.

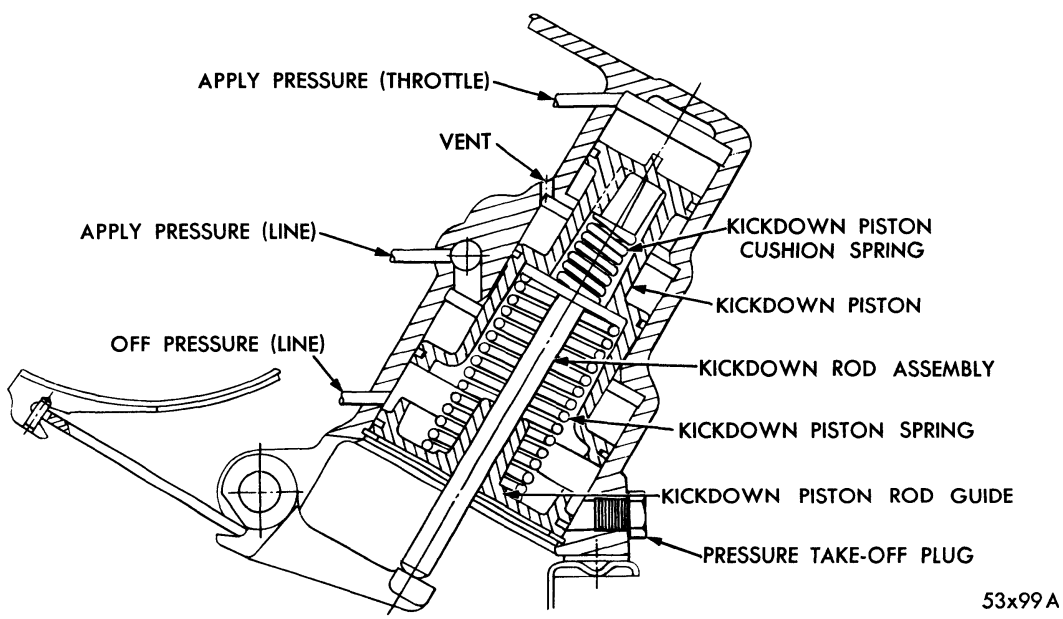

Fig. 30—Kickdown Servo Piston

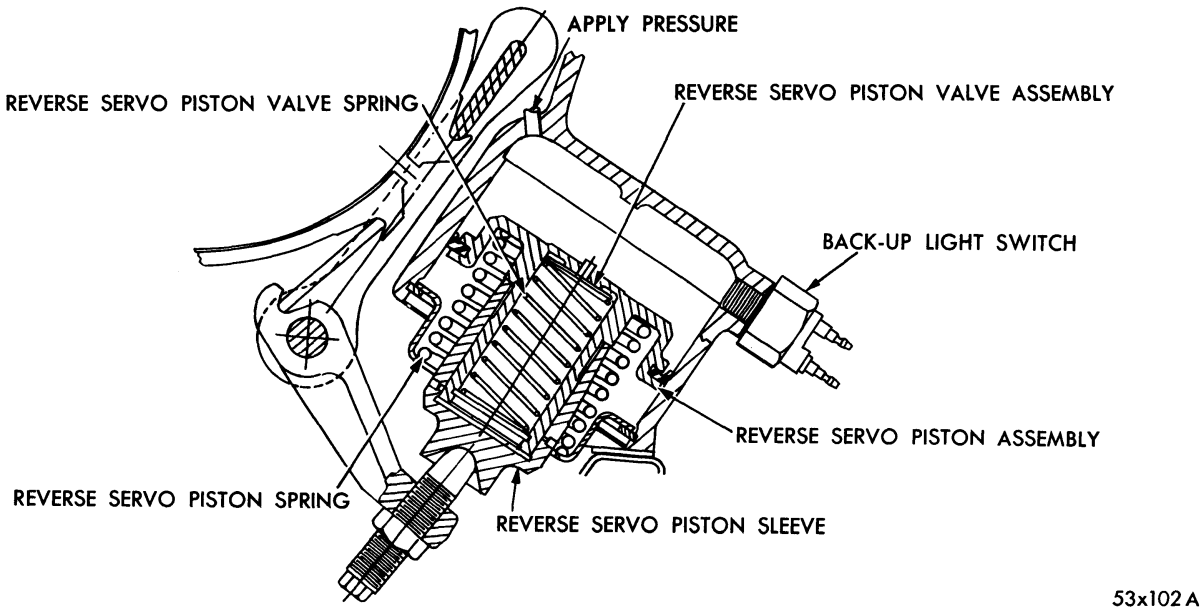

Fig. 31—Reverse Servo Piston

Initial engagement of the kickdown piston, when shifting from neutral to drive or to low, is softened by the compression of the kickdown piston cushion spring in conjunction with restricting hole in the servo restrictor valve.

i. Reverse Servo (Fig. 31)

The reverse servo piston is moved hydraulically to apply the reverse band through the reverse band lever, strut, and link. The result is to hold the carrier of the rear planetary set stationary and provide a reverse ratio of 2.29 to 1 through the reverse planetary gear set.

On initial engagement, oil is admitted to the chamber behind the reverse servo piston and is allowed to flow around the reverse servo piston valve, which is held open by a boss at the top of the servo chamber. The reverse servo piston sleeve is forced down against the reverse band lever with enough load to apply the reverse band and hold idle engine torque.

At this time, enough oil pressure builds up in the servo chamber to begin application of the reverse servo piston. As the reverse servo piston moves, the reverse servo piston valve is allowed to close and the oil, trapped in the chamber inside of the reverse servo piston, is forced out of the two metering holes in the reverse piston sleeve, cushioning the engagement.

The reverse servo piston is released by the return spring when the source of hydraulic pressure is discontinued.

j. Throttle Valve

The throttle valve cam is rotated, in proportion to the amount of throttle opening of the carburetor, by a linkage connecting the throttle valve cam to the vehicle's throttle linkage. The throttle valve cam then positions one end of the throttle valve spring in accordance with the amount of carburetor throttle opening, the spring being only slightly compressed at closed throttle and further compressed at wide open throttle. The other end of the throttle valve spring, therefore, exerts a force on the throttle valve that increases, in proportion, the amount of carburetor throttle opening.

The throttle valve allows oil to flow from the line pressure port to the throttle pressure port, which is connected to the reaction area by a small hole through the throttle valve. Throttle pressure will build up in the throttle pressure circuit and against the reaction area until it reaches a value great enough to balance the force of the throttle valve spring. If throttle pressure builds up too high, the throttle valve will move slightly to such a position that excess oil is allowed to escape through the vent port.

Throttle pressure will vary with the amount

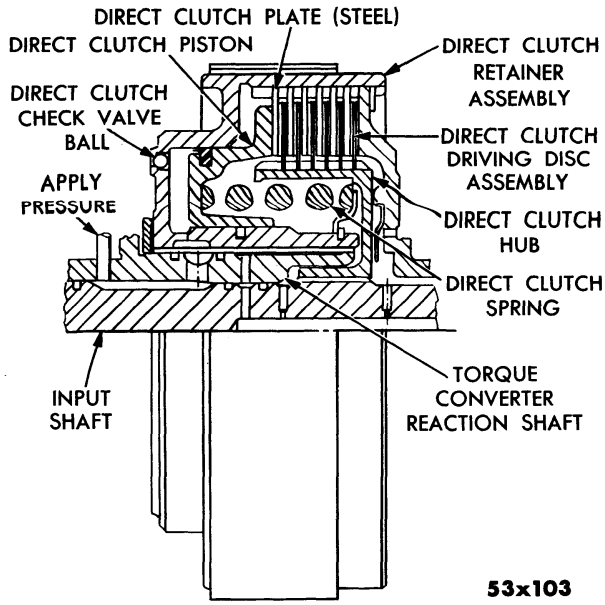

Fig. 32—Direct Clutch

of carburetor throttle opening from a value of 15 psi, at closed throttle, to a value of approximately 90 psi, at wide open throttle. Throttle pressure is routed to the following places:

1. The throttle pressure area of the kickdown servo.

2. The throttle pressure port of the servo restrictor valve operating plug.

3. The throttle pressure port of the shuttle valve plug.

4. The kickdown valve.

5. Through metering hole "D" to the throttle pressure port of the shift valve.

k. Direct Clutch (Fig. 32)

The direct clutch piston is moved hydraulically to engage the multiple disc direct clutch. The direct clutch piston is released by means of the direct clutch spring when control pressure is discontinued.

Although no pressure is applied to the direct clutch piston in reverse or neutral, there is oil present in the direct clutch piston chamber. With the high rotative speeds of the direct clutch retainer in reverse or neutral, it is possible to build up sufficient centrifugal oil pressure to move the direct clutch piston. To eliminate the possibility of clutch drag caused by such movements, the direct clutch check valve ball (refer to Fig. 32) is unseated by centrifugal force and the oil in the chamber is allowed to vent. For normal application of the direct clutch, the flow of oil, under controlled pressure into the direct clutch piston chamber, is sufficient to seat the direct clutch check valve ball, closing the vent.

l. Governor Valve

The governor is mounted on the output shaft in such a manner that when the output shaft rotates, the governor weight assembly exerts a centrifugal force on the governor shaft. The governor shaft, in turn, transmits this force to the governor valve. Oil is allowed to flow from the line pressure port to the governor pressure port, building up pressure in the governor circuit and against the valve reaction area to a value sufficient to balance the centrifugal force of the weight.

The greater the car speed, the greater is the centrifugal force of the weights and, hence, the greater governor pressure necessary to balance the centrifugal force. If the car speed decreases, the decrease in centrifugal force allows the valve to move out slightly, venting excess oil and bringing the governor once more in balance at a lower pressure.

The governor weight assembly is constructed so that for car speeds under 25 mph both weights act as a unit, with the result that small changes in speed result in comparatively large changes in centrifugal force and governor pressure. Above 25 mph the primary weight moves outward against the pre-load of the spring and bot-

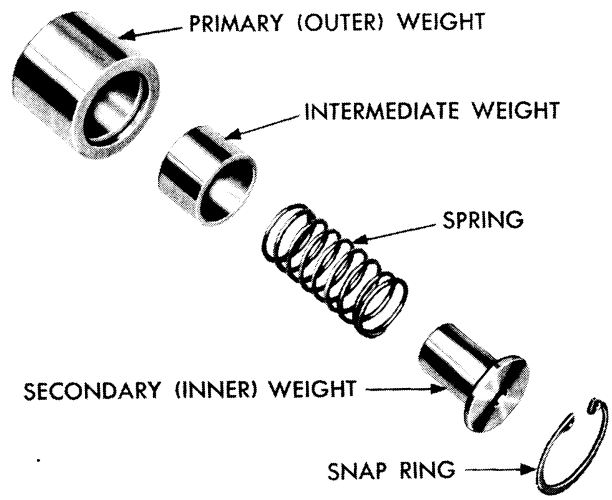

Fig. 32A—Three Stage Governor (Disassembled View)

toms against the snap ring, leaving only the secondary weight active. Small variations in vehicle speed above 25 mph, therefore, result in only small variations in governor pressure.

Governor pressure is routed to the governor pressure ports of the shuttle valve and the shift valve.

NOTE

If the vehicle is equipped with the three stage governor, as shown in Figure 32A, all three weights act together in the first stage. In the second stage the inner weight only is effective while in the third stage both inner and intermediate weights act in unison.

m. Shift Valve (Fig. 33)

The shift valve is normally at either extreme of its travel. With the shift valve downshifted (at the extreme of travel toward the governor pressure end of the valve body) any oil in the direct clutch chamber and the kickdown servo "off" area is allowed to escape through the vent port.

When the shift valve is moved to the opposite extreme of its travel, the vent port is closed off and oil is fed by line pressure through metering hole "A" into the direct clutch chamber and the kickdown servo "off" area, to the direct clutch port of the shuttle valve.

Due to the effect of metering hole "A", the direct clutch piston moves up rather slowly to the point where the direct clutch plates are squeezed together. The pressure then rises to a value great enough to balance the forces of line pressure and throttle pressure on the apply side of the kickdown piston. The kickdown piston and direct clutch are designed so that the value of this "balance pressure" is sufficient to complete a smooth clutch engagement during the time required to back-off the kickdown piston.

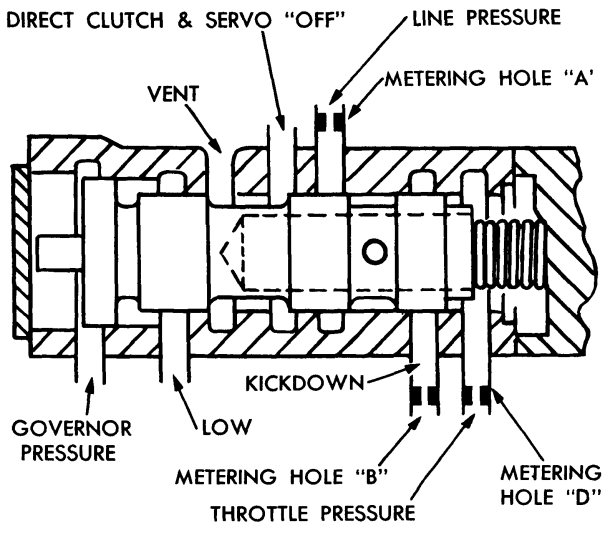

Fig. 33—Shift Valve

After completion of the upshift, clutch and servo-off pressure rises further to the value of line pressure, providing a "safety margin" of clutch load.

At light throttle (15 psi throttle pressure), the shift valve is made to upshift at 15 to 20 miles per hour, and "balance pressure" is a low value corresponding to the small force of the throttle pressure on the kickdown piston. The resulting low-clutch engagement load is, therefore, in proportion to the light throttle engine output. At wide open throttle (90 psi throttle pressure), the shift valve upshifts at approximately 60 mph and "balance pressure" is at a high value, engaging the clutch at a load corresponding to the high engine output.

With the shift valve in the upshifted position, throttle pressure is not allowed to act on the end of the shift valve. Instead, any oil trapped in that area is allowed to flow through the holes in the shift valve to the kickdown port and, from there, through metering hole "B" to be vented out the low port of the manual valve. The shift valve spring then exerts the only force on the "throttle end" of the shift valve. Thus, regardless of throttle opening, the shift valve will downshift when speed drops to a point low enough that governor pressure can no longer overcome the force of the shift valve spring. This downshift occurs at a speed of approximately 11 mph.

All that is required of the shift valve for low range operation is that it must downshift in response to the movement of the selector lever to low position and remain downshifted, regardless of car speed. The shift valve is forced to downshift by the application of line pressure from the low port of the manual valve to the low port and the kickdown port of the shift valve. To insure that the shift valve remains downshifted, regardless of vehicle speed (governor pressure), line pressure is also allowed to flow

around the throttle pressure check valve ball to the throttle pressure port of the shift valve.

It is necessary that whenever the forces of governor pressure and throttle pressure act on the shift valve to cause an upshift or downshift the valve must "snap" from one position to the other without hesitating or "hunting." This is accomplished through the use of the "D" and "B" metering holes. As the shift valve passes through its mid-position (moving in either direction) oil from the throttle valve passes through metering hole "D", through the throttle pressure port, to the end of the shift valve. It is passed, from there, through the holes in the shift valve in the kickdown port of the shift valve through metering hole "B", and is vented out the low port of the manual valve. Because the pressure "upstream" from metering hole "D" is at the value of throttle pressure and the pressure "downstream" from metering hole "B" is zero (vented) the pressure on the end of the shift valve between the two metering holes is at a value between throttle pressure and zero.

When the car reaches the speed at which the upshift should occur, governor pressure reaches a value great enough to overcome the forces of throttle pressure and the shift valve spring, causing the shift valve to start moving. As the shift valve reaches mid-position, the pressure on the throttle end of the shift valve drops to the "in between" pressure, previously described, causing the valve to move rapidly in the same direction. Past mid-position, the throttle pressure port is covered by the shift valve, allowing the pressure on the end of the shift valve to drop to zero with a further accelerating effect on its movement. Snap action of the shift valve during a downshift occurs by reversing the order of the previously described events.

n. Kickdown Valve

A kickdown valve is a spring-loaded ball, and when operated, downshifts the shift valve, which vents oil from both the direct clutch and the kickdown servo-off area, returning the transmission to low gear.

The kickdown valve is normally held closed by the kickdown valve spring, but is forced open by the kickdown valve rod, which is moved by an arm of the throttle valve cam when it is near the wide open extreme of throttle opening. With the kickdown valve open, oil from the throttle valve is allowed to flow through metering hole "C" to the kickdown port of the shift valve. The oil may flow from there through metering hole "B" and out to vent through the low port of the manual valve. With throttle pressure at its maximum of 90 psi "upstream" from metering hole "C" and the pressure of zero "downstream" from metering hole "B," the pressure in between the two holes is maintained at a value of approximately 75 psi. This pressure, when applied to the end of the shift valve through the holes in the shift valve, is great enough to make the shift valve downshift against the force of any governor pressure up to that corresponding to approximately 55 mph (depending upon car model) car speed.

o. Servo Restrictor Valve and Servo Restrictor Valve Operating Plug

Under normal driving conditions, the car is brought to a stop at closed throttle with the downshift occurring at approximately 11 mph. If the kickdown piston was allowed to apply freely under these conditions, its speed and load of application would be great enough to take up drive line backlash with a harsh and audible "clunk."

To retard and soften kickdown piston engagement, the servo restrictor valve is made to close at closed throttle, restricting the flow of oil to the line pressure area of the servo through the hole in the valve. Under all conditions of greater throttle opening when unrestricted flow is desired, the greater throttle pressure acts on the large end of the servo restrictor valve operating plug, forcing the servo restrictor valve from its seat.

p. Shuttle Valve, Shuttle Valve Plug, and Servo Pressure Bleed Valve

The shuttle valve has two separate functions, and performs each independently of the other. The first is that of providing fast and smooth direct clutch engagement when the driver makes a "lift-foot" upshift.

The lift-foot upshift is made by accelerating the car in kickdown gear at or near wide open throttle to a comparatively high speed and then returning the accelerator pedal to closed throttle. Without the shuttle valve, the resulting upshift would consist of a series of lurches, caused first

by the braking effect on the kickdown gear and, then, by the too hard engagement of the direct clutch.

Under conditions of closed throttle (low throttle pressure) and high car speed (high governor pressure) the shuttle valve and shuttle valve plug are forced to their extreme of travel (toward the throttle end of the valve body). In this position, oil is allowed to flow from the servo pressure port to the direct clutch pressure port. Because the line pressure area of the kickdown servo is being fed oil only through the hole in the servo pressure bleed valve, pressure on this area drops to a low value while oil from the shuttle valve and from the shift valve build up pressure on the direct clutch and the "off" area of the kickdown servo. The kickdown band load is then reduced sufficiently to allow the band to slip, giving a feeling of free wheeling. In the meantime, the direct clutch has built up enough pressure load to complete a smooth engagement.

The second function of the shuttle valve is to regulate the application of the kickdown piston when making kickdowns. Kickdowns made at low speeds require very little time in which to complete the shift, due to the comparatively small change in engine speed between direct drive and kickdown gear. The higher the speed at which the kickdown shift is made, the longer the time required to make a smooth shift.

For all kickdowns, the shuttle valve plug is forced against the stop ring by line pressure and wide open throttle pressure (90 psi) thus limiting the travel of the shuttle valve. The force of the shuttle valve spring is great enough so that the combined force of line pressure on the shuttle valve reaction area and governor pressure (at speeds under 25 mph) on the governor pressure area cannot move the shuttle valve toward the shuttle valve plug. Thus, for kickdowns below 25 mph, oil is fed to the line pressure area of the kickdown servo pressure bleed valve and through the line pressure and servo ports of the shuttle valve. Speed of kickdown piston application is then at its maximum.

As further insurance against the engine "running away" before the kickdown piston has time to engage the band during low speed kickdowns, the direct clutch is held engaged until the kickdown piston has contacted the band. This is accomplished by the introduction of a restriction (metering hole "E", placed so that oil is "backed-up" into the clutch chamber as the kickdown piston moves on). This "back-up" pressure is greatest on low speed kickdown when the kickdown applies rapidly and is, even then, just barely enough to hold the clutch applied until the kickdown piston engages. At this time, the kickdown piston can no longer force oil into the clutch and the pressure is allowed to fall to zero.

For kickdowns at higher speeds, governor pressure attains a sufficiently high value to move the shuttle valve toward the shuttle valve plug, cutting off the feed of line pressure to the shuttle valve. Oil must then flow to the line pressure area of the kickdown servo only through the hole in the servo pressure bleed valve. Kickdown piston application is therefore retarded.

If, on high speed kickdown, the servo pressure drops below the proper value (due to restricted flow through the servo pressure bleed valve hole), the drop in force of servo pressure on the shuttle valve reaction area causes the shuttle valve to move back toward the governor pressure end of the valve body, allowing enough oil to flow from the line pressure area of the shuttle valve to maintain servo pressure at the desired value during servo piston movement.

MAINTENANCE, TESTS, AND ADJUSTMENTS

23. CHECKING FLUID LEVEL (REFER TO FIG. 34)

Check fluid level every 1,000 miles as follows:

OIL REFILL CHART

MODEL	REFILL	DRY
C-67	10 quarts	10½ quarts
C-68, C-69, C-70, and C-300	11 quarts	11½ quarts

With engine idling, oil level should not be above the "Full" mark on the dip stick after the car has been driven sufficiently to bring engine and transmission up to operating temperature. **NOTE: If oil is slightly below desired level, add a little oil at a time and recheck. Do not add full quart unless oil level is below "Low" mark and transmission is at normal operating temperature.**

24. DRAINING AND REFILLING

The transmission and torque converter should be drained and refilled with fresh Automatic Transmission Fluid (Type "A") every 20,000 miles.

a. To Drain

Remove transmission oil pan drain plug and allow transmission to drain. Remove the access plate from the bottom of torque converter housing and rotate torque converter until the drain plug is accessible. Remove plug and drain fluid. Check gasket and transmission drain plug. Install new gasket if necessary. Install both plugs and tighten. Install access plate on housing and tighten bolts.

b. To Refill

Apply parking brake. Add five quarts of Automatic Transmission Fluid (Type "A") through the transmission filler tube. Start engine and add approximately four quarts more while engine is running. Allow engine to idle for two minutes. Shift selector lever through all positions and return to Neutral (N). Add sufficient fluid to bring level to "L" mark on transmission dip stick. Fluid level will rise to "full" mark with transmission at normal operating temperature. Recheck level when warm.

NOTE

Overfilling can result in oil being forced out of the filler tube.

25. SEASONAL PREPARATION

a. Preparation for Winter Driving

Should slow engine turn-over be experienced on starting, (during extreme cold weather for which 5W oil is recommended and used in an engine) it is permissible to drain one quart of Type "A" fluid from the transmission and replace with one quart of kerosene. After performing this operation, the fluid level of the transmission should be checked in accordance with recommended procedures. If additional fluid is required, sufficient

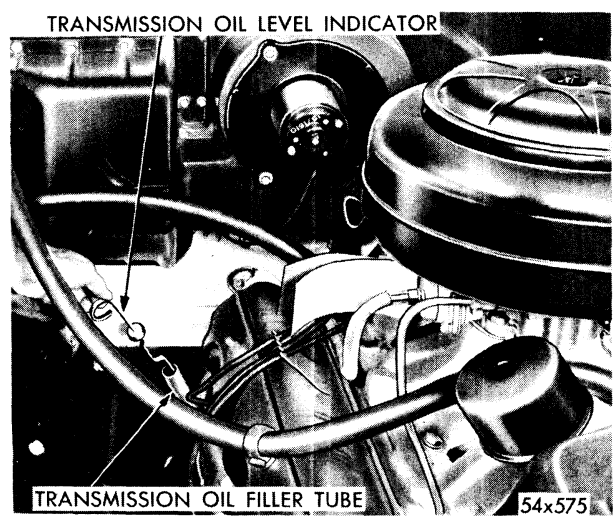

Fig. 34—Checking Fluid Level (Typical View)

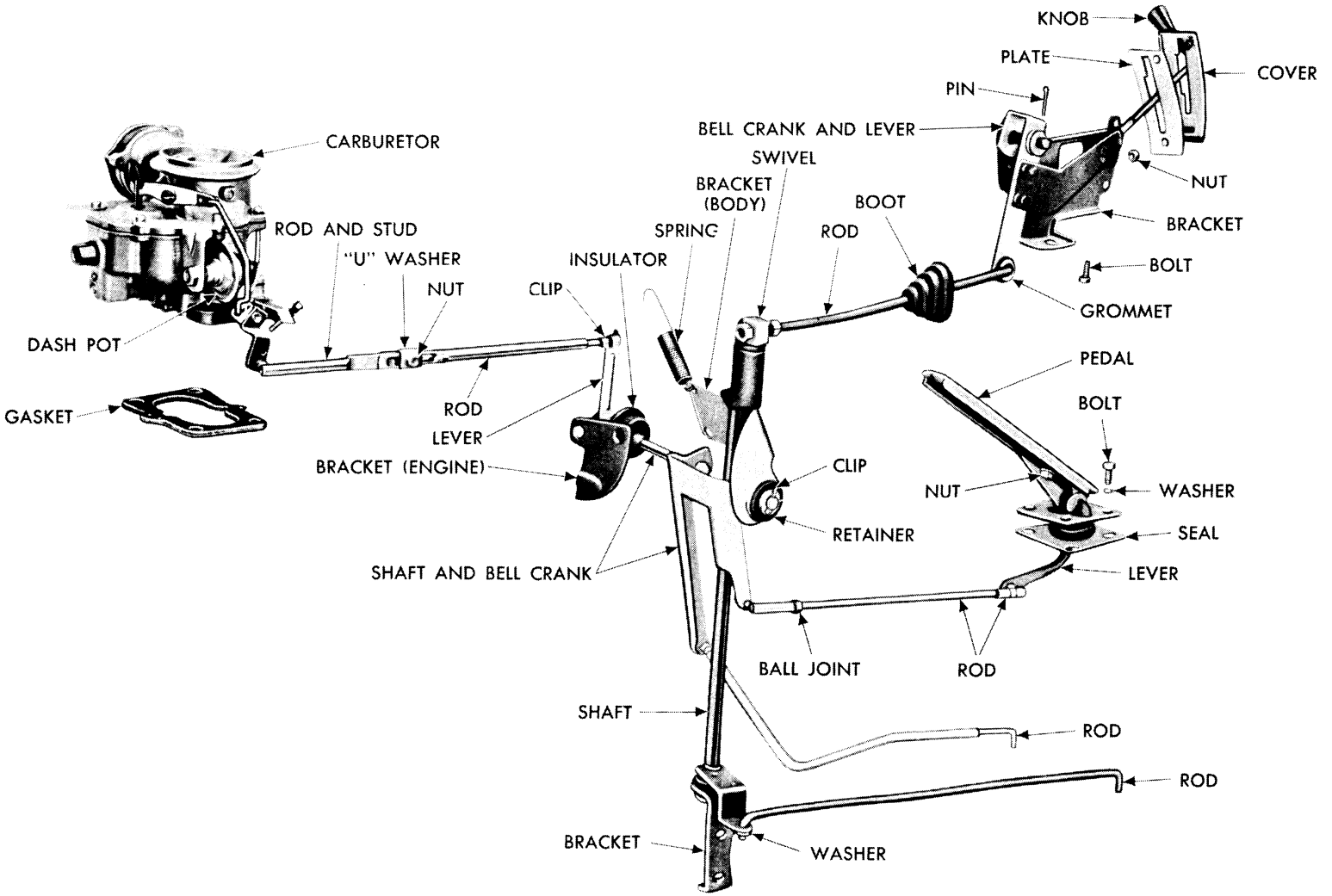

Fig. 35—Throttle Control Linkage

Type "A" fluid should be added to make up the difference.

b. Preparation for Summer Driving

In the event the Type "A" transmission fluid had been thinned down with kerosene for extreme cold weather operation, it will not be necessary to drain and refill the transmission. The reason is that the higher transmission operating temperatures in warm weather will gradually evaporate the kerosene. It is only necessary to assure that the proper fluid level in the transmission is maintained by adding Type "A" fluid as required.

26. GEARSHIFT LINKAGE ADJUSTMENT (REFER TO FIG. 35)

(1) Selector lever is held in the gate (between Neutral and Drive positions) under tension, which is adjustable by a bracket to which it is attached behind the instrument panel. Using Tool C-394 (spring scale) and pulling out from the selector lever knob, should require a one to two pound pull to break contact between the selector lever and gate. If it does not, then adjust by loosening bracket attaching bolts and sliding bracket to obtain the proper tension. Tighten bolts and recheck tension.

If correct tension cannot be obtained by adjusting bracket, it can be corrected by removing the selector lever and mounting bracket assembly and bending the tension spring. Bend the tension spring away from the gate to **decrease** tension and toward the gate to **increase** tension.

(2) Raise hood and inspect the selector lever-to-torque shaft rod for interference (where it goes through the fire wall). If necessary, bend rod to provide clearance at this point.

(3) Disconnect the selector lever-to-torque shaft control rod at upper torque shaft rod (adjustment end).

(4) Make sure manual control lever (located on side of transmission) is in the neutral detent position (second detent from rear, all the way to rear, and one notch forward) by shifting it out of neutral and back again.

(5) Shift selector lever through all ranges.

The selector lever must go into gate without interference when shifting—do not use force. Recheck the assembly and adjustment.

27. THROTTLE PRESSURE AND THROTTLE LINKAGE ADJUSTMENT

Accurate adjustment of the transmission throttle linkage and setting of the throttle oil pressure is very important for proper operation. The following procedure should be very carefully performed.

a. Throttle Linkage Adjustment

(1) Be sure there is no binding in the throttle linkage; if there is, correct this condition before proceeding.

(2) Run engine until normal operating temperature is reached.

(3) Remove air cleaner to make sure the choke is in the fully opened position (to assure being off fast idle cam).

(4) Connect tachometer leads to coil and ground.

(5) Adjust engine idle adjusting screw on carburetor to give 475-500 rpm (transmission in neutral position). Stop engine.

(6) Loosen the throttle linkage adjusting screw, as shown in Figure 36 (located on accelerator shaft-to-carburetor rod).

(7) Move the rear portion of the accelerator shaft-to-carburetor rod rearward until it is stopped by the idle stop on the transmission throttle cam.

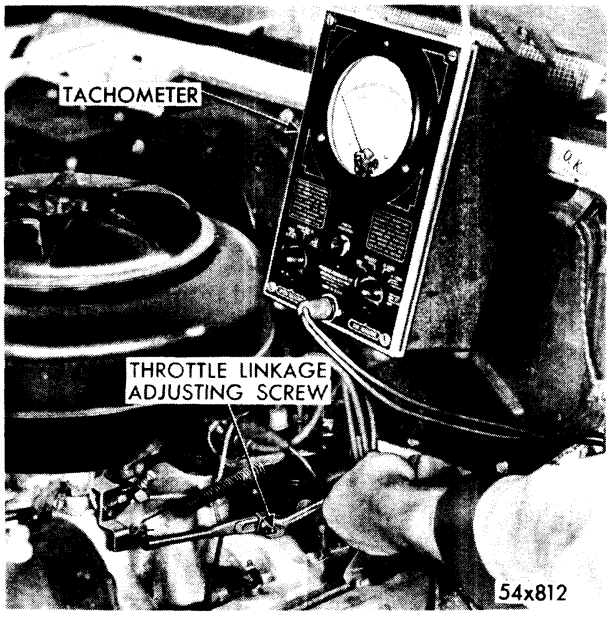

Fig. 36—Adjusting Throttle Linkage

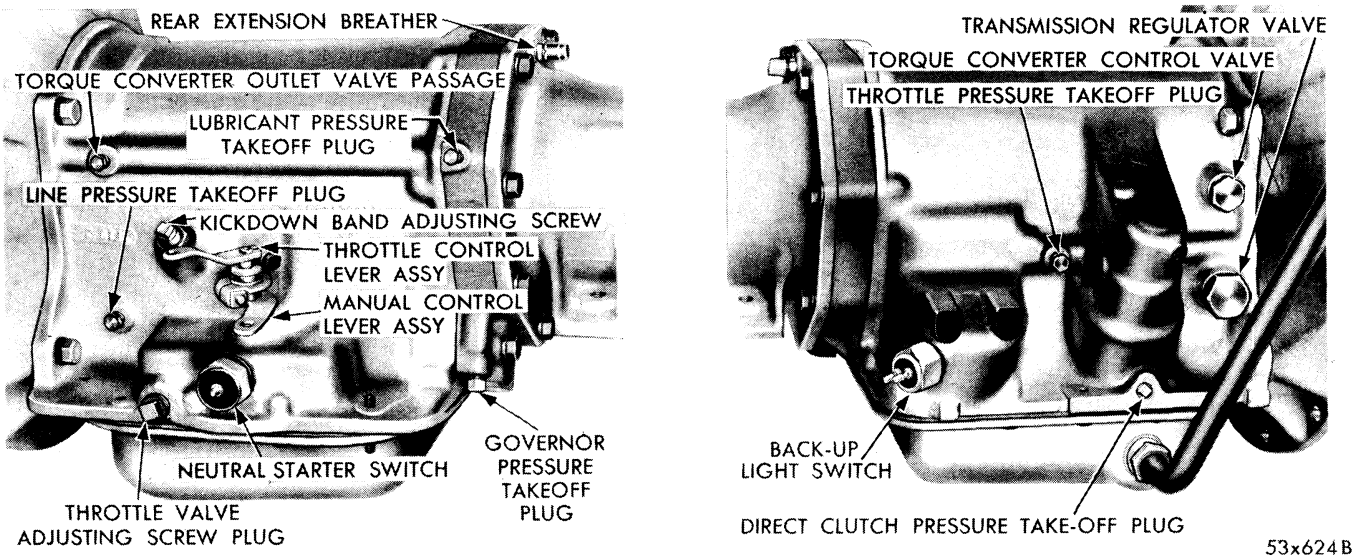

Fig. 37—Exterior Views of Transmission

(8) With rods in line and rear portion of rod lightly pre-loaded, lock throttle linkage adjusting screw by applying 15 foot-pound torque, as shown in Figure 36.

b. Throttle Pressure Adjustment

(1) With throttle linkage properly adjusted and tachometer attached, start engine and recheck idle setting (475-500 rpm) with transmission in neutral and hand brake set. Raise vehicle on hoist.

(2) Remove the throttle oil pressure take-off plug (1/8" pipe) located between reverse and kickdown servos on right side of transmission. (Refer to Fig. 37.) Connect a 100 psi pressure gauge (Tool C-3292). Since the engine is idling, and the manual lever is in neutral, the gauge will show no pressure.

(3) Shift manual control lever on left side of transmission to Drive range. When the manual control lever is moved into Drive range, (one detent toward the front) engine speed will drop approximately 50 rpm. Check throttle pressure.

Throttle pressure should read 13 to 15 psi. If the pressure is not within specifications, adjust as follows:

(4) Remove the throttle valve adjusting screw plug (3/8 inch pipe). (About one quart of transmission fluid will drain out.)

(5) Insert adjusting screw wrench, Tool C-3279A (or Tool C-3279), and adjust throttle pressure to 14 psi. (Fig. 38.) Turn screw **OUT** to increase pressure and **IN** to decrease pressure. Open and release the throttle several times to check for proper setting (throttle pressure should return to 14 psi).

(6) Replace the throttle valve adjusting screw plug and tighten to 25 foot-pounds torque.

(7) With the accelerator pedal fully released, and engine at 475 to 500 rpm, the pressure should read 14 psi.

(8) Very slowly move the accelerator pedal or lever from underneath. With throttle pressure and linkage properly adjusted, the throttle pressure will rise immediately with an increase in engine rpm.

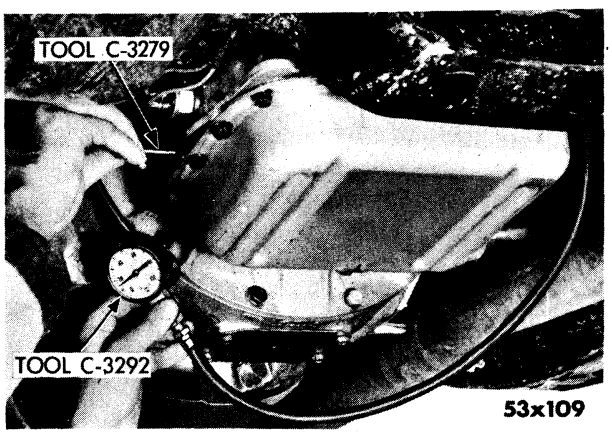

Fig. 38—Setting Throttle Pressure

NOTE

Do not use throttle rod when making this check. Use accelerator pedal lever located on underside of floor pan.

(9) Remove oil pressure gauge and install 1/8 inch pipe plug. Tighten to 12 foot-pounds torque.

(10) Replace the fluid that drained out, with Automatic Transmission Fluid (Type "A"). Turn off engine.

(11) Check accelerator pedal height at wide open throttle. There should be sufficient clearance between the tip of the pedal and the floor mat so that the pedal is not forced into the mat during a kickdown. Adjust, if necessary, by lengthening or shortening the accelerator pedal-to-accelerator shaft rod assembly.

CAUTION

To prevent overheating of transmission and torque converter, do not hold throttle wide open for more than a few seconds when making throttle pressure check.

28. ADJUSTMENT OF KICKDOWN (FRONT) BAND (REFER TO FIG. 37)

(1) Transmission band adjustments must be made under the vehicle. Using a 3/4 inch open end wrench, loosen and back-off the lock nut. Check the freeness of the adjusting screw in the transmission case. If free, set the click device on the small inch-pound torque wrench, Tool C-3380, for 72 inch-pounds torque. Install a 3/8 inch, 12-point socket (3/8 drive) on the wrench. Tighten the adjusting screw to the specified torque. Use a reference mark of chalk or colored pencil on the corner of the adjusting screw square and the transmission case. Using extreme care, back the adjusting screw out exactly three turns. Holding the adjusting screw stationary with a small wrench, tighten the lock nut securely.

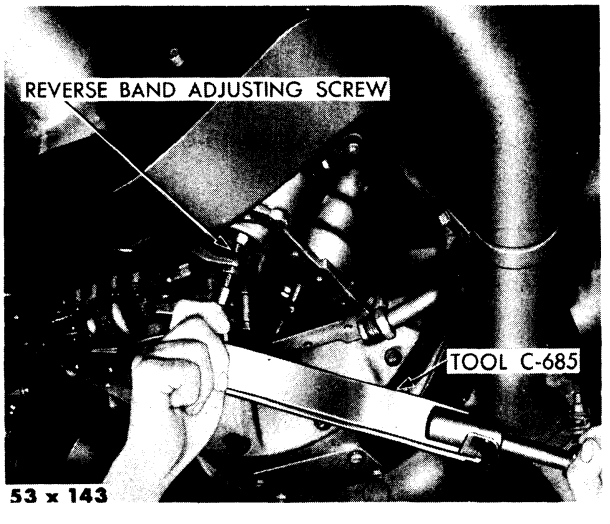

Fig. 39—Adjusting Reverse Band

CAUTION

Extreme care must be exercised in performing this operation to insure correct adjustment, otherwise, serious damage can occur when transmission is operated.

29. ADJUSTMENT OF REVERSE (REAR) BAND (REFER TO FIG. 39)

(1) Drain transmission and remove transmission oil pan.

(2) Remove reverse band adjusting screw lock nut and tighten adjusting screw to 25 inch-pounds torque. Back out adjusting screw 10 turns. Holding adjusting screw in this location, replace the adjusting screw lock nut and tighten to 35 foot-pounds torque.

(3) Replace the transmission oil pan, using a new gasket, and refill transmission with Automatic Transmission Fluid (Type "A").

30. TESTING NEUTRAL AND BACK-UP LIGHT SWITCHES

Before proceeding with any tests of the neutral or back-up light switches it is essential that the gearshift linkage be correctly adjusted. (Refer to Paragraph 26.)

Since the cause for the transmission neutral switch failing to operate properly may be electrical or mechanical, one, or more, of the following conditions may be present:

If, attempting to start, the engine fails, the fault lies in the switch itself, positioning of the manual valve lever cam, or the switch mounting. If replacement of a neutral switch (with one known to work satisfactorily) fails to correct the condition, again check the gearshift adjust-

ment before proceeding with any electrical checks.

One of the most common causes of electrical failure is due to poor wire ends. The cause of this poor contact is usually traceable to the wire ends being crimped to the wire insulation only and not to the wire itself. Although the wire ends may be soldered to the wire itself, it is essential that it also be crimped to the wire to prevent a high resistance in the circuit that could prevent the neutral switch from operating properly.

31. SERVICE DIAGNOSIS CHART

This Service Diagnosis Chart has operating difficulties listed in the following groups: Poor Shift Quality; Improper Response To Selector Lever Position; Excessive Slip Indications; Dragging Bands, Clutch, or Brake; Abnormal Shift Patterns; Other Difficulties; and Noises.

After road testing, match the trouble found to its particular group and to the specific difficulty under that group. The numbers found after the "Operation Difficulty" are next checked against the "Index of Possible Causes" and remedied in the sequence shown.

Never remove the transmission from the vehicle until all the possible "in car" causes have been checked. At this time, the oil pan should be removed to make a visual inspection for dirt, metal chips, band material, broken band ends, and burred or scored band contact surfaces.

Operation Difficulty	Possible Causes
POOR SHIFT QUALITY	
Harsh shift N to R	25-26-27
Harsh shift N to D	2-23
Delayed shift N to D	4-24
Runaway on upshifts	1-3-8-13-15-23-33-34-38-40-44-45-46
Runaway on upshifts light throttle only	32
Harsh upshifts	3-8-13-15-23-33-42-43
Harsh lift-foot shifts	3-13-15-16-22
Runaway on downshifts at part throttle	1-2-3-13-14-18
Harsh downshift	3-13-15-18-44-45-47
Runaway on kickdowns	4-8-13-18-22-23-36-37
Harsh kickdowns	4-8-16-22-23-33-34-36-37-38-42-43-44-45
Shudder during shifts	21
IMPROPER RESPONSE TO SHIFT LEVER POSITION	
No detent feel	14
Detent not with pointer	2-14
Gate not with pointer	2-4-13-21-23-33-34-38
Moves forward in N	43-44-50
Moves forward in N at high engine speed	46
Moves backward in N	2-14-25-26-27-51
No drive	1-2-8-12-14-30-31-32-33-50-51
No drive in D and L	15-51

SERVICE DIAGNOSIS CHART—Cont'd.

EXCESSIVE SLIP INDICATIONS

Slip in all ranges	1-8-9-13-30-32-33-38
Kickdown band slips	3-4-13-15-19-22-23-24
KD band slips over 25 mph	19-22
Slips in D (direct)	13-23-40-44-45-46
Reverse band slips	13-25-26-27
Slips on steep grades	1

DRAGGING BANDS, CLUTCH, OR BRAKE

Drag in all ranges	7-21-43
Drag in D and L	25-26-27-51
Drag in R, D and L	13-33-34-38-44-45
Drag in D (direct)	13-41
Drag in R, D (direct)	23

ABNORMAL SHIFT PATTERNS

No upshift	1-2-13-14-21-23-36-37-46
Upshift pattern low	3-13-15-21-36-37
Upshift pattern low at heavy throttle only	8
All upshifts 10-15 mph	15-17
Upshift pattern high	3-13-15-21-36-37
Shifts erratically	1-13-21-35
No downshift	21-36
Low downshift speed	21
High downshift speed	2-13-14-20
KD at part throttle	2-13-14-20
No kickdown	3-13-15-20-21
KD limit low	8-13-36-37

OTHER DIFFICULTIES

Starter won't energize	2-5-14
Hard to shift into N	5
Hard to shift into R	6
Accel. pedal sticks at closed throttle	3-15
Hard to fill trans.	11-35
Oil foams from filler	1-11-35
Oil leaks at seals	11-29-35
Transmission overheats	4-9-25-26-27-33-34-37-38-39-41-43-44-47
Impossible to push start the engine	35-37

NOISES

Grating (car moving)	10-28
Buzzing	1-33
Squealing after trans. installation	30-31
Whistling (R, D and L)	9-30
Rubbing	32-47
Rubbing in D (direct)	41
Excessive gear noise	37-48-50-51-52
Grinding	49

INDEX OF POSSIBLE CAUSES

1. Oil level
2. Gearshift linkage adj.
3. Throttle linkage adj.
4. Kickdown band adj.
5. Neutral starter switch
6. Back-up switch
7. Hand brake adj.
8. Regulator valve, spring
9. Converter control valve
10. Speedometer pinion
11. Breather
12. Oil strainer
13. Valve body mating surface
14. Manual valve, lever
15. Throttle valve, cam, spring
16. Servo press. bleed valve
17. Throt. press. check ball
18. Servo restrictor valve
19. Valve body end cover plug
20. Kickdown valve ball, rod
21. Shift valve, spring
22. Shuttle valve, plug, etc.
23. KD piston, guide, etc.
24. KD band, lever, strut, etc.
25. Reverse band adjustment
26. Rev. piston, sleeve, etc.
27. Rev. band, lever, strut, etc.
28. Rear bearing, snap ring
29. External seals
30. Front pump drive sleeve
31. Front pump pinion
32. Front pump assy. (Worn)
33. Reg. body mating surfaces
34. Reaction shaft seal
35. Output shaft supp. gaskets
36. Governor assembly
37. Rear pump assembly
38. Input shaft seal rings
    Reaction shaft bore
39. Plugged lubrication holes
40. Clutch retainer bushing
    Reaction shaft seal rings
41. KD sun gear snap ring
42. Direct clutch spring
43. Clutch spg. re. snap ring
44. Clutch discs, plates
45. Clutch piston, seal rings
46. Clutch check valve ball
47. Thrust washers
48. KD carrier bushing
49. Oil collector rings
50. Planet pinion shafts
51. Output shaft support
52. Output shaft bushing

32. HYDRAULIC CONTROL PRESSURE CHECKS

a. Line Pressure

Remove the 1/8 inch pipe plug from the line pressure take-off hole located on the front left side of the transmission case. (Fig. 37.) Install Tool C-3293 (300 psi) pressure gauge at this point.

LINE PRESSURE CHART

Gearshift Position	Rear Wheels	Engine Speed	Line Pressure
R	Free to Turn	1600	225 to 275
N	.....	800	85 to 95
D	Brakes Applied	800	85 to 95
L	Brakes Applied	800	85 to 95

If line pressure is not correct, investigate items 1-8-12-13-14-15-23-26-30-31-32-33 in the Service Diagnosis Chart.

b. Throttle Pressure

Remove the 1/8 inch plug from the throttle pressure take-off hole located on the right-hand side of the transmission case. (Fig. 37.) Install Tool C-3292 (100 psi) pressure gauge at this point.

THROTTLE PRESSURE CHART

Gearshift Position	Brakes	Throttle	Engine Speed	Throttle Pressure
D	Applied	Closed	Idle	13 to 15
D	Applied	Wide Open	1300 to 1500	80 to 90

Do not hold throttle wide open for longer than a few seconds. If band slips check items 2-3-13-15-19-22-23-24 on the Service Diagnosis Chart.

If throttle pressure is not correct, check line pressure and items 3-13-15-17-20-23 in the Service Diagnosis Chart. When checking throttle pressure, always follow up by checking throttle linkage adjustment.

c. Governor Pressure

Remove the 1/8 inch pipe plug from the governor pressure take-off hole located on the lower left side of the output shaft support. (Fig. 37.) Install gauge (100 psi), Tool C-3292, at this point.

GOVERNOR PRESSURE CHART

Transmission should be in Drive with the wheels free to turn.

Model	True Speed M.P.H.	Governor Pressure
C-67	13-15	15
	23-32	45
	51-61	60
C-68	14-16	15
	25-34	45
	55-65	60
C-69	14-16	15
	25-34	45
C-70 and C-300	55-65	60

If governor pressure does not correspond to car speeds, check items 13-35-36-37-51 in the Service Diagnosis Chart.

d. Clutch Pressure

Remove the 1/8 inch pipe plug fitting from the pressure take-off hole tapped in the kickdown servo (Fig. 37) and install gauge (100 psi), Tool C-3292. With the rear wheels free to spin, accelerate the engine slowly until an upshift occurs. During the upshift, the pressure gauge attached to the kickdown servo should show a very rapid pressure rise from 0 to final clutch or line pressure. This rise should not take more than 1½ to 2 seconds.

With an engine speed of not less than 650 rpm (transmission upshifted) the direct clutch pressure should read not lower than 10 psi below line pressure.

Should a slow rise in clutch pressure be observed, or a clutch pressure of more than 10 psi lower than line pressure be obtained, it is an indication of abnormal leakage. For possible sources of abnormal leakage, check items 1-3-8-13-23-33-34-40-44-45-46 on the Service Diagnosis Chart.

e. Lubrication Pressure

Remove the ½ inch pipe plug fitting at the upper left side of the output shaft support (Fig. 37), and install a 1/8 inch flared tube connector. Connect gauge (100 psi), Tool C-3292, to the connector.

Always place a flared tube nut in the flared tube fitting when screwing it in and out to keep from crushing it.

With engine running 800 rpm in neutral, lubrication pressure should be at least 10 psi but not higher than 50 psi. If the pressure is incorrect, check line pressure and items 9-30-34-35-38-39 51-54 in the Service Diagnosis Chart.

Lubrication pressure should be checked only when it is suspected to be incorrect.

33. ROAD TESTING

When faulty operation of the transmission is reported, transmission fluid level and engine idle speed should be checked before anything else. Good transmission operation also depends on good engine operation. Therefore, it is necessary to make sure the engine is operating at full efficiency.

If when tuning the engine, the throttle linkage between the carburetor and the transmission is disturbed, it will be necessary to readjust the linkage. Refer to Throttle Pressure and Throttle Linkage Adjustment.

The following test procedure is suggested as a means of checking complete transmission operation:

(1) Move selector lever through its positions. Check for binding (hanging) or insufficient travel.

Do not operate engine with wide open throttle in reverse.

(2) Attach an electric tachometer to the engine, as specified by the manufacturer. Move selector lever to drive (D), checking speed and smoothness of engagement. Apply both hand brake and foot brake and check for band slippage at wide open throttle. Check the kickdown band adjustment before proceeding with the road test.

Do not hold at wide open throttle for longer than a few seconds.

(3) Accelerate the car at very light throttle. The transmission should upshift at 13-16 mph (C-67); 15-18 mph (C-68 and C-70); 14-17 mph (C-69). Check quality of the shift.

(4) Slow the car to approximately 25 mph, then go quickly to wide open throttle (without going into kickdown). Check for possible clutch slippage. The transmission should not downshift at this time.

(5) Make a kickdown at 15 to 20 mph, checking quality of the shift.

(6) Release the accelerator to approximately half throttle so that the transmission upshifts at 25 to 30 mph. Check quality of the shift.

(7) Make a kickdown at 35 to 40 mph checking quality of the shift.

(8) Release the accelerator to closed throttle. Check quality of the "lift-foot" shift.

(9) Make a kickdown at 45 mph. Check quality of the shift.

(10) Accelerate (in kickdown) at wide open throttle until the transmission upshifts. The shift should occur at 52-69 mph or 51-61 mph* (C-67); 56-74 mph or 55-65 mph* (C-68 and C-70); and 54-71 mph or 53-63 mph* (C-69). Check quality of the shift.

*Using three-stage governor.

(11) Slow down to 65 (C-68, C-69 and C-70) or 60 (C-67) mph and try to make a kickdown at this speed. This is above the kickdown limit so no shift should take place.

(12) Slow down to 40 to 50 mph and move the selector lever to (L). The transmission should downshift.

(13) Move selector lever back to (D) at approximately 20 mph. (The transmission will upshift.) Coast to a stop. The transmission should downshift at approximately 9 to 11 mph. Check the quality of the downshift.

34. CHECKING FOR OIL LEAKS

If the transmission is leaking oil, check the following points.

a. Leaks not Requiring Removal of Transmission from Vehicle

(1) Transmission output shaft rear oil seal.

(2) Speedometer pinion assembly in rear extension.

(3) Oil pan drain plug.

(4) Oil pan to transmission case.

(5) Regulator valve and torque converter control valve plugs.

(6) Governor, line, and throttle pressure pipe plugs in case (test pressure holes).

(7) If oil is found inside torque converter housing, determine whether it is Automatic Transmission Fluid or Engine Oil. Check torque converter drain plug (Automatic Transmission Fluid, Type "A" has a slightly sulfurous odor). Also check fluid level for overfilling. Leaks at these locations should be corrected, regardless of how slight.

b. Leaks Requiring Removal of Transmission from Car

(1) Sand hole in transmission case.

(2) Sand hole in front oil pump housing.

(3) Front oil pump housing bolts loose or damaged sealing washers.

(4) Torque converter impeller hub seal (located on forward end of front oil pump housing), known also as front oil pump housing dust seal. When correcting, make sure torque converter hub run-out is within limits.

(5) Front oil pump housing seal (located on outside diameter of front oil pump housing). When replacement of the front oil pump housing is made, or whenever it is necesary to correct a leak due to this "O" seal ring, the following precautions should be taken:

1. Install a new "O" ring seal in its groove in the front oil pump housing.

2. Make sure that the seal has not been twisted during this installation, as this alone will cause a leak.

3. Measure the amount the seal protrudes above the front oil pump housing completely around the O.D. If, at any point, the seal protrudes less than .010 inch, or if considerable variation exists in the amount the seal protrudes, a new front pump housing should be selected.

Leaks at these locations may be remedied by tightening loose bolts or replacing damaged or faulty parts.

SERVICING OF COMPONENT PARTS WITH TRANSMISSION IN VEHICLE

35. OIL PAN

a. Removal

(1) Drain transmission, and when oil has drained, install drain plug and tighten.

(2) Remove oil pan filler tube from oil pan.

(3) Remove the oil pan bolts, oil pan, and gasket from transmission case. (Fig. 40.)

b. Installation

(1) Using a new gasket on oil pan, place pan into position on transmission case. (Fig. 40.)

(2) Install the oil pan bolts, drawing them down evenly and tighten to 17 foot-pounds torque. Install oil pan filler tube and tighten nut to 40 foot-pounds torque.

(3) Refill with Automatic Transmission Fluid.

36. VALVE BODY AND TRANSFER PLATE ASSEMBLY

a. Removal

(1) Remove oil pan.

(2) Disconnect the throttle and manual control lever linkage from levers.

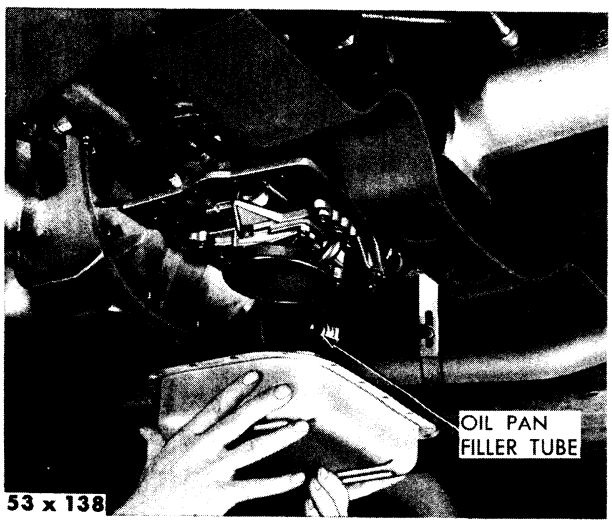

Fig. 40—Removing or Installing the Transmission Oil Pan

(3) Loosen the throttle and manual control lever assembly locking screws.

(4) Slide throttle valve operating lever assembly off shaft and remove the throttle valve camshaft felt retainer and felt.

(5) Slide the manual lever assembly off shaft and remove manual valve shaft seal cover.

(6) Remove the two oil strainer support bolts and washers. Remove the oil strainer assembly from valve body and transfer plate assembly.

(7) Remove the five transfer plate bolts and lockwashers.

(8) Remove valve body and transfer plate assembly. (Fig. 41.)

b. Installation

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

Place valve body and transfer plate assembly into position on transmission case and install the five transfer plate bolts and lockwashers. (Fig. 41.)

Two bolts are 1⅝ inches long. They go through

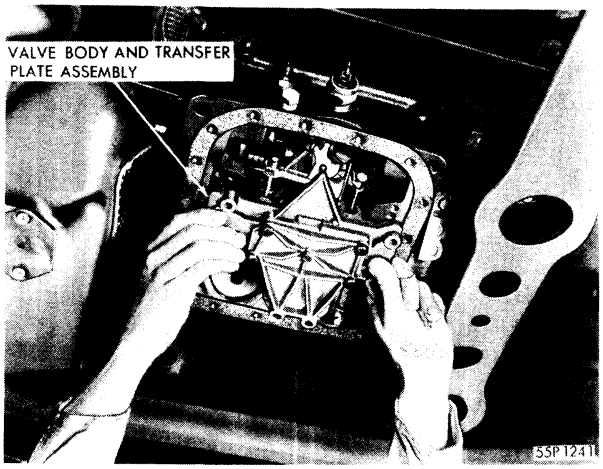

Fig. 41—Removing or Installing Transfer Plate Assembly

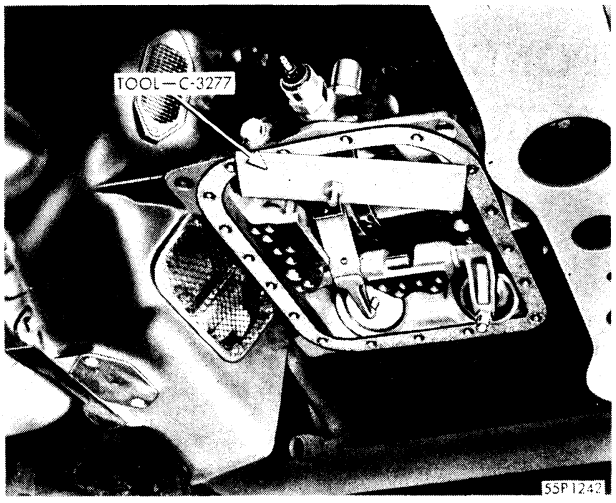

Fig. 42—Using Tool C-3277 to Install Oil Seal

the transfer plate cover on valve body. The other three are 1⅛ inches long. Draw bolts down evenly and tighten to 17 foot-pounds torque.

(2) Make sure the two oil strainer tube seals are in position over the oil strainer and place oil strainer assembly into position on transfer plate.

Make sure oil tubes on strainer properly enter the valve body.

(3) Install the two oil strainer support bolts and lockwashers. Tighten from 12 to 17 foot-pounds torque.

(4) Place the manual valve lever shaft cover over the manual valve lever shaft and slide into position on transmission case.

(5) Install the manual control lever (arm side of lever against cover) on manual valve lever shaft, and tighten locking screw.

(6) Place throttle valve camshaft felt and retainer over throttle valve shaft.

(7) Install throttle valve lever assembly on the throttle camshaft, and tighten locking screw.

(8) Check operation of controls by shifting the manual control into the four operating positions.

(9) Check throttle cam position in throttle operating lever assembly and throttle camshaft assembly for kickdown operation. Visually check the manual valve lever contact on neutral starter switch.

(10) Install oil pan.

(11) Set throttle linkage and gearshift linkage.

37. MANUAL CONTROL VALVE LEVER SHAFT OIL SEAL

a. Removal

(1) Remove oil pan, valve body, and transfer plate assembly.

(2) Using a suitable brass drift, drive seal out of transmission case from below.

b. Installation

(1) Using Tool C-3277, start oil seal (with lip of seal towards outside of case) squarely and tighten until the tool bottoms with transmission case. Seal will then be correctly positioned. (Fig. 42.)

(2) Install valve body, transfer plate assembly, and oil pan.

38. KICKDOWN PISTON

a. Removal

(1) Remove oil pan, valve body, and transfer plate assembly.

(2) Loosen kickdown band adjusting screw lock nut and back adjusting screw out sufficiently to permit the kickdown band strut to be removed by compressing band ends.

(3) With kickdown band lever hanging down, install Tool C-3289 on transmission case. Apply sufficient pressure on the kickdown

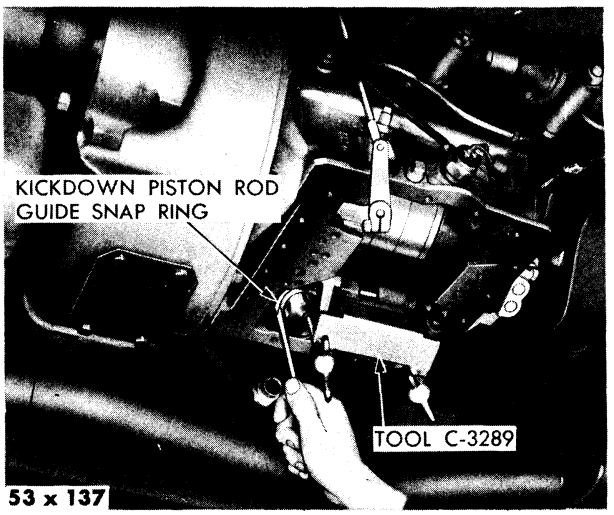

Fig. 43—Removing or Installing the Kickdown Piston Rod Guide Snap Ring

rod guide to permit easy removal of the snap ring. (Fig. 43.)

(4) Loosen compression portion of tool and remove the piston rod guide, piston spring and kickdown piston rod assembly. The kickdown piston cushion spring will fall out of piston when piston rod assembly is removed.

(5) Using pliers, Tool C-484 (inserted inside of kickdown piston), remove piston from transmission case.

b. Installation

(1) Make sure the two interlocking seals are locked in position and all seals are coated with MOPAR Lubriplate. Place kickdown piston in transmission case. With one hand, apply slight pressure to piston and, at the same time, carefully compress bottom seal and push piston into transmission case.

After bottom seal has entered, piston will seem to hang at two different locations while being pushed into case. This is due to seals entering cylinder; do not use extreme force. If any of the rings should be broken when piston assembly is being installed, transmission will not operate properly.

(2) Slide piston spring over kickdown piston rod assembly. Balance the piston cushion spring on rod assembly. MOPAR Lubriplate may be used to help hold cushion spring on rod assembly. Install in piston.

(3) Holding it in this position, install the kickdown piston rod guide assembly on kickdown piston rod assembly .

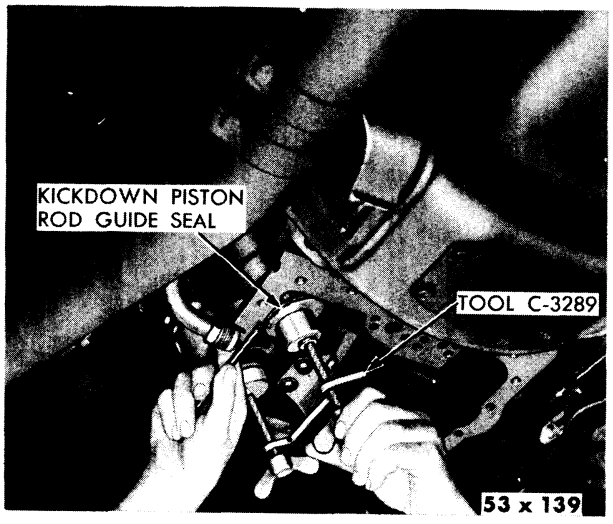

Fig. 44—Positioning Kickdown Piston Rod Guide Seal

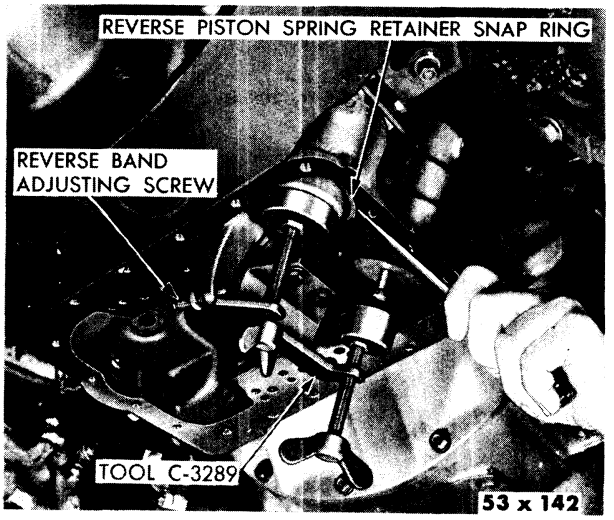

Fig. 45—Removing or Installing the Reverse Servo Piston Spring Retainer Snap Ring

(4) Using Tool C-3289, compress the kickdown piston spring to the point that piston seal slightly binds on transmission case. Work seal into position and gradually compress spring until seal enters case and snap ring can be installed. (Fig. 44.)

(5) Install kickdown piston rod guide snap ring, making sure it is properly seated.

(6) Loosen compressing portion of tool and remove tool from transmission case.

(7) With one end of kickdown band fitted over adjusting screw, compress the other end sufficiently to install the kickdown band strut between kickdown band and kickdown band lever.

Make sure kickdown band strut slot engages with kickdown band strut pin in the band end.

(8) Install valve body, transfer plate assembly, and oil pan.

(9) Adjust kickdown band.

39. REVERSE SERVO

a. Removal

(1) Remove oil pan, valve body, and transfer plate assembly.

(2) Loosen reverse servo adjusting screw lock nut and back adjusting screw out sufficiently to permit reverse band strut to be removed by compressing band ends.

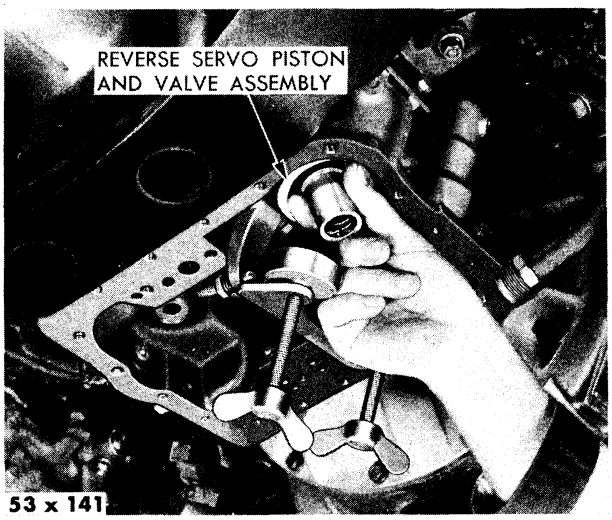

Fig. 46—Removal or Installation of Reverse Servo Piston and Valve Assembly

(3) Remove reverse servo piston sleeve.

(4) Mount Tool C-3289 on transmission case and compress reverse piston spring retainer.

(5) Using a screwdriver, remove the reverse servo piston and valve assembly spring retainer snap ring (Fig. 45) and loosen compressing part of tool.

Spring retainer may require guiding out of transmission case.

(6) Remove the spring retainer, spring reverse servo piston, and valve assembly from transmission case. (Fig. 46.)

(7) Using pliers, Tool C-3229, remove the reverse servo piston valve spring snap ring. Remove spring and valve from piston.

b. Installation

(1) Place the reverse servo piston valve and spring in reverse servo piston (shaft on valve protruding through hole in bottom of piston).

(2) Using pliers, Tool C-3229, install the reverse servo piston valve spring snap ring. Make sure it is seated properly.

(3) Coat the reverse servo piston ring (neoprene) with MOPAR Lubriplate. Insert reverse servo piston and valve assembly into transmission case in a cocked position. By rotating piston, the ring will enter case without being damaged. (Fig. 46.)

(4) Place reverse servo piston spring over piston and position spring retainer over spring. Using Tool C-3289, compress spring sufficiently to install snap ring.

Spring retainer may require guiding into transmission case. Make sure snap ring seats properly.

(5) Remove Tool C-3289 from transmission case and install reverse servo piston sleeve. Make sure sleeve slides freely on piston by working it up and down.

(6) Making sure one end of the reverse band assembly is hooked in the reverse link assembly, compress the other end sufficiently to install the reverse band strut in slots of reverse band assembly and reverse band lever assembly.

(7) Adjust reverse band.

(8) Install valve body, transfer plate assembly, and oil pan.

40. SPEEDOMETER PINION

a. Removal

(1) Disconnect speedometer cable and housing from sleeve assembly on transmission.

(2) Remove speedometer pinion and sleeve assembly from transmission extension. (Fig. 47.)

b. Installation

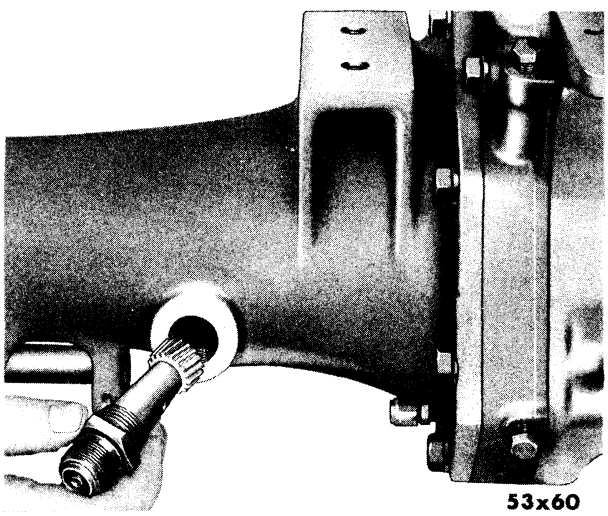

Fig. 47—Removing or Installing the Speedometer Drive Pinion

(1) Install speedometer pinion and sleeve assembly in transmission extension and tighten to 45 foot-pounds torque.

(2) Connect speedometer cable and housing to sleeve assembly on transmission and tighten.

41. NEUTRAL STARTER SWITCH (REFER TO FIG. 37)

a. Removal

(1) Remove wire at switch.

(2) Remove switch and gasket.

A small amount of transmission fluid will drain out when switch is removed.

b. Installation

(1) Place gasket over switch and install switch in transmission case. Tighten to 20 foot-pounds torque.

(2) Connect wire to switch.

(3) Refill transmission with Automatic Transmission Fluid (Type A).

42. BACK-UP LIGHT SWITCH (REFER TO FIG. 37)

a. Removal

(1) Remove wire from switch on reverse servo located on right side of transmission.

(2) Remove switch and gasket.

b. Installation

(1) Place gasket over switch and install switch in reverse servo. Tighten to 20 foot-pounds torque.

(2) Connect wire to switch.

43. TRANSMISSION OUTPUT SHAFT REAR BEARING OIL SEAL

a. Removal

(1) Disconnect the front propeller shaft universal joint and secure shaft to frame.

(2) Apply the hand brake and remove the propeller shaft flange nut, shakeproof washer, and washer.

(3) Release hand brake and install puller, Tool C-452. Remove the propeller shaft flange and drum assembly.

(4) Remove the transmission support grease shield spring (small one).

(5) Remove brake support grease shield from extension housing.

If screwdriver or sharp instrument is used in performing this operation, care must be exercised not to damage the neoprene sealing surface at bottom of shield.

(6) Install puller, Tool C-748, and remove the transmission output shaft rear bearing oil seal.

b. Installation

(1) Using driver, Tool C-3205, install output shaft rear bearing oil seal.

(2) Install brake support grease shield on extension housing.

Indent on grease shield must match groove in housing for correct positioning. Shield must be located on housing far enough to permit installation of spring.

(3) Install brake support grease shield spring (opening in spring toward adjusting sleeve). Make sure spring is properly seated in groove.

(4) Make sure brake adjustment is backed off sufficiently and install brake drum assembly.

In some instances it may be necessary to use Tool C-496 to press drum assembly on output shaft.

(5) Install propeller shaft flange washer, shakeproof washer, and nut.

(6) Adjust hand brake.

(7) Apply hand brake and tighten the propeller shaft flange nut to 160 foot-pounds torque.

(8) Connect front propeller shaft universal joint.

44. TRANSMISSION REGULATOR VALVE ASSEMBLY

a. Removal (Refer to Fig. 37)

(1) Remove transmission regulator valve spring retainer, gasket, and spring.

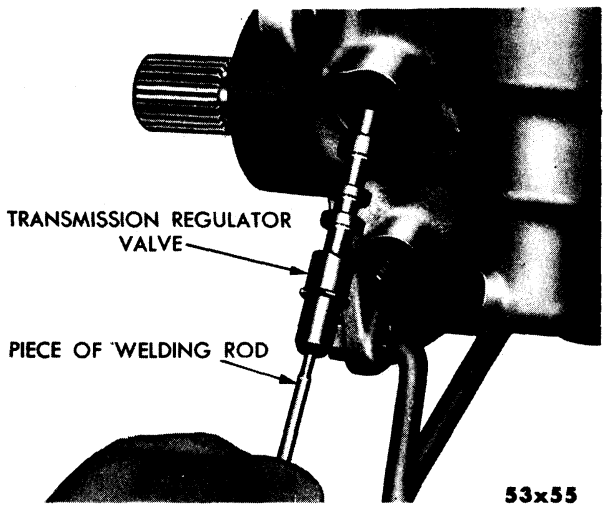

Fig. 48—Removal of Transmission Regulator Valve

(2) Using a mechanical retriever or a piece of welding rod inserted in end of valve, remove valve, as shown in Figure 48.

b. Installation

(1) Place valve into position in valve body.

(2) Install regulator valve spring, gasket, and retainer and tighten to 50 foot-pounds torque.

45. TORQUE CONVERTER CONTROL VALVE ASSEMBLY (REFER TO FIG. 37)

a. Removal

(1) Remove the torque converter control valve spring retainer, gasket, and spring.

(2) Using a mechanical retriever or a piece of welding rod inserted in end of valve, remove valve.

b. Installation

(1) Place valve into position in valve body.

(2) Install torque converter control valve spring, gasket, and retainer and tighten to 40 foot-pounds torque.

46. OIL COOLER (REFER TO FIG. 49)

a. Removal

(1) Drain water from radiator.

(2) Remove battery and battery pan.

(3) Remove lower radiator-to-oil cooler water hose.

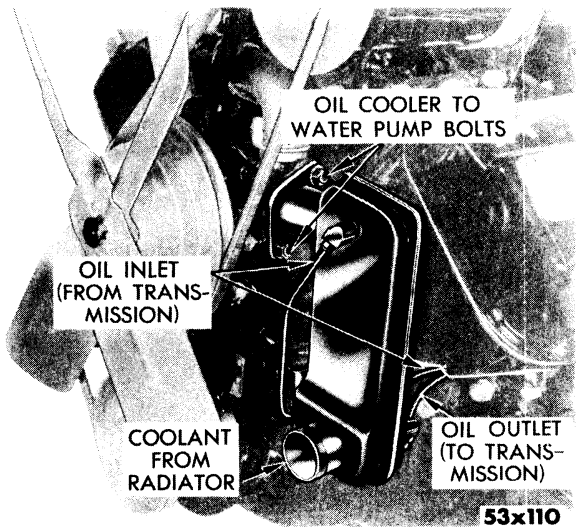

Fig. 49—Transmission Oil Cooler Installed (Typical View)

(4) Remove inlet and outlet oil tubes.

(5) Remove oil cooler-to-water pump flange bolts.

b. Inspection

(1) Attach a bearing wear detector to one oil line fitting and block off the other with a 1/8 inch pipe plug. **Air pressure, alone may be used in the bearing wear detector providing pressure does not exceed 10 psi.**

(2) Open valve on line to cooler and submerge cooler in water. Air bubbles or oil coming from the water inlet or outlet passages of cooler indicate a defective cooler radiator and the unit must be replaced.

c. Installation

(1) Clean mating flanges thoroughly.

(2) Install new flange gasket.

(3) Install oil cooler-to-water pump flange bolts and tighten.

(4) Install inlet and outlet oil tubes.

(5) Install lower radiator-to-oil cooler water hose.

(6) Install battery and battery pan.

(7) Refill radiator.

(8) Start engine and check unit for water and oil leaks.

REMOVAL AND INSTALLATION OF TRANSMISSION

47. REMOVAL OF TRANSMISSION FROM VEHICLE

(1) Disconnect battery.

(2) Raise vehicle off floor.

(3) Drain transmission and torque converter. When fluid has drained, replace drain plug and tighten. Disconnect oil pan filler tube assembly from oil pan.

(4) Disconnect the front propeller shaft universal joint and secure shaft to frame.

(5) Using Tool C-3281 (or apply the hand brake to hold shaft flange and drum assembly) remove the flange nut, shakeproof washer, and washer.

(6) Release hand brake, if applied, and using puller, Tool C-452, remove brake drum assembly.

(7) Remove the transmission brake support grease shield spring. This spring has two purposes; it acts as a guide for the brake shoes and retains the brake support grease shield to the transmission extension housing.

(8) Using a suitable drift, remove pin which secures brake shoe anchor in extension housing.

(9) Slide hand brake assembly from extension housing.

(10) Disconnect speedometer cable housing from drive pinion.

(11) Disconnect neutral starter and back-up light wires from switches.

(12) Disconnect throttle and manual control linkage from levers.

(13) Remove bolts and lockwashers from the oil pan that hold the exhaust pipe bracket or bracket to the transmission.

NOTE

It may also be necessary to loosen bracket at the exhaust pipe.

(14) Remove the nuts and lockwashers from the rear engine mounts.

(15) Install engine support fixture, Tool C-3245. Adjust fixture to support the weight of the engine. (See Fig. 50.)

(16) Raise engine slightly. Remove crossmember-to-frame bolts and remove crossmember, leaving engine rear support adaptor attached to transmission. Use care when removing crossmember. Do not damage brake line.

CAUTION

When using Tool C-3245, do not lower engine more than three inches from floor pan (to avoid disrupting the set position of water hose and other engine attachments).

(17) Remove the two upper transmission case-to-converter housing bolts and lockwash-

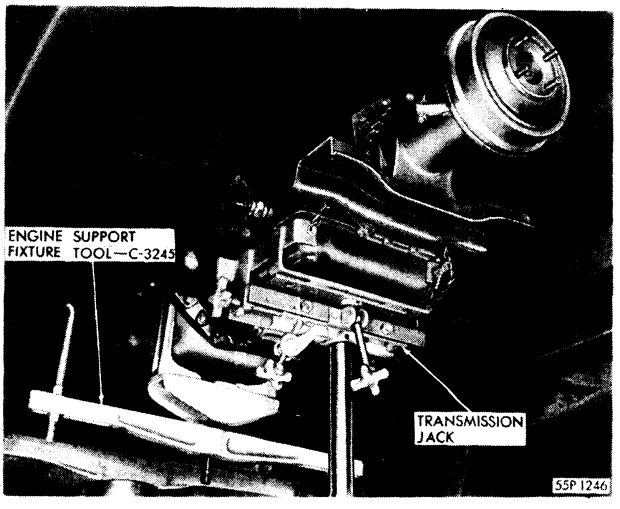

Fig. 50—Engine Support Fixture and Jack Installed in Position (Typical View)

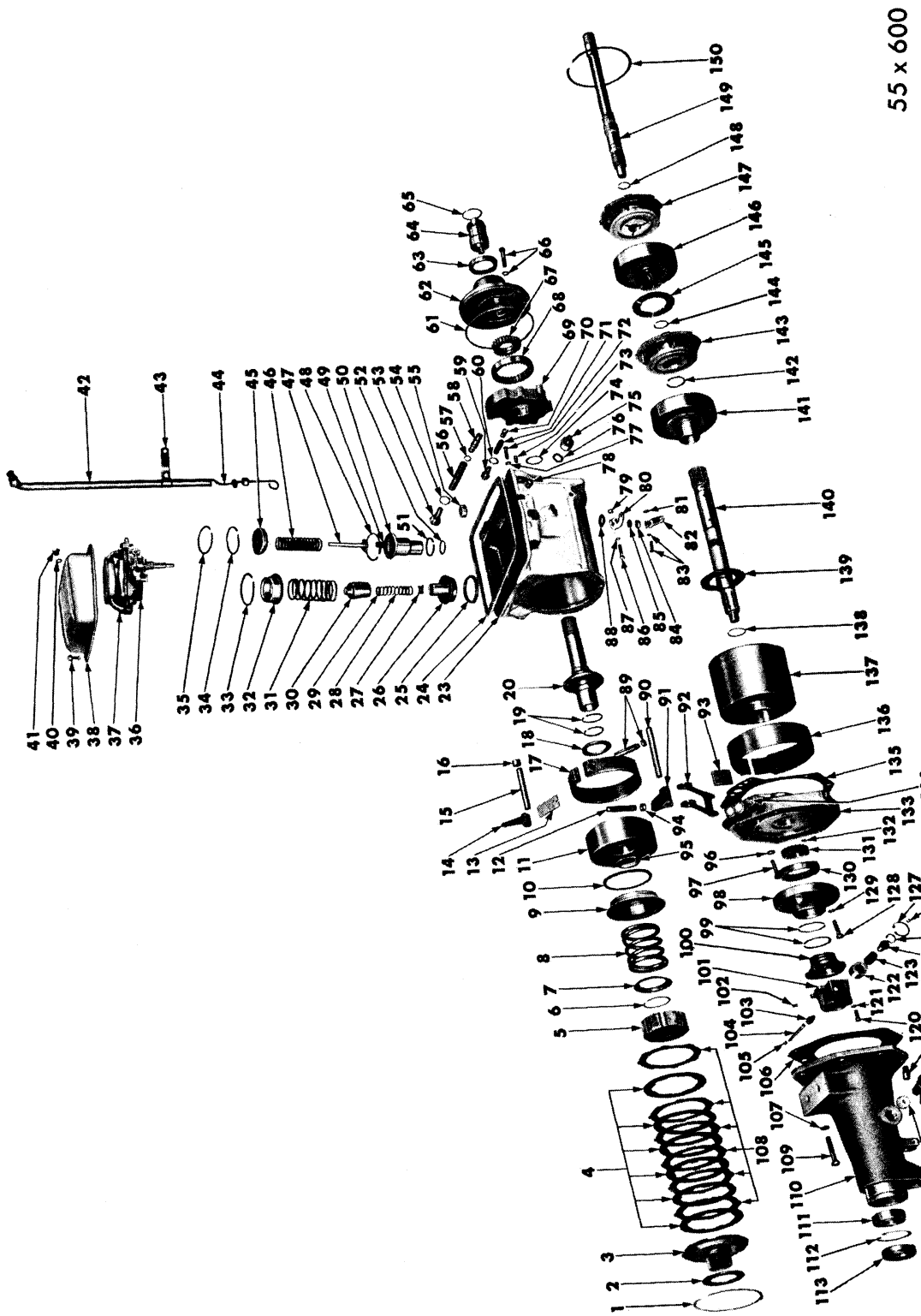

Fig. 51—Transmission Assembly (Disassembled View)

1—Kickdown sun gear snap ring
2—Kickdown planet pinion carrier thrust washer
3—Kickdown sun gear assembly
4—Direct clutch driving disc plates
5—Direct clutch hub
6—Direct clutch spring retainer snap ring
7—Direct clutch spring retainer
8—Direct clutch spring
9—Direct clutch piston
10—Direct clutch piston seal ring
11—Direct clutch piston retainer
12—Reverse band adjusting screw
13—Kickdown band strut
14—Kickdown band lever
15—Kickdown band lever shaft
16—Kickdown band lever shaft plug
17—Kickdown band
18—Direct clutch piston retainer thrust washer
19—Torque converter reaction shaft seal rings
20—Torque converter reaction shaft
23—Transmission case
24—Oil pan gasket
25—Reverse servo piston ring
27—Reverse servo piston valve
28—Reverse servo piston valve spring
29—Reverse servo piston valve spring snap ring
30—Reverse servo piston sleeve
31—Reverse servo piston spring
32—Reverse servo piston spring retainer
33—Reverse servo piston spring retainer snap ring
34—Kickdown piston rod guide seal ring
35—Kickdown piston rod guide snap ring
36—Valve body and transfer plate assembly
37—Oil strainer assembly
38—Oil pan
39—Oil pan screw and washer assembly
40—Oil pan drain plug gasket
41—Oil pan drain plug
42—Oil pan filler tube
43—Oil pan filler tube bracket
44—Oil level indicator
45—Kickdown piston rod guide
46—Kickdown piston spring
47—Kickdown piston rod
48—Kickdown piston ring—large
49—Kickdown piston cushion spring
50—Kickdown piston
51—Kickdown piston ring—intermediate
52—Kickdown piston ring—small
53—Regulator valve spring retainer
54—Regulator valve spring retainer gasket
55—Manual valve lever shaft oil seal
56—Regulator valve spring
57—Regulator valve spring seat
58—Regulator valve
59—Torque converter control valve spring retainer
60—Torque converter control valve spring retainer gasket
61—Front oil pump housing seal
62—Front oil pump housing
63—Transmission front oil pump housing dust seal
64—Front oil pump drive sleeve
65—Front oil pump drive sleeve seal ring
66—Front oil pump housing screw and lockwasher
67—Front oil pump pinion
68—Front oil pump gear
69—Regulator valve body and gasket
70—Torque converter control valve
71—Torque converter control valve spring
72—Reaction shaft to case screw
73—Reaction shaft dowel
74—Torque converter reaction shaft seal
75—Neutral starter switch
76—Neutral starter switch gasket
77—Reaction shaft to case screw lockwasher
78—Throttle valve adjusting screw plug
79—Manual valve lever screw nut
80—Manual valve lever
81—Throttle valve operating lever screw nut
82—Throttle valve operating lever
83—Throttle valve operating lever screw and lockwasher
84—Throttle valve camshaft felt retainer
85—Throttle valve camshaft felt
86—Manual valve lever screw
87—Manual valve lever screw lockwasher
88—Manual valve lever shaft seal cover
89—Kickdown band adjusting screw and locknut
90—Reverse band lever shaft
91—Reverse band lever
92—Reverse band link assembly
93—Reverse band strut
94—Reverse band adjusting screw locknut
95—Direct clutch piston retainer seal ring
96—Output shaft support to case screw lockwasher
97—Output shaft support to case screw
98—Rear oil pump housing assembly
99—Governor support piston rings
100—Governor support
101—Governor body
102—Governor locating screw
103—Governor valve
104—Governor valve shaft
105—Governor valve shaft snap ring
106—Transmission extension gasket
107—Extension to case screw lockwasher
108—Direct clutch plates
109—Extension to case screw
110—Transmission extension housing
111—Output shaft rear bearing
112—Output shaft rear bearing snap ring
113—Output shaft rear bearing oil seal
114—Speedometer pinion gear
115—Speedometer pinion sleeve
116—Speedometer drive pinion shaft
117—Speedometer drive pinion shaft plain washer
118—Speedometer drive pinion shaft lock
119—Extension breather
120—Governor body screw
121—Governor body screw lockwasher
122—Governor primary weight
123—Governor weight spring
124—Governor secondary weight
125—Governor secondary weight snap ring
126—Governor valve shaft snap ring
127—Governor weight assembly snap ring
128—Rear oil pump housing screw
129—Rear oil pump housing screw lockwasher
130—Rear oil pump gear
131—Rear oil pump pinion
132—Rear oil pump pinion ball
133—Output shaft support
134—Output shaft support pipe plug
135—Output shaft support gasket
136—Reverse band assembly
137—Planet pinion carrier housing
138—Output shaft seal ring
139—Planet pinion carrier housing thrust washer
140—Output shaft
141—Reverse annulus gear
142—Reverse annulus gear snap ring
143—Reverse planet pinion carrier assembly
144—Kickdown annulus gear snap ring
145—Kickdown planet pinion carrier thrust washer
146—Kickdown annulus gear
147—Kickdown planet pinion carrier assembly
148—Kickdown annulus gear stop ring
149—Input shaft
150—Kickdown planet pinion carrier snap ring

Fig. 51—Transmission Assembly (Disassembled View)

ers and install guide studs, Tool C-3276.

(18) Remove the two lower transmission case-to-converter housing bolts and lockwashers. Slide transmission straight back, to avoid damage to the torque converter driving sleeve. Lower to the floor.

(19) Remove the front oil pump drive sleeve and inspect. Check the drive lugs and machined surfaces for burrs and wear. Check ring for broken ends and free rotation in ring grooves.

(20) Remove the bolts and lockwashers which hold the engine rear support adaptor to the extension housing. Remove adaptor. Inspect bolts and holes in housing for stripped or worn threads.

48. INSTALLATION OF TRANSMISSION IN VEHICLE

(1) Install (if removed) guide studs, Tool C-3276, in the two upper transmission case-to-converter housing bolt holes.

(2) Lubricate front oil pump drive sleeve ring and bearing surface with MOPAR Lubriplate and install in torque converter hub. Make sure driving lugs are properly engaged.

(3) Note position of driving lugs on front oil pump drive sleeve. Position front oil pump pinion accordingly to aid in proper engagement when transmission is installed.

(4) Raise transmission on jack and slide transmission over guide studs and into position. Make sure driving lugs on front oil pump drive sleeve properly engage the front oil pump pinion.

CAUTION

To avoid damage to front oil pump, transmission must be properly aligned. Do not attempt to use transmission-to-converter housing bolts to bring transmission and converter housing together. If oil pump drive sleeve and input shaft have been properly aligned, the transmission should slide into position relatively easily. DO NOT FORCE.

(5) Install the two lower transmission case-to-converter housing bolts and lockwashers. **Do not tighten.**

(6) Remove guide studs and install the two upper transmission case-to-converter housing bolts and lockwashers. Draw all transmission case-to-converter housing bolts down evenly and tighten to 50 foot-pounds torque.

(7) Place engine rear support adapter into position on extension housing and install the bolts and lockwashers. Tighten to 50 foot-pounds torque.

(8) Place crossmember into position and install the crossmember-to-frame bolts. Tighten to 55 foot-pounds torque.

(9) With engine mounts in position, lower engine and at the same time, align mounting holes in adapter with holes in crossmember.

(10) Install the bolts and lockwashers that hold the engine rear support to the crossmember and tighten to 50 foot-pounds torque.

(11) Remove support fixture, Tool C-3245, from side of frame member.

(12) Install the bolts and lockwashers that hold the exhaust pipe bracket (or brackets) to the transmission and tighten clamp bolt (or bolts) to exhaust pipe.

(13) Connect throttle and manual control linkage to levers.

(14) Connect neutral starter and back-up wires to switches.

(15) Connect speedometer cable housing to drive pinion.

(16) Slide hand brake assembly into position on extension housing and install pin in anchor.

NOTE

Make sure brake support spacer (insulator) and sleeve remained in position when brake assembly was installed.

(17) Install brake support grease shield on extension housing.

NOTE

Indent in shield is for correct positioning on extension housing. Shield must be located on

housing far enough to permit installation of spring.

(18) Install brake support grease shield spring (opening in spring toward adjusting sleeve). Make sure spring is properly seated in groove.

(19) Install brake drum assembly, flatwasher, shakeproof washer, and nut.

NOTE

In some instances it may be necessary to use Tool C-496 to press drum onto output shaft.

(20) Apply hand brake or use Tool C-3281. Tighten nut to 160 foot-pounds torque.

(21) Install propeller shaft and tighten nuts to 37 foot-pounds torque.

(22) Refill transmission.

(23) Connect battery.

(24) Adjust manual and throttle control linkage.

RECONDITIONING OF TRANSMISSION ASSEMBLY

(REFER TO FIG. 51)

49. TRANSMISSION EXTENSION HOUSING

a. Removal

(1) Raise vehicle off floor.

(2) Drain transmission. When fluid has drained, replace drain plug and tighten.

(3) Disconnect the front propeller shaft universal joint and secure shaft to frame.

(4) Apply the hand brake or use Tool C-3281, and remove the universal flange nut, shakeproof washer, and flat washer.

(5) Release hand brake (if applied) and using puller, Tool C-452, remove brake drum assembly.

(6) Disconnect speedometer cable housing from drive pinion.

(7) Remove speedometer drive pinion from transmission extension housing.

CAUTION

Nylon gear can be easily damaged if extension housing is removed without first removing the speedometer drive pinion.

(8) Remove the nuts and lockwashers from the rear engine mount bolts.

(9) Install engine support fixture, Tool C-3245, and adjust to support the weight of the engine.

(10) Raise engine slightly, remove crossmember-to-frame bolts and remove crossmember.

CAUTION

Use care when removing crossmember so as not to damage brake line. When using Tool C-3245, do not lower engine more than three inches from floor pan (to avoid disrupting the set position of radiator hose and other engine attachments).

(11) Remove the engine rear support adapter attaching screws and lockwashers. Remove adapter from transmission extension housing. Check screws and holes in housing for stripped or worn threads.

(12) Using a suitable drift, remove pin which secures brake shoe anchor in extension housing.

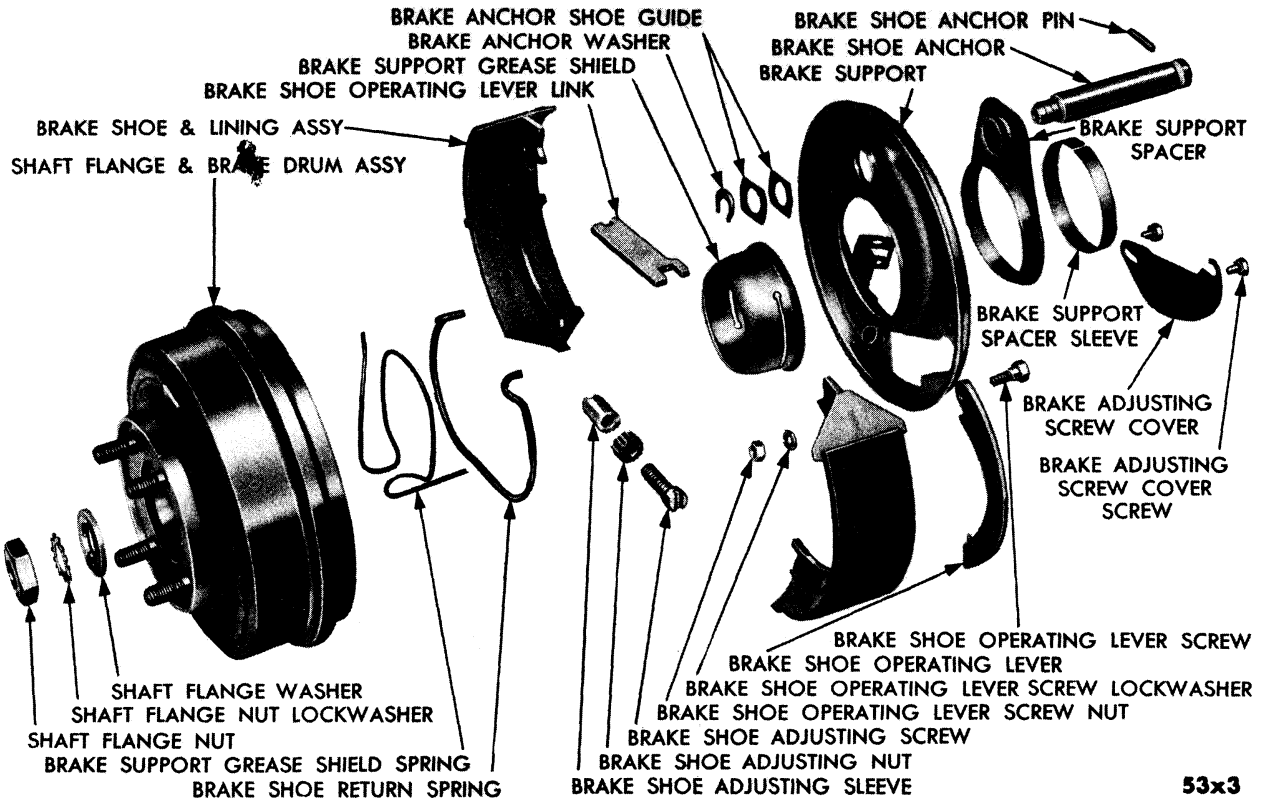

Fig. 52—Internal Expanding Hand Brake (Disassembled View)

(13) Remove the brake support grease shield spring and remove shield. (Refer to Fig. 52.)

NOTE

If a screwdriver or sharp instrument is used in removing shield, care must be exercised not to damage the neoprene sealing surface at the bottom of the shield.

(14) Slide the hand brake assembly from extension housing.

(15) Remove the extension housing retaining screws and lockwashers.

CAUTION

The output shaft support-to-transmission case retaining screw must be left in position. (Refer to Figure 59). Removal of this screw will cause excessive clearance to exist between the direct clutch assembly and the kickdown planet, should the gear train be pulled out during the servicing of the governor.

(16) Install guide studs, Tool C-3283, and attach puller, Tool C-3282. Pull extension housing from output shaft support assembly and remove gasket. (See Fig. 53.)

(17) Remove puller, Tool C-3282, from extension housing.

b. Installation

(1) Install new transmission extension gasket

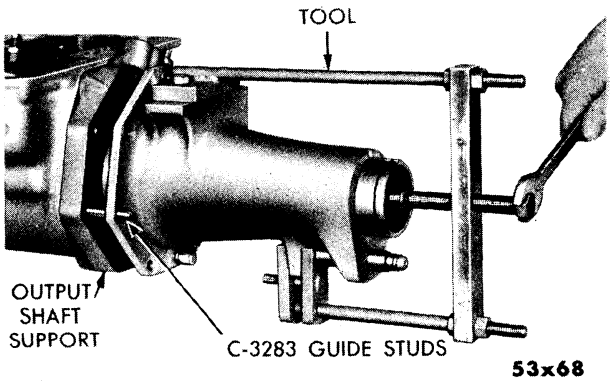

Fig. 53—Removing Transmission Extension Housing Using Tool C-3282

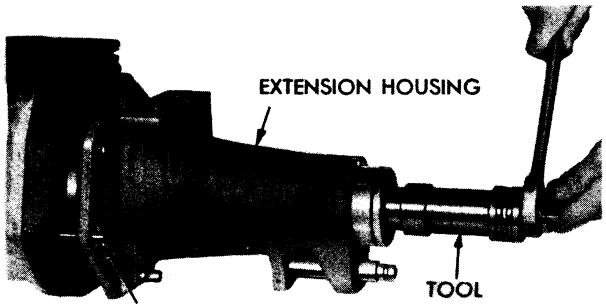

Fig. 54—Installation of Transmission Extension Housing Assembly

over guide studs and into position against output shaft support. Do not use sealing material on gasket.

(2) Guide extension housing over output shaft and on to guide studs. Using Tool C-496 with adapter Tool C-3284, press extension housing into position against output shaft support. (See Fig. 54.)

(3) Start five of the transmission extension-to-case screws and lockwashers. Remove guide studs, Tool C-3283, and install the remaining two. Draw down evenly and tighten to 30 foot-pounds torque.

(4) Slide hand brake assembly into position on extension housing and install pin in anchor.

NOTE

Make sure brake support spacer (insulator) and sleeve remained in position when brake assembly was installed.

(5) Install brake support grease shield on extension housing.

NOTE

Indent in shield is for correct positioning on extension housing. Shield must be located on housing far enough to permit installation of spring.

(6) Install brake support grease shield spring (opening in spring toward adjusting sleeve). Make sure spring is properly seated in groove.

(7) Position engine near support adaptor on extension housing and install the attaching screws and lockwashers. Tighten to 30 foot-pounds torque.

(8) Place crossmember into position and install the crossmember-to-frame bolts. Tighten to 55 foot-pounds torque.

(9) With engine mounts in position, lower engine and, at the same time, align mounting holes in adapter with holes in crossmember. Install bolts, lockwashers, and nuts. Tighten to 30 foot-pounds torque.

(10) Remove holding fixture, Tool C-3245, from side of frame member.

(11) Connect speedometer cable housing to drive pinion.

(12) Install hand brake drum assembly, flatwasher, shakeproof washer, and nut.

NOTE

In some instances it may be necessary to use Tool C-496 to press brake drum onto output shaft.

(13) Apply hand brake or use Tool C-3281 and tighten nut to 160 foot-pounds torque.

(14) Install propeller shaft and tighten nuts to 37 foot-pounds torque.

(15) Refill transmission.

CAUTION

Since torque converter was not drained, use extreme care when refilling so as not to overfill.

50. TRANSMISSION OUTPUT SHAFT REAR BEARING

a. Removal

(1) Remove transmission extension housing.

(2) Install puller, Tool C-748, and remove the output shaft rear bearing oil seal. Remove any burrs from counterbore of extension housing.

(3) Using a pair of long-nose pliers, remove the output shaft rear bearing snap ring. Note that snap ring has beveled edge. Inspect ring for distortion.

(4) Using driver, Tool C-3275, drive output shaft rear bearing out of extension housing. (See Fig. 55.)

b. Installation

(1) Using driver, Tool C-3204, install the output

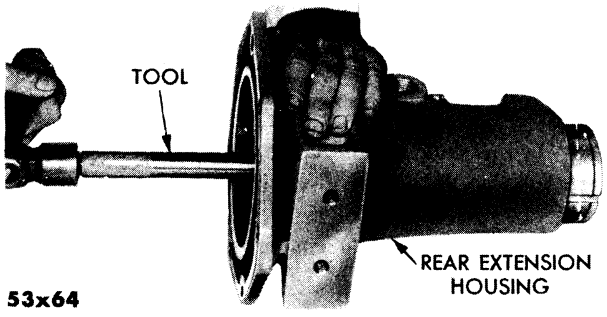

Fig. 55—Removing Output Shaft Rear Bearing Using Tool C-3275

shaft rear bearing in extension housing by driving on **lettered side of bearing.** (See Fig. 56.)

CAUTION

Always use a new bearing for installation. Never use a bearing which has been removed. Make sure bearing is properly seated, then lubricate with Automatic Transmission Fluid (Type "A").

(2) Install output shaft rear bearing snap ring (beveled side toward the rear of the extension). Make sure it seats properly.

(3) Using driver, Tool C-3205, install output shaft rear bearing oil seal. (Fig. 57.)

(4) Install transmission extension housing.

51. GOVERNOR

a. Removal, Disassembly, and Inspection

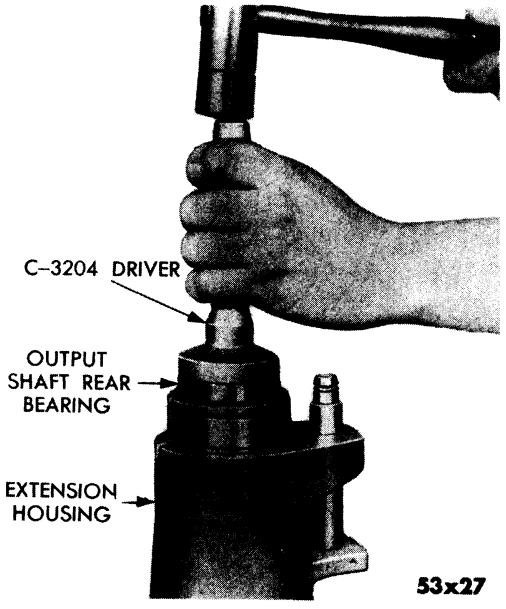

Fig. 56—Installing Output Shaft Rear Bearing

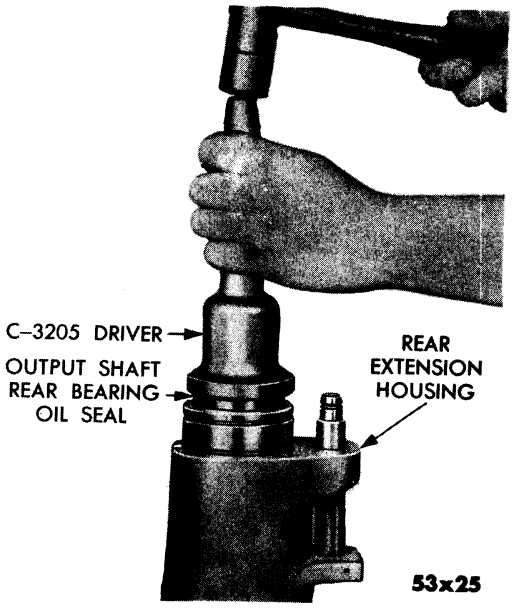

Fig. 57—Installation of Output Shaft Rear Bearing Oil Seal

(1) Remove transmission extension housing.

(2) Using a sharp instrument, such as an ice pick, remove either of the governor valve shaft snap rings. (Fig. 58.)

(3) Remove governor valve shaft and valve from governor valve body assembly. (Fig. 59.)

(4) Using pliers, Tool C-760, remove governor weight assembly snap ring (large one). (Fig. 60.) Remove governor weight assembly from governor body. (Fig. 61.)

(5) Using pliers, Tool C-3229, remove governor secondary weight snap ring.

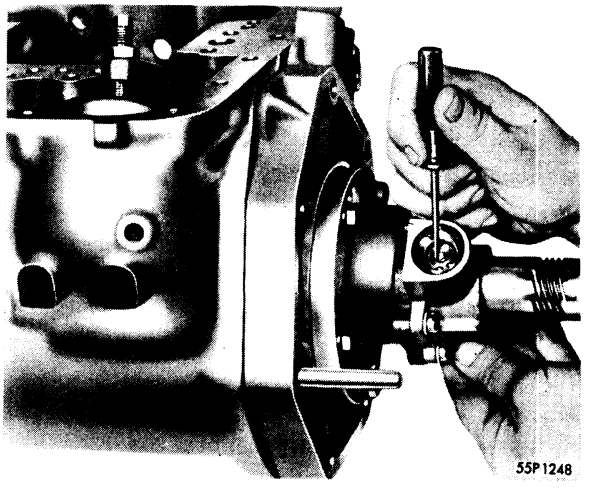

Fig. 58—Removal or Installation of Governor Valve Shaft Snap Ring

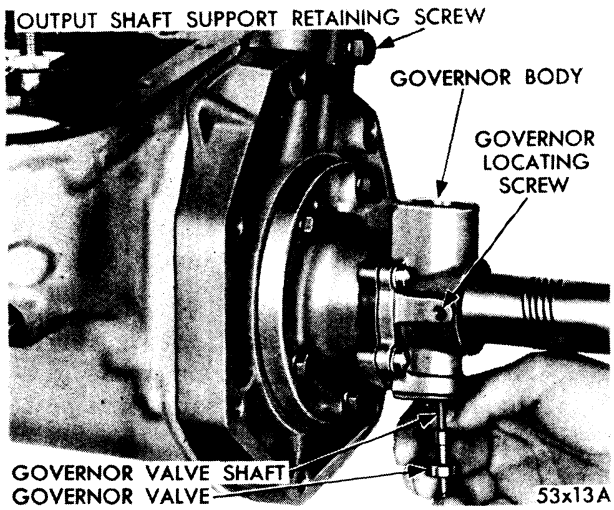

Fig. 59—Removal and Installation of Governor Valve and Shaft

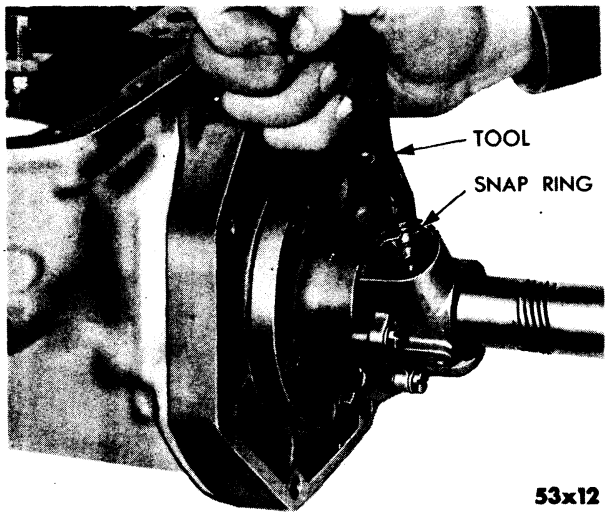

Fig. 60—Removal and Installation of Governor Weight Assembly Snap Ring Using Tool C-760

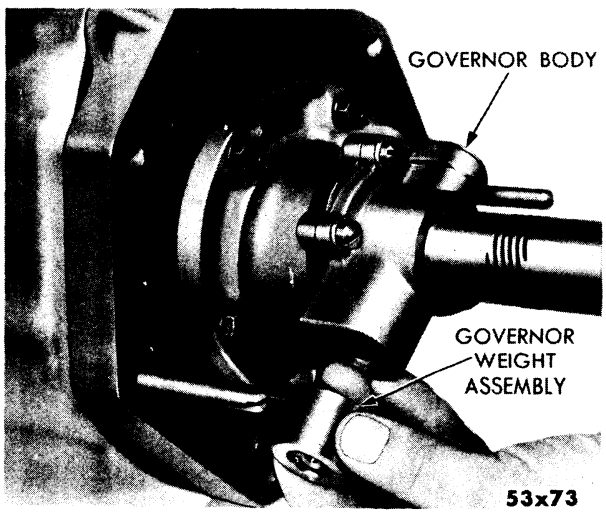

Fig. 61—Removal and Installation of Governor Weight Assembly (2-Stage Governor)

NOTE

Keep thumb pressure against secondary weight when removing snap ring.

(6) Remove governor secondary weight and spring (also remove intermediate weight if three-stage governor is used). All components should be thoroughly cleaned of any foreign matter. Use compressed air to dry parts—never a cloth or like material which may leave lint. Inspect all parts for burrs and wear. Check secondary weight for free movement (intermediate weight on three-stage governor) in primary weight by placing secondary weight (or intermediate weight) in primary weight without the spring. Secondary (or intermediate) weight should fall freely when both parts are clean and dry. Inspect governor weight spring for distortion.

(7) Remove governor locating screw from the governor body and output shaft.

(8) Slide governor body and support from output shaft. (Fig. 62.)

(9) Remove the two governor support piston rings and inspect.

(10) Remove the four governor body-to-support screws and lockwashers. Separate body from support and inspect.

CAUTION

Mating surfaces are machined to close tolerances

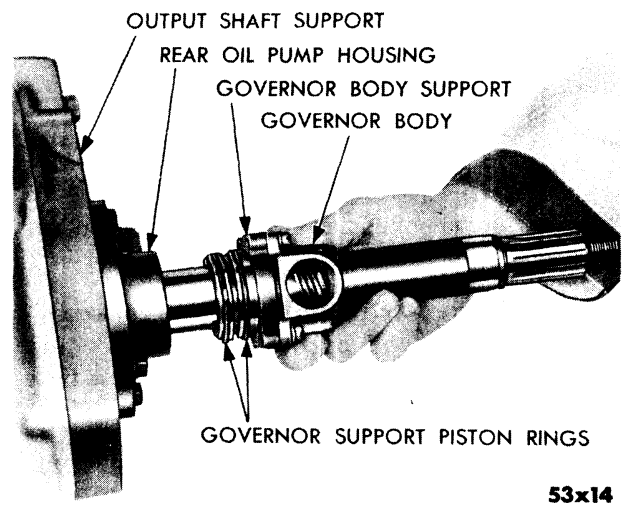

Fig. 62—Removal and Installation of Governor Body and Support Assembly

and can be easily damaged. Inspect oil passages and make sure they are free from dirt or foreign matter. Governor support has pressed-in steel sleeve which routes oil through the support. Make sure these passages are open. Do not attempt to replace sleeve if it is damaged—replace support. Clean passages with compressed air.

Governor valve and body should be inspected for scoring. If scoring is present, the part should be replaced. Inspect governor valve and make sure the lands of the governor valve have not been nicked or rounded. If either condition exists, replace the valve.

b. Assembly and Installation

(1) Coat the two governor support piston rings with MOPAR Lubriplate and install on the governor support. Stagger ring gaps and make sure the rings are free to rotate in lands.

(2) Position governor body on support and install the four screws and lockwashers.

Do not tighten screws at this time.

(3) Slide governor support and body assembly over output shaft and into position in rear oil pump housing.

Compress governor support piston rings with fingers, as support enters oil pump housing.

(4) Align locating hole in output shaft to locating screw hole in governor body and install governor screw. Tighten to 4 foot-pounds torque.

Holes can be easily aligned by turning output shaft and holding governor body.

(5) Tighten the four governor body screws to 10 foot-pounds torque.

(6) Dry governor parts with compressed air but do not lubricate when assembling.

(7) Place governor weight spring over secondary weight and position both in primary weight (position both in intermediate weight if three-stage governor is used).

Make sure governor weight spring seats properly.

(8) Guide secondary weight, and compress governor weight spring sufficiently to install snap ring. Make sure snap ring is seated properly.

(9) Place governor weight assembly (secondary weight snap ring up) into governor body and install snap ring. Make sure snap ring seats properly.

(10) Slide the governor valve (small end up) over governor valve shaft.

(11) Slide the governor shaft into governor body through the output shaft and governor weight assembly; at same time, position valve into body.

(12) Install the governor valve shaft snap ring.

CAUTION

Make sure the snap rings at both ends of the governor shaft are securely locked, otherwise serious transmission damage will occur if the shaft comes loose during operation.

(13) Check operation of governor weight assembly and valve by turning output shaft. Both should fall freely in body.

(14) Install transmission extension housing.

52. REAR OIL PUMP

a. Removal

(1) Remove transmission extension housing.

(2) Using a sharp instrument, such as an ice pick, remove either of the governor valve shaft snap rings.

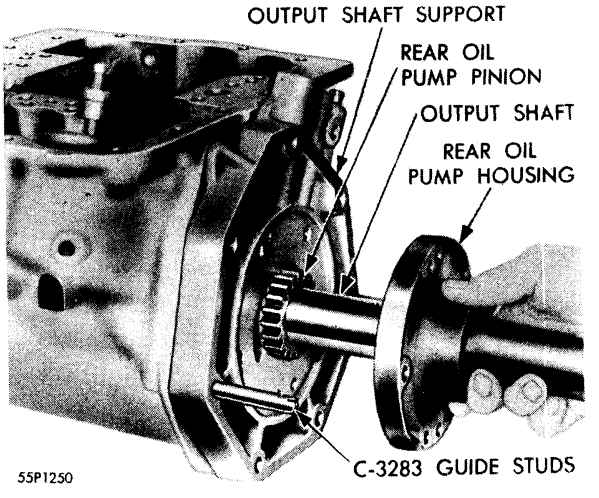

Fig. 63—Removal or Installation of Rear Oil Pump Housing

(3) Remove governor valve shaft and valve from governor valve body assembly.

(4) Using pliers, Tool C-760, remove governor weight assembly snap ring (large one) and remove governor weight assembly from governor body.

(5) Remove governor locating screw from governor body and output shaft.

(6) Slide governor body and support from output shaft.

(7) Loosen the four governor body-to-support screws. DO NOT REMOVE.

(8) Remove the five rear oil pump housing-to-output shaft support screws and lockwashers. Remove housing and oil pump gear as shown in Figure 63. Use Prussian blue to mark front side of gear in housing. **Do not use scribe.** Inspect machined surfaces for nicks and burrs, oil pump gear and housing for being scored or pitted, and pump housing plug for leaks.

(9) Remove rear oil pump pinion from output shaft, as shown in Figure 64. Mark front side with Prussian blue.

NOTE

Oil pump pinion is keyed to output shaft by a small ball. Use care when removing pinion not to lose ball. Inspect keyway in pinion and ball pocket in output shaft for wear. Inspect gear for pitting or scoring.

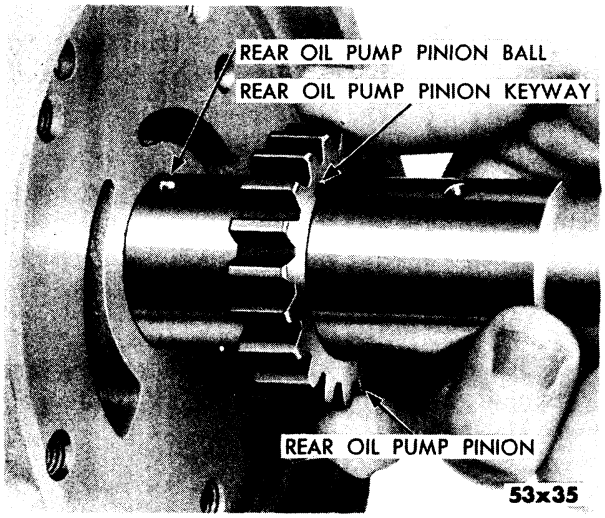

Fig. 64—Removal and Installation of Rear Oil Pump Pinion

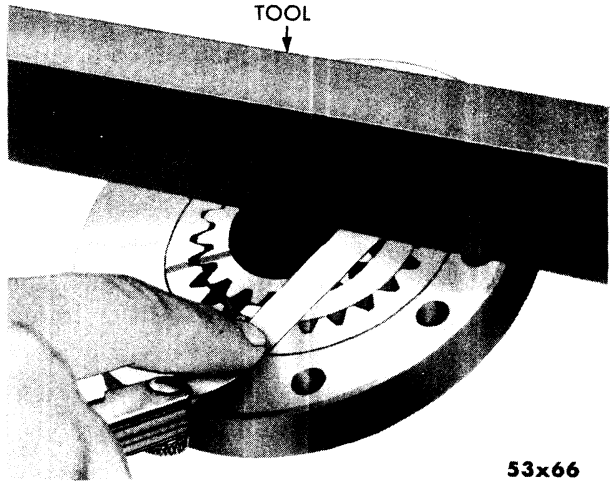

Fig. 65—Checking Clearance Between Pump Body and Gears Using Tool C-3355

(10) Using Tool C-3335 and feeler gauge, check clearance between pump housing face and face of gears, as shown in Figure 65. Clearance limits are .001 to .003 inch.

b. Installation

(1) Coat transmission rear oil pump pinion ball with MOPAR Lubriplate and insert in ball pocket in output shaft.

(2) Lubricate rear oil pump drive pinion, place over output shaft, and slide into position aligning keyway in pinion with ball in shaft.

Pinion was marked when removed. Make sure it is installed correctly.

(3) Lubricate rear oil pump gear and position into rear oil pump housing.

Make sure gear is installed correctly. Check marking.

(4) Slide rear oil pump housing assembly over output shaft and into position against output shaft support.

NOTE

There are two extra holes in housing which are used for vents. Check each screw hole before installing screws.

(5) Install the five rear oil pump housing-to-output shaft support screws and lockwashers. Draw down evenly. Tighten to 20 foot-pounds torque.

After screws have been properly tightened,

turn output shaft to make sure pump gears are free to rotate. If not, disassemble pump to determine cause.

(6) Coat the two governor support piston rings with MOPAR Lubriplate, and stagger rings. Make sure they rotate freely in lands.

(7) Slide governor support and body assembly over output shaft and into position in rear oil pump housing.

Compress governor support piston rings with fingers as support enters oil pump housing.

(8) Align locating hole in output shaft to locating hole in governor body and install governor locating screw. Tighten to 4 foot-pounds torque.

Holes can be easily aligned by turning output shaft and holding governor body.

(9) Tighten the four governor body screws (ones which were loosened when assembly was removed) to 10 foot-pounds torque.

(10) Place governor weight assembly secondary weight snap ring up into governor body and install snap ring. Make sure snap ring seats properly.

(11) Slide the governor shaft into governor body through the output shaft and governor weight assembly; at the same time, position valve into body.

(12) Install governor valve shaft snap ring. Make sure the snap rings at both ends of the governor shaft are securely locked, otherwise serious transmission damage will occur if the shaft comes loose during operation.

(13) Check operation of governor weight assembly and valve by turning output shaft. Both should fall freely in body.

The three-stage governor can be used as a replacement for the two-stage governor if the governor assembly is replaced in its entirety. Transmissions having the new governor can be identified by the letter "H" after the part number.

(14) Install extension housing.

SERVICING THE TORQUE CONVERTER

53. CHECKING AND CORRECTING TORQUE CONVERTER HUB RUNOUT

a. Hub Runout

(1) Remove transmission.

(2) Remove the torque converter housing-to-engine adapter bolts and lockwashers.

(3) Using care, remove the torque converter housing.

Permissible torque converter hub runout when mounted on the crankshaft, is .004" total indicator reading. If new torque converter is being installed, make sure all visible foreign matter, such as raised metal around studs, chips, etc., have been removed from the converter and crankshaft drive flanges. Check crankshaft flange runout (maximum .002" total indicator reading). Tighten stud nuts to 55 foot-pounds torque.

Check the torque converter runout by mounting a dial indicator to the adapter plate or to some other unit which is mounted rigidly to the engine block. (Refer to Fig. 66.) Rotate the converter 360° and determine the converter hub O.D. runout.

If this exceeds .004" total indicator reading, correct by using one of the two following methods.

b. Acetylene Torch Method

When using this method, make definitely sure the torque converter has been drained.

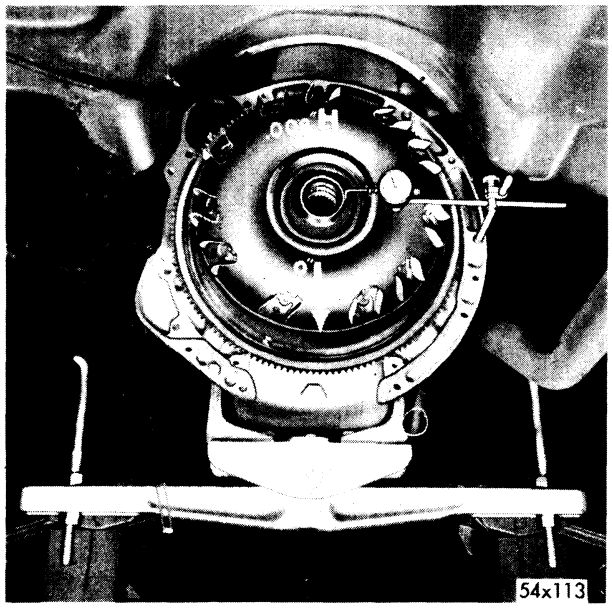

Fig. 66—Checking Torque Converter Run-Out

(1) Mark the position of the hub low spot as accurately as possible on the impeller shell. Rotate the converter so this mark is directly down.

(2) Remove the dust shield from the front of the adapter plate. Using a piece of chalk, mark the front cover directly opposite the hub low spot previously marked on the impeller shell. The subsequent heating operation can now be done through the opening in the adapter plate. (Refer to Fig. 67.)

(3) The size of the spot to be heated is governed by the magnitude of hub runout and is usually about ½ inch diameter for .008 inch total indicator reading. Using an acetylene torch, containing a No. 3 tip and set to maximum heat, apply it to the selected spot until it becomes a dull red. Rapid heating of a local area is essential and, if the torch is adjusted properly, the spot will become red within a few seconds.

CAUTION

If sparks are noted, it is an indication that torch is too close and metal is starting to burn. Move torch back slightly. Care should be taken to remove the torch the instant the selected spot becomes a dull red to avoid over-correction or damage to the unit.

(4) The area is then quenched as rapidly as possible with cold water (hose or wet rags). It is suggested this be done by starting around the heated area and working in toward the spot. This prevents the heat from spreading. **The hub runout should not be rechecked until the converter has returned to a uniform room temperature.**

(5) If the converter hub runout exceeds .016 inch total indicator reading, remove the converter and inspect the drive flanges for raised metal chips, etc. Check crankshaft flange runout (maximum .002 inch). If the hub runout remains in excess of .016 inch total indicator reading, install a new converter.

c. Shim Method

Check the hub runout as previously described. If this runout exceeds .004 inch, then proceed as follows:

(1) Mark the position of the hub high point, as determined by the indicator, on the impeller shaft.

(2) Remove the converter and select the converter drive stud nearest the hub high point.

(3) Install shims over one stud so that the total thickness equals about ½ the total indicator reading to be corrected.

Fig. 67—Heating Torque Converter to Correct Run-Out

(4) The total shim thickness should never exceed .008 inch. If the converter hub runout exceeds .016 inch total indicator reading, remove the converter and re-inspect the drive flanges for raised metal, chips, etc. If the hub runout remains in excess of .016 inch total indicator reading, install a new converter.

After torque converter hub runout has been corrected, proceed as follows:

(1) Place the torque converter housing in position on dowels and install mounting bolts. Tighten to 30 foot-pounds torque.

54. REMOVAL OF TORQUE CONVERTER FROM VEHICLE

(1) Remove transmission.

(2) Remove the starting motor.

(3) Remove the torque converter housing- to-engine adapter bolts and lockwashers.

(4) Carefully remove the torque converter housing.

(5) If torque converter is being removed because of excessive runout damage, check by using a dial indicator on hub and mark the highest point of runout on both converter and crankshaft flange. The reason is so it may be determined later if runout was caused by the converter or crankshaft, after crankshaft has been checked in the same manner.

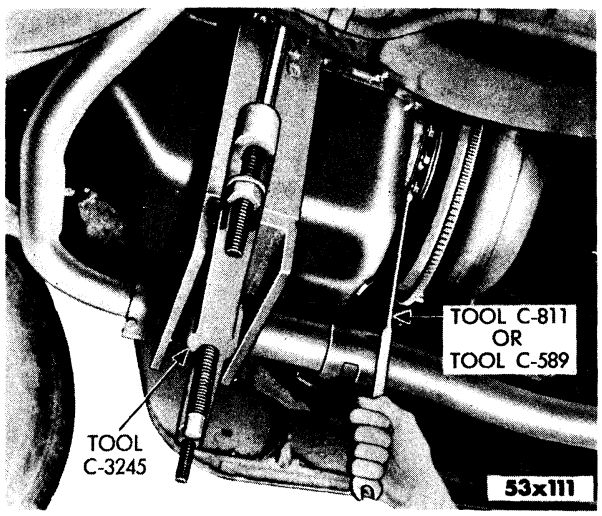

Fig. 68—Removing or Installing Torque Converter Mounting Stud Nuts

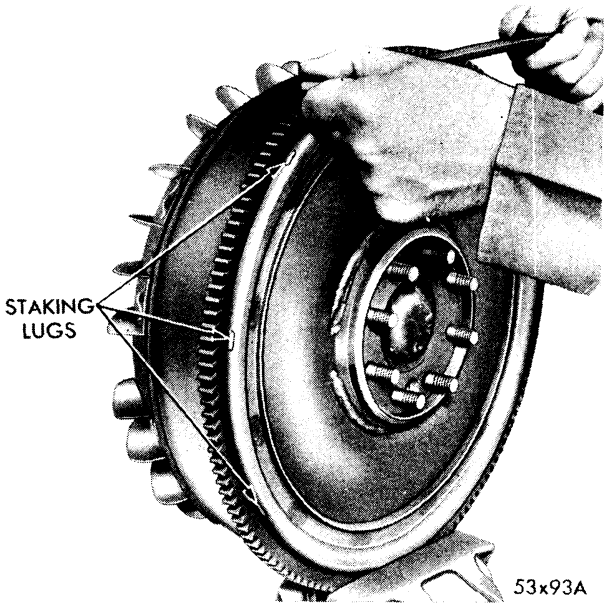

Fig. 69—Removal of Staking Lugs from Torque Converter

(6) Using wrench, Tool C-811, remove the eight torque converter stud nuts and lockwashers from crankshaft flange, as shown in Figure 68.

(7) Remove torque converter from crankshaft.

(8) Check crankshaft flange runout (maximum .002 inch).

55. REPLACING STARTER RING GEAR ON TORQUE CONVERTER

a. Removal

(1) Support the torque converter assembly in a vise. With a file, carefully remove the staking welds which retain the ring gear to the torque converter, as shown in Figure 69.

NOTE

Be careful to avoid distortion when supporting torque converter in the vise.

(2) Place torque converter on blocks of wood for support while removing gear.

(3) Using a blunt chisel, or drift, tap around

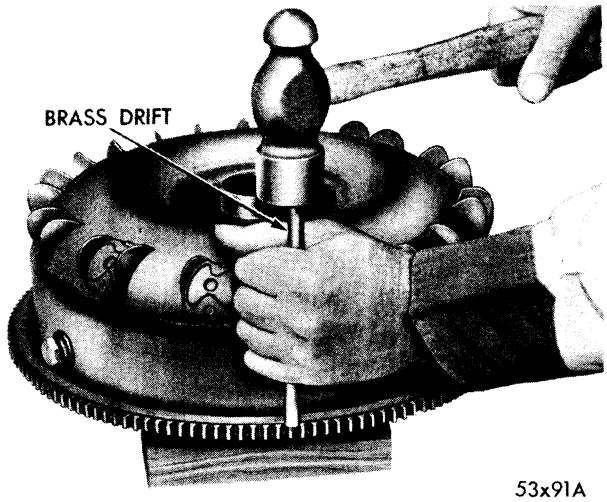

Fig. 70—Removal of Starter Ring Gear

ring gear until it comes off torque converter. (Fig. 70.)

b. Installation

(1) Remove burrs or raised spots (left on the gear contact surface of the torque converter) with a file.

CAUTION

Do not remove more metal from the torque converter than is required to remove burrs and rough surfaces.

Any of the following methods may be used to heat the starter ring gear for installation of converter:

OVEN

When available, use oven, C-794, and set temperature at 150 degrees F. Allow ring gear to remain in oven for approximately 15 to 20 minutes.

BOILING WATER

Place ring in a shallow container, add water, and heat for approximately eight minutes (after water has come to a boil).

STEAM

Place ring gear on a flat surface and direct the steam flow around the gear for approximately two minutes.

FLAME

Place ring gear squarely on a flat surface. Using a medium-size tip, direct a low flame around the inner rim of the gear. **Do not direct the flame onto the teeth of the ring gear.** Place a few drops of water on the face of the gear at short intervals during the heating process. When the gear is hot enough to boil the drops of water, installation of gear to torque converter can be made.

(1) Place starter gear over flange surface of torque converter. Make sure that the rear face of gear contacts flange on torque converter evenly around the entire diameter.

(2) Reweld ring gear to torque converter, using extreme care to place as nearly as possible the same amount of metal in exactly the same location as original assembly. This is necessary in order to maintain proper balance of the unit. Place welds alternately on opposite sides of the converter to minimize distortion.

The following suggestions are offered as an aid in making the weld:

1. Use a welding current of 200 amps.

2. Use a D. C. welder that is set at straight polarity, or an A. C. welder.

3. Use a $\frac{5}{32}$ inch diameter Fleet Weld No. 47, or $\frac{5}{32}$ inch diameter General Electric No. W28 or equivalent.

CAUTION

To prevent burning through the torque converter, the arc should be directed at the intersection of the gear and the housing from an angle of approximately 45 degrees from the face of the gear. DO NOT GAS WELD. Such a procedure would ruin the unit.

Before installing the torque converter, inspect all gear teeth and remove all nicks where metal is raised, welding spatter, etc., as these will cause noisy starter operation.

56. INSTALLATION OF TORQUE CONVERTER IN VEHICLE

(1) Inspect mating surfaces on torque converter and crankshaft flange for burrs and dirt. Install torque converter on crankshaft.

(2) Install the eight torque converter stud nuts

and lockwashers. Draw down evenly and tighten.

NOTE

When torque converter assembly is removed from the crankshaft drive flange for any reason, the converter assembly runout should be checked when reinstalled. Runout should not exceed .004 inch total indicator reading. Refer to checking and correcting Torque Converter Hub Runout.

(3) Install the starting motor and tighten the mounting bolts securely.

(4) Place the torque converter housing in position on dowels. Install the mounting bolts. Tighten to 30 foot-pounds torque.

(5) Install transmission.

DISASSEMBLY, INSPECTION, AND ASSEMBLY OF TRANSMISSION

Observe the following precautions during disassembly and assembly of transmission:

(1) Cleanliness through the entire disassembly and assembly cannot be overemphasized. Unit should be thoroughly cleaned when removed from vehicle. When disassembling, each part should be placed in a suitable solvent, washed, then dried by compressed air.

Do not wipe parts with shop towels. Use lintless paper towels made for this purpose.

(2) All of the mating surfaces in the transmission are accurately machined; therefore, careful handling of parts must be exercised to avoid the occurrence of nicks or burrs.

(3) The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on valves, use extreme care so as not to round off the sharp edges.

(4) Lubricate all bearings and gears with Automatic Transmission Fluid (Type "A") when assembling, unless otherwise specified. Use MOPAR Lubriplate on all seals, rings, thrust washers and gaskets.

CAUTION

Do not use a sealing material on any gasket or mating surface when assembling transmission. Always use new gaskets.

(5) Tighten all bolts and nuts to correct specifications.

(6) Where snap rings are used in assembly, always make sure they are seated properly.

(7) When it becomes necessary to recondition transmission (and vehicle has accumulated considerable mileage) install new sealing rings on parts requiring their usage.

(8) If mating parts do not go together properly, always check for cause. **Do not force parts unnecessarily.**

57. REMOVAL OF EXTERIOR COMPONENTS, PUMPS, AND GOVERNOR (REFER TO FIG. 51)

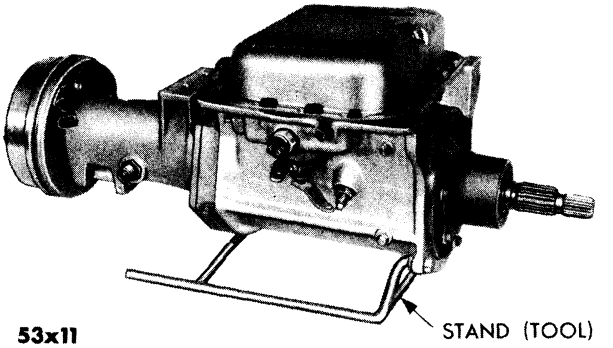

Fig. 71—Transmission Assembly (Inverted Position) In Stand, Tool C-3280

(1) Place transmission assembly in stand, Tool C-3280 and invert, as shown in Figure 71.

(2) Remove the eighteen oil pan bolts (with attached lockwashers) and remove the oil pan and gasket.

(3) Loosen the throttle (top) and manual (bottom) control lever assembly locking screw.

(4) Slide the throttle valve operating lever assembly off shaft, and remove the throttle valve camshaft felt retainer and felt. Slide the manual valve lever assembly off shaft and remove manual valve lever shaft seal cover. Inspect both throttle and manual control levers for wear.

(5) Remove the two oil strainer support bolts and washers and remove oil strainer assembly. Inspect seal rings located at both outlet sides of strainer.

(6) Remove the five transfer plate bolts and lockwashers.

(7) Remove the valve body and transfer plate assembly from transmission case, as shown in Figure 72.

CAUTION

Mating surfaces are machined; use extreme care not to damage these surfaces. Place valve body in stand, Tool C-3294.

(8) Remove the neutral starter and back-up light switches. The neutral starter switch is located on left side of transmission case just below the manual throttle valve. The back-up light switch is on the right side of the transmission case. (Refer to Fig. 37.)

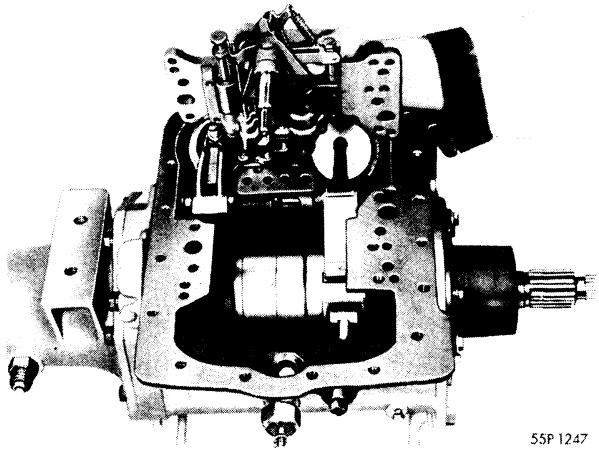

Fig. 72—Removal or Installation of Valve Body and Transfer Plate

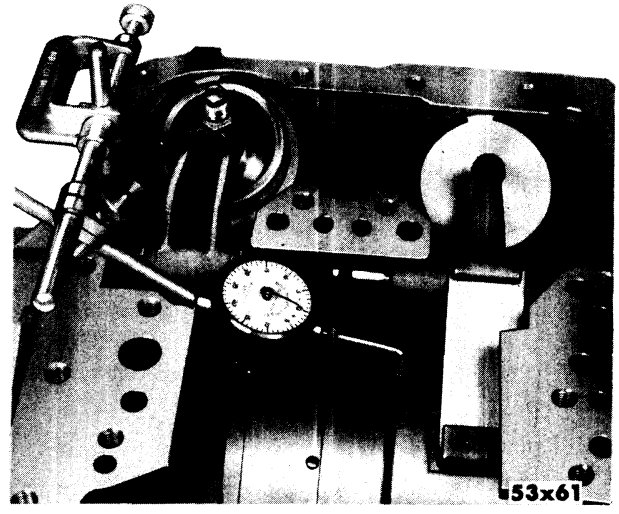

Fig. 73—Checking Transmission End Clearance With Tool C-430

(9) Check transmission end clearance with either a dial indicator, Tool C-430, or feeler gauge, as shown in Figure 73. To make this check, first measure the distance between the direct clutch assembly and carrier housing when clutch is in rearward position. Pry the clutch forward by carefully inserting screwdriver between the direct clutch and carrier housing. Remove screwdriver and measure again. Limits are .026 to .052 inch.

NOTE

Hand brake assembly must be installed and tightened to required specifications before attempting to check transmission end play.

(10) Remove transmission extension.

(11) Remove governor assembly.

(12) Remove rear oil pump.

58. REMOVAL OF OUTPUT SHAFT SUPPORT, PLANET PINION CARRIERS, AND DIRECT CLUTCH ASSEMBLIES

(1) Remove output shaft support-to-transmission case bolt and washer. (Refer to Fig. 59.)

(2) With one hand, work the output shaft up and down and, at the same time, apply pressure with the other hand to the input shaft. Slide the output shaft rear support assem-

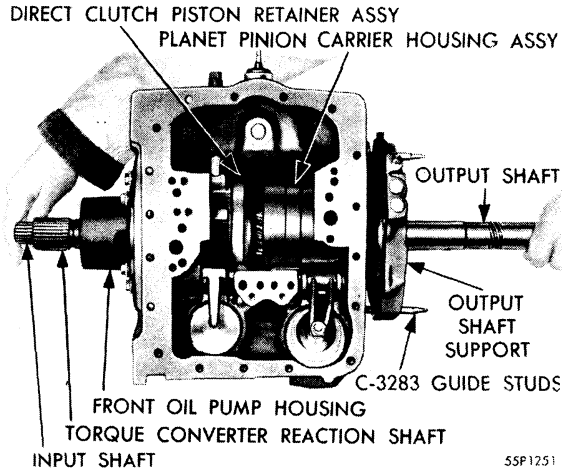

Fig. 74—Removing Output Shaft, Carrier Housing and Input Shaft Assemblies

bly, planet pinion carrier housing assembly, and gasket from rear of transmission case, as shown in Figure 74. If rear support is stuck to transmission case and cannot be removed, as just described, proceed as follows: Install one of the oil pan bolts in transmission case and, with the aid of a pry bar, pry against support sufficiently to separate support from case. (Refer to Fig. 75.)

(3) Remove the direct clutch piston retainer assembly from torque converter reaction shaft.

(4) Remove the direct clutch piston retainer thrust washer from torque converter reaction shaft. This washer is a select fit and controls the end clearance between the direct clutch assembly and carrier housing. Inspect washer for cracks, burrs, and wear. Identify for assembly purposes.

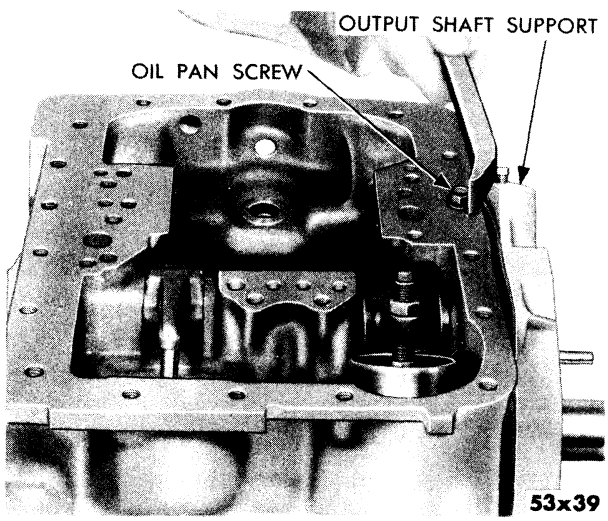

Fig. 75—Method of Separating Output Shaft Rear Support From Transmission Case

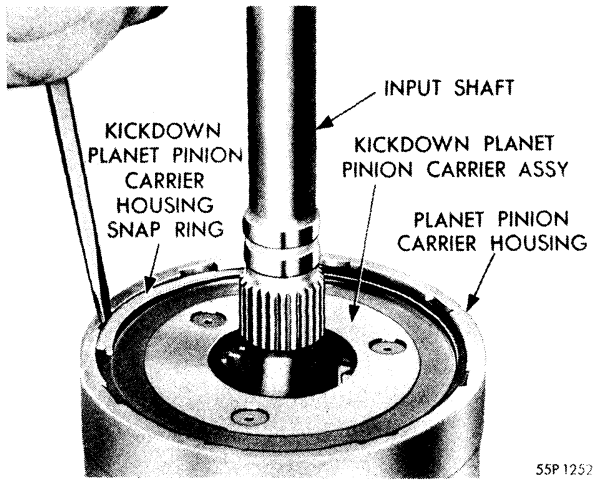

Fig. 76—Removal or Installation of Snap Ring

(5) Remove the kickdown planet pinion carrier thrust washer from direct clutch retainer assembly and inspect for cracks and wear.

59. REMOVAL (AND INSPECTION) OF PLANET PINION CARRIERS FROM HOUSING ASSEMBLY

(1) Place unit in an upright position in Tool C-3285.

(2) Using a feeler gauge, check clearance between the kickdown planet pinion carrier housing snap ring and kickdown planet pinion carrier assembly. This clearance

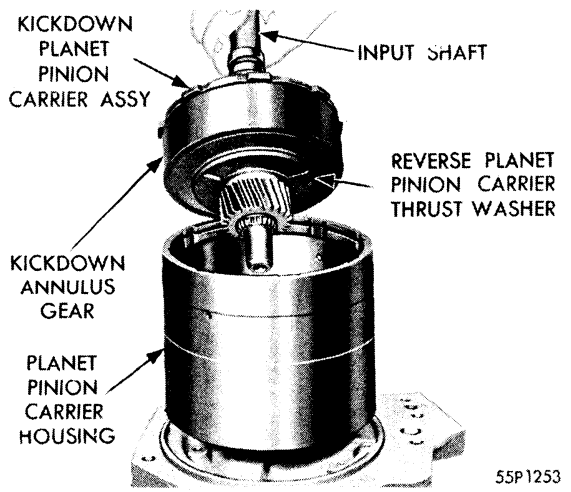

Fig. 77—Removal or Installation of Input Shaft and Carrier Assembly

should be .012 to .038 inch. If within these limits, identify each thrust washer as it is removed during disassembly.

(3) Using a screwdriver, remove the transmission kickdown planet pinion carrier housing snap ring, as shown in Figure 76. Identify snap ring to aid in assembly.

(4) Remove the input shaft, kickdown planet pinion carrier assembly, and kickdown annulus gear from carrier housing. (Fig. 77.)

(5) Remove the reverse planet pinion carrier thrust washer and inspect for cracks and wear.

(6) Using pliers, Tool C-3301, remove the transmission kickdown annulus gear snap ring, as shown in Figure 78.

(7) Remove the kickdown annulus gear from input shaft and inspect for worn, cracked, and broken gear teeth.

(8) Remove kickdown planet pinion carrier assembly from input shaft. (Refer to Fig. 79.) Inspect stop ring on end of shaft which controls position of annulus gear on input shaft. Check all oil passages in both the gear and shaft for obstructions. Inspect splines and bearing surfaces on input shaft for burrs and wear.

Inspect planet pinion carrier for scores on thrust surfaces and for broken and worn teeth. Using a feeler gauge, check end clearance on individual planet pinion gears. Clearance should

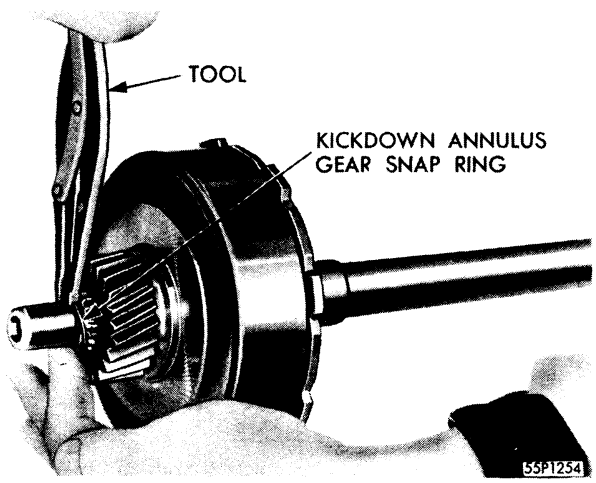

Fig. 78—Removal and Installation of Kickdown Annulus Gear Snap Ring

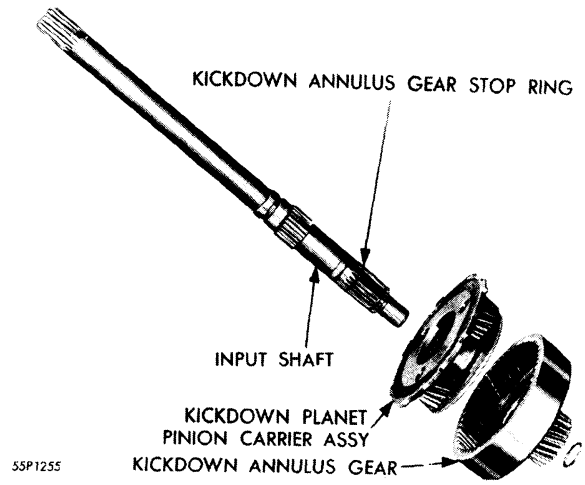

Fig. 79—Input Shaft and Kickdown Planetary Gear Set (Disassembled View)

be .006 to .017 inch. Inspect pinion shafts for tight fit in the carrier and make sure pinions are free to rotate on shafts. Inspect oil holes in the thrust washer of the kickdown carrier to make certain they are open. **Do not replace carrier unless inspection reveals it is necessary.**

NOTE

The planet pinion carrier assembly is serviced only as a complete assembly.

(9) Remove reverse planet pinion carrier assembly from planet pinion carrier housing. (Fig. 80.) Do not replace carrier unless

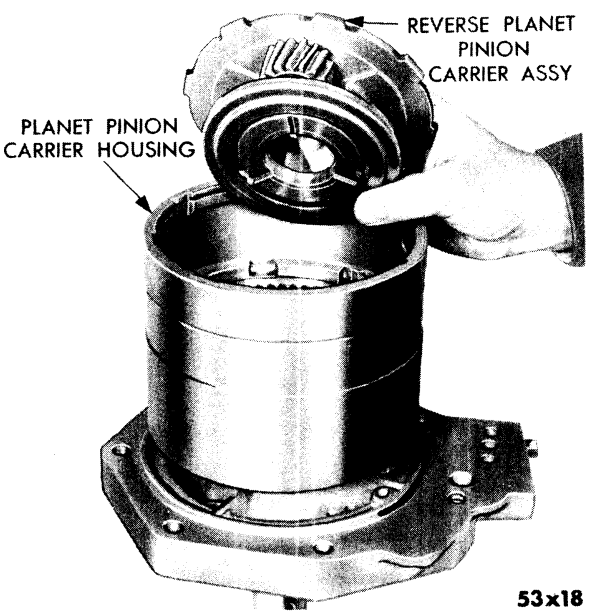

Fig. 80—Removal and Installation of Reverse Planet Pinion Carrier Assembly

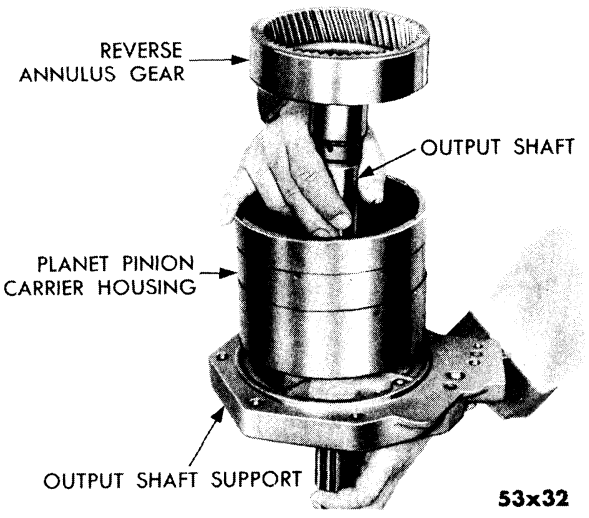

Fig. 81—Removal and Installation of Reverse Annulus Gear and Output Shaft

inspection reveals it is necessary.

(10) Remove the output shaft and reverse annulus gear assembly from the carrier housing and output shaft support, as shown in Figure 81.

(11) Using pliers, Tool C-3301, remove the reverse annulus gear snap ring and remove annulus gear from output shaft. Inspect thrust surfaces and journals for scores and annulus gear for worn or broken teeth. Inspect splines on both shaft and gear for burrs and wear. Check speedometer pinion gear and gear on output shaft for burrs.

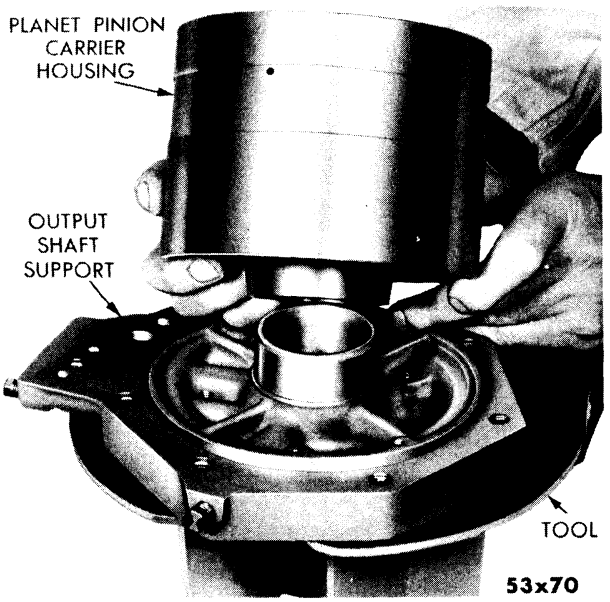

Fig. 82—Removal of Carrier Housing From Output Shaft Support

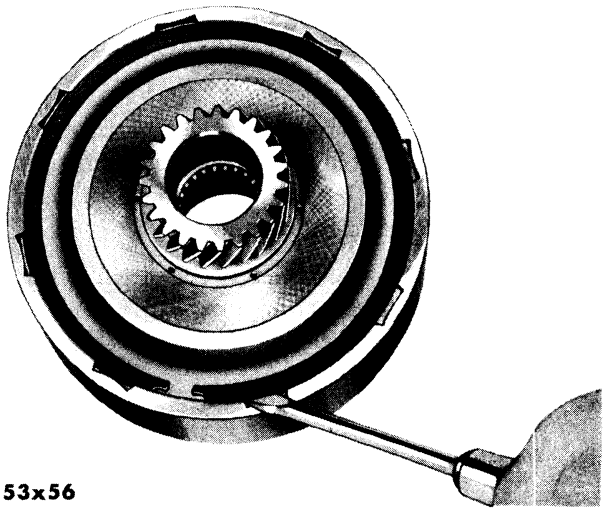

Fig. 83—Removal and Installation of Kickdown Sun Gear Snap Ring

Inspect bushing located in the end of output shaft, for wear, scores, and burrs. **The output shaft is serviced only as an assembly.**

NOTE

On some C-69 and C-70 models an additional snap ring is located just forward of the splines at the rear of the output shaft. This ring should be left in same position as found.

(12) Remove planet pinion carrier housing thrust washer and inspect for cracks and wear.

(13) Remove planet pinion carrier housing from output shaft support. (Fig. 82.) Inspect driving lug slots inside of housing for wear. Inspect bearing and thrust surfaces for scores and burrs. Closely inspect band contacting surface for burned spots and scoring, especially if lining has become excessively worn.

Inspect all oil passages in output shaft support for any obstructions. Check rear oil pump mating surface for burrs and score marks. Check for stripped threads in support. Inspect gasket surfaces for burrs and dirt. Inspect both inside and outside bearing surfaces for wear and scoring.

60. DISASSEMBLY AND INSPECTION OF DIRECT CLUTCH PISTON RETAINER

(1) Using a screwdriver, remove the kickdown sun gear snap ring. (Fig. 83.) Snap ring is a select fit. Identify to aid in assembly.

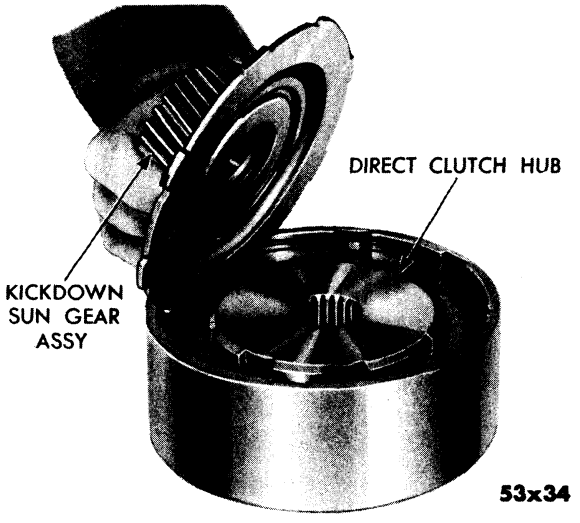

Fig. 84—Removal and Installation of Kickdown Sun Gear

(2) Lift out kickdown sun gear assembly. (Fig. 84.) Note oil slinger on reverse side. Inspect for clutch material obstructing oil passages and slinger. Remove any foreign material which may have accumulated on front side. Inspect driving disc contact surface for evidence of burning or scoring.

(3) Inspect sun gear for cracked or broken teeth.

(4) Lift out direct clutch hub from center of direct clutch piston retainer. (Fig. 85.) Oil passages in hub lubricate the clutch plates and driving discs when clutch is in released position (all positions except direct). Inspect clutch hub driving lugs for wear, and remove any metal pickup which may have accumulated on either side of the hub. Inspect splines in center of hub for burrs and wear.

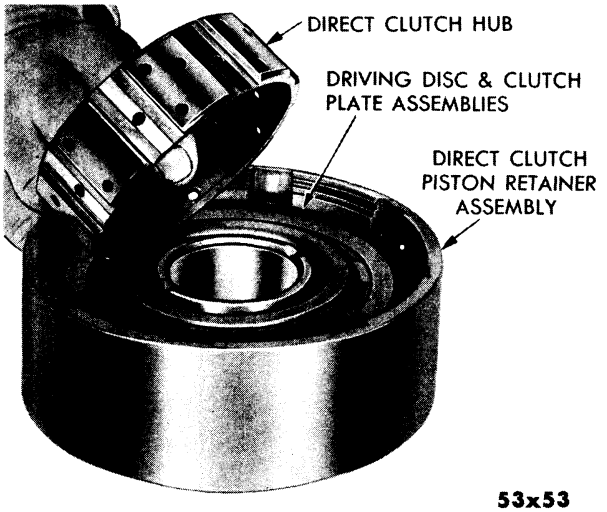

Fig. 85—Removal of Direct Clutch Hub

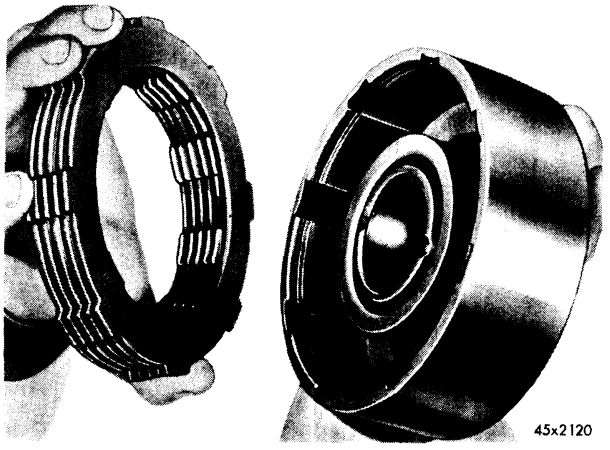

Fig. 86—Removal of Clutch Discs and Clutch Plates

(5) Invert the direct clutch piston retainer and remove the six clutch plates (steel) and six driving discs (seven each in C-300). (Fig. 86.) Note the position in which these were assembled. If assembly was started with the cork portion on outer top, the same sequence must be followed all through the assembly, or vice versa. Assembling in this manner assures a more even contact. Driving discs are constructed of cork and krafelt, cycle-welded to a steel disc. Inspect driving discs for evidence of burning, glazing, and flaking off of facing material. Check disc by scratching facings with finger nail; if material collects under nail, replace all driving discs.

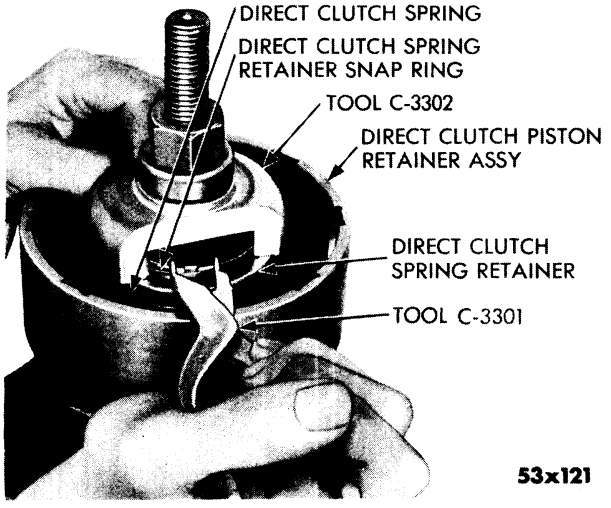

Fig. 87—Removal and Installation of Direct Clutch Spring Retainer Snap Ring

Replace driving discs if splines have became damaged. Inspect the steel clutch plates for evidence of burning, scoring, and damaged splines.

(6) Using Tool C-3302, compress the direct clutch spring sufficiently to unseat the direct clutch spring retainer snap ring with Tool C-3301, as shown in Figure 87.

(7) Release Tool C-3302, and remove the direct clutch spring retainer snap ring, spring retainer, and spring from the direct clutch spring retainer. (Fig. 88.)

(8) Using a twisting motion, remove the direct clutch piston assembly from clutch retainer. (Fig. 89.) Note the ball check in clutch retainer housing. The purpose of the ball check is to relieve centrifugal oil pressure when transmission is in neutral and engine speeds are increased (otherwise clutch may engage). Make sure ball operates freely. The bearing used in the direct clutch piston retainer is of the steel-backed bronze type and is not replaceable. If the torque converter reaction shaft seal rings have worn or grooved the bearing so that bronze is no longer visible at that point, replace the direct clutch piston retainer. Inspect the band contacting surface for deep scores and burns, especially if the band lining is worn to the point where the steel band has been contacting the direct clutch piston retainer. Do not turn the direct clutch piston retainer in a lathe to remove score marks. Inspect steel clutch plate contacting surfaces for deep scores and burrs. Replace if needed.

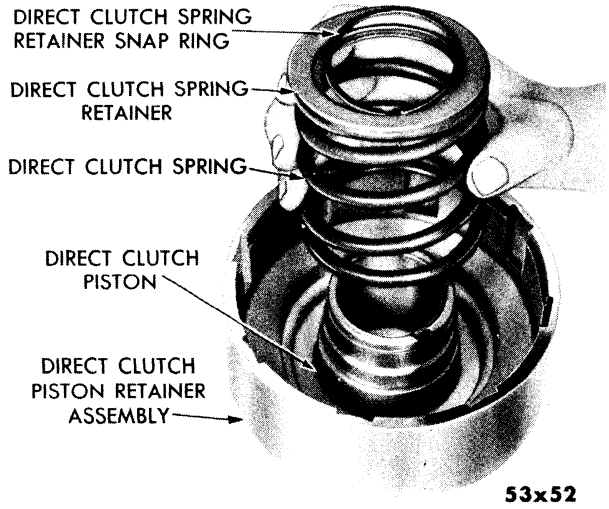

Fig. 88—Removal and Installation of Direct Clutch Spring, Retainer and Snap Ring

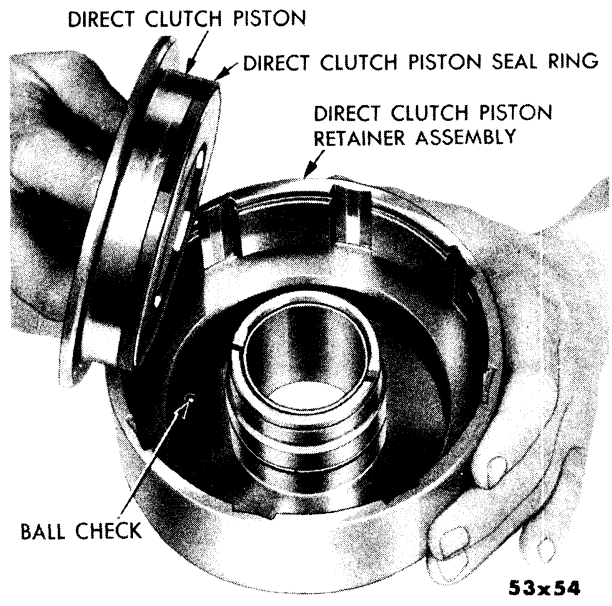

Fig. 89—Removal and Installation of Direct Clutch Piston Assembly

Make sure clutch driving lugs will slide freely into retainer. Remove any metal pickup on hub of retainer. Inspect inside bore of the piston for score marks; if light, remove with crocus cloth. If heavy, replace the piston.

(9) Remove the direct clutch piston retainer seal ring (lip type neoprene) from retainer hub, as shown in Figure 90.

(10) Remove the direct clutch piston seal ring (neoprene) from outer diameter of piston.

61. ASSEMBLY OF DIRECT CLUTCH PISTON RETAINER

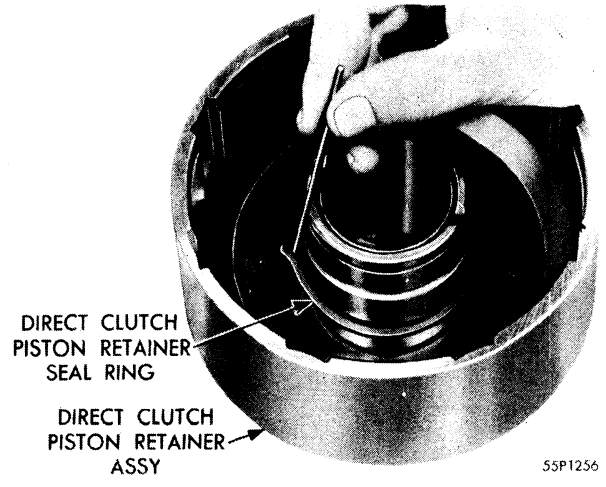

Fig. 90—Removal or Installation of Piston Retainer Seal Ring

(1) Coat a new direct clutch piston seal ring with MOPAR Lubriplate and install on piston, with lip of seal facing away from the flange.

(2) Coat a new direct clutch piston retainer seal ring with MOPAR Lubriplate and install (lip of seal down) on retainer hub.

(3) Place piston assembly in the direct clutch retainer and, with a twisting motion, seat piston in bottom of retainer. **Use care not to damage lip of seals.**

(4) Seat the direct clutch spring into the direct clutch piston retainer and position spring retainer and snap ring on spring.

(5) Using Tool C-3302, compress the direct clutch spring sufficiently to seat the snap ring. (Fig. 87.)

NOTE

Piston spring retainer may require guiding past the snap ring grooves. Make sure snap ring is properly seated.

(6) Place the direct clutch hub in center of direct clutch piston retainer.

(7) Lubricate all clutch plates and driving discs with Automatic Transmission Fluid (Type "A") and assemble by placing one of the clutch plates in the direct clutch piston retainer (Fig. 91), followed by a driving disc. **If first driving disc was installed with cork portion on outer top, the remaining discs must be installed in the same manner or vice versa. Repeat this procedure until all discs and plates have been installed. Refer to Figure 92 for correct sequence when installing.**

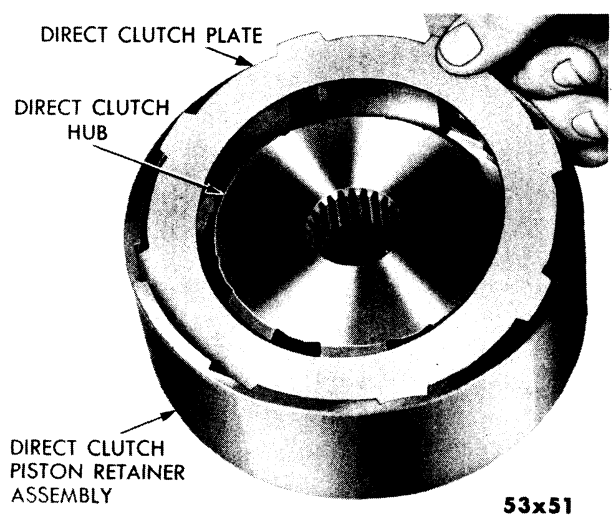

Fig. 91—Assembly of Direct Clutch

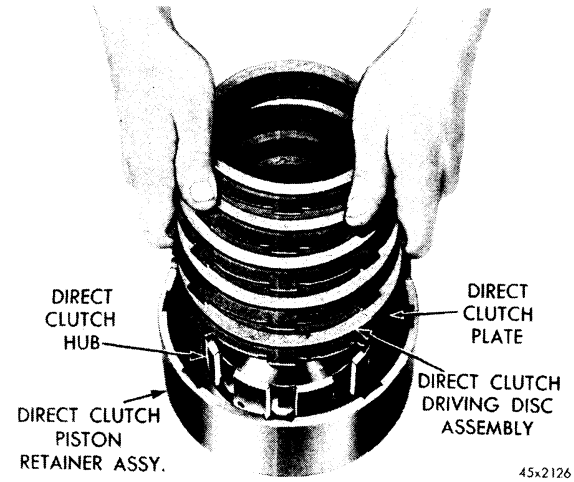

Fig. 92—Installation of Clutch Plates and Clutch Driving Discs

(8) Place the kickdown sun gear assembly in the direct clutch piston retainer and install snap ring (select fit).

(9) Using a feeler gauge, check the clearance under the kickdown sun gear snap ring. Clearance limits are as close to zero as possible. Snap rings are available in the following three thicknesses:

.059"-.061"	Thin
.062"-.064"	Medium
.065"-.067"	Thick

Make sure snap ring seats properly.

62. REMOVAL AND INSPECTION OF REVERSE AND KICKDOWN BAND ASSEMBLIES

(1) Mark the reverse band assembly for installation purposes, then compress ends of band sufficiently to remove the reverse band strut.

(2) Unhook reverse band assembly from link assembly and remove by rotating band ends through rear opening in transmission case, as shown in Figure 93.

(3) Compress kickdown band ends sufficiently to remove the kickdown band strut. Note that strut is grooved to act as a guide to the kickdown band strut pin on band end.

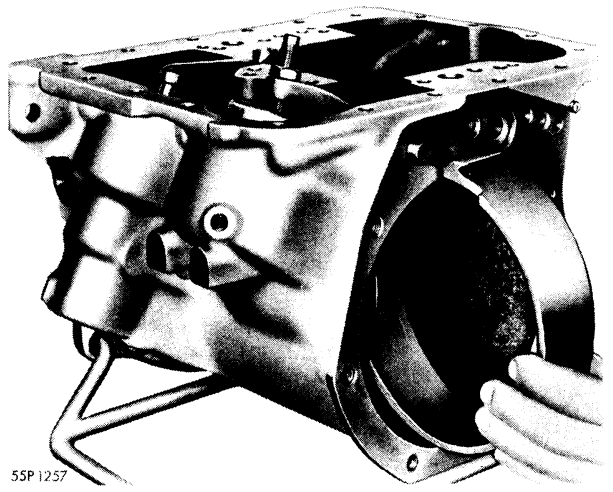

Fig. 93—Removal or Installation of Reverse or Kickdown Band

(4) Remove the kickdown band assembly by rotating band ends through rear opening in transmission case, as shown in Figure 93. Both bands have bonded lining and it is suggested that no attempt be made to reline them. The kickdown band is narrower and has a different lining material.

(5) Make visual inspection of linings for wear and bond to metal band. If linings are worn to the point that grooves are no longer visible, band assemblies must be replaced. Inspect bands for distortion and cracked ends.

63. REVERSE AND KICKDOWN BAND LEVER ASSEMBLIES

a. Inspection

Inspect reverse band link assembly for wear and riveting of assembly. Inspect levers for cracks and wear. Make sure they have side clearance and are free to turn on shafts. Do not remove these assemblies unless inspection reveals it is necessary to do so.

b. Removal

(1) Insert finger in back of reverse band and link assembly lever shaft. Holding the reverse band lever and link assembly with the other hand, push shaft out of rear opening in case.

(2) Remove kickdown band lever shaft plug in front of transmission case.

(3) Remove kickdown band lever by inserting finger in back of kickdown lever shaft. Holding the band lever with the other hand, push shaft out front of transmission case.

64. REMOVAL, DISASSEMBLY, AND INSPECTION OF FRONT OIL PUMP

(1) Remove the transmission regulator valve spring retainer, spring gasket, and valve. (Fig. 94.)

(2) Remove the torque converter control valve spring retainer, spring, gasket, and valve (top). To remove these valves when transmission is installed in vehicle will require the aid of a mechanical retriever or a piece of welding rod inserted in end of valve. (Fig. 48.) Valves are so constructed that they will not drop into front housing when being removed.

(3) Remove the seven front oil pump housing-to-transmission case bolts and washers. Sealing washers used under bolts are made from aluminum or copper. Discard and use new ones for assembly.

(4) The front oil pump assembly may be removed by tapping lightly with a fiber hammer.

Using Prussian blue, mark front side of gears. Do not use scribe marks.

(5) Remove oil pump gear from front oil pump housing.

(6) Remove the front oil pump housing seal (large neoprene) from housing.

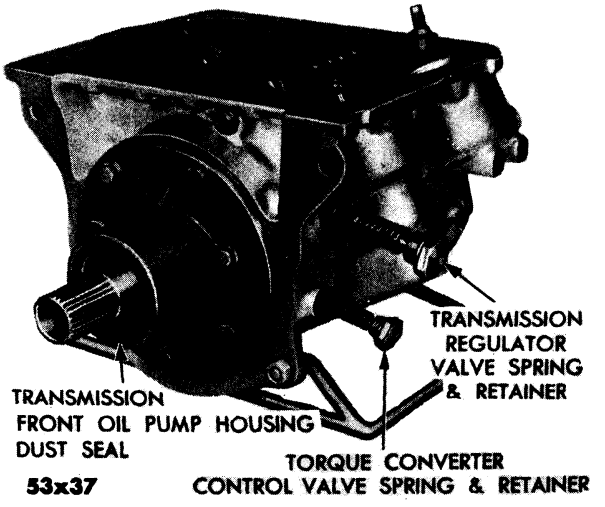

Fig. 94—Transmission Regulator and Torque Converter Control Valve Spring Retainers

(7) Using a brass drift, drive the front oil pump housing dust seal out front of housing.

(8) Inspect front oil pump housing bushing for scores (bushing not replaceable). Purpose of this bushing is to support the front oil pump drive sleeve. Slight scores may be removed with crocus cloth. Inspect pump housing and gears for scores.

(9) Using Tool C-3335 and feeler gauge, check clearance between pump housing face and face of gears. (Fig. 65.) Clearance limits are from .001 to .003 inch. Make sure all oil passages are open by blowing out with compressed air.

65. REMOVAL AND INSPECTION OF REGULATOR VALVE BODY

(1) Using the two threaded holes provided in the regulator valve body, attach puller, Tool C-3287, and install guide studs, Tool C-3288. (Fig. 95.) Pull regulator body and discard gasket.

(2) The regulator valve body is made of aluminum and requires care in handling to avoid damage. Place body and both valves in pan containing a clean solvent. Wash thoroughly, and dry with compressed air. Inspect both valves for free movement in valve body. They should fall in and out of bores when both the valves and body are dry. Crocus cloth may be used to polish valves, providing care is exercised not to round the sharp edge portion of the valves. The sharp edge portion is vitally important to this type of valve. It helps to prevent dirt and foreign matter from getting between the valve and body, thus reducing the possibilities of sticking. Check all fluid passages for obstructions and inspect all mating surfaces for burrs and distortion. If regulator valve body should have a slight nick or raised portion on mating surfaces, it may be removed by using a surface plate and crocus cloth.

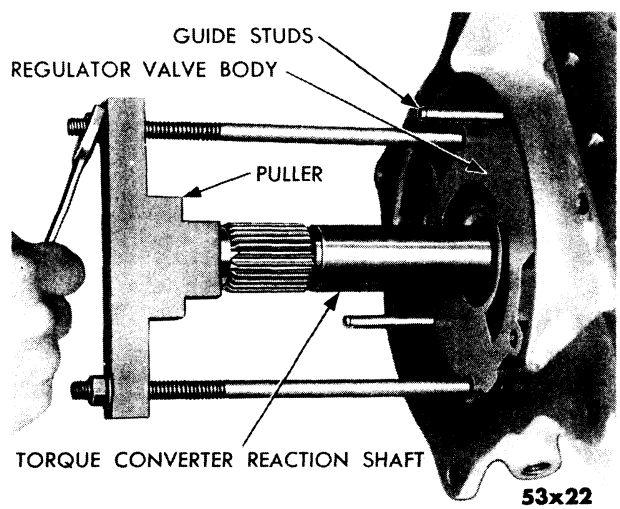

Fig. 95—Removal of Regulator Valve Body

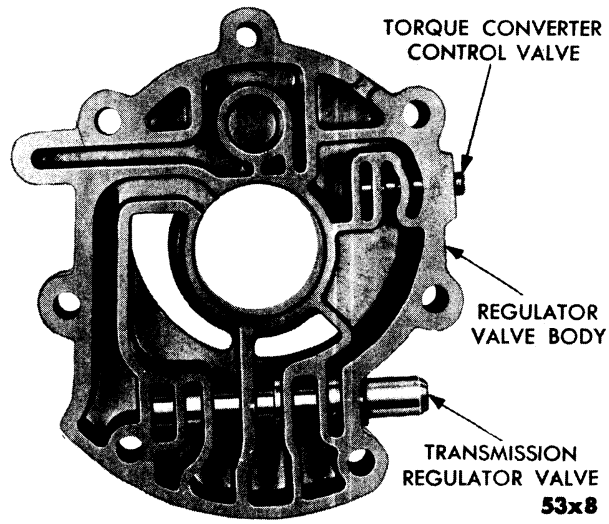

Fig. 96—Valves in Valve Body

(3) Check regulator valve spring seat (snap ring). After both valves and regulator valve body have been thoroughly cleaned and inspected, they should be placed on clean paper and covered with clean shop towels until ready for installation. **Leave valves in regulator body bores until ready for assembly. This will help to prevent damage. (Fig. 96.)**

66. REMOVAL AND INSPECTION OF REVERSE SERVO PISTON

(1) Lift out reverse servo piston sleeve. Inspect inside bore, lever, and contacting surface on piston sleeve for scores and wear. Make sure the two bleeder holes are open. These provide the cushioning effect when reverse band is applied.

(2) Install Tool C-3289 on transmission case and compress reverse piston spring re-retainer.

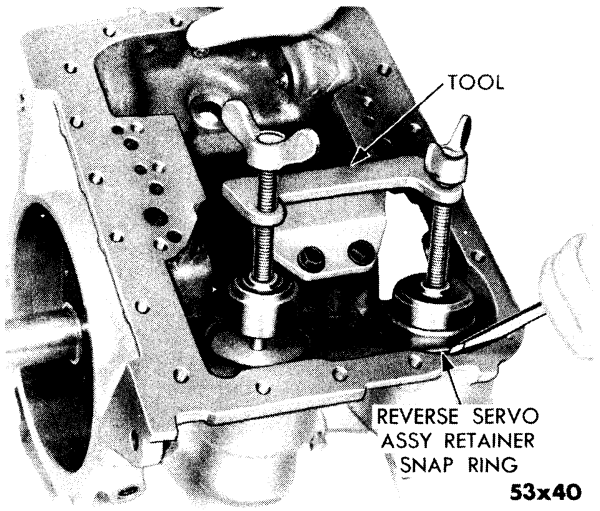

Fig. 97—Removal and Installation of Reverse Servo Assembly Retainer Snap Ring

(3) Using a screwdriver, remove the reverse servo piston and valve assembly spring retainer snap ring. (Fig. 97.) Loosen compressing portion of tool. **Spring retainer may require guiding out of transmission case.**

(4) Remove the spring retainer, spring, servo piston, and valve assembly. (Fig. 98.)

(5) Remove servo piston ring (lip type neoprene) from piston.

(6) Using pliers, Tool C-3229, remove reverse servo piston valve spring snap ring.

(7) Remove spring and valve from piston. Inspect servo bore for scoring. Light scores may be removed with crocus cloth.

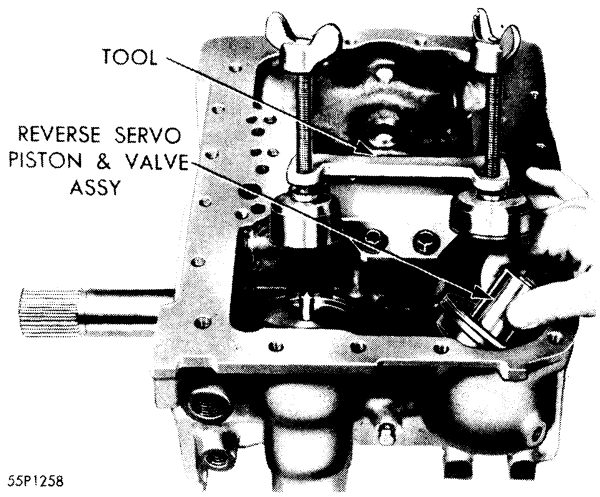

Fig. 98—Removal or Installation of Reverse Servo Piston

67. REMOVAL AND INSPECTION OF KICKDOWN PISTON

(1) Using Tool C-3289, apply sufficient pressure on the kickdown piston rod guide and remove the snap ring.

(2) Loosen compressing portion of tool and remove tool from transmission case. Remove piston rod guide, piston spring, kickdown piston rod assembly, and kickdown piston cushion spring. Inspect riveting of the kickdown piston rod to kickdown piston spring retainer.

(3) Remove seal ring from guide. Inspect for light scores and wear on piston rod and guide.

(4) Using pliers, Tool C-484, remove the transmission kickdown piston from the transmission case, as shown in Figure 99.

(5) Remove the three seal rings (two locking and one open type) from the kickdown piston. Inspect piston for light scores and wear. Inspect rings for broken ends.

68. TORQUE CONVERTER REACTION SHAFT

a. Inspection

Inspect torque converter reaction shaft seal rings (interlocking type) for broken ends. Make sure they are free to rotate in the lands. Inspect bushing inside of torque converter reaction shaft for scoring. Inspect splines on shaft for burrs and wear. Remove the reaction shaft seal (neo-

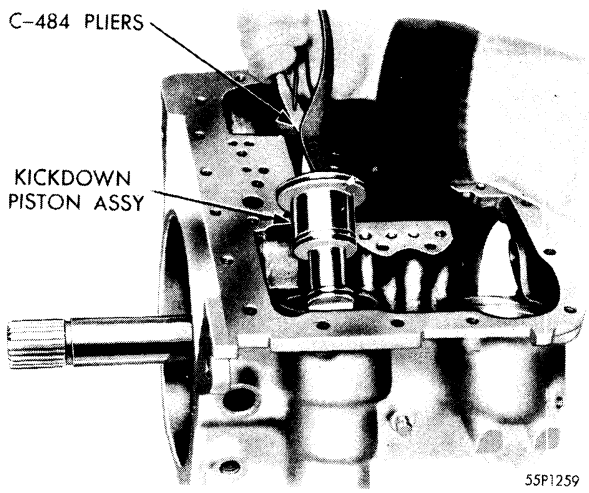

Fig. 99—Removal of Kickdown Piston Assembly

prene). Inspect thrust surface for wear and slight scores.

Do not remove the torque converter reaction shaft unless inspection reveals it is necessary to do so.

b. Removal

(1) Remove torque converter reaction shaft seal (neoprene).

(2) Using a suitable brass drift, remove the reaction shaft dowel pin from reaction shaft flange and transmission case.

(3) Remove the three transmission case-to-reaction shaft bolts and washers.

(4) Using Tool C-3297, press reaction shaft out of transmission case (Fig. 100).

(5) Remove the two torque converter reaction shaft seal rings (interlocking).

69. REMOVAL OF MANUAL CONTROL VALVE LEVER SHAFT OIL SEAL

Using a suitable drift, drive seal out of transmission case.

70. REMOVAL OF KICKDOWN BAND ADJUSTING SCREW

Loosen locking nut and remove kickdown band adjusting screw and lock nut.

When lock nut is loosened, the adjusting screw must be finger free. If not, inspect screw and nut for pulled threads or foreign material in threads.

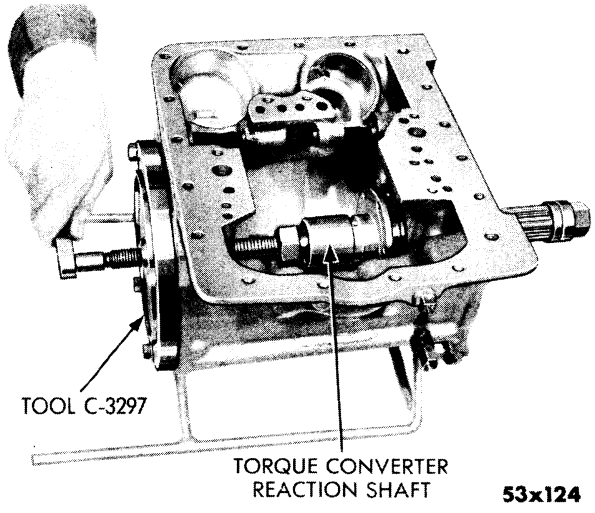

Fig. 100—Removing Torque Converter Reaction Shaft

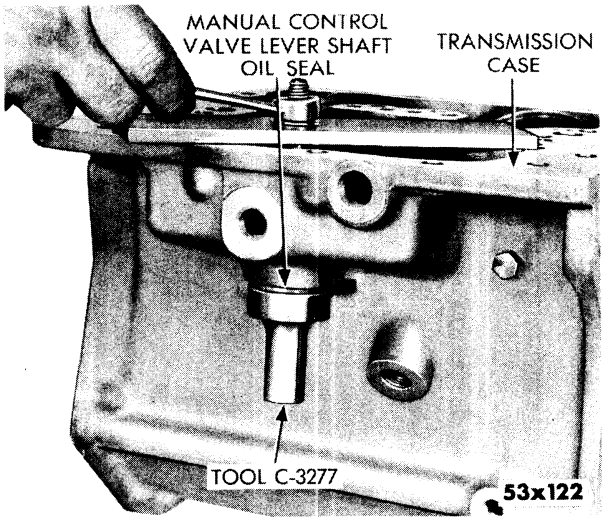

Fig. 101—Installation of Manual Control Lever Shaft Oil Seal

71. INSPECTION OF TRANSMISSION CASE

Inspect transmission case for cracks, holes, and stripped threads. Check for burrs on mating surfaces. Blow compressed air through all passages to make sure they are open. Check oil pressure take-off plugs for tightness.

72. INSTALLATION OF KICKDOWN BAND ADJUSTING SCREW

It is vitally important that adjusting screw fits freely into transmission case.

Screw adjusting screw (with locking nut attached) into transmission case until there is approximately 1 inch of screw left on outside of case. **Do not lock screw into position at this time.**

73. INSTALLATION OF MANUAL CONTROL LEVER SHAFT OIL SEAL

Using Tool C-3277, start seal (with lip of seal towards outside of case) squarely and tighten until the tool bottoms on transmission case. Seal will then be correctly positioned. (Fig. 101.)

74. INSTALLATION OF TORQUE CONVERTER REACTION SHAFT

Using sun lamp, heat front of transmission case to approximately 170 to 190 degrees F.

(1) Coat with MOPAR Lubriplate and install the two torque converter reaction shaft seal rings on shaft and lock in place. Make sure they are free to rotate in lands.

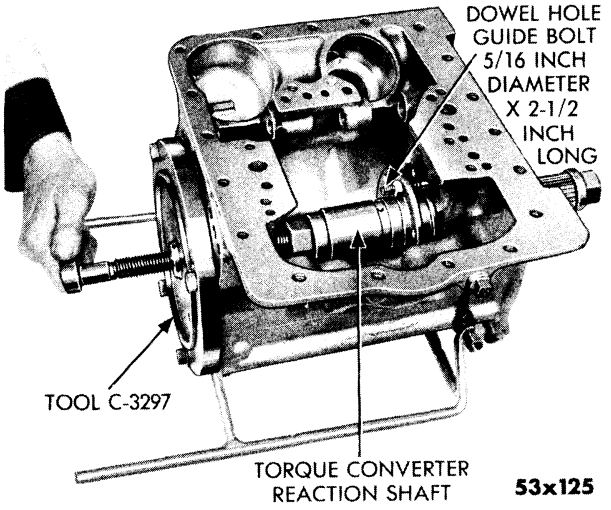

Fig. 102—Installation of Torque Converter Reaction Shaft

(2) Coat portion of reaction shaft that presses into case, with MOPAR Lubriplate. Position torque converter reaction shaft in front of transmission case so that holes in shaft align with bolt holes in case.

(3) Place a 5/16 inch (.308 to .311 inch outside diameter in unthreaded section) 2¼ inch bolt through dowel guide pin holes in case and reaction shaft to act as guide. Install nut. Using Tool C-3297, press reaction shaft into place. (Fig. 102.) Do not remove 5/16 inch bolt from dowel pin holes at this time.

(4) Start the three transmission case-to-reaction shaft bolts and washers and tighten slightly, but do not torque.

(5) Remove 5/16 inch bolt from dowel pin hole and install the reaction shaft dowel from inside of transmission case.

(6) Tighten transmission-to-reaction shaft bolts to 15 foot-pounds torque.

(7) Coat new torque converter reaction shaft seal (neoprene) with MOPAR Lubriplate and install on shaft.

75. ASSEMBLY AND INSTALLATION OF KICKDOWN PISTON

(1) Coat the three kickdown piston rings with MOPAR Lubriplate (two locking and one open type) and install on piston. Lock into position and make sure they are free to rotate in lands.

(2) Place kickdown piston assembly into transmission case, compress bottom ring with a piece of brass rod (with end flattened) and push piston into case. (Fig. 103.)

NOTE

After bottom ring has entered, piston will seem to hang at two different locations while being pushed into case. This is due to rings entering cylinder. If any of the rings should be broken when piston assembly is being installed, transmission will not operate properly.

(3) Place kickdown piston cushion spring in piston.

(4) Install Tool C-3289 on transmission case.

(5) Place kickdown piston rod assembly in piston and slide piston spring over kickdown piston rod assembly.

(6) Coat the new kickdown piston rod guide seal ring with MOPAR Lubriplate and install on kickdown piston rod guide. Make sure ring rotates freely in lands.

(7) Install the kickdown piston rod assembly.

(8) Using extreme care, compress the kickdown piston spring to the point that piston guide seal ring slightly binds on case. Using a piece of brass rod flattened on one end, work seal ring into position, gradually compressing spring until seal ring enters case and snap ring can be installed.

(9) Install the kickdown piston rod guide snap ring. Make sure snap ring is properly seated.

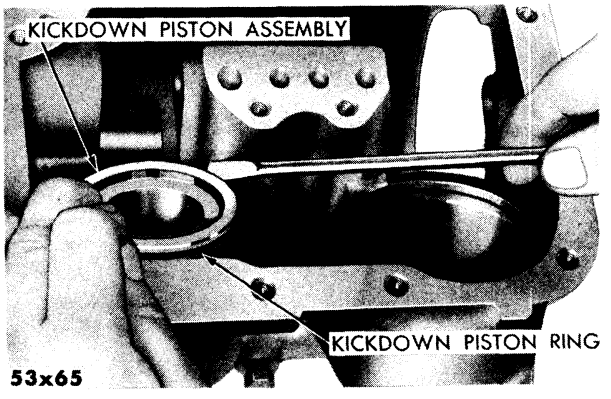

Fig. 103—Installation of Kickdown Piston Assembly

76. ASSEMBLY AND INSTALLATION OF REVERSE SERVO PISTON

(1) Place the reverse servo piston valve and spring in reverse servo piston. (Shaft on valve protruding through hole in bottom of piston.)

(2) Using pliers, Tool C-3229, install the reverse servo piston valve spring snap ring. Make sure snap ring is properly seated.

(3) Coat the new reverse servo piston ring (neoprene) with MOPAR Lubriplate and install on piston.

(4) Insert reverse servo piston and valve assembly into transmission case in a cocked position. By rotating piston, the piston ring will enter case without being damaged. (Fig. 98.)

(5) Place reverse servo piston spring over piston and position spring retainer over spring.

(6) Compress spring, with Tool C-3289, sufficiently to install snap ring. (Fig. 97.) **Spring retainer may require guiding into case. Make sure snap ring seats properly.**

(7) Inspect interior of reverse servo piston sleeve for burrs. Place piston sleeve over piston. Make sure sleeve slides freely on piston by working it up and down. Remove installing tool from transmission case.

77. INSTALLATION OF REGULATOR VALVE BODY

Inspect regulator valve body and valves to make sure that no damage has occurred since first inspection and cleaning. Blow out passages with compressed air.

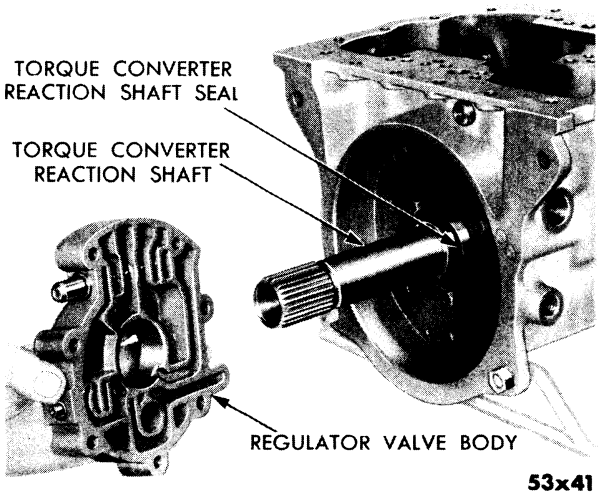

Fig. 104—Installation of Regulator Valve Body Assembly

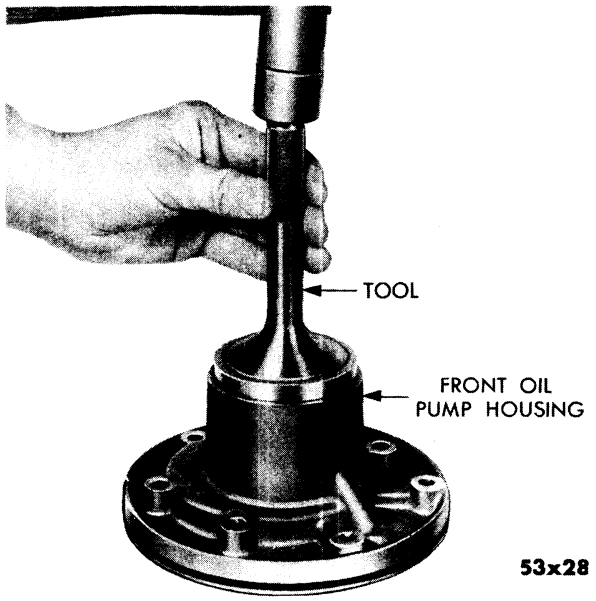

Fig. 105—Installation of Front Oil Pump Housing Dust Seal

(1) Make sure torque converter reaction shaft seal (neoprene) is coated with MOPAR Lubriplate.

(2) Place the transmission regulator valve and torque converter control valve in the regulator valve body.

(3) Install guide studs, Tool C-3288, (if removed) in front of transmission case and position new regulator valve body gasket on studs and against case.

(4) Place transmission regulator valve body assembly (with oil passages to rear, as shown in Fig. 104), over torque converter reaction shaft and seat firmly against gasket on front of transmission case.

CAUTION

Use extreme care, when reaction shaft seal enters regulator body, to prevent reaction shaft screws from damaging passages on regulator body.

78. INSTALLATION OF TORQUE CONVERTER OUTLET CHECK VALVE

The valve assembly should be installed in the lubrication oil passage behind the pipe plug. (Refer to Fig. 37.)

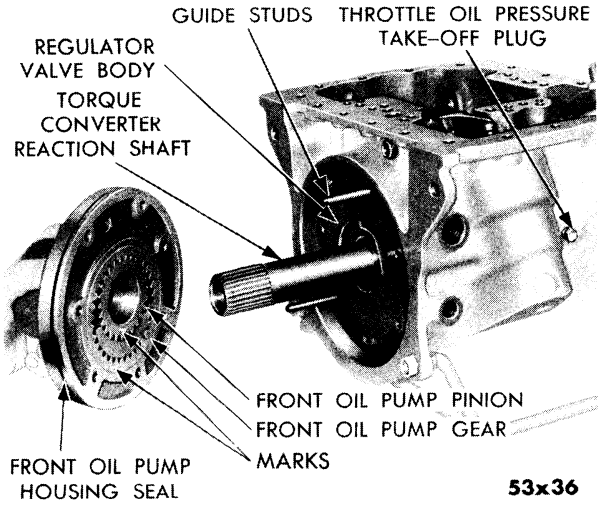

Fig. 106—Installation of Front Oil Pump Assembly

NOTE

It is very important that the check valve ball be installed into the transmission "ball end first," with the check valve ball spring toward the outside.

Failure to install the valve properly will completely shut off the lubrication oil supply from the torque converter and cause extensive damage to the transmission.

79. ASSEMBLY AND INSTALLATION OF FRONT OIL PUMP

(1) Position front oil pump housing dust seal in front of oil pump housing (metal portion of seal down).

(2) Using driver, Tool C-3287, bottom seal in housing. (Fig. 105.)

(3) Coat new transmission oil pump housing seal with MOPAR Lubriplate and install on housing. Make sure seal is properly seated in groove and that it protrudes .010 inch above outer diameter of housing.

(4) Place transmission front oil pump gear and pinion (driving lugs of pinion facing up) in oil pump housing. (Fig. 106.) Check marking.

CAUTION

Unless oil pump pinion is installed correctly, considerable damage will result when transmission is installed in vehicle. Lubricate oil pump gears with Automatic Transmission Fluid (Type A).

(5) Place front oil pump housing assembly over torque converter reaction shaft and slide into position over guide studs until oil pump housing seal is flush with transmission case.

(6) Using new aluminum or copper washers on bolts, start five of the bolts and draw housing down evenly until it is seated in transmission case.

(7) Remove guide studs and install the two remaining bolts and washers. Tighten to 17 foot-pounds torque. (Fig. 107.)

NOTE

After all bolts have been installed and properly torqued, engage the driving lugs of the oil pump pinion to determine if oil pump pinion turns freely. Use the oil pump drive sleeve for this check. If not free, remove pump and check for foreign matter between pump gears and housing.

(8) Using a new gasket, install the torque converter control valve spring and retainer. Tighten to 40 foot-pounds torque.

(9) Using a new gasket, install the transmission regulator valve spring and retainer. Tighten to 50 foot-pounds torque.

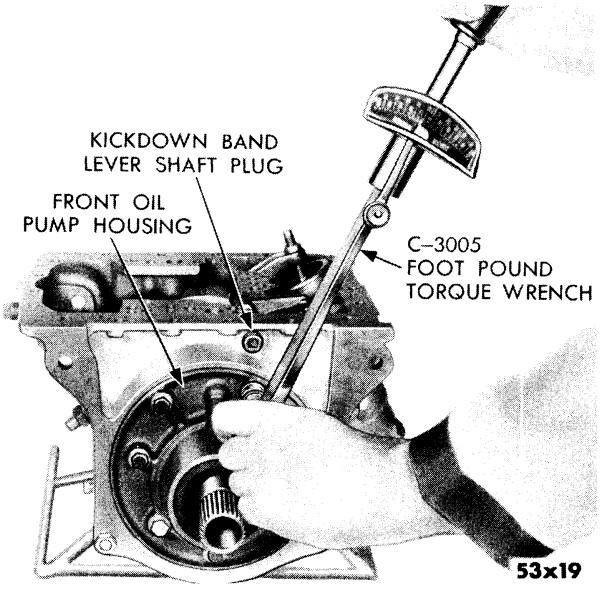

Fig. 107—Tightening Front Oil Pump Housing Bolts

80. INSTALLATION OF REVERSE BAND, KICKDOWN BAND AND LEVER ASSEMBLIES

If the kickdown and reverse lever assemblies were not removed, omit operations (1), (2), and (5).

(1) Place kickdown band lever assembly in transmission case and slide the kickdown band lever shaft into position from front of transmission case. **Make sure lever operates freely on shaft.**

(2) Install kickdown band lever shaft plug in front of transmission case and tighten to 35 foot-pounds torque, as shown in Figure 108.

(3) Place kickdown band assembly into transmission case by rotating ends of band through rear opening in case. (Fig. 93.)

(4) Fit the proper end of the kickdown band over adjusting screw and compress the band sufficiently to install the kickdown band strut between other band end and kickdown band lever, as shown in Figure 109.

NOTE

Make sure kickdown band strut slot engages with kickdown band strut pin in the band end.

(5) Place the reverse band lever assembly in reverse band link assembly and position in transmission case, aligning the holes in the lever and link assemblies to holes in transmission case. Slide the reverse band lever shaft into position from rear of transmission case. Figure 110 illustrates assembly of reverse band linkage after installation in case.

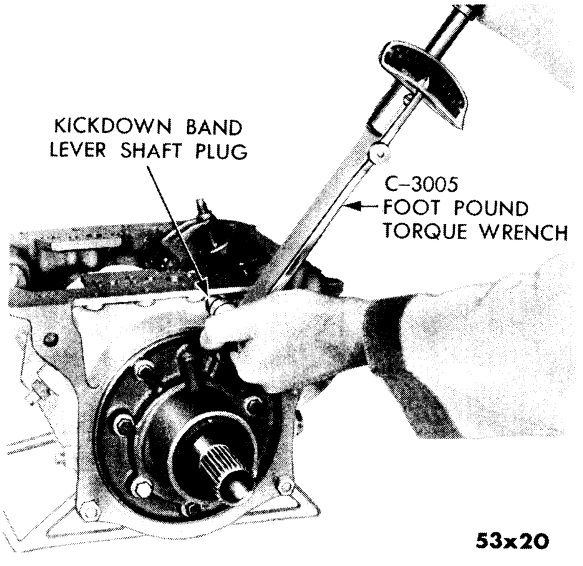

Fig. 108—Tightening Kickdown Band Lever Shaft Plug

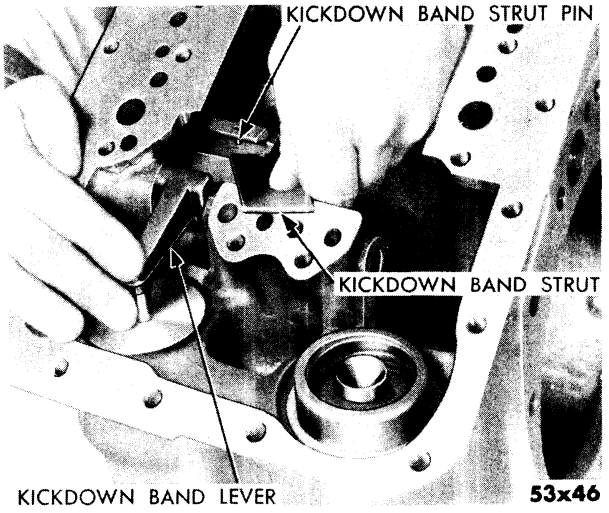

Fig. 109—Installation of Kickdown Band Strut

NOTE

If new reverse band is to be installed, loosen lock nut and back adjustment out until approximately 1 inch of screw is above lever on lock nut side.

(6) Place reverse band assembly into transmission case by rotating ends of band through rear opening in case. (Fig. 93.)

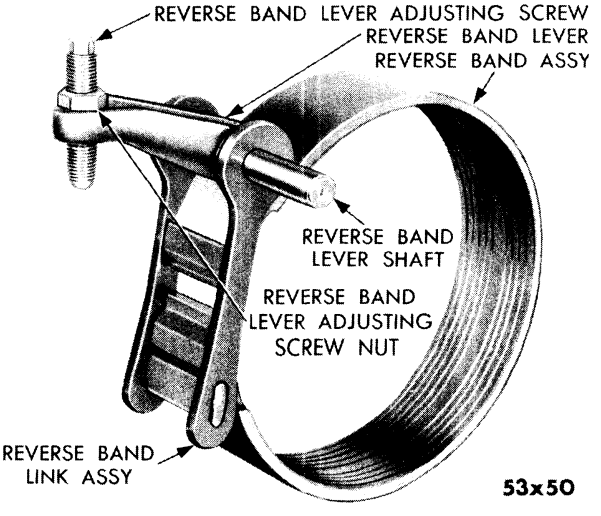

Fig. 110—Reverse Band Linkage

(7) Hook the proper end of the reverse band (previously identified when band was removed) in link assembly. Compress the band sufficiently to install the reverse band strut in the slots of reverse band and reverse band lever assembly.

81. INSTALLATION OF PLANET PINION CARRIERS IN HOUSING

(1) Place output shaft support on Tool C-3285 with bearing surface up.

(2) Lubricate bearing surface of planet pinion housing. Place bearing surface of housing over output shaft surface. (Fig. 82.)

(3) Place the reverse annulus gear on the output shaft and install snap ring. Output shaft may be placed in a vise, providing it is clean and equipped with **brass jaws.**

NOTE

Reverse annulus gear must fit tightly on output shaft. End clearance is controlled by various snap rings which are available in the following three thicknesses:

Size	Part Number
.078″-.080″	1329608
.082″-.084″	1329609
.086″-.088″	1329610

Make sure snap ring seats properly.

(4) Coat transmission output shaft seal ring with MOPAR Lubriplate and install on shaft. Lock into position and make sure ring rotates freely in lands.

(5) Coat the planet pinion carrier housing thrust washer with MOPAR Lubriplate. Slide over output shaft and into position on reverse annulus gear.

(6) Place output shaft and reverse annulus gear into position in the planet pinion carrier housing and through the output shaft support. Be careful not to damage the output shaft seal ring as it enters the output shaft support. (Fig. 81.)

NOTE

Make sure the planet pinion carrier thrust washer seats properly between the reverse annulus gear and the planet pinion carrier housing. Coat output shaft splines with MOPAR Lubriplate.

(7) Lubricate thrust surfaces and gear teeth of the reverse planet pinion gear and carrier assembly. Place carrier assembly in the reverse annulus gear.

NOTE

Make sure driving lugs on carrier assembly properly engage the slots in the planet pinion carrier housing. (Fig. 80).

(8) Coat input shaft bearing surfaces with MOPAR Lubriplate.

(9) Lubricate thrust surfaces and gear teeth on the kickdown planet pinion gear and carrier assembly. Slide assembly (oil collector ring up) carefully down on rear end of input shaft and over stop ring.

(10) Lubricate teeth and thrust surfaces of the kickdown annulus gear. Slide on to input shaft down to stop ring. (Fig. 79.)

(11) Install kickdown annulus gear snap ring. Make sure it is seated properly. (Fig. 78.) Input shaft may be placed in a vise, providing it is clean and equipped with **brass jaws.**

(12) Engage the gear teeth of the kickdown planet pinion gears with teeth on the kickdown annulus gear. Slide the pinion gear and carrier assembly into position in the kickdown annulus gear.

(13) Coat the reverse planet pinion carrier thrust washer with MOPAR Lubriplate and install on kickdown annulus.

(14) Place the kickdown planet pinion carrier assembly, annulus gear, and input shaft into position in planet pinion carrier housing. (Fig. 77.) Make sure planet pinion carrier thrust washer remains on annulus, and the driving lugs on carrier assembly properly engage the slots in the planet pinion housing.

(15) Install planet pinion carrier housing snap ring (not a selective fit). Make sure it is

positioned and seated properly. (Fig. 76.) Lubricate gear and splines.

(16) Using a feeler gauge, check the clearance between the kickdown planet pinion carrier housing snap ring and the kickdown planet pinion carrier assembly. Limits are .010 to .021 inch. If not within these limits, disassemble and recheck the reverse planet pinion carrier and the planet pinion carrier housing thrust washers.

82. INSTALLATION OF OUTPUT SHAFT SUPPORT, PLANET PINION CARRIER, AND DIRECT CLUTCH ASSEMBLIES

(1) Coat the kickdown planet pinion carrier thrust washer with MOPAR Lubriplate. Place over kickdown sun gear and on to thrust surface of direct clutch piston retainer assembly.

(2) Place the direct clutch piston retainer assembly over the input shaft, engaging sun gear with the kickdown planet pinion gears and engaging splines of the input shaft with the direct clutch hub. (Fig. 111.) Make sure kickdown planet pinion carrier thrust washer remains in position.

(3) Coat the direct clutch piston retainer thrust washer (select fit) with MOPAR Lubriplate and install on torque converter reaction shaft, inside of transmission case. To prevent damage, use care when sliding washer over rings.

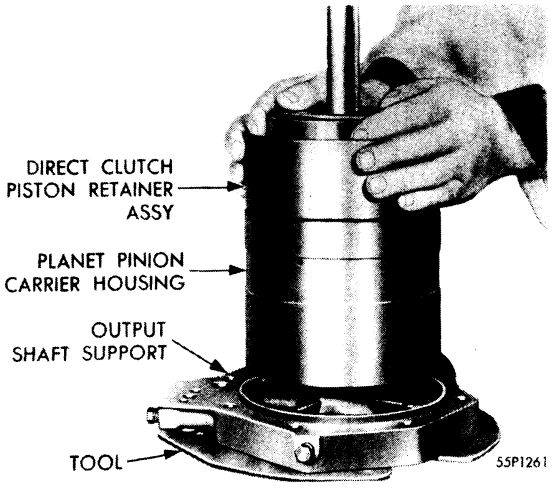

Fig. 111—Installation of Direct Clutch Piston Retainer Assembly

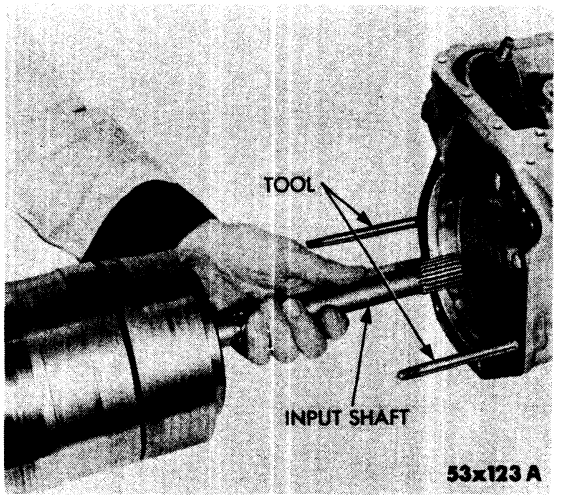

Fig. 112—Preparing to Install Power Train Assembly

(4) Install guide studs, Tool C-3283, in rear of transmission case. Position new output shaft support gasket over guide studs and on to case.

(5) Insert input shaft, with direct clutch assembly, planet pinion carrier housing, output shaft support, and output shaft attached, through the rear of transmision case and through the torque converter reaction shaft. Guide assembly through bands and over guide studs and into position in transmission case, as shown in Figures 112 and 113.

CAUTION

Do not force assembly into case. Avoid damaging seal rings on torque converter reaction shaft.

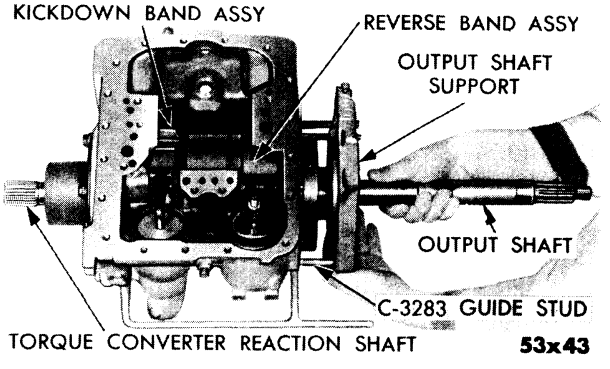

Fig. 113—Installation of Power Train in Transmission

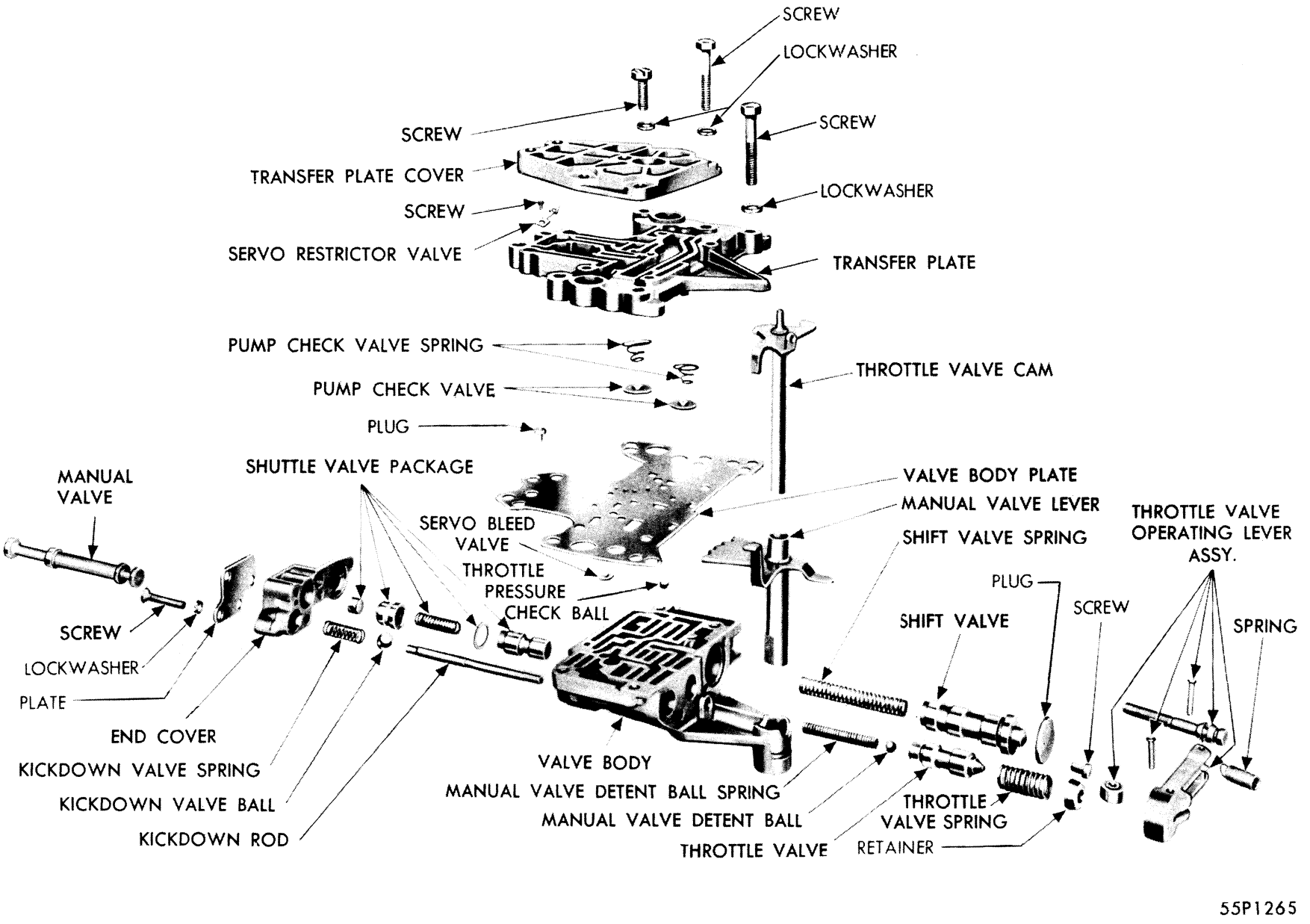

Fig. 114—Valve Body and Transfer Plate Assembly (Disassembled View)

(6) Install the one output shaft support-to-transmission case screw and lockwasher (finger tight).

83. REAR OIL PUMP ASSEMBLY AND INSTALLATION

(1) Coat transmission rear oil pump pinion ball with MOPAR Lubriplate and insert in ball pocket in output shaft. (Fig. 64.)

(2) Lubricate rear oil pump drive pinion with MOPAR Lubriplate and place over output shaft and slide into position, aligning keyway in pinion with ball in shaft.

Pinion was marked when removed in disassembly, make sure it is installed correctly.

(3) Lubricate rear oil pump gear and position in rear oil pump housing. **Make sure gear is installed correctly. Check marking.**

(4) Slide rear oil pump housing assembly over output shaft, (Fig. 63) and into position against output shaft support.

NOTE

There are two extra holes in housing which are used for vents. Make definitely sure you do not attempt to install bolts in these holes. Check each bolt hole before installing bolts.

(5) Install the five rear oil pump housing-to-output shaft support bolts and lockwashers. Draw down evenly. Tighten to 20 foot-pounds torque.

NOTE

After bolts have been properly tightened, turn output shaft to make sure pump gears are free to rotate. If not, remove pump to determine cause.

84. ASSEMBLY OF GOVERNOR ON OUTPUT SHAFT

(1) Coat the two governor support piston rings with MOPAR Lubriplate and install on the governor support. Stagger rings and make sure they are free to rotate in lands.

(2) Position governor body on support and install the four screws and lockwashers. **Do not tighten screws at this point.**

(3) Slide governor support and body assembly over output shaft (Fig. 62), and into position in rear oil pump housing.

NOTE

Compress governor support piston rings with fingers as support enters oil pump housing.

(4) Align locating hole in output shaft to locating bolt hole in governor body and install governor locating screw. Tighten to 4 foot-pounds torque.

NOTE

Holes can be easily aligned by turning output shaft and holding governor body.

(5) Tighten the four governor body screws to 10 foot-pounds torque.

(6) Dry governor parts with compressed air. Do not lubricate when assembling.

(7) Place governor weight spring over secondary weight and position both in primary weight. **Make sure governor weight spring seats properly.**

(8) Guide secondary weight and compress governor weight spring sufficiently to install snap ring. Make sure snap ring is seated properly.

(9) Place governor weight assembly (secondary weight snap ring **up**) into governor body (Fig. 61), and install snap ring. Make sure snap ring seats properly. (Fig. 60.)

(10) Slide the governor valve (small end up) over governor valve shaft.

(11) Slide the governor shaft into governor body (Fig. 59), through the output shaft and governor weight assembly. At same time, position valve into body.

(12) Install the governor valve shaft snap ring. Make sure it is properly locked to shaft. (Fig. 58.)

(13) Check operation of governor weight assembly and valve by turning output shaft. Both should fall freely in body.

85. ASSEMBLY AND INSTALLATION OF TRANSMISSION EXTENSION, OIL SEAL AND BEARING

If inspection revealed that it was not necessary to remove output shaft rear bearing, omit operations (1) and (2).

(1) Using driver, Tool C-3204, install the output shaft rear bearing in extension housing. (Fig. 56.) Make sure bearing is properly seated then lubricate with Automatic Transmission Fluid (Type "A").

(2) Install output shaft rear housing snap ring.

Install bevel side up, and make sure snap ring seats properly. On the Chrysler C-300 Model, replace existing snap ring with the new improved type Part No. 1672138.

(3) Replace extension breather (vent) and tighten to 12 foot-pounds torque.

(4) Install new transmission extension gasket over guide studs and into position against output shaft support. Do not use sealing material on gasket.

(5) Using care to avoid damaging the governor housing, place rear extension housing over output shaft and on to guide studs.

(6) Using Tool C-496 (with Adapter C-3284) press extension housing into position against output shaft support. (Fig. 54.)

(7) Remove guide studs and install the seven transmission extension-to-case screws and lockwashers. Draw down evenly and tighten to 30 foot-pounds torque.

(8) Tighten the output shaft support-to-case bolts to 30 foot-pounds torque.

NOTE

After these bolts have been properly torqued, turn output shaft to make sure it turns freely.

(9) Coat nylon gear and threads on speedometer drive pinion with MOPAR Lubriplate and install in transmission extension. (Fig. 47.) Tighten to 45 foot-pounds torque.

86. CHECKING TRANSMISSION END PLAY

Before transmission end play is checked, it is necessary that the hand brake drum be installed and tightened to required torque specifications. This operation is necessary to aid in proper seating of bearing.

Using dial indicator, Tool C-430 (or feeler gauge) measure the distance between the direct clutch assembly and carrier housing when clutch is in rearward position. Using a screwdriver inserted between the direct clutch assembly and carrier housing, carefully pry the direct clutch forward. Remove screwdriver and measure again. The difference in the measurements is the end clearance and must be .026 to .052 inch. (Refer to Fig 73.)

NOTE

The total end play should never be less than that of the kickdown planet pinion carrier, which has a permissible end play of .012 to .038 inch.

If it does not fall within this specification the transmission will have to be partially disassembled in the following manner to allow a direct clutch piston retainer thrust washer of proper thickness to be installed: Remove the seven bolts and lockwashers from the transmission and install guide studs, Tool C-3283. Remove the one output shaft support-to-case bolt and washer and remove the extension housing, output shaft, support, and planet pinion carrier housing assembly as one assembly. Remove the direct clutch piston retainer thrust washer. Using a micrometer, measure the thickness of the washer. Select washer to give correct clearance. These washers are available in various thicknesses.

Assemble, as previously instructed, and recheck end play. Using driver, Tool C-3205, install output shaft rear bearing oil seal. (Fig. 57.)

87. ADJUSTMENT OF KICKDOWN BAND (FRONT)

Adjustment of both bands can be made with valve body and transfer plate in transmission. It is easier, however, to make these adjustments at this time. To adjust the kickdown (front) band, it is suggested that transmission be turned on its side and band adjusted as follows:

(1) Using a box wrench, loosen the lock nut of the kickdown band adjusting screw (Fig. 37), and back off several turns.

(2) Make sure adjusting screw turns freely in transmission case.

(3) Using wrench, Tool C-3380, tighten kickdown band adjusting screw to 72 inch-pounds torque.

NOTE

Make sure lock nut does not contact transmission case when torquing screw, otherwise false reading will be obtained.

(4) Using a piece of chalk or colored pencil, mark the location of the adjusting screw in relation to the transmission case.

(5) Turn adjusting screw back **exactly** three turns and, while holding in this position, tighten lock nut securely.

CAUTION

Extreme care must be exercised in performing this operation to assure correct adjustment, otherwise serious damage will occur when transmission is operated.

88. ADJUSTMENT OF REVERSE BAND

Remove reverse band adjustment screw lock nut and tighten adjusting screw to 25 inch-pounds torque. Back out adjusting screw 10 turns. Holding adjusting screw in this location, replace the adjusting screw lock nut and tighten to 50 foot-pounds torque.

89. INSTALLATION OF VALVE BODY AND TRANSFER PLATE ASSEMBLY

(1) Install neutral starter switch gasket and back-up light switch. Tighten neutral starter switch to 20 foot-pounds torque.

(2) Clean mating surfaces and check for burrs on both the transmission case and valve body.

(3) Place valve body and transfer plate into position on transmission case. Install the five transfer plate bolts and lockwashers.

NOTE

Two bolts are 1⅝ inches long. These go through the transfer plate cover on valve body. The other three are 1⅛ inches long. Draw bolts down evenly and tighten to 17 foot-pounds torque.

(4) Make sure the two oil strainer tube seals are in position on oil strainer and place oil strainer assembly into position on valve body. Install the two oil strainer support bolts (1¼ inches long) and lockwashers. Tighten to 17 foot-pounds torque. **Make sure oil tubes on strainer properly enter the valve body.**

(5) Place the manual valve lever shaft seal cover over the manual valve lever shaft.

(6) Install the manual control lever (arm side of lever against cover) on manual valve lever shaft. Tighten locking screw.

(7) Place the throttle valve camshaft felt and retainer over the throttle valve shaft.

(8) Install throttle valve lever assembly on the throttle camshaft and tighten locking screw.

(9) Check operation of controls by shifting the manual control into the four operating positions.

(10) Check the throttle cam position in throttle operating lever assembly and the throttle camshaft assembly for kickdown operation. Visually check the manual valve lever contact on neutral starter switch.

(11) Using a new oil pan gasket, place oil pan into position on transmission case. Install the eighteen oil pan bolt and washer assemblies. Drawing them down evenly, tighten to 17 foot-pounds torque.

(12) Tighten oil pan drain plug to 25 foot-pounds torque.

SERVICING VALVE BODY AND TRANSFER PLATE ASSEMBLY

90. DISASSEMBLY AND INSPECTION OF VALVE BODY AND TRANSFER PLATE ASSEMBLY

Place valve body and transfer plate assembly in stand, Tool C-3294. (Fig. 115.) **Do not use vise to hold valve body and transfer plate.**

(1) Remove two of the long transfer plate cover bolts and lockwashers and install guide studs, Tool C-3295.

(2) Keeping finger pressure against transfer plate, remove the remaining three, (two long and one short) transfer plate cover bolts. Remove transfer plate cover. (Fig. 116.)

(3) Using care not to lose the servo restrictor valve operating plug from transfer plate, remove transfer plate from valve body plate. (Fig. 117.)

NOTE

Observe position of front and rear pump check valves in transfer plate. Rear pump check valve has metering hole in it.

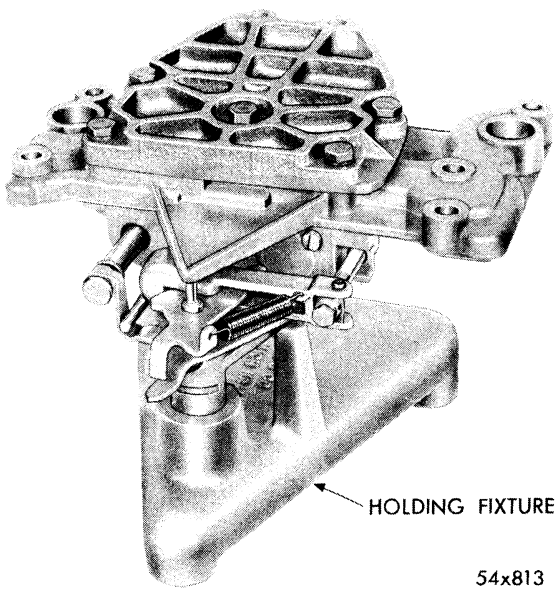

Fig. 115—Valve Body and Transfer Plate Assembly in Stand

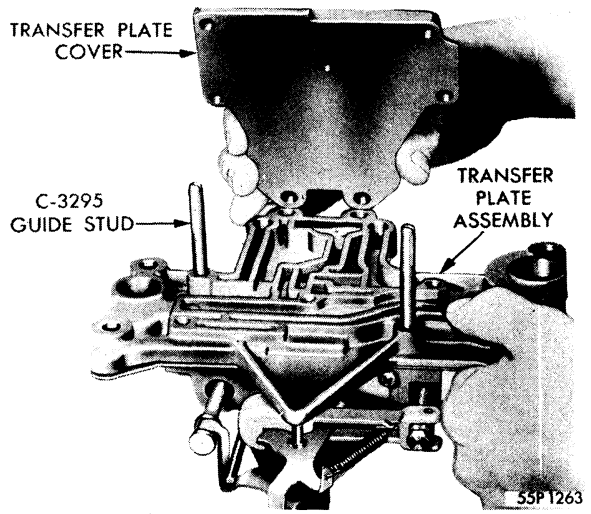

Fig. 116—Removal of Transfer Plate Cover

(4) Remove valve body plate from valve body. (Fig. 118.) **Servo pressure bleed valve may**

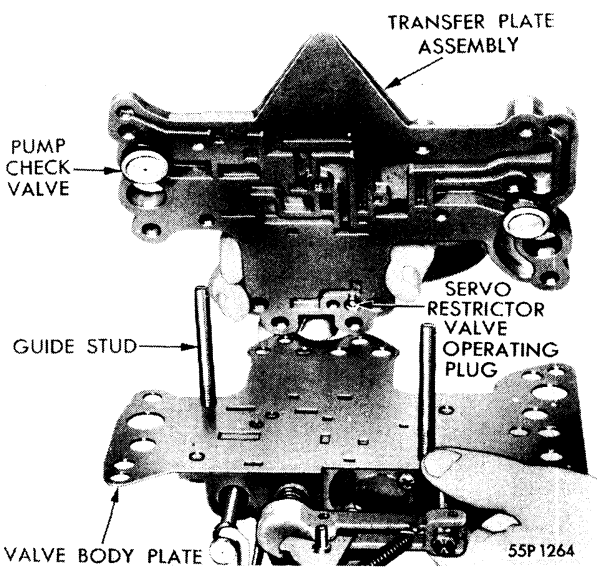

Fig. 117—Removal of Transfer Plate Assembly

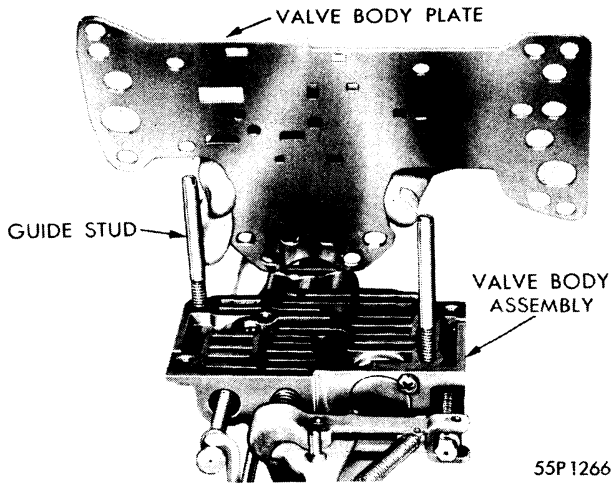

Fig. 118—Removal of Valve Body Plate

stick to valve body plate when it is removed.

(5) Note positions of servo pressure bleed valve and pressure check valve ball. (Fig. 119.) Remove and place in clean container. Remove the throttle valve cam spring from cam and operating lever.

(6) Compressing the throttle valve operating lever assembly against throttle valve spring, slide the throttle valve cam assembly from the manual valve lever assembly. (Fig. 120.)

Remove any burrs from the throttle valve camshaft and manual valve lever shaft before sliding them from the valve body.

(7) Swing throttle valve operating lever out of the way and remove the throttle valve spring and retainer from throttle valve. Remove the throttle valve from valve body bore.

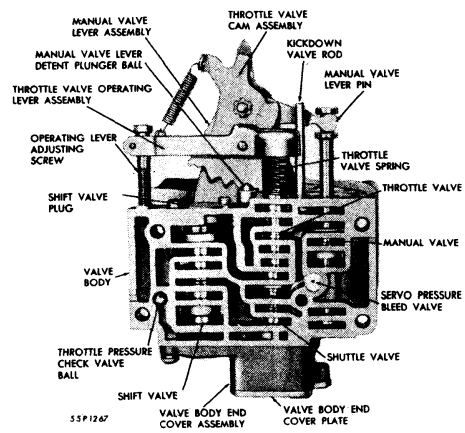

Fig. 119—Valve Body Assembly

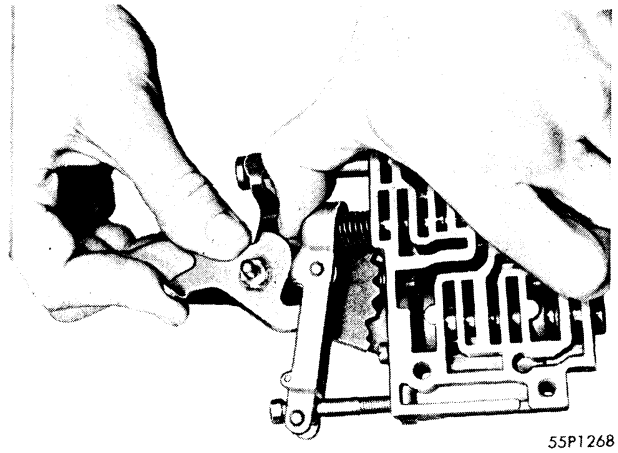

Fig. 120—Removal or Installation of Throttle Valve Cam Assembly

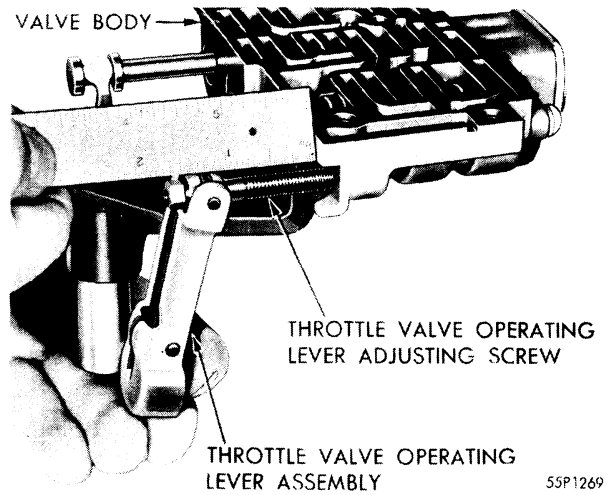

Fig. 121—Adjusting Throttle Valve Operating Lever

(8) Check the distance from valve body to end of throttle valve operating adjusting screw. This should be approximately $1\frac{11}{16}$ inches. (Refer to Fig. 121.)

(9) Using Tool C-3279, remove the throttle valve adjusting screw and throttle valve operating lever assembly.

NOTE

Normally, it is not necessary to remove this assembly unless it is to replace damaged parts.

(10) Remove the four (three long and one short) valve body and cover plate screws and lockwashers and remove valve body and cover plate. (Fig. 122.)

(11) Remove valve body and cover screw and lockwasher.

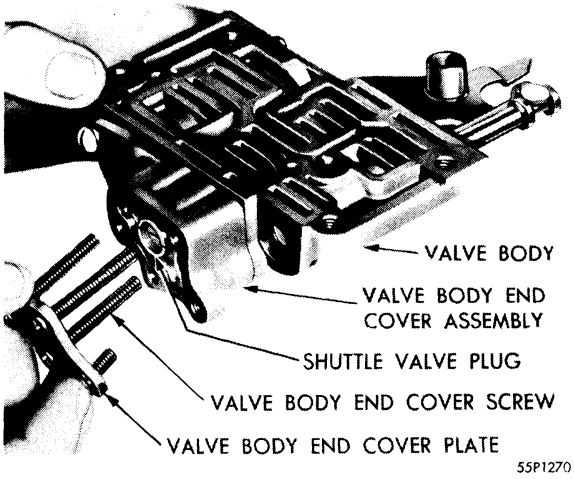

Fig. 122—Removal or Installation of Valve Body End Cover Plate

NOTE

Keep pressure against valve body and cover when removing screw as there are three springs behind cover.

(12) Carefully remove valve body and cover so as not to lose any of the springs or kickdown valve ball. Kickdown valve spring (short) will drop out when cover is removed. This is an adjustable plug, **do not disturb setting.**

(13) Remove kickdown valve ball from body.

(14) Remove the shuttle valve by using the shuttle valve spring. The shuttle valve stop ring will come out with the valve, as shown in Figure 123.

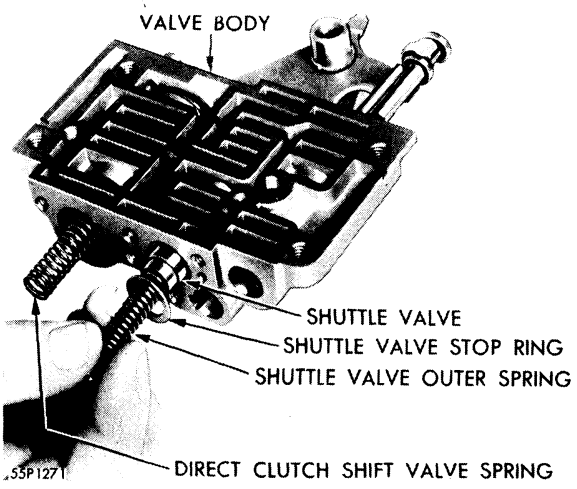

Fig. 123—Removal or Installation of Shuttle Valve Assembly

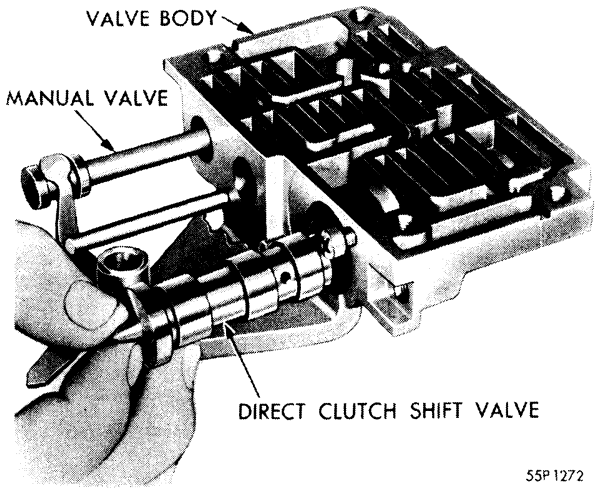

Fig. 124—Removal or Installation of Direct Clutch Shift Valve

NOTE

The ¼ inch slot in the shuttle valve of the "after" cars has been eliminated.

(15) Remove the direct clutch shift valve spring from valve body.

(16) Mark the direct clutch shift valve plug with Prussian blue (in order to install in same direction). Loosen the direct clutch shift valve plug screws sufficiently to allow removal of plug by pushing on open end of shift valve with finger.

(17) Remove the direct clutch shift valve. (Fig. 124.) Remove valve body from stand, Tool C-3294, and place on clean paper.

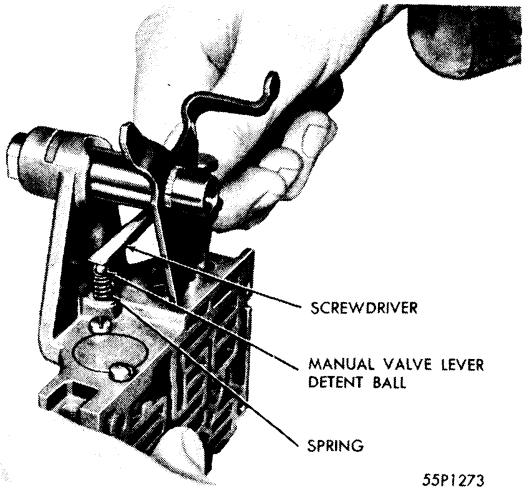

Fig. 125—Compressing Manual Valve Detent Spring and Ball

(18) Remove kickdown rod from cover end of valve body.

(19) Place manual control lever on manual valve lever assembly and turn in counter-clockwise direction until manual control valve is in low range position (last detent).

(20) Using a screwdriver, compress detent spring (pushing on ball), as shown in Figure 125, and continue turning manual valve lever assembly until manual valve becomes disengaged from manual valve lever assembly.

CAUTION

Use extreme care when turning manual valve lever as ball will come out the instant detent is passed. Remove manual valve from valve body bore.

(21) Remove manual control lever and slide the manual valve lever assembly from valve body. Normally, it is not necessary to remove the manual valve and manual valve lever assembly from valve body unless it is to replace damaged parts.

(22) Remove manual valve lever detent spring from valve body.

91. CLEANING AND INSPECTION OF VALVE BODY AND TRANSFER PLATE ASSEMBLY

After each part has been thoroughly cleaned and inspected, place on clean paper until ready for assembly.

(1) Place all parts in a clean solvent, wash thoroughly, and dry with compressed air. Make definitely sure all passages are free from obstructions.

(2) Inspect all mating surfaces for burrs, nicks, and grooves. Small ones may be removed with crocus cloth, otherwise, damaged parts must be replaced.

(3) Using straightedge, Tool C-3335, check all mating surfaces for distortion.

(4) Using a pen light, inspect bores in valve body for score marks, pits, and irregularities.

(5) Inspect all springs for distortion and collapsed coils.

(6) Inspect all valves and plugs for burrs, nicks, and scores. Small ones may be removed with crocus cloth, providing extreme care is used not to round off the sharp edge portion of the valve. The sharp edge portion is vitally important to this type valve. It helps to prevent dirt and foreign matter from getting between valves and body, thus reducing the possibilities of sticking.

(7) Check valves and plugs for free operation in bores. All must fall freely in bores when the valves, plugs, and bores are clean and dry.

(8) Inspect detent portions on manual valve lever assembly for wear. Inspect detent ball for wear and make sure it slides freely into valve body.

(9) Inspect riveting and wear on manual valve lever pin in lever assembly.

(10) Inspect the staking of manual lever and throttle cam to their respective shafts.

(11) Inspect the throttle valve operating lever roller to make sure it rolls freely.

(12) Inspect throttle valve operating lever adjusting screw and pin for wear. Make sure adjusting screw rotates freely in throttle valve operating lever.

(13) Check nib in throttle valve operating lever (which contacts throttle valve spring retainer) for wear.

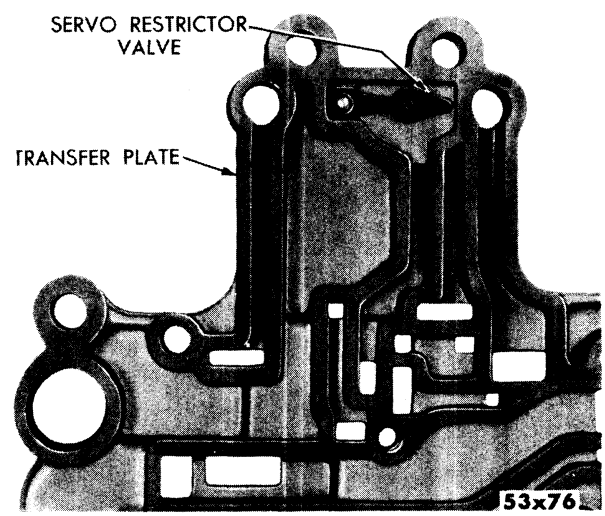

Fig. 126—Servo Restrictor Valve

(14) Inspect kickdown valve rod for wear and scoring; also inspect for wear at entering point in valve body.

(15) Inspect kickdown valve ball seat in valve body.

(16) Inspect servo restrictor valve in the transfer plate to make sure valve is seating properly. (Fig. 126.) If valve is distorted, carefully remove the drive screw. Install new valve and new drive screw making sure the drive screw is tight.

CAUTION

Use extreme care not to distort transfer plate when performing this operation.

(17) Make careful inspection of valve body plate for burrs and make definitely sure the five small holes (metering) are open.

(18) Visually inspect pump check valve springs in transfer plate. (Fig. 127.)

92. ASSEMBLY OF VALVE BODY AND TRANSFER PLATE ASSEMBLIES

When assembling the valve body and transfer plate assemblies, handle parts carefully to avoid damage, such as nicks, etc., to mating surfaces. Use a twisting motion when placing valves in their respective bores.

(1) Place the manual valve lever detent ball spring and detent ball into place in the valve body. **Ball must be held in place.**

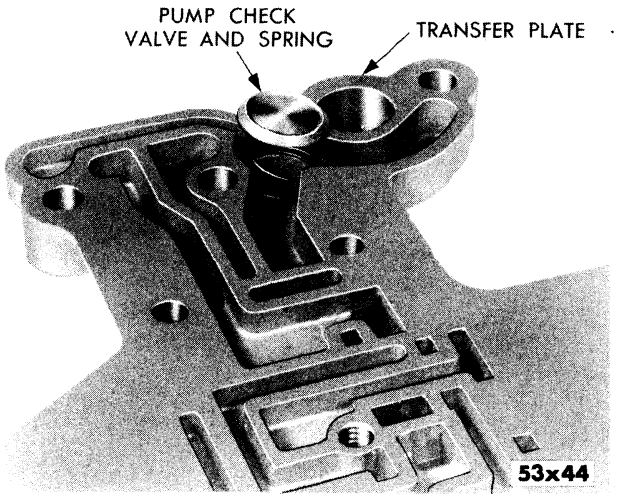

Fig. 127—Front Pump Check Valve and Spring (Typical of Rear Check Valve)

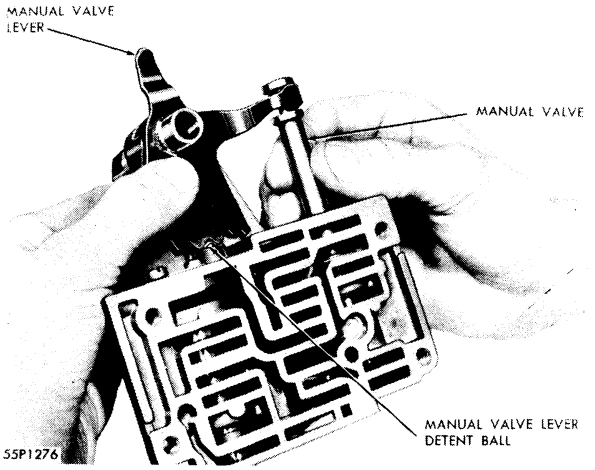

Fig. 128—Installing Manual Valve and Lever

(2) Slide manual valve lever assembly into valve body.

(3) Using a twisting motion, place manual valve in valve body sufficiently to engage manual valve with manual valve lever. Using the manual control lever on manual valve lever assembly, turn slowly in clockwise direction and, at the same time, using a twisting motion (Fig. 128), guide the manual valve into valve body to low range position. **Make sure detent ball is seated in detent.**

(4) Place kickdown rod (small end toward end cover) into position in valve body.

(5) Place valve body in stand, Tool C-3294, and install the direct clutch shift valve. (Fig. 124.)

(6) Place the direct clutch shift valve plug into position (same as it was when removed) in valve body. Draw the two screws down evenly and tighten to 30 inch-pounds torque.

(7) Install the direct clutch shift valve spring in valve.

(8) Install the shuttle valve in valve body. Coat stop ring lightly with MOPAR Lubriplate and place into recess in valve body. Place shuttle valve spring in shuttle valve.

(9) Place kickdown valve ball into valve body.

(10) Place valve body and cover plate on end cover. Install the one short screw and lockwasher and tighten snugly.

(11) Place adjustable shuttle valve plug into position in valve body end cover.

(12) Install the kickdown valve spring in place in end cover.

(13) Install valve body end cover to valve body.

CAUTION

Make sure the direct clutch shift valve, shuttle valve, and kickdown valve springs are properly seated in position when cover is being installed.

(14) Install the valve body end cover screw and lockwasher, but do not tighten.

(15) Install the three (long) valve body end cover plate screws and lockwashers. (Fig. 122.) Draw down evenly and tighten to 30 inch-pounds torque. Tighten the valve body end cover bolt and the remaining end cover plate bolt to 30 inch-pounds torque.

(16) Using Tool C-3279, install throttle valve adjusting screw, and throttle valve operating lever assembly. Adjust to where there is approximately $1\frac{1}{16}$ inches distance between the valve body and end of throttle valve operating adjusting screw.

(17) Install throttle valve (point outward) in valve body.

(18) Place throttle valve spring and retainer over throttle valve. Swing throttle valve operating lever over spring and retainer.

(19) Compressing the throttle valve operating lever assembly against the throttle valve spring, slide the throttle valve cam assembly into manual valve lever assembly indexing cam portion in slot of operating lever. (Fig. 120.)

(20) Install servo bleed valve and throttle pressure check valve ball into position in valve body. (Fig. 119.) Install guide studs, Tool C-3295.

(21) Position the transfer plate cover on transfer plate and install the center screw (short) and lockwasher finger tight. Install the servo restrictor valve operating plug (long end first) into transfer plate, as shown in Figure 129.

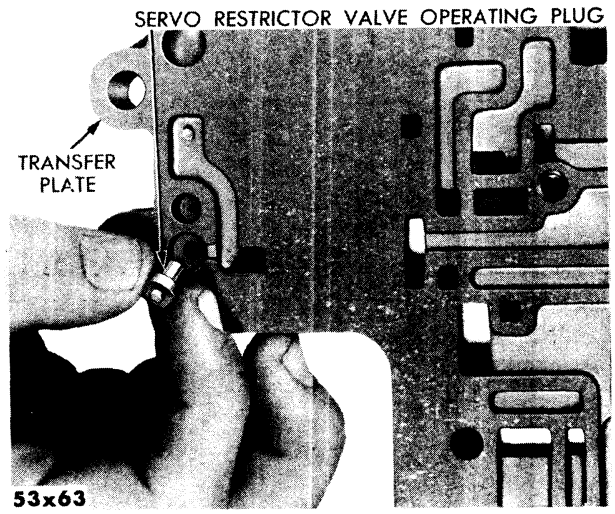

Fig. 129—Installation of Servo Restrictor Valve Operating Plug

(22) Make sure the pump check valves and springs are properly positioned in transfer plate. The pump check valve with the metering hole should be toward the rear of the transmission. Place valve body plate flush into position on transfer plate by compressing pump check valve springs.

CAUTION

Make sure pump check valves enter transfer plate, otherwise valve body plate will be damaged when assembly is drawn down onto valve body.

(23) Keep sufficient pressure on transfer plate and valve body plate to hold them together. Place over guide studs and into position on valve body. Install two of the transfer plate cover screws and lockwashers (one on each side), finger tight. Make definitely sure pump check valves remain in position in valve body plate.

(24) Remove the guide studs and install the remaining two transfer plate cover bolts and lockwashers. Draw transfer plate down evenly and tighten all five bolts to 50 inch-pounds torque.

CAUTION

Avoid overtightening as this will cause valve body to warp, which will result in sticky valves. Check operation of pump check valves to make sure they can be unseated by pressing down on them.