SECTION 5-C
TRANSMISSION REMOVAL AND INSTALLATION
DISASSEMBLY AND ASSEMBLY

CONTENTS OF SECTION 5-C

5-14 TRANSMISSION ASSEMBLY: REMOVAL & INSTALLATION

a. Removal

1. Raise car and provide support front and rear.

2. Disconnect exhaust crossover pipe both ends and at transmission. Remove pipe.

3. Remove universal joint "U" bolts and slide front propeller shaft rearward to separate universal joint at transmission. Support propeller shaft to avoid weight of propeller shaft damaging center universal joint.

4. Place suitable jack under transmission and fasten transmission securely to jack.

5. Remove transmission mounting pad to crossmember bolts.

6. Remove transmission support crossmember to frame rail bracket bolt at each end of crossmember. Remove crossmember.

7. Disconnect speedometer cable.

8. Loosen shift linkage adjusting swivel clamp nut. Remove cotter key, spring, and washer attaching equalizer to range selector outer lever. Remove equalizer.

9. Disconnect transmission filler pipe at engine and at transmission. Remove filler pipe.

10. Support engine at oil pan.

11. Remove transmission cover pan to case tapping screws. Remove cover pan.

12. Mark flywheel and converter pump for reassembly in same position, and remove three converter pump to flywheel bolts.

13. Remove transmission case to engine block bolts.

14. Move transmission rearward to provide clearance between converter pump and crankshaft. Lower transmission and move to bench.

b. Installation

1. Assemble transmission to suitable transmission jack and raise transmission into position. Rotate flywheel or converter to permit coupling of flywheel and converter with original relationship.

2. Install transmission case to engine block bolts. Torque to 30-40 ft. lbs. Do not overtighten.

3. Install flywheel to converter pump bolts. Torque to 18-25 ft. lbs.

4. Install transmission support crossmember. Install mounting pad to crossmember bolts.

5. Remove transmission jack and engine support.

6. Install transmission cover pan with tapping screws.

7. Install transmission filler pipe and clamp using new "O" ring.

8. Reconnect speedometer cable.

9. Reconnect front propeller shaft to transmission companion flange and install "U" bolts.

10. Reinstall exhaust crossover pipe.

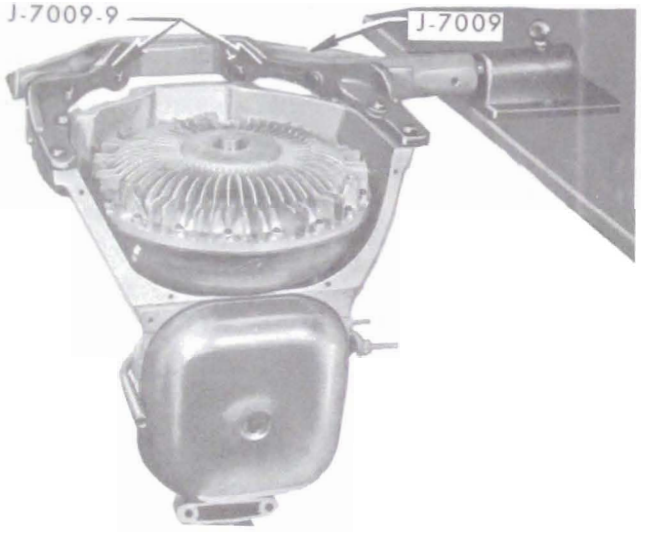
11. Fill transmission.

(a) Add 5 pints of oil prior to first engine start.

(b) Start engine in Neutral range. DO NOT RACE ENGINE. Immediately add oil to bring level to 1/2" below full mark. (Approximately 8 pints if converter was empty -- none if converter was full).

(c) When engine and transmission are thoroughly warmed up, adjust oil level to full mark on dip stick.

5–15 CONVERTER AND GEAR SET: REMOVAL, DISASSEMBLY, INSPECTION AND REASSEMBLY

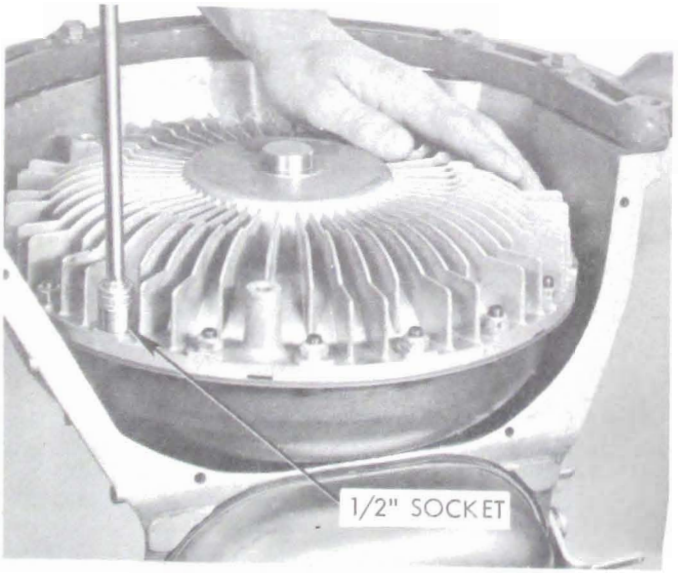


a. Removal and Inspection of Converter and Gear Set

1. Assemble transmission to fixture J-7009 and adapter J-7009-9.

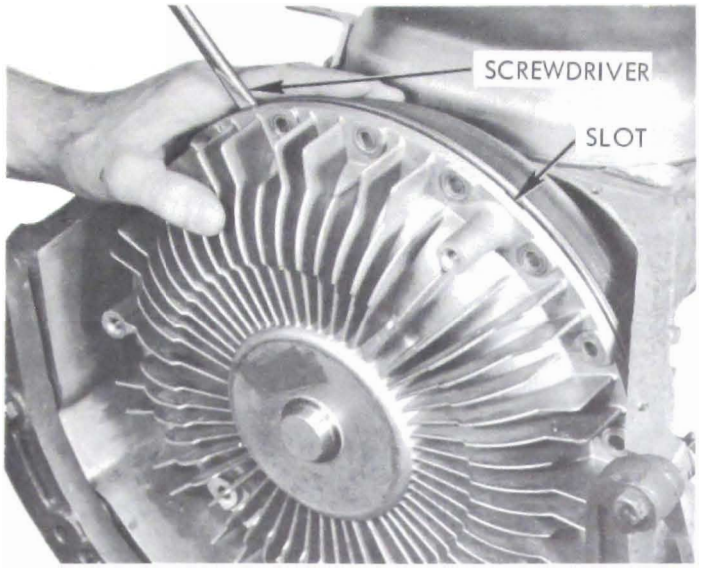
2. Remove transmission vent pipe assembly. See paragraph 5-36.

5-100



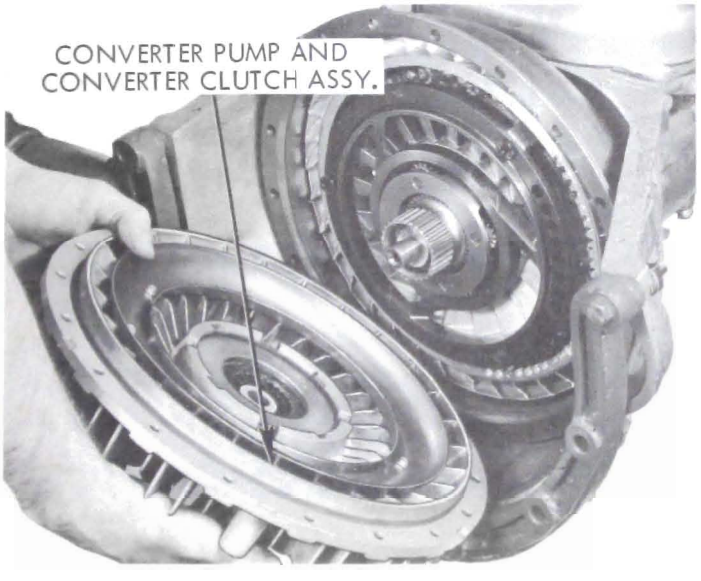
3. Remove converter pump to housing bolts and nuts.

5-101



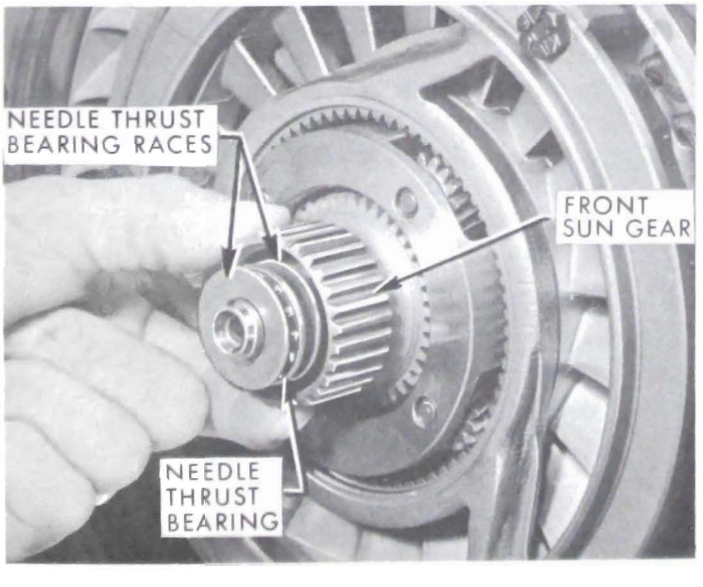
4. Raise transmission to horizontal position. Provide a pail or other suitable receptacle to catch the oil as it drains out of converter. Pry converter pump away from housing by using a screwdriver blade in slots provided.

5-102



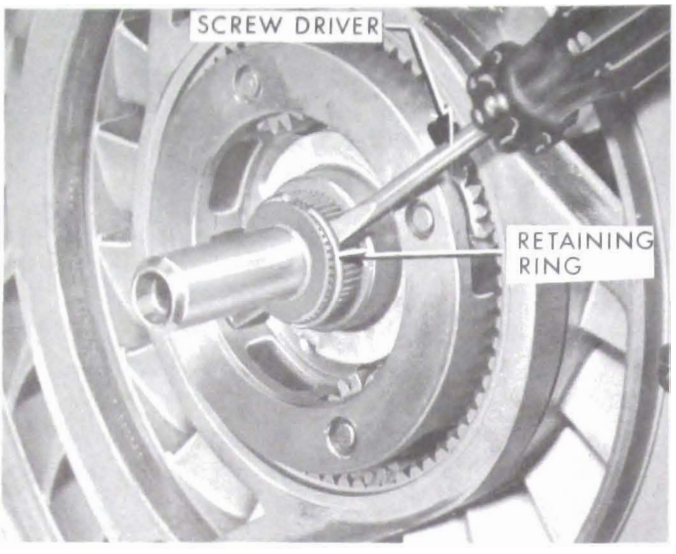
5. Remove converter pump and converter clutch assembly and allow to drain. Refer to paragraph 5-16 for disassembly, inspection and reassembly of converter clutch assembly.

5-103



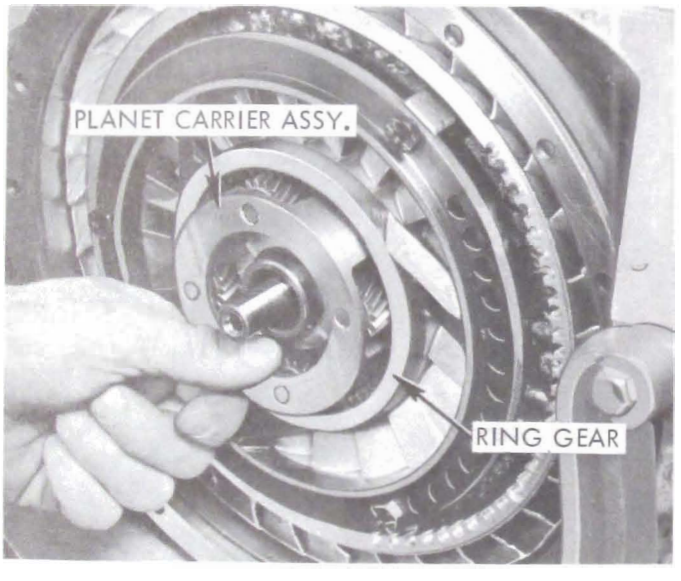
6. Remove front sun gear, needle thrust bearing, and two select fit needle thrust bearing races. Set gear, bearing and races aside on clean working surface.

5-104



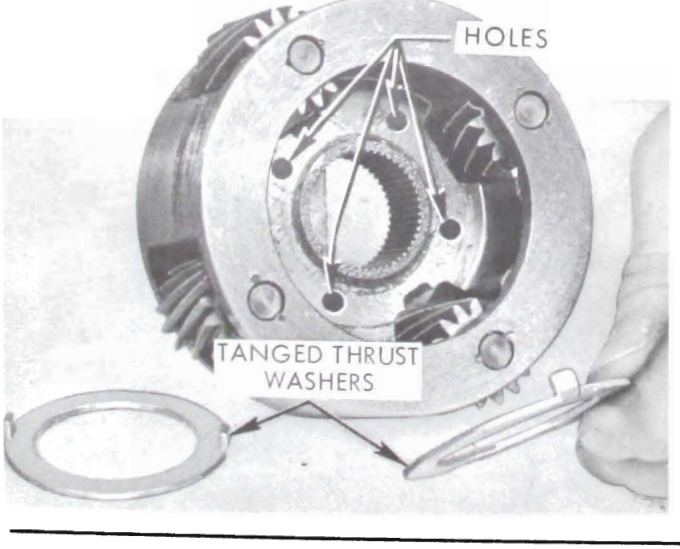
7. Remove planet carrier retaining ring. Use a thin bladed screwdriver to pry ring out of groove in output shaft.

5-105



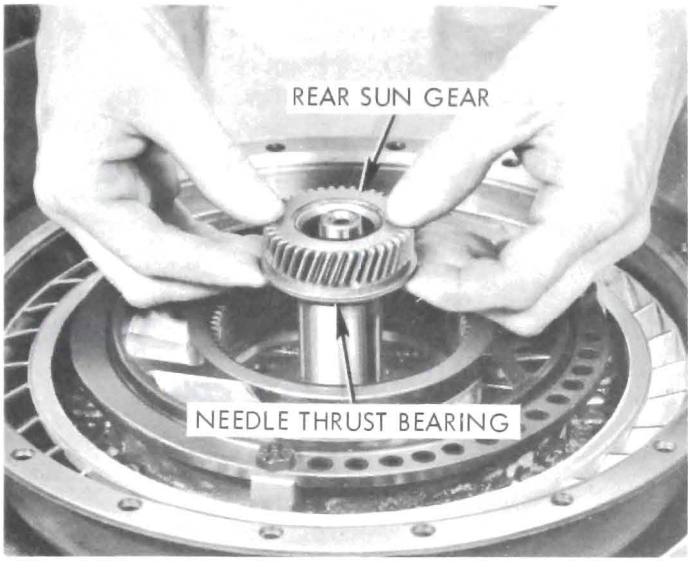
8. Slide planet carrier assembly out of ring gear and place on clean working surface.

5-106



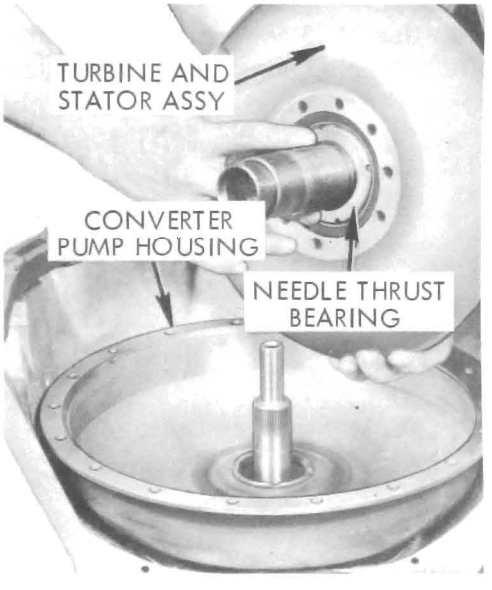
9. Separate front and rear tanged thrust washers from planet carrier assembly. Examine washers for scoring or wear. Check planet pinions for scoring, imbedded metal or looseness on shaft. Worn or loose pinions require replacement of carrier assembly. Pick out imbedded metal with small screwdriver.

5-107



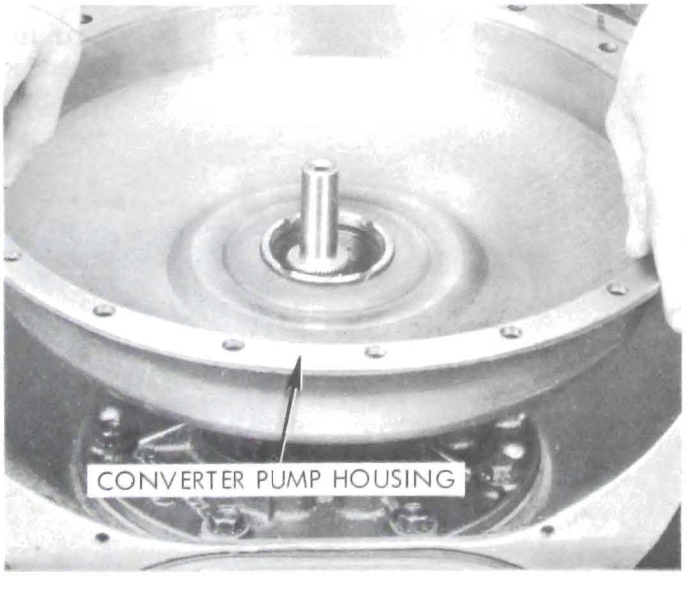
10. With transmission vertical, remove rear sun gear and needle thrust bearing. Set aside on clean surface.

5-108



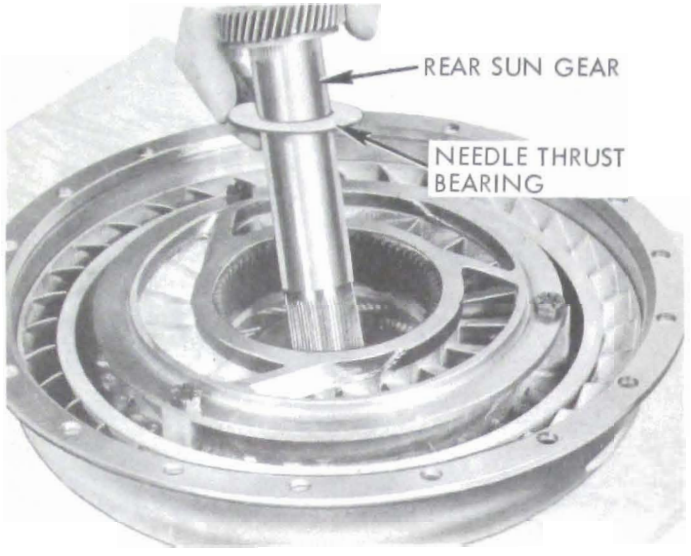
11. Lift turbine and stator assembly and turbine needle thrust bearing out of housing; set aside on clean working surface.

5-109



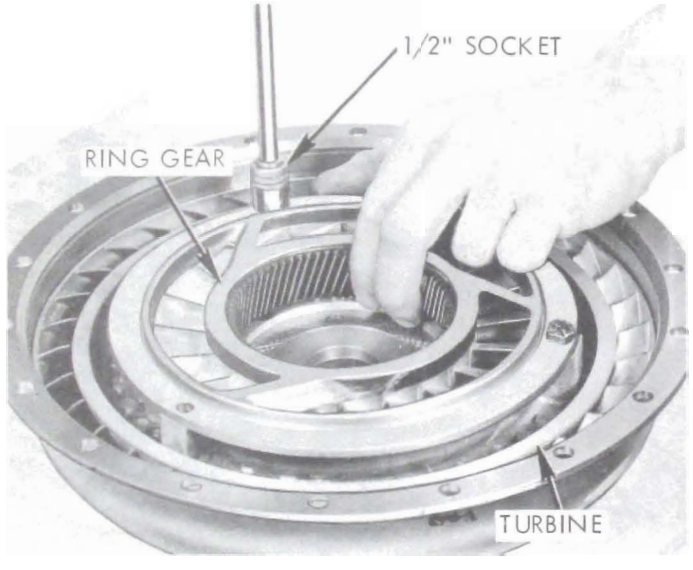
12. Lift converter pump housing out of transmission and set housing hub through hole in bench. To conserve space and for convenience while inspecting and gauging the converter, it is advisable to set the turbine and stator assembly and rear sun gear in the pump housing before proceeding with inspection of parts or further disassembly of transmission.

5-110



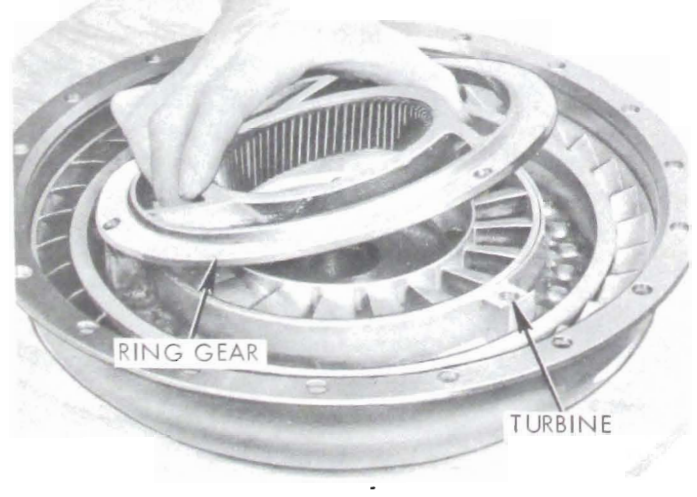
13. Remove rear sun gear and needle thrust bearing from bench assembly. Check gear for scoring or imbedded metal. Pick out imbedded metal with small screwdriver. Check babbitted inner surfaces of gear shaft. If babbitt is chipped or flaked off, rear sun gear must be replaced. Check needle thrust bearing for looseness or wear.

5-111



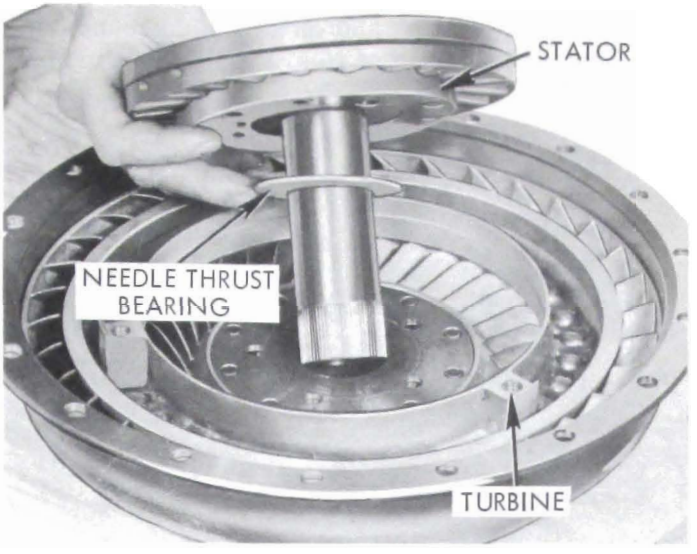
14. Use 1/2'' wrench to remove three bolts attaching ring gear to turbine.

5-112



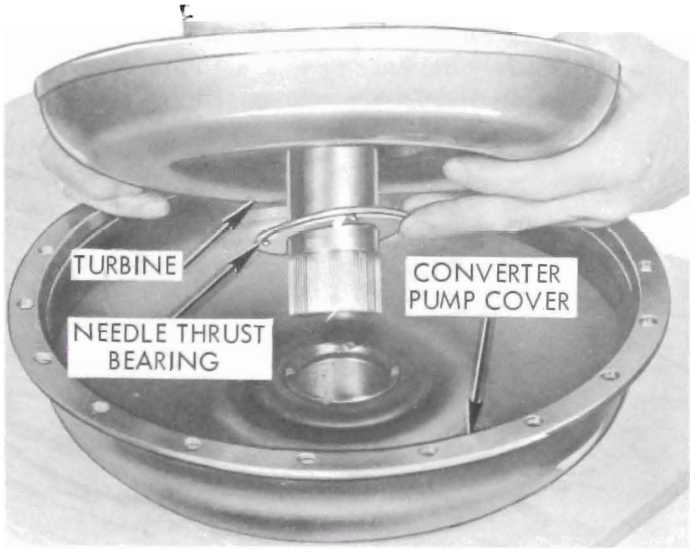
15. Lift ring gear off turbine. Examine ring gear for wear, scoring or imbedded metal. Pick out imbedded metal with small screwdriver.

5-113



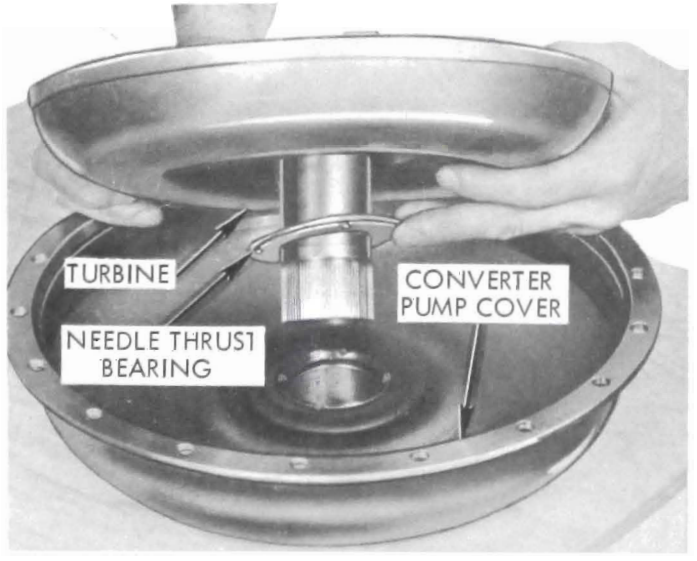
16. Lift stator and needle thrust bearing out of turbine. Check stator for chipped, cracked or broken vanes. Check babbitted inner surfaces of stator shaft. If babbitt is scored or flaked off, the stator must be replaced. Check needle thrust bearing for wear or looseness.

5-114



17. Lift turbine and needle thrust bearing out of converter pump cover. Examine turbine for chipped, cracked or broken vanes. Examine babbitted inner surfaces of turbine shaft. If babbitt is scored or flaked off, the turbine must be replaced. Examine converter pump housing hub for scoring, burrs or roughness that might damage pump seal or pump bushing when re-installed.

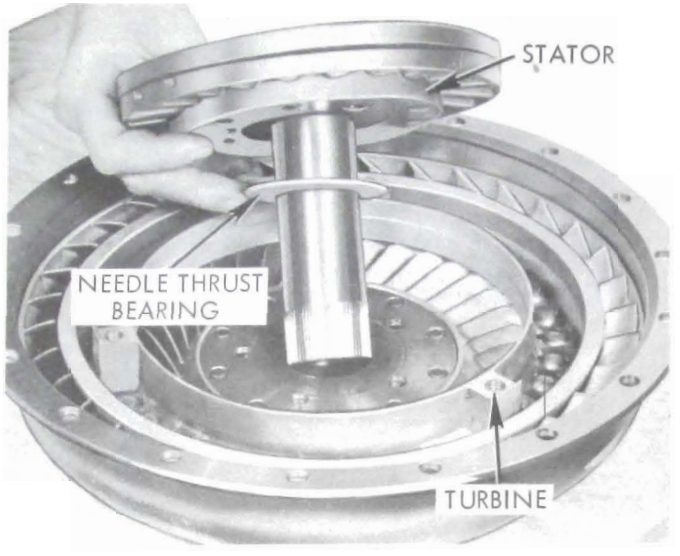
5-115



b. Reassembly for Converter Clearance Check (ON BENCH)

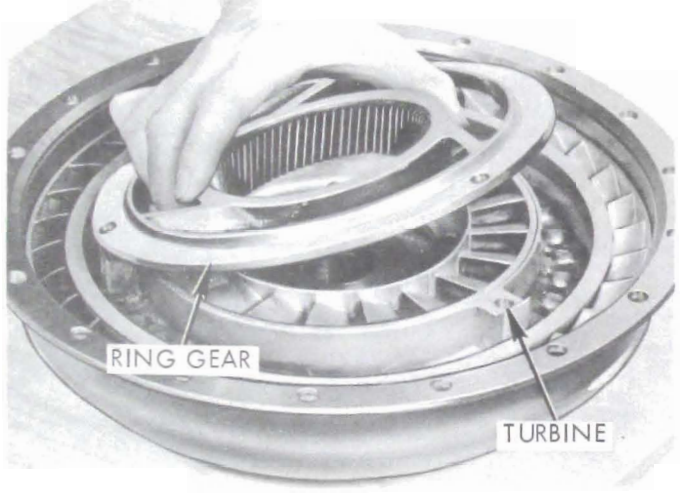
1. Set converter pump housing hub through hole in bench. Place turbine and needle thrust bearing that will be used at final assembly in pump housing.

5-116



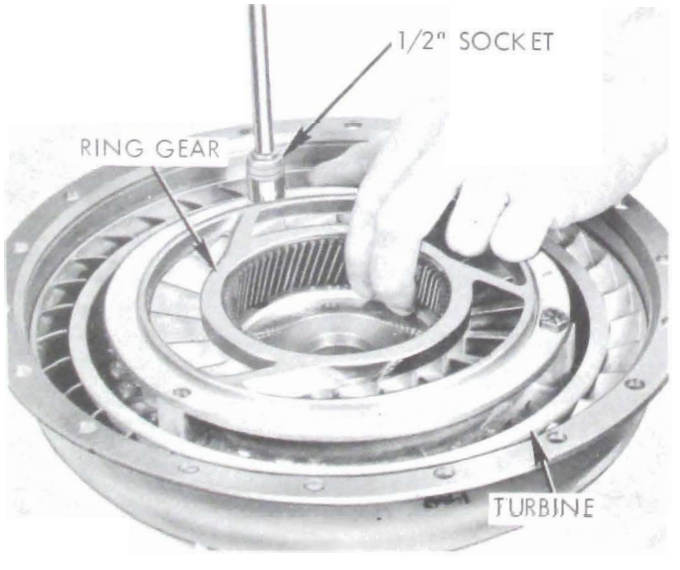
2. Set stator and needle thrust bearing that will be used at final assembly in turbine.

5-117



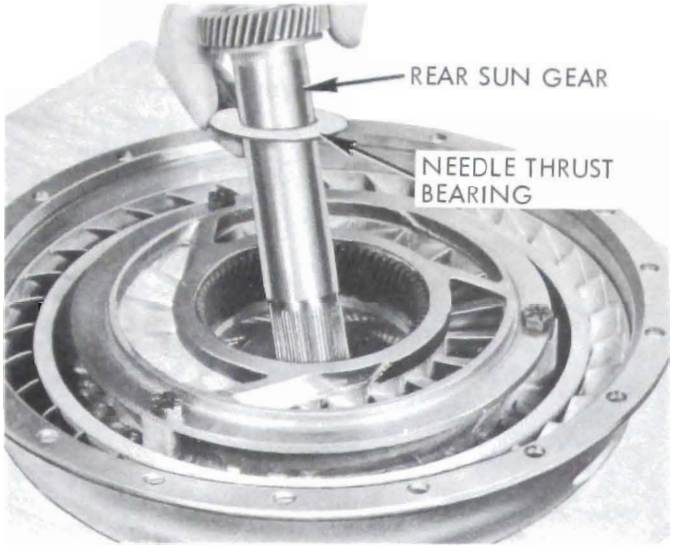
3. Set ring gear in place on turbine. Bolt holes are unevenly spaced so ring gear may be installed in only one position.

5-118



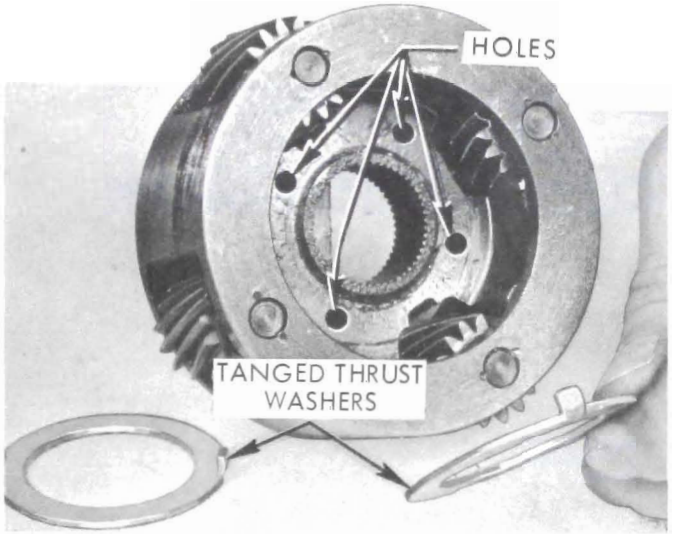
4. Install ring gear to turbine bolts and torque to 15-20 ft. lbs.

5-119



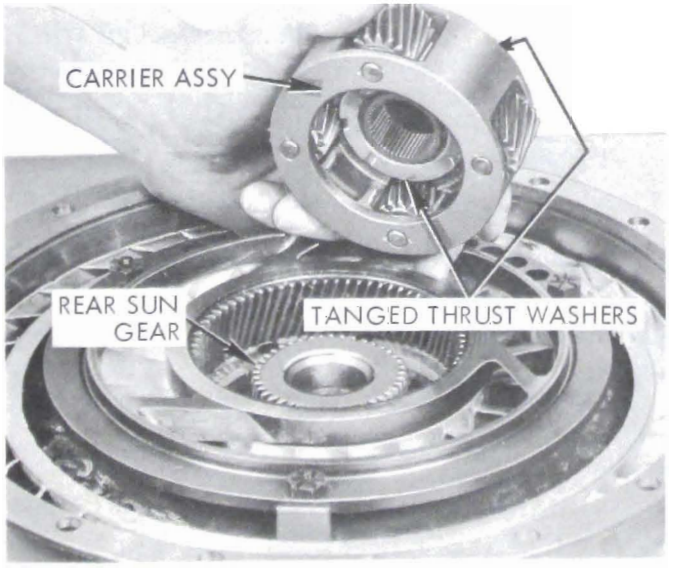
5. Set sun gear and needle thrust bearing that will be used at final assembly in place.

5-120



6. Install tanged thrust washers in front and rear of planet carrier. Tangs on front and rear washers must engage alternate holes in carrier.

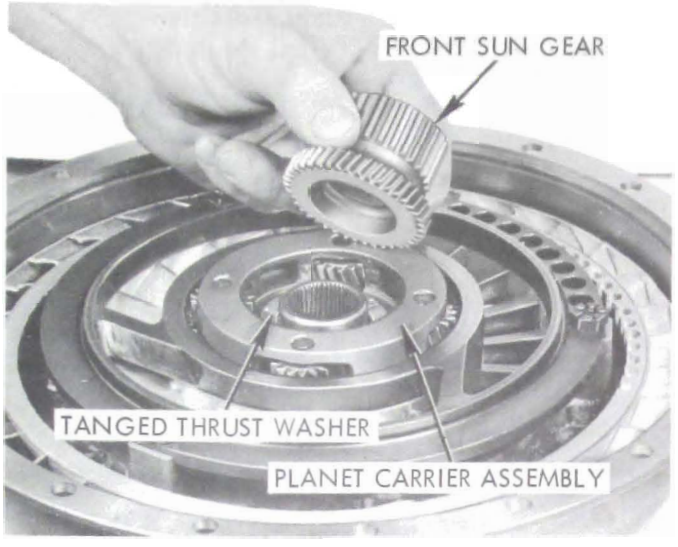
5-121



7. Set carrier assembly with tanged thrust washers in place on rear sun gear.

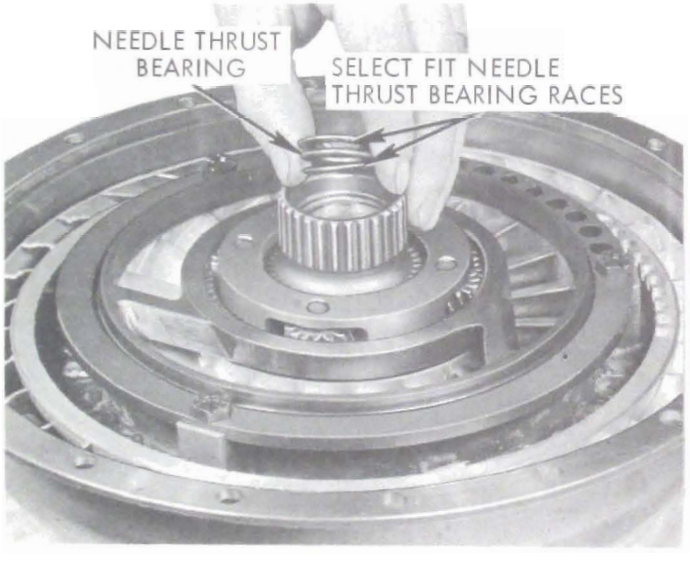
NOTE: Deep side of carrier assembly toward rear sun gear.

5-122



8. Examine front sun gear for wear, scoring or imbedded metal. Pick out imbedded metal with small screwdriver. Be sure tanged thrust washer is in place on forward side of planet carrier. Set front sun gear in place on planet carrier.

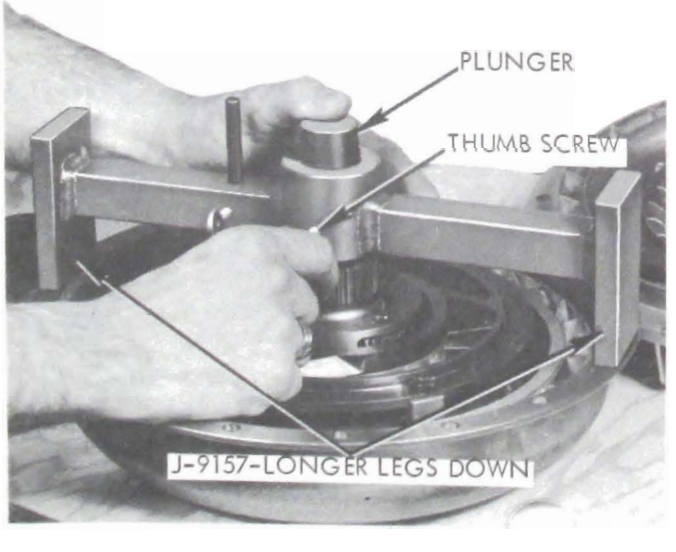
5-123



9. Set needle thrust bearing that will be used in final assembly and two select fit needle thrust bearing races in place on top of front sun gear.

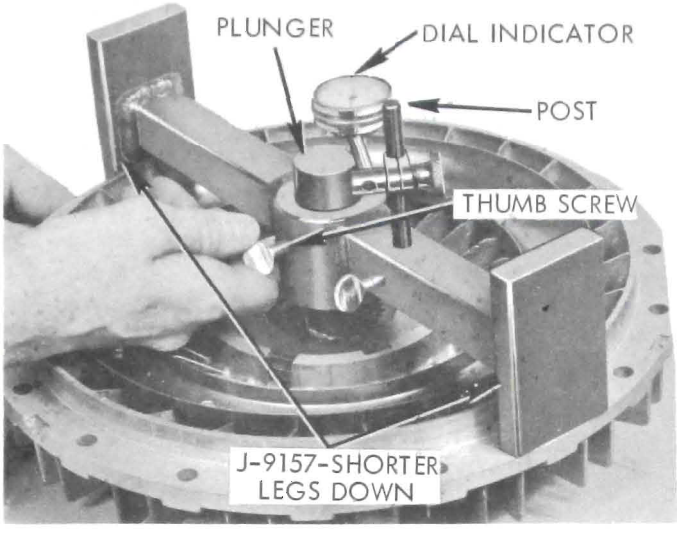
NOTE: .030" race toward sun gear.

5-124



10. Set converter clearance gauge J-9157 on pump housing with longer legs "down" on housing. Loosen thumb screw and push plunger down to bear on needle thrust bearing and races. Tighten thumb screw.

5-125

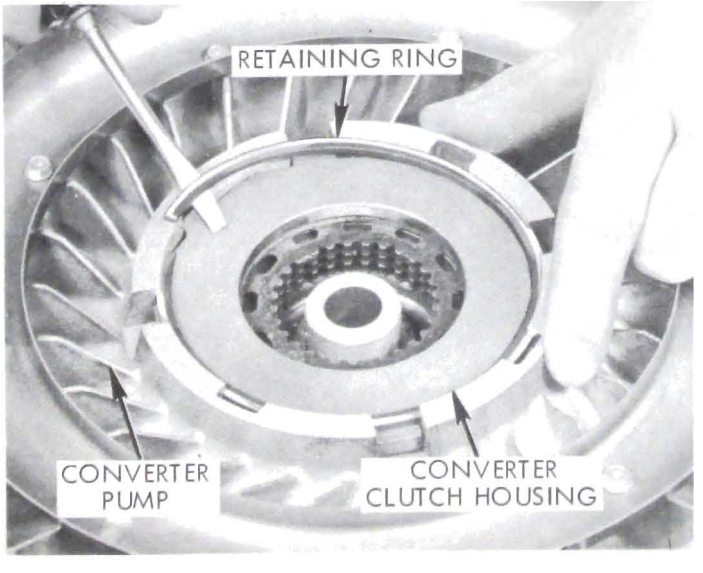


11. Turn gauge J-9157 over (short legs down) and set in place on converter pump. Assemble dial indicator to post with indicator bearing on plunger. "ZERO" the indicator. Loosen the plunger thumb screw; observe indicator reading.

NOTE: If, when the gauge is set in place on converter pump, the plunger holds the gauge up so legs do not rest on pump rim, indicator reading when thumb screw is released will be in compression, not clearance. If plunger drops when thumb screw is released, indicator reading will be in clearance, not compression.

Select needle thrust bearing races to provide .010" clearance to .005" compression. Refer to paragraph 5-34 for installation of converter and gear set. 5-126

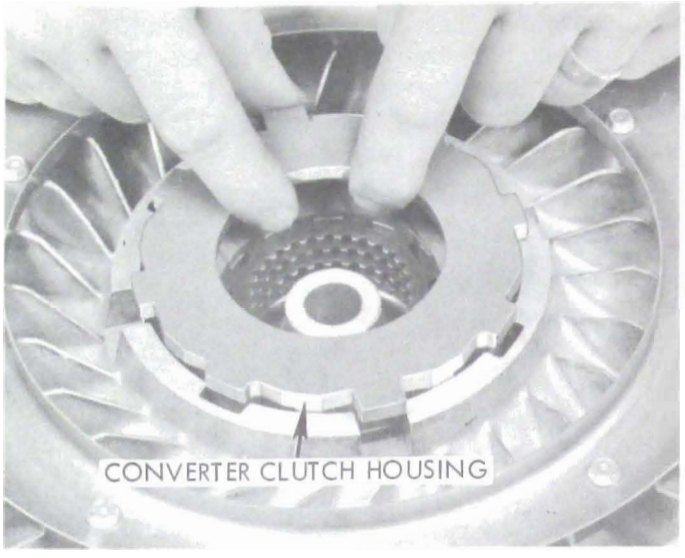
5-16 CONVERTER CLUTCH AND CONVERTER PUMP: DISASSEMBLY, INSPECTION AND REASSEMBLY



a. Disassembly and Inspection

1. Pry converter clutch housing retaining ring out of groove in converter pump.

5-127

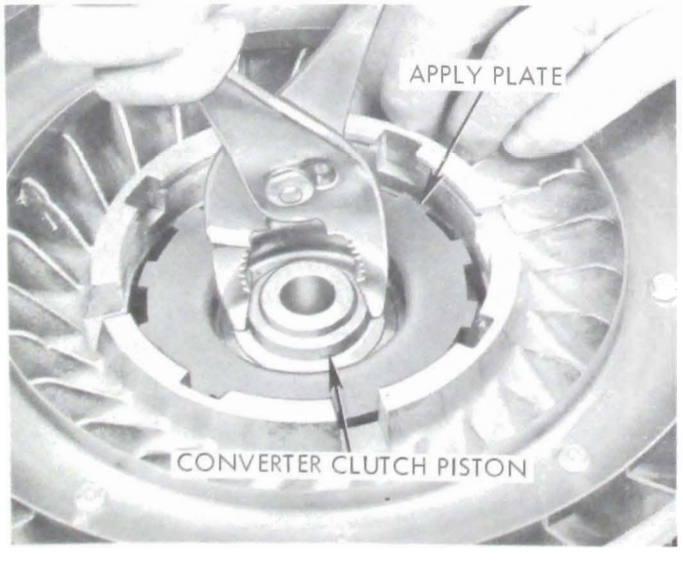


2. Lift converter clutch housing out of converter pump. Examine clutch plate contact surface for wear or scoring.

5-128

3. Remove converter clutch pack. Examine plates for scoring, warping or excessive wear.

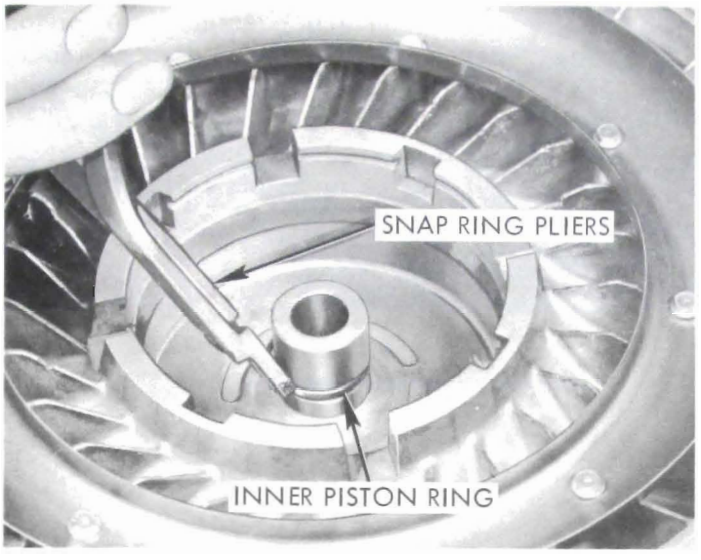
5-129



4. Remove converter clutch piston and apply plate using pliers. Examine apply plate for scoring or excessive wear. Check piston bore in converter pump for scoring or pitting. Check inner bore of piston for wear or scoring.

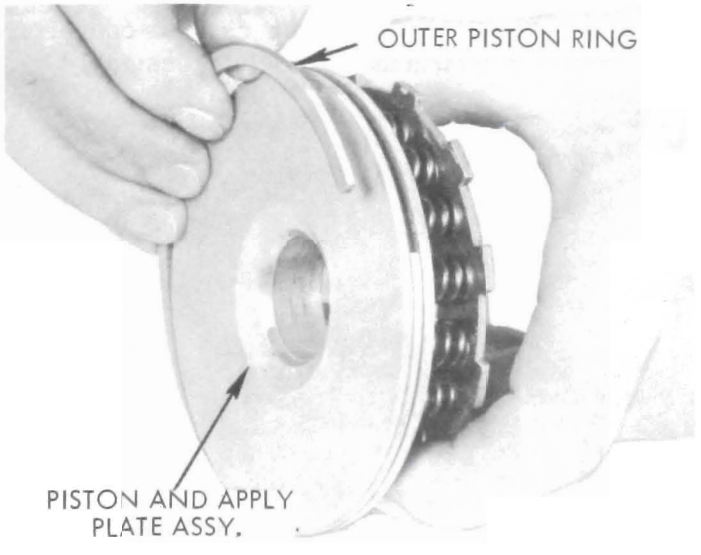
NOTE: Piston and apply plate is serviced as an assembly only.

5-130



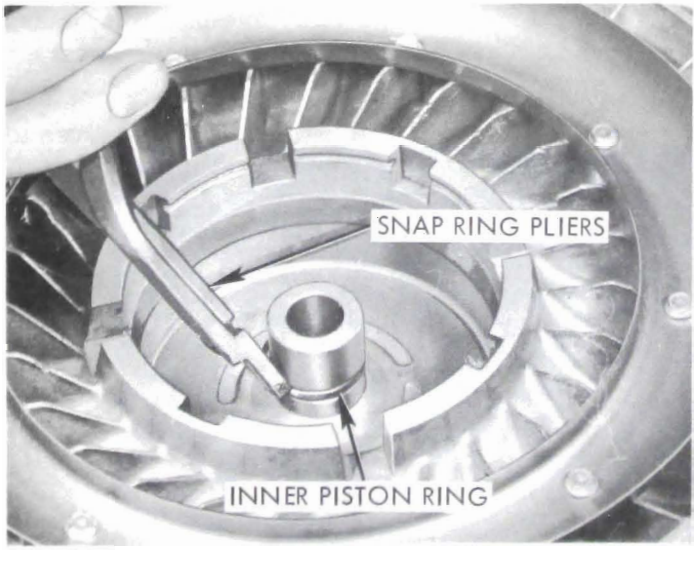
5. Unhook, expand and remove converter clutch piston inner ring. Check for wear or scoring.

5-131



6. Remove and examine converter clutch outer piston ring for cracks or excessive wear.

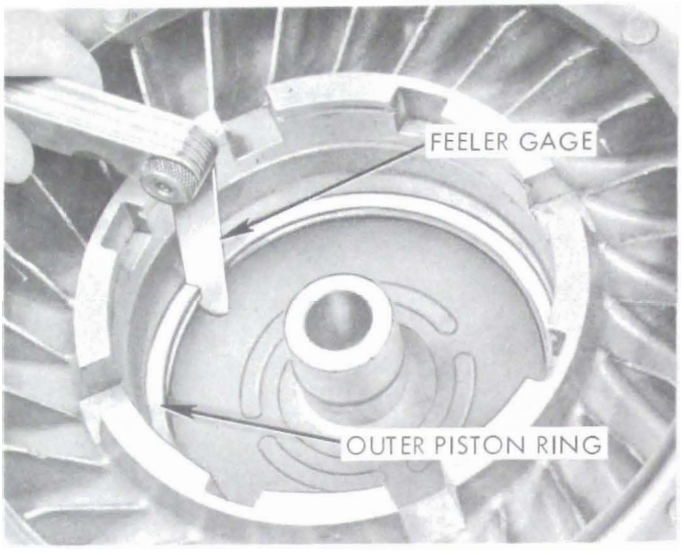
5-132



b. Reassembly

1. Examine converter pump for chipped, cracked or broken vanes. Check for damaged or loose pump ring. Make sure converter clutch apply hole is open and free of dirt. Expand and install converter clutch inner piston ring and hook ends.

5-133

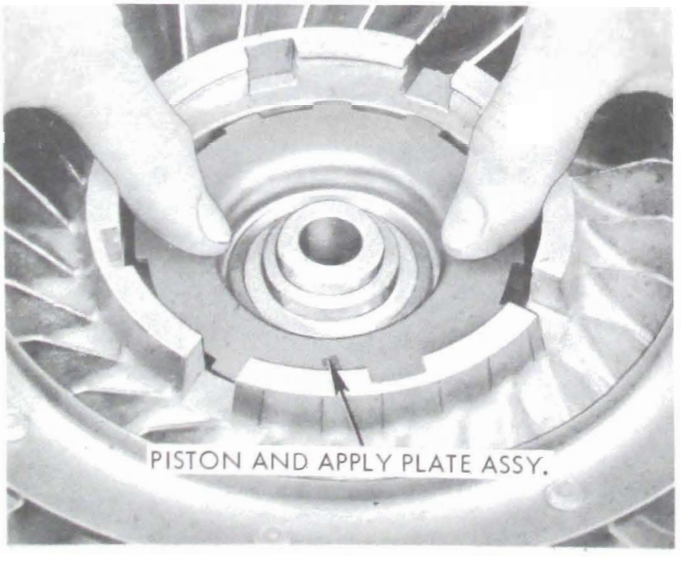


2. Position converter clutch outer piston ring squarely in lower part of bore (about 1/4'' from bottom). Check ring gap with feeler gauge. Gap must be between .002'' and .007''. If gap is less than .002'', file end of ring. If gap is more than .010'', replace ring.

5-134

3. Install outer piston ring on converter clutch piston and apply plate assembly.

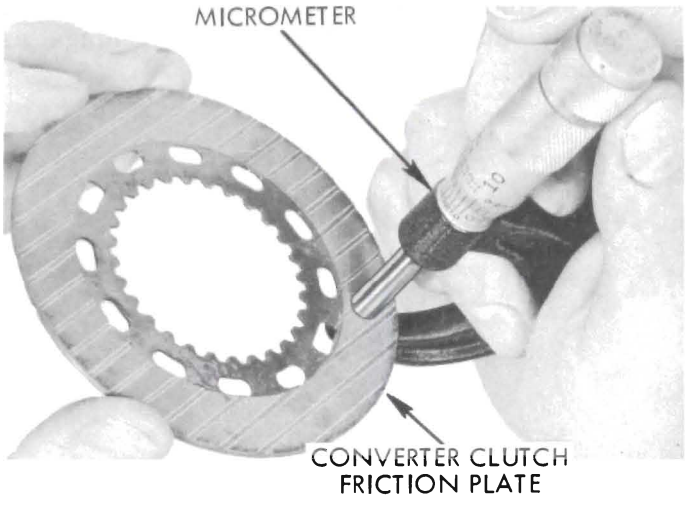
5-135



4. Lubricate liberally and push piston and apply plate assembly into bore of converter pump.

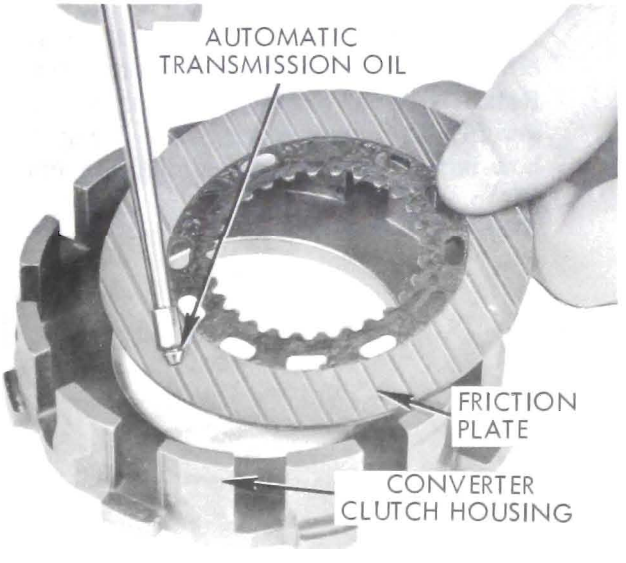
NOTE: A chamfer in the bore serves to compress the outer piston ring; however, if difficulty is encountered, a thin feeler gauge may be used to start the ring ends over the chamfer.

5-136



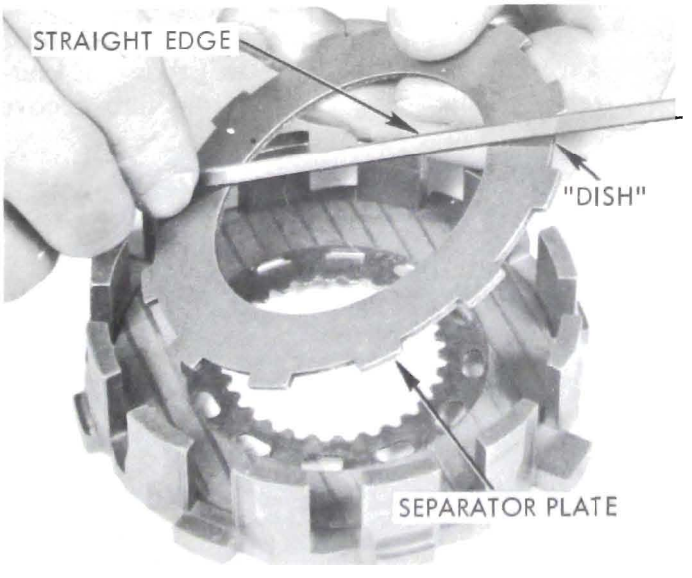
5. Examine converter clutch friction plates for evidence of wear, burning or flaking. Measure any questionable plate. When new, converter clutch friction plates are .079''-.084'' thick. Plates worn thinner than .074'' should be replaced.

5-137



6. Liberally lubricate a friction plate and install in converter clutch housing.

5-138



7. Check a separator plate for ''dish'' by holding a straight edge firmly against the plate. Note ''dish'' and install separator plate. All separator plates must be installed with ''dish'' same way.

Continue alternately installing a lubed friction plate and a separator plate until four liberally lubed friction plates and three separator plates have been installed.

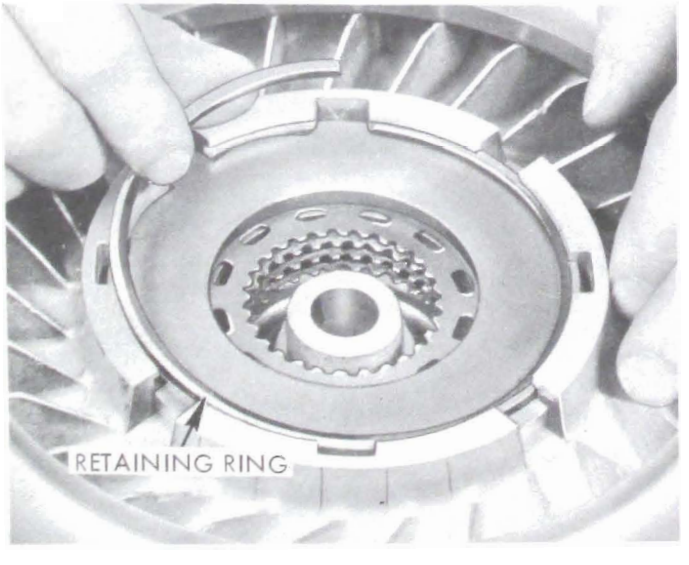
5-139

8. Rotate piston apply plate so tangs of apply plate are centered in openings as shown.

5-140

9. Lower converter clutch housing and clutch pack assembly into converter pump. Retain clutch plates with fingers until assembly is properly aligned. Long tangs of housing must engage openings in converter pump.

5-141

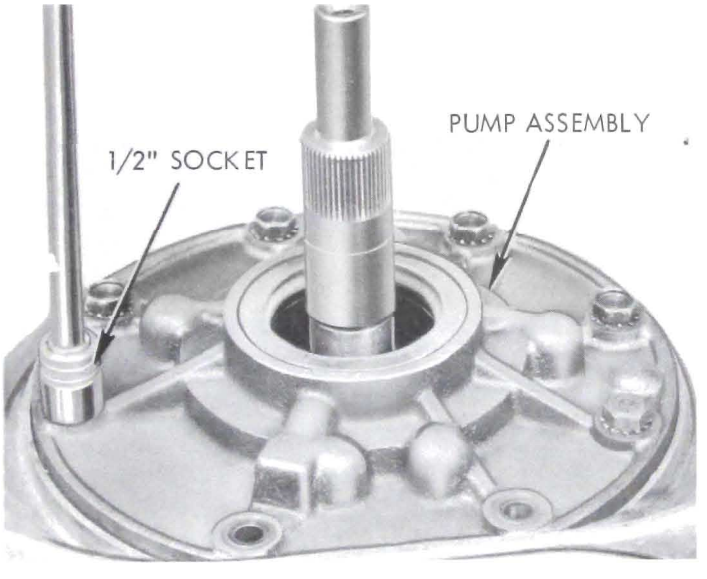


10. Install housing retaining ring over converter clutch housing in groove of converter pump. Tap ring solidly into groove with drift.

5-142

Refer to paragraph 5-34 for installation of converter assembly.

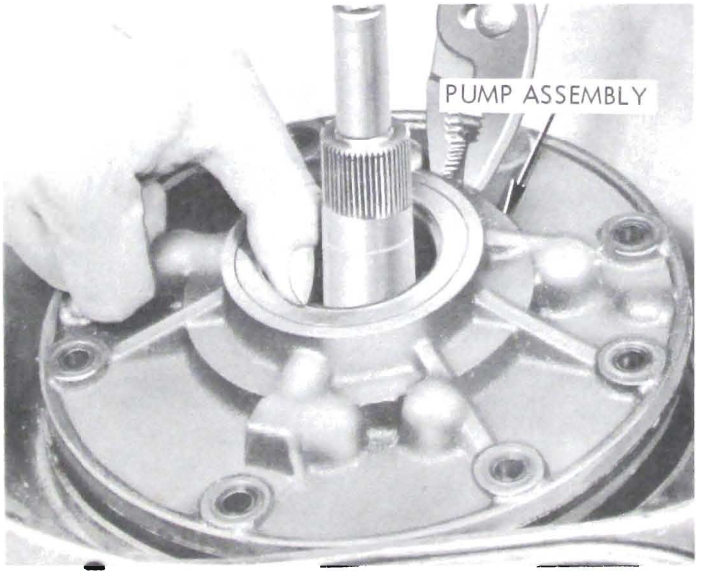
5–17 PUMP: REMOVAL, DISASSEMBLY, INSPECTION AND REASSEMBLY



a. Removal

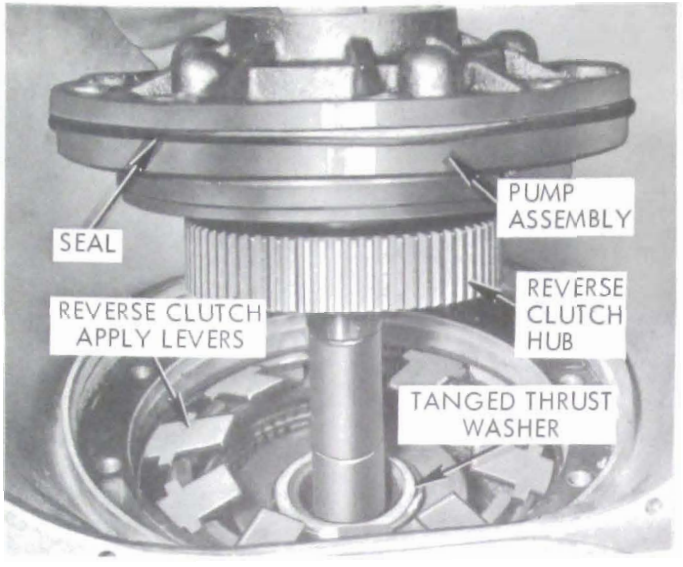
1. Remove special bolts with captive sealing lockwashers (1/2'' wrench).

5-143



2. Grasp pump body with pliers and hand. Lift pump assembly clear of case.

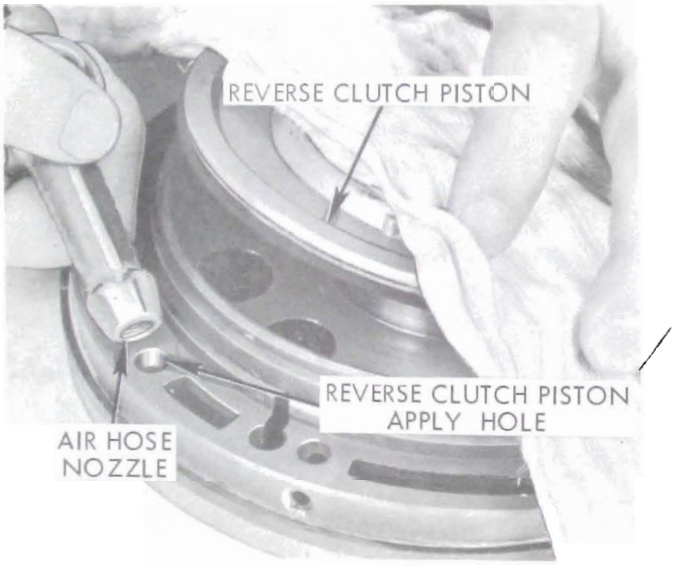
5-144



3. Lift pump assembly out of case. Reverse clutch hub will usually be removed with pump. Set reverse clutch hub aside. Remove and discard pump to case gasket.

NOTE: A tanged thrust washer may remain on top of stator overrunning clutch race. It should be placed in the rear of the reverse clutch hub.

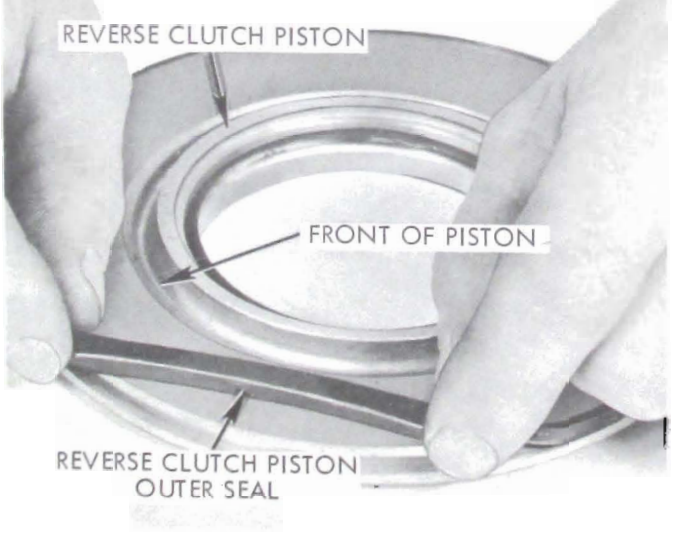
5-145



b. Disassembly and Inspection

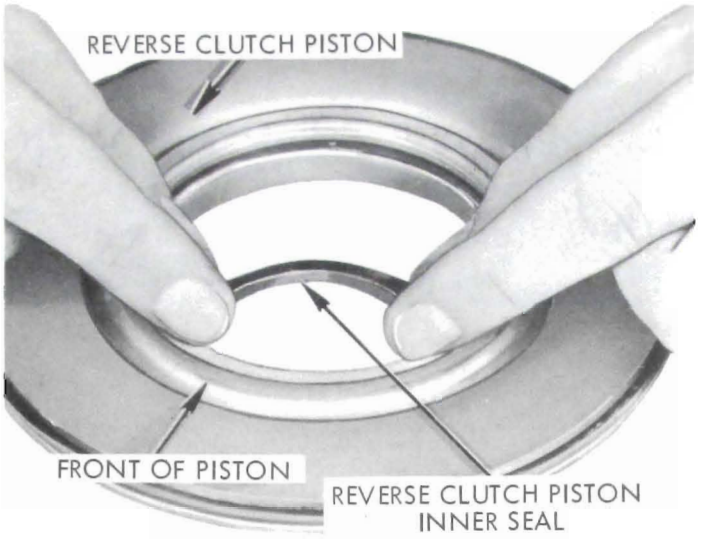
1. Use air pressure to remove reverse clutch piston from reverse clutch housing. Cover assembly with cloth to protect against oil spatter.

5-146



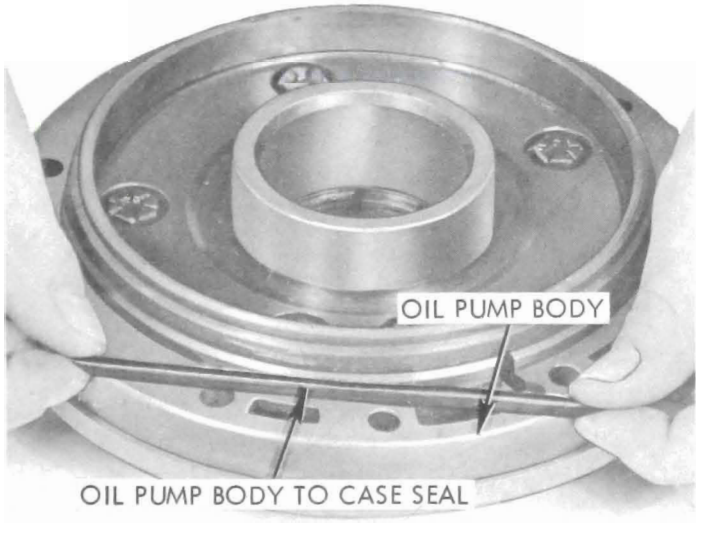
2. Examine reverse clutch piston outer seal for nicks, cuts or wear. If necessary to replace, remove the seal.

5-147



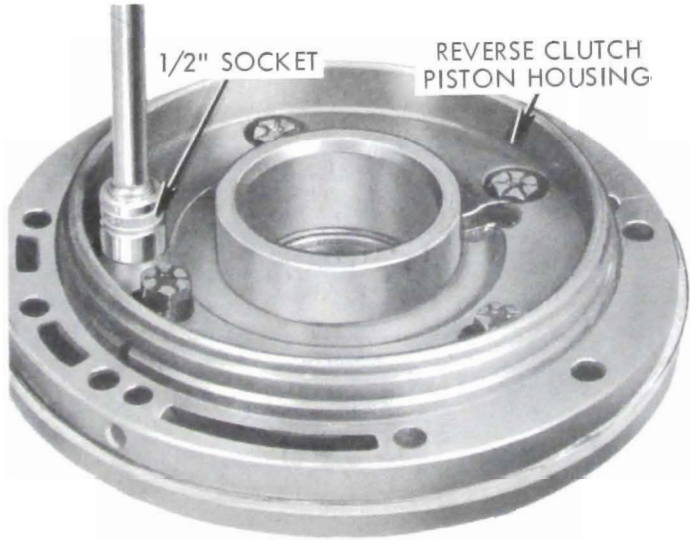
3. Examine reverse clutch piston inner seal for nicks, cuts or wear. If necessary to replace, remove the seal.

5-148



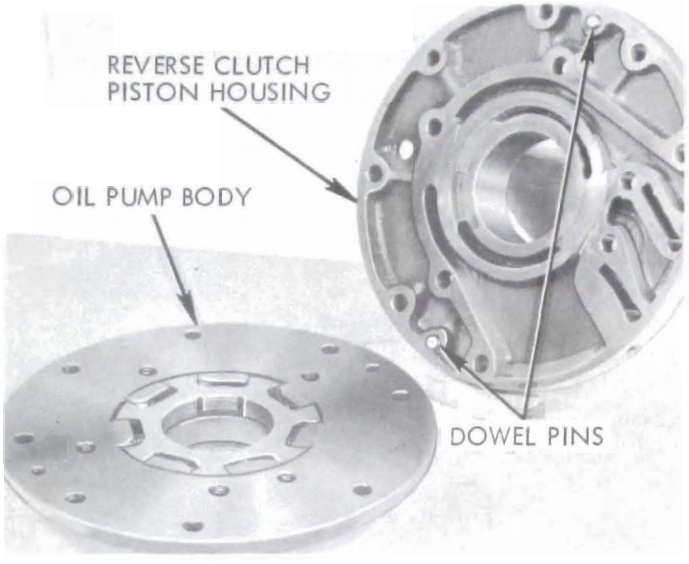
4. Remove and discard oil pump body to case seal.

5-149



5. Remove reverse clutch piston housing to oil pump body bolts (1/2'' socket).

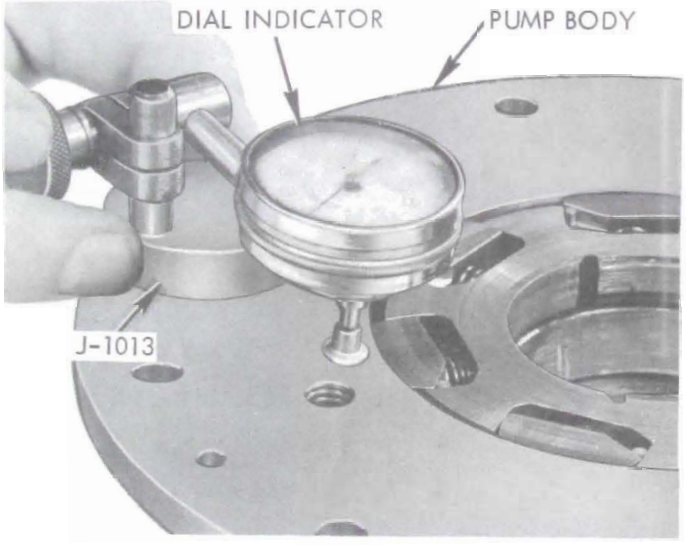
5-150



6. Lift reverse clutch piston housing off oil pump. Lift straight up to avoid damage to dowel pin holes.

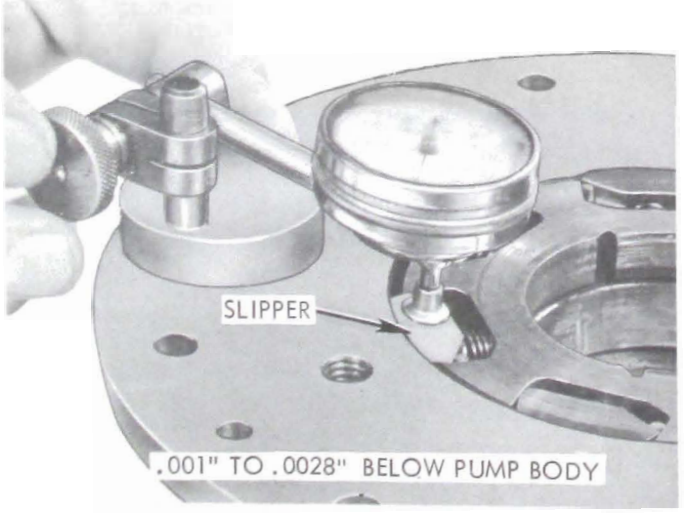
NOTE: Slipper sealing pins may stick to reverse clutch piston housing and be removed with housing.

5-151



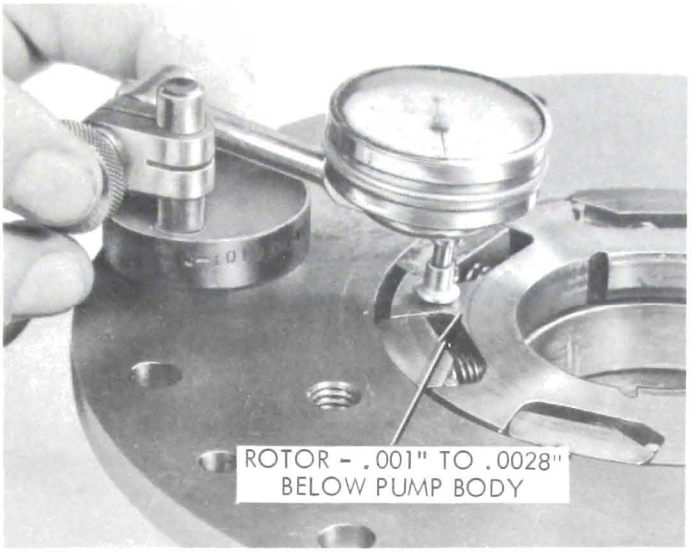
7. Mount a dial indicator on base and "Zero" the indicator on oil pump body.

5-152



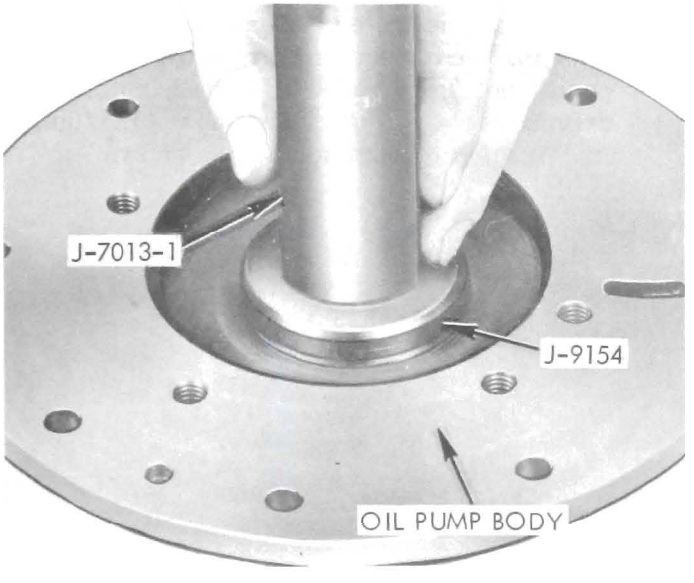
8. Move indicator plunger to bear on oil pump slippers one at a time. Slippers should be from .001" to .0028" below surface of oil pump body.

5-153



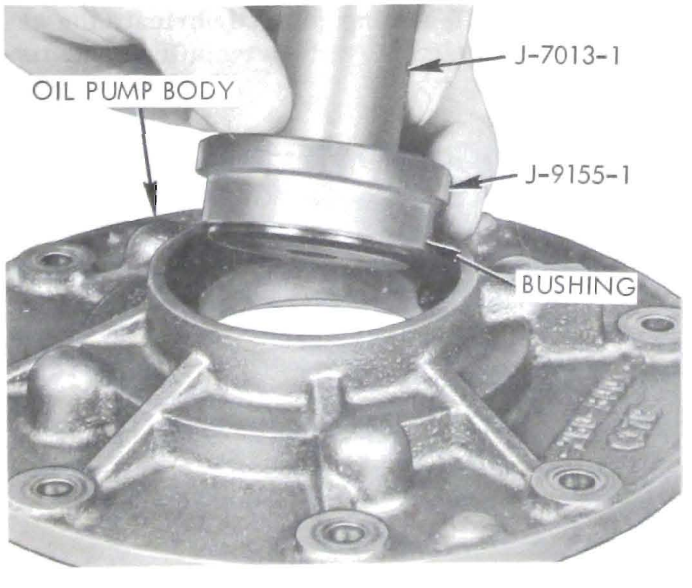
9. Move indicator plunger to rest on rotor. Check rotor in several places. Rotor should be from .001'' to .0028'' below oil pump body.

5-154



10. Examine bushing; if worn or scored, remove rotor, slippers, springs and pins and drive out bushing and seal with remover J-9154.

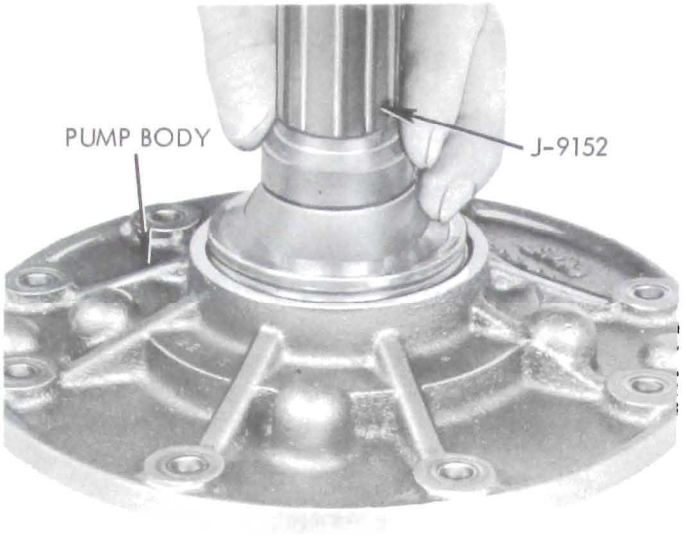
5-155



c. Reassembly

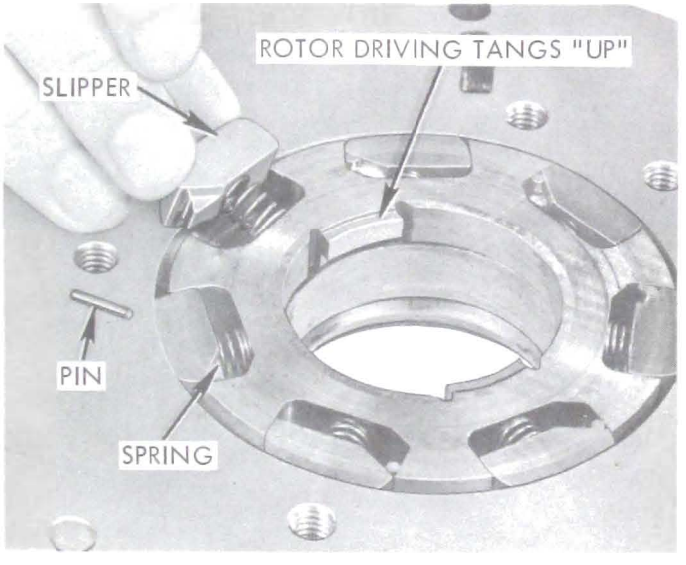
1. Install new bushing using installer J-9155.

5-156



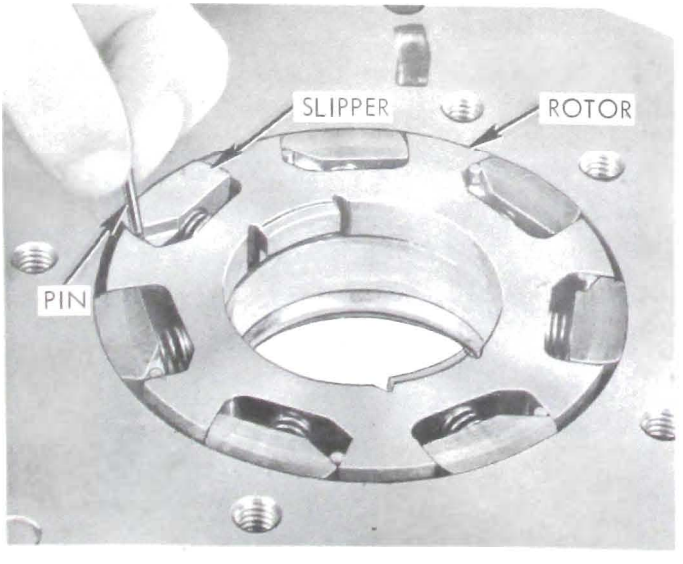
2. Apply Permatex to outer diameter of new seal and install seal using installer J-9152. Wipe away any excess Permatex after installation.

5-157



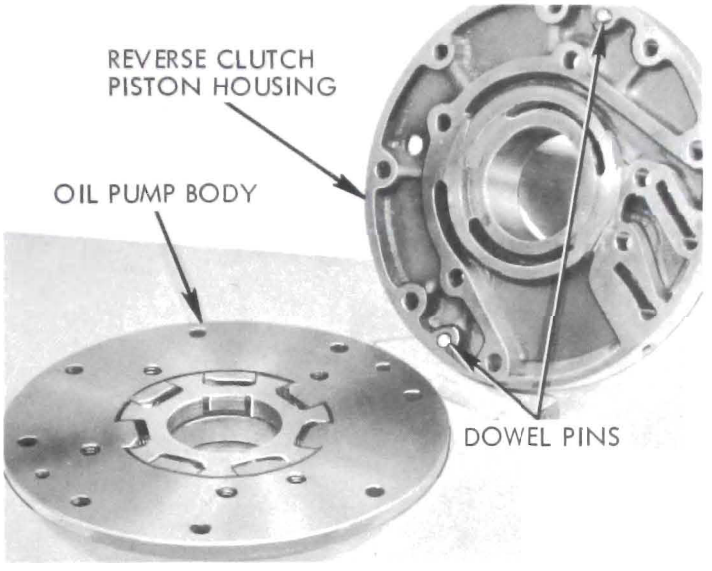
3. Examine rotor, slippers, springs and pins for wear, scoring or pitting. Replace parts not serviceable. Install rotor with driving tangs "up" as shown in figure. Install slippers and springs as shown.

5-158



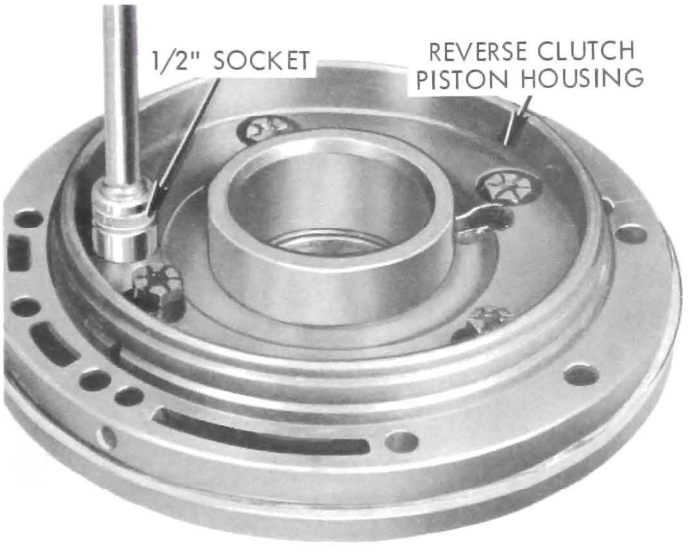
4. Install sealing pins. Lubricate the assembly liberally with automatic transmission oil.

5-159



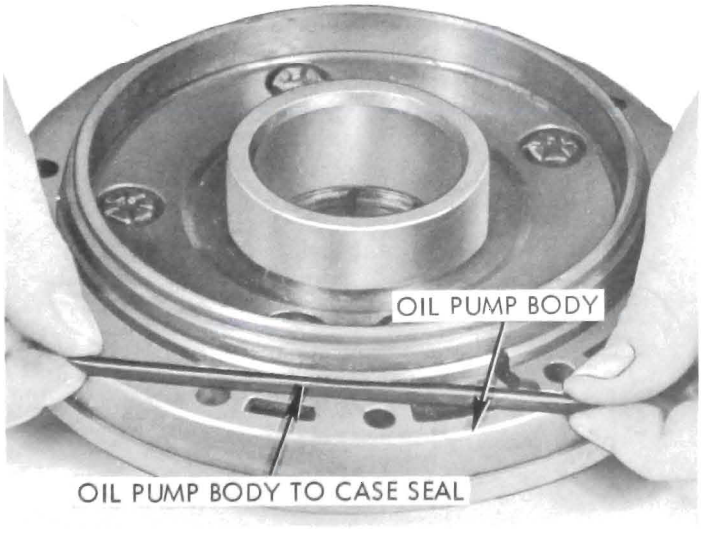
5. Set reverse clutch piston housing squarely in place on pump body. Dowel pins are unevenly spaced so assembly is possible in only one position.

5-160



6. Install reverse clutch piston housing to pump body bolts and torque alternately and evenly to 15 to 20 ft. lbs.

5-161

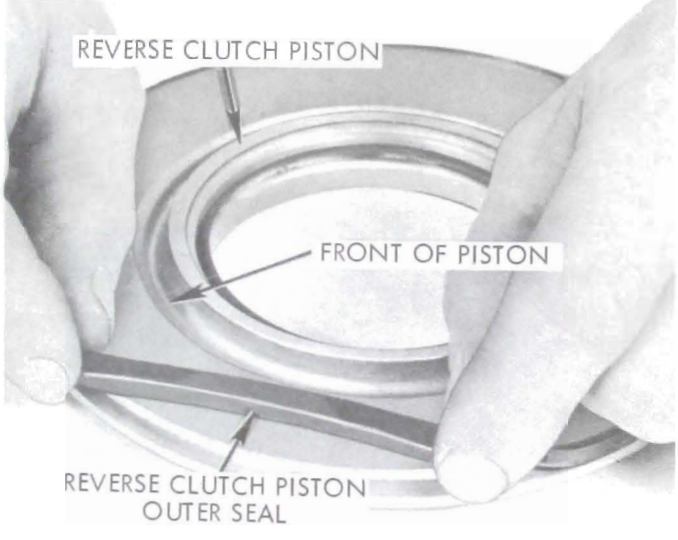


7. Install new oil pump body to transmission case sealing ring.

5-162

8. Install reverse clutch piston inner seal with lip toward front of piston.

5-163



9. Install reverse clutch piston outer seal with lip toward front of piston.

5-164

10. Lubricate seals and install piston in piston housing using a loop of smooth wire to start the lips of the seals into the bore.

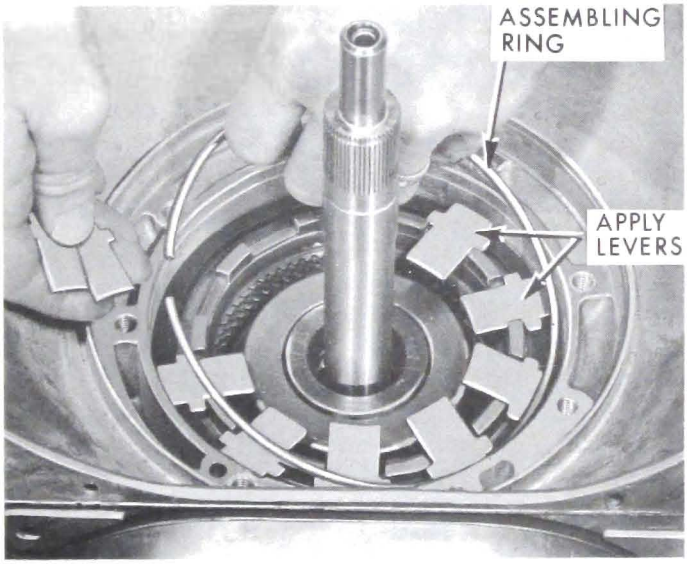
NOTE: The inner seal lip should be started first.

NOTE: A satisfactory tool can be made by crimping a loop of .020'' music wire in a short length of copper tubing.

5-165

Refer to paragraph 5-30 for installation of pump assembly.

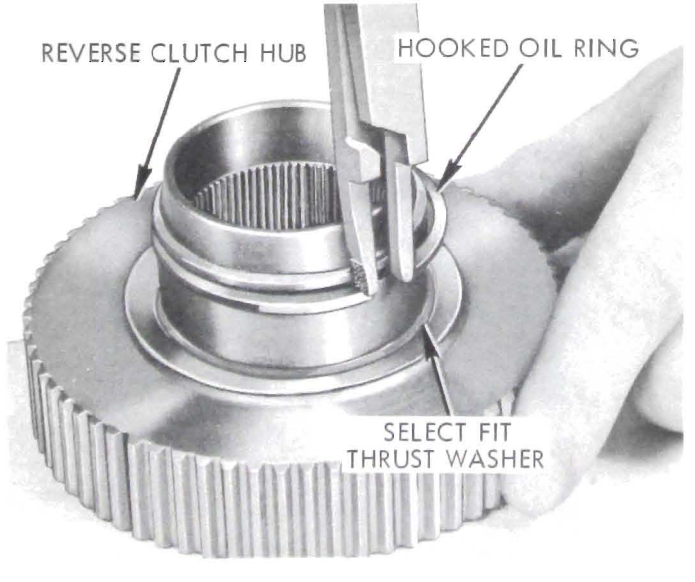
5–18 REVERSE CLUTCH COMPONENTS: REMOVAL AND INSPECTION



1. Remove lever assembling ring and apply levers. Check levers for wear or bending. Lift out reverse clutch hub, select fit thrust washer on the front side and tanged thrust washer on the rear.

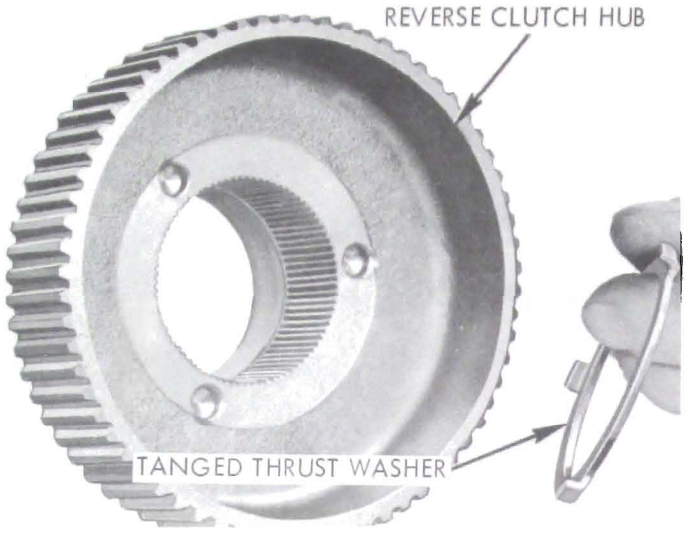
NOTE: Reverse clutch hub and thrust washers may have been removed with pump.

5-166



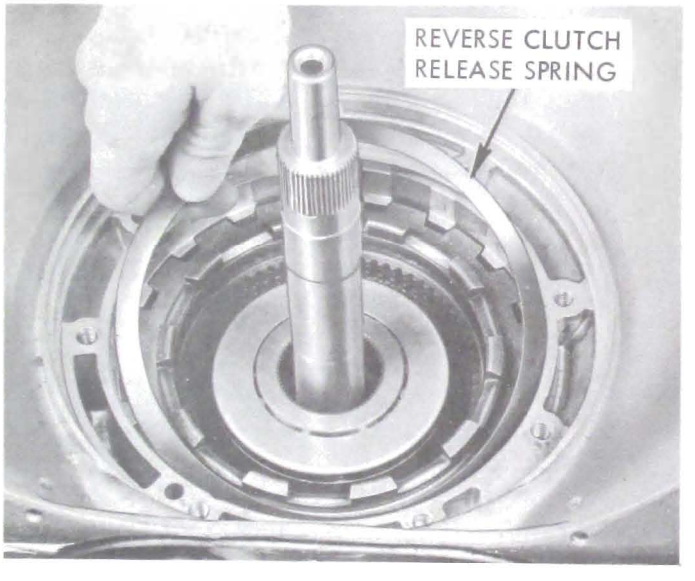
2. Unhook, expand and remove reverse clutch hub oil ring. Examine ring for wear. Remove select fit thrust washer. Examine washer and hub for evidence of wear or scoring.

5-167



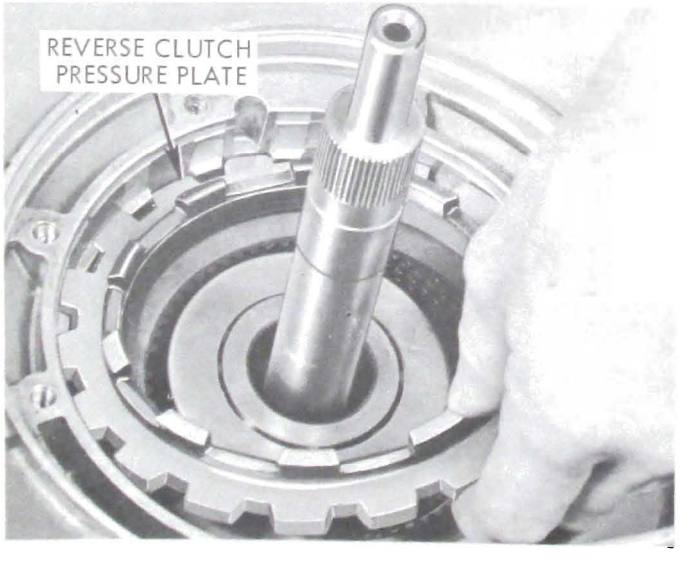
3. Remove tanged thrust washer at rear of clutch hub. Examine for wear.

5-168



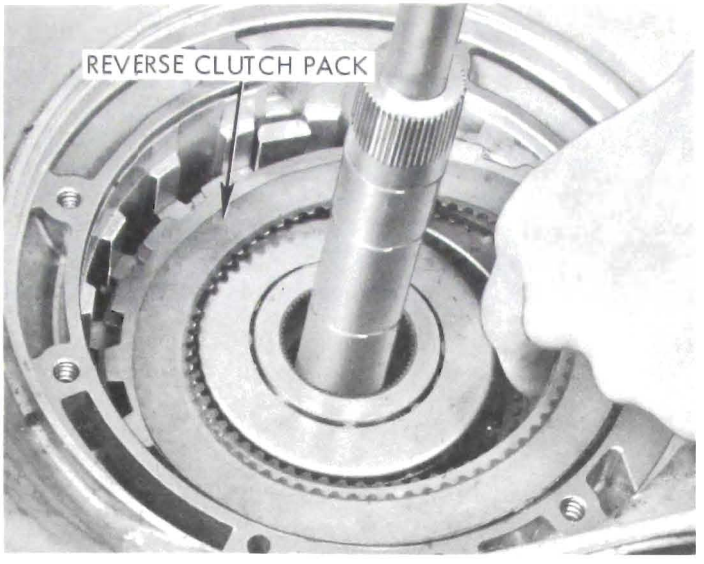
4. Remove bellville reverse clutch release spring. Check spring for cracks or wear.

5-169



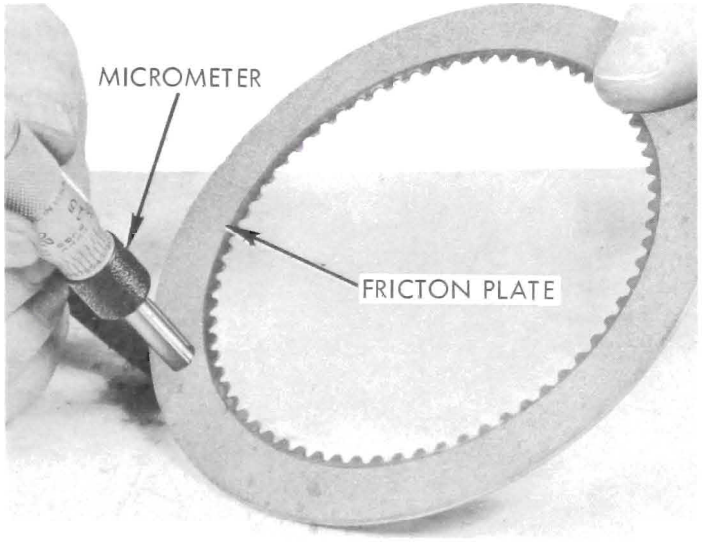
5. Remove reverse clutch pressure plate. Examine plate for wear.

5-170



6. Remove reverse clutch pack. Examine plates for wear, flaking, burning or scoring.

5-171

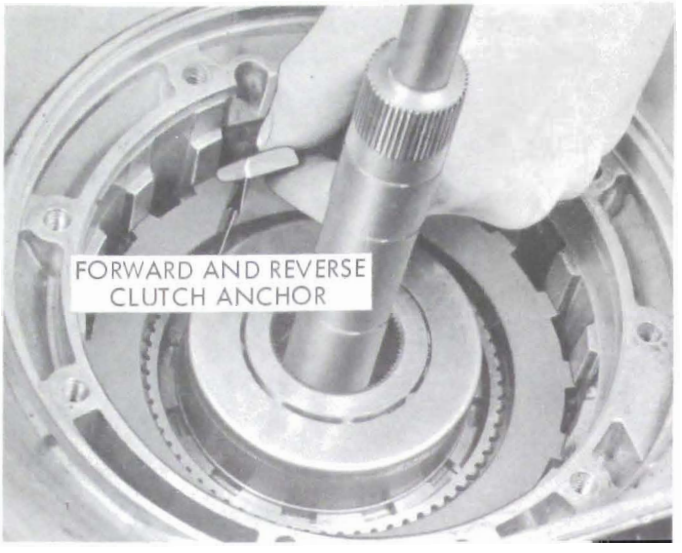


7. Measure reverse clutch friction plates. When new, friction plates are .079'' to .084'' thick. Plates worn thinner than .074'' should be replaced.

5-172

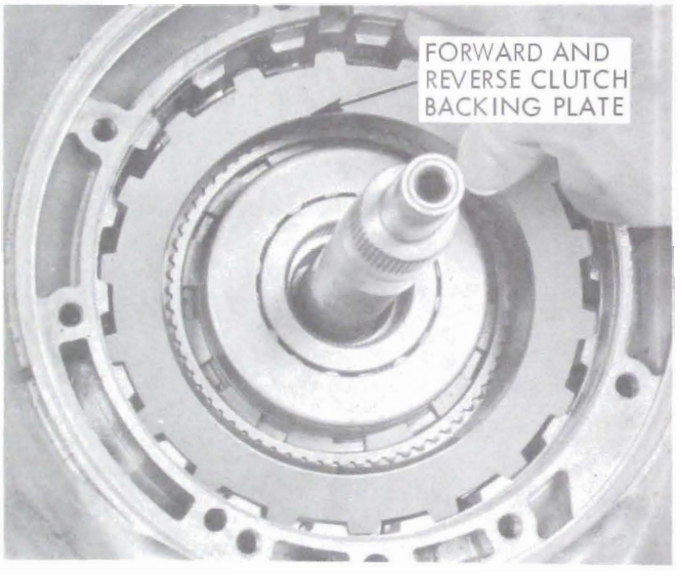
Refer to paragraph 5-30 for installation of clutch components.

5-19 COAST AND OVERRUNNING CLUTCH ASSEMBLY: REMOVAL. FORWARD CLUTCH PACK, RELEASE SPRING AND APPLY LEVERS: REMOVAL AND INSPECTION



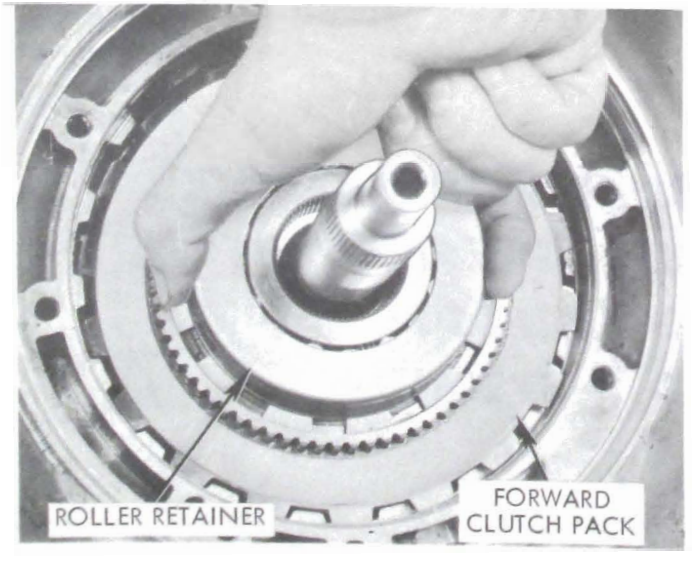
1. Remove forward and reverse clutch anchor.

5-173



2. Rotate forward and reverse clutch backing plate to disengage lugs from slots in case. Remove backing plate. Examine plate for wear or scoring.

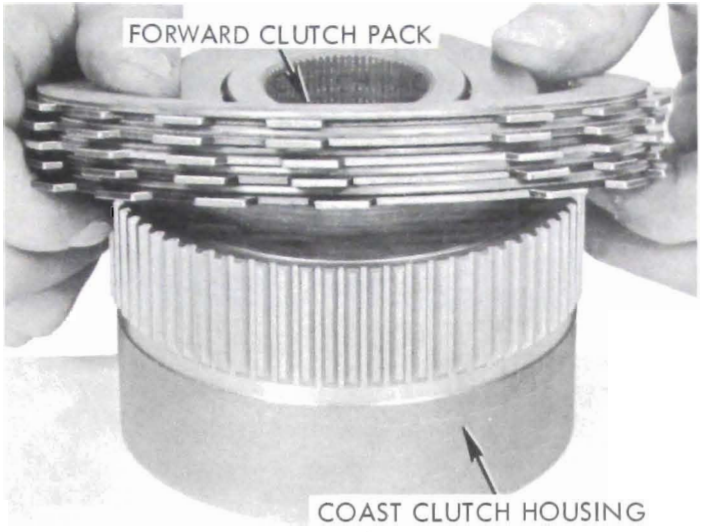
5-174



3. Grasp overrunning clutch cam and roller retainer and lift complete coast clutch, overrunning clutch and forward clutch pack out of transmission.

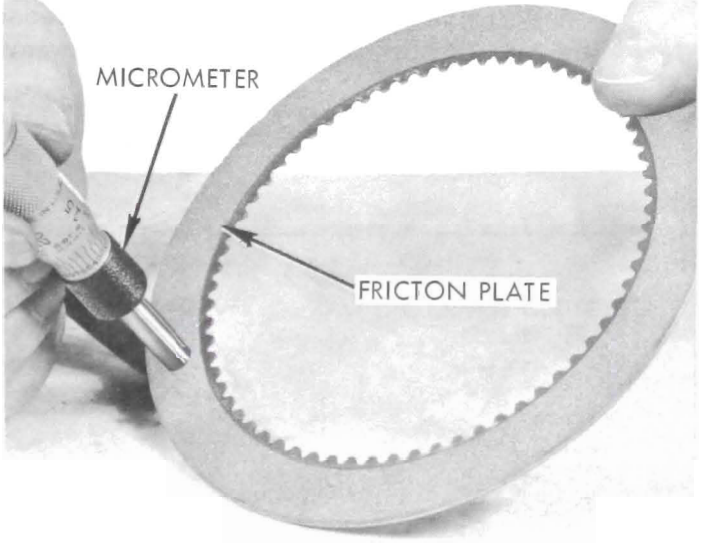
NOTE: The rear externally splined clutch plate will remain in transmission on forward clutch pressure plate. Remove remaining plate and place with forward clutch pack.

5-175



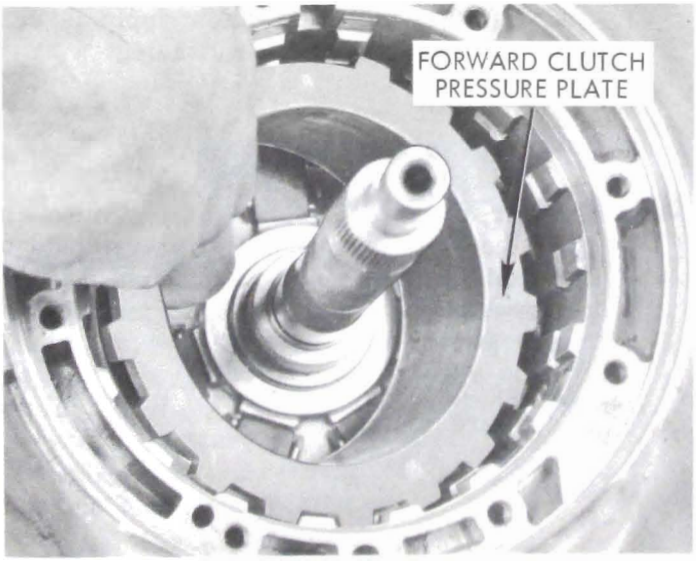
4. Lift forward clutch pack off coast clutch housing. Examine plates for wear, scoring, flaking or warping.

5-176



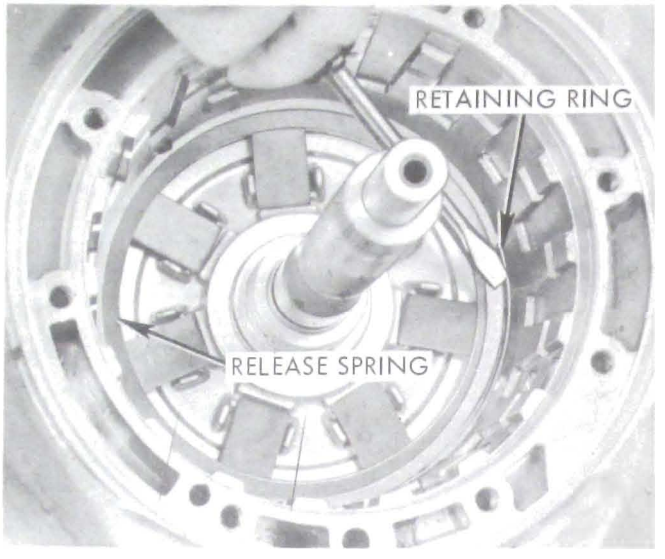
5. Measure forward clutch friction plates. When new, forward clutch friction plates are .079'' to .084'' thick. Plates worn thinner than .074'' should be replaced.

5-177



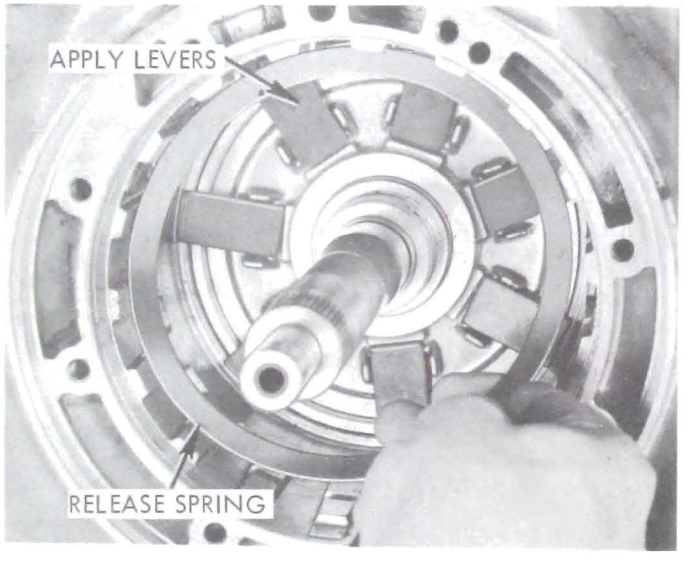
6. Remove forward clutch pressure plate. Examine for cracks or worn spots where levers contact plate.

5-178



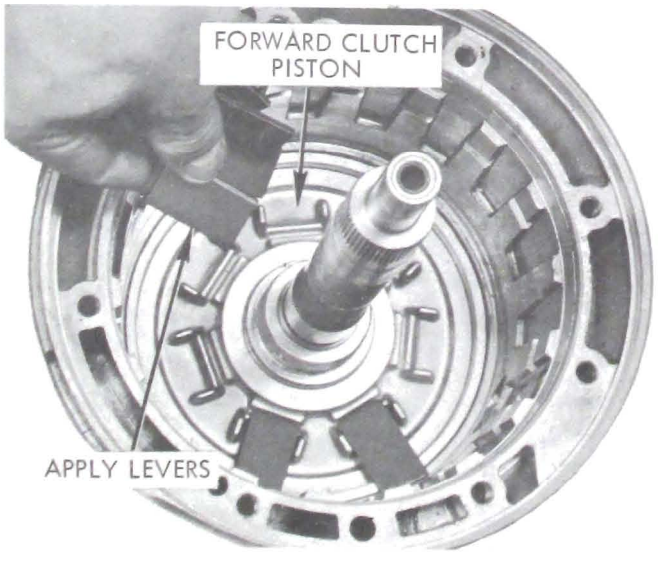
7. Pry forward clutch release spring retaining ring out of groove in case. Remove retaining ring.

5-179



8. Remove bellville forward clutch release spring. Check spring for cracks or wear.

5-180

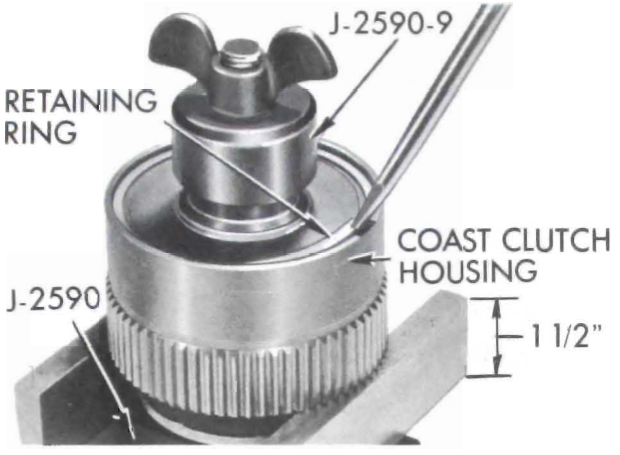


9. Remove forward clutch apply levers. Check levers for wear or bending.

5-181

Refer to paragraph 5-22 for removal of valve body, paragraph 5-23 for removal of companion flange, and paragraph 5-24 for removal of coast clutch support and forward clutch piston.

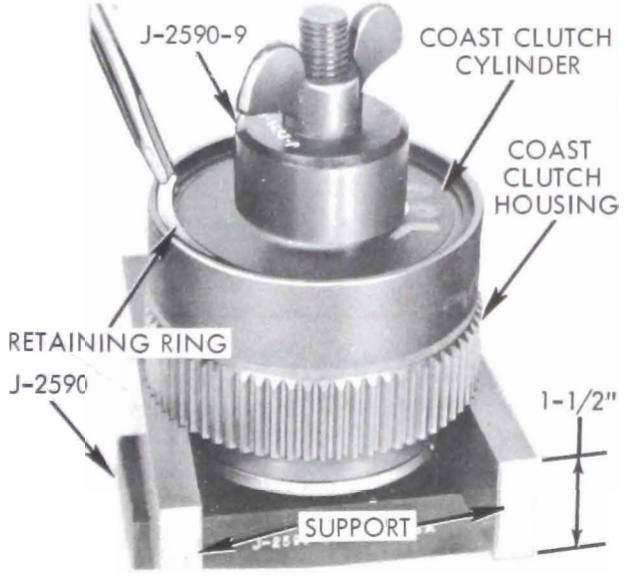
Refer to paragraph 5-29 for installation of forward clutch.



10. Examine coast clutch to forward clutch cylinder oil ring. If worn or scored, unhook, expand and remove ring.

5-181A

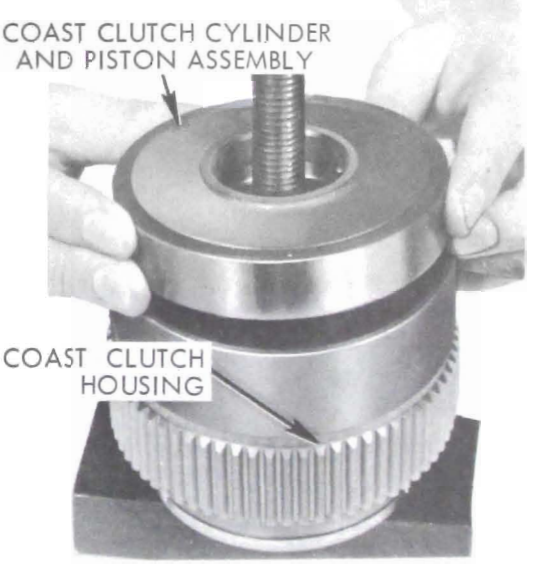
5–20 COAST AND OVERRUNNING CLUTCH: DISASSEMBLY, INSPECTION AND REASSEMBLY



a. Disassembly and Inspection

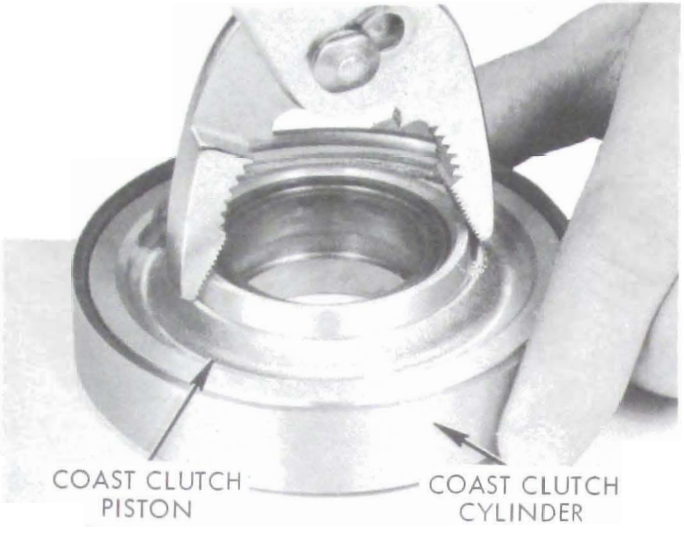
1. Assemble coast and overrunning clutch assembly in tool J-2590. Provide support so assembly rests on lower edge of coast clutch housing. Tighten wing nut to relieve pressure on coast clutch cylinder to housing retaining ring. Pry ring out of groove in housing and remove ring.

5-182



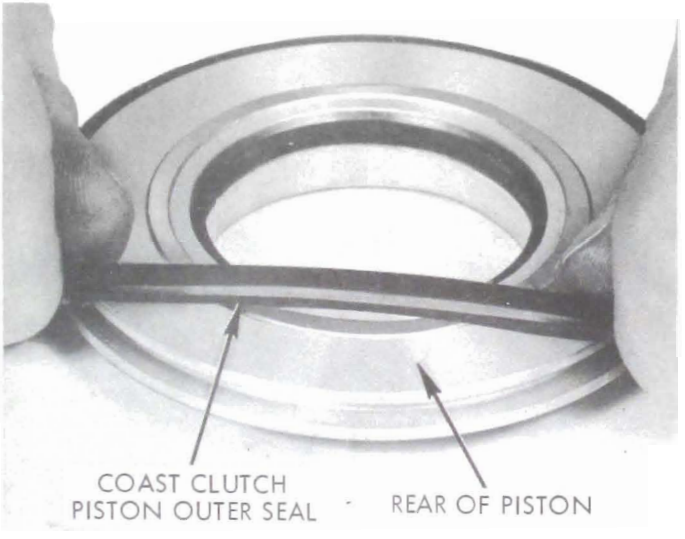
2. Remove wing nut and spacer. Lift coast clutch piston and cylinder out of coast clutch housing.

5-183



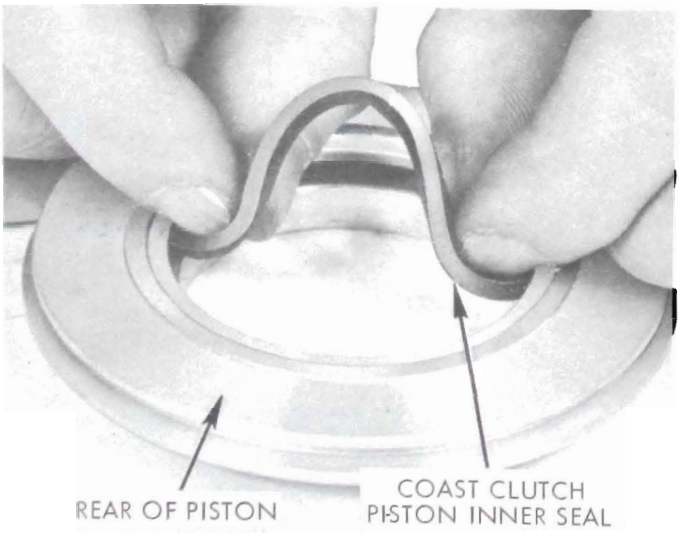
3. Use pliers to remove piston from cylinder. Check coast clutch cylinder to output shaft bushing. If worn or scored replace cylinder.

5-184



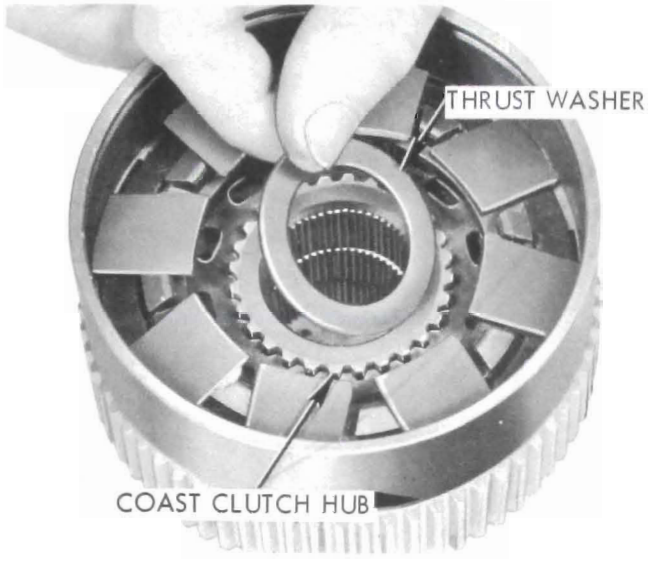
4. Examine piston outer seal for nicks, wear or cuts. If seal is damaged or worn, remove outer seal.

5-185



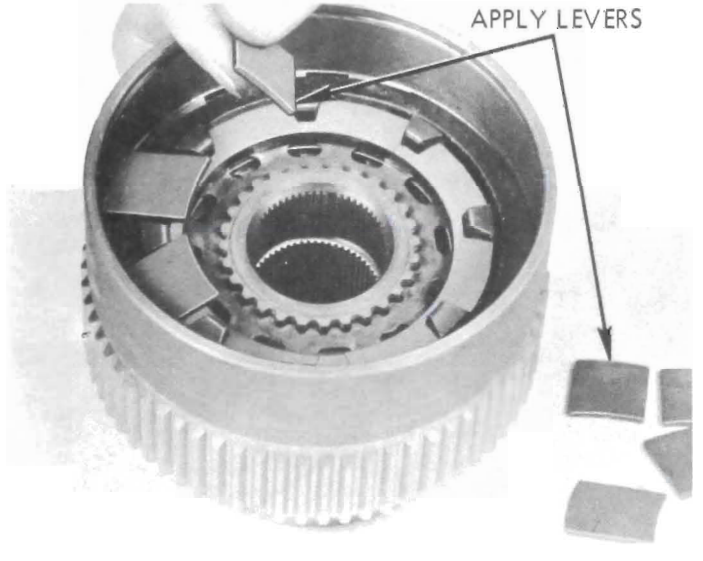
5. Examine piston inner seal for wear, nicks or cuts. If damaged or worn, remove seal.

5-186



6. Remove coast clutch hub to coast clutch cylinder thrust washer. Examine washer for wear or scoring.

5-187

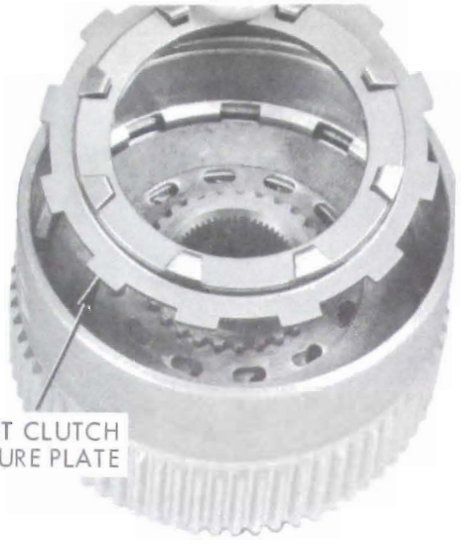


7. Remove coast clutch apply levers. Examine levers for wear or bending

5-188

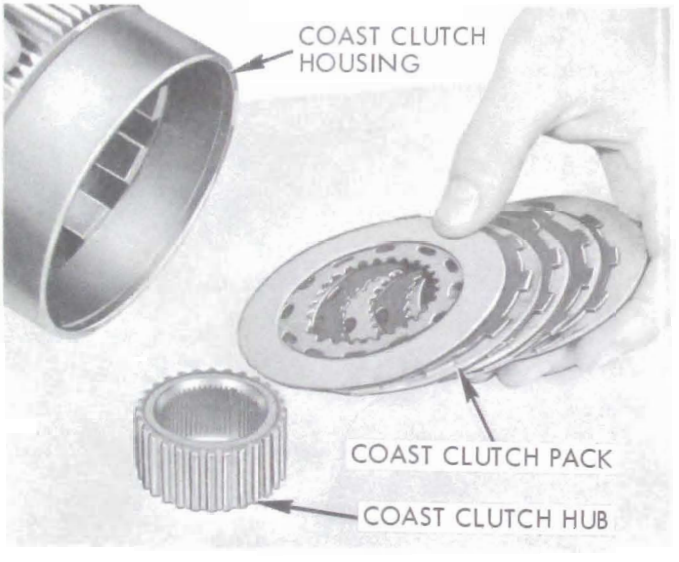
8. Remove coast clutch release spring. Examine spring for wear or cracks.

5-189



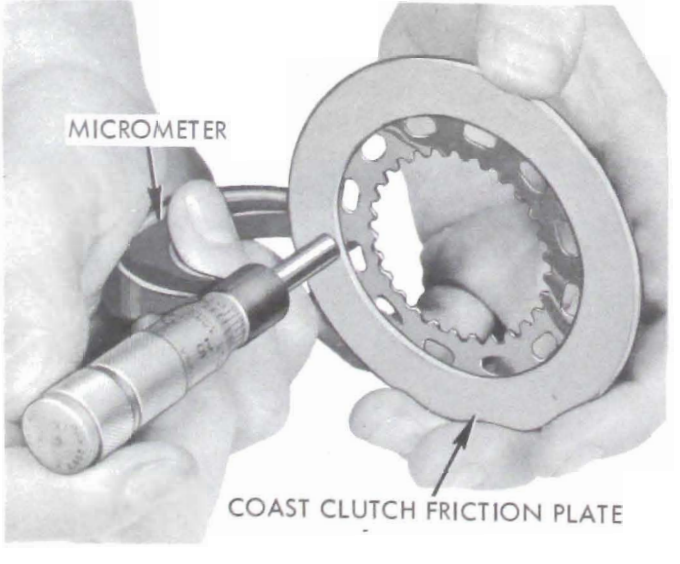
9. Remove coast clutch pressure plate. Examine plate for wear or scoring.

5-190



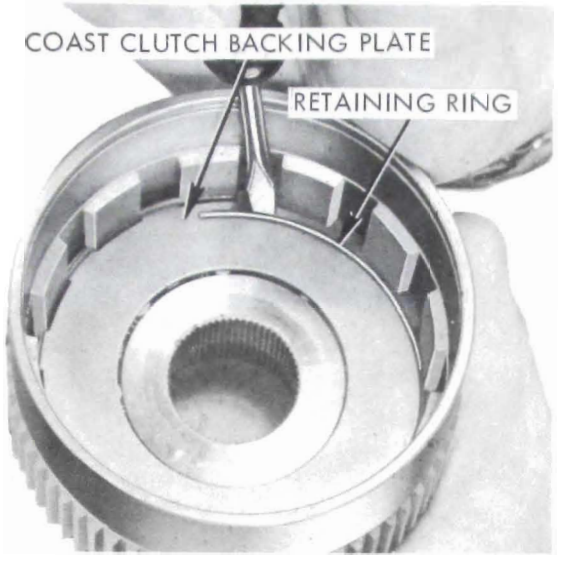
10. Tip coast clutch housing to remove clutch pack and hub. Examine hub for chips or scoring. Examine clutch plates for wear, scoring, burning, flaking or warping.

5-191



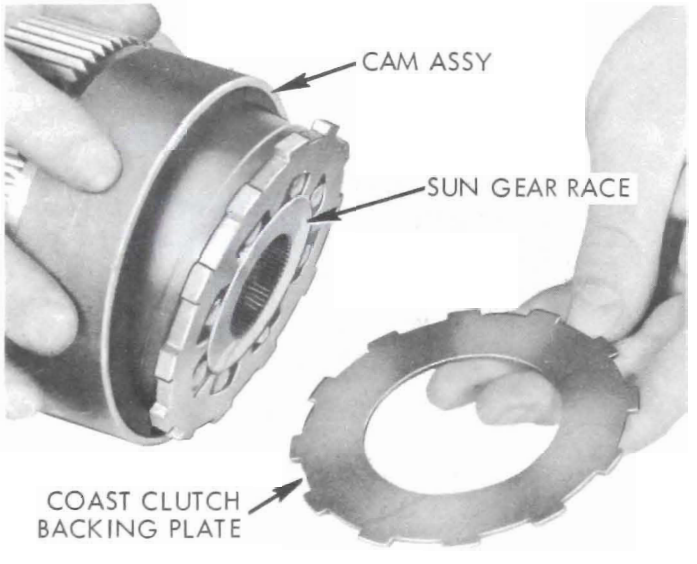
11. Measure the friction plates. When new the plates are .079''-.084'' thick. Plates worn thinner than .074'' should be replaced.

5-192



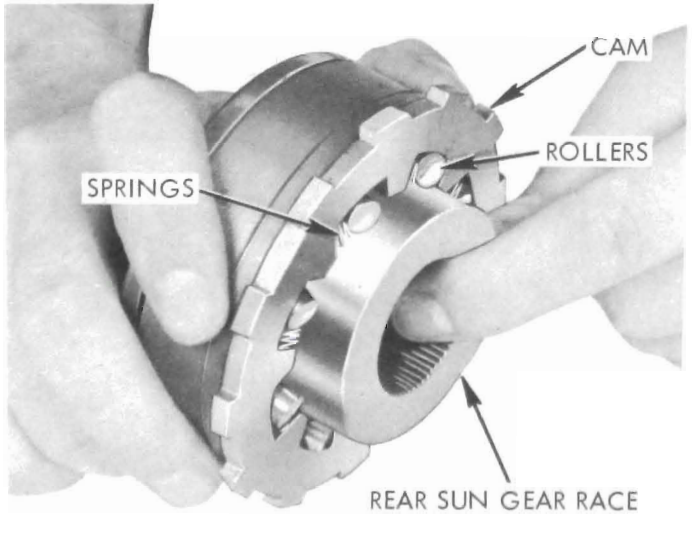
12. Pry cam retaining ring out of groove in backing plate. Remove ring.

5-193



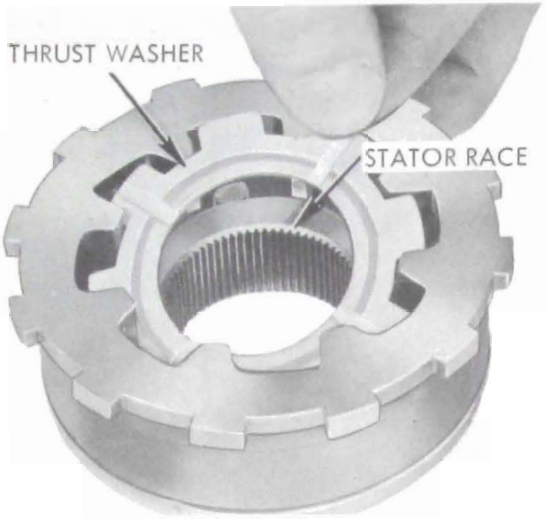
13. Tilt coast clutch housing to remove coast clutch backing plate and overrunning clutch assembly. Examine backing plate for evidence of wear or scoring.

5-194



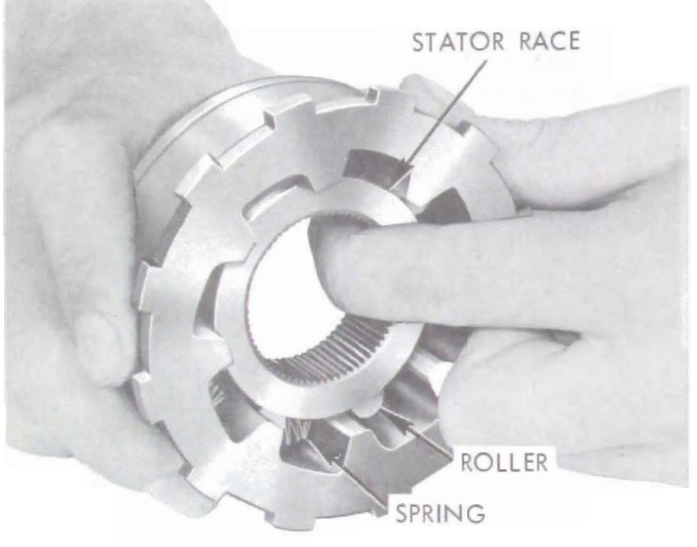
14. Pull rear sun gear race out of cam assembly. Rollers and springs will fall out. Examine race for wear, scoring, denting or damage to splines. Examine rollers for wear or scoring.

5-195



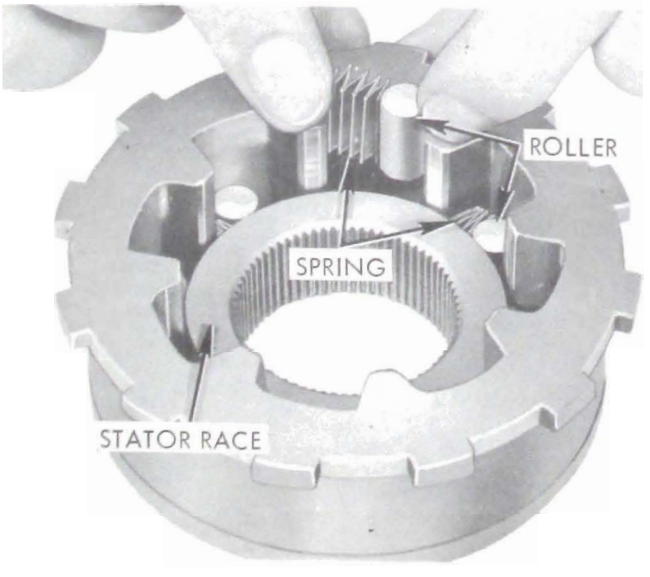
15. Remove roller thrust washer. Examine washer for wear or scoring.

5-196



16. Pull stator race out of cam. Rollers and springs will fall out. Examine race for wear, scoring, denting or damage to splines. Check rollers for wear or scoring. Examine cam for wear, scoring, or denting. If cam must be replaced, drive off roller retainer and stake in place on new cam.

5-197

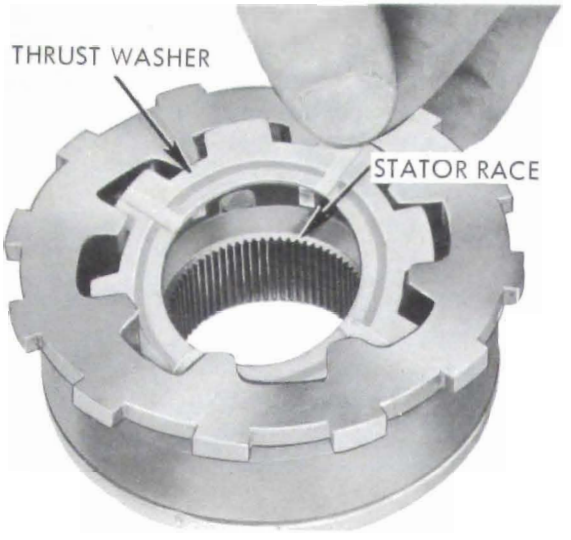


b. Assembly

1. Thoroughly clean all parts before beginning assembly. Set cam and roller retainer on clean surface. Place stator race inside cam. Assemble rollers and springs as shown in figure.

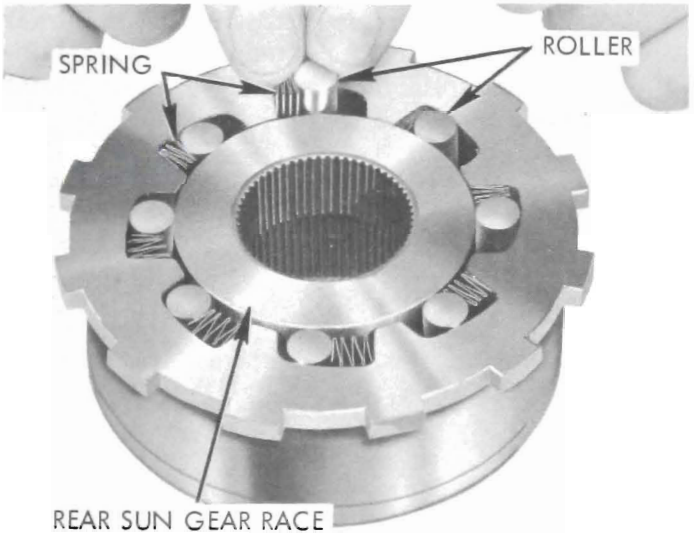
NOTE: Stator race has larger splined I.D. than rear sun gear race.

5-198



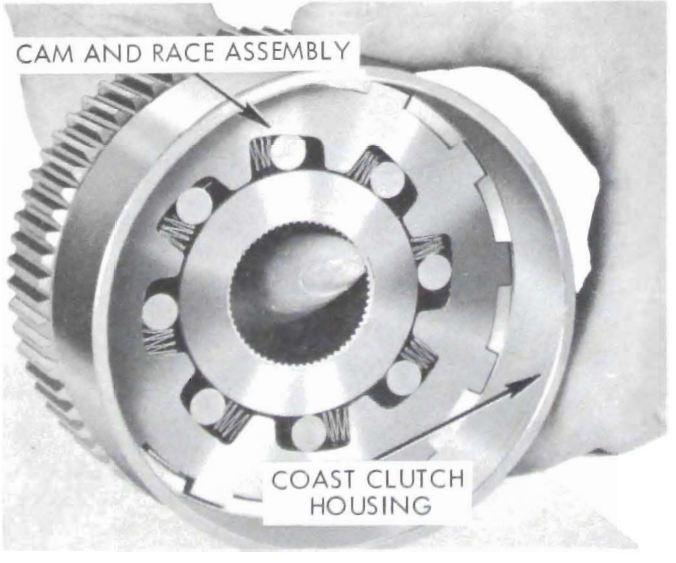
2. Lubricate and install thrust washer on stator race.

5-199



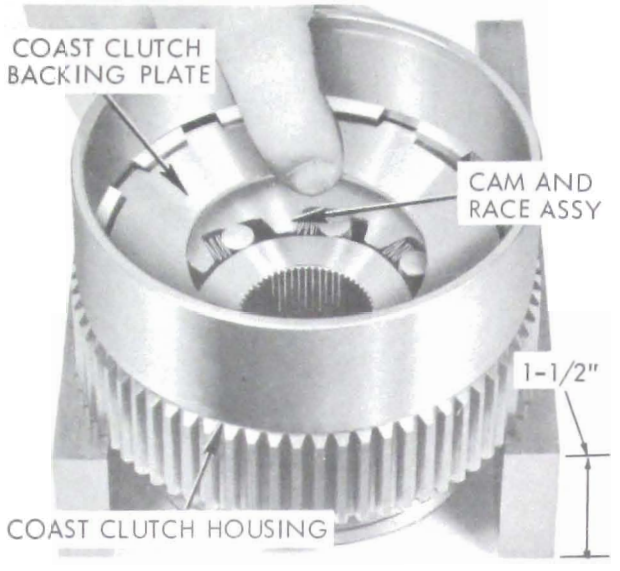
3. Set rear sun gear race in place on thrust washer. Assemble rollers and springs as shown in figure.

5-200



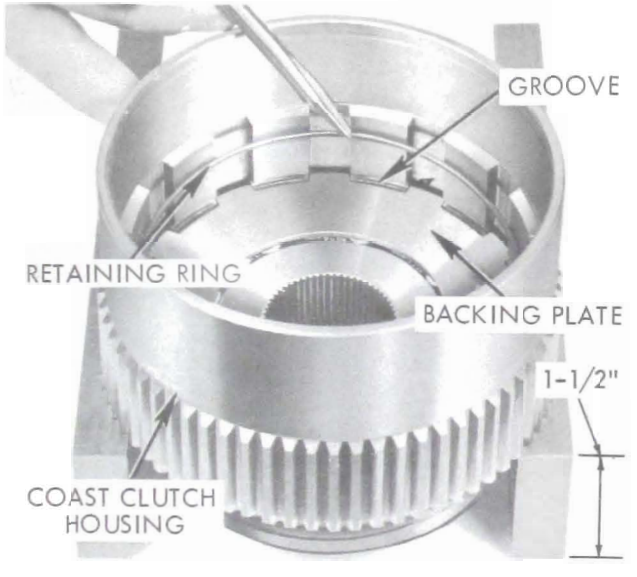
4. Install cam and race assembly in coast clutch housing. Rotate cam assembly so lugs on cam engage notches in coast clutch housing.

5-201



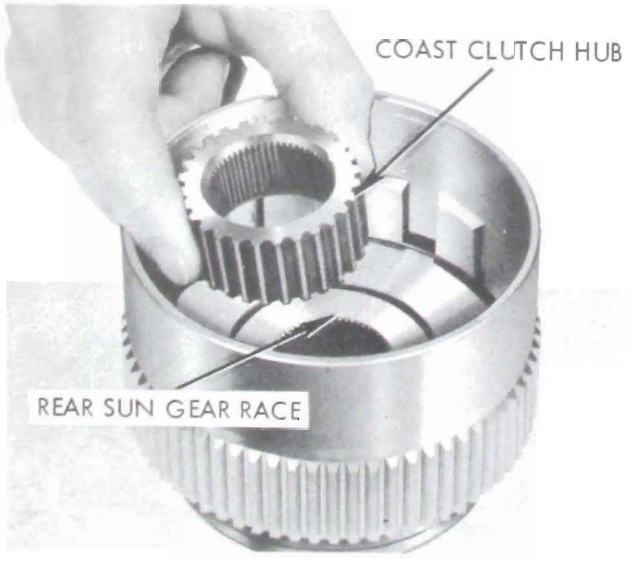
5. Set assembly on blocks or otherwise support on lower edge of coast clutch housing. Install coast clutch backing plate on cam and race assembly.

5-202



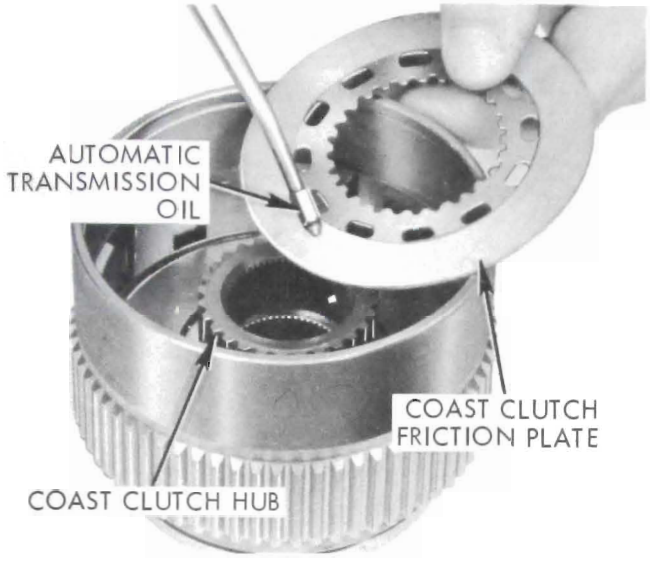
6. With assembly still resting on lower edge of coast clutch housing, install retaining ring solidly in groove of coast clutch housing above backing plate.

5-203



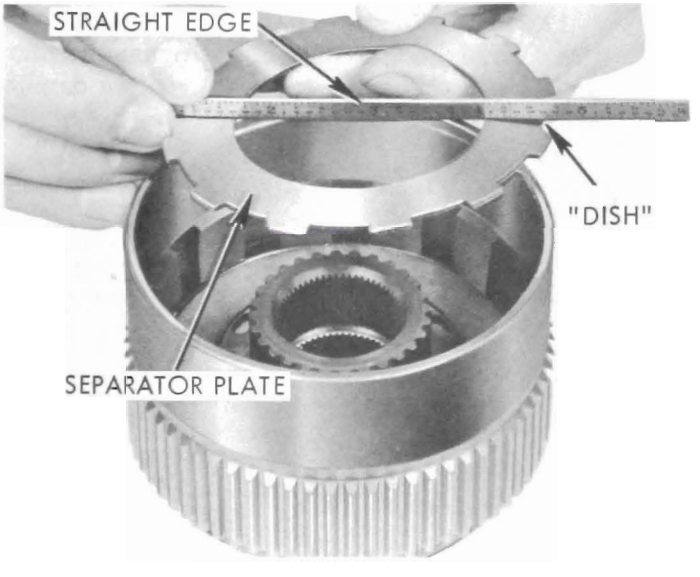
7. Set coast clutch hub in place on rear sun gear race.

5-204



8. Lubricate a coast clutch friction plate with automatic transmission oil and install on backing plate with splines engaged with coast clutch hub splines.

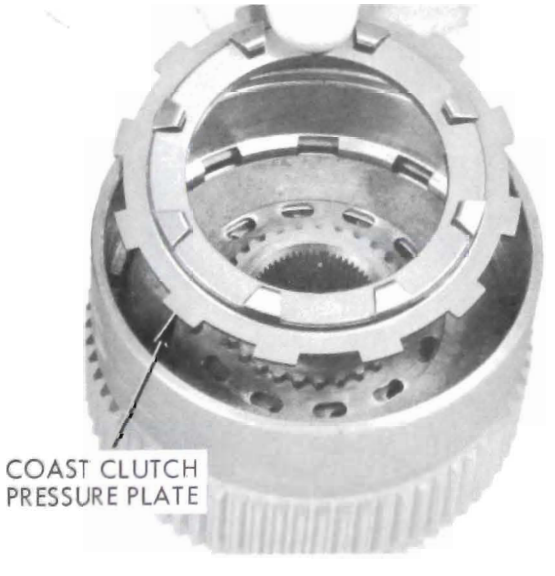
5-205



9. Check a coast clutch separator plate for "dish" by holding a straight edge firmly against the plate. Note direction of "dish" and install separator plate.

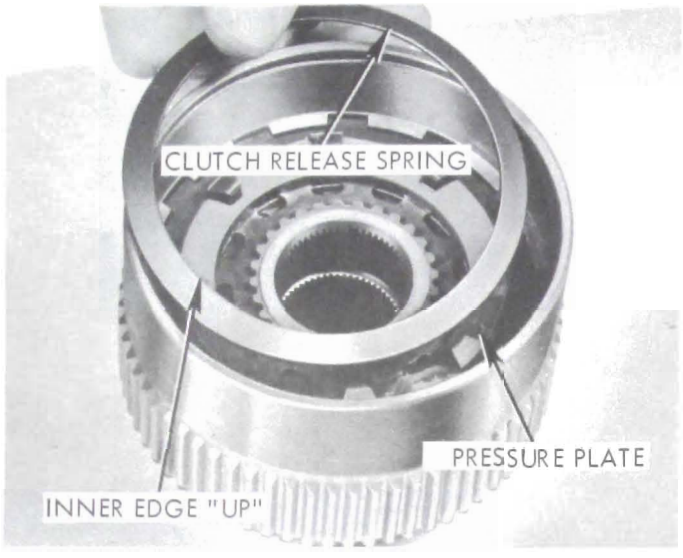
All separator plates must be installed with "dish" same way. Continue alternately installing a lubed friction plate and a separator plate until five friction plates and four separator plates have been installed.

5-206



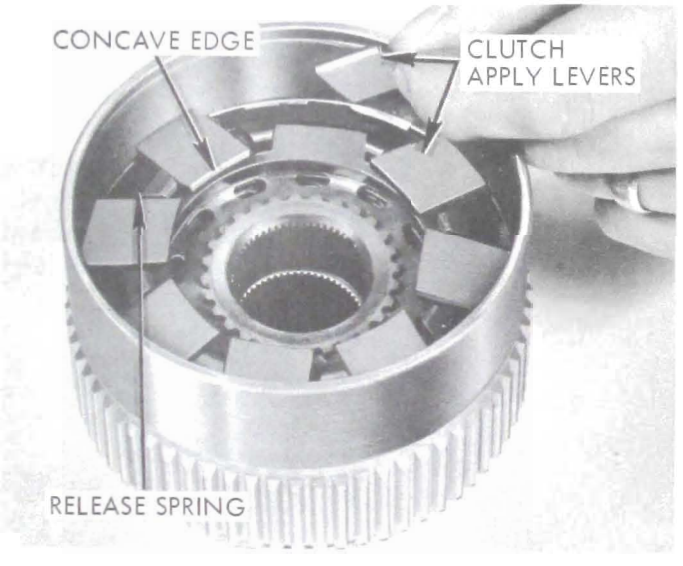
10. Install pressure plate on top of last lubed friction plate. Engage lugs in notches of coast clutch housing.

5-207



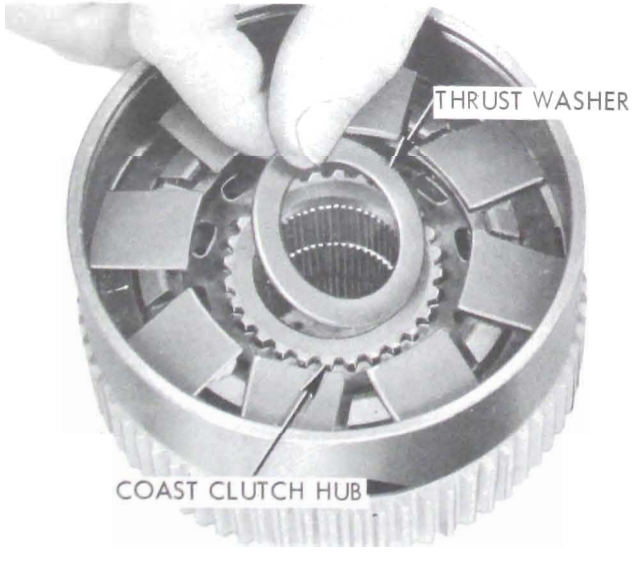
11. Install bellville clutch release spring on pressure plate with inner edge of spring "up".

5-208



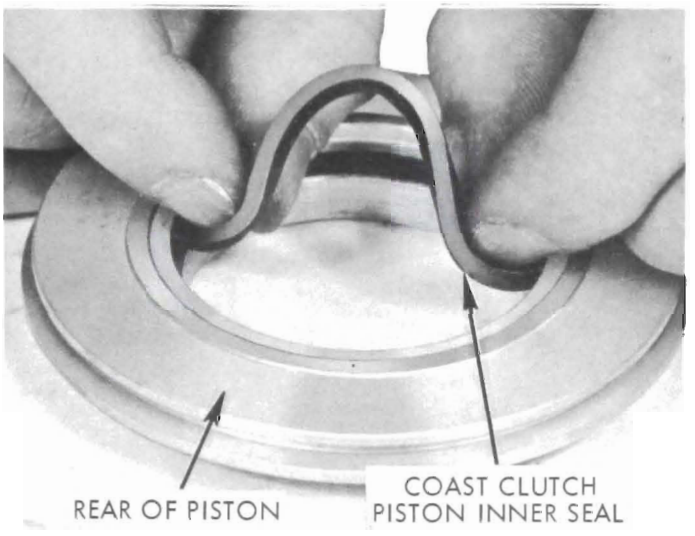
12. Install apply levers, concave edge "in" between the lugs of the pressure plate and flat on release spring. Apply a daub of clean chassis lube on each lever to hold it in place.

5-209



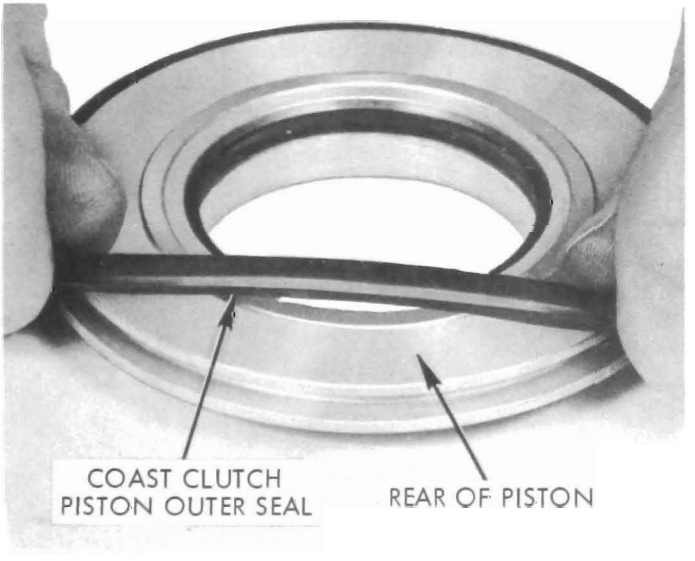
13. Set thrust washer in place on top of coast clutch hub.

5-210



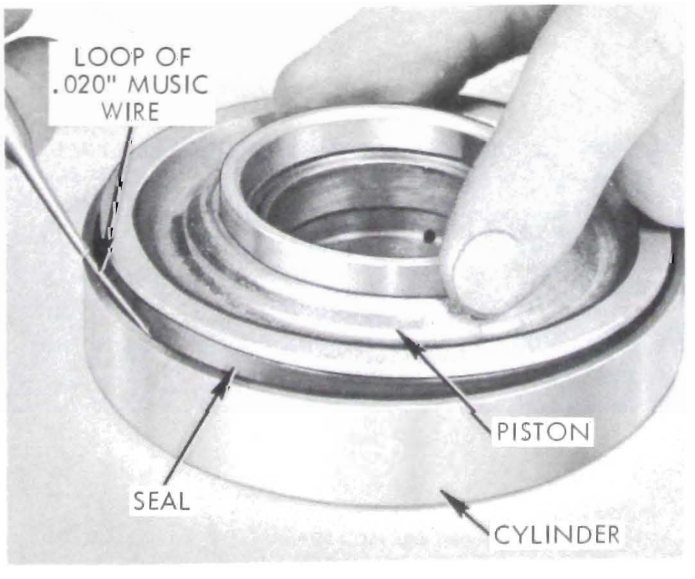
14. Install piston inner seal with lip toward rear of piston as shown in figure.

5-211



15. Install piston outer seal with lip toward rear of piston as shown in figure.

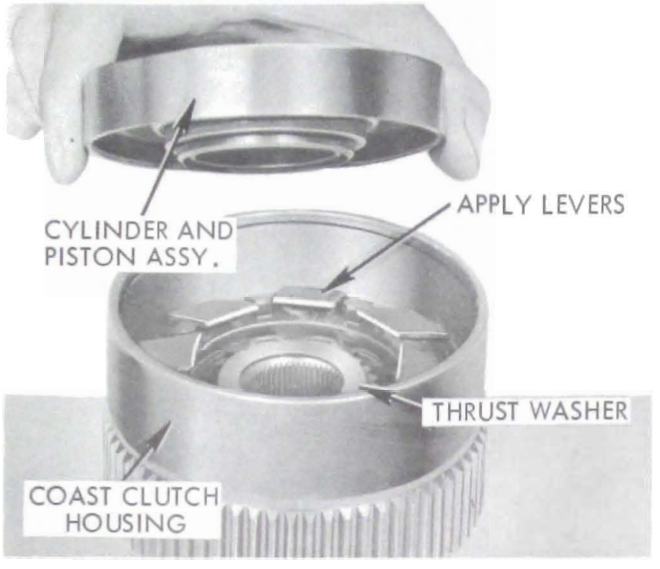
5-212



16. Lubricate seals and install piston in bore of coast clutch cylinder by using a loop of smooth wire to start the lips of the seals into the bore.

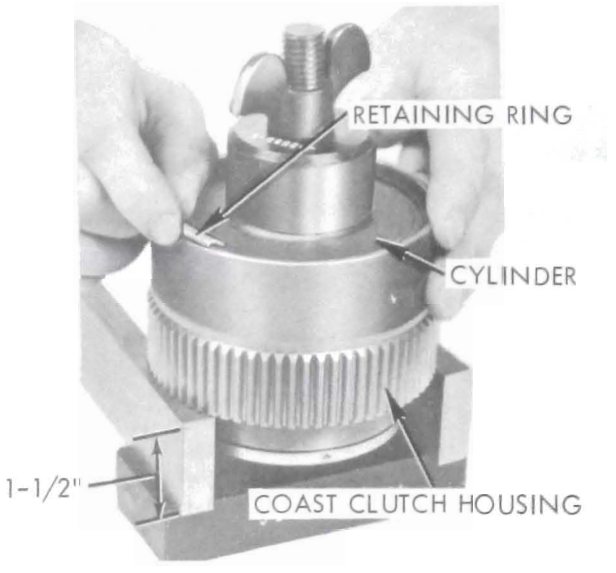
NOTE: Start inner seal first.

5-213



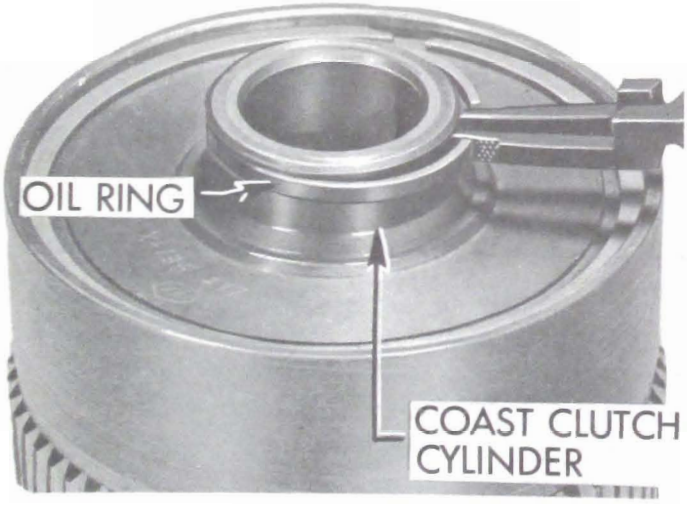
17. Make sure thrust washer and all apply levers are properly in place. Install cylinder and piston assembly squarely in bore of coast clutch housing.

5-214



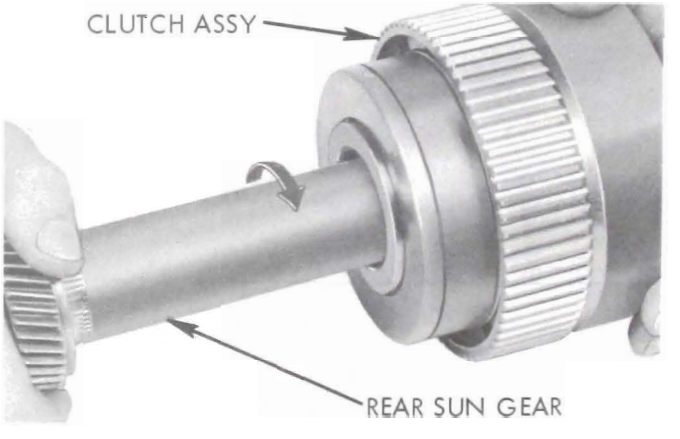
18. Assemble tool J-2590 to clutch assembly as shown. Tighten wing nut until clearance is provided for installation of retaining ring above piston cylinder. Install retaining ring solidly in groove of coast clutch housing. Remove tool J-2590.

5-215



19. Expand and install coast clutch cylinder to forward clutch cylinder oil ring. Hook ends.

5-215A

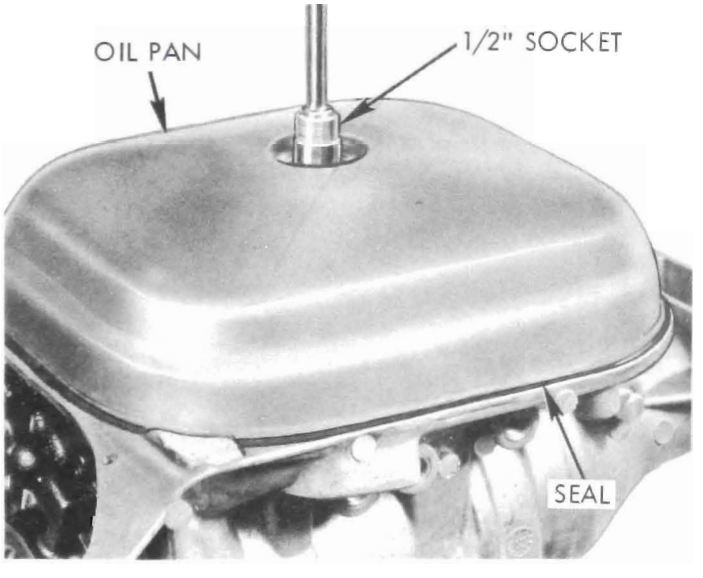


20. Insert rear sun gear in sun gear race. Turn sun gear as shown in figure to check for drag on coast clutch. Excessive drag may indicate clutch separator plates all not dished same way, or foreign material is present. Correct if necessary. Sun gear overrunning clutch should not permit rotation opposite arrow direction.

5-216

Refer to paragraph 5-29 for installation of coast clutch assembly.

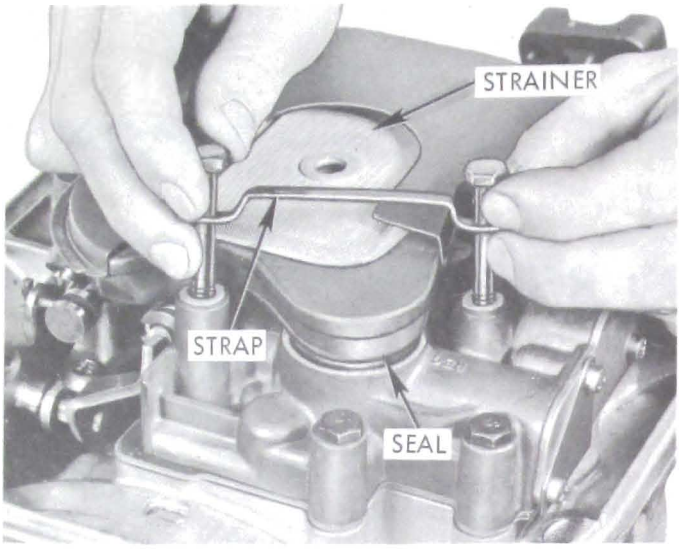
5-21 OIL PAN: REMOVAL



1. Remove oil pan bolt and gasket (1/2'' wrench). Remove oil pan and seal.

5-217

5-22 VALVE BODY: REMOVAL, DISASSEMBLY, INSPECTION AND REASSEMBLY

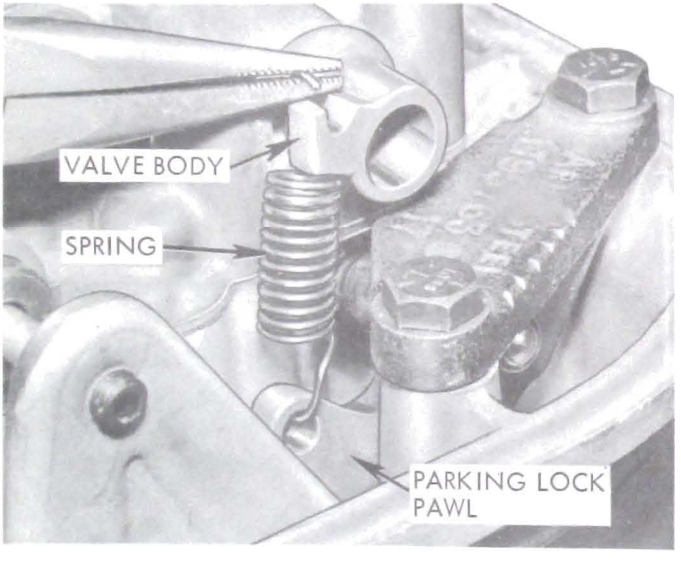


a. Oil Strainer Removal

1. Remove oil strainer strap bolts (7/16" wrench). Remove strap, strainer, and strainer "O" ring. Discard "O" ring.

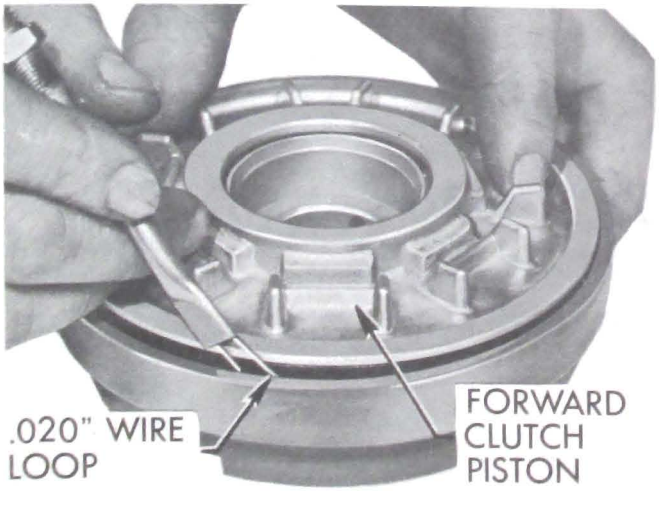
NOTE: If job is equipped with oil screen, same two bolts attach screen but without strap.

5-218



2. Use needle nose pliers to remove parking lock pawl disengaging spring.

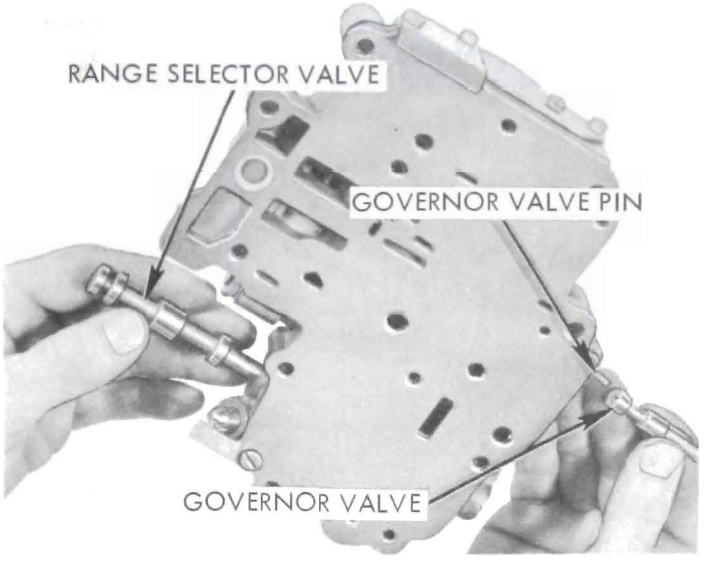
5-219



3. Lubricate seals and install forward clutch piston. A loop of smooth wire may be used as an aid in starting the seal lip into the piston bore.

NOTE: Start inner seal lip first.

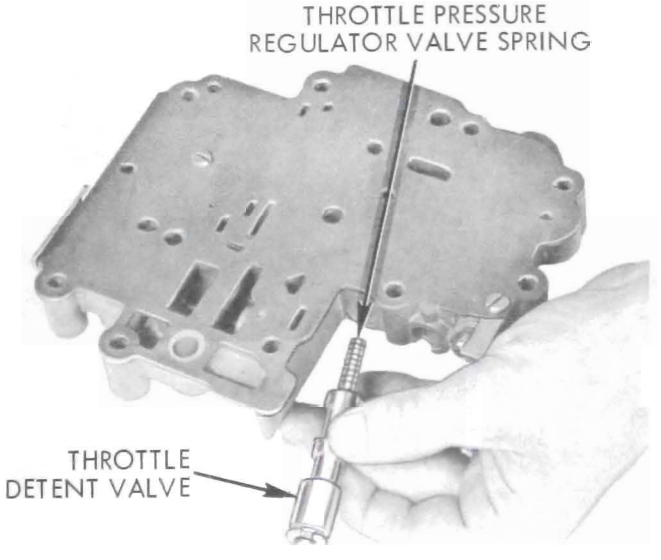
5-265



b. Disassembly and Inspection

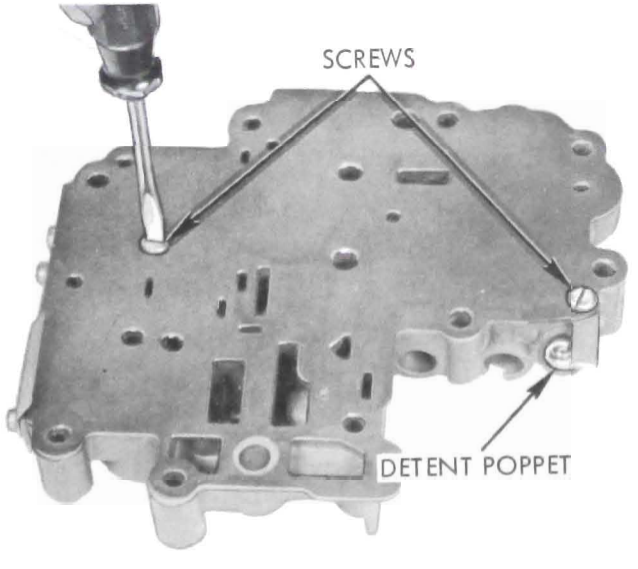
1. Remove range selector and governor valve. Tilt valve body to remove governor valve pin.

5-221



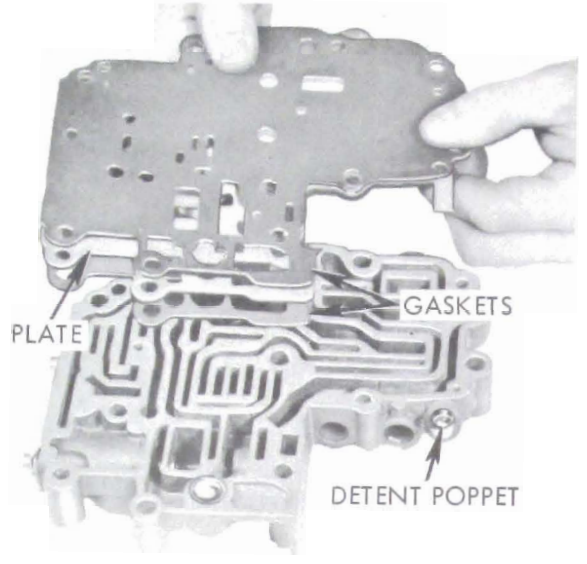
2. Remove throttle detent valve and throttle pressure regulator valve spring.

5-222



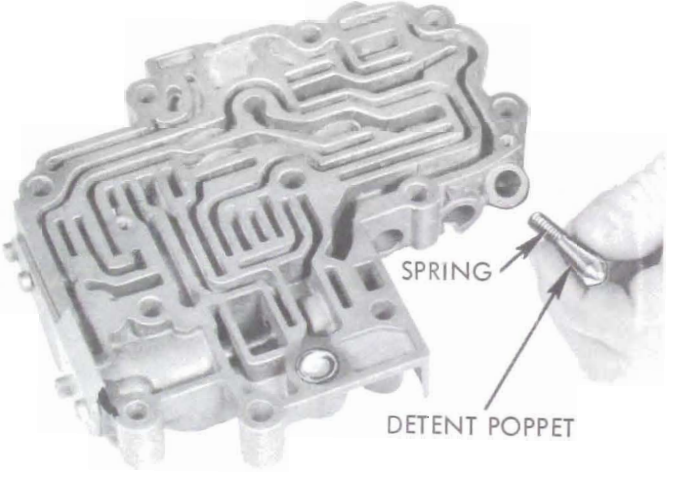
3. Remove two screws attaching valve body plate and gaskets to valve body. Detent poppet may slide out when screws are removed.

5-223



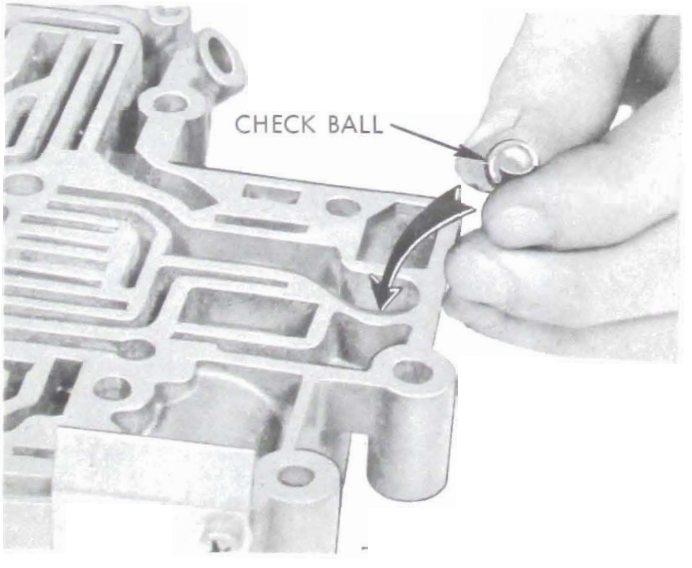
4. Remove valve body plate and gaskets. Check gasket for evidence of leakage or improper installation.

5-224



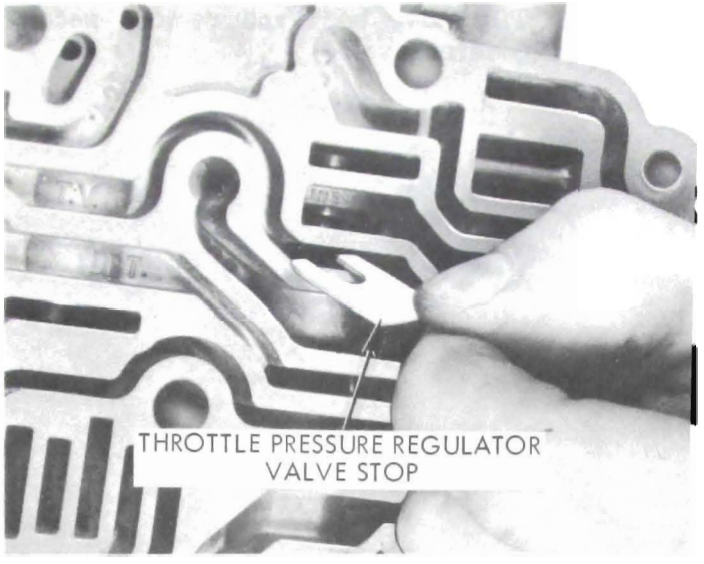
5. Remove selector lever detent poppet and spring.

5-225



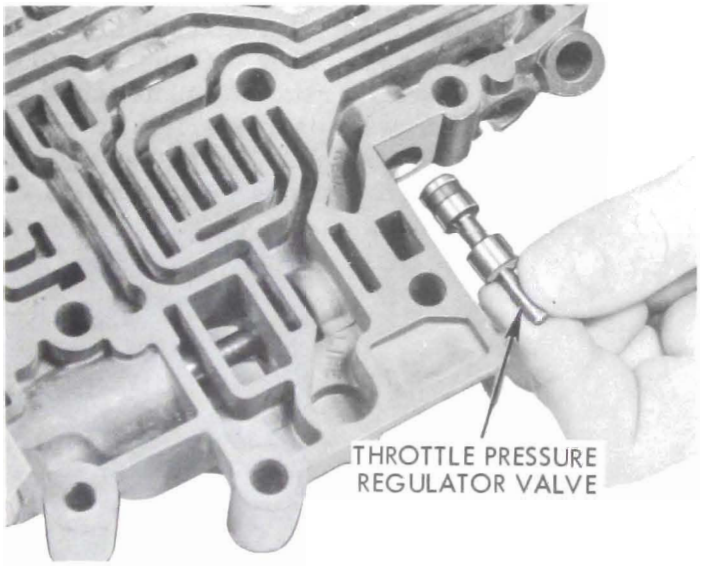
6. Remove check ball.

5-226



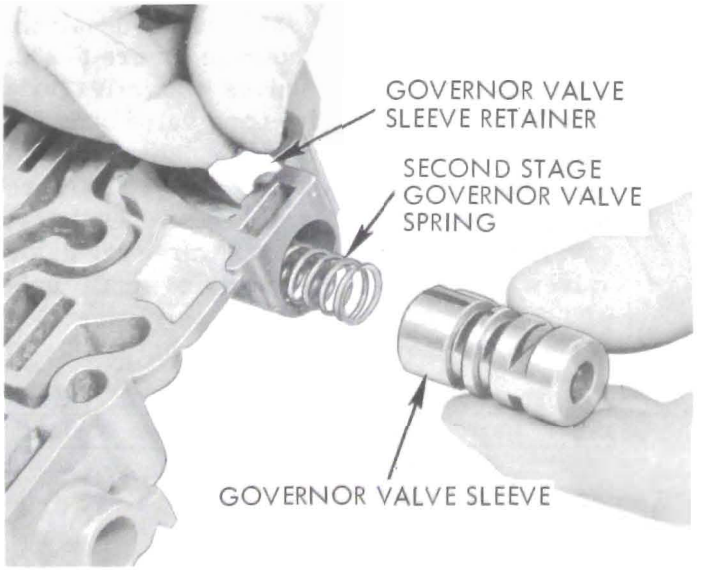
7. Remove pressure regulator valve stop.

5-227



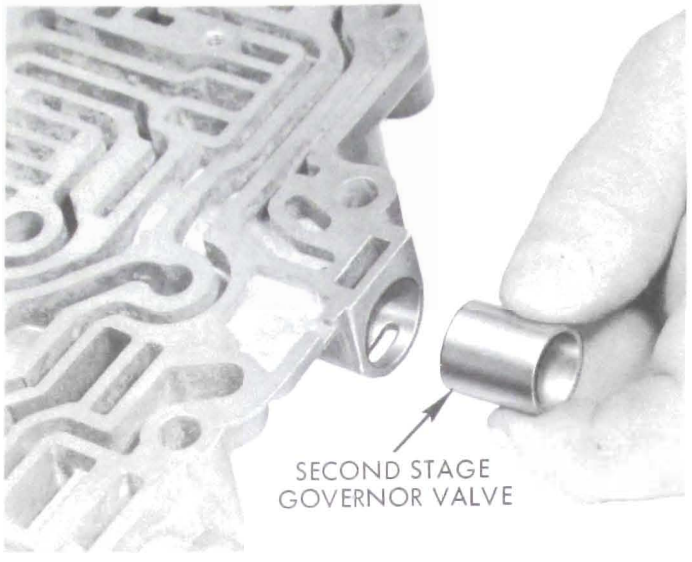
8. Tilt valve body and remove throttle pressure regulator valve.

5-228



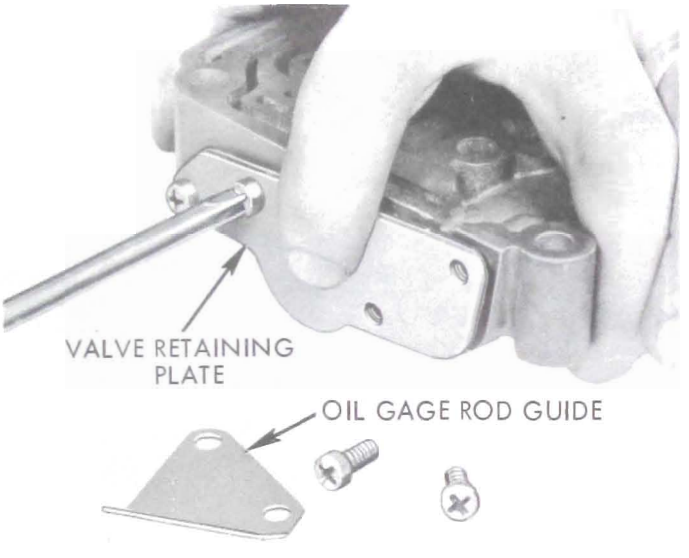
9. Press in on governor valve sleeve to release spring pressure on retainer. Invert valve body to allow removal of retainer. Remove sleeve and second stage governor valve spring.

5-229



10. Tilt valve body and remove second stage governor valve.

5-230



11. Remove two screws attaching oil gauge rod guide to valve body. Remove guide. Firmly hold valve retaining plate and remove two screws attaching plate to valve body. Release the plate carefully against pressure of three springs behind the plate. Remove plate and gasket.

5-231

12. Tilt valve body and remove valves, sleeves and springs shown in Figure 5-232. Thoroughly clean all valves and valve body in solvent. Inspect valves and valve body for evidence of wear or damage due to foreign material or improper assembly. Be sure small holes in converter pressure regulator, governor, and throttle pressure regulator valves are clear. Be certain small hole (.032") in valve body plate is clear. Dry valve body and valves with clean air blast.

Test each valve in its bore. All valves must move freely of their own weight.

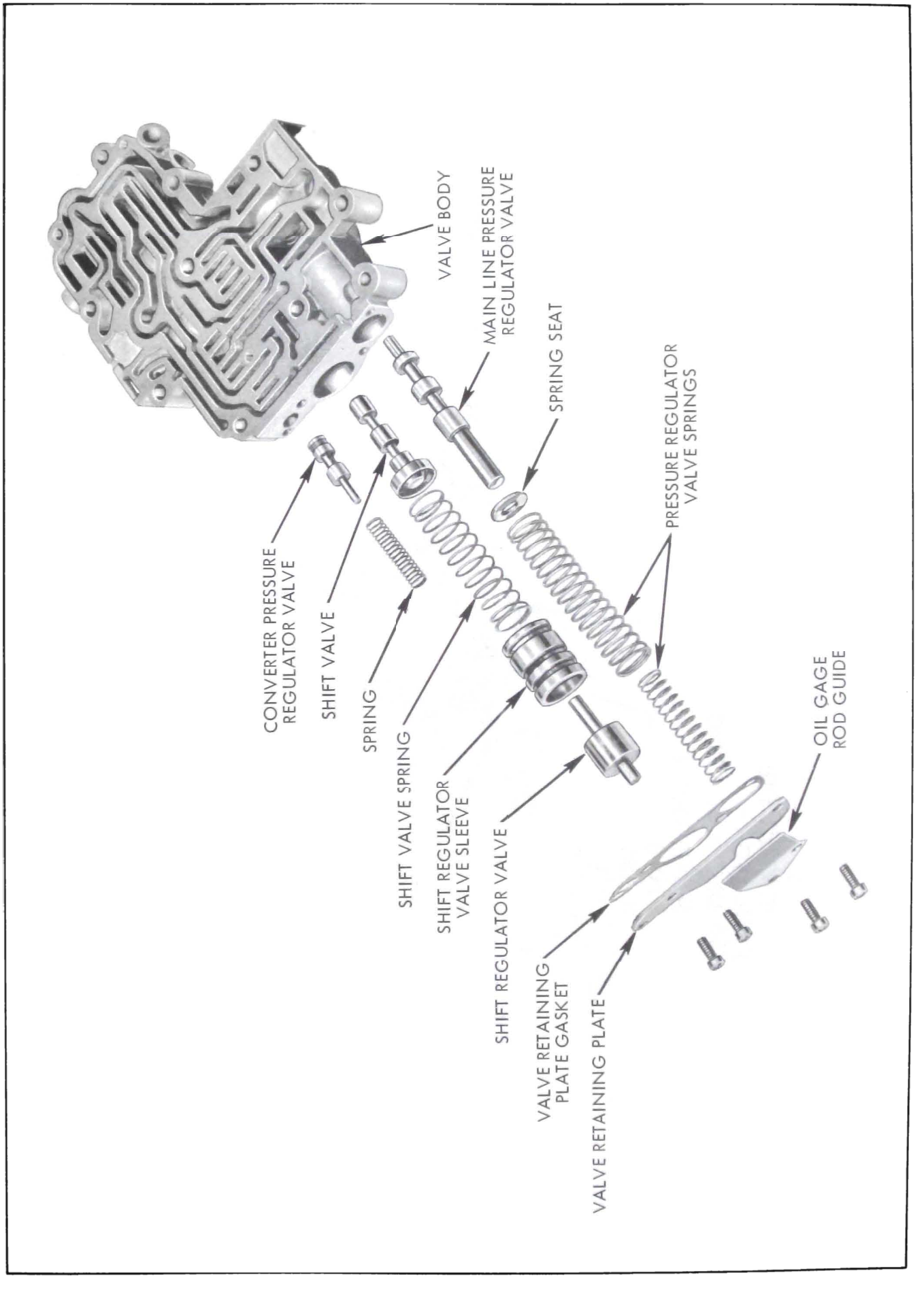


Figure 5-232

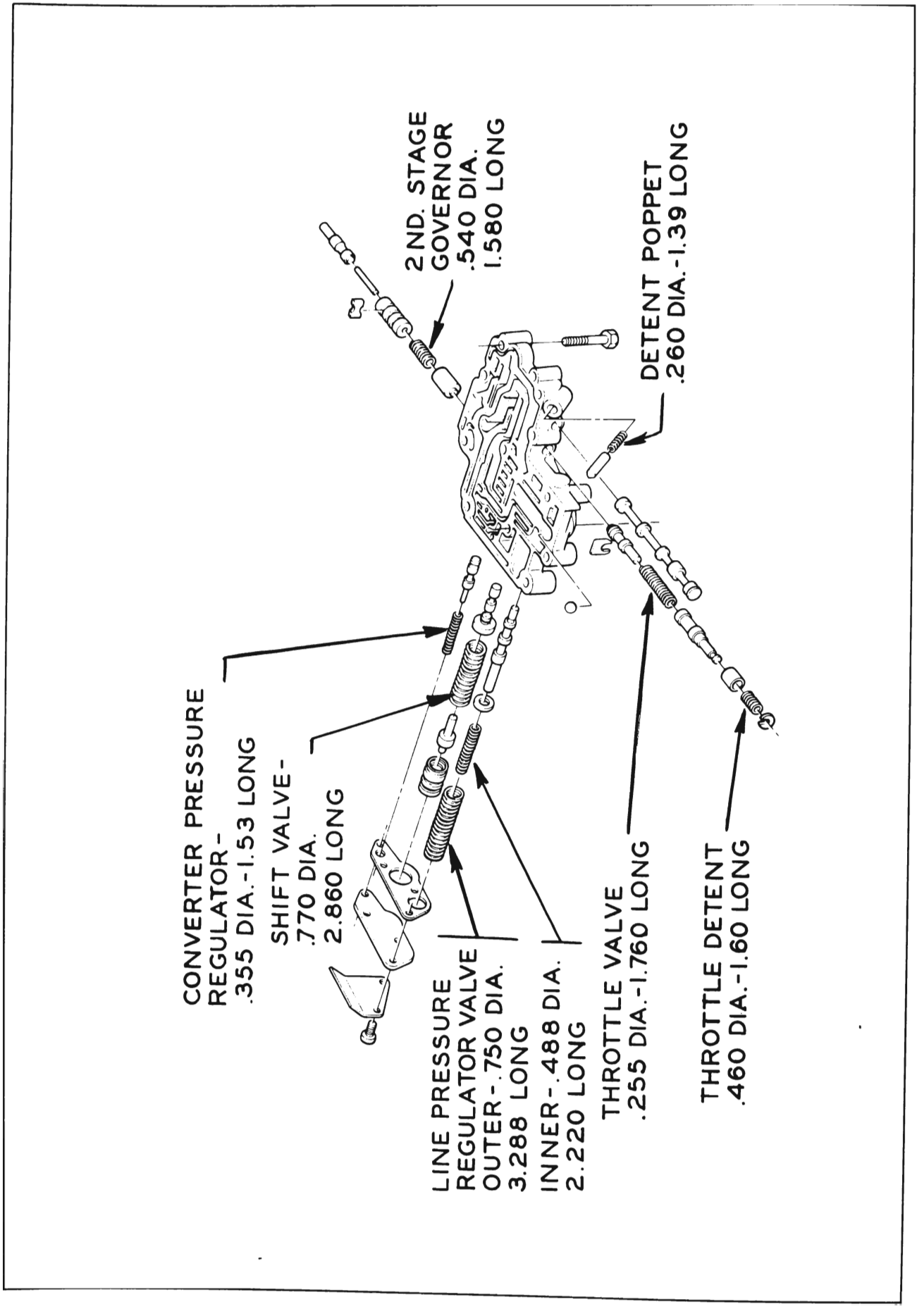
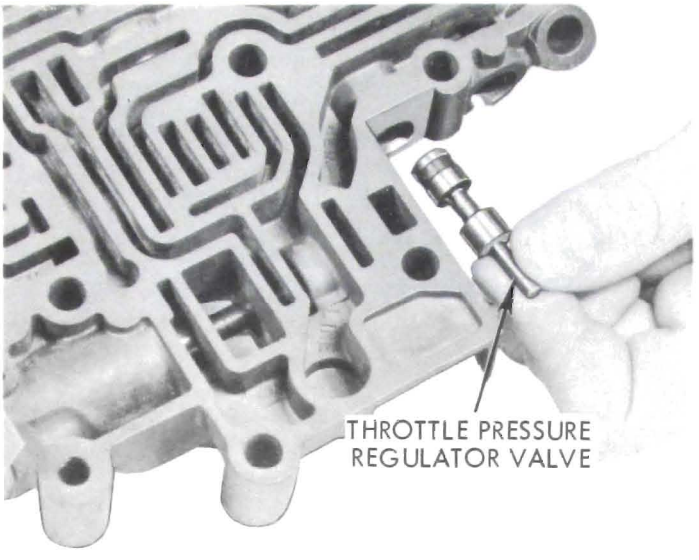


Figure 5-233-Valve Body Spring Identification Chart



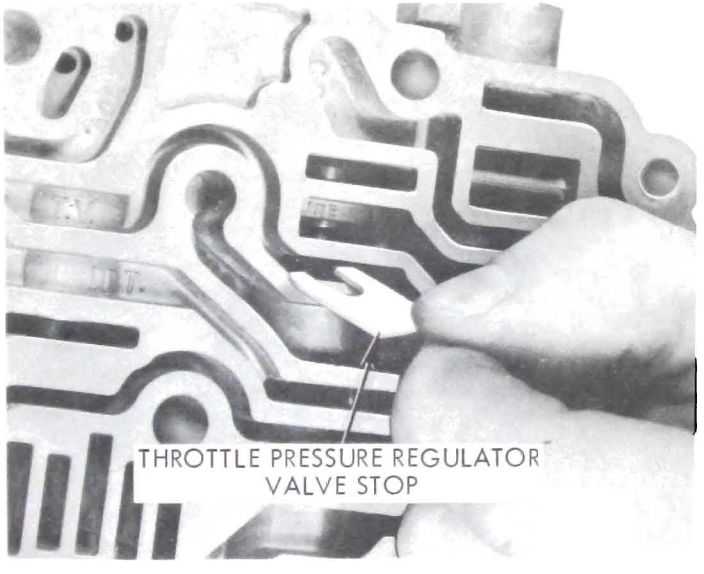
5-234

c. Reassembly

1. Begin reassembly of valve body by installing converter pressure regulator, shift, and main line pressure regulator valves, sleeves and springs as shown in Figure 5-232. Use new valve retaining plate to valve body gasket; install plate and oil gauge rod guide. Install and tighten screws.

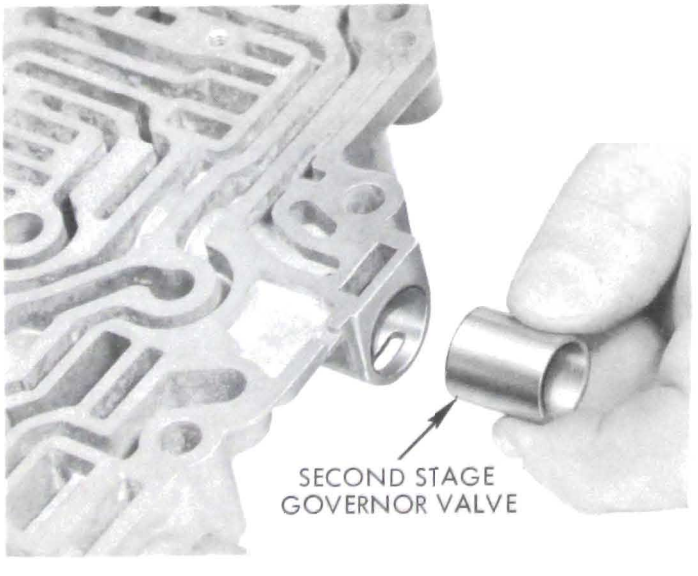
2. Install throttle pressure regulator valve. Tilt valve body so valve slides to bottom of bore.

NOTE: Use Figure 5-233 to identify springs if necessary.



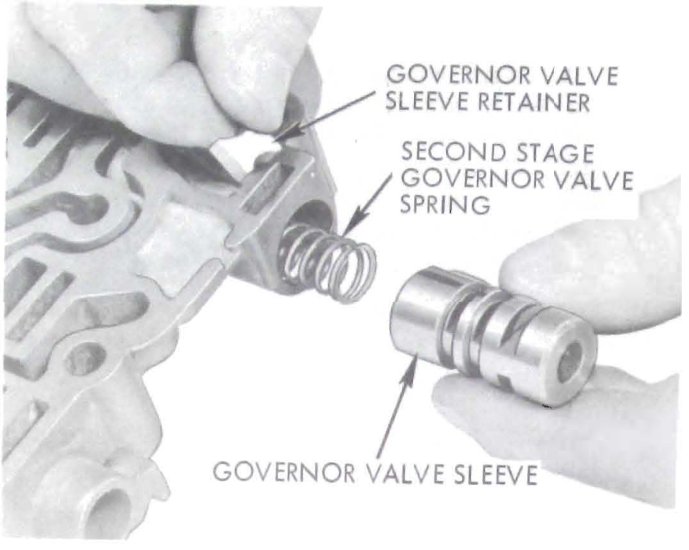
5-235

3. Be sure throttle pressure regulator valve is at bottom of bore. Install throttle pressure regulator valve stop as shown in figure. Check to be sure stop is in correct opening.



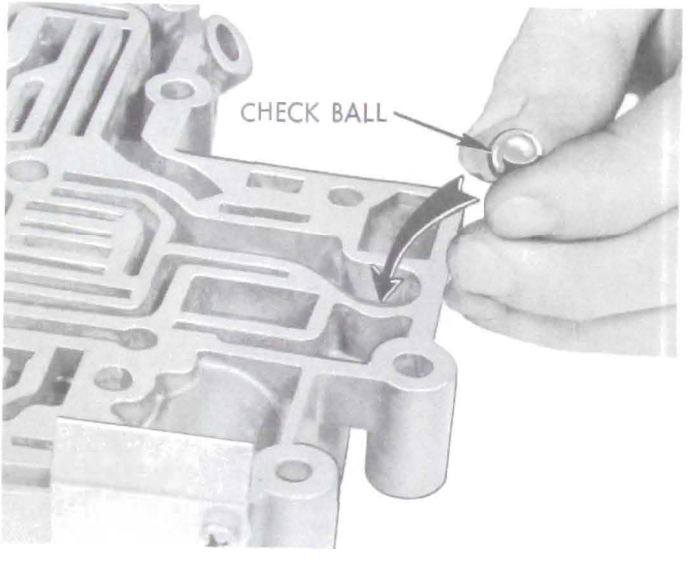
5-236

4. Install second stage governor valve.



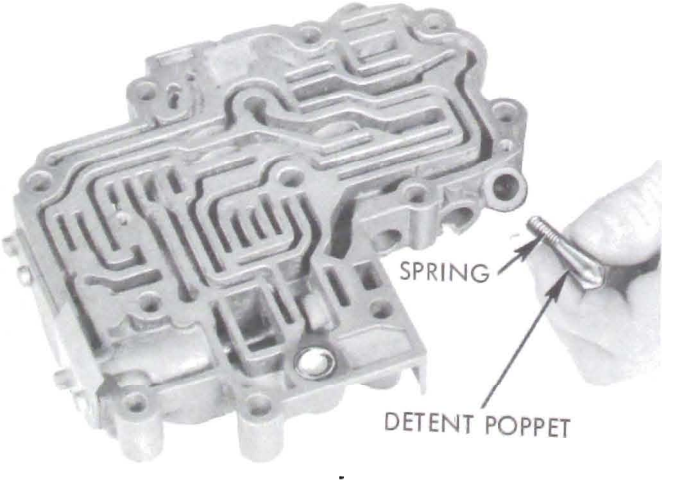
5. Install second stage governor valve spring, sleeve and retainer. Press in on sleeve against spring pressure and install retainer through valve body in wide slot of sleeve.

5-237



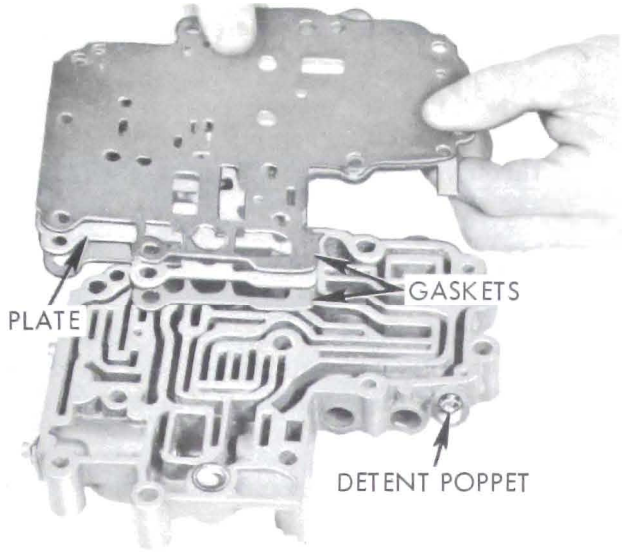
6. Install check ball.

5-238



7. Install detent poppet and spring.

5-239

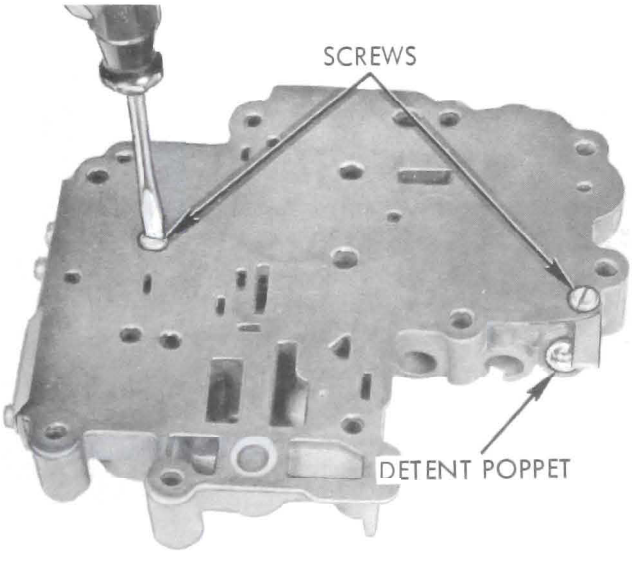


8. Use new gaskets, one on each side of valve body plate. Position plate and new gaskets on valve body.

NOTE: It will be necessary to depress detent poppet to allow plate attaching screws to be started.

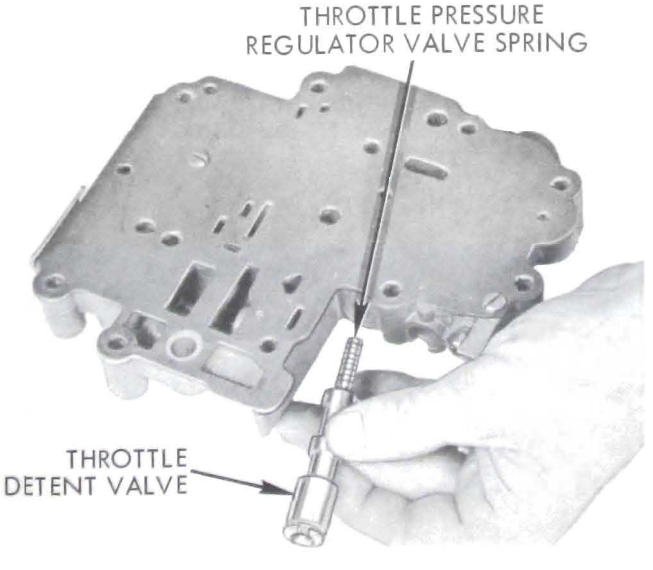
NOTE: Service inner and outer plate gaskets are identical, while production inner and outer gaskets are not. Always use two new service gaskets when reassembling valve body.

5-240



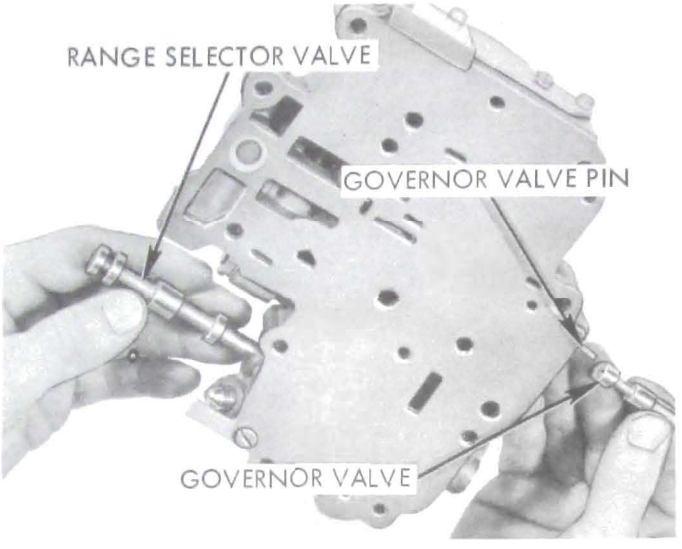
9. Make sure detent poppet is properly in place and install screws. Do not overtighten as gasket may be damaged.

5-241



10. Install throttle detent valve and throttle pressure regulator valve spring.

5-242



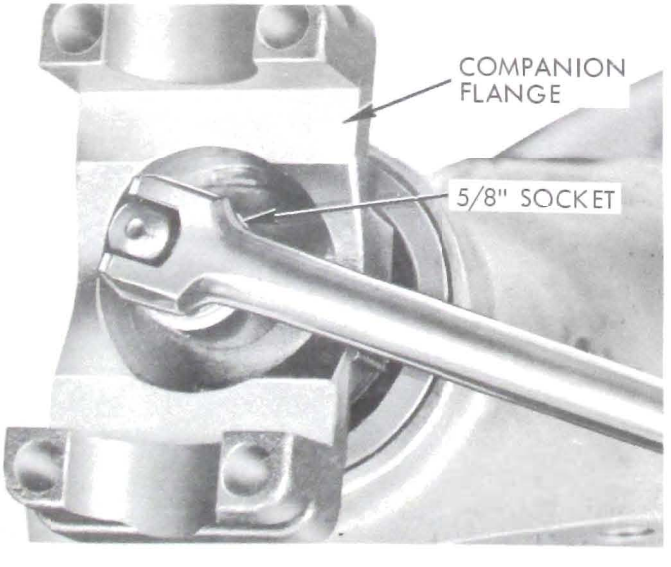
11. Install range selector valve, governor valve and pin.

NOTE: It may be necessary to shake valve body to start governor valve pin through hole in second stage governor valve.

5-243

If coast clutch support is to be removed, set valve body aside. Refer to paragraph 5-31 for installation of valve body.

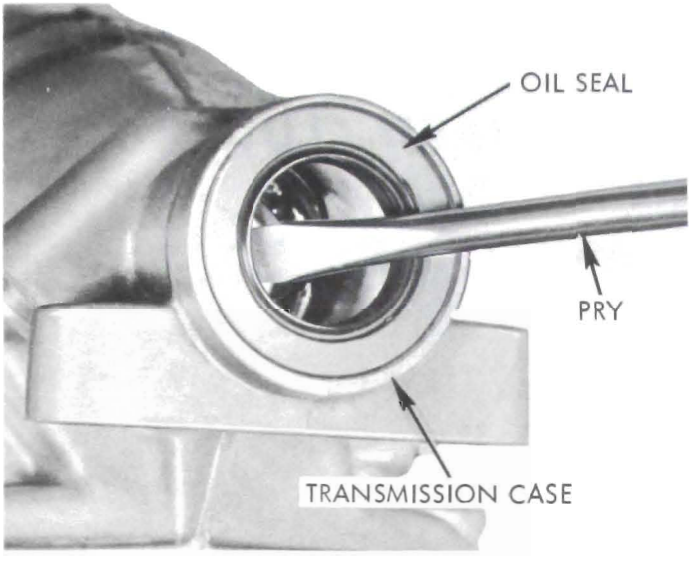
5-23 COMPANION FLANGE AND SEAL: REMOVAL AND INSTALLATION



a. Removal

1. Engage parking lock pawl and remove companion flange to output shaft attaching bolt (5/8'' socket); tap flange off output shaft.

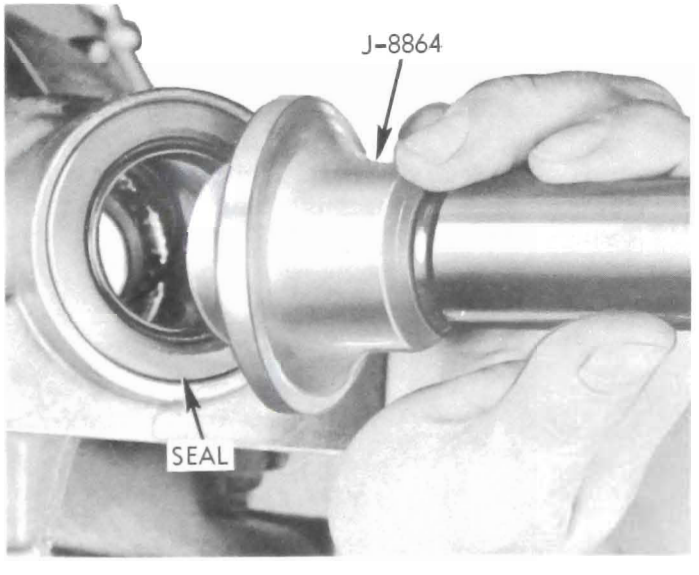
5-244



2. Pry old seal out of transmission case.

NOTE: The seal may be removed with transmission in car if care is taken to avoid damage to output shaft splines.

5-245

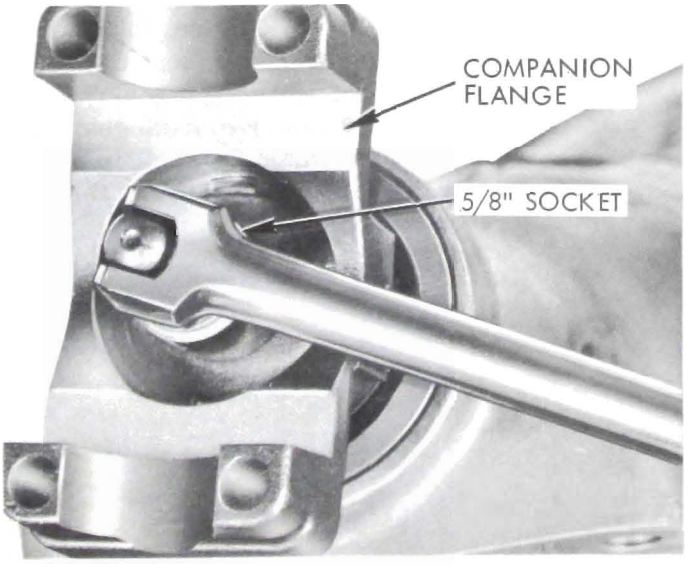


b. Installation

1. Apply Permatex to O.D. of new seal. Install seal using Installer J-8864.

NOTE: Seal may be installed with transmission in car.

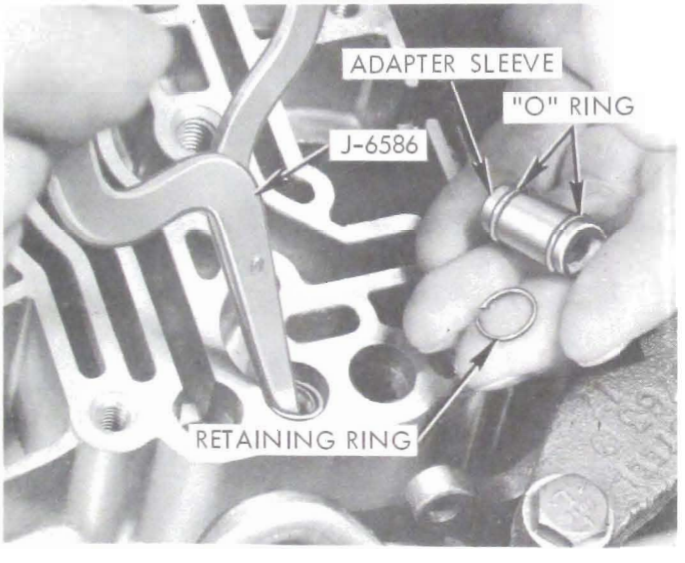
5-246



2. Engage parking lock pawl. Lubricate companion flange and install. Install companion flange attaching bolt and torque to 45-55 ft. lbs.

5-247

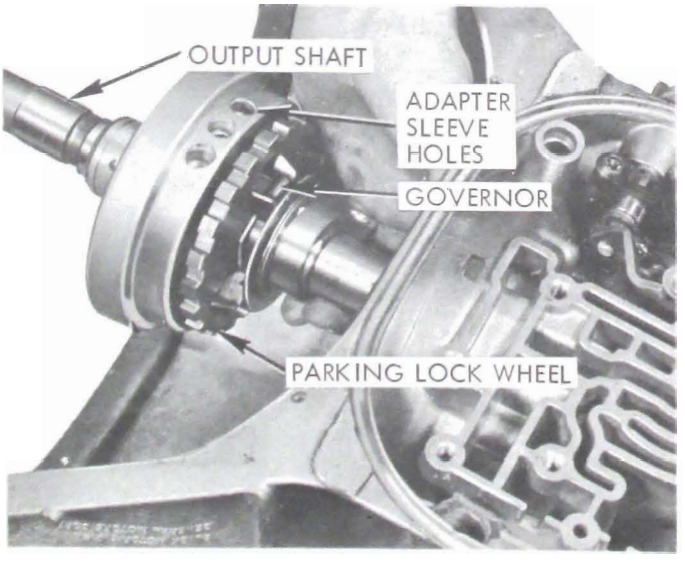
5-24 OUTPUT SHAFT, FORWARD CLUTCH PISTON AND CYLINDER, PARKING LOCK RATCHET WHEEL AND GOVERNOR ASSEMBLY: REMOVAL, DISASSEMBLY, INSPECTION, REASSEMBLY



a. Removal

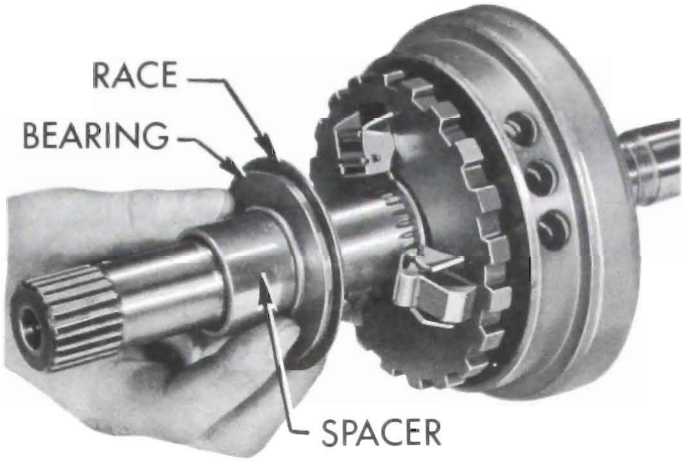
1. Remove companion flange (par. 5-23). Use tool J-6586 to pull three adapter sleeves and retainer out of transmission case and coast clutch support. Examine "O" rings for nicks or cuts. Discard any questionable rings.

5-248



2. Pull output shaft forward to remove shaft, forward clutch piston and cylinder, parking lock ratchet wheel and governor as an assembly. Speedometer driving gear will be pulled off output shaft as shaft is pulled through rear bearing. Remove gear through companion flange seal.

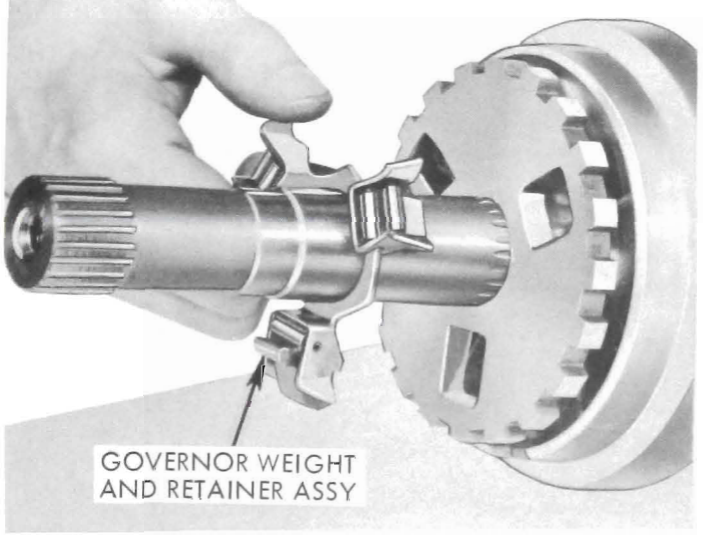
5-249



b. Disassembly and Inspection

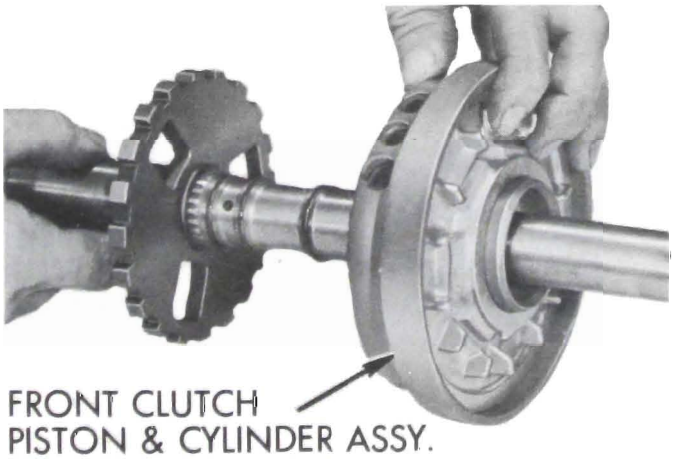
1. Slide governor lever actuating sleeve, needle thrust bearing, thrust bearing race and parking lock ratchet wheel spacer off rear of output shaft. Examine needle thrust bearing, race, and sleeve for wear or scoring.

5-250



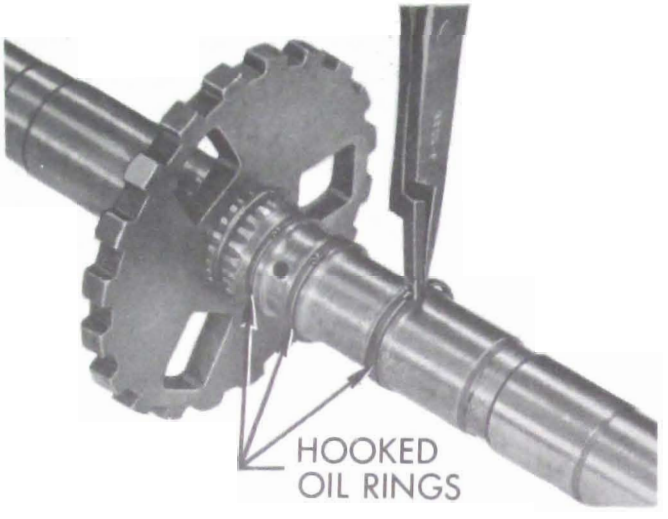
2. Slide governor weight and retainer assembly off rear of output shaft. Check weights for looseness on pins. Check staking to be sure pins are not loose in retainers.

5-251



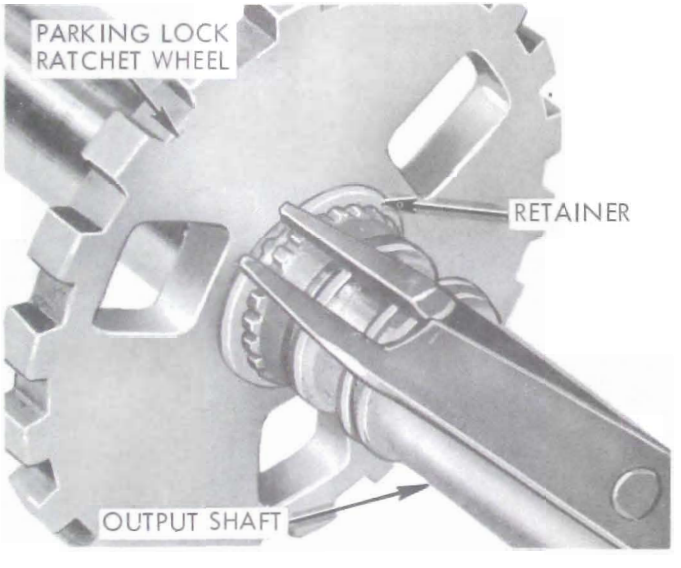
3. Slide forward clutch piston and cylinder assembly off forward end of output shaft. Set cylinder, piston and thrust washer aside.

5-252



4. Examine three hooked oil rings on output shaft just forward of parking lock ratchet wheel. If worn or scored, unhook, expand and remove the rings.

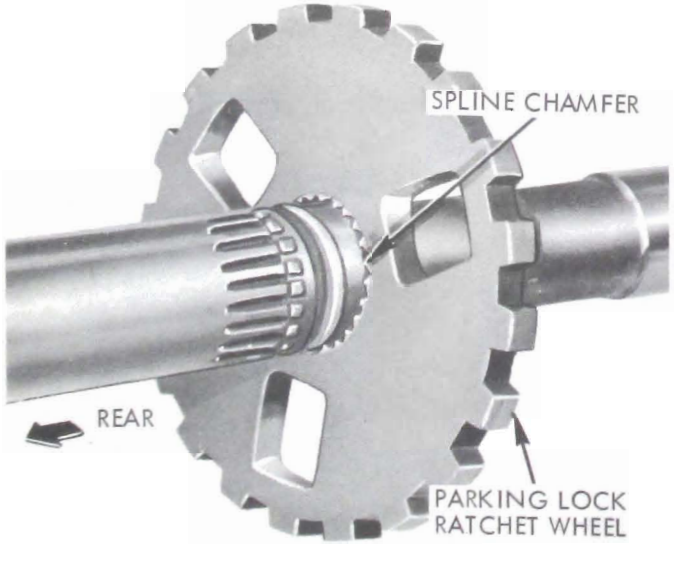
5-253



5. If parking lock ratchet wheel is worn or broken, expand and remove retaining ring on output shaft forward of wheel. Slide parking lock ratchet wheel off forward end of output shaft.

Examine output shaft for damaged splines, scored bearing surfaces, broken ring lands, etc.

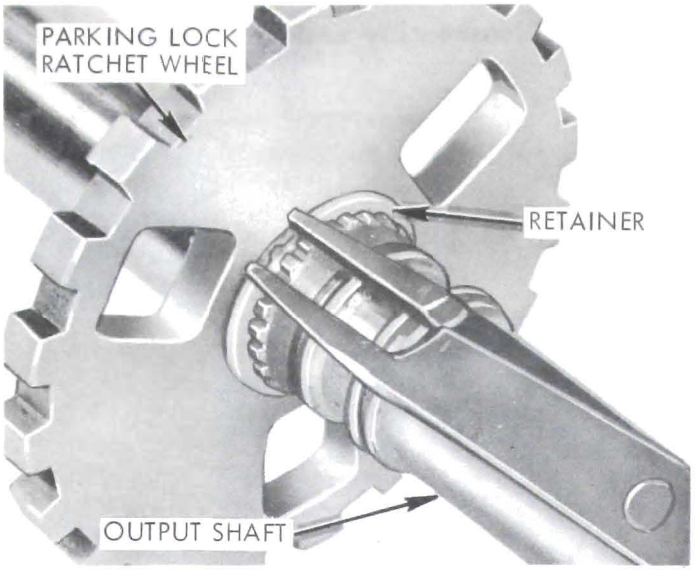
5-254



c. Assembly of Parking Lock Ratchet Wheel and Output Shaft

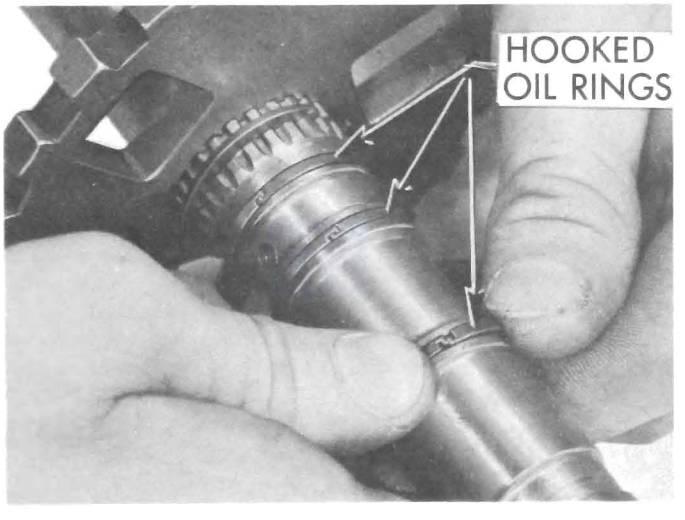
1. Install parking lock ratchet wheel with spline chamfer toward rear of output shaft.

5-255



2. Position parking lock ratchet wheel rearward on output shaft splines. Expand and install retaining ring solidly in groove of output shaft.

5-256



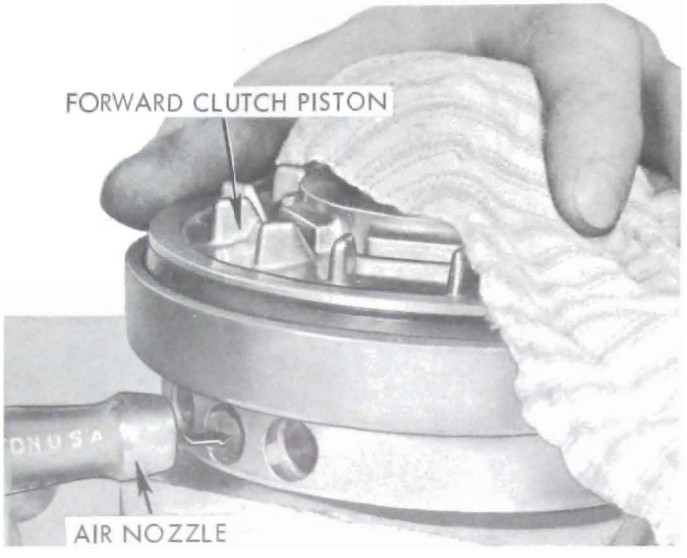
3. Expand and install three hooked oil rings in grooves of output shaft.

5-257

d. Disassembly and Inspection of Forward Clutch Cylinder and Piston Assembly

1. Remove thrust washer from front of forward clutch cylinder. If worn or scored, discard the washer.

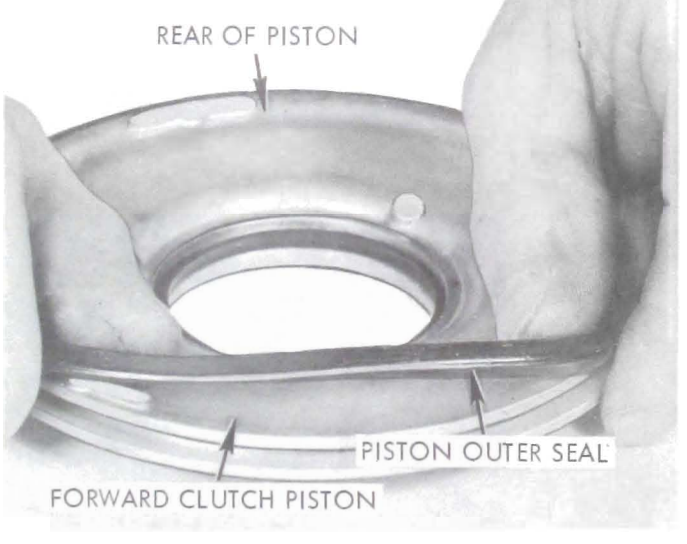
5-258



e. Disassembly and Inspection

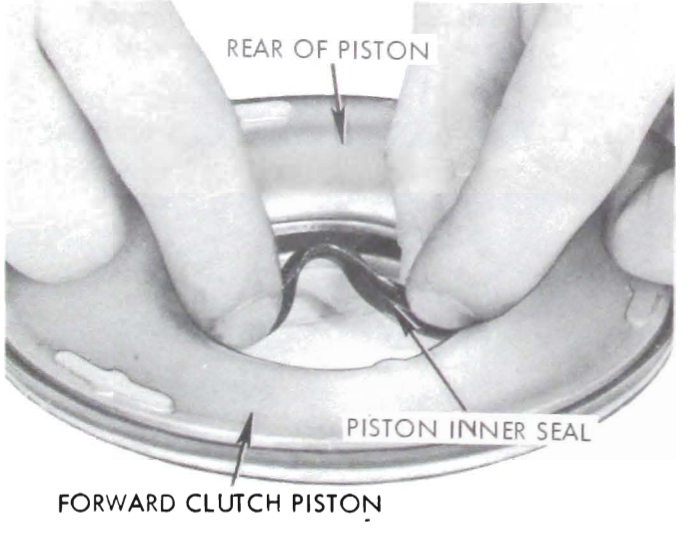
1. Cover assembly with a cloth as protection against oil spatter and direct compressed air into center oil transfer sleeve hole to remove forward clutch piston from cylinder.

5-259



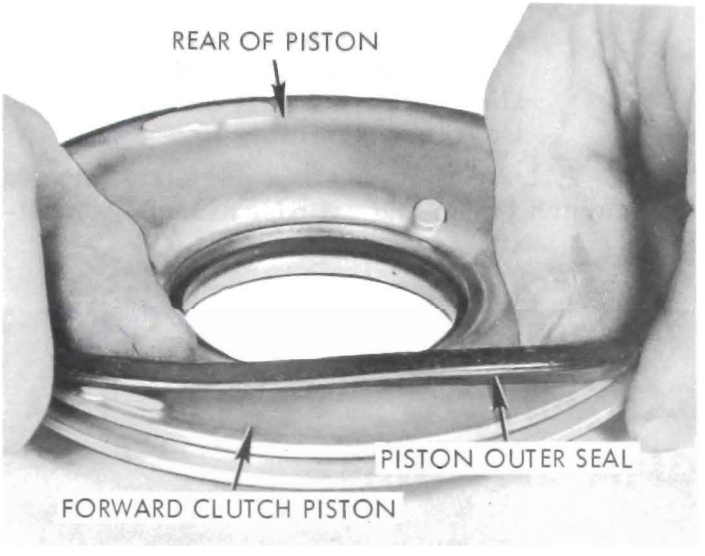
2. Examine forward clutch piston outer seal. If nicked, torn or worn, remove the seal.

5-260



3. Examine forward clutch piston inner seal. If nicked, torn or worn, remove the seal.

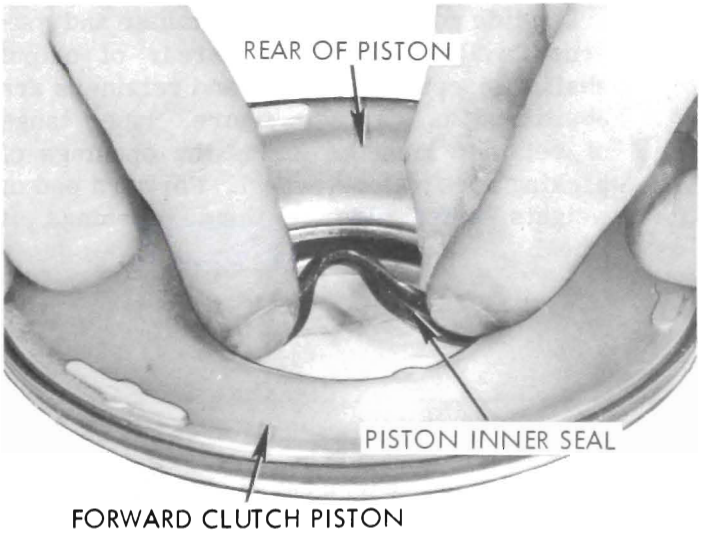
5-261



f. Reassembly of Coast Clutch Support and Forward Clutch Piston and Cylinder

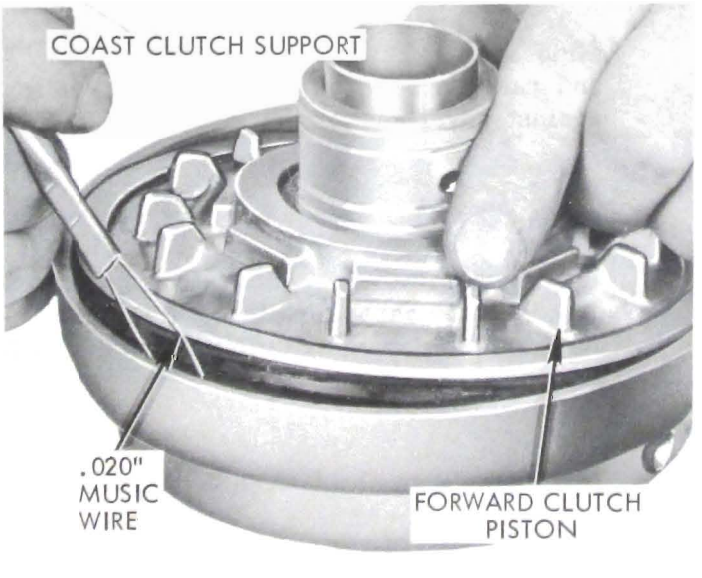
1. Install forward clutch piston outer seal on piston. Lip of seal toward rear of piston

5-263



2. Install forward clutch piston inner seal on forward clutch piston. Lip of seal toward rear of piston.

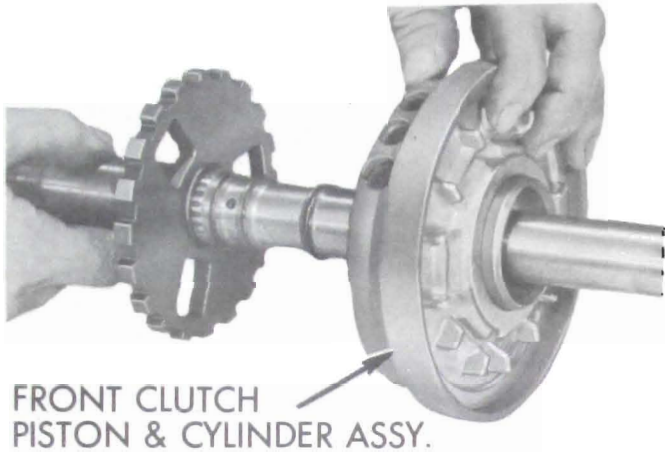
5-264



3. Lubricate seals and install forward clutch piston. A loop of smooth wire may be used as an aid in starting the seal lip into the piston bore.

NOTE: Start inner seal lip first.

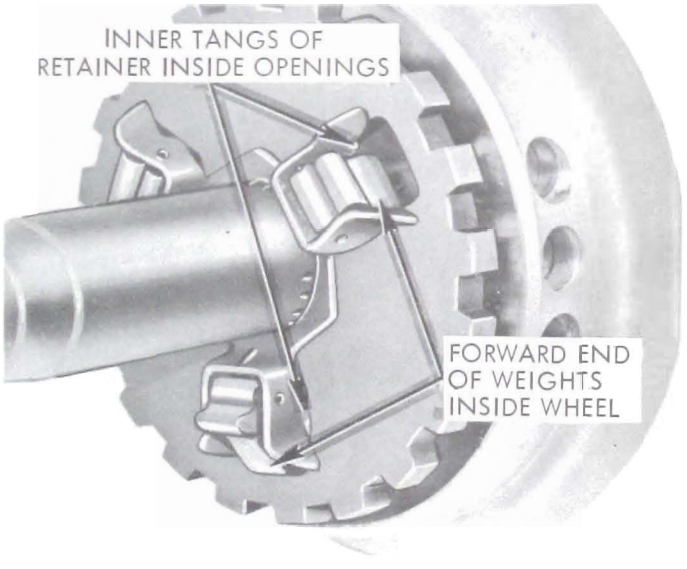
5-265



g. Assembly of Output Shaft, Forward Clutch Piston and Cylinder Assembly, Parking Lock Ratchet Wheel and Governor Assembly

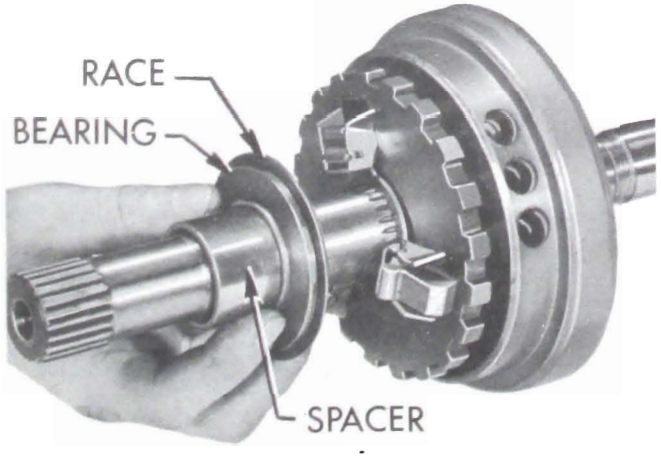
1. Lubricate oil rings and slide forward clutch piston and cylinder assembly on output shaft.

5-266



2. Slide governor weight retainer and governor weight assembly on rear of output shaft. Be certain weights and retainers are positioned as shown in figure. Inner tangs of retainer must be inside the openings of parking lock ratchet wheel. Forward end of weights must also be inside openings of wheel.

5-267

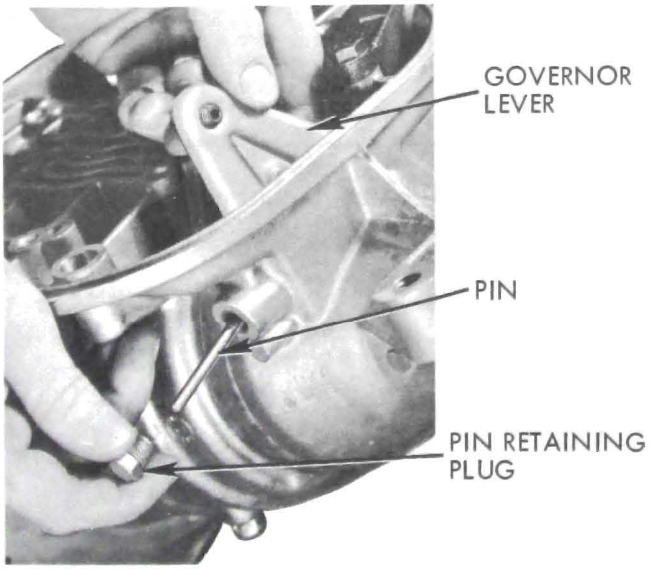


3. Lubricate needle thrust bearing and slide spacer, sleeve, needle thrust bearing and race on rear of output shaft. Position against governor weights.

5-268

If further work is to be done on transmission, set assembly aside. Refer to paragraph 5-28 for installation of output shaft assembly.

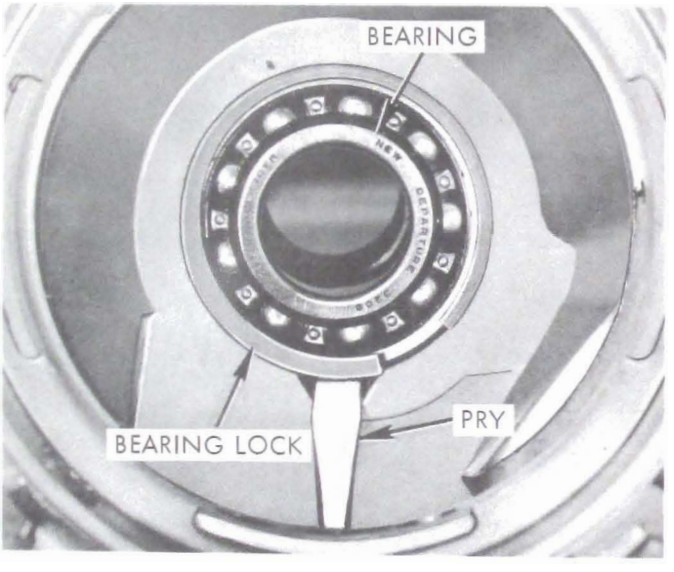
5-25 GOVERNOR LEVER AND PIN: REMOVAL AND REPLACEMENT



If lever is damaged or pin hole is badly worn, remove pin retaining plug in side of transmission case. Slide pin out of case and lever. Replace parts as necessary. Install pin through case and lever. Install plug.

5-269

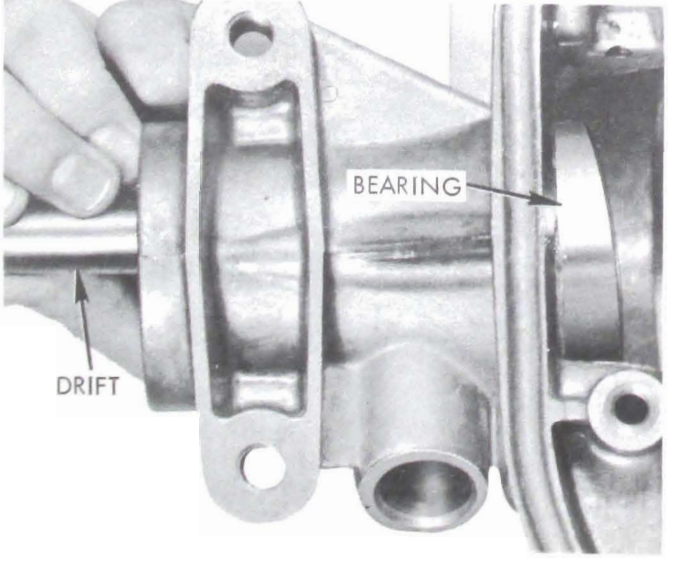
5–26 TRANSMISSION REAR BEARING: REMOVAL AND INSTALLATION



a. Removal

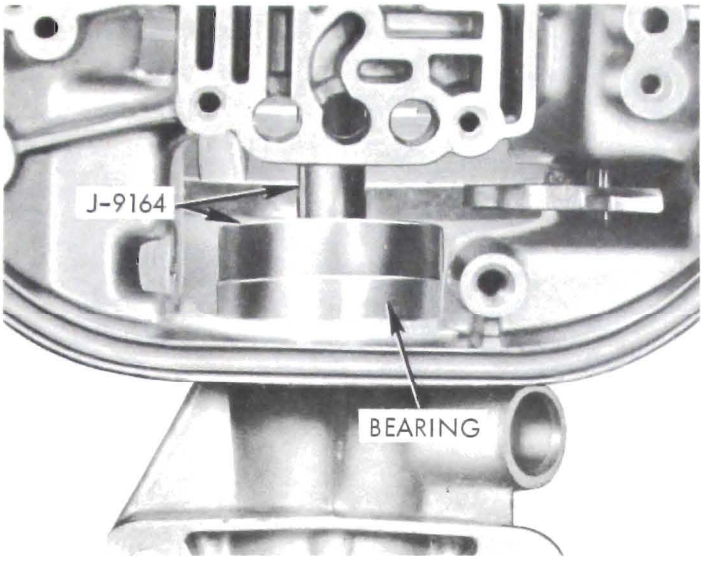
1. Remove governor lever and pin (par. 5-25). If bearing is defective, pry bearing lock out of groove in case.

5-270



2. Drive bearing out of case using a drift inserted from the rear.

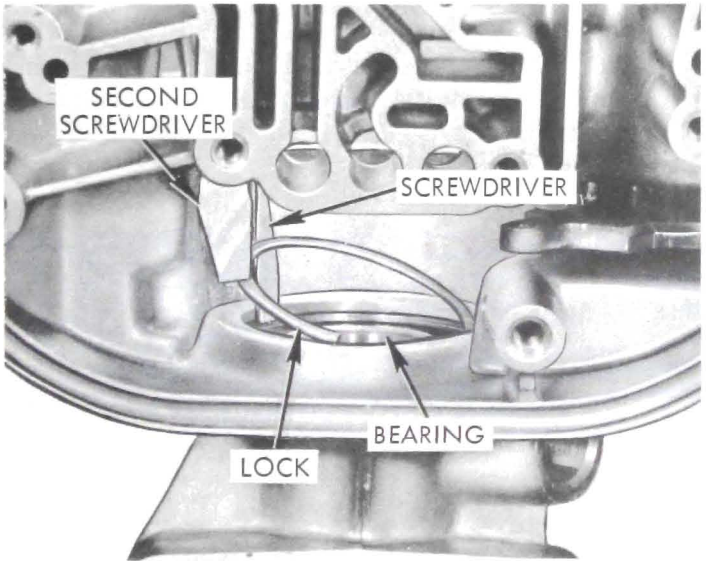
5-271



b. Installation

1. Drive new bearing squarely into case using Installer J-9164.

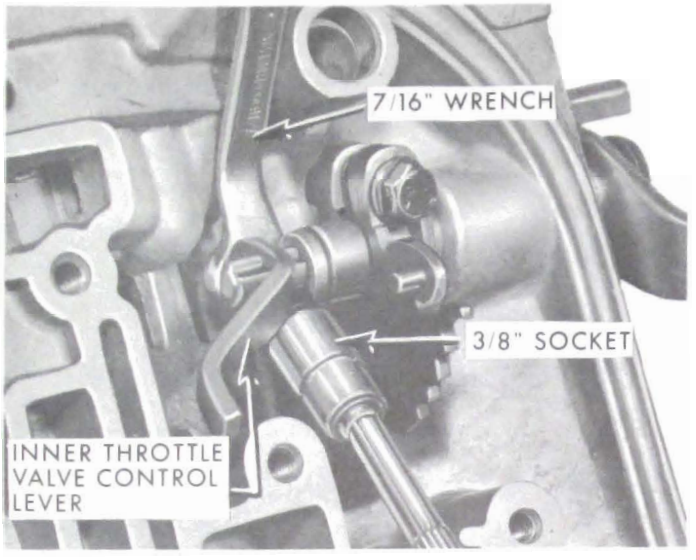
5-272



2. Start one end of bearing lock into groove above bearing. Form a ramp with a screwdriver inserted between case and lock as shown in figure. Push lock down ramp and into groove with second screwdriver as shown in figure.

5-273

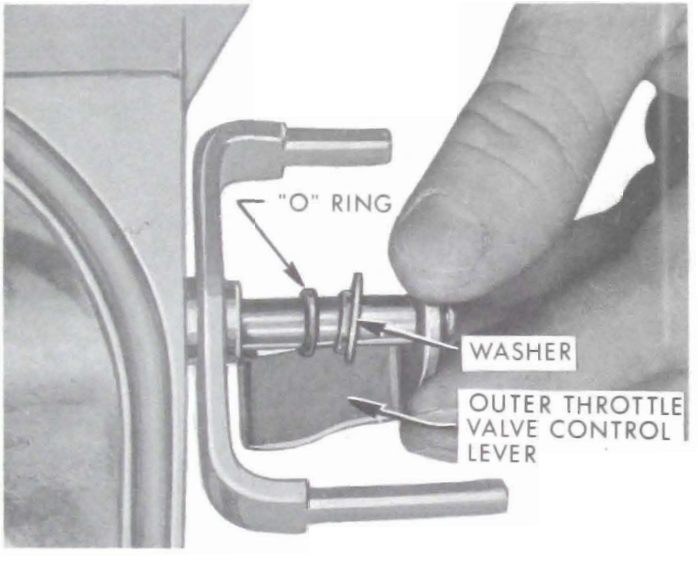
5-27 RANGE SELECTOR LEVERS AND SHAFT, THROTTLE VALVE CONTROL LEVERS AND SHAFT, AND PARKING LOCK ACTUATOR: REMOVAL AND REPLACEMENT



a. Removal of Inner Throttle Valve Control Lever

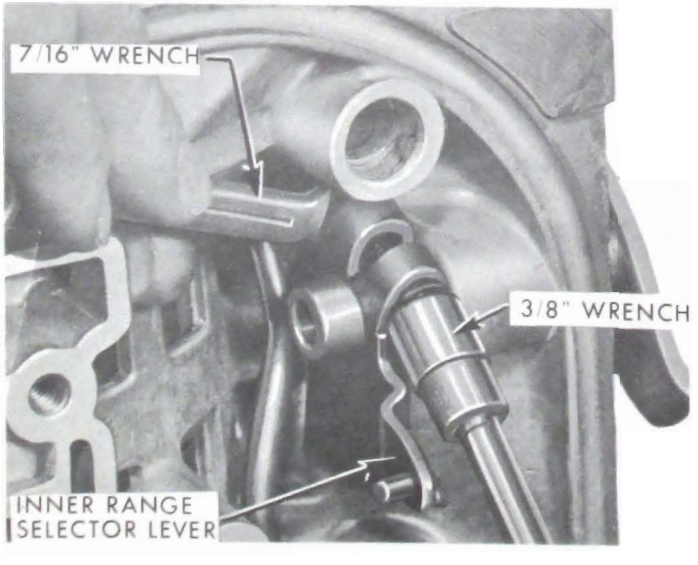
1. Use 3/8'' socket and 7/16'' wrench to remove screw and nut attaching lever to shaft.

5-274



2. Slide inner lever off shaft and remove. Slide outer lever and shaft out of range selector shaft. Check ''O'' ring; if worn or torn, remove ''O'' ring.

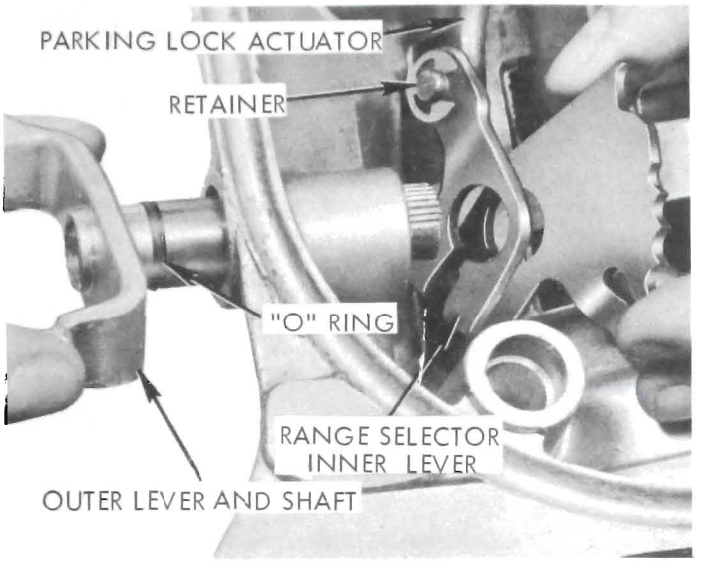
5-275



b. Removal of Range Selector Levers and Shaft and Parking Lock Actuator

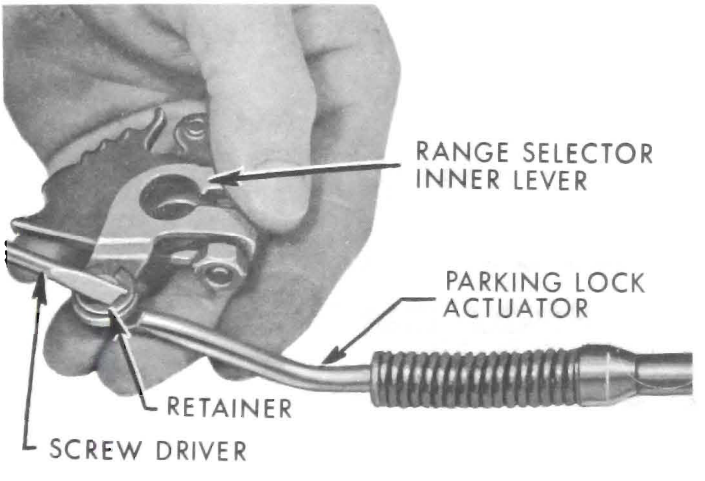
1. Use 3/8'' socket and 7/16'' wrench to remove screw and nut attaching range selector inner lever to shaft.

5-276



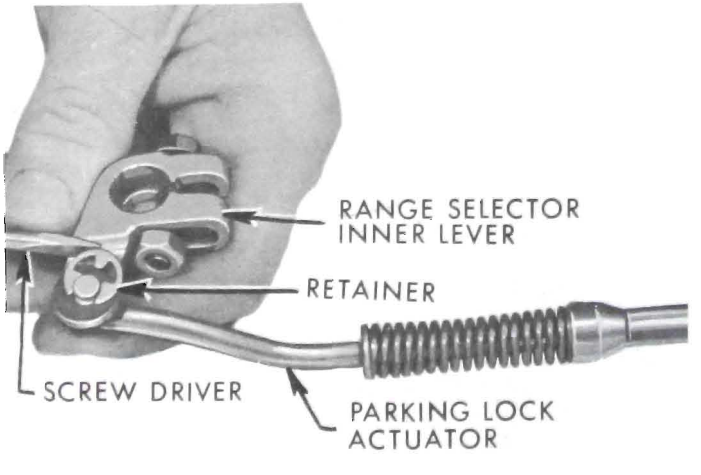
2. Slide range selector inner lever off selector shaft. Remove inner lever and parking lock actuator assembly. Examine shaft "O" ring. If worn, nicked or cut, remove "O" ring.

5-277



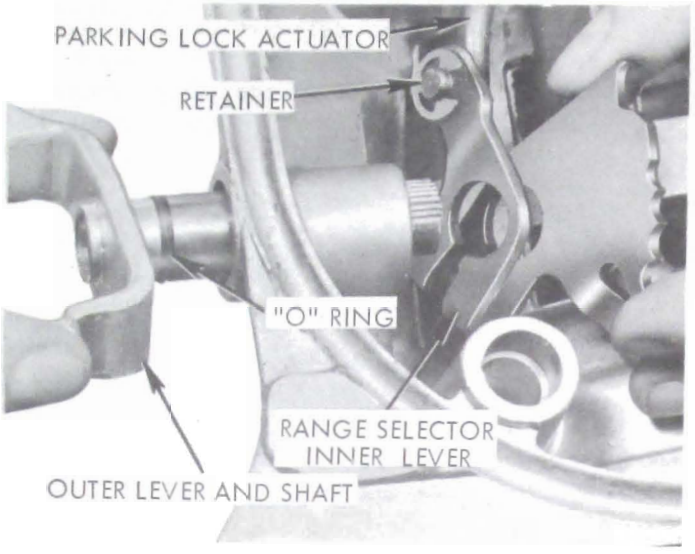
3. If parking lock actuator is bent or damaged, or if range selector requires replacement, pry retainer off actuator rod.

5-278



4. Assemble parking lock actuator rod to inner lever as shown. Push retainer on shaft with screwdriver.

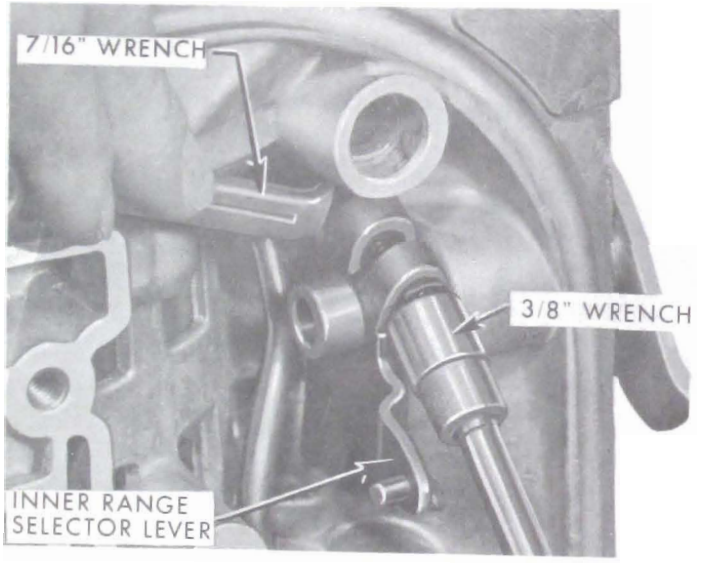
5-279



c. Installation of Range Selector Levers and Shaft

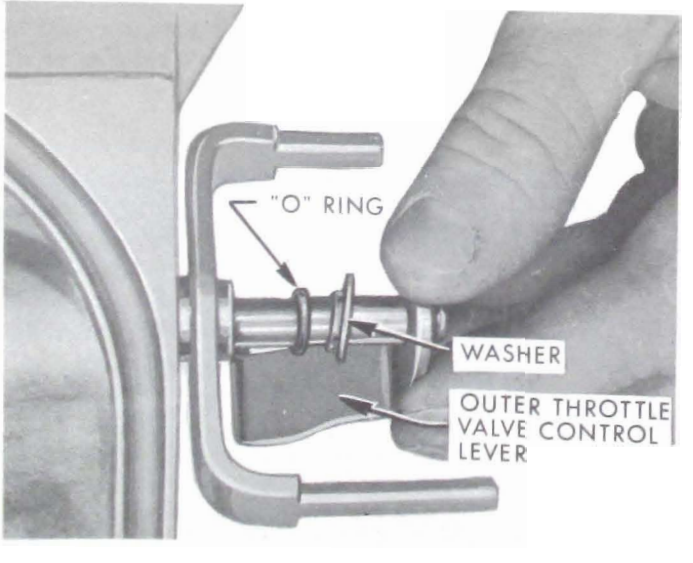
1. Install and lube "O" ring. Slide shaft through case and carefully align splines on shaft with splines in inner lever. Hold outer lever and shaft "in" against case and push inner lever completely on shaft.

5-280



2. Install and tighten bolt and nut.

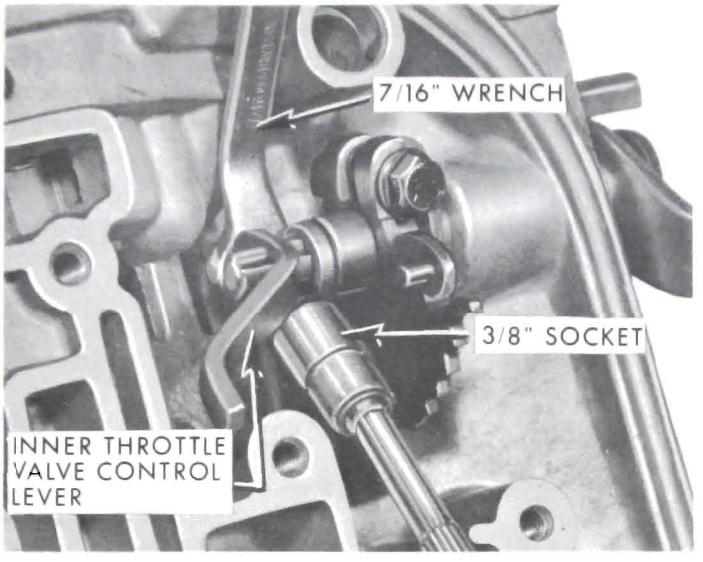
5-281



d. Installation of Throttle Valve Control Levers and Shaft

1. Assemble special washer and "O" ring on throttle control lever shaft as shown in figure. Lube "O" ring. Slide shaft into range selector shaft.

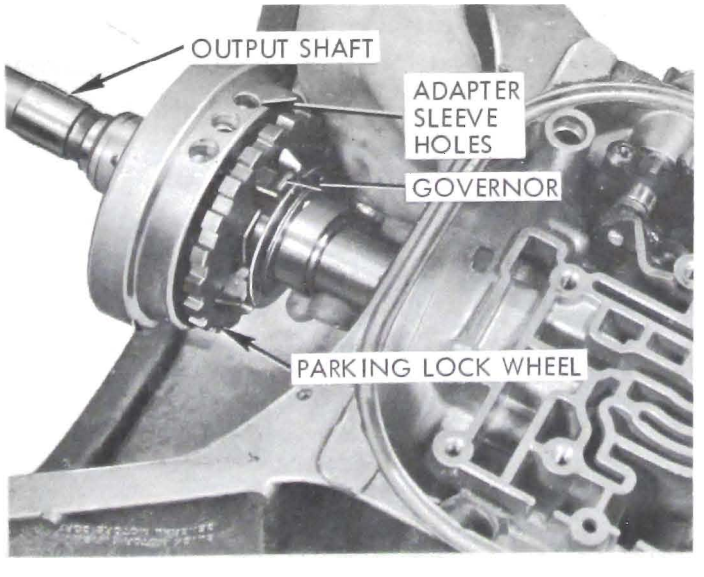
5-282



2. Carefully engage splines on shaft with splines in inner lever. Press lever on shaft till approximately .005'' clearance exists between inner throttle valve control lever and range selector lever shaft. Install and tighten bolt and nut.

5-283

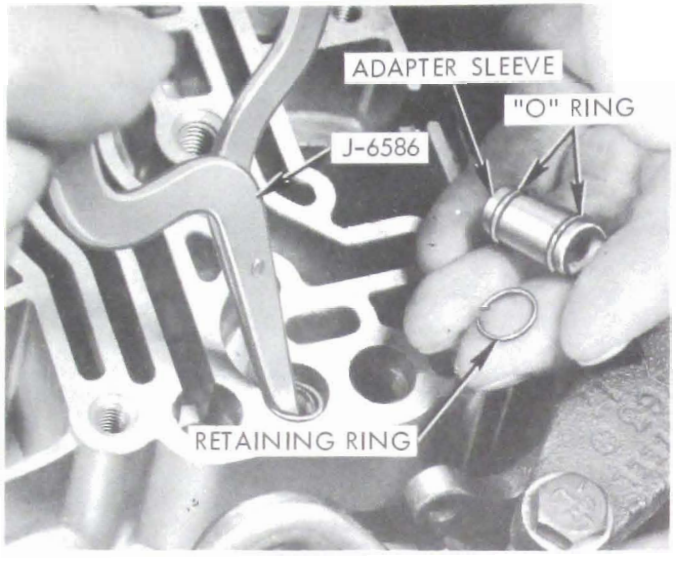
5-28 OUTPUT SHAFT, COAST CLUTCH SUPPORT, FORWARD CLUTCH PISTON, PARKING LOCK RATCHET WHEEL, AND GOVERNOR ASSEMBLY: INSTALLATION



1. Lube coast clutch support O.D. and position support so oil transfer holes are ''up''. Hold governor assembly in position against parking lock wheel and start rear of shaft through bearing. Ease assembly into position. If parking lock pawl is installed, hold it ''up'' out of the way to allow assembly to move fully into case.

When correctly positioned in case, the coast clutch support oil transfer holes will line up with oil transfer holes in case. If necessary to rotate support, insert smooth punch through oil transfer holes in case to rotate support. Use care to avoid nicking or denting either support or case.

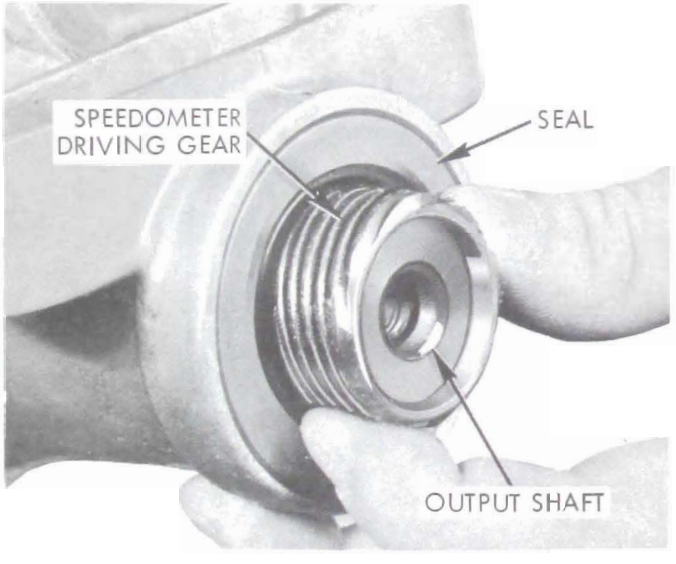
5-284



2. Be certain holes in case and support line up. Lube and install oil transfer sleeves and "O" rings, and retainers. Retainers should be positioned flat against sleeves.

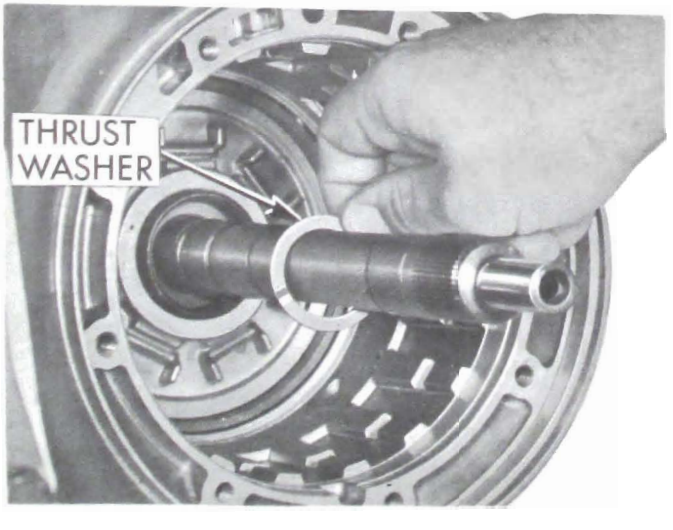
NOTE: Oil transfer sleeves are soft aluminum and can be damaged if not handled and installed with care.

5-285



3. Lubricate liberally with chassis lube to avoid damage to seal, and install speedometer driving gear on output shaft. Install companion flange (par. 5-23).

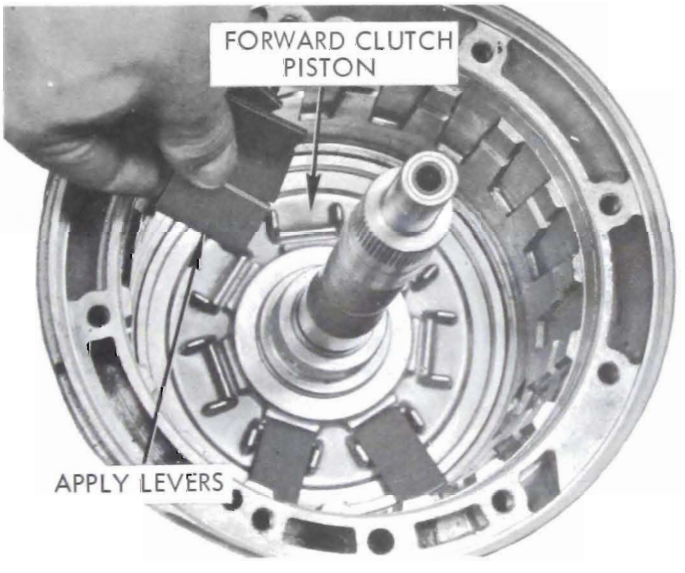
5-286



4. Lubricate and install thrust washer on forward end of forward clutch cylinder.

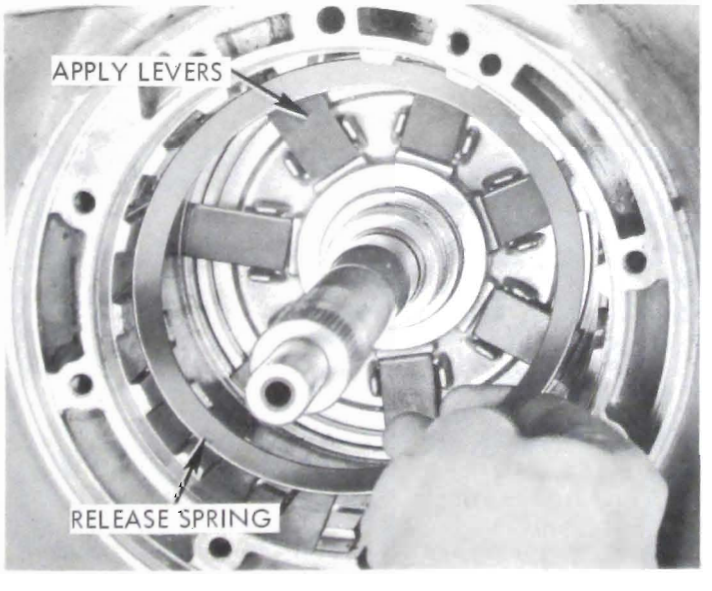
5-286A

5-29 COAST AND OVER-RUNNING CLUTCH ASSEMBLY, FORWARD CLUTCH PACK, RELEASE SPRING AND APPLY LEVERS: INSTALLATION



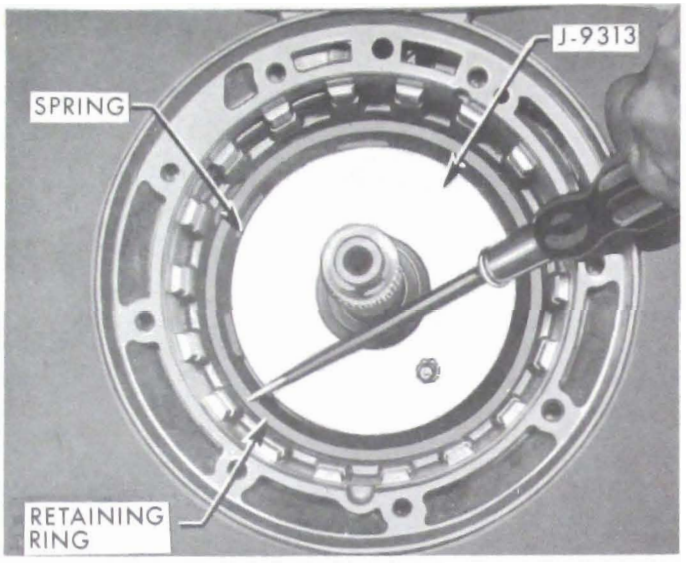
1. With transmission case in vertical position, install forward clutch apply levers as shown in figure.

5-287



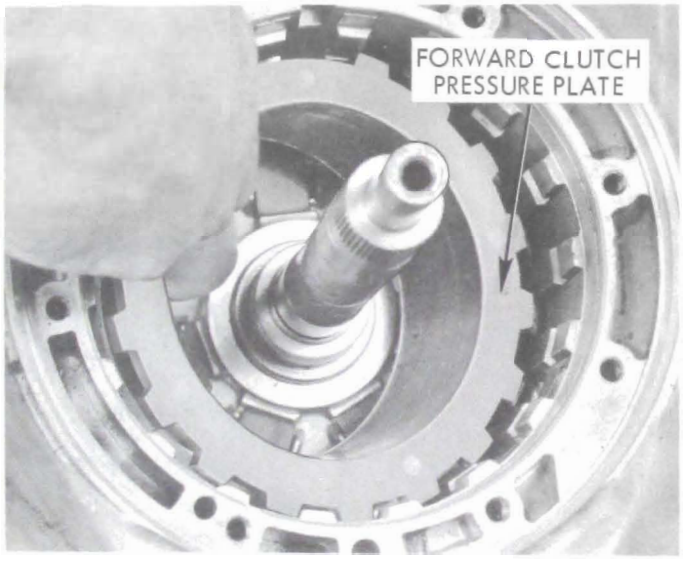
2. Install forward clutch release spring flat on levers (inner edge of spring "down").

5-288



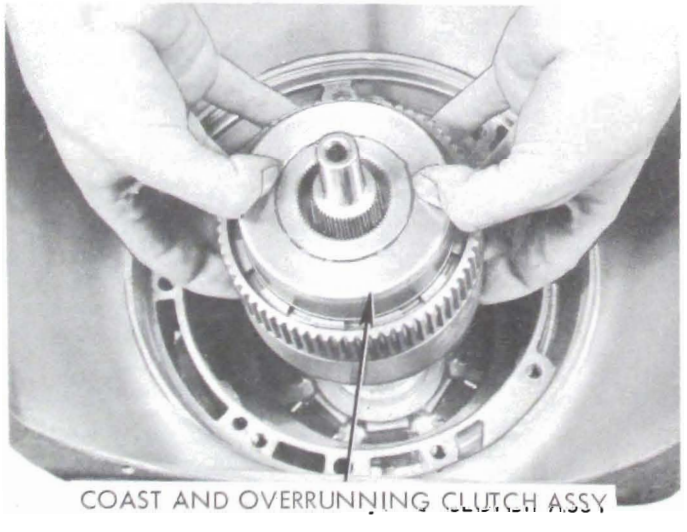
3. Position spring centering tool J-9313 over coast clutch support to rest on levers and center spring. Install spring retainer over spring and press down and outward to slightly compress spring and position retainer in groove of case. It is absolutely necessary that the retaining ring be correctly installed. Check to be sure retaining ring is in groove all the way around. Remove tool J-9313.

5-289



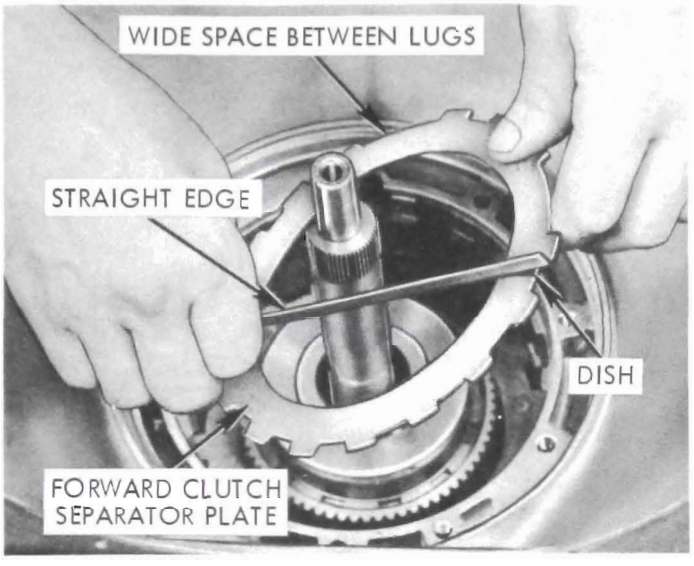
4. Set forward clutch pressure plate in place on apply levers. Take care to position wide space between lugs toward top of case for installation of anchor later.

5-290



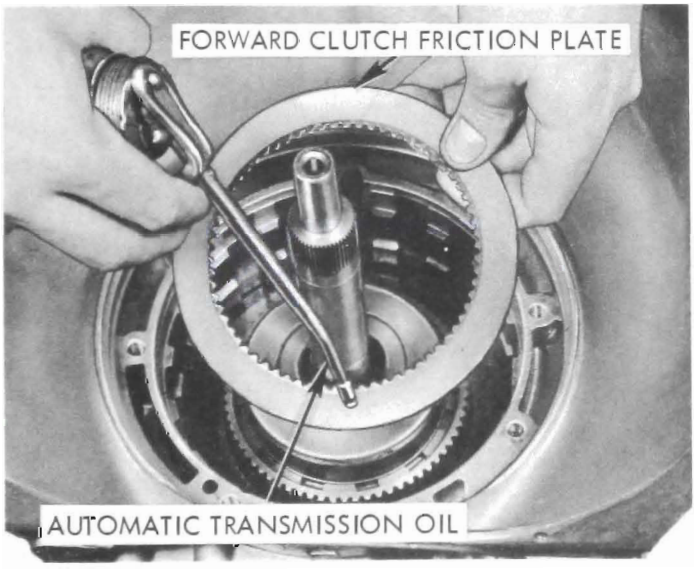
5. Set coast and overrunning clutch assembly in place on coast clutch support.

5-291



6. Check a forward clutch separator plate (no notches on lugs) for "dish". Note direction of dish and install it on forward clutch pressure plate. Take care to position wide space between lugs toward top of case for installation of anchor later.

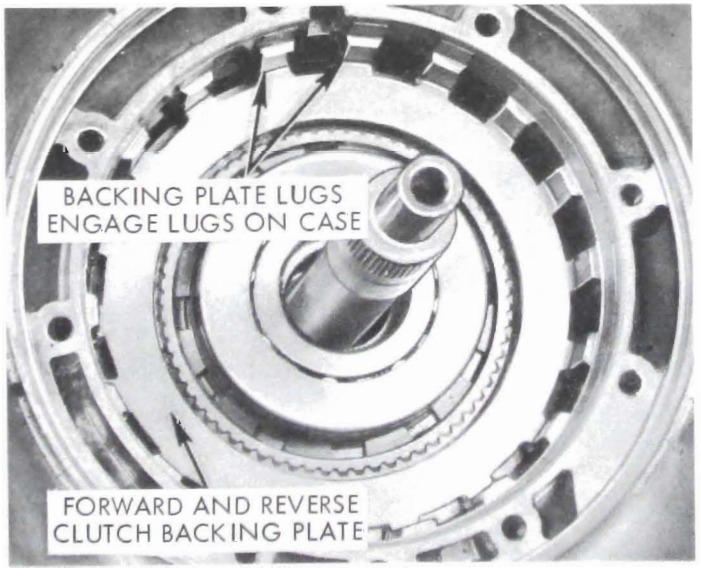
5-292



7. Lubricate a forward clutch friction plate with automatic transmission oil. Install over coast clutch housing by engaging splines of plate with splines on coast clutch housing. Continue alternately installing a separator plate and a lubed friction plate until five separator plates (all "dished" same way) and five friction plates have been installed.

NOTE: All separator plates must be installed with wide space between lugs toward top of case for installation of anchor later.

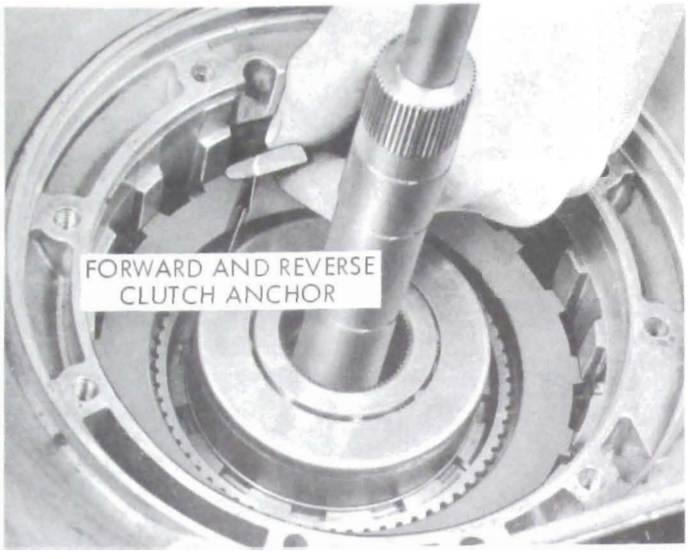
5-293



8. Install forward and reverse clutch backing plate on top of forward clutch pack. Rotate backing plate so lugs on backing plate engage lugs in case.

NOTE: The backing plate should require no force to install. Correct installation of forward clutch pack will provide sufficient clearance and require no force to install backing plate.

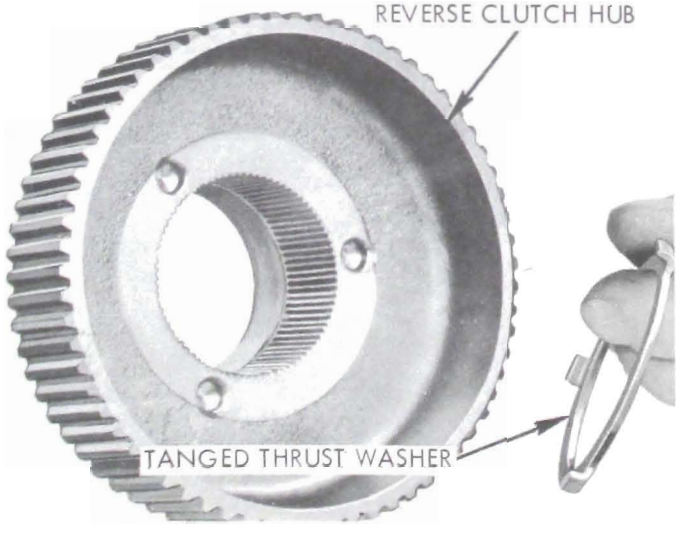
5-294



9. Install forward and reverse clutch anchor in slot at top of case.

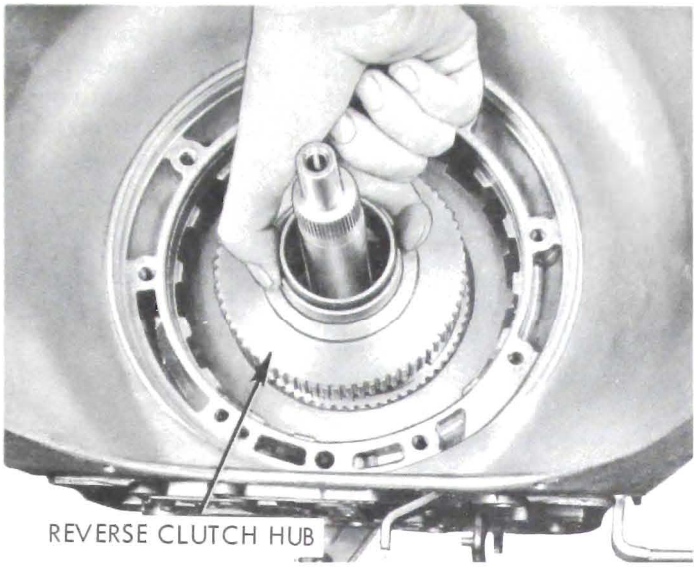
5-295

5-30 REVERSE CLUTCH COMPONENTS AND OIL PUMP: INSTALLATION



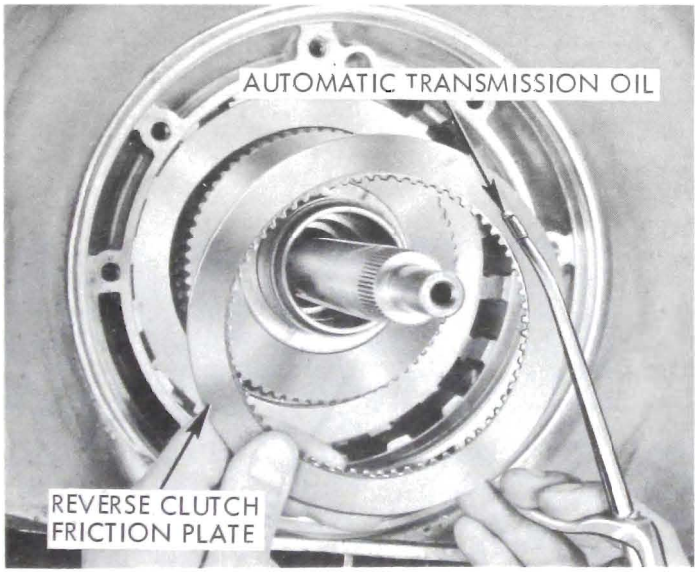
1. Be sure tanged thrust washer is in place at rear of reverse clutch hub.

5-296



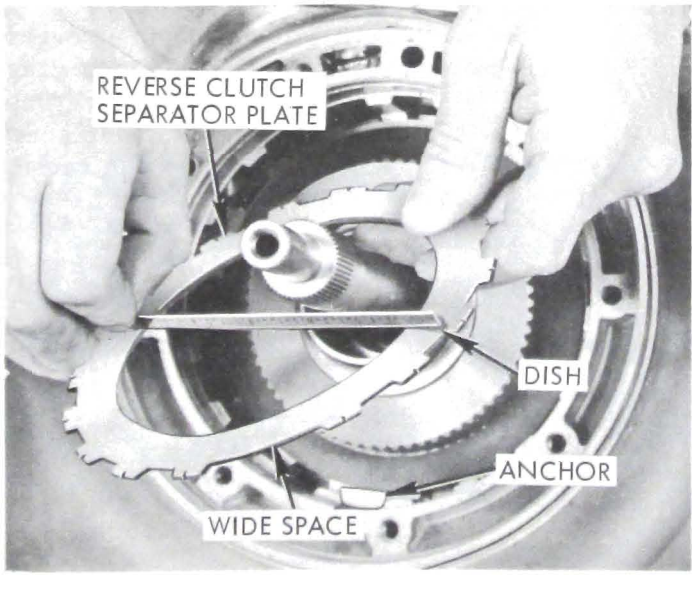
2. Set reverse clutch hub in place on overrunning clutch assembly.

5-297



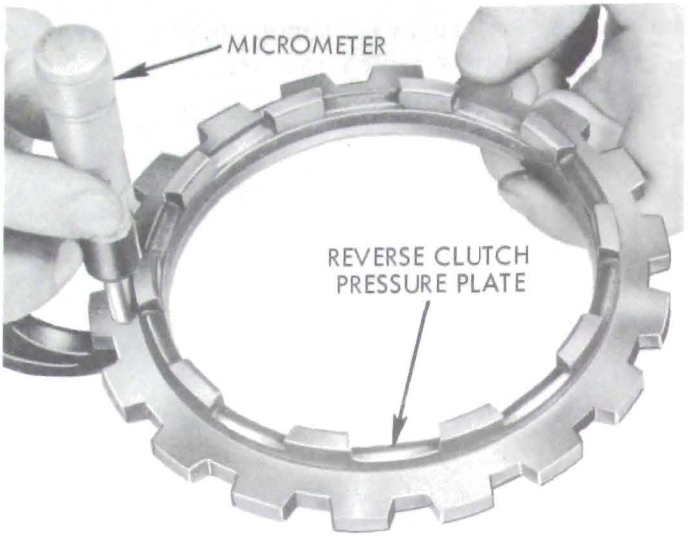
3. Liberally lubricate and install a reverse clutch friction plate on forward and reverse clutch backing plate by engaging splines on hub with splines on plate.

5-298



4. Check a reverse clutch separator plate (notch in tangs) for "dish". Note direction of "dish" and install separator plate above friction plate. Install plate with wide space between lugs toward top of transmission to clear anchor. Continue the build-up of clutch pack by alternately installing a lubed friction plate and a separator plate until four friction plates and three separator plates have been installed. All separator plates must be installed with "dish" same way.

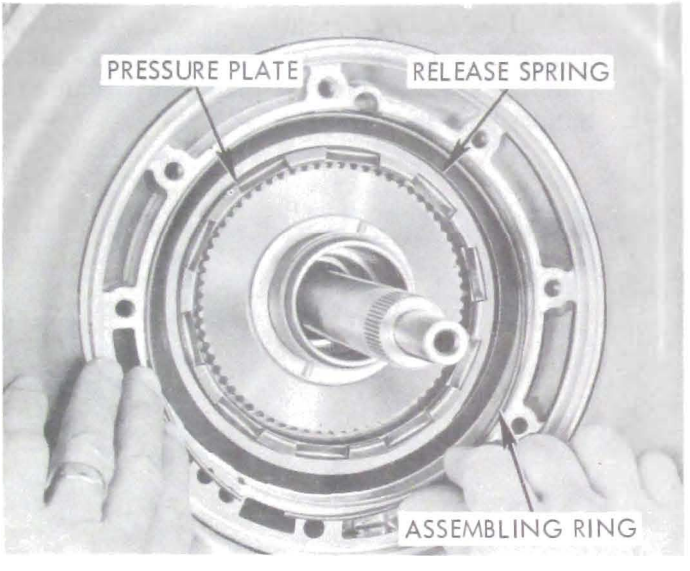
5-299



5. Reverse clutch pressure plates are supplied in three thicknesses. If a new pressure plate is being installed, measure the old plate in an unworn area near the end of a lug. The new plate to be installed must be the same thickness or reverse clutch pack clearance will be adversely affected.

Install pressure plate over top friction plate with wide space between lugs toward top of transmission to clear anchor.

5-300

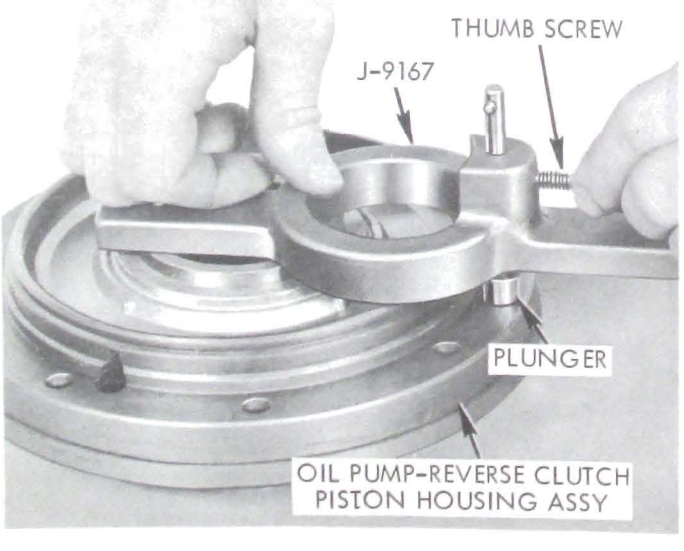


6. Install release spring and assembling ring over pressure plate.

NOTE: Center edge of release spring "up".

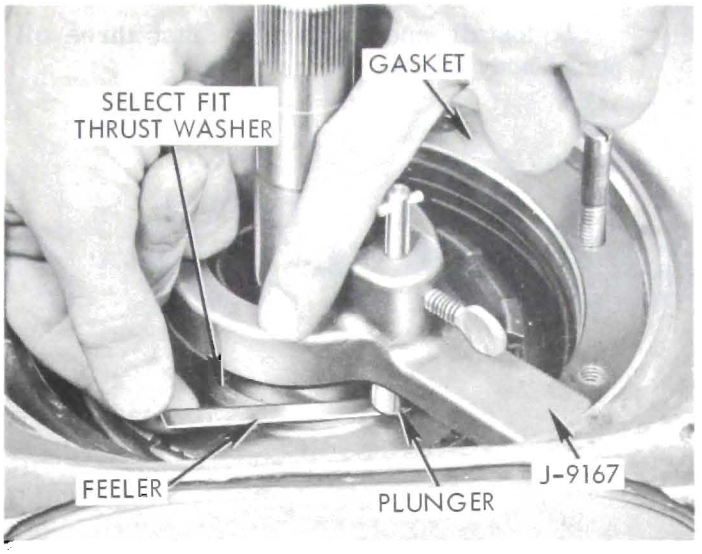
5-301

NOTE: Do not install apply levers until hub clearance has been checked and thrust washer between reverse clutch hub and reverse clutch piston housing has been selected.



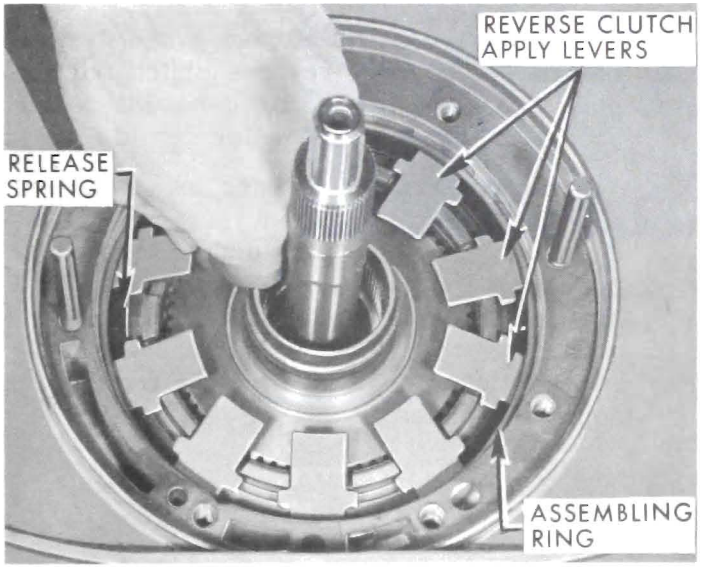
7. Set gauge J-9167 on oil pump - reverse clutch piston housing assembly with gauge bearing firmly on center hub of reverse clutch piston housing. Loosen thumb screw and allow plunger to bear on gasket surface of oil pump assembly. Tighten thumb screw.

5-302



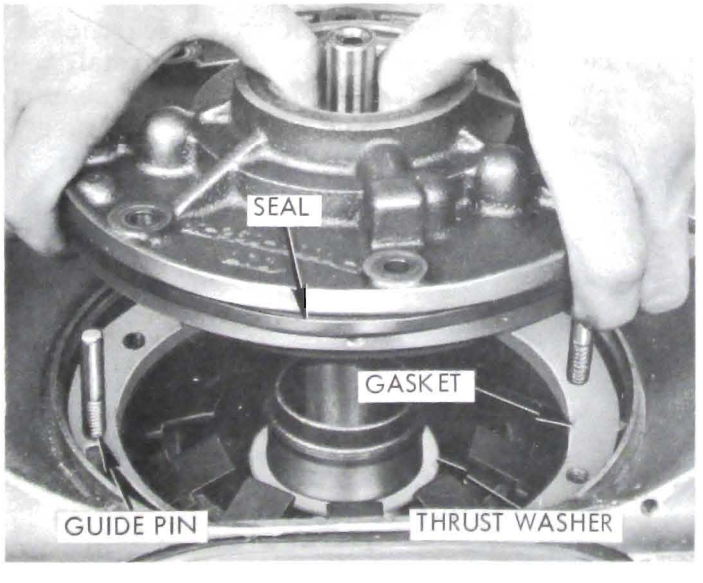
8. Install new oil pump gasket over 5/16 - 18 guide pins in case. Place a select fit reverse clutch hub to reverse clutch piston housing thrust washer in position on hub. Set gauge J-9167 over reverse clutch hub with ends of gauge resting squarely on gasket. Check clearance between end of plunger and select fit thrust washer with .006'' and .035'' feeler gauges. If the .006'' feeler will not fit between the end of the plunger and the washer, select one size thinner washer. If the .035'' feeler will fit between the end of the plunger and the washer, select one size thicker washer.

5-303



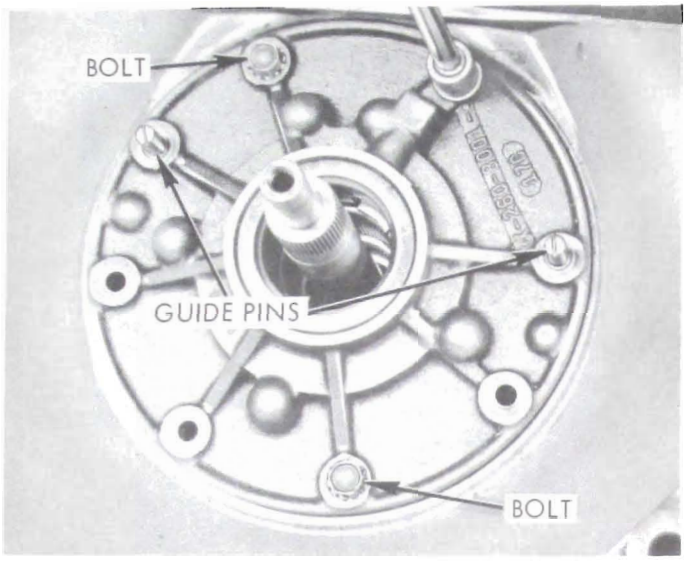
9. Install reverse clutch apply levers in notches of pressure plate, flat on release spring and with lever ends under the assembling ring. Push assembling ring down on levers to hold them in place. Chassis lube daubed on levers will help keep them in place.

5-304



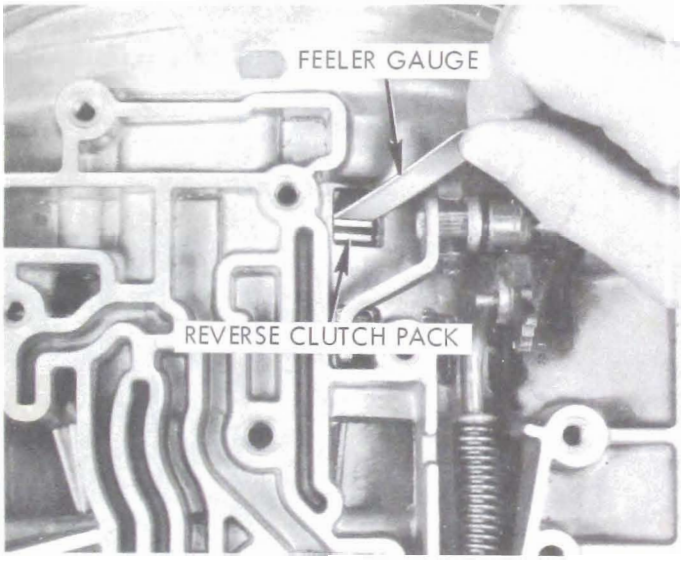
10. Liberally lube thrust washer and oil pump body to case seal. Carefully line up bolt holes with guide pins and lower pump into place.

5-305



11. Install and tighten at least three oil pump body to case bolts.

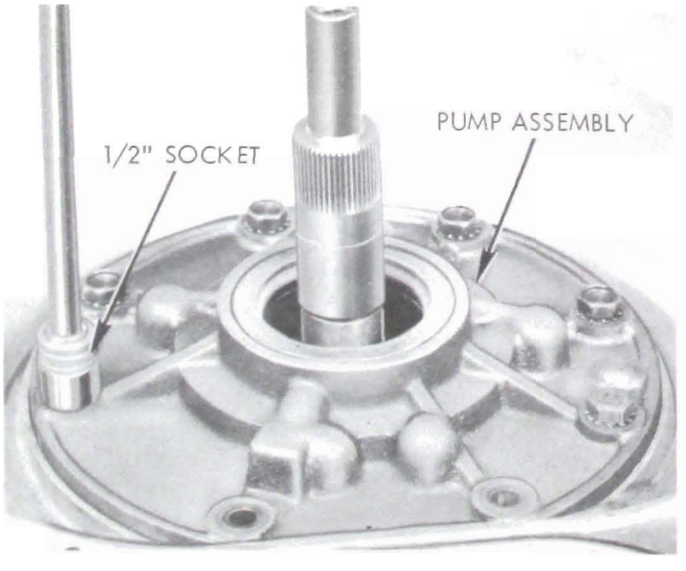
5-306



12. Insert a .029'' feeler gauge through the case between a reverse clutch friction plate and a separator plate. A .029'' feeler should go and a .061'' feeler should not go.

If pack clearance is less than .030'', it may be due to incorrect pressure plate, separator plates not all ''dished'' same way or apply levers incorrectly installed and binding on piston. If pack clearance is more than .060'' it may be due to incorrect pressure plate or excessively worn friction or separator plates.

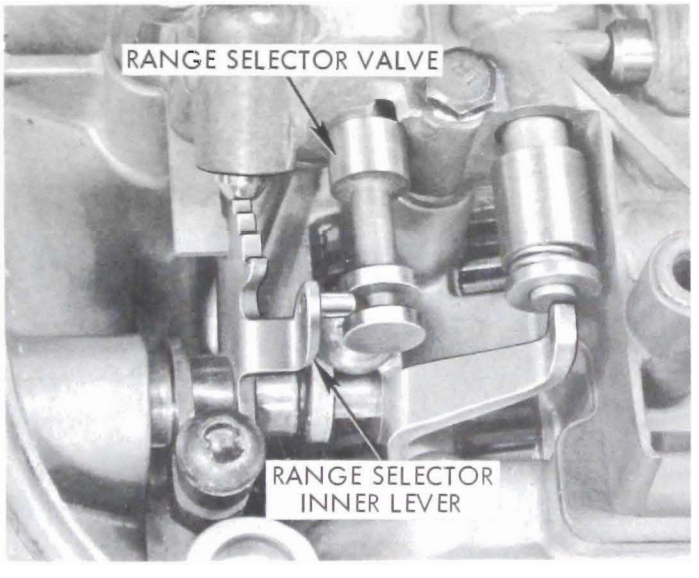
5-307



13. If reverse clutch pack clearance is satisfactory, remove guide pins, install remaining special bolts and captive sealing lock washers. Torque alternately and evenly to 20-24 ft. lbs.

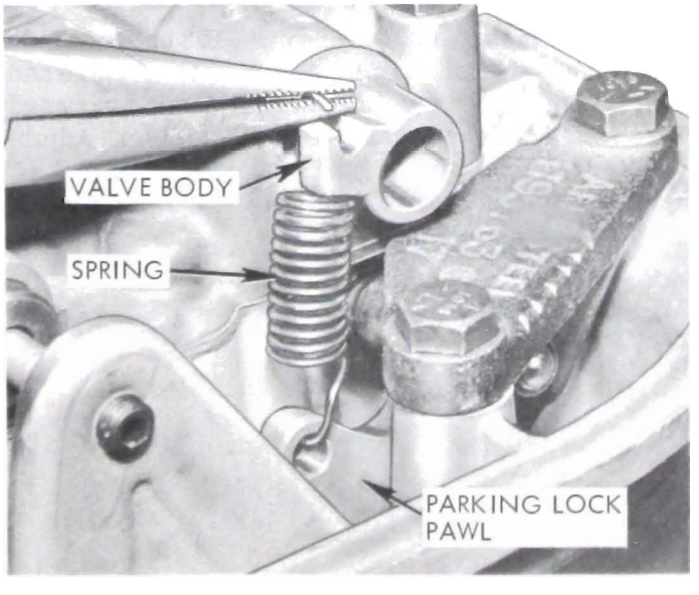
5-308

5-31 VALVE BODY: INSTALLATION



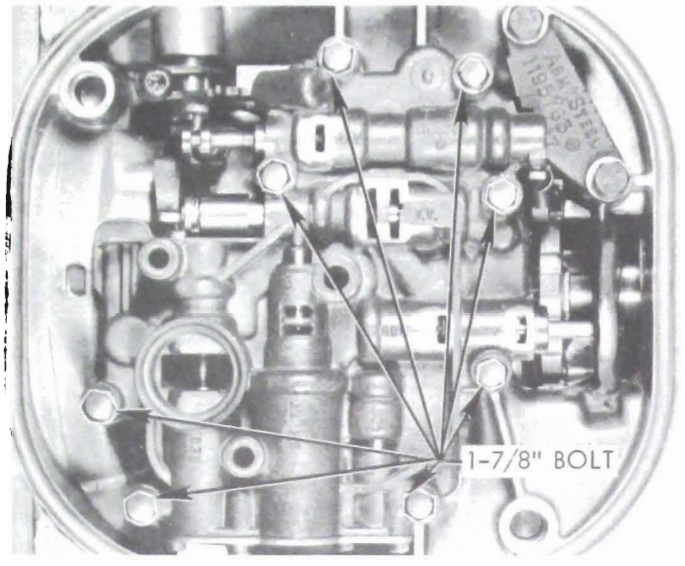
1. Be certain surfaces of case and valve body are clean. Set valve body assembly in place and engage pin of range selector inner lever with groove of selector valve.

5-309



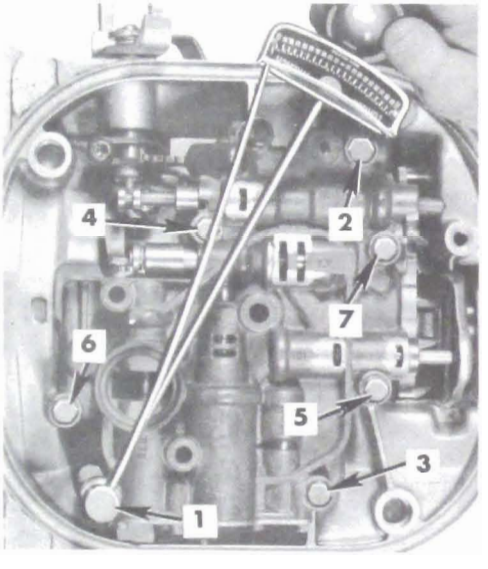
2. Install parking lock pawl disengaging spring.

5-310



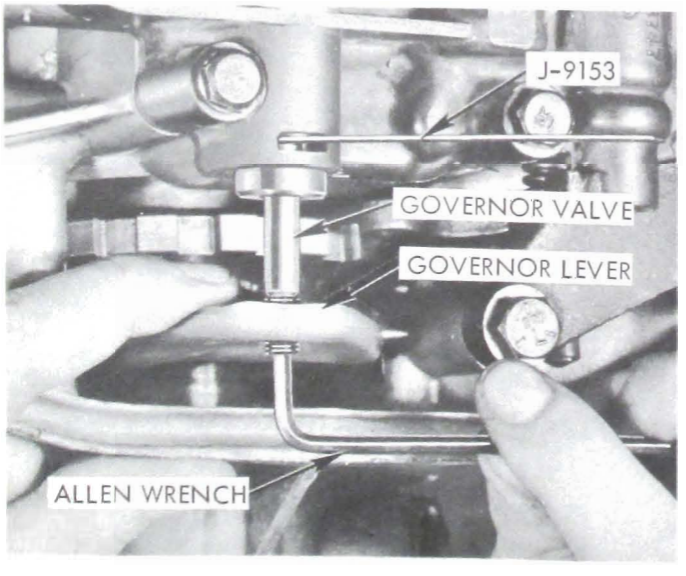
3. Install 1/4 - 20 x 1-7/8'' bolts in locations shown.

5-311



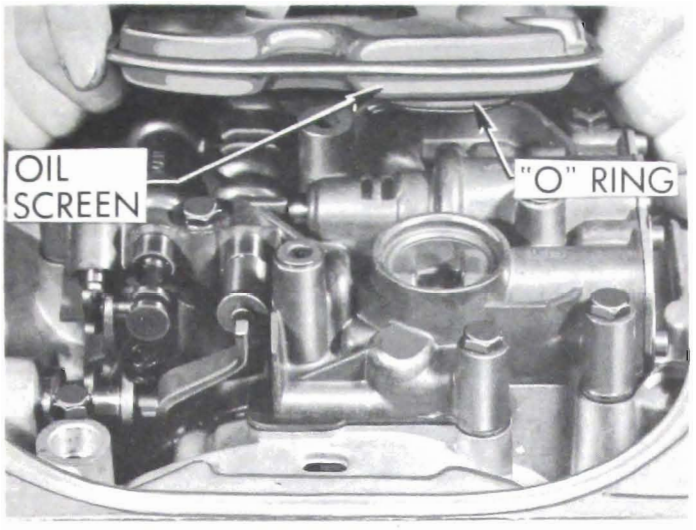
4. Torque bolts in sequence shown to 100 inch pounds exactly.

5-312



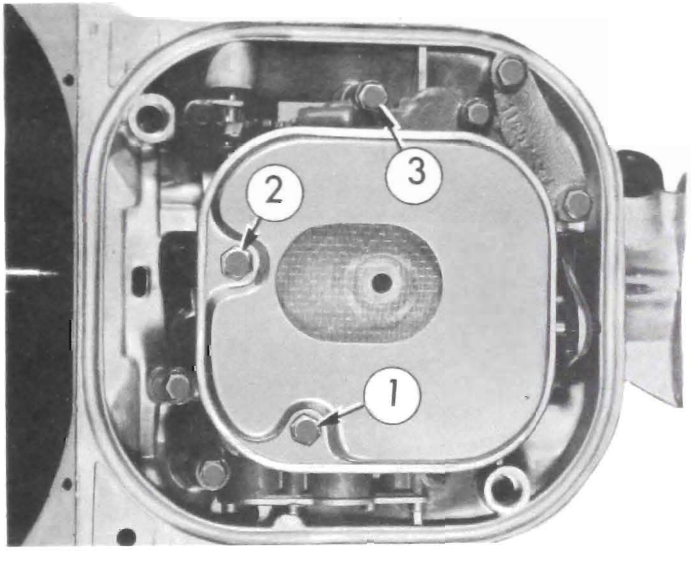
5. Insert .025'' feeler J-9153 between forward edge of rear land of governor valve and valve sleeve. Hold governor lever rearward and valve forward against feeler. Adjust screw so screw just touches rear end of valve with valve held ''in'' against feeler. Remove feeler.

5-313



6. Install new "O" ring on oil screen and set in place on valve body. Install two 1/4" - 20 x 2 1/2" attaching bolts.

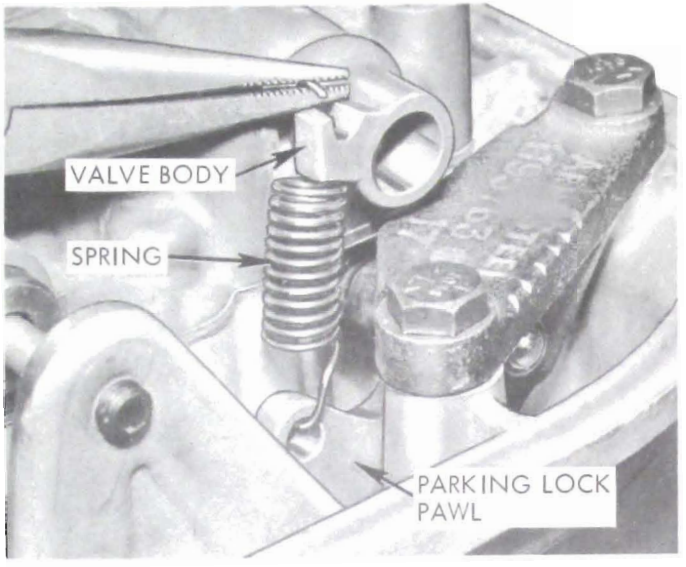
5-314



7. Torque bolts indicated to exactly 100 inch pounds in sequence shown.

5-315

5-32 PARKING LOCK PAWL: REMOVAL AND REPLACEMENT

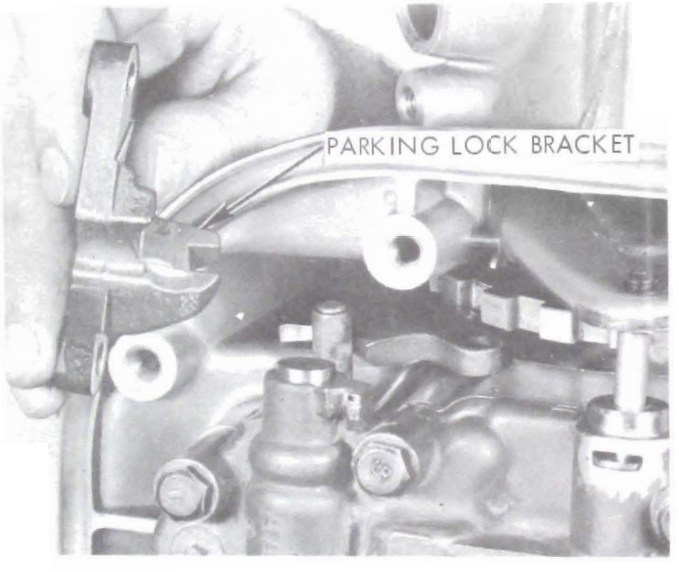


NOTE: This operation can be performed with transmission in car.

a. Removal

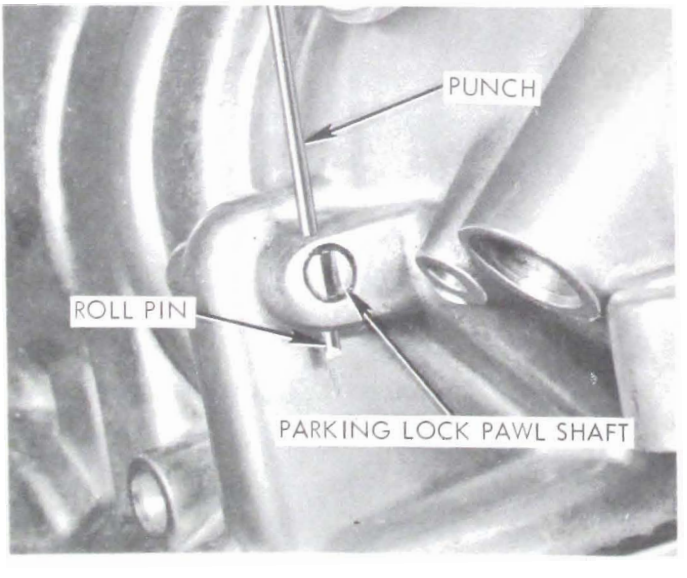
1. Remove oil pan and seal (par. 5-21); remove parking lock pawl disengaging spring.

5-317



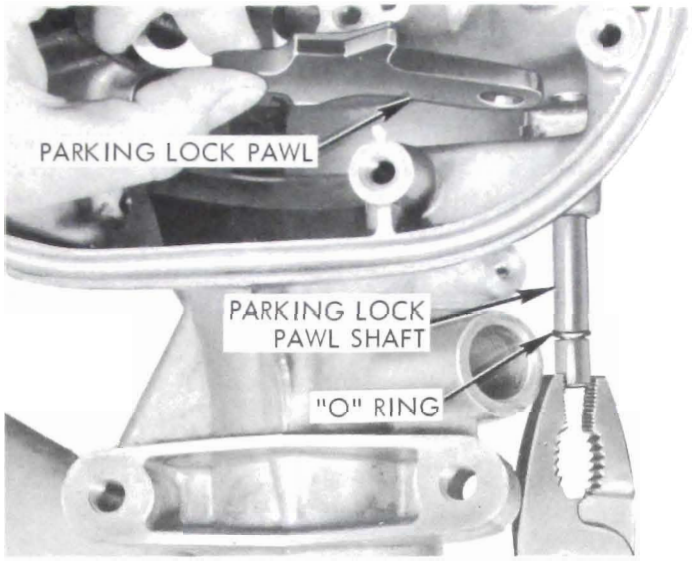
2. Remove parking lock bracket to case bolts (1/2'' wrench). Remove bracket.

5-318



3. Use a small punch or drift to drive parking lock pawl shaft pin out of case.

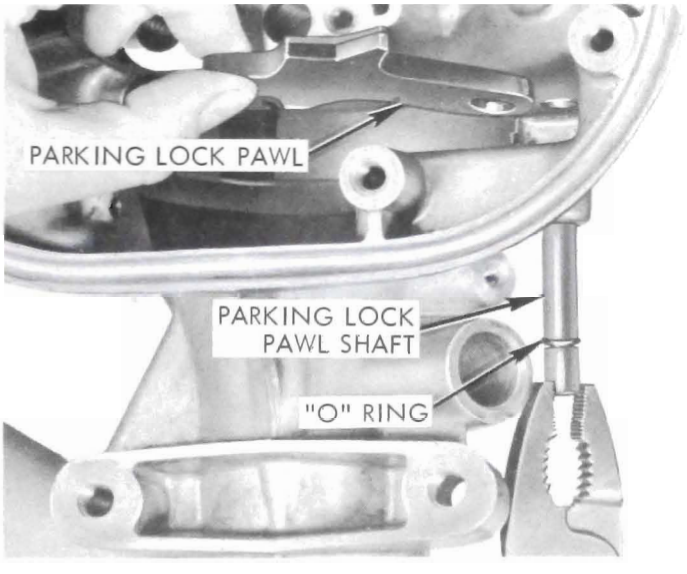
5-319



4. Pull parking lock pawl shaft and "O" ring out of case. Remove pawl.

NOTE: It may be necessary to start shaft out of case using needle nose pliers to grip the shaft inside the case.

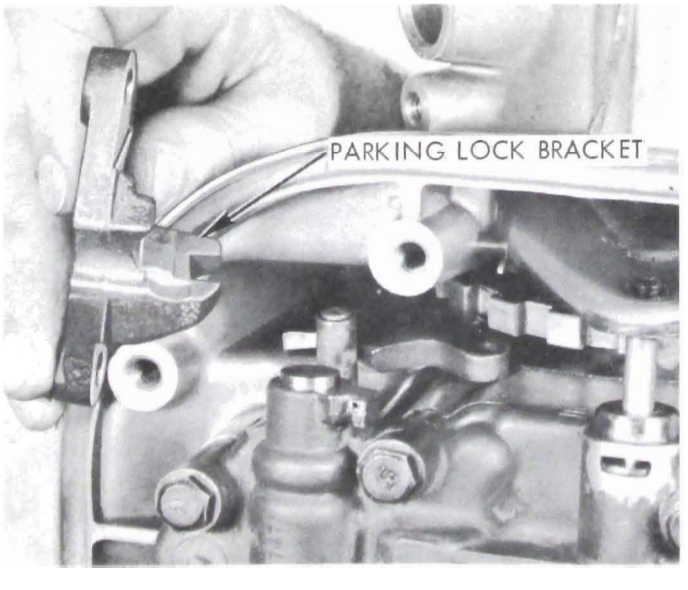
5-320



b. Replacement

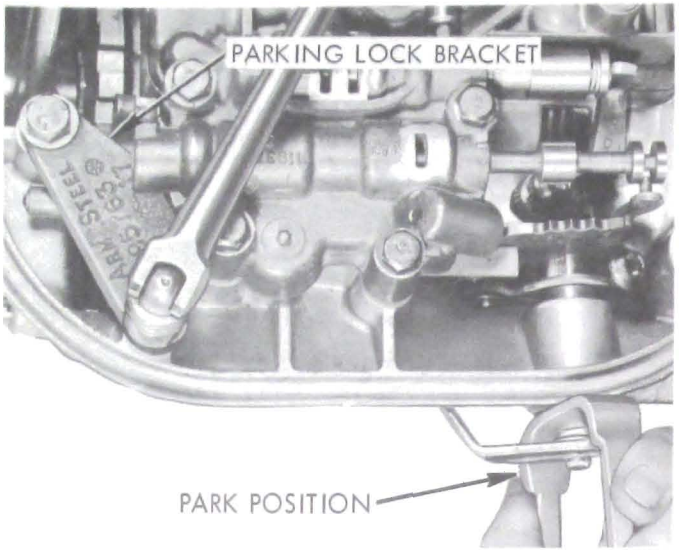
1. Install and lube "O" ring on parking lock pawl shaft. Align pawl with shaft and install shaft with slot lined up with hole in case. Install roll pin.

5-321



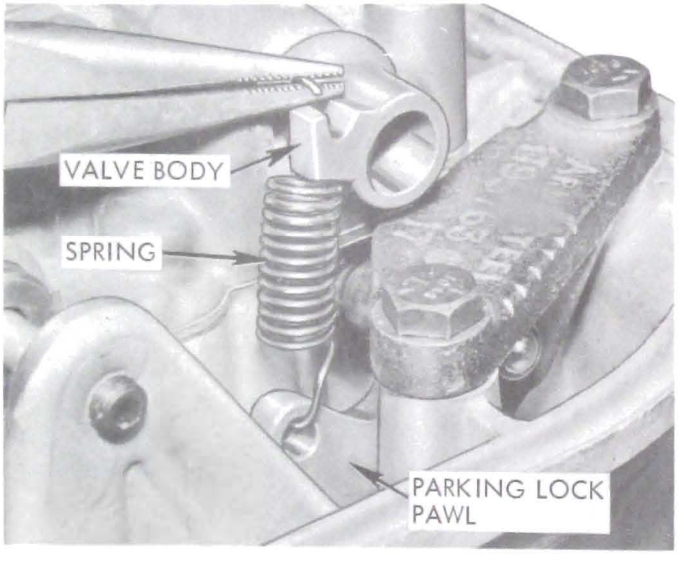
2. Install parking lock bracket but do not tighten bolts.

5-322



3. Shift transmission to park position. Turn output shaft so pawl engages wheel. Tighten parking lock bracket bolts. Move selector to neutral and back to park position. Check for freedom of travel between park and neutral ranges. If a bind exists, use .001" shims both bracket bolts. Torque bolts to 15-20 ft. lbs. Shims are available through Buick parts warehouses under group 4.596.

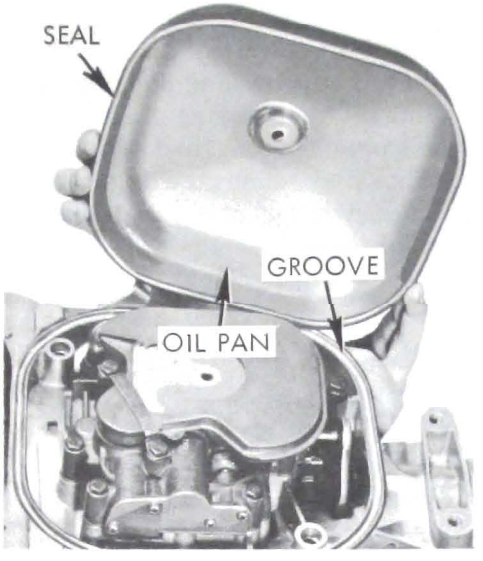
5-323



4. Install parking lock pawl disengaging spring.

5-324

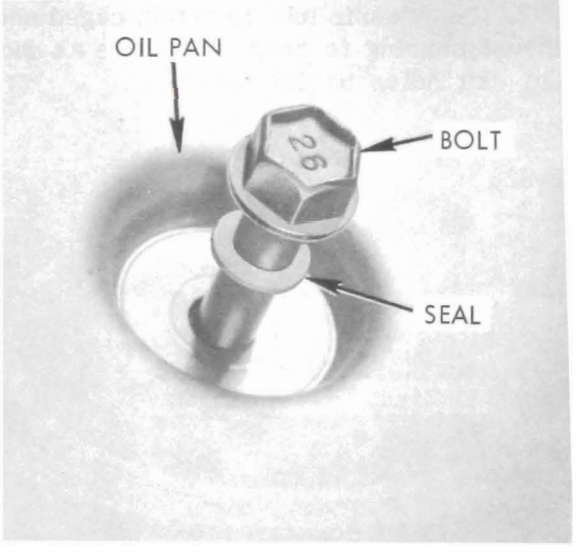
5-33 OIL PAN AND SEAL: INSTALLATION



1. Assemble new seal to oil pan and set oil pan in place.

5-325

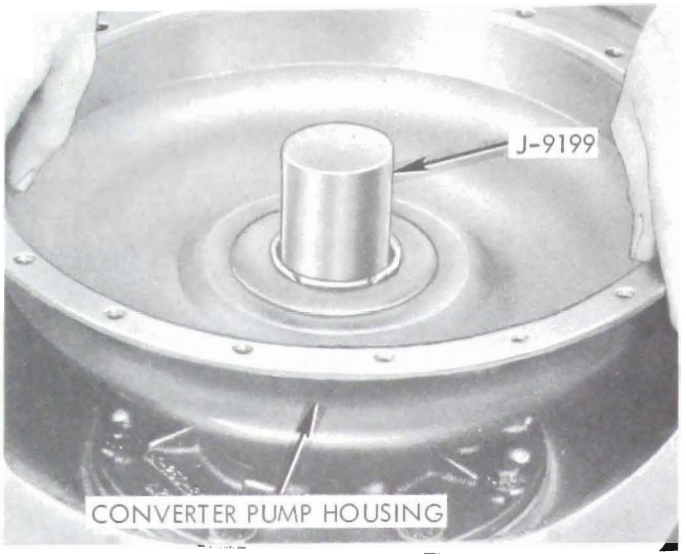
NOTE: Unless care is used to avoid stretching seal when installing seal on oil pan, difficulty will be encountered. A suggested alternate is to place seal in position in case groove around valve body and set oil pan on seal. Rap pan sharply with palm of hand to install seal on pan.



2. Assemble new seal on bolt and install bolt. Torque to 15-20 ft. lbs.

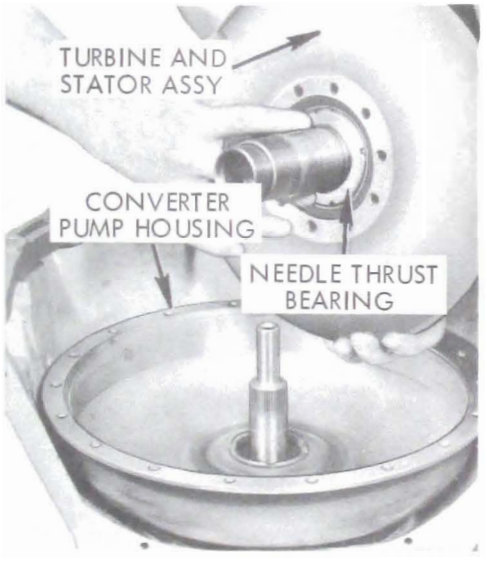
5-326

5-34 CONVERTER AND GEAR SET: INSTALLATION



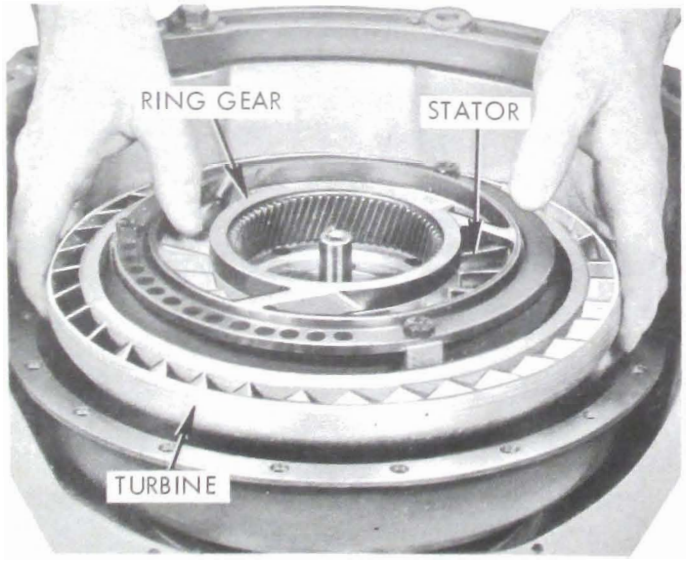
1. Set converter pump housing assembly tool J-9199 over output shaft. Tool centers converter pump housing so housing hub does not damage seal during installation. Lube hub of pump housing and install carefully. Rotate housing to engage lugs on pump with slots of converter pump housing hub. Remove tool J-9199.

5-327



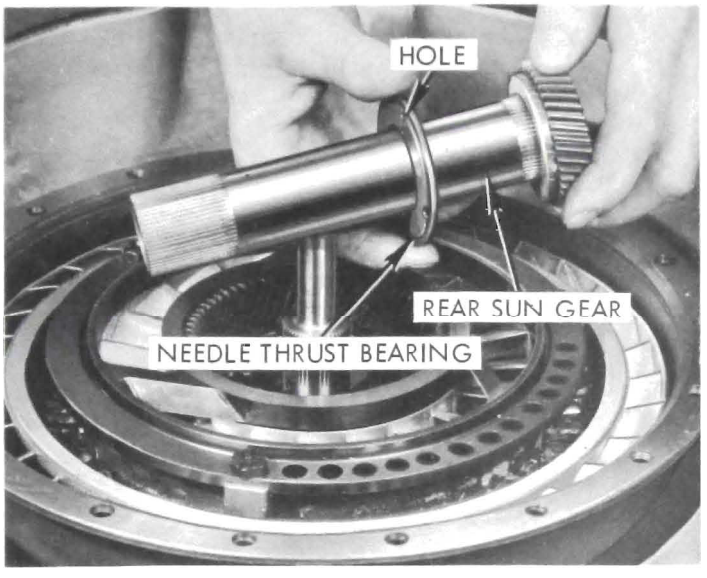
2. Use chassis lube to retain caged needle thrust bearing to rear of turbine as shown. Oil exit holes to the rear.

5-328



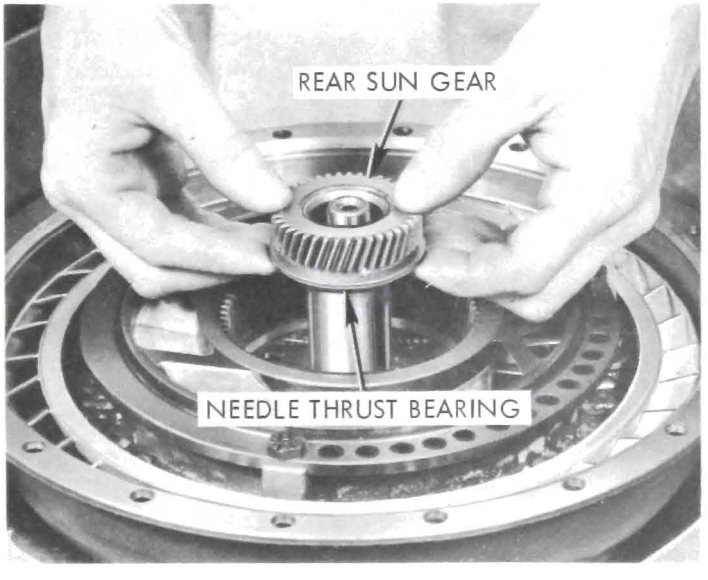
3. Set stator and turbine assembly into pump housing carefully to avoid damage to splines. Rotate turbine and stator to engage splines. The stator and turbine will drop into place when splines are lined up.

5-329



4. Assemble caged needle thrust bearing to rear of rear sun gear as shown. Oil exit holes to the rear.

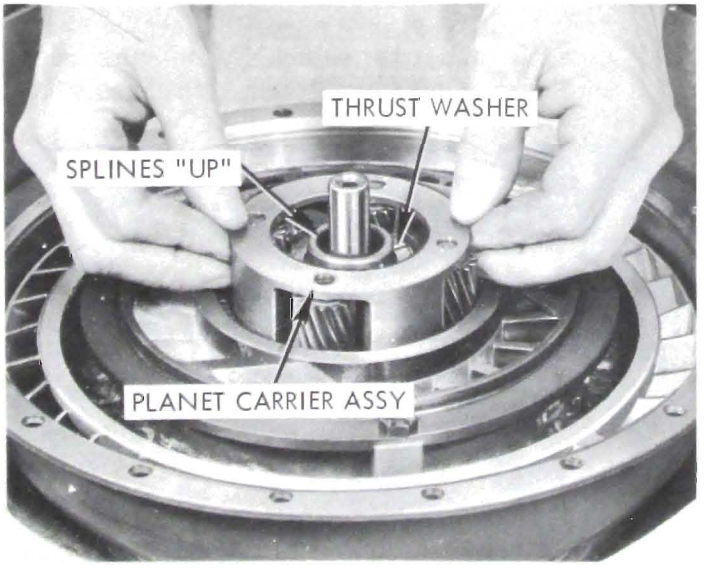
5-330



5. Lubricate sun gear shaft inside and out. Slide sun gear and needle bearing carefully into place. Rotate the gear to engage splines.

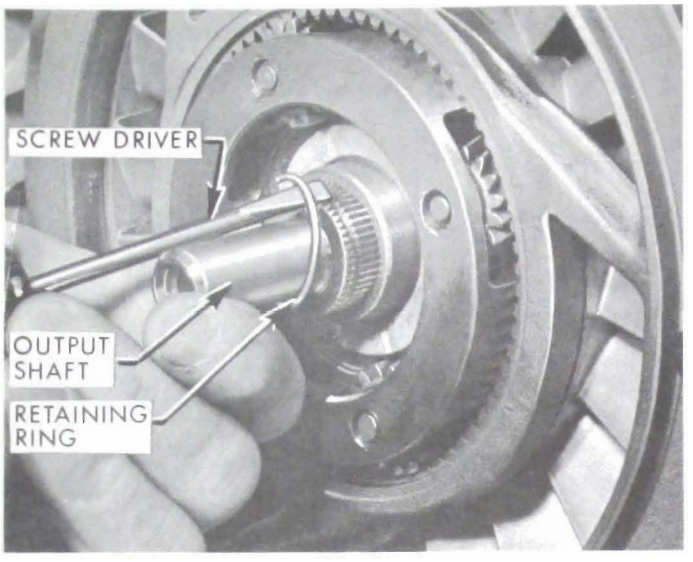
NOTE: Two sets of splines must be engaged (sun gear race and coast clutch hub). Do not force the gear as spline damage may result.

5-331



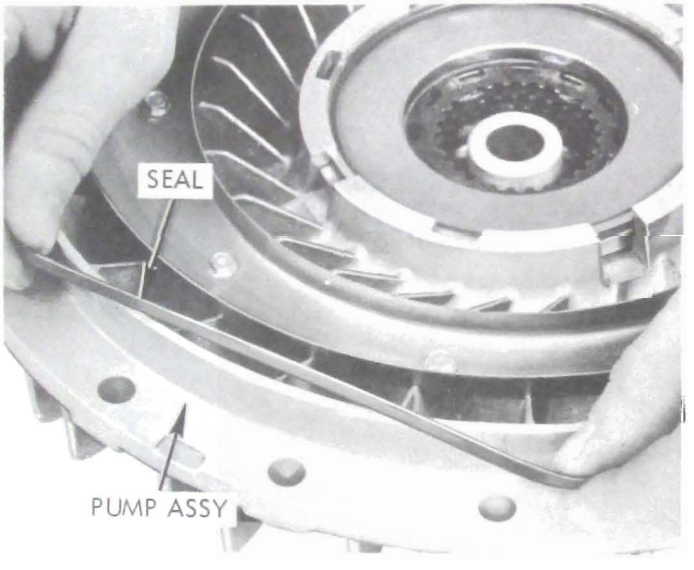
6. Set planet carrier over rear sun gear with tanged thrust washers in place front and rear - Deeper pocket of carrier "down" toward rear sun gear and splined portion "up".

5-332



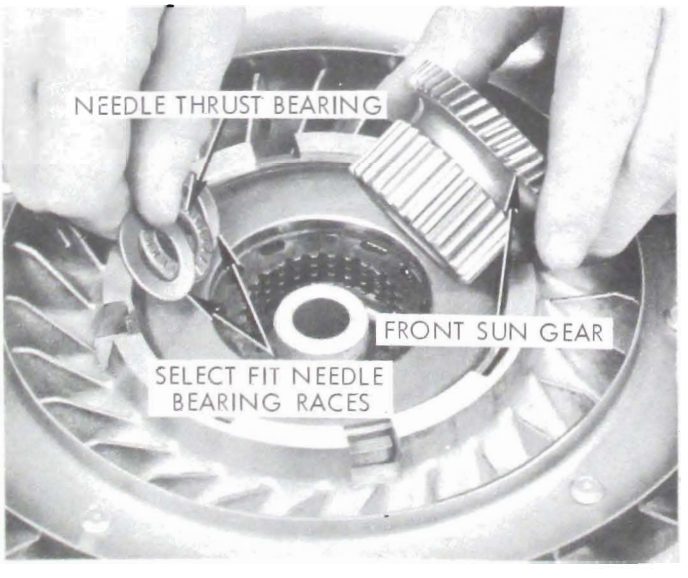
7. Use a small screwdriver to install retaining ring in groove of output shaft.

5-333



8. Assemble new converter pump oil seal to pump. The seal is square section and must not be twisted.

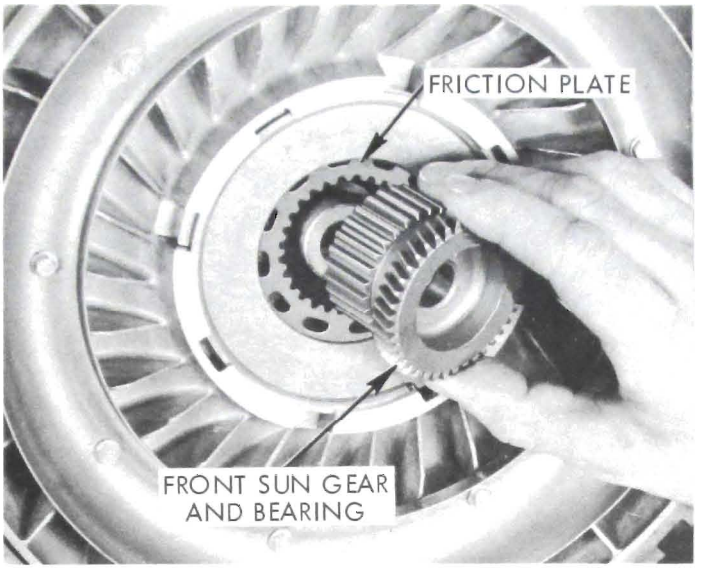
5-334



9. Lubricate and assemble needle thrust bearing and two select fit bearing races into front sun gear. Retain with chassis lube.

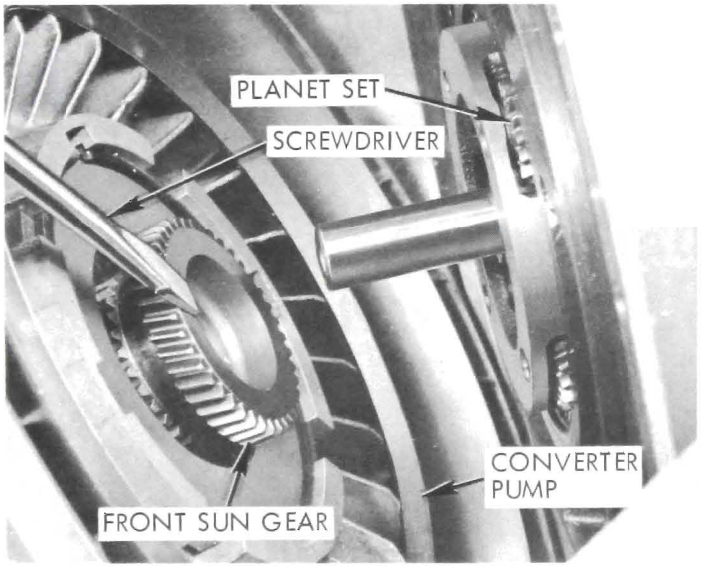
5-335

NOTE: .030'' Bearing race toward sun gear.



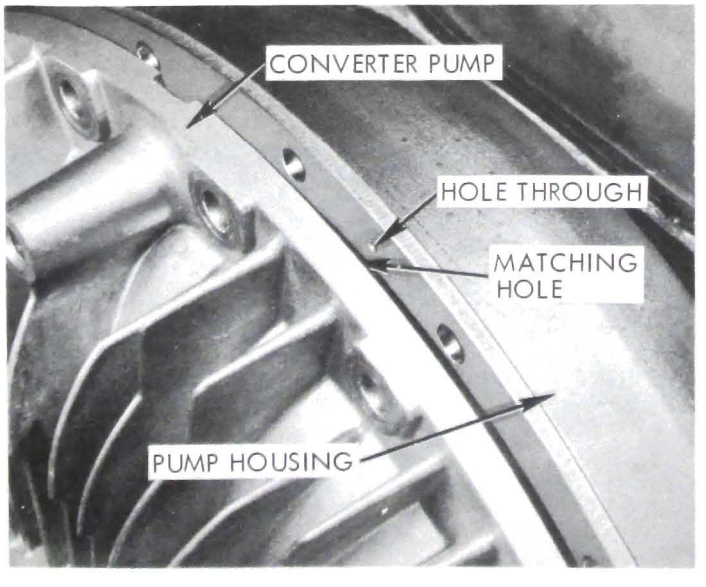
10. Engage splines on sun gear hub with splines of converter clutch friction plates. Rotate gear while pressing down very lightly till all splines are engaged.

5-336



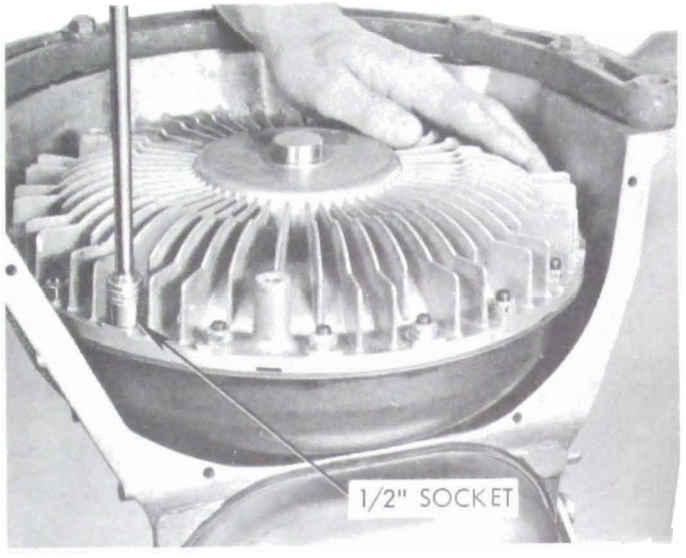
11. Hold front sun gear in place with long screwdriver while positioning converter pump against pump housing. Remove screwdriver. Rotate the assembly very slightly to mesh the front sun gear with the planet pinions. When gears are in mesh, push converter pump into converter housing and pull housing toward pump.

5-337



12. Before installing pump housing to converter pump bolts, check locating hole through housing and matching hole part way through converter pump flange. These holes must line up to preserve balance of assembly.

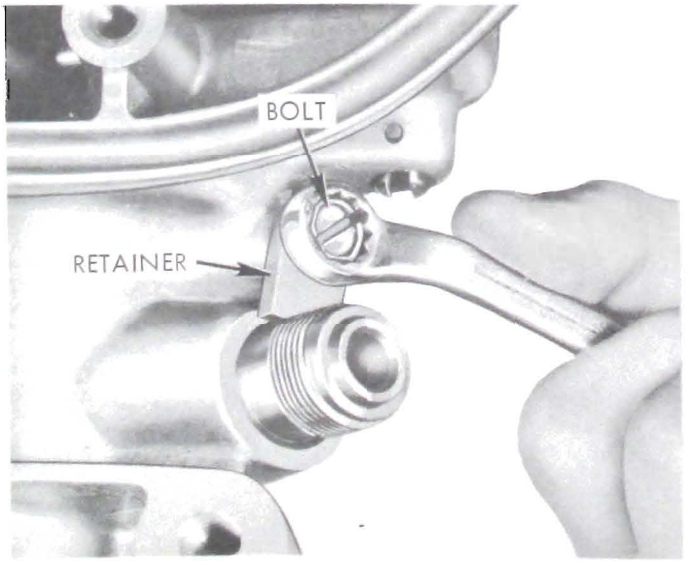
5-338



13. Set transmission vertical. Install and tighten special nuts and bolts alternately and evenly. Torque to 15-20 ft. lbs. Install transmission vent. See paragraph 5-36.

5-339

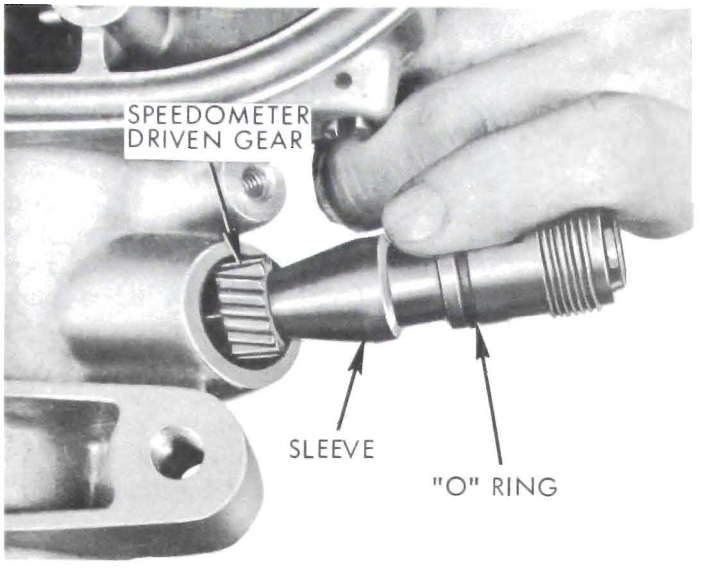
5-35 SPEEDOMETER DRIVEN GEAR SLEEVE AND "O" RING: REMOVAL AND REPLACEMENT



a. Removal (Reverse Removal Procedure for Replacement)

1. Remove bolt attaching speedometer driven gear sleeve retainer to case. Remove retainer.

5-340



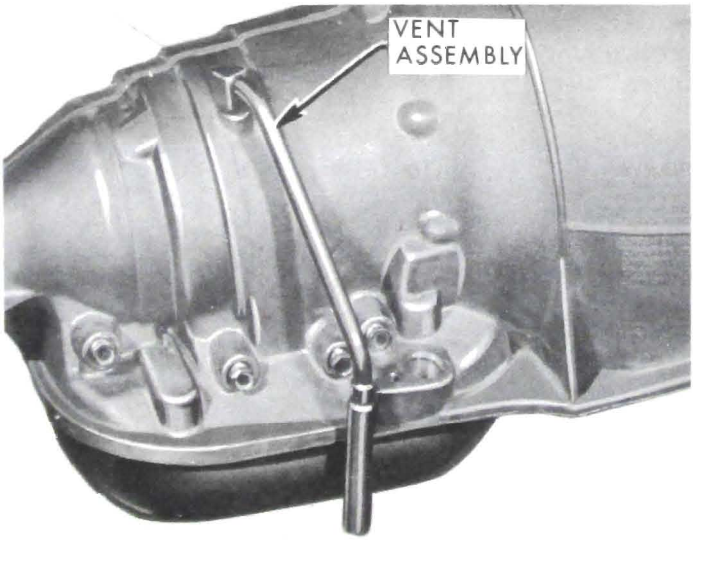
2. Slide driven gear sleeve, gear, and "O" ring out of case. Examine "O" ring for nicks or tears. Replace if necessary.

NOTE: Plastic gear and shaft are not retained in sleeve. If replacement of the gear is necessary, slide gear and shaft out of sleeve.

5-341

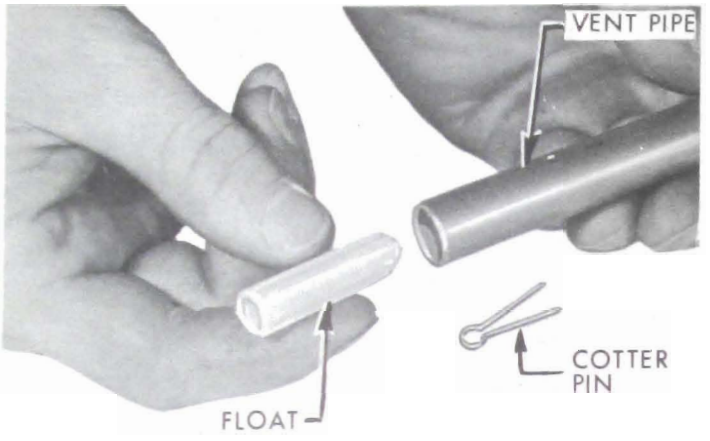
NOTE: Reverse removal procedure for replacement.

5-36 VENT: REMOVAL, DISASSEMBLY AND INSTALLATION



1. Remove vent assembly from case by pulling straight up. To reinstall, reverse removal procedure.

5-342



2. Remove cotter pin and slide float out of tube. Wipe off float and clean tube in solvent. To reassemble, install float pointed end first and then cotter pin in hole below float.

5-343

5-37 BALANCING TRANSMISSION

Whenever a replacement converter pump or converter pump housing is installed, there is a possibility that some unbalance may be introduced. In production, converter pumps and housings are balanced as an assembly, while service replacement parts are balanced individually. If objectionable unbalance is encountered in a Dual Path automatic transmission, the unbalance may be corrected as outlined below.

1. Connect a reliable tachometer to the engine and place instrument in position so driver may observe engine speed.

2. Raise car sufficiently to allow lower fly wheel housing to be removed and weights to be attached to converter pump to housing bolts.

3. Screw largest of three J-9367 weights on portion of converter pump to housing bolt extending through nut. See Figures 9 and 10. Any one of the 18 bolts will serve equally well as a starting point. It is advisable to mark with crayon or pencil the starting point so subsequent locations of the weights may be referred to it. See Figure 11.

4. Start engine and with transmission in "Park" range, operate at exactly 1500 RPM. Carefully note intensity of vibration.

5. Remove trial weight from starting point and move it 180° (directly across from starting point).

NOTE: There are 18 converter pump to housing bolts, so by counting nine bolts in either direction, the opposite location may be found.

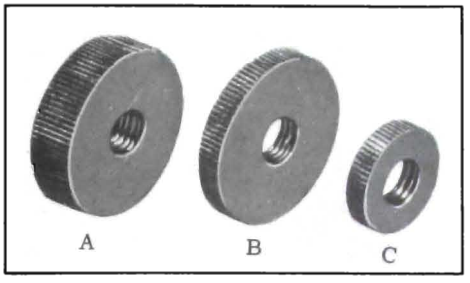


Figure 5-344—Trial Weight Set J-9367

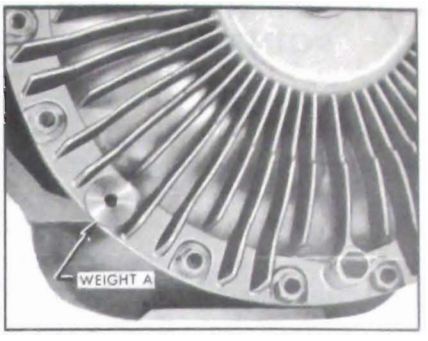


Figure 5-345—Trial Weight Installed

Carefully note vibration with trial weight in second position (opposite first position).

6. Move trial weight to third position (half-way between first and second position).

NOTE: Use either the fourth or fifth bolt between first and second position. It is not possible to install weight exactly halfway between first and second position.

Carefully note vibration intensity with trial weight in third position.

7. Move weight to fourth position (opposite third position); run engine again at 1500 RPM and carefully note vibration.

8. It should be apparent from the foregoing checks that one position of the weight made a greater improvement than any of the others; smaller trial weights may now be tried in that area to determine the weight or combination of weights that reduce vibration the greatest amount. After determining the weight or weights that provide the greatest improvement, move the weight or weights to the right or left to determine if the vibration can be further reduced.

When the location is found that provides the greatest improvement, the trial weight or weights should be removed and permanent weights installed in their place as indicated below.

Permanent weights are available through Buick Parts Warehouses under group 4.115.

Trial Weight	Permanent Weight Required	Attaching Bolt
"A" (Largest)	2 - 1195094 (.135" thick)	2 - 1195069 *
"B"	1 - 1195094	1 - 1195069
"C" (Smallest)	1 - 1195092 (.0345" thick)	Production

*NOTE: A special longer bolt must be used with balance weight 1195094. If two 1195094 weights are required they must be positioned adjacent to each other.

5-38 PRESSURE CHECK POINTS

A Gauge set may be connected at the taps shown in Figures 5-346 and 5-347. Pressures indicated in Figures 5-28, 5-29, 5-30, 5-31, 5-32, and 5-33 may be expected within 10%. If the transmission is functioning correctly, however, no tear down should be made due to pressure variations.

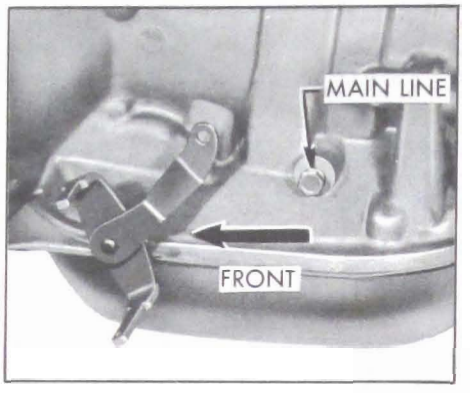


Figure 5-346—Left Side Pressure Tap

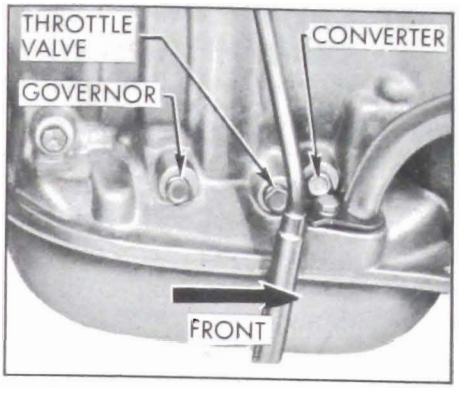
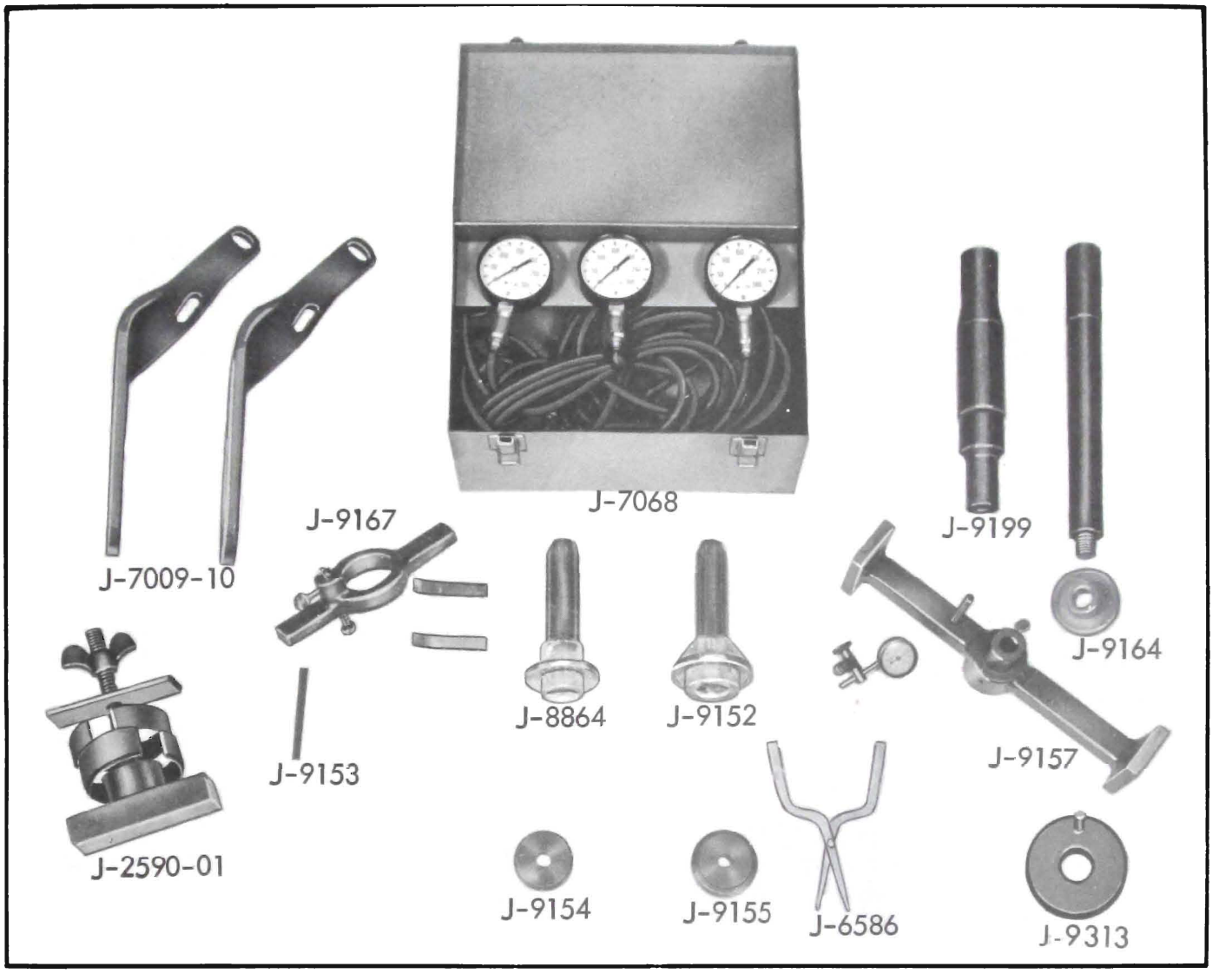


Figure 5-347—Right Side Pressure Taps



AUTOMATIC TRANSMISSION SPECIAL TOOLS

J-2590-01	Clutch Spring Compressor
J-6586	Oil Delivery Sleeve Remover and Installer
J-7009-10	Adapter Kit (Use with J-7009 Transmission Holding Fixture)
J-7068	3 - Gauge Pressure Gauge Set
J-8864	Transmission Seal Installer
J-9152	Oil Pump Seal Installer
J-9153	Governor Setting Gauge
J-9154	Oil Pump Bushing Remover
J-9155	Oil Pump Bushing Installer
J-9157	Convertor Clearance Gauge
J-9164	Transmission Bearing Installer (Includes Handle)
J-9167	Reverse Clutch Hub Clearance Gauge (2 feelers)
J-9199	Convertor Pump Housing Assembly Tool
J-9313	Spring Centering Tool

Figure 5-348—Automatic Transmission Special Tools