Transfer Case - Overhaul - BW 4482-NR4

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Adapter Studs	31 N.m	23 lb ft
Case Bolts	21 N.m	15 lb ft
Drain Plug	25 N.m	18 lb ft
Encoder Motor Bolts	10 N.m	89 lb in
Encoder Motor Bracket Bolt	10 N.m	89 lb in
Fill Plug	25 N.m	18 lb ft
Vehicle Speed Sensors	17 N.m	13 lb ft
Vent	6 N.m	53 lb in

SEALERS, ADHESIVES, AND LUBRICANTS

Sealers, Adhesives, and Lubricants

Application	Type of Material	GM Part Number	
		United States	Canada
Drain Plug	Pipe Sealant	12346004	10953480
Fill Plug	Pipe Sealant	12346004	10953480
Front Output Shaft Cup Plug	Threadlocker	12345382	10953489
Rear Case Half to Front Case Half	RTV Sealant	12345739	10953541
Transfer Case Fluid	DEXRON(R)III	12346143	10952622
Vehicle Speed Sensor O-Ring	Transfer Case Fluid	12346143	10952622
Vent	Pipe Sealant	12346004	10953480

CAPACITIES - APPROXIMATE FLUID

Capacities - Approximate Fluid

Application	Specification	
	Metric	English
DEXRON(R)III Fluid GM P/N 12346143 (Canadian P/N 10952622)	1.4 liters	1.5 quarts

VISUAL IDENTIFICATION

TRANSFER CASE DISASSEMBLED VIEW

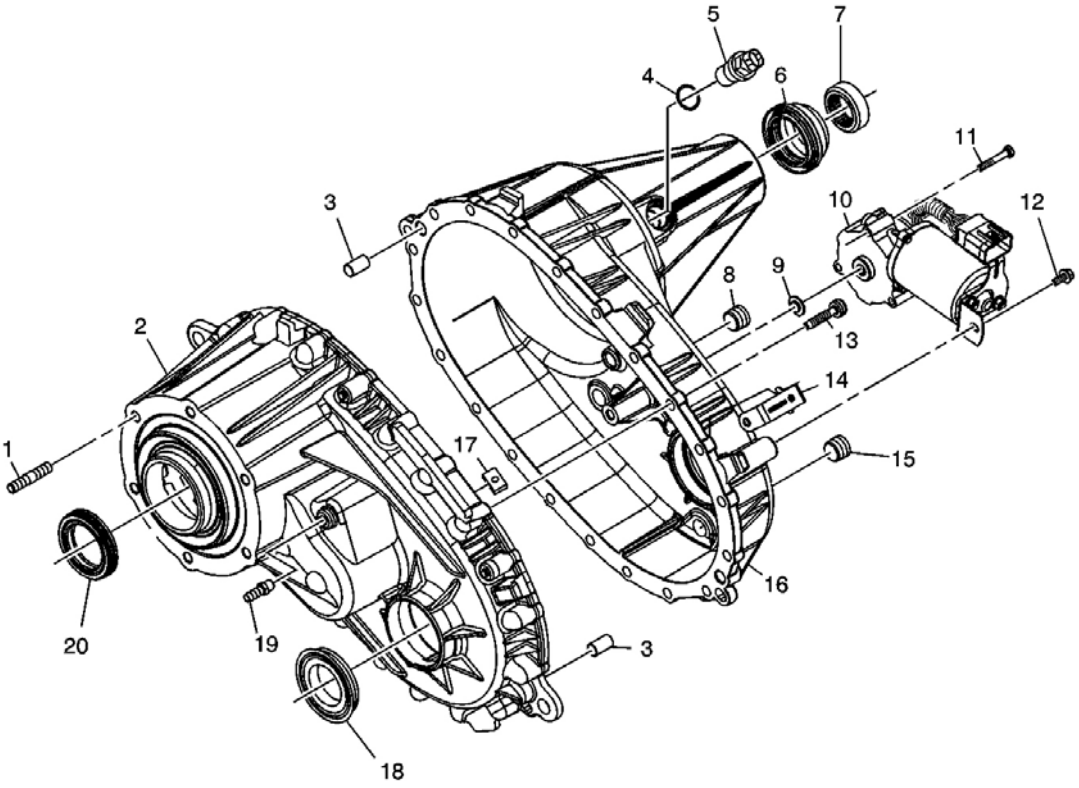


Fig. 1: Case Components Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1

Callout	Component Name
1	Adapter Stud
2	Front Case Half
3	Location Pin
3	Location Pin
4	Vehicle Speed Sensor O-Ring Seal
5	Vehicle Speed Sensor
6	Rear Output Shaft Seal
7	Shipping Seal
8	Fill Plug
9	Shift Detent Lever Seal
10	Encoder Motor
11	Encoder Motor Bolt
12	Encoder Motor Bracket Bolt

13	Case Half Bolt
14	Wiring Harness Bracket
15	Drain Plug
16	Rear Case Half
17	Magnet
18	Front Output Shaft Seal
19	Vent
20	Input Shaft Seal

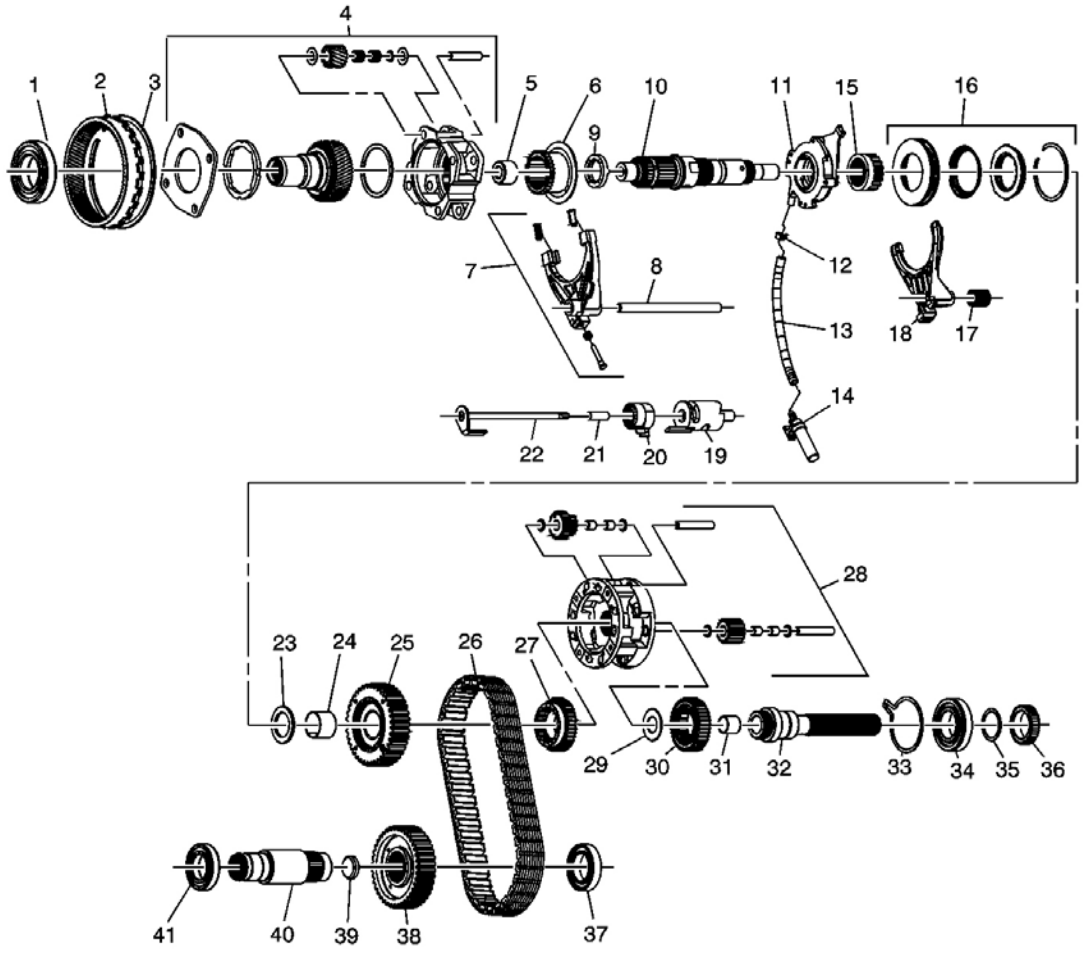


Fig. 2: Transfer Case Internal Components Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Input Gear Bearing

2	Annulus Gear
3	Annulus Gear Retaining Ring
4	High/Low Planetary Carrier Assembly
5	Mainshaft Front Support Bearing
6	High/Low Range Sleeve
7	High/Low Range Shift Fork Assembly
8	Shift Fork Shaft
9	Input Gear Thrust Washer
10	Mainshaft
11	Oil Pump
12	Oil Pump Hose Clamp
13	Oil Pump Hose
14	Oil Pump Screen
15	Inner Lockup Hub
16	Lockup Shift Assembly
17	Shift Fork Shaft Spring
18	Lockup Shift Fork
19	Shift Detent Lever Cam
20	Shift Detent Lever Shaft Spring
21	Shift Detent Lever Shaft Sleeve
22	Shift Detent Lever Shaft
23	Drive Sprocket Thrust Washer
24	Drive Sprocket Bushing
25	Drive Sprocket
26	Drive Chain
27	Front Sun Gear
28	Planetary Differential Assembly
29	Rear Output Shaft Thrust Washer
30	Rear Sun Gear
31	Mainshaft Rear Support Bushing
32	Rear Output Shaft
33	Rear Output Shaft Bearing Outer Retaining Ring
34	Rear Output Shaft Bearing
35	Rear Output Shaft Bearing Retaining Ring
36	Speed Reluctor Wheel
37	Front Output Shaft Rear Bearing
38	Driven Gear
39	Front Output Shaft Cup Plug
40	Front Output Shaft
41	Front Output Shaft Front Bearing

REPAIR INSTRUCTIONS

TRANSFER CASE DISASSEMBLE

Tools Required

- **J 2619-01** Slide Hammer. See **Special Tools and Equipment** .
- **J 3289-20** Holding Fixture. See **Special Tools and Equipment** .
- **J 22912-01** Rear Pinion and Axle Bearing Remover. See **Special Tools and Equipment** .
- **J 23907** Slide Hammer with Bearing Adapter. See **Special Tools and Equipment** .
- **J 26941** Bushing and Bearing Remover - 3-4 inch. See **Special Tools and Equipment** .
- **J 45358** Case Spreader. See **Special Tools and Equipment** .
- **J 45548** Mainshaft Support Bushing/Bearing Remover. See **Special Tools and Equipment** .
- **J 45759** Assembly Fixture. See **Special Tools and Equipment** .

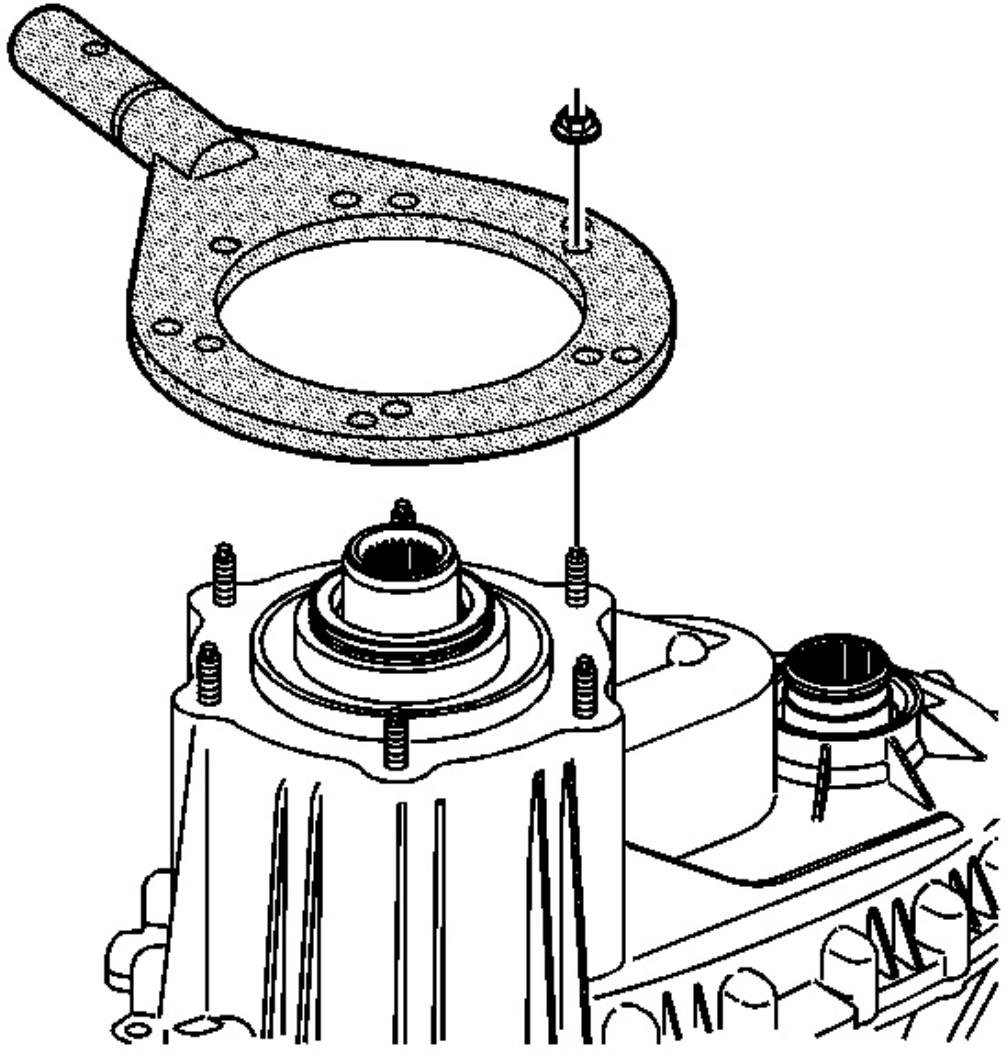


Fig. 3: Mounting Transfer Case To J 45759
Courtesy of GENERAL MOTORS CORP.

1. Using the adapter studs, attach the **J 45759** to the transfer case. All of the transfer case disassembly procedures can be performed with the case mounted to the **J 45759** .

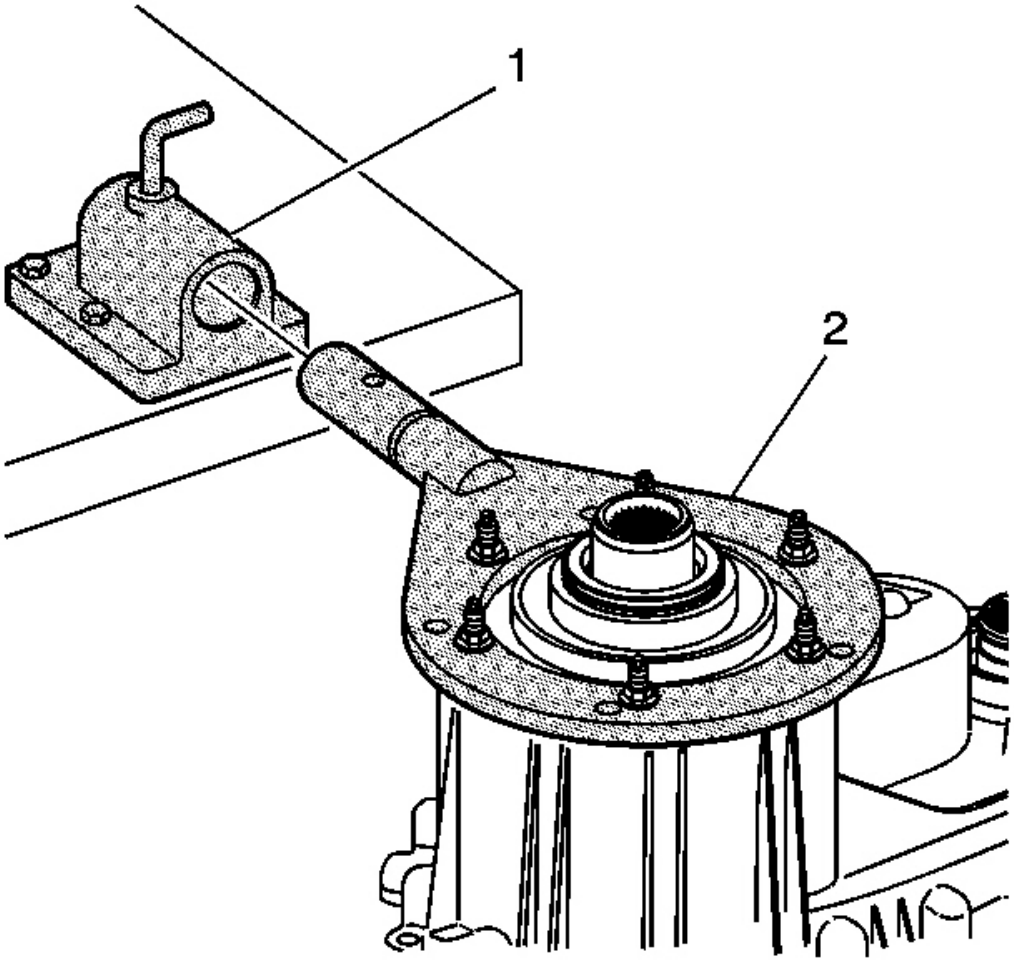


Fig. 4: Installing J 45759 Into J 3289-20
Courtesy of GENERAL MOTORS CORP.

2. Mount the **J 3289-20** (1) to a sturdy work bench.
3. Install the **J 45759** (2) into **J 3289-20** (1) and secure with pivot pin.

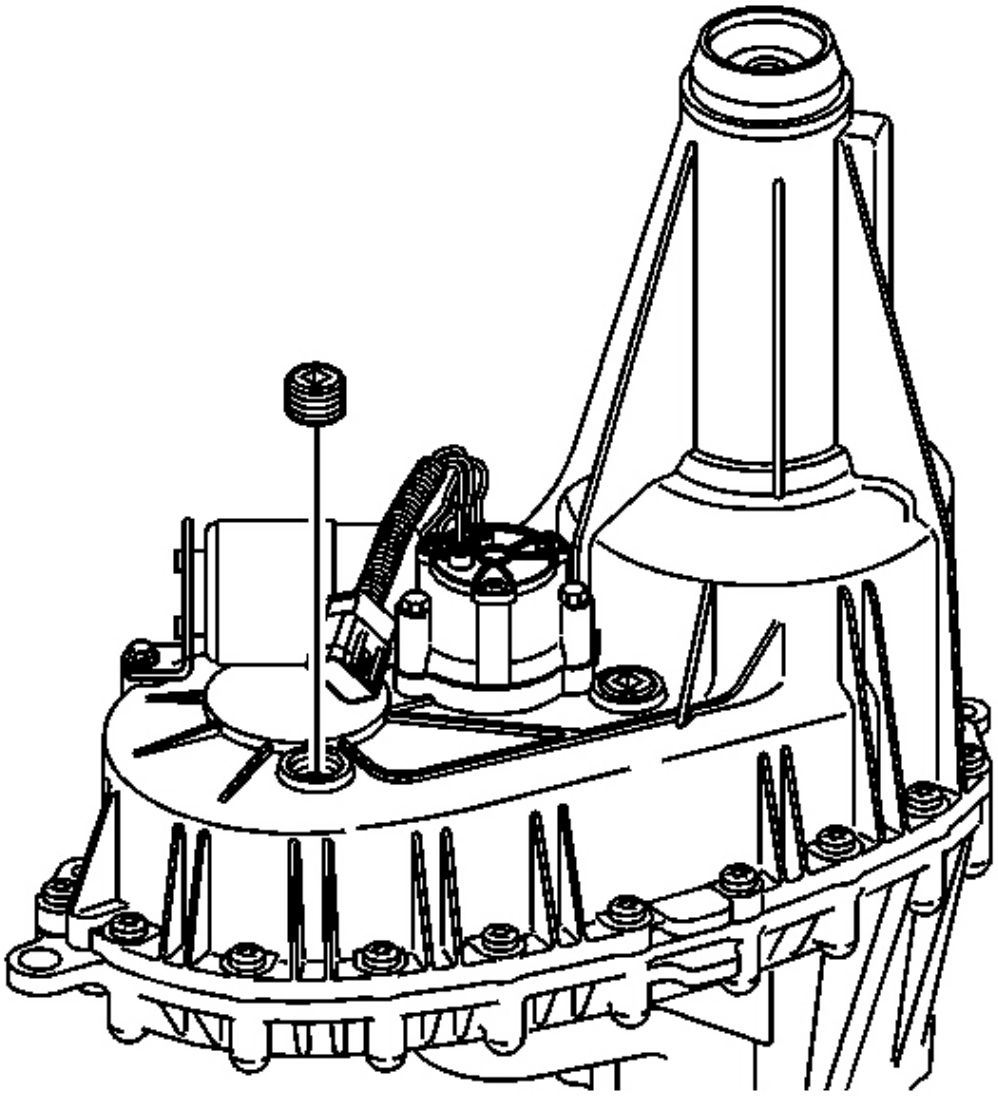


Fig. 5: View Of Drain & Fill Plug
Courtesy of GENERAL MOTORS CORP.

4. Remove the drain plug and the fill plug. Ensure all of the transfer case fluid is drained out of the transfer case.

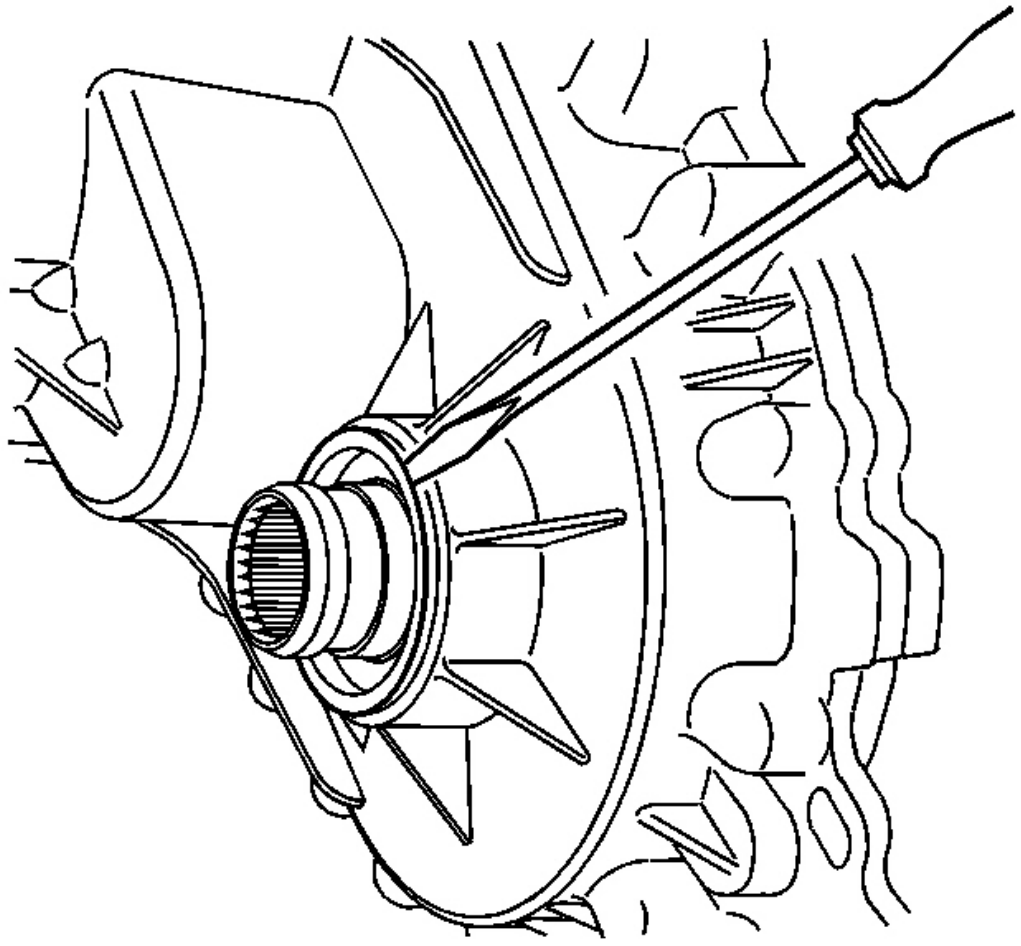


Fig. 6: Inserting Screwdriver Behind Inner Race Of Seal
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Transfer Case Seal Removal Notice in Cautions and Notices.

IMPORTANT: The front output shaft seal is a two piece internal seal. The inner seal race is a force fit on the front output shaft.

5. Remove the front output shaft seal by inserting a flat-tipped screwdriver behind the inner race of the seal.
6. Pry the inner seal race forward.

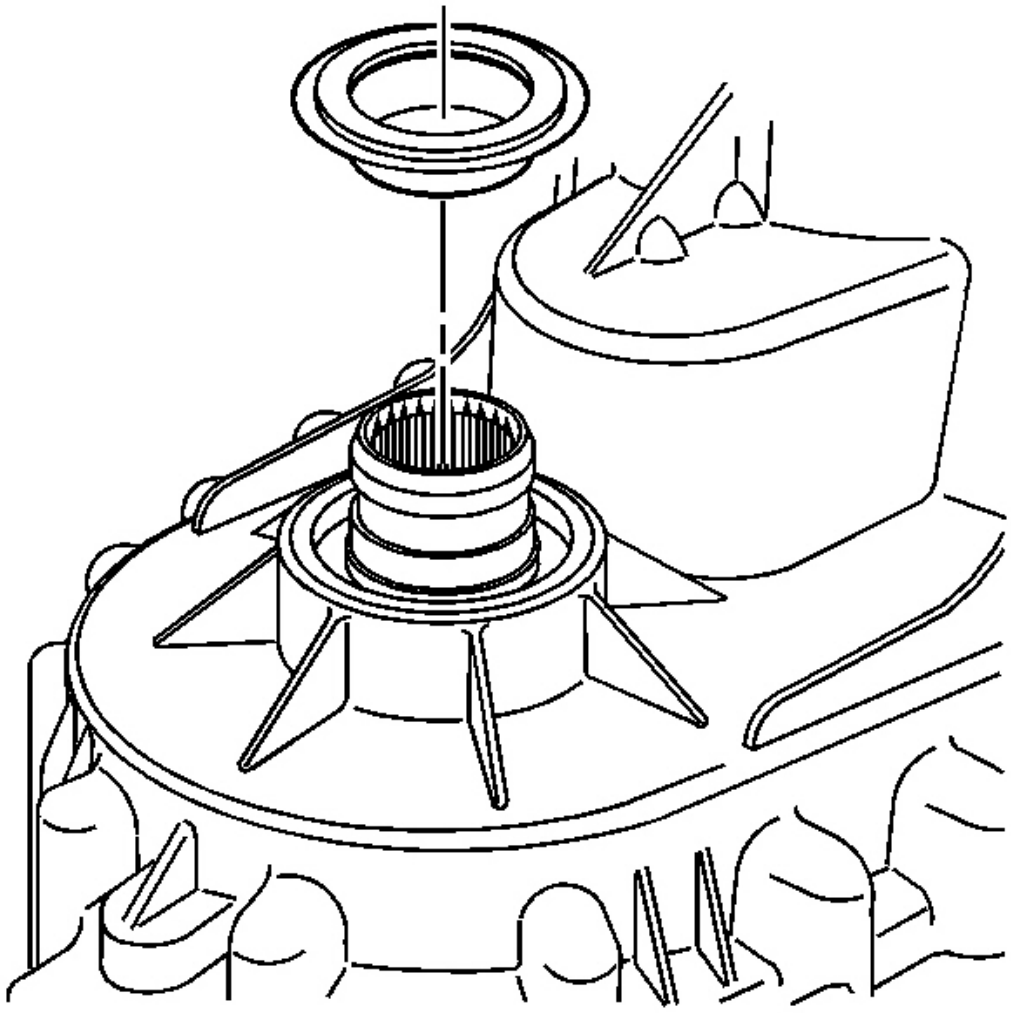


Fig. 7: View Of Inner Seal Race From The Front Output Shaft
Courtesy of GENERAL MOTORS CORP.

7. Using a small pry bar, move the inner seal race forward on the front output shaft.
8. Remove the inner seal race from the front output shaft.

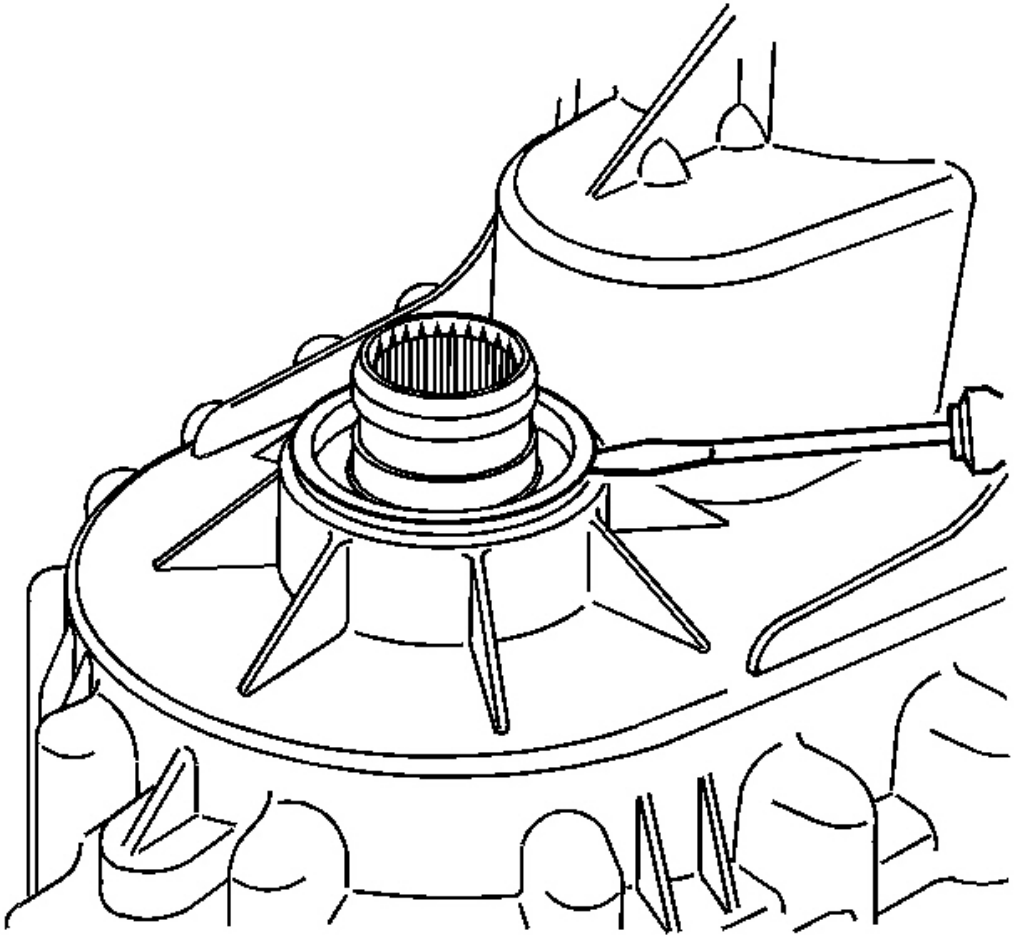


Fig. 8: Locating Outer Lip Of The Front Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

9. Insert a flat-tipped screwdriver or a small pry bar between the outer lip of the front output shaft seal and the transfer case.
10. Remove the remaining part of the front output shaft seal from the transfer case.

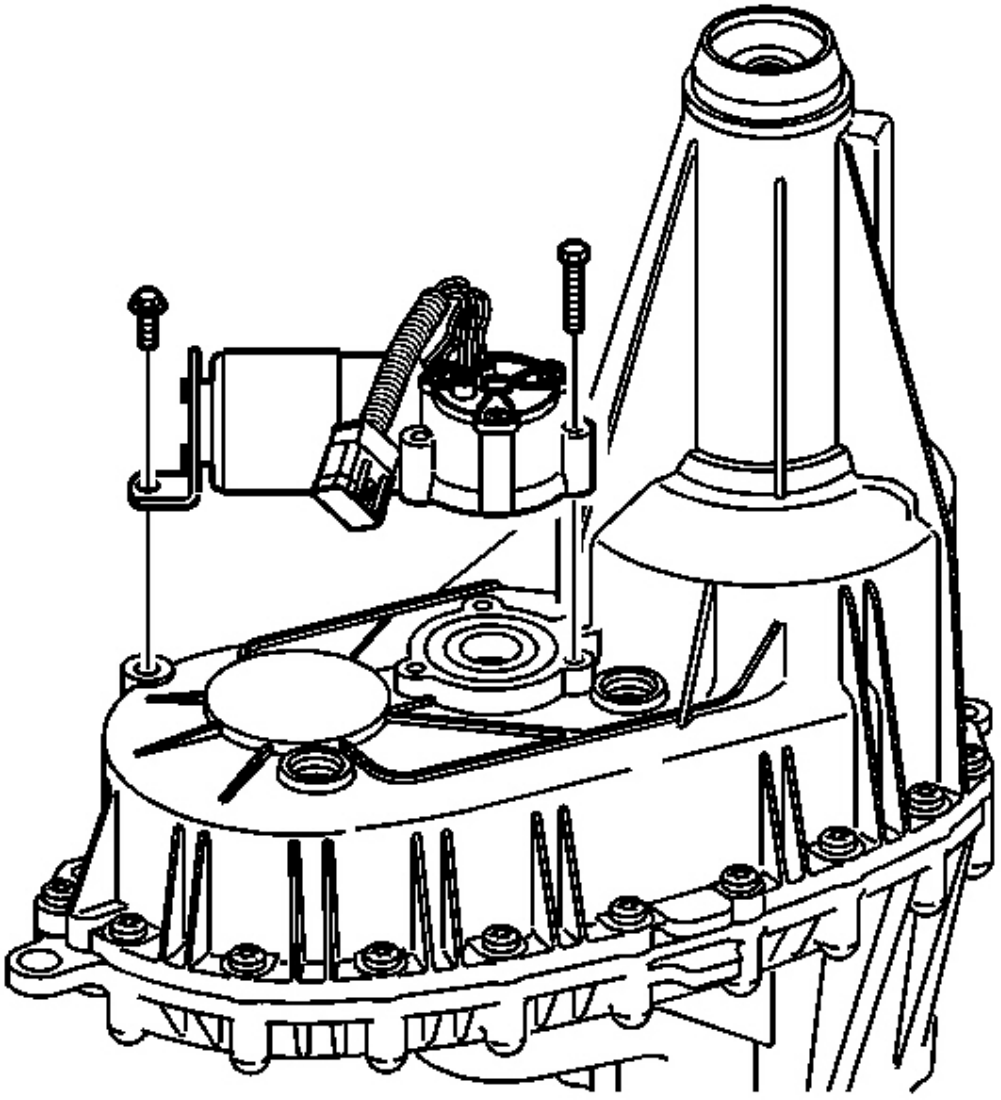


Fig. 9: Locating Encoder Motor Assembly
Courtesy of GENERAL MOTORS CORP.

11. Remove the encoder motor bracket bolt.
12. Remove the encoder motor mounting bolts.
13. Remove the encoder motor assembly.

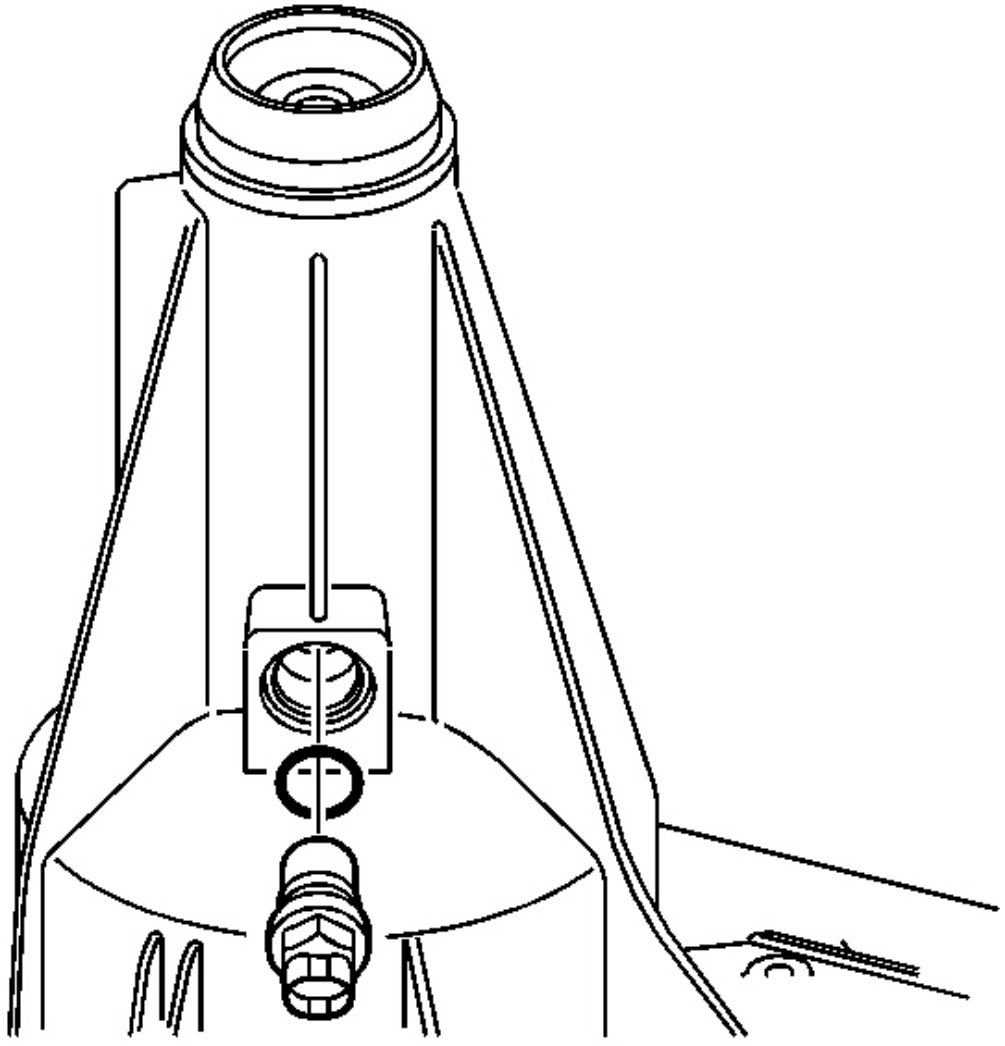


Fig. 10: Identifying Vehicle Speed Sensor (VSS) & O-Ring Seal
Courtesy of GENERAL MOTORS CORP.

14. Remove the vehicle speed sensor (VSS) and the O-ring seal.

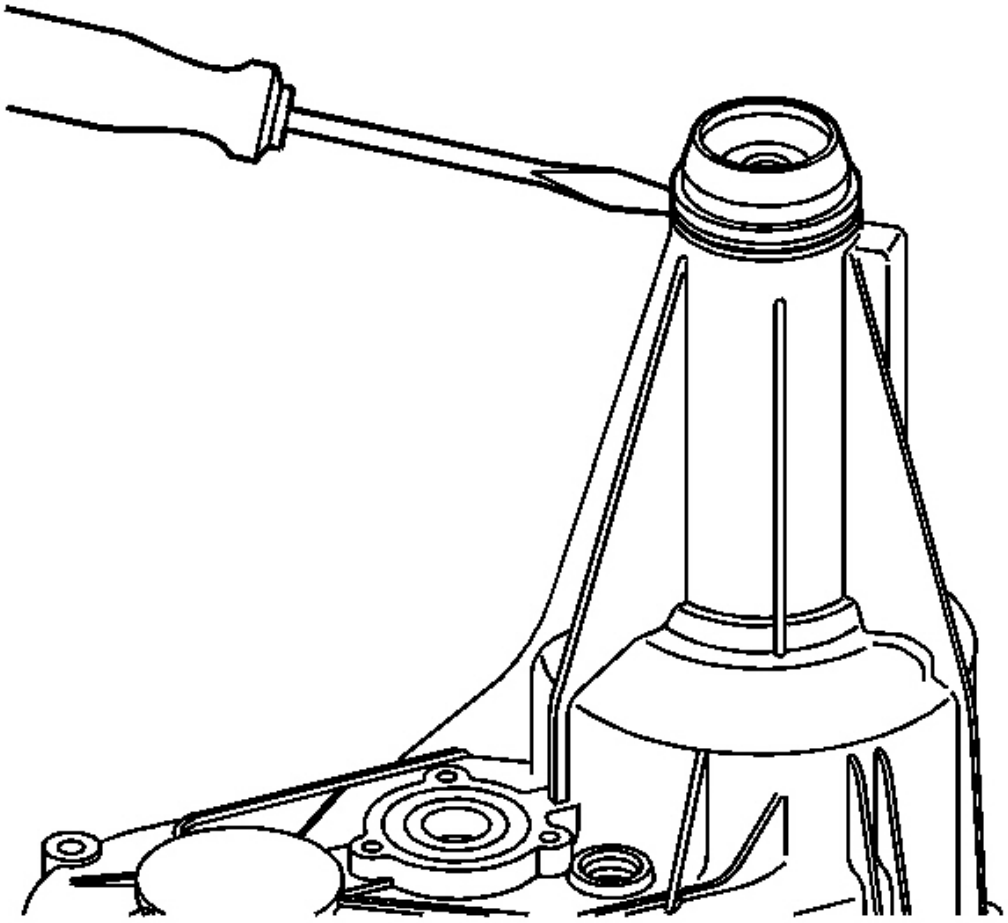


Fig. 11: Removing Rear Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Transfer Case Seal Removal Notice in Cautions and Notices.

15. Remove the rear output shaft seal by prying it out with a flat-blade screwdriver.
16. Remove the shipping seal from the rear output shaft, if equipped.

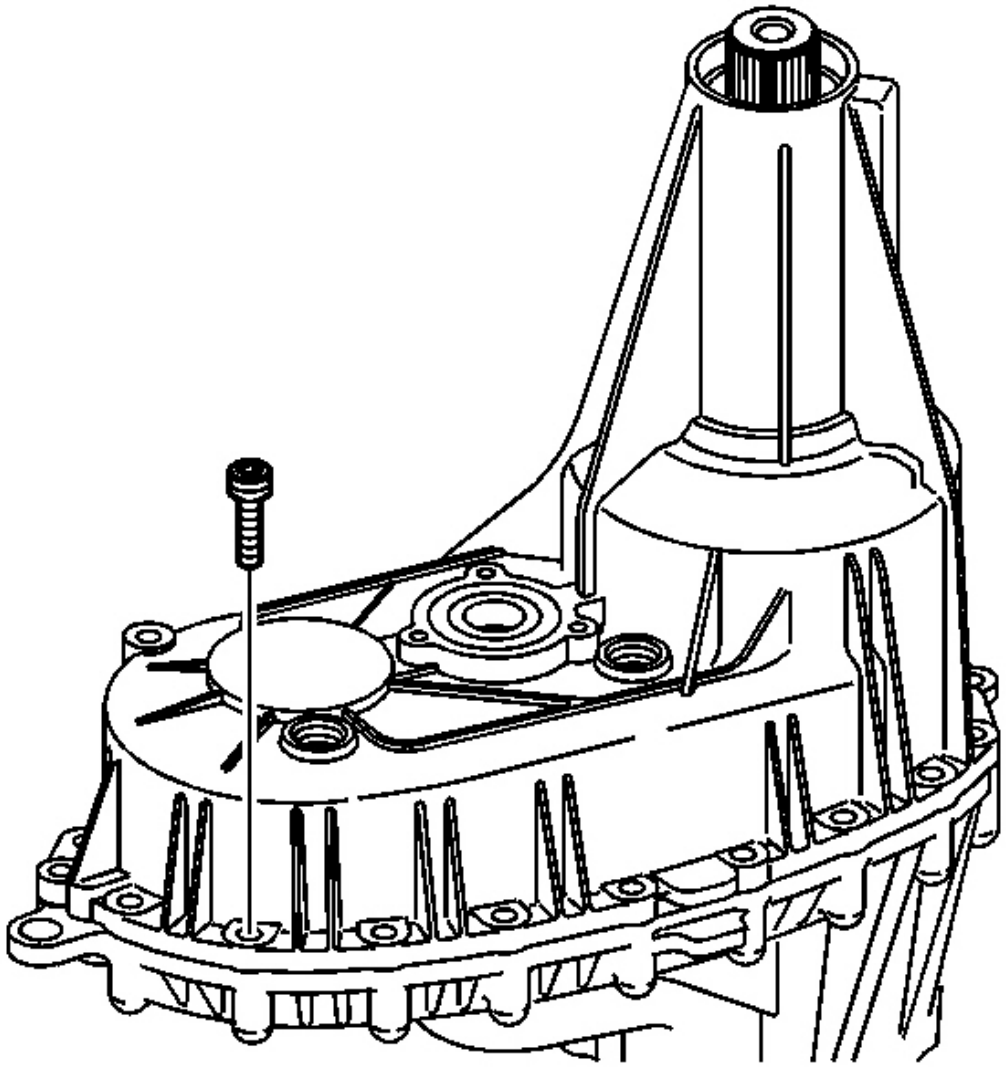


Fig. 12: Identifying Transfer Case Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

17. Remove the transfer case retaining bolts and washers.

    Mark the location of the brackets.

NOTE: **Refer to Machined Surface Damage Notice in Cautions and Notices.**

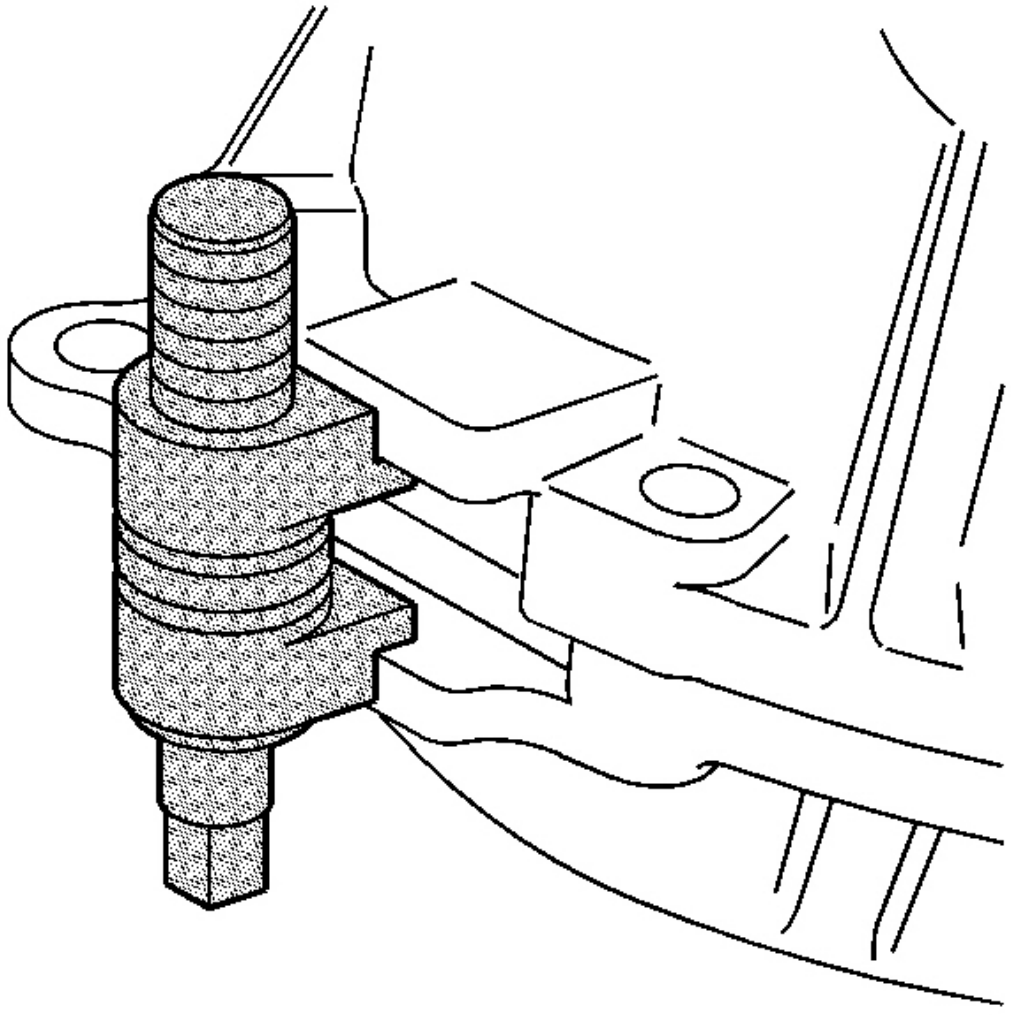


Fig. 13: View Of J 45358 Installed Between The Tabs On The Case Halves
Courtesy of GENERAL MOTORS CORP.

18. Using the **J 45358** between the tabs on the case halves, shear the sealer that is holding the case halves together.
19. Using pry bars at each side of the case, remove the case from the locating pins.

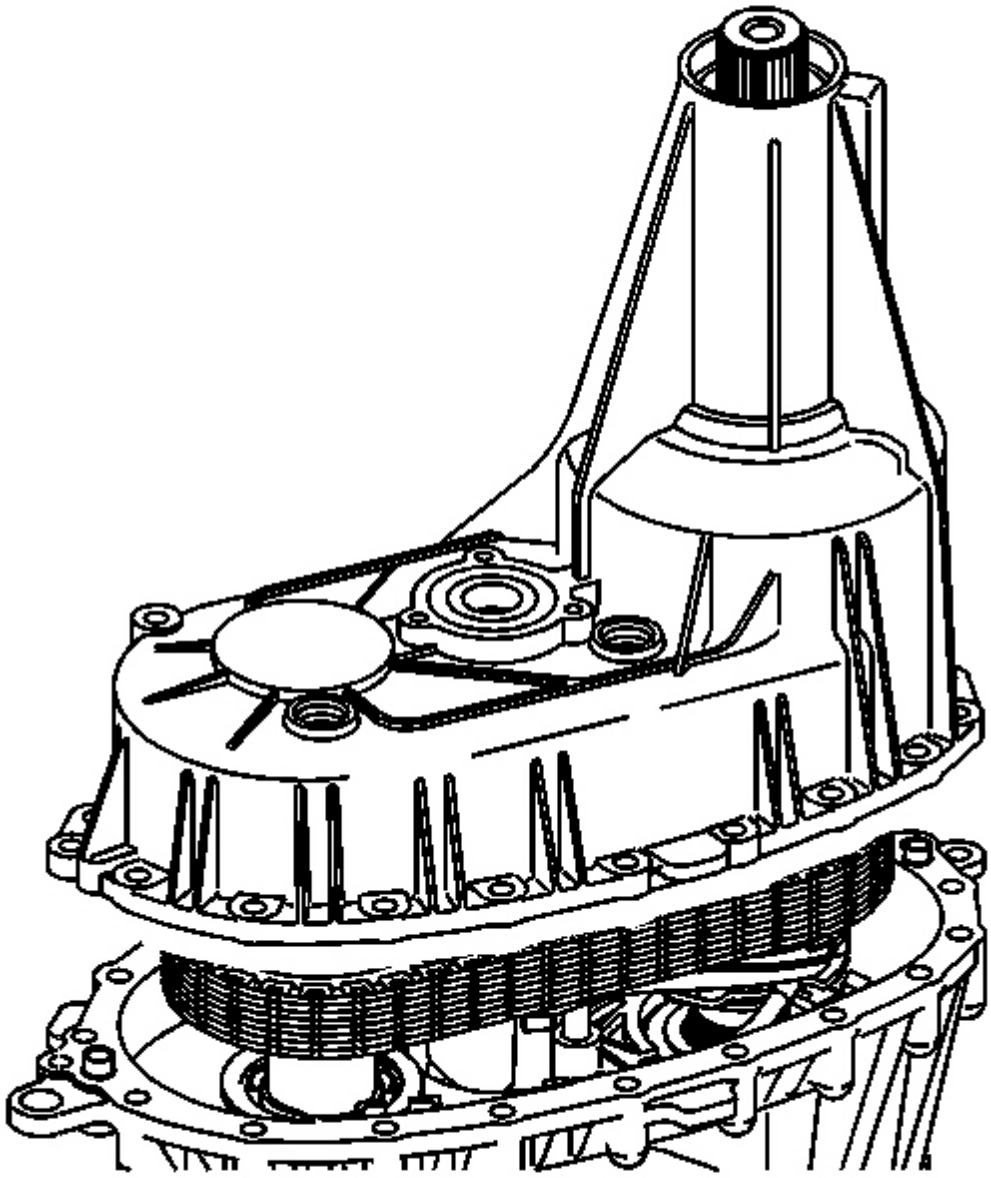


Fig. 14: View Of Rear Case & Front Case Half
Courtesy of GENERAL MOTORS CORP.

20. Remove the rear case half from the front case half. The rear output shaft will come with the rear case half.

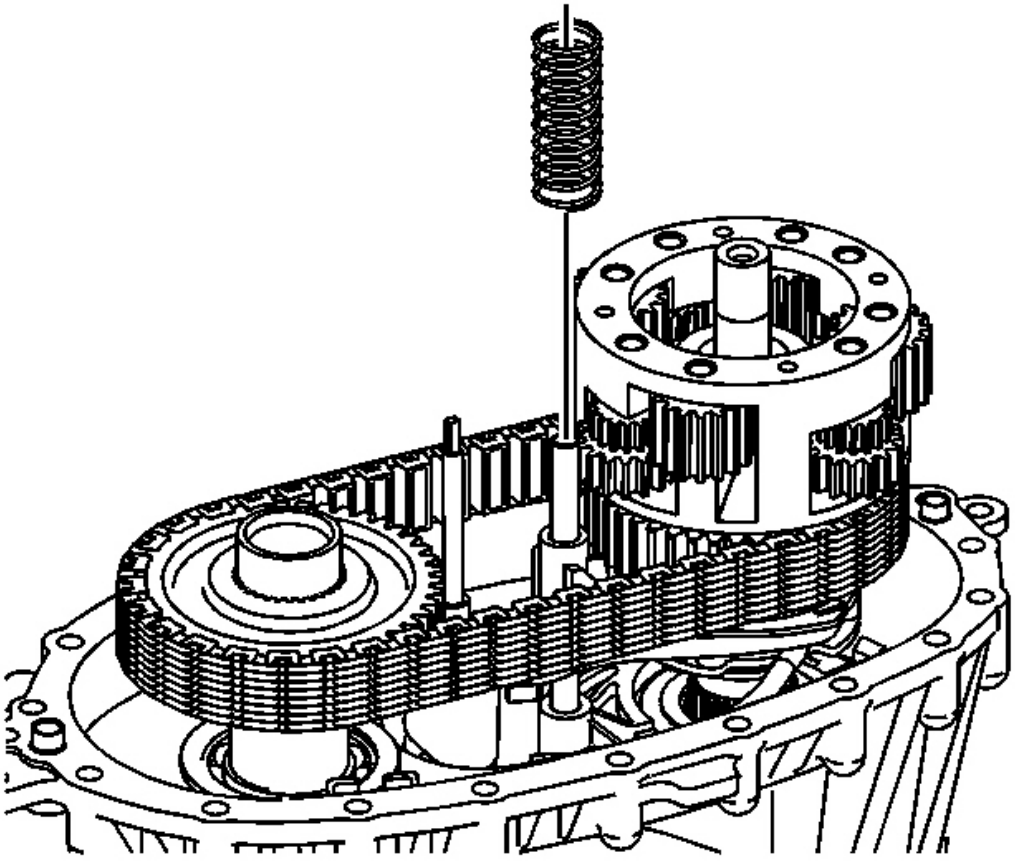


Fig. 15: Identifying Shift Fork Shaft Spring
Courtesy of GENERAL MOTORS CORP.

21. Remove the shift fork shaft spring.

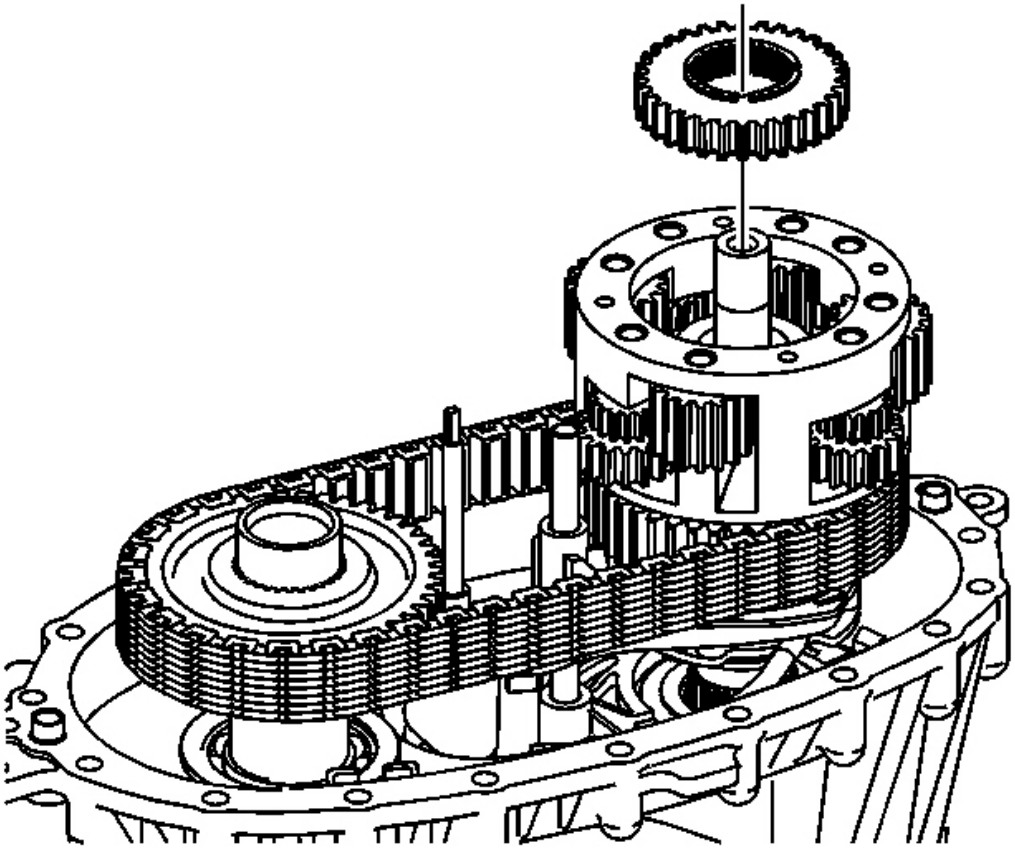


Fig. 16: View Of Rear Sun Gear
Courtesy of GENERAL MOTORS CORP.

22. Remove the rear sun gear.

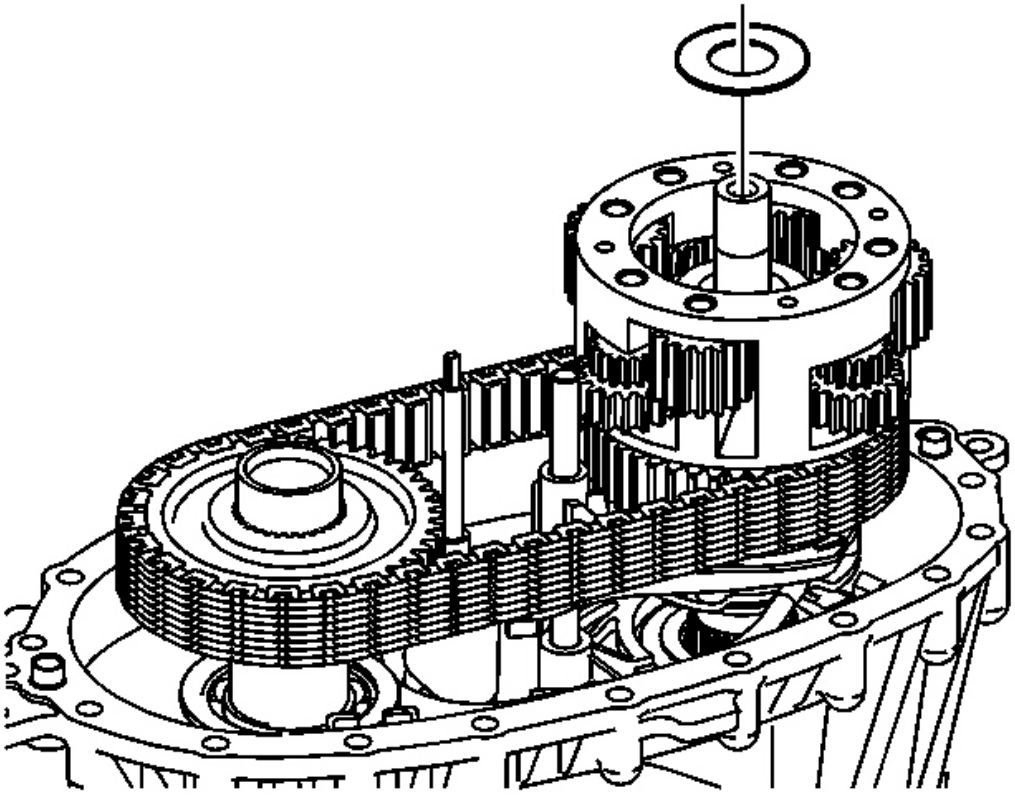


Fig. 17: Locating Rear Output Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

23. Remove the rear output shaft thrust washer.

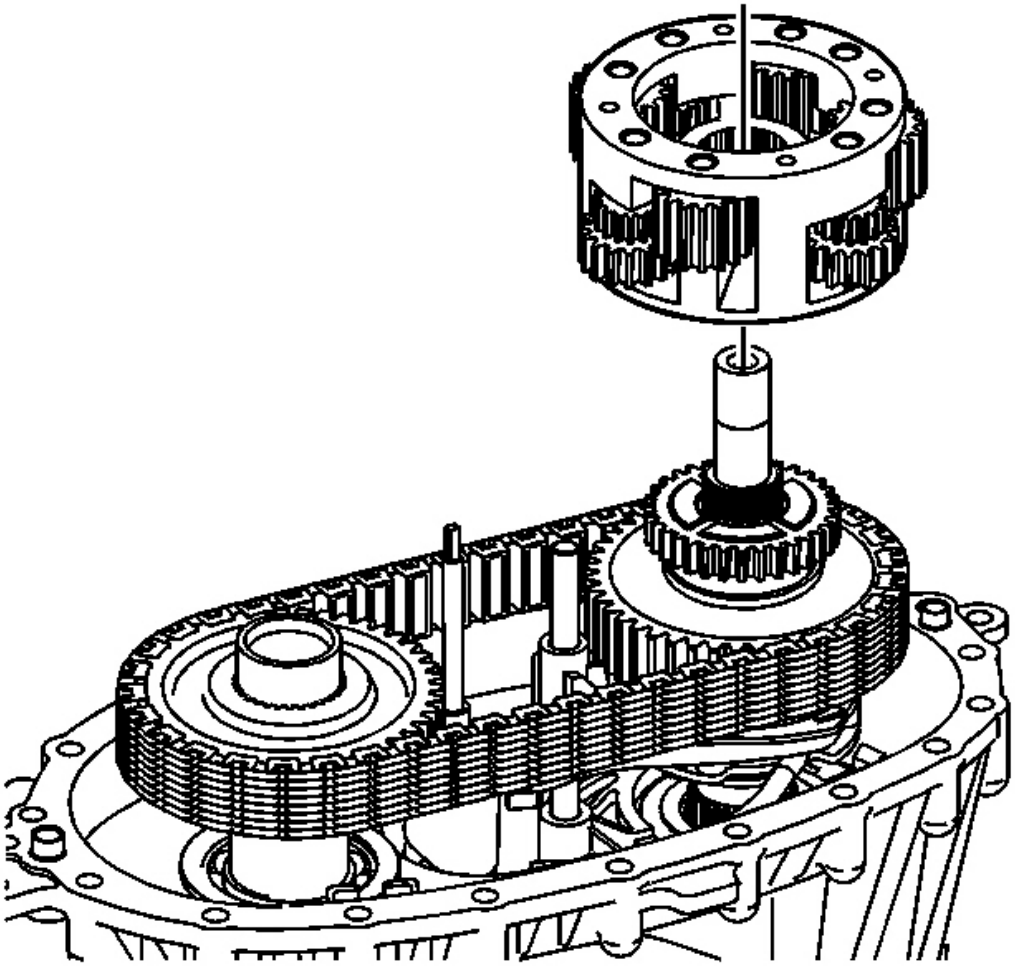


Fig. 18: View Of Planetary Differential Assembly
Courtesy of GENERAL MOTORS CORP.

24. Remove the planetary differential assembly.

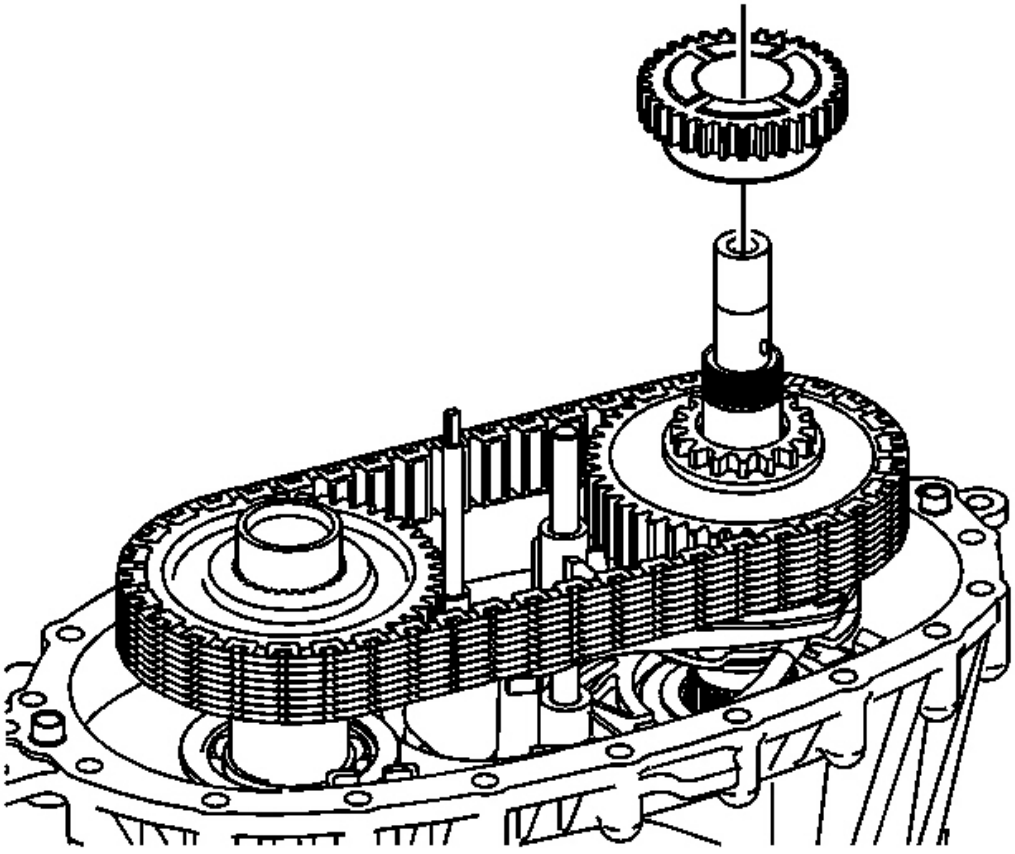


Fig. 19: Identifying Front Sun Gear
Courtesy of GENERAL MOTORS CORP.

25. Remove the front sun gear.

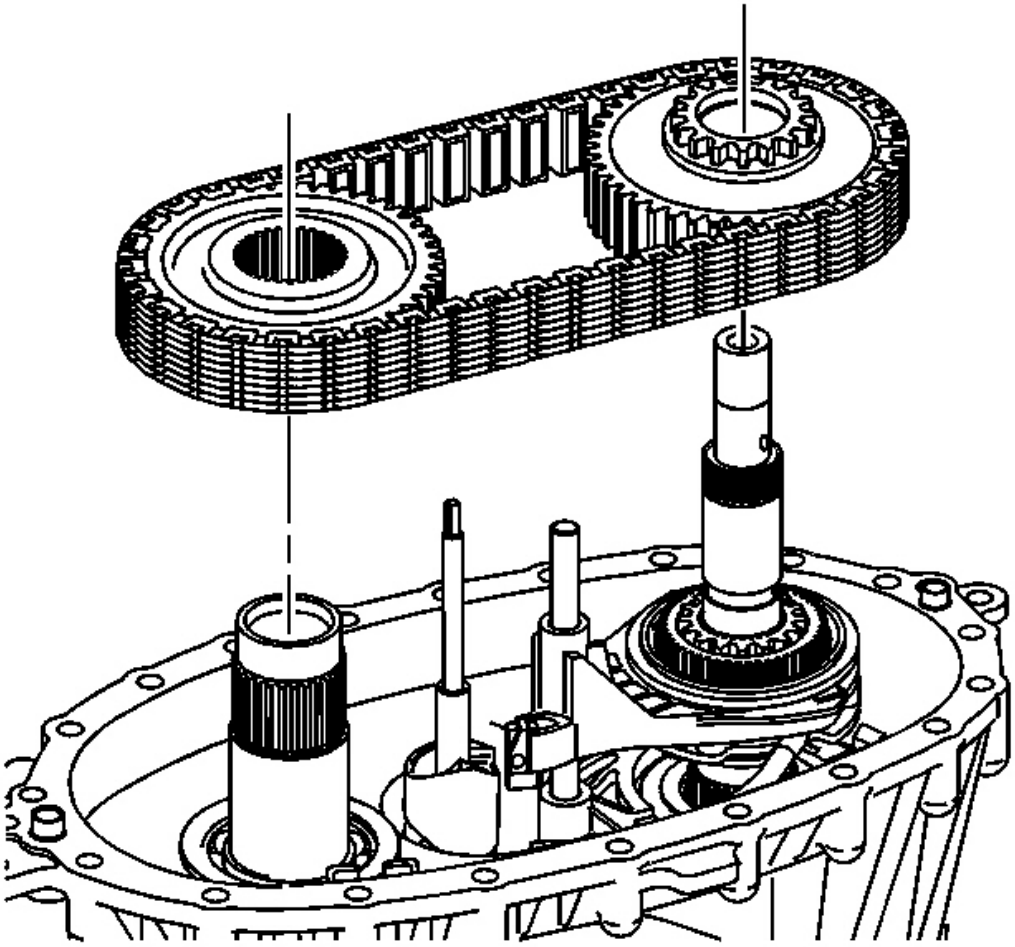


Fig. 20: View Of Drive Chain & Sprockets
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If the chain and sprockets are to be used again, mark the relationship of the chain to the sprockets in order to mark the wear patterns.

26. Remove the chain with the drive sprocket and driven sprocket.

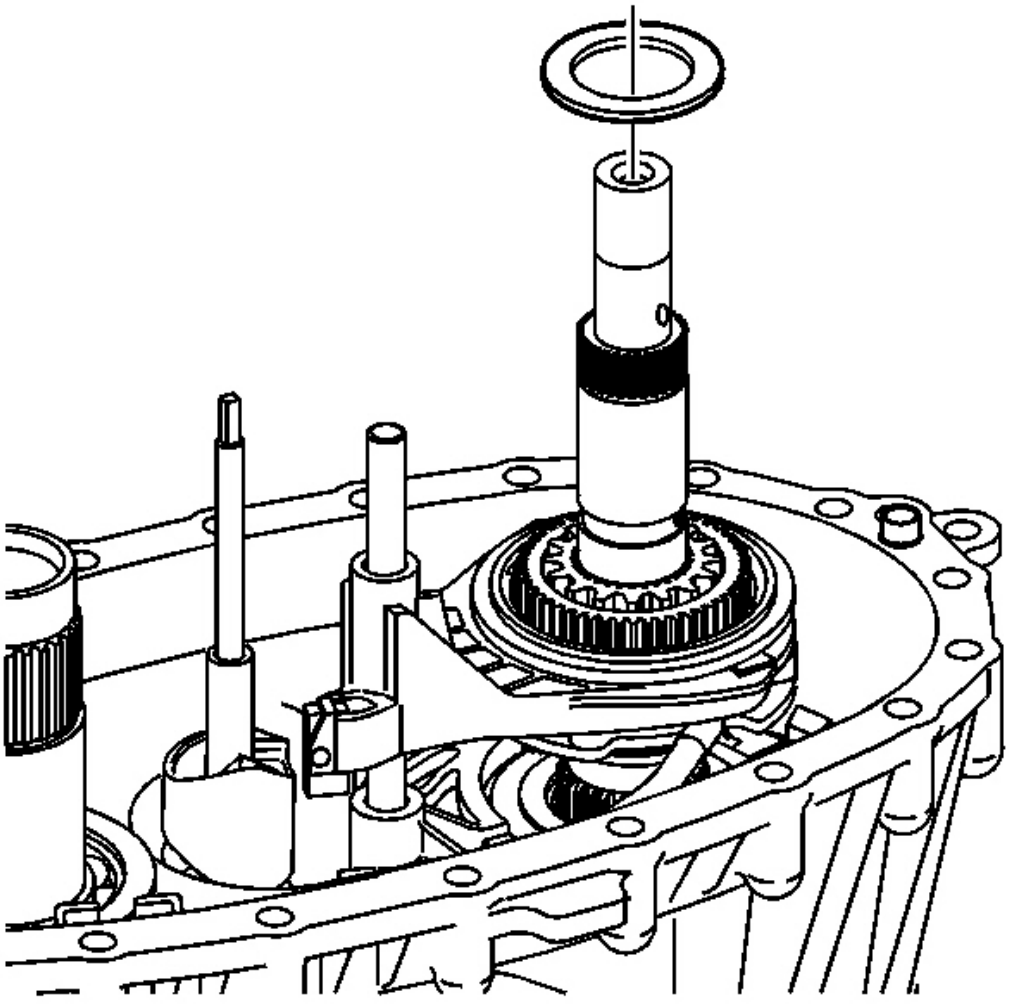


Fig. 21: Identifying Drive Sprocket Thrust Washer
Courtesy of GENERAL MOTORS CORP.

27. Remove the drive sprocket thrust washer.

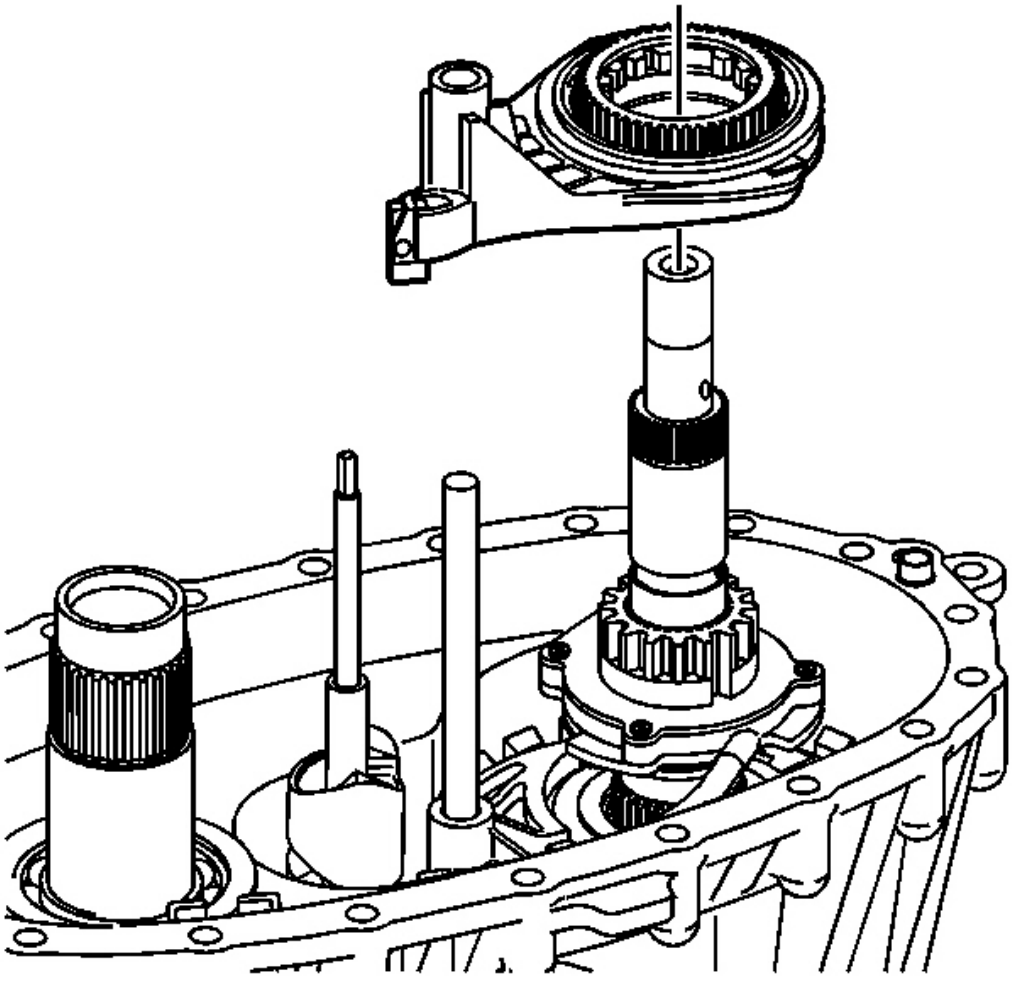


Fig. 22: Identifying Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

28. Remove the lockup shift assembly and lockup mode shift fork.

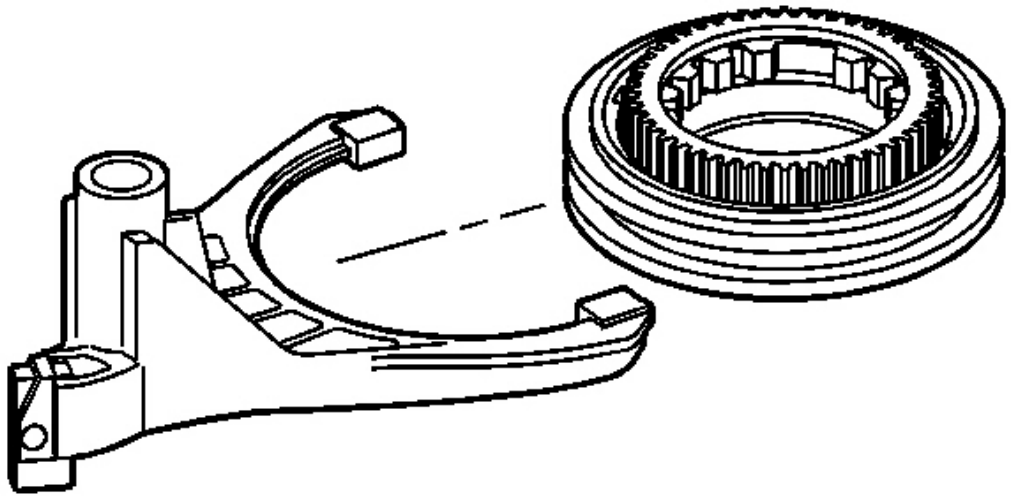


Fig. 23: View Of Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

29. Remove the lockup mode shift fork from the lockup shift assembly.

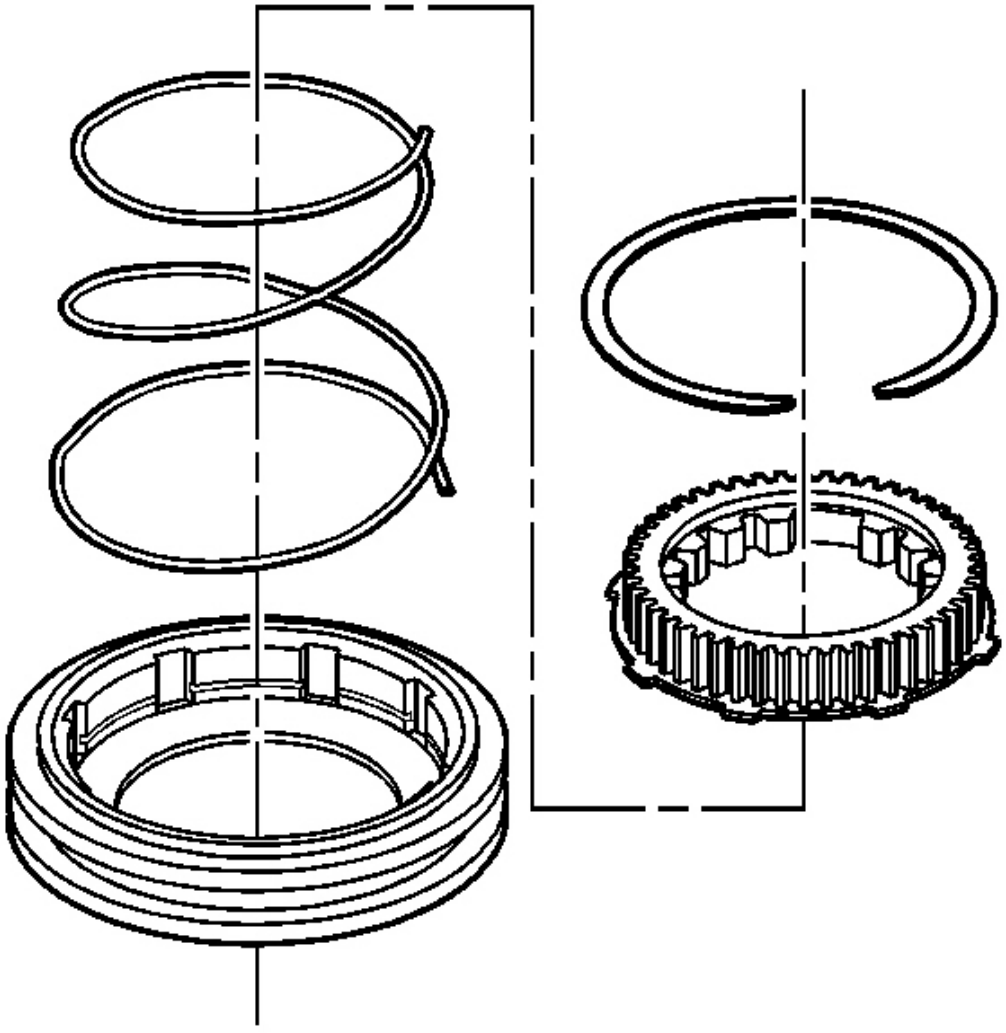


Fig. 24: Illustrating Lockup Shift Assembly Components
Courtesy of GENERAL MOTORS CORP.

30. If necessary, disassemble the lockup shift assembly.
    1. Remove the retainer ring from the sleeve.
    2. Remove the hub.
    3. Remove the spring.

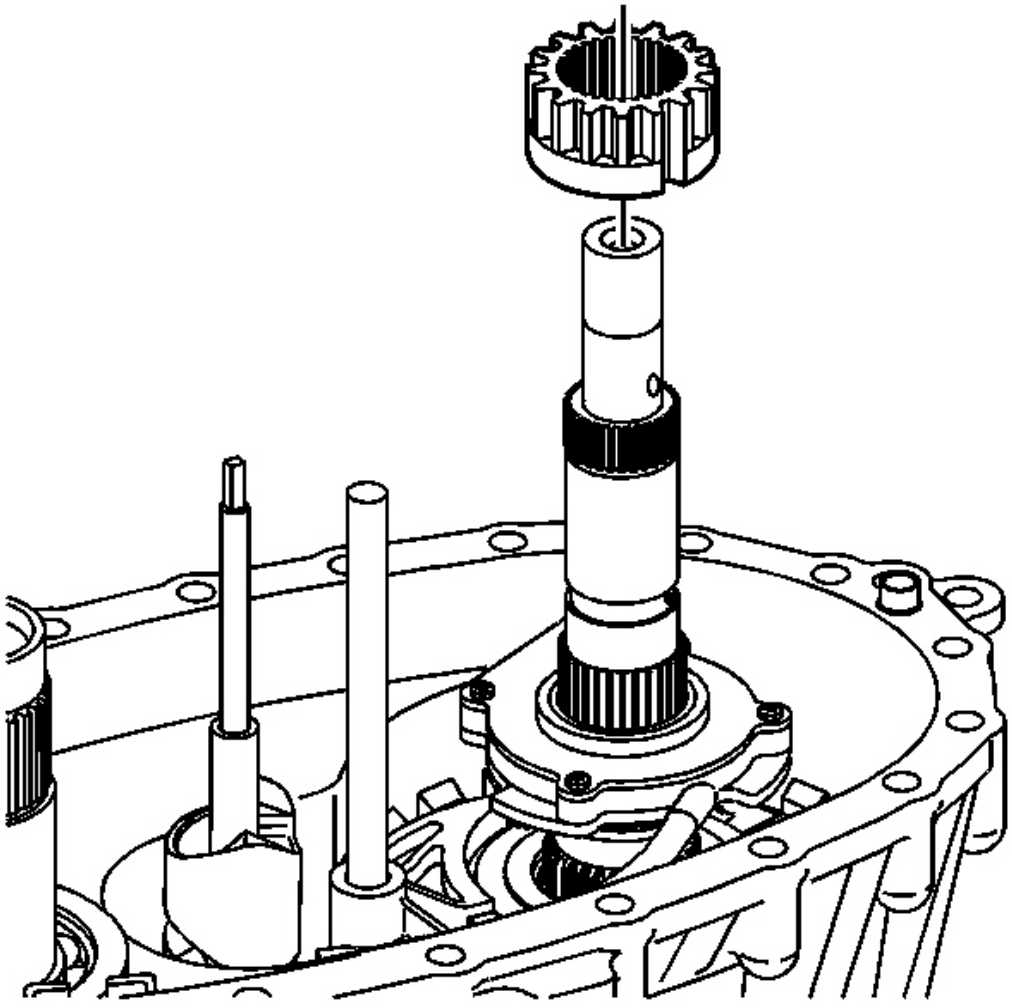


Fig. 25: View Of Inner Lockup Hub
Courtesy of GENERAL MOTORS CORP.

31. Remove the inner lockup hub.

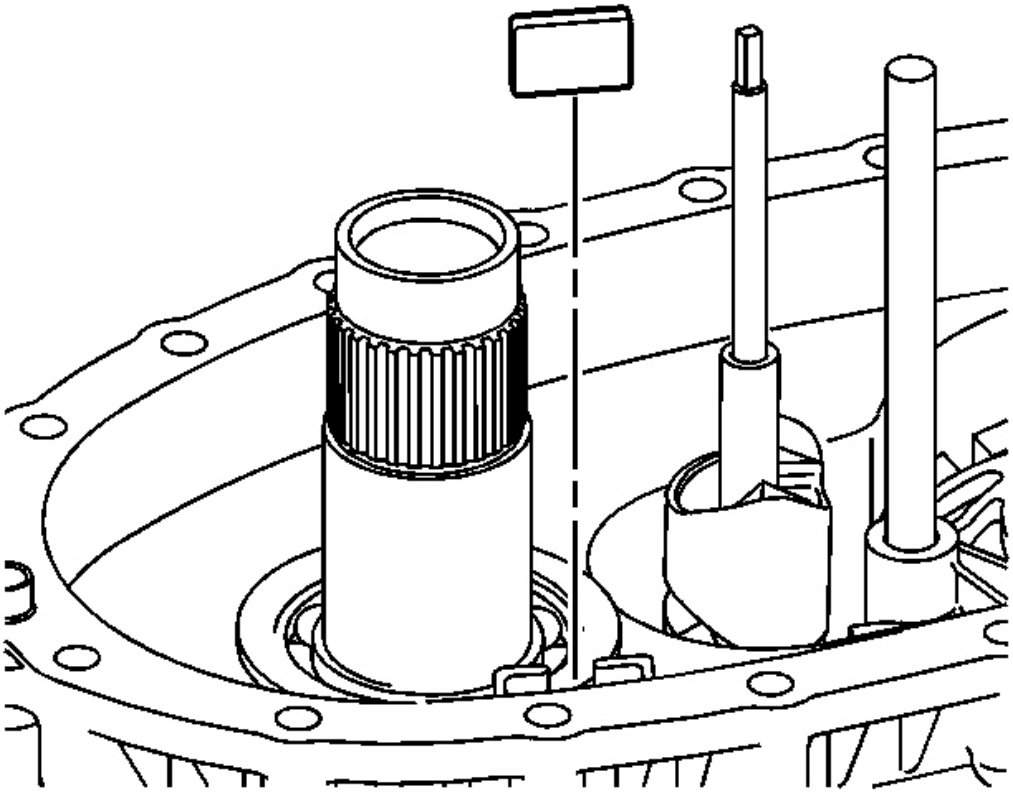


Fig. 26: Identifying Magnet
Courtesy of GENERAL MOTORS CORP.

32. Remove the magnet.

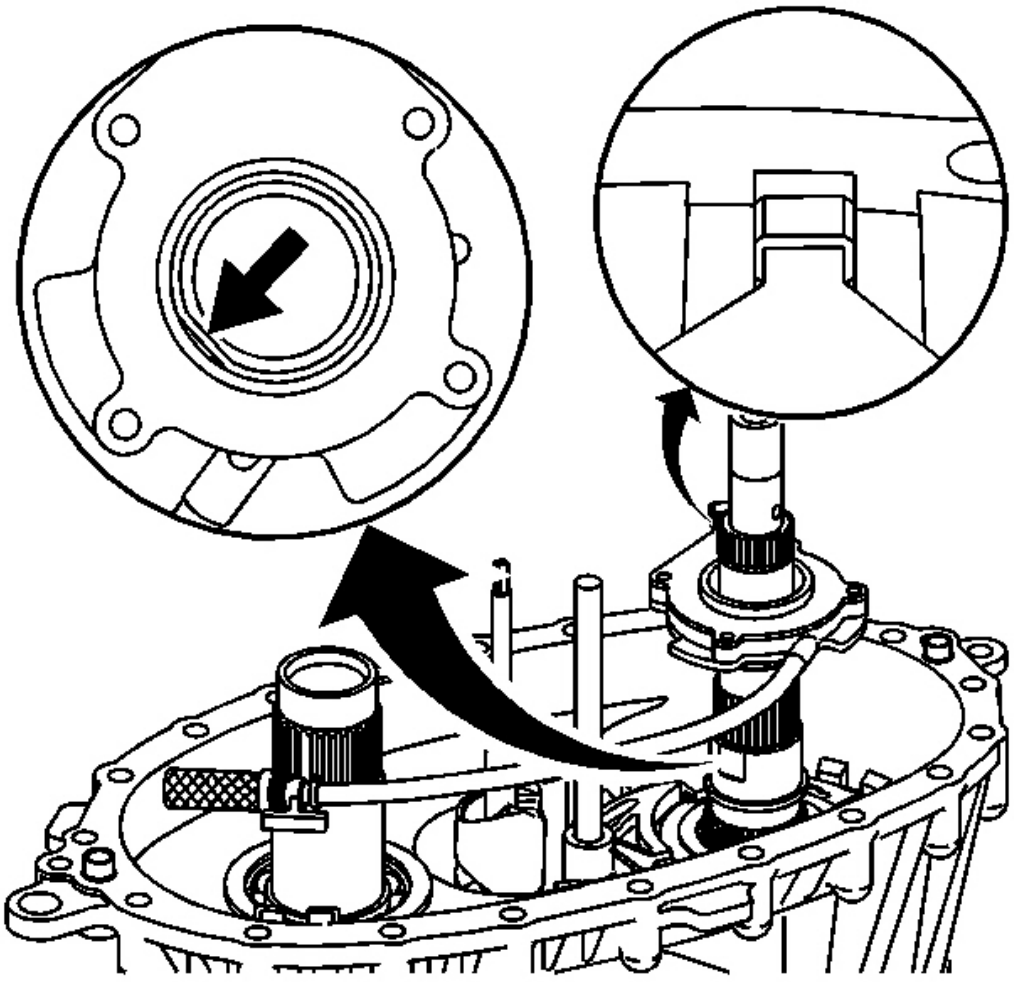


Fig. 27: Expanded View Of Oil Pump Assembly
Courtesy of GENERAL MOTORS CORP.

33. Remove the oil pump assembly with the hose and screen.

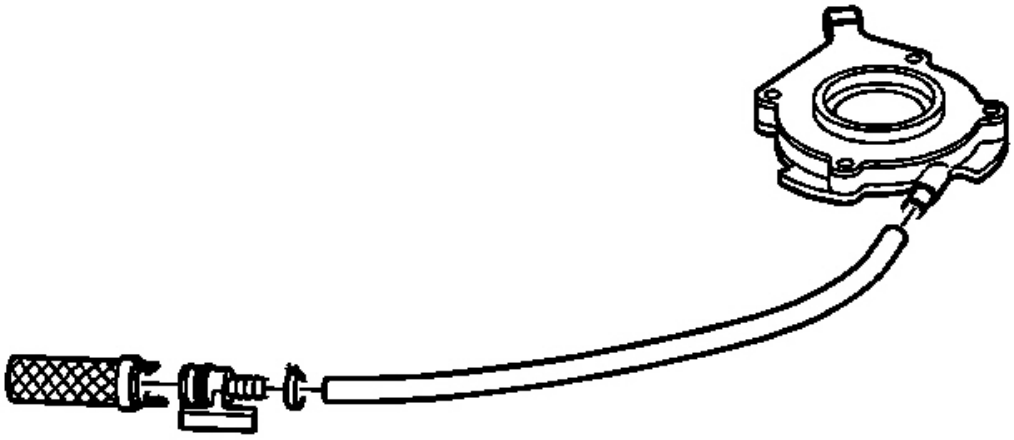


Fig. 28: Locating Oil Pump Hose & Screen
Courtesy of GENERAL MOTORS CORP.

34. Disconnect the oil pump hose from the oil pump screen.
35. Disconnect the oil pump hose from the oil pump.

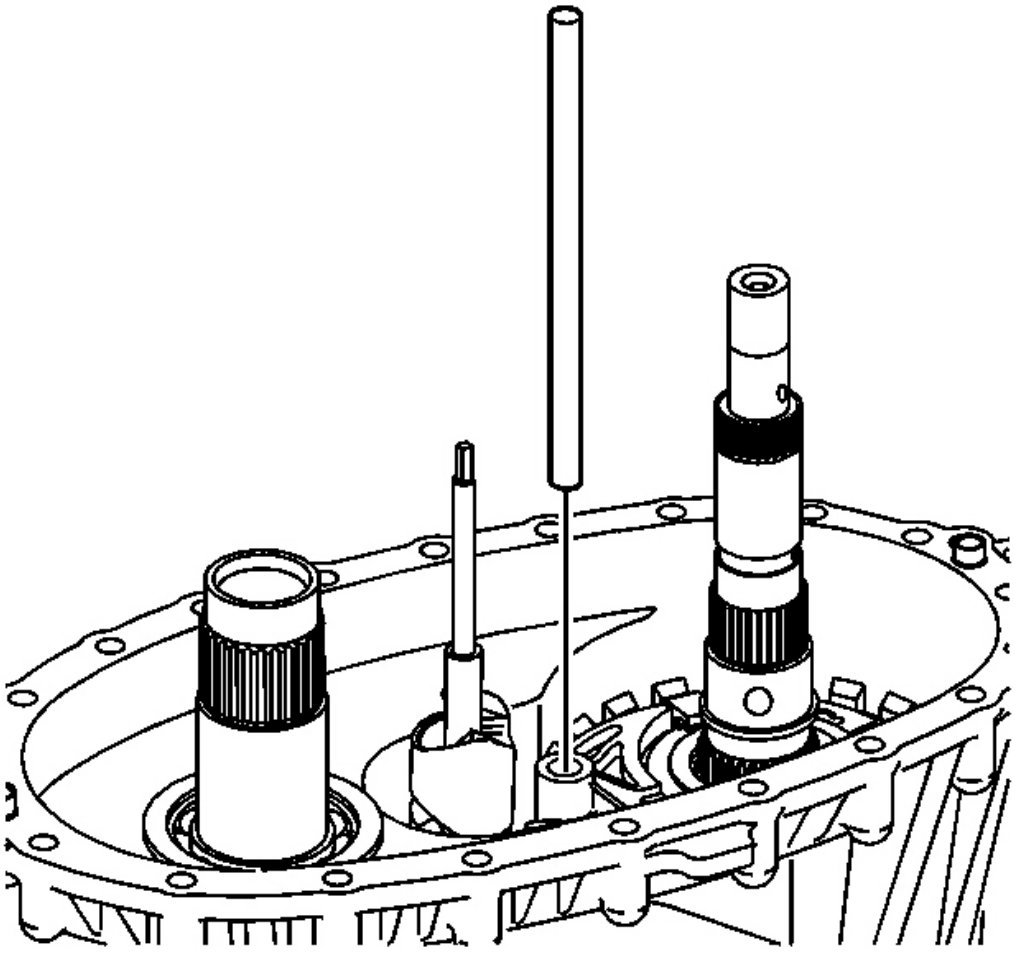


Fig. 29: View Of Shift Fork Shaft
Courtesy of GENERAL MOTORS CORP.

36. Remove the shift fork shaft.

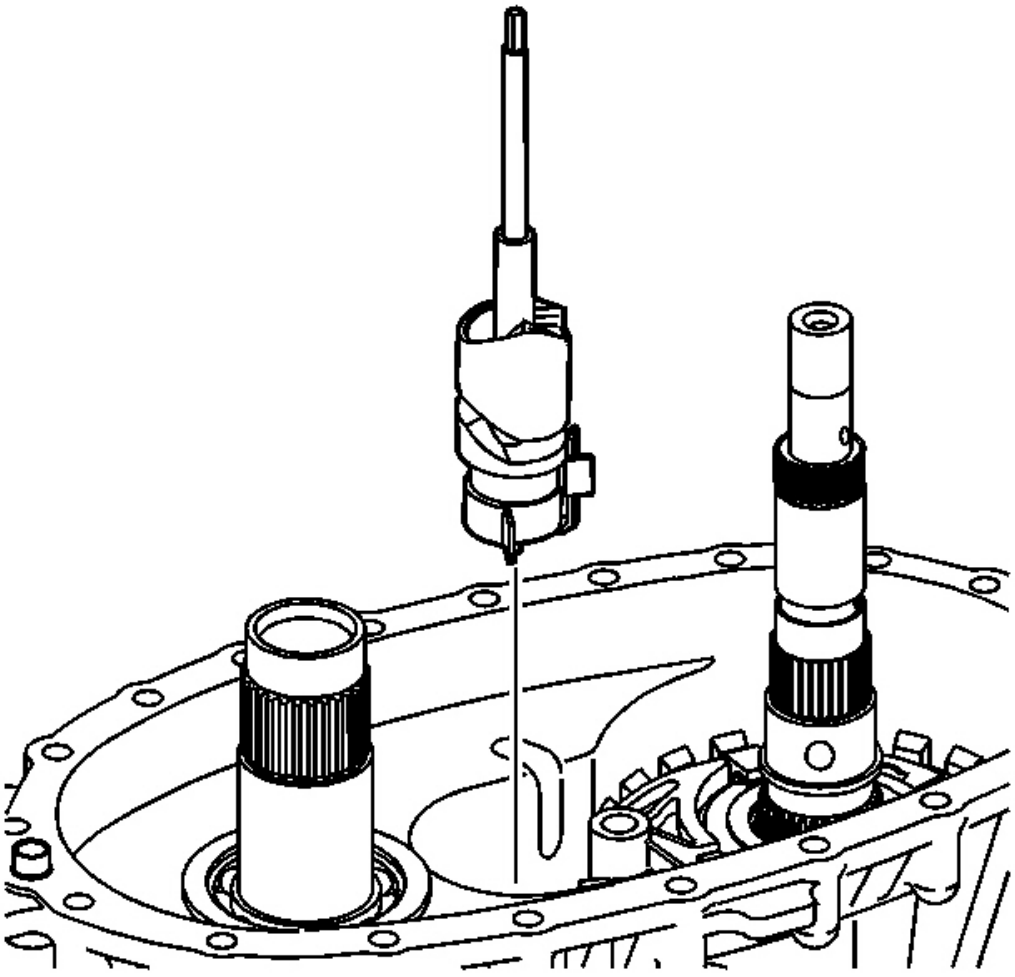


Fig. 30: Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: In order to prevent component damage, properly remove and install the shift detent lever shaft assembly. When removing or installing the shift detent lever shaft assembly, keep the shaft straight and do not tilt. Tilting the shift detent lever shaft assembly in the transfer case housing will break the tip on the end of the shaft.

37. Remove the shift detent lever assembly.
    - Rotate the high/low shift fork roller from the shift detent lever assembly.
    - Lift straight up on the shift detent lever assembly.

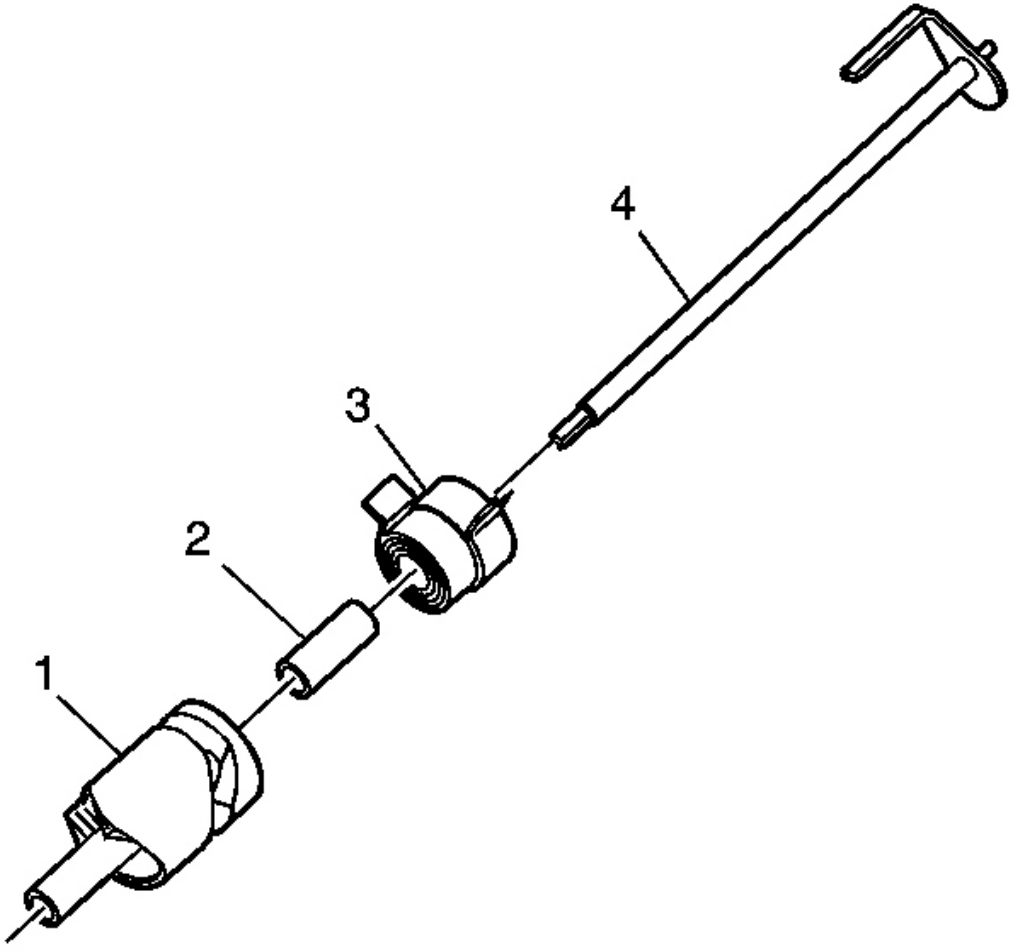


Fig. 31: Expanded View Of Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

38. If necessary, disassemble the shift detent lever assembly.
    1. Hold the shift detent lever assembly by one tab of the spring (3), in a vise.
    2. Rotate the other spring tab and slide the detent lever cam (1) off the shaft.
    3. Remove the sleeve (2).
    4. Push the shaft (4) out of the spring (3).

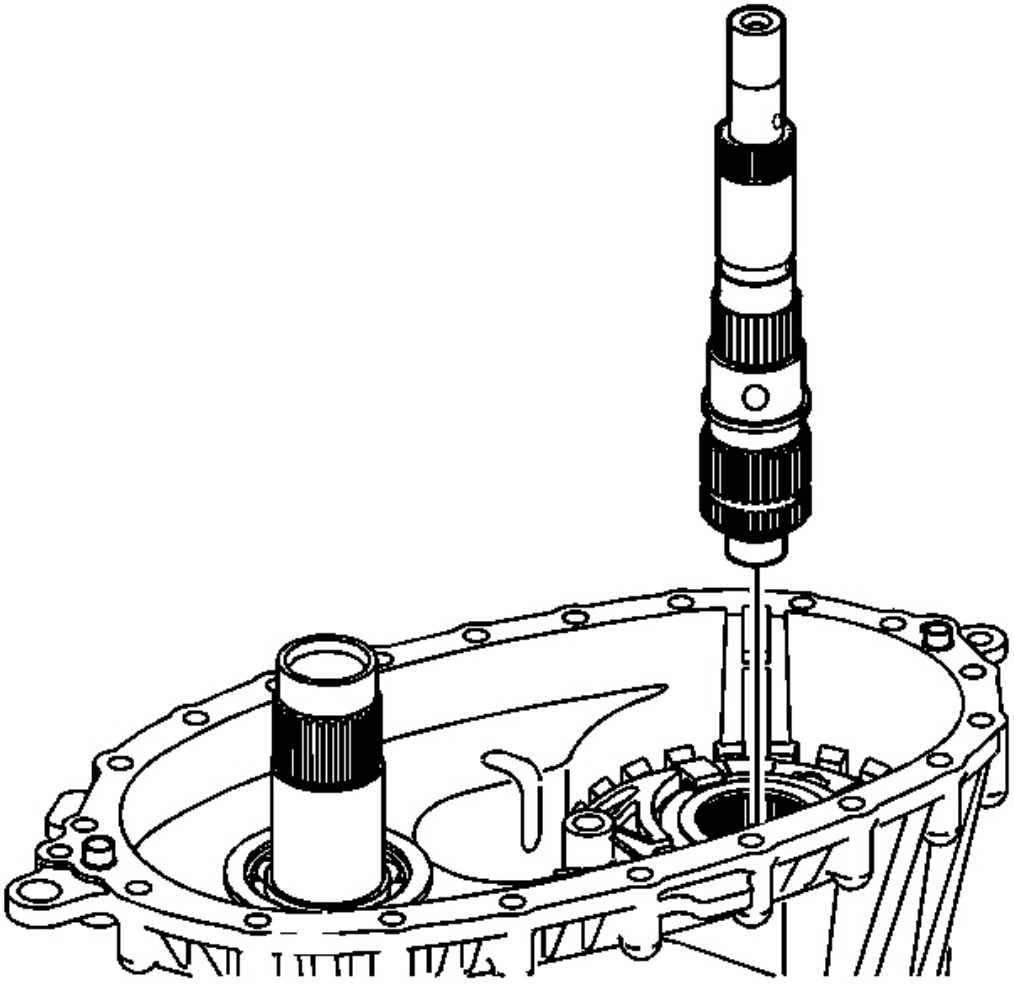


Fig. 32: View Of Mainshaft
Courtesy of GENERAL MOTORS CORP.

39. Remove the mainshaft.

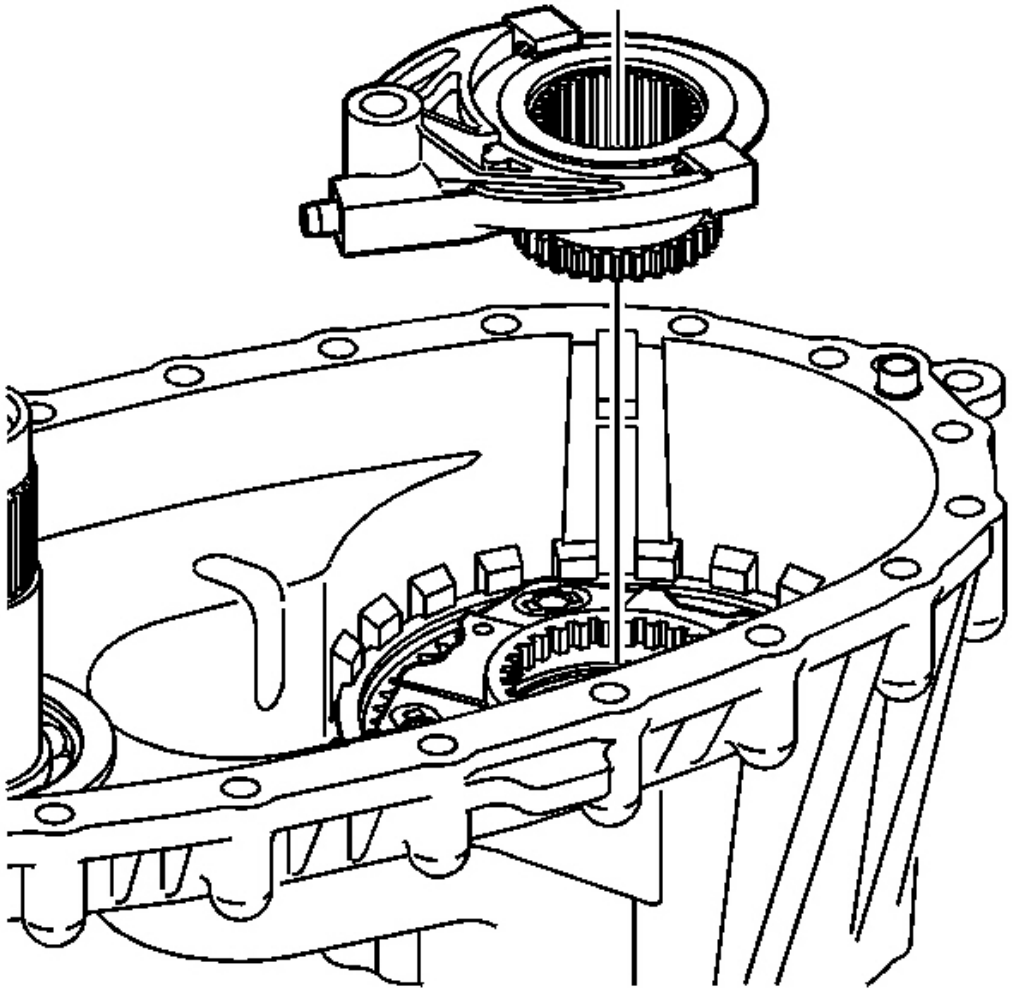


Fig. 33: Identifying High/Low Range Sleeve With The High/Low Range Shift Fork
Courtesy of GENERAL MOTORS CORP.

40. Remove the high/low range sleeve with the high/low range shift fork.

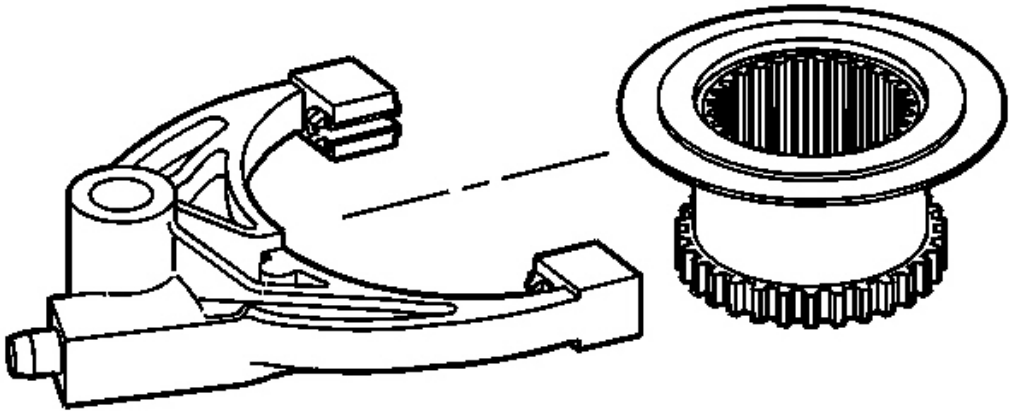


Fig. 34: View Of Range Shift Fork & Range Shift Sleeve
Courtesy of GENERAL MOTORS CORP.

41. Remove the range shift fork from the range shift sleeve.

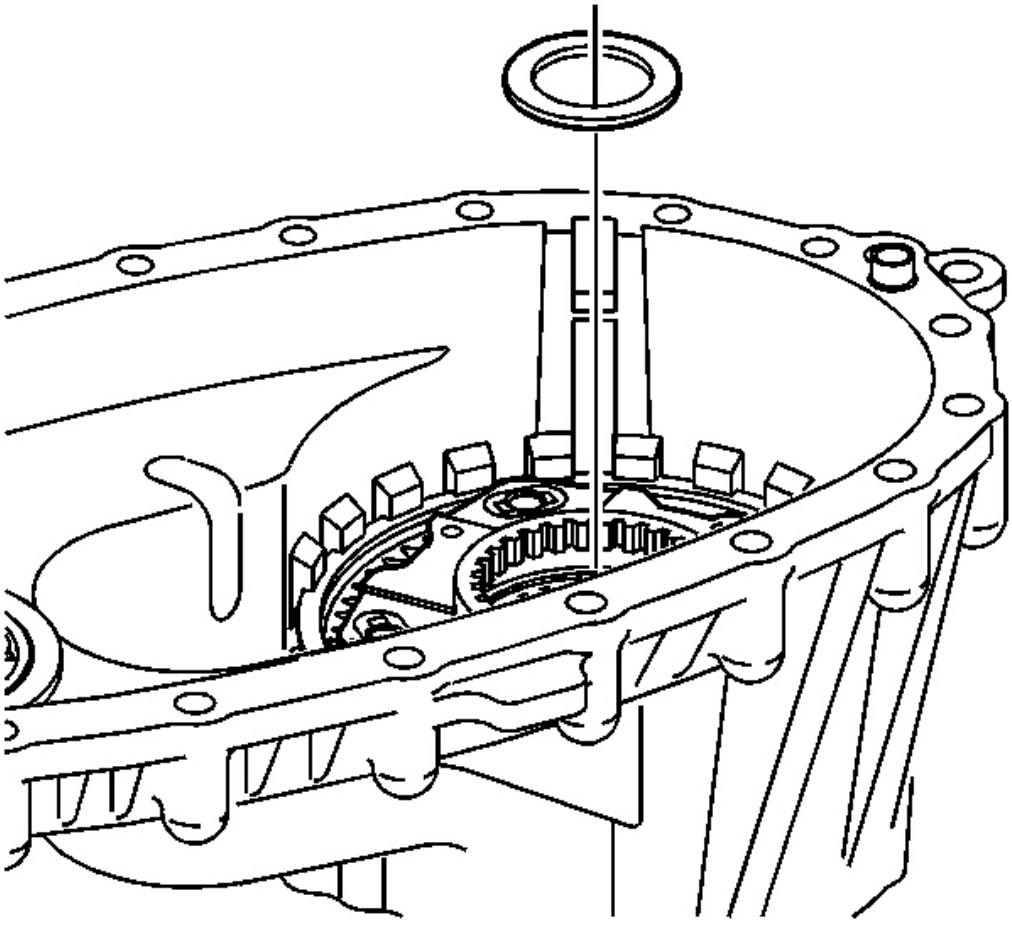


Fig. 35: Locating Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

42. Remove the input shaft thrust washer.

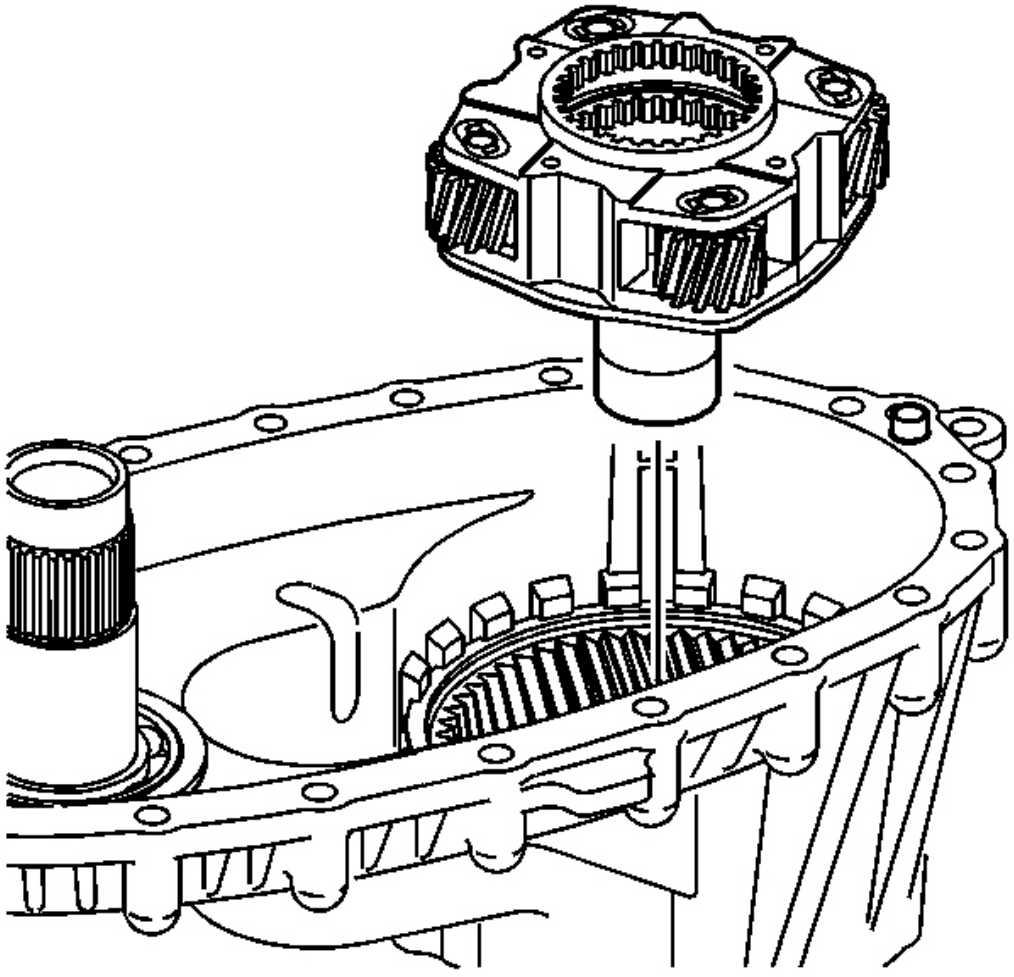


Fig. 36: Identifying High/Low Planetary Carrier
Courtesy of GENERAL MOTORS CORP.

43. Remove the high/low planetary carrier.

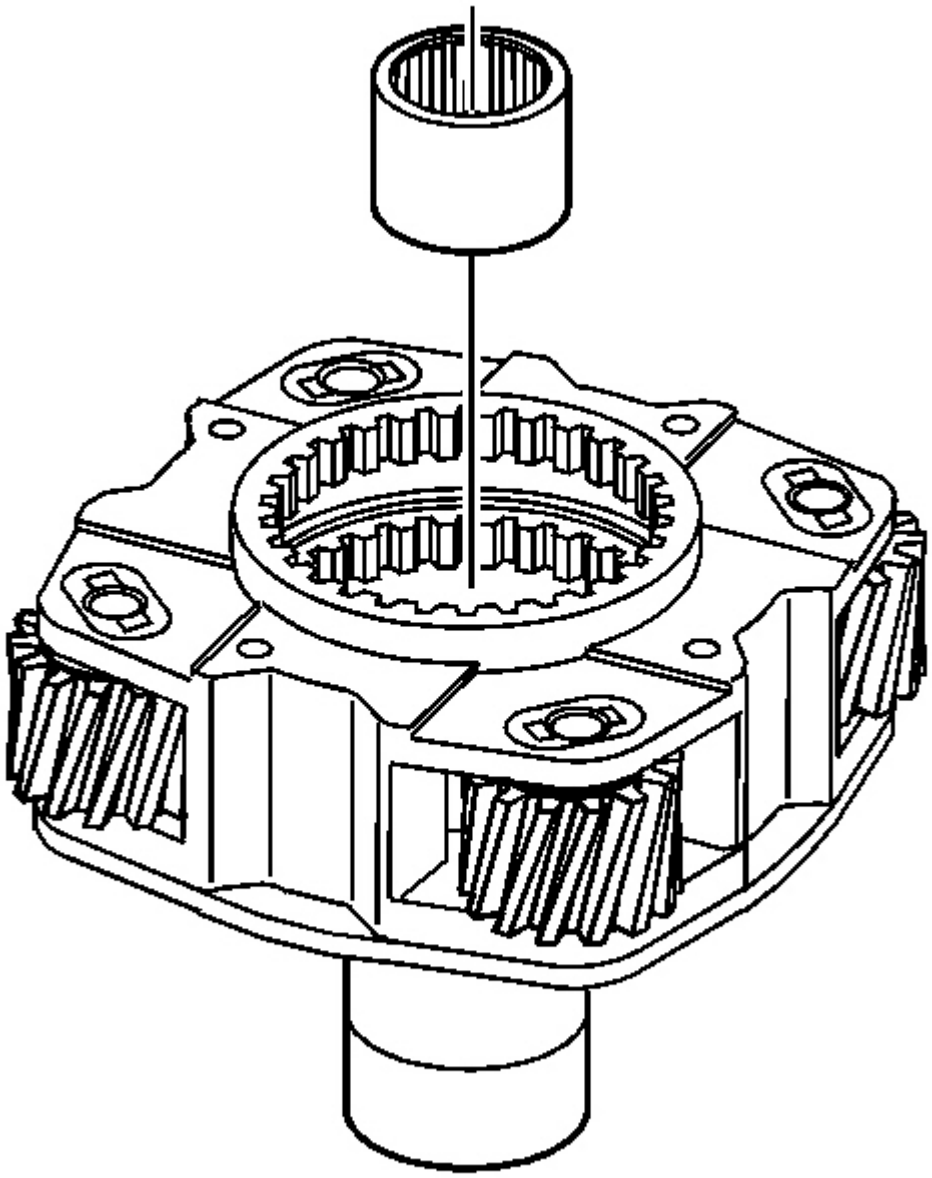


Fig. 37: View Of Mainshaft Front Support Bearing
Courtesy of GENERAL MOTORS CORP.

44. Inspect the mainshaft front support bearing for being faulty. Refer to **Cleaning and Inspection** .
45. Using a brass drift and a hammer, remove the mainshaft front support bearing from the planetary carrier assembly.

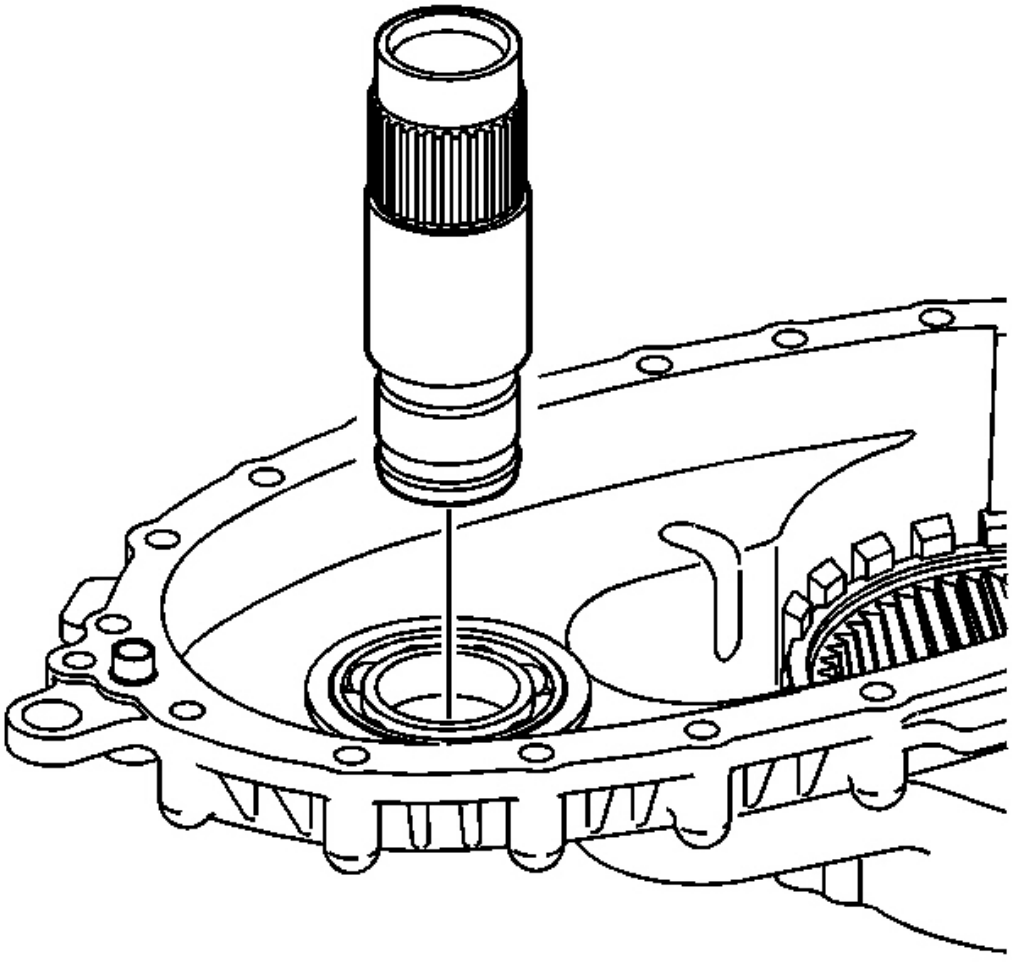


Fig. 38: Front Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

46. Remove the front output shaft assembly.

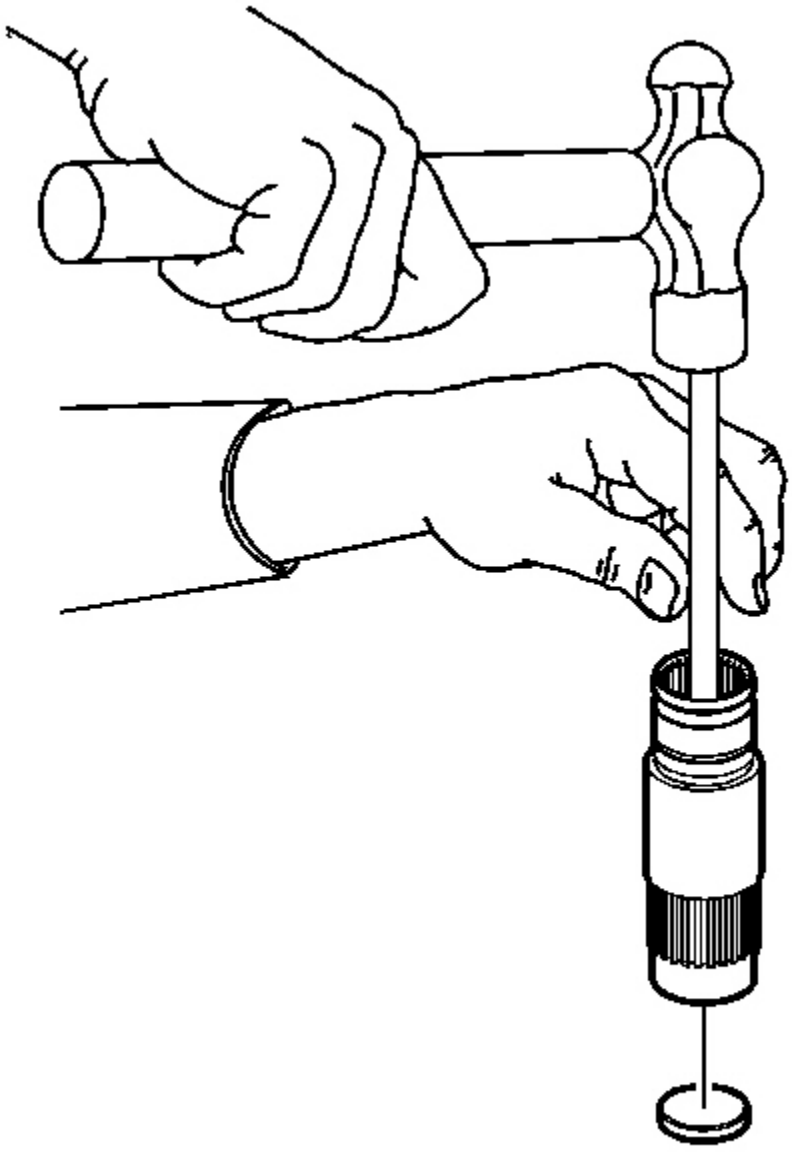


Fig. 39: Removing Cup Plug
Courtesy of GENERAL MOTORS CORP.

47. If the cup plug in the front output shaft is leaking, remove the plug using a brass drift.

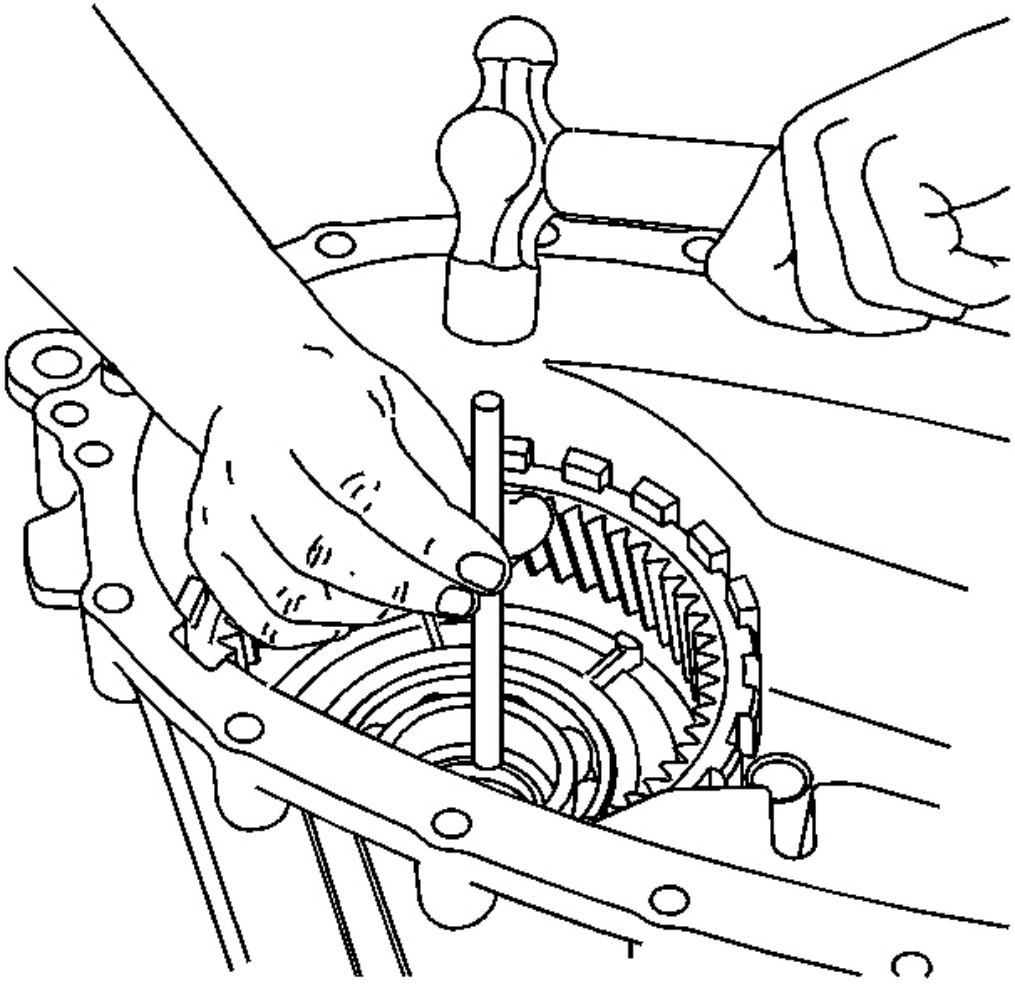


Fig. 40: Identifying Input Seal
Courtesy of GENERAL MOTORS CORP.

48. Using a hammer and a suitable punch, remove the input seal.

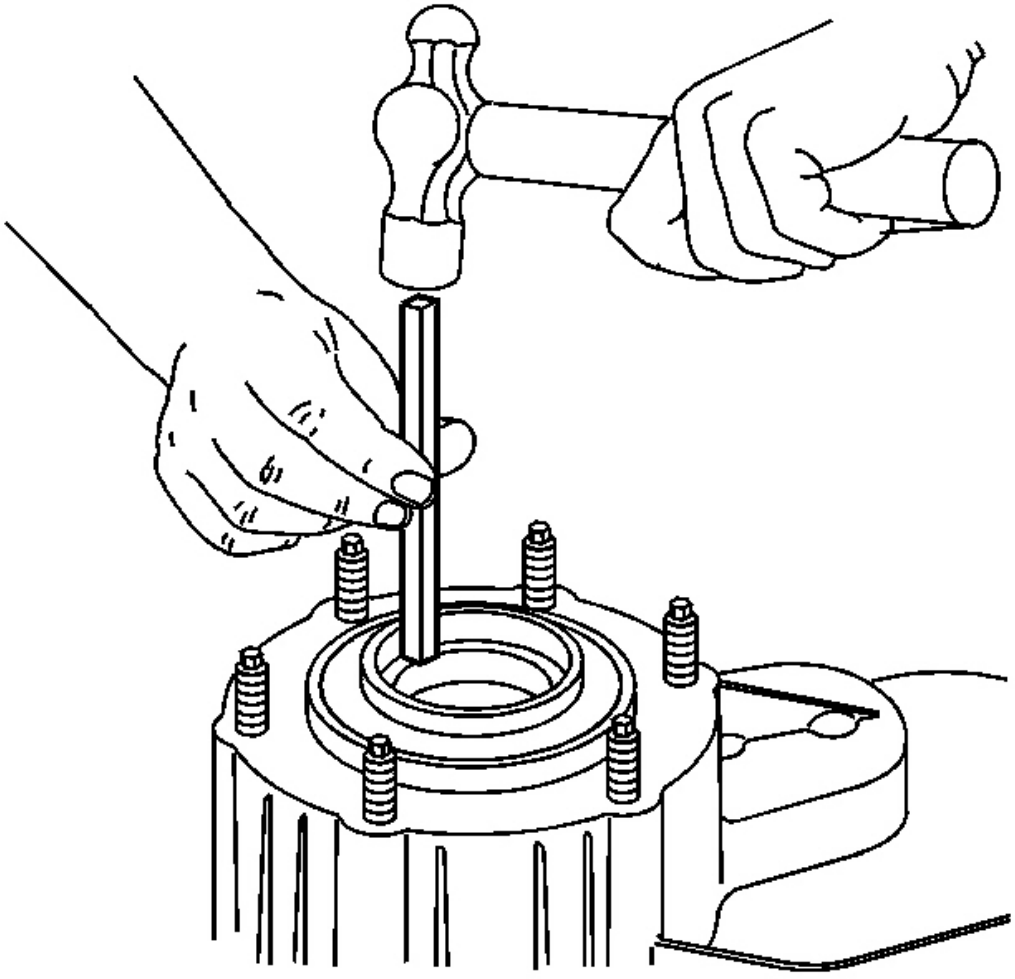


Fig. 41: Tapping Out Input Shaft Bearing With Brass Drift
Courtesy of GENERAL MOTORS CORP.

49. Using a hammer and a brass drift, remove the input shaft bearing from the front case half.

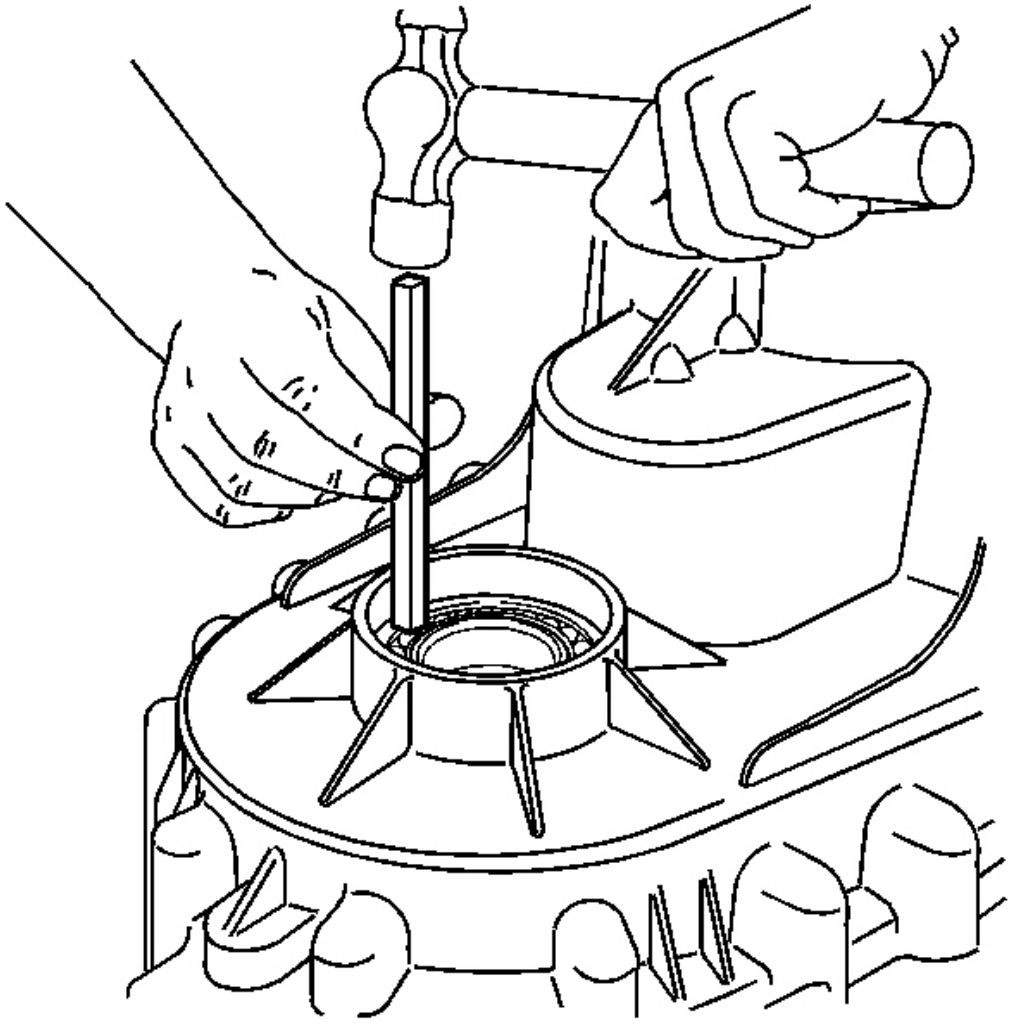


Fig. 42: Removing Front Output Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

50. Using a brass drift, remove the front output shaft bearing from the front case half.

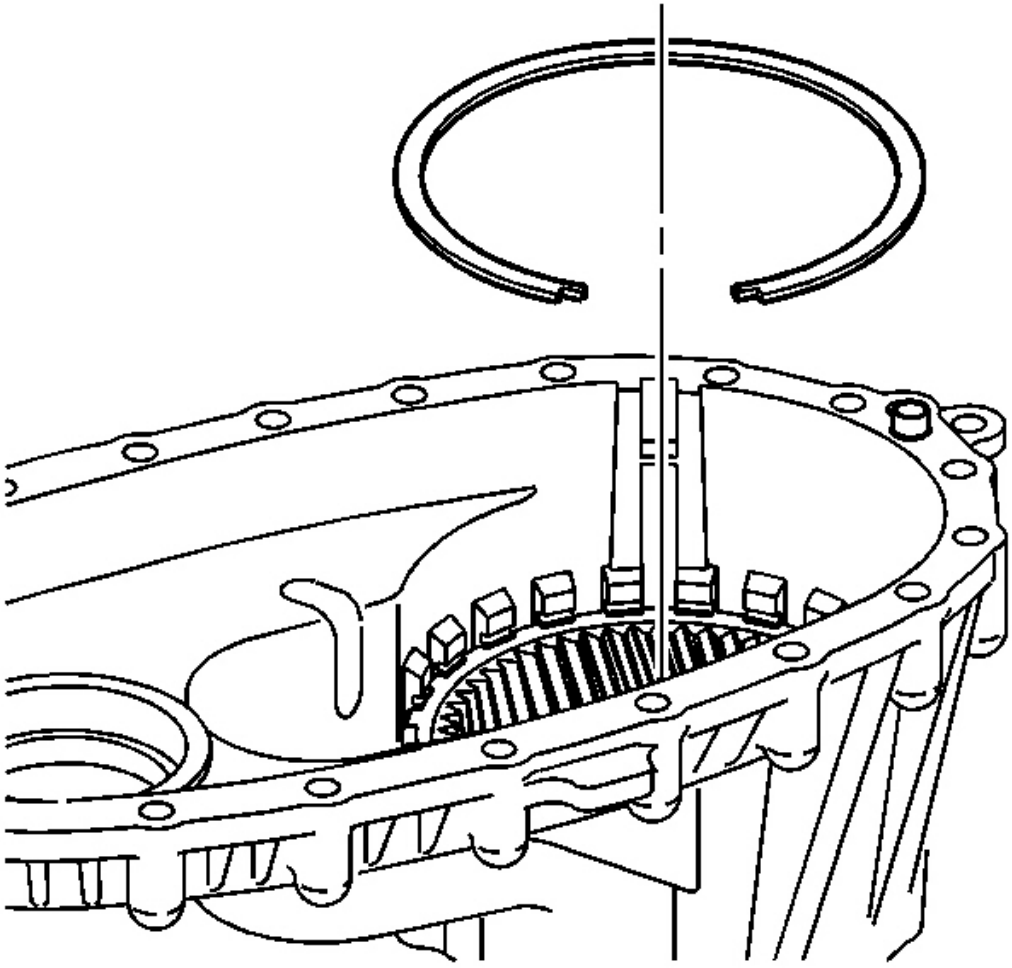


Fig. 43: Locating Retaining Ring For Annulus Gear
Courtesy of GENERAL MOTORS CORP.

51. Remove the retaining ring for the annulus gear.

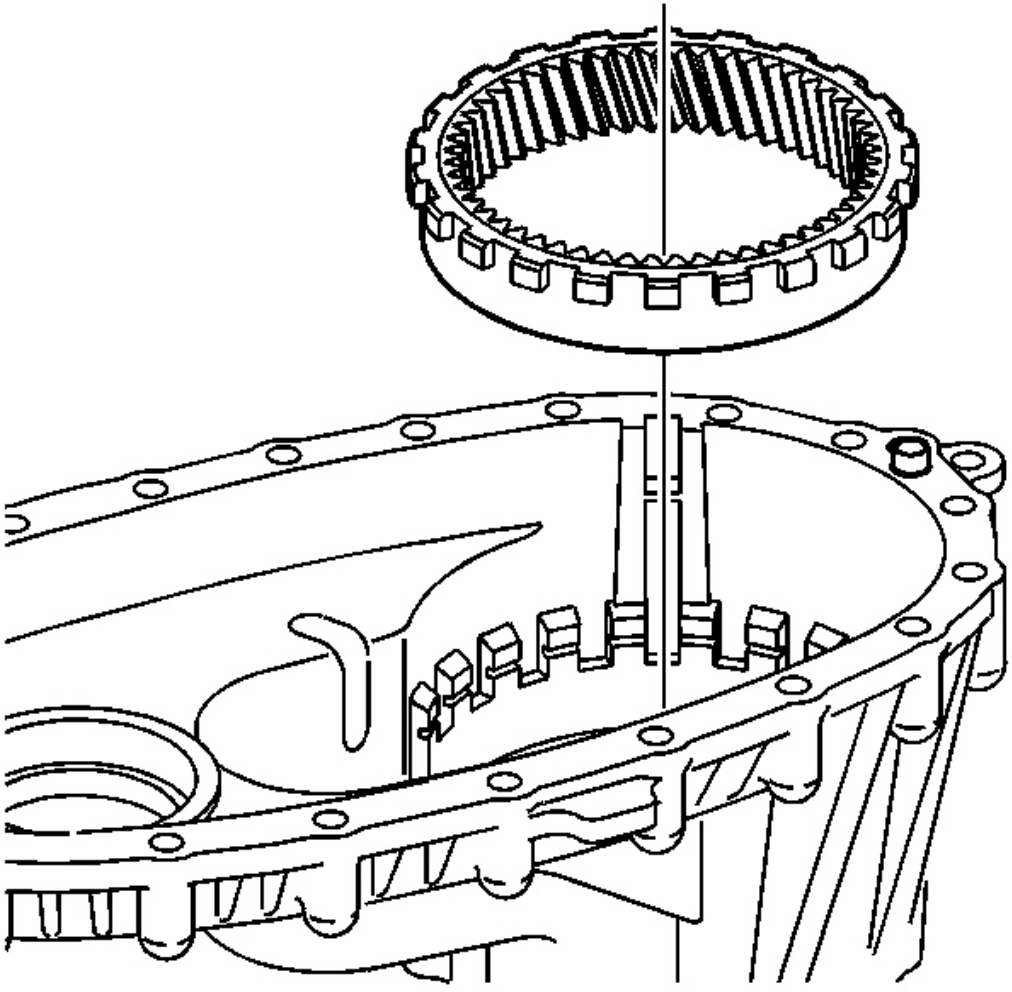


Fig. 44: Identifying Annulus Gear
Courtesy of GENERAL MOTORS CORP.

52. Remove the annulus gear from the front case half.

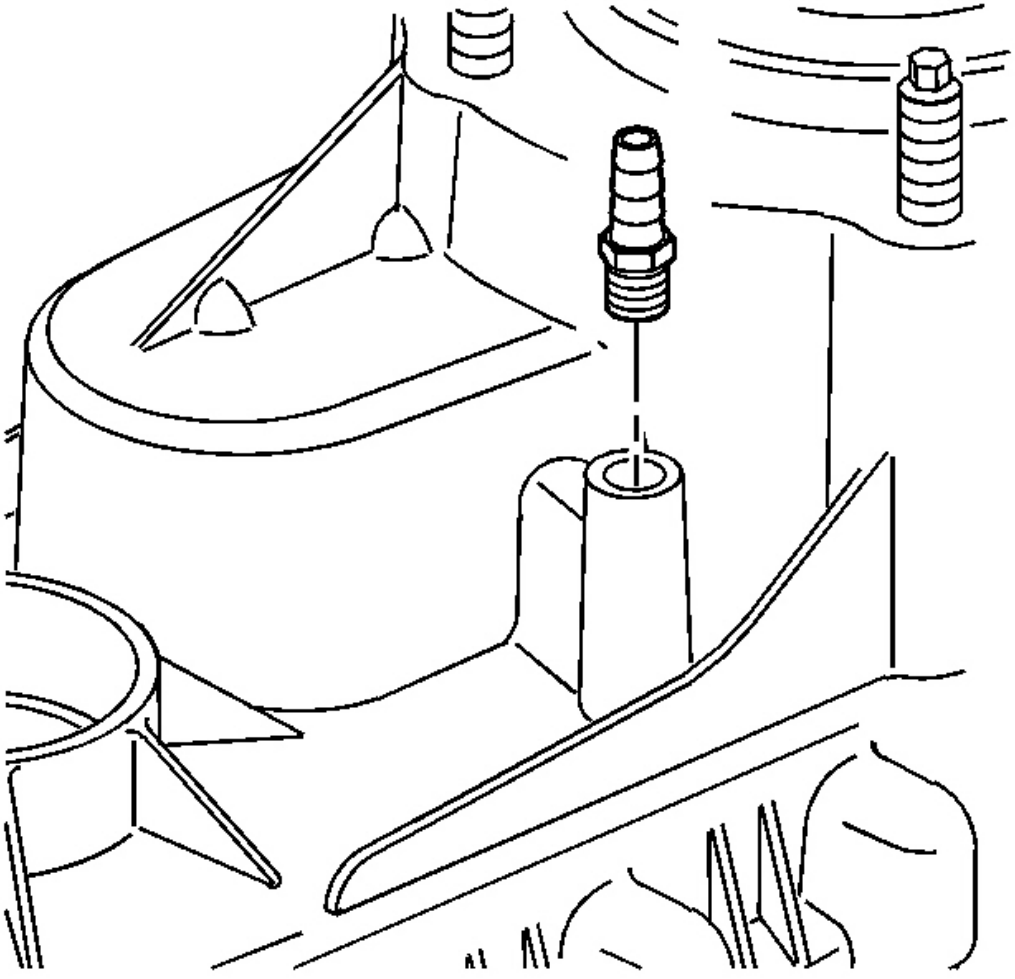


Fig. 45: View Of Front Case Vent
Courtesy of GENERAL MOTORS CORP.

53. If necessary, remove the vent from the front case half.

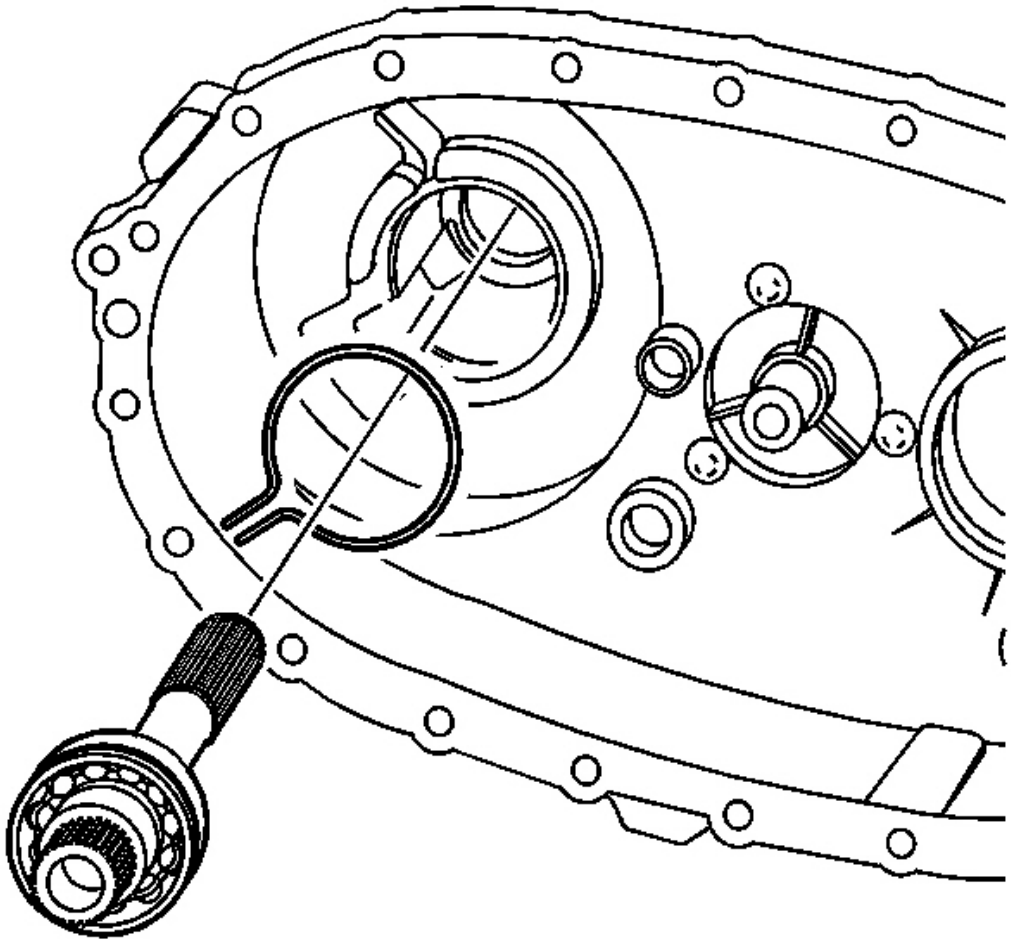


Fig. 46: Identifying Rear Output Shaft & Outer Retaining Ring
Courtesy of GENERAL MOTORS CORP.

54. Remove the rear output shaft from the rear case half.
    1. Spread the rear output shaft rear bearing outer retaining ring.
    2. Using a soft-face hammer, tap on the end of the rear output shaft.

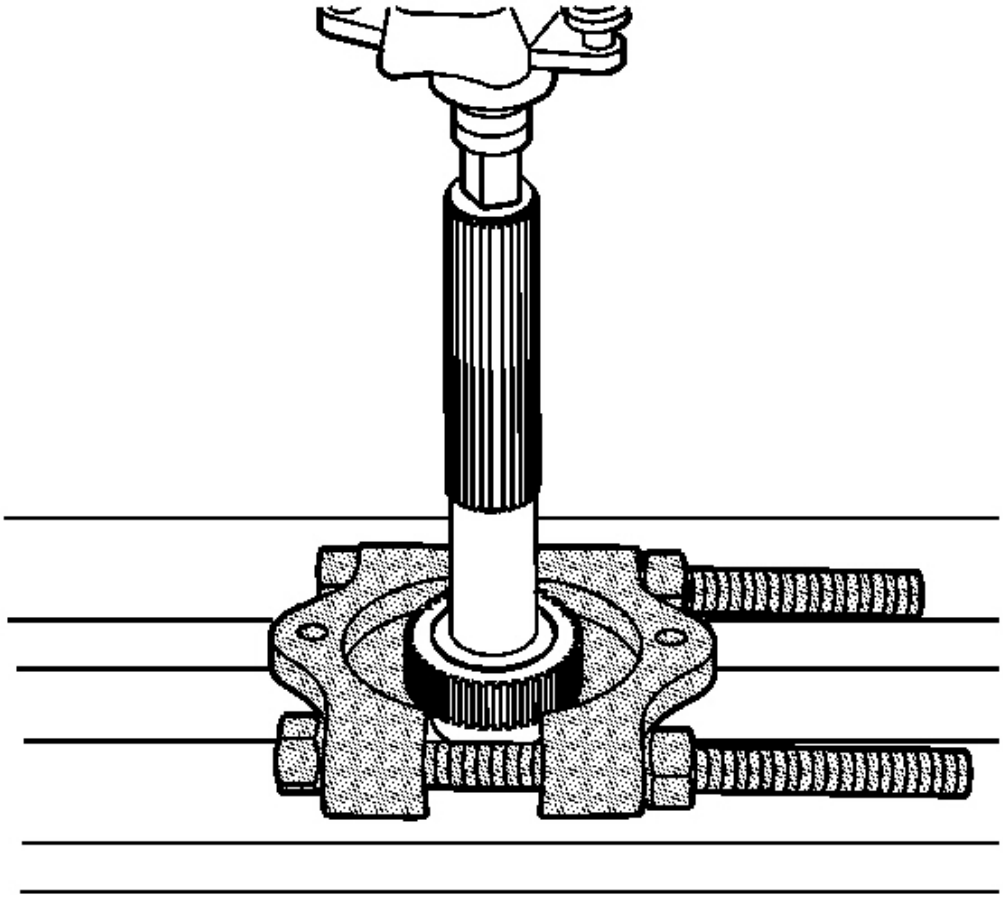


Fig. 47: Removing Speed Reluctor Wheel With J 22912-01
Courtesy of GENERAL MOTORS CORP.

55. Using a hydraulic press and the **J 22912-01** , remove the speed reluctor wheel.

    Do not use the speed reluctor wheel again.

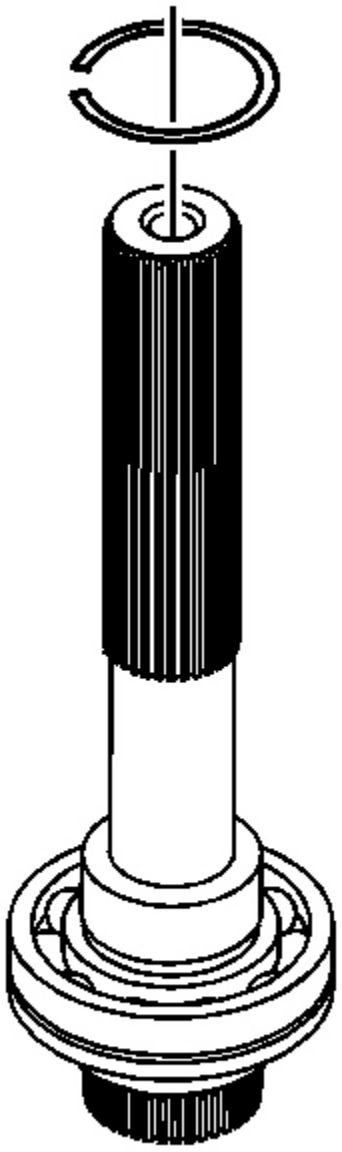


Fig. 48: View Of Rear Output Shaft Bearing Retaining Ring
Courtesy of GENERAL MOTORS CORP.

56. Remove the retaining ring for the rear output shaft bearing.

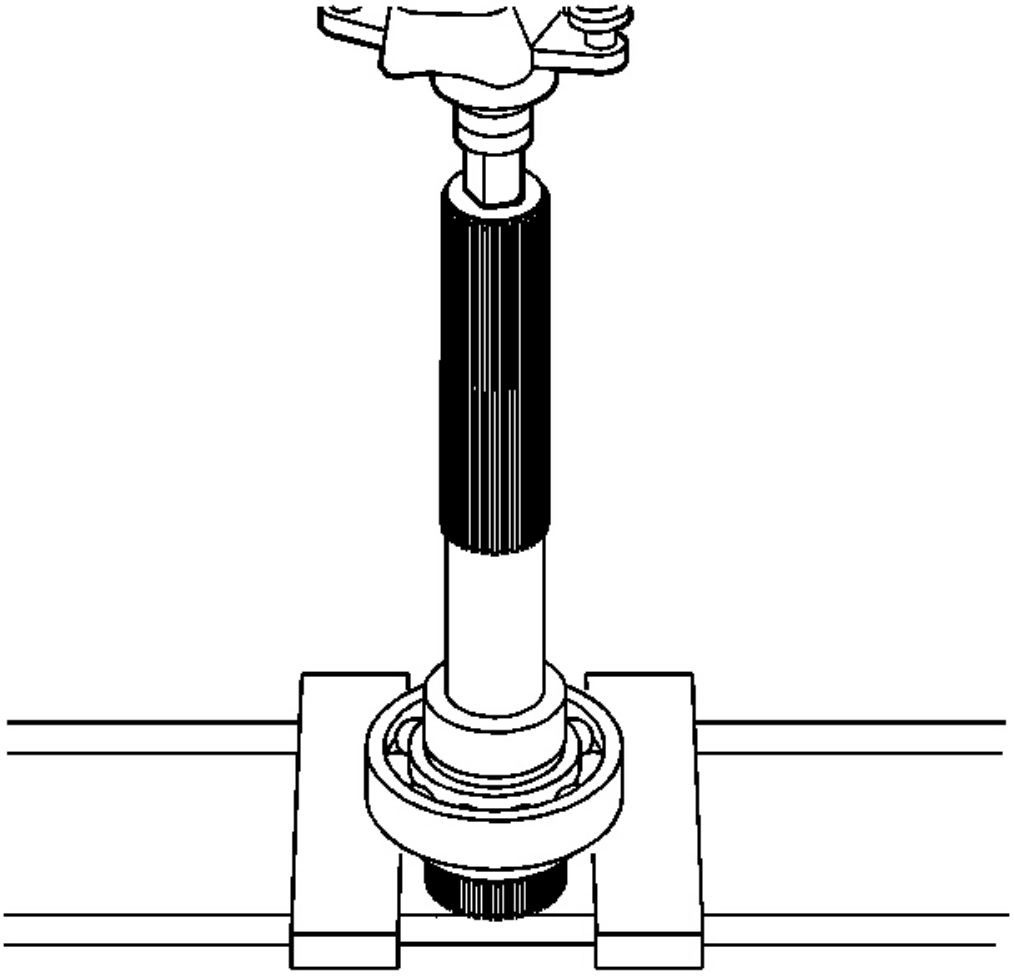


Fig. 49: Pressing Out Rear Output Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

57. Using a hydraulic press, remove the rear output shaft bearing.

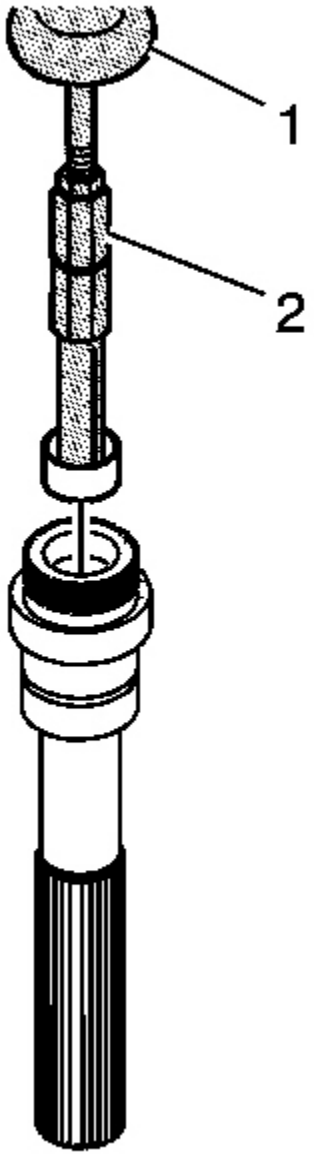


Fig. 50: Using J 2619-01 & J 45548 To Remove Mainshaft Rear Support Bushing
Courtesy of GENERAL MOTORS CORP.

58. Inspect the mainshaft rear support bushing in the rear output shaft for being faulty. Refer to **Cleaning and Inspection** .
59. Using the **J 2619-01** (1) and the **J 45548** (2), remove the mainshaft rear support bushing from the rear

output shaft.

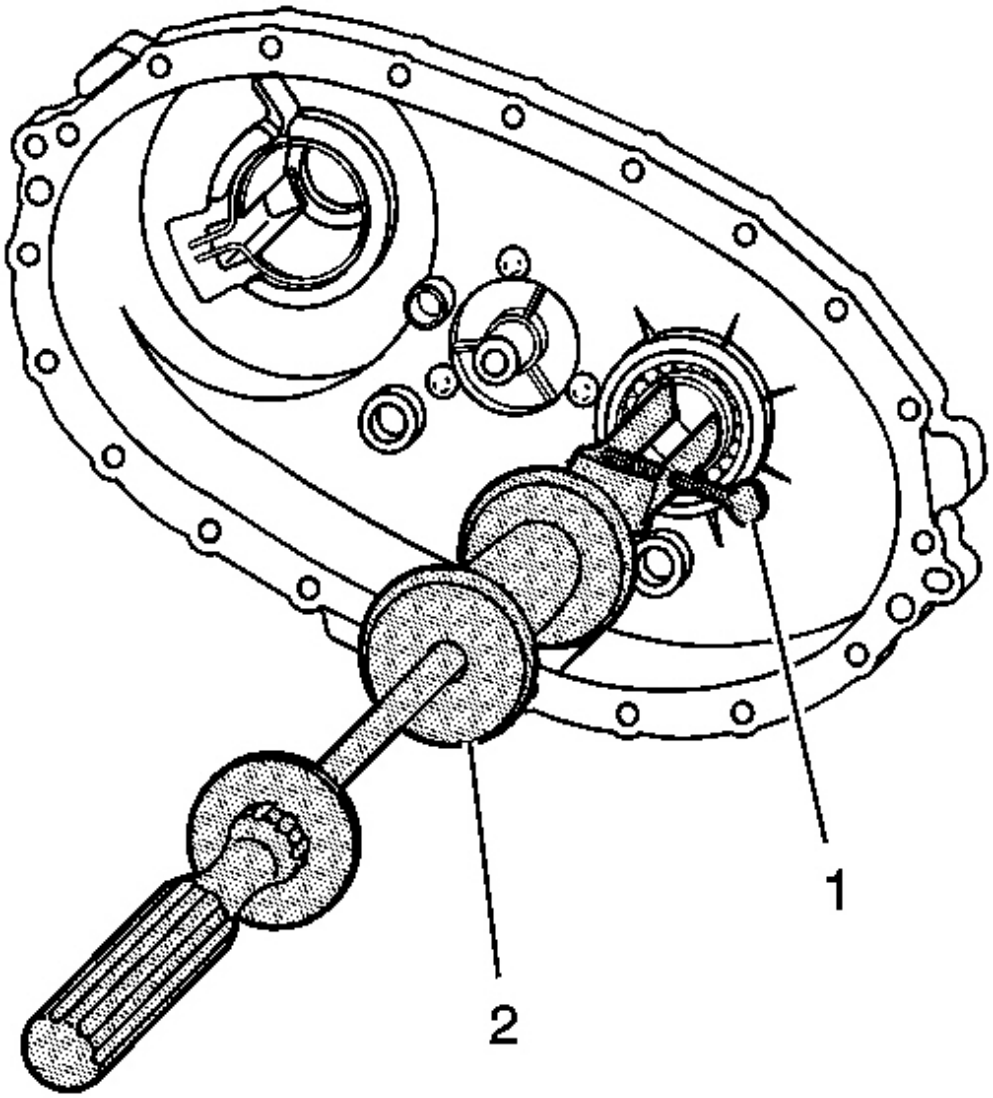


Fig. 51: Identifying J 26941 & J 23907
Courtesy of GENERAL MOTORS CORP.

60. Using the **J 26941** (1) and the **J 23907** (2), remove the rear bearing for the front output shaft from the rear case.

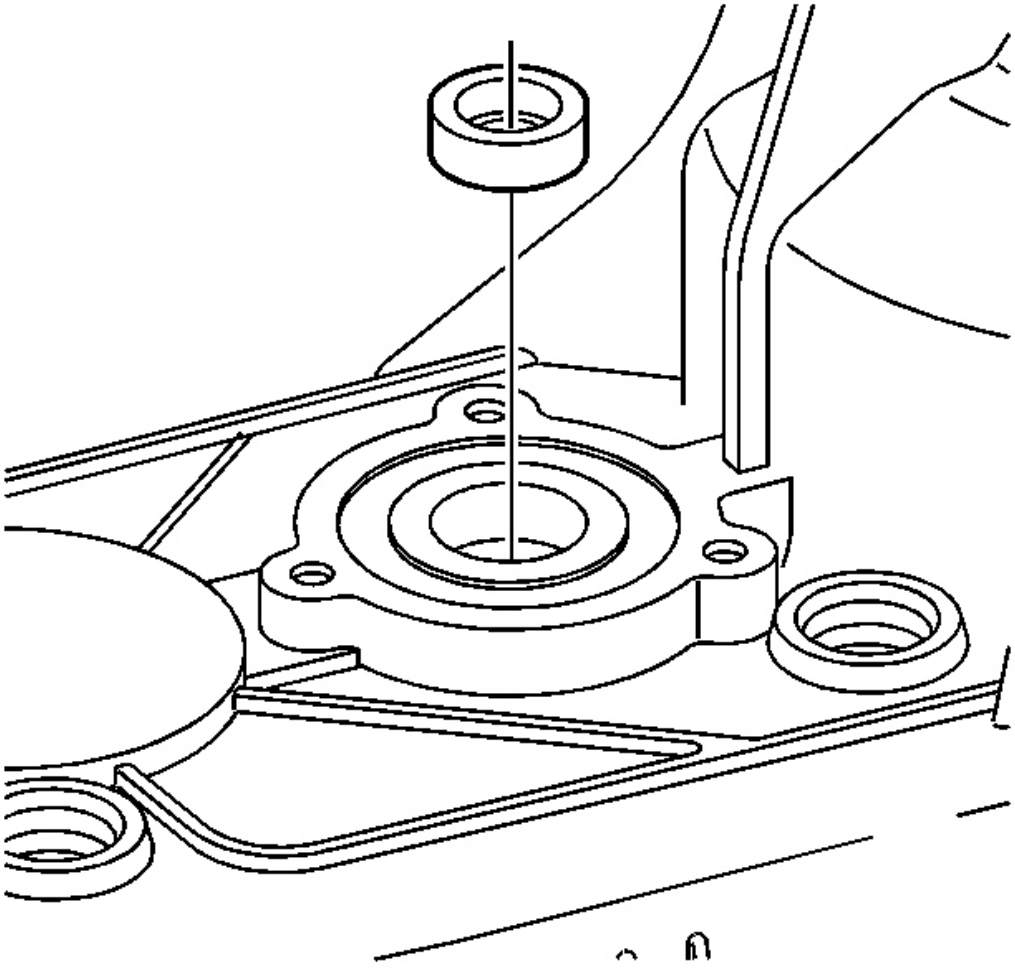


Fig. 52: View Of Shift Detent Lever Shaft Seal
Courtesy of GENERAL MOTORS CORP.

61. Remove the seal for the shift detent lever shaft by prying it out from the case.

CLEANING AND INSPECTION

Front Case Half

1. Clean the front case half in cleaning solvent and air dry.

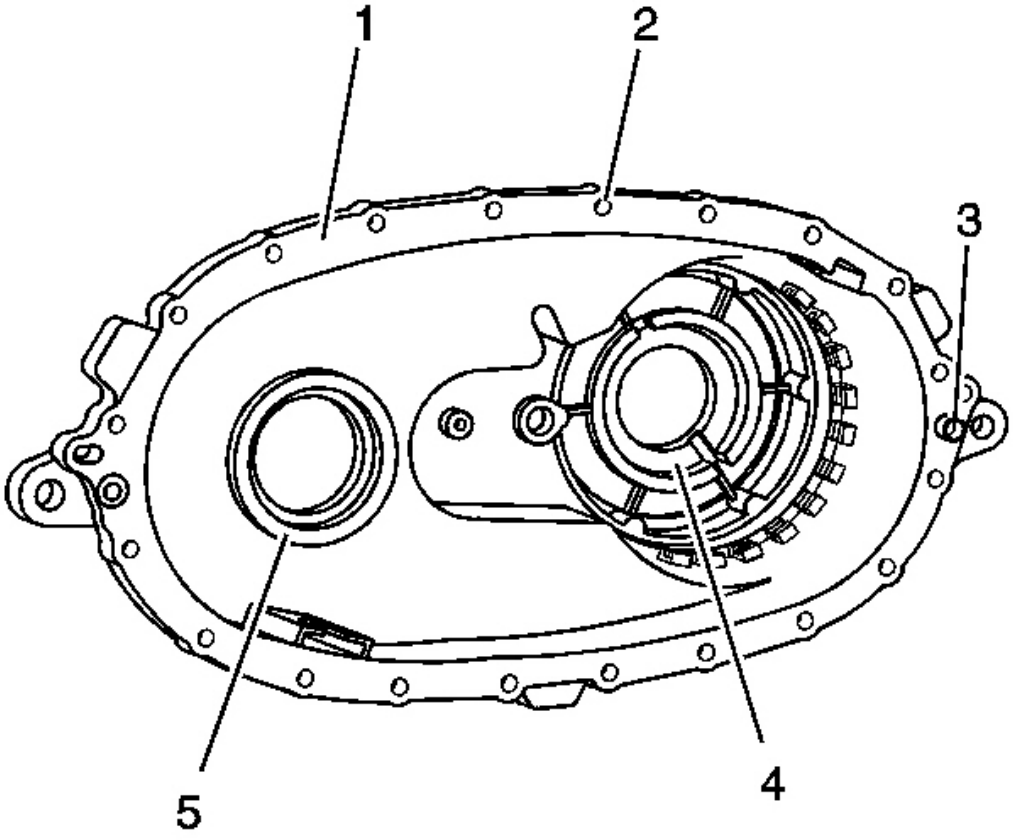


Fig. 53: View Of Front Case Inspection Areas
Courtesy of GENERAL MOTORS CORP.

2. Remove the shavings from the case half bolt holes.

NOTE: Refer to Machined Surface Damage Notice in Cautions and Notices.

3. Remove the sealer from the case sealing surfaces.
4. Inspect the case for being broken or cracked.
5. Inspect the front output shaft front bearing bore (5) for the following conditions:
   - A spun bearing
   - Cracks
6. Inspect the input shaft bearing bore (4) for the following conditions:
   - A spun bearing
   - Cracks

7. Replace the front case half if any of the above conditions are found.
8. Inspect the sealing surfaces (1) for damage.
9. Repair small scratches or nicks with a soft stone.
10. Inspect the front case to transmission case mounting surface for damage.
11. Inspect the case threaded bolt holes (2) for damage.
12. Repair any damaged threads.
13. Inspect the transmission to transfer case studs for damage.
14. Replace any damaged studs. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
15. Inspect the location pins (3) for being loose or missing.
16. Repair or replace any damaged location pins.
17. Inspect the front output shaft front bearing and the input shaft bearing for the following conditions:
    - Roughness
    - Brinelling
    - Pitting
18. Replace the bearings if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

Rear Case Half

1. Clean the rear case half in cleaning solvent and air dry.

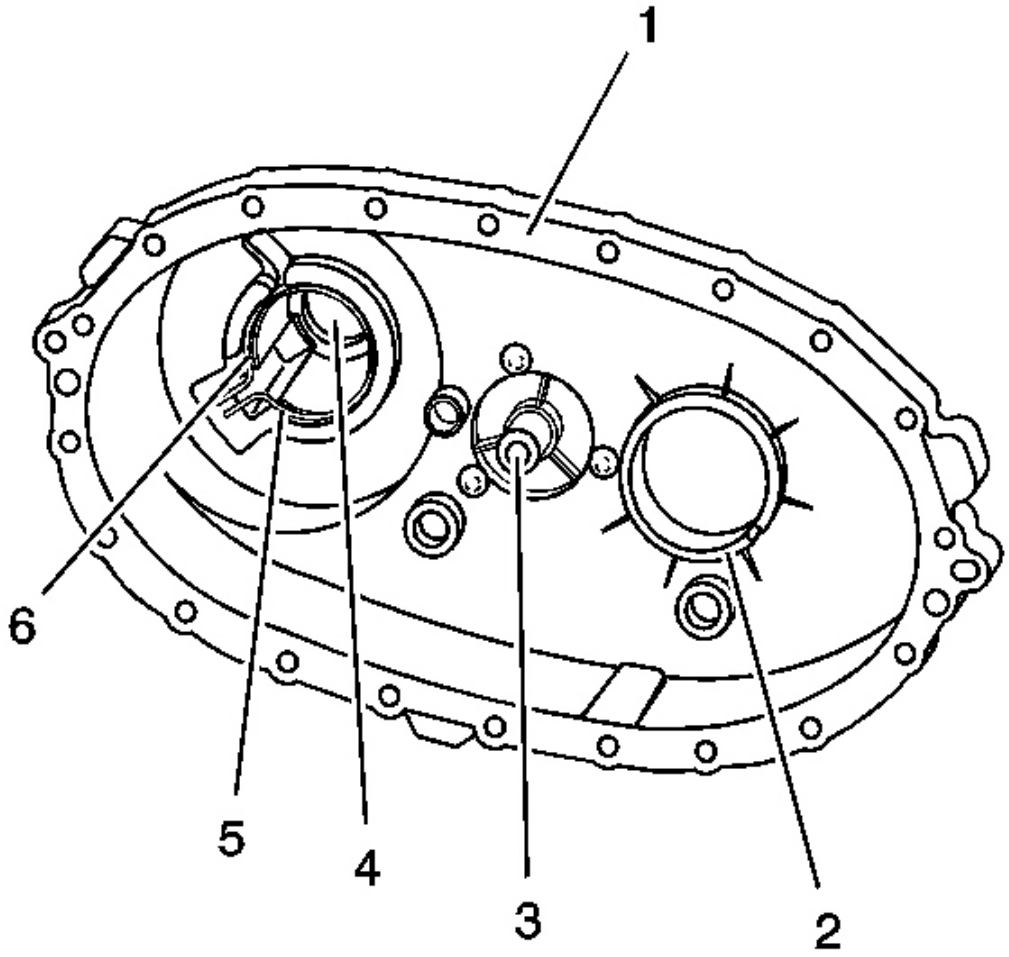


Fig. 54: Locating Rear Case Half Inspection Points
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Machined Surface Damage Notice in Cautions and Notices.

2. Remove the sealer from the case sealing surfaces.
3. Inspect the case for being broken or cracked.
4. Replace the case if it is broken or cracked.
5. Inspect the sealing surfaces (1) for damage.
6. Repair small scratches or nicks with a soft stone.
7. Inspect the case threaded bolt holes for damage.

8. Repair any damaged threads.
9. Inspect the front output shaft rear bearing bore (2) for the following conditions:
    - Spun bearing
    - Cracks
10. Inspect the rear output shaft rear bearing bore (5) for the following conditions:
    - Spun bearing
    - Cracks
11. Replace the case if the bearing has spun. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
12. Inspect the retaining ring (6) for the rear output shaft rear bearing for being bent or twisted.
13. Replace a faulty retaining ring.
14. Inspect the rear output shaft bushing (4) for scoring or wear.
15. Replace the case if the rear output shaft bushing is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
16. Inspect the shift detent lever shaft bore (3) for the following conditions:
    - Out of round
    - Excessive wear
17. Replace the case if the shift detent lever shaft bore is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

Oil Pump

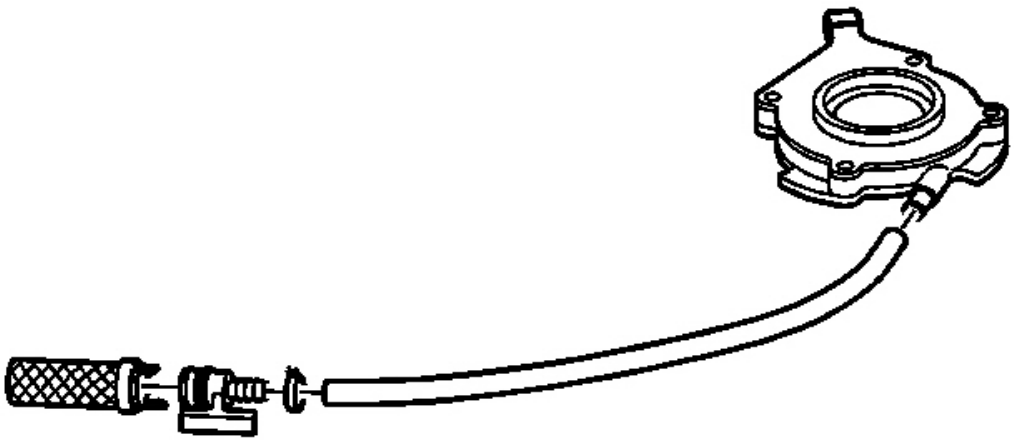


Fig. 55: Locating Oil Pump Hose & Screen
Courtesy of GENERAL MOTORS CORP.

1. Remove the oil pump suction hose from the oil pump screen.
2. Clean the hose and screen in cleaning solvent and air dry.
3. If the screen is embedded with debris, replace the screen.
4. Inspect the hose for cracking or tears.
5. Replace the hose if it is faulty.
6. Inspect the oil pump for free movement.
7. Replace the oil pump if there is any binding. Do not disassemble the oil pump. The oil pump is serviced as a unit.
8. Inspect the wear clip on the oil pump.
9. Replace the oil pump if the wear clip is missing or faulty.

High/Low Range Components

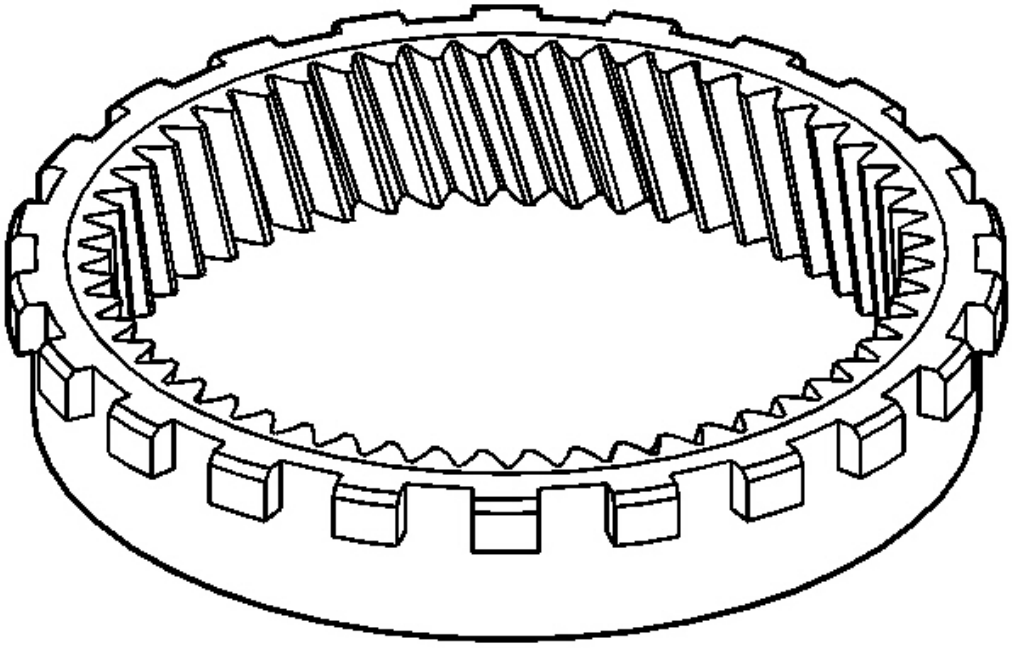


Fig. 56: Annulus Gear
Courtesy of GENERAL MOTORS CORP.

1. Clean the annulus gear in cleaning solvent and air dry.
2. Inspect the annulus gear teeth for the following conditions:
   - Damage or excessive wear

- Chipped
- Debris embedded in the root of the teeth

3. Replace the annulus gear if it is faulty.

1. Clean the high/low range shift sleeve in cleaning solvent and air dry.
2. Inspect the high/low range shift sleeve for the following conditions:
    - Excessive wear or roughness on the shift fork pad surface (2)
    - Damaged, chipped or excessive wear on the engagement teeth (3)
    - Excessive looseness or gouging on the mainshaft splines (1)

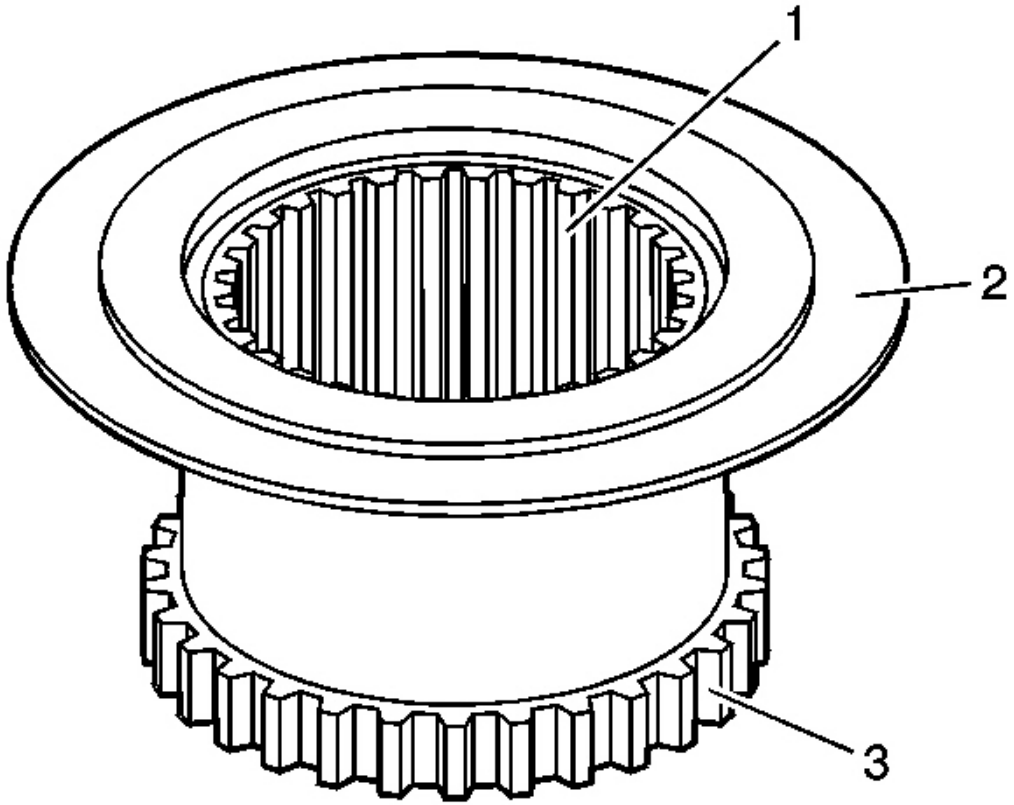


Fig. 57: Identifying High/Low Range Shift Sleeve Inspection Areas
Courtesy of GENERAL MOTORS CORP.

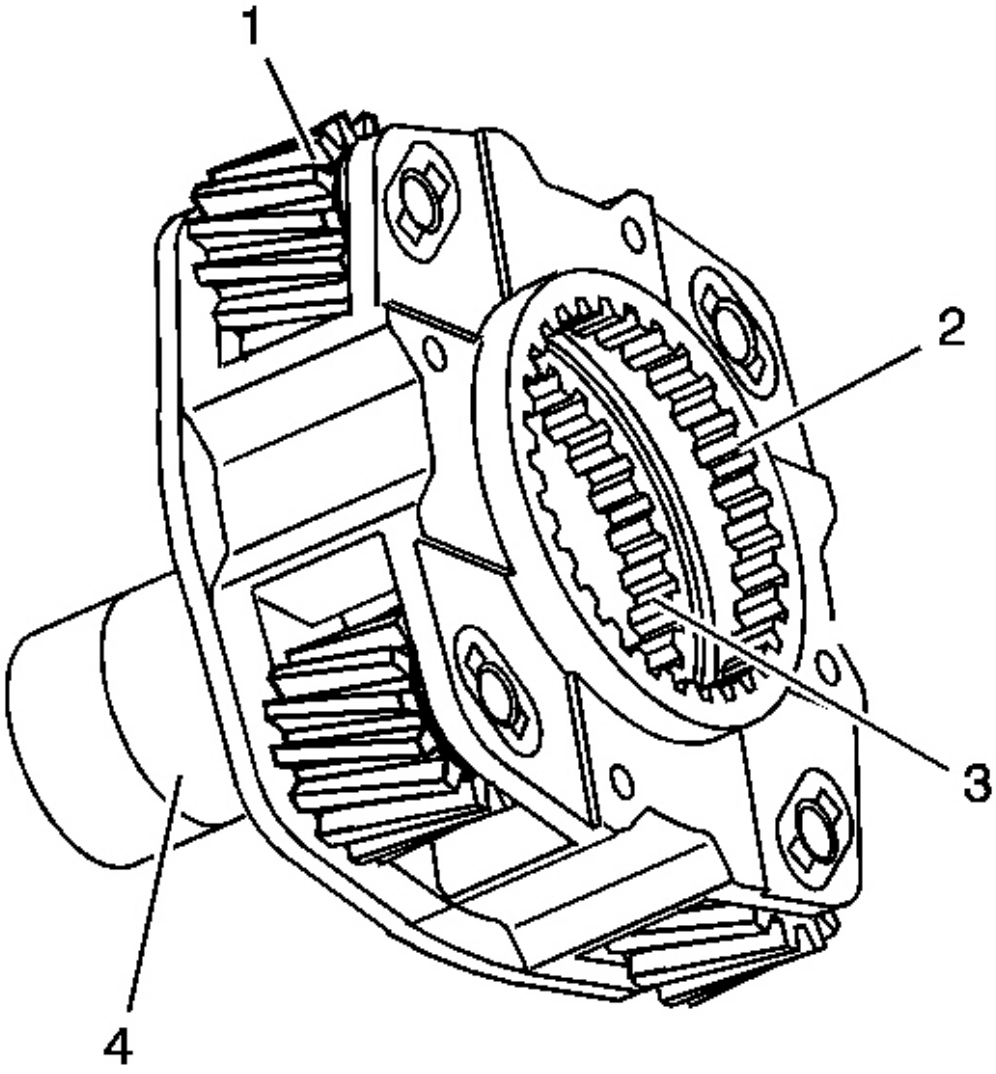


Fig. 58: View Of High/Low Planetary Carrier Inspection Areas
Courtesy of GENERAL MOTORS CORP.

1. Clean the high/low planetary carrier in cleaning solvent. Do not disassemble the planetary carrier.
2. Air dry and ensure all cleaning solvent is removed from the bearings in the planetary gears (1). Do not spin the planetary gears with compressed air.
3. Inspect the planetary gears for chipped teeth.
4. Inspect the planetary gears for debris embedded in the root of the teeth.

5. Inspect the planetary gears for excessive side movement from worn bearings or shafts.
6. Inspect the low range teeth (2) for damage or excessive wear.
7. Inspect the high range teeth (3) for damage or excessive wear.
8. Inspect the input seal surface (4) for scoring or excessive wear.
9. Inspect the thrust washer surface for scoring or excessive wear.
10. Replace the high/low planetary carrier if any of the above conditions are found.
11. Inspect the mainshaft front support bearing for the following conditions:
    - Scoring
    - Pitting
    - Brinelling
    - Excessive wear
12. Replace the mainshaft front support bearing if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
13. Inspect the high/low planetary thrust washer for excessive wear or scoring.
14. Replace the thrust washer if it is faulty.

Differential Components

1. Clean the planetary differential in cleaning solvent. Do not disassemble the planetary differential.
2. Air dry and ensure all cleaning solvent is removed from the bushings in the pinion gears (3). Do not spin the pinion gears with compressed air.

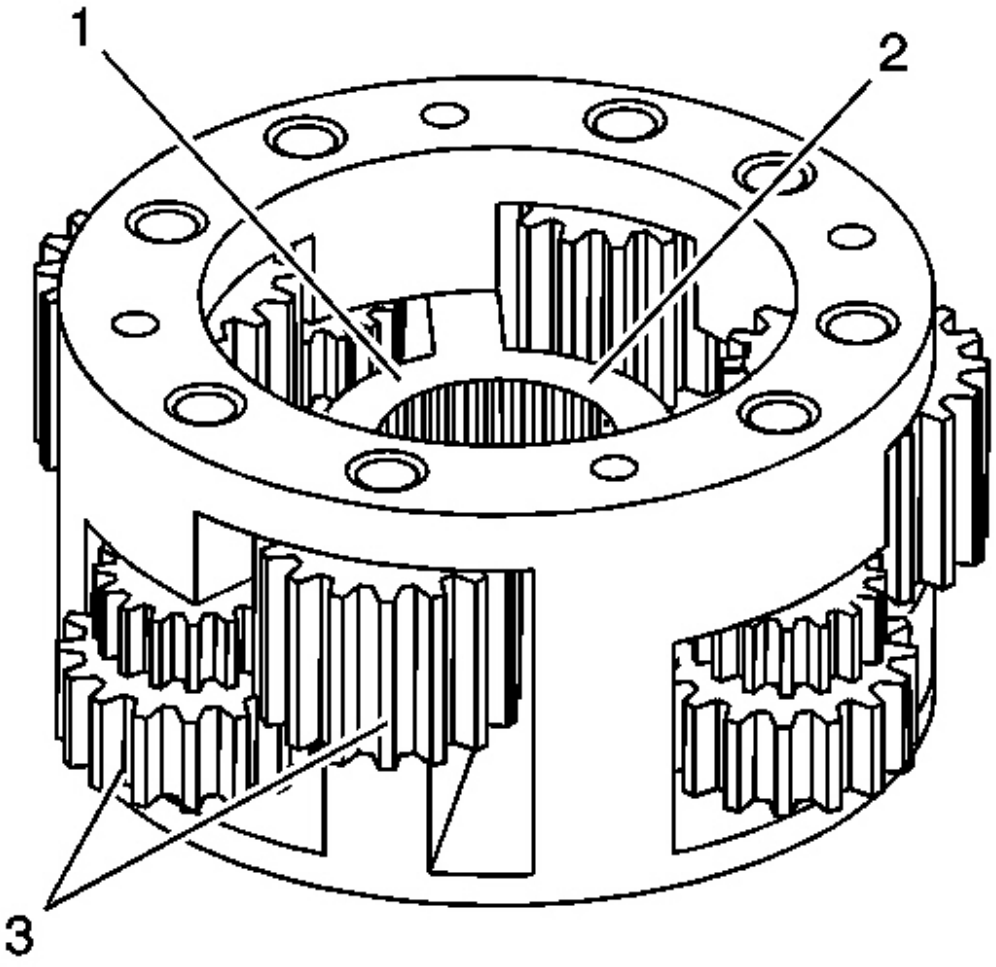


Fig. 59: Locating Planetary Differential Inspection Points
Courtesy of GENERAL MOTORS CORP.

3. Inspect the pinion gears for chipped teeth.
4. Inspect the pinion gears for debris embedded in the root of the teeth.
5. Inspect the pinion gears for excessive side movement from worn bushings or shafts.
6. Inspect the planetary differential assembly for cracks at the web (1) of the housing.
7. Inspect the thrust washer surface (2) for scoring or excessive wear.
8. Inspect the planetary differential for distortion.
9. Inspect the planetary differential to mainshaft splines for excessive wear.

10. Replace the planetary differential if any of the above conditions are found.
11. Inspect the thrust washers for excessive wear or scoring.
12. Replace the thrust washers if they are faulty.

Sun Gears and Lock-Up Hub

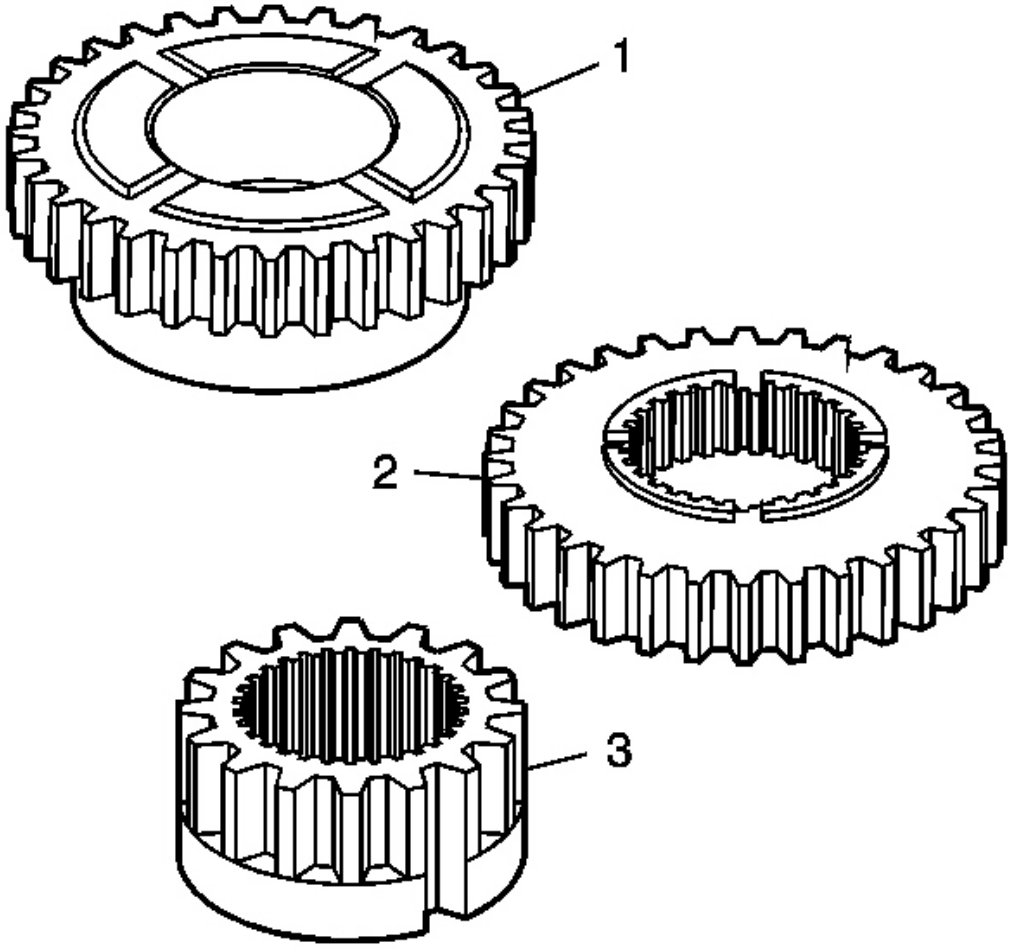


Fig. 60: Identifying Front Sun Gear, Rear Sun Gear & Inner Lockup Hub
Courtesy of GENERAL MOTORS CORP.

1. Clean the front sun gear (1), the rear sun gear (2), and the inner lockup hub (3) in cleaning solvent and air dry.
2. Inspect the teeth on the front sun gear (1), the rear sun gear (2), and the inner lockup hub (3) for the

following conditions:

- Chipped teeth
- Excessively worn gear surfaces

  Slight wear marks are normal.

- Debris embedded in the root of the teeth

3. Inspect the thrust washer surfaces for excessive wear or scoring.
4. Replace the front sun gear (1), the rear sun gear (2), and the inner lockup hub (3) if they are faulty.

Lock-Up Shift Assembly

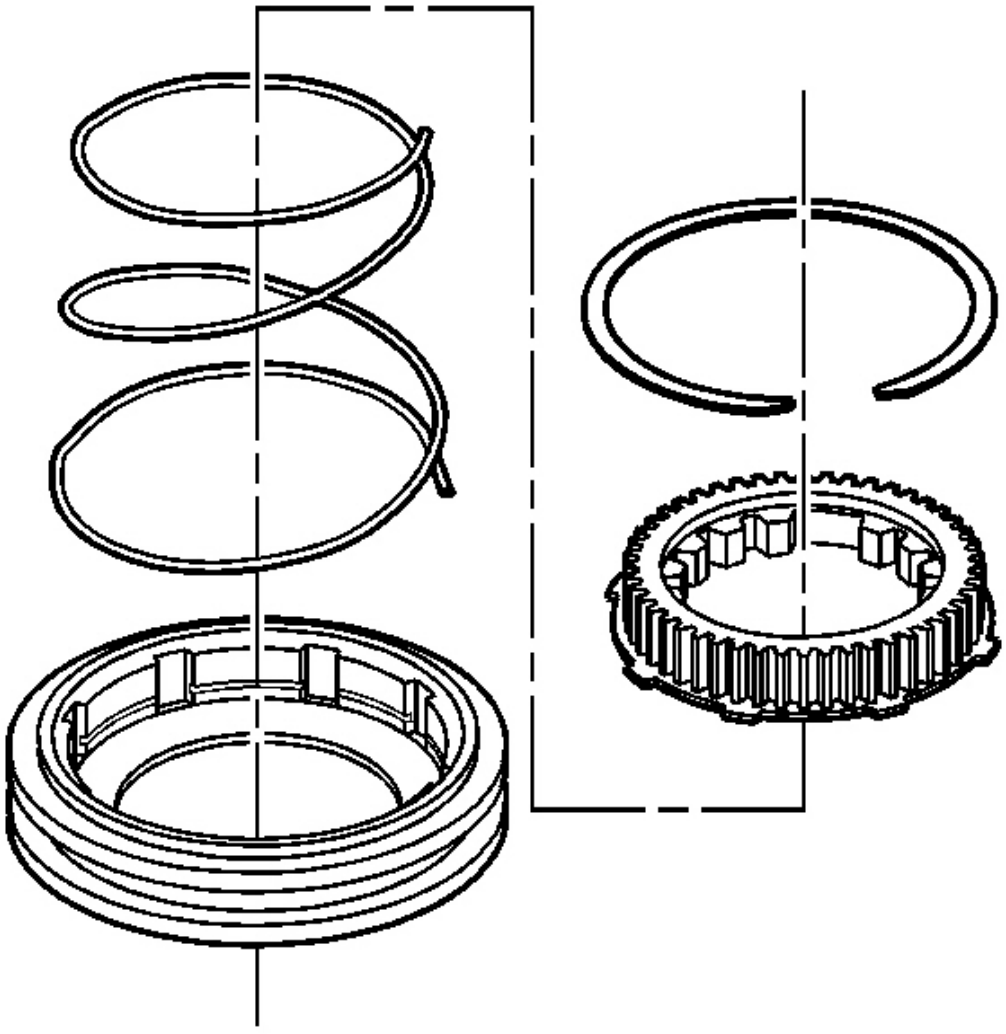


Fig. 61: Illustrating Lockup Shift Assembly Components
Courtesy of GENERAL MOTORS CORP.

1. If necessary, disassemble the lockup shift assembly. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
2. Clean the lockup shift assembly components in cleaning solvent and air dry.
3. Inspect the lockup shift hub engagement teeth for the following conditions:
    - Chipped teeth
    - Excessively worn gear surfaces

Slight wear marks are normal.

- Debris embedded in the root of the teeth

4. Replace the lockup shift assembly if it is faulty. The lockup shift assembly components are not serviced separately.

Drive Chain and Sprockets

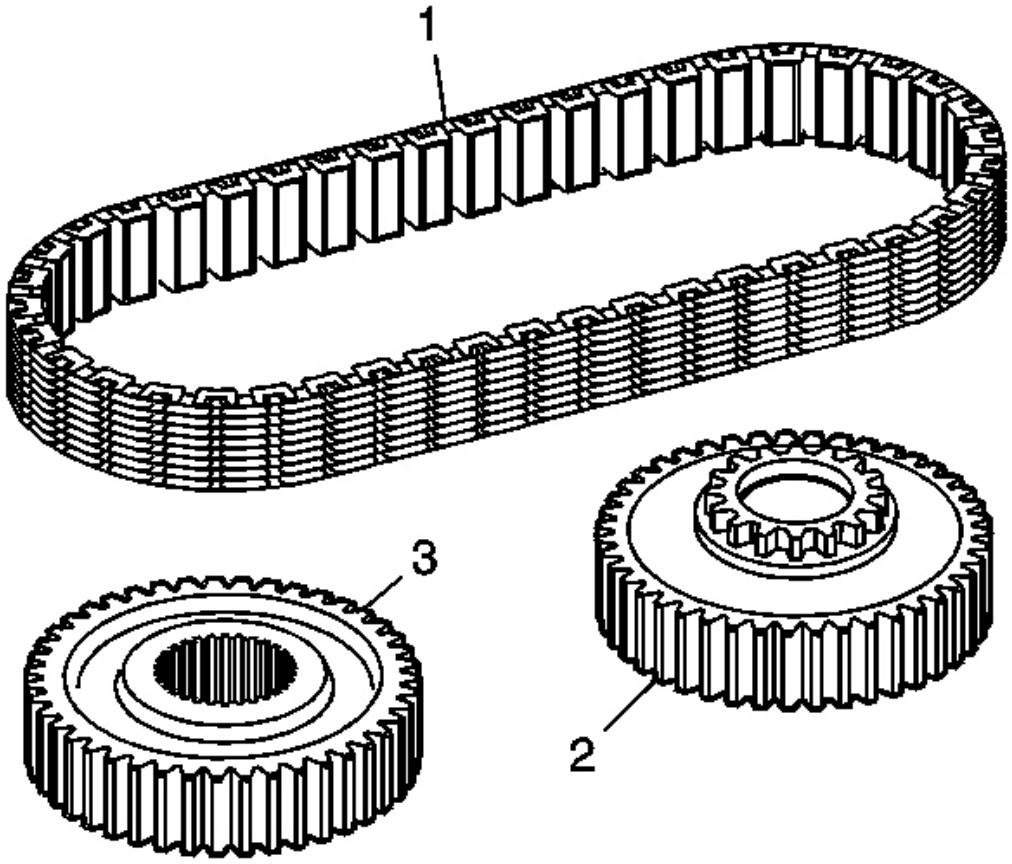


Fig. 62: View Of Drive Chain, Drive Sprocket & Driven Sprocket
Courtesy of GENERAL MOTORS CORP.

1. Clean the drive chain (1), drive sprocket (2), and driven sprocket (3) in cleaning solvent and air dry.
2. Inspect the drive chain (1) for the following conditions:
   - Loose link pins
   - Binding or stiff links

- Debris embedded in the links
- Worn teeth surfaces

3. Replace the chain if any of the above conditions are found.
4. Inspect the driven sprocket (3) and the drive sprocket (2) for the following conditions:
    - Chipped teeth
    - Excessively worn gear surfaces

      Slight wear marks are normal.

    - Debris embedded in the root of the teeth
5. Inspect the drive sprocket (2) for the following conditions:
    - Lockup shift engagement teeth for chipping
    - Lockup shift engagement teeth for excessive wear
6. Inspect the drive sprocket bushing for the following conditions:
    - Excessive wear
    - Scoring
7. Replace the sprockets if any of the above conditions are found. The chain and sprockets may be replaced separately.

Mainshaft

1. Clean the mainshaft in cleaning solvent.
2. Clean the mainshaft oil galleries (1) and air dry.

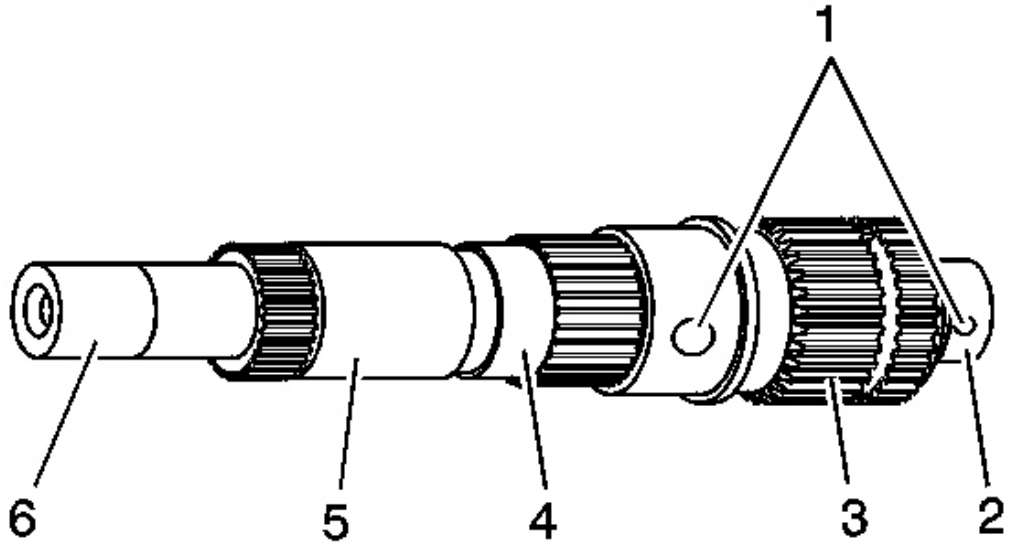


Fig. 63: Identifying Mainshaft Inspection Areas
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not attempt to smooth any roughness in the bearing journals.

3. Inspect the bearing journals on the mainshaft for the following conditions:
    - The front support bearing (2)
    - The drive gear bushing (4)
    - The front sun gear (5)
    - The rear support bushing (6)
        - Scoring
        - Pitting
        - Brinelling
        - Excessive wear
4. Inspect the mainshaft range collar splines (3) for damage or excessive wear. Witness marks at the location of the gear is normal.
5. Replace the mainshaft if any of the above conditions are found.

Front Output Shaft

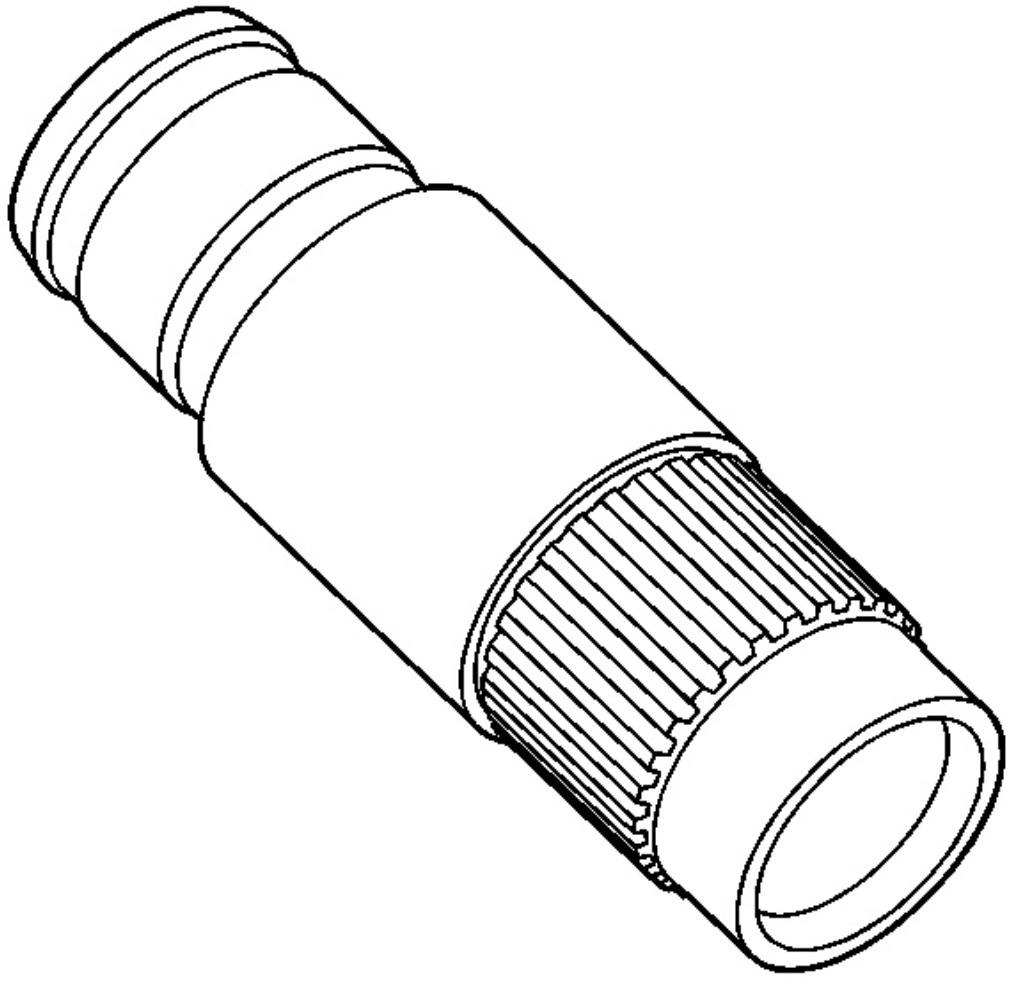


Fig. 64: Front Output Shaft
Courtesy of GENERAL MOTORS CORP.

1. Clean the front output shaft in cleaning solvent and air dry.
2. Inspect for spun bearings at the front output shaft bearing areas.
3. Inspect the front output internal splines and driven gear splines for damage or excessive wear.
4. Replace the front output shaft if it is damaged.
5. Inspect the cup plug in the front output shaft for leaking.
6. Replace the cup plug if it is leaking. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

Rear Output Shaft

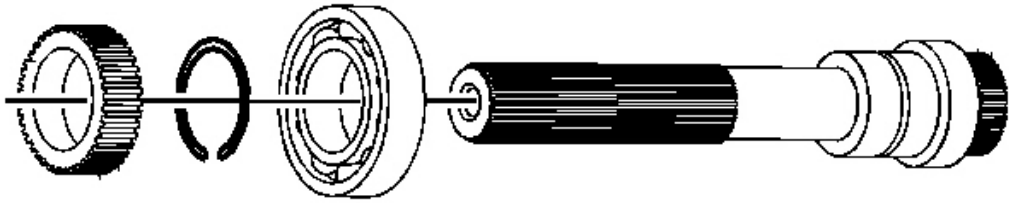


Fig. 65: View Of Rear Output Shaft Components
Courtesy of GENERAL MOTORS CORP.

1. Clean the rear output shaft with rear output shaft bearing in cleaning solvent.
2. Air dry and ensure all solvent is removed from the bearing.
3. Inspect the speed reluctor wheel for damage.
4. Replace the speed reluctor wheel if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
5. Inspect the rear output shaft bearing for the following conditions:
   - Scoring
   - Pitting
   - Brinelling
   - Excessive wear
6. Replace the rear output shaft bearing if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
7. Inspect the mainshaft rear support bushing for the following conditions:
   - Pitted
   - Wear
   - Corrosion
8. Replace the mainshaft rear support bushing if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
9. Inspect the rear output shaft splines for wear or damage.
10. Inspect the rear output shaft bearing area for a spun bearing.
11. Replace the rear output shaft if any of the above conditions are found.

Shift System Components

1. Clean the following shift system components in cleaning solvent and air dry.

- The lockup mode shift fork (1)
- The high/low range shift fork (2)
- The shift detent lever shaft assembly (3)
- The shift fork spring (4)
- The shift fork shaft (5)

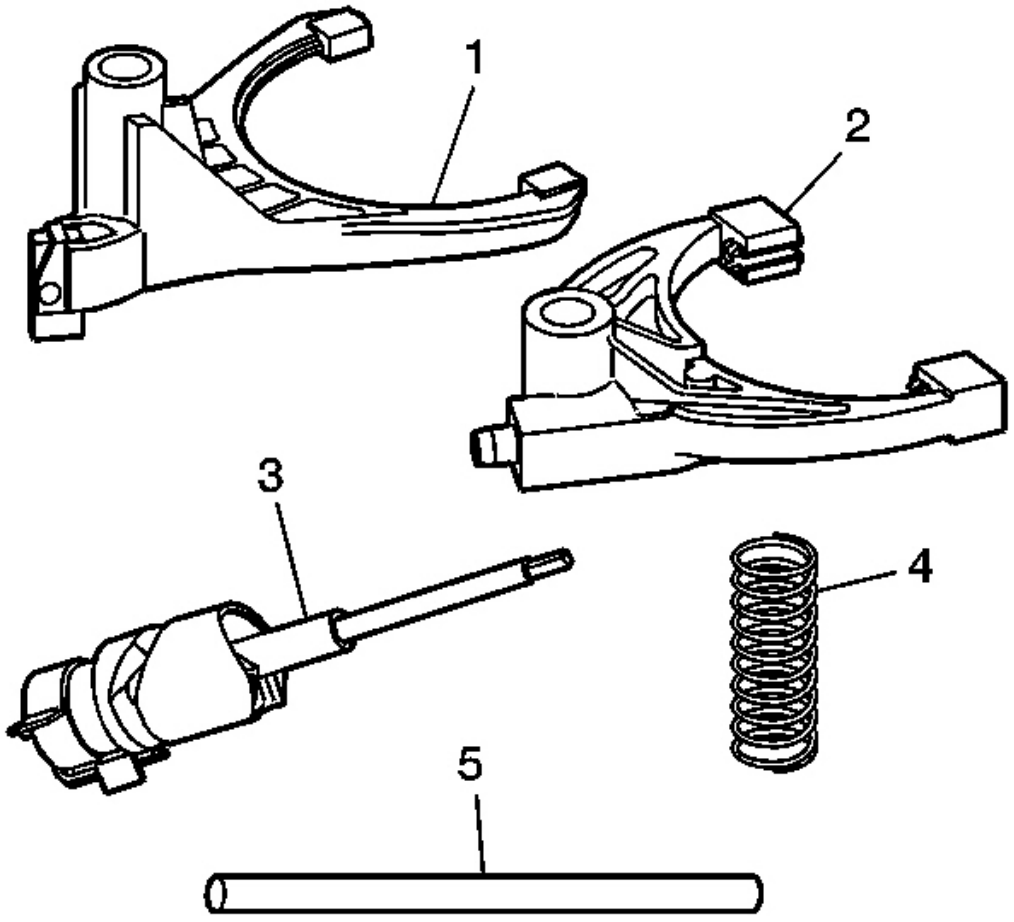


Fig. 66: Identifying Shift System Components
Courtesy of GENERAL MOTORS CORP.

2. Inspect the shift fork shaft (5) for straightness and excessive wear at the shift fork locations.
3. Replace the shift fork shaft if it is not straight or if it is worn excessively.

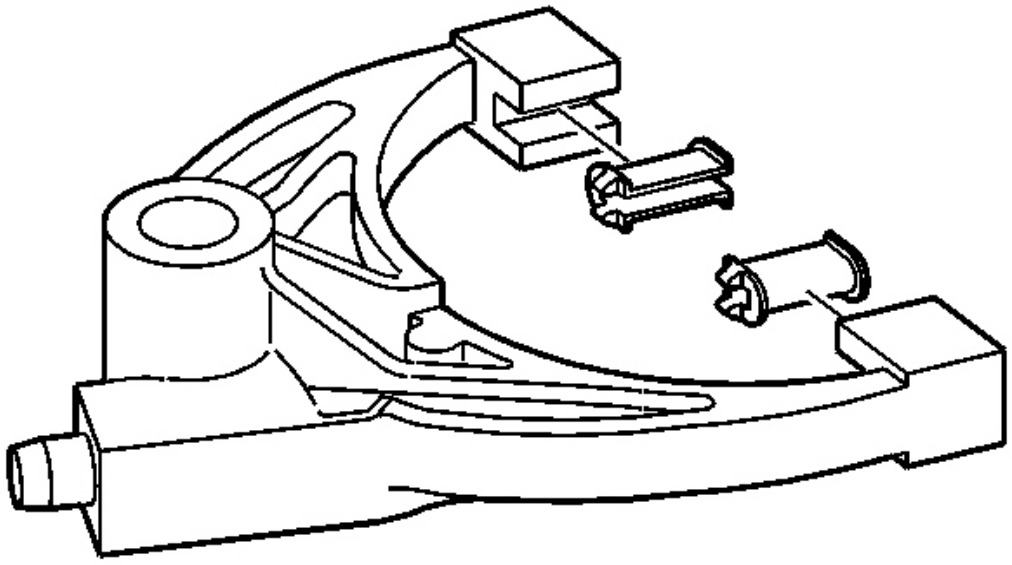


Fig. 67: Identifying Shift Fork Pads
Courtesy of GENERAL MOTORS CORP.

1. Inspect the pads on the high/low range shift fork for wear.
2. Replace the worn pads.
3. Inspect the roller on the shift fork for wear.
4. Inspect the bore for the shift fork shaft for excessive wear.
5. Replace the shift fork if the above conditions are found.

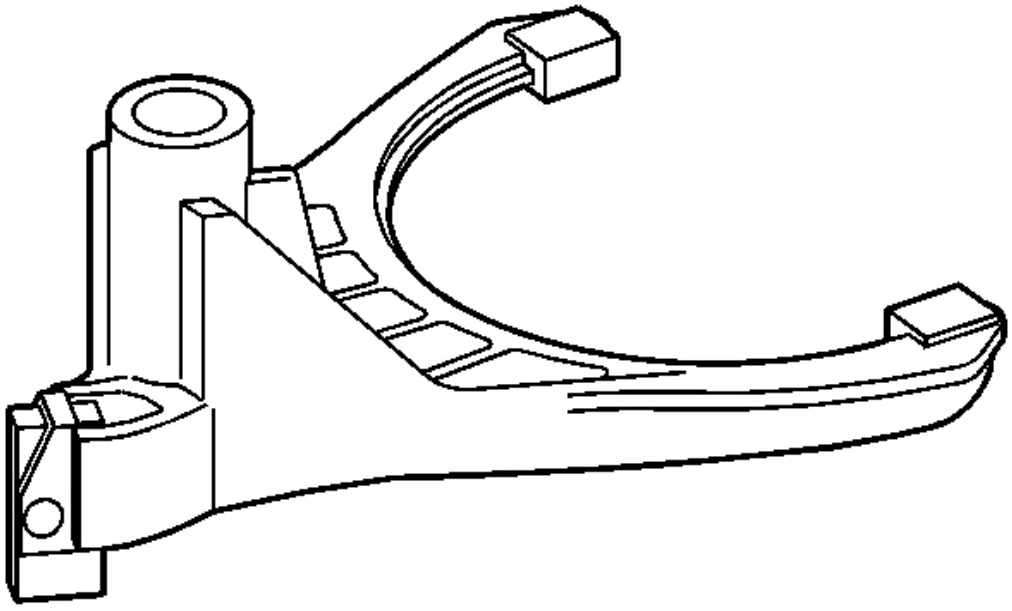


Fig. 68: Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

1. Inspect the lockup mode shift fork for excessive wear at the lockup collar pads.
2. Inspect the lockup mode shift fork for wear at the shift detent cam follower.
3. Inspect the lockup mode shift fork for cracks.
4. Replace the lockup mode shift fork if any of the above conditions are found.

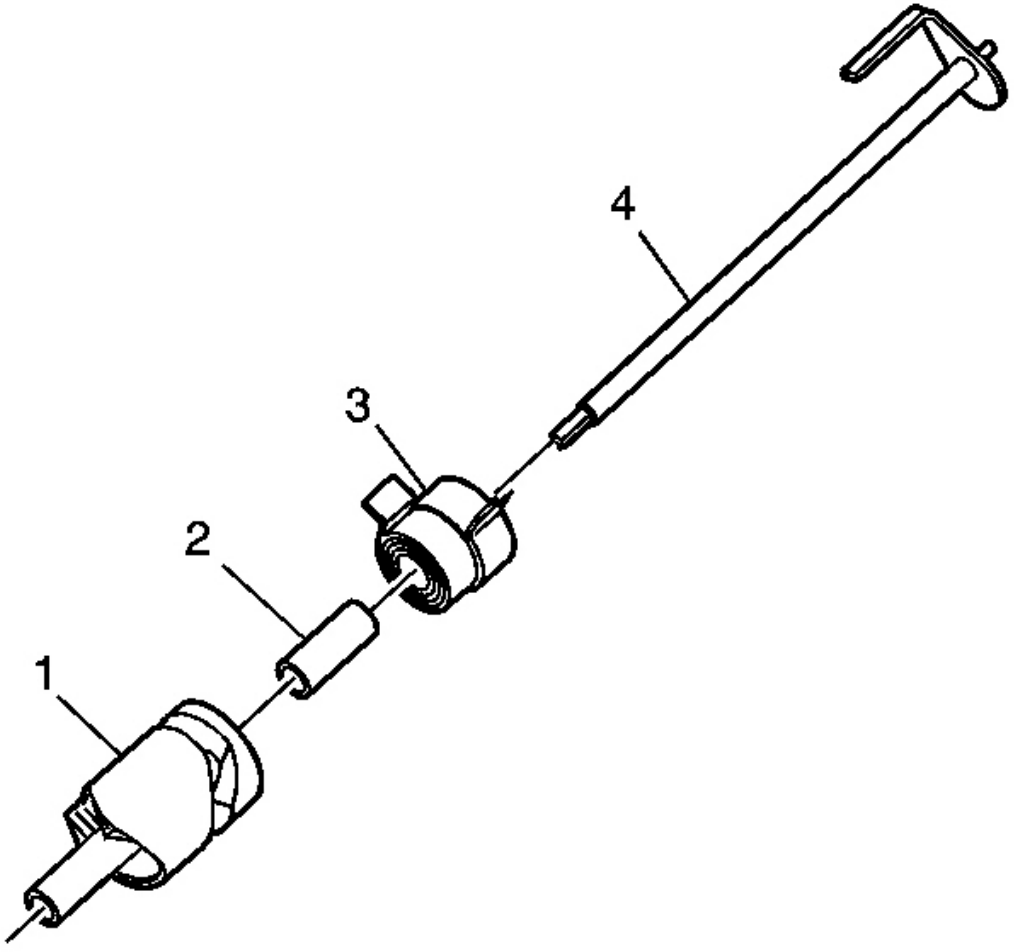


Fig. 69: Expanded View Of Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Only disassemble the shift detent lever shaft assembly if replacing a faulty component. The tip on the end of the shift detent lever shaft is used for assembly. If the tip is broken off, the shaft can still be used, but may cause problems aligning with the rear case half during the assembly procedure.

1. Inspect the shift detent lever (1) at the cam surfaces for the following conditions:
   - Roughness
   - Grooved

    - Excessive wear
2. Inspect the shift detent lever shaft (4) for the following conditions:
    - Encoder motor drive end excessively worn
    - Straightness
3. Inspect the sleeve (2) for excessive wear or for being grooved from the spring (3).
4. Inspect the spring (3) for being weak or for the tabs being bent.
5. Replace any of the above components if they are found to be faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE ASSEMBLE

Tools Required

- **J 3289-20** Holding Fixture
- **J 8092** Universal Driver Handle
- **J 22912-01** Rear Pinion and Axle Bearing Remover
- **J 36850** Transjel Lubricant
- **J 42176** Universal Driver Handle - Non-Threaded
- **J 42738** Seal Installer
- **J 43484** Front Output Shaft Seal Installer
- **J 45756** Rear Output Shaft Seal Installer
- **J 45757** Mainshaft Support Bushing and Bearing Installer
- **J 45759** Assembly Fixture

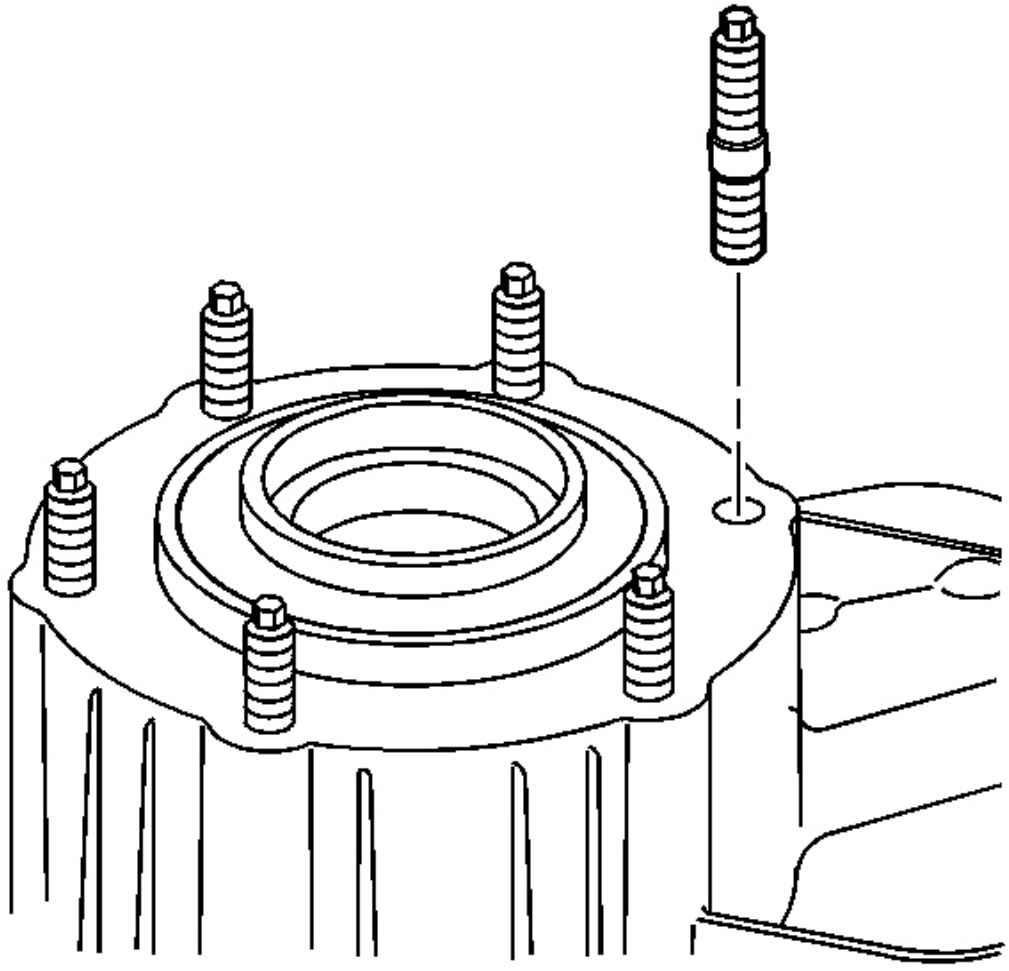


Fig. 70: View Of Transfer Case Mounting Stud
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

1. If removed, install the transfer case mounting studs.

   Tighten: Tighten the mounting studs to 31 N.m (23 lb ft).

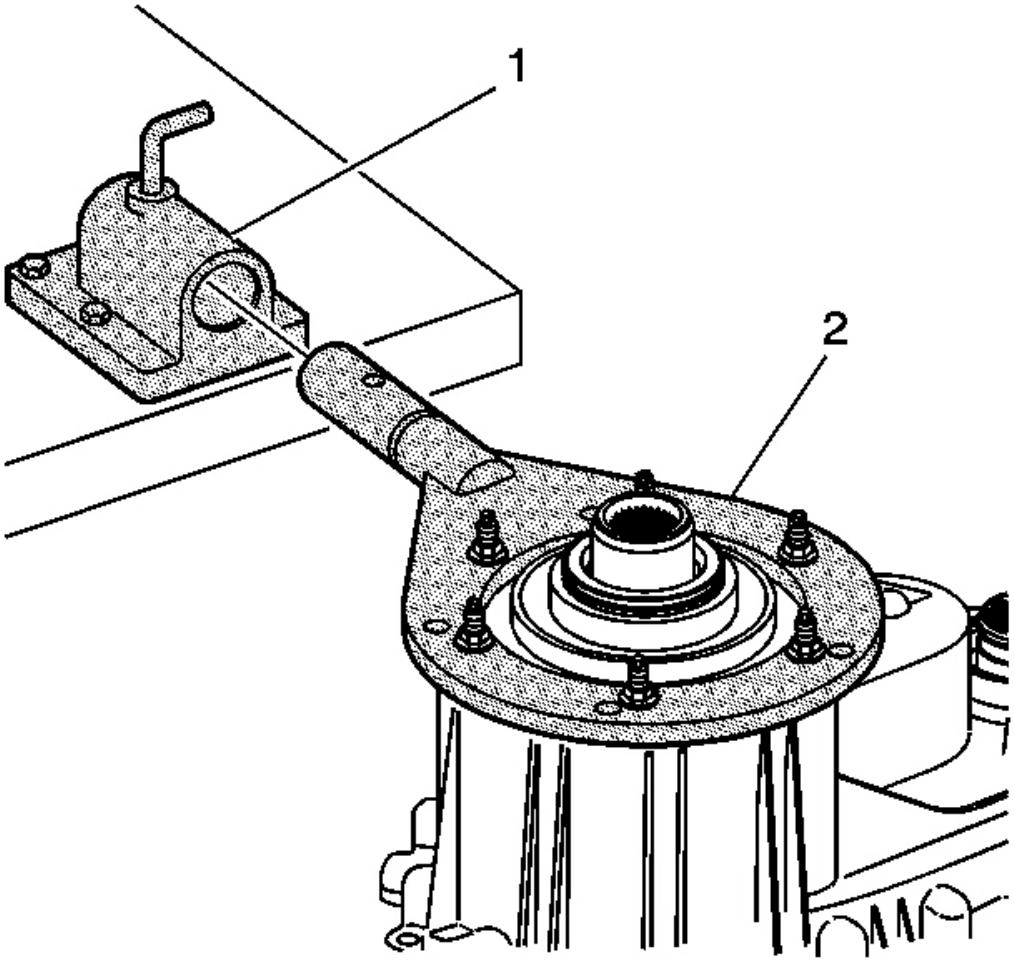


Fig. 71: Installing J 45759 Into J 3289-20
Courtesy of GENERAL MOTORS CORP.

2. Using the adapter studs, attach the **J 45759** to the front transfer case. All of the assembly procedures can be performed with the case mounted to the **J 45759** .
3. Install the **J 45759** (2) into the **J 3289-20** (1) and secure with the pivot pin.

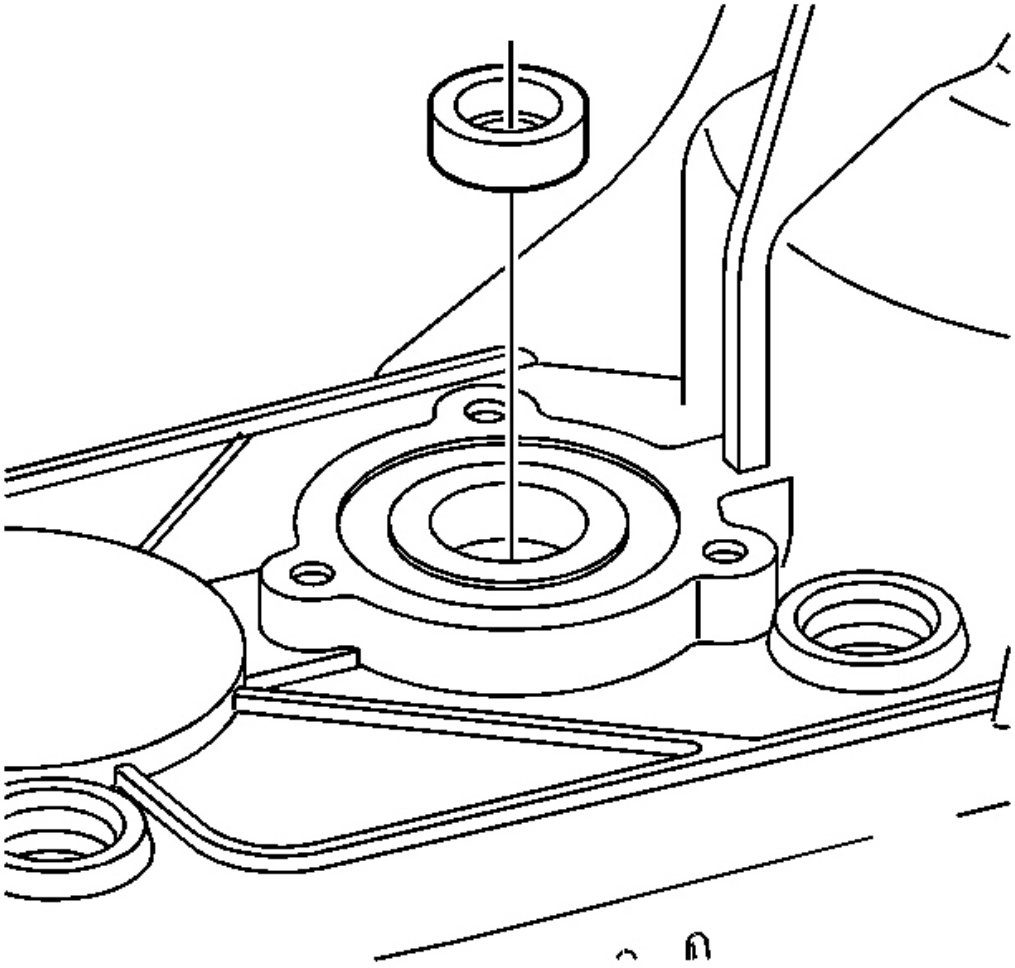


Fig. 72: View Of Shift Detent Lever Shaft Seal
Courtesy of GENERAL MOTORS CORP.

4. Install the seal for the shift detent lever shaft. The seal will install using hand pressure. The spring side, or opened side, of the seal faces outward.

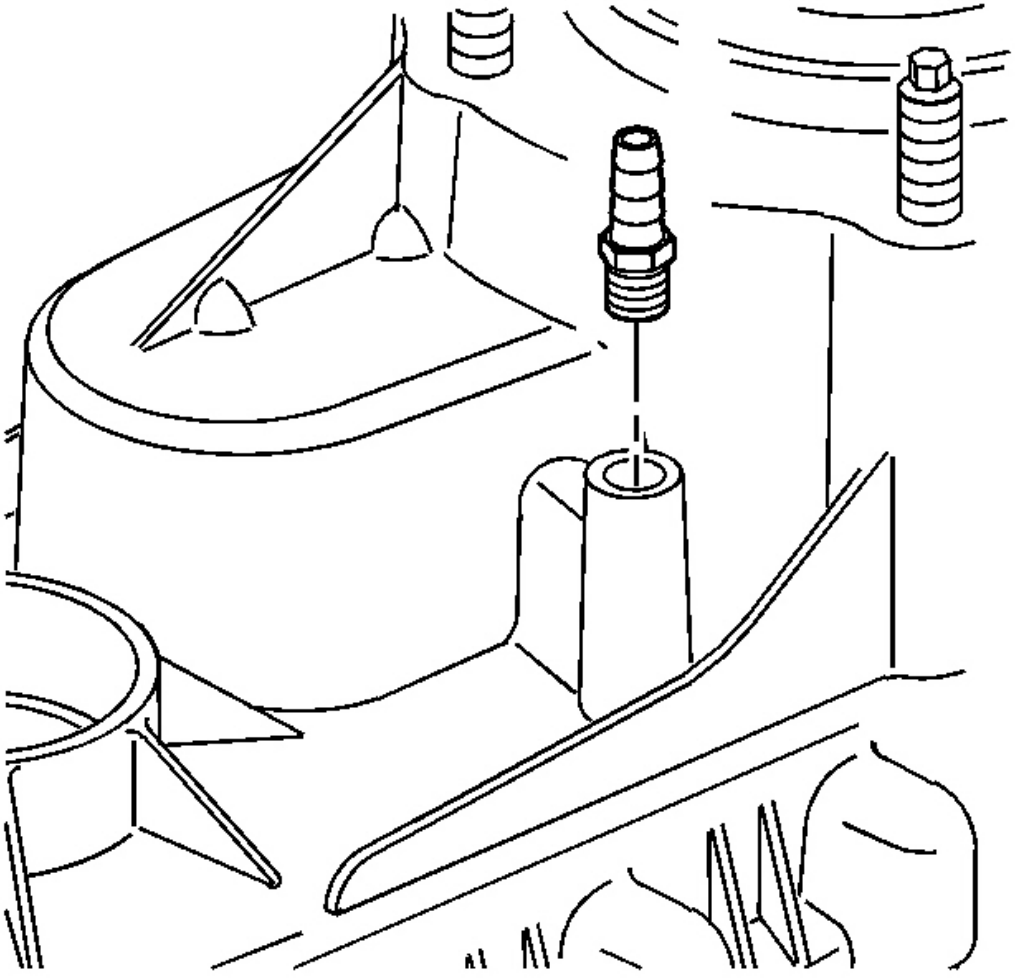


Fig. 73: View Of Front Case Vent
Courtesy of GENERAL MOTORS CORP.

5. If the vent is removed, apply pipe sealant GM P/N 12346004 (Canadian P/N 10953480) to the threads on the vent.
6. Install the vent.

Tighten: Tighten the vent to 6 N.m (53 lb in).

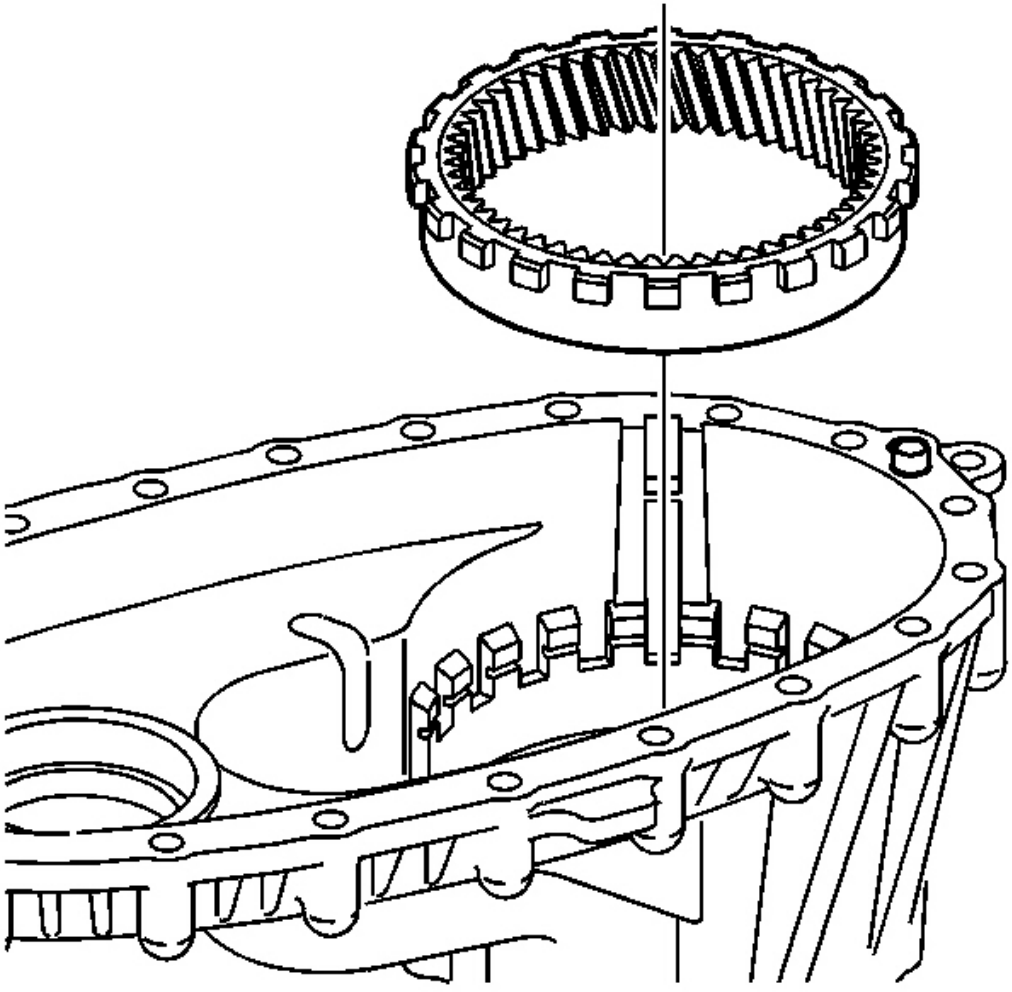


Fig. 74: Identifying Annulus Gear
Courtesy of GENERAL MOTORS CORP.

7. Install the annulus gear in the front case half.

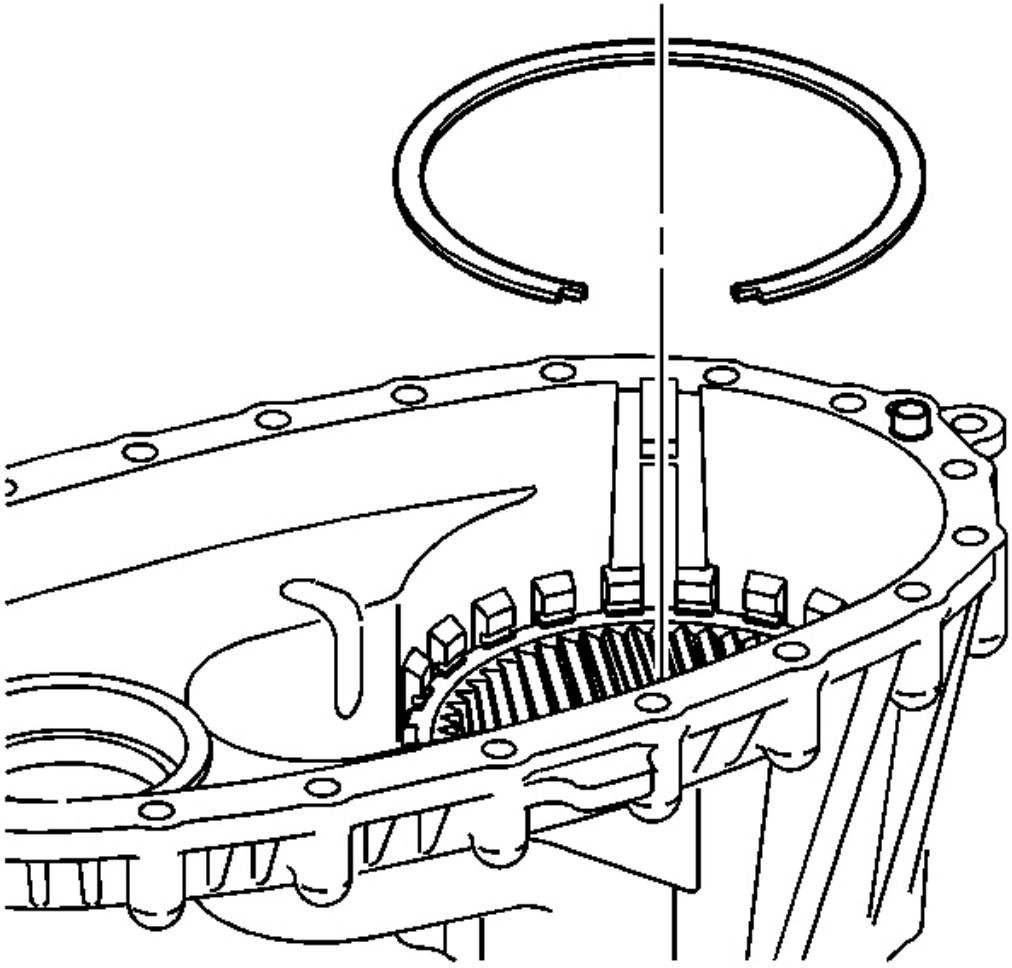


Fig. 75: Locating Retaining Ring For Annulus Gear
Courtesy of GENERAL MOTORS CORP.

8. Install a NEW retaining ring for the annulus gear.

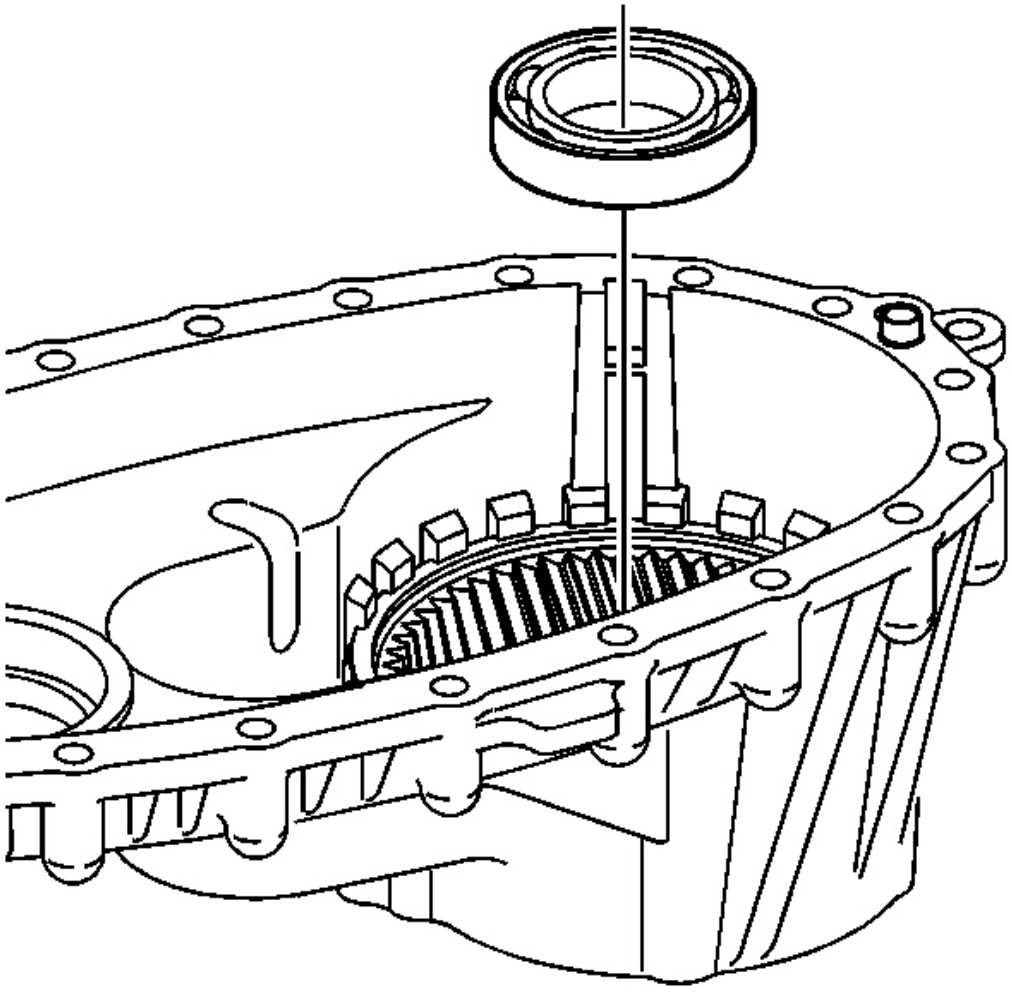


Fig. 76: Installing Input Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Lubricate all of the bearings and bearing journals with transfer case fluid during installation.

9. Install the input shaft bearing in the front case half.
    - Use a hammer and a brass drift only on the outer bearing race.
    - Ensure the bearing is kept square to the bore while installing.

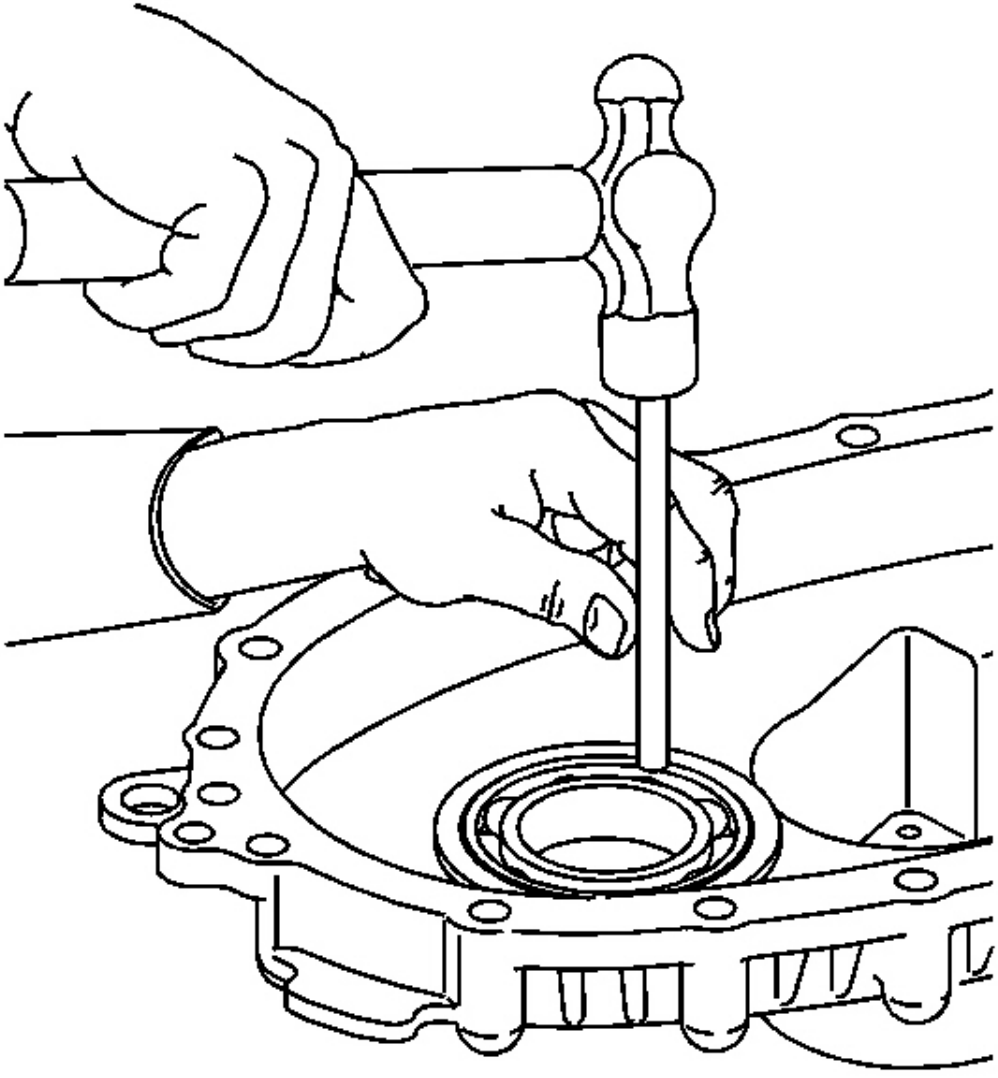


Fig. 77: Installing Front Bearing For Front Output Shaft
Courtesy of GENERAL MOTORS CORP.

10. Install the front bearing for the front output shaft in the front case half.
    - Use a hammer and a brass drift only on the outer bearing race.
    - Ensure the bearing is kept square to the bore while installing.

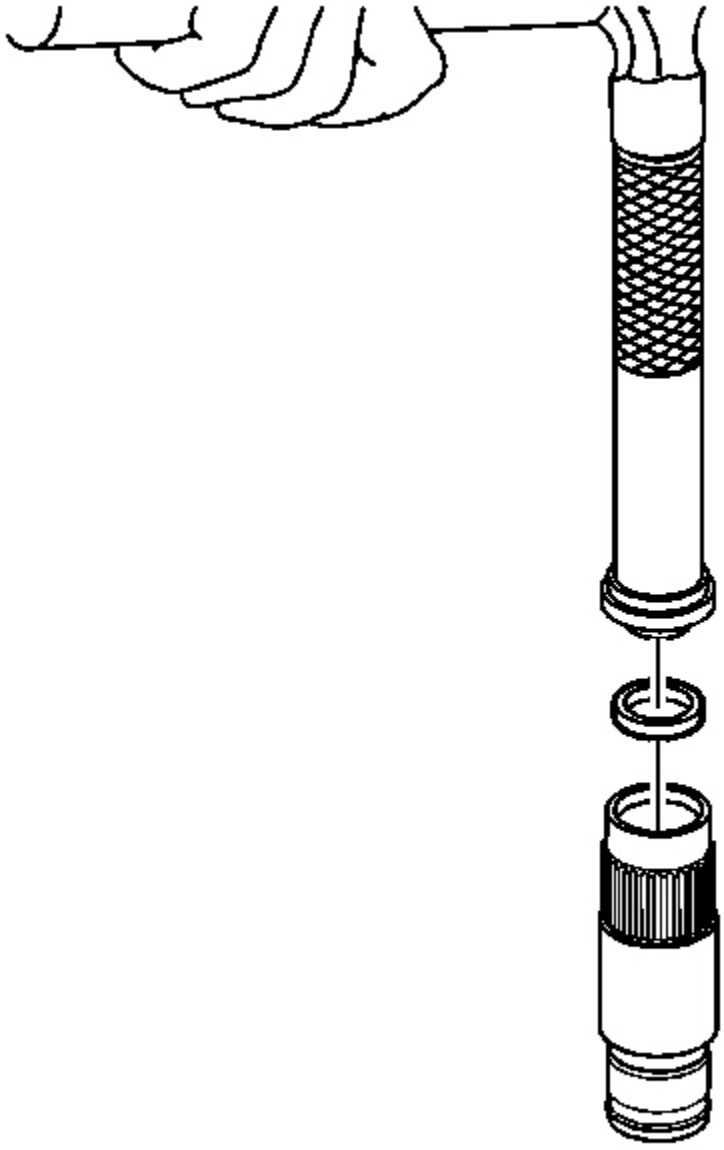


Fig. 78: Installing Cup Plug
Courtesy of GENERAL MOTORS CORP.

11. If it is a new shaft or if the cup plug was removed, apply threadlocker GM P/N 12345382 (Canadian P/N 10953489) to the cup plug.
12. Using a suitable driver, install the cup plug in the front output shaft. Install the cup plug 1 mm (0.039 in) from flush with the end of the shaft.

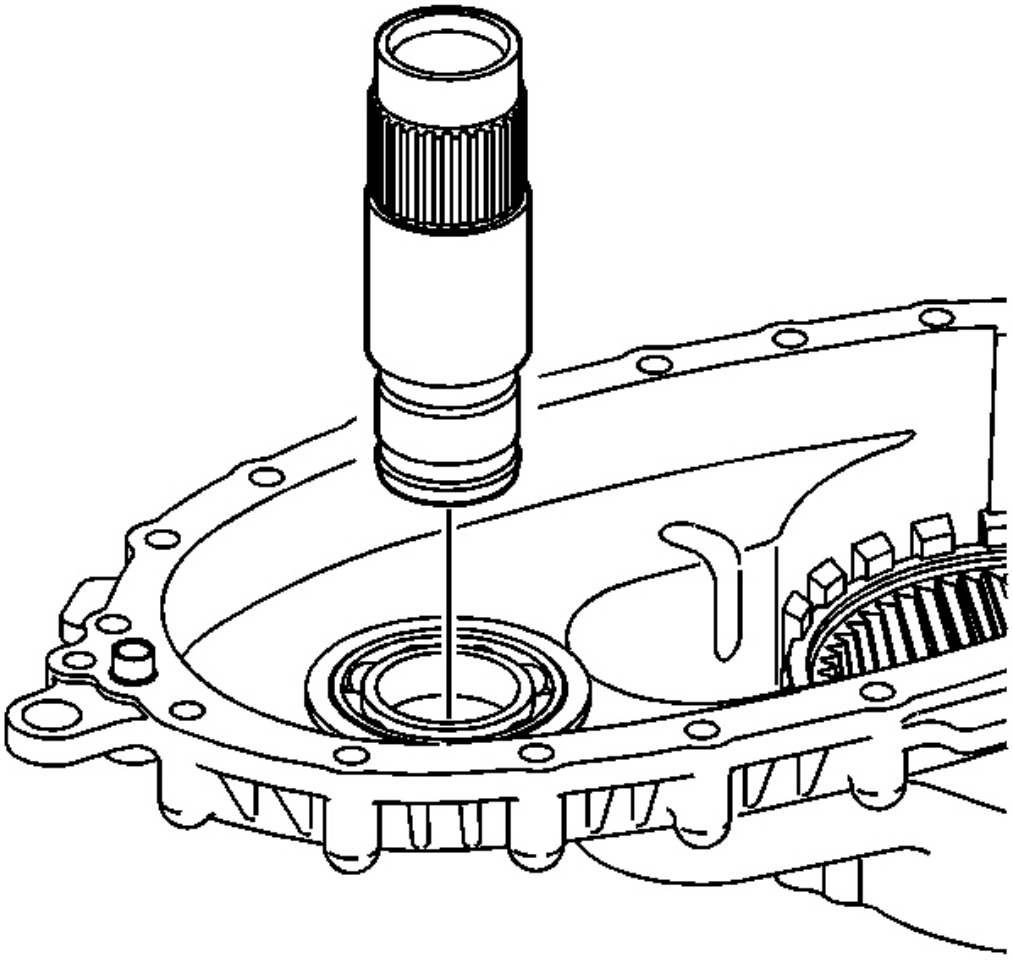


Fig. 79: Front Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

13. Install the front output shaft assembly.

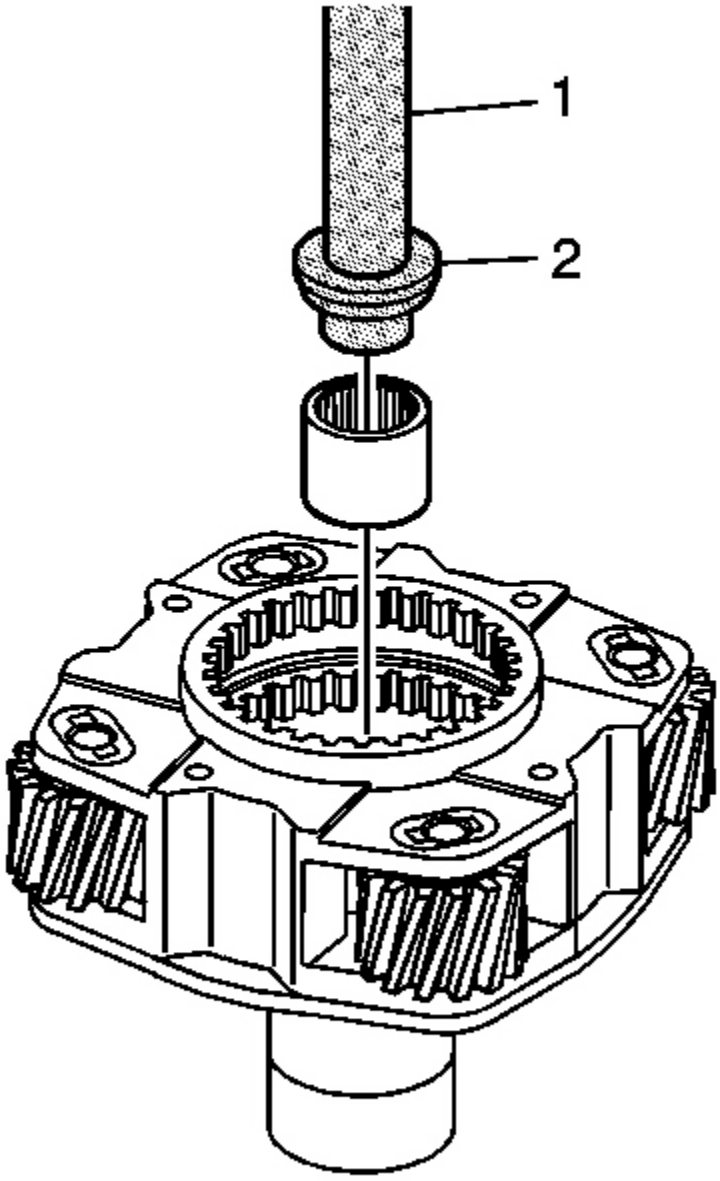


Fig. 80: Identifying J 42176 & J 45757
Courtesy of GENERAL MOTORS CORP.

14. Using the **J 42176** (1) and the **J 45757** (2), install the mainshaft front support bearing in the high/low planetary carrier assembly.

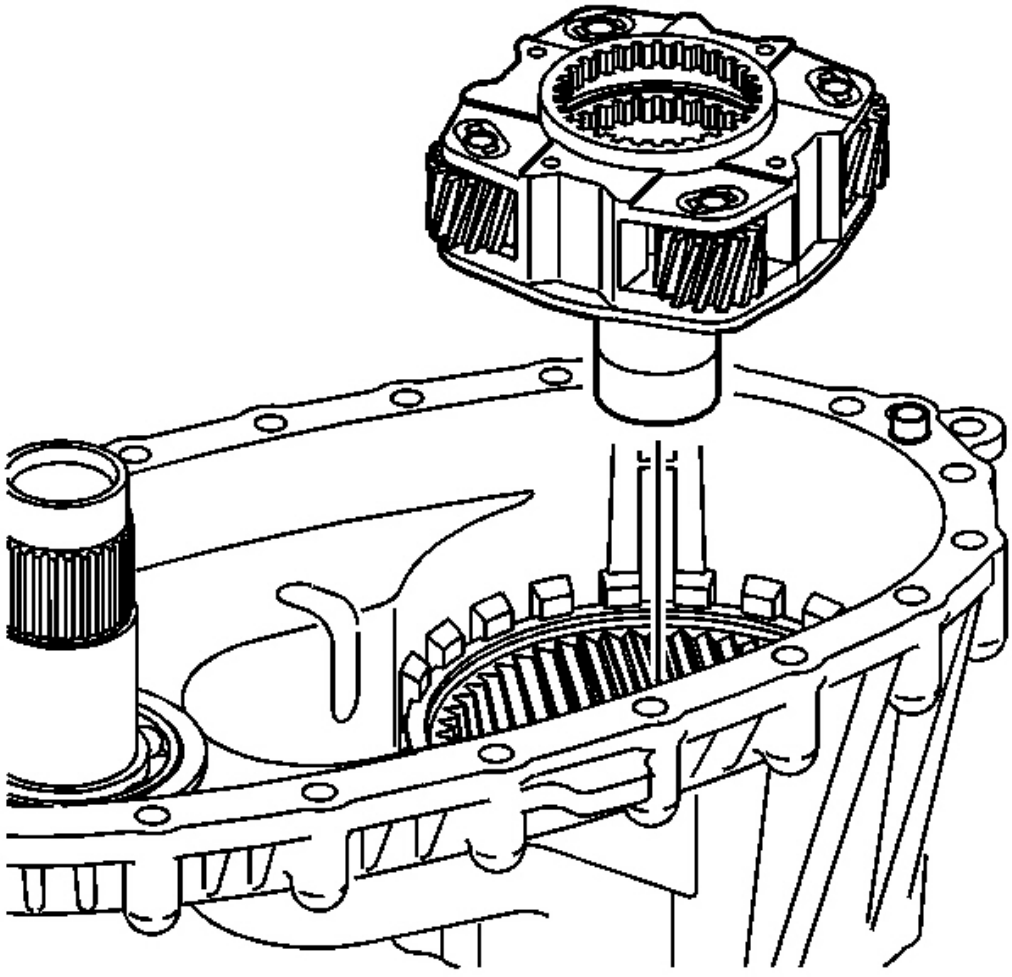


Fig. 81: Identifying High/Low Planetary Carrier
Courtesy of GENERAL MOTORS CORP.

15. Install the high/low planetary carrier.

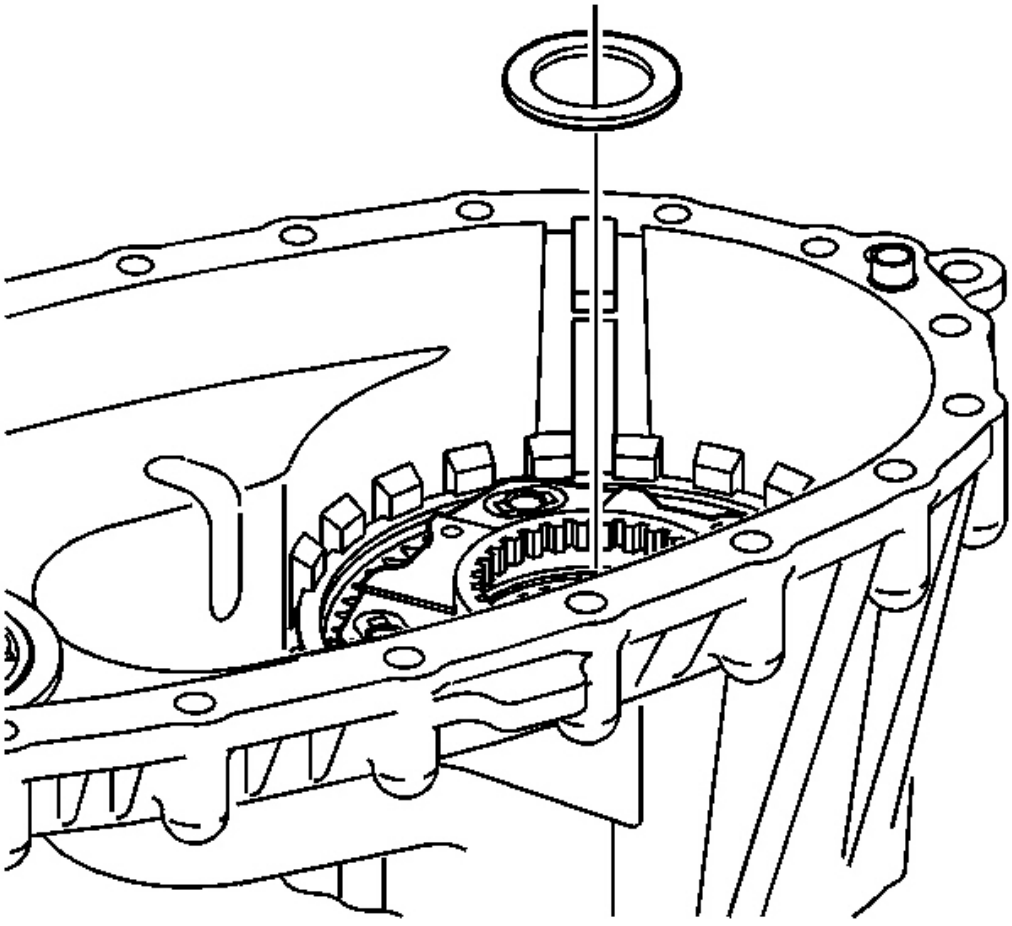


Fig. 82: Locating Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

16. Lubricate the input shaft thrust washer with **J 36850** or equivalent.
17. Install the input shaft thrust washer.

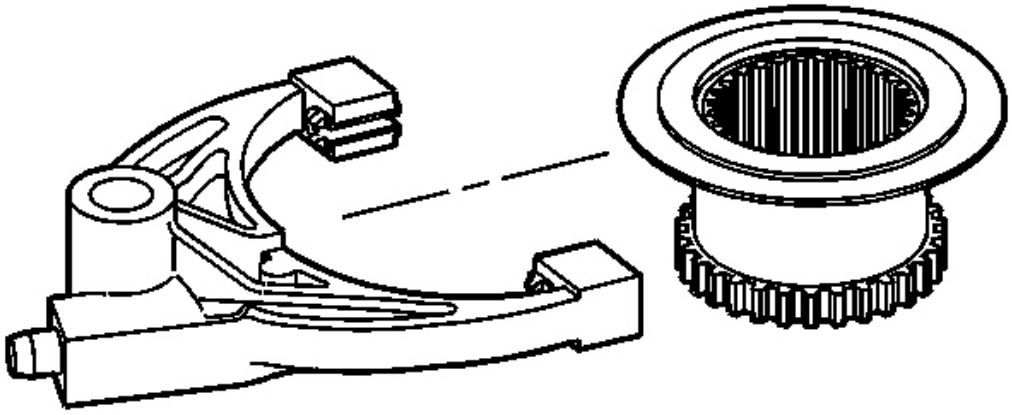


Fig. 83: View Of Range Shift Fork & Range Shift Sleeve
Courtesy of GENERAL MOTORS CORP.

18. Install new shift fork pads, if removed.
19. Install the range shift sleeve in the range fork.

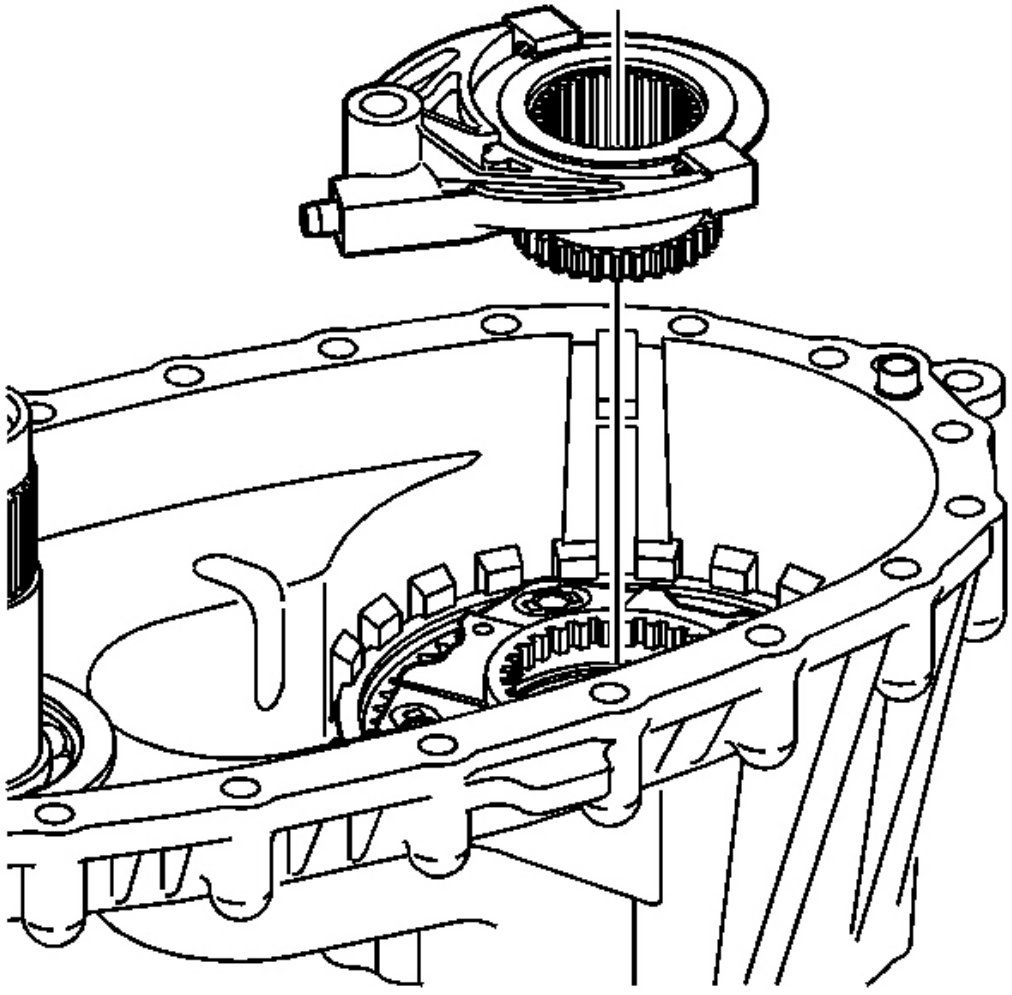


Fig. 84: Identifying High/Low Range Sleeve With The High/Low Range Shift Fork
Courtesy of GENERAL MOTORS CORP.

20. Align the gear teeth on the range shift sleeve to the planetary carrier.
21. Install the range shift fork and the range shift sleeve.

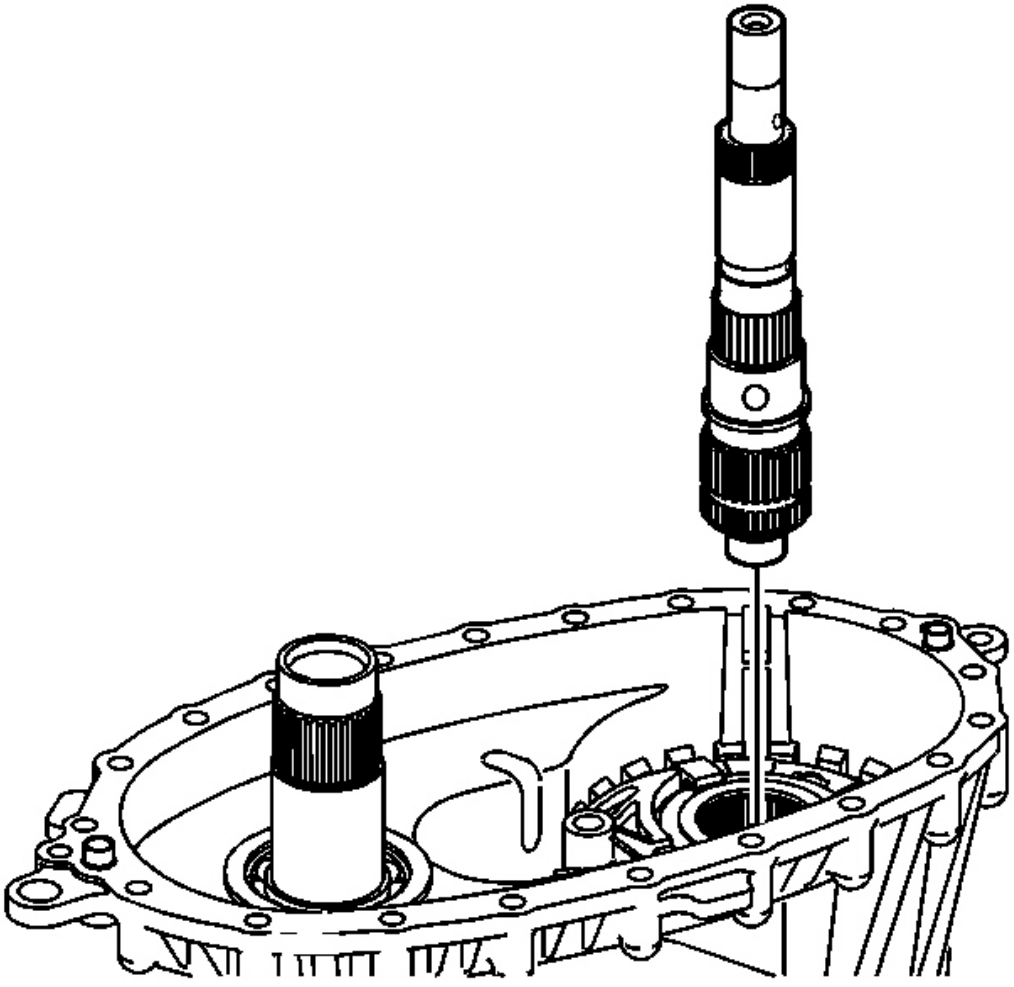


Fig. 85: View Of Mainshaft
Courtesy of GENERAL MOTORS CORP.

22. Install the mainshaft.

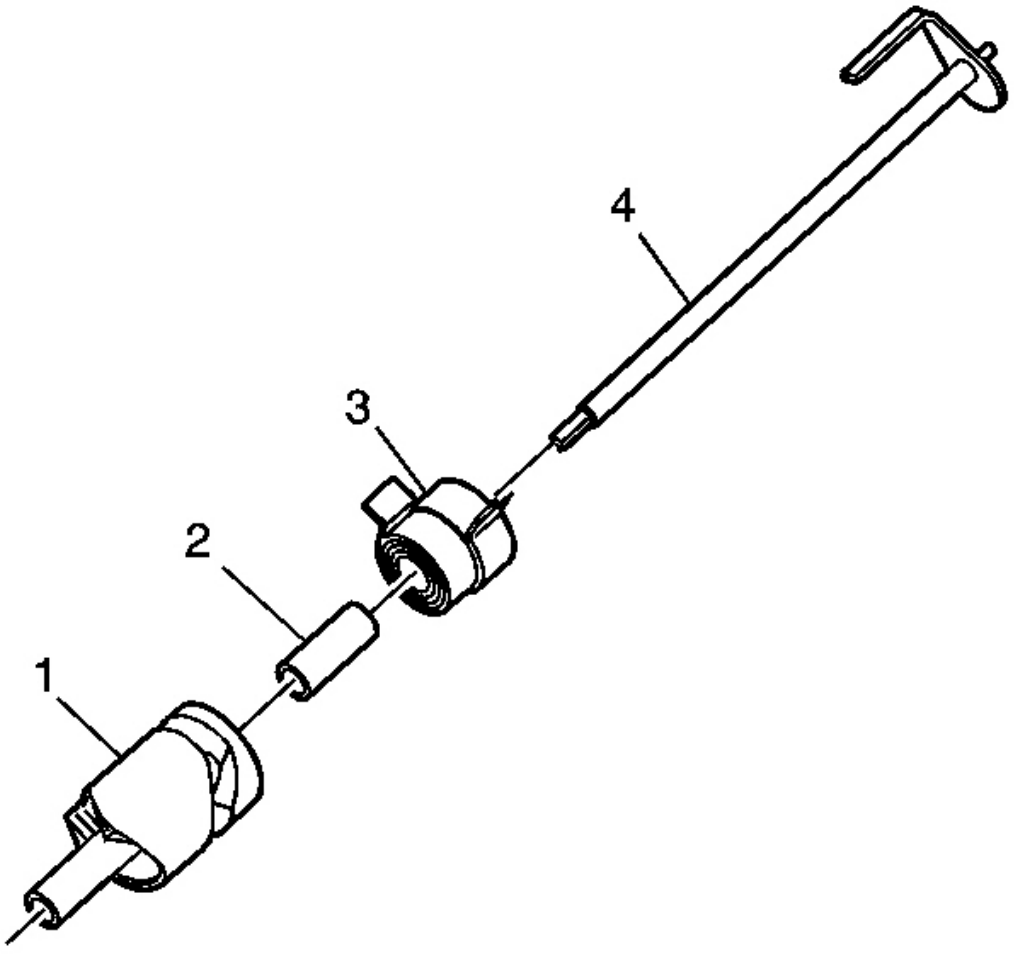


Fig. 86: Expanded View Of Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

23. Assemble the shift detent lever assembly.
    1. Mount the spring (3), by one tab, in a vise.
    2. Install the sleeve (2) in the spring (3).
    3. Install the shaft (4) partially in the spring (3).
    4. Install the shift detent lever cam (1) on the shaft (4).
    5. Rotate the spring (3) and install the tab on the shift detent lever cam between the spring tabs.
    6. Finish installing the shaft, aligning the lever on the shaft between the spring tabs.

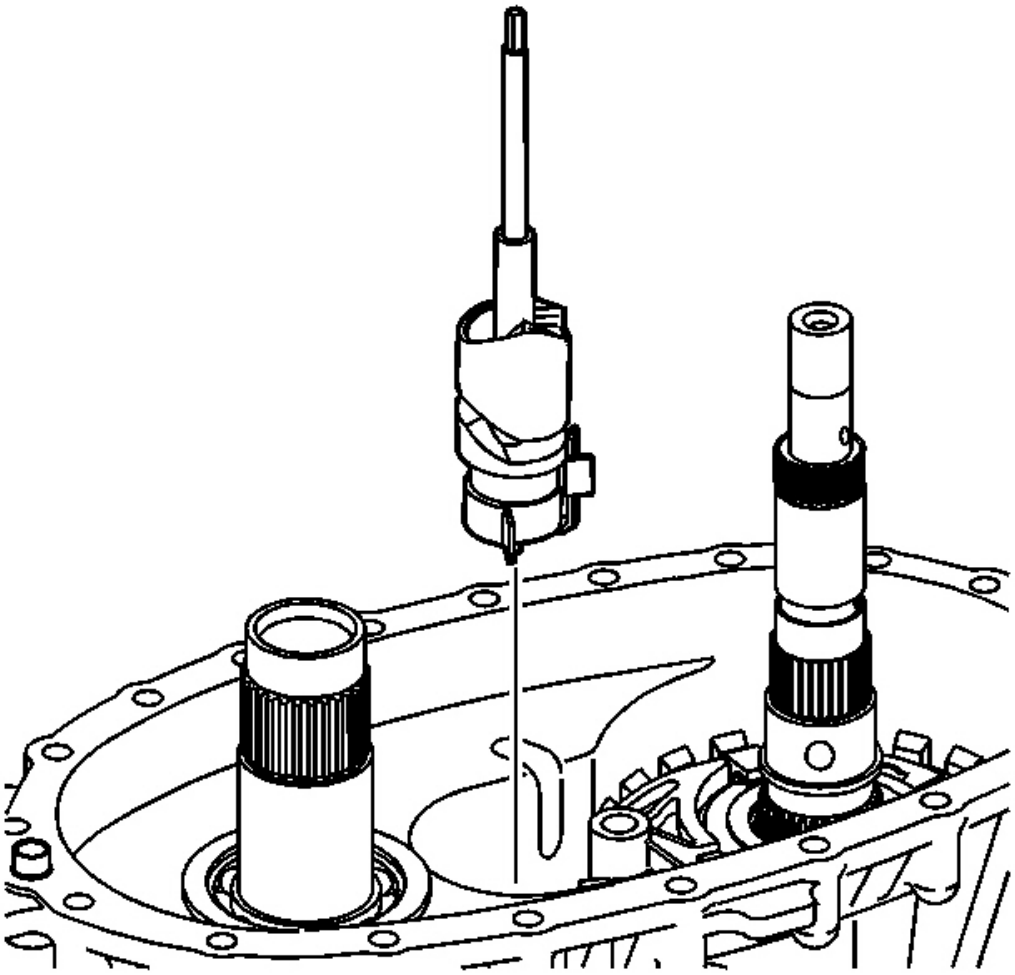


Fig. 87: Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: In order to prevent component damage, properly remove and install the shift detent lever shaft assembly. When removing or installing the shift detent lever shaft assembly, keep the shaft straight and do not tilt. Tilting the shift detent lever shaft assembly in the transfer case housing will break the tip on the end of the shaft.

24. Install the shift detent lever assembly.
    1. Install the shift detent lever assembly straight, with the tip into the hole in the case.
    2. Rotate the high/low shift fork to position the shift fork roller in the shift detent lever slot.

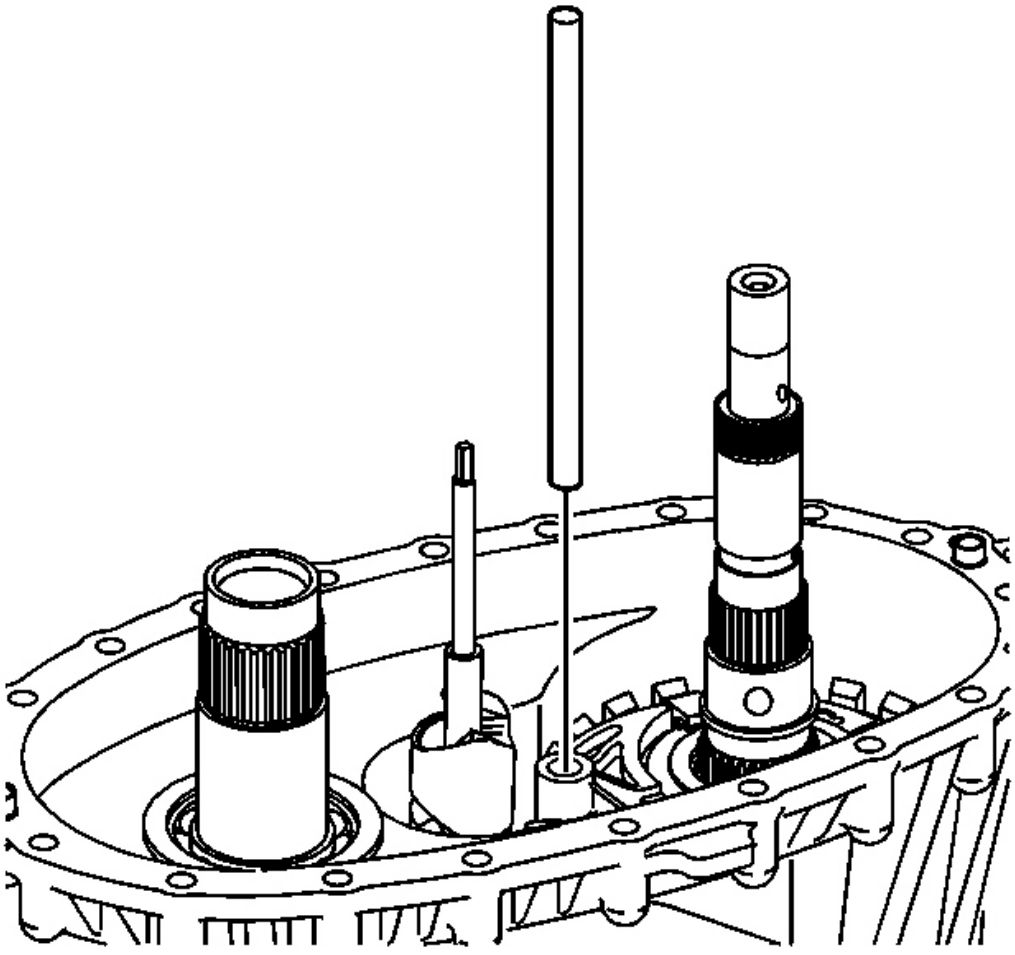


Fig. 88: View Of Shift Fork Shaft
Courtesy of GENERAL MOTORS CORP.

25. Install the shift fork shaft.

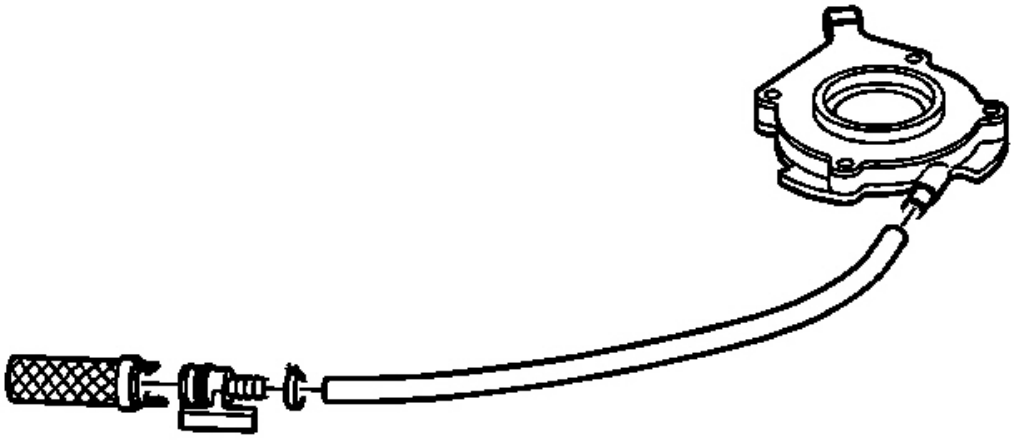


Fig. 89: Locating Oil Pump Hose & Screen
Courtesy of GENERAL MOTORS CORP.

26. Connect the oil pump hose to the oil pump screen.
27. Connect the oil pump hose to the oil pump.

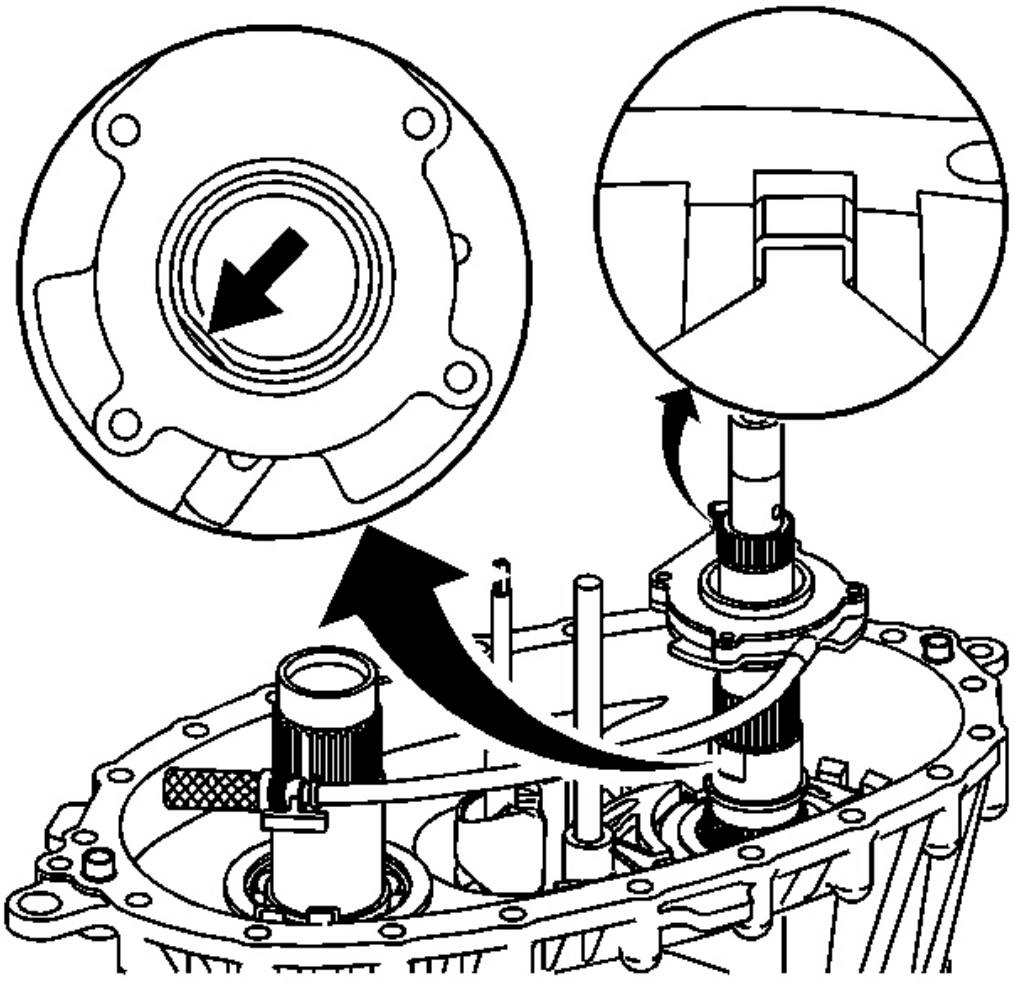


Fig. 90: Expanded View Of Oil Pump Assembly
Courtesy of GENERAL MOTORS CORP.

28. Install the oil pump assembly with the hose and screen.
    1. Align the square boss of the oil pump gear with the flat area on the mainshaft.
    2. Install the oil pump in the slot of the front case half. Ensure the wear clip is on the oil pump.
    3. Install the oil pump screen in the front case half.

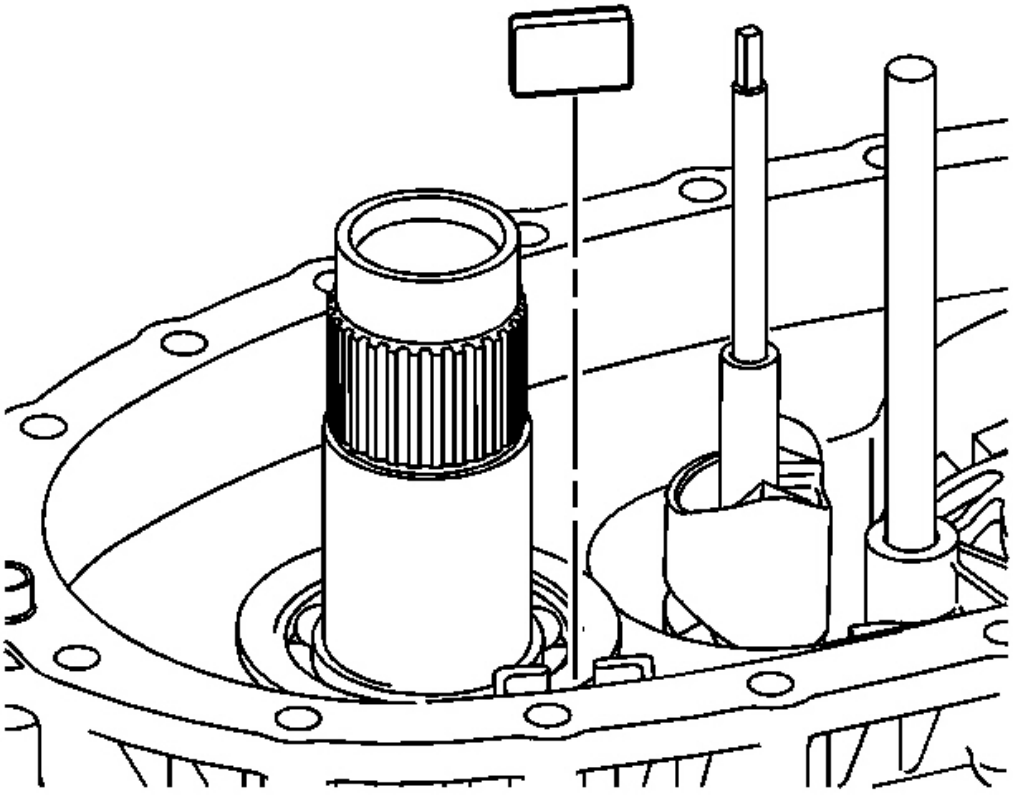


Fig. 91: Identifying Magnet
Courtesy of GENERAL MOTORS CORP.

29. Install the magnet.

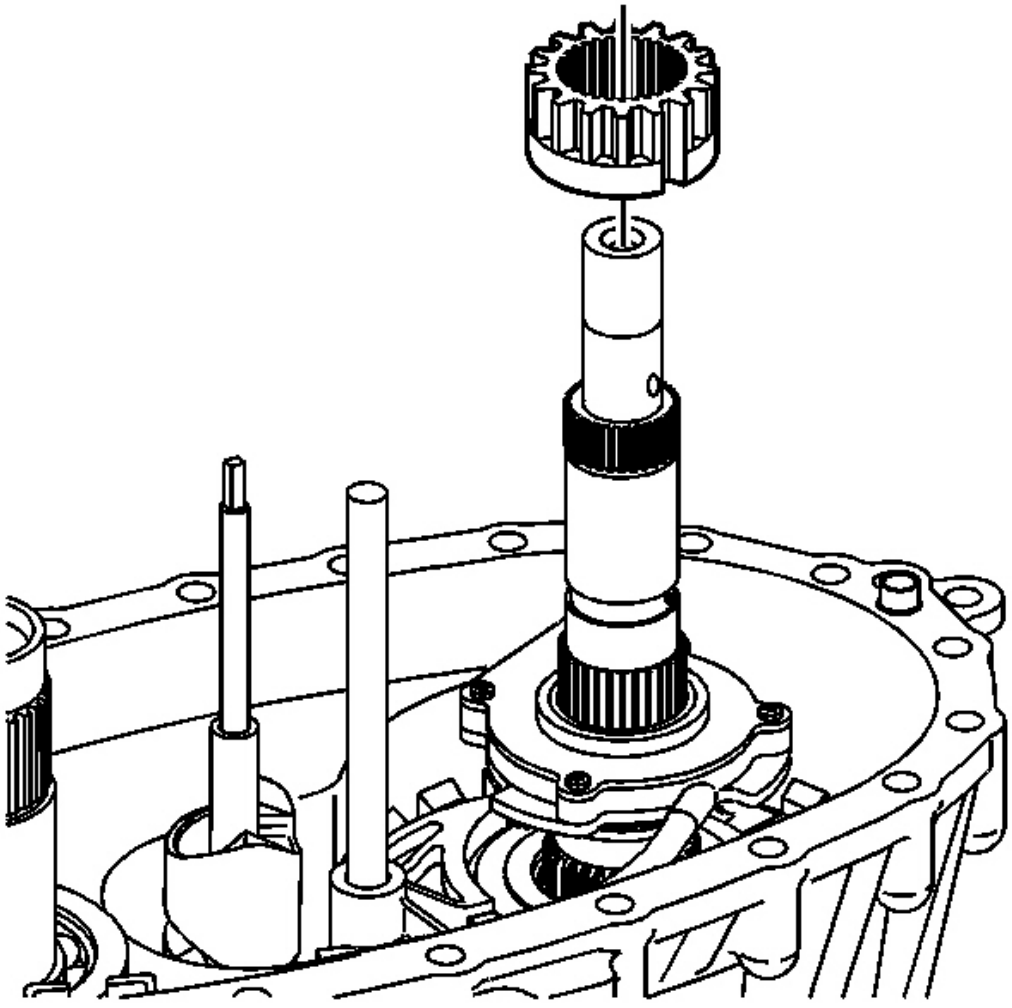


Fig. 92: View Of Inner Lockup Hub
Courtesy of GENERAL MOTORS CORP.

30. Install the inner lockup hub.

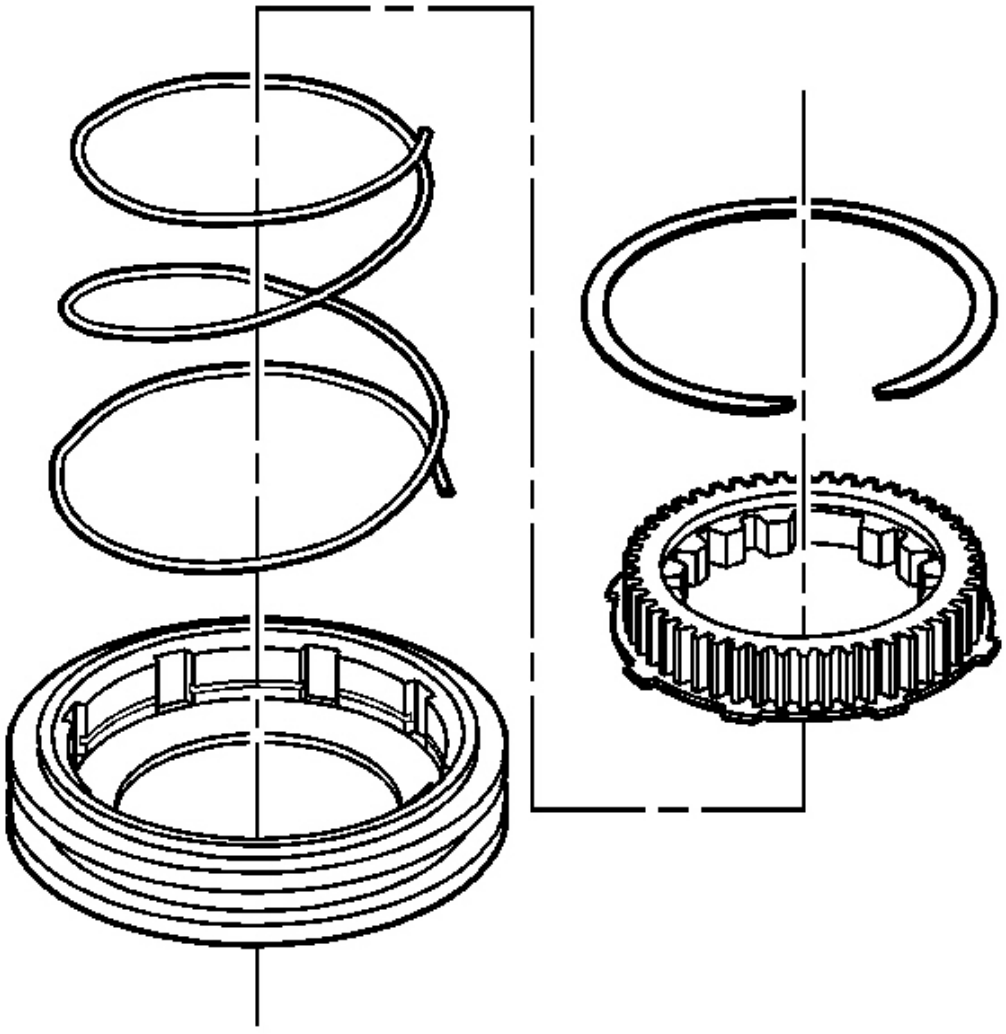


Fig. 93: Illustrating Lockup Shift Assembly Components
Courtesy of GENERAL MOTORS CORP.

31. If necessary, assemble the lockup shift assembly.
    1. Install the spring in the sleeve.
    2. Install the hub, with the external tabs, towards the spring.
    3. Install the retainer ring in the sleeve.

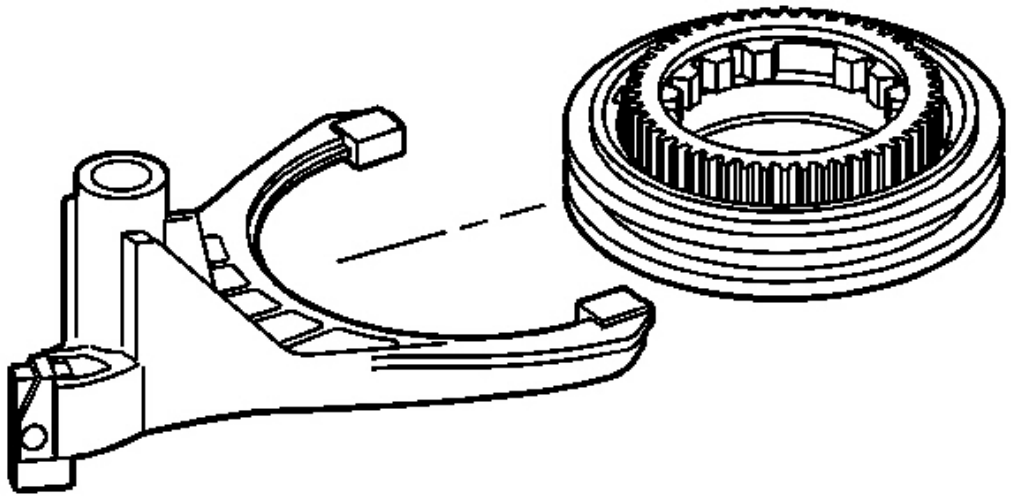


Fig. 94: View Of Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

32. Install the lockup mode shift fork to the lockup shift assembly.

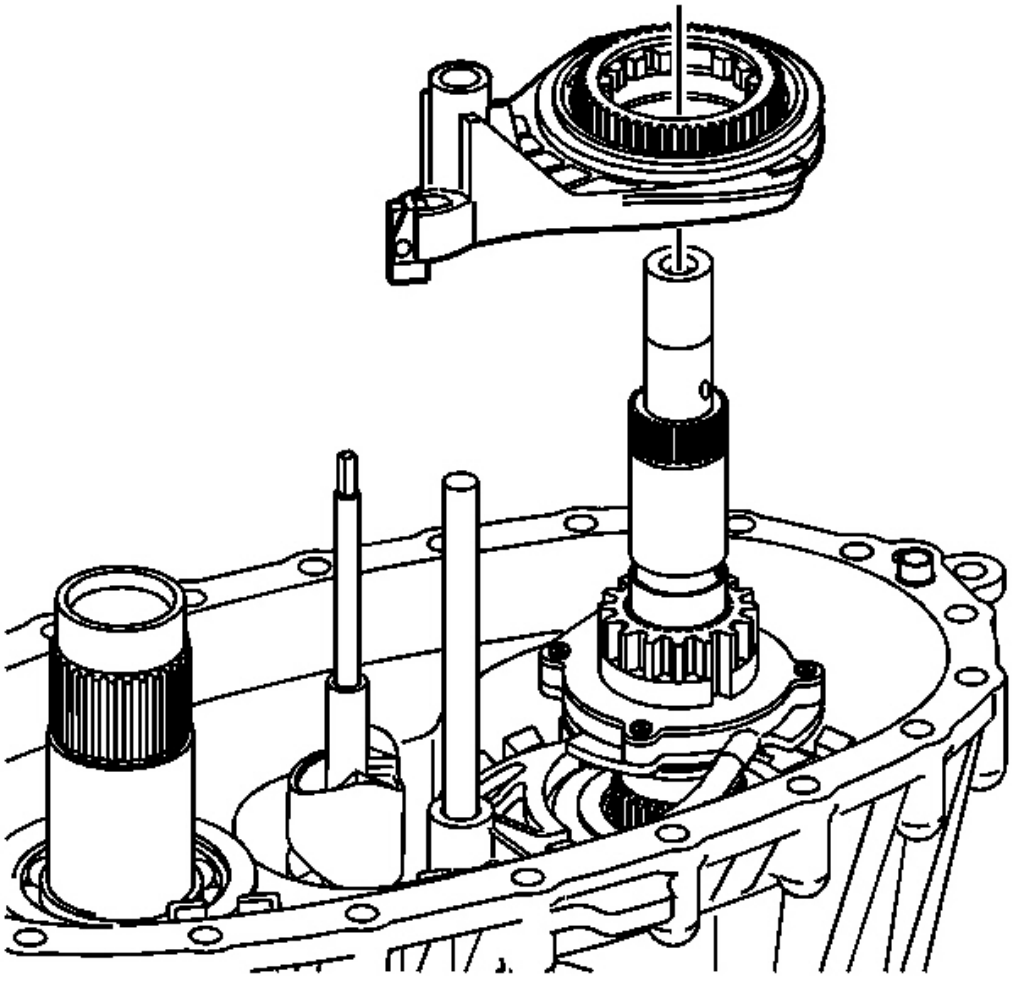


Fig. 95: Identifying Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

33. Install the lockup shift assembly and lockup mode shift fork.
    - Slide the shift fork over the shift fork shaft.
    - Turn the mainshaft to align the slot on the inner lockup hub with the large tooth area on the lockup shift assembly hub.

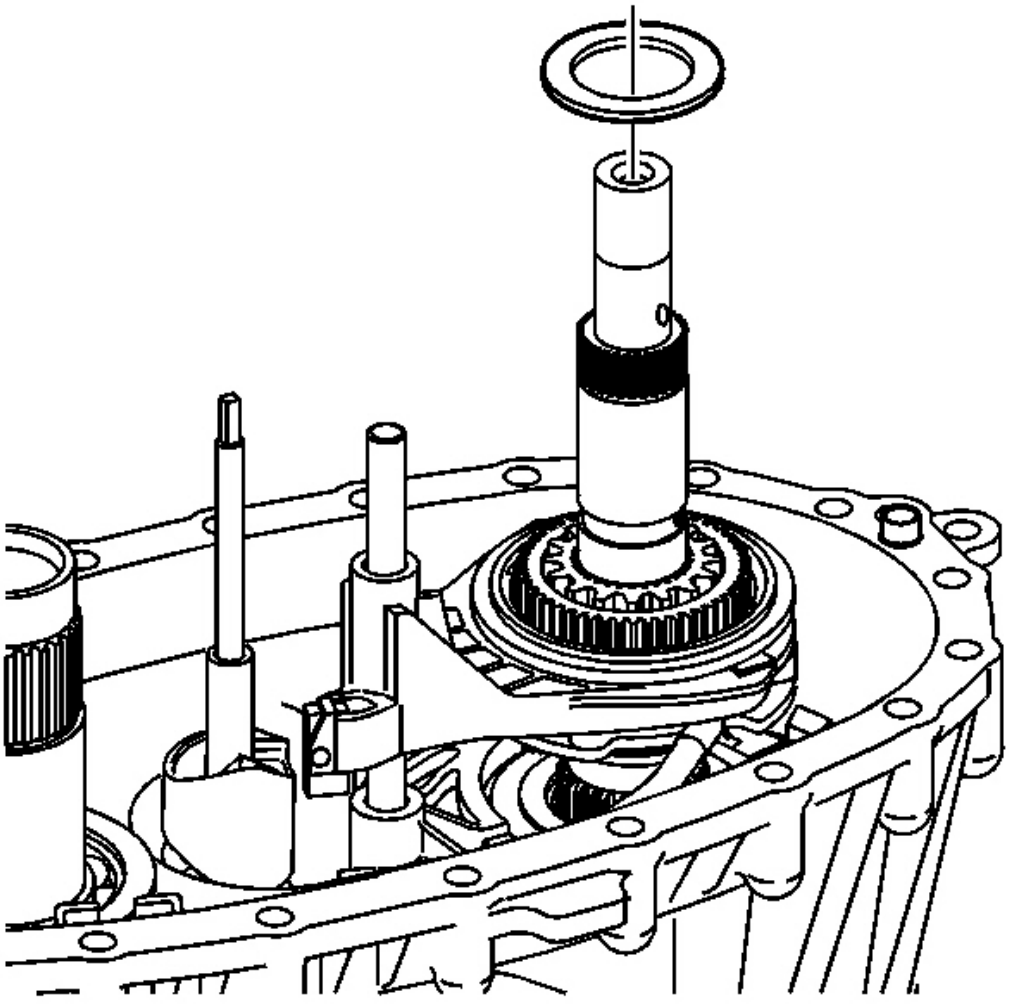


Fig. 96: Identifying Drive Sprocket Thrust Washer
Courtesy of GENERAL MOTORS CORP.

34. Lubricate the drive sprocket thrust washer with **J 36850** or equivalent.
35. Install the drive sprocket thrust washer.

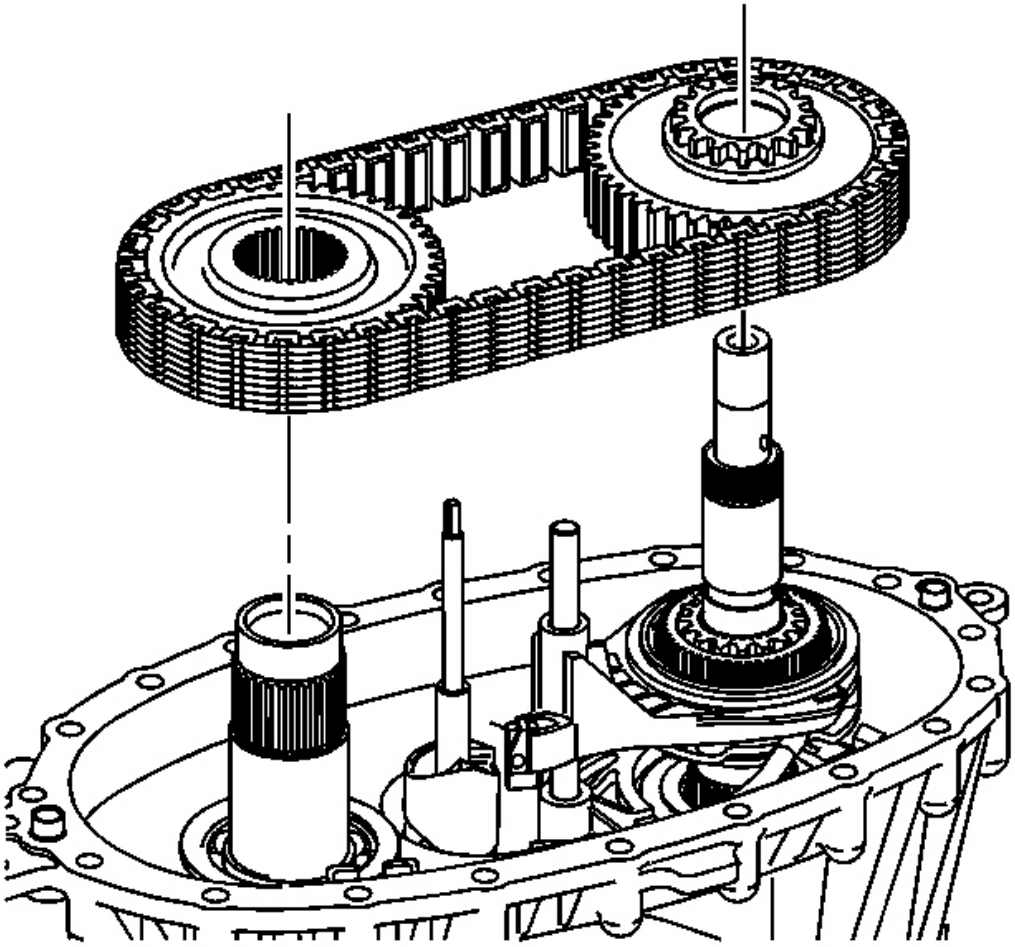


Fig. 97: View Of Drive Chain & Sprockets
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If using the chain and sprockets again, ensure to align the marks of the drive chain and sprockets.

36. Install the drive chain and sprockets.
    - The blue link on the chain faces up.
    - Align the drive sprocket engagement teeth with the lockup shift assembly hub teeth.

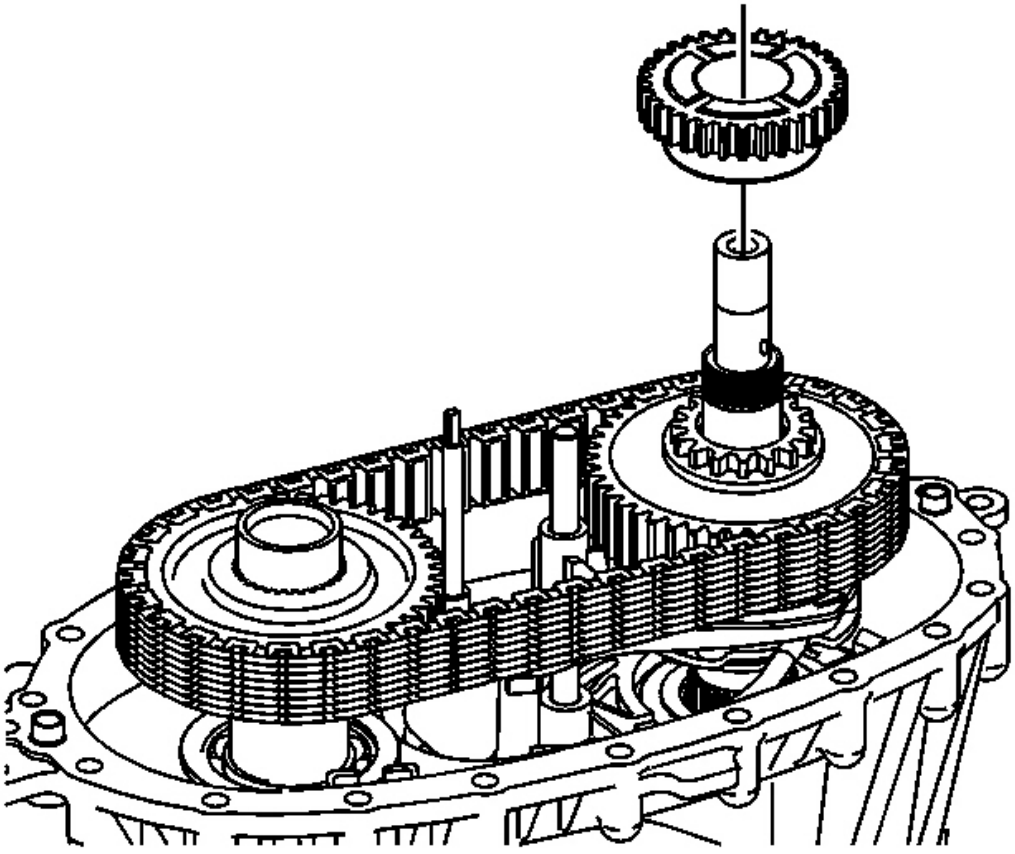


Fig. 98: Identifying Front Sun Gear
Courtesy of GENERAL MOTORS CORP.

37. Install the front sun gear.

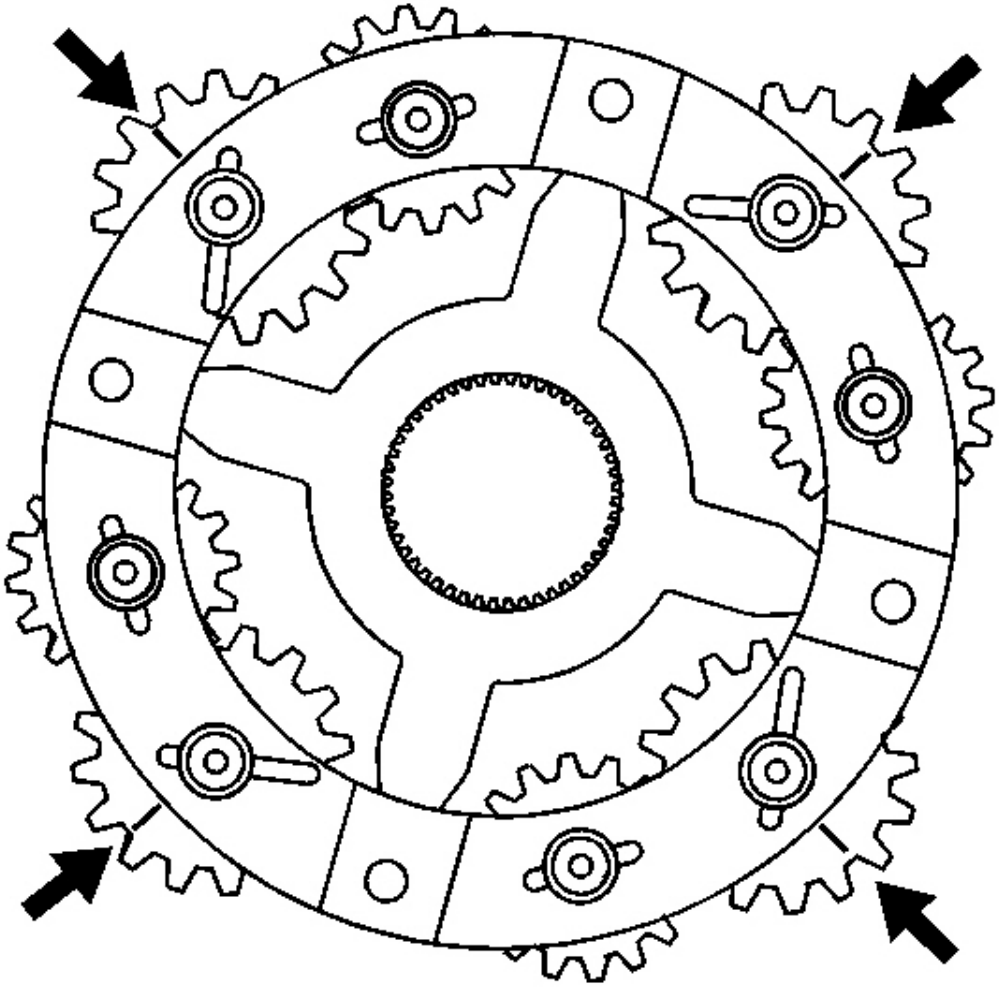


Fig. 99: Aligning Marks On The Pinion Gears
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The planetary differential gears are timed to the sun gears. If the gears are not timed properly, the differential will not rotate without binding.

38. With the rear side of the planetary differential facing up, align the marks on the pinion gears. Position the alignment marks with an area on the planetary differential that can be reference for all gears.

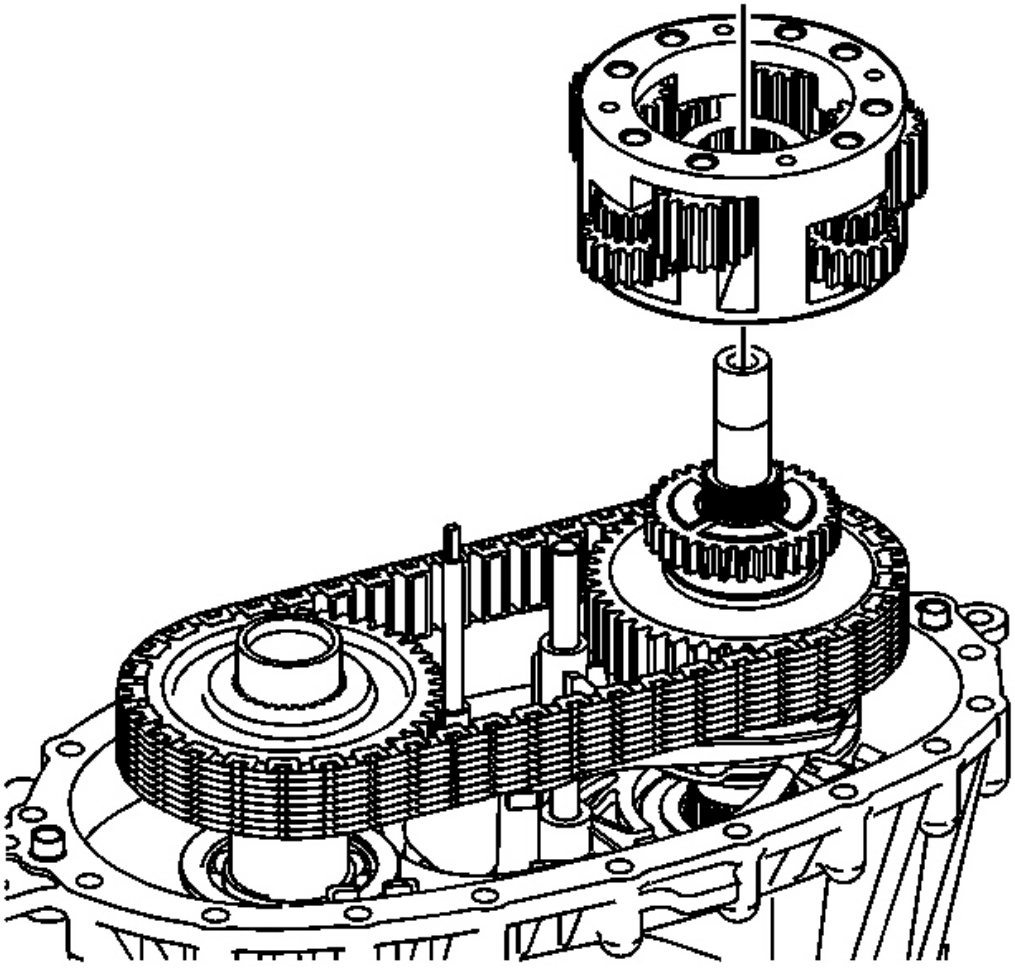


Fig. 100: View Of Planetary Differential Assembly
Courtesy of GENERAL MOTORS CORP.

39. Install the planetary differential assembly.
    - Do not rotate the planetary differential pinion gears when installing.
    - Ensure the alignment marks are still in position.
    - The single row pinion gears face rearward, or up. The double row pinion gears face forward, or down.

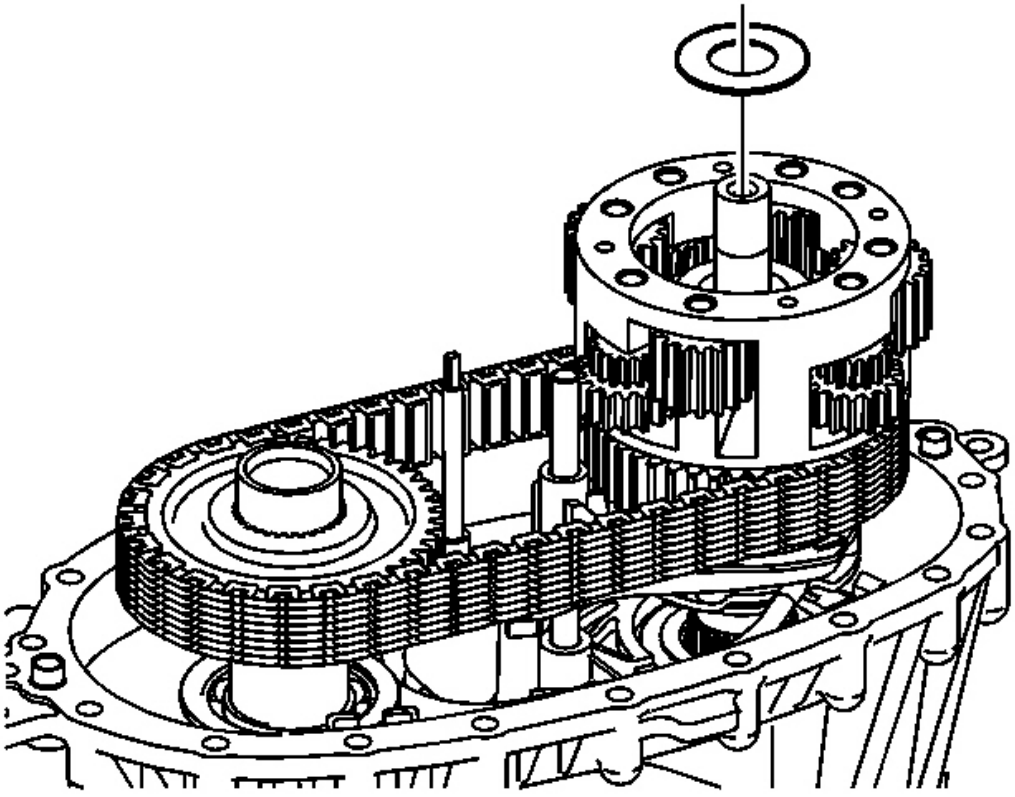


Fig. 101: Locating Rear Output Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

40. Lubricate the rear output shaft thrust washer with **J 36850** or equivalent.
41. Install the thrust washer.

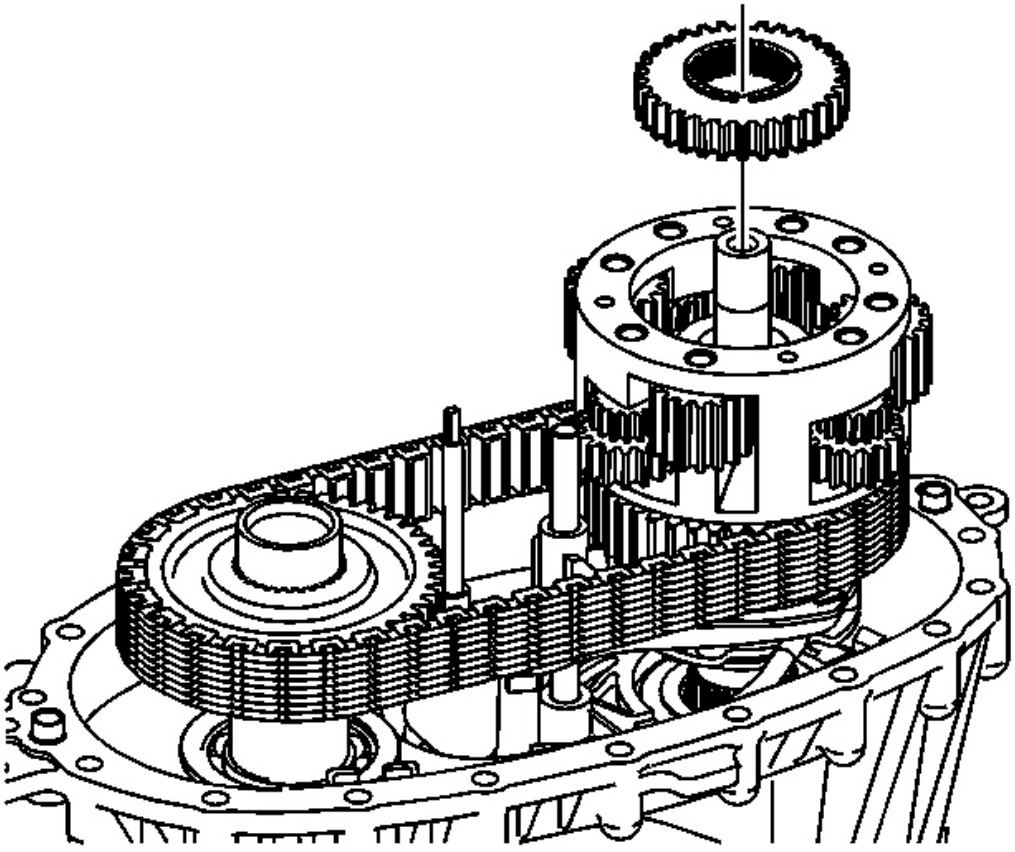


Fig. 102: View Of Rear Sun Gear
Courtesy of GENERAL MOTORS CORP.

42. Install the rear sun gear.
    - The shoulder side of the gear faces up.
    - Do not rotate the differential pinion gears.

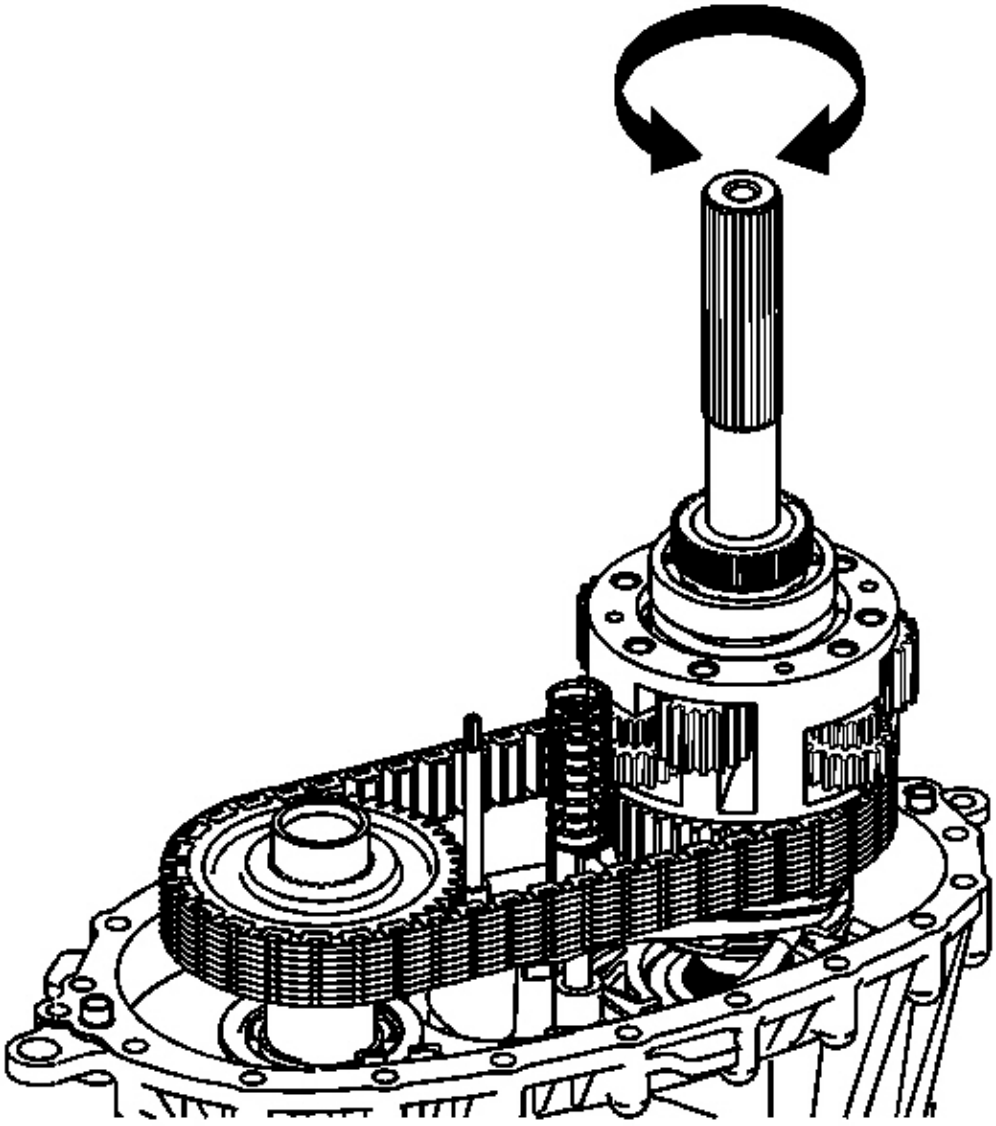


Fig. 103: Checking Planetary Differential Pinion Gear Rotation With Rear Output Shaft
Courtesy of GENERAL MOTORS CORP.

43. Temporarily install the rear output shaft to the planetary differential and the rear sun gear.
44. Rotate the rear output shaft three or four revolutions to rotate the planetary differential pinion gears. If properly aligned, the pinion gears will rotate freely, there will be no binding.
45. Remove the rear output shaft without disturbing the rear sun gear.

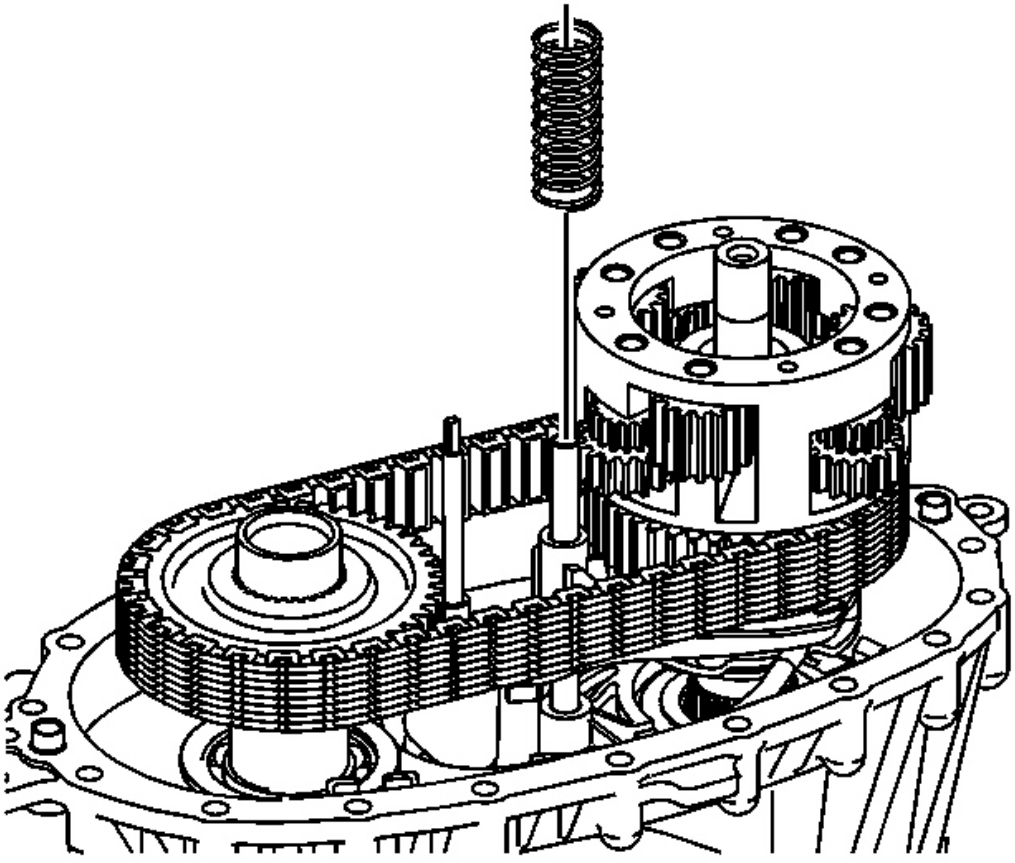


Fig. 104: Identifying Shift Fork Shaft Spring
Courtesy of GENERAL MOTORS CORP.

46. Install the shift fork shaft spring.

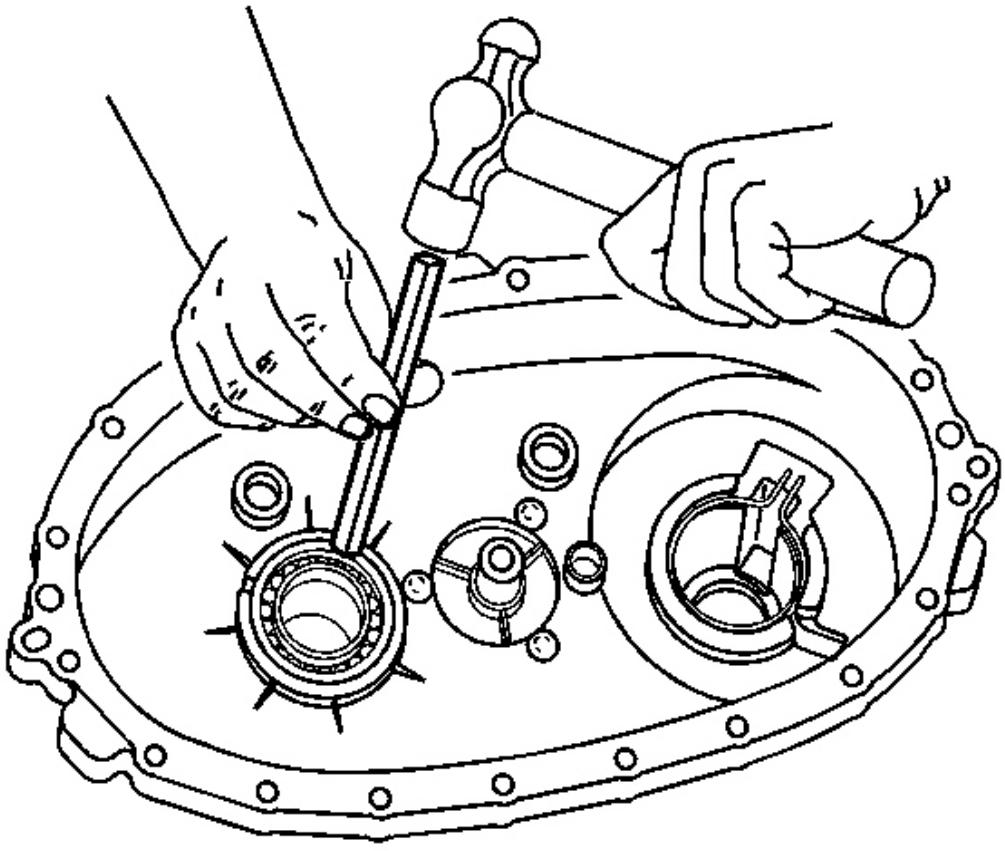


Fig. 105: Installing Front Output Shaft Rear Bearing
Courtesy of GENERAL MOTORS CORP.

47. Install the front output shaft rear bearing in the rear case half.
    - Use a hammer and a brass drift only on the outer bearing race.
    - Ensure the bearing is kept square to the bore while installing.

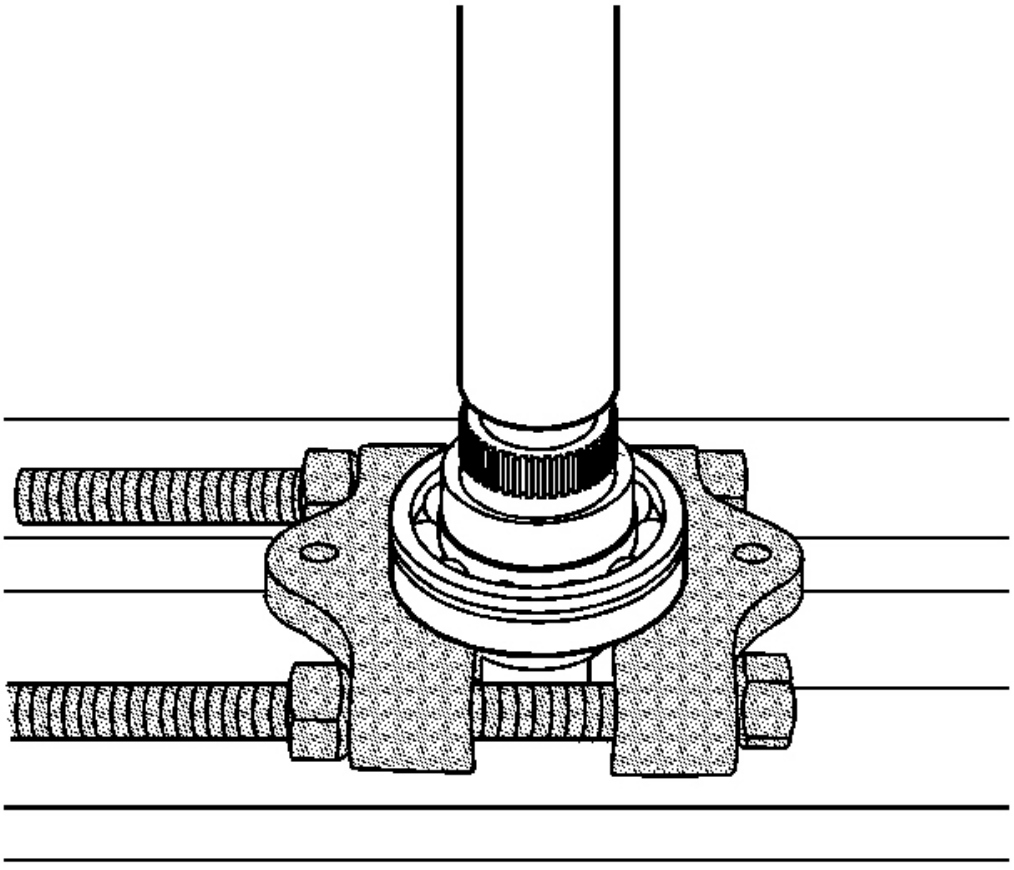


Fig. 106: View Of J 22912-01
Courtesy of GENERAL MOTORS CORP.

48. Using a hydraulic press and the **J 22912-01** , install the rear output shaft bearing.
    - The retaining ring groove on the bearing goes toward the input end or forward.
    - Use a suitable press plate on the end of the rear output shaft.
    - Ensure the bearing is supported on the inner race.

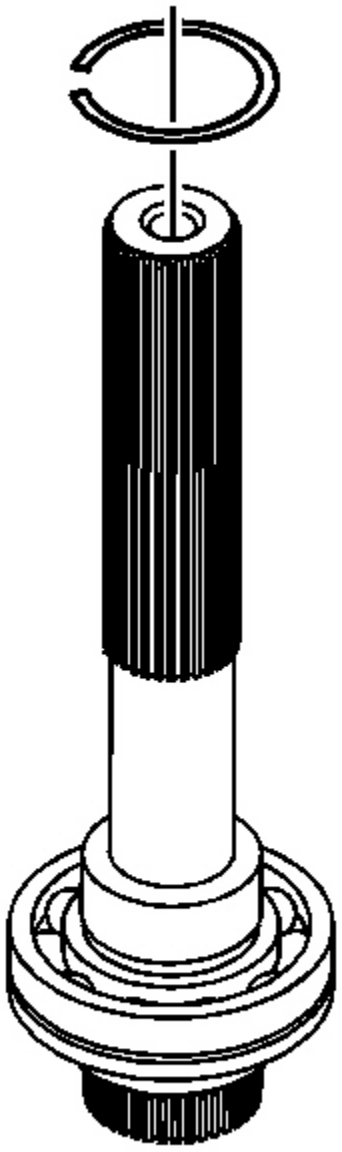


Fig. 107: View Of Rear Output Shaft Bearing Retaining Ring
Courtesy of GENERAL MOTORS CORP.

49. Install a NEW retaining ring for the rear output shaft bearing.

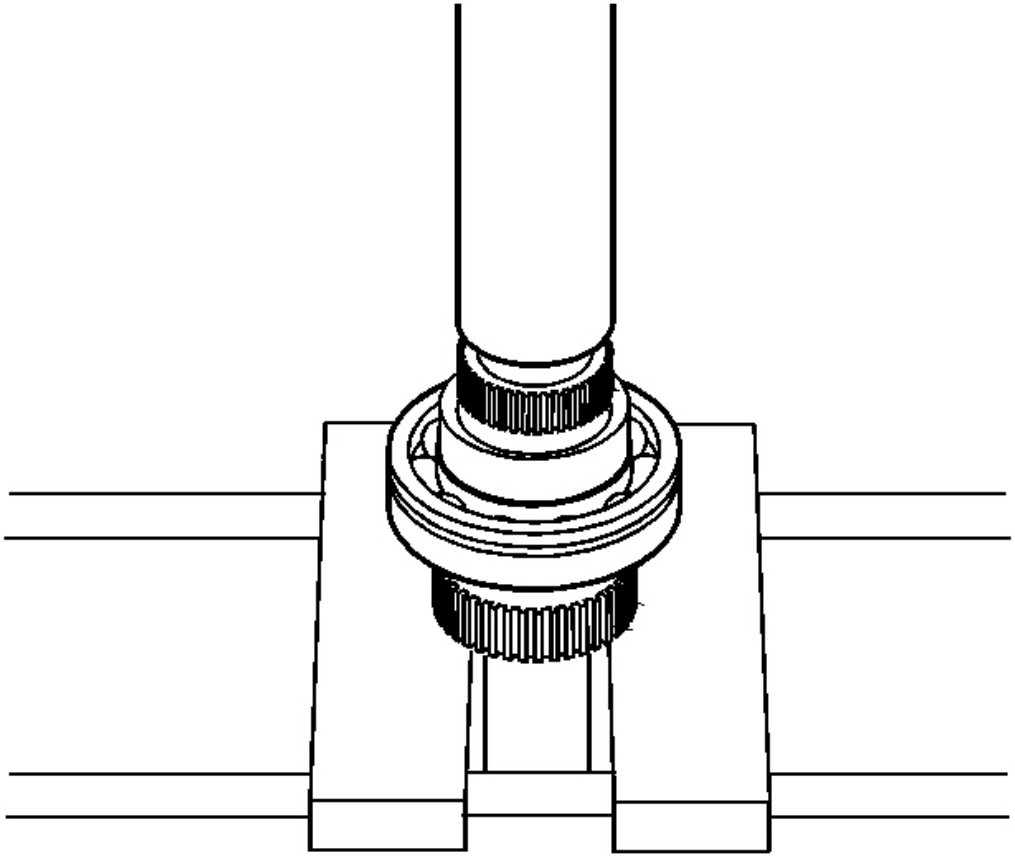


Fig. 108: Pressing In Speed Reluctor Wheel
Courtesy of GENERAL MOTORS CORP.

50. Using a hydraulic press, install a NEW speed reluctor wheel.

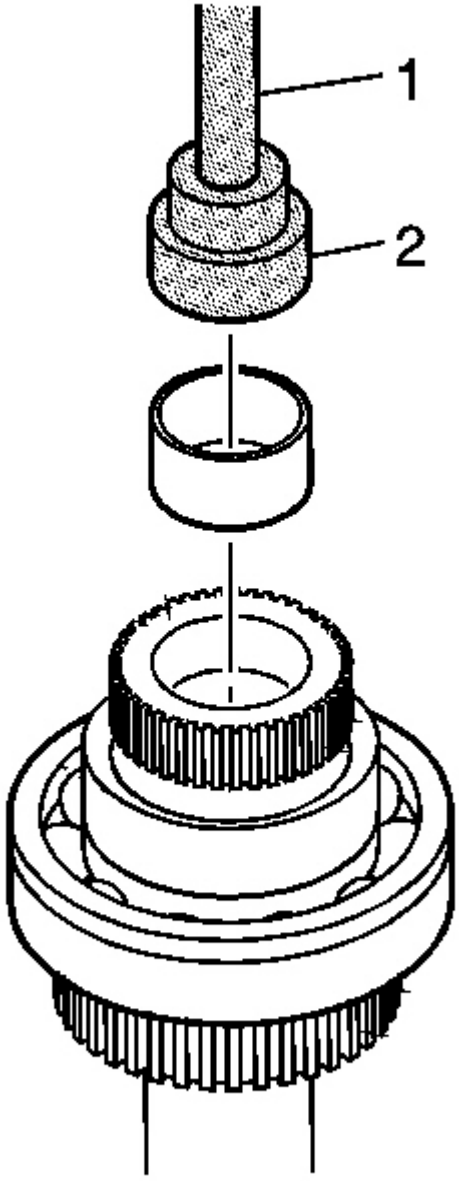


Fig. 109: Installing Mainshaft Rear Support Bushing In Rear Output Shaft
Courtesy of GENERAL MOTORS CORP.

51. Using **J 42176** (1) and **J 45757** (2), install the mainshaft rear support bushing in the rear output shaft.

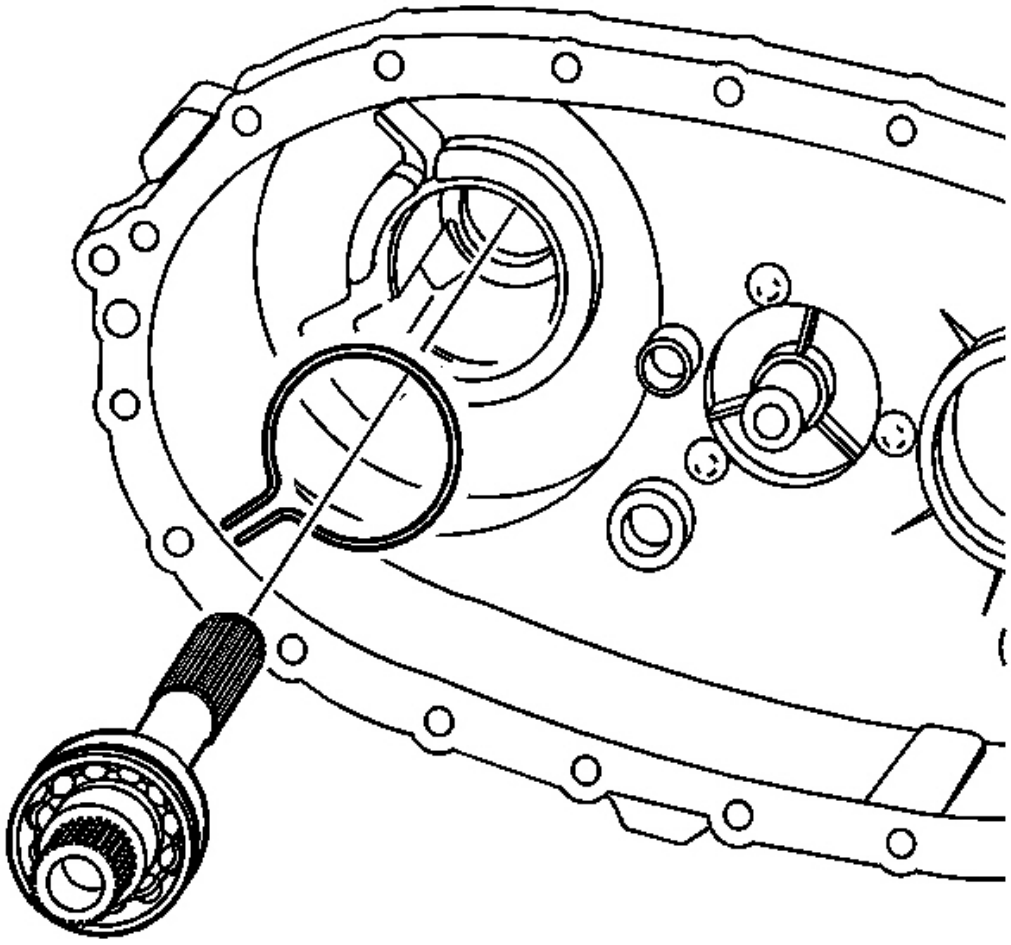


Fig. 110: Identifying Rear Output Shaft & Outer Retaining Ring
Courtesy of GENERAL MOTORS CORP.

52. Install the rear output shaft in the rear case half.
    1. Spread the rear output shaft rear bearing outer retaining ring.
    2. Install the rear output shaft bearing outer retaining ring until it is seated in the bearing groove.

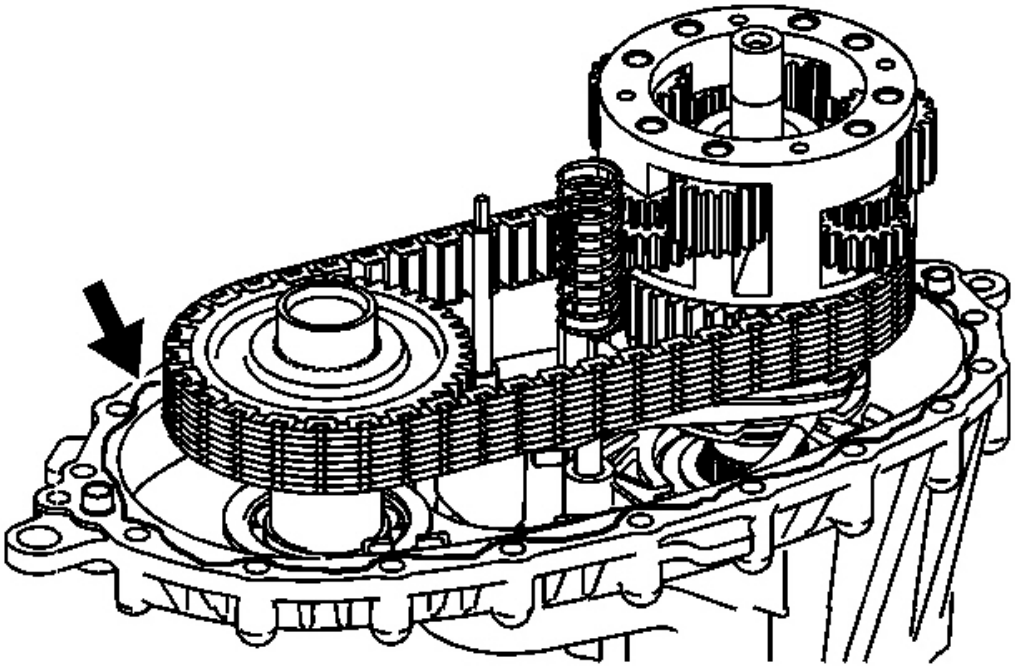


Fig. 111: Identifying Sealing Surfaces
Courtesy of GENERAL MOTORS CORP.

IMPORTANT:

- **Ensure that both the sealing surfaces on the front and rear case halves are free of dirt, oil, and cleaning solvent.**
- **Ensure the locating pins are installed in the case halves.**

53. Install the locating pins in the front case and rear case half, if necessary.
54. Apply a 3.175 mm (1/8 in) bead of RTV sealant GM P/N 12345739 (Canadian P/N 10953541) or equivalent to the mating surfaces of the front case half.

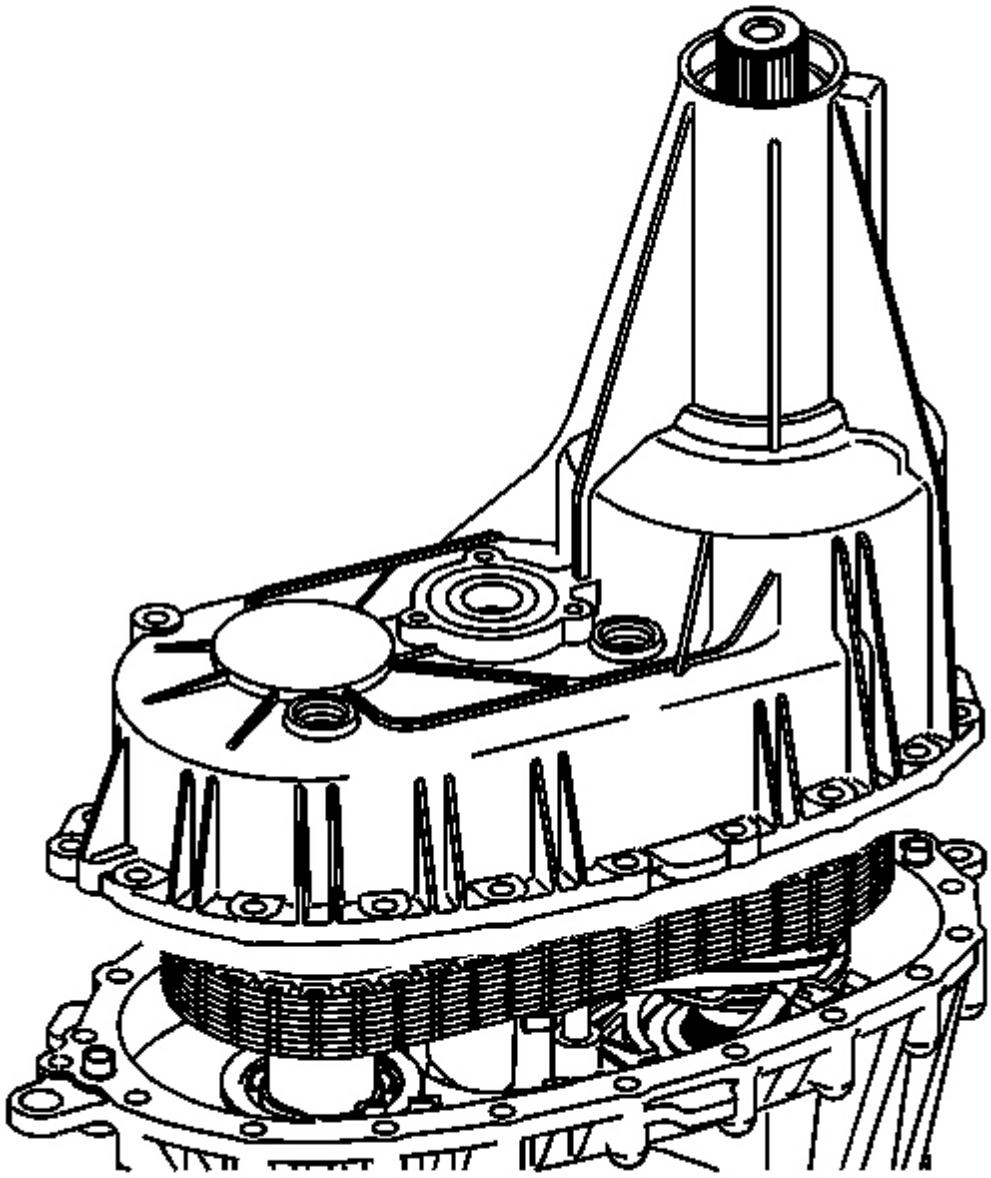


Fig. 112: View Of Rear Case & Front Case Half
Courtesy of GENERAL MOTORS CORP.

55. Lower the rear case half into place.

    The rear output shaft may require rotating to align the teeth with the planetary differential.

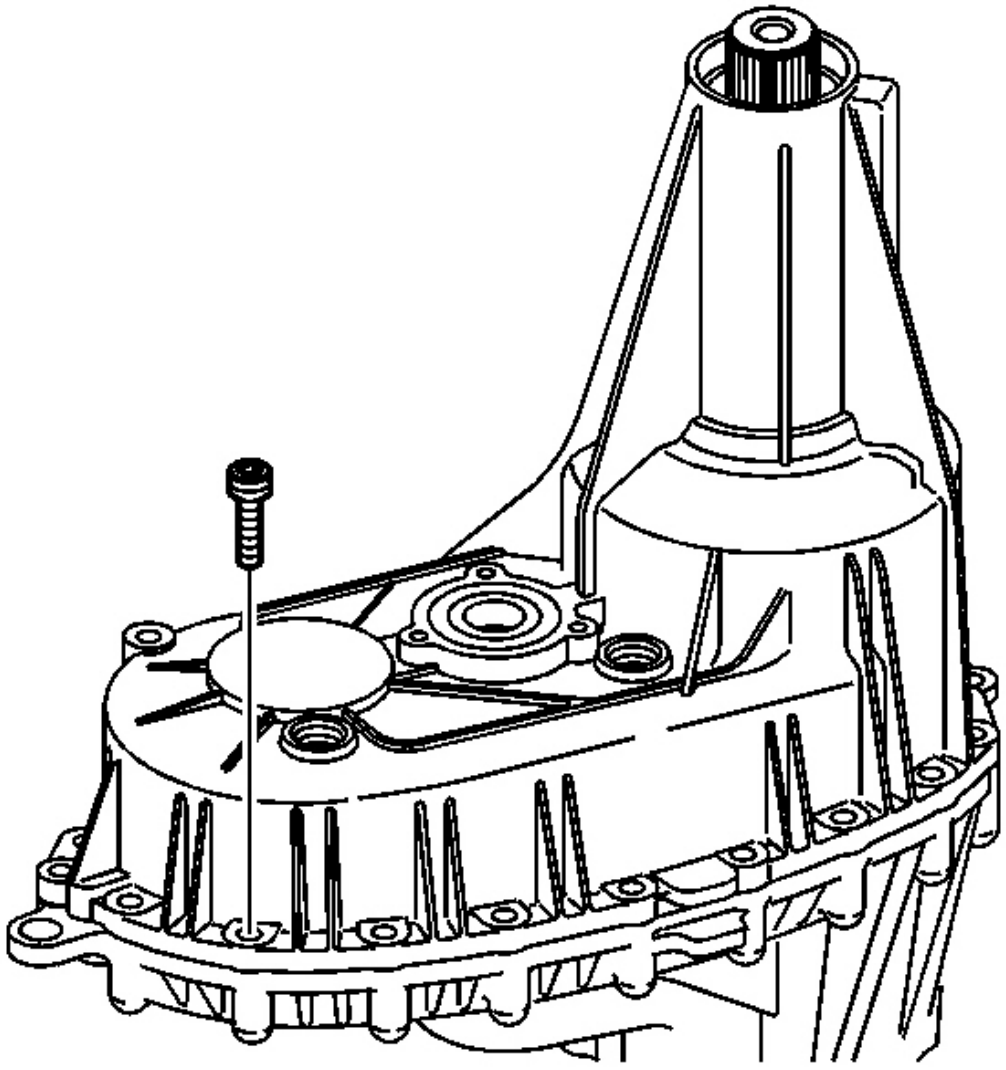


Fig. 113: Identifying Transfer Case Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: **This component is made of magnesium. Proper assembly is required to prevent damage. Ensure the magnesium transfer case housings are properly insulated from all external steel components, or galvanic corrosion will occur. New nylon coated case bolts and aluminum washers must be used. Use only aluminum fill and drain plugs. Use only aluminum brackets under the case bolts. Ensure new seals are installed that have a**

rubber insulated outside diameter and have no tears or cuts. Extensive damage will occur if there is galvanic corrosion between the magnesium and steel components.

56. Inspect the nylon coating on the case bolts for cuts or tears.
57. Replace the case bolts if there is any damage to the nylon coating.

IMPORTANT: The case bolts are self-tapping; they must be hand started. Do not use power assisted tools to install the bolts.

58. Install the case bolts with washers, and the brackets.

    Tighten: Tighten the case bolts to 21 N.m (15 lb ft).

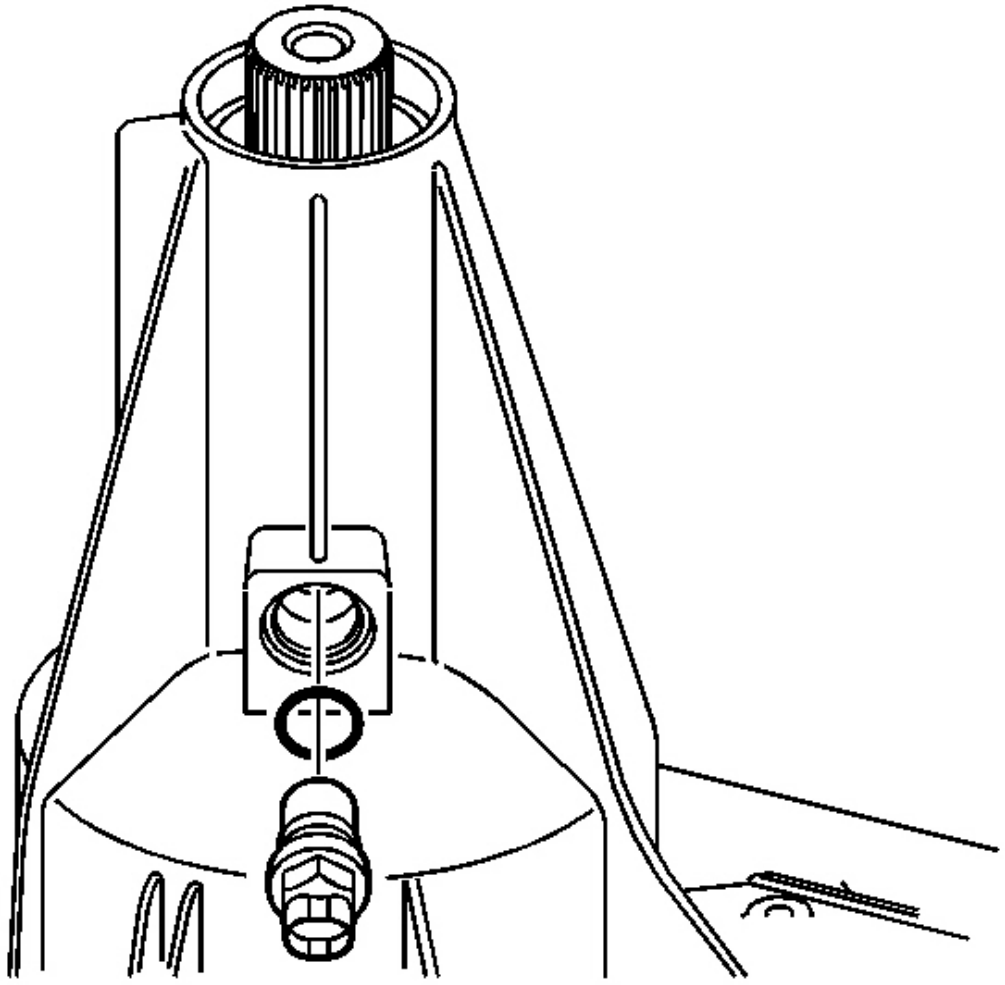


Fig. 114: Locating Vehicle Speed Sensor (VSS)
Courtesy of GENERAL MOTORS CORP.

59. Install the vehicle speed sensor (VSS) with a new O-ring seal.

    Tighten: Tighten the speed sensor to 17 N.m (13 lb ft).

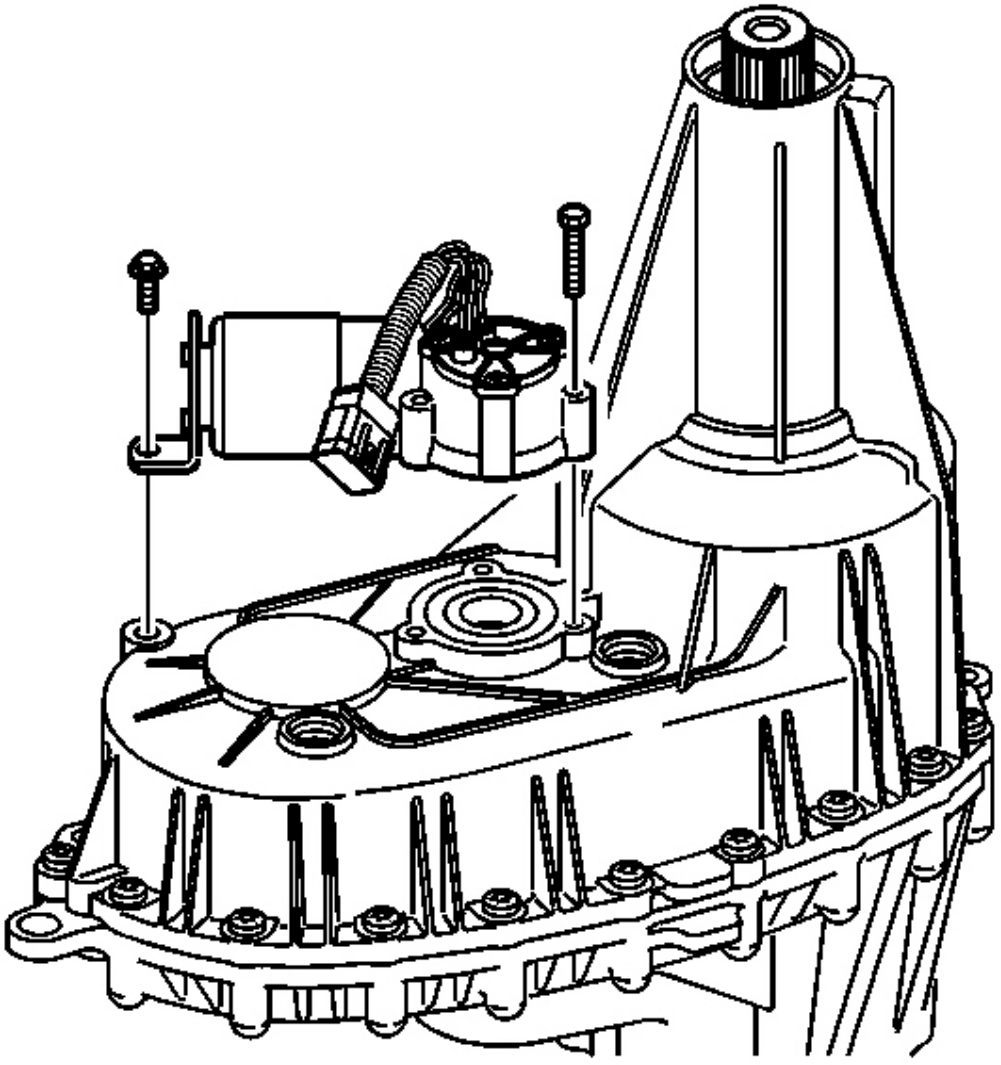


Fig. 115: Identifying Encoder Motor Assembly
Courtesy of GENERAL MOTORS CORP.

60. Apply a 3.175 mm (1/8 in) bead of RTV sealant GM P/N 12345739 (Canadian P/N 10953541), or equivalent, to the sealing surface of the encoder motor assembly.
61. Install the encoder motor assembly. Rotate the shift detent lever to align to the encoder motor.
62. Loosely install the encoder motor mounting bolts.
63. Loosely install the encoder motor bracket bolt.

Tighten:

- Tighten the encoder motor mounting bolts to 10 N.m (89 lb in).
- Tighten the encoder motor bracket bolt to 10 N.m (89 lb in).

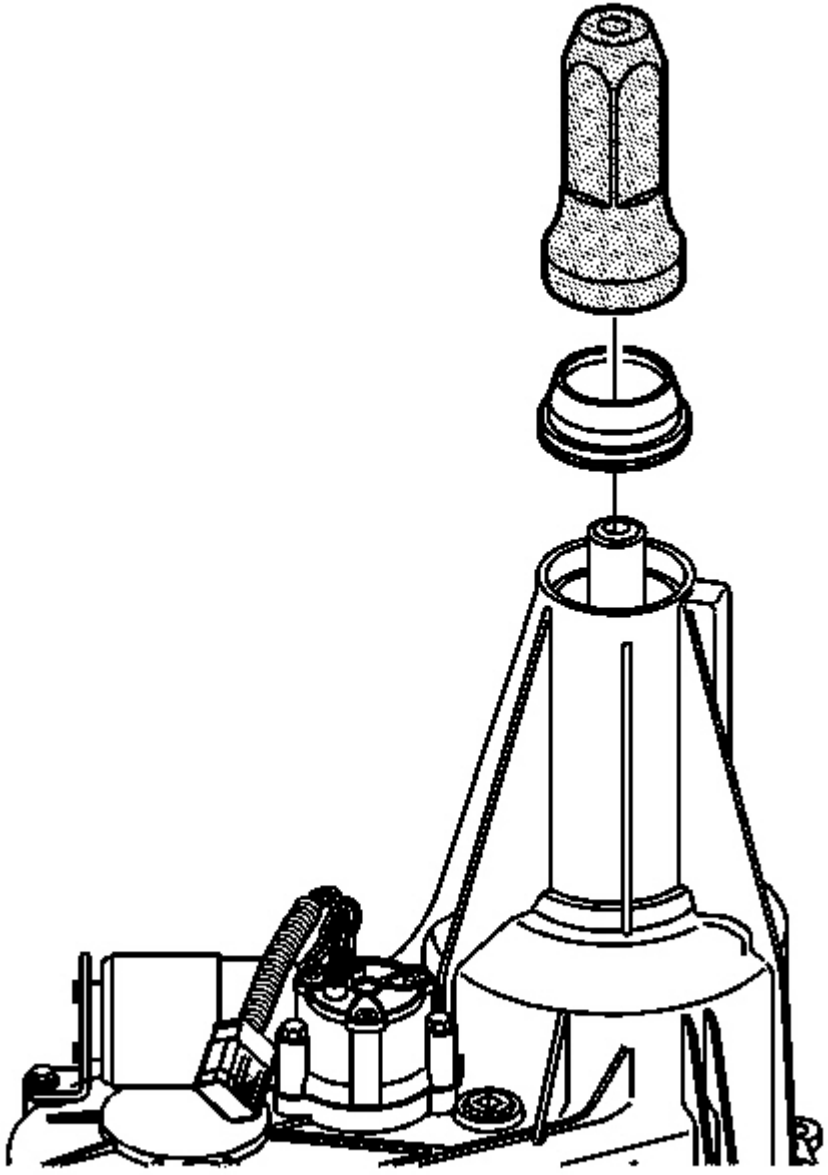


Fig. 116: Installing Rear Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

64. Using **J 45756** , install the rear output shaft seal.

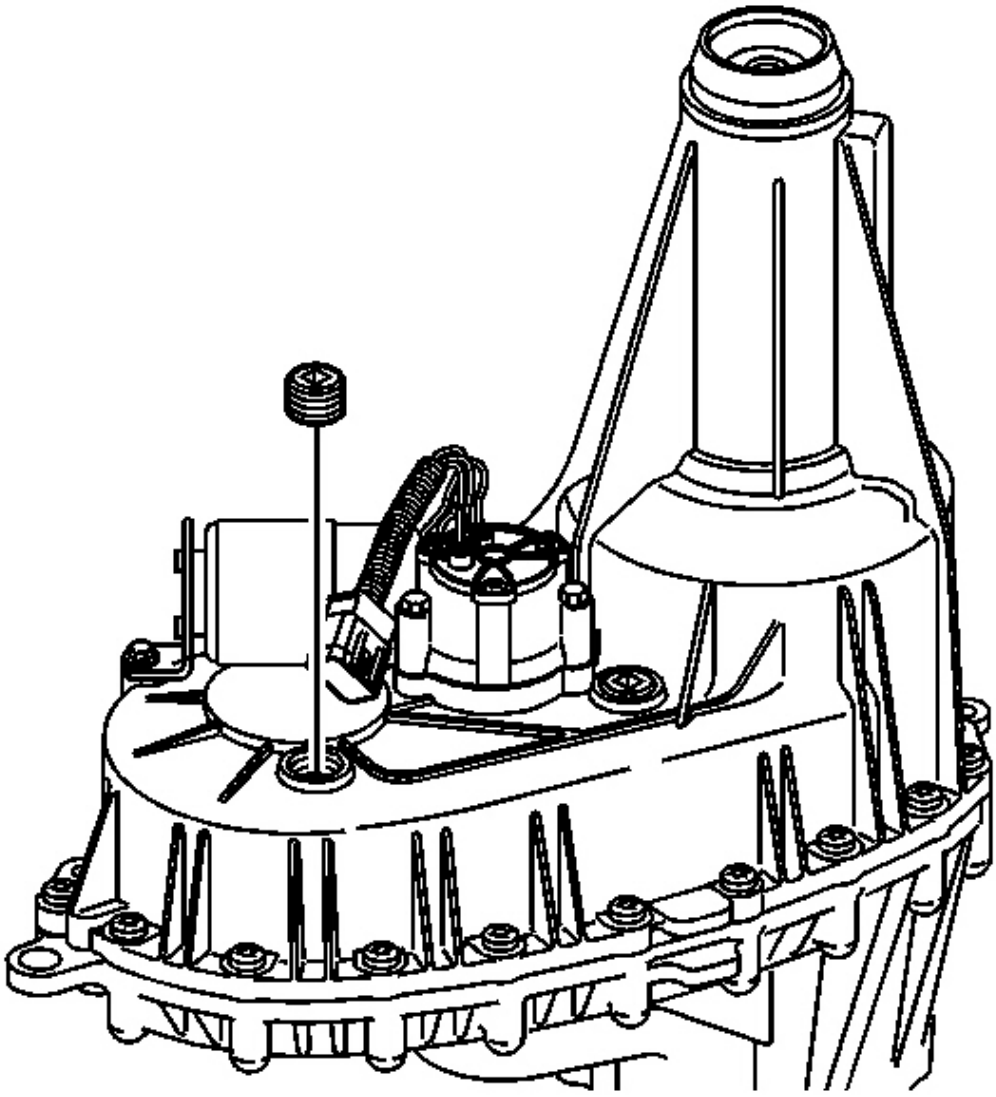


Fig. 117: View Of Drain & Fill Plug
Courtesy of GENERAL MOTORS CORP.

65. Apply pipe sealant GM P/N 12346004 (Canadian P/N 10953480) to the threads on the drain plug and fill plug.
66. Install the drain plug and the fill plug.

Tighten: Tighten the drain plug and fill plug to 25 N.m (18 lb ft).

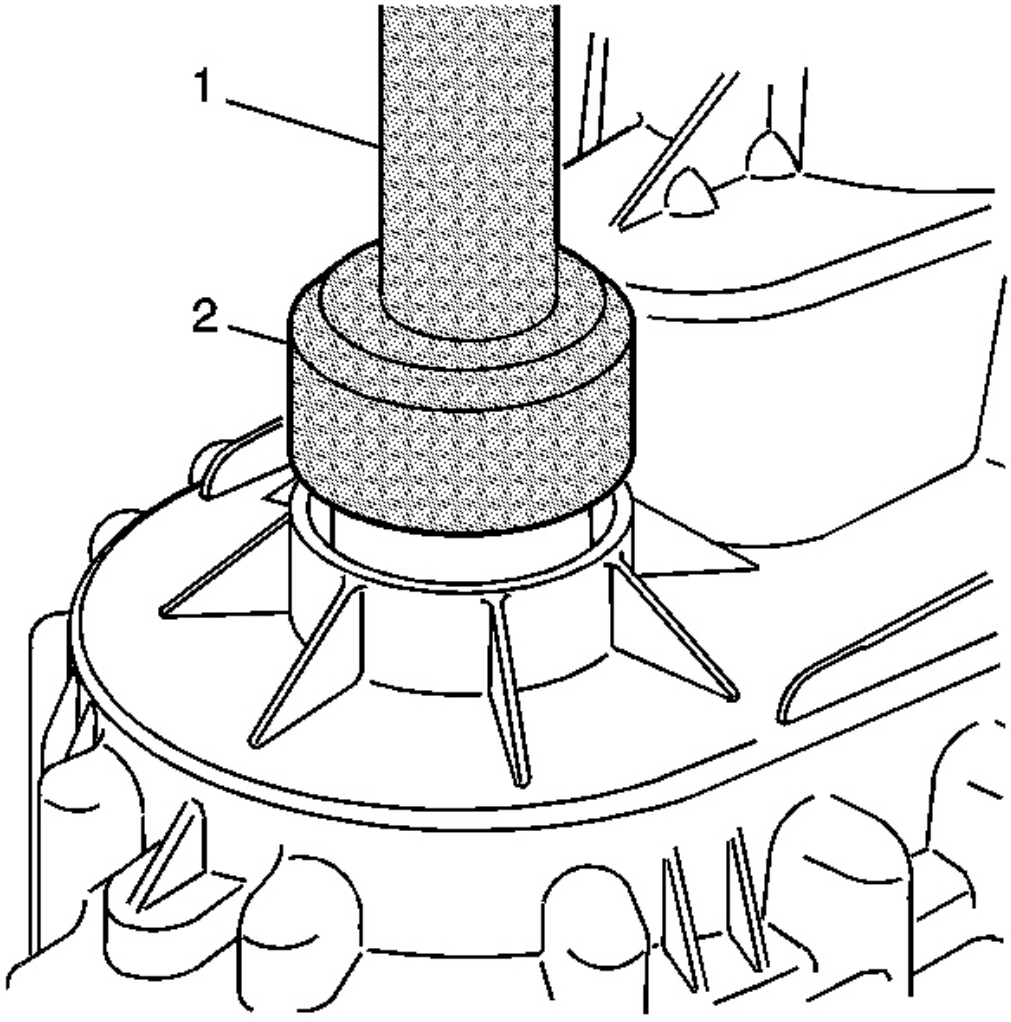


Fig. 118: Installing Front Output Shaft Seal With J 43484 & J 8092
Courtesy of GENERAL MOTORS CORP.

67. Using the **J 43484** (2) and the **J 8092** (1), install the front output shaft seal.

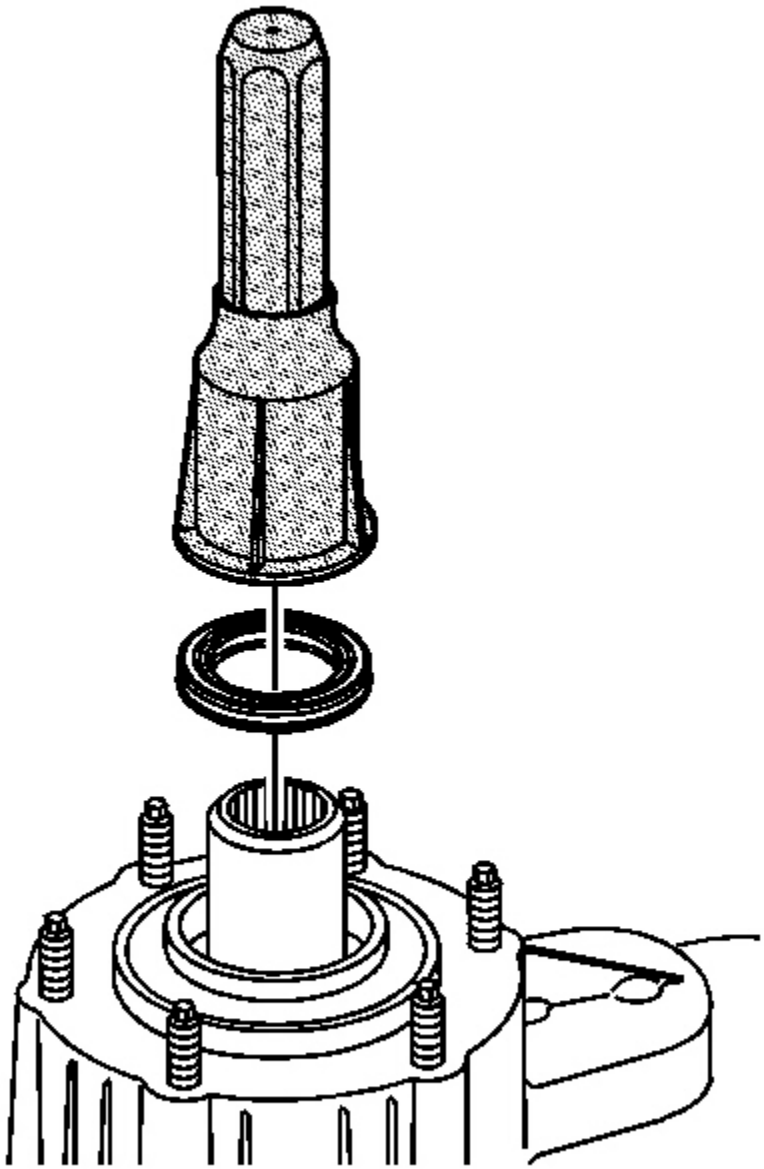


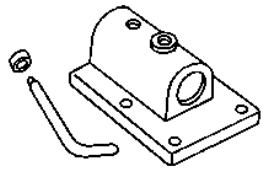
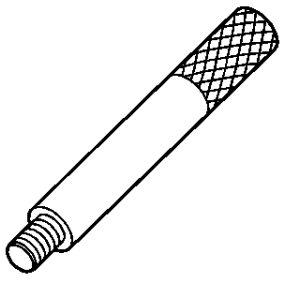
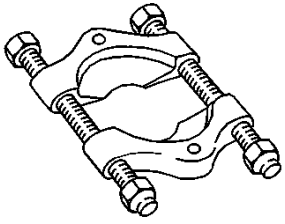
Fig. 119: Installing The Front Input Shaft Seal J 42738
Courtesy of GENERAL MOTORS CORP.

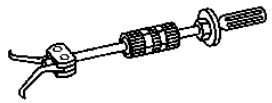
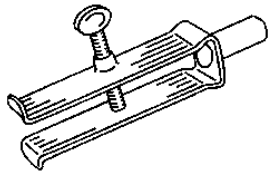
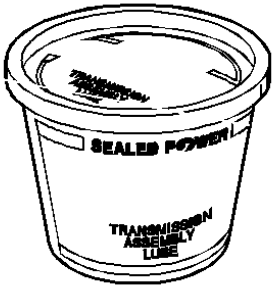
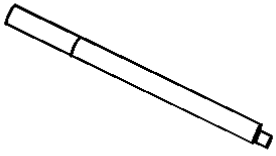
68. Using the **J 42738** , install the front input shaft seal.
69. Remove the transfer case from the **J 45759** .

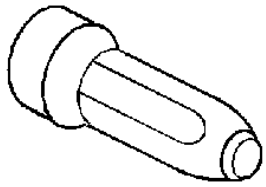
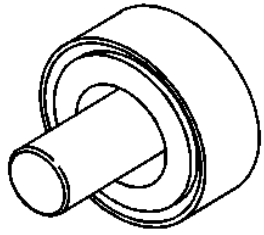
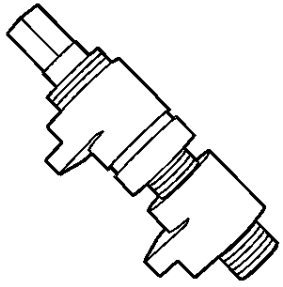
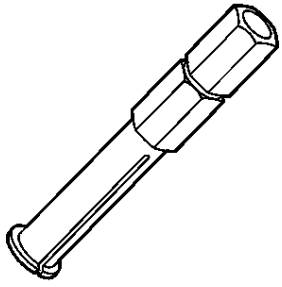
SPECIAL TOOLS AND EQUIPMENT

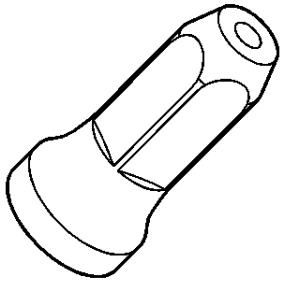
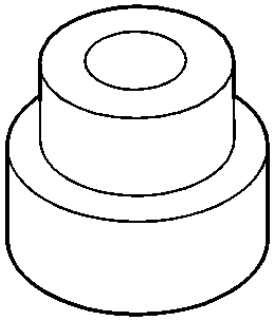
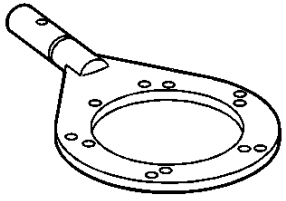
SPECIAL TOOLS

Special Tools

Illustration	Tool Number/Description
	J 2619-01 Slide Hammer
	J 3289-20 Holding Fixture
	J 8092 Universal Driver Handle
	J 22912-01 Rear Pinion and Axle Bearing Remover

	J 23907 Slide Hammer with Bearing Adapter
	J 26941 Bushing and Bearing Remover - 3-4 inch
	J 36850 Transjel Lubricant
	J 42176 Universal Driver Handle - Non-Threaded
	J 42738 Seal Installer

	
	J 43484 Front Output Shaft Seal Installer
	J 45358 Case Spreader
	J 45548 Mainshaft Support Bushing/Bearing Remover

	J 45756 Rear Output Shaft Seal Installer
	J 45757 Mainshaft Support Bushing and Bearing Installer
	J 45759 Assembly Fixture