

1997 DRIVE AXLES**Axle Shafts - Catera****TROUBLESHOOTING****CLICK NOISE IN TURNS**

The following conditions may cause a clicking noise in turns:

- Worn outboard joint
- Damaged outboard joint
- Cut seal
- Damaged seal

CLUNK WHEN ACCELERATING FROM COAST

The following may cause a clunk when accelerating from coast to drive:

- Worn universal joint
- Damaged universal joint
- Bad motor mount
- Worn differential bushing
- Damaged front differential bushing
- Worn rear differential bushing
- Damaged rear differential bushing

SHUDDER OR VIBRATION DURING ACCELERATION

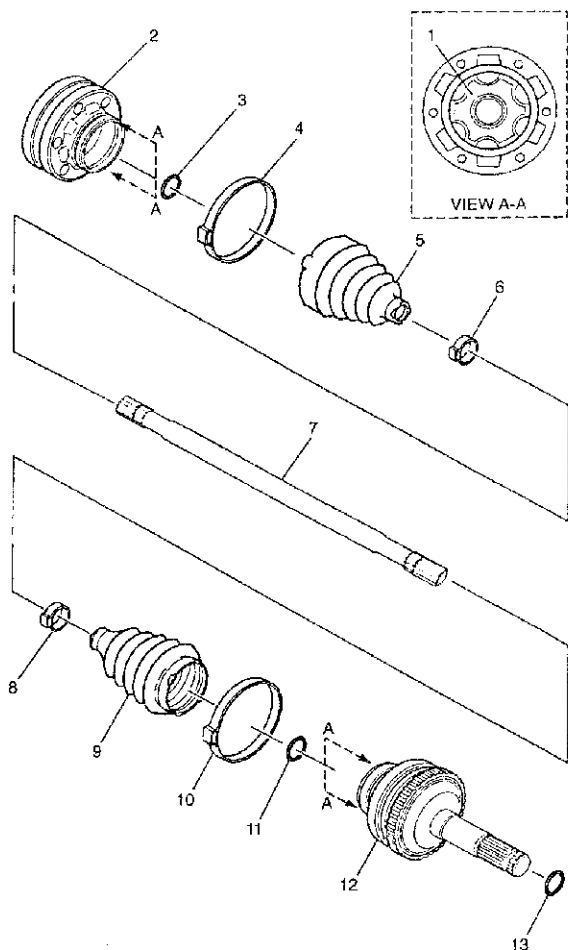
The following may cause a shudder or a vibration during acceleration:

- Incorrect trim height
- Worn inboard damage
- Damaged inboard joint
- Worn outboard joint
- Damaged outboard joint

REMOVAL & INSTALLATION

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Legend

- | | |
|---|---|
| (1) Inner Race | (8) Small Seal Retaining Clamp |
| (2) Cross Groove Inboard Housing Assembly | (9) Drive Axle Outboard Boot |
| (3) Retaining Ring | (10) Large Seal Retaining Clamp |
| (4) Large Seal Retaining Clamp | (11) Retaining Ring |
| (5) Drive Axle Inboard Boot | (12) Cross Groove Outboard Housing Assembly |
| (6) Small Seal Retaining Clamp | (13) Retaining Ring |
| (7) Axle Shaft | |

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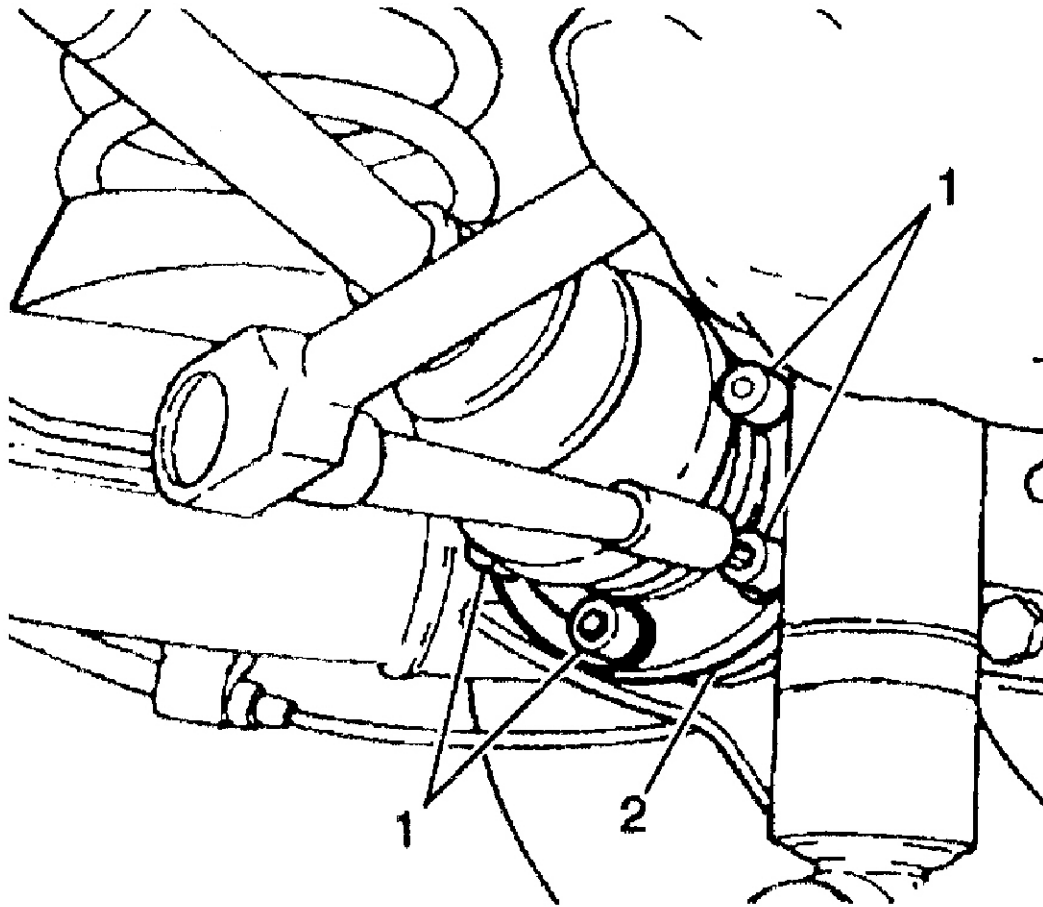
Fig. 1: Exploded View Of Axle Shaft Components
Courtesy of GENERAL MOTORS CORP.

AXLE SHAFTS

NOTE: Numbers in parenthesis correspond with numbers in illustrations.

Removal

1. Place the gear selector in the NEUTRAL position.
2. Raise and support the vehicle.
3. Remove the tire and wheel assembly.
4. Install the Wheel Hub Flange Holding Adapter (J 42066) to the wheel hub flange with the wheel bolts. See **Fig. 15**.
5. Remove the bolts (1) from the axle shaft flange (2) while holding the Wheel Hub Flange Holding Adapter (J 42066) with a ratchet. See **Fig. 2** & **Fig. 15**.



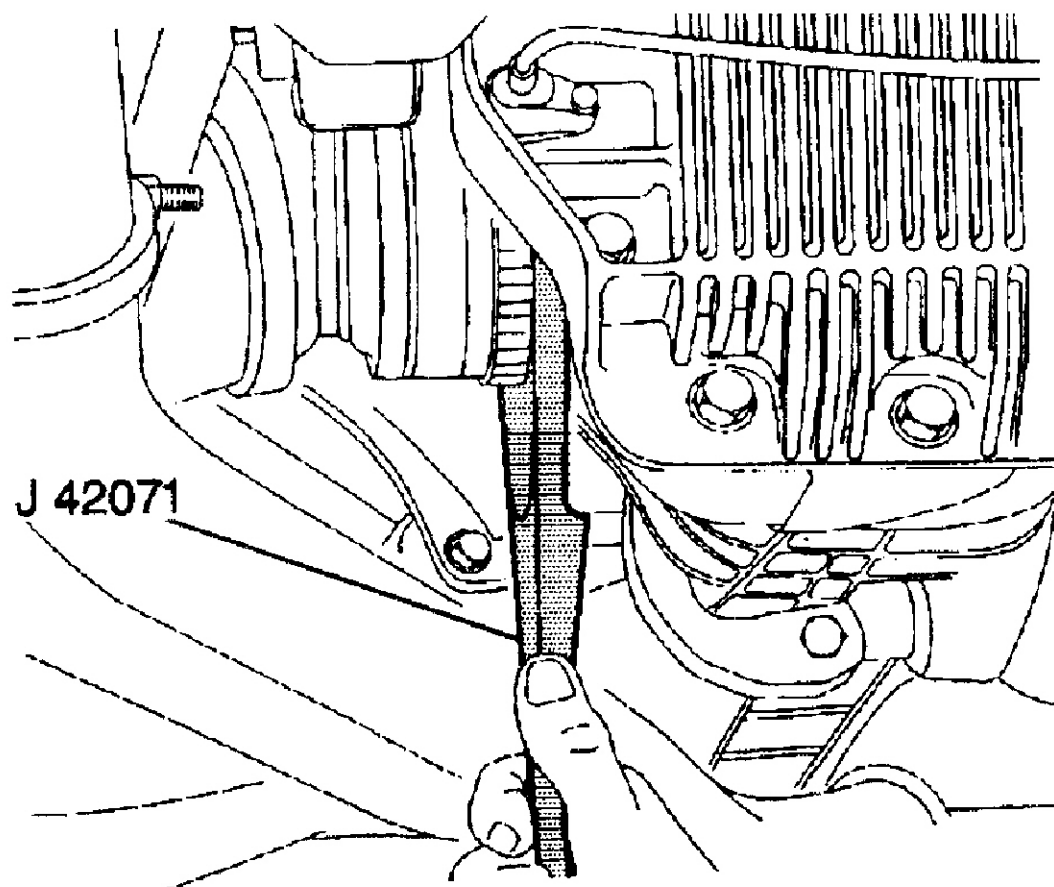
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Fig. 2: Removing Bolts From Axle Shaft Flange
Courtesy of GENERAL MOTORS CORP.

6. Separate the outer end of the axle shaft from the wheel bearing hub inner flange.

CAUTION: Ensure beveled side of Drive Axle Separator (J 42071), labeled "Differential Side", is against the differential and NOT against the axle shaft. Damage to ABS sensor reluctor may occur if separator is not installed correctly.

7. Use the Drive Axle Separator (J 42071) and a deadblow hammer to separate the axle shaft from rear axle differential. See **Fig. 3** & **Fig. 15**.
8. Remove the axle shaft from the vehicle.
9. Clean the axle shaft spline.
10. Clean the seal surfaces.



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Fig. 3: Separating Axle Shaft From Rear Axle Differential
 Courtesy of GENERAL MOTORS CORP.

Installation

1. Lubricate the axle shaft spline with differential lubricant.
2. Lubricate the seal surfaces with differential lubricant.

CAUTION: Use only enough force necessary to seat the axle shaft into the rear axle differential.

3. Use a rubber faced mallet to drive the outer end of the axle shaft to install the axle shaft into the differential bore.
4. Position the other end of the axle shaft into the wheel bearing hub inner flange.
5. Use a ratchet to hold the Wheel Hub Flange Holding Adapter (J 42066) while installing the bolts to the axle shaft flange. See **Fig. 15** .
6. Tighten the bolts to specification. See **TORQUE SPECIFICATIONS** .

OVERHAUL

GKN AXLE SHAFT

NOTE: The following overhaul procedures apply to the outer constant velocity joint only. The inner joint cannot be serviced. If the inner joint requires service, the entire axle shaft assembly must be replaced.

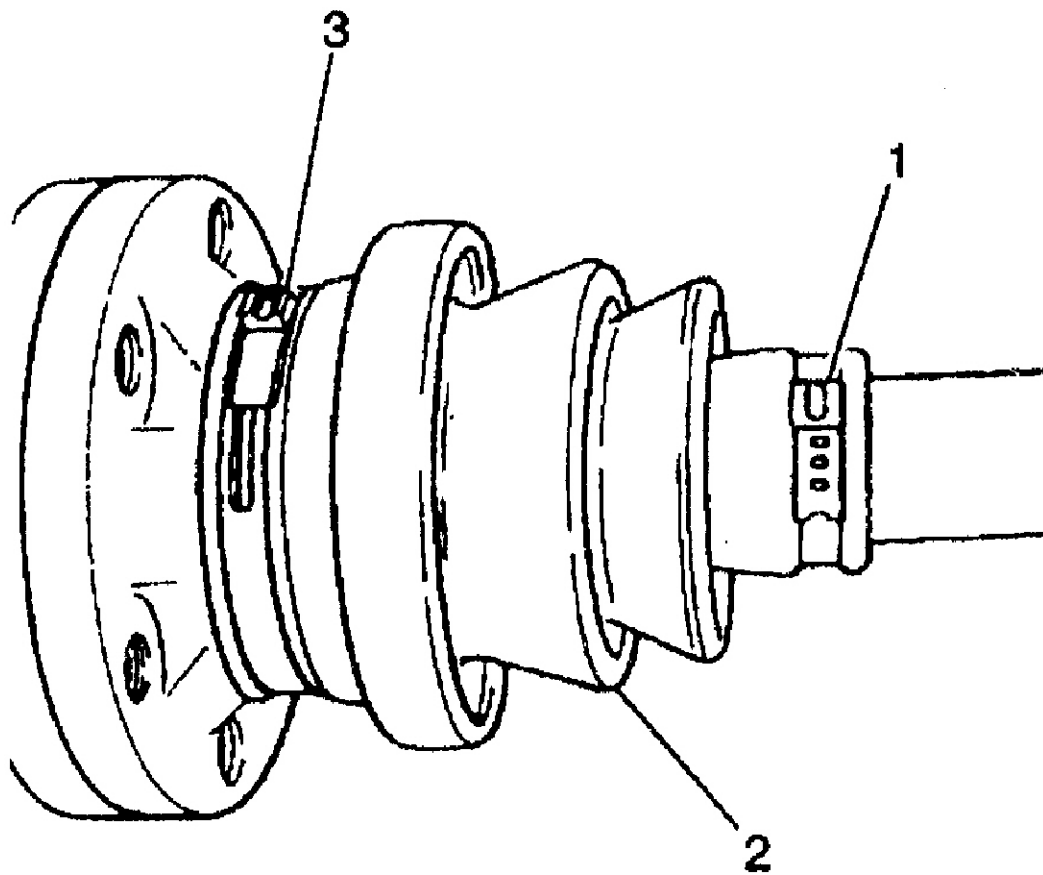
The GKN axle shaft is identified by its shaft diameter and by the axle manufacturer's markings on the outer surface

of the inner joint. This marking contains the Made in Germany phrase along with some other manufacturing data. The diameter of the GKN axle shaft should measure about 32.1 mm (1.26 in). The Delphi/Saginaw axle will most likely be found on the mid-year and on later Cateras. The Delphi/Saginaw axle contains slightly smaller drive axles shafts measuring 27.7 mm (1.09 in) in diameter.

NOTE: Numbers in parenthesis correspond with numbers in illustrations.

Disassembly

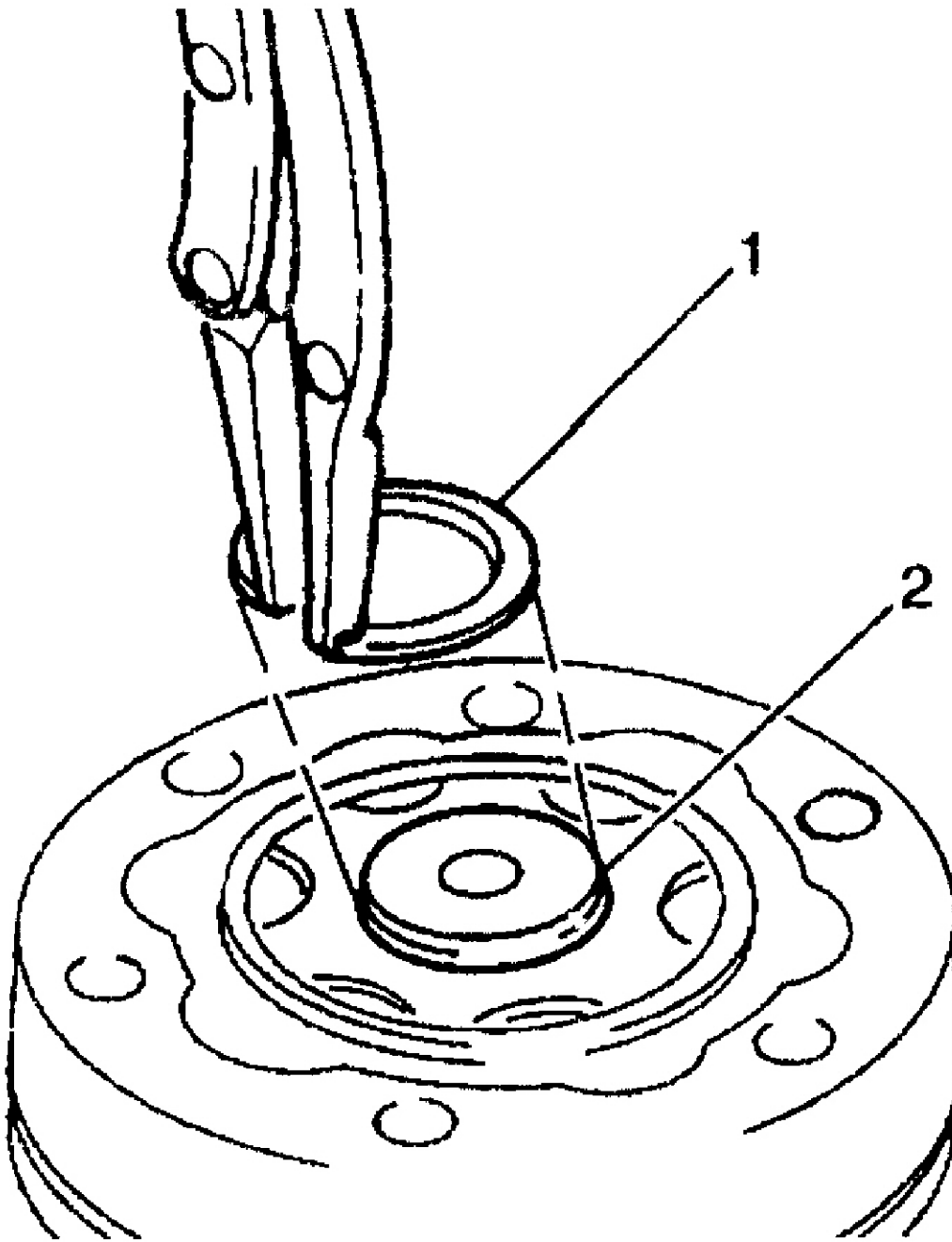
1. Clean the outside of the axle shaft using a suitable solvent before disassembling.
2. Clamp the axle shaft at the shaft surface in a soft metal-jawed vice.
3. Using tin snips or another suitable cutting tool, cut both inner (3) and outer (1) boot retaining clamps in the raised crimp area. See **Fig. 4**.



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Fig. 4: Cutting Inner & Outer Boot Retaining Clamps
Courtesy of GENERAL MOTORS CORP.

4. Perform the step that applies below:
 - If replacing the boot, remove the clamps.
 - If not replacing the boot, slide the cap and the boot slightly down the axle shaft in order to expose the outer constant velocity joint without destroying the clamps.
5. Using a suitable drift and hammer, tap the inner/outer dust shield caps away from both sides of the outer constant velocity joint.
6. Clean away any grease from the axle shaft and outer constant velocity joint.
7. Remove the retaining ring (1) from the axle shaft shaft (2). See **Fig. 5**.



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Fig. 5: Removing Retaining Ring From Axle Shaft
Courtesy of GENERAL MOTORS CORP.

8. Discard the retaining ring.
9. Remove the axle shaft shaft from the vice.
10. Slide the inner dust shield boot and cap toward the center of the shaft in order to expose the bottom of the outer constant velocity joint.

NOTE: Ensure inner race is fully supported in the press during the next step.

11. Install the axle shaft onto a press, ensuring that the inner race is fully supported.

NOTE: Do not attempt to disassemble the outer constant velocity joint until the joint is removed from the axle shaft shaft.

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12. Press the axle shaft shaft from the outer constant velocity joint.
13. If replacing or removing the boot for cleaning:
 - Loosen the Inner boot clamp.
 - Carefully slide the boot and the dust shield off of the axle shaft shaft in order to prevent damage to the boot from the shaft spline edges.
14. Clean the following components using a suitable solvent:
 - The axle shaft shaft
 - The boot
15. Inspect the axle shaft shaft for twisting, cracking, or excessive spline wear. Replace as needed.
16. Inspect the boots for splits, fatigue, cracks, or wear. Replace as needed.
17. If replacing the axle shaft, remove the ABS sensor reluctor ring from the inner constant velocity joint.

Inspection

1. Inspect the grease in the joint. If contaminated, replace the joint. If not contaminated, clean the joint using a suitable solvent.
2. Tilt the inner race to one side in order to expose each ball bearing for inspection.
3. Replace the joint if any of the following conditions exist:
 - Any severe pits, galls, or play between the balls and the cage windows.
 - Any cracks or other damage to the cage.
 - Any pits, galls, or chips in the raceway.
4. If the joint becomes disassembled during the inspection, perform the following steps:
 - Note the identification groove (1) on the outer race and identification step (2) of the inner race for proper orientation upon reassembly. See **Fig. 6**.

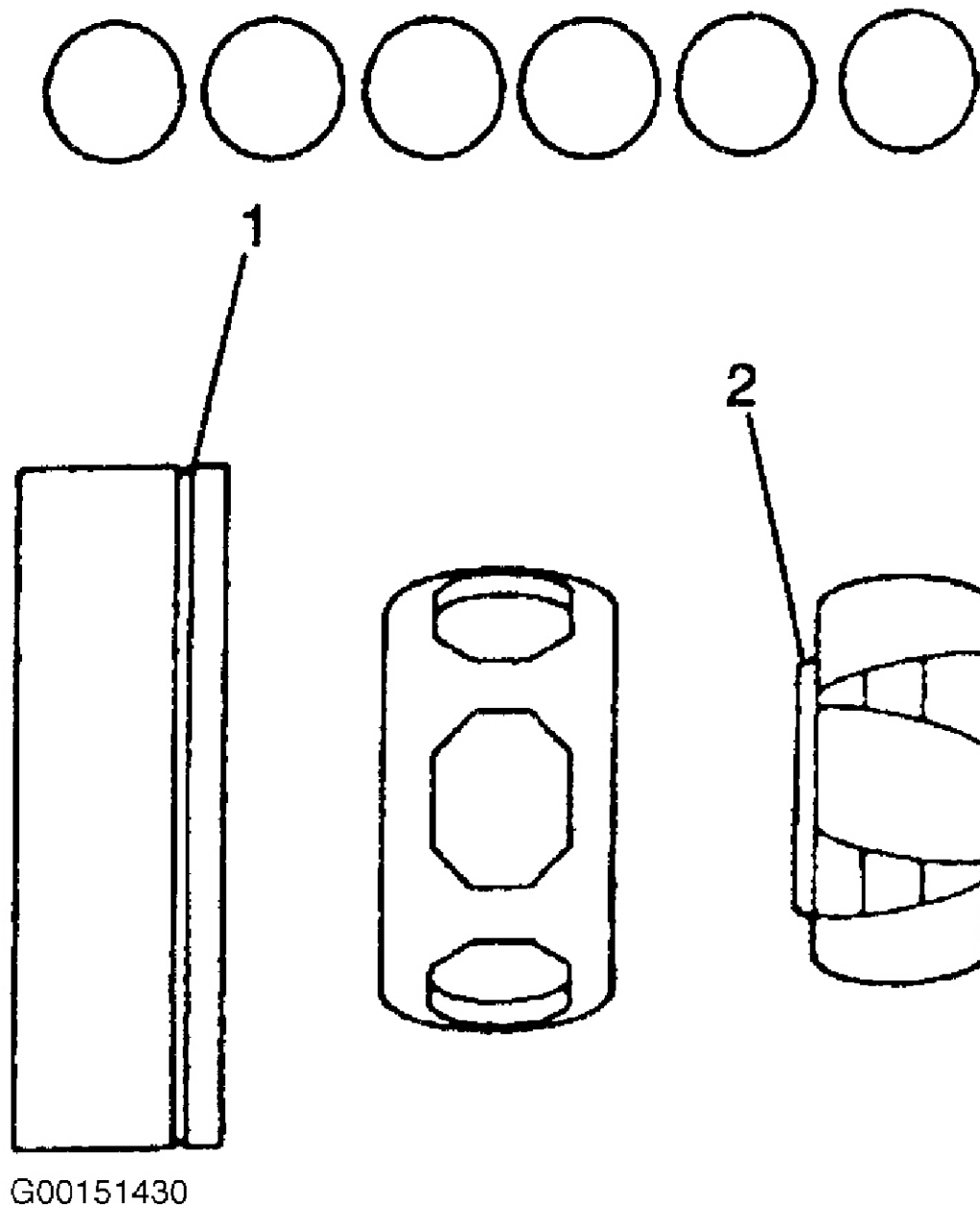


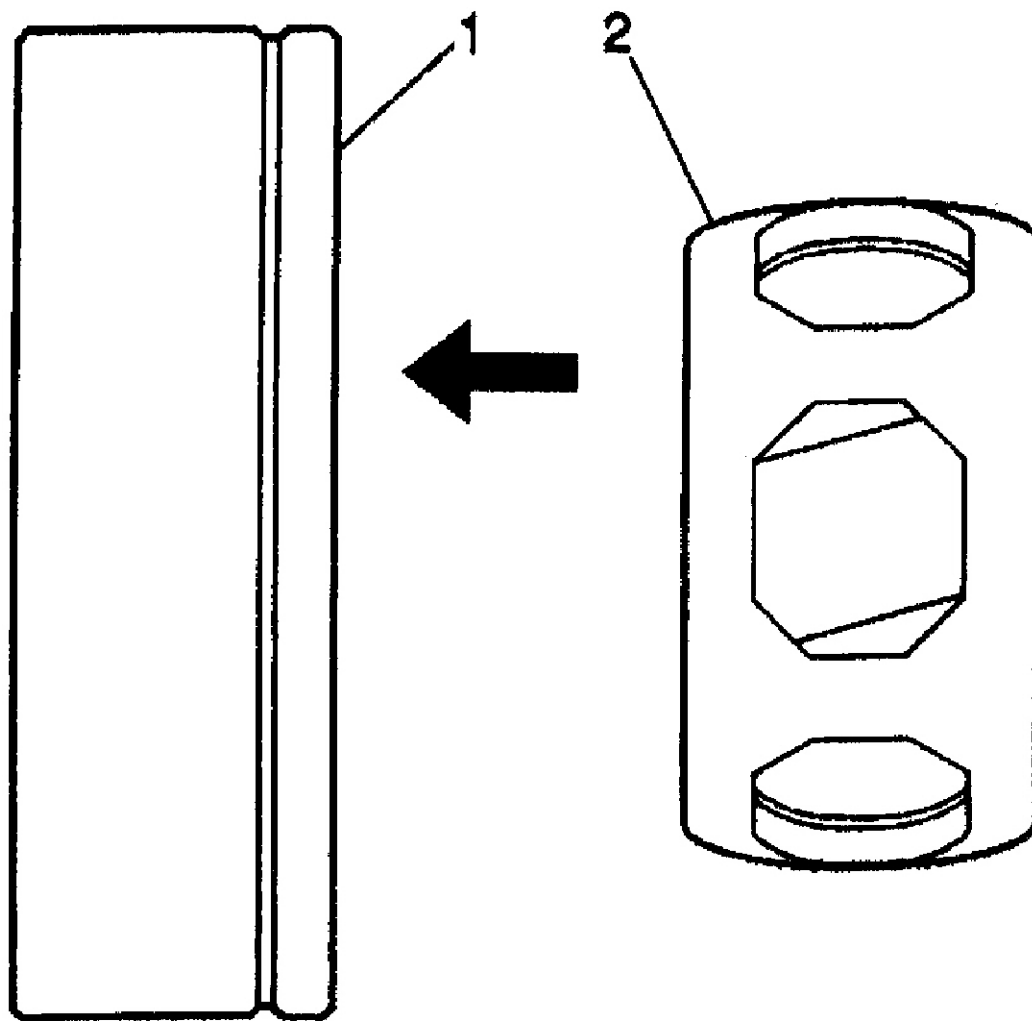
Fig. 6: Locating Identification Grooves
 Courtesy of GENERAL MOTORS CORP.

Disassembly

CAUTION: Complete disassembly of the outer constant velocity joint is not recommended. The internal components are a precision fit and develop their own characteristic wear patterns. Do not intermix components from another joint. This may result in looseness, binding, or premature failure of the joint. Should the joint become inadvertently disassembled, follow the assembly procedure EXACTLY.

NOTE: Numbers in parenthesis correspond with numbers in illustrations.

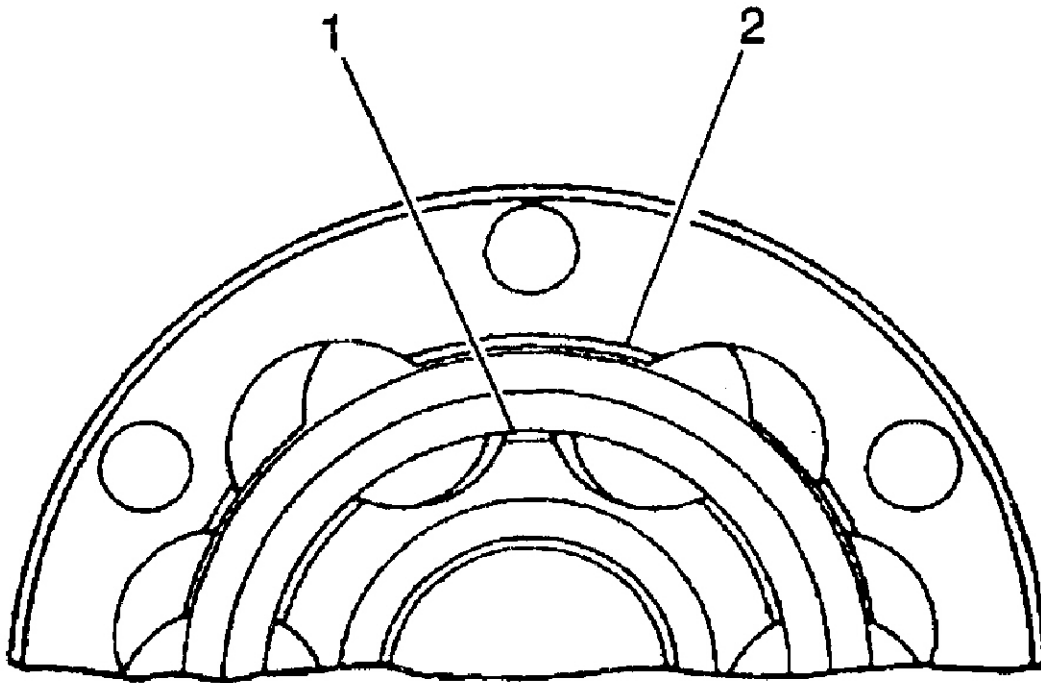
1. Lightly grease the inner/outer race ball bearing contact surfaces.
2. Position the inner race in the center of the cage.
3. Place the inner race/cage assembly (2) into the outer race (1), using the markings as noted during disassembly. See **Fig. 7**.



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Fig. 7: Placing Inner Race/Cage Assembly Into Outer Race
Courtesy of GENERAL MOTORS CORP.

4. Inspect that the identification markings on both the inner (2) and outer (1) races are on opposite sides. See **Fig. 6** .
5. Align the thick sections on the outer race (2) with the narrow sections of the inner race (1). See **Fig. 8** .



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Fig. 8: Aligning Thick Sections On Outer Race With Narrow Sections On Inner Race
 Courtesy of GENERAL MOTORS CORP.

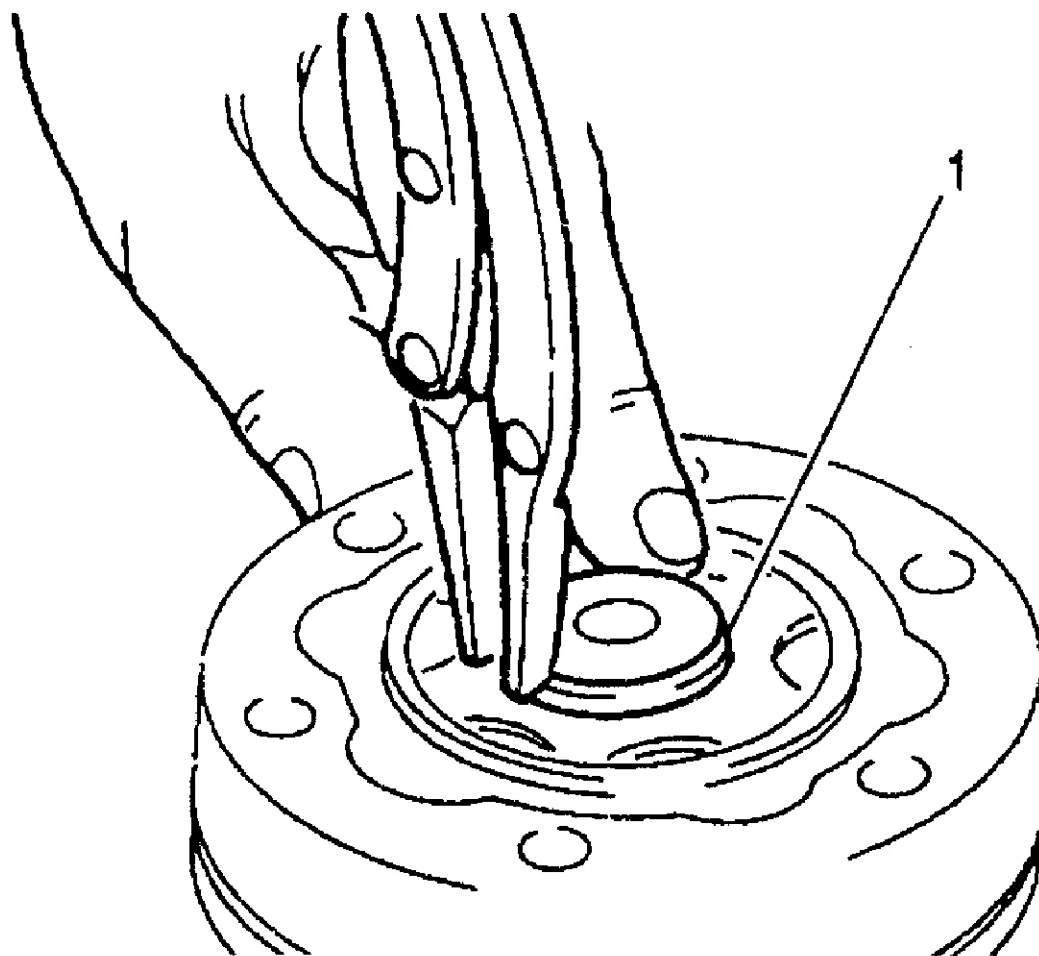
6. Tilt the cage and inner race, fitting each ball one at a time.
7. Inspect the plunge movement: Plunge movement is about 8.5 mm (0.33 in).
8. If no plunge movement can be achieved, disassemble the joint. Repeat the assembly procedure until plunge movement can be achieved.

Reassembly

1. Remove the old silicone sealing bead from the dust shield caps and the outer constant velocity joint surfaces.
2. Clean the dust shield cap and outer constant velocity joint surfaces.
3. Install the axle shaft boot onto the axle shaft shaft.
4. Install the dust shield cap onto the axle shaft shaft.

CAUTION: The inner joint race should take the pressing load during the next step.

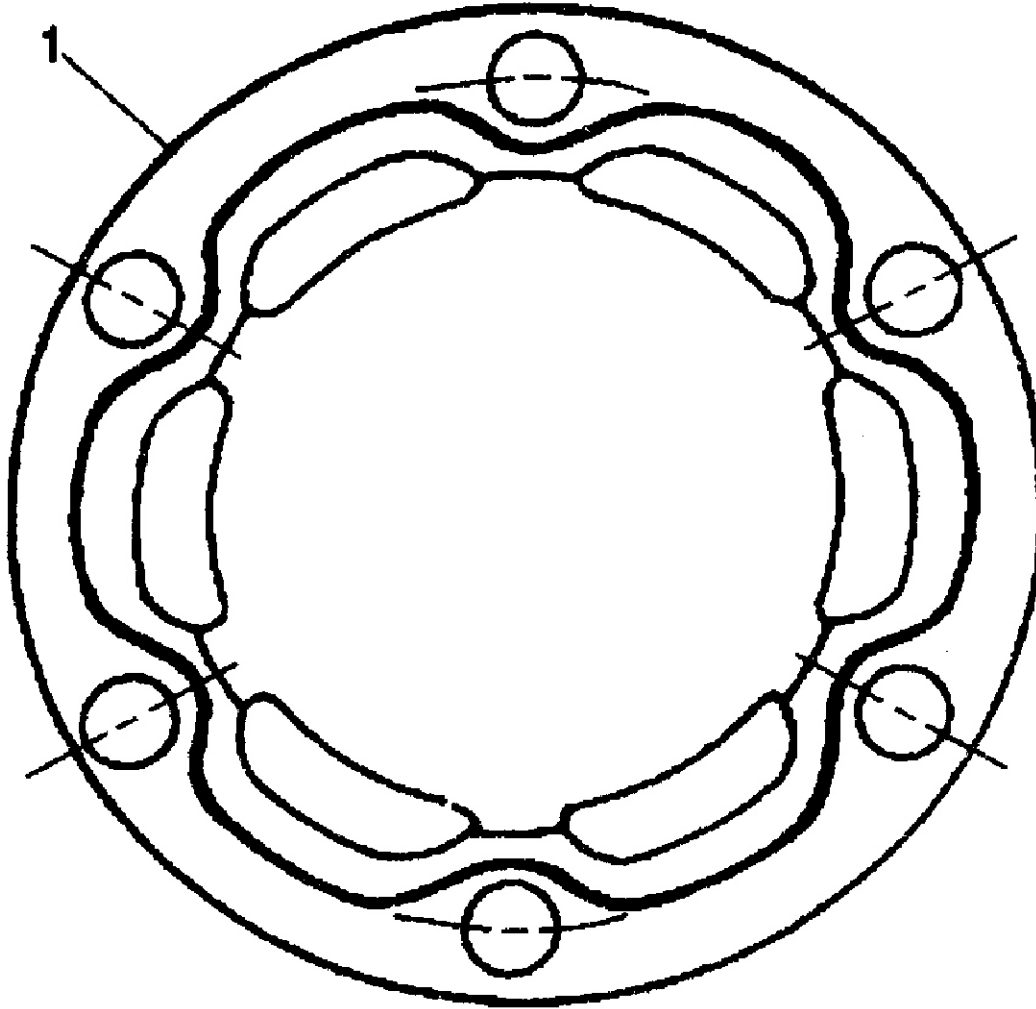
5. Press the outer constant velocity joint onto the axle shaft shaft:
 - Point the inner race identifying step toward the shaft shoulders.
 - Point the outer race identifying channel away from the shaft.
6. Install a new axle shaft retaining ring (1). See **Fig. 9**.



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Fig. 9: Installing Axle Shaft Retaining Ring
Courtesy of GENERAL MOTORS CORP.

7. Apply a 2 mm bead of RTV to both cap surfaces.
8. Allow the RTV to cure for about one hour.
9. Pack the inside section of the joint and boot with 40 g of grease.
10. Pack the outside section of the joint with 20 g of grease.
11. Position the inner/outer dust shield caps (1) onto the outer constant velocity joint, aligning all bolt holes. See **Fig. 10**.



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Fig. 10: Positioning Inner/Outer Dust Shield Caps
 Courtesy of GENERAL MOTORS CORP.

12. Using a soft-faced mallet, tap the dust shields into place on the joint.
13. Locate the ends of the boot into the boot groove on the dust shield cap and shaft, if removed.
14. Move the small end of the boot up the shaft to the joint in order to purge any air pressure in the boots and work out any dimples before applying new clamps.
15. Position a small clamp over the small end of the boot at the axle shaft shaft.
16. Using the Boot Clamp Tool (J 35566), crimps the clamp end. See **Fig. 15**.
17. Position the large clamp over the large end of the boot at the axle shaft shaft.
18. Using the Boot Clamp Tool (J 35566), crimps the clamp end. See **Fig. 15**.

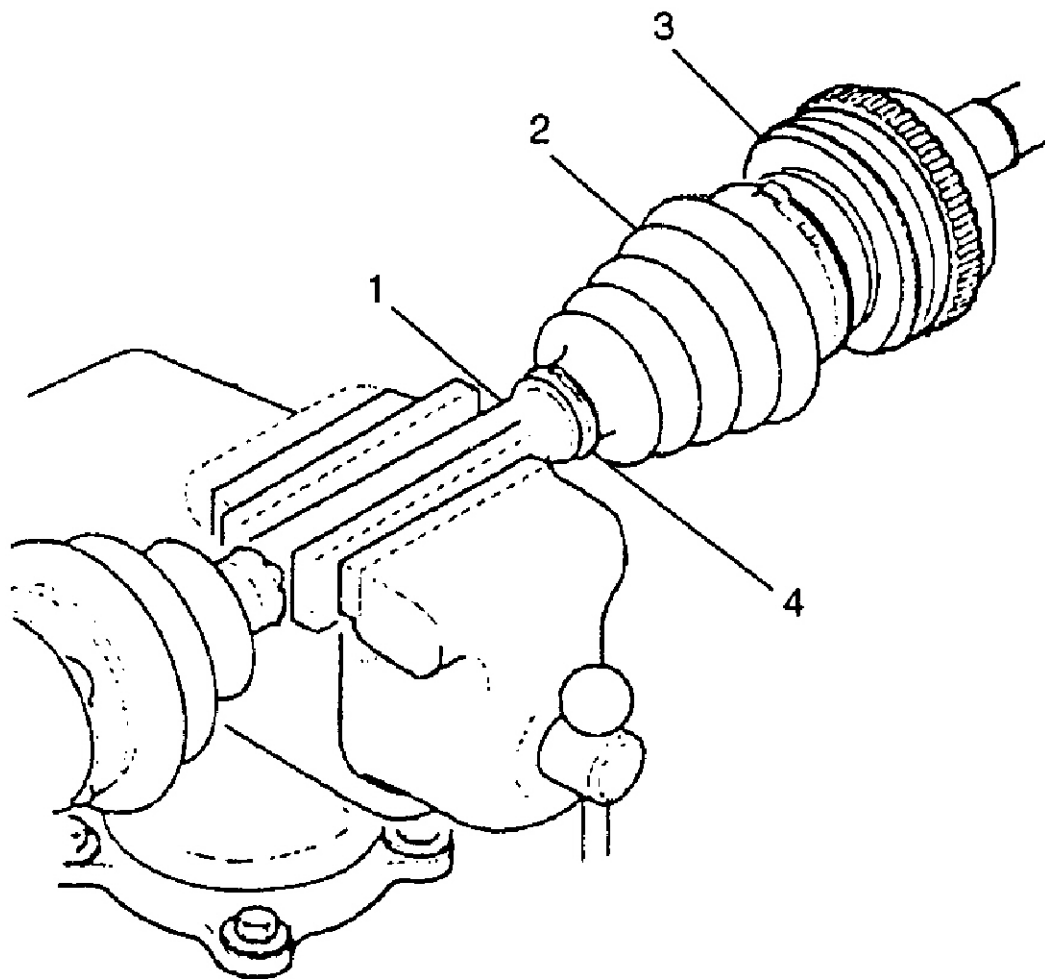
SAGINAW AXLE SHAFT (OUTER JOINT & BOOT)

NOTE: Numbers in parenthesis correspond with numbers in illustrations.

Disassembly

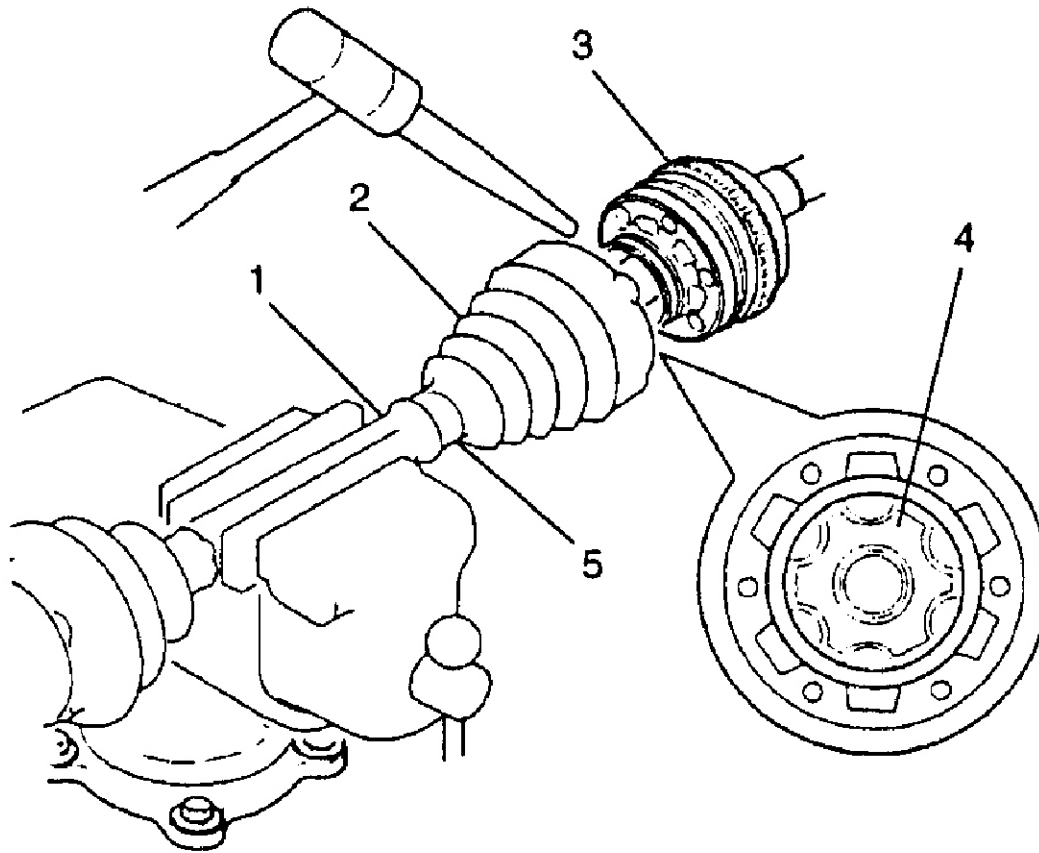
1. Clamp the axle shaft assembly into a vise which has brass inserts.
2. Remove the large boot retaining clamp from the outboard cross groove joint with a side cutter.
3. Discard the large boot retaining clamp.
4. Remove the small boot retaining clamp (4) from the axle shaft (1) with side cutter. See **Fig. 11**.

5. Discard the small boot retaining clamp (4). See **Fig. 11** .
6. Wipe grease from face of cross-groove outer race (3). See **Fig. 11** .



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Fig. 11: Disassembling Outer Joint & Boot (1 Of 2)
Courtesy of GENERAL MOTORS CORP.



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Fig. 12: Disassembling Outer Joint & Boot (2 Of 2)
 Courtesy of GENERAL MOTORS CORP.

7. Use a brass drift and a hammer to tap on the outer race of the cross-groove (3). This may take several taps before the cross-groove assembly (3) disconnects from the axle shaft (1). Take care not to damage the inner race (3). See **Fig. 12**.

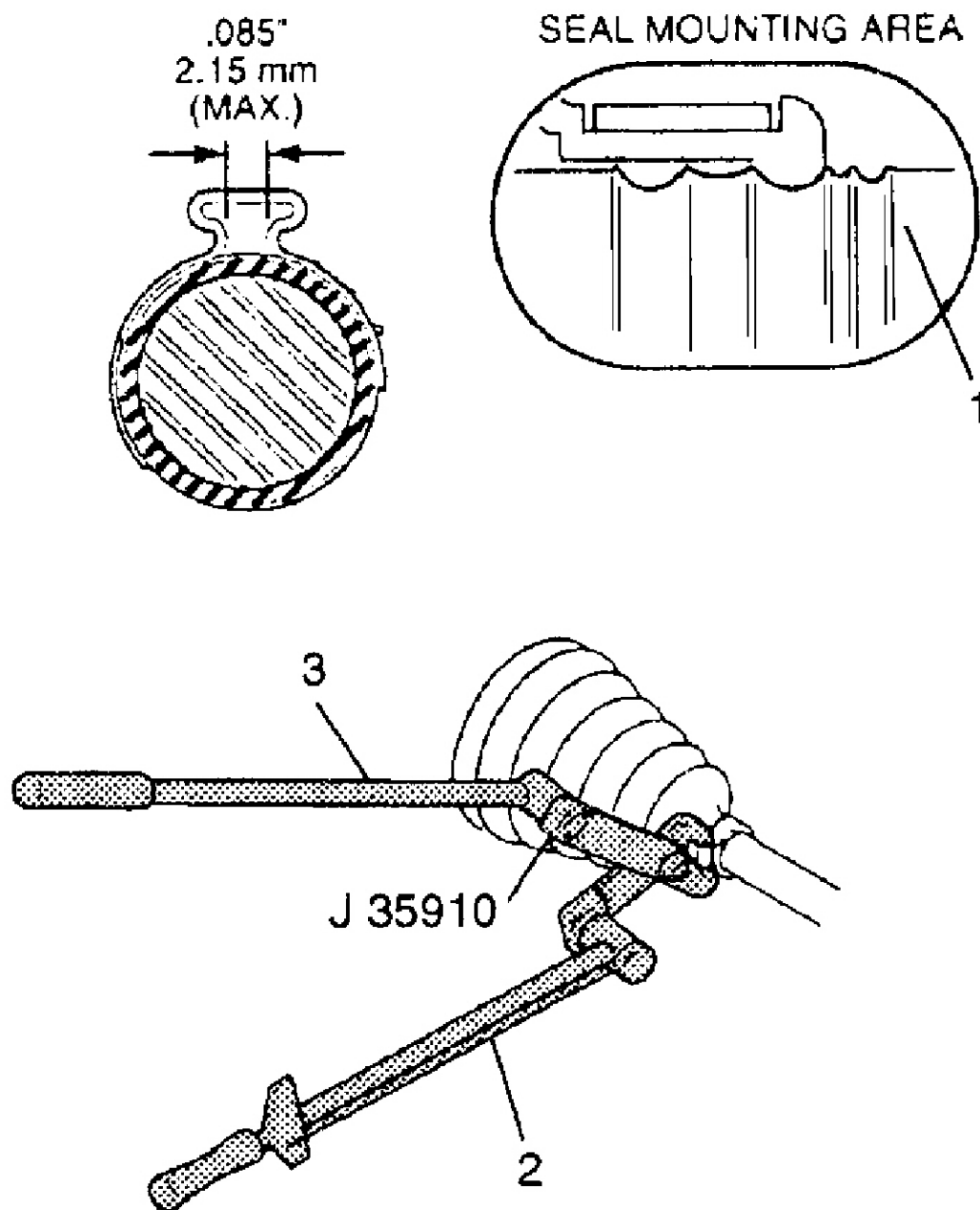
CAUTION: Never reuse the retaining ring (5). See Fig. 12 .

8. Remove the retaining ring (5) from the axle shaft shaft (1). See **Fig. 12**.
9. Discard the retaining ring (5). See **Fig. 12**.
10. Remove the old seal (2) from the axle shaft shaft (1). See **Fig. 12**.
11. Discard the old seal (2). See **Fig. 12**.
12. Check the inboard joint for any wear. Replace if necessary.

Reassembly

1. Pack the outboard cross groove joint with half the grease provided in the service kit.
2. Place new small boot retaining clamp on neck of boot. Do not crimp.
3. Position the new large boot retaining clamp around the joint boot.
4. Clean the axle shaft shaft. Use a wire brush to remove any rust in the boot mounting area (grooves).
5. Place the new retaining ring onto the axle shaft shaft.
6. While supporting the inboard assembly, place the axle shaft assembly onto the arbor press with the outboard cross groove assembly under the press head.
7. Lower the arbor press head onto the outboard cross groove assembly until the press cannot move any further.

8. Remove the axle shaft assembly from the arbor press.
9. Slide the boot back toward the outboard joint and place the neck of the joint boot into the boot groove on the axle shaft shaft.
10. Crimp the small retaining clamp by using J 35910 with a breaker bar (2) and torque wrench (1). Tighten to 136 N.m (100 ft. lbs.). See **Fig. 13**.



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Fig. 13: Crimping Small Retaining Clamp
 Courtesy of GENERAL MOTORS CORP.

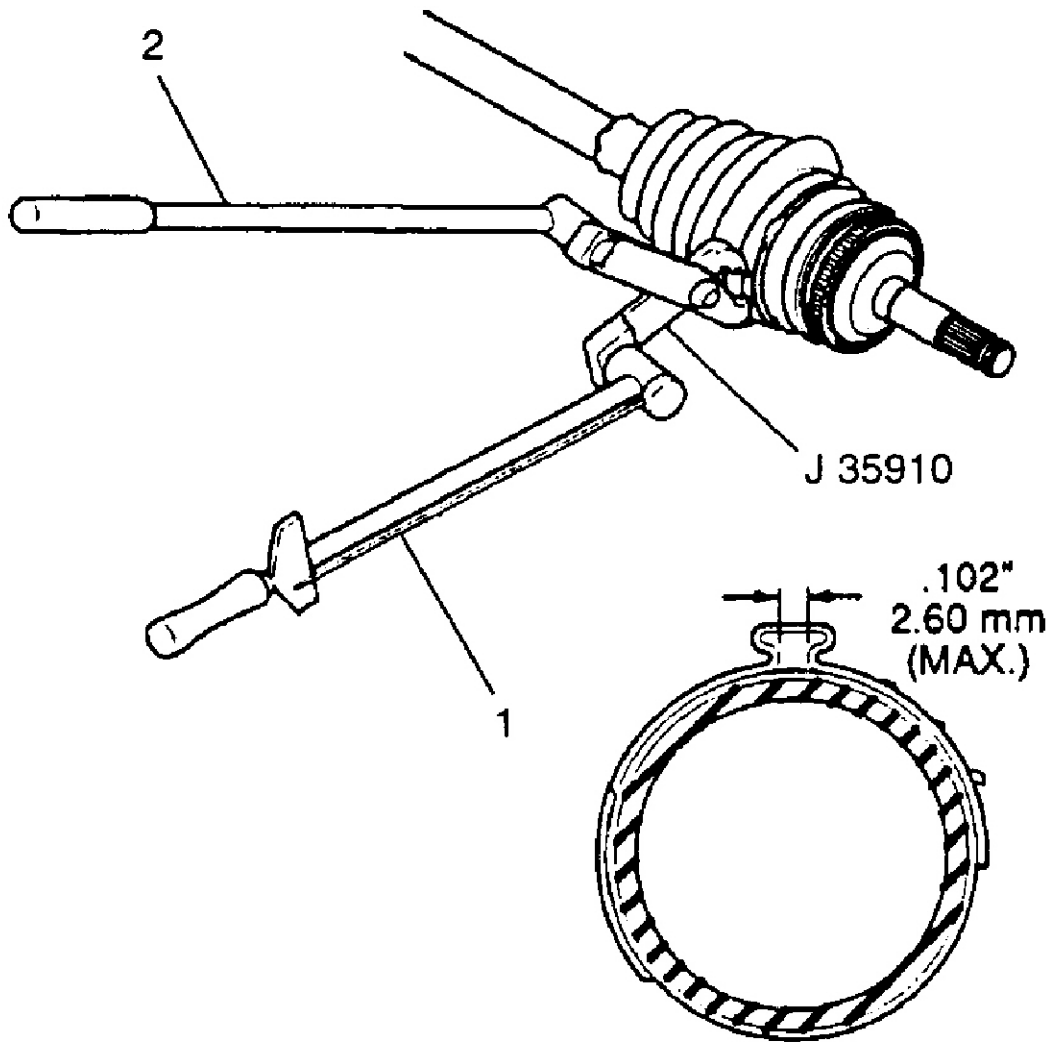
11. Place the remaining grease into the outboard boot.

CAUTION: The boot must not be dimpled, stretched or out of shape in any way. If the boot is not shaped correctly, equalize pressure on the boot properly by hand.

12. Slide large diameter of the boot with the large boot retaining clamp in place over the lip of the inboard joint

housing.

13. Crimp the large boot retaining clamp by using J 35910 with a breaker bar (2) and torque wrench (1). Tighten to 176 N.m (130 ft. lbs.). See **Fig. 14** .



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Fig. 14: Crimping Large Boot Retaining Clamp
 Courtesy of GENERAL MOTORS CORP.

TORQUE SPECIFICATIONS

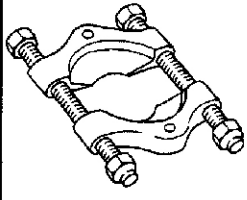
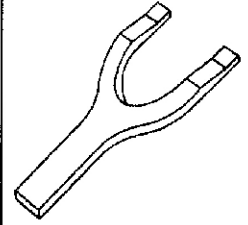
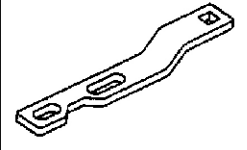
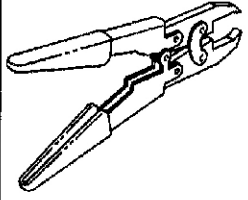
TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Axle Shaft Flange Bolts	
Step 1	37 (50)
Step 2	Turn Additional 67 Degrees
Wheel Lug Nuts	80 (110)

SPECIAL TOOLS

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Illustration	Tool Number/ Description	Illustration	Tool Number/ Description
	J 22912-01 Universal Bearing Puller		J 42071 Drive Axle Separator
	J 42066 Wheel Hub Flange Holding Adapter		J 35566 Boot Clamp Tool

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Fig. 15: Identifying Special Tools
Courtesy of GENERAL MOTORS CORP.

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