

FINAL DRIVE

TORONADO (94 AND 96 SERIES)

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FINAL DRIVE

PERIODIC MAINTENANCE

Check lubricant level at each engine oil change period. Maintain lubricant level to filler plug hole in cover. Use only Gear Lubricant, Part No. 1050015 or equivalent.

Always clean dirt or foreign material from around plug opening before removing filler plug.

Periodic or seasonal changes are not recommended.

GENERAL DESCRIPTION (Fig. 3EC-1)

The final drive assembly, mounted and splined directly to the automatic transmission, consists of a pinion drive gear, a ring gear and a planetary gear train.

The planetary gear train consists of a planet pinion carrier with three pair of planet pinions, a sun gear and an internal gear and performs the same function as the side gears and pinion gears in a conventional differential.

Torque from the final drive is transmitted to a right and left output shaft which connect to drive axles. The right output shaft is splined to the sun gear while the left output shaft is splined to the planet pinion carrier.

OPERATION

With the car traveling straight ahead and with equal traction on both driving wheels, the ring gear and the planetary gear set rotate in the same direction and at the same speed. The planetary gears are not moving.

When the left wheel starts to turn faster than the right wheel, Fig. 3EC-2, torque from the transmission is transmitted to the drive pinion, then to the ring gear which is bolted to the case. The case contains an integral internal gear which drives the three outer pinions which are in mesh with and drive the three inner pinions. The three inner pinions being in mesh with the sun gear attempt to turn the sun gear at the same speed as the left wheel, but are prevented from doing so due to the friction between the right tire and the ground. This forces the planet pinions to walk around the sun gear, allowing the left wheel to rotate faster than the right wheel.

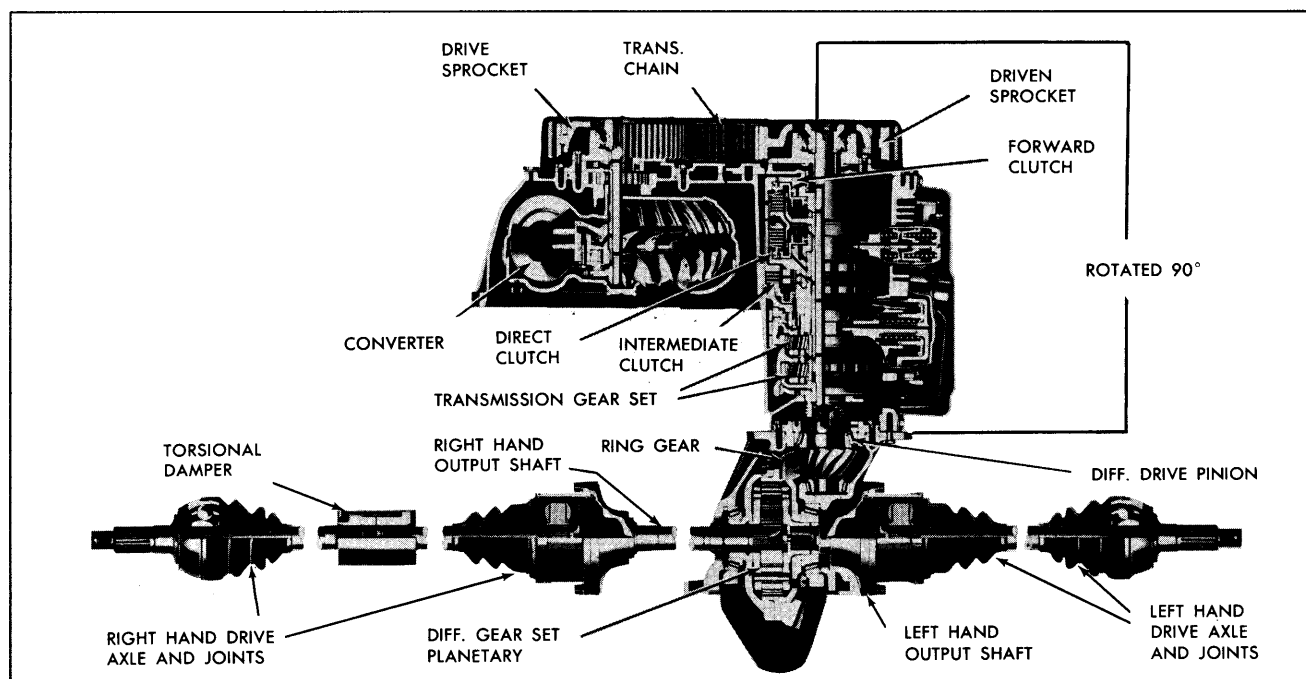


Fig. 3EC-1 Power Train Components

When the right wheel starts to turn faster than the left wheel, Fig. 3EC-3, torque from the transmission is transmitted to the drive pinion, then to the ring gear, which is bolted to the case. The case contains an integral internal gear which drives the three outer pinions which are in mesh with and drive the three inner pinions. The three

inner pinions being in mesh with the sun gear turn the sun gear at wheel speed. The planet pinion carrier is prevented from turning at right wheel speed, due to friction between the left tire and the ground. With the left wheel turning slower than the right wheel the planet pinion carrier walks around the internal gear.

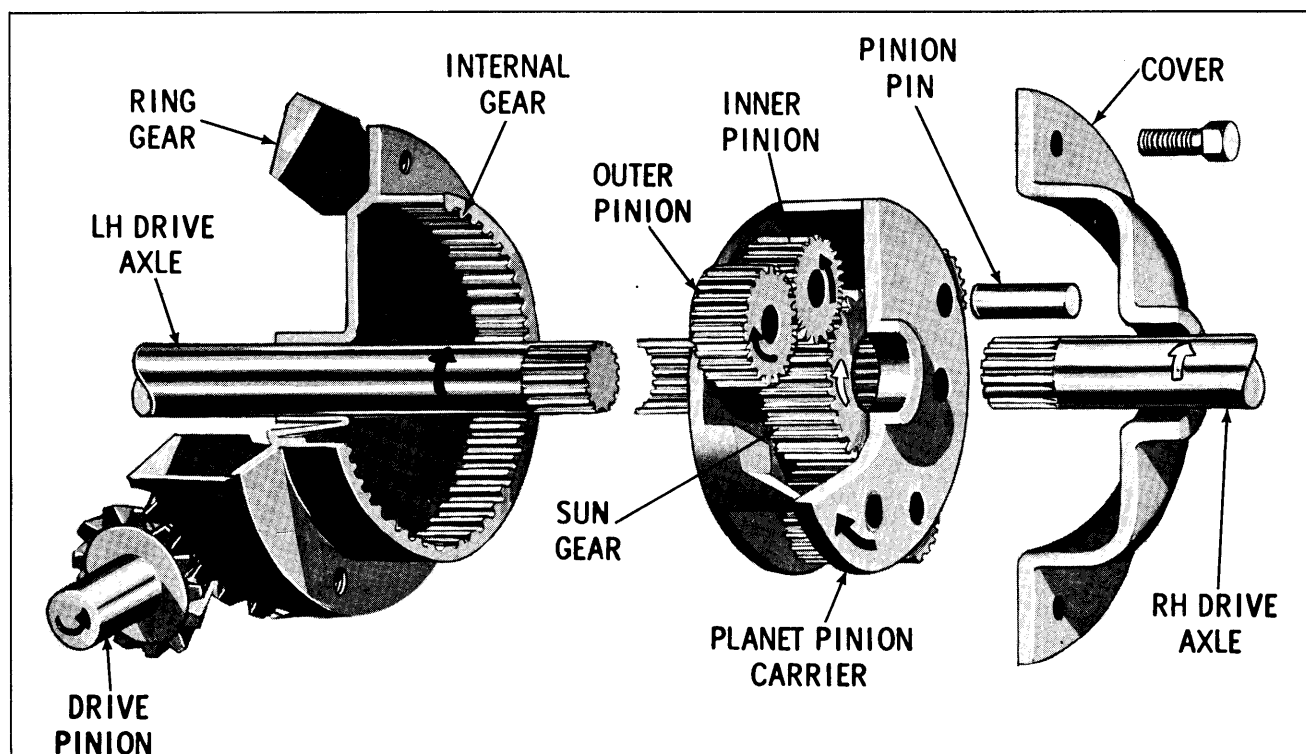


Fig. 3EC-2 Gear Train - Left Wheel Turning Faster Than Right Wheel

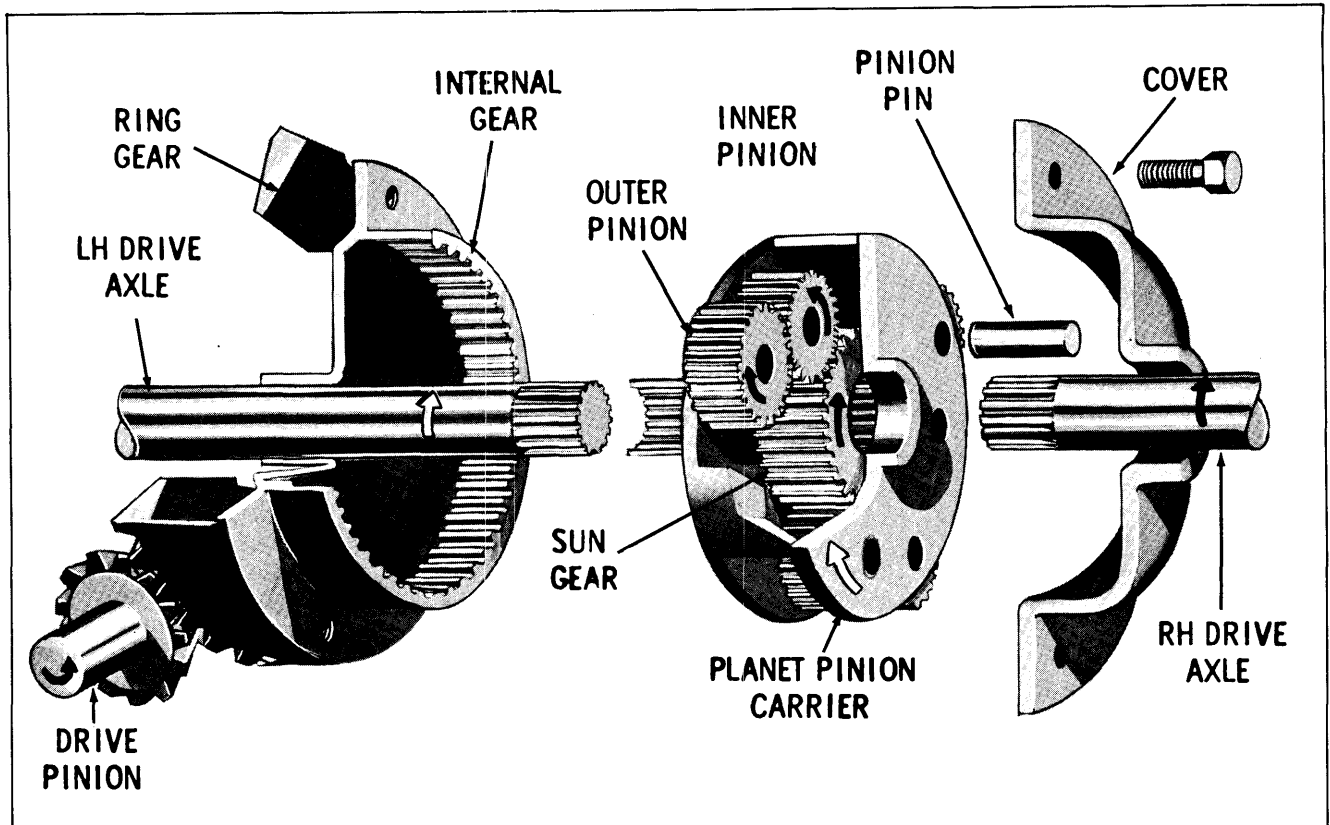


Fig. 3EC-3 Gear Train - Right Wheel Turning Faster Than Left Wheel

OUTPUT SHAFTS AND SEALS

RH OUTPUT SHAFT, BEARING AND SEAL

Removal

1. Disconnect battery.
2. Hoist car.
3. Remove engine oil filter element.
4. Remove attaching bolts, R.H. drive axle to R.H. output shaft. Then move drive axle rearward until free from output shaft.
5. Disconnect support from engine and brace. (Fig. 3EC-4)
6. Remove output shaft assembly.
7. If output shaft seal is to be replaced, install Seal Remover J-943 into seal and drive seal out with a hammer. (Fig. 3EC-5)
8. If output shaft bearing is to be replaced, it can be removed with a press as shown in Fig. 3EC-6.

Install

1. If output shaft bearing was removed, assemble parts as shown in Fig. 3EC-7.

2. Position assembly in a press and install bearing until seated as shown in Fig. 3EC-8.
3. Pack area between bearing and retainer with wheel bearing grease, then install slinger as shown in Fig. 3EC-9.
4. If output shaft seal was removed, new seal can be installed as shown in Fig. 3EC-10.
5. Apply Special Seal Lubricant Part No. 1050169 to output shaft seal, then install output shaft into final drive indexing splines of output shaft with final drive.

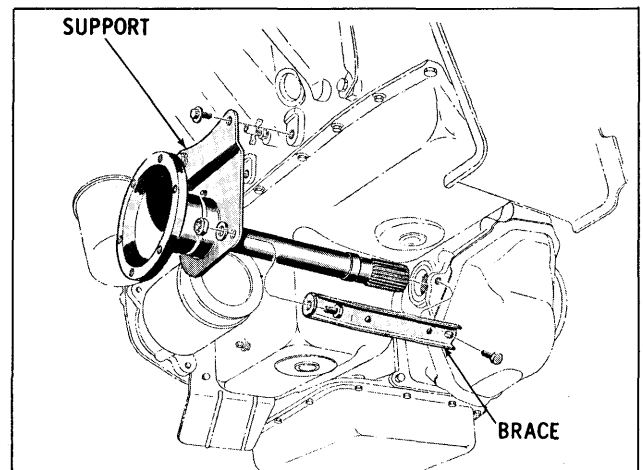


Fig. 3EC-4 R.H. Output Shaft Removal

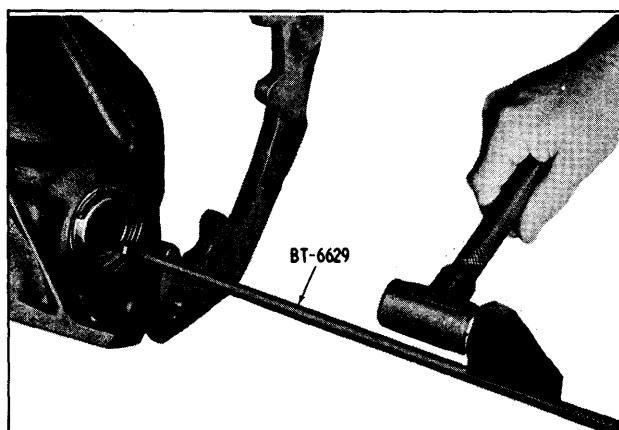


Fig. 3EC-5 Removing R.H. Output Shaft Seal

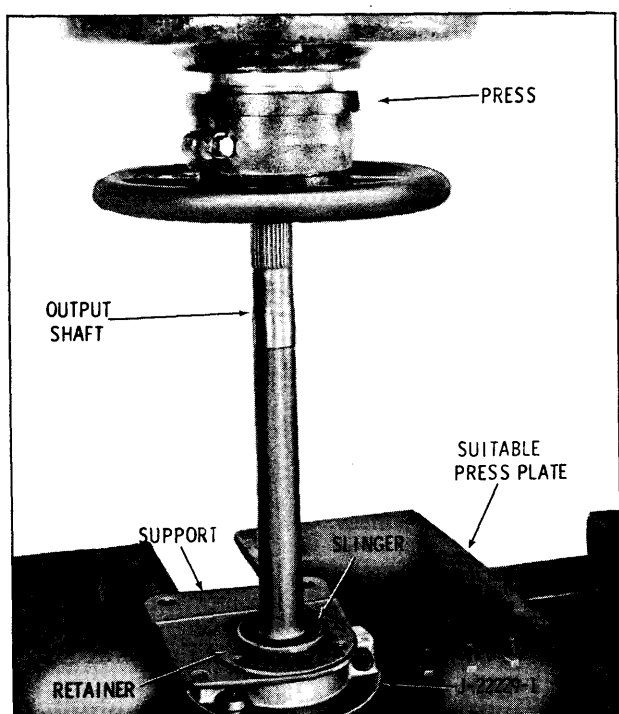


Fig. 3EC-6 Removing R.H. Output Shaft Bearing

6. Install support to engine and brace. (Fig. 3EC-4)
7. Move drive axle forward until alignment with output shaft is obtained. Install attaching bolts. Torque to 65 ft. lbs.
8. Install engine oil filter element.
9. Connect battery.
10. Check engine oil level and final drive oil level and check for oil leaks.

LH OUTPUT SHAFT AND SEAL

Removal

1. Remove L.H. drive axle. Refer to Section

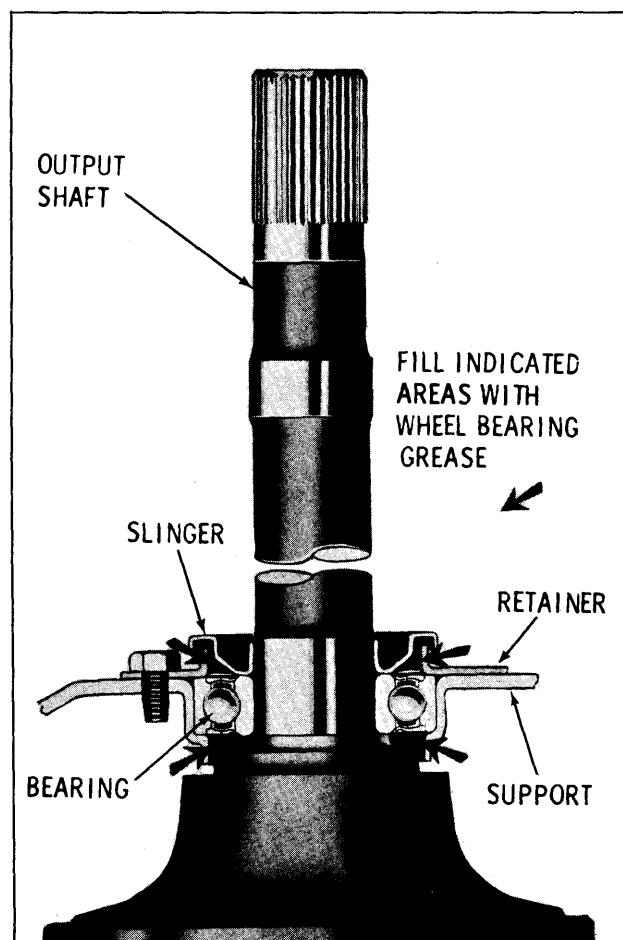


Fig. 3EC-7 R.H. Output Shaft Assembly

3EB, DRIVE AXLE ASSEMBLY (LEFT HAND), Steps 1 through 15 under REMOVAL.

2. Remove R.H. output shaft. Refer to Section 3EC, R.H. OUTPUT SHAFT, BEARING AND SEAL. Follow Steps 3 through 6 under REMOVE.
3. Using a 9/16" socket remove LH output shaft retaining bolt and remove LH output shaft. (Fig. 3EC-11)
4. If output shaft seal is to be replaced, insert Tool J-943 into seal and drive out with a hammer. (Fig. 3EC-12)

Install

1. If output shaft seal was removed, install new seal as shown in Fig. 3EC-13.
2. Apply Special Seal Lubricant Part No. 1050169 to the seal; then, insert output shaft into final drive assembly, indexing splines of output shaft with splines in final drive.
3. Install LH output shaft retaining bolt and torque to 45 ft. lbs. (Fig. 3EC-11)
4. Install RH output shaft as outlined under RH

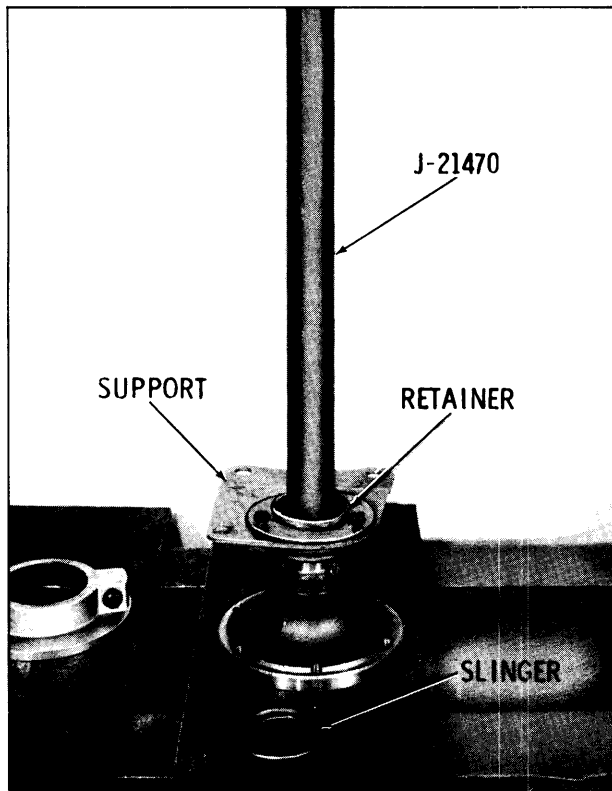


Fig. 3EC-8 Installing R.H. Output Shaft Bearing

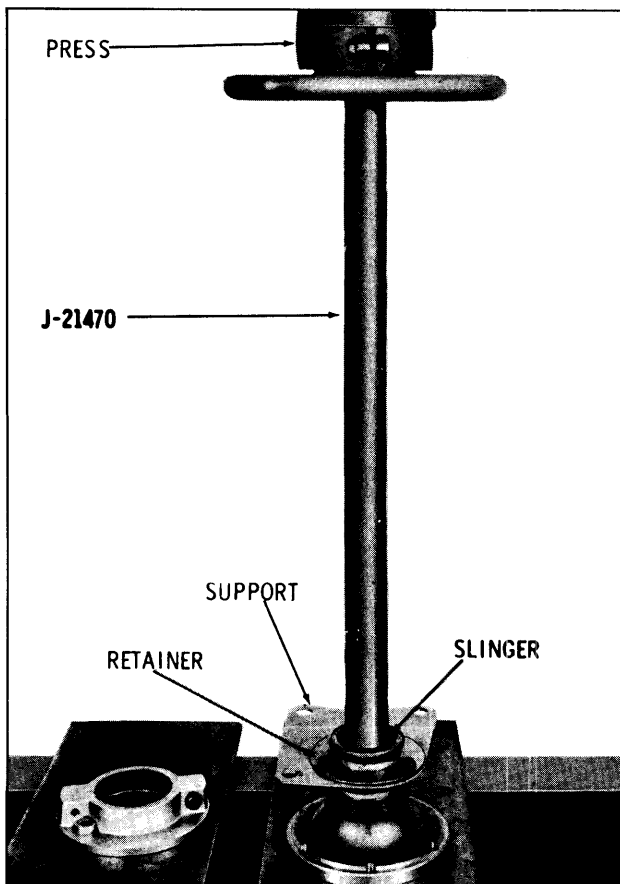


Fig. 3EC-9 Installing Slinger

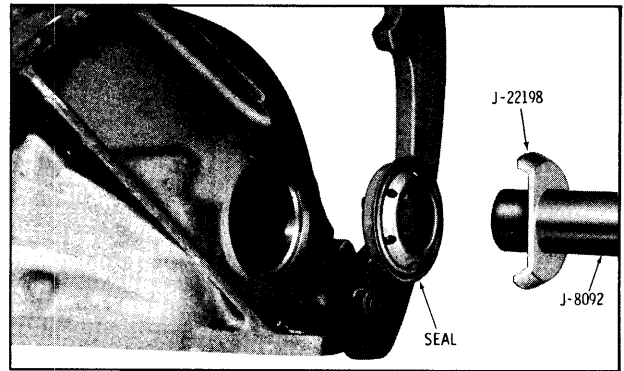


Fig. 3EC-10 Installing R.H. Output Shaft Seal

OUTPUT SHAFT, BEARING AND SEAL, Steps 5 through 8 under Install.

5. Install L.H. drive axle. Refer to Section 3EB, DRIVE AXLE ASSEMBLY (LEFT HAND), Steps 1 through 10 under INSTALLATION.

TRANSMISSION FILLER TUBE

Removal and Installation

The automatic transmission filler tube is located on the final drive. The filler tube can be removed by removing bolt "A", Fig. 3EC-11 and then pulling the filler tube out of the housing. To install, position a new "O" ring seal on the filler tube. Coat seal with Special Seal Lubricant Part No. 1050169 and install filler tube into housing. Install bolt "A" and torque to 25 ft. lbs.

FINAL DRIVE

Removal

1. Disconnect battery.
2. Remove bolts "A", "B", and "C" and nut "D". Nut "D" must be removed with a special wrench, such as MAC S-147. (Fig. 3EC-11)

NOTE: It may be necessary to remove the transmission filler tube to obtain clearance.

3. Hoist car. If a two post hoist is used, the car must be supported with floor stands at the front frame rails and the front post lowered.
4. Disconnect right and left drive axles from the output shafts.
5. Remove engine oil filter element.
6. Disconnect brace from final drive, then disconnect RH output shaft support from engine. (Fig. 3EC-3)
7. Move R.H. drive axle rearward until R.H. output shaft can be removed from final drive.
8. Remove bolt "X" and loosen bolts "Y" and "Z". (Fig. 3EC-14)

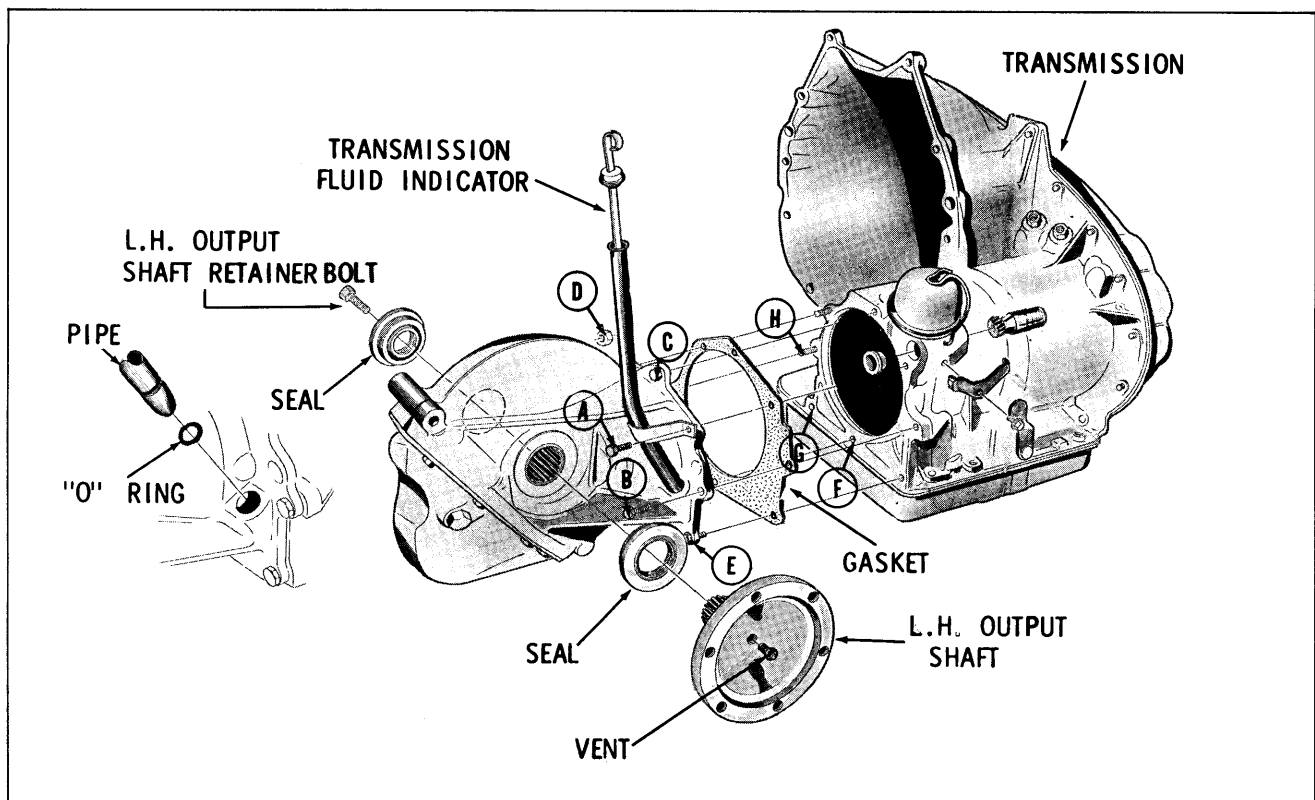


Fig. 3EC-11 Final Drive Attachment

9. Remove final drive cover and allow lubricant to drain.
10. Position transmission lift with adapter for final drive as shown in Fig. 3EC-15. Install an anchor bolt through final drive housing and lift pad.
11. Remove bolts "E", "F", and "G" and nut "H". (Fig. 3EC-11)
12. Move transmission lift toward front of car to disengage final drive splines from transmission.

NOTE: As the final drive is disengaged from transmission, some transmission fluid will be lost. Provide a container to prevent oil from running on floor.

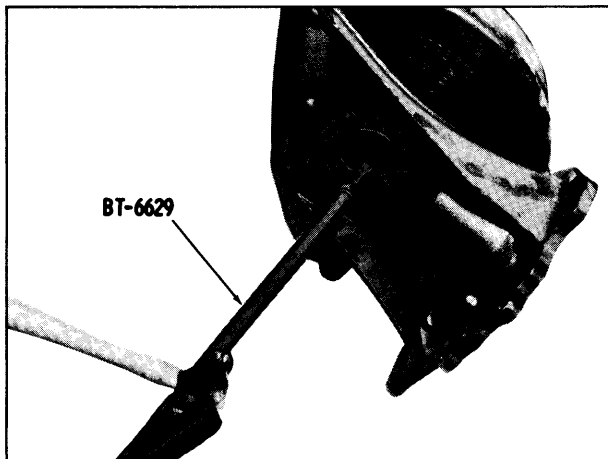


Fig. 3EC-12 Removing L.H. Output Shaft Seal

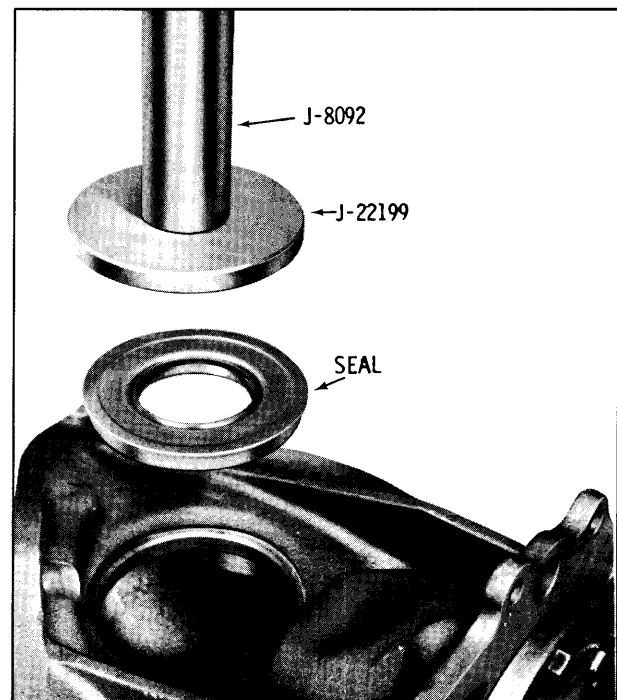


Fig. 3EC-13 Installing L.H. Output Shaft Seal

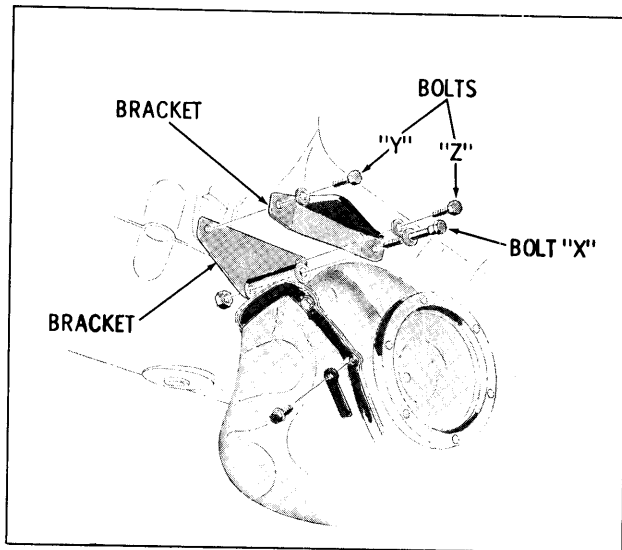


Fig. 3EC-14 Disconnecting Final Drive From Engine

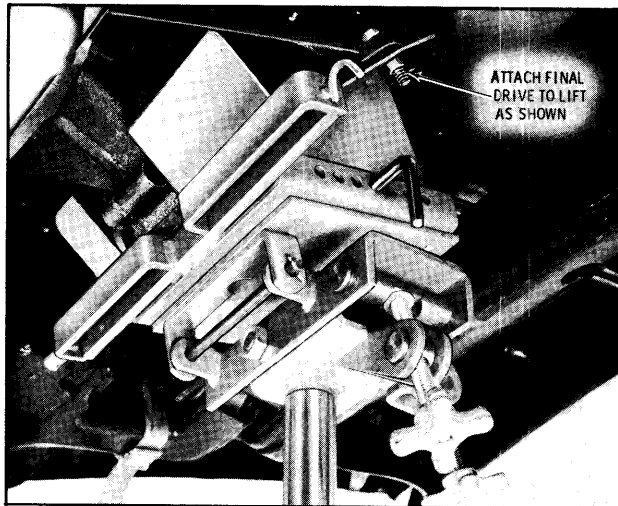


Fig. 3EC-15 Connecting Lift to Final Drive

13. Lower transmission lift and remove final drive from lift.
14. Using a 9/16" socket remove the left output shaft retainer bolt, then pull output shaft from final drive. (Fig. 3EC-11)
15. Remove transmission to final drive gasket.

Install

1. Apply Special Seal Lubricant Part No. 1050169 to both output shaft seals.
2. Install the left output shaft into the final drive. Retain with bolt. Torque bolt to 45 ft. lbs. (Fig. 3EC-11)
3. Position final drive on transmission lift and install an anchor bolt through housing and lift pad. (Fig. 3EC-15)
4. Apply a thin film of Special Seal Lubricant Part No. 1050169 on the transmission side of

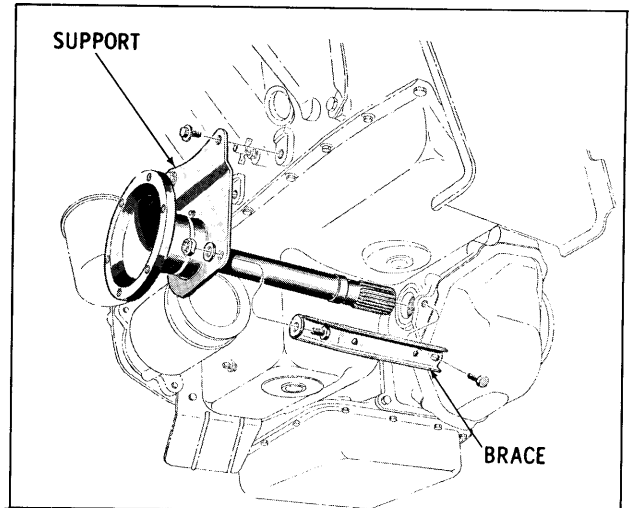


Fig. 3EC-16 R.H. Output Shaft Installation

a new final drive to transmission gasket, then position gasket on transmission.

5. Raise transmission lift. Align the two bolt studs "D" and "H" on the transmission with their mating holes in the final drive. Move final drive until it mates with the transmission.

NOTE: It may be necessary to rotate the left output shaft so that the splines on the final drive pinion engage the splines of the transmission output shaft. Do not allow gasket to become mispositioned while engaging splines.

6. Install bolts "E", "F" and "G" and nut "H" finger tight. (Fig. 3EC-11)
7. Install bolt "X" and torque to 75 ft. lbs. Tighten and torque bolts "Y" and "Z" to 50 ft. lbs. (Fig. 3EC-14)
8. Loosen and remove lift from final drive.
9. Position a new cover gasket on the final drive, then install cover. Torque cover bolts to 30 ft. lbs.
10. Install right output shaft into final drive indexing splines of output shaft with splines of final drive. Install support and brace bolts. Torque as outlined in Fig. 3EC-16.
11. Connect drive axles to output shafts. Torque to 65 ft. lbs.
12. Install engine oil filter element.
13. Raise hoist, remove floor stands and lower car.
14. If filler tube was removed, install a new "O" ring and install filler tube.
15. Install bolts "A", "B", and "C" and nut "D". (Fig. 3EC-11) Torque all final drive to transmission bolts to 25 ft. lbs. Torque nuts to an approximate 25 ft. lbs.

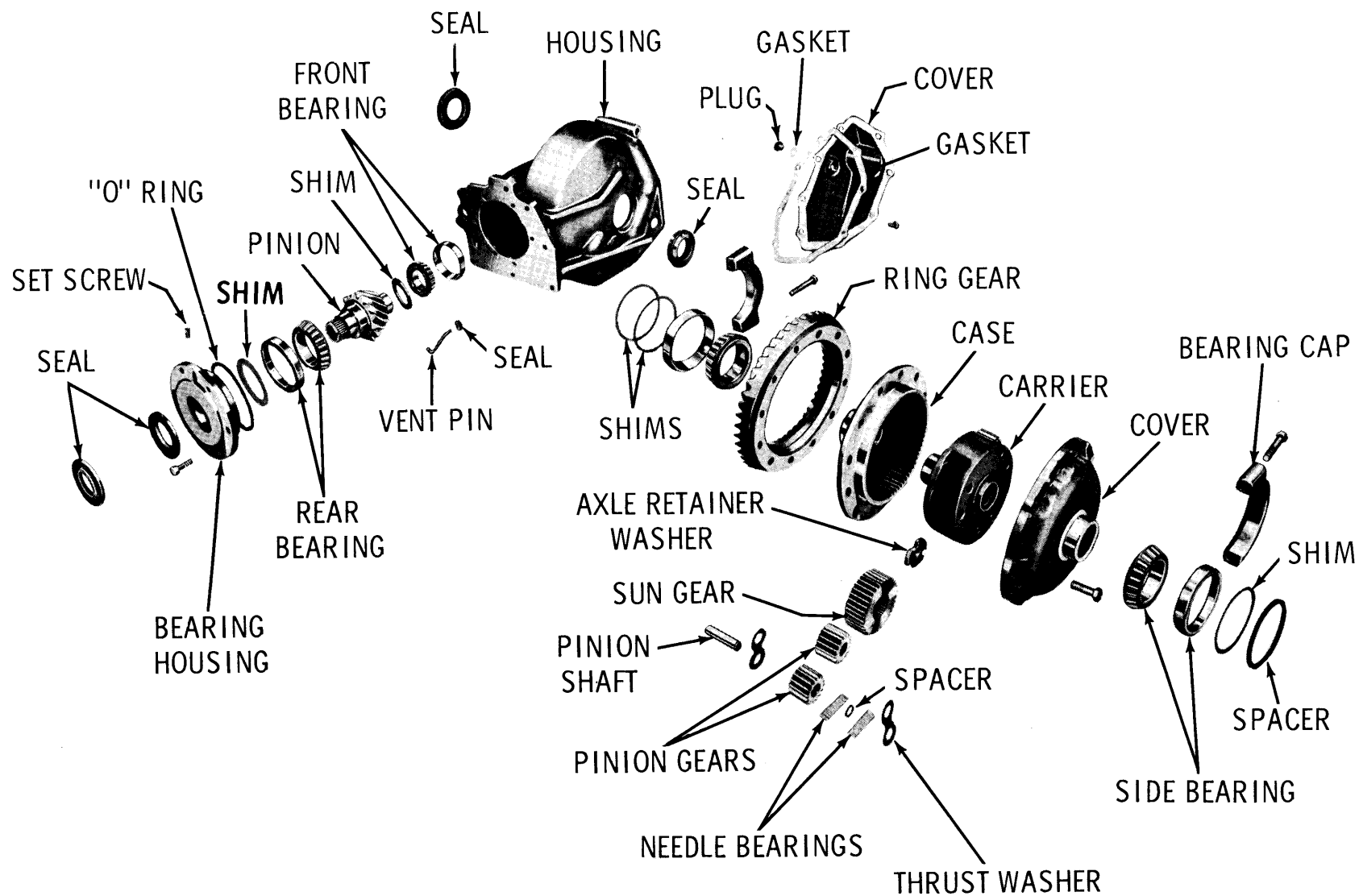


Fig. 3EC-17 Final Drive Assembly

16. Connect battery.
17. Fill final drive with 4-1/2 pints of Lubricant Part No. 1050015.
18. Check engine oil level, start engine and check transmission fluid level. Add fluid as necessary.
19. Check for any oil leaks.

FINAL DRIVE (Fig. 3EC-17)

Disassembly

1. Install adapter J-22296-1 on Differential Holding Fixture J-3289. Differential Holding Fixture must be modified to obtain clearance between fixture and final drive housing. Mount final drive in holding fixture as shown in Fig. 3EC-18.
2. Rotate differential case several times to seat bearings, then mount dial indicator as shown in Fig. 3EC-19. Use a small button on the indicator stem so that contact can be made near heel end of tooth. Set dial indicator so that stem is in line as nearly as possible with gear rotation and perpendicular to tooth angle for accurate backlash reading.
3. Check backlash at three or four points around ring gear. Lash must not vary over .002" around ring gear.

NOTE: Pinion must be held stationary when checking backlash. If variation is over .002" check for burrs, uneven bolting conditions or distorted case cover and make corrections as necessary.

NOTE: Bearing caps are of different size and can only be installed in one position.

5. Install Spreader J-22196 on final drive, indexing the two guides on the Spreader with the two holes on the carrier. (Fig. 3EC-21)
6. Turn the Spreader screw to expand Spreader until the spacer and shim(s) can be removed from between the small side bearing and the carrier. Retain spacers and shims for re-assembly.

NOTE: Spread carrier only enough to relieve tension on the spacer and shims. The shims may be removed with Tool J-22608 as shown in Figs. 3EC-19A and B.

7. Remove spreader from carrier.
8. Remove the spacer and shims, then slide the case assembly to the left, away from the pinion gear. Remove case assembly from carrier.
9. Rotate carrier so that the pinion is up. Check pinion bearing pre-load as shown in Fig. 3EC-20A. Record the pinion bearing pre-load.

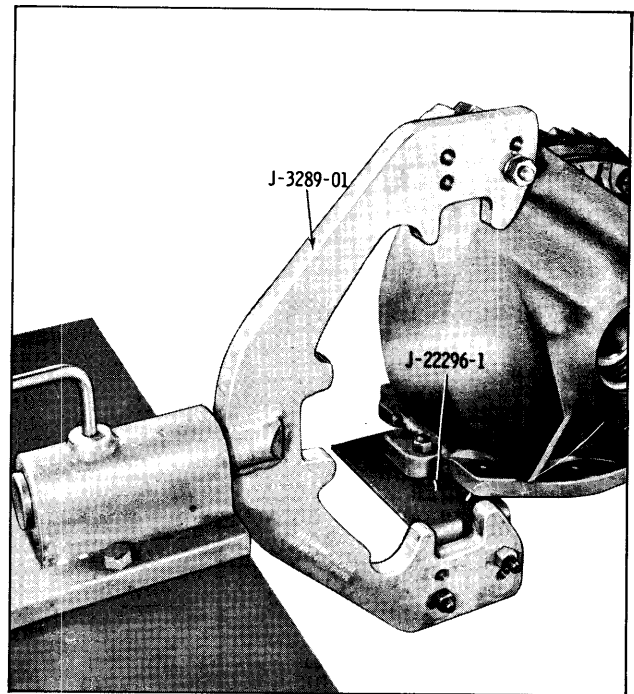


Fig. 3EC-18 Final Drive In Holding Fixture

10. Remove the bearing housing bolts. Remove the drive pinion and housing as shown in Fig. 3EC-22. Remove housing from drive pinion. Remove O ring seal from bearing housing.
11. Remove O ring seal and vent wire from housing. (Fig. 3EC-23)
12. Install Tool J-22201 on Slide Hammer J-2619. Position Tool J-22201 as shown in Fig. 3EC-24 and tighten screw. Remove pinion front outer race.
13. Remove the output shaft oil seals as shown in Fig. 3EC-25 and 3EC-26.
14. Remove the two oil seals from the pinion bearing housing as shown in Fig. 3EC-27.

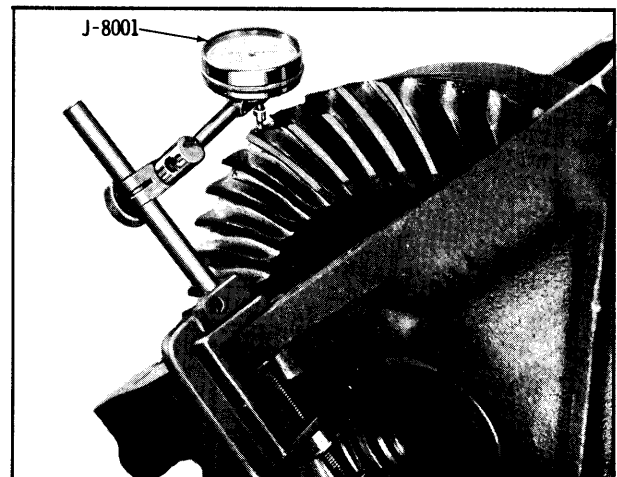


Fig. 3EC-19 Checking Ring Gear to Pinion Backlash

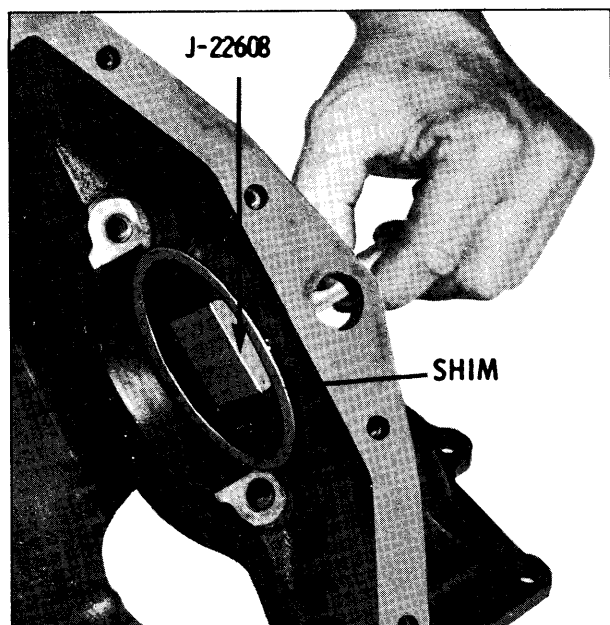


Fig. 3EC-19A Removing Shims

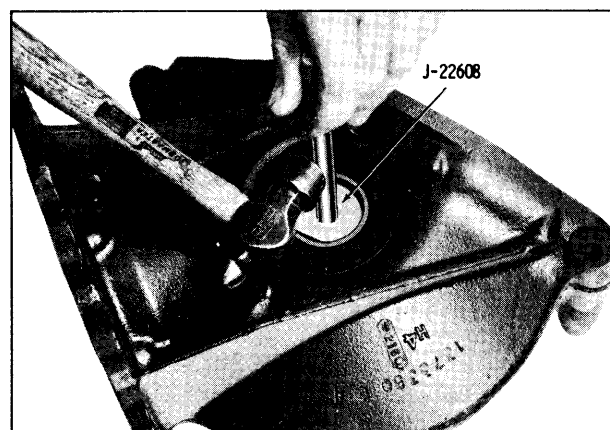


Fig. 3EC-19B Positioning of Tool J-22608

15. If necessary to remove the pinion rear outer race, it can be removed and installed as shown in Fig. 3EC-28.

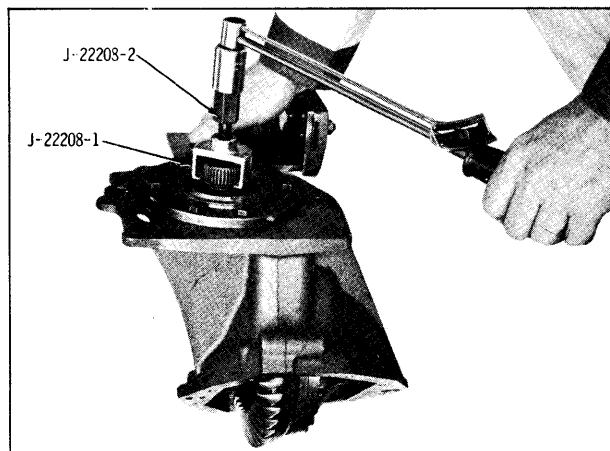


Fig. 3EC-20 Checking Pinion and Side Bearing Pre-Load

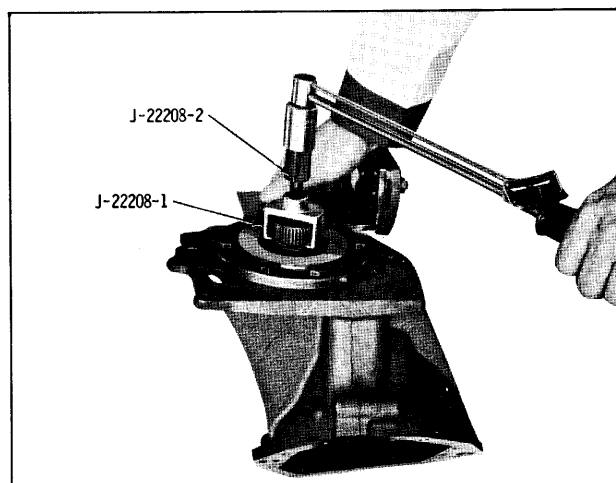


Fig. 3EC-20A Checking Pinion Pre-Load

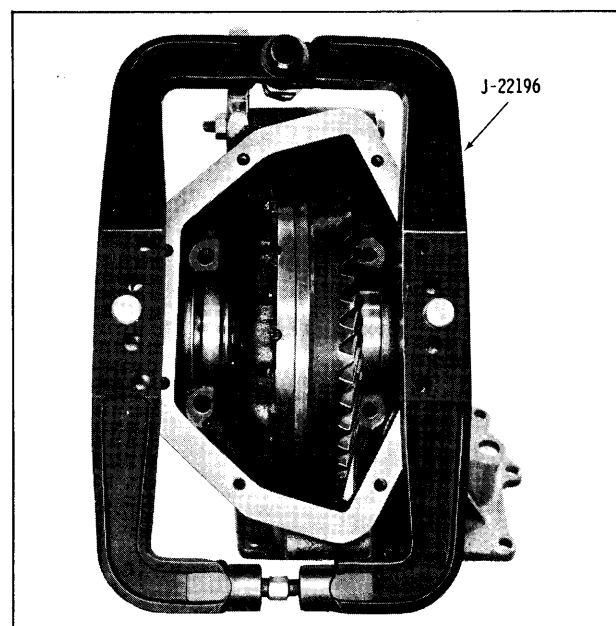


Fig. 3EC-21 Spreading Carrier Housing

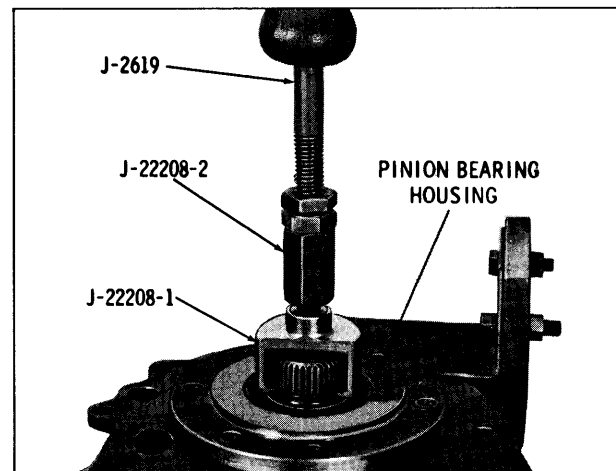


Fig. 3EC-22 Removing Pinion and Bearing Housing

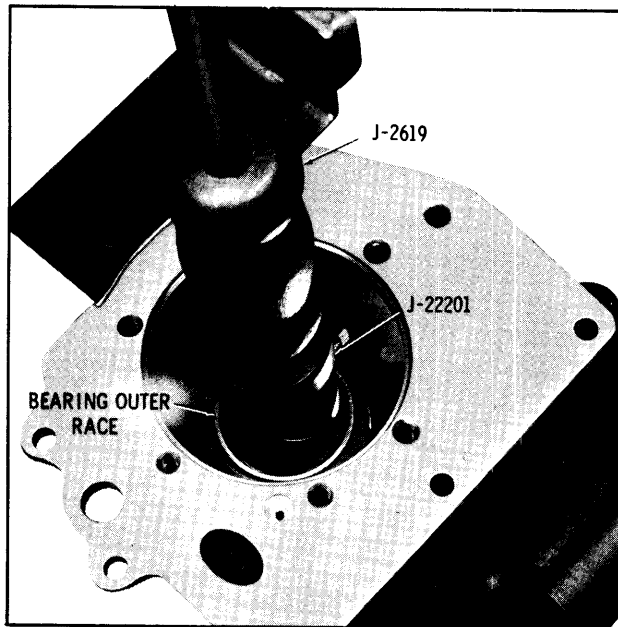


Fig. 3EC-23 O'Ring Seal and Vent Pin

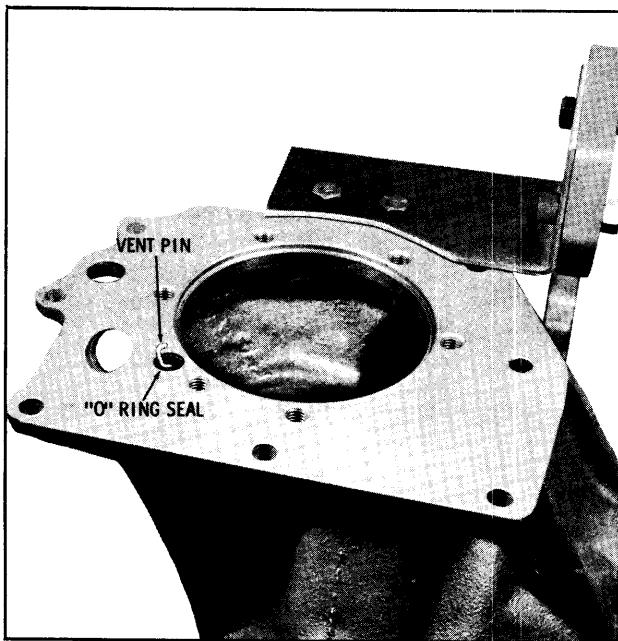


Fig. 3EC-24 Removing Pinion Front Bearing Outer Race

PINION BEARINGS

Removal

1. Remove the pinion front bearing and selective shim as shown in Fig. 3EC-29. Bearing can be removed without Tool J-8433-1 if a press is available.
2. Remove the pinion rear bearing as shown in Fig. 3EC-30.

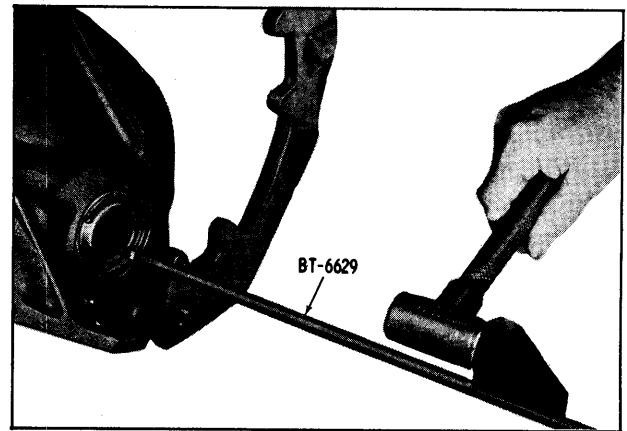


Fig. 3EC-25 Removing R.H. Output Shaft Seal

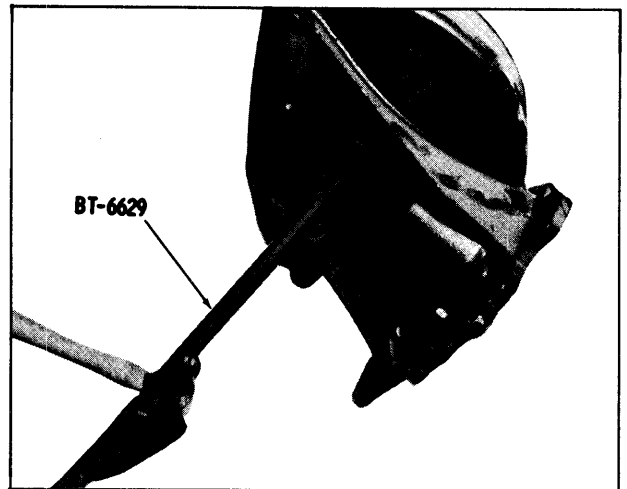


Fig. 3EC-26 Removing L.H. Output Shaft Seal

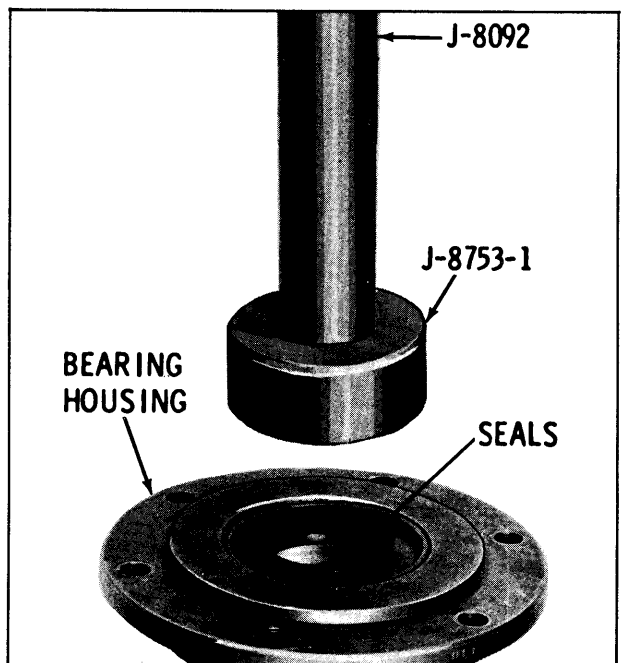


Fig. 3EC-27 Removing Oil Seals From Pinion Bearing Housing

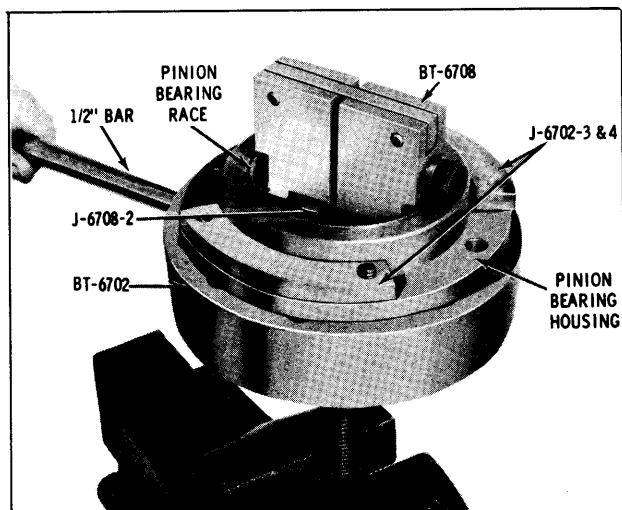


Fig. 3EC-28 Removing Pinion Rear Bearing Outer Race

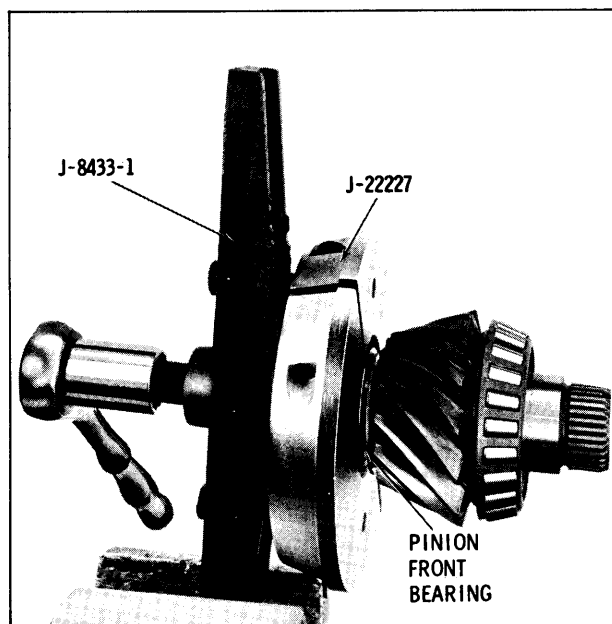


Fig. 3EC-29 Removing Pinion Front Bearing

FINAL DRIVE CASE

Disassembly

1. If the side bearings are to be removed, they can be removed as shown in Fig. 3EC-31 and 3EC-32.
2. Mark ring gear, case and the case cover, then remove all but two of the cover to ring gear bolts. Leave two of the bolts, 180° apart, loose.
3. Position case as shown in Fig. 3EC-33 and tap lightly on a bench to separate the case halves. Remove planet pinion carrier.
4. Remove the two remaining ring gear bolts and separate ring gear from case.

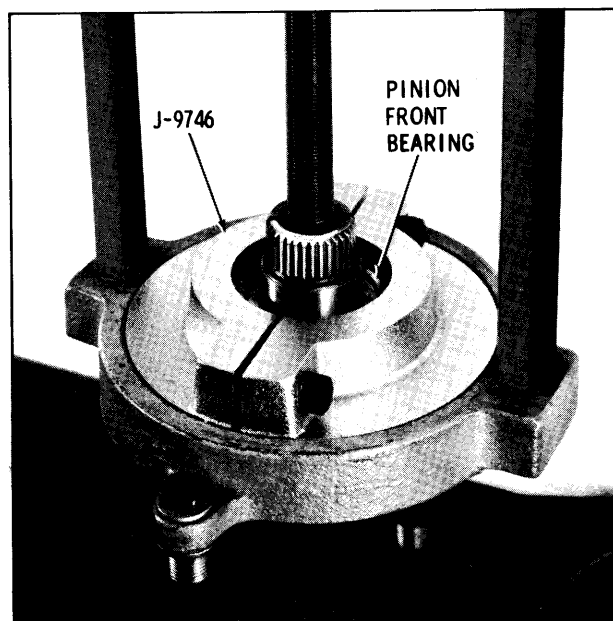


Fig. 3EC-30 Removing Pinion Rear Bearing

CLEANING AND INSPECTION

1. Clean all bearings thoroughly in clean solvent (do not use a brush). Examine bearings visually and by feel. All bearings should feel smooth when oiled and rotated while applying as much hand pressure as possible.

NOTE: Minute scratches and pits that appear on rollers and races at low mileage are due to the initial pre-load, and bearings having these marks should not be rejected.

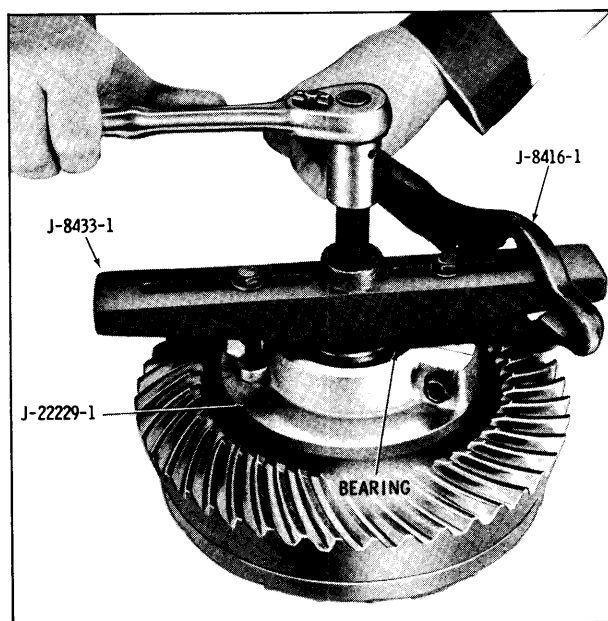


Fig. 3EC-31 Removing Left Side Bearing

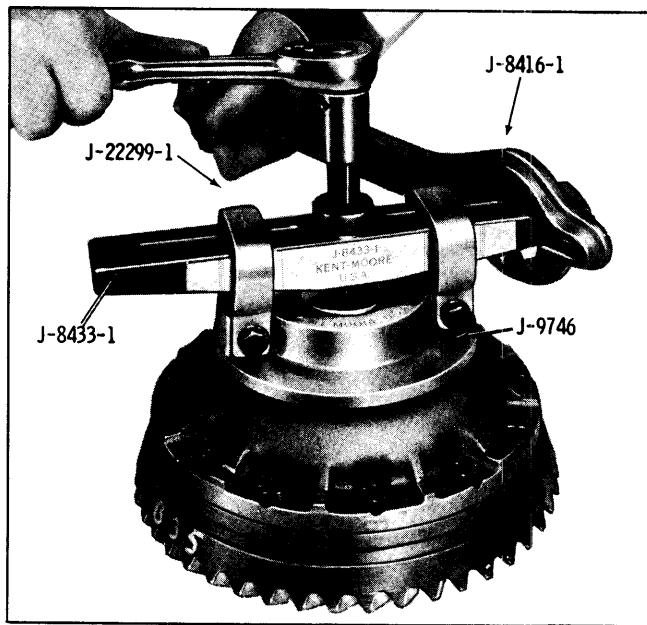


Fig. 3EC-32 Removing Right Side Bearing

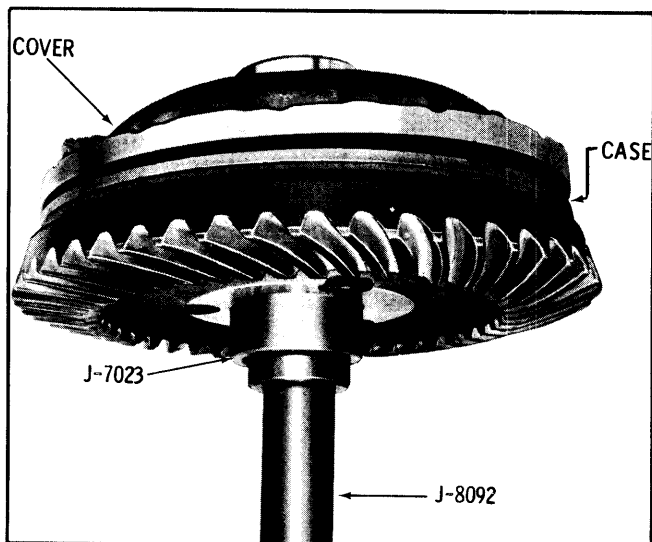


Fig. 3EC-33 Separating Case Halves

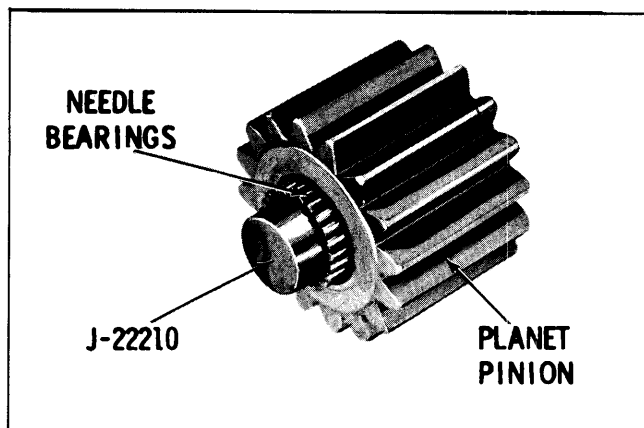


Fig. 3EC-34 Installing Needle Bearings

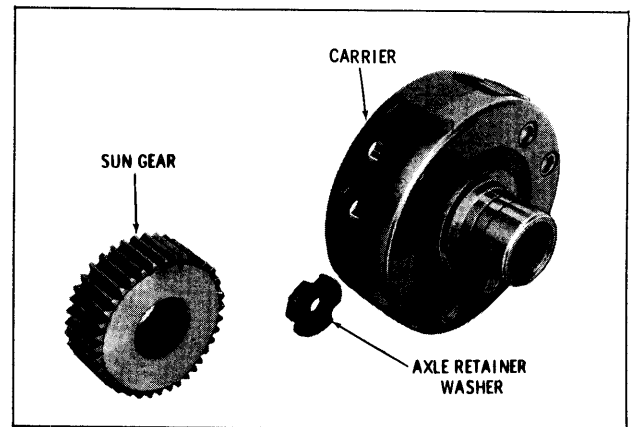


Fig. 3EC-35 Installing Sun Gear Into Carrier

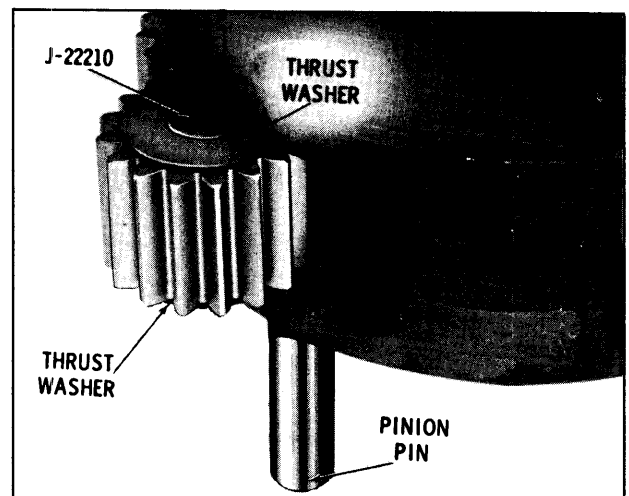


Fig. 3EC-36 Positioning of Parts Prior to Installation

2. Examine the ring gear and drive pinion teeth for excessive wear and scoring. Any of these conditions will require replacement of the gear set.

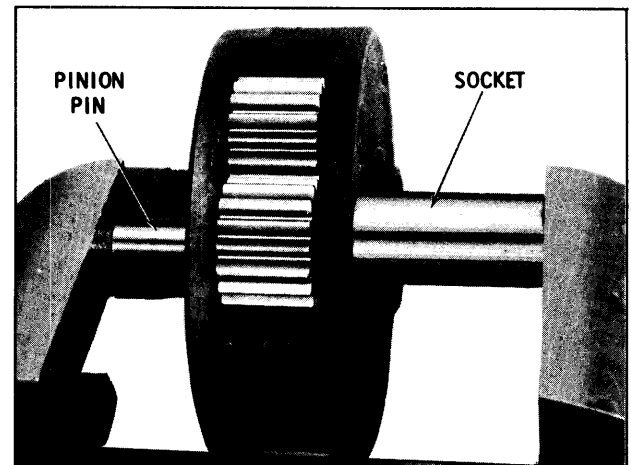


Fig. 3EC-37 Installing Planet Pinion Pin

3. Inspect the planet pinions, shafts and sun gear for unusual wear; also check the pinion thrust washers, and the pinion needle bearings.
4. Check the press fit of the side bearing inner races on the case and cover hubs. Side bearings must be a tight press fit on the hub.
5. Check the internal gear in the case. The case and cover are serviced only as an assembly.

PINION GEARS

Remove and Install

1. Support carrier assembly.
2. Using a tapered punch, press or drive the pinion pins out of the carrier.
3. Remove the pinion thrust washers, roller needle bearings, spacer and sun gear.

NOTE: The sun gear can be removed from only one opening of the carrier. This opening can be identified by the thinner wall at the carrier opening.

4. After removal of the sun gear, the left axle retainer washer can be removed from the carrier.
5. Install loading Tool J-22210 into planet pinion. Position a spacer washer over the loading tool, then install 24 needle bearings on each side of the spacer washer. (Fig. 3EC-34)
6. If the axle retainer washer was removed, install at this time.
7. Position sun gear into carrier through large opening. (Fig. 3EC-35).
8. Position a thrust washer on each side of the planet pinion, then insert planet pinion into carrier. (Fig. 3EC-36)
9. Using a deep socket as a receiver, press pinion pin into carrier, until it bottoms, as shown in Fig. 3EC-37.
10. Place a large punch in a vise, to be used as an anvil, and stake the opposite end of the pinion pin in three places.

CHECKING PINON DEPTH

1. Install pinion front outer race as shown in Fig. 3EC-38. Drivegace until it bottoms.
2. Lubricate front bearing with final drive lubricant and install into front outer race.
3. Position Tool J-21777-10 on front bearing. Install Tool J-21579 on final drive housing and retain with two bolts. Thread screw J-21777-13 into J-21579 until tip of screw engages Tool J-21777-10. Torque screw J-21777-13 to 20 in. lbs. to pre-load bearing. (Fig. 3EC-39)

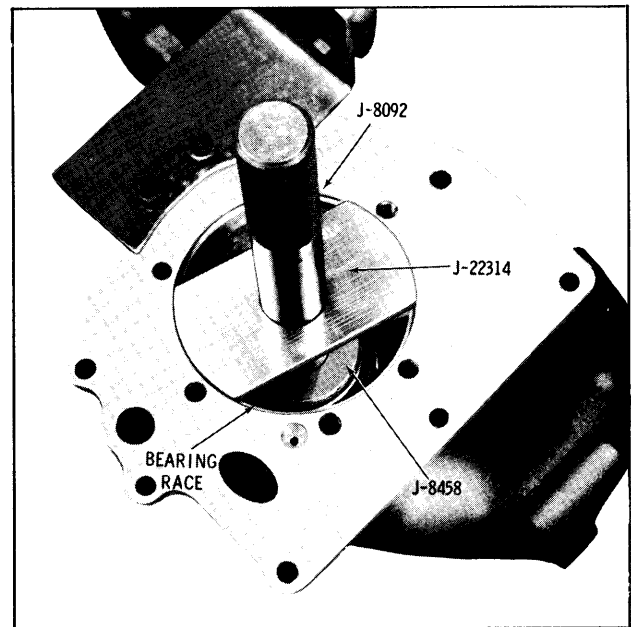


Fig. 3EC-38 Installing Pinion Front Bearing Outer Race

4. Remove dial indicator post from Tool J-21777-11 and install Discs J-21777-11 and J-21777-12 as shown in Fig. 3EC-40. Reinstall dial indicator post.
5. Place the gauging discs in the side bearing bores and install the side bearing caps.
6. Position the dial indicator, J-8001 on the mounting post of the gauge shaft and with the contact rod OFF the gauging area of J-21777-10. Set dial indicator on ZERO, then depress the dial indicator until the needle rotates 3/4 turn clockwise. Tighten the dial indicator in this position. RESET DIAL INDICATOR ON ZERO.
7. Position the gauge shaft assembly in the carrier so that the dial indicator contact rod is directly in line with the gauging area BUT NOT ON and the discs seated fully in the side bearing bores.

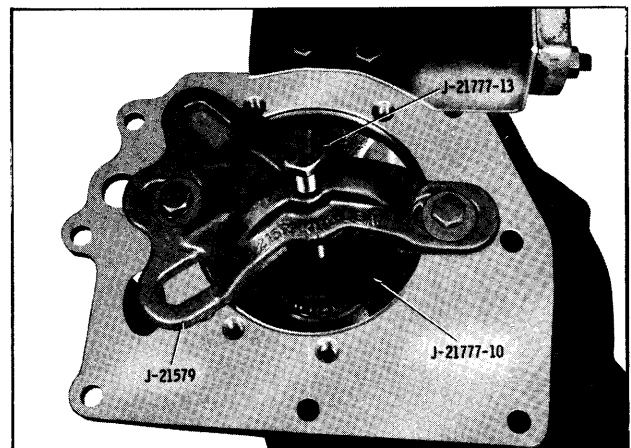


Fig. 3EC-39 Pre-Loading Pinion Front Bearing

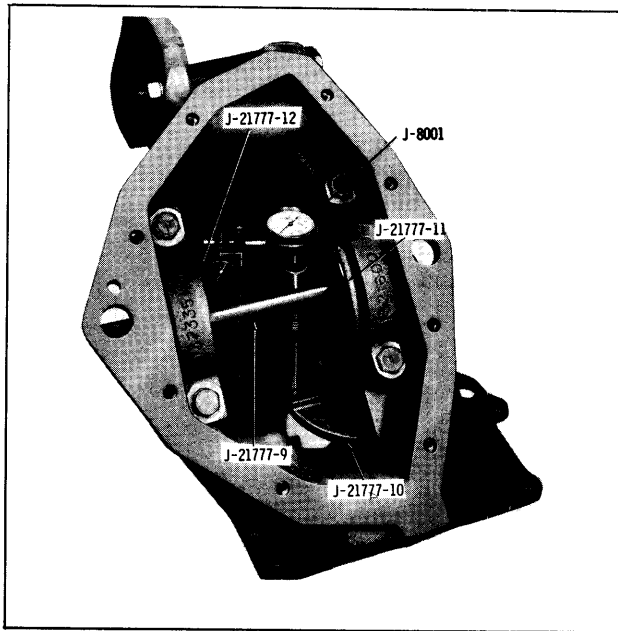


Fig. 3EC-40 Pinion Depth Gauge Installation

8. Rotate the gauge shaft assembly until the dial indicator rod contacts the gauging area of J-21777-10. Rotate gauge shaft slowly back and forth until the dial indicator reads the greatest deflection.
9. At the point of greatest deflection, read the dial indicator directly for pinion depth.
10. Select the correct pinion shim to be used during pinion reassembly on the following basis:
 - a. If a service pinion is being used, or a production pinion with no marking, the correct shim will have a thickness equal to the indicator gauge reading found in Step 9.
 - b. If a production pinion is being used and it is marked "+" or "-", the correct shim will be determined as follows:

 Pinions marked "+" (plus) the shim thickness indicated by the dial indicator on the pinion setting gauge must be INCREASED by the amount etched on the pinion.

 If the pinion is marked "-" (minus) the shim thickness indicated by the dial indicator on the pinion setting gauge must be DECREASED by the amount etched on the pinion.
11. Remove pinion depth checking tools and front bearing from carrier.

CASE

Assembly

1. Install the planet pinion carrier into the case with the large hub of the carrier toward the case.

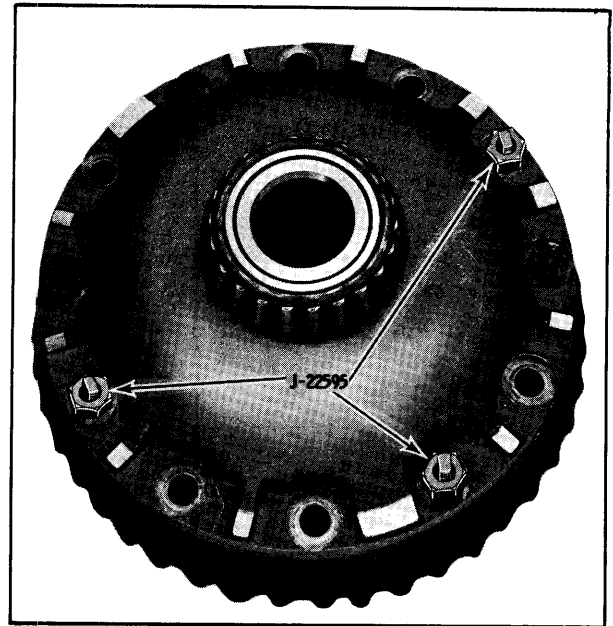


Fig. 3EC-41 Ring Gear Installation

2. With the case and cover alignment marks aligned, insert four ring gear attaching bolts through case and cover. Install two alignment studs, made from 7/16" x 1-1/2" bolts, into ring gear. Align mark on ring gear with alignment marks on case and cover and install ring gear on case. Tighten the four ring gear bolts alternately. Remove alignment studs and install remaining ring gear bolts. Torque

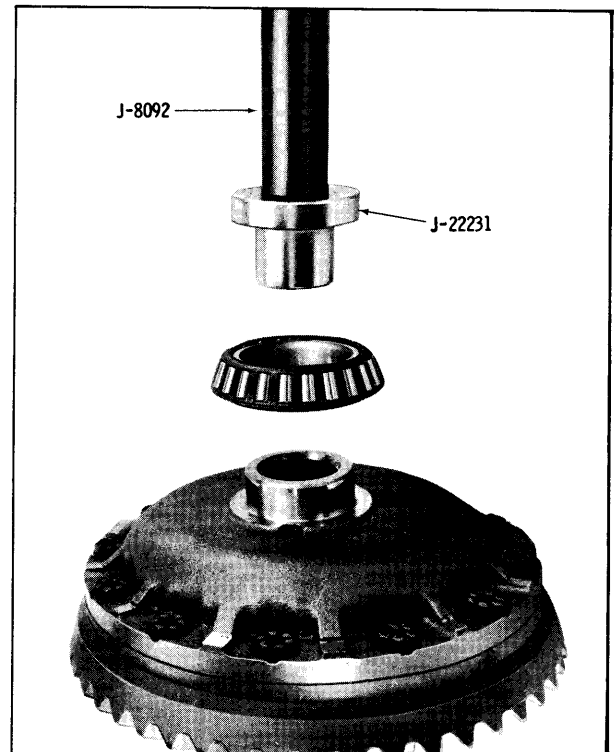


Fig. 3EC-42 Installing Right Side Bearing

ring gear to 85 ft. lbs. (Fig. 3EC-41)

NOTE: Position case assembly in a brass jawed vise to torque bolts.

3. If side bearings were removed, they can be installed as shown in Fig. 3EC-42 and 3EC-43. Use opposite side bearing driver tool as a back-up plate.
4. Install pinion rear bearing as shown in Fig. 3EC-44.
5. Position correct shim on drive pinion and install the drive pinion front bearing as shown in Fig. 3EC-45.
6. Lubricate pinion bearings and install pinion into carrier.

PINION BEARING PRE-LOAD (With Case Assembly Removed)

1. Install Tool BT-6702 in a vise and bolt pinion bearing housing as shown in Fig. 3EC-46.
2. Install Tool BT-6708 under pinion bearing race and tighten bolt until tool is secure. By turning Tool BT-6702 with 1/2" bar clockwise, pinion bearing race can be removed.

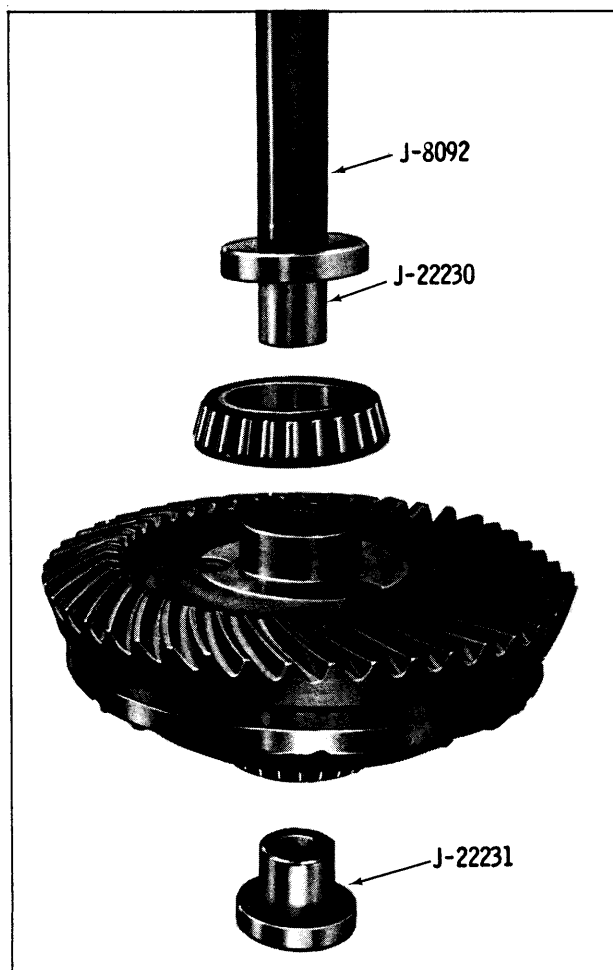


Fig. 3EC-43 Installing Left Side Bearing

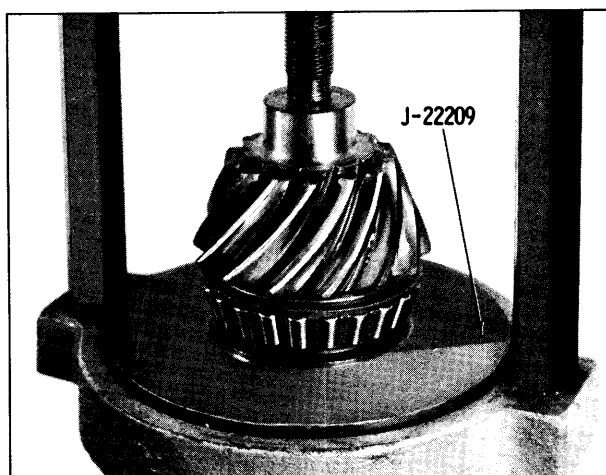


Fig. 3EC-44 Installing Pinion Rear Bearing

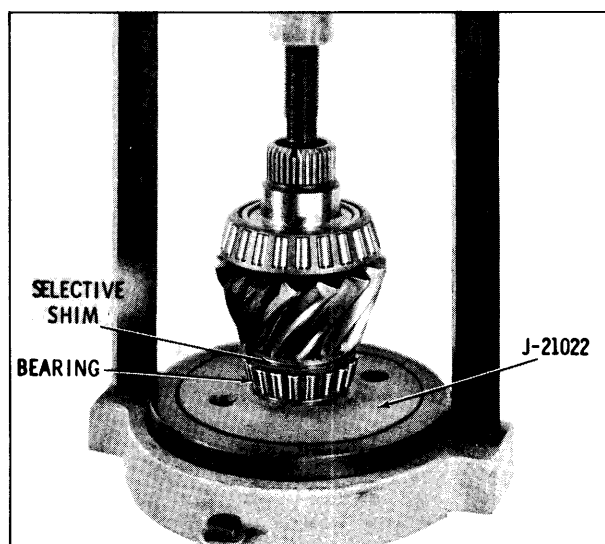


Fig. 3EC-45 Installing Pinion Front Bearing

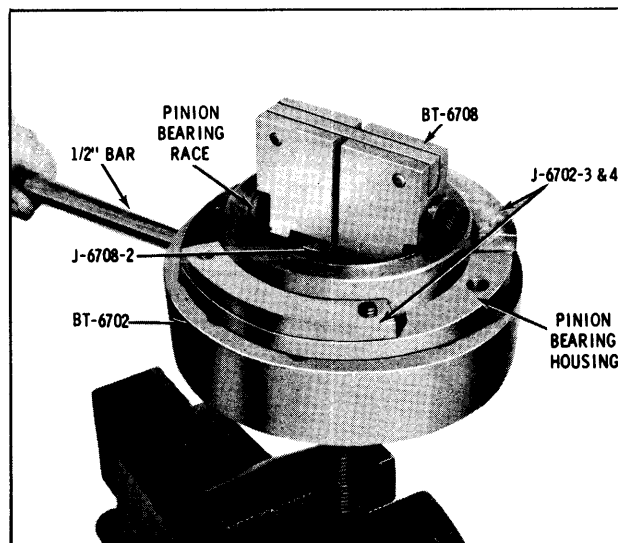


Fig. 3EC-46 Removing Pinion Rear Bearing Outer Race

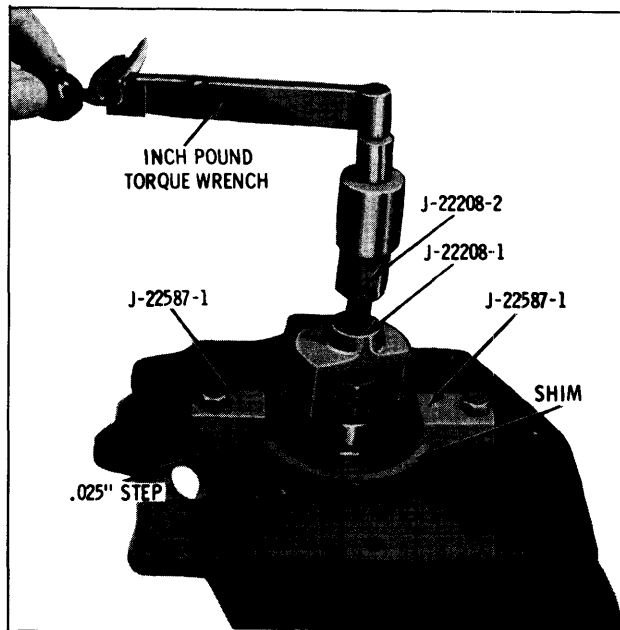


Fig. 3EC-47 Checking Shim Thickness and Preload

3. Remove existing shim from bearing housing.
4. Position pinion bearing race on pinion bearing and install Tool J-22587-1 as shown in Fig. 3EC-47. Using a feeler gauge check thickness between bearing race and Tool J-22587-1. Loosen bolts holding Tool J-22587-1 so that pinion bearing shim can be installed. Shims are available in sizes from .035" to .071" in increments of .001". Add shims until a pre-load of 2 to 3 in. lbs. is obtained. RECORD FINAL SHIM THICKNESS.
5. Remove Tool J-22587-1.
6. With dial indicator J-8001 and extension J-7057, attach existing dial indicator post to

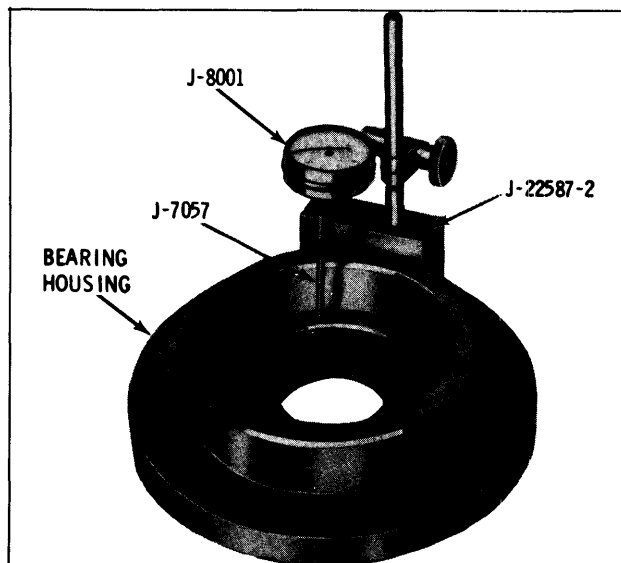


Fig. 3EC-48 Checking Inner Flange of Housing

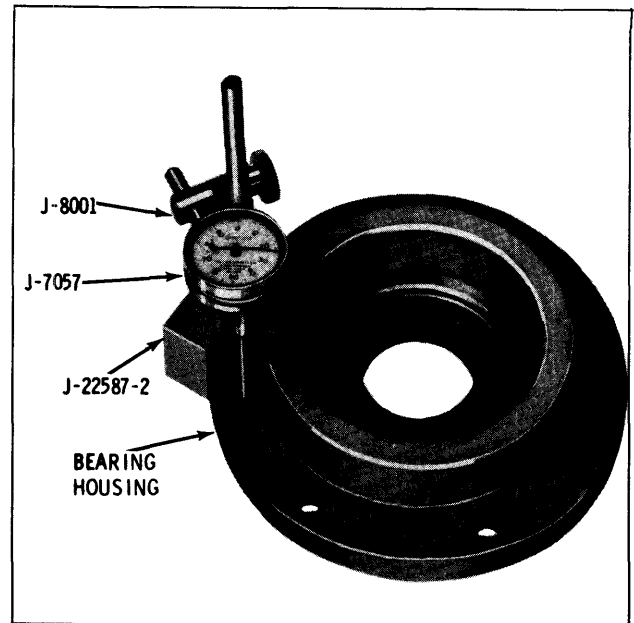


Fig. 3EC-49 Checking Outer Flange of Housing

- Tool 22587-2. (Fig. 3EC-48) While holding contact studs (three) of Tool J-22587-2 firmly against shoulder of bearing housing, position dial indicator as shown in Fig. 3EC-48 and rotate dial to ZERO.
7. Carefully lift dial indicator assembly over flange of bearing housing and position assembly as shown in Fig. 3EC-49. With the three contact studs held firmly against shoulder of bearing housing, read the dial indicator deflection. RECORD THIS DEFLECTION.

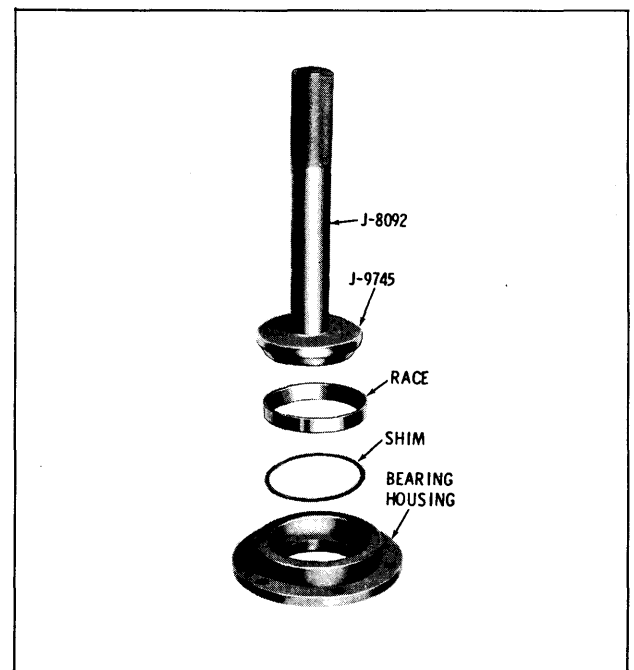


Fig. 3EC-50 Installing Pinion Bearing Outer Race

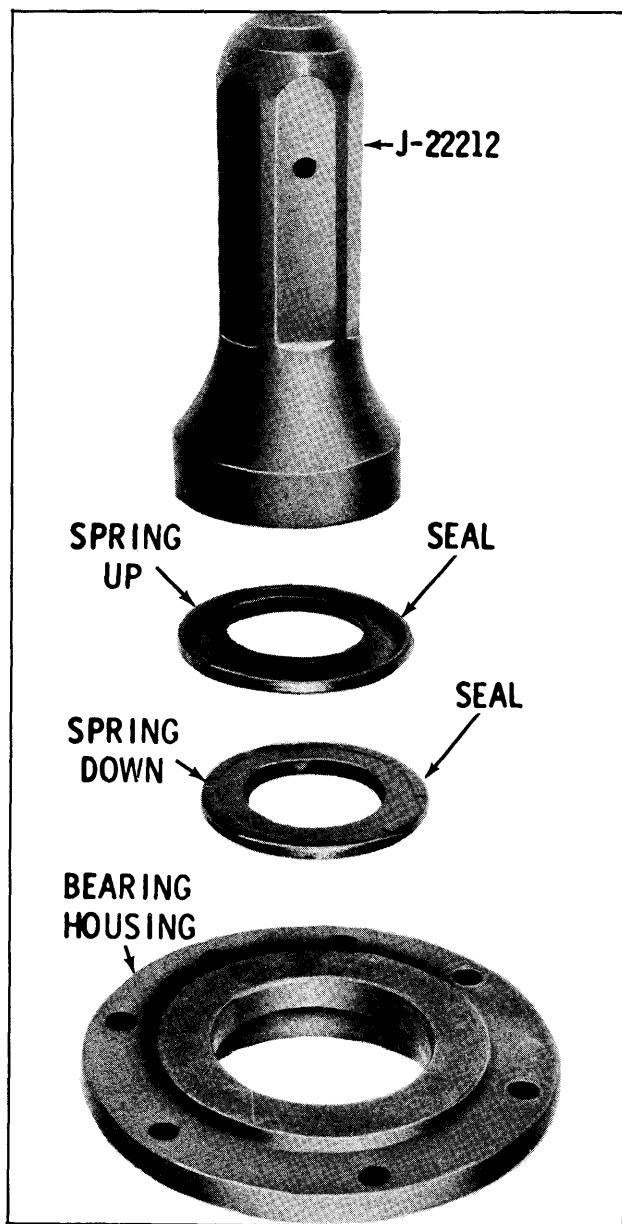


Fig. 3EC-51 Installing Seals Into Bearing Housing

The following is an example of finding the correct pinion bearing pre-load with information obtained above.

$$\begin{array}{r}
 .052 \text{ (Shims recorded in Item 2)} \\
 +.024 \text{ (Diff. in housing - Item 7)} \\
 \hline
 .076 \\
 -.025 \text{ (Built in step in Tool J-22587-1)} \\
 \hline
 .051 \\
 -.002 \text{ (To compensate for increase in pre-load} \\
 \text{when installing housing)} \\
 \hline
 .049 \text{ (Actual pinion bearing pre-load shim re-} \\
 \text{quired)}
 \end{array}$$

8. Position shim into bearing housing and install pinion rear bearing outer race as shown in Fig. 3EC-50.
9. Install seals into bearing housing as shown in Fig. 3EC-51.

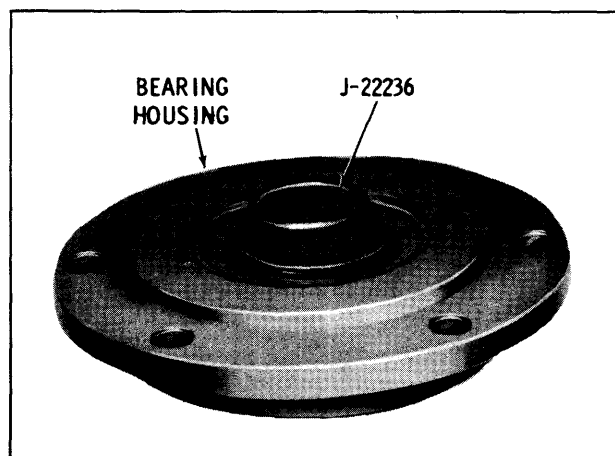


Fig. 3EC-52 Installing Bearing Housing to Housing

10. Install a new O ring seal on the bearing housing.
11. Install "O" ring and vent pin on face of carrier. (Fig. 3EC-53)
12. Install seal protector J-22236 over drive pinion and install bearing housing over seal protector into position on the housing. Torque the attaching bolts to 35 ft. lbs. (Fig. 3EC-52)

SIDE BEARING PRE-LOAD ADJUSTMENT

Differential side bearing pre-load is adjusted by means of shims placed between the side bearings and carrier. Shims are used on both sides and are available in increments of .002" from .036" to .070". One spacer, with a tolerance of .185" to .195", is used on the right side only. By changing the thickness of both shims equally, the ring gear to pinion backlash will not change.

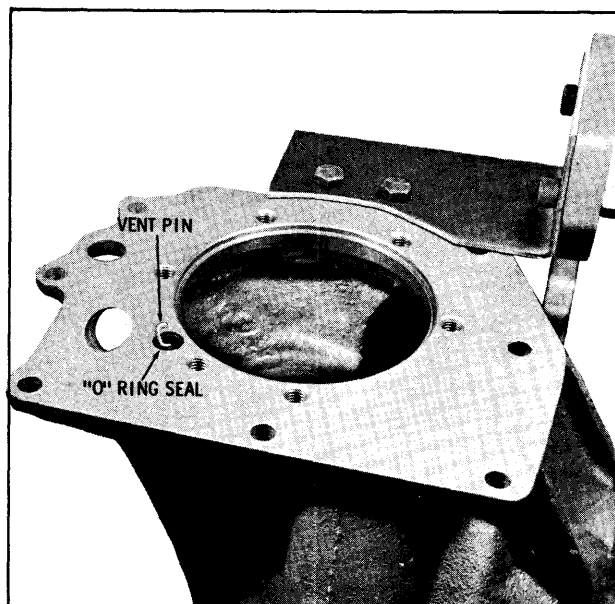


Fig. 3EC-53 Installing "O" Ring and Vent Pin

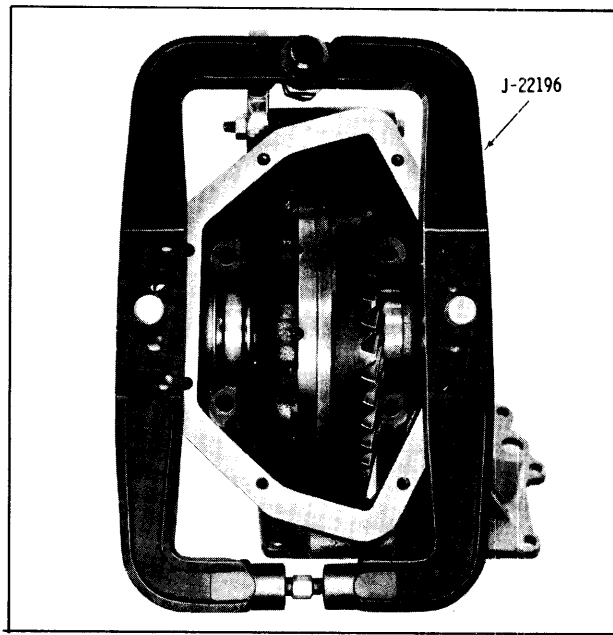


Fig. 3EC-54 Spreading Carrier Housing

1. Before installation of the case assembly, make sure that side bearing surfaces in the carrier are clean and free of burrs. Side bearings must be oiled with Lubricant Part No. 1050015.
2. Place differential case and bearing assemblies in position in carrier.
3. If the original ring gear and pinion are re-used, subtract the reading obtained in Step 8 from the reading obtained in Step 3 of the Final Drive Disassembly procedure. This determines the original side bearing pre-load and will aid in determining whether thicker or thinner shims will be required to bring the side bearing pre-load within specifications.
4. Install original shim on left side and spacer on right side.

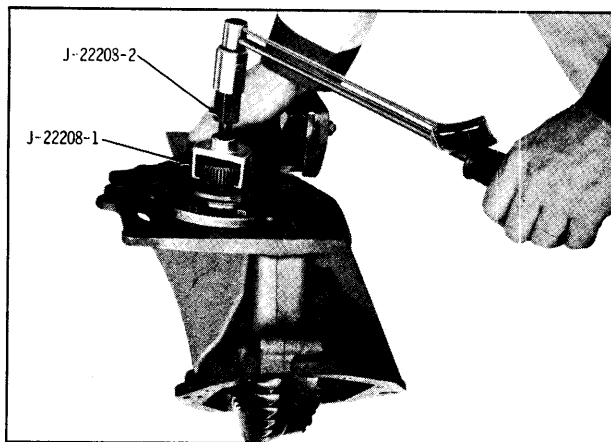


Fig. 3EC-55 Checking Pinion and Side Bearing Pre-load

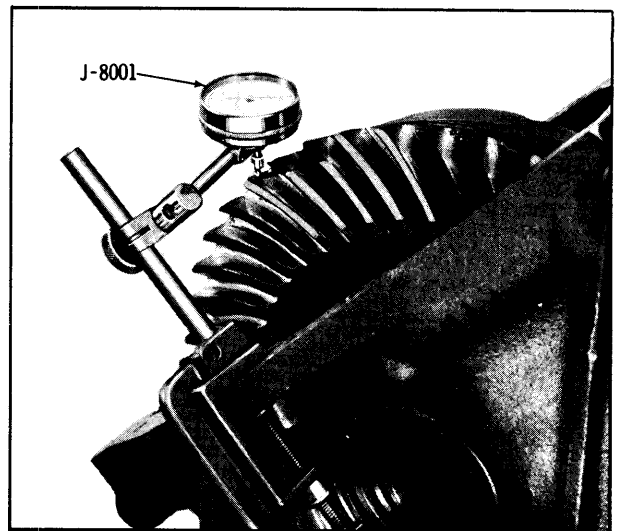


Fig. 3EC-56 Checking Ring Gear to Pinion Backlash

5. Install Spreader J-22196 on carrier and spread carrier just enough so that shim can be inserted between the spacer and the carrier. (Fig. 3EC-54)
6. Release tension on spreader tool, install side bearing caps, then check pre-load as shown in Fig. 3EC-55. Pre-load should be 15 to 20 in. lbs. for new bearings, 5 to 7 in. lbs. for old bearings over the pinion bearing pre-load.
7. If pre-load is not within specifications, obtain proper combination of shims, either thicker or thinner, until side bearing pre-load is 15 to 20 in. lbs. for new bearings, 5 to 7 in. lbs.

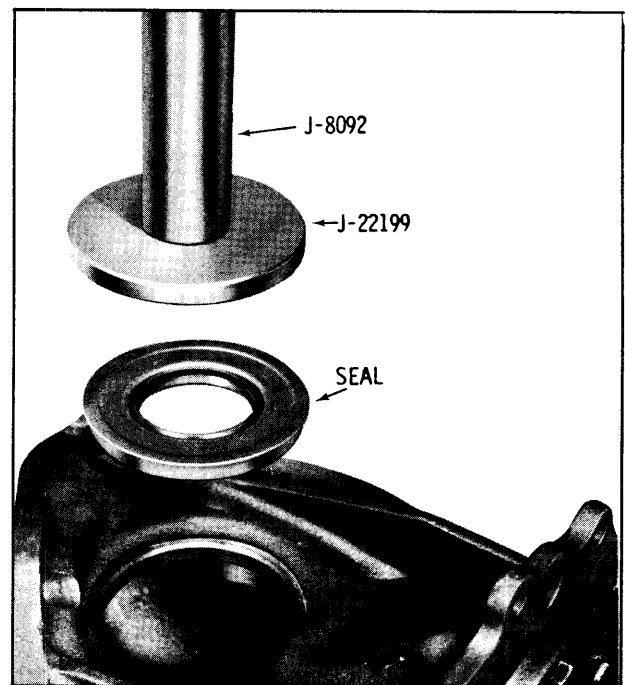


Fig. 3EC-57 Installing L.H. Seal

for old bearings over the pinion bearing pre-load.

BACKLASH ADJUSTMENT

1. Rotate differential case several times to seat bearings, then mount dial indicator as shown in Fig. 3EC-56. Use a small button on the indicator stem so that contact can be made near heel end of tooth. Set dial indicator so that stem is in line as nearly as possible with gear rotation and perpendicular to tooth angle for accurate backlash reading.
2. Check backlash at three or four points around ring gear. Lash must not vary over .002" around ring gear.

NOTE: Pinion must be held stationary when checking backlash. If variation is over .002" check for burrs, uneven bolting conditions or distorted case cover and make corrections as necessary.

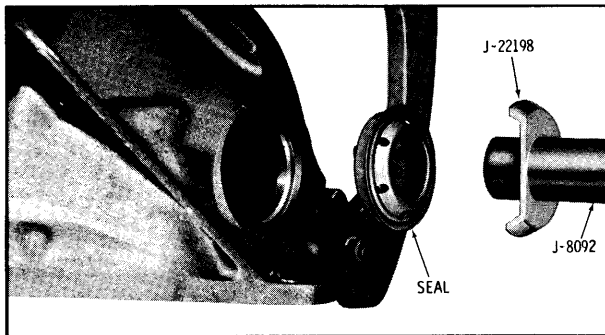


Fig. 3EC-58 Installing R.H. Seal

3. Backlash at the point of minimum lash should be between .006" and .008" for all new gears. If original ring gear and pinion was installed, backlash should be set at the same reading obtained in Step 3 of the Final Drive Disassembly procedure, provided reading was within specifications.
4. If backlash is not within specifications, correct by increasing thickness of one differential shim and decreasing thickness of other shim the same amount. This will maintain correct differential side bearing pre-load.

For each .001" change in backlash desired, transfer .002" in shim thickness. To decrease backlash .001", decrease thickness of right shim .002" and increase thickness of left .002". To increase backlash .002" increase thickness of right shim .004" and decrease thickness of left shim .004".
5. When backlash is correctly adjusted, remove spreader. Install the bearing caps and bolts. Torque to 50 ft. lbs.
6. Install new output shaft seals as shown in Fig. 3EC-57 and 3EC-58.
7. Install new gasket on housing. Install cover, torque cover bolts to 30 ft. lbs. Fill final drive to proper level with the specified lubricant.

NOTE: If final drive was removed without removing the transmission, do not install gasket, cover or lubricant at this time.

FINAL DRIVE SPECIFICATIONS

LUBRICATION

Capacity	4-1/2 Pints
Replenish	Special Lubricant, Part No. 1050015

ADJUSTMENTS

Backlash006" to .008"
Pinion Bearing Pre-load	
New Bearings	2 to 3 in. lbs.
Old Bearings	2 to 3 in. lbs.
Side Bearing Pre-load	
New Bearings	15 to 20 in. lbs. over Pinion Bearing Pre-load
Old Bearings	5 to 7 in. lbs. over Pinion Bearing Pre-load

GEAR RATIO	3.21
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TORQUE SPECIFICATIONS

APPLICATION	FT. LBS.
Final Drive Cover	30
Side Bearing Caps	50
Bearing Retainer Housing	35
Ring Gear	85
Drive Axle to Output Shaft	65
Final Drive Support Bracket to Engine	50
Final Drive to Support Bolt	75
RH Output Shaft Bracket to Engine	50
RH Output Shaft Brace on Engine	25
RH Output Shaft Brace to Bracket	15
LH Output Shaft Retainer Bolt	45
Bleed Valve to LH Output Shaft	8
Final Drive to Transmission Bolts and Nuts	25

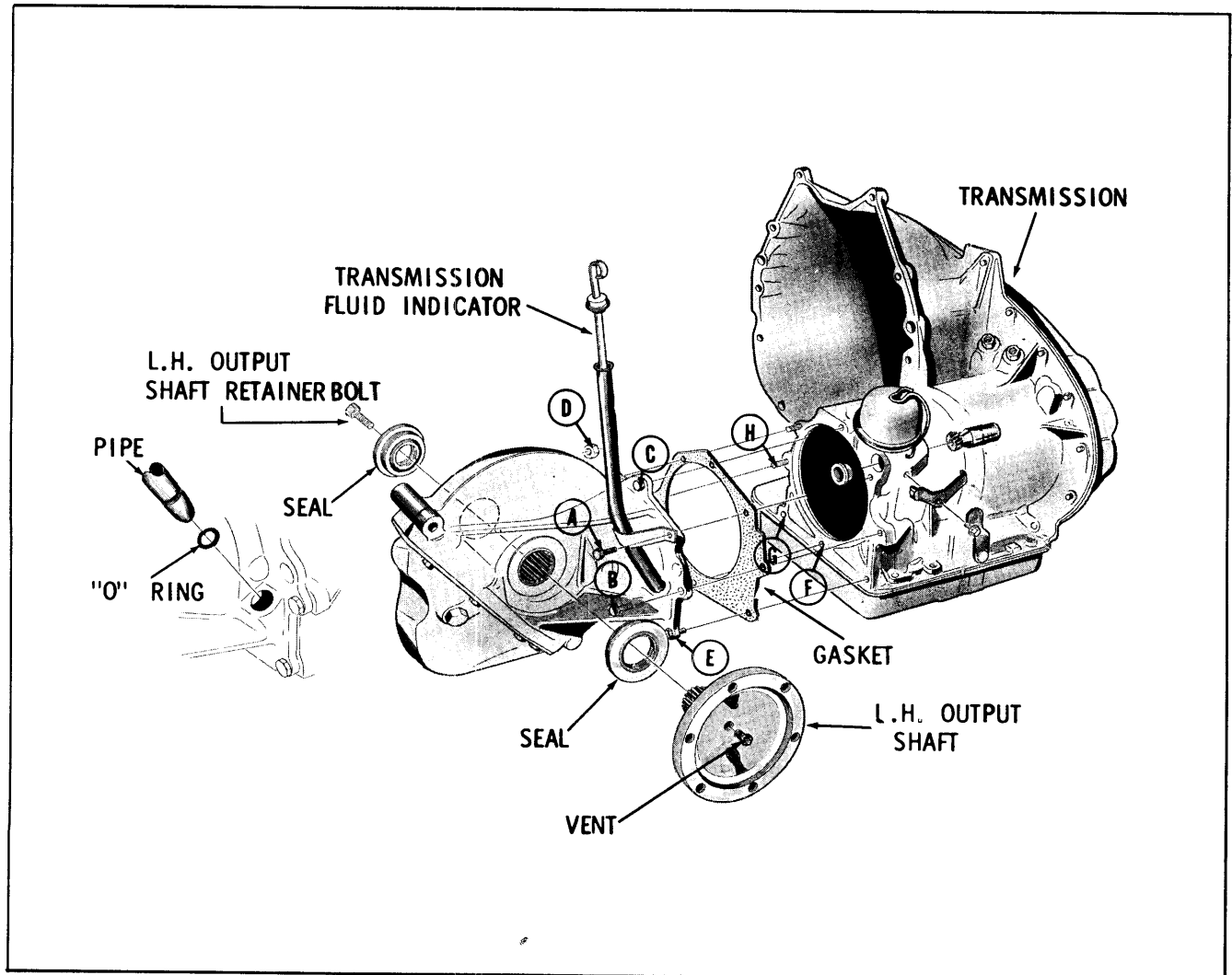


Fig. 3EC-59 Final Drive Attachment

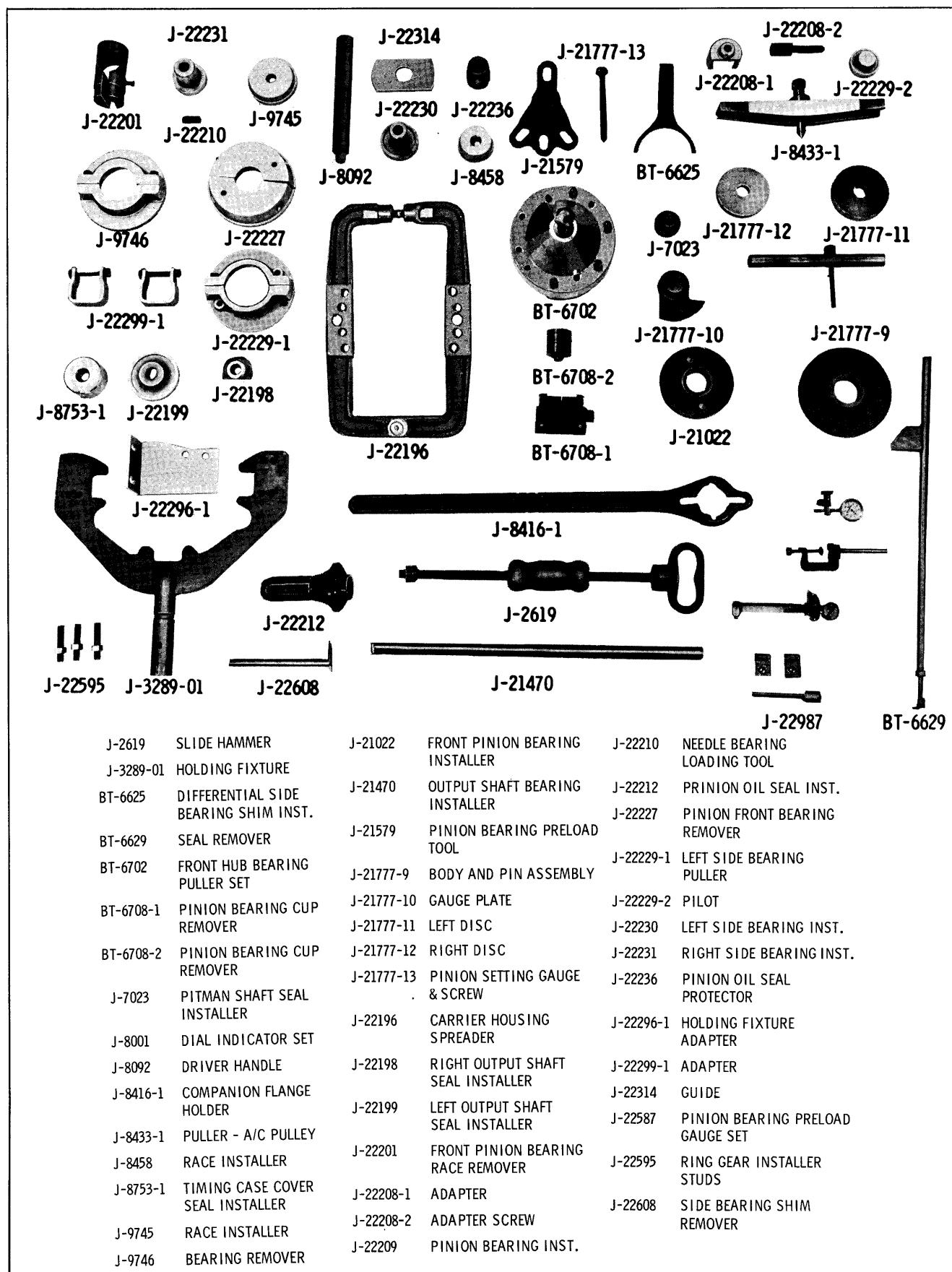


Fig. 3EC-60 Final Drive Tools