CADILLAC – EXC. ELDORADO & SEVILLE

Cadillac, Except Eldorado & Seville

NOTE – *See General Motors Integral Housing article for information on Seville rear axle.*

DESCRIPTION

Hypoid gear, unitized carrier and housing design, with coil spring rear suspension on all models except commercial chassis. Heavier commercial chassis uses semi-eliptical leaf spring suspension. Unit utilizes two tapered roller bearings and a straight roller straddle bearing to support drive pinion and provide rigidity.

AXLE RATIO & IDENTIFICATION

Identification number is stamped on back side of right caliper support plate on vehicles with disc brakes. On vehicles with drum brakes, identification number is stamped on right brake drum surface. An axle identification stamp is also stamped on right side of axle tube approximately 3" from differential housing. This stamp contains last digit of model year, axle assembly part number code, source identity and date of manufacture.

Axle Ratio Identification

Axle Ratio	Conventional	Positive Traction
2.28-1		
DeVille	7VB	7VS
Brougham	7WB	7WS
2.73-1		
DeVille	7VE	7VW
Brougham	7WE	7WW
3.08-1		
DeVille	7VJ	7VY
Brougham	7WJ	7WY
Limousine & Commercial Chassis	7XJ	7XY

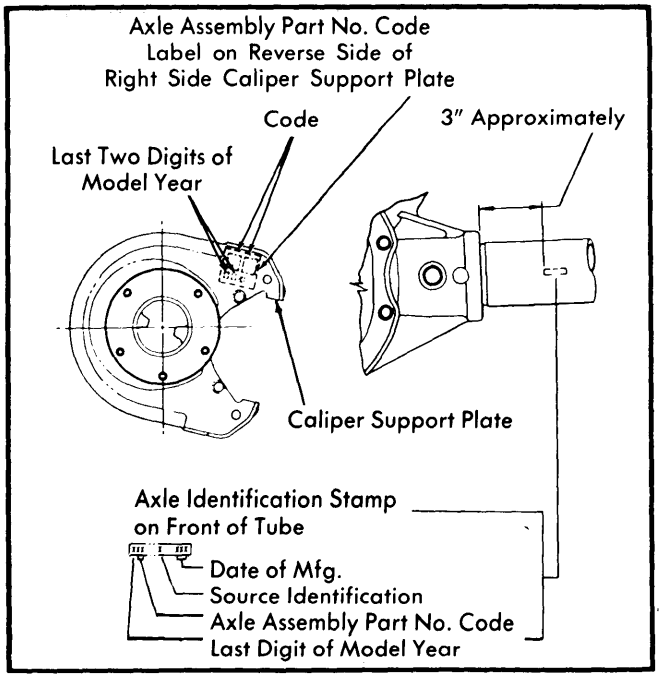

Fig. 1 Rear Axle Code Location for Disc Brakes

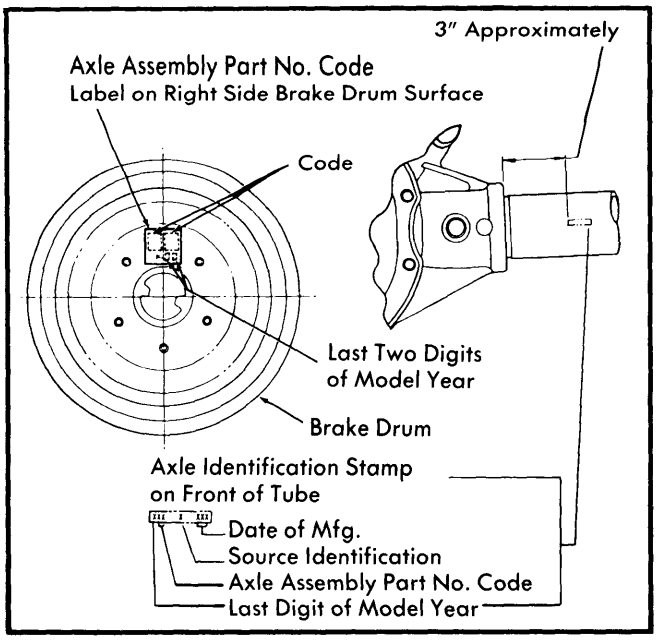

Fig. 2 Rear Axle Code Location for Drum Brakes

REMOVAL & INSTALLATION

AXLE SHAFTS, OIL SEALS & BEARINGS

Removal – Raise rear end of vehicle, then remove wheel and brake drum. Remove nuts and lock washers that secure cover, gasket and backing plate to rear axle housing. Remove differential pinion cross shaft. Push flanged end of axle shaft toward center of vehicle and remove "C" lock. Remove axle shaft. Carefully pry out seal. Using a puller (J-22813-01), remove bearing.

Installation – 1) Press bearing into axle tube until it bottoms against shoulder (exc. Limousine and Commercial Chassis). On Limousine and Commercial Chassis use installing tools (J-23765 and J-23690) and seat bearing to a depth of .550" as measured from end of axle tube to bearing. On all models pack cavity between seal lips with wheel bearing lubricant then install seal flush with end of axle tube.

2) Slide axle into axle tube being careful not to damage seal. Install "C" locks on button end of axle shaft. Push shaft outward until shaft locks in counter bore of differential side gear.

3) Install pinion cross shaft aligning hole in shaft with lock screw hole. Install lock screw and tighten to 20 ft. lbs. Install differential cover and fill differential with lubricant.

PINION FLANGE & OIL SEAL

Removal – 1) Scribe alignment marks on propeller shaft and pinion flange to maintain balance when reassembling. Remove attaching bolts and support rear of propeller shaft from underbody of vehicle.

2) Remove rear wheels and drums (or calipers) and record pinion preload by using an INCH lb. torque wrench. Remove pinion nut and use suitable puller to remove flange. Drive seal out with a blunt chisel.

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Installation –Pack inner lip of new seal with wheel bearing lubricant and drive seal into position with suitable tool. Install pinion flange on shaft (align marks made on disassembly if using old flange), then install pinion washer and nut. Gradually tighten nut until pre-load recorded on disassembly is reached, then make final tightening adjustments to set 3-5 INCH lbs. above original reading.

NOTE – *Very slight tightening of pinion nut can greatly increase preload torque. Exceeding specifications will collapse the preload spacer and require replacement of the spacer.*

CHECKING PINION RUNOUT

Attach pinion flange wobble checking gauge (J-24798) to pinion flange and check runout with dial indicator. If runout exceeds .014", index tool 180° on flange and recheck. If wobble is still in excess of .014", replace the flange.

REAR AXLE ASSEMBLY

Removal – 1) Raise vehicle so that frame and rear axle are supported. Disconnect Automatic Level Control (if equipped) at over travel lever. Hold lever down until shock is deflated then place lever in center position.

2) Disconnect lower shock absorber retaining nuts. Remove rear lower control arm nuts and bolts. Remove lower control arm. Remove rear mounting nuts of upper control arm. Remove control arm pivot bolt and control arm.

3) Mark pinion flange and propeller shaft for reassembly reference. Disconnect and support propeller shaft. Disconnect brake hoses and parking brake cable. CAUTION – *If axle is allowed to wind up as it is lowered, springs may snap from their seats. Use extreme caution to prevent wind up condition.* Lower axle assembly out of vehicle.

Installation – To install, reverse removal procedure noting the following: If equipped with Automatic Level Control, attach air lines to shock absorbers (if removed). Inflate air reservoir to 140 psi (or highest pressure available if not over 140 psi). Lift over travel lever and allow air to enter shock. Release over travel lever and secure to axle.

OVERHAUL

DISASSEMBLY

Raise vehicle on hoist, then remove wheels, brake drums, axle shafts and propeller shaft. Place a drain pan under differential, then loosen differential cover to housing screws, slide cover back over screws, and allow fluid to drain. Remove cover screws, then remove cover and gasket.

Backlash Check – NOTE – *If original ring gear and pinion set is to be used on reassembly, it is important to re-establish exact backlash found on disassembly.* Remove adjuster nut lock tab, then position a dial indicator so that button on end of extension touches ring gear tooth on face of drive side at heel. Angle between indicator button and tooth face must be 90°. With pinion securely held in place, rock ring gear back and forth and note indicator reading. Repeat procedure at two other locations evenly spaced around ring gear. Backlash readings should be .005-.008", and should not vary from each other by more than .002".

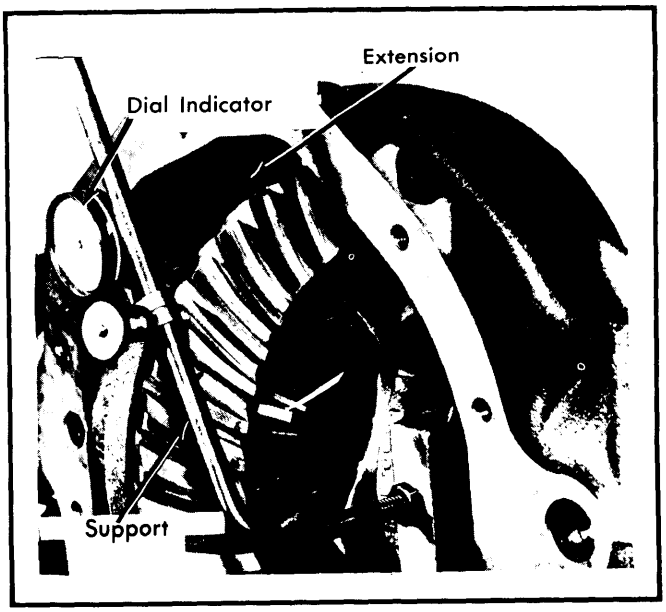

Fig. 3 Checking Ring Gear to Pinion Backlash

Differential Case Removal – 1) Remove axle shafts as previously described. Reinstall cross shaft to retain side gears. Remove bearing caps and mark for installation. Remove one ring gear-to-case bolt. NOTE – *Bolts are left hand thread.*

2) Install a differential case puller tool (J-2625) on differential case. Pull case out of housing just enough so side shims can be removed. Remove and mark shims for reassembly. Remove differential case from housing.

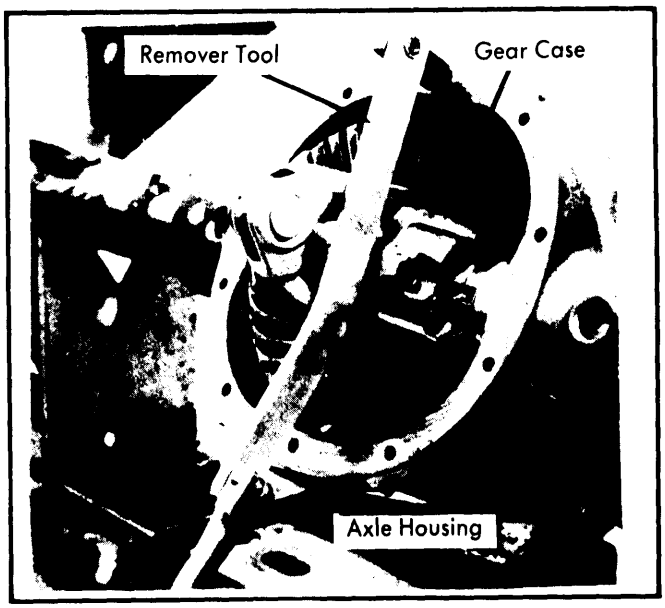

Fig. 4 Removing Differential Gear Case

Pinion Removal – 1) Remove differential case and pinion flange as previously described. Thread pinion nut back onto pinion shaft about half way for thread protection.

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2) Place differential cover temporarily back onto housing to prevent pinion from falling out during removal. Install pinion remover tool (J-22536) and drive out pinion. Keep firm pressure on remover tool toward differential. This will keep front bearing seated and prevent damage to outer cup.

3) Remove pinion nut, oil seal and front pinion bearing. Remove cover and then remove pinion from housing. Discard pinion oil seal and collapsable spacer.

Pinion Bearing Removal – 1) Remove pinion shaft from differential housing. Press bearings from shaft using suitable press and adapters (J-9746-02 on Limousine and Commercial Chassis or J-22912-01 on all other models). Remove shim from between rear pinion bearing and pinion gear and record thickness.

2) Drive bearing outer cups from differential housing using a punch in slots provided in housing. Inspect pinion bearing bores for burrs and nicks, remove as necessary.

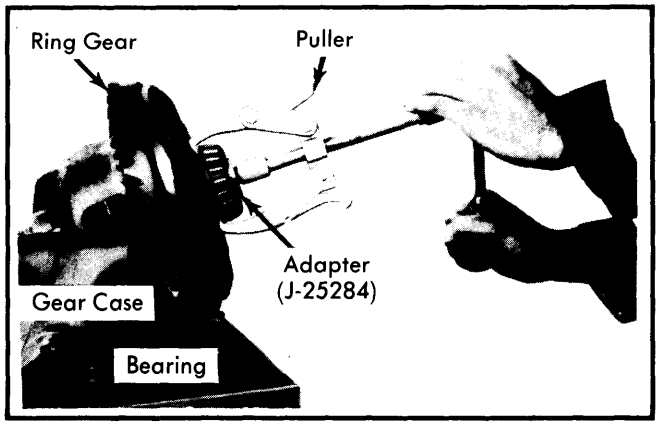

Fig. 5 Removing Gear Case Bearings

Gear Case Disassembly – Remove differential side bearings using puller (J-22888) and an adapter plug (J-25284). Remove ring gear bolts (left hand threads) then tap ring gear from case using soft mallet. Clean case and check for any nicks or burrs, remove as necessary.

CLEANING & INSPECTION

Wash all parts in a suitable solvent or mineral spirits, then dry thoroughly using dry, compressed air. Using a clean cloth, wipe inside of axle housing and differential carrier clean. Visually inspect all parts for chips, nicks, or excessive wear. Repair or replace parts as necessary.

REASSEMBLY

Gear Case Assembly – 1) Lubricate inside of ring gear and differential gear case. Align holes in ring gear and gear case, then start ring gear on gear case by pressing on gear case (with adapter plug J-25284 installed) as shown in *Fig. 6*.

2) Start all ring gear bolts, then using a criss-cross pattern, tighten all bolts evenly to 90 ft. lbs.

3) Install bearings on gear case with thick end of bearing toward case. Drive bearings into place using suitable tool (J-22175) and adapter plug (J-25284).

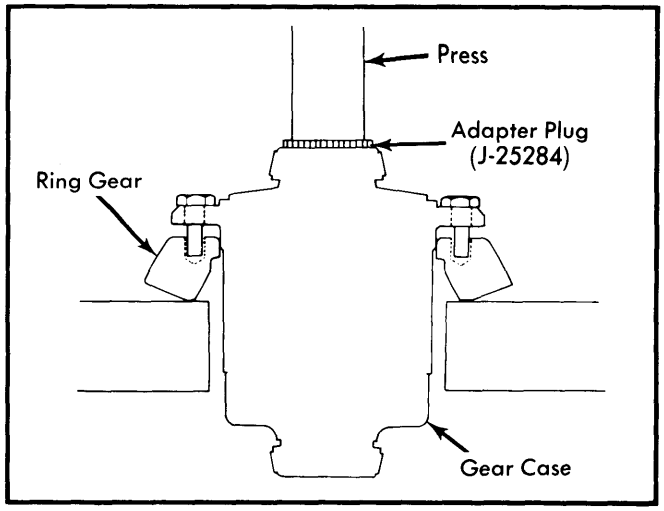

Fig. 6 Installing Ring Gear to Gear Case

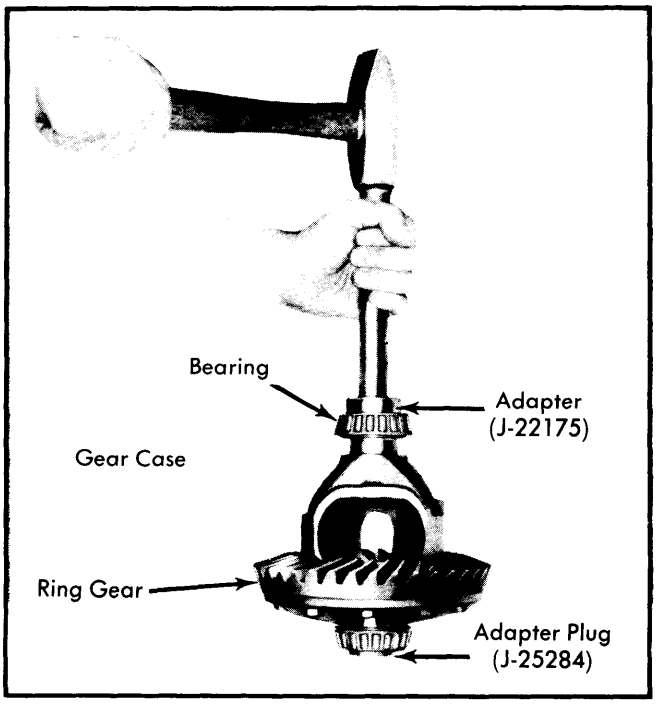

Fig. 7 Installing Gear Case Bearings

Pinion Depth Setting – 1) If original ring gear, pinion and rear pinion bearing are to be reinstalled, the original shim thickness may be used. If new components are used proceed as follows:

NOTE – *Use Pinion Setting Gauge J-21777-350 to obtain proper pinion depth setting.*

2) Clean housing assembly and all gauge parts to insure accurate measurements. Lubricate front and rear pinion bearings and install them in their bearing cups.

3) Mount gauge plate (J-21777-29) on preload stud (J-21777-43) and install through rear pinion bearing. Place front pilot (J-21777-42) and nut onto preload stud. Tighten nut until

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snug, then rotate bearings to make sure they are seated (refer to *Fig. 8).*

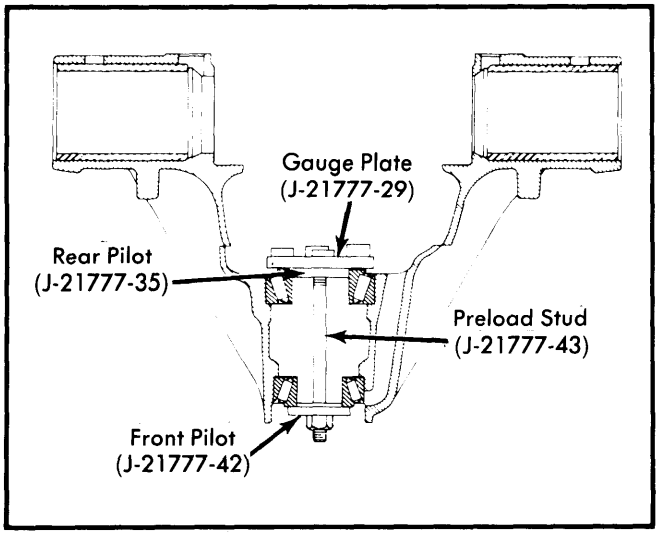

Fig. 8 Pinion Setting Gauge Installation

4) Hold preload stud stationary and tighten nut until a torque of 20 INCH lbs. is required to rotate bearings.

5) Install bearing discs (J-21777-45) on arbor (J-21777-1) with small step on discs facing outward. Place arbor and plunger assembly into gear case making sure bearing discs are seated properly in gear case bearing housing (refer to *Fig. 9).*

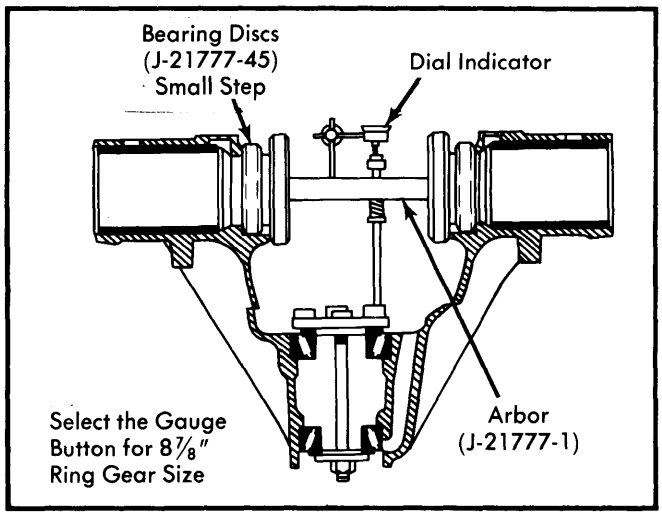

Fig. 9 Arbor & Plunger Installation

6) Install bearing caps finger tight to prevent setting gauge from moving. Position a dial indicator on post of arbor with contact finger against top of plunger. Preload indicator one half revolution and tighten it in this position.

7) Rotate gauge until arbor plunger is on the 8⅞" button of gauge plate. Rock plunger rod slowly back and forth across button until dial indicator shows the greatest deflection.

8) At this point set dial indicator to zero. Rock plunger rod several times to verify dial setting.

9) Swing plunger until it is removed from gauge button. The dial indicator now indicates nominal pinion shim thickness. Record this thickness.

10) Check pinion for a code number. This number indicates the amount to add or subtract from the nominal pinion shim thickness. If pinion is stamped with a plus (+), add that many thousandths to indicator reading. If Pinion is stamped with a minus (–), subtract that many thousandths from indicator reading.

11) Select the appropriate shim thickness and place shim on pinion shaft up against pinion head. Lubricate rear pinion bearing and install bearing onto pinion shaft.

Pinion Installation – 1) Lubricate bearings before installing. Install new collapsable spacer on pinion shaft. Position pinion assembly in differential housing.

2) Install holding fixture (J-22535-1) to hold pinion shaft in differential housing. Install front bearing onto pinion shaft and slide into its bearing cup.

3) Pack inner lip of new pinion oil seal with wheel bearing lubricant. Install oil seal in differential housing.

4) Install pinion flange on pinion shaft, tapping until a few pinion shaft threads show through flange. Place pinion washer and nut on pinion shaft. Hold pinion flange from turning and tighten nut until end play is taken up.

5) At this point, check turning torque of pinion shaft with an INCH lb. torque wrench. Preload should be 5 to 10 INCH lbs. on used bearings and 15 to 30 INCH lbs. on new bearings.

NOTE – *Very slight tightening of pinion nut can greaty increase preload torque. If pinion nut is over tightened, a new collapsible spacer must be installed.*

6) Rotate pinion several times to make sure that bearings are seated. Check pre-load to assure that specifications are correct.

Gear Case Installation – 1) Check condition of bearings and bearing seat; clean, repair or replace as necessary. Lubricate bearing with differential lubricant, then install cups on bearings. Install gear assembly in housing and support assembly to prevent falling.

2) Install a holding strap (J-22779-6) to left bearing and tighten bolts evenly until gear assembly is a snug fit. This will hold gear case in position.

3) With ring gear tight against pinion gear (a .000-.001" backlash), insert special gauge tool J-22779 between lift bearing cup and housing (refer to *Fig. 10).* While oscillating special tool, turn adjusting nut until a noticeable drag is felt. Tighten lock bolt on special tool.

NOTE – *Production shims are available from .210-.272" in .002" increments. Service spacers are .170" thick. Service shims are available from .040-.082" in .002" increments.*

4) Between the right bearing and housing, install a .170" spacer, a shim and a feeler gauge. Feeler gauge must be thick enough to produce a slight drag when removed between housing and shim.

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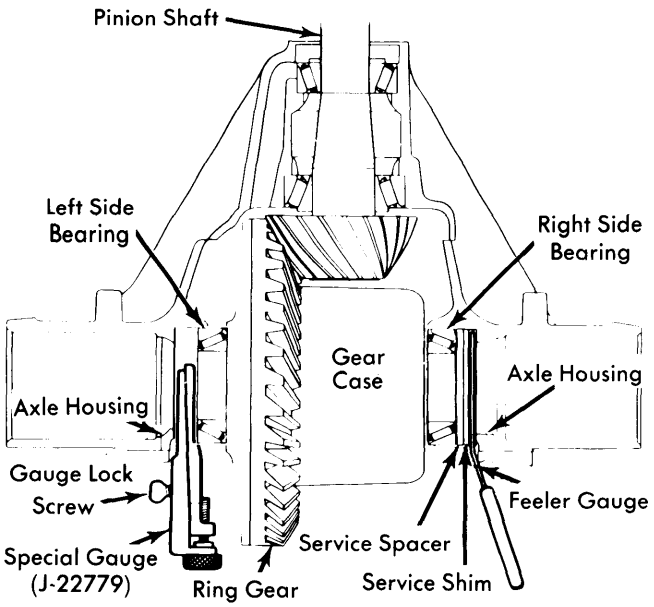

Fig. 10 Gear Case & Side Shim Installation

5) When all gauges, shims and spacers are installed correctly, measure these gauges, shims and spacers to determine correct shim packs needed then proceed as follows:

6) Remove special gauge J-22779 and measure thickness with a micrometer. Take three readings and average measurements. This will give the thickness of service shim(s) required for left side.

7) Remove spacer, shim and feeler gauge from right side. Add thickness of these together. This will give shim pack thickness for right side.

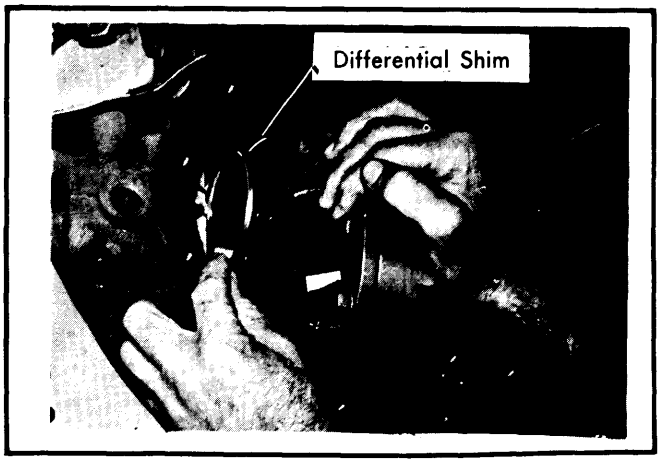

Fig. 11 Installing Side Bearing Shim

8) To obtain proper gear backsash, subtract .010" from measurement obtained in step 6) and add .010" to measurement obtained in step 7).

9) To obtain proper side bearing preload, add .004" to measurements (both sides) obtained in step 7).

10) Assemble shim packs for left and right sides according to final dimensions obtained in step 9).

11) Install left shim pack first, then install right shim pack. Install shim packs between bearing cup and housing. Position shims so that chamfered side is against spacers.

12) Install bearing caps and tighten bolts. Mount dial indicator on housing and check gear backlash setting. Take readings at four different locations 90° apart. If backlash readings are not within specifications or if readings vary more than .002", add shim thickness on one side and subtract from other side. Original total thickness must be maintained.

13) Backlash changes approximately .002" for every .003" change in shim dimension change. If backlash is greater than specification, increase shim thickness on left side and decrease on right side. If backlash is less than specification, decrease shim thickness on left side and increase on right side.

NOTE – *Total shim thickness (both sides added together) must remain unchanged.*

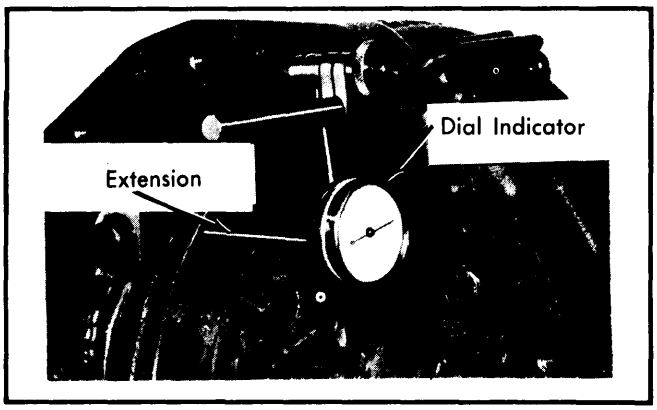

Fig. 12 Checking Gear Case Runout

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Bearing Cap Bolts	65
Ring Gear-to-Gear Case Bolts	90
Housing Cover Bolts	30
Pinion Cross Shaft Lock Screw	20
Pinion Flange-to-Yoke Flange	70

SPECIFICATIONS

Application	Measurement
Pinion Flange Maximum Runout	.014"
Side Bearing Preload	Slip Fit Plus .008"
Pinion Bearing Preload	
Used Bearings	5-10 INCH lbs.
New Bearings	15-30 INCH lbs.
Ring Gear-to-Pinion Backlash	
New Gears①	.005-.008"
Used Gears②	Re-establish Reading Found on Disassembly

① – Less than 3000 miles on gears.
② – More than 3000 miles on gears.