

REAR AXLE

Contents

| SUBJECT | PAR. | SUBJECT | PAR. |
|--|------|---------------------------------------|----------|
| GENERAL | N-1 | POWR-LOK DIFFERENTIAL | N-16 |
| REAR AXLE SHAFT AND BEARING REMOVAL | | Chatter | N-22 |
| Semi-Float-Tapered Axle Shaft | N-2 | Disassembly and Reassembly | N-19 |
| Semi-Float-Flanged Axle Shaft | N-3 | Torque Test | N-18 |
| Semi-Float-Flanged Axle Shaft Bearing Installation | N-4 | Trouble Symptoms | N-17 |
| REAR AXLE ASSEMBLY | N-5 | REAR AXLE ASSEMBLY INSTALLATION | N-29 |
| Cleaning and Inspection | N-11 | TRAC-LOK DIFFERENTIAL | N-20 |
| Differential Bearing Preload and Ring Gear Backlash Adjustment | N-15 | Lubrication | N-21 |
| Differential Case Disassembly | N-8 | Trouble Symptoms | N-22 |
| Differential Case Reassembly | N-13 | Disassembly | N-24, 25 |
| Differential Side Gear Adjustment | N-14 | Inspection | N-26 |
| Inspection and Servicing | N-6 | Reassembly | N-27 |
| Pinion Bearing Cup Removal | N-10 | Trac-Lok Unit Replacement | N-28 |
| Pinion Installation and Adjustments | N-12 | Backlash | N-31 |
| Pinion and Differential Bearing Removal | N-9 | TROUBLE SHOOTING | |
| Rear Axle Assembly Removal | N-7 | DIFFERENTIAL | N-30 |
| | | Rear Wheel Noise | N-32 |
| | | SERVICE DIAGNOSIS | N-33 |
| | | REAR AXLE SPECIFICATIONS | N-34 |

N-1. GENERAL

A semifloating rear axle assembly is standard on all Jeepster Series vehicles. Two models of similar design rear axles are used. See Specifications Chart, Par. N-34, for description and ratio. The axle model

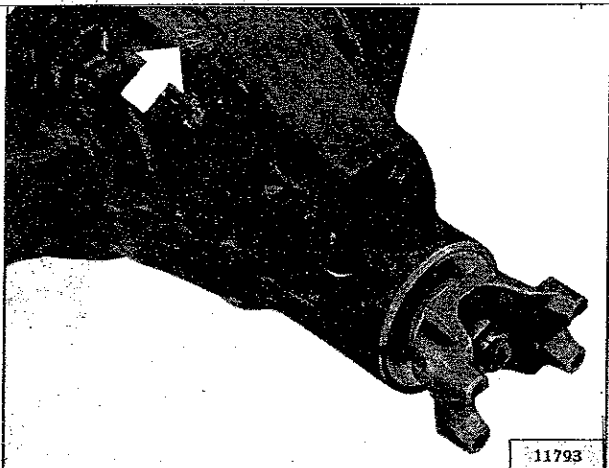


FIG. N-1—AXLE MODEL IDENTIFICATION

number is cast into the housing as illustrated in Fig. N-1. A metal tag under two adjacent differential housing cover cap screws is stamped to identify the number of teeth in the drive gear and pinion and notes the axle ratio. A Powr-Lok or Trac-Lok differential can be identified by a separate metal tag attached to the housing cover, as shown in Fig.

N-2. Information for wheel bearing adjustment is given in Section Q.

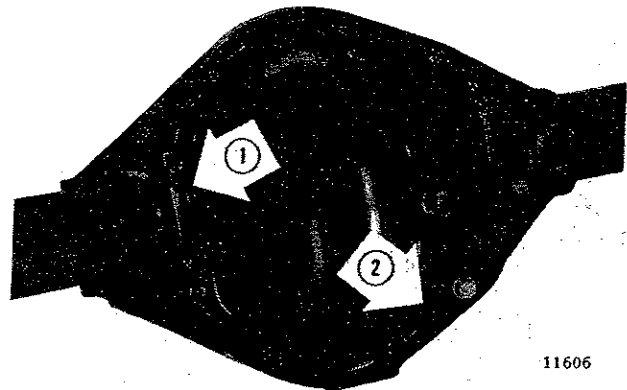


FIG. N-2—RATIO, POWR-LOK AND TRAC-LOK DIFFERENTIAL IDENTIFICATION

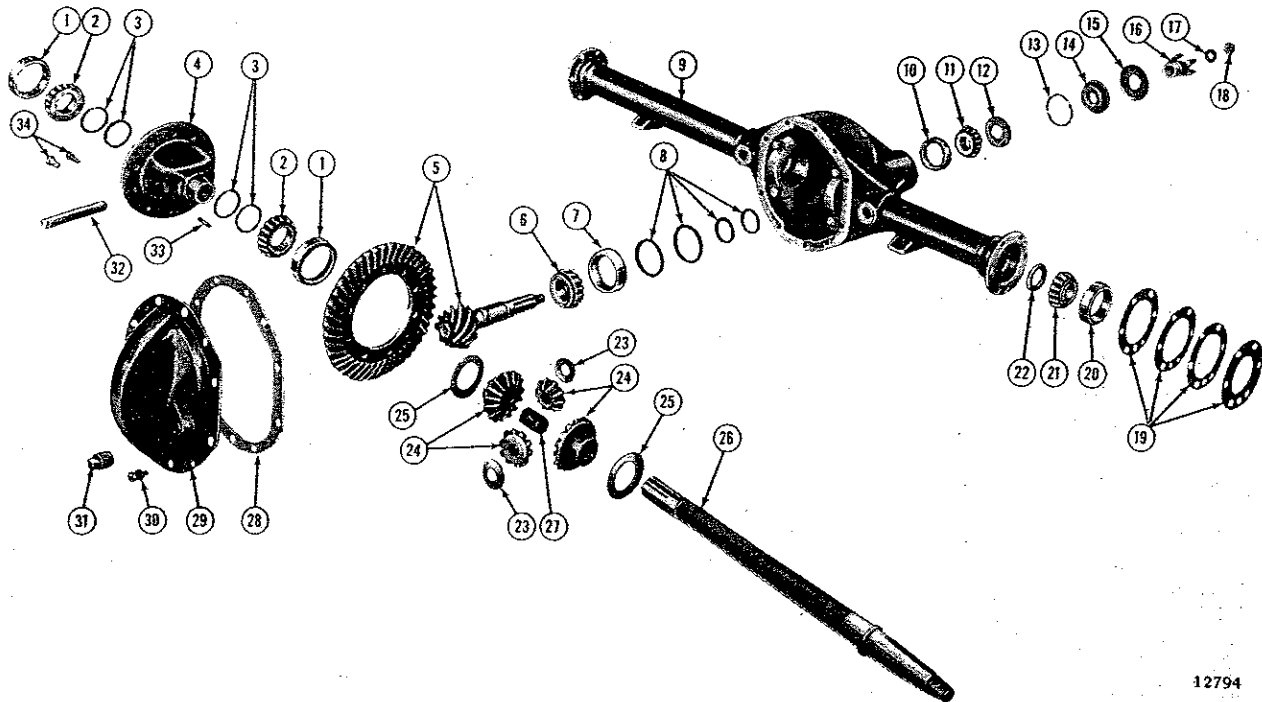
1—Ratio Tag

2—Powr-Lok or Trac-Lok Tag

N-2. REAR AXLE SHAFT REMOVAL AND INSTALLATION (Semi-Float Tapered Shaft)

Procedure for removing the rear axle shafts is as follows:

- Jack up the wheel and remove the hub cap.
- Remove wheel.
- Remove the axle shaft cotter pin, castle nut, and flat washer.
- Back off on brake adjustment eccentric.



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FIG. N-3—SEMIFLOATING REAR AXLE—TAPERED SHAFT

- | | | |
|--|-----------------------------|------------------------------|
| 1—Differential Bearing Cup | 12—Oil Slinger | 23—Thrust Washer |
| 2—Differential Bearing Cone and Rollers | 13—Gasket | 24—Differential Pinion Gears |
| 3—Shims | 14—Pinion Oil Seal | 25—Thrust Washer |
| 4—Differential Case | 15—Dust Shield | 26—Axle Shaft |
| 5—Ring Gear and Pinion | 16—Yoke | 27—Thrust Block |
| 6—Pinion Inner Bearing Cone and Rollers | 17—Flat Washer | 28—Gasket |
| 7—Pinion Inner Bearing Cup | 18—Pinion Nut | 29—Housing Cover |
| 8—Pinion Shims | 19—Wheel Bearing Shims | 30—Screw and Lock Washer |
| 9—Axle Housing | 20—Bearing Cup | 31—Filler Plug |
| 10—Pinion Outer Bearing Cup | 21—Bearing Cone and Rollers | 32—Differential Shaft |
| 11—Pinion Outer Bearing Cone and Rollers | 22—Oil Seal | 33—Lock Pin |
| | | 34—Ring Gear Screw |

e. Use Wheel Hub Puller C-319 to remove the wheel hub as shown in Fig. N-4.

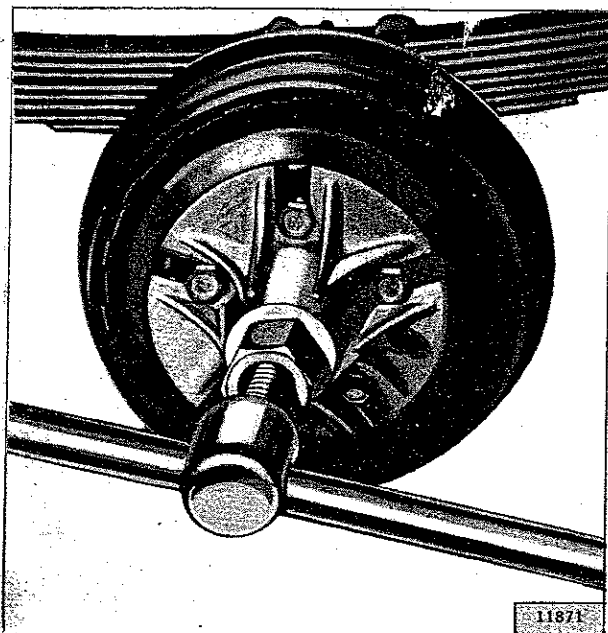


FIG. N-4—WHEEL HUB PULLER

f. Remove the screws attaching the brake dust protector, grease and bearing retainers, brake assembly, and shim to the housing.

g. Remove the hydraulic line from the brake assembly.

h. Remove the dust shield and oil seal.

i. Using Tool C-637 and Adapter Tool SP-342, remove the axle shaft bearing cone, roller, and cup as shown in Fig. N-5.

j. Should an axle shaft be broken, the inner end can usually be drawn out of the housing with a wire loop after the outer oil seal is removed. However, if the broken end is less than 8" [20.3 cm.] long it will usually be necessary to remove the differential assembly.

To remove the bearing from an axle shaft, use Combination Bearing Puller W-104-B shown in Fig. N-6.

Installation is the reverse of removal.

Note: Place the hub and drum on the axle shaft taper and then insert the axle shaft key in the keyway. Never install the key in the keyway before placing the hub and drum assembly on the axle shaft. Further, be sure that the axle shaft nut is torqued to a minimum of 150 lb-ft. [21 kg-m.].

Check the shaft oil seal before installing the rear axle. If replacement is necessary, use Axle Shaft

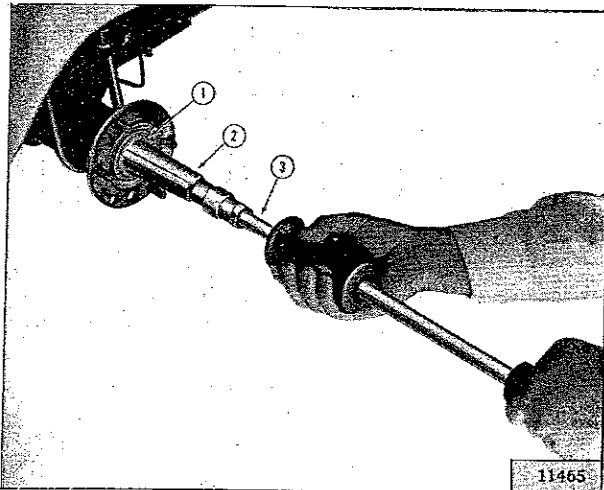


FIG. N-5—REMOVING TAPERED AXLE SHAFT
1—Cone and Roller 2—Axle 3—Tool C-637

Oil Seal Driver W-186, Fig. N-13.

Before installing the axle shaft nut cotter pin, adjust the wheel bearings as outlined in Section Q.

N-3. Rear Axle Shaft and Bearing Removal (Semi-Float-Flanged Shaft)

a. Jack up vehicle and remove wheels.

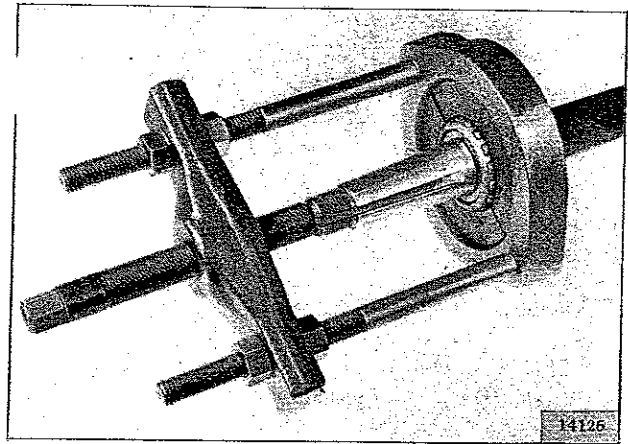


FIG. N-6—REMOVING AXLE SHAFT BEARING—
TAPERED SHAFT

b. Remove brake drum.

c. Remove axle shaft flange cup plug by piercing the center with a sharp tool and prying it out.

d. Using access hole in axle shaft flange remove nuts attaching backing plate and retainer to axle tube flange.

e. Attach axle shaft adapter tool W-343 and slide hammer handle C-637 to axle shaft flange and re-

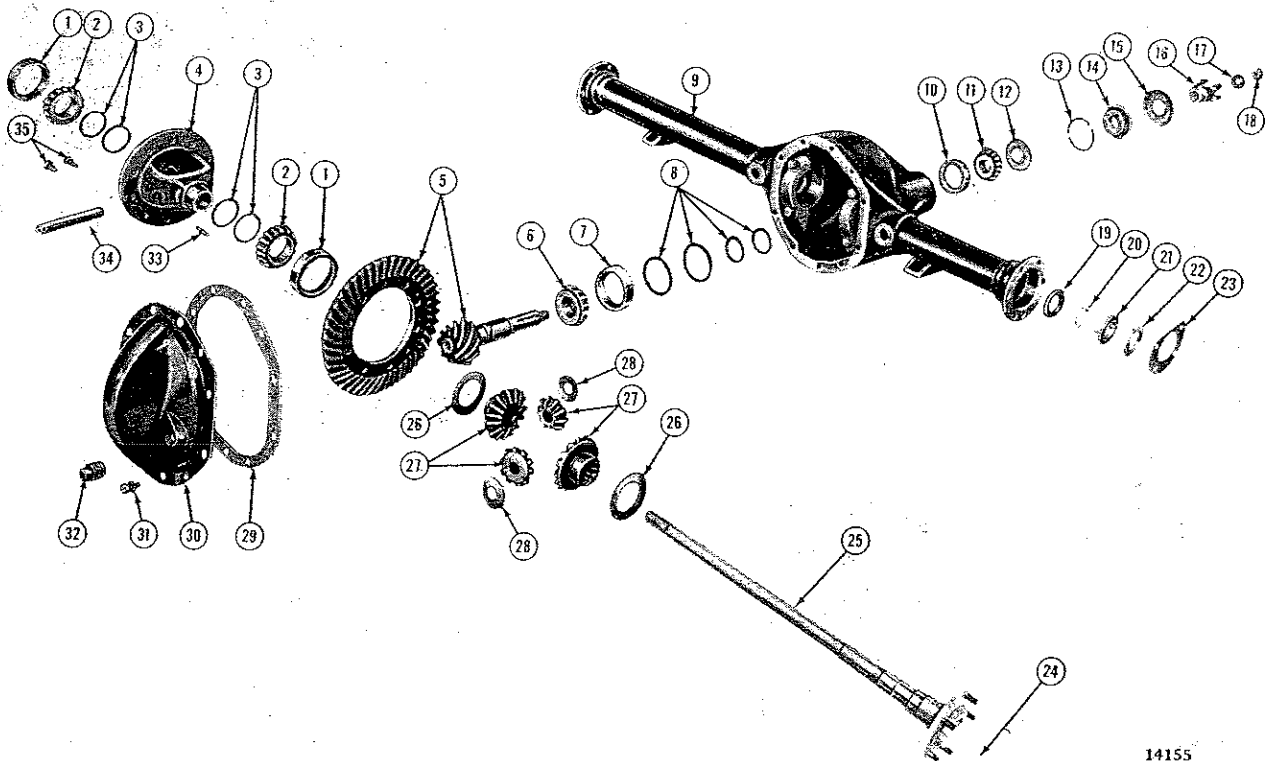


FIG. N-7—SEMI-FLOAT REAR AXLE ASSEMBLY—FLANGED SHAFT

- | | | |
|-----------------------------|------------------------------|------------------------------|
| 1—Differential Bearing Cup | 13—Gasket | 25—Axle Shaft |
| 2—Differential Bearing | 14—Pinion Oil Seal | 26—Thrust Washer |
| 3—Shims | 15—Dust Shield | 27—Differential Pinion Gears |
| 4—Differential | 16—Yoke | 28—Thrust Washer |
| 5—Ring Gear and Pinion | 17—Flat Washer | 29—Gasket |
| 6—Pinion Inner Bearing | 18—Pinion Nut | 30—Housing Cover |
| 7—Pinion Inner Bearing Cup | 19—Axle Housing Oil Seal | 31—Screw and Lockwasher |
| 8—Pinion Shims | 20—Axle Shaft Retainer Ring | 32—Filler Plug |
| 9—Axle Housing | 21—Axle Shaft Bearing | 33—Lock Pin |
| 10—Pinion Outer Bearing Cup | 22—Axle Shaft Oil Seal | 34—Differential Shaft |
| 11—Pinion Outer Bearing | 23—Axle Shaft Retainer Plate | 35—Ring Gear Screw |
| 12—Oil Slinger | 24—Axle Shaft Cup Plug | |

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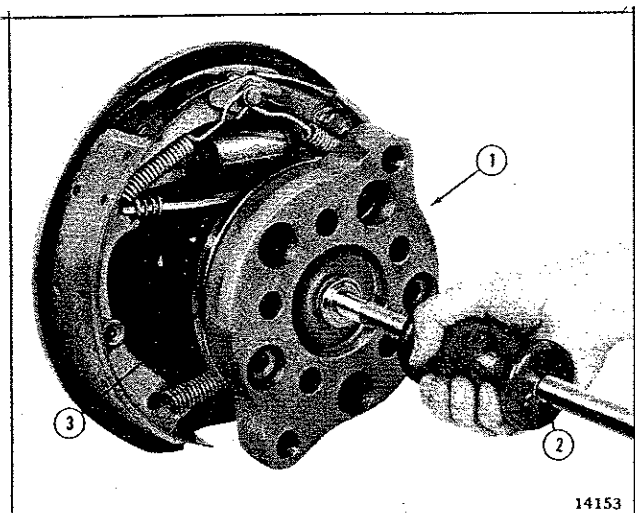


FIG. N-8—REMOVING FLANGED AXLE SHAFT

- 1—Flange Adapter Tool W-343
2—Tool C-637
3—Axle Flange

move axle shaft, as shown in Fig. N-8.

Note: Make certain the old bearing cup has been removed from the axle housing.

f. Remove axle shaft oil seal from axle housing tube using tool C-637.

g. Wipe axle housing tube seal bore clean and install a new oil seal using driver tool W-186, as shown in Fig. N-13.

Caution: Under no circumstances should axle shaft retaining rings or bearings be removed using a torch, because heat is fed into the axle shaft bearing journal and thereby weakens this area.

h. Position the axle shaft assembly in a heavy vise and using a chisel cut a deep groove into the retaining ring. This will enlarge bore of retaining ring, or split the ring and permit it to be driven off of axle shaft. Refer to Fig. N-9.

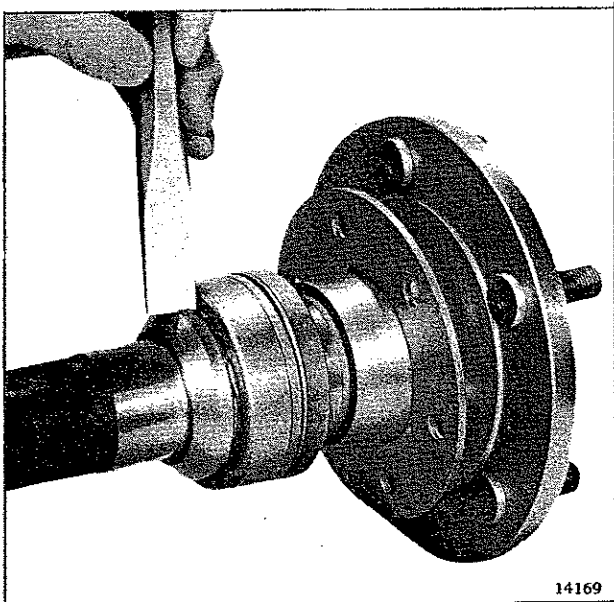


FIG. N-9—NOTCHING BEARING RETAINING RING

i. Using a hacksaw, cut through the oil seal, being careful not to damage the seal contact surface. Remove oil seal from axle shaft.

Important: Thoroughly lubricate W-343 puller bolts and bolt contact points before attempting to remove bearing from axle shaft. **DO NOT USE POWER OPERATED IMPACT TOOLS ON PULLER BOLTS.**

j. Attach puller tool W-343 to axle shaft using the flange stud nuts. Position puller bolts against dimples of holding ring and alternately tighten until bearing is pressed from shaft, as shown in Fig. N-10.

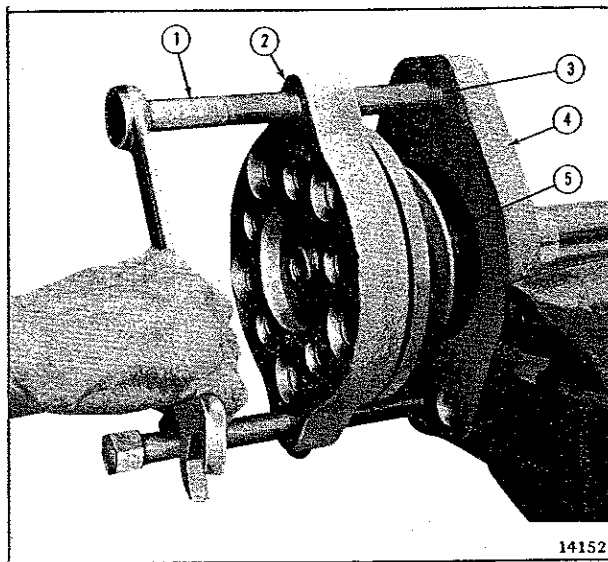


FIG. N-10—REMOVING AXLE SHAFT BEARING

- 1—Bolt
2—Flange Adapter
3—Dimple in Holding Ring
4—Holding Ring
5—Adapter Plates

N-4. Rear Axle Shaft and Bearing Installation (Semi-Float-Flanged Shaft)

a. Inspect the axle shaft oil seal journal for scratches and polish with fine crocus cloth if necessary.

b. Install retainer plate on the axle shaft.

c. Apply grease to the new oil seal cavity between the seal lips and carefully slide seal, on the axle shaft seal seat. The outer face of the seal must be toward the axle flange.

d. Pack the bearing full of grease prior to installation, using the proper lubricant.

e. Install the unit bearing on the axle shaft making certain the cup rib ring is facing the axle flange.

f. Install the bearing retainer ring on the axle shaft.

g. Using puller tool W-343, press the new axle shaft bearing and retainer ring on the axle shaft simultaneously. Tighten puller bolts alternately until the bearing and retainer ring are properly seated against the shaft shoulder. Refer to Fig. N-11 and N-12.

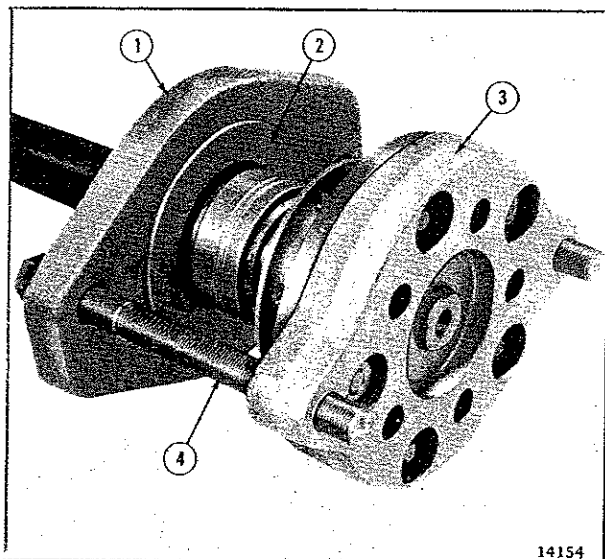


FIG. N-11—INSTALLING AXLE SHAFT BEARING

- 1—Holding Ring
- 2—Adapter
- 3—Flange Adapter
- 4—Bolt

Note: Make certain the old bearing cup has been removed from the axle housing before the axle shaft and new unit bearing is installed into the axle housing.

h. Install axle shaft through the backing plate using care not to damage the axle housing tube inner oil seal.

i. Apply a thin coating of lubricant to the outside diameter of the bearing cup prior to installing in the bearing bore.

j. Tap end of flanged shaft lightly with a rawhide mallet to position the axle shaft bearing in the housing bearing bore.

k. Attach the axle shaft retainer and brake backing plate to the axle tube flange. Secure with nuts

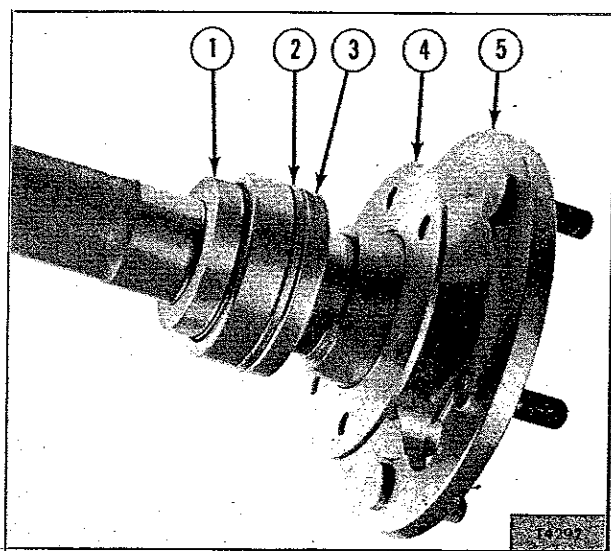


FIG. N-12—AXLE SHAFT BEARING INSTALLED

- 1—Retainer Ring
- 2—Unit Bearing
- 3—Seal
- 4—Retainer Plate
- 5—Axle Shaft Flange

and lockwashers. Torque 25 to 35 lb. ft. [3,4-4,8 kg-m.].

l. Install a new cup plug into the axle shaft flange hole.

m. Install the brake drum, and rear wheel assembly.

N-5. REAR AXLE ASSEMBLY

The following paragraphs (Pars. N-5 through N-15) describe the removal, disassembly, assembly and services performed on rear axle assemblies having conventional differentials. Pars. N-16 through N-28 describe the services to be performed on rear axle assemblies having Powr-Lok and Trac-Lok differentials.

Note: The full floating front axle differential assembly is similar to the rear axle differential and is removed, inspected, disassembled, and assembled in the same manner as the rear axle differential covered in this section.

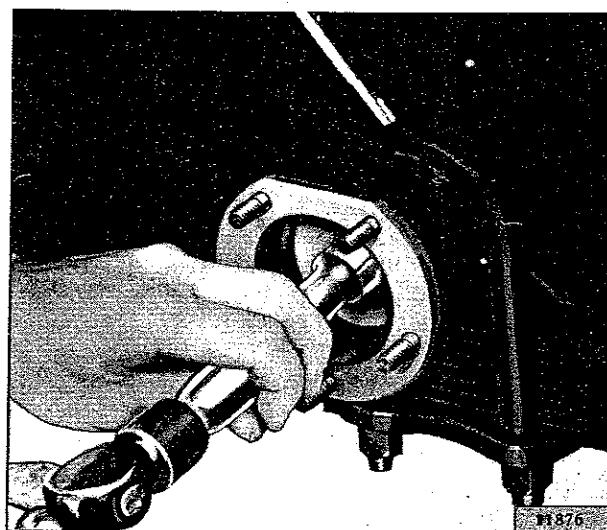


FIG. N-13—OIL SEAL DRIVER

Note: The pinion shaft oil seal is serviced in the vehicle when replacement is necessary. Refer to Fig. N-14.

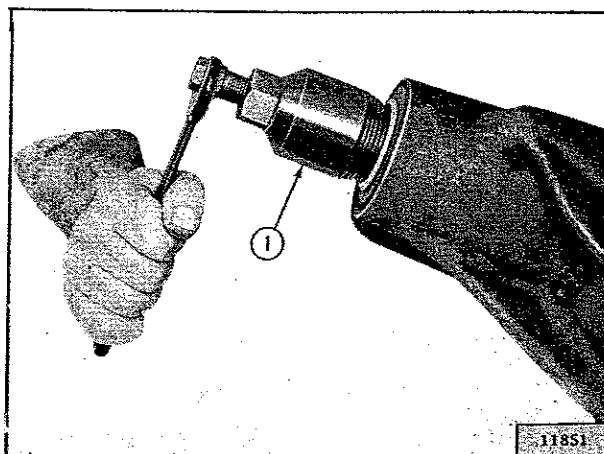


FIG. N-14—REMOVING PINION SHAFT OIL SEAL

- 1—Tool W-251

N-6. Inspection

Refer to Fig. N-3 and N-7.

Before disassembling the differential, it is advisable to determine through inspection the cause of the failure. Inspection procedure is as follows:

- Drain lubricant and remove housing cover and gasket.
- Clean the differential parts thoroughly with solvent.
- Carefully inspect all parts.

Should it be determined by inspection that the differential requires overhauling, the axle must first be removed from the vehicle.

Note: All service replacement axle assemblies are shipped from the factory without lubricant in the differential. Lubricant must be added to the differential before the axles are installed in vehicles. Use the grade and quantity of lubricant specified in the Lubrication Chart.

After the axle has been installed in the vehicle, check to be sure the lubricant level in the differential is up to the filler plug opening.

N-7. Rear Axle Removal

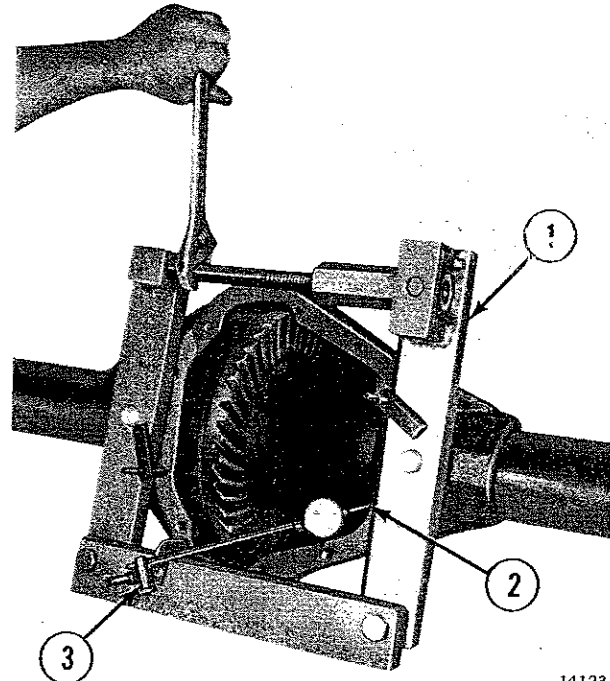
To remove the rear axle, proceed as follows:

- Raise the rear of the vehicle with a hoist. Safely support the frame ahead of the rear springs.
- Remove the wheels.
- Disconnect the propeller shaft at the rear yoke.
- Disconnect the shock absorbers at the axle mounting.
- Disconnect the brake hydraulic hose at the tee fitting on the axle just below the left frame side rail. Tape ends of hose to keep out dirt.
- Disconnect the parking brake cable at the frame mounting.
- Support the axle housing on a jack.
- Remove the axle U-bolts.
- Slide the axle from under the vehicle.

N-8. Differential Case Disassembly

Refer to Fig. N-3 and N-7.

- Remove the axle shafts. Refer to Par. N-7 for rear axle removal and Par. M-4 for front axle removal.
- Remove the housing cover and four cap screws holding the two differential side bearing caps in position. Make sure there are matching letters or some type of identification marks on the caps and housing so that each cap can be reinstalled in the same position and location from which it is removed.
- Use Spreader W-129, as shown in Fig. N-15, to spread the housing. Install Hold-Down Clamps W-129-18, if available, to keep the spreader in position. Clamp on a dial indicator. From the side, measure the carrier spread. Do not spread the carrier more than .020" [0.508 mm.].
- Remove the dial indicator.



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FIG. N-15—DIFFERENTIAL CARRIER SPREADER TOOL W-129

- 1—Spreader W-129
- 2—Dial Indicator and Pointer
- 3—Dial Indicator Clamp

Note: When removing the axle differential from the rear axle housing, use Spreader Tool No. W-129.

- Carefully pry the differential case loose, using pry bars at the heads of the ring gear bolts and carrier casting.
- Remove spreader immediately to prevent the possibility of the carrier taking a set.
- Remove the screws holding the ring gear to the differential case.
- With a small punch, as shown in Fig. N-16, drive out the lock pin.
- Remove the differential shaft and thrust block.

Note: Thrust block used with semi-float tapered axle shaft only. Refer to Fig. N-3.

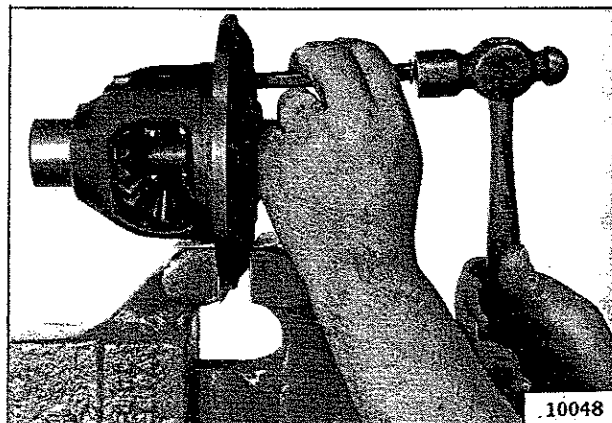


FIG. N-16—REMOVING LOCK PIN

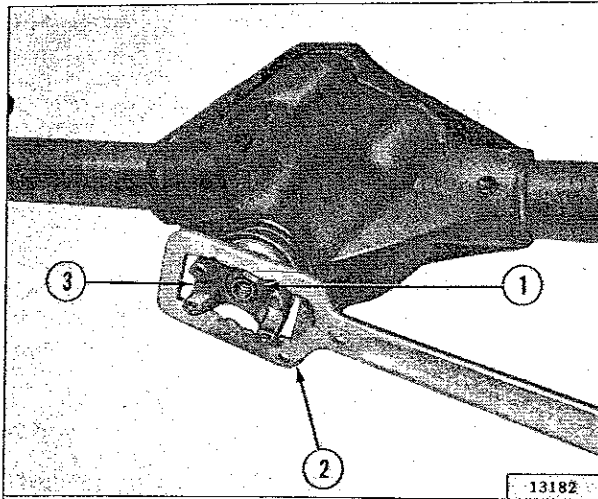


FIG. N-17—END YOKE HOLDING WRENCH

- 1—Nut
2—Wrench C-3281
3—Yoke

j. Carefully so as not to lose the thrust washers, remove the differential pinion gears.

k. With Tool C-3281 to hold the shaft as shown in Fig. N-17, remove the nut. With Puller W-172 remove the yoke as shown in Fig. N-18.

l. Using a rawhide hammer, drive on the end of the pinion shaft to force the pinion out of the differential housing.

Note: Pinion bearing adjusting shims may remain on the pinion shaft; stick to the bearing which is still in the housing; or fall out loose. These shims should be collected and kept for reassembly.

m. Remove outer pinion bearing cone, baffle and oil seal by using a 2" x 2" piece of hardwood or a length of pipe and drive out through the neck of the carrier housing. Discard seal.

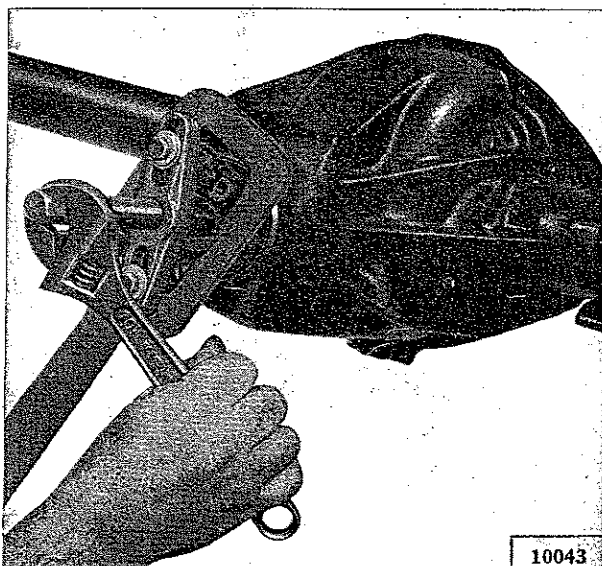


FIG. N-18—END YOKE PULLER

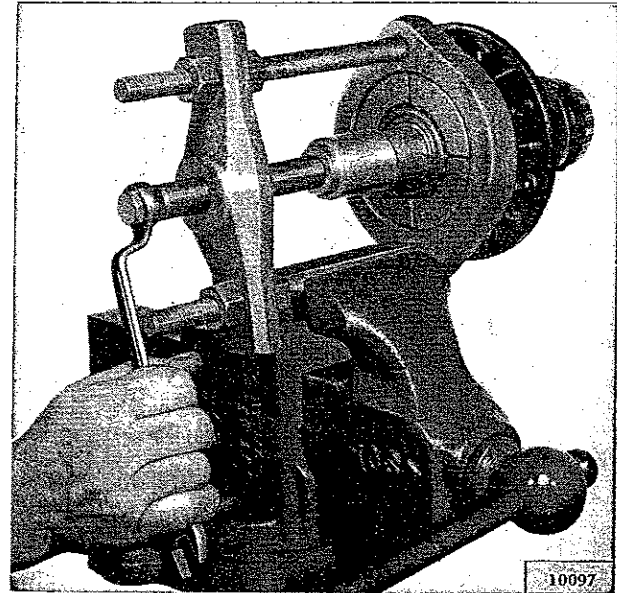


FIG. N-19—REMOVING CONE AND ROLLER WITH PULLER

N-9. Pinion and Differential Case Bearing Removal

Refer to Fig. N-3 and N-7.

To remove the differential bearing cones and rollers and pinion inner bearing cone and roller, use Bearing Puller W-104-B as shown in Fig. N-19. Use of the puller assures easy removal of bearings without damage to cone rollers as pulling pressure is applied directly to the bearing cone.

N-10. Pinion Bearing Cup Removal

Note: The differential carrier housing has recesses in the casting to permit the use of a brass drift to drive the inner and outer bearing cups from the housing.

a. Using a brass drift, drive the pinion inner bearing cup and shims from the housing. Even if mutilated, these shims should be kept for proper assembly of differential.

b. Using a brass drift, drive the outer pinion cup from the housing.

N-11. Cleaning and Inspection

a. Clean all parts in fast evaporating mineral spirits or a dry cleaning solvent and with the exception of bearings, dry with compressed air.

b. Inspect differential bearing cones, cups and rollers for pitting, galling or other visible damage.

c. Inspect differential case for elongated or enlarged pinion shaft hole. The machined thrust washer surface areas and counterbores must be smooth and without metal deposits or surface imperfections. If any of the above conditions exist, satisfactory correction must be made or the case replaced. Inspect case for cracks or other visible damage which might render it unfit for further service.

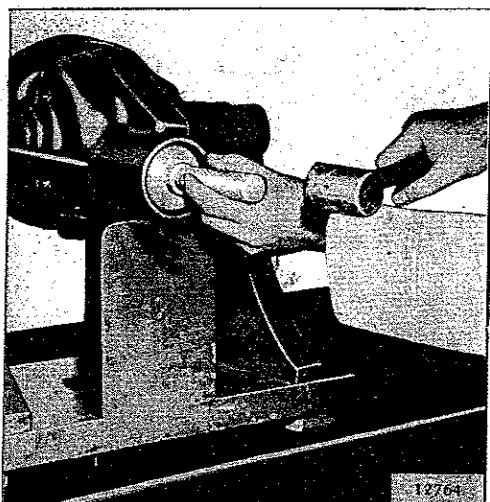


FIG. N-20—INSTALLING OUTER BEARING CUP

d. Inspect differential pinion shaft for excessive wear in contact area of differential pinions. Shaft should be smooth and round with no scoring or metal pickup

e. Inspect differential side gears and pinions; they should have smooth teeth with a uniform contact pattern without excessive wear or broken surfaces. The differential side gear and pinion thrust washers should be smooth and free from any scoring or metal pickup.

f. Inspect axle shaft thrust block for excessive wear or visible damage. The wear surface on the opposite ends of the blocks, must be smooth.

Note: Thrust block used with semi-float tapered axles only.

g. Inspect differential pinion shaft lock pin for damage or looseness in case. Replace pin or case as necessary.

h. Inspect drive gear and pinion for worn or chipped teeth or damaged attaching bolt threads. If replacement is necessary, replace both the drive gear and drive pinion as they are available in matched sets only.

i. Inspect drive pinion bearing cones, cups and rollers for pitting, galling, excessive wear, or other visible damage. If inspection reveals that either are unfit for further service, replace both cup and cone.

j. Inspect differential carrier for cracks or other visible damage which would render it unfit for further service. Raised metal on the shoulder of bearing cup bores incurred in removing pinion cups should be flattened by use of a flat nose punch.

k. Inspect drive pinion for damaged bearings journals and mounting shim surface or excessively worn splines. If replacement is necessary, replace both the drive pinion and drive gear as they are available in matched sets only.

l. Inspect companion flange for cracks, worn splines, pitted, rough or corroded oil seal contacting surface. Repair or replace companion flange as necessary.

m. Inspect drive pinion bearing shim pack for broken, damaged or distorted shims. Replace if

necessary during establishment of pinion bearing preload.

N-12. Pinion Installation and Adjustment

Refer to Fig. N-3 and N-7.

Adjustment of the pinion is accomplished by the use of shims placed between the inner bearing cup and the axle housing and between the pinion shoulder and the outer bearing. The shims behind the inner bearing cup adjust the position of pinion in relation to the ring gear. The shims behind the outer bearing adjust the pinion inner and outer bearing preload. Install the pinion as follows:

a. Install outer bearing cup using Tool W-264 on model 27 and W-126 on model 44 axles, as shown in Fig. N-20.

b. Install the inner bearing cup using Tool W-126 on model 27 and 30 axles, and Tool W-344 on model 44 axles to drive the cup into the housing.

c. Use Tool C-3095 to press the inner bearing cone and roller onto the pinion shaft on axle Model 44. Other models use Tool W-262 as shown in Fig. N-21.

d. Place the pinion in the housing and install a .065" [1,651 mm.] shim, the inner cone and roller, sleeve SP-1997 from Tool W-162, and the pinion nut.

e. Select the proper pinion adjusting gauge to obtain the correct reading for the differential model. The pinion adjusting fixture must first be set by the use of a master gauge which is included in the

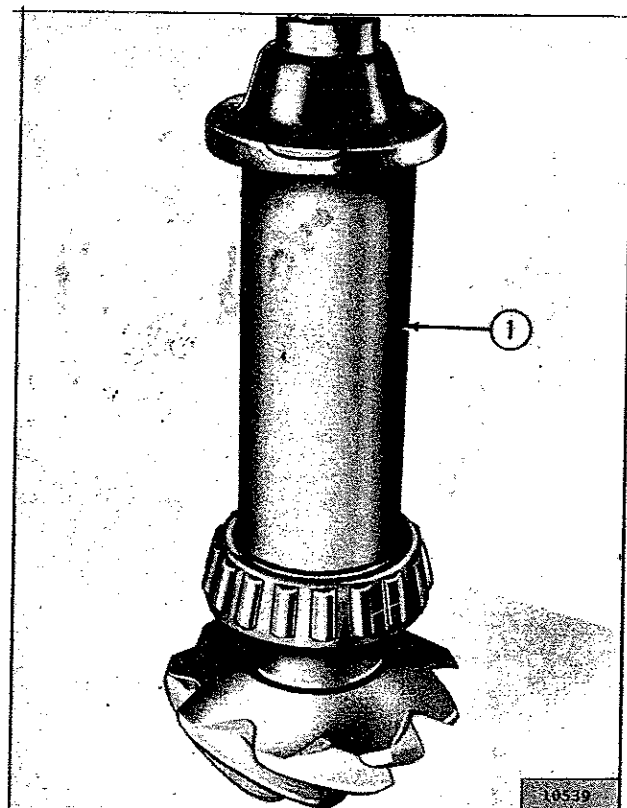


FIG. N-21—PINION BEARING INSTALLING SLEEVE

1—Sleeve

W-99 Kit. Gauge block W-101-A-24 or SP5433 is stamped with the letter H which indicates it is used to set the adjusting fixture on Model 27AF axle differentials. Gauge block W-101-A-22 or SP5453 is stamped with the letters D, G, F, A, C, E and B. Use the letter E for Model 44 axle differentials. When installing the pinion in the Model 30 rear axle, use Master Gauge Tool SP-5291 and gauge block lettered "K". Tool SP-5264 is used with the dial indicator in W-99 Tool Set for setting pinion. After selecting the proper gauge, the adjusting fixture can be set as follows:

- f. Place the gauge block against the machined surface of the dial indicator mount, as shown in Fig. N-23.
- g. Set the dial indicator on zero by rotating the face.
- h. Install the pinion adjusting fixture on the pinion with the stationary guide pin and the adjustable guide pin seated in pinion shaft lathe centers, as shown in Fig. N-22.

Note: Use the "C" type alignment fixture vertically as shown in Fig. N-24, so that weight of jig assembly is always directly centered and supported on pinion shaft center. The function of the fixture is to accurately hold the dial indicator and its mount in alignment to the pinion shaft while it is pivoted on the stationary guide pin. If a consistent repeat dial reading cannot be obtained, look for dirty or burred pinion centers or a bent or twisted aligning jig. Keep jig flat in metal case when not in use. Do not allow other tools to rest on it. Treat the C-type fixture tool carefully as a precision instrument.

- i. Seat the gauge mount firmly on the pinion head and swing the dial indicator through the differential bearing bore as shown in Fig. N-24.
- j. The lowest reading indicates the center of the differential bearing bore. At this point the dial indicator should read the same as mark etched on the pinion head. If the reading does not agree, add or

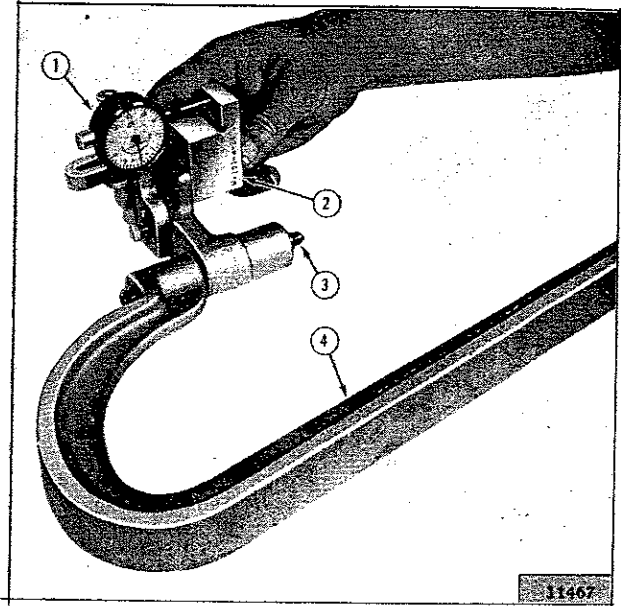


FIG. N-23—SETTING PINION GAUGE FOR MODEL 27AF AXLE DIFFERENTIAL.

- | | |
|------------------|------------------|
| 1—Dial Indicator | 3—Stationary Pin |
| 2—Gauge Block | 4—C-Clamp |

remove the shims behind the bearing cup until the readings agree.

- k. The end of each pinion is etched with a plus (+) number, a minus (−) number or zero (0) number to indicate the best running position for each particular gear set. This dimension is controlled by shimming behind the inner pinion bearing cup. Therefore if a pinion is etched (+2), this pinion would require .002" less shims than a pinion etched "0". By removing shims the mounting distance is *increased* which is just what a (+2) etching indicates. Or if a pinion is etched (−2), add .002" more shims than would be required if the pinion were etched "0". By adding .002" shims the

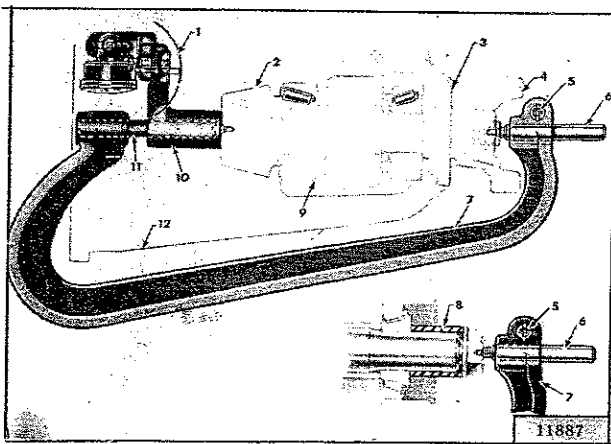


FIG. N-22—PINION ADJUSTING FIXTURE

- | | |
|------------------------|-------------------------|
| 1—Dial Gauge Swing Arc | 7—C-Clamp |
| 2—Pinion | 8—Sleeve Bearing |
| 3—Flange | 9—Inner Bearing |
| 4—Yoke | 10—Housing |
| 5—Thumb Screw | 11—Stationary Guide Pin |
| 6—Guide Pin | 12—Pinion Housing |

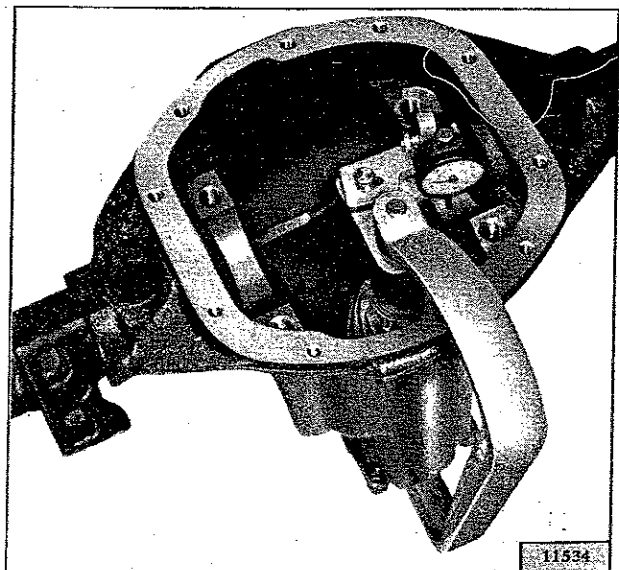


FIG. N-24—CHECKING PINION ADJUSTMENT

mounting distance is decreased which is just what a (−2) etching indicates.

Note: To increase the dial reading decrease shims; to decrease the dial reading increase shims. Example: With a dial reading of minus .001" and a pinion marking of plus .002" remove .003" shims to obtain a higher dial reading of plus .002"

l. If the original ring and pinion set is to be re-used, measure the old pinion shim pack and build a new shim pack to this dimension. Collect shim pack saved from teardown. Measure each shim separately with a micrometer and add together to get total shim pack thickness from original buildup. Note the (+) or (−) etching on both the old pinion and the new one, and adjust the thickness of new shim pack to compensate for the difference between these two figures. Refer to chart for example. If the old pinion reads (+2) and the new pinion is (−2), add .004" shims to the original pack dimension. Now build a new shim pack to this resulting dimension.

m. When the correct adjustment is reached, remove the pinion adjusting fixture and sleeve SP-1997. Install outer bearing.

n. Install only the oil slinger, the yoke, the flat washer, and the pinion nut. Holding the yoke with Flange Holder C-3281, torque the nut 200 to 220 lb-ft. [27,65 a 30,42 kg-m.].

o. Using Inch-Pound Torque Wrench W-297 on the nut check the rotating torque. The rotating torque should be 10 to 25 lb-in. [0,115 a 0,288 kg-m.].

Note: Disregard starting torque.

| Old Pinion Marking | NEW PINION MARKING | | | | |
|--------------------|--------------------|--------|--------|--------|--------|
| | −4 | −3 | −2 | −1 | 0 |
| +4 | +0.008 | +0.007 | +0.006 | +0.005 | +0.004 |
| +3 | +0.007 | +0.006 | +0.005 | +0.004 | +0.003 |
| +2 | +0.006 | +0.005 | +0.004 | +0.003 | +0.002 |
| +1 | +0.005 | +0.004 | +0.003 | +0.002 | +0.001 |
| 0 | +0.004 | +0.003 | +0.002 | +0.001 | 0 |
| −1 | +0.003 | +0.002 | +0.001 | 0 | −0.001 |
| −2 | +0.002 | +0.001 | 0 | −0.001 | −0.002 |
| −3 | +0.001 | 0 | −0.001 | −0.002 | −0.003 |
| −4 | 0 | −0.001 | −0.002 | −0.003 | −0.004 |

| Old Pinion Marking | NEW PINION MARKING | | | | |
|--------------------|--------------------|--------|--------|--------|--|
| | +1 | +2 | +3 | +4 | |
| +4 | +0.003 | +0.002 | +0.001 | 0 | |
| +3 | +0.002 | +0.001 | 0 | −0.001 | |
| +2 | +0.001 | 0 | −0.001 | −0.002 | |
| +1 | 0 | −0.001 | −0.002 | −0.003 | |
| 0 | −0.001 | −0.002 | −0.003 | −0.004 | |
| −1 | −0.002 | −0.003 | −0.004 | −0.005 | |
| −2 | −0.003 | −0.004 | −0.005 | −0.006 | |
| −3 | −0.004 | −0.005 | −0.006 | −0.007 | |
| −4 | −0.005 | −0.006 | −0.007 | −0.008 | |

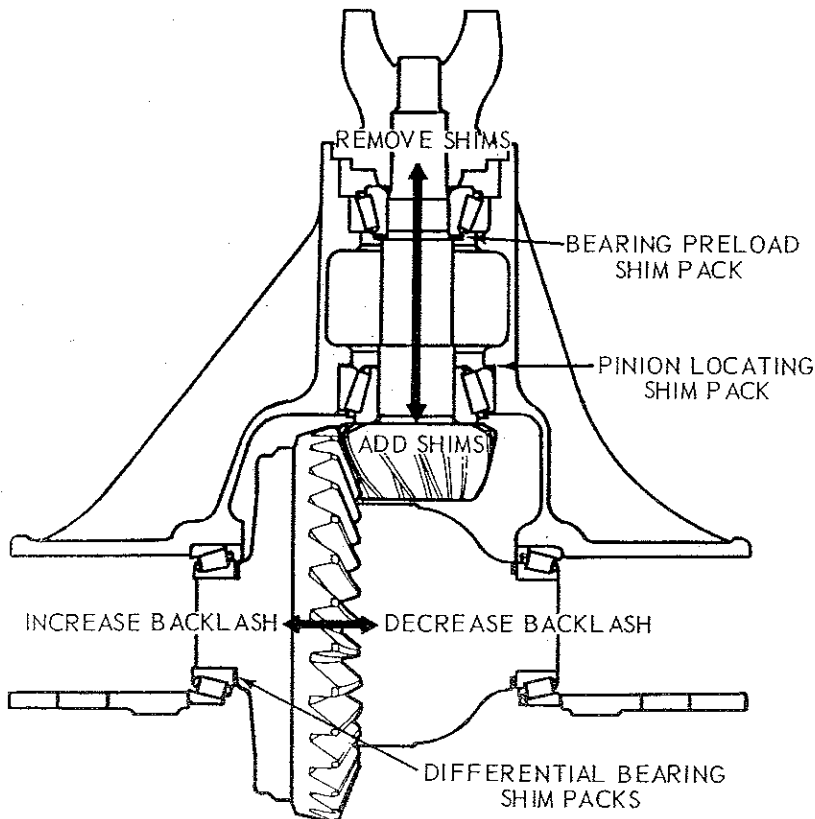


FIG. N-25—DIFFERENTIAL SHIM PACK LOCATIONS

p. Add or remove shims between the pinion outer bearing and the pinion shaft to obtain correct torque reading.

N-13. Differential Case Reassembly

Procedure for assembling the differential case on semifloating rear axles is as follows:

- Reassemble the differential pinions, side gears, thrust washers, and shaft in relative position shown in Fig. N-3 and N-7. Make sure the spacers are installed.
- Install differential shaft lock pin.
- Check side gear clearance as described in Par. N-14.
- Examine contacting surfaces of ring gear and differential case for burrs or foreign matter.
- Assemble ring gear on differential case with assembly hole on each lined up.
- Tap ring gear into place with mallet.
- Install ring gear screws. Torque 35 to 55 lb-ft. [4,84 a 7,60 kg-m.].

N-14. Adjustment of Differential Side Gears

Clearance between the differential side gears and differential case should be .000" to .006" [0,000 a 0,192 mm.]. Procedure for checking clearance is as follows:

- With the differential positioned as shown in Fig. N-26, tap the differential lightly on a flat surface so the differential gears settle into proper position.
- Measure the clearance between side gears and the case with leaf feeler gauge as illustrated.
- If the clearance exceeds .006" add shims between the side gears and the case. To bring the clearance within specified tolerance, shims in these thicknesses are available. .004" [0,102 mm.], .006" [0,152 mm.], .008" [0,203 mm.]. If shims are required, at least one shim should be placed on each side and the shim packs kept as even as possible. After adding shims, repeat the clearance check.

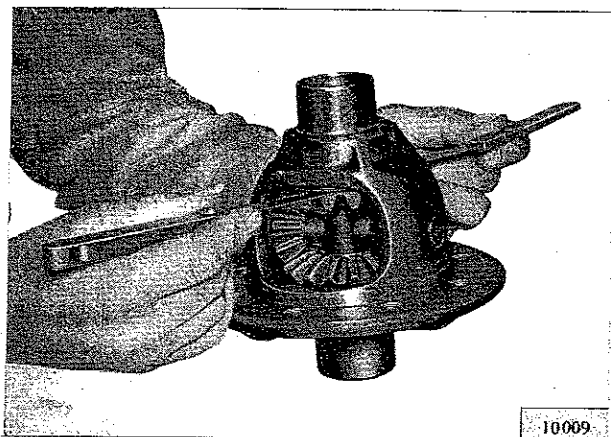


FIG. N-26—CHECKING SIDE GEAR CLEARANCE

N-15. Adjustment of Differential Bearing Preload and Ring Gear Backlash

Refer to Fig. N-25.

The adjustment of the differential bearings is maintained by the use of shims placed between the differential case and the differential bearing. Procedure for adjusting bearing preload is as follows:

- Install the differential case and bearings in the axle housing without shims and with the bearing cups snug.
- Holding the ring gear in contact with the pinion and using a screwdriver blade to move the differential bearing cups toward the center, insert feeler gauge on each side between differential bearing cup and the axle housing. There should be only .001" to .002" [0,025 a 0,051 mm.] backlash remaining with the feeler gauge inserted.
- After the shim pack requirement for each bearing has been established remove the differential assembly. Make up shim packs and keep them separated.
- Add an additional .015" [0,381 mm.] thickness of shims to the pack on the tooth side of the ring gear.
- Place the differential bearing shim packs on the differential case under each bearing. Install bear-

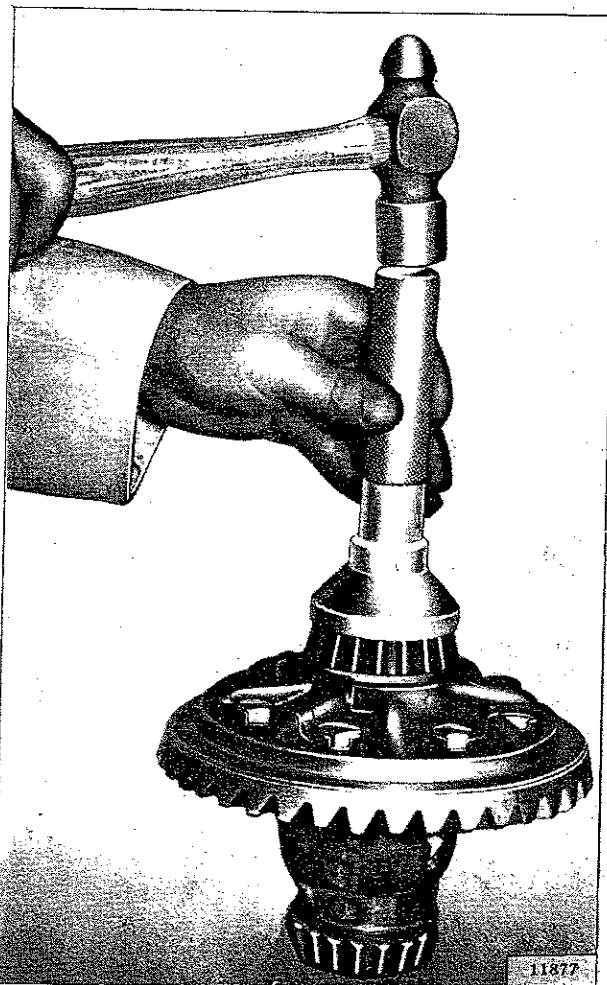


FIG. N-27—DIFFERENTIAL BEARING DRIVER

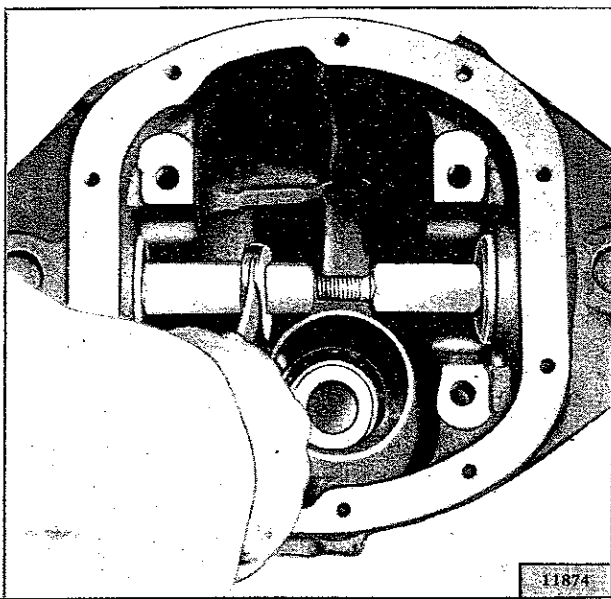


FIG. N-28—INSTALLING INNER OIL SEALS—
MODEL 27 FRONT AXLE DIFFERENTIAL

ings with Driver C-3716 for Model 27AF and 30 axles and Driver W-188 for Model 44 axles. See Fig. N-27.

Note: When overhauling the Model 27AF front axle differential, check the axle inner oil seals. Should new seals be required, install them using Tool W-128 as shown in Fig. N-28. When installing the axle differential in the axle housing, use Spreader Tool W-129.

f. Attach the Carrier Spreader W-129, (see note Par. N-8) install a dial indicator, (Fig. N-15) and spread the carrier a maximum of .020" [0,508 mm.].

g. Remove the indicator.

h. Lubricate bearings and place the differential in the carrier.

i. Tap the unit carefully into place with soft mallet, making sure the ring gear teeth mesh with the pinion teeth.

j. Install bearing caps, matching their markings with those on the carrier.

k. Apply sealing compound to the screw threads. Torque the screws 70 to 90 lb-ft. [9,68 a 12,44 kg-m.].

l. Install dial indicator to check ring gear backlash (Fig. N-29). Check backlash at two points. Backlash must be held between .005" to .010" [0,127 a 0,254 mm.]. If backlash does not fall within specifications, shims should be interchanged between the two differential bearing shim packs until correct backlash is obtained.

Note: Changing the position of a .005" [0,127 mm.] shim from one side to the other will change the amount of backlash approximately .003" [0,076 mm.].

m. Check ring gear for runout. A reading in excess of .006" [0,152 mm.] indicates a sprung differential

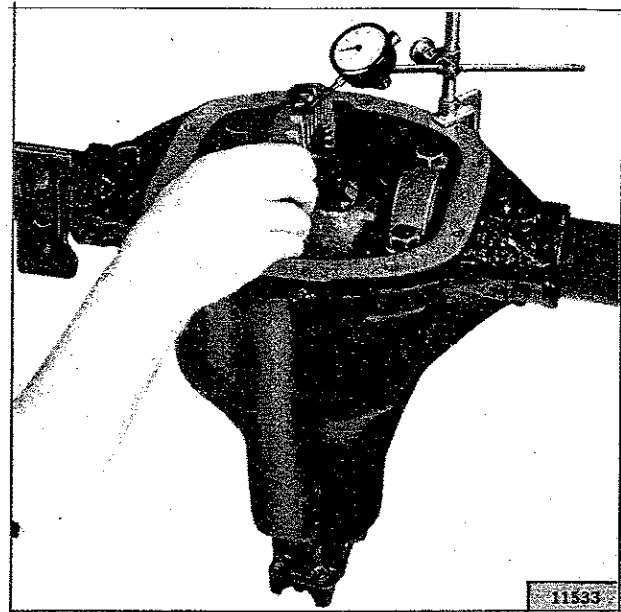


FIG. N-29—CHECKING RING GEAR BACKLASH

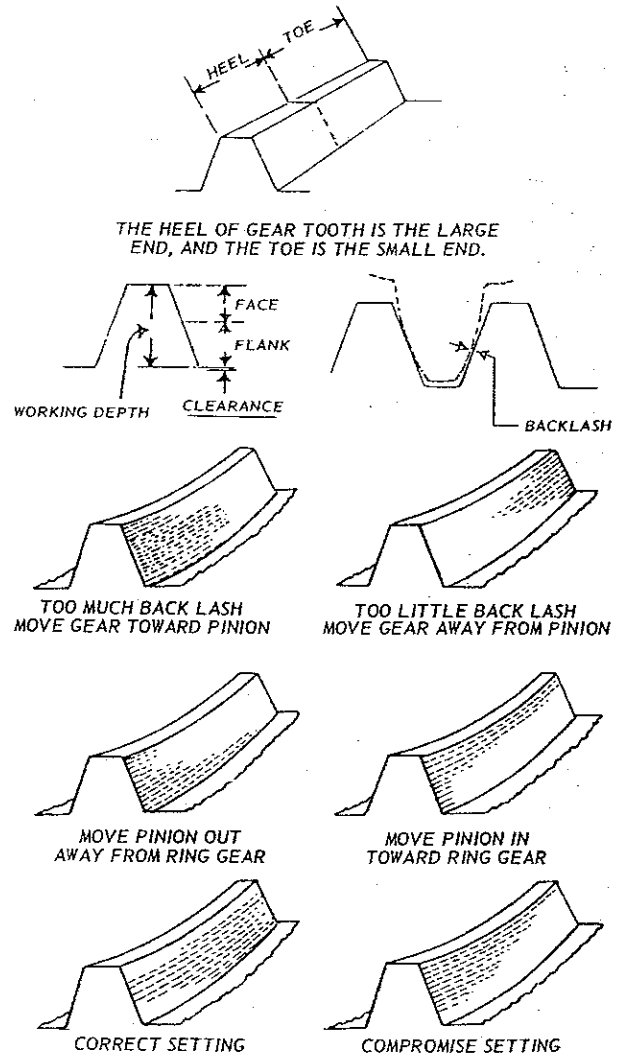


FIG. N-30—GEAR TOOTH CONTACT

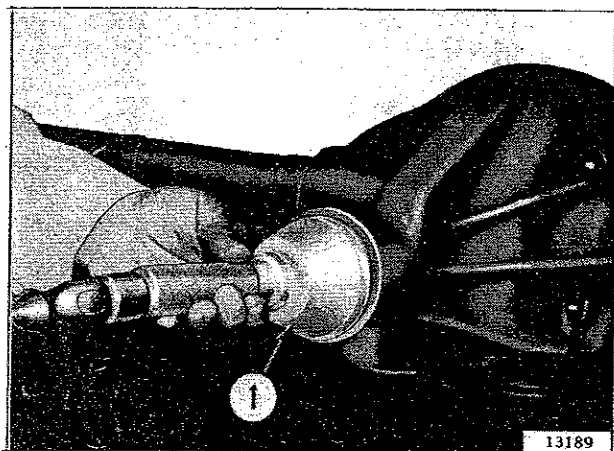


FIG. N-31—PINION SHAFT OIL SEAL INSTALLER

1—Tool W-147

case, dirt between the case and the gear, or loose ring gear screws.

n. In order to assist in determining whether the gears are properly adjusted, paint the bevel gear teeth with red lead or prussion blue and turn the bevel gear so the pinion will make an impression on the teeth. The correct procedure to follow in the event of an unsatisfactory tooth contact is shown in Fig. N-30.

o. After the differential has been assembled and adjusted, the pinion shaft oil seal should be installed.

p. Remove the sleeve previously installed in place of the yoke. Install the oil seal with Tool W-147 shown in Fig. N-31.

q. Install the yoke with Flange Installer W-162, as shown in Fig. N-32.

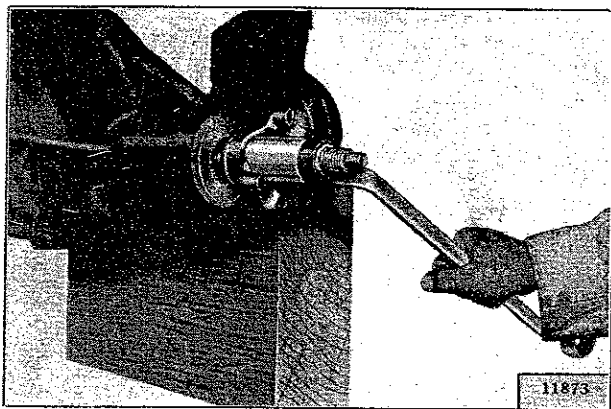


FIG. N-32—YOKE INSTALLING TOOL

- r. Install pinion nut and cotter pin.
- s. Install axle shafts and housing cover.

N-16. POWR-LOK DIFFERENTIAL

As optional equipment a Powr-Lok differential is available on all Jeepster models equipped with semi-float tapered axle shafts. The Powr-Lok differential may be identified by a tag located on the opposite side of the differential housing from the ratio tag (Fig. N-2) and stamped with either a "T" or with the words, "USE LIMITED SLIP DIFF. LUBE ONLY." This differential is available for rear axles only.

Whenever a replacement or conversion Powr-Lok differential is to be installed in an axle which has been previously in service and acquired mileage, be sure to record the amount of backlash between the ring gear and pinion at the time of disassembly. When the axle is again assembled the ring gear and pinion must be set to this same amount of backlash.

Axle ratios and speedometer gear application is very important. In like model axles, the ratio may be changed by simply changing to the desired ring gear and pinion; except in the case of the 3.73:1 or higher ratios. When changing from a 3.73:1 or higher to 3.54 or lower ratio, or vice versa, the differential case must also be changed on a standard differential assembly, and the differential assembly, less ring gear and pinion, when a Powr-Lok differential assembly is involved. When changing from any ratio to another, it will also be necessary to change speedometer gears. Speedometer gears for Powr-Lok and standard differentials of the same ratio, are interchangeable. A complete rear axle assembly replacement is necessary, if a conversion from one type of differential assembly to another is desired.

Note: Powr-Lok differentials use a special lubricant. Refer to the Lubrication Chart.

N-17. Trouble Symptoms and Possible Causes

If noises such as chatter are detected, when turning a corner, the probable reason for this is that incorrect gear lubricant has been installed in the axle. Axles equipped with a limited slip differential require special lubricant. Refer to Lubrication Section, Par. B-53.

Note: It may be necessary to use an additive to attempt to eliminate chatter. If this is not successful then disassembly and inspection of the differential becomes necessary.

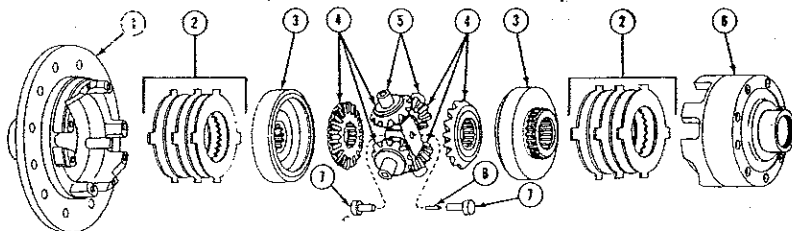


FIG. N-33—POWR-LOK DIFFERENTIAL

- 1—Differential Case Flange Half
- 2—Disc and Plate Set
- 3—Side Gear Ring
- 4—Side Gear and Pinion Mate Gear Set
- 5—Pinion Mate Cross Shaft
- 6—Differential Case Button Half
- 7—Axle Shaft Spacer
- 8—Axle Shaft Spacer Roll Pin

Warning: Extreme care must be exercised on a Powr-Lok equipped vehicle to be sure the transmission is in the neutral position whenever the engine is started with one wheel jacked up. Otherwise the vehicle may lurch unexpectedly and fall off the jack.

N-18. Torque Test

Procedure for testing torque Powr-Lok differentials on Jeepster Series vehicles is as follows:

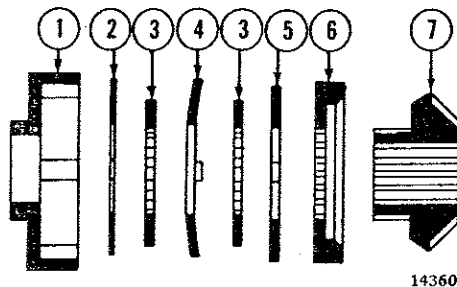
- Place the transmission in neutral.
- Raise one wheel off the floor and place a block in front and at the rear of the opposite wheel.
- Apply a torque wrench to the axle shaft nut of the elevated wheel.
- Turn wheel with torque wrench. Disregard breakaway torque and observe torque required to continuously turn wheel smoothly. Torque should read 40 lb-ft. [5,53 kg-m.] or more.

N-19. Powr-Lok Differential Disassembly and Reassembly

Refer to Figs. N-33 and N-34.

The procedure for overhauling disc type Powr-Lok differentials is as follows:

- Remove axle shafts following procedure described in Par. N-2.
- Remove housing cover and gasket.
- Remove the Powr-Lok differential from the axle. Do not remove the ring gear or bearing cone and rollers unless replacement is to be made. Mark the bearing cups so they may later be reassembled with the same bearing cones. Mark the differential case halves for correct alignment at reassembly. Each pinion mate cross shaft should also be marked so that each pin cam surface will match with the same V-ramp in the case when reassembled.
- Separate the case halves.
- Remove the disc and plate sets. The illustration (Fig. N-34) shows the arrangement of plates and discs. When reassembling unit, discs and plates must be reinstalled in this arrangement. Be sure to keep in mind which way the set will face toward the case.



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FIG. N-34—PLATE ASSEMBLY ORDER

- | | |
|--------------------|------------------|
| 1—Case | 5—Plate |
| 2—Thin Plate | 6—Side Gear Ring |
| 3—Disc | 7—Side Gear |
| 4—Belleville Plate | |

f. Remove the pinion mate cross shafts, bevel pinion mate gears, bevel side gears, and side gear rings.

g. Clean all parts thoroughly in kerosene and dry with compressed air.

h. Inspect all parts. Replace any items which appear to be worn or damaged.

i. Inspect the plate surfaces of the case halves, the side gear rings, and the clutch friction plates and discs for excessive wear or scoring.

j. Inspect the pinion mate shaft and ramp surfaces on the case for excessive wear and pitting.

k. Inspect the pinion gear races that bear on the side gear rings.

l. Inspect the corresponding surfaces on the side gear rings.

m. Inspect the clutch plates and discs for cracks and distortion. In the event one or more of the clutch plates or discs needs replacing, replace the entire stack of plates and discs on each side of the pinions. These stacks are supplied in sets. The differential case halves are not serviced. Should replacement be required, it is necessary to replace the complete differential.

n. Assemble the clutch friction plates, clutch friction discs, and dished plates on the splined hub of each bevel side gear. Make sure the plates and discs are installed in the proper relationship as shown in Fig. N-34. The dished plates in the plate and disc set are always assembled with the convex side toward the case. As each part is reassembled in its proper position, it is necessary that it be lightly coated with Powr-Lok lubricant.

o. Place each differential case half on its side and install the side gear rings with the plates and discs assembled. The side gear ring will rotate with a slight drag when properly located in the case.

p. With the ring gear flange half of the differential case in an upright position, assemble the bevel side gears, pinion mate cross shafts, and bevel pinion mate gears. Install the remaining case half on the ring gear flange half. Make sure that all markings coincide.

q. Install the differential case bolts and turn them in a few threads.

r. Using axle shafts from the vehicle, align the splines of the side gear, and the side gear ring.

s. With these axle shafts in position, tighten the differential case bolts evenly. Torque 35 to 45 lb-ft. [4,84 a 6,22 kg-m.].

t. Remove the axle shafts.

u. Check for proper assembly. Each pinion mate cross shaft should be tight on its ramp. If there is clearance between the cross shaft and the ramp, the clearance should be no more than .005" [0,127 mm.].

This clearance should be equal on all four cross shaft ends.

v. Reinstall the unit in the axle.

w. Install axle shafts as described in Par. N-2. Other service operations such as ring gear and pinion replacement, or pinion and bearing adjustments, are performed in the same manner as de-

scribed in Pars. N-7 through N-15 for standard axles, with the exception of the following torque recommendations. Torque the differential case bearing cap screws 70 to 90 lb-ft. [9,7 a 12,4 kg-m.] and the cover screws 15 to 25 lb-ft. [2,1 a 3,4 kg-m.]. The ring gear screws on axles with Power-Lok differentials should be torqued as follows: Model 30 and 44 axles 35 to 55 lb-ft. [4,84 a 7,60 kg-m.].

N-20. TRAC-LOK DIFFERENTIAL

As optional equipment Trac-Lok Model 44 differential is available on all Jeepster vehicles equipped with semi-float flanged axle shafts.

A conventional differential transmits all of the ring gear torque through the differential gears to the axle shafts. Torque is at all times equal on the axle shafts, and if one wheel slips, the other wheel can only put out as much torque as the slipping wheel.

The Trac-Lok differential is similar, except that part of the torque from the ring gear is transmitted through clutch packs between the side gears and differential case. The multiple disc clutches, with radial grooves on the plates and concentric grooves on the discs are engaged by a preload from Belleville springs, plus separating forces from the side gears as torque is applied through the ring gear.

The Trac-Lok construction permits differential action when required for turning corners and transmits equal torque to both wheels when driving straight ahead. However, when one wheel tries to spin due to leaving the ground, a patch of ice, etc., the clutch packs automatically provide more torque to the wheel which is not trying to spin.

It can be seen then that the Trac-Lok differential resists wheel spin on bumpy roads and provides more pulling power when one wheel tries to slip. In many cases of differences in traction, pulling power will be automatically provided until both wheels start to slip.

In diagnosis of vehicle operators' complaints, it is important to recognize two things:

- If, with unequal traction, both wheels slip, the Trac-Lok has done all it can possibly do.
- In extreme cases of differences in traction, the wheel with least traction may spin after the Trac-Lok has transferred as much torque as possible to the non-slipping wheel.

N-21. Lubrication

The Trac-Lok differential requires a special lubricant and ordinary multipurpose gear lubricants **MUST NOT** be used. Use only 'Jeep' Differential Oil, Part No. 94557.

Trac-Lok differential may be cleaned only by disassembling the unit and wiping with clean rags. Do not flush the Trac-Lok unit.

Note: The Trac-Lok differential is serviced at the same time intervals as the standard differential.

N-22. Trouble Symptoms

If noises or roughness, such as chatter, are present

in turning corners, the probable cause is incorrect or contaminated lubricant.

Before any differential is removed and disassembled for chatter complaints, the correctness of lubricant can and should be determined.

A complete lubricant drain, and refill with specified Limited Slip Differential lubricant will usually correct chatter.

The following procedure is recommended to ensure complete removal of old lubricant.

- Warm the lubricant by vehicle road operation, or 5 minutes of operation in gear at 30 mph with both wheels off the ground on a hoist.

Caution: Never place the transmission in gear with the engine running when only one wheel of a Limited Slip Differential equipped vehicle is raised. The vehicle might drive itself off the jack and produce damage or injury.

- Drain lubricant while warm. Remove drain plug or cover to drain completely. If cover is removed, it may be necessary to replace gasket at this time.
- Refill axle with specified Limited Slip Differential lubricant.
- Operate the vehicle for approximately ten miles [16,09 km.], making at least ten figure 8 turns to flush the old lubricant out of the clutch packs.
- Repeat steps b, c, and d, making sure to replace the cover gasket if required in step c.
- It is possible that slight chatter, requiring additional vehicle operation, may remain after step e. If chatter persists after 100 miles [160,9 km.] of vehicle operation, or remains severe after step e above, disassembly and repair will be necessary.

N-23. Unit Inoperative

Proper performance and capabilities of Limited Slip Differentials are often misunderstood. No precise methods of measuring Limited Slip Differential performance are generally available in the field. A functioning unit can be determined by relatively simple vehicle operational tests, as follows:

- Place one wheel on good dry pavement, and the other on ice, mud, grease, etc.
- Gradually increase engine rpm to obtain maximum traction prior to "break-a-way." The ability to move the vehicle effectively will demonstrate proper performance.
- If extremely slick surfaces, such as ice or grease, are used some question may exist as to proper performance at step b. In these extreme cases a properly performing Limited Slip Differential will provide greater "pulling" power by lightly applying the parking brake.

N-24. Trac-Lok Differential Disassembly and Reassembly

It is recommended that the complete axle assembly be removed from the vehicle, when it becomes necessary to remove the Trac-Lok from the housing. Refer to Par. N-3 and N-8 for removal of axle shafts and differential case from axle housing.

With the Trac-Lok unit removed from the axle housing, proceed as follows:

N-25. Disassembly

a. Place the axle shaft, which was removed from the assembly, into a vise. Tighten shaft in vise firmly. The spline end of the shaft is not to extend beyond $2\frac{3}{4}$ " [7 cm.] above the top of the vise. This will eliminate the shaft from fully entering into the side gear and causing interference with the step plate tool during disassembly of the pinion mate gears, etc.

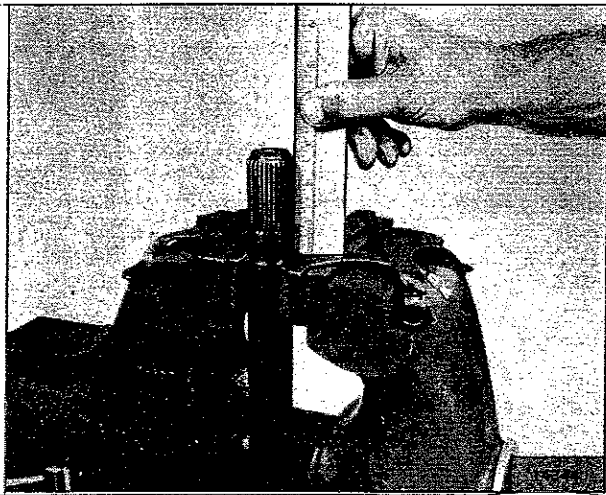


FIG. N-35—AXLE SHAFT POSITIONED IN VISE

b. Assemble the differential case to the axle shaft with the ring gear screw heads up. Assembling the differential case onto the shaft will serve as a holding device to remove the ring gear and to disassemble the internal parts of the case.

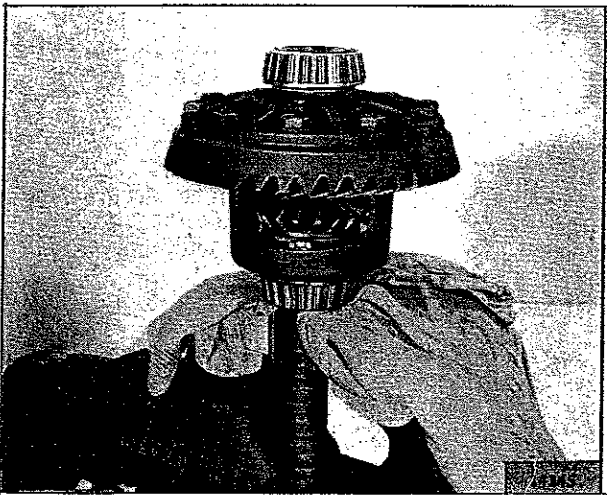


FIG. N-36—DIFFERENTIAL POSITIONED ON AXLE SHAFT

c. Remove the ring gear screws and ring gear. It is necessary to remove the ring gear to allow clearance for the removal of the cross pin. Place a few shop towels over the top of the vise to protect

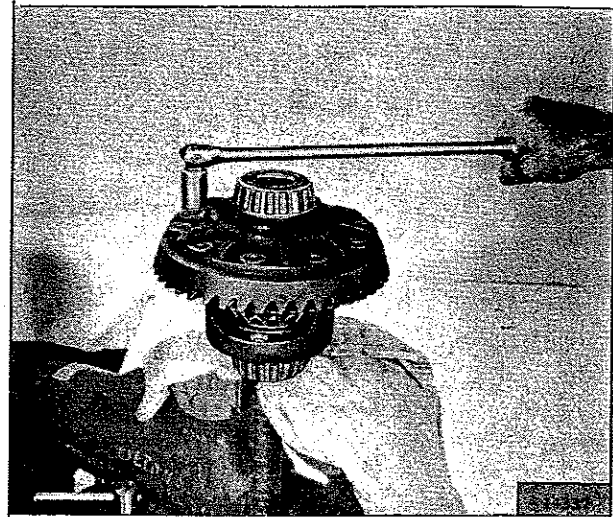


FIG. N-37—REMOVING RING GEAR

the gear teeth from becoming nicked after it is free from the case. Tap ring gear with a rawhide hammer to free it from the case.

Note: It is recommended that whenever the ring gear screws are removed they are to be replaced with new screws.

d. Remove differential case from axle shaft and remove ring gear.

e. All Trac-Loks are identified with a manufacturing date, and the complete part number stamped on the barrel of the case. If the axle is equipped with Trac-Lok Limited Slip Differential, it will contain a tag requesting the use of Limited Slip Lubricant.

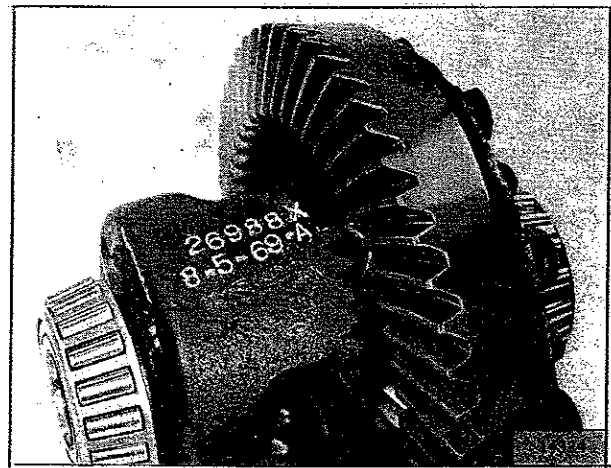


FIG. N-38—TRAC-LOK IDENTIFICATION

f. The Trac-Lok is identified with $\frac{1}{8}$ " [3,18 mm.] high numbers stamped in the case. For example: The numbers 8-5-69A is the manufacturing or build date of the Trac-Lok and is interpreted as follows. The first number is the month, second number is the day of the month, third number is the year, the letter is the shift. For example: August 5, 1969 first shift. The number stamped above the

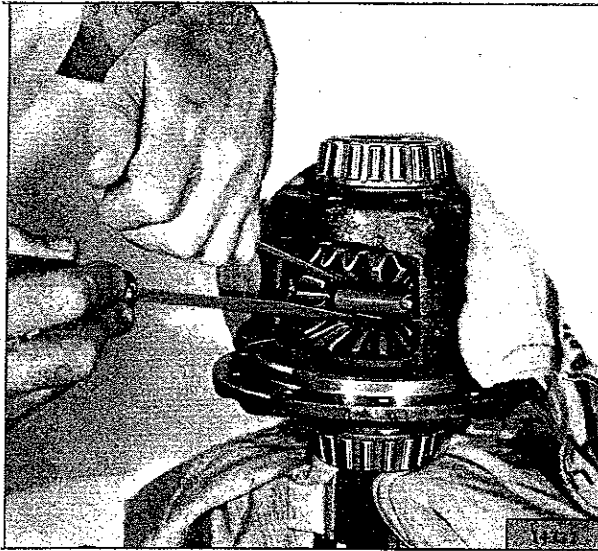


FIG. N-39—REMOVING SNAP RINGS FROM CROSS PIN

manufacturing date is the complete Trac-Lok assembly part number.

g. It is recommended that when referring to the Trac-Lok, obtain the complete part number and build date. To do this it will be necessary to wipe off the lubricant from the case.

h. Reposition differential case onto axle shaft as shown. Remove the two snap rings from the cross pin. Use two screw drivers and push the rings free from the cross pin. Place a shop towel behind the case to prevent the snap rings from flying out of the case.

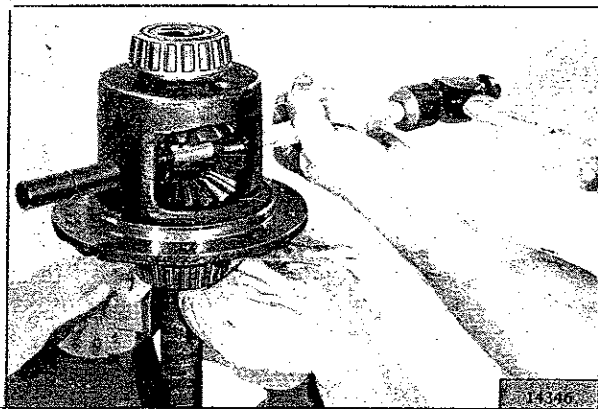


FIG. N-40—REMOVING CROSS PIN

i. Remove the cross pin. Use a hammer and punch as shown to remove the cross pin from the case.

Note: A gear rotating tool C-4142 is required to service the Trac-Lok differential. The Tool consists of four parts: a Handle, Pawl, Forcing Screw and Step Plate.

j. Assemble the step plate tool into the bottom side gear.

k. Position the gear rotating tool into the top side gear.

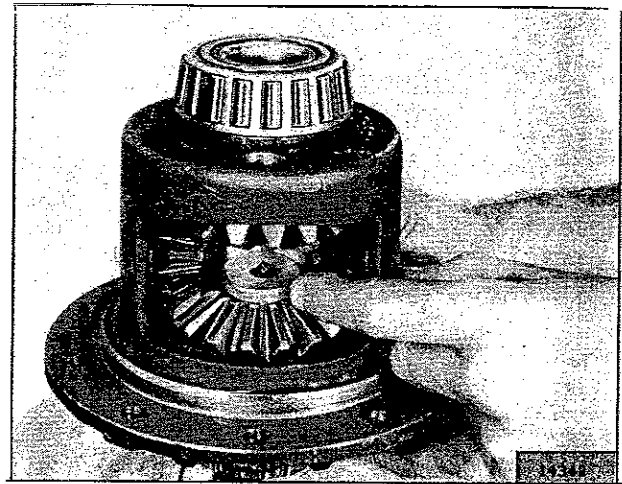


FIG. N-41—INSTALLING STEP PLATE TOOL

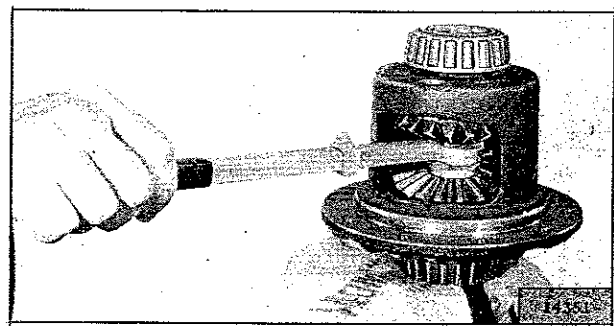


FIG. N-42—INSTALLING GEAR ROTATING TOOL

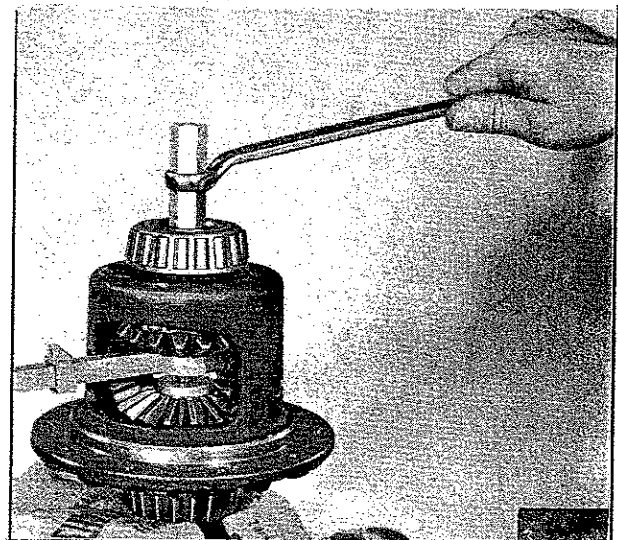


FIG. N-43—THREADING FORCING SCREW INTO ROTATING TOOL

l. Insert the forcing screw down through the top of the case and thread into the gear rotating tool.

Note: Before using the forcing screw be sure the threads are lubricated with a fine coat of oil. Also apply a small spot of grease to the centering hole in the step plate before it contacts the forcing screw.

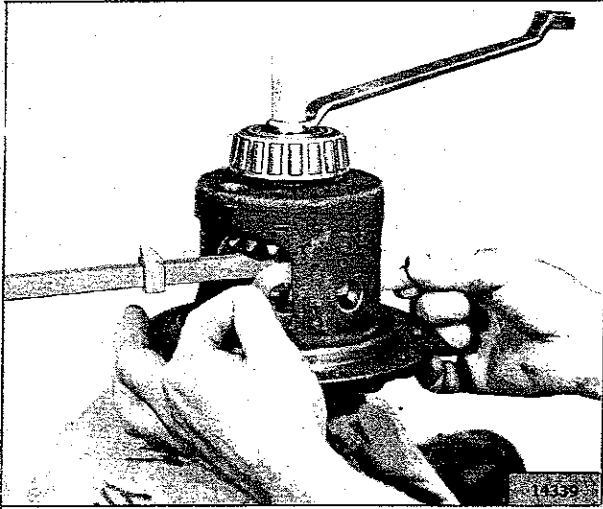


FIG. N-44—REMOVING PINION MATE WASHERS

m. Thread forcing screw so that it becomes centered into the step plate. Torque forcing screw tight. This will move the side gears away from the pinion mate gears, and relieve the load between the gears, allowing only the pinion mate gears to be loose.

n. Remove both pinion mate spherical washers. Use a shim stock of .030" [0,762 mm.] thickness or an equivalent tool to push out the spherical washers. Relieve the tension of the Belleville spring by loosening the forcing screw.

o. Retighten forcing screw until a very slight movement of the pinion mate gears is detected.

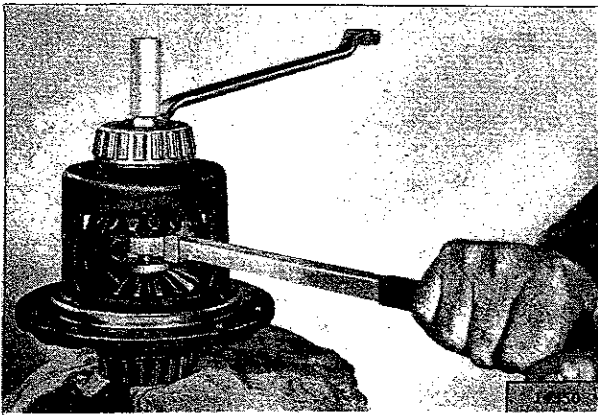


FIG. N-45—REMOVING PINION MATE GEARS

p. Insert the pawl rotating tool between one of the side gear teeth as shown. Pull on handle so the top side gear will rotate and also allow the pinion mate gears to rotate. Also continue pulling on tool until the gear hits the handle.

q. Remove pawl from between the gear teeth and repeat the above until the pinion mate gears can be removed through the large opening of the case.

Note: When attempting to rotate the side gear, it will probably be necessary to adjust the forcing screw by very slightly tightening or loosening until

the required load is applied to the Belleville springs to allow the side gear and pinion mate gears to rotate.

r. Retain the top side gear and clutch pack in the case by holding hand on the bottom of the rotating tool while removing forcing screw. Remove rotating tool, top side gear, and clutch pack.

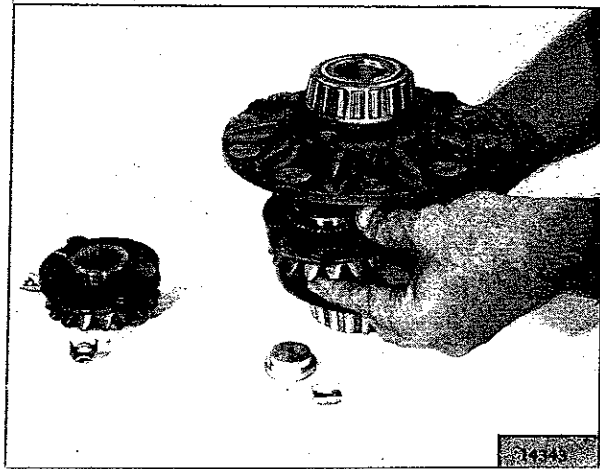


FIG. N-46—TRAC-LOK UNIT DISASSEMBLY

s. Remove the differential case from the axle shaft. Turn case with the flange or ring gear side up and allow the step plate tool side gear and clutch pack to be removed from the case. Remove the retainer clips from both clutch packs to allow separation of the plates and discs.

N-26. Inspection

a. Plates and discs—If any one member of either stack shows evidence of excessive wear or scoring, then the complete stack is to be replaced on both sides.

b. Side gears and pinion mate gears—The gear teeth of these parts should be checked for extreme wear or possible cracks. The external teeth of the side gear which holds the clutch pack should also be checked for wear or cracks. If replacement of one gear is required due to wear, etc., then both side gears, pinion mate gears, and washers are to be replaced.

c. Cross pin—If excessive wear is evident, then the cross pin should be replaced.

d. Clutch retainer clips—If wear is evident on any one of the retainer clips, it is suggested that all four clips be replaced.

e. Differential case—If scoring, wear, or metal pick-up is evident on the machined surfaces, then replacement of the case is necessary.

f. Example of radial groove plate (A) and the concentric groove disc (B) shown in Fig. N-47.

N-27. Reassembly

a. Assemble plates and discs in exactly the same position as they were removed, regardless of whether they are new parts or the original parts.

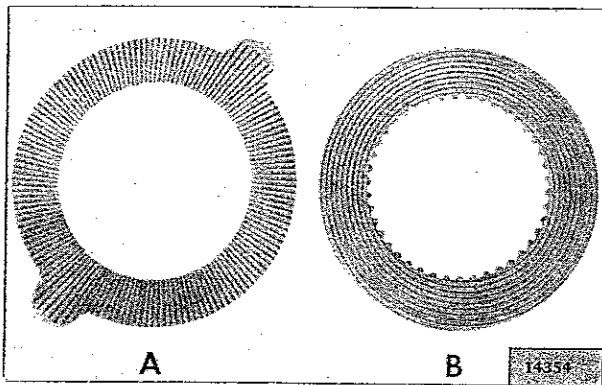


FIG. N-47—PLATE AND DISC IDENTIFICATION

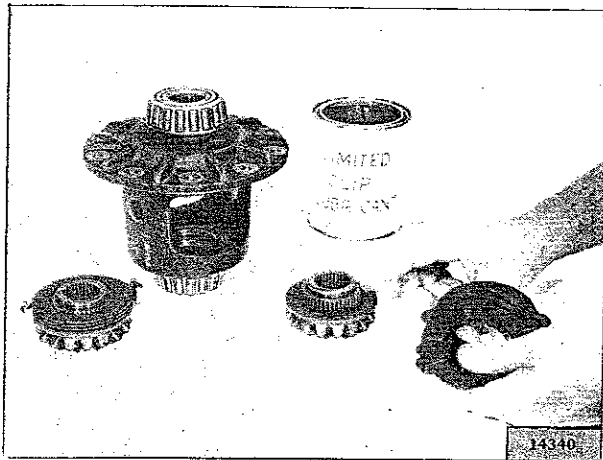


FIG. N-48—LUBRICATING TRAC-LOK COMPONENTS

b. Prelubricate the thrust face of the side gear, assemble the plates and discs to the side gear splines, prelubing each part as shown with the specified lubricant. Both stacks.

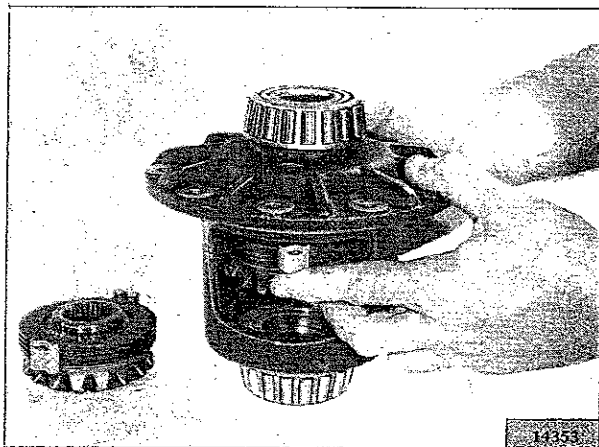


FIG. N-49—INSTALLING PLATE RETAINER CLIPS

c. Assemble the retainer clips to the ears of the plates. Make sure both stacks are completely assembled or seated onto the ears of the plates.

d. With the differential case positioned as shown, assemble the clutch pack and side gear into the case. Make sure the clutch pack stays assembled

to the side gear splines and that the retainer clips are completely seated into the pockets of the case. To prevent pack from falling out of the case it will be necessary to hold them in place by hand while assembling the case onto the axle shaft.

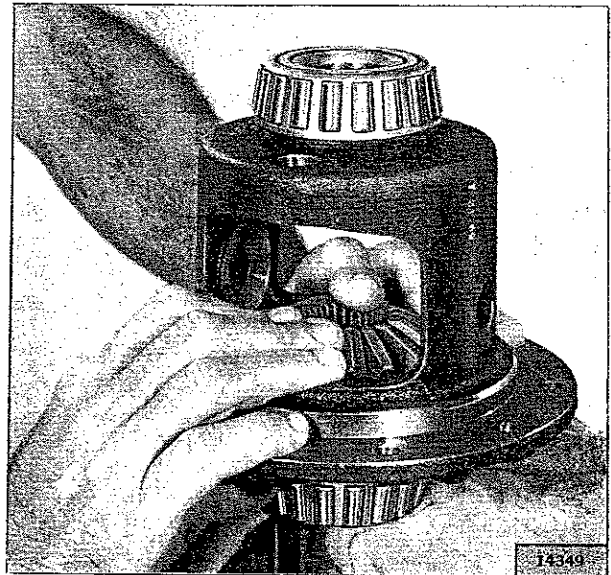


FIG. N-50—INSTALL DIFFERENTIAL CASE ON AXLE SHAFT

e. Assemble differential case onto the axle shaft in the position as shown.

Caution: When assembling the differential case onto the axle shaft, be sure that the splines of the side gears are lined up with those of the axle shaft. Also make sure that the clutch pack is still properly assembled into the case after assembling the case onto the shaft.

f. Assemble the step plate tool into the side gear as shown in Fig. N-41. Apply a small dab of grease into the centering hole of the step plate tool.

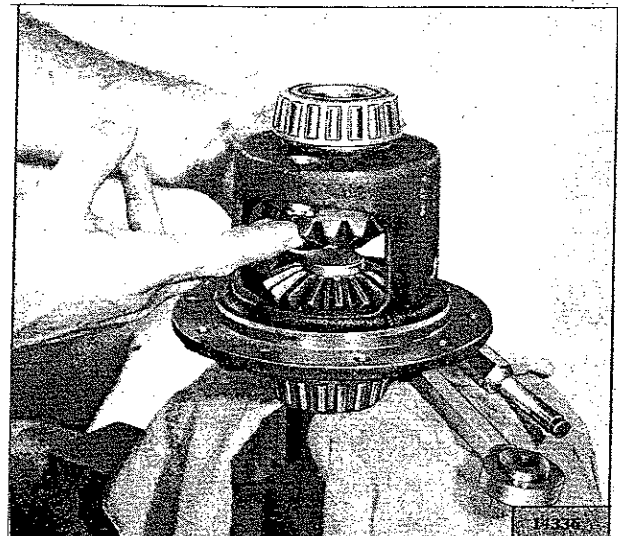


FIG. N-51—INSTALLING CLUTCH PACK AND SIDE GEAR

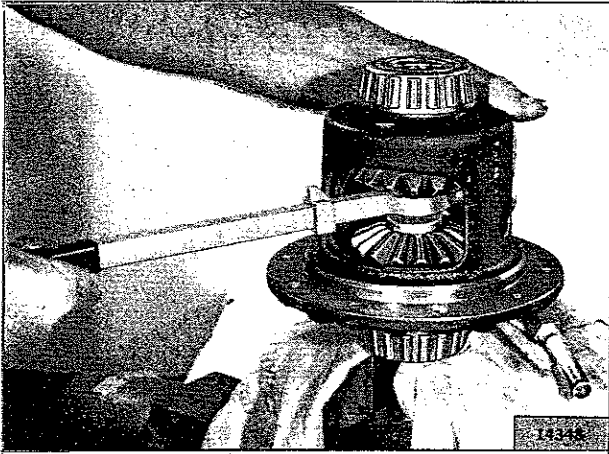


FIG. N-52—POSITIONING GEAR ROTATING TOOL

g. Assemble the other clutch pack and side gear exactly as shown. Be sure the clutch pack stays assembled onto the side gear splines and that the retainer clips are completely seated into the pockets of the case.

h. Position the gear rotating tool into the top side gear.

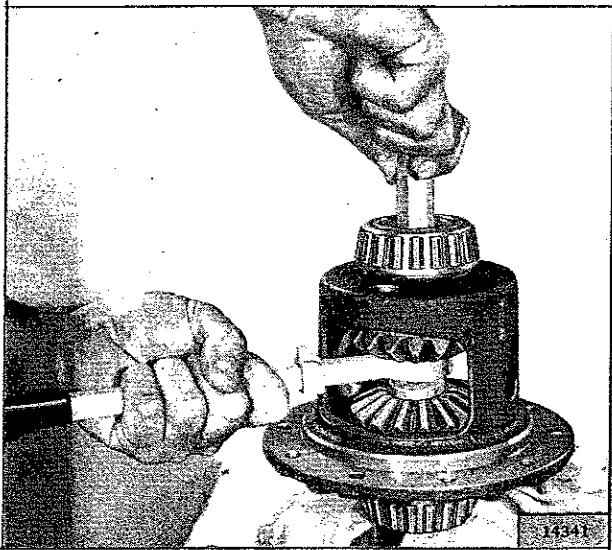


FIG. N-53—THREADING FORCING SCREW INTO ROTATING TOOL

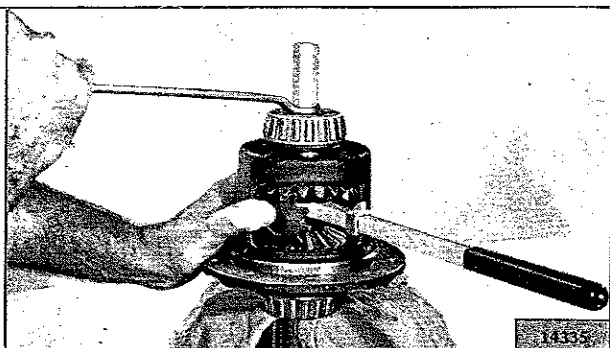


FIG. N-54—STARTING PINION MATE GEARS INTO CASE

i. Keep side gear and rotating tool in position by holding with hand. Insert the forcing screw down through the top of the case, and thread into the rotating tool.

j. Position both pinion mate gears exactly as shown. Be sure the holes of the gears are lined up with each other. Hold gears in place by hand.

k. Tighten forcing screw so that the Belleville springs will compress and allow clearance between the teeth of the pinion mate gears and side gears.

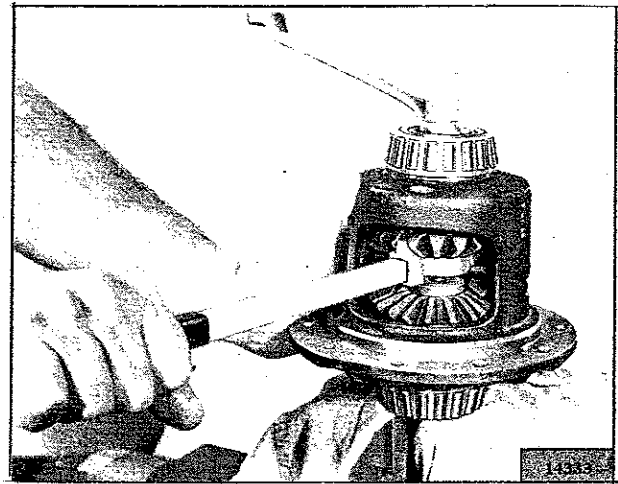


FIG. N-55—ROTATING PINION MATE GEARS INTO POSITION

l. While holding the pinion mate gears in place, insert the pawl of the rotating tool between one of the side gear teeth as shown. Pull on handle so that the top side gear will rotate and allow the pinion mate gears to rotate and enter into the case.

Note: As mentioned before, it will probably be necessary to adjust the forcing screw by very slightly loosening or tightening until the required load is applied to the Belleville plates or discs to allow the side gear and pinion mate gears to rotate.

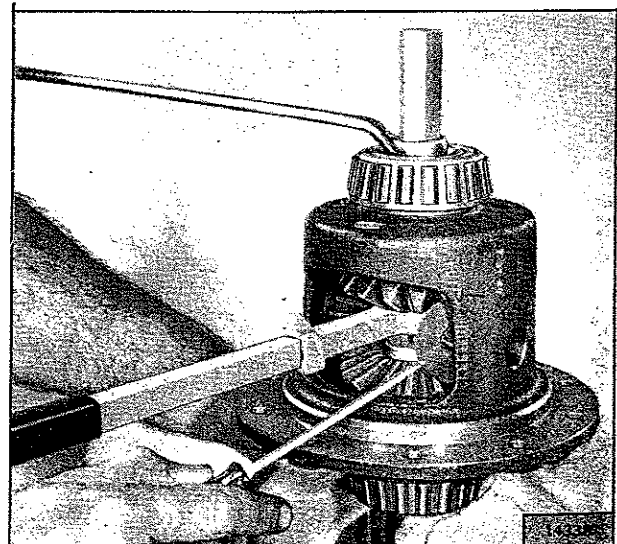


FIG. N-56—INSTALLING PINION MATE WASHERS

m. Pull on tool until the handle hits the gear. Remove pawl from between the gear teeth, reposition handle and pawl. Repeat the same operation until the holes of both pinion mate gears are lined up exactly with those of the case.

n. Prelubricate both sides of the pinion mate spherical washers with the specified lubricant.

o. Apply torque to the forcing screw to allow clearance to assemble the spherical washers.

p. Assemble washers into case. Use a very small screw driver to push washers into place, as shown in Fig. N-56.

Caution: Be sure the holes of the washers and gears are lined up exactly with those of the case.

q. Remove forcing screw, rotating tool, and step plate.

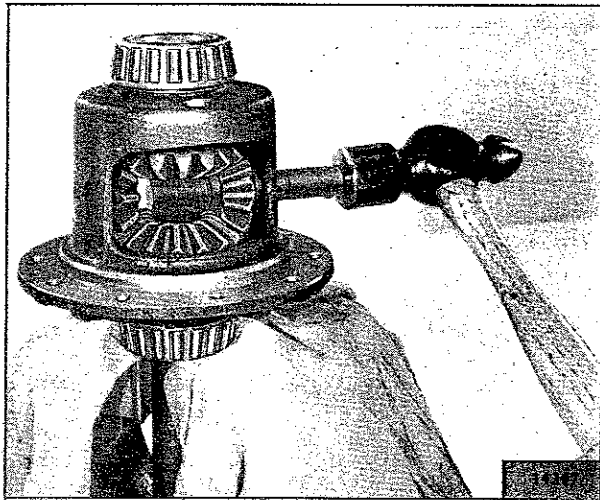


FIG. N-57—INSTALLING CROSS PIN

r. Prelubricate the cross pin with the specified lubricant. Assemble cross pin into case. Use a hammer as shown. Be sure the snap ring grooves of the cross pin are exposed to allow assembly of the snap rings.

s. Assemble snap rings.

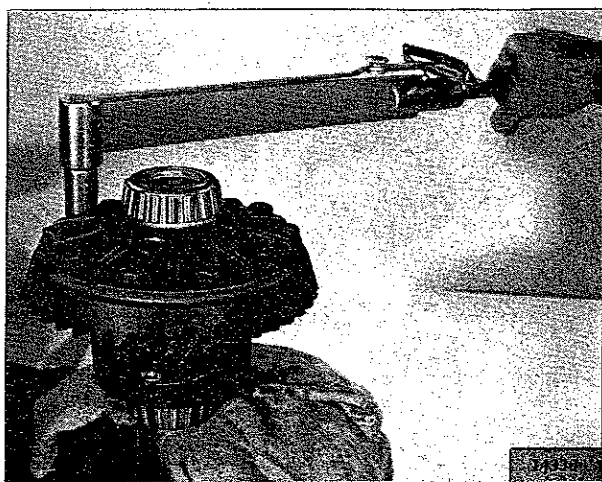


FIG. N-58—TORQUING RING GEAR SCREWS

t. Remove case from axle shaft. Assemble ring gear to case.

u. Line up the ring gear screw holes with those of the case. Assemble ring gear screws finger tight.

v. Reposition differential case onto axle shaft as shown. Draw screws up evenly.

Note: Use new ring gear screws and torque to 45-50 ft. lbs.

w. This completes the service procedure for the Trac-Lok assembly. Install Trac-Lok differential case assembly into axle housing. Follow the service procedure given in Par. N-4 and N-13 through N-15, to complete the differential and axle assembly servicing.

N-28. Complete Assembly Replacement

a. If inspection reveals that the replacement of the Trac-Lok as a unit is required, the following steps should be followed.

b. Remove both differential bearing cones and shims. Mark or tag each side bearing cone and shim pack as it is removed to indicate from which side of the case they were removed.

c. To remove ring gear from case, follow the same steps as illustrated in Fig. N-37.

d. Assemble ring gear to new Trac-Lok case. Follow the same steps as illustrated in Fig. N-58. Make sure the gear flange on the differential case is free of nicks, burrs, etc.

e. Inspect shims and bearings which were removed from the old case. If shims on bearings show excessive wear or damage, they should be replaced. Make sure they are used on exactly the same sides of the new case as they were removed from the old case. Assemble shims and differential bearing cones. Use step plate on bottom bearing to protect the bearing from becoming damaged during assembly of the top bearing. To completely seat the bearings use the proper bearing driver tool.

f. Prelubricate differential bearing cones with the specified lubricant, and assemble case into axle housing. Follow the service procedure given in Par. N-4 and N-13 through N-15 to complete the differential and axle assembly servicing.

N-29. INSTALLING REAR AXLE

All service replacement axle assemblies are shipped from the factory without lubricant in the differential. Lubricant must be added to the differential before the axles are installed in vehicles. Use the grade and quantity of lubricant specified in the Lubrication Chart.

When adding differential lubricant, suspend the axle with the axle shafts horizontal and the yoke end of the pinion housing hanging down, then turn the pinion shaft several times to assure that the lubricant gets into the pinion shaft bearings.

Procedure for installing the rear axle on Jeepster Series vehicles is as follows:

a. Position the axle assembly under the vehicle.

b. Position springs to axle pads, and install spring clips and nuts.

- c. Attach the brake line hose at tee fitting on top of housing.
- d. Attach parking brake cables at rear of brake backing plate.
- e. Connect the shock absorbers at the axle mounting pads.
- f. Connect the propeller shaft at the rear universal joint.
- g. Adjust and bleed brakes. (See Section P).
- h. Install wheels and lower vehicle to floor.
- i. Check parking brake as described in Section P.
- j. Fill the axle housing with the proper lubricant. For correct lubricant refer to the Lubrication Chart.

N-30. TROUBLE SHOOTING

The following problems can be present with either the conventional differential, Powr-Lok or Trac-Lok differential.

N-31. Backlash

Excessive backlash in the vehicle drive line may be the results of excessive backlash in the transmission, propeller shaft spline, universal joint, ring gear and pinion, the axle shaft spline, or the differential.

Excessive backlash in the differential may be measured as follows:

- a. Jack up one rear wheel.
- b. Put the transmission in gear.
- c. Measure the travel of the jacked-up wheel on a 10" [25.40 cm.] radius from the wheel center. This total movement should not exceed 1¹/₄" [3.17 cm.] in a new unit. In order to restrict the backlash to the axles only, make sure that the yoke of the propeller shaft does not move during the check.
- d. If all causes of backlash mentioned above have been eliminated with the exception of the differential and that still exceeds the maximum allowable movement, overhaul the differential.

N-32. Rear Wheel Noise

Looseness of the rear axle shaft nut on semifloating tapered rear axles may produce a clicking or creaking noise. This noise can usually be stopped by torquing the wheel hub nut 150 to 175 lb.-ft. [20.7 to 24.2 kg-m.]. If the condition has continued for some time, slight wear may have resulted allowing the noise to persist. In this case, coat the hub, key, and keyway on tapered axle shafts with white lead and torque the nut as specified. If the noise persists after this treatment, replace the worn parts.

N-33. SERVICE DIAGNOSIS

| SYMPTOMS | PROBABLE REMEDY |
|--|-----------------|
| Axle Noisy on Pull and Coast | |
| Excessive Back Lash Bevel Gear and Pinion..... | Adjust |
| End Play Pinion Shaft..... | Adjust |
| Worn Pinion Shaft Bearing..... | Adjust |
| Pinion Set too Deep in Bevel Gear too Tight..... | Adjust |
| Wrong Lubricant Being Used (Powr-Lok or Trac-Lok Differential)..... | Replace |
| Axle Noisy on Pull | |
| Pinion and Bevel Gear Improperly Adjusted..... | Adjust |
| Pinion Bearings Rough..... | Adjust |
| Pinion Bearings Loose..... | Adjust |
| Axle Noisy on Coast | |
| Excessive Back Lash in Bevel Gear and Pinion... | Adjust |
| End Play in Pinion Shaft..... | Adjust |
| Improper Tooth Contact..... | Adjust |
| Rough Bearings..... | Replace |
| Back Lash | |
| Worn Differential Pinion Gear Washers..... | Adjust |
| Excessive Back Lash in Bevel Gear and Pinion... | Adjust |
| Worn Universal Joints..... | Replace |

N-34. REAR AXLE SPECIFICATIONS

| | TAPERED AXLE SHAFT | TAPERED AXLE SHAFT | FLANGED AXLE SHAFT |
|-----------------------------------|---------------------------|---------------------------|---------------------------|
| Make..... | Dana | Dana | Dana |
| Model..... | 30 | 44 | 44 |
| Description..... | Semifloating Hypoid Gears | Semifloating Hypoid Gears | Semifloating Hypoid Gears |
| Drive Pinion Offset (Vertical)... | 1.12" [28,4 mm.] | 1.50" [38,0 mm.] | 1.50" [38,0 mm.] |
| Number of Differential Pinions. | 2 | 2 | 2 |
| Gear Ratio: | | | |
| V6 With 3-Speed: | | | |
| Standard..... | 3.73:1 | 3.73:1 | 3.73:1 |
| Optional..... | 4.88:1 | 4.88:1 | 4.88:1 |
| V6 With Hydra-Matic* | | | |
| Standard..... | 3.33:1 | 3.33:1 | 3.33:1 |
| Optional..... | 3.73:1 | 3.73:1 | 3.73:1 |
| F4 With 3-Speed: | | | |
| Standard..... | 4.27:1 | 4.27:1 | 4.27:1 |
| Optional..... | 5.38:1 | 5.38:1 | 5.38:1 |
| Ring Gear Pitch Diameter. | 7.12" [19,05 cm.] | 8.50" [21,6 cm.] | 8.50" [21,6 cm.] |
| Pinion Adjustment..... | Shim | Shim | Shim |
| Pinion Bearing Adjustment.... | Shim | Shim | Shim |

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