

SERVICE MANUAL

FR-500 AXLES

INCLUDES

DIFFERENTIALS - PLANETARIES - BRAKES

articulated

H-400

"Payloader"

&

D-500

"Paydozer"

FORM

SMFR-500

11-65

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SECTION ONE. GENERAL

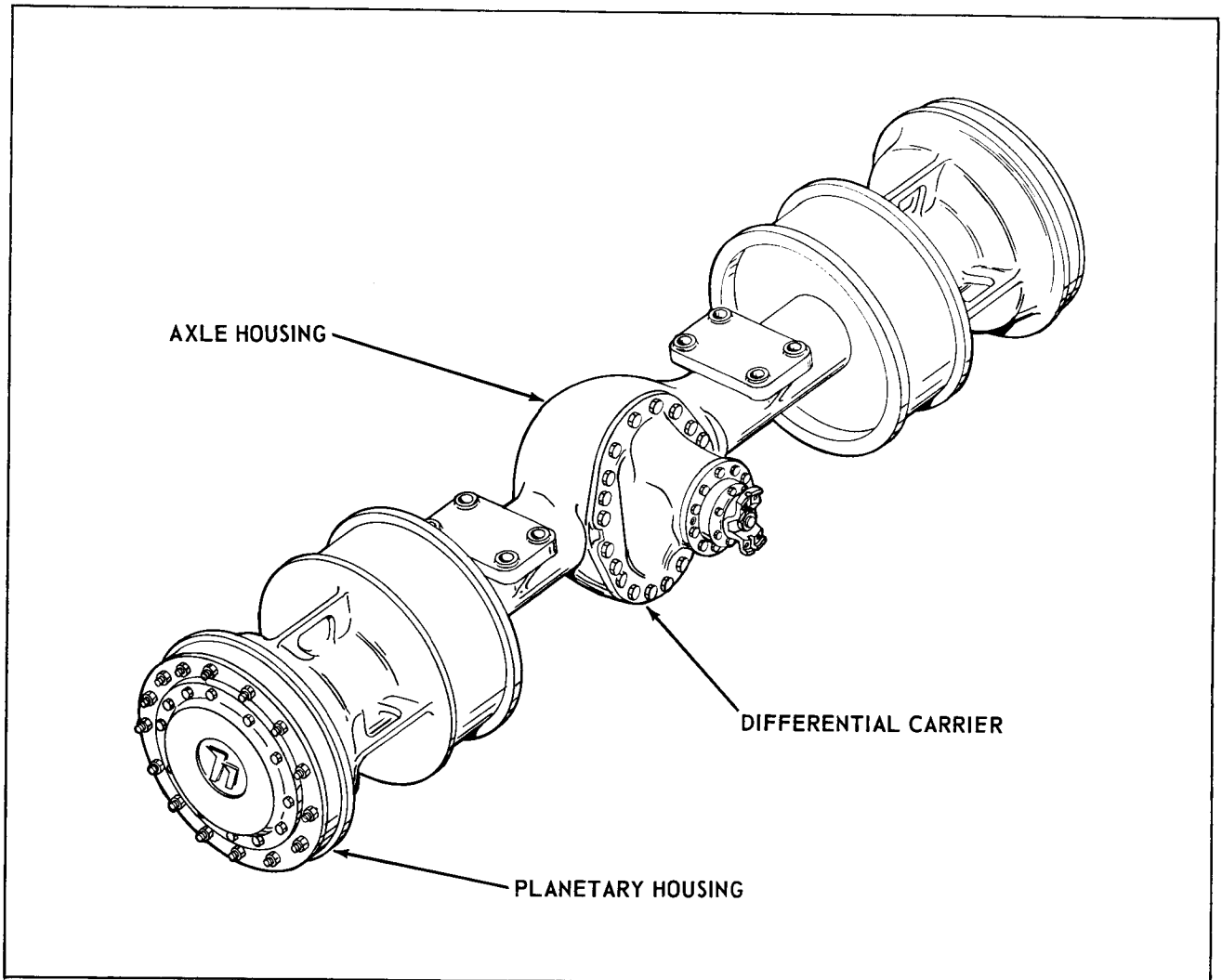


Figure 1-1

AXLES

1-1. Both axles are the full-floating, double-reduction type. The front axle housing is rigidly attached to the front main frame. The rear axle housing is attached to the axle cradle, which pivots on the rear main frame. The first gear reduction in the drive axle occurs at the differential. A second gear reduction takes

place at the planetaries, giving a total drive axle ratio as shown in Table IV, page 45.

1-2. Each wheel revolves on two tapered roller bearings mounted on the axle housing spindle. The axle is full-floating in that none of the weight is supported by, or transmitted to the axle shafts. All the weight on the axle is supported by the wheels, bearings, and axle housing.

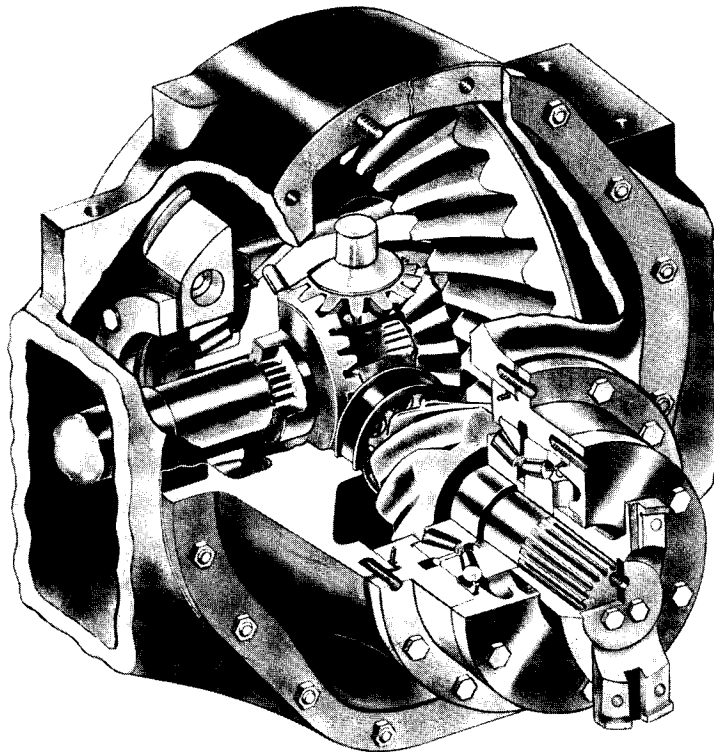


Figure 1-2

Differential

1-3. The differential is mounted rigidly on the forward side of the rear axle housing and on the rear side of the front axle housing. The differentials are connected by splined companion yoke flanges to the flanged yokes on the propeller shafts from the transmission.

1-4. Basically, the differential consists of a heavy duty spiral bevel ring gear, pinion gear and spider gear assembly. The differential and spider gear assembly rotate on tapered roller bearings. The pinion is straddle mounted and has a double-row tapered roller bearing in front of the pinion teeth which takes the forward and reverse thrust, and a straight roller bearing behind the pinion teeth to carry the radial load.

1-5. Three functions of the differential are: transmitting the torque from the propeller shaft to the axle shafts, performing the first torque multiplication in the double reduction axles, and allowing one drive wheel to rotate at a

different speed than the opposite wheel.

1-6. When both drive wheels are free to turn under equally resistant loads, the differential ring gear and the four small pinion gears (spider gears) act as one rigid unit, transmitting torque to the splined differential side gears. The side gears, being splined to the axle shafts, then drive each wheel with the same torque at identical speeds. In this instance, the spider gears do not rotate on their axis and the side gears rotate at the same speed as the ring gear.

1-7. When the resistance on one drive wheel exceeds the resistance on the other, or when the tractor makes a turn, the ring gear continues to revolve but the spider gears cease to act as a unit with the ring gear. The spider gears now turn on their own axis and permit one drive wheel to rotate faster than the other. As one drive wheel slows down, the speed of the other drive wheel is proportionally increased. This permits the vehicle to make a sharp turn without dragging one drive wheel.

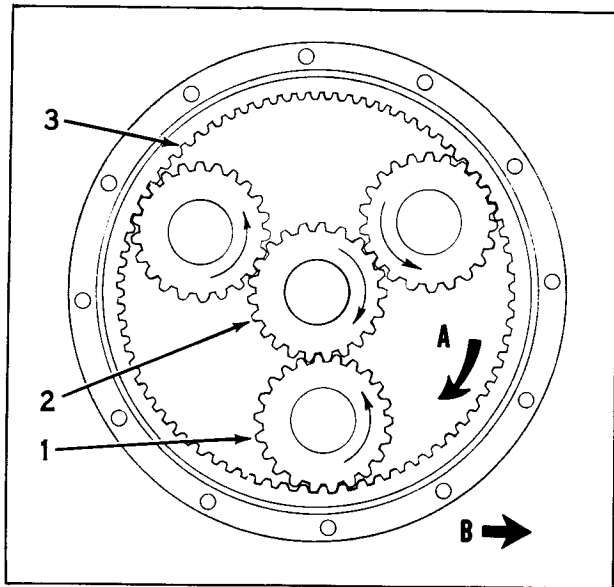


Figure 1-3

Planetary

1-8. The planetary assemblies are located in the outer portion of each drive wheel. Three planet gears are mounted on shafts and are housed behind the planet carrier. The planet gears (1) are meshed with the sun gear (2), which is part of the axle shaft, and are also meshed with the internal ring gear (3). The ring gear is splined to the outer end of the axle housing and cannot rotate. As the axle shaft and sun gear revolve, they rotate the planet gears on their shafts. The planet gears, meshed with the stationary ring gear, cause the planet carrier and wheel, which is bolted to the planet carrier, to rotate in direction "A", driving the tractor in direction "B".

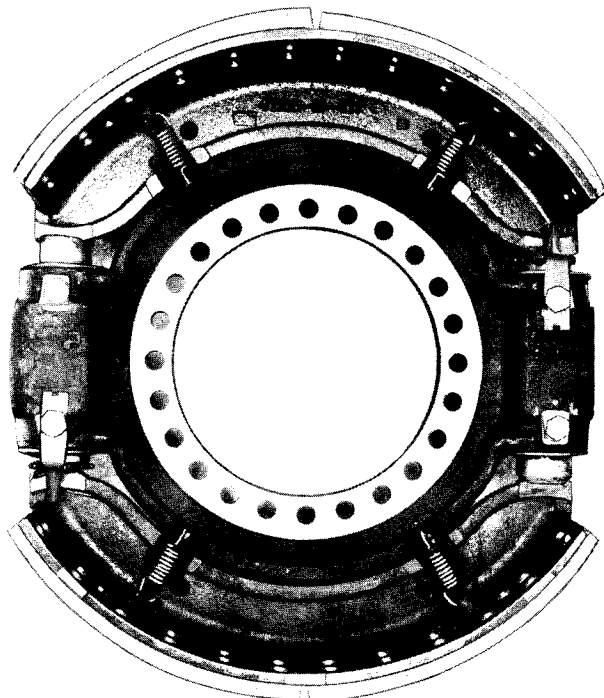


Figure 1-4

Brakes

1-9. The brakes are a wedge actuated type, equipped with automatic adjusters and two hydraulic cylinders per wheel.

1-10. When the brakes are applied, the pressure of the hydraulic fluid forces the piston in the wheel cylinder outward. The piston moves a wedge against the two plungers in the actuator housing, moving both plungers outward. The plungers, in turn, contact the brake shoe and lining assemblies, moving them outward to contact the brake drum and stop the tractor.

1-11. The wedge is spring loaded, and as soon as the brake apply pressure is removed, the wedge will return to the non-apply position, pushing the cylinder piston toward the bottom of the cylinder. Each brake shoe and lining assembly is connected to the spider with springs which move it away from drum contact.

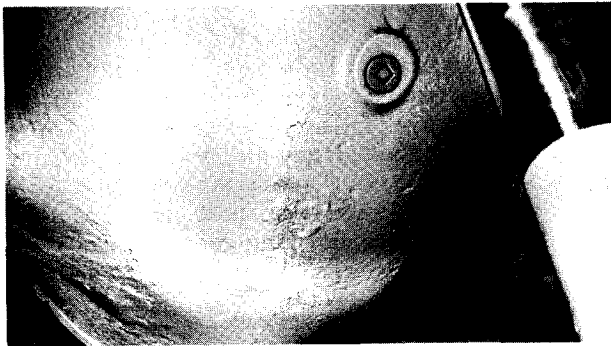


Figure 1-5

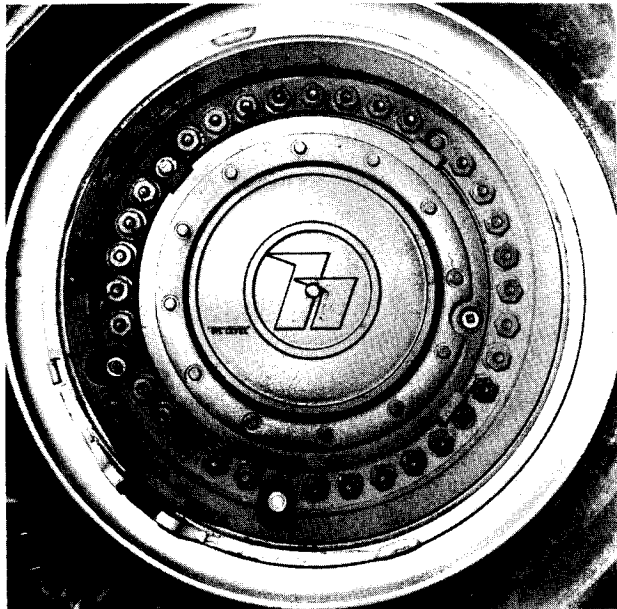


Figure 1-6

PREVENTIVE MAINTENANCE

1-12. OIL. Fill the differential and planetaries with recommended lubricant as listed in Table III, page 45.

1-13. OIL CHANGE INTERVALS. Axle lubricant should be changed at regular intervals of 1000 hours. Drain while the assembly is warm so any contaminants will flow out with the draining lubricant. Clean and install drain plugs, refill the assembly with the specified lubricant. Check lubricant level each 100 hours of operation.

1-14. LEVEL CHECK.

NOTE

Be sure the machine is on level ground before checking fluid levels.

Check the level of the lubricant in the differential at the oil level plug in the axle bowl. The level should be even with the level of the plug hole.

Prior to checking the level of the lubricant in each planetary hub, rotate the wheel until the oil level mark on the planetary cover is horizontal and below the center line of the wheel and hub assembly. The lubricant should be even with the level of the plug hole.

1-15. BRAKE ADJUSTMENT. The brakes on each axle are self-adjusting. After initial adjustment, brakes should require only periodic checking for drum-to-lining clearance. The clearance should not exceed 0.050-inch. Brake adjustment procedure may be found in Section V.

1-16. DIFFERENTIAL ADJUSTMENT. The differential gears should be checked for backlash and correct tooth pattern after every overhaul. If differential trouble is suspected, check these adjustments before overhaul to determine if adjustment will correct the trouble. Perform the differential adjustments as shown in Section III.

TROUBLE SHOOTING

1-17. Noises and vibration originating in the transmission drive shafts or tires are often attributed to the drive axle. These sources of noises should be investigated before deciding that the cause is in the axle.

1-18. The noise source can be isolated within the axle by jacking up the tractor so the tires clear the ground. If noise is in one axle, disconnect the drive shaft of the opposite axle at the transmission, so only the noisy axle is



rotating, to isolate the noise. Run the engine at a moderate speed with the transmission in first gear. Be certain that both wheels are off the ground to prevent damage to the differential.

CAUTION

If a failure should occur in the differential, the tractor should not be operated under its own power. If the tractor must be moved, disconnect the drive shaft at

the transmission or remove the drive shaft completely. Drain both planetary reservoirs of the noisy axle, remove the planetary covers and pull the axle shafts out to prevent further damage. After pulling out the axle shafts, install the planetary covers and fill the planetary reservoirs with lubricant before moving the tractor. The tractor may be driven a short distance with one axle if the drive shaft and axle shafts are removed from the noisy axle or differential.

TROUBLE SHOOTING CHART

AXLE		
TROUBLE	CAUSE	REMEDY
Noise.	<ol style="list-style-type: none"> 1. Incorrect lubricant, or level too low. 2. Wheel bearings scored or damaged. 3. Wheel bearings improperly adjusted. 4. Sun gear teeth excessively worn or damaged. 	<ol style="list-style-type: none"> 1. Check level; fill with correct grade and type of lubricant. 2. Replace bearings. 3. Adjust wheel bearings. 4. Replace axle shaft.
Loss of lubricant.	<ol style="list-style-type: none"> 1. Lubricant level too high. 2. Lubricant foams excessively. 3. Lubricant leaks at planetary cover. 4. Worn or broken oil seal on axle spindle housing (oil leak from behind wheel into brake compartment). 5. Worn or broken drive axle oil seal (oil level in differential rises). 	<ol style="list-style-type: none"> 1. Drain to correct level. 2. Drain and fill with correct type and viscosity of oil. 3. Tighten capscrews or replace gasket. 4. Replace spindle oil seal. 5. Replace axle shaft oil seal.
DIFFERENTIAL		
Noise when turning.	<ol style="list-style-type: none"> 1. Worn spider gears or side gears. 	<ol style="list-style-type: none"> 1. Replace gears.
Loss of lubricant.	<ol style="list-style-type: none"> 1. Worn drive pinion oil seal. 2. Scored or worn differential drive yoke. 	<ol style="list-style-type: none"> 1. Replace oil seal. 2. Replace drive yoke and drive pinion oil seal.



DIFFERENTIAL (Continued)		
TROUBLE	CAUSE	REMEDY
Differential overheats.	<ol style="list-style-type: none">1. Incorrect lubricant or level too low.2. Carrier bearing adjusted too tightly.3. Excessive wear in gears.4. Pinion and ring gear adjustment too tight.	<ol style="list-style-type: none">1. (a) Check level, fill with correct grade and type of lubricant. (b) Check differential housing for leaks.2. Readjust differential bearings to required preload.3. Check gears for excessive wear or scoring. Replace as necessary.4. Readjust pinion and ring gear backlash.
Continual noise.	<ol style="list-style-type: none">1. Incorrect lubricant or level too low.2. Pinion or ring gear bearing worn.3. Gear teeth excessively worn or damaged.4. Unmatched pinion and ring gears.	<ol style="list-style-type: none">1. (a) Check level, fill with correct grade and type of lubricant. (b) Check differential housing for leaks.2. Replace worn bearings.3. Replace gears.4. Replace with a new matched pinion and ring gear.
Noise when driving.	<ol style="list-style-type: none">1. Incorrect lubricant or level too low.2. Pinion and ring gear adjustment too tight.	<ol style="list-style-type: none">1. (a) Check level, fill with correct grade and type of lubricant. (b) Check differential housing for leaks.2. Readjust pinion and ring gear backlash.
Noise when coasting.	<ol style="list-style-type: none">1. Pinion or ring gear bearings damaged.2. Pinion and ring gear adjustment too loose.	<ol style="list-style-type: none">1. Replace bearings.2. Readjust pinion and ring gear backlash.
Note: The following problems can be checked when the differential has been removed and disassembled.		
Side gear broken at hub.	<ol style="list-style-type: none">1. Misaligned or bent drive axle	<ol style="list-style-type: none">1. (a) Replace damaged gears. (b) Check drive axle for alignment, and examine other gears and bearings for possible damage and replace as needed.



DIFFERENTIAL (Continued)		
TROUBLE	CAUSE	REMEDY
Gears scored.	2. Worn thrust washers.	2. (a) Replace damaged gears. (b) Examine other gears and bearings for possible damage. (c) Replace all thrust washers.
	1. Incorrect lubricant or level too low.	1. (a) Replace scored gears. (b) Inspect all gears and bearings for possible damage. (c) Clean out housing and fill with correct grade and type of lubricant.
	2. Excessive spinning of one wheel.	2. (a) Replace scored gears. (b) Inspect all gears, pinion bores and shaft for scoring. Inspect bearings for possible damage and replace as needed.
Pinion and/or ring gear tooth breakage.	1. Improper pinion and bevel gear adjustment (backlash).	1. Replace gears with a new matched set.
	2. Excessive shock loading of gears.	2. Inspect remaining parts for possible damage and replace as needed.
PLANETARY		
Noise.	1. Planetary gears or ring gear teeth worn, chipped or broken.	1. Replace planetary gears or ring gear.
	2. Bearings in planetary gears worn or broken.	2. Replace gear shafts and bearings.
BRAKES		
Brakes drag.	1. Brakes incorrectly adjusted.	1. Adjust brakes.
	2. Return springs broken.	2. Replace springs.
	3. Wedge return spring broken.	3. Replace spring.
Brakes slip.	1. Oil or grease on linings.	1. Replace linings.
	2. Linings worn.	2. Replace linings.
	3. Brakes need adjustment.	3. Adjust brakes.
	4. Hydraulic fluid level low.	4. Replenish hydraulic fluid supply.
Erratic braking.	1. Air in brake system.	1. Bleed brakes.



SECTION TWO. AXLE DISASSEMBLY AND ASSEMBLY

PREPARATION FOR DISASSEMBLY

2-1. Axle disassembly preparation should include:

- a. Removing the tires and wheels from the axle.
- b. Disconnecting the drive shaft and brake lines at the axle.
- c. Removing the axle from the tractor.
- d. Using plain steam (no caustic soda) to clean the outside of the axle, hubs, and brake drums.

e. Preparing a dirt free work area at least 12 feet wide by 15 feet long.

f. Providing a hoist and suitable chains to lift component parts.

g. Supporting the axle at the mounting pads.

h. Gathering the following tools for disassembly:

Wheel nut wrench.

Lifting tool.

Axle shaft tool.

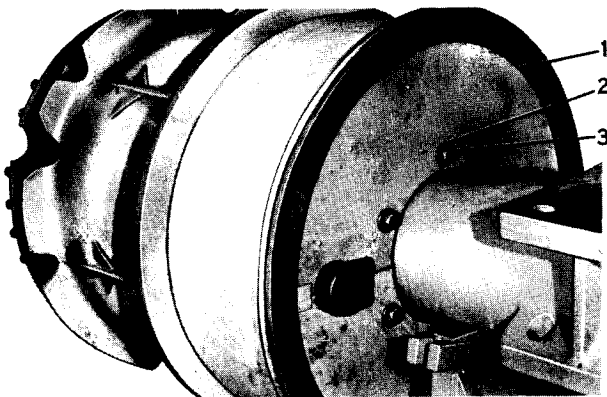


Figure 2-1

DISASSEMBLY

2-2. Remove the six nuts (3) and flat washers (2) that secure the shield halves (1) to the brake mounting bolts; remove the shield halves and spacers.

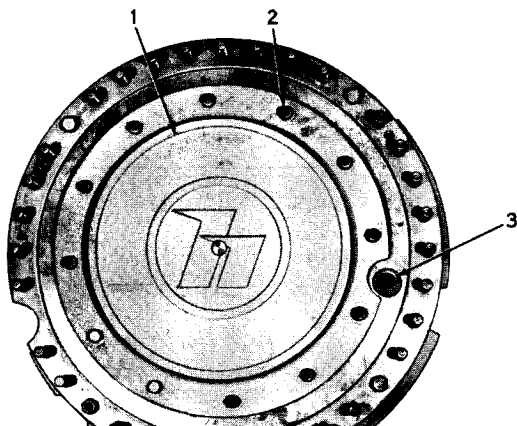


Figure 2-2

2-3. Rotate the wheel hub until the drain hole plug is at the bottom. Remove the plug and "O" ring. Drain the lubricant through the drain hole (3). Remove the cap screws (2) and sealing washers that secure the cover (1) to the planetary carrier. Remove the cover and gasket.

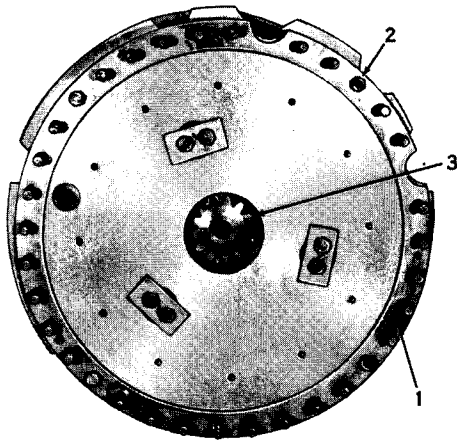


Figure 2-3

2-4. Thread the special tool in the threaded pilot hole in the axle shaft (3). Remove the axle shaft. Remove the capscrews (2) holding the carrier to the wheel assembly. Install three puller screws in the tapped holes (1) and use them to pull the planetary carrier assembly out part of the way.

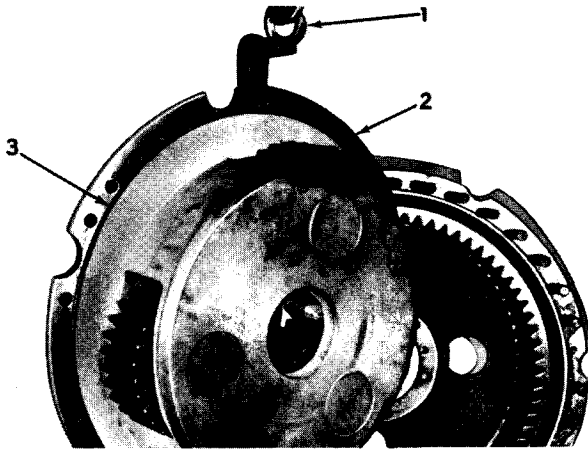


Figure 2-4

2-5. Bolt the special lifting tool (1) into a puller screw hole and into a cover screw hole directly beneath. Hook a hoist into the lifting tool and remove the carrier assembly (2) from the axle. Remove the seal ring (3) from the lip of the carrier. Refer to Section IV for disassembly and assembly of the planetary carrier assembly.

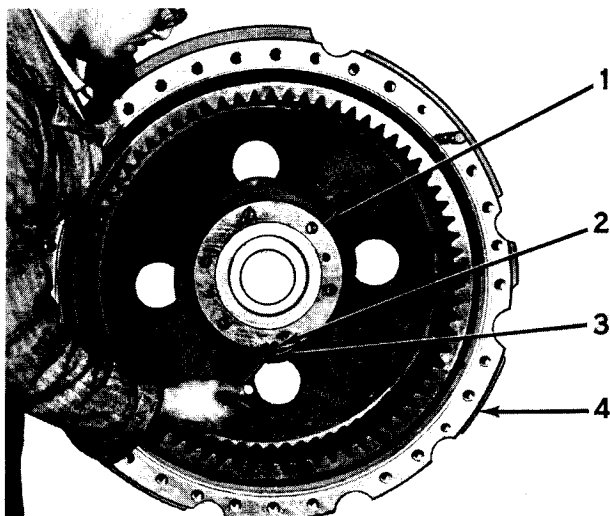


Figure 2-5

2-6. Remove the socket head capscrew (3) and lock washer (2) that lock the position of the wheel bearing adjusting nut (1). Take the weight off the wheel bearings with a chain and hoist attached to the wheel assembly (4).

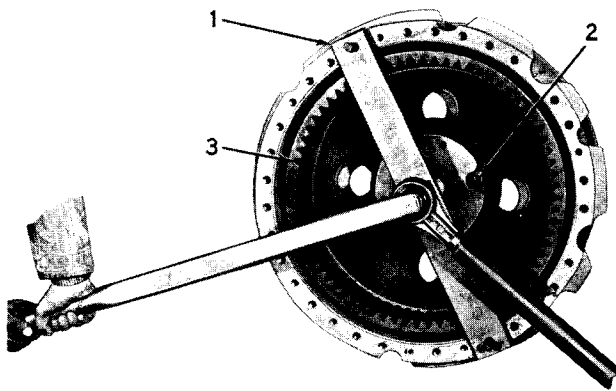


Figure 2-6

2-7. Use the wheel bearing adjusting wrench (1) and remove the wheel bearing nut (2). Remove the ring gear and hub assembly (3) by pulling it straight off the axle housing splines. Refer to Section IV for disassembly and reassembly of the ring gear and hub assembly.

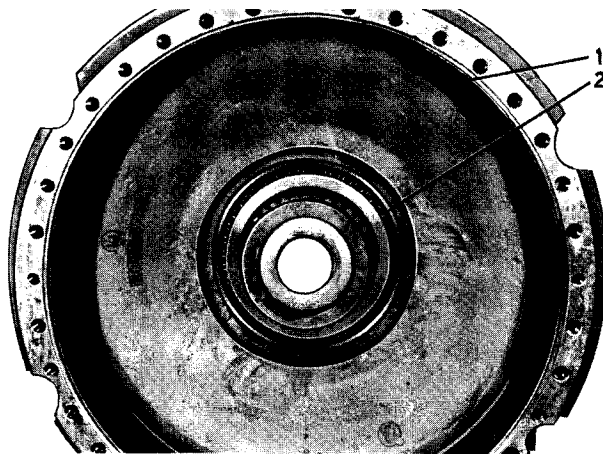


Figure 2-7

2-8. Pull the assembled drive wheel (1), brake drum, and bearings off the axle housing, pulling straight out to avoid damage to the bearings. Remove the outer bearing cone (2) from the wheel. Refer to Section IV for disassembly and assembly of the wheel and drum assembly.

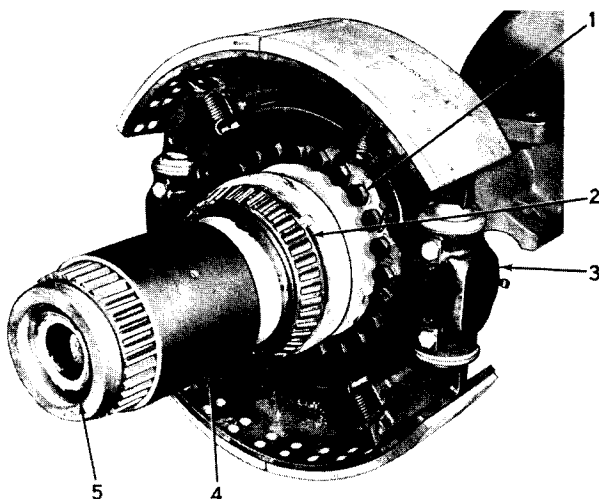


Figure 2-8

2-9. Remove the spacer (4) and bearing cone (2) from the axle housing. Remove the oil seal (5) from the bore of the housing. Remove the lock nuts and capscrews (1) that secure the brake assembly (3) to the flange on the axle housing. Remove the brake assembly. Refer to Section V for disassembly and assembly of the brake assembly.

2-10. Disassemble the opposite axle end in the same manner as described above.

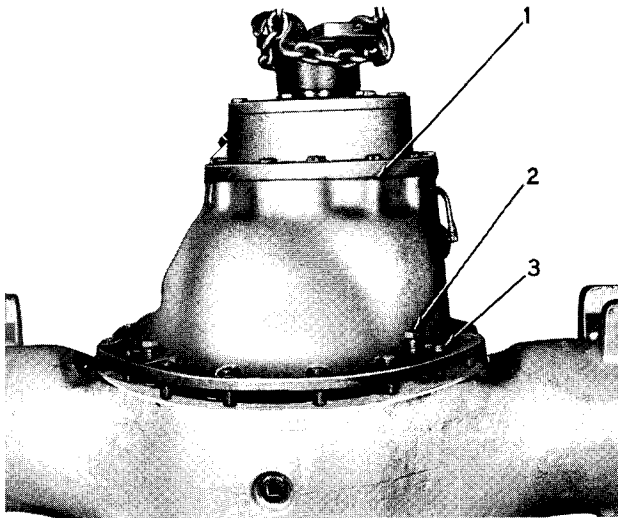


Figure 2-9

2-11. Remove the drain plug from the axle housing and drain the lubricant.

2-12. Use a chain and hoist to support the differential assembly (1). Remove the nuts on the differential mounting studs (3). Install cap screws (2) in the threaded holes, and use the cap screws as puller screws. Pull the differential from the axle housing, supporting the weight with the hoist. Lift gradually and evenly, taking care not to damage threads on studs. Remove the differential assembly. Refer to Section III for disassembly and assembly of the differential.

PREPARATION FOR ASSEMBLY

2-13. Preparation for axle assembly should include:

a. Cleaning all parts thoroughly. Rough parts such as castings or all metal parts without finished, ground or polished surfaces may be cleaned in a hot solution of mild alkali. Parts should remain in tank until thoroughly clean and heated through.

WARNING

Exercise care to avoid skin rashes and inhalation of vapors when using alkali or solvent type cleaners.

b. Cleaning other parts with a solvent type cleaner such as carbon tetrachloride or petroleum solvents. **DO NOT USE GASOLINE.**

c. Drying parts thoroughly with soft, clean, absorbent paper towel or cloths free of abrasive material.

CAUTION

NEVER dry bearings by spinning with compressed air.

d. Inspecting all bearings, cups and cones, including any not removed from the axle. Replace any parts that are worn, pitted, or damaged in any way. Remove parts needing replacement with a puller or with a press,

using suitable arbors. Avoid the use of drifts or hammers.

e. Inspecting all gears and splines for wear or damage. Replace all parts that are scored, pitted, ridged, or worn.

f. Inspecting axle shafts for signs of torsional fractures or other indications of impending failure.

NOTE

Parts that are to be assembled immediately should be coated with light oil to prevent corrosion. If parts are to be stored for any length of time or if they are not to be assembled immediately, coat them with a good grade of rust preventive and wrap in paper, treated to prevent corrosion.

g. Replacing all seals, gaskets, "O" rings and retaining rings.

h. Assembling the following tools and supplies:

Wheel nut wrench

Torque wrench, 500 ft-lb.

Torque multiplier, 4 to 1.

Lifting tool.

Loctite Plastic Gasket or equivalent.

Axle shaft tool.

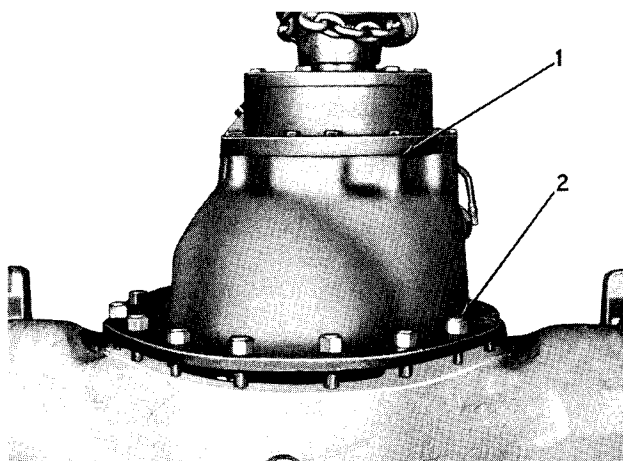


Figure 2-10

ASSEMBLY

2-14. After the axle housing has been thoroughly cleaned, coat the differential mounting face with "Loctite Plastic Gasket" or equivalent. Lift the assembled differential (1) with a hoist and place into position on the housing. Be careful not to damage the threads on the studs during installation. Draw the nuts (2) down evenly on the studs until drawn tight. Torque the nuts as directed in Table 1, page 44.

NOTE

Follow manufacturer's instructions for application and curing time for "Loctite Plastic Gasket".

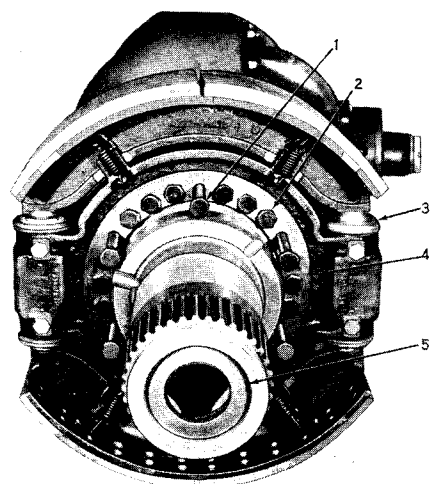


Figure 2-11

2-15. Install the seal (5) in the end of the axle housing, with the lip outward. Install the brake spider assembly (4), being certain that the proper assembly is on the correct side. The forward rotation of the wheel causes the brake shoe to push against the solid anchor (3) of the brake spider assembly. Install short cap screws (2), as indicated. Then install the six long cap screws (1). The long cap screws support the dust shield on the back side of the brake assembly. Install the nuts on the cap screws. Torque as directed in Table I, page 44.

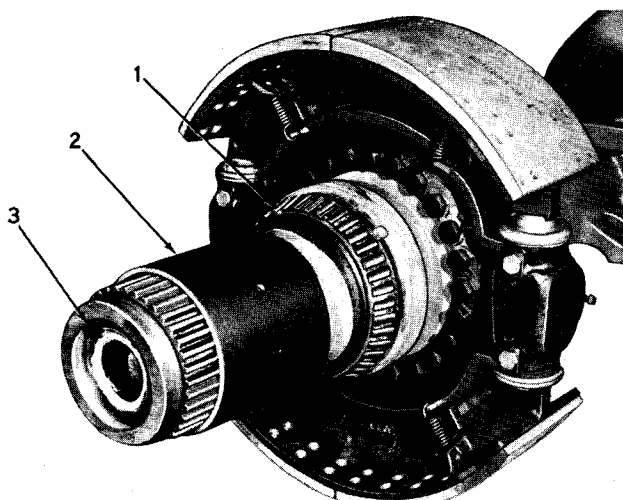


Figure 2-12

2-16. Lubricate the bearing (1) and oil seal (3) with the type lubricant recommended in Table III, page 45. Install bearing (1) and bearing spacer (2) on the axle housing. Check splines, on the axle housing end, for nicks and burrs.

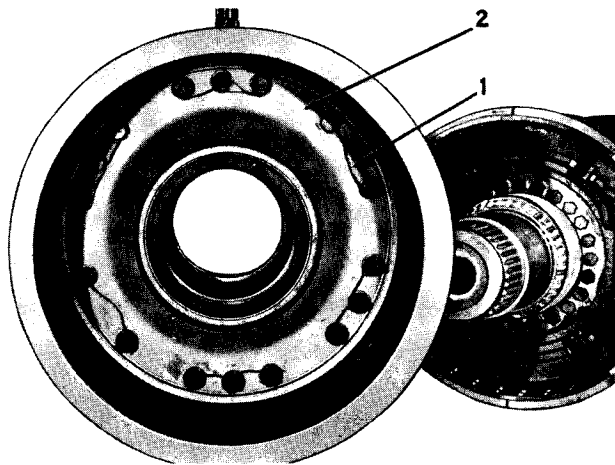


Figure 2-13

2-17. Check lock wiring (1) of the cap screws to be sure that the lock wires are in place. Also be certain that the shield (2) is not damaged.

2-18. Lift the wheel and drum assembly into position on the axle spindle. Install the outer bearing cone.

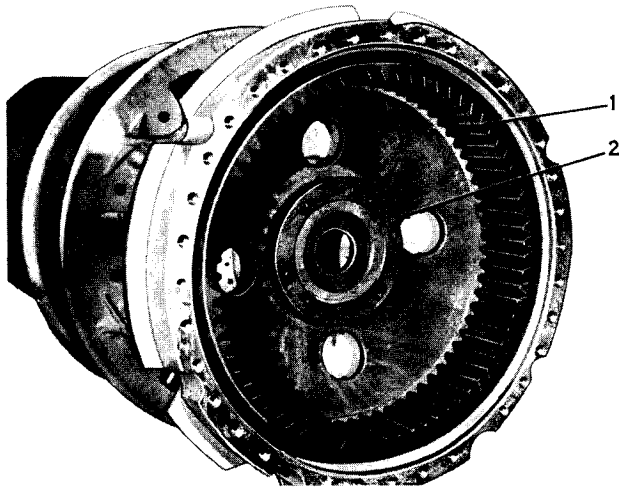


Figure 2-14

2-19. Install the ring gear and hub assembly (1) on the splines on the axle end. Install the wheel bearing adjusting nut (2).

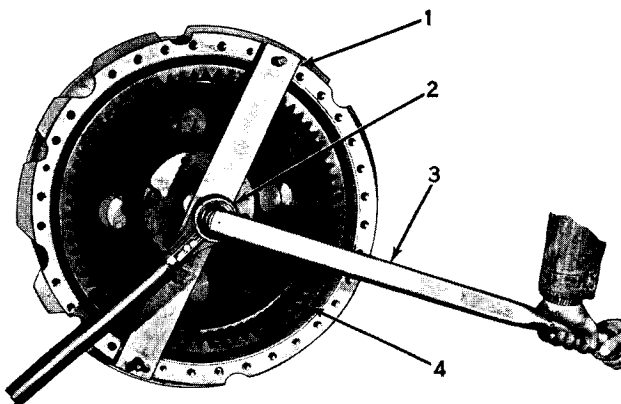


Figure 2-15

2-20. Install the wheel nut wrench (1), 4 to 1 torque multiplier (2), and 500 ft-lb torque wrench (3). Torque the nut to 2000 ft-lbs. (500 ft-lbs. on gauge) to seat the bearings, then loosen nut. Retorque to 1500 ft-lbs. (375 ft-lbs. on gauge). Be sure one of the nut locking holes lines up with a hole in the ring gear assembly (4). Tighten the nut to line up the holes. Do not back off on adjustment. Install the socket head cap screw and lock washer to lock the adjustment. Torque as directed in Table II, page 44.

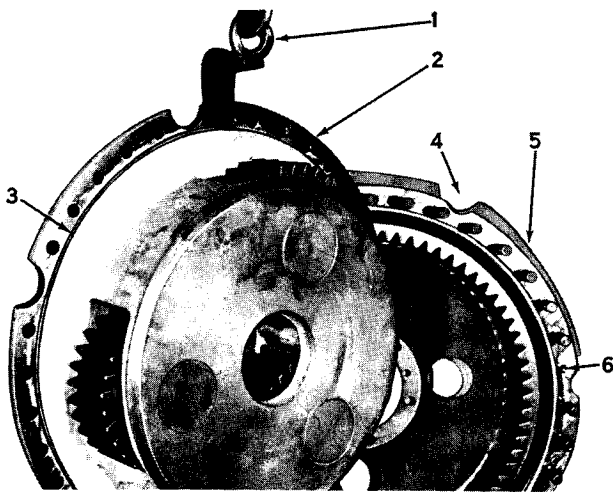


Figure 2-16

2-21. Bolt the lifting tool (1) on the planetary carrier assembly, using one jackscrew hole and one cover hole directly below it. Install the "O" ring (3) on the carrier assembly (2). Lift the carrier assembly into position on the wheel assembly (5), aligning the cutouts (4). Be sure that the four capscrew holes line up with the tapped holes (6) in the wheel.

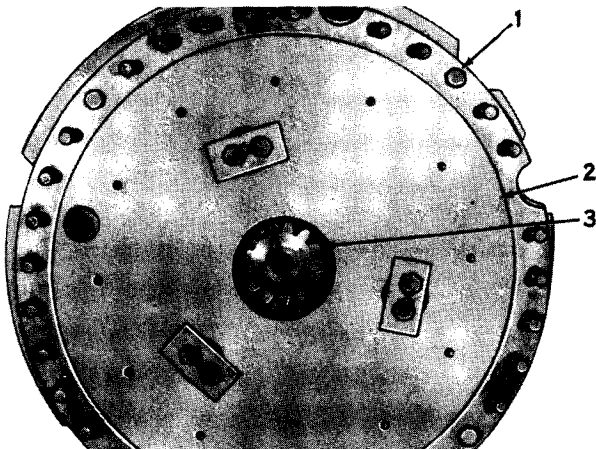


Figure 2-17

2-22. Install four capscrews (1) in the planetary carrier assembly (2) and torque as directed in Table II, page 44. Install the axle shaft (3). The axle shaft has a threaded hole at the gear end. Install the special tool in the threaded hole. Using the tool as a lever, raise the inner end of the axle shaft to enter the differential side gear splines. Align the three planetary gears with the axle gear and tap the axle shaft with a plastic tipped mallet.

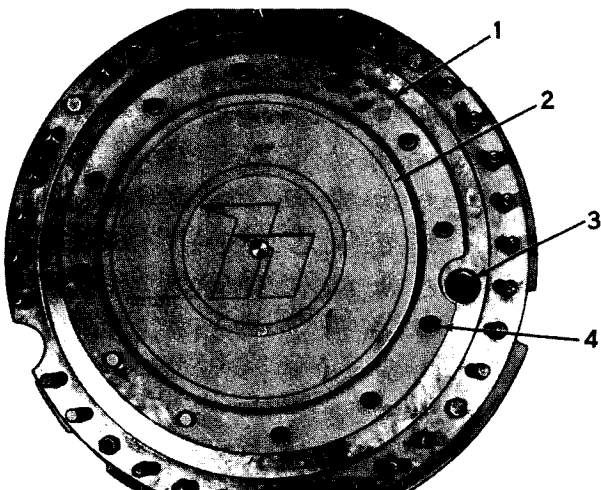
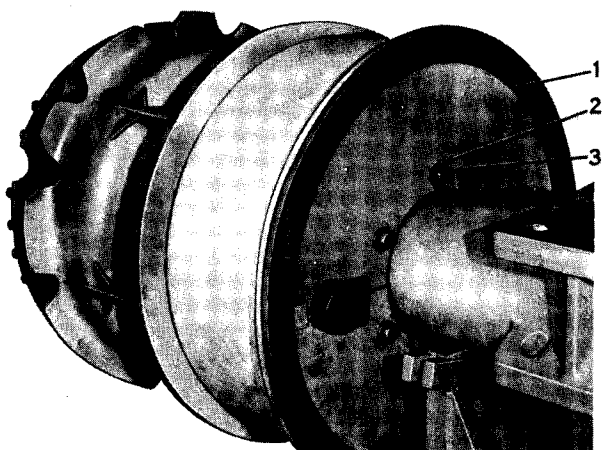


Figure 2-18

2-23. Install the gasket (1), cover (2), and capscrews with sealing washers (4). Align the cutout with the filler hole (3). Torque the capscrews as directed in Table II, page 44. Install the plug.



2-24. Adjust the brakes as directed in Section V. Install spacers on the six long brake mounting capscrews. Position the two halves of the dust shield (1) on the spacers; secure with six flat washers (2) and nuts (3).

Figure 2-19

SECTION THREE. DIFFERENTIAL DISASSEMBLY AND ASSEMBLY

PREPARATION FOR DISASSEMBLY

3-1. Remove the differential from the axle (See Section II). Differential disassembly preparation should include:

a. Using plain steam (no caustic soda), clean the outside of the differential housing thoroughly.

b. Preparing a dirt-free work area at least 10 feet square.

c. Gathering the following tools and equipment:

A work bench.

A shop press.

A hoist.

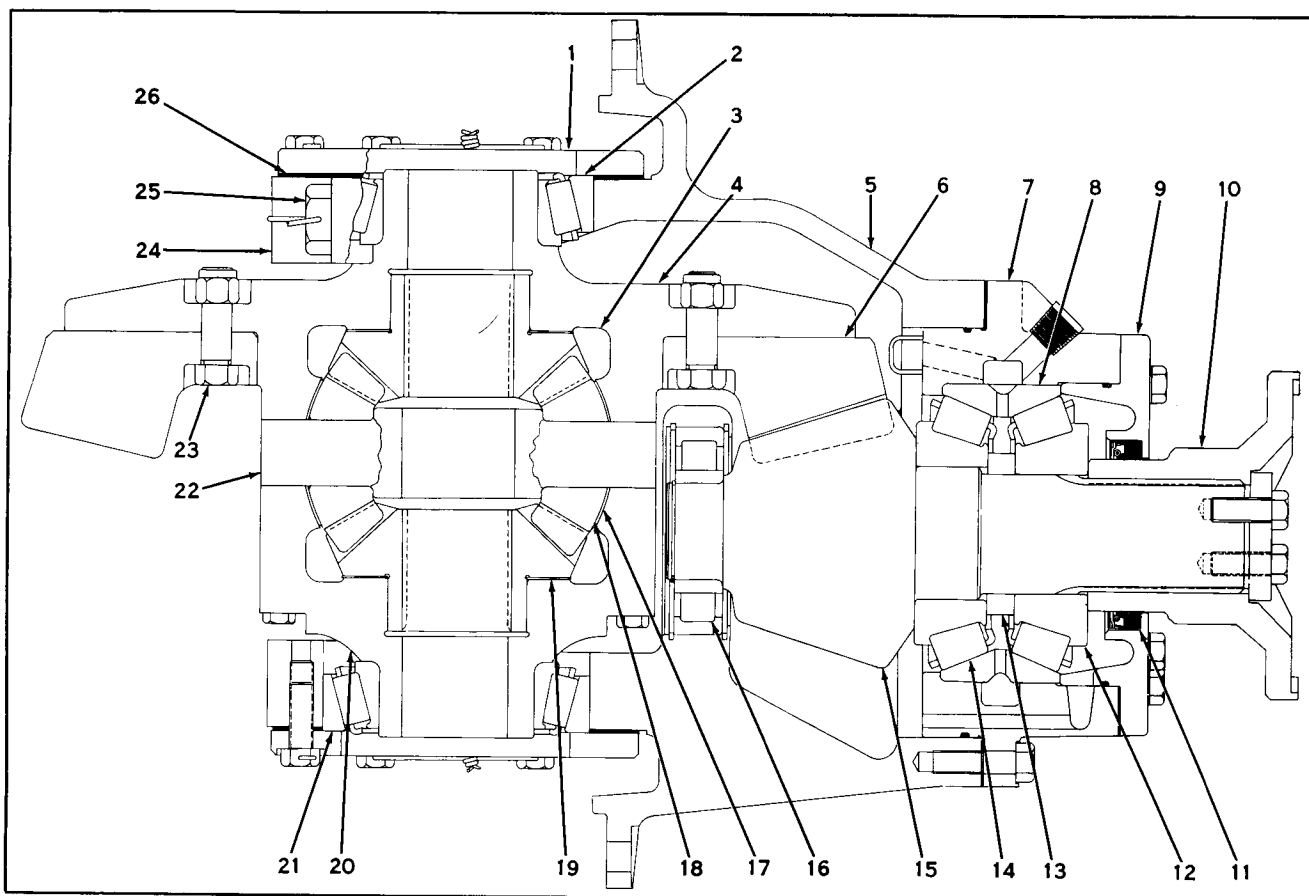


Figure 3-1

- | | | | |
|-------------------------|------------------------|---------------------------|---------------------|
| 1. Bearing adjuster | 8. Bearing cup | 15. Pinion shaft and gear | 21. Bearing cup |
| 2. Carrier bearing | 9. Seal retainer | 16. Radial bearing | 22. Spider |
| 3. Side gear | 10. Yoke | 17. Thrust washer | 23. Ring gear bolt |
| 4. Flanged case | 11. Seal | 18. Spider gear | 24. Bearing cap |
| 5. Differential carrier | 12. Front bearing cone | 19. Thrust washer | 25. Cap bolts |
| 6. Ring gear | 13. Spacer | 20. Plain case | 26. Adjusting shims |
| 7. Pinion housing | 14. Rear bearing cone | | |

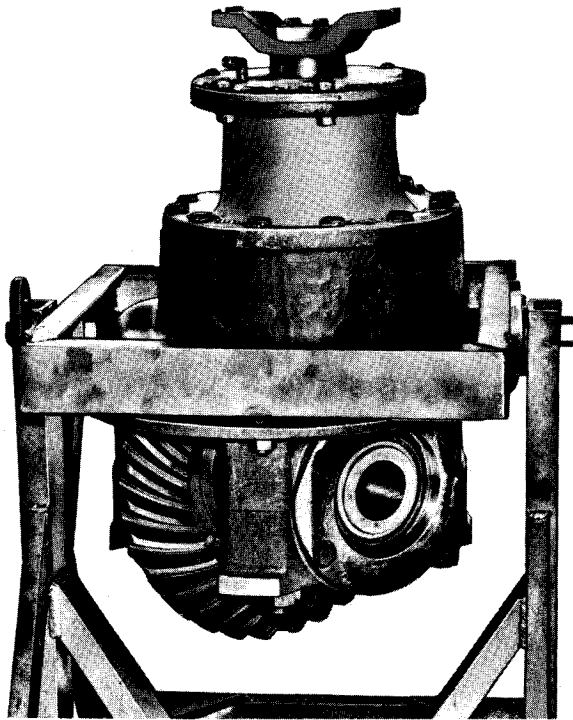


Figure 3-2

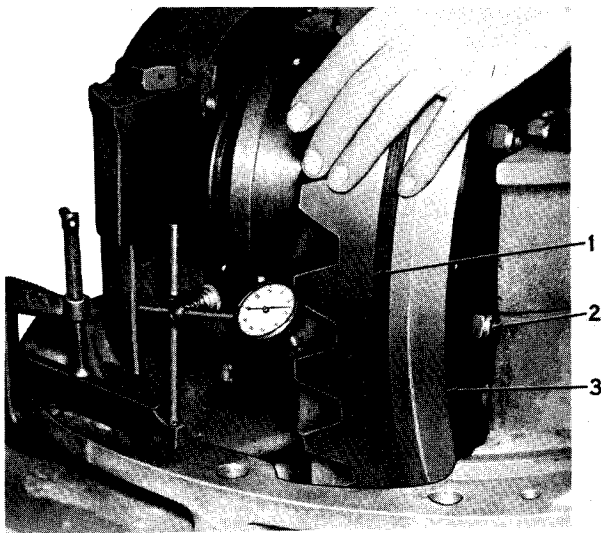


Figure 3-3

DISASSEMBLY

3-2. Place the differential assembly in a stand or other suitable support to facilitate disassembly. A stand similar to the one shown can be made from blueprints that are available upon request, as drawing number SSK-318. Send your request to:

International Harvester Company,
Construction Equipment Division,
P.O. Box 270,
Melrose Park, Illinois.
Attention: Service Publications Section.

3-3. Measure and note the backlash of the differential ring gear and pinion before disassembly.

NOTE

If the ring gear (1) is to be replaced, it will be easier to loosen the nuts (2) holding the ring gear to the flanged differential case (3) before removing the pinion assembly. Hold the pinion shaft yoke with a bar to keep the ring gear from turning.

3-4. Before starting differential disassembly, check the pinion shaft end play to determine if it is excessive. The end play is controlled by the pinion shaft front bearing and should be 0.007-inch, ± 0.001 -inch. If the end play is excessive, the bearing can be adjusted as outlined under "Field Adjustment of Pinion Front Bearing", paragraph 3-19.

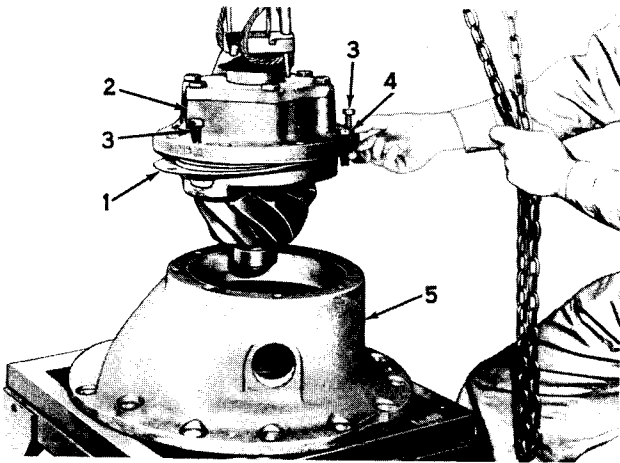


Figure 3-4

3-5. Remove the cap screws (4) and lock wires that secure the pinion gear housing (2) to the carrier housing (5). Install three 1/2-13 NC jack screws (3) in the puller holes in the pinion gear housing (2). Run the jack screws in until the pinion gear housing is free of the bore in the carrier housing. Attach a cable to the pinion shaft yoke and lift the assembly, with the cone center adjusting shims (1), out of the carrier housing. Tag these shims and keep separate for proper reassembly. Remove the "O" ring from the pinion gear housing.

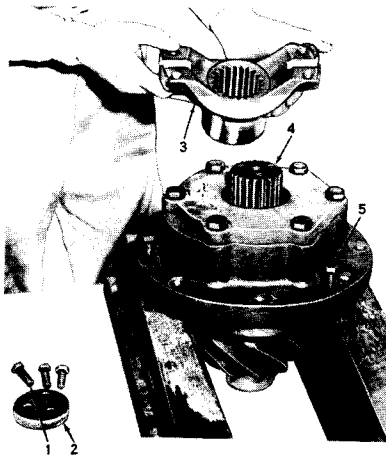


Figure 3-5

3-6. Remove the cap screws (1) that secure the yoke retainer (2) to the pinion shaft (4), and pull off the pinion shaft yoke (3). Remove the jack screws (5).

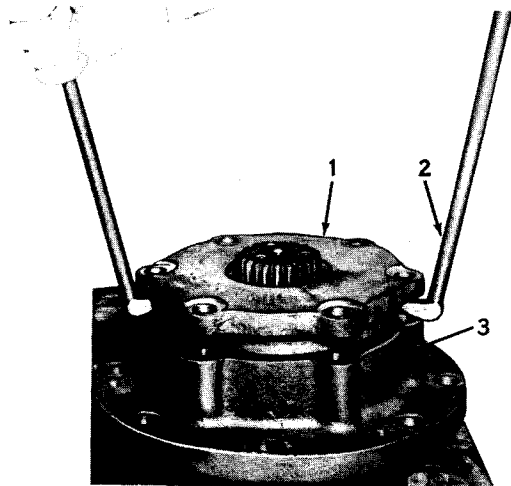


Figure 3-6

3-7. Remove the cap screws and lock washers that secure the seal retainer (1) to the pinion gear housing (3). Drive on the outer edge of the retainer with a fiber hammer until two bars (2) can be inserted between the flanges. Pry off the retainer.

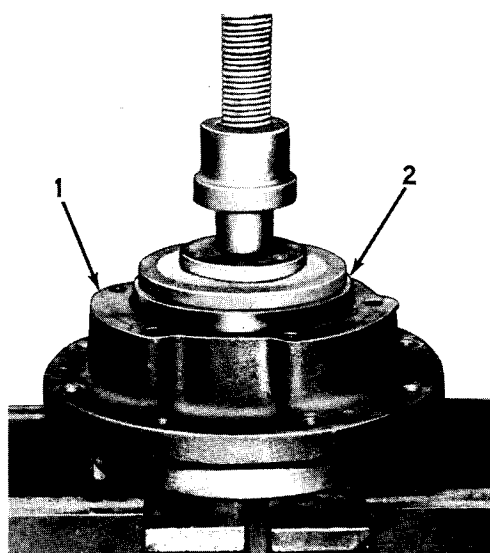


Figure 3-7

3-8. Support the pinion gear housing (2) with blocks and press the pinion shaft (1) from the pinion front bearing cone. The front and rear pinion bearing cup is of one-piece construction. The cup can be pressed out of the pinion housing from the rear, if desired.

NOTE

If the pinion bearing assembly is to be reused, it will be necessary to retain the same relationship between the cup and cones because of the established wear pattern. Proper identification of parts should be made when disassembling.

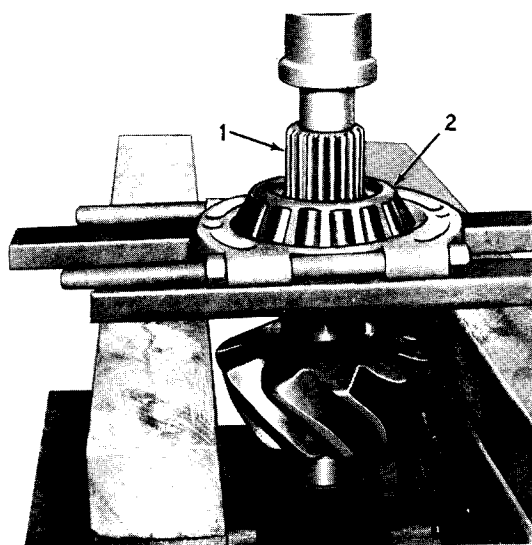


Figure 3-8

3-9. The bearing rear cone (2) and bearing spacer come out with the pinion shaft (1). Lift the bearing front cone from the cup. Slide the bearing spacer off the pinion shaft. If necessary, remove the bearing rear cone (2) from the pinion shaft by pressing the shaft out of the bearing.

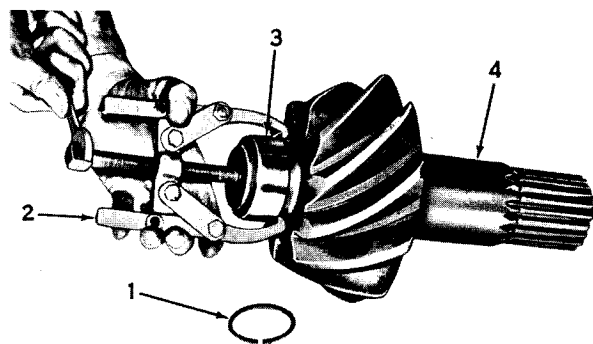


Figure 3-9

3-10. If it is necessary to remove the inner race (3) of the pinion rear roller bearing, remove the snap ring (1) and pull the race off the end of the pinion shaft (4) with a standard puller (2). The ring gear and differential assembly must be out of the carrier housing before the pinion shaft rear roller bearing outer race can be removed, as the outer race is retained in the carrier housing by two snap rings.

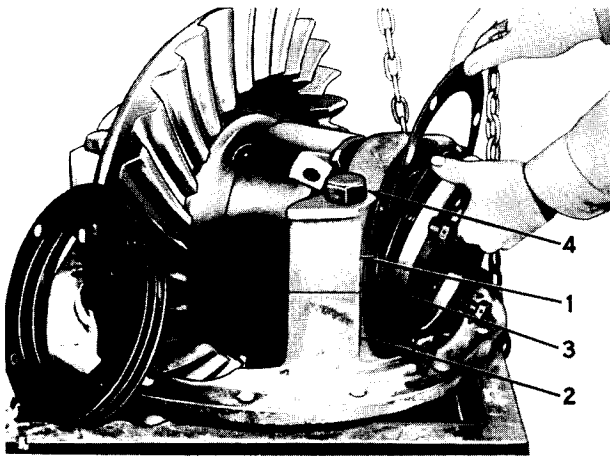


Figure 3-10

3-11. Remove the lock wire and four capscrews (4) that secure the bearing adjusting covers (1) to the carrier housing (2). Remove both covers and shims. Note the size of the shim pack (3) removed from each side and keep separate. Tag the shim pack from one side for proper reassembly.

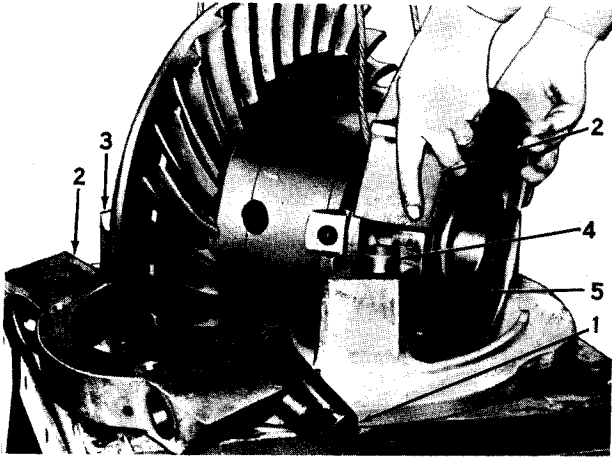


Figure 3-11

3-12. Remove the lock wire and bearing cap bolts (1) that secure the bearing caps (2) to the carrier housing (3). The bearing caps and carrier housing legs are marked at the factory to assure correct assembly. If the original identification marks are not clear, mark one bearing cap and carrier leg with a center punch or chisel to identify for correct assembly. Tap the bearing caps (2) with a fiber hammer to loosen and remove the caps from the dowels (4) and carrier bearings (5).

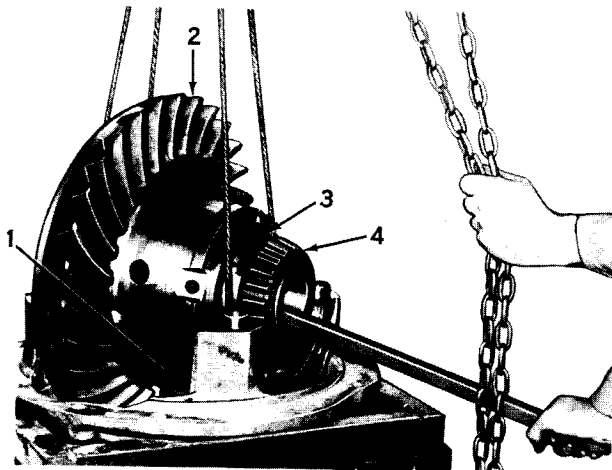


Figure 3-12

3-13. Sling a cable around the ring gear (2) and differential assembly (3), as shown. Lift the assembly just high enough to remove both carrier bearing cups. Tag the cups to identify them for correct reassembly. As the differential assembly is lifted out of the carrier housing, tip it slightly so the ring gear (2) clears the pinion shaft bearing boss (1). If necessary, remove the carrier bearing cones (4) with a standard bearing puller. Be sure that the force is exerted on the inner race and not on the bearing cage.

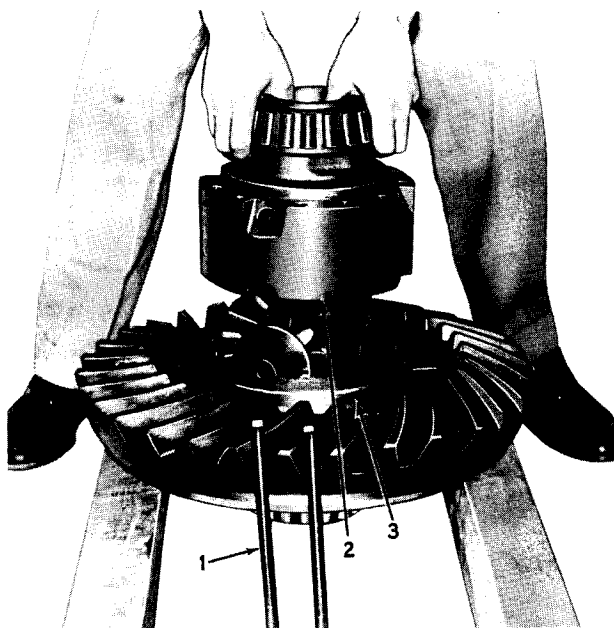


Figure 3-13

3-14. If the original identification marks are not clear, mark the differential case halves with a punch or chisel for correct alignment when assembling. Remove the capscrews (1) holding the two differential case halves together, and lift the plain half (2) from the flanged half (3). One of the differential side gears may come out with the plain half. If it does, take care not to let it fall and damage the flanged half or the spider gears.

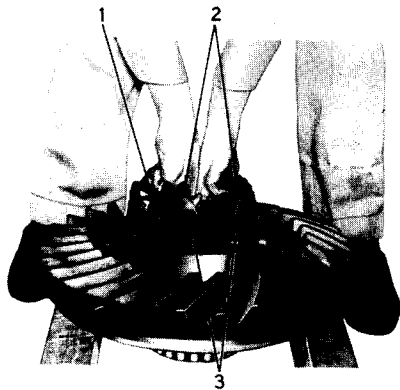


Figure 3-14

3-15. Remove the spider (1) with the spider gears (2) and thrust washers (3).

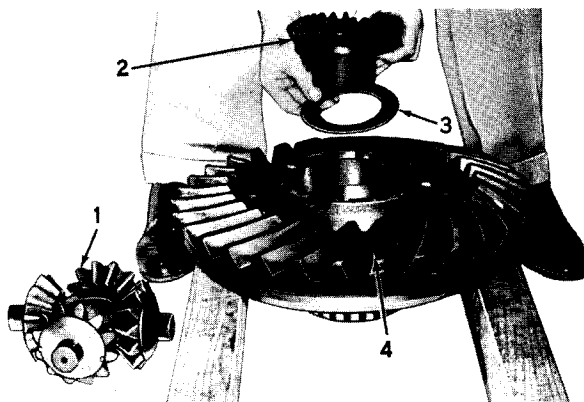


Figure 3-15

3-16. The spider (1) can be installed four ways and need not be marked before removal. Remove the other side gear (2) and thrust washer (3) from the flanged case assembly (4).

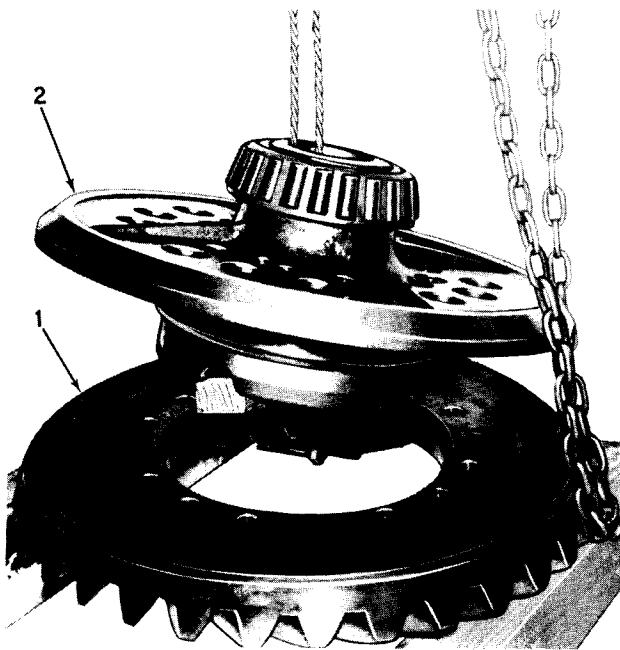


Figure 3-16

3-17. If it is necessary to remove the ring gear (1), mark the case and the gear before disassembly. Remove the nuts and drive out the dowel bolts holding the ring gear (1) to the flanged differential case (2). Place two blocks under the ring gear and attach a hoist to the flanged case (2). Raise the hoist slightly and tap the ring gear off the flanged case.

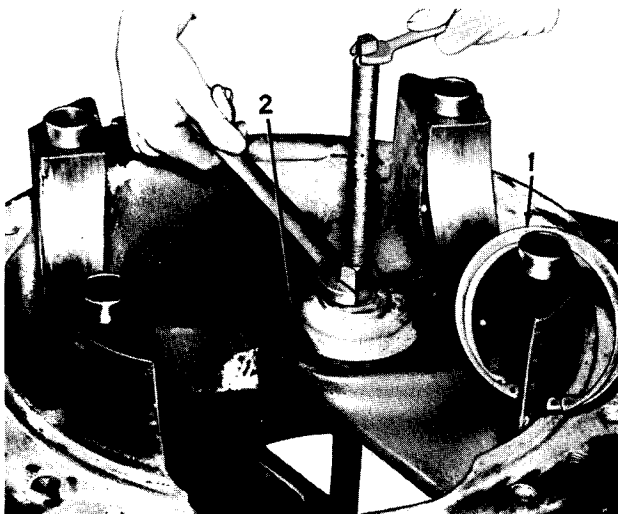


Figure 3-17

3-18. If the pinion rear roller bearing outer race is to be replaced, remove both snap rings (1) and press or pull the race out of the carrier housing bore (2).

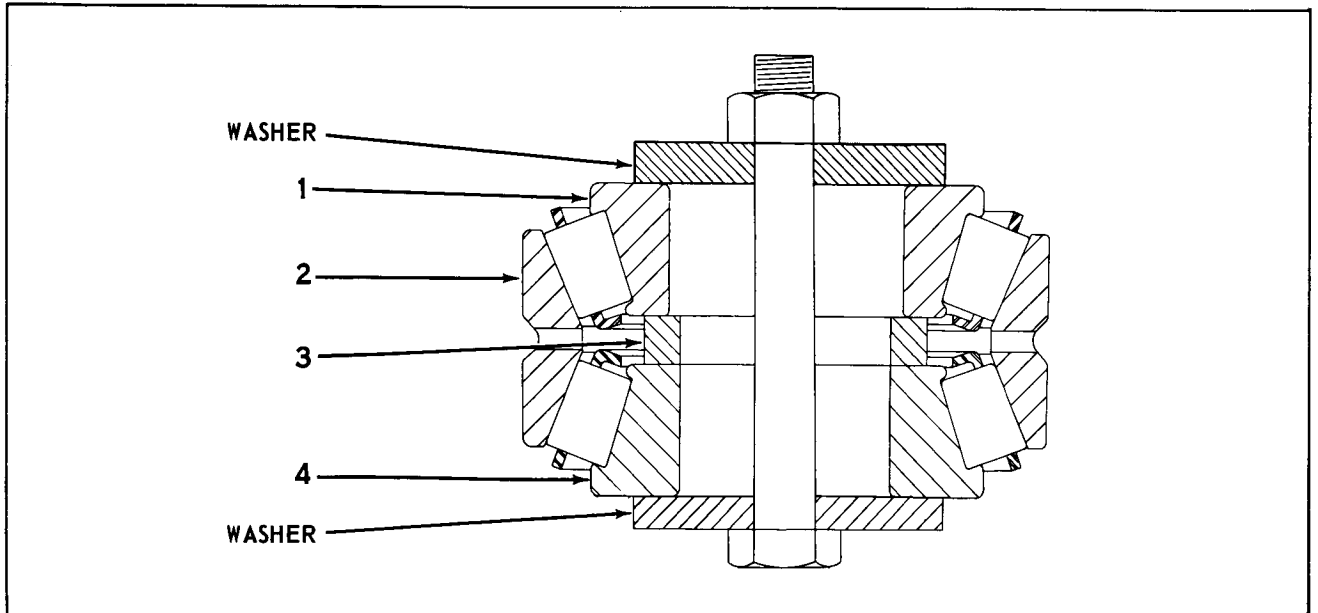


Figure 3-18

FIELD ADJUSTMENT OF PINION FRONT BEARING

3-19. The pinion shaft front bearing, consisting of a cup, spacer, and two cones, is furnished as a complete matched assembly. Because of this, a definite procedure for field adjustment of this bearing, due to normal wear, must be followed. This procedure for adjusting end play, as outlined below, only applies to bearing assemblies that show normal wear. A bearing assembly that is heavily pitted, scored, or excessively worn should not be salvaged.

a. Assemble the complete bearing (with spacer installed).

b. Position flat washers on the ends of the bearing cones. Install a 3/4 x 7-inch bolt through the washers and bearing assembly. Install the nut and torque to 50 ft-lbs. to preload the bearings.

c. Rotate the cup (2) while tightening the nut to fully seat the bearings.

d. Measure across the bearing races with a 5- to 6-inch micrometer at three different

points. Record the readings.

e. Remove the nut, flat washer and bearing cone. Remove spacer (3). Install cone and flat washer without spacer (3).

f. Install nut and torque as before while rotating the bearing cup (2).

g. Measure across the bearing races (1 and 4) at three different points and record the readings.

h. The factory end play specification in a new bearing assembly is 0.007-inch, ± 0.001 -inch.

i. If the difference in readings taken in step d and g, above, is greater than specified, grind or lap the spacer (3), as necessary, to obtain factory specified end play.

NOTE

The width of the spacer (3) is etched on the face of the O.D.

PREPARATION FOR ASSEMBLY

3-20. Prepare the differential for assembly as follows:

a. Wash all parts in an oil solvent and dry thoroughly with compressed air.

CAUTION

NEVER dry bearings by spinning with compressed air.

b. Inspect all bearings, cups, and cones, including those not removed from the carrier or pinion shaft. Replace if rollers or cups are pitted or damaged in any way.

c. Inspect all gears for wear or damage. Gears which are pitted, galled, ridged, scored or worn should be replaced.

NOTE

When necessary to replace either the pinion or ring gear, both gears must be replaced as a set. These gears are matched to assure quietness and satis-

factory service. Unmatched pinion and ring gears will not render satisfactory gear tone or gear life.

d. Inspect differential case halves, thrust washers, spider, spider gears, and side gears for pitted, scored, or worn thrust surfaces.

e. Thrust washers must be replaced in sets. The use of a combination of old and new washers will result in premature failure.

f. Remove nicks, burrs, and mars from machined or ground surfaces. All threads must be clean and free to obtain accurate adjustment and correct torque. A fine mill stone or India stone is suited for this purpose.

g. Clean the axle drive housing thoroughly to remove all old lubricant and foreign matter.

h. Inspect axle shafts for signs of wear or damage. Replace if necessary.

i. Inspect the splines on the pinion shaft for signs of wear or damage. Remove all burrs with a stone.

ASSEMBLY

3-21. If the pinion rear roller bearing outer race was removed, install one snap ring (1) in the bottom of the bearing bore in the carrier housing. Start the identification groove end of the outer race in the bore and press the outer race in until it bottoms against the snap ring. Install the other snap ring.

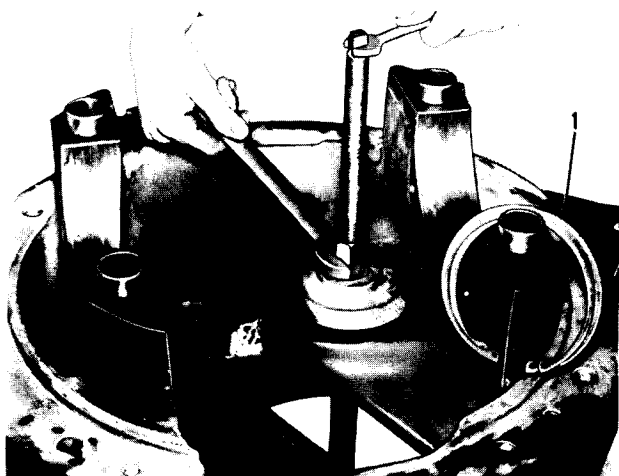


Figure 3-19

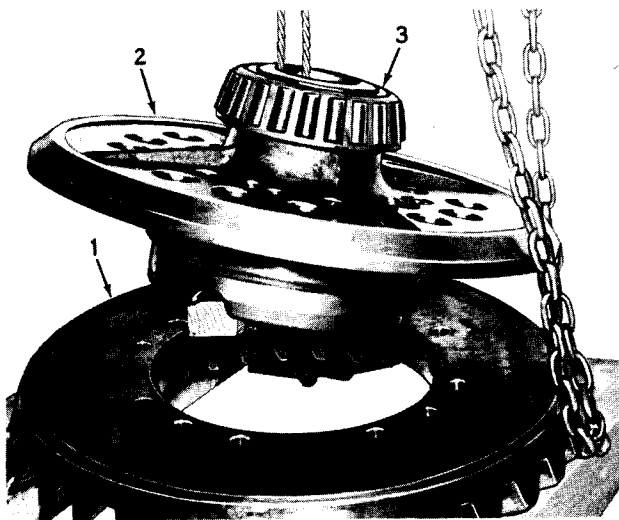


Figure 3-20

3-22. If removed, press the carrier bearing cones (3) on the two halves of the differential case (2). Be sure the cones are fully seated.

3-23. Be sure that the mating surfaces of the ring gear (1) and flanged half (2) of the differential case are clean and dry. Line up the dowel bolt holes and the markings and drive the dowel bolts through the ring gear and the flanged case with the heads on the gear side. Secure with self-locking nuts. Torque as directed in Table I, page 44.

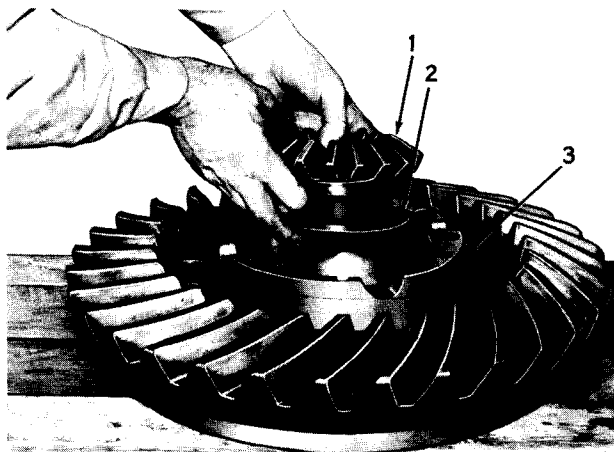


Figure 3-21

3-24. Install the thrust washer (2) and side gear (1) in the flanged case (3).

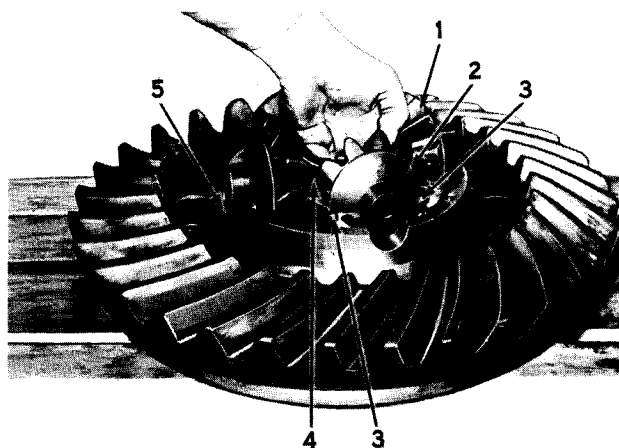


Figure 3-22

3-25. Place the four spider gears (1) with thrust washers (2) on the spider (4). Position the thrust washers (2) so that the tabs (3) are below the center line of the spider. There is a shoulder on the inner bore of the flanged case (5) which these tabs contact to prevent the thrust washers from turning. When the thrust washers are correctly positioned, place spider assembly (4) in the flanged case (5), being sure that all four spider gears mesh with the side gear and that the spider is seated in the flanged case.

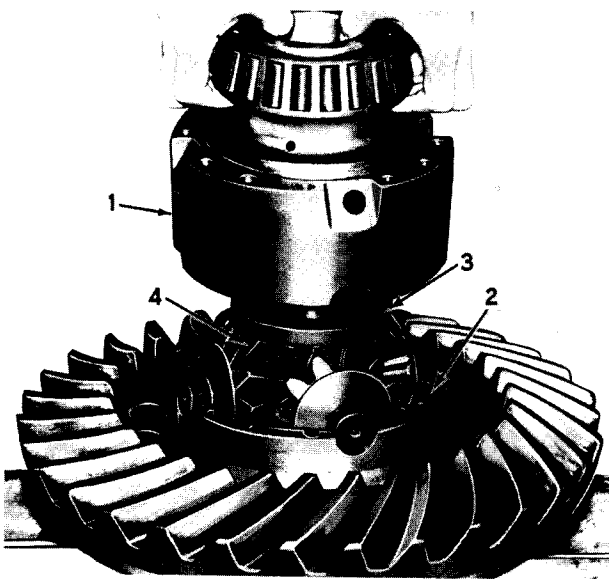


Figure 3-23

3-26. Install the other side gear (4) and thrust washer (3). Install the plain differential case (1) on the flanged case (2) so that the marks previously made are aligned. Secure with the capscrews and torque as directed in Table I, page 44. Lock wire these capscrews if heads are drilled.

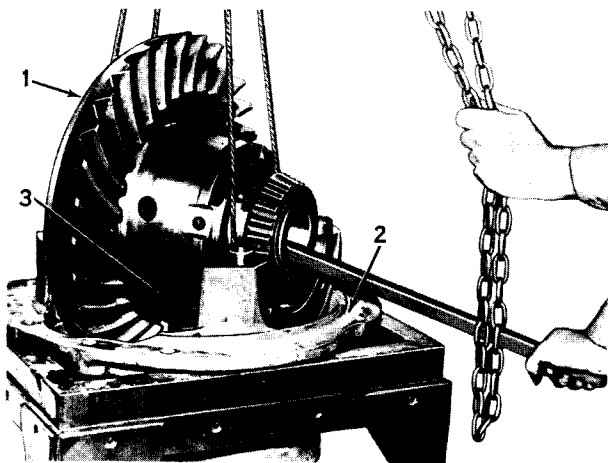


Figure 3-24

3-27. Lift the differential assembly (1) and tip it slightly when installing it in the carrier housing (2) so the ring gear teeth will clear the pinion shaft rear bearing boss (3). When the assembly clears the bearing boss, place the carrier bearing cups on the cones and lower the assembly into position.

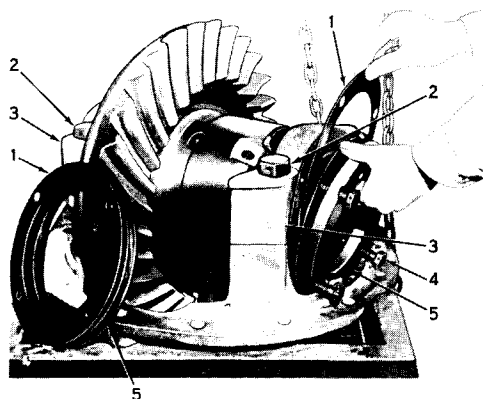


Figure 3-25

3-28. Install the carrier bearing caps (3) so that the aligning marks coincide. Draw the cap bolts (2) down, but do not torque. Under each bearing adjusting cover (5) place the shims (1) that were removed during disassembly and install the covers (5). Rotate the differential while torquing the cover bolts (4) as shown in Table I, page 44. This will seat the bearings. Torque the bearing cap bolts as directed in Table I.

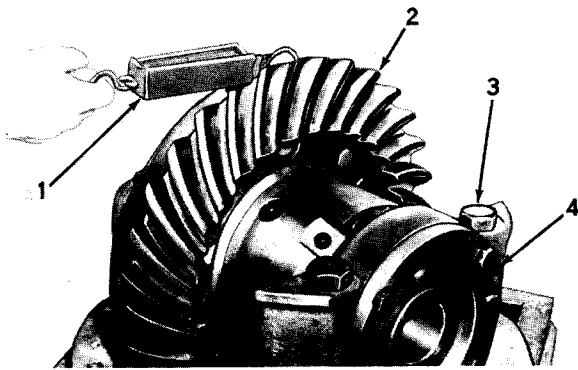


Figure 3-26

3-29. Check the bearing preload by placing a spring scale (1) on the outer edge of the ring gear (2) and measuring the pull required to turn the ring gear. The preload should be between 3 and 4 pounds. If the preload is too low, remove shims from under the cover (4). If the preload is too high, add shims. Recheck the preload and adjust until it is correct.

NOTE

Every time shims are added or replaced, loosen the carrier cap bolts (3). Always torque the cover bolts before torquing the bearing cap bolts.

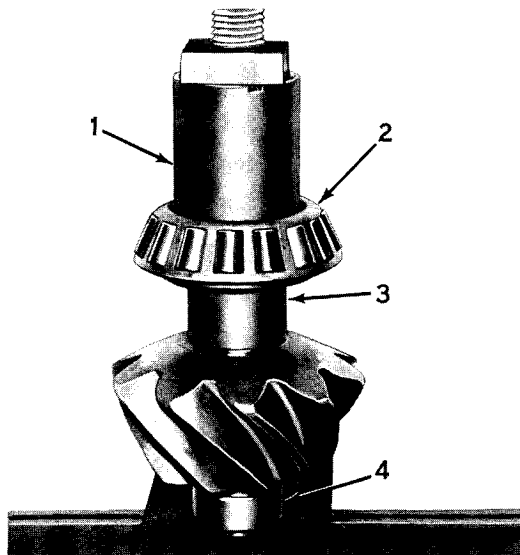


Figure 3-27

3-30. If it was removed, press the pinion shaft rear roller bearing inner race (4) on the pinion shaft (3) and install the snap ring. If removed, press the pinion shaft front bearing rear cone (2) on the pinion shaft with a suitable driver (1) against the inner race.

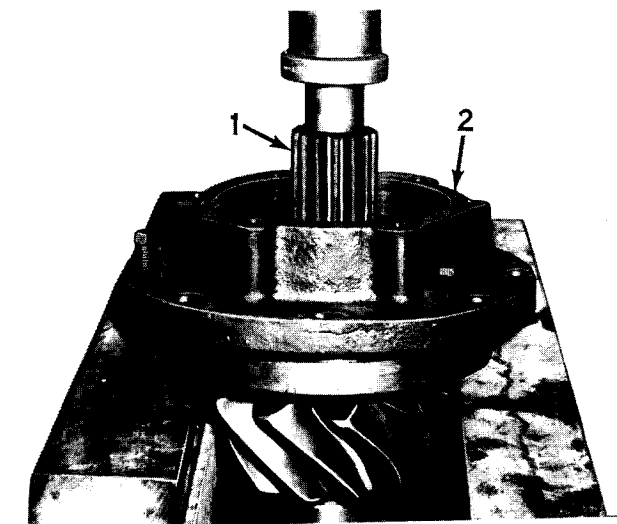


Figure 3-28

3-31. Press the pinion bearing cup (2) into the pinion housing (1). Be sure it is seated all the way around.

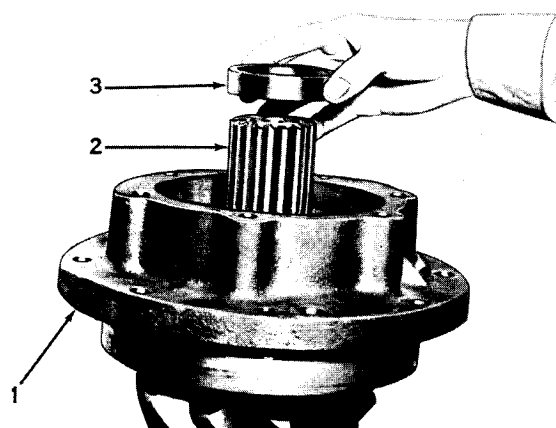


Figure 3-29

3-32. Place the pinion shaft (2) into the pinion housing (1) and install the bearing spacer (3). Press the front cone of the pinion front bearing onto the pinion shaft (2).

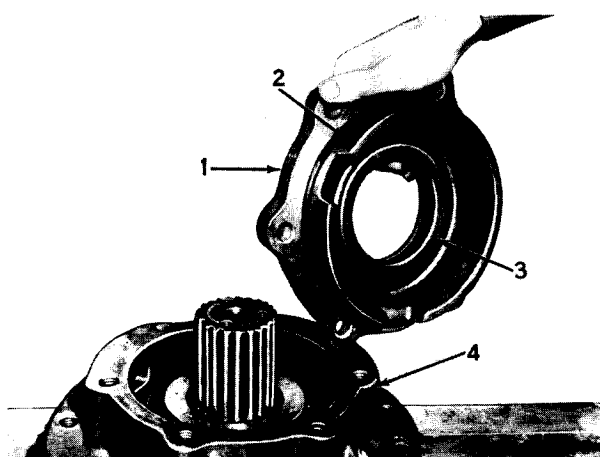


Figure 3-30

3-33. Install a new "O" ring (2) in the groove in the seal retainer (1). Place the seal retainer with oil seal (3) on the housing (4), and tap into place with a soft mallet. Coat the threads of the capscrews with Loctite Type C. Install the capscrews and torque as directed in Table I, page 44.

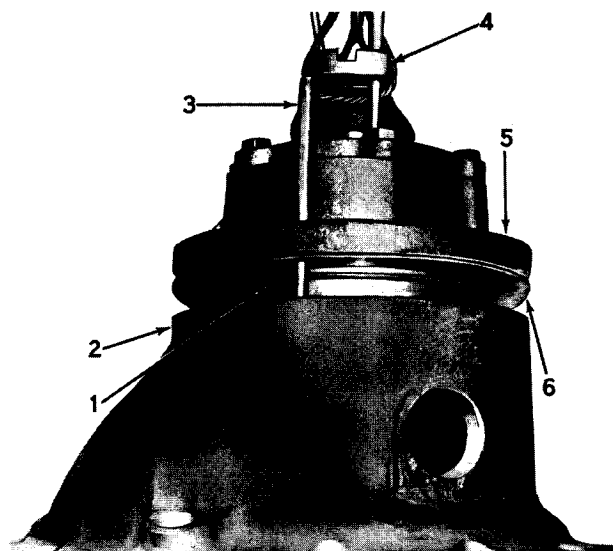


Figure 3-31

3-34. Check the end of the pinion shaft and note the number etched there. This is a four digit number such as 5.520. Record this number; it is the correct cone center dimension.

3-35. Install the pinion shaft yoke (4) and yoke retainer. Secure with capscrews and torque the capscrews as shown in Table I, page 44. Place a new "O" ring (1) in the groove of the pinion housing (5). Place the pinion gear housing shims (6) that were removed during disassembly on the pinion housing (5). Use a drift pin (3) to line up the pinion housing and shims with the carrier housing holes. Lower the pinion assembly into the carrier housing (2), being sure that the match-marked teeth of the pinion and ring gear mesh. Torque the capscrews securing the pinion housing to the carrier housing as shown in Table I, page 44. Do not lockwire at this time.

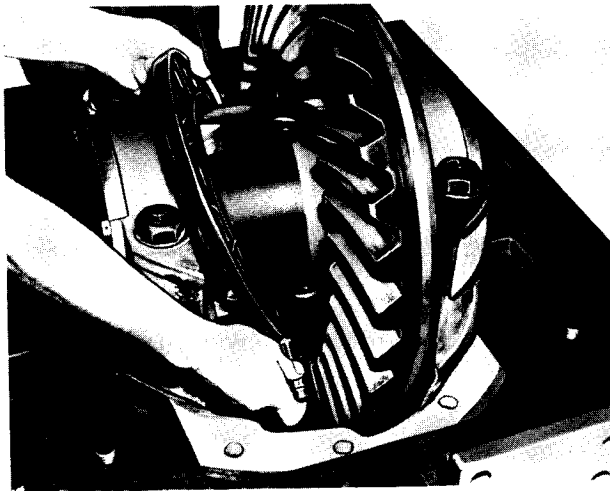


Figure 3-32

3-36. Check and set the cone center. Measure the diameter of the differential case as shown. Record one half of this measurement (the radius of the case).

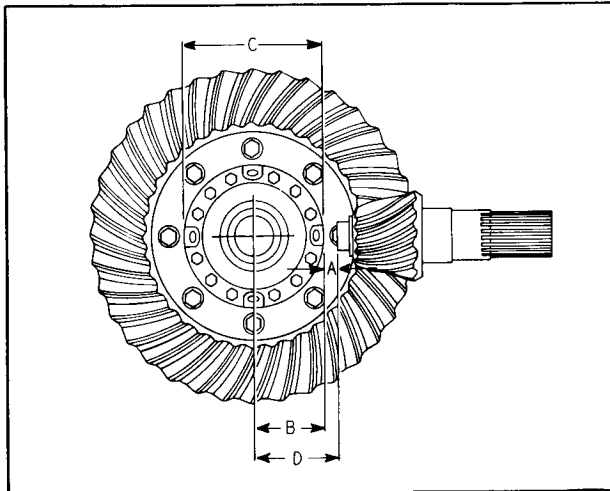


Figure 3-33

3-37. The diameter of the differential case is shown as dimension C. The radius, noted above, is dimension B. To determine dimension A, subtract dimension B from dimension D, which is the number etched on the pinion.



Figure 3-34

3-38. Measure the distance between the end of the pinion shaft and the outside of the differential case with a feeler gauge. If the dimension is not the same as dimension A, figure 3-33, add or remove shims from under the pinion housing. Adding shims will increase the dimension, removing shims will decrease the dimension.

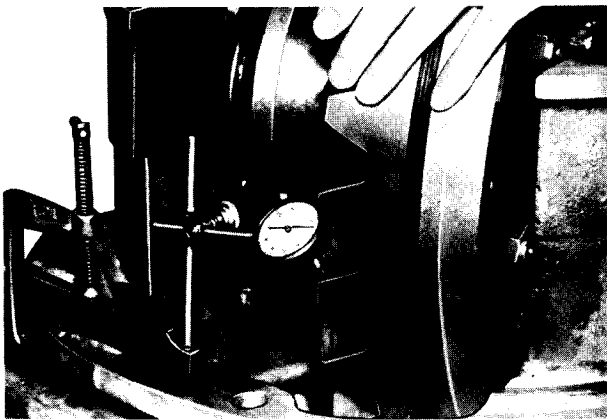


Figure 3-35

3-39. The correct backlash for the pinion and ring gears is etched on the rim of the ring gear, between the matching teeth, preceding the letters "BL". Rotate the gears until the match marked teeth of the ring and pinion are meshing. Check the backlash with the dial indicator. Hold the pinion and move the dial gear to read the backlash. If the backlash is not correct, transfer shims from under one of the bearing covers to the other. DO NOT change the total number of shims, or the bearing preload will be changed. With every change of shims, loosen the bearing cap bolts. ALWAYS torque the bearing cover bolts before torquing the bearing cap bolts.



3-40. After the cone center and backlash are correct, check for correct tooth contact. Coat about 12 teeth of the ring gear with oiled red lead and turn the pinion against a slight resistance of the ring gear to obtain a tooth pattern. The correct tooth pattern will be as shown. The patterns made by hand rotation are small and favor the toe of the gear. Under load, the patterns enlarge and move toward the rear of the tooth.

Figure 3-36



Figure 3-37

3-41. If the tooth pattern is high and narrow, move the pinion inward the center of the ring gear by removing shims from under the pinion housing. Readjust the gear backlash.

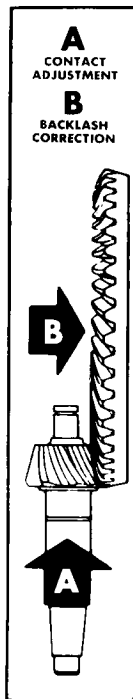


Figure 3-38

3-42. If the tooth pattern is low and narrow on the tooth, move the pinion away from the center of the ring gear by adding shims under the pinion housing. Readjust the gear backlash.

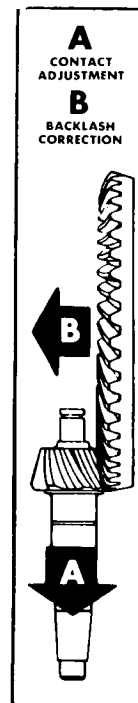




Figure 3-39

3-43. If the tooth pattern shows a short heavy toe contact, move the ring gear out away from the pinion by adjusting the shims under the bearing covers. (Keep total shims the same and observe precautions above.) This may increase the backlash beyond limits. Then remove shims under the pinion housing to readjust backlash.

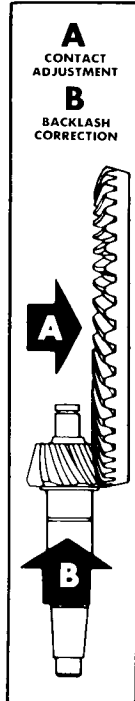
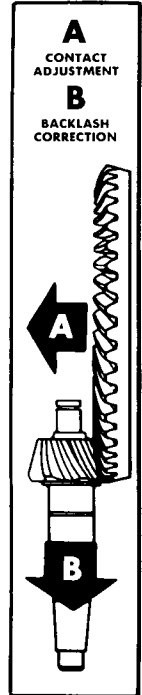


Figure 3-40

3-44. If the tooth pattern shows a short heavy heel contact, move the ring gear in toward the pinion. Readjust the backlash.

3-45. When differential adjustments are correct, lockwire the pinion housing capscrews and bearing cover capscrews.



SECTION FOUR. PLANETARY DISASSEMBLY AND ASSEMBLY

PREPARATION FOR DISASSEMBLY

4-1. Disassembly preparation should include:

- a. Removing planetary assemblies from the axle (See Section II).
- b. Preparing a dirt-free work area at least six feet square.

c. Cleaning the outside of the planetary carrier assembly with solvent or plain steam (no caustic soda).

d. Gathering the following tools and supplies:

Work bench.

Suitable hoist.

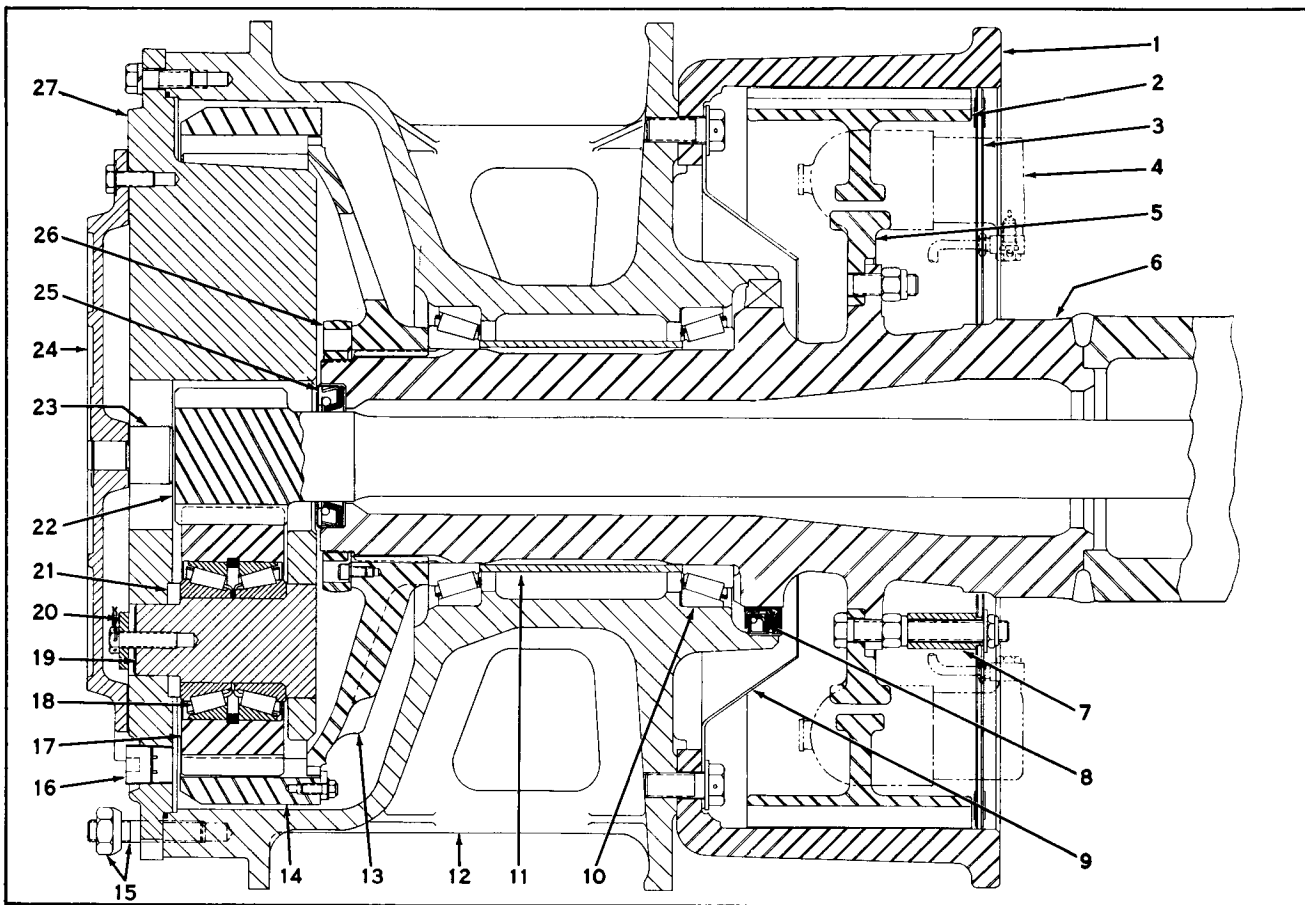


Figure 4-1

- | | | | |
|-------------------|-------------------|------------------------|---------------------------------|
| 1. Brake drum | 8. Seal | 15. Wheel stud and nut | 22. Axle shaft and sun gear |
| 2. Brake shoe | 9. Grease Shield | 16. Plug | 23. Thrust button |
| 3. Dust shield | 10. Bearing | 17. Pinion gear | 24. Cover |
| 4. Wheel cylinder | 11. Spacer | 18. Bearing | 25. Seal |
| 5. Brake spider | 12. Wheel hub | 19. Pinion shaft | 26. Wheel bearing adjusting nut |
| 6. Axle housing | 13. Ring gear hub | 20. Lock plate | 27. Planetary carrier |
| 7. Sleeve | 14. Ring gear | 21. Spacer | |

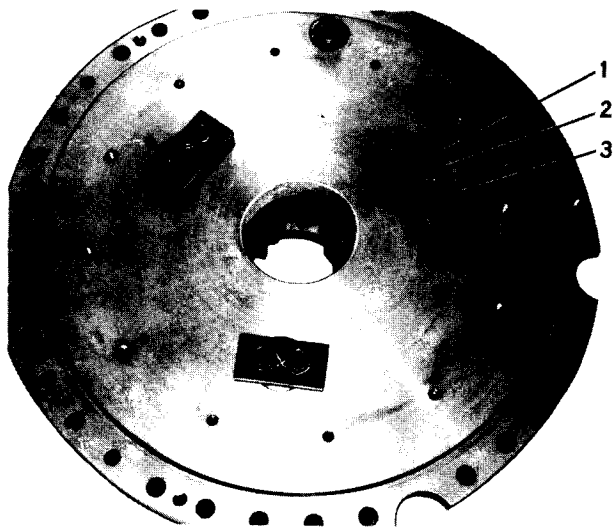


Figure 4-2

DISASSEMBLY

4-2. Inspect the thrust button in the planet carrier cover. If it is worn or damaged, remove the thrust button from the cover.

4-3. Cut and remove the lock wires (2). Remove the capscrews (1) and lockplates (3) from the pinion shafts.

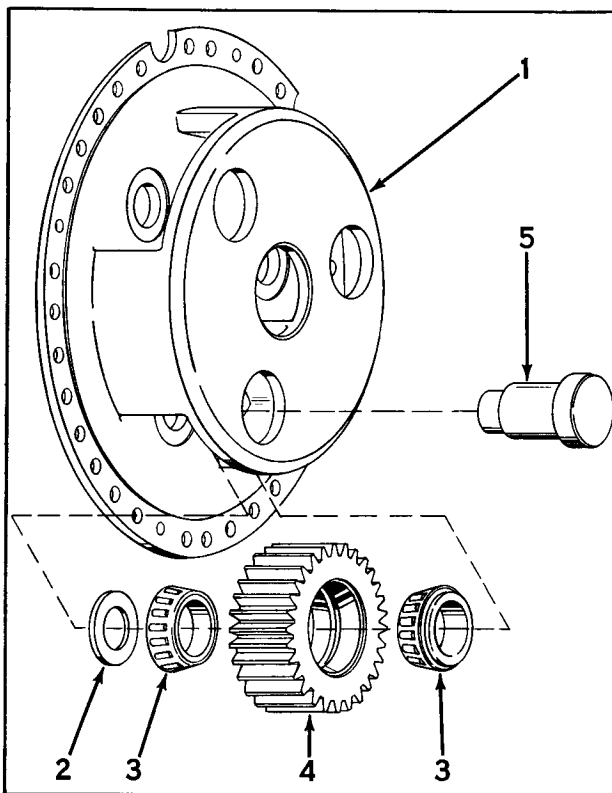


Figure 4-3

4-4. Press the pinion shafts (5) from the planet carrier (1), using a press bar and pressing from the small end of the pinion shaft.

4-5. Remove the assembled pinion and bearings from the planet carrier. Inspect the bearing cones (3) and cups in the pinion (4). Be sure they rotate freely and smoothly. If the bearings do not operate freely or smoothly, or if they are damaged, pull the bearing cups and cones from the pinion. Remove the retaining ring from the pinion.

4-6. Remove the spacer (2) from the carrier.



PREPARATION FOR ASSEMBLY

4-7. Preparation for assembly should include:

a. Cleaning all parts thoroughly in solvent. Use compressed air to dry parts.

CAUTION

NEVER dry bearings by spinning with compressed air.

b. Inspecting all bearing cups and cones, including any not removed. Replace parts that are worn or damaged in any way.

c. Inspecting pinions for wear or damage.

Pinions showing wear or damage should be replaced

d. Inspecting pinion shafts for wear or ridging. Replace if worn or damaged in any way.

e. Replacing all retaining rings, gaskets, and sealing washers.

f. Parts that are to be assembled immediately should be dipped in light oil to prevent corrosion. If any parts are to be stored for any length of time, treat them with a good grade of rust preventive and wrap them in treated paper.

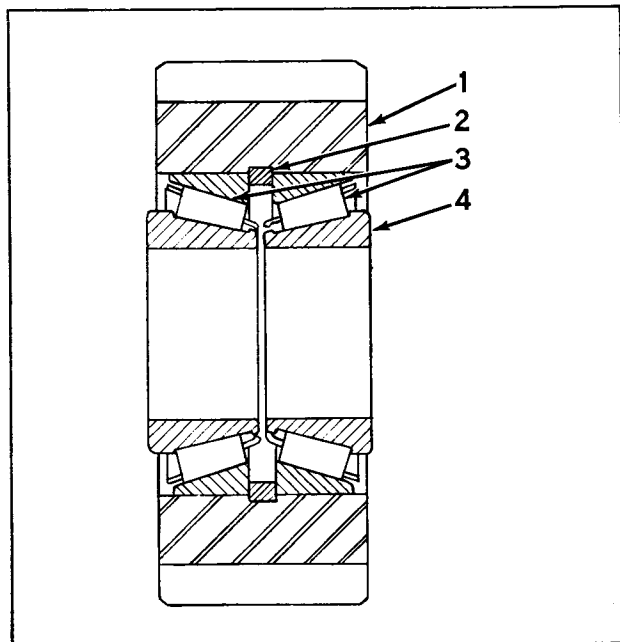


Figure 4-4

ASSEMBLY

4-8. Install the retaining ring (2) in the pinion (1). Press the bearing cups (3) into position against the retaining ring. The bearing cups should be centered in the pinion. Install the bearing cones (4).

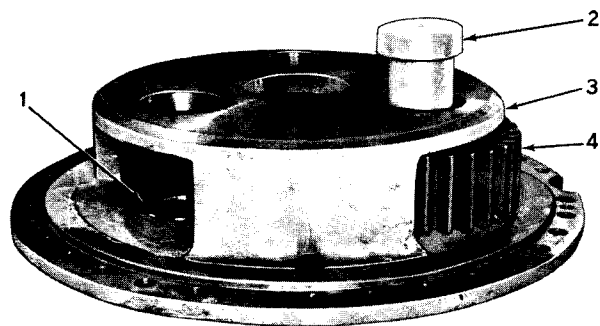


Figure 4-5

4-9. Position the spacer (1) in the recess at the pinion hole in the carrier.

4-10. Slide the assembled pinions (4) into the carrier (3). Align the holes and press the pinion shaft (2) through the carrier and pinion, small diameter end first.

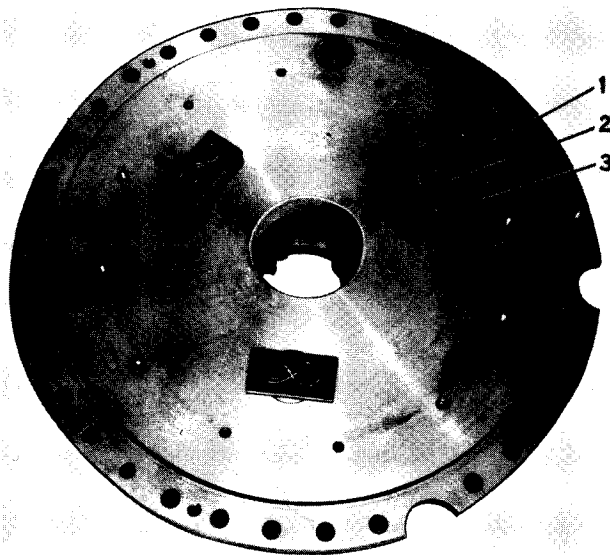


Figure 4-6

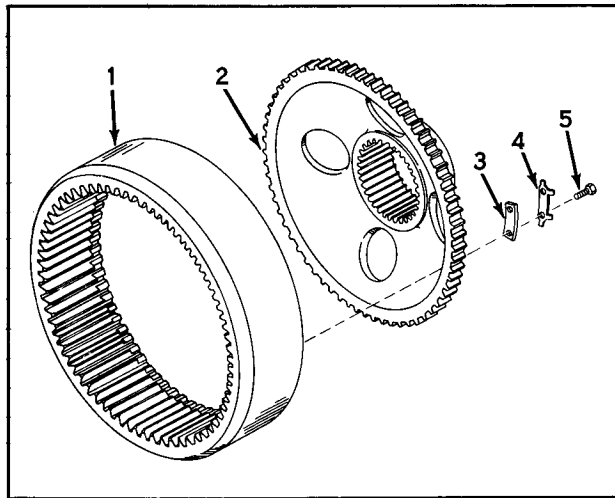


Figure 4-7

4-11. Position the lockplates (3) on the pinion shafts, as shown, to provide clearance for the planetary cover. Secure with capscrews (1) and torque as directed in Table I, page 44. Install lock wire.

4-12. If the thrust button was removed, press a new thrust button in the cover.

RING GEAR AND HUB DISASSEMBLY AND ASSEMBLY

4-13. Remove the eight capscrews (5), four lock plates (4), and four retainer plates (3) that secure the ring gear (1) to the ring gear hub (2); remove the ring gear.

4-14. Discard the lock plates (4).

4-15. Position the ring gear (1) on the ring gear hub (2); secure with four retainer plates (3), four lock plates (4), and eight capscrews (5). Torque the capscrews as shown in Table II, page 44. Bend the tabs of the lockplate (4) against the flats of the capscrews after torquing.

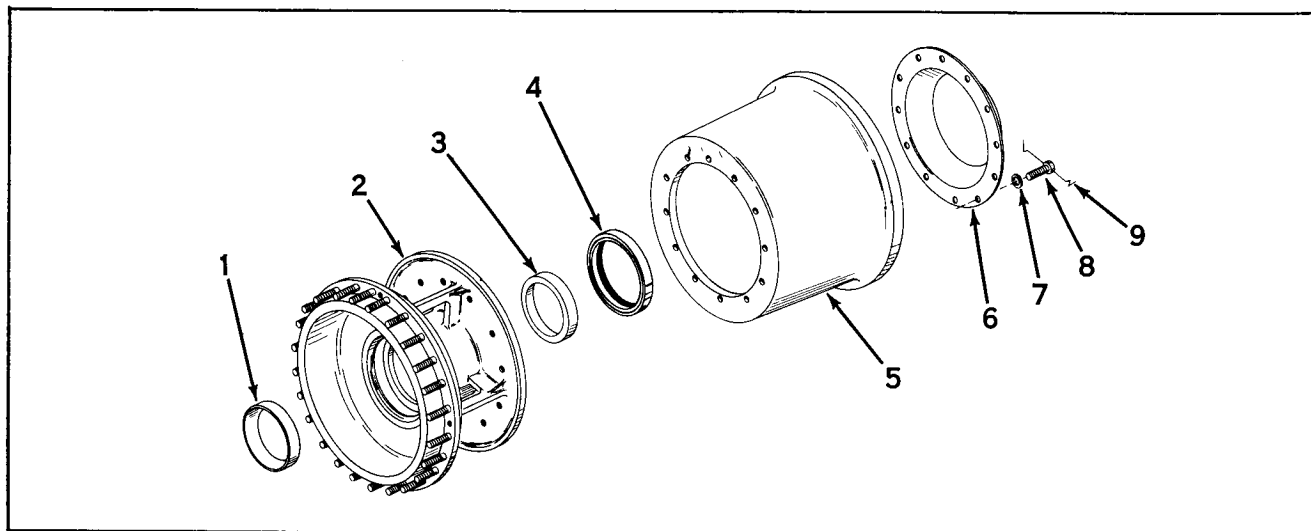


Figure 4-8

HUB, BEARING AND BRAKE DRUM

Disassembly

4-16. Cut the lock wire (9) and remove the capscrews (8) and washers (7) that secure the shield (6) and brake drum (5) to the drive wheel (2). Remove the shield and brake drum. Remove oil seal (4) from bore of hub.

4-17. Inspect the bearing cups (1 and 3) in the drive wheel, and the bearing cones removed from the drive wheel and axle housing, for wear or damage. Mark each bearing cup and cone so that they may be rematched if they are reused.

4-18. Check the rollers for flats or worn spots.

Place cones in a wire basket and clean in cleaning solvent. Use fresh solvent for final cleaning.

CAUTION

NEVER dry bearings by spinning with compressed air.

4-19. Dip cones in light oil and recheck for wear, flat spots, or damage. If cups or cones are worn or damaged, replace complete bearing. Remove damaged cups by pressing out of drive wheel.

Assembly

4-20. If the bearing cups (1 and 3) were removed, measure the distance between the shoulders in the bore of the hub, dimension "X", with a 7- to 8-inch micrometer. The measurement should be 7.154-inches, ± 0.001 -inch. If the dimension is not correct, select proper shims (0.003- and 0.012-inch are available) and cement shims to inside of housing with Loctite type "A" adhesive, or equivalent, so the shims become a permanent part of the wheel.

4-21. Install the bearing cups (1 and 3) into the hub (2). Install the seal (4) with the lip facing toward the bearing cups.

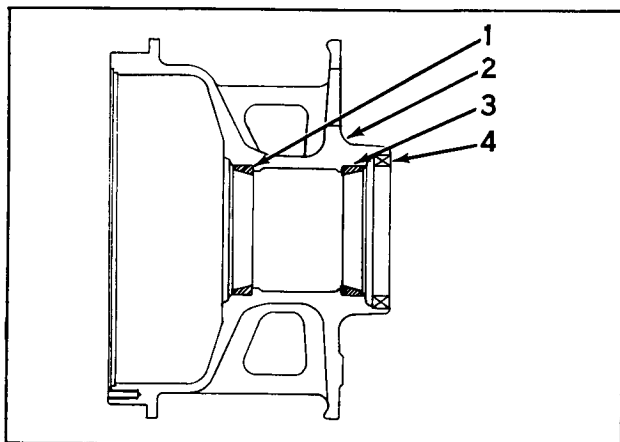
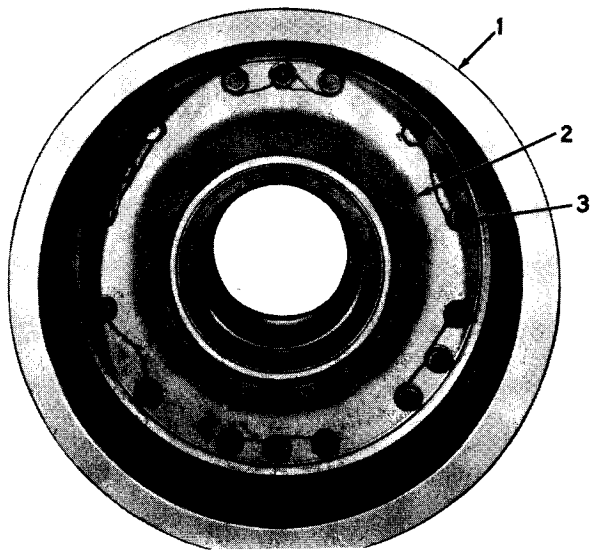


Figure 4-9



4-22. Position the brake drum (1) and shield (2) against the drive wheel, aligning the holes. Secure with washers and capscrews (3). Torque the capscrews as directed in Table I, page 44. Lockwire in groups as shown.

Figure 4-10

SECTION FIVE. BRAKE DISASSEMBLY AND ASSEMBLY

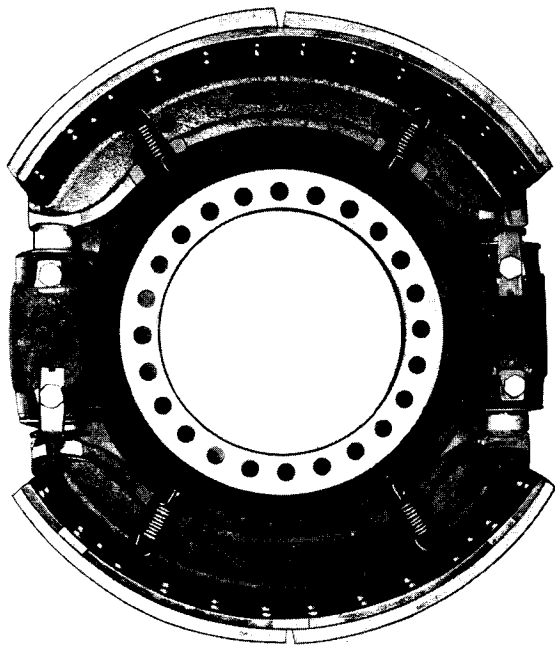


Figure 5-1

PREPARATION FOR DISASSEMBLY

5-1. Disassembly preparation should include:

a. Disconnecting the hydraulic lines from the wheel cylinders.

b. Disassembling the axle (See Section II) as far as necessary to remove the assembled brake and spider.

c. Preparing a dirt-free work area at least six feet square.

d. Gathering the following tools and supplies:

Work bench for disassembly.

C-clamp with 14-inch jaw.

Grease, MIL-G-10924A (Lithium Base, Multi-purpose NLGI, Grade 1).

Solvent (kerosene or diesel fuel oil).

Feeler gauge set.

Standard mechanic's hand tools.

Pans for small parts.

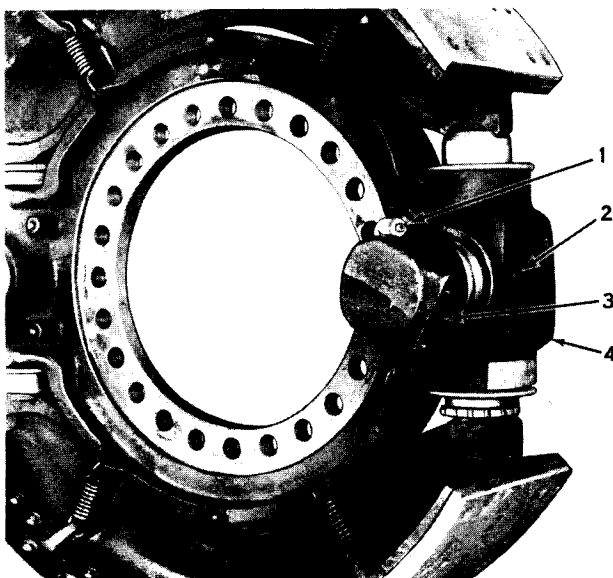


Figure 5-2

DISASSEMBLY

5-2. Remove the bleeder screw (1) from the wheel cylinder (3) and drain the hydraulic fluid. Loosen the setscrew (2) holding the wheel cylinder in position. Unscrew the cylinder from the spider (4). Disassemble the wheel cylinder as directed on page 40.

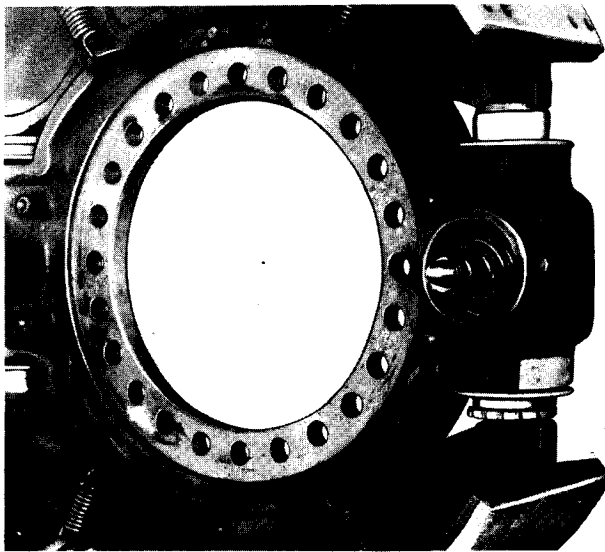


Figure 5-3

5-3. Remove the assembled wedge, spring, and rollers from the brake spider. Disassemble the wedge and roller assembly as directed on page 40.

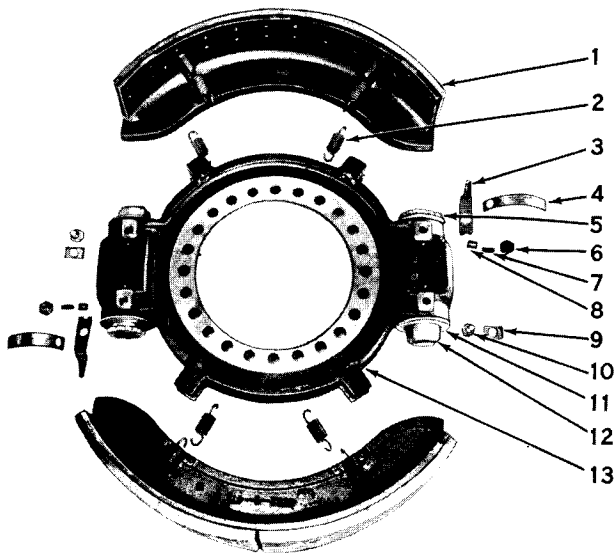


Figure 5-4

5-4. Remove the eight shoe return springs (2) and the two shoe and lining assemblies (1). Replace the linings as directed below.

5-5. Remove the capscrew (6), lock plate (4), detent (3), spring (7), and guide (8) from the spider (13). Remove the assembled automatic adjuster (5). Disassemble the adjuster as directed on page 41.

5-6. Remove the plunger guide screws (10) and remove lock plate (9). Remove the solid plungers (12). Label them to prevent the plungers from the left and right brakes from being interchanged.

5-7. Remove the seal and retainer (11) from the spider.

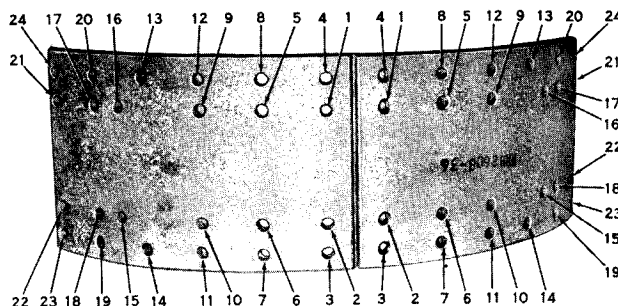


Figure 5-5

BRAKE RELINING

5-8. Remove the brake shoe and lining assembly as directed above.

a. Punch out rivets and remove linings from shoes.

NOTE

Lining and shoe contact faces should be clean before clamping lining in position. Rivets of the correct body diameter,

head size and shape, length, and material should be used.

b. Clamp the lining to the brake shoe with C-clamps so the rivet holes in both pieces are in alignment.

c. Drive the rivets squarely into the holes with a 7/16-inch flat head drift.

d. Make certain the lining is firmly clamped to the shoe, locating the C-clamps as close to the rivet holes as possible.

e. Form the rivet heads with the correct

tubular rivet set following the sequence shown.

f. Check lining installation with a 0.002-inch feeler gauge to assure lining and shoe contact.

g. Circle grind linings to provide the correct lining and drum contact. With the brakes in the full release position, the lining should be ground 0.070-inch less than the drum diameter. If 80% of the lining has not cleaned up, the brakes should be adjusted and the lining ground until 80% contact of the drum diameter is obtained. The 80% contact must be continuous and in the middle of the lining.

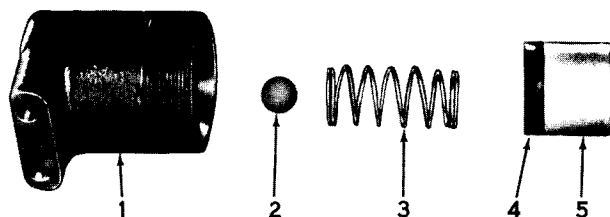


Figure 5-6

WHEEL CYLINDER DISASSEMBLY AND ASSEMBLY

5-9. Shake or slide the piston (5) from the cylinder housing (1). Take care not to lose the spring (3) or ball (2).

5-10. Inspect parts for scoring or damage. Replace if necessary.

5-11. Dip the cup (4) and piston in hydraulic brake fluid. Install the ball and spring in the cylinder housing. Insert the cup and piston; take care not to damage the lip of the cup during installation.

WEDGE AND ROLLER DISASSEMBLY AND ASSEMBLY

5-12. Remove the rollers (1). Remove the E-washer (5) and washer (4) that secure the spring (3) to the wedge (6). Remove the spring. Slide the cage (2) from the wedge.

5-13. Inspect parts for wear or damage. Replace if necessary.

5-14. Slide the cage (2) on the wedge (6). Position the spring (3) on the wedge; secure by installing the washer (4) and E-washer (5). Position the rollers.

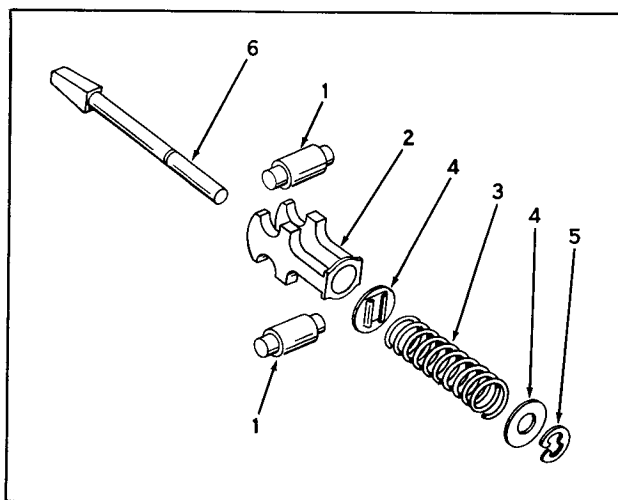


Figure 5-7

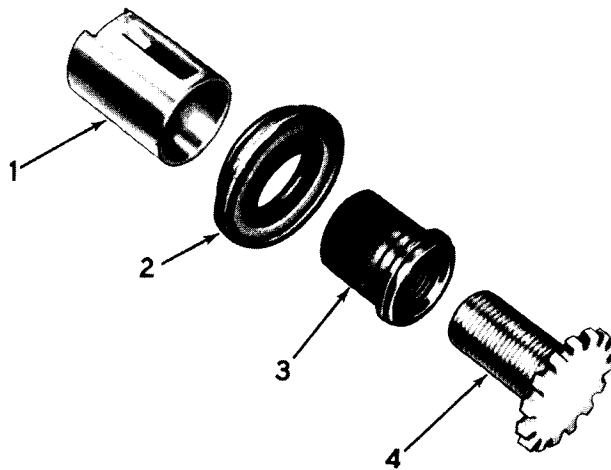


Figure 5-8

AUTOMATIC BRAKE ADJUSTERS DISASSEMBLY AND ASSEMBLY

5-15. Remove the assembled adjust bolt assembly (4) and actuator (3) from the adjust plunger (1). Unscrew the adjust bolt assembly from the actuator. Clean and inspect for wear.

5-16. Clean and inspect parts for wear or damage. Replace if necessary.

5-17. Screw the adjust bolt assembly (4) all the way into the actuator; back out 1/4-turn. Position the assembled bolt assembly and actuator in the adjust plunger (1).

BRAKE PREPARATION FOR ASSEMBLY

5-18. Assembly preparation should include:

a. Inspecting lining and drums for wear. Replace worn brake linings as directed on page 39.

b. Cleaning brake components with a suitable solvent such as kerosene or diesel fuel oil. DO NOT use gasoline or hot water solutions for cleaning. Gasoline coats metal parts and prevents grease from adhering. Water causes

etching and rust if parts are not dried completely.

c. Lubricating the internal actuating parts of the brake assembly (wedge assembly, guide screws, plungers, actuator cavity) and area about the hold-down springs. Grease MIL-G-10924A (Lithium Base, Multi-purpose NLGI, Grade 1) is recommended for this application.

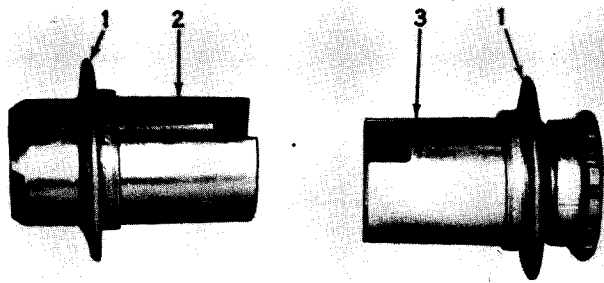


Figure 5-9

BRAKE ASSEMBLY

5-19. Install the seal assemblies (1) in the grooves of the plungers (2 and 3). Install the assembled plunger and seals in the spider.

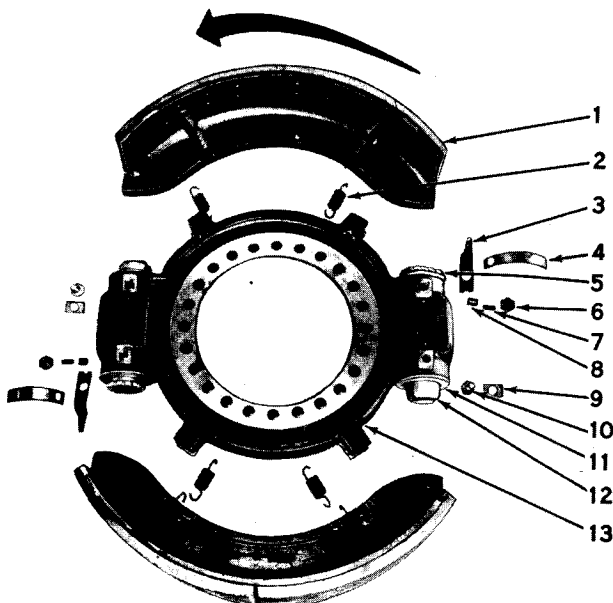


Figure 5-10

5-20. Install one anchor plunger (12) and one adjust plunger (5) at each end of the brake spider. The braking force must be absorbed by the anchor plunger (in the forward direction) as shown. It is imperative that each brake be assembled in this manner.

NOTE

Left-hand and right-hand solid plungers are not identical and must not be interchanged.

5-21. Assemble the guides (8) into the holes in the spider and into the slots in the plungers, with the notches in the guides outward toward the brake shoes. Install the spring (7), lockplates (4 and 9) and capscrews (6 and 10). Torque as directed in Table I, page 00.

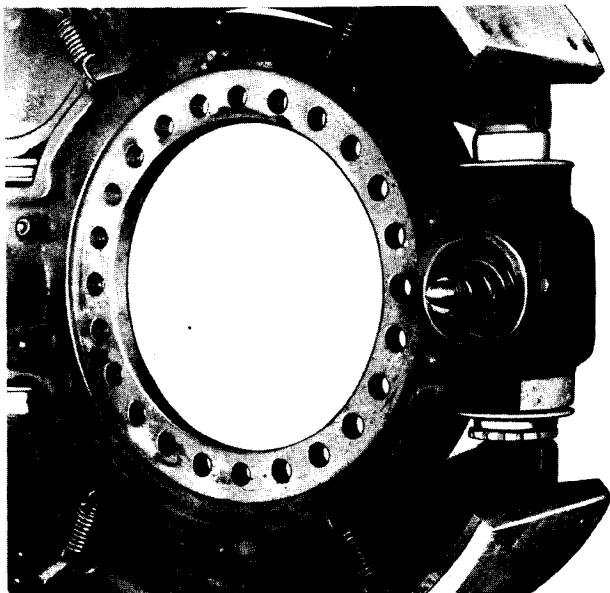


Figure 5-11

5-22. Install the assembled wedge and rollers in position in the brake spider. Make sure the rollers in the cage enter the slots in the plungers.

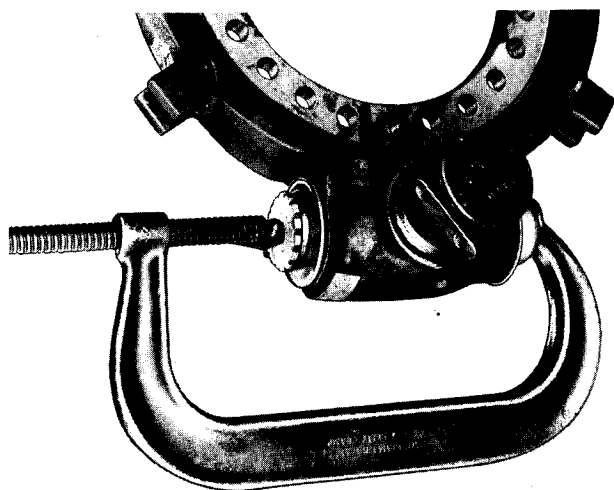


Figure 5-12

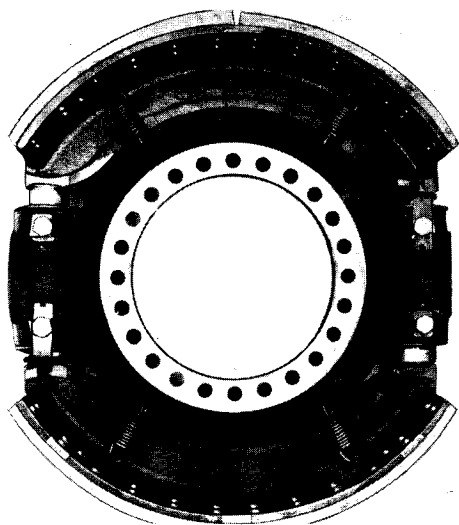


Figure 5-13

5-23. Hold the plungers in the retracted position with a C-clamp. Screw the assembled cylinders into the spider until it tightens but **DO NOT FORCE**. If the cylinder is not positioned correctly, unscrew to line up as desired. This will take less than one turn. Tighten set screw just enough to keep cylinder housing in position. **OVER-TIGHTENING MAY DISTORT CYLINDER HOUSING.**

5-24. Install the bleeder in the opening in the cylinder that does not have a tubing seat.

5-25. Install the brake shoes and return springs. Make sure the long radius of the brake shoe indexes with the adjust plunger as illustrated.

BRAKE ADJUSTMENT

5-26. Remove dust shield from inside of wheel.

5-27. Final adjustment is made with the tractor in motion by pumping the brake pedal. This is done in both forward and reverse directions. After this is done, brake drum-to-lining clearance should be rechecked to be certain it does not exceed 0.050-inch.

5-28. Turn the adjusting bolt outward with a spanner wrench so there is 0.050-inch clearance between the brake lining and drum surface. Repeat procedure on all shoes.



TABLE I. SPECIAL TORQUE VALUES

Axle Mounting Capscrews & Nuts	3500 ft. lbs.
Wheel Stud Nuts	500 ft. lbs.
Wheel Bearing Adjusting Nut	1500 ft. lbs.
Brake Mounting Nuts	300 ft. lbs.
Brake Drum-to-Hub Capscrews	420 ft. lbs.
Differential Mounting Nuts	300 ft. lbs.
Differential Seal Retainer-to-Cage Capscrews	160-180 ft. lbs.
Differential Pinion Cage-to-Carrier Capscrews	160-180 ft. lbs.
Differential Case Half Capscrews	140-165 ft. lbs.
Differential Ring Gear-to-Flanged Case Nuts	175-195 ft. lbs.
Differential Bearing Cap Bolts	500-550 ft. lbs.
Differential Carrier Bearing Adjusting Cover Capscrews ..	160-180 ft. lbs.
Differential Yoke Retainer Capscrews	160-180 ft. lbs.
Planetary Studs	160 ft. lbs.
Planetary Cover Capscrews	80 ft. lbs.

TABLE II. STANDARD TORQUE VALUES
(TORQUE IN FOOT-POUNDS, ±10% ALLOWABLE VARIATION)

Size	Grade 2		Grade 3		Grade 5		Grade 7		Grade 8	
	N. C.	N. F.	N. C.	N. F.	N. C.	N. F.	N. C.	N. F.	N. C.	N. F.
1/4	5.5 1,400	6.5 1,600	9 2,160	10 2,475	9 2,160	10 2,475	11 2,670	12 3,060	12 3,055	14 3,495
5/16	12 2,300	13 2,550	18 3,560	20 3,940	18 3,560	20 3,940	23 4,400	25 4,880	25 5,040	29 5,560
3/8	21 3,410	24 3,860	32 5,260	37 5,960	32 5,270	37 5,970	40 6,510	45 7,370	45 7,440	50 8,430
7/16	34 4,680	38 5,220	52 7,240	58 8,060	52 7,240	58 8,060	65 8,930	70 9,960	70 10,220	80 11,390
1/2	52 6,240	58 7,040	80 9,650	90 10,880	80 9,640	90 10,880	95 11,920	110 13,420	110 13,610	125 15,350
9/16	70 7,580	79 8,450	105 11,630	120 12,990	115 12,380	125 13,800	140 15,300	150 17,050	160 17,480	180 19,500
5/8	98 9,410	100 10,650	150 14,480	155 16,380	160 15,380	165 17,400	190 19,000	200 21,500	225 21,700	230 24,580
3/4	175 13,880	190 15,100	No SAE Rating		280 22,700	315 25,350	350 28,050	390 31,350	400 32,100	440 35,800
7/8	150 10,350	160 11,410			420 28,800	460 31,750	560 38,800	620 42,800	650 44,400	700 48,900
1	225 13,600	250 15,230			625 37,800	700 42,400	800 50,900	950 57,200	950 58,200	1050 65,300
1-1/8	320 17,100	360 19,200			840 45,200	950 50,700	1200 64,100	1300 71,900	1350 73,300	1500 82,200
1-1/4	450 21,700	500 24,100			1150 57,400	1300 63,600	1650 81,400	1800 90,200	1900 93,000	2100 103,200
1-3/8	590 25,850	675 29,420			1500 68,400	1700 77,800	2200 97,000	2500 110,500	2500 111,000	2800 126,200
1-1/2	785 31,450	885 35,400			2000 83,200	2300 93,600	2900 118,000	3300 133,000	3350 135,000	3500 151,800

Torques based on SAE minimum standards.



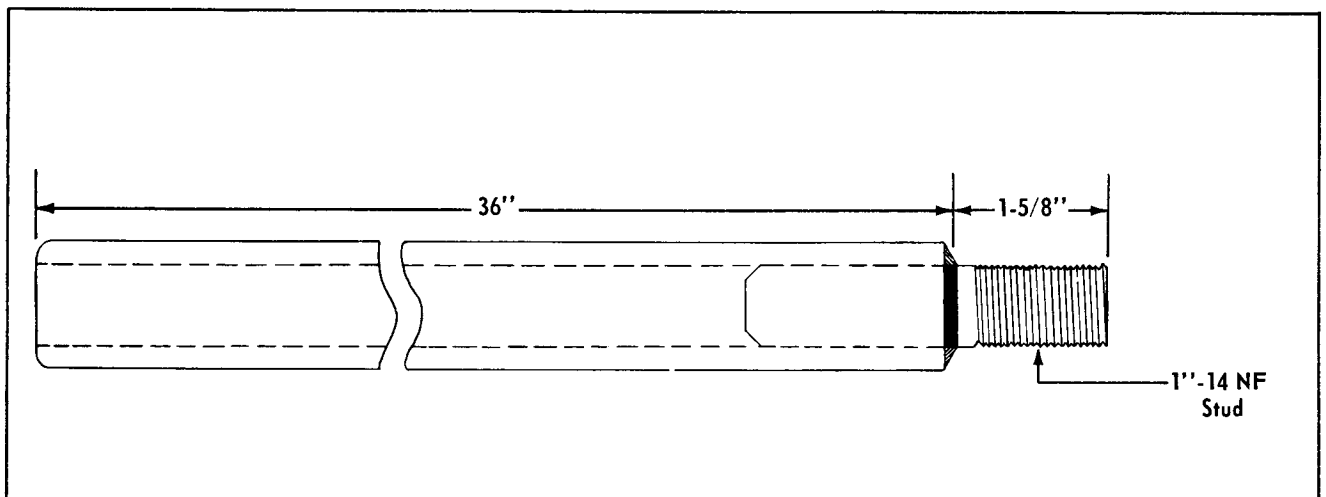
TABLE III. LUBRICANTS AND CAPACITIES

Capacity		Lubricant		
Differential	26 pt. ea.	MIL-L-2105A	EP	Above 32° -- 140 Below 32° -- 90
Planetaries	32 pt. ea.	MIL-L-2105A	EP	Above 32° -- 140 Below 32° -- 90

TABLE IV. SPECIFICATIONS

Axle:	
Overall Length	140-3/4"
Approximate Weight	7000 lbs.
Ratios:	
Differential	3.9:1
Planetary	6.46:1
Total	25.25:1
Differential:	
Gear Backlash	0.014"-0.018"
Ring Gear Runout	0.008" (Max)
Brakes:	
Diameter of Brake Drum	25.98"
Width of Brake Shoes	8"

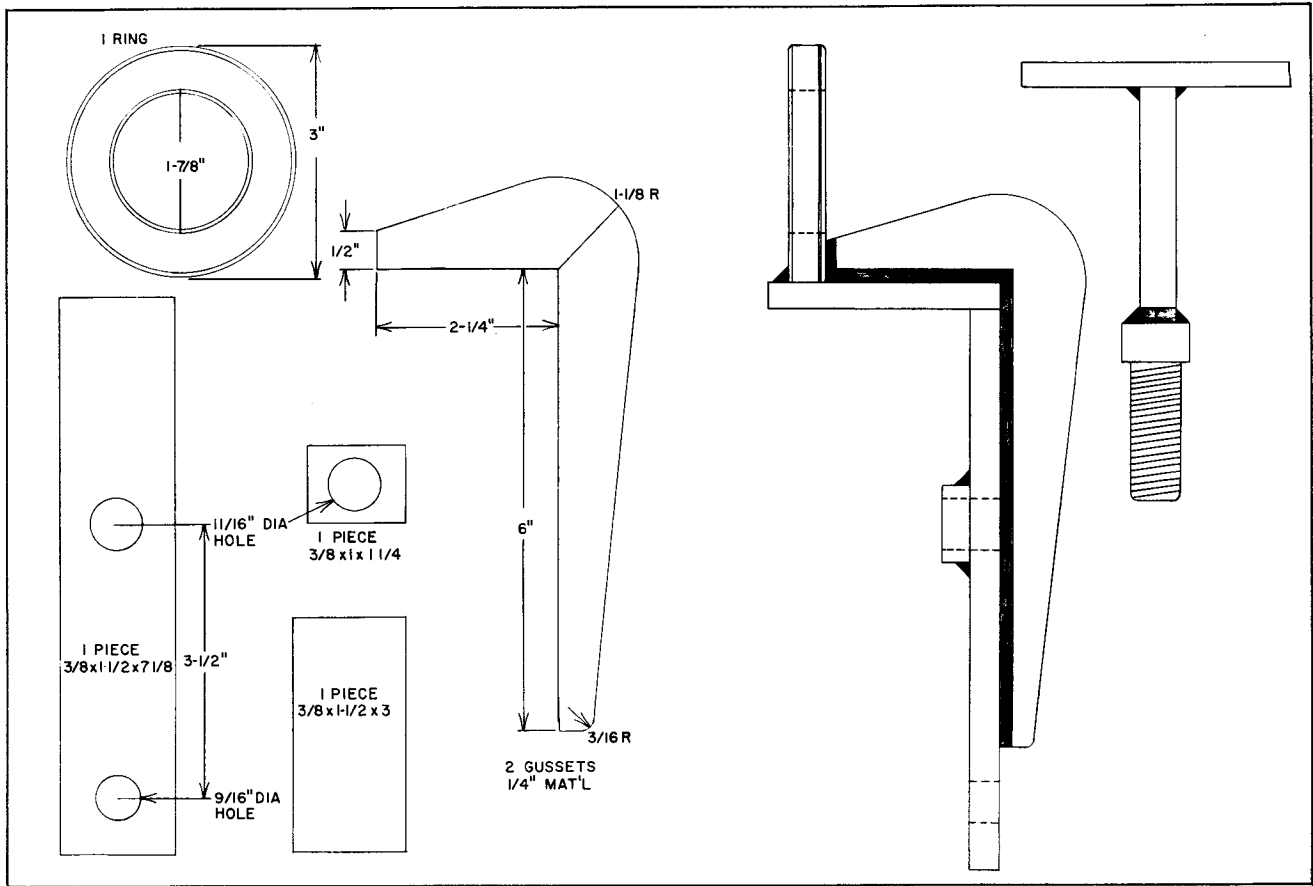
SPECIAL TOOLS



Axle Removal and Installation Tool



SPECIAL TOOLS (Continued)



Special Lifting Tool