

Product: WHEEL LOADER

Model: 990 WHEEL LOADER 7HK

Configuration: 990 Wheel Loader 7HK00001-UP (MACHINE) POWERED BY 3412 Engine

## Disassembly and Assembly

### 990 & 990 SERIES II WHEEL LOADERS & 844 WHEEL TRACTOR POWER

Media Number -SEN6647-04

Publication Date -01/10/2004

Date Updated -09/09/2015

SEN66470011

## Front Drive Shaft & Carrier Bearing

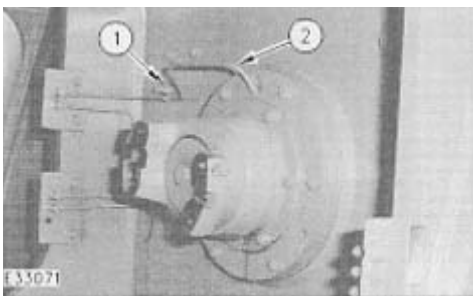
SMCS - 3253; 3267-010; 3267-015; 3267-016

## Remove & Install Front Drive Shaft & Carrier Bearing

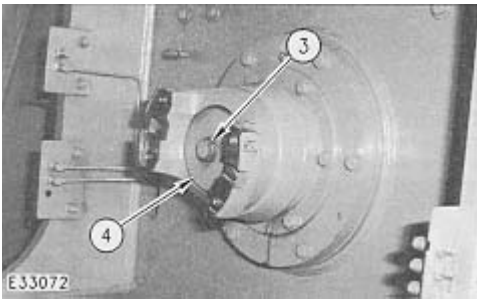
Tools Needed		A	B
138-7575	Link Breaker	*	
89-9008	Ratchet Pulver		1

Start By:

- a. remove center drive shaft

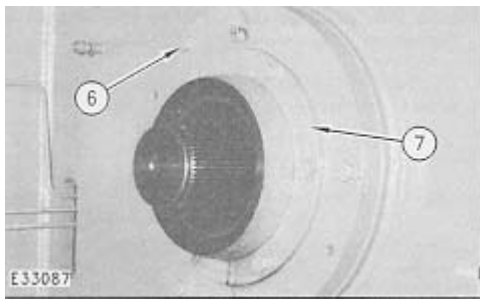
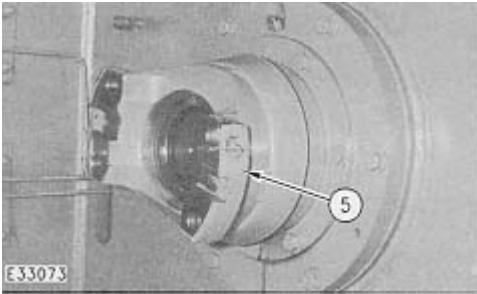


1. Remove the nut that holds clip (1) in position. Loosen end nuts on grease tube assembly (2), and remove the grease tube assembly.



2. Remove bolt (3) and retainer (4).

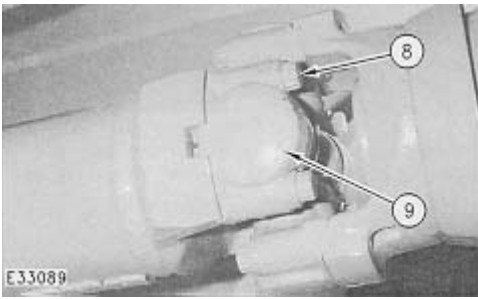
3. Remove yoke assembly (5) from the front drive shaft.



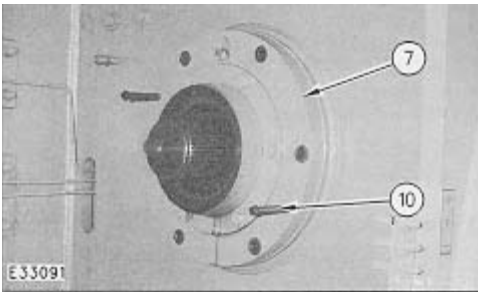
4. Remove six bolts (6), washers, and the nuts that hold carrier bearing cage (7) to the front main frame.



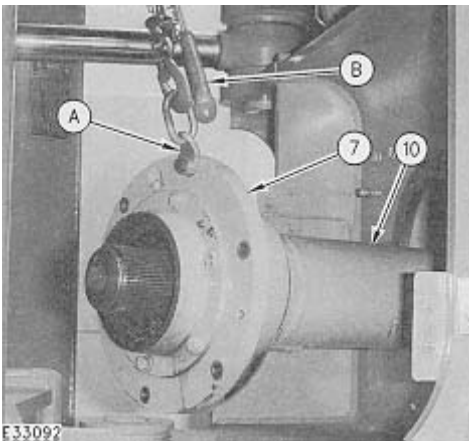
5. Support the front drive shaft with wood blocks and suitable floor jack. Secure the front drive shaft and wood blocks to the floor jack.



6. Remove four bolts (8), and remove spider bearing group (9).



7. Install two M12 forcing screws (10) in carrier bearing cage (7) as shown. Tighten the forcing screws evenly to loosen the carrier bearing cage from the front main frame.



8. Fasten Tooling (A) and Tooling (B) to the carrier bearing and front drive shaft as shown. Use Tooling (B) to the front drive shaft level as it is being removed from the front main frame. Using two persons, carefully remove the carrier bearing and front drive shaft from the machine. The combined weight of the carrier bearing and front drive shaft is 108 kg (240 lb).

**NOTE:** The following steps are for the installation of the front drive shaft and carrier bearing.

9. Fasten Tooling (A) and Tooling (B) to carrier bearing and front drive shaft. Put the unit in position in the front main frame. Do not remove Tooling (A) and Tooling (B) from the unit at this time.

10. Support the front drive shaft with wood blocks and suitable floor jack. Secure the front drive shaft and wood blocks to the floor jack. Remove Tooling (A) and (B) from the carrier bearing and front drive shaft.

11. Position carrier bearing cage (7) in the front main frame.

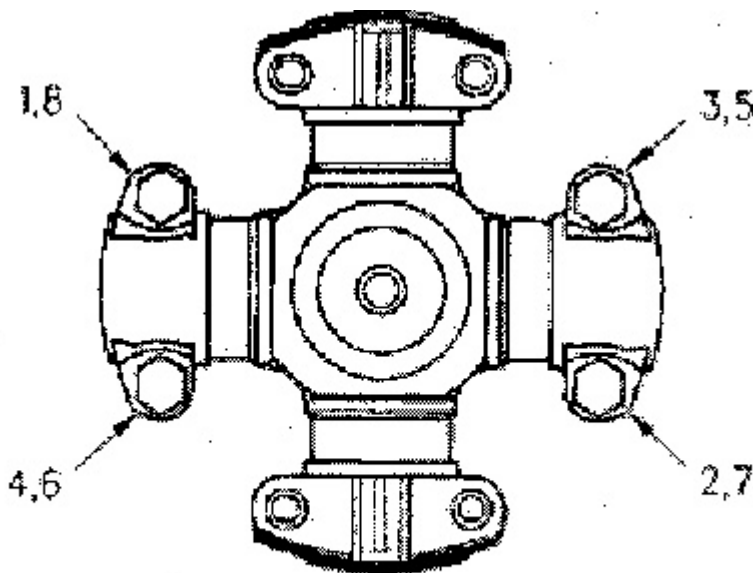
12. Install six bolts (8) and the washers that hold the carrier bearing cage to the front main frame.

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## NOTICE

Be sure spider bearing group (9) and yoke assembly (5) is thoroughly clean prior to installation. Also, when the front drive shaft is installed, it must be installed in phase with the center and rear drive shafts. Be sure all joint groups, yokes and lubrication fittings (front, center, and rear) are in alignment with each other.

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Illustration 2

Illustration 2

**13.** Install spider bearing group (9) and four bolts (8). Tighten bolts (8) to a torque of  $530 \pm 70$  Nm ( $400 \pm 50$  lb ft). Refer to illustration 2 for the correct tightening sequence.

**14.** Put yoke assembly (5) in position on the front drive shaft. Install bolt (3) and retainer (4) that hold the yoke assembly. Tighten bolt (3) to a torque of  $530 \pm 70$  Nm ( $400 \pm 50$  lb ft).

**15.** Install grease tube assembly (2) and clip (1) that holds it to the front main frame.

End By:

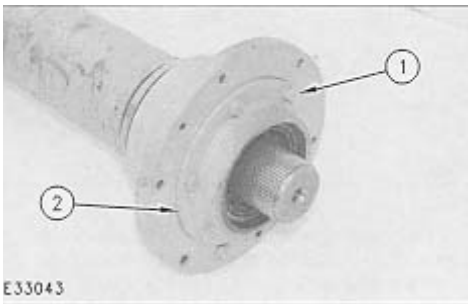
a. install center drive shaft

## Disassemble Front Drive Shaft & Carrier Bearing

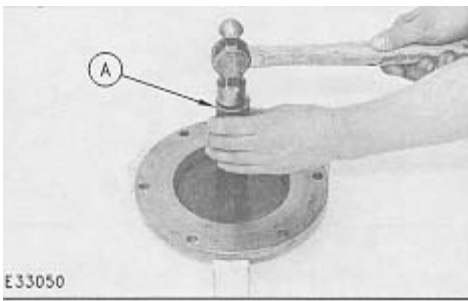
Tools Needed		A	B
1P-0520	Driver Group	1	
1U-6410	Three Jaw Puller		1

Start By:

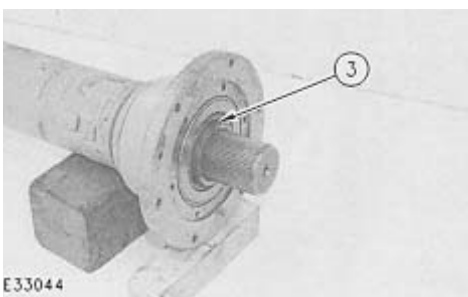
a. remove front drive shaft and carrier bearing



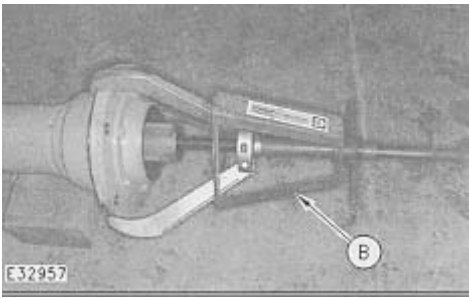
1. Remove six bolts (1) and bearing retainer (2) from the bearing cage.
2. Remove the O-ring seal from the bearing cage.



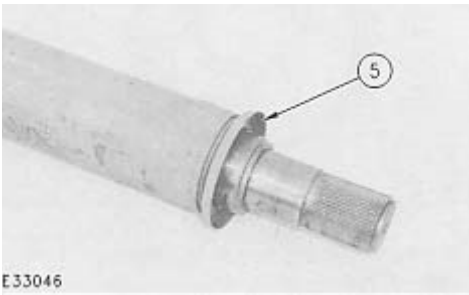
3. Use Tooling (A), and remove the lip-type seal from bearing retainer (2).



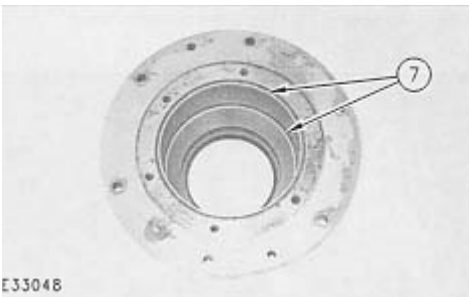
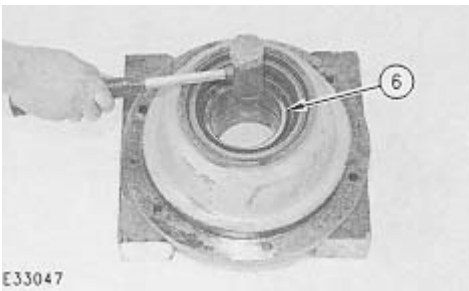
4. Remove spacer (3) from the front drive shaft.



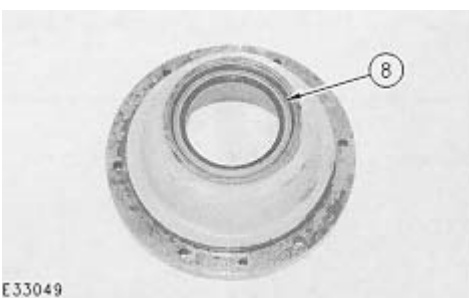
5. Use Tooling (B) to remove bearing cage (4) from the front drive shaft. The weight of the bearing cage is 36 kg (80 lb).



6. Remove guard (5) from the front drive shaft.



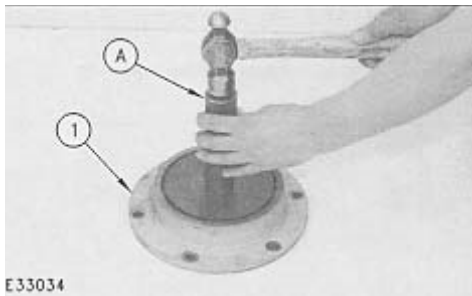
7. Remove bearing cones (6) and bearing cups (7) from bearing cage (4).



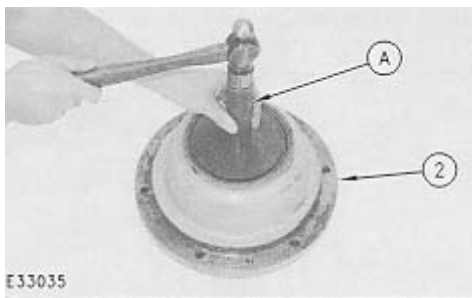
8. Use Tooling (A) and remove lip-type seal (8) from bearing cage (4).

# Assemble Front Drive Shaft & Carrier Bearing

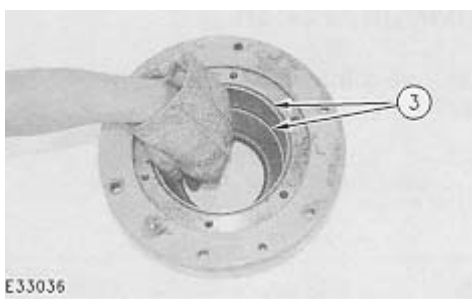
Tools Needed		A
1P-0520	Driver Group	1



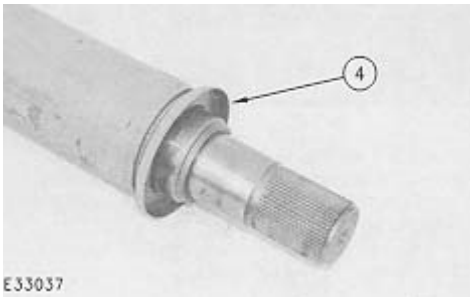
**1.** Use Tooling (A) to install lip-type seal into bearing retainer (1). Install the seal until it makes contact with the counterbore in the bearing retainer and with the lip of the seal facing toward the outside of the bearing retainer as shown. Put 1P0808 General Purpose Lubricant on the lip of the seal.



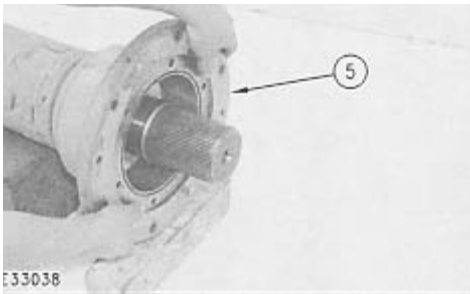
**2.** Use Tooling (A) to install lip-type seal into bearing cage (2). Install the seal until it makes contact with the counterbore in the bearing cage and with the lip of the seal facing toward the outside of the bearing cage, as shown. Put 1P0808 General Purpose Lubricant on the lip of the seal.



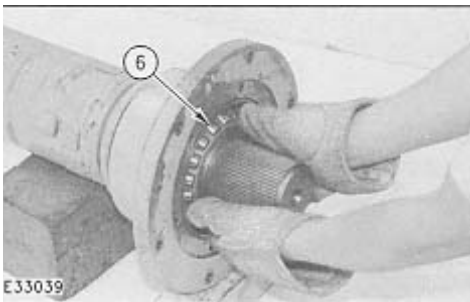
**3.** Use heat resistant gloves to handle the bearing. Lower the temperature of bearing cup (3), and install it in the bearing cage.



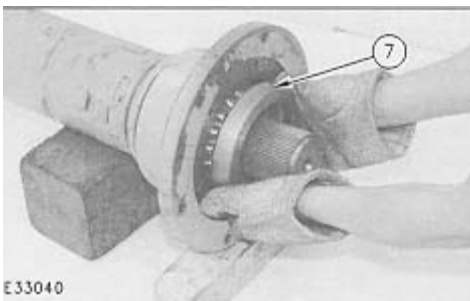
4. Install guard (4) on the front drive shaft.



5. Using two persons, install bearing cage (5) on the front drive shaft. The weight of the bearing cage is 36 kg (80 lb).

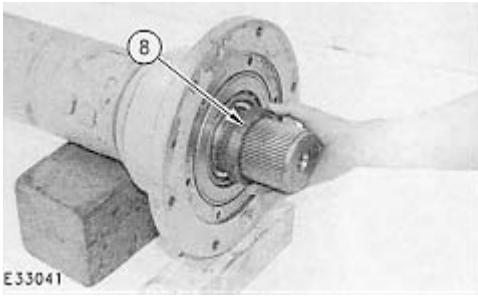


6. Use heat resistant gloves to handle the bearing cones. Heat the bearing cones (6) to a maximum of 135°C (275°F) and install them on the drive shaft as shown.

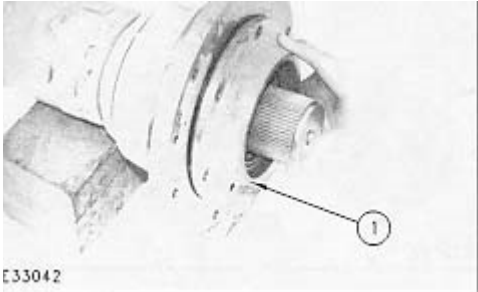


7. Use heat resistant gloves to handle the bearing cup. Lower the temperature of bearing cup (7), and install it in the bearing cage.





**8.** Install spacer (8) on the front drive shaft. Check the condition of the O-ring seal used on bearing cage (2). If the seal is damaged, use a new part for replacement. Put clean oil on the O-ring seal. Install the O-ring seal on bearing cage (2).



**9.** Use six bolts and washers to install retainer (1) to the front bearing cage.

End By:

**a.** install front drive shaft and carrier bearing

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Configuration: 990 Wheel Loader 7HK00001-UP (MACHINE) POWERED BY 3412 Engine

## Disassembly and Assembly

### 990 & 990 SERIES II WHEEL LOADERS & 844 WHEEL TRACTOR POWER

Media Number -SEN6647-04

Publication Date -01/10/2004

Date Updated -09/09/2015

SEN66470013

## Front Axle Housing Group (Fixed)

SMCS - 3260-010

### Remove & Install Front Axle Housing Group (Fixed)

Tools Needed	A	B
138-7576 Link Bracket	4	
137-4370 Load Leveler (10 Ton)		1

Start By:

- a. remove front tires & rim assemblies

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#### NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide", for tools and supplies to collect and contain fluids in Caterpillar machines.

Dispose of all fluids according to local regulations and mandates.

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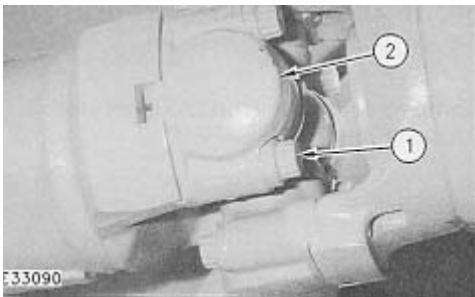
**NOTE:** Put identification on all lines, hoses, wires, and tubes for installation purposes. Cap and plug all lines, hoses, and tubes to prevent fluid loss and to prevent contaminants from entering the system.



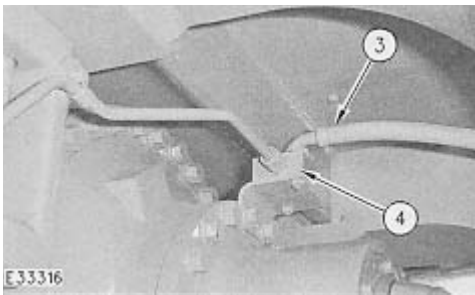
**Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.**

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1. Release the hydraulic system pressure. Refer to the topic "Hydraulic System Pressure - Release" in this module.
2. Drain the oil from the front axle housing and final drive assemblies in a suitable container for storage and disposal.

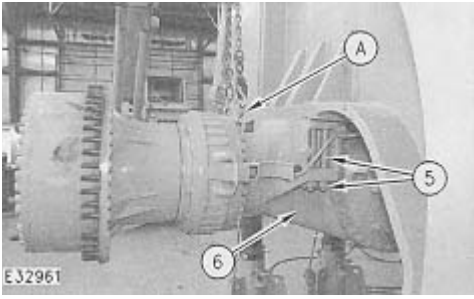


3. Remove eight bolts (1) and spider and bearing group (2) from the drive shaft.



4. Remove hose assembly (3) from junction block (4).





5. Attach Tooling (A) to the left and right sides of the front axle assembly. Left side shown.
6. Attach a hoist, Tooling (B), and suitable lifting chains to Tooling (A).
7. Remove eight nuts, the washers and bolts (5) from each side of front axle housing (6).
8. Lower front axle housing (6) to the ground. The weight of the front axle housing is 5230 kg (11,500 lb).

**NOTE:** The following steps are for the installation of the front axle housing.

9. Install the front axle housing in the reverse order of removal.
10. Tighten nuts and bolts (5) to a torque of  $2000 \pm 250 \text{ N}\cdot\text{m}$  ( $1480 \pm 185 \text{ lb ft}$ ).
11. Tighten bolts (1) to a torque of  $530 \pm 70 \text{ N}\cdot\text{m}$  ( $400 \pm 50 \text{ lb ft}$ ).
12. Fill the front axle housing and final drive assemblies with oil. Refer to the Operation & Maintenance Manual for the correct oil and filling procedure.
13. Purge the air from the front service brakes. Refer to the Brakes Test & Adjust Manual for the correct procedure.
14. After purging the front service brakes, check the oil level of the steering and brake hydraulic tank. Refer to the Operation & Maintenance Manual for the correct oil and filling procedure.

End By:

- a. install front tires & rim assemblies
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Product: WHEEL LOADER

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## Disassembly and Assembly

### 990 & 990 SERIES II WHEEL LOADERS & 844 WHEEL TRACTOR POWER

Media Number -SEN6647-04

Publication Date -01/10/2004

Date Updated -09/09/2015

SEN66470014

## Front Differential & Bevel Gear

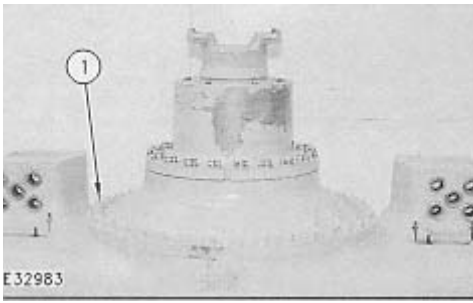
SMCS - 3258-015; 3258-016

### Disassemble Front Differential & Bevel Gear

Tools Needed		A	B	C	D	E	F	G
1P-2420	Transmission Stand Group	1						
1U-6691	Socket Wrench Assembly		1					
9U-6600	Hand Pump Group			1	1			
1P-0820	Hydraulic Puller Group			1	1			
5F-7369	Leg			2	2			
5F-7342	Adapter			2	2			
5F-7343	Bearing Puller Attachment			1	1			
1B-4207	Hex Nut			2	2			
3H-0465	Plate			4	4			
1P-0524	Drive Plate			1		1		
1P-0519	Drive Plate				1			
1H-3107	Puller Assembly					1		
1H-3110	Bearing Puller Attachment					1		
5P-1730	Holding Fixture Attachment					1	1	
5P-0964	Spanner Wrench							1

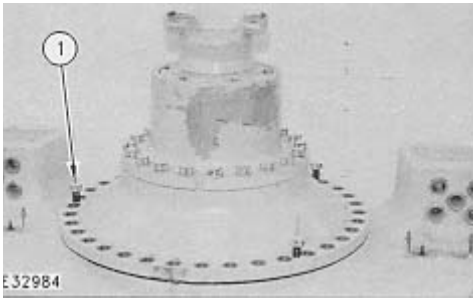
Start By:

a. remove front axle housing group (fixed)



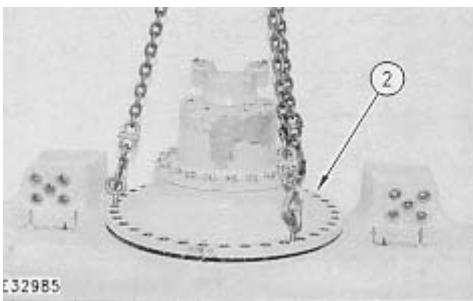
Typical example

1. Remove bolts (1) from the carrier.



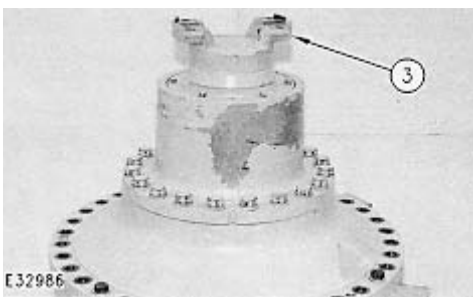
Typical example.

2. Use three of the bolts (1) as forcing screws to free the carrier from the axle housing.

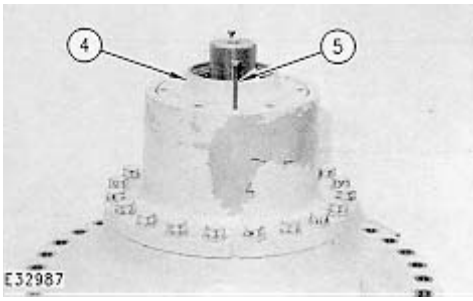


Typical example.

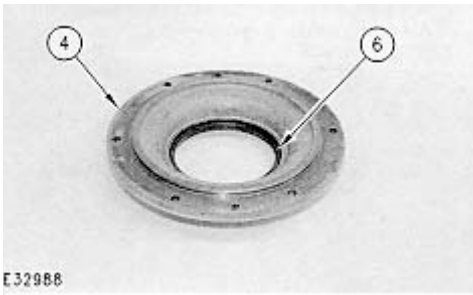
3. Install three 7/8-9 NC forged eyebolts in the carrier. Fasten a hoist to the eyebolts, and remove carrier (2) and the differential from the axle housing. The weight of the carrier and differential is 794 kg (1750 lb).



4. Position the carrier and differential on Tooling (A). Remove yoke (3).

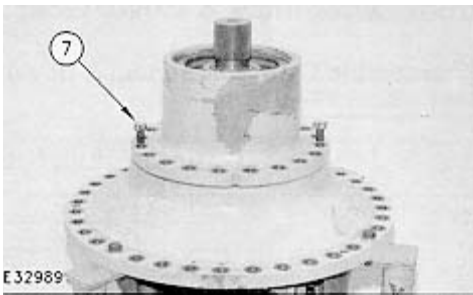


5. Remove the bolts from retainer (4). Install two 3/8-16 NC forcing screws (5) in the retainer; then remove it from the bevel housing.

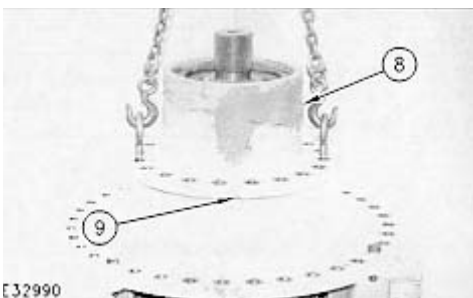


6. Remove seal (6) from retainer (4).

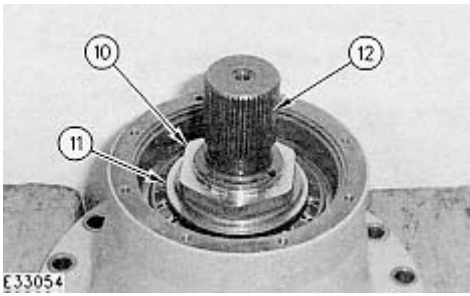
7. Remove the bolts from the bevel gear housing.



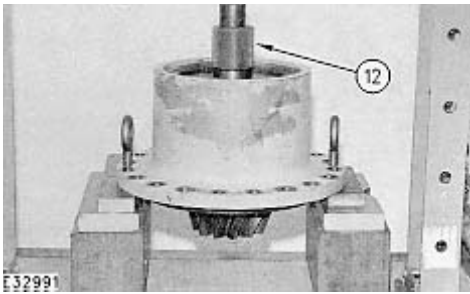
8. Use two of the bolts from the bevel gear housing (7) as forcing screws to remove the pinion and housing from the differential housing.



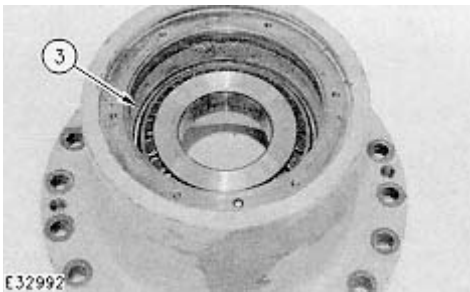
9. Install two 7/8-9 NC forged eyebolts in the bevel gear housing. Fasten a hoist to the eyebolts, and remove housing (8). The weight of the bevel pinion and housing is 170 kg (375 lb). Remove the shim pack.



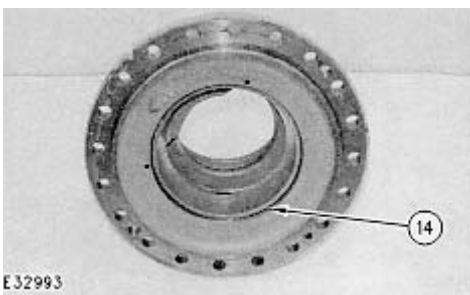
**10.** Bend the collar of nut (10) out of the slot in the pinion assembly. Remove nut (10) and washer (11) from pinion assembly (12). Remove nut (10) with Tooling (B).



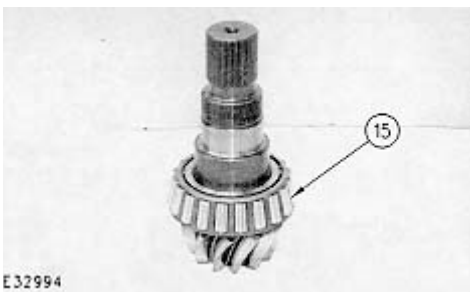
**11.** Use a press to remove pinion assembly (12).



**12.** Remove bearing (13) from the housing.



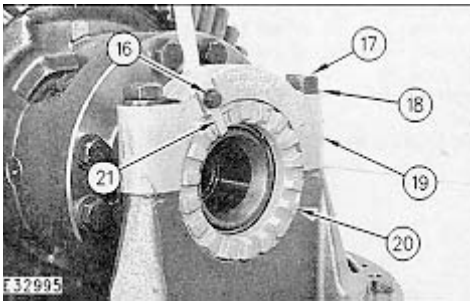
**13.** Remove two bearing cups (14) from the housing.



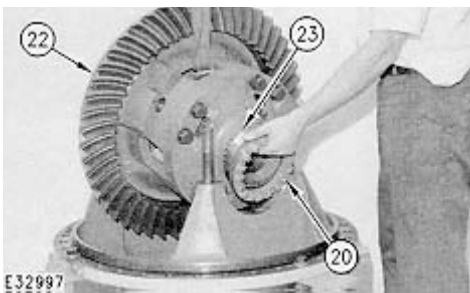


14. Remove bearing (15) from the pinion.

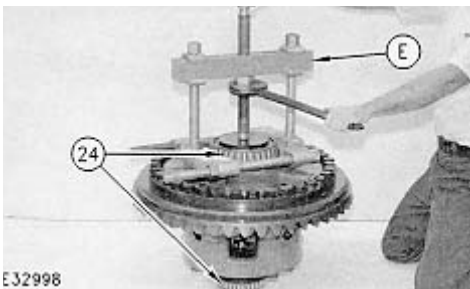
15. Turn the differential over, and fasten it to Tooling (A).



16. Remove bolts (17) and washers (18) from the bearing caps. Remove bolts (16) and locks (21). Remove caps (19).



17. Fasten a hoist and lifting sling to differential (22). Remove the differential along with adjusting rings (20) and bearing caps (23). The weight of the differential is 222 kg (490 lb).



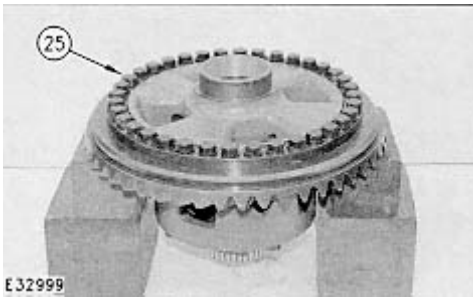
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## NOTICE

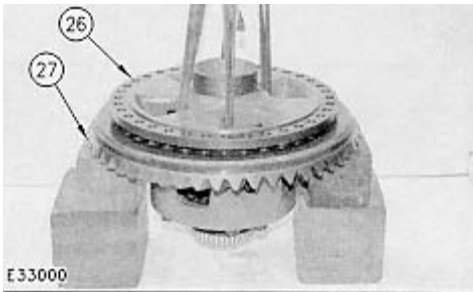
**Bearings (24) are the type that may be damaged when they are removed. When Tooling (E) is used, bearings (24) can be heated or alternate Tooling (C) and (D) can be used.**

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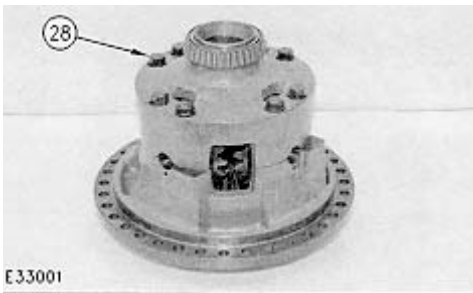
18. Use Tooling (E) or alternate Tooling (C) and (D) to remove bearings (24).



**19.** Remove bolts (25).

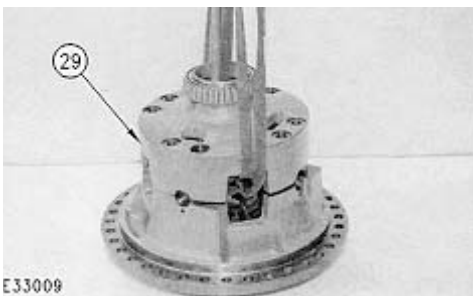


**20.** Fasten a hoist to differential group (26) and remove it from gear (27). The weight of the differential group is 221 kg (490 lb). The weight of the gear is 68 kg (150 lb).

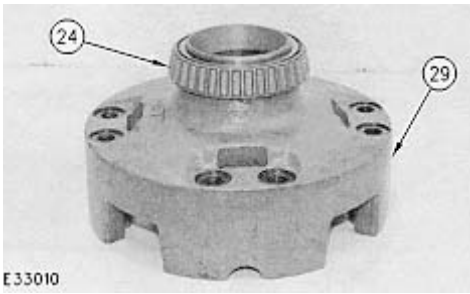


**21.** Place an alignment mark across the housing and case assembly for assembly purposes.

**22.** Remove bolts (28).

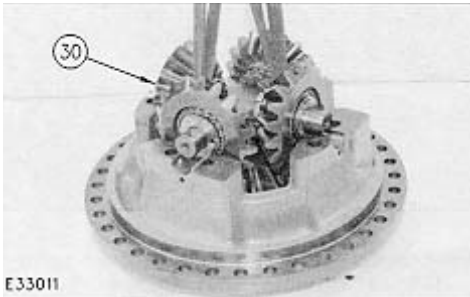


**23.** Remove housing (29) from the case assembly. The weight of the housing is 63 kg (140 lb). Remove the washer and gear.

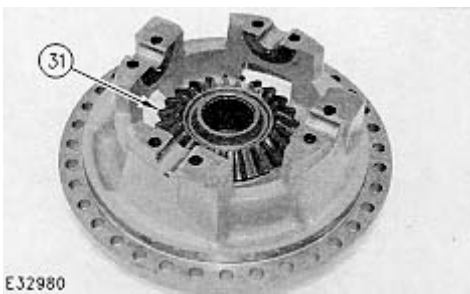


**NOTE:** See Step 18 for the proper removal of bearing (24).

**24.** Remove bearing (24) from housing (29).



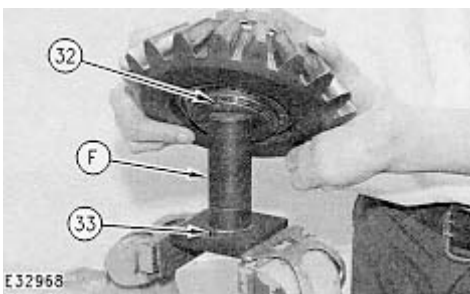
**25.** Fasten a hoist to spider assembly (30), and remove it from the case.



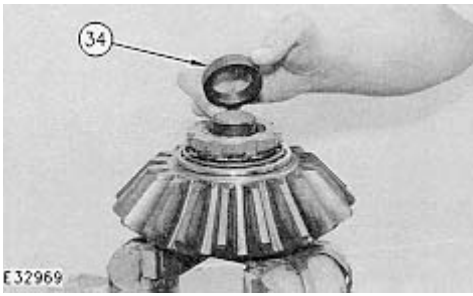
**26.** Remove gear (31) and the washer from the case.

**27.** Remove the four pinion assemblies from the spider.

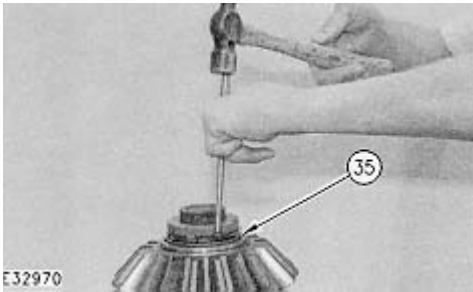
**28.** Disassemble the pinion assemblies as follows:



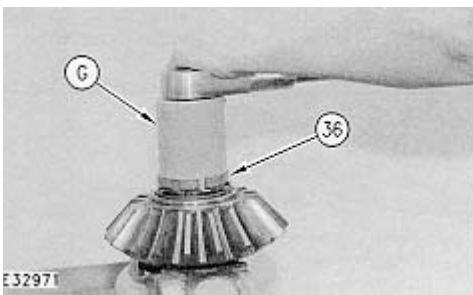
**a.** Put Tooling (F) in a vise, and position the pinion on the holding fixture as shown. Make sure groove (32) is in alignment with dowel (33).



**b.** Install nut (34) [part of Tooling (F)] on top of the pinion.

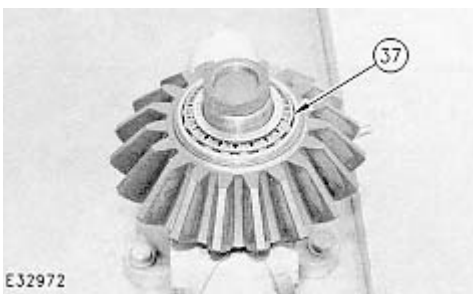


**c.** Use a hammer and punch to straighten the tab on lock (35).



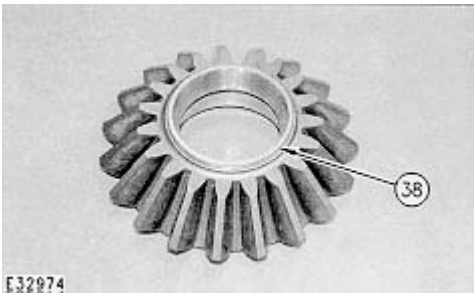
**d.** Remove nut (36) from the pinion retainer with Tooling (G).

**e.** Remove the lock.

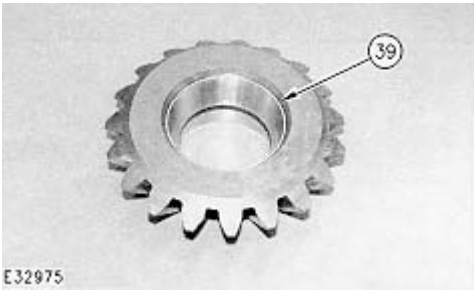


**f.** Remove the pinion with small bearing cone (37) from the pinion retainer.

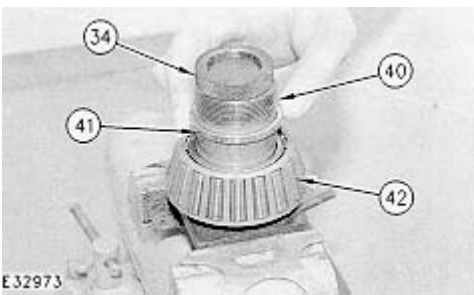
**g.** Remove the core from the pinion.



**h.** Remove small bearing cup (38) from the pinion.



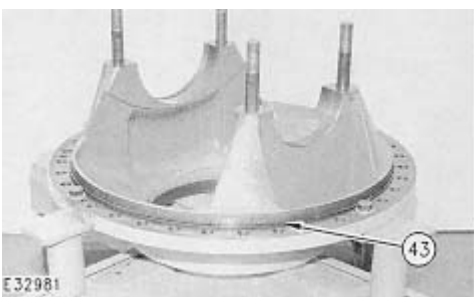
**i.** Remove large bearing cup (39) from the opposite side of the pinion.



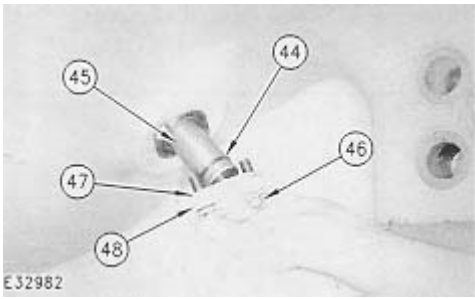
**j.** Remove cone spacer (41) and large bearing cone (42) from pinion retainer (40).

**k.** Remove nut (34) from Tooling (F) and remove the pinion retainer.

**l.** Repeat Steps 28a through 28k for the other three pinions.



**29.** Remove O-ring seal (43).



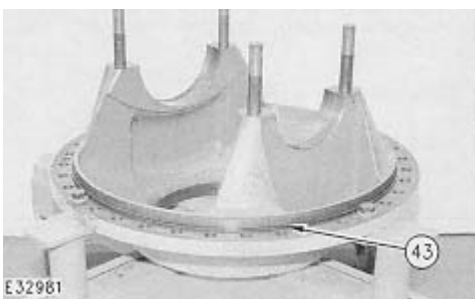
Typical example.

**30.** Remove four bolts (46) and cover (48) with shims (47). Remove pin (45) from the axle housing. Remove O-ring seal (44) from the pin.

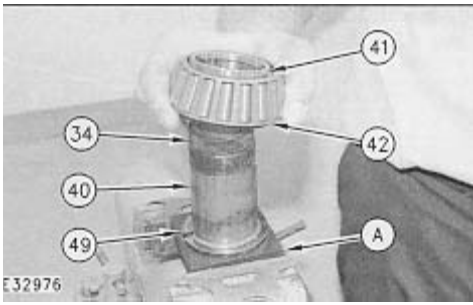
## Assemble Differential & Bevel Gear

Tools Needed		A	B	C	D	E	F	G
5P-1730	Holding Fixture	1						
1U-6691	Socket Wrench Assembly		1					
FT-1393	Spanner Wrench			1				
1P-0520	Driver Group				1	1		
5P-0964	Spanner Wrench						1	
8S-2328	Dial Indicator							1

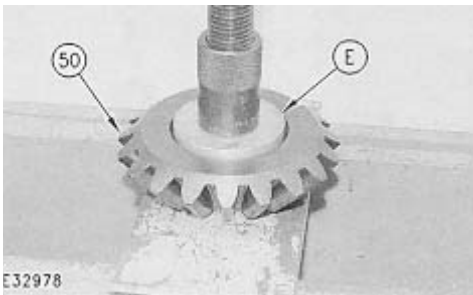
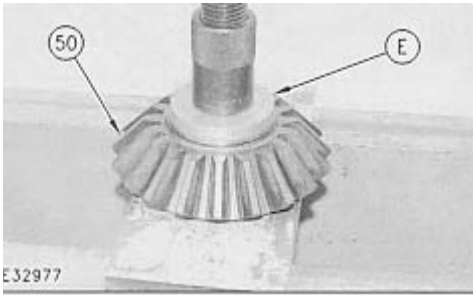
Tools Needed		H
1P-2420	Transmission Stand Group	1



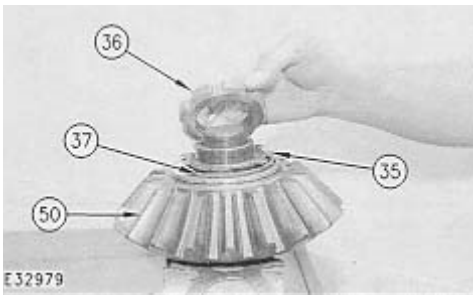
1. Install O-ring (43) on the housing.
2. Assemble the pinion assembly as follows:



- a. Put Tooling (A) in a vise.
- b. Install pinion retainer (40) on Tooling (A). Make sure groove (49) is in alignment with the dowel. If the dowel was removed, install it to a height of  $2.6 \pm 0.4$  mm ( $.102 \pm .016$  in).
- c. Install nut (34) to hold the pinion retainer.
- d. Install large bearing cone (42), cone spacer (41) and the retainer.



- e. Use heat resistant gloves to handle the bearing cups. Lower the temperature of the large and small bearing cups, and install them in pinion (50). Use Tooling (E) to be sure the cups are seated against the pinion shoulders.

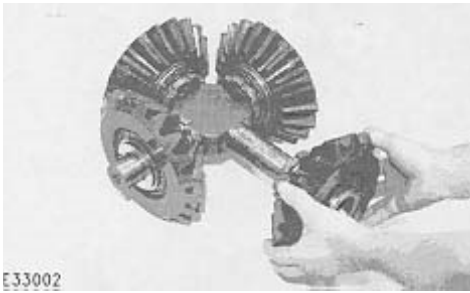


- f. Install pinion (50) and small bearing cone (37). Remove nut (34), and install lock (35) and nut (36).

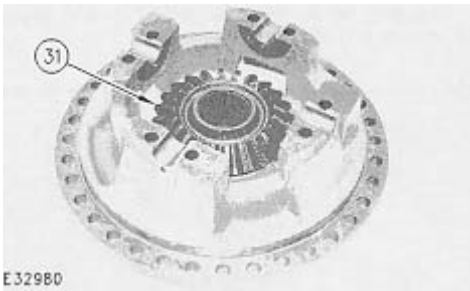
**g.** Use Tooling (F) to tighten nut (36) to a torque of  $70 \pm 15$  N·m ( $50 \pm 11$  lb ft). Turn the pinion slowly while nut (36) is tightened.

**h.** Bend a tab in lock (35) to keep nut (36) in position.

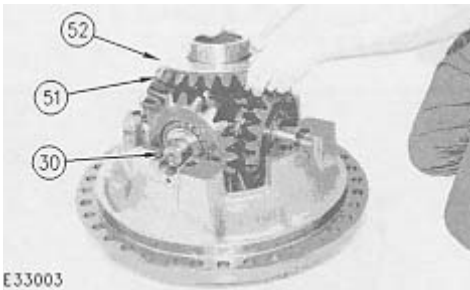
**i.** Repeat Steps 2a through 2h for the other three pinions.



**3.** Install the four pinion assemblies on the spider.

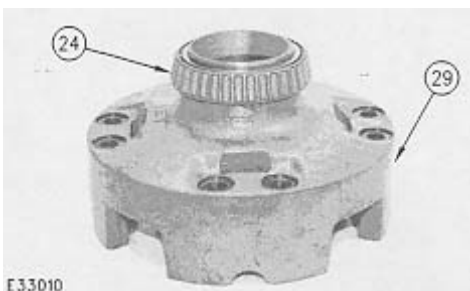


**4.** Install the thrust washer and gear (31). Make sure the grooves in the thrust washer are in alignment with the dowels in the housing.



**5.** Fasten a hoist to spider (30) and install the spider in the housing. Make sure the groove in each pinion assembly is in alignment with its dowel in the housing.

**6.** Install gear (51) and washer (52).





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