SECTION 3 FINAL DRIVE

SPECIFICATIONS & MAINTENANCE 3.1

Specifications

Chain Size ..... ANSI 100
Approved Chain Manufacturer ..... Tsubaki
Lubricating Oil ..... 10W30 API Classification SE/CD
Oil Capacity (each)..... 7 Liters. (1.9 gal)
Torque Specifications:
Chain Tightener Clamp Nuts ..... 150 lbs / ft (203 nm)
Motor Sprocket Bolt..... 25 lbs /ft (34 nm)
Wheel Nuts..... 100 - 110 lbs /ft (135 - 149 nm)
Tire Pressure..... 50 psi (345 Kpa)

Maintenance	Initial Check (hrs)	Check Every (hrs)
Tire Pressure	8	8
Wheel Nut Torque	8	8
Lubrication Oil	50	150 (*)
Chain Tension	50	150
Motor Mounting Nuts	50	150
Axle Bearing Pre-load	50	150

(*) Change every 1000 hours.

LUBRICATION 3.2

Checking The Oil Level

The loader has 2 independent final drive housings. When checking the oil level ensure the loader is on a level surface.

1 Remove any attachment, raise the boom arms and engage the boom support pins. Shut off the engine.

2 Remove the top (upper) check plug located between the 2 tires at the very front of the loader. (fig. C597) The oil level should be at the top of the check hole with a little to trickle out.

WARNING

Never work under a raised boom arm without the boom supports engaged and the engine shut off.

Adding Oil

Oil should be added with the loader on a level surface.

1 Remove any attachment, raise the boom arms and engage the boom support pins. Shut off the engine.

2 Remove the small inspection cover located to the rear of the steering lever. (fig. C2024)

3 Remove the oil level check plug as outlined above. (fig. C597)

4 Remove the vented filler plug. (fig. C2038)

5 Add 10W30 API classification SE/CD oil until it begins to flow out the upper check hole. Total final drive housing capacity per side is 7 liters (1.9 gal).

6 Replace all plugs.

IMPORTANT

Check the final drives closely for damaged seals or other leaks if the oil level is excessively low.

Changing The Oil

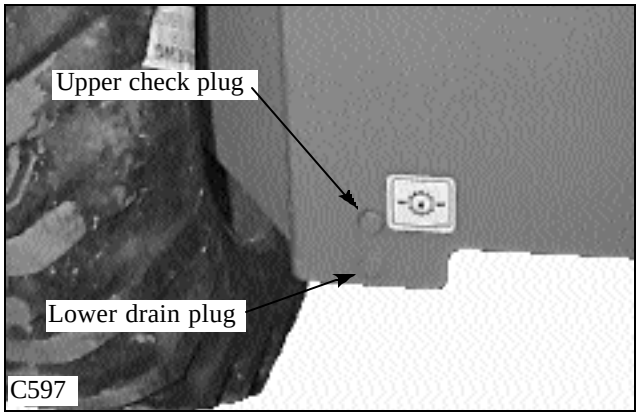
Ensure the loader is on a level surface before changing the oil.

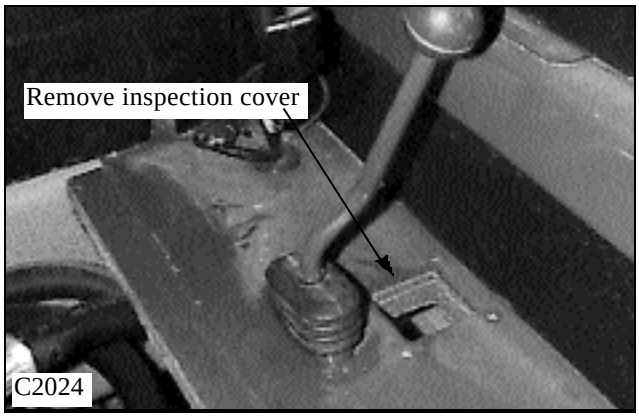
1 Remove any attachment, raise the boom arms and engage the boom support pins. Shut off the engine.

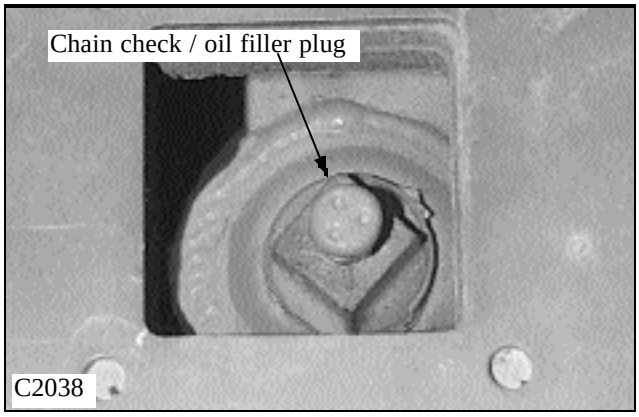
2 Slide a drain pan under one of the lower drain plugs located at the front of the loader, between the 2 front wheels. (fig. C597) Be prepared to contain 7 liters (1.9 gal) of oil.

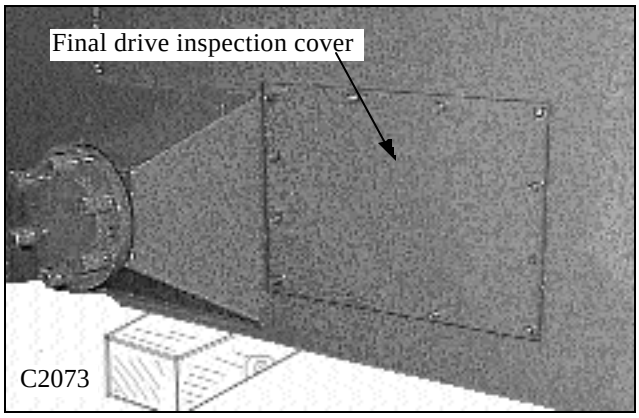
3 Remove the drain plug. Allow the oil to drip completely out of the final drive housing. Replace the drain plug . Dispose of the waste oil in an environmentally friendly manner. If the oil is contaminated, remove the side inspection cover to flush the housing. (fig. C2073)

4 Replenish the oil as outlined above in Adding Oil with 10W30 API classification SE/CD oil.









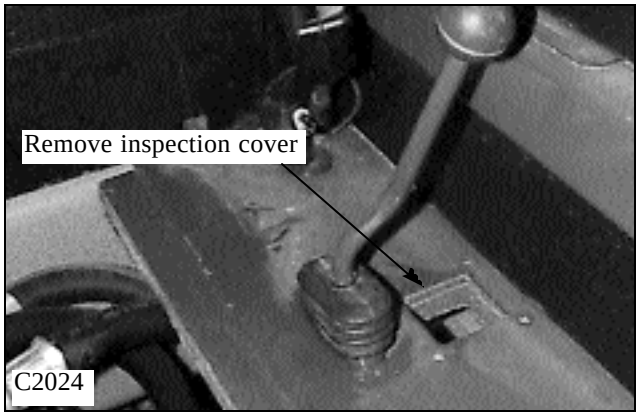
DRIVE CHAIN 3.3

Checking The Drive Chain

The drive chain must be checked for adjustment after the first 50 hours of service and every 150 hours thereafter. Correct chain tension must be set to 1/4 to 3/8 inches (6 to 9mm) free play.

1 Remove any attachment, raise the boom arms and engage the boom support pins. Shut off the engine.

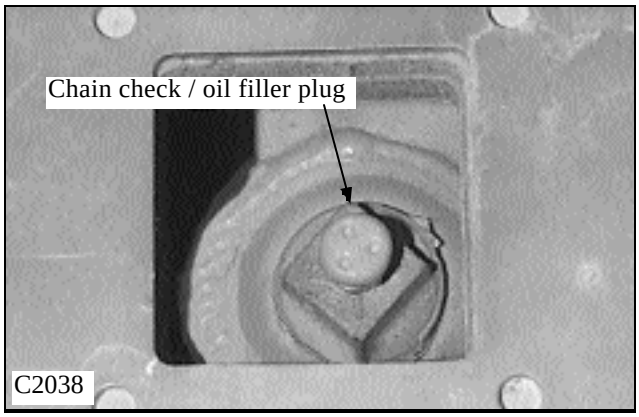
2 Remove the small inspection cover located to the rear of the steering lever. (fig. C2024)



C2024

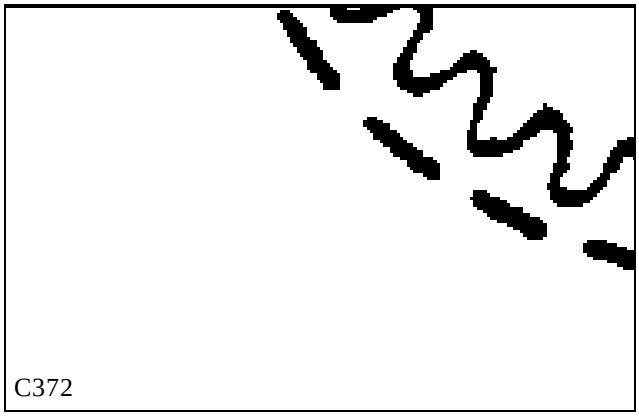
3

3 Remove the vented filler / check plug. (fig. C2038)

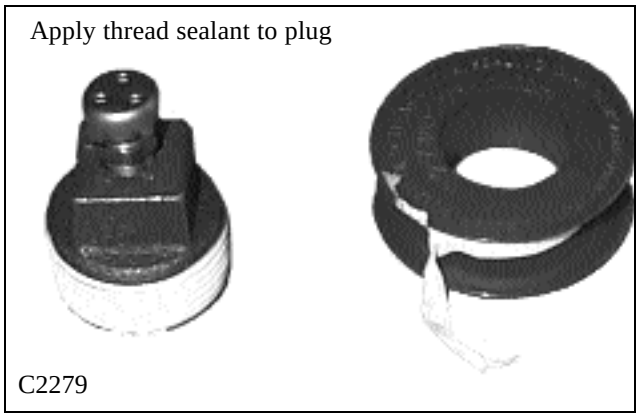


C2038

4 Check the chain tension using the special tension tool P/ N 960997. Slide the special tool into the filler hole and use the hooked end to grab under the chain. (fig. C372) Pull upward on the tool using a force equal to approximately 30 lbs (13.6 kg) pull. The special tool is calibrated in 1/4 inch increments. (6mm) Correct adjustment is calculated by the number of marks the special tool moves. The special tool should only move 1/4 to 3/8 inches (6 to 9mm) at a 30 lbs (13.6kg) pull. Replace the plug if no further adjustment is required.


C372

5 Apply a thread sealant to the inspection / fill plug before replacing. (fig. C2279)



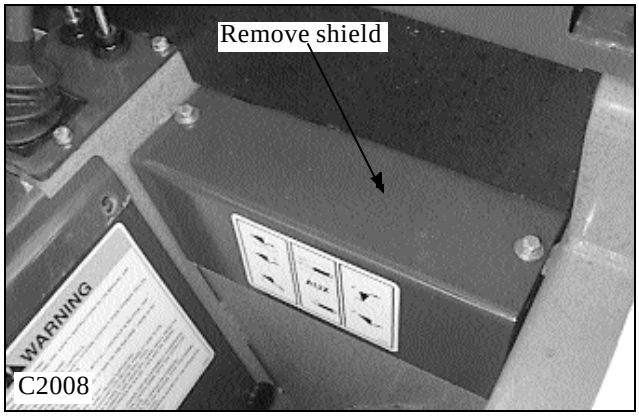
C2279

DRIVE CHAIN 3.3

Adjusting The Drive Chain

After checking the chain for proper free play, you may need to make an adjustment.

1 Access the chain tightener located at the front of the operators compartment, just above the foot rests, by removing the cover shield. (fig. C2008)

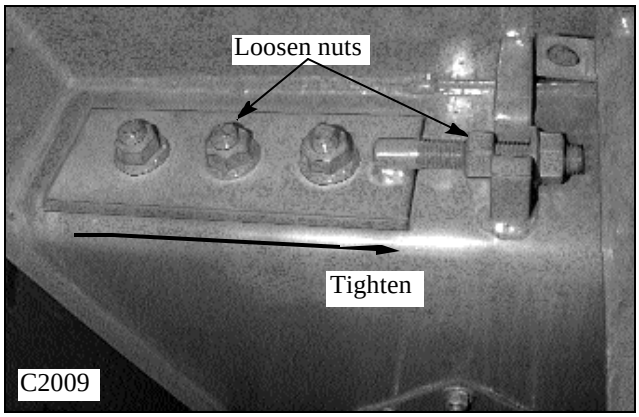


C2008

2 Loosen the 3 tightener nuts approximately 1/4 turn. (fig. C2009) Do not loosen too much. This would allow the chain tightener to drop too low and give a false reading when the chain is check for tension.

3 Loosen the rear adjuster nut. (fig. C2009) Turn the forward nut in to tighten, or out to loosen, the chain.

4 Inspect the chain adjustment again. It must be 1/4 to 3/8 inches (6 to 9mm) at 30 lbs pull (13.6kg).

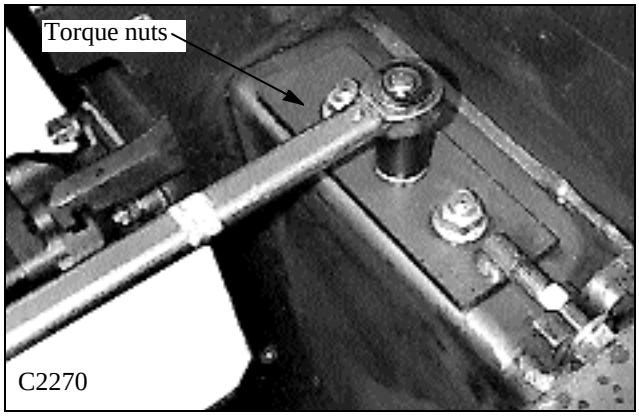


C2009

5 Torque the 3 chain tightener nuts to 150 lbs/ft (203nm) And recheck the chain tension. (fig. C2270)

6 Tighten the adjuster nut against the plate. Re-seal the plugs and replace the inspection covers.

If proper chain tension adjustment can not be reached using the adjuster plate the chain will need to be replaced. Do not remove extra links from the chain. It has reached it's normal service life and must be replaced.



C2270

IMPORTANT

Adjusting the chain tension too loose will allow the chain to "WHIP" and possibly cause part failure.

7 Replenish the final drive housing with 7 liters 1.9 gal) of API classification SE / CD oil.

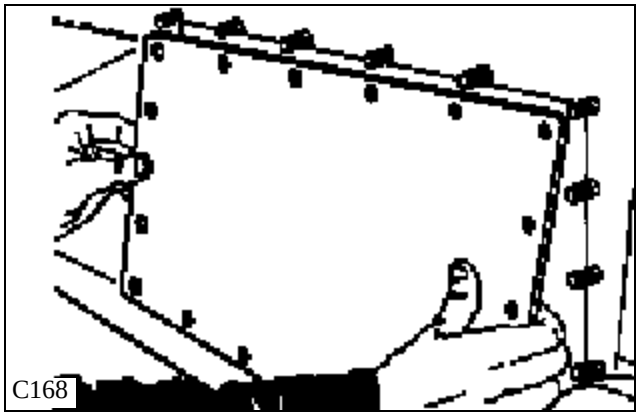
8 Install the wheels and torque the wheel nuts to specs on page 3-2. (fig. C1658)

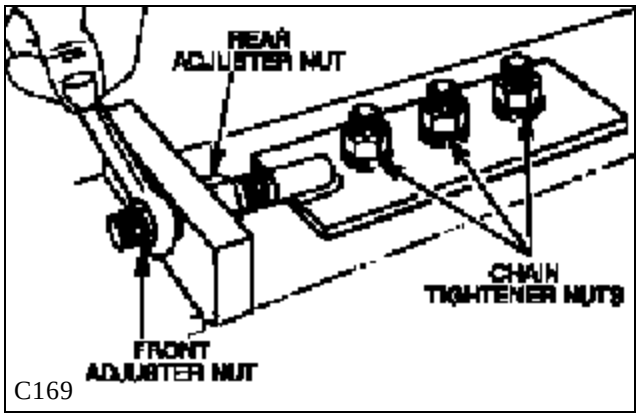

C1658

DRIVE CHAIN 3.3

Chain Removal

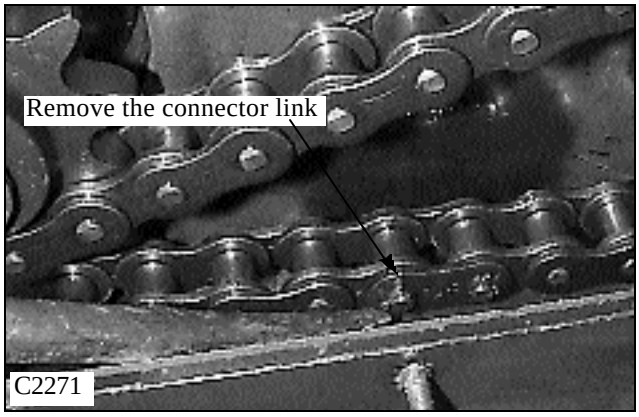
1 Remove any attachment, raise the boom arms and engage the boom support pins. Shut off the engine.
2 Block the loader securely with all 4 wheels clear of the ground.
3 Remove the wheels from the side of the loader the chain is to be removed.
4 Clean the excess dirt from the final drive housing drain plug area and the inspection cover area located between the 2 axle towers. (fig. C168)
5 Remove the lower drain plug and drain the oil. Refer to Section 3.2 page 3-3.
6 Remove the final drive inspection cover. (fig. C168)
7 Rotate the chain, if necessary, to locate the master connecting link by starting the engine and engaging the steering control. Be sure the loader is securely raised clear of the ground.
7 Loosen the 3 chain tightener nuts. Refer to Adjusting the drive Chain page 3-5.
8 Loosen the adjuster nuts and allow the tightener to fully release the tension on the chain. (All the way back in the adjustment slots).


C168



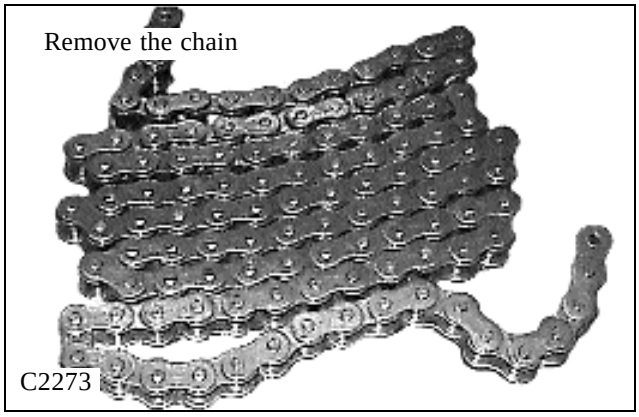
C169

9 Remove the cotter pins from the master connecting link and remove the connecting link. (fig. C2271) The connecting link is a press fit type and will need to be supported as you drive the link pins through the link plate.



C2271

10 Remove the chain from the housing by turning the axles by hand and pulling the slack chain out the inspection cover area. (fig. C2273) Hold the chain up off the drive sprocket to allow the chain to rotate freely.

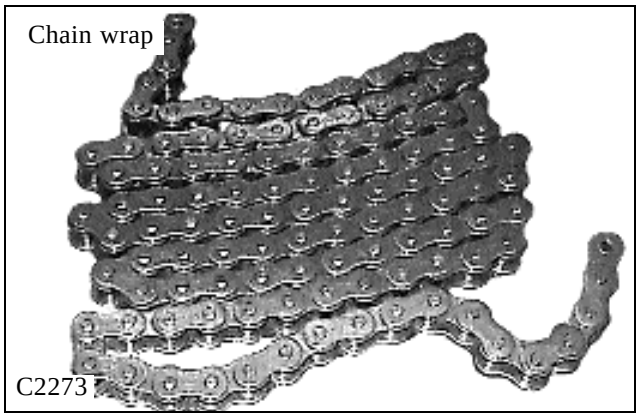


C2273

DRIVE CHAIN 3.3

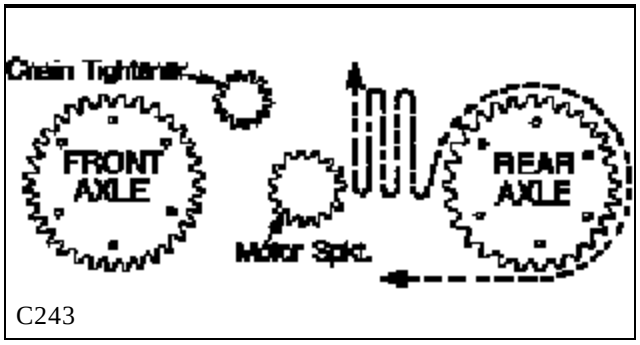
Chain Installation

1 Make sure the chain tightener and adjuster are clear rearward in the adjustment slots.
2 Wrap the chain in a “Z” pattern as shown in fig. C2273.
3 Install the wrapped chain into the final drive housing.



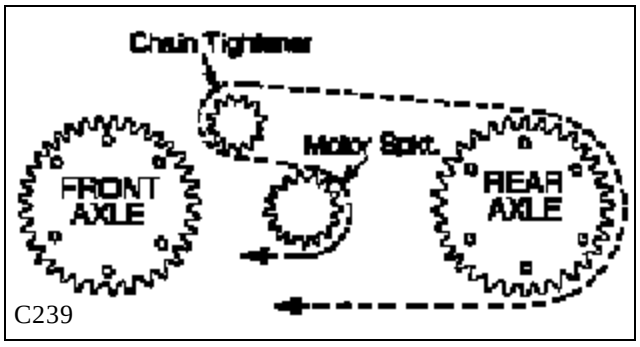
C2273

4 Place one end of the chain over the top of the rear axle sprocket. Rotate the axle and bring the chain along the bottom of the final drive housing to approximately the center. (fig. C243)



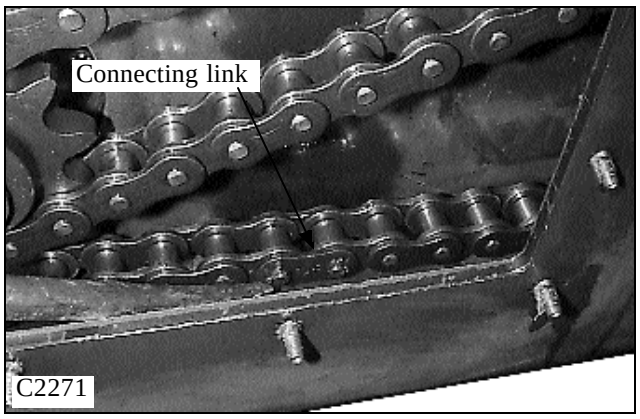
C243

5 Place the other end of the chain over the top of the chain tightener sprocket and bring it back around the drive motor sprocket. (fig. C239)
6 Wrap the chain over the front axle sprocket. Rotate the axle and chain around the bottom of the final drive housing until the ends of the chain meet together.



C239

7 Install a new connecting link. (fig. C2271) Place the connecting link into the chain so the cotter pins face the inspection cover hole. Bend the ends of the cotter pins at least 90 º apart.
8 Adjust the chain tension as outlined on page 3-5.
9 Replace the inspection cover using silicone. Do not over tighten the inspection cover nuts. 18 lbs / ft maximum. (24.5 nm)
10 Replace the wheels and torque the wheel nuts to 100 to 110 lbs/ft. (136 to 149 nm).



C2271

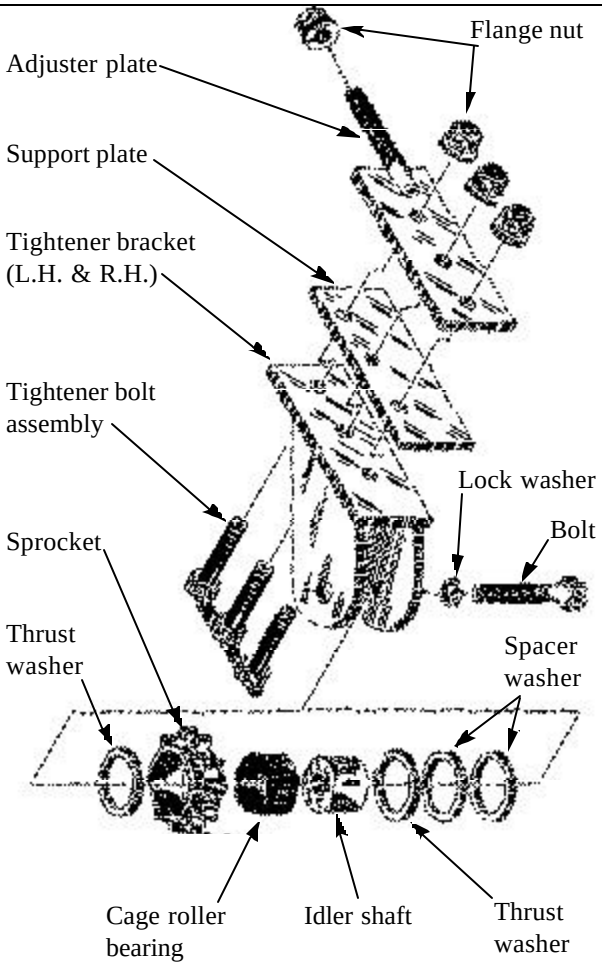
CHAIN TIGHTENER 3.4

Chain Tightener Removal

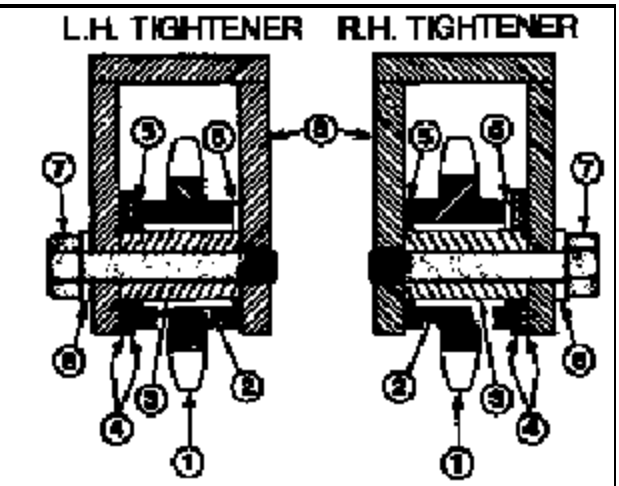
1 Remove any attachment, raise the boom arms and engage the boom support pins. Shut off the engine.
2 Block the loader securely with all four wheels clear of the ground.
3 Remove the wheels from the side of the loader to be repaired.
4 Drain the lubricating oil from the final drive housing. Refer to Section 3.2 page 3-3.
5 Remove the final drive inspection cover located between the 2 axles.
6 Loosen the chain tightener and adjuster and disconnect the chain. Refer to Section 3.3 page 3-5.
7 Rotate the front axle and pull the excess chain rearward through the chain tightener sprocket. Leave the chain in the housing.
8 Remove the 3 chain tightener nuts. You may require some help to hold the tightener assembly as you release the nuts. The tightener is now free to be removed.

Inspection

Follow fig. C1173 to disassemble the chain tightener assembly. Note the finely machined thrust washers used on either side of the sprocket. The 2 spacer washers are used to align the sprocket with the axle sprocket and chain. The spacer washers are always used next to the head of the bolt, away from the threaded side of the tightener bracket.
Inspect the thrust washers, sprocket, sprocket bearing surface, bearing and idler shaft for scaring or excessive wear. Replace worn parts as required.
When assembling the new components, use Loctite type 609 (red) to the threaded area of the tightener bracket assembly. Torque the bolt to 180 lbs/ft (245 nm).



C1173 **R.H Tightener Assembly Shown**



C233

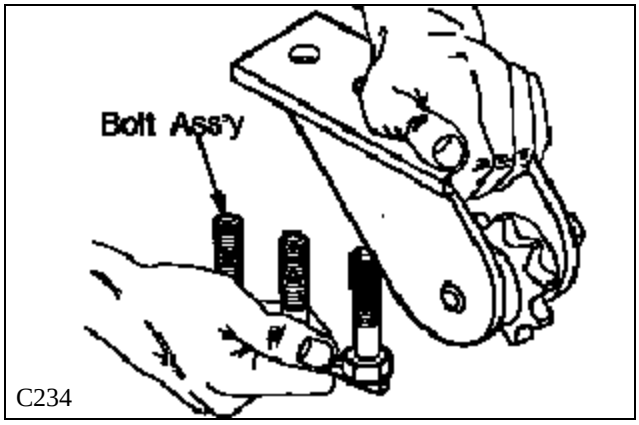
CHAIN TIGHTENER 3.4

Chain Tightener Installation

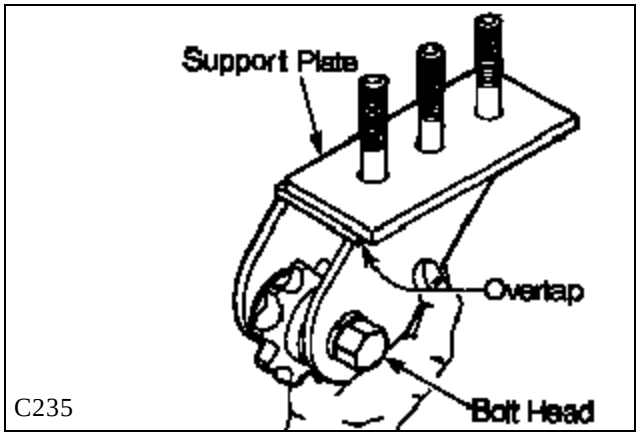
1 Assemble the left and right chain tightener assemblies as shown in fig. C233 on the previous page. Make sure to place both spacer washers next to the side of the tightener where the bolt screws in. (Always toward the outside of the loader). Use Loctite type 609 (red) on the threaded area of the tightener bracket to help secure the bolt. Torque the bolt to 180 lbs/ft. (245 nm) The chain tighteners are offset differently for the left and right hand side. Be sure to place the tightener assemblies into the correct housing. The head of the bolt always faces toward the outside of the loader. (Toward you as you install into the loader).

2 Install the bolt assembly into the tightener bracket. (fig. C234)

3 Install the support plate onto the chain tightener. The support plate holes are drilled off center. Install the support plate so that it extends beyond the chain tightener bracket on the bolt head side. (fig. C235)

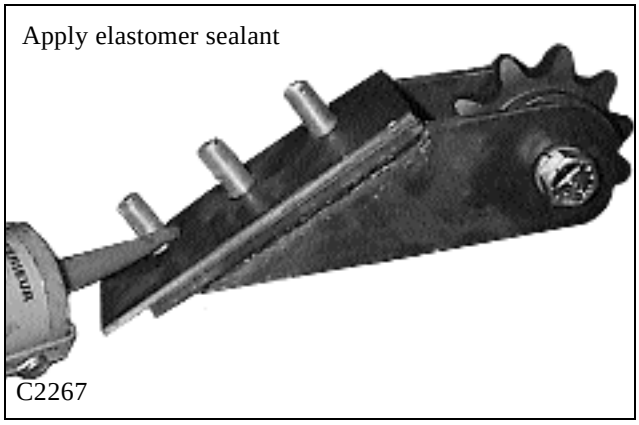


C234



C235

4 Apply elastomer sealant around the bolt threads and support plate. (fig. C2267)



C2267

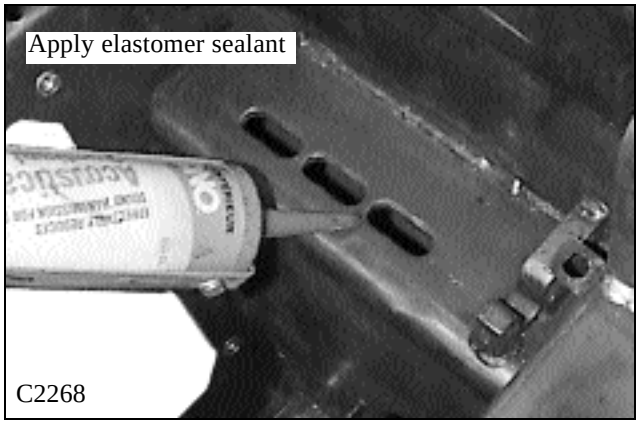
5 Apply elastomer sealant to the adjustment slots located on the loader housing. (fig. C2268)

6 Install the adjuster plate to the frame and apply elastomer sealant around each bolt assembly hole.

7 Install the tightener assembly to the frame. You may need an extra pair of hands to hold the tightener in place, while someone installs the 3 flanged locking nuts. Only hand tighten the nuts.

8 Place the drive chain around the chain tightener idler sprocket. Loop it around the drive motor sprocket, and then install the connecting link to the chain.

9 Tighten the 3 chain tightener bolts and loosen 1/4 turn. Adjust the drive chain tension as outlined on page 1-5.



C2268

DRIVE MOTOR SPROCKET 3.5

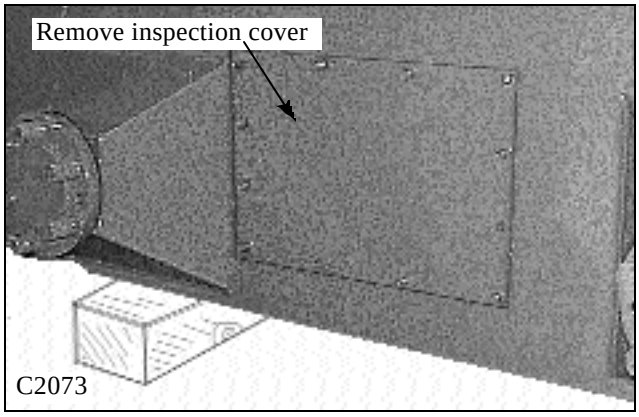
Replacement

The torque motor drive sprocket can be removed from the loader without removing the drive motor from the final drive housing.

1 Place the loader on a level surface, engage the parking brake and shut off the engine.

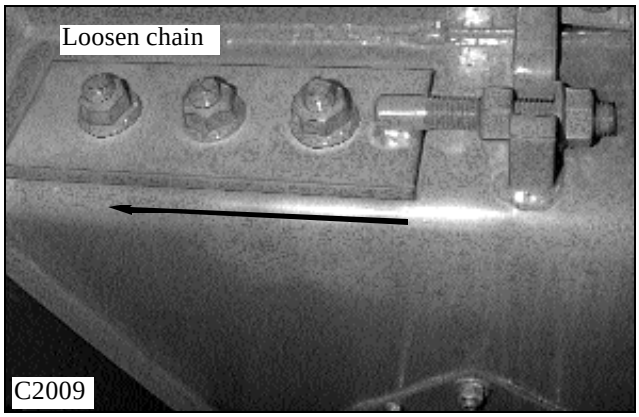
2 Raise the loader securely from the ground and remove the wheels on the side to be worked on.

3 Remove the inspection cover located between the axle assemblies. (fig. C2073)



3

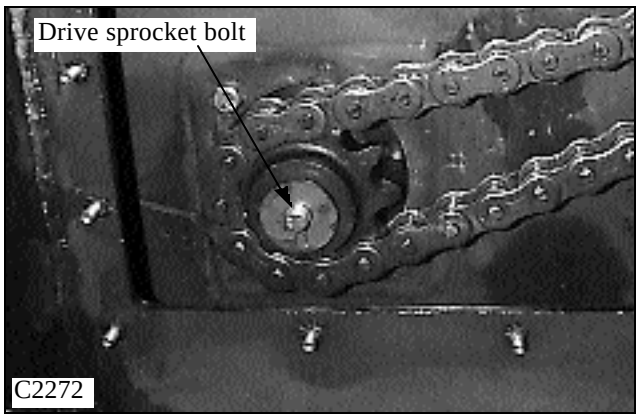
4 Loosen the drive chain to its' slackest position. (fig. C2009) See page 1-6 for assistance.

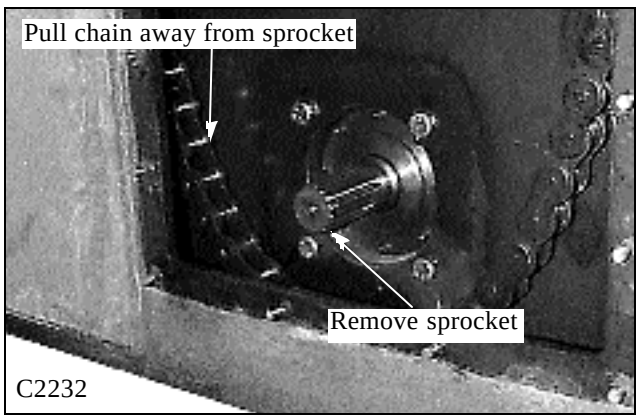


5 Remove the bolt retaining the drive sprocket to the drive motor. (fig. C2272)

6 Pull the chain away from the sprocket and slide the sprocket off the drive motor shaft. (fig. C2232)

7 Replace the drive sprocket in the reverse order above. Apply Loctite 242 (blue) to the drive sprocket bolt and torque the bolt to 28 lbs / ft (38 Nm)

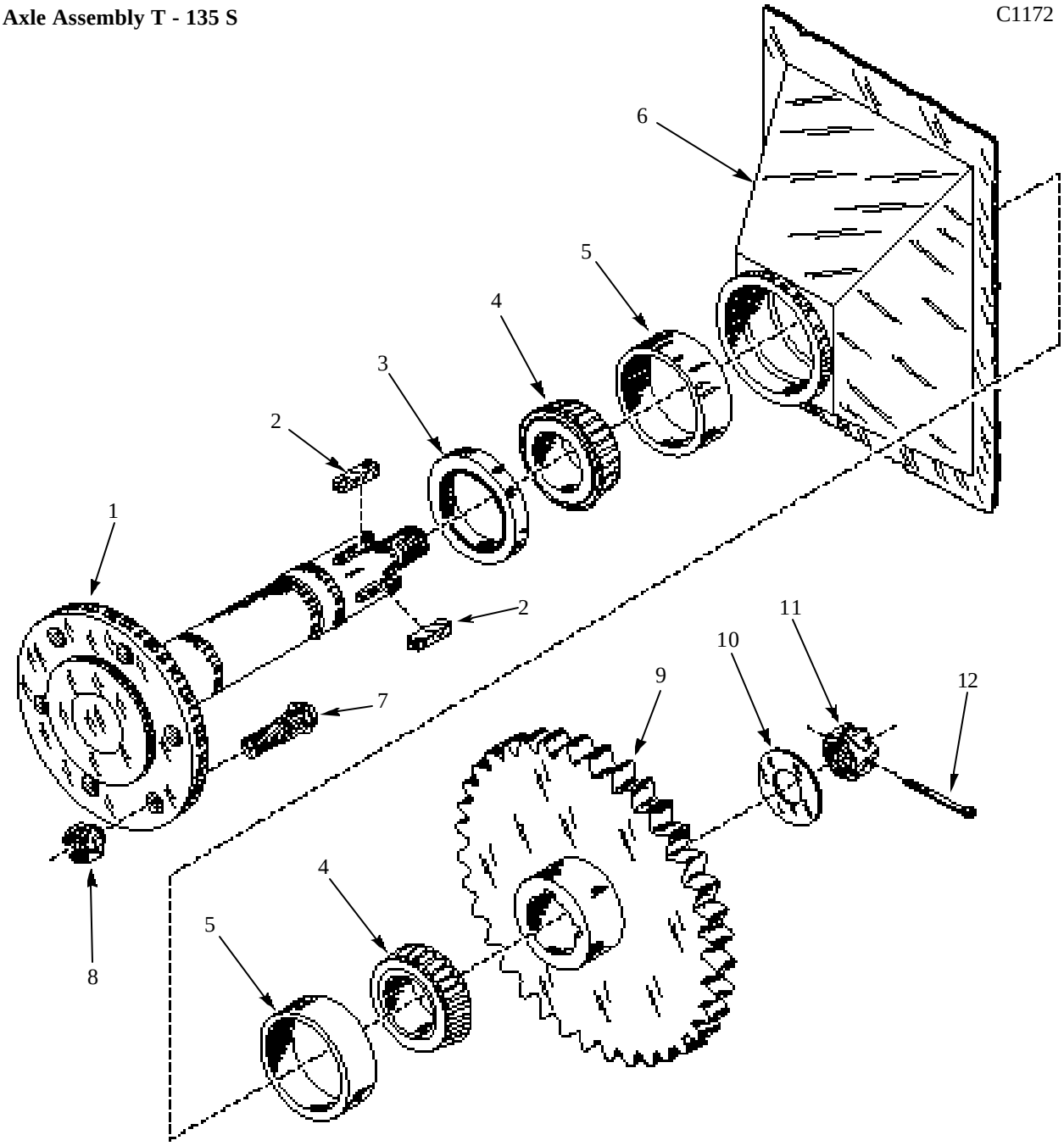




AXLE ASSEMBLY 3.6

Axle Assembly T - 135 S

C1172

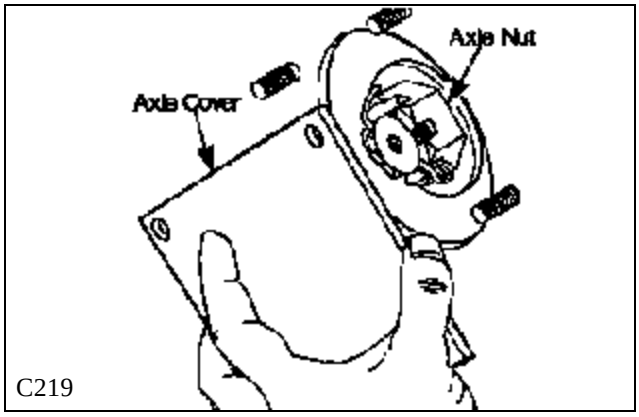


1	Axle	7	Wheel Stud
2	Key	8	Wheel Nut
3	Seal	9	Axle Sprocket
4	Bearing	10	Washer
5	Race	11	Castle Nut
6	Axle “Tower”	12	Cotter Pin

AXLE ASSEMBLY 3.6

Axle Removal

1 Remove any attachment, raise the boom arms and engage the boom support pins. Shut off the engine.
2 Block the loader securely with all 4 wheels clear of the ground.
3 Remove the wheels from the side of the loader the chain is to be removed.
4 Clean the excess dirt from the final drive housing drain plug area and the inspection cover area located between the 2 axle towers. (fig. C)
5 Drain the lubricating oil from the final drive housing. Refer to Section 3.2 page 3-3.
6 Remove the final drive inspection cover located between the 2 axles.
7 Remove the drive chain from the final drive housing. Refer to Section 3.3 page 3-6.
8 **FRONT AXLE:** Remove the foot peal assembly if so equipped. Refer to Section 4.
9 Remove the inner axle cover plate from the final drive housing. (fig. C219)
10 **REAR AXLE:** Remove the inner axle cover plate from the final drive housing.
11 Remove the split pin from the castle nut on the end of the axle. (fig. C227)



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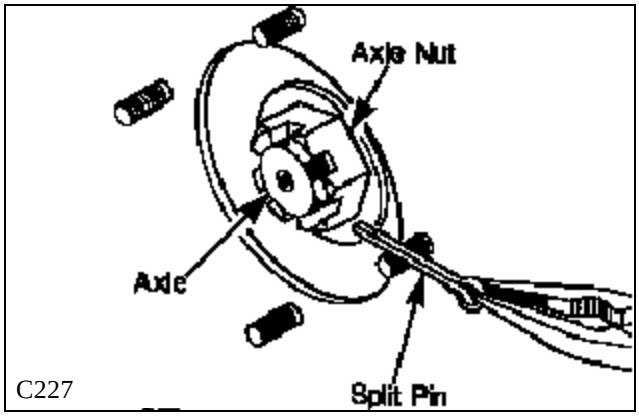
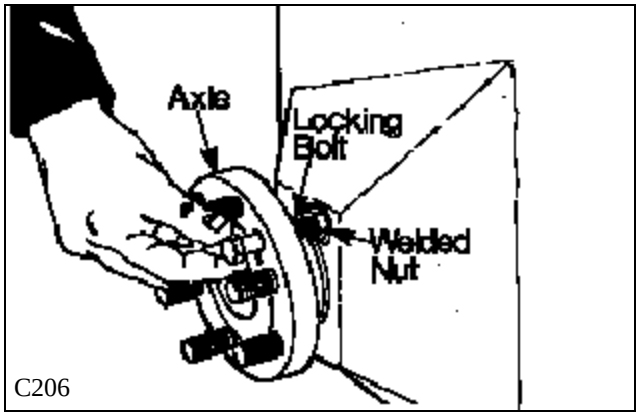


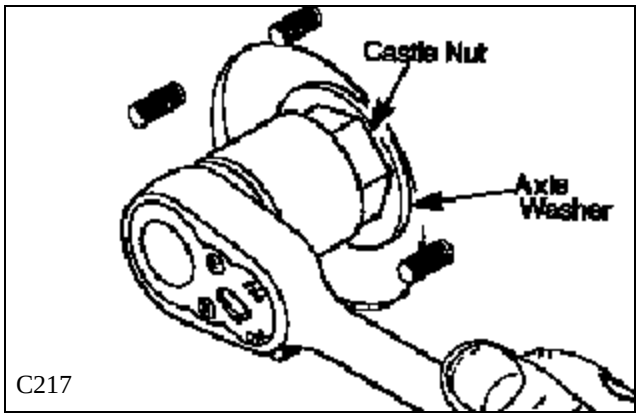
C227

12 Install a bolt, 1/2 UNC approximately 3'' long, through the axle flange and into the final drive housing to prevent the axle from turning as the castle nut is removed. (fig. C206)
Note: Later model machines may not be equipped with the nut welded to the axle tower. The axle may be held stationary by inserting a bar between the wheel studs.



C206

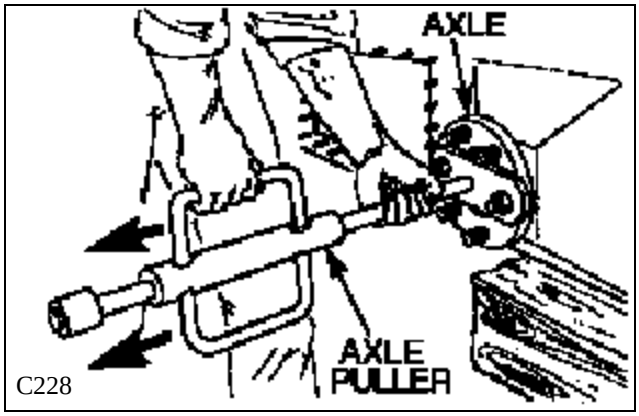
13 Remove the rear castle nut and axle washer. (fig. C217)
14 Remove the bolt from the axle flange that was installed to keep the axle from turning.



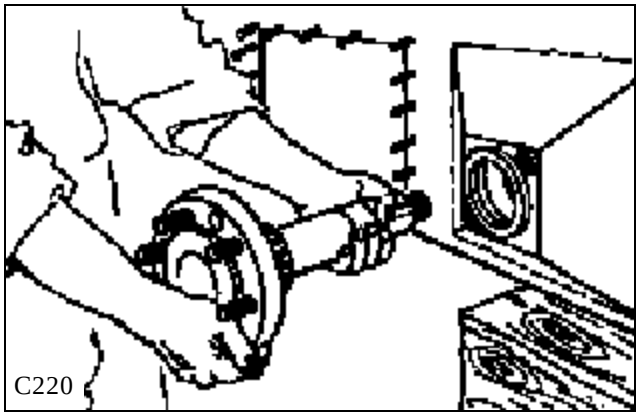
C217

AXLE ASSEMBLY 3.6

15 Attach a special axle puller tool, Thomas P/N 955283, to the axle flange wheel studs using the wheel nuts that are on the loader. (fig. C228)
16 Using the slide hammer action of the special puller, remove the axle. The rear bearing and axle sprocket will remain in the final drive housing.
17 Remove the axle sprocket and bearing from the final drive housing through the inspection cover area.



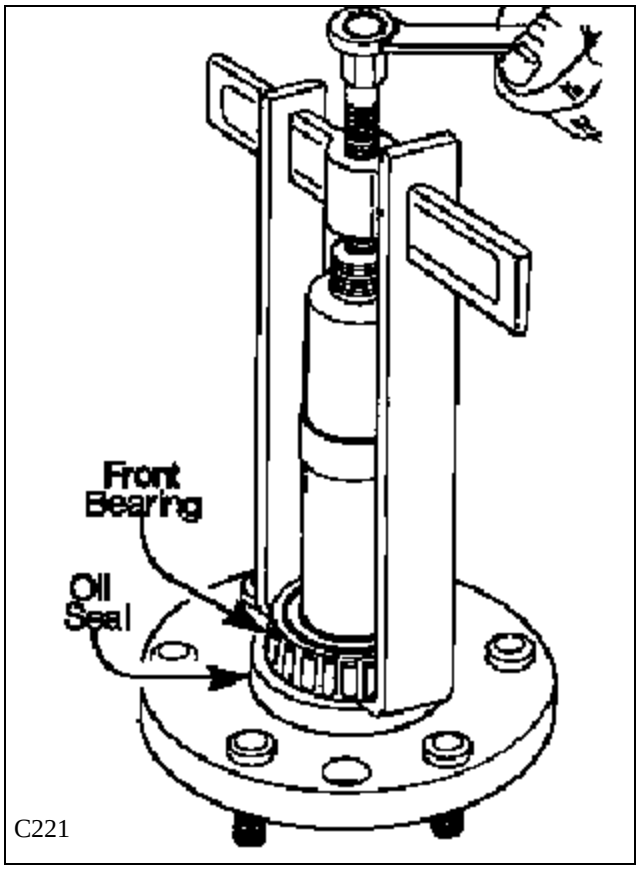
C228


C220

18 Using a bearing puller, remove the bearing still pressed in place on the axle. (fig. C221)
19 Remove and discard the axle oil seal.

Inspection

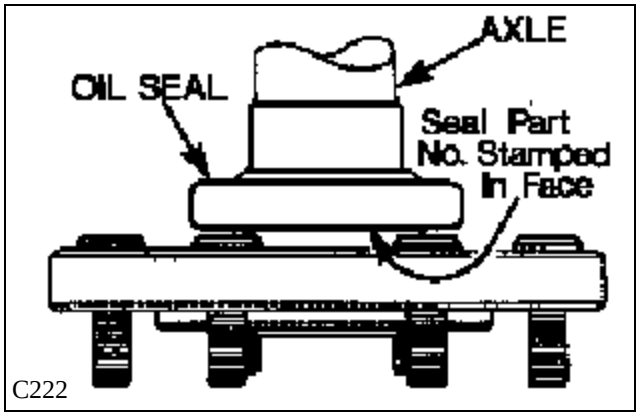
1 Inspect the seal surface area for scaring, pitting or nicks. Minor scratches may be removed using fine emery cloth. Replace the axle if worn excessively.
2 Inspect the axle threads for damage. Replace axle if the threads are non serviceable.
3 Inspect the axle keys for wear Replace as required.
4 Inspect the key way slots for wear. Replace the axle and keys if the keys do not fit tightly into the key ways.
5 Replace any axle studs as required.
6 Inspect the axle sprocket for abnormal tooth wear and the fit of the axle key in the sprocket key ways. Replace the sprocket if necessary.
7 Inspect the bearing races in the final drive housing. Replace them if necessary using a brass drift punch and hammer. Cooling the races in a freezer will aid in easing this procedure.
8 Replace the bearings if new races are installed or if they are pitted or damaged.



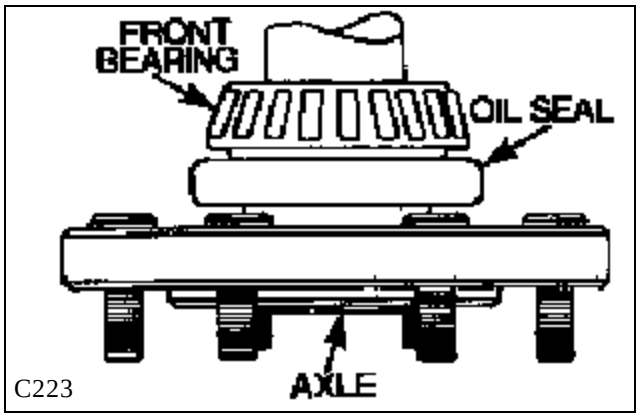
C221

Axle Installation

1 Check the axle seal surface area for damage. Minor scratches may be repaired using fine emery cloth.
2 Inspect the axle threads for damage. Replace axle if the threads are non serviceable.
3 Inspect the key way slots for wear. Replace the axle and keys if the keys do not fit tightly into the key ways.
4 Replace any axle studs as required.
5 Lubricate the axle oil seal with light grease.
6 Install the seal onto the axle. The seal part number stamping must face the flange side of the axle. (fig. C222)
7 Using a press, install the front, or outer, bearing onto the axle. Be sure to support the axle up off the wheel studs to prevent damaging the wheel studs. (fig. C223)

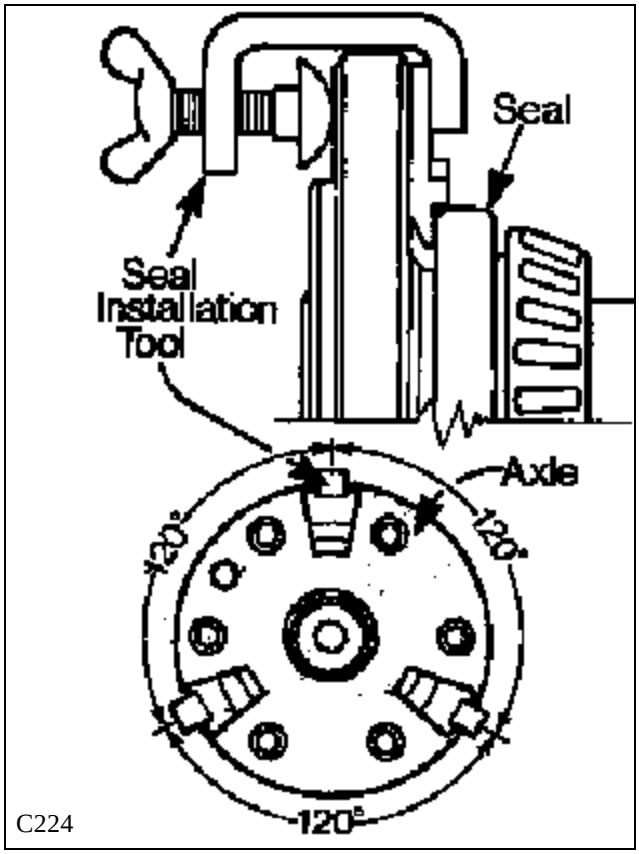


C222



C223

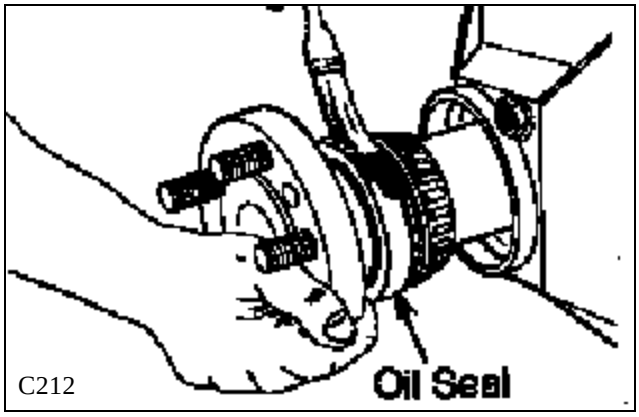
8 Place 3 seal installation tools, Thomas P/N 955281, Equally spaced around the axle flange, behind the seal as shown in fig. C224. (approximately 120º increments). These special tools must be used to properly locate the seal into the final drive housing.



C224

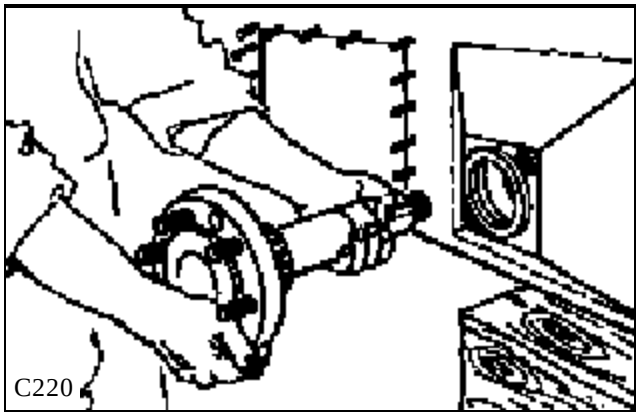
AXLE ASSEMBLY 3.6

9 Place the axle sprocket into the final drive housing with the hub facing toward the bearing race area. (outside)
10 Apply gasket sealant to the outer edge of the axle oil seal. (fig. C212) Take care, make sure none gets on the bearing surface.

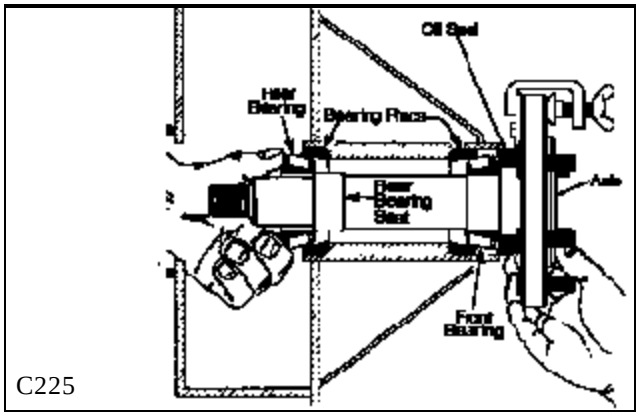


C212

11 Guide the axle into the final drive housing. (fig. C220)

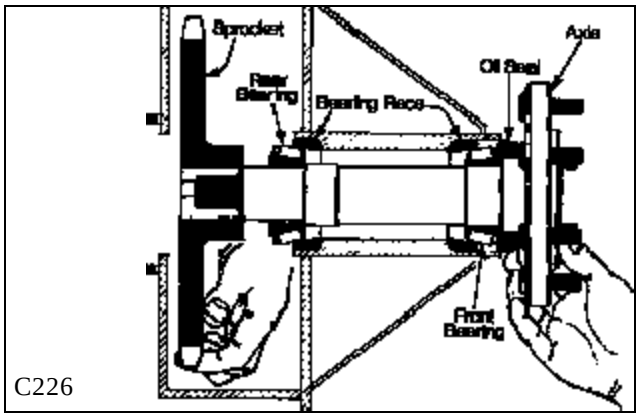

C220

12 Place the rear (inside) axle bearing onto the axle.



C225

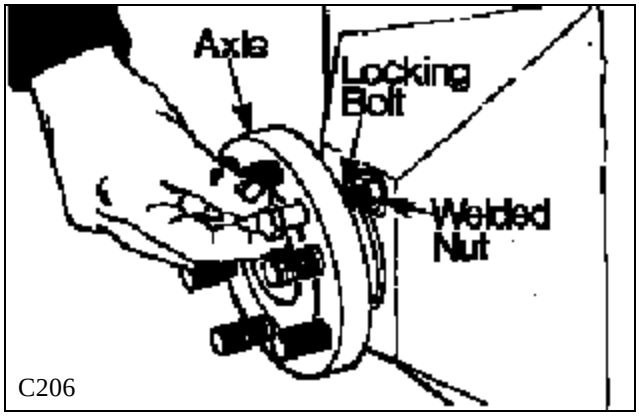
13 Start the axle into the drive sprocket. Place the axle washer and castle nut onto the threaded end of the axle.



C226

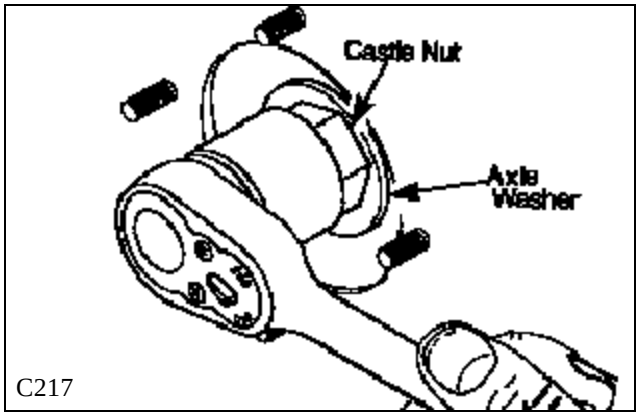
AXLE ASSEMBLY 3.6

14 Place a bolt (1/2 x 3'') through the axle flange and screw it into the final drive housing to prevent the axle from turning as the castle nut is being tightened. (fig. C206)
Note: Later model machines may not be equipped with the nut welded to the axle tower. The axle may be held stationary by inserting a bar between the wheel studs.



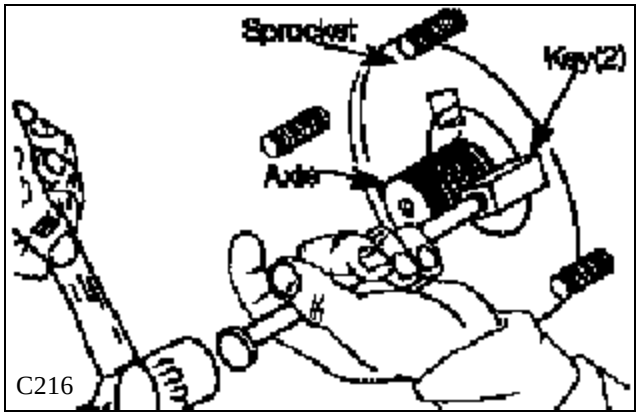
C206

15 Tighten the castle nut and guide the axle into the final drive housing as straight as possible to prevent damaging the seal. Tap the axle flange with a hammer if necessary to assist the installation.
As the castle nut is being tightened the rear (inside) bearing is being pressed into place and the axle oil seal is simultaneously pulled into the proper location into the final drive housing.
16 When the castle nut will not turn on any further tap the face of the flange with a hammer to ensure the seal and bearing has seated into place.
17 Remove the castle nut, axle washer and remove the axle oil seal installation tools.



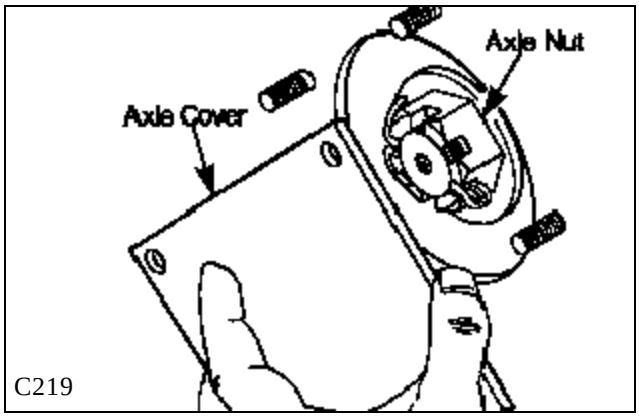
C217

18 Line up the axle and sprocket key ways and install the keys into the key way slots. (fig. C216) Use a brass drift punch and hammer if necessary to install the keys into the key way slots.



C216

19 Install the axle washer and castle nut. Tighten the castle nut to remove all axle bearing end play. (Zero preload) Continue tightening until the split pin hole in the axle will align with the castle nut.
20 Install the split pin. Bend the end of the split pin straight back against the axle washer.
21. Install the axle cover using silicone to seal the matting surfaces. Do not over tighten the retaining nuts. 15 lbs/ft maximum. (20 nm)
22 Install the drive chain. Refer to Section 3.3 page 3-7.
23 Fill the final drive housing to the correct level using 10W30 API classification SE/ CD oil. Refer to Section 3.2 page 3-3 for procedure.
24 Install the inspection cover using silicone to seal the matting surfaces. Do not over tighten the retaining nuts. 15 lbs/ft maximum. (20 nm)
25 Install the wheels. Torque the wheel nuts to 100 to 110 lbs/ft. (135 to 149 nm).

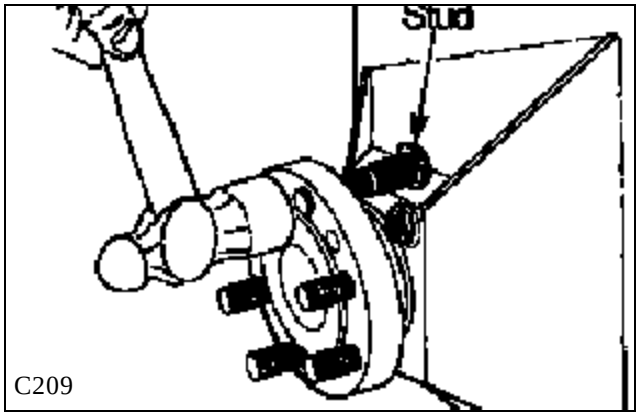


C219

AXLE ASSEMBLY 3.6

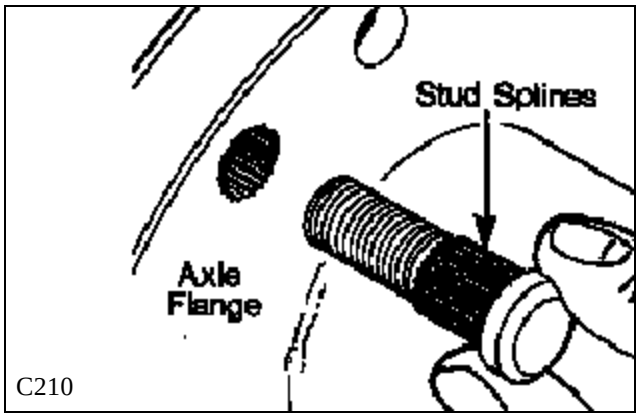
Axle Stud Replacement

1 Lower the boom arms and shut off the engine.
2 Raise and block clear of the surface the loader side of the loader the wheel studs are to be changed on.
3 Remove the wheel the studs are to be replaced on.
4 Remove the damaged or broken stud by rotating the axle so the damaged stud is at the 12:00 o'clock position as shown in fig. C209. The axle "tower" is relieved, or notch, in this location to allow stud removal without removing the axle assembly.
2 Strike the stud with a hammer to remove from the axle flange. (fig. C209)



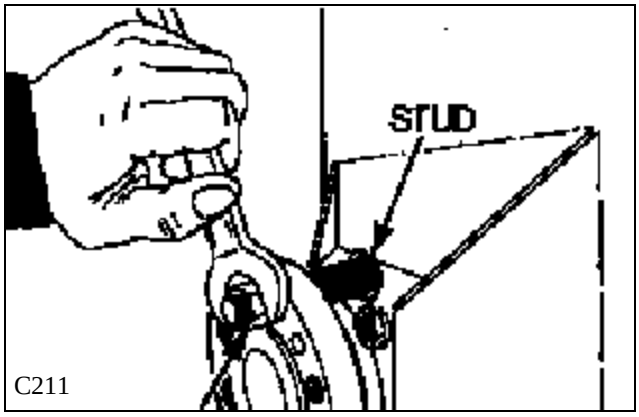
C209

3 Place a new stud in position behind the axle flange. Line up the splines on the stud with the splines cut into the axle flange. (fig. C210)



C210

4 Place a wheel nut on the stud and use it to draw the stud into place in the axle flange as you tighten it. (fig. C211)
5 Replace the wheel and torque the wheel nuts to 100 to 110 lbs/ft. (135 to 149 nm)



C211

IMPORTANT

Torque the wheel nuts daily to prevent stud and/or wheel damage.

C1658

TROUBLE SHOOTING 3.7

Problem	Cause	Corrective Action	Section
Final drive noisy.	No lubricating oil.	Check oil level. Add 10W30 SE/CD oil to correct level.	3.2
	Chain is loose.	Adjust the chain tension. Check chain tension every 150 hours.	3.3
	Axle has too much end play. (Bearing pre-load)	Check and adjust the bearing pe-load on the axle bearings	3.6
	Chain tightener damage or failure.	Inspect the chain tightener and repair if necessary.	3.4
No drive on one side.	Drive chain failure.	Inspect the drive chain and connecting link. Replace damaged parts. Check the chain tension every 150 hours.	3.3
	Drive motor sprocket failure	Inspect the drive sprocket and splines. Replace parts as required.	3.5 2
	Drive motor or hydrostatic system failure	Refer to the hydrostatic drive section. Diagnose and make repairs as required.	2
Lubrication oil leaking through the filler / breather cap.	Lubricating oil level too high.	Check the oil level.	3.2
	Drive motor shaft seal leakage.	Inspect and repair damaged parts.	2
Wheel studs shearing off.	Wheel nuts loose.	Replace the wheel studs. Check wheel nut torque daily. Torque wheel nuts at 100 to 110 lbs/ft. (135 to 149 nm)	3.6
Wheel stud threads stripped.	Wheel nuts over tightened.	Replace the wheel studs. Check wheel nut torque daily. Torque wheel nuts at 100 to 110 lbs/ft. (135 to 149 nm)	3.6