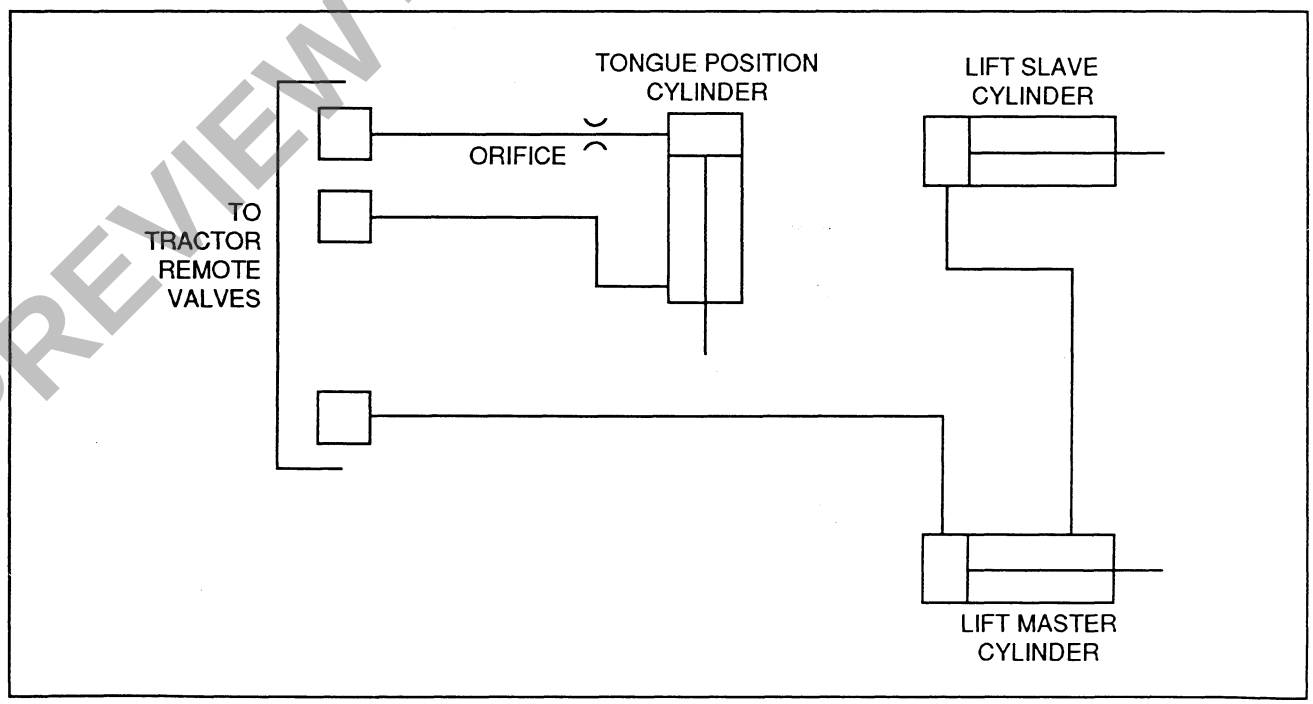
PROBLEM	POSSIBLE CAUSE	CORRECTION
Header will not raise or lower	Safety stops in safety position	Raise machine and put safety stops in storage position.
	Hose disconnected or not properly connected to tractor remote outlet	Check hydraulic connections.
	No hydraulic pressure flow	Make sure hydraulic hose is connected to tractor remote valve.
		Tractor relief valve setting too low. See tractor service manual and check tractor hydraulic system.
Right end raises before left end	Hydraulic flow too low - not enough pressure to move piston in lift master cylinder past rephasing grooves	Increase tractor engine RPM.
		Tractor relief valve setting too low. See tractor service manual and check tractor hydraulic system.

HYDRAULIC SCHEMATIC



L92A-0004

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STANDARD TORQUE SPECIFICATIONS

U.S. Standard Hardware

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers, dry, or when lubricated with engine oil. These values do not apply if special graphites, molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs



Size	Pound-Feet (LB·FT)	Newton metres (N·m)
1/4-20	8.4	11
1/4-28	9.7	13
5/16-18	17	24
5/16-24	19	26
3/8-16	31	42
3/8-24	35	47
7/16-14	49	67
7/16-20	55	75
1/2-13	76	105
1/2-20	85	115
9/16-12	110	150
9/16-18	120	165
5/8-11	150	205
5/8-18	170	230
3/4-10	265	360
3/4-16	295	405
7/8-9	430	585
7/8-14	475	640
1-8	645	875
1-12	705	955
1-1/8-7	795	1080
1-1/8-12	890	1210
1-1/4-7	1120	1520
1-1/4-12	1240	1680
1-3/8-6	1470	1990
1-3/8-12	1670	2270
1-1/2-6	1950	2640
1-1/2-12	2190	2970

Grade 8 Bolts, Nuts, and Studs



Size	Pound-Feet (LB·FT)	Newton metres (N·m)
1/4-20	12	16
1/4-28	14	18
5/16-18	25	33
5/16-24	27	37
3/8-16	44	59
3/8-24	49	67
7/16-14	70	95
7/16-20	78	105
1/2-13	105	145
1/2-20	120	165
9/16-12	155	210
9/16-18	170	235
5/8-11	210	285
5/8-18	240	325
3/4-10	375	510
3/4-16	420	570
7/8-9	605	820
7/8-14	670	905
1-8	910	1230
1-12	995	1350
1-1/8-7	1290	1750
1-1/8-12	1440	1960
1-1/4-7	1820	2460
1-1/4-12	2010	2730
1-3/8-6	2380	3230
1-3/8-12	2710	3680
1-1/2-6	3160	4290
1-1/2-12	3560	4820

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TONGUE POSITION CYLINDER

⚠ CAUTION

Before doing any service or maintenance work on the machine, you must:

- **Put the tongue in roading position.**
- **Raise the header.**
- **Disengage all power.**
- **Shut off the tractor engine.**
- **Look and Listen! Make sure all moving parts are stopped.**
- **Install the roading pin in the roading pin lock hole and install the hair pin.**
- **Install the cylinder safety stops.**

⚠ WARNING

When the header is raised, install the cylinder safety stops on both header lift cylinders to prevent accidental lowering of the header.

Removal

1. Park the machine on a solid level surface. Put the tongue in the roading position. Stop the tractor engine.

2. Install the roading pin in the roading hole. Install the hair pin in the roading pin.



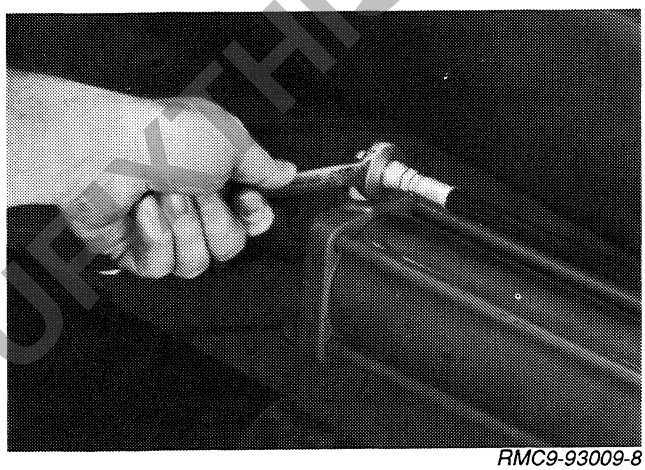
RMC9-93010-2

3. Put blocks in front of and behind the tires of the machine.

4. Clean the area around the fittings in the tongue position cylinder.

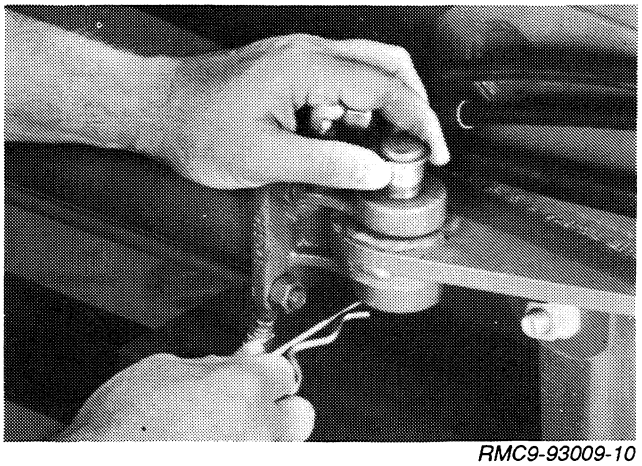
5. Move the remote lever for the tongue position cylinder in both directions to relieve the pressure in the circuit.

6. Disconnect the hoses from the fittings. Install caps on the fittings and plugs in the hoses.



RMC9-93009-8

7. Remove the hair pin and the clevis pin from the base end of the tongue position cylinder.

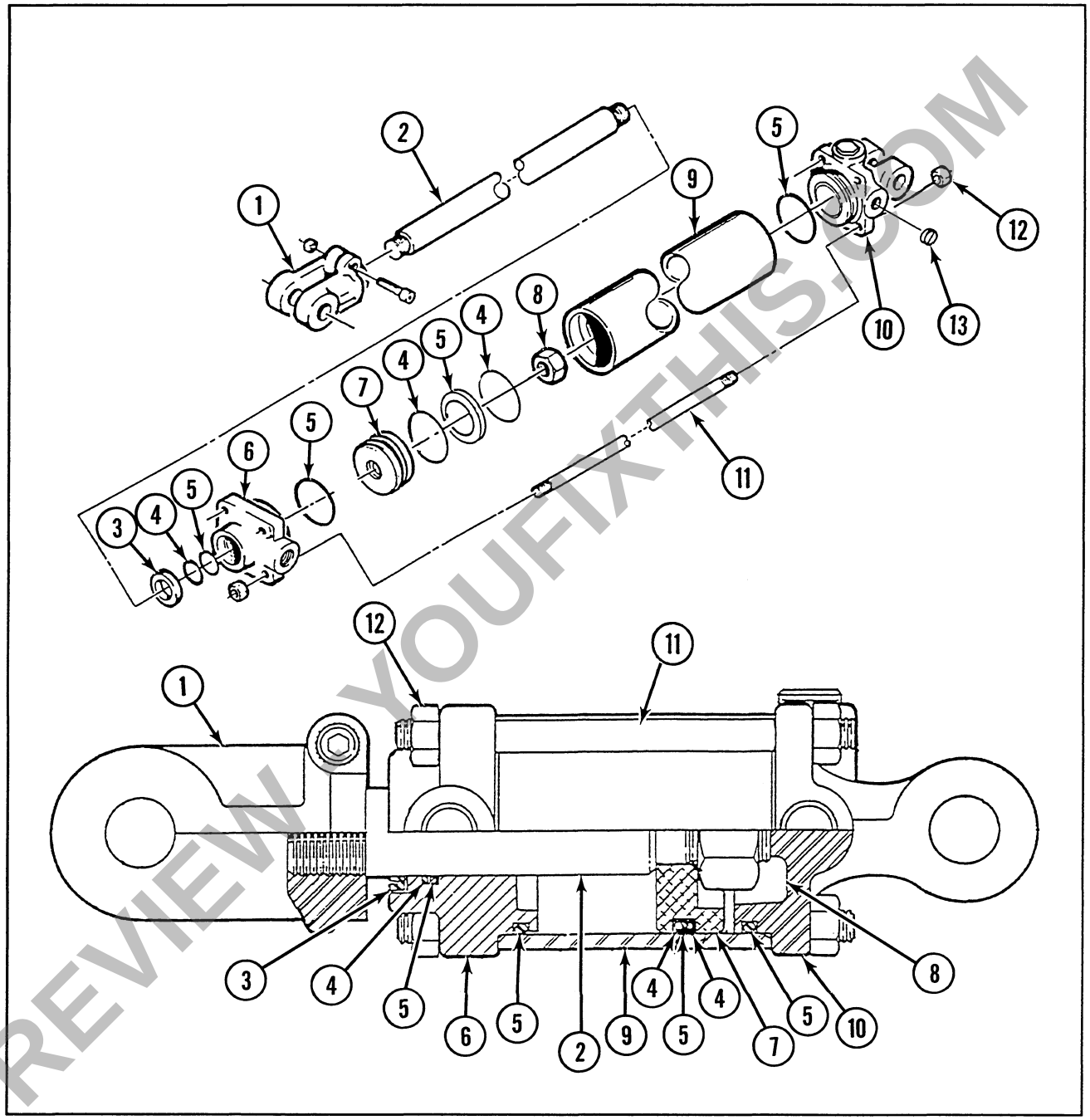


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Disassembly



L93A-0003

TONGUE POSITION CYLINDER

1. Clevis
2. Piston Rod
3. Wiper
4. Backup Ring
5. O-Ring
6. Gland
7. Piston
8. Nut
9. Tube
10. Base End
11. Stud
12. Nut
13. Orifice

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CHECKLISTS

Daily Checklist

____ Check knife bolts before operating the machine each day to maintain 70 LB·FT (95 N·m) torque.
____ Remove all crop residue.
____ Do all lubrication items required daily and those whose calendar time is due.
____ Check all hydraulic connections for leaks.
____ Check components for looseness.
____ Check tractor connection for security, proper connections, and operation of controls.

After the First 25 Hours

____ Check the tension of hay conditioner drive chain. See Drive Chain Adjustment in Section 9002.

After the First 40 Hours

____ Change oil in the cutterbed. See Lubrication, Cutterbed in this section for the procedure.

IT IS EXTREMELY IMPORTANT to change the oil in the cutterbed after the first 40 hours of operation, and at the beginning of each season thereafter, or every 100 hours of operation, whichever comes first.

THE OIL LEVEL IN THE CUTTERBED MUST BE CORRECT. DO NOT OVERFILL THE CUTTERBED. EXCESS OIL WILL CAUSE FAILURE OF THE CUTTERBED DUE TO OVERHEATING.

The oil level in the cutterbed cannot be checked. If in doubt as to the amount of oil in the cutterbed, drain the cutterbed and fill with the correct type and quantity of lubricant. See Lubrication Specifications in this section for the correct lubricant.

Every 50 Hours

____ Lubricate the drive clutch. DO NOT over-lubricate. Wipe any excess grease from the clutch assembly.
____ Lubricate the upper adjustable link.

Every 100 Hours and/or at the Beginning of Each Season

____ Change oil in the cutterbed. See Lubrication, Cutterbed in this section for the procedure.

IT IS EXTREMELY IMPORTANT to change the oil in the cutterbed after the first 40 hours of operation, and at the beginning of each season thereafter, or every 100 hours of operation, whichever comes first.

THE OIL LEVEL IN THE CUTTERBED MUST BE CORRECT. DO NOT OVERFILL THE CUTTERBED. EXCESS OIL WILL CAUSE FAILURE OF THE CUTTERBED DUE TO OVERHEATING.

The oil level in the cutterbed cannot be checked. If in doubt as to the amount of oil in the cutterbed, drain the cutterbed and fill with the correct type and quantity of lubricant. See Lubrication Specifications in this section for the correct lubricant.

____ Change oil in the gearbox. See Lubrication; Gearbox in this section.
____ Clean and pack the wheel bearings.
____ Check the tension of the hay conditioner drive chain. See Section 9005. Check the lubricant on the hay conditioner drive chain and add lubricant as necessary. See Lubrication; Chain Case in this section.

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SAFETY PRECAUTIONS

PERSONAL SAFETY!



This is the safety alert symbol. The safety alert symbol will direct your attention to information that involves your safety.

The words DANGER, WARNING or CAUTION are used with the safety alert symbol on safety instructions throughout this manual and on machine decals. For your personal safety, and the safety of those nearby, learn to recognize these safety alerts, and follow the recommended precautions and safe operating practices.

DANGER: The word "DANGER" identifies extreme hazards which can result in a high probability of death or irreparable injury if proper precautions are not taken.

WARNING: The word "WARNING" identifies hazards which can result in death or injury if proper precautions are not taken.

CAUTION: The word "CAUTION" identifies general safety precautions and safe practices to protect the operator and others from possible injury.

FOLLOW SAFETY INSTRUCTIONS!

FAILURE TO FOLLOW THE "DANGER", "WARNING" OR "CAUTION" INSTRUCTIONS CAN RESULT IN DEATH OR INJURY.

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19. Drive the other bearing cap into the yoke until the groove for the snap ring can be seen. Make sure the groove for the snap ring is clean. Install the snap ring. Use a screwdriver to push the snap ring into the groove all the way around.

20. Set the quick disconnect yoke on the vise so the shoulders of the cross are supported by the jaws of the vise. DO NOT allow the trunnions to contact the vise. Hit the yoke with the hammer to seat the bearing cap against the snap ring. DO NOT hit the yoke near the opening for the bearing cap.



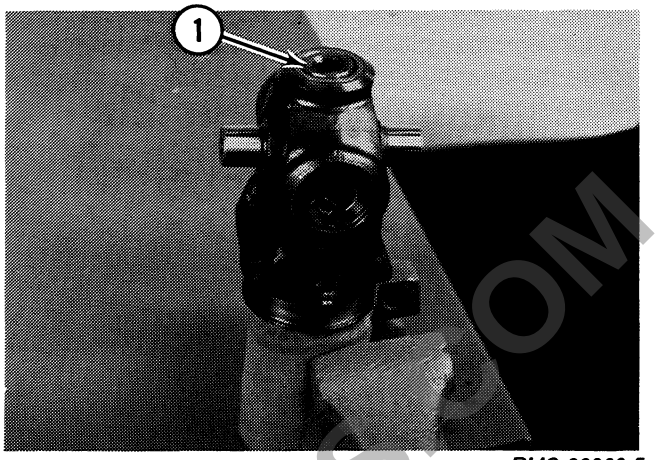
RMC-92066-3

1. Trunnion
2. Shoulder

21. Turn the quick disconnect yoke over in the vise. Be careful not to damage the trunnions. Hit the yoke with the hammer to seat the other bearing cap against the snap ring. DO NOT hit the yoke near the opening for the bearing cap.

22. Use the procedure in Steps 20 and 21 to seat the bearing caps against the snap rings in the shaft yoke.

23. Wrap a shop cloth around the shaft to protect the splines. Clamp the shaft in the vise so the shaft yoke is up. The ball in the shaft yoke has a flat area around each end of the hole. The flat area is wider on one side of the ball. Rotate the ball so the wide flat area is up.

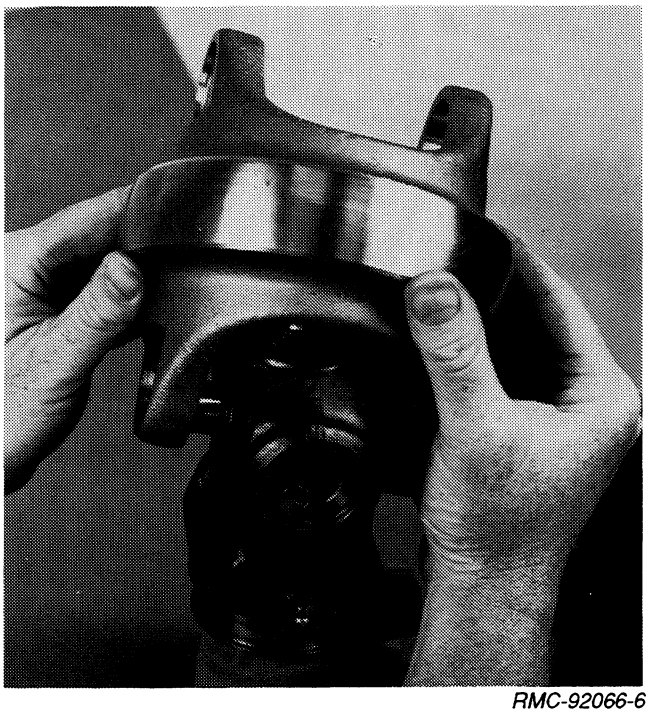


RMC-92066-5

1. Wide Flat Area on the Ball

24. Rotate the center housing so the grease fitting is away from the shaft yoke. This will align the grease fitting in the center housing with the hole in the shields. The grease fittings in the center housing and the cross must be toward the same side of the assembly.

Make sure the pin of the center plate in the center housing is clean. Install the pin in the ball and the cross in the ears of the shaft yoke. The cross must be installed through the wide side of the shaft yoke.



RMC-92066-6

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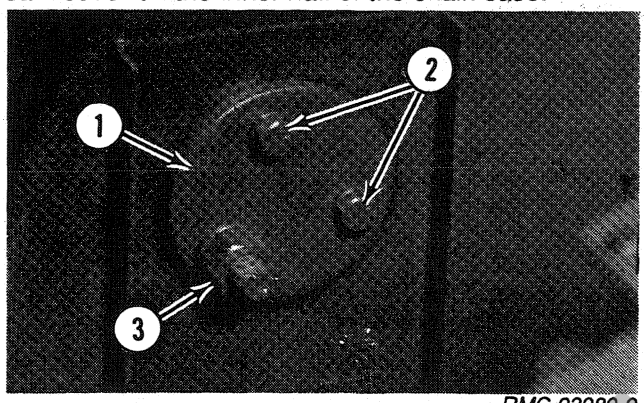
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12. Remove the two long cap screws, the spacers, and the flat washers at the bottom of the chain case.

13. Remove the flanged screws and flanged nuts that fasten the two halves of the chain case together. Remove the shield mounting bracket at the top of the chain case.

14. Remove the outer half of the chain case.

15. Loosen the nut and the two cap screws in the cam cover on the inner half of the chain case.



RMC-92089-9

1. Cam Cover
2. Cap Screws
3. Nut

16. Rotate the cam cover to decrease the tension on the chain.

17. Remove the connecting link from the drive chain. Remove the drive chain.

18. Remove the outer snap ring from the output shaft of the gearbox.

19. Remove the shear hub and sprocket assembly.

20. Hold the inner half of the chain case. Remove the cap screws that fasten the inner half of the chain case to the gearbox. Remove the inner half of the chain case and the outer halves of the U-joint assemblies.

21. Open the front shield.

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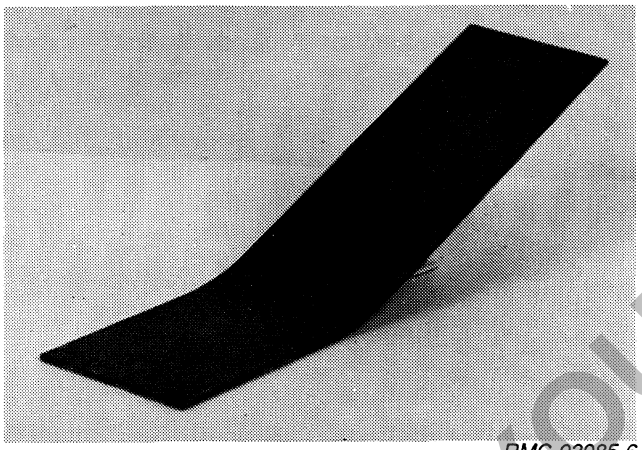
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4. Lightly hit the head of the Allen head screw with a hammer to loosen the lower pin in the housing.

5. Remove the Allen head screw and the lower pin.

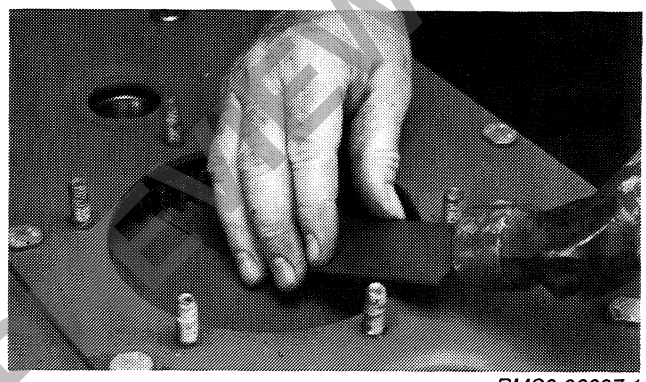
6. Drive the upper pin up out of the housing using a hammer and a brass drift. Use a brass drift that is just slightly smaller than the upper pin.

7. Make a shim driver to remove the shims from below the idler gear. Cut a piece of 1/16 to 1/8 IN (1.6 to 3.2 mm) thick sheet metal to approximately 2 IN (51 mm) by 8 IN (203 mm). Bend the shim driver as necessary so the shim driver can be installed through the opening in the housing.



RMC-92085-6

8. Use the shim driver to drive the two thick shims out from under the idler gear. Be careful not to drive against the bearing in the idler gear.



RMC9-92087-1

9. Slide the idler gear toward the opening. There is a thin shim on top of the bearing in the idler gear.

10. Remove the idler gear, the thin shim, and the two thick shims.

11. Rotate the bearing to make sure the bearing rotates freely. If the bearing does not rotate freely, replace the bearing.

12. To replace a bearing in an idler gear, do the following:

a. Remove both of the retaining rings from the bearing.

b. Press the bearing from the idler gear. DO NOT press against the inner race of the bearing.

c. Install one of the retaining rings on the new bearing.

d. Press the bearing into the idler gear until the retaining ring contacts the idler gear. Press against the outside race of the bearing. DO NOT press against the inner race of the bearing.

e. Install the other retaining ring on the bearing.

13. Inspect the cutterbed for the following:

a. An excess of metal particles or large metal particles in the oil. Large metal particles indicate a failure of a bearing or gear teeth.

NOTE: A small amount of fine metal particles will be present due to normal wear.

b. Loose parts such as broken gear teeth or nuts.

c. Damaged, scored, or cracked gear teeth.

d. Gear teeth discolored due to excessive heat.

e. Roughness in any of the bearings.

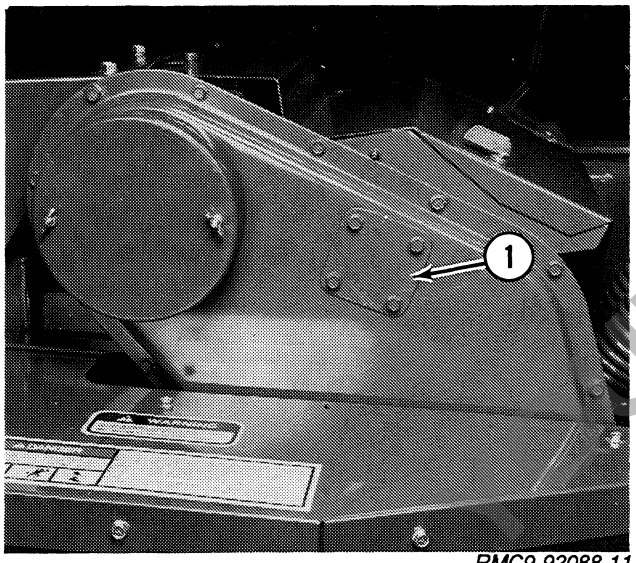
If any of the conditions are present, completely disassemble the cutterbed. See Cutterbed Disassembly and Assembly in this section. Thoroughly clean all of the components. Replace any components that are damaged and assemble the cutterbed.

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Drive Chain Adjustment

Check the tension of the hay conditioner drive chain after the first 25 hours and at the beginning of each season. To check and adjust the tension of the hay conditioner drive chain, do the following:

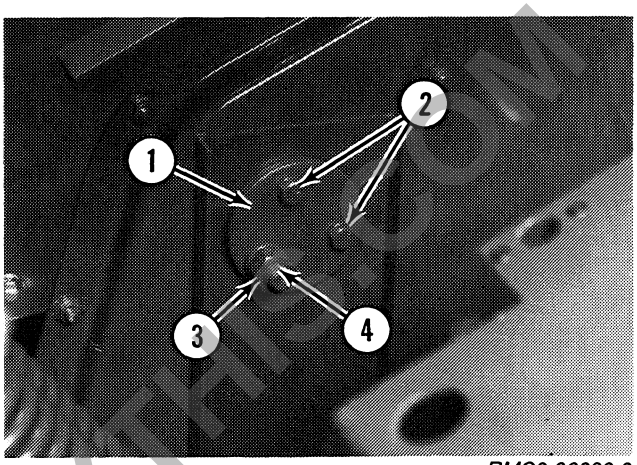
1. Remove the outside access cover. Check the tension. There must 1/4 IN (6 mm) maximum deflection at the tightest position. If the adjustment is correct, install the outside access cover. If adjustment is required, continue with the procedure.



RMC9-92088-11

1. Access Cover

2. Loosen the nut and the two cap screws in the cam cover on the inner half of the chain case. Use the two flat areas on the bolt to hold the bolt while loosening the nut.



RMC9-92089-9

1. Cam Cover
2. Cap Screws
3. Nut
4. Flat Area on End of Bolt

3. Rotate the cam cover clockwise to increase the tension. Check the chain for 1/4 IN (6 mm) maximum deflection.

4. When the tension is correct, hold the cam cover and tighten the two cap screws and the nut on the cam cover. Check the tension of the chain again to make sure the cam cover did not move.

5. Use Loctite Locquic Primer N or an equivalent cleaner to clean the sealing surface on the access cover and the outer half of the chain case. Clean both areas two times. Apply RTV-108 or an equivalent silicone sealant to the access cover. Install the access cover.

GEARBOX

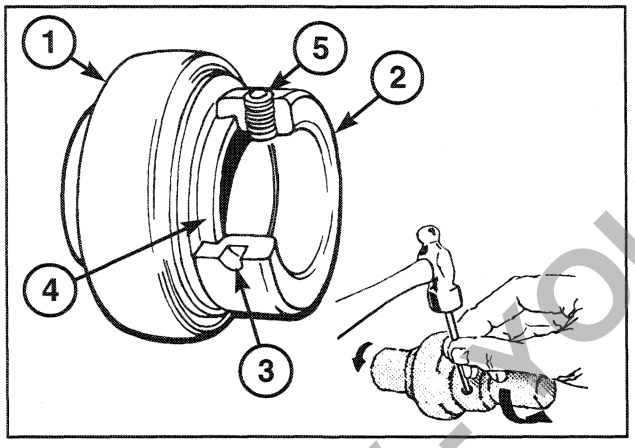
See Section 9002 for gearbox removal and installation and gearbox disassembly and assembly information.

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GENERAL SERVICE PROCEDURES

Bearing Replacement (Eccentric Self-Locking Collar)

Sealed ball bearings are used on several shafts and are held in position in the structure with bearing flanges. The bearings are held in position on the shaft by a locking collar. The locking collar has an eccentric counterbore. This counterbore engages the eccentric end of the bearing inner race when the bearing is assembled. The locking collar is rotated on the bearing to lock the assembly on the shaft. The assembly grips the shaft tightly with a positive locking action that increases with use. A set screw in the locking collar applies additional locking pressure.



L97A-0297

1. Bearing
2. Locking Collar
3. Drift Pin Hole
4. Bearing Inner Race
5. Set Screw

1. Loosen the set screw.

2. Use a drift punch inserted in the drift pin hole to rotate and loosen the locking collar. Rotate the locking collar opposite the direction of normal shaft rotation.

3. Remove the locking collar.

4. Support the shaft.

5. Remove the bolts for the bearing flanges.

6. Slide the bearing and the bearing flanges from the shaft.

NOTE: Removing paint and corrosion from the shaft will make removal easier.

7. Put the bearing and bearing flanges on the shaft. Make sure the bearing inner race is turned in the correct direction.

8. Install the bolts for the bearing flanges. Make sure the bearing is straight within the bearing flanges. Tighten the bolts evenly.

9. If a bearing is being installed on the other end of the shaft, repeat Steps 7 and 8 for the other bearing.

10. Put the locking collar on the shaft.

11. Push the locking collar against the bearing inner race. Rotate the locking collar in the direction of normal shaft rotation until tightly engaged. Tighten the locking collar by hitting with a drift punch inserted in the drift pin hole.

NOTE: Always tighten the locking collar in the direction of normal shaft rotation.

12. Tighten the set screw in the locking collar.

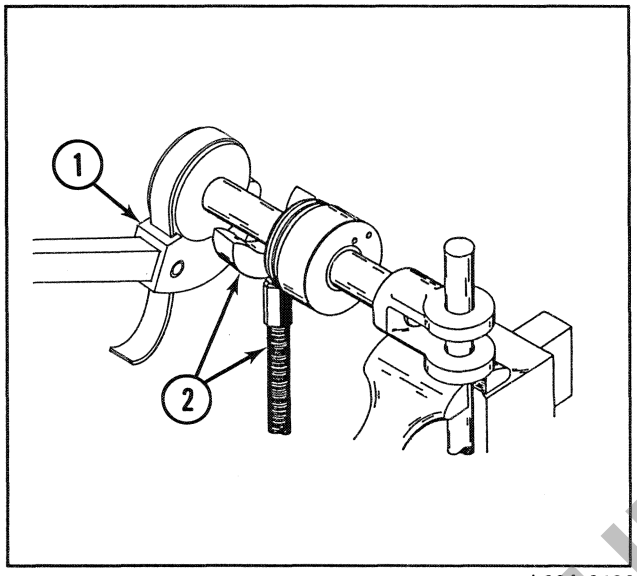
Set Screw Size	N·m	LB·INCHES
1/4-20	4.8	78
5/16-18	18	156
3/8-16	31	273
7/16-14	49	428

13. If a bearing is installed on the other end of the shaft, repeat steps 10 through 12 for the other bearing.

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13. Use a rod to hold the clevis while you remove the piston. Fasten the rod in a vise and install the clevis on the rod. Put a support under the piston rod near the piston. Put a shop cloth between the support and the piston rod to prevent damage to the piston rod. Use the strap wrench to remove the piston from the piston rod. Be careful not to damage the OD of the piston.



L92A-0136

1. Strap Wrench
2. Support

14. Remove the gland from the piston rod.

15. Remove and discard the wear ring, the seal ring, and the O-ring from the piston. Remove and discard the O-ring from the inside of the piston.

Remove and discard the O-rings and backup rings from the groove in the head and the groove in the gland.

Remove and discard the O-ring dirt seal from the head and the gland.

Remove and discard the wiper and the seal from the inside of the gland.

Inspection

1. Clean all parts in cleaning solvent.

2. Check to make sure the piston rod is straight. If the piston rod is not straight, install a new piston rod. Do not try to straighten the piston rod.

3. Remove any marks and sharp edges on the chamfer at the piston end of the piston rod.

4. Illuminate the inside of the tube. Inspect the inside of the tube for deep grooves and other damage. If there is any damage to the tube, a new tube must be used.

5. Inspect the ends of the tube for sharp edges that will damage the O-rings on the piston, the gland, and the head. Remove any sharp edges.

6. Inspect the piston for damage and wear. If the piston is damaged or worn, replace the piston.

7. If the cylinder is a single acting cylinder, make sure the vent plug is open.

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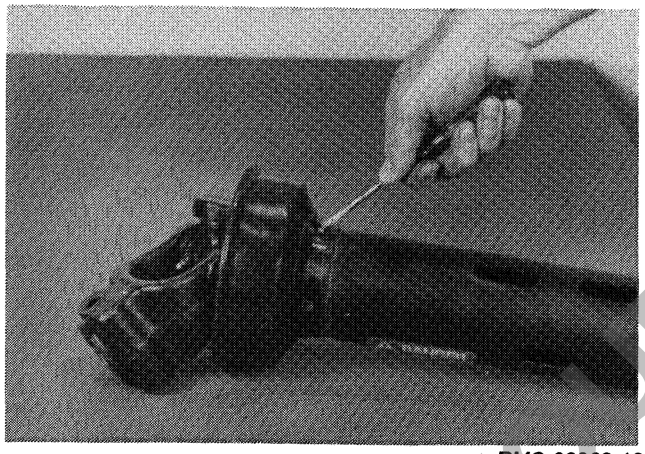
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Removal and Installation of Shields

1. Pull the halves of the clutch shaft apart.

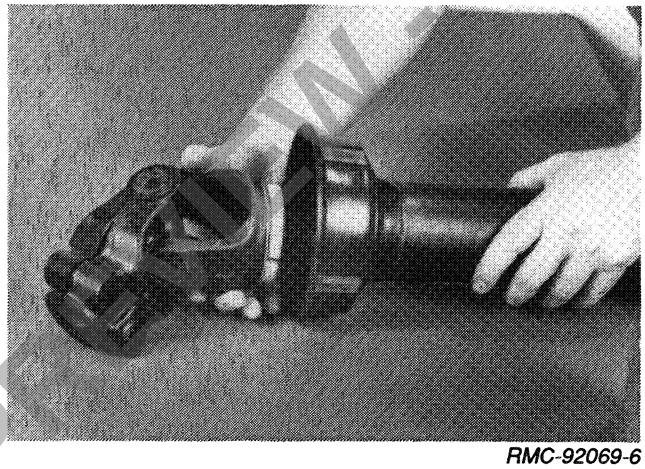
2. If you are removing the shield from the slip tube, remove the grease fitting from the end of the slip tube.

3. Find the end of the retaining ring through one of the access holes in the shield. Use a screwdriver to push the ends of the retaining ring out of the groove in the shield and toward the yoke. Push the retaining ring out of the groove through each of the access holes in the shield.



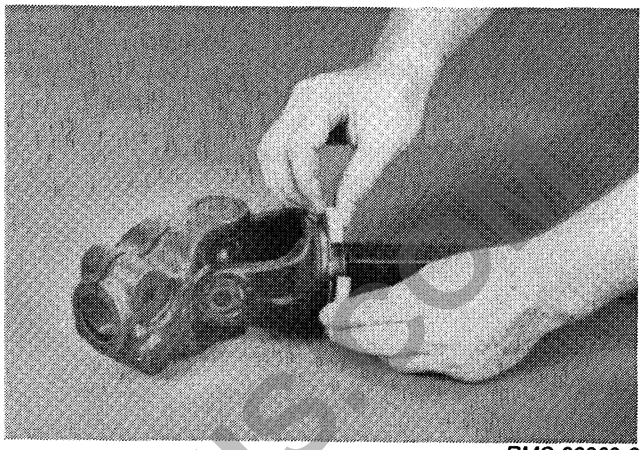
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4. Remove the shield from the shaft.



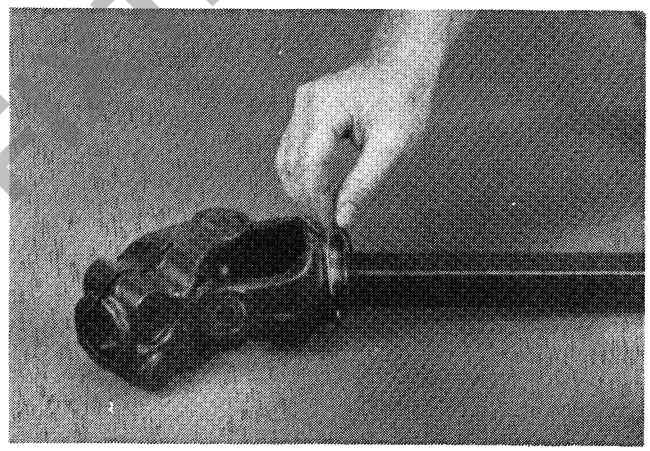
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5. Remove the bearing ring from the yoke.



RMC-92069-2

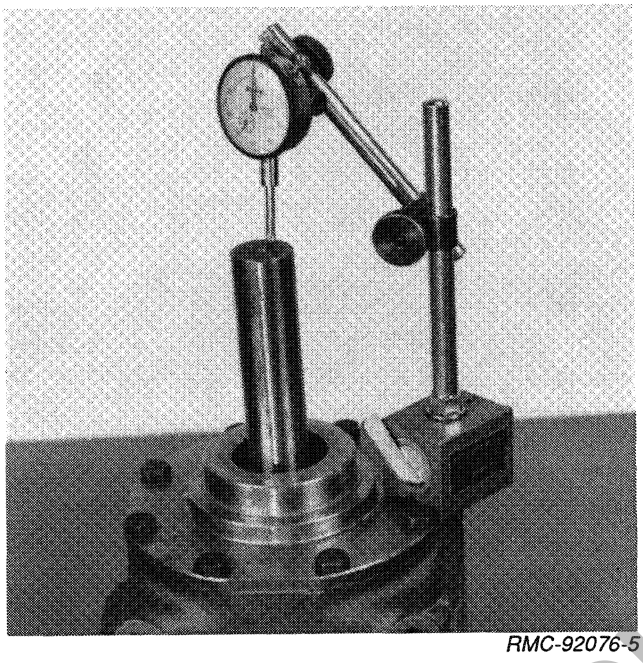
6. Remove the retaining ring from the yoke.



RMC-92069-3

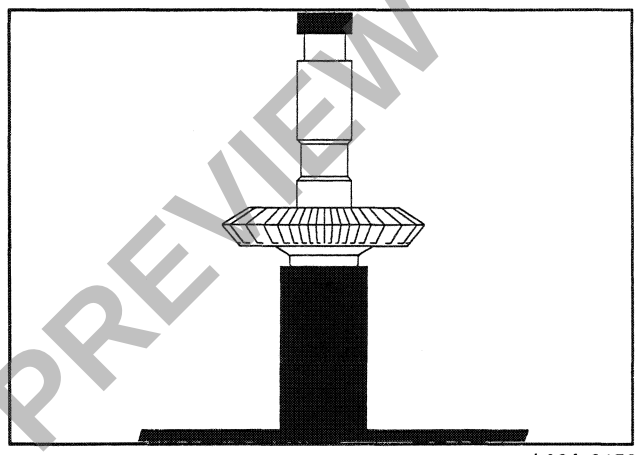
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13. Check the end play of the output shaft. If the end play must be .002 IN (.05 mm). If there is too much end play, add shims to the outer shim pack. If there is not enough end play, remove shims from the outer shim pack.



RMC-92076-5

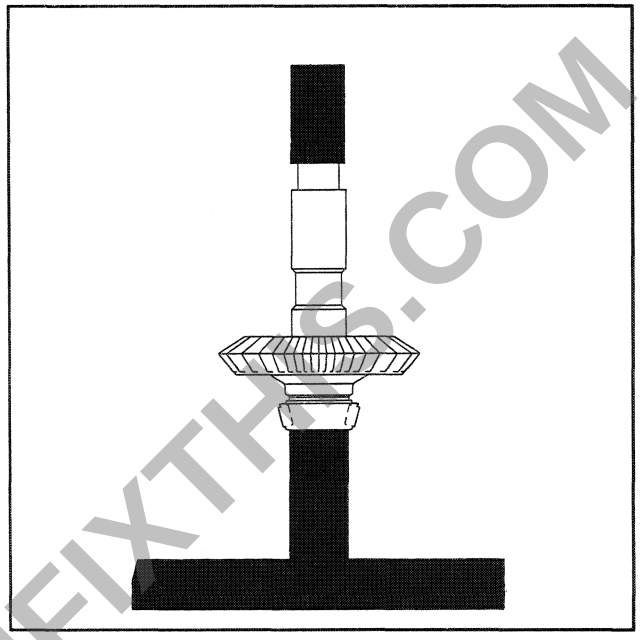
14. Install the key in the keyway of the input shaft. Align the key with the keyway in the input gear and press the input shaft into the input gear. Make sure the input gear is seated against the shoulder of the input shaft.



L92A-0153

15. Install the outer shim pack and then the spacer onto the input shaft.

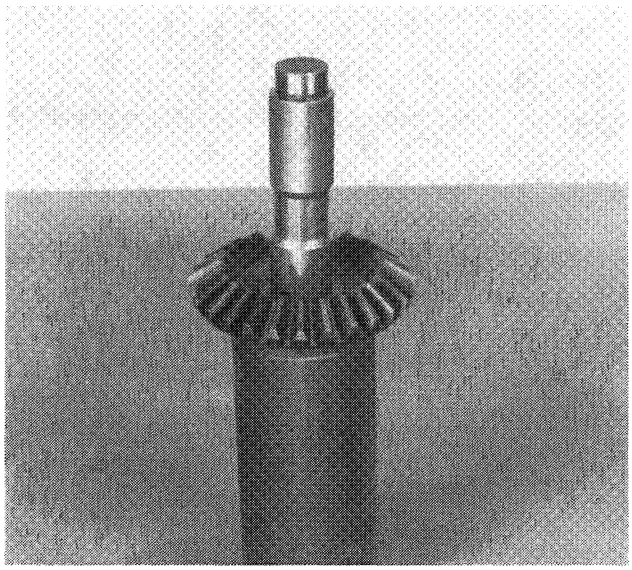
16. Press the input shaft into the new outer bearing cone. Make sure the spacer and the shim pack are tight between the inner bearing cone and the input gear.



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1. Outer Shim Pack
2. Spacer

17. Set the input shaft assembly in a piece of pipe. The pipe must support the input gear.



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f. Install the cap screws and hardened washers that fasten the U-joint assembly to the adapter. Tighten the cap screws to 70 LB·FT (95 N·m).

h. Rotate the slinger so the slinger is 90° to the disc as shown in the illustration. Align the holes in the cage rings, slinger and adapter. Install the spacers, the cap screws, and the hardened washers. Tighten the cap screws to 76 LB·FT (105 N·m).

22. Rotate the discs one complete revolution by hand to check the timing. The knives must not contact the discs. If there is any contact, change the position of the discs as necessary to correct the timing.

23. If the lubricant was removed from the cutterbed, install the correct type and quantity of lubricant. See Section 1103 for the correct procedure and the lubrication specifications.

IT IS IMPORTANT THAT THE OIL LEVEL IN THE CUTTERBED BE CORRECT. DO NOT OVERFILL THE CUTTERBED. EXCESS OIL WILL CAUSE FAILURE OF THE CUTTERBED DUE TO OVERHEATING.

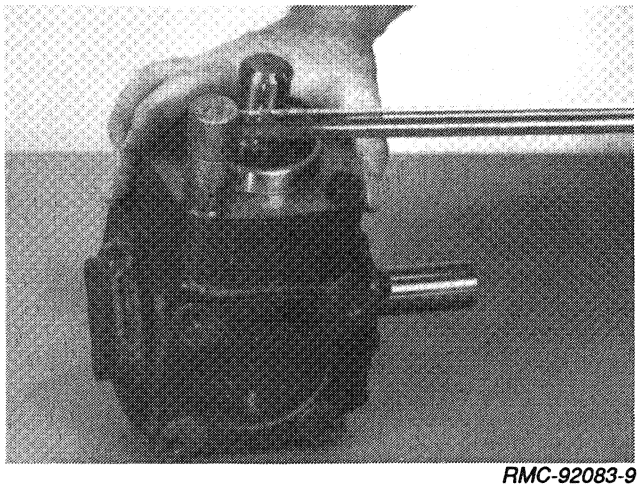
The oil level in the cutterbed cannot be checked. If in doubt as to the amount of oil in the cutterbed, drain the cutterbed and fill with the correct type and quantity of lubricant.

23. Close both access covers at the front of the header.

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20. Install the cap screws for the output cover. Tighten the cap screws to 65 LB·FT (88 N·m).

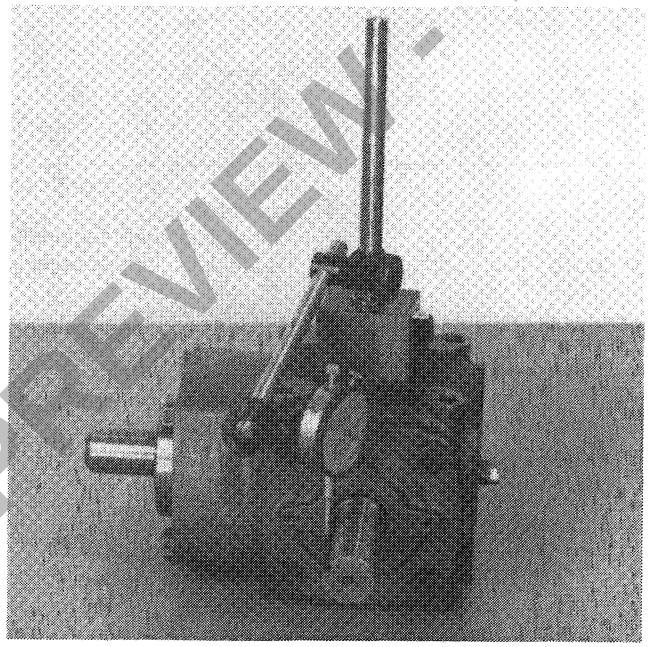


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21. Check the backlash of the gear set. The backlash must be .0060 to .0157 IN (.15 to .40 mm). To change the backlash, adjust the shims on the output shaft.

To decrease the backlash, remove shims from the outer shim pack and add an equal thickness of shims to the inner shim pack.

To increase the backlash, remove shims from the inner shim pack and add an equal thickness of shims to the outer shim pack.



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22. Apply oil to the new seal. Start the seal into the bore. The lip of the seal must be toward the inside of the output cover. Use a driver that is larger than the OD of the seal. Drive the seal into the bore until the face of the seal is even with the face of the output cover. Be careful not to damage the lip of the seal.



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23. Check the rolling torque of the input shaft. The rolling torque must be 4.77 LB·IN (5.5 Kgcm).

24. Check the rolling torque of the output shaft. The rolling torque must be 3.0 to 11.7 LB·IN (3.5 to 13.5 Kgcm).

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