

# **LUBRICATION & MAINTENANCE GUIDE**

## **950 WHEEL LOADER**

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<b>SERIAL</b>	<b>43J2724-UP</b>	<b>73J2081-UP</b>
<b>NUMBERS</b>	<b>81J3730-UP</b>	<b>31K962-UP</b>

## **FOREWORD**

This book is a guide to equipment care. The illustrated, step-by-step instructions are grouped by servicing intervals; items without specific intervals are listed under "When Required". Circled numbers in the Lubrication and Maintenance Chart are to key the charted items to the instructions in the book.

Use the service meter to determine servicing intervals. Calendar intervals (daily, weekly, 2 weeks, etc.) shown may be used instead of service meter intervals if it provides more convenient servicing schedules; and approximates the indicated service meter reading.

Perform previous interval items at multiples of the original requirement. For example, at 100 service hours or 2 weeks, also perform those items listed under "Every 50 Service Hours or Weekly" and "Every 10 Service Hours or Daily".

Some photographs in this publication may show details or attachments that may be different from your unit. Also, the ROPS, for some photographs, has been removed for illustrative purposes.

Continuing improvement and advancement of product design may cause changes to your machine which may not be included in this publication. Each publication is reviewed and revised, as required, to update and include these changes in later editions.

Whenever a question arises regarding your Caterpillar product, or this publication, please consult your Caterpillar dealer for the latest available information.

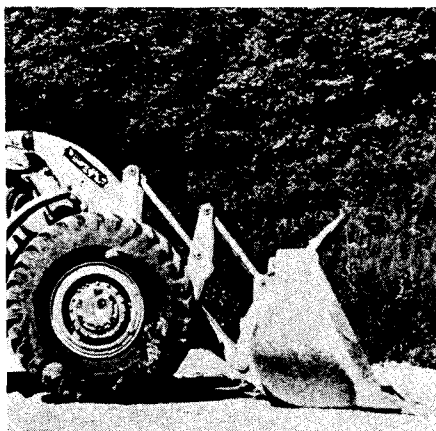
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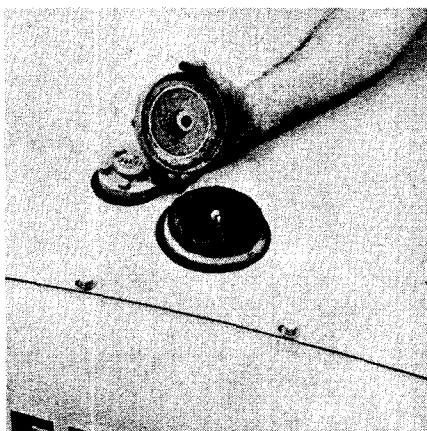
## SAFETY



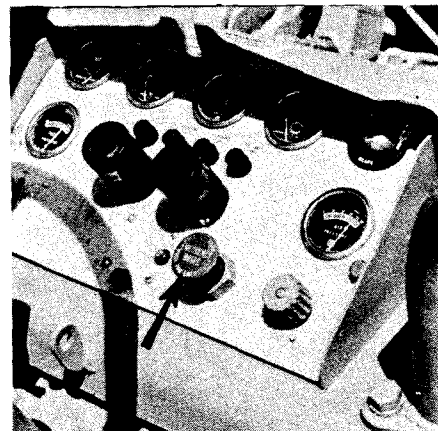
THIS SYMBOL WARNS OF POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.



Lower all equipment before servicing loader.



Use caution when removing radiator cap, drain plugs, grease fittings or pressure taps.



Engage parking brake, block tires and attach warning tags to controls while servicing loader.

Use a self attaching air chuck and stand behind tread when inflating tires.

Do not attempt adjustments while loader is moving or the engine is running.

Use the proper tools. Repair or replace broken or damaged equipment.

Wear hard hat, safety glasses and safety shoes as the job requires.

Do not allow unauthorized personnel on loader while it is being serviced.

Operate engine only in well ventilated area.

### WARNING

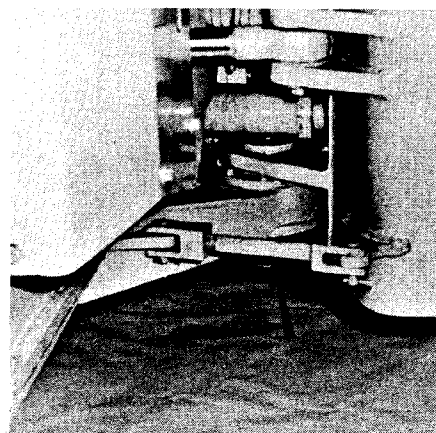
Personal injury can result if machine is articulated when someone is in the pivot area. Install safety pin, shut off engine and relieve hydraulic pressure before working in pivot area.

### WARNING

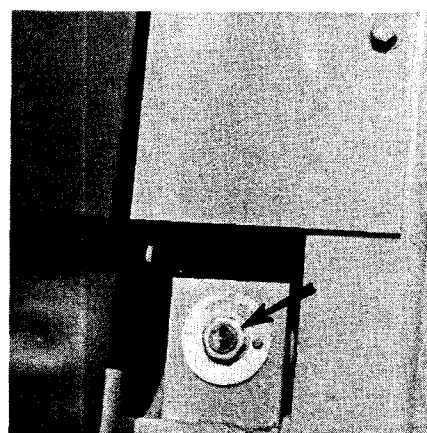
When using pressure air wear safety glasses and protective clothing. Maximum air pressure must be below 30 PSI (2 kg/cm<sup>2</sup>).

### WARNING

To avoid possible weakening of the ROPS (Rollover Protection Structure), consult a Caterpillar dealer before altering the ROPS in any way. The protection offered by the ROPS will be impaired if it has been subjected to structural damage or has been involved in an overturn incident.



Connect frames with safety link before servicing loader center area.



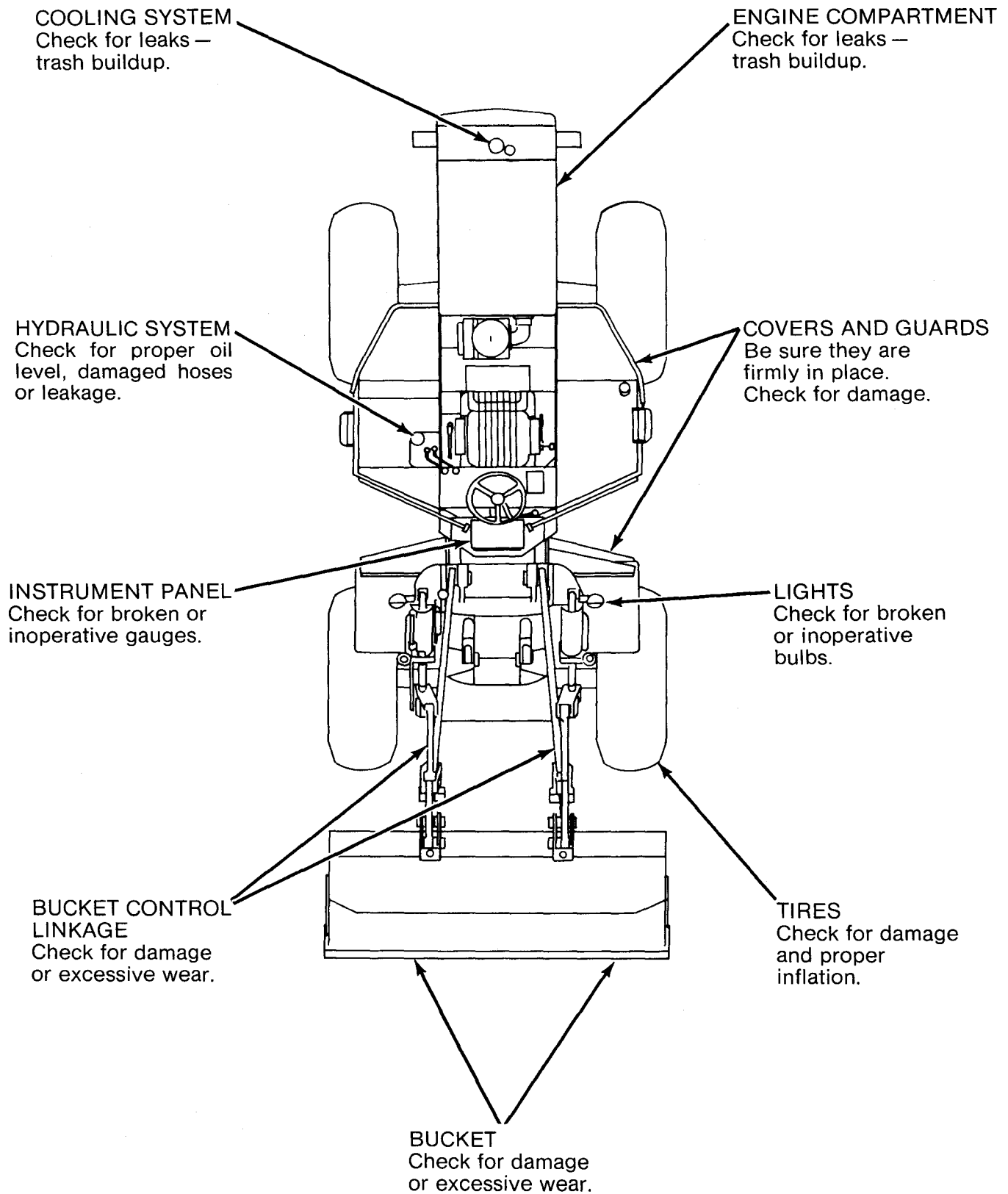
Turn disconnect switch OFF and remove key before servicing electrical system.



Read warning and caution information provided on the loader. Follow servicing instructions carefully.

## WALK-AROUND CHECKS

Walk around the loader frequently. Look for loose bolts, trash or dirt buildup, oil and coolant leaks and cut or gouged tires.



# FUEL AND LUBRICANT SPECIFICATIONS

## NOTE

The abbreviations listed below follow S.A.E. J754 nomenclature. The classifications follow S.A.E. J183 classifications. MIL specifications are U.S.A. Military Specifications. These definitions will be of assistance in purchasing. The specific classifications for this machine are found on the "RECOMMENDED LUBRICANTS" chart.

## Diesel Fuel

Use only distillate fuels (ASTM No. 1 or No. 2 Fuel Oil or No. 1D or No. 2D Diesel Fuel Oil) with a minimum cetane number of 35. Heavier oil is generally preferable because of its higher energy content. Contact your Caterpillar dealer regarding fuels marketed in your area.

## Engine Oils (EO)

**CD** - Use oils that meet Engine Service Classification **CD** or MIL-L-2104C.

**CC** - Use oils that meet Engine Service Classification **CC**, MIL-L-2104B or MIL-L-46152.

**EO** - **CD** or **CC**.

## Hydraulic Brake Fluid (BF)

Use heavy duty hydraulic brake fluid meeting the requirements of SAE J1703c.

## Lubricating Grease (MPGM)

Use Multipurpose-type Grease (**MPGM**) which contains 3-5% molybdenum disulfide conforming to MIL-M-7866, and containing a suitable corrosion inhibitor. NLGI No. 2 Grade is suitable for most temperatures. Use NLGI No. 0 or No. 1 Grade for extremely low temperatures.

## Hydraulic Oil (HYDO)

Use (**EO**) or industrial-type hydraulic oils which are certified by the supplier as having anti-wear, anti-foam, anti-rust and anti-oxidation additive properties for heavy duty use.

## Multipurpose-type Gear Lubricant (MPL)

Use Gear Lubricant Classification GL-5, or MIL-L-2105B.

RECOMMENDED LUBRICANTS		
AT STARTING TEMPERATURES FROM $-10^{\circ}\text{F}$ ( $-23^{\circ}\text{C}$ ) TO $+120^{\circ}\text{F}$ ( $+48^{\circ}\text{C}$ ) <sup>(1)</sup>		
COMPARTMENT OR SYSTEM	ABOVE $32^{\circ}\text{F}$ ( $0^{\circ}\text{C}$ )	BELOW $32^{\circ}\text{F}$ ( $0^{\circ}\text{C}$ )
<b>CD</b>		
Engine Crankcase	SAE 30	SAE 10W <sup>(2)</sup>
Transmission System	SAE 30	SAE 10W
Steering Gear Housing	SAE 30	SAE 30
<b>HYDO</b>		
Hydraulic Control System	SAE 10W	SAE 10W
<b>MPL</b>		
Front and Rear Differentials and Final Drives	SAE 90	SAE 80

<sup>(1)</sup>Below  $-10^{\circ}\text{F}$  ( $-23^{\circ}\text{C}$ ) consult your Caterpillar dealer for Cold Weather Recommendations.

<sup>(2)</sup>SAE 10W oil may be used in the diesel engine even if day-time ambient temperature rises to  $70^{\circ}\text{F}$  ( $21^{\circ}\text{C}$ ). Below  $-10^{\circ}\text{F}$  ( $-23^{\circ}\text{C}$ ) it may be necessary to warm the engine oil so the engine can be cranked and the oil will circulate freely.

## Key to Lubricants:

- CD** - Engine Service Classification **CD** or MIL-L-2104C
- CC** - Engine Service Classification **CC**, MIL-L-2104B or MIL-L-46152
- EO** - **CD**, **CC**
- HYDO** - **EO**, or certified Industrial-type Hydraulic Oils
- MPGM** - Multipurpose-type Grease with 3 to 5% Molybdenum Disulfide
- MPL** - GL-5, MIL-L-2105B
- BF** - Hydraulic Brake Fluid, SAE J1703c

## NOTE

The engine cooling system is protected to  $-20^{\circ}\text{F}$  ( $-29^{\circ}\text{C}$ ) with permanent-type antifreeze when shipped from the factory.

# LUBRICATION AND MAINTENANCE CHART

LUBRICATION AND MAINTENANCE CHART		LUBRICANT	MAINTENANCE	PAGE NO.
ITEM	SERVICE			
EVERY 10 SERVICE HOURS OR DAILY				
① Engine crankcase	Check oil level	CD	●	10
② Radiator	Check coolant level		●	10
③ Engine precleaner	Check		●	10
EVERY 100 SERVICE HOURS OR 2 WEEKS				
④ Hydraulic system <sup>(1)</sup>		HYDO		10
⑤ Bucket pivot pins	Lubricate 4 fittings	MPGM		11
⑥ Bucket positioner bearing and oil cup	Lubricate 1 fitting -	MPGM		11
	fill oil cup	EO		11
⑦ Lift arm, lift cylinder trunnion and piston rod bearings	Lubricate 8 fittings	MPGM		11
⑧ Frame upper pivot bearings	Lubricate 1 fitting	MPGM		11
⑨ Ripper trunnion block and cylinder rod pin bearings	Lubricate 3 fittings	MPGM		11
⑩ Ripper link assembly pin bearings	Lubricate 8 fittings	MPGM		11
⑪ Multipurpose bucket control lever	Lubricate 1 fitting	MPGM		12
⑫ Rear axle trunnion bearings	Lubricate 2 fittings	MPGM		12
⑬ Batteries	Check electrolyte level		●	12
EVERY 250 SERVICE HOURS OR MONTHLY				
⑭ Hydraulic brake master cylinders - shoe-type brakes or disc-type brakes	Check fluid level	BF		12
⑮ Engine crankcase	Change oil <sup>(1)</sup> and filter element - wash breather	CD		13
⑯ Steering cylinder bearings	Lubricate 4 fittings	MPGM		14
⑰ Bucket control cylinders and linkage bearings	Lubricate 14 fittings	MPGM		14
⑱ Lumber fork clamp pivots	Lubricate 6 fittings	MPGM		14
⑲ Side dump bucket pivots	Lubricate 4 fittings	MPGM		14
⑳ Multipurpose bucket hydraulic cylinder, rod bearings and bowl bearings	Lubricate 8 fittings	MPGM		14
㉑ Drive shaft spline	Lubricate 1 fitting	MPGM		14
㉒ Fan bearings	Lubricate 1 fitting	MPGM		15
㉓ Steering follow-up linkage	Lubricate 2 fittings	MPGM		15
㉔ Side dump bucket latch	Check oil level	EO		15
㉕ Fan and alternator belts	Check condition - adjust		●	15

# LUBRICATION AND MAINTENANCE CHART

LUBRICATION AND MAINTENANCE CHART		LUBRICANT	MAINTENANCE	PAGE NO.
ITEM	SERVICE			
EVERY 500 SERVICE HOURS OR 3 MONTHS				
(26) Transmission system <sup>(2)</sup>	Change filter element	CD	●	16
(27) Hydraulic system	Change filter elements	HYDO	●	16
(28) Service brakes (disc-type)	Check		●	17
EVERY 1000 SERVICE HOURS OR 6 MONTHS				
(29) Transmission system <sup>(2)</sup>	Change oil, wash magnetic screen and wash and oil breather	CD	●	18
(30) Drive shaft support bearing	Lubricate 1 fitting	MPGM		19
(31) Frame lower pivot bearing	Lubricate 1 fitting	MPGM		19
(32) Drive shaft universal joints	Lubricate 5 fittings	MPGM		19
(33) Fuel tank and filler cap	Drain water and sediment - wash and oil cap	EO	●	19
EVERY 2000 SERVICE HOURS OR 1 YEAR				
(34) Front and rear differentials and final drives	Change lubricant	MPL		20
(35) Hydraulic system	Change oil and wash filler screen	HYDO	●	20
(36) Hydraulic control lever bearings	Lubricate 2 fittings	MPGM		21
(37) Auxiliary hydraulic control lever bearings	Lubricate 1 fitting	MPGM		21
(38) Engine valve lash	Check - adjust		●	22
(39) Steering gear housing and shaft lower bearing	Check oil level	CD		22
WHEN REQUIRED				
(40) Transmission system <sup>(3)</sup>	Check oil level	CD		24
(41) Front and rear differentials and final drives <sup>(3)</sup>	Check lubricant level	MPL		24
(42) Engine air intake system	These areas require periodic maintenance that cannot be given a definite service hour interval. Maintenance information for specific items in these areas is found on the indicated pages.		●	24
(43) Fuel system filters			●	27
(44) Service brakes (shoe-type)			●	28
(45) Cooling system			●	29

<sup>(1)</sup> Normal oil change interval when fuel sulphur content is 0.4% or less. When sulphur content is 0.4% to 1.0%, reduce oil change interval one-half. When sulphur content is above 1.0%, reduce oil change to one-fourth normal interval.

<sup>(2)</sup> Change oil any time it becomes thick and black.

<sup>(3)</sup> Check frequently if any signs of leakage develop or are suspected.

## Key to Lubricants:

- CD - Engine Service Classification CD or MIL-L-2104C
- CC - Engine Service Classification CC, MIL-L-2104B or MIL-L-46152
- EO - CD, CC
- HYDO - EO, or certified Industrial-type Hydraulic Oils
- MPL - GL-5, MIL-L-2105B
- MPGM - Multipurpose-type Grease with 3 to 5% Molybdenum Disulfide
- BF - Hydraulic Brake Fluid, SAE J1703c

## General Service Recommendations

Wipe all fittings, caps and plugs before servicing, to prevent dirt from entering service points.

Fill fuel tank at the end of each day of operation to drive out moisture laden air and prevent condensation.

Check fuel level with dipstick in filler opening.

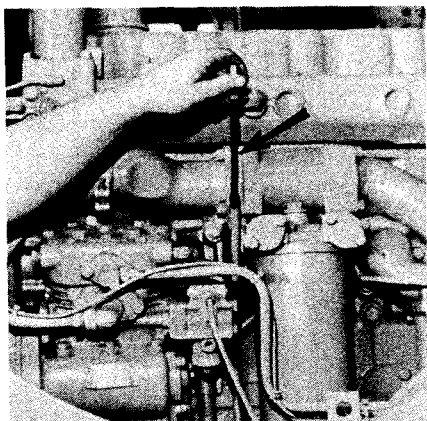
Use clean water that is low in scale forming minerals, not softened water.

Add Caterpillar Corrosion Inhibitor to coolant. Follow recommendations given on container.

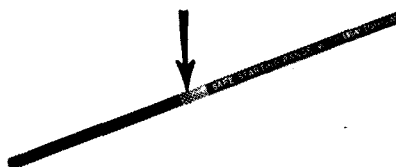


## EVERY 10 SERVICE HOURS OR DAILY

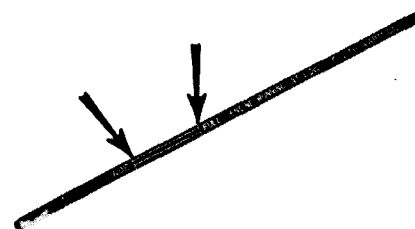
### ① ENGINE CRANKCASE



1. Check oil level. Machine must be level. Check can be made ...



2... before starting. Level must be in SAFE STARTING RANGE on gauge. Or ...

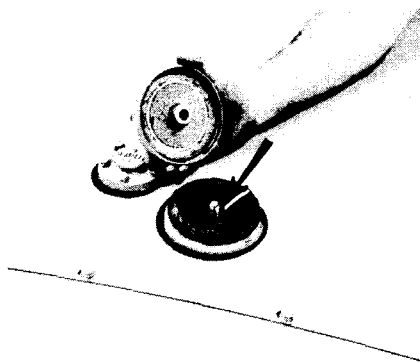


3... with engine warm and running. Maintain level between FULL and ADD marks on gauge.

### ② RADIATOR

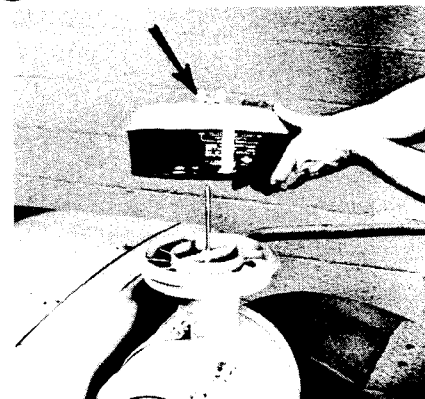


1. Check coolant level. Remove cap slowly to relieve pressure.



2. Maintain level to within ½ inch (1 cm) of bottom of fill pipe.

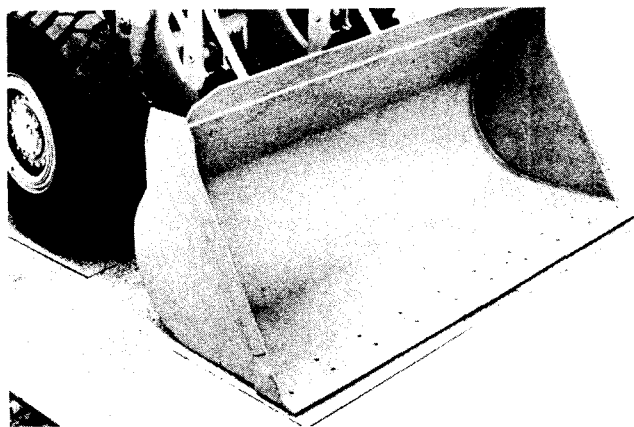
### ③ PRECLEANER



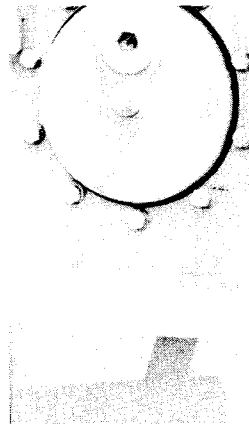
Remove body and empty when necessary. Periodically wash entire precleaner in water.

## EVERY 100 SERVICE HOURS OR 2 WEEKS

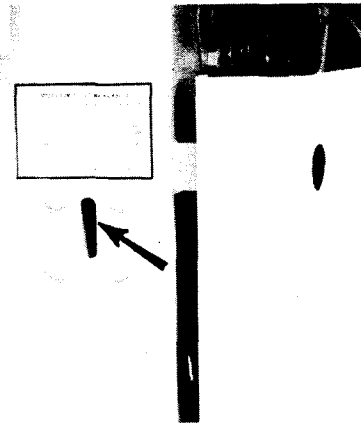
### ④ HYDRAULIC SYSTEM



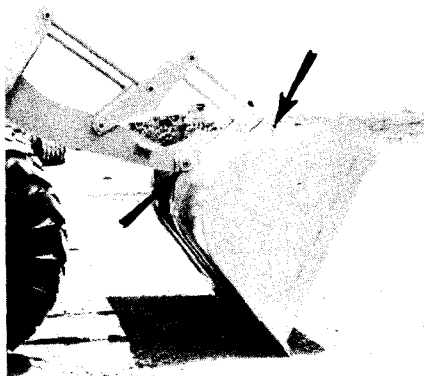
1. Loader must be level, bucket flat on ground, engine cold and engine stopped.



2. Maintain oil level between ADD and FULL marks in sight gauge.

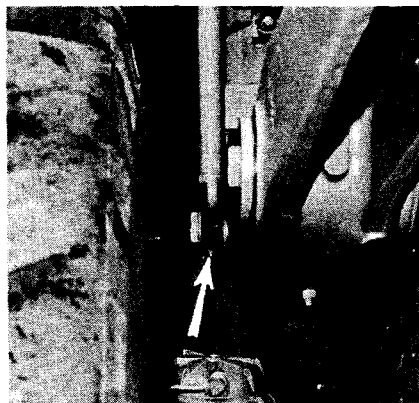


**5 BUCKET PIVOT PINS**

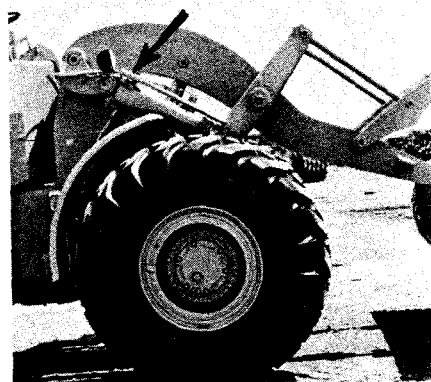


Lubricate 4 fittings.

**6 BUCKET POSITIONER BEARING AND OIL CUP**

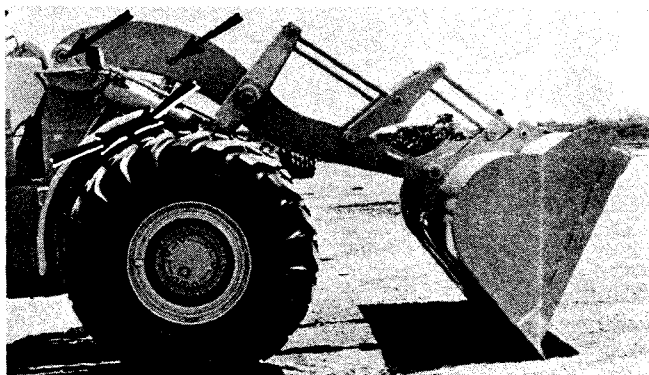


1. Lubricate 1 fitting.



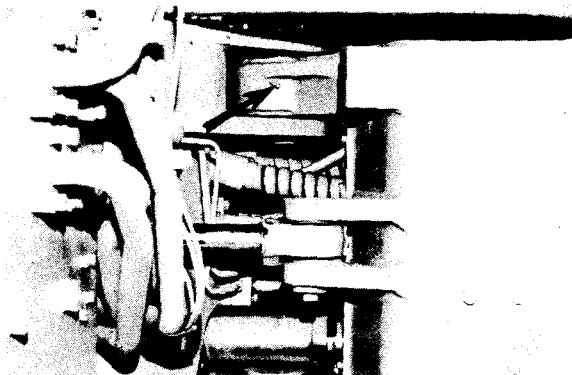
2. Fill oil cup.

**7 LIFT ARM, LIFT CYLINDER TRUNNION AND PISTON ROD BEARINGS**



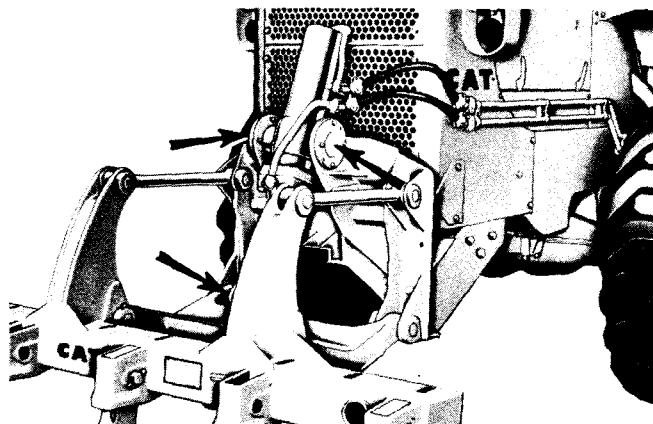
Lubricate 4 fittings on each side.

**8 FRAME UPPER PIVOT BEARINGS**



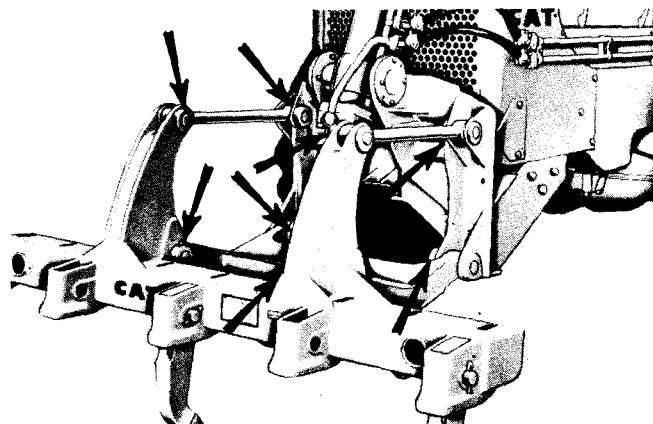
Lubricate 1 fitting.

**9 RIPPER TRUNNION BLOCK AND CYLINDER ROD PIN BEARINGS**



Lubricate 3 fittings.

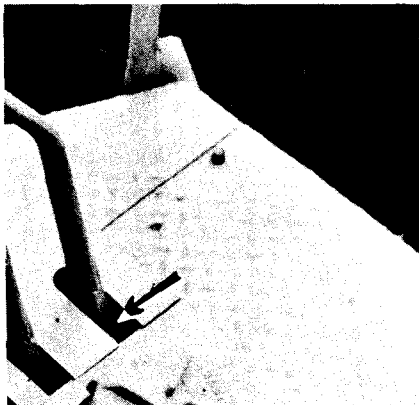
**10 RIPPER LINK ASSEMBLY PIN BEARINGS**



Lubricate 8 fittings.

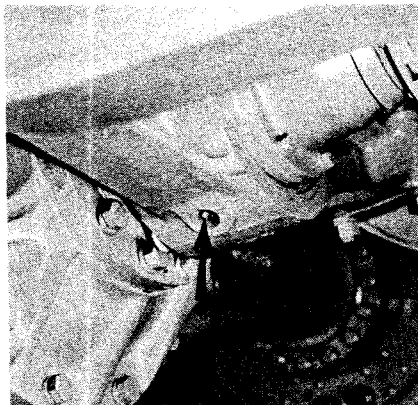
## EVERY 100 SERVICE HOURS OR 2 WEEKS

### 11 MULTIPURPOSE BUCKET CONTROL

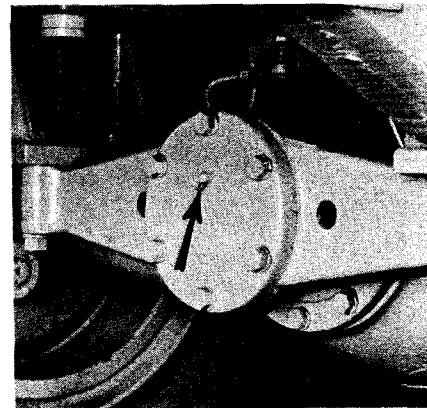


Lubricate 1 fitting.

### 12 REAR AXLE TRUNNION BEARINGS

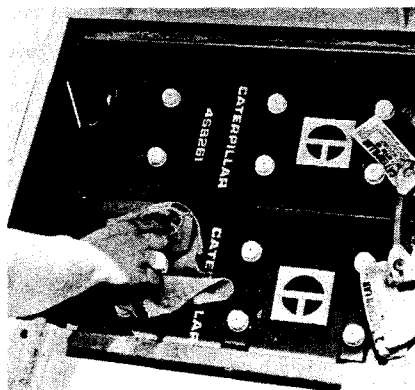


1. Lubricate 1 fitting at bottom of front trunnion.

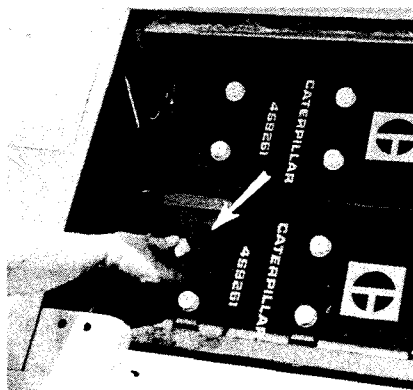


2. Lubricate 1 fitting at rear of rear trunnion.

### 13 BATTERIES



1. Unlatch seat and tip forward. Clean batteries.



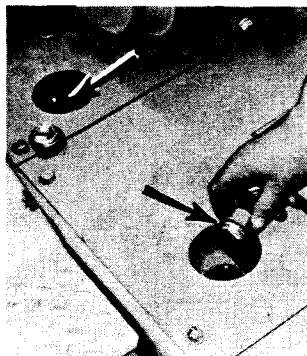
2. Maintain electrolyte to bottom of filler openings.

#### NOTE

At proper charge rate, a battery will not require more than 1 ounce (30 cc) of water per cell per week.

## EVERY 250 SERVICE HOURS OR MONTHLY

### 14 BRAKE MASTER CYLINDERS (For shoe-type brakes)



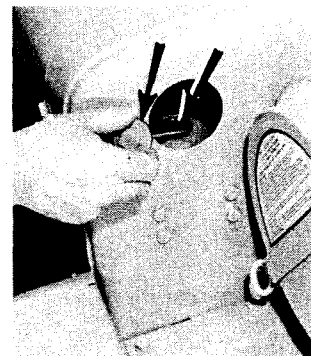
Remove covers and plugs. Maintain fluid level  $\frac{1}{2}$  inch (12,7 mm) below filler openings. Clean and install plugs and covers.



### (For disc-type brakes)

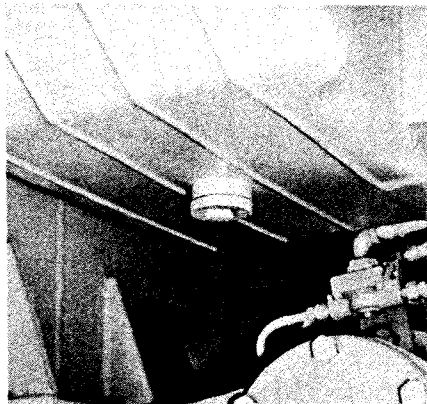


Remove cover and plug. Maintain fluid level  $\frac{1}{2}$  inch (12,7 mm) below filler opening.

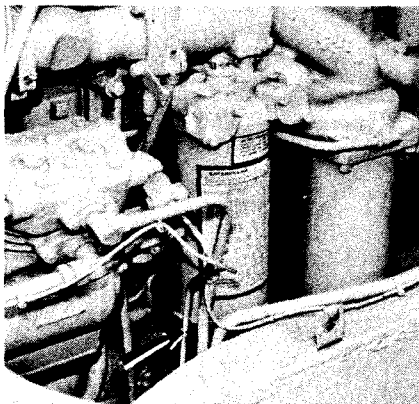


## EVERY 250 SERVICE HOURS OR MONTHLY

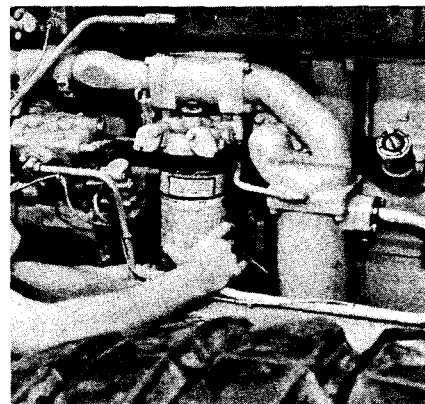
### 15 ENGINE CRANKCASE (Bolt-on-type Filter)



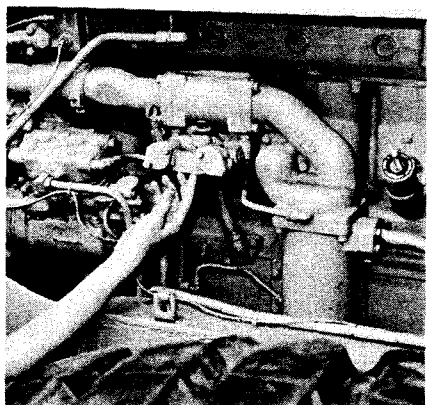
1. When oil is warm and engine stopped, remove crankcase drain plug.



2. Remove filter housing drain plug.



3. Remove housing and used element.



4. Inspect seal. Use new seal if necessary. Clean base.

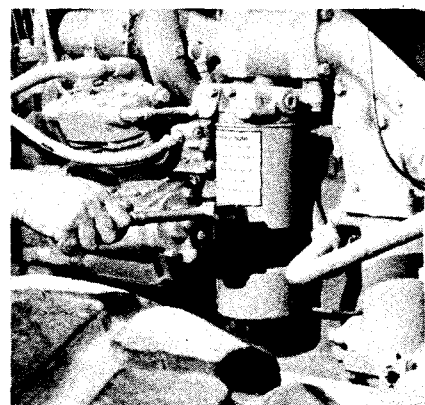
5. Clean and install housing with new element.

6. Clean and install filter housing drain plug.

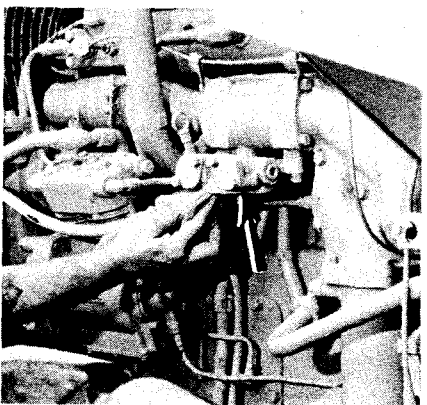
7. Clean and install crankcase drain plug.

8. Fill crankcase. See REFILL CAPACITIES.

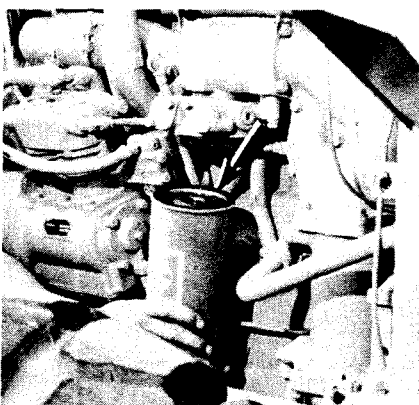
### (Spin-on-type Filter)



1. When oil is warm and engine stopped, remove crankcase drain plug. Remove filter element.



2. Clean base. Make sure all old gasket is removed.



3. Apply coat of clean lubricating oil to gasket of new element.

4. Install filter by hand.

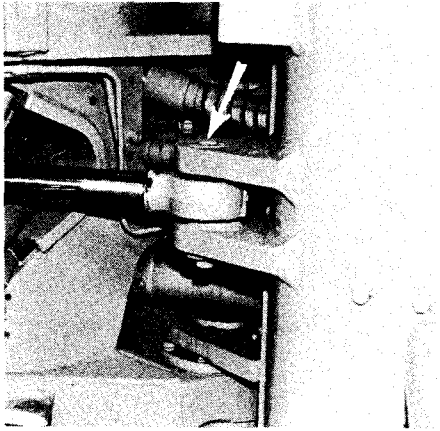
5. When gasket contacts base, tighten  $\frac{1}{2}$  turn more.

6. Clean and install crankcase drain plug.

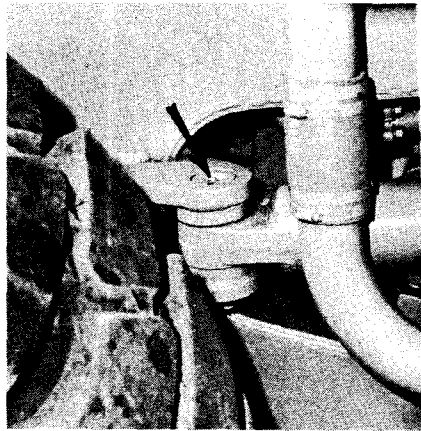
7. Fill crankcase. See REFILL CAPACITIES.

## EVERY 250 SERVICE HOURS OR MONTHLY

### 16 STEERING CYLINDER BEARINGS

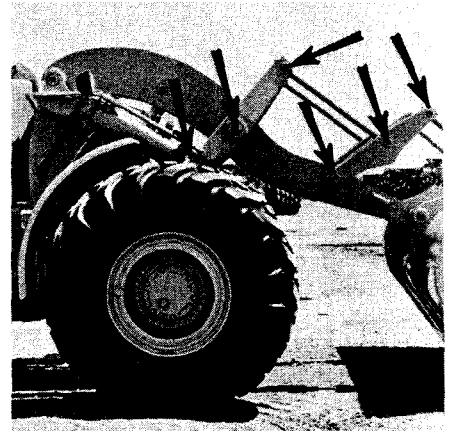


1. Lubricate 1 fitting at end of each rod.



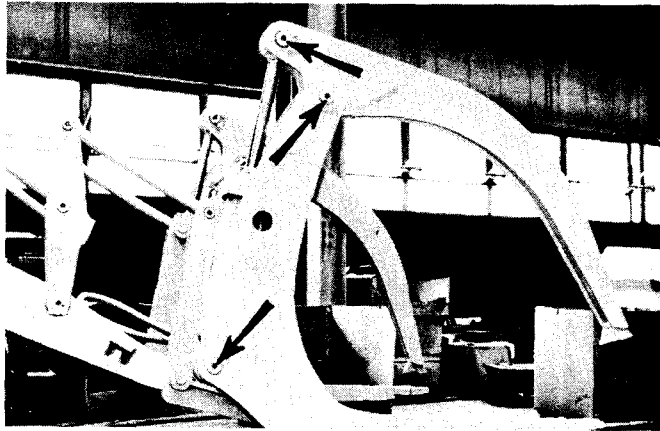
2. Lubricate 1 fitting at end of each housing. Total 4 fittings.

### 17 BUCKET CYLINDERS AND LINKAGE



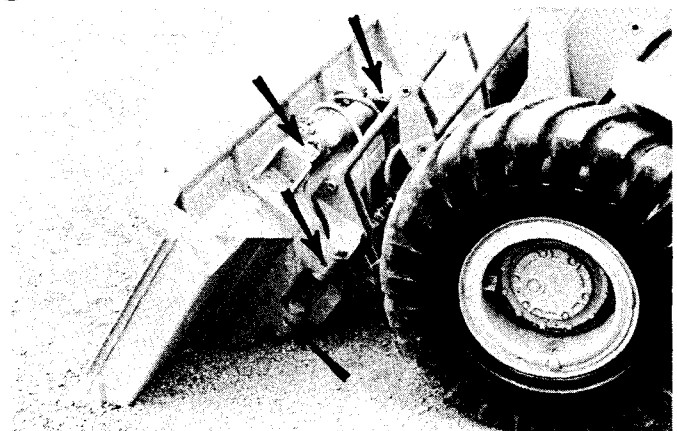
Lubricate 7 fittings on each side. Total 14 fittings.

### 18 LUMBER FORK CLAMP PIVOTS



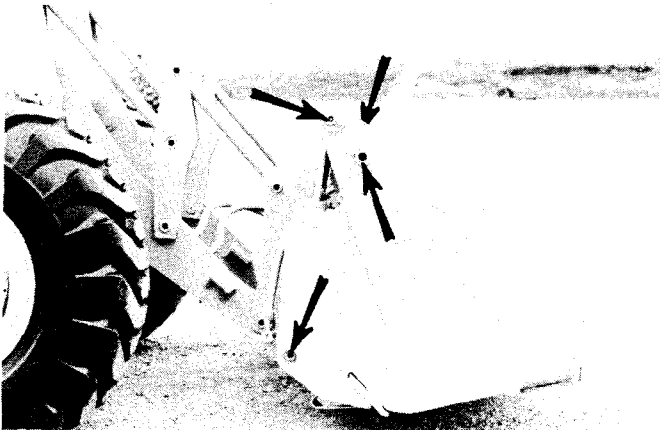
Lubricate 3 fittings on each side. Total 6 fittings.

### 19 SIDE DUMP BUCKET PIVOTS



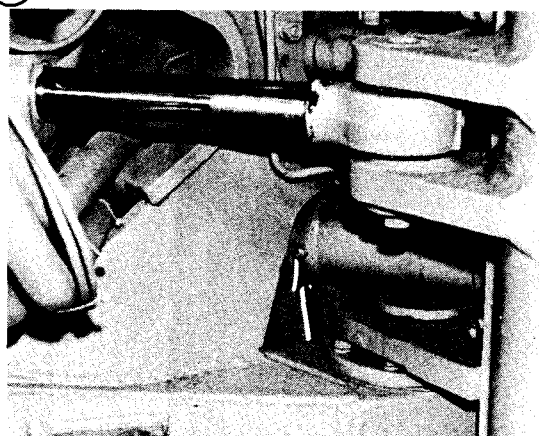
Lubricate 2 fittings on top and 2 fittings at side. Total 4 fittings.

### 20 MULTIPURPOSE BUCKET BEARINGS



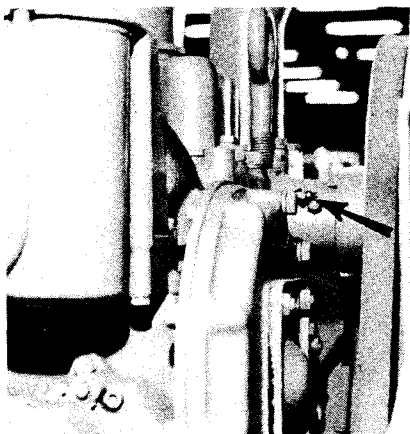
Lubricate 4 fittings on each side. Total 8 fittings.

### 21 DRIVE SHAFT SPLINE



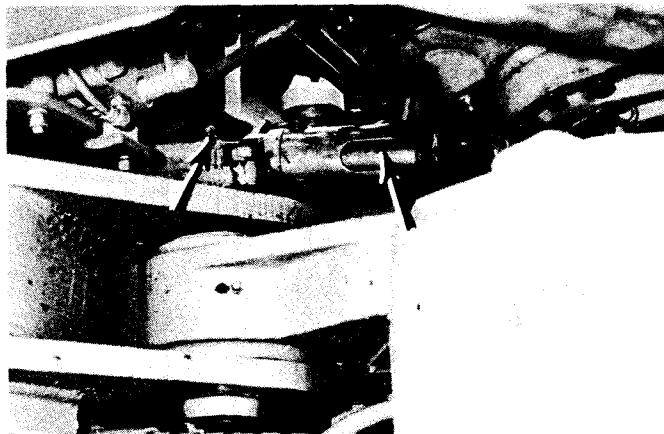
Lubricate 1 fitting. Turn machine full right or full left and stop engine before lubricating.

## 22 FAN BEARINGS



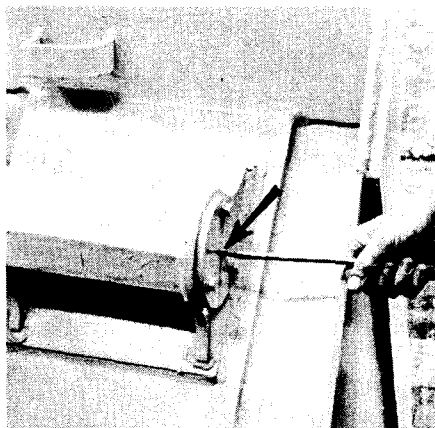
Lubricate 1 fitting.

## 23 STEERING FOLLOW-UP LINKAGE

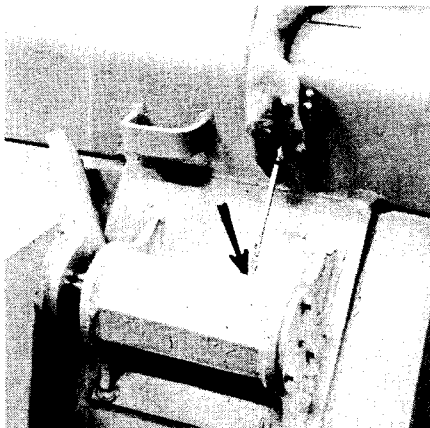


Lubricate 2 fittings.

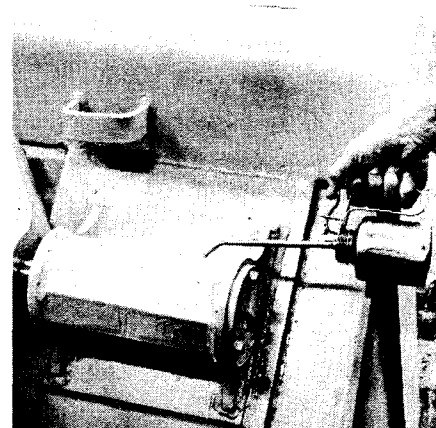
## 24 SIDE DUMP BUCKET LATCH



1. Loosen level plug. If oil level is to plug opening, tighten plug.

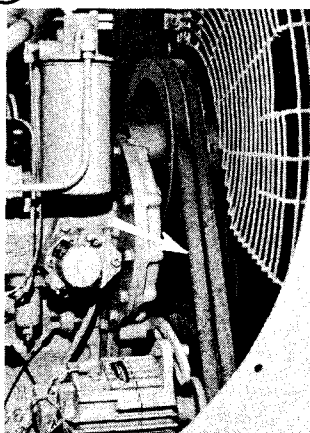


2. If not, remove fill plug.

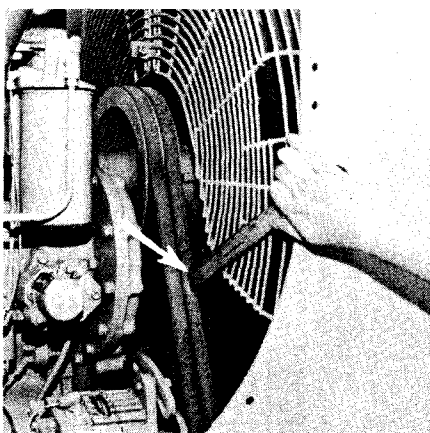


3. Add oil until it appears at level plug opening. Install plugs.

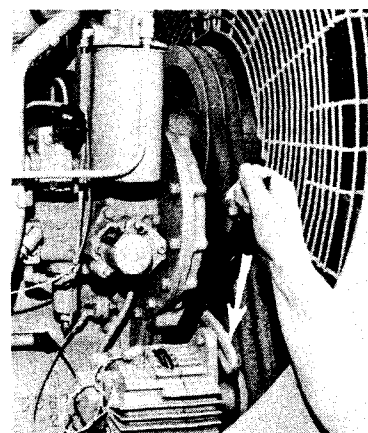
## 25 FAN AND ALTERNATOR BELTS



1. Check condition and adjustment of belts.



2. Belts should deflect  $\frac{9}{16}$  to  $\frac{13}{16}$  inch (14 to 20 mm) under 25 lbs. (11,5 kg) pressure.

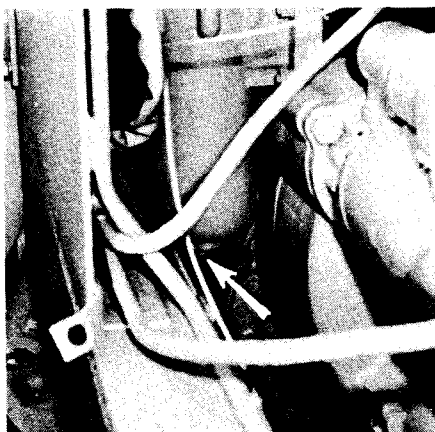


3. To adjust, loosen bracket bolt and pry alternator in required direction. Tighten bolt.

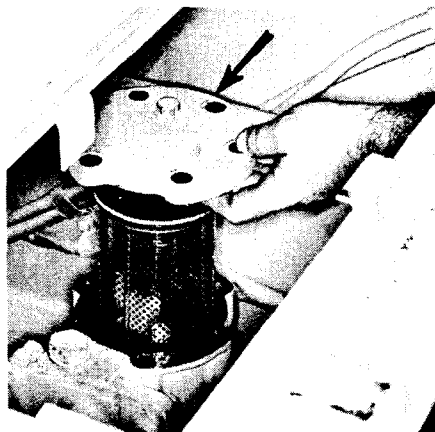


## EVERY 500 SERVICE HOURS OR 3 MONTHS

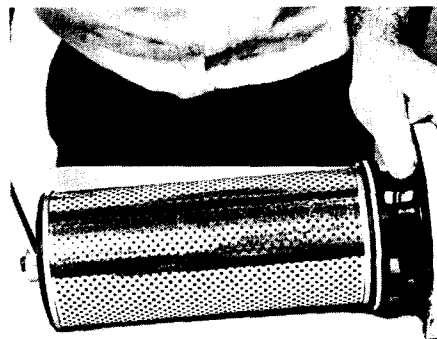
### 26 TRANSMISSION SYSTEM



1. Remove filter housing drain plug and drain oil.

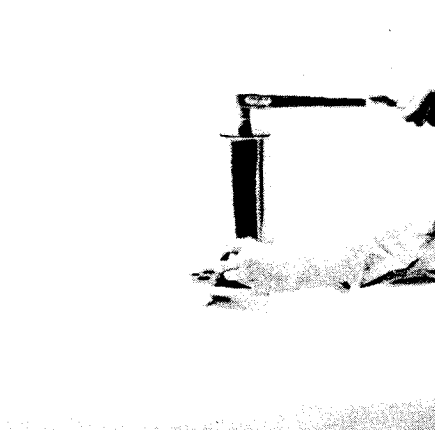


2. Remove cover and element assembly.



3. Remove element from cover.

4. Clean cover.



5. Install new element on cover. Tighten to  $10 \pm 2$  lb. ft. ( $1,4 \pm 0,3$  mkg).



6. Inspect seals and use new ones if necessary.



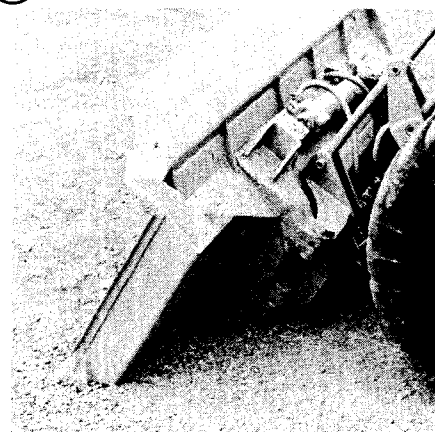
7. Install cover and element assembly.

8. Clean and install housing drain plug.

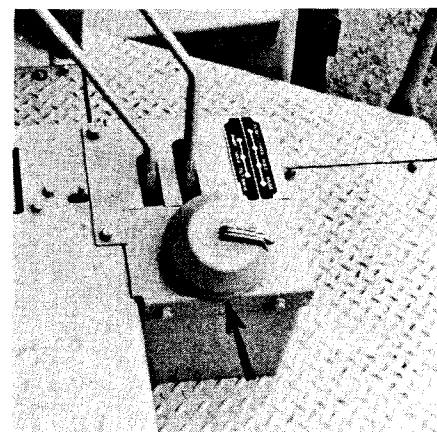
9. Start engine and operate a few minutes.

10. Check and add oil if necessary.

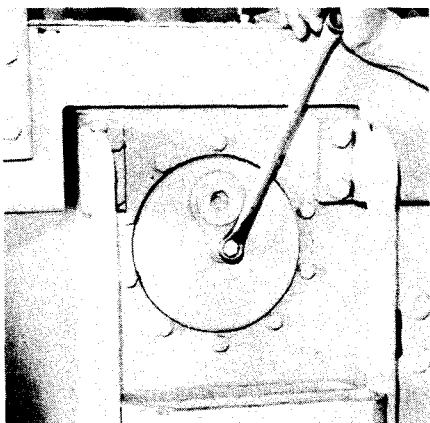
### 27 HYDRAULIC SYSTEM



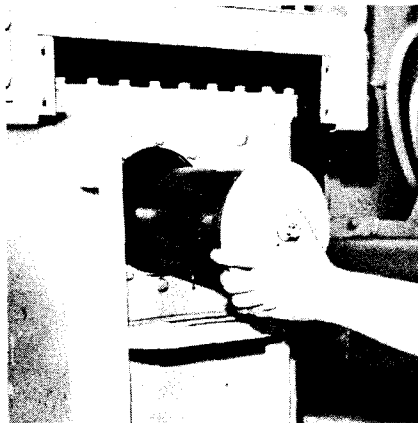
1. Bucket flat on ground and engine stopped. Move hydraulic controls to relieve system pressure.



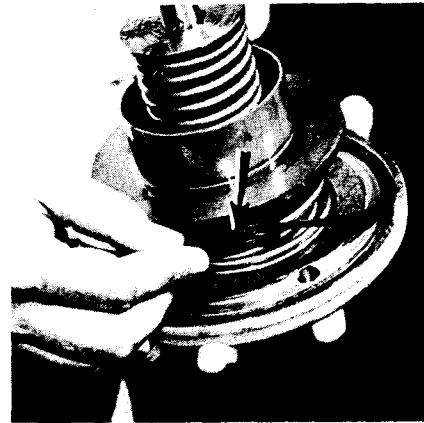
2. Loosen tank filler cap slowly to relieve tank pressure.



3. Loosen filter element assembly retaining bolt.

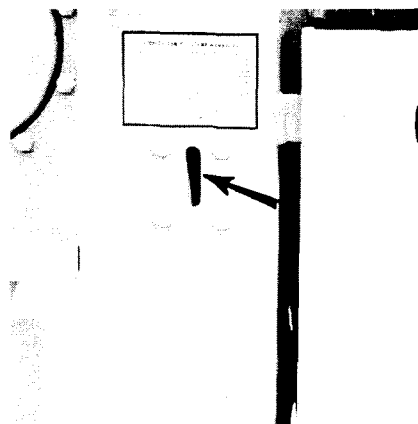


4. Remove cover and elements.



5. Inspect cover seal. Use new one if necessary.

6. Install new elements and cover. Tighten to  $43 \pm 4$  lb. ft. ( $5,9 \pm 0,6$  mkg).

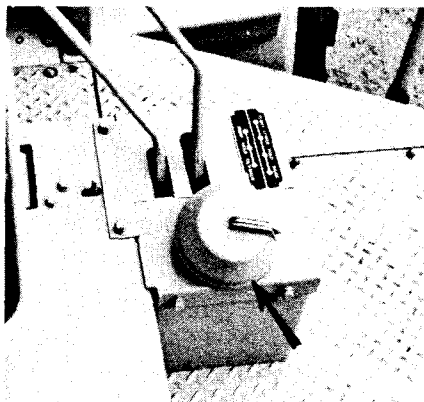


7. Fill to above ADD mark in sight gauge. Leave filler cap loose.

8. Make sure hydraulic controls are in HOLD.

9. Start engine.

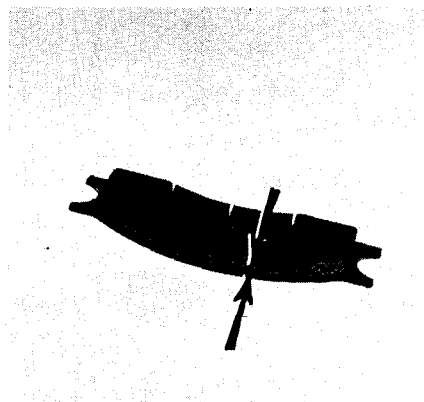
## 28 BRAKES (Disc-type)



10. Check oil level and add oil if necessary. Tighten filler cap.



1. Apply wheel brakes and inspect linings.

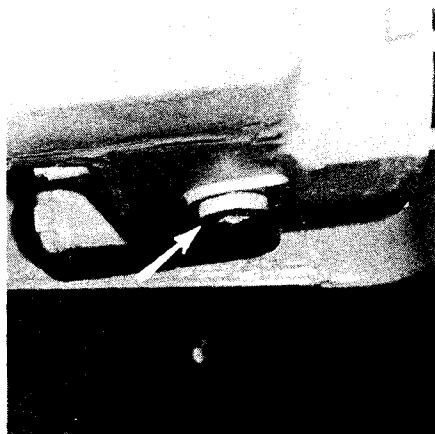


2. Replace linings when worn down to within .25 inch (6,4 mm) of the backing plates.



## EVERY 1000 SERVICE HOURS OR 6 MONTHS

### 29 TRANSMISSION SYSTEM



1. Remove transmission drain plug.

2. Change filter element (see item 26).

5. Wash tube and screen in clean solvent.

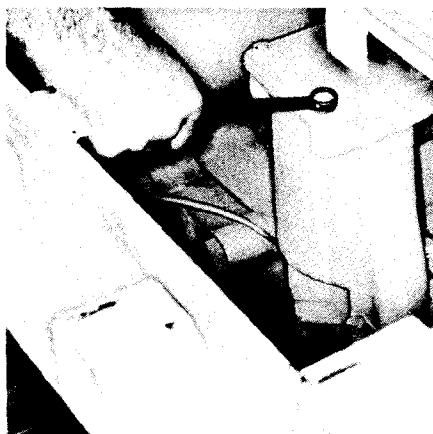
6. Clean magnets with a cloth, stiff bristle brush or pressure air.

#### WARNING

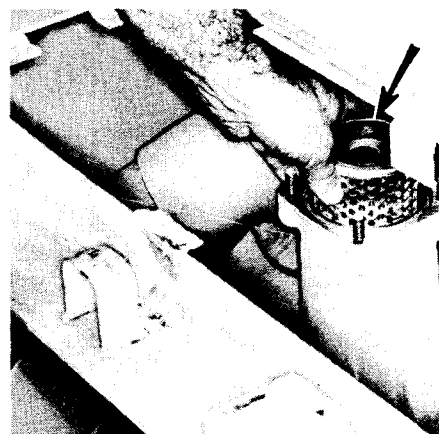
When using pressure air wear safety glasses and protective clothing. Maximum air pressure must be below 30 PSI (2 kg/cm<sup>2</sup>).

#### CAUTION

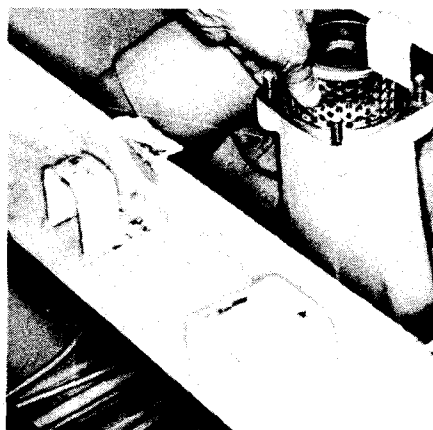
Do not drop or rap magnets against hard objects. Replace any damaged magnets.



3. Remove magnetic strainer cover.



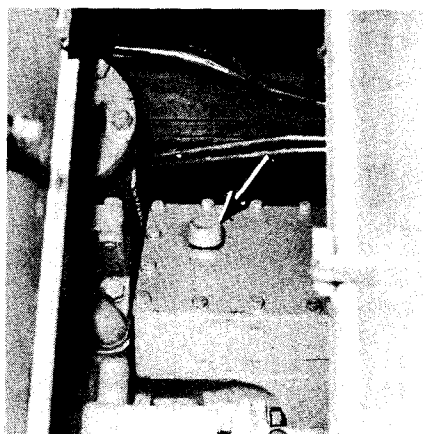
4. Remove retainer, tube and screen.



7. Install tube, screen and retainer.

8. Install cover. Use a new gasket if necessary.

9. Clean and install transmission drain plug.

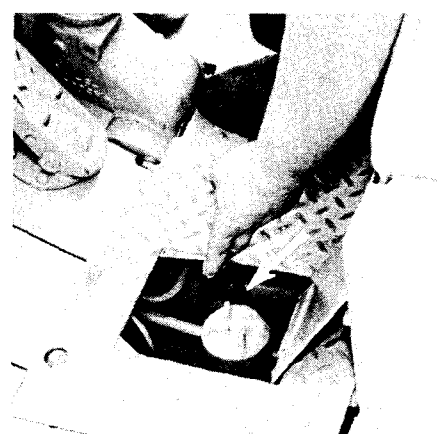


10. Remove transmission breather.

11. Install new breather.

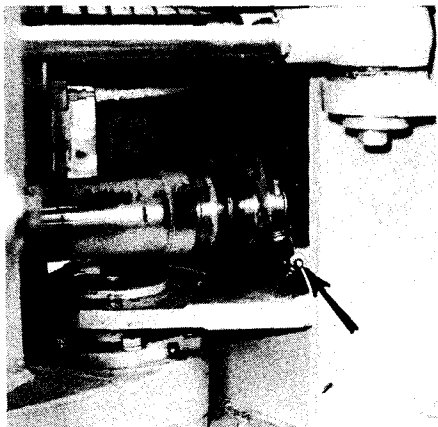
12. Fill transmission. See RE-FILL CAPACITIES.

13. Start engine.



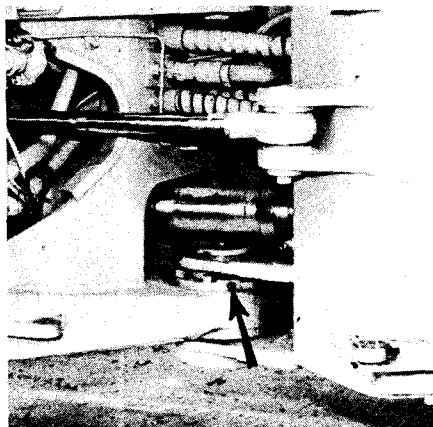
14. Operate loader a few minutes and recheck oil level. Add oil if necessary.

**30 DRIVE SHAFT  
SUPPORT BEARING**



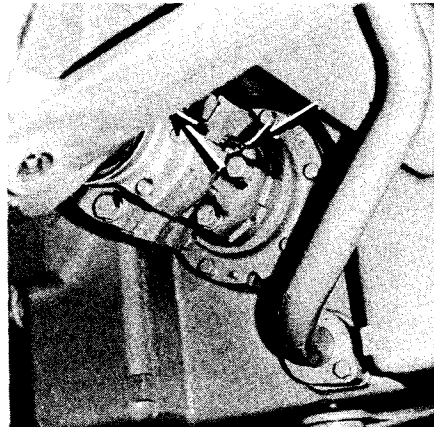
Lubricate 1 fitting.

**31 FRAME LOWER  
PIVOT BEARING**

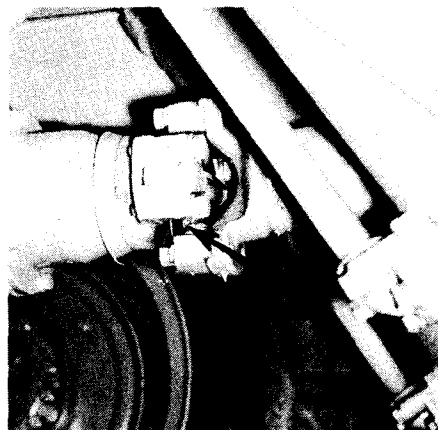


Lubricate 1 fitting.

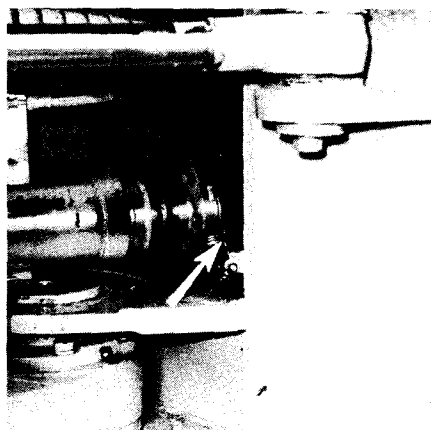
**32 DRIVE SHAFT  
UNIVERSAL JOINTS**



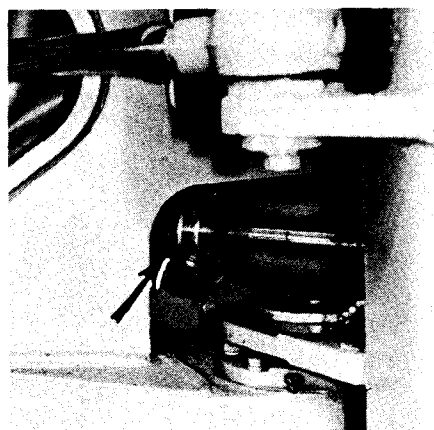
1. Lubricate 2 fittings.



2. Lubricate 1 fitting.

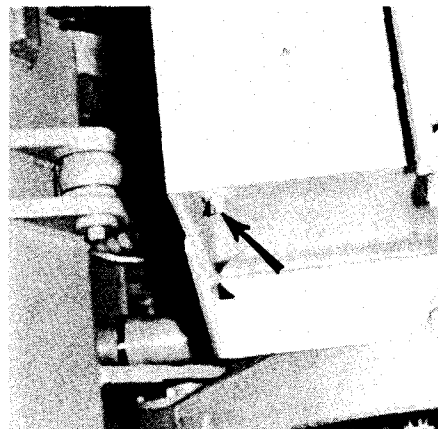


3. Lubricate 1 fitting.



4. Lubricate 1 fitting. Total 5 fittings for universal joints.

**33 FUEL TANK AND FILLER CAP**



1. Remove fuel tank drain plug and drain water and sediment. Replace plug.



2. Remove tank filler cap and disassemble.

3. Wash in clean solvent.  
4. Reassemble, oil element lightly and install.

## EVERY 2000 SERVICE HOURS OR 1 YEAR

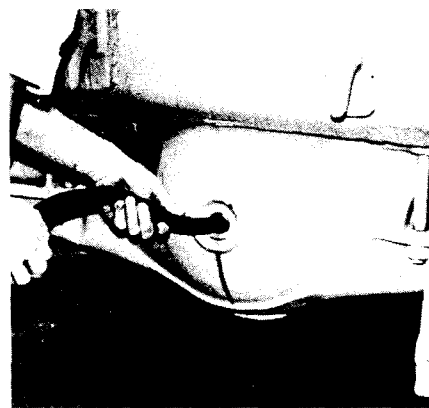
### 34 FRONT AND REAR DIFFERENTIALS AND FINAL DRIVES



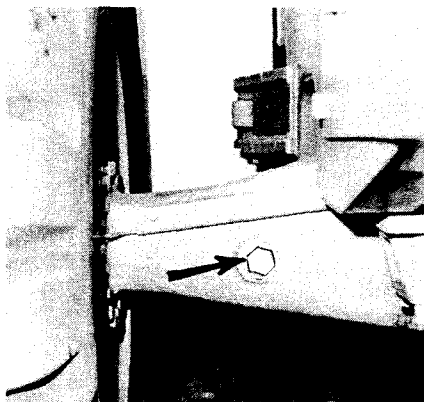
1. Position each wheel with drain plug down. Remove each plug and drain oil. Clean and install plugs.



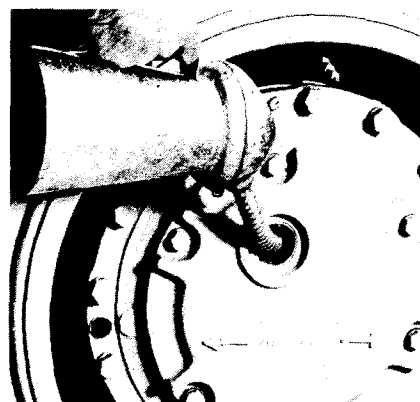
2. Remove front and rear differential drain plugs and drain oil. Clean and install plugs.



3. Remove front differential fill plug and fill. See REFILL CAPACITIES. Clean and install plug.



4. Remove rear differential fill plug and fill. See REFILL CAPACITIES. Clean and install plug.



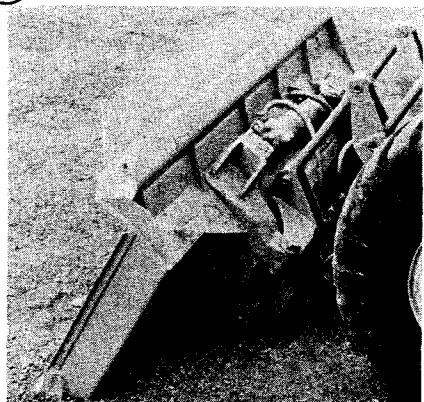
5. To speed filling, position final drive fill plugs above horizontal center line of wheels. Remove plugs and add oil.

6. Start engine.

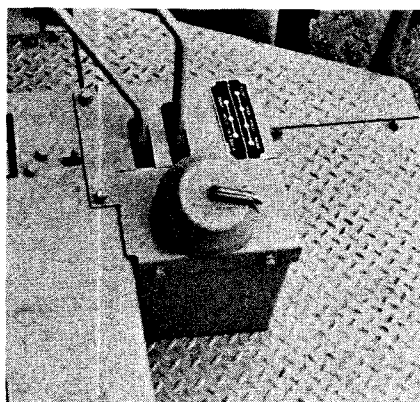
7. Operate machine on level ground for a few minutes and recheck oil level.

8. Add oil if required.

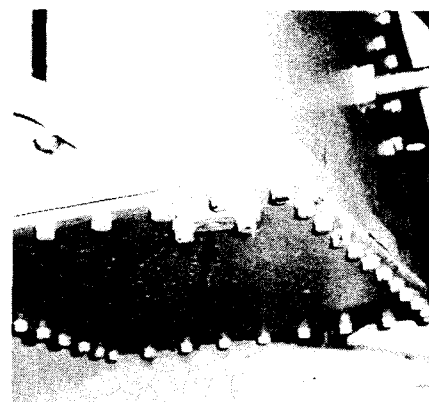
### 35 HYDRAULIC SYSTEM



1. Drain system when oil is warm, bucket at ground level, engine stopped, and parking brake set.



2. Remove fill cap slowly to relieve system oil pressure.



3. Remove drain opening cover and drain oil.

4. Clean cover assembly.
5. Be sure cover seal is in place.
6. Install cover.



7. Remove oil filler screen.

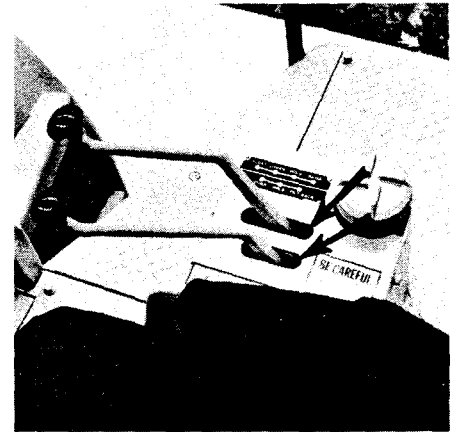
8. Wash screen in clean solvent.
9. Install screen.
10. Install new filter elements (See item 27).



11. Fill tank to above ADD mark in sight gauge. See REFILL CAPACITIES.

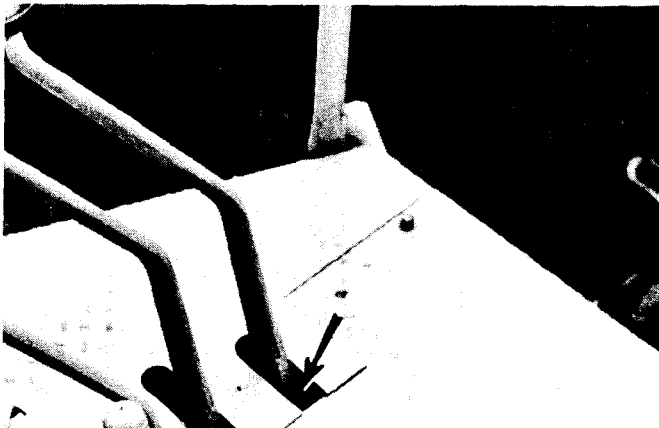
12. Check oil level several times during the first day of operation. See your Caterpillar dealer for bleeding bucket positioner and lift kickout.

### ③⑥ HYDRAULIC CONTROL LEVER BEARINGS



Lubricate 1 fitting each lever. Total 2 fittings.

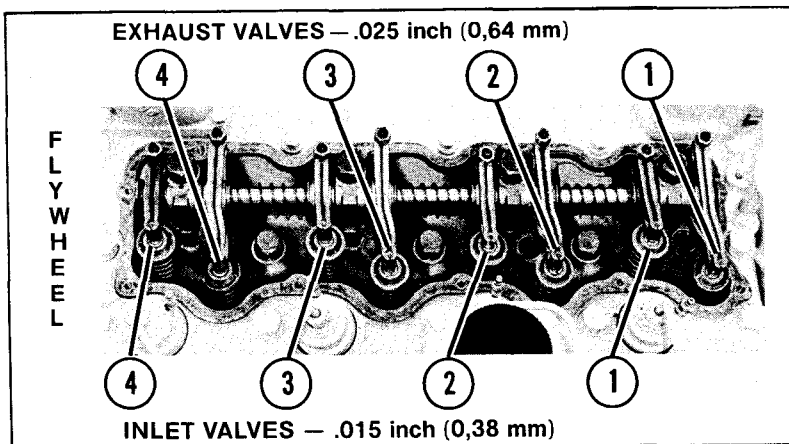
### ③⑦ AUXILIARY HYDRAULIC CONTROL LEVER BEARING



Lubricate 1 fitting.

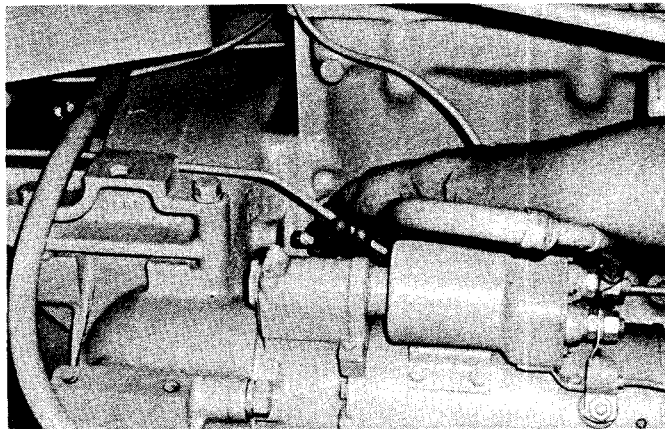
# **EVERY 2000 SERVICE HOURS OR 1 YEAR**

## **38 ENGINE VALVE LASH**

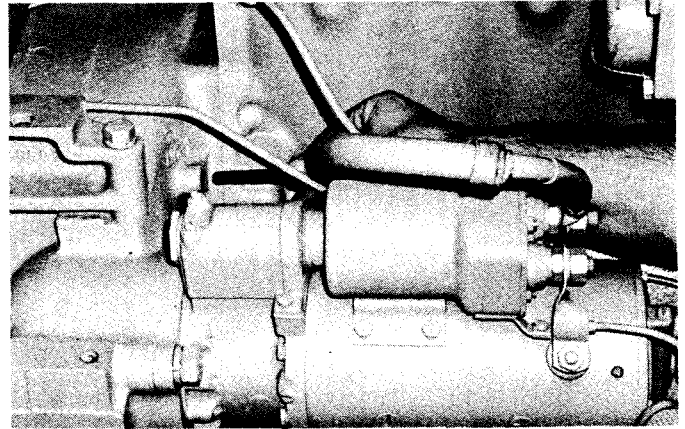


Check valve lash with engine stopped and cold.

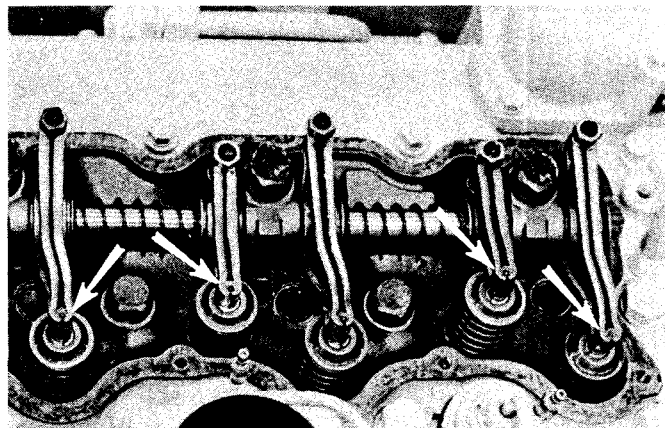
**NOTE**  
Do not use starting motor to rotate engine.



2. Remove plug from flywheel housing.



3. Turn flywheel slowly to close No. 1 inlet and exhaust valves. Install a  $\frac{3}{8}$ " NC bolt of the proper length in flywheel through hole in housing.



4. Check lash of No. 1 and No. 2 inlet valves. Check lash of No. 1 and No. 3 exhaust valves. Adjust valves if necessary. See page 23.

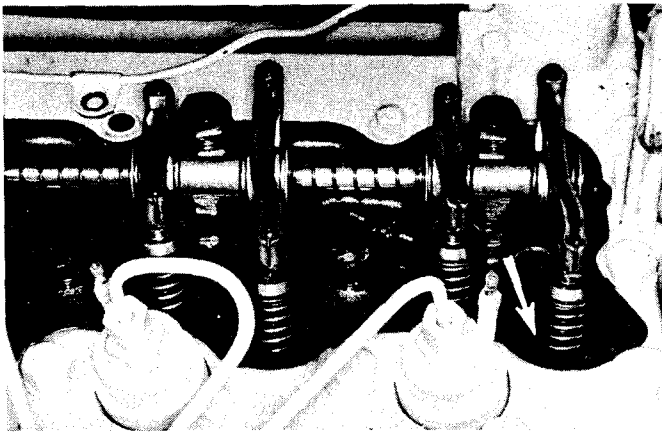
5. Remove bolt.

6. Rotate flywheel 360° to close No. 4 inlet and exhaust valves.

7. Insert timing bolt in flywheel.

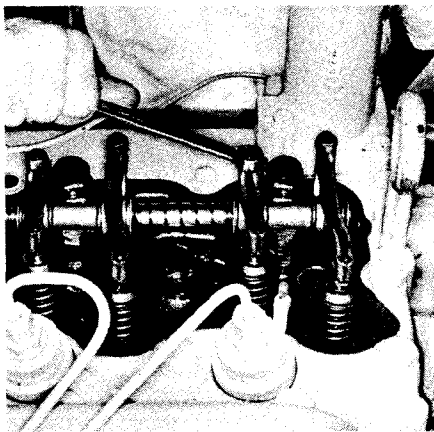
8. Check lash of No. 3 and No. 4 inlet valves. Check lash of No. 2 and No. 4 exhaust valves. Adjust valves if necessary.

9. Remove timing bolt and install plug.

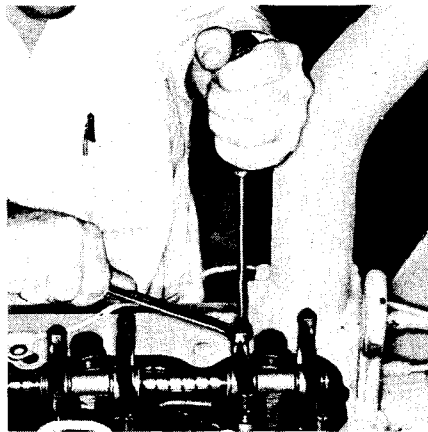


10. Start engine and run at low idle. Check valve rotators. If valves do not rotate, see your Caterpillar dealer.

### To Adjust Valve Lash

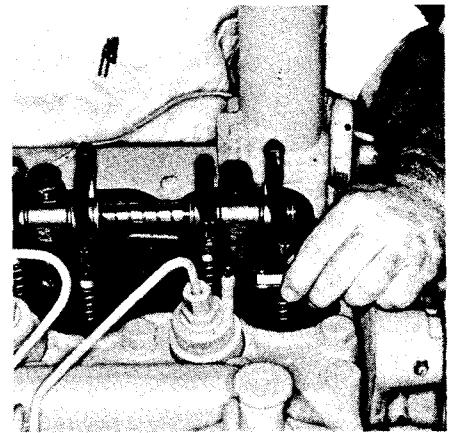


1. Loosen adjusting screw locknut.

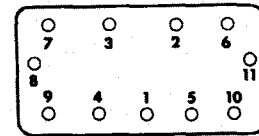


2. Turn adjusting screw in to close gap, out to open gap (see page 22 for correct lash).

3. Hold adjusting screw and tighten locknut.



4. Recheck adjustment.



11. Stop engine and install valve cover.

Tighten bolts to 6 to 10 lb. ft. (0,83 to 1,39 mkg) in sequence shown.

#### NOTE

Do not overtighten.

5. Remove timing bolt from flywheel and install plug.

6. Install rocker arm cover (see 11, above, for correct bolt tightening sequence).

## 39 STEERING GEAR HOUSING AND SHAFT LOWER BEARING



1. Remove plug and lubricate with 2 or 3 squirts of oil.

2. Clean and install plug.

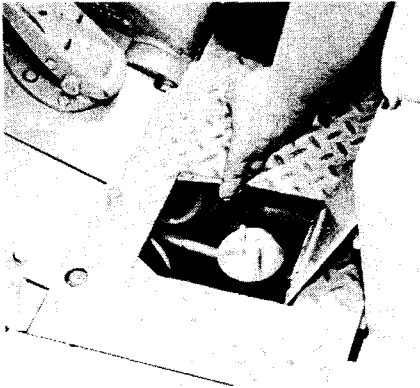


3. Remove filler plug. Maintain oil level at filler plug opening.

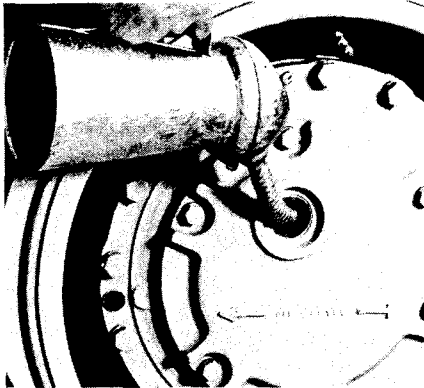
4. Clean and install plug.

## WHEN REQUIRED

### 40 TRANSMISSION SYSTEM



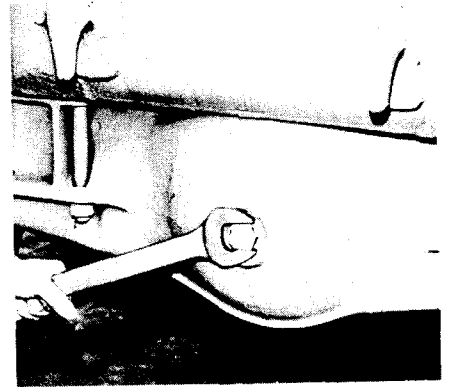
Check oil level. Maintain oil at FULL mark on gauge.



4. Check final drives at level plugs. Maintain oil level at bottom of level plugs.

### 41 DIFFERENTIALS AND FINAL DRIVES

1. Operate machine on level ground for a few minutes.
2. Lower bucket and stop engine.

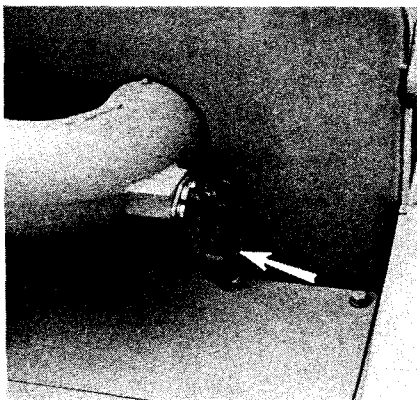


3. Check front and rear differentials at filler plugs. Maintain oil at bottom of filler plug openings.

#### NOTE

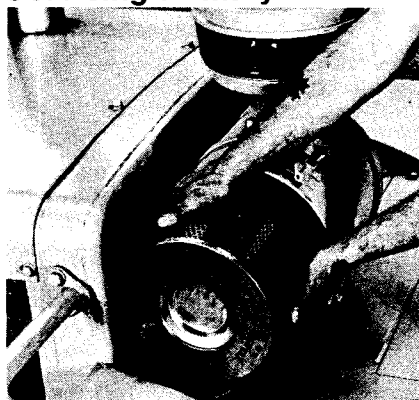
Check above items whenever a leak is suspected, or is evident.

### 42 ENGINE AIR INTAKE SYSTEM

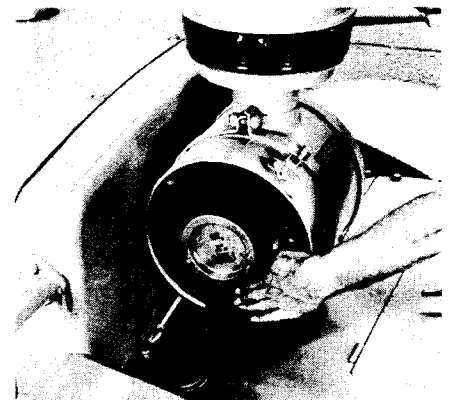


Service air cleaner element if RED bank in indicator is locked up. Stop engine.

#### Servicing Primary Elements

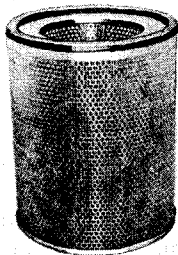


1. Remove cover. Remove element.

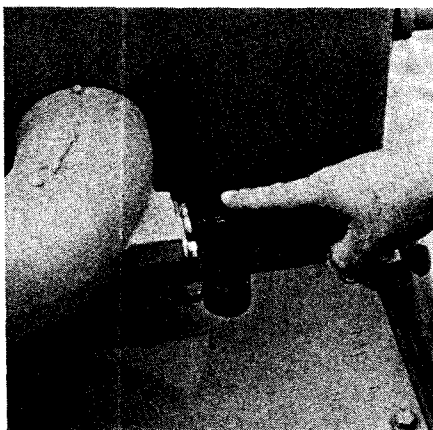


2. Clean inside of air cleaner body. Clean cover.





3. Clean and inspect element. (See page 26). Install clean element.



4. Install cover. Reset indicator.

If indicator shows RED shortly after installation of clean primary element, and element has been cleaned 6 to 8 times, change element.

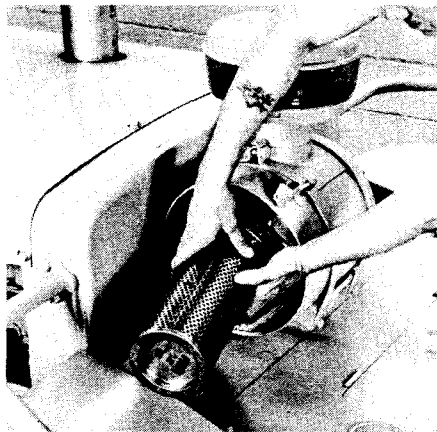
If new primary element was used, and indicator shows RED, service secondary element.

If new primary element was used, and indicator shows RED, replace secondary element.

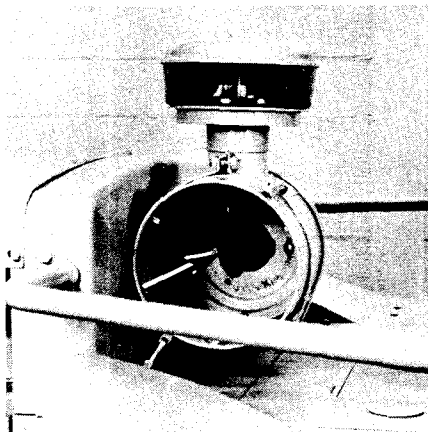
#### CAUTION

Do not clean secondary element.

### Servicing Secondary Element

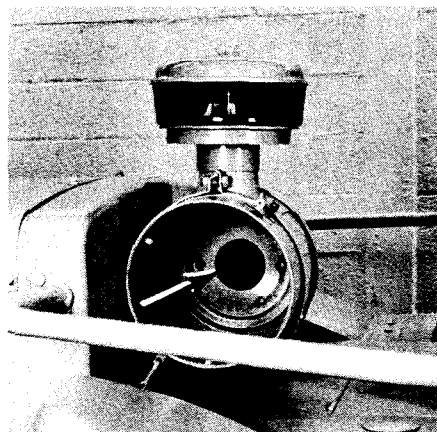


1. Remove cover and primary element. Remove and discard secondary element.

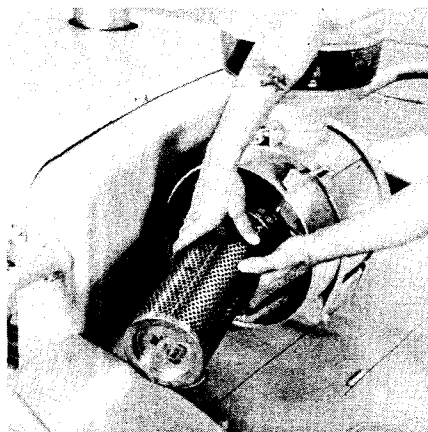


2. Cover air inlet opening.

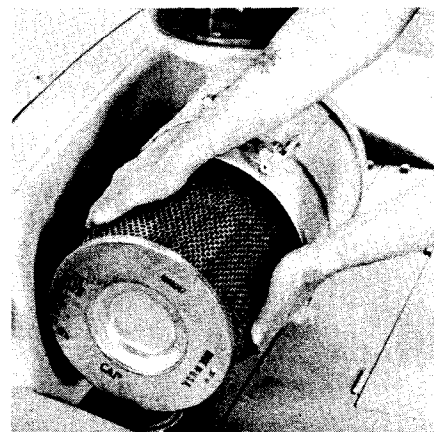
3. Clean air cleaner housing.



4. Uncover inlet opening.



5. Install new secondary element. Tighten nuts to  $20 \pm 5$  lb. ft. ( $2,8 \pm 0,7$  mkg).



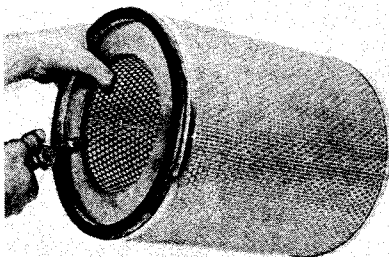
6. Install primary element and cover. Reset indicator.



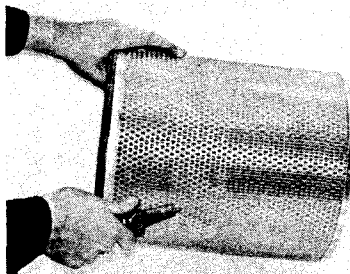
## WHEN REQUIRED

### CLEANING AIR CLEANER ELEMENTS

Pressure Air — 30 PSI (2 kg/cm<sup>2</sup>) Maximum

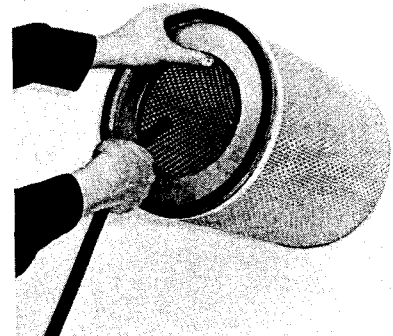


1. Direct air inside element along length of pleats.

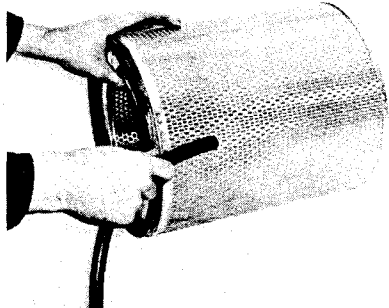


2. Direct air outside along length of pleats. Direct air inside along length of pleats. Check element.

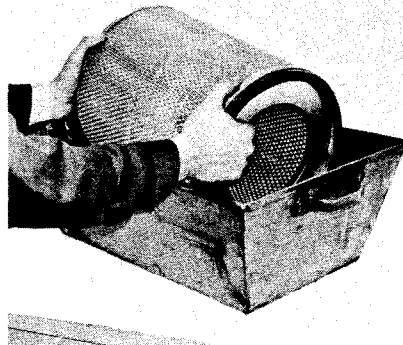
WATER — 40 PSI (3 kg/cm<sup>2</sup>) Maximum



1. Direct water inside element along length of pleats.



2. Direct water outside along length of pleats. Rinse, air dry thoroughly and check.



1. Wash in warm water and non-sudsing household detergent.

2. Rinse with clean water, 40 PSI max (3 kg/cm<sup>2</sup>), see above.

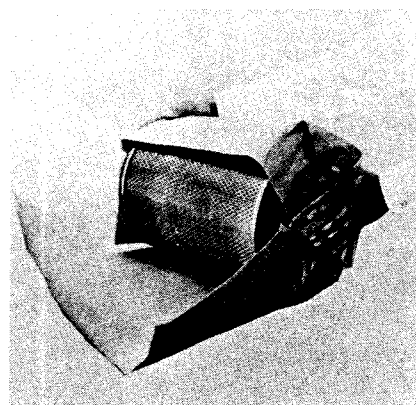
3. Air dry thoroughly and check.

### Detergent

### Checking Element



1. Insert light inside clean and dry element and check. Discard element if pinholes or tears are found.



2. Wrap and store good elements in a clean dry place.

### ⚠ WARNING

When using pressure air wear safety glasses and protective clothing. Maximum air pressure must be below 30 PSI (2 kg/cm<sup>2</sup>).

### CAUTION

Do not clean elements by bumping or tapping.

Do not use elements with damaged pleats, gaskets or seals.

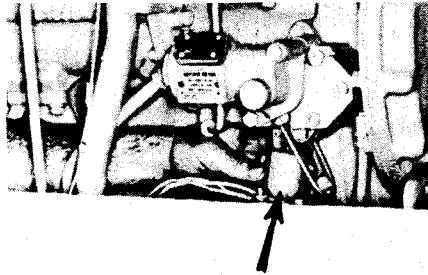
### NOTE

Have spare elements on hand to use while cleaning used elements.

## 43 FUEL SYSTEM

### Primary Filter Element

Clean element when fuel pressure gauge registers out with engine running.

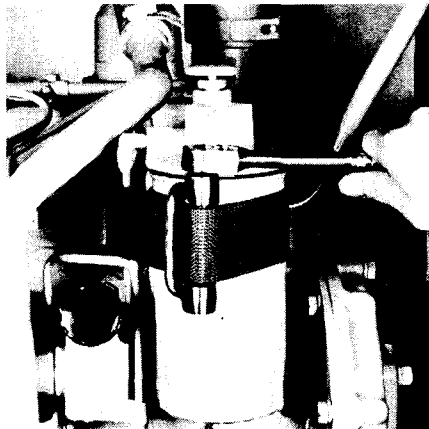


2. Wash element in clean solvent.
3. Clean bowl.
4. Install element and bowl.

1. Remove filter bowl and element.

### Final Filter

If fuel pressure gauge still registers OUT with engine running, change final fuel filter.

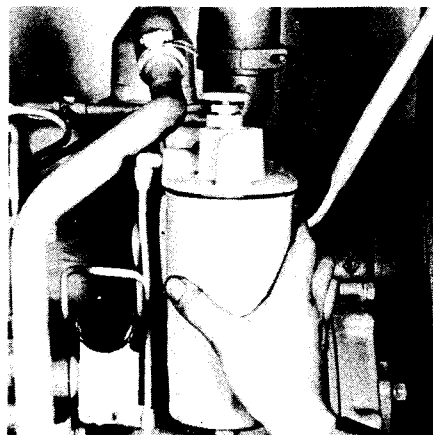


1. Remove filter.

2. Clean filter base. Be sure all of old filter gasket is removed.

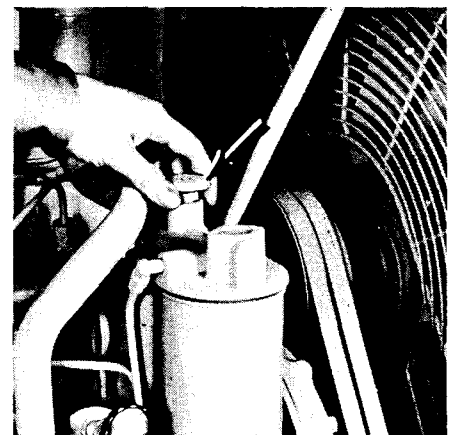


3. Lubricate new filter gasket with clean diesel fuel.



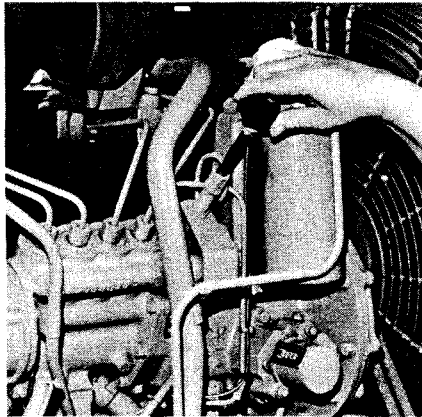
4. Install new filter. When gasket contacts base, tighten  $\frac{1}{2}$  turn more. Prime system, start engine and check for leaks.

### Priming the Fuel System

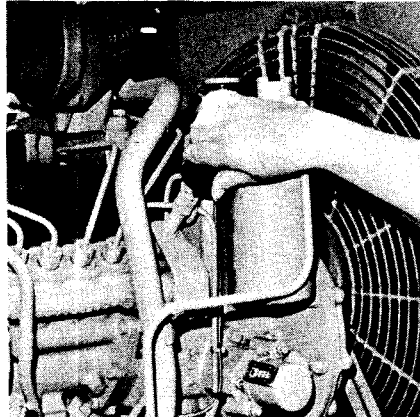


1. Move governor control to off. Open vent valve.

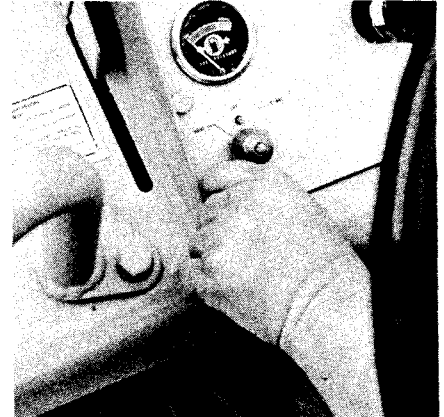
## WHEN REQUIRED



2. Unlock priming pump and operate pump.

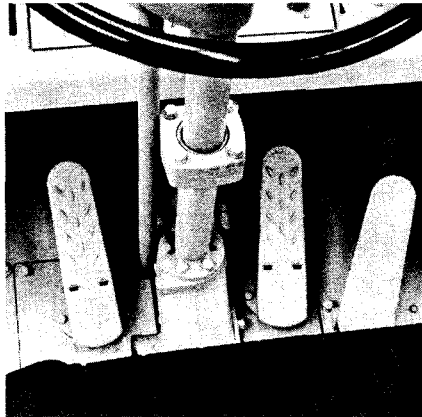


3. When fuel flows free of bubbles, close pump and lock plunger.

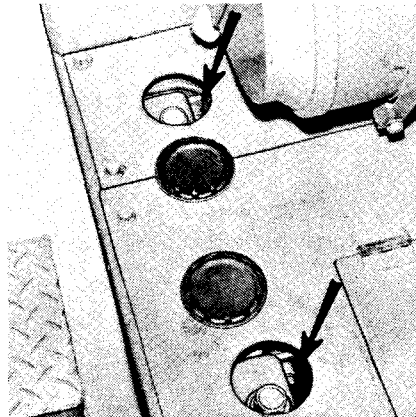


4. Close vent valve. Start engine.

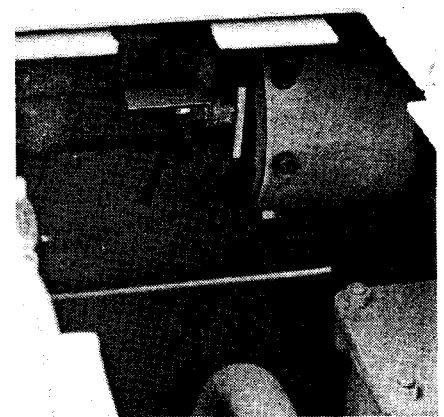
### 44 BRAKES(Shoe-type)



1. Apply brakes.

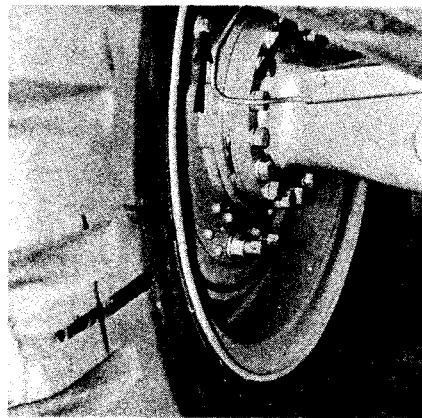


2. Check the master cylinder stroke indicator.

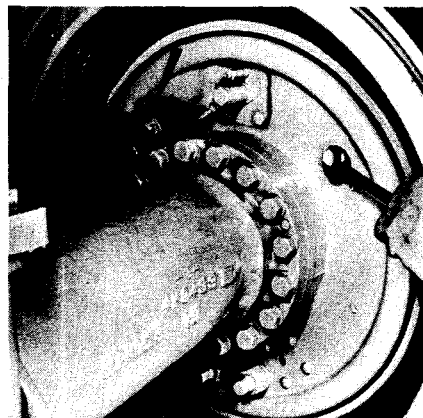


3. If indicator extends more than 1.25 inch (32 mm), adjust the brakes, or inspect the system for a leaking master cylinder, broken lines or other brake system failures.

### To Adjust Shoe-type Brakes:



1. Each wheel has 2 adjusting cams at the top inside of brake flange.



2. Rotate cams until they are against stops.

3. Rotate cams in opposite direction until linings are tight.

4. Back cam off ¼ turn.

## 45 COOLING SYSTEM

Whenever draining and refilling the cooling system, always recheck the coolant level when the engine reaches normal operating temperature.

Stop engine. Remove cap slowly to relieve pressure. Maintain coolant level  $\frac{1}{2}$  inch (1 cm) below the bottom of the fill pipe.

Use clean water that is low in scale forming minerals — not softened water.

Never add coolant to an overheated engine, allow engine to cool first.

Add Caterpillar Corrosion Inhibitor. Follow recommendations given on container.

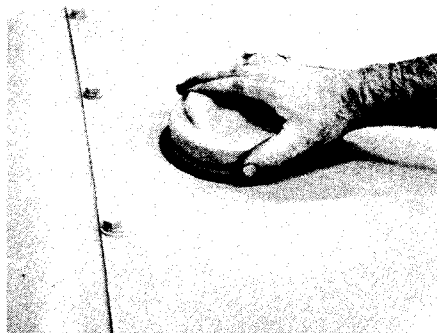
### WARNING

Inhibitor contains alkali, avoid contact with skin and eyes.

Check specific gravity of antifreeze solution frequently in cold weather to assure adequate protection.

## Cleaning the Cooling System

1. Run engine for 5 minutes. Park machine on level ground and stop engine.



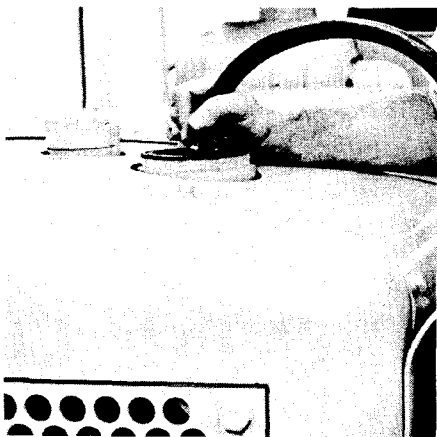
2. Turn filler cap slowly to relieve pressure, then remove caps.



3. Open drain valve and drain coolant.



4. Close drain valve and fill with cleaning solution.<sup>(1)</sup>
5. Start and run engine for  $\frac{1}{2}$  hour. Stop engine and drain cleaning solution.



7. Close drain valve and fill system with neutralizing solution.<sup>(2)</sup>
8. Start and run engine for 10 minutes. Stop engine and open drain valve.
9. Flush system with clean water.
10. Close drain valve and add coolant to proper level.

<sup>(1)</sup> 2 lb. Sodium Bisulphate ( $\text{NaHSO}_4$ ) per 10 gal. water (25 grams per liter).

<sup>(2)</sup>  $\frac{1}{2}$  lb. Sodium Carbonate Crystals ( $\text{Na}_2\text{CO}_3 \cdot 10 \text{H}_2\text{O}$ ) per 10 gal. water (6 grams per liter).

### NOTE

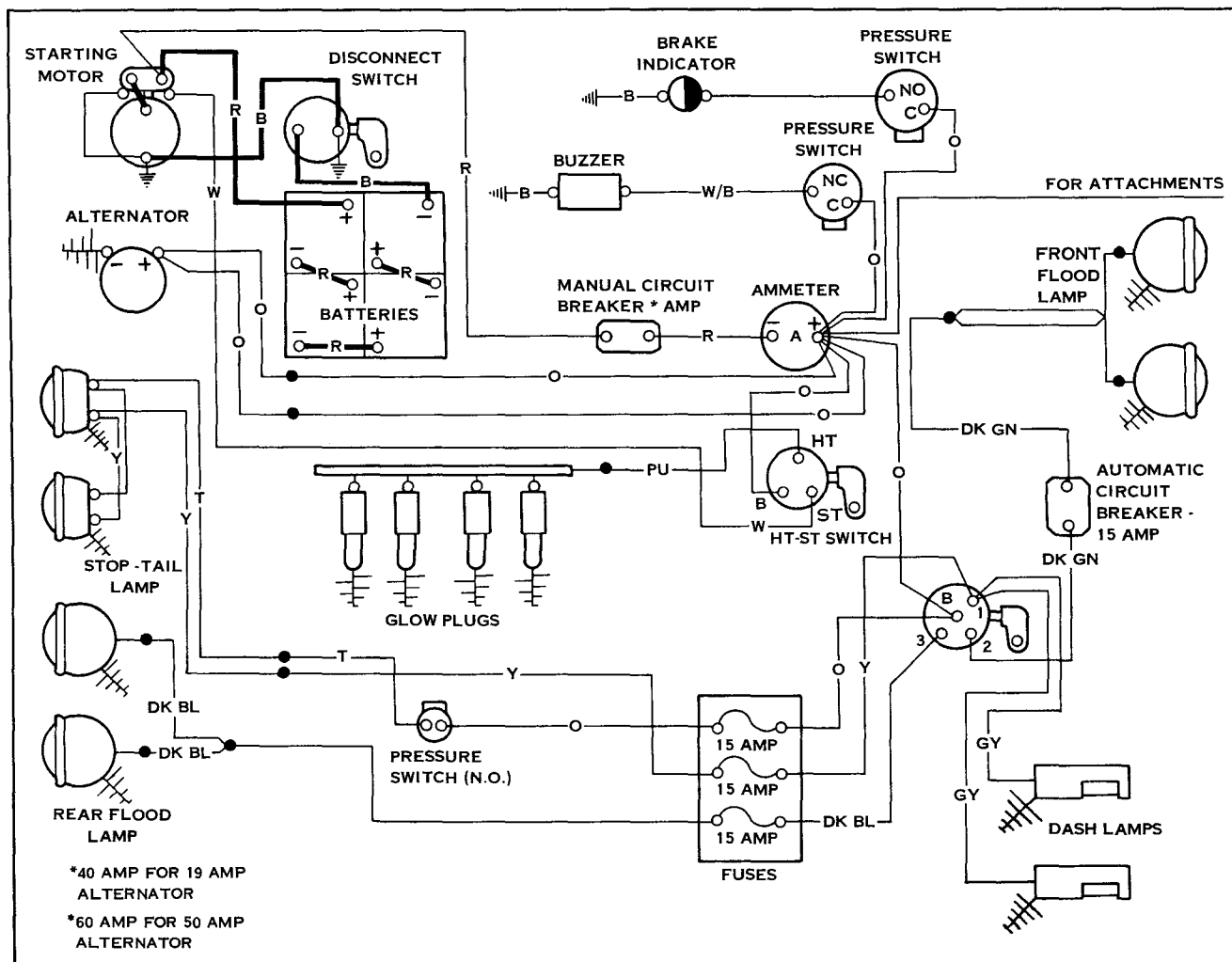
Most commercial cooling system cleaners may be used.

### WARNING

Use all cleaning solutions with care.

6. Flush system with clean water until draining water is clear.

# WIRING DIAGRAM



## COLOR ABBREVIATIONS

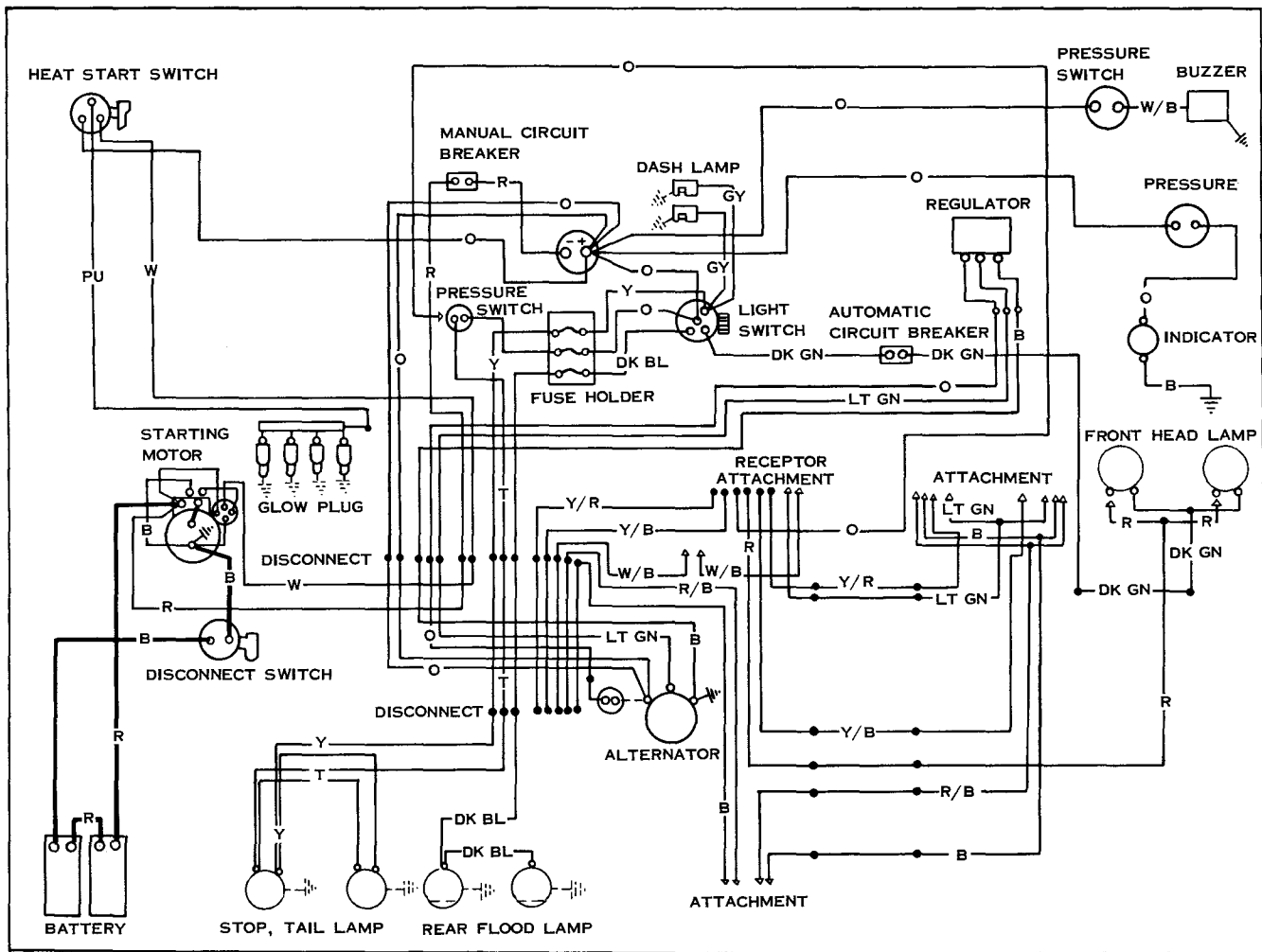
R	RED
B	BLACK
W	WHITE
O	ORANGE
Y	YELLOW
T	TAN
GY	GRAY
DK BL	DARK BLUE
DK GN	DARK GREEN
PU	PURPLE
LT GN	LIGHT GREEN
BR	BROWN
W/B	WHITE W/BLACK

## SYMBOL

## DESCRIPTION

○	WIRING TERMINAL
●	SPLICE-OR JUNCTION OF WIRES
+	CROSSING OF WIRES NOT CONNECTED
	VISIBLE GROUNDING OF COMPONENTS
	INTERNAL GROUNDING OF COMPONENTS

# 73J1-UP



## COLOR ABBREVIATIONS

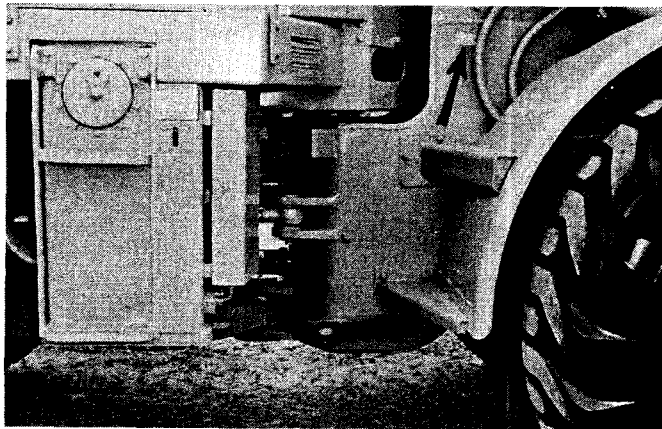
O	ORANGE
Y	YELLOW
R	RED
B	BLUE
W	WHITE
T	TAN
GY	GRAY
BR	BROWN
PU	PURPLE
GN	GREEN
W/R	WHITE W/RED STRIPE
W/B	WHITE W/BLUE STRIPE
Y/R	YELLOW W/RED STRIPE
Y/B	YELLOW W/BLUE STRIPE
R/B	RED W/BROWN STRIPE
DK BL	DARK BLUE
DK GN	DARK GREEN
LT GN	LIGHT GREEN

SYMBOL	DESCRIPTION
○	WIRING TERMINAL
●	SPLICE OR JUNCTION
+	WIRES NOT CONNECTED
⏏	EXTERNAL GROUND
⏏	INTERNAL GROUND
→	DISCONNECT OR RECEPTOR

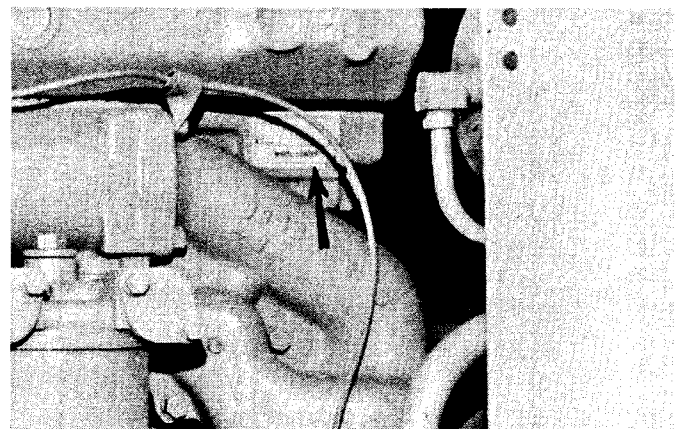
## REFILL CAPACITIES (Approximate)

COMPARTMENT OR SYSTEM	U.S. MEASURE	METRIC MEASURE	IMPERIAL MEASURE
Engine Crankcase	4.75 gal.	17.9 ltr.	4 gal.
Transmission System	8 gal.	30 ltr.	6.7 gal.
Hydraulic Tank	29 gal.	110 ltr.	24.2 gal.
Differentials and Final Drives	Front	7 gal.	26,5 ltr.
	Rear	8.5 gal.	32 ltr.
Steering Gear	.87 gal.	3,3 ltr.	.7 gal.
Fuel Tank	53 gal.	201 ltr.	44.2 gal.
Cooling System	7.5 gal.	28 ltr.	6.3 gal.
Service Brake Reservoir	.5 qt.	0,5 ltr.	.4 qt.

## SERIAL NUMBER LOCATIONS



LOADER FRAME



ENGINE