TECHNICAL PUBLICATIONS

An Operator's Manual and a Parts Catalog are packed and shipped with this machine for customer use. Additional technical publications are available for this machine, at a nominal cost, through your authorized International Construction Equipment distributor or dealer. This material includes Service Manuals and Technical Training Courses.

These additional publications are strongly recommended for the customer who performs his own maintenance and service on this equipment.

It is the policy of International Harvester Company to improve its products whenever it is possible and practical to do so. We reserve the right to make changes or add improvements at any time without incurring any obligation to make such changes on products sold previously.

MODEL 250 SERIES B LOADER

FORM

OM-L250 B Rev. 1

SEPTEMBER, 1969

(Supersedes FORM 1 085 345 R1 which should be destroyed)

PRINTED IN UNITED STATES OF AMERICA

PAY LINE PUBLICATIONS INFORMATION

The following basic publications are available for additional information on this particular machine. Special publications, other than the basic publications shown below, can be ordered from the PAY LINE Index and Price List. (*) Please tear out this page and check the publications desired. Fill in ALL the information requested and mail to:

International Harvester Company, Printing and Distribution Services, 807 Blackhawk Drive, Westmont, Illinois, 60559
Attn: PAY LINE CUSTOMER SALES

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	FORM NO.	DESCRIPTION	Price
☐		Engine Parts Catalog	$
☐		Engine Parts Catalog	
☐	TC-111B	Chassis and Engine Parts Catalog	12.80
☐		Chassis Parts Catalog	
☐		Operator's Manual	
☐		Operator's Manual	
☐	ISS-1503D	Engine Service Manual	11.40
☐		Engine Service Manual	
☐	ISS-1050-1	Chassis Service Manual	25.60
☐		Chassis Service Manual	
(*) ☐	1 019 104 R12 (Or later)	PAY LINE Index and Price List . . . . . (List of all PAY LINE publications available)	

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CONTENTS

This manual covers the instructions for operation, lubrication, adjustments and maintenance for normal daily care. These instructions are divided into ten sections to simplify your reference to the information most important to you. This manual must be read completely prior to operating this equipment, to gain a full knowledge of the machine and its correct normal maintenance and operation.

Refer to each specific section for a complete list of the subjects covered within the section.

SCHEDULED (NORMAL) MAINTENANCE WILL

"Increase Your Profit"

THROUGH INCREASED MACHINE RELIABILITY
AND AVAILABILITY

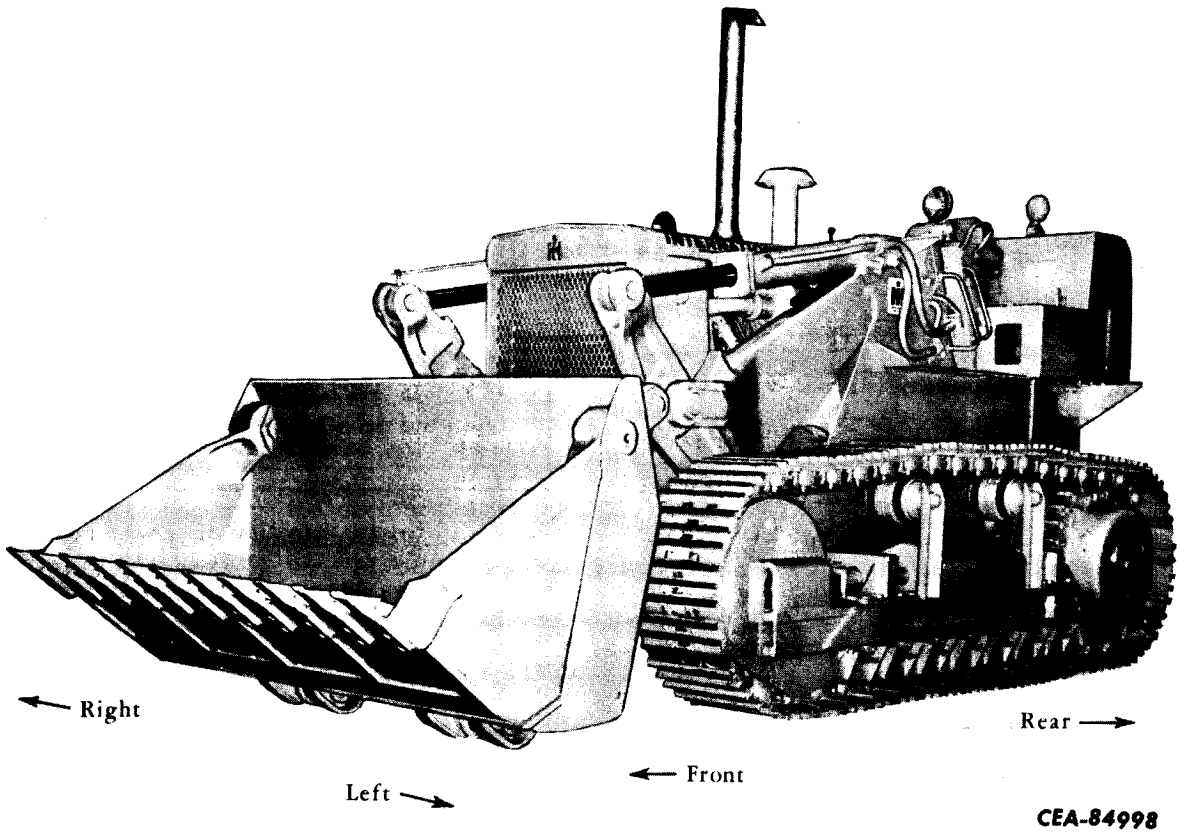
This machine is your INVESTMENT—NOW—let's use it to make all the PROFIT possible.

Normal maintenance is necessary to extend the long life of high production from this machine. International Harvester Company has designed a program to assist you in restricting delays and costly repairs to a minimum. This program consists of normal maintenance; scheduled interval lubrication, adjustments, and inspections. This program, when used, will result in INCREASED PROFITS by reducing "down-time" and costly repairs. This systematic procedure of lubrication, adjustments, and inspections is outlined in Section 8, "SCHEDULED MAINTENANCE" of this manual.

Inspection report forms and other technical training aids for your service and maintenance personnel are available, at a nominal cost, through your authorized International Construction Equipment distributor or dealer.

SECTION CONTENTS

GENERAL



Illust. 1
MODEL 250 SERIES B Loader With Drott 4-IN-1 Bucket

Any cross references in this manual are to a specific section of the manual. Refer to first page of that section for a list of the section contents.

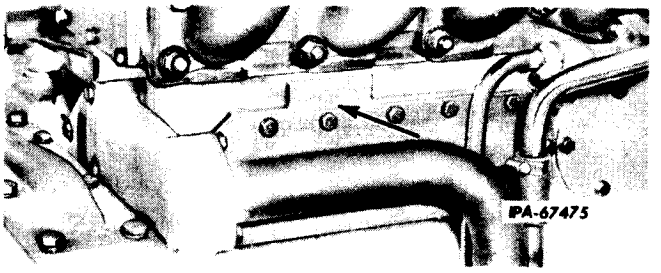
Some illustrations are of general application of this model and may not show your equipment accurately in all details.

SERIAL NUMBERS

Certain tools are required for the normal maintenance of this loader. These tools are packaged in waterproof paper and are received with the loader.

Throughout this manual the use of the terms "left," "right," "front" and "rear" must be understood to avoid confusion when following instructions. "Left" and "right" indicate the left and right sides of the loader when facing forward in the operator's seat.

The engine serial number is stamped on a pad located on the right side of the engine (Illust. 2). The chassis serial number is stamped on a plate attached to the left hand seat side sheet (Illust. 3).

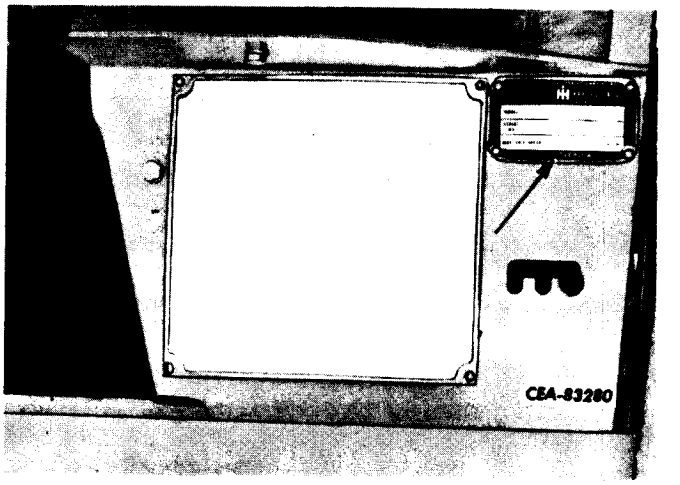


Illust. 2
Engine Serial Number.

Use serial numbers when requesting information or ordering parts. For ready reference, write these serial numbers in the spaces provided below.

Engine Serial No. L-250 BPM _____

Chassis Serial No. L-250 BP _____



Illust. 3
Chassis Serial Number.

MACHINE TRANSPORT

SHIPPING INSTRUCTION

NOTE: When transporting a loader on a high speed carrier, seal the air cleaner intake and exhaust pipe openings to prevent turbocharger damage.

Truck

When shipping this loader by truck, the state and local regulations may vary. Contact the state and/or local authorities for the proper shipping and loading regulations.

Railroad Flatcar

The loading rules and specifications published by the Association of American Railroads must be followed when shipping this loader on open top railroad cars. Check the manual entitled "Rules Governing the Loading of Commodities on Open Top Cars" at the nearest Railroad Freight Agency.

MOVING A DISABLED MACHINE

NOTE: If the power train or tracks are damaged, DO NOT tow; the machine must be transported on a carrier to avoid further damage.

To avoid the possibility of power train damage, limit towing to a distance of 1/2 mile at speeds up to 1 mph. In emergency or for extremely short distance towing, step 2 of this procedure may be disregarded.

If the loader can be towed, proceed as follows:

1. Lock the gear selector lever in "NEUTRAL."

2. Place the "HI-LO" shift lever in neutral (N). This lever can be moved only when the gear selector lever is in "NEUTRAL" and there is oil pressure in the transmission and torque converter hydraulic system. If no pressure exists, proceed as follows:

   a. Remove the rear platform from the operator's compartment.

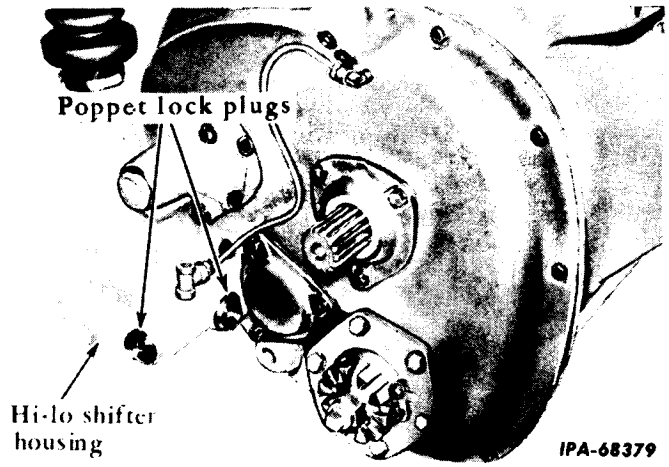
b. Remove the poppet lock plugs (Illust. 4) from the "HI-LO" shifter housing, then remove the poppet lock springs and lock.

c. Shift the "HI-LO" lever into neutral (N).

d. Reinstall the poppet lock, springs and plugs. Reinstall the rear platform.

3. Release the foot brake.

4. Use a towing cable of sufficient strength.



Illust. 4
"HI-LO" Shifter Housing.

MACHINE STORAGE

When the loader and/or its equipment is not to be used for a period of time, store it in a dry and protected place. Leaving equipment outdoors exposed to the elements will materially shorten its life.

Follow the procedure below when the loader is placed in storage for 30 days or more. The equipment must be lubricated every six months. Use caution when starting an engine that has been in storage. Refer to the instructions under "PREPARING STORED MACHINE FOR SERVICE" in this section.

1. Thoroughly wash or clean the loader and its equipment.

2. Completely lubricate all points of the loader and equipment as outlined in the "LUBRICATION GUIDES" in Section 8.

3. Drain off the water from the fuel tank and fuel filters; close the drain valves.

4. Clean the fuel strainer. Refer to "FUEL SYSTEM" in Section 9.

NOTE: Be sure fuel tank contains minimum of five to ten gallons of approved diesel fuel.

5. Move the loader to storage location.

6. Block up the bucket to avoid contact with the ground.

7. This machine was shipped from the factory with anti-freeze in the cooling system. If the cooling system will be exposed to freezing temperatures during storage and water only was used during operation, the cooling system must be drained and refilled with an anti-freeze solution while at operating temperature. Refer to the anti-freeze table on page 12, Section 9, to select a solution suitable for the lowest temperature that the cooling system will be exposed to during storage.

NOTE: If anti-freeze solution is not used, the residual water retained by capillary attraction inside the cooler tubes must be blown out with dry compressed air through the drain cock on the cooler. DO NOT RELY ONLY ON DRAINING THE WATER.

8. Clean and remove the valve housing cover; then flush the valves, rocker arms and push rods with Grade-30 lubricating oil. (Remove any rust before lubricating.) Use a paint brush to coat the inside of the valve housing cover with Grade-30 lubricating oil. Reinstall the valve housing cover.

9. Remove the injection nozzles. Spray about one ounce of Grade-30 lubricating oil into each cylinder. Crank the engine two or three revolutions. Clean the gasket seats and install new gaskets when reinstalling the injection nozzles.

Continued on next page.

MACHINE STORAGE

10. Completely service the air cleaner. Refer to "AIR CLEANING SYSTEM" in Section 9.

11. Plug up the ends of the exhaust pipe and breather pipe. Remove the air cleaner cap and cover the air intake pipe.

12. Remove the batteries and store them in a cool dry place above freezing (+32°F). The batteries must be fully charged at the time of storage. Check the batteries at least once a month for water level and specific gravity. Batteries must never be allowed to run down below 3/4 full charge while in storage.

13. Coat the bucket cutting edge, corners, teeth and connecting pins on the bucket with chassis grease.

14. Coat the exposed portions of the hydraulic cylinder rods with chassis grease.

PREPARING STORED MACHINE FOR SERVICE

1. Install fully charged batteries and make the proper cable connections. (Refer to "ELECTRICAL SYSTEM" in Section 9.)

2. Remove the valve housing cover and flush the valve and valve operating mechanism with a mixture of one-half kerosine and one-half Grade-10 oil.

3. Drain the crankcase and fill with the specified lubricating oil. (Refer to the "LOADER LUBRICATION GUIDE" in Section 8.)

4. Be sure the lubricating oil filters have new elements before starting the engine.

5. Clean the fuel strainer. Refer to "FUEL SYSTEM" in Section 9.

6. Remove the coverings from the exhaust pipe, crankcase breather pipe and air cleaner pipe. Install the air cleaner cap.

7. Check the cooling system for leaks and loose connections.

8. Replace the primary and final fuel filter elements. Close all fuel drains, fill the fuel tank and vent the fuel system. Refer to "FUEL SYSTEM" in Section 9.

9. Before starting the engine, prime the turbocharger as follows:

   a. Clean the area where the oil inlet tube connects to the turbocharger.

   b. Disconnect the oil inlet tube from the top of the turbocharger.

   c. Using a squirt can, shoot four to five ounces of oil (same type and viscosity as in crankcase) into the turbocharger inlet hole.

   d. Install a new oil inlet tube gasket and reconnect the oil inlet tube.

◆ CAUTION: KEEP THE DOORS WIDE OPEN OR MOVE THE LOADER OUTSIDE THE STORAGE ROOM IMMEDIATELY TO AVOID DANGER FROM EXHAUST GAS. DO NOT ACCELERATE THE ENGINE RAPIDLY OR OPERATE IT AT HIGH SPEED IMMEDIATELY AFTER STARTING.

10. When starting the engine, allow the engine to run at low idle a few minutes to allow thorough distribution of the lubricating oil. The loader must not be placed under load until normal oil pressure and temperature is reached.

11. After the engine has started, observe if any valves are sticking. If so, pour a small quantity of diesel fuel, dry-cleaning solvent or kerosine on the valve stems until loose. If the engine is misfiring or loss of power is evident after starting the engine, the fuel system is possibly clogged. (Refer to "FUEL SYSTEM" in Section 9.)

12. Install the valve housing cover.

13. Clean the chassis grease from the exposed portions of the hydraulic cylinder rods.

SECTION CONTENTS

INITIAL SERVICE PROCEDURE

Before operating this loader:

1. Be sure the cooling system is filled to the proper level (one inch above the baffle).

2. Check the fan belt tension every 10 hours until the tension remains stabilized. Refer to "BELTS" in Section 9.

3. Check the battery liquid level. Refer to "ELECTRICAL SYSTEM" in Section 9.

4. Check the oil levels in the different compartments. For lubricant, refer to "LUBRICATION WHEN SHIPPED" in this section. For procedures, refer to Section 8.

5. Operate the new loader for the first 20 to 30 hours at wide open throttle with light loads.

6. Check the torque of the track shoe bolts every 10 hours for the initial 100 hours of operation or until they take a "set." Refer to "TORQUES" in Section 10.

BEFORE STARTING THE NEW MACHINE

LUBRICATION WHEN SHIPPED

The loader and equipment have been lubricated at the factory for operation in an air temperature range of -10°F to +90°F. If this loader and equipment is to be operated above or below this range, change to the correct lubricants. Unless an exception is shown below, all lubricants can be used (within above temperature range) until regular scheduled (normal) change intervals occur. Refer to "LUBRICATION GUIDES" in Section 8 for the scheduled (normal) change intervals and to "Lubricant Specifications and Capacities" for the proper oil grades for various air temperatures.

COMPARTMENT	LUBRICANT
CRANKCASE	EO
REAR FRAME	EO ⏢
HYDRAULIC SYSTEM (LOADER EQUIPMENT	EO ⊕
TRACK ROLLERS	⋕
TRACK IDLERS	⋕
FRONT IDLERS	⋕
SPROCKET DRIVE HOUSINGS	MPL
WATER PUMP HOUSING	MPG
FAN BEARING HOUSING	MPG

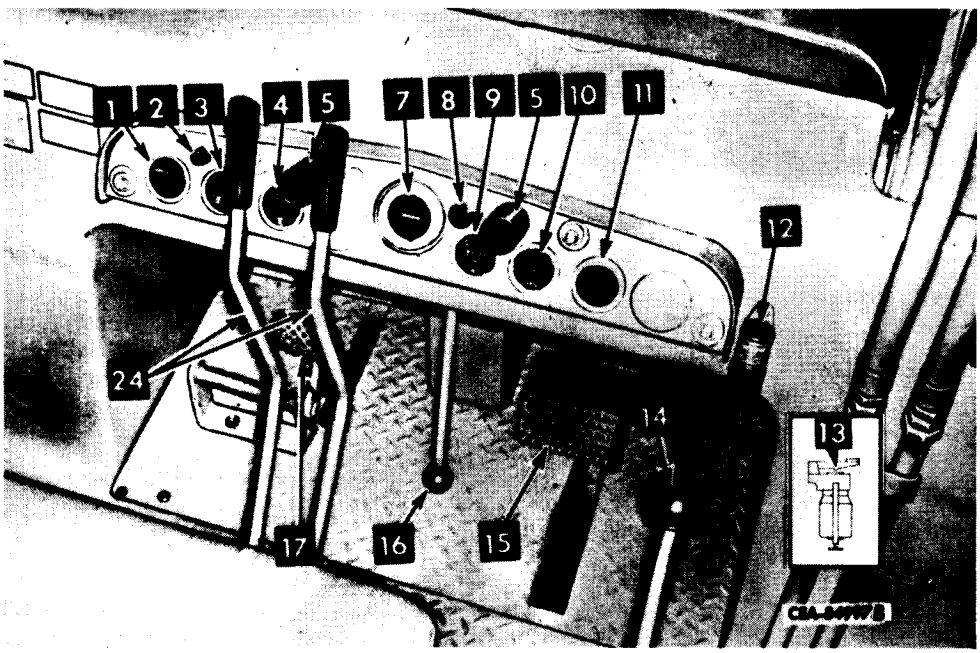
⏢ After the initial 100 hours of operation, service the transmission torque converter steering booster suction and pressure filter elements. Refer to "TRANSMISSION, TORQUE CONVERTER AND HYDRAULIC STEERING BOOSTERS OIL FILTERS" in Section 9. Thereafter, service at the regular scheduled (normal) interval.

⊕ After the initial 50 hours of operation, drain the system, service the filters and change the oil. Refer to "LOADER EQUIPMENT" in Section 9. Thereafter, service at the regular scheduled (normal) interval.

⋕ The front idlers, track idlers and track rollers are lubricated for life with a Grade-30 (Series 3) engine oil. A level check of these compartments is not required.

This section covers the location and function of the various indicators and controls of this loader. In the case of controls, more detailed information regarding operation can be found in Sections 5 and 6.

Regardless of previous experience as a loader operator, you must be thoroughly familiar with the location and use of all indicators and controls before operating this loader. Check all indicators, immediately after starting, again upon reaching operating temperatures and at frequent intervals during operation to assure proper care through prompt detection of irregularities. If any of the indicators do not register properly, stop the engine; locate and correct the cause immediately. Refer to "INDICATOR CHECK" in Section 5.



Illust. 1
Indicators and Controls (ALSO REFER to Illust. 3, 4, 5, 6 and 7).

The number of the indicator or control corresponds with the numbers shown in Illust. 1 unless otherwise indicated.

1 Transmission Clutch Oil Pressure Indicator

This indicator registers the pressure of the oil being delivered to the clutch packs in the transmission. After the engine has operated a sufficient length of time, this indicator must register in the "RUN" (green) range. If the indicator registers in the "DANGER" range, stop the engine and consult your authorized International Construction Equipment distributor or dealer before operating the loader.

Continued on next page.

2 Fuse Housing

This fuse protects the panel lights, head lights and rear lights. For additional information on the fuse refer to "ELECTRICAL SYSTEM" in Section 9.

3 Not Used.

4 Engine Oil Pressure Indicator

This indicator shows the pressure at which the lubricating oil is circulating through the engine. This indicator must register in the "IDLE" range immediately upon starting. When the engine is operated at full load speeds, the pointer must be in the "RUN" range. Stop the engine immediately and investigate cause if little or no pressure is indicated.

5 Instrument Panel Light

These lights are operated with the light switch (8).

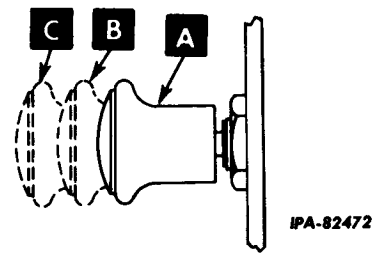
6 Not Used

7 Engine Hourmeter

This meter records the actual hours of engine operation. It eliminates guess work when determining proper lubrication and maintenance periods. It also assists in computing specific job per hour costs.

8 Light Switch

The light switch has three positions as shown in Illust. 2.



Illust. 2
Light Switch Positions.

A. "OFF."
B. "HEADLIGHTS AND PANEL LIGHTS."
C. "HEADLIGHTS, PANEL LIGHTS AND REAR LIGHT."

9 Engine Coolant Heat Indicator

The heat indicator shows the temperature of the coolant circulating through the engine. After the engine has operated a sufficient length of time, the pointer of the indicator must be in the "RUN" range and should remain there during regular operation.

10 Ammeter

The ammeter indicates the rate at which the battery is being charged or discharged. The ammeter must show charge when the engine is operating faster than low idle speed. If it shows discharge or a high rate of charge continuously while the engine is operating at this speed, investigate the cause immediately. If unable to find the cause, consult your authorized International Construction Equipment distributor or dealer.

11 Torque Converter Oil Temperature Indicator

This indicator registers the temperature of the fluid in the torque converter. After the engine has operated sufficiently to reach a stablilized torque converter temperature, check the indicator. The indicator must register in the "RUN" range (green area). If the indicator registers in the "CHECK" range, make the checks as follows:

a. Be sure the transmission clutch oil pressure indicator is registering the correct pressure.

b. Stop the engine. Check the oil level in the rear frame (refer to Section 8 for the correct level checking procedure).

c. Be sure the transmission oil coolers (mounted on the front side of the radiator) are not restricted.

d. Service the transmission and torque converter filters in the following sequence: pressure filter, safety filter and the suction filter. For filters servicing procedures, refer to "TRANSMISSION, TORQUE CONVERTER AND HYDRAULIC STEERING BOOSTER OIL FILTERS" in Section 9.

12 Air Cleaner Service Indicator

The green signal band telescopes the red signal band. The green band is actuated directly by a pressure drop (vacuum) between the air cleaner and the engine. After starting the engine, the green band may rise sufficiently exposing part of the red band. THIS MUST NOT BE MISTAKEN AS A SIGNAL FOR ELEMENT SERVICE. During operation, the green band will gradually rise in the window as dirt accumulates in the filter element. When the filter element reaches the maximum allowable restriction, the green band is out of view and automatically locks in this position. The red band will remain fully exposed even after stopping the engine. When this happens, filter element service is required. For air cleaner service instructions, refer to "AIR CLEANING SYSTEM" in Section 9.

13 Ether Injector Lever

The ether injector attachment is a cold weather starting aid. For additional information on the use of this attachment, refer to "STARTING THE ENGINE" in Section 5.

14 Transmission "HI-LO" Shift Lever

This lever is used to select the "HI" or the "LO" transmission gear range to provide two speeds forward and two reverse. For additional information refer to "OPERATING THE MACHINE" in Section 5.

15 Brake Pedal

The brake pedal is used to stop the tractor by mechanically applying the pivot brakes. The brake pedal is also used as a parking brake, refer to "Brake Pedal Lock" in this section.

16 Engine Speed Control Lever

Pull this lever "up" to increase the engine speed: push it "down" to decrease the speed. When the lever is moved all the way down, it cuts off the fuel supply which stops the engine.

17 Decelerator Pedal

Depressing this pedal slows the engine and overrides the setting of the engine speed control lever. It is used to slow the engine speed to approximately low idle so the transmission gears can be shifted easily and the loader can be started in motion gradually with the engine speed control lever remaining in its original position.

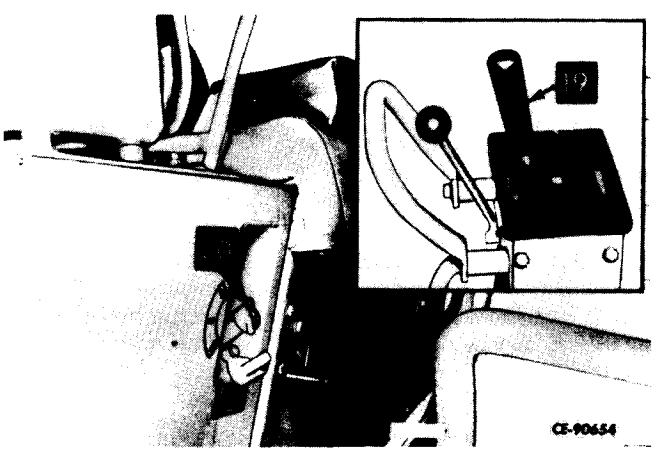
Continued on next page.

18 Brake Pedal Lock

The brake pedal (15) can also be used for parking by keeping the brake applied with the pedal lock (18, Illust. 3). To lock the brake pedal, depress the pedal as far as possible and lift up on the lock lever, remove the foot from the brake pedal, and the lock will hold the pedal in the applied position. (Illust. 4.) To release the brake, depress the pedal - the lock will automatically disengage.

19 Starting Switch Button (Illust. 3 and 6)

Place the "Safety Lock" in the "ON" position. Pull the gear selector lever to the rear in the slot provided in the hydraulic control gate to contact the starter switch button, completing the electrical circuit between the batteries and cranking motor.



Illust. 3
Brake Pedal Lock, Starting Switch Button and Electrical System Master Switch.

20 Electrical System Master Switch (Illust. 3)

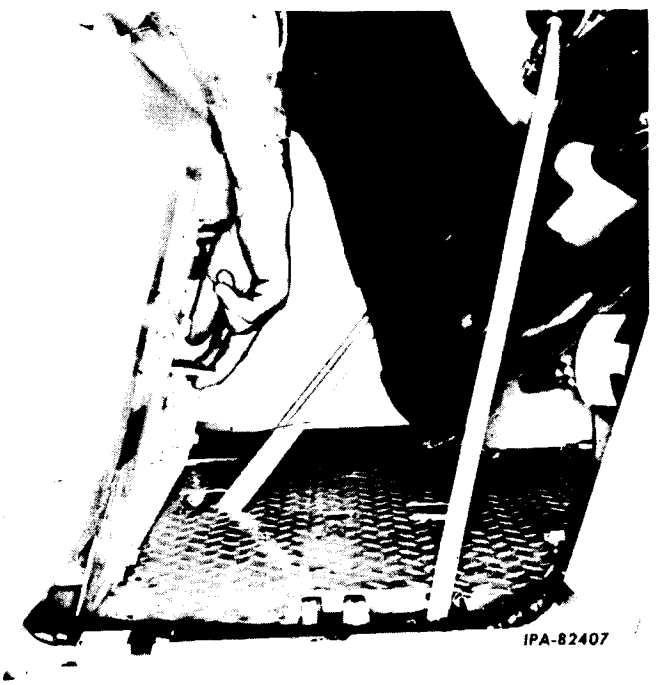
Pull and turn the switch to either "OFF" position to cut-out the electrical system.

NOTE: To prevent unauthorized of accidental starting, place thw hasp under the switch. Apply a padlock to the hasp, if so desired.

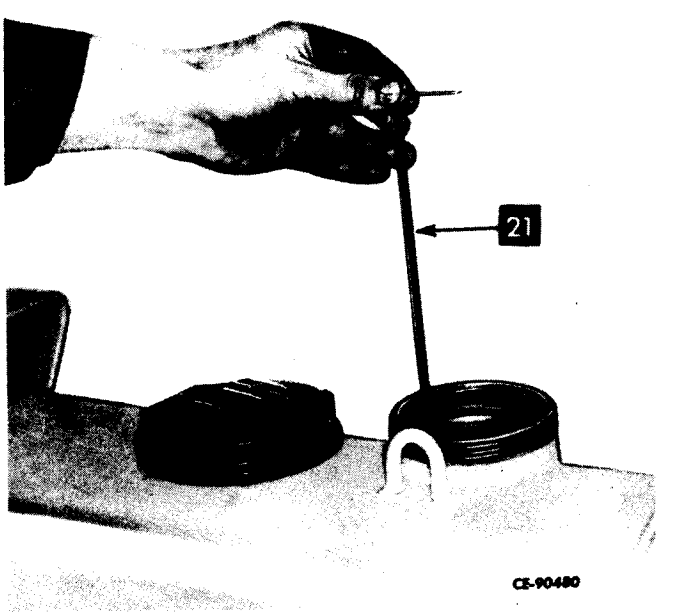
To close the electrical system, turn the switch to "ON."

NOTE: Keep the switch "ON" while the engine is running.

21 Fuel Tank Dip Stick (Illust. 5)



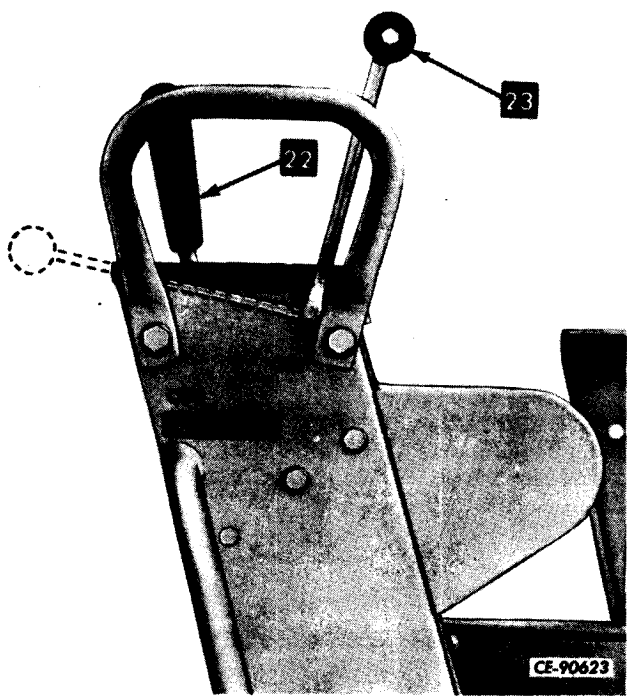
Illust. 4
Engaging the Brake Pedal Lock.



Illust. 5
Fuel Tank Dip Stick.

22 **Transmission Gear Selector Lever (Illust. 6)**

This lever is used to select the various transmission gear ranges. For additional information refer to "OPERATING THE MACHINE" in Section 5.



Illust. 6
Transmission Gear Selector Lever and Selector Lock Lever.

23 **Transmission Selector Safety Lock Lever (Illust. 6)**

This lever is used to lock the transmission gear selector lever (22) in the "NEUTRAL" position. During normal operation the lock lever is positioned in the "Off" position. This allows the gear selector lever to be moved to any of the four shift positions. Whenever starting the engine or when it is allowed to idle and the gear selector lever is in "NEUTRAL", the safety lock lever should be placed in the "ON" position.

24 **Steering Levers**

The right and left hand steering levers are used to steer the loader by engaging or disengaging the power flow from the transmission to either track. For additional information refer to "STEERING THE MACHINE" in Section 5.

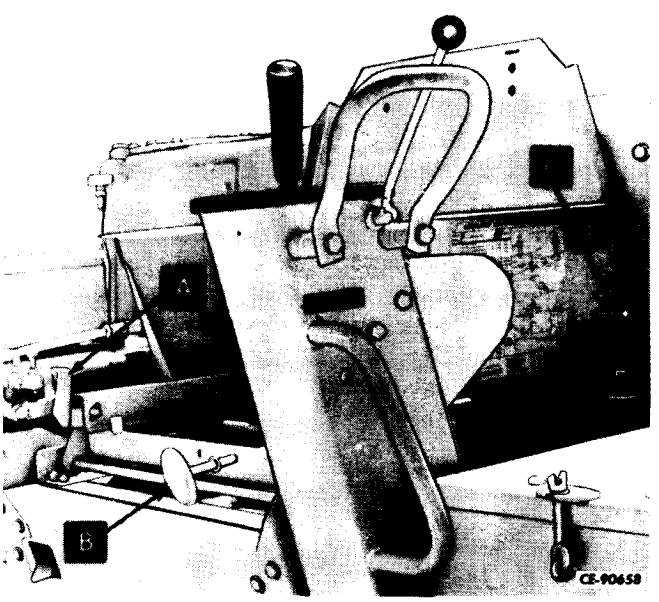
25 **Seat Adjustment (Illust. 7)**

For operator's convenience in reaching the controls and improved operating visibility, the operator's seat can be adjusted forward or backward and the bottom and back seat cushions can be adjusted to various positions.

Press down on the lever (A) and slide the seat back or forth to any one of five positions. When the seat engages the slide rail notch in the desired position, release the lever (A).

Turn the knob (B) to raise or lower the bottom seat cushion to any one of four positions.

Pull up on the adjuster rod (C), one on each side, and move the back seat cushion to any one of three positions.



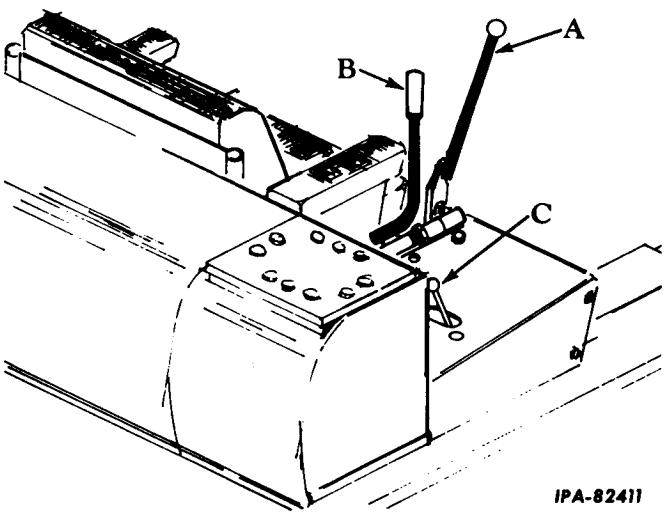
Illust. 7
Seat Adjustment.

26 **Not used**

CONTROLS (LOADER EQUIPMENT)

Hydraulic Valve Control Levers (Illust. 9)

These levers operate the hydraulic valve which is used to control the front and/or rear mounted loader equipment.

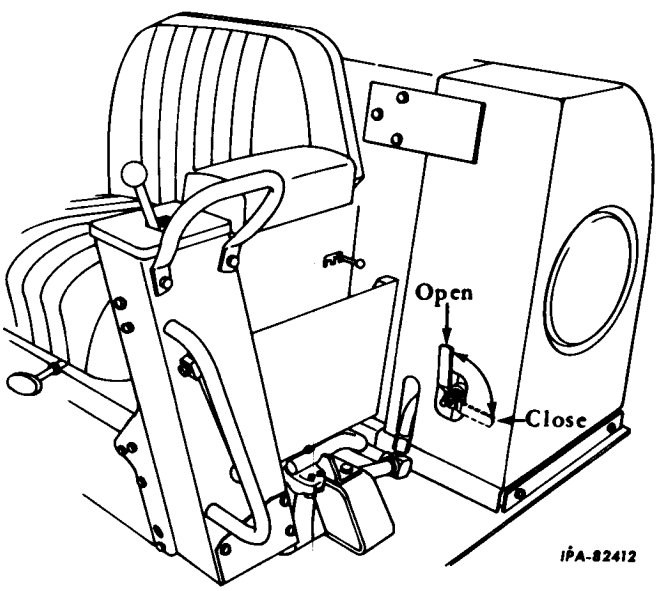


Illust. 9
Hydraulic Valve Control Levers.

The lever (A) controls the operation on any front mounted equipment. Loaders equipped with DROTT 4-in-1 bucket or grapple, require levers (A and B) for operation. Lever (B) is also required for operating any rear mounted equipment. Loaders equipped with front and rear mounted equipment, require lever (C) which permits a dual function of lever (B). Refer to "CONTROL LEVER OPERATION" in Section 6 for additional information.

Hydro Spring Valve (Illust. 10) (If Equipped)

The hydro spring cushions the oil pressure of the lift cylinders circuit. This feature can be included or omitted from the circuit with the hydro spring valve. Place the valve in the "open" position to include in the circuit; place it in "close" to omit it from the circuit. Refer to "HYDRO-SPRING" in Section 6 for additional information.

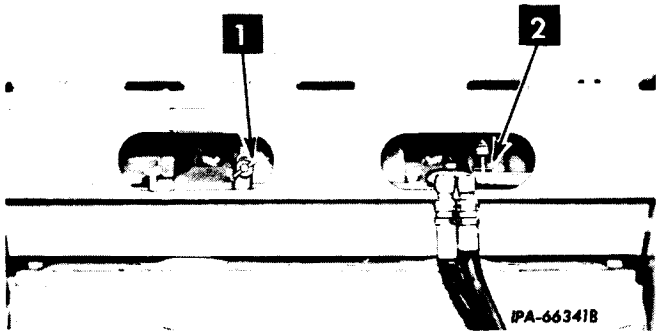


Illust. 10
Hydro Spring Valve Positions.

Step numbers correspond with the numbers shown on the illustrations.

1 Fuel tank drain valve (Illust. 1). Drain moisture from fuel tank. If loader is equipped with water trap, unscrew the drain screw (Illust. 5) and flush water and sediment. Retighten screw.

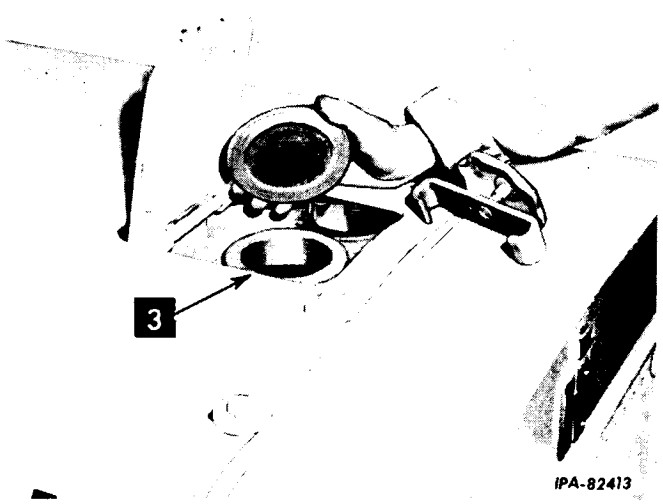
2 Fuel shut-off valve (Illust. 1). Open the shut-off valve. To prevent leakage from this valve when open, screw the needle stem out until the seat of the stem is tight against the stop.



Illust. 1

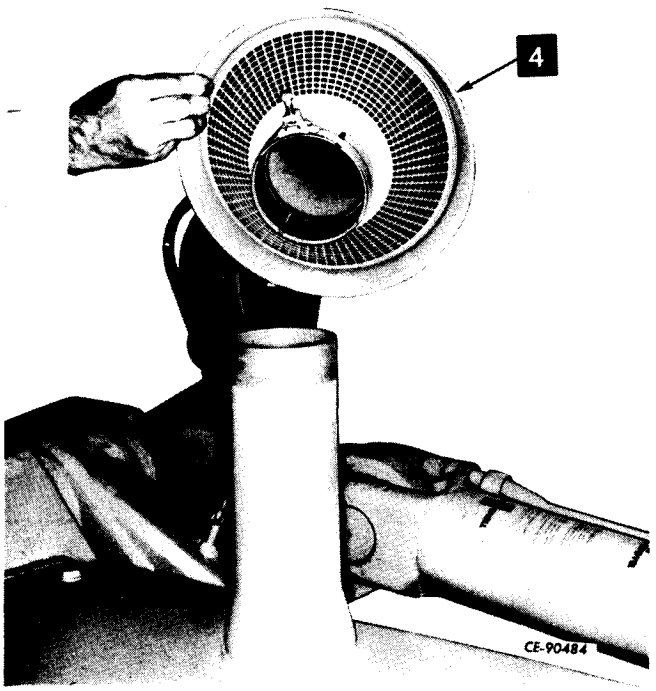
3 Check level of coolant in radiator (Illust. 2). Correct level should be one inch above baffle; if below, add coolant.

NOTE: Check coolant level before operating engine.



Illust. 2

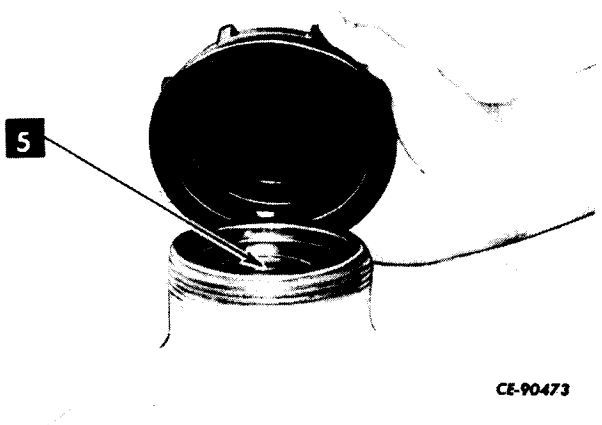
4 Air intake cap (Illust. 3). Remove the cap (twist and pull upward). Clean the screen with compressed air or wash in clean hot water preferrably containing a small amount of non-sudsing detergent.



Illust. 3

5 Be sure fuel tank is full (Illust. 4). Fill the tank at the end of each day's operation to reduce condensation of moisture.

Continued on next page.

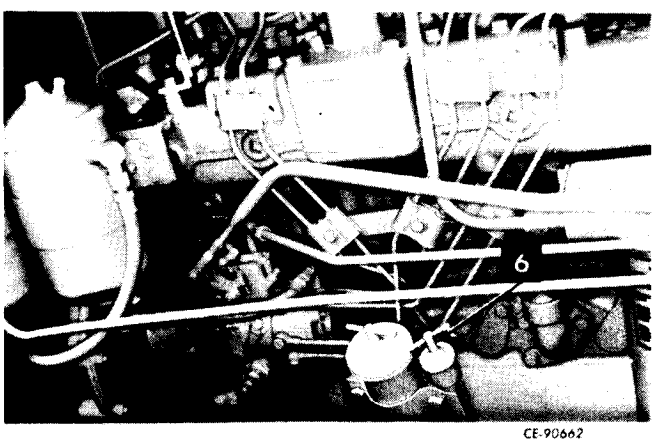


Illust. 4

PREPARING FOR EACH DAY'S WORK

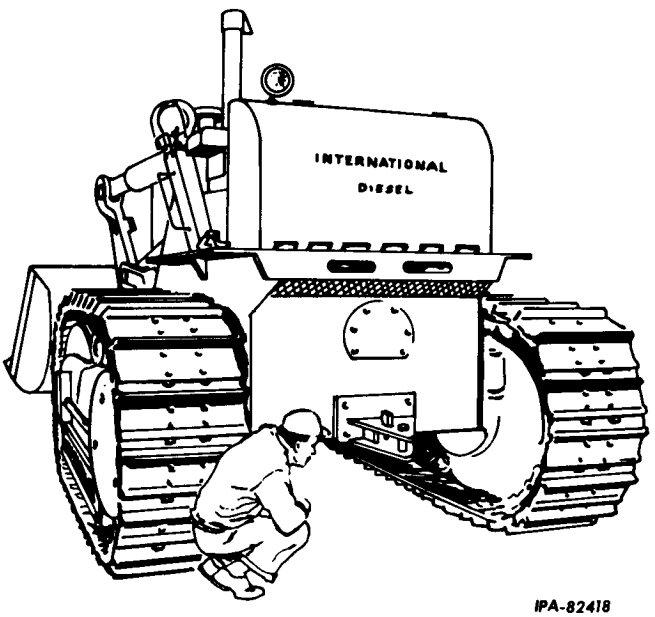
6 Lubrication

Perform each of the 10 hour lubrication requirements shown on the "LUBRICATION GUIDES" in Section 8.



CE-90662

Illust. 5



IPA-82418

LOOK FOR LEAKS AND DETERMINE THEIR SOURCE SO THAT THEY CAN BE CORRECTED.

SECTION CONTENTS

For instructions on operating the loader equipment, refer to Section 6.

PRECAUTIONS

Before starting or operating this loader read the following general precautions. These are listed here to help you protect the machine and to remind you of protection for yourself and those around you. Sound judgement and observance of these rules will help make your job a safer one.

Do not place the loader under load without the proper engine oil pressure and operating temperature. After starting the engine, allow it to run at approximately 800 to 1200 rpm (engine speed control lever in the first or second notch) for 5 to 10 minutes to obtain complete distribution of the lubricating oil.

To prevent any possible damage to the generator and/or voltage regulator, the electrical system master switch must be in the "ON" position when the engine is running. The switch must be in the "OFF" position only when the engine is shut down at the end of each day or when the operator leaves the loader unattended.

If the loader is left out during cold weather and the tracks become frozen to the ground, do not attempt to jerk them free with the power of the engine. Start the loader slowly and, if the tracks do not break free, pry them loose. If necessary, use a blow torch, being careful about fire hazards. To prevent the tracks from freezing in the ground, park the loader on planks.

Continued on next page.

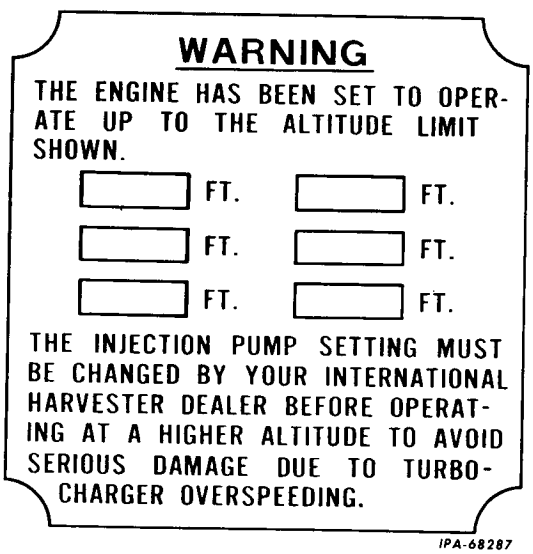
PRECAUTIONS

Never pour cold coolant into the radiator if the engine is very hot unless conditions make it absolutely necessary. Under such conditions, start the engine and let it idle while slowly pouring the coolant into the radiator. Fill the fuel tank at the end of each day's work to reduce moisture condensation in the tank.

When using a long chain or cable to hitch the loader to the load, drive the loader forward slowly until all slack is taken out.

During normal operation, the turbocharger must be free from vibration and unusual noises.

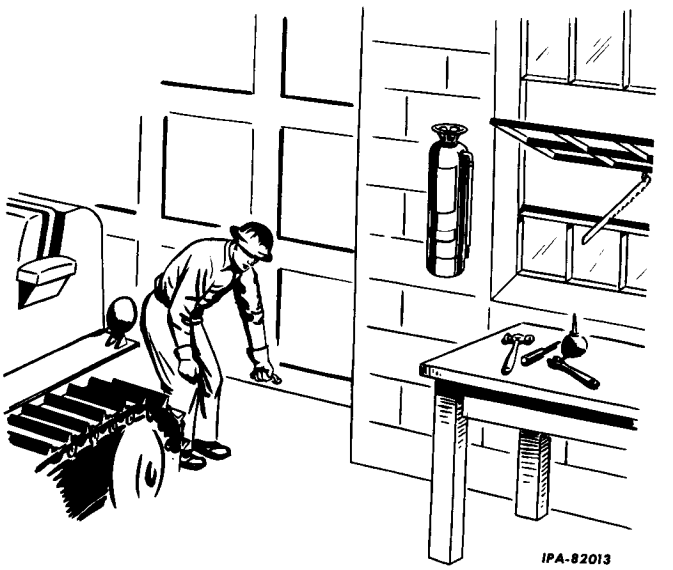
A turbocharger warning plate (Illust. 1), mounted on the left hand side of the governor control housing in the operator's compartment, shows the maximum altitude at which this loader may be operated. If the loader is to be operated at a higher altitude, consult your authorized International Construction Equipment distributor or dealer to change the injection pump setting.



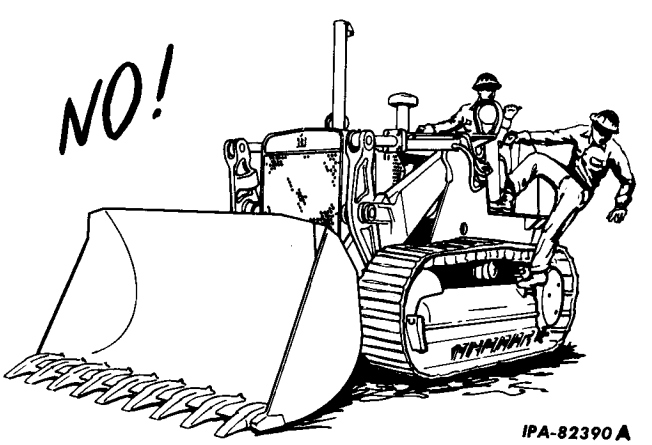
Illust. 1
Turbocharger Warning Plate.

Before shutting down, operate the engine at half throttle (no load) for three to five minutes. This will aid in cooling the engine and turbocharger.

◆ CAUTION: FOR PERSONAL PROTECTION, OBSERVE THE FOLLOWING SAFETY PRECAUTIONS.



PROVIDE PROPER VENTILATION WHEN OPERATING A LOADER IN A CLOSED BUILDING.

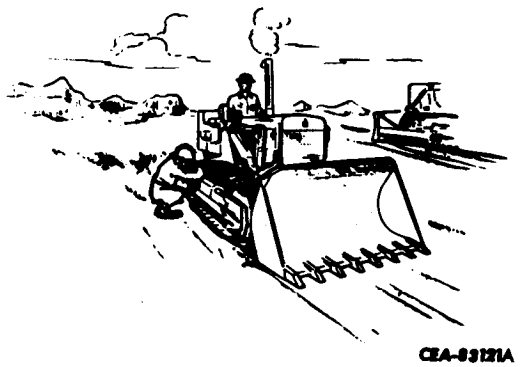


ONLY ONE PERSON, THE OPERATOR, SHOULD BE PERMITTED TO RIDE ON THE LOADER WHEN IT IS IN OPERATION.

PRECAUTIONS

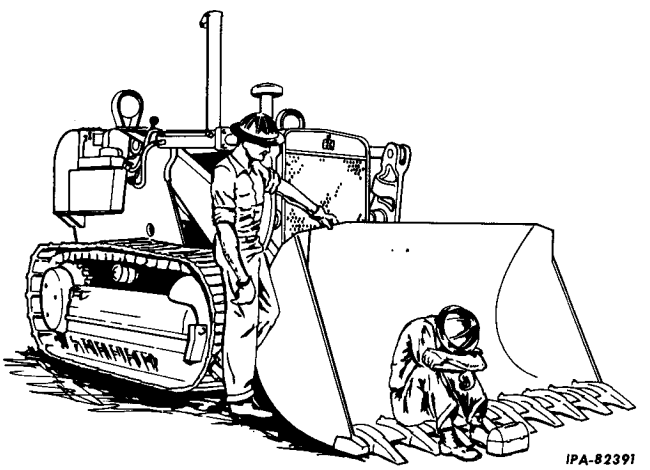
Use a commercial solvent or kerosine for cleaning parts unless otherwise specified.

Never operate the loader engine when cleaning or lubricating the loader.



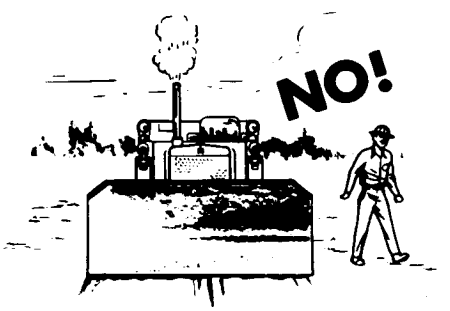
CEA-83121A

If it is necessary to make any checks with the engine running, always use two men. One man must stay at the loader controls while the other does the checking. As an added precaution, when making checks with the engine running, lock the transmission gear selector lever in the "NEUTRAL" position; shift the "HI-LO" shift lever in neutral (N) and apply and lock the foot brake.



IPA-82391

CLEAR IMMEDIATE AREA OF PERSONNEL OR OBSTRUCTIONS BEFORE STARTING ENGINE.

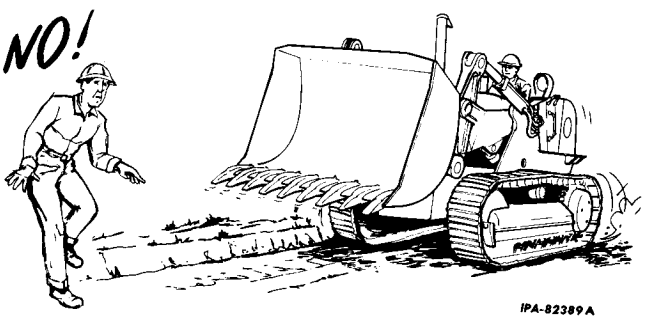


CEA-83124

When leaving the loader unattended, always lock the transmission gear selector lever in "NEUTRAL" and place the "HI-LO" shift lever in neutral (N); then apply and lock the foot brake.

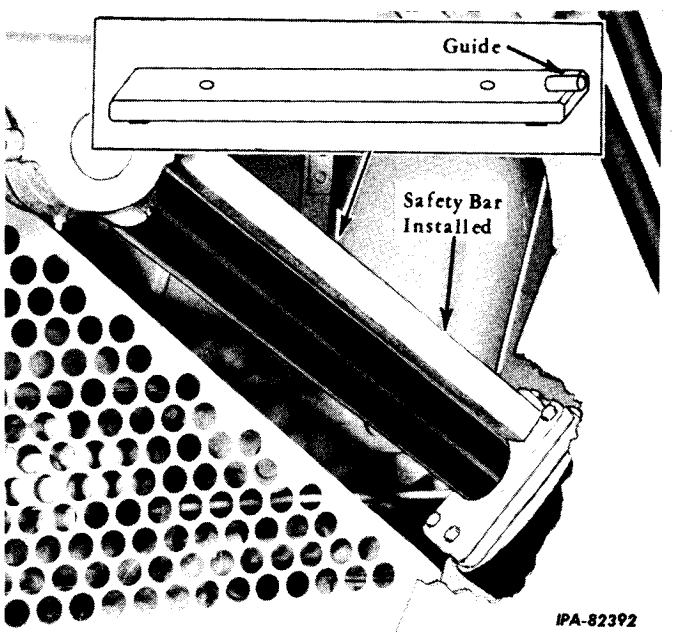
NEVER LEAVE THE LOADER UNATTENDED WHILE THE ENGINE IS RUNNING.

Lower the bucket before making any adjustments. To prevent personal injury, be sure no personnel are standing in the way of the bucket when it is being lowered.



IPA-82389A

CARRY BUCKET LOW FOR MAXIMUM VISIBILITY.



IPA-82392

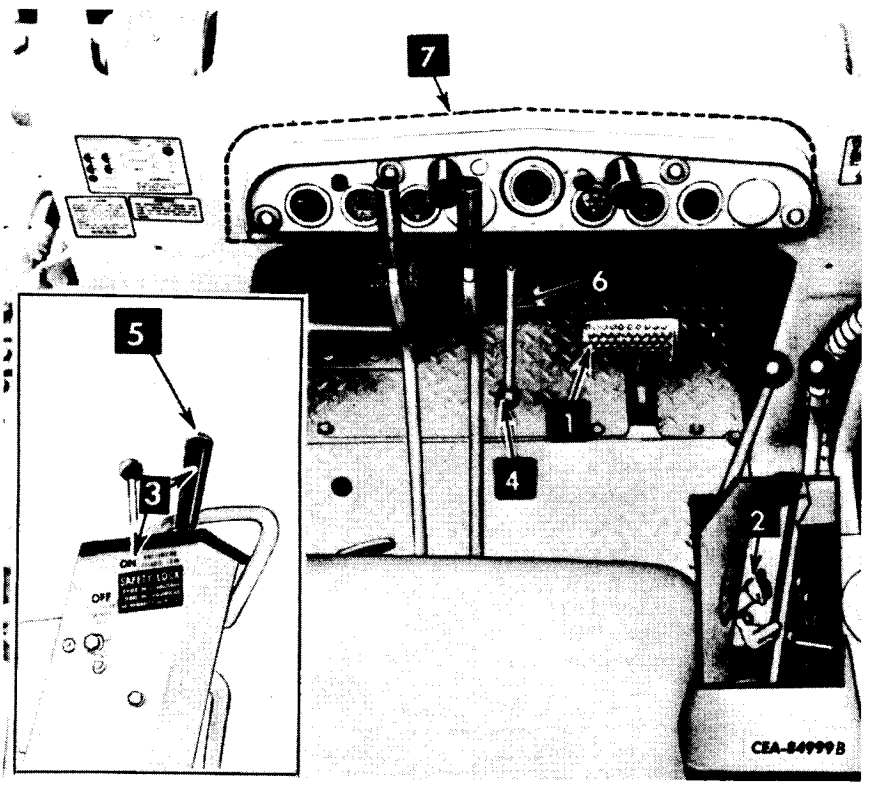
ALWAYS INSTALL THE SAFETY BAR WHENEVER SERVICING ANY PART OF LOADER WHICH REQUIRES THE LIFT ARM IN THE RAISED POSITION.

Position the safety bar so the guide on the end of the bar, engages the slot in the cylinder head of the lift cylinder and the opposite end of the bar rests against the block on the lift arm.

OPERATING THE MACHINE

STARTING THE ENGINE

Step numbers correspond with the numbers shown on Illust. 2.



Illust. 2
Starting the Engine.

NOTE: This engine cannot be started by towing, pushing or coasting the loader.

1 Apply and lock the foot brake.

2 Turn the electrical system master switch to "ON".

3 Lock power shift transmission gear selector lever in "NEUTRAL".

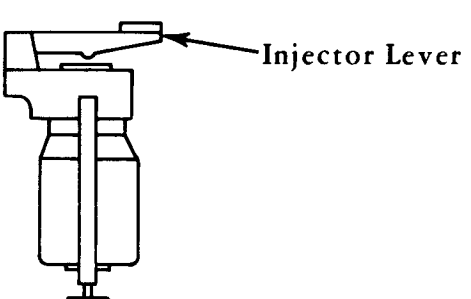
4 Move the engine speed control lever all the way up, then return to half throttle (approximately forth notch from bottom).

NOTE: Do not use the "Ether Injector" when starting or operating a warm engine.

5 Crank engine as follows:

a. NORMAL START - Pull the safety lock lever up into the "ON" position; move the transmission gear selector lever to the rear into the "START" position to contact the starting switch button to crank the engine.

b. USING ETHER INJECTOR - Same as step a, simultaneously depressing ether injector lever (Illust. 3) until engine starts. After engine starts it may be necessary to intermittently inject ether until engine is running smoothly.



Illust. 3
Ether Injector.

INDICATOR CHECK

NOTE: Crank engine for 30 seconds at a time; if engine does not start, allow cranking motor to cool two or three minutes before cranking again.

If the engine will not start or runs roughly, it may be due to one of the following:

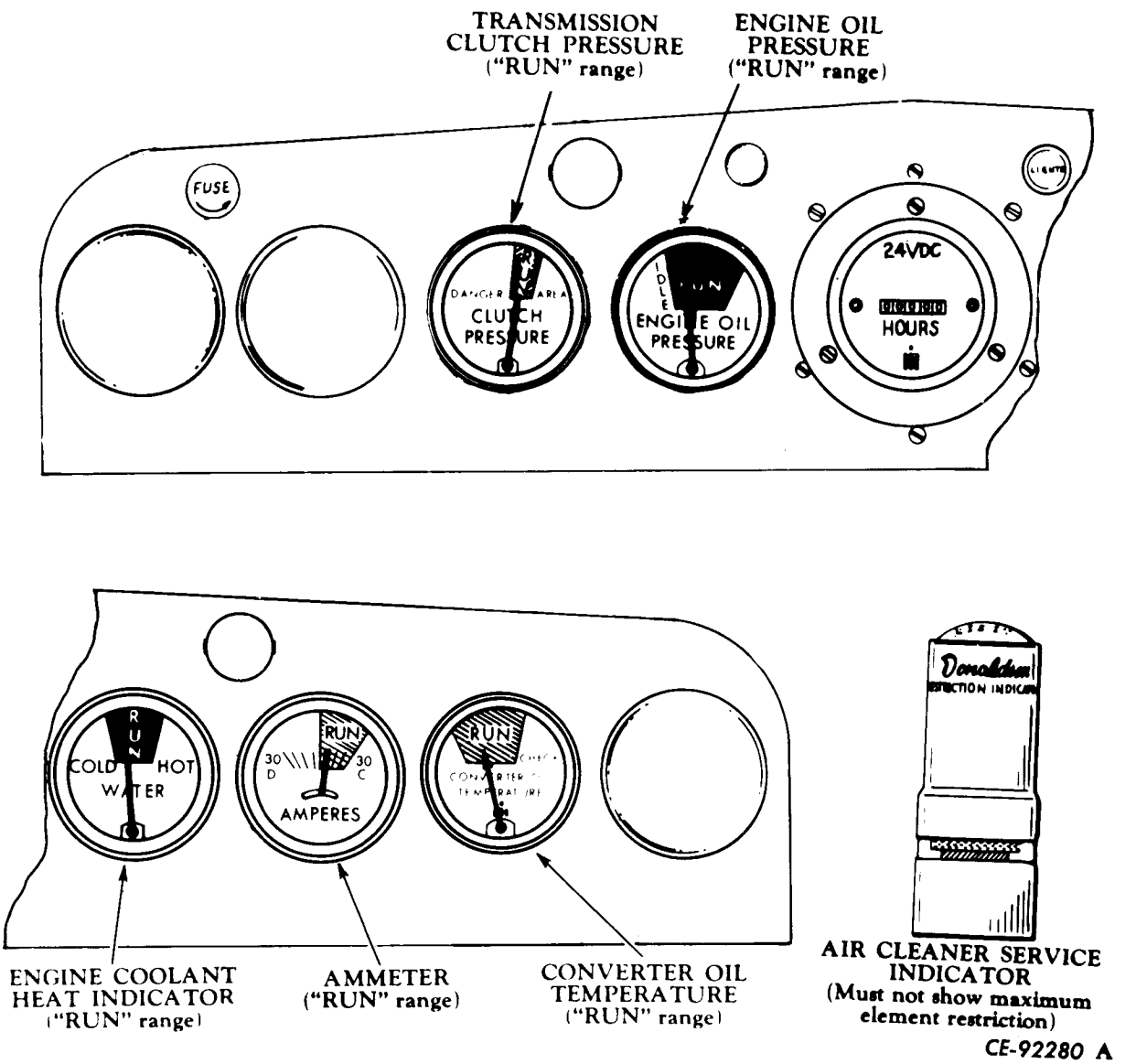
1. Air may be in the fuel system. Refer to "FUEL SYSTEM" in Section 9.

2. Air cleaner restricted. Check air cleaner service indicator.

6 After the engine starts, reduce engine speed to approximately 800 RPM (first or second notch).

7 Check all indicators for proper loader operation. Refer to "INDICATOR CHECK" in this section.

Immediately after the engine has started, and at frequent intervals during its operation, check all instruments to be sure of safe loader operation. The indicators in Illust. 4 are shown in their



Illust. 4
Instrument Panel.

OPERATING THE MACHINE

INDICATOR CHECK

"normal operating" positions at proper operating temperature and engine speed. A comparison between the illustration and the instrument panel will readily indicate proper loader function. Stop the engine if any of the indicators do not register as indicated, and locate and correct the cause. A more detailed description of each indicator and its function can be found in Section 3.

All indicators shown below are with: normal operating temperature; engine at high idle speed. Each indicator must register within range specified below for safe, correct operation.

OPERATING THE MACHINE

Step numbers correspond with the numbers shown on Illust. 5.

NOTE: Before operating, check all indicators. Refer to "INDICATOR CHECK" in this section.

1 Place the engine speed control lever in the high idle position (all the way up).

2 Depress the decelerator pedal to decrease engine speed to low idle.

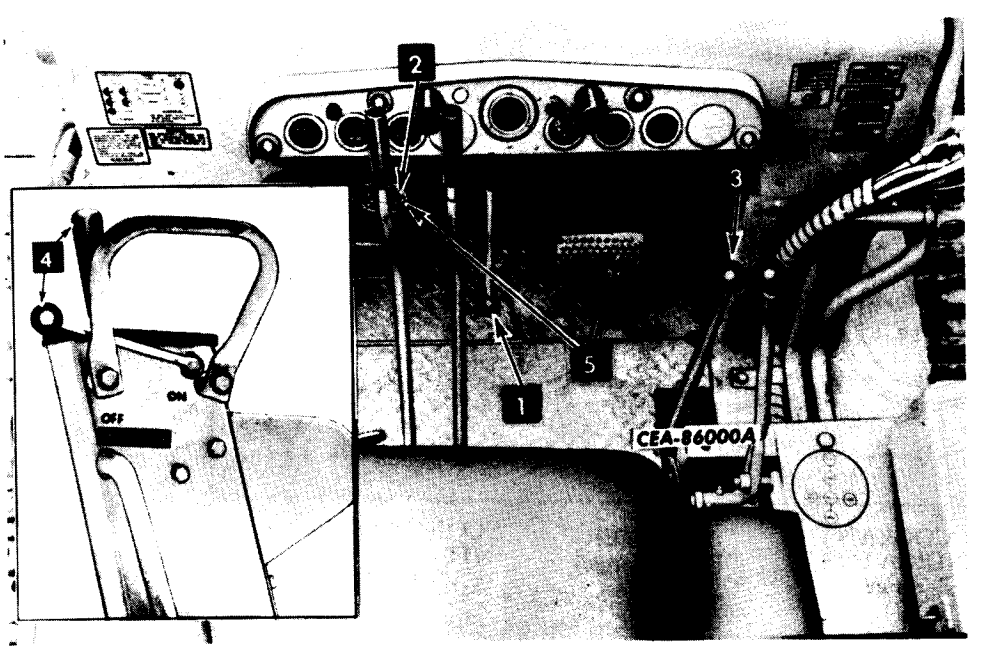
3 Shift the "HI-LO" shift lever from neutral (N) to the desired position. Refer to text in this section, "SHIFTING THE "HI-LO" SHIFT LEVER (ILLUST. 6)."

4 Unlock the gear selector lever and move it to the desired position. (Illust. 6.)

5 Release the brake pedal and gradually release the decelerator pedal.

SHIFTING THE TRANSMISSION GEAR SELECTOR LEVER (ILLUST. 6)

Within the "HI" or "LO" speed ranges are two power shift speed positions (1 and 3 or 2 and 4). These speeds are available in both forward and reverse and are power shifted with the transmission gear selector lever. When operating in either "HI" or "LO" range and the gear selector lever is in range "1-2," move the selector lever to range "3-4" for an immediate "on-the-go" increase in tractor speed. When operating in range "3-4" and an immediate "on-the-go" track power increase is required, move the selector lever to range "1-2." Normally, when loading is done in range "1-2," range "3-4" in either forward or reverse would be used to transport the material.



Illust. 5
Operating the Loader.

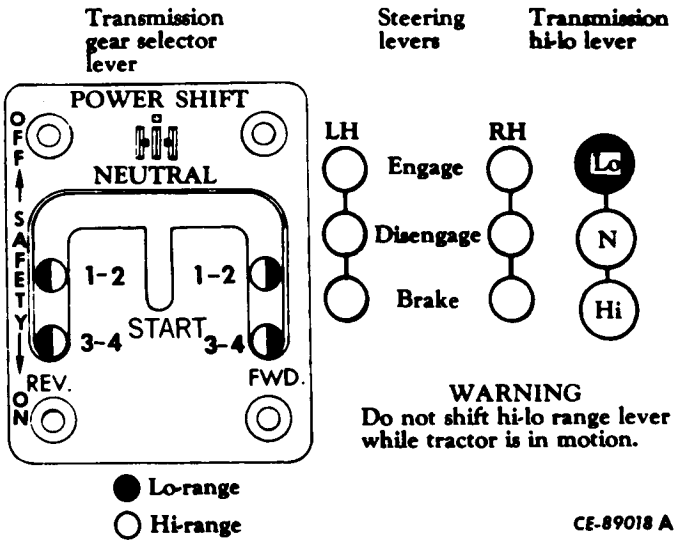
OPERATING THE MACHINE

Changing Direction of Travel

1. Decelerate the engine to low idle with foot decelerator and stop loader.

2. Shift the transmission gear selector lever to the desired position.

3. Release brake pedal; gradually release the decelerator pedal.



Illust. 6
Shifting Patterns.

STEERING THE MACHINE

SHIFTING THE "HI-LO" SHIFT LEVER (ILLUST. 6)

The transmission has a "LO" speed range for heavy work, and a "HI" speed range for normal work and traveling. Selection of the proper range ("HI" or "LO") will depend on the ground conditions and type of material being handled. To select the loader speed range ("HI" or "LO"), the loader must be stopped and the transmission gear selector lever must be in neutral.

Steering the loader is accomplished with the two steering levers. Each of the two levers function in three positions as shown in Illust. 7. "ENGAGE" (forward position) controls the power flow from the transmission to each track; "DISENGAGE" (middle position) interrupts the power from the transmission to each track; "BRAKE" (rear position) interrupts the power flow and applies the brake.

To turn to the right or left, pull back the steering lever on the side toward which the turn is to be made. Pull the lever back just enough to make the desired turn. To make a pivot turn, pull the lever all the way back.

LOCKING BOTH TRACKS

When both steering levers are pulled simultaneously all the way back, the braking action "locks" both tracks.

NOTE: Never pull both steering levers all the way back to stop the loader unless the loader is moving very slowly. Use the foot brake to slow down or stop the loader.

DOWNGRADE OPERATION

Before going downgrade, select a gear range which will provide full loader control without overspeeding the engine. Steering is handled in the same manner as when traveling on level ground with or without a load.

NOTE: In steep downhill operation, use the decelerator pedal and foot brake to control loader speed.

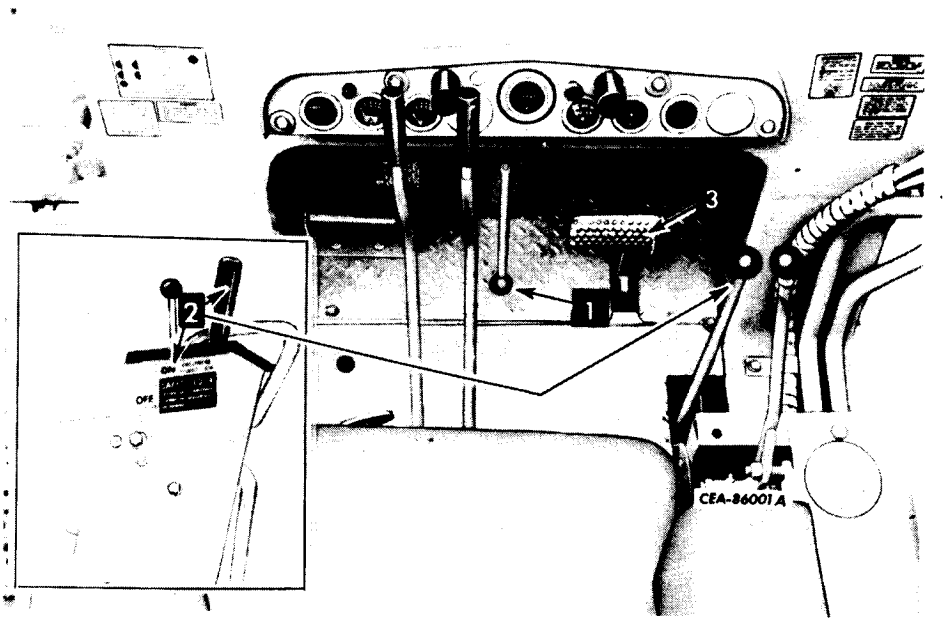
OPERATING OVER AN OBSTRUCTION

When crossing a log or ditch bank, use the decelerator pedal to slow the loader; and when possible, cross at an angle. Then gradually increase the power to the tracks as the loader moves forward, over, and down. If the load is light, it may also be necessary to use the foot brake.

OPERATING THE MACHINE

STOPPING THE MACHINE

Step numbers correspond with the numbers shown on Illust. 7.



Illust. 7
Stopping the Loader.

1 Move the engine speed control lever down to low idle, DO NOT STOP THE ENGINE.

2 Place and lock the transmission gear selector lever in "NEUTRAL". Place the "HI-LO" shift lever in neutral (N).

3 Apply and lock the foot brake.

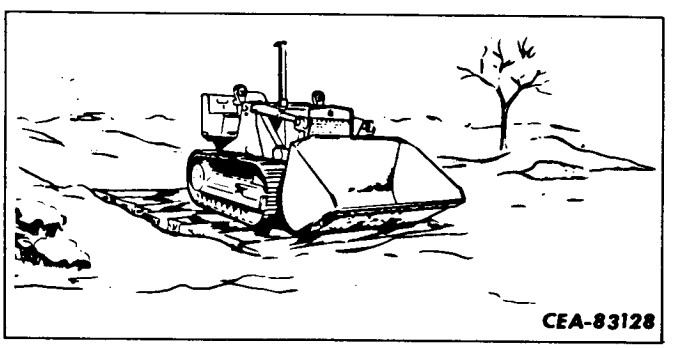
NOTE: During extremely cold weather, secure the tracks with blocks. DO NOT LOCK THE BRAKE.

PARKING

A few "DO" suggestions to protect both lives and equipment when parking.

DO park loader on planks in freezing weather, to prevent tracks from freezing to ground.

DO lower hydraulically supported loader equipment to the ground to reduce injury possibilities and to gain loader stability.



Illust. 8
Parking on Planks.

NOTE: PARKING ON A STEEP SLOPE IS NOT RECOMMENDED.

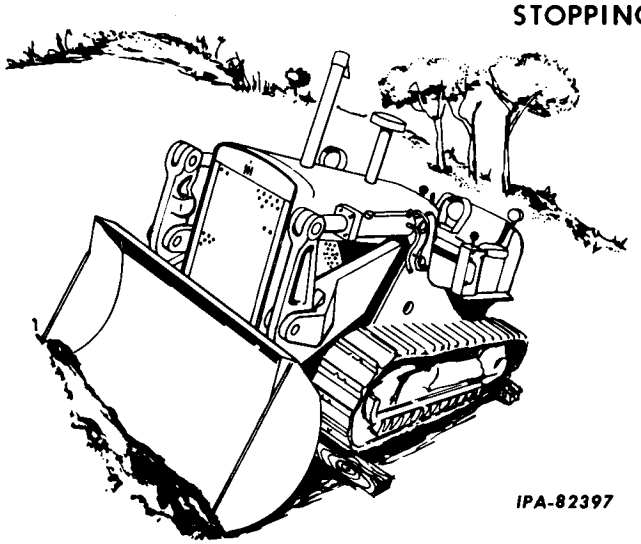
◆ CAUTION: NEVER LEAVE LOADER UNATTENDED WHILE THE ENGINE IS RUNNING.

DO park loader on level ground, if at all possible, to:

a. Avoid unexpected movement.

b. Obtain accurate coolant, lubricant and fuel level checks.

STOPPING THE MACHINE



Illust. 9
Parking on a Slope.

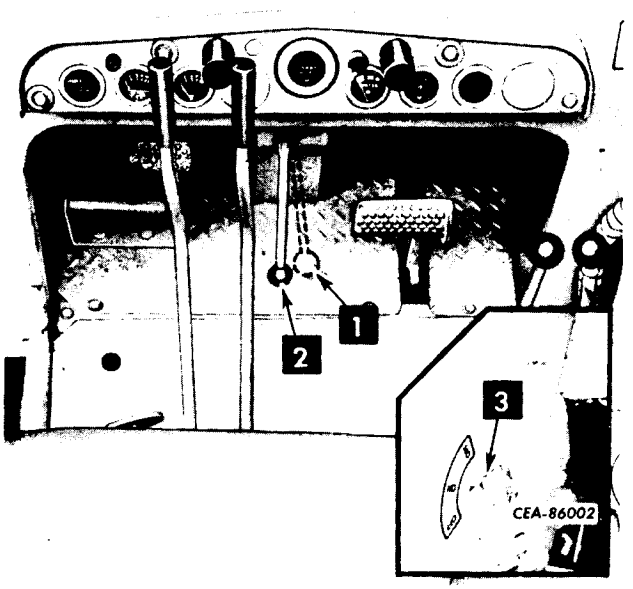
DO avoid parking loader on slopes. If necessary, park at a right angle, then secure with blocks (front and rear) (Illust. 9.)

STOPPING THE ENGINE

Step numbers correspond with the numbers shown on Illust. 10.

1 Operate the engine at half throttle (no load) for three to five minutes.

NOTE: Serious damage can result to the engine and turbocharger if the above step is neglected.

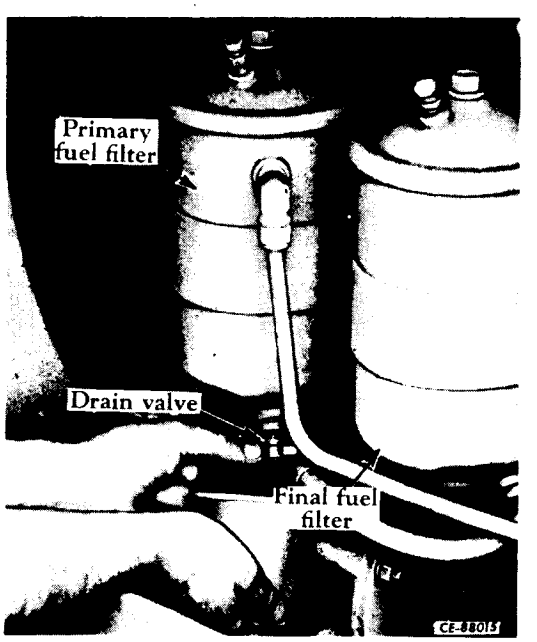


Illust. 10
Stopping the Engine.

2 Move the engine speed control lever down to the shut-off position.

3 Turn electrical system master switch to "OFF."

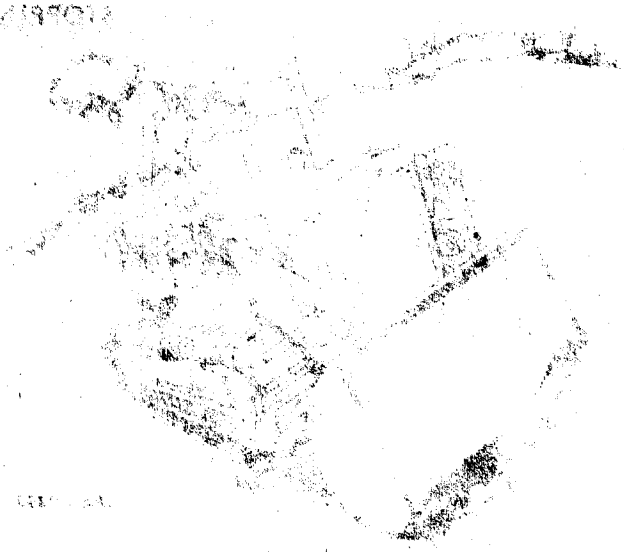
NOTE: When the loader is shut down at the end of each day and is left unattended, this switch may be locked.

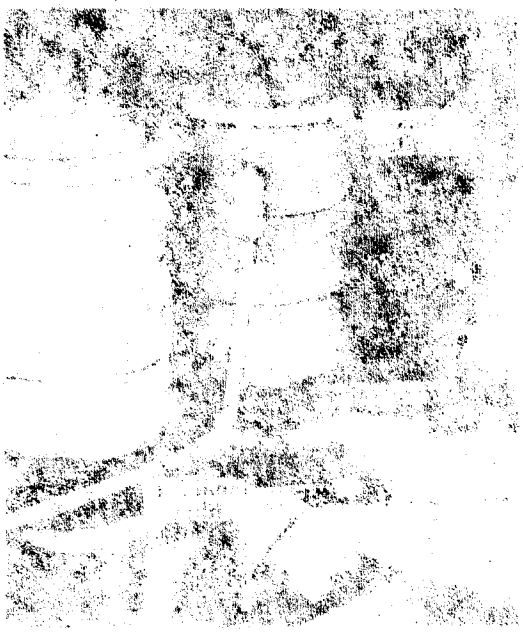


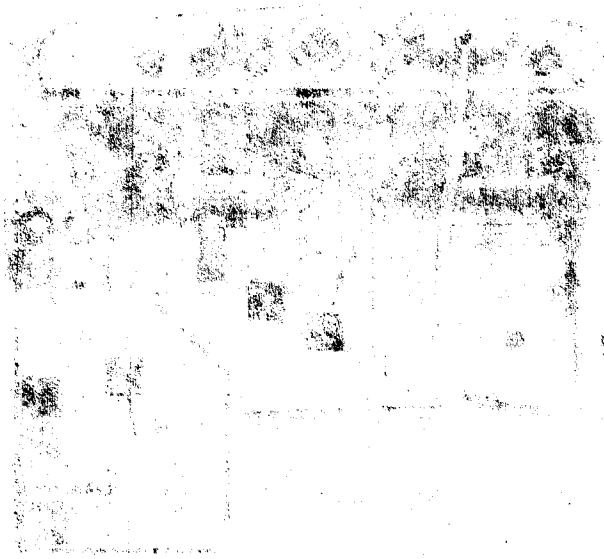
Illust. 11
Draining Water Separator Primary Fuel Filter Element.

4 Drain the water separator primary fuel filter element (if equipped).

Open the drain valve (Illust. 11); drain water into a container to avoid spilling, until clear diesel fuel appears, then close the valve.







SECTION CONTENTS

GENERAL

The hydraulic system provides power for hydraulic operated loader equipment and various other implements and attachments.

Specific instructions for operation of the loader equipment are included in this section. Instructions for operation of various other implements and attachments are furnished with the equipment.

CONTROL LEVER OPERATION

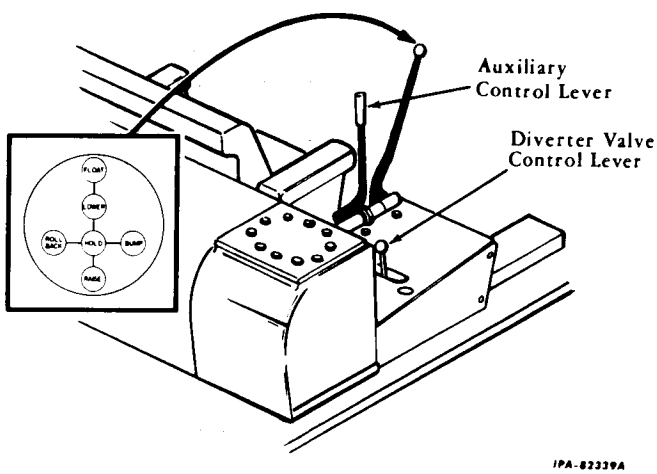
LIFT ARM AND BUCKET CONTROL LEVER (ILLUST. 1)

The lever positions are: RAISE, HOLD, LOWER, FLOAT, DUMP, ROLL BACK. The positions of DUMP and ROLL BACK can be used simultaneously with any of the other four positions.

Raise

Pull the lever back as far as it will go. A detent in the valve locks the lever in this position; a return to "HOLD" must be done manually.

NOTE: On units equipped with automatic kick-out feature, the lever will automatically return to "HOLD" when the lift arm and bucket reach a preset dumping height.



Illust. 1
Lift Arm and Bucket Control Lever Positions.

CONTROL LEVER OPERATION

Hold

To hold the lift arm and bucket in any fixed position, move the lever to this position.

Lower

Move the lever to this position. The lever, when released, will automatically return to "HOLD."

Float

Move the lever to this position. A detent in the valve locks the lever in this position; a return to "HOLD" must be done manually. This allows a bucket return to ground level by gravity.

Dump

With the lever in "RAISE," "HOLD," "LOWER," or "FLOAT," move the lever to this position. The lever, when released, will automatically return to "HOLD."

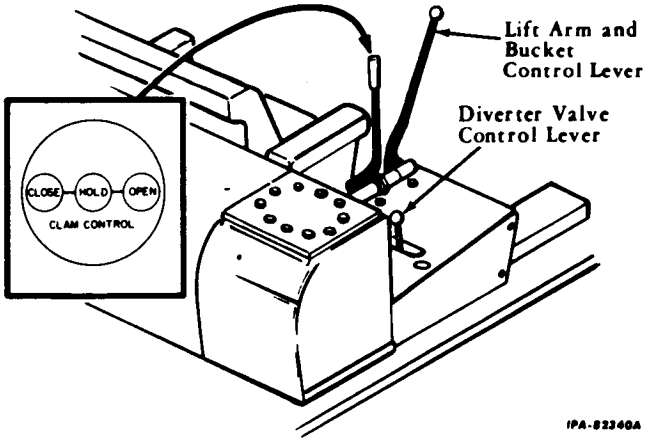
Roll Back

With the lever in "RAISE," "HOLD," "LOWER," or "FLOAT," move the lever to this position. The lever, when released, will automatically return to "HOLD."

NOTE: On units equipped with automatic kick-out feature, a detent in the valve locks the lever in this position. The lever will automatically be released from "ROLL BACK" position when the bucket reaches a preset position.

AUXILIARY CONTROL LEVER

The auxiliary control lever positions are: CLOSE, HOLD, OPEN (Illust. 2) or LOWER, HOLD, RAISE (Illust. 3).



Illust. 2
Auxiliary Control Lever Positions (For Loaders Equipped with DROTT 4-IN-1 Bucket or Grapple).

Close

To close the clam of the bucket or arm of the grapple, move the lever to this position.

Hold

To hold the clam of the bucket or arm of the grapple in any fixed position, move the lever to this position.

NOTE: The lever, when released, will automatically return to "HOLD" from "CLOSE" or "OPEN." Holding the lever in "CLOSE" or "OPEN" upon reaching the limit of piston travel will produce excessive heat which may affect equipment performance and cause the hydraulic system and engine to overheat. The correct procedure is to switch to "HOLD" at the limit of travel if it is desired to hold this position for several minutes.

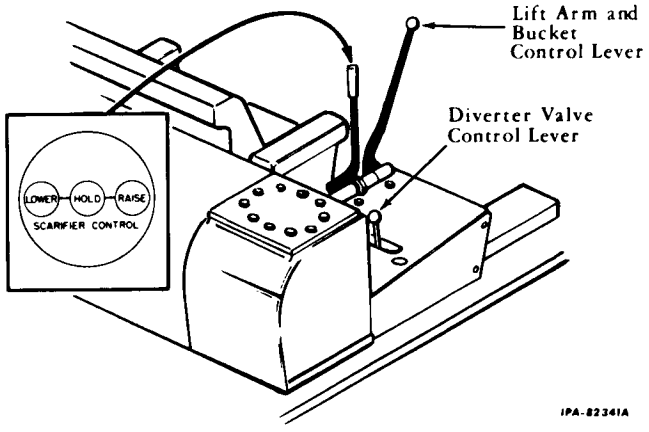
Open

To open the clam of the bucket or arm of the grapple, move the lever to this position.

Lower

To lower the scarifier teeth into the ground, move the lever to this position.

CONTROL LEVER OPERATION



Illust. 3
Auxiliary Control Lever Positions
(For Loaders Equipped with
Rear Mounted Scarifier).

Hold

To hold the scarifier teeth in any fixed position, move the lever to this position.

NOTE: The lever, when released, will automatically return to "HOLD" from "RAISE" or "LOWER." Holding the lever in "RAISE" or "LOWER" upon reaching the limit of piston travel will produce excessive heat which may affect scarifier performance and cause the hydraulic system and engine to overheat. The correct procedure is to switch to "HOLD" at the limit of travel if it is desired to hold this position for several minutes.

Raise

To raise the scarifier, move the lever to this position.

DIVERTER VALVE CONTROL LEVER (ILLUST. 4)

The diverter is used when operating a loader equipped with a DROTT 4-IN-1 or grapple, and a rear scarifier.

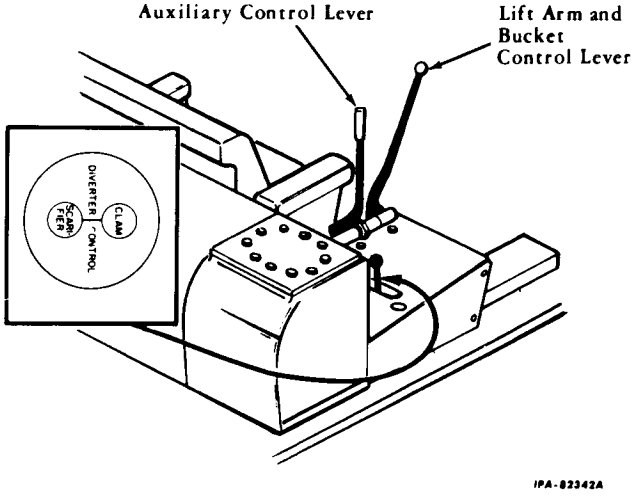
The diverter valve control lever positions are: SCARIFIER, CLAM.

Scarifier

To operate the scarifier, move the lever to this position.

Clam

To operate the clam of the 4-IN-1, or grab arm of the grapple, move the lever to this position.

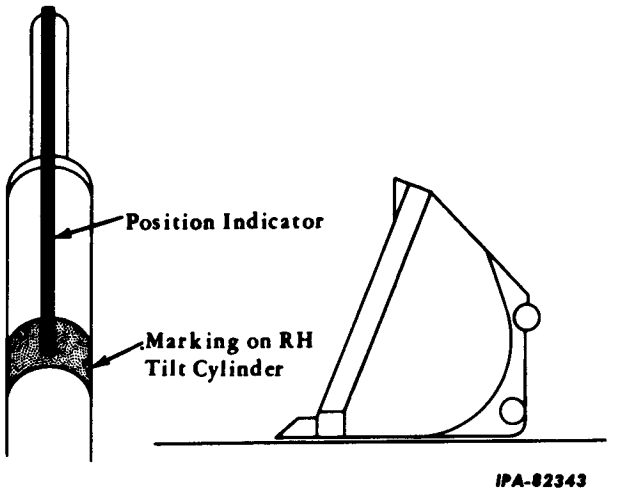


Illust. 4
Diverter Valve Control Lever Positions.

POSITION INDICATOR

LOADERS EQUIPPED WITH STANDARD BUCKET

With the bucket in the raised or lower position, roll the bucket back or forward until the indicator tip is centered on the marking on the right hand tilt cylinder as shown in Illust. 5. This indicates the cutting edge and teeth of the bucket are in a level position. With this as a starting point, it enables the operator to determine the desired depth of cut.



Illust. 5
Position Indicator
(Loaders Equipped with Standard Bucket)

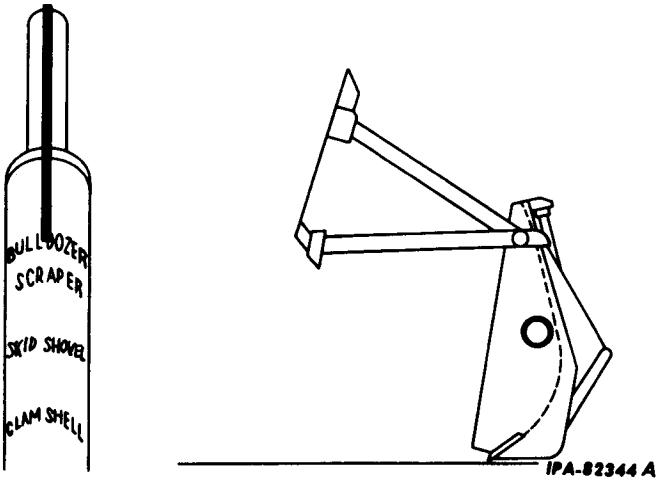
LOADERS EQUIPPED WITH DROTT 4-IN-1 BUCKET

The 4-IN-1 can be used as a "BULLDOZER," "SCRAPER," "SKID SHOVEL," or "CLAM-SHELL." The position indicator and decal located on the right hand tilt cylinder, enables the operator to position the 4-IN-1 in any one of these four positions as follows:

Bulldozer (Illust. 6)

a. Lower the 4-IN-1 to ground level.

b. Roll the 4-IN-1 back or forward until the indicator tip is centered on "BULLDOZER." Open the clam.

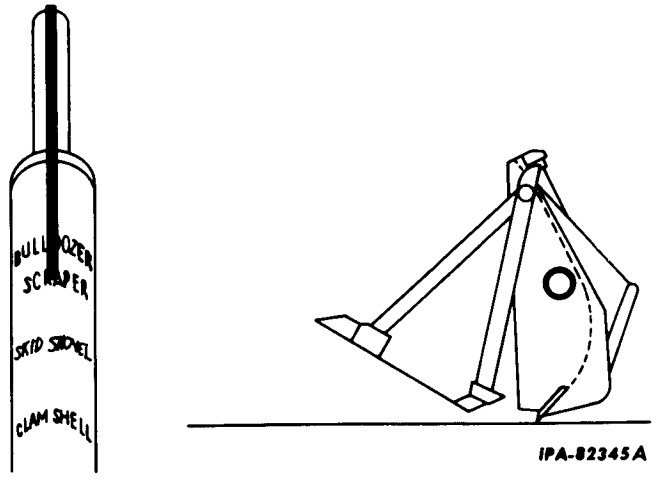


Illust. 6
Position Indicator and 4-IN-1
in Bulldozer Position.

Scraper

a. Lower the 4-IN-1 to ground level.

b. Roll the 4-IN-1 back or forward until the indicator tip is centered on "SCRAPER." Open the clam slightly.

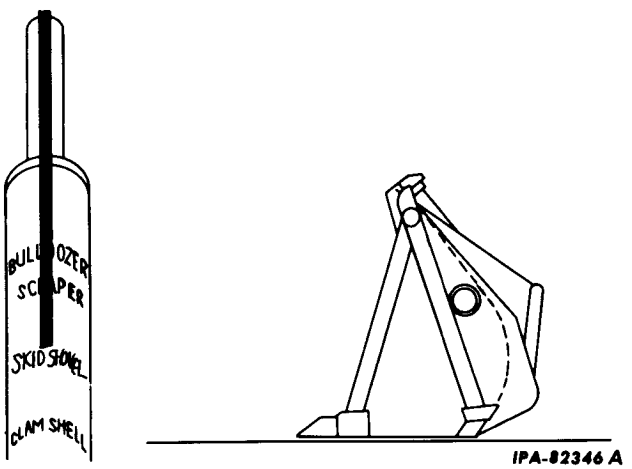


Illust. 7
Position Indicator and 4-IN-1
in Scraper Position.

Skid Shovel (Illust. 8)

a. Lower the 4-IN-1 to ground level.

b. Roll the 4-IN-1 back or forward until the indicator tip is centered on "SKID SHOVEL."

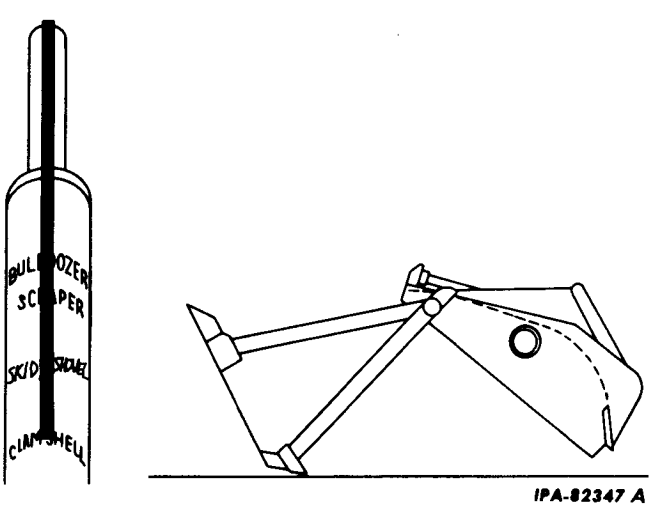


Illust. 8
Position Indicator and 4-IN-1 in Skid Shovel Position.

Clamshell (Illust. 9)

a. Lower the 4-IN-1 to ground level.

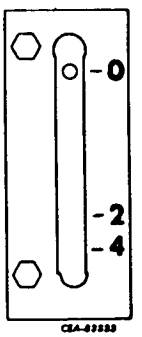
b. Roll the 4-IN-1 back or forward until the indicator tip is centered on "CLAM-SHELL." Open the clam all the way.



Illust. 9
Position Indicator and 4-IN-1 in Clamshell Position.

DEPTH-OF-CUT INDICATOR (ILLUST. 10)

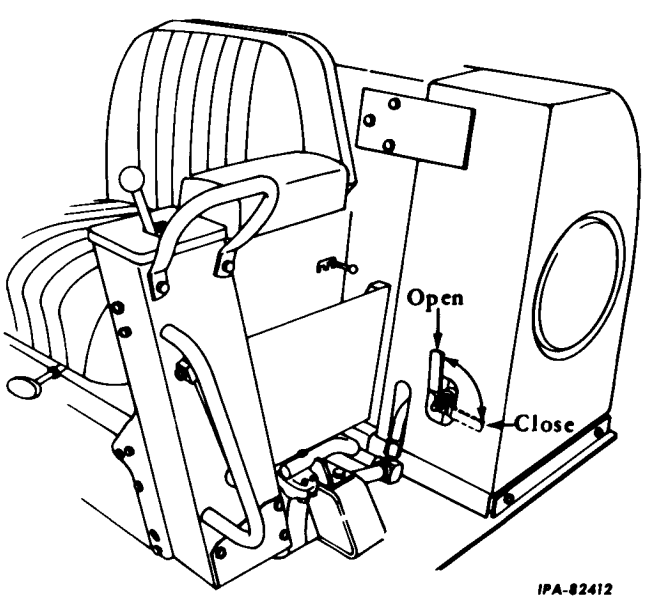
This indicator is located on the upper left rear side of the 4-IN-1 bucket. It indicates the maximum amount of depth cut depending on the clam opening. Use this indicator when inch-close dozer, grader or scraper accuracy is required.



Illust. 10
4-IN-1 Depth Gauge Indicator.

HYDRO SPRING (IF EQUIPPED)

The hydro spring is a mechanical "shock absorber" for the hydraulic lift circuit. It is not connected to and has no effect on any of the other loader hydraulic circuits. When used, it reduces the "bounce" when transporting and the "shock" when driving or bumping into hard objects. When greater prying forces are required or when finish grading where rigid control is needed, omit the hydro spring by closing the hydro spring valve.



Illust. 11
Hydro Spring Valve Positions.

SELF-LEVELING AND AUTOMATIC KICK-OUT (IF EQUIPPED)

The kick-out device, located on the right side of the front frame, automatically stops the bucket at a pre-set height for dumping.

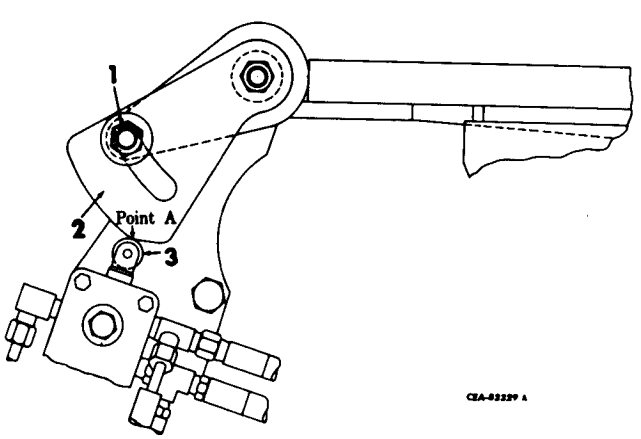
The self-leveling device, located on the right hand tilt cylinder, allows the operator to automatically return the bucket to a pre-set digging angle after dumping.

After loading the bucket, pull the lift arm and bucket control lever into "RAISE." A detent in the valve will then retain this position until the bucket has risen to the pre-set height. The lever will then automatically return to the "HOLD" position. After dumping, pull the control lever into "ROLL BACK" and push forward into "FLOAT." Again, detents in the valve will retain the lever position; the bucket will return to the pre-set digging angle and ground level. The lever will then automatically return from "ROLL BACK" to "HOLD"; return from "FLOAT" must be done manually.

Automatic Kick-out Adjustment (Illust. 12)

1. Raise the bucket to the desired dumping height.

2. Loosen the lock nut (1) and move the cam (2) until point A of the cam depresses the roller (3), as shown; retighten the lock nut.



Illust. 12
Automatic Kick-out Adjustment.

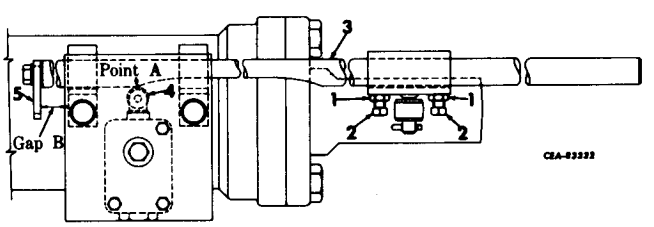
1. NUT, lock.
2. CAM.
3. ROLLER, valve.

Self-leveling Adjustment (Illust. 13)

1. With the bucket lowered, tilt it to the desired dig angle.

2. Loosen the lock nuts (1) and set screws (2) and slide the shaft (3) until point A of the shaft depresses the roller (4) as shown; retighten the set screws and lock nuts.

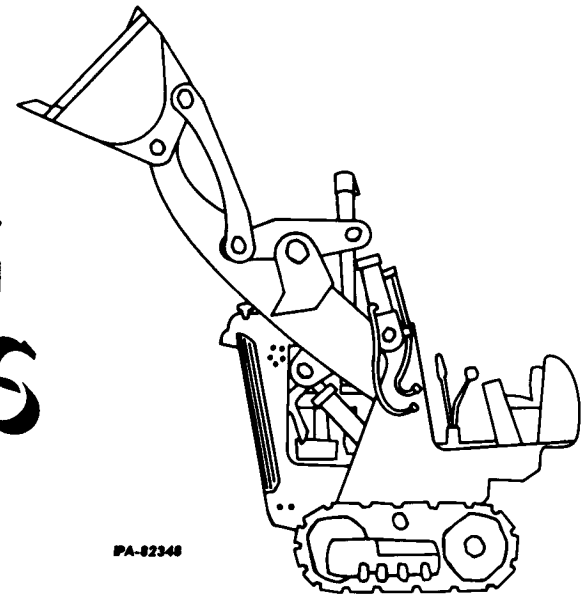
3. A minimum of 1/16 inch clearance must exist (gap B) between the indicator (5) and the valve mounting bracket when the bucket is completely rolled back. Check this by rolling the bucket back very slowly. If necessary, readjust the self-leveling shaft for the required clearance.



Illust. 13
Self-leveling Adjustment.

1. NUT, lock.
2. SCREW, set.
3. SHAFT.
4. ROLLER, valve.
5. INDICATOR.

OPERATING TECHNIQUES

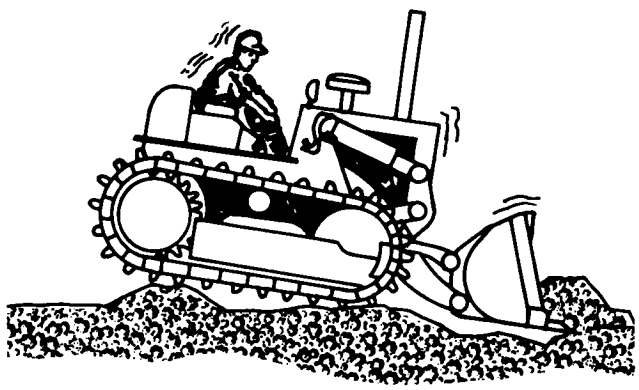


PA-82348

SECTION CONTENTS

GENERAL

When possible, start all jobs from relatively level ground. If necessary, level an area large enough to provide sufficient working space for the loader. This prevents back and forth pitching of the loader and will result in easier digging.



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Illust. 1

Avoid track spinning whenever possible; this wastes effort and only converts a relatively smooth working area into ruts and piles that pitch and tilt a loader. In cold weather this material can freeze and cause additional difficulty the following day.

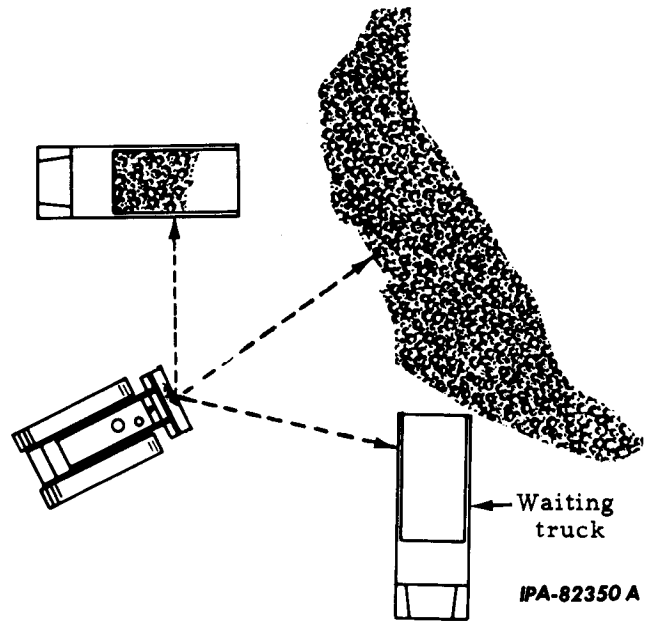
Crossing ditches, ridges, rocks or logs must be done slowly and, if possible, at an angle. This slows the fall, lessens the danger of upsetting the loader and reduces the fall jolt which can be harmful to the operator and loader.

When handling heavy loads or working on rough terrain, we recommend that the counterweight attachment be installed on the rear of the loader to counterbalance the loader bucket.

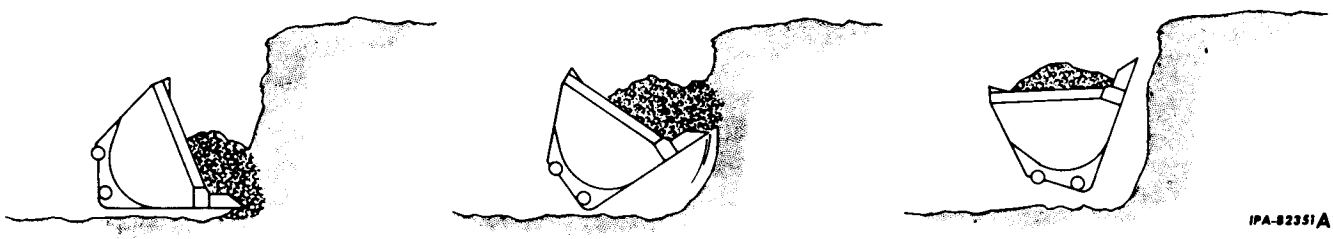
OPERATING TECHNIQUES

TRANSPORTING, LOADING OR PILING

When loading from a bank or stockpile, use the V-method shown in Illust. 2. Keep the trucks close to the work area to minimize loader travel. Keep work areas clean and level. When possible, spot the next truck to be loaded on the opposite side as shown in Illust. 2.



Illust. 2

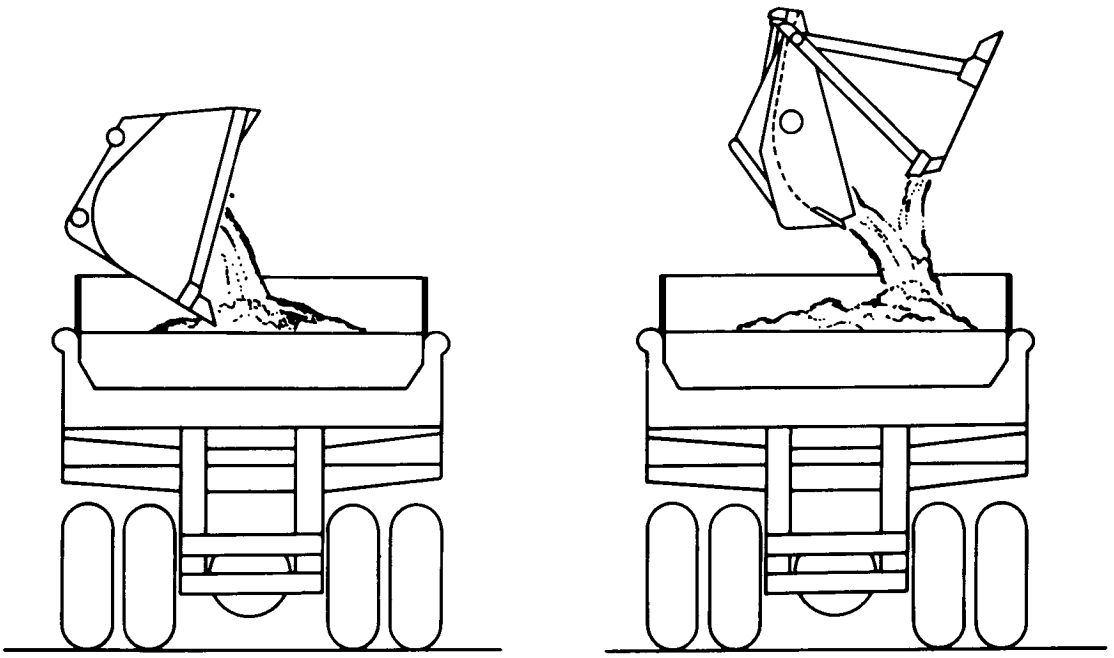


Illust. 3

Approach the bank or stockpile with the engine at full governed speed. Keep the bucket flat, working into the material at or near ground level. As the bucket penetrates the material, raise the bucket slightly. When the material boils to the top of the spillboard, roll the bucket all the way back (Illust. 3).

Raise the bucket to provide ground clearance and, at the same time, disengage the forward travel of the loader. Back away in an arc from the bank or stockpile as shown in Illust. 2 just far enough to allow turning of the loader for the approach to the truck.

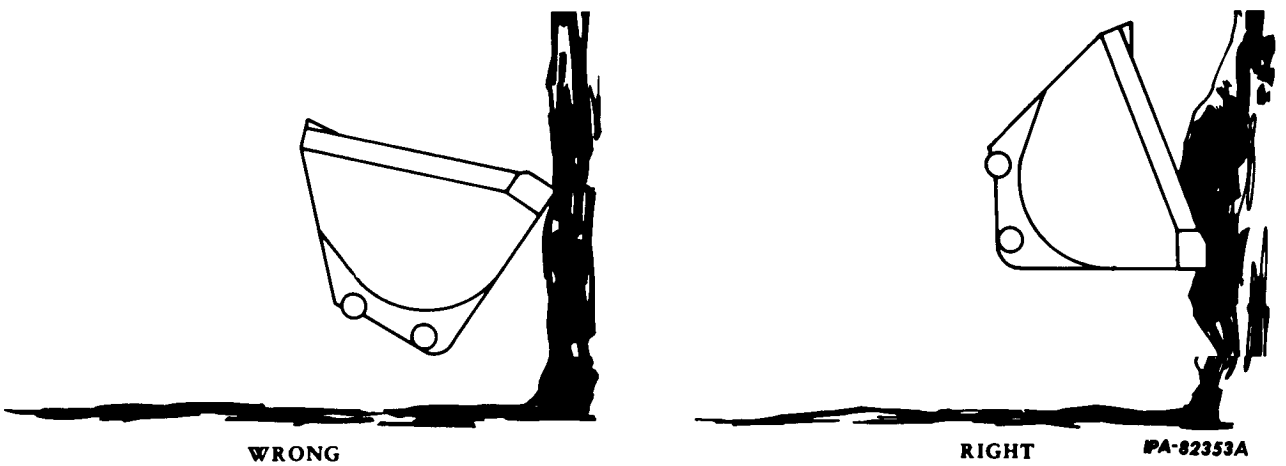
TRANSPORTING, LOADING OR PILING



Illust. 4

When transporting material, raise the left arm to give the same ground clearance as provided by the loader. A loaded bucket must never be transported in the fully raised position. Keep the travel speed reasonable for safe operation. Upon reaching the truck, raise the bucket high enough to clear the truck body. Reduce forward speed and dump load (Illust. 4). Shake bucket only to loosen dirt from within.

When load is dumped, back away, lower bucket to carrying position and return to work site.



Illust. 5

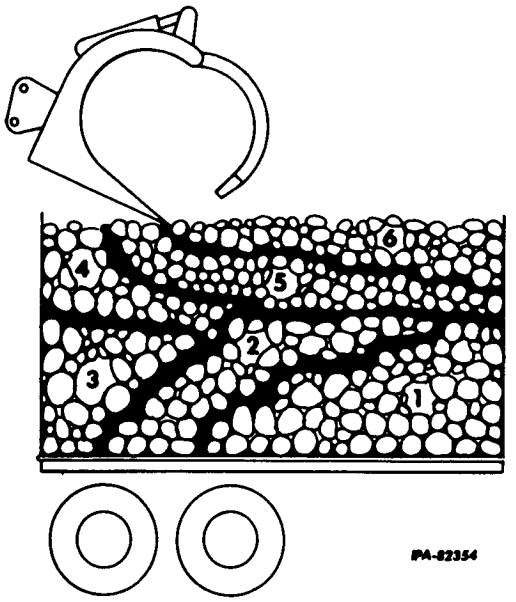
When bank loading, keep the cutting edge flat as shown in Illust. 5. Tilting the bucket back too far, forces the flat of the cutting edge against the bank preventing the bucket from digging. This non-productive maneuver causes waste of power and time and possible damage to the tilt cylinders and linkage.

When stockpiling, move each load only once and keep travel distance down to a minimum. When possible, locate stockpiles as close as possible without hindering other work on the site.

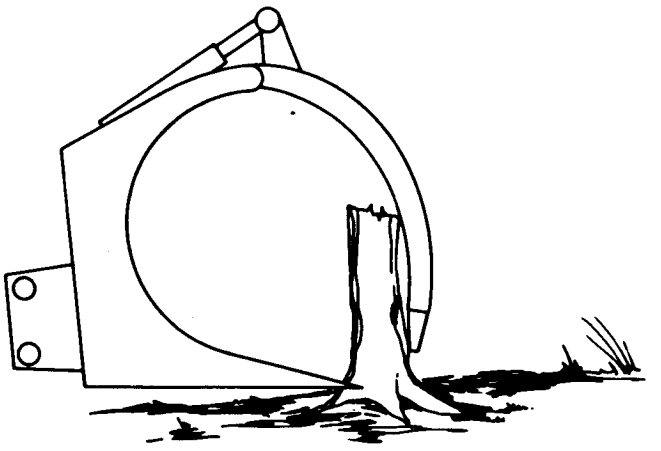
Continued on next page.

OPERATING TECHNIQUES

TRANSPORTING, LOADING OR PILING



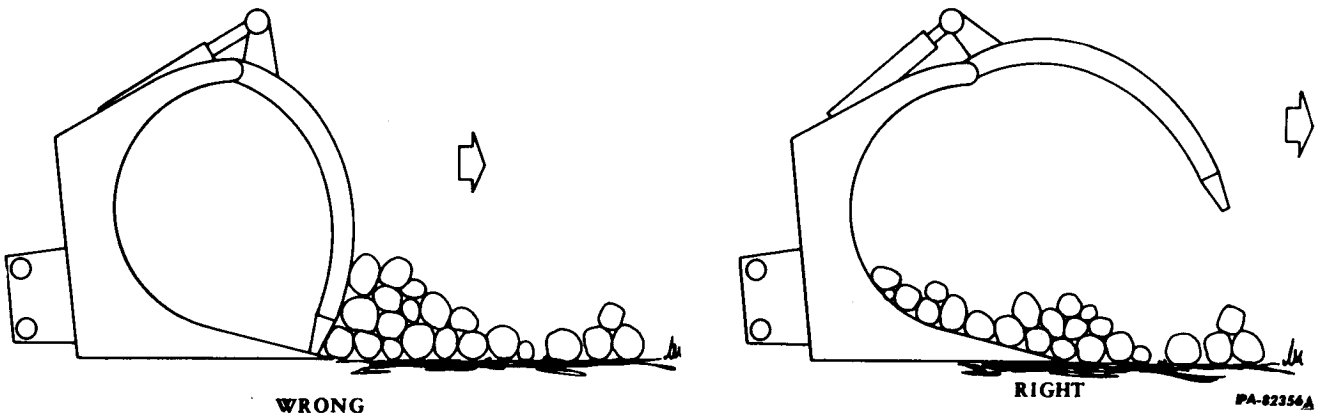
Illust. 6



Illust. 7

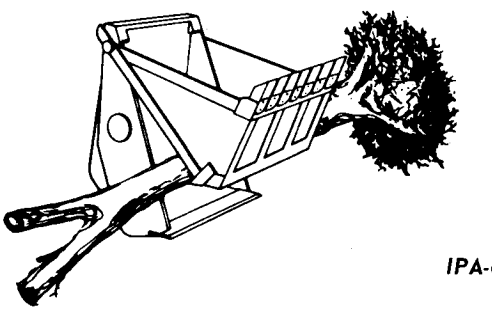
When loading logs with the grapple, load the truck in the sequence shown in Illust. 6. When loading long trailers, jack-knife the truck and load the trailer from both ends.

Never use the grab arm of the grapple to remove stumps or other anchored objects (Illust. 7).



Illust. 8

Never use the grab arm of the grapple to push material (Illust. 8).



Illust. 9

When transporting trees or other large objects always balance the load as shown in Illust. 9. Balance the load when picking it up to prevent twisting the lift frame and linkage.

DIGGING AND CLEARING

Plan excavating jobs so most of the work can be done with the loader being driven forward out of the excavation, rather than being backed out. Use as flat a ramp as possible. A steeper ramp can be used when driving forward than when in reverse.

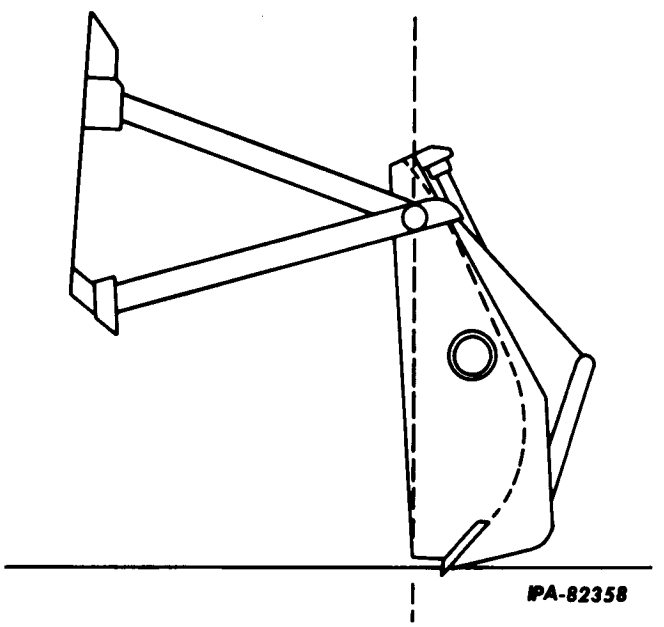
Always feed the bucket into the ground gradually until the desired depth of cut is obtained. When selecting the gear range and determining the depth of cut, allow for an increase in resistance as the load increases. It may be necessary to raise the lift arms slightly to obtain greater traction.

Reduced loader effort is required when material can be moved downhill.

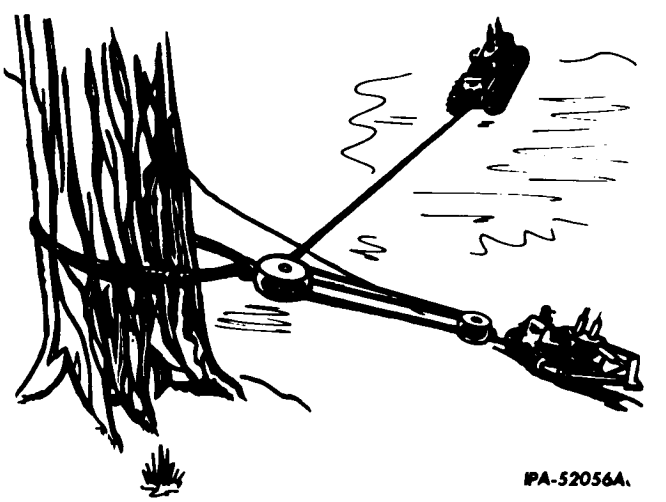
With the clam fully open, the DROTT 4-IN-1 bucket can be used as a bulldozer. Position the bucket as shown in Illust. 10 for digging.

Snow can act as an insulating blanket and reduce or eliminate the need for ripping. Therefore, remove snow only from the area to be worked each day; leave the rest to insulate the ground.

When the ground is hard or frozen and the area must be ripped before it can be worked, rip a relatively small section and work it to grade before enlarging the cut. This will require ripping each section only once, not every morning after the ground has refrozen. To prevent breaking or bending scarifier teeth, never turn the loader while the scarifier teeth are in the ground.



Illust. 10



Illust. 11

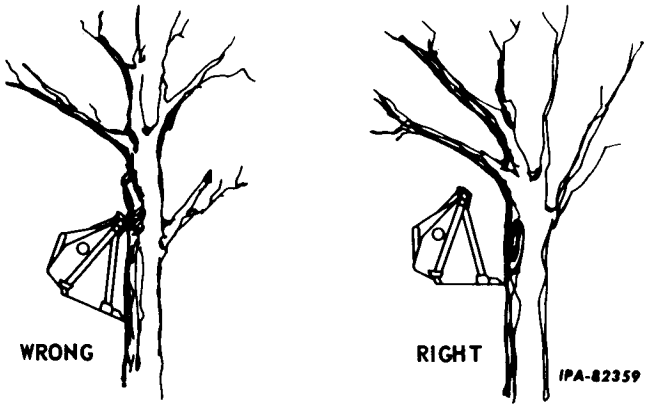
Initial work on steep hillsides can be made more nearly safe by operating a tandem arrangement as shown in Illust. 11.

◆ CAUTION: FALLING DEAD LIMBS CAUSE INJURIES. WHEN EXTENSIVE TREE CLEARING IS INVOLVED, SUITABLE PROTECTION SHOULD BE USED BY THE OPERATOR.

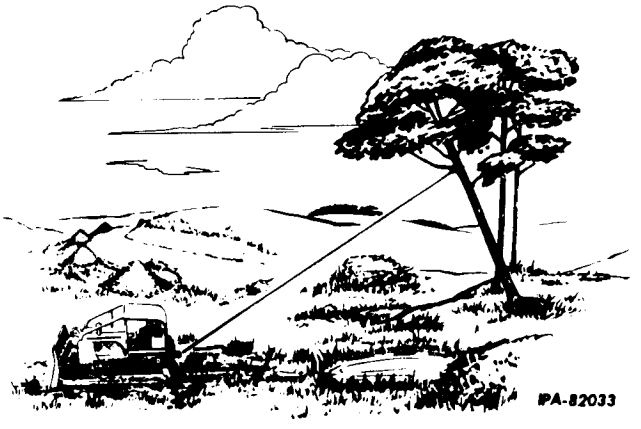
Continued on next page.

OPERATING TECHNIQUES

DIGGING AND CLEARING



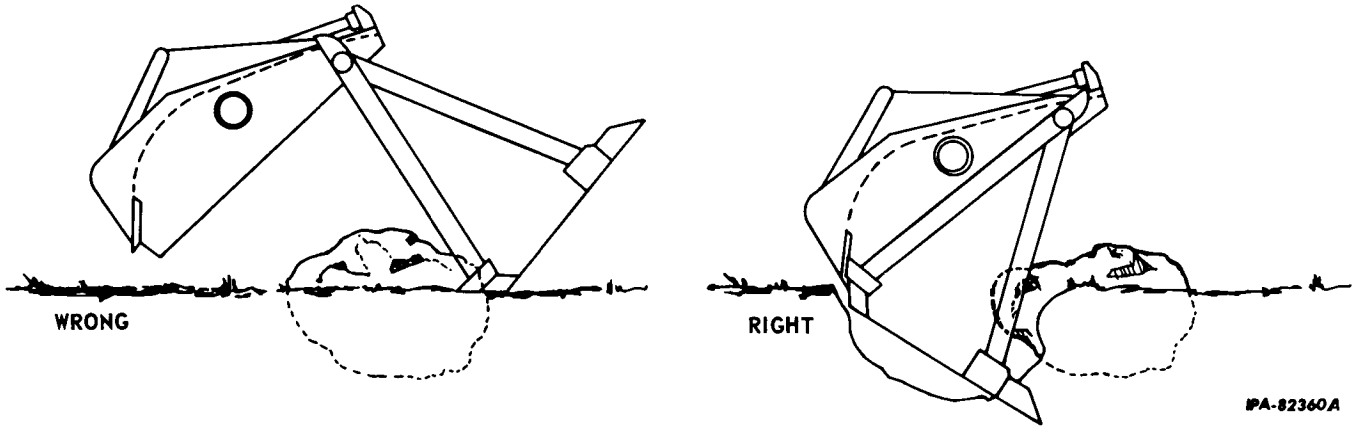
Illust. 12



Illust. 13

When clearing trees, raise the bucket high to gain leverage and make contact gently to reduce possible harm to the operator and loader. The bucket must be positioned with the bottom parallel with the ground. DO NOT push with the top of the bucket (Illust. 12).

Heavy roots of large trees may require cutting from several sides of the tree. Use a cable to topple and remove trees from soft ground (Illust. 13).



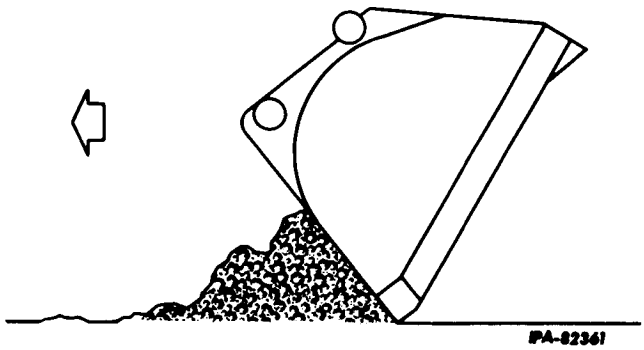
Illust. 14

When clearing a rocky area, remove the small and loose rocks first, large and solid rocks can then be loosened and moved with less difficulty.

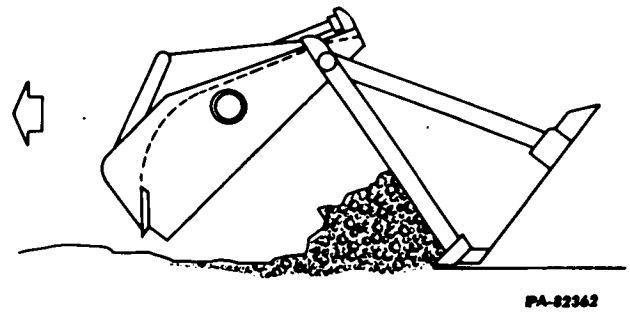
When loosening large or solid rocks, greater force and penetration can be obtained by digging under the rock with the bucket (Illust. 14). Lifting the rock with the bucket while pushing will increase traction and reduce track spinning.

Never use the clamshell to remove buried or anchored objects (Illust. 14).

SPREADING AND LEVELING



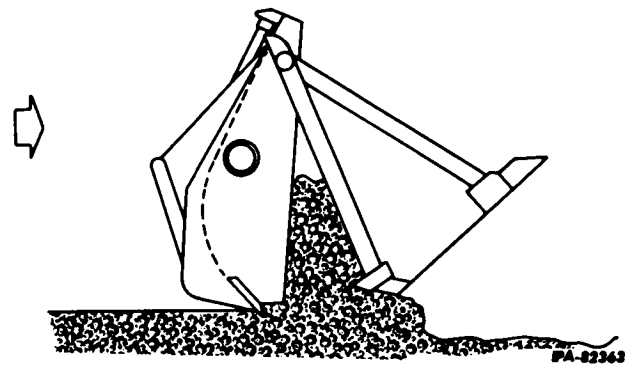
Illust. 15



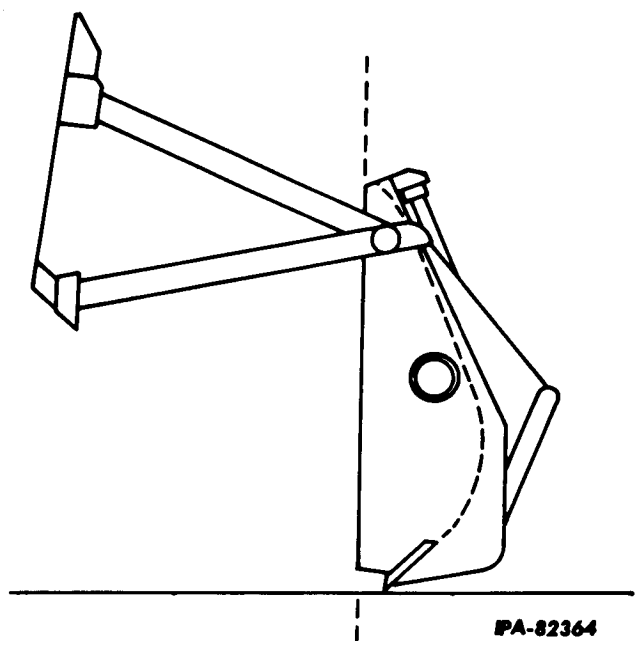
Illust. 16

When finishing in non-solid materials, position the bucket as shown in Illust. 15 or 16 and backdrag the loose material. This method is not recommended where abrasive material is common.

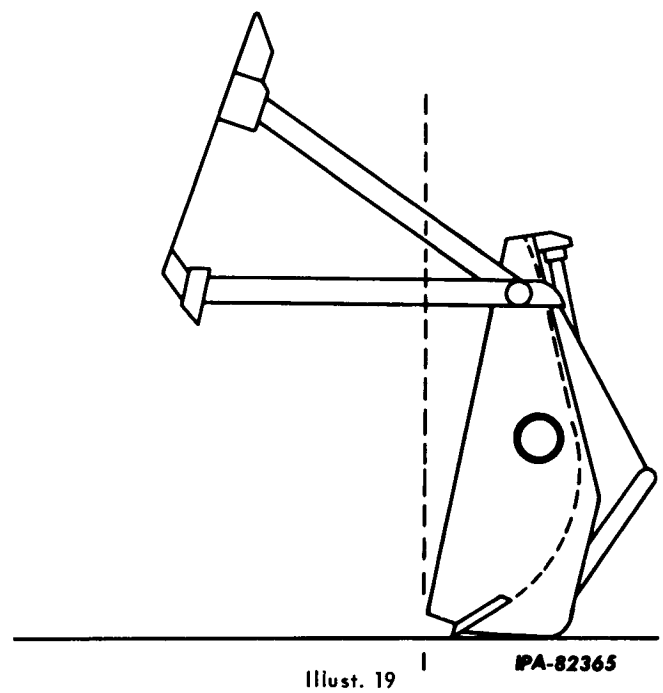
By placing the DROTT 4-IN-1 bucket in the scraper position and opening the clam slightly, spreading of material can be done on the "run." The amount of spread can be controlled by the amount of clam opening (Illust. 17).



Illust. 17



Illust. 18



Illust. 19

With the clam fully open, the DROTT 4-IN-1 bucket can be used to bulldozer material. Position the bucket as shown in Illust. 18 for level grading. Position the bucket as shown in Illust. 19 for spreading or to obtain a lesser cut.

SCHEDULED MAINTENANCE

SECTION CONTENTS

Scheduled maintenance is the normal maintenance necessary to provide proper and efficient equipment operation.

To protect your investment and prolong the service life of your equipment, follow the scheduled maintenance listed below.

SCHEDULED MAINTENANCE GUIDE

▲ Every 10 Hours of Operation

Air intake cap	Remove and clean. Refer to "AIR CLEANING SYSTEM" in Section 9.
Fuel tank	Drain water and fill tank. Refer to "FUEL SYSTEM" in Section 9.
Primary fuel filter water separator (if equipped)	Open drain valve, at bottom of case, after shutdown. Close valve when clean diesel fuel (no water) appears.
Radiator	Check coolant level. Refer to "COOLING SYSTEM" in Section 9.
Track shoe bolts ⊛	Check torque. Refer to "TORQUES" in Section 10.
Scheduled lubrication	Refer to "LOADER" and "LOADER EQUIPMENT" lubrication guides in this section.

⊛ This is only necessary for the initial 100 hours of operation. After the initial 100 hours of operation, check the bolts as indicated in this guide.

Continued on next page.

SCHEDULED MAINTENANCE

SCHEDULED MAINTENANCE GUIDE

Every 50 Hours of Operation

Scheduled lubrication	Refer to "LOADER LUBRICATION GUIDE" in this section.

Every 100 Hours of Operation

Air cleaner dust unloader	Check for restrictions and clean if necessary. Refer to "AIR CLEANING SYSTEM" in Section 9.
Air cleaner hose connections and clamps	Check for and correct loose fits or damage.
Battery ⊕	Check liquid level; terminal tightness and clean batteries. Refer to "ELECTRICAL SYSTEM" in Section 9.
Bolts, nuts or pins (loader equipment)	Check for and correct loose or broken bolts, nuts or pins.
Decelerator	Check operation. Refer to "DECELERATOR" in Section 9.
Fan and alternator belts and water pump belt	Check tension. Refer to "BELTS" in Section 9.
Fuel strainer	Remove and clean. Refer to "FUEL SYSTEM" in Section 9.
Hydro-spring	Check operation. Refer to " LOADER EQUIPMENT in Section 9.
Radiator and connections	Check for and correct leaks. If anti-freeze is used, check its strength.
Radiator core	Clean the outside. Refer to "COOLING SYSTEM" in Section 9.
Tracks	Check track tension. Refer to "TRACK" in Section 9.
Scheduled lubrication	Refer to "LOADER LUBRICATION GUIDE" in this section.

⊕ When the ambient temperature is continuously +90°F or higher, check the liquid level every 50 hours.

SCHEDULED MAINTENANCE GUIDE

Every 200 Hours of Operation

Scheduled lubrication	Refer to "LOADER LUBRICATION GUIDE" in this section

Every 250 Hours of Operation

Scheduled lubrication	Refer to "LOADER LUBRICATION GUIDE" in this section.

Every 500 Hours of Operation

Cooling system	Clean. Refer to "COOLING SYSTEM" in Section 9.
Crankcase breather	Remove and clean; replace element if necessary. Refer to "AIR CLEANING SYSTEM" in Section 9.
Engine valves	Check clearance. Refer to "ENGINE VALVE CLEARANCE ADJUSTMENTS" in Section 9.
Primary and final fuel filters	Change (depending upon loss of engine power or misfiring). Refer to "FUEL SYSTEM" in Section 9.
Tracks	Check track shoe bolts torque. Refer to "TRACKS" in Section 9.
Turbocharger	Clean. Check cap screws, hold down nuts, air connections and oil connections for tightness. Condition of hoses and oil lines must be checked, replace where necessary. Refer to "TURBOCHARGER" in Section 9.
Wiring	Check for and repair worn, cracked or frayed insulation, broken wires, loose or corroded connections.
Scheduled lubrication	Refer to "LOADER" and "LOADER EQUIPMENT" lubrication guides in this section.

Every 1000 Hours of Operation

Scheduled lubrication	Refer to "LOADER LUBRICATION GUIDE" in this section.

LUBRICATION

For information about the lubrication of a new loader, refer to "LUBRICATION WHEN SHIPPED" in Section 2.

The life and performance of a loader and its equipment depends on the care that it is given, and proper lubrication is probably the most important maintenance service for your loader and its equipment.

Thorough lubrication service performed at definite intervals will aid greatly in prolonging the life of the loader and its equipment and in reducing operating expense.

The type of work being done, load, ground and weather conditions are all factors to consider in frequency of lubrication. The scheduled intervals between lubrication periods shown on the "LUBRICATION GUIDES" are approximate, being based on average operating conditions. It may be necessary to lubricate after shorter working periods under severe operating conditions such as extremely dusty conditions, low engine temperatures, intermittent operation, excessively heavy loads with high oil temperatures, or when diesel fuel with a high sulphur content is used. However, the time intervals between lubrication periods must never exceed those indicated in this manual.

SELECTION OF LUBRICANTS

SELECTION OF LUBRICANTS

The selection of the proper type (specification) and grade (weight or viscosity) of lubricant is not guess work. Many tests have been made to determine the correct lubricants for this loader and its equipment. For detailed information regarding lubricants, refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section.

Lubricant Viscosities

During cold weather, base the selection of a crankcase lubricating oil viscosity on the lowest anticipated temperature for the day to make starting easier. For hot weather operation, base the selection on the highest anticipated temperature. Refer to the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" on page 5 of this section.

When the temperature changes, even though the regular interval of lubrication has not been reached, the lubricants must be altered to agree with the temperature.

NOTE: It is not necessary to change the lubricant in the different compartments when the temperature falls into a different range during a working day. For example: Grade-30 oil may be used instead of Grade-10 oil in temperatures below +32°F if no starting difficulty is experienced; Grade-10 oil, that is specified for use in temperatures of +32°F to -10°F, may be used in temperatures as high as +40°F, except when operating under continuously heavy loads.

PRECAUTIONS

After changing engine oil, operate the engine at low idle, without load, for at least five to ten minutes. This will allow the oil to work into the bearings and onto the cylinder walls.

LUBRICANT SPECIFICATIONS AND CAPACITIES

It is not the policy of the International Harvester Company to approve lubricants or to guarantee oil performance in service. The responsibility for the quality of the lubricant must remain with the supplier of the lubricant. When in doubt, consult your authorized International Construction Equipment distributor or dealer for information given in the latest service bulletin on crankcase lubricating oils or gear lubricants.

The lubricants specified for this loader are shown in the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" on this page.

LUBRICANT SPECIFICATIONS AND CAPACITIES CHART (U.S. MEASURE)

LUBRICANT KEY: EO - Engine Oil; MPL - Multi-purpose Type Gear Lubricant; MPG - Multi-purpose Grease

LUBRICATION POINT	CAPACITY	ANTICIPATED AIR TEMPERATURE		
		Above +32°F	+32°F to -10°F	Below -10°F
Crankcase:		EO - SERIES 3 or MIL-L-45199A.		
Less filters	25 qts.	Grade-30	Grade-10	Blend of 2-1/2 qts kerosine and remainder Grade-10
With filters	27 qts.			
Rear Frame (#)	40 gals.	Sup. 1, DEF. 2101D, MIL-L-2104B, SERIES 3 or MIL-L-45199A. Grade 10		DEXTRON ATF
Hydraulic System:		EO - MIL-L-2104B, Sup. 1, DEF. 2101D, SERIES 3 or MIL-L-45199A.		
With standard bucket	28 gals.	Grade-10		
With Drott 4-in-1 bucket	32 gals.			
Track Roller (each) Track Idler (each) Front Idler (each)	Front idlers, track idlers and track rollers are lubricated for life.			
Sprocket Drive Housing (each)	28 qts.	MPL - IHB-22 Grades 132H EP, 135H EP (*), or MIL-L-2105B		MIL-L-10324A
		Grade-90 (±)	Grade-80 (±)	
Water Pump Housing	1/2 oz.	MPG - IH-251H EP or equivalent #2 multi-purpose lithium grease.		
Fan Bearing Housing	2-1/2 oz.			
All lubrication fittings	Fill as instructed			

(#) - Common reservoir for planetary steering, hydraulic steering boosters, torque converter and transmission.

(*) - For specifications, consult your authorized International Construction Equipment distributor or dealer.

(±) - A multi-grade 80-90 may be used at temperatures between -10°F and +90°F. A Grade-140 may be used at temperatures above +90°F.

SCHEDULED MAINTENANCE

LOADER LUBRICATION GUIDE

Points of lubrication are individually explained under "LUBRICATION POINTS." They are identified by item numbers corresponding with those listed in the chart below and the loader diagram.

Always use clean lubricators and containers. Wipe dirt from fittings before fresh grease is added.

LUBRICATION INTERVAL	ITEM NO.	POINT OF LUBRICATION	LUBRI-CANT	REMARK
Every 10 hours ▲	10	Crankcase oil level	EO	Check
	15	Rear frame oil level	EO	Check
Every 50 hours ●	3	Governor control upper and lower bell crank	MPG	Grease
	4	Universal joint	MPG	Grease
	5	Brake pedal	MPG	Grease
	8	Steering brake shaft	MPG	Grease
Every 100 hours ⬟	9	Crankcase oil drain plug and filler neck	EO	Drain refill
	11	Lubricating oil filters	EO	Drain refill
Every 200 hours ▼	1	Front engine support	MPG	Grease
	11	Lubricating oil filter elements	- - -	Change
Every 250 hours ▬	14	Sprocket drive housing oil level	MPL	Check
Every 500 hours ■	7	Sprocket drive housing oil	MPL	Change
	12	Transmission, torque converter and steering booster pressure filter element	- - -	Change
Every 1000 hours ▰	2	Transmission, torque converter and steering booster safety filter element	- - -	Clean
	6	Transmission, torque converter and steering booster suction filter element	- - -	Clean
	16	Rear frame oil	EO	Change

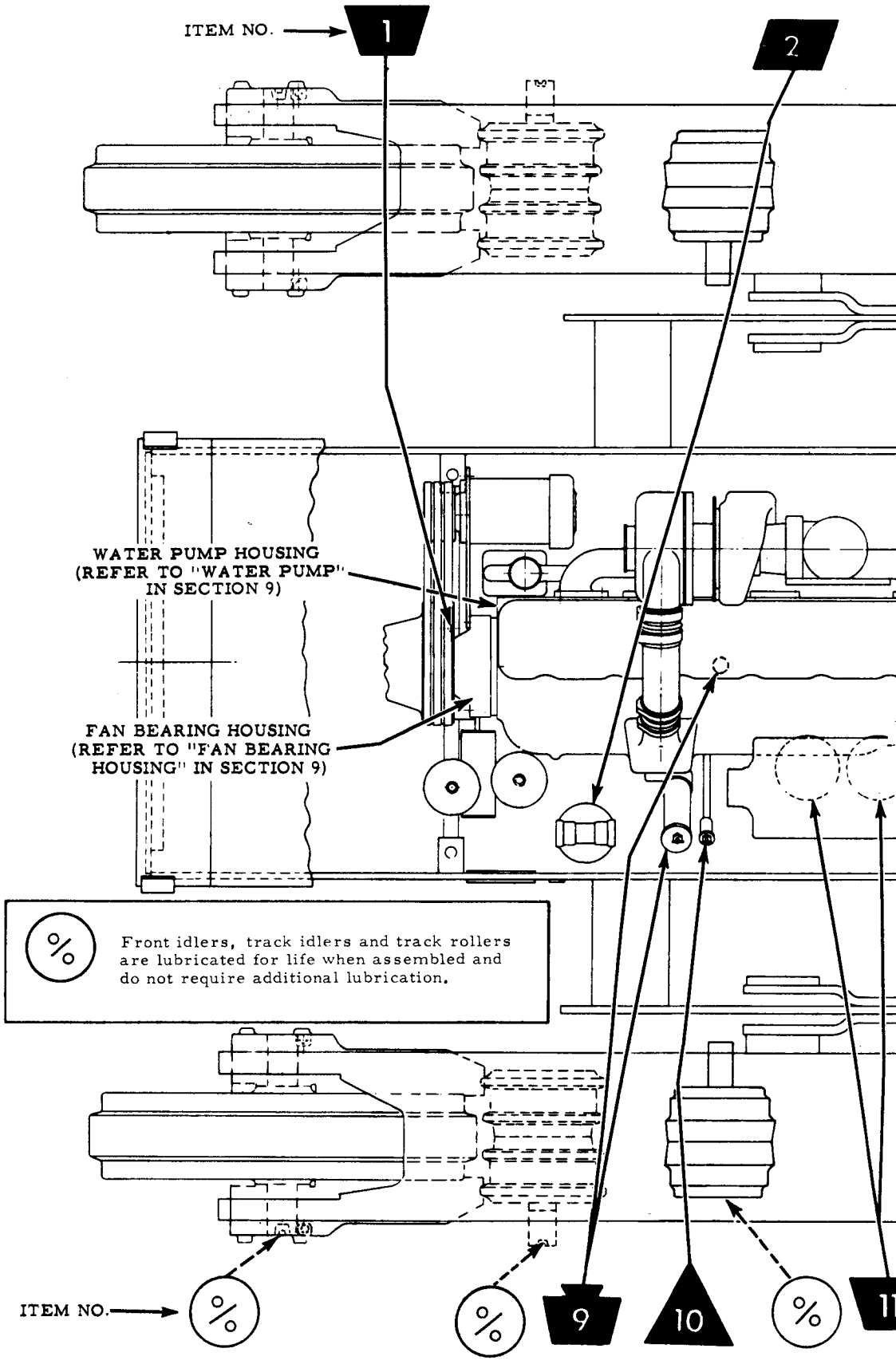
NOTE: Intervals of time between lubrication services are based on average operating conditions. Under unusually severe conditions of operation, reduce the intervals of time between services.

The symbols around the item numbers indicate the intervals between service.

▲ -10 hours ⬟ -100 hours ▬ -250 hours

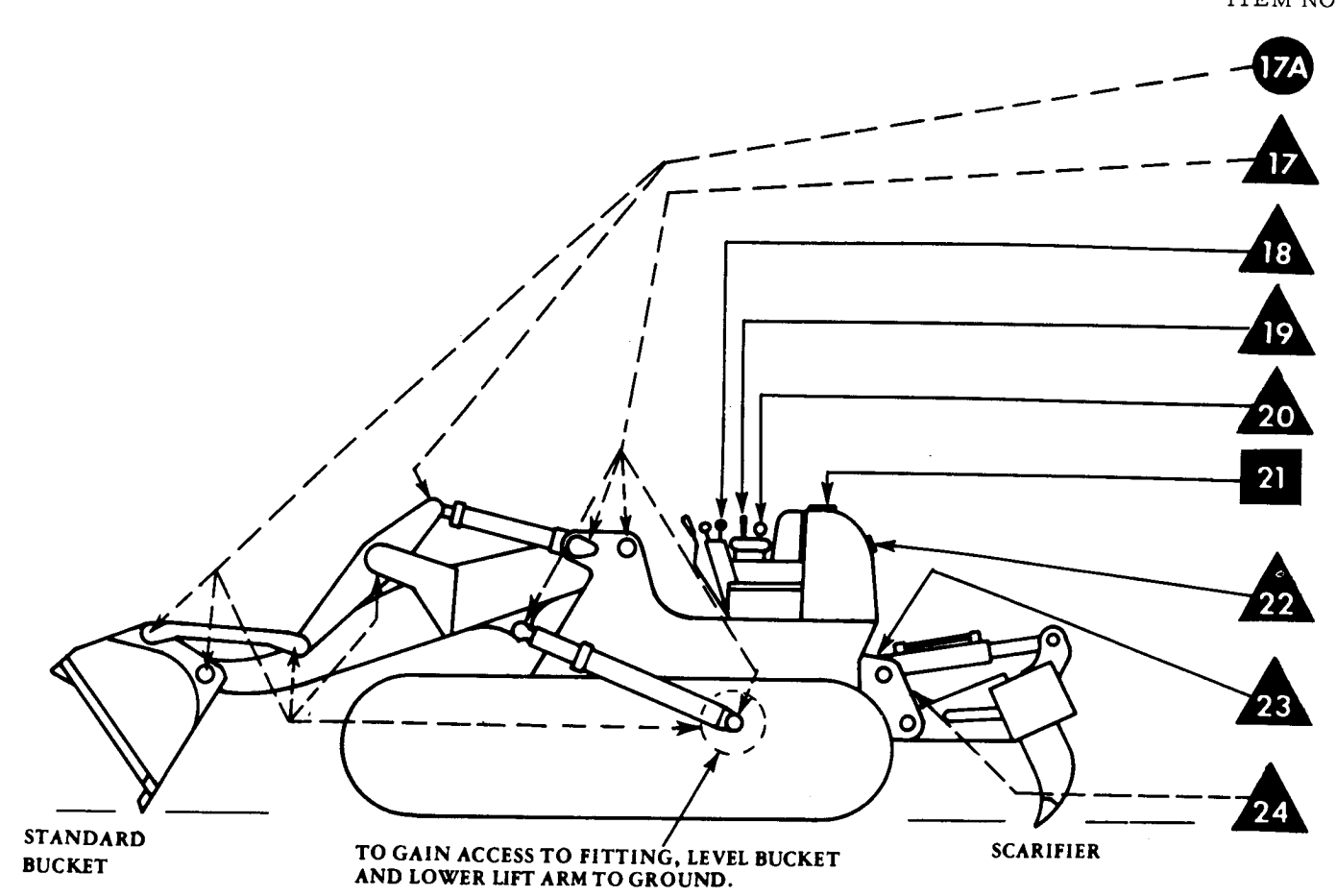
● -50 hours ▼ -200 hours ■ -500 hours ▰ -1000 hours

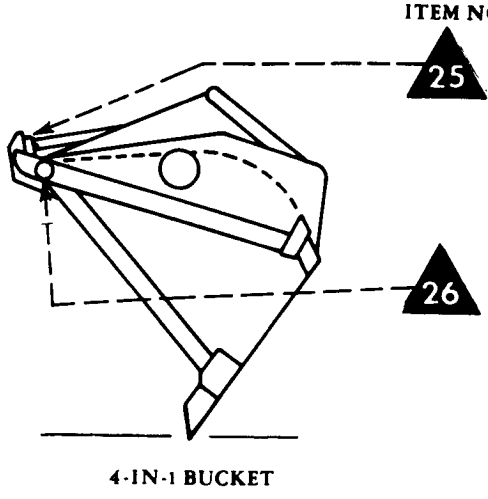
NOTE: All dotted shaft arrows indicate

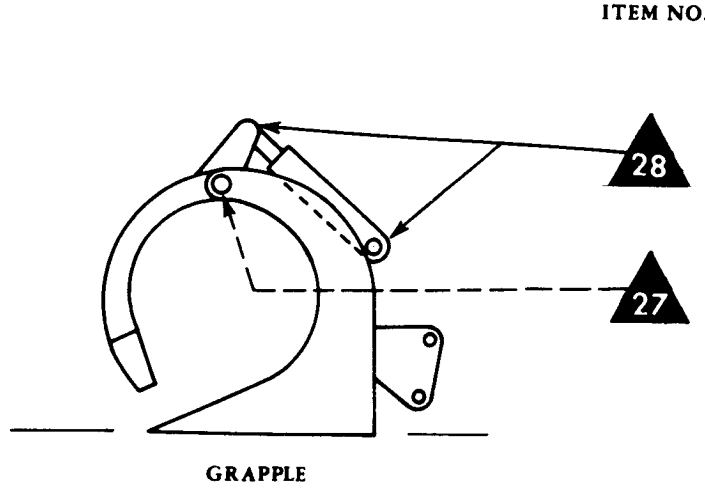


NT LUBRICATION GUIDE

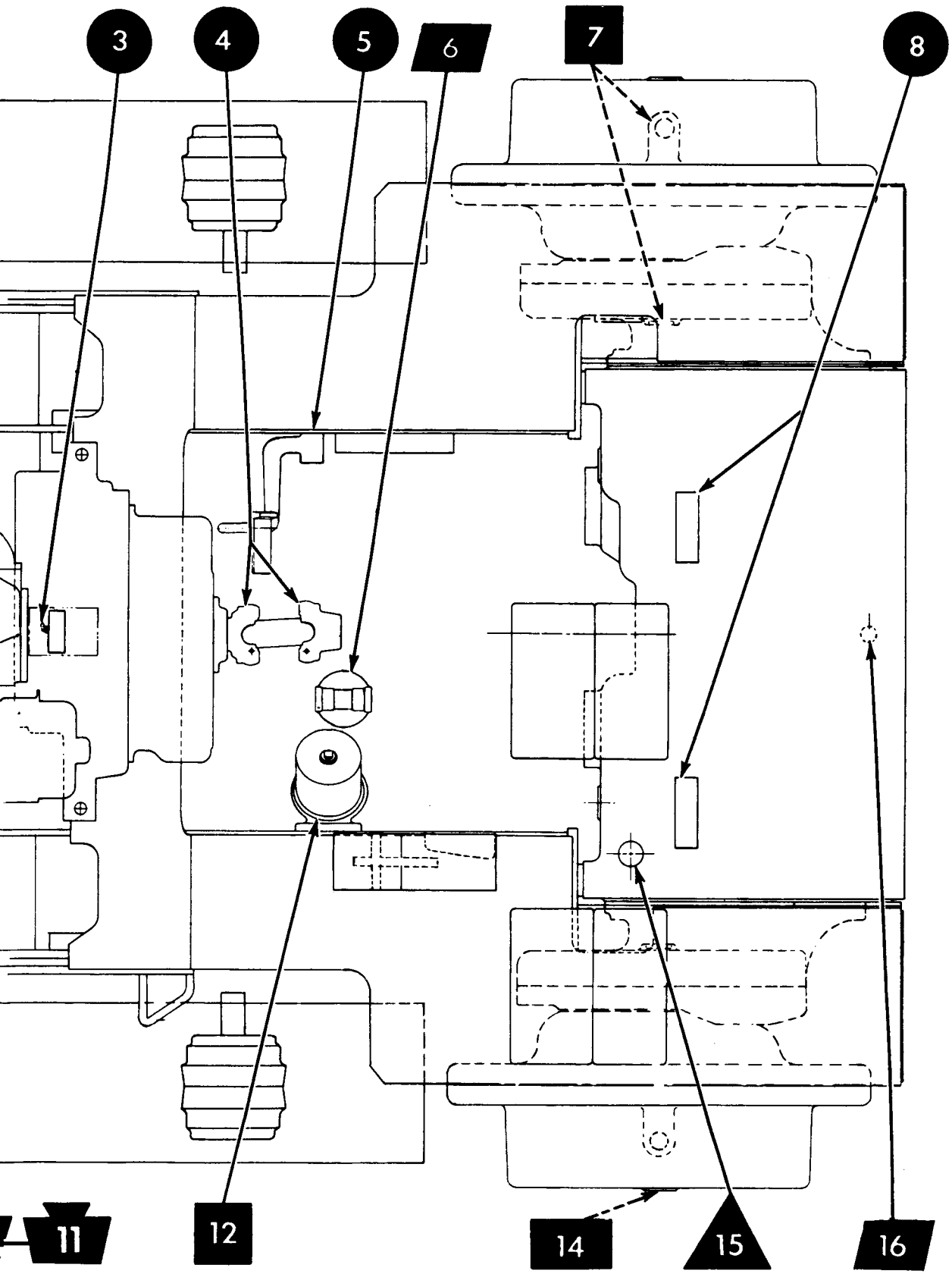
oints that must be lubricated on both sides of loader.
on the lift arm and bucket as shown.







oints that must be lubricated on both sides of loader.



SCHEDU

LOADER EQUIP

NOTE: All dotted shaft arrows indicate
When lubricating loader equipment, pos

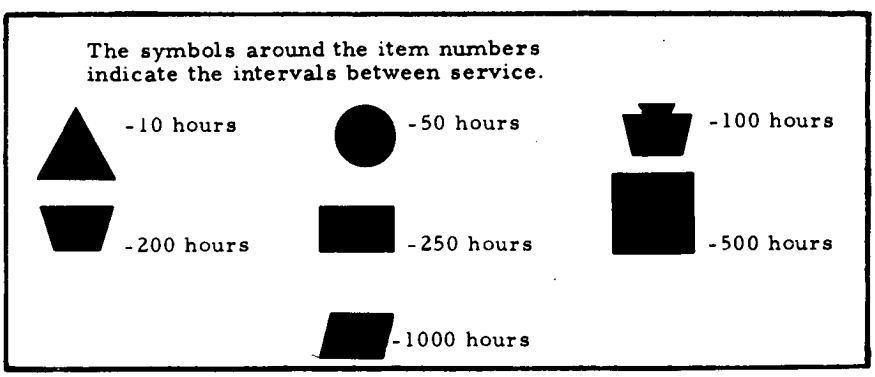
Points of lubrication are individually explained under "LUBRICATION POINTS." They are identified by item numbers corresponding with those listed along the side of the Lubrication Guide.

Always use clean lubricators and containers. Wipe dirt from fittings before fresh grease is added.

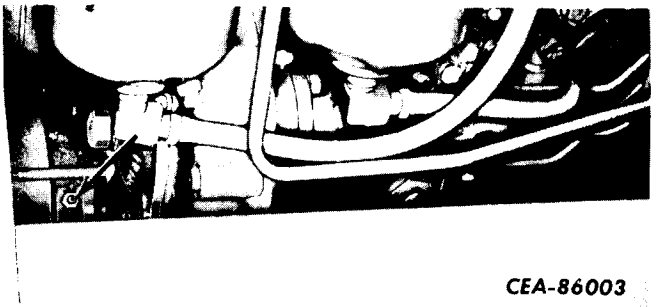
LUBRICATION INTERVAL	ITEM NO.	POINT OF LUBRICATION	LUBRICANT	REMARKS
Every 10 Hours ▲	17	Loader linkage (no cord rings)	MPG	Grease (#)
	18	Control linkage	MPG	Grease (#)
	19	Auxiliary control linkage	MPG	Grease (#)
	20	Diverter valve control linkage	MPG	Grease
	22	Hydraulic reservoir oil level	EO	Check
	23	Scarifier cylinder connecting pins	MPG	Grease
	24	Scarifier frame connecting pins	MPG	Grease
	25	Clam cylinder upper connecting pin	MPG	Grease (#)
	26	Clam-to-blade pin	MPG	Grease (#)
	27	Grapple cylinder connecting pins	MPG	Grease
	28	Grapple arm connecting pin	MPG	Grease
Every 50 Hours ●	17A	Loader linkage (with cord rings)	MPG	Grease (#)
Every 500 Hours ■	21	Hydraulic system and filters	EO	Service

NOTE: Intervals of time between lubrication services are based on average operating conditions. Under unusually severe conditions of operation, reduce the interval of time between services.

(#) Lubricate until excess lubricant is observed.



LUBRICATION POINTS



CEA-86003

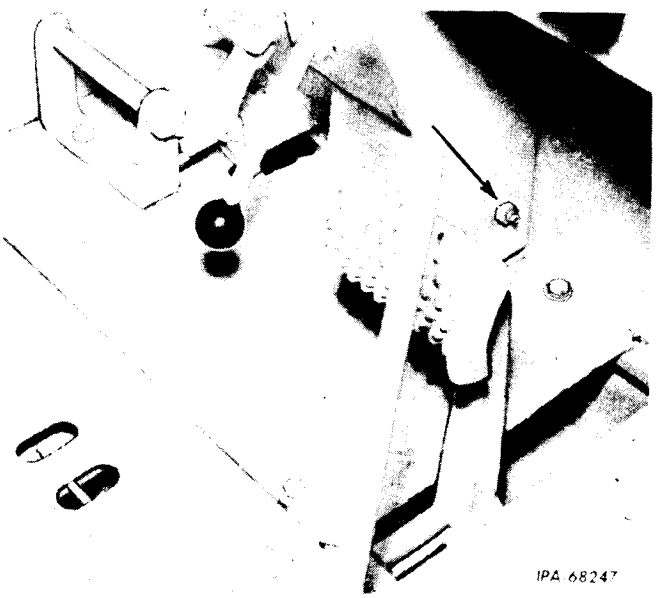
Illust. 1

Item 1 - Front Engine Support (Illust. 1)

Apply two or three strokes of the lubricator or until clean lubricant appears.

Item 2 - Transmission, Torque Converter and Steering Booster Safety Filter Element

Service the filter. Refer to "TRANSMISSION, TORQUE CONVERTER AND HYDRAULIC STEERING BOOSTER OIL FILTERS" in Section 9.



IPA 68247

Illust. 2

Item 3 - Governor Control Upper and Lower Bell Crank (Illust. 2)

Apply two or three strokes of the lubricator.

IPA-66348A

Illust. 3

Item 4 - Universal Joint (Illust. 3)

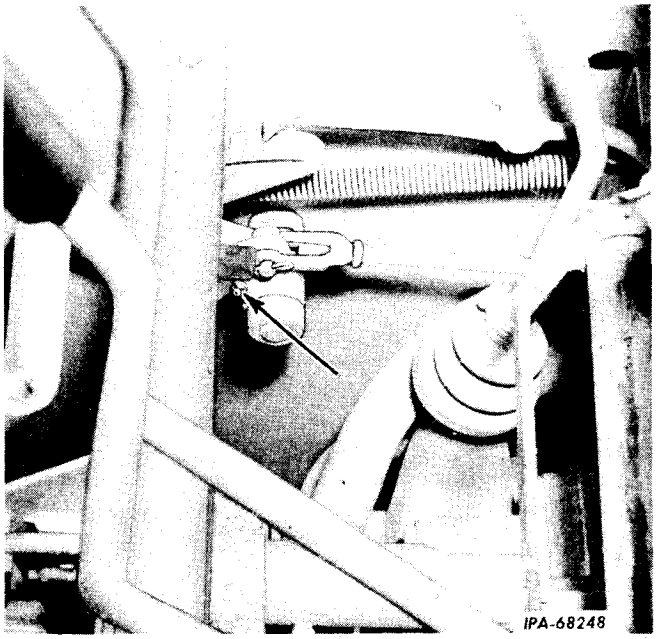
(Two fittings.) Remove the rear platform. Apply three or four strokes of the lubricator or until lubricant appears.

NOTE: To reach the fittings, the universal joint may have to be turned by hand until the fittings are facing upward; connect the flexible extension to the grease gun.

Continued on next page.

SCHEDULED MAINTENANCE

LUBRICATION POINTS



Illust. 4

Item 5 - Brake Pedal (Illust. 4)

Remove the rear platform. Apply two or three strokes of the lubricator; or until clean lubricant appears.

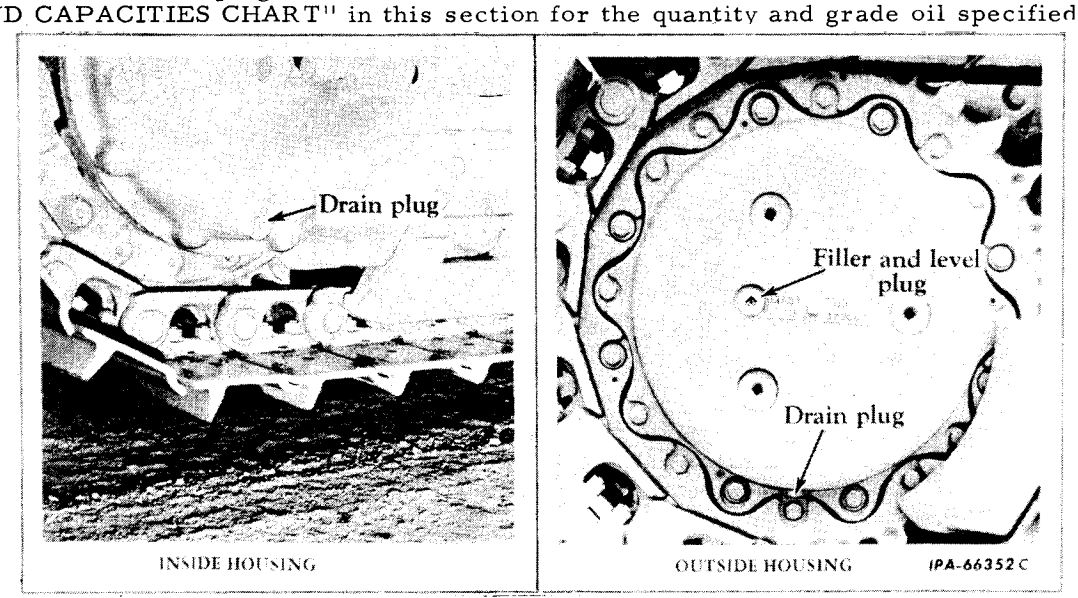
Item 6 - Transmission, Torque Converter and Steering Booster Suction Filter Element

Service the filter. Refer to "TRANSMISSION, TORQUE CONVERTER AND HYDRAULIC STEERING BOOSTER OIL FILTERS" in Section 9.

Item 7 - Sprocket Drive Housing Oil (Illust. 5)

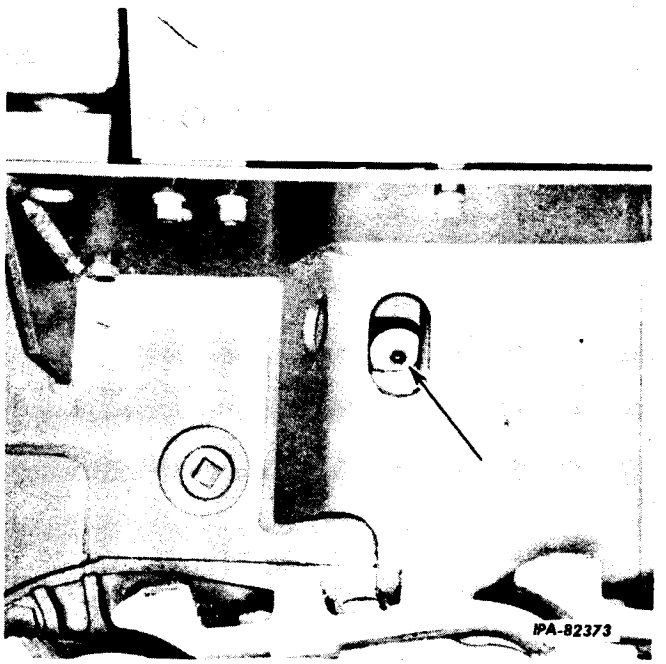
(One on each side of housing.) Position the loader on level ground with the "OIL LEVEL" mark on the housing parallel to the track frame. Remove the drain plugs immediately after operation while the lubricant is warm.

Drain the old lubricant from the housing; fill to the proper level with fuel oil. Operate the loader in low gear for several minutes. Remove the drain plugs and allow time for complete drainage of fuel oil. Reinstall the plugs and refill at the fillers. Refer to the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in this section for the quantity and grade oil specified.



Illust. 5

LUBRICATION POINTS



Illust. 6

Item 8 - Steering Brake Shaft (Illust. 6)

(One on each side.) Apply two or three strokes of the lubricator or until clean lubricant appears.

Item 9 - Crankcase Oil

1. After reaching operating temperature, stop the engine and drain the crankcase and oil filter cases. Remove the oil pan door to reach the crankcase oil pan drain plug.

2. After complete draining, reinstall and tighten all drain plugs and oil pan door.

3. Remove the cases and add one quart of oil to each. Reinstall the cases, tighten the case bolts (refer to "TORQUES" in Section 10); be sure the cases are seated squarely in the header.

4. Deduct the amount of oil added to each case from the total capacity and add the remaining amount to the crankcase. Refer to the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in this Section for quantity and grade oil specified.

5. Operate the engine at low idle for 5 to 10 minutes, do not operate under load until normal oil pressure and temperature are reached. During warmup, check the filter cases for leaks.

Continued on next page.

LUBRICATION POINTS

Item 10 - Crankcase Oil Level (Illust. 7)

The gauge has "L" and "H" marks on the "ENGINE RUNNING" and the "ENGINE STOPPED" sides of the gauge.

NOTE: Use the correct side of the gauge. Operate the engine at low idle when checking with the engine running.

Before checking the crankcase oil level while the engine is running, loosen the oil filler cap to vent the crankcase, thereby relieving crankcase pressure to provide an accurate reading.

With the engine stopped, allow enough time for the oil to drain back into the crankcase.

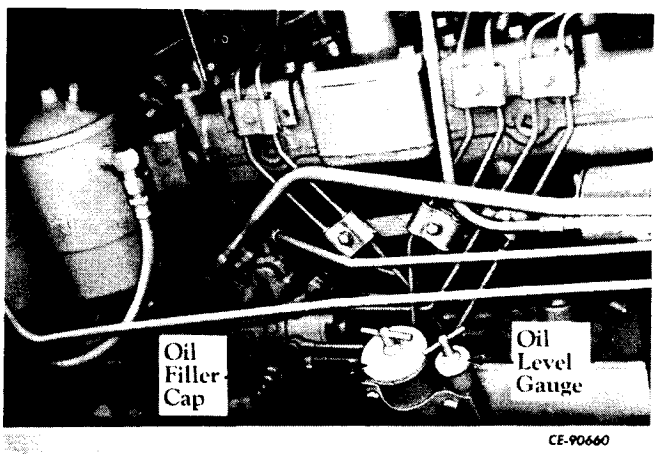
1. Unscrew the wing nut, remove the gauge and wipe the gauge clean.

2. Insert the gauge completely but, do not tighten.

3. Remove the gauge and check the oil level. Install and secure the gauge.

4. Unscrew the crankcase oil filler cap. Add oil, if necessary to bring the oil level up to the "H" mark on the oil level gauge. Install the oil filler cap.

NOTE: Never run the engine if the level of the oil is at or below the "L" mark on the oil level gauge.



Illust. 7

Item 11 - Lubricating Oil Filters and Elements

Drain and Refill

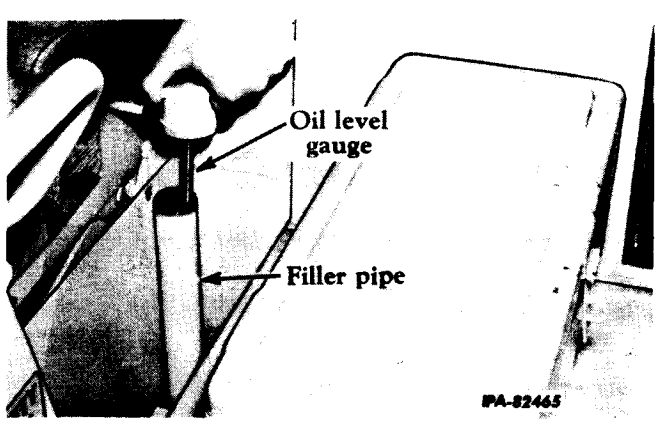
Drain the oil filters with each crankcase oil change. Refer to Item 9, page 11 for service instructions.

Changing Elements

Refer to "ENGINE LUBRICATING OIL FILTERS" in Section 9.

Item 12 - Transmission, Torque Converter and Steering Booster Pressure Filter Element

Service the filter. Refer to "TRANSMISSION, TORQUE CONVERTER AND HYDRAULIC STEERING BOOSTER OIL FILTERS" in Section 9.



Illust. 8

LUBRICATION POINTS

Item 13 – Not Used

Item 14 - Sprocket Drive Housing Oil Level (Illust. 5)

(One on each side.) Position the loader on level ground with the "OIL LEVEL" mark on the housing parallel to the track frame. Remove the filler and level plug, check the lubricant and, if the lubricant is low, fill to the level of the plug opening. Install the plug.

Item 15 - Rear Frame Oil Level (Illust. 8)

This gauge has "LOW" and "FULL" and "ENGINE RUNNING" markings on the rod.

NOTE: Before checking the rear frame oil level while the engine is running at low idle; place the transmission gear selector lever in "NEUTRAL" and apply the lock.

Before checking the rear frame oil level while the engine is running at low idle; place the transmission gear selector lever in "NEUTRAL" and apply the lock.

1. Unscrew and remove the gauge and wipe it clean.

2. Insert the gauge until the bottom of the gauge cap rests on the top of the filler sleeve threads. Do not screw the gauge cap onto the sleeve threads.

3. Remove the gauge and check the lubricant level. If necessary, add oil through the filler to bring the level up to the "FULL" mark on the gauge. Reinstall and secure the gauge.

NOTE: Never operate the loader if the level of the oil is at or below the "LOW" mark on the oil level gauge.

Illust. 9

Item 16 - Rear Frame Oil (Illust. 9)

Remove the plug immediately after operation while the lubricant is warm. After the system has drained, reinstall the plug and refill at the filler (Illust. 5). Refer to the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in this section for the quantity and grade oil specified. The rear frame lubricant must be changed at least once each year, even if the 1000 hour operational period has not elapsed.

Continued on next page.

SCHEDULED MAINTENANCE

LUBRICATION POINTS

Item 17 - Loader Linkage (No Cord Rings)

(Three on each side.) Apply two or three strokes of the lubricator to each fitting, or more, until clean lubricant appears.

Item 17A – Loader Linkage (With Cord Rings)

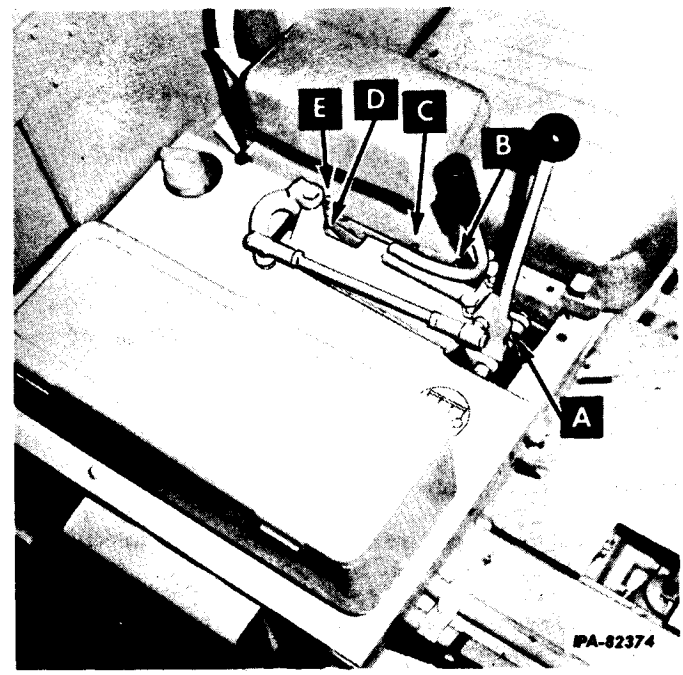
(Six on each side.) Apply two or three strokes of the lubricator to each fitting, or more, until clean lubricant appears.

Item 18 - Control Linkage (Illust. 10)

Apply two or three strokes of the lubricator to fittings (A, B, D and E), or more, until clean lubricant appears.

Item 19 - Auxiliary Control Linkage (Illust. 10)

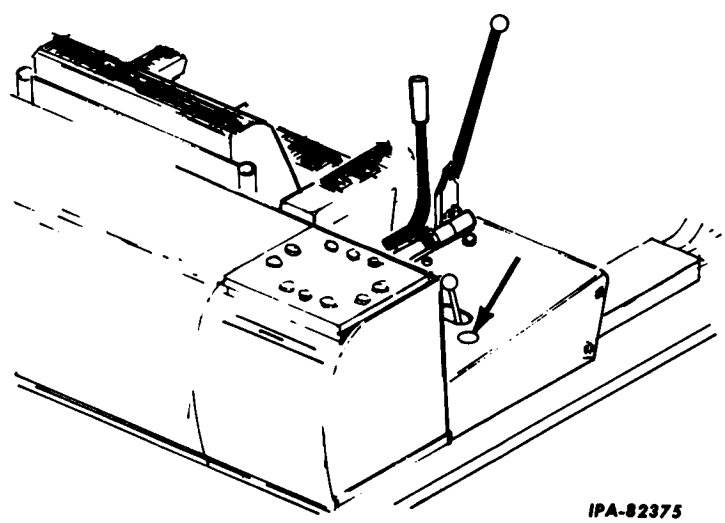
Apply two or three strokes of the lubricator to fitting (C), or more, until clean lubricant appears.



Illust. 10

Item 20 - Diverter Valve Control Linkage (Illust. 11)

(One fitting.) Apply two or three strokes of the lubricator, or more, until clean lubricant appears.



Illust. 11

LUBRICATION POINTS

Item 21 - Hydraulic System and Filters

Drain the hydraulic system oil and service the filters. Refer to "LOADER EQUIPMENT (Hydraulic System)" in Section 9.

Item 22 - Hydraulic Reservoir Oil Level

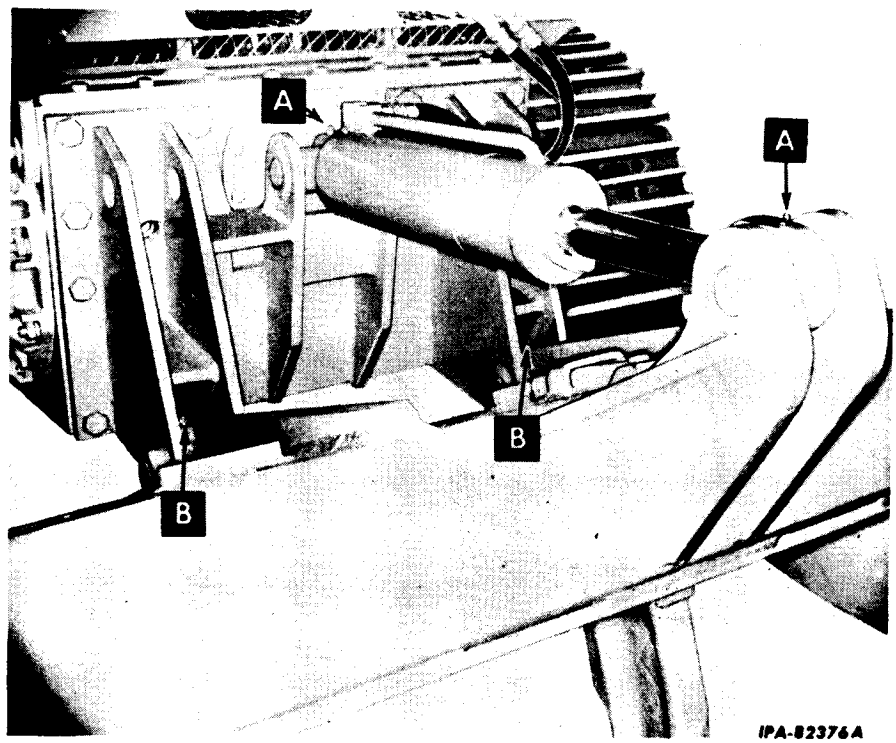
Check the lubricant level. Refer to "LOADER EQUIPMENT (Hydraulic System)" in Section 9.

Item 23 - Scarifier Cylinder Connecting Pins (Illust. 12)

(Two fittings.) Apply two or three strokes of the lubricator to the fittings (A), or more until clean lubricant appears.

Item 24 - Scarifier Frame Connecting Pins (Illust. 12)

(Two fittings.) Apply two or three strokes of the lubricator to the fittings (B), or more, until clean lubricant appears.



Illust. 12

Continued on next page.

LUBRICATION POINTS

Item 25 - Clam Cylinder Upper Connecting Pin

(One on each side.) Apply two or three strokes of the lubricator to each fitting, or more, until clean lubricant appears.

Item 26 - Clam-to-Blade Pin

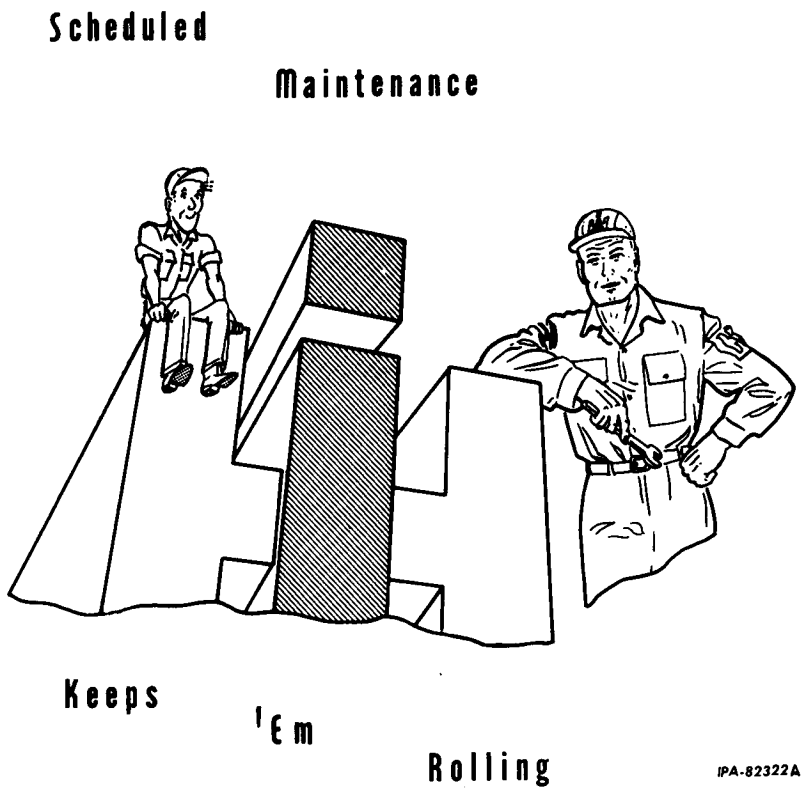
(One on each side.) Apply two or three strokes of the lubricator to each fitting, or more, until clean lubricant appears.

Item 27 - Grapple Cylinder Connecting Pins

(Two fittings.) Apply two or three strokes of the lubricator, or more, until clean lubricant appears.

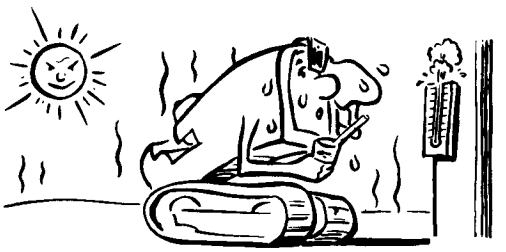
Item 28 - Grapple Arm Connecting Pin

(One on each side.) Apply two or three strokes of the lubricator, or more, until clean lubricant appears.



SECTION CONTENTS

Preparations for



Hot

or

Cold

Weather

IPA-52062 B

Proper maintenance and mechanical efficiency are assured during seasonal air temperature changes, when these instructions are followed.

FUEL SYSTEM

When temperatures are +10°F or below or when your operations require extensive idling, an "1-D" diesel fuel is recommended. Consult your authorized International Construction Equipment distributor, dealer or fuel supplier for the diesel fuels which will give the most satisfactory performance for your International engine.

LUBRICATION

Lubricate the loader. Use the lubricants specified in the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in Section 8.

COOLING SYSTEM

Prepare the cooling system as follows:

1. Check the entire system for leaks.

2. Inspect the condition of all hoses and replace the hoses and hose clamps where necessary.

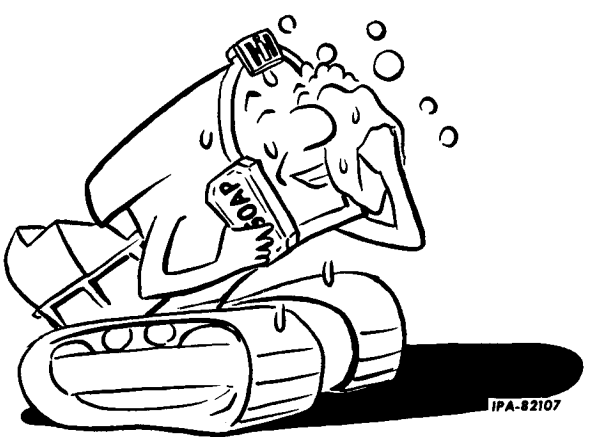
3. Check the operation of the thermostat. Do this by observing the engine coolant temperature when performing the following step. If improper thermostat operation is indicated, refer to "COOLING SYSTEM" on page 14 in this section for thermostat removal and a complete checking procedure.

4. Clean cooling system. For this procedure, refer to "COOLING SYSTEM" on page 12 in this section.

5. Check the tension and condition of the alternator water pump and fan belts and adjust or replace if necessary. For these procedures, refer to "BELTS" on page 9 in this section.

6. Remove all bugs or dirt from the radiator core using air or water under pressure. Direct the flow through the core, opposite the normal direction of air flow.

7. Clean the radiator guard and outside of core.



IPA-82107

ELECTRICAL SYSTEM

Remove all corrosion from battery terminals and cables. Repair or replace all wires which have worn, cracked or frayed insulation; also broken or loose wires. Service the batteries. Refer to "ELECTRICAL SYSTEM" on page 16. in this section.

AIR CLEANING SYSTEM

AIR CLEANER

This loader has either a regular duty air cleaner (Illust. 3) or a heavy duty air cleaner (Illust. 5). Both are "dry-type" with replacable filter elements. The regular duty air cleaner has two elements; primary and safety. The primary element can be cleaned for a limited number of times before replacement is necessary, however, the safety element must be replaced when plugged. The heavy duty air cleaner element cannot be cleaned and must be replaced when plugged. Detailed service procedures for either air cleaner can be found in the following text.

Precautions

As a precaution against dirt entering the engine:

All gaskets and rubber hoses between the air cleaner, turbocharger and intake manifold, and between the manifold and cylinder head must be in good condition and the joints or connections must be tight.

Never operate the engine unless a filter element is in place and the automatic dust unloader is installed.

Never remove the element from the air cleaner while the engine is running.

Automatic Dust Unloader (Regular Duty Air Cleaner)

The dust unloader automatically discharges the accumulated dirt in the air cleaner body.

At the interval specified on the "SCHEDULED MAINTENANCE GUIDE", squeeze or remove the dust unloader to be sure it is open and contains no obstructions.

NOTE: When reinstalling the unloader, be sure the flat side is in line and not broadside to the fan blast, or proper function will be affected.

Air Cleaner Service Indicator (Illust. 1)

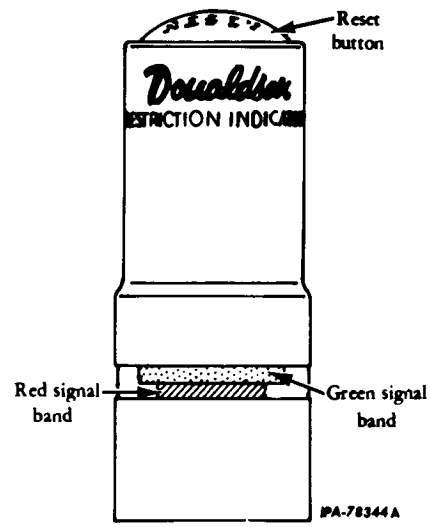
The air cleaner service indicator signals when air filter element service is required. A complete description of indicator operation can be found in Section 3.

After servicing the element, reset the indicator by pressing the reset button.

Service Indicator Safety Filter (Illust. 2)

If the air cleaner service indicator or tubing from the indicator to the air cleaner becomes damaged, the filter (7) will prevent unfiltered air from entering the engine through the damaged indicator or tubing. If a leak occurs, this filter will, with continued operation, plug up. Plugging of this filter will be indicated by loss of indicator operation. This can be checked as follows:

NOTE: Units equipped with heavy duty (FARR) air cleaners - disconnect the elbow (11) from the dust bin on the housing (6, Illust. 5) and seal the opening in the housing.



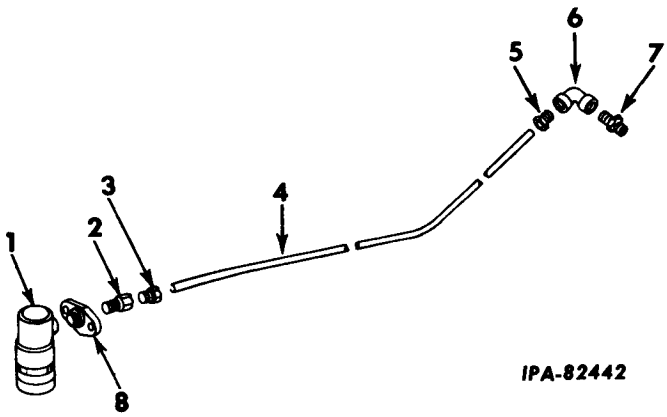
Illust. 1
Air Cleaner Service Indicator.

Remove the air intake cap. Start the engine and operate at low idle. Gradually seal off the air intake opening with a flat piece of cardboard until it is almost completely covered. If the green signal band of the indicator (Illust. 1) fails to rise and lock in position, the service indicator safety filter is plugged. Once detected, the lead must be located and corrected immediately, and the service indicator safety filter cleaned or replaced to regain the full advantage of the service indicator.

Continued on next page.

MAINTENANCE

AIR CLEANING SYSTEM



Illust. 2
Air Cleaner Service Indicator and Components.

1. INDICATOR, air cleaner service.
2. BODY.
3. NUT.
4. TUBE.
5. NUT.
6. ELBOW.
7. FILTER, safety
8. FLANGE.

Service the service indicator safety filter as follows:

1. Disconnect the tube (4) from the elbow (6).

2. Remove the elbow (6) and connector (7) from the tube (3, Illust. 3).

3. Direct compressed air through the connector (7) in the opposite direction to the normal air flow until all foreign material is removed.

4. Install the connector (7) and elbow (6) onto the tube (3, Illust. 3). Reconnect the tube (4) to the elbow (6).

Primary Filter Element Service (Regular Duty Air Cleaner (Illust. 3)

The air cleaner primary element must be serviced whenever indicated by the air cleaner service indicator. Refer to "Air Cleaner Service Indicator" in Section 3.

The primary element can be cleaned by either of two methods; washing or compressed air.

Washing is the preferred method as it removes more dust and soot and restores the element to an almost new condition. The result being better performance and longer intervals between required element service. It is suggested that a spare element be available for use while the serviced element is drying. This will reduce unit down-time to only a few minutes and will allow sufficient time to service the restricted element properly.

NOTE: A filter element must be replaced after 6 washings.

Cleaning the element with compressed air is not considered an entirely satisfactory method. Some dust will remain in the element causing more frequent servicing of the element. Use this method only as a temporary measure until sufficient time is available to clean the element by "washing."

NOTE: After cleaning, if an element is to be stored for later use, place it in a plastic bag and store in an element shipping container to protect against dirt and damage.

Removal

1. Stop the engine. Wipe off any accumulation of dust from the element cover (16).

2. Depress and lock the decelerator pedal as shown in Illust. 4.

3. Remove the nuts (17) and the cover (16).

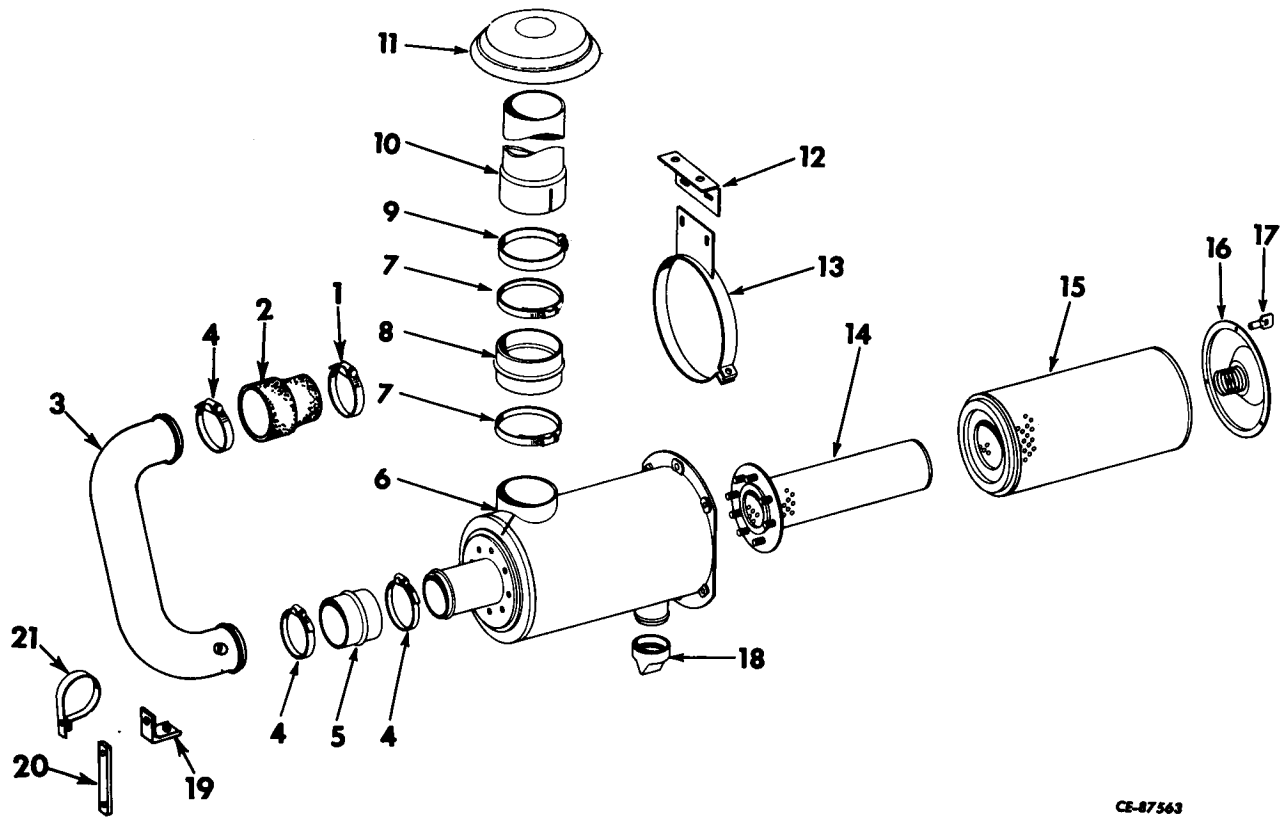
4. Remove the element (15).

NOTE: Be careful not to dislodge dust from the dirty element on to the safety element (14).

5. Check the condition of the gasket on the end of the primary element. If the gasket is damaged or missing, replace the element.

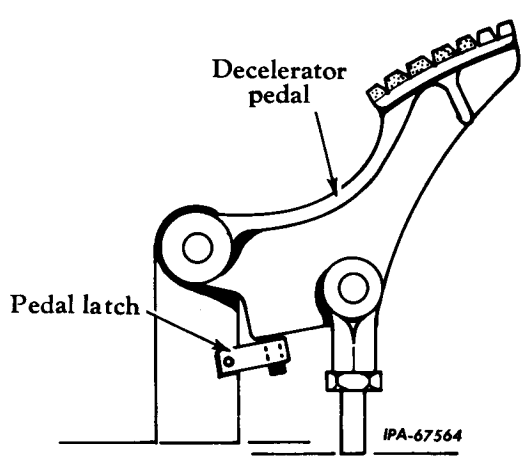
Continued on page 6

AIR CLEANING SYSTEM



Illust. 3
Exploded View of Regular Duty Air Cleaner.

1. CLAMP, hose.
2. ADAPTER, tube.
3. TUBE, air cleaner to turbocharger.
4. CLAMP, hose.
5. CONNECTOR, air cleaner to tube.
6. BODY, air cleaner.
7. CLAMP, hose.
8. HOSE, air cleaner inlet.
9. CLAMP, tube.
10. TUBE, air cleaner inlet.
11. CAP, air intake.
12. BRACKET, air cleaner hood mounting.
13. BRACKET, air cleaner clamp.
14. ELEMENT, safety filter.
15. ELEMENT, primary filter.
16. COVER, element.
17. NUT, cover.
18. UNLOADER, automatic dust.
19. ANGLE, support.
20. BAR, support.
21. CLAMP, tube.



Illust. 4
Decelerator Pedal Depressed and Locked.

AIR CLEANING SYSTEM

Washing

NOTE: Never wash elements in fuel oil, gas or solvent. DO NOT OIL ELEMENTS. Do not attempt to take elements apart. Do not tap the element against a hard surface; this will damage the element.

1. Tap the side or end of the element against the palm of your hand to remove loose dust.

2. Wash the element in clean, warm water (+70°F to +100°F). A small amount of non-sudsing detergent added to the water will remove the soot.

3. Rinse the element in clear water (if a hose is used, do not exceed 40 psi). Shake the element carefully to remove excess water.

NOTE: Do not use compressed air to speed the drying of the element; the air pressure will rupture the wet element.

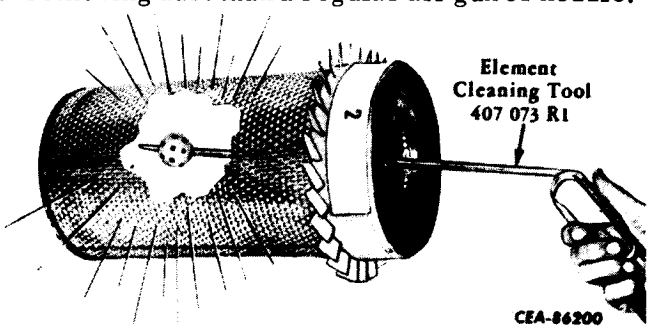
4. Lay the element on its side and allow it to air dry before reinstalling. Overnight drying is usually sufficient. When drying the element protect it from dirt and/or freezing.

NOTE: If no spare element is available, the wet element, after excess water has been shaken out, may be installed in the air cleaner and the engine operated at low idle for 10 minutes before operating.

5. Inspect for damage. Refer to "Inspection" on this page.

Compressed Air

An element cleaning tool (IH Part No. 407 073 R1, Illust. 5) for use with compressed air, is available from your authorized International Construction Equipment distributor or dealer. This tool will do a faster and more efficient job of removing dust than a regular air gun or nozzle.



Illust. 5
Using Element Cleaning Tool.

NOTE: Do not tap the element against a hard surface; this will damage the element.

1. Carefully tap side or end of the element against the palm of your hand to remove loose dust.

2. Direct clean, dry compressed air up and down the pleats on the clean side (inside) of the element.

NOTE: Air pressure at the nozzle must not exceed 100 psi. Keep a reasonable distance between the air nozzle and the element.

3. Inspect the element for damage. Refer to text "Inspection" which follows:

Inspection

1. Inspect the filter element for leaks or damage by placing a bright light inside the element. Inspection of the element on the outside will disclose any holes where concentrated light shines through. The slightest rupture requires replacement of the filter element.

2. Inspect the contact surfaces of the element and the air cleaner body. If faulty or damaged gaskets or surfaces are noted, correct these conditions immediately.

3. Remove all dirt from the air cleaner body inside with a damp cloth. A small amount of non-sudsing detergent added to the water will remove the soot.

4. Squeeze or remove and clean the dust unloader (18) to be sure it is open and contains no obstructions.

Installation

1. Install the open end of the primary element (15) into the air cleaner body over the safety element (14).

2. Install the cover (16) making sure that the element retaining spring is inserted into the cup on the end of the element (15). Secure with the nuts (17) making sure the cover is not cocked.

3. Unlock the decelerator pedal.

4. Inspect and tighten all air cleaner and inlet and outlet hose connections before resuming operation.

5. Start the engine. If the air cleaner service indicator (Illust. 1) continues to show air flow restriction, stop the engine; replace both the primary and safety filter elements (refer to "Safety Filter Element Service") as outlined in the following text.

AIR CLEANING SYSTEM

Safety Filter Element Service (Regular Duty Air Cleaner (Illust. 3)

NOTE: Replace the primary element whenever replacing the safety element.

Replace the filter elements as follows:

1. Depress and lock the decelerator pedal as shown in Illust. 4.

2. Remove the cover nuts (17) and the cover (16).

3. Remove the element (15). Remove the eight nuts and lock washers, from the front of the body (6), which secure the element (14) inside the body; remove the element (14).

4. Wipe the inside of the body (6) with a damp cloth.

5. Install a new element (14) and secure with the eight nuts and lock washers.

6. Install a new element (15).

7. Install the cover (16) making sure that the element retaining spring is inserted into the cup on the end of the element (15). Secure with the nuts (17) making sure the cover is not cocked.

8. Unlock the decelerator pedal.

Filter Element Service (Heavy Duty Air Cleaner) (Illust. 6)

NOTE: Do not operate loader when there is any damage to the weather cap or aspirator, or when there is restriction of the air cleaner inlet. This could cause air cleaner element burning.

Replace the filter element when indicated by the air filter service indicator. Refer to "Air Cleaner Service Indicator" in Section 3.

1. Remove the cap (1) and panel (2).

2. Loosen the four clamps securing the adapter (3) and panel (4) to the air cleaner housing.

3. Remove the adapter (3) and panel (4) from the air cleaner housing.

4. To remove the dirty filter element (5), insert fingers in the element openings and pull the element away from each side of the housing to break the seal.

5. Carefully remove the filter element and discard.

NOTE: Do not attempt to clean or re-use the old filter element.

6. Turn each locking screw on the plate (13) counterclockwise 1/4 turn and remove the plate.

7. Clean the inside of the housing (6) of all dirt and foreign material. Use a clean damp cloth.

8. Check the condition of the gasket (14). If it is worn or damaged, replace it.

9. Install the plate (13). Turn each locking screw clockwise 1/4 turn.

10. Inspect the new element (5) for shipping damage before installing. If damaged, DO NOT USE.

11. Insert the new element (5) into the housing (6).

NOTE: No gaskets are required; the plastic face forms its own seal. Be sure all edges of the face seal of the element (5) are seated against the housing. The air cleaner service indicator will not signal correctly unless the element is properly sealed in the air cleaner housing or if the element is punctured.

12. Clean the panel (4) with steam, washing or by directing compressed air through the tubes from the front and back of the panel and through the dust bin.

13. Wipe out the adapter (3) and clean the air intake cap (1).

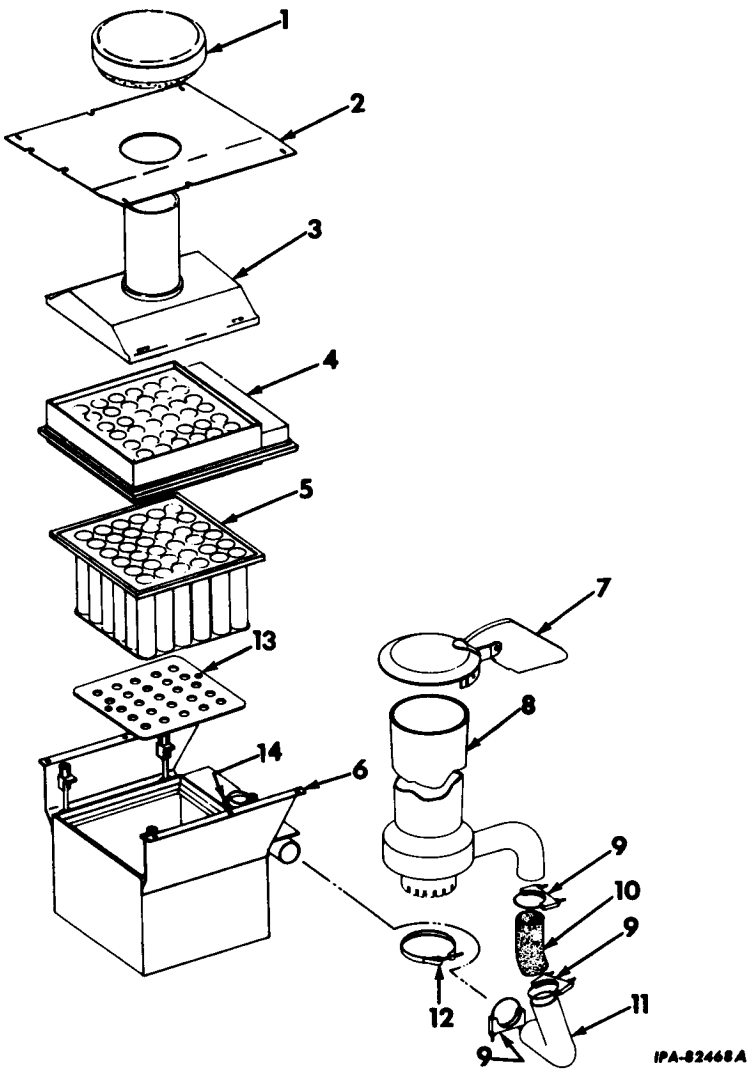
14. Install the panel (4) onto the housing and the adapter (3) onto the panel (4). Be sure the panel is properly seated on the gasket (14). Secure the panel and adapter to the housing with the four clamps. Tighten the nuts (refer to "TORQUES" in Section 10 for specified torque).

15. Install the panel (2) and cap (1).

Aspirator (Heavy Duty Air Cleaner) (Illust. 6)

The aspirator (8) requires no maintenance beyond an occasional inspection. This inspection should include a visual examination of the aspirator itself to be sure that it has not been clogged or damaged. Be sure the weather cap (7) opens easily and immediately upon engine start-up.

AIR CLEANING SYSTEM



Illust. 6
Exploded View of Heavy Duty Air Cleaner.

1. CAP, air intake.
2. PANEL, removable.
3. ADAPTER, intake.
4. PANEL, rotonamic.
5. ELEMENT, filter.
6. HOUSING, air cleaner.
7. CAP, weather.
8. ASPIRATOR.
9. CLAMP.
10. HOSE.
11. ELBOW, exhaust.
12. CLAMP, aspirator.
13. PLATE, support.
14. GASKET.

AIR CLEANING SYSTEM

AIR INTAKE CAP

The dome of the air intake cap serves as a rain shield, and the screen prevents chaff and coarse dirt from getting into the air cleaner. Keep this screen clean from all chaff, oil or dust. Clogged holes in the screen will reduce the power of the engine by restricting the flow of air.

A twist and an upward pull, after loosening clamp screw, will remove the cap. Use compressed air to clean the screen. If compressed air is not available, wash in clean hot water or preferably water containing a small amount of non-sudsing detergent.

CRANKCASE BREATHER (ILLUST. 7)

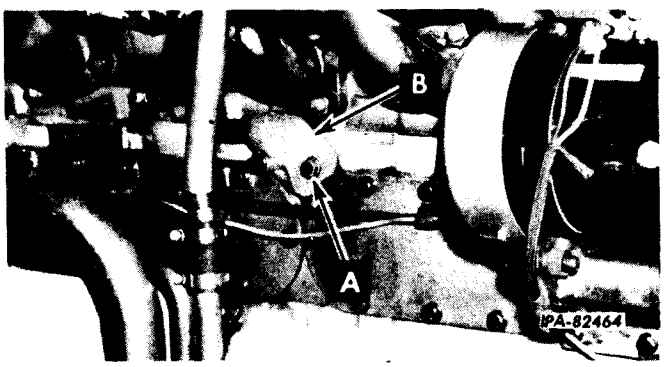
The crankcase breather is located above the push rod chamber covers on the right side of the crankcase. To clean the breather element, proceed as follows:

1. Remove the two bolts (A) which secure the breather pipe (B) to the crankcase and the bolt on the breather pipe bracket.

2. Remove the breather element from the crankcase and wash it in kerosine or diesel fuel; then dry thoroughly.

3. Check the breather pipe to be sure it is not plugged or restricted.

4. Reinstall the element, breather pipe and bracket, using a new breather pipe gasket.



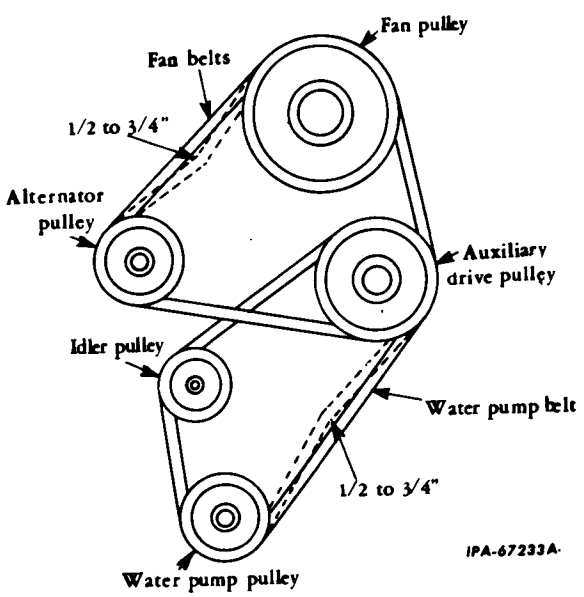
Illust. 7
Crankcase Breather.

BELTS

Belts on new loaders (also new replacement belts) lose their tension as they "seat" into the pulleys. Check a new belt every ten hours, until the tension remains stabilized.

BELT TENSION

The tension is correct when the belt can be depressed, by thumb (approx. 25 lb. load),



Illust. 8
Correct Belt Tensions.

BELTS

1/2 to 3/4 inch midway between the pulleys (Illust. 8).

ADJUSTMENT

Fan and Alternator Belts (Illust. 9)

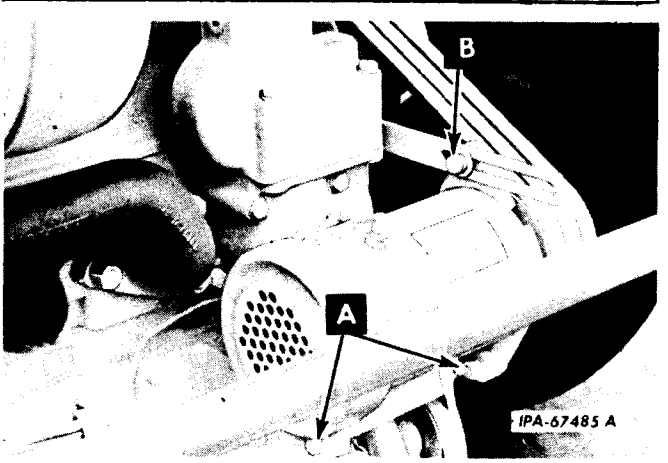
> CAUTION: BEFORE REMOVING THE ALTERNATOR BELT, PLACE THE ELECTRICAL SYSTEM MASTER SWITCH IN THE "OFF" POSITION.

1. Loosen the cap screws (A and B).

2. Move the alternator out to tighten the belts or in to loosen them until the tension on the belts is 1/2 to 3/4 inch.

3. Retighten the cap screws (A and B).

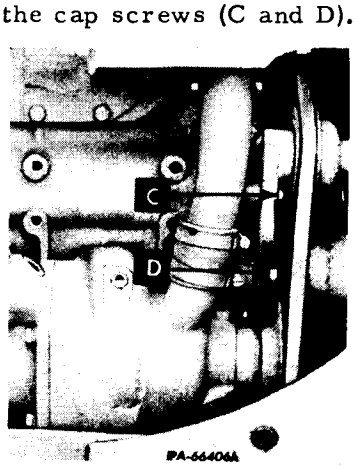
> NOTE: Never use a pry bar on the alternator to adjust belt tension, as alternator bearing damage will result.



Illust. 9
Fan and Alternator Belt Tension Adjustment.

Water Pump Belt (Illust. 10)

1. Loosen the cap screws (C and D).



Illust. 10
Water Pump Belt Adjustment.

2. Move the idler out to tighten the belt or in to loosen it until the tension on the belt is 1/2 to 3/4 inch.

3. Retighten the cap screws (C and D).

REMOVAL AND REPLACEMENT

Replace badly worn, greasy or cracked belts immediately. These conditions prevent proper belt function.

Fan and Alternator Belts

Never replace just one belt; if one belt needs replacement, replace all three.

NOTE: Before removing and replacing the belts, check to be sure the water pump belt has the correct tension and is in good working condition. If not, replace the water pump belt at the same time. (Refer to "Water Pump Belt" shown below.)

1. Loosen the cap screws (A and B, Illust. 9).

2. Move the alternator in to loosen the belts so they can be slipped off the pulleys.

3. Remove the right hand half of the fan guard.

4. Work the old belts (one at a time) over the fan blades.

5. Work the new belts over the fan blades and onto the pulleys. Adjust them as described in "Fan and Alternator Belts" under "Adjustment" on this page.

6. Install the right hand half of the fan guard.

Water Pump Belt

NOTE: Before removing and replacing the water pump belt, check to be sure the fan and alternator belts are in good working condition. If not, replace these belts at the same time. Refer to the preceding text entitled "Fan and Alternator Belts."

1. Loosen the cap screws (C and D, Illust. 10).

2. Move the idler in to loosen the belt so it can be slipped off the pulleys.

BELTS

3. Loosen the cap screws (A and B, Illust. 8) and move the alternator in so the fan and alternator belts can be slipped off the auxiliary drive pulley.

4. Remove the water pump belt and replace it with a new one.

5. Place the fan and alternator belts on the auxiliary drive pulley and adjust the fan belts. Refer to "Fan and Alternator Belts" under "Adjustment" on page 10 in this section.

6. Adjust the water pump belt. Refer to "Water Pump Belt" under "Adjustment" on page 10 in this section.

COOLING SYSTEM

The cooling system operates under pressure which is controlled by the pressure relief valve.

The belt-driven water pump circulates the coolant through the engine block, cylinder head, radiator, and engine oil cooler. Circulation is controlled by the thermostat which by-passes coolant flow from the radiator until the engine reaches operating temperature.

PROPER COOLANT LEVEL

Proper cooling is assured only when the system is sealed; the pressure relief valve and thermostat are operating properly; and the system is free of coolant and air flow restrictions and is filled to the proper level. Proper coolant level is one inch above the baffle.

CARE OF THE SYSTEM

To keep the system internally free of rust and sludge, add a corrosion inhibitor to the water during warm weather operation or use IH Premium anti-freeze during cold weather operation. Use softened or rain water when possible; these provide the greatest protection against scale accumulations.

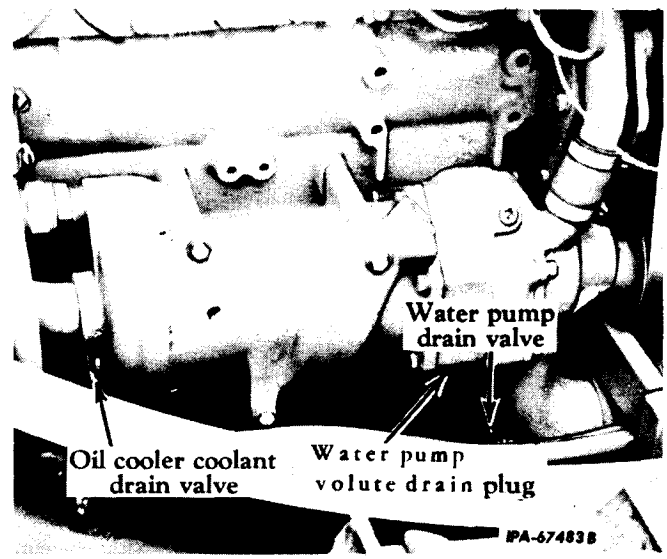
Drain and thoroughly flush the system at least twice a year. The appearance of rust or sludge in the system indicates the rust and sludge inhibitor additives are weakened and must be replaced. Refer to "CLEANING THE SYSTEM" on page 12 in this section.

DRAINING THE SYSTEM

1. Run the engine until it reaches operating temperature; then stop engine.

2. Remove the radiator cap. Use CAUTION: Refer to "RADIATOR CAP" on page 13 in this section.

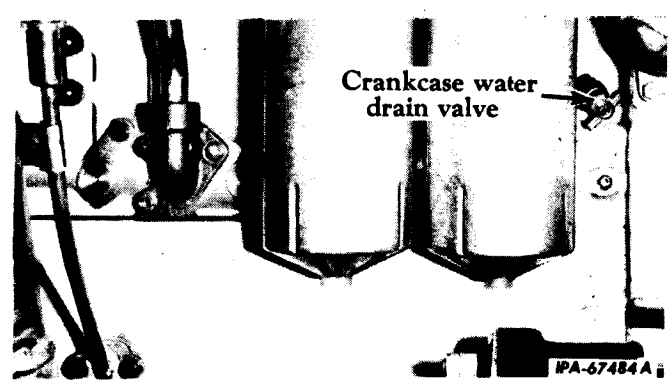
3. Open the oil cooler drain valve, water pump drain valve and remove the water pump volute drain plug (Illust. 11).



Illust. 11
Oil Cooler and Water Pump Drains.

4. Open the crankcase drain valve (Illust. 12).

5. Allow system to drain completely; do not let drain outlets plug-up during draining.



Illust. 12
Crankcase Drain Valve.

COOLING SYSTEM

FILLING THE SYSTEM

Do not add cold coolant into the radiator of an overheated engine unless absolutely necessary. However, if necessary:

Remove the radiator cap carefully, refer to "RADIATOR CAP" on page 13 in this section.

Coolant must be added to radiator slowly with engine running at low idle speed.

1. Close the oil cooler drain valve, water pump drain valve and install the water pump volute drain plug (Illust. 11).

2. Close the crankcase drain valve (Illust. 12).

3. Fill the cooling system slowly, this allows more air to escape and the system to be filled to maximum capacity. Install a cooling system corrosion inhibitor (for warm weather operation) or IH Premium Anti-Freeze (for cold weather-consistently at or below +32°F) according to the instructions printed on the container. Refer to "ANTI-FREEZE" on this page.

NOTE: Use only a corrosion inhibitor that is compatible with aluminum. DO NOT use inhibitors labeled as "acid neutralizers".

4. Start engine and run until normal operating temperature is reached; adding coolant when needed to keep proper level of one inch above the baffle.

5. After all air is removed and level remains fixed, install the radiator cap.

CLEANING THE SYSTEM

1. Drain the system. Refer to "DRAINING THE SYSTEM" on page 11 in this section.

2. Close the cooling system drains.

3. Fill the system with clean water (refer to "FILLING THE SYSTEM" on this page), and add a flushing compound that is compatible with aluminum. Flush the system in accordance with the instructions furnished with the compound.

4. After flushing, rinsing, and completely draining the system, refill with clean coolant. Refer to "FILLING THE SYSTEM" on this page.

ANTI-FREEZE

IH Premium anti-freeze (permanent type) is the recommended solution for this loader. DO NOT use methanol or alcohol as an anti-freeze.

NOTE: Do not mix brands of anti-freeze solutions. Mixed solutions make it impossible to determine the protection against freezing.

Check the solution frequently and at normal operating temperature, to be sure the cooling system has sufficient protection against freezing.

The following table shows the percentage of anti-freeze solution required for the various temperatures.

Freezing Point (Fahrenheit)	USE IN COOLING SYSTEM IH Premium (Ethylene Glycol-Permanent Type)
+20°	16%
+10°	25%
0°	33-1/3%
-10°	40%
-20°	45%
-30°	50%
-40°	54%
-50°	58%
-60°	62%
-70°	65%

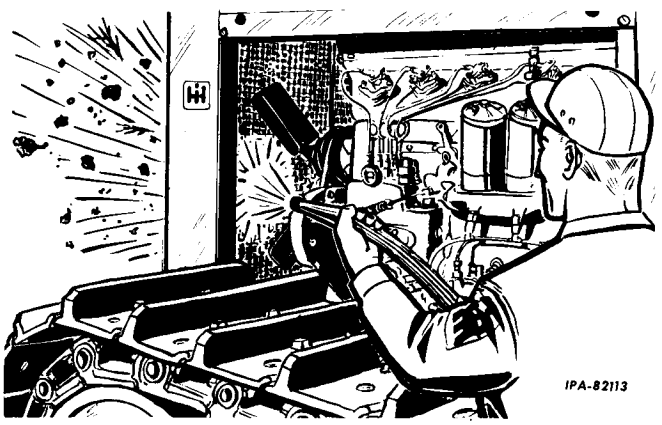
COOLING SYSTEM

CLEANING THE RADIATOR

Minor internal sludge accumulations will be removed when flushing the cooling system.

When internal accumulations are found that cannot be removed by normal flushing methods, consult your authorized International Construction Equipment distributor or dealer.

Remove all bugs or dirt from the radiator core using air or water under pressure. Direct the flow through the core, opposite the normal direction of air flow.



RADIATOR CAP (ILLUST. 13)

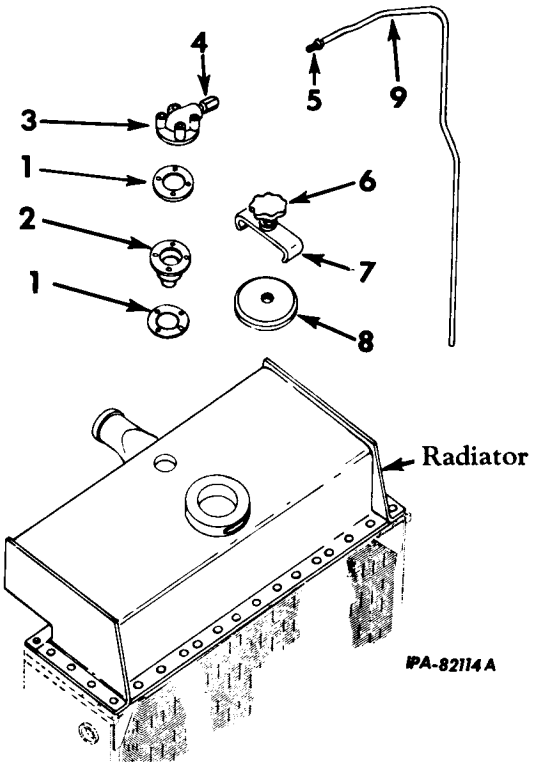
The radiator cap seals the coolant filler opening of the radiator. Positive sealing requires a cap gasket and its contacting surfaces in good condition, and a properly tightened cap.

To remove the cap, lift the radiator cap shield and unscrew the handle (6) slowly until all pressure is relieved, and the clamp (7) clears the slots in the radiator filler neck.

When installing the cap, the gasket and contacting surfaces must be clean; then tighten the handle (6), by hand, until snug.

PRESSURE RELIEF VALVE (ILLUST. 13)

The pressure relief valve keeps the pressure of the coolant at approximately six to eight psi. The valve is located on the top of the radiator top tank, just behind the filler neck. Excess pressure and coolant released by the valve are discharged through the overflow tube (9).



Illust. 13
Radiator Cap and Relief Valve Assemblies.

1. GASKET, valve.
2. VALVE, relief.
3. HOUSING, valve.
4. CONNECTOR.
5. NUT, connector.
6. HANDLE, cap.
7. CLAMP, cap.
8. CAP, radiator.
9. TUBE, overflow.

Replacing the Valve

Do not attempt to repair a faulty valve (2); replace it.

1. Remove the engine hood.

2. Disconnect the overflow pipe (9) from the housing (3).

3. Remove the four cap screws securing the valve assembly (Ref. 1 to 4) to the radiator, and remove the valve assembly.

NOTE: When replacing the valve (2), replacement of the two gaskets (1) is also recommende

4. Assemble and secure the new valve (2), gaskets (1) and housing (3) on the radiator.

5. Reconnect the overflow pipe (9).

6. Reinstall the engine hood.

COOLING SYSTEM

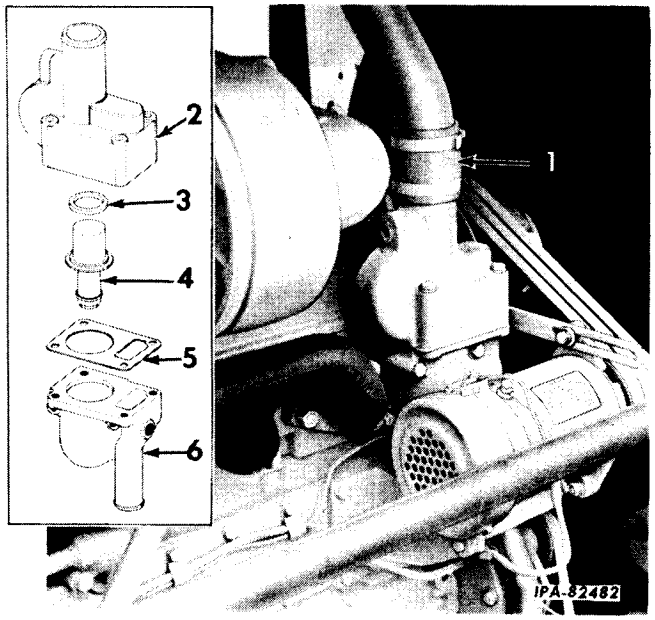
THERMOSTAT

The thermostat has two functions; gain rapid engine warm-up; control coolant temperature. The thermostat is the non-adjustable type, designed to maintain a coolant operating temperature of +180°F to +195°F.

NOTE: Use only a permanent type anti-freeze in this engine.

Removing and Checking the Thermostat (Illust. 14)

Engine overheating is sometimes due to a faulty thermostat. Remove and check the thermostat as follows:



Illust. 14
Thermostat.

1. HOSE, radiator inlet.
2. HOUSING, thermostat.
3. SEAL.
4. THERMOSTAT.
5. GASKET.
6. HOUSING, water outlet.

1. Drain the cooling system to a level below the thermostat housing. Refer to "DRAINING THE SYSTEM" on page 11 in this section.

2. Disconnect the hose (1) from the housing (2).

3. Remove the four cap screws securing the housing (2) to the housing (6); remove the housing (2), gasket (5), and thermostat (4).

NOTE: Check the condition of the seal (3) pressed in the housing (2). If seal is worn or damaged, remove and replace with new.

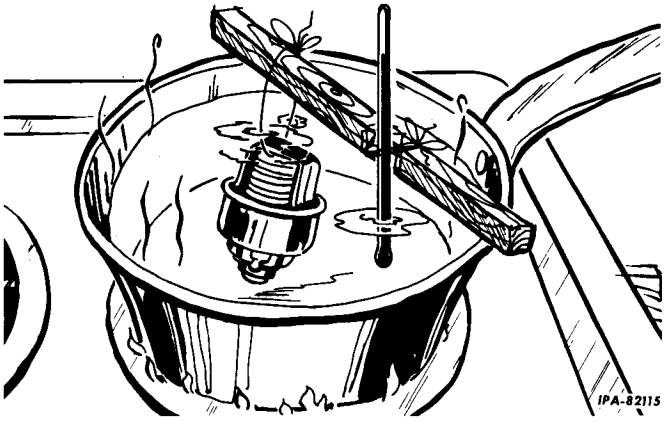
4. Clean the thermostat housing, removing all scale and rust.

5. Clean the thermostat. Replace the thermostat if coated with scale as this will not allow proper operation.

6. Check the thermostat as follows (Illust. 15):

a. Suspend the thermostat and a thermometer in a container of water.

NOTE: Do not allow either one to contact the container sides or bottom.



Illust. 15
Checking the Thermostat.

b. Heat water and carefully note temperature when thermostat starts to open (approx. +180°F) and when fully open (approx. +195°F).

c. If thermostat does not function as described, replace it.

Installing the Thermostat (Illust. 14)

1. Clean the gasket surface of the housing (6) to assure proper sealing when reassembled.

2. Install the new gasket (5) on the housing (6) and install the thermostat (4).

NOTE: Do not damage the ring in the seal (3) when installing the thermostat.

3. Install and secure the housing (2) onto the housing (6). Tighten the four cap screws. Refer to "TORQUES" in Section 10.

4. Reconnect and secure the radiator inlet hose (1). Refer to "TORQUES" in Section 10.

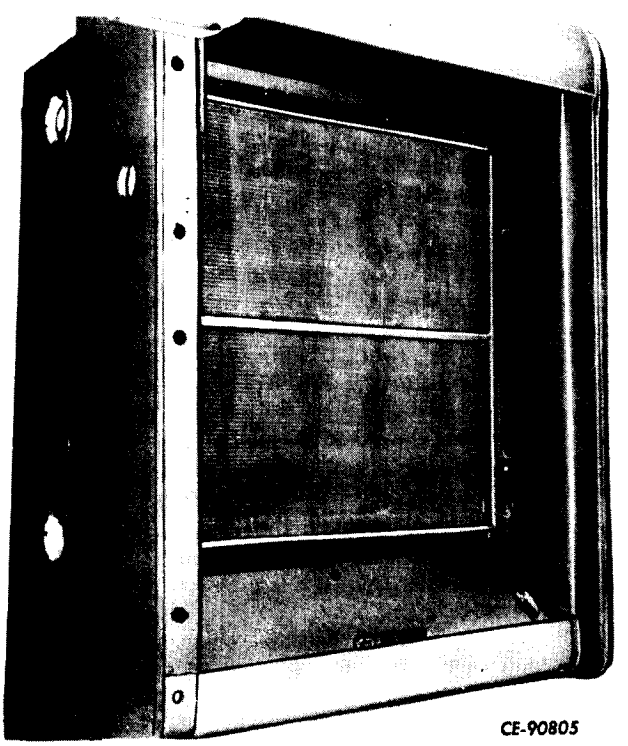
5. Fill the cooling system, refer to "FILLING THE SYSTEM" on page 12 in this section.

ENGINE OIL COOLER

The oil cooler is mounted on the left side of the crankcase and connected to the cooling system. The cooler has two functions; gain rapid engine oil warm-up; control engine oil temperature during operation.

TRANSMISSION OIL COOLER (ILLUST. 16)

Remove the radiator guard door latch pins and retainer pins so the hinged door can be swung away to gain access to the cooler which is also hinged type. The hinged type transmission oil cooler is mounted on radiator side channel brackets. Remove two bolts to allow the cooler to be pivoted away from the radiator core for cleaning. Keep core clean at all times to prevent air flow restriction. Remove all bugs or dirt from the core using air or water under pressure. Direct the flow through the core opposite the normal direction of air flow.



Illust. 16
Transmission Oil Cooler.

WATER PUMP

No lubrication of the pump is required as the bearings are of the permanently sealed type and are packed with special lubricant at the factory for the life of the bearing.

The water pump requires no attention other than bearing replacement when they show excessive looseness or if a water leak develops which indicates that a damaged or badly worn seal needs replacement.

When overhauling the water pump, pre-pack the bearings and housing with grease before assembling. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in Section 8 for the type and quantity of grease required.

FAN BEARING HOUSING

No lubrication of the housing is required as the bearings are of the permanently sealed type and are packed with special lubricant at the factory for the life of the bearing.

The fan bearing housing requires no attention other than bearing replacement when they show excessive looseness or if a grease seal leak develops which indicates that a damaged or badly worn seal needs replacement.

When overhauling the fan bearing housing, pre-pack the bearings and housing with grease before assembling. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in Section 8 for the type and quantity of grease required.

DECELERATOR

CHECKING OPERATION

1. Lock transmission gear selector lever in "NEUTRAL".

2. Start engine, after proper warm-up, move throttle control lever all the way up. Depress decelerator pedal to stop.

3. Check engine rpm. The engine speed must be 900 50 rpm; if not, adjust the decelerator pedal.

PEDAL ADJUSTMENT (ILLUST. 17)

1. With engine running set governor control hand lever to high idle position on ratchet. Depress decelerator pedal (2) to stop. Check engine rpm.

2. Stop engine.

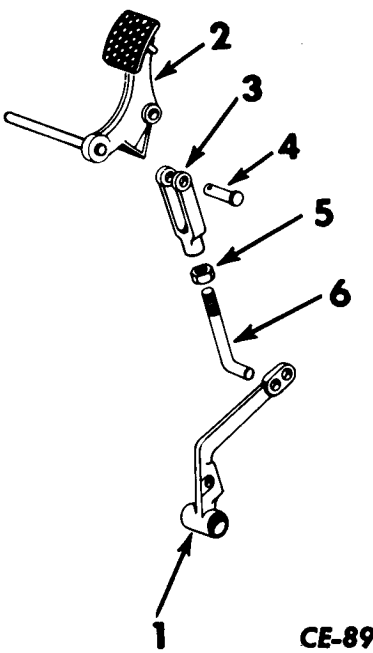
3. Loosen nut (5).

4. Remove rod end pin (4) from clevis (3) and separate from decelerator pedal (2).

5. Turn clevis (3) in or out to decrease or increase engine idle rpm to 900 ± 50 rpm when pedal is applied to stop.

6. Reassemble disconnected parts in reverse order. Tighten nut.

7. Check operation as described under "CHECKING OPERATION".



Illust. 17
Decelerator Pedal Adjustment.

1. DECELERATOR, lever.
2. DECELERATOR, pedal.
3. CLEVIS.
4. ROD, end pin.
5. NUT.
6. ROD.

ELECTRICAL SYSTEM

PRECAUTIONS

The electrical generating system now incorporates a direct diode rectified generator (alternator) which requires special handling and procedures different from those associated with the old style DC generator.

Before working on any part of the electrical system place the electrical system master switch in the "OFF" position.

All terminals must be clean and fastened securely. Never paint electrical connections. Repair or replace all broken wires immediately.

◆ CAUTION: WHEN INSTALLING BATTERIES BE SURE TO CONNECT GROUND CABLE TO NEGATIVE TERMINAL. WHEN CONNECTING A BOOSTER BATTERY OR BATTERY CHARGER MAKE CERTAIN TO CONNECT NEGATIVE TERMINALS TOGETHER AND THE POSITIVE TERMINALS TOGETHER. DO NOT SHORT ACROSS OR GROUND ANY TERMINALS OF ALTERNATOR OR REGULATOR. DO NOT ATTEMPT TO POLARIZE THE ALTERNATOR, FAILURE TO OBSERVE THESE PRECAUTIONS WILL RESULT IN SEVERE DAMAGE TO THE HARNESS AND ALTERNATOR. NEVER OPERATE THE ALTERNATOR ON OPEN CIRCUIT, NEGLECT OF THIS COULD RESULT IN PERSONAL INJURIES.

IMPORTANT: IF FOR ANY REASON THE LOADER MUST OPERATE WITHOUT BATTERIES IT IS ABSOLUTELY IMPERATIVE TO DISCONNECT THE FIELD CONNECTOR AND THE BATTERY TERMINAL AT THE ALTERNATOR PRIOR TO STARTING THE LOADER, MAKE SURE THESE TWO LIVE TERMINALS ARE WRAPPED INDIVIDUALLY WITH ELECTRICAL GRADE TAPE WHILE OPERATING IN THIS MANNER. DO NOT CONNECT ANY CABLE TO THE "R" TERMINAL ON THE ALTERNATOR.

ELECTRICAL SYSTEM

REGULATOR

The regulator is adjusted and sealed by the manufacturer. If the regulator fails to operate properly, consult your authorized International Construction Equipment distributor or dealer.

ALTERNATOR

The alternator requires no lubrication since it is a lifetime lubricated unit. If the alternator fails to operate properly, consult you authorized International Construction Equipment distributor or dealer.

CRANKING MOTOR

The cranking motor must be lubricated every 5000 hours under normal starting conditions, or sooner, should it become necessary to remove the motor in the process of engine servicing.

1. Remove the cranking motor for lubrication.

2. At the time of lubrication, the cranking motor should be cleaned, disassembled and inspected for further maintenance requirements. Consult your authorized International Construction Equipment distributor or dealer for procedure to follow.

3. All wicks and oil reservoirs must be saturated with grade-10 engine oil. The splines underneath the clutch should be lightly lubricated with the same grade of engine oil.

4. Reinstall the cranking motor. Refer to "TORQUES" in Section 10.

If the cranking motor fails to operate properly, consult your authorized International Construction Equipment distributor or dealer.

LIGHT FUSE

A cartridge type 3AG-15 amp fuse is located in the fuse housing on the instrument panel. If a short circuit occurs in the light circuit, the fuse will burn out and break the circuit, preventing damage to the electrical system.

It is important to use the same capacity fuse for replacement. If the lights fail, check the fuse. If the fuse continually burns out, check the electrical wiring for short circuits. To install a new fuse, unscrew the cap on the fuse housing.

STORAGE BATTERIES

◆ CAUTION: BATTERIES GIVE OFF HIGHLY INFLAMMABLE GAS. NEVER ALLOW SPARKS OR OPEN FLAME NEAR THE BATTERIES. AVOID SPILLING ANY ELECTROLYTE ON HANDS OR CLOTHING.

Maintenance

Proper battery maintenance will assure maximum service. Following are a few simple rules:

____ Keep battery cable terminals clean and tight.

____ Keep filler cap vent holes unplugged.

____ Replace worn, cracked, broken or corroded cables.

____ Keep batteries fastened securely in frame.

NOTE: Excessive tightening can warp or crack battery case.

____ Maintain the correct battery liquid level. Refer to text "Liquid Level".

____ Keep the batteries clean. Refer to "Cleaning the Batteries".

ELECTRICAL SYSTEM

Cleaning the Batteries

If the top of a battery is dirty, it may be cleaned with a brush dipped in ammonia or soda solution. The vent plugs must be tightened and sealed to prevent any solution from getting into the battery cells. After the foaming stops, flush off the battery with clean water and unseal the vent plugs. Brighten the terminal contact surfaces with steel wool or a stiff brush.

Liquid Level

The electrolyte in each cell must be at the proper level (1/4 to 1/2 inch above the plates) at all times to prevent battery failure. Check the level of the electrolyte. When the electrolyte is below this level, pure distilled water must be added. Never use hydrant water or any water which has been in a metal container. Acid or electrolyte must never be added except by a skilled batteryman. Under no circumstance add any special battery "dopes", solutions or powders.

It is especially important to keep the batteries at full charge for cold weather operation. Add distilled water to the batteries in freezing temperatures only when the engine is to operate for several hours, to thoroughly mix the water and the electrolyte, or damage to the batteries will result from the water freezing.

ENGINE LUBRICATING OIL FILTERS

CHANGING THE ELEMENTS (ILLUST. 19)

Removal

1. After reaching operating temperature, stop the engine and drain the crankcase.

2. Remove the plugs (8) and drain the oil filters completely; then reinstall the gaskets and plugs.

3. Clean the filter header (3) to prevent dirt from dropping into the cases during reassembly.

4. Unscrew the two filter case bolts (1), and remove the cases (6) and elements (5).

5. Remove and discard the elements (5) and gaskets (4).

6. Wash the filter cases thoroughly in solvent and dry.

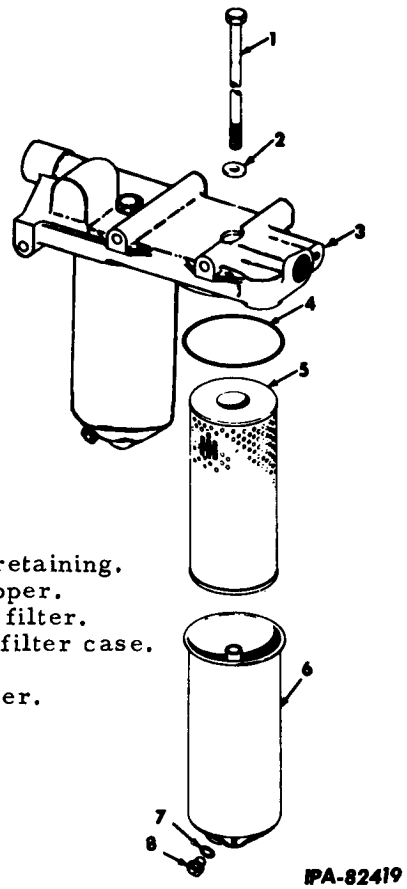
Installation

1. Place the new elements (5) into the cases (6) and add one quart of oil to each case.

2. Using new gaskets (4) secure the filter cases to the header with the bolts (1) and washers (2). Tighten the case bolts (refer to "TORQUES" in Section 10 for the specified torque), and be sure the cases are seated squarely in the header.

Deduct the amount of oil added to each case from the total capacity and add the remaining amount to the crankcase. Refer to the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in Section 8 for quantity and grade oil specified.

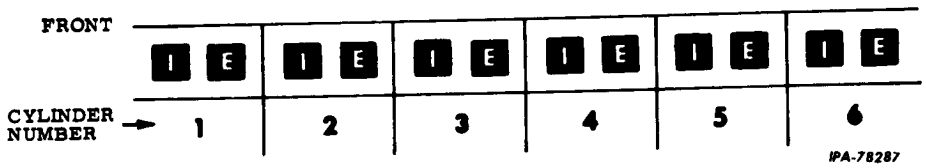
4. Operate the engine at low idle for 5 to 10 minutes, do not operate under load until normal oil pressure and temperature are reached. During warm-up, check the filter cases for leaks.



1. BOLT, case retaining.
2. WASHER, copper.
3. HEADER, oil filter.
4. GASKET, oil filter case.
5. ELEMENT.
6. CASE, oil filter.
7. WASHER.
8. PLUG, drain.

Illust. 19
Exploded View of Engine Lubricating Oil Filters.

ENGINE VALVE CLEARANCE ADJUSTMENTS



Illust. 20
Engine Valves.

The numbers in Illust. 20 are the cylinder numbers. For identification purposes, the exhaust valves are identified by the letter "E" and the intake valves by letter "I."

For valve clearance, refer to "ENGINE" in Section 10.

1. Remove the valve cover and gasket. Crank the engine (refer to "HAND CRANKING" on page 24 in this section) until the No. 1 piston is on the compression stroke and the timing pointer on the crankcase front cover is in line with the "TDC" pin on the vibration damper.

NOTE: Be sure the No. 1 piston is on the compression stroke by turning both push rods by hand. The valves are closed when the push rods are loose and can be turned easily.

2. Adjust the Nos. 1, 2 and 4 intake valves and the Nos. 1, 3 and 5 exhaust valves. Turn the rocker arm adjusting screws in or out until the correct feeler gauge clearance is obtained.

3. Crank the engine one complete revolution again lining up the "TDC" pin with the pointer. Adjust the valve lash of Nos. 3, 5 and 6 intake valves and Nos. 2, 4 and 6 exhaust valves.

NOTE: Be accurate. Use a feeler gauge for checking the valve clearance.

4. Check the condition of the valve cover gasket and replace if necessary. Install the gasket and valve cover. Tighten the valve cover cap screws (refer to "TORQUES" in Section 10 for specified torque). Check to be sure the gasket makes an oil-tight seal with the cylinder head.

ETHER INJECTOR

CHANGING THE STARTING FLUID CONTAINER

◆ CAUTION: OBSERVE THE PRECAUTIONS PRINTED ON THE CONTAINER WHEN USING OR STORING THIS FLUID AND WHEN DISCARDING THE EMPTY CONTAINERS.

NOTE: Improper starting fluids can cause valve seizure and severe damage to the engine. Consult your authorized International Construction Equipment distributor or dealer for the recommended starting fluid to be used.

1. Turn the thumb screw clockwise until the bails and starting fluid container can be removed from the injector body.

2. Locate the new container between the bails and place the bails into the slots on the injector body.

3. Tighten the thumb screw (turning counterclockwise) and, at the same time, guide the container head into the injector body.

4. Tighten the thumb screw enough to hold the container firmly into position. Turn the can back and forth to be sure it is seated properly in the injector body.

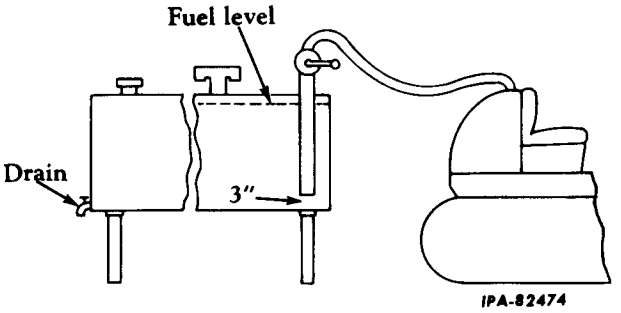
FUEL SYSTEM

GENERAL

If a large stationary fuel storage tank is used, use a pump to remove fuel rather than a faucet. Provide a space of at least three inches between the bottom of the pump suction pipe and the bottom of the storage tank for settling of sediment and water.

Locate a drain at the opposite end of the tank. Drain off the sediment and water regularly.

NOTE: Diesel fuel tanks and supply lines must never be galvanized, despite the fact that the zinc coating will reduce rust formation. Diesel fuel oil reacts chemically with zinc to form powdery flakes. These flakes can chip off causing damage to the fuel pump.



Illust. 21
Fuel Storage Tank.

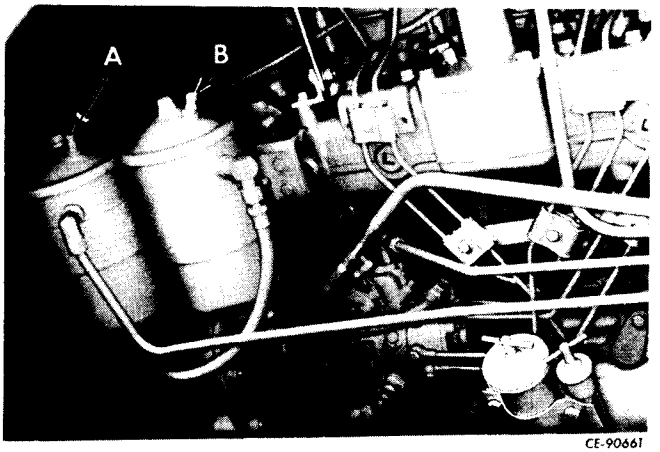
FUEL INJECTION PUMP

DO NOT ATTEMPT TO ADJUST THE FUEL INJECTION PUMP.

Unsatisfactory operation of the engine may not be due to the fuel injection pump. If unsatisfactory operation persists after servicing the filters and/or venting the system, consult your authorized International Construction Equipment distributor or dealer to service the fuel injection pump. Special equipment and knowledge are required for proper injection pump service; these are available at your distributor or dealer.

VENTING THE SYSTEM

All air must be eliminated from the fuel lines before the engine will operate properly. All fuel line connections must be tight to prevent leakage and to prevent air from entering the system. The system must be vented when:



Illust. 22
Fuel Filters and Vent Valves.

An engine, in operation, runs out of fuel.

A new engine is being started for the first time.

Fuel filter elements have been replaced.

Fuel piping has been disconnected or loosened.

Vent the system as follows:

1. Fill the fuel tank and open the shut-off valve under the fuel tank.

2. Open the valve (A, Illust. 22) on the primary fuel filter. When fuel flows out in a solid stream, close the valve.

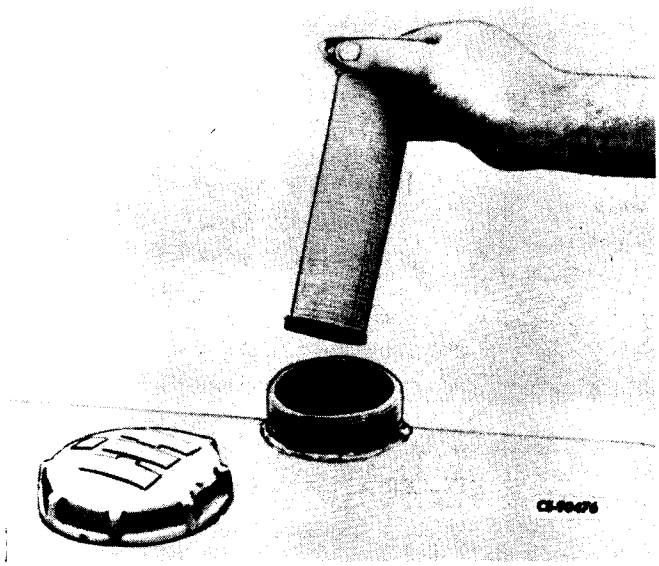
3. Open the valve (B, Illust. 22) on the final fuel filter. When fuel flows out in a solid stream, close the valve.

4. Start the engine.

FUEL SYSTEM

FUEL STRAINER (ILLUST. 23)

This strainer filters the fuel entering the tank. This eases the job of the fuel filters. Remove and clean the strainer with kerosine or diesel fuel.



Illust. 23
Fuel Strainer.

FUEL FILTER ELEMENTS

These elements cannot be cleaned and must not be disturbed except for replacement.

The standard primary filter element is the cotton thread type with a controlled density to avoid premature plugging. (On machines equipped with a water separator, the primary filter element is the paper pleated type and must be drained daily as outlined in the "SCHEDULED MAINTENANCE GUIDE" in Section 8.) This element is the first in the system to filter the fuel as it comes from the tank.

The final filter element is the paper pleated type. This element will need replacement less often than the primary filter if proper primary element service and water draining procedures are followed.

NOTE: NEVER USE THE COTTON OR WATER SEPARATOR TYPE ELEMENT IN THE FINAL FILTER.

When to Replace Elements

Fuel filter restriction causes loss of engine power or misfiring.

NOTE: Replace the primary fuel filter element. Vent the fuel system. Start the engine. If the engine has not regained full power or continues to misfire, stop the engine; replace the final fuel filter element, then vent the fuel system.

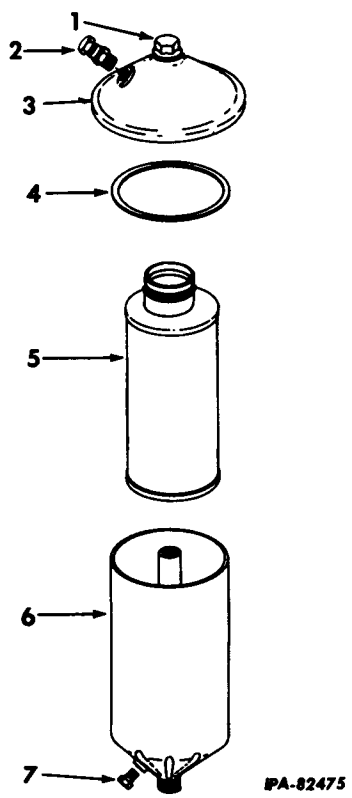
Replacing the Element

Primary or Final Filters (Illust. 24)

Keep the new element in the package until ready for installation. Clean the outside of the filter case and cover before removing the cover.

1. Drain the water and sediment from the fuel tank.

2. Close the fuel tank shut-off valve under the fuel tank.



Illust. 24
Fuel Filter Disassembled.

1. SCREW, retaining.
2. VALVE, bleeder.
3. COVER.
4. GASKET, element cover.
5. ELEMENT.
6. CASE.
7. PLUG, drain.

3. Open the valve (2) and remove the plug (7). Allow the fuel to drain completely.

LOADERS EQUIPPED WITH WATER SEPARATOR TYPE PRIMARY FUEL FILTER ELEMENT; open the filter case drain valve.

4. Unscrew the retaining screw (1) and remove the cover (3).

5. Remove and discard the gasket (4).

6. Remove and discard the element (5).

7. Thoroughly clean the inside of the cover and case with diesel fuel or kerosine.

8. Install the new element (5) into the case.

9. Place the new gasket (4) into the cover (3). Place the cover on the case (6). Tighten the retaining screw (1); do not "spin" the cover on, this may shift the gasket (4).

10. Install the plug (7) (or close the drain valve water separator type) and close the valve (2).

11. Vent the fuel system. Refer to "VENTING THE SYSTEM" on page 21 of this section.

HAND CRANKING

This procedure is for timing or valve adjustment only. It is not intended as a method for starting the engine.

◆ CAUTION: WHENEVER HAND CRANKING THE ENGINE BE SURE THE ENGINE IS COLD. NEVER HAND CRANK A WARM OR HOT ENGINE.

To crank the engine by hand, proceed as follows:

1. Place the electrical system master switch in "OFF."

2. Place the engine speed control lever in the "SHUT-OFF" position (lever all the way down).

3. Place a 7/8 inch socket on the auxiliary drive gear hub. Crank the engine as required.

LOADER EQUIPMENT

HYDRAULIC SYSTEM

Checking the Oil Level

To check the oil level, proceed as follows:

◆ CAUTION: ALWAYS LOOSEN THE FILLER AND LEVEL PLUG SLOWLY, IN CASE THERE IS STILL SOME PRESSURE IN THE SYSTEM.

Illust. 25
Hydraulic Reservoir Filler and Level Plug.

1. With the engine stopped, the bucket and scarifier (if equipped) resting level on the ground and the control handle in the "HOLD" position, remove the filler and level plug (Illust. 25).

2. Check the level in the tank. Add lubricant to bring the level up to the plug opening.

3. Reinstall and tighten the plug. Refer to "TORQUES" in Section 10.

Draining the System (Illust. 26)

1. Position the front idlers of the loader over a log so the front track shoes are approximately three feet off the ground, thus allowing clearance for full tilt forward of the bucket in the full down pressure position. A pit or ditch can also be used by positioning the loader up to the edge, allowing sufficient clearance for tilting the bucket.

2. Raise the lift arm to the maximum height. Roll the bucket all the way forward. Open the clam when loader is equipped with 4-IN-1.

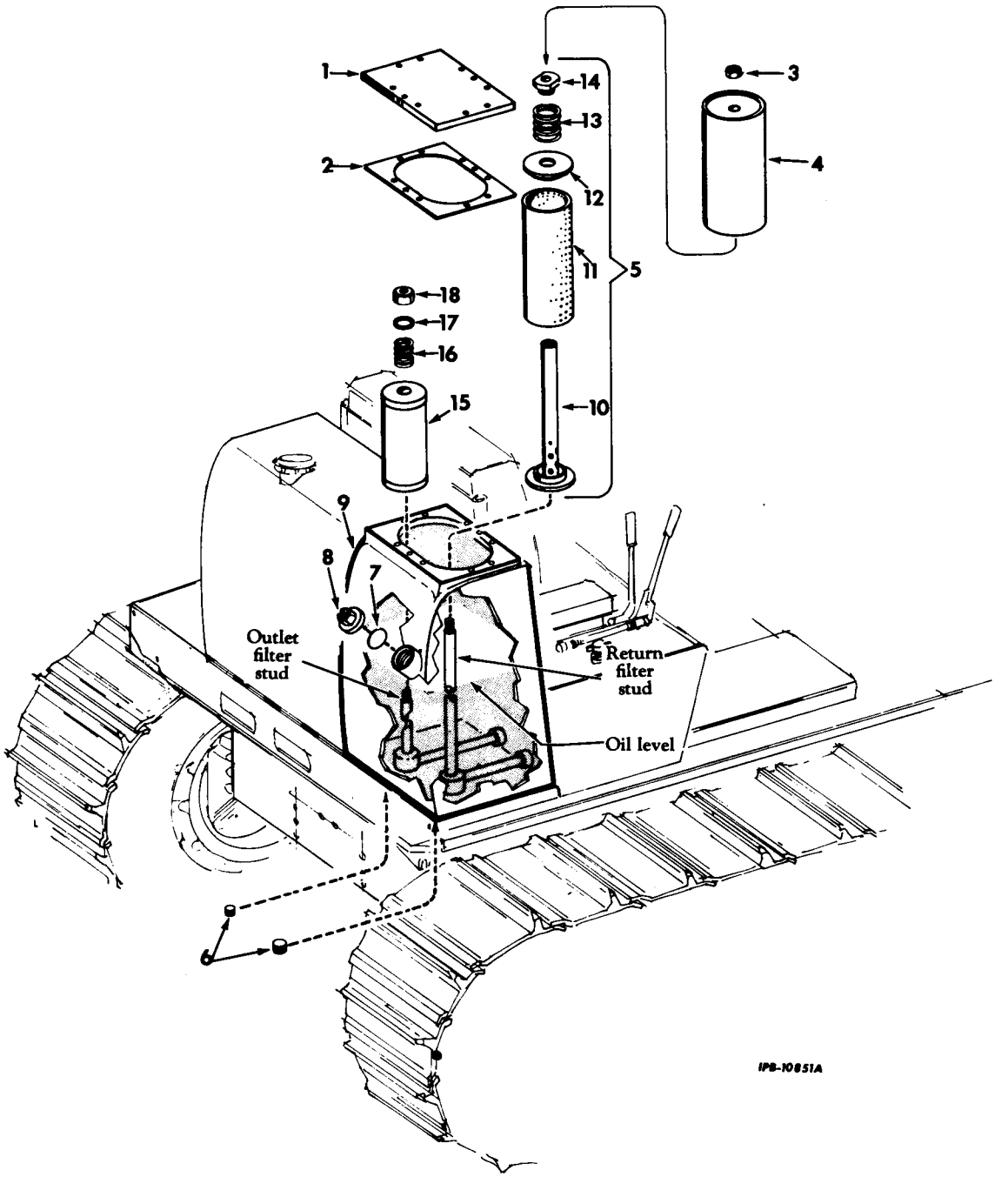
3. Stop the engine.

4. Remove the drain plugs (6) from the bottom of the reservoir tank (9). Remove the filler and level plug (8).

5. LOADERS EQUIPPED WITH A 4-IN-1: With the engine stopped, close the clam.

Continued on page 28

LOADER EQUIPMENT



Illust. 26
Hydraulic Reservoir Tank and Filters.

1. COVER.
2. GASKET.
3. NUT, lock.
4. SHROUD, return filter.
5. FILTER AND BASE ASSEMBLY, return.
6. PLUG, drain.
7. "O" RING.
8. PLUG, filler and level.
9. TANK, reservoir.
10. BASE, return filter.
11. ELEMENT, return filter.
12. SUPPORT, filter.
13. SPRING.
14. RETAINER, spring.
15. FILTER, outlet.
16. SPRING.
17. WASHER.
18. NUT, lock.

6. With the engine stopped, ease the control level into the "LOWER" position and allow the lift arm to drop slowly to the ground. Should the lift arm drop too fast, alternately return the control lever to the "HOLD" position.

7. Loosely install the filler and level plug (8).

8. Remove the 10 cap screws and lock washers securing the cover (1) to the tank (9). Remove the cover (1) and gasket (2).

9. Inspect the gasket (2) for damage and replace with a new one if necessary. If in doubt, always install a new gasket.

10. Remove the return filter element (11) as follows:

a. Remove the nut (3) from the return filter stud.

b. Lift the shroud (4) from the tank.

c. Lift the assembly (5) from the tank.

d. Disassemble the assembly (5) by unscrewing the retainer (14) from the base (10) and remove the spring (13), support (12) and element (11) from the base (10).

e. Discard the element (11).

11. Remove the filter (15) as follows:

a. Remove the nut (18) from the outlet filter stud.

b. Remove the washer (17), spring (16) and filter (15) from the stud.

12. Clean all parts which were removed from the tank in kerosine or diesel fuel.

13. Thoroughly clean the interior of the tank being sure all particles are removed from the corners.

14. Reassemble the assembly (5) as follows:

a. Install the new element (11) onto the base (10).

b. Place the support (12) onto the element (11).

c. Place the spring (13) onto the base (10).

d. Secure the spring, support and element to the base with the retainer (14).

15. Reinstall the assembly (5) over the return filter stud in the tank.

16. Place the shroud (4) over the assembly (5) and secure in place with the nut (3).

17. Reinstall the filter (15) over the outlet filter stud in the tank. Install the spring (16) and secure with the washer (17) and nut (18).

18. Position the gasket (2) over the opening in the top of the tank (4). Align the holes in the gasket with the holes in the tank.

19. Place the cover (1) over the opening in the top of the tank (position cover with finished surface on gasket) and secure in place with the hardware previously removed.

20. Install the drain plugs (6) and fill the tank with lubricant as outlined under "Filling and Venting the System" which follows.

Filling and Venting the System

NOTE: Use clean oil from a clean container. Keep oil in the system clean. Maintain all packings and fittings against leakage.

Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in Section 8 for type and quantity of lubricant required.

1. Remove the plug (8, Illust. 26) from the reservoir tank.

2. Fill the tank until the lubricant is up to the level of the plug opening. Install the filler and level plug.

3. Start the loader engine and run it at low idle speed.

4. Operate all the controls so the cylinders are filled with oil and air is expelled by raising the lift arms up and down and tilting the bucket back and forth four or five times.

◆ CAUTION: ALWAYS LOOSEN THE FILLER AND LEVEL PLUG SLOWLY IN CASE THERE IS STILL SOME PRESSURE IN THE SYSTEM.

5. With the bucket and scarifier (if equipped) resting on the ground, remove the filler and level plug and check the lubricant level. If necessary, add lubricant to fill the reservoir tank to the proper level. Repeat the procedure in Steps 3 and 4 until the lubricant level remains at the specified level in the reservoir tank.

6. Install and tighten the filler and level plug. Refer to "TORQUES" in Section 10.

HYDRO SPRING

To check hydro spring performance, turn the hydro spring valve to the "OPEN" position. Lower the bucket rapidly from the raised position and stop it instantly by moving the control lever to the hold position. This shock load will be absorbed by the hydro spring and not transferred to the loader frame if the system is working properly.

If the system does not function properly or the system leaks, consult your authorized International Construction Equipment distributor or dealer.

HYDRAULIC CYLINDER PACKINGS

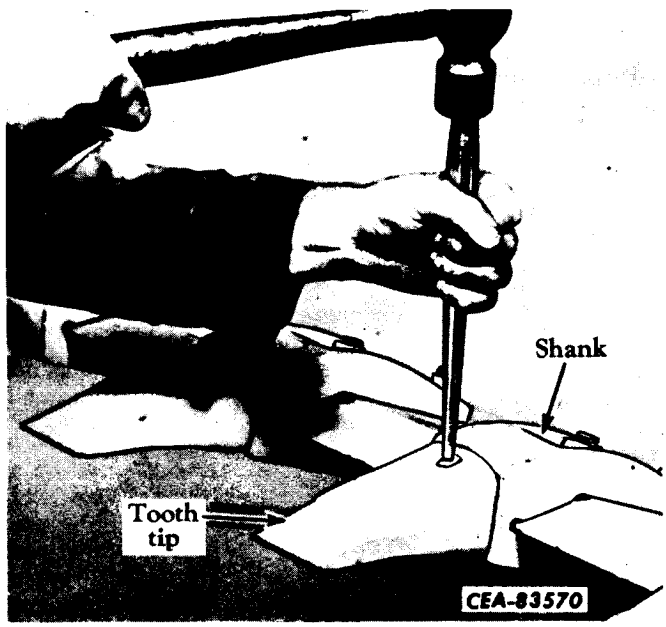
Normally a small controlled amount of hydraulic oil is allowed to seep past the piston packing to provide the necessary piston rod lubrication. Over a period of time, through normal usage, an increased amount of oil will escape past the worn packing. If leakage is excessive, consult your authorized International Construction Equipment distributor or dealer.

BUCKET TEETH

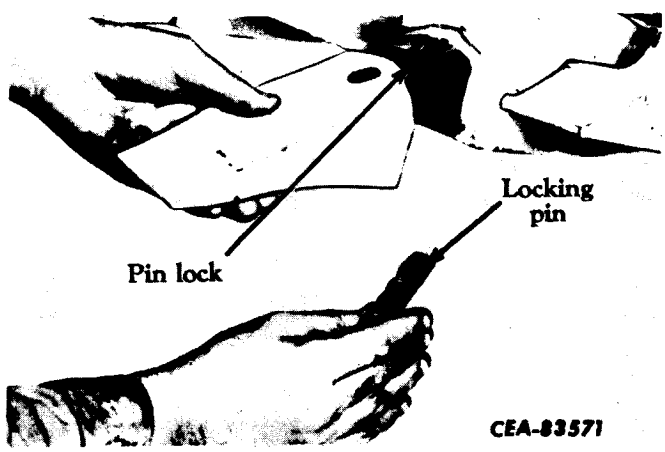
A worn tooth tip can be reversed; a broken tooth tip can be replaced. For removal and installation, proceed as follows:

1. Lower the bucket to the ground; roll the bucket all the way back; stop the engine.

2. Drive out the locking pin (Illust. 28) with a punch and hammer (Illust. 27); remove the tooth tip.



Illust. 27
Removing the Tooth Locking Pin.



Illust. 28
Removing the Tooth Tip.

NOTE: If the locking pin comes out fairly easy, check the pin lock, which remains in the tooth tip, for wear or damage. Replace if necessary.

3. Reinstall the tooth tip; secure to the shank with the locking pin.

STEERING PLANETARY BRAKE AND PIVOT BRAKE ADJUSTMENT
(ILLUST. 29)

Adjust the pivot brakes when the steering levers can be pulled against the seat with the engine running or when the brake pedal bottoms. Refer to "Pivot Brake Adjustment".

Adjust the steering planetary brakes when they slip or the tractor creeps to one side. Refer to "Steering Planetary Brake Adjustment".

Adjust the steering lever linkage when the levers are hard to pull or they stick in the disengaged position. Refer to "Steering Lever Linkage Adjustment".

NOTE: The preceding adjustments compensate for normal wear only. For a major adjustment refer to the Service Manual.

Before performing adjustments, remove all dirt accumulation from the main frame cover. Excessive dirt pack-up could cause binding of external brake linkage.

After adjustment has been performed, the unit must be checked out in actual operation for proper functioning.

PIVOT BRAKE ADJUSTMENT

◆ CAUTION: EXCEPT FOR STEPS 2 AND 3, PERFORM THE FOLLOWING STEPS WITH THE ENGINE STOPPED. BEFORE PERFORMING STEPS 2 AND 3 BE SURE THE TRANSMISSION GEAR SELECTOR LEVER IS LOCKED IN THE "NEUTRAL" POSITION WITH THE SELECTOR LOCK LEVER, AND THAT THE "HI-LO" SHIFT LEVER IS IN NEUTRAL (N).

1. Loosen the lock nut (8) and turn the adjusting screw (9) until the hand lever can be pulled to dimension "E" (2-1/4 inches) (measured from the top edge of the front seat support) without bowing the lever. Tighten the lock nut (8).

NOTE: When adjusting right hand side, it will be necessary to remove hydraulic control valve side cover to gain access to adjusting screw.

2. Start the engine.

3. Pull back on the steering levers. The adjusted lever travel "E" (obtained in Step 1) should reduce to dimension "F" (1-3/4 to 2 inches). If necessary, readjust screw (9) until dimension "F" is obtained with the engine running. Tighten the lock nut (8). Stop the engine.

4. Depress foot pedal and check free travel (8-3/4 to 9-1/4 inches - as shown on Illust. 29). If proper free travel is not obtained, check for binding of linkage or recheck steps one through three.

5. Perform the following step if correct free travel was not obtained in step four.

a. Remove rear and right hand platforms.

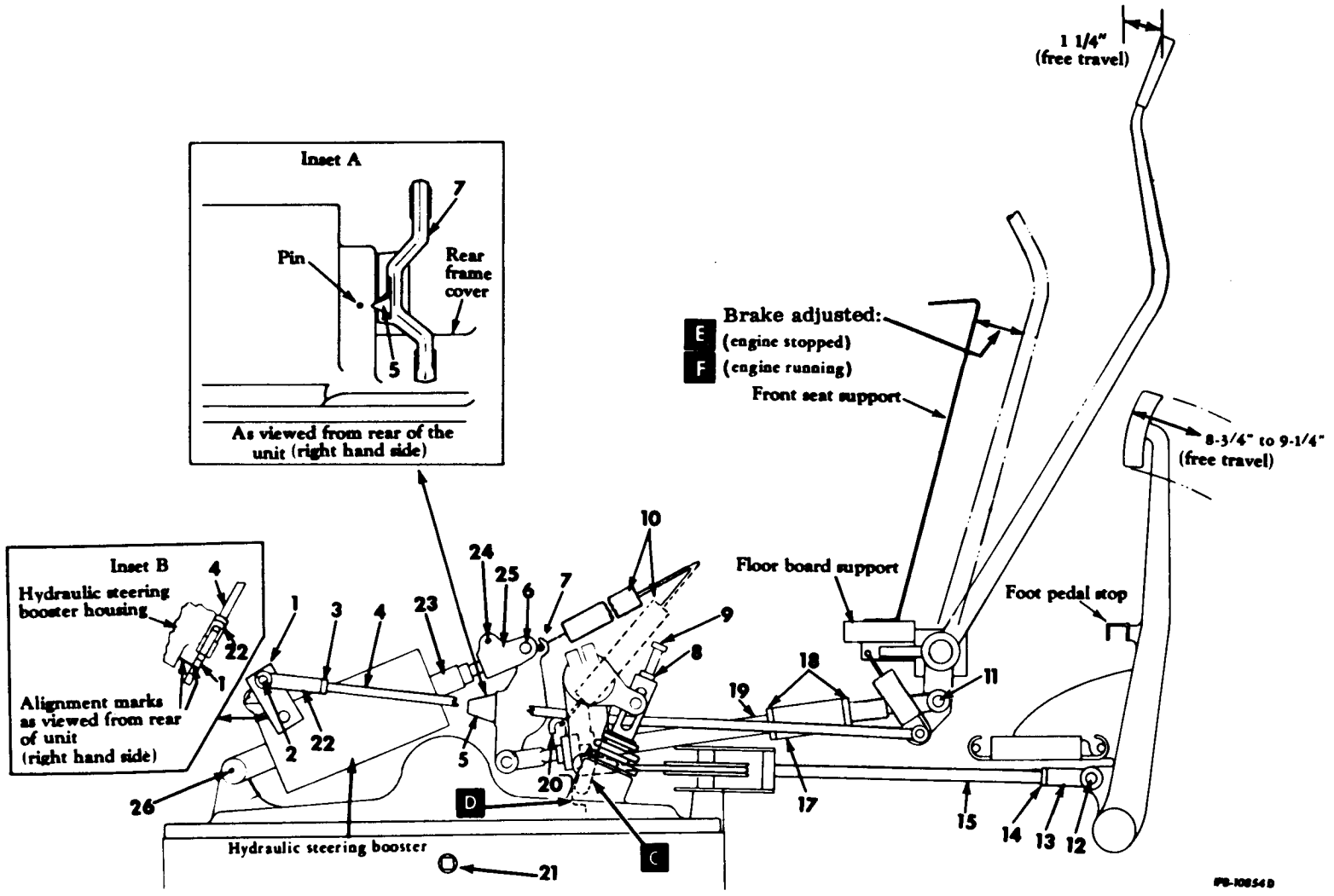
b. Remove rod end pin (12).

c. Push bellcrank (C) against stop (D).

d. Loosen lock nut (14) and adjust clevis (13) as required to reconnect it to foot pedal when pedal is against stop and bellcrank is against stop (D).

e. Secure clevis to pedal with rod end and cotter pins.

f. Reinstall the platforms.



Illust. 29
Pivot Brake and Steering Planetary Brake Adjustments.

1. LEVER, hydraulic steering booster valve operating.
2. PIN, rod end.
3. NUT, lock.
4. ROD, steering booster valve operating.
5. POINTER.
6. PIN, hydraulic booster clevis.
7. BELLCRANK.
8. NUT, lock.
9. SCREW, adjusting.
10. SPRING.
11. PIN, release rod end.
12. PIN, rod end.
13. CLEVIS, brake pulley pull rod yoke.
14. NUT, lock.
15. YOKE, brake pulley pull rod.
17. TURNBUCKLE.
18. NUT, lock.
19. ROD, release.
20. HOOK.
21. PLUG, 1-1/2" square socket pipe.
22. CLEVIS.
23. PISTON, hydraulic steering booster.
24. SCREW, booster piston clevis lock.
25. CLEVIS, hydraulic booster piston.
26. PIN, booster pivot pin.

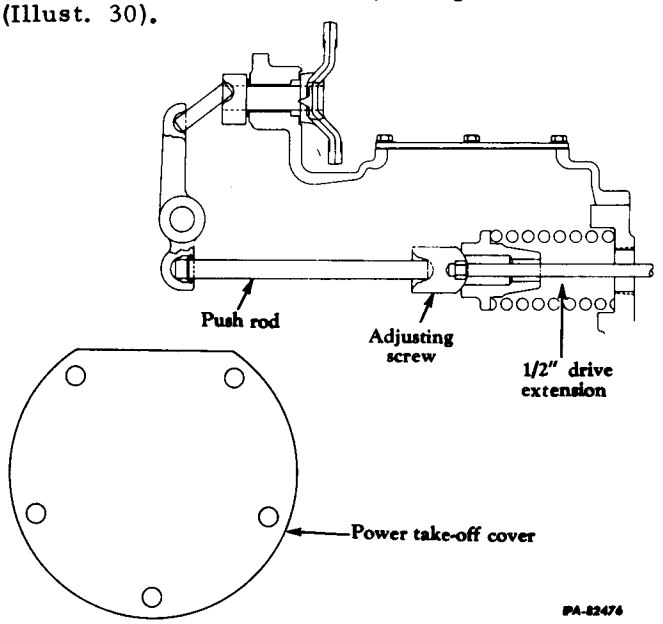
STEERING PLANETARY BRAKE AND PIVOT BRAKE ADJUSTMENT
(ILLUST. 29)

STEERING PLANETARY BRAKE ADJUSTMENT

NOTE: Use "METHOD A" when the rear power take-off cover can be removed and "METHOD B" when the cover cannot be removed.

Method A

1. Remove the power take-off cover. Remove the plug (21, Illust. 29) from the main frame to gain access to the brake adjusting screw (Illust. 30).



Illust. 30
Brake Fork Push Rod and Adjusting Screw.

2. Insert a rod from loader rear and push clevis (25) forward to insure piston (23) is fully extended. (Steering planetary brakes engaged).

3. Insert a 1/2 inch drive extension through the access hole in the main frame and into the adjusting screw. Reach in through the power take-off cover opening and check for movement of the brake fork push rod. If movement exists, turn the adjusting screw clockwise until the push rod becomes snug. If no movement exists, turn the adjusting screw counterclockwise until the push rod becomes loose: then turn clockwise until the rod becomes snug. Turn the adjusting screw counterclockwise 1/2 turn. This should provide approximately a 1/32 inch end play on the push rod.

4. Repeat adjustment procedure to this point on the other side of the loader.

5. Install the pipe plugs (21). Install the power take-off cover using a new gasket.

Method B

NOTE: The following adjustments are a two man operation.

1. Apply the foot brake pedal and pedal lock.

2. Remove the rear platform so the "U" joint can be seen.

3. Remove pipe plug (21) from main frame to gain access to the brake adjusting screw (Illust. 30).

4. Insert a 1/2 inch drive extension through access hole in main frame and into adjusting screw.

◆ CAUTION: USE AN EXTENSION LONG ENOUGH TO AVOID ANY CONTACT WITH THE TRACK WHEN MAKING THE FOLLOWING ADJUSTMENTS.

5. Start engine. Move engine speed control lever to third notch (approximately 1050 RPM).

6. Pull back steering lever (on side not being adjusted) to full pivot position. Leave other lever on side being adjusted in engaged position (forward).

7. Move gear selector lever to "FORWARD 2" and "HI-LO" lever to "HI." Turn drive extension clockwise until "U" joint starts to rotate. Then turn extension counterclockwise until "U" joint stops. Continue to turn an additional 1-1/2 turns.

8. Lock gear selector lever and move "HI-LO" lever to "NEUTRAL".

9. Stop engine, remove drive extension and install pipe plug (21).

10. Repeat adjustment procedure on other side of loader.

STEERING LEVER LINKAGE ADJUSTMENT

◆ CAUTION: LOCK THE GEAR SELECTOR LEVER IN "NEUTRAL" AND PLACE THE "HI-LO" LEVER IN NEUTRAL (N) BEFORE PERFORMING THE FOLLOWING STEPS.

1. Start the engine and operate at low idle.

2. Pull back on steering hand levers. If hand lever pull is hard or a short catch is felt, disconnect operating rod (4) at the booster and shorten the rod by turning the clevis (22) one turn at a time until lever travel is smooth. If hand lever hangs up when released, lengthen the rod (4) until it returns freely. When the adjustment is completed and rod (4) is connected and secured, the booster timing marks (Inset B, Illust. 29) will not necessarily be aligned.

3. Stop the engine.

TRACK

Improper track tension and loose track shoes will cause damage and premature wear to the track. When new tracks or track shoes are installed, track tension and track shoe bolts should be checked every 10 hours and adjusted if necessary until the track is "broken in" and the shoe bolts have taken a "set."

TRACK SHOE BOLTS

The bolts used for attaching the track shoes to the tracks are heat-treated alloy bolts and will stand a considerable tightening strain. Ordinary bolts must not be used.

While tightening the bolts, strike the head of each bolt several sharp hammer blows; then retighten. For proper torque, refer to "TORQUES" in Section 10.

◆ CAUTION: AS A SAFETY MEASURE, USE GOGGLES TO PROTECT YOUR EYES WHILE STRIKING THE BOLTS.

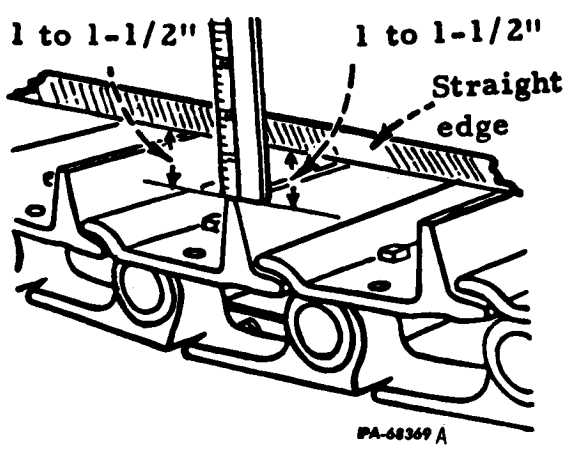
CHECKING TRACK TENSION

1. Place a wooden block, approximately one foot in height, under the foremost track shoe lug.

2. Drive the tractor forward until the track chain is tight along the ground and around the sprocket.

3. Apply and lock the brake; stop the engine.

4. Place and lock the transmission gear selector lever in "NEUTRAL" position.



Illust. 31
Checking Slack in Track Chain.

5. Push the top of the track down between the front idler and the first track idler in order to accumulate all the chain slack at this point.

6. Place a straight edge on the track so the ends rest over the front idler and track idler. Measure the clearance between the bottom of the straight edge and the top of the shoe grouser with a ruler at the midway point between the idlers (Illust. 31). If this distance is more than 1-1/2 inches or less than one inch, adjust the track chain.

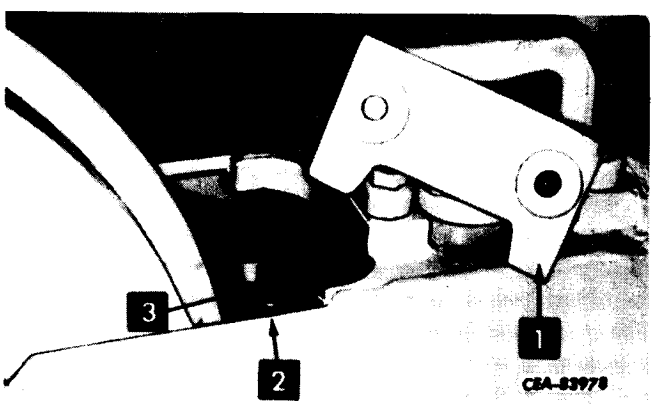
ADJUSTING THE TENSION (ILLUST. 32)

Track chain tension is adjusted by hydraulic pressure. The front idler is forced forward for track adjustment by chassis lubricant under pressure with the standard type bucket or hand lubricator.

◆ CAUTION: THE PRESSURE IN THIS SYSTEM IS HELD BY THE BALL CHECK ASSEMBLY AND THE VENT SCREW. A LOOSE OR IMPROPER THREAD FIT OF EITHER OF THESE PARTS CAN ALLOW THEM TO BE EJECTED UNDER THE PRESSURE OF THE LUBRICANT, CAUSING POSSIBLE INJURY. WHEN RELIEVING TRACK TENSION, NEVER LOOSEN THESE PARTS MORE THAN THE PRESCRIBED AMOUNT, AND ALWAYS STAY TO THE SIDE WHILE LOOSENING THE BALL CHECK OR VENT SCREW.

When adjustment becomes necessary, proceed as follows (Illust. 32):

1. Remove the scraper (1).



Illust. 32
Hydraulic Track Adjuster.

1. SCRAPER, front idler.
2. SCREW, socket head (vent).
3. FITTING, lubrication.

TRACK

2. To increase track chain tension, connect the lubricator nozzle to the lubrication fitting (3).

3. Determine the amount of adjustment necessary, and add lubricant to obtain the proper track chain tension. It is advisable to move the machine forward and backward slightly to be sure the correct tension has been obtained.

4. To reduce track chain tension, loosen the vent screw (2) one-half to one full turn to allow the pressurized lubricant to escape through the relief passage. If lubricant does not appear, loosen the ball check (located under the lubrication fitting (3) one-half to one full turn to allow the pressurized lubricant to escape from a second relief passage.

5. When the proper tension has been obtained, secure the vent screw a/o ball check (refer to "TORQUES" in Section 10).

◆ CAUTION: USE EXTREME CARE WHEN RELIEVING PRESSURE WITH THE FOLLOWING EMERGENCY METHOD. IF LOOSENED EXCESSIVELY, THE BALL CHECK OR VENT SCREW CAN BE EJECTED BY THE CYLINDER PRESSURE. NEVER LOOSEN THE BALL CHECK MORE THAN A TOTAL OF FIVE TURNS, AND NEVER LOOSEN THE VENT SCREW MORE THAN ONE TURN.

6. Should the relief passages become blocked, unscrew the ball check an additional four turns (4-1/2 to 5 total turns). This will allow the pressurized lubricant to escape through a slot cut into the side of the ball check. Tighten the ball check (refer to "TORQUES" in Section 10) after the proper tension is obtained.

7. Install and fasten the scraper (1).

TRANSMISSION, TORQUE CONVERTER AND HYDRAULIC STEERING BOOSTER OIL FILTERS

The transmission, torque converter and steering boosters have three filters: suction, pressure, and safety. Service these filters as follows:

PRESSURE FILTER (ILLUST. 34)

To gain access to the pressure filter (Illust. 33), remove the platform from the operator's compartment and service the filter as follows (Illust. 34):

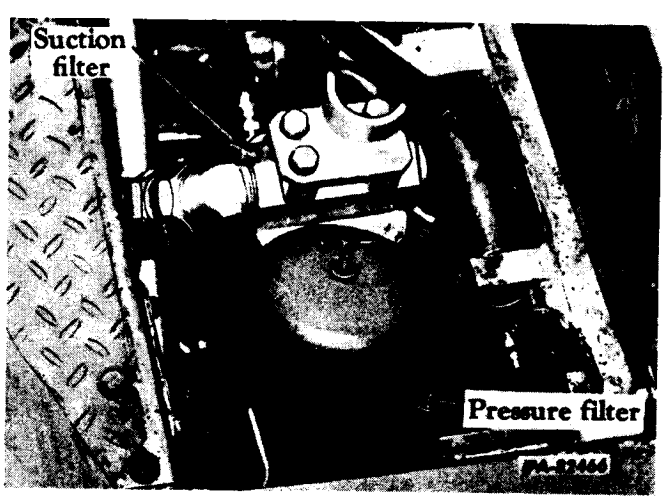
1. With the engine stopped, operate the steering levers several times to relieve any pressure.

2. Remove all outside dirt from filter case and base.

3. Unscrew the hold-down bolt (7) and remove the case (5) from the base (1).

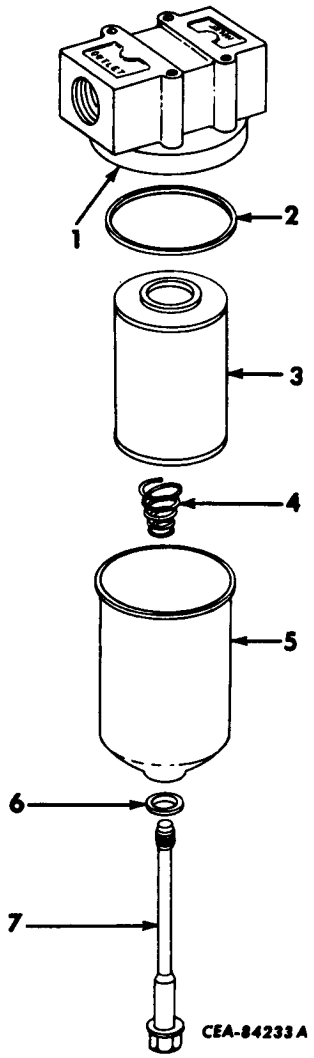
4. Remove and discard the old element (3).

5. Remove the spring (4) from the case and rinse the case and spring thoroughly in kerosene or diesel fuel.



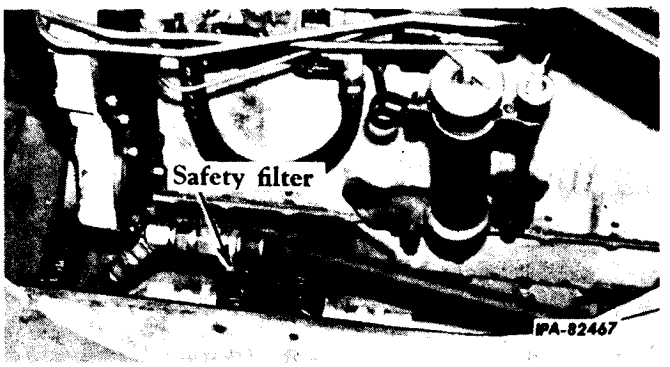
Illust. 33
Pressure and Suction Filters.

TRANSMISSION, TORQUE CONVERTER AND HYDRAULIC STEERING BOOSTER OIL FILTERS



Illust. 34
Pressure Filter

1. BASE
2. "O" RING
3. ELEMENT.
4. SPRING.
5. CASE
6. "O" RING
7. BOLT, hold-down.



Illust. 35
Safety Filter.

6. Inspect the "O" rings (2 and 6) for wear or damage; replace with new if necessary. When in doubt, always install a new "O" ring.

7. Install the spring (4) and new element (3) into the case (5). Lubricate "O" rings (2 and 6) with a light coat of oil.

8. Install the case (5) to the base (1) and draw the case up tight with the hold-down bolt (7). Refer to "TORQUES" in Section 10 for the specified torque.

9. Replace the platform. Start the engine and let it idle for approximately five minutes (during this time operate the steering levers several times). Stop the engine and check the filter for leaks, correct all leaks.

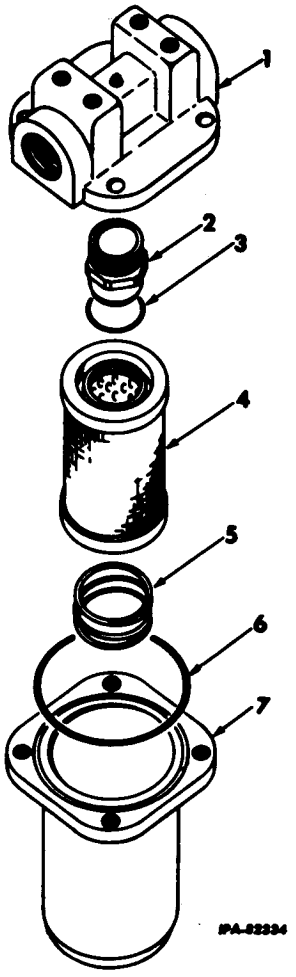
10. Check the lubricant level in the rear frame as outlined under "LUBRICATION POINTS" in Section 8.

SUCTION AND SAFETY FILTERS (ILLUST. 36)

The method of service is the same for either of these filters. To reach the suction filter (Illust. 33), remove the operator's compartment platform; to reach the safety filter (Illust. 35), remove the engine left hand side sheet.

1. Remove the four cap screws and separate the housing (7) from the base (1).

TRANSMISSION, TORQUE CONVERTER AND HYDRAULIC STEERING BOOSTER OIL FILTERS



Illust. 36
Suction and/or Safety Filter.

1. BASE.
2. FITTING.
3. "O" RING.
4. ELEMENT.
5. SPRING.
6. "O" RING.
7. HOUSING.

2. Remove the element (4) with "O" ring (3) from the fitting (2).

3. Wash the element (4), spring (5) and housing (7) in kerosine.

4. Inspect the "O" rings (3 and 6) for wear or damage and replace with new if necessary. When in doubt, always install a new "O" ring.

5. Remove all dirt from the inside of the base (1), using a cloth dampened with kerosine.

6. Check that the "O" ring (3) is in place in the groove in the element (4). Slip the "O" ring end of the element on to the fitting (2).

7. Install the spring (5) into the housing (7) and secure the housing to the base (1) with the hardware previously removed. Tighten the cap screws to the torque specified under "TORQUES" in Section 10.

8. Start the engine and let it idle for approximately five minutes (during this time, check the filter for leaks. Correct all leaks no matter how minor); then check the lubricant level in the rear frame as outlined under "LUBRICATION POINTS" in Section 8.

TURBOCHARGER

CLEANING THE TURBOCHARGER

Soft carbon deposits may build up on the compressor housing and wheel. These deposits must be removed to protect the turbocharger and engine.

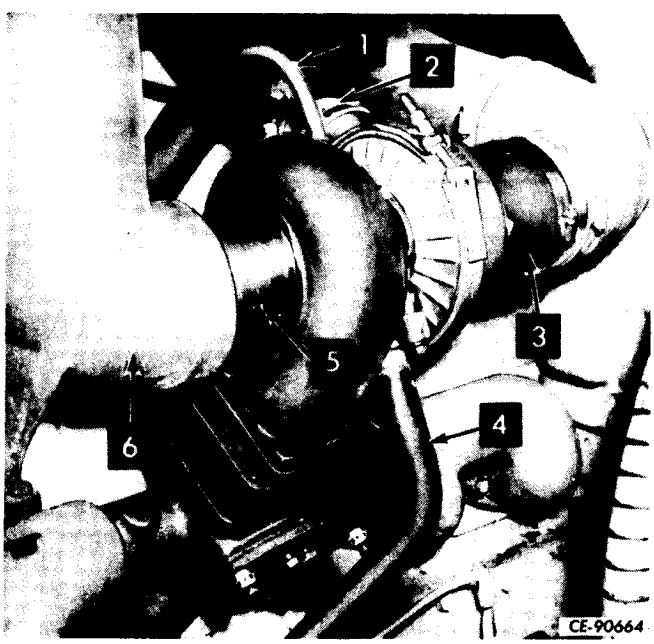
To protect the engine and turbocharger when cleaning, perform this service inside the shop. Use a toothbrush with the handle filed square for scraping.

NOTE: NEVER use a metallic scraper or a caustic solution.

NOTE: Allow exhaust manifolds to cool before removing the turbocharger from the engine. This will prevent warping of the exhaust manifold and turbocharger mounting flanges.

Removal (Illust. 37)

ONLY MACHINES EQUIPPED WITH REGULAR DUTY AIR CLEANER: Remove the air cleaner intake cap.



Illust. 37
Turbocharger Removal.

1. TUBE, oil inlet.
2. HOSE, air cross-over tube.
3. HOSE, air cleaner-to-turbocharger.
4. TUBE, oil outlet.
5. SLEEVE, exhaust.
6. ELBOW, exhaust.

ONLY MACHINES EQUIPPED WITH HEAVY DUTY AIR CLEANER: Disconnect the elbow (11, Illust. 6) from the air cleaner housing.

1. Remove the exhaust stack. Remove the two spring retainers and the spring from the exhaust elbow.

2. Remove the exhaust elbow (6) (held with hex-head cap screws, nuts and lock washers) and turbocharger exhaust sleeve (5).

NOTE: The exhaust sleeve (5) is loosely held between the exhaust elbow (6) and the turbine housing. The sleeve must be held as the elbow is removed, to prevent the sleeve from dropping.

3. Disconnect the oil inlet tube (1) and outlet tube (4) from the center housing. Remove and discard the tube gaskets. Cover all openings.

4. Loosen the clamps securing the air cleaner hose (3) to the compressor housing; remove the hose.

5. Loosen the clamps on the air crossover tube hose (2) at the compressor housing. Position these parts away from the turbocharger.

6. Remove the four turbocharger mounting bolts. Lift the turbocharger from the center exhaust manifold and place it in a horizontal position on a bench.

7. Remove the turbocharger gasket from the center exhaust manifold. Inspect the gasket for wear or damage and replace if necessary.

8. Cover or plug the exhaust manifold and air tubes.

9. Inspect the external parts of the turbocharger for cracks or oil leaks.

Disassembly

1. Cover, or plug, the bearing housing oil inlet and oil drain ports. Wash the exterior of the turbocharger.

NOTE: Use a Bendix metal cleaner or equivalent. A caustic solution must not be used.

2. Mark the assembled position of parts as follows (Illust. 38):

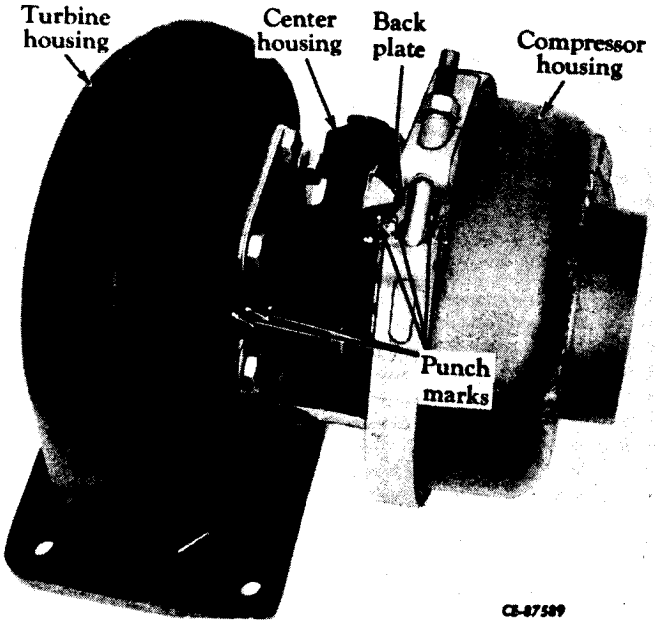
Compressor housing-to-back plate.

Back plate-to-center-housing.

Center housing-to-turbine housing.

MAINTENANCE

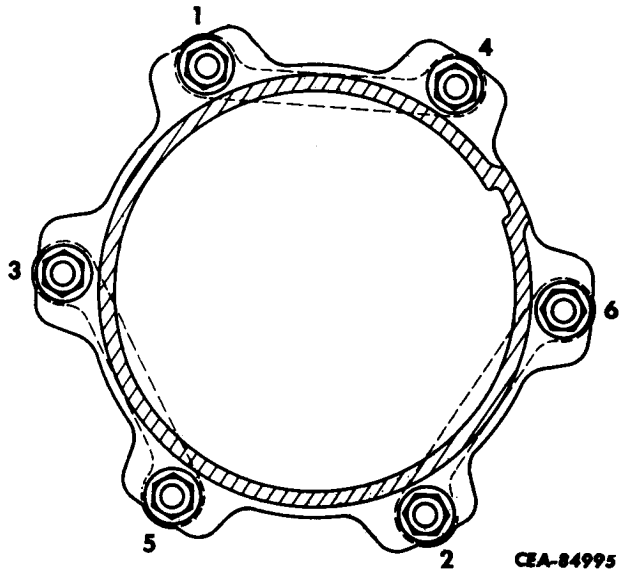
TURBOCHARGER



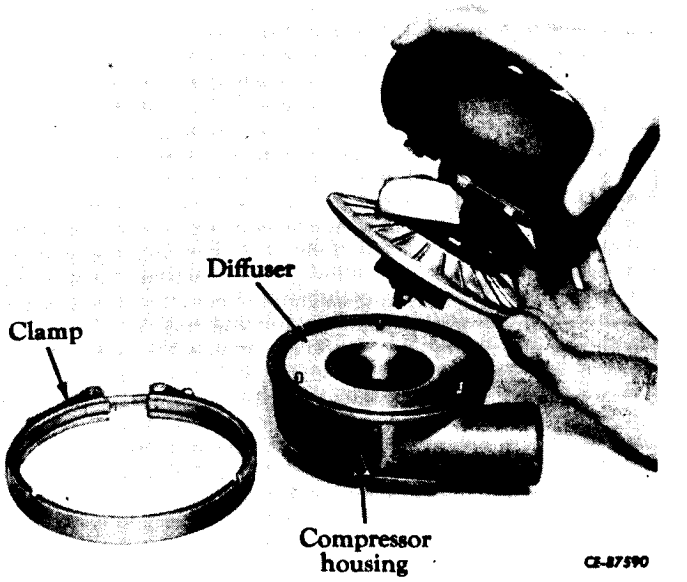
Illust. 38
Related Positions of Parts.

3. Stand the turbocharger on the turbine housing end and block in place.

4. Progressively loosen each of the six bolts, which secure the turbine housing and the compressor housing to the bearing housing, one turn at a time following the pattern shown in Illust. 39. Remove the bolts and the lock plates and clamps.



Illust. 39
Bolt Torqueing Diagram.



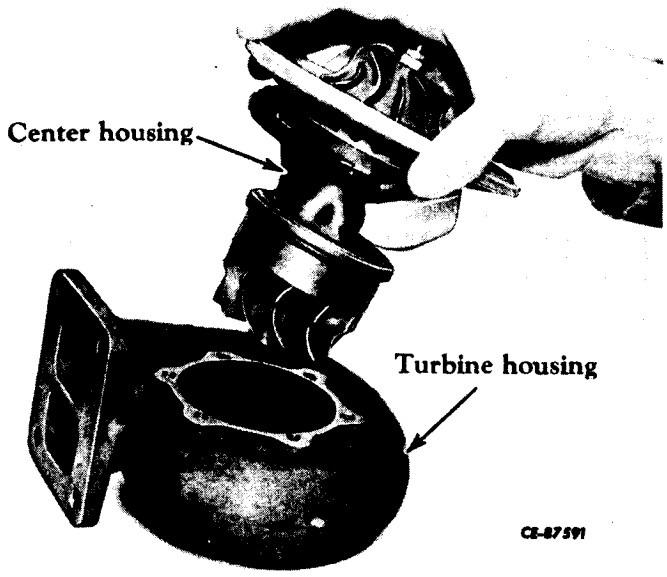
Illust. 40
Removing Compressor Housing.

5. Place the turbocharger on a bench. Remove the clamp (Illust. 40). Carefully lift the turbine housing with the center housing attached from the compressor housing (Illust. 40). A light tap with a rubber mallet on the compressor mounting flange as lifting pressure is applied, may be necessary. Remove the diffuser (Illust. 40) from the compressor housing.

NOTE: Be careful when removing the compressor housing from the bearing support housing and bearing support housing from the turbine housing. The blades of the compressor wheel and the turbine wheel could be damaged, thereby affecting the balance and causing vibration and damage to the turbocharger.

6. Carefully lift the center housing assembly from the turbine housing (Illust. 41). A light tapping with a soft mallet on the turbine housing mounting flange as lifting pressure is applied, may be necessary.

TURBOCHARGER



Illust. 41
Removing Turbine Housing.

Cleaning

Soft carbon deposits must be removed from the compressor housing and compressor wheel. The removal of the deposits is to protect the engine and turbocharger, and restore the turbocharger to its original operating condition.

1. Place the bearing housing on its side in a clean shallow pan. NEVER REST THE WEIGHT OF THE UNIT ON EITHER THE TURBINE OR COMPRESSOR WHEEL.

NOTE: Be sure the bearing support housing oil inlet and oil drain ports are covered, or plugged, to prevent the cleaning fluid getting into the housing.

2. Using a clean paint brush, apply several coats of Bendix metal cleaner or equivalent, to the compressor wheel. NEVER USE A CAUSTIC SOLUTION.

3. After deposits have softened, remove them with a soft brush or plastic blade scraper.

4. Wash the compressor housing and the nozzle ring, if dirty, in the same type cleaning fluid and dry thoroughly.

Reassembly

1. Install the bearing support housing into the turbine housing (Illust. 41), and align the marks made prior to disassembly (Illust. 38).

NOTE: When assembling the bearing support housing to the turbine housing, be careful not to damage the turbine wheel blades.

2. Install a new "O" ring on the bearing support housing (Illust. 41).

3. Install the compressor housing (Illust. 40) onto the bearing support housing, and align the marks made prior to disassembly (Illust. 38).

NOTE: When assembling the compressor housing to the bearing support housing, be careful not to damage the compressor wheel blades.

4. Install the lock plates, clamps and the six bolts finger tight. Progressively tighten the bolts one turn at a time following the pattern shown in Illust. 39. Tighten the bolts to the correct torque, refer to "TORQUES" in Section 10.

Installation (Illust. 37)

1. Inspect the air intake system for loose bolts, nuts or any foreign material.

2. Inspect the center exhaust manifold for fins or projections which may have become loose and for pieces of gaskets or any foreign material. If any foreign material is evident, remove the manifold and clean before installing the turbocharger.

3. Inspect the tubes (1 and 4) to be sure they are not clogged.

4. Inspect the turbocharger mounting pad on the manifold for flatness. Be sure all of the old gasket has been removed.

5. Install the turbocharger onto the exhaust manifold, using a new gasket.

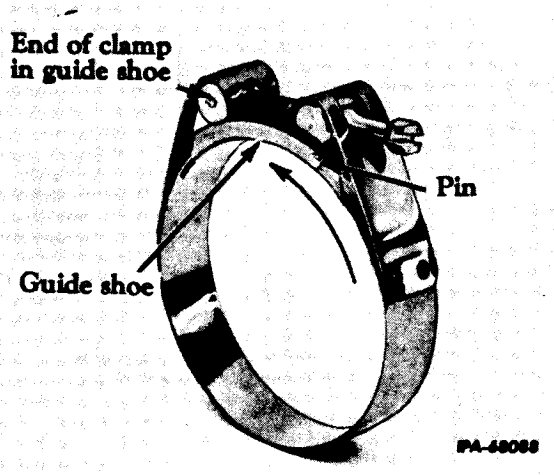
6. Install the four nuts (using an anti-seize compound) that secures the turbocharger to the manifold.

7. Install the elbow (6) with the sleeve (5); secure with the four cap screws and nuts.

8. Remove the covers, or plugs, from the oil drain port and the oil inlet port on the center housing. Using new gaskets, connect tubes (1) and (4) to the turbocharger.

9. Connect the air crossover tube hose (2) to the compressor housing, and tighten the clamps. Connect the air cleaner hose (3) to the compressor housing; tighten the clamps.

NOTE: When tightening clamps, be sure the guide shoe (Illust. 42) is moved in the direction indicated by the arrow, as far as it will go. This will assure correct clamping and efficient sealing.



Illust. 42
Hose Clamp.

10. Operate the engine observing the turbocharger for any of the following:

a. Unusual turbocharger noises.

b. Lubrication leaks.

c. Fastening to the engine not secure.

d. Excessive exhaust smoke.

e. Air leaks in the air cleaner-to-turbocharger or turbocharger-to-intake manifold ducting.

Investigate and correct any of these conditions immediately to avoid possible turbocharger or engine damage.

11. Retighten cap screws, hold down nuts, air connections, and oil connections to and from the turbocharger after the initial warm-up.

12. Install the spring and the two retainers over the top of the elbow (1). Reinstall the hood. Reinstall the exhaust stack.

13. ONLY MACHINES EQUIPPED WITH REGULAR DUTY AIR CLEANER: Install the air cleaner intake cap.

ONLY MACHINES EQUIPPED WITH HEAVY DUTY AIR CLEANER: Reconnect the elbow (11. Illust. 6) to the air cleaner housing.

CAPACITIES (U. S. MEASURE)

Fuel tank	Approx. 86 gals.
Cooling system	50 qts.
Crankcase:	
With filters drained	25 qts.
With filters changed	27 qts.
Hydraulic system:	
Loaders equipped w/DROTT 4-IN-1	32 gals.
Loaders equipped w/standard bucket	28 gals.
Sprocket drive housings (each side)	28 qts.
Rear frame*	40 gals.

*Common reservoir for planetary steering hydraulic steering boosters, torque converter and transmission.

SPECIFICATIONS

ENGINE (429 TURBOCHARGED, 4 CYCLE, VALVE-IN-HEAD)

Type	Diesel
Cylinders	6
Bore	4-1/2 in.
Stroke	4-1/2 in.
Electrical system	24 volt-negative ground
Valve clearance:	
Intake (cold)	.012- .014 in.
Exhaust (cold)	.024- .026 in.
Fan and alternator belt tension	1/2 to 3/4 in.
Water pump belt tension	1/2 to 3/4 in.
Fuel injection pump	Roosa-Master

ENGINE SPEEDS

Full load	2300 ± 10 rpm
High idle	
Engine in chassis	2480 ± 60 rpm
Low idle	775 ± 25 rpm
Decelerator pedal	900 ± 50 rpm

TORQUE CONVERTER

Make	Rockford
Type	Single-stage with fixed stators
Fluid	Grade-10 engine oil

TRACK

Tread	76 in.
Ground contact length	107 in.
Track shoe width	18 in.

HYDRAULIC SYSTEM (LOADER EQUIPMENT)

Pump capacity	45 gpm
Pump type	gear
Operating pressure	1900 psi

Continued on next page.

SPECIFICATIONS AND CAPACITIES

SPECIFICATIONS

LOADER SPEEDS (AT 2300 ENGINE RPM)

Forward Speeds:	
1st, low range	2.1 mph
1st, high range	2.6 mph
2nd, low range	4.0 mph
2nd, high range	4.9 mph
Reverse Speeds:	
1st, low range	2.4 mph
1st, high range	2.9 mph
2nd, low range	4.5 mph
2nd, high range	5.5 mph

TORQUES

All torques are given with bolts, studs and nuts lubricated with engine oil unless otherwise indicated.

Cranking motor mounting bolts	105-120 ft-lbs.
Element hold-down clamp nuts	75 in-lbs.
Engine lubricating oil filter case retaining bolts	15-20 ft-lbs.
Fuel filter case retaining screws	15-20 ft-lbs.
Hydraulic reservoir filler and level plug	30 ft-lbs. max.
Hydraulic track adjuster socket head screw	10-15 ft-lbs.
Hydraulic track adjuster ball check assembly	45-55 ft-lbs.
Radiator and air cleaner hose clamps	20-25 in-lbs.
Thermostat housing cap screws	33-37 ft-lbs.
Track idler, track roller and front idler fill and level plug	15-40 ft-lbs.
Track shoe bolts	220-250 ft-lbs.
Transmission pressure filter case bolt	10-15 ft-lbs.
Transmission safety filter housing cap screws	56-63 ft-lbs.
Transmission suction filter housing cap screws	56-63 ft-lbs.
Turbocharger (turbine) housing bolts	100-130 in-lbs.
Turbocharger (compressor housing clamp)	40-80 in-lbs.
Valve cover cap screws	33-37 ft-lbs.

GENERAL

Length (over-all):	
Bucket on ground and rolled back (Drott 4-in-1, including teeth)	216 in.
Bucket on ground and rolled back (Skid shovel)	207-1/2 in.
Width, over-all (with standard track shoe)	96 in.
Height, over-all (less exhaust and air cleaner pipes and lights)	92-7/8 in.
Weight (approximate pounds):	
Drott 4-in-1	40,475
Skid shovel	39,200

DIESEL FUEL

Consult your authorized International Construction Equipment distributor or dealer or fuel supplier for the diesel fuels which will give the most satisfactory performance in your International engine.

Specifications Subject to Change Without Notice.