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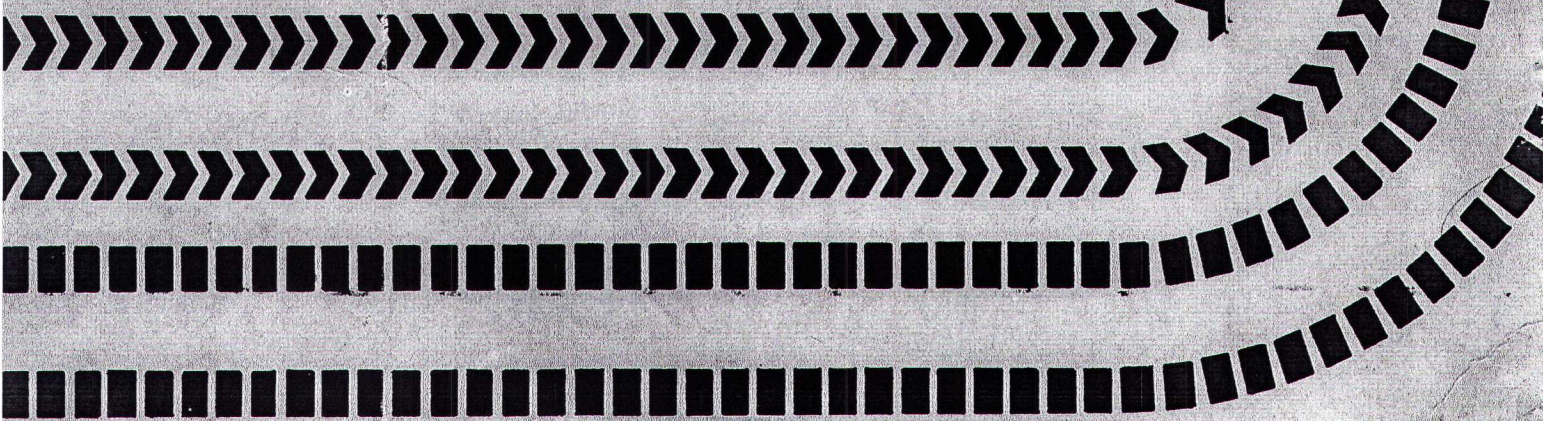
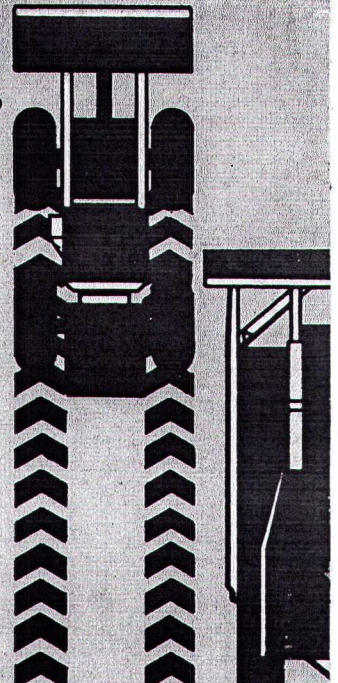
CONSTRUCTION EQUIPMENT

OPERATOR'S MANUAL

**MODEL H-60E
PAY[®] LOADER**

FORM
OM-H-60E

AUGUST, 1973



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 H-60E PAY[®] LOADER

**FORM
OM-H-60E**

AUGUST, 1973

CONTENTS

This manual covers the instructions for operation, lubrication, adjustments and maintenance for normal daily care. These instructions are divided into nine sections to simplify your reference to the information most important to you. This manual must be read completely prior to operating this machine, 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.

SECTION 1 - INTRODUCTION

This section discusses generally the use of this manual, serial numbers and how to ship or store this machine.

SECTION 2 - BEFORE STARTING THE NEW MACHINE

This section outlines the special procedures necessary to insure proper "break-in" and care of a new machine.

SECTION 3 - INSTRUMENTS AND CONTROLS

The text and illustrations on instruments and controls in this section are designed to tell you "where it is," "what it does," and "how to use it." Read this section carefully.

SECTION 4 - PREPARING FOR EACH DAY'S WORK

This illustrates the few simple preparations before each day's work to assure a "lost-time" free work day.

SECTION 5 - OPERATING THE MACHINE

This section outlines and illustrates the step-by-step procedures for starting, operating, and stopping the machine.

SECTION 6 - OPERATING TECHNIQUES

A few operating suggestions and techniques are discussed with simple ideas to help ease the work and lengthen the useful life of your machine.

SECTION 7 - SCHEDULED MAINTENANCE

This section saves money! A complete scheduled maintenance procedure is outlined here - one that assures less down-time and expense, and more profit and work from your machine. Read and use this section - INCREASE YOUR PROFIT through increased machine reliability and availability.

SECTION 8 - MAINTENANCE

Much of the maintenance and adjustment procedures outlined in Section 7 need clear explanation. This section is devoted to explaining the "how to do" in an easy style to help you "do it yourself" and get it right.

SECTION 9 - SPECIFICATIONS AND CAPACITIES

This section covers the capacities, general dimensions and weights, speeds and torques.

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SCHEDULED (NORMAL) MAINTENANCE WILL

"Increase Your Profit"

THROUGH INCREASED MACHINE RELIABILITY AND AVAILABILITY

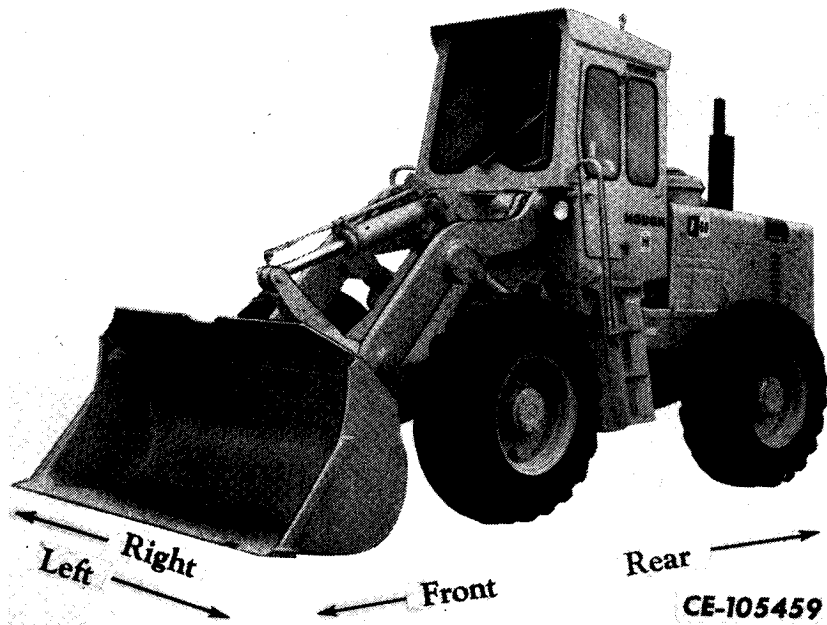
This machine is your INVESTMENT - NOW - let's use it to make all the PROFIT possible.

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 inspection is outlined in Section 7, "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.

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GENERAL



Illust. 1
MODEL H-60E PAY loader

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 machine accurately in all details.

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 machine when facing forward in the operator's seat. See Illust. 1.

INTRODUCTION

SECTION 1

Page 2

SERIAL NUMBERS

Record the PAY loader, engine, transmission, and converter serial numbers for service parts replacement purposes. The PAY loader serial number plate is located to the right of the instrument panel in the operator's compartment. (Illust. 2.) This number is also stamped into the rear frame on the left rear side.

The engine serial number (Illust. 3) is stamped on a pad below the center of the intake manifold.

All other components having serial numbers are each equipped with a separate serial number plate.

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

PAY loader Serial Number _____

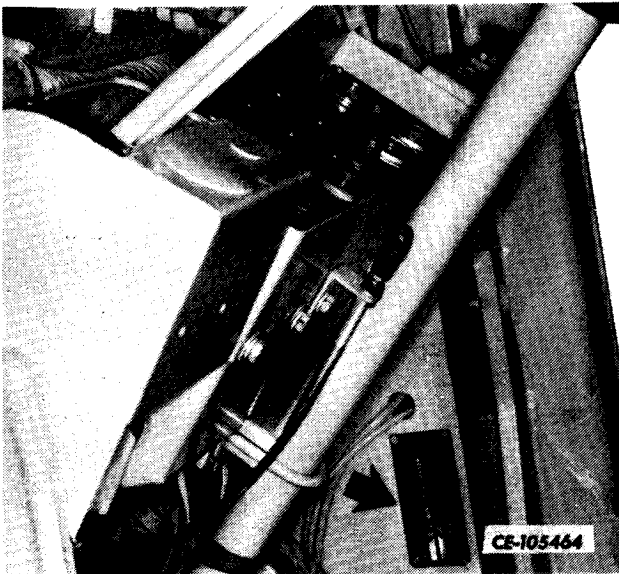
Engine Serial Number _____

Transmission Serial Number _____

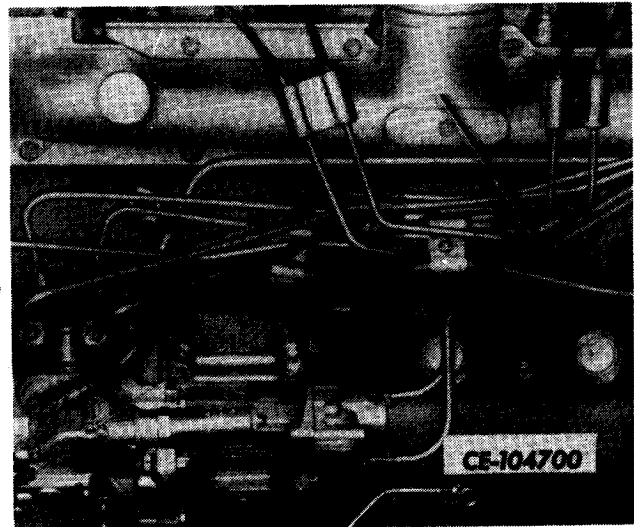
Torque Converter Serial Number _____

Front Axle Serial Number _____

Rear Axle Serial Number _____



Illust. 2
PAY loader Serial Number Plate



Illust. 3
Engine Serial Number Plate

MACHINE TRANSPORT

SHIPPING INSTRUCTIONS

CAUTION: ALWAYS INSTALL THE SAFETY BAR BEFORE TRANSPORTING THE MACHINE.

Machines must be empty during transit.

Truck

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

Railroad Flatcar

The loading rules and specifications published by the Association of American Railroads must be followed when shipping this machine 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.

Driving

If this machine is to be highway driven from one job site to another, contact the state and/or local authorities for roading regulations.

MOVING DISABLED MACHINE

Towing

Towing articulated machines is not recommended. They have no steering or braking power unless the engine will run to drive the hydraulic steering pump and air compressor.

MACHINE STORAGE

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

Follow the procedure below when the machine is placed in storage for 30 days or more. The machine 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 machine.
2. Completely lubricate all points of the machine as outlined in the "LUBRICATION GUIDE" in Section 7.
3. Prepare the engine for storage as follows:
 - a. Start and run the engine for approximately 10 minutes. During this time, move the machine to the storage location. Lower the bucket to the ground.
 - b. Drain and clean the cooling system. Refer to "COOLING SYSTEM" in Section 8.
 - c. Refill the cooling system. If the cooling system will be exposed to freezing temperatures during storage,

the cooling system must be refilled with an anti-freeze solution while at operating temperature. Select a solution that will be suitable for the lowest temperature the cooling system will be exposed to during storage. Refer to "COOLING SYSTEM" in Section 8 for the type of anti-freeze specified.

If anti-freeze is not used, refill the cooling system with a suitable water and corrosion inhibitor solution. Refer to "COOLING SYSTEM" in Section 8 for the type of cooling system inhibitor solution specified.

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.

- d. Clean and remove the valve housing covers; 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 covers with Grade-30 lubricating oil.

(Continued on next page)

MACHINE STORAGE

- e. Remove the injection nozzles. Squirt approximately one ounce of Grade-30 lubricating oil into each cylinder. Crank the engine two or three revolutions. Clean the nozzle seats and reinstall the injection nozzles.
 - f. Reinstall and secure the valve housing covers. Refer to "SPECIAL TORQUES" in Section 9.
4. Completely service the air cleaner. Refer to "AIR CLEANING SYSTEM" in Section 8.
 5. To prevent dirt or moisture from entering the engine, plug up the ends of the exhaust pipe and crankcase breather pipe. Remove the air cleaner intake hood and cover the intake pipe.
 6. Position all controls so that the minimum amount of machined, unpainted surfaces are exposed. Thoroughly coat these surfaces with chassis grease.
 7. Cover the transmission breather with tape to prevent moisture from entering.
 8. Remove the batteries and store them in a cool dry place above freezing (+32°F). Tag the battery cables to ensure proper installation. 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.
 9. If it is desirable to leave the tires on the machine, jack the machine up and place it on blocks with the tires in suspension. Deflate and cover the tires.
 10. Open the air tank drain valves.

PREPARING STORED MACHINE FOR SERVICE

1. Inflate the tires. Check inflation pressure. Refer to "SPECIFICATIONS" in Section 9.
2. Close the tank drain valves.
3. Clean the chassis grease from the exposed unpainted surfaces, external shafts, flanges and seals.
4. Install fully charged batteries and make the proper cable connections.
5. Remove the coverings from the exhaust pipe, crankcase breather pipe, air cleaner intake pipe and transmission breather opening. Install the air cleaner hood.
6. Check the cooling system for leaks and loose connections.
7. Fill the fuel tanks with an approved diesel fuel. Refer to "FUEL SYSTEM" in Section 8.
8. Remove the valve housing covers and flush the valve and valve operating mechanism with a mixture of one-half kerosine and one-half Grade-10 oil.
9. Change the engine oil and filters. Refer to "ENGINE OIL AND FILTERS" in Section 8.

CAUTION: KEEP THE DOORS WIDE OPEN OR MOVE THE MACHINE 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. Start the engine. Refer to "STARTING THE ENGINE" in Section 5.
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 8 for filter changing procedure.)
12. Install and secure the valve housing covers. Refer to "SPECIAL TORQUES" in Section 9.
13. Allow the engine to run for 5 to 10 minutes to allow thorough distribution of the lubricating oil. Do not place the engine under load until normal oil pressure is reached.

STANDARD TORQUES

(For special torque data refer to "SPECIAL TORQUES" in Section 9.)

This chart provides tightening torque for general purpose applications using original equipment standard hardware as listed in the Parts Catalog for the machine involved. DO NOT SUBSTITUTE. Original equipment standard hardware is defined as IH Type 8, coarse thread bolts and nuts and thru hardened flat washers, all phosphate coated and assembled without supplemental lubrication.

The torque shown below also apply to the following:

1. Phosphate coated bolts used in tapped holes in steel or gray iron.
2. Phosphated coated bolts used with prevailing torque nuts (Nuts with distorted threads or plastic inserts).
3. Phosphate coated bolts used with copper plated weld nuts.
4. Plain finish (uncoated) bolts and nuts that are clean, rust free and oiled and used in the same manner as described above.

Markings on bolt heads or nuts indicate material grade ONLY and are NOT to be used to determine required torque.

NOMINAL THREAD DIAMETER	STANDARD TORQUE ±10%	
	FOOT LBS.	NEWTON METERS
1/4	7	10
5/16	14	19
3/8	24	32
7/16	38	51
1/2	60	80
9/16	80	110
5/8	115	155
3/4	200	270
7/8	320	440
1	480	650
1-1/8	590	800
1-1/4	830	1100
1-3/8	1100	1500
1-1/2	1400	1900
1-3/4	2300	3100
2	3400	4600



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INITIAL SERVICE PROCEDURE

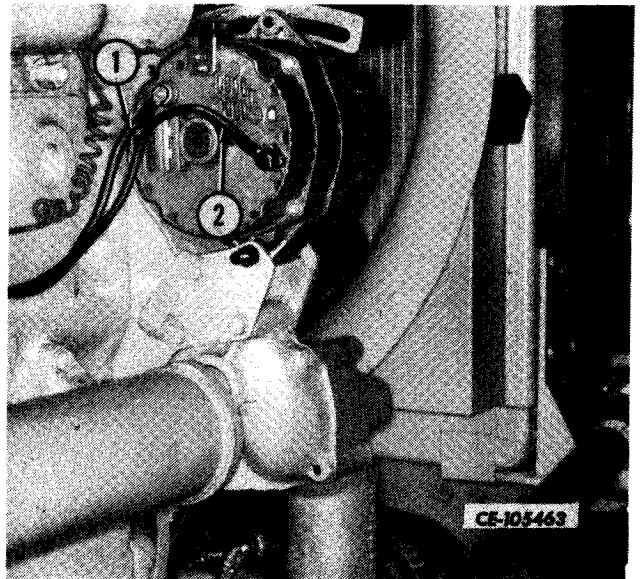
CAUTION: ALWAYS INSTALL THE SAFETY BAR OR PIN BEFORE SERVICING OR TRANSPORTING THE LOADER. FOR ADDITIONAL INFORMATION, REFER TO "SAFETY BAR AND PINS" IN SECTION 5.

6. Check the oil levels in the different compartments. For lubricant, refer to "LUBRICATION WHEN SHIPPED" in this section. For procedures, refer to Section 7.

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

Before operating this machine:

1. Be sure the cooling systems are filled to the proper level. Refer to "COOLING SYSTEM" in Section 8.
2. Check the belt tensions at 1, 10 and 50 hour intervals until the tensions remain stabilized. Refer to "BELTS" in Section 8.
3. Check the battery liquid level. Refer to "ELECTRICAL SYSTEM" in Section 8.
4. Be sure the battery terminals are clean and the battery cables are fastened securely to the correct terminals. Refer to "ELECTRICAL SYSTEM" in Section 8.
5. Be sure the terminals on the back of the alternator are clean and the cables are fastened securely to the proper terminals as follows (Illust. 1):
 - a. The black cable (2) is connected to ground.
 - b. The red cable (1) is connected to the starter ("R" terminal on the alternator).



Illust. 1
Alternator Connections

BEFORE STARTING THE NEW MACHINE

LUBRICATION WHEN SHIPPED

The machine has been lubricated at the factory for operation in an air temperature range of -10°F to +90°F. If this machine 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 GUIDE" in Section 7 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
Transmission and Torque Converter	EO ⊕
Differential and Wheel Planetaries	MPL
Transfer Drive	MPL
Hydraulic Reservoir	EO ⊕

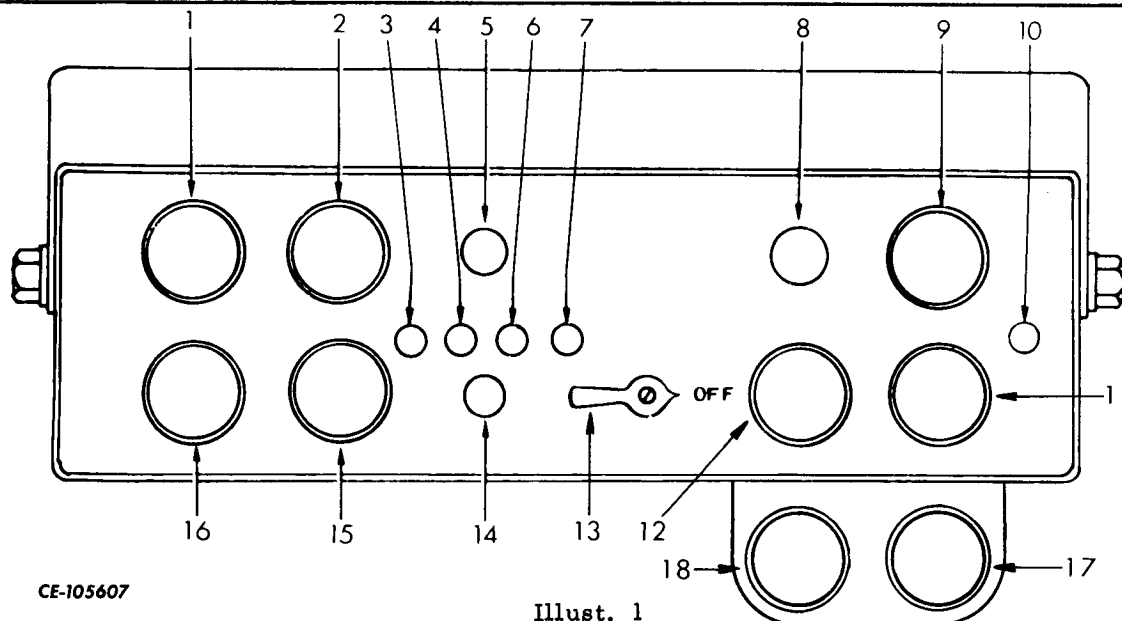
- ⊕ After the initial 100 hours of operation, change transmission oil filter element and clean the transmission sump strainers. Refer to "TRANSMISSION OIL FILTERS" in Section 8. Thereafter, service at the regular scheduled (normal) intervals.
- ⊕ After the initial 100 hours of operation, change the hydraulic oil filter elements. Thereafter, service these filters at the intervals specified in the "SCHEDULED MAINTENANCE GUIDE" in Section 7.

This section covers the location and function of the various instruments and controls of this machine. In the case of controls, more detailed information regarding operation can be found in Section 5.

Regardless of previous experience as an operator, you must be thoroughly familiar with the location and use of all instruments and controls before operating this machine. Check all instruments, 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 instruments do not register properly, stop the engine; locate and correct the cause immediately. Refer to "INSTRUMENT CHECK" in Section 5.

The number of the instrument or control (1 through 18) corresponds with the numbers shown on Illust. 1 unless otherwise indicated.



CE-105607

Illust. 1
Instruments and Controls

- | | |
|---|--|
| 1. Engine Oil Pressure Gauge | 12. Torque Converter Oil Temperature Gauge |
| 2. Engine Coolant Temperature Gauge | 13. Combination Switch |
| 3. Fuse-Rear Driving Lights Circuit | 14. Starter Switch |
| 4. Fuse-Tail Lights Circuit | 15. Volt Meter |
| 5. Ether Injector Plunger (if equipped) | 16. Fuel Level Gauge |
| 6. Fuse-Stop Lights Circuit | 17. Transmission Clutch Pressure Gauge (if equipped) |
| 7. Fuse-Heater and Defroster Circuit | 18. Hydraulic Pressure Gauge (if equipped) |
| 8. Plug Button | |
| 9. Fuel Pressure Gauge | |
| 10. Plug Button | |
| 11. Air Pressure Gauge | |

① Engine Oil Pressure Gauge

This gauge shows the pressure at which the lubricating oil is circulating through the engine. This gauge must register in the "IDLE" (8 to 15 psi) range immediately upon starting. When the engine is operated at full load speed, the pointer must be in the (15 to 75 psi) "RUN" range. Stop the engine immediately and investigate cause if little or no pressure is indicated.

The oil pressure gauge gives some indication of the oil condition once it is at operating temperature. Pressure drops between oil changes may be caused by oil dilution, a clogged crankcase suction strainer or an internal engine oil leak. Always determine the cause of decreased normal engine oil pressure.

② Engine Coolant Temperature Gauge

This gauge shows the temperature of the coolant circulating through the engine. After the engine has operated a sufficient length of time, the pointer of the gauge must be in the green "RUN" (160°F. to 210°F.) range.

During normal operation, the gauge readings should vary between the minimum and maximum indicated by the "RUN" segment of the gauge.

Continuous engine operation below the minimum temperature is harmful to the engine oil. Low coolant temperatures will also cause exhaust smoke and increase the rate of fuel consumption.

NOTE: In cold weather, it may be necessary to cover part of the radiator to maintain the minimum coolant temperature indicated at the lower end of the "RUN" segment.

Overheating indicates the need for mechanical correction. A clogged cooling system or a low coolant level will also cause high operating temperatures. The engine temperature, under full load conditions, should remain below the maximum reading listed.

③ Rear Driving Lights Circuit Fuse

This fuse protects the rear driving lights circuit. Refer to "ELECTRICAL SYSTEM" in Section 8 for additional information on fuses.

④ Tail Light Circuit Fuse

This fuse protects the tail lights circuit. Refer to "ELECTRICAL SYSTEM" in Section 8 for additional information on fuses.

⑤ Ether Injector Plunger (If Equipped)

The ether injector plunger injects ether into the engine when pressed down. The ether aids in starting the engine during cold weather.

NOTE: The ether injector plunger should be used only when the air temperature is below freezing.

Refer to "STARTING THE ENGINE" in Section 5 for operation of the starting aid.

⑥ Stop Light Circuit Fuse

The fuse inside of this holder protects the stop light circuit. Refer to "ELECTRICAL SYSTEM" in Section 8 for additional information as fuses.

⑦ Heater and Defroster Circuit Fuse

This fuse protects the heater and defroster circuit (if so equipped). Refer to "ELECTRICAL SYSTEM" in Section 8 for additional information on fuses.

⑧ Plug Button

This plugged hole is not used.

⑨ Fuel Pressure Gauge

This gauge registers the pressure of the fuel from the fuel tanks through the fuel filters to the engine fuel injection nozzles.

The pointer of the gauge must register in the "RUN" (green) range when the engine is operating at high idle speed. When the pointer is in the "CHANGE FILTER" range (black area) while the engine is operating at this speed, it means that the primary fuel filter needs replacement; the primary and final fuel filters need replacement; or that the fuel system is clogged at some point. It may also be accomplished by a loss of power or misfiring of the engine.

10 Plug Button

This plugged hole is not used.

11 Air Pressure Gauge

This gauge registers the amount of air pressure in the air tank. Tap the gauge lightly when checking the gauge reading. The unit should not be moved until the gauge is registering in the "RUN" (green) segment of the gauge. The left side of the "RUN" segment is approximately 75 PSI and the right side approximately 125 PSI.

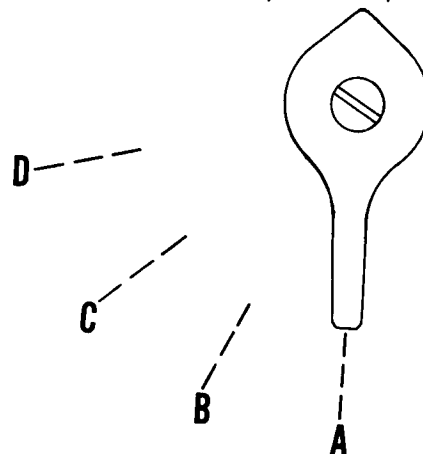
NOTE: A low air pressure warning buzzer will sound until the air pressure reaches 60 PSI.

12 Torque Converter Oil Temperature Gauge

This gauge registers the temperature of the fluid in the torque converter. After the engine has operated sufficiently to reach a stabilized torque converter temperature, tap the gauge lightly and check the reading. The gauge must register in the "RUN" (green area). The left side of the "RUN" segment is approximately 100°F and the right side approximately 250°F. If the gauge registers in the "CHECK OIL" segment, shift the transmission to a lower gear range and reduce engine speed. If this fails to bring the temperature into the "RUN" segment, proceed as follows:

- a. Stop the engine. Check the oil level in the transmission (refer to Section 7 for the correct level checking procedure).
- b. Service the transmission filter. For filter servicing procedures, refer to "CHANGING THE FILTER ELEMENT" under "TRANSMISSION AND TORQUE CONVERTER" in Section 8.

NOTE: Continual high fluid temperatures should be corrected before resuming to operate the machine.

13 Combination Switch (Illust. 2)

CE-105327

Illust. 2

Combination Switch Positions

- A. OFF
- B. Ignition
- C. Instruments and front driving lights
- D. Instruments and front and rear driving lights

The combination switch has four positions.

A Position - Off

There is no electric current flow to any circuit when the combination switch is in this position.

B Position - Ignition

This switch position allows electric current to flow to the ignition circuit. The combination switch must be in one of the ignition positions (B, C or D) before the engine can be started or cranked.

C Position - Ignition, Instrument Lights, Tail Lights and Front Driving Lights

The instrument panel lights, tail lights and front driving lights will be on when the combination switch is in this position. The engine may also be started in this switch position.

D Position - Ignition, Instrument Lights, Tail Lights and Front and Rear Driving Lights

The instrument panel lights, tail lights, front and rear driving lights will be on when the combination switch is in this position. The engine may also be started in this position.

14 Starter Switch

Turn the combination switch to the ignition position and press the starter switch to crank the engine. After the engine starts to run, release the starter switch.

NOTE: Never press the starter switch while the engine is running. This will damage the cranking motor and the engine flywheel.

15 Voltmeter

The voltmeter indicates the condition of the batteries. When the engine is not running or is running at low idle speed, the gauge pointer should be within the left green area, which indicates a good battery charge. If the voltage drops below the left green area, the batteries should be checked. With the engine operating above low idle speed, the gauge pointer should be within the right green area, which is the normal operating range. If the voltage drops below the right green area, the batteries and/or voltage regulator should be checked. If the voltage exceeds the right green area, the voltage regulator may be at fault.

16 Fuel Level Gauge

This gauge is electrically operated and indicates the available fuel supply in the fuel tank. Tap the gauge lightly when taking a reading.

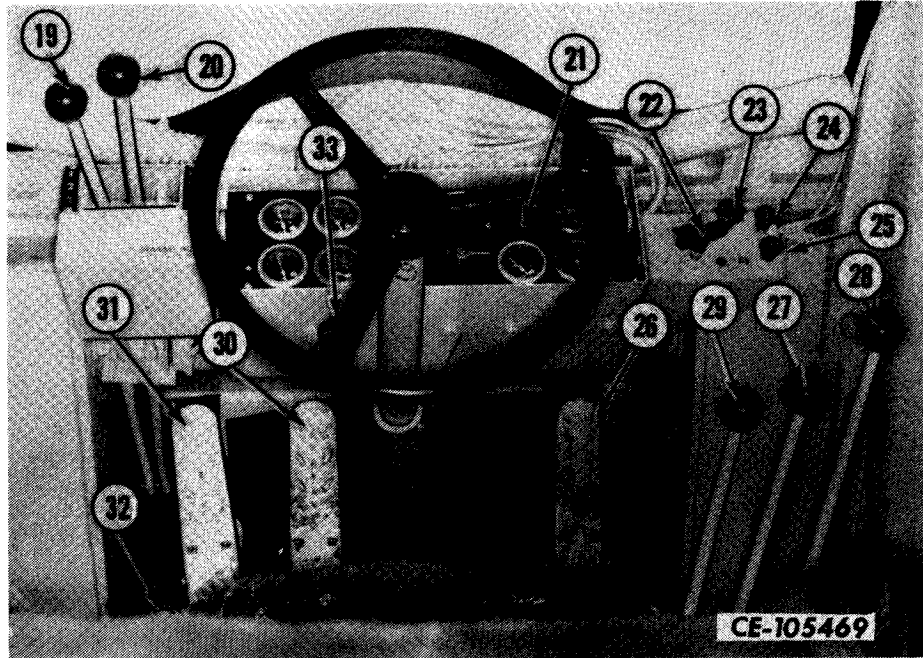
17 Transmission Clutch Pressure Gauge (If Equipped)

This gauge 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, the gauge must register 270-300 pounds of pressure. If the pointer is below or above the normal operating pressure, stop the engine and service the transmission oil filter. Refer to "TRANSMISSION OIL FILTER" in Section 8. If after servicing the filter, the pointer still registers below or above the normal operating pressure, stop the engine and consult your authorized International Construction Equipment distributor or dealer before operating the machine. This group should be disconnected when checks are completed as the extreme pressure change to which the gauge is subjected will greatly reduce the gauge life.

18 Hydraulic Oil Pressure Gauge (If Equipped)

This gauge registers the pressure of the oil being delivered to the main hydraulic valve. The gauge should be connected only when pressure checks are being made. The gauge should give a pressure reading of 2500 psi maximum.

The number of the control (19 through 33) corresponds with the numbers shown on Illust. 3 unless otherwise indicated.



Illust. 3
Controls

- | | |
|--|---|
| 19. Transmission Gear Range Lever | 27. Bucket Control Lever |
| 20. Transmission Direction Lever | 28. Boom Control Lever |
| 21. Instrument Panel | 29. Third Spool Control Lever (if equipped) |
| 22. Hand Throttle Control | 30. Brake Pedal |
| 23. Window Wipers Control | 31. Brake and Transmission Disconnect Pedal |
| 24. Heater Control (if equipped) | 32. Horn Button |
| 25. Window Defroster Control (if equipped) | 33. Engine Shut-down Control |
| 26. Accelerator Pedal | |

19 Transmission Gear Range Lever

This lever is used to select any one of the transmission gear ranges. For additional information refer to "DRIVING THE MACHINE" in Section 5.

20 Transmission Direction Lever

This lever is used to select machine direction. Refer to "DRIVING THE MACHINE" in Section 5 for additional information.

21 Instrument Panel

Refer to "INSTRUMENTS AND CONTROLS" in this section.

22 Hand Throttle Control

The hand throttle is used to keep the engine running at a speed higher than low idle without

(Continued on next page)

keeping the accelerator pedal depressed. Turn the handle to the left or right to unlock it. Pull the control "out" until the engine is running at the desired speed. Turn the handle to the left or right to lock it into this position. Push the control "in" before leaving the operator's compartment.

23 Window Wiper Control

Pull the wiper control knob out to turn the window wipers on. Push the knob in to turn them off. After turning on the wipers, the speed may be increased by turning the knob clockwise or decreased by turning the knob counterclockwise.

24 Heater Control (If Equipped)

The heater is controlled by a two speed pull switch. Pull the switch "out" to the desired fan speed. Push the switch "in" all the way to turn the heater off.

NOTE: The heater unit is connected to the engine by water hoses.

Each hose is connected to a shut-off valve at the engine. Be sure the valves are open when the heater and defroster are being operated. Turn off the valves when the heater is not being used during the warm seasons.

25 Window Defroster Control (If Equipped)

The window defrosters are turned on when this control is pulled "out" and turned off when it is pushed "in."

26 Accelerator Pedal

Depress this pedal to increase the engine speed; release the pedal to decrease the engine speed.

27 Bucket Control Lever

The bucket control lever is the left lever (center lever is equipped with the third spool control lever) at the right of the operator's seat. This lever controls the roll back and dump operations of the bucket. Refer to "LOADING MECHANISM OPERATION" in Section 5 for additional information.

28 Boom Control Lever

The boom control lever is the far right lever at the right of the operator's seat. This lever controls the raising and lowering operation of the booms. Refer to "CONTROL LEVER OPERATION" in Section 5 for additional information.

29 Third Spool Control Lever (If Equipped)

This lever controls any attachment which requires hydraulic power from a third spool on the main control valve.

30 Brake Pedal

Depress the brake pedal according to machine's speed and the road conditions then slowly release the pedal as the machine's speed decreases. When the machine comes to a complete stop, there should only be enough pressure to hold it stationary.

NOTE: Gradually increasing pressure on the brake pedal as the machine loses speed will result in a very rough stop.

31 Brake and Transmission Disconnect Pedal

This pedal works in the same manner as the brake pedal except that it also stops clutch pressure in the transmission. When this pedal is depressed, no power can be transmitted through the transmission and full engine power can be used to operate the machine hydraulics while braking.

32 Air Horn Button

The horn button is located on the floorboard to the left of the brake and transmission disconnect pedal. Step on the button to sound the horn.

33 Engine Shut-down Control

The engine shut-down control is located to the left of the steering column on the underside of the instrument panel box. Pull the control handle out all the way to shut the engine down. After the engine has stopped completely, push the handle back in. The shut-down control stops the fuel supply to the engine.

PARKING BRAKE LEVER

The parking brake lever is located to the right rear of the operator's seat on the floorboard. To apply the parking brake pull the lever up and back; to release push forward and down.

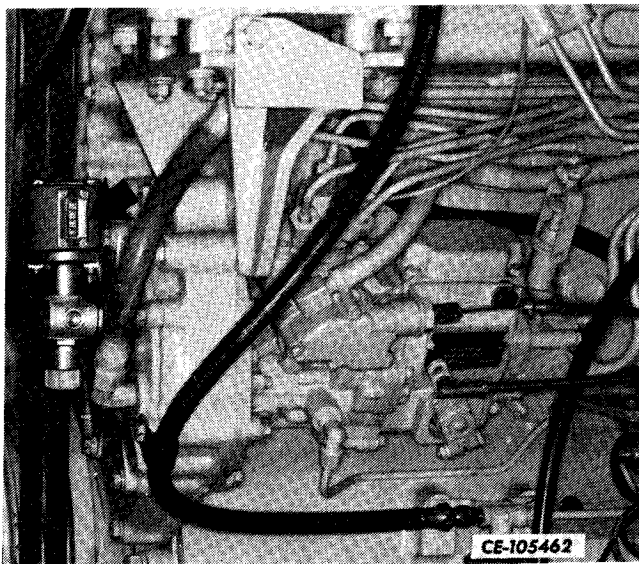
It is recommended that the parking brake only be used to hold the machine after it has come to a stop. However, should the brake system ever fail, the parking brake may be used to make an emergency stop.

CAUTION: THE PARKING BRAKE SHOULD ALWAYS BE APPLIED WHEN THE OPERATOR IS NOT IN THE DRIVER'S SEAT.

SERVICE RECORDER (Illust. 4)

The service recorder is geared to the engine, and when the crankshaft turns a specific number of revolutions in an hour at average operating speeds on an average job application, the dial advances one number. Different job applications will cause the service recorder to differ from the amount of clock hours worked.

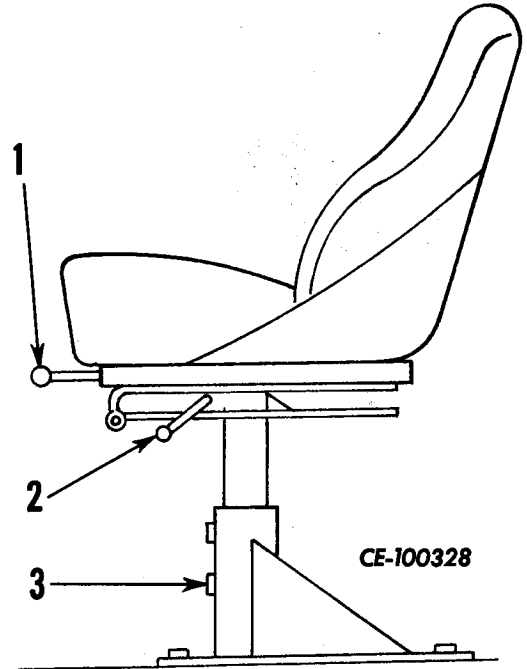
The purpose of the service recorder is to indicate when to perform the recommended maintenance and lubrication operations. The intervals in this manual are given in service hours, so daily readings will tell you when to service the machine. Rely on the service recorder and not the clock to measure service intervals.



Illust. 4
Service Recorder

SEAT ADJUSTMENT (Illust. 5)

For operator's convenience in reaching the controls and improved operating visibility, the operator's seat can be adjusted to various positions.



Illust. 5
Seat Adjustments

1. Forward or back positioning lever
2. Tilt lever
3. Height adjustment

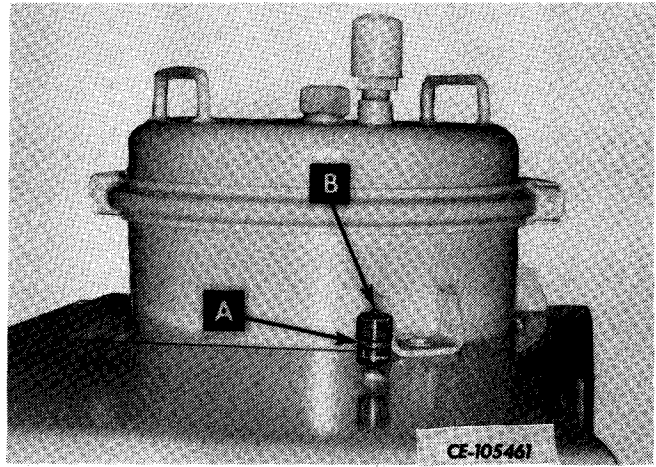
CAUTION: DO NOT ADJUST THE SEAT POSITION WHILE THE MACHINE IS IN MOTION.

One seat adjustment lever is attached to the bottom right front side of the seat. To adjust the seat forward or backward, pull the lever (1) and slide seat in the desired direction. The lever (2) on the left side of the seat pedestal allows the seat to tilt forward or back. Pull up on the tilt lever to adjust the tilt of the seat. The height can be adjusted by removing the two bolts (3) that secure the inner post to the outer post and lining up the holes in both posts at a higher or lower setting. Be sure to replace the two bolts with the heads of the bolts towards the front of the seat.

NOTE: DO NOT ADJUST THE SEAT TILT WHILE SITTING IN THE SEAT.

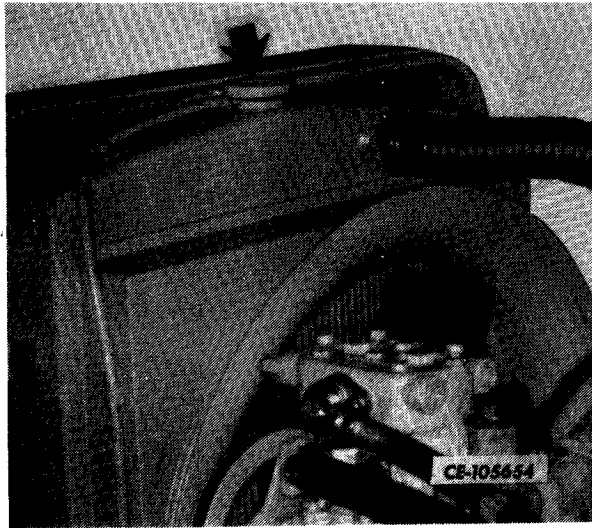
AIR CLEANER SERVICE INDICATOR (Illust. 6)

During operation, the red band will gradually rise in the indicator window (A) as dirt accumulates in the air filter elements. THIS MUST NOT BE MISTAKEN AS A SIGNAL FOR ELEMENT SERVICE. When the filter elements reach the maximum allowable restriction, the red band will completely fill the indicator window and automatically lock 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 8. Press the reset button (B) on top of the indicator after the elements have been serviced.



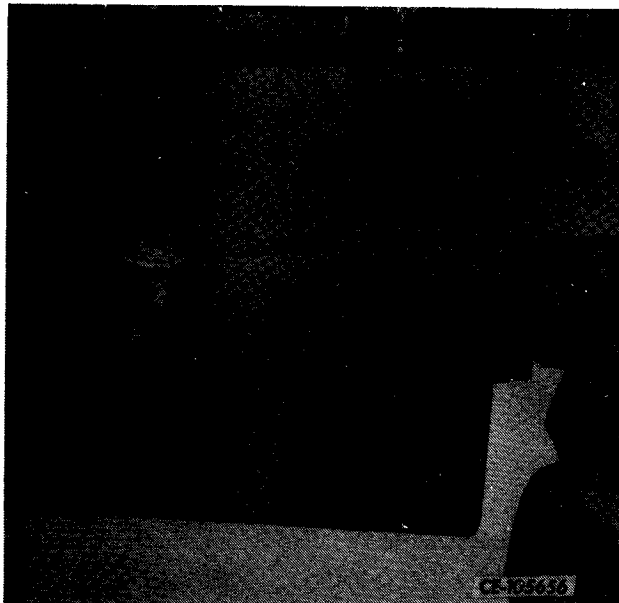
Illust. 6
Air Cleaner Service Indicator

1. Check level of coolant in radiator, and bring up to the proper level if low (Illust. 1). Always remove cap slowly after engine has been running.



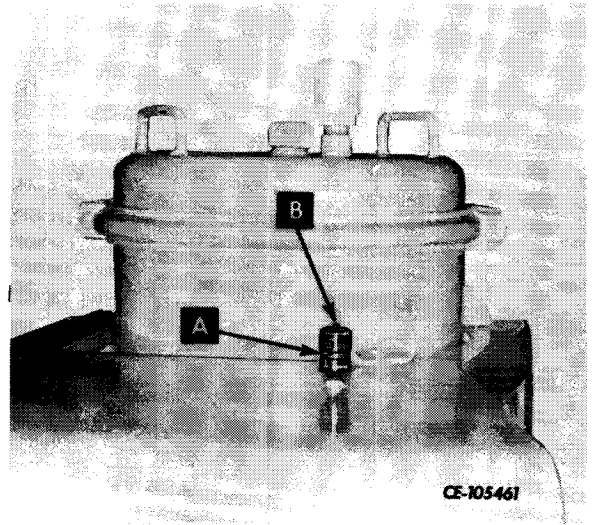
Illust. 1
Check Coolant Level

2. Be sure the fuel tank is full (Illust. 2). Fill the tank at the end of each day's operation to reduce condensation.



Illust. 2
Check Fuel Level

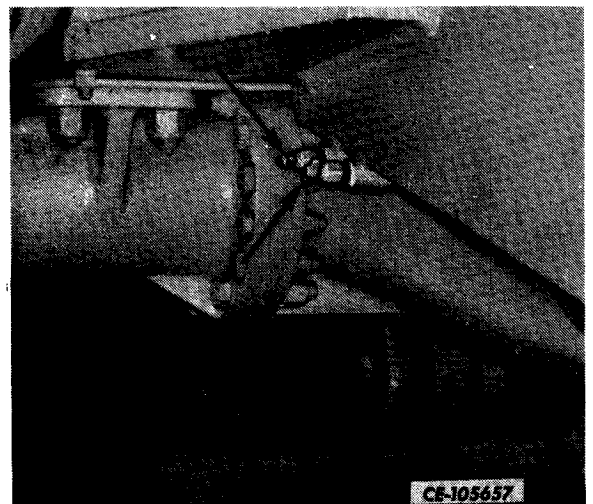
3. Check the air cleaner service indicators to see if the filters are restricted (Illust. 3). If so indicated, service the filters before operating the machine.



Illust. 3
Check Air Cleaner Service Indicator

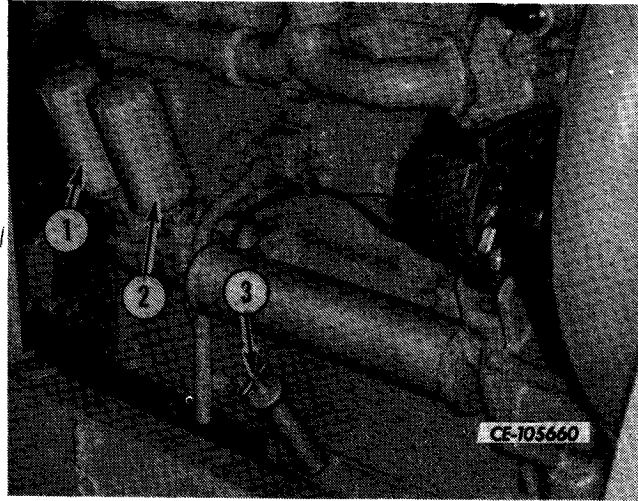
4. Open the air reservoir drain valves (Illust. 4). Drain all accumulated moisture then close the valves. The valves are located on the left side of the loader just behind the front axle.

NOTE: It is especially important that the air tanks are thoroughly drained of water in cold weather.



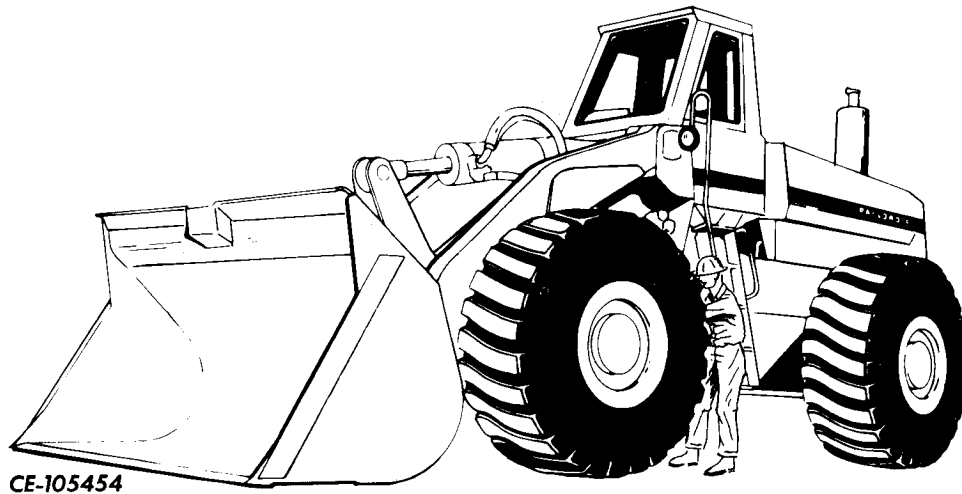
Illust. 4
Drain Water From Air Reservoirs

5. Check the oil (with the engine stopped) and add sufficient new oil to bring it to the "H" mark (full) on the gauge (3, Illust. 5). Do not operate the engine if the oil level is below the "L" mark (low) on the gauge.



Illust. 5
Check Engine Oil Level

6. Perform each of the 10 hour lubrication requirements shown on the "SERVICE GUIDES" in Section 7.



Illust. 6
General Inspection

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

CLEAN ALL GLASS (WINDOWS, WINDSHIELD, INSTRUMENTS AND SIDE VIEW MIRROR (IF SO EQUIPPED)).

CHECK HEADLIGHTS FOR OPERATION. ALSO CHECK TAIL LIGHT AND STOP LIGHT.

CHECK TIRES FOR CUTS, TREAD WEAR AND PROPER INFLATION.

SECTION CONTENTS		Page No.
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Shifting Gears		7
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AUTOMATIC BOOM KICK-OUT		12
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STOPPING THE MACHINE		13
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STOPPING THE ENGINE		16

PRECAUTIONS

Before starting or operating this machine, 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 machine under load without the proper engine oil pressure and operating temperature. After starting the engine, allow it to run at low idle for 5 to 10 minutes to obtain complete distribution of the lubricating oil.

Never pour cold coolant into the radiator if the engine is very hot unless conditions make it absolutely necessary. Under such conditions, refer to "FILLING THE SYSTEM" under "COOLING SYSTEM" in Section 8.

Fill the fuel tanks at the end of each day's work to reduce moisture condensation in the tanks.

Never shift the transmission into neutral (N) going downhill. The machine may go out of control or the transmission, converter or engine may be damaged when the transmission is again placed in gear.

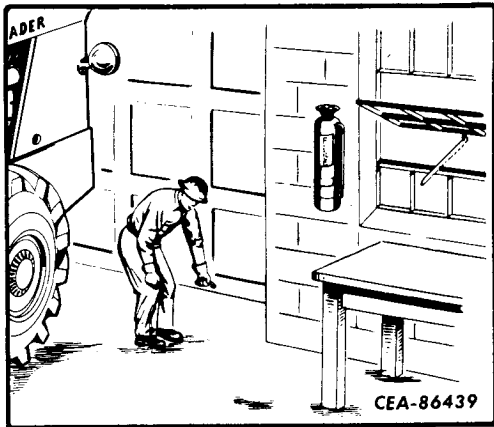
Before shutting down the engine, run at half-speed or less for at least four minutes to avoid afterboil.

Perform a visual and operational check of the machine before putting it to work.

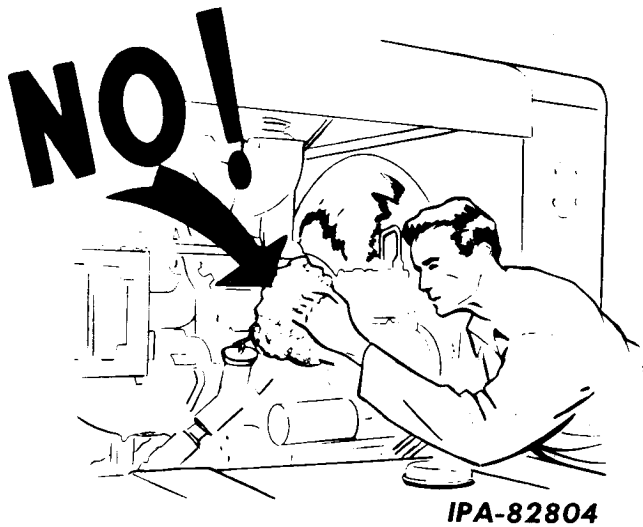
The roll-over protective structure (R. O. P. S.) provides operator protection in the event of machine roll-over or upset. These structures are designed to bend during a roll-over to protect the operator from sudden impact loads. DO NOT attempt to repair a protective structure for further service after an accident. Repaired structures do not provide the original strength and protection. Contact your International Construction Equipment distributor for information on structure replacement.

PRECAUTIONS

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



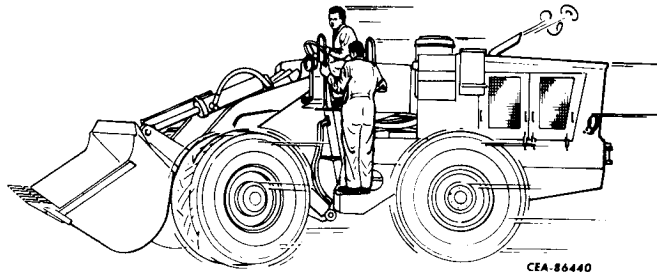
Never start the machine in an enclosed building unless the doors and windows are open.



Never operate the engine when cleaning or lubricating the machine.

Do not drive the machine without sufficient air pressure for proper braking.

Do not pump the brakes. You may reduce air pressure too low for good braking.

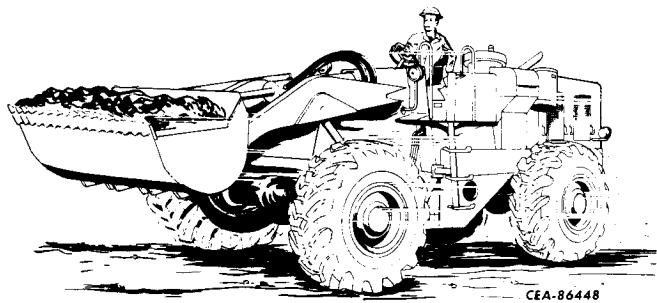


Never haul passengers.

Before starting the engine or beginning to move the machine give a couple of short blasts of the horn. Be sure the area is clear of personnel.

Keep the windshield clean.

Slow down when traveling in congested areas.



Always operate loader at speeds slow enough to insure complete operator control.

On haul roads and in pits, give the right-of-way to loaded machines.

When leaving the machine unattended for any length of time, make sure the transmission shift lever is locked in neutral (N), the bucket is completely lowered, and the engine is stopped.

Never allow anyone to work on the machine while it is moving.

Avoid smoking when refueling or servicing the tractor.

PRECAUTIONS

If it is necessary to make any checks with the engine running, use two men. One man must remain in the operator's compartment to safeguard the second man making checks or adjustments. As an added precaution, when making checks with the engine running, position the transmission shift lever in neutral (N). Apply the parking brake.

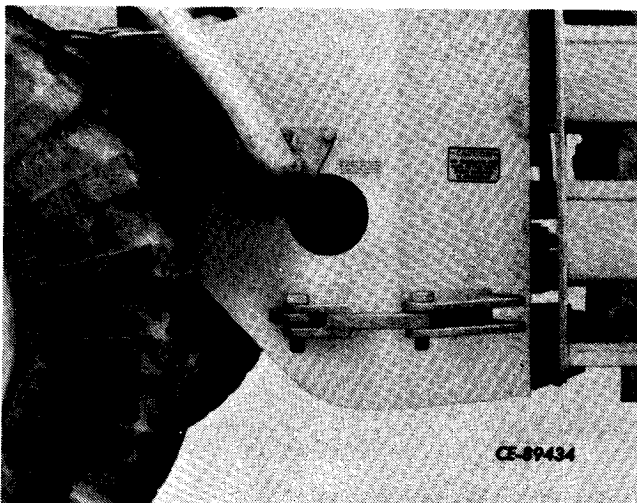
Use a commercial solvent or kerosene unless otherwise specified for cleaning parts. Never operate the engine when using cleaning solvents.

Always install adequate blocking to support the bucket before servicing any part of the machine which requires the bucket in the raised position. Never allow the hydraulic system to support the bucket when servicing the machine.

How To Use The Safety Bar and Pins

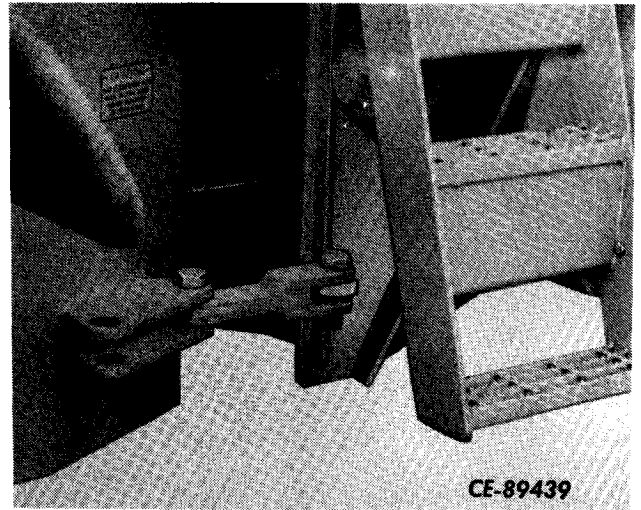
CAUTION: DO NOT SERVICE OR TRANSPORT THE MACHINE UNLESS THE SAFETY BAR OR PINS ARE IN PLACE.

A bar and two pins (Illust. 1) are provided on the right side of the tractor as a safety device. These should be used to lock the two tractor halves when the tractor is serviced or transported.



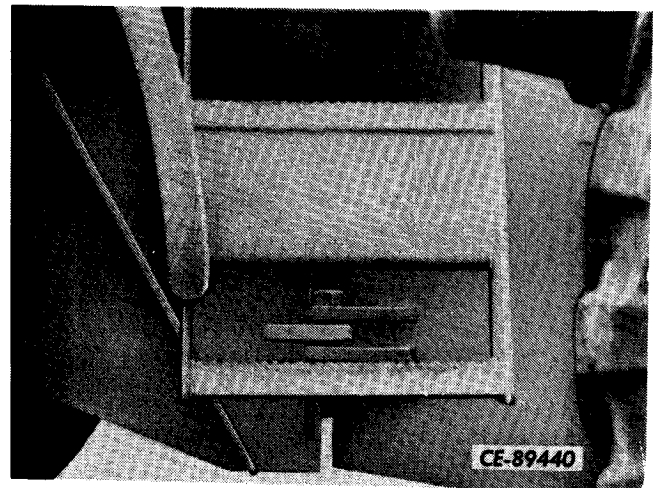
Illust. 1
Safety Bar and Pins (Stowed Position)

Lock the tractor halves in the straight position by installing the bar and two pins as shown in Illust. 2.



Illust. 2
Safety Bar and Pin in Straight Lock Position

To lock the tractor halves in either a full left or full right turn, only one of the pins is used. Turn the tractor to its full turn position and insert the pin in the pin holes on the closed side of the tractor as shown in Illust. 3.



Illust. 3
Safety Bar and Pin in Full Lock Position

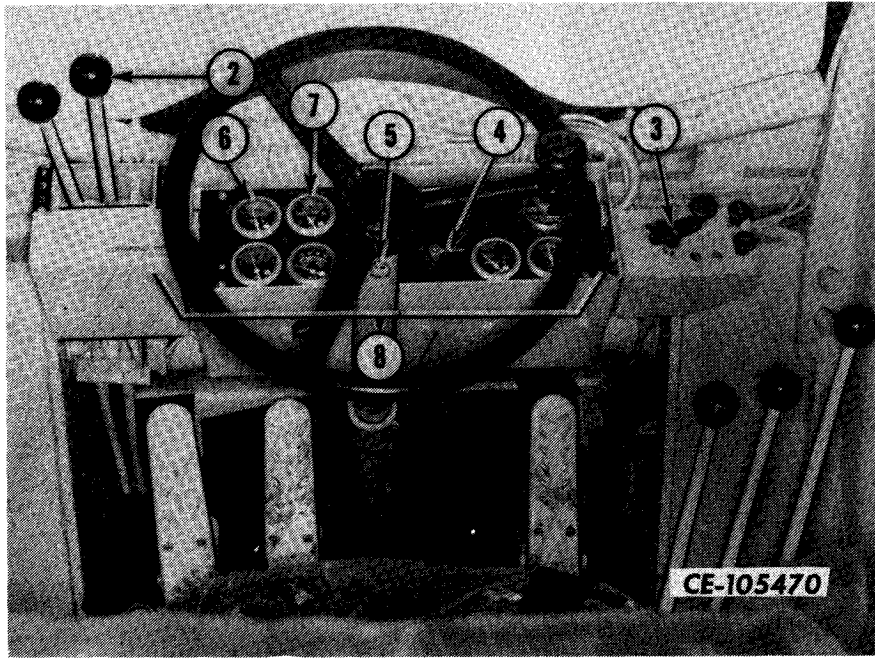
Always check that the bar and pins have been replaced in the stowed position provided on the right side of the tractor (Illust. 1) before operating the tractor.

Broken or lost safety bar and pins should be repaired or replaced immediately to insure that this safety device is always available for use.

STARTING THE ENGINE

NOTE: Before starting the engine be sure you understand the functions of all the control levers, pedals, switches and instrument panel gauges.

Step numbers correspond with the numbers shown in Illust. 4.



Illust. 4
Starting the Engine

- ① Apply the parking brake. (Not illustrated.)
- ② Place the transmission direction lever in "N" position.

NOTE: The transmission direction lever is equipped with a neutral start switch. This switch will not allow the engine to start unless the transmission lever is in "N" (neutral) position.

- ③ Make sure the hand throttle control is pushed all the way in.
- ④ Turn ignition switch on.

- ⑤ Crank the engine as follows:

A. NORMAL START: Press the starter switch and release it the instant the engine starts.

NOTE: To avoid possible damage to the cranking motor, release the button as soon as the engine starts. Never press the button while the engine is running.

B. USING ETHER INJECTOR (If so equipped):

NOTE: The ether injector should be used only when the air temperature is below freezing.

NOTE: Do not spray ether directly into the air cleaner.

Depress the accelerator pedal to full throttle position. Press the starter switch and ether injector plunger at the same time. Hold the ether injector plunger down for a maximum of two seconds. If the temperature is below zero (0°F) additional applications of ether may be required.

NOTE: Additional injections of ether should be limited to two. Excessive use of ether could cause engine damage.

Release the starter switch the instant the engine starts. After the engine starts accelerating, let up on the accelerator pedal to the lowest no load position that allows smooth sustained operation.

NOTE: If the engine fails to start within 15 seconds, release the starter button and allow a two (2) minute interval before again trying to start the engine. Continuous engine cranking without recovery periods will damage the cranking motor and rapidly drain the batteries.

⑥ After the engine is started, let it run at low-idle until the oil pressure gauge reaches the "RUN" segment.

NOTE: Do not accelerate or hold the engine at full speed until the engine oil pressure gauge is in the "RUN" segment.

⑦ Major changes in engine speed and/or loads should be avoided until the water temperature gauge reaches the "RUN" segment.

⑧ Check all instruments for proper loader operation. Refer to "INSTRUMENT CHECK" in this section.

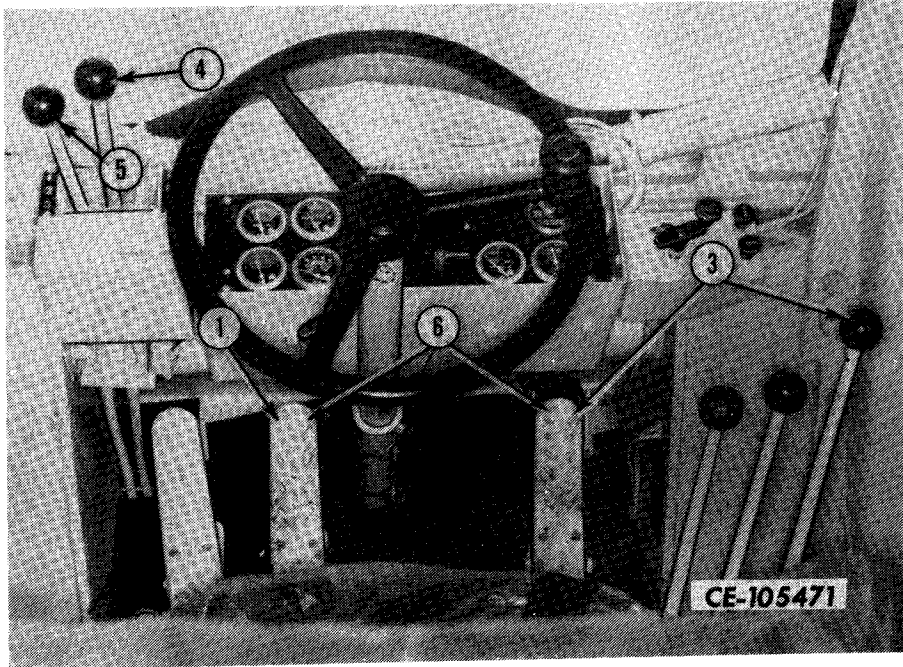
INSTRUMENT CHECK

Immediately after the engine has started, and at frequent intervals during its operation, check all instruments to be sure of safe operation. Refer to "INSTRUMENTS AND CONTROLS" in Section 3 for the correct normal gauge readings.

Stop the engine if any of the instruments do not register as indicated, and locate and correct the cause. Each instrument must register within the range specified for safe, correct operation.

DRIVING THE MACHINE

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



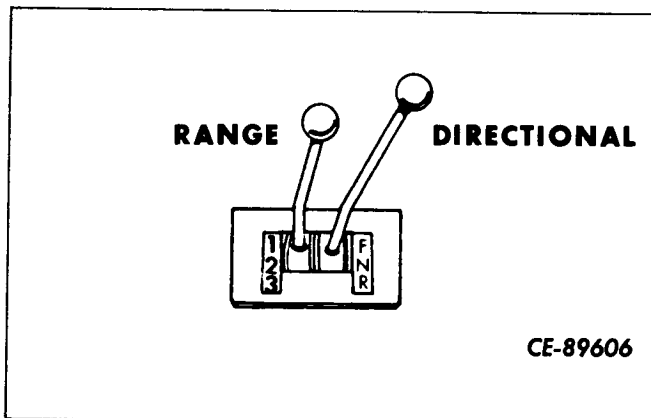
Illust. 5
Driving the Machine

- ① Depress the brake pedal.
- ② Release the parking brake. (Not illustrated.)
- ③ Partially accelerate the engine and raise the booms until the bucket is off of the ground and in the carry position. Release the accelerator pedal.
- ④ Place the transmission direction lever in the desired position.
- ⑤ Place the transmission gear range lever in the desired position.
- ⑥ Release the brake pedal and gradually depress the accelerator pedal until the desired machine speed is obtained.

DRIVING THE MACHINE

SHIFTING GEARS

The transmission has three forward gear ranges, three reverse gear ranges and neutral which are manually selected with the transmission gear range and direction levers (Illust. 6).



Illust. 6
Transmission Control Levers

The transmission is the full soft power shift type. The gear range or direction can be changed at any time without stopping the machine. The transmission clutches are designed to absorb any direction or gear range shifts made. All shifts are done manually.

Down-Shifting

A down-shift from "3" to "2" or "2" to "1" or "3" to "1" can be made at any time. The only sensation that will be felt on a down-shift is deceleration. The amount of deceleration felt will depend upon the speed the machine is traveling at the time the shift is made and to which gear range the down-shift is made.

Up-Shifting

Acceleration is the only sensation felt on an up-shift. An up-shift can be made at any time, but the most efficient use of each gear range is obtained when maximum engine rpm is reached in the gear range before an up-shift is made.

"1" (first gear) is the lowest and main working gear range. "2" (second gear) can be used for working and roading the machine. "3" (third gear) is used to road the machine for longer distances at the maximum machine speeds. The direction lever "N" (neutral) position has a neutral start safety switch incorporated in it. The direction lever must be in "N" before the engine can be started. "R" (reverse) also has "1" (first), "2" (second) and "3" (third) gear ranges.

STEERING

The machine is articulated and steering is accomplished by hydraulic power which pivots the main frames at the center hinge. Turn the steering wheel until reaching the desired angle of turn. Hydraulic power holds the angle of turn until the steering wheel is again turned.

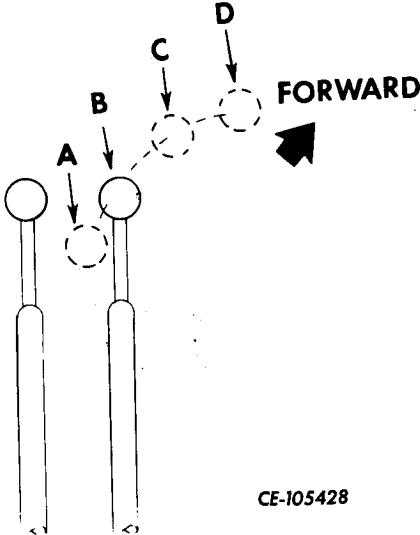
LOADING MECHANISM OPERATION

The hydraulic system provides power for hydraulically operated loader equipment. When the bucket circuit is being operated, flow to the boom circuit is cut off.

NOTE: Holding a control lever in any position except HOLD or FLOAT for an extended period of time after the hydraulic cylinder rod has reached the limit of its travel will produce excessive heat in the hydraulic system which may affect loader performance.

BOOM CONTROL LEVER (Illust. 7)

The boom control lever is the lever at the far right of the operator's seat. It has four positions. They are: RAISE, HOLD, LOWER and FLOAT.



Illust. 7

Boom Control Lever Positions

- | | |
|-------------------|-------------------|
| A. RAISE POSITION | C. LOWER POSITION |
| B. HOLD POSITION | D. FLOAT POSITION |

Raise (A, Illust. 7)

To raise the booms, pull the lever back as far as it will go. A detent in the valve locks the lever in this position. The return to HOLD can be done manually or will be done automatically when the boom reaches the preset stopping height of the automatic boom kick-out. Refer to "AUTOMATIC BOOM KICK-OUT" in this section for additional information.

Hold (B, Illust. 7)

The control lever, when not in a detented position, will automatically return to HOLD when released. The boom will remain in the same position that it was in when the lever was released.

Lower (C, Illust. 7)

Push the lever part way forward to lower the boom. The lever will automatically return to HOLD when released.

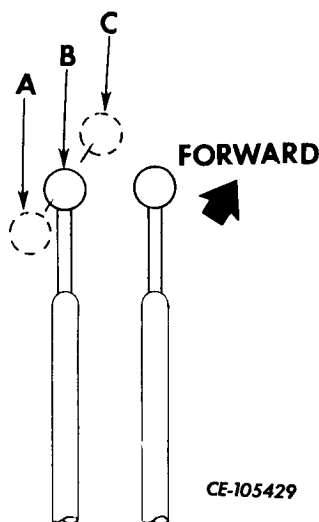
Float (D, Illust. 7)

◆ CAUTION: THE BOOM ASSEMBLY, IF RAISED, CAN BE LOWERED ANY TIME THE LEVER IS MOVED TO FLOAT OR LOWER POSITION WHETHER THE ENGINE IS RUNNING OR NOT. ALWAYS LOWER THE BOOM TO THE GROUND WHEN IT IS NOT IN USE.

Push the lever all the way forward for this position. This position is detented so the lever must be pulled back manually to the HOLD position. FLOAT position allows the booms to lower faster by gravity to ground level.

BUCKET CONTROL LEVER (Illust. 8)

The bucket control lever is the left lever (the center lever if the machine is equipped with a third spool control lever) at the right of the operator's seat. The lever's three positions are: ROLL BACK, HOLD and DUMP.



Illust. 8

- A. ROLL BACK POSITION
- B. HOLD POSITION
- C. DUMP POSITION

Roll Back (A, Illust. 8)

To roll back or close the bucket pull the control lever back. The lever will return to HOLD automatically when released and stop the roll back motion of the bucket.

If the machine is equipped with an automatic bucket positioning device, a detent in the control valve will hold the lever in ROLL BACK until the bucket positioner kicks it out. Refer to "AUTOMATIC BUCKET POSITIONER" in this section.

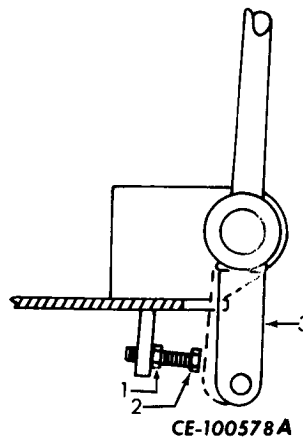
Hold (B, Illust. 8)

The bucket will stay in the attitude it is in when the bucket lever is placed in HOLD position. The lever will return to HOLD position automatically when released from DUMP position.

Dump (C, Illust. 8)

To dump the bucket push the lever forward. When the lever is released it will automatically return to "HOLD."

NOTE: Proper adjustment of the bucket dump speed is very important to protect the loader mechanism against damage. A production adjustment is made at the factory. However, this production adjustment is not suitable for all loading applications. Adjustment will vary according to bucket size and material being loaded. Therefore, an adjustment should be made which will control bucket dump speed and reduce shock but will not greatly slow the loading cycle or increase hydraulic system temperature.



Illust. 9

Bucket Dump Speed Adjustment

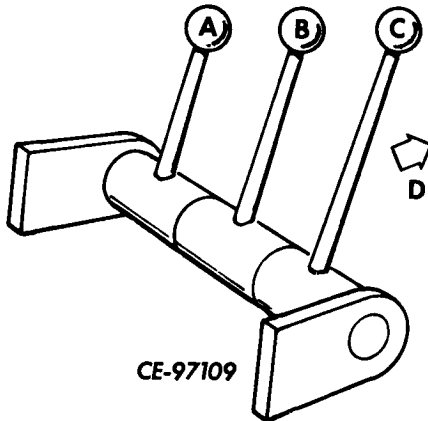
NOTE: WHEN A BUCKET OPENING AT AN UNCONTROLLED SPEED IS SUDDENLY STOPPED BY THE BUCKET CYLINDERS "BOTTOMING," A TREMENDOUS SHOCK LOAD MUST BE ABSORBED BY THE CYLINDERS, BELLCRANKS, BUCKET LINKS AND PINS. CONTINUED ABUSE OF THIS NATURE CAN RESULT IN FATIGUE FAILURE OF THESE COMPONENTS.

Adjust the bucket dump speed when necessary as follows:

1. Loosen jam nut (1, Illust. 9).
2. Turn bolt (2, Illust. 9) "in" or "out" as necessary to limit the travel of the control lever (3, Illust. 9). The bolt adjustment should give a minimum dump speed time of four seconds with an empty bucket at full governed engine speed.
3. Tighten the jam nut (1, Illust. 9).

THIRD SPOOL CONTROL LEVER

The third spool control lever (A, Illust. 10) controls the hydraulic operation of various attachments. The use and operation of the third spool control lever for each individual attachment is explained below.



Illust. 10
Control Levers

- A. Third Spool Control Lever
- B. Bucket Control Lever
- C. Boom Control Lever
- D. Front of Machine

Multi-Purpose Bucket Attachment Operation

The third spool control lever, when used for the multi-purpose bucket, controls the opening and closing of the clam on the bucket.

Open

Push the control lever forward to open the bucket clam. When released the lever will return to the hold position.

Hold

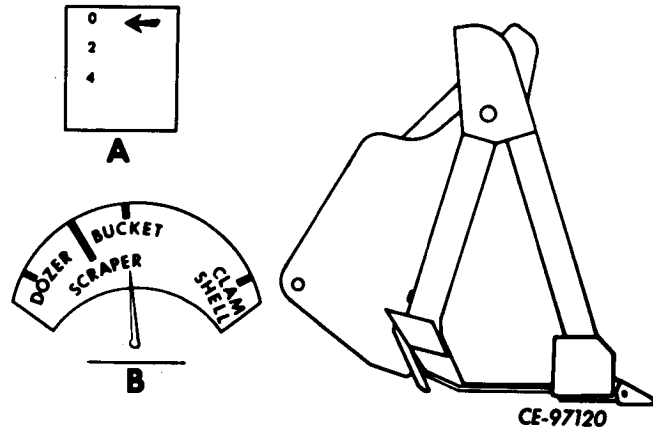
The control lever will return automatically to the hold position from either the open or close position when released. The bucket clam will remain in the same position it was when the control lever was released.

Close

Pull the control lever back to close the bucket clam. When released, the lever will return to the HOLD position. When the machine is equipped with a multi-purpose bucket, it is also equipped with a bucket position indicator. The decal (B, Illust. 11) on the indicator shows the attitude to set the bucket tilt at for the various multi-purpose clam uses.

A clam opening decal (A, Illust. 11) is located on the upper left hand side of the bucket. This decal indicates to what extent the clam is open or closed.

"0" indicates closed, "2" indicates half open and "4" indicates open.



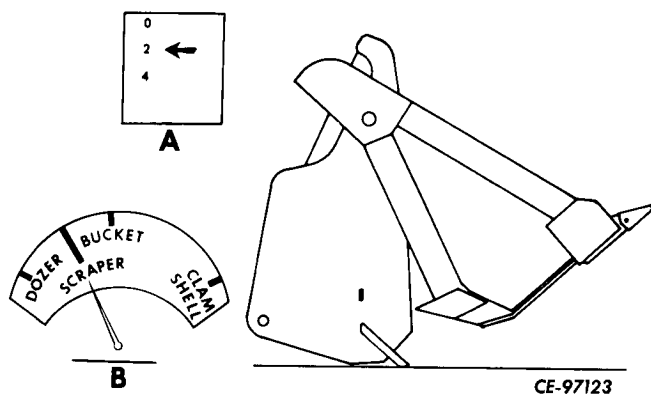
Illust. 11
Multi-Purpose Bucket Set In "BUCKET"
Position

- A. Clam Decal
- B. Bucket Position Indicator Decal

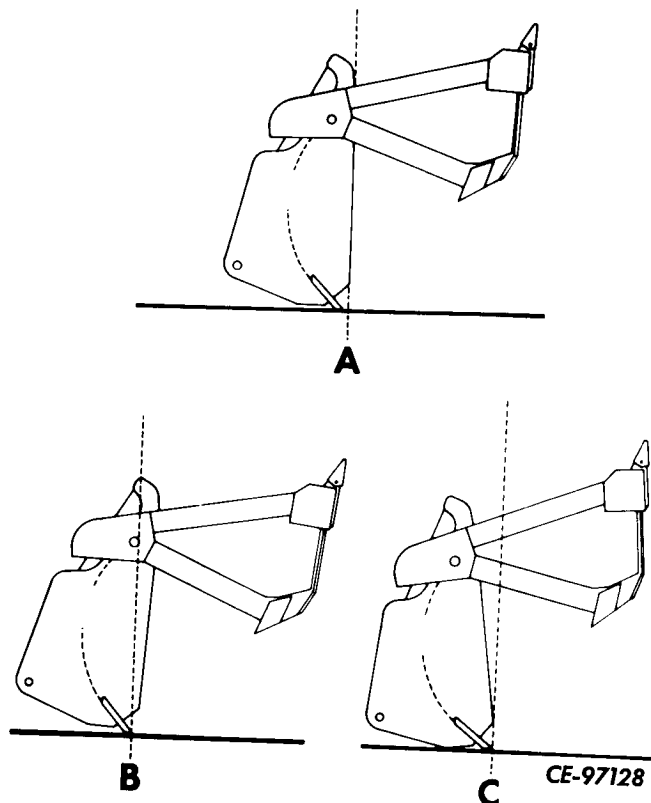
Raise the bucket a few feet off of the ground whenever changing the clam setting.

To set the multi-purpose attachment as a bucket, pull the third spool control lever back until the clam indicator is at the "0" setting on the clam decal (A, Illust. 11). Tilt the bucket forward or back until the bucket position indicator is on the "BUCKET" increment (B, Illust. 11).

To set the multi-purpose bucket as a scraper, open the clam until the indicator points to "2" or "4" on the clam decal (A, Illust. 12). The more the clam is open, the deeper a cut can be made. Tilt the bucket forward or back until the bucket position indicator is on the "SCRAPER" increment (B, Illust. 12).

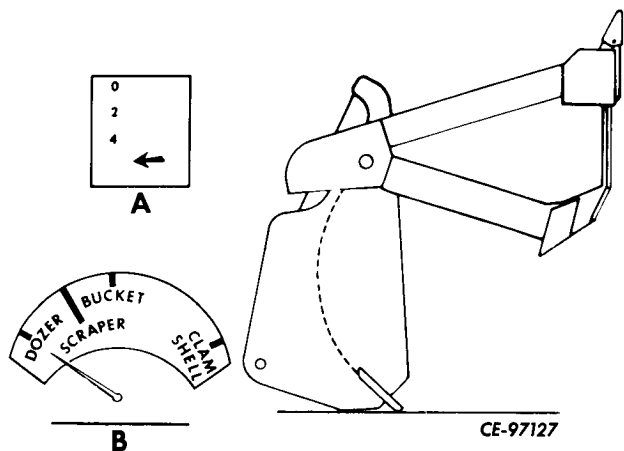


Illust. 12
Multi-Purpose Bucket Set In
"SCRAPER" Position

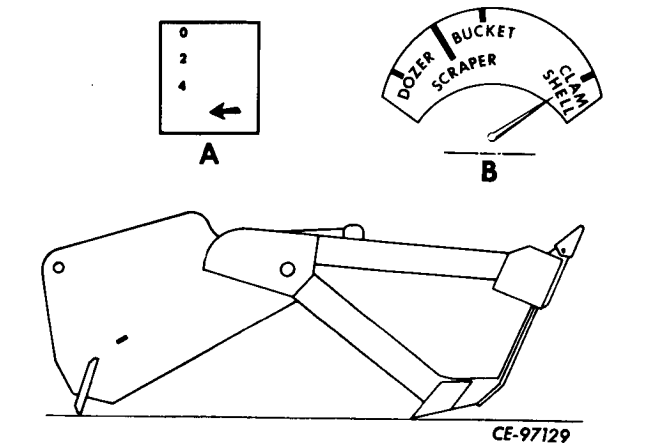


Illust. 14
Dozer Blade Tilt Positions

To use the multi-purpose bucket as a dozer, open the clam until the clam indicator is at the bottom of the clam decal or completely open (A, Illust. 13). Tilt the bucket until the position indicator is on "DOZER" (B, Illust. 13). Cut depth is controlled by tilting the blade forward or backwards. For a deep cut, tilt the bucket forward (B, Illust. 13). For a lesser amount of cut, tilt the blade farther back (C, Illust. 14). Position A (Illust. 14) is for level grading.



Illust. 13
Multi-Purpose Bucket Set In
"DOZER" Position



Illust. 15
Multi-Purpose Bucket In
"CLAM SHELL" Position

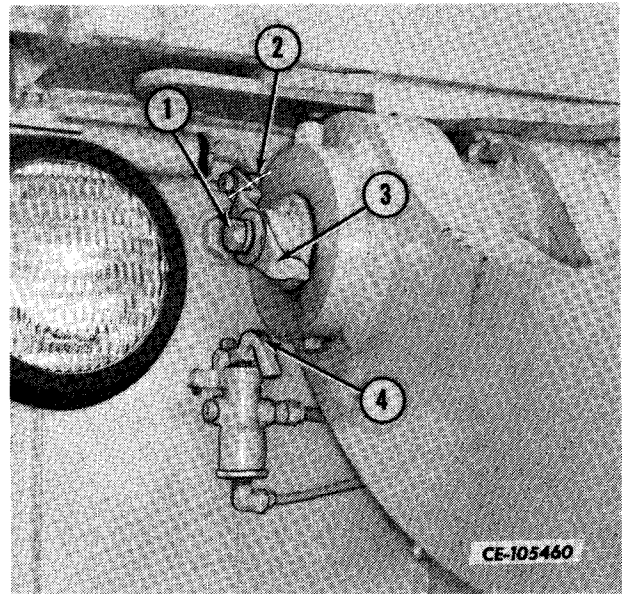
AUTOMATIC BOOM KICK-OUT (Illust. 16)

The machines loading boom is equipped with an air operated kick-out control system. When the boom control lever is pulled back into the detented RAISE position, the boom will raise until the kick-out mechanism is tripped. When the kick-out is tripped, the boom control lever will be kicked out of the RAISE position and into HOLD. The boom will be stopped at the preset height of the boom kick-out.

Setting the Kick-out Stopping Height

To set the kick-out for a particular stopping height, do the following:

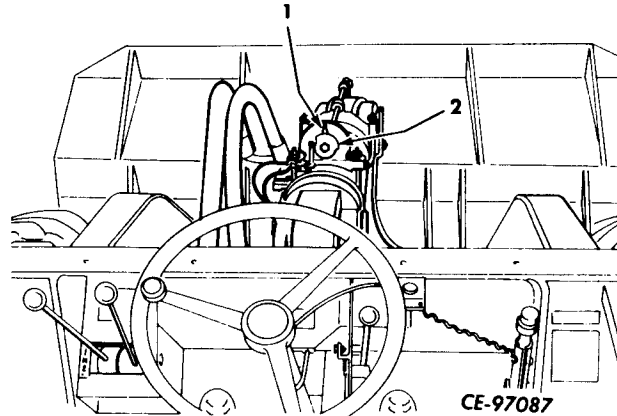
1. Loosen the cam roller lever securing bolt (1) until the lever will turn freely on the bolt.
2. Start the engine and raise the boom to the desired height.
3. Turn the cam roller lever (3) counterclockwise until the cam roller (2) is resting on top of the cam (4).
4. Tighten the cam roller lever securing bolt (1).



Illust. 16
Automatic Boom Kick-out Control

AUTOMATIC BUCKET POSITIONER (If Equipped)

The automatic positioning device is located in front of the operator on the bucket cylinder. The device can be set to automatically position bucket for proper bucket loading. Adjustment can be made by loosening capscrew in center of the cam (2, Illust. 17). When the desired bucket position is found, tighten capscrew.



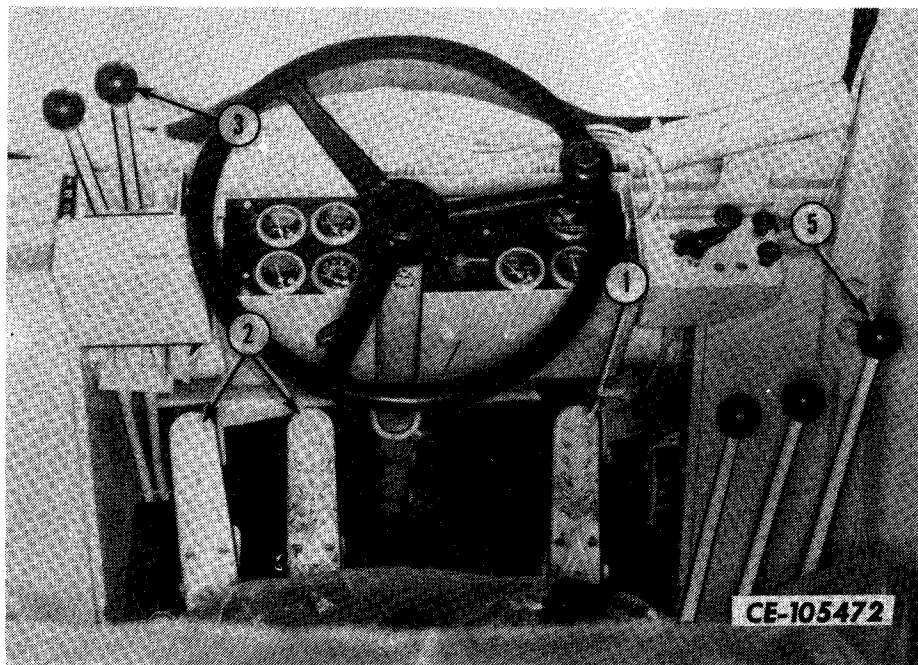
Illust. 17
Automatic Bucket Positioner

1. Indicator 2. Cam

After dumping the bucket, pull the bucket control lever back into "ROLL BACK" position and release the lever. When the bucket reaches its preset position, the automatic bucket positioner will kick the control lever into the "HOLD" position.

STOPPING THE MACHINE

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



Illust. 17
Stopping the Machine

- ① Fully release the accelerator pedal.
- ② Apply the brake pedal or the brake and transmission disconnect pedal until the machine comes to a complete stop.

CAUTION: DO NOT FAN THE BRAKES BY REPEATEDLY DEPRESSING AND RELEASING THE BRAKE PEDAL. THIS CAN REDUCE THE AIR PRESSURE TOO LOW FOR BRAKING.

- ③ Shift the transmission direction lever into "N" (neutral). NOTE: The transmission can remain in gear if the machine has been brought to a temporary stop.
- ④ Apply the parking brake. (Not illustrated.)
- ⑤ Lower the bucket to the ground.

Automatic Brake Apply System

The machine is equipped with an "automatic apply brake system" which has a separate, protected, braking system for each axle. Under normal operating conditions, both braking systems work together and are controlled by either one of the two treadle valves in the operator's compartment.

The heart of the "automatic apply brake system" is in the left treadle valve. This treadle valve has an additional emergency section. The emergency section has three air inlet ports, one from each air reservoir. The "front axle service air reservoir" and the "rear axle service air reservoir" are connected to the same internal passages in the emergency section. Each system is protected by a check valve at the inlet port. The air inlet from the wet air reservoir is on the left side of the treadle valve. This port is the control or sensing portion of the system.

As the term "automatic apply brake system" implies, the regular service brakes will be applied automatically under certain emergency conditions. These conditions are described below.

(Continued on next page)

STOPPING THE MACHINE

Automatic Brake Apply System - Continued

Working in conjunction with the "automatic apply brake system" is an audible warning device (buzzer). Whenever the air pressure in the wet air reservoir is 60-psi or less the buzzer will sound warning the operator of low air pressure in the wet reservoir (and/or low air pressure in one, or both, of the service air reservoirs). This buzzer warning will give the operator time to prepare for an involuntary stop.

◆ CAUTION: IF THE LOW AIR PRESSURE WARNING BUZZER SOUNDS, STOP THE MACHINE IMMEDIATELY, APPLY THE PARKING BRAKE, INVESTIGATE AND CORRECT THE CAUSE OF THE LOW AIR PRESSURE.

Air loss, in most cases, would be limited to one section of the air brake system. Should the rear axle air system fail, the front axle system will continue to meter air pressure. In the event the front axle air section fails, controlling forces pass through the treadle valve and will continue to provide metered air pressure. Either one of these systems will continue to operate as long as air

pressure is above 50-psi in the wet reservoir. Each service reservoir is protected by a check valve between it and the air supply (wet tank).

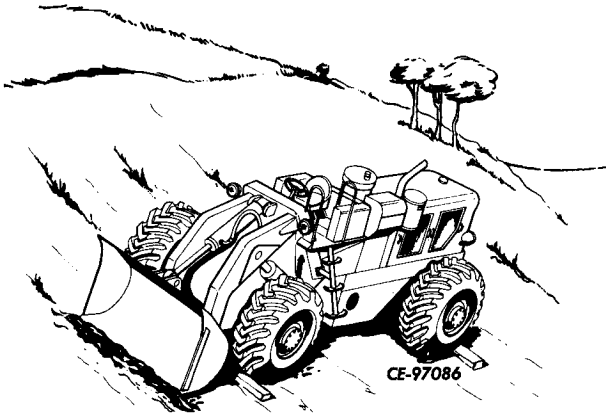
Should air pressure in the wet air reservoir drop to approximately 50-psi the brakes will be applied automatically by the action of the emergency protection unit to stop and hold the machine. The brakes will remain applied until pressure in the wet reservoir again reaches approximately 60-psi.

NOTE: Built into the automatic apply brake valve is an air bleed down device that will allow the air pressure in the applied or holding brake system to bleed down in 15 to 30 minutes. When this happens, the air pressure in the automatic apply brake valve will come back into balance and the holding service brake will release, automatically. This is important to remember especially if the machine came to a stop on a grade. Apply the parking brake and block the wheels, any time the "automatic apply brake system" is activated, to make certain the machine will not run away when the holding service brake releases automatically.

Loss of air pressure in both of the service air reservoirs will not activate the "automatic apply brake system," and the machine will not have any service brakes.

PARKING THE MACHINE

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



Illust. 18
Parking on a Slope

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

DO park machine in area free of grease or fuel puddles which causes tire deterioration.

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

DO park machine on level ground, if at all possible.

- a. To avoid unexpected movement.
- b. To obtain accurate coolant, lubricant and fuel level checks.

DO park on level ground when possible. If necessary to park on slope, park at right angle, then secure with blocks (front and rear), Illust. 18.

NOTE: PARKING ON A STEEP SLOPE IS NOT RECOMMENDED.

STOPPING THE ENGINE

Cool Engine Down

Idle the engine 3 to 5 minutes before shutting it down. This will allow lubricating oil and water to carry heat away from the combustion chamber, bearings, shafts, etc.

Idling

Long periods of idling are not good for an engine because operating temperatures drop so low the fuel may not burn completely. This will cause carbon to clog the injector and piston rings.

If the engine coolant temperature becomes too low, raw fuel will wash lubricating oil off of cylinder walls and dilute the crankcase oil so all moving parts will suffer from poor lubrication.

NOTE: If the engine is not being used, shut it down.

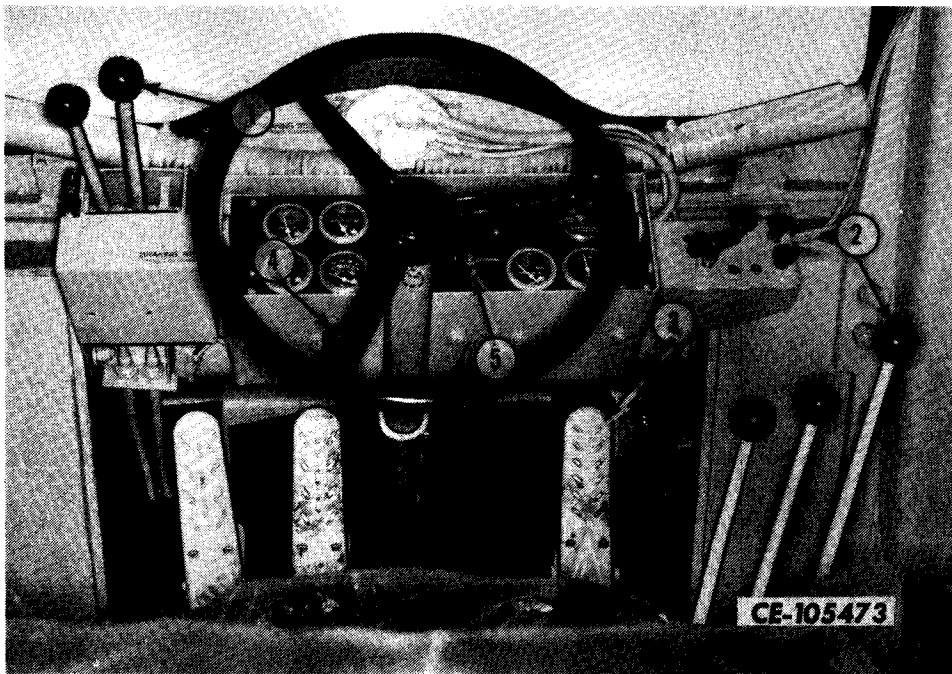
NOTE: Stop the engine immediately if any parts fail.

Practically all failures give some warning to operate before parts fail and ruin engine. Many engines are saved because alert operators heed warning signs (sudden drop in oil pressure, unusual noises, etc.) and immediately shut down engine. A delay of ten seconds after a bearing failure causes a knock and may result in a ruined crankshaft or allow a block to be ruined by a broken connecting rod.

Never try to make the next trip or another load after engine indicates that something is wrong. It does not pay.

Shut-down

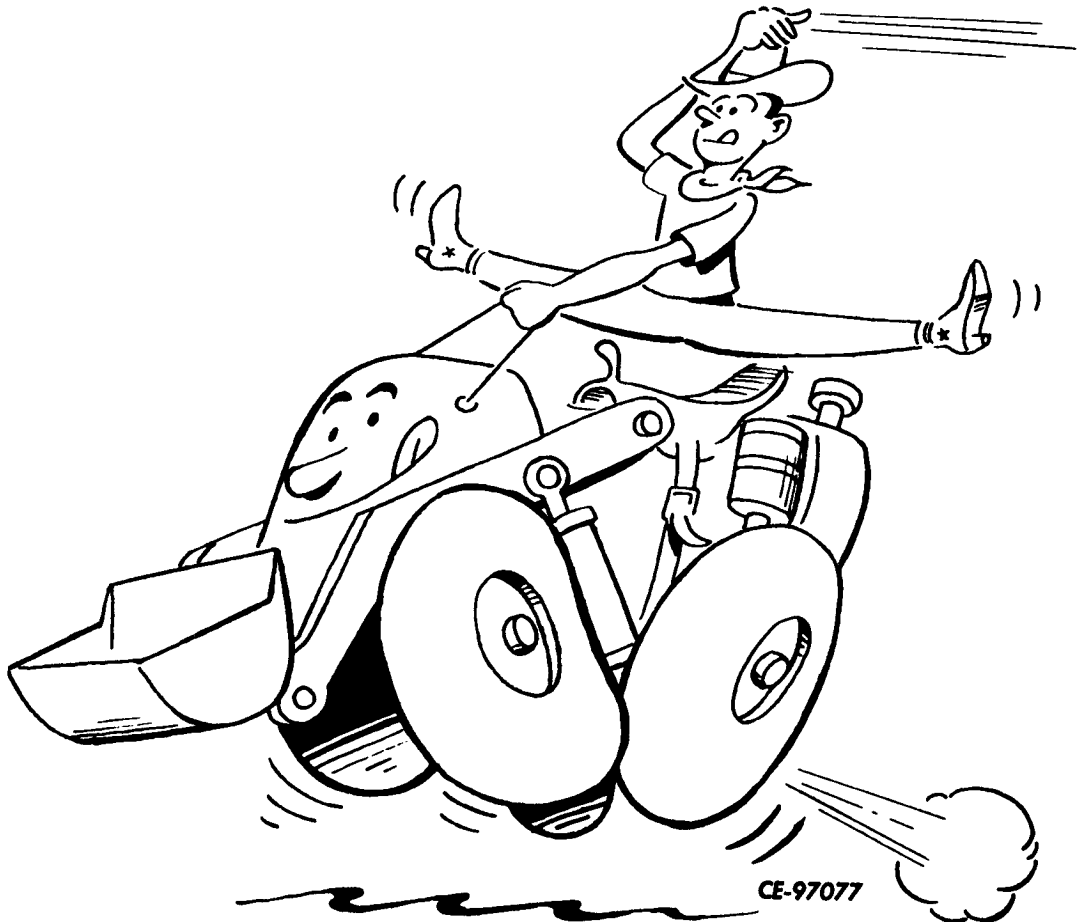
Step numbers correspond with the numbers shown in Illust. 19.



Illust. 19
Stopping the Engine

STOPPING THE ENGINE

- ① Shift the transmission the transmission direction lever to "N" (neutral).
- ② Lower the bucket to the ground.
- ③ Operate the engine at half throttle (no load) for three to five minutes to cool it down, then release the accelerator pedal.
- ④ Pull out and hold the engine shut-down handle until the engine stops. After the engine stops, push the handle in.
- ⑤ Turn the electrical system ignition switch "OFF."
- ⑥ Apply the parking brake before leaving the loader. (Not illustrated.)



GET TO KNOW YOUR MACHINE



OPERATING TECHNIQUES

SECTION CONTENTS

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IMPROPER USE OF THE MULTI-PURPOSE BUCKET	8

GENERAL

Terrain, footing conditions, types of materials being worked and maneuvering space determine the speed at which the loader can function.

When the bucket is at work, keep the engine speed near full throttle and operate in the first (1) or second (2) gear transmission range. Use gear range two (2) and three (3) for traveling purposes.

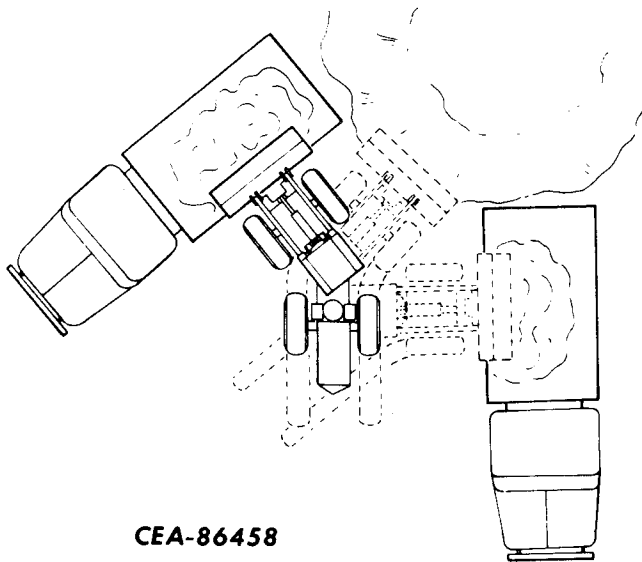
The techniques for using the loader as described below are not intended to be all inclusive. Each work situation will vary. Loader operation may be altered for each particular application for best efficiency.

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

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

LOADING, TRANSPORTING AND PILING

When loading from a bank or stockpile, use the V-method shown in Illust. 1, or the step loading 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. 1.

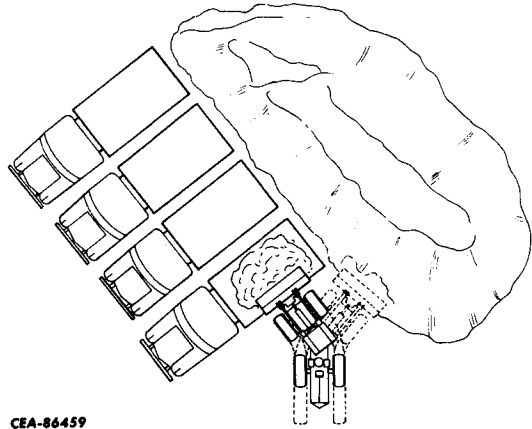


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Illust. 1
"V" Method Loading

Digging in hard material can be aided by "wiggling" the bucket edge immediately after penetration. Operate the bucket control lever alternately between its roll back and dump positions. This action will loosen the material and improve bucket loading. Coordinated operation of the two hydraulic control levers as the bucket enters the material will yield satisfactory bucket loads.

NOTE: The boom assembly need not be fully raised to load the bucket. Maximum bucket loading can be obtained before the bucket reaches operator eye level.

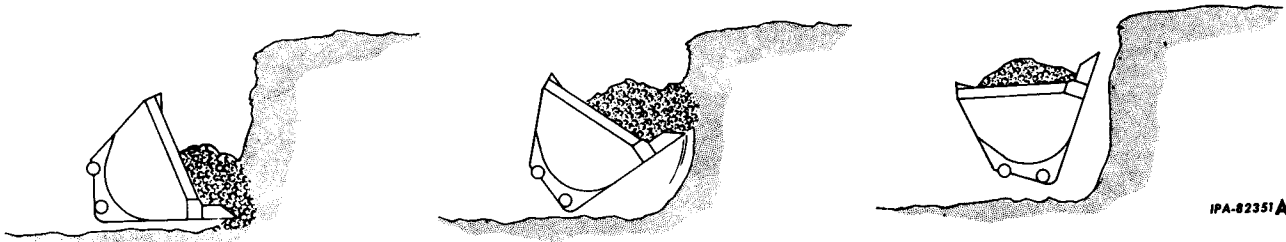


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Illust. 2
Step Loading Method

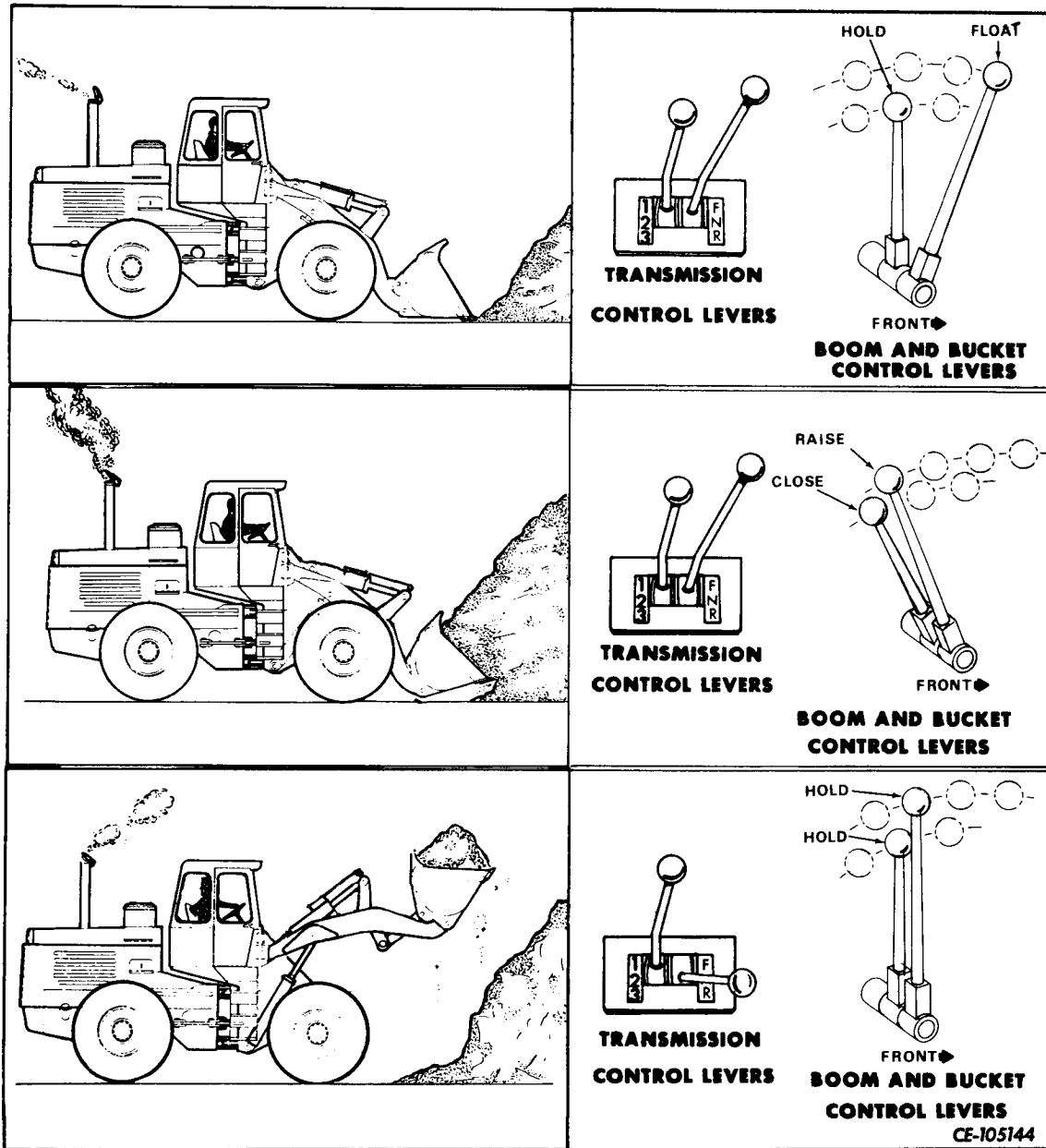
Approach the bank or stockpile with the engine at full governed speed. Keep the bucket flat, working into the material at or near ground level. As the bucket penetrates the material, raise the bucket slightly. When the material boils to the top of the spillboard, roll the bucket all the way back (Illust. 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. 1 and 2 just far enough to allow turning of the loader for the approach to the truck.



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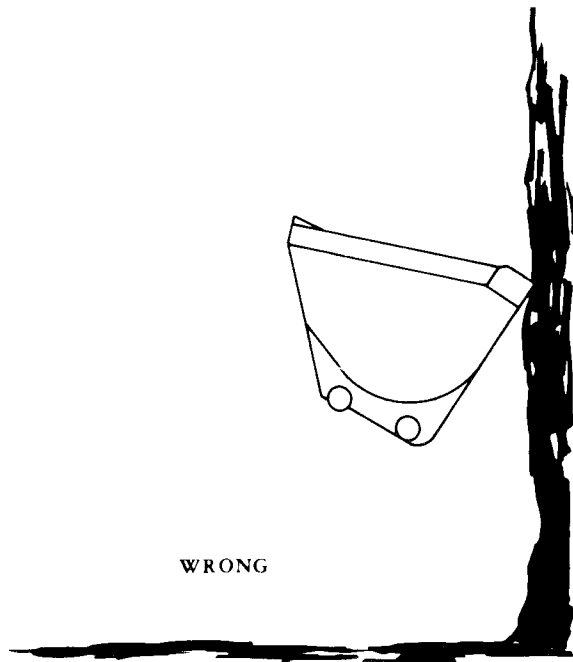
Illust. 3
Bank Loading



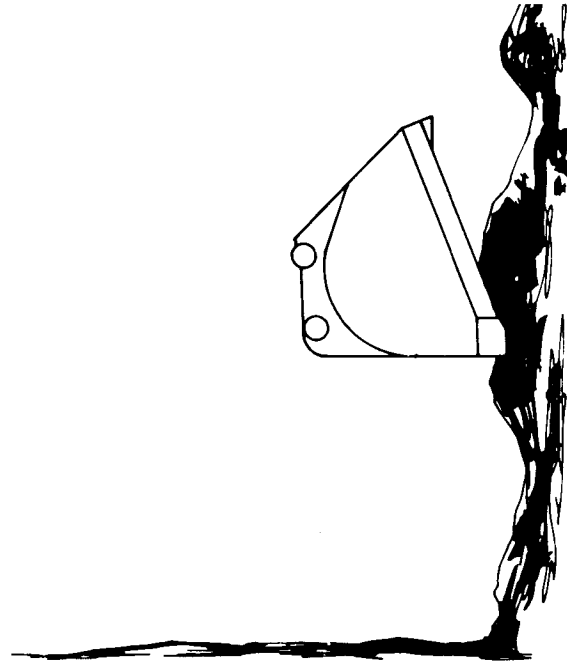
Illust. 4
Loading Sequence

OPERATING TECHNIQUES

LOADING, TRANSPORTING AND PILING



WRONG



RIGHT

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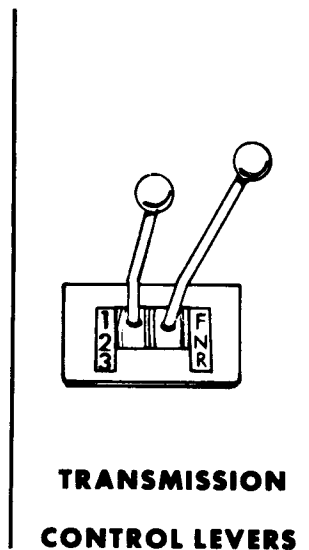
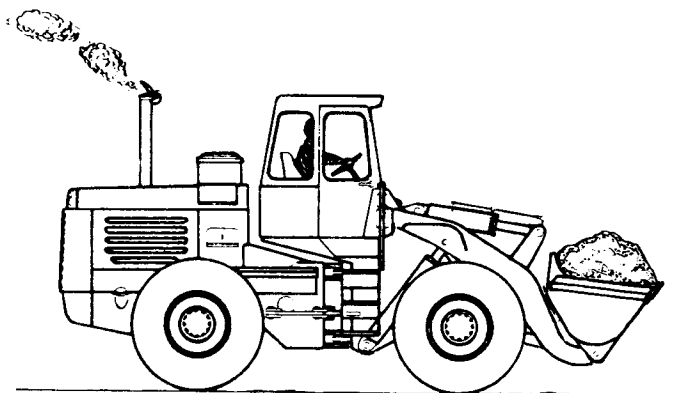
Illust. 5

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 bucket cylinders and linkage.

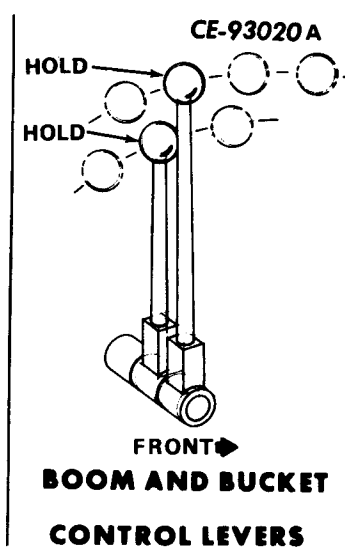
Transport loads close to the ground (Illust. 6). If it is necessary to carry the bucket raised in transit, the operator should use increased caution. Perform all steering and shifting as smoothly as possible.

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.

Use the lower transmission gear range for bucket loading and the transportation of loads. The higher gear range may be used for making return trips to the loading sites.



TRANSMISSION
CONTROL LEVERS



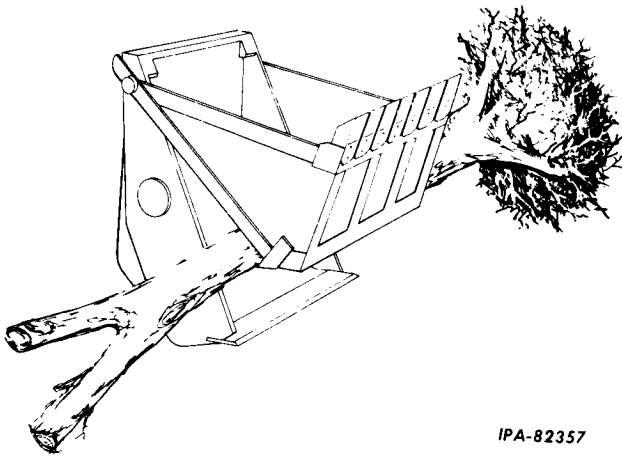
CE-93020A
BOOM AND BUCKET
CONTROL LEVERS

Illust. 6
Transporting Filled Bucket

LOADING, TRANSPORTING AND PILING

The speed used to transport loads should be relative to the bucket carry position and the type route used. Safety should be considered at all times. Travel slow anytime a load is carried over rough and/or sloping footing. A loaded bucket should never be transported with the boom fully raised.

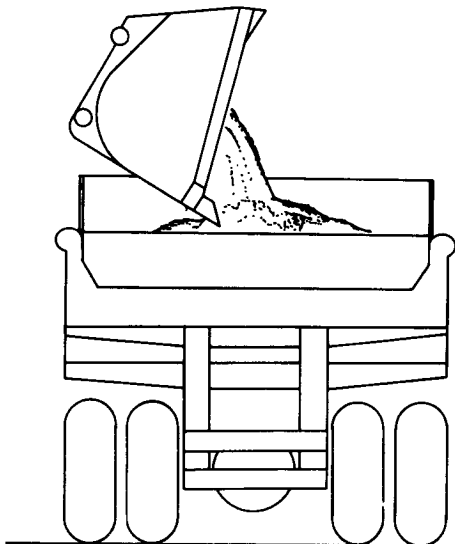
When transporting trees or other large objects always balance the load as shown in Illust. 7. Balance the load when picking it up to prevent twisting the lift frame and linkage.



IPA-82357

Illust. 7

Upon reaching the truck, raise the bucket high enough to clear the truck body. Reduce forward speed and dump load slowly (Illust. 8). This will reduce the shock of weight transfer to the rear axle when the bucket is emptied. Shake bucket only to loosen dirt from within.



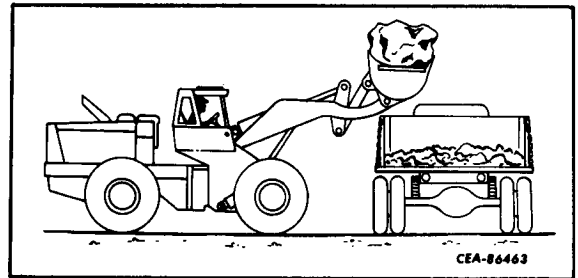
Illust. 8
Dumping Into Truck

After the bucket empties, move the bucket control lever back until the bucket clears the truck. Back the loader away from the truck, lower the boom and return to the loading site.

NOTE: If the machine is equipped with an automatic bucket positioner, pull the bucket lever all the way back and release it. The machine can be backed away from the truck as soon as the bucket has rolled back far enough to clear the side of the truck. The bucket will stop when it reaches the pre-set loading position and the bucket lever will kick into the hold position automatically.

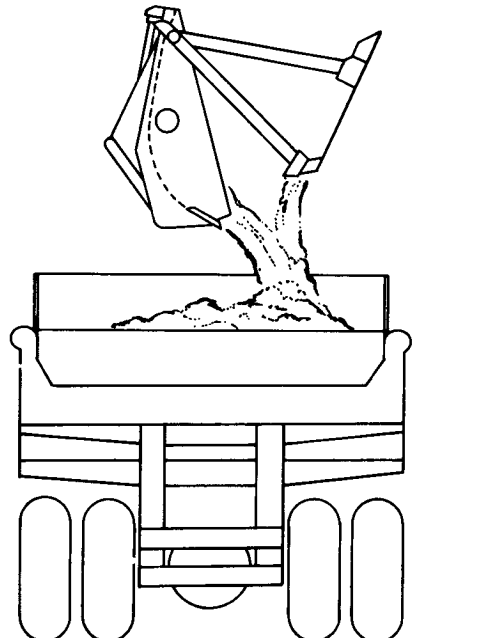
Lower loaded or unloaded bucket to ground when waiting for any length of time.

Put enough loose rock or dirt into the truck first to act as cushioning material before proceeding to load larger rocks (Illust. 9). Place large rocks into center of truck from the lowest possible height.



CEA-86463

Illust. 9
Dumping Large Rock



IPA-82352

DIGGING, CLEARING AND LEVELING

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 rather than 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.

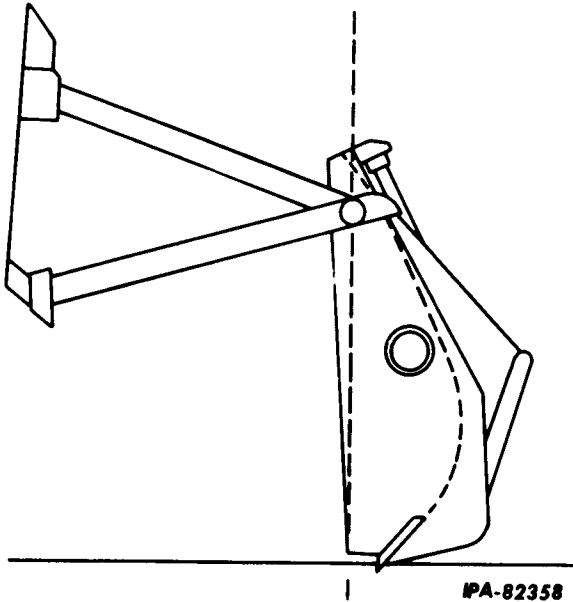
Reduced loader effort is required when material can be moved downhill.

With the clam fully open, the MULTI-PURPOSE bucket can be used as a bulldozer. Position the bucket as shown in Illust. 10 for digging.

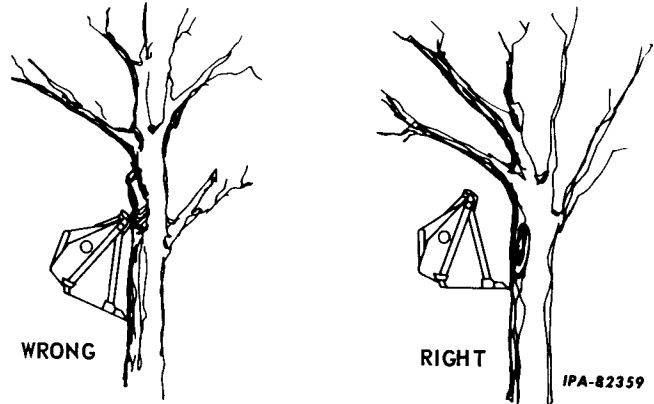
Snow can act as an insulating blanket and reduce or eliminate the need for ripping. Therefore, remove snow only from the area to be worked each day; leave the rest to insulate the ground.

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.

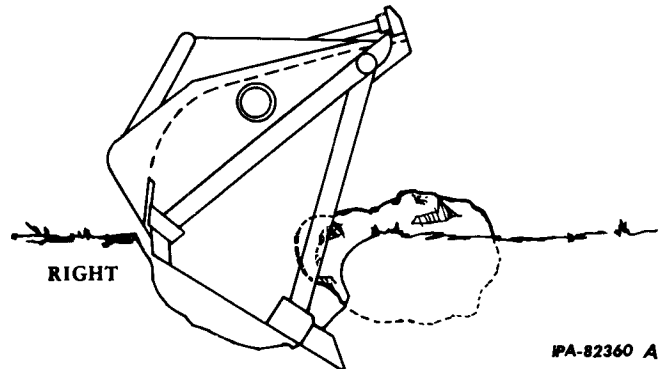
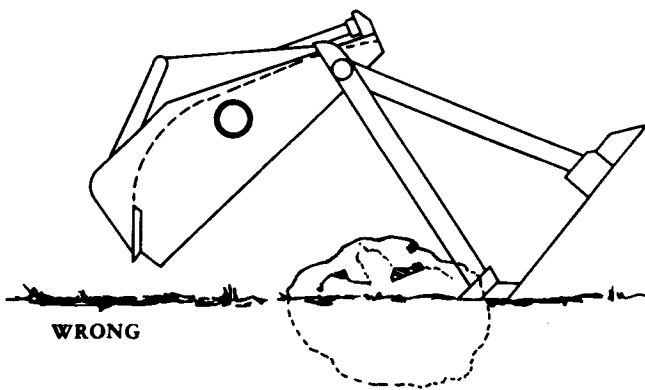
When clearing trees, raise the bucket high to gain leverage and make contact gently to reduce possible harm to the operator and loader. The bucket must be positioned with the bottom parallel with the ground. DO NOT push with the top of the bucket (Illust. 11).



Illust. 10



Illust. 11



Illust. 12

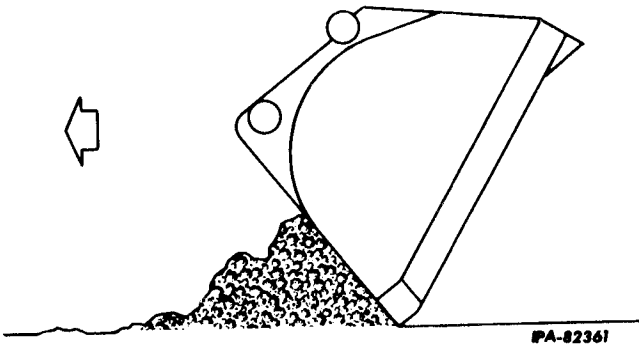
DIGGING, CLEARING AND LEVELING

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.

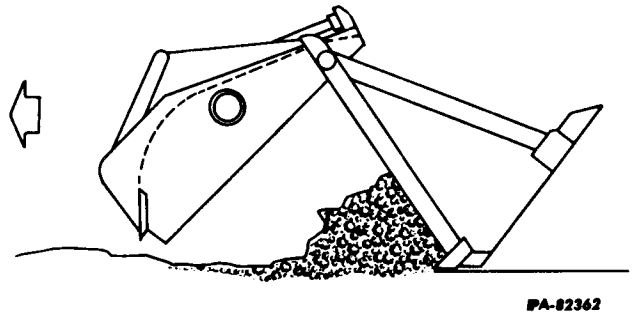
Never use the clamshell to remove buried or anchored objects (Illust. 12).

When loosening large or solid rocks, greater force and penetration can be obtained by digging under the rock with the bucket (Illust. 11). Lifting the rock with the bucket while pushing will increase traction and reduce wheel spinning.

When finishing a non-solid materials, position the bucket as shown in Illust. 13 or 14 and backdrag the loose material. This method is not recommended where abrasive material is common.

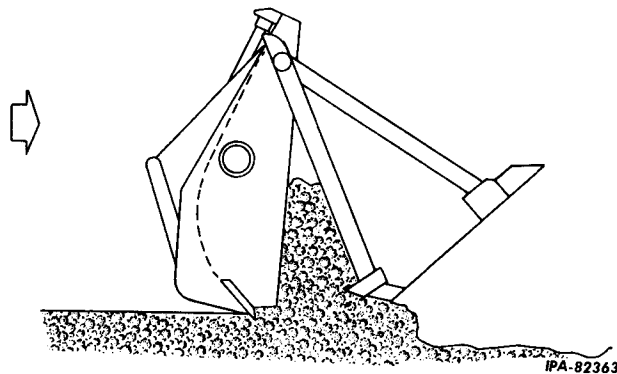


Illust. 13



Illust. 14

By placing the MULTI-PURPOSE 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. 15).

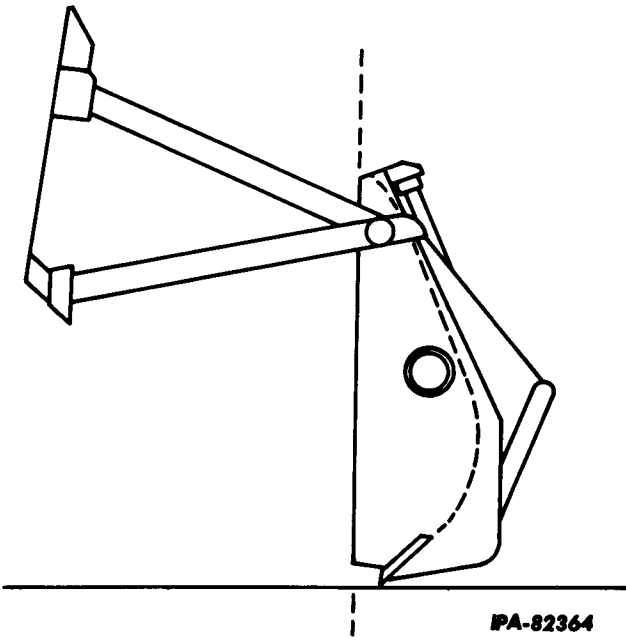


Illust. 15

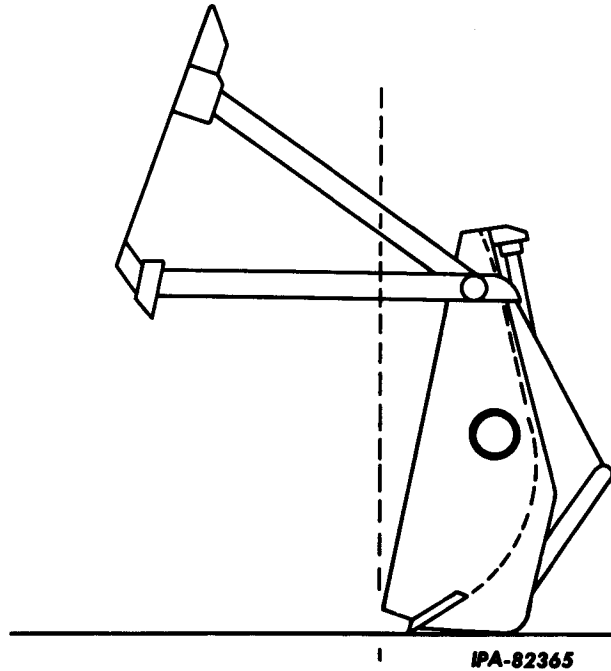
DIGGING, CLEARING AND LEVELING

With the clam fully open, the MULTI-PURPOSE bucket can be used to bulldozer material. Position the bucket as shown in Illust. 16 for level

grading. Position the bucket as shown in Illust. 17 for spreading or to obtain a lesser cut.



Illust. 16



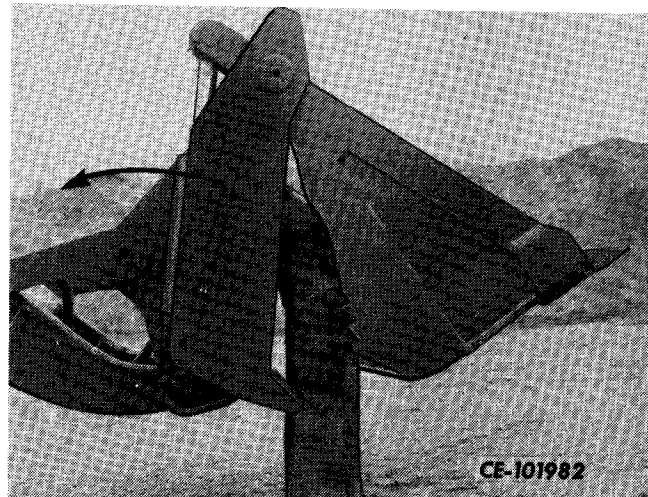
Illust. 17

IMPROPER USE OF THE MULTI-PURPOSE BUCKET

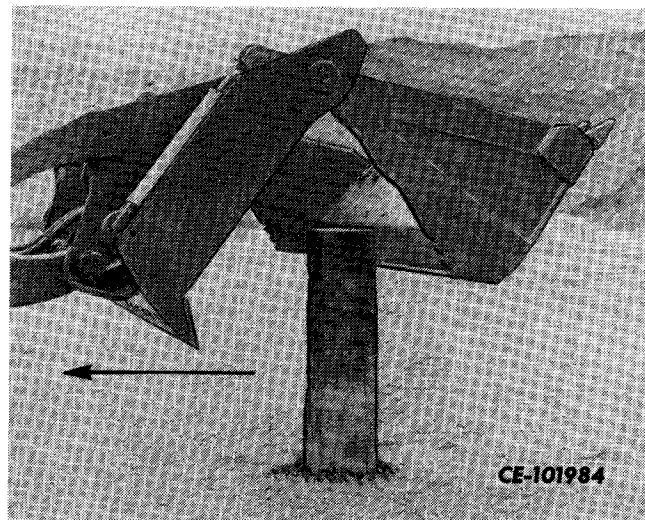
Much unnecessary damage can be done to multi-purpose buckets by subjecting them to uses for which they were not designed. The following illustrates some of the ways a Multi-Purpose Bucket should NOT be used.

DO NOT try to break off buried or anchored objects with the clam while back-dragging -- it may bend the clam (Illust. 19). Back-dragging with the clam should be limited to loose material free of stumps and boulders.

DO NOT use rollback force to pull stumps or buried objects from the ground -- it may bend the clam (Illust. 18).



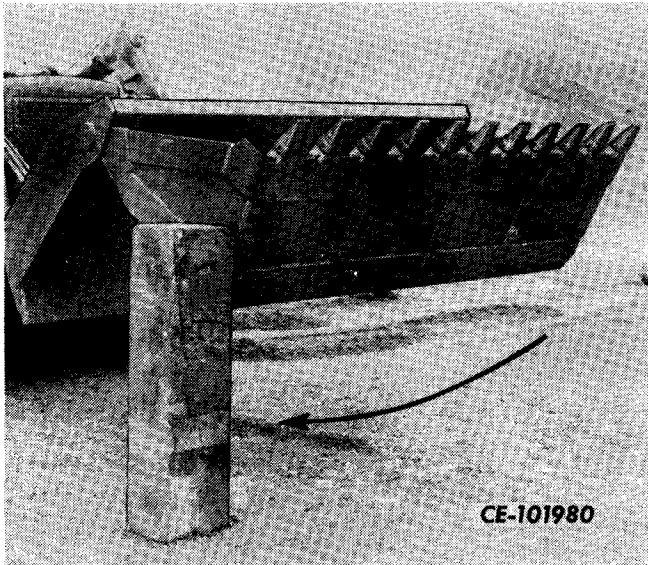
Illust. 18



Illust. 19

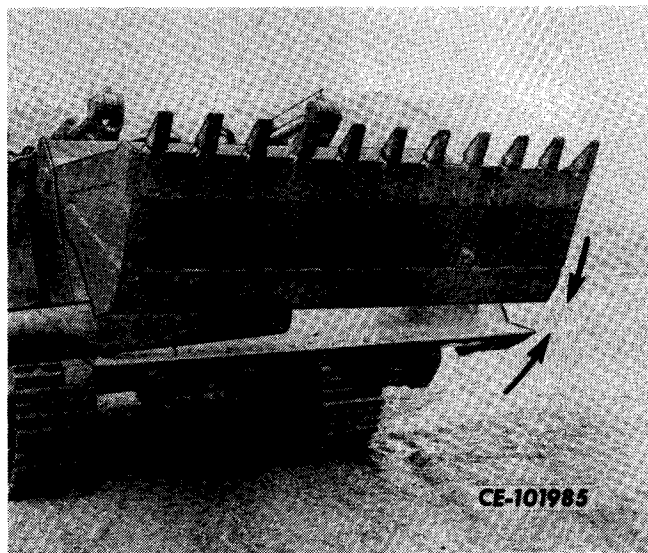
IMPROPER USE OF THE MULTI-PURPOSE BUCKET

DO NOT sideload the clam against anchored objects - especially when open (Illust. 20). This may bend the sides of the clam.



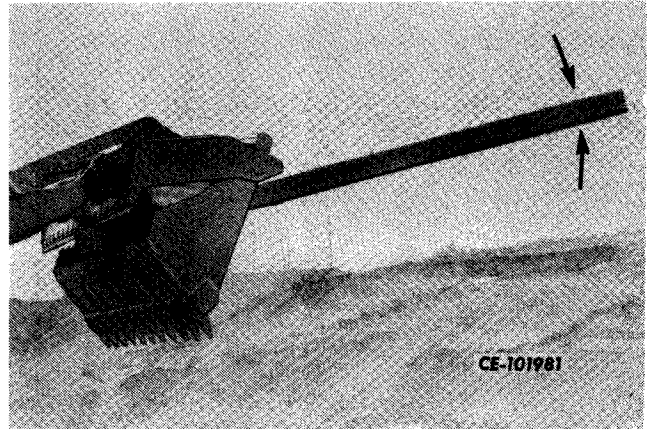
Illust. 20

DO NOT clamp objects on only one side of the clam. It causes uneven stresses and may twist the clam out of line (Illust. 21).



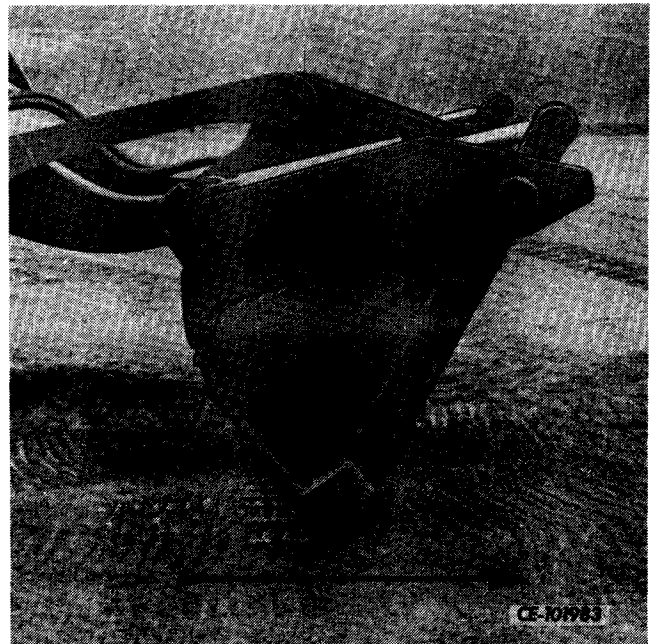
Illust. 21

DO NOT clamp objects and use them as battering rams (Illust. 22). This may bend the clam and the blade.



Illust. 22

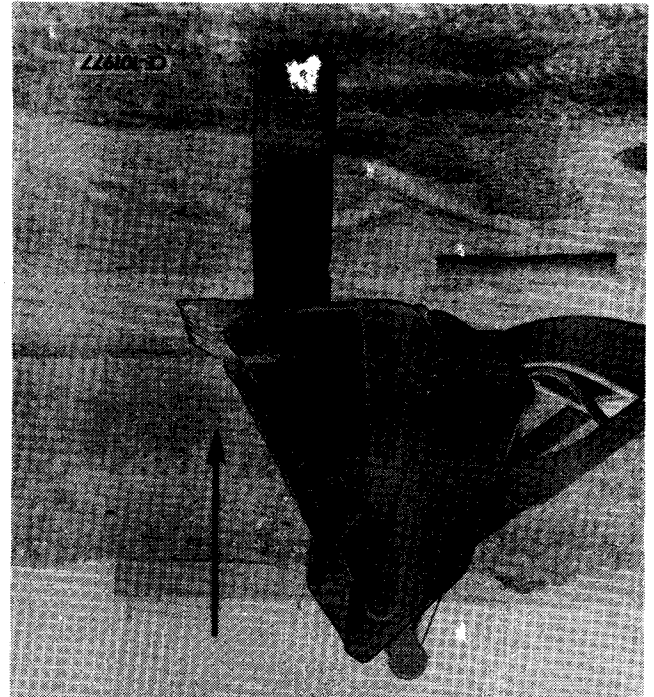
DO NOT grade in the forward direction with the bucket in dump position (Illust. 23). This could cause damage to tilt cylinder and linkage.



Illust. 23

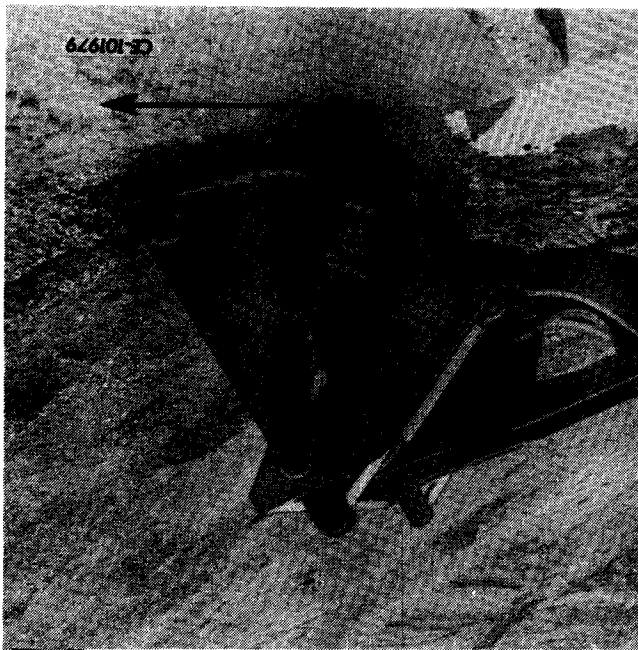
OPERATING TECHNIQUES

IMPROPER USE OF THE MULTI-PURPOSE BUCKET



DO NOT use the bottom of the clam as a pile driver (Illustr. 24). It will bend the clam.

Illustr. 24



DO NOT charge a bank with an object caught between the clam and blade (Illustr. 25). This can twist the clam out of alignment.

Illustr. 25



DO NOT try to pick up objects too large to handle (Illustr. 26). It may damage bucket and linkage.

Illustr. 26


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MULTI-PURPOSE BUCKET LUBRICATION POINTS	12


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 cleaner service indicator Check indicator. Refer to "AIR CLEANING SYSTEM" in Section 8.
- Air tanks Drain water. Refer to "AIR PRESSURE SYSTEM" in Section 8.
- Scheduled lubrication Refer to "LUBRICATION GUIDE" in this section.

 - Every 50 Hours of Operation

- Belts Check tension and replace when necessary. Refer to "BELTS" in Section 8.
- Fuel tanks Drain water. Refer to "FUEL SYSTEM" in Section 8.
- Tires Check inflation pressure. Refer to "TIRES" in Section 8.
- Scheduled lubrication Refer to "LUBRICATION GUIDE" in this section.

SCHEDULED MAINTENANCE GUIDE



- Every 100 Hours of Operation

Air cleaner hoods	Clean, Refer to "AIR CLEANING SYSTEM" in Section 8.
Hydraulic reservoir filter elements	Initial element change. Refer to "HYDRAULIC SYSTEM" in Section 8.
Hydraulic reservoir relief valve	Remove and clean. Refer to "HYDRAULIC SYSTEM" in Section 8.
Service brake power cluster breathers	Remove and clean. Refer to "BRAKE SYSTEM" in Section 8.
Transmission breather	Remove and clean. Refer to "TRANSMISSION" in Section 8.
Transmission system filter	Initial element change. Refer to "TRANSMISSION" in Section 8.
Scheduled lubrication	Refer to "LUBRICATION GUIDE" in this section.



- Every 200 Hours of Operation


Air system	Check for and correct leaks. Refer to "AIR PRESSURE SYSTEM" in Section 8.
Crankcase breather	Clean. Refer to "AIR CLEANING SYSTEM" in Section 8.
Service brakes	Check for wear and adjust or replace when necessary. Refer to "BRAKE SYSTEM" in Section 8.
Stop light switch	Check. Refer to "ELECTRICAL SYSTEM" in Section 8.
Scheduled lubrication	Refer to "LUBRICATION GUIDE" in this section.



- Every 500 Hours of Operation

Engine valves	Check clearance. Refer to "ENGINE VALVE CLEARANCE ADJUSTMENT" in Section 8.
Fuel filter elements	Change. Refer to "FUEL SYSTEM" in Section 8.
Transmission and torque converter filter element	Change. Refer to "TRANSMISSION" in Section 8.
Scheduled lubrication	Refer to "LUBRICATION GUIDE" in this section.

SCHEDULED MAINTENANCE GUIDE

 - Every 1000 Hours of Operation

- Cooling system Clean. Refer to "COOLING SYSTEM" in Section 8.
- Parking brake Adjust. Refer to "BRAKE SYSTEM" in Section 8.
- Scheduled lubrication Refer to "LUBRICATION GUIDE" in this section.

PERIODIC

- Air cleaner elements Clean or change when the air cleaner service indicator shows completely red. Refer to "AIR CLEANING SYSTEM" in Section 8.
- Battery terminals Clean terminals with steel wool or brush.
- Main frame center hinges Check and when necessary to prolong the life of the center hinge bearings. See your local International Harvester Construction Equipment distributor or dealer.
- Oil pump screen Clean this screen whenever the oil pan is removed.
- Parking brake linings Check for wear and replace when necessary. Refer to "BRAKE SYSTEM" in Section 8.
- Wiring Check for worn, cracked or frayed insulation, broken wires, and loose or corroded connections.

LUBRICATION

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

The life and performance of a machine depends on the care that it is given, and proper lubrication is an important maintenance service for your machine.

Thorough lubrication service performed at definite intervals will aid greatly in prolonging the life of the machine and in reducing operating expenses.

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 GUIDE" 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

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 machine. For detailed information regarding lubricants, refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section.

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



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" in this section.

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.

for information given in the latest service bulletin on crankcase lubricating oils or grease lubricants

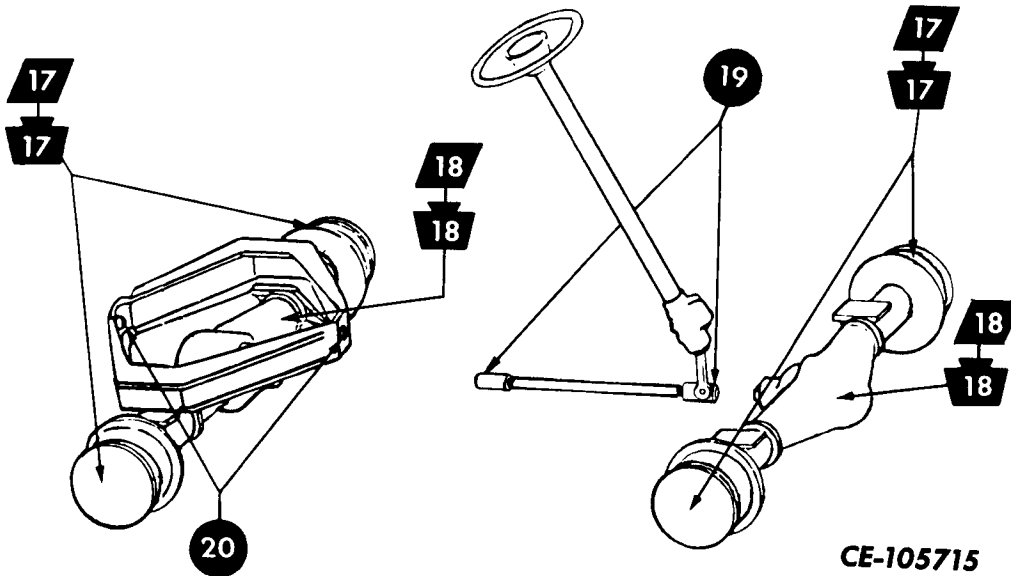
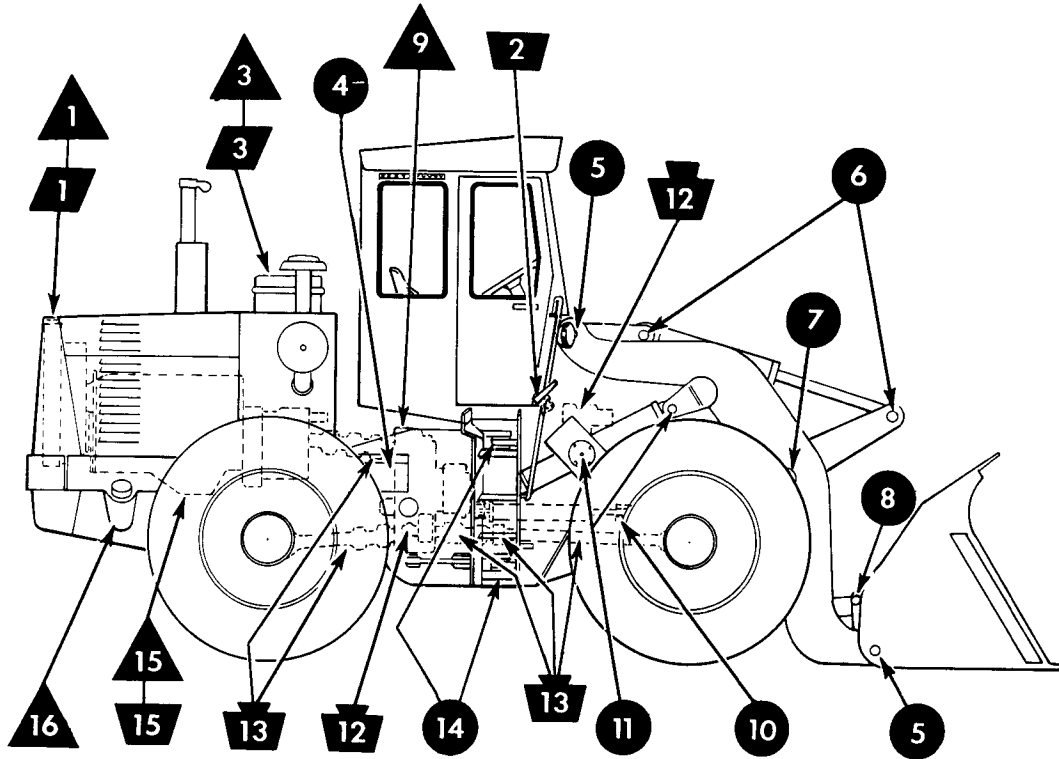
The lubricants specified for this machine are shown in the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in this section.

LUBRICANT SPECIFICATIONS AND CAPACITIES

LUBRICANT SPECIFICATIONS AND CAPACITIES CHART (U.S. MEASURE)				
Lubricant Key: EO - Engine Oil MPL - Multi-purpose Type Gear Lubricant BF - Brake Fluid MPG - Multi-purpose Grease				
LUBRICATION POINT	CAPACITY	ANTICIPATED AIR TEMPERATURE		
		+120° F +20° F	+70° F -10° F	+10° F -30° F
Engine Crankcase w/ filter change	17 qts.	I.H. No. 1 Engine Oil or API CD/CC or CD oil or MIL-L-2104C oil or MIL-L-45199B (Series 3)		
		Grade-30	Grade-10	Grade-10 (S)
Hydraulic System	18 gals.	EO - MIL-L-45199B or MIL-L-2104B API CD/CC or CD		
		20W ⊕	10W ⊕	10W ⊕ (S)
Differential (2)	16 pts.	MIL - I.H. 135H EP or MIL-L-2105B or API GL-5		
Wheel Planetaries (4)	2 pts.	Grade-140	Grade-140 (#)	Grade-90
Transmission System	30 qts.	Dexron® ATF		
Parking Brake Actuator	Fill As Instructed	BF - I.H. SAE-J1703C Super Heavy Duty Brake Fluid		
Service Brake Power Clusters				
All Lubrication Fittings	Fill as Instructed	MPG - I.H. 251H EP * or equivalent No. 2 multi-purpose lithium grease or MIL-G-10924B		

- ⊛ For the specifications, consult your authorized International Construction Equipment distributor or dealer.
- # Below +32° F use Grade-90.
- ⊕ Engine oils meeting or exceeding the "wear test sequence" for evaluating oils for API service CC or CD.
- Ⓢ Below 0° F use SAE-10W diluted 10% with kerosine.

LUBRICATION CHART








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LUBRICATION GUIDE

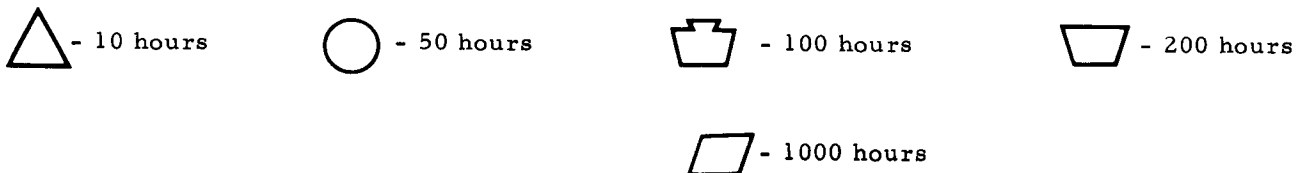
Points of service are individually explained under SERVICE POINTS. They are identified by item numbers corresponding with those listed in the chart below and the tractor diagram.

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

SERVICE INTERVAL	ITEM NO.	POINT OF SERVICE	LUBRICANT	REMARK
Every 10 Hours 	1	Radiator Coolant	Ⓝ	Check
	3	Hydraulic Reservoir Oil Level	EO	Check
	9	Transmission Oil Level	Dexron	Check
	14	Upper and Lower Articulation Pivots	MPG	Grease
	15	Engine Oil Level	EO	Check
	16	Fuel Level	⊛	Fill
Every 50 Hours 	4	Batteries	Ⓟ	Check
	5	Boom Pivots	MPG	Grease
	6	Bucket Cylinders	MPG	Grease
	7	Bellcrank Pivots	MPG	Grease
	8	Bucket Link Pivots	MPG	Grease
	10	Steering Cylinders	MPG	Grease
	11	Boom Cylinders	MPG	Grease
	19	Drag Link	MPG	Grease
20	Rear Axle Cradle Pivots	MPG	Grease	
Every 100 Hours 	12	Power Clusters	BF	Check
	13	Drive Shafts	MPG	Grease
	17	Axle Hub Final Drives	MPL	Check
	18	Axle Differentials	MPL	Check
Every 200 Hours 	2	Brake Treadles	EO	Lubricate
	15	Engine Oil and Filters	EO	Change
Every 1000 Hours 	1	Radiator Coolant	Ⓝ	Change
	3	Hydraulic System Oil and Filters	EO	Change
	9	Transmission System Oil	Dexron	Change
	17	Axle Hub Final Drives	MPL	Change
	18	Axle Differentials	MPL	Change

- ⊛ Refer to "FUEL SYSTEM" in Section 8 for the type of fuel specified.
- Ⓝ Refer to "COOLING SYSTEM" in Section 8 for coolant specifications.
- Ⓟ Refer to "ELECTRICAL SYSTEM" in Section 8 for information.

The symbols around the item numbers indicate the intervals between 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.

LUBRICATION POINTS

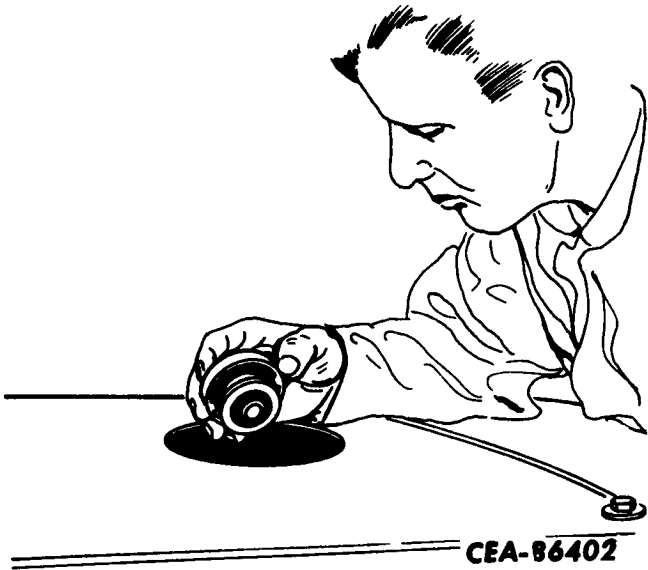
Item 1 - Radiator Coolant

Checking Coolant Level (Illust. 1)

Check the radiator fluid level when the engine water temperature gauge is in the "RUN" segment.

CAUTION: Remove the radiator cap slowly to gradually release any pressure build up.

The fluid should be level with the filler neck. If the fluid level is low, refer to "Filling the System" under "COOLING SYSTEM" in Section 8.



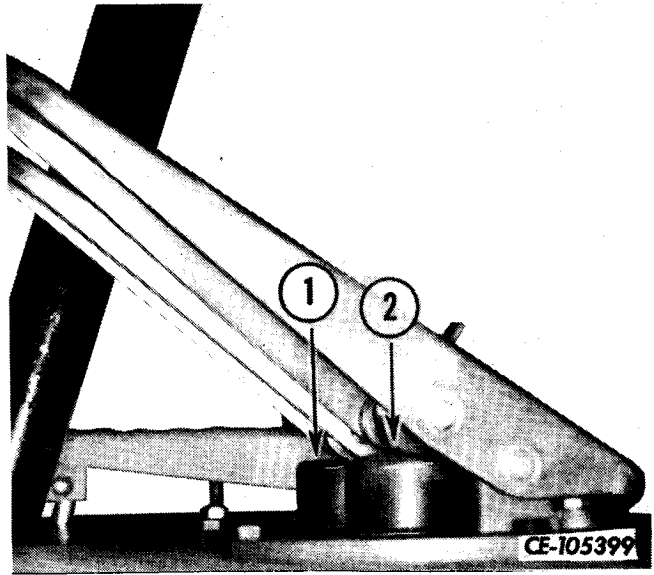
Illust. 1
Visual Coolant Level Check

Changing Coolant

Drain coolant, clean system and refill with fresh coolant. Refer to "COOLING SYSTEM" in Section 8.

Item 2 - Brake Treadles (Illust. 2)

Lift the boot (1 and 2) under the treadles away from the mounting plate and lubricate the valve plunger with a few drops of SAE 20 MS oil (MIL-L-2104B). Wipe off excess oil and install the rubber on the mounting plate. Avoid using too much oil because contact with the rubber spring in the top of the valve could cause the spring to deteriorate. Lubricate both brake treadles.



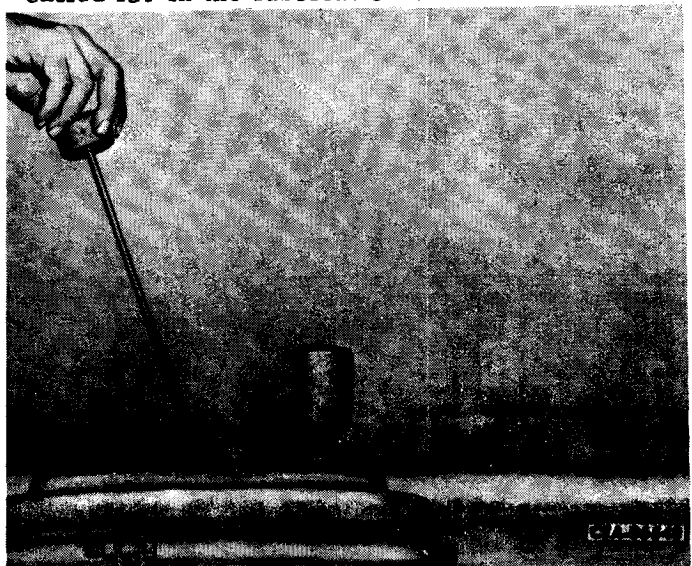
Illust. 2
Brake Treadle Boots

Item 3 - Hydraulic Reservoir Oil Level

Checking Oil Level (Illust. 3)

Check oil level in tractor hydraulic reservoir (Illust. 3). Make this level check with the engine off and the loading mechanism lowered so the bucket is resting on the ground. Loosen reservoir filler cap slowly to relieve pressure before removing cap. The reservoir oil level should be kept between the "H" and "L" marks on the gauge.

Add oil if required. Refer to "HYDRAULIC SYSTEM" in Section 8. Use the type of oil called for in the lubrication chart.



Illust. 3
Checking Oil Level

LUBRICATION POINTS

Changing the Oil

Change the oil. Refer to "HYDRAULIC SYSTEM" in Section 8.

Item 4 - Batteries

Check the fluid level of the batteries. Refer to "ELECTRICAL SYSTEM" in Section 8.

Item 5 - Boom Pivots

(Two fittings on each boom arm.) Apply the lubricator to the fittings on each end of the boom arm until clean lubricant appears.

Item 6 - Bucket Cylinders

(Two fittings on each cylinder.) Apply the lubricator to the fitting on each end of the cylinder until clean lubricant appears.

Item 7 - Bellcrank Pivots

(Two fittings.) Apply the lubricator to the fittings located at the inside of each bellcrank arm near the top of the cross shaft until clean lubricant appears.

Item 8 - Bucket Link Pivots

(Two fittings on each link.) Apply the lubricator to the fittings located at each end of the bucket links until clean lubricant appears.

Item 9 - Transmission Oil Level

Check the oil level. Refer to "TRANSMISSION" in Section 8.

Item 10 - Steering Cylinders

(Two fittings on each cylinder.) Apply the lubricator to the fittings at each end of the cylinder until clean lubricant appears.

Item 11 - Boom Cylinders

(Three fittings for each cylinder.) One fitting is located where the cylinder connects to the boom. There are two fittings at the trunnion; one on the outside and one inside of the frame. Apply the lubricator to each fitting until clean lubricant appears.

Item 12 - Power Clusters

Check the brake fluid level. Refer to "BRAKES" in Section 8.

Item 13 - Drive Shafts

Converter to Transmission.

(Three fittings.) Apply the lubricator to each spider fitting and to the slip tube fitting until clean lubricant appears.

Transmission to Rear Axle

(Three fittings.) Apply the lubricator to each spider fitting and to the slip tube fitting until clean lubricant appears.

Transmission To Hanger Bearing

(Two fittings.) Apply the lubricator to each spider fitting until clean lubricant appears.

Hanger Bearing

(One fitting.) Apply the lubricator to the hanger bearing fitting until clean lubricant appears.

Hanger Bearing To Front Axle

(Two fitting.) Apply the lubricator to the slip tube fitting and the spider fitting until clean lubricant appears.

Item 14 - Upper and Lower Articulation Pivots

(Two fittings.) Apply the lubricator to the fitting of each pivot until clean lubricant appears.

Item 15 - Engine Oil and Filters**Checking Oil Level**

Refer to "ENGINE OIL AND FILTERS" in Section 8 for checking procedure.

Changing Oil and Filters

Refer to "ENGINE OIL AND FILTERS" in Section 8 for oil and filter changing procedure.

Item 16 - Fuel Level

Fill the fuel tank at the end of each work shift to keep moisture condensation to a minimum. Refer to "FUEL SYSTEM" in Section 8 for the type of fuel specified.

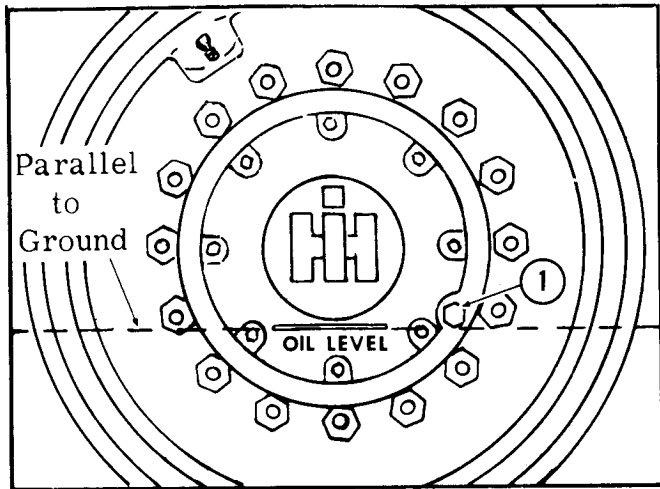
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Item 17 - Axle Hub Final Drives

Checking the Lubricant Level

NOTE: The following procedure must be performed at each wheel final drive with the machine parked on level ground.

1. Position the machine so the wheel oil level mark is parallel with the ground (Illust. 4).



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Illust. 4
Wheel Hub Oil Level Check

2. Clean around the fill-check plug (1, Illust. 4) before removing to prevent contamination from getting in.
3. Remove the fill-check plug and check the oil level. The correct level is even with the fill-check hole. If the level is low, add lubricant to the correct level. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section.
4. Install the fill-check plug (1, Illust. 4).

Changing the Oil

NOTE: Each of the drive wheels has its own lubricant reservoir and must be drained and refilled separately with fresh lubricant. The following procedure is the same for each wheel planetary.

1. While the lubricant in the axle is at operating temperature, position the unit on level ground with the final drive drain plug (1, Illust. 4) at the lowest point.
2. Remove the final drive drain plug and completely drain into a container of sufficient size.

3. Reposition the machine so the oil level mark is parallel with the ground (Illust. 4).

4. Fill the final drive with fresh lubricant up to the hole. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of lubricant specified.

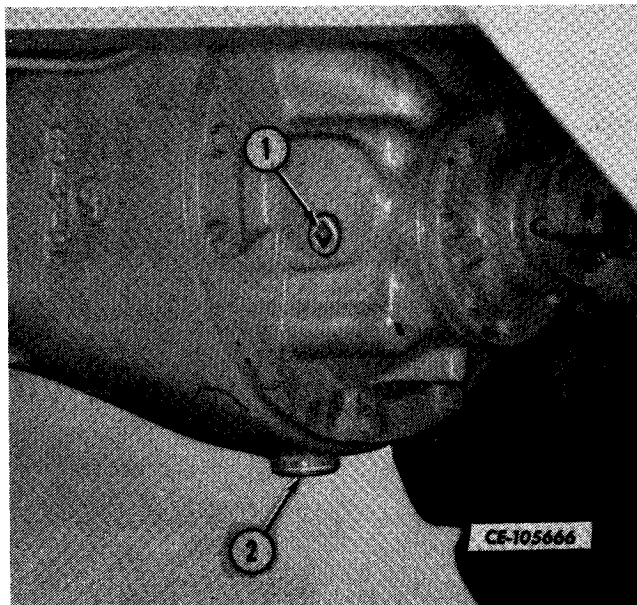
5. Install the plug (1, Illust. 4).

Item 18 - Axle Differentials

Checking the Lubricant Level

NOTE: The following procedure is the same for both axle differentials.

1. Park the machine on level ground. Lower the bucket, apply the parking brake and shut the engine down.
2. Clean around the differential fill-check plug to prevent contaminants from getting into the axle.
3. Remove the fill-check plug (1, Illust. 5) and check the level. The correct level is the bottom of the fill-check hole. If the level is low, add lubricant until it reaches the correct level. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of lubricant specified.
4. Install the fill-check plug (1, Illust. 5).



Illust. 5
Differential Fill-Check Plug and Drain Plug

1. Fill-check plug
2. Drain plug

LUBRICATION POINTS

Changing the Oil

NOTE: The following procedure is the same for both differential assemblies.

1. While the lubricant in the axle is at operating temperature, park the machine on level ground.
2. Lower the bucket to the ground, apply the parking brake and shut the engine down.
3. Remove the differential drain plug (2, Illust. 5) and completely drain the differential into a container of sufficient size.
4. Remove the differential fill-check plug (1, Illust. 5).
5. Install the drain plug back (2, Illust. 5) in place after the differential is completely drained.

6. Fill the differential with fresh lubricant up to the fill-check hole. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of lubricant specified.

7. Install the fill-check plug (1, Illust. 5).

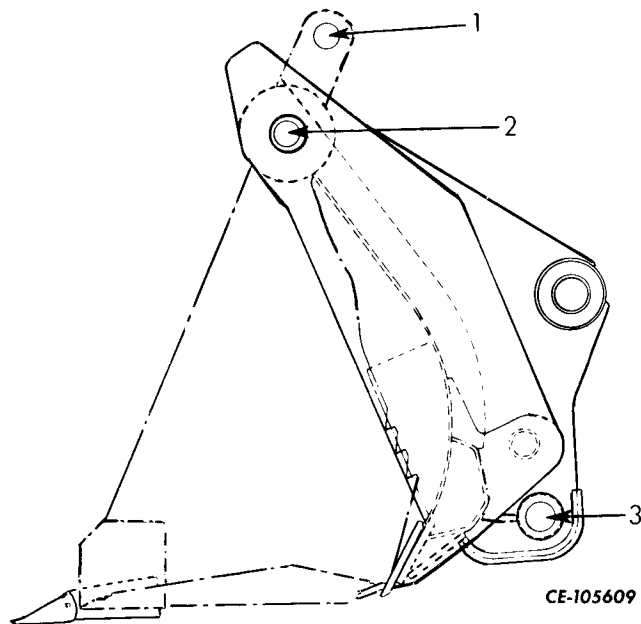
Item 19 - Drag Link

(Two fittings.) Apply the lubricator to the fitting at each ball socket end until clean lubricant appears.

Item 20 - Rear Axle Cradle Pivots

(Two fittings.) Apply the lubricator to the fittings, located below the front and rear axle cradle pivots, until clean lubricant appears.

MULTI-PURPOSE BUCKET LUBRICATION CHART
(If Equipped)



MULTI-PURPOSE BUCKET LUBRICATION GUIDE (If equipped)

Points of lubrication are individually explained under "MULTI-PURPOSE BUCKET 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	LUBRICANT	REMARKS
Every 50 Hours	1	Clam Cylinder Connecting Pin	MPG	Grease
	2	Clam to Blade Pin	MPG	Grease
	3	Clam Cylinder Connecting Pin	MPG	Grease

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.

MULTI-PURPOSE BUCKET LUBRICATION POINTS (If Equipped)

Item 1 - Clam Cylinder Connecting Pins

(One fitting on each side.) Apply the lubricator to each side.) Apply the lubricator to each fitting until clean lubricant appears.

Item 3 - Clam Cylinder Connecting Pins

(One fitting on each side.) Apply the lubricator to each fitting until clean lubricant appears.

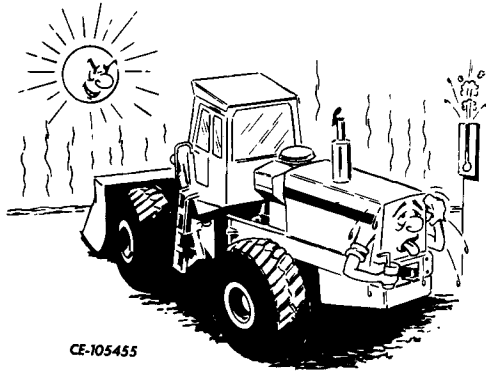
Item 2 - Clam to Blade Pin

(One fitting on each side.) Apply the lubricator to each fitting until clean lubricant appears.

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Preparations for Hot or Cold Weather



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

FUEL SYSTEM

Refer to "FUEL SYSTEM" in this section for the diesel fuels which will give the most satisfactory performance for your International engine.

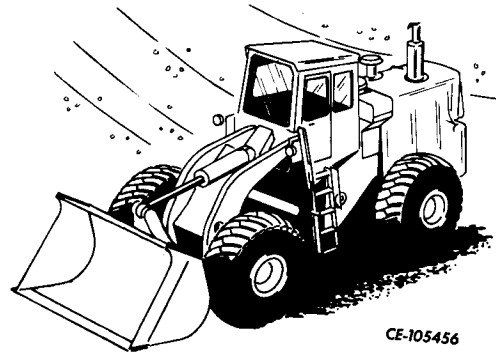
LUBRICATION

Lubricate the machine. Use the lubricants specified in the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in Section 7.

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

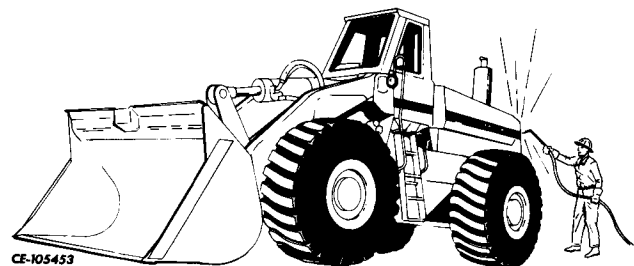


4. Clean cooling system. For this procedure, refer to "COOLING SYSTEM" in this section.

5. Check the tension and condition of the belts and adjust or replace if necessary. For these procedures refer to "BELTS" 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 grille and outside of core.



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" in this section.

AIR CLEANING SYSTEM

AIR CLEANER

Removal (Illust. 1)

This machine is equipped with a "dry-type" air cleaner (Illust. 1) with replaceable filter elements. The air cleaner has two elements; outer and inner. The outer element can be cleaned for a limited number of times before replacement is necessary, however, the inner element must be replaced when plugged. Detailed service procedures for this air cleaner are covered in the following text.

Precautions

As a precaution against dirt entering the engine:

All connections between the air cleaner and the engine must be tight.

Never operate the engine unless the filter elements are in place.

Outer Filter Element Service

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

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

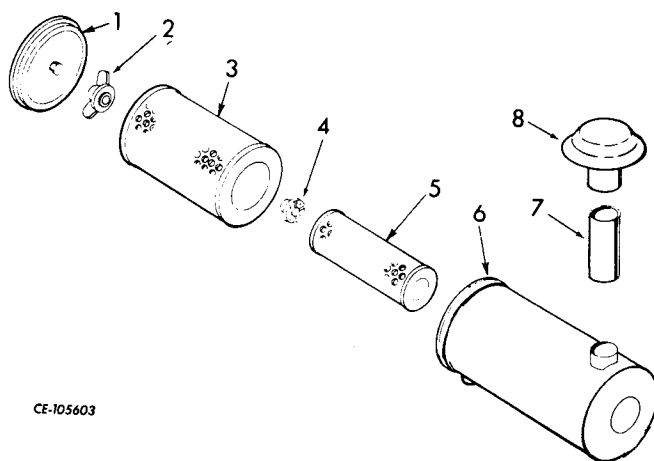
Washing is the preferred method as it removes more dust and soot and restores the element to an almost new condition. The result being better performance and longer intervals between required element service. It is suggested that a spare element be available for use while the serviced element is drying.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

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

Cleaning the element with compressed air is not considered an entirely satisfactory method. Some dust and soot 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.

1. Stop the engine. Wipe off any dust accumulation on the outside of the cover (1).
2. Loosen the nut in the center of the cover and remove the cover.
3. Remove wing nut (2).
4. Remove the outer element (3). Be careful not to dislodge dust from the dirty element on to the smaller element (5).
5. Check the condition of the gasket on the end of the outer element. If the gasket is damaged or missing, replace the element.
6. Wipe the inside of the body (2) with a clean, damp cloth. A small amount of non-sudsing detergent added to the water will facilitate the removal of soot.



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Illust. 1
Exploded View of Air Cleaner

- | | |
|-------------------|----------------------|
| 1. COVER | 5. ELEMENT, inner |
| 2. NUT, wing | 6. BODY, air cleaner |
| 3. ELEMENT, outer | 7. TUBE, air intake |
| 4. NUT, round | 8. HOOD, air intake |

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.

(Continued on next page)

AIR CLEANING SYSTEM

AIR CLEANER - Continued

Washing - Continued

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 clean 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" in this section.

Compressed Air

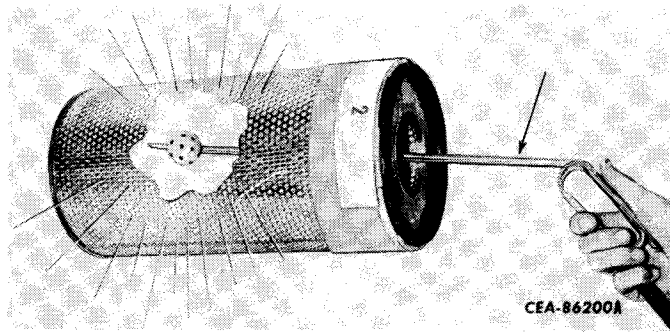
An element cleaning tool (IH Part No. 407 073 R1, Illust. 2) for use with compressed air, is available from your authorized International Construction Equipment distributor or dealer, and will do a faster and more efficient job of removing dust than a regular air gun or nozzle.

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 "Inspection."



Illust. 2
Using Element Cleaning Tool

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.

Installation (Illust. 1)

1. Install the open end of the element (3) into body (6) over element (5) and secure with wing nut (2).
2. Install the cover (1) and secure, making sure the cover is not cocked.
3. Inspect and tighten all air cleaner connections before resuming operation.
4. Start the engine. If the air cleaner service indicator shows all red, stop the engine; replace the inner filter element. Refer to "Inner Filter Element Service" in this section.

Inner Filter Element Service

Replace the inner element with every third service of the outer element or when plugged, as shown by the service indicator.

AIR CLEANING SYSTEM

Removal (Illust. 1)

1. Loosen the nut in the center of the cover (1) and remove the cover.
2. Remove and service element (3) as described under "Outer Filter Element Service" in this section.
3. Remove the round nut (4) and element (5).
4. Clean the inside of body (6) with a damp cloth.

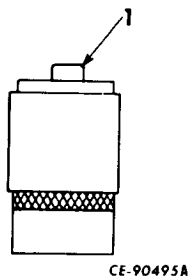
Installation (Illust. 1)

1. Install a new element (5) into body (6) and secure in place with round nut (4).
2. Install element (3) over element (5) and secure with wing nut (2).
3. Install cover (1) and secure, making sure the cover is not cocked.

AIR CLEANER SERVICE INDICATOR
(Illust. 3)

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 (1).



Illust. 3
Air Cleaner Service Indicator

AIR CLEANER INTAKE HOOD (Illust. 1)

The dome of the air cleaner 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.

Loosen the clamp screw on the hood and remove it by twisting and pulling upward. 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. Install the hood back in place and tighten the clamp.

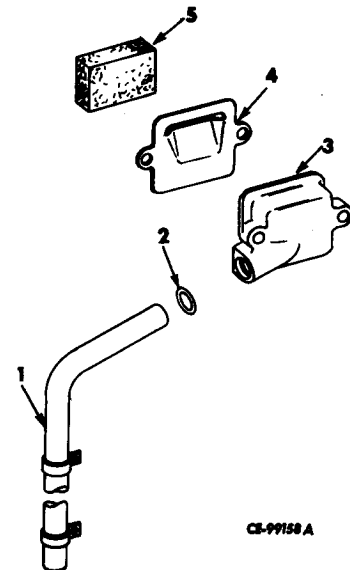
CRANKCASE BREATHER (Illust. 4)

1. Remove the four capscrews securing the housing (3) and pipe (1).
2. Remove the housing (3) and pipe (1) from the engine as an assembly.
3. If the baffle (4) is attached to the housing (3) remove it from the housing.
4. Remove the breather element (5) from the crankcase.
5. Wash the element and all other parts in kerosine or diesel fuel. Dry thoroughly.

NOTE: If the breather element remains plugged after cleaning or if the element remains badly corroded, replace the element.

6. Install the element (5) into the crankcase.

(Continued on next page)



Illust. 4
Crankcase Breather

AIR CLEANING SYSTEM

CRANKCASE BREATHER (Illust. 4) - Continued

7. Place the baffle (4) onto the body (3) with the open slot at the top and the extruded portion of the baffle inside of the body.

NOTE: Make sure the element does not protrude over into the slot in the baffle.

8. Check the "O" ring (2) and replace if damaged.

9. Install the "O" ring into the tube hold of the body (3), then insert the tube (1).

10. Secure the tube (1) and body (3) in place with the capscrews previously removed.

AIR PRESSURE SYSTEM

The air compressor governor is factory set to maintain a minimum pressure of 80 psi and a maximum pressure of 105 psi in the air system. If the air compressor governor does not cut out when maximum governor pressure is reached, the air tank safety valve will open at the factory setting of 150 psi.

If the governor and/or the safety valve fails to operate properly, consult your authorized International Construction Equipment distributor or dealer.

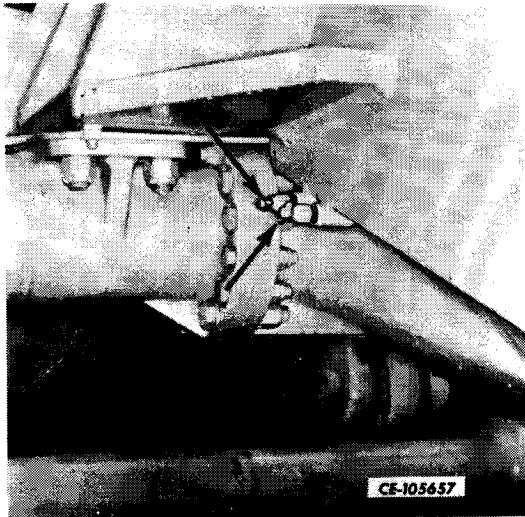
◆ CAUTION: COMPLETELY LOWER THE BUCKET TO PREVENT VEHICLE MOVEMENT. BE SURE THERE IS AN ADEQUATE SUPPLY OF PRESSURE IN THE AIR SYSTEM.

◆ CAUTION: DO NOT OPEN THE DRAIN VALVES MORE THAN TWO TURNS.

Open the air tank drain valves (Illust. 5). Drain accumulated water from the tanks then close the valves.

DRAINING THE AIR TANKS

NOTE: It is especially important that the air tanks are thoroughly drained of water in cold weather.



Illust. 5
Air Tank Drain Valves

AIR LINES

Inspect all hoses and connections to be sure they are not leaking.

1. Coat all air system hose connections with soapsuds to check for leakage.

2. Apply the brakes while checking the hose connections from the brake valve to the brake actuators.

3. Continue applying the brakes until the check has been completed.

NO LEAKAGE IS PERMISSIBLE.

BELTS

Belts on new machines and replacement belts lose their tension as they seat into the pulley grooves. Check the tension of these belts at 1, 10 and 50 hour intervals to stabilize the belt tension. If the tension falls below a required minimum, the belt slips, damaging the belts and pulley grooves.

The correct belt tensions measured with a "Gates KRIKIT Gauge" are shown in the following chart.

NOTE: Do not allow belt tensions to fall below the specified "Minimum Permissible Tension" values. Check the belt tension more often if necessary.

TENSION

The tension applied to a new belt (initial installation only) is different than the retension applied to a used belt (one that has been run five minutes or longer).

In emergency cases only when a Gates belt tension gauge is not available and the machine must be operated, belt tensions may be checked by "Deflection Method."

Checking Tension

Belt tensions are to be measured by means of a "Gates KRIKIT Gauge" to insure correct tensions. This gauge may be obtained from:

The use of "Fishhook Scale and Straight Edge" is preferred over the unreliable "Thumb Method." The required belt deflections under 25 lbs. deflecting force are shown in the following chart.

Gates Rubber Company
999 South Broadway
Denver, Colorado 80217

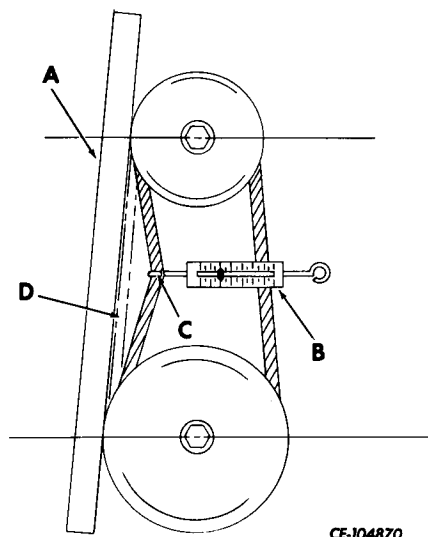
(Continued on next page)

BELT TENSION CHART (Using "KRIKIT" Gauge)		
Condition	Air Compressor Belt	Fan and Alternator Belt
New Belt Installation	95 to 100 lbs.	95 to 100 lbs.
New Machine Upon Delivery 1 Hour After Belt Replacement After 10 Hours of Operation After 50 Hours of Operation At Intervals of 200 Hours	80 to 85 lbs.	80 to 85 lbs.
Minimum Permissible Tension	60 lbs.	60 lbs.

BELT TENSION CHART (Deflection Method)			
Condition	Air Compressor Belts	Fan and Alternator Belt	
	Point A	Point B	Point C
New Belt Installation	17/32 in.	11/16 in.	3/4 in.
New Machine Upon Delivery 1 Hour After Belt Replacement After 10 Hours of Operation After 50 Hours of Operation At Intervals of 200 Hours	9/16 in.	23/32 in.	13/16 in.
Minimum Permissible Tension	19/32 in.	25/32 in.	7/8 in.

BELTS

TENSION - Continued

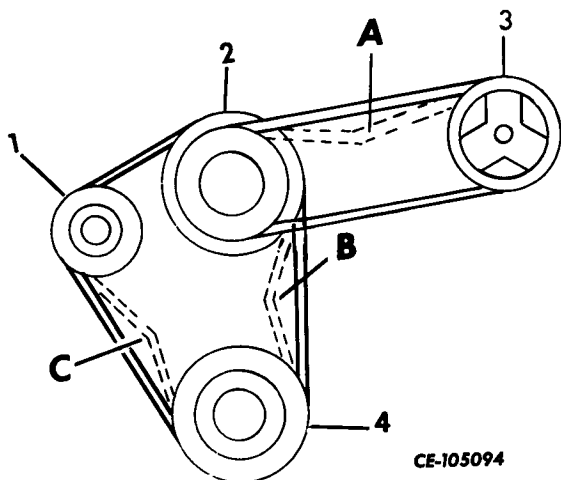


CE-104870

Illust. 6
Deflection Method

Tension Check Points (Illust. 7)

The fan and alternator belt tension should be checked at point (B) or (C). When checking the tension of the fan and alternator belts, the readings may vary considerably between the belts. When this occurs, average the readings to establish the applied tension.



CE-105094

Illust. 7
Belt Tension Check Points.

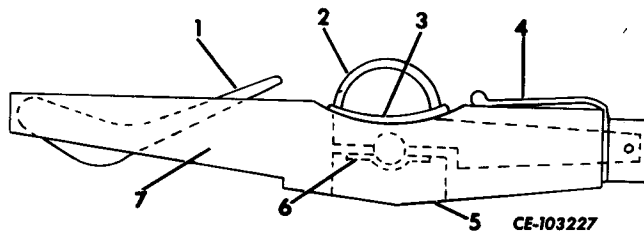
1. PULLEY, alternator
2. PULLEY, fan
3. PULLEY, air compressor
4. PULLEY, crankshaft

Check the air compressor belt tension at point (A) midway between the compressor pulley and the fan pulley.

Using "Gates KRIKIT Gauge" (Illust. 8)

1. There are several ways to hold the gauge while testing belt tension.

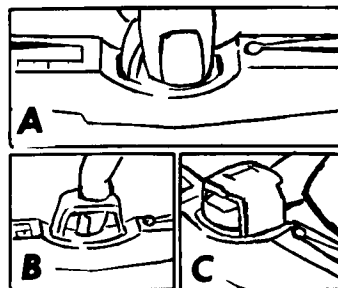
- a. By holding the rubber loop (2) with the ends of the thumb and index fingers directly on the raised pressure pad (3). (A, Illust. 9.)
- b. By slipping the index finger between the rubber loop (2) and pressure pad (3). (C, Illust. 9.)
- c. By inserting the index finger through top of the rubber loop (2). (B, Illust. 9.)



CE-103227

Illust. 8
Gates KRIKIT Gauge.

- | | |
|-----------------------|-----------------------|
| 1. Indicator arm | 5. Positioning flange |
| 2. Rubber finger loop | 6. Tension spring |
| 3. Pressure pad | 7. Body |
| 4. Pocket clip | |



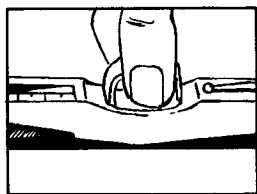
CE-103228 A

Illust. 9
Holding the Gauge.

NOTE: DO NOT touch the gauge with any other finger while testing the belt, as this will cause the gauge to read inaccurately.

2. Position the gauge in the center of the belt between the two pulleys. The flange (5) should be flat against the top edge of the belt. Make

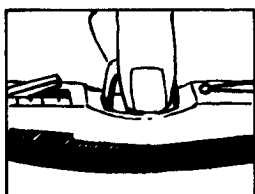
sure the indicator arm (1) is below the scale on top of the body (7). (Illust. 10.)



CE-103229

Illust. 10
Positioning the Gauge.

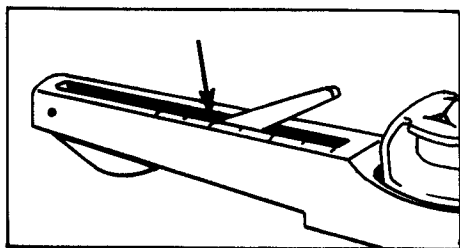
3. Very slowly press on the pressure pad (3) at a right angle to the belt surface until you hear or feel the click release of the tension spring (6). DO NOT PRESS ANY MORE as soon as the spring clicks and the indicator arm (1) shows the correct reading. (Illust. 11.)



CE-103230

Illust. 11
Pressing for Reading.

4. The correct tension reading is read at the point where the top of the indicator arm crosses the numbered scale on the top of the gauge body, as shown in Illust. 12.



CE-103231

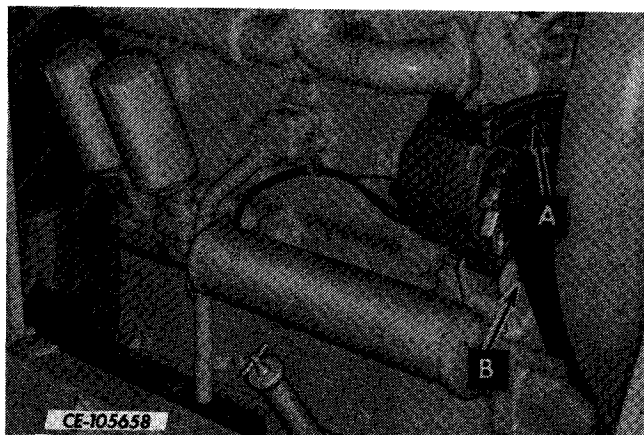
Illust. 12
Reading Belt Tension Gauge.

NOTE: Before adjusting belt tension, check the tension several times. Use an average of the readings.

ADJUSTMENT

Alternator and Fan Belts (Illust. 13)

1. Loosen the alternator adjusting brace screw (A) and the alternator mounting screw (B).



CE-105558

Illust. 13

Fan and Alternator Belts Adjustment.

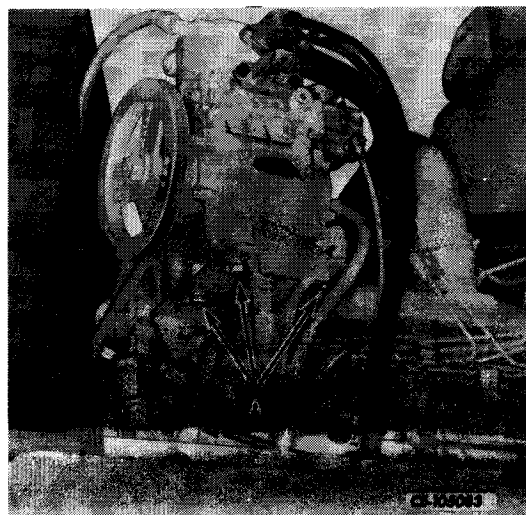
2. Move the alternator out to tighten the belts or in to loosen them until the correct tension is obtained as described under "TENSION."
3. Retighten the cap screws (A and B).

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

Air Compressor Belt (Illust. 14)

1. Loosen the four air compressor mounting bolts (A).

(Continued on next page.)



CE-103043

Illust. 14
Air Compressor Belt Adjustment.

BELTS

ADJUSTMENTS - Continued

Air Compressor Belt (Illust. 14) - Continued

2. Move the air compressor "out" to tighten the belt or "in" to loosen it until the correct tension is obtained as described under "TENSION."
3. Retighten the air compressor mounting bolts (A).

REMOVAL AND REPLACEMENT

Replace badly worn or severely cracked belts immediately.

When replacing a belt(s), always check the condition of the remaining belt(s) on the engine, and if necessary, replace them at the same time. When replacing the fan and alternator belts, always replace the belts as a matched set.

Prior to installing the new belt(s), inspect all pulley grooves for wear and the presence of grease, oil, dirt, etc. If foreign material is present, it should be removed. If a pulley is damaged or grooves worn, it should be replaced. When replacing belts and pulleys, pulley alignment must be checked. A misalignment that can be detected by the naked eye is detrimental.

During assembly, do not force the belt(s) into the pulley grooves by prying with a screw driver, pry bar, etc. This will damage the belt side cords which will cause the belt(s) to turn over in the pulley grooves and will end in complete destruction of the belt(s) in operation.

If the fan and alternator or compressor belts are disturbed for any reason, the belts must be adjusted to the correct belt tension.

Removing the Alternator and Fan Belts (Illust. 13)

1. Loosen the brace bolt (A) and mounting bolts (B).
2. Move the alternator in toward engine.
3. Slip the old belts over the fan blades and remove them.

Installing the Alternator and Fan Belts

1. Work the new belts over the fan blades and over top of the fan pulley.
2. Slide the belts over the crankshaft pulley.
3. Push in on the alternator, if necessary, and slide the belts over the alternator pulley.
4. Adjust the belt tension. Refer to "Adjustment."

Removing the Air Compressor Belt (Illust. 14)

1. Loosen the four air compressor mounting bolts (A).
2. Move the compressor all the way in toward the engine.
3. Slip the old belt off of the compressor pulley and over the fan blades.

Installing the Air Compressor Belt

1. Work the new belt over the fan blades and into the fan pulley groove.
2. Slide the belt over the air compressor pulley and into groove.
3. Adjust the belt tension. Refer to "Adjustment."

BRAKES

SERVICE BRAKES

This machine is equipped with manual-adjustment air over hydraulic brakes.

The brake system is divided into two separate circuits, each having its own air and hydraulic supply. One circuit operates the front brakes and the second operates the rear brakes. In the event of a failure in one circuit, the braking system still retains braking effort in the remaining circuit.

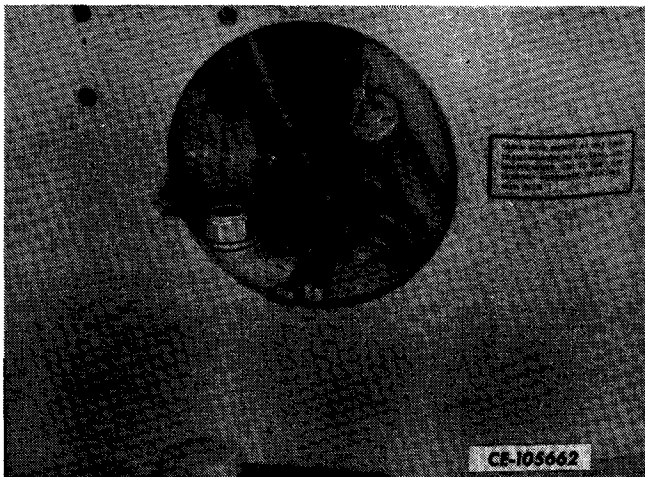
When the brake pedal is applied, air pressure in the brake power cluster air chamber forces a piston in the brake power cluster hydraulic (master) cylinder to pressurize brake fluid to the wheel cylinders. This pressurized fluid forces plungers to expand the brake shoes against the brake drum.

◆ CAUTION: TRAPPED AIR IN THE HYDRAULIC BRAKE LINES BETWEEN THE BRAKE POWER CLUSTERS AND THE WHEEL CYLINDERS REDUCES BRAKING EFFECTIVENESS. BLEED THE BRAKES.

Checking Brake Fluid Level

Each axle has a power cluster to supply brake fluid. The front axle brake power cluster is located in the front frame on the right side. The rear axle power cluster (Illust. 15) is in the rear frame to the right of the transmission. Check the fluid in each power cluster as follows:

1. Lower the bucket to the ground shut the engine down and apply the parking brake.



Illust. 15
Power Cluster (Rear) Filler Cap.

2. Wipe the filler cap (Illust. 15) and the area around it to prevent contaminants from entering.

◆ CAUTION: BE CAREFUL NOT TO SPLASH BRAKE FLUID INTO EYES.

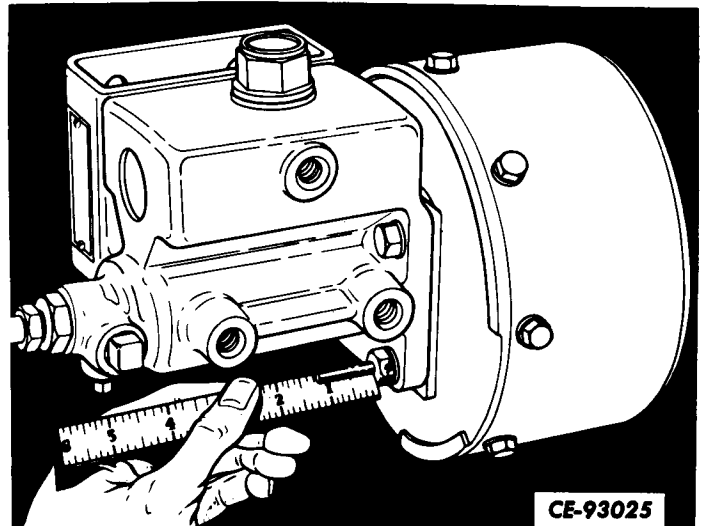
3. Remove the filler cap and check the fluid level. The correct level is 3/8 to 1/2 inch below the filler hole. If necessary, add fluid. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in Section 7 for the type of lubricant specified.
4. Before installing the filler cap, be sure the vent hole in the filler cap is not plugged up.
5. Install and secure the cap.

Checking for Adjustment

Check the brakes periodically for the need of adjustment as follows:

1. Check the fluid level in the power clusters. Refer to "Checking Brake Fluid Level" in this section.
2. Start the engine. Build up the air pressure until the air pressure gauge indicator is in the "RUN" segment. Shut the engine down.
3. Apply the parking brake.

(Continued on next page)



Illust. 16
Checking Stroke Indicator.

BRAKES

SERVICE BRAKES - Continued

Checking for Adjustments - Continued

NOTE: Checking brake operation is a two-man operation. Each axle has its own brake power cluster and is checked independently of the other. The procedure is the same for both power clusters.

4. Depress and hold the brake pedal.
5. Measure the length of the stroke indicator (Illust. 16) on the power cluster. If the stroke indicator length is more than one (1) inch, the brakes on the axle that power cluster is supplying must be adjusted.

NOTE: If adjustment is required refer to "Adjusting Brakes" in this section. If the brakes fail to maintain their adjustment or periods of adjustment becomes more frequent, then the brakes must be disassembled and serviced as required.

Adjusting the Brakes

NOTE: The brake linings should be adjusted while they are cool.

1. Park the machine, lower the bucket and shut the engine down.
2. Release the service brakes pedal.
3. Apply the parking brake and block the wheels.

NOTE: Each wheel has two adjustments. The following procedure is the same for each wheel.

4. Remove the rubber cover plugs (Illust. 17) from the two adjustment slots.
5. Insert an adjusting spoon or screw driver through one of the adjusting slots and into the notches of the adjusting wheel.
6. Turn the adjusting wheel until the brake shoe moves out and touches the brake drum.
7. Apply the brake pedal a few times after initial lining contact is made. This will center the lining in the drum.
8. Adjust the lining snug against the brake drum, then back the adjusting wheel off seven clicks by moving the adjusting tool in the opposite direction.



Illust. 17
Adjustment Slot Plugs and Bleeder Screws

9. Repeat Steps 5 through 8 at the second wheel lining adjuster.
10. Install the adjustment slot covers back in place.
11. Adjust the remaining wheel brakes in the same manner as described in Steps 4 through 11.

Bleeding the Brakes

◆ CAUTION: AIR TRAPPED IN THE HYDRAULIC BRAKE SYSTEM REDUCES BRAKING EFFECTIVENESS. BLEED THE WHEEL CYLINDERS.

Air in the brake system will cause a "spongy" feeling in the brake pedal. When this condition occurs, the air must be bled. Air is most likely to enter at system leaks, disconnected brake lines, or when the brake fluid level is low in the master cylinder. Check all connections for the cause of air entering the system.

Another indication of air in the hydraulic brake system is the necessity of having to adjust the brake linings more frequently than normal.

Bleeding the brake system is a two man operation. Bleed the system as follows:

BRAKES

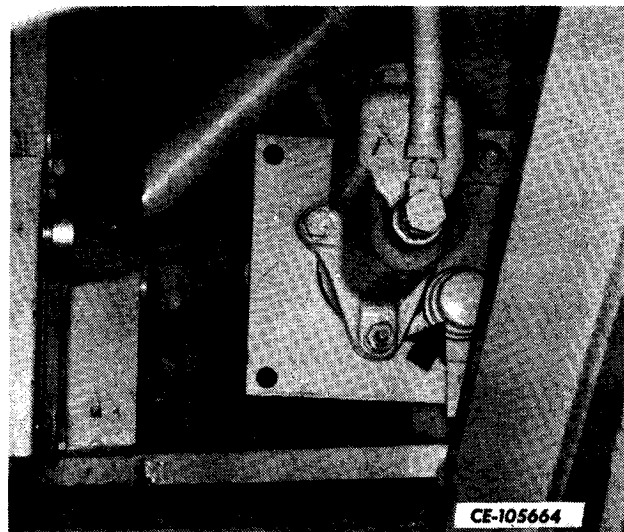
1. Park the machine and apply the parking brake. Lower the bucket to the ground. Block the wheels.
2. Run the engine until the air pressure gauge indicator is in the "RUN" segment, then shut the engine down.
3. Check the fluid level in the power clusters. Refer to "Checking Brake Fluid Level" in this section.
4. Open the bottom wheel cylinder bleeder screw (2, Illust. 17) on the wheel closest to the power cluster for that axle.

CAUTION: BE CAREFUL NOT TO SPLASH BRAKE FLUID INTO EYES.

5. Have the helper in the operator's compartment slowly depress the brake pedal and hold it depressed. This will force brake fluid from the bleeder screw.
 6. Close the bleeder screw then let up on the brake pedal.
 7. Repeat steps 5 and 6 until a stream of air-free fluid comes from the bleeder screw.
- NOTE: To eliminate the necessity of having to close the bleeder screw after each time the brake pedal is depressed, the following alternate bleeding procedure may be used. Attach a bleeder hose to the bleeder screw. Immerse the other end of the bleeder hose in a clean jar partially filled with fresh brake fluid. The brake pedal may be depressed and let up, without the necessity of closing the bleeder screw, until air-free fluid is coming out of the hose in the jar. When air-free fluid comes out of the hose, close the bleeder screw and remove the hose.
8. Bleed the top wheel cylinder (3, Illust. 17) on the same wheel.
 9. Bleed the other wheel brakes for the same axle in the same manner as the first wheel.
 10. Bleed the wheel brakes on the second axle as described in Steps 4 through 9.
 11. Refill the power clusters with brake fluid.

Breathers

Each power cluster is equipped with a breather (Illust. 18)



Illust. 18
Power Cluster Breather (Rear Shown).

1. Remove the breathers from the power clusters.
2. Wash them in a commercial cleaning solvent to completely remove any contaminants from the cap.
3. Dry thoroughly using a light pressure of compressed air or shake to remove as much solvent as possible.
4. Dip the caps in clean engine oil. Allow excess oil to drain out.
5. Install the breathers back in place.

PARKING BRAKE

This machine is equipped with an internal expanding drum type parking brake. The parking brake is mounted in the drive line between the front drive shaft and differential. The parking brake can be adjusted two ways. They are as follows:

Minor Adjustment (Illust. 19)

1. Turn the adjusting knob cap on the end of the parking brake lever until a reasonable amount of effort is required to apply the brake and a distinct over-center action is felt.
2. If the parking brake knob is at full adjustment and more adjustment is required, perform a major adjustment on the parking brake.

(Continued on next page)

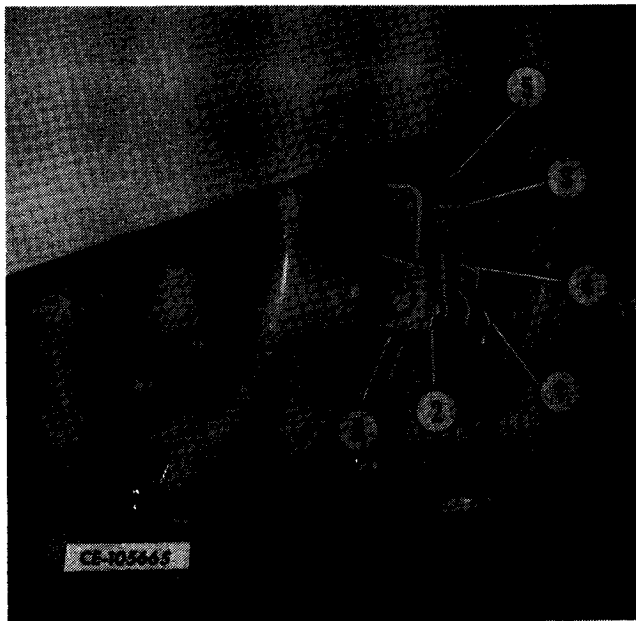
BRAKES

PARKING BRAKE - Continued

8. Lubricate the lever assembly and all linkage pivot points with Grade 10W oil.

Major Adjustment

1. Loosen the adjusting knob cap on the end of the parking brake lever all the way out to relieve all tension.
2. Remove the cotter pin (1) and clevis pin (2) that is securing the clevis (4) to the brake level (6).
3. Loosen jam nut (3) and back it away from the clevis a few turns.
4. Shorten the length of the brake cable by rotating the clevis onto the cable (5) clockwise. The cable should be shortened enough to remove all slack out of the brake arm (6) without causing drag between the brake lining and drum.
5. Reinstall the clevis pin (2) through the clevis and brake arm. Secure the clevis pin with the cotter pin (1).
6. Tighten jam nut (3) down against the clevis (4).
7. Pull the parking brake lever back to test the adjustment. If necessary, perform an adjustment at the lever knob.



Illust. 19
Parking Brake Linkage.

COOLING SYSTEM

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

Circulation is controlled by a thermostat which by-passes coolant flow from the radiator until the engine reaches operating temperature.

The pressure-cooled system will not operate properly unless the cooling system is tight. The radiator cap must be properly tightened to the stop. The gasket surface of the cap must be in good condition. The radiator cap regulating valve and the thermostat must operate properly. The system must not have loose connections or leaks. Unless these instructions are followed, pressure will not be maintained and loss of coolant and consequent overheating will result.

CARE OF THE SYSTEM

To keep the system internally free of rust and sludge, add IH cooling system conditioner to your 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" in this section.

RADIATOR CAP

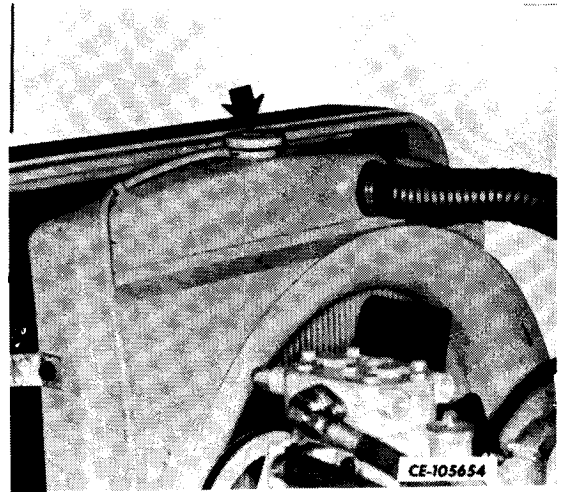
A regulating pressure valve, built into the radiator cap, is designed to open at a pressure of approximately 6-1/2 to 8 pounds per square inch.

NOTE: Do not attempt to repair or replace any of the regulating valve parts. If the valve is faulty, replace it with a new radiator cap of the same type.

Removal

◆ CAUTION: WHEN CHECKING THE COOLING SYSTEM ON A MACHINE THAT HAS BEEN RUNNING, LOOSEN THE RADIATOR CAP SLOWLY TO RELEASE ANY PRESSURE THAT COULD HAVE ACCUMULATED, AND TO PREVENT INJURY FROM OVERFLOWING HOT FLUIDS.

Turn the cap to the left (counterclockwise) to the safety stop until pressure is released; then press down on the cap and continue to turn until the cap is free to be removed.



Illust. 20
Radiator Cap

DRAINING THE SYSTEM

1. Run the engine until the engine coolant temperature gauge is in the "RUN" area, then shut the engine down.
2. Remove the radiator cap. Use CAUTION. Refer to "RADIATOR CAP."
3. Open the radiator drain valve (Illust. 21).
4. Open the engine oil cooler drain valve (Illust. 22).
5. Remove the crankcase drain plugs located midway between the fuel filters and injection pump.



Illust. 21
Radiator Drain Valve.

COOLING SYSTEM



Illust. 22
Engine Oil Cooler Drain Valve.

6. Allow the system to drain completely. Do not let the drain outlets plug up during draining.

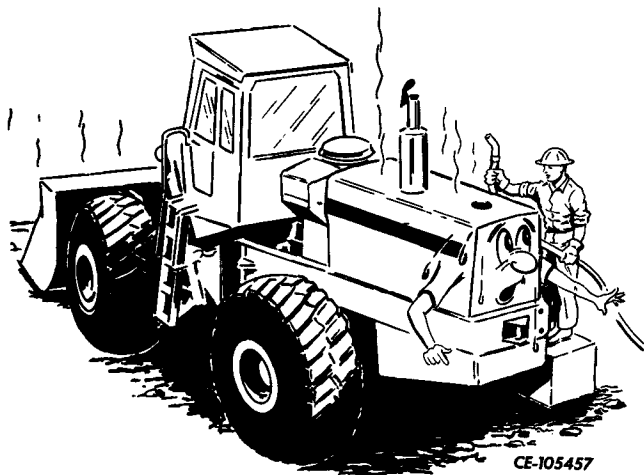
7. Reinstall the crankcase drain plugs, close the radiator drain valve and the oil cooler drain valve.

FILLING THE SYSTEM

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

— Remove the radiator cap carefully, refer to "RADIATOR CAP" in this section.

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



Illust. 23
"DO NOT Use Cold Water in a Hot Engine."

NOTE: Fill the cooling system slowly, this allows more air to escape and the system to be filled to maximum capacity. Install "IH cooling system conditioner" (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" in this section.

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

1. Be sure the drains are closed.
2. Fill the cooling system until the coolant is one inch below the bottom of the filler neck. Wait a few minutes to allow for the escape of air; then add coolant as needed.
3. Install the radiator cap.
4. Start and run the engine until the normal operating temperature is reached.
5. Stop the engine, carefully remove the radiator cap, refer to "RADIATOR CAP" in this section.
6. Recheck the level. If necessary, add coolant to bring the level one inch below the filler neck.
7. 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" in this section.
2. Close the radiator and engine drains.
3. Fill the system with clean water (refer to "FILLING THE SYSTEM") 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."

COOLING SYSTEM

ANTI-FREEZE

IH Premium anti-freeze (permanent type) is the recommended solution for this machine. 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.

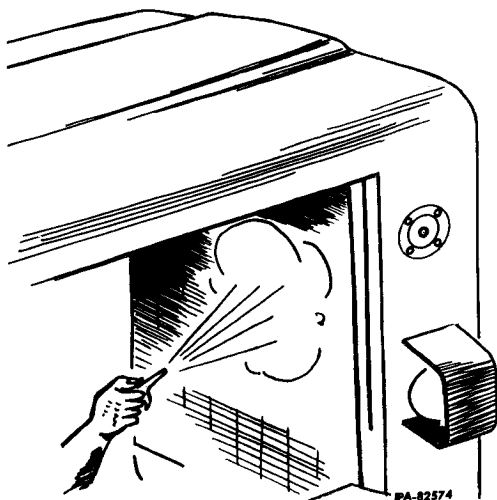
Check the solution frequently and at normal operating temperature, to be sure the cooling system has sufficient protection against freezing.

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%

CLEANING THE RADIATOR

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



Illust. 24
Cleaning Radiator.

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. (Illust. 24.)

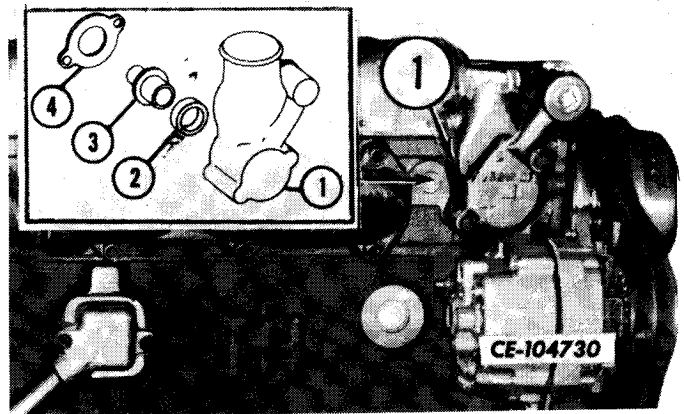
THERMOSTAT

The thermostat has two functions; gain rapid engine warm-up; control coolant temperature. The thermostat is the non-adjustable type.

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

Removal (Illust. 25)

1. Drain the cooling system to a level below the thermostat housing. Refer to "DRAINING THE SYSTEM" in this section.
2. Disconnect radiator inlet hose and thermostat by-pass hose from the thermostat housing.



Illust. 25
Thermostat and Housing.

1. HOUSING, thermostat
 2. SEAL
 3. THERMOSTAT
 4. GASKET
3. Remove the two cap screws securing housing (1) to the cylinder head; remove housing (1), seal (2), thermostat (3) and gasket (4).
4. Clean the thermostat housing, removing all scale and rust.

NOTE: Check the condition of the seal (2) pressed in the housing (1). If seal is worn or damaged, remove and replace with new.

Checking (Illust. 26)

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

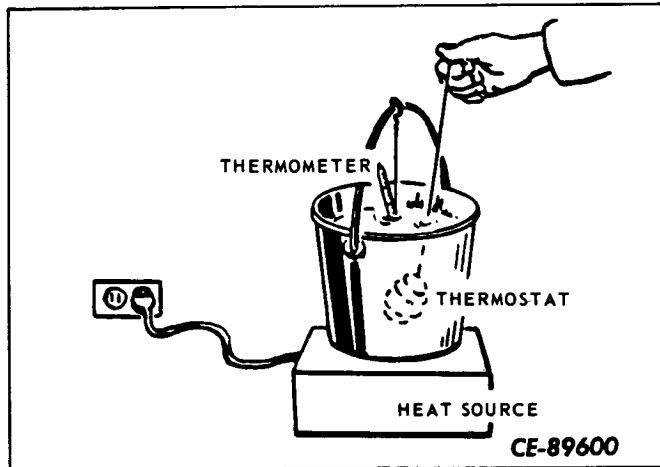
2. Check the thermostat as follows:

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.

b. Heat water and carefully note temperature when thermostat starts to open (approx. +167°F) and when fully open (approx. +192°F).

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



Illust. 26
Checking the Thermostat

Installation (Illust. 25)

1. Clean the gasket surfaces of the cylinder head and the thermostat housing to assure proper sealing when reassembled.

2. Install the thermostat (3) in the thermostat housing (1).

NOTE: Do not damage the seal (2) when installing the thermostat.

3. Install and secure housing (1) onto the cylinder head using a new gasket (4). Tighten the two cap screws.

4. Reconnect and secure the radiator inlet hose and thermostat at by-pass hose.

5. Fill the cooling system, refer to "FILLING THE SYSTEM."

ENGINE OIL COOLER

The oil cooler is mounted on the right 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.

The oil drain plug is in the cooler body and water drain valve in the rear.

TRANSMISSION OIL COOLER

The transmission oil cooler is mounted to the rear side of the radiator. There is no maintenance to be performed on the 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.

ELECTRICAL SYSTEM

PRECAUTIONS

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

◆ CAUTION: BEFORE WORKING ON ANY PART OF THE ELECTRICAL SYSTEM, DISCONNECT THE BATTERY GROUND CABLE UNTIL ALL ELECTRICAL WORK HAS BEEN COMPLETED.

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

ALTERNATOR W/INTEGRAL REGULATOR

The alternator incorporates a built in transistorized voltage regulator. The alternator requires no lubrication since its bearings are factory lubricated for life and require attention only at time of major overhaul. The integral regulator is sealed by the manufacturer.

NOTE: The unit electrical system is negative ground. Be CERTAIN the ground polarity is correct when:

- a. Installing a new battery.
- b. Connecting a battery charger.
- c. Using a booster.

Failure to observe proper polarity will result in damage to the alternator.

NEVER use a fast charger as a booster to start the engine.

NEVER unhook a battery terminal while the engine is running.

NEVER disconnect the alternator cable while the engine is running.

DO NOT POLARIZE THE ALTERNATOR.

DO NOT SHORT ACROSS OR GROUND ANY TERMINALS OF THE ALTERNATOR OR REGULATOR.

Voltage Regulator (Illust. 27)

This engine is equipped with a transistor type voltage regulator. This regulator incorporates a voltage adjustment that can be used to maintain the battery in a satisfactory charge condition, thereby obtaining maximum battery life.

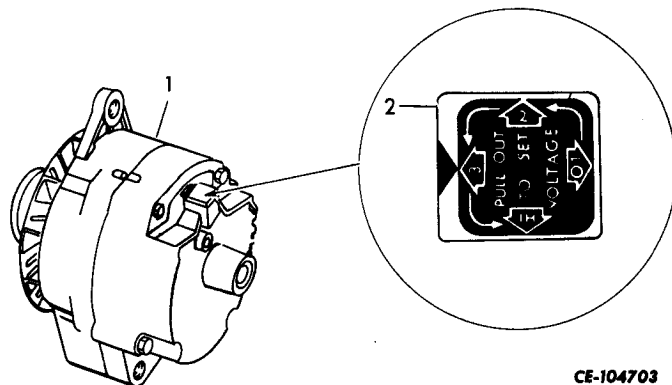
When to Adjust the Regulator

1. If battery uses too much water at normal setting (position "3" on the cap aligned with the arrow) reduce the voltage setting by aligning position "2" on the cap (2) with the arrow.
2. If further reduction in setting is desired, align the "LO" position on cap (2) with the arrow.
3. If the battery is consistently under charged at the normal setting (position "3" on the cap aligned with the arrow), increase the voltage setting by aligning the "HI" position on the cap with the arrow.

NOTE: If either of the conditions in Steps 1 to 3 persists after making the adjustments; consult your authorized International Engine Distributor or Dealer.

Adjustment

1. To adjust the regulator setting remove voltage adjustment cap (2) from alternator.
2. Position the cap until the desired setting is aligned with the arrow on the alternator. Refer to Steps 1 to 3 under the "Voltage Regulator" for the desired setting.
3. Reinstall the cap in the alternator.



CE-104703

Illust. 27
Voltage Adjustment Cap.

1. ALTERNATOR
2. CAP, voltage adjustment

ELECTRICAL SYSTEM

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. If the application is such that frequent or severe engine starts are required, motor lubrication and maintenance must be made at shorter intervals of 1000 hours or less.

1. Remove the cranking motor for lubrication.
2. At time of lubrication, motor should be cleaned, disassembled and inspected for further maintenance requirements. Consult your International Engine 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 oil.
4. Reinstall the cranking motor.

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

STORAGE BATTERIES

The machine is equipped with four six volt batteries. They are in battery compartments located at both sides of the rear main frame.

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

Never allow the battery to stand on concrete, ground or a metal support unless proper insulation is provided. A wooden platform or board is sufficient insulation. Be sure the battery is fastened securely to avoid damage from vibration.

NOTE: If tightened excessively, the battery case could warp or break.

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 "Liquid Level."

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

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. Most batteries have a water level fill guide mark and this should be followed for proper level indication. 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 circumstances, add any special battery "dopes," solutions or powders.

It is especially important to keep the battery at full charge for cold weather operation. Add distilled water to the battery 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 battery will result from the water freezing.

BULB REPLACEMENT

Refer to the following procedures for bulb replacement.

Front Driving Lights

Raise the rubber retainer lip; remove the sealed beam unit. Disconnect the plug from the sealed beam and install a new one.

Rear Driving Lights

Raise the rubber retainer lip; remove the sealed beam unit. Loosen the terminal screws and disconnect the two wires from the sealed beam unit. Attach the wires to a new sealed beam and secure with the terminal screws. Install the sealed beam in the rubber retainer.

Tail and Stop Lights

Raise the rubber retainer and remove the lamp assembly. Loosen the screw securing the white ground wire. Pull the other two wires free of their sockets. Attach the red lamp assembly wire to the white wire. Attach the black lamp assembly wire to the pink wire. Secure the white lamp assembly wire with the screw. Install the lamp assembly in the rubber retainer.

Instrument Panel Gauge Lights

Reach behind the instrument panel and pull the light socket free of the gauge. Depress the bulb, turn it counterclockwise in the socket and pull the bulb free of the socket.

FUSE REPLACEMENT

If a short circuit occurs in a 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. Refer to your machine parts catalog for the proper replacement fuse. If the lights fail, check the fuse. If the fuse continually burns out, check the electrical wiring for short circuits.

Fuse Holders In Instrument Panel

To replace a blown fuse, unscrew the fuse holder cap and pull the fuse out. Refer to "INSTRUMENTS AND CONTROLS" in Section 3 to determine which fuse protects which circuit.

CIRCUIT BREAKERS

The electrical system is also protected by two circuit breakers. In the event of a "short circuit" or "ground," the circuit breaker will open before damage occurs, and will continue to open and close until the trouble clears or is corrected. The circuit breaker will then return and stay in its normal closed position. It is important to use the same capacity circuit breaker for replacement.

STOP LIGHT SWITCH

To check the stop light switch for proper operation, the air pressure gauge must be in the "RUN" area. Station a helper at the rear of the machine to observe the stop lights. Depress one of the brake treadles. The stop lights should go on. If not, check for and correct the problem. Possible trouble areas may be the fuse, burned out bulbs, or the stop light switch.

ENGINE OIL AND FILTERS

CHECKING OIL LEVEL

1. Park the machine on level ground; apply the parking brake; lower the bucket to the ground and stop the engine.
2. Allow 10 to 15 minutes for the oil to drain back into the crankcase.
3. Loosen the "T" handle of the gauge (3, Illust. 28) remove the gauge and wipe it clean.
4. Insert the gauge completely, but do not tighten.
5. Remove the gauge and check the oil level. If level is at or below the "ADD" mark, add oil, through the level gauge and filler pipe, to bring the level up to the "FULL" mark on the gauge. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in Section 7 for the type of lubricant specified.
6. Reinstall and secure the oil level gauge.

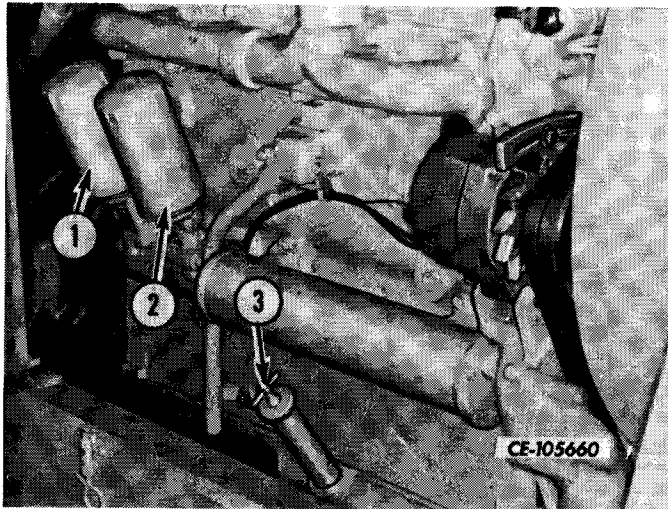
4. Remove the filters by turning them counter-clockwise. Discard the filters.

NOTE: The lubricating oil filters are a spin-on type filter. These filters cannot be cleaned and should not be disturbed except when it becomes necessary to replace them.

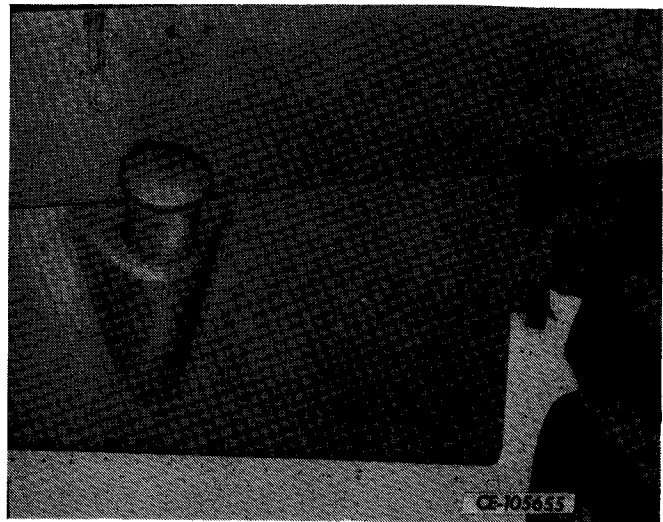
5. Install the new filters. Apply a little engine oil to the seal and thread the filter on until the filter gasket contacts the header. By hand, turn the filter 1/2 to 3/4 turns more.

NOTE: Do not use tools to tighten the filter.

6. Check the "O" ring around the engine oil drain plug and replace if damaged.
7. Install the engine oil drain plug (Illust. 29) in place.



Illust. 28
Engine Oil Level Gauge and
Filler Hole and Oil Filters.



Illust. 29
Engine Oil Drain Plug

CHANGING THE OIL AND FILTERS

1. After reaching operating temperature; park the machine on level ground; lower the bucket to the ground; apply the parking brake and stop the engine.
2. Remove the engine oil drain plug (Illust. 29) and allow the oil to drain completely.
3. Clean the outside of the engine oil filters (1 and 2, Illust. 28) to prevent dirt from entering the system while servicing.
8. Fill the crankcase with fresh oil. Refer to the "LUBRICANT SPECIFICATIONS AND CAPACITIES CHART" in Section 7 for quantity and grade oil specified.
9. 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 for leaks.

ENGINE VALVE CLEARANCE ADJUSTMENT

Following this simplified procedure, all valves can be adjusted quickly and accurately. Note that the engine need not be cranked six times to position the piston of each cylinder on TDC. All valves are adjusted by cranking the engine only twice.

NOTE: Valve lash is adjusted with engine "warm" which means any temperature above freezing. The valves can be adjusted with the engine "hot," but the workmanship usually suffers due to the heat.

1. Remove the valve cover. Turn the crankshaft until the number one piston is on the compression stroke and the timing pointer on the front cover is in line with the TDC mark (pin) on the vibration damper. Refer to "HAND CRANKING" in this section.

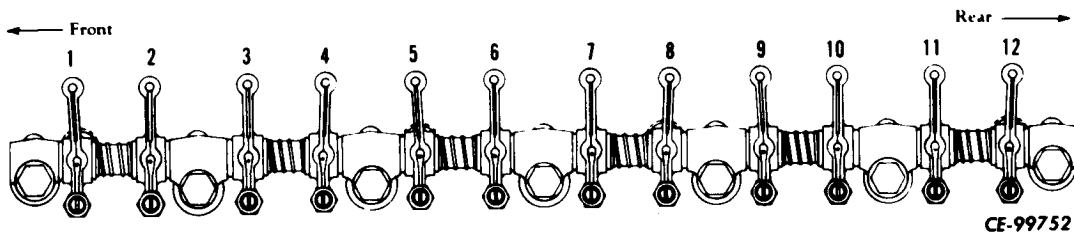
NOTE: Be sure that the number one piston is on the compression stroke by turning both push rods by hand to determine that both valves are closed. Valves are closed when push rods are loose and can be turned easily.

2. Six valves are adjusted when the No. 1 piston is at TDC (compression) and the remaining six are adjusted when the No. 6 piston is at TDC (compression). Illust. 30 shows the numbering sequence of the valves which correspond to the chart. Numbers 1, 3, 5, 7, 9 and 11 are intake valves; and numbers 2, 4, 6, 8, 10 and 12 are exhaust valves. Refer to "SPECIFICATIONS" in Section 9 for specified clearance.

NOTE: DO NOT adjust valves with the engine running. Severe damage can result from inserting feeler gauge between valve and valve lever due to close clearance of valve to piston.

3. Replace the valve cover. Tighten the valve cover bolts. Refer to "Torques" in Section 9. Be sure to use new packing rings under the valve cover bolt washers to avoid having oil leaks develop at this point. Check that the valve cover gasket makes an oil tight seal with the cylinder head. Use a new gasket if necessary.

WITH	ADJUST VALVES (Engine Warm)											
No. 1 Piston at T.D.C. (Compression)	1	2	3			6	7			10		
No. 6 Piston at T.D.C. (Compression)				4	5			8	9		11	12



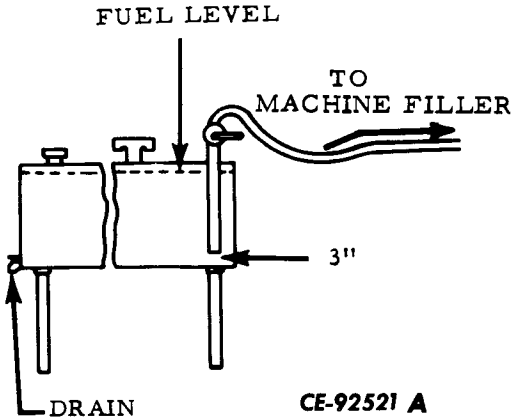
Illust. 30
Valve Arrangement.

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.

NOTE: Diesel fuel storage 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 injection pump.



Illust. 31
Fuel Storage Tank

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

Do not use the last three inches of fuel in the supply tank; collect it in a container and allow it to settle. In this manner the sediment and foreign material can be separated from the fuel and disposed of with little or no loss of fuel.

FUEL TANKS

Open the fuel tank drain valves located on the bottom of the tanks and drain off any accumulated water. Close the valves when clean diesel fuel begins to flow.

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, 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.

FUEL SYSTEM

DIESEL FUEL SPECIFICATION

The following table shows the limiting requirements for diesel fuels recommended for use in International diesel engines: (These are equivalent to ASTM Spec. D-975)

Requirements	Grade 2-D [†] (Preferred)	Grade [‡]
Flash Point, degrees F, minimum	125 or legal	100 or legal
Pour Point, degrees F, maximum	10 below ambient +	10 below ambient +
Cloud Point, degrees F, maximum	ambient +	ambient +
Water and Sediment, percent by volume, maximum	0.05	Trace
Carbon Residue on 10 percent Residuum, percent, maximum	0.35	0.15
Ash, percent by weight, maximum	0.01	0.01
Distillation Temperatures, degrees F:		
90 percent Point, minimum	540	---
90 percent Point, maximum	640	550
Sulphur, percent by weight, maximum	0.5	0.5
Cetane Number, minimum	40	40
Copper Strip Corrosion, maximum	No. 3	No. 3
Viscosity, Kinematic at 100F, centistokes, minimum	2.0	1.4
Viscosity, Kinematic at 100F, centistokes, maximum	4.3	2.5

Notes: [‡] - Grade 2-D is preferred but -1D should be used at temperatures below 10 degrees F or for operations entailing considerable idling.

+ - Ambient refers to lowest temperature at which the engine is to be operated.

FUEL FILTERS (Illust. 32)

The primary and final fuel filters are spin-on type filters. These filters cannot be cleaned and should not be disturbed except when it becomes necessary to replace them.

The primary filter (3) is the paper pleated type. This filter is the first in the system to filter the fuel as it comes from the tank.

The final filter (4) is the paper pleated type. This filter will need replacement less often than the primary filter if proper primary filter service procedures are followed.

When to Replace Filters

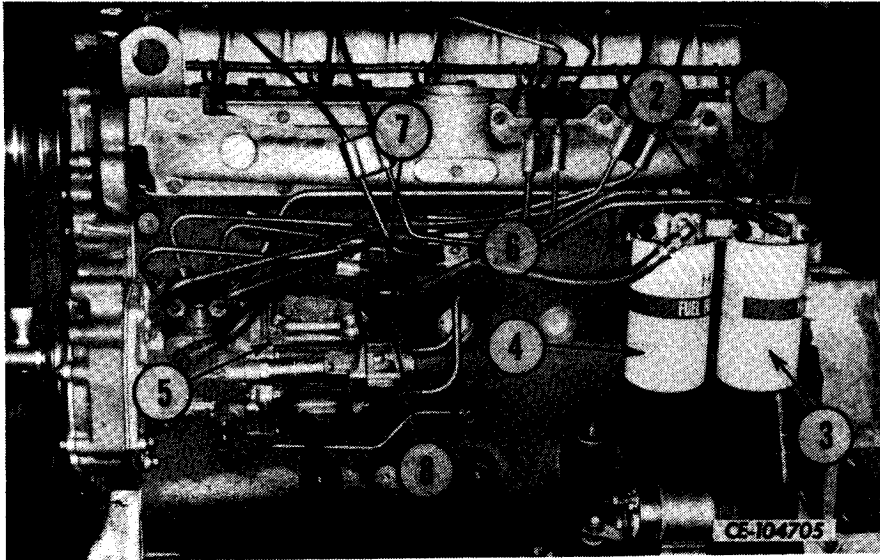
When the fuel oil pressure gauge indicates fuel filter replacement or when the engine is misfiring or a loss of power is evident.

1. Before replacing the primary filter, drain the water and sediment from the fuel tank.
2. If the engine shows loss of power, replace the primary filter. Vent the fuel system. Start the engine.
3. If the engine still shows loss of power, stop the engine; replace the final filter, then vent the fuel system.

FUEL SYSTEM

FUEL FILTERS (Illust. 32) - Continued

When to Replace Filters - Continued



Illust. 32

Fuel Filters, Vent Valves and Fuel Injection Pump.

- | | |
|------------------------------|-----------------------------|
| 1. Primary filter vent valve | 5. Fuel injection pump |
| 2. Final filter vent valve | 6. Hand priming pump handle |
| 3. Primary filter | 7. Wing bolt |
| 4. Final filter | 8. Locking strap |

Replacing the Filter

NOTE: Before removing filter, wipe all dirt and dust from filter header.

1. Remove the fuel tank drain plug. Drain any accumulated water then reinstall the drain plug.
2. Unscrew the filter from the header; discard the filter. A filter removing wrench can be used for this purpose if unable to turn by hand. This tool provides leverage to break the bond between the filter header and the filter seal.

NOTE: Do not use any tool for installation.

3. Thoroughly clean the filter header with kerosene or diesel fuel to prevent dirt or foreign material from falling into the new filter.
4. Apply a light coating of clean engine oil or chassis grease to the seal surface on the new filter.
5. Install, but do not "spin," the new filter, turning it until the seal just contacts the filter header.

6. Make aligning marks on the filter and filter header; give the filter an additional 1/4 to 1/2 turn.

NOTE: Do not over-tighten the filter.

7. Vent the fuel system. Refer to "PRIMING AND VENTING THE FUEL SYSTEM."

PRIMING AND VENTING THE FUEL SYSTEM
(Illust. 32)

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 primed and vented when:

- An engine, in operation, runs out of fuel.
- A new engine is being started for the first time.
- Fuel filters have been replaced.
- Fuel piping has been disconnected or loosened.

HYDRAULIC SYSTEM

FILLING THE SYSTEM

NOTE: Always use clean oil from a clean container. Correct all leaks.

1. Be sure the reservoir drain valve is closed and the drain plugs are in place.
2. Remove the reservoir filler cap (3, Illust. 33). Fill the reservoir with fresh oil up to the "H" mark on the dipstick. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in Section 7 for the quantity and grade of oil specified.
3. Reinstall and tighten the filler cap.
4. Start the engine and run at medium idle.
5. Slowly operate the booms, bucket and steering controls several times so all cylinders become filled with oil and air is expelled.
6. Lower the booms to the ground and shut the engine down.
7. Remove the filler cap slowly to release the pressure build-up.
8. Add oil to bring the level up to the "H" mark on the dipstick.
9. Reinstall and tighten the filler cap.

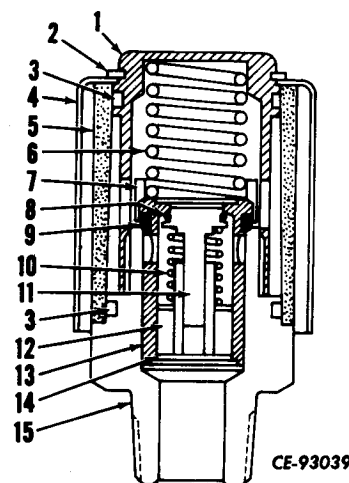
SERVICING THE RELIEF VALVES (Illust. 34)

1. Stop the engine.

CAUTION: ALWAYS LOOSEN THE FILLER CAP SLOWLY IN CASE THERE IS STILL SOME PRESSURE IN THE SYSTEM.

2. Remove the filler cap (3, Illust. 33) on the reservoir in order to relieve any pressure in the tank.

3. Remove the lock ring (2) and cover (4) from the relief valve (4, Illust. 33).
4. Remove the filter (5) and clean in a suitable solvent. Dry thoroughly with compressed air from the inside.
5. Check the seal rings (3) for wear or deterioration. Replace them if necessary.
6. Replace the filter (5) and cover (4). Secure with ring (2).
7. Reinstall the reservoir filler cap.



Illust. 34
Vacuum Pressure Relief Valve.

- | | |
|------------------|---------------------|
| 1. CAP. | 9. SLEEVE, seal. |
| 2. LOCK, ring. | 10. POPPET, spring. |
| 3. FILTER, seal. | 11. POPPET. |
| 4. COVER. | 12. GUIDE. |
| 5. FILTER. | 13. SLEEVE. |
| 6. SPRING. | 14. LOCK, ring. |
| 7. RETAINER. | 15. BODY. |
| 8. POPPET, seal. | |

TIRES

Avoid parking the machine in puddles of oil, gasoline or grease.

Check inflation pressures with an accurate tire pressure gauge when the tires are cool. Refer to "SPECIFICATIONS" in Section 9 for the correct inflation pressures. Install the valve caps.

Never vent built-up pressure in a tire, such as encountered on extremely hot days. Pressure built-up on hot days actually protects the tires by avoiding excessive sidewall flexing and heat which are detrimental to tire life. Venting tires will also result in underinflation when the tire cools.

UNDER INFLATION

Too little air pressure increases deflection, causes the tire to wipe and scuff over the road, results in extra strain on the tire, and increases the chance for bruising.

PROPER INFLATION

Maintaining the proper air pressure provides maximum road contact and results in increased tire life.

OVER INFLATION

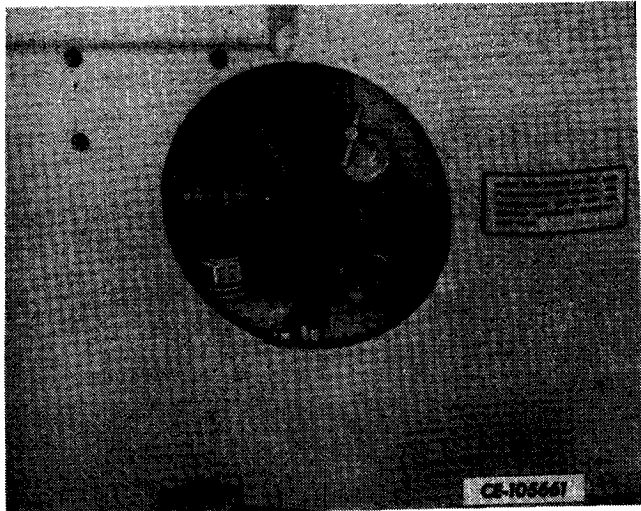
Over inflation reduces tire deflection and tire contact area, causing the tire to ride on the crown, and results in rapid wear in the center of the tread.

TRANSMISSION

CHECKING THE OIL LEVEL

◆ CAUTION: DO NOT CHECK THE TRANSMISSION OIL LEVEL OR ADD OIL UNLESS THE MACHINE HALVES ARE SECURELY LOCKED WITH THE SAFETY BAR AND PINS PROVIDED. HAVE A SECOND PERSON AT THE MACHINE CONTROLS WHILE CHECKING THE OIL.

1. Work the machine until the torque converter oil temperature gauge registers in the "RUN" area. Make use of all transmission direction and gear ranges.
2. Park the machine on level ground and shift the transmission to "N" (neutral).
3. Lower the bucket to the ground and apply the parking brake.
4. Stop the engine and install the safety bar.
5. Start the engine and let it run at low idle.
6. Turn the "T" handle of the transmission oil level gauge (Illust. 35) counterclockwise to loosen it.
7. Remove the oil level gauge and wipe it clean.
8. Insert the oil level gauge back in the tube as far as it will go.



Illust. 35

Transmission Oil Level Gauge and Filler Tube.

9. Remove the oil level gauge again and check the level. The correct level is between the "FULL" and "ADD" marks. If below the "ADD" mark, add enough oil to bring the level up to the "FULL" mark. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of lubricant specified.

NOTE: If the oil level is above the "FULL" mark, drain the oil level down to the "FULL" mark by removing the drain plug from the bottom of the transmission. Too much oil in the transmission will cause aeration of the oil.

10. Install the oil level gauge back in place.

FUEL SYSTEM

If air has entered the fuel system, vent the system as follows:

1. Fill the fuel tank.
2. Unlock the plunger of the hand priming pump by loosening the wing bolt (7) until the locking strap (8) can be rotated away from the pump handle (6).
3. Open the vent valve (1) on top of the primary fuel filter (3).
4. Pump fuel into the fuel filter, using the pump handle (6), until the fuel coming out of the primary filter vent valve (1) is free of air bubbles.
5. Close the vent valve on the primary fuel filter.
6. Open the vent valve (2) on top of the final fuel filter (4).
7. Pump fuel into the fuel filter, using the pump handle (6), until the fuel coming out of the final filter vent (2) is free of air bubbles. Close the vent (2) on the final filter. Lock the pump handle (6) in place with strap (8) and wing bolt (7).

HAND CRANKING

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

This procedure is used only for adjusting the valves.

1. Place the electrical ignition switch in "OFF" position.
2. Place the transmission in neutral (N).
3. Install blocking behind the accelerator pedal to be sure the fuel supply is shut off.
4. Install a 1/2 inch wrench on one of the three bolts securing the vibration dampner. Crank the engine as required.

HYDRAULIC SYSTEM

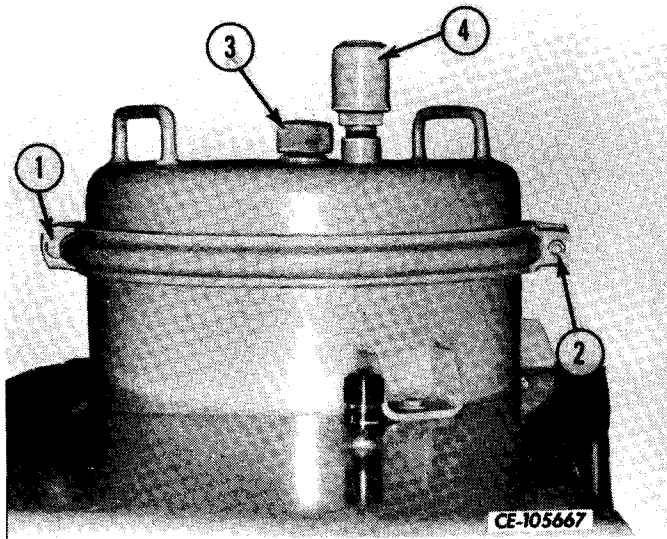
DRAINING THE SYSTEM

1. Operate the boom, bucket and steering until the hydraulic oil becomes warm.
2. Park the machine on level ground.
3. Raise the bucket completely and roll the bucket back all the way.
4. Shut the engine down and apply the parking brake.
5. Clean the top of the reservoir with kerosine or cleaning solvent.
6. Slowly loosen and remove the reservoir filler cap (3, Illust. 33).
7. Remove the plug from the reservoir drain valve.
8. Fit a hose to the spout of a large funnel. Put the other end of the hose into a container large enough to hold all of the fluid from the reservoir.
9. Place the funnel under the reservoir drain and open the drain valve and allow the reservoir to drain.
10. Close the reservoir drain valve.
11. Lower the booms slowly. After the booms come to rest on the ground push the bucket lever forward and let the bucket down slowly. This will force the hydraulic oil out of the boom and bucket cylinders and into the reservoir.
12. Position the funnel under the reservoir drain again and open the drain valve.
13. Allow the reservoir to drain completely then close the drain valve.
14. Put the reservoir filler cap (3, Illust. 33) back in place until the system is to be refilled. This will keep contamination from getting into the reservoir.

◆ CAUTION: DO NOT ALLOW ANYONE UNDER THE BOOM AND BUCKET WHILE IN THE RAISED POSITION.

◆ CAUTION: ALWAYS LOOSEN THE FILLER CAP SLOWLY TO GRADUALLY RELEASE ANY PRESSURE BUILD-UP IN THE RESERVOIR.

HYDRAULIC SYSTEM



Illust. 33

Hydraulic Reservoir Fill-Check,
Relief Valve and Cover Clamps.

SERVICING THE FILTERS

1. Drain the hydraulic system. Refer to "DRAINING THE SYSTEM."
 2. Loosen the clamp (1 and 2, Illust. 33) nuts securing the reservoir cover in place.
- NOTE:** Before removing any components from the reservoir for servicing, wipe the top surface of the reservoir, using clean kerosine or a commercial cleaning solvent.
3. Remove the reservoir cover and sealing "O" ring.
 4. Loosen and remove the nuts securing the filter cover plate.

5. Remove the cover plate.
6. Remove the filter elements.

NOTE: Open and inspect the filter elements for warning signs such as metallic and packing deposits which would indicate problems in other components.

7. Check the outlet screen in the bottom of the reservoir for trapped particles. If any are found, remove the screen, wash it in solvent, dry with compressed air and install back in place.
8. Check the rubber seal in the by-pass valve. Be sure it is in place and pliable.
9. Clean the reservoir relief valve (4, Illust. 33). Refer to "SERVICING THE RELIEF VALVE."
10. Install new filter elements in the reservoir. Be sure they are seated properly over the spacers in the bottom of the reservoir.
11. Place the filter cover plate over the filter elements.
12. Secure the cover plate with the nuts previously removed.
13. Inspect the sealing "O" ring and replace it if damaged.
14. Install the sealing "O" ring in place on the reservoir.
15. Put the reservoir cover in place and secure it with the clamps.
16. Fill the reservoir with fresh oil. Refer to "FILLING THE SYSTEM."

CHANGING THE FILTER ELEMENT
(Illust. 36)

NOTE: Service the filter at the scheduled interval shown on the "SCHEDULED MAINTENANCE GUIDE" in Section 7.

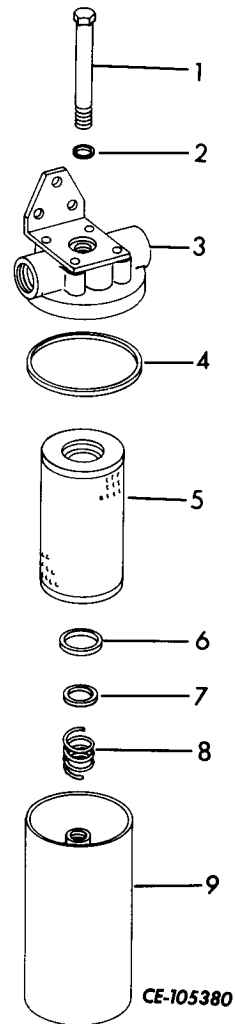
Removal

1. After reaching operating temperature, park the machine on level ground, stop the engine and lower the bucket to the ground. Install the safety bar.
2. Remove all outside dirt from the filter case and head.
3. Loosen the large bolt (1) in the center of the head.
4. Hold the filter case (9) and unscrew the bolt completely.
5. Pull the case (9) free of the head (3) and lower the case and element as a unit.
6. Turn the case upside down and drain the oil out.
7. Remove and discard the element (5). Be careful not to lose the spring (8), washer (7) and seal (6) from the bottom of the case.
8. Place the spring (8), washers (2 and 7), bolt (1) and case (9) in a solvent bath. Wash out any sludge that has accumulated in the case. Wipe the inside of the head (3) out. Dry all parts thoroughly.
9. Check the condition of the large seal (4) in the head and small seal (6) from the case. Replace them if they show signs of wear or deterioration.

Installation

1. Preassemble the following parts in the order given:
 - a. Insert the spring (8), washer (7) and small seal (6) over the shaft in the case and push them to the bottom.
 - b. Install the element (5) into the case. Push the element down and seat it over the seal (6).
2. Position the preassembled parts so the case seats squarely into the head.

3. Install the washer (2) on the bolt (1) and insert the bolt into the head (3). Tighten the bolt into the case.
4. Start the engine and let it idle for approximately five minutes. During this time check for filter leaks. Correct any leaks.
5. Check the transmission oil level as described under "CHECKING THE OIL LEVEL."



Illust. 36
Transmission and Torque Converter Oil Filter.

- | | |
|-------------|------------|
| 1. BOLT. | 6. SEAL. |
| 2. WASHER. | 7. WASHER. |
| 3. HEAD. | 8. SPRING. |
| 4. SEAL. | 9. CASE. |
| 5. ELEMENT. | |

TRANSMISSION

CHANGING THE OIL

1. After reaching operating temperature, park the machine on level ground. Lower the bucket to the ground, apply the parking brake and shut the engine down.
2. Install the safety bar.
3. Place a container under the transmission to catch the oil.
4. Remove the drain plug (12, Illust. 37) and washer (11) from the bottom of the transmission immediately after operation while the lubricant is still warm.
5. Unscrew the transmission oil level gauge and remove. This will vent the case and allow the oil to drain faster.
6. Open the vent valve on the top right side of the transmission and torque converter oil cooler. The cooler is mounted to the rear of the radiator.
7. After the lubricant has drained, service the transmission filter element. Refer to "CHANGING THE FILTER ELEMENT."
8. Install the transmission drain plug (12) and washer (11). Close the oil cooler vent valve.
9. Service the transmission sump strainers. Refer to "SUMP STRAINERS."
10. Fill the transmission with fresh lubricant to the proper level through the fill-check pipe.
11. Install the oil level gauge in the fill-check pipe.
12. Start the engine.
13. Check the lubricant level. Refer to "CHECKING THE OIL LEVEL."

SUMP STRAINERS (Illust. 37)

Service the transmission sump strainers after the oil has been drained for the scheduled oil change.

Removal

1. Disconnect the hoses from retainers (1 and 17) and move them out of the way.

2. Loosen the bolts securing retainer (1). Remove the retainer (1) with sump strainer (3) and gasket (2). Avoid disturbing the sump shroud (4) or gasket (8) will have to be replaced.

3. Loosen the bolts securing retainer (17). Remove the retainer (1) with sump strainer (15) and gasket (16). Avoid disturbing sump shroud (14) or gasket (13) will have to be replaced.

4. Unscrew the sump strainers (3 and 15) from retainers (1 and 17).

5. Wash all of the removed parts, except the gaskets (2 and 16) in a commercial cleaning solvent. Be sure all particles are removed from the strainers.

6. Dry all parts thoroughly.

7. Check the check valves of the strainers for proper operation by pushing down on the stem from the inside. The valve disc should move freely.

Installation

1. Assemble the strainers (3 and 15) onto the retainers (1 and 17).

2. Place a new gasket (2) over the strainer (3) and up against the retainer face with the holes lined up.

3. Install the retainer with strainer and gasket into the shroud (4) in the transmission sump.

4. Secure the retainer (1) in place with the bolts previously removed.

5. Attach the previously removed hose to the retainer (1).

6. Place a new gasket (16) over strainer (15) and up against the retainer face with the holes lined up.

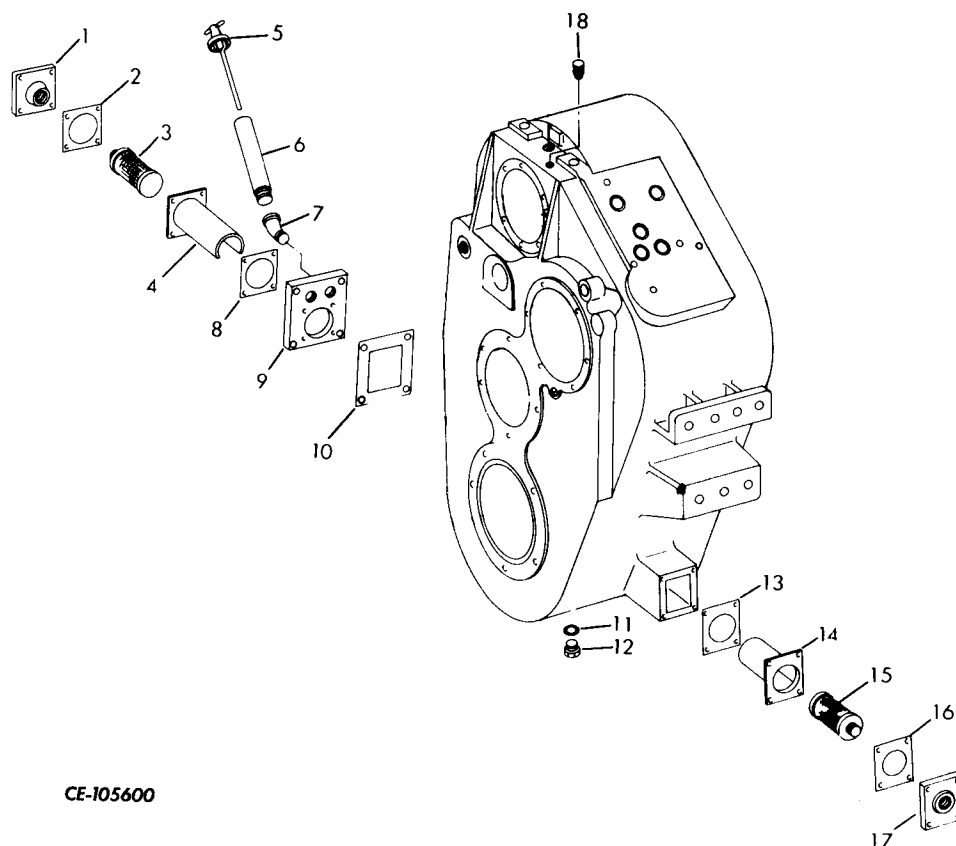
7. Install the retainer with strainer and gasket into the shroud (14) in the transmission sump.

8. Secure the retainer (17) in place with the bolts previously removed.

9. Attach the hose to the retainer.

10. After the transmission has been filled with fresh lubricant, start the engine and check the sump strainers for leaks.

TRANSMISSION



CE-105600

Illust. 37
Transmission Sump Strainers.

- | | |
|------------------------------------|-----------------|
| 1. RETAINER. | 10. GASKET. |
| 2. GASKET. | 11. WASHER. |
| 3. STRAINER. | 12. DRAIN PLUG. |
| 4. SHROUD. | 13. GASKET. |
| 5. OIL LEVEL GAUGE. | 14. SHROUD. |
| 6. FILLER TUBE. | 15. STRAINER. |
| 7. ELBOW. | 16. GASKET. |
| 8. GASKET. | 17. RETAINER. |
| 9. FILLER TUBE AND STRAINER PLATE. | 18. BREATHER. |

BREATHER

1. Remove the transmission breather (18, Illust. 37) from the top of the transmission.
2. Wash thoroughly in commercial cleaning solvent and dry with compressed air.
3. Install the breather in place on the transmission.



CAPACITIES (U. S. Measure - Approximate)

Fuel tank	50 gal.
Cooling system	18 qts.
Crankcase	
With filter change	15 qts.
Without filter change	14 qts.
Transmission and torque converter system	To "Full" mark
Axle differential (each)	16 pts.
Planetary hubs (each)	2 pts.
Hydraulic system	18 gal.

SPECIFICATIONS

Engine	
Make	International
Model	D-360
Type	Direct start, direct injection, 4 cycle diesel
Number of cylinders	6
Bore	3.88 in.
Stroke	5.08 in.
Displacement	360 cu. in.
Firing order	1-5-3-6-2-4
Valve clearance	
Intake (warm)011 to .013
Exhaust (warm)020 to .022
Rated horsepower	110 @ 2500 rpm
SAE net torque	261 ft-lbs @ 1600 rpm
Engine speeds:	
Full load governed	2500 rpm
Low idle (no load)	700 ± 50 rpm
High idle (no load)	2700 ± 50 rpm
Electrical System	
Volts	24V
Amps	40 amp
Ground	Negative
Torque Converter	
Make	Twin Disc
Type	Single stage
Stall ratio	2.3 to 1
Transmission	
Make	International
Model	S-700
Type	Three speed, con- stant mesh, full reversing, power soft shift
Number of ranges	
Forward	3
Reverse	3
Speeds	
First gear forward	4.9
Second gear forward	9.6
Third gear forward	24.0
First gear reverse	5.9
Second gear reverse	11.4
Third gear reverse	28.5

SPECIFICATIONS

<p>Transmission - Continued</p> <p>Clutches</p> <p>Transmission pump</p> <p>Capacity</p> <p>Clutch pressure</p> <p>Filtration</p> <p>Axle</p> <p>Make</p> <p>Model</p> <p>First reduction</p> <p>Second reduction</p> <p>First reduction ratio</p> <p>Second reduction ratio</p> <p>Total final drive reduction ratio</p> <p>Service Brakes</p> <p>Type</p> <p>Wheel brakes</p> <p>Tires (tubeless)</p> <p>Size:</p> <p>Standard 15.5 x 25-12 Pr. (L-2)</p> <p>Optional 14.0 x 24-12 Pr. (G2)</p> <p>Optional 15.5 x 25-12 Pr. (L-3)</p> <p>Hydraulic Loader System</p> <p>Boom cylinders:</p> <p>Number of cylinders</p> <p>Type</p> <p>Bucket control cylinder</p> <p>Type</p> <p>Hydraulic Steering System</p> <p>Steering cylinders:</p> <p>Number of cylinders</p> <p>Type</p> <p>Hydraulic System Pumps</p> <p>Steering pump:</p> <p>Pressure</p> <p>Capacity</p> <p>Loader pump:</p> <p>Pressure</p> <p>Capacity</p>	<p>Multiple disc, pressure balanced, oil cooled</p> <p>21.8 gpm @ 2500 rpm (engine) 270 to 300 psi One replaceable, pleated paper, radial fin type element</p> <p>International FR-60 Center section, single pinion and gear Planetary finals 4.333:1 5.2:1 22.53:1</p> <p>Air over hydraulic Double adjustable shoe</p> <p>30-40 psi 30-40 psi 30-40 psi</p> <p>2 Double-acting</p> <p>Double-acting</p> <p>2 Double-acting</p> <p>2000 ± 25 psi @ 1100 ± 100 rpm 19 gpm @ 2500 rpm</p> <p>2500 ± 25 psi @ 2500 rpm 36 gpm @ 2500 rpm</p>
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SPECIFICATIONS

Loader Mechanism Speeds

Boom raising time	6.76 seconds
Boom lowering time	4.24 seconds
Bucket dump time	2.05 seconds
Bucket roll back time	2.95 seconds

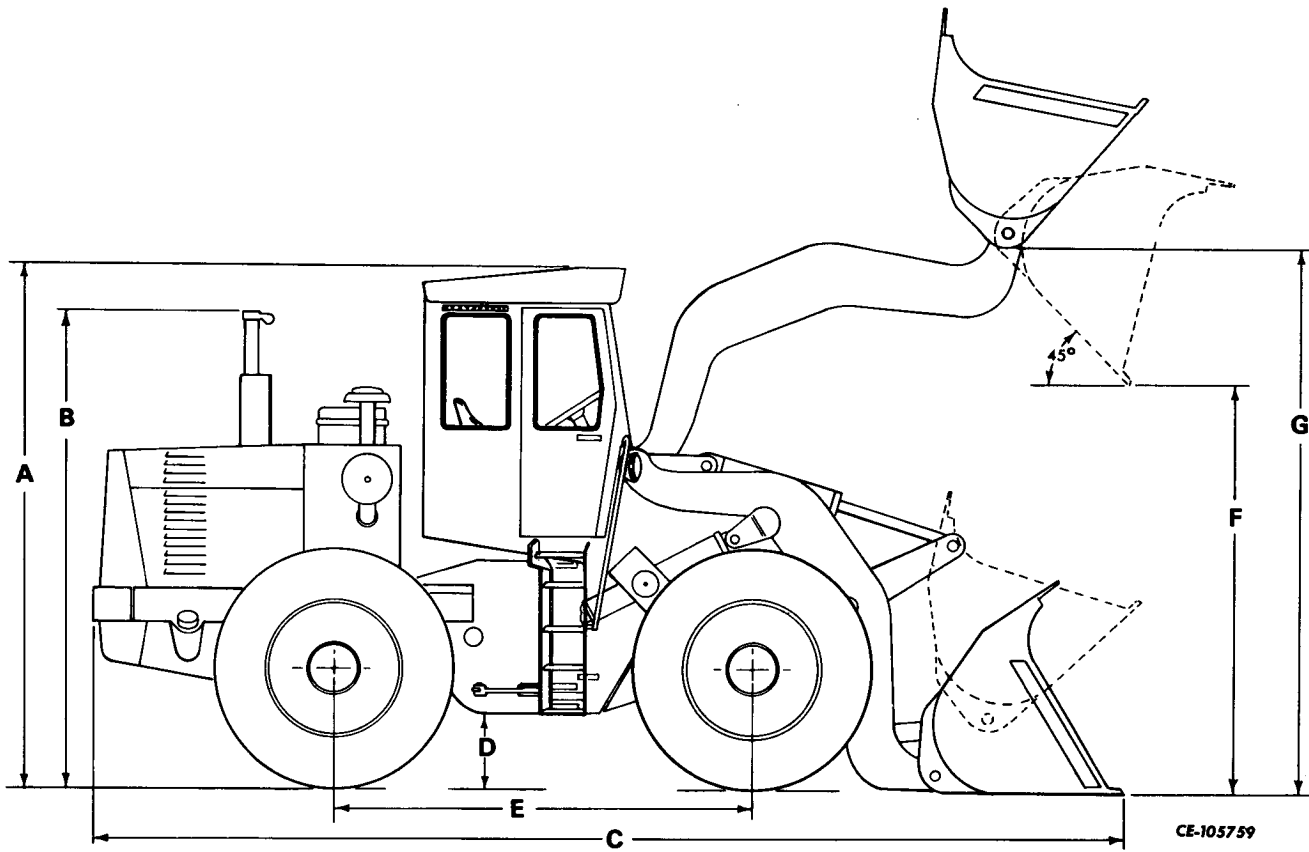
Radiator Cap	7 psi
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Torques

All torques are given with bolts, screws and nuts
lubricated with engine oil unless otherwise indicated

Cranking motor mounting bolts	85 ft-lbs
Oil pan drain plug	30 ft-lbs
Radiator and air cleaner hose clamps	20 in-lbs
Valve cover bolts	25 in-lbs
Wheel lug nuts	290-320 ft-lbs

DIMENSION DIAGRAM



GENERAL

A.	Height to top of cab	123"
B.	Height to top of exhaust stack	112"
C.	Length with bucket on ground	237-1/2"
D.	Ground clearance (minimum)	12-1/2"
E.	Wheel base	100"
F.	Bucket clearance in dump position	8'-7-1/2"
G.	Bucket clearance in rolled back position	10'-10-1/2"
	Width at front and rear tires	92-1/2"
	Total rear axle oscillation	24°
	Articulation	35° both ways from center
	Turning radius at 35° articulation	
	To outside of rear hub	202-1/2"
	To outside bucket corner at carry	223-1/2"
	Approximate weight over front axle	9,800 lbs
	Approximate weight over rear axle	11,130 lbs
	Approximate total weight	21,000 lbs