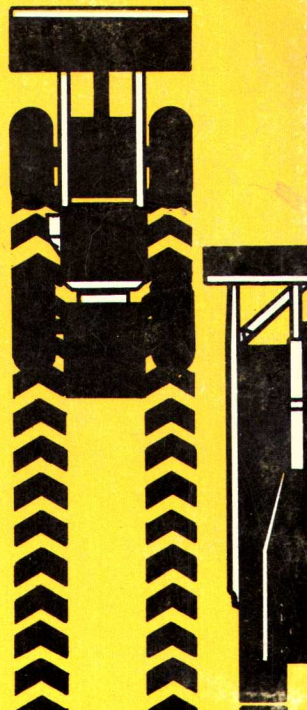
INTERNATIONAL®
CONSTRUCTION EQUIPMENT



OPERATOR'S MANUAL

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-400C
PAY® LOADER

FORM

OM-H-400C-1

August, 1974

PRINTED IN UNITED STATES OF AMERICA

(0574)

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.

SCHEDULED (NORMAL) MAINTENANCE WILL

"Increase Your Profit"

THROUGH INCREASED MACHINE RELIABILITY AND AVAILABILITY

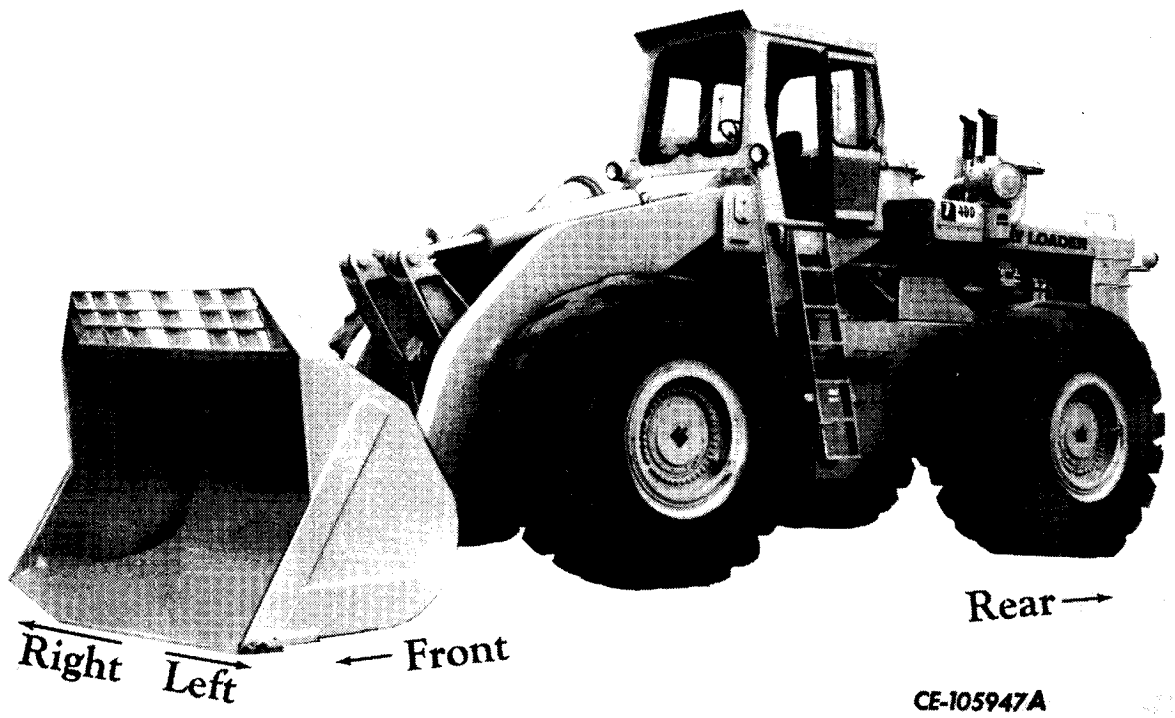
This machine is your INVESTMENT - NOW - let's use it to make all the PROFIT possible.

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.

SECTION CONTENTS

GENERAL



Illust. 1
H-400C PAYloader w/Spade Nose Bucket

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

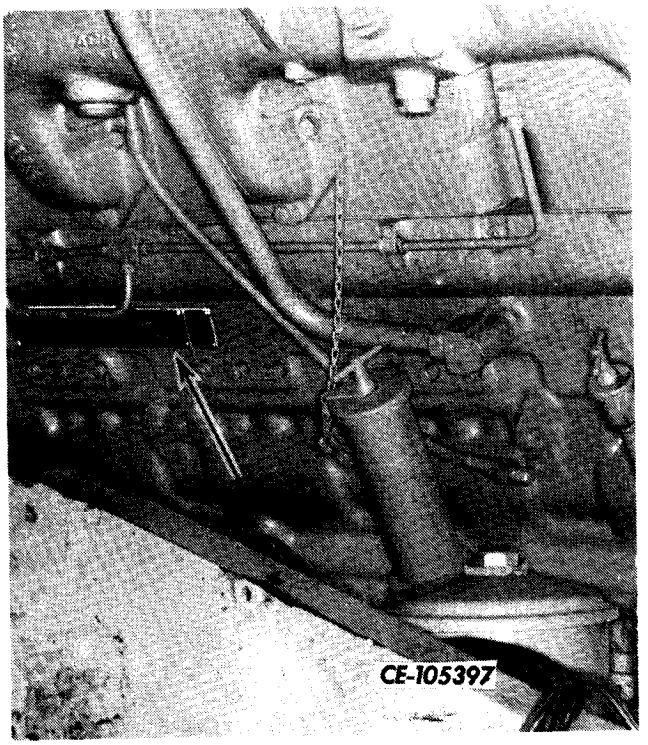
Some illustrations are of general application of this model and may not show your machine accurately in all details.

Throughout this manual, the use of the terms "left," "right," "front" and "rear" must be underscored 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. Refer to Illust. 1.

CUMMINS DIESEL ENGINE WARRANTY

International Harvester Company makes no warranty to the Cummins Diesel engine in the Model H-400C PAYloader. The engine is warranted by Cummins Engine Company, Inc., Columbus, Indiana 47201. Servicing of the engine during the warranty period is to be handled by the Cummins Engine Company distributor or dealer in your locality.

SERIAL NUMBERS



Illust. 2
Cummins Engine Serial Number Plate.

Record the PAYloader, engine, transmission, and converter serial numbers for service and parts replacement purposes. The PAYloader serial number plate is mounted on the cab support below the cab door by the ladder. This number is also stamped into the rear frame on the left rear side.

The engine serial number (Illust. 2) is stamped on a plate on the left side of the block on the Cummins engine.

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.

PAYloader Serial Number _____
Engine Serial Number _____
Transmission Serial Number _____
Torque Converter Serial Number _____
Front Axle Serial Number _____
Rear Axle Serial Number _____
_____ _____
_____ _____

MACHINE TRANSPORT

SHIPPING INSTRUCTIONS

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

NOTE: When transporting this machine on a high-speed carrier, seal the intake and exhaust pipe openings to prevent turbocharger damage.

Machines must be empty during transit.

Truck

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

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.

MACHINE TRANSPORT

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

The following procedure is for chassis storage only. For engine storage instructions, refer to your Cummins Diesel Operator's Manual.

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

Follow the procedure below when the 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. Drain off the water from the fuel tank. Refer to "FUEL SYSTEM" in Section 8.

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

4. Cover the transmission breather opening with tape.

5. If the cooling system will be exposed to freezing temperatures during storage and water only was used during operation, the cooling system must be drained and refilled with an anti-freeze solution while at operating temperature. Refer to "COOLING SYSTEM" in Section 8 to select a solution suitable for the lowest temperature that the cooling system will be exposed to during storage.

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

6. Completely service the air cleaners. Refer to "AIR CLEANING SYSTEM" in Section 8.

7. Move the machine to the storage area. Lower the bucket to the ground.

8. 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 hood and cover the air cleaner intake pipe.

9. Open both air tank drain valves.

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

11. Coat the exposed portions of all cylinder rods and control valve spools with chassis grease.

12. 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.

PREPARING STORED MACHINE FOR SERVICE

The following procedure is for chassis only. For engine instructions, refer to your Cummins Diesel Operator's Manual.

1. Inflate the tires. Check inflation pressure. Refer to "SPECIFICATIONS AND CAPACITIES" in Section 9. Remove the blocks (if the machine was jacked up). Lower the machine to the ground.

2. Close both air tank drain valves.

3. Remove the covering from the air cleaner intake pipes. Install the air cleaner weather caps.

4. Remove the covering from the transmission breather.

5. Install fully charged batteries. Make the proper cable connections.

6. Remove all covers and tapes from the openings on the engine exhaust and crankcase breather.

7. Fill the fuel tank with a good grade of fuel oil.

8. Check the air cleaner. Clean, if necessary.

9. Clean the chassis grease from the exposed portions of the cylinder rods and control valve spools.

10. Check all lubricant capacities to be sure they are at the proper levels.

11. Refer to Cummins Diesel Operator's Manual for procedure of restoring engine to service.

◆ 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.

12. When starting the engine, allow the engine to run at part throttle for approximately five minutes to allow thorough distribution of the lubricating oil. Do not place the machine under load until normal oil pressure and temperature are reached.

13. Operate the machine until the transmission oil reaches normal operating temperatures.

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 B, coarse thread bolts and nuts and thru hardened flat washers, all phosphate coated and assembled without supplemental lubrication.

The torques shown below also apply to the following:

1. Phosphate coated bolts used in tapped holes in steel or gray iron.
2. Phosphate 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 on nuts indicated 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

SECTION CONTENTS

INITIAL SERVICE PROCEDURE

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

BEFORE STARTING THE ENGINE

1. Refer to your Cummins Operator's manual for engine service instructions.

2. Be sure the cooling system is filled to the proper level. Refer to "COOLING SYSTEM" in Section 8.

3. Check the belt tensions at 1, 10 and 50-hour intervals until the tensions remain stabilized.

Refer to Cummins Engine Manual for checking procedure.

If equipped with an air-conditioner, refer to "AIR-CONDITIONER" in Section 8 for freon compressor belt tensioning information.

4. Check the battery liquid level. Refer to "ELECTRICAL SYSTEM" in Section 8.

5. 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.

BEFORE OPERATING THIS MACHINE

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.

LUBRICATION WHEN SHIPPED

This machine has been lubricated at the factory for operation in an air-temperature range of -10 degrees F. to 110 degrees F. If the 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 interval occurs. Refer to "SERVICE GUIDES" 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 ⊛
Hydraulic Reservoir	EO ⊕
Transmission	EO ⋕
Transfer Drive	MPL
Axles	MPL

⊛ The crankcase has been filled with the type and viscosity of oil as specified by Cummins Engine Company. Refer to your Engine Operator's Manual for the length of time this oil can be used before draining.

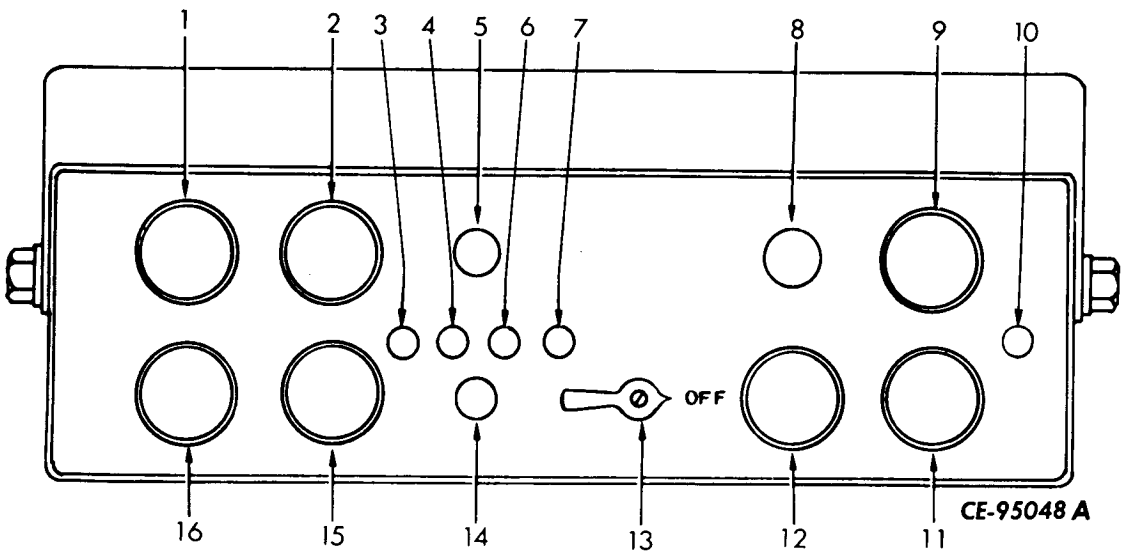
⊕ After the initial 100 hours of operation, replace the hydraulic oil filters. Thereafter, service these filters at the intervals specified in the "SCHEDULED MAINTENANCE GUIDE" in Section 7.

⋕ After the initial 100 hours of operation, change the transmission oil filter element and clean the transmission sump strainers. Thereafter, change the oil filter element and clean the sump strainers 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 16) corresponds with the numbers shown on Illust. 1 unless otherwise indicated.



Illust. 1
Instruments and Controls.

1. Engine Oil Pressure Gauge.
2. Engine Coolant Temperature Gauge.
3. Fuse—Rear Driving Lights Circuit.
4. Fuse—Tail Light Circuit.
5. Starting Aid Plunger (If equipped).
6. Fuse—Stop Lights Circuit.
7. Fuse—Heater and Air-Conditioner Circuit.
8. Parking Brake Warning Light.
9. Plug Button.
10. Plug Button.
11. Air Pressure Gauge.
12. Torque Converter Temperature Gauge.
13. Combination Switch.
14. Starter Switch.
15. Voltmeter.
16. Fuel Level 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" range immediately upon starting. When the engine is operated at full-load speed, the pointer must be in the "RUN" (green) 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 "RUN" (green) 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) Starting Aid Plunger (If equipped)

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

NOTE: The starting aid plunger should be used only when the air temperature is below freezing (+32 degrees F.).

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 lights circuit. Refer to "ELECTRICAL SYSTEM" in Section 8 for additional information on fuses.

(7) Heater and Air-Conditioner Circuits Fuse

The fuse inside of this holder protects the heater circuit or the air-conditioner circuit, depending on which is being used at the time. Refer to "ELECTRICAL SYSTEM" in Section 8 for additional information on fuses.

(8) Parking Brake Warning Light

This light will flash on and off if the parking brake is applied when the electrical combination switch is turned on. A buzzer will also sound intermittently.

The parking brake warning light will continue to flash until the parking brake is fully released at 85 psi air pressure.

NOTE: Do not operate the machine with the parking brake applied.

For bulb replacement, refer to "ELECTRICAL SYSTEM" in Section 8.

(9) Plug Button

This plugged hole is used for an optional attachment control.

(10) Plug Button

This hole is used for an optional attachment control.

(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 its reading. The gauge must register in the "RUN" (green) area. The left side of the "RUN" segment is approximately 100 degrees F. and the right side approximately 250 degrees 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).

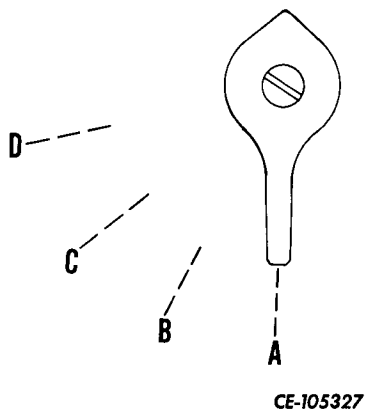
b. Service the transmission filter. For filter servicing procedures, refer to "CHANGING THE FILTER ELEMENT" under "TRANSMISSION AND TORQUE CONVERTER" in Section 8.

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

(13) Combination Switch (Illust. 2)

A Position - Off
This position is used to stop the engine. There is no electrical current flow to any circuit when the combination switch is in this position.

B Position - Ignition
This switch position allows electrical 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.



Illust. 2
Combination Switch Positions.

A. Off.
B. Ignition.
C. Instruments and Front Driving Lights.
D. Instruments and Front and Rear Driving Lights.

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

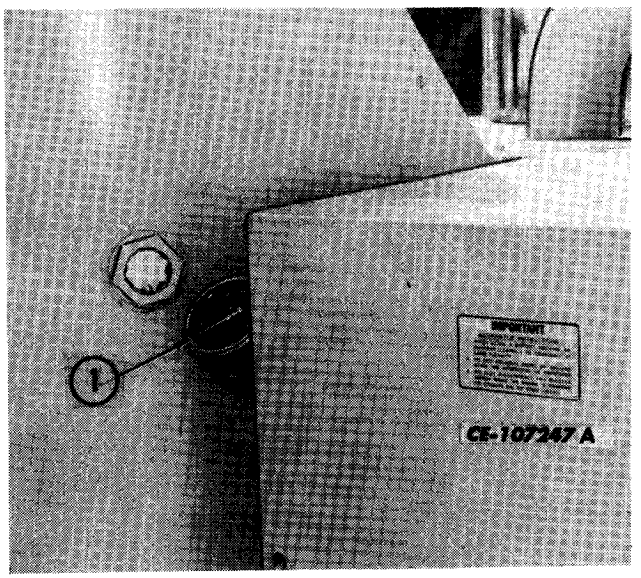
The voltmeter indicates the condition of the batteries. When the engine is not running or is running at low idle speed, the gauge pointer should be within the left green area, which indicates a good battery charge. If the voltage drops below the left green area, the batteries should be checked. With 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 lighly when taking a reading.

TACHOMETER

The tachometer (1, Illust. 3) is located to the left of the hydraulic reservoir. It is visible to the operator from the operator's seat. It indicates engine speed in hundreds of revolutions per minute and is used to check engine crankshaft speed.

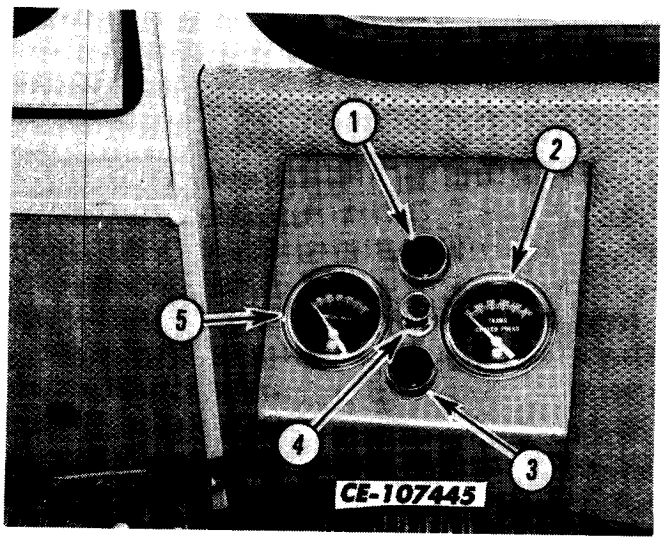


Illust. 3
Tachometer

AUXILIARY INSTRUMENTS (If equipped) (Illust. 4)

The auxiliary instruments are located to the right of the operator's seat on the cab wall. The instruments are as follows:

Item numbers correspond with numbers shown in Illust. 4.



Illust. 4
Auxiliary Instruments.

1. High Engine Coolant Temperature Warning Light.
2. Transmission Clutch Oil Pressure Gauge.
3. Low Engine Oil Pressure Warning Light.
4. Instrument Panel Light.
5. Hydraulic Oil Pressure Gauge.

(1) High Engine Coolant Temperature Warning Light

The high engine coolant temperature warning light will come on if the engine coolant temperature exceeds 200 degrees F. If the light comes on, shut the engine down immediately and correct the cause of overheating.

(2) Transmission Clutch Oil Pressure Gauge

This gauge registers the pressure of the oil being delivered to the clutch packs in the transmission. The gauge should be connected only when pressure checks are being made. After the engine has operated a sufficient length of time, the gauge must register 240-260 pounds of pressure. If the pointer is below or above the normal operating pressure, stop the engine and service the transmission oil filters. Refer to "TRANSMISSION AND TORQUE CONVERTER" in Section 28. If, after servicing the filters, 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 gauge should be disconnected when checks are completed, as the extreme pressure changes to which the gauge is subjected will greatly reduce the gauge life.

(3) Low Engine Oil Pressure Warning Light

The low engine oil pressure warning light will come on if the oil pressure drops below 15 psi. If the light comes on, shut the engine down immediately and correct the cause of low oil pressure.

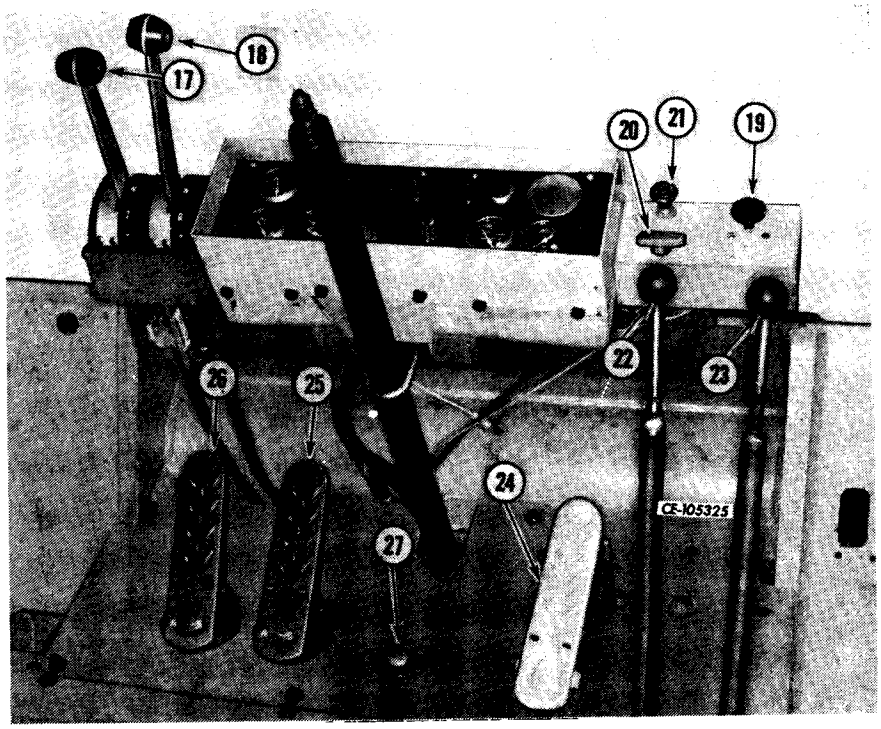
(4) Instrument Panel Light

The auxiliary instrument panel light will come on when the combination switch is placed in C or D position. Refer to "Combination Switch" and Illust. 2 in Section 3 under "INSTRUMENTS AND CONTROLS."

(5) Hydraulic Oil Pressure Gauge

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 3000 psi maximum.

The number of the control (17 through 27) corresponds with the numbers shown on Illust. 5, unless otherwise indicated.



Illust. 5
Controls.

17. Transmission Gear Range Lever.
18. Transmission Direction Lever.
19. Parking Brake Knob.
20. Hand Throttle Control.
21. Window Wiper Control.
22. Bucket Control Lever.
23. Boom Control Lever.
24. Accelerator Pedal.
25. Brake Pedal.
26. Brake and Transmission Disconnect Pedal.
27. Air Horn Button.

(17) 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.

(18) Transmission Direction Lever

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

(19) Parking Brake Knob

The parking brake is to be used only for parking the machine. Push the knob in to apply the brake. Pull it out to release the brake.

The machine air pressure must be built up to 85 psi before the parking brake can be fully released. The parking brake warning light on the instrument panel will be flashing and a warning buzzer will sound intermittently while the parking brake is engaged.

NOTE: Do not drive with the parking brake applied.

(20) Hand Throttle Control

The hand throttle control is attached to the right side of the instrument panel on a support bracket. In its lowest or "down" position, minimum fuel is supplied to the engine. As the control is pulled up, the amount of fuel metered to the engine increases. The control may be locked in any position by turning the handle 1/4 turn to the right. Push the control down before leaving the operator's compartment.

(21) 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.

(22) Bucket Control Lever

The bucket control lever is the left lever of the two levers at the right of the operator's seat. This lever controls the roll back and dump operations of the bucket. Refer to "CONTROL LEVER OPERATION" in Section 5 for additional information.

(23) Boom Control Lever

The boom control lever is the right lever of the two levers 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.

(24) Accelerator Pedal

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

(25) Brake Pedal

Depress the brake pedal according to the 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.

(26) 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.

(27) Air Horn Button

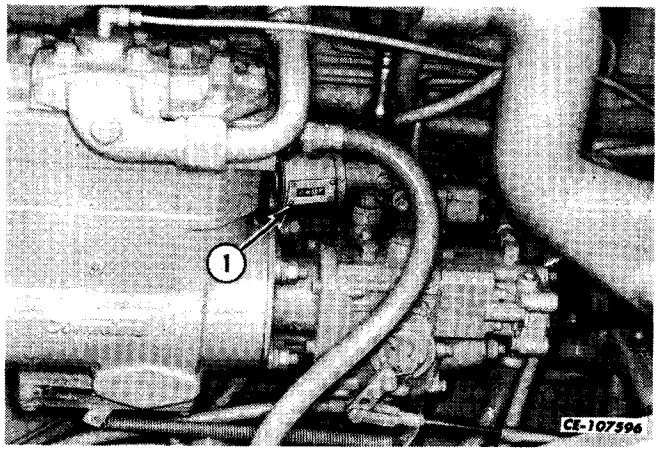
The horn button is located on the floorboard between the accelerator and brake pedals. Step on the button to sound the horn.

Service Recorder (1, Illust. 6)

The service recorder is located on the right side of the engine above the fuel injection pump.

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.

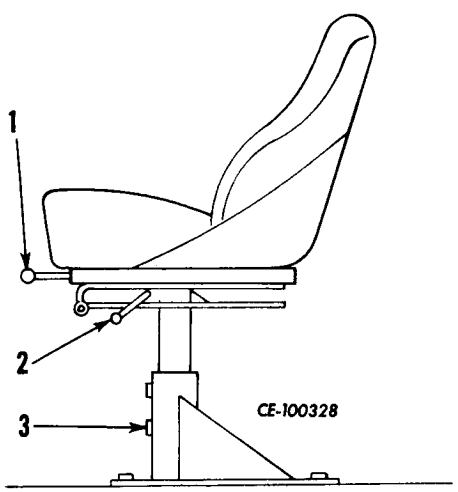


Illust. 6
Service Recorder.

Solid Base Seat Adjustment (Standard) (Illust. 7)

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

One seat adjustment lever is attached to the bottom 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.



Illust. 7
Solid Base Seat Adjustments.

1. Forward or Back Positioning Lever.
2. Tilt Lever.
3. Height Adjustment.

Air Suspension Seat Adjustment (If equipped) (Illust. 8)

The air suspension seat has an air shock absorber which receives compressed air from the machine air system. This allows the operator to adjust the firmness of the seat suspension by regulating the amount of air in the shock absorber. The seat adjustments are made as follows:

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

1. Push air control knob (1) in to get a more firm ride or pull it out to get a softer ride.

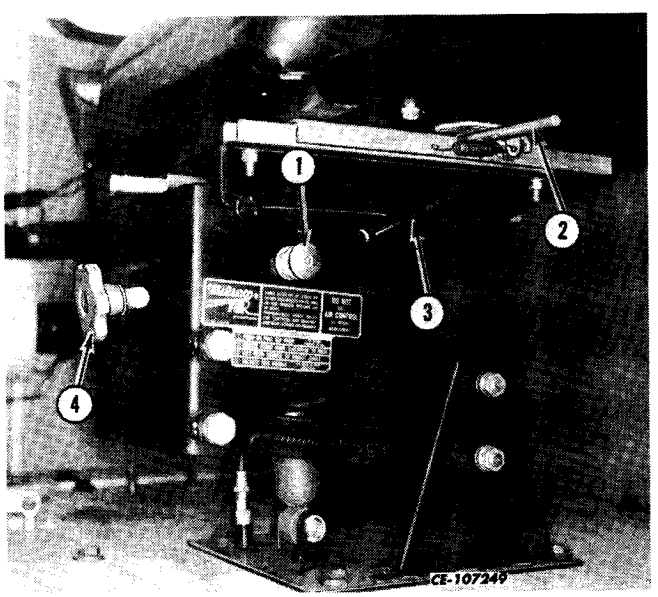
2. Push side lever (2) back to release. Slide the seat forward or back to the desired position, then release the lever.

3. Lift up handle (3) to release the tilt catch. Position the seat at the desired tilt angle and push the lever down to lock in position.

NOTE: Do not adjust the tilt while sitting in the seat.

4. To raise the seat turn knob (4) clockwise; to lower counterclockwise.

Check and tighten bolts periodically to prevent excessive bushing wear.



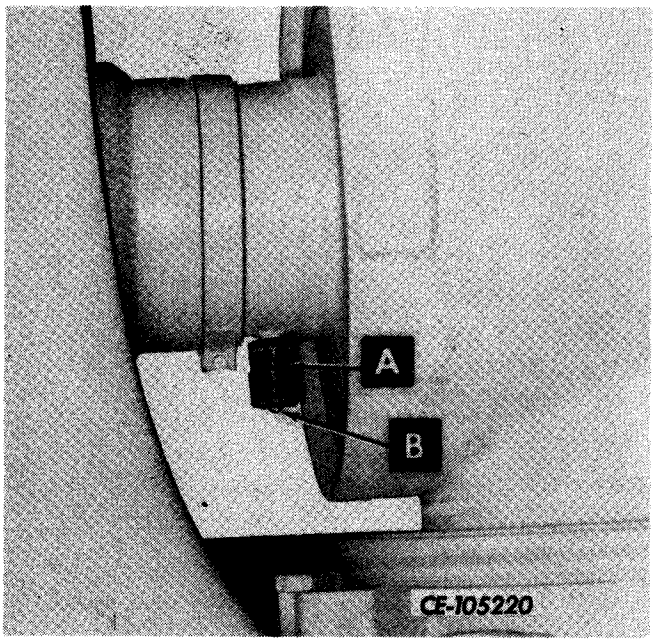
Illust. 8
Air Suspension Seat Controls

1. Air Control.
2. Forward and Rear Control.
3. Tilt Control.
4. Height Adjuster.

Air Cleaner Service Indicators (Illust. 9)

There is an air cleaner service indicator mounted on the tube between each air cleaner and the engine. 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 the indicator after the elements are serviced.



Illust. 9
Air Cleaner Service Indicator.

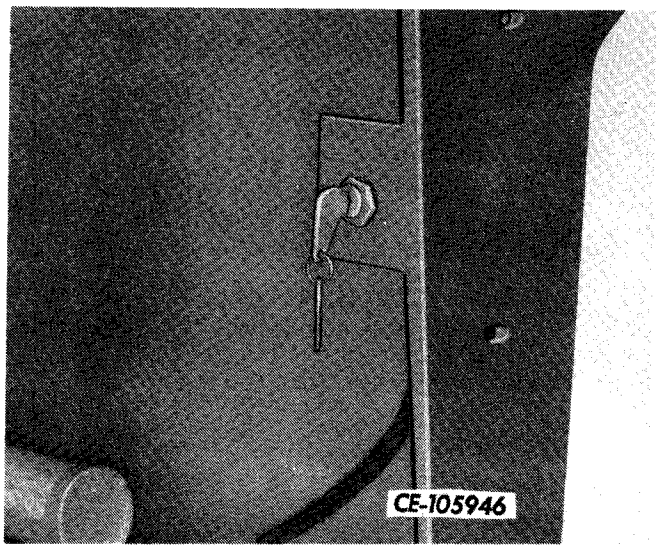
Electrical System Master Switch

The electrical system master switch (Illust. 10) is used to cut off the flow of electrical current to all machine systems.

◆ CAUTION: THE ELECTRICAL SYSTEM MASTER SWITCH SHOULD BE TURNED OFF (NO CURRENT) WHENEVER THE ELECTRICAL SYSTEM IS BEING WORKED ON.

To turn the electric current off, turn the key and remove it.

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

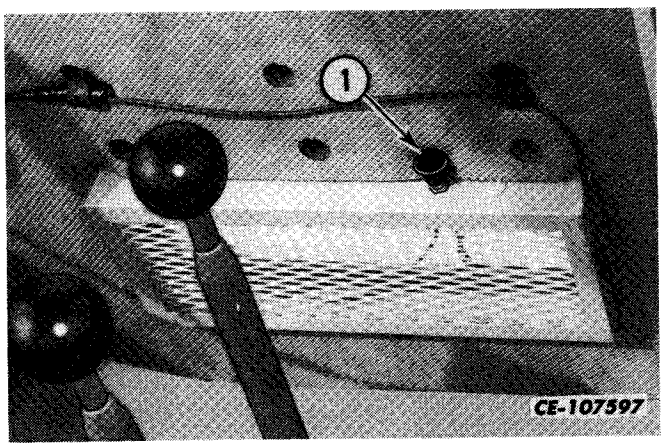


Illust. 10
Electrical System Master Switch.

Cab Pressurizer Blower Switch

The cab pressurizer is only on machines equipped with an R.O.P.S. cab and without a heater. If the machine has an R.O.P.S. cab and a heater, the heater blowers are used to pressurize the cab. Refer to "Heater, Defroster and Pressurizer Controls for R.O.P.S. Cab" in this section.

The pressurizer switch (1, Illust. 11) is located on top of the air inlet grille. It has three positions: OFF, HIGH and LOW. Turn the switch clockwise 45 degrees for HIGH blower speed or 90 degrees for LOW. Turn the switch all the way counterclockwise for OFF position.



Illust. 11
Cab Pressurizer Switch

Air-Conditioner Controls (If equipped) (Illust. 12)

Item numbers correspond with numbers shown in Illust. 12.

(1) Air Conditioning Direction Control

This knob controls the direction of air flow through defrost or normal outlets.

(2) Louvers

Four louvers direct the cooled air as desired.

(3) Air Conditioning Temperature Control

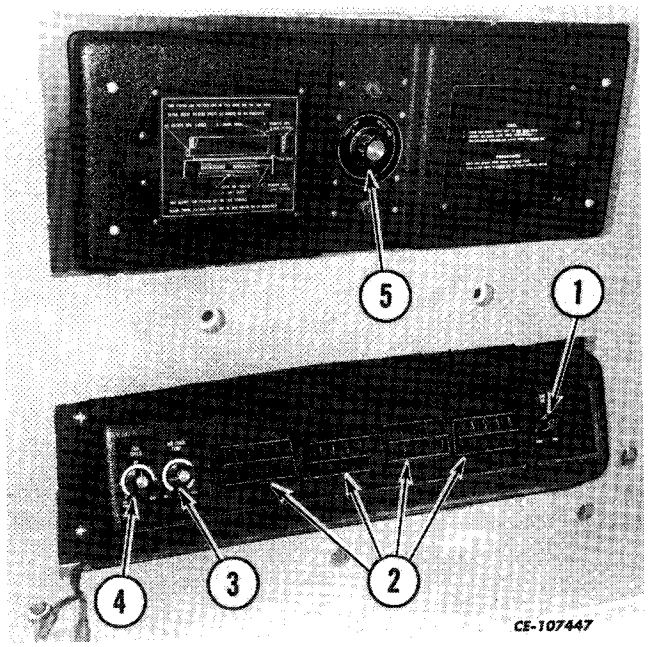
This knob turns the air-conditioner "on" and "off" and controls the temperature of the air. If cooler temperature is desired, turn the knob to the right. If warmer temperature is desired, turn the knob to the left. To turn the air conditioner "off," turn the knob to the left until a click is heard.

(4) Fan Speed Control Knob

This knob controls the force of air. The fan is "off" when the knob is straight up and down. Turn the knob to the left for higher fan speed when cooling the air. Turn the knob right for higher fan speed when venting the cab with outside air.

(5) Fresh Air Control

This knob is used to control the cooling of fresh air or recirculated inside air. For maximum cooling, set this knob to "Recirc Air" position.



Illust. 12
Air-Conditioner Controls.

1. Air Conditioning Direction Control.
2. Louvers.
3. Air Conditioning Temperature Control
4. Fan Speed Control Knob.
5. Fresh Air Control.

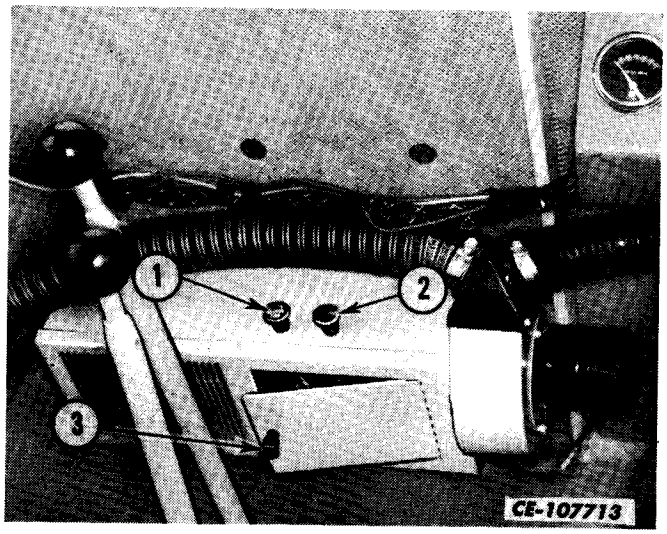
Heater, Defroster and Pressurizer Controls For R.O.P.S. Cab (If equipped) (Illust. 13)

The heater unit is to the right of the operator's seat on the cab wall. The unit has two switches which operate the heater and defroster blowers. The front switch (1) is for the heater and the rear switch (2) is for the defroster. Both switches have three positions: OFF, HIGH and LOW. Pull the switch half-way out for HIGH or all the way out for LOW. Push the switch all the way in for OFF.

The heater unit has a door (3) on it which may be opened to allow more air into the cab.

NOTE: The heater hoses going from the engine to the heater coil have shut-off valves located at the engine connections. These valves should be closed during the summer off season and open during the cold season when the heater is in use.

The cab will be pressurized whenever the heater blower or defroster blower is on.



Illust. 13
Heater and Defroster Controls In R.O.P.S. Cab.

1. Heater Blower Switch.
2. Defroster Blower Switch.
3. Heater Door.

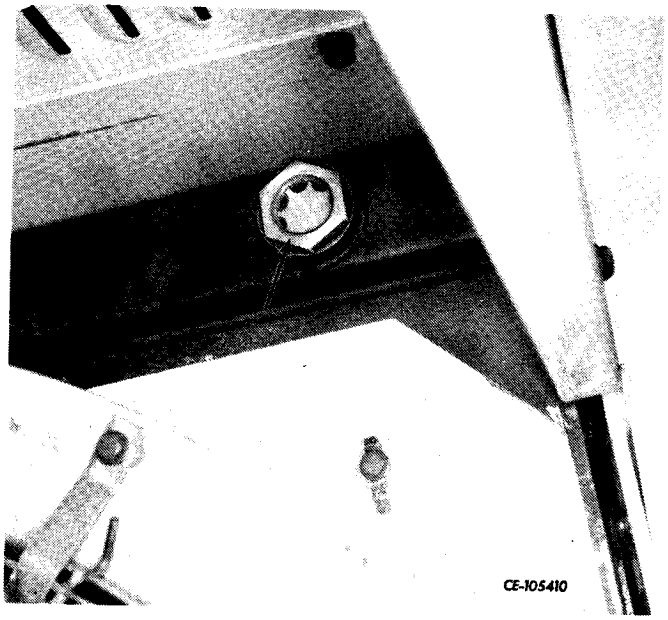
Heater And Defroster Controls For Non-R.O.P.S. Cab (If equipped)

The heater is to the right of the operator's seat on the cab wall. The unit has one switch which operates the blower. The single blower supplies air to both the cab and the window defrosters. The switch has three positions: OFF, HIGH and LOW. Turn the switch clockwise 45 degrees for HIGH or 90 degrees for LOW. Turn the switch counterclockwise all the way for OFF.

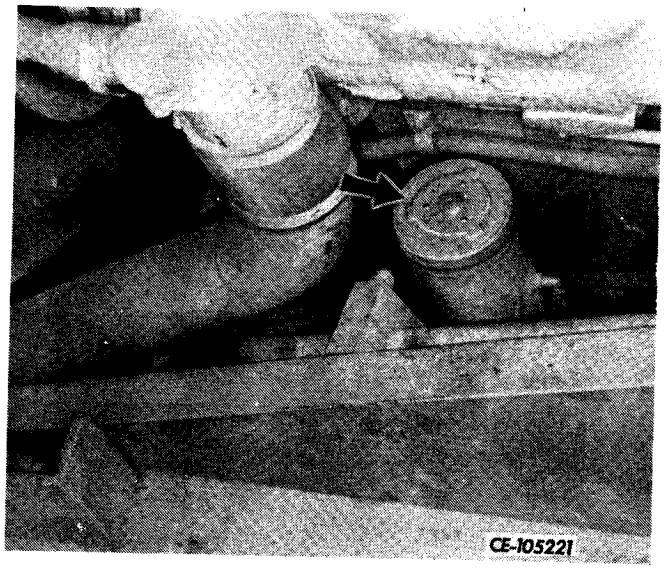
The heater unit has a door on it which may be opened to allow more heat for the operator. When the door is closed, more air will be diverted to the defrosters.

NOTE: The heater hoses going from the engine to the heater coil have shut-off valves at the engine connections. Close these valves during the summer off season to stop water circulation through the heater coil.

1. Check level of coolant in radiator. Look at the sight gauge in the top tank of the radiator. The ball in the gauge should be floating. If the ball is not floating, remove the radiator cap and add coolant until the level is up to the bottom of the filler neck.



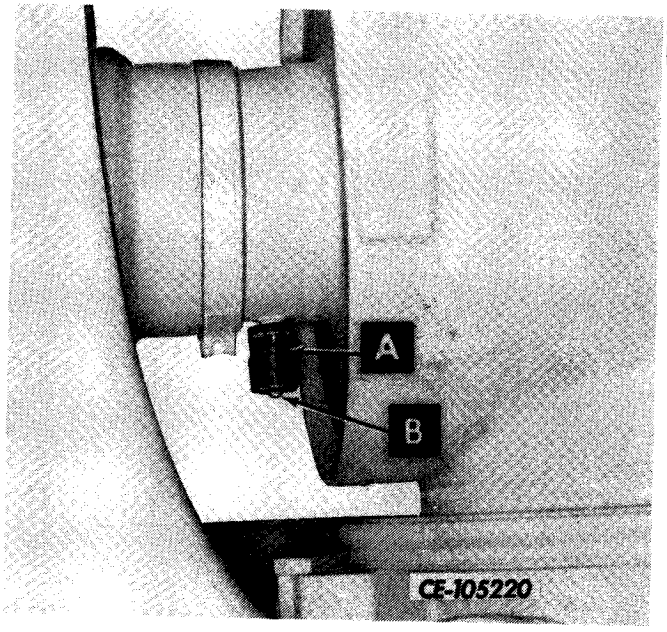
Illust. 1
Radiator Sight Gauge.



Illust. 2
Fuel Tank Filler Cap.

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

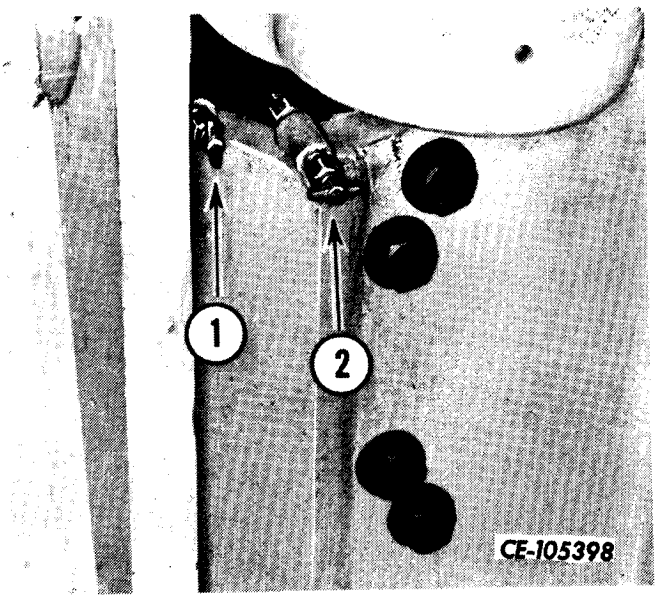
3. Check the air cleaner service indicators (Illust. 3) to see if the air cleaner filters are restricted. If so indicated, service the air cleaner filters before operating the machine.



Illust. 3
Air Cleaner Service Indicator.

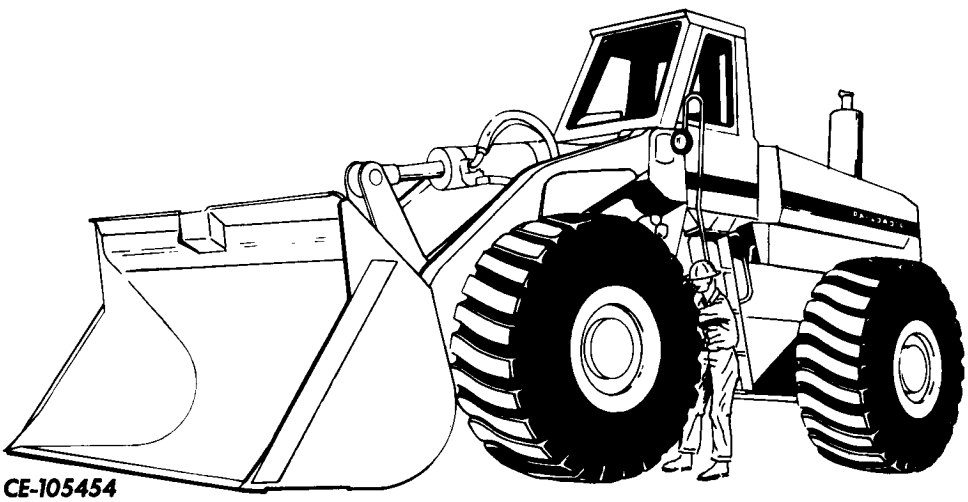
4. Open the air reservoir drain valves (1 and 2, Illust. 4). Drain any accumulated moisture, then close the valves. The valves are located on the left in the center hinge area below the steering cylinder.

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



Illust. 4
Air Reservoir Drains.

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



Illust. 5
General Inspection.

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

CHECK HEADLIGHTS FOR OPERATION. ALSO CHECK TAILLIGHT AND STOPLIGHT.

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

CHECK TIRES FOR CUTS, TREAD WEAR, PROPER INFLATION.

SECTION CONTENTS

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 judgment and observance of these rules will help make your job a safer one.

Never pour cold coolant into the radiator if the engine is very hot unless conditions make it absolutely necessary. Under such conditions, start the engine and let it idle while slowly pouring the coolant into the radiator.

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

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 for thorough distribution of the lubricating oil.

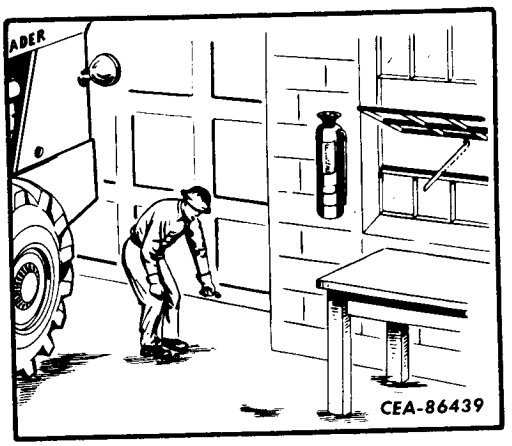
Before shutting down, operate the engine at half throttle (no load) for three to five minutes. This will aid in cooling the engine and prevent afterboil.

Never shift the transmission into neutral (N) while the machine is moving under load 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.

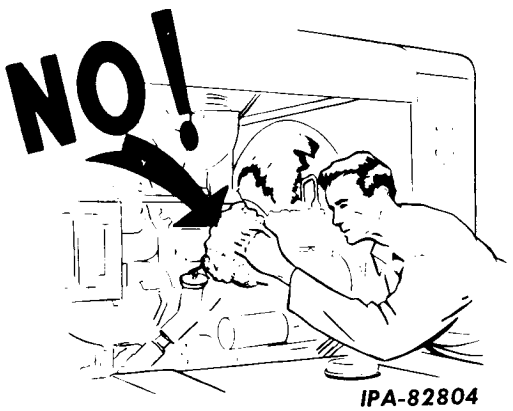
PRECAUTIONS

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

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



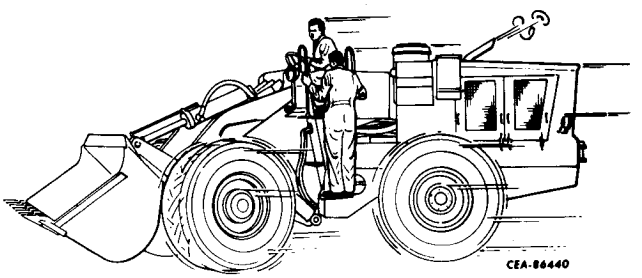
Never start the machine in an enclosed building unless the doors and windows are open.



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.

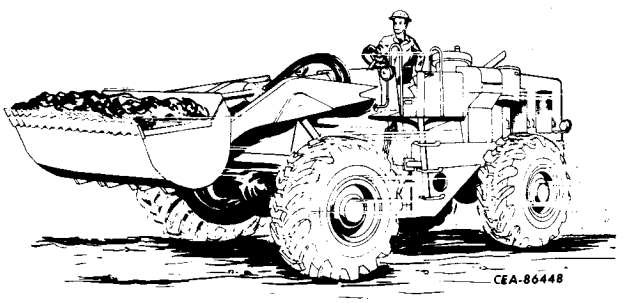


Never haul passengers.

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 positioned 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.

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.

PRECAUTIONS

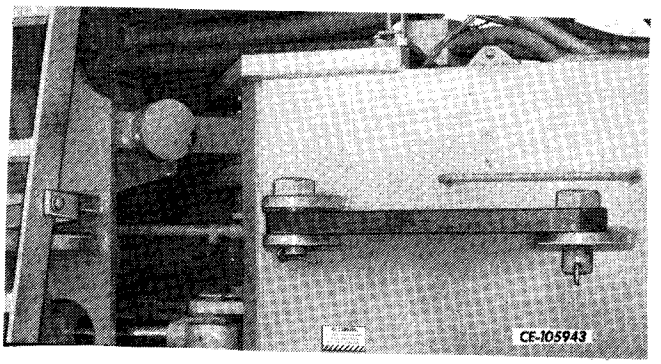
Use a commercial solvent or kerosene unless otherwise specified for cleaning parts. Never operate the the engine when using cleaning solvents.

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

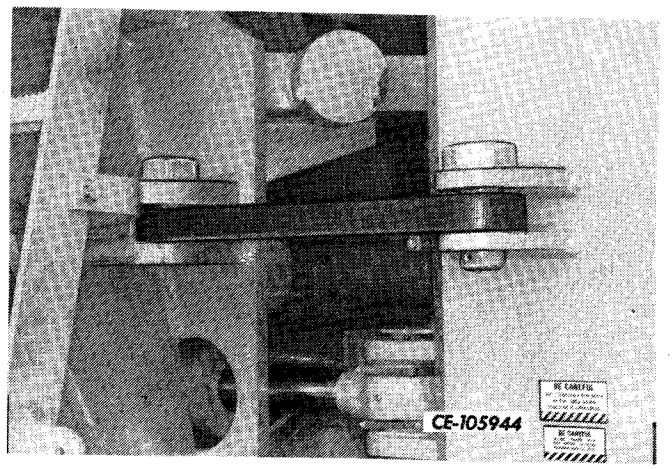
> ◆ CAUTION: DO NOT SERVICE OR TRANSPORT THE MACHINE UNLESS THE SAFETY BAR OR PINS ARE IN PLACE.

A bar and two pins (Illust. 1) are provided on the left 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.



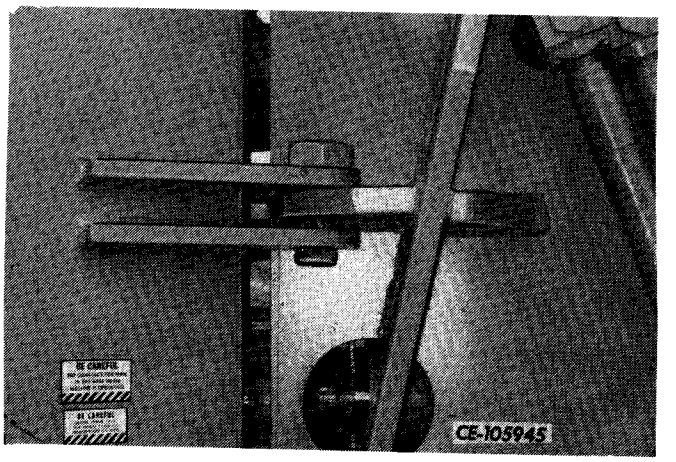
Illust. 1
Safety Bar and Pins Stowed.

To lock the tractor halves in straight position, the bar and two pins are used as shown in Illust. 2.



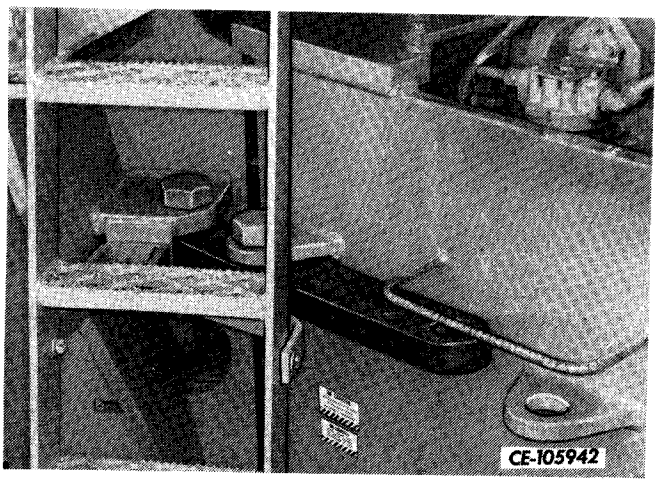
Illust. 2
Safety Bar in Straight Lock Position.

To lock the machine in a full right turn, only one pin is used. Turn the machine to its full right turn position and insert the pin through the holes on the right side of the machine. Refer to Illust. 3.



Illust. 3
Safety Pin Installed In Full Right Turn Lock Position.

To lock the machine in a full left turn, the safety bar and both pins are used. Turn the machine to its full left turn position and install the safety bar and pins as shown in Illust. 4.



Illust. 4
Safety Bar and Pins Installed in Full Left Turn Lock Position.

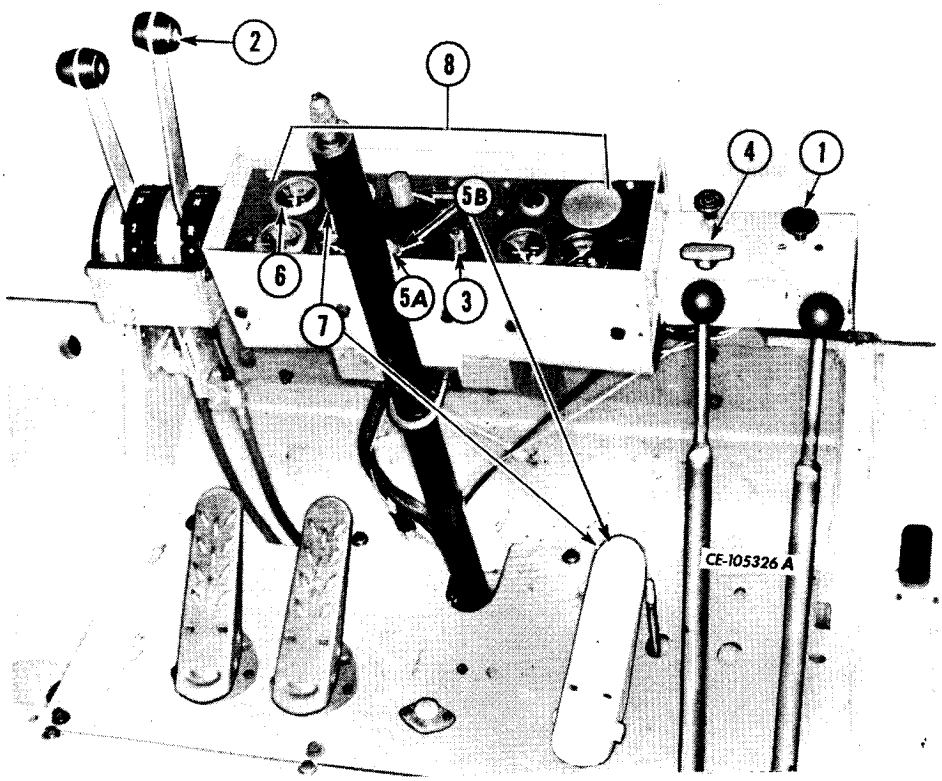
Always check that the bar and pins have been replaced in storage position on the left side of the tractor (Illust. 1) before operating the tractor.

Broken or lost safety bar and pins should be repaired or replaced immediately to insure that the safety device is always available for use. Do not attempt to service or transport the tractor if the safety bar or pins are broken or missing.

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. When starting the engine for the first time refer to your Cummins Engine Operator's Manual for additional instructions.

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



Illust. 5
Starting the Engine.

(1) Apply the parking brake.

(2) Place the transmission direction lever in "N" (neutral) 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).

(3) Turn the ignition switch to the "IGN" position.

(4) Make sure the engine hand throttle is pushed in.

NOTE: Refer to the Cummins Engine Operator's Manual for additional prestarting instructions.

STARTING THE ENGINE

(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 STARTING AID (If equipped):

NOTE: The starting aid should be used only when the air temperature is below freezing (+32 degrees F.).

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

Depress the accelerator pedal to full throttle position. Press the starter switch and starting aid plunger at the same time. Hold the starting aid plunger down for a maximum of two seconds. If the temperature is below zero (0 degrees 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

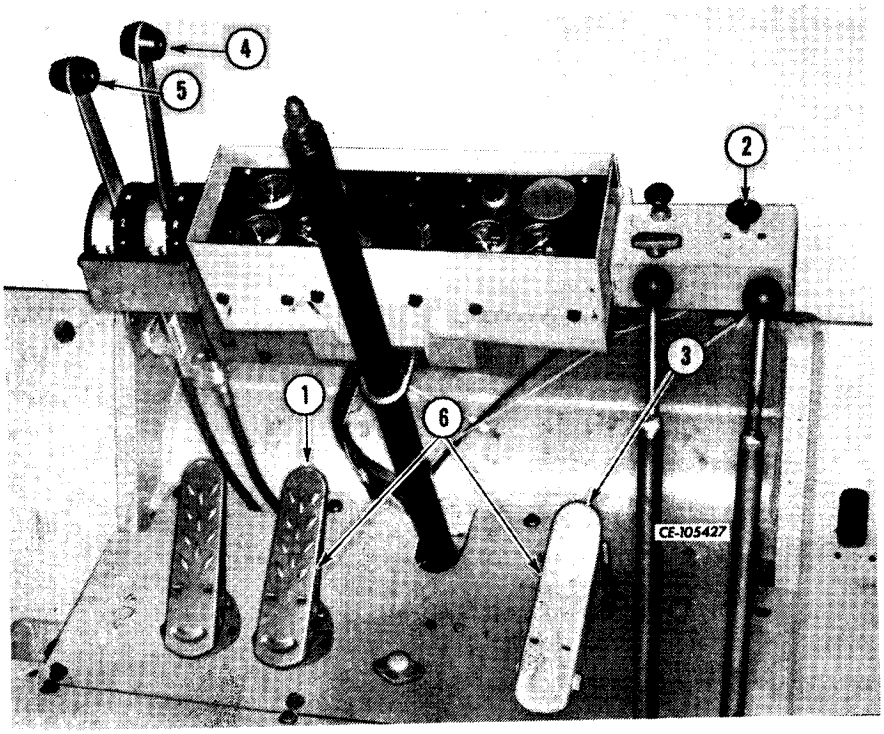
Immediately after the engine has started, and at frequent intervals during its operation, check all instruments to be sure of safe operation.

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. 6.



Illust. 6
Driving the Machine.

(1) Depress the brake pedal.

(2) Release the parking brake.

NOTE: The air system pressure must be built up to 85 psi before the parking brake will fully release.

(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.

NOTE: If the machine is equipped with a back-up warning alarm, the alarm will sound intermittently when the direction lever is in "R" (reverse) and the gear range lever is in "1" or "2."

(5) Place the transmission gear range lever in the desired position.

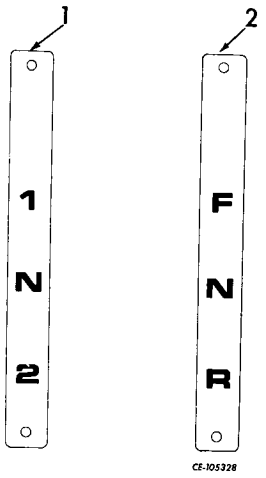
(6) Release the brake pedal and gradually depress the accelerator pedal until it is fully depressed.

SHIFTING GEARS

The transmission has five gear ranges; two forward, two reverse and neutral. There is a neutral position in the direction lever and in the gear range lever. Refer to Illust. 7.

The transmission is the semisoft power shift type. The gear range lever or direction lever can be manually shifted at any time without stopping the machine. When changing directions, the shift will be soft.

DRIVING THE MACHINE



Illust. 7
Transmission Control Lever Position Selector Strips.

1. Gear Range Strip.
2. Direction Strip.

All shifts are done manually. "1" (first gear) is the working gear range. "2" (second gear) is used for driving the machine on roads and hauling loads for a distance. "2" may also be used for working in loose material. The transmission clutches are designed to absorb any shift changes made.

Down-Shifting

A down-shift from "2" to "1" can be made at any time. The machine will decelerate immediately upon the down-shift. The amount of deceleration felt will depend upon the speed the machine is traveling at when the down-shift is made.

Up-Shifting

An up-shift from "1" to "2" can be made at any time. Acceleration will be the only sensation felt on an up-shift. It is not necessary to up-shift from "1" to "2" when roading the machine. You may start in "2" range.

The direction lever "N" position has a neutral start switch incorporated in it. The direction lever must be in "N" position before the engine can be started.

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.

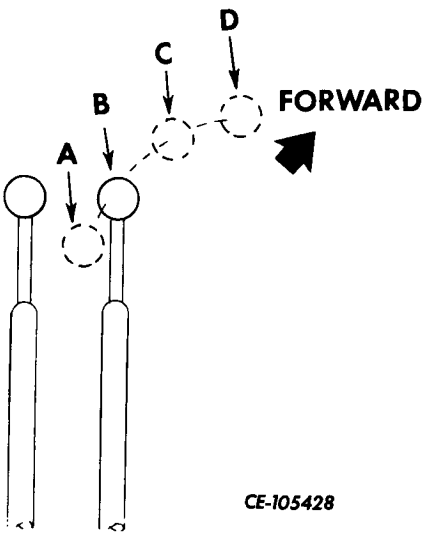
NOTE: Holding a control lever in any position except HOLD or FLOAT for an extended period of time after the hydraulic cylinder rod has reached the limit of its travel will produce excessive heat in the hydraulic system which may affect loader performance.

BOOM CONTROL LEVER (Illust. 8)

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.

Raise

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 will be done automatically when the boom reaches the preset stopping height of the automatic boom kickout, or the lever can be returned manually. Refer to "AUTOMATIC BOOM KICKOUT" in this section for additional information.



Illust. 8
Boom Control Lever Positions.

A. RAISE Position.
B. HOLD Position.
C. LOWER Position.
D. FLOAT Position.

LOADING MECHANISM OPERATION

Hold

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

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

Float

> ◆ 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.

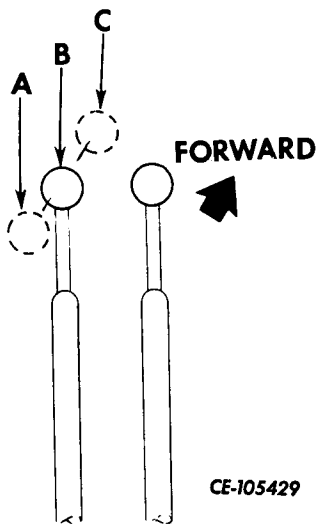
Push the lever all the way forward for this position. This position is detented so the lever must be pulled back manually to the HOLD position. FLOAT position allows the booms to lower faster by gravity to ground level.

BUCKET CONTROL LEVER (Illust. 9)

The bucket control lever is the left lever of the two levers at the right of the operator's seat. It has three positions. They are: ROLL BACK, HOLD and DUMP.

Roll Back

To roll the bucket back, pull the lever back. This position is detented. The return to HOLD must be done manually except when the bucket tilt attitude is below horizontal. After the bucket has been dumped, pull the lever into the ROLL BACK position. When the bucket tilt reaches the horizontal attitude, the automatic bucket positioner will kick the lever into HOLD position. Refer to "AUTOMATIC BUCKET POSITIONER" in this section for additional information.



Illust. 9
Bucket Control Lever Positions.

A. ROLL BACK Position. B. HOLD Position.
C. DUMP Position.

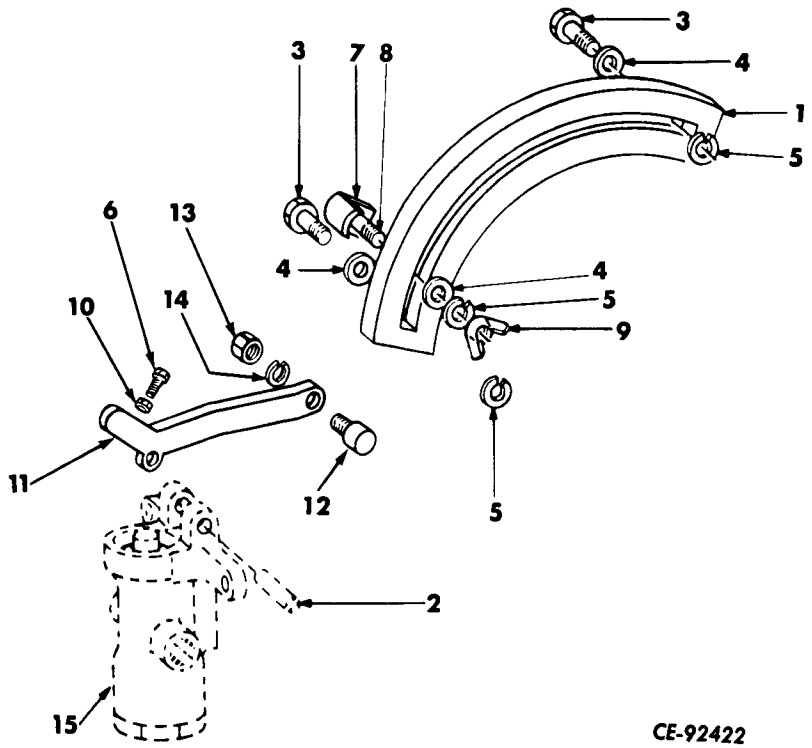
Hold

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 or from ROLL BACK when the bucket floor is above the horizontal position.

Dump

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

AUTOMATIC BOOM KICK-OUT (Illust. 10)



Illust. 10
Boom Kick-Out Control.

The machine's loading boom is equipped with an air-operated kick-out control system. The system stops boom travel automatically at a preselected height. The cam surface (1) is fixed to the upper boom end, on the outside of the right boom arm. The system air control valve is mounted to the inside of the front frame.

In operation, the cam (1) moves with the loader boom. The cam follower (12) on the valve actuating lever (11) follows the cam surface until it contacts the movable cam lobe (7), and actuates the control valve lever (11). This causes the bucket lever to be released into the HOLD position.

AUTOMATIC BOOM KICK-OUT ADJUSTMENT

To reset the automatic boom kick-out control, raise the boom to the desired stopping height.

Place the boom control lever in the HOLD position. Loosen the wing nut (9) and position the cam lobe (7) so that it just touches the cam follower (12). Tighten the wing nut.

AUTOMATIC BUCKET POSITIONER (Not Illustrated)

The automatic bucket positioner, which is attached onto the bucket cylinder, is factory preset to keep the bucket in a horizontal or "digging" attitude, with the cutting edge of the bucket parallel to the ground.

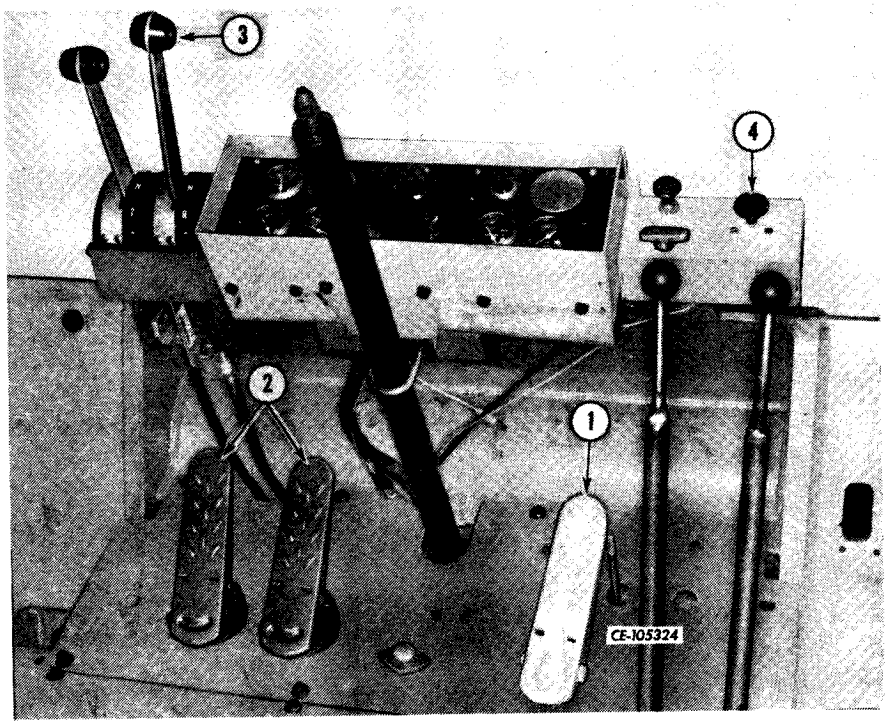
The object of the bucket positioner is to cause the bucket to return to its proper digging attitude automatically after its load has been dumped and the tractor is returning to the work area. After dumping, the operator moves the bucket control lever into its detented ROLL BACK position. When the bucket reaches its pre-set attitude, it automatically stops, and the bucket lever kicks into its HOLD position.

AUTOMATIC POSITIONER ADJUSTMENT

Adjustment of the bucket positioner is made at the end of the positioner rod where the two nuts secure the rod to the clamp which goes around the piston rod. Screwing the nuts further onto the positioner rod will cause the bucket to position in a more "open" attitude. Screwing the two nuts further out on the rod will cause the bucket to stop in a more "rolled back" attitude.

STOPPING THE MACHINE

Step numbers correspond with the numbers shown in Illust. 11.



Illust. 11
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 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.

AUTOMATIC BRAKE APPLY SYSTEM

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).

As the term "automatic apply brake system" implies, the parking/emergency disc brake will be applied automatically under certain emergency conditions. These conditions are described below.

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.

STOPPING THE MACHINE

◆ 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.

85 psi air pressure is required to hold the spring apply parking/emergency disc brake in the released position. As the air pressure diminishes below 85 psi, a holding valve will keep the disc brake released.

Should air pressure in the wet air reservoir drop to 45 psi, the holding valve will open and the parking/emergency brake will apply full disc brake effort automatically to stop the machine. Also, the parking brake warning light will flash on and off. The brake will remain applied until air pressure in the wet reservoir again reaches 85 psi.

PARKING THE MACHINE

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

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

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

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

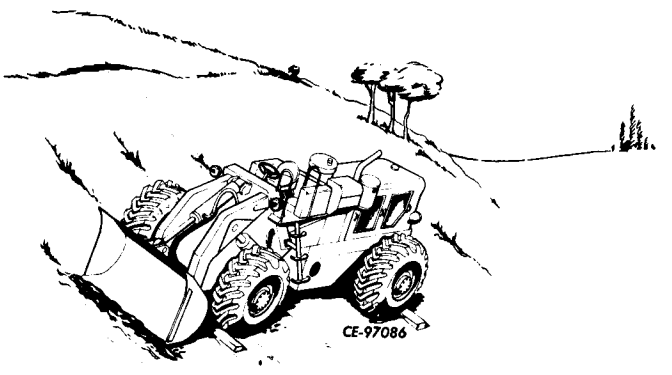
DO park machine on level ground, if at all possible:

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. 12.

NOTE: PARKING ON A STEEP SLOPE IS NOT RECOMMENDED.



Illust. 12
Parking on a Slope.

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.

This cooling-down period is especially important for the turbocharger. The turbocharger contains bearings and seals that are subject to high heat of combustion exhaust gases. While the engine is running, this heat is carried away by oil circulation. If the engine is stopped suddenly, the turbocharger temperature may rise as much as 100 degrees F. The result of this extreme heat may be seized bearings or loose oil seals.

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.

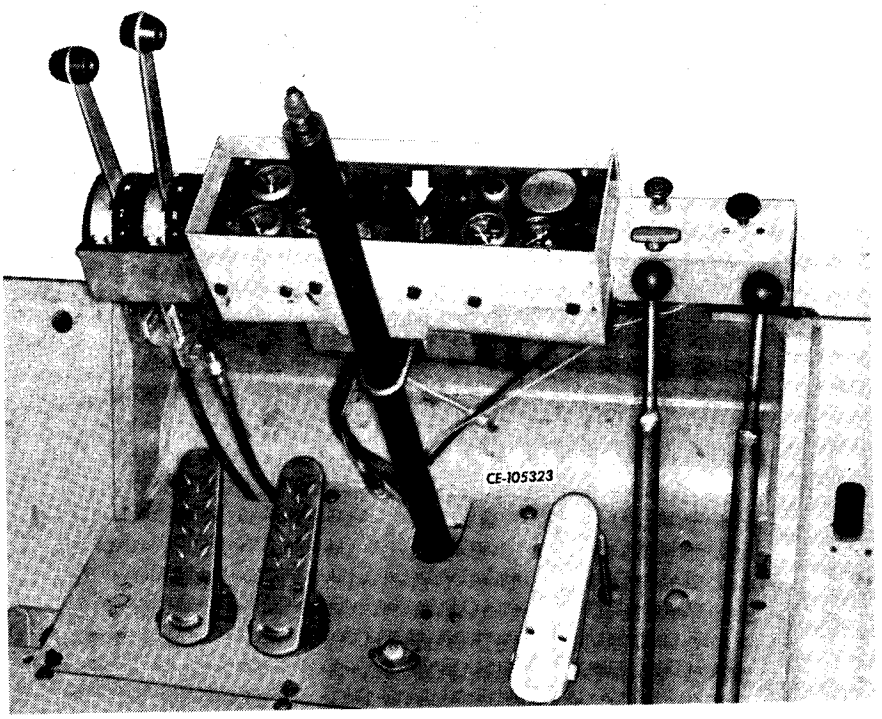
SHUTDOWN

To shut the engine down after the cooling period turn the combination switch (Illust. 13) to the "OFF" position.

NOTE: Stop the engine immediately if any parts fail.

Practically all failures give some warning to operator before parts fail and ruin engine. Many engines are saved because alert operators heed warning signs (sudden drop in oil pressure, unusual noise, 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 the engine indicates that something is wrong. It does not pay.



Illust. 13
Combination Switch.

OPERATING THE AIR-CONDITIONER (If equipped)

INITIAL COOLING

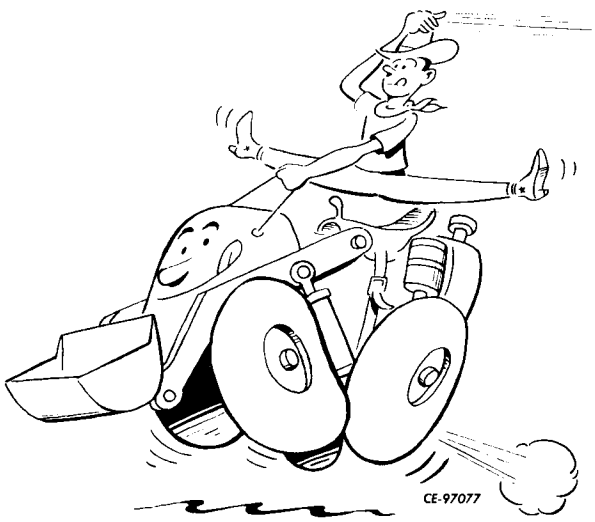
1. When possible, park the machine in shade. If parked in open sun, remove overheated air inside cab by driving with cab air vents and door open and the air-conditioner on.

2. After a short time, close the vents and door and adjust the air flow and temperature to your liking.

NOTE: For maximum cooling, turn the fresh air control to "Recirc Air" position.

STALE AIR AND SMOKE

To remove stale air and smoke while air-conditioner is operating, open a fresh air vent slightly for a short period of time.



GET TO KNOW YOUR MACHINE.

SECTION CONTENTS

GENERAL

Terrain, footing conditions, type of materials being worked, and maneuvering space determine the speed at which the loader can be worked. When the bucket is at work, keep the engine speed near full throttle and operate in the first gear transmission range. Use second gear range for traveling purposes. The techniques for using the loader described below are not intended as all inclusive. Each work situation will vary. Loader operation must be altered for each particular application to use the loader to best advantage.

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

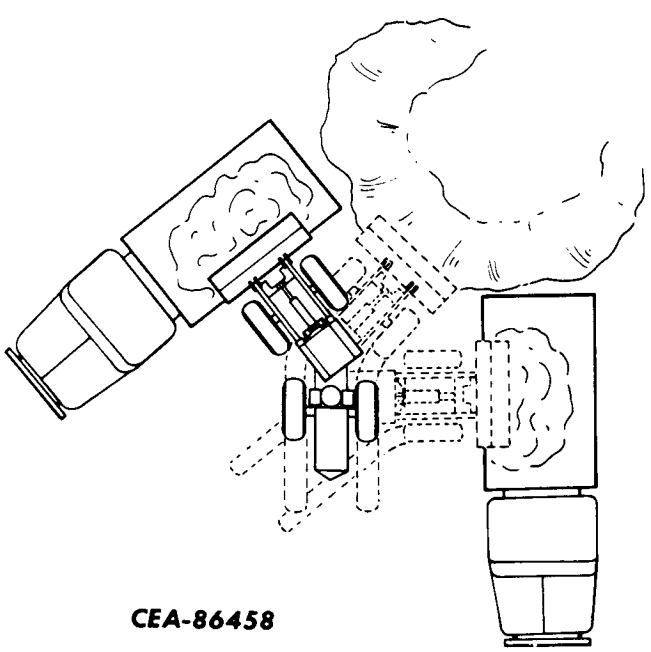
Avoid wheel spinning whenever possible; this wastes effort and only converts a relatively smooth working area into ruts and piles that pitch and tilt a loader. In cold weather, this material can freeze and cause additional difficulty the following day.

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.

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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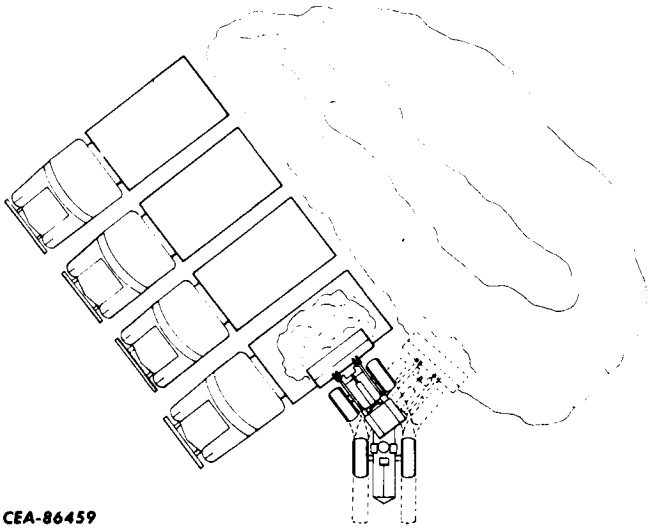
Illust. 1
"V-" Method Loading.

LOADING, TRANSPORTING AND PILING



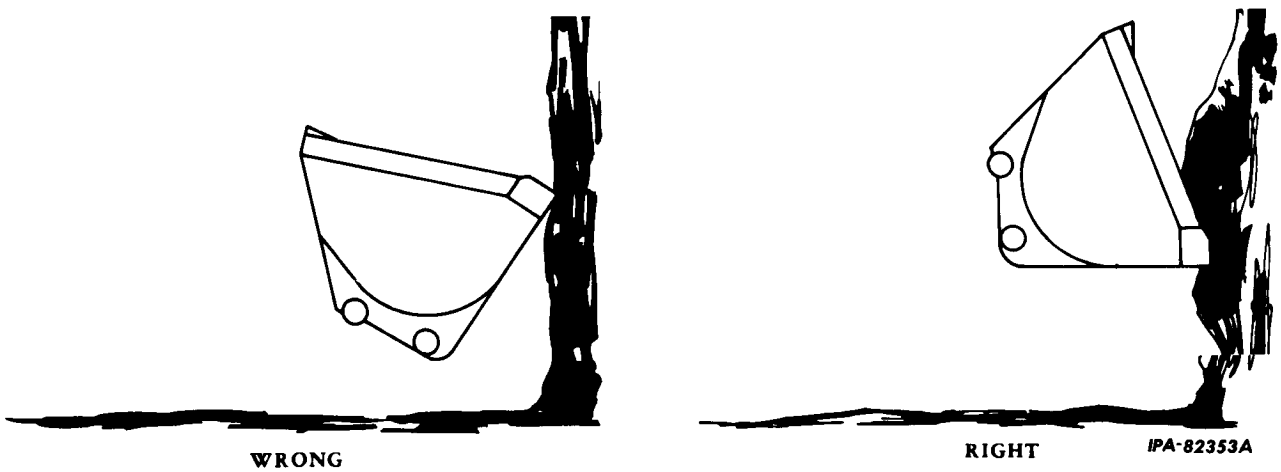
Illust. 2
Step-Loading Method.

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 will be obtained before the bucket reaches operator eye level.

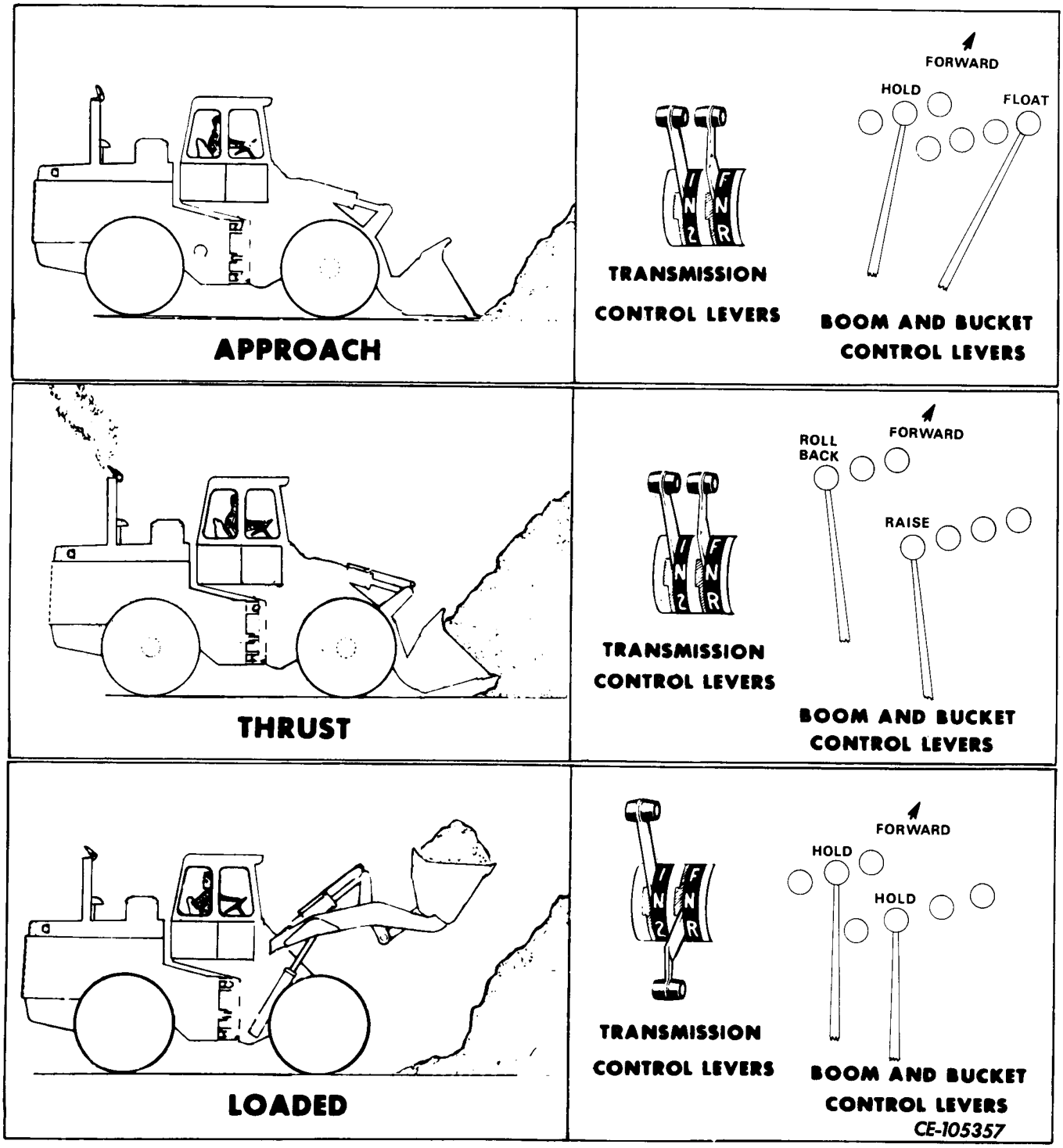
When bank loading, keep the cutting edge flat, as shown in Illust. 3. Tilting the bucket back too far forces the flat of the cutting edge against the bank, preventing the bucket from digging. This nonproductive maneuver causes waste of power and time and possible damage to the bucket cylinders and linkage.

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



Illust. 3
Bank Loading.

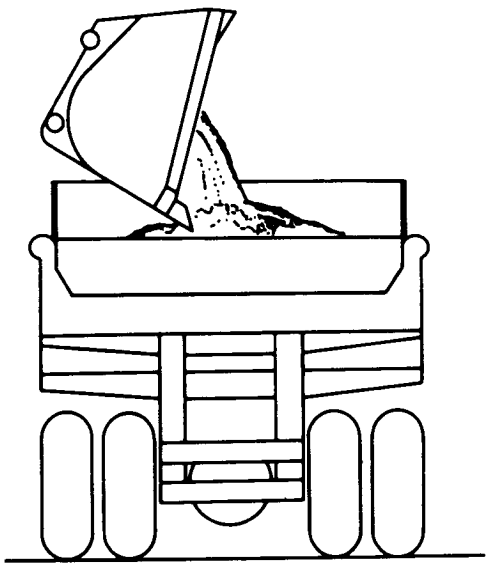
LOADING, TRANSPORTING AND PILING



Illust. 4
Loading Sequence.

LOADING, TRANSPORTING AND PILING

When transporting material, raise the boom arms to give the same ground clearance as provided by the loader. A loaded bucket must never be transported in the fully raised position. Keep the travel speed reasonable for safe operation. Upon reaching the truck, raise the bucket high enough to clear the truck body. Reduce forward speed and dump load slowly (Illust. 5). 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.



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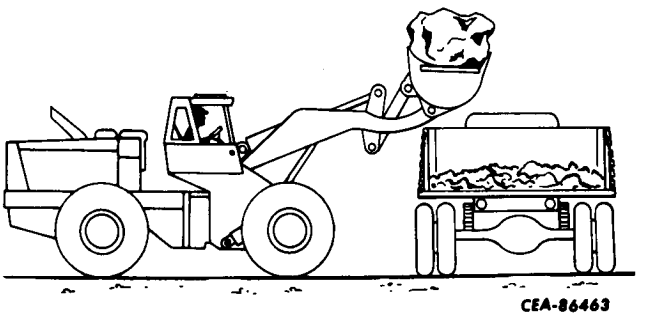
Illust. 5
Dumping Into Truck.

Before dumping a large rock(s) into a truck (Illust. 6), put enough loose rock or dirt into the truck first to act as cushioning material. Place large rocks into center of truck from as low a height as possible.



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Illust. 6
Dumping Large Rock Into Truck.

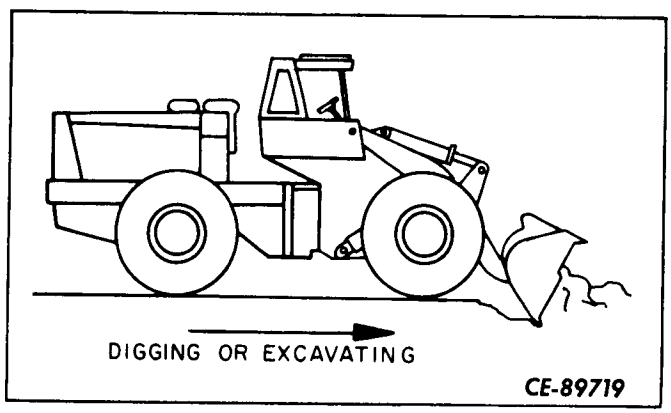
After the bucket empties, move the bucket control lever all the way back into the detented ROLL BACK position. Back the loader away from the dump area, lower the boom and return to the loading site. The bucket will automatically return to its preset working position.

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

DIGGING, CLEARING AND LEVELING

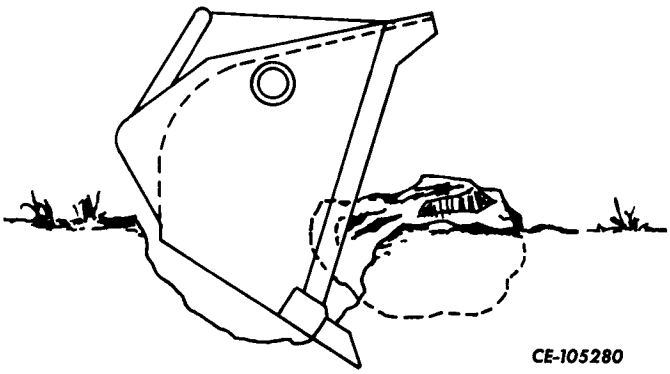
When digging or excavating, level the bucket with the ground. Use the boom control lever to force the bucket cutting edge into the ground as the tractor moves forward (Illust. 7). If the cutting edge does not penetrate the ground immediately, use the bucket control lever to incline the angle of the cutting edge slightly to give better penetration. As the cutting edge penetrates, use the bucket control lever to adjust the bucket cutting depth to prevent excessive penetration. Manipulate the boom and bucket control levers slightly to maintain as good a grade as possible. When the bucket is full or at the tractor end of the cut, roll the bucket back and raise it to clear the ground. Carry the load to the desired dump area.

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.



Illust. 7
Digging or Excavating.

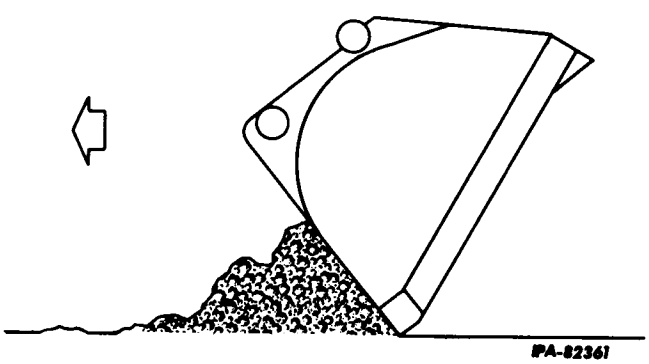
When loosening large or solid rocks, greater force and penetration can be obtained by digging under the rock with the bucket (Illust. 8). Lifting the rock with the bucket while pushing will increase traction and reduce wheel spinning.



Illust. 8
Large Rock Removal.

When backdragging or leveling, keep the bucket cutting edge level with the ground as the tractor is moved backward (Illust. 9). Lift the bucket off the ground when moving forward to begin a new drag so it will not cut in.

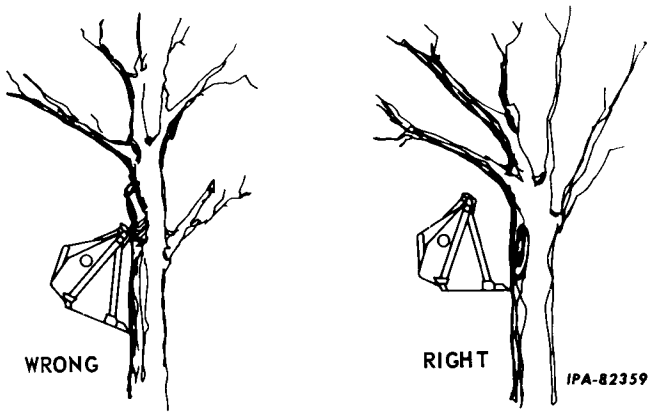
NOTE: Never travel forward with the bucket in a complete DUMP position on the ground. Serious damage to loading mechanism can result.



Illust. 9
Backdragging or Leveling.

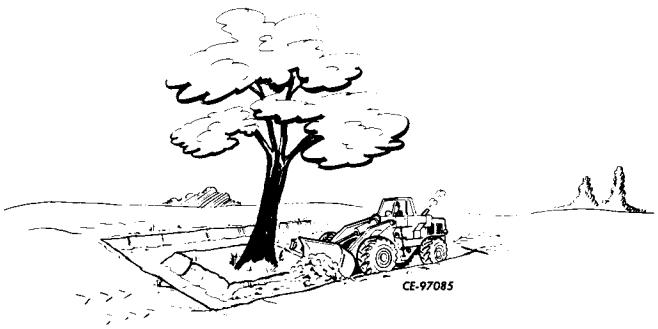
DIGGING, CLEARING AND LEVELING

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. 10).



Illust. 10
Removing Small Tree.

Heavy roots of large trees may require cutting from several sides of the tree (Illust. 11). Use a cable to topple and remove trees from soft ground.



Illust. 11
Removing Large Tree.

SECTION CONTENTS

Scheduled maintenance is the normal maintenance necessary to provide proper and efficient equipment operation. To protect your investment and prolong the service life of your equipment, follow the scheduled maintenance listed below.

SCHEDULED MAINTENANCE GUIDE

▲ **- Every 10 Hours of Operation**

Air cleaner service indicators	Check for indication to service air cleaner elements. Refer to "AIR CLEANING SYSTEM" in Section 8.
Air tanks	Drain water. Refer to "AIR PRESSURE SYSTEM" in Section 8.
Alcohol evaporator (if equipped)	Fill. Refer to "ALCOHOL EVAPORATOR" in Section 8.
Cab pressurizer air filter	Clean when heater or pressurizer is in use. Refer to "AIR CLEANING SYSTEM" in this section.
Engine	Refer to your Cummins Diesel Operator's Manual for any scheduled maintenance to be performed at this time.
Scheduled lubrication	Refer to "LUBRICATION GUIDE" in this section.

● **- Every 50 Hours of Operation**

Air-conditioner (If equipped)	Operate for 5 to 10 minutes during OFF season. Refer to "AIR-CONDITIONER" in Section 8.
Air-conditioner outside filters (If equipped)	Clean during seasons of use. Refer to "AIR-CONDITIONER" in Section 8.
Dust vacuator valve	Check for restrictions and clean if necessary. Refer to "AIR CLEANING SYSTEM" in Section 8.

(Continued on next page)

SCHEDULED MAINTENANCE GUIDE

Engine	Refer to your Cummins Engine Operator's Manual for any scheduled maintenance to be performed at this time.
Fuel tank	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.

- Every 100 Hours of Operation

Air cleaner hoods	Clean. Refer to "AIR CLEANING SYSTEM" in Section 8.
Air-conditioner inside air filters (If equipped)	Clean during season of operation. Refer to "AIR-CONDITIONER" in Section 8.
Differential vent tubes	Check for obstructions.
Engine	Refer to your Cummins Engine Operator's Manual for any scheduled maintenance to be performed at this time.
Hydraulic reservoir relief valves	Remove and clean. Refer to "HYDRAULIC SYSTEM" in Section 8.
Hydraulic reservoir filter elements	Initial element change. Refer to "HYDRAULIC SYSTEM" in Section 8.
Parking brake actuator breather	Remove and clean. Refer to "BRAKE SYSTEM" in Section 8.
Service brake power cluster breather	Remove and clean. Refer to "BRAKE SYSTEM" in Section 8.
Transfer drive breather	Remove and clean. Refer to "TRANSFER DRIVE BREATHER" in Section 8.
Transmission and torque converter breather	Remove and clean. Refer to "TRANSMISSION AND TORQUE CONVERTER" in Section 8.
Scheduled lubrication	Refer to "LUBRICATION GUIDE" in this section.

- Every 200 Hours of Operation

Air-conditioner freon compressor belt (If equipped)	Check and adjust tension. Refer to "AIR-CONDITIONER" in Section 8.
Air system	Check for and correct leaks. Refer to "AIR PRESSURE SYSTEM" in Section 8.
Engine	Refer to Cummins Engine Operator's Manual for any scheduled maintenance to be performed at this time.
Service brakes	Check for wear and adjust or replace when necessary. Refer to "BRAKE SYSTEM" in Section 8.

SCHEDULED MAINTENANCE GUIDE

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	Refer to Cummins Engine Operator's Manual for any scheduled maintenance to be performed at this time.
Transmission and torque converter system filter elements	Change. Refer to "TRANSMISSION AND TORQUE CONVERTER" in Section 8.
Scheduled lubrication	Refer to "LUBRICATION GUIDE" in this section.

▰ - Every 1000 Hours of Operation

Cooling system	Clean. Refer to "COOLING SYSTEM" in Section 8.
Engine	Refer to Cummins Engine Operator's Manual for any scheduled maintenance to be performed at this time.
Hydraulic system filter elements	Change. Refer to "HYDRAULIC 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 indicators show all red. Refer to "AIR CLEANER SYSTEM" in Section 8.
Air-conditioner refrigerant level (If equipped)	Check. Refer to "AIR-CONDITIONER" in Section 8.
Engine	Refer to Cummins Engine Operator's Manual for any additional maintenance to be performed.
Parking brake pads	Check for wear and replace when necessary. Refer to "BRAKE SYSTEM" in Section 8.
Starting aid ether can (If equipped)	Replace when empty. Refer to "STARTING AID" in Section 8.

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 depend 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 guesswork. 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 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.

LUBRICANT SPECIFICATIONS AND CAPACITIES

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

LUBRICATION POINT	CAPACITY	ANTICIPATED AIR TEMPERATURE		
		+ 120° F. + 20° F.	+ 70° F. - 10° F.	+ 10° F. - 30° F.
Engine Crankcase w/filters w/o filters	27 gals. 21 gals.	EO - Refer to your Cummins Diesel Operator's Manual.		
Hydraulic System	126 gals.	EO - MIL - L - 45199B or MIL - L - 2104B		
		10W ⊕	10W ⊕	10W ⊕ §
Axles (2)	34-1/2 gals.	MPL - IH 135H EP or MIL - L - 2105B or API GL - 5		
		Grade - 140	Grade - 140 #	Grade - 90
Transmission System	30 gals.	Dexron® ATF		
Parking Brake Actuators Service Brake Power Clusters	Fill as instructed.	BF - IH SAE - J1703C Super Heavy Duty Brake Fluid		
Transfer Drive	1 pt.	MPL - IH 135H EP or MIL - L - 2105B or API GL - 5		
		Grade - 90	Grade - 90	Grade - 90
All Lubrication Fittings	Fill as instructed.	MPG - IH 251H EP * or equivalent No. 2 multipurpose lithium grease or MIL - G - 10924B		

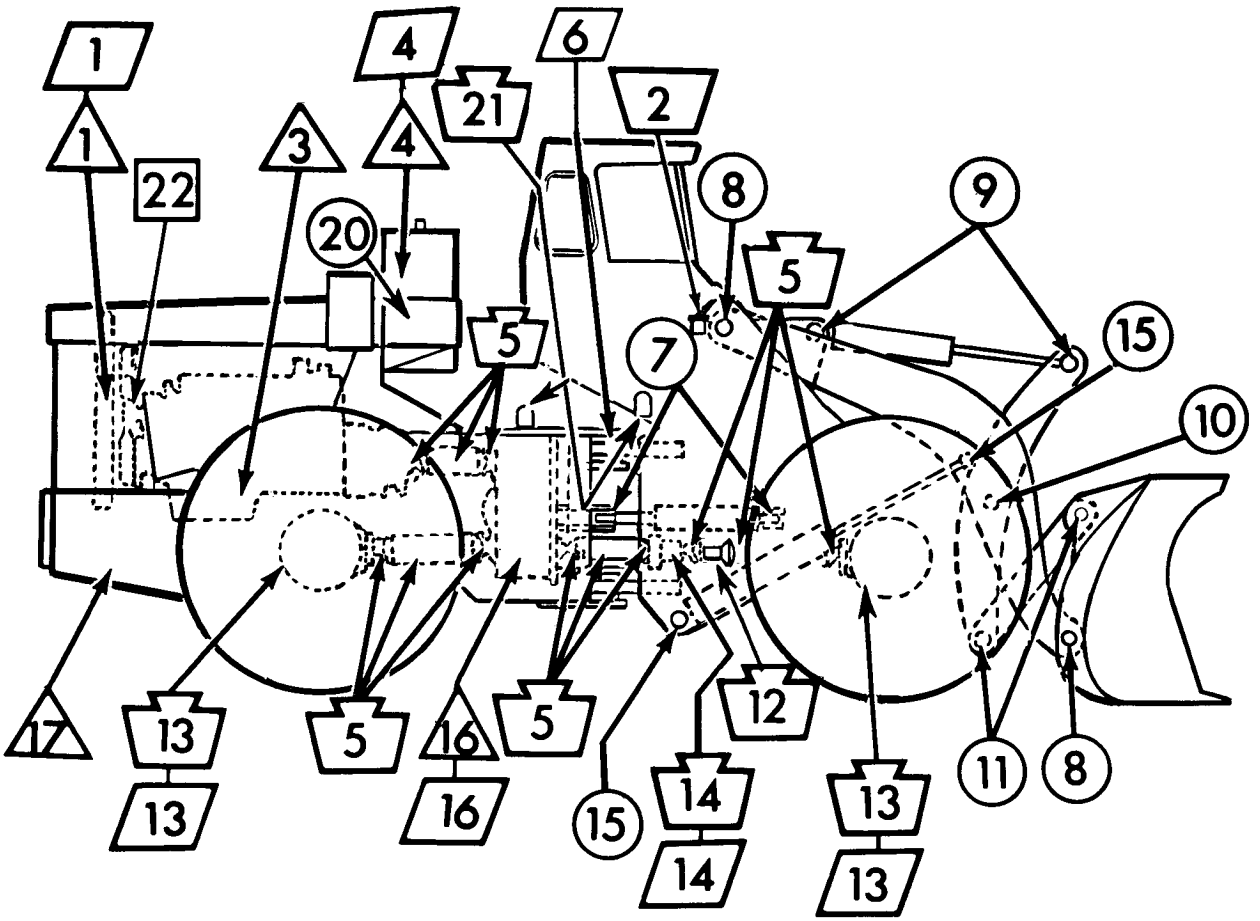
* For the specifications, consult your authorized International Construction Equipment distributor or dealer.

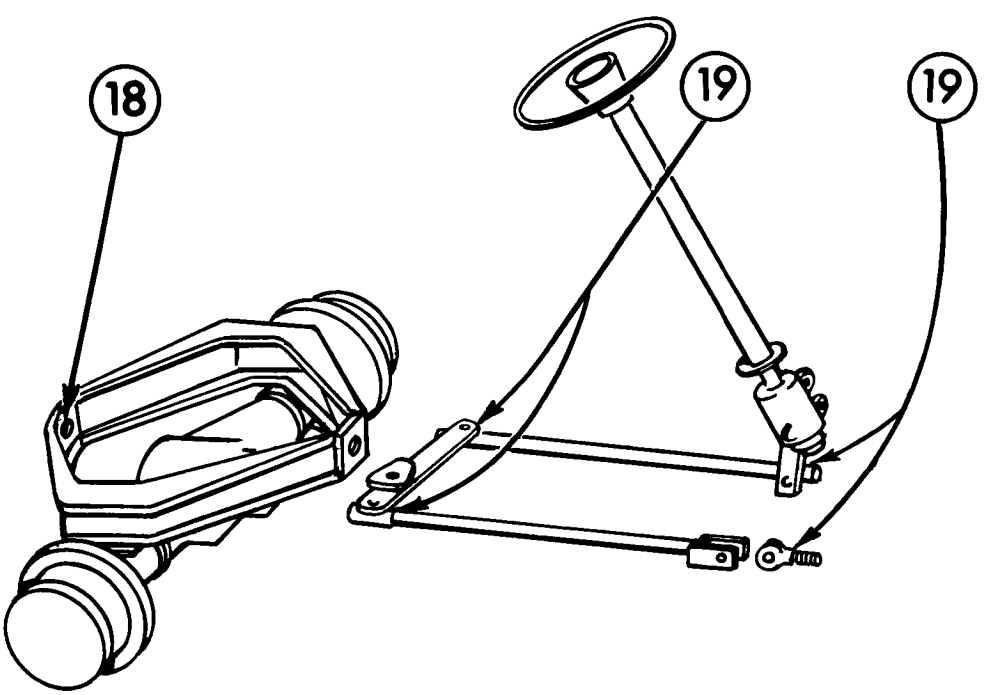
Below +32° F., use Grade - 90.

⊕ 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 kerosene.

LUBRICATION GUIDE





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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	Crankcase Oil Level	EO	Check
	4	Hydraulic Reservoir Oil Level	EO	Check
	16	Transmission Oil Level	Dexron	Check
	17	Fuel Level	⊛	Fill
Every 50 Hours ●	7	Steering Cylinders	MPG	Grease
	8	Boom Pivots	MPG	Grease
	9	Bucket Cylinders	MPG	Grease
	10	Bellcrank Pivots	MPG	Grease
	11	Bucket Link Pivots	MPG	Grease
	15	Boom Cylinders	MPG	Grease
	18	Rear Axle Cradle Pivots	MPG	Grease
	19	Steering Linkage	MPG	Grease
	20	Batteries	---	Check
Every 100 Hours ⬟	5	Drive Shafts	MPG	Grease
	12	Parking Brake Actuators Fluid Level	BF	Check
	13	Axle Lubricant Level	MPL	Check
	14	Transfer Drive Lubricant Level	MPL	Check
	21	Power Cluster Reservoirs Fluid Level	BF	Check
Every 200 Hours ▬	2	Brake Treadles	EO	Lubricate
Every 500 Hours ■	22	Fan Hub	MPG	Lubricate
Every 1000 Hours ▰	1	Radiator Coolant	---	Change
	4	Hydraulic System Oil and Filters	EO	Change
	6	Upper and Lower Articulation Pivots	MPG	Grease
	13	Axle Lubricant	MPL	Change
	14	Transfer Drive Lubricant	MPL	Change
	16	Transmission System Oil	Dexron	Change

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.

⊛ See Cummins Engine Operator's Manual for fuel specifications.

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

▲ - 10 hours ● - 50 hours ⬟ - 100 hours

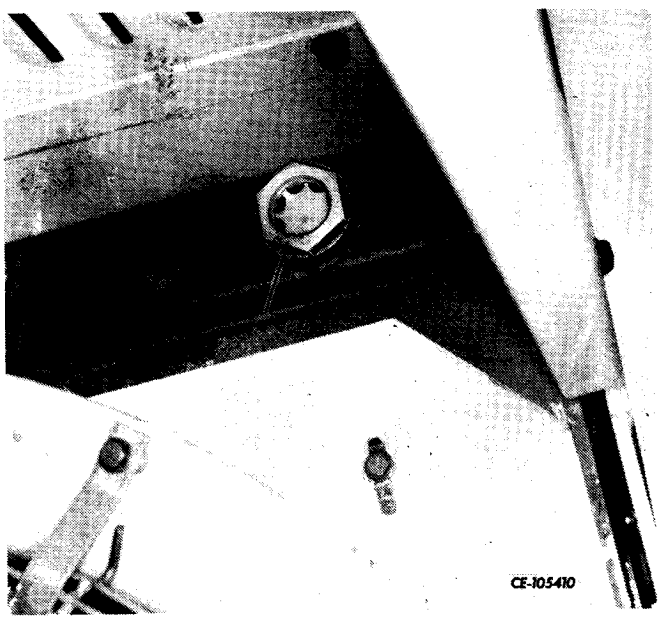
▬ - 200 hours ■ - 500 hours ▰ - 1000 hours

SERVICE POINTS

Item 1 - Radiator Coolant

Checking Coolant Level (Illust. 1)

Check the coolant level at the sight gauge in the top tank of the radiator. The ball in the sight gauge must be floating at the top of the window. If the ball appears below the top of the window, add coolant to the proper level. Refer to "COOLING SYSTEM" in Section 8.



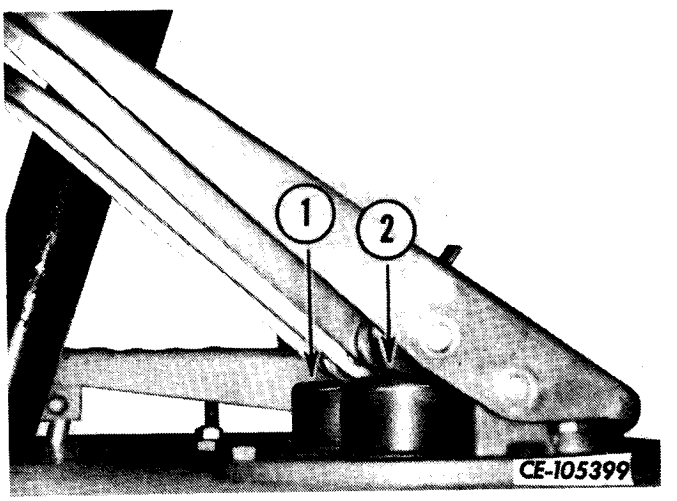
Illust. 1
Radiator Sight Gauge.

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 treadle 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 - Crankcase Oil Level

Checking Oil Level

Check the crankcase oil daily or at the beginning of each work shift. Refer to your Cummins Engine Operator's Manual for checking procedure and proper level.

Changing Oil

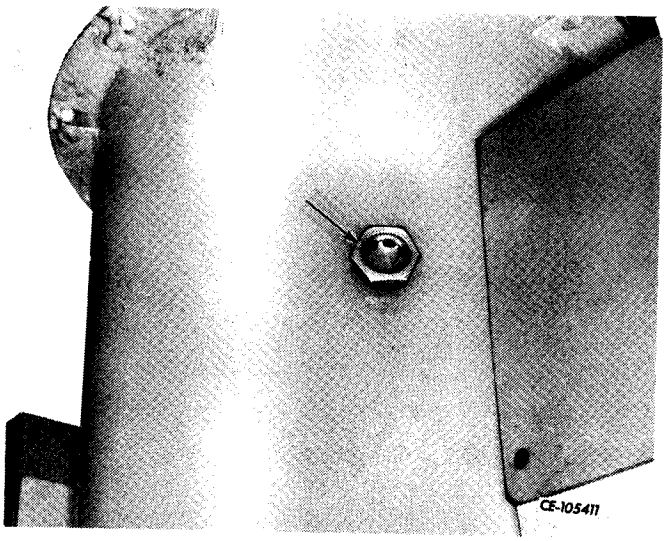
Refer to your Cummins Engine Operator's Manual for engine oil and filter changing intervals and oil specifications.

SERVICE POINTS

Item 4 - Hydraulic Reservoir Oil Level

Checking Oil Level

Check the hydraulic system oil level at the sight gauge on the front side of the hydraulic oil reservoir with the bucket resting flat on the ground. The ball inside of the sight gauge must be floating in the window of the gauge. If the ball is not floating, add oil as described under "HYDRAULIC SYSTEM" in Section 8.



Illust. 3
Reservoir Sight Gauge.

Changing Oil

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

Item 5 - Drive Shafts

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

Transmission To Transfer Drive
(Three fittings) - Apply the lubricator to each spider fitting and to the slip yoke fitting until clean lubricant appears.

Transfer Drive To Front Axle
(Three fittings) - Apply the lubricator to each spider fitting and to the slip yoke fitting until clean lubricant appears.

Transmission To Rear Axle
(Three fittings) - Apply the lubricator to each spider fitting and to the slip yoke fitting until clean lubricant appears.

Item 6 - Upper And Lower Articulation Pivots

(Two fittings) - Apply the lubricator to each fitting located on the frame ears until clean lubricant appears between the frame tongues.

Item 7 - Steering Cylinders

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

Item 8 - 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 9 - Bucket Cylinders

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

Item 10 - Bellcrank Pivots

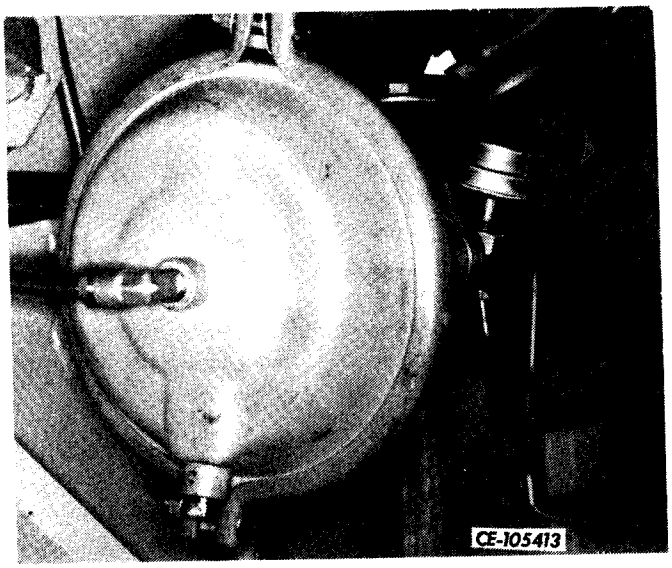
(Two fittings) - Apply the lubricator to the fittings located at the inside of each bellcrank arm near the top of the cross shaft until clean lubricant appears.

Item 11 - 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.

SERVICE POINTS

Item 12 - Parking Brake Actuators Fluid Level (Illust. 4)



Illust. 4
Parking Brake Actuator Filler Cap.

There are two parking brake actuators. They are located in the front frame below the steering cylinders and in front of the parking brake unit.

1. Clean the area around the filler cap, then remove the cap.

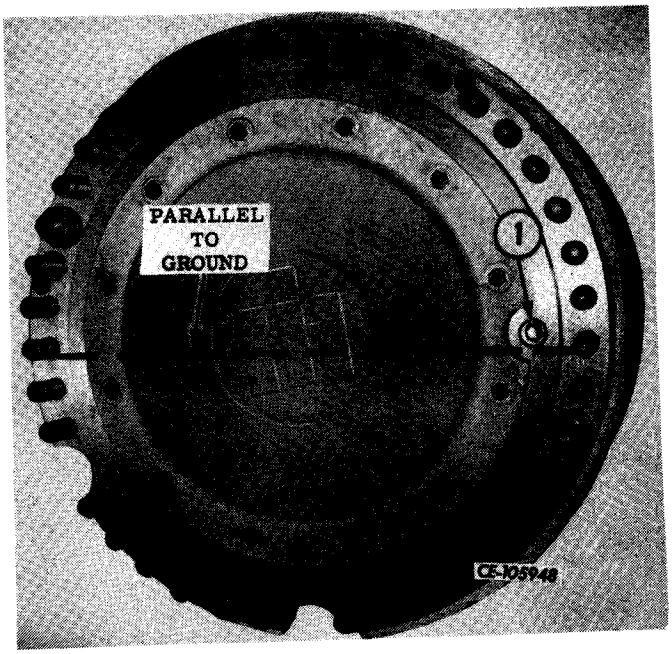
2. Check the fluid level (the correct level is 3/4 inch from the top of the filler neck). If necessary, add fluid. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of lubricant specified.

3. Before installing the filler cap, be sure the vent hole in the filler cap is not plugged up.

4. Install and secure the cap.

Item 13 - Axle Lubricant (Illust. 5)

Checking Lubricant Level



Illust. 5
Axle Lubricant Level Check Plug.

1. Position the machine on level ground so the check plug (1) is either left or right on the axle horizontal center line. Refer to Illust. 5. Let the machine sit long enough for the oil to level out in the planetaries and housing.

2. Clean the area around the check plug. Remove the plug (1) and check the lubricant level. The lubricant must be level with the bottom of the check hole.

3. If the level is low, remove the fill plug from the center of the axle bowl. Add lubricant through fill hole in the axle bowl until it starts flowing from the check plug (1, Illust. 5). Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of lubricant specified.

4. Install the fill and check plugs.

5. Repeat the above procedure on the second axle.

SERVICE POINTS

Changing the Lubricant

1. Park the machine on level ground.

2. While the lubricant is at operating temperature, remove the drain plugs from the axle bowls and drain the lubricant.

NOTE: Each of the wheel planetaries must be drained separately. The following procedure is the same for each wheel planetary.

3. Position the wheel with the planetary drain plug at the lowest point.

4. Remove the planetary drain plug and allow the planetary to drain completely.

5. Install the axle bowl drain plugs.

6. Position the machine so the plug hole in one of the planetaries is either right or left on the axle horizontal center line. Refer to Illust. 5.

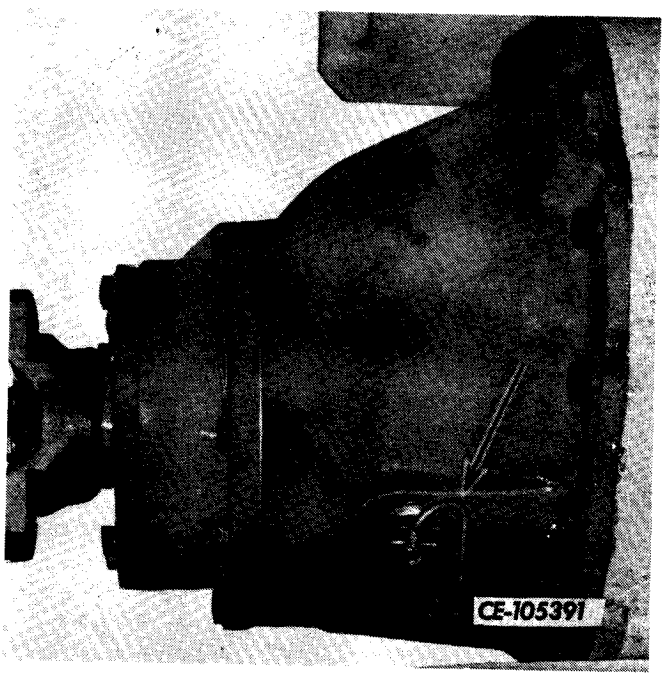
7. Install the plug in the planetary on the other side of the machine.

8. Fill the axle with fresh lubricant through the open planetary hole up to the bottom of the hole. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of lubricant specified.

9. Let the machine set for awhile so the lubricant can settle and fill all cavities. Recheck the level and add more lubricant if required.

10. Install the fill-check plugs in the axle bowls.

11. Check the differential vent tubes (Illust. 6) and clear any obstructions.



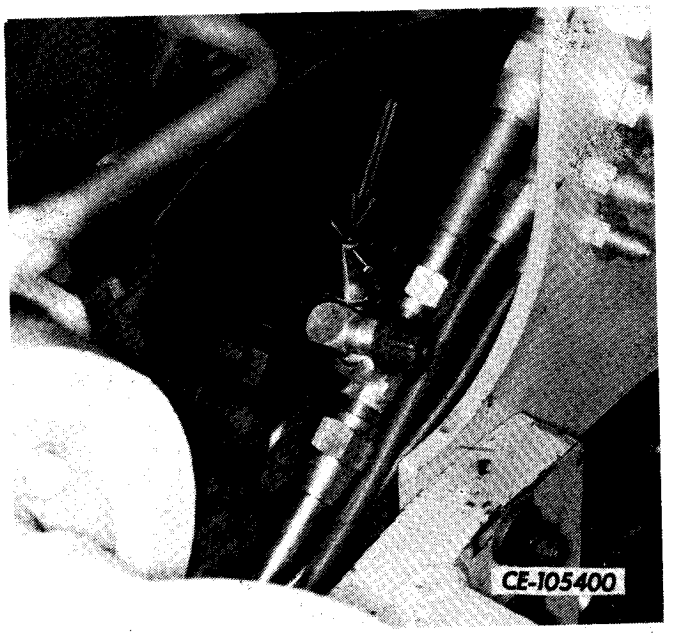
Illust. 6
Differential Vent Tube.

SERVICE POINTS

Item 14 - Transfer Drive Lubricant

Checking Lubricant Level (Illust. 7)

The transfer drive is located in the front frame just ahead of the articulation area.



Illust. 7
Transfer Drive Fluid Level Gauge.

1. Park the machine on level ground.

2. Turn the "T" handle on the dipstick counterclockwise to loosen it.

3. Remove the dipstick and check the lubricant level on the gauge. If the lubricant level is below the "FULL" mark, add enough lubricant to bring the level up to the mark. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of lubricant specified.

4. Install the dipstick in place and tighten the "T" handle.

Changing the Lubricant

1. Remove the dipstick by turning the "T" handle counterclockwise.

2. Remove the drain plug and copper washer from the bottom of the transfer drive body.

3. Allow the lubricant to completely drain.

4. Clean the plug and washer in solvent and dry thoroughly. If the washer is damaged, replace it.

5. Install the washer and plug.

6. Fill the transfer drive body with fresh lubricant. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of lubricant specified.

7. Check the lubricant level. If low, add lubricant to the proper level.

8. Install the dipstick.

Item 15 - Boom Cylinders

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

Item 16 - Transmission Oil

Checking Oil Level

Refer to "TRANSMISSION AND TORQUE CONVERTER" in Section 8.

Changing the Oil

Refer to "TRANSMISSION AND TORQUE CONVERTER" in Section 8.

SERVICE POINTS

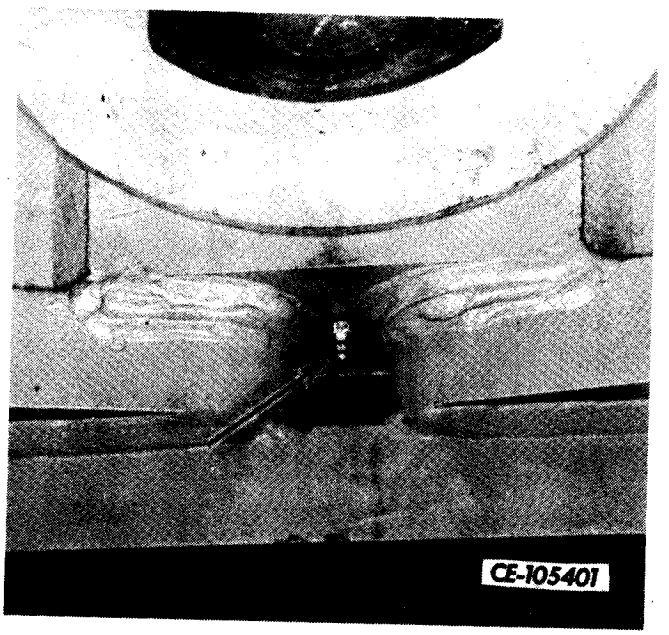
Item 17 - Fuel Level (Illust. 8)

Fill the fuel tank at the end of each work shift to keep moisture condensation to a minimum. Refer to Cummins Engine Operator's Manual for type of fuel specified.

Illust. 8
Fuel Fill.

Item 18 - Rear Axle Cradle Pivots (Illust. 9)

(Two fittings) - Apply the lubricator to each fitting located below the cradle pivot pins in a hole in the cradle until clean lubricant appears.



Illust. 9
Axle Cradle Lubrication Fitting.

Item 19 - Steering Linkage

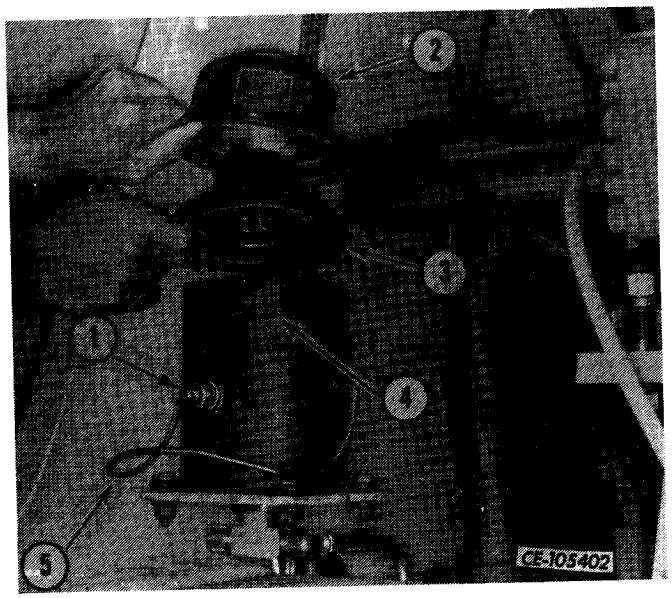
(Four fittings)- Lubricate the three fittings in the drag link ball socket ends and the fitting in the eye bolt going into the hydraulic steering valve. Apply the lubricator to each fitting until clean lubricant appears.

Item 20 - Batteries

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

SERVICE POINTS

Item 21 - Power Cluster Reservoir Fluid Level (Illust. 10)



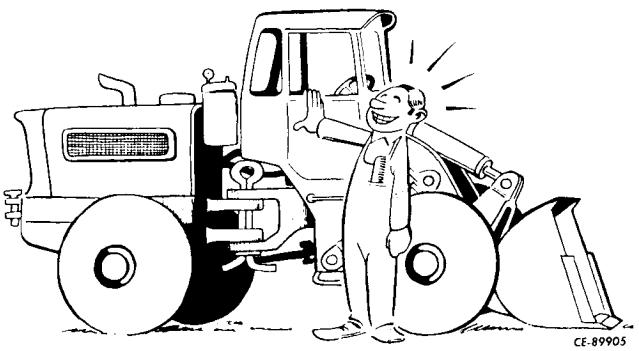
Illust. 10
Power Cluster Fluid Reservoir (Front).

1. Sight Gauge.
2. Cap.
3. Boot.
4. Fluid Level Line.
5. Clamp.

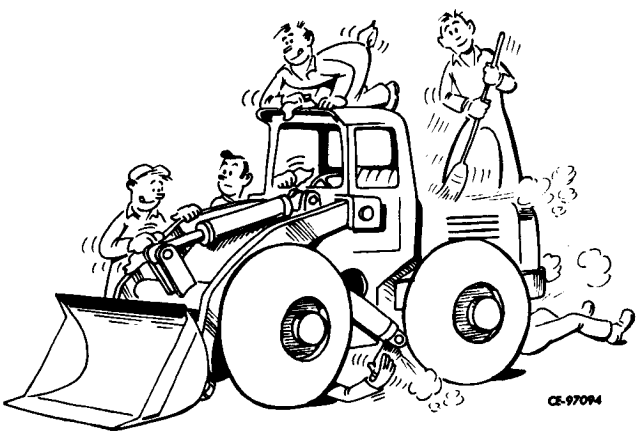
There are two power cluster brake fluid reservoirs. One is located in the front frame to the left side of the main hydraulic valve. The other is located in the rear frame on the right side above the power cluster. Check the sight gauge (1) on each fluid reservoir. The sight gauge should be completely filled with fluid. If the gauge is only partially filled or shows no fluid at all, pull the wire clamp (5) off of the cap (2), remove the cap and rubber boot (3) inside and fill the reservoir with brake fluid to the fluid level line (4). Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in this section for the type of brake fluid specified. Install the rubber boot and cap and secure with the wire clamp.

Item 22 - Fan Hub

Remove the allen head plug from the fan hub and install a grease fitting. Apply the lubricator until clean grease appears. Remove the grease fitting and reinstall the allen head plug.



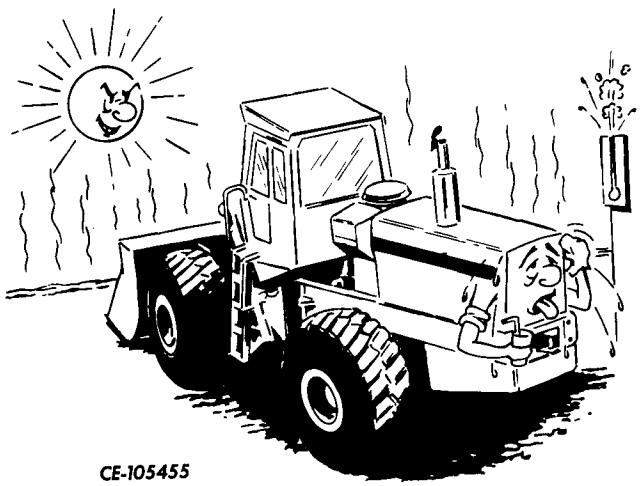
SCHEDULED MAINTENANCE PAYS



KEEP IT CLEAN

SECTION CONTENTS

PREPARATIONS FOR HOT OR COLD WEATHER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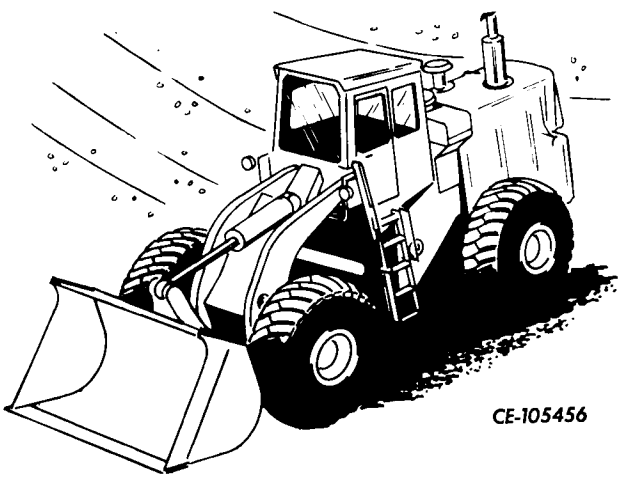
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Proper maintenance and mechanical efficiency are assured during seasonal air temperature changes, when these instructions are followed.

FUEL SYSTEMS

Refer to your Cummins Engine Operator's Manual for the diesel fuels which will give the most satisfactory performance for your engine.

LUBRICATION

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

COOLING SYSTEMS

Prepare the cooling systems 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.

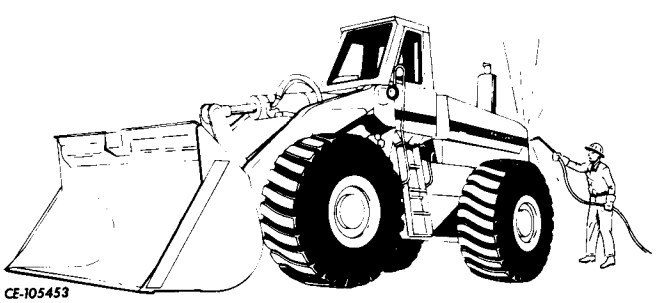
3. Check the operation of the thermostats. Do this by observing the engine coolant temperature when performing the following step. If improper thermostat operation is indicated, refer to your Cummins Engine Operator's Manual for thermostat removal and a complete checking procedure.

4. Clean cooling systems. 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 the procedures refer to your Cummins Engine Operator's Manual.

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

7. Clean the radiator grilles and outside of cores.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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 CLEANERS

This machine is equipped with two "dry-type" air cleaners (Illust. 1) with replaceable filter elements. Each 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 the air cleaners 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.

Removal (Illust. 1)

1. Stop the engine. Wipe off any dust accumulation from the cover (11) and remove the cover and gasket (10).

2. Check the condition of the cover gasket (10). If damaged, replace it.

3. Remove wing nut (9) along with gasket (8).

4. Remove the outer element (7). Be careful not to dislodge dust from the dirty element onto the smaller element (3).

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 nonsudsing detergent added to the water will facilitate the removal of soot.

Washing

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

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

2. Wash the element in clean, warm water (+70 degrees F to +100 degrees F.). A small amount of nonsudsing 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.

(Continued on next page)

AIR CLEANING SYSTEM

AIR CLEANERS - Continued

Outer Filter Element Service - Continued

Washing - Continued

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.

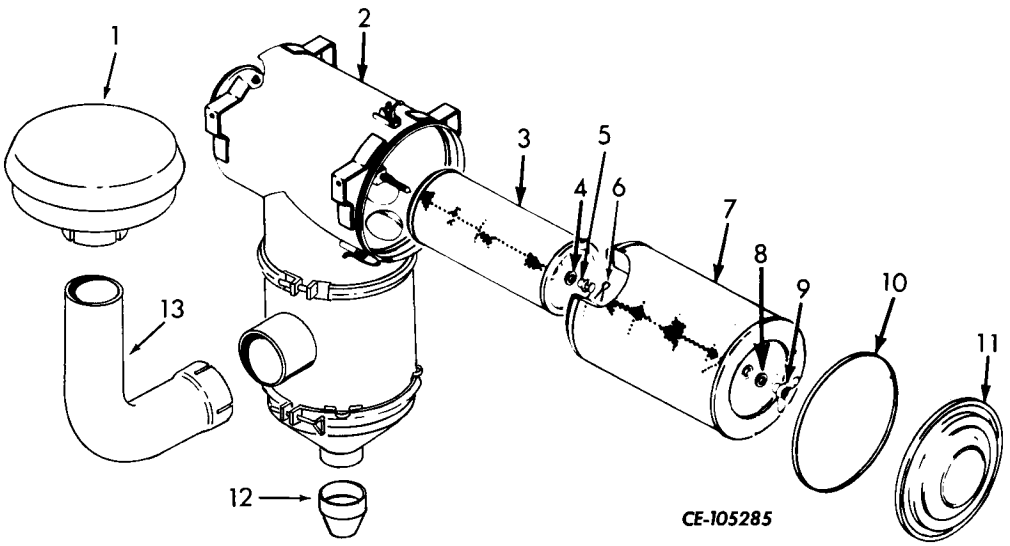
Compressed Air

An element cleaning tool (IH Part No. 407 073 R 1, 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.

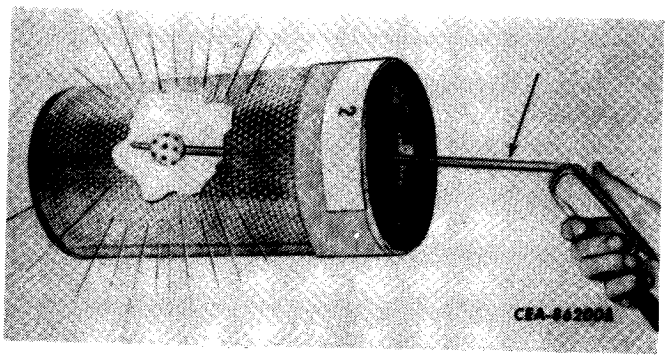
2. Direct clean, dry compressed air up and down the pleats on the clean side (inside) of the element.



Illust. 1
Exploded View of Air Cleaner.

1. Air Intake Hood.
2. Air Cleaner Body.
3. Inner Element.
4. Lock Nut Gasket.
5. Lock Nut Cotter Pin.
6. Inner Element Lock Nut.
7. Outer Element.
8. Wing Nut Gasket.
9. Outer Element Wing Nut.
10. Cover Gasket.
11. Cover.
12. Vacuator Valve.
13. Air Intake Tube.

AIR CLEANING SYSTEM



Illust. 2
Using Element Cleaning Tool.

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."

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 sufaces are noted, correct these conditions immediately.

Installation (Illust. 1)

1. Install the open end of the element (7) into body (2) over element (3) and secure with gasket (8) and wing nut (9).

2. Install the cover (11) with gasket (10) 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.

Removal (Illust. 1).

1. Remove the cover (11) and gasket (10).

2. Remove and service element (7) as described under "Outer Filter Element Service" in this section.

3. Remove the cotter pin (5), nut (6), gasket (4) and element (3).

4. Clean the inside of the body (2) with a damp cloth.

Installation (Illust. 1)

1. Install a new element (3) in body (2) and secure with gasket (4), nut (6) and cotter pin (5).

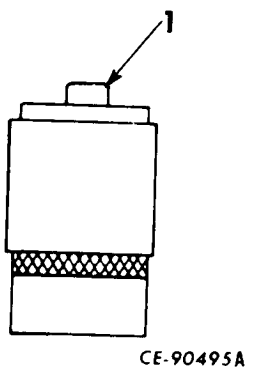
2. Install element (7) over element (3) and secure with gasket (8) and nut (9).

3. Install the cover (11) and gasket (10) and secure, making sure the cover is not cocked.

AIR CLEANER SERVICE INDICATORS (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 CLEANING SYSTEM

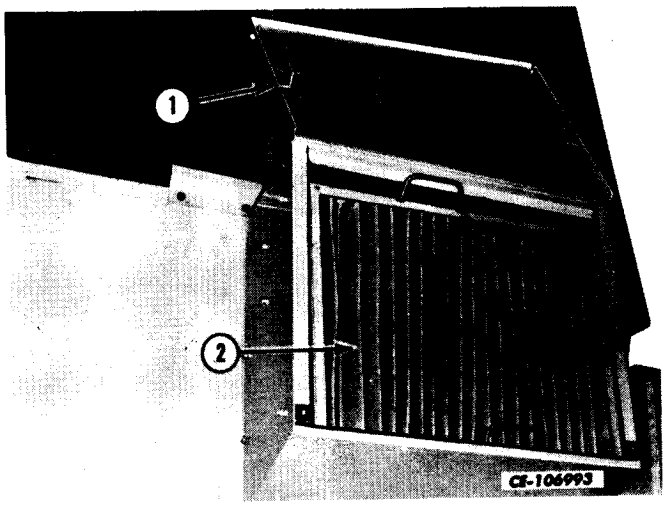
AIR CLEANER HOODS (1, Illust. 1)

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 nonsudsing detergent. Install the hood back in place and tighten the clamp.

Dust Unloader Valve (12, Illust. 1)

The valve automatically discharges the accumulated dirt in the air cleaner body. At the interval specified on the "SCHEDULED MAINTENANCE GUIDE" in Section 7, squeeze or remove the valve to be sure it is open and contains no obstructions.



Illust. 4
Cab Pressurizer Air Filter.

1. Grille cover. 2. Filter.

CAB PRESSURIZER AIR FILTER (Machine with R.O.P.S. Cab only) (Illust. 4)

If the machine has an R.O.P.S. cab, there is an air filter located outside the cab on the right side. This filter must be cleaned when the cab pressurizer or heater (if equipped) is in use. Under normal conditions, the filter will require cleaning every 10 hours of use. If the conditions are very dusty, the filter will require cleaning more often. A clean filter is required for efficient operation of the pressurizer and/or heater unit. Clean the filter as follows:

1. Loosen the wing bolts, securing the grille cover (1, Illust. 3) and open the cover.

2. Lift the filter (2, Illust. 3) out.

3. Wash the filter in warm water and let dry thoroughly.

4. Install the filter so the small mesh screen is toward the outside. Be sure the filter is seated properly.

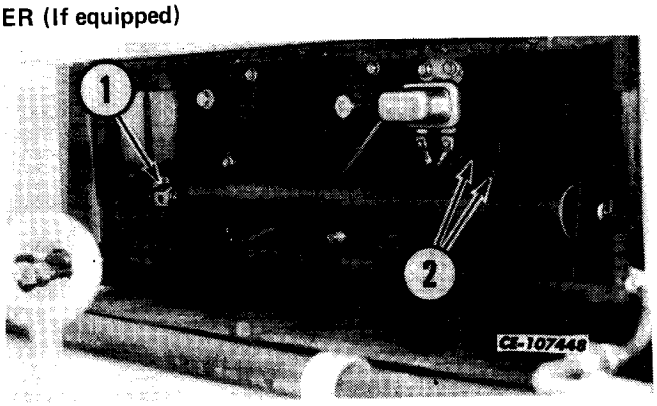
5. Close the cover and secure with the wing bolts.

AIR-CONDITIONER (If equipped)

OFF-SEASON CARE

It is most important in the off-season to operate the system. Do not remove the belt or make any adjustments other than to turn the air conditioning temperature control to the "OFF" position.

The system should be operated for five to ten minutes each week. This operation will keep the compressor seal from drying out.



Illust. 5
Refrigerant Sight Glass and Fuses.

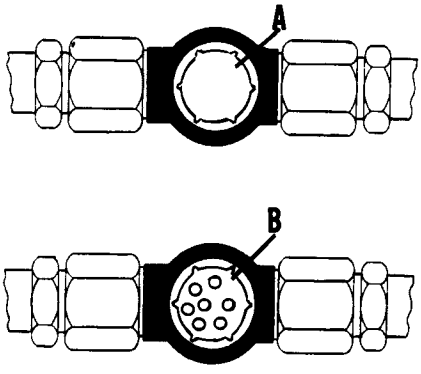
1. Sight glass. 2. Fuses.

AIR-CONDITIONER (If equipped)

CHECKING THE REFRIGERANT LEVEL

A sight glass (1, Illust. 5) is located inside the outside air-conditioner filter access cover. To check the refrigerant level in the system, observe the sight glass while the system is operating.

If no air bubbles can be seen in the liquid refrigerant flowing through the sight glass (A, Illust. 6), the refrigerant supply is adequate.



Illust. 6
Checking Refrigerant Level

Bubbles or foam showing in the sight glass indicates that the refrigerant supply is low (B, Illust. 6). Refer to the Service Manual for service procedures.

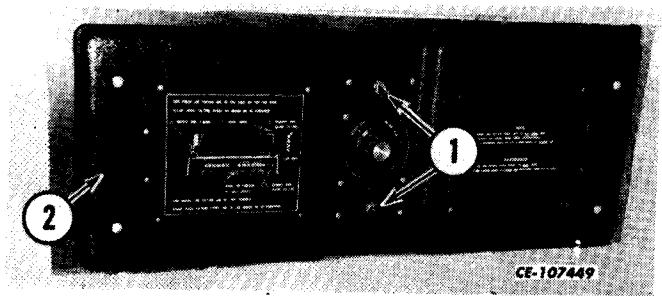
AIR-CONDITIONER FILTERS

Inside Air-Conditioner Filters (Illust. 7)

Two filters inside the console clean the air as it is recirculated through the air-conditioner for recooling. These filters should be cleaned every 100 hours during seasons of operation as follows:

1. Loosen the two fasteners (1) and lower the console cover (2).

2. Remove the filters from inside of cover (2).



Illust. 7
Inside Air-Conditioner Filter Cover.

1. Fasteners. 2. Cover, console.

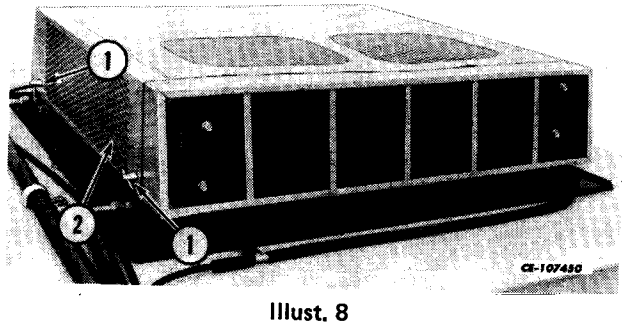
3. Wash the filters in warm water with a small amount of nonsudsing detergent. Rinse the filters in clean water and dry thoroughly.

4. Reinstall the filters and secure the console cover (2) in place over them with the two fasteners (1).

Outside Air-Conditioner Filters (Illust. 8)

Two filters (located on either side of the roof-mounted air-conditioner) clean the fresh air before it enters the air-conditioner. Both filters should be cleaned every 50 hours of operation as follows:

1. Loosen the "T" hold-down bolts (1) and lift the access door (2).



Illust. 8
Outside Air-Conditioner Filter Access Door.

1. BOLTS, hold down. 2. DOOR, access.

(Continued on next page)

AIR-CONDITIONER (If equipped)

AIR-CONDITIONER FILTERS - Continued

Outside Air-Conditioner Filters - Continued

2. Remove the filter located just inside door (2).

3. Carefully tap the filter against the palm of your hand to remove loose dust.

4. Direct clean, dry, compressed air up and down the pleats on the clean side of the filter.

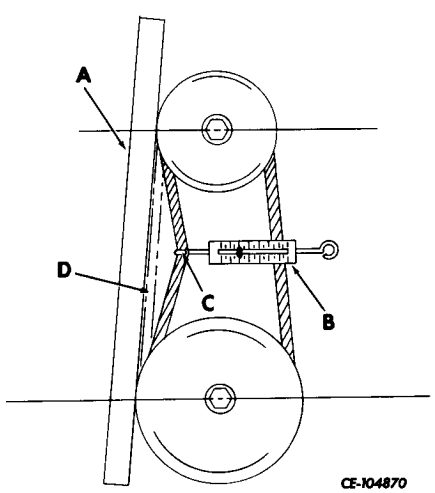
NOTE: Air pressure at the nozzle must not exceed 100 psi. Keep a reasonable distance between the air nozzle and the element.

5. Reinstall the filters inside the air-conditioner. Close door (2) and secure with the hold-down bolts (1).

FREON COMPRESSOR DRIVE BELT

Checking Tension (Illust. 9)

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 hours to stabilize the belt tension and at intervals of 200 hours thereafter.



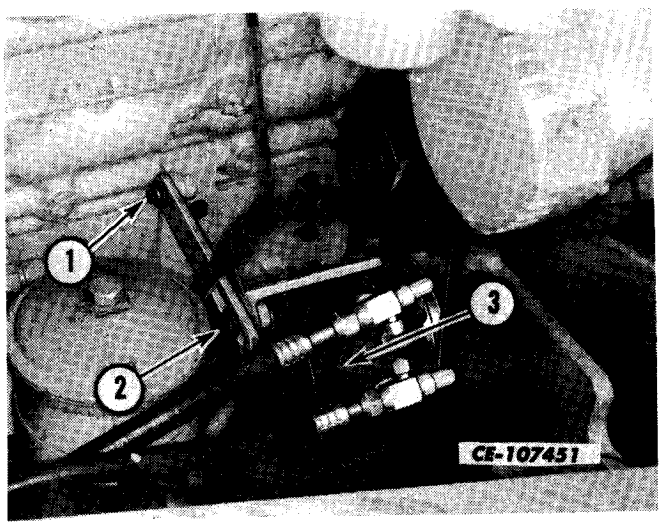
Illust. 9
Checking Belt Tension.

Whenever possible, the belt tension should be checked at the center point of the belt between the two pulleys. Using a spring scale and a straightedge, check the tension as follows:

1. Position the straightedge (A) over the belt (D).

2. Hook the spring scale (B) over the belt midway between the two pulleys (C). Pull the spring scale down at a right angle to approximately a 20-lb. deflection reading.

3. Holding the spring scale in this position, measure the distance between the hooked position on the belt and the bottom of the straightedge. The tension will be correct when the distance is 1/4 to 1/2 of an inch.



Illust. 10
Freon Compressor Belt Tensioning.

1. Brace bolt. 2. Brace Bolt. 3. Freon Compressor.

Adjustment (Illust. 10)

1. Loosen the compressor brace bolts (1 and 2).

2. Move the compressor out to tighten the belt or in to loosen the belt until the correct tension is obtained.

3. Tighten the compressor brace bolts (1 and 2).

NOTE: Do not overtighten belt, as this produces excessive loads on compressor bearings. After belt has been secured, recheck belt tension.

AIR-CONDITIONER (If equipped)

FUSES

There are two fuses located behind the L.H. outside filter. Refer to item 2, Illust. 5. Each of the fuses protects one of the air-conditioner fan motors. The fuses are 14-amp capacity. There is also a fuse in the instrument panel protecting the entire air-conditioning circuit. Refer to Illust. 1 in Section 3.

Refer to "ELECTRICAL SYSTEM" in Section 8 for additional information on fuses.

AIR PRESSURE SYSTEM

The air compressor governor is factory set to maintain a minimum pressure of 105 psi and a maximum pressure of 125 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.

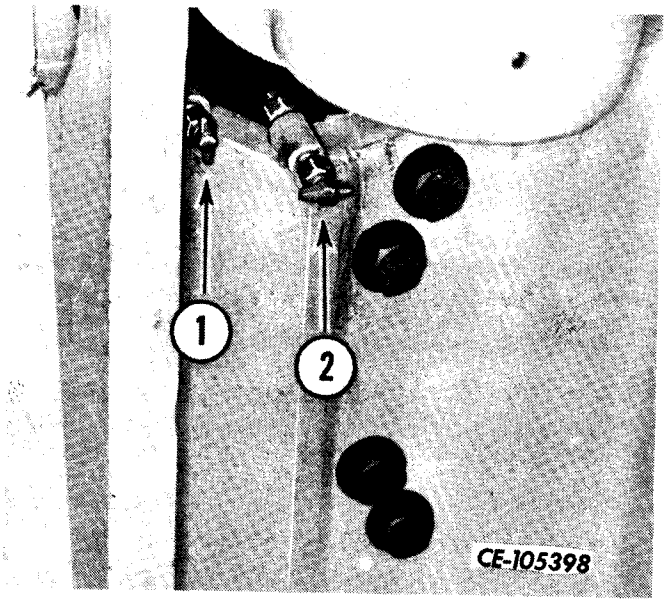
NOTE: It is especially important that the air tanks are thoroughly drained of water in cold weather.

DRAINING THE AIR TANKS

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

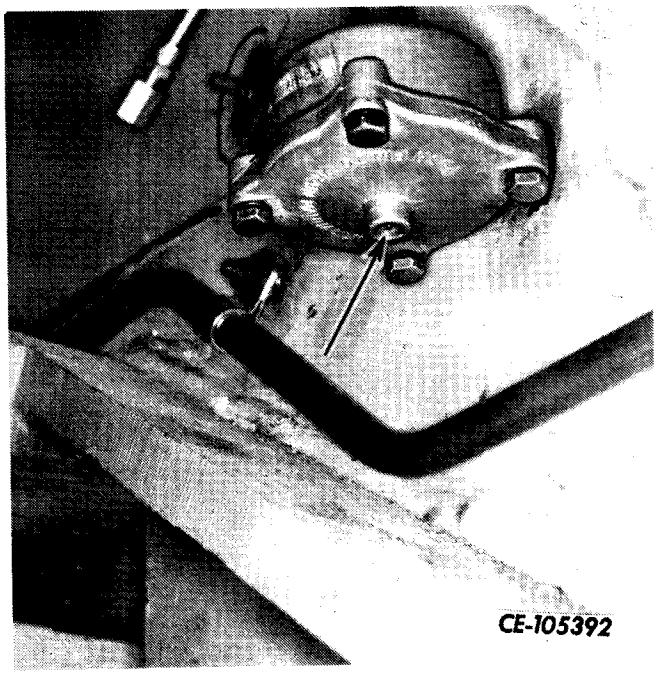
◆ CAUTION: DO NOT OPEN THE DRAIN VALVES MORE THAN TWO TURNS.

Open the air tank drain valves (1 and 2, Illust. 11). Drain accumulated water from the tanks and then close the valves.



Illust. 11
Air Tank Drain Valves.

AIR PRESSURE SYSTEM



Illust. 12
Moisture Ejector Valve Drain Pin.

Moisture may also accumulate in the bottom of the moisture ejector valve. Press the pin (Illust. 12) in the bottom of the valve up to drain any moisture accumulation.

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.

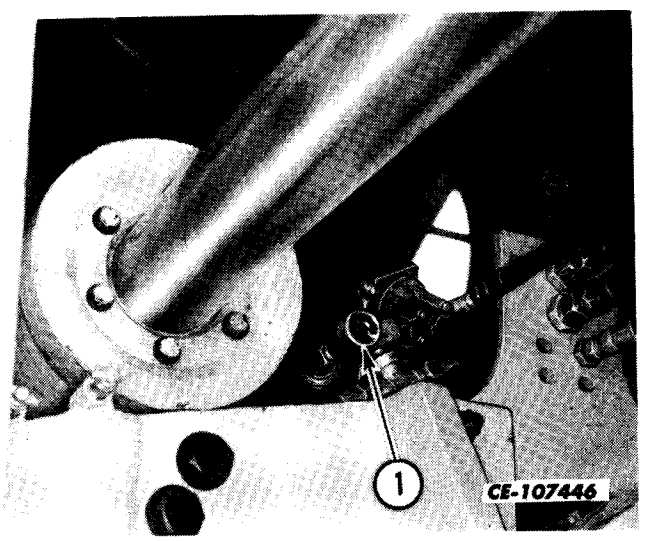
2. Apply the brakes while checking the hose connections from the brake valve to the brake actuators.

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

NO LEAKAGE IS PERMISSIBLE.

ACCESSORY AIR CHUCK
(If equipped)

The accessory air chuck (1, Illust. 13) receives its air supply from the machine air pressure system. Before using the air chuck, drain all moisture from the system. Refer to "Draining the Air Tanks." Install the safety bar in the straight lock position. Start the engine and build up the air system pressure. Attach an air valve to the end of the hose, which is supplied with the attachment. Insert the other end of the hose into the air supply chuck on the machine. Disconnect the hose from the chuck when not in use.



Illust. 13
Accessory Air Chuck

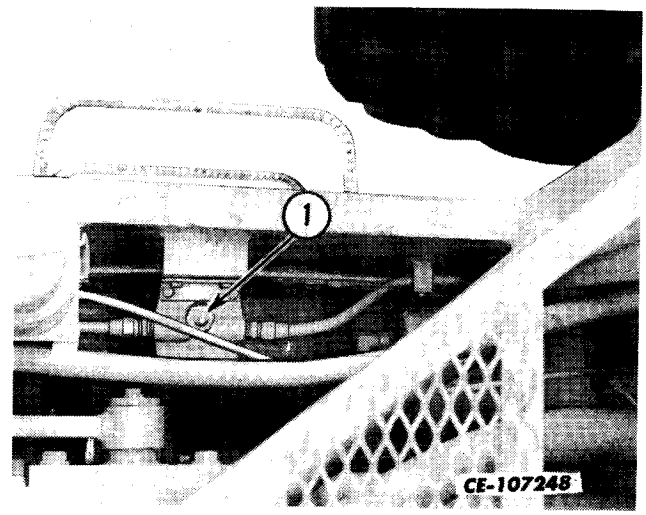
ALCOHOL EVAPORATOR (If equipped)

The function of the alcohol evaporator is to inject alcohol vapor into the air system to prevent condensation from accumulating in the brake system. Warm air from the compressor passes through the evaporator and evaporates small amounts of alcohol. This air alcohol mixture is then piped into the air system.

> ◆ CAUTION: DO NOT SMOKE OR USE OPEN FLAME IN OR AROUND AREA WHEN SERVICING ALCOHOL EVAPORATOR.

Fill the evaporator tank daily. To fill, remove the filler plug (1, Illust. 14) and pour in methyl alcohol. Reinstall the filler plug.

NOTE: A drain valve is located at the bottom of the tank if it is ever necessary to drain the evaporator.



Illust. 14
Alcohol Evaporator Filler Plug.

BELTS

Belts on new machines and replacement belts lose their tension as they seat into the pulley grooves. If the tension falls below a required minimum, the belts will slip, damaging the belts and pulley grooves.

Refer to your Cummins Engine Operator's Manual for belt tensioning and replacement information. If equipped with an air-conditioner, refer to "AIR-CONDITIONER" in this section for freon compressor belt retensioning information.

BRAKES

SERVICE BRAKES

This machine is equipped with manual-adjusting 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 clusters 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.

(Continued on next page)

BRAKES

SERVICE BRAKES - Continued

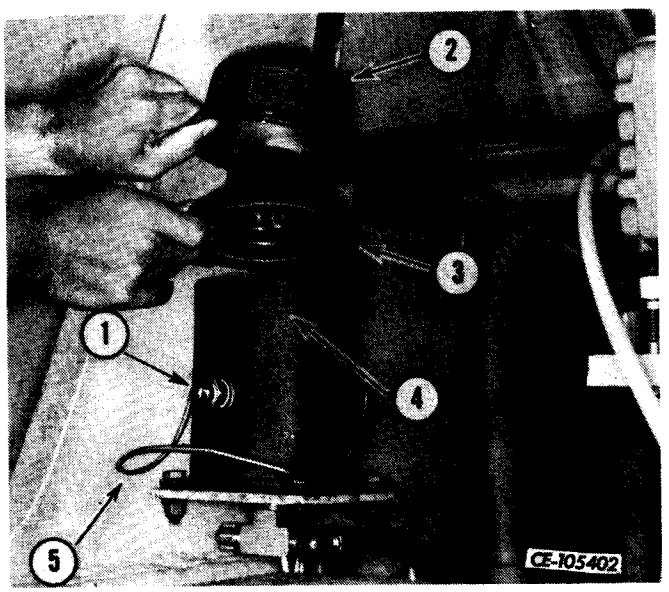
Checking Brake Fluid Level (Illust. 15)

Each wheel service brake has its own power cluster. Two brake fluid reservoirs supply the power cluster master cylinders with brake fluid. The reservoir in the front frame supplies the two power clusters in the front frame and the reservoir in the rear frame supplies the two power clusters in the rear frame.

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

2. Check the sight gauge (1) on each brake fluid reservoir. The sight gauge must be completely filled with fluid.

3. If the gauge is only partially filled or shows no fluid, slide the wire clamp (5) off of the reservoir cap. Remove the cap (2) and rubber boot (3) inside. Fill the reservoir with brake fluid up to the fluid level line (4). Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in Section 7.



Illust. 15
Service Brake Power Cluster Fluid Reservoir.

1. Sight Gauge.
2. Cap.
3. Boot.
4. Fluid Level Line.
5. Clamp.

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

4. Install the rubber boot back inside of the reservoir, place the cap on and slide the wire clamp onto the cap and into the groove.

Adjusting the Brakes

NOTE: The brake linings should be adjusted when the machine starts losing braking power.

1. Lower the bucket to the ground, apply the parking brake and release the brake pedal.

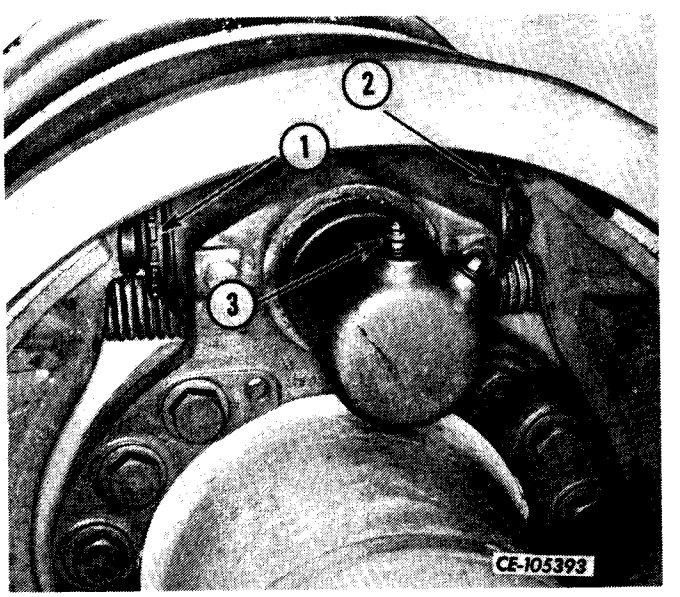
2. Each wheel has two adjustments (1 and 2, Illust. 16); one for each shoe.

With an adjusting spoon or screwdriver, turn the adjusting bolt on one shoe at a time until the shoe moves firmly against the drum.

3. Back-off on the adjusting bolt seven notches. (This is equivalent to a clearance of approximately .010 inch between the brake lining and drum.)

4. Repeat steps 2 and 3 for the remaining brake shoes for that particular wheel.

5. Repeat steps 2 thru 4 for the remaining wheels.



Illust. 16
Brake Adjusters and Bleeder.

BRAKES

Bleeding the Brakes

> ◆ CAUTION: AIR TRAPPED IN THE HYDRAULIC BRAKE SYSTEM REDUCES BRAKING EFFECTIVENESS. BLEED THE POWER CLUSTERS, DISPLACEMENT CYLINDERS AND WHEEL CYLINDERS.

If braking power is less than normal, there could possibly be air in the hydraulic brake lines. If air does get into the brake lines, it must be bled out.

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. Each brake has its own hydraulic lines and master cylinder and is bled independently of the others. Bleed the system as follows:

1. Park the machine and apply the parking brake. Lower the bucket to the ground.

2. Run the engine until the air pressure gauge is in the "RUN" segment, then shut the engine down.

3. Clean the power cluster reservoir caps off. Remove the caps and fill the reservoirs with brake fluid up to the fluid level line. Refer to "LUBRICANT SPECIFICATIONS AND CAPACITIES" in Section 7 for the type of brake fluid specified.

4. Start at the power cluster closest to one of the brake fluid reservoirs. Open the bleeder screw (Illust. 17) on the power cluster master cylinder.

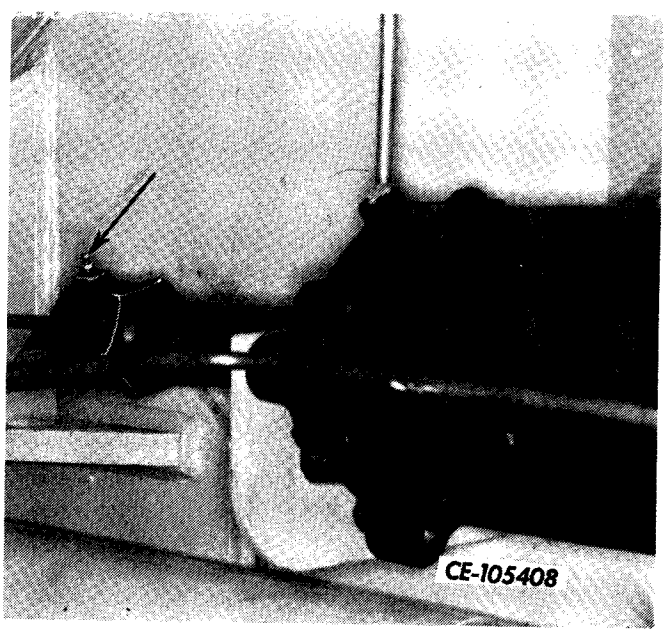
> ◆ CAUTION: BE CAREFUL NOT TO SPLASH BRAKE FLUID INTO EYES.

5. Have the second man in the operator's compartment slowly depress the brake pedal and hold it depressed.

6. Close the bleeder screw, then let up 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.



Illust. 17
Power Cluster Bleeder Screw (right front shown).

8. Open the bleeder screw on the wheel cylinder (3, Illust. 16) connected to the power cluster master cylinder that was just bled.

9. Perform steps 5 through 7 on the wheel cylinder.

(Continued on next page)

BRAKES

SERVICE BRAKES - Continued

Bleeding the Brakes - Continued

10. Bleed the second power cluster master cylinder and wheel cylinder for the same axle.

11. Bleed the other axle brake system as shown in steps 4 through 9.

12. Refill the brake fluid reservoirs to the fluid level line.

Breathers

Each power cluster is equipped with a breather.

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 air-over hydraulic-released, spring-applied disc-type parking brake. When the parking brake knob is pulled out to OFF position, air pressure is applied to the actuator, overcoming the spring tension in the brake calipers, thereby releasing the parking brake. If a leak occurs in the air lines, or air pressure is low in the system, the parking brake will automatically be applied.

There is no adjustment to compensate for lining wear. Check the amount of lining wear periodically. When the linings get down to 1/8 inch thick, or if they no longer hold, replace the lining pads.

Checking the Fluid

Each parking brake caliper has an actuator to operate it. Check the fluid level in each actuator fluid reservoir. Refer to "SERVICE POINTS" for the level-checking procedure.

Bleeding the Brake

If the parking brake lining pads are dragging or won't release, it is possible there is air in the hydraulic parking brake lines. If this is the case, bleed the hydraulic lines as follows:

1. Station a helper in the operator's compartment.

2. Block the machine wheels to prevent possible machine movement and lower the bucket to the ground.

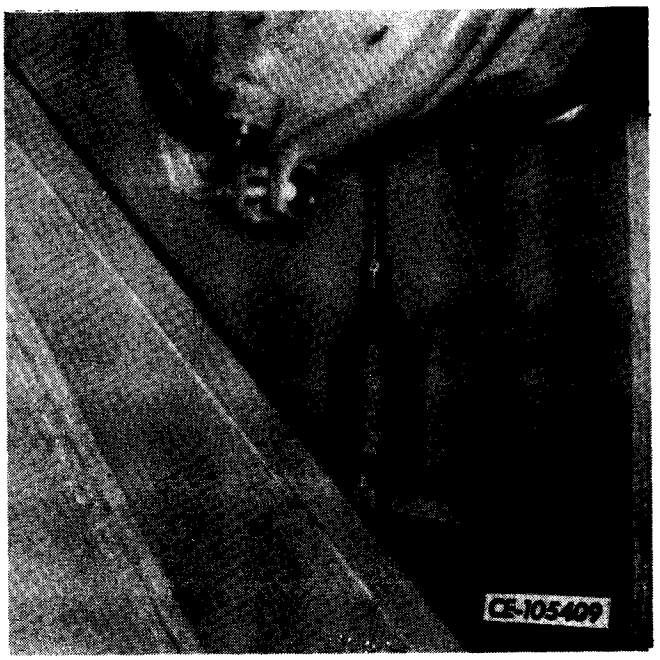
3. Start the engine and let it run until the air pressure gauge indicator is in the "RUN" area.

4. Shut the engine down.

5. Fill the parking brake actuator reservoirs to the proper level.

6. Push the parking brake knob in.

7. Open the bleeder screw on one of the displacement cylinders (Illust. 18).



Illust. 18
Displacement Cylinder.

BRAKES

> ◆ CAUTION: BE CAREFUL NOT TO GET BRAKE FLUID IN YOUR EYES WHEN THE PARKING BRAKE IS RELEASED.

8. Pull the parking brake knob out slowly. This will force brake fluid out of the bleeder screw.

9. Close the bleeder screw.

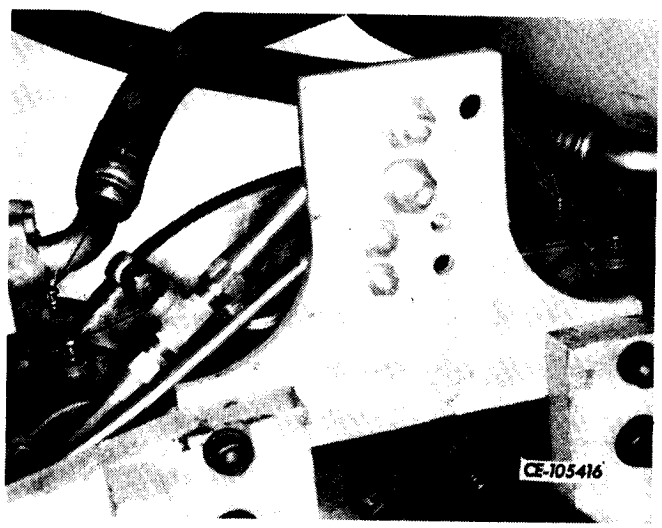
10. Repeat steps 6 thru 9 until a stream of air-free fluid is coming out of the bleeder screw.

NOTE: To eliminate the necessity of having to close the bleeder screw after each time the parking brake knob is pulled out, 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 parking brake knob may be pulled out and pushed in 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.

11. Open one of the bleeder screws (Illust. 19) on top of the brake caliper which is connected to the actuator for which the displacement cylinder was just bled.

12. Bleed in the same manner as the displacement cylinder.

13. Close the bleeder screw.



Illust. 19
Parking Brake Caliper Bleeder Screws.

14. Bleed the other side of the brake caliper in the same manner.

15. Bleed the displacement cylinder and brake calipers for the other actuator in the same way.

16. Refill the actuator reservoirs with brake fluid.

Breathers

Each parking brake actuator is equipped with a breather.

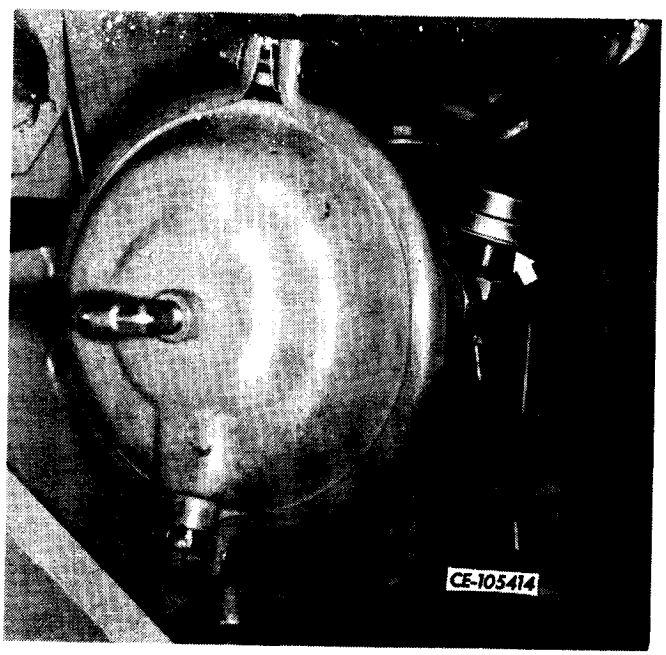
1. Remove the breathers (Illust. 20) from the actuators.

2. Wash the breathers in a commercial cleaning solvent to completely remove any contaminants in the cap.

3. Dry thoroughly, using a light pressure of compressed air. If compressed air is not available, shake to remove the excess cleaning solvent.

4. Dip the caps in clean engine oil. Allow the excess oil to drain out.

5. Install the breathers back in place.



Illust. 20
Parking Brake Actuator Breather.

COOLING SYSTEM

The cooling system operates under pressure which is controlled by a pressure-relief valve in the radiator cap.

CARE OF THE SYSTEM

Proper cooling is assured only when the system is sealed; the radiator cap gasket is in good condition; the pressure-relief valve and thermostats are operating properly; the system is free of coolant and air-flow restrictions; and the system is filled to the proper level.

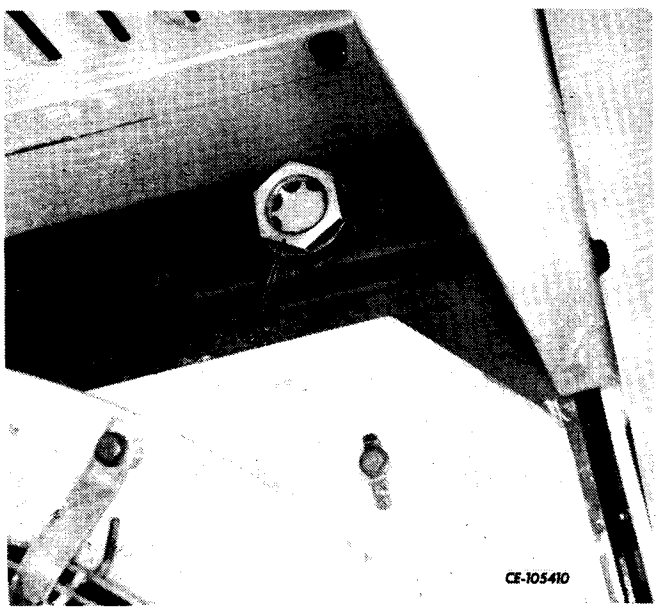
To keep the system internally free of rust and sludge, use the proper coolants as specified in your Cummins Engine Operator's Manual.

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.

CHECKING COOLANT LEVEL

1. Check the coolant level at the sight gauge (Illust. 21) in the top tank of the radiator. The ball must be floating at the top of the sight gauge.

2. If the ball is not at the top of the sight gauge, add coolant. Refer to "FILLING THE SYSTEM."



Illust. 21
Radiator Sight Gauge.

DRAINING THE SYSTEM

1. Run the engine until the engine coolant temperature gauge is in the "RUN" area, then shut the engine down.

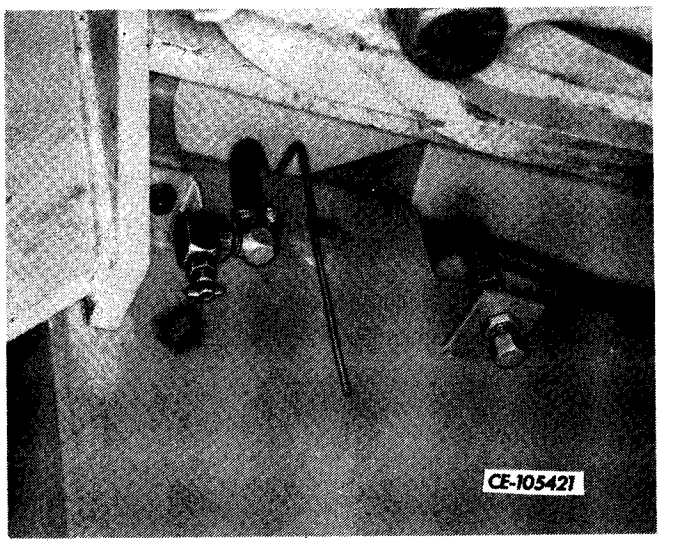
2. Remove the radiator cap. Use CAUTION. Refer to "RADIATOR CAP."

3. Open the radiator drain valve (Illust. 22) located just ahead of the fuel tank on the far right side.

4. Remove the crankcase drain plugs.

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

6. Reinstall the crankcase drain plugs and close the radiator drain valve.



Illust. 22
Radiator Drain Valve.

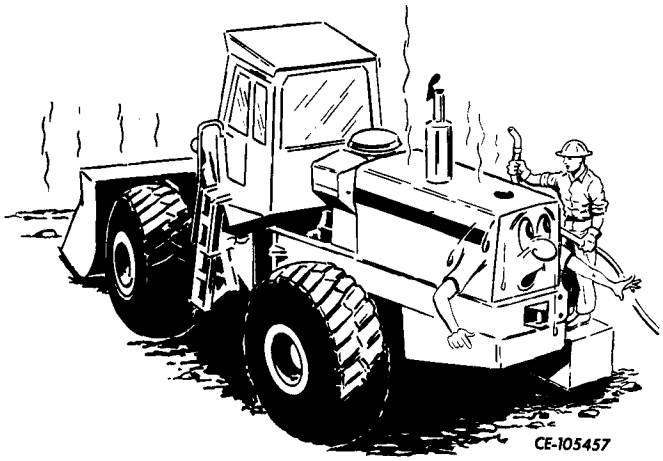
FILLING THE SYSTEM

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

_____ Remove the radiator cap (Illust. 23) carefully; refer to "RADIATOR CAP" in this section.

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

COOLING SYSTEM



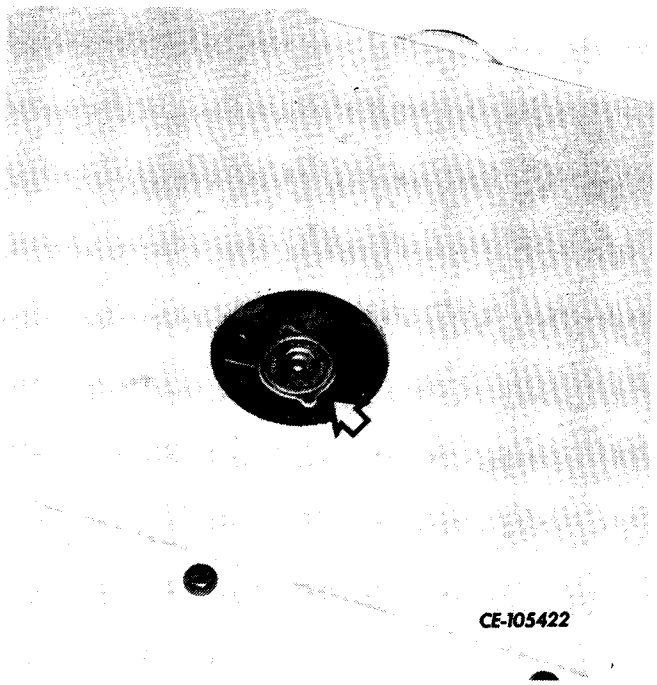
"Don't Add Cold Water To A Hot Machine Unless Absolutely Necessary."

1. Be sure the drains are closed.

2. Fill the cooling system slowly; this allows more air to escape and the system to be filled to maximum capacity. Refer to your Cummins Engine Operator's Manual for the type of coolant specified.

3. Start engine and run until normal operating temperature is reached, adding coolant as needed to keep proper level at the bottom of filler neck.

4. After all air is removed and level remains fixed, install the radiator cap (Illust. 23).



Illust. 23
Radiator Cap.

CLEANING THE SYSTEM

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

2. Close the cooling system drains.

3. Fill the system with clean water (refer to "FILLING THE SYSTEM" in this section), 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" in this section.

COOLING SYSTEM

ANTI-FREEZE

Refer to your Cummins Engine Operator's Manual for the type of anti-freeze specified.

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 (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%

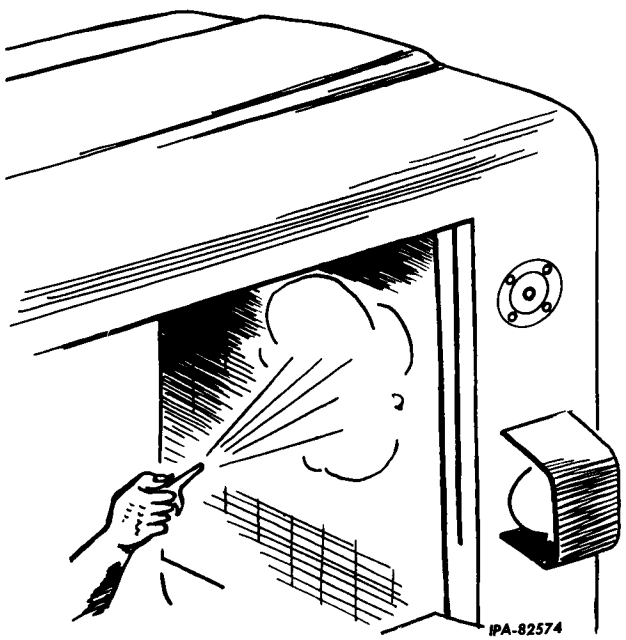
NOTE: A further increase in anti-freeze volume decreases the freezing point.

CLEANING THE RADIATOR

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

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

Remove all bugs or dirt from the radiator core, using air or water under pressure (Illust. 24). Direct the flow through the core, opposite the normal direction of air flow.



Illust. 24
Cleaning Radiator.

RADIATOR CAP

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

◆ 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.

When installing the cap, the gasket and contacting surfaces must be clean.

COOLING SYSTEM

The radiator cap is equipped with a pressure-relief valve. The relief valve keeps the system pressurized at approximately six to eight psi.

THERMOSTATS

The thermostats have two functions; gain rapid engine warm-up; control coolant temperature. Engine overheating is sometimes due to an inoperative thermostat.

Refer to your Cummins Engine Operator's Manual for thermostat checking procedure.

ENGINE OIL COOLER

The engine oil cooler is mounted on the right side of the engine and is connected to the engine cooling system.

The cooler has two functions; gain rapid engine oil warm-up; control engine oil temperature during operation.

TRANSMISSION SYSTEM AND HYDRAULIC SYSTEM OIL COOLERS

The transmission system and hydraulic system oil coolers are in a split unit mounted to the rear of the radiator. The large section on the left side cools the transmission and torque converter system. The small section on the right cools the hydraulic system oil.

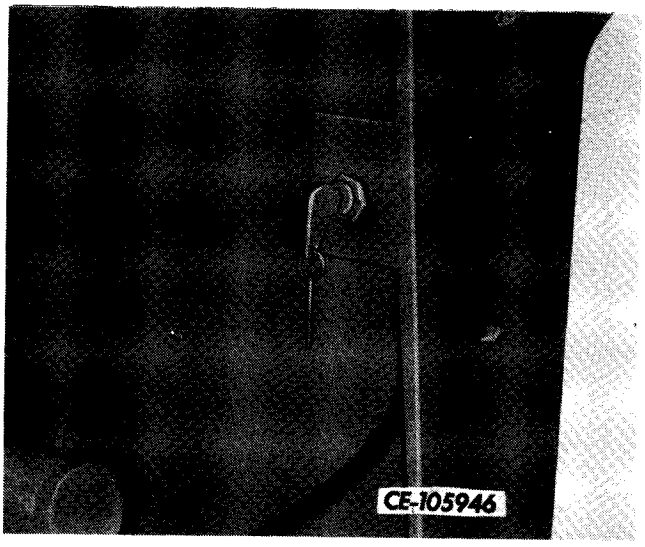
WATER PUMP

Refer to your Cummins Engine Operator's Manual for maintenance to be performed on the water pump.

ELECTRICAL SYSTEM

PRECAUTIONS

Before working on any part of the electrical system, turn the electrical system master switch "OFF" (Illust. 25).



Illust. 25
Electrical System Master Switch.

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

◆ CAUTION: WHEN INSTALLING BATTERIES, BE SURE TO CONNECT THE GROUND CABLE TO THE NEGATIVE TERMINAL. WHEN CONNECTING A BOOSTER BATTERY OR BATTERY CHARGER, MAKE CERTAIN TO CONNECT THE NEGATIVE TERMINAL TO THE NEGATIVE TERMINAL AND THE POSITIVE TERMINAL TO THE POSITIVE TERMINAL. DO NOT SHORT ACROSS OR GROUND ANY TERMINALS OF THE ALTERNATOR.

ALTERNATOR

Refer to vour Cummins Engine Operator's Manual for all maintenance to be performed on the alternator.

REGULATOR

The regulator is adjusted and sealed by the manufacturer. If the regulator fails to operate properly, consult your authorized Cummins Engine dealer.

CRANKING MOTOR

Refer to your Cummins Engine Operator's Manual for all maintenance to be performed on the cranking motor.

ELECTRICAL SYSTEM

STORAGE BATTERIES

The machine is equipped with four twelve-volt batteries. They are in battery compartments located at both sides of the hydraulic reservoir.

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

Maintenance

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

Keep battery cable terminals clean and tight.

Keep filler cap vent holes unplugged.

Replace worn, cracked, broken or corroded cables.

Keep batteries fastened securely in frame.

> NOTE: Excessive tightening can warp or crack battery case.

Maintain the correct battery liquid level. Refer to "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. 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 batteries at full charge for cold-weather operation. Add distilled water to the batteries in freezing temperatures only when the engine is to operate for several hours, to thoroughly mix the water and the electrolyte, or damage to the batteries will result from the water freezing.

BULB REPLACEMENT

Refer to the following procedures for bulb replacement.

Front and/or Rear Driving Lights

Raise the rubber retainer lip; remove the sealed beam unit. Disconnect the plug from the sealed beam.

Instrument Panel Gauge and Parking Brake Warning Lights

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

Tail and Stop Light

Remove the screws securing the lens. Depress the bulb, turn it counterclockwise in the socket, then pull it free of socket.

ELECTRICAL SYSTEM

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.

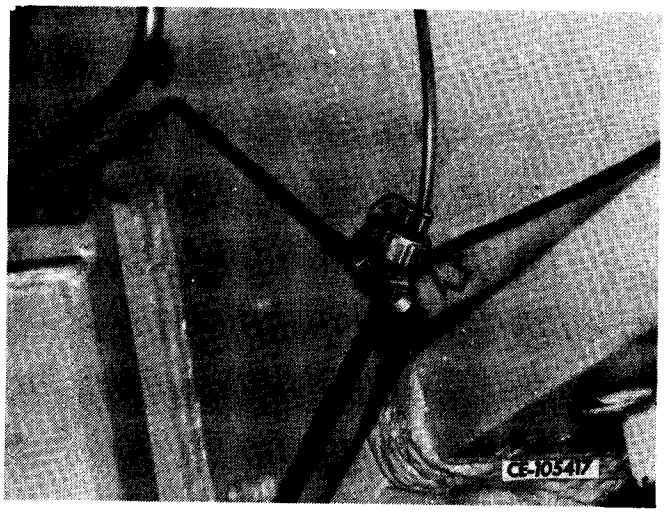
It is important to use the same capacity fuse for replacement. Refer to your machine parts catalog for the proper replacement fuse. If the lights fail, check the fuse. If the fuse continually burns out, check the electrical wiring for short circuits.

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.

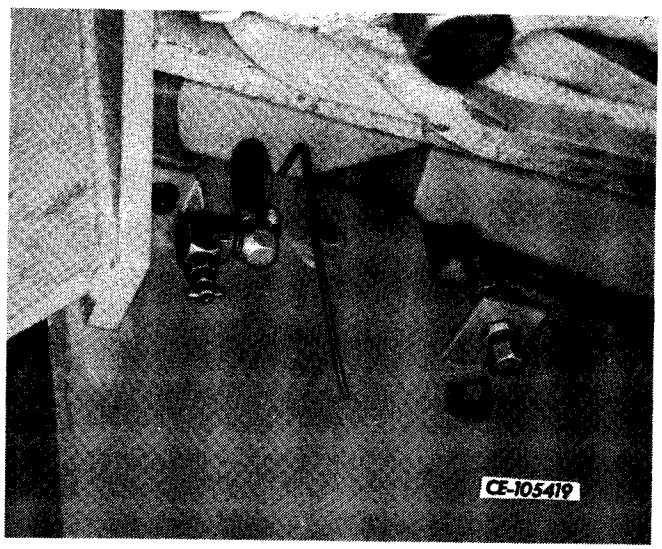
STOP LIGHT SWITCH (Illust. 26)

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.



Illust. 26
Stop Light Switch.

ENGINE



Illust. 27
Crankcase Oil Drain.

Refer to your Cummins Engine Operator's Manual for all maintenance and lubrication to be performed on the engine.

NOTE: The engine lubricating oil drain is located at the lower right corner of the fuel tank (Illust. 27).

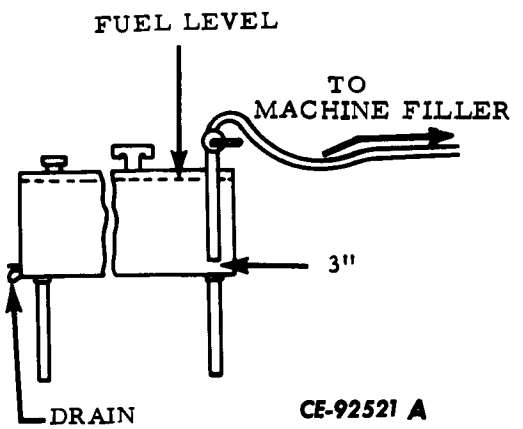
FUEL SYSTEM

GENERAL

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

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

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.



Illust. 28
Fuel Storage Tank.

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.

DIESEL FUEL SPECIFICATIONS

Refer to your Cummins Engine Operator's Manual for the type of fuel specified.

ENGINE FUEL SYSTEM

Refer to your Cummins Engine Operator's Manual for all engine fuel system servicing procedures.

DRAINING THE FUEL TANK

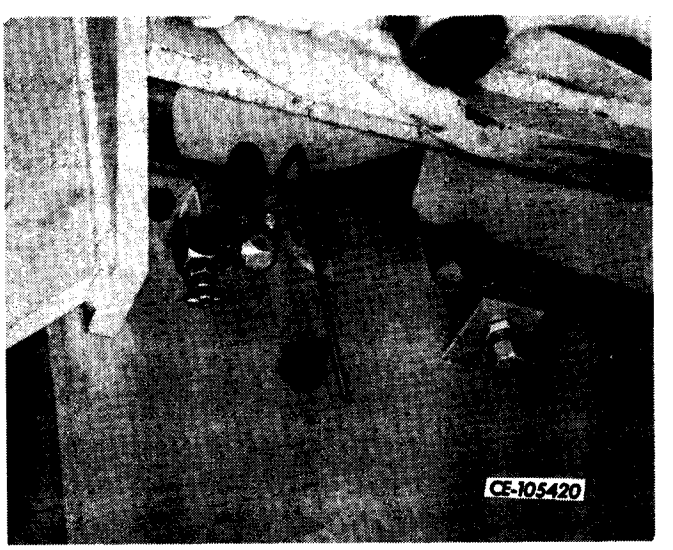
Drain water from the fuel tank at the interval specified in the "SCHEDULED MAINTENANCE GUIDE" in Section 7 as follows:

1. Remove a drain plug from one of the front corners of the fuel tank.

2. When clean fuel starts running from the drain, install the plug back in place.

FUEL TANK VENT (Illust. 29)

Keep the fuel tank vent tube free of obstructions.



Illust. 29
Fuel Tank Vent Tube.

HYDRAULIC SYSTEM

DRAINING THE SYSTEM

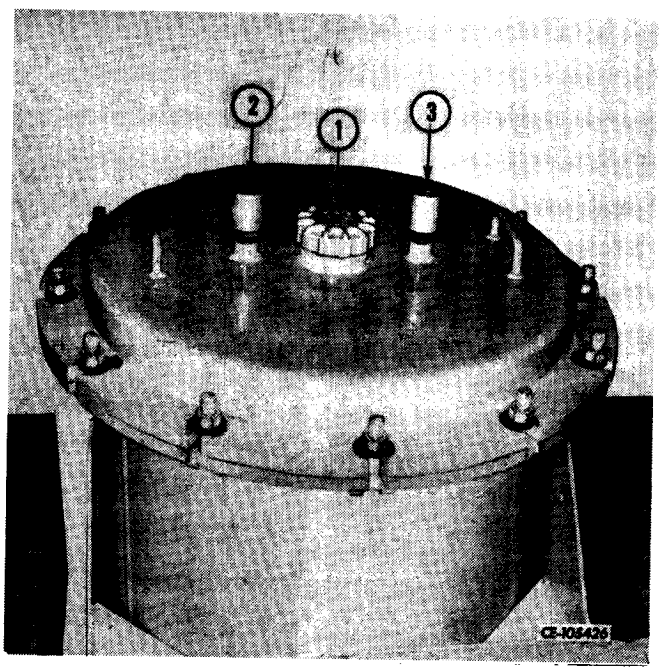
1. Operate the boom, bucket and steering until the hydraulic oil becomes warm.

2. Raise the bucket completely and roll the bucket back all the way.

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

3. Park the machine on level ground, shut the engine down, and apply the parking brake.

4. Clean the top of the reservoir with kerosene or cleaning solvent.

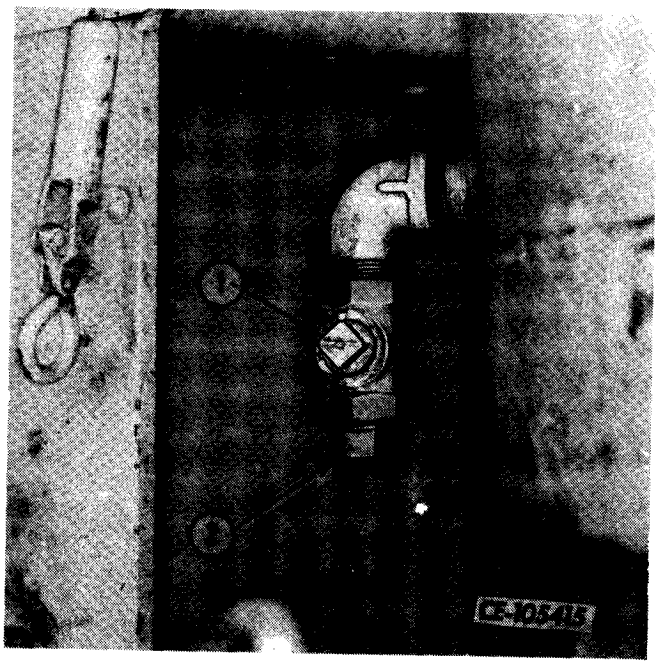


Illust. 30
Reservoir Filler Cap and Relief Valves

5. Slowly loosen and remove the reservoir filler cap (1, Illust. 30).

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

6. Remove the plug (2, Illust. 31) from the bottom of the reservoir drain.



Illust. 31
Reservoir Drain Valve and Plug.

7. 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.

8. Place the funnel under the reservoir drain and open the drain valve (1, Illust. 31).

9. 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.

10. Let the upper portion of the reservoir drain completely. Close the drain valve and install the plug in the drain hole.

11. Remove the drain plug from the bottom of the reservoir and let the lower portion of the reservoir drain.

12. Install the drain plug back in place.

13. Put the reservoir filler cap back in place until the system is to be refilled this will keep contamination from getting into the reservoir.

HYDRAULIC SYSTEM

SERVICING THE RESERVOIR FILTERS

1. Drain the hydraulic system. Refer to "DRAINING THE SYSTEM."

2. Loosen the 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 kerosene 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 it with compressed air, and install it back in place.

8. Check the rubber seals in both of the by-pass valves. Be sure they are in place properly and are pliable.

9. Clean the reservoir relief valves. Refer to "SERVICING THE RELIEF VALVES."

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. Be sure the cover plate is properly in place with the flanges on the underside down inside of the 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 nuts.

16. Fill the reservoir with fresh oil. Refer to "FILLING THE 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. 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 relieve the pressure build-up.

8. Add oil to bring the level up to the "H" mark on the dipstick.

9. Reinstall and tighten the cap.

SERVICING THE RELIEF VALVES
(Illust. 32)

1. Stop the engine.

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

HYDRAULIC SYSTEM

2. Remove the filler cap (1, Illust. 30) on the reservoir in order to relieve any pressure in the tank.

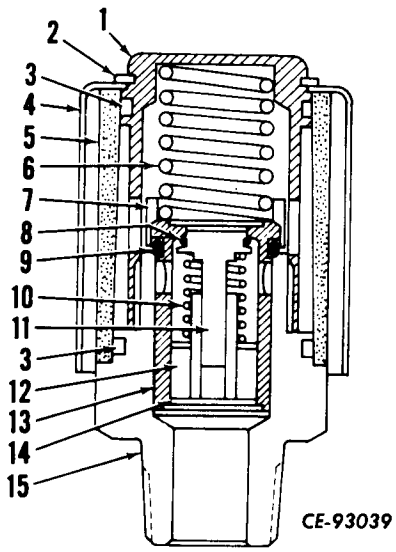
3. Remove the lock ring (2) and cover (4) from the relief valves (2 and 3, Illust. 30).

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.



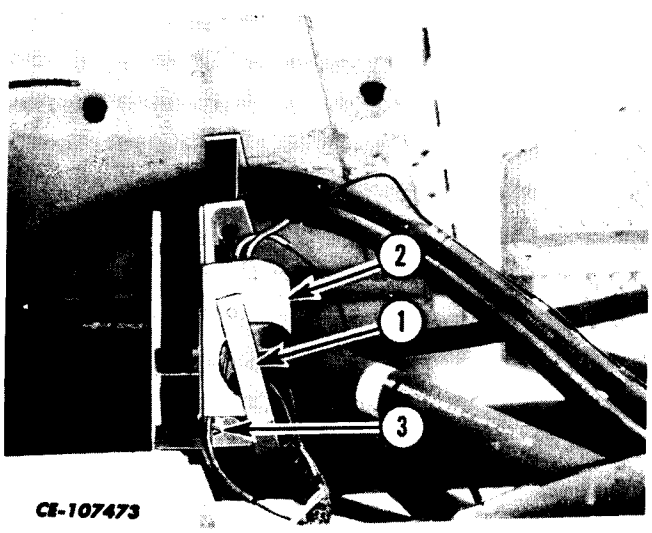
Illust. 32
Vacuum Pressure Relief Valve.

1. Cap
2. Lock Ring.
3. Filter Seal.
4. Cover.
5. Filter.
6. Spring.
7. Retainer.
8. Poppet Seal.
9. Sleeve Seal.
10. Poppet Spring.
11. Poppet.
12. Guide.
13. Sleeve.
14. Lock Ring.
15. Body.

STARTING AID

Periodically, the ether starting fluid will be used up and the ether fluid can will have to be replaced. The ether can holder is located under the operator's compartment on a bracket. Refer to Illust. 33.

To remove the can, pull the bail (1) out as far as possible, away from the base of the can. Pull the can free of the holder (2). Install the new can into the holder (2) and rest the can base on the wire rest (3). Push the bail (1) down under the base of the can to lock the can in place.



Illust. 33
Ether Can Holder.

1. Bail.
2. Can holder.
3. Wire can rest.

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 under inflation 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 the 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.

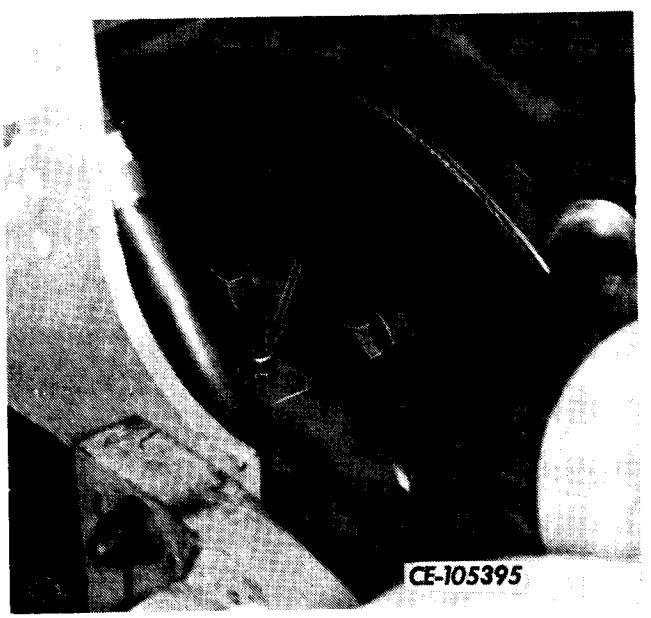
TRANSFER DRIVE BREATHER (Illust. 34)

1. Remove the breather from the top of the transfer drive.

2. Wash the breather in a commercial cleaning solvent to remove any contaminants in the cap.

3. Dry thoroughly, using compressed air, or shake to remove the excess cleaning solvent.

4. Install the breather back in place.



Illust. 34
Transfer Drive Breather.

TRANSMISSION AND TORQUE CONVERTER

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.

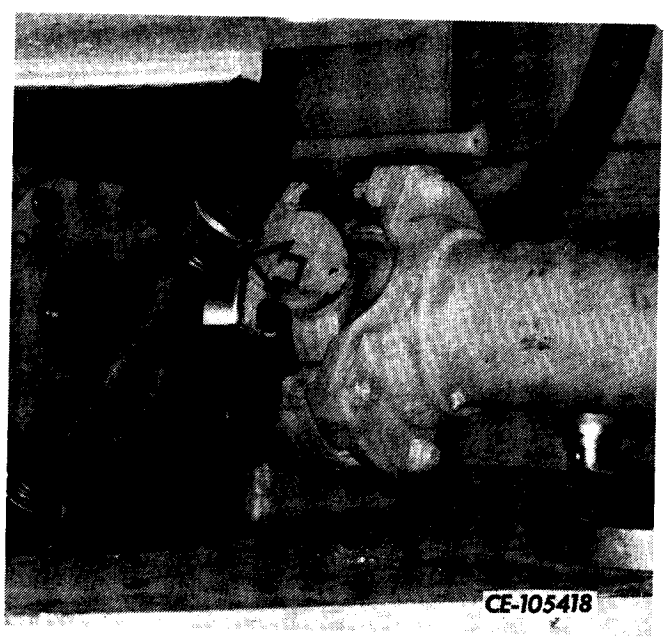
2. Park the machine on level ground and shift the transmission to "N" (neutral).

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. Unscrew the dipstick (Illust. 35) located on the right side of the front transmission cover. Wipe the dipstick clean.



Illust. 35
Transmission Dipstick.

7. Insert the dipstick back in the tube and screw it down.

8. Unscrew the dipstick again and check the oil level on the dipstick gauge. The correct level is between the "ADD" and "FULL" 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.

CHANGING THE FILTER ELEMENTS

NOTE: Service the filters (1 and 2, Illust. 36) at the scheduled interval shown on the "SCHEDULED MAINTENANCE GUIDE" in Section 7. The following procedure is the same for both filters.

Removal (Illust. 37)

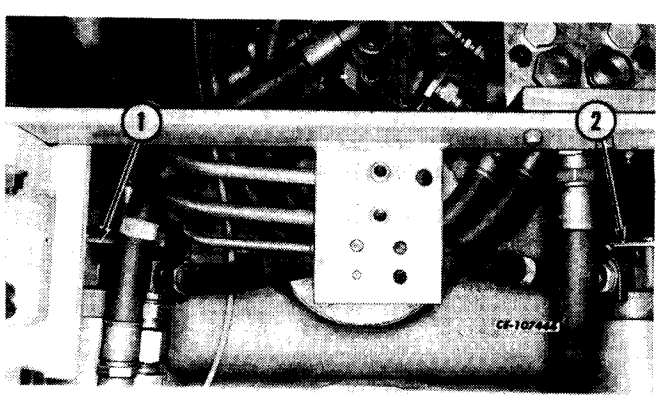
1. After reaching operating temperature, park the machine on level ground, stop the engine and lower the bucket to the ground. Install the safety bar.

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 (14) and unscrew the bolt completely. Remove bolt (1) and washer (2).

(Continued on next page)



Illust. 36
Transmission System Filters.

TRANSMISSION AND TORQUE CONVERTER

CHANGING THE FILTER ELEMENTS - Continued

Removal - Continued

5. Pull the case (14) free of the head (5) 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 (8) and two seals (7). Be careful not to lose the spring (13), washer (12), cap (11) and seal (10) from the bottom of the case.

8. Place the spring (13), cap (11), washers (2 and 12), bolt (1) and case (14) in a solvent bath. Wash out any sludge that has accumulated in the case. Wipe the inside of the head (5) out. Dry all parts thoroughly.

9. Check the condition of the large seal (6) in the head and small seal (10) from the case. Replace them if they show signs of wear or deterioration.

Installation (Illust. 37)

1. Preassemble the following parts in the order given:

   a. Insert the spring (13), cap (11), washer (12) and small seal (10) over the shaft in the case and push them to the bottom.

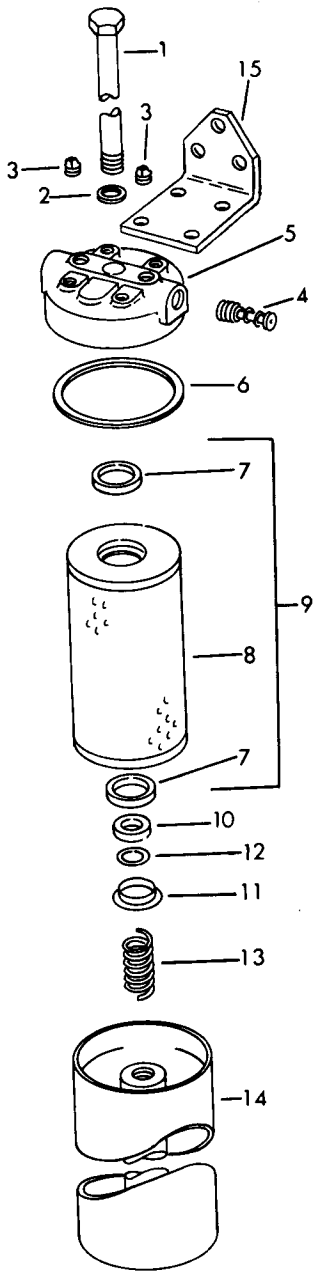
   b. Install the element (8) with seals (7) into the case. Push the element down and seat it over the seal (10).

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 (5). Tighten the bolt into the case.

4. After servicing both filters, start the engine and let it idle for approximately five minutes. During this time, check for filter leaks. Correct any leak.

5. Check the transmission oil level as described under "CHECKING THE OIL LEVEL."



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Illust. 37
Transmission and Torque Converter Oil Filter.

1. Bolt.
2. Washer.
3. Plug.
4. Valve.
5. Head.
6. Seal.
7. Seal.
8. Element.
9. Element Assembly.
10. Seal.
11. Cap.
12. Washer.
13. Spring.
14. Case.

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 (10, Illust. 38) and washer (9) from the bottom of the transmission immediately after operation, while the lubricant is still warm.

5. Unscrew the transmission oil level gauge and remove it. This will vent the case and allow the oil to drain faster.

6. After the lubricant has drained, service the transmission filter element. Refer to "CHANGING THE FILTER ELEMENT."

7. Install the transmission drain plug and washer.

8. Service the transmission sump strainers. Refer to "SUMP STRAINERS."

9. Fill the transmission with fresh lubricant to the proper level through the fill-check pipe.

10. Install the oil gauge in the fill-check pipe.

11. Start the engine.

12. Check the lubricant level. Refer to "CHECKING THE OIL LEVEL."

SUMP STRAINERS (Illust. 38)

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

Removal

1. Loosen the bolts securing the split flange halves (2) and disconnect the tube (1) from adapter (3). Move the tube out of the way.

2. Disconnect hose (13) from the other sump adapter.

3. Loosen the bolts and remove the adapter (3), gasket (4), check valve (5), gasket (6) and strainer (7) from the transmission case.

4. Loosen the bolts and remove the check valve with adapter (12), gasket (11) and strainer (8) from the transmission case.

5. Unscrew the strainers (7 and 8) from the check valves (5 and 12).

6. Wash all of the removed parts, except the gaskets (4, 6 and 11) in a commercial cleaning solvent. Be sure all particles are removed from the strainers.

7. Dry all parts thoroughly.

8. Check the check valves (5 and 12) for proper operation by pushing down on the stem from the inside. The valve disc should move freely.

Installation

1. Assemble the strainers (7 and 8) into the check valves (5 and 12).

2. Install a new gasket (6) in place over the strainer (7).

3. Install a new gasket (4) between adapter (3) and check valve (5).

4. Hold the parts together and insert them into the transmission case. Secure in place with the bolts previously removed.

5. Attach the tube (1) to the adapter (3) and secure in place with the split flanges (2).

6. Install a new gasket over strainer (8) and against the check valve flange (12).

7. Position the parts in the transmission case and secure with the bolts previously removed.

8. Attach the hose (13) to the adapter on the check valve (12).

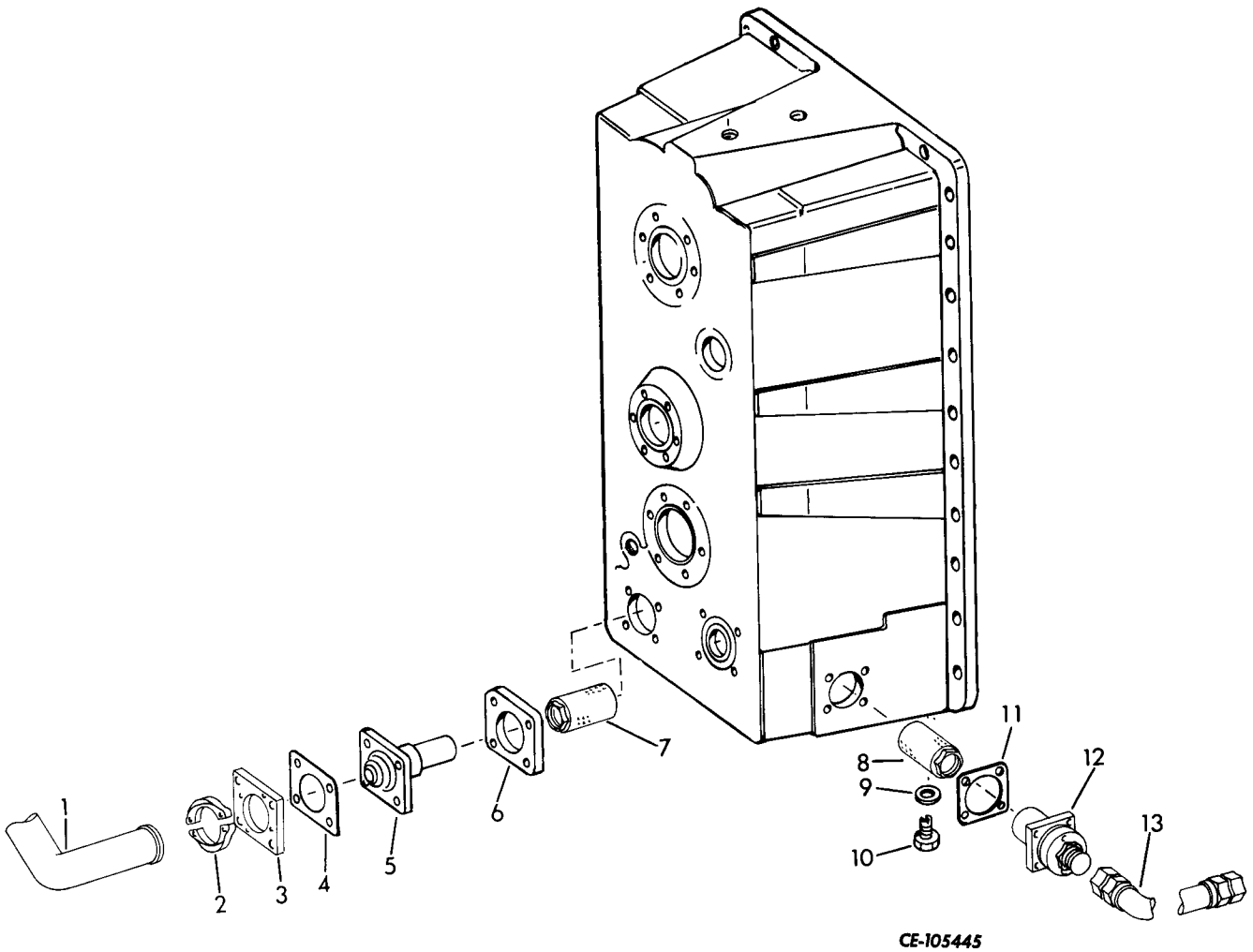
9. After the transmission has been filled with fresh lubricant, start the engine and check the sump strainers for leaks.

(Continued on next page)

TRANSMISSION AND TORQUE CONVERTER

SUMP STRAINERS (Illust. 26) - Continued

Installation - Continued



Illust. 38
Sump Strainers.

1. Tube.
2. Split Flange Clamps.
3. Adapter.
4. Gasket.
5. Check Valve.
6. Gasket.
7. Strainer.
8. Strainer.
9. Washer.
10. Plug.
11. Gasket.
12. Check Valve.
13. Hose.

TRANSMISSION AND TORQUE CONVERTER

BREATHER (Illust. 39)

1. Remove the transmission and torque converter system breather (1).

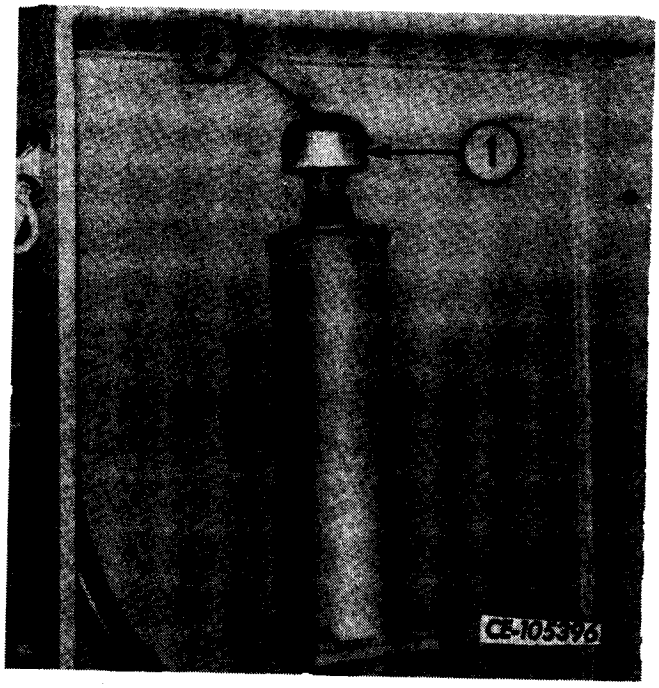
2. Remove the screw (2) from the top of the breather. Take the cap off and remove the element.

3. Wash the housing and cap with cleaning solvent and dry thoroughly with compressed air.

4. Clean the element with compressed air from the inside. If the element is beyond cleaning, replace the complete breather assembly.

5. Install the element on the housing and place the cap over it. Secure the cap with the screw (2).

6. Install the breather in place on the breather tube.



Illust. 39
Transmission and Torque Converter System Breather.

CAPACITIES (U.S. MEASURE—APPROXIMATE)

Fuel tank	250 gals.
Cooling system	45 gals.
Crankcase:	
With filters changed	27 gals.
Without filters changed	18 gals.
Transmission and torque converter system	34 gals.
Axle (each)	24 gals.
Hydraulic system	126 gals.
Transfer drive	1 pt.
Air-conditioner refrigerant (if equipped)	64 ozs.

SPECIFICATIONS

ENGINE

Make and model	Cummins, VT-1710 C 635
Type	Turbocharged, direct start, direct injection, 4-cycle diesel
Number of cylinders	12
Bore	5-1/2 in.
Stroke	6 in.
Displacement	1710 cu. in.
Rated horsepower	635 @ 2100 rpm
Net torque	1588 ft. lbs.
Air compressor	Gear driven
Flywheel horsepower (with parasitic load)	560 @ 2100 rpm

ELECTRICAL SYSTEM

System voltage	24 volt—neg. ground
Batteries	Four—12 volt

TORQUE CONVERTER

Type	Single stage—single phase
Stall ratio	4.74:1

TRANSMISSION

Type	Constant mesh, directional soft shift, full power shift, countershaft
Make	International Harvester
Model	P-6000 SS
Number of ranges:	
Reverse	2
Forward	2
Speeds:	
First gear (forward and reverse)	8.7 mph
Second gear (forward and reverse)	20 mph
Clutches	Multiple disc, oil cooled
Pump capacity	30 gpm @ 2100 rpm
Filtration	Replaceable filter element, two sump strainers

(Continued on next page)

SPECIFICATIONS

AXLES	
Make	International Harvester
Model	FR-500
Type	Rigid type—double reduction
Gear reduction ratio:	
Differential reduction	3.91 to 1
Planetary reduction	6.46 to 1
Total reduction	25.25 to 1
SERVICE BRAKES	
Type	2 shoe, internal expanding
Operation	Wheel by wheel, air over hydraulic, split air system, wedge-type brakes; braking with or without transmission disconnect.
Brake size	28 in. x 8 in.
Wheel cylinder	Single cylinder, 3-in. dia., 16° wedge angle, 2-in. stroke
PARKING BRAKE	
Type	Disc type, 2 calipers on intermediate drive shaft
Operation	Spring apply, air over hydraulic release
Actuators	2—one for each caliper
TIRES (tubeless)	
Size:	
Standard—6540 x 39—30 PR (L4)	60 psi
Optional—6540 x 39—30 PR (L5)	60 psi
Optional—33.25 x 35—32 PR (L4)	65 psi
Optional—33.25 x 35—32 PR (L5)	65 psi
HYDRAULIC LOADER SYSTEM	
Boom cylinders:	
Number of cylinders	2
Type	Double acting
Bucket cylinders:	
Number of cylinders	2
Type	Double acting
HYDRAULIC STEERING SYSTEM	
Steering cylinders:	
Number of cylinders	2
Type	Double acting
HYDRAULIC SYSTEM	
Type	Closed with pressure control (30 psi) and vacuum relief
Filtration	Seven 5-micron filters
Main valve	Two spool, pilot operated, with relief valve

SPECIFICATIONS

HYDRAULIC SYSTEM PUMPS

Number of pumps	2
Type	Double element, gear type
Main hydraulic pump output	219 gpm @ 2100 rpm and 3000 psi
Steering pump	64 gpm @ 2100 rpm and 2000 psi

AIR-CONDITIONER (If equipped)

Cooling capacity	21,000 BTU/hr.
Air-flow circulation	400 cfm maximum
Electrical system	24 volt

LOADER MECHANISM SPEEDS

Boom raising time (*)	10.1 sec.
Boom lowering time (under pressure) (*)	7.6 sec.
Boom lowering time (in float position)	5 sec.
Bucket dump time (*)	2.67 sec.
Bucket roll-back time (*)	3.6 sec.

RADIATOR CAP ..... 7 psi

TORQUES

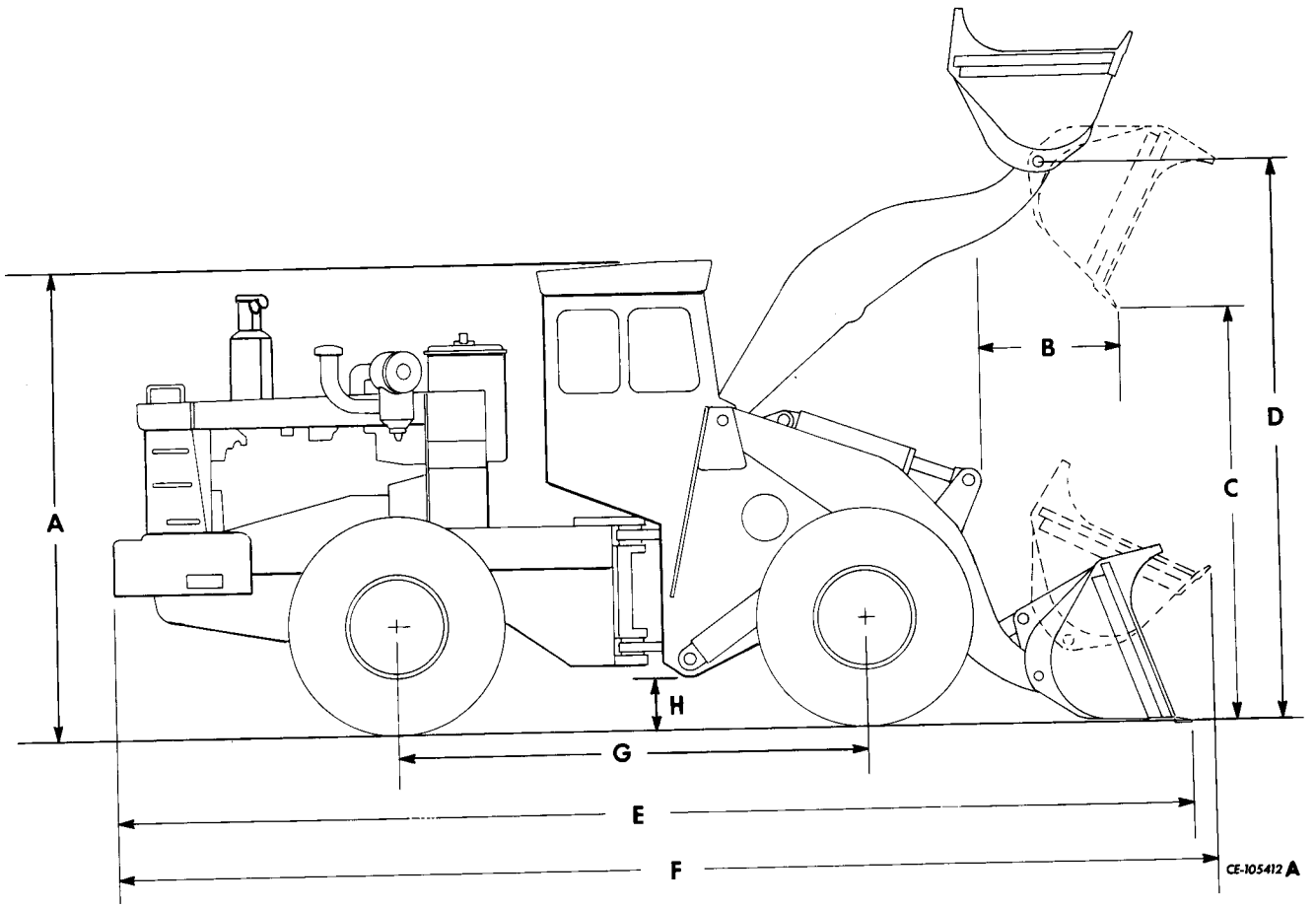
All torques are given with bolts, screws and nuts lubricated with engine oil, unless otherwise indicated.

Wheel lug nuts	700-800 ft. lbs.

(*) At governed speed with bucket empty.

GENERAL

SPECIFICATIONS



Illust. 1
General Dimensions.

	With General-Purpose Rock Bucket	With Spade-Nose Rock Bucket
A. Height to top of cab (*)	14 ft. 11-1/2 in.	14 ft. 11-1/2 in.
B. Reach at 7-ft. cutting edge clearance and 45° dump angle	105 in. w/o teeth	112 in. w/o teeth
	113 in. w/ teeth	117 in. w/teeth
Reach at maximum height and 45° dump angle	72 in. w/o teeth	79 in. w/o teeth
	79 in. w/teeth	84-1/2 in. w/teeth
C. Dump clearance at maximum height and and 45° dump angle (*)	160 in. w/o teeth	153 in. w/o teeth
	153 in. w/teeth	147-1/2 in. w/teeth
D. Height to bucket pivot (*)	18 ft., 5 in.	18 ft., 5 in.
E. Overall length with bucket on ground	35 ft., 4 in. w/o teeth	36 ft., 2 in. w/o teeth
F. Overall length with bucket at carry	35 ft., 4-1/2 in. w/o teeth	36 ft., 2-1/2 in. w/o teeth

(*) Increases or decreases according to tire size.

SPECIFICATIONS

	With General-Purpose Rock Bucket	With Spade-Nose Rock Bucket
G. Wheelbase	15 ft.	15 ft.
H. Ground clearance (*)	21-3/4 in.	21-3/4 in.
Width (bucket)	168 in.	168 in.
Turning radius—outside corner of bucket	30 ft.	30 ft.
SAE bucket capacity:		
Rated cu. yds.	11	11
Struck cu. yds.	9.38	9.4
Basic operating weight with L4 tires (no attachments) (see note)	122,580 lbs. w/o teeth	123,900 lbs. w/o teeth
Breakout force	77,237 lbs.	66,937 lbs.
Lifting capacity @ SAE carry lbs.	95,838 lbs.	90,133 lbs.

(*) Increases or decreases according to tire size.

NOTE: With L5 tires, add 3,560 lbs.

MACHINE PERFORMANCE CHART

SYSTEM	GAUGE	TYPE OF ENGINE	
		Cummins VT-1710C 635	
		Minimum	Maximum
ENGINE	Water Temp. (degrees Fahrenheit)	180 degrees	195 degrees
	Oil Press. (psi)	40	150
CONVERTER	Temperature (degrees Fahrenheit)	100 degrees	250 degrees
	Charging Pressure (psi)	(#) 80	(#) 150
TRANSMISSION	Temperature (degrees Fahrenheit)	100 degrees	250 degrees
	Clutch (psi)	(#) 240	(#) 260
	Lube (psi)	(#) 20	(#) 40
HYDRAULIC	Main Hydraulic Pressure (psi)	(#) 3000	(#) 3100
	Steering Pressure	(§) 1900	(§) 2100
AIR SYSTEM	Pressure (psi)	75	125
(%) TACHOMETER	Low Idle No Load (RPM)	550	650
	High Idle No Load (RPM)	2100/2250	
	Governed Speed (RPM)	2100	
	Converter Stall (RPM)	2100/2250	
	Hydraulic Stall (RPM)	1650/1800	
	Full Stall (RPM)	1575/1725	

(%) - An RPM tolerance of plus or minus 50 RPM is acceptable.

(#) - At 160 degrees - 180 degrees F. oil temperature.

(§) - At 160 degrees - 180 degrees F. oil temperature and maximum RPM.