Operator's Instruction Manual

CASE INDUSTRIAL W-12 DIESEL UNIT LOADER

4 WHEEL DRIVE

J. I. CASE® CO. RACINE, WISCONSIN U.S.A.

TO THE PURCHASER OF A CASE LOADER

The care you give your new Case Loader will greatly determine the satisfaction and service life you will obtain from it. Use this manual as your guide. By observing the instructions and suggestions in this manual, your Case Loader will serve you well for many years.

As an Authorized Case Industrial Dealer, we stock Genuine Case Parts, which are manufactured with the same precision and skill as the original equipment. Our factory trained staff is kept well informed on the best methods of servicing Case equipment and is ready and able to help you.

Should you require additional aid or information, contact us.

YOUR AUTHORIZED CASE INDUSTRIAL DEALER

To insure efficient and prompt service, please furnish us with the Model, Serial, Transmission and Engine Numbers of your Loader in all correspondence or contacts.

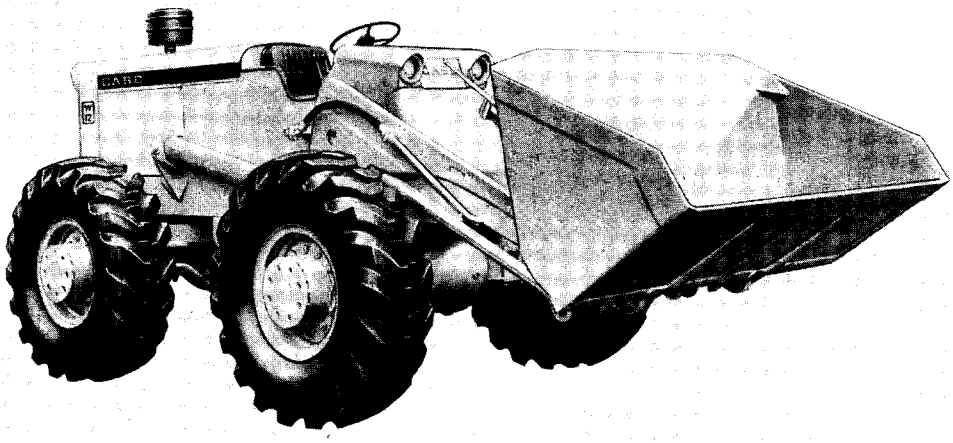


Figure 1. Right Side View of W-12 Loader

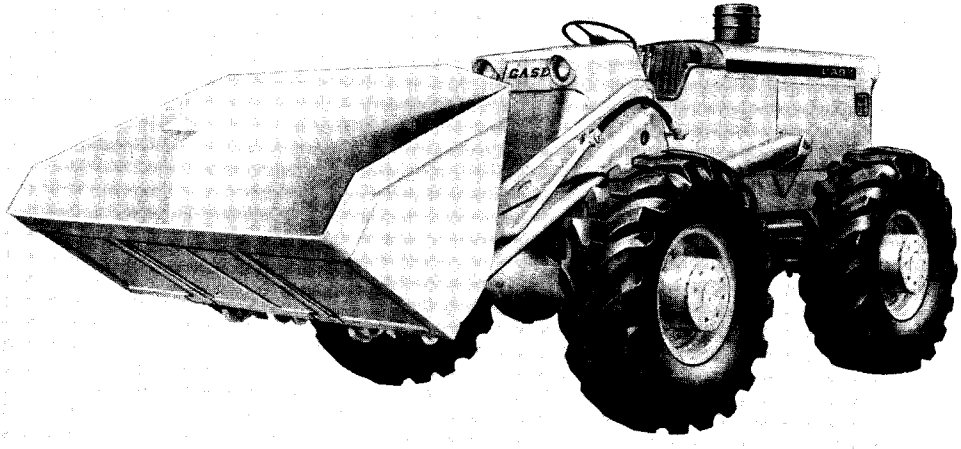


Figure 2. Left Side View of W-12 Loader

INTRODUCTION

The rubber tired loader, with its great variety of special tools and extra equipment, is a relatively new addition to the industrial equipment field. Because of its speed, maneuverability and adaptiveness, it has become a greatly needed machine for all types of construction and general contracting jobs, logging camps, municipal departments, coal yards, gravel pits, quarries, docks, airports, steel mills, foundries, public utility companies, lumber yards, railroads, large warehouses and factories.

The rugged combination of a Case Diesel Engine and Full Power Shift Transmission with three speeds forward and three speeds reverse, provides a full range of working speeds adaptable to all of the above uses.

Case Powrcel Diesel Engine

The Case W-12 Loader is powered by a rugged six cylinder full diesel engine that is noted for its quiet operating characteristics and economy.

Advanced engineering includes the CASE POWRCEL combustion system which produces all of the available power out of each charge of injected fuel. To protect the closely fitted precision parts, the finest filters available have been provided to clean the fuel, the intake air, crankcase oil, transmission oil and hydraulic oil.

Torque Converter

The Torque Converter provides smoothness of operation, ease of handling and eliminates gear shift guess work. Because torque is multiplied automatically, the engine power is fitted to the load more efficiently and only three range speeds are necessary for maximum performance, because the torque converter provides an infinite number of speed ratios in each range. The conventional clutch is eliminated.

Positive Control Hydraulics

The double acting hydraulic cylinders and 4 position control valve provide positive bucket control when raising, lowering, tilting or transporting. All the operating controls are conveniently located so the operator has complete control of the loader while in a comfortable seated position. Big Pay Loads in less time, while a minimum amount of operator fatigue, result from this complete, positive control.

Maximum Stability

The wide wheel tread and low center of gravity give the Loader exceptional balance and stability for handling heavy loads in rough terrain.

SERIAL NUMBER

When ordering parts from your Authorized Case Industrial Dealer in all contacts or correspondence relative to your Case Loader, always specify the Serial Number, Engine Number, Model of the Loader and the Transmission Serial Number.

The Model and Serial Number are stamped on the plate located on the instrument panel, Figure 3. The Engine Number is stamped on a plate fastened to the left hand side of the engine on the fuel pump mounting flange, Figure 4, and the Transmission Serial Number plate is located on the left hand side of the transmission transfer gear housing.

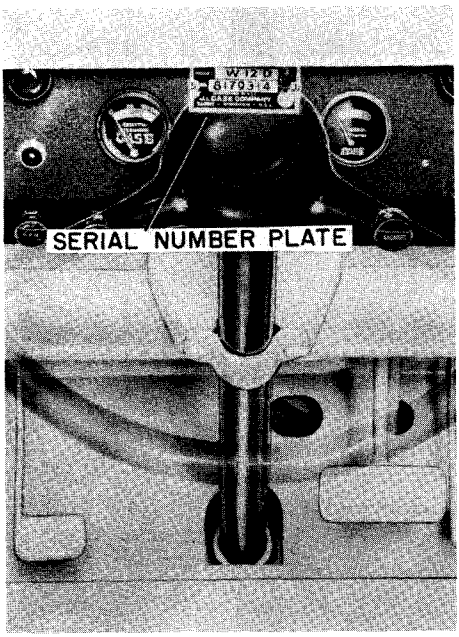


Figure 3

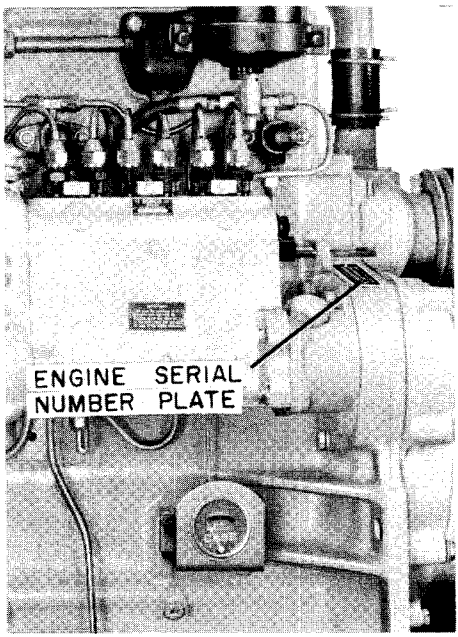


Figure 4

NOTE: The terms Right Hand and Left Hand whenever used in this manual, refer to the machine as viewed when seated in the operator's seat. See Page 2.

For convenient reference, fill in the Serial Number, Engine Number, Transmission Serial Number and Model Number of your Loader in the spaces provided below.

Model Number _____ Engine Number _____

Loader Serial Number _____ Transmission Number _____

ENGINE

General

Type	6 Cylinder, 4 Stroke Cycle, Valve-in-Head Diesel Engine
Firing Order	1-5-3-6-2-4
Bore	4-3/8 Inches
Stroke	5 Inches
Piston Displacement	451 Cubic Inches
Compression Ratio	15 to 1
Cylinder Sleeves	Removable Wet Type
No Load Governed Speed	2180 RPM
Full Load Governed Speed	2000 RPM
Engine Idling Speed	750 RPM
Valve Tappet Clearance (Both Intake and Exhaust)	.025 Inch (Cold)
Diesel Fuel Recommendation	Number 2 Diesel Fuel
Air Filter	Heavy Duty Dry Type

Piston Rings

Rings Per Piston	4
Number of Compression Rings	3
Number of Oil Rings	1

Piston Pins

Type Pins	Full Floating Type

Connecting Rods

Type Bearings	Replaceable Precision, Steel Back, Copper-Lead Alloy Liners

Main Bearings

Number of Bearings	7
Type Bearings	Replaceable Precision Steel Back, Copper-Lead Alloy Liners

Engine Lubricating System

Oil Pressure	40 to 45 Pounds With Engine Warm and Operating at Full Governed RPM
Type System	Forced Circulation, Gear Type Pump, Floating Oil Screen Inlet.
Oil Filter	Replaceable Element Full Flow Type

FUEL SYSTEM

Fuel Injection System

Fuel Injection Pump	Robert Bosch, Type PES (Multiple Plunger)
Pump Timing	31 Degrees Before Top Dead Center (Port Closing)
Fuel Injectors	Robert Bosch, Throttling Pintle Type; (Opening Pressure 1950 to 2050 PSI)
Fuel Transfer Pump	Plunger Type, Integral Part of Injection Pump
Governor	Variable Speed, Fly-Weight Centrifugal Type; Integral Part of Injection Pump.

Fuel Filters

1st. Stage Fuel Filter	Replaceable Element Type
2nd Stage Fuel Filter	Replaceable Element Type
Final (3rd Stage) Fuel Filter	Replaceable "Sealed Type" Filter
Fuel Tank Water Trap and Drain	Located in Base of Fuel Tank

Fuel Gauges

Fuel Tank Gauge	Located on Instrument Panel
Fuel Pressure Gauge	Located on Left Side of Engine. Indicates Condition of Fuel Filters.

COOLING SYSTEM

Type of System ---------- Pressurized, Thermostat Controlled By-Pass Type; Forced Circulation (Impeller Type Pump)
Radiator ---------- Heavy Duty Fin and Tube Type
Thermostat ---------- Starts to Open At Approximately 180° F.; Fully Open at 195°F.
Radiator Shutters ---------- Available as Extra Equipment
Pressure Cap Required ---------- 4PSI
Suction Type Fan (Standard) ---------- 6 Blades 20-1/4" Dia.
Pusher Type Fan (Optional) ---------- 6 Blades 22" Dia.

ELECTRICAL SYSTEM

Type of System ---------- 24 Volt, Negative Ground
Batteries ---------- Two 12 Volt Batteries Connected in Series (Auto-Lite Type 14H or Equivalent, 90 Ampere Hours at 20 Hour Rate)
Generator ---------- 24 Volt, Shunt Type
Voltage Regulator ---------- Automatic; Located on Fuel Tank Mounting Plate
Starting Motor ---------- 24 Volt

HYDRAULIC SYSTEM

Lift Cylinders - Double Acting ---------- 5" Dia. 36" Stroke
Tilt Cylinders - Double Acting ---------- 4" Dia. 24" Stroke
Pump ---------- Gear Type, Driven From Transmission.
Pump Capacity at 2000 RPM ---------- 52 Gallons Per Minute
Reservoir ---------- Electric Welded Steel Tank With Breather, Oil Level Dip Stick and Full Flow Micronic Filter.
Standard Control Valve ---------- Two Spool, Four Positions Detent Retained In (Raise Neutral - Lower - Float) Internal Relief Valve

POWER TRAIN

Torque Converter ---------- Single Stage, Ratio 3.5 to 1

Transmission ---------- Full Power Shift. 3 Speeds Forward and 3 Speeds Reverse

TRAVEL SPEEDS

Low ---------- 0-2.8 MPH Forward and Reverse
Intermediate ---------- 0-7.6 MPH Forward and Reverse
High ---------- 0-24. MPH Forward and Reverse

Axles ---------- Spiral Bevel with Planetary Reduction in Hub

WHEELS AND TIRES

Standard (Both front and rear) ---------- 16.00 x 24
Ply (Both front and rear) ---------- 12
Tread (Both front and rear) ---------- 77-3/4"

Optional Rock Grader (Both front and rear) ---------- 16.00 x 24
Ply ---------- 12
Tread (Both front and rear) ---------- 77-3/4"

Optional Sand Tire (Both front and rear) ---------- 20.5 - 25
Ply ---------- 12
Tread ---------- 80"

APPROXIMATE CAPACITIES

Fuel Tank ---------- 40 Gallons

Cooling System ---------- 10-1/2 Gallons

Hydraulic Reservoir ---------- 16 Gallons

Torque Converter and Transmission ---------- 7-1/2 Gallons

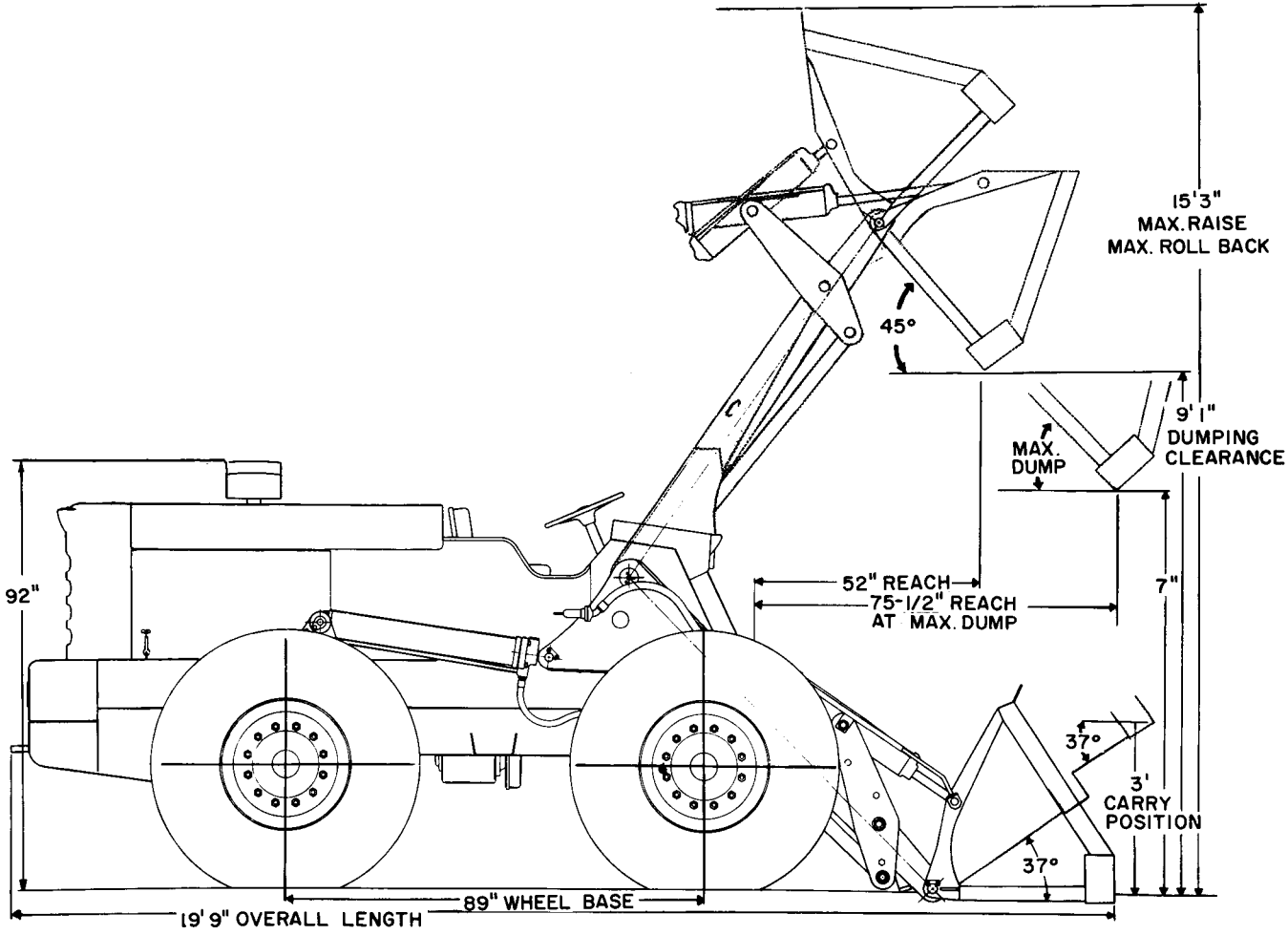

15'3"
MAX. RAISE
MAX. ROLL BACK
45°
9'1"
DUMPING
CLEARANCE
MAX.
DUMP
92"
52" REACH
75-1/2" REACH
AT MAX. DUMP
7"
37°
3'
CARRY
POSITION
37°
89" WHEEL BASE
19'9" OVERALL LENGTH

Figure 5

OVERALL MEASUREMENTS

Height (To Top of Air Cleaner)	92"
Width (Over Hubs)	96"
Length - Bucket on Ground	19'9"
Length - Bucket at Carry Position	20'1"
Wheel Base	89"
Ground Clearance	15-5/8"
Approximate Weight	20,940 Pounds

STANDARD BUCKET

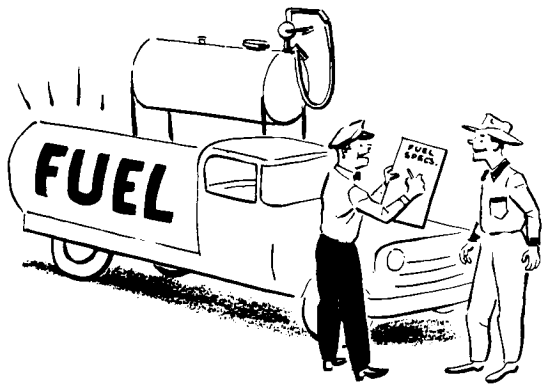
Heaped Capacity	2-1/2 Cubic Yards (SAE Rated)
Struck Capacity	2 Cubic Yards
Width Outside (Standard Bucket)	102"
Height to Center of Hinge Pin	11'10"
Tip Back - Ground Level	37°
Tip Back at 3' Carry Position	37°
Raising Time	7-1/2 Seconds
Lowering Time	4-1/2 Seconds
Maximum Dumping Clearance, at 45° Dump	9'1"
Reach to Frame at Maximum Height, Max Dump	47"
Reach to Tire at Maximum Height, Max Dump	29"
Angle of Dump at Maximum Height	51°
Reach to Frame at 7'0" Dump Height and Max Dump	75-1/2"
Digging Depth	12" at 15°
Lift Capacity 0-MPH	15,000 Pounds
Lift Capacity 4-MPH	9,000 Pounds
Reach to Frame at Max Height 45° Dump	52"
Reach to Tire at Max Height 45° Dump	34"

TURNING RADIUS

Outside Corner of Bucket at Carry Position	23'5"
Outside Rear Hub	23' 3-1/2"
Outside Rear Counterweight	22'9-1/2"

GENERAL

Many thousands of hours of economical operation have been built into the engine of your Case W-12 Loader. The quality of fuel that you purchase and the precautions that you observe to see that only clean fuel enters your engine, will be a deciding factor in its performance.



To protect the service life that was built into your Case diesel engine, do the following:

1. Purchase fuel only from a reliable dealer who handles a reputable, well-known brand and has the facilities to keep it clean during storage and delivery.

2. Use a Number 2 Diesel fuel that meets the requirements listed on the following page.

3. If necessary use a fuel conditioner as discussed on Page 15.

4. Follow the precautions covering fuel handling and storage that are described in this section of the manual.

5. BUY CLEAN FUEL AND KEEP IT CLEAN.

FUEL SPECIFICATIONS FOR A SUITABLE NUMBER 2 DIESEL FUEL

Case Diesel Engines are designed to operate most efficiently when using a NUMBER 2 DIESEL FUEL. Most well known refiners and distributors, market a good grade of diesel fuel and there should be no difficulty in obtaining it.

ATTENTION

Do not confuse Number 2 Diesel Fuel with Number 2 Furnace Oil, as this does not always meet the fuel specifications for Diesel Engines.

Specifications for a Suitable Number 2 Diesel Fuel

A.P.I. Gravity	32-39
Pour Point	A Rating 10 Degrees Lower Than the Lowest Expected Temperature.
Volatility	
Initial Boiling Point (Minimum)	320° Fahrenheit
50% condensed	475° - 550° Fahrenheit
Final Boiling Point (Maximum)	675° Fahrenheit
Distillation Recovery (Minimum)	97%
Flash Point	Legal Minimum Limit or Higher
S.U. Viscosity at 100° Fahrenheit	34-39 Seconds
CETANE (Minimum)	45 (45-55 for winter use)
Diesel Index	43
Water and Sediment (Maximum)	.05%
Ash (Maximum)	.02%
TOTAL SULPHUR (Maximum)	.5%
Conradson Carbon	.2%
Copper Strip Corrosion	Pass
Alkali and Mineral Acid	Neutral

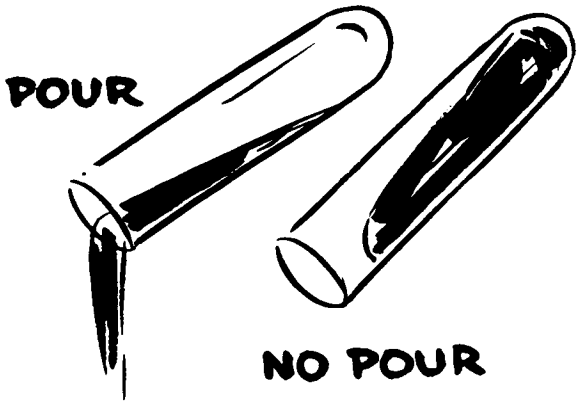
The use of Number 1 Diesel Fuel, which is a lighter fuel, may result in a loss of engine power and also increased fuel consumption because it has less heat content and a lower viscosity than Number 2 Diesel Fuel. The life of the injection pump may also be affected because of the lack of lubricant in the lighter Number 1 Diesel Fuel.

DEFINITIONS OF DIESEL FUEL TERMS

The definitions of the following terms used in describing the fuel specifications will be used for reference when selecting a suitable fuel.

POUR POINT - is the lowest temperature at which fuel remains fluid and will pour.

Pour Point is especially important for cold weather operation because:



1. If the prevailing air temperatures are lower than the Pour Point, the engine will not start because the fuel will not flow through the fuel system.

2. The high precision injection pump and injector parts receive some of their lubrication from the diesel fuel. If the fuel is not fluid, serious damage may occur due to lack of lubrication.

3. Use diesel fuel that has a Pour Point rating at least 10° lower than the coldest anticipated temperature. At approximately 10° above the Pour Point, waxes, etc., in the fuel start to congeal and will clog the filters.

CETANE - is the self-ignition quality of diesel fuel. Do not apply the Cetane rating to diesel engine performance as you would Octane rating to gasoline engine performance. High Cetane ratings do not necessarily provide improved diesel engine performance. A Cetane number of 40 is considered low, while a Cetane number of 60 is considered high.

Your Case Diesel Engine is designed to operate most efficiently using a NUMBER 2 DIESEL FUEL with a Cetane number of 45 to 50.

Number 1 Diesel Fuel grades with higher Cetane numbers are not recommended because; Premimum diesel fuels are higher in price but will not materially increase engine performance and result in higher operating costs; Number 2 Diesel Fuels with a Cetane Number of 45 to 50 are widely distributed and are readily available.

SULPHUR - is the percent of corrosive sulphur in the fuel.

A high sulphur content (above 0.5 %) in diesel fuel is always undesirable, but is especially harmful when the engine must be operated in cold weather, intermittently or with varying loads, where it is difficult to maintain the correct operating temperature. These types of operations result in moisture condensation in the engine, which unites with the sulphur to form destructive acid.

High sulphur contents in the fuel will cause: excessive engine wear; formation of harmful deposits on valves, rings, pistons and cylinder sleeve walls; possible corrosive damage to the fuel system.

To keep the engine free of harmful deposits and to counteract any destructive acids that may be formed, a "Heavy Duty," additive type crankcase oil must be used.

Use a good grade "Heavy Duty" crankcase oil with a Service Designation of DG (Series 1) if the sulphur content is 0.5% or less and operating conditions are favorable - no prolonged idling, frequent stops and starts, or cold weather operation.

Use a good grade "Heavy Duty" crankcase oil with a Service Designation of DM (Series 1) if operating conditions are favorable - not extreme high or low operating temperatures, no prolonged idling and the sulphur content of the fuel is less than 1%.

Use a good grade "Extra Heavy Duty" crankcase oil with a Service Designation of "DS" (Series 2 or Series 3) if the sulphur content is above 0.5% (not exceeding 1%) or where operating conditions are severe.

ASH - is the percentage of harmful non-combustible material in diesel fuel. A fuel containing a higher maximum Ash content than .01 per cent can damage the extremely close fitting parts in the fuel injection system.

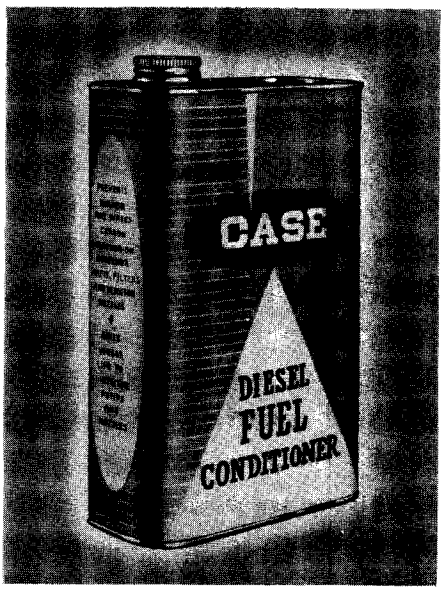
FUEL CONDITIONER

In areas where gum and varnish in the fuel present a problem, it is recommended that Case "Diesel Fuel Conditioner" be used. "Diesel Fuel Conditioners" act as detergents or solvents and can be used to clean out gum and varnish deposits already in an engine and when used regularly, will prevent these deposits from forming.

The following "Fuel Conditioner" recommendations are made for those areas troubled with gum and varnish in the fuel:

1. Obtain Case "Diesel Fuel Conditioner" and use it as follows:
   A. Add it to the fuel in the main storage tank;
   OR
   B. Add a small quantity to the Loader fuel tank daily;
   OR
   C. Use the "Conditioner" periodically or when any symptoms develop in the engine that indicate gum and varnish deposits in the Fuel Injection System.

NOTE: Refer to the instructions furnished with the "Conditioner" as to the amount that should be used.



Case Fuel Conditioner

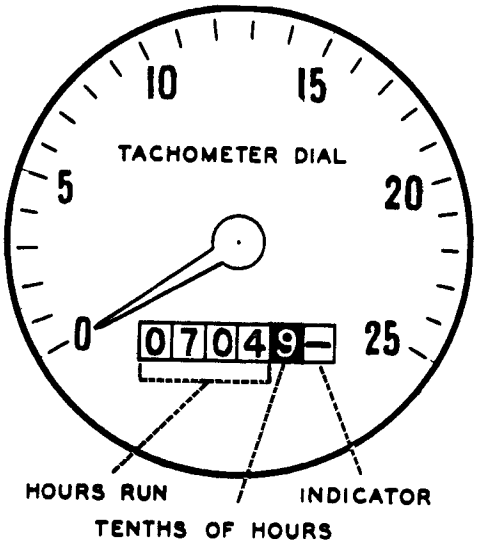
IMPORTANT

1. Buy Diesel Fuel in quantities that will be used up in 90 days or less.
2. Protect the main storage tank with a shelter so the fuel can be kept as cool as possible.
3. When a Loader is to remain idle for a month or longer, follow the Engine Storage recommendations on Page 117 of this manual.

BUY CLEAN FUEL AND KEEP IT CLEAN !

Down time due to careless fuel handling is expensive.

Lubricating your Case Diesel Loader will require only a few minutes of regular daily attention. Wherever possible, automatic lubrication or prepacked bearings have been provided to reduce the demand made on the operator's time.

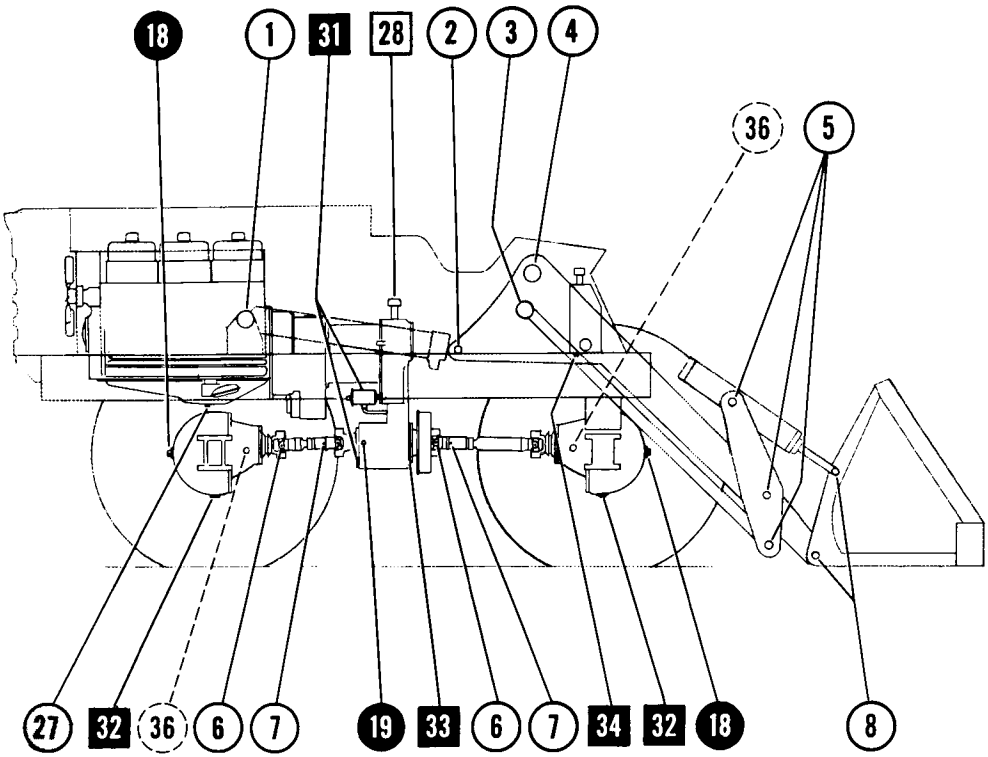


Engine Hour Meter

To assure maximum engine service and complete satisfaction, two factors must be observed:

1. Have a regular schedule of inspection and lubrication. All time intervals in the Lubrication Section and the Preventive Maintenance Section are based on Hour Meter Readings. Reading the Hour Meter provided on your Loader will tell you when to service it.

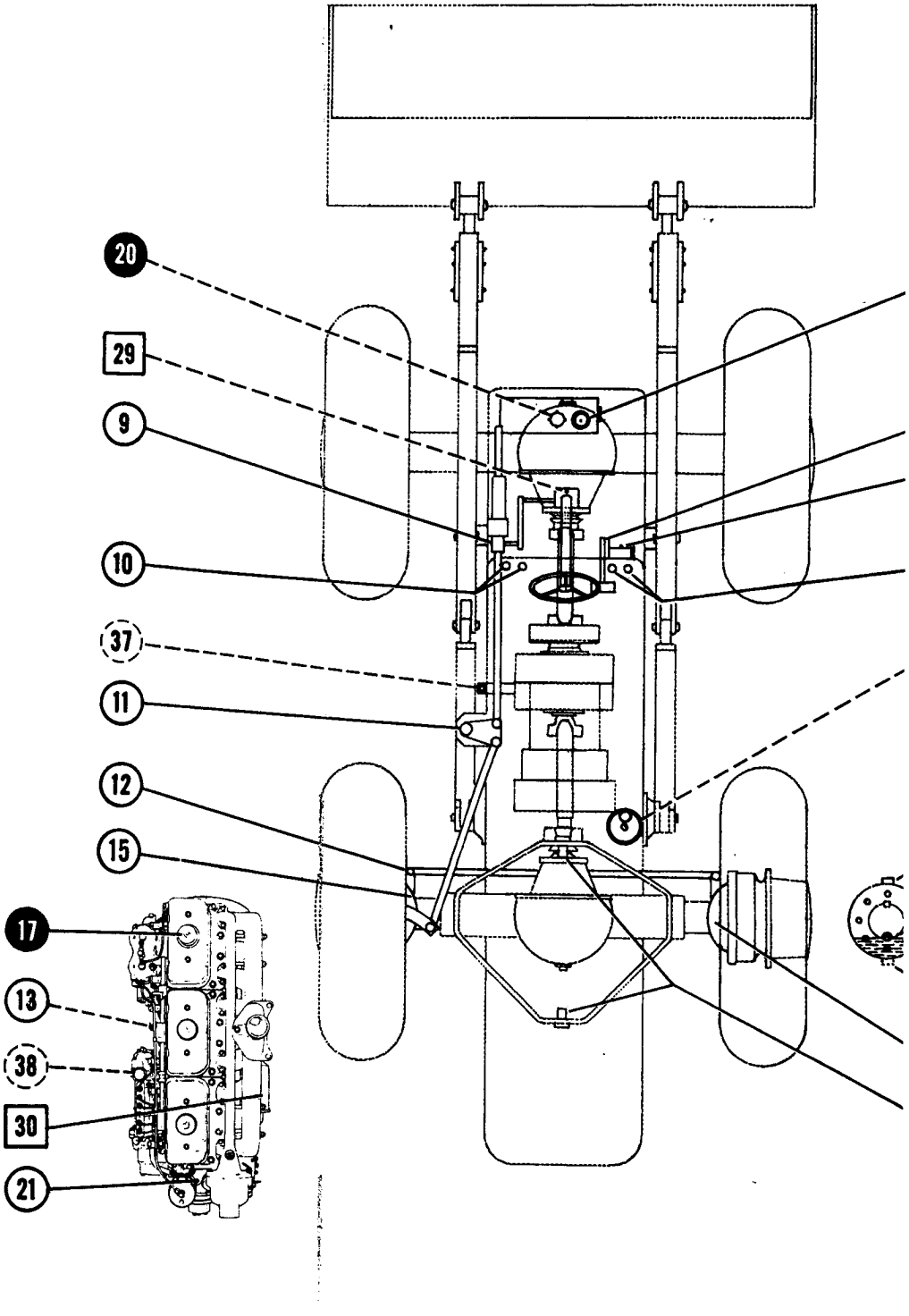
2. Use only high quality oils and greases of unvarying specifications. Always buy from a reliable dealer who handles reputable, well-known brand lubricants. Use only oil and grease of the specifications recommended in this manual.



Lubrication Points	Approximate Capacities	Above 80°F.	80° to 32°F.	32° to —20°F.	—20°F. or Below
Engine Crankcase*	12 Quarts	SAE 30**	SAE 20W**	SAE 10W	SAE 5W
with Oil Filter	14 Quarts	SAE 30**	SAE 20W**	SAE 10W	SAE 5W
Fuel Injection Pump	½ Pint	SAE 30**	SAE 20W**	SAE 10W	SAE 5W
Transmission and Torque Converter					
(Initial Fill)	7½ Gallons	Automatic Transmission Fluid Type C	Automatic Transmission Fluid Type C	Automatic Transmission Fluid Type C	Automatic Transmission Fluid Type C
(Refill including Filter)	5¾ Gallons				
Hydraulic System Reservoir	15 Gallons	SAE 10W	SAE 10W	SAE 10W	SAE 10W
Power Steering and Power Brake System	2 Quarts	Automatic Transmission Fluid Type A	Automatic Transmission Fluid Type A	Automatic Transmission Fluid Type A	Automatic Transmission Fluid Type A
Axles (Both Rigid and Steering)					
Differential Housings (One each axle)	20 Quarts Each	SAE 90EP	SAE 90EP	SAE 80EP	SAE 80EP
Planetary Housings (Two each axle)	3 Quarts Each	SAE 90EP	SAE 90EP	SAE 80EP	SAE 80EP
Steering Gear Housing	1 Pint	SAE 90 General Purpose Gear Lubricant	SAE 90 General Purpose Gear Lubricant	SAE 90 General Purpose Gear Lubricant	SAE 90 General Purpose Gear Lubricant

*Refer to Page 21 for engine lubrication oil service designations.

For the first 480 hours, use engine oil **one grade lighter than recommended in the above table when the air temperature is above 32° Fahrenheit.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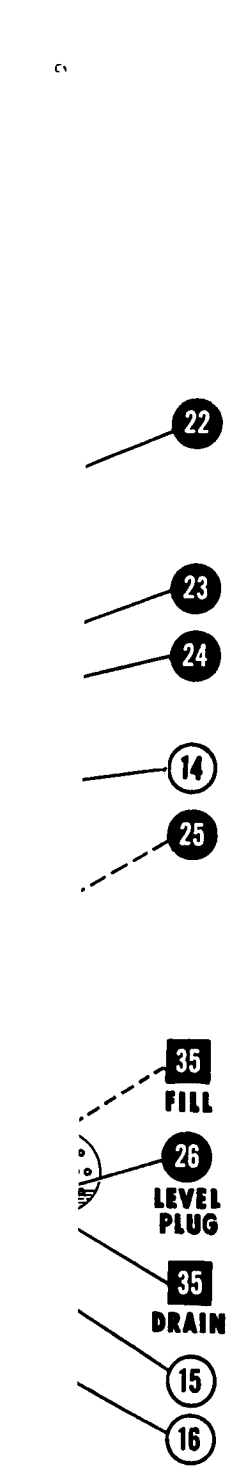


REF NO.	LUBRICATION POINTS	NO. OF POINTS	GREASE (#1 Gun)	DRAIN	CHECK	CLEAN	CHANGE	FREQUENCY (HOURS)
1	Lift Cylinder Rear Pins	2	■					
2	Lift Cylinder Front Pins	2	■					
3	Leveling Link Rear Pins	2	■					
4	Lift Arm Cross Shaft	2	■					
5	Leveling Link Bell Crank Pins	6	■					
6	Universal Joint	4	■					
7	Drive Shaft Slip Joint	2	■					
8	Bucket Pivot Pins	4	■					
9	Steering Cylinder Actuator Ball Stud	1	■					
10	Range & Direction Selector Levers	2	■					
11	Intermediate Steering Lever	1	■					
12	Tie Rod Ends	2	■					
13	Engine Oil Level	1			■			
14	Bucket Control Levers	2	■					
15	Rear Wheel Trunnion Socket Bearings	2	■					
16	Rear Axle Mounting Bracket Pivot Pins	2	■					
17	Crankcase Breathers * **	3				■		
18	Differential Oil Level	2			■			
19	Transmission Oil Level	1			■			
20	Hydraulic Reservoir Oil Level	1			■			
21	Fan Shaft & Bearing (#1 Gun Grease Only)	1	■					
22	Hydraulic Reservoir Breather ***	1				■		
23	Brake Pedal Pivot Pin	1	■					
24	Brake Pedal Bell Crank	1	■					
25	Power Steering Reservoir	1		■				
26	Planetary Oil	4		■				
27	Engine Crankcase Oil	1		■			■	
28	Transmission Case Breather	1				■		
29	Steering Gear Box	1		■				
30	Engine Crankcase Filter ***	1					■	
31	Trans. Filter Element & Strainer Screen. ***	2				■	■	
32	Differential Oil	2		■			■	
33	Transmission Oil	1		■			■	
34	Hydraulic System & Filter ***	2		■			■	
35	Planetary Oil	4		■			■	
36	Differential Filler	2						
37	Transmission Filler	1						
38	Injection Pump (See Page 25)	1						

10 HOURS OR DAILY

60 HOURS OR WEEKLY

120 HOURS

240 HOURS

1000 HOURS OR YEARLY

* Daily in dusty conditions

** If so equipped

*** Refer to Pages 24 thru 31 for complete filter service instructions.

( ) or — — — Denotes filler openings.

Selection of Lubrication Oil

It is extremely important that you select and use in your Case Diesel Loader a stable, high quality, "Heavy Duty Type" engine lubricating oil that has the proper body (SAE Viscosity Rating) for the prevailing air temperatures.

It should be understood that a lubricating oil produced primarily for diesel engine usage will give better service because the properties of the oil will combat destructive acids and harmful deposits that may form in a diesel engine as a result of severe operating conditions or the type of fuel being burned.

Engine Oil Body Recommendations (SAE Viscosity Rating)

SAE 30 ---------- Air Temperatures above 80° F.

SAE 20-W ---------- Air Temperatures from 80° F. to 32°F.

SAE 10-W ---------- Air Temperatures from 32°F. to -20°F.

SAE 5-W* ---------- Air Temperatures below -20°F.

*NOTE: If the Loader is to operate under a heavy constant load during extremely cold weather, it is advisable to use SAE 10-W. It may then be necessary to drain the oil while it is still hot. Pre-heat the oil to approximately 100° F. before pouring it back into the crankcase just prior to starting.

Using lubricating oils of the recommended SAE Viscosity Rating assures you that the oil will remain fluid or free flowing within the specified air temperature ranges. The use of either heavier or lighter bodied oils than recommended may seriously affect engine lubrication and performance. Too light an oil used during warm weather may result in high oil consumption and cause increased engine wear. Using too heavy an oil during cold weather will affect starting, and may result in a poor rate of lubricant distribution causing increased engine wear.

ENGINE LUBRICATING OIL SERVICE DESIGNATIONS

To simplify the selection of a suitable heavy duty engine lubricating oil to meet diesel engine service conditions, the American Petroleum Institute (composed of most major oil companies and refineries) has adopted three service designations for diesel engine use.

1. Service "DG" - Favorable Diesel Engine Operation.
2. Service "DM" (Series 1) - Moderate to Severe Diesel Engine Operation.
3. Service "DS" (Series 2 and 3) - Severe Diesel Engine Operation

Always use a high quality, stable, heavy duty engine oil with a service designation of DG, DM or DS, depending on your particular diesel engine operating conditions.

Service "DG" - For favorable diesel engine operation where there are no harmful low or high operating temperatures, no prolonged idling or frequent stops and starts and where the sulphur content of the fuel is less than .5%.

Service "DM" - For moderate, to severe diesel engine operation where there are no extreme high or low temperatures, no prolonged idling and the sulphur content of the fuel is less than 1%.

Service "DS" - For severe diesel engine operation such as:

1. Low Temperature engine operating conditions, frequent stop and start operation, prolonged idling, operating with a light load (especially during cold weather) and operating without radiator shutters during extremely cold weather all tend to produce water in the engine. Water, when combined with sulphur in the fuel or in the crankcase oil itself, will form destructive acids in the engine that cause excessive engine wear, harmful deposits and possible corrosive damage to the engine and fuel system.

2. High temperature engine operating conditions as a result of heavy loads during very hot weather, cause excessive engine wear. Lubricating oils that do not have the protective additives to withstand high temperatures may break down under this condition, resulting in excessive oil consumption, engine wear and harmful deposits.

3. Diesel fuel being used that has a sulphur content above .5%, but less than 1%. The higher the sulphur content in the diesel fuel, the greater are the chances for acid and deposit formations in the engine. When fuel containing sulphur in excess of .5% must be used, heavy duty "DS" lubricating oil will aid in preventing damage to the engine by tending to neutralize any acid formed and by carrying most of the sludge formation in suspension.

CAUTION: Change the crankcase oil frequently when severe operating conditions exist. The oil will eventually become saturated with contaminants and lose its protective properties.

The term "Heavy Duty Type" does not refer to the weight or body (SAE Viscosity Rating) of an oil. A "Heavy Duty" oil is a detergent or additive type oil to which chemicals have been added to:

1. Make it more resistant to oxidation and corrosive substances, such as sulphur.

2. To improve some property in the oil, such as its Pour Point, or its ability to withstand heat and pressure.

3. To give the oil the ability to aid in preventing harmful deposits by holding carbon, sludge, etc., in suspension.

ENGINE CRANKCASE OIL CHANGE

"RUN IN" OIL - Drain the special "run in" oil after the first 20 hours of operation and replace with fresh oil. Drain and refill the crankcase at least every 120 hours thereafter.

REGULAR OIL CHANGE - Drain and refill the crankcase at least every 120 hours of operation.

If the engine service is severe - (frequent stopping and starting, high sulphur content in fuel) - the crankcase should be drained more often to prevent the formation of sludge or harmful deposits in the engine.

NOTE: You cannot determine the condition of a detergent (heavy duty) oil by its color. Detergent type oil will become much darker in color within a short period of operation. This is caused by the oil's ability to hold carbon in suspension.

CRANKCASE OIL REFILL

IMPORTANT

1. When just the crankcase is drained, always refill with 12 measured quarts of oil. Do not refill using the dipstick as a guide.

2. If you have drained the crankcase and replaced the oil filter element, pour in 14 measured quarts, operate the engine for a few minutes to fill the filter body; then check the oil level with the dipstick. Be sure to allow sufficient time for the oil to run down off the engine parts.

3. By following the above procedure, you will prevent overfilling or underfilling the crankcase; either of which can be detrimental to the engine service life and will give false oil consumption records.

ENGINE OIL FILTER ELEMENT

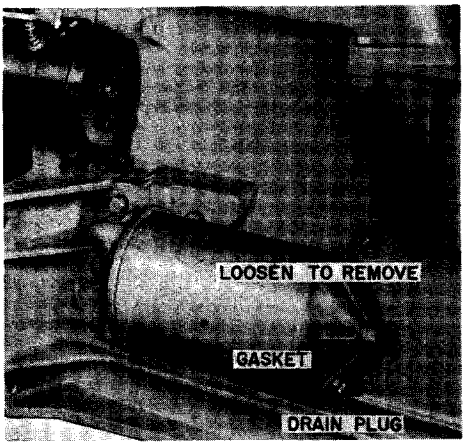


Figure 6

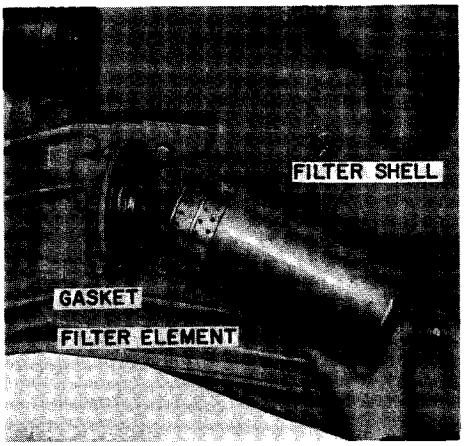


Figure 7

After the first 120 hours of operation and each 240 hours of operation thereafter, install a new Genuine Case Filter Element as follows:

Removal

1. Remove the drain plug, Figure 6, if so equipped.

2. Loosen the hex head bolt on the filter shell until the shell and element can be lifted off the base together, Figure 6.

3. Pull the contaminated element out of the shell, Figure 7, and flush the shell and filter base with clean diesel fuel.

Installation

1. Install a new Case Filter Element on the bolt. Be sure the element is installed as shown in Figure 7, and BE CAREFUL not to push the rubber grommet seal out of the element with the bolt.

2. Install the new gasket provided with the element, Figure 7.

3. Position the shell and element on the base and tighten the bolt just enough to form a seal and replace the filter shell drain plug.

4. Operate the engine and check for leakage.
   NOTE: If leakage is observed between the shell and bolt head, a new shell gasket must be installed, Figure 6.

Genuine Case Filter Element are obtainable from your Authorized Case Industrial Dealer. This element has been designed to

protect your Case W-12 Diesel Engine from harmful dust and abrasives. Do not use substitutes.

IMPORTANT: You cannot determine the condition of an oil filter element by its appearance. While an element may not appear to be excessively dirty, it may be completely contaminated with extremely fine particles of abrasive material. CHANGE THE OIL FILTER AT THE RECOMMENDED TIME INTERVALS.

FUEL INJECTION PUMP LUBRICATION

Case W-12 Loaders are equipped with either a sump lubricated pump, Figure 8, or an engine lubricated pump, Figure 9.

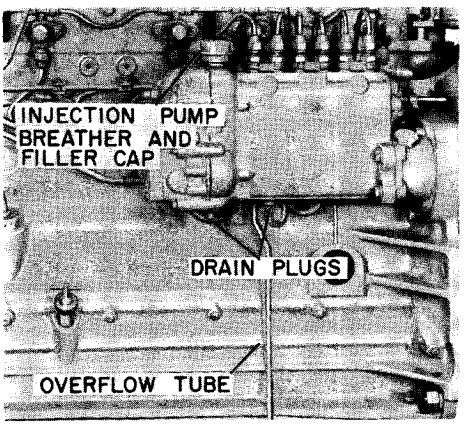


Figure 8

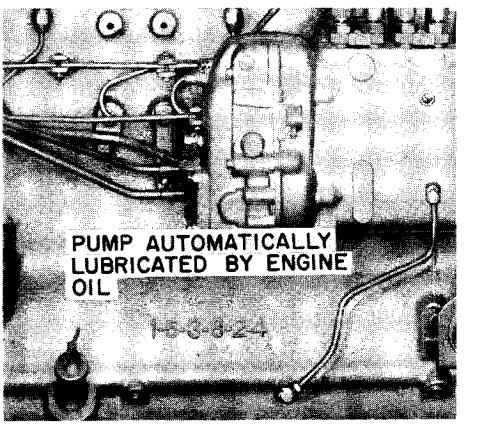


Figure 9

The Sump Lubricated Pump must be drained and refilled with clean oil of the same grade and viscosity as the crankcase after each 60 hours of operation. To drain the lubricating oil from the injection pump, remove the two 1/8 inch plugs from the bottom of the pump. Be sure to replace the plugs before refilling, Figure 8. Failure to change the injection pump lubricating oil at regular 60 hour intervals can result in serious damage to the pump.

The Injection Pump Filler opening is located under the breather cap. Simply remove the cap and pour 1/2 pint of oil into the filler opening.

The Sump Lubricated Pump Breather Cap, Figure 8, must be cleaned after each 60 hours of operation in clean fuel oil or kerosene. Squirt a few drops of oil into the wire mesh inside of the cap and let it drain before replacing the cap.

IMPORTANT - Sump Lubricated Pumps

After operating the Loader under heavy load, it is normal for excess fuel oil to drip out of the overflow tube after the engine is stopped.

POWER STEERING AND POWER BRAKE FILTER ELEMENT

Capacity of Power Steering and Power Brake System ---- 2 Quarts
Type Fluid ---------- Automatic Transmission Fluid - Type A

Reservoir Filter Element

Cleaning Interval --1000 hours (more often in severe dust conditions)

A fine mesh screen filter element is provided in the reservoir body, Figure 10. Clean the element every 1000 hours of operation (more often in severe dust conditions).

Wash the element in clean fuel oil. Blow the element out with compressed air. Reinstall the element making sure the filter flange is up as shown in Figure 10.

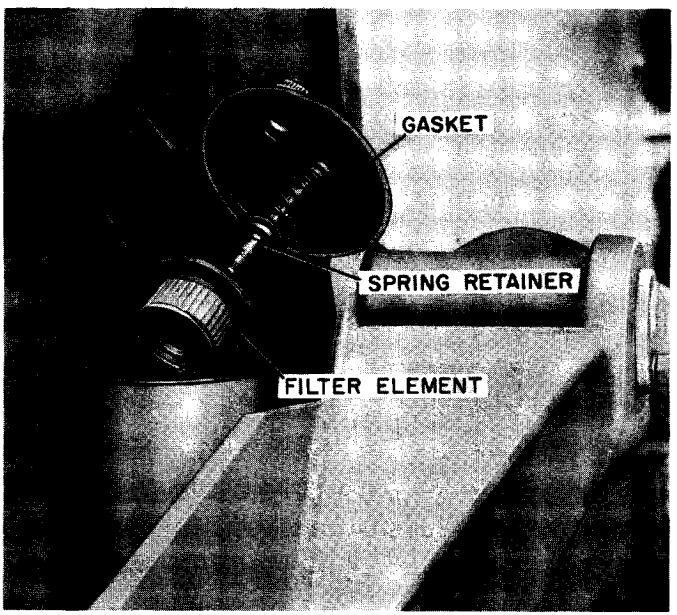


Figure 10

Use care not to damage the reservoir cover gasket when removing and reinstalling the cover. Check the spring locknut on the reservoir cover mounting bolt, Figure 10. It must be in the position shown. Should it slide upward on the bolt, the filtration action of the element will be lost.

NOTE: If proper care is taken to prevent the entry of dirt into the reservoir, and if the filter element is cleaned periodically, it should not be necessary to ever drain and replace the hydraulic steering fluid.

Filling and Bleeding Air From The Power Steering System

NOTE: Refer to Page 106 for Bleeding the Hydraulic Power Brake System.

Remove the reservoir cap and carefully fill reservoir with clean Automatic Transmission Fluid Type - A until the oil level is 1-1/2" below the top of the filler opening, Figure 11. Replace the reservoir cap and start the engine. Turn the wheel through several turns: then stop the engine and refill the reservoir to 1-1/2" below the top of the filler opening.

Figure 11

Repeat until the fluid level ceases to drop after turning the steering wheel. The system is then completely filled.

NOTE: The first few times you turn the steering wheel, do not make full turns. Make full turns only after a sufficient amount of fluid is added to the system. IMPORTANT: While bleeding air from system, operate engine at low idle speed (approximately 750 RPM)

Check the reservoir fluid level every 60 hours of operation. Wipe the reservoir cover and cap clean before removing the cap. Keep the reservoir filled to 1-1/2" below the top of the filler opening, Figure 11. Overfilling the reservoir will cause the oil to surge out of the breather.

TRANSMISSION OIL AND FILTER CHANGE

OIL CHANGE INTERVAL - Each 1000 hours - Change the transmission element and clean the fluid strainer.

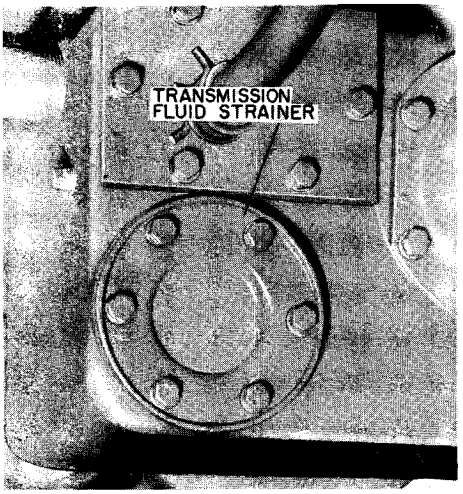


Figure 12. Transmission Fluid Strainer

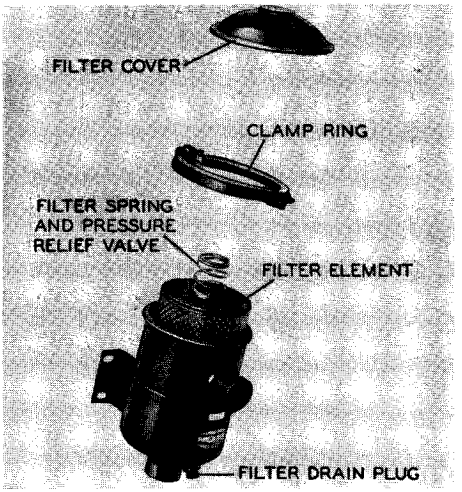


Figure 13. Transmission Filter Assembly

1. Remove the drain plug from the transmission, Figure 14.

2. Remove the fluid strainer, Figure 12, and clean with mineral spirits, using a soft bristle brush. Reinstall clean strainer screen in transmission.

3. Remove the transmission filter drain plug, Figure 13.

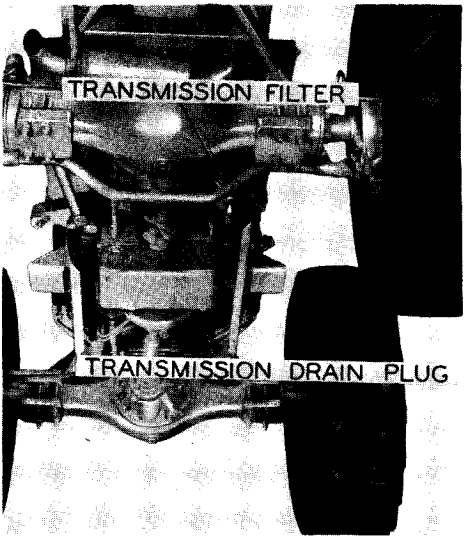


Figure 14. Transmission Drain Plug

4. To replace the contaminated filter element with a clean filter element, remove the clamp screws and ring, Figure 13.

IMPORTANT: Be careful when removing filter cover not to lose filter spring and pressure relief valve.

5. Drain and flush out the filter body with clean fuel before installing the new filter element. After installing the new element, reinstall pressure relief valve, spring, cover clamp ring and screws, Figure 13.

6. Pour 4 to 5 gallons of Type C Transmission Fluid through the Transmission filler opening, Figure 15.

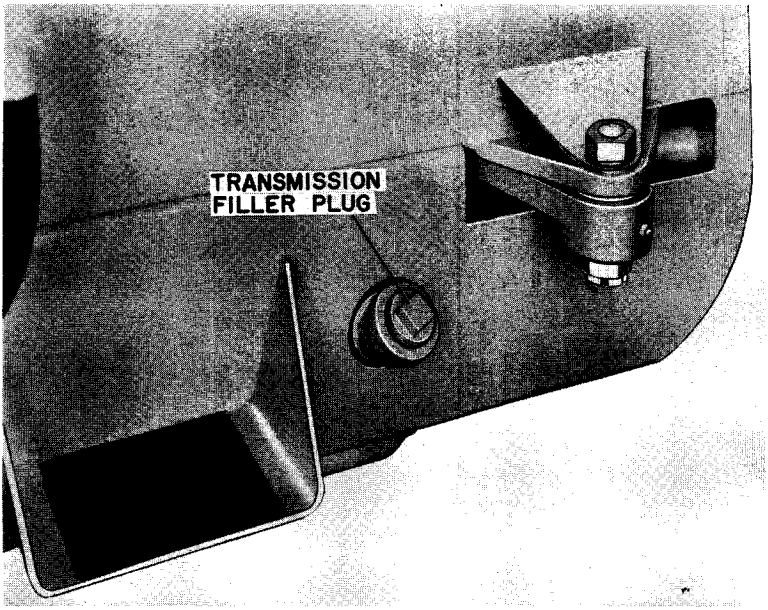


Figure 15

7. Start the engine and let it run at idling speed with the transmission in neutral to charge the transmission hydraulic system with oil.

8. After the engine has been running at idling speed for a few minutes, add enough Type C Transmission Fluid to bring the oil up to the level plug opening, Figure 15.

9. When the transmission has been filled to the correct level operate the engine until the transmission fluid is warm - then check the filter and fluid strainer for leaks.

HYDRAULIC RESERVOIR FILTER ELEMENT

CHANGE INTERVAL - 1000 Hours

The hydraulic reservoir oil and filter element must be changed after each 1000 hours of operation. A drain plug is located on the underside of the hydraulic reservoir.

Install a new edge wound filter element each time the oil in the hydraulic reservoir is changed. To install a new filter element remove the four capscrews and hose shown in Figure 16. DO NOT ATTEMPT CLEANING AND REUSING FILTER ELEMENT. REFER TO FILTER ASSEMBLY AND INSTALLATION INSTRUCTIONS BELOW.

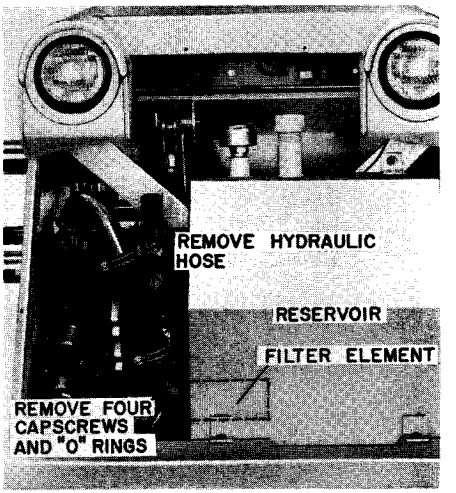


Figure 16

Flush out the hydraulic reservoir and replace the filter element, four capscrews, "O" rings and hose, Figure 16. Fill the reservoir with 8 gallons of SAE 10W (MS-DG) oil. Start the engine and bleed the system by operating the lift and tilt control levers. Recheck the oil level with the dipstick and add oil if necessary.

Assembly and Installation of a New Filter Element

Extreme care must be taken during the assembly of the filter element to make sure it seals properly, but does not get crushed. To properly assemble the element:

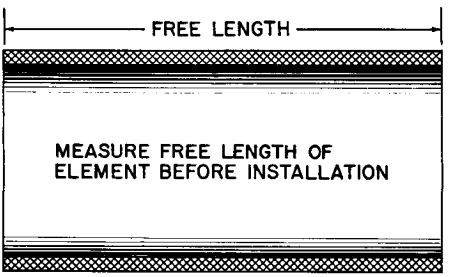


Figure 17

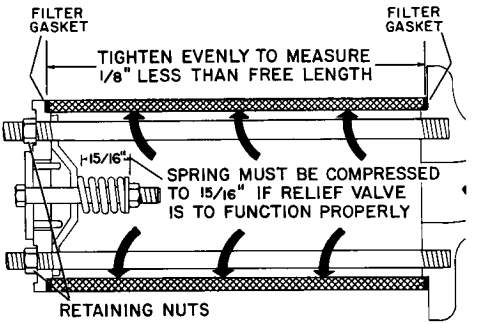


Figure 18

1. Measure the free length of the new filter before installation, Figure 17.

2. Tighten the retaining nuts down evenly, Figure 18, until the element measures 1/8 of an inch less than in number 1 above. (Figure 17).

DO NOT COMPRESS THE FILTER ELEMENT MORE THAN 1/8" AS IT WILL CRUSH AND LOSE ITS FILTERING ABILITY. REFER TO FIGURE 18.

Hydraulic Oil Filter Relief Valve

A relief valve, Figure 18, is incorporated into the filter element to prevent cold oil from damaging the filter element. If this relief valve spring is not properly compressed to 15/16" as illustrated in Figure 18, it either will allow unfiltered oil to flow into the hydraulic system or cold oil may damage the element - check this adjustment when servicing the filter element.

Hydraulic System Breather

Every 5 to 60 hours, depending upon dust conditions, remove and clean the edge wound paper filter element, Figure 19.

Wash the element in a greaseless cleaning fluid such as is used for removing spots from clothing.

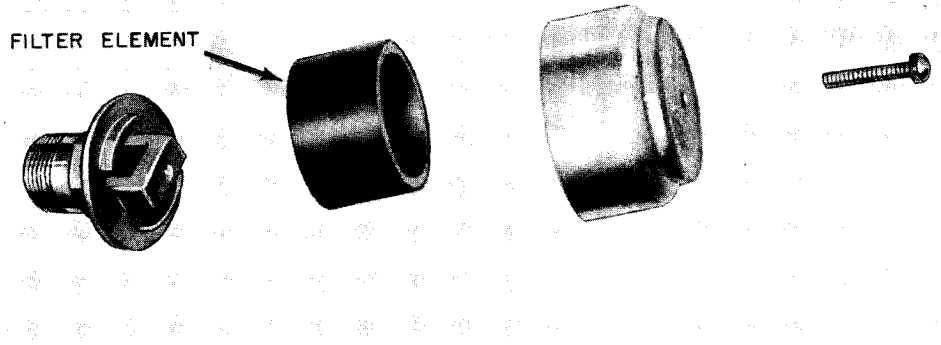


Figure 19. Hydraulic System Breather Filter Element

IMPORTANT

Failure to keep the filter element clean will restrict the breathing of the hydraulic system and will result in oil being forced past the seals by the pressure build up.

RUN-IN PROCEDURE

IMPORTANT

AT ALL TIMES, KEEP THE ENGINE
UP TO THE RECOMMENDED MINIMUM
OPERATING TEMPERATURE
(WORK ZONE ON THE TEMPERATURE GAUGE)
DO NOT IDLE THE ENGINE

Careful attention must be given to proper "Run-In" procedure. Piston rings and cylinder sleeves can be seriously damaged in a new engine if "Run-In" instructions are not followed. The following procedure is recommended:

1. Operating Temperature

Maintain the coolant temperature in the Work Zone on the temperature gauge.

Low operating temperatures contribute to the formation of destructive acids and harmful deposits in the engine.

Adding or removing one or both hood sides will aid in regulating coolant temperature.

Radiator Shutters are available as extra equipment.

2. Crankcase Oil

Case Diesel Loaders are shipped from the factory with a special "Run-In" oil in the crankcase. After the first 20 hours of operation, drain this oil while the engine is hot and replace it with fresh oil.

NOTE

For the next 480 hours, change the crankcase oil at the recommended 120 hour intervals, but use one grade lighter oil than recommended in the table on Page 18, when the air temperature is above 32°F. Do not drain special run in oil oil until the engine has been operated 20 hours. Replace engine filter element after first 120 hours of operation and every 240 hours thereafter. Change hydraulic reservoir filter element after first 20 hours of operation (Run-In) and each time the reservoir oil is changed thereafter.

PRE-STARTING CHECK LIST

Before starting your Case Diesel Loader for the first time and before each operating period thereafter, check the following:

1. Make sure everyone responsible for the operation and maintenance of the Loader understands the importance of clean fuel. Refer to Fuel Specifications on Page 12.

2. Check that all lubrication fittings are serviced as directed on Pages 18 and 19.

3. Check that crankcase and transmission are filled to levels indicated on Pages 18 and 19.

4. Be sure air cleaner element is clean. Refer to Preventive Maintenance Section.

5. Check that radiator is filled. Use only soft water that is as free as possible of scale forming minerals - or a reputable nationally recognized brand of ethylene glycol type anti-freeze. Refer to Page 90.

6. Check that the fuel tank is filled with clean, water free diesel fuel that meets requirements listed on Pages 12 through 15. Always wipe fuel tank cap clean before removing it. Drain any water or sediment from the water trap before starting each shift.

7. Visually check fuel system for leakage. Check the engine for coolant or crankcase oil leakage.

8. Check that fan and power steering belts are just tight enough to eliminate slippage. Refer to Pages 95 and 96.

9. Check that Clutch Pressure Gauge registers in the green zone.

10. Check the hydraulic power steering and make sure the fluid reservoir is filled. Refer to Page 27.

11. Check the air pressure in the tires. See Page 116.

12. Check the oil level in the hydraulic reservoir.

13. Start the engine and let it warm up to the recommended operating temperature.

14. Operate the hydraulic control levers and observe the action of the bucket. Inspect the hoses and connections for evidence of oil leaks.

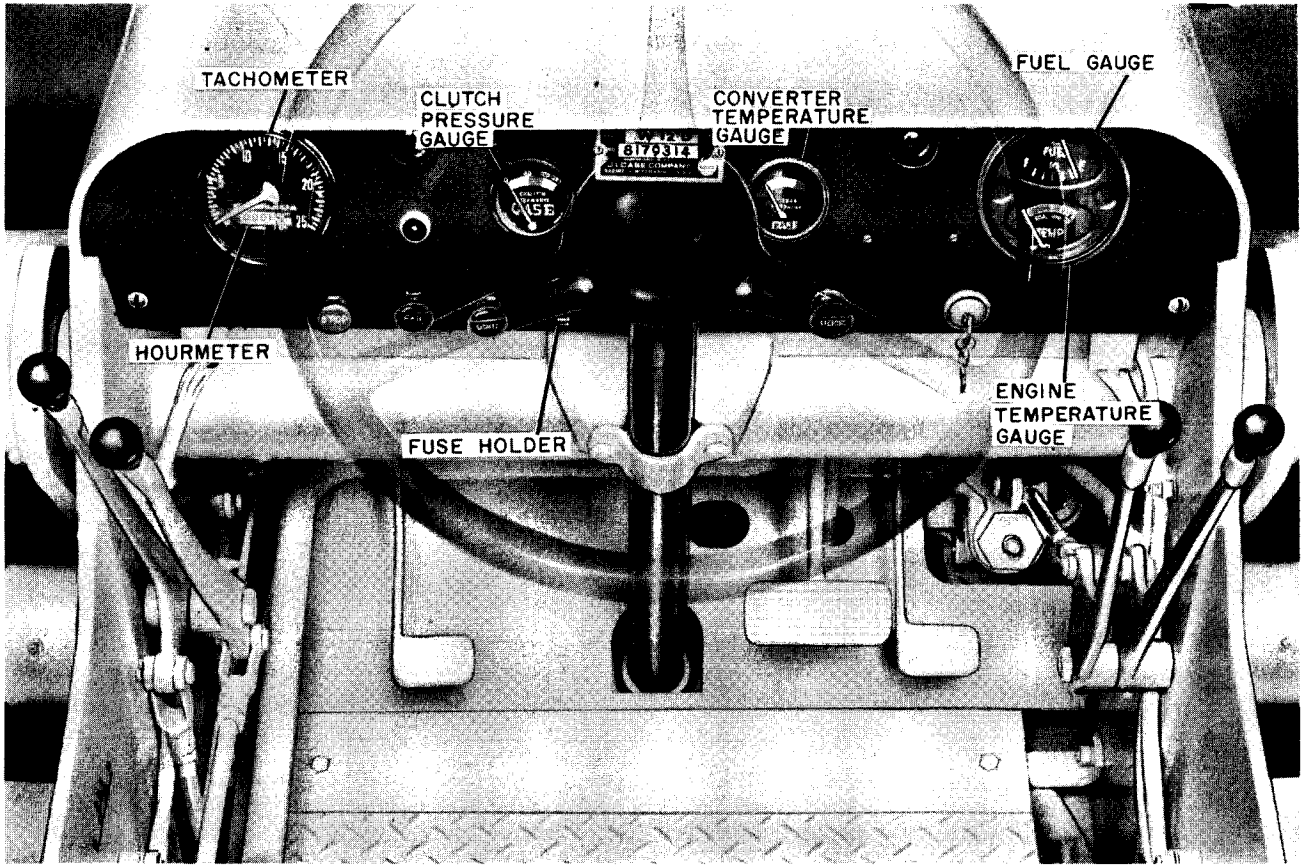

TACHOMETER
CLUTCH PRESSURE GAUGE
CONVERTER TEMPERATURE GAUGE
FUEL GAUGE
HOURMETER
FUSE HOLDER
ENGINE TEMPERATURE GAUGE

Figure 20

TACHOMETER - Figure 20. Indicates engine speed in revolutions per minute. Revolutions per minute is indicated in 50 RPM steps on the tachometer dial.

HOURMETER - Figure 20. The hourmeter is located within the tachometer dial. The direct reading hourmeter indicates hours and tenths of hours that engine has run. The hourmeter does not record clock hours, but rather the average engine hours, at a mean speed of 1650 RPM. The hourmeter provides a convenient means of knowing when to service the Loader.

CLUTCH PRESSURE GAUGE - Figure 20. Indicates hydraulic clutch operating oil pressure. The gauge needle should register in the Green (90 to 150 PSI) Zone on the gauge. If the gauge needle drops out of the operating zone, will not reach the correct operating zone, or goes over the correct operating zone, DO NOT OPERATE THE LOADER UNDER LOAD UNTIL THE CAUSE HAS BEEN DETERMINED AND CORRECTED.

CONVERTER TEMPERATURE GAUGE - Figure 20. Indicates operating temperature of the oil in the torque converter. The gauge needle should register in the Green Zone on the gauge. If the gauge needle rises into the red zone - PLACE THE TRANSMISSION IN NEUTRAL, IDLE THE ENGINE UNTIL THE GAUGE NEEDLE RETURNS TO THE GREEN ZONE. One of the causes of converter oil overheating is operating too long at stall speed.

FUEL GAUGE - Figure 20. Indicates amount of fuel in the fuel tank.

ENGINE TEMPERATURE GAUGE - Figure 20. The gauge needle will register in the Work Zone when the engine is at correct operating temperature. Refer also to Page 90.

FUSE HOLDER - Figure 20. Contains 20 Amp fuse.

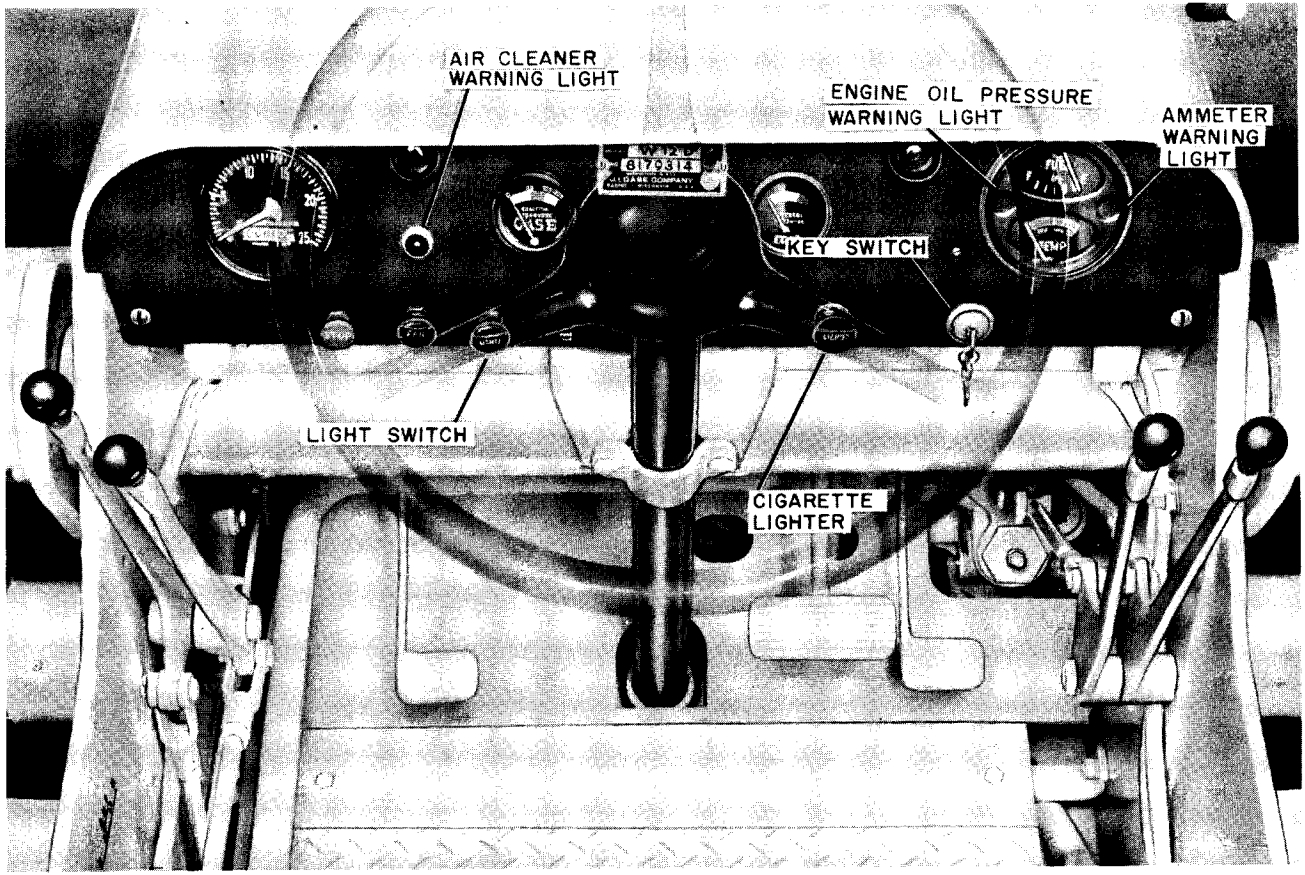

AIR CLEANER
WARNING LIGHT
ENGINE OIL PRESSURE
WARNING LIGHT
AMMETER
WARNING
LIGHT
KEY SWITCH
LIGHT SWITCH
CIGARETTE
LIGHTER

Figure 21

ENGINE OIL PRESSURE WARNING LIGHT - Figure 21. The oil pressure warning light will light when the key switch is turned to the start position and should go off when the engine starts. If the warning light remains on, or goes on during operation, it is an indication of no oil pressure or very low pressure. STOP THE ENGINE AND CHECK FOR THE CAUSE.

AMMETER WARNING LIGHT - Figure 21. The warning light goes on when the key switch is turned on and should go off when the Loader engine starts. If the ammeter warning light does not go off when the Loader engine starts and is running, it is an indication that the battery is discharging and the generator is not supplying current. STOP THE ENGINE AND CHECK FOR THE CAUSE. Refer to Pages 99, 100 and 101. NOTE: If the ammeter light flickers when the Loader engine is at low idle, the battery, generator or regulator may not necessarily require servicing. However, if the warning light remains on when engine is increased, stop the engine immediately and check for the cause, Pages 99, 100 and 101.

AIR CLEANER WARNING LIGHT - Figure 21. Light goes on when air cleaner element must be serviced. Refer also to Pages 87 and 88.

CIGARETTE LIGHTER - Figure 21. Push lighter element fully in to light. Lighter element will remain in socket until lit, then pop out to normal position. Pull lighter element out of socket to use.

KEY SWITCH - Figure 21. Combination four position switch. The four positions are ACCESSORY, OFF, RUN and START. The Loader will not start without the key. Refer also to Page 45.

LIGHT SWITCH - Figure 21. Pull the light switch out to the first position to turn on headlights, instrument panel lights and red tail lights. When brake pedal is depressed, red tail lights should brighten. Pull the light switch out to second position to turn on headlights, instrument panel lights and rear lights.

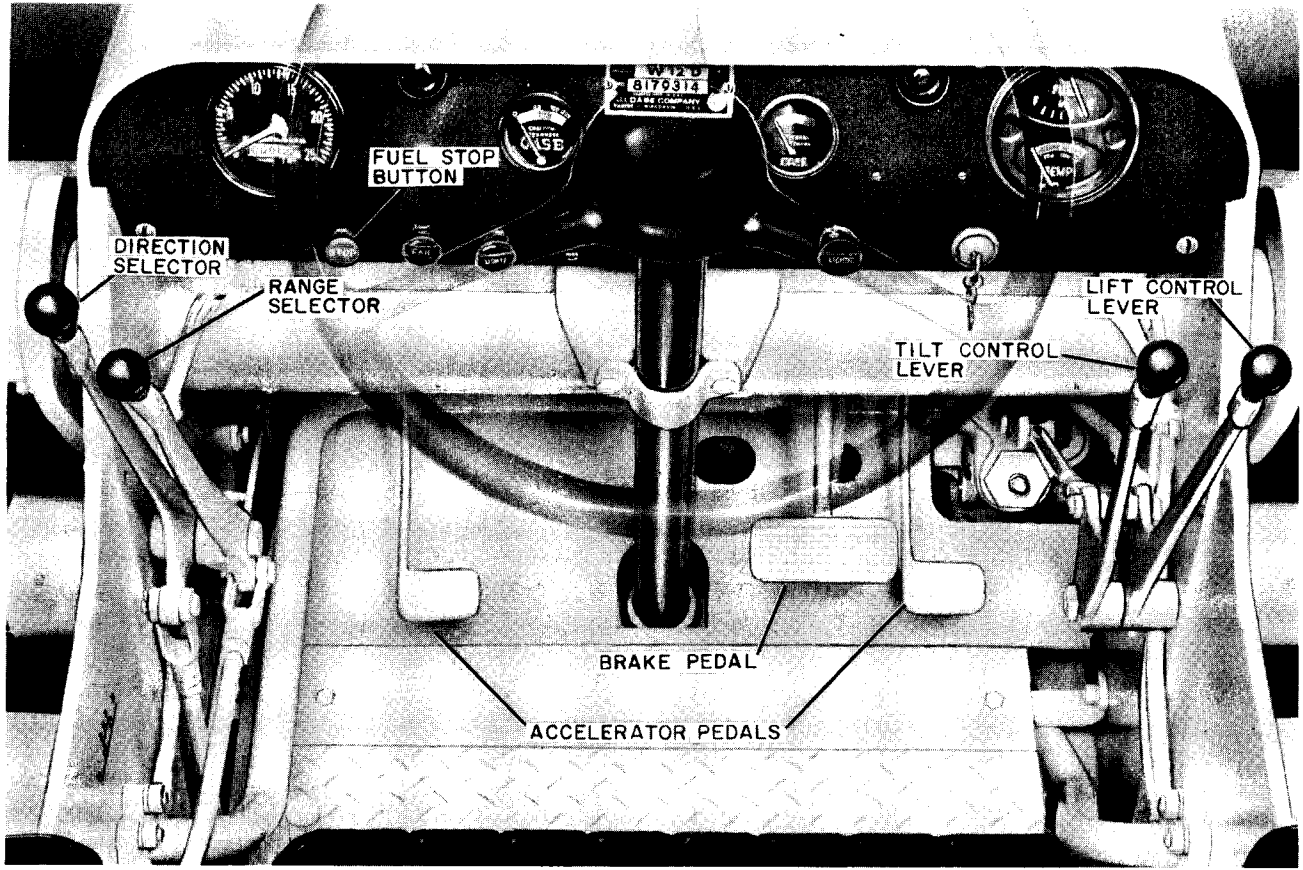

FUEL STOP BUTTON
DIRECTION SELECTOR
RANGE SELECTOR
LIFT CONTROL LEVER
TILT CONTROL LEVER
BRAKE PEDAL
ACCELERATOR PEDALS

Figure 22

FUEL STOP BUTTON - Figure 22. To stop the engine, pull the button OUT until the engine stops completely. Depress the accelerator pedals and push the button all the way IN before starting the engine.

BUCKET LIFT CONTROL LEVER - Figure 22. Push the control lever forward to lower the bucket. Pull the control lever rearward to raise the bucket. The raise, neutral, lower and float positions are retained positions. The control lever must be manually moved from all four of these positions. Refer to Page 42 for complete operation of the lift control lever.

BUCKET TILT CONTROL LEVER - Figure 22. Push the tilt control lever forward to tilt the bucket down. Pull the tilt control lever rearward to tilt the bucket up. The tilt control lever automatically returns to neutral when released, stopping and holding the bucket in any position. Refer to Page 43.

RANGE SELECTOR - Figure 22. Place the selector in any of the three ranges (Low, Intermediate, High) for the required working speed.

DIRECTION SELECTOR - Figure 22. Push direction selector forward to move the Loader in a forward direction. Pull the direction selector rearward to move the Loader in a rearward direction.

BRAKE PEDAL - Figure 22. Depress brake pedal for braking action and lighting the red stop lights.

ACCELERATOR PEDALS - Figure 22. Depress either accelerator pedal or both pedals together to increase acceleration.

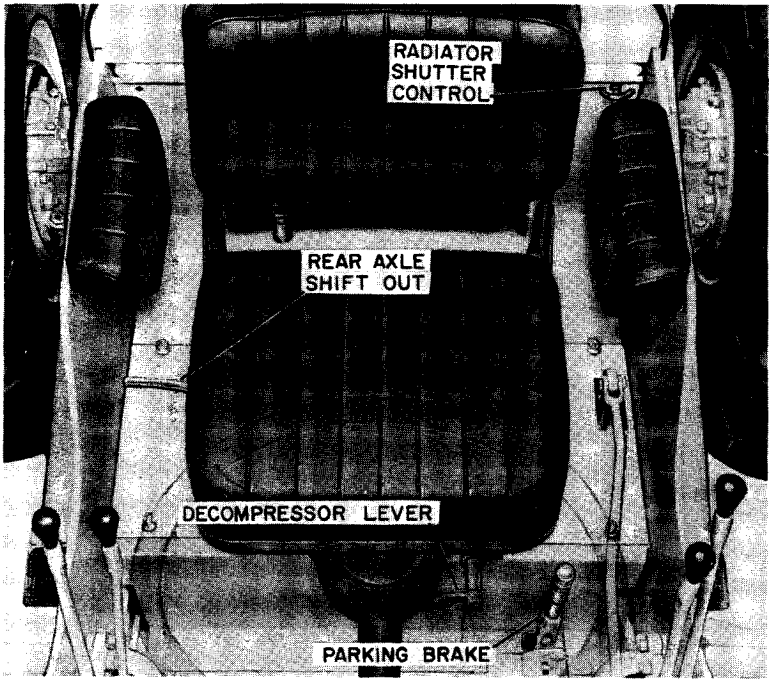


Figure 23

RADIATOR SHUTTER CONTROL - (Extra equipment) - Figure 23. To close the shutters partially or fully, pull the control out to the required position and turn the handle clockwise to lock the shutter in place.

DECOMPRESSOR LEVER - Figure 23. Raising the lever holds the exhaust valves open and relieves engine compression. Pushing the lever down releases the valves and restores compression. Refer also to Page 44.

REAR AXLE SHIFT-OUT - Figure 23. Push handle down to disengage rear axle for road travel. Pull handle up to engage rear axle for four wheel drive.

PARKING BRAKE - Figure 23. Pull handle up to engage the parking brake when stopped on an incline or when the operator leaves the Loader.

FUEL PRESSURE GAUGE - Figure 24. The gauge indicates the condition of the Fuel Filters. When the needle is in the Green Zone, the filters are in good condition. Refer to Page 79.

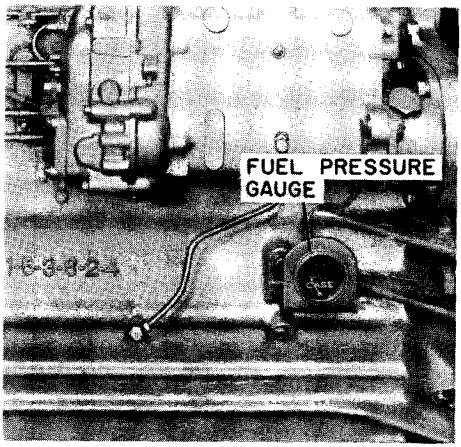


Figure 24

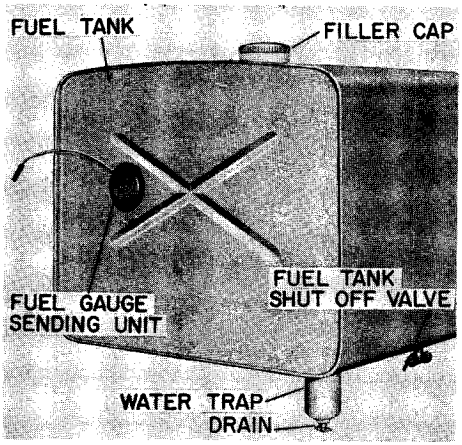


Figure 25

FUEL TANK SHUT-OFF VALVE - Figure 25. Turn the valve fully IN to shut off fuel from the tank.

Operator's Seat Adjustment

This seat, Figure 26, is adjustable forward or back by moving the lever to the required detent. The weight adjustment lever pushed forward increases firmness in the cushion, pushed back, the adjustment lever increases the softness of the cushion.

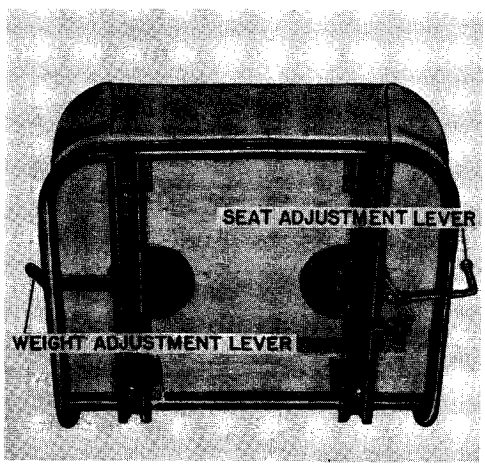


Figure 26

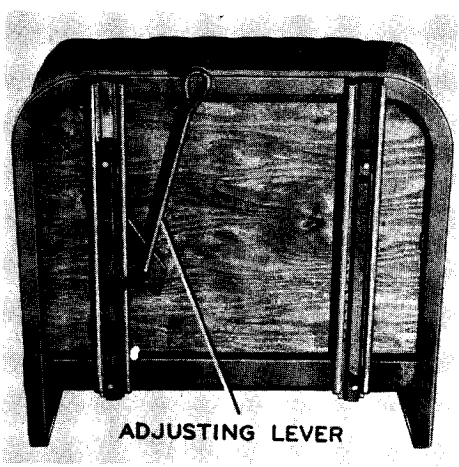
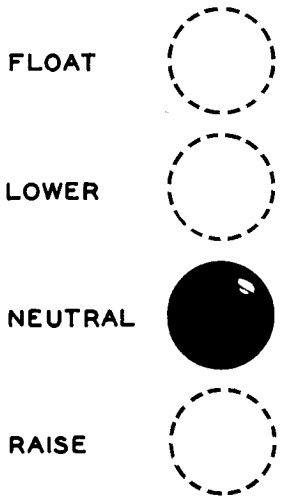


Figure 27

This seat, Figure 27, is adjustable forward or back by moving the lever to the required detent.

BUCKET LIFT CONTROL



Standard Lift Control

The standard lift control on the Case W-12 Loader is a two spool, four position valve with an internal relief valve. The four positions are Raise, Neutral, Lower and Float.

Figure 28. Standard Control

TO RAISE THE BUCKET - pull the control lever rearward, Figure 28. Raise is a retained position and the control lever must be manually moved from the raise position to any other required position. By placing the lever in the retained raise position, the operators hand is free to work the tilt lever for fast, efficient crowding action.

TO STOP THE BUCKET - the control lever must be manually moved from the raise, float or lower positions to neutral.

TO LOWER THE BUCKET - push the control lever forward, Figure 28. Lower is a retained position and the control lever must be manually moved from the lower position to any other required position. By placing the lever in the retained lower position, the operator's hand is free to work the tilt lever for fast, efficient crowding operation.

FLOAT - is a retained position ahead of the lowering position, Figure 28, and provides the bucket with float action. By pushing the control lever all the way forward until the valve spool locks in float detent, thus leaving him free to operate the bucket tilt lever. The retained float position also allows the bucket to skim over graded or smooth surfaces without constant lever manipulation. This float action prevents gouging or skipping.

BUCKET TILT CONTROL

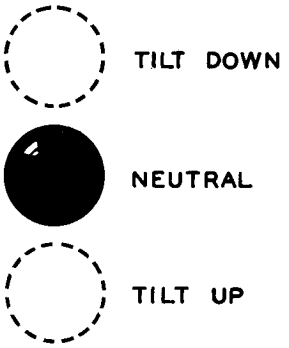


Figure 29

Push the lever forward to tilt the bucket down. Pull the lever back to tilt the bucket up. Releasing the lever will allow it to automatically return to neutral, stop the bucket and hold it in position.

BUCKET SIGHT LEVEL GAUGE

A bucket sight level gauge, Figure 30, is located directly ahead of the operator and is in his normal line of vision when operating the Loader.

The position of the gauge rod in its sheath indicates the angle at which the bucket is tilted.

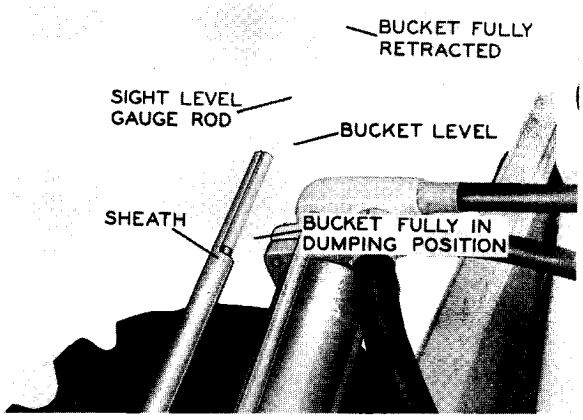


Figure 30

BUCKET RETRACTED (TILTED UPWARD) - The rod will protrude above the end of its sheath.

BUCKET IN LEVEL POSITION - The rod will be approximately even with the end of its sheath, Figure 30.

BUCKET IN DUMPING POSITION - The rod will be at the lower end of the cutaway portion of its sheath, Figure 30.

DECOMPRESSOR

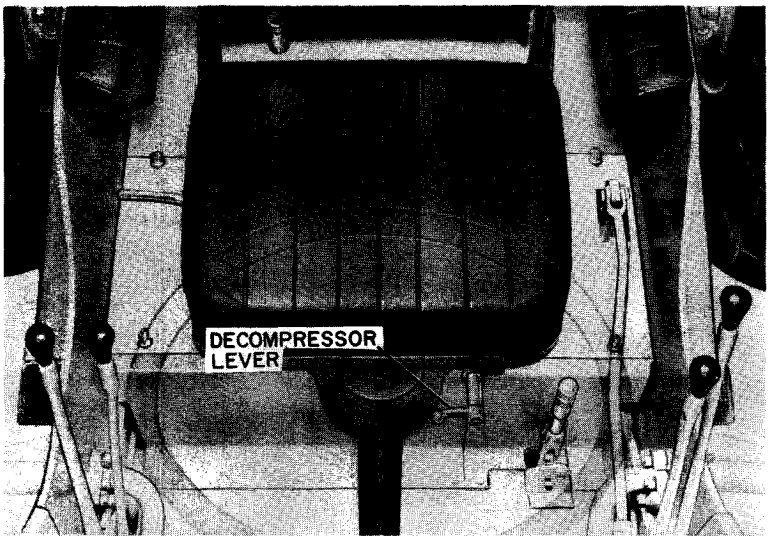


Figure 31

The decompressor, Figure 31, makes it possible to manually relieve engine compression when it is necessary to crank the engine for operations such as checking valve tappet clearances, etc. Raising the lever holds the exhaust valves open and thereby relieves compression. Pushing the hand lever down releases the valves and restores compression.

NOTE: The decompressor may be used to stop the diesel engine in an emergency. Should the fuel stop control be damaged so the engine cannot be shut off, raising the decompressor lever will stop the engine.

The decompressor may also be used as an extra precautionary measure to prevent children or unauthorized persons from accidentally starting the diesel engine.

IMPORTANT

Do not use the decompressor lever as a regular means by which to stop the engine. Serious damage to the engine may result.

STARTING PROCEDURE

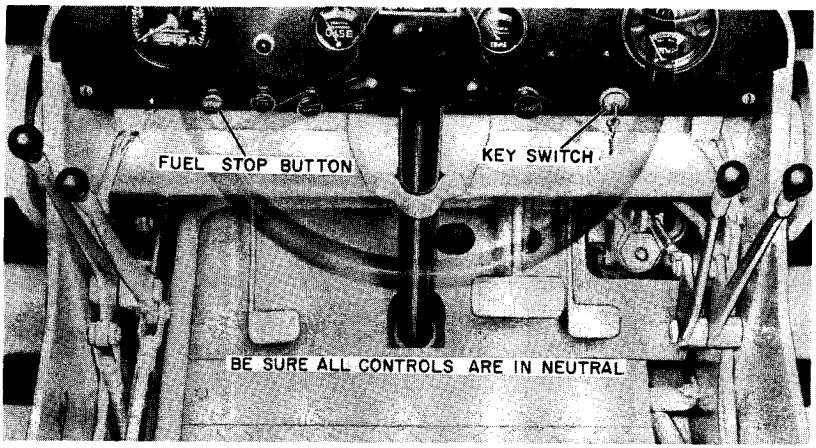


Figure 32

To start the engine of a W-12 Loader, place all the controls in neutral. Depress the accelerator pedals half way and push the fuel stop button all the way in. Turn the key switch fully clockwise until the engine starts. Release the key.

CAUTION

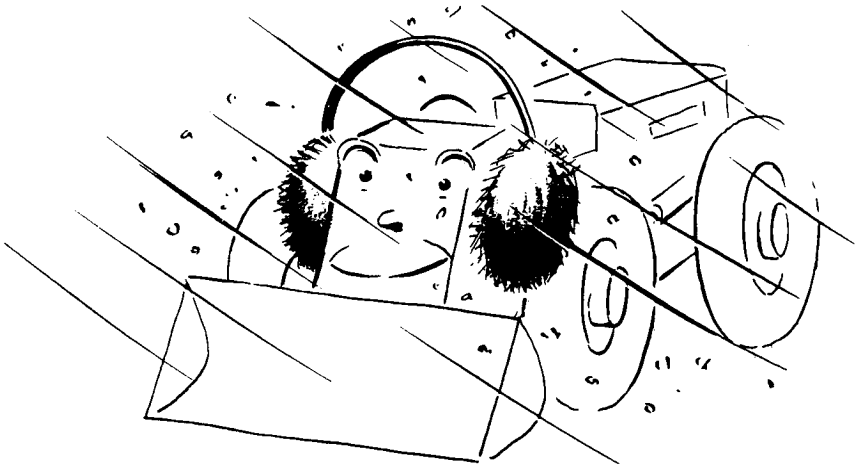
1. Immediately check that the oil pressure warning light and ammeter warning light go out. If not, stop engine and investigate.
2. If engine fires and stops, wait for starting motor to stop spinning before again turning key switch to START.
3. Do not use starting motor longer than 30 seconds without interruption. Wait at least 3 minutes so batteries can recuperate and starting motor can cool.

NOTE: While the engine is being turned over with the key switch, white or black exhaust smoke should be observed. If none is observed and engine will not start, it is an indication that no fuel is being delivered to the cylinders.

Stopping the Engine

Idle the engine for a few minutes, before shutting it off, so engine parts can cool evenly. Place all controls in neutral. Pull the fuel stop button out and hold it until the engine stops completely. Turn the key switch counter-clockwise to OFF.

COLD WEATHER OPERATION



To start and operate your Case Diesel Loader during cold weather the following precautions must be observed:

1. BATTERIES - Both storage batteries must be fully charged. Refer to Pages 97 thru 99.

2. FUEL RECOMMENDATIONS - The diesel fuel must have a Pour Point 10 degrees Fahrenheit lower than the prevailing air temperature and a Cetane rating from 45 to 55. The fuel must be clean and free of water. Refer to Page 12.

3. CRANKCASE OIL - the oil in the crankcase must be of the recommended viscosity. See Page 18.

4. TRANSMISSION OIL - always use Automatic Transmission Fluid - Type C.

5. HYDRAULIC RESERVOIR OIL - always use SAE 10W (MS-DG) both winter and summer.

6. COOLING SYSTEM - the cooling system must be protected by a reputable brand of "High Boiling Point" type Ethylene Glycol antifreeze.

7. STOPPING THE ENGINE - always allow the engine to reach operating temperature before stopping it. If the engine has been working under load, always idle the engine for a few minutes before stopping it so the engine parts can cool evenly.

8. CONDENSATION IN FUEL TANK - always fill the fuel tank at the end of the day's operation to prevent the tank from "sweating" and water entering the fuel.

9. FUEL TANK WATER TRAP - drain the fuel tank water trap daily to prevent any accumulation of water from freezing and causing possible damage to the water trap on the fuel tank due to expansion.

10. DURING EXTREMELY COLD WEATHER, the following extra precautions may be required:

A. Remove and store the batteries in a moderately warm place (preferably room temperature). Reinstall the batteries just prior to starting.

B. Drain the crankcase oil while it is still warm from operation. Store it in a warm place. If possible, pre-heat it to approximately 100 degrees Fahrenheit before replacing it just prior to starting.

C. Drain and store the anti-freeze in a warm place. If possible, the anti-freeze should be warmed before replacing it in the cooling system just prior to starting.

CAUTION

NEVER IDLE THE ENGINE FOR PROLONGED PERIODS OF TIME! DURING EXTREMELY COLD WEATHER, WATCH THE COOLANT TEMPERATURE CAREFULLY AND NEVER OPERATE THE ENGINE FOR PROLONGED PERIODS BELOW THE RECOMMENDED COOLANT TEMPERATURE, (WORK ZONE ON THE TEMPERATURE GAUGE).

During extremely cold temperatures, the engine will not warm up to or maintain the operating temperature at low engine speeds. Low idling speeds during extremely cold temperature will result in incomplete combustion, heavy deposit formations on the valve system and possible serious damage to the engine.

1. ENGINE WARM UP PROCEDURE

A. Close the radiator shutters (if so equipped) or cover the radiator.

B. Start the engine and allow it to run at a reduced speed just long enough for the oil to circulate through the engine. (Not over one or two minutes.)

2. MAINTAINING ENGINE OPERATING TEMPERATURE

When the engine is not operating under load, but the operator wishes to keep the engine running due to the extremely cold temperatures:

A. Keep the hood sides in place on the Loader.

B. Keep the radiator shutters closed sufficiently to maintain temperature in the Work Zone range on the temperature gauge.

C. DO NOT IDLE THE ENGINE.

Coolant Heater

The engine cylinder block on the W-12 Loader is provided with two passages located on the Right Hand side of the engine near the engine oil filter, Figure 33. The MAXIMUM depth the coolant heater can be submerged in the cylinder block is 5-1/2 inches, Figure 34.

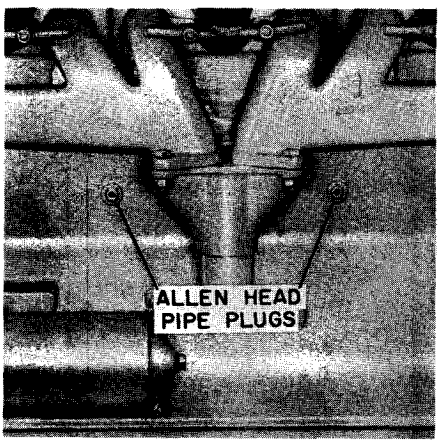


Figure 33

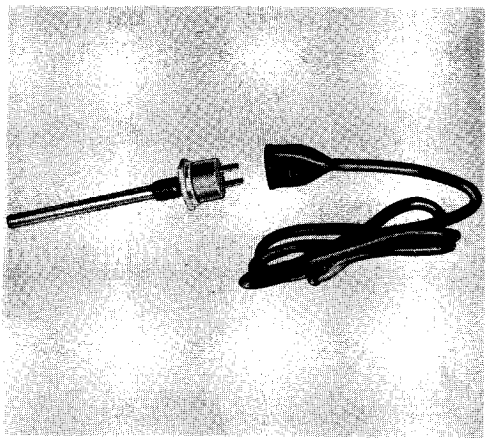


Figure 34

To install the coolant heater, remove the Allen Head pipe plug from the cylinder block, Figure 33 and follow the heating element manufacturer's instructions for installation.

Cold Weather Starting Fluid

To start the Loader diesel engine at freezing temperatures or below, it may be necessary to use starting fluid. Genuine Case Starting Fluid is available through your Authorized Case Industrial Dealer, Figure 35.

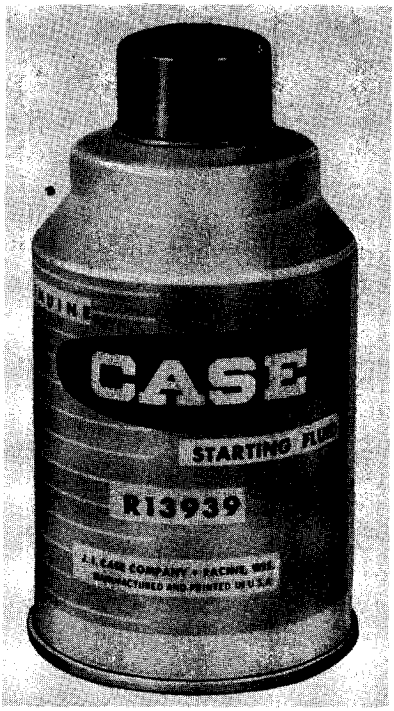


Figure 35

To start the diesel engine using starting fluid, proceed as follows:

1. Spray starting fluid into the air cleaner.

2. At the same time turn the starter key clockwise to start engine. Then release key when engine starts.

NOTE: Complete instructions are given on the container.

SAFETY PRECAUTIONS

1. Before starting the engine, be sure all operating controls are in Neutral.
2. Keep bucket as close to ground level as possible when transporting loads on grades or slopes.
3. Keep brakes in proper adjustment.
4. Never operate any of the controls from any position but seated in the operator's seat.
5. Be extra careful when working on banks or hillsides.
6. Keep Loader in gear when going down steep grades.
7. Drive at speeds slow enough to insure safety and complete control, especially over rough terrain.
8. Reduce speed when making a turn or applying brakes.
9. Never shift to a low range when operating at a high speed. Slow down at least as much as the lower range top speed before shifting down.
10. Never leave the engine running while it is unattended.
11. Always lower the Loader lift arms to the ground or block them securely before performing any service operation or when leaving the machine unattended.
12. Never dismount from a Loader when it is in motion.
13. Never permit persons other than the operator to ride on the Loader.
14. Never stand between a Loader and machine when hitching unless all the controls are in neutral and the parking brake locked.
15. Be careful removing radiator pressure cap when the radiator is hot. Refill only when the engine is stopped.
16. Do not oil, grease or adjust a Loader when the engine is running
17. Never refuel a Loader when the engine is hot or running.
18. Do not smoke when refueling or using Starting Fluid.
19. Be extra careful when using cold weather starting fluid. Read the instructions on the can and those listed on Page 49.
20. Never operate a Loader in a closed shed or garage.
21. Do not wear loose fitting clothing which may catch in the moving parts.
22. To prevent highway accidents, use red warning flags in the daytime and red warning lamps at night.
23. Keep a first aid kit and fire extinguisher on the Loader.

This section of the Operator's Manual will provide helpful suggestions to enable you to operate the Loader most effectively. The amount of work accomplished per hour will depend primarily on the job layout and the development of a work cycle. From there on, operator skill and capability are the determing factors.

In many types of operations, personnel working in shifts or different operators assigned from day to day, will be servicing and operating the Loader. For this reason, the Loader has been designed with simplified operating controls and a minimum of daily service requirements, so there will be no difficulty in training a new operator.

A new operator should be trained to effectively use all of the advantages built into the Case W-12 Loader. The procedure outlined below should be followed whenever a new operator is assigned to the Loader.

1. Review this Operator's Manual thoroughly.

2. Go through the Pre-Starting Check List. Refer to Page 33.

3. Operate all the controls to be completely familiar with them. Refer to Pages 34 through 45.

4. Go through a simple work cycle: Fill the bucket, Transport the load, Empty the bucket, Return to refill. Refer to Pages 52 through 57.

5. Review all Safety Precautions listed in this Manual.

THE WORK CYCLE

The first thing to be established for any type of loader operation is a work cycle, whether the operation is to be stockpiling, loading, land clearing, excavation, leveling or grading.

The work cycle for most Loader applications consists of:

1. FILLING THE BUCKET

2. TRANSPORTING THE LOAD

3. EMPTYING THE BUCKET

4. RETURNING TO REFILL THE BUCKET

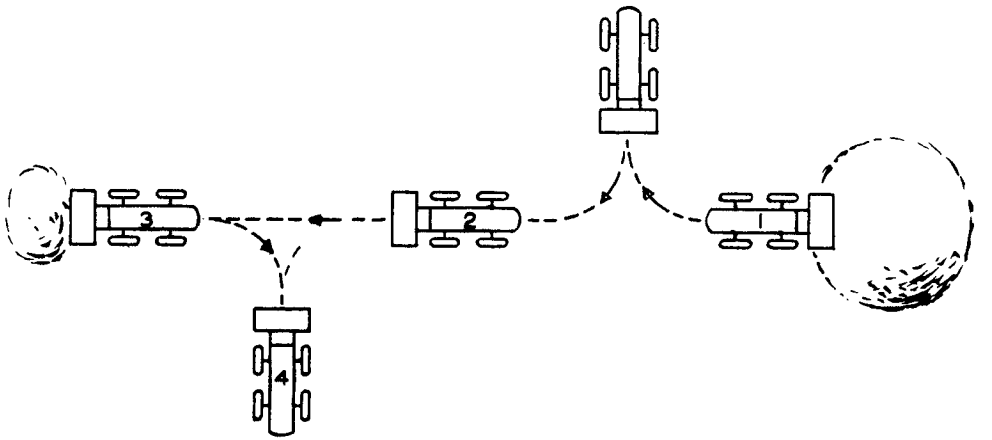


Figure 36

The following pages of this manual describe these steps in detail. The new operator should study these steps and practice each one until it is mastered. When the separate steps are mastered, the operator can co-ordinate them to further reduce the time consumed in completing the job.

Filling The Bucket

1. To fill the bucket, select a forward speed range to fit the terrain and material conditions, During the approach to the cut or stockpile, use the bucket sight level gauge as a guide and locate the bucket parallel to the ground with the Bucket Tilt Control, then push the Bucket Lift Control forward to lower the bucket to ground level, Figure 37.

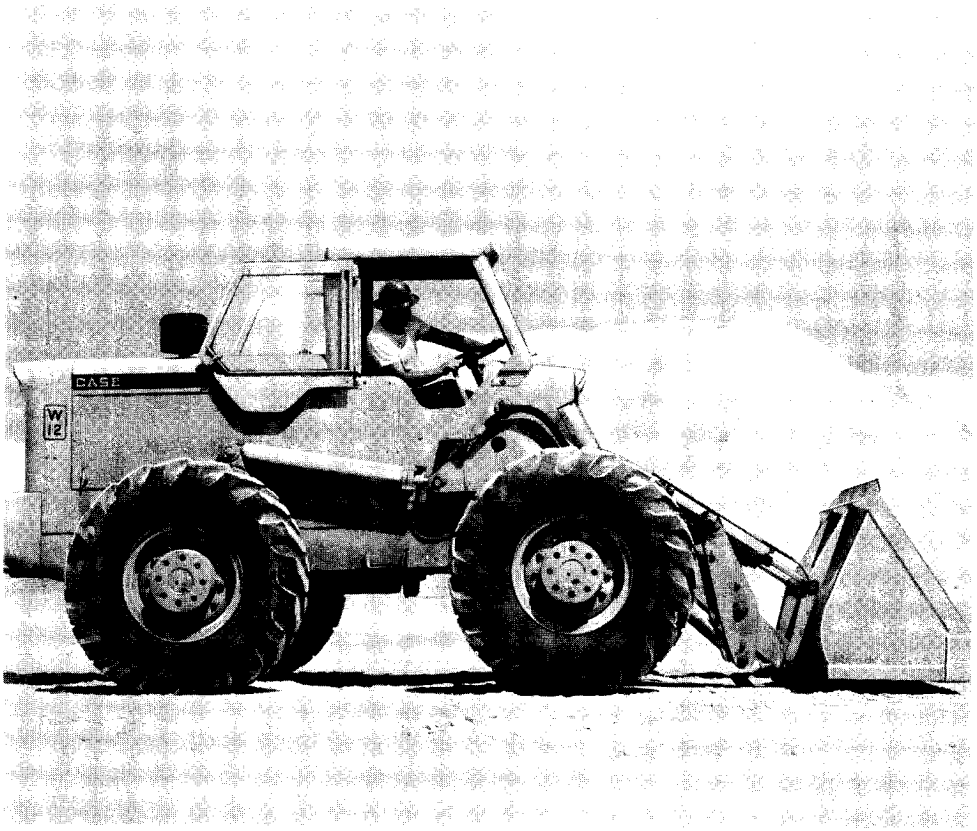


Figure 37

2. As the bucket penetrates the stockpile or cut to a point where enough resistance is encountered to stop the forward motion of the Loader, place the lift control in the retained raise position and work the tilt control while continuing to move forward. This working of the tilt control while the lift arms raise will bring the bucket up in a continual arc, filling it completely.

Figure 38

3. When the bucket is filled, the direction selector and range selector can be pulled back simultaneously allowing the operator to back away from the cut or stockpile in a higher speed range and cut time in the work cycle.

Figure 39

This method of filling the bucket is sometimes called "crowding" and is the most efficient and speedy method to get a large pay load. Practice and continual operation in different types of material will enable the operator to gauge his initial penetration and length of arc to obtain a heaping bucket every cut.

Transporting The Load

The terrain and material conditions will be the determining factors in this phase of the work cycle. The Direction Selector allows the operator to use forward and reverse to best advantage when transporting. In addition to the Direction Selector, the Range Selector (Low, Intermediate and High) can be used to shorten the work cycle. Filling the bucket is usually accomplished in a lower speed range, while transporting is usually in a higher speed range. Therefore, depending on type of material, terrain and transport distance, a skillful operator can select suitable speed ranges rapidly to save valuable time and adapt the Loader to any condition that may be encountered.

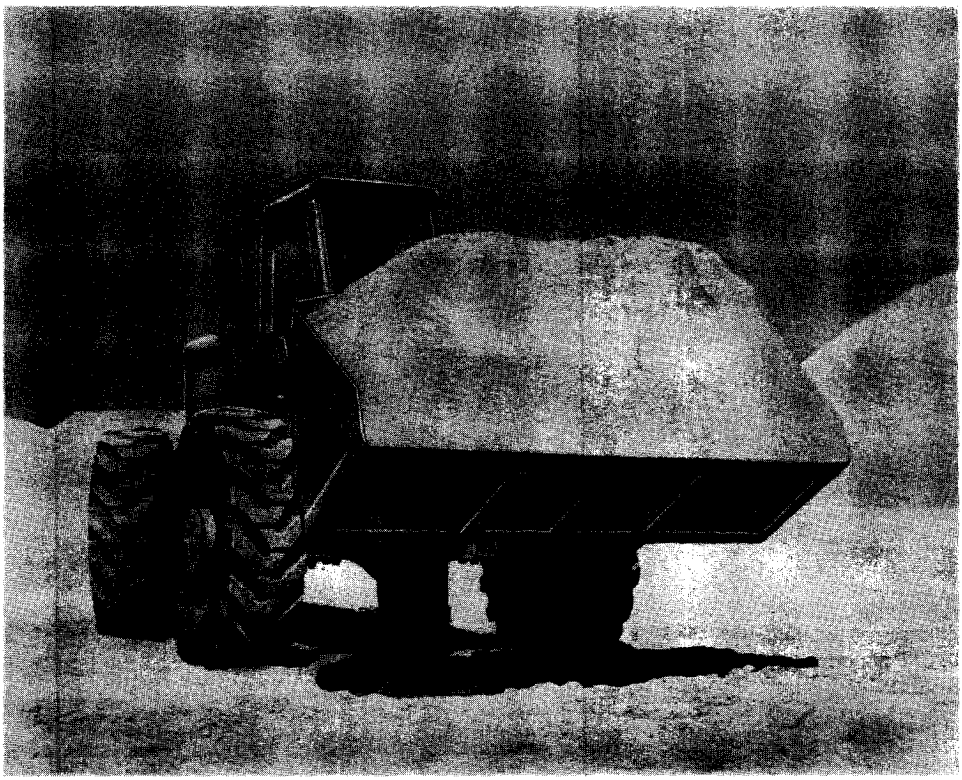


Figure 40

The bucket should be carried as close to the ground as conditions permit, to give the operator a clear view and to provide greater stability in transporting the load.

Emptying The Bucket

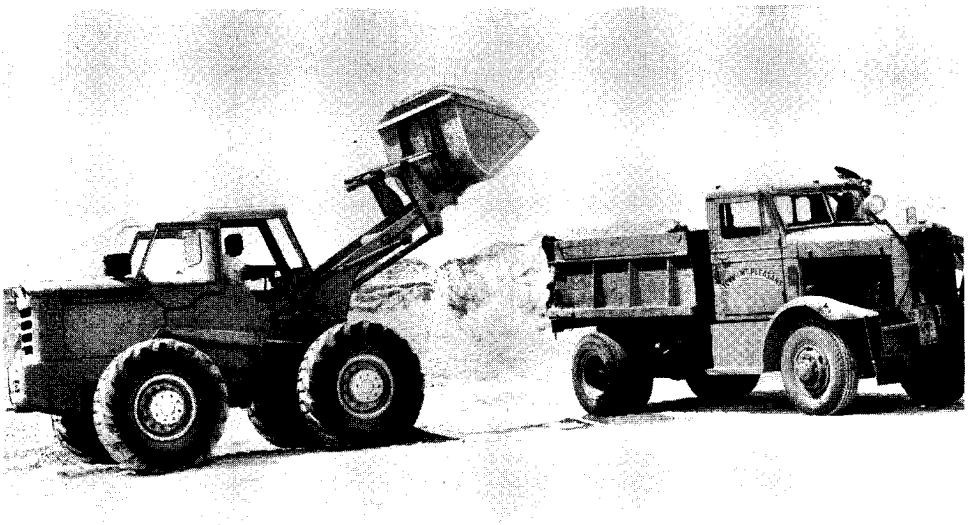


Figure 41

The operator can shorten the work cycle considerably by having the bucket in position to dump at the end of the transport run. By moving the Bucket Lift Control back as the dump area is near, the bucket will be at the proper height to load trucks, dump onto a stockpile or into a fill, Figure 41.

Figure 42

Move the Bucket Tilt Control fully forward to empty the bucket, Figure 42.

Returning to Refill the Bucket

The use of both forward and reverse and the three speed ranges will enable the operator to save time in this phase of the work cycle. As the Loader approaches to refill, the operator can use the sight level gauge as a guide to locate the bucket parallel to the ground while lowering the bucket to ground level and be ready for another bucket full when the stockpile or cut is rached.

TRUCK LOADING

Most truck loading operations are controlled by a truck spotter and the work cycle is dependant on his ability and judgment along with the variables of: Type of material, transport distance and terrain.

The following diagrams illustrate possible variations from the work cycle shown on Page 52 through 57.

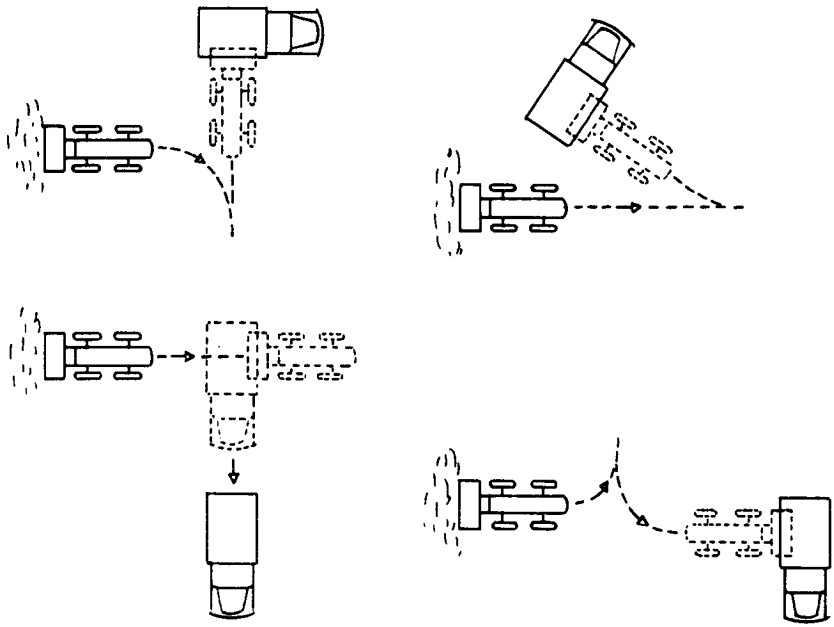


Figure 43

Note that the transport distances are usually short and that maneuverability and operator skill are most important. The work area is generally small and the alertness of the truck spotter and truck driver are also determining factors in the speed and ease of the loading operation.

LAND CLEARING

The Case W-12 Loader is an important tool in the clearing of virgin land and preparation of the land for development.

The first phase of the land clearing operation is to remove shrubs, brush and small trees. This will enable the operator to clear the work area sufficiently to plan his work cycle for succeeding operations. The brush rake shown on the following pages is available, as extra equipment, for W-12 Loaders engaged in land clearing operations.

Approach

The approach for the land clearing operation should be made with the brush rake tines at ground level and the rake tilted forward slightly, Figure 44.

Figure 44

Crowd

As the tines penetrate to a point where enough resistance is encountered to halt the forward motion of the Loader, the operator can manipulate the tilt control lever to produce the crowding effect

described on Page 53. Tangled root structures can be cleared by raking to full depth from two directions at right angles to each other.

Figure 45

Figure 46

If the W-12 Loader is working from a clearing directly into dense, rank growth, the easiest way to remove trash is by back dragging, as shown in Figure 46, until a sufficient work area in the undergrowth is obtained.

Transport

Trash may be transported to the designated dump area after a sufficient work area is created. The brush rake will generally be carried higher than the bucket for transporting, since the load on the lift arms is lighter and because tangled trash may catch on undergrowth and be pulled off the brush rake.

If the trash is to be piled and burned, the operator can shake most of the dirt out during transport to the dump area, by working the lift control up and down rapidly.

Figure 47

The tines may become clogged when working in rank, tangled material. The operator can clean the tines by raising the lift arms to full height, then working the tilt control lever back and forth rapidly so the rake raps sharply against the stop blocks on the lift arms.

Clean tines will do a more efficient job.

When brush and shrubs have been cleared, the top soil may be removed and stockpiled for future use, or the area may be scarified as a final clearing operation, Figure 48.

Figure 48

Figure 49

The long tines of the brush rake are capable of digging under the simple root structure of most small trees and picking up the tree, to direct its line of fall or transport it to the dump area, as shown in Figure 49. Always use the center tines of the brush rake. Never use the end tines for prying or lifting.

Tree Removal

CAUTION

It is recommended that the operator wear some type of protective head gear and the operator's compartment be shielded as much as possible during tree removal operations. Good judgement and proper safety precautions will reduce hazards encountered in land clearing operations.

To remove large trees, several factors must be considered:

1. The direction of fall must be determined.
2. Take advantage of roots exposed by topsoil removal.
3. Take advantage of leaning or heavy branches on the side to which the tree must fall.
4. Take advantage of irregularities in the surface of the earth.

All of the above listed items will aid in removing large trees more easily.

Remove large trees in the following manner:

1. Take cuts with brush rake around the circumference of the trunk to break off or cut through the large roots at the base of the trunk, as shown in Figure 50.

Figure 50

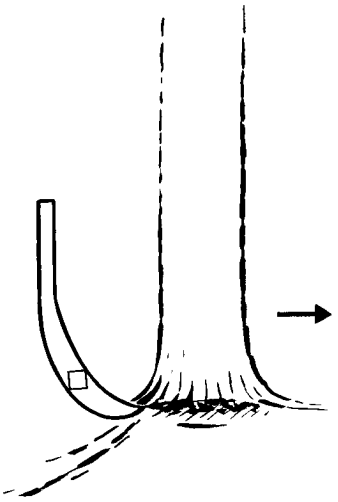


Figure 51

2. Dig a trench with the brush rake, on the side of trunk directly opposite the proposed line of fall, Figure 51.

This will enable the Loader to loosen the tree and cut away more of the root structure. The trench will also allow the Loader to be below and clear of any upturning roots which might cause possible injury to the operator or damage to the Loader.

3. To push the tree over, raise the brush rake as high as possible on the trunk to obtain greater leverage. Tilt the brush rake, Figure 52, so the tines and the top cross angle are both in contact and centered on the trunk. Place the Loader in low range and push the tree over.

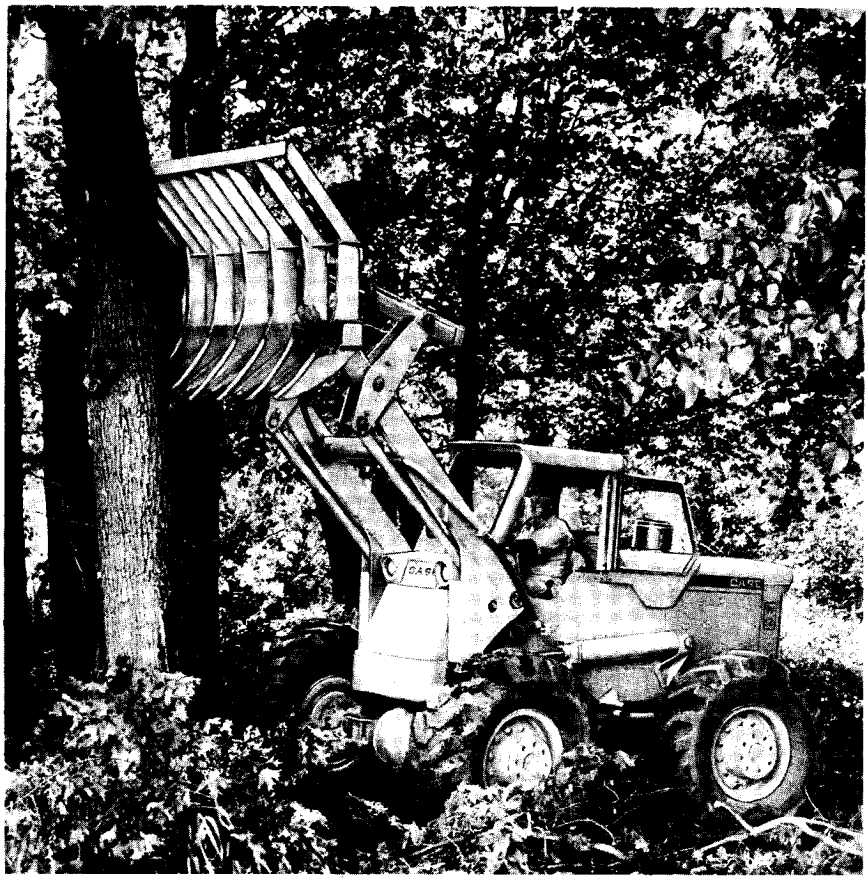


Figure 52

CAUTION

The utmost care must be taken during tree removal to avoid accidents which might cause injury to the operator or damage to the Loader. Use common sense and follow the simple precautions listed in this section to prevent accidents.

GRADING

A dozer and backfill blade is available, as extra equipment for installation on the W-12 Loader. Although a certain amount of grading can be done with the Loader bucket, the blade attachment is designed specifically for the operation and is more economical for use when the Loader is to do grading and dozing work.

Figure 53

There are, in most grading operations "borrow" points and "fill" spots. Several passes over the same path from the borrow points to the fill spots will build up windrows from accumulated blade spillage. These windrows create a confined slot, making it possible to push larger loads with less side spillage from the borrow points to the fill spots, Figure 53.

The windrows can be cleaned up in the finish grading operation by back dragging over the graded area to fill in low spots with the lift control in float or to compact certain portions with down pressure on the blade.

Figure 54

STOCKPILING

Using the work cycle described on Pages 52 through 57 as a basis for stockpiling work, the largest amount of material can be moved in the least amount of time. The availability of a large capacity, light material bucket as extra equipment makes stockpiling a speedy operation. Certain material conditions may warrant the use of the standard bucket for stockpiling instead of the light material bucket.

Constant practice, a complete knowledge of the operating controls and their functions, and the ability to apply this knowledge with common sense and safety precautions will permit the new operator to perform any of the jobs for which a Case Loader can be used.

DEVELOPING OPERATING TECHNIQUES

Review the following operating techniques. They'll help you move more yardage with less wear on the machine and less effort for you.

1. Job Layout

A. Set up the work cycle as short as possible. Study Page 57 for various ways to spot dump trucks efficiently.

B. Spend a few minutes leveling off the work area, if necessary. Smooth runways for the Loader and a level parking area for trucks will speed up the job.

C. Keep transport distance as short as possible; less transport makes a shorter work cycle.

2. Filling The Bucket

A. Set the bottom of the bucket level or parallel to ground for loose materials. Use the sight level gauge as a guide. Enter material with the bucket just skimming top of the ground.

B. Don't have the bucket tilted back from level position. This causes a lifting force as the bucket enters material and reduces crowding traction.

C. Don't "cowboy" the Loader by hitting the bank or pile too hard or fast. This is hard on man and machine.

D. Coordinate tilt and lift of bucket so bucket fills gradually as it "walks" its way up the pile in loose material.

E. In packed or hard material, coordinate the bucket controls to fill the bucket in a continual arc.

F. Don't try to fill the bucket completely at the bottom of the bank or pile. This overloads or stalls the hydraulic system and wastes time.

G. Don't sit and spin the wheels when crowding the bank. You'll just dig holes with the tires. Make loading or backing out easy by varying the foot accelerator to obtain best crowding or reversing traction.

3. Transporting

A. Keep bucket low when backing out and carrying. This provides best stability, particularly when backing up a ramp or incline.

B. Don't back out with the bucket fully raised. Stability is reduced and steering traction is lowered. If bucket load is exceptionally heavy, steering can be improved by backing out with the bucket actually skidding on the ground.

4. Emptying the Bucket

A. It is not necessary to use the brakes when emptying the bucket. Use the direction selector and accelerator pedals to control the Loader. Approach the dump area with the bucket at proper dumping height, decelerate, push the tilt control forward and pull both the range and direction levers rearward, accelerate. This will "throw" the load out of the bucket. Use extreme care and plenty of practice to perfect this method of emptying the bucket.

B. If sticky material packs in bucket corners, raise the bucket to full height and rapidly move the tilt lever back and forth to rap the bucket against the lift arm stops and jar the packed material out.

5. Truck Loading

A. Keep the wind to your back for dumping into a truck. This eliminates chance of dust and loose material blowing into your face and impairing visibility. This also reduces engine air cleaner maintainance.

B. Start raising the bucket so it will just reach dumping height at the time you arrive at the dump area.

C. If one side of the truck is lower than the other, try to spot the truck so you dump over the low side. This improves reach and distribution of the load on the truck.

D. Reach over the dump into the far side of a truck first. Fill the truck gradually from the far side to the near side in order to distribute the load in the truck properly.

6. Grading Or Dozing

A. Grade or doze down hill whenever possible to enlist the aid of gravity in obtaining increased speed and power.

B. Use the slot method, described on Page 64 to push larger amounts of material in less time.

C. Taking lighter cuts at a higher speed range will speed up the grading operation.

7. General

A. Keep the Loader serviced and in top running condition at all times. A few minutes of preventive maintainance will save many hours of down time.

B. Use the proper attachments and extra equipment available for specialized applications.

C. Know your Loader thoroughly.

WARNING

TOWING THE LOADER IS NOT RECOMMENDED. TOWING THE LOADER MAY RESULT IN DAMAGE TO THE STEERING AXLE, TORQUE CONVERTER AND TRANSMISSION.

PERCENTAGE OF SWELL OF EARTH

Payments for earth moving are generally made on the basis of measurements of solid or compacted material. The terms "Pay Load","Bank Measure," "Compact Measure," generally refer to the quantity of earth as measured in the cut before it is loosened. Since loaders, scrapers, and other pieces of equipment handle earth after it has been loosened, it is necessary to know the pay load hauled per trip.

The difference between the volume occupied by the material after it is loosened and that occupied in its original compact form is called the "swell" and is expressed in terms of percentage of the original volume occupied. Thus, if a cubic yard of solid rock occupies 1-1/2 cubic yards of space after it has been blasted, we would say that the swell is .5 or 50 percent. The following table gives the generally accepted percentages of swell for different classes of material.

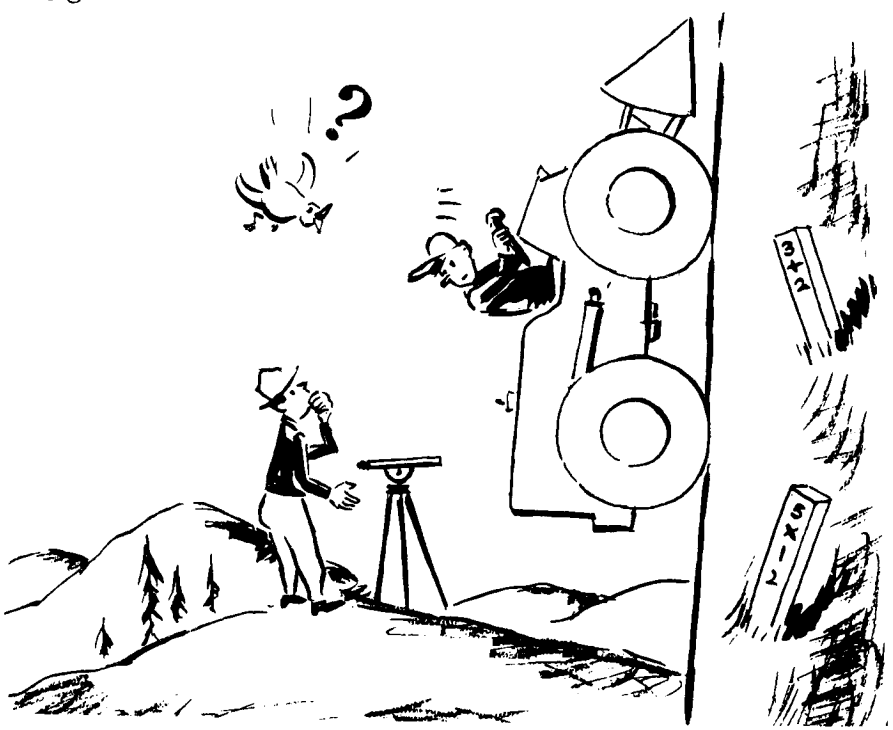
Percentage Swell Of Different Classes Of Earth On Loosening

MATERIAL	PERCENT SWELL
Clean Sand or Gravel	5 to 15
Top Soil	11 to 20
Loam	17-1/2
Good Common Earth	24 to 35
Clay with Sand or Gravel	30 to 45
Clay - Light and Friable	35 to 55
Clay - Hard and Tough	42 hard lump to 62 with rocks or roots.
Shale and Soft Rock	50 to 73
Hard Rock	56 well blasted to 98 poorly blasted.

GRADES AND GRADE LINES

Grades are referred to in per cent. The grade line is referred to as a plus or minus grade, PLUS when going UP, MINUS when going DOWN. For example plus 1% grade is uphill at the rate of 1 foot per 100 feet of horizontal distance, while a minus 1.5% grade is downhill at the rate of 1.5 feet per 100 feet of horizontal distance.

PER CENT GRADE	ANGLE OF GRADE	
1% grade	0°	34.4'
5% grade	2°	51.7'
10% grade	5°	42.6'
20% grade	11°	18.6'
25% grade	14°	2.2'
45% grade	24°	13.7'
75% grade	36°	52.2'
100% grade	45°	



APPROXIMATE WEIGHTS OF COMMON MATERIALS IN POUNDS PER CUBIC YARD

Ashes and Cinders	1000 - 1100
Average Crushed Stone	2700 - 3000
Clay	
Dry	2300 - 2400
Wet	2900 - 3000
Clay and Gravel (Dry)	2700
Coal (Broken)	
Anthracite	1500 - 1600
Bituminous	1350 - 1400
Coke	800
Common Earth	
Loose	2100
Packed	2500 - 2700
Wet Packed	3000 - 3100
Gravel	
Dry	3000 - 3100
Wet	3300 - 3400
Iron Ore (Broken)	3600 - 5500
Limestone (Broken)	2500 - 2700
Sandstone (Broken)	2300 - 2500
Shale (Broken)	2500 - 2700
Slag (Broken)	2400
Sand	
Dry	2200 - 2500
Wet	3000 - 3300
Sand and Gravel	2700 - 3000

PREVENTIVE MAINTENANCE IS IMPORTANT TO YOU!

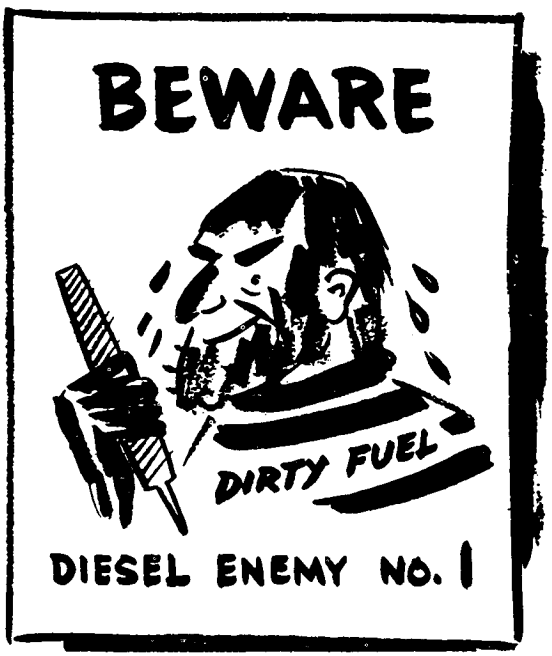
AS THE OWNER OF A CASE MODEL W-12 LOADER YOU POSSESS A MACHINE THAT IS MADE TO THE HIGHEST STANDARDS POSSIBLE.

PREVENTIVE MAINTENANCE BY YOU OR YOUR OPERATOR IS THE EASIEST AND MOST ECONOMICAL MEANS OF ASSURING MANY SATISFACTORY PRODUCTIVE HOURS OF OPERATION.

The preceding sections of this operator's manual have dealt with instructions necessary for daily operation of your Loader. The following subjects present detailed instructions concerning the care and adjustment of the various parts.

FUEL SYSTEM

The fuel system on your Case Model W-12 Loader consists of a fuel supply tank, fuel filters and the fuel injection equipment. The service life of the fuel injection equipment on your diesel engine is wholly dependent upon the cleanliness of the fuel. If abrasives or water are permitted to reach the high precision moving parts in the injection equipment, rapid wear will result and poor performance may be expected. To prevent abrasives or water from reaching the injection equipment, it is important that you use clean fuel and regularly service the filters and water trap as described in this manual



PROTECT YOUR FUEL SYSTEM

BUY CLEAN FUEL

AND

KEEP IT CLEAN

Figure 55, illustrates the fuel flow from the engine fuel supply tank to the combustion chambers. The fuel system is composed of the following units:

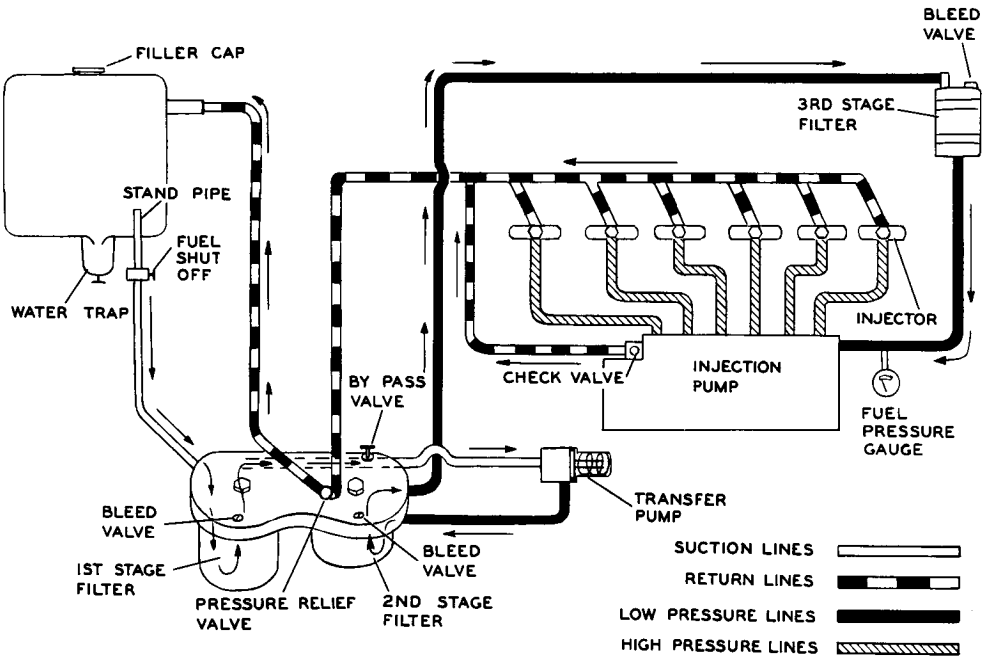


Figure 55. Diesel Fuel System Flow Diagram

FUEL SUPPLY TANK --------An Air Vent in the fuel tank filler cap, vents air into the tank as fuel is removed. A water trap with a drain valve is located on the bottom of the fuel tank.

FUEL TRANSFER PUMP ------The fuel transfer pump which supplies fuel from the tank to the injection pump is an integral part of the injection pump.

FIRST STAGE FUEL FILTER --The first stage filter is of the replaceable element type. It removes abrasive particles from the fuel. A bleed valve is located in the top of the filter to vent air out of the filter.

SECOND STAGE FUEL FILTER - The second stage filter uses a replaceable element which removes very fine abrasive particles from the fuel. A bleed valve is provided in the top of the filter to vent air out.

BLEEDER BY-PASS VALVE -- AND LINE - The bleeder by-pass valve is used only when bleeding air from the fuel system. When the by-pass valve is open, the fuel flows directly from the first stage filter through the cored passage in the filter head to the second stage filter, by-passing the fuel transfer pump.

FUEL PRESSURE GAUGE ----- The fuel pressure gauge is to be used as a guide for determining when to service the fuel filters. Refer to Page 78.

FINAL (THIRD STAGE) ------- FUEL FILTER - The final (third stage) filter is of the "sealed unit" type. It provides the final filtering action before the fuel reaches the precision injection equipment. A bleed valve is located in the top of the filter to vent air out.

RELIEF (OVERFLOW VALVE) - The relief valve is provided on the inlet side of the second stage filter to maintain a pre-set pressure on the fuel entering the second and final filters. Fuel in excess of the pre-set pressure is returned directly to the fuel tank. This materially increases the service life of both the second and final filters.

FUEL INJECTION PUMP ------ The fuel injection pump receives fuel from the final filter and then meters and distributes the fuel under very high pressure to each of the six injectors. Fuel in excess of the engine demand is returned to the supply tank through the fuel return line.

FUEL INJECTORS ---------- The injectors deliver the metered fuel to the engine combustion chambers in a predetermined spray pattern. The small amount of fuel used to lubricate each injector is returned to the fuel tank through the leak-off and return lines.

BLEEDING THE FUEL SYSTEM

THE FUEL SYSTEM MUST BE BLED IF AIR ENTERS THE FUEL SYSTEM AS A RESULT OF:

1. Engine running out of fuel.

2. Parts removed for service or repairs.

3. Engine stored for a considerable period of time.

NOTE

AFTER RUNNING OUT OF FUEL, IT MAY BE POSSIBLE TO REFUEL AND START THE ENGINE WITHOUT BLEEDING. HOWEVER, A SMALL AMOUNT OF AIR MAY REMAIN IN THE FILTERS, RESULTING IN LACK OF POWER AND STALLING WHEN A LOAD IS APPLIED.

IMPORTANT

1. Be certain the fuel tank is full for the bleeding operation.

2. Wipe the filter tops clean before opening bleed valves.

3. CLOSE THE BLEEDER BY-PASS VALVE IMMEDIATELY AFTER BLEEDING THE FINAL FILTER. Although the engine may start and operate with the by-pass valve open, it will lack power and stall when a load is applied.

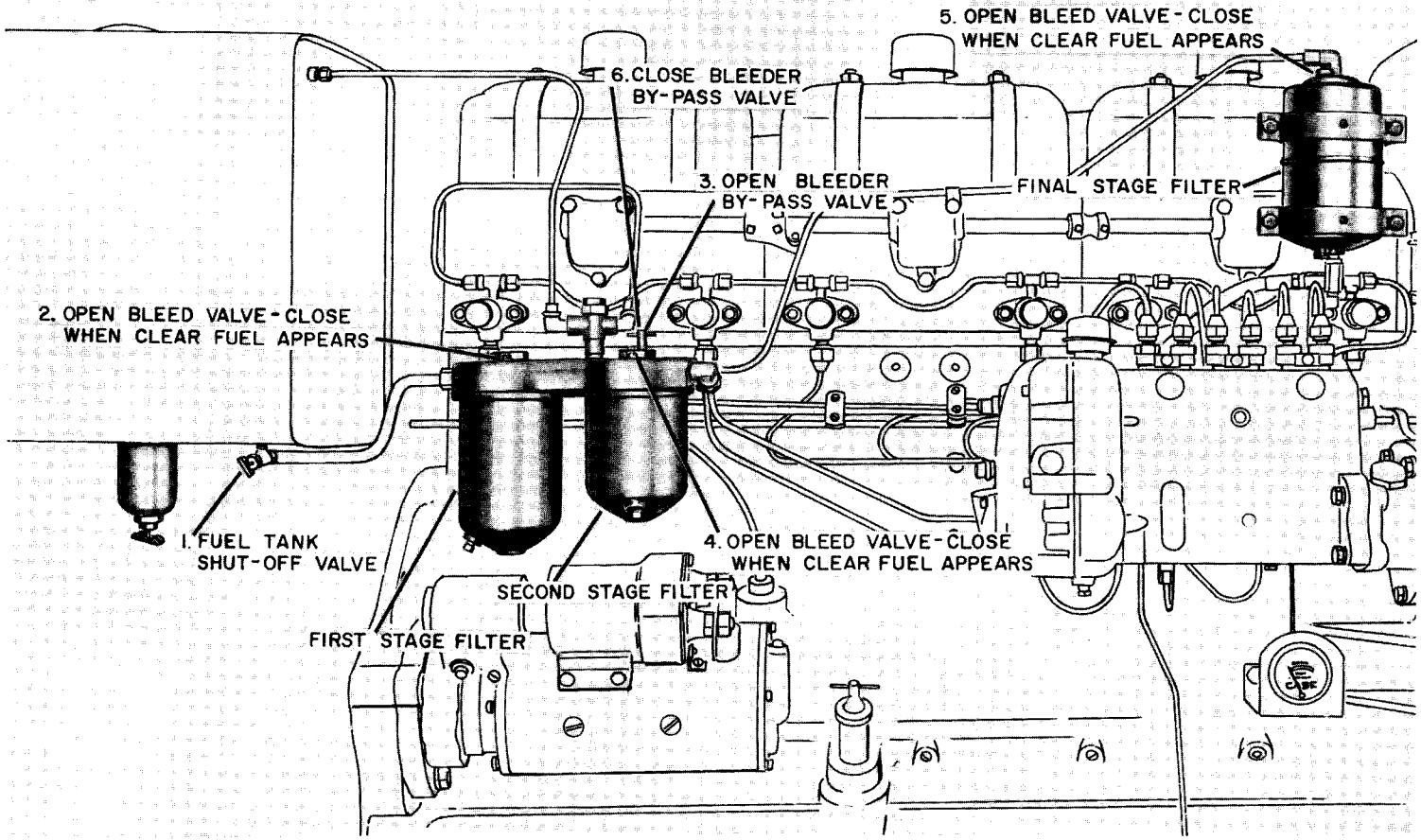


Figure 56. Sequence for Bleeding The Fuel System

CHECKING CONDITION OF FUEL FILTERS

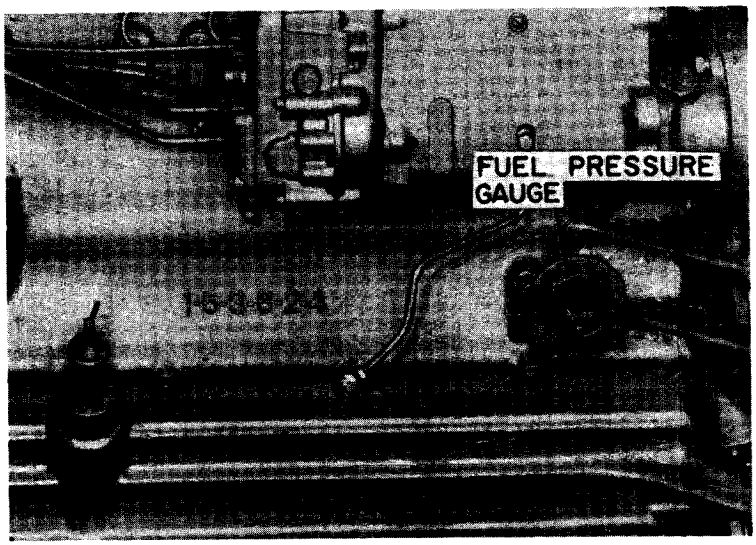


Figure 57

It is important that the fuel pressure gauge be checked daily. In normal operation, the needle will appear in the Green Zone, Figure 58. This indicates a satisfactory condition of all fuel filters.

As sediment gradually plugs a filter element, a drop in pressure will result. This will be indicated by the needle moving downward toward the Red Zone at the left side of the gauge, as shown in Figure 59.

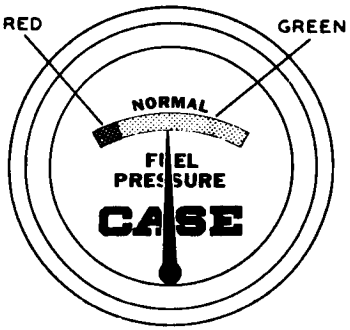


Figure 58. Element Is Clean

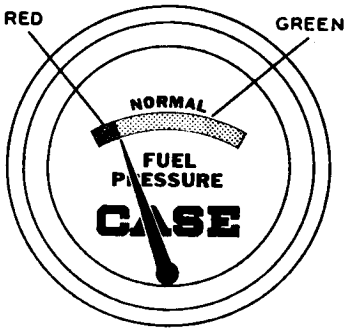


Figure 59. Replace Element

WARNING: When the needle enters the Red Zone, one or more of the filter elements has become plugged to the point where it must be serviced immediately.

SERVICING FUEL FILTERS

When servicing fuel filters, always begin with the first stage filter and by the process of elimination, follow on through the second and final stage filters, if necessary until the needle in the fuel pressure gauge registers in the Green Zone. Proceed in the following manner:

First Stage Filter

Service the first stage filter as described on Page 82. Bleed the system.

After bleeding the system, start the engine and check the fuel pressure gauge immediately. If the needle registers in the Green Zone, all fuel filters are now in satisfactory condition.

If the needle registers in the Red Zone, or if the engine fails to start, proceed to service the second stage filter.

Second Stage Filter

Service the second stage filter as described on Page 83. Bleed the system.

After bleeding the system, start the engine and observe pressure gauge reading. If the needle registers in the Green Zone, all fuel filters are now in a satisfactory condition. If the needle registers in the Red Zone, or the engine fails to start, proceed to check the final filter.

Final Fuel Filter

If you have been servicing the 1st and 2nd Stage Fuel filters regularly and are using clean Diesel Fuel that meets Case specifications on Page 12, you can expect many thousands of hours of operation from the final filter.

A badly restricted final filter will result in a low pressure gauge reading or in a loss of power under load until finally the engine will stall.

How To Check The Final Filter

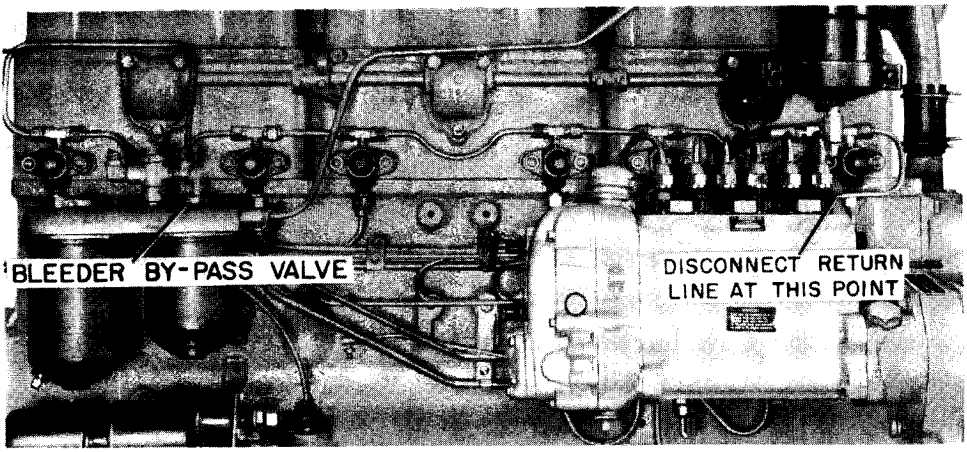


Figure 60

1. The fuel tank must be full.

2. Clean the outside of the fuel injection pump, the fuel lines and the area around the pump. This cannot be overemphasized.

3. Carefully disconnect the fuel return line at the point indicated in Figure 60. Make sure no dirt enters the line. NOTE: The fitting must be removed from the pump in order to obtain an accurate check. Use a 9/16 inch box end wrench to remove and tighten the fitting.

4. Open the bleeder by-pass valve, Figure 60. If a small continuous flow of fuel does not appear at the opening, the final filter is plugged and must be replaced. Refer to Page 84.

CAUTION

Use extra care to prevent dirt entering the fuel system when reconnecting the return line. Tighten the fitting carefully so the threads are not damaged. Do not over-tighten. Tighten the tubing nut until it seats against the fitting on the injection pump.

THE BLEEDER BY-PASS VALVE MUST BE CLOSED BEFORE STARTING THE ENGINE.

Checking 1st and 2nd Stage Filter Conditions If Engine Will Not Start

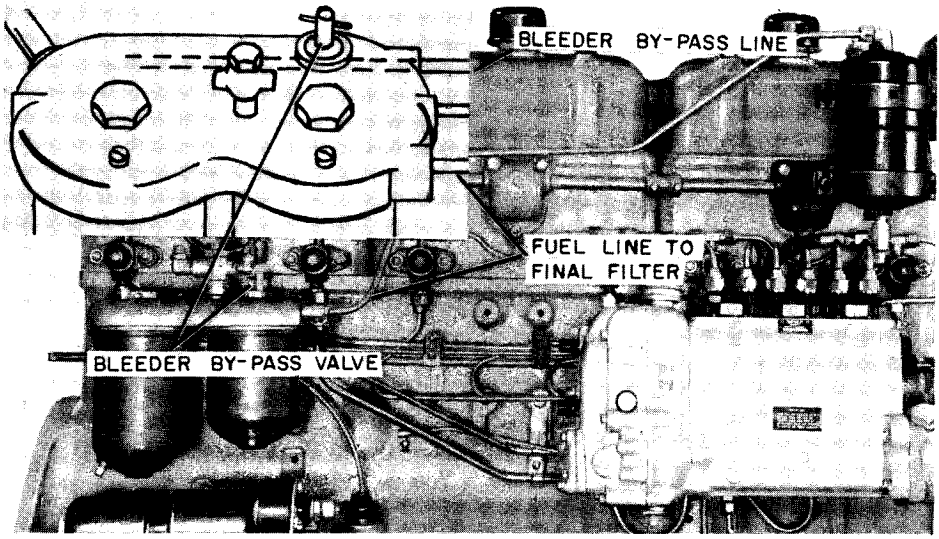


Figure 61

An engine that cannot be started due to a plugged fuel filter is easily recognized by a lack of exhaust smoke while the engine is being turned over by the starting motor. No exhaust smoke can only mean that no fuel is reaching the combustion chambers.

To determine which filter is plugged, proceed as follows:

1. Make sure the fuel tank is full.

2. Disconnect the 5/16 inch bleeder by-pass line at the by-pass valve, Figure 61. Check the fuel flow. If fuel does not flow freely, the first stage filter is plugged. Reconnect fuel line.

3. Open by-pass valve and disconnect fuel line to final filter, Figure 61. If fuel does not flow freely, the second stage filter is plugged. Reconnect fuel line.

4. Check the final filter as described on Page 80.

REPLACING FIRST STAGE FILTER ELEMENT

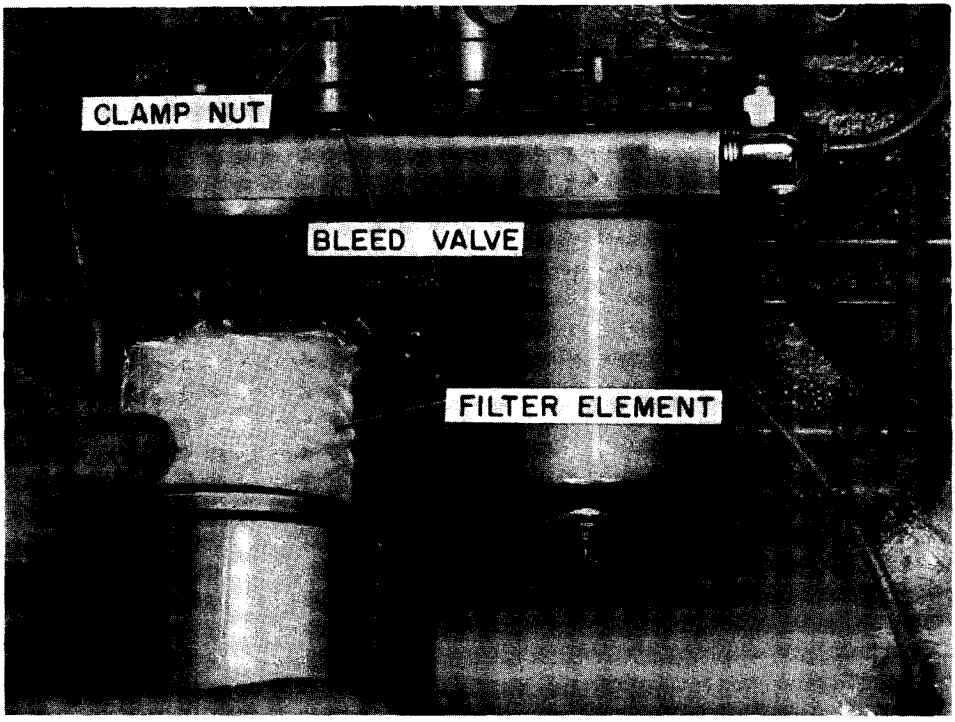


Figure 62. Removing Filter Element for Replacement

To Remove the Filter Element:

1. CLEAN THE LEFT HAND SIDE OF THE ENGINE THOROUGHLY. BE SURE NO DIRT IS LEFT ON THE FILTER BODY.
2. Close the fuel shut-off valve on the fuel tank, remove the drain plug from the bottom of the filter and allow it to drain.
3. Loosen the filter clamp nut on the filter cover until the body can be lowered away from the cover, Figure 62.
4. Lift the contaminated element out of the body and discard it, Figure 62.
5. Wash the filter body assembly thoroughly in clean diesel fuel.
6. Install a new Genuine Case Filter Element in the filter body. Be sure to install the new filter body gasket provided with the new element. Check that the clamp nut gasket is in good condition. Replace it if necessary.
7. Install the filter drain plug and bleed the system as directed on Page 77.

REPLACING SECOND STAGE FILTER ELEMENT

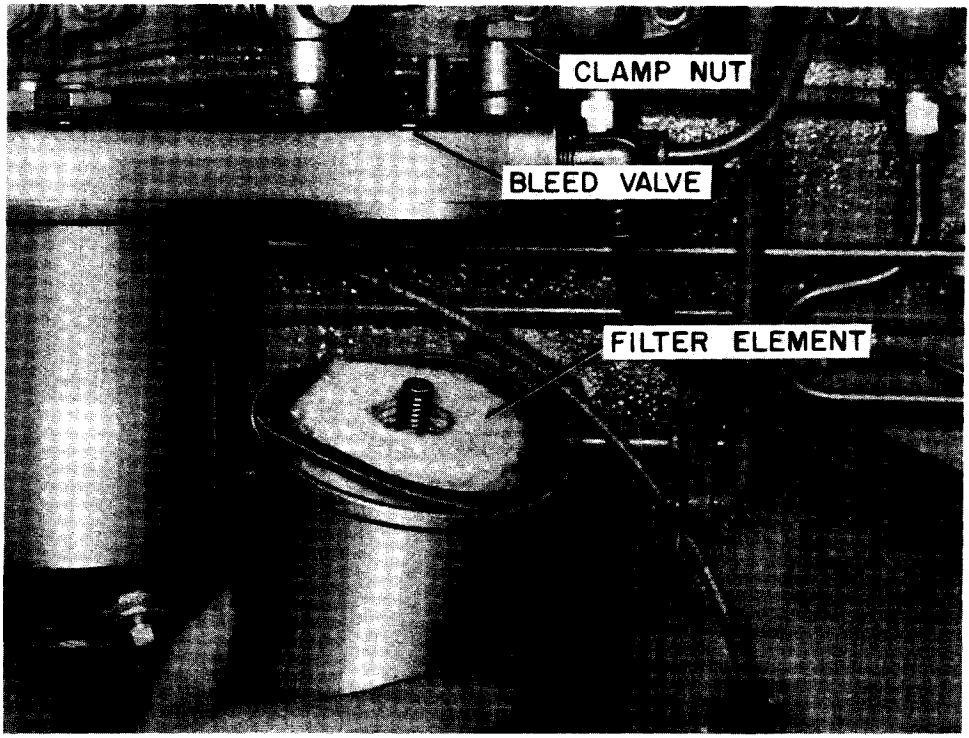


Figure 63. Removing Filter Element for Replacement

To Remove the Filter Element:

1. CLEAN THE LEFT HAND SIDE OF THE ENGINE THOROUGHLY. BE SURE NO DIRT IS LEFT ON THE FILTER BODY.
2. Close the fuel shut-off valve on the fuel tank, remove the drain plug from the bottom of the filter and allow it to drain.
3. Loosen the filter clamp nut, Figure 63, until the entire filter body assembly can be lowered away from the top cover.
4. Lift the contaminated element out of the body and discard it, Figure 63.
5. Wash the filter body assembly thoroughly in clean diesel fuel.
6. Install a new Genuine Case Filter Element in the filter body. Be sure to install the new filter body gasket provided with the new element. Check that the clamp nut gasket is in good condition.
7. Install the filter drain plug and bleed the system as directed in Page 77.

REPLACING FINAL FILTER

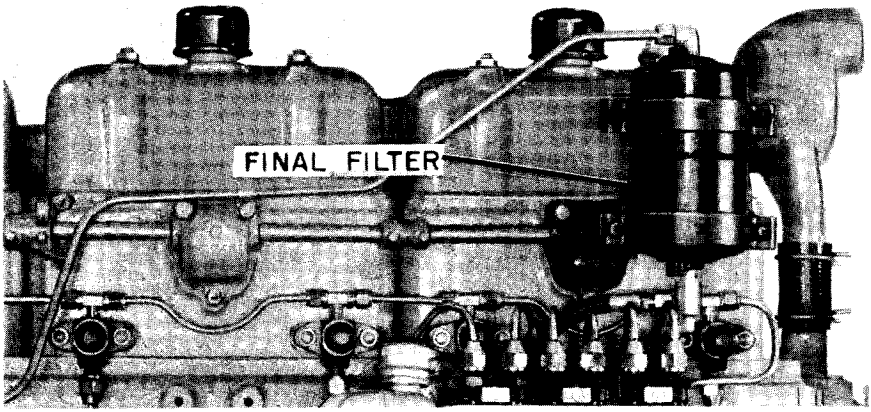


Figure 64

NOTE: The final filter can be expected to last thousands of hours ONLY if the first and second stage filters have been serviced regularly as directed in this manual and if the fuel being used is clean when it enters the tank and meets the specifications listed on Page 12.

While replacing the final filter is a simple matter mechanically, there are certain precautions that can only be safely performed in the Case Dealer's Service Shop where experienced personnel are available.

Removal of the final filter by inexperienced personnel will expose the high precision and most clostly units of the fuel system to the entry of dirt.

FUEL TANK WATER TRAP

Before starting the Loader engine for each day's operation, open the drain valve on the fuel tank water trap, Figure 65. Drain until clear fuel appears. This will remove any water or sediment that may have settled out of the fuel while the engine was stopped.

IMPORTANT: Always be sure to drain water trap daily in cold weather. If a large amount of water is allowed to accumulate and freeze in the trap - serious damage to the fuel tank may result.

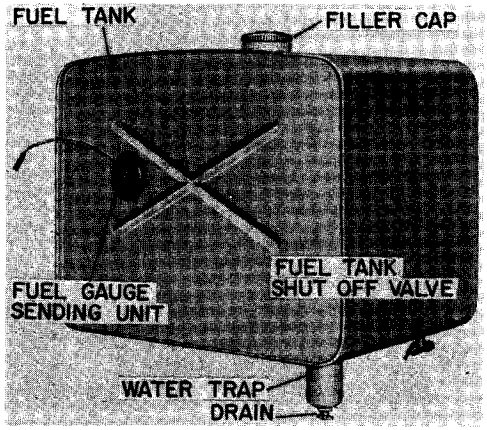


Figure 65

IMPORTANT: Always fill the fuel tank at the end of each day's operation to prevent condensation from forming in the tank and entering the fuel.

CRANKCASE BREATHERS

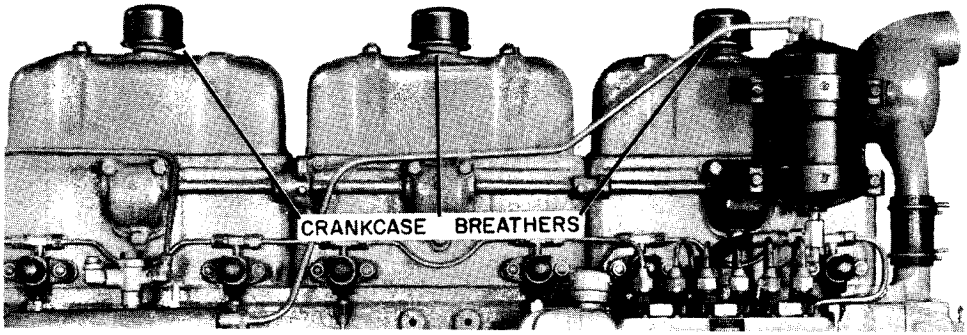


Figure 66. Crankcase Breathers

Your diesel engine is provided with three crankcase breathers, one on each valve cover, Figure 66. It is the important function of the breathers to provide crankcase ventilation and to prevent dirt and dust from entering the crankcase.

Failure to keep the breathers clean may result in:

1. Engine lubricating oil being forced past seals due to excessive pressures built up in crankcase.
2. Excessive oil consumption due to pressure built up in crankcase.
3. Formation of acids or sludge in the crankcase and harmful deposits in the engine due to improper ventilation.

Servicing Crankcase Breathers

Remove and clean the crankcase breathers every 60 hours of operation. During extremely dusty conditions, it may be necessary to clean the breathers as often as every 5 to 60 hours.

To service the breathers:

1. CLEAN THE AREA AROUND THE BREATHERS BEFORE REMOVING THEM.
2. Pull the breathers off the valve covers and wash them in clean diesel fuel. Shake them dry after cleaning.
3. Pour a small quantity of engine lubrication oil into each breather and shake the excess oil out. Replace the breathers on the valve covers.

AIR CLEANER

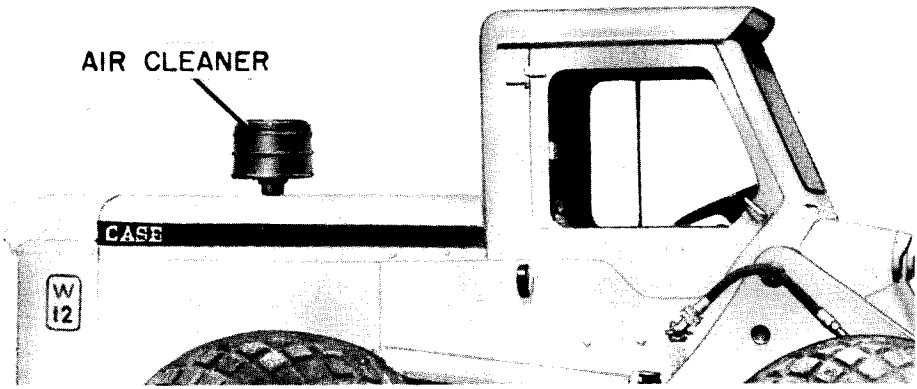


Figure 67

The dry type air cleaner on Case W-12 Loaders will provide hundreds of hours of satisfactory service if it is serviced properly.

The air cleaner filter element must be serviced immediately if the red warning light on the instrument panel lights. Refer to Page 87, Figure 69.

Every 60 hours of operation check the warning light and vacuum switch to be sure it is working.

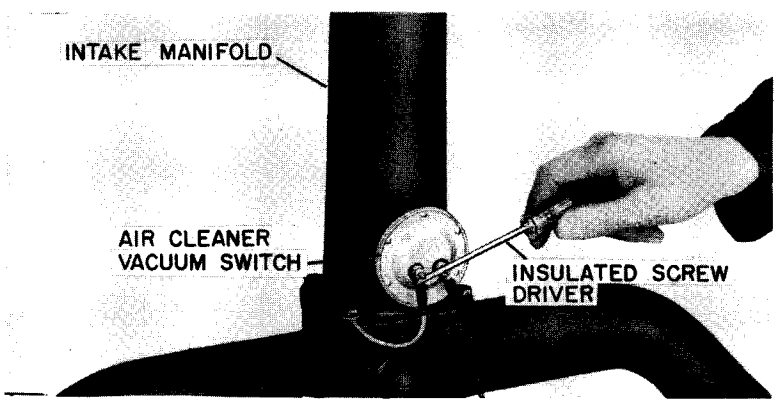


Figure 68

To check the warning light, place an electric insulated screw driver across the terminals of the vacuum switch and see if the warning light flashes on. The vacuum switch is located on the air intake stack. If the light does not flash, replace the bulb and check the wiring.

Cleaning The Filter Element

Unscrew the wing nut or wing stud on top of the air cleaner, remove the cover and filter element, Figure 69.

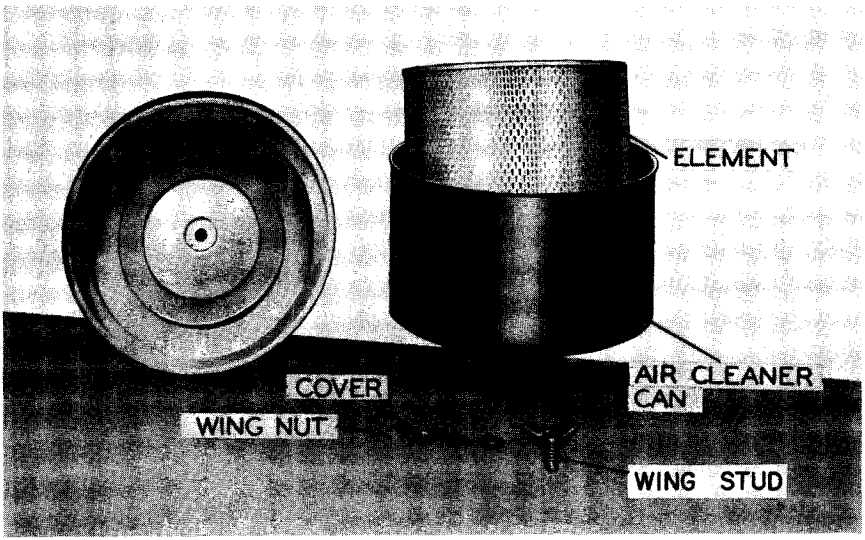


Figure 69

Tap the filter element against a firm surface to remove loose dirt.

Place the element on a flat clean surface, then place a board or plate with a small opening over the top of the filter element and gasket.

Insert an air hose through the opening in the board. Blow the filter element clean, starting with the low air pressure and gradually increasing it. Be careful not to rupture the filter element with extreme air pressures. Install a new element if the one being serviced is damaged in any way.

In this manner clean the filter element as thoroughly as possible. The element cannot be cleaned completely, so it is important that you check the warning light and vacuum switch often to be sure they are functioning.

Do not clean and use the same filter element more than three times. Replace the element when the warning light indicates a fourth cleaning would be necessary.

COOLING SYSTEM

Capacity of System ---------- 10-1/2 Gallons

Temperature Control (Thermostat) ----- 180° to 195° Fahrenheit (Radiator Shutters Available as Extra Equipment).

Operating Temperature -------- Keep Gauge Needle Within Work Zone on Temperature Gauge

General Description

Your Case Diesel Loader has a large capacity cooling system to provide efficient cooling under heavy loads. The coolant is circulated through the system by means of an impeller type pump which is driven from the crankshaft by a pair of Vee Belts. Coolant is circulated through the radiator, down into a distributor gallery in the engine block; then up past the entire length of the cylinder sleeves into the cylinder heads where it passes into a water manifold and travels to the top of the radiator.

A thermostat and by-pass hose are located in the cooling system as shown in Figure 70. The thermostat blocks the coolant flow to the radiator when the coolant temperature is below 180 degrees Fahrenheit. The coolant must then pass down through the by-pass hose and be recirculated through the engine until the heat of combustion warms it sufficiently to open the thermostat.

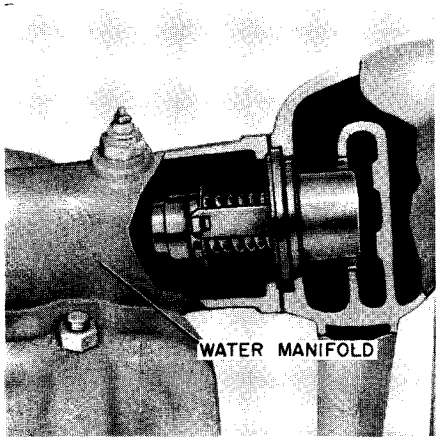


Figure 70

When the thermostat is fully open, the by-pass is closed and the coolant must pass through the radiator. A large fan draws air past the radiator tubes and dissipates heat in excess of the engine's operating temperature and in this way automatically maintains engine temperature within its normal range.

CAUTION: DO NOT OPERATE THE ENGINE WITHOUT THE THERMOSTAT. IF THE THERMOSTAT IS NOT IN PLACE IT WILL BE DIFFICULT TO BRING THE ENGINE UP TO OPERATING TEMPERATURE.

Rules for Maintaining Correct Operating Temperature

1. ALWAYS operate the engine between 2/3 and wide open when the engine is not under load. DO NOT slow idle engine.

2. In areas where cool or cold climatic temperatures are common, radiator shutters (available as extra equipment) should be installed.

3. Keep radiator filled with a clean or soft water that is as free as possible of scale forming minerals. Always use a reputable brand "Rust Inhibitor."

4. Keep radiator and engine clean.

5. Check fan and water pump drive belt for slippage. Make sure fan blades and shrouding are not bent.

6. Check that hoses are not collapsed or leaking.

7. Do not overload the engine.

Checking Thermostat

During operation, check the temperature gauge frequently. Should the engine warm up very slowly under load, or if the temperature gauge needle does not reach the recommended operating range, remove and check the thermostat. Suspend the thermostat in a pan of water that is being heated and check the opening temperature with a thermometer. If the thermostat is inoperative, discard it and install a new genuine Case Thermostat having the same heat range as the original. The thermostat must start to open at 180° F., and be fully open at 195° F.

NOTE

An engine that is not working under load will be slow to warm up to operating temperature. This is due to the large capacity cooling system and is normal. When the engine is under load, however, it should warm up reasonably soon.

During extremely cold weather, and if the thermostat is found to be operative, failure to maintain the proper operating temperature is an indication that radiator shutters are required.

Anti-Freeze Solutions

Your Case Loader is shipped from the factory with high boiling type anti-freeze in the cooling system protected to 20 degrees below zero. This anti-freeze should never be used more than one winter due to the natural break down of the rust inhibitor.

Use only a nationally recognized brand of High Boiling Point Ethylene Glycol Base anti-freeze in the W-12 Loader.

Low Boiling Point Type alcohol base anti-freeze solutions are not recommended for use. Loss from evaporation could be excessive since the boiling point of alcohol is frequently below the Loader engine's minimum operating temperature.

DO NOT mix different types of anti-freeze solutions in the cooling system. The exact amount of protection afforded is almost impossible to determine by use of a tester when different types solutions are mixed.

CAUTION

Never use any of the following as anti-freeze:

1. Solutions of unknown composition such as: honey, sugar, glucose, or sodium silicate.

2. Inorganic salt base solutions such as: sodium chloride (common salt), calcium chloride, magnesium chloride.

3. Mineral oil or petroleum base solutions such as: kerosene, fuel oil or lubricating oil.

Thermostat Removal

1. Drain the cooling system. See Pages 93 and 94.

2. Remove the hood.

3. Remove the upper radiator hose and the by-pass hose; then remove the thermostat housing. The thermostat is located between the water manifold and the thermostat housing, Figure 71.

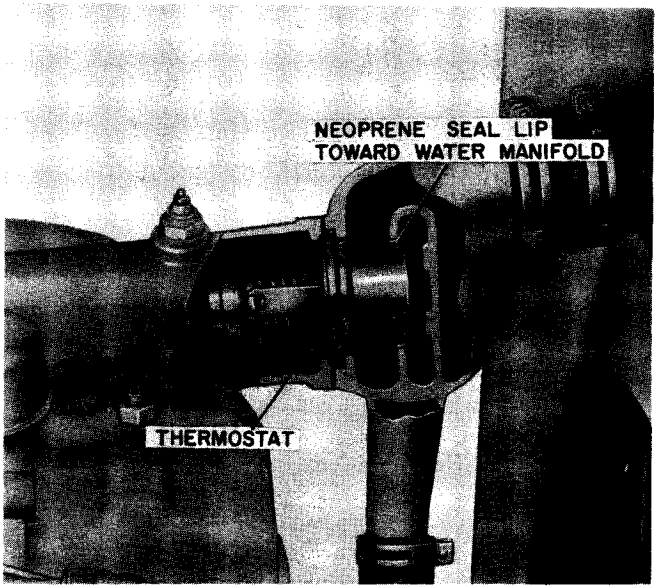


Figure 71

Thermostat Installation

1. Install a new Genuine Case Thermostat (180° - 195° range), as indicated in Figure 71.

2. Install the thermostat housing with a new gasket on the water manifold. Place a thin film of sealing compound on the gasket. Be sure to remove all old gasket material before installing a new gasket.

3. Refill cooling system and check operating temperature.

Genuine Case Thermostats are obtainable from your Authorized Case Industrial Dealer. This thermostat has been designed to provide efficient heat control for your Case Diesel Loader. Do not use substitutes.

FACTS TO REMEMBER ABOUT PRESSURIZED COOLING SYSTEMS

1. CAUTION: ALWAYS REMOVE THE PRESSURE CAP SLOWLY. Quick removal of the pressure cap could reduce the pressure enough to cause the coolant to boil out of the radiator filler opening and result in painful burns to the operator.

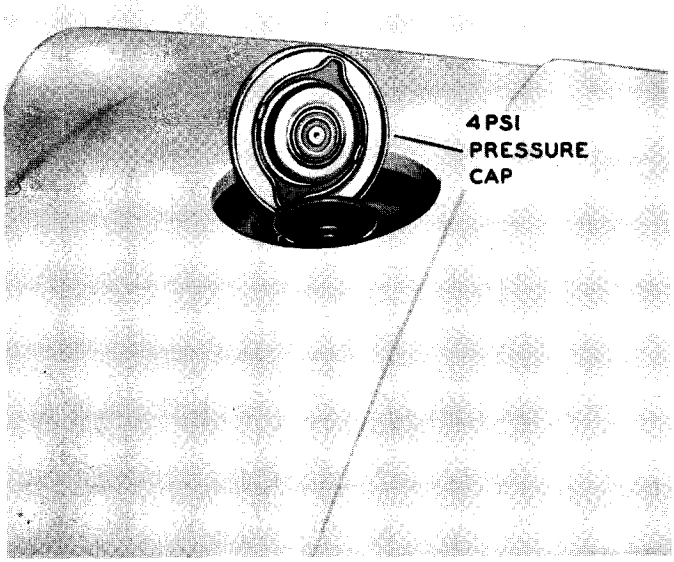


Figure 72

2. The pressure cap on a pressurized cooling system is equipped with a control valve which functions as a SAFETY RELIEF VALVE to keep the pressure within the system at 4 lbs. Operating the engine without a pressure cap or a pressure cap that has a control valve that is is not set to function at the designated 4 lbs. can cause SERIOUS DAMAGE.

3. Pressurizing the cooling system reduces the loss of coolant by evaporation, surging or boiling, thus making the efficiency of the cooling system dependent upon good seals at the radiator cap, hoses and hose connections. It is especially important that ALL LEAKS REGARDLESS OF SIZE be repaired quickly. A small drip can become a heavy stream, when 4 PSI of pressure is built up in the cooling system. A weak hose could burst while the Loader is in operation and cause serious injury or damage. Check all hoses and hose connections frequently. KEEP HOSES, HOSE CONNECTIONS AND PRESSURE CAP IN GOOD CONDITION.

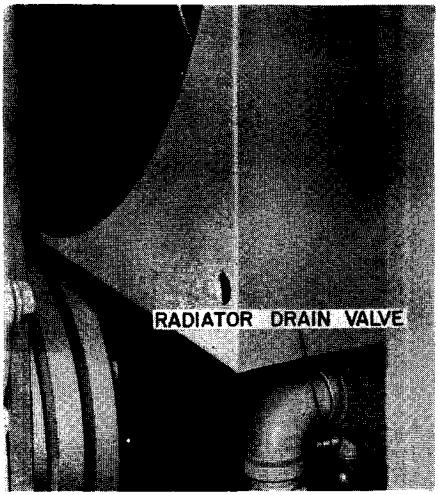


Figure 73. Radiator Drain Valve Location

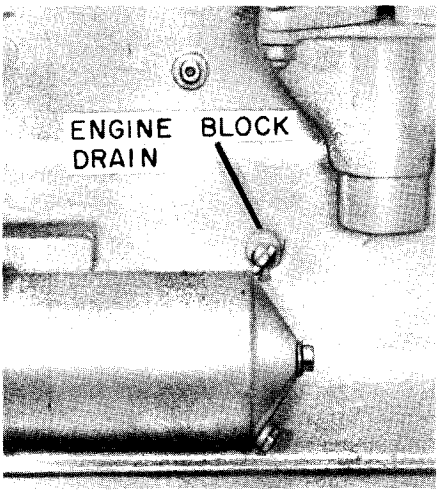


Figure 74. Engine Block Drain Valve Location

CAUTION

NEVER POUR COOLANT INTO A HOT ENGINE. THE ENGINE BLOCK OR CYLINDER HEAD MIGHT CRACK BY THE SUDDEN CONTRACTION CAUSED BY THE DIFFERENCE IN TEMPERATURE BETWEEN THE METAL AND THE COOLANT.

Clean the cooling system at least once a year. In areas where water containing scale forming mineral is all that is available, clean the system more often. Mineral scale, rust or dirt deposits in the cooling system form an insulation which prevents the heat of combustion from passing into the coolant and being dissipated.

To clean the cooling system:

1. While the coolant is still hot, open the radiator drain valve and the engine block drain valve, Figure 73 and 74.

2. Add a radiator cleaner to the system and refill with clean water. Any nationally known commercial brand cleaner marketed by a reputable manufacturer may be used. Follow the directions provided with the cleaner.

3. After draining the cleaning solutions, flush the system with clean water before refilling for operation.

4. Check the hoses, elbows, pump and water manifold for leakage.

5. Make sure the outside of engine is clean and that radiator fins are cleaned of dirt accumulations.

NOTE

AFTER THE COOLING SYSTEM HAS BEEN COMPLETELY DRAINED AND REFILLED, OPERATE THE ENGINE FOR APPROXIMATELY FIVE MINUTES TO BLEED ALL AIR OUT OF THE SYSTEM. RECHECK COOLANT LEVEL AND ADD COOLANT IF NECESSARY.

When water is used in the cooling system during the warm summer months, always add a reputable brand rust (or corrosion) inhibitor.

Fan and Water Pump Drive Belts

The effectiveness of the cooling system depends upon the condition and tautness of the Vee belts that drive the fan and water pump. Slippage in these belts can result in engine overheating, since neither the pump nor the fan will be driven at full speed.

Be sure the Vee belts on your Case W-12 Loader are always in top shape and properly adjusted.

Fan Belt Adjustment

Properly adjusted Vee Belts can be depressed 1/2" midway between the generator pulley and the fan pulley, Figure 75.

To tighten the belts, loosen the generator mounting bolts and swing the generator further away from the engine.

IMPORTANT: The belts must ride on the side of the Vee pulley - never on the bottom.

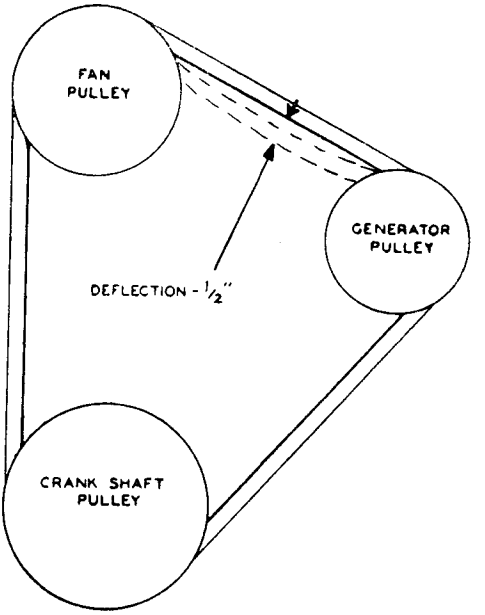


Figure 75

Replacing the Fan Belts

To install new Vee belts, proceed as follows:

1. Remove the power steering belts.
2. Loosen the generator mounting bolts and swing generator toward the engine.
3. Slip the new Vee belts over the fan pulley, then onto the lower drive pulley and the generator pulley.
4. Tighten the belts properly.
5. Install the power steering belts. Refer to Page 96.

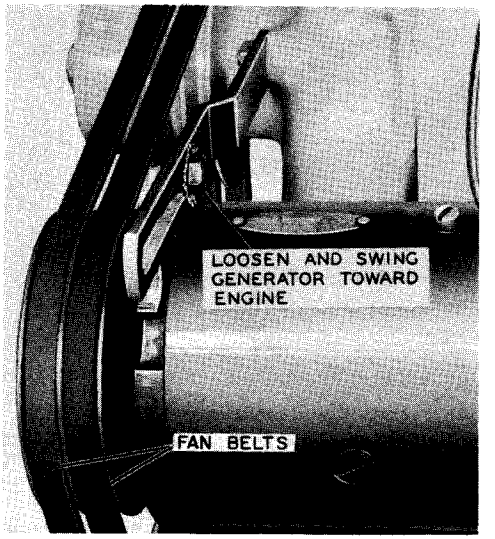


Figure 76

IMPORTANT

THE FAN BELTS ARE MATCHED AS A SET. DO NOT REPLACE ONE BELT WITHOUT REPLACING THE SET.

POWER STEERING DRIVE BELTS

The effectiveness with which the power steering and power brakes operate depends upon the condition and tautness of the Vee belts that drive the hydraulic steering pump. Slippage in the belts can result in sluggish steering action, since the hydraulic pump will not be driven at full speed, causing the volume of oil pumped through the system to be reduced.

Power Steering Drive Belt Adjustment

Properly adjusted power steering belts can be depressed 1/4 inch at a point midway between the crankshaft pulley and the pulley on the hydraulic power steering pump.

To adjust the belts, that have type of adjusting bracket illustrated, Figure 77, loosen the lock nut on the adjusting bolt and move the pump assembly up or down to obtain the proper belt tension. Retighent the lock nut on the adjusting bolt.

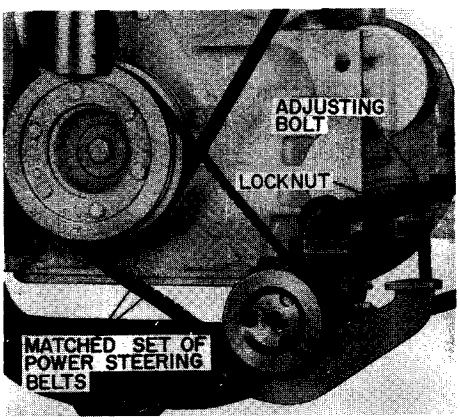


Figure 77

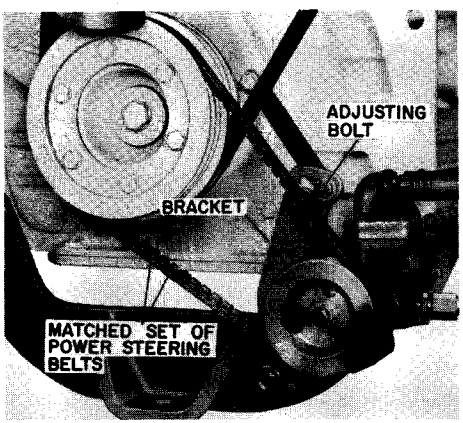


Figure 78

To adjust the belts that have the type of adjusting bracket illustrated, Figure 78, loosen adjusting bolt and move the bracket outward to obtain proper belt tension. Then retighten adjusting bolt.

IMPORTANT

THE POWER STEERING BELTS ARE MATCHED TO OPERATE AS A SET. DO NOT REPLACE ONE BELT WITHOUT REPLACING THE MATCHED SET.

NOTE

The hydraulic power steering requires no adjustment other than belt tension and keeping the fluid reservoir full. Should attention be required consult your Authorized Case Industrial Dealer.

STORAGE BATTERIES

Battery Size (Each) ---------- Auto-Lite Type 14H or equivalent, 12 Volt; 90 Ampere Hours at 20 Hour Rate.

When working around a storage battery, remember all of its exposed metal parts are "live". Never lay a metal object across the terminals as a spark or short circuit may result. Sparks, lighted matches and exposed flames must be kept away from the batteries due to the presence of explosive gas in the batteries.

The liquid in the battery is acid. Use care not to spill it on your hands or clothing.

Rules for Battery Care

1. Add pure water, as needed, to keep the separators covered. Check every 60 hours or weekly.

2. Keep the batteries in a healthy state of charge as shown by hydrometer readings.

3. Make sure the batteries are securely fastened in position. Wires leading from the battery should not touch cell connectors or lay on the battery container.

4. Keep the batteries clean and dry.

On a diesel engine it is very important to keep both batteries fully charged, since starting is largely dependent upon the cranking speed developed by the batteries and starting motor.

If both batteries are weak, recharging or replacing just one battery will not help. Both must be brought up to full charge with a hydrometer reading of 1.280 to 1.300.

Each week, and before adding water, take a hydrometer reading from every cell. The gravity reading from each cell should be between 1.250 and full charge. If it varies more than this, the batteries should be replaced.

NOTE: The full charge gravity reading will usually be indicated on the battery. A battery having a reading of 1.175 will freeze at approximately zero degrees Fahrenheit.

If one battery is weak and the other near full charge, there is a possibility of overcharging and damaging the fully charged battery. If it is necessary to add water to a battery frequently, it is probably being overcharged. CHECK BOTH BATTERIES and bring them up to full charge. Check for loose ground connections.

If a battery will not hold a charge, replace it with a new one meeting the specifications listed on Page 97.

Cold Weather Precautions

As air temperatures drop, a storage battery's output capacity lowers. A battery actually becomes "numb" from the cold and will not turn an engine over as fast or for as long a period as it will during warm temperatures.

Since starting a diesel engine is very dependent upon turning the engine over fast enough to cause self-ignition of the diesel fuel, the importance of having fully charged batteries for cold weather starting cannot be over-emphasized.

During extremely cold weather, the batteries should be removed and stored in a moderately warm place (preferably room temperature) in order to keep the output capacity up for starting.

Adding Water

Unless the tap water in your area is "approved water" (water free of scale-forming minerals), always add distilled water to the battery. When the water is added during freezing weather, the battery must receive a charge immediately to mix the water and electrolyte. If it is not mixed, the water will remain at the top and freeze.

Check the liquid level in each cell weekly by removing the vent plugs. Water must be added before the tops of the separators are exposed. DO NOT OVERFILL.

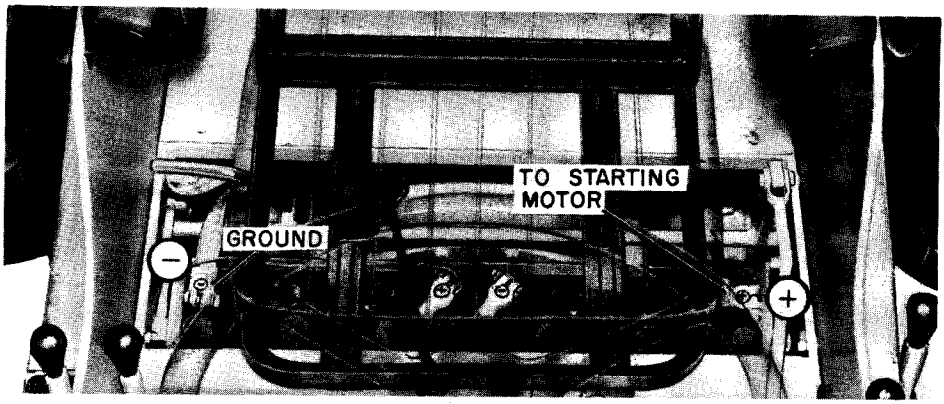


Figure 79. Battery Cable Hook-up

Vent Plugs

Always keep the vent plugs in place and tight. Be sure the vent holes are free of dirt to prevent gas pressure in cell from breaking the sealing or the container.

Cable Terminals and Battery Posts

The battery terminals must be kept clean and tight. A good method of cleaning terminals is to remove all excess corrosion with a wire brush, then wash with a weak baking soda solution or ammonia. After cleaning, a thin coating of vaseline or light cup grease will retard further corrosion. Be sure ground connection of the Loader is kept clean.

Idle Battery

When the Loader is not in active use, the batteries will require a charge at sufficient intervals to keep the hydrometer reading at or above 1.250. An idle storage battery will slowly discharge.

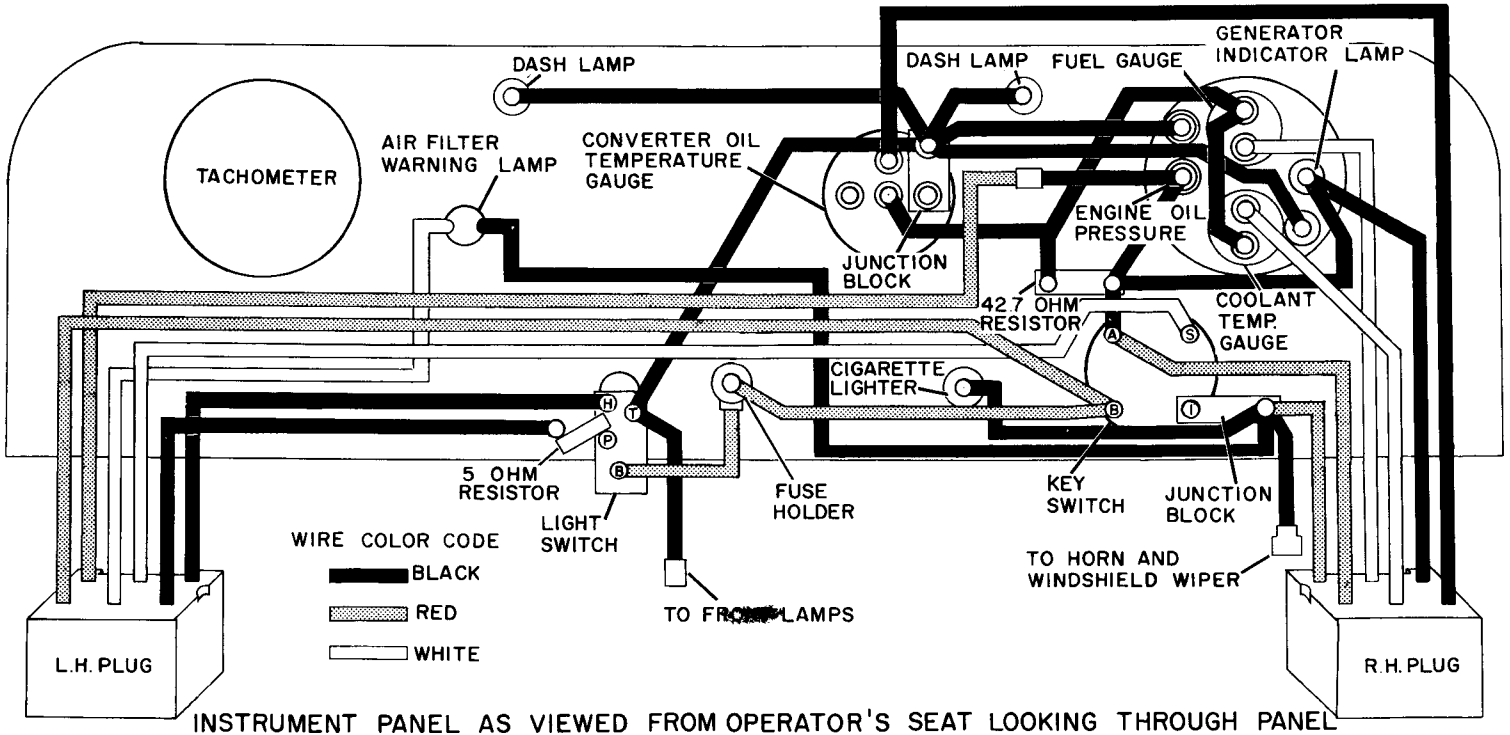


Figure 80. Instrument Panel Wiring Diagram

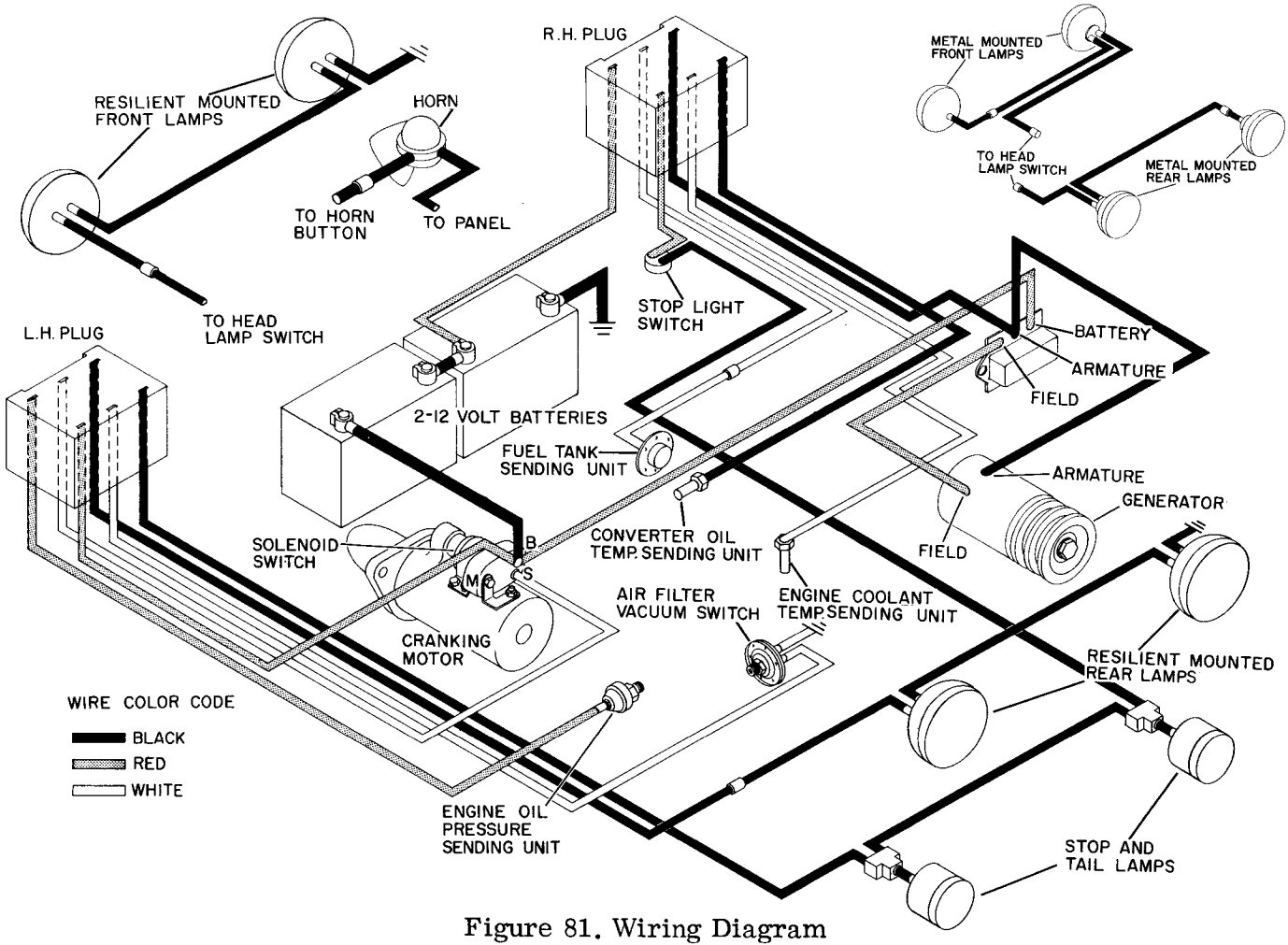


Figure 81. Wiring Diagram

Lighting Equipment

Air Filter Warning Lamp ---------- 12 Volt Single Contact

Gauge Cluster Lamp Bulbs ---------- 24 Volt Single Contact

Headlights ---------- 35 Watt, 12 Volt Sealed Units in Series

Rear Lights -------- 35 Watt, 12 Volt Sealed Units in Series

Instrument Panel Lights -------- 1 C.P. Single Contact, 24 Volt.

Combination Stop and Tail Lights - Two Contact, 32-4 C.P. 12 Volt.

Headlights

All genuine Case 12 Volt Replacement Sealed Units have a label marked "12-V," or are stamped "12-V" on the back of the unit. This marking is placed on the unit to make sure you do not install a 6 volt sealed unit - which would burn out immediately.

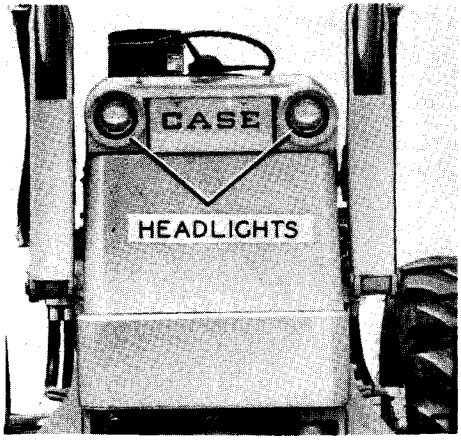


Figure 82

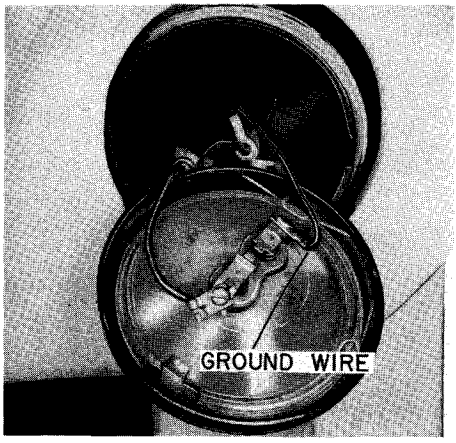


Figure 83

To install a new sealed unit, metal mounted lamps, remove the clamp screw and the clamp. On rubber mounted lamps roll the rubber lip of the edge of the sealed unit, then pull the old unit out and disconnect the two wires shown in Figure 83. When connecting the new sealed unit wires, be sure the connections are tight.

Rear Lights

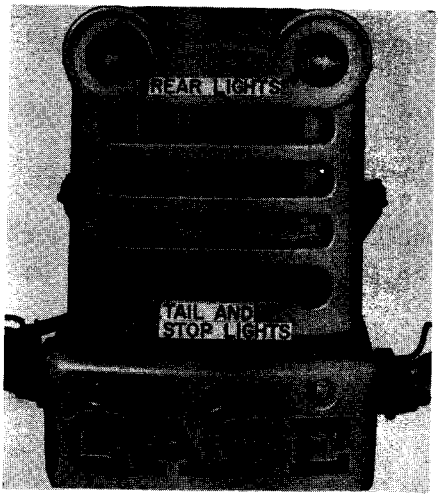


Figure 84. Rear Lights and Stop Lights

Note: Removal and Installation of Headlights and Rear Lights is exactly the same.

Instrument Panel Lights

The panel lights and the gauge cluster lights are controlled by the headlights switch. To replace the panel bulb, pull the light hood off and replace the bulb. To replace the gauge cluster bulb, reach behind the panel and pull the bulb socket out of the gauge cluster and replace bulb.

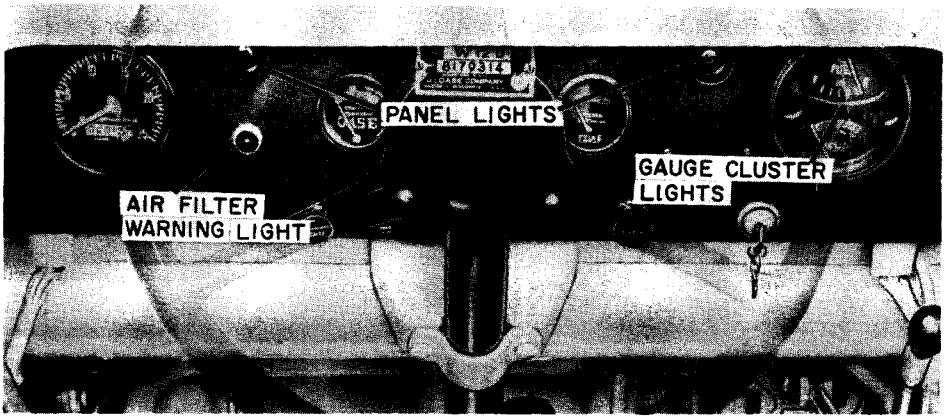


Figure 85

To replace the air filter warning lamp bulb, unscrew the red plastic shield and replace bulb.

BRAKE SHOE ADJUSTMENT

Occasionally it may be necessary to adjust the brake shoes to compensate for loss of pedal due to lining wear.

To adjust the brake shoes proceed as follows:

Steering (Rear) Axle

1. Jack both rear wheels clear of the ground or floor. Be sure parking brake is released.
2. Expand brake shoes on each rear wheel, as shown in Figure 86, until a heavy drag is felt when rotating the wheels.
3. Loosen the brake adjusting nuts on both rear wheels evenly, just enough so the wheels turn freely. Lower the Loader wheels to the ground or floor.

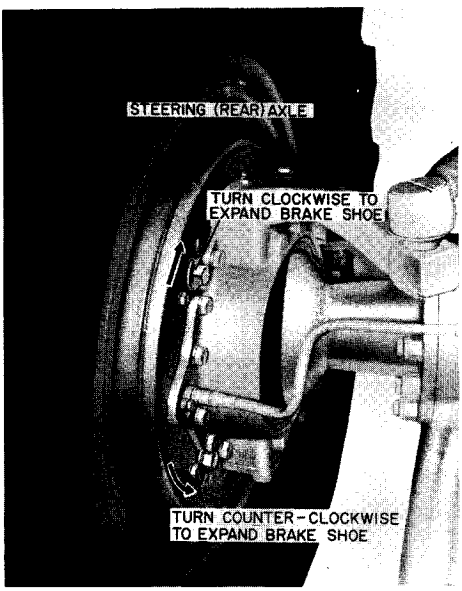


Figure 86

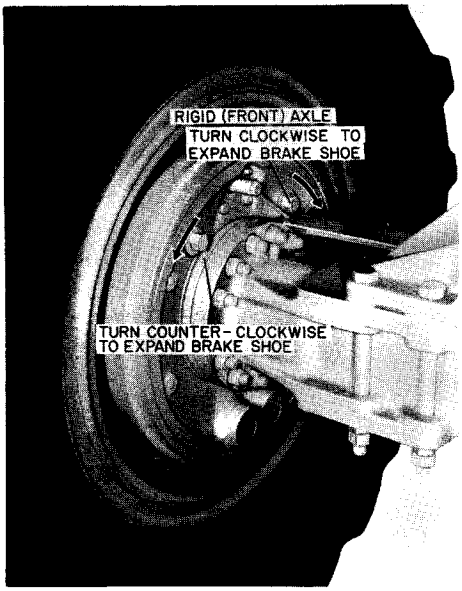


Figure 87

Rigid (Front) Axle

1. Jack both front wheels clear of the ground or floor. Be sure parking brake is released.
2. Expand brake shoes on each front wheel, as shown in Figure 87, until a heavy drag is felt when rotating the wheels.
3. Loosen the brake adjusting nuts on each front wheel evenly, just enough so the wheels turn freely. Lower the Loader wheels to the ground or floor.

PARKING BRAKE ADJUSTMENT

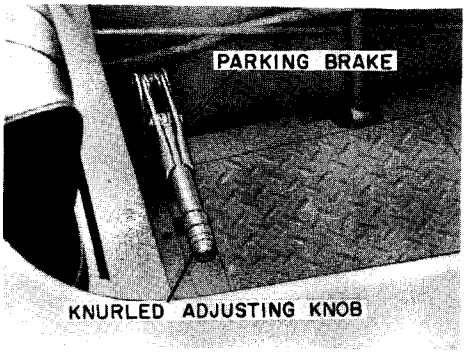


Figure 88

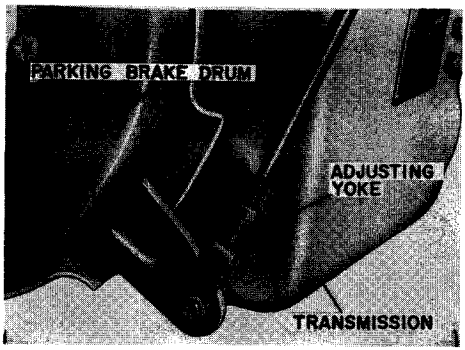


Figure 89

Occasionally it may be necessary to adjust the parking brake on the transmission.

The parking brake can be adjusted as follows:

MINOR

The parking brake handle located in the operator's compartment at the rear left hand corner, Figure 89. To adjust the parking brake with the handle, turn the knurled portion of the handle toward the front of the Loader to increase the tension - Turn rearward to decrease tension. After several minor adjustments have been made it will be necessary to make a major adjustment. A major adjustment is made as follows:

MAJOR

The brake rod and yoke which is connected to the brake lever, Figure 88. To adjust the parking brake by the rod and yoke, disconnect the yoke from the brake lever and turn either on or off for required adjustment.

CAUTION: After the parking brake has been adjusted several times the brake lining wear should be checked as follows:

1. Disconnect the adjusting yoke from the brake lever, Figure 88.

2. Check the travel of the brake lever - if the travel exceeds 1-5/8 inches - when disconnected from the yoke - the brake linings must be replaced.

SEE YOUR AUTHORIZED CASE INDUSTRIAL DEALER

BLEEDING THE HYDRAULIC POWER BRAKE SYSTEM

The Hydraulic Power Steering and Power Brake System uses the same reservoir. The control valve meters fluid to both the power steering and power brake system.

Whenever the main brake fluid line is disconnected from the master cylinder - it will be necessary to bleed the brake system at ALL FOUR WHEELS.

Whenever a brake fluid line is disconnected from any individual wheel - that WHEEL CYLINDER must be bled.

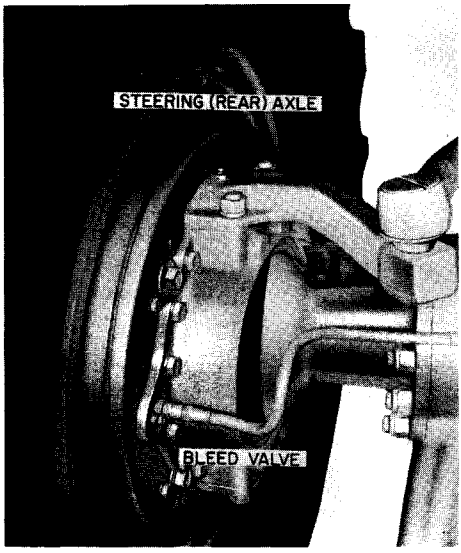


Figure 90

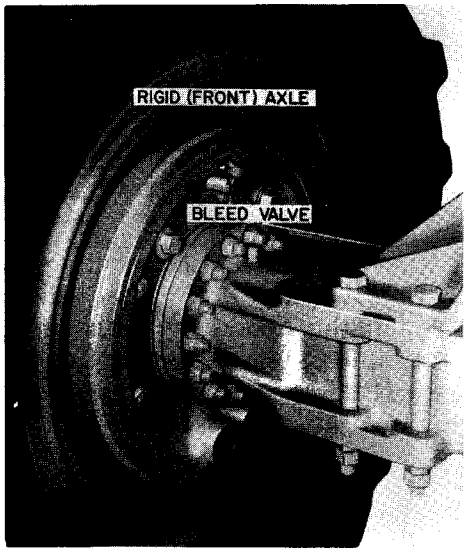


Figure 91

To bleed the brake system proceed as follows:

1. Loosen the bleeder valve on the wheel cylinder. Have someone depress the brake pedal while you observe flow of brake fluid from bleed valve. When air bubbles cease to appear, close the bleed valve, Figures 90 and 91.

2. Repeat this operation on all wheel cylinders that need bleeding.

3. Check the power steering and brake reservoir. Add Automatic Transmission Fluid - Type A, if necessary.

VALVE TAPPET CLEARANCE

Check the valve (tappet) clearance after every 240 hours of engine operation.

CLEARANCE

.025 inch with engine cold (both intake and exhaust valves).

SEQUENCE FOR CHECKING VALVE CLEARANCE

The two valves for each cylinder are to be checked and adjusted when the piston for that particular cylinder is at top dead center on the compression stroke. Start with Number 1 cylinder and follow the sequence of firing order (1-5-3-6-2-4).

DECOMPRESSOR LEVER

Use the decompressor lever to release the compression when cranking the engine, but restore compression when checking or adjusting the valve clearances.

SETTING THE NUMBER 1 PISTON AT TOP DEAD CENTER ON THE COMPRESSION STROKE

A. Release the engine compression and crank the engine slowly, until the crankshaft pulley is in the position shown in Figure 92. (The 1° to 5° closely spaced marks will be above the pointer and the Top Dead Center mark will be aligned with the pointer).

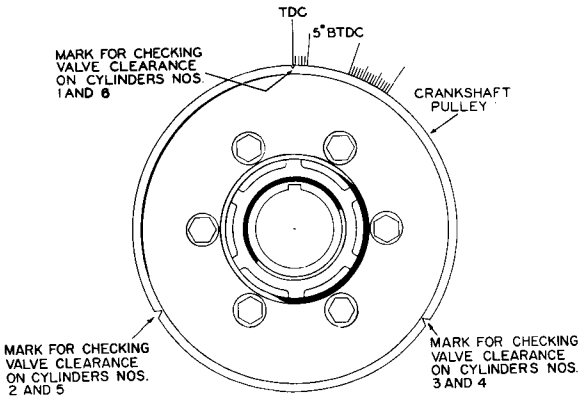


Figure 92

B. When Number 1 piston is at top dead center on the compression stroke, the push rods will be loose on Number 1 cylinder. The push rod for the exhaust valve on Number 2 cylinder will be tight. Refer to Figure 93. If the reverse is true, crank the engine one complete revolution.

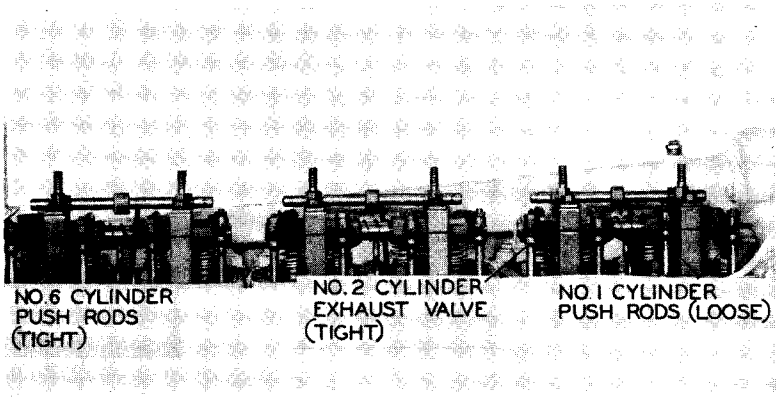


Figure 93. Checking Valve Push Rods

After checking and adjusting the valve clearance on Number 1 cylinder, rotate the flywheel one third revolution until the pointer is aligned with the next single mark. The piston in Number 5 cylinder will then be at top dead center on the compression stroke and the valve on that cylinder can then be checked and adjusted.

Continue on in this manner until the valve clearance on all cylinders has been checked and adjusted. It will require 1-2/3 revolutions of the crankshaft pulley to check all six cylinders.

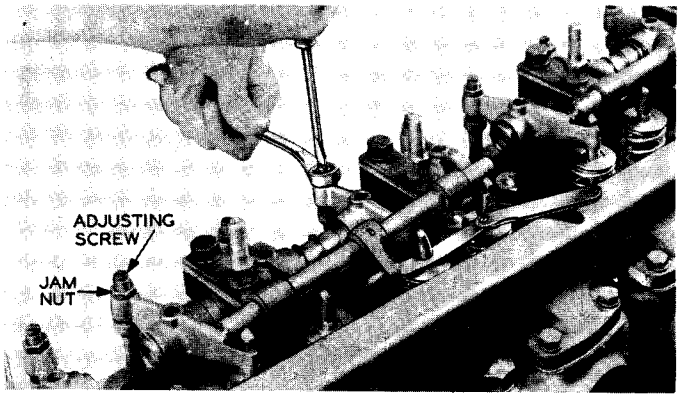


Figure 93A.Checking and Adjusting
Valve (Tappet) Clearance

After the valve tappet clearances are checked and while the valve covers are removed, start the engine and check that the rocker arm assemblies are receiving lubrication.

GOVERNOR AND ENGINE SPEED

The governor on your Case Model W-12 Loader is an integral part of the fuel injection pump. The governor has been set at the factory to produce a full load governed engine speed of 2000 RPM.

DO NOT ATTEMPT TO ADJUST THE GOVERNOR OR THE THROTTLE LINKAGE. Unauthorized changes in the governed engine speed of a Case Loader will automatically serve to void and waive any warranty whatsoever by the J. I. Case Company.

OIL PUMP FLOATING SCREEN

All engine lubrication oil drawn into the oil pump must pass through the floating screen. It is very important that this screen be kept free of restrictions.

At least once every 1000 Hours, the floating screen assembly should be removed and cleaned in diesel fuel. To remove the screen it is necessary to first drain and remove the crankcase oil pan.

NOTE: It is recommended that you arrange to have your Authorized Case Industrial Dealer do this when you take your Loader in for its seasonal tune-up and inspection.

HYDRAULIC SYSTEM PRESSURE CHECK

The pressure relief valve in the control valve body on W-12 Loaders should be set to open at 1980 PSI of hydraulic pressure at 1500 Engine RPM.

Under no circumstances may the pressure relief valve setting be above 1980 PSI as it may result in damage to the Hydraulic System Components. A damaged relief valve spring can be easily detected because it will allow hydraulic oil to flow through the control valve directly back to the reservoir without building up sufficient working pressure in the hydraulic system.

To check the W-12 Loader hydraulic system pressure, proceed as follows:

1. Rest the Loader bucket flat on the ground or floor.

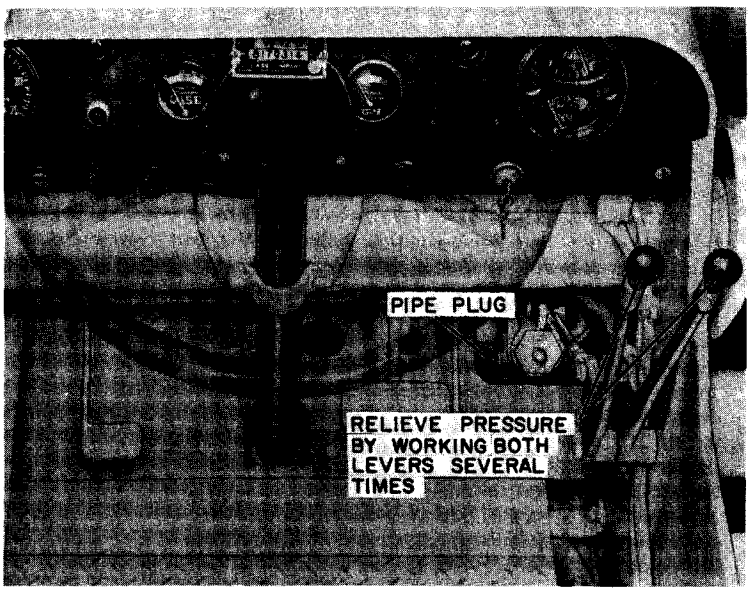


Figure 94

2. Shut off the engine and relieve hydraulic pressure in the lines, by working both control levers back and forth several times, Figure 94.

3. Place a receptacle under the hydraulic control valve body and remove the small pipe plug shown in Figure 95.

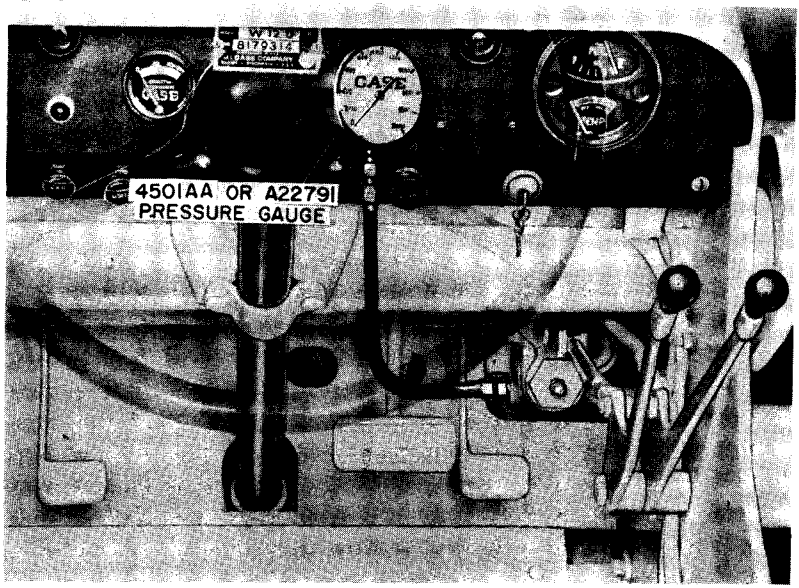


Figure 95

4. Install a 4501AA Pressure Gauge in the threaded junction block opening as shown in Figure 95. Note: The 4501AA or A22791 Pressure Gauge can be purchased from your Case Dealer.

5. Start the W-12 Loader engine and run it at approximately 1000 RPM.

6. Slowly move the tilt control lever rearward to the tilt up position. Continue holding the control lever rearward until the bucket is against the stops and the pressure relief valve is forced open.

7. Gradually increase engine speed to 1500 RPM.

8. Observe the pressure gauge reading. The pressure gauge should register 1980 PSI at 1500 Engine RPM. If the pressure gauge registers below, the pressure relief valve must be adjusted.

To adjust the pressure relief valve, proceed as follows:

A. Remove the acorn nut from the relief valve and loosen the jam nut, Figure 96.

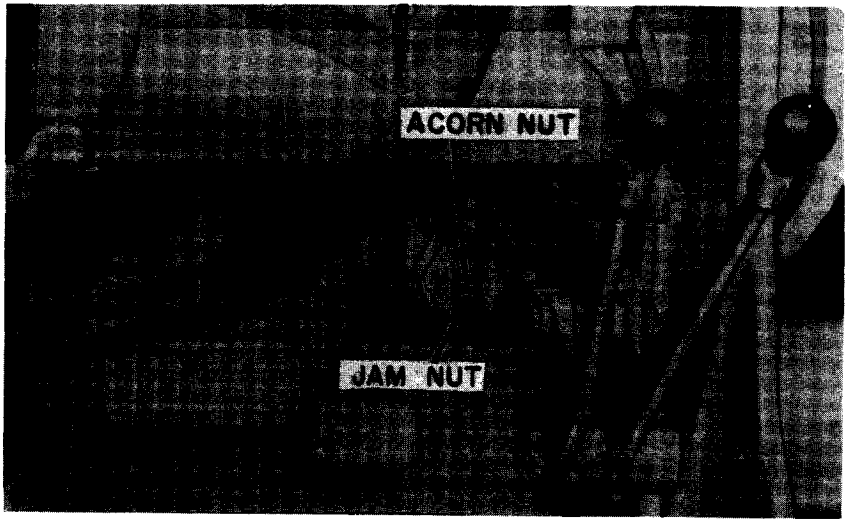


Figure 96

B. With engine running at 1500 RPM place either control lever in a powering position. Turn the relief valve adjusting screw in or out until the 1980 PSI gauge reading is obtained.

C. Hold the adjusting screw in position while tightening the jam nut. Install the acorn nut.

9. After the correct pressure relief valve setting is obtained, rest the Loader bucket flat on the ground or floor and shut off the engine.

10. Relieve hydraulic pressure in the lines by working both control levers back and forth several times.

11. Remove the Pressure Gauge and reinstall the small pipe plug. Refer to Figures 94 and 95.

12. Start the engine. Bleed the hydraulic system by working both bucket control levers through several full cycles. Check the oil level in the hydraulic reservoir, add oil if necessary.

CHANGING TUBELESS TIRES

Changing tubeless tires on the W-12 Loader is a simple process, but requires some extra equipment to insure correct removal and installation of the rim from the tire. Listed below is the equipment to make tire changing speedy and efficient on the "TG" Series rims, which are standard equipment on the Loader.

Two Tire Tools of the type shown in Figure 97.

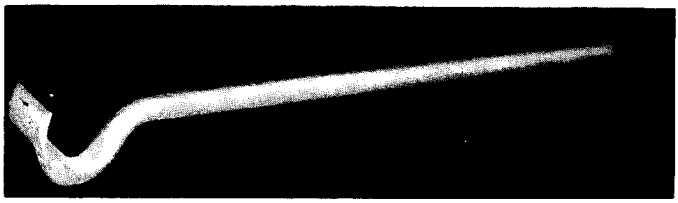


Figure 97

One can of Rubber Lubricant of any well known brand.
One Babbitt Hammer.

Removing Tire From Rim

1. Deflate the tire completely by removing the valve core.
2. Lay the tire and rim assembly on a flat surface with the loose flange side up.
3. Drive the flat ends of two tire tools between the tire and flange with a babbitt hammer, Figure 98. Locate the tools a few inches apart for greater prying action, Figure 99.

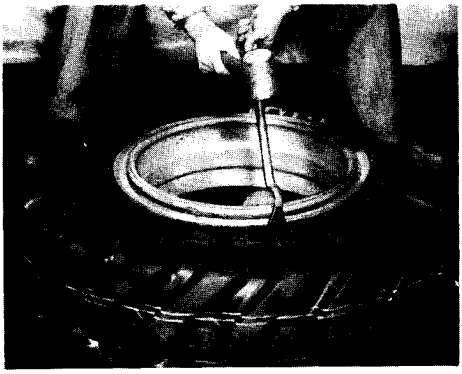


Figure 98

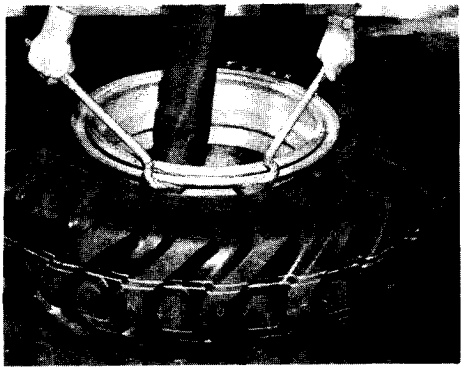


Figure 99

4. Pry out with both tools. Hold one tool in position, applying pry out action and slide the other tool a few inches and apply pry out

action. Continue moving and prying in successive steps around the circumference of the rim, Figure 99, until the bead is entirely loose.

5. Stand on the flange and tire using your body weight to depress the flange far enough to insert the tool and pry the lock ring loose, Figure 100.

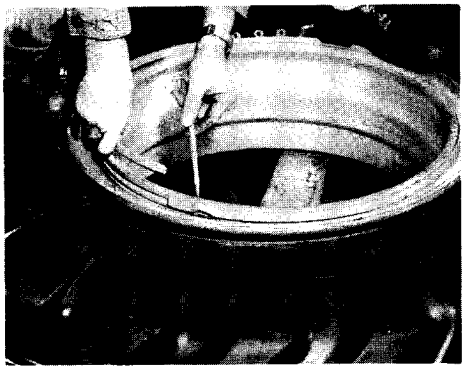


Figure 100

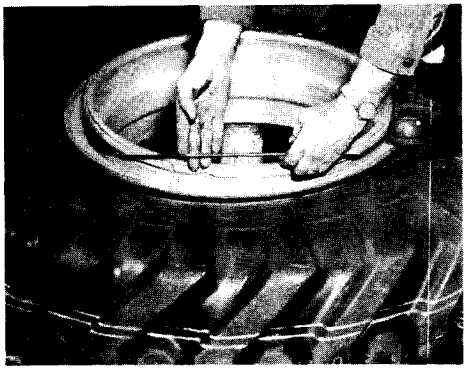


Figure 101

6. Depress the flange and remove the "O" Ring from the lower groove, Figure 101.

7. Remove the flange.

8. Turn the tire and rim assembly over and using the two tire tools, loosen the rim base flange in the same manner as described in Step 4, Figure 99.

9. Stand the tire up and remove the rim base.

Replacing Tire On Rim

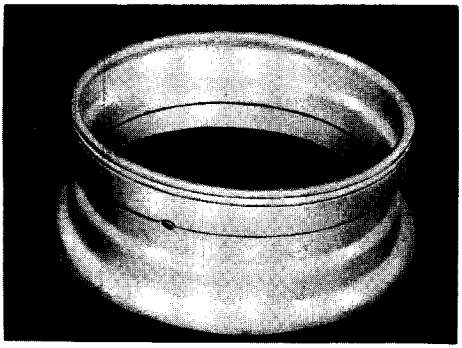


Figure 102

Figure 103

1. Locate the rim base on a flat surface with the fixed flange down. Place a wood block under the rim, Figure 102.

2. Install the valve spud on the rim and place the tire over the rim base.

3. Place the loose flange over the rim base and press it on straight, Figure 103. Be sure the flange is not cocked or binding on the rim base.

4. Stand on the flange using your body weight to depress the flange below the two grooves in the rim base, Figure 104.

5. Snap the lock ring into the upper groove, Figure 104.

   NOTE: Be sure the "hump" on the lock ring is UP to insure easy removal of the lock ring for future tire changing.

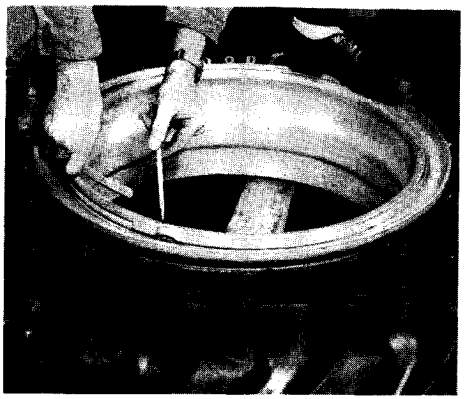


Figure 104

6. Coat the rubber "O" ring with a rubber lubricant and install it in the lower groove on the rim base, Figure 105.

Figure 105

Figure 106

NOTE: It may be necessary to hold the loose flange down with the tire tool to expose the "O" ring groove, Figure 105.

7. Replace the valve core in the tire.

8. Check to make sure the lock ring fits snugly and is locked in place around the entire circumference of the rim base, then start to inflate the tire, Figure 106, until the loose flange slides over the "O" ring and up against the lock ring.

9. Check the lock ring again to make sure it is properly sealed in the groove and fits snugly around the entire rim base, then inflate the tire to the required operating pressure.

IMPORTANT

Always Inflate Tires When They Are Cold

RECOMMENDED TIRE PRESSURES

16.00 x 24 12 Ply ---------- 40 Pounds

20.5 x 25 12 Ply ---------- 30 Pounds

STORING THE LOADER

Whenever the W-12 Loader is to remain idle for an extended period of time or whenever it is to be removed from storage, certain precautions must be observed - especially as to protecting the fuel system.

To protect the diesel fuel system, the valves and the cylinder sleeve walls, proceed as follows:

1. Clean the Loader thoroughly and completely lubricate it as directed on Pages 18 and 19.

2. While the engine is still hot from operation:

   a. Drain the crankcase and refill it with a good grade of new engine oil Refer to Page 18.

   b. Drain and clean the oil filter body and install a new element, Pages 24 and 25.

   c. Service the air cleaner as directed on Pages 86 and 87.

3. Drain the diesel fuel tank and pour one or two gallons of Diesel Flushing Oil into the fuel tank.

The following commercial Diesel Flushing Oils - or the equivalent may be used:

Solnus XXX ---------- Sun Oil Co.

VM 1102 ---------- Socony Vacuum Oil Co.

Carnea Oil #21 ---------- Shell Oil Co.

Alweather Oil ---------- Sinclair Refining Co.

Capella Oil AA ---------- The Texas Co.

Texaco Almag ---------- The Texas Co.

No. 10 C ---------- General Electric Co.

Wemco C ---------- Westinghouse Electric Co.

Lonco # 71 ---------- London Chemical Co.

If flushing oil is not available, a mixture of 50 percent SAE 10-W engine crankcase oil and 50 percent pure white kerosene may be used.

4. Start and operate the engine until a blue-white smoke appears at the exhaust. This indicates the regular fuel in the filters has been used up and the flushing oil is being burned. Operate the engine for an additional ten minutes before stopping it.

5. While the engine is still hot, drain the coolant from the cooling system. After the system is drained, leave the radiator and engine block drains open and loosen the radiator cap to replace pressure on the gasket. Place a warning tag on the radiator cap stating that cooling system has been drained.

6. Remove and store the batteries in a dry and moderately warm place - especially if freezing temperatures are expected. Take hydrometer readings periodically and record them. When the readings near 1.200, the battery must be recharged.

7. Raise and block up the Loader. Protect the tires from heat and sun light. It is not necessary to reduce the air pressure in the tires.

8. Be sure the crankcase breather caps are clean and in place and the air cleaner is on the air intake pipe.

REMOVING THE LOADER FROM STORAGE

A diesel Loader that has been in storage will require careful attention before it is started and placed in operation.

1. Refill the cooling system.

2. Make sure the tires are properly inflated, then take the Loader off the blocking.

3. Make sure the air cleaner element and the crankcase breather caps are clean.

4. Lubricate the Loader completely to remove dried and dust contaminated grease.

5. Make sure the crankcase, the hydraulic reservoir and the transmission are filled to the correct levels.

6. Relieve the engine compression and hand crank the engine several complete revolutions to make sure it turns freely.

7. Replace the fully charged batteries. See Wiring Diagram, Pages 100 and 101.

8. Drain all of the Diesel Flushing Oil out of the fuel tank and the filters. Refill the tank with clean diesel fuel.

9. Bleed the fuel system as directed on Page 77.

10. Start the engine and let it run at idling speed. It is advisable to remove the valve covers to make sure no valves are sticking and the rocker arm assemblies are receiving lubrication. DO NOT ACCELERATE THE ENGINE OR RUN IT AT FULL SPEED IMMEDIATELY AFTER STARTING.

11. Immediately upon starting the engine, check the oil pressure and ammeter warning lights.

NOTE: The flushing oil in the fuel system will cause a blue-white exhaust for a short time. This will not damage the engine.

Although the standard bucket on the Case W-12 Loader is used for most loader applications where the material weight is between 2800 and 3200 pounds per cubic yard, there are available, as extra equipment, several attachments to provide a wide range of special applications for which the Loader is well suited. There are jobs where it may be advantageous to have more than one of the easily interchangeable attachments on hand to increase the versatility of the W-12 Loader.

LIGHT MATERIAL BUCKET

(Extra Equipment)

The large capacity (3-1/2 cubic yards, heaped) light material bucket, Figure 107, is used extensively in coal yards, by municipalities for snow removal and hauling, by factories for hauling cinders, steel shaving and many types of yard work where the material being handled weighs between 1800 and 2200 pounds per cubic yard.

Figure 107

HEAVY DUTY BUCKET

(Extra Equipment)

Bucket Teeth Optional

The heavy duty bucket, Figure 108, is available to provide a tool for digging and powerful pry-out action. Equipped with optional teeth, the bucket is used for excavation, for shallow scrarifying and

for any operation requiring digging and heavy duty pry out action and where material weight is between 3200 and 4000 pounds per cubic yard. Refer to Page 122 for heavy duty bucket installation.

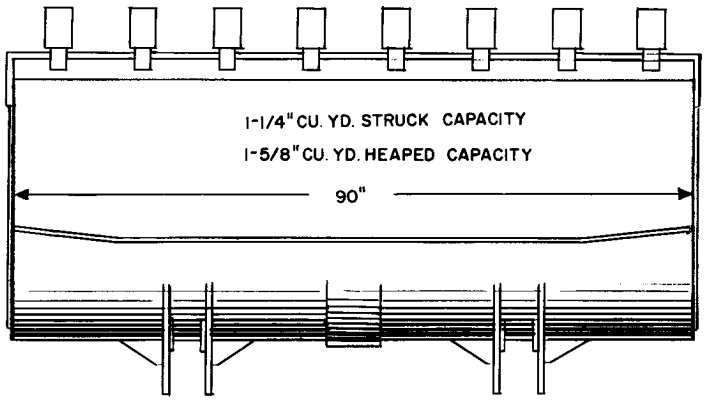


Figure 108. Heavy Duty Bucket With Optional Teeth

NOTE: The number of teeth and spacing of the teeth is dependent upon applications. Bucket teeth can be ordered separately to be installed to your specifications or can be installed on the bucket at the factory.

DOZER AND BACKFILLING ATTACHMENT

(Extra Equipment)

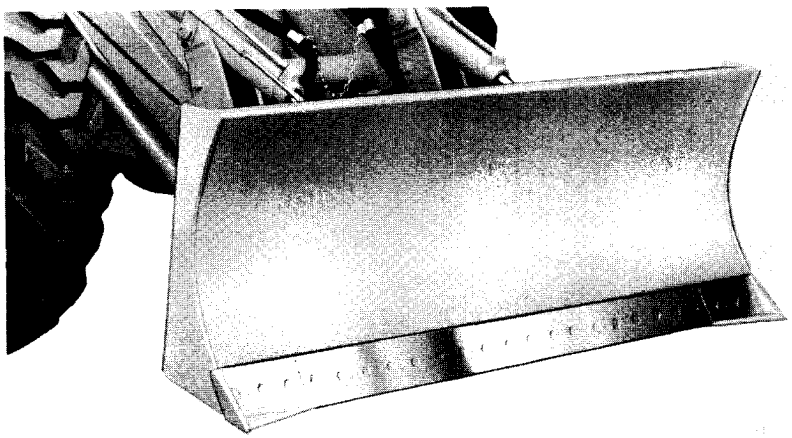


Figure 109

The large blade attachment is a handy tool for finishing grading, backfilling and dozing. Refer to Page 122, for installation of the dozer blade attachment.

INSTRUCTIONS FOR INSTALLING AND REMOVING BUCKETS AND BLADE ATTACHMENT

Interchanging buckets or blades on the Loader is a speedy operation that requires a minimum of tools and effort.

To remove the bucket or blade from the W-12 Loader remove the retaining capscrews from the lock plates.

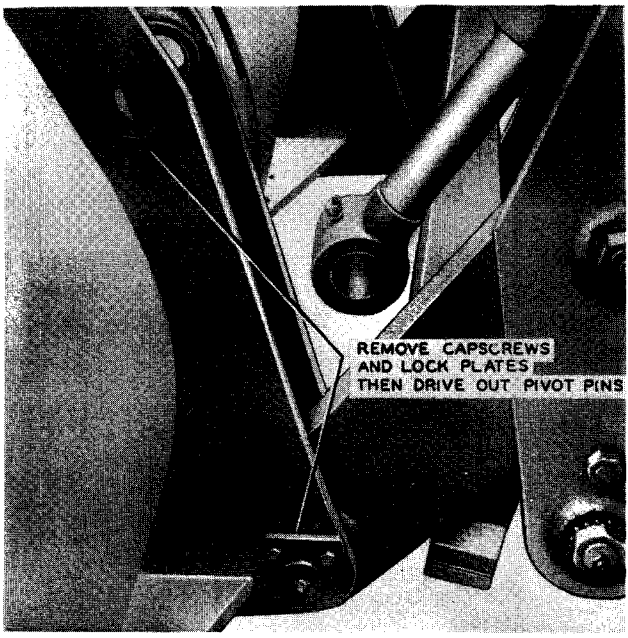


Figure 110

Remove the lock plate and the four bucket pivot pins, Figure 110.

Remove the bucket or blade.

To install the bucket or blade, align the pivot pin holes on the bucket or blade with the pivot pin holes on the lift arms and the tilt cylinder arms, Figure 110.

Install the four pivot pins and the lock plates, Figure 110.

Replace the lock plate retaining capscrews.

SNOW PLOW ATTACHMENTS

(Extra Equipment)

The two types of snow plow attachments illustrated in Figures 111 and 112, are available as extra equipment to adopt the W-12 Loader to any snow removal applications.

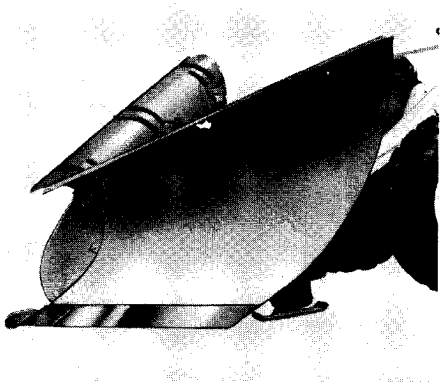


Figure 111

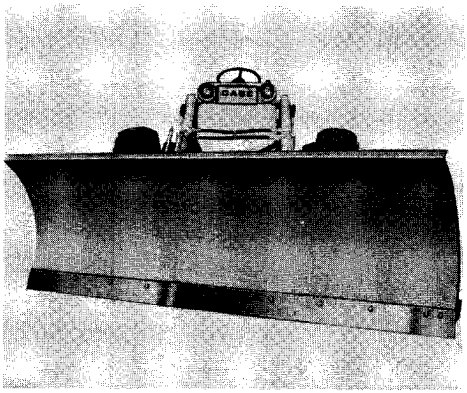


Figure 112

BRUSH RAKE

(Extra Equipment)

The brush rake Figure 113, can be installed on W-12 Loaders for use in land clearing operations.

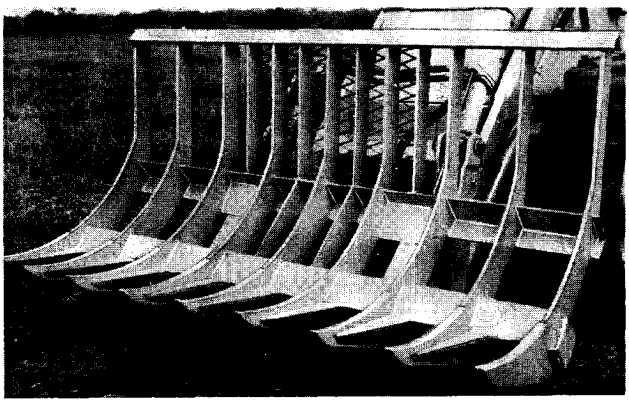


Figure 113

Refer to Page 122 for installing the brush rake attachment.

OPERATOR'S CAB

(Extra Equipment)

A strongly constructed operator's cab, Figure 114, can be ordered as extra equipment for the W-12 Loader. The cab completely covers the operator's cockpit and provides the operator with protection from the elements. The large windshield equipped with a windshield wiper and glass panels in the doors and the rear window are adequate for the operator to have a clear view on all sides. Once installed, the cab need not be removed for seasons or weather changes. The doors can be secured open for warm weather operation, Figure 114, while the cab still provides adequate protection from dust and rain.

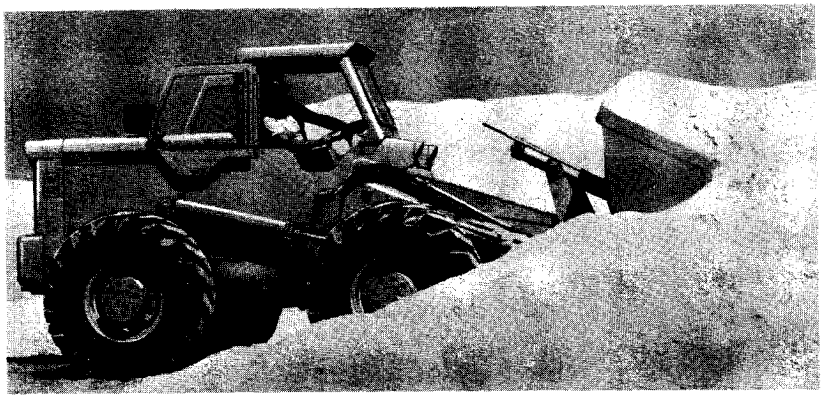


Figure 114

RADIATOR SHUTTERS

(Extra Equipment)

It may be necessary, during extremely cold weather to cover the radiator in order to maintain proper operating (coolant) temperature.

To close the radiator shutters part way or fully, pull the handle out to the required position and turn it clockwise to lock in position. Refer to Page 40.

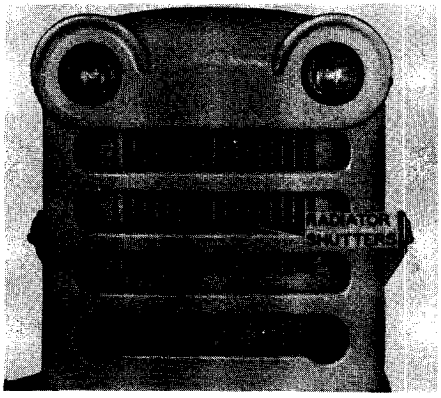


Figure 115

PUSHER FAN

(Extra Equipment)

There is available, as extra equipment, a pusher type fan. The pusher fan is recommended for use in warm temperatures to expell the heat out and away from the operator and engine. Where climatic conditions warrant, the use of both the suction fan in cool weather and the pusher fan in warm weather will aid in regulating engine operating temperature and will increase operator comfort.

HEATER AND DEFROSTER

(Extra Equipment)

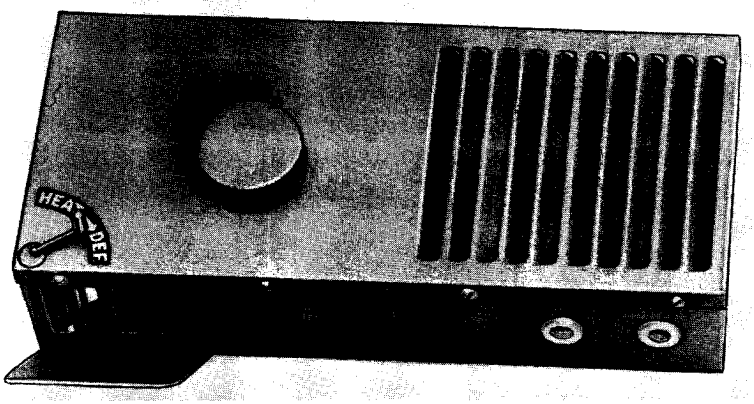


Figure 116

The heater and defroster attachment can be ordered as extra equipment from your Authorized Case Industrial Dealer.

The heater and defroster are operated by pulling the fan button all the way out.

ACCUMULATOR

(Extra Equipment)

A hydraulic accumulator attachment is available for installation on Case W-12 Loaders to reduce the shockload on the lift arm hydraulic circuit when the Loader is operating over rough terrain.

The accumulator acts as a cushioning device for the hydraulic system. The accumulator attachment is equipped with a shut-off valve for use when the cushioning action is not required, such as level grading.

CLUTCH CUT-OFF VALVE

(Extra Equipment)

A clutch cut-off valve is available for Loaders that are operated extensively on hillsides. The clutch cut-off valve prevents the transmission clutch from disengaging when the brakes are applied. This eliminates the delay in picking up the power when the brakes are released, making it easier to hold the Loader on a hillside or slope.

The clutch cut-off valve is also an aid when loading trucks downhill, as it allows the reverse clutch to engage with less delay and reduces the possibility of the machine rolling toward the truck before the reverse clutch engages.

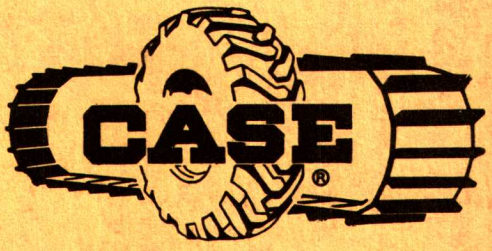
TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

WARNING!

LOWER THE LOADER LIFT ARMS TO THE GROUND OR BLOCK THEM SECURELY BEFORE PERFORMING ANY SERVICE OPERATIONS OR WHEN LEAVING THE MACHINE UNATTENDED.

As a member of the National Safety Council, we are priviledged to use the Green Cross for Safety to designate not only our interest in Safety, but to point out more clearly the safety precautions in this manual.



FOR FURTHER INFORMATION CONSULT YOUR CASE DEALER

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