CLARK EQUIPMENT INDUSTRIAL TRUCK DIVISION CLARK EQUIPMENT

OPERATORS MANUAL

FOR

CY 160 BD

GOV'T 0-215

CLARK EQUIPMENT COMPANY

PUBLISHED BY

TECHNICAL SERVICE DEPARTMENT,
BATTLE CREEK, MICHIGAN, U.S.A.

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SAFETY INSTRUCTIONS FOR MAINTAINING INDUSTRIAL TRUCKS

Powered industrial trucks may become hazardous if adequate maintenance is neglected. Therefore, adequate maintenance facilities, personnel and procedures should be provided.

Maintenance and inspection of all powered industrial trucks should be performed in conformance with the recommendations in this Manual and the following practices:

1. Only qualified and authorized personnel should be permitted to maintain, repair, adjust, and inspect industrial trucks, and a scheduled preventive maintenance, lubrication, and inspection system should be followed.

2. When truck is to be parked for maintenance: Turn off engine, lower lifting mechanism, place directional controls in neutral, (clutch type trucks may be left in gear) apply parking brake and chock wheels.

3. Before working on truck raise wheels free of floor or disconnect power source. Use chocks or other positive truck positioning devices and block carriage, innermast(s), or chassis before working under them. Before working on engine fuel system of: (a) Gasoline powered trucks with gravity feed fuel systems, be sure fuel shutoff is closed; (b) LP gas powered trucks, close LP-gas cylinder valve and run engine until fuel in system is depleted and engine dies.

4. When starting engine place shift levers in neutral and depress clutch (or brake pedal on automatic transmissions).

5. Avoid fire hazards and have fire protection equipment present. Do not use an open flame to check level, or for leakage, of fuel, electrolyte or coolant. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.

6. Properly ventilate work area, vent exhaust fumes and keep shop clean and floor dry.

7. Use hoisting equipment for heavy lifts.

8. Handle LP Gas cylinders with care. Do not drop, dent, or damage in any way.

9. Brakes, steering mechanisms, control mechanisms, warning devices, lights governors, lift overload devices, safety guards and safety devices should be inspected regularly and maintained in a safe operating condition.

10. All parts of lift and tilt mechanisms and frame members should be carefully and regularly inspected and maintained in a safe operating condition.

11. Special trucks or devices designed and approved for hazardous area operation should receive special attention to ensure that maintenance preserves the original approved safe operating features.

(Continued)

SAFETY INSTRUCTIONS FOR MAINTAINING INDUSTRIAL TRUCKS

12. Fuel systems should be checked for leaks and condition of parts. Extra special consideration should be given in the case of a leak in the fuel system. Action should be taken to prevent the use of the truck until the leak has been corrected.

13. All hydraulic systems should be regularly inspected and maintained in conformance with good practices. Tilt cylinders, valves, and other similar parts should be checked to assure that "drift" has not developed to the extent that it would create a hazard.

14. Capacity rating, operation and maintenance instruction plates, tags, or decals should be maintained in legible condition.

15. Batteries, motors, controllers, limit switches, protective devices, electrical conductors and connections should be inspected and maintained in conformance with good practices. Special attention should be paid to the condition of electrical insulation.

16. Industrial trucks should be kept in a clean condition to minimize fire hazards and facilitate detection of loose or defective parts.

17. Modifications and additions which affect capacity rating and safe operation should not be performed by the user without manufacturer's approval.

18. Care should be taken to assure that all replacement parts are interchangeable with the original parts and of a quality equal to that provided in the original equipment.

INDUSTRIAL TRUCK DIVISION

PLEASE NOTE

INSTRUCTIONS ON USE OF MANUAL

This Operator's Manual is published as a service reference guide and includes Specifications, Operating Instructions, Lubrication and Preventive Maintenance Instructions, and Trouble Shooting Guide.

The TABLE OF CONTENTS for this manual is printed on green paper and is placed at the front for easy reference. A separate INDEX (also printed on green paper) is placed in front of the Lubrication and Preventive Maintenance Section.

Lubrication and Preventive Maintenance Instructions are listed under the TIME INTERVALS that they should be performed.

The TIME INTERVAL is part of the page number and code number.

Example: 8H 002-0; 8H is the TIME INTERVAL (8 operating hours), 002 is the PAGE NUMBER, and -0 is a CODE NUMBER that you as a customer should disregard. The dash number or code number is for the benefit of the publisher only.

The INDEX is set up under the TIME INTERVALS that the Lubrication and Preventive Maintenance should be performed.

Example: (8 Hours)	Time Interval (H=Hours)	&	Page Number (000-)
Hydraulic Sump Tank, level check...	8H		503
Brake Pedal Free Travel, check.....	8H		303

The above states to check the sump tank fluid level every 8 operating hours and refer to page 503 for fluid recommendations etc. Also, to check brake pedal free travel at this interval and turn to page 303 for instructions.

Turn to the eight (8) hour section (8H) and then to the page listed — 503 or 303 etc. The instructions covered therein will pertain only to the checks or adjustments that should be performed at this TIME INTERVAL.

If, for instance, the Brake Pedal Free Travel is incorrect, you would then refer to the INDEX for "Brake Pedal Free Travel, adjust" which would be listed in the TIME INTERVALS following the 8 hour section.

Example: (100 Hours)	Time Interval (H=Hours)	&	Page Number (000-)
Brake Pedal Free Travel, adjust....	100H		302

Turn to the one hundred hour section (100H) and then to

page 302. Complete instructions as to the importance of pedal free travel, the method to check and adjust for correct free travel with illustrations are included therein.

NOTE

YOU WILL NOTE THAT AT THE BEGINNING OF EVERY SECTION A LUBRICATION AND PREVENTIVE MAINTENANCE ILLUSTRATION IS SHOWN GIVING THE LOCATION OF THE COMPONENTS TO BE SERVICED.

It is impossible to cover all types of machine operations in one manual. Operating conditions should determine the lubrication and maintenance intervals. Common sense and a close observance can best determine the frequency with which you should service your machine.

The care you give your machine will greatly determine the satisfaction and service life that you will obtain from it. A difinite maintenance program should be set up and followed. Haphazard maintenance will only lead to faulty performance and short life.

INDUSTRIAL TRUCK DIVISION

TABLE OF CONTENTS

Plate 10123. Machine Serial No. Location

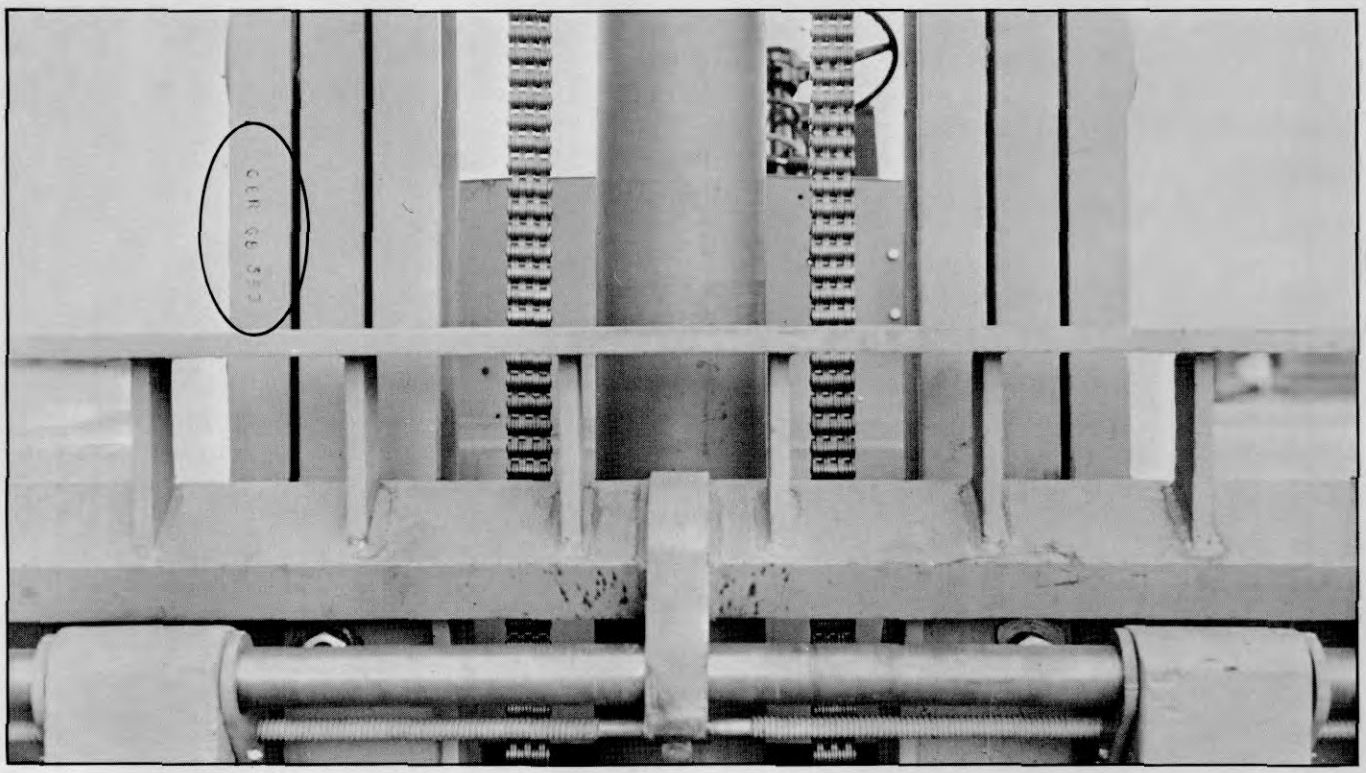
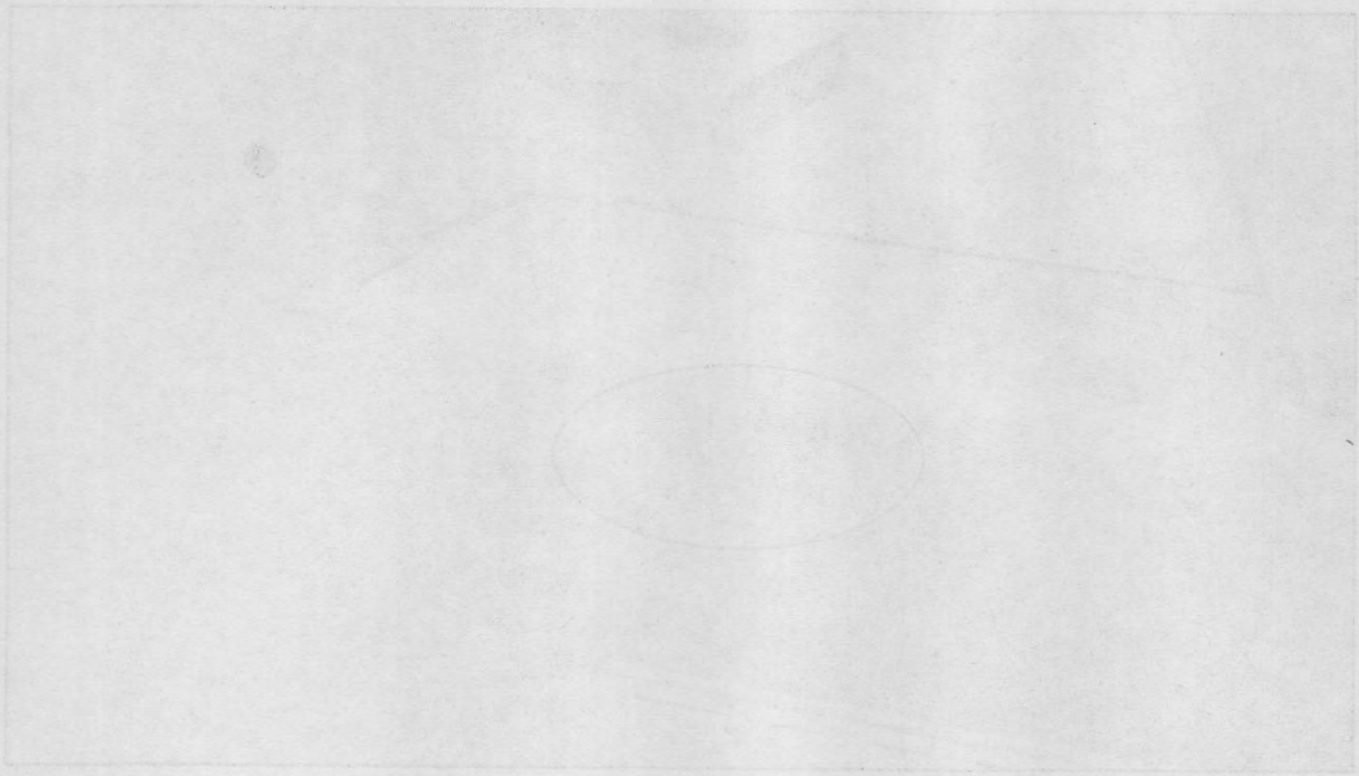
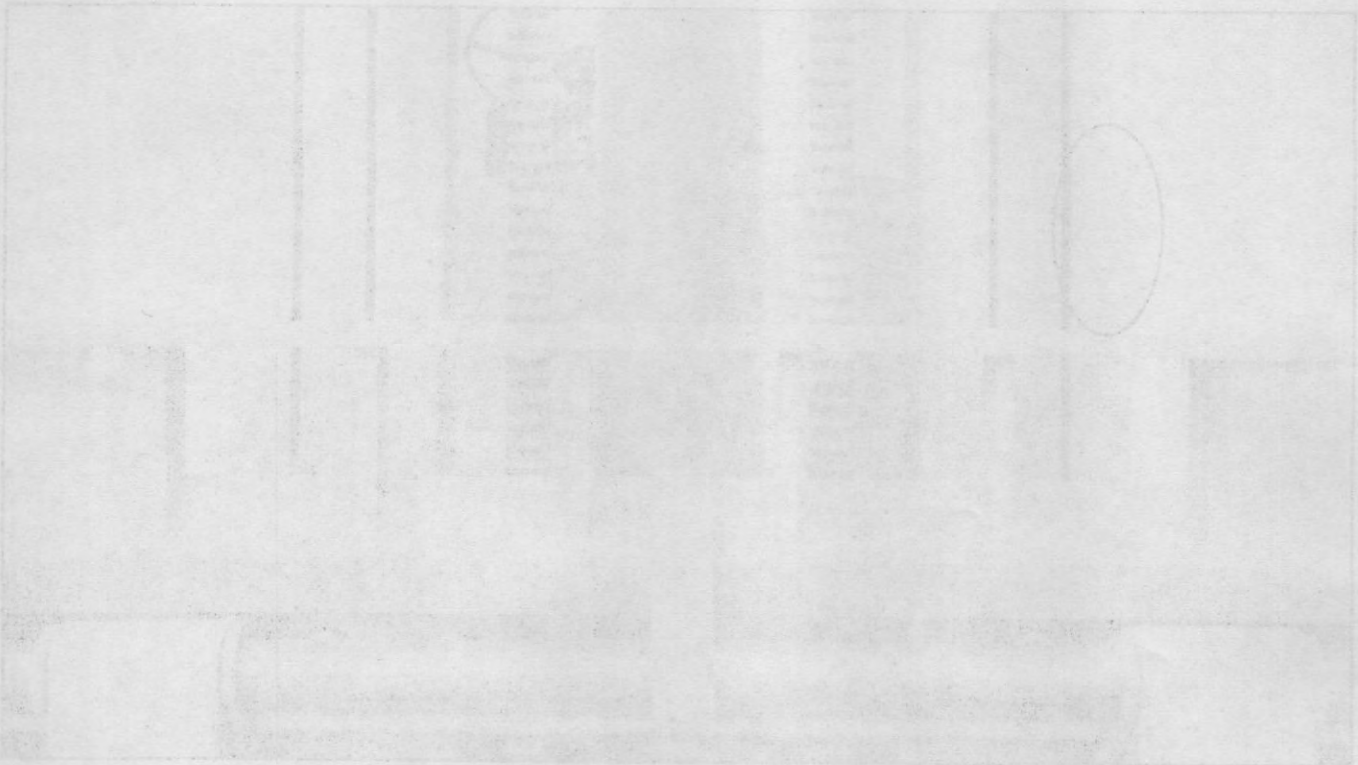


Plate 10124. Upright Serial (Deck) No. Location





INDUSTRIAL TRUCK DIVISION

SPECIFICATIONS

GENERAL

Type of vehicle ..... Yardlift

Capacity 16,000

Vehicle Gross Service Weight:

Front Axle (Drive)..... 12,600 Lbs
Rear Axle (Steer) ..... 10,700 Lbs

Total Gross Weight ..... 23,300 Lbs

ENGINE

Crankcase Capacity:Refer to Diesel Oper. Manual

FUEL TANK CAPACITY ..... 44 Gallons

COOLING SYSTEM CAPACITY .....19 Quarts

FAN BELT DEFLECTION ..... 3/4" to 1"

TORQUE CONVERTER

Diameter ..... 12 Inch
Torque Multiplication..... 3.0 to 1

TRANSMISSION

Speeds ..... 4 Forward 4 Reverse
Capacity (Torque Converter and Trans. ...
..... 30 Quarts

STEER AXLE

Axle Alignment:
Toe-in ..... 0 Degrees
Camber Angle ..... 1 Degree
Caster ..... 0 Degrees

Left-hand turning radius angle,

Inside Wheel ..... 75 Degrees

Right-Hand Turning Radius Angle,

Inside Wheel ..... 75 Degrees

DRIVE AXLE

Differential Capacity ..... 14 Pints
Wheel End Capacity ..... 8 Pints
(each end)

ELECTRICAL SYSTEM 12 Volt Negative Ground

Battery ..... 12 Volts 70 Amp Hour

Alternator ..... 22 Amp

Armature Rotation ..... Either

Cold Output .....
.... 20 Amps at 14 Volts at 2000 R.P.M.

Field Current .....
2.2-2.6 Amps at 12 Volts (80°F)

Brush Spring Tension (ounces) 28

HYDRAULIC SYSTEM

Sump Tank Capacity ..... 44 Gallons

Sump Tank Filter (Replaceable). 25 Micron

Sump Tank Breather ..... (Cleanable)

Sump Tank Strainer..... 80 Mesh

Hydraulic Pumps

Main Pump:
Type ..... Gear

Capacity .....
75 G.P.M. at Governed R.P.M.

Steer Pump

Type ..... Gear

Capacity.....
..... 20 G.P.M. at Governed R.P.M.

System Pressure Relief Valve Setting...
..... 1750 P.S.I.

Hydraulic Valve

Pressure Relief Valve Setting .....
..... 1750 to 1800 P.S.I.

BRAKE SYSTEM

Type .....Hydraulic Vacuum Booster
Brake Pedal Free Travel.....1/16 to 3/16"
.....(1/8" Nominal)

INDUSTRIAL TRUCK DIVISION

DIMENSIONAL SPECIFICATIONS

SPEEDS AND GRADES

Travel Speed, M.P.H.

	LOADED					EMPTY				
Gear	1	2	3	4	5	1	2	3	4	5
	3.4	6.4	8.6	17.4	-	3.8	6.8	9.2	18.5	-

Lift and Lowing Speeds	LOADED	EMPTY
Lift Speeds (FPM)	89	105
Lowering Speeds (FPM)	70	80

Drawbar Pull in Pounds First Gear	LOADED	EMPTY
(at 1 M.P.H.)	15,380	15,300

Gradeability (%) First Gear	LOADED
(at 1 M.P.H.)	40

TIRES PNEUMATIC

Standard ..... 9.00 X 20 — 12 Ply

Drive and Steer Tires are on demountable rims and fully interchangeable.

Tire Pressure..... 95 Lb P.S.I.

ENGINE FILTERS: Four, all standard equipment. (1) Fuel filter in metallic bowl. (2) Final fuel filter at carburetor. (3) One quart oil filter with automotive type replaceable cartridge. (4) Dry type air cleaner with precleaner, visual restriction indicator.

ELECTRICAL SYSTEM: 12-volt electrical system. 70-amp. hour battery; 22 amp, controlled by voltage regulator; electric starter, dust enclosed ignition distributor, keyless starting ignition switch, electric horn. Automotive type fuses protect the electrical circuits. A multiple disconnect plug under the instrument panel is provided for servicing ease.

HYDRATORK TRANSMISSION: Standard on CY Models. 12" industrial torque converter, 3:0 to 1 torque multiplication; charging pump and pressure control valves externally mounted. 4 speed power shift transmission is a separate unit with constant mesh alloy steel gears. Speed and direction selectors externally located.

ENGINE, DIESEL: General Motors 4 cylinder, 2-cycle, 4-valve Rotor-type pump crank shaft driven. Quickly replaceable cam-operated unit fuel injectors pressurize fuel at injector tip, eliminating high pressure fuel lines.

	GM Diesel
Model	4-53
Bore	3 7/8"
Stroke	4 1/2"
Displacement—cu. in.	212.3
Governed r.p.m.	2800
Net brake Hp. at gov. r.p.m.	110
Bare engine Hp. at gov r.p.m.	130
Max torque—lb ft.	272
Crankcase capacity—qts.	14
Fuel tank capacity—gals.	44

INSTRUMENTS: Engine hour meter; ammeter; oil pressure, fuel and temperature gauges; all mounted in cowl within easy view of operator.

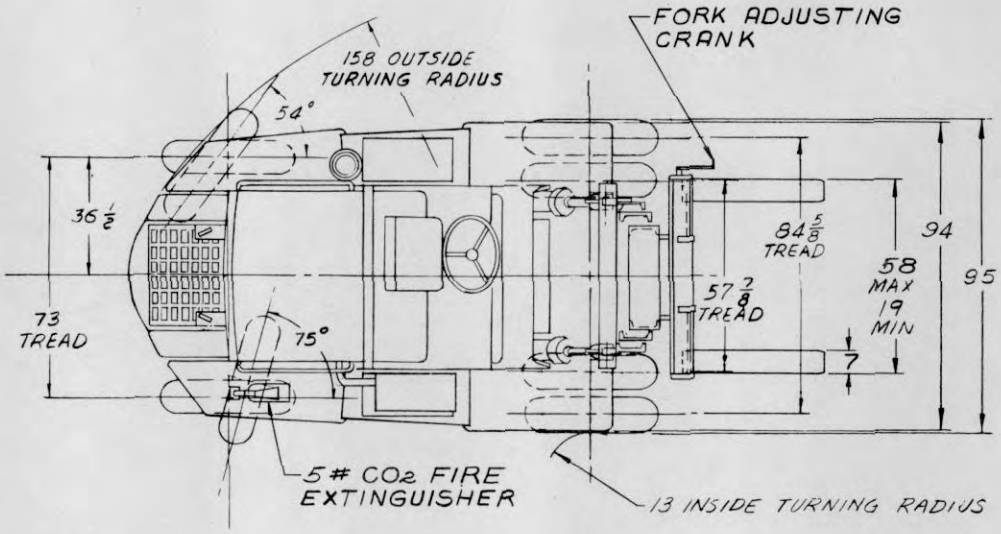
HYDRAULIC SYSTEM: Pump, Gear type, with tandem steering pump; capacity at full governed r.p.m., 75 g.p.m.; Steering pump, 20 g.p.m. at governed r.p.m.; 8 g.p.m. controlled flow to steering

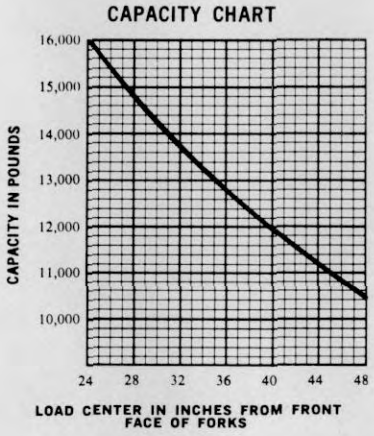
Control valve — Spool type full feathering with integral, pilot controlled relief; individual checks on each port to prevent back flow or reverse control.

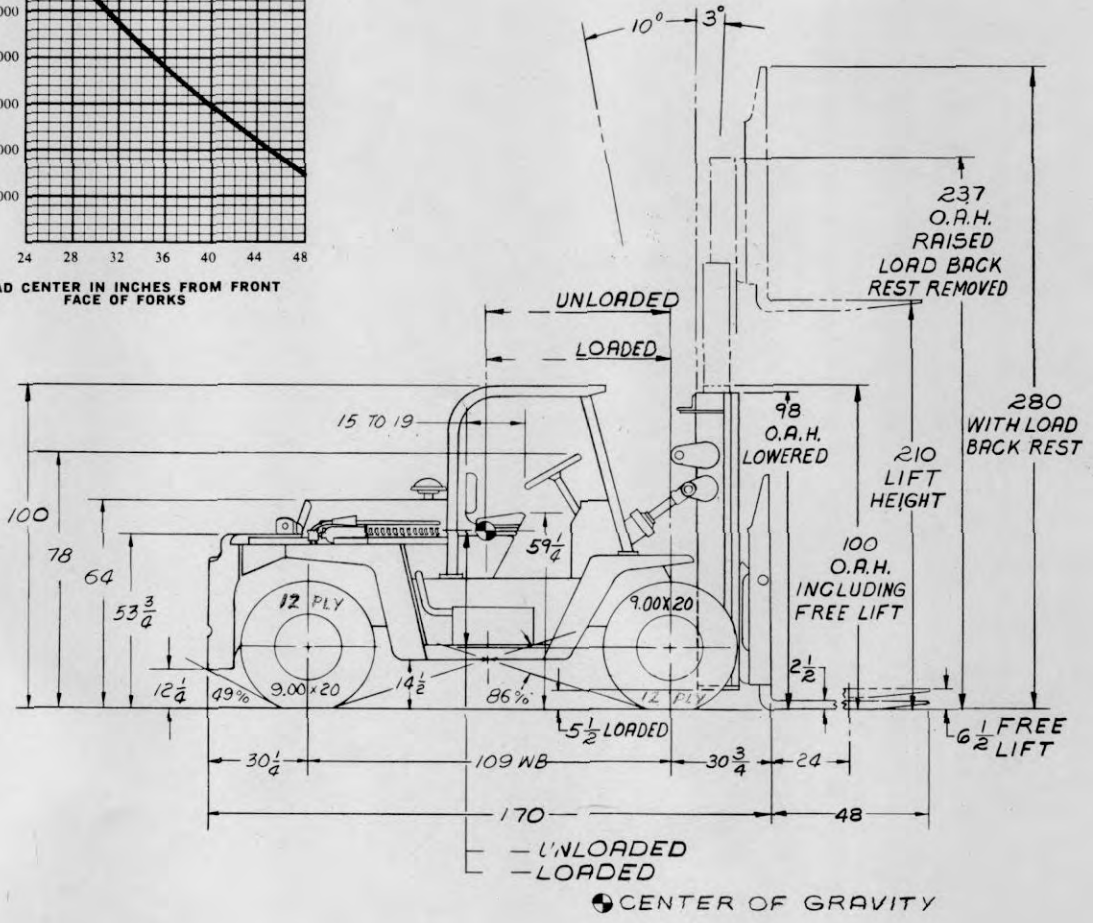
System oil capacity, 44 gallons; 3" intake line with 80 mesh screen in the sump and a 10 micron full-flow filter in the return line from valve to sump. The oil lines consist of S.A.E. straight thread ports with "O" ring seals, J.I.C. tested steel tube and high pressure wire braid reinforced hose.

POWER BRAKES: Vacuum power operated; 16" diameter lining. Hand operated parking brake on differential. Hand Brake lever with adjustment in handle.

GENERAL: Protectoseal fuel tank filler cap, recess pin-type coupler and multi-pass muffler are all standard equipment.


FORK ADJUSTING CRANK
158 OUTSIDE TURNING RADIUS
54°
36 1/2
73 TREAD
75°
84 5/8 TREAD
57 7/8 TREAD
58 MAX
19 MIN
94
95
7
5# CO2 FIRE EXTINGUISHER
13 INSIDE TURNING RADIUS


CAPACITY CHART
CAPACITY IN POUNDS
16,000
15,000
14,000
13,000
12,000
11,000
10,000
24
28
32
36
40
44
48
LOAD CENTER IN INCHES FROM FRONT FACE OF FORKS


10°
3°
237 O.A.H. RAISED LOAD BACK REST REMOVED
UNLOADED
LOADED
15 TO 19
98 O.A.H. LOWERED
210 LIFT HEIGHT
280 WITH LOAD BACK REST
100 O.A.H. INCLUDING FREE LIFT
100
78
64
53 3/4
59 1/4
12 PLY
9.00X20
12 1/4
49%
9.00 x 20
14 1/2
86%
12 PLY
2 1/2
5 1/2 LOADED
6 1/2 FREE LIFT
30 1/4
109 WB
30 3/4
24
170
48
UNLOADED
LOADED
CENTER OF GRAVITY

INDUSTRIAL TRUCK DIVISION

NEW MACHINE 50 HOUR SERVICE AND INSPECTION

N O T E

PERFORM THIS SERVICE AND INSPECTION AFTER THE FIRST 50 HOURS OF OPERATION OF NEW MACHINES.

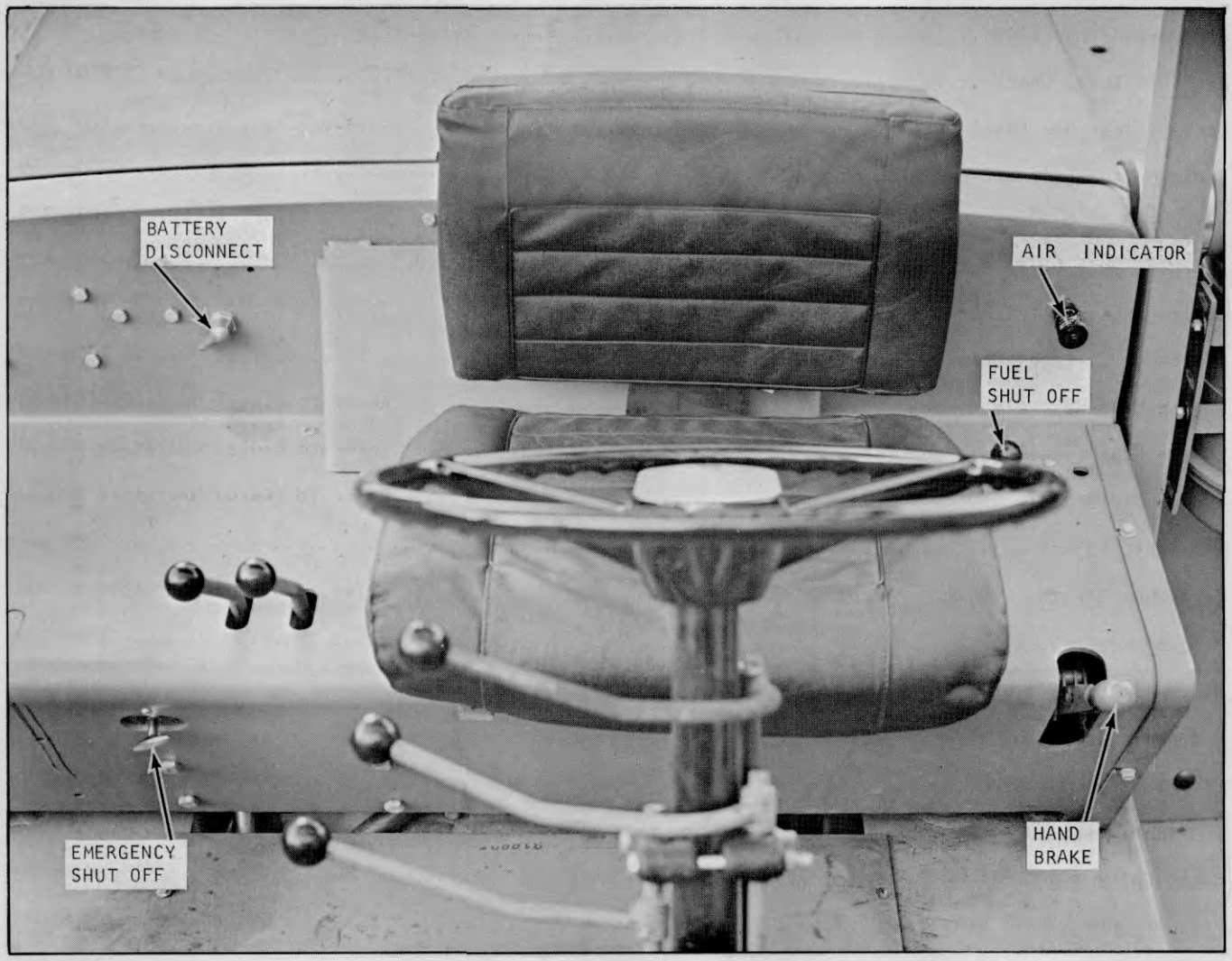
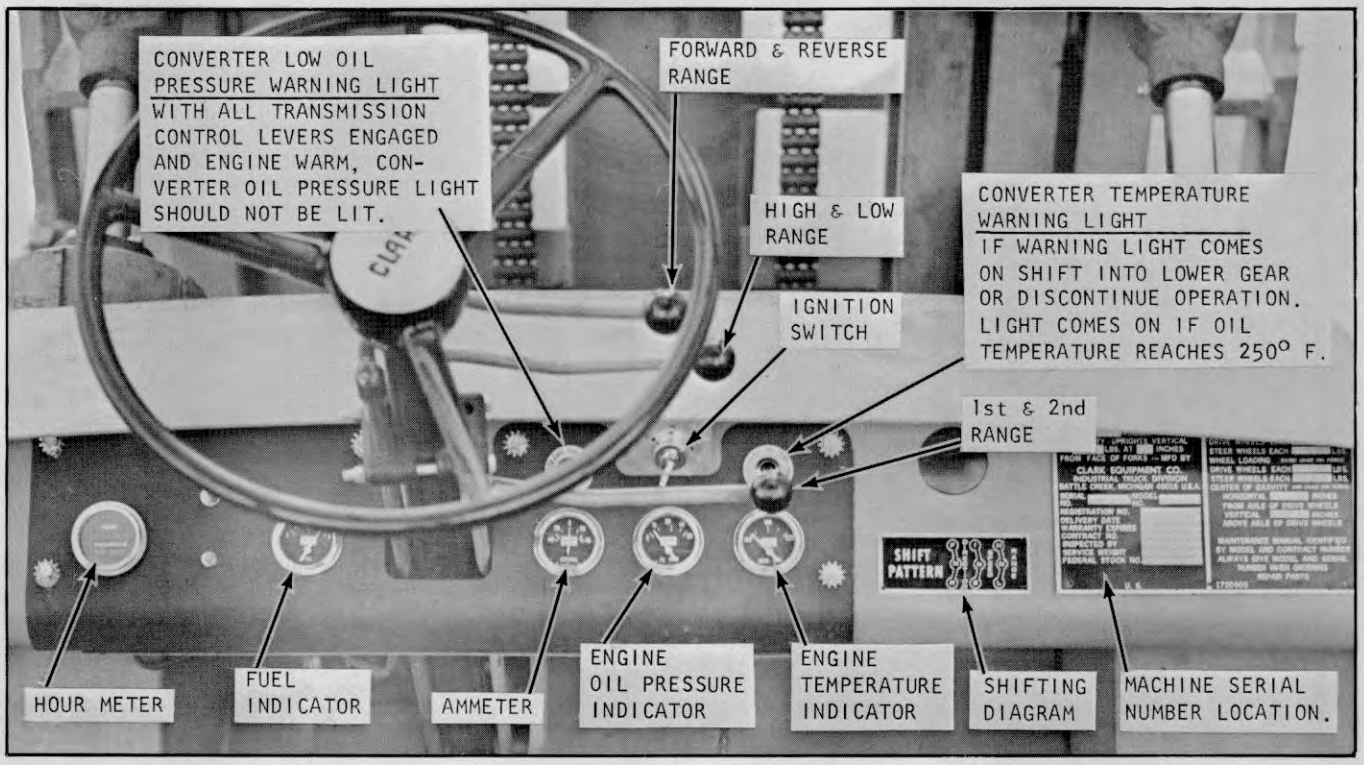
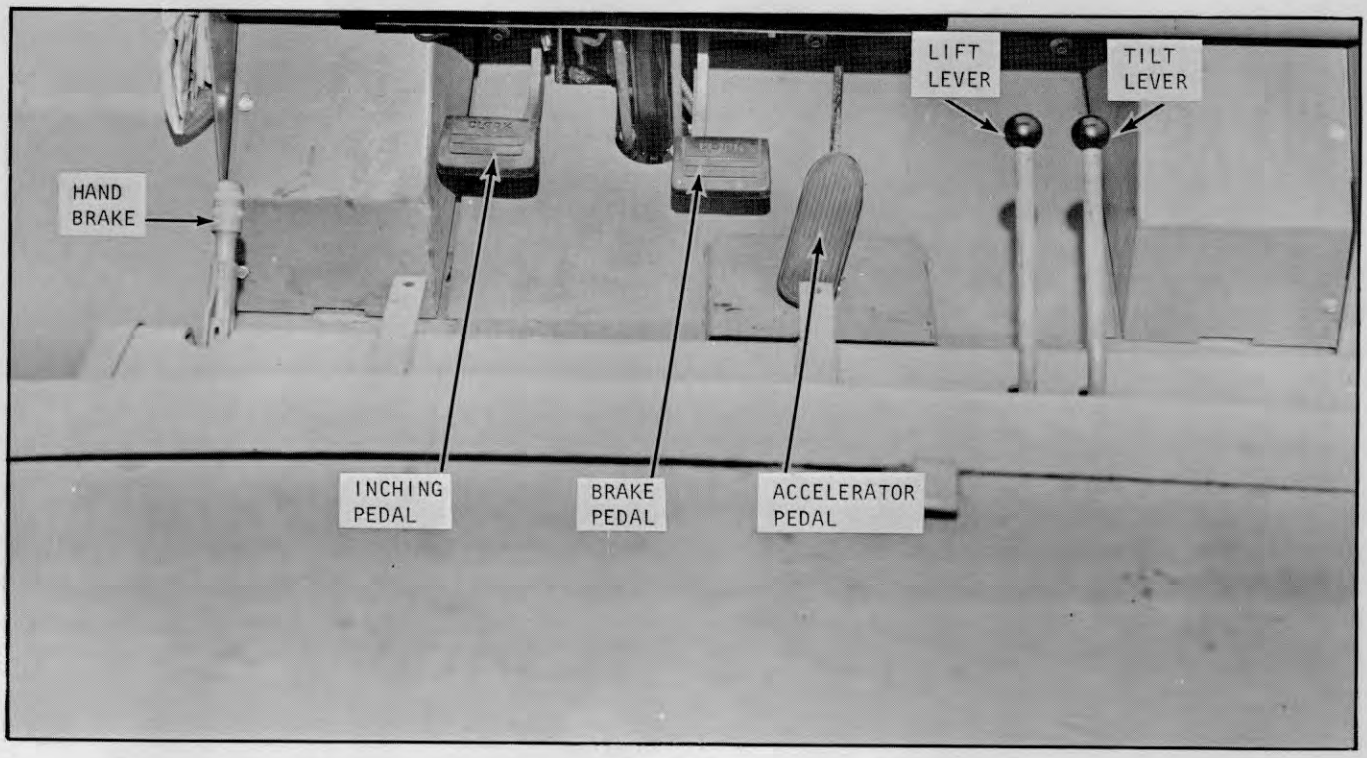
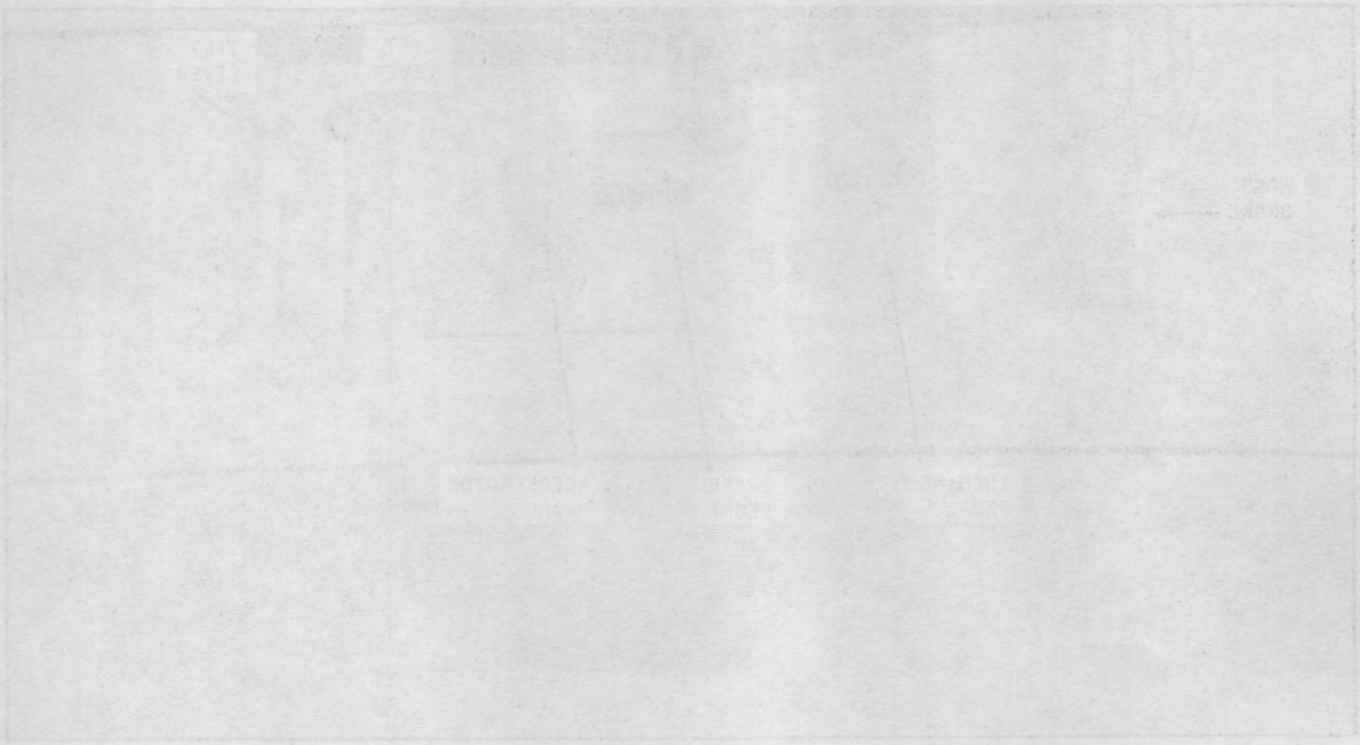


Plate 10126. Controls





Playe 10125. Location of Controls



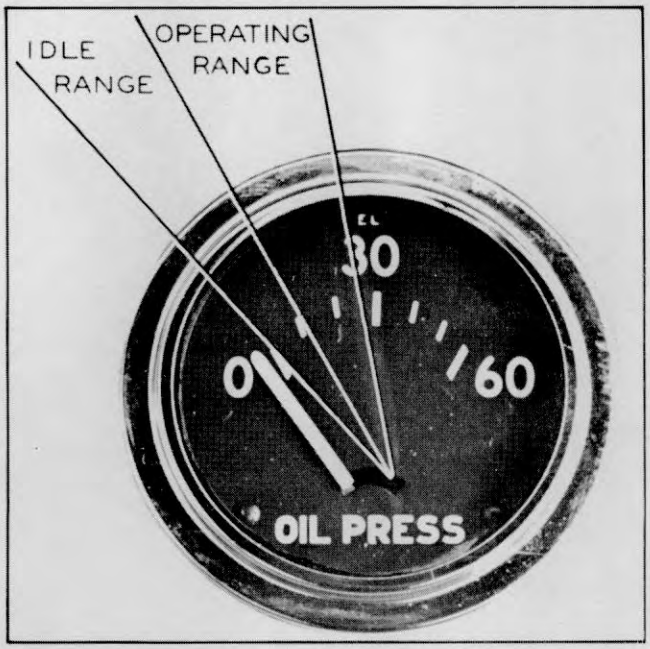


Plate 6417. Oil Pressure Indicator

N O T E

Normal oil pressure is 26 lbs. at 2600 R.P.M. with oil hot (about 140° F) which at idling speed results in pressure between 5 and 10 lbs.

C A U T I O N

IF OIL PRESSURE IS ERRATIC OR FALLS BELOW THE 5 TO 10 LB. LIMIT, STOP THE ENGINE IMMEDIATELY AND FIND THE CAUSE OF THE TROUBLE. REFER TO TROUBLE SHOOTING SECTION FOR THIS INFORMATION.

C A U T I O N

ON NEW MACHINES, AFTER STARTING ENGINE -- RUN IT AT IDLE FOR 5 MINUTES, THEN STOP ENGINE AND RECHECK OIL LEVEL IN CRANKCASE -- BRING OIL LEVEL TO HIGH MARK, IF NECESSARY.

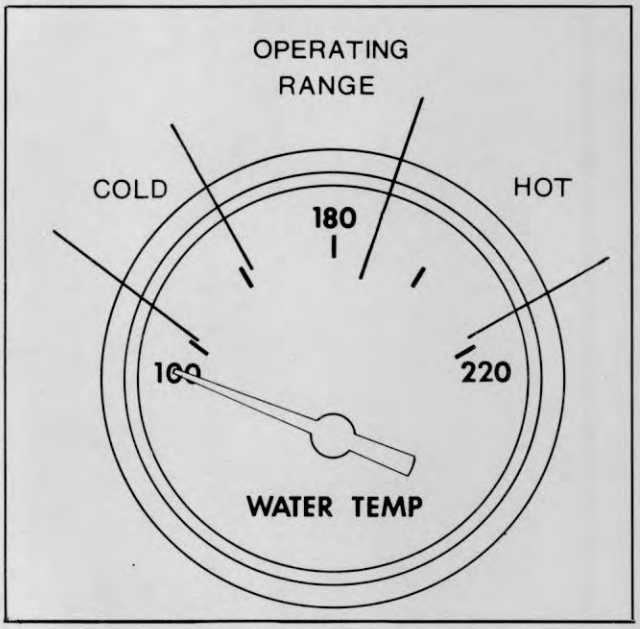


Plate 9974. Engine Coolant Temperature Indicator

N O T E

Before placing machine in operation run engine a few minutes to warm oil especially in cold operating conditions.

Low operating temperatures wastes fuel and increases engine wear.

N O T E

The coolant temperature should register 150° to 185° F. after the first ten or fifteen minutes of operation.

C A U T I O N

DO NOT IDLE THE ENGINE FOR LONG PERIODS, AS IT IS NOT ONLY DETRIMENTAL TO THE ENGINE BUT ALSO INCREASES OPERATING COSTS AS YOU ARE USING FUEL WITHOUT BENEFIT.

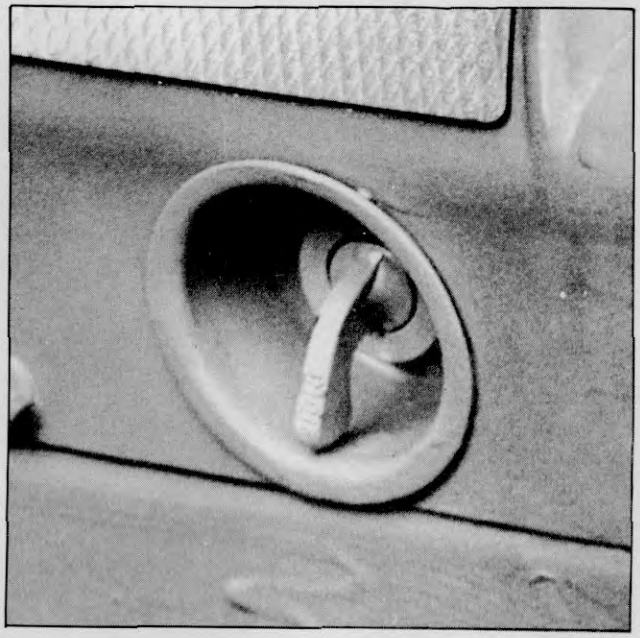


Plate 7018. Ignition Switch

STARTING

Place all transmission control levers in neutral position. Pull out on choke button and turn ignition switch. The starter is engaged when the switch lever is turned to ignition position.

DO NOT ENGAGE THE STARTER LONGER THAN 15 SECONDS WITHOUT A MINUTE OR SO INTERVAL BETWEEN TRIALS.

If the engine becomes overchoked or flooded; push choke button in, depress accelerator pedal fully and engage starter. If all necessary equipment is in correct working order, the engine will start.

Allowing a reasonable time interval for the engine to warm up, check instrument panel making certain the converter oil temperature light is not lit. Check engine oil pressure indicator. If reading is erratic or low; or, if the previously mentioned light is lit, turn off machine and correct difficulty.

N O T E

Converter pressure light will remain on until all transmission control levers are engaged. Run engine a few minutes to warn oil, especially in cold operating conditions.

TO OPERATE MACHINE

1. Place all transmission control levers in neutral position and start engine.

2. Move HIGH and LOW shift lever into desired position.

3. Move 1st and 2nd lever into position.

4. Now move FORWARD And REVERSE lever into position.

N O T E

Either the forward and reverse or 1st and 2nd lever must be in neutral position before moving high and low shift lever into position. All control levers must be engaged before machine will move. A diagram located on the instrument panel (Plate 9958) will aid the operator in selecting the correct gear and range.

TO STOP MACHINE

Remove foot from accelerator pedal and depress brake pedal. If machine is to be parked, place all transmission control levers in neutral position, apply hand brake and shut engine off.

C A U T I O N

IF THE ENGINE HAS BEEN OPERATING AT OR NEAR FULL LOAD, IT SHOULD BE ALLOWED TO RUN AT FAST IDLE (600 TO 800 R. P. M.) FOR ONE OR TWO MINUTES AFTER LOAD IS REMOVED BEFORE BEING STOPPED. THIS ALLOWS INTERNAL ENGINE TEMPERATURES TO EQUALIZE.

TO MOVE A LOAD

The forks should be adjusted sidewise on fork bars to obtain maximum balance in proportion to width of load. Raise or lower forks to proper level and center the load as nearly as possible on the forks. Tilt upright assembly slightly backward to prevent the load from falling, accelerating engine slightly at the same time. Back away from stack.

Adjust the forks with load so they are close to the floor or ground but high enough to avoid hitting obstructions. The operator should have clear vision ahead when moving in a forward direction. When this is not possible, the operator should drive in reverse and sufficiently turn in his seat to obtain clear vision backward.

When the load is to be deposited, enter the area squarely, especially when placing one load on top of another, in order that all piles will be square and secure. Place load directly over desired area and slowly lower to the floor.

IMPORTANT

EVERY 8 OPERATING HOURS (OR EVERY SHIFT) ELEVATE UPRIGHT TO THE UPPER LIMIT. THIS WILL PROVIDE LUBRICATION TO THE TOP PORTION OF THE LIFT CYLINDER.

SAFETY AND OPERATION SUGGESTIONS

The use of industrial powered trucks is subject to certain hazards that cannot be overcome by purely mechanical means. The exercise of intelligence, care and common sense by the truck operator is necessary to eliminate the hazards of overloading, slipping and falling of the load; obstructions in the path of travel, or the use of equipment for a purpose for which it is not intended or designed.

The following are a few suggestions that should be followed in the operation of this machine.

1. Operate machine with forks close to floor, loaded or empty, but high enough to avoid hitting obstructions.

2. If vision is obstructed by the load, operate machine in reverse and sufficiently turn in the seat to obtain clear vision.

3. Avoid sudden stops or starts. When backing, be sure to look for fellow workmen before moving machine.

4. Drive carefully at all times. Exercise caution at cross aisles. Sound horn for safety.

5. Be sure loads are safe to move. Have loads properly centered on machine. Refer to the Capacity Chart in Specifications for various load center ratings.

6. An operator should be assigned to a specific machine.

7. The operator should be qualified and drive in accordance with his company's safety rules.

8. If the machine does not respond immediately, report to designated individual in charge. A minor adjustment now may save a major repair later.

9. Do not allow riders or hitchhikers.

10. Operate the machine at a safe distance behind other vehicles.

11. Do not operate machine with wet or greasy hands.

12. Observe highway traffic laws in the operation of the vehicle in the plant.

13. Drive carefully on wet or slippery floors.

14. Keep feet within running line of truck.

15. Observe the Operating Rules and Preventive Maintenance Instructions ASA B56.1 Safety Code for Powered Industrial Trucks.

16. Avoid overloading the truck -- this is a safety measure against possible injury to the driver and fellow workmen. Overloading shortens the life of the truck and increases maintenance.

17. Do not operate machine for prolonged periods in an unventilated area. All engines produce poisonous carbon monoxide gas as a by-product of combustion and can be dangerous if allowed to accumulate in a closed area.

18. Be sure the brakes are in proper working condition. Be sure all mechanical and electrical components are working correctly.

INDUSTRIAL TRUCK DIVISION

LUBRICATION AND PREVENTIVE MAINTENANCE INDEX

LUBRICATION & PREVENTIVE MAINTENANCE ILLUSTRATIONS

N O T E

When Performing the 100, 500, or 1000 Hour Lubrication and Preventive Maintenance, always include the previous lubrication and preventive maintenance schedules.

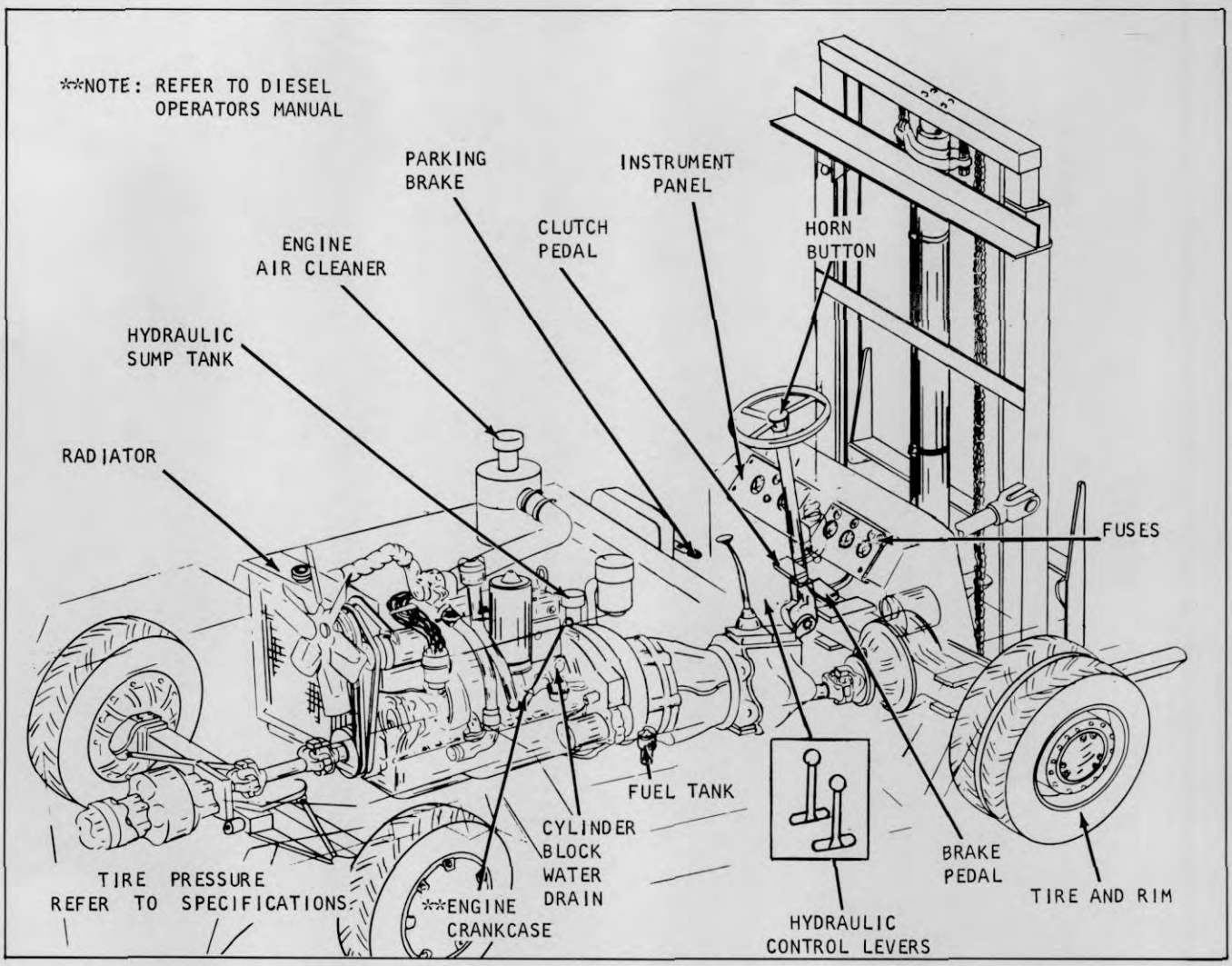


Plate 9973. Lubrication & Preventive Maintenance Illustration

HORN

Check to be sure the horn is working properly.

FUEL TANK

Check fuel supply and fill if necessary. Use a good grade of fuel.

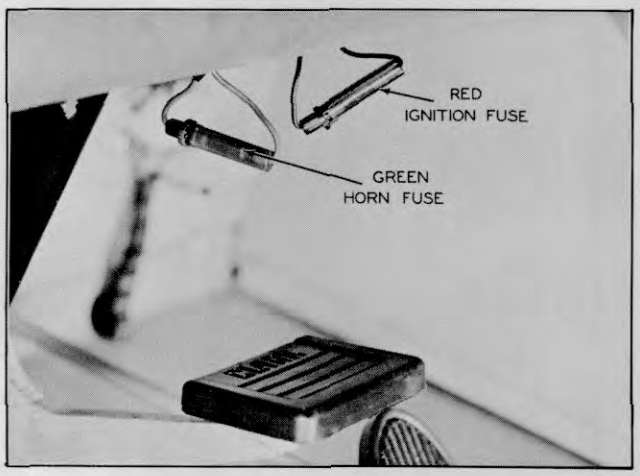


Plate 6424. Ignition Fuse and Horn Fuse

ENGINE CRANKCASE

Before attempting to start the engine, first make sure that it has sufficient oil. The oil filler pipe is located on the right side of the machine. The oil level stick is of the dipstick or bayonet type and is also located on the right side of the machine. Fill the crankcase reservoir through the filler pipe to the proper level as indicated on the dipstick, Plate 3145. Never permit the oil level to fall below the low mark on the dipstick.

C A U T I O N

DO NOT OVERFILL THE CRANKCASE, AS TOO MUCH OIL WILL BRING THE LEVEL HIGH ENOUGH FOR THE CONNECTING RODS TO DIP, THUS CAUSING EXCESSIVE QUANTITIES OF OIL TO BE THROWN TO THE CYLINDER WALLS RESULTING IN OIL CONSUMPTION, SMOKING, EXCESSIVE CARBON DEPOSITS AND FOULED SPARK PLUGS.

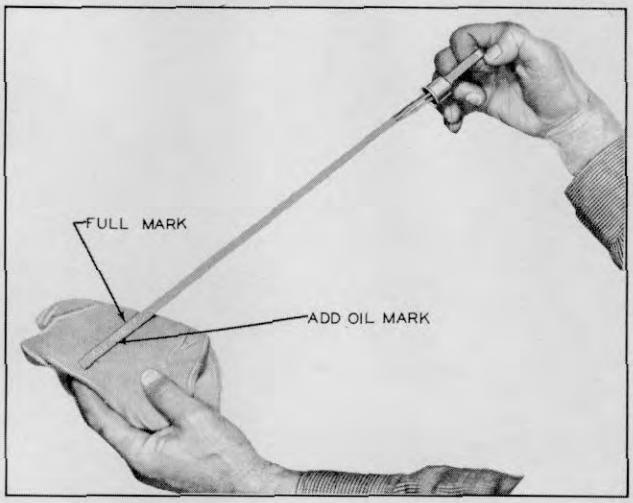


Plate 3145. Crankcase Oil Check

ENGINE COOLING

Make sure that the radiator drain cock and the water drains in the cylinder block are closed. Check radiator coolant level and fill to within 1 inch of the top with clean water; or if operation is in cold weather, use a suitable anti-freeze solution.

C A U T I O N

NEVER POUR COLD WATER OR COLD ANIT-FREEZE INTO THE RADIATOR OF AN OVERHEATED ENGINE. ALLOW THE ENGINE TO COOL AND AVOID THE DANGER OF CRACKING THE CYLINDER HEAD OR BLOCK. KEEP ENGINE RUNNING WHILE ADDING WATER OR ANTI-FREEZE.

C A U T I O N

WHEN PERMANENT ANTI-FREEZE OF THE ETHYLENE GLYCOL TYPE IS USED, THE COOLANT SOLUTION MUST CONTAIN AT LEAST 40% WATER.

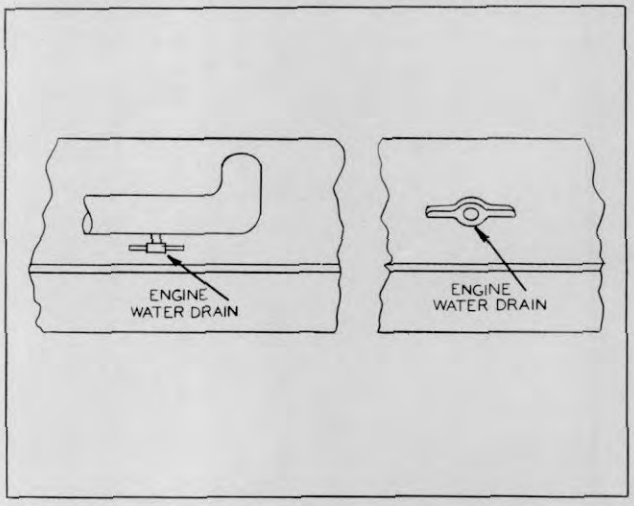


Plate 6421. Cylinder Block Water Drain

Inspect for proper inflation. Refer to Specifications for correct tire pressure.

Inspect tires and wheels regularly for cuts, breaks, alignment, security of wheel clamp bolts and lug nuts or bolts.

Even with the best of maintenance practices, cuts will still be a source of tire trouble. The correct procecure for handling and repairing tires should be given careful attention. Close inspection of all tires should be made at the time of inflation check, and all tires having cuts that penetrate into the cord body should be taken off for proper repair.

Failure to make regular inspections and repairs, when needed, will result in further deterioration of the cord body and eventually a blowout. Small rocks and dirt will get into shallow cuts in the tread and if neglected will gradually be pounded through the cord body.

One simple method to forestall this action is to clean out the cut with an Awl or similar tool to remove any stones or other matter which may be lodged in the cut. Use a sharp, narrow-bladed knife and cut away the rubber around the cut to form a cone-shaped cavity extending to the bottom of the injury. The sides of the cavity should be slanted enough to prevent stones from wedging into it. Tires with cuts treated in this manner may be continued in service without danger of further growth of these injuries. If a tire has at least one deep cut that requires a repair, then all smaller cuts may be quickly and economically repaired and vulcanized by the steam kettle method.

N O T E

It is not recommended that tires with breaks be used again.

If uneven tire wear is evident, wheel alignment should be checked.

W A R N I N G

IN ALL CASES, WHEN REMOVING TIRES WITH SPLIT RIMS FROM THE MACHINE FOR REPAIR OR PERIODIC ROTATION, COMPLETELY DEFLATE TIRES. THIS MAY BE ACCOMPLISHED BY REMOVING THE VALVE CORE.

W A R N I N G

IN ALL CASES, WHEN REMOVING TIRES EQUIPPED WITH THE LOCK RING TYPE RIM FROM THE MACHINE FOR REPAIR OR PERIODIC ROTATION, COMPLETELY DEFLATE TIRES. THIS MAY BE ACCOMPLISHED BY REMOVING THE VALVE CORE.

W A R N I N G

WHEN REPAIRING TIRES USED ON MACHINES THAT EMPLOY THE LOCK RING TYPE RIM, USE CAUTION WHEN INFLATING TIRE, PROCEED AS FOLLOWS:

(1) After positioning lock ring on rim, turn wheel and rim assembly over so that lock ring is on side toward ground.

(2) Inflate tire to 5 to 10 pounds.

(3) Turn rim over and tap lock ring carefully with a mallet to be sure it is properly seated.

(4) Turn rim and wheel over once again so that lock ring is on the bottom and inflate tire to proper pressure.

W A R N I N G

IF LOCK RING IS NOT LOCATED PROPERLY, IT IS POSSIBLE FOR IT TO POP OFF RIM WITH GREAT FORCE WHEN TIRE IS INFLATED AND COULD RESULT IN SERIOUS INJURY TO ANYONE STRUCK BY IT.

On machines using split rims, make periodic checks for noises in the wheel, as it is possible for damage to occur to the wheel bolts if they are not securely tightened when tires are changed. If the wheel bolts are loose or have been sheared off as a result of being loose, a grinding or scraping noise will be present when wheels are turned. Should this condition

exists it will be necessary to immediately remove the rim and tire from the machine and determine the cause of noise and repair or replace defective parts.

```
X X X X X X X X X X X X X X X X X X X X X X X X X X X
X                                                     X
X                    W A R N I N G                    X
X                                                     X
X  BEFORE REMOVING TIRE FROM RIM, RELEASE             X
X                                                     X
X  ALL AIR FROM THE TIRE BY REMOVING VALVE            X
X                                                     X
X  STEM CORE.                                         X
X                                                     X
X X X X X X X X X X X X X X X X X X X X X X X X X X X
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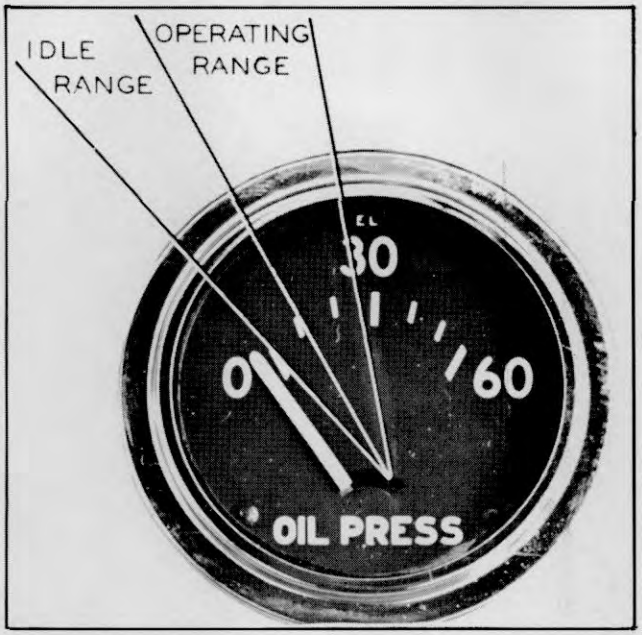


Plate 6417. Oil Pressure Indicator

N O T E

Normal oil pressure is 26 lbs. at 2600 R. P. M. with oil hot (about 140° F) which at idling speed results in pressure between 5 and 10 lbs.

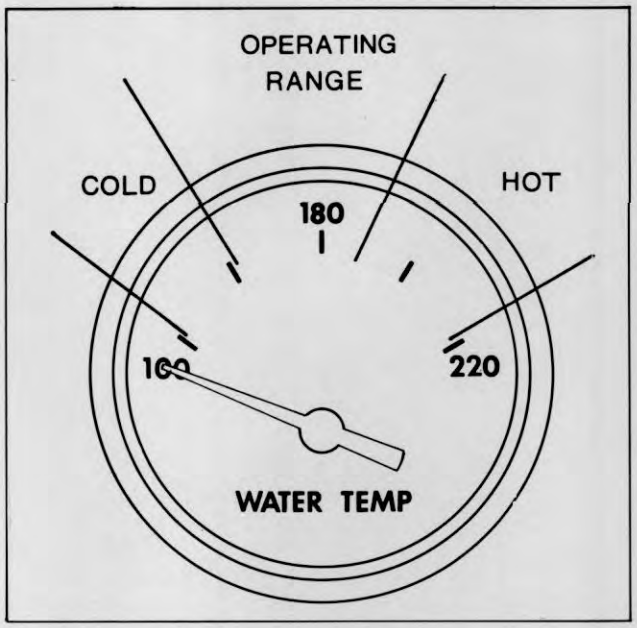


Plate 9974. Engine Coolant Temperature Indicator

N O T E

The water temperature should register 150° to 185° F. after the first ten or fifteen minutes of operation.

Plate 6419. Converter Oil Temperature Warning Light

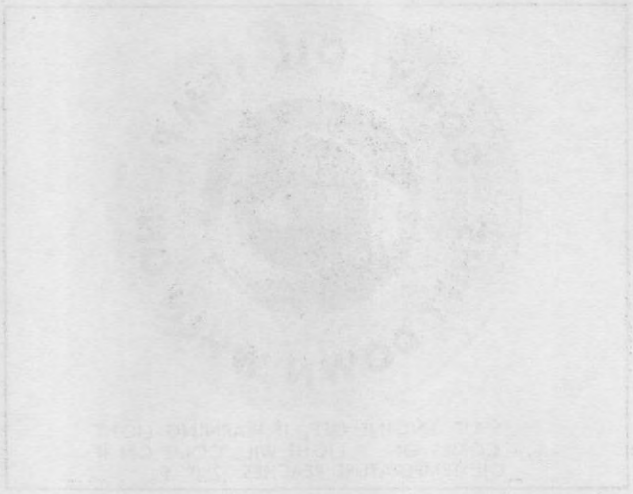
N O T E

If warning light comes on shift into lower gear or discontinue operation until oil cools. Converter temp light should not be lit. Light will come on if oil temperature reaches 250° F.

Plate 6420. Converter Low Oil Pressure Warning Light

N O T E

With all transmission control levers engaged and engine warm, converter oil pressure light should not be lit. If light comes on discontinue operation and determine cause.



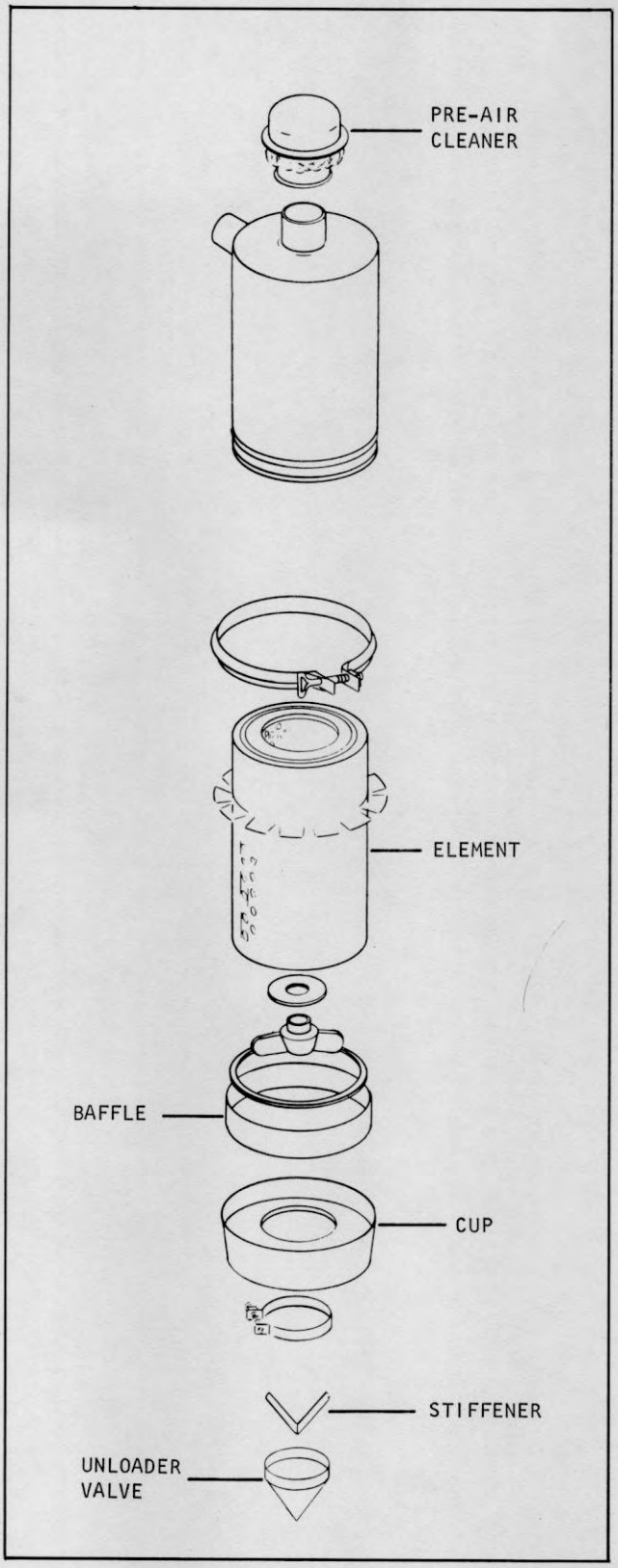


Plate 9975. Air Cleaner Assembly

PRE-AIR CLEANER

Remove and clean exterior and interior thoroughly every 8 operating hours or more often under extremely dusty conditions, see Plate 9975.

DUST CUP

Empty and clean dust cup regularly. Daily care may be necessary under dusty conditions. Remove foreign material such as leaves from around filter and tighten wing nut if necessary.

Unloader valve should be serviced regularly and daily under extremely dusty operating conditions.

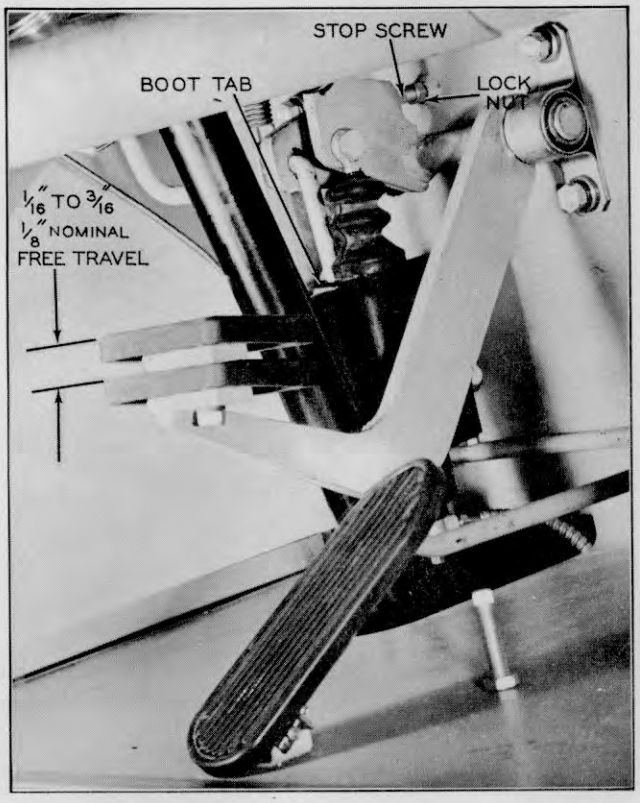


Plate 6425. Brake Pedal Free Travel

BRAKE PEDAL

1. Depress brake pedal with ignition off and hold foot pressure for at least ten seconds. Pedal must be solid, must not be spongy or drift under foot pressure.

2. Start engine and allow it to idle for about ten seconds.

3. Depress brake pedal with about as much foot pressure as required for normal stopping and hold pressure.

4. Remove foot from pedal and turn off ignition switch.

5. Depress brake pedal five times slowly. Pedal should be depressed approximately the same distance each time. If the pressure required to depress the pedal to the same position has increased, the brake system is working properly.

6. Check pedal free travel. Pedal should have 1/16 to 3/16 (1/8 nominal) inch free travel.

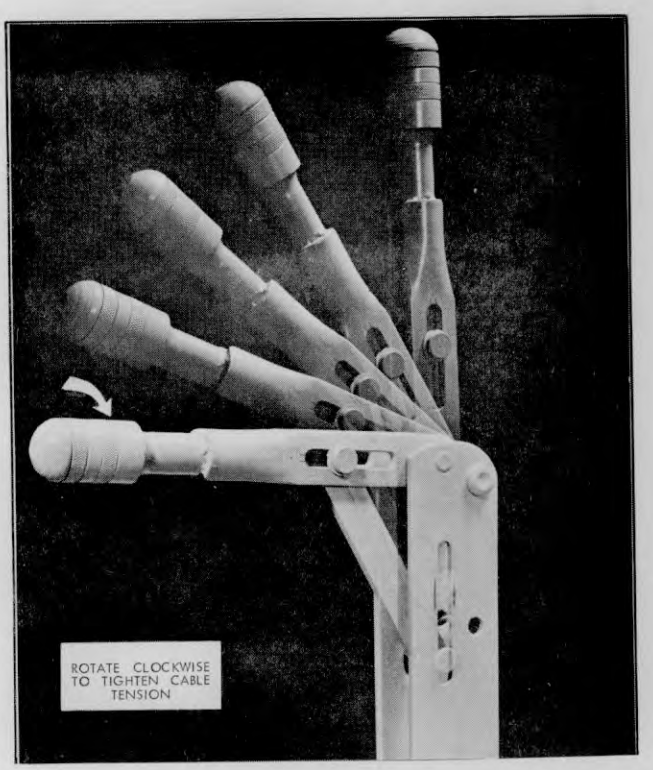
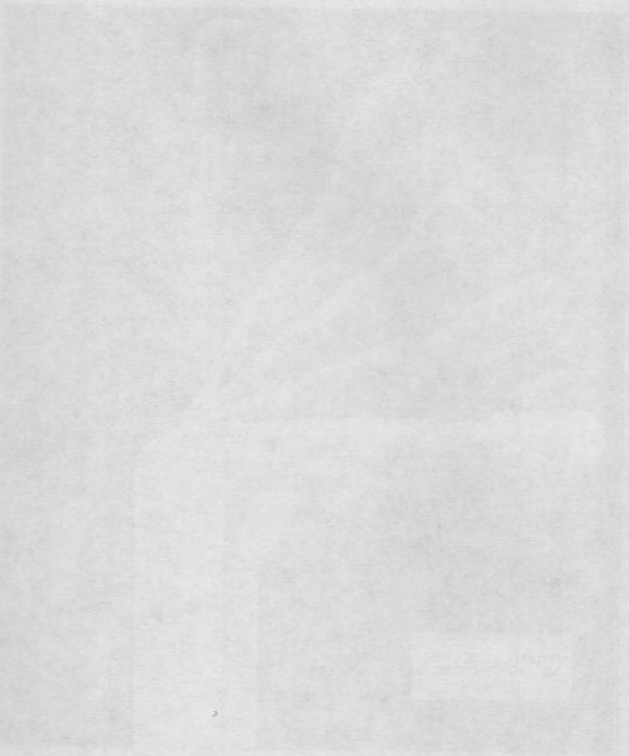
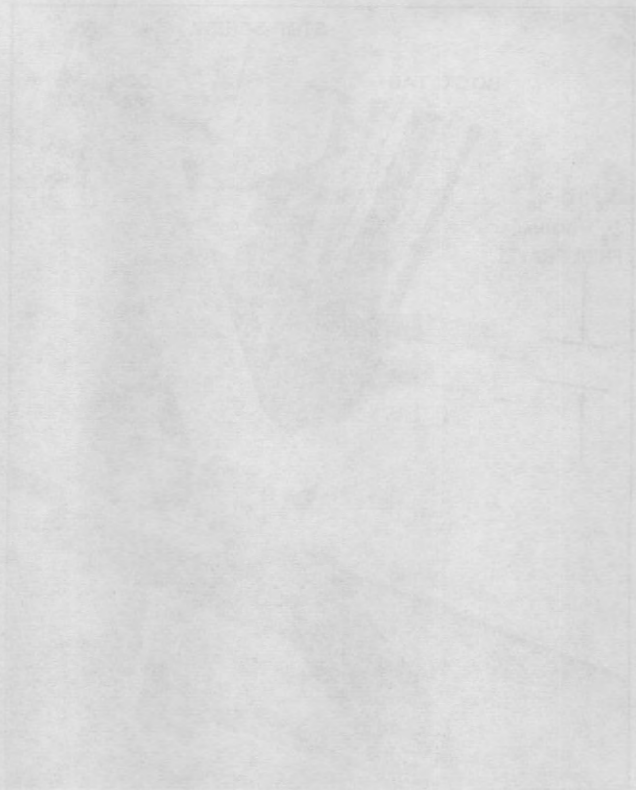


Plate 6505. Parking Brake

PARKING BRAKE

Make certain that the parking brake is working properly and will hold truck on a reasonable grade.





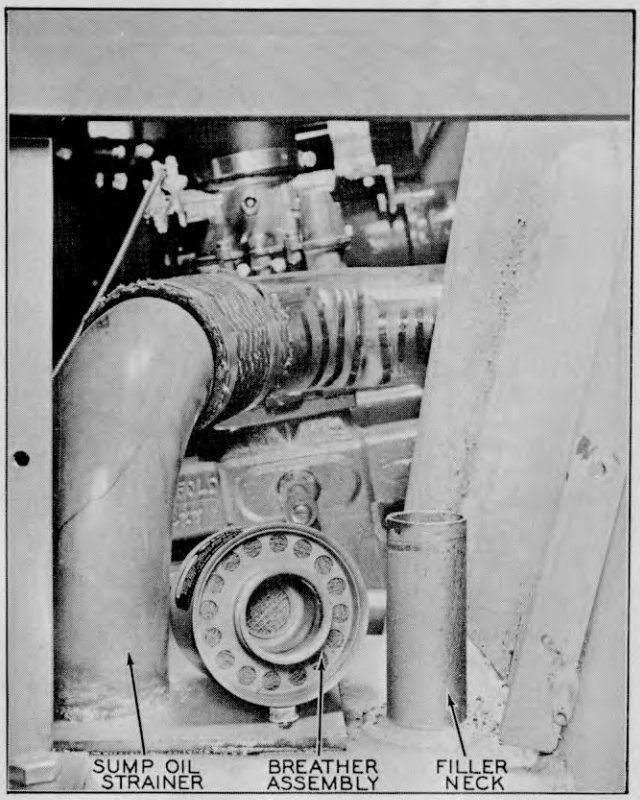


Plate 6426. Hydraulic Sump Tank

HYDRAULIC SUMP TANK

Check hydraulic sump tank fluid level in the following manner.

1. Lower upright.

2. Shut engine off.

3. Check fluid level by measuring from top of filler pipe. Oil level should be (8) eight inches from the top.

When adding fluid to the system, care should be taken to keep the fluid free of dust, dirt and all foreign particles. The fluid should be poured through a 200-mesh wire screen which may be conveniently placed or soldered into the large end of a funnel.

NOTE

BEFORE PLACING FUNNEL IN USE, BE CERTAIN THAT IT IS CLEAN.

CAUTION

NEVER USE A CLOTH STRAINER WHEN ADDING FLUID TO THE HYDRAULIC SUMP TANK. CLOTH STRAINERS CONTAIN LINT WHICH IS HARMFUL TO THE HYDRAULIC SYSTEM.

Fill sump tank, if necessary. Start engine and operate valve control levers allowing any air in the lines to escape, then recheck sump tank fluid level before putting machine into operation.

HYDRAULIC CONTROL LEVERS

Check lift and tilt operation. The lift and tilt cylinders should actuate when lift or tilt levers are moved either way from neutral position.

When load is elevated and control lever returned to neutral position, load should remain in elevated position with no downward drift. If load drifts downward, this may indicate lift cylinder leather or seal damage.

With tilt lever in neutral position, upright should remain steady with no backward or forward drift. If upright drifts either way, this may indicate tilt cylinder seal or leather damage.

CAUTION

DO NOT HOLD CONTROL LEVERS IN EXTREME POSITIONS AFTER A LOAD HAS REACHED ITS LIMITS. TO DO SO WILL RESULT IN EXCESSIVE HIGH OIL PRESSURE THAT MAY RESULT IN HEATING OF THE HYDRAULIC OIL.

WARNING

AN INFLATED TIRE AND RIM CAN BE VERY DANGEROUS. MANY ACCIDENTS, SOME FATAL, HAVE RESULTED FROM IMPROPER HANDLING AND OPERATION OF VEHICLE RIMS TIRES AND WHEELS. IT IS, THEREFORE, OF THE UTMOST IMPORTANCE THAT THE FOLLOWING PRECAUTIONS BE NOTED BY ALL PERSONS CONCERNED TO AVOID PERSONAL INJURY AND COSTLY DAMAGE.

1. After raising the vehicle and prior to removal of wheels, place blocking under the frame so the vehicle cannot become lowered by accident. Blocking must be of adequate strength to support the weight of the vehicle.

2. In all cases the air should be removed from the tire by removing the valve core before attempting to remove the wheel from the vehicle. The tire should not be inflated while it is "off" the vehicle. Check for security of all rim retainment bolts and wheel attaching bolts before inflating tire. A clip-on type air chuck should be used so the operator can stand to one side during tire inflation.

3. In all cases, when removing wheels equiped with the lock ring type rim from the vehicle for repair or periodic rotation, completely deflate tires. This is best accomplished by removing the valve core.

4. Tires used on the lock ring type rim should be inflated in a safety cage. See Plate 7614. Insure that rings are properly seated prior to inflation. An inflated tire contains potentially explosive energy that can blow rings loose. A clip-on type air chuck should also be used, so the operator can stand to one side during tire inflation.

5. Use properly matched parts only. Rim base and rings must be matched according to manufacturer, size and type. This information is stamped on each part.

6. Remove rust and other foreign matter. Accumulation of such material in the rim gutter can prevent the proper fitting of rings. Parts that are excessively corroded are weakened and should be replaced. Use of a rust preventative compound (not containing water) during mounting will minimize rusting.

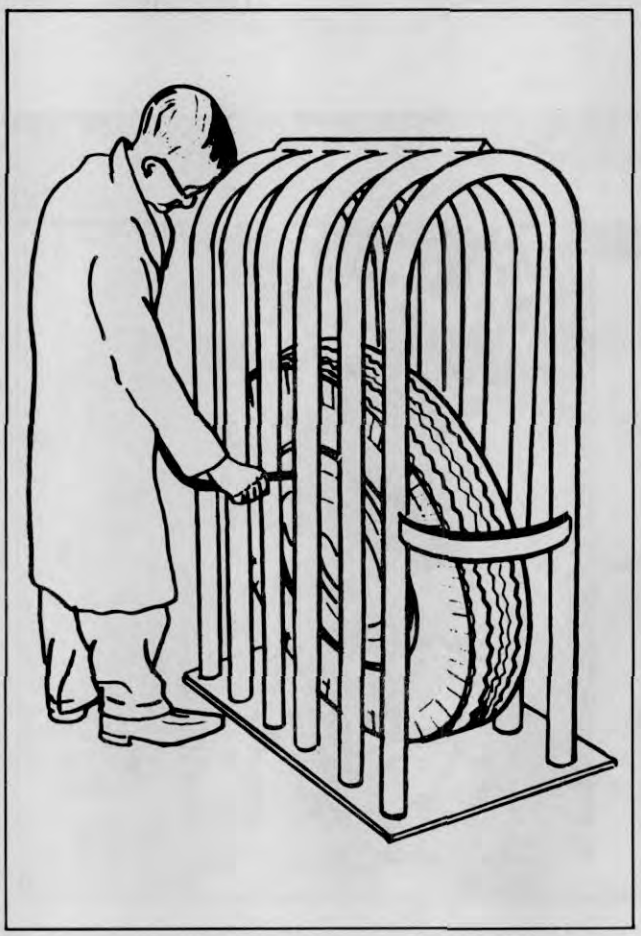


Plate 7614. Safety Cage

7. Do not use over-size or over-inflated tires. Use only preferred or alternate size rims for tires and do not exceed recommended air pressures. It is also important to maintain uniform inflation in both tires of a dual assembly so that weight is equally sustained.

8. Do not run vehicle on one tire of a dual assembly. Never re-inflate a tire that has been run flat without first throughly inspecting it and the rim assembly. It is especially important to make sure the lock ring is secure in the gutter and has not been damaged prior to re-inflation.

9. Completely deflate tire prior to demounting. Remove valve core to insure complete deflation. Check for damage or worn parts. Mark defective parts for destruction to preclude their future use. Abuse during operation or in mounting the tire can cause dents, cracks or distortions which weaken the parts and prevent safe, proper assembly. Replace defective parts with new parts of the correct size and type.

10. Periodically check clamps and wheel nuts.

Loose clamps can cause dangerous rim slippage or detachment of rim and tire from the vehicle. Loose wheel nuts can cause severe damage to rim and hub. Excessive torque is also dangerous in that it can cause stud and rim breakage.

11. Even with the best of maintenance practices, cuts will still be a source of tire trouble. The correct procedure for handling and repairing tires should be given careful attention. Close inspection of all tires should be made at the time of inflation check, and all tires having cuts that penetrate into the cord body should be taken off for proper repair.

Failure to make regular inspections and repairs, when needed, will result in further deterioration of the cord body and eventually a blowout. Small rocks and dirt will get into shallow cuts in the tread and if neglected will gradually be pounded through the cord body.

One simple method to forestall this action is to clean out the cut with an Awl or similar tool to remove any stones or other matter which may be lodged in the cut. Use a sharp, narrow-bladed knife and cut away the rubber around the cut to form a cone-shaped cavity extending to the bottom of the injury. The sides of the cavity should be slanted enough to prevent stones from wedging into it. Tires with cuts treated in this manner may be continued in service without danger of further growth of these injuries. If a tire has at least one deep cut that requires a repair, then all smaller cuts may be quickly nnd economically repaired and vulcanized by the steam kettle method.

N O T E

It is not recommended that tires with breaks be used again.

If even tire wear is evident, wheel alignment should be checked.

DIRECTIONAL TREAD TIRES

All directional tread tires are to be mounted in the correct position with respect to the arrow cast on the side of the tire as explained and illustrated.

Directional Tread Dual Tires:

1. Inside dual tire arrow to point in the direction of forward rotation, see Plate 6422.

   (Rotate wheel to bring arrow on tire above the wheel. Arrow must point toward front of truck.)

2. Outside dual tire arrow to point in the direction of rearward rotation. See Plate 6423.

   (Rotate wheel to bring arrow on tire above the wheel. Arrow must point toward rear of truck.)

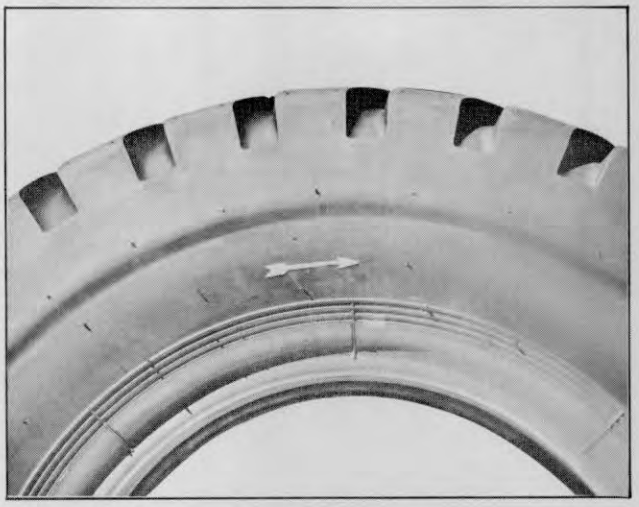


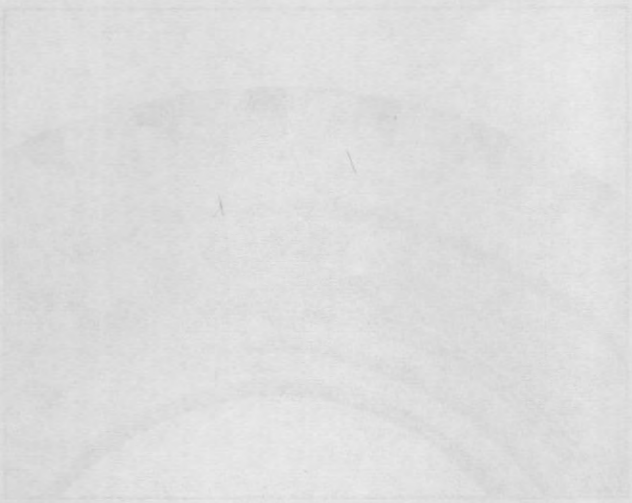
Plate 6422. Inside Dual Tire
(or Single Drive Tire)
(Arrow to point toward front of truck)

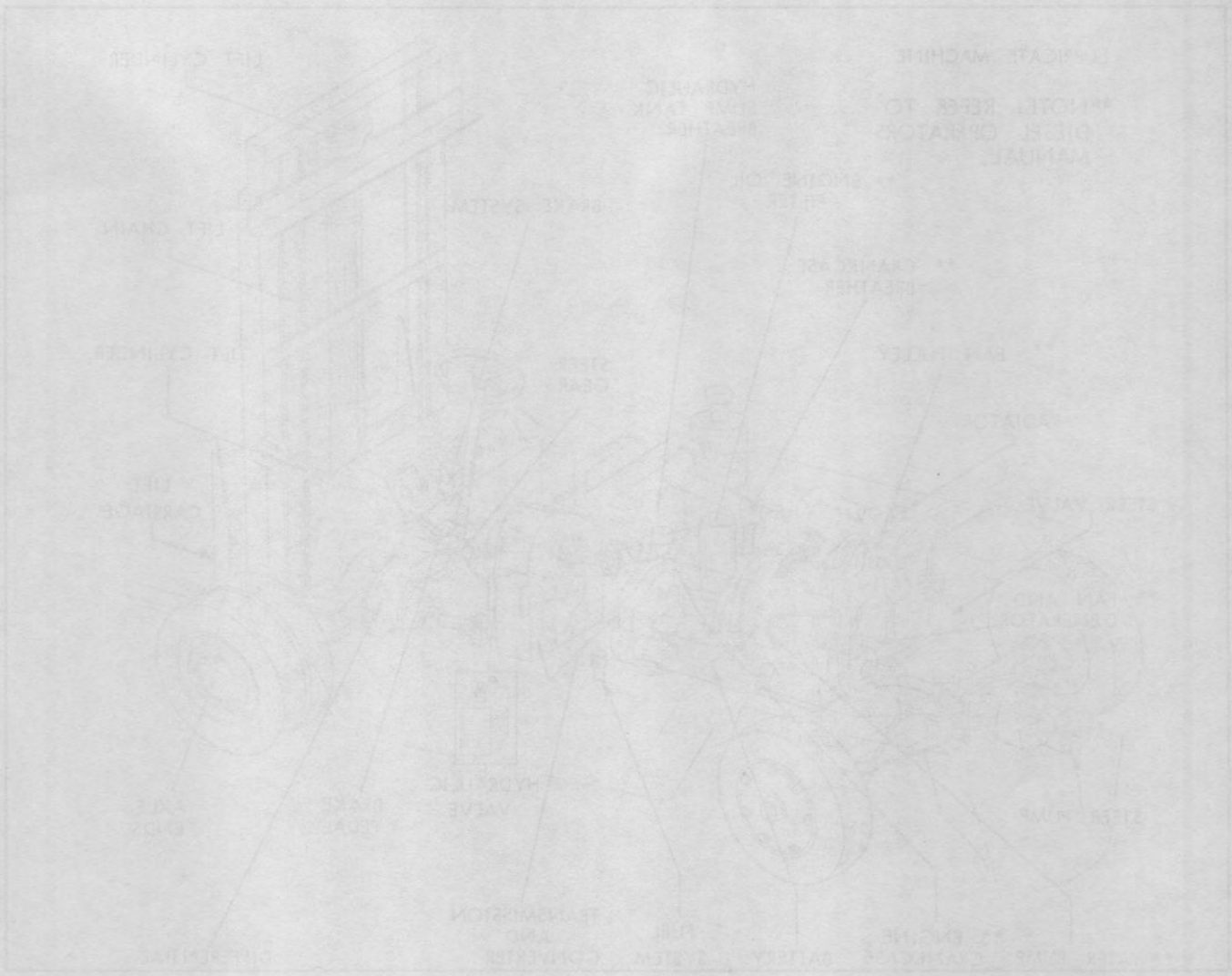
Plate 6423. Outside Dual Tire
(Arrow to point toward
rear of truck)

Directional Tread Single Drive Tires:

1. Tire arrow to point in the direction of forward rotation, See Plate 6422.

   (Rotate wheel to bring arrow on tire above the wheel. Arrow must point toward front of truck, see Plate 6422.





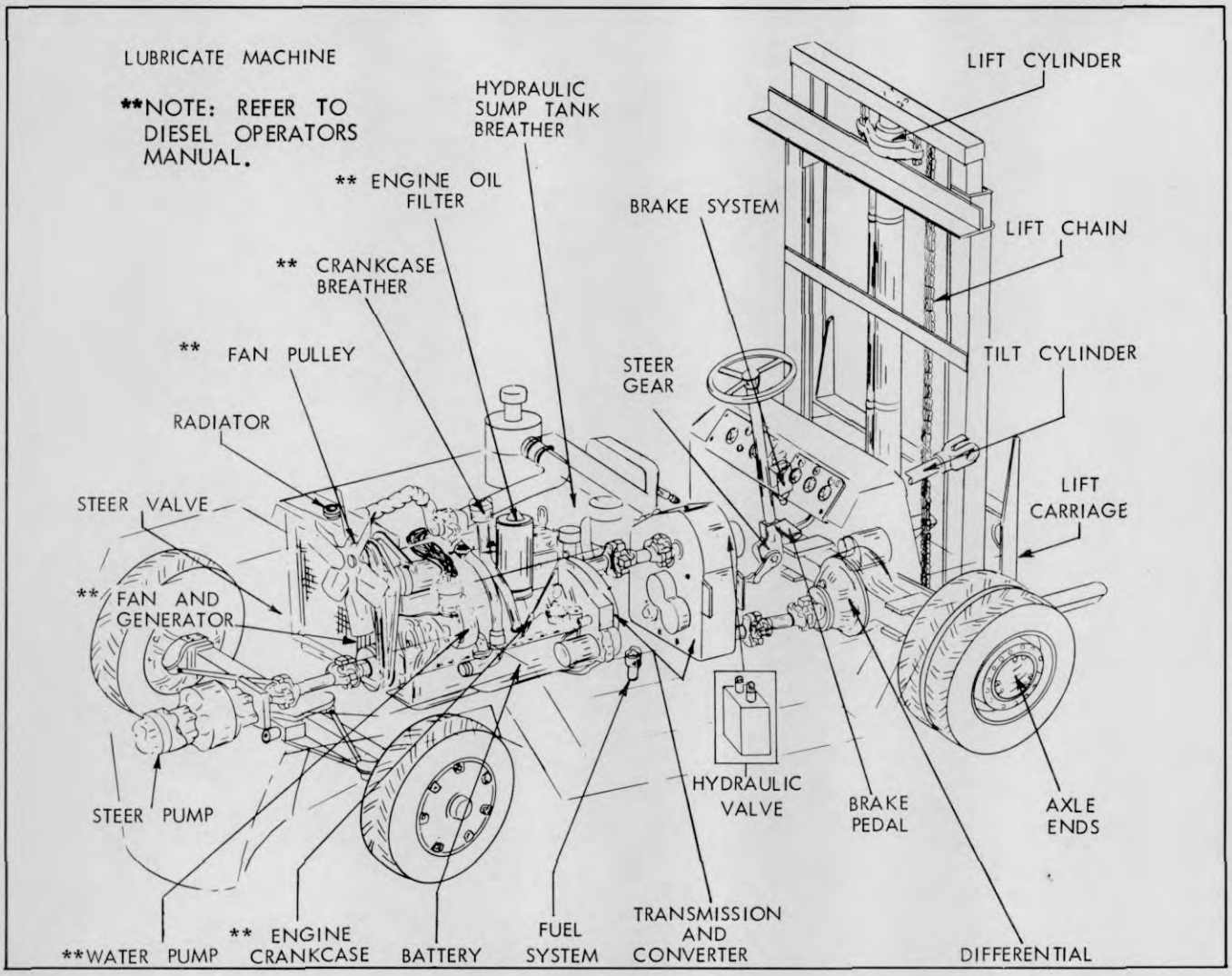


Plate 6509. Lubrication & Preventive Maintenance Illustration

TRANSMISSION & CONVERTER. Verify fluid level, fill if necessary with Automatic Transmission Fluid Type AQATF. Transmission Level Plug is located on the right front face of transmission. Fill through Filler Plug located on left hand side of converter until oil comes up to level plug in transmission.

DIFFERENTIAL. Verify lubricant level, fill if necessary with E.P.G.L. S.A.E. 90, Clark Specifications MS 8.

FUEL LINES. Make certain that fuel line connections are secure. Check fuel lines for obstructions and leaks. Check screen in fuel filler cap to make certain that is is properly installed.

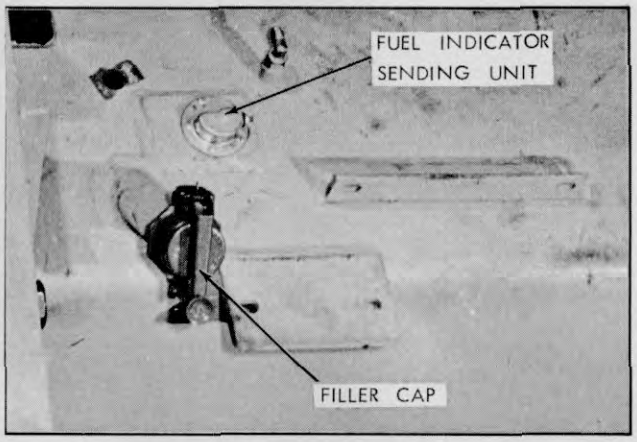


Plate 6506. Fuel Tank

COOLING SYSTEM

Check radiator and hoses for leaks.

Add proper amount of water or anti-freeze solution to cooling system. If anti-freeze is not available and machine is to be at rest for an appreciable length of time, drain radiator when temperature is liekly to be 32^{o} F, or lower. If water is added to radiator containing anti-freeze solution, always test solution in radiator with a hydrometer to determine the degree of protection. For proper amount of anti-freeze solution required to protect the cooling system, refer to instructions on anti-freeze container.

Cooling System Capacity - Refer to Specification.

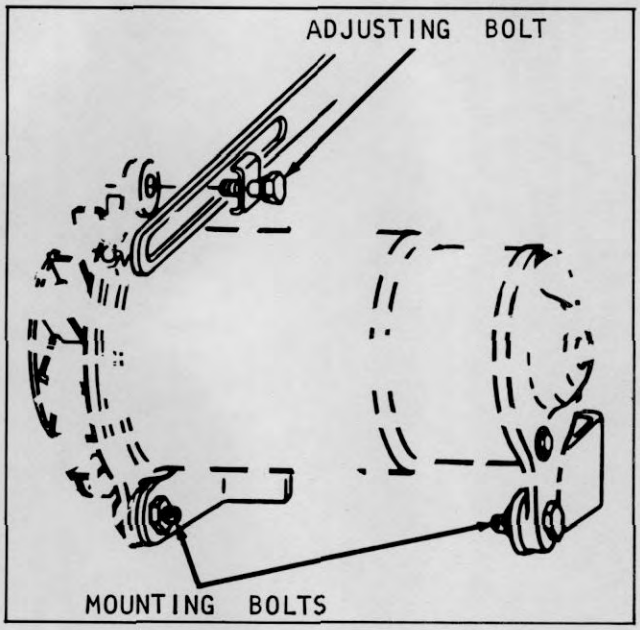


Plate 6631. Drive Belt Adjustment

DRIVE BELT ADJUSTMENT

The drive belts should have finger pressure deflection of 3/4 to 1 inch midway on long span. If belts require adjustment, use following procedure.

1. Loosen brace adjusting bolt and two lower mounting bolts, see Plate 6631.

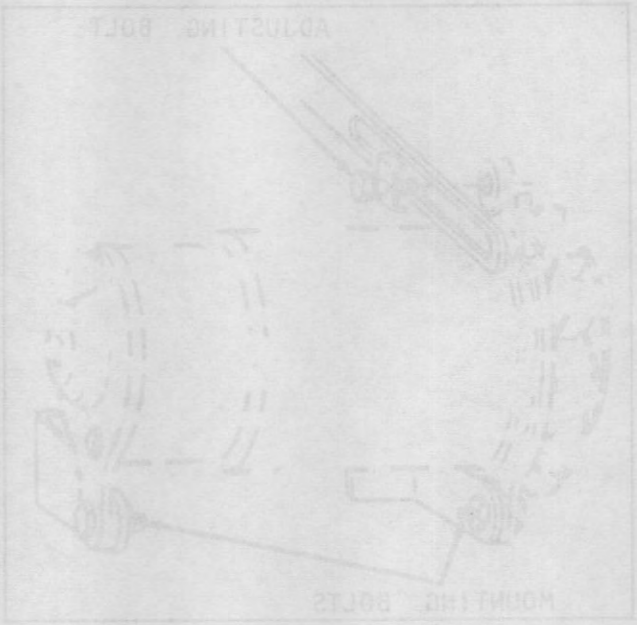
2. Move charging unit toward cylinder block to loosen Drive Belt and away from cylinder block to tighten belt. Tighten bolts when correct finger deflection is obtained.

C A U T I O N

EXERCISE CAUTION WHEN ADJUSTING BELTS. BELTS ADJUSTED TOO TIGHT WILL VERY LIKELY CAUSE BEARING DAMAGE. HOWEVER, BELTS ADJUSTED TOO LOOSE, BELT WEAR WILL RESULT AND ALSO HIGH ENGINE TEMPERATURE DUE TO BELT SLIPPAGE.

N O T E

Upon replacement of drive belts, it will be necessary to use a matched set of belts.



STEER GEAR

Verify lubricant level, fill if necessary with Amolith Grease EP #1 or equivalent.

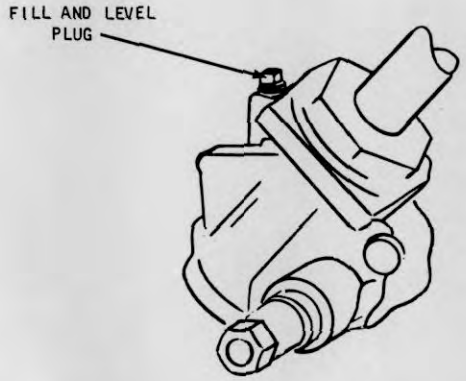


Plate 6429. Steering Gear

BATTERY INSPECTION

Check battery fluid level. Make sure that all connections are tight at battery, starter, charging unit, voltage regulator, distributor and spark plugs.

Take hydrometer reading of electrolyte to determine state of charge. Charge battery if reading is below 1.225 at 24° C(75° F), or below 1.265, if machine is operating in cold climates. If machine is operating in tropical areas, in which freezing weather is not encountered, the full charge specific gravity reading may be lowered from 1.375 to 1.225 by diluting the electrolyte with distilled water.

C A U T I O N

MAKE CERTAIN THAT SPECIFIC GRAVITY IS

ADJUSTED TO NORMAL IF MACHINE IS SHIPPED

TO AREAS WHERE IT WILL BE EXPOSED TO

FREEZING TEMPERATURES.

N O T E

Add distilled water immediately before charging. Do not add distilled water to a battery immediately after a charge.

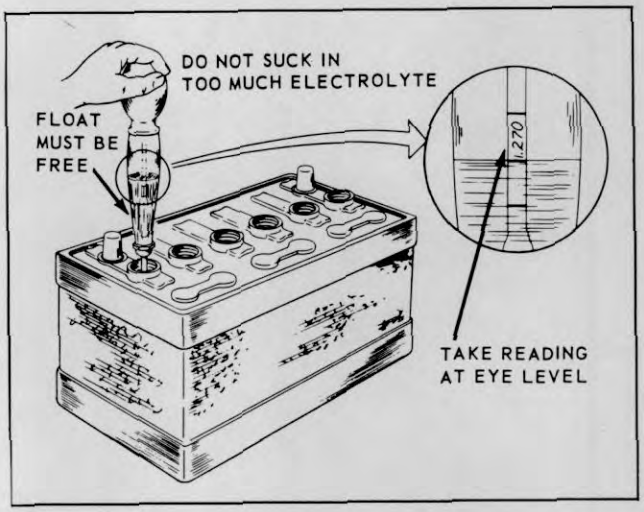


Plate 6271. Check specific Gravity of Battery

TO TEST BATTERY

1. Connect positive lead of test voltmeter to positive terminal of battery and negative lead of voltmeter to negative (grounded) terminal of battery.

2. Record voltmeter reading.

3. Now pull high tension wire from ignition coil so engine will not start when starter is engaged.

4. Turn ignition switch to start position and check the voltmeter reading.

5. Compare this reading with the previously recorded reading.

If the voltage drop was more than 4 volts, or if the second reading registered below 8 volts, battery should be replaced.

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X X
X W A R N I N G X
X X
X NEVER ALLOW FLAME OR SPARKS NEAR THE X
X X
X BATTERY FILLER HOLES. BECAUSE EXPLOSIVE X
X X
X HYDROGEN GAS MAY BE PRESENT. X
X X
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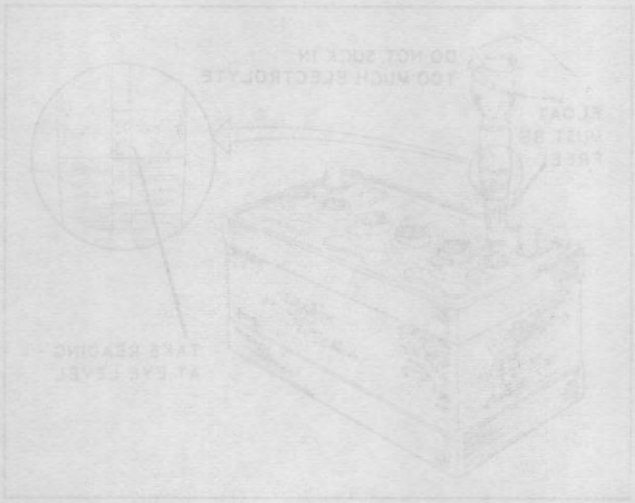
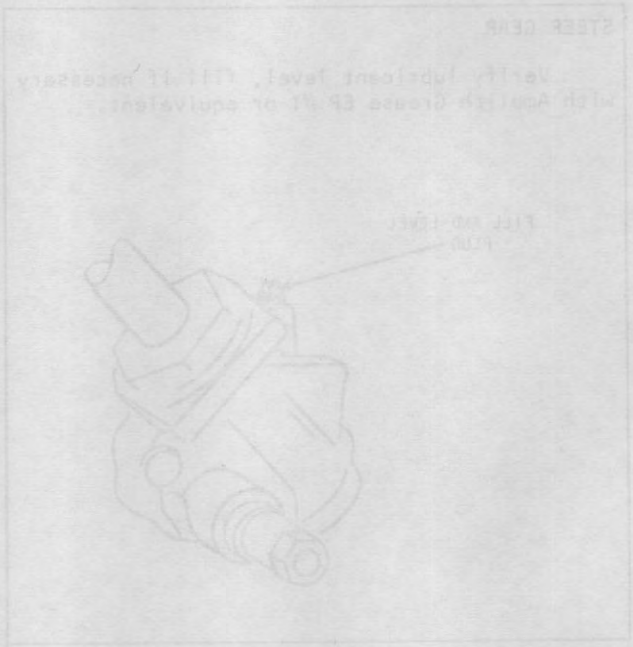




BRAKE SYSTEM

Using Boot Tap (See Plate 6425, pull boot free of master cylinder and check brake fluid level. Brake fluid should be within 1/4 inch of the top. Fill with S.A.E. 70R3 Heavy Duty. Hydraulic Brake Fluid. Be sure to replace boot properly over "lip" of master cylinder after checking or adding fluid.

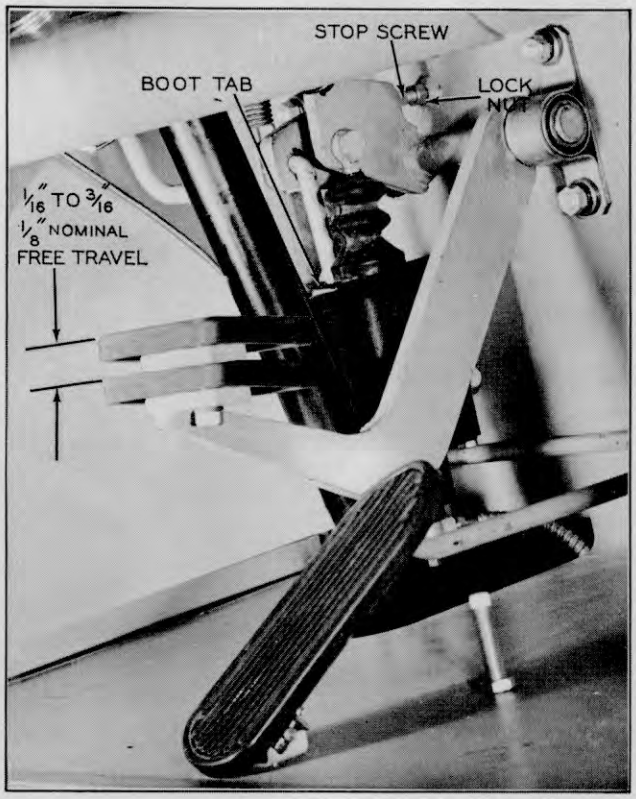


Plate 6425. Brake Pedal Adjustment

BRAKE PEDAL

The brake pedal is properly adjusted if it has at least 1/16 to 3/16 inch (1/8 inch nominal) free play before meeting resistance from master cylinder. If necessary, adjust per instructions given in the following paragraphs.

Brake Pedal Adjustment: Refer to Plate 6425, then make the following adjustment.

1. Loosen lock nut and rotate stop screw to obtain the specified pedal free travel.
2. Tighten lock nut to hold the adjustment.

AXLE ENDS

Verify lubricant level, fill if necessary with Extreme Pressure Hypoid Gear Lubricant, S.A.E. 90. Verify lubricant level by rotating wheel so plug is at approximately 4 o'clock, See Plate 6430.

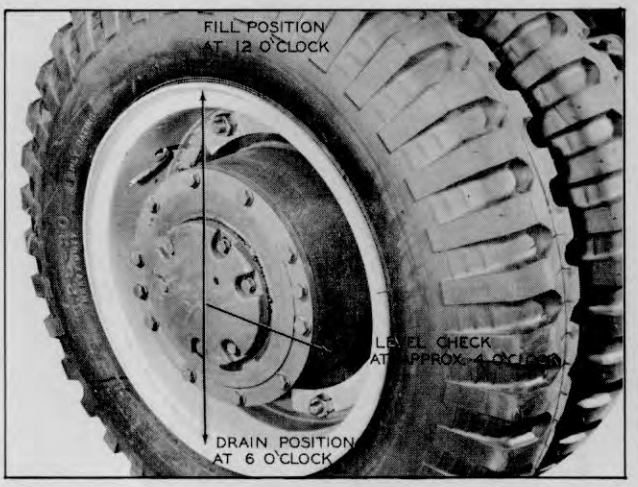


Plate 6430. Check Axle End Lubricant

HYDRAULIC SUMP TANK BREATHER

Check breather to be sure it is not dirty or clogged with foreign matter. Replace breather if dirty.

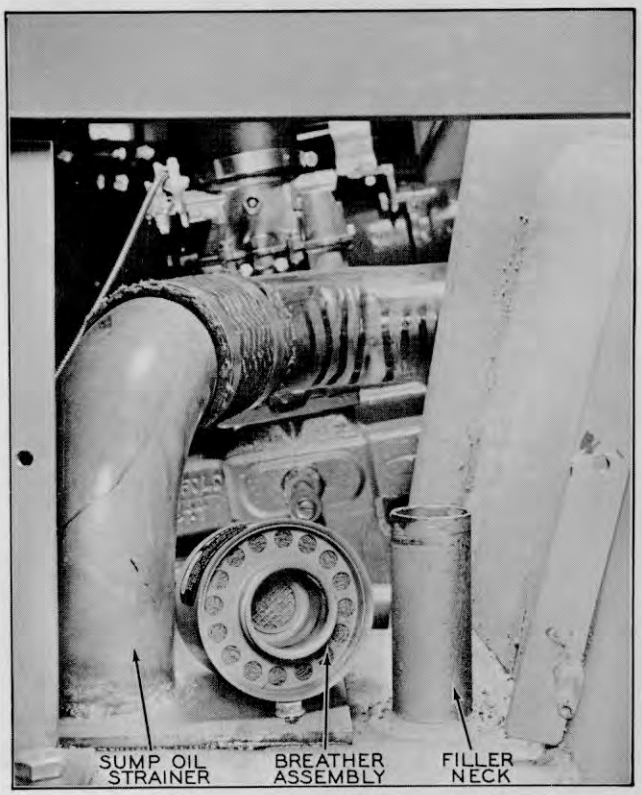


Plate 6426. Sump Tank Breather

LUBRICATION AND PREVENTIVE MAINTENANCE

LIFT AND TILT CYLINDERS

Check for drift, leakage at packings, damage and security of mountings (Anchor and Pivot Pins, Flanges).

LIFT CHAINS

The lift chains are mounted to the chain anchors on the lift carriage and at the chain anchor rods near the lift cylinder piston head.

NOTE

LIFT CHAINS MUST NOT HAVE ANY SLACK WITH FORKS LOWERED. WITH LIFT CARRIAGE LOWERED AND CARRIAGE FORKS EMPTY, LIFT CHAINS ARE PROPERLY ADJUSTED IF THE BOTTOM OF THE FORK HEEL IS 1/2 INCH OFF THE FLOOR.

If it becomes necessary to adjust the lift chains, use the following procedure:

1. Machine must be on a level surface with forks empty.

2. Bring upright to vertical position (no backward or forward tilt).

3. Lower lift carriage -- be sure upright is vertical to the level (floor) surface.

4. Adjust chain length so that the bottom of the fork heel is 1/2 inch off floor.

LUBRICATE MACHINE

CAUTION

WHEN LUBRICATING THE TRUCK, MAKE A VISUAL INSPECTION OF ALL HYDRAULIC LINES, FITTINGS AND ALL ELECTRICAL WIRING. LUBRICATE ALL MISCELLANEOUS LINKAGE WITH S.A.E. NO. 20 OIL.

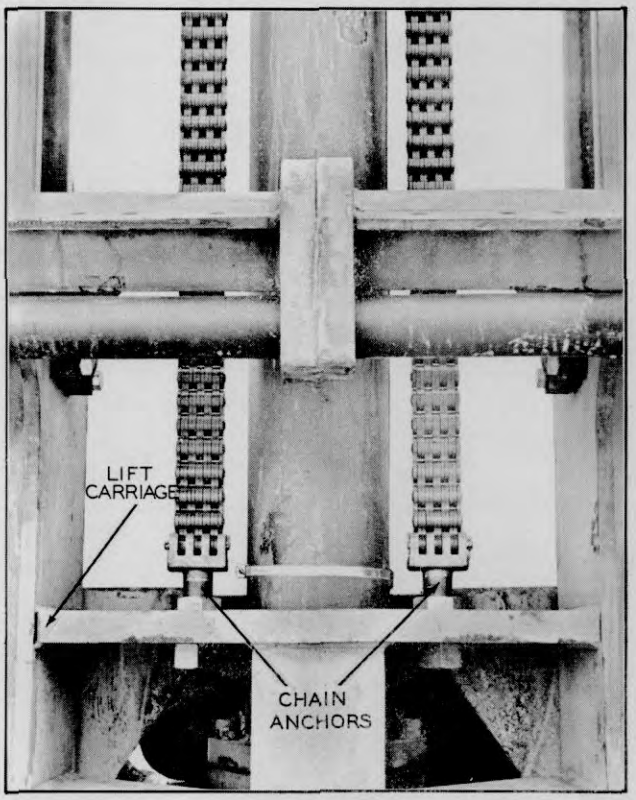


Plate 6431. Lift Chain Adjustment

STEER VALVE (BOOSTER) AND STEER PUMP

Inspect for leakage, damaged lines, security of mounting.

HYDRAULIC CONTROL VALVE AND LINES

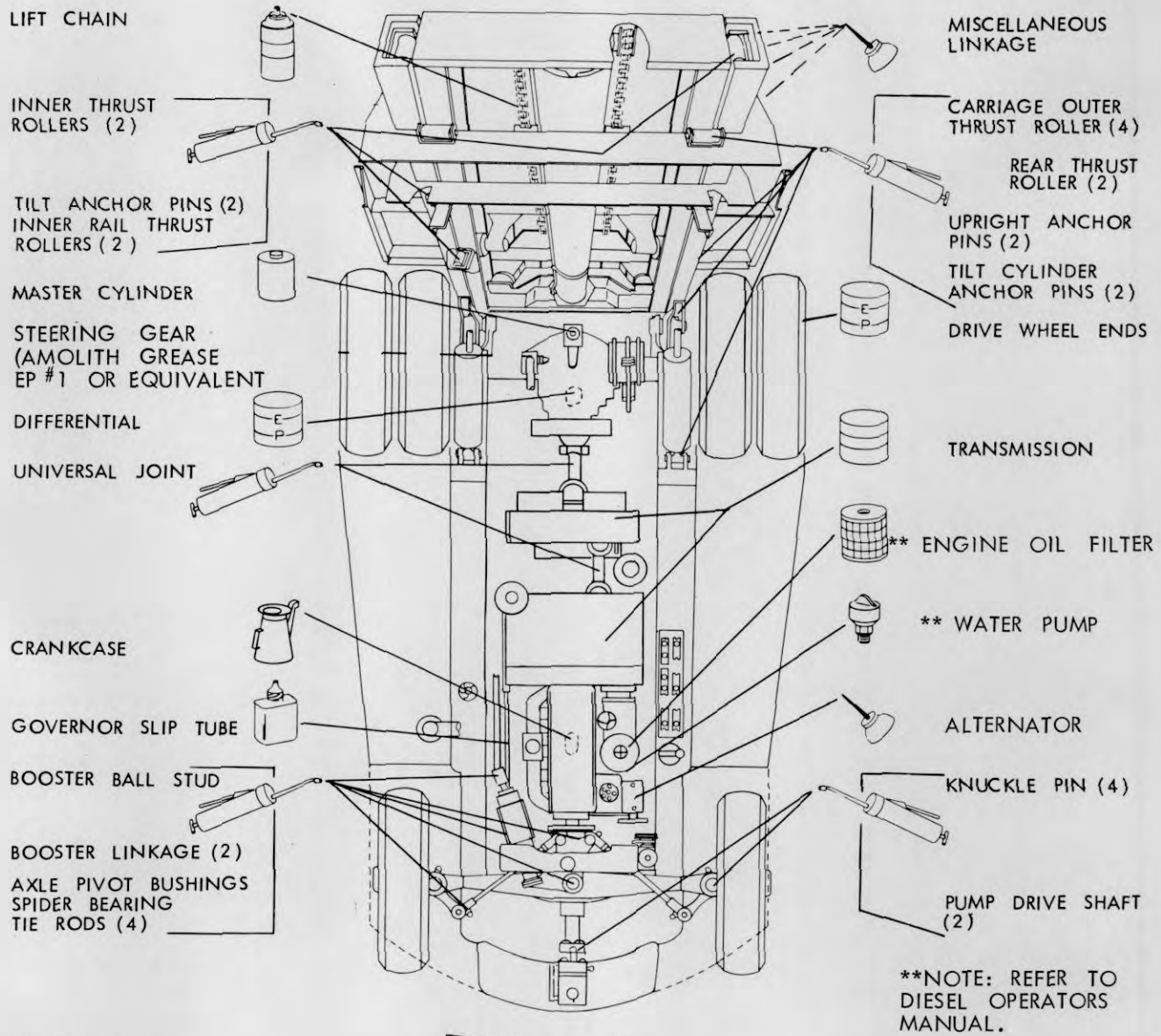
Inspect for damage, leakage and security of mounting.

LIFT BRACKET

Inspect for damage, bent forks etc.

INDUSTRIAL TRUCK DIVISION

LUBRICATION AND PREVENTIVE MAINTENANCE



**NOTE: REFER TO DIESEL OPERATORS MANUAL.

CHASSIS GREASE

ENGINE OIL: S.A.E. 20

879803 AUTOMATIC TRANSMISSION FLUID TYPE "A" ARMOUR QUALIFIED

WATER PUMP GREASE

ENGINE OIL FILTER CARTRIDGE KIT

1800200 HYDRAULIC BRAKE FLUID HEAVY DUTY S.A.E. 70 R3

GRAPHITE GREASE

886399 CHAIN LUBE

GEAR LUBE. S.A.E. 90

EXTREME PRESSURE S.A.E. 90 GEAR LUBE.

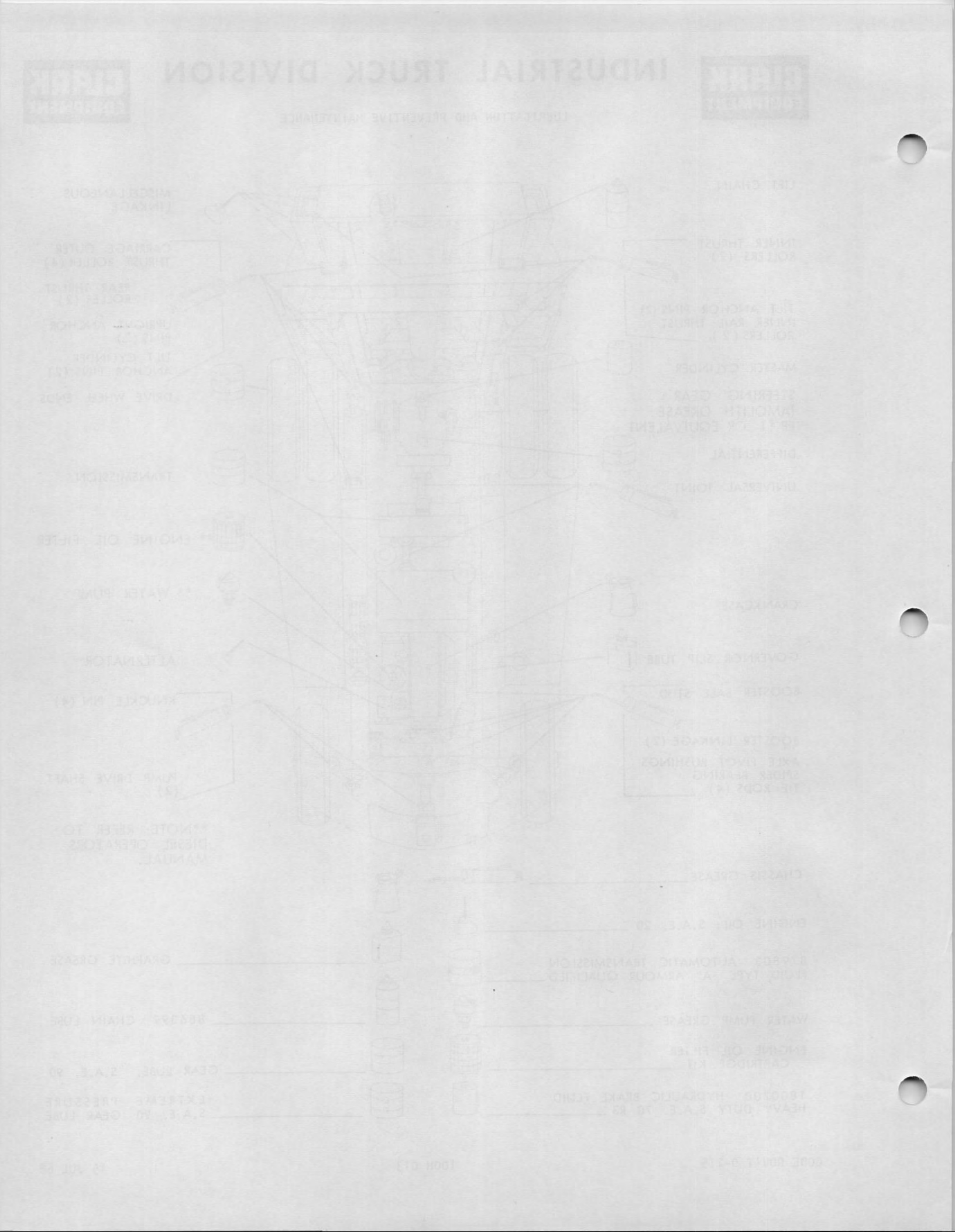


Plate 7165. Restriction Indicator

Plate 7173. Cleaning Dusty Element

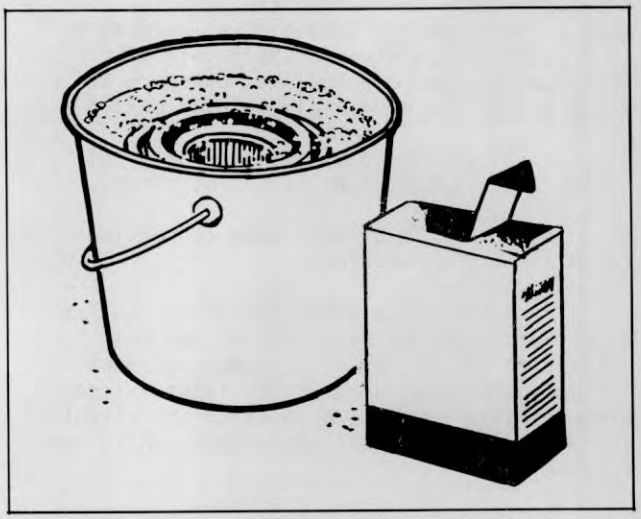


Plate 7174. Cleaning Oily Sooty Element

C A U T I O N

AIR PRESSURE MUST NOT EXCEED 100 P. S. I. MAINTAIN A REASONABLE DISTANCE BETWEEN NOZZLE AND ELEMENT. DIRECT AIR THROUGH ELEMENT (OPPOSITE TO DIRECTION OF ARROWS CAST ON END OF ELEMENT). DO NOT DAMAGE FINS, OR SEALING SURFACES OR RUPTURE ELEMENT NOR ALLOW DUST TO DEPOSIT ON CLEAN AIR SIDE.

N O T E

Pre-Air cleaner fins are not removable.

RESTRICTION INDICATOR

When signal locks in view (Plate 7165.), service the filter element as follows:

1. Remove cover.

2. Lift out baffle.

3. Empty dust from cup.

4. Remove filter element. Clean thoroughly by using one of the following methods.

(a) Dry Dusty Element: Use compressed dry, clean air directing air up and down pleats on the clean side of the element.

(b) Oily or Sooty Element: For best results, use small amount of cool tap water with non-sudsing household detergent then add warm water. The warmer the solution the better the cleaning. Soak for approximately 15 minutes. Rinse element thoroughly with clean water from hose (maximum pressure 40 P.S.I.). Air dry completely before reusing.

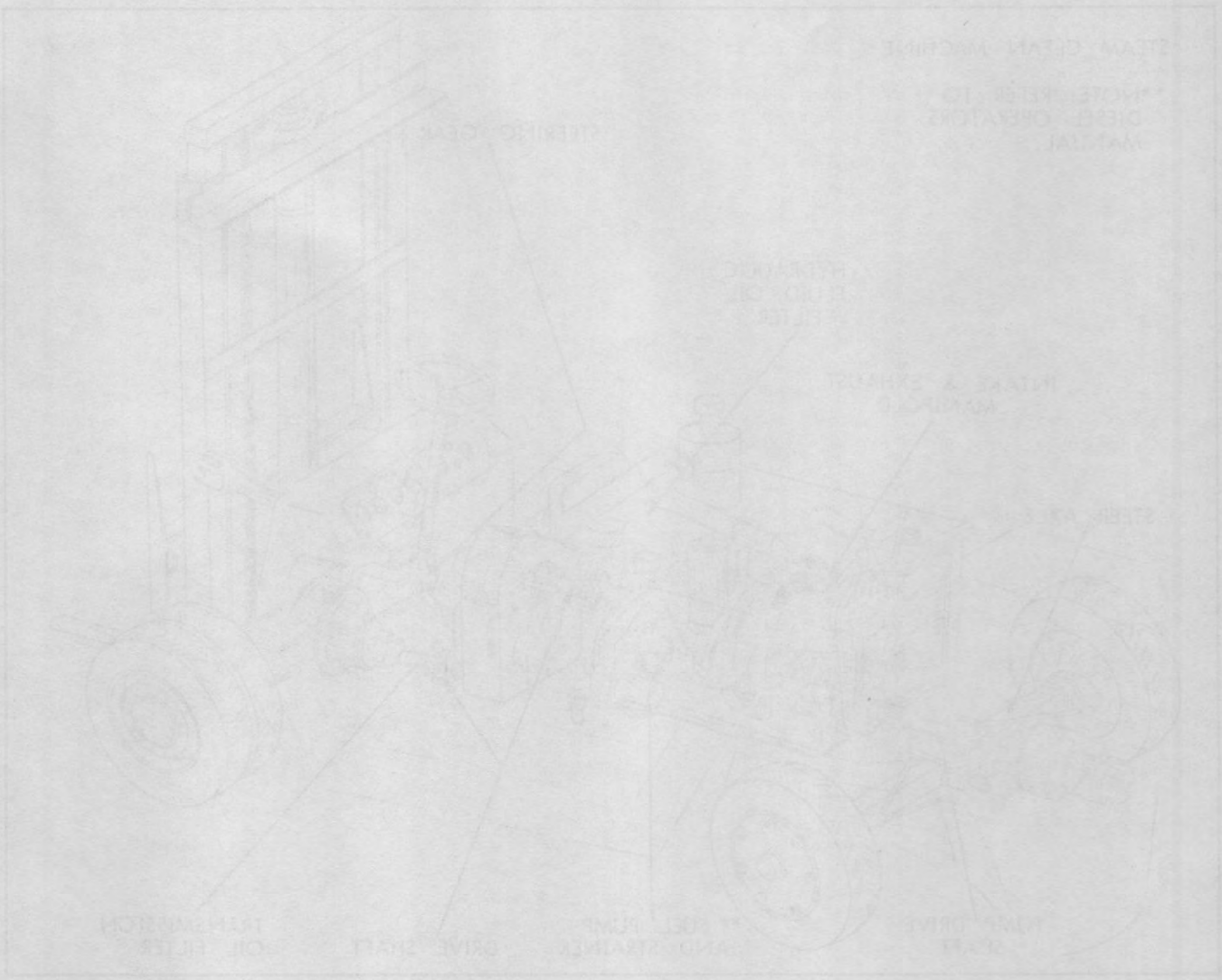
5. Clean cover, baffle and inside of filter body with a clean lint free cloth.

6. Check air cleaner hose connections for air tight connections.

7. After air cleaner has dried, (a fan or air draft may be used, but do not heat element to hasten drying), inspect element for damage by placing a bright light inside element. Thin spots, pin holes or the slightest rupture will render the element unfit for further use.

8. Install filter element making sure wing nut is tight.

9. Replace baffle, cup, and unloader valve.



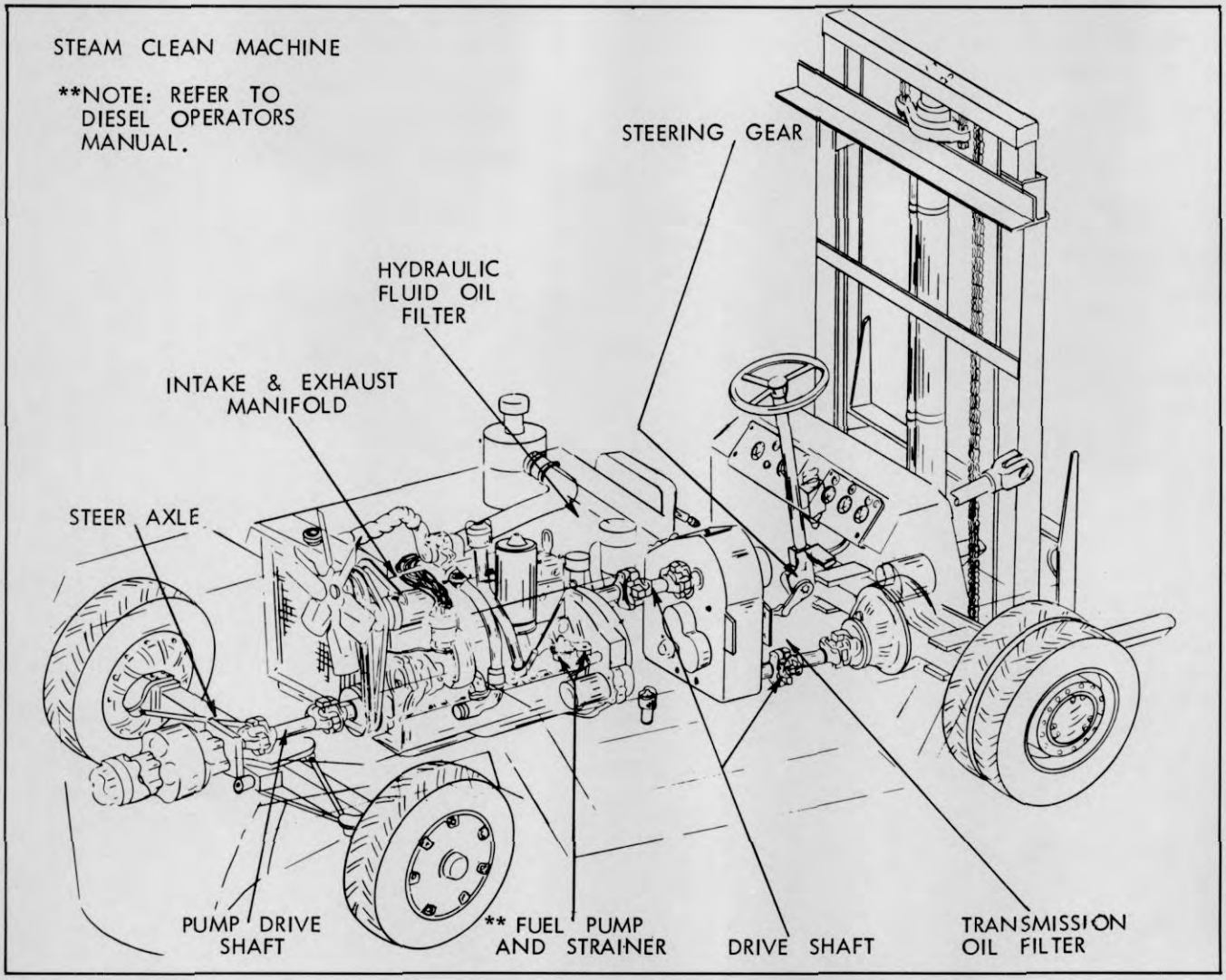


Plate 6510. Lubrication and Preventive Maintenance Illustration

NUTS, BOLTS AND CAP SCREWS. Check security of mounting, tighten as required.

TRANSMISSION & CONVERTER OIL FILTER. The oil filter element is of the replaceable type. The element should be changed whenever the oil is drained. To remove element, remove oil filter cover screw and gasket. Lift out oil filter element. Drain and thoroughly clean filter case. Install new element. Use new gaskets and install cover spring, oil filter cover and secure with cover screw.

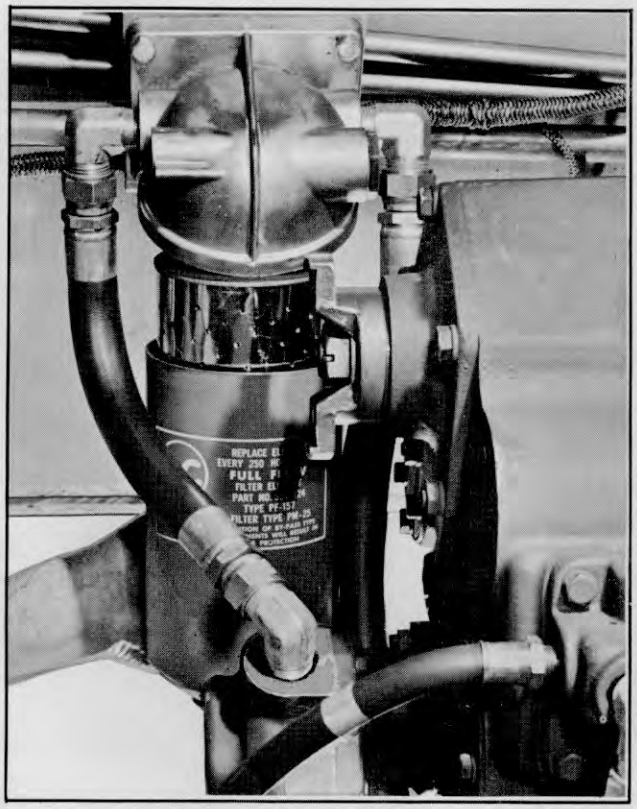


Plate 6258. Transmission Oil Filter

N O T E

Oil filter should be replaced any time oil is changed or a repair is made.

HYDRAULIC SUMP TANK OIL FILTER. The oil filter element is of the replaceable type.

1. Remove filter case, bolt and gasket, pull from machine, See Plates 6434 and 6433.

2. Remove filter, filter spring and thoroughly clean case.

3. Replace bolt gasket and install bolt in case.

4. Install filter spring (narrow end down) and filter in case.

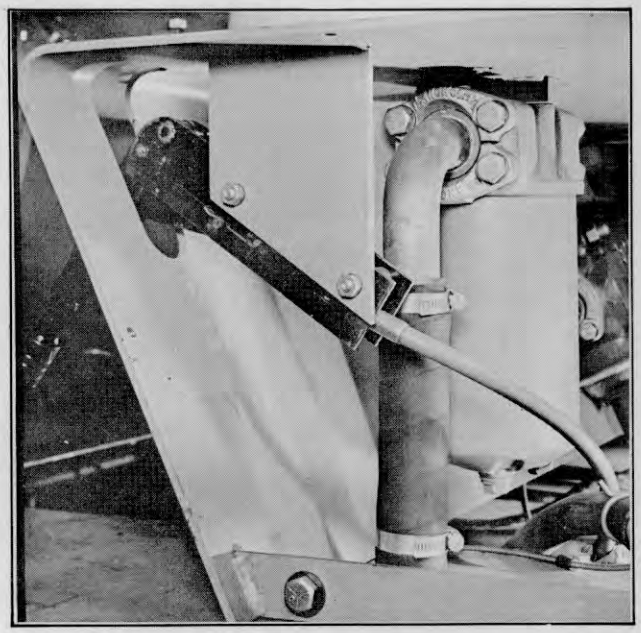


Plate 6434. Sump Tank Oil Filter

5. Using a new case seal ring, install case and secure with bolt. Replace seal ring and gasket, do not reuse old components as they do not afford a positive seal.

C A U T I O N

START ENGINE AND OPERATE HYDRAULIC CONTROL LEVERS SEVERAL TIMES, CHECK OIL FILTER FOR LEAKS.

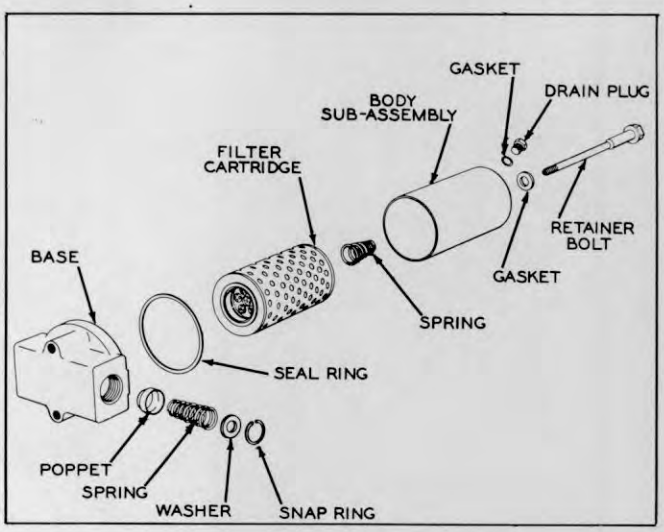


Plate 6433. Hydraulic Oil Filter Components.

STEERING GEAR

Steering gear adjustments must be made in the following manner (See Plates 6435 & 6436.)

Always check worm bearing thrust adjustment, and adjust if necessary, before making sector gear lash adjustment.

Before making adjustments, the following preliminary operations are necessary.

1. Disconnect steering drag link from pitman arm. Note relative position of drag link parts when disconnecting link so the parts may be assembled correctly.

2. Check lubricant level in steering gear housing. If low, add enough lubricant to bring level up to filler plug hole. Use Amolith Grease EP #1 or Equivalent.

3. Tighten steering gear-ahead position of steering mechanism by turning steering wheel to extreme right.

C A U T I O N

APPROACH EXTREME ENDS CAUTIOUSLY; WORM

BALL NUT MUST NOT STRIKE ENDS WITH ANY

DEGREE OF FORCE.

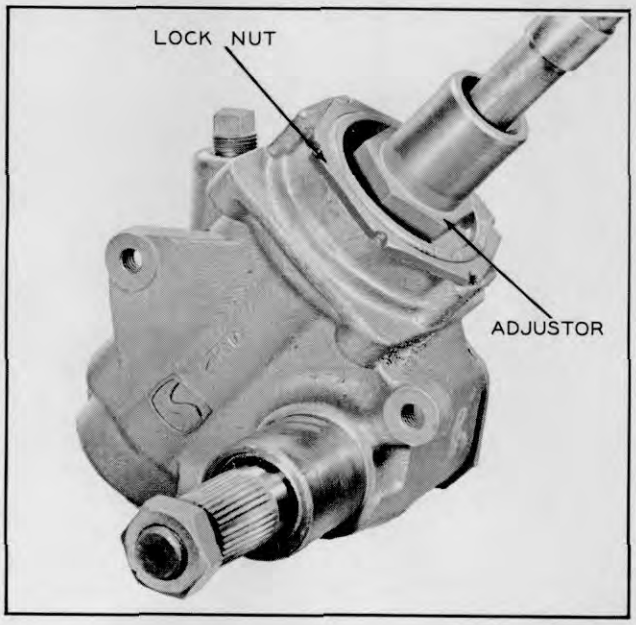


Plate 6435. Steering Gear Thrust Adjustment (Worm Bearings)

Turn to opposite end in the same manner, counting the exact number of turns from right to the left end. Turn wheel back one-half number of wheel turns. Mark wheel with respect to steering column so center position may readily be found during adjustment procedures.

Worm Bearing THRUST Adjustment: Refer to Plate 6435. and proceed as follows:

1. Check tightness of end cover bolts. Loosen lock nut and turn lash adjuster screw (Plate 6436.) counterclockwise a few turns to provide clearance between sector gear and worm ball nut.

2. Turn steering wheel GENTLY to one extreme end. Turn wheel back one full turn. With spring scale on spoke of wheel, measure pull required to KEEP WHEEL MOVING. Pull on scale should be made at right angles to wheel spoke. If pull is within 1 1/2 to 2 pounds, proceed to lash adjustment in the following paragraphs. If pull is not within 1 1/2 to 2 pounds, adjust worm bearings. The pitman shaft adjustment must be made if worm bearing check is accomplished, or if the worm bearings are adjusted.

3. If it is necessary to adjust the worm bearings, loosen lock nut and then turn worm bearing adjuster nut clockwise until all end play is removed, See Plate 6435. Using spring scale as directed in Step 2, check pull and readjust as necessary; then tighten lock nut securely.

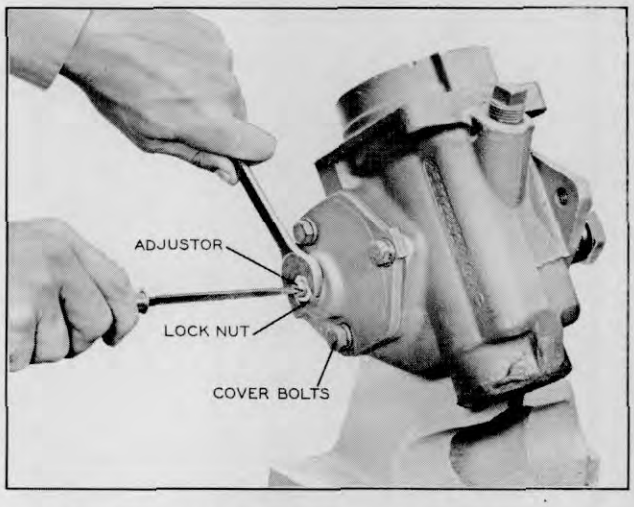
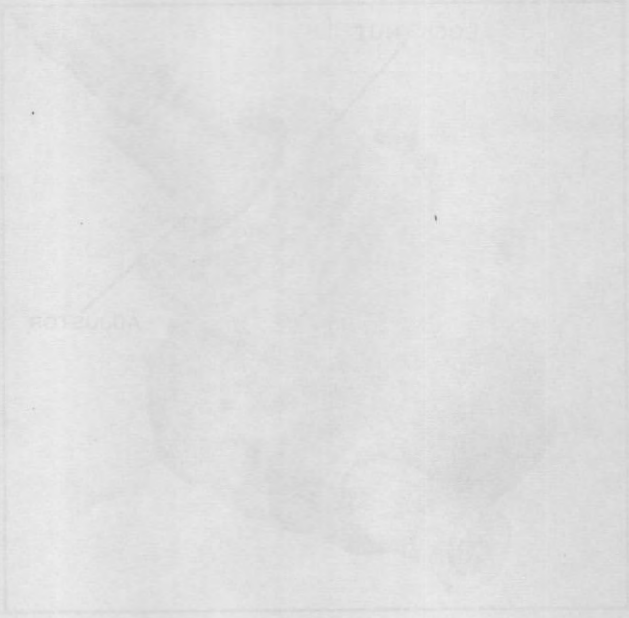


Plate 6436. Steering Gear Lash Adjustment (Sector Gear)

Sector Gear Lash Adjustment: Refer to Plate 6436. and proceed as follows:

1. Steering Gear Mechanism must be in straight-ahead position as previously explained.

2. Turn lash adjuster screw clockwise to remove all lash between bear teeth. Tighten adjuster screw lock nut. Position spring scale on steering



wheel so pull may be made at right angles to wheel spoke.

3. Measure pull while wheel is TURNED THROUGH CENTER POSITION. Readjust if reading is not within 2 1/2 to 3 pounds.

4. Tighten adjuster screw lock nut, check pull again.

5. After adjustments are made, install drag link on pitman arm.

N O T E

I Steer linkage adjustment is necessary do not install drag link to pitman arm.

STEERING AXLE AND LINKAGE ADJUSTMENTS

1. Raise the steer wheels from the floor.

2. Remove the rear drag link from the steer axle spider, Plate 6437. Item A.

3. Check steer wheels for correct turning geometry by turning the wheels all the way to the left -- this should allow the right hand steer wheel to attain an angle of 75 degrees to the frame. If adjustment is necessary, the axle stops on the right side of the axle are turned "in" or "out", whichever is necessary to achieve the correct angle. Repeat this procedure with the left wheel.

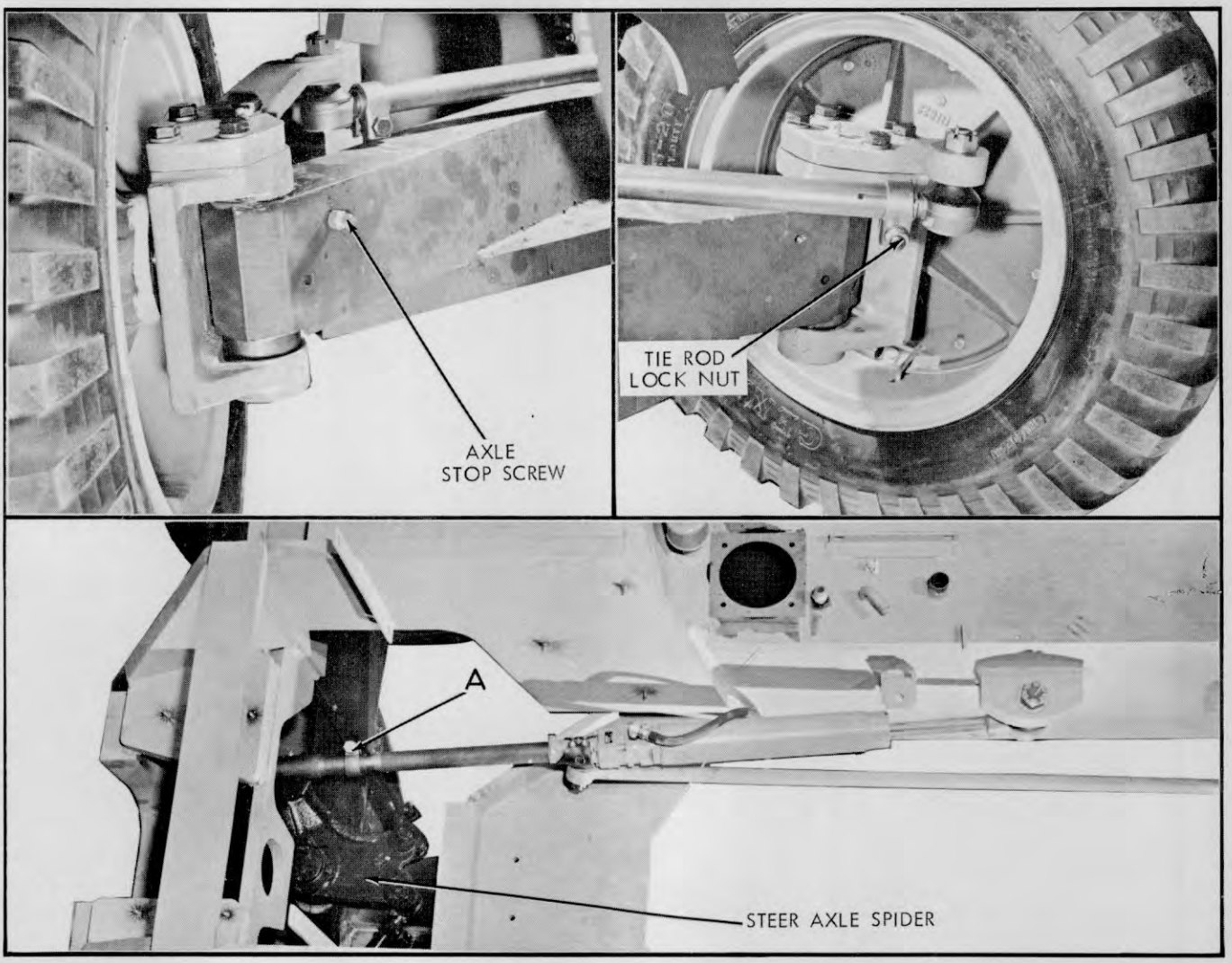
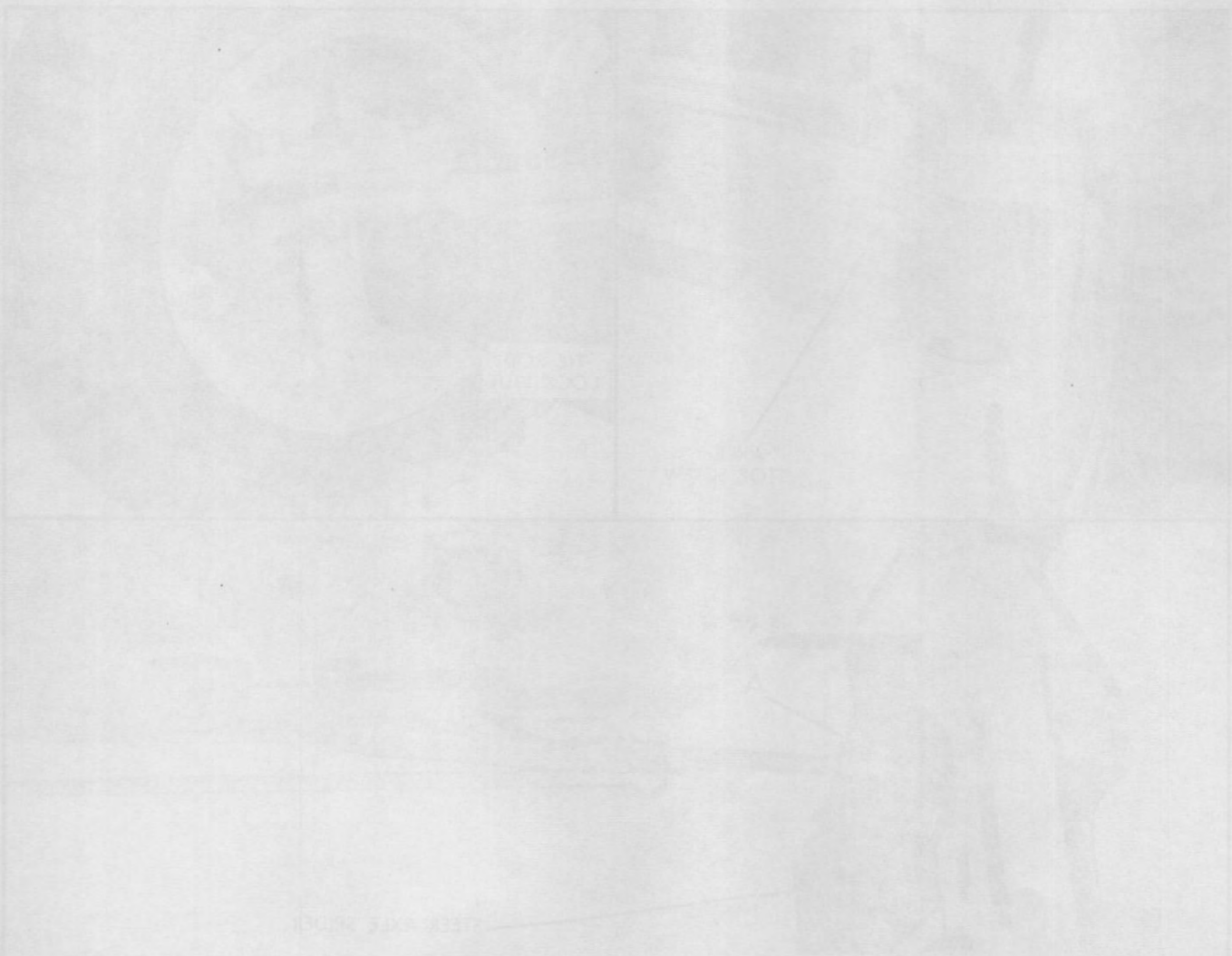


Plate 6437. Steer Axle and Linkage Adjustments



4. After adjusting the stop screws, check the steering wheel alignment. Steer wheels must be in straight-ahead position before making the following adjustments.

a. Rotate hand wheel as far as it will go in one direction. Carefully counting the number of turns, turn wheel all the way in the opposite direction.

b. Now turn hand wheel back exactly half-way, noting position by a piece of tape placed on the hand wheel.

5. The steering wheels should track square with the drive wheels with no toe-in or toe-out. If adjustment is necessary, adjust the alignmnet of the steering wheels by loosening the lock nut of the tie rod ends and turning the tie rods until the wheels are in alignment.

N O T E

Tie rods should be adjusted the same length. Adjust both tie rods until wheels are in alignment, then tighten lock nut against tie rod ends to secure adjustment.

6. With steer wheels in full left turn position, pull piston rod out of steer cylinder so it is fully extended. Then push the rod into the cylinder one-half inch. Loosen clamp (A) on the adjustable end of drag link (located nearest steer cylinder) and turn rod until it lines up with the ball stud in the alxe spider -- attach rod end to spider ball stud and tighten clamp.

7. Remove pitman arm (plate 6438.) Turn the hand wheel all the way to the left. Loosen lock nuts on pitman arm stops. Remove and then remount pitman arm in serration nearest reat stop (B). Turn hand wheel one-half turn clock-wise, loosen lock nuts on the adjustable end of drag link (C), and turn the rod end until it lines up with pitman arm, install, and tighten lock nuts.

8. Turn hand wheel to full left turn, adjust (rear) pitman arm stop (B) until it is just contacting pitman arm, then turn stop one complete turn in and tighten lock nut. Repeat for full right turn, adjusting (front) Pitman arm stop (D).

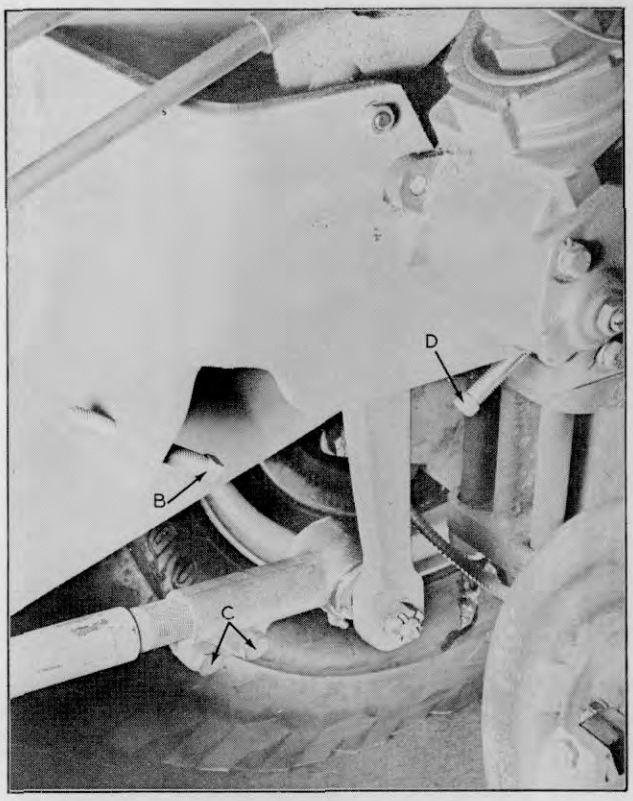
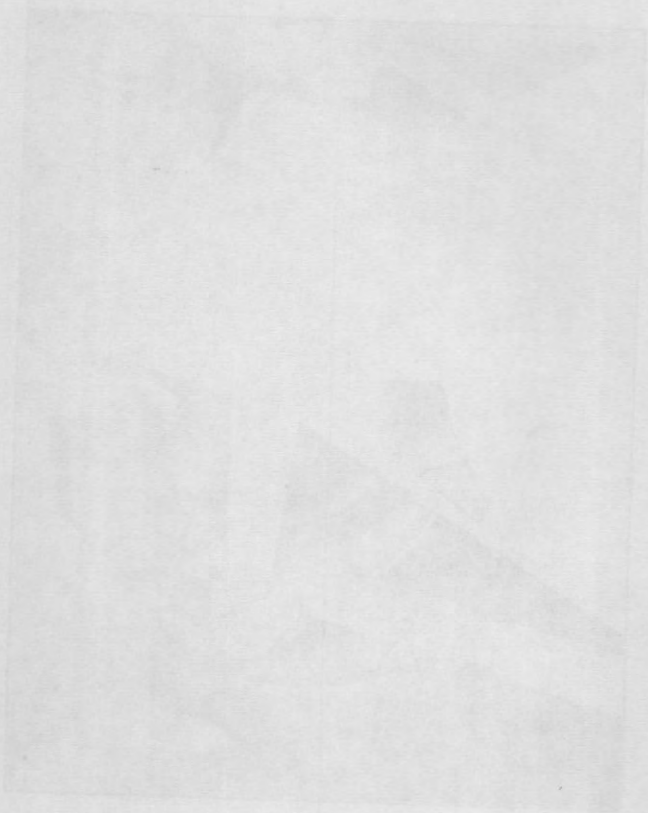


Plate 6438. Steer Linkage Adjustments (Pitman Arm Stops)

9. Turn hand wheel until steer wheels are in straight-ahead position. Remove hand wheel and replace on steering column with the center spoke aligned plus or minus 10 degrees with the center line of the machine -- the center spoke pointing back.



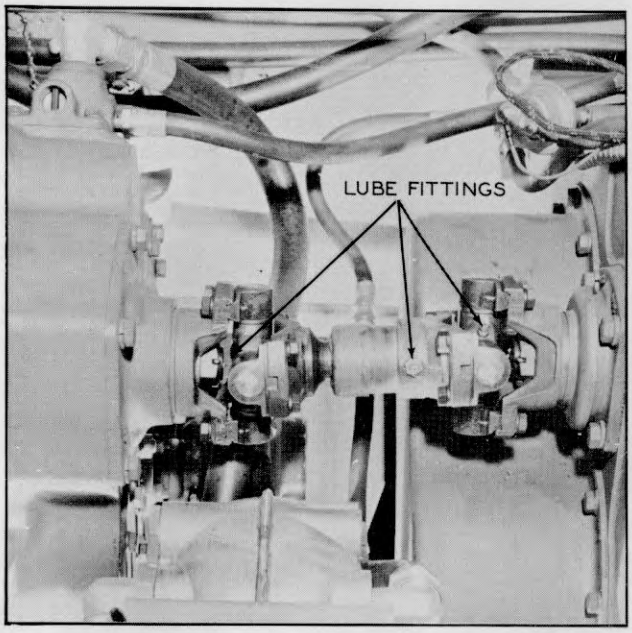


Plate 6439. Drive Shaft

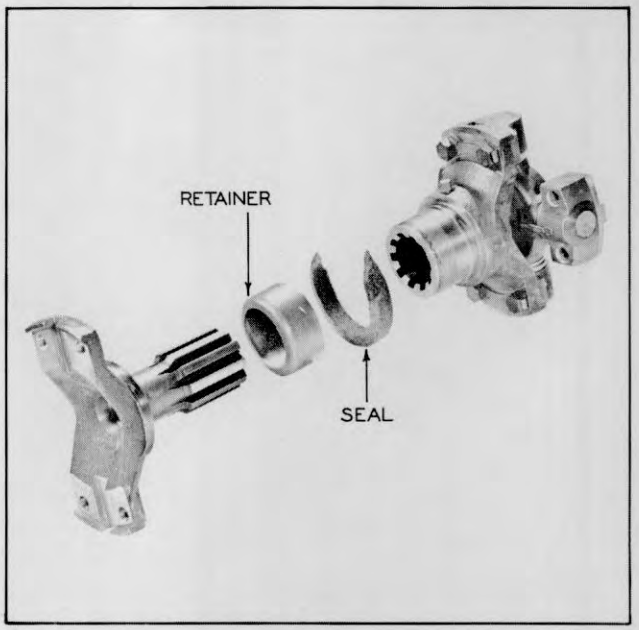


Plate 6440. Steering Pump Drive Shaft

UNIVERSAL JOINTS

Inspect drive universal joints (Plate 6439.) and steer pump universal joints (driven off engine crank pulley, (Plate 6440) for security of mounting and excessive bearing wear.

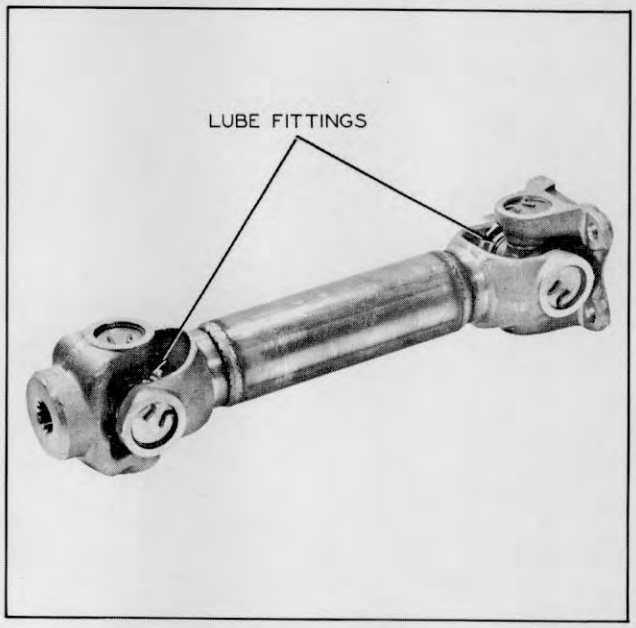
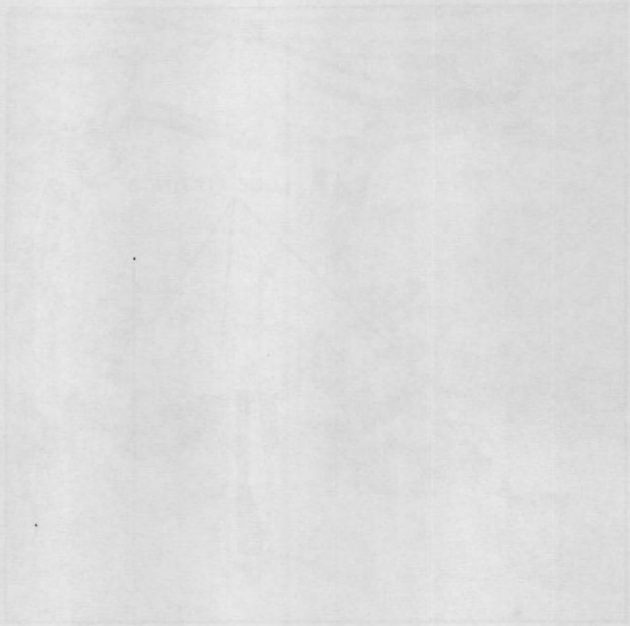
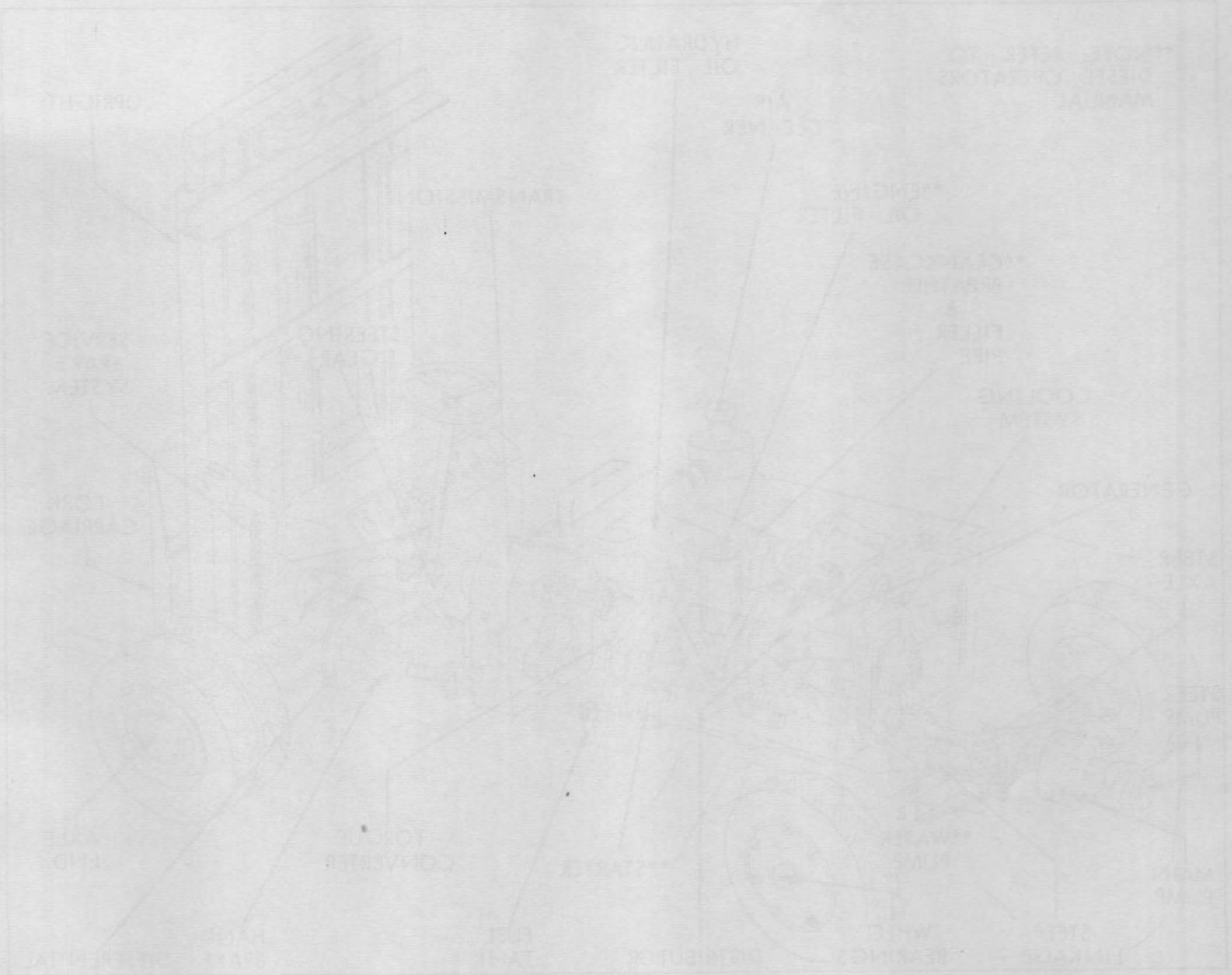


Plate 6441. Drive Shaft





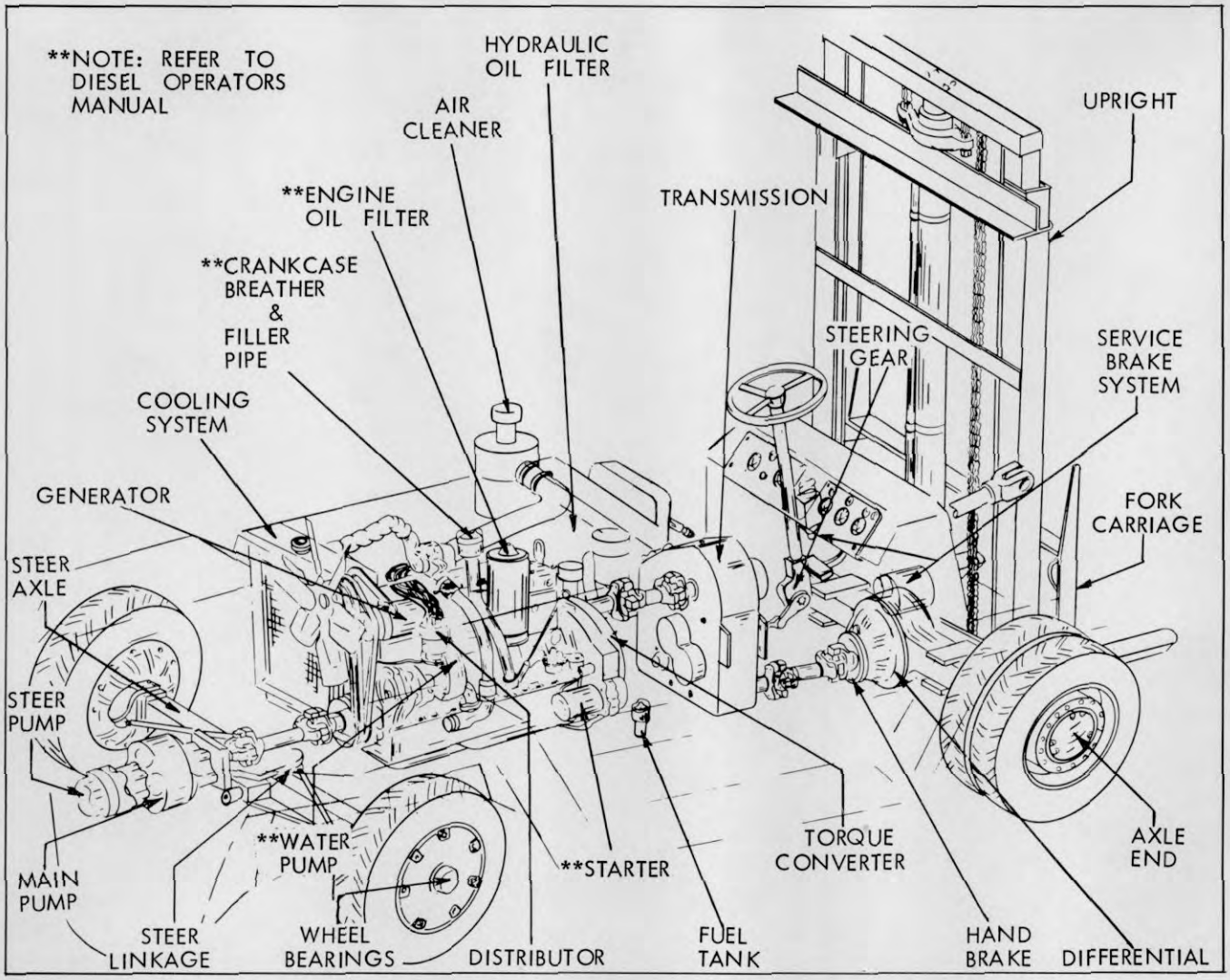


Plate 6511. Lubrication and Preventive Maintenance Illustration

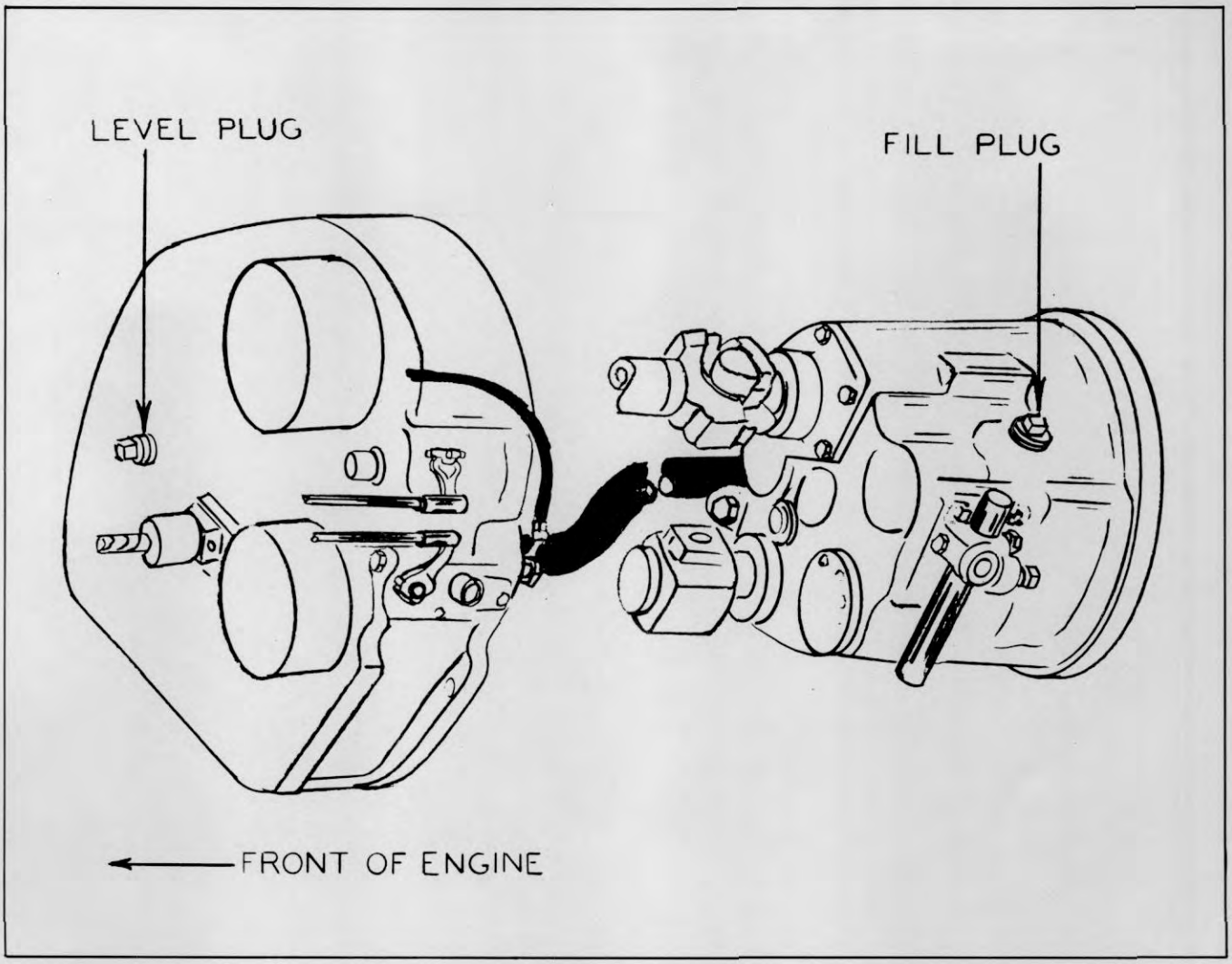


Plate 6455. Converter and Transmission

DIFFERENTIAL

Drain and refill to proper level with E.P.G.L. S.A.E. 90, Clark Specification MS 8.

TRANSMISSION AND CONVERTER

Drain and refill converter and transmission with Type AQATF Lubricant.

C A U T I O N

DO NOT USE FLUSHING OIL OR COMPOUND TO FLUSH SYSTEM.

N O T E

Fill through filler plug at left hand side of converter until oil comes up to level plug on lower right front face of transmission case.

2. Run engine at fast idle 2 minutes to prime converter.

3. Check oil level in transmission, add as required. Refer to Specifications for capacity.

STEERING WHEEL BEARINGS

Adjustments:

1. Raise rear of machine so that tires clear floor.

2. Inspect adjustment of bearings by griping top and bottom of tire, chuck tire "in" and "out" to determine looseness or wobble. Now grip front and rear side of tire, chuck tire "in and "out" to determine looseness or wobble.

N O T E

Before making wheel bearing adjustments, be sure play (looseness or wobble) is in the wheel bearings and not in the king pins.

N O T E

If wheel bearings need adjusting, clean and repack bearings before making adjustments. Refer to Lubrication paragraph.

3. If looseness or wobble is in the wheel bearings, remove hub cap and nut and nut lock, see Plates 6452 & 6453. Tighten inner nut with a 12" wrench, and at the same time turning the wheel in one direction and then in the other until there is a slight bind to be sure all bearing surfaces are in contact. Then back off adjusting nut 1/6 to 1/4 turn allowing the wheel to rotate freely. Secure nut at this position with nut and nut lock.

Lubrication:

1. Remove wheels after 1000 hours or every six months of operation. Clean bearings and repack with medium bodied high temperature wheel bearing grease, See Plates 6452 & 6453.

2. Install wheels and adjust wheel bearings as previously described.

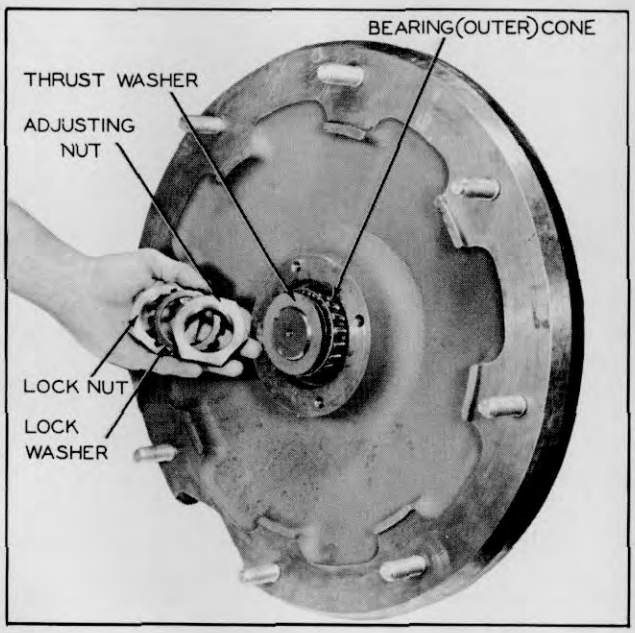


Plate 6452. Wheel Bearings

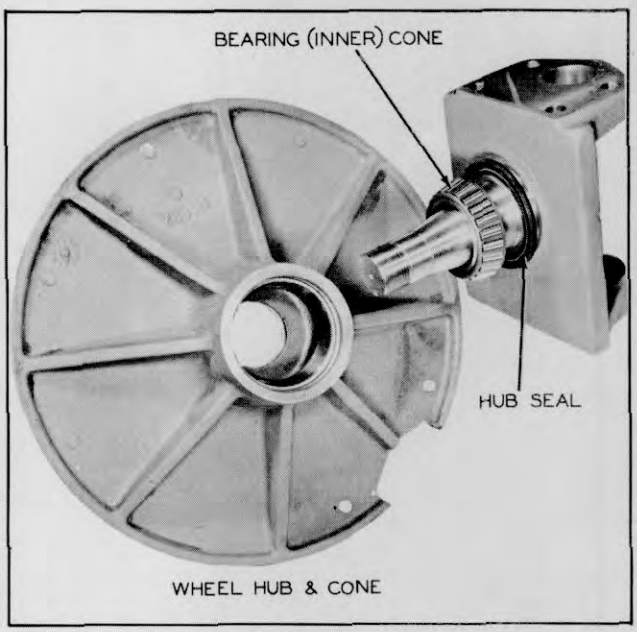
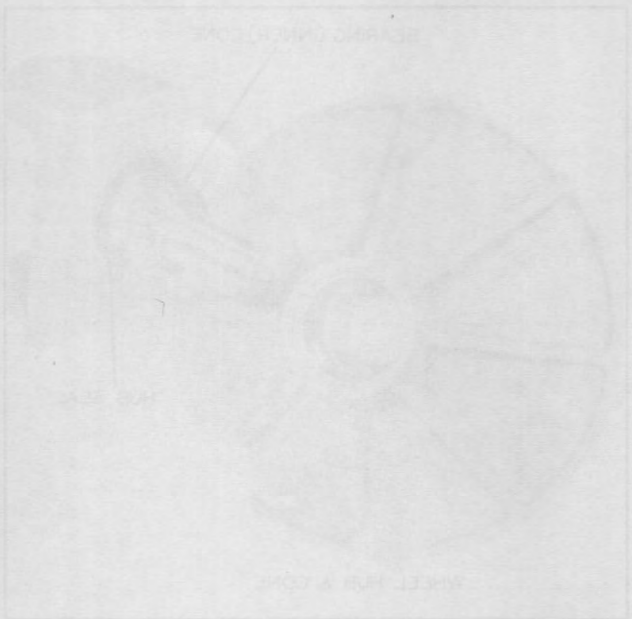


Plate 6453. Wheel Bearings



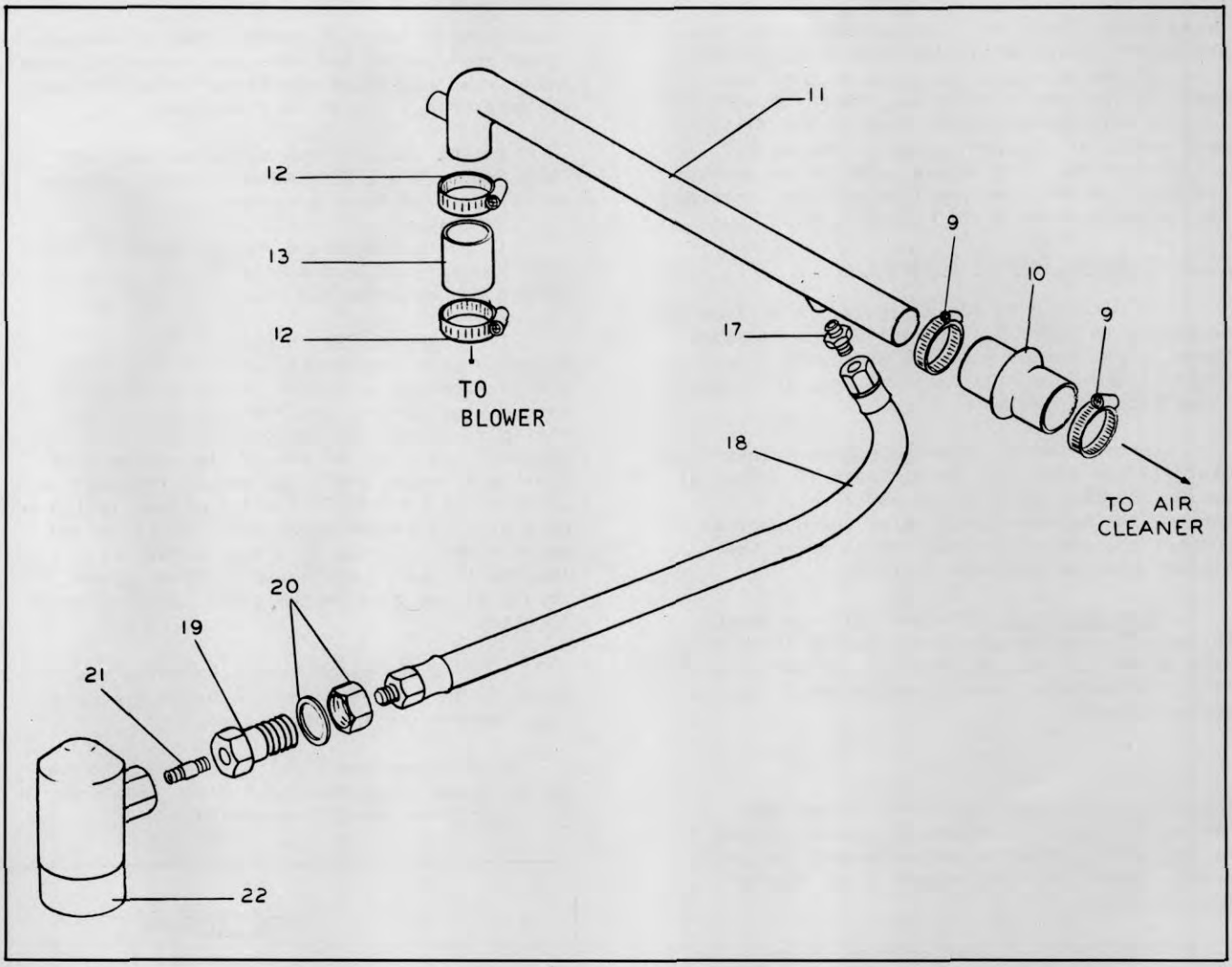


Plate 9977. Hydrovac -to- Air Cleaner Lines

When installing air cleaner, be sure all hose connections are tight preventing any dirt or dust from entering at these points.

Check Hydrovac -to- Engine Air Cleaner Hose for security of mounting See Plate 9977. Hose clamps must be tight preventing air and dirt from entering the unit.

BRAKE SYSTEM

TESTS. Because improper action of the brake pedal may indicate troubles other than faulty pedal adjustment, make the following preliminary tests and observations to determine whether a brake pedal adjustment will remedy the condition.

1. Performance Test Without Gauges:

With the ignition off, depress brake pedal and hold foot pressure for at least ten seconds. If brake pedal gradually "falls away" under foot pressure, the hydraulic brake system is leaking and immediate correction must be made.

a. Check level of brake fluid in brake master cylinder. If level is low, fill to within 1/4 inch of the top. Check master cylinder for leakage.

b. Inspect all fluid lines, connections and backing plates for leakage.

c. Check brake pedal for proper free travel of 1/16 to 3/16 inch (1/8 nominal).

Start the engine and allow it to idle for about ten seconds. Depress brake pedal with about as much foot pressure as required for nominal stopping. Remove foot from pedal and turn off ignition switch. Depress and release

brake pedal five times slowly. Pedal should be depressed approximately the same distance each time. If the pressure required to push the pedal to this position during the fifth application is noticeably greater than on the first application the vacuum system is operating satisfactorily. If pressure required to depress the pedal to the same position has not increased the vacuum system is not working correctly.

2. Performance Test With Gauges:

To make the following tests, it will be necessary to have: (1) Hydraulic Line Pressure Gauge, capacity 300 lbs. (2) Hydraulic Line Fittings and Hose. (3) Vacuum Gauge. (4) Vacuum Gauge Fittings and Hose.

Connect vacuum gauge to engine intake manifold and make sure of at least 16 inches of vacuum. Remove Vacuum gauge and insert in vacuum line between check valve and Hydrovac. Connect the hydraulic pressure gauge in the bleeder hole at any wheel cylinder.

Test Number 1. With the ignition switch turned off, and vacuum gauge reading at zero. Make moderate brake application and hold for at least ten seconds. Record reading of hydraulic pressure gauge.

N O T E

There must be no vacuum in the system when making this test. If there is vacuum present in the system, depress and release brake pedal several times to bring vacuum gauge reading down to zero.

Test Number 2: Start engine, allow it to idle ten seconds. With vacuum gauge reading at least 16 inches, make a moderate brake application. Record reading of hydraulic pressure gauge.

The hydraulic line pressure gauge reading for Test Number 2, should be considerable higher than the pressure reading taken in Test Number 1, using the same pedal pressure. If not, the vacuum power system is not functioning properly.

Test Number 3: Start engine, allow it to idle about ten seconds. Vacuum gauge reading should be at least 16 inches.

Turn off ignition and note any decrease in the vacuum readings.

N O T E

Vacuum should not decrease more than 5 inches in 15 seconds.

Test Number 4: Start engine, allow it to idle about ten seconds. Vacuum gauge reading should be at least 16 inches. Make a moderate brake application and note any change in vacuum gauge reading. There should not be a decrease of more than 5 inches in 15 seconds.

If the vacuum brake system passes both Test Number 3 and Test Number 4, the vehicle is ready to go into operation.

If the vacuum brake system passes either Test Number 3 or Test Number 4, but not both, remove the hydrovac and repair or replace.

If, however, Test Number 3 and Test Number 4 both show excessive loss of vacuum, the leakage may be either in the Hydrovac or Vacuum Line between the Hydrovac and Intake Manifold. Disconnect the vacuum line at the Hydrovac and plug the end of the vacuum line. Start the engine and allow vacuum to build up at least 16 inches. Turn off ignition switch and note drop in vacuum gauge reading. If vacuum gauge holds or drops at a much slower rate, leakage is indicated in the Hydrovac which should be occuring in the check valve, line or fittings.

3. If brake pedal reacts normally but feels spongy, bleed hydraulic brake system as described on the following page.

4. If brake pedal fails to return to normal released position, check brake pedal return spring, and replace if necessary.

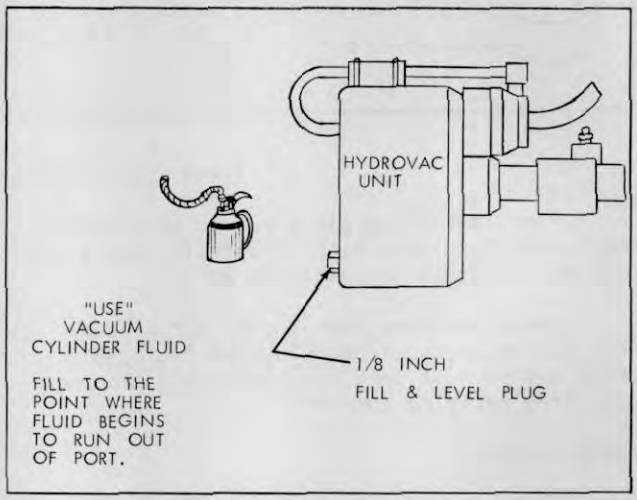


Plate 6469. Check Hydrovac Fluid Level.

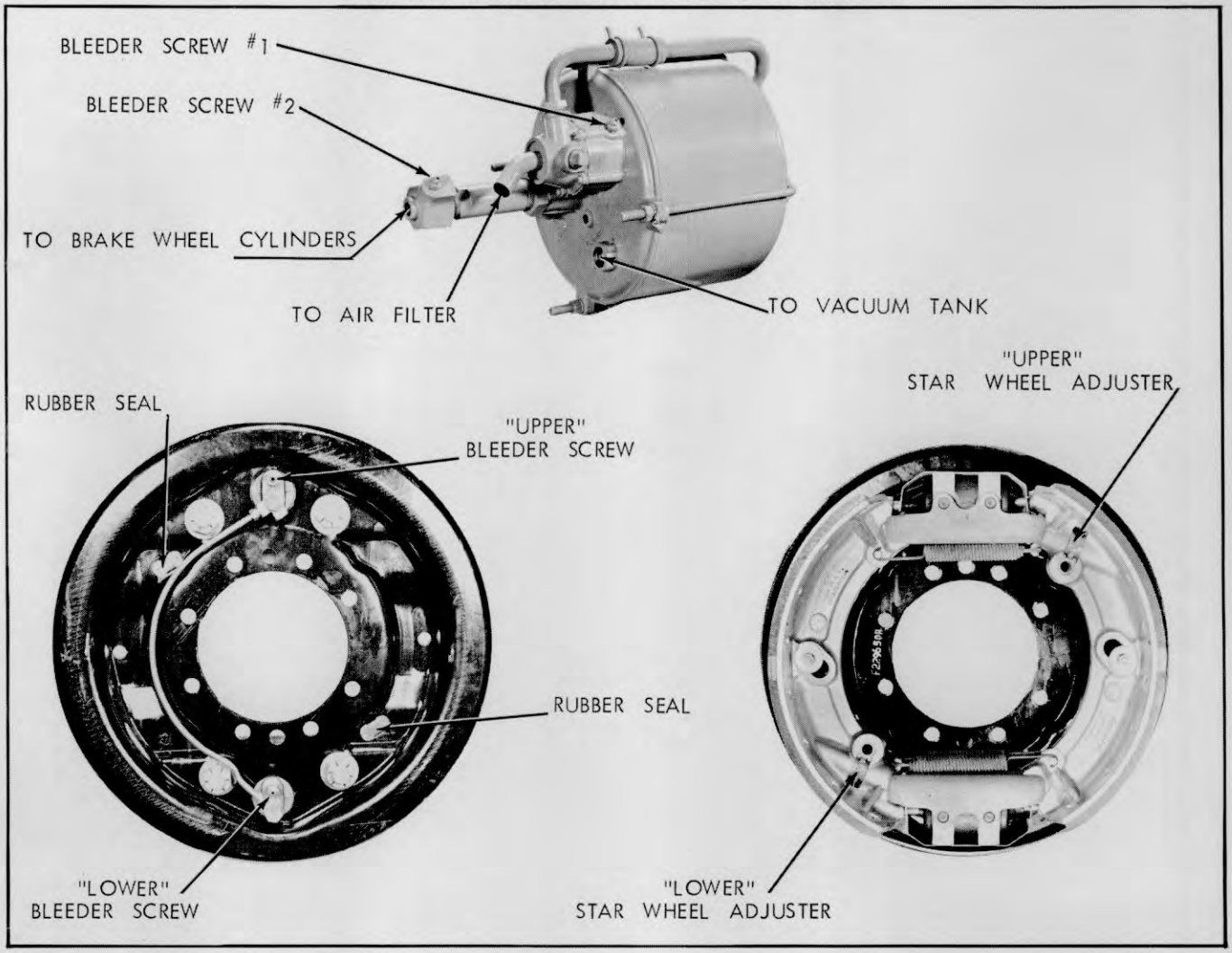


Plate 6457. Bleeding Brake System and Brake Adjustments

BLEEDING BRAKE SYSTEM

Proper operation of the hydraulic brake system requires a solid column of fluid without air bubbles at all points in the pressure system. Under certain conditions it becomes necessary to bleed fluid from system in order to expel air bubbles which have become mixed with the fluid. The necessity of bleeding is indicated by a soft or spongy brake pedal, or at any time a brake line is removed (or broken) the system must be bled.

CAUTION

THE BLEEDING OPERATION MUST BE DONE WITH THE ENGINE OFF, AND NO VACUUM IN THE SYSTEM.

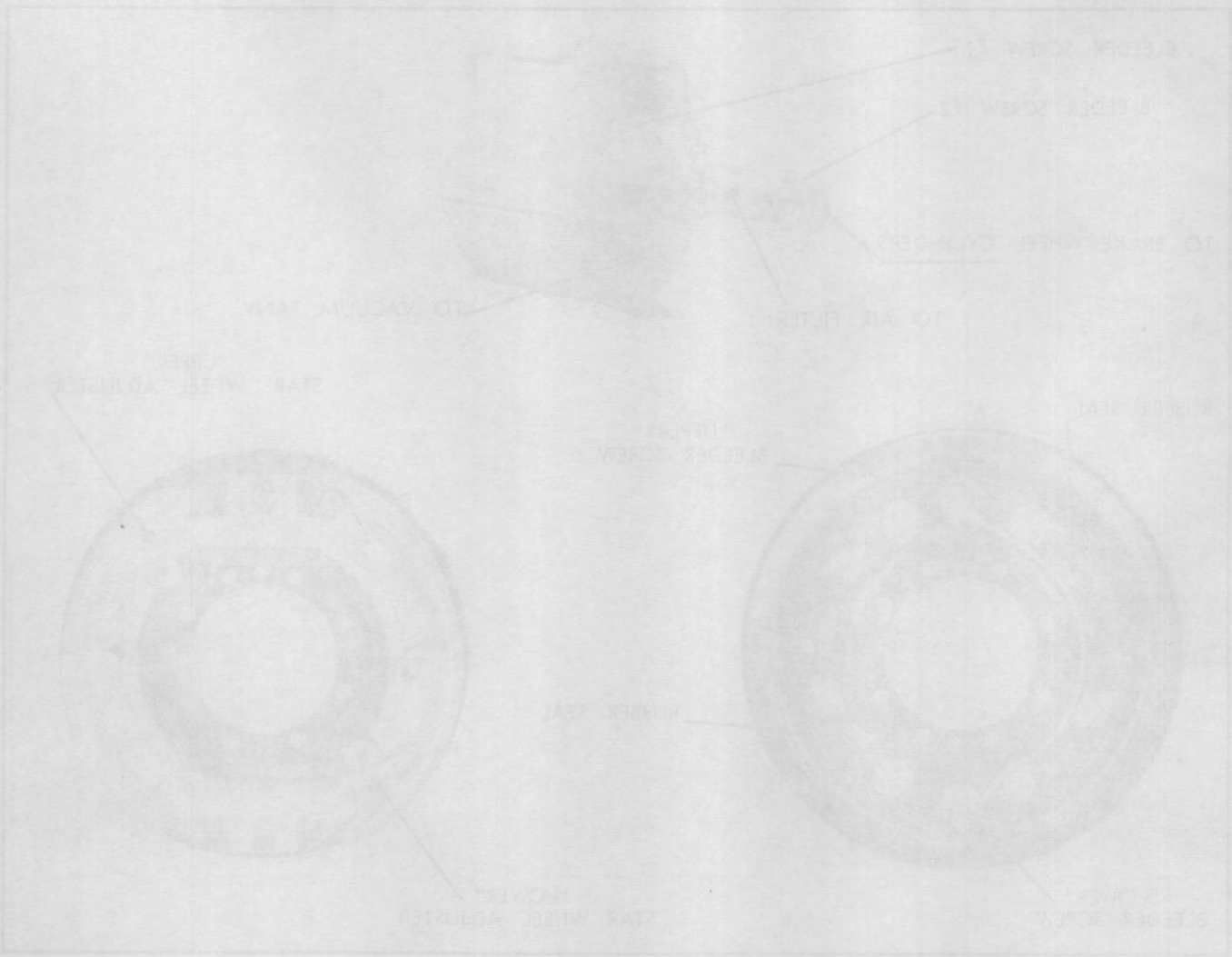
1. Clean dirt from around the filler cap of the master cylinder reservoir and then remove the filler cap.

2. Fill master cylinder reservoir with brake fluid (S.A.E. 70R3 Heavy Duty Hydraulic Brake Fluid).

NOTE

Check hydrovac fluid level. (See Plate 6469)

FILL WITH VACUUM CYLINDER FLUID TO THE THE POINT WHERE FLUID BEGINS TO RUN OUT OF PORT.



N O T E

Only new, clean genuine hydraulic brake fluid should be used. Keep master cylinder filled with clean fluid during bleeding operation. A bleeder hose should be used. Install bleeder hose on first bleeding screw to be bled. Have loose end of bleeder hose submerged in brake fluid in glass jar. This prevents the possibility of air being sucked into lines during bleeding operation.

3. It is necessary to first bleed fluid at the Hydrovac Unit, See Plate 6457. Loosen bleeder screw #1 one full turn, depress brake pedal slowly allowing fluid and air to escape at this point. Tighten the bleeder screw and then release brake pedal. Repeat this operation several times providing a pumping action which will force out air at this point. Remove bleeder hose and install hose on bleeder screw #2.

4. Loosen bleeder screw #2 one full turn and depress brake pedal slowly allowing fluid and air to escape at this point — tighten bleeder screw and allow brake pedal to return to its off position. Repeat this procedure several times providing a pumping action which will force out air at this point. Remove bleeder hose.

N O T E

This procedure must be repeated until air has escaped from the system at both these points. Always release brake pedal after closing bleeder screw — never before.

5. Install bleeder hose on the bleeder screw of the lower wheel cylinder on the left front wheel. Loosen bleeder screw and depress brake pedal slowly allowing fluid and air to escape, tighten bleeder screw and release brake pedal. Repeat procedure approximately ten times. After this line has been properly bled, repeat the same procedure on the upper wheel cylinder of the same wheel. Then bleed the lower right front wheel cylinder. Now bleed the upper right front wheel cylinder. The bleeding operation must be repeated until the system is properly bled — completely free of air.

N O T E

Fluid withdrawn from system during bleeding operation should not be used again.

BRAKE ADJUSTMENTS

When drums are hot, allow to cool, then proceed as follows:

1. Adjust brake pedal free play to 1/16 to 3/16 inch (1/8 inch nominal).

2. Raise machine until drive wheel tires clear floor. Be sure machine is properly supported and blocked.

C A U T I O N

PLACE BLOCKING UNDERNEATH AXLE FOR SAFETY.

3. Remove rubber seals from backing plate, see Plates 6457 and 4379.

4. At one adjustment slot, insert 3/8 INCH HEX WRENCH until it engages shoe adjusting worm. Rotate wrench in the direction of forward wheel rotation until lining drags on drum.

5. Rotate wrench in opposite direction, increasing clearance until drag is relieved. Then rotate adjustment one additional turn (two turns with new lining) to provide working clearance.

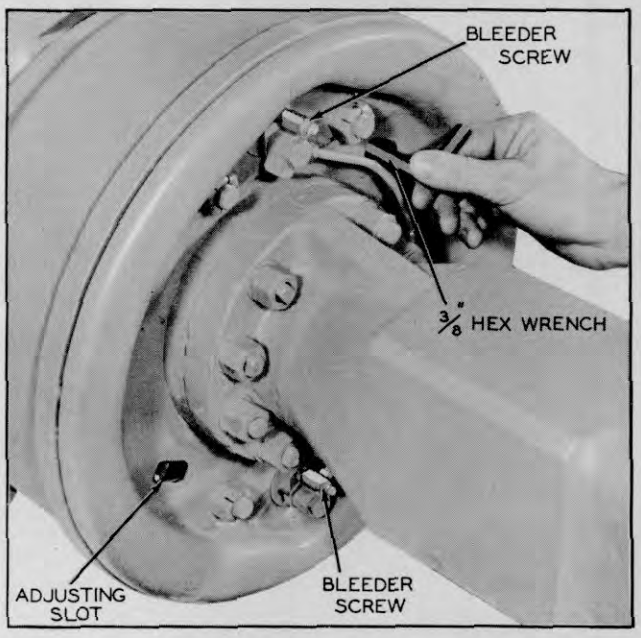


Plate 4379. Adjusting Brakes

6. Repeat Steps 4 and 5 at the second adjustment slot.

7. Replace rubber seals in adjustment slots.

8. Repeat this operation on the opposite drive wheel.

9. Remove blocking, lower machine to floor. Test brakes.

HAND BRAKE ADJUSTMENT

The brake is located on the drive shaft just behind the front drive axle differential, see Plate 6470. The brake has two adjustments. A minor adjustment may be made at the actuating lever located in the driver's compartment. If necessary, a major adjustment may be made at the brake assembly. Brake adjustments are made as follows:

1. Minor Adjustment: Rotate knob on top of the hand brake lever clockwise to increase tension, or counterclockwise to loosen tension. Adjustment should be made with hand lever in fully released position, then test adjustment by applying (pivoting) lever to set brake. See Plate 6505.

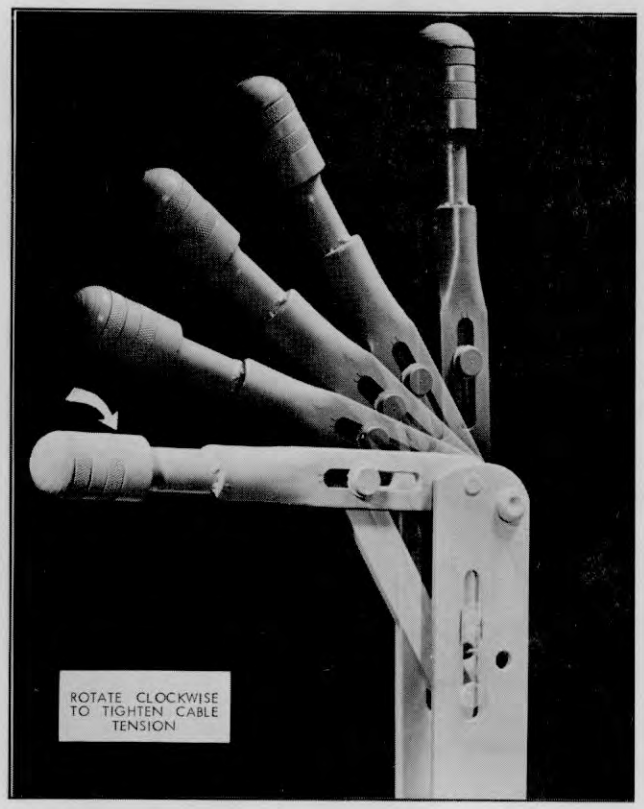


Plate 6505. Hand Brake (Actuating) Lever

2. Major Adjustment: If a major adjustment is necessary to provide proper brake lever release travel and also to provide proper brake tension, proceed as follows:

a. Set hand brake lever in fully released position and turn knob adjustment counterclockwise as far as possible, See Plate 6505.

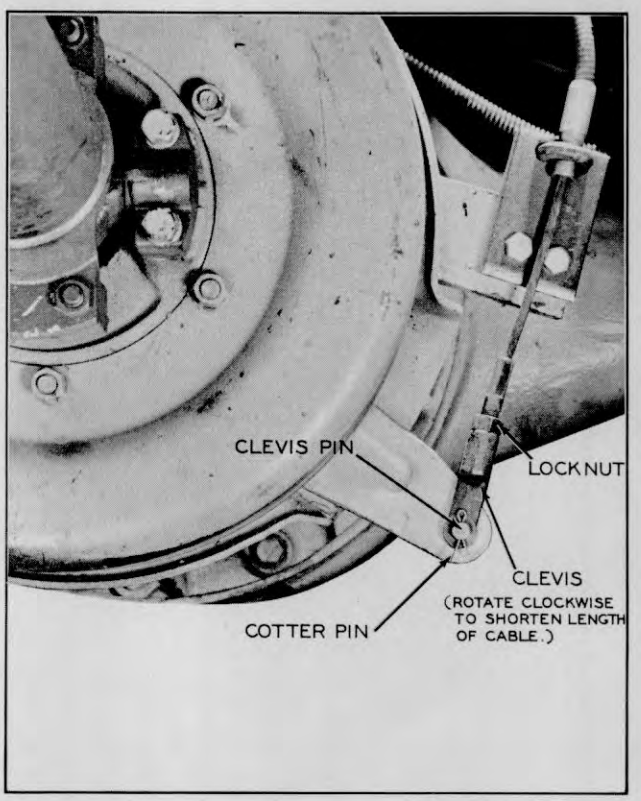


Plate 6470. Brake Assembly

b. The major adjustment is made at the brake assembly, see Plate 6470. Remove cotter pin and clevis releasing clevis from actuating arm of the brake assembly. Loosen clevis lock nut and rotate clevis in a clockwise direction to shorten length of cable. After satisfactory adjustment is made, install clevis and secure with clevis pin and cotter pin. Tighten lock nut.

c. Test brake adjustment at hand lever. If necessary, make minor adjustment at hand lever knob as required.

COOLING SYSTEM

Radiator Pressure Caps:

```
X X X X X X X X X X X X X X X X X X X X X X X X X X X
X                                                     X
X                    W A R N I N G                    X
X                                                     X
X  USE EXTREME CARE IN REMOVING THE RADIATOR          X
X                                                     X
X  PRESSURE CAP. IN PRESSURE SYSTEMS, THE             X
X                                                     X
X  SUDDEN RELEASE OF PRESSURE CAN CAUSE A              X
X                                                     X
X  STEAM FLASH AND THE FLASH, OR THE LOOSENED          X
X                                                     X
X  CAP CAN CAUSE SERIOUS PERSONAL INJURY.              X
X                                                     X
X  LOOSEN CAP SLOWLY AND ALLOW STEAM TO                X
X                                                     X
X  ESCAPE.                                            X
X X X X X X X X X X X X X X X X X X X X X X X X X X X
```

1. Inspect pressure cap gasket and radiator filler neck to be sure they are providing a proper seal. If the rubber face of the valve is defective, a new cap should be installed.

Plate 6458. Radiator Pressure Cap

2. Inspect pressure cap for freedom of operation.

Pressure caps employ a spring loaded, rubber-faced valve which presses against a seat in the radiator top tank. Pressure caps employ either a vacuum valve held against its seat under spring pressure, or a weighted vacuum valve which hangs open until forced closed by a surge of vapor or coolant. Check to be sure components are free to operate.

N O T E

If a new cap is required, always install a cap of the same type and pressure rating, which is 7 Lb.

3. Inspect for dented or clogged overflow pipe. To remove clogged material, run a flexible wire through pipe until obstruction is removed.

When a pressure cap opens the sudden surge of vapor or liquid must blow by the overflow pipe. If the pipe is dented or clogged, the pressure developed by the obstruction may cause damage to radiator or hoses.

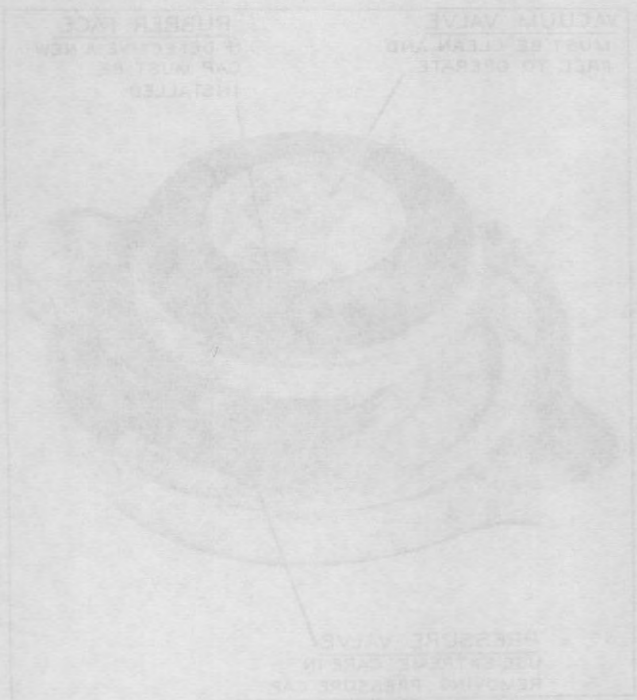
Inspect and Clean Cooling System:

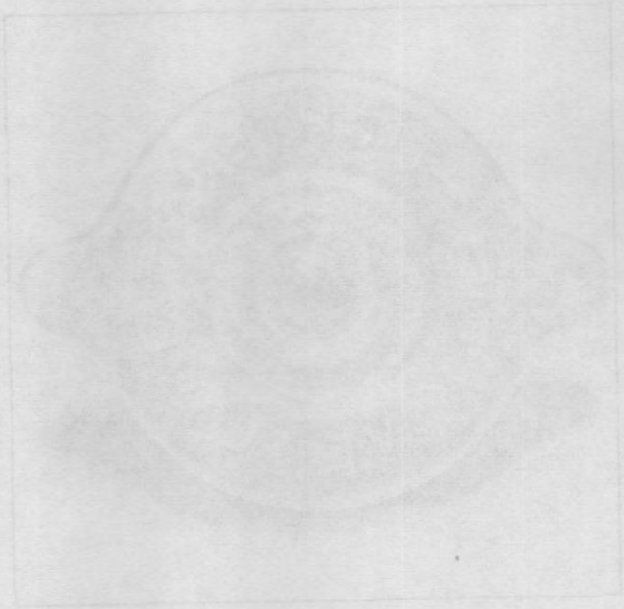
Check hose connections for coolant leaks as well as air leakage. Air leakage around hose connections allows oxygen into the system which is a major factor in corrosion.

Plate 6459. Pressure Cap Gasket, Valve and Valve Gasket

N O T E

Exhaust gas leakage between cylinder head and gasket also results in orrision. If exhaust gas discharges into coolant, the coolant and the gas combine to form a variety of acids. It is therefore important that cylinder head stud nuts be drawn down to specifications as instructed in "engine tune-up".





Using a washing soda solution, flush cooling system in the following manner:

1. Drain system.

2. Replace half of volume with fresh water. Refer to Specifications for capacity.

3. Boil other half of volume and add washing soda until no more will dissolve.

4. Add hot soda solution to cooling system (fill up).

5. Operate engine normally for 24 hours.

6. Drain, flush, refill with clean water to which a soluable oil has been added in a proportion of 1 ounce per gallon of water.

Maintaining the cooling system efficiency is important, as engine temperatures must be brought up to and maintained within satisfactory range for efficient operation; however, must be kept from overheating, in order to prevent damage to valves, pistons and bearings. Continued overheating may cause internal damage, while continuously low operating temperature wastes fuel, increases engine wear and causes oil sludge and corrosion of engine parts.

Overcooling may be caused by operating conditions such as excessive idling, low speeds and light loads during cold weather. Overheating may be caused by faulty thermostat, clogged radiator or an improperly adjusted fan belt.

CAUTION

NEVER POUR COLD WATER OR COLD ANTI-FREEZE INTO THE RADIATOR OF AN OVERHEATED ENGINE. ALLOW THE ENGINE TO COOL AND AVOID THE DANGER OF CRACKING THE CYLINDER HEAD OR BLOCK. KEEP ENGINE RUNNING WHILE ADDING WATER.

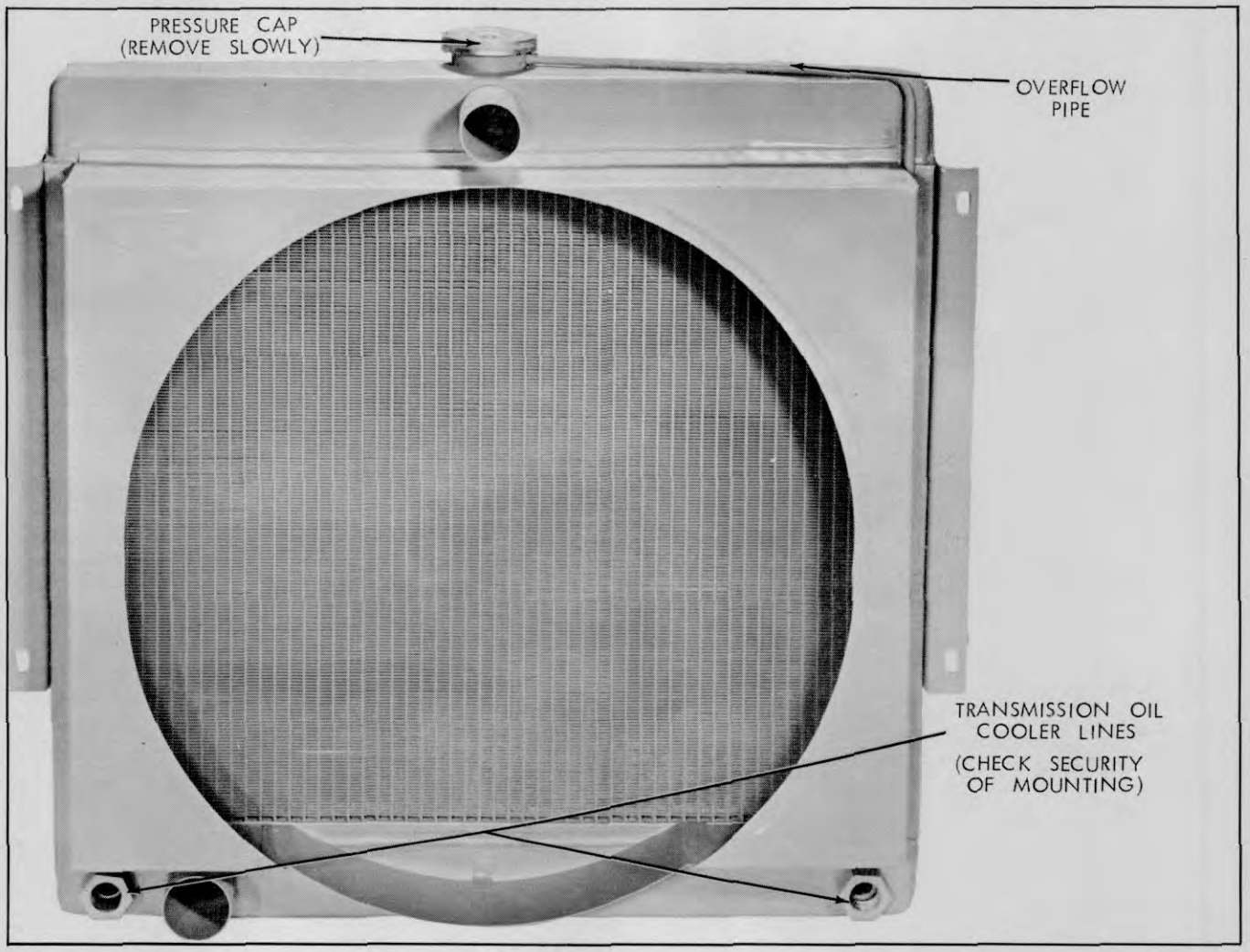
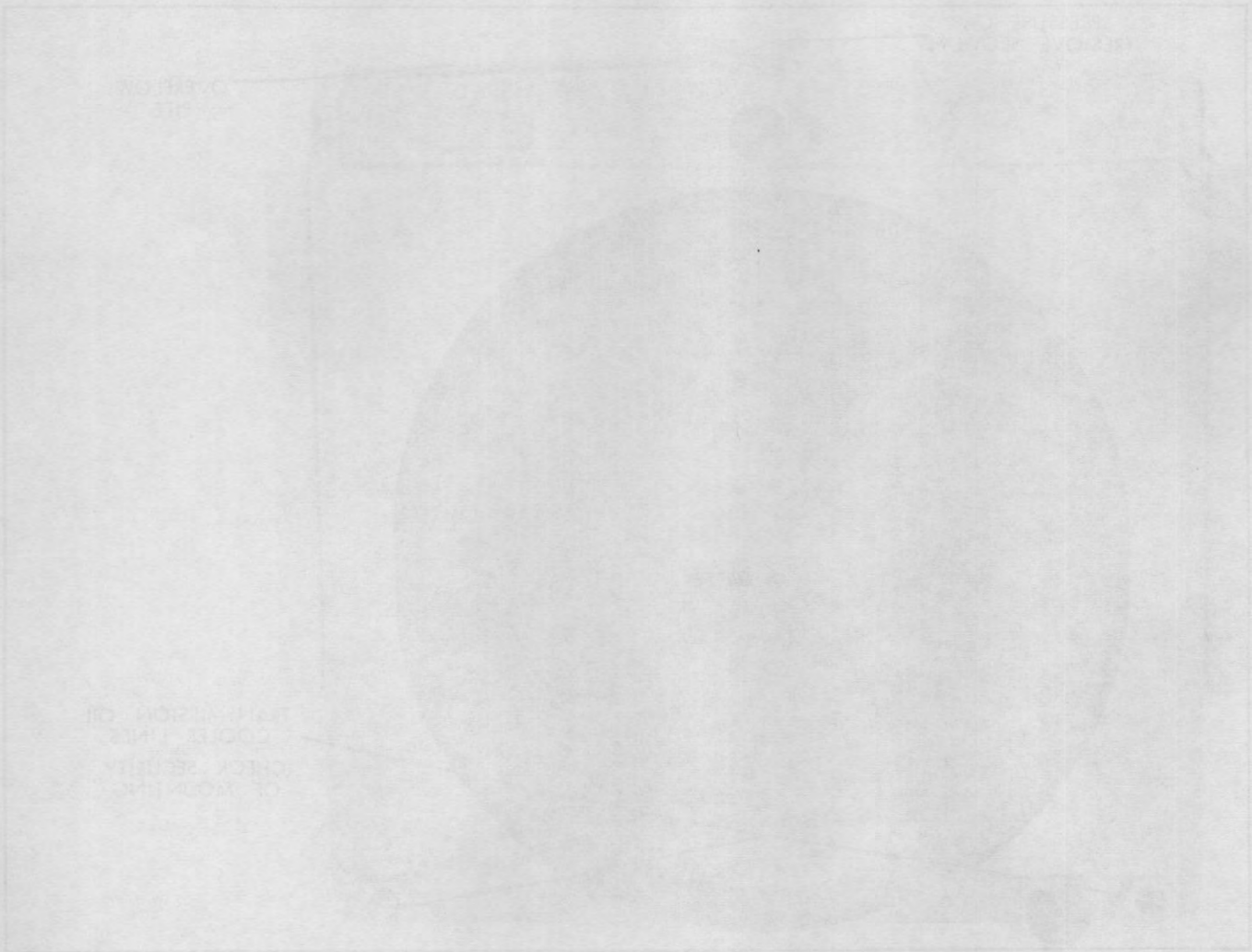


Plate 6460. Radiator



HYDRAULIC SUMP TANK

Drain and refill with Hydraulic Fluid Per Clark Specifications MS-68.

CAUTION

THE HYDRAULIC SYSTEM MUST BE KEPT CLEAN. IT MAY BE NECESSARY TO DRAIN, CLEAN AND REFILL THE SUMP TANK MORE OFTEN UNDER ADVERSE CONDITIONS. THIS IS BEST DETERMINED BY CHECKING CONDITION OF THE HYDRAULIC FLUID FOR EVIDENCE OF DIRT, SLUDGE OR ANY FOREIGN MATTER AT PERIODIC INTERVALS.

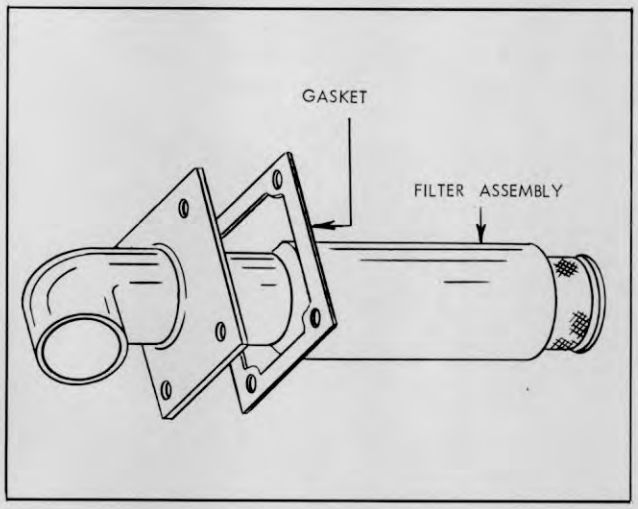


Figure 34. Strainer Assembly

1. Lower upright. Shut engine off.

2. Place a large container underneath the sump tank which is located at the left side of machine.

3. Remove sump tank drain plug, located at bottom of tank, and allow the fluid to drain. Replace drain plug.

CAUTION

DO NOT START PUMP WHILE SUMP TANK IS EMPTY AS DAMAGE TO THE HYDRAULIC PUMP WILL RESULT.

4. Remove and Clean Sump Tank Strainer Assembly:

a. Disconnect hose and remove retainer bolts.

b. Lift strainer assembly out of sump tank.

c. Soak assembly in Stoddard type cleaning solvent; or, steam clean unit.

d. Remove any remaining gasket material from mounting flange.

e. Before installation, be sure strainer assembly is absolutely clean. If cleaned in Stoddard type solvent, let unit dry before installing to sump tank.

f. Using new gasket, install strainer assembly to sump tank.

g. Install hose and tighten hose connections.

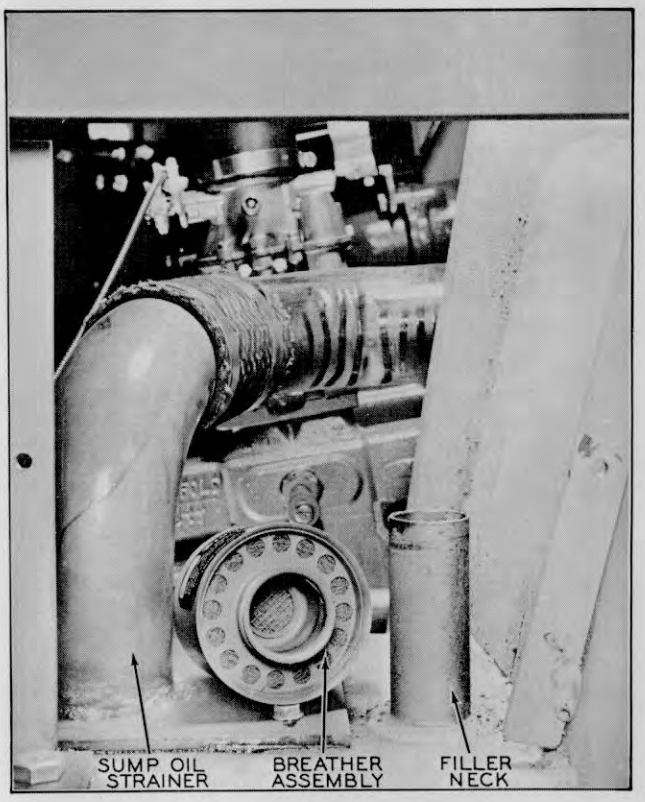
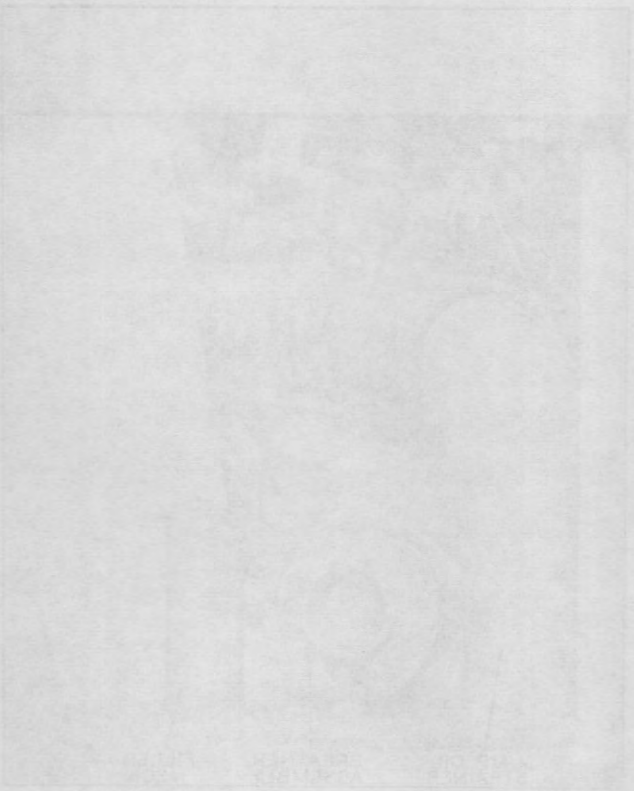


Plate 6426. Sump Tank and Strainer Assembly

5. Place or solder a 200-mesh wire screen into the large end of a funnel. Thoroughly clean funnel before putting it into use. Fill sump tank to within 8 inches of the top of the fill pipe.

CAUTION

NEVER USE A CLOTH STRAINER WHEN FILLING OR ADDING FLUID TO THE HYDRAULIC SUMP TANK. CLOTH STRAINERS CONTAIN LINT WHICH IS HARMFUL TO THE HYDRAULIC SYSTEM.



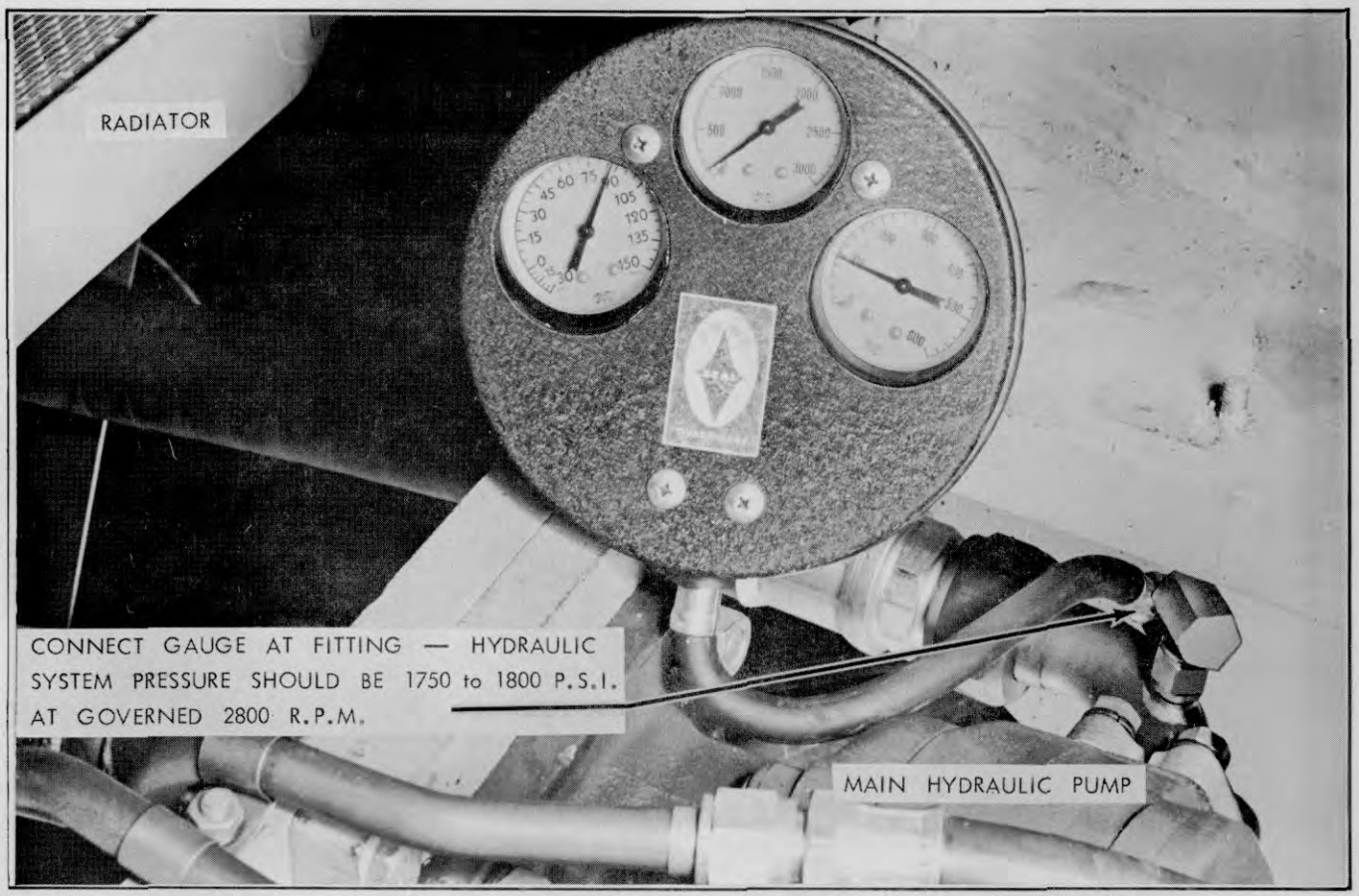


Plate 6464. Main Hydraulic System Pressure Check

MAIN HYDRAULIC SYSTEM PRESSURE CHECK

Make a pressure check of the Hydraulic System as shown in Plate 6464.

System pressure should be checked with engine running at governed 2800 R.P.M. Move lift lever to "raise" position. When forks reach maximum lift height, check gauge reading. Pressure should be 1750 to 1800 P.S.I.

If adjustment is necessary, remove acorn nut and washer, See Plate 6463. Rotate adjusting stud clockwise to raise pressure and counter-clockwise to lower pressure. After obtaining satisfactory adjustment, replace washer and acorn nut.

N O T E

Pressure relief adjustment is made at the hydraulic control valve.

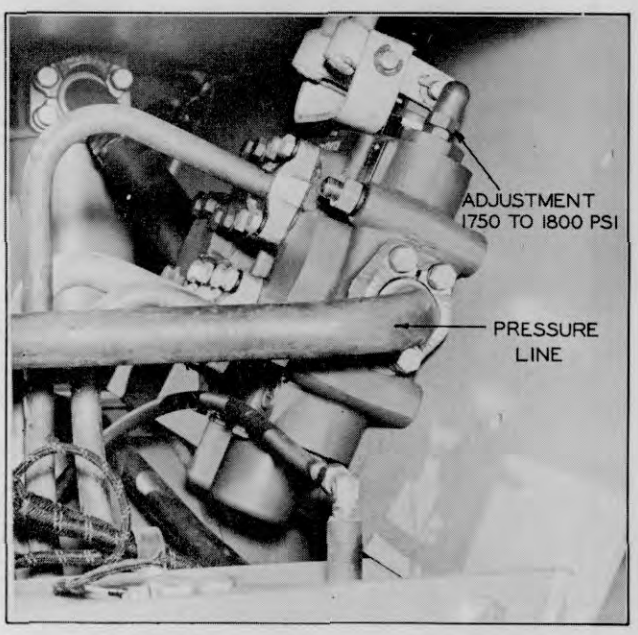
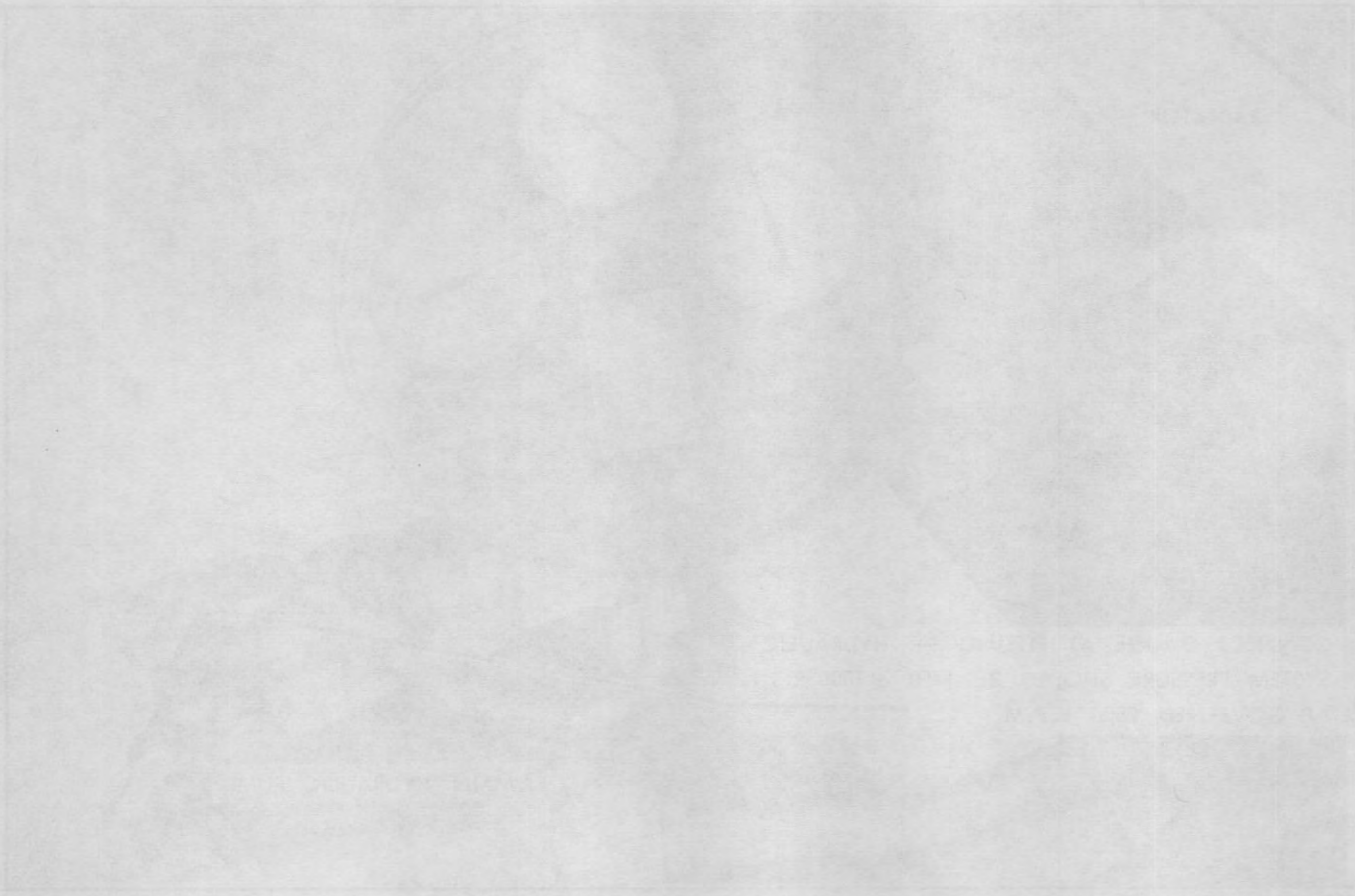


Plate 6463. Hydraulic Control Valve



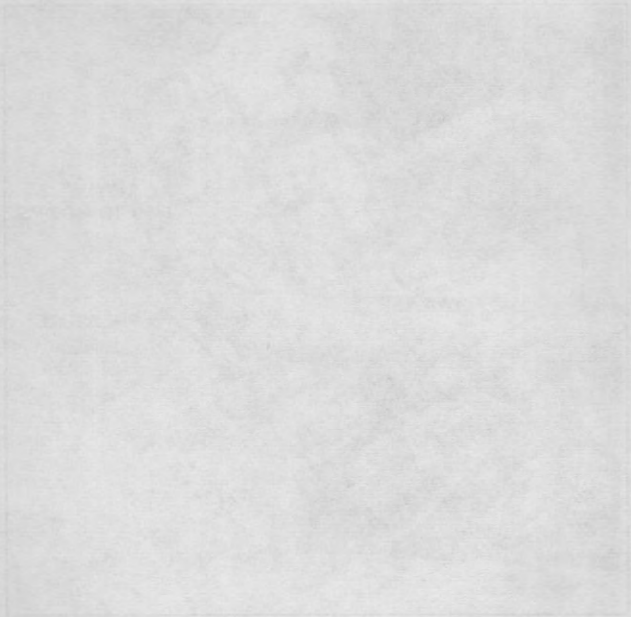


Plate 6465. Steering System Pressure Check

STEER SYSTEM HYDRAULIC PRESSURE CHECK

Make a pressure check of the Steer System as shown in Plate 6465.

N O T E

System pressure should be 1750 P.S.I. at governed 2800 R.P.M.

Place blocking near the steer axle stops so that when wheels are turned the pressure relief valve will actuate, See Plate 6466.

With wheels blocked and tu ned, gauge reading sho ld be 1750 P.S.I. with engine running at governed 2800 R.P.M.

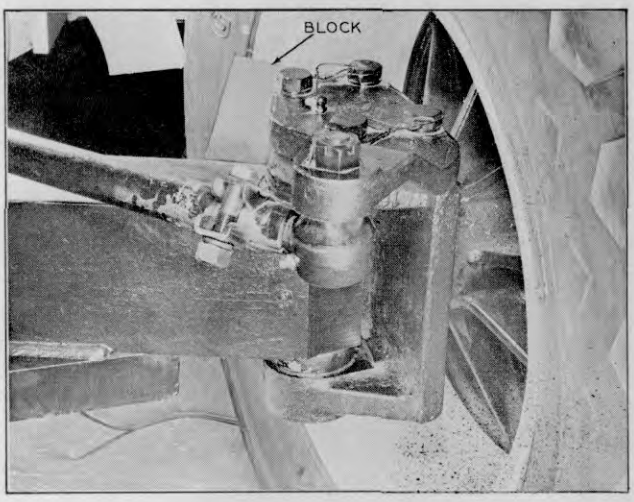
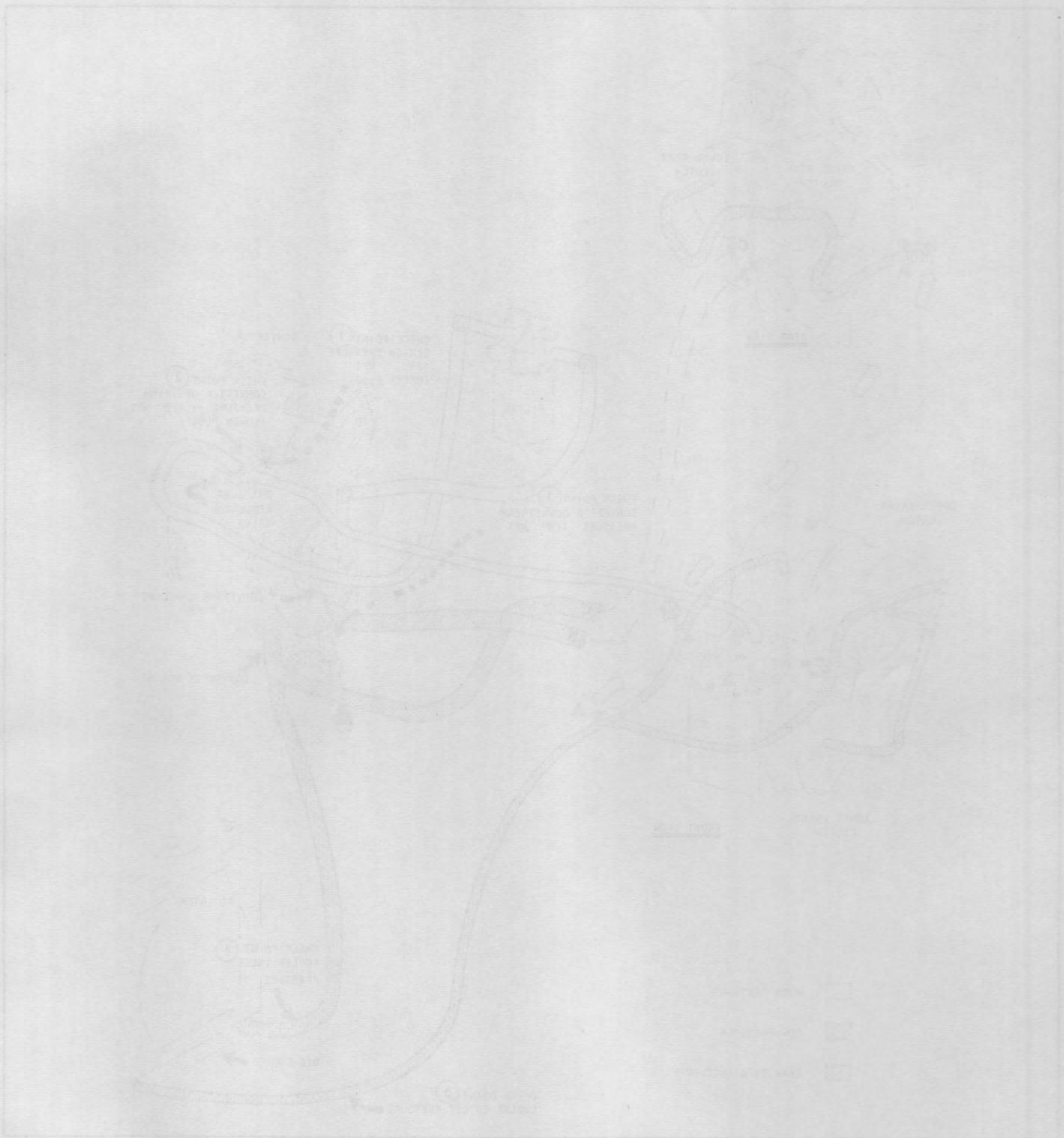


Plate 6466. Blocking Steer Wheels for ystem Pressure Check



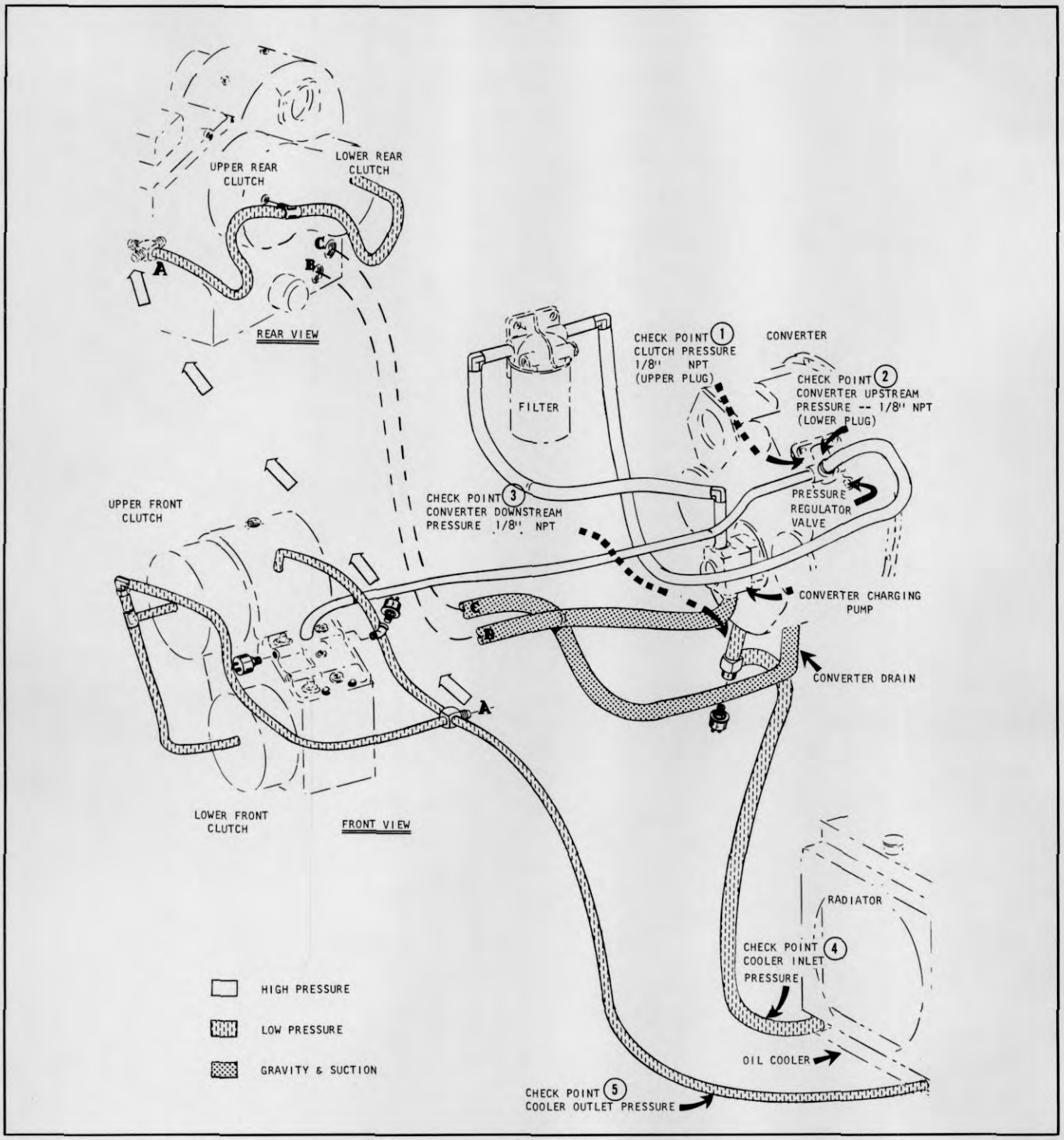


Plate 8432.

S P E C I F I C A T I O N S

HYDRATORK (POWERSHIFT) TRANSMISSION MODEL T-76B
4-SPEED FORWARD AND 4-SPEED REVERSE

HYDRATORK (POWER SHIFT) TRANSMISSION MODEL T-76B
4-SPEED FORWARD AND 4-SPEED REVERSE

MAKE ALL CHECKS AFTER COMPLETE SYSTEM IS UP TO NORMAL OPERATING TEMPERATURE (200° F. MINIMUM)

Converter Pressure Check: Operate engine at 2000 R.P.M. Place transmission direction and speed levers in neutral position

TRANSMISSION CLUTCH OIL PRESSURE P. S. I.

Check Point	CLUTCH	All Other Models	240 to 280 P.S.S.

Check Point	Converter OUT	25 Minimum
		40 Maximum

NOTE: Check Points 2, 4, & 5 (Not Used)

N O T E

Refer to the Diagram on the previous page for location of check points, high and low pressure lines and gravity & suction lines.

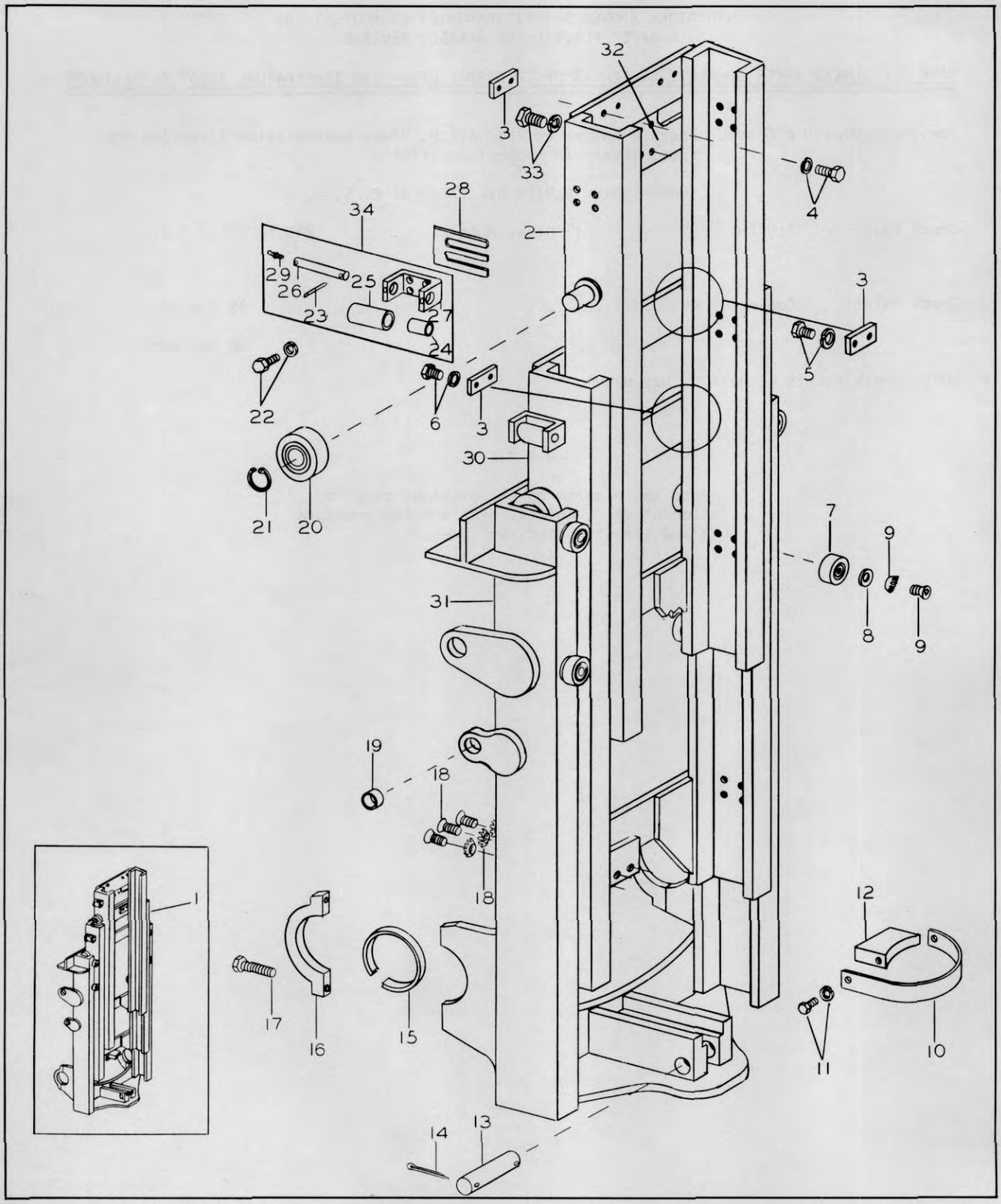


Plate 9993. Upright Roller Adjustment Checks

LIFT CARRIAGE AND UPRIGHT ROLLER ADJUSTMENTS

To maintain top performance from the upright it may be necessary, from time to time, to adjust the rollers located on the lift carriage and upright. These adjustments may be accomplished as follows:

N O T E

The upright rail assemblies are manufactured with a slight taper. Check to be sure there is no bind. Extend upright to the upper limit, then lower upright. If there is a bind, the inner rail will hesitate or emain at the upper limit. As the lift cylinder begins to retract, The rails will break free and then lower. This indicates improper adjustment or this may indicate a damaged roller. Raise and lower carriage and check to be sure all rollers rotate freely.

Inner Rail Thrust Rollers:

1. Because of the taper in the rail assemblies; the rollers may bind if roller adjustment is made with the upright lowered; therefore, the upright must be extented to the upper limit with no backward or forward tilt before making any adjustments.

2. Insert pry bar between end of either right or left inner rail and outer rail, See Plate 6467.

3. Move inner rail sideways to remove all clearance at opposite rail.

4. When checking clearance on side pry bar was installed, there should be some clearance between the Outer Rail and the Bottom Roller at roller edge. THIS CLEARANCE SHOULD NOT EXCEED 1/32 INCH.

N O T E

The inner rail thrust rollers must be checked for proper clearance the full length of the outer rail assembly.

N O T E

There are four inner rail rollers which do not require adjustment. Replace in the event of wear or damage. Maximum clearance 1/16 inch or 1/32 inch at each side.

N O T E

The inner thrust rollers (located at top of upright outer rail) must be checked for proper clearance the full length of the inner rail assembly.

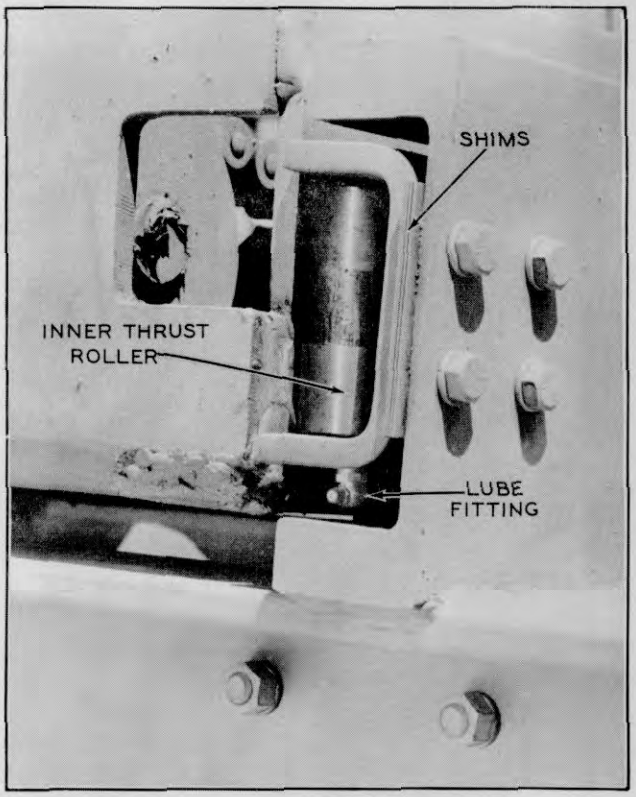


Plate 6467. Upright Roller Adjustment Check

5. Check clearance between Inner Thrust Roller and Inner Rail. ROLLER CLEARANCE MUST BE CHECKED THE FULL LENGTH OF THE INNER RAIL ASSEMBLY. Refer to Step 4 for roller clearance specifications.

6. If adjustment is required, proceed as follows.

7. Disassemble upright.

8. Loosen Roller Bracket Retaining Bolts and add or remove shims to acquire the clearance previously stated.

9. Reassembly upright.

10. Follow Steps 1 thru 5 and recheck clearance.

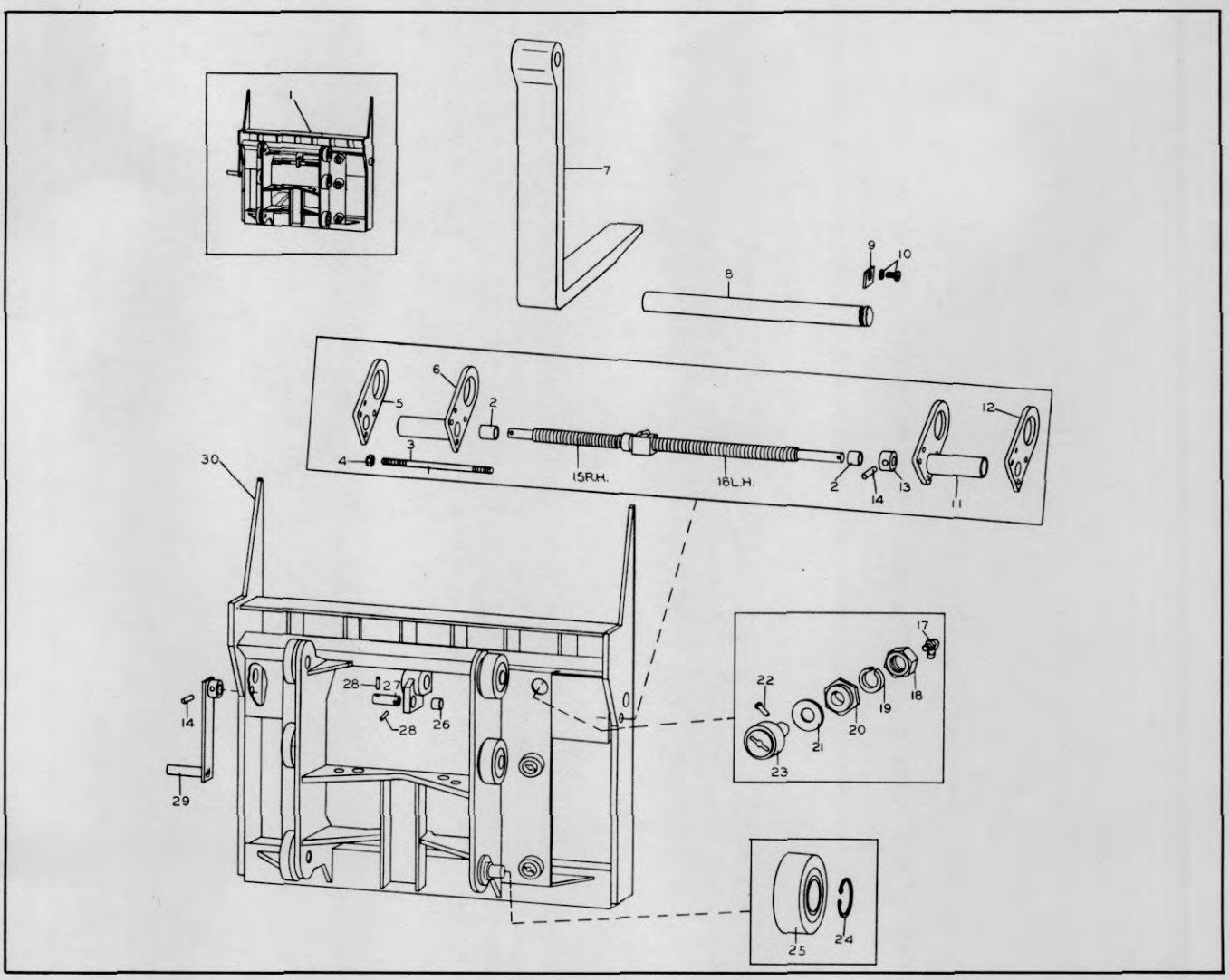


Plate 9992. Lift Carriage

Outer Thrust Rollers:

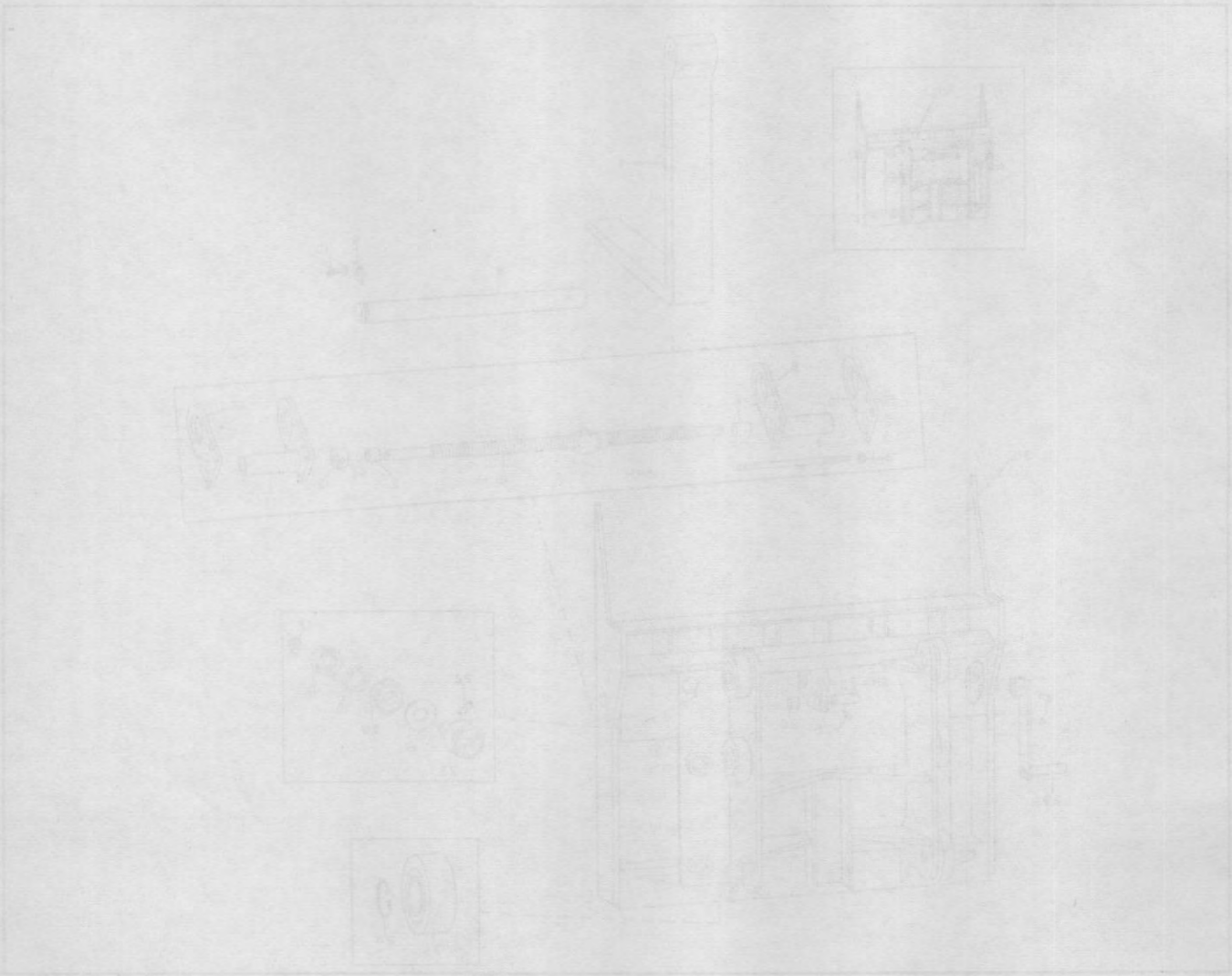
Check clearance between the Outer Thrust Rollers and Inner Rails. Maximum allowable clearance is 1/64 inch or 1/32 inch each side. Rollers should be free to rotate without binding.

N O T E

Roller Clearance should be checked the full length of the rails.

If adjustment is necessary, loosen roller shaft lock nut and using wrench, rotate eccentric bushing (20) in direction necessary to obtain correct clearance.

Tighten lock nut without moving shaft and roller from adjusted position.



TORQUE CONVERTER

TROUBLE	PROBABLE CAUSE	REMEDY
Low converter downstream pressure (Below 20 P.S.I. with engine at 2000 RPM - NO LOAD)	Worn oil sealing and "O" rings.	Trouble is internal and will require a complete teardown of the converter.
	Worn oil pump.	Replace.
	Safety Valve remains open.	Clean and check valve spring and valve.
Suction line taking air.	Low oil level.	Fill to proper level.
	Suction line connections taking air.	Check oil line connections and tighten securely.
	Worn oil pump.	Replace.
High converter downstream pressure (Above 45 R.S.I. with engine at 2000 RPM - NO LOAD)	Oil cooler or oil restricted.	Check oil cooler line and oil cooler for restrictions. Clean or replace.
	Oil too heavy	Check oil weight. See oil recommendations.
	Cold oil.	Converter pressure in cold weather will vary. As soon as converter gets hot, pressure should drop.
Over-heating.	See items #1 & #2.	
	Oil cooler or oil cooler lines restricted causing safety valve to stay open.	Clean and check oil cooler and oil cooler lines. Replace if necessary.
	Oil cooler too small.	Replace with larger cooler.
	Worn oil pump.	Replace oil pump.
	Converter drain line to transmission or oil sump not installed properly.	Install at lowest drain opening in converter housing. Line must maintain constant gradual drop to oil sump for gravity drain.
Noisy Converter.	Worn coupling gear.	Replace.
	Worn oil pump	Replace.
	Damaged bearing.	A complete teardown will be necessary to determine this. Replace if necessary.
	Worn drive gears.	Replace.
Low clutch pressure.	Transmission malfunction.	Close pressure line to transmission control valve. If clutch pressure returns to normal, trouble is in transmission.

TORQUE CONVERTER CONTINUED

TROUBLE	PROBABLE CAUSE	REMEDY
	Worn oil pump.	Replace
	Regulation valve stuck open.	Clean and check valve for worn or dirty parts, replace if necessary.
High clutch pressure. (See pressure specifications)	Regulation valve stuck closed.	Clean and check valve for worn or dirty parts, replace if necessary.
Lack of power.	Improper engine function.	Tune engine.
	Engine stall speed below normal.	Tune engine. Check governor.
	Low converter downstream pressure.	Report to designated individual in authority.
	Air in the oil.	Change oil.
	Improper oil.	See oil recommendations.
Oil in engine flywheel housing.	"O" ring between impeller cover and impeller damaged.	Replace.
	Oil baffle "O" ring damaged.	Replace.
	Oil baffle oil seal damaged.	Replace.

COOLING SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
Overheating	Unusual operating condition of high temperature.	Inspect. (Refer to Diesel Engine Operators Manual
Loss of cooling solution.	Loose hose connections. Damaged or deteriorated hose. Leaking Radiator	Tighten hose connections. Replace hoses. Repair or replace radiator.
Engine operates too cool.	Thermostat sticking. Low air temperature.	Replace thermostat and gasket Cover radiator.
Noises	Frayed or loose fan belt. Water pump defective.	Replace or adjust belt. Replace pump.

COOLING SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
Overheating	Unusual operating condition of high temperature.	Inspect. (Refer to Diesel Engine Operators Manual
Loss of cooling solution.	Loose hose connections.	Tighten hose connections.
	Damaged or deteriorated hose.	Replace hoses.
	Leaking Radiator	Repair or replace radiator.
Engine operates too cool.	Thermostat sticking.	Replace thermostat and gasket
	Low air temperature.	Cover radiator.
Noises	Frayed or loose fan belt.	Replace or adjust belt.
	Water pump defective.	Replace pump.

STARTING MOTOR

TROUBLE	PROBABLE CAUSE	REMEDY
Starting motor cranks engine slowly.	Engine oil too heavy.	Change to proper grade oil.
	Battery charge low.	Recharge or replace battery.
	Battery cell shorted.	Replace battery.
	Battery connections corroded, broken, or loose.	Clean and tighten, or replace cables.
	Dirty commutator.	Clean commutator.
	Insufficient brush surface contact.	Free-up or replace brush.
	Defective starting motor.	Replace starting motor.
	Starting switch defective.	Replace switch.
Starting motor does not crank engine.	Engine oil too heavy.	Change to proper grade oil.
	Starting motor, Solenoid, or cables defective; loose connections.	Replace or tighten loose connections.
	Starting motor pinion gear jammed in flywheel drive gear.	Remove starting motor and reinstall. Replace defective driving gear.
	Dirty drive mechanism.	Clean and lubricate drive mechanism.
	Faulty Relay Switch.	Replace Relay Switch.
	Ignition Fuse Blown.	Replace Fuse.
	Faulty Ignition Switch.	Replace Switch.
	Faulty Neutral Starting Switch.	Replace Switch. NOTE: The INDEX of this manual will list an ADJUSTABLE Neutral Starting Switch if your machine is so equipped.

ALTERNATOR TROUBLES

TROUBLE	PROBABLE CAUSE	REMEDY
Noisy alternator.	Worn or dirty bearings	Replace parts.
	Loose mounting bolts	Tighten as required
	Loose drive pulley	Tighten shaft nut.
	Defective diode.	Replace Diodes
	Defective Stator	Replace stator or alternator
No Output	Slipping Belts	Replace or Adjust belts
Low Output	Defective Diode	Replace Diode
	Check Wiring	Tighten Fasteners
	Slipping Belts	Adjust Belts
	Voltage Regulator out of adjustment	Adjust or Replace

BATTERY AND HORN

TROUBLE	PROBABLE CAUSE	REMEDY
Battery discharged.	Battery solution level low.	Add distilled water to bring level above plates; inspect for cracked case.
	Short in battery cell.	Replace battery.
	Alternator not charging	Inspect alternator, fan belt, and regulator.
	Loose or dirty connections; broken cables.	Clean and tighten connections; replace cables.
	Excessive use of starting motor.	Tune up engine; charge battery.
	Idle battery	Recharge or replace battery.
	Short circuits.	Replace defective wiring.
Battery (other troubles)	Overheated battery.	Inspect for short circuit or excessive alternator charge.
	Case bulged (or out of shape).	Inspect for overcharging and overtightening of hold-down screws.

BATTERY, LIGHTS AND HORN (Continued)

TROUBLE	PROBABLE CAUSE	REMEDY
Horn troubles.	Loose or dirty wiring connections.	Clean and tighten connections.
Horn sounds continuously.	Short-circuit in wiring between horn and horn button.	Replace wire.
Improper tone.	Loose or dirty wiring connections.	Clean and tighten connections.
	Cover or bracket screws loose.	Tighten.
	Points adjusted improperly.	Adjust points.
Horn will not operate.	Horn Fuse Blown.	Replace Fuse.
	Open Circuit.	Trace, repair or replace as required.
	Faulty Horn Relay.	Replace relay.

DRIVE AXLE

TROUBLE	PROBABLE CAUSE	REMEDY
Continuous Axle Noise.	Badly worn parts.	Replace worn parts with new.
	Unevenly worn tires.	Replace tires.
	Improperly adjusted wheel bearing.	Adjust correctly.
	Lack of lubricant.	Add sufficient lubricant of correct grade.
Axle Noise on Drive or on Coast Only.	Differential pinion gear and ring gear out of adjustment or worn excessively.	Adjust, repair or replace entire unit if conditions warrants.
Excessive Backlash in Axle Driving.	Loose axle shaft drive flange cap screws.	Tighten cap screws.
	Flange loose on axle shaft.	Reweld flange to shaft.
	Worn splines on axle shaft at differential end.	Replace drive flange and shaft assembly.
	Differential drive pinion gear and ring gear out of adjustment or worn excessively.	Adjust or replace as condition warrants.
Complete Failure to Function.	Broken axle shaft.	Replace axle shaft.
	Broken teeth on ring gear or pinion gear.	Replace ring gear and pinion and other parts of differential necessary. Adjust ring gear and pinion gear correctly.

STEERING AXLE

TROUBLE	PROBABLE CAUSE	REMEDY
Uneven Tire Wear	Damaged Axle.	Replace Axle.
	Incorrect Caster or Camber.	Adjust Tie Rods
	Tire Pressure Low	Inflate tires properly. Check Wheel alignment.

BRAKES

TROUBLE	PROBABLE CAUSE	REMEDY
Brakes drag.	Improper pedal adjustment.	Adjust brake pedal free travel.
	Brake pedal return spring broken or weak.	Replace spring.
	Brakes improperly adjusted.	Adjust brakes.
	Brake shoe anchor pin tight in shoe.	Free-up pin and lubricate lightly.
	Brake shoe return spring broken or weak.	Replace spring.
	Loose or damaged wheel bearings.	Adjust or replace wheel bearings.
	Insufficient brake shoe clearance, or improper brake anchor pin adjustment.	Adjust brakes.
	Brake backing plate loose.	Tighten plate.
	Grease on linings.	Correct grease leakage; clean or install new shoes and lining assemblies.
	Dirt imbedded in lining.	Clean lining with wire brush.
	Drums scored or rough.	Replace drum and brake shoe and lining assemblies.
Severe brake action on light pedal pressure.	Brake shoes improperly adjusted.	Adjust brakes.
	Grease on linings.	Correct grease leakage; clean or install new shoes and lining assemblies.
	Loose brake shoe anchor.	Adjust and tighten.
Brake locked.	Brake pedal lacks free travel.	Adjust pedal free travel.
	Brakes frozen to drums (cold weather).	Break loose by driving vehicle.
Brake noisy or chatters.	Brake lining worn.	Replace shoe and lining assemblies.
	Grease on linings.	Correct leakage; clean or replace shoe and lining assemblies.
	Dirt embedded in linings.	Clean lining with wire brush.
	Improper or loose linings.	Replace shoe and lining assemblies.
	Brake shoe or drum distorted.	Straighten or replace.

BRAKES (Continued)

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive pedal travel.	Lining worn.	Adjust or replace shoe and lining assemblies.
	Brake improperly adjusted.	Adjust brake.
	Scored brake drums.	Repair or replace drums.
Excessive pedal pressure.	Grease on linings; worn or glazed lining.	Correct grease leakage; clean up and replace shoe and lining assemblies.
	Warped brake shoes, or defective brake linings.	Replace shoe and lining assemblies.
	Shoes improperly adjusted.	Adjust brakes.
	Brake drum scored or distorted.	Repair or replace drums.
	Shoes improperly adjusted.	Adjust brakes.
	Insufficient fluid in master cylinder.	Fill master cylinder to within 1/4 inch of the top.
Wheel troubles.	Wheel wobbles; bent.	Inspect mounting on hub, spindles, and drive axle; replace defective wheel or mounting.
	Wheel loose on hub.	Tighten.
	Wheel out of balance.	Balance wheel.
	Wheel bearings run hot.	Adjust, lubricate wheel bearings.

STEERING

TROUBLE	PROBABLE CAUSE	REMEDY
Steering difficult	Lack of Lubrication	Lubricate
	Tire Pressure low.	Inflate properly
	Tight steering system connections	Lubricate and adjust linkage.
	Tight steering gear; misaligned front wheels; or bent frame.	Adjust
	Bent Steering connecting linkage or arm.	Straighten or replace linkage.
	Misaligned steering gear mounting.	
Wander or weaving	Improper camber or caster (axle twisted).	Install new axle
	Tire pressures uneven	Inflate properly.
	Steering system connections or king pin bearings not properly adjusted.	Lubricate and adjust.
	Loose wheel bearings.	Adjust wheel bearings.
	Steering gear worn or maladjusted.	Adjust drag link & tie rod.
	Steering gear mountings loose.	Tighten mounting bolts.
Low speed shimmy or wobble.	Loose steering connections.	Adjust and tighten linkage.
	Steering gear worn, or adjustment too loose.	Adjust
	Loose wheel bearings.	Adjust wheel bearings.
Vehicle pulls to one side.	Odd size, or new and old tires on opposite front wheels.	Match tires.
	Tires not inflated evenly.	Inflate properly
	Tight wheel bearings.	Adjust. Lubricate wheel bearings.
	Bent steering arm or connection.	Straighten or replace bent linkage.

HYDRAULIC SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
Pump not delivering oil.	Wrong direction of rotation.	Must be reversed immediately to prevent seizure and breakage of parts due to lack of oil.
	Tank oil level low.	Add recommended oil.
	Oil intake pipe or suction filter plugged.	Replace filter cartridge, clean strainer if so equipped.
	Air leak in suction line.	Will prevent priming, or cause noise and irregular action of control circuit.
	Oil viscosity too heavy to pick up prime.	Thinner oil should be used, per recommendations for given perature and service.
	Broken pump shaft or gear.	Replace parts
Pump not developing pressure.	Pump not delivering oil for any of the above reasons.	Check oil circulation by watching oil in tank.
	Relief valve setting not high enough.	Refer to relief valve instructions.
	Relief valve sticking open.	Dirt under pressure adjustment valve. Refer relief valve instructions.
	Leak in hydraulic control system (cylinders or valves).	Find leak and correct.
	Partially clogged intake line, intake filter or restricted intake pipe.	Pump must receive intake oil freely or cavitation will take place.
Pump making noise.	Small air leak at pump intake piping joints.	Test by pouring oil on joints while listening for change in operation. Tighten as required.
	Air leak at pump shaft packing.	Repair or replace.
	Tank air vent plugged.	Must be open thru breather opening or air filter.
	Too high oil viscosity.	Use recommended oils.
	Shaft packing worn.	Replace shaft packing per preceding instructions.
	Oil filter dirty.	Replace filter element.
Forks do not lift to maximum height.	Hydraulic Oil level low.	Fill sump tank.

HYDRAULIC SYSTEM CONTINUED

TROUBLE	PROBABLE CAUSE	REMEDY
Lift or tilt action fails.	Loss of oil pressure.	Check Hydraulic pump. Inspect Hose.
Oil leak at top of lift cylinder assembly.	Worn or damaged lift piston seal.	Replace seal.
	Scored cylinder wall.	Replace cylinder.
	Plugged vent line.	Clean out vent line. Replace if collapsed.
Oil leak around piston rod at tilt cylinder.	Worn seal.	Replace seal.
	Scored piston rod.	Replace rod and eliminate cause of scoring which may be caused by misalignment, worn bearing or foreign matter.
With load centered on lift forks load is lifted unevenly.	Lift chains out of adjustment.	Adjust chains.