CLARK EQUIPMENT INDUSTRIAL TRUCK DIVISION CLARK EQUIPMENT

OPERATORS MANUAL

IT 581 SERIES

IT 50, 60, 70, 80

BOOK NO. OMA-224-1

CLARK EQUIPMENT COMPANY

PUBLISHED BY

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

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 recommendation in this manual and the following practices.

1. A scheduled preventive maintenance, lubrication, and inspection system should be followed.

2. Only qualified and authorized personnel should be permitted to maintain, repair, adjust, and inspect industrial trucks.

3. Before Leaving The Truck:

   A. Stop truck.

   B. Fully lower the load engaging means.

   C. Place directional controls in neutral.

   D. Apply the parking brake.

   E. Stop the engine or turn off power.

   F. Lock the control or ignition circuit.

   G. Block the wheels if truck is on a ramp, or being worked on.

4. Before Working On Truck:

   A. Raise wheels free of floor or disconnect power source.

   B. Use chocks or other positive truck positioning devices.

   C. Block load engaging means, innermast(s), or chassis before working under them.

   Before working on engine fuel system of gasoline powered trucks with gravity feed fuel systems, be sure fuel shutoff valve is closed.

   Before working on engine fuel system of LP gas powered trucks, close LP gas cylinder valve and run engine until fuel in system is depleted and engine stops running.

   Operation to check performance of the truck or attachments should be conducted in an authorized, safe clearance area.

5. Before Starting To Operate The Truck:

   A. Be in operating position.

   B. Depress clutch (or brake pedal on automatic transmission and electric trucks).

   C. Place directional controls in neutral.

   D. Start engine or turn on power.

   E. Before operating truck, check functioning of lift and tilt systems, directional and speed controls, steering, warning devices, brakes, and any attachment. (If used)

   F. Release parking brake.

- continued -

SAFETY INSTRUCTIONS FOR MAINTAINING INDUSTRIAL TRUCKS

6. 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.

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

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, 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.

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 practice. 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, operation and maintenance instructions 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 practice. 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 and safe truck operation should not be performed by the customer or user without manufacturers prior written approval. Capacity, operation and maintenance instruction plates, tags or decals should be changed accordingly.

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.

- continued -

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WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

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LUBRICATION AND MINOR MAINTENANCE PROCEDURES

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FORWARD

OPERATING SECTION

The purpose of this section is to help you learn to **operate** a Clark Forklift Truck **safely** and **efficiently.**

From an operating standpoint, a forklift truck is unique in many ways — size, height, rear wheel steering, the loads it carries and so on. Thus, it takes practice and concentration to learn to operate a forklift.

Naturally, everything has a starting point and the first thing any driver must do is to become completely familiar with the vehicle he is driving — its various major components and what they do, operating controls, and functions of the machine.

Your mastery of the Clark Forklift Truck, your skill, your care ... obviously can lead to safe and efficient operation of the unit ... reduce downtime, maintenance, and load damage.

Perhaps not so obvious is the role you must play in the maintenance of your forklift. Much as an airline pilot checks out his plane before taking off the ground, you should **check your unit** out at the beginning of your shift and **before putting it to work.** Such checks are easy and quick ... and include water and fluid level checks, check of lights and safety devices, and a check of brakes and controls.

In addition to these checks, which are detailed on the **Daily Inspection Form** in this book, note and report to your maintenance department any malfunctions or conditions which reduce safety, impair efficiency, or which might lead to breakdown.

The Clark Forklift Trucks are built to take hard work ... not abuse. They are built to be safe. But ... as with any other vehicle ... they are only as good and safe as the man behind the wheel and the men responsible for maintaining them.

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KNOW YOUR TRUCK...

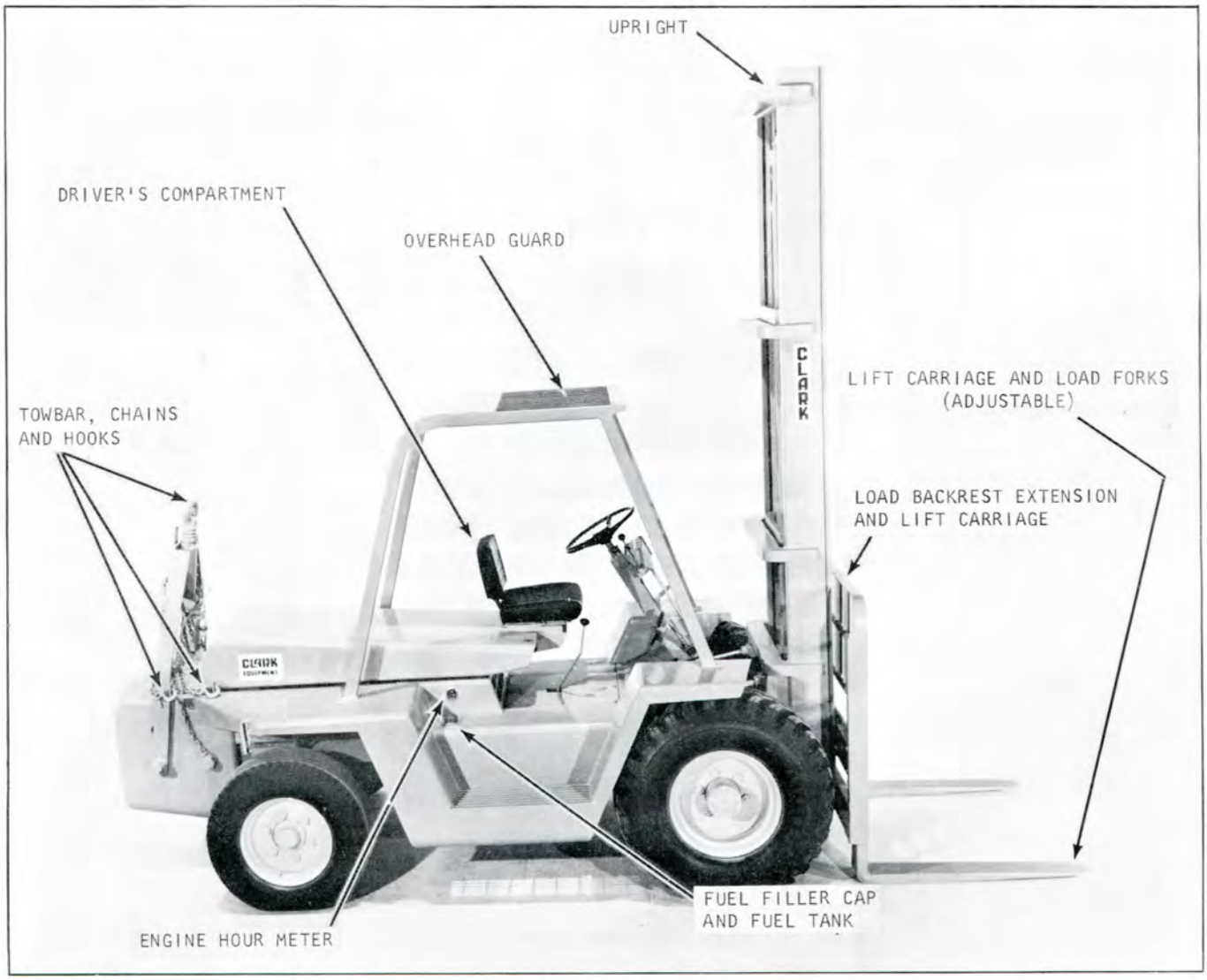
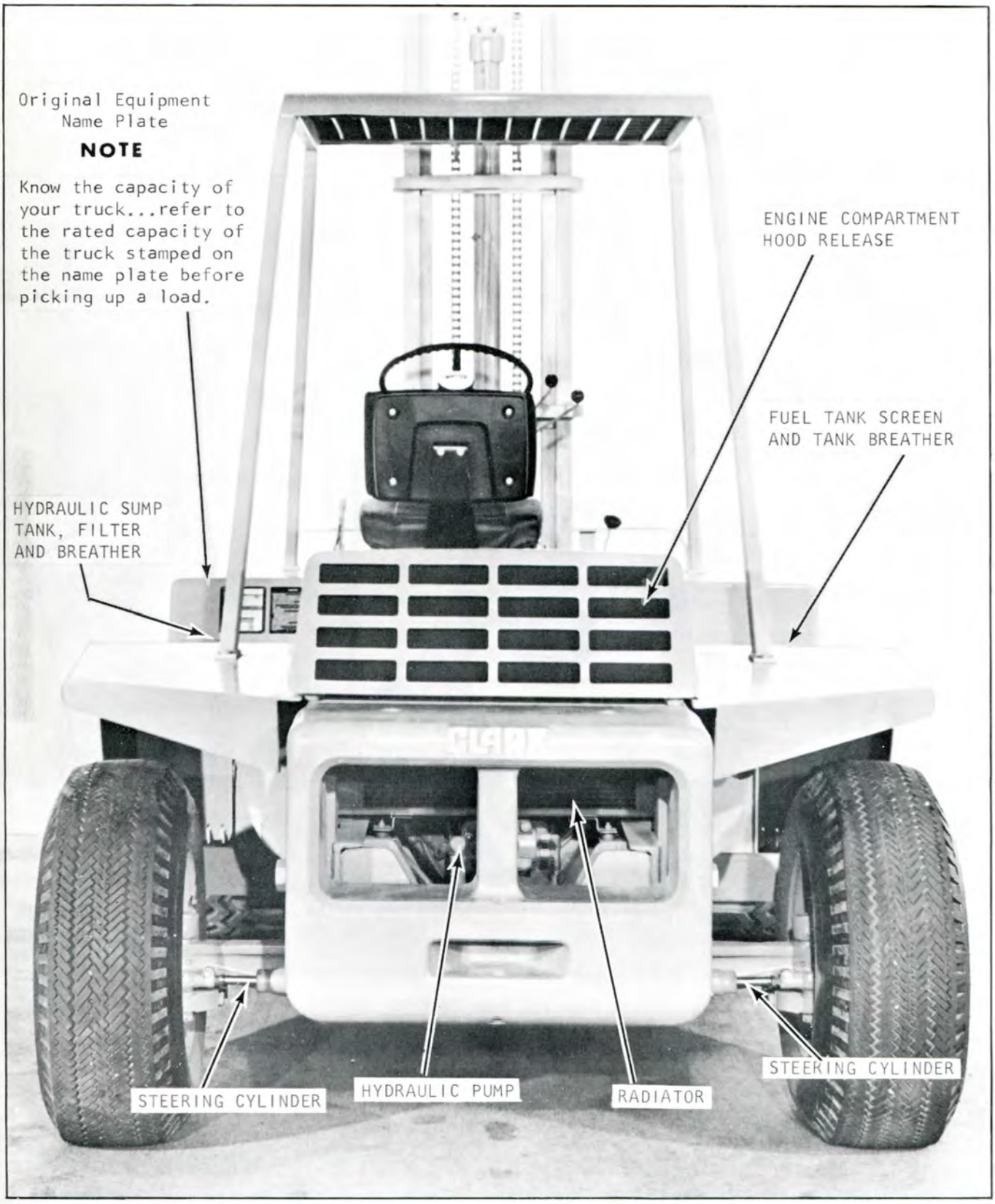


Plate 10853-M-224-1970



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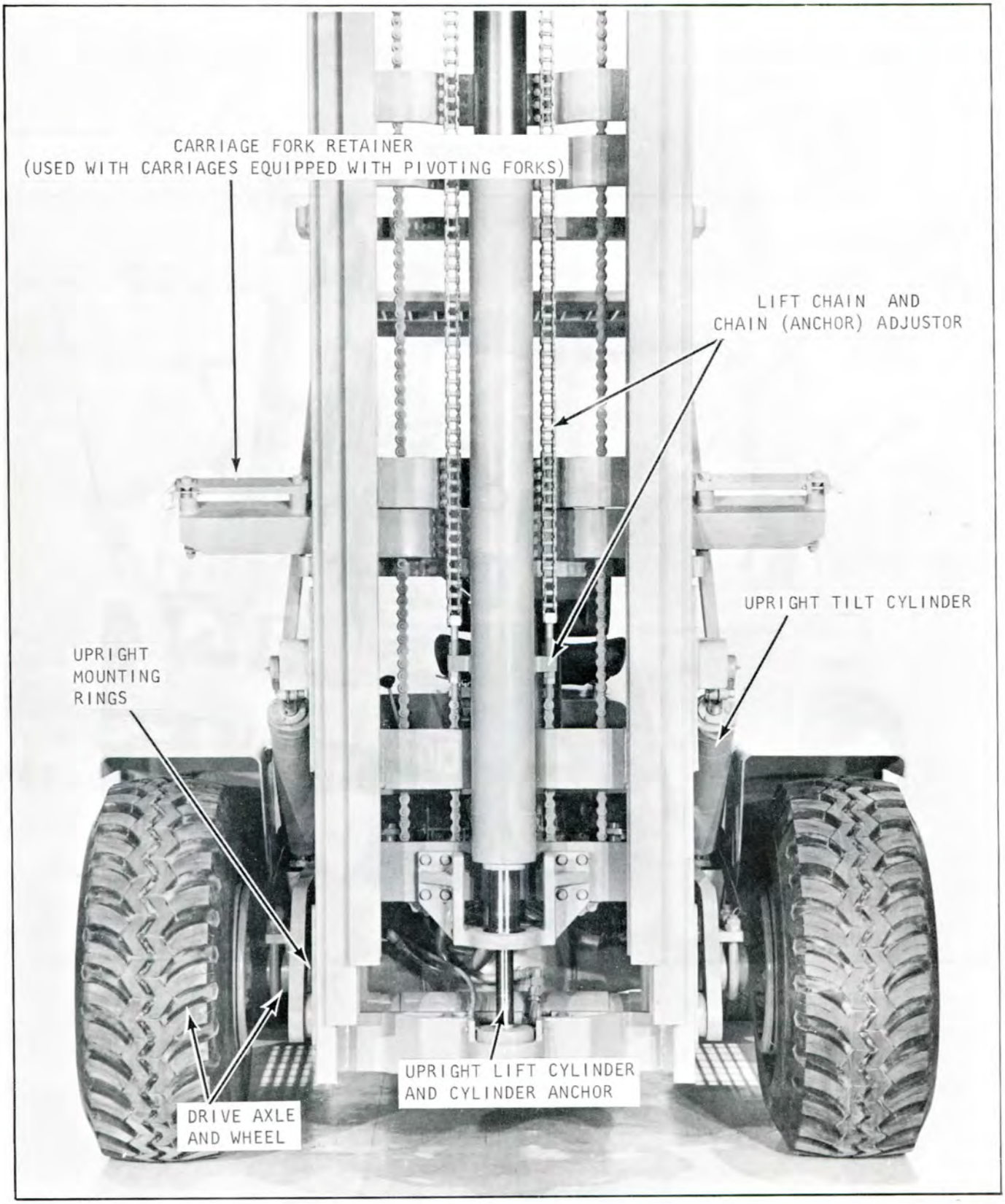

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KNOW YOUR TRUCK...

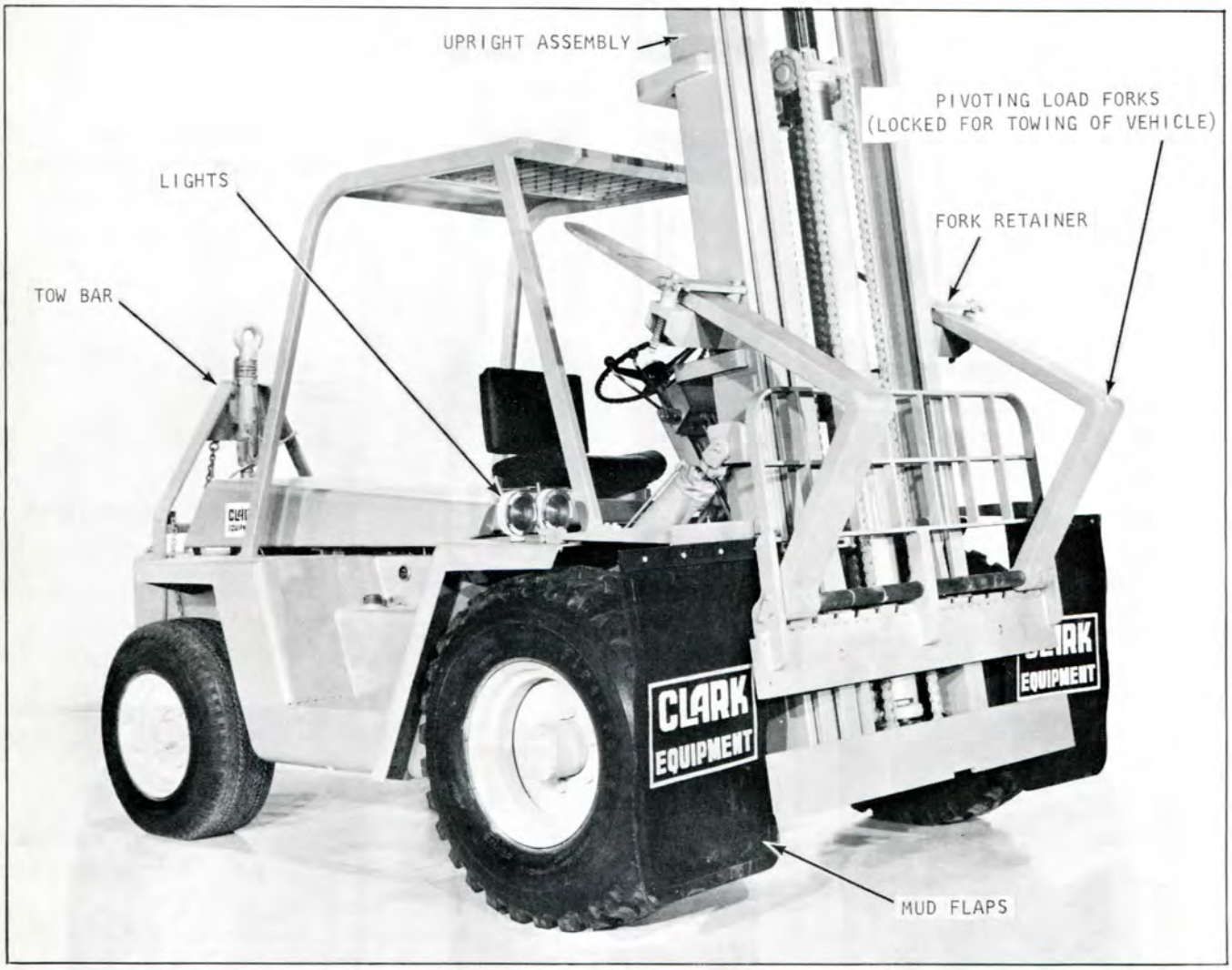

Plate 10856-M-224-1970

KNOW YOUR TRUCK...

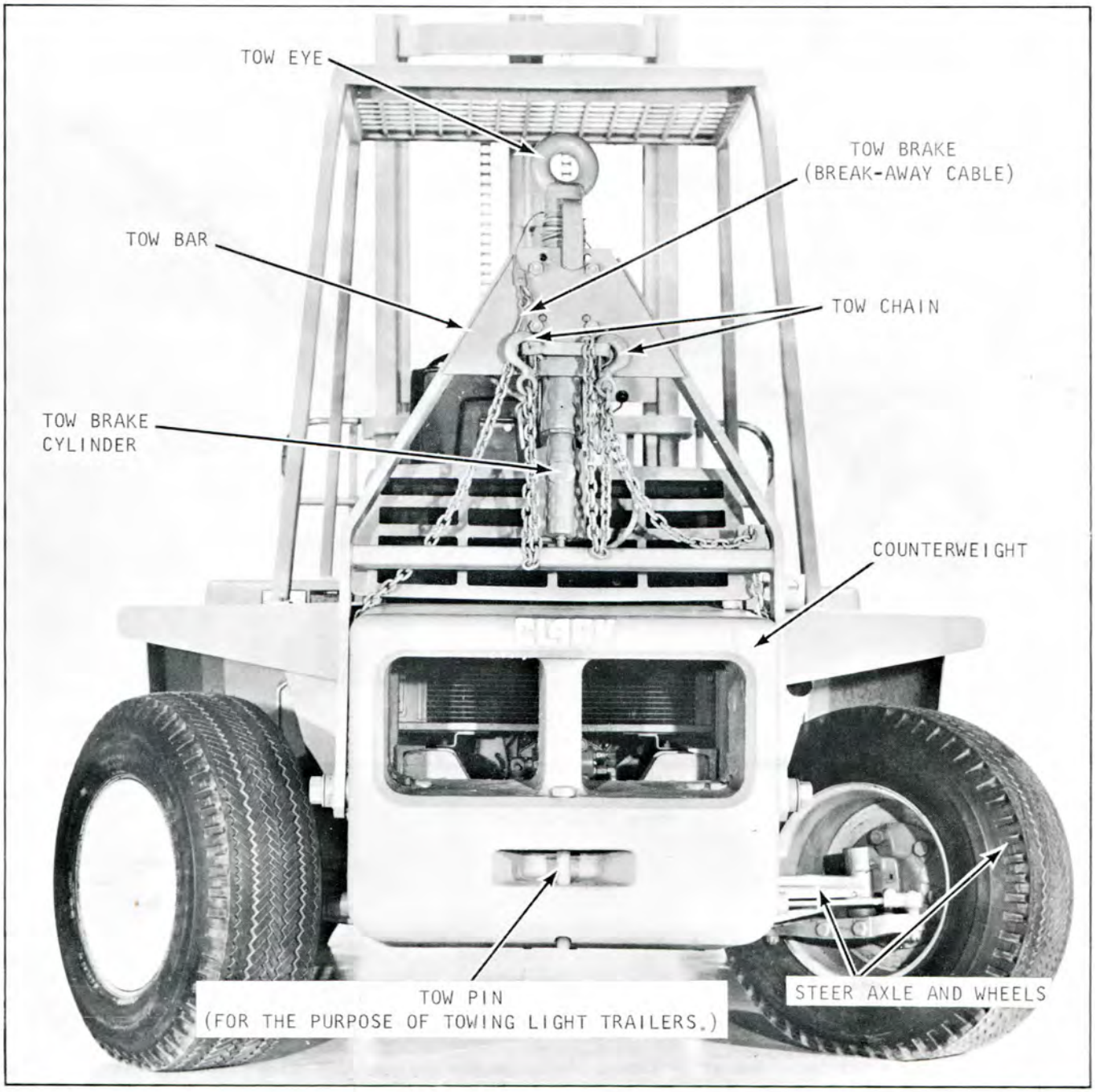

Plate 10857-M-224-1970

KNOW YOUR TRUCK...

Plate 10858-M-224-1970

Vehicles equipped with 24 foot and 30 foot uprights have long tilt cylinders to allow 45° forward tilt so machines can clear 10 foot doors or obstacles. See arrow above. Refer to the instructions on the following pages.

After walking around the vehicle and getting some idea of what you are going to drive...climb into the driver's compartment. Never climb into or operate a truck with wet or greasy hands or shoes...

Plate 10859

...a slip may not be fatal, but it can cause injury and at least a red face.

Plate 10860

Wet or greasy hands can cause one to lose his grip of the hand wheel and...greasy shoes can slip when applying the service brakes.

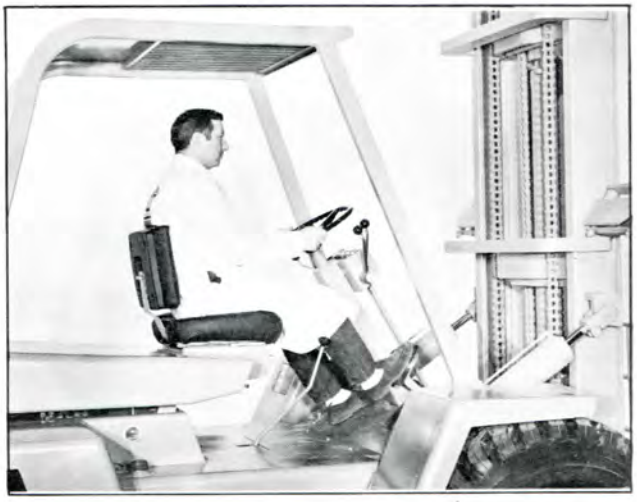

Plate 10861

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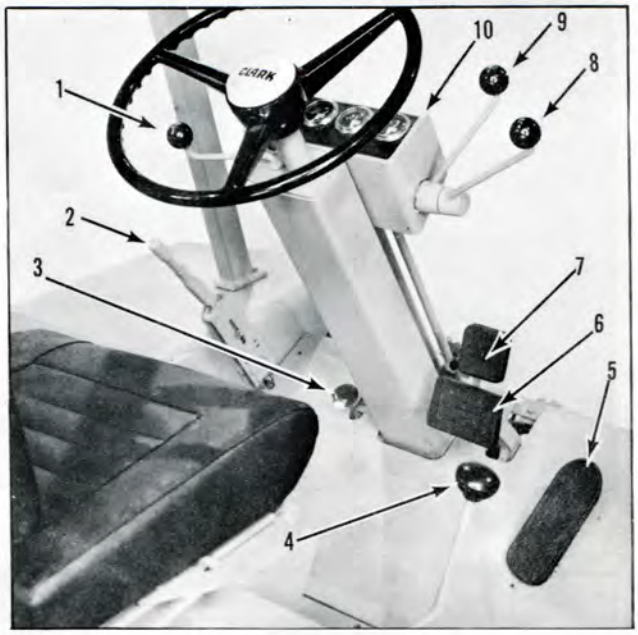

Plate 10704

The controls in the driver's compartment are:

1. Forward & Reverse Shift Lever
2. Hand Brake Lever
3. Converter Disconnect Pedal
4. Speed Selector Control
5. Accelerator Pedal
6. Brake Pedal
7. Auxiliary/Accelerator Pedal
8. Tilt Control - Upright
9. Lift Control - Upright
10. Instrument Console

The driver's seat can be adjusted fore and aft.

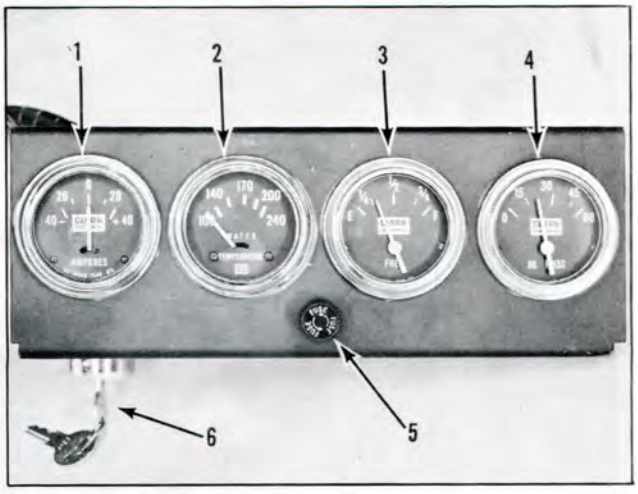

Plate 10705

The instrument console has these instruments and controls:

1. Ammeter
2. Engine Water Temperature Indicator
3. Engine Fuel Tank Indicator
4. Engine Oil Pressure Indicator
5. Ignition System Fuse
6. Ignition/Starter Switch

Plate 10706

Another instrument....the engine hour meter....is located on the right side of the vehicle in the frame just above the fuel filler cap.

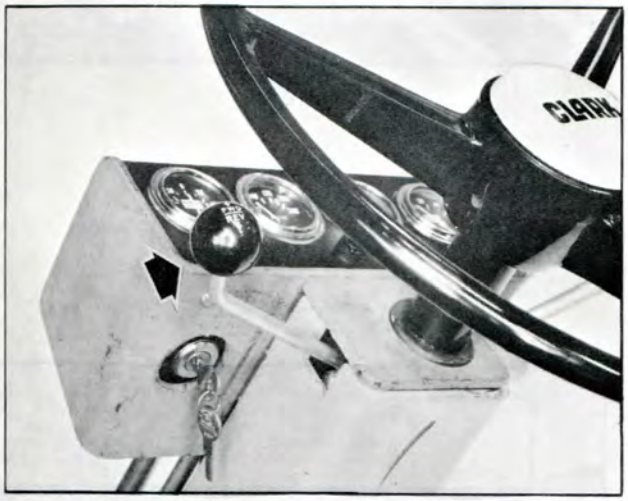

Plate 10707

The forward-reverse lever is located to the left of the instrument panel and under the steering wheel...

Plate 10708

...the diagram on the control knob indicates in which direction to move the lever for Forward, Reverse and Neutral is in center position.

The speed selector lever is located to the right of the driver. The decal immediately behind the lever and to the right of the driver's seat indicates whether you are in 1st, 2nd, 3rd, or 4th speed.

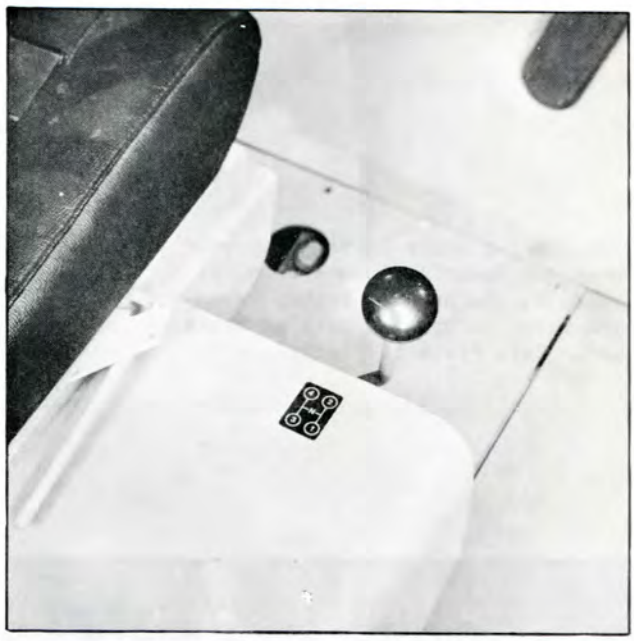

Plate 10709

The shift patterns are shown here. When the speed selector lever is moved to center, it is in neutral... ...pushing lever to the right and back, it is in 1st or low speed... ...moving lever straight forward, it is in 2nd speed...bringing lever back to center, pulling toward you and rearward, it is in 3rd speed...moving lever straight forward will place it in 4th speed.

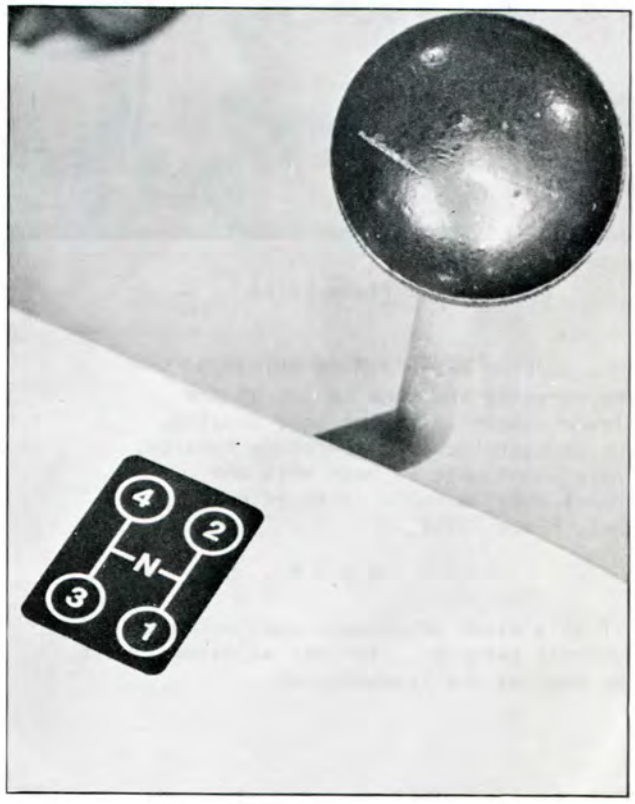

Plate 10710

The parking brake lever is to your left. When the lever is pushed down, it releases the parking brake. When the lever is up, the parking brake is set. Ref. Plate 10711.

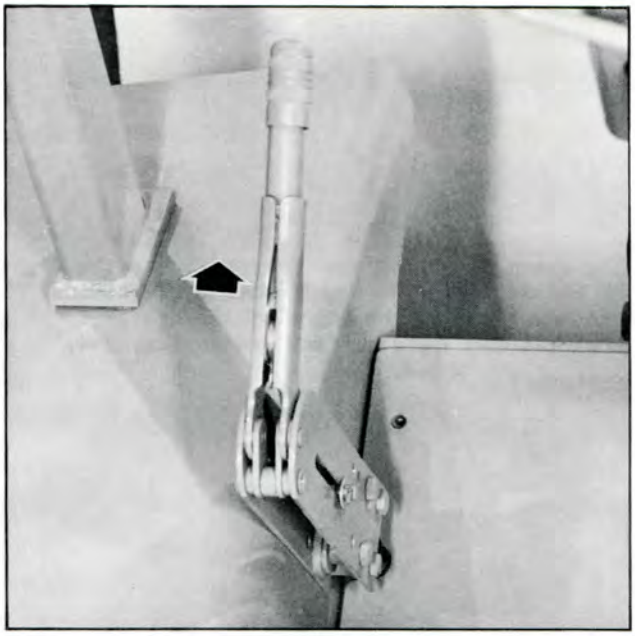

Plate 10711

The parking brake assembly is mounted on the transmission and has a cable running to the brake lever in the driver's compartment. Ref. Plate 10712.

Plate 10712

The parking brake can be adjusted by rotating the knob on top of the lever clockwise to increase tension, or counterclockwise to reduce tension. Adjustment must be made with the hand lever in fully released position. Ref. Plate 10755.

N O T E

If this minor adjustment does not provide correct tension....further adjustment must be made at the transmission.

Plate 10755

The horn is mounted in the center of the steering hand wheel.

Plate 10713

STARTING THE ENGINE:

To start the engine, set the parking brake and place the forward-reverse lever in neutral. Then place the speed control lever in neutral. Pull out on the choke button.

Turn the starter key switch to start position. The starter is engaged when the key is turned clockwise.

C A U T I O N

Do not engage the starter until engine comes to a complete rest...to do so, will result in motor damage.

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

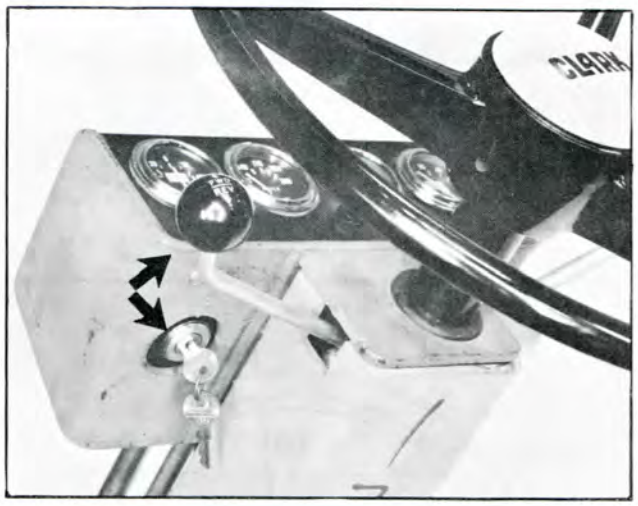

Plate 10752

Plate 10714

Plate 10715

After the engine starts...push in on the choke button...slowly...to keep the engine idling smoothly. In cold weather the choke control may have to be used for 4 to 5 minutes.

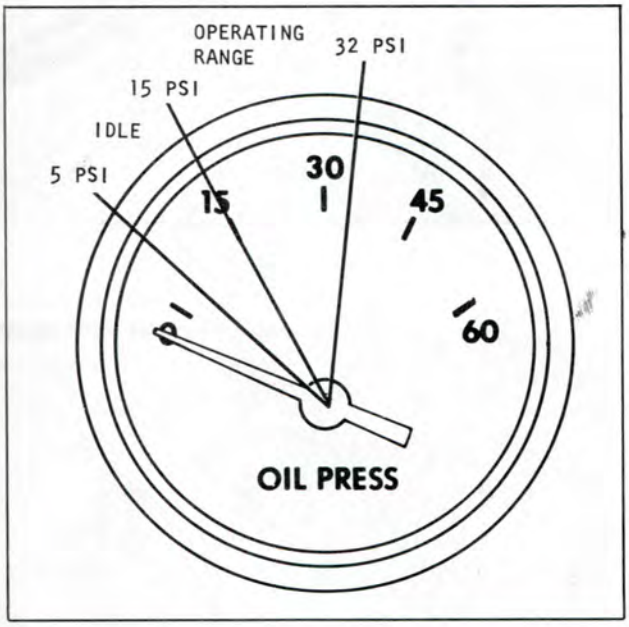

Plate 9615

CAUTION

Immediately after starting the engine... whether in normal or cold starting conditions ...engine oil pressure should be at least 30 psi. If the pressure is low, erratic, or there is no pressure indicated, shut engine down and report condition to the designated person in authority.

...allow the engine to warm up at part throttle...for several minutes, then operate the truck. Do not race the engine until the engine water temperature reads normal.

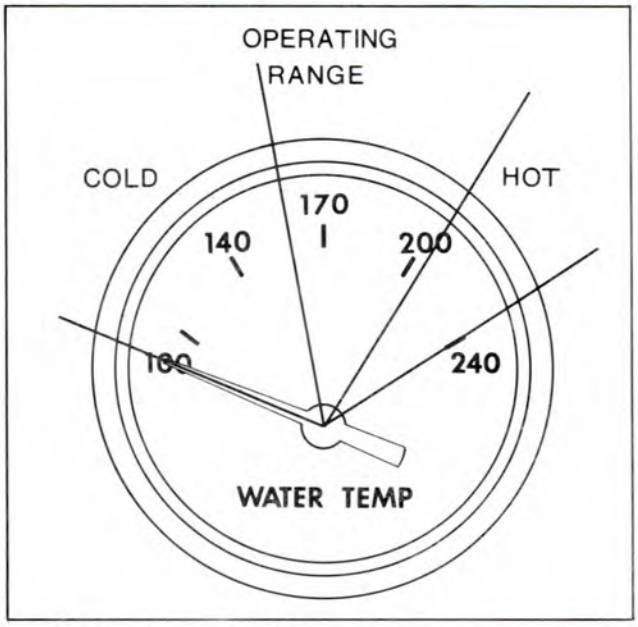

Plate 10754

While the engine is warming, depress brake pedal and hold foot pressure for at least ten seconds...pedal must be solid, must not be spongy or drift under foot pressure. This is a means of checking brake system and determining that the system is working satisfactorily.

Plate 10716

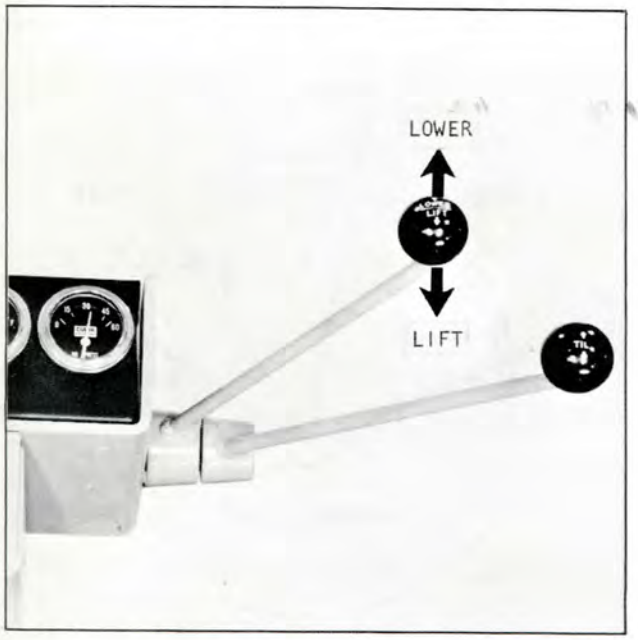

Plate 10717

To lift the carriage and forks, pull the control lever toward you...to lower the assembly, push the control forward. Upon releasing the control it will return to center and the carriage and fork travel will stop.

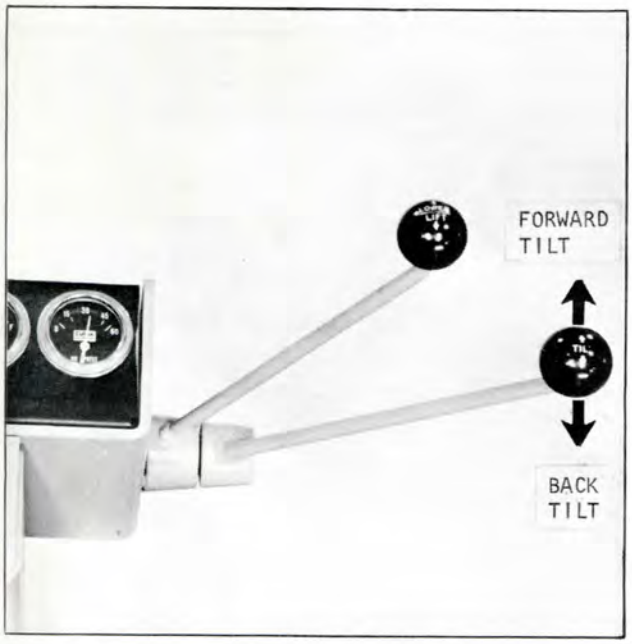

Plate 10718

To tilt carriage and upright back or toward vehicle...pull on control lever. A diagram on the lever knobs indicates the direction in which to move the lever.

CAUTION

Never hold control levers in operating positions after the carriage or upright has reached the end of its travel...doing so will result in undesireable heating of the fluid and could harm the hydraulic system.

TRUCKS SO EQUIPPED

Machines equipped with 45° forward tilt upright will have a lock-out device. To get forward tilt, you must operate an override control.

1. With your left hand...depress the button located on the side of the instrument panel.

2. Now, with your right hand...push tilt lever. The upright will move forward until you release the tilt lever...releasing the override button **does not stop** the upright.

W A R N I N G

DO NOT OVERRIDE THE TILT LIMIT DEVICE EXCEPT TO...

...obtain minimum forward tilt required to pick up or deposit a load.

...tilt the upright forward with unloaded forks raised within first stage of upright.

Plate 10881

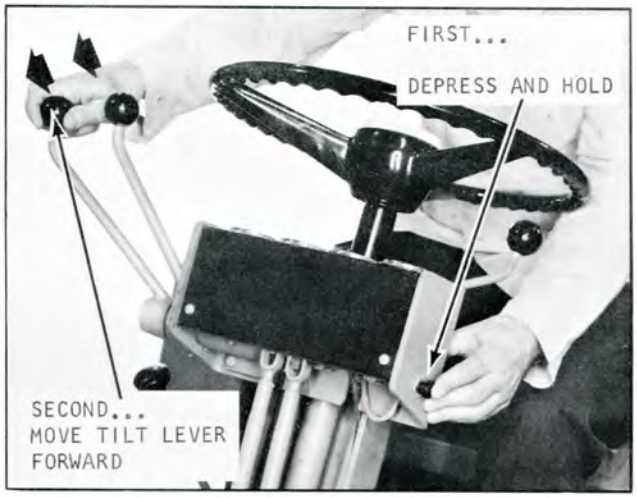

Plate 10882

Plate 10880

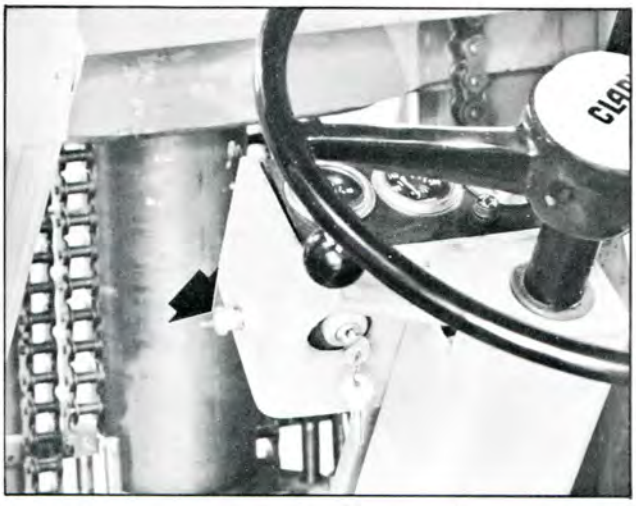

Plate 10883

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With the engine fully warmed up and the parking brake released... (Ref. Plate 10711)

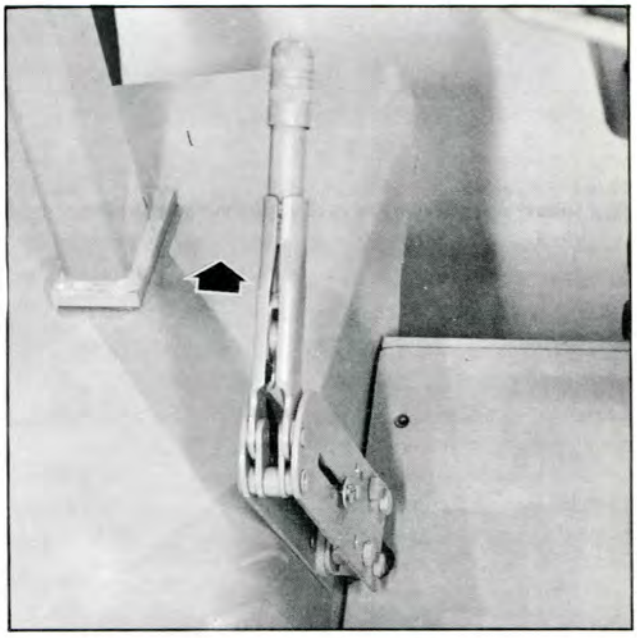


Plate 10711

Plate 10725

...depress left foot disconnect pedal, then, with the forward-reverse lever...

Plate 10709

...in neutral, shift the speed selector into 2nd speed.

N O T E

If you are starting in rough terrain, mud, etc., with a capacity load...you should shift into low gear for the initial start.

Now shift the directional...

...lever into forward...by pushing the lever forward.

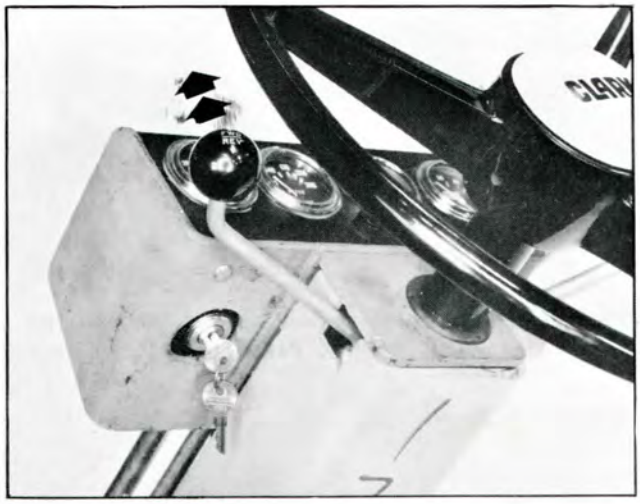


Plate 10719

With engine idling at 600 rpm, release left foot disconnect pedal and then accelerate the engine.

Plate 10725

When up shifting from one speed to another, depress disconnect pedal...let up on the accelerator...shift to next higher speed and...release left foot pedal and step on the accelerator.

Plate 10714

When down shifting from one speed to another, depress disconnect pedal...increase engine rpm slightly and then...down shift into next lower gear. Release disconnect pedal.

Plate 10725

To reverse direction of travel...let up on the accelerator and slowly apply the brakes. When the vehicle comes to a complete stop... shift forward-reverse lever to opposite direction.

Plate 10716

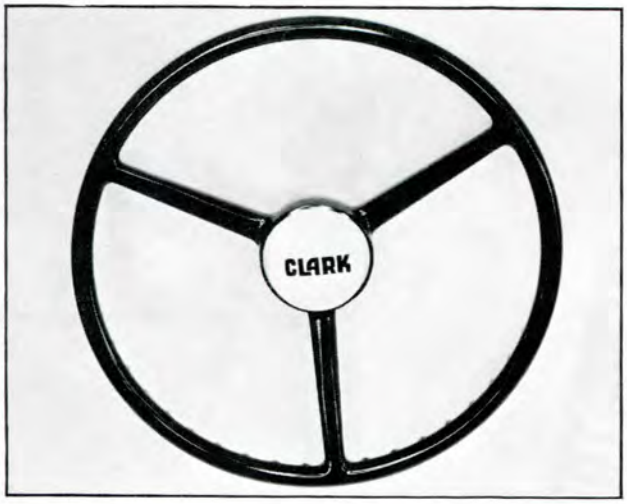


Plate 10720

The vehicle is equipped with power steering...

Plate 10838

...is steered by the rear wheels.

PICKING UP A LOAD

When approaching a load...align vehicle with load. Stop vehicle...place controls in neutral ...apply hand brake...and...

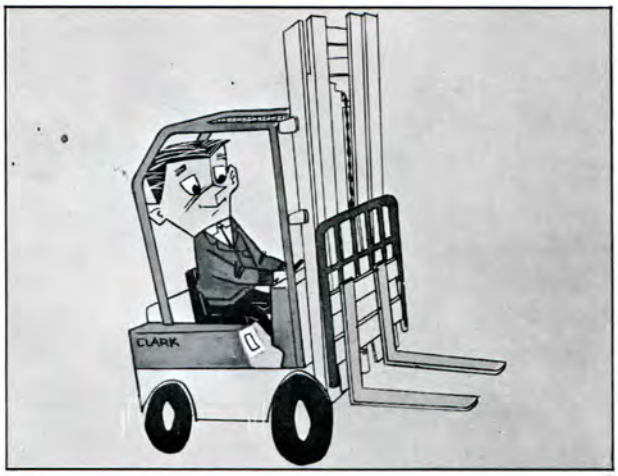


Plate 10721

...adjust forks sidewise on fork bars to obtain maximum balance in proportion to width of load... then...

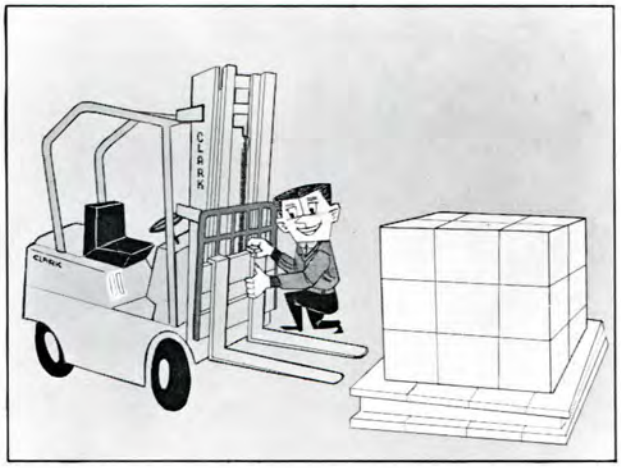


Plate 10722

...tilt upright forward...raising or lowering carriage as needed to enter or chisel into a load.

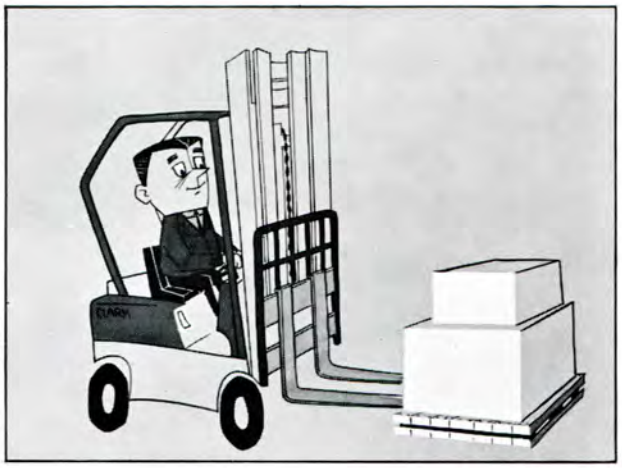


Plate 10723

Plate 10724

Depress disconnect pedal...shift into 2nd speed ...release disconnect pedal...feather the brake while depressing the aux/accelerator pedal to provide complete control of the vehicle while slowly entering the load. Then...

Plate 10725

...depress disconnect pedal shutting power off to the drive wheels...rev engine slightly as...

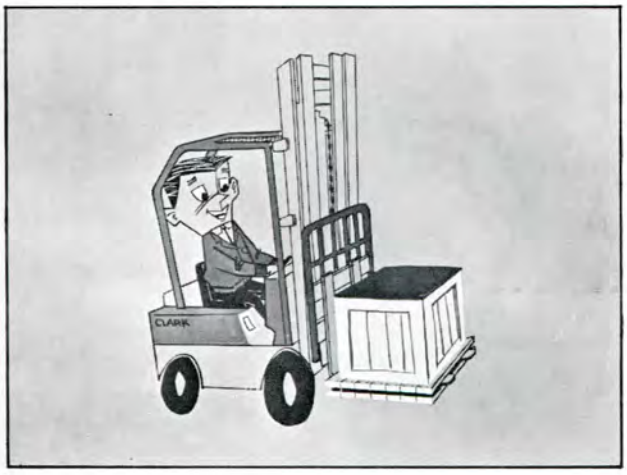


Plate 10726

...the load contacts carriage and backrest. Fully apply brakes and raise carriage slightly just lifting load free of ground...be sure load is centered on forks.

C A U T I O N

When picking up a load that is stacked in aisles, be sure that forks do not stick out beyond load ...extending into the next stack.

Position forks as far as possible into load, then...raise carriage & forks slightly lifting load off floor.

Tilt upright slightly back...to prevent the load from falling...with brake applied. Deaccelerate engine to idle, select either forward or reverse (as necessary), release the disconnect and brake pedals and...slightly depress the accelerator.

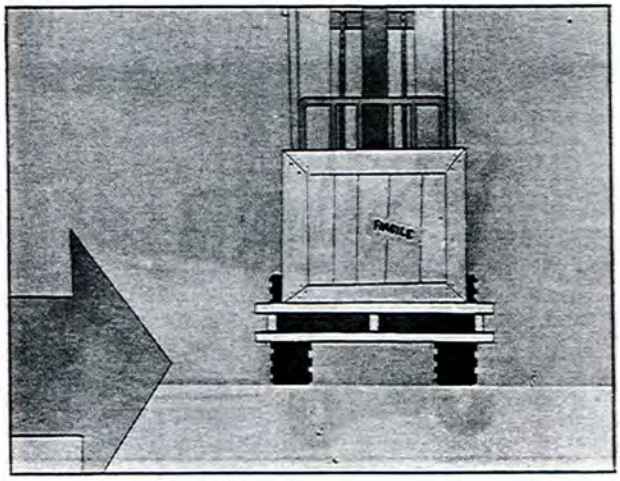


Plate 10727

N O T E

Lower load to ground...if originally the forks could not be centered and placed completely beneath load...then reposition forks to completely engage the load, and be sure to center as nearly as possible on the forks. Tilt it back...load should be tilted back until it rests securely for traveling.

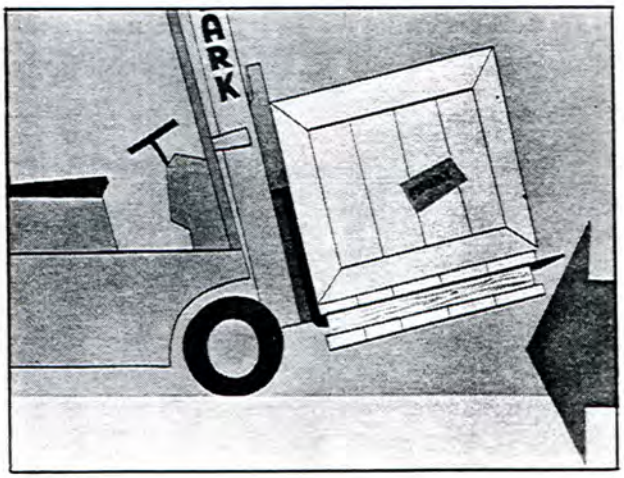


Plate 10728

Raise the forks to a level where the forks with load are close to the ground but high enough to avoid hitting obstructions.

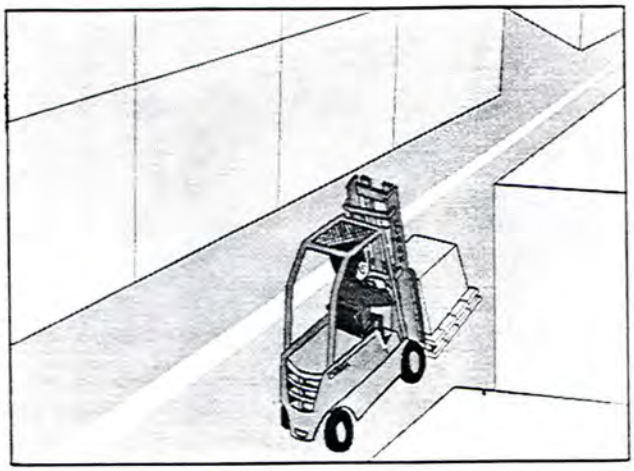


Plate 10729

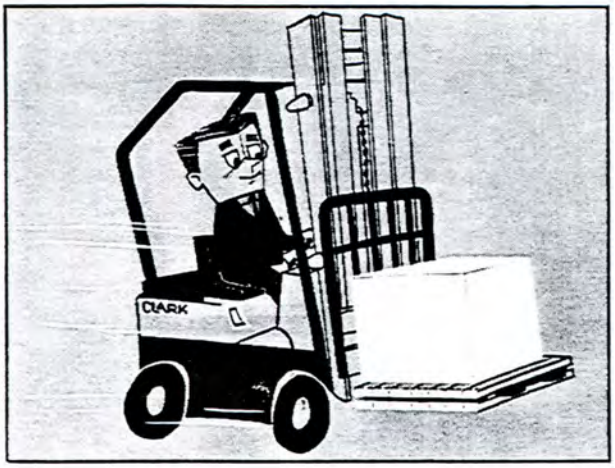


Plate 10730

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.

Picking Up A Load

Prior to picking up a load ... make certain the load back-rest extension is mounted securely to carriage and is not damaged ... and ... after adjusting forks as outlined ... make certain the forks are locked in position as shown below.

WARNING

IMPORTANT

WARNING

Plate 10757

Lift lever to unlock forks ... slide forks to desired position. Then.....

.....lower lever to lock forks ... be sure lock is in groove of fork bar.

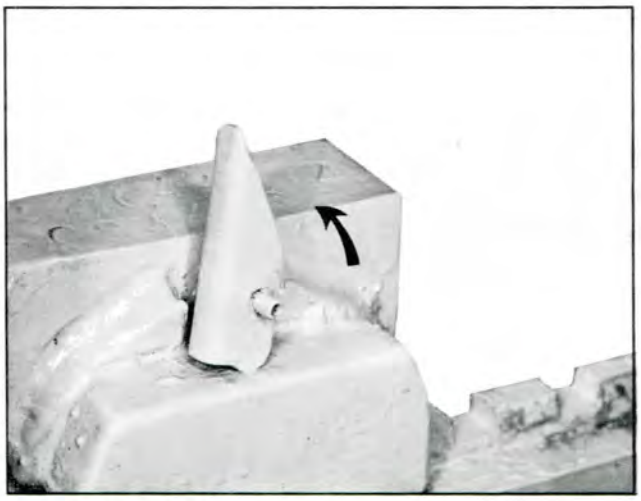


Plate 10758

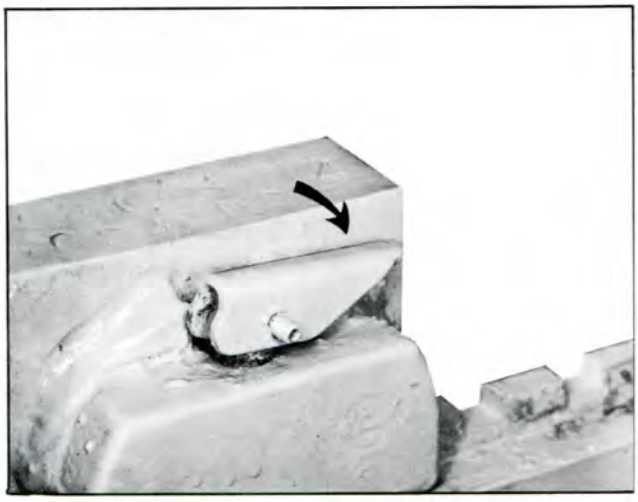


Plate 10759

To Move A Load

The forks should be adjusted sidwise on the fork bars to obtain firm support and maximum balance of the load. Raise or lower the forks to the proper level and engage the load by driving forward. Tilt the upright backward sufficiently to adequately cradle the load, and raise load sufficiently to clear obstructions, accelerating engine slightly at the same time. Back away from stack.

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 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 into position. Disengage forks from the load by using necessary lift-tilt and then back away.

Loads will vary in size, shape, method of packaging, stacking procedures, etc. The best way to handle a load will depend on these factors. If in doubt, consult with your supervisor.

OPERATING SAFETY RULES and PRACTICES

NOTE: The following is reproduced from:

American National Standard ... Safety Standard for Powered Industrial Trucks

B56.1 - 1969

Operator Qualifications

1. Operator's of powered industrial trucks shall be physically qualified. An examination should be made on an annual basis and include such things as field of vision, hearing, depth perception and reaction timing.

Operator Training

2. Only trained and authorized operators shall be permitted to operate a powered industrial truck. Methods should be devised to train operators in the safe operation of powered industrial trucks. It is recommended that badges or other visual indication of the operator's authorization shall be displayed at all times during work period.

General

1. Safeguard the pedestrians at all times. Do not drive a truck up to anyone standing in front of a bench or other fixed object.
2. Do not allow anyone to stand or pass under the elevated portion of any truck, whether loaded or empty.
3. Unauthorized personnel should not be permitted to ride on powered industrial trucks. A safe place to ride should be provided where riding of trucks is authorized.
4. Do not put arms or legs between the uprights of the mast or outside the running lines of the truck.

- continued -

5. When leaving a powered industrial truck unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shut off, brakes set, key or connector plug removed. Block wheels if truck is parked on an incline.

6. Maintain a safe distance from the edge of ramps or platforms and do not, while on any elevated dock or platform, push freight cars. Do not use trucks for opening or closing freight doors.

7. Have brakes set and wheel blocks in place to prevent movement of trucks, trailers, or railroad cars while loading or unloading. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. Check the flooring of trucks, trailers, and railroad cars for breaks and weakness before driving onto them.

8. Be sure of sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.

9. Use an Overhead Guard as protection against falling objects.

10. Use a load backrest extension whenever necessary to minimize the

WARNING

AN OVERHEAD GUARD IS INTENDED TO OFFER PROTECTION FROM THE IMPACT OF SMALL PACKAGES, BOXES, BAGGED MATERIAL, ETC., REPRESENTATIVE OF THE JOB APPLICATION, BUT NOT TO WITHSTAND THE INPACT OF A FALLING CAPACITY LOAD.

possibility of the load or part of it from falling rearward.

11. Use only approved industrial trucks in hazardous locations.

12. Whenever a truck is equipped with vertical only, or vertical and horizontal travel controls elevatable with the lifting carriage or forks for lifting personnel, the following additional precautions

- continued -

should be taken for the protection of personnel being elevated ...

(a) Use of a safety platform firmly secured to the lifting carriage and/or forks.

(b) Provide means whereby personnel on the platform can shut off power to the truck.

(c) Provide such protection from falling objects as indicated necessary by the operating conditions.

13. Report all accidents involving personnel, building structures, and equipment.

14. Spinner knobs must not be attached to steering handwheels of trucks not originally equipped with such, without approval of the safety department.

15. Fire aisles, access to stairways, and fire equipment shall be kept clear.

Traveling

1. Observe all traffic regulations including authorized plant speed limits. Under normal traffic conditions, keep to the right. Maintain a safe distance, approximately three truck lengths from the truck ahead, and keep the truck under control at all times. Use of truck on public roads shall conform to local traffic regulations.

2. Yield the right of way to ambulances, fire trucks, or other vehicles in emergency situations.

3. Do not pass another truck traveling in the same direction at intersections, blind spots, or at other dangerous locations.

4. Slow down and sound horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, travel with load trailing.

5. Cross railroad tracks diagonally wherever possible. Do not park closer than 8 feet from center of railroad tracks.

6. Look in the direction of, and keep a clear view of the path of travel.

7. Ascend or descend grades slowly.
When ascending or descending grades in excess of 10%, loaded trucks shall be driven with the load upgrade.

- continued -

Unloaded trucks should be operated on all grades with the load engaging means downgrade.

On all grades the load and load engaging means shall be tilted back if applicable, and raised only as far as necessary to clear the road surface...and/or high enough to avoid hitting obstructions.

8. Under all travel conditions the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.

9. Travel with load engaging means or load low and, where possible, tilted back. Do not elevate the load except during stocking.

10. Make starts, stops, turns or direction reversals in a smooth manner so as not to shift load and/or overturn the truck.

11. Stunt driving and horseplay should not be permitted.

12. Slow down for wet and slippery floors.

13. Before driving over a dockboard or bridgeplate, be sure that it is properly secured. Drive carefully and slowly across the dockboard or bridgeplate and never exceed its rated capacity.

14. Do not run vehicles onto any elevator unless specifically authorized to do so. Approach elevators slowly, and then enter squarely after the elevator car is properly leveled. once on the elevator, neutralize the controls, shut off power, and set brakes. It is advisable that all personnel leave the elevator before a truck is allowed to enter or leave.

15. Motorized hand trucks must enter elevator or other confined areas with load end forward.

- continued -

16. Avoid running over loose objects on the roadway surface.

17. While negotiating turns, reduce speed to a safe level, turning hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, turn the hand steering wheel at a moderate, even rate.

Loading

1. Handle only stable or safely arranged loads. When handling off-center loads which cannot be centered, operate with caution.

2. Handle only loads within the rated capacity of the truck.

3. Adjust for long or high (including multiple tiered) loads which may affect capacity.

4. When attachments are used, particular care should be taken in securing, manipulating, positioning, and transporting the load. Operate trucks equipped with attachments as partially loaded trucks when not handling a load.

5. Place load engaging means under the load as far as possible and carefully tilt the mast backward to stabilize the load. Caution should be exercised in tilting backward with high segmented loads.

6. Use extreme care when tilting load forward or backward particulary when high tiering. Do not tilt forward with load engaging means elevated except to pick up a load. Do not tilt an elevated load forward except when the load is in a deposit position over a rack or stack. When stacking or tiering use only enough backward tilt to stabilize the load.

- continued -

Operator Care of Truck

1. Give special consideration to the proper functioning of tires, horn, lights, battery, controller, lift system (including load engaging means, chains, cable, and limit switches), brakes and steering mechanism. If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the matter shall be reported immediately to the designated authority, and the truck shall be taken out of service until it has been restored to safe operating condition.

2. Do not make repairs or adjustments unless specifically authorized to do so.

3. Do not fill fuel tanks while engine is running and avoid spillage.

4. Spilliage of oil or fuel shall be carefully washed away or completely evaporated and fuel tank cap replaced before restarting engine.

5. Do not operate a truck with a leak in the fuel system until the leak has been corrected.

6. Do not use open flames for checking electrolyte level in storage batteries or gasoline level in fuel tank.

IMPORTANT

The transmission is equipped with a NEUTRAL STARTING SWITCH ... engine must not start in any position other than neutral ... place the Forward and Reverse Lever in forward position and attempt to start engine ... if it starts it indicates that the neutrol start switch is faulty or out of adjustment ... repeat check in reverse. The engine should start only when the lever is placed in NEUTRAL position ... if a malfunction exists, report condition to your maintenance department. This TEST should be made only WITH the SERVICE BRAKES FULLY APPLIED.

- continued -

WARNING

COOLING SYSTEM

Use extreme coution in removing RADIATOR PRESSURE CAP. In pressure systems ... the sudden release of pressure can cause a steam flash ... the flosh, or the loosened cop can cause serious injury. loosen cop slowly and ollow the steam to escape... place a rag over cap before attempting to loasen the cop.

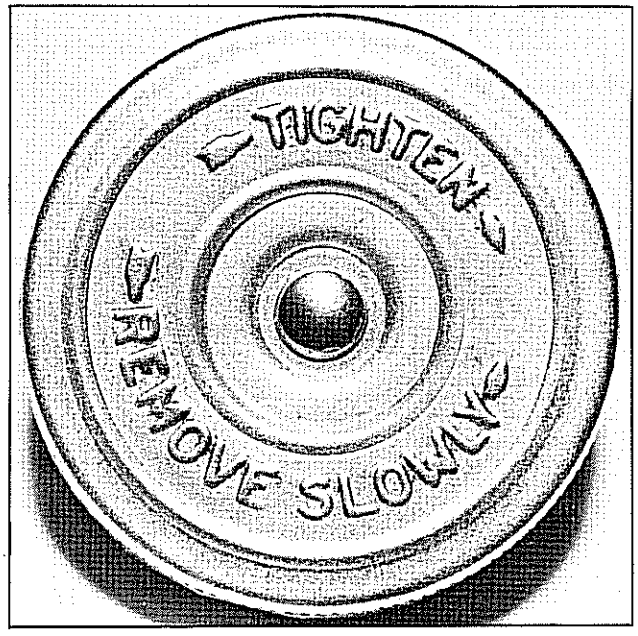


Plate 10829.

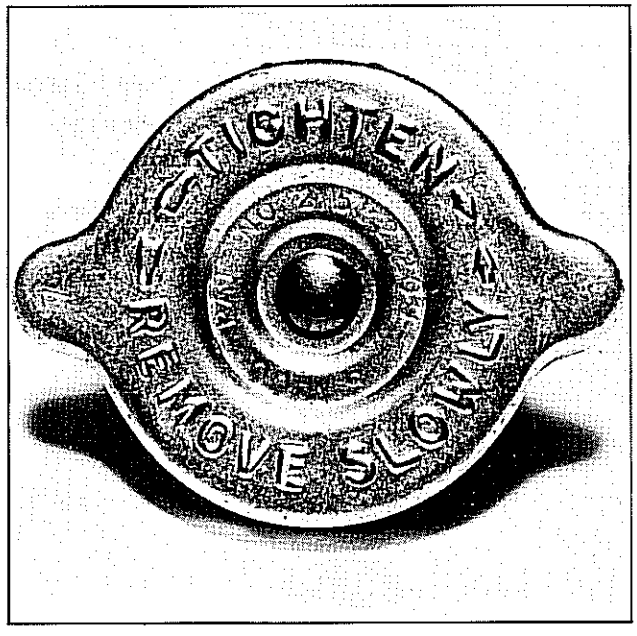


Plate 6458.

FUEL — GASOLINE and DIESEL

1. Before filling the tank ... make certain filler cap screen is in place and not damaged.

..... Smoking or carrying lighted tobacco or any open flame is prohibited during all fueling operation.

..... Refill gasoline fuel tanks only at locations that are designated for this purpose ... refer to local ordinances.

..... Never operate the vehicle with a leaking fuel system ... report condition to your maintenance department.

..... Refer to "Fuel Handling and Storage Safety" procedures in the "P.M." instructions.

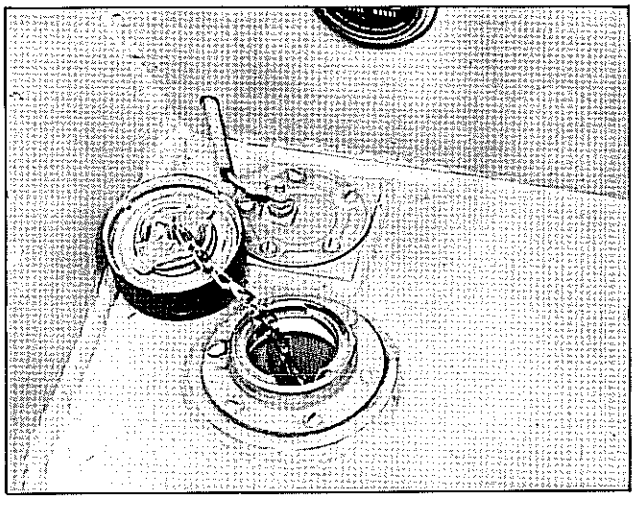


Plate 10765.

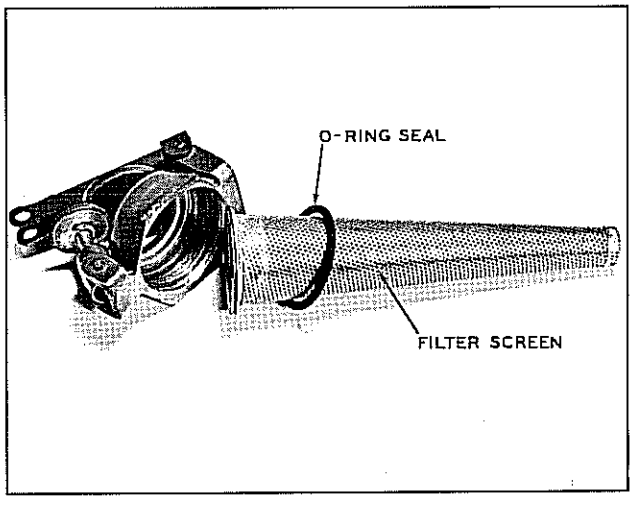


Plate 6227.

WARNING

Trained and designated personnel should exchange LP-Containers. Handle containers carefully ... the careless handling of LP-Containers can result in a serious accident. Extreme care should be exercised when transporting containers so they are not accidentally dropped or physically damaged.

Exchanging L.P. Gas Containers

1. Close container valve by turning to the right (clockwise).
2. Operate engine until it stops ... to burn gas vapors in the fuel system.
3. Disconnect fuel line at quick-disconnect coupling.
4. Loosen container fasteners ... swing and lift up container mounting device ... then remove container.
5. Install a recharged container of the same type.
6. When replacing container ... place container in its compartment so the center device properly locates container in position ... secure container with fasteners. Then ... connect quick-disconnect coupling at shut-off valve on tank.
7. Slowly open the valve ... by turning left (counterclockwise).
8. Important ... turning the valve too quickly will close a safety check valve and shut off the gas supply. If the check valve should close ... shut off the container valve and wait one to five minutes ... until the check valve reopens ... before turning on the container valve.

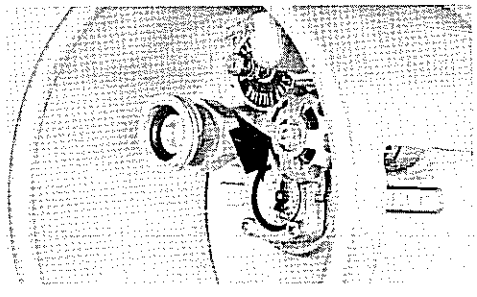


Plate 10830.
LP-Container Shut-Off Valve

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

GETTING READY TO TOW

We recommend the tow vehicle be as heavy as possible, preferably a truck weighing at least 3,000 pounds heavier than the vehicle being towed. The towing vehicle should have all wheel brakes and should conform to "ICC" regulations.

HOOK-UP

Before towing the vehicle, the following procedure must be followed.

1. Lower tow bar so eye is level with coupler of towing vehicle...hold eye in this position by connecting safety chain hook to fender bracket and chain link in slot on tow bar. Now... hook break-away cable to towing vehicle (where required)...make coupling of lights (where required).

CHAINS

2. Criss cross safety chains under tow bar and put them through tow bar loop (welded to underside of tow bar near the end). Connect chains to towing vehicle...leaving only enough slack to permit a full turn.

LOCK-OUT

3. Place shift lever in neutral...lock lever in this position with lock plate provided on floor plate.

PIVOTED FORKS

4. Start engine...tilt upright to maximum back tilt. Pull pin and pivot hold down latch to one side...fold forks back over hold down arms...pivot latch over fork. Be sure washer on latch pin is raised and placed on top side of latch with latch in locking position... secure latch with pin. Stop engine and release parking brake.

WHEN NOT TOWING

1. The break-away cable should be looped back and connected to the arm located at reservoir on tow bar. The light cable should be looped around tow bar to take up excess cable and the connector snapped into retainer on tow bar.

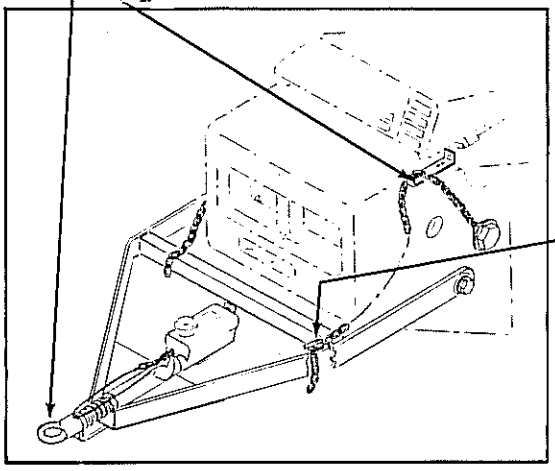
2. Raise tow bar to vertical position...connect chain between fender bracket and slot of tow bar...run chains around cross bar to take up excess slack and connect chain hooks to loop at end of tow bar.

REFER TO ILLUSTRATIONS ON FOLLOWING PAGES

GETTING READY FOR HOOK-UP

1. Connect Tow Chain to Support Tow Bar for Hook-Up as shown.

A. With chain positioned over fender bracket (as shown) ... lower tow bar so eye is level with coupler of towing vehicle ... hold in this position.



B. Connect chain link in slot on tow bar... retaining tow bar in position.

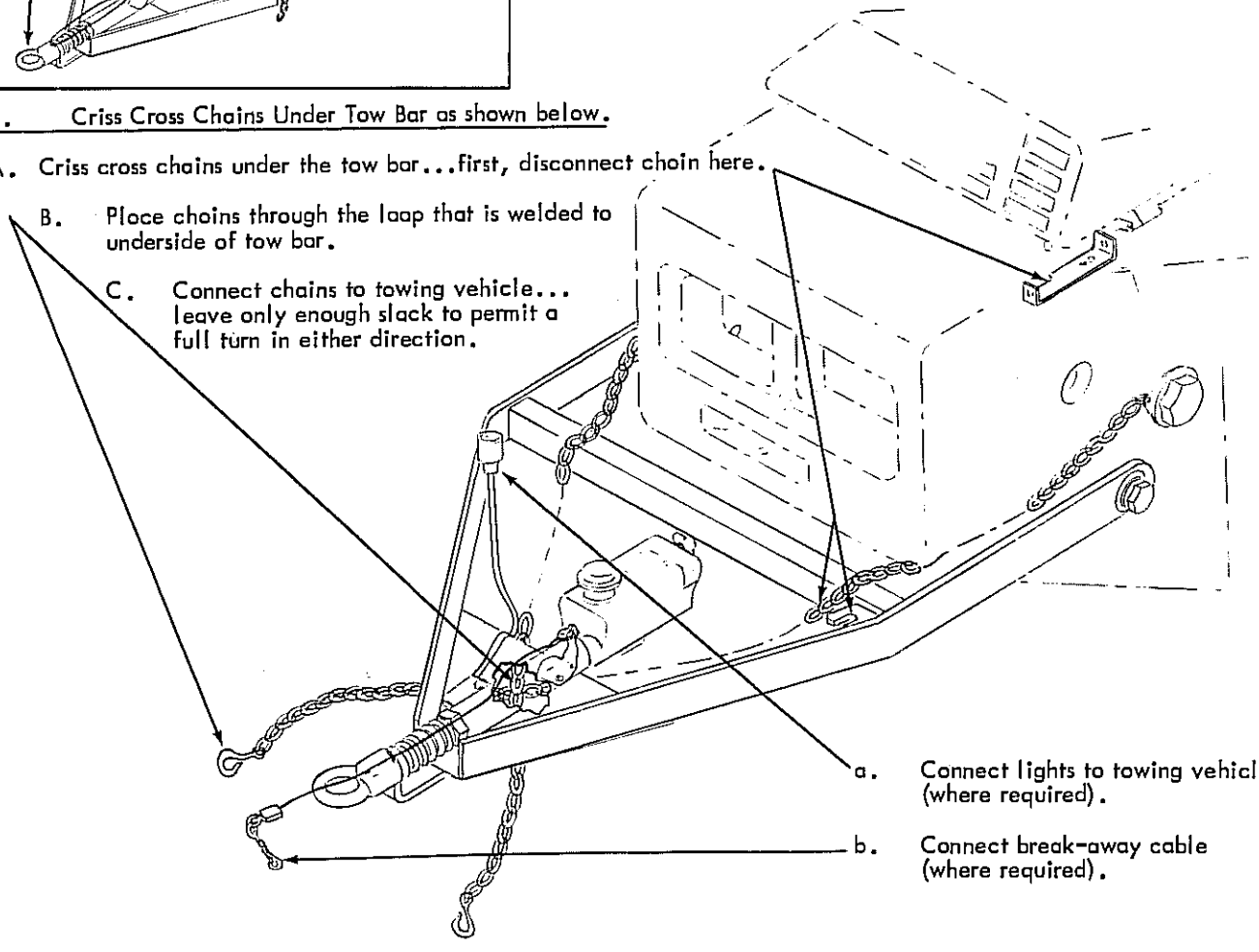
C. Back the "IT" up to the towing vehicle and then make the coupling of the tow bar.

2. Criss Cross Chains Under Tow Bar as shown below.

A. Criss cross chains under the tow bar...first, disconnect chain here.

B. Place chains through the loop that is welded to underside of tow bar.

C. Connect chains to towing vehicle... leave only enough slack to permit a full turn in either direction.



a. Connect lights to towing vehicle (where required).

b. Connect break-away cable (where required).

3. Lock-Out Shift Lever ... refer to following page.

4. Pivoted Forks ... refer to following page/s.

Plate 10731

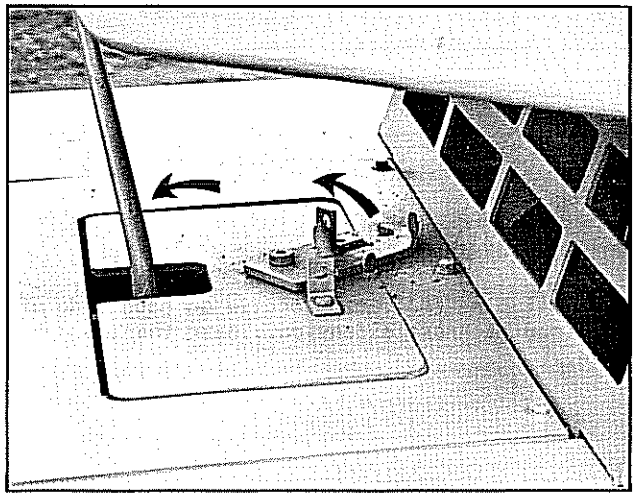


Plate 10879

Prior to towing vehicle, shift the...

...speed selector into neutral position.

...Pivot the lock-out device from its unlatched position (see above) to the...

...latched position, as shown below and in opposite column.

Refer to complete towing instructions on the previous pages.

If your truck is equipped with a fold-down load backrest...refer to the following pages.

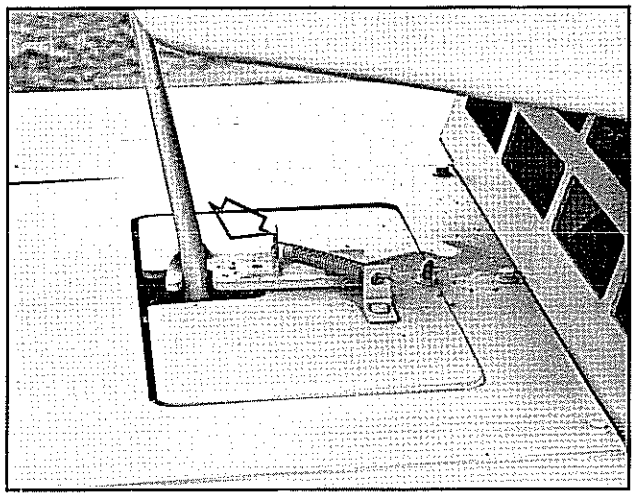


Plate 10732

SHIFT LEVER LOCK-OUT DEVICE

...must be latched before towing truck.

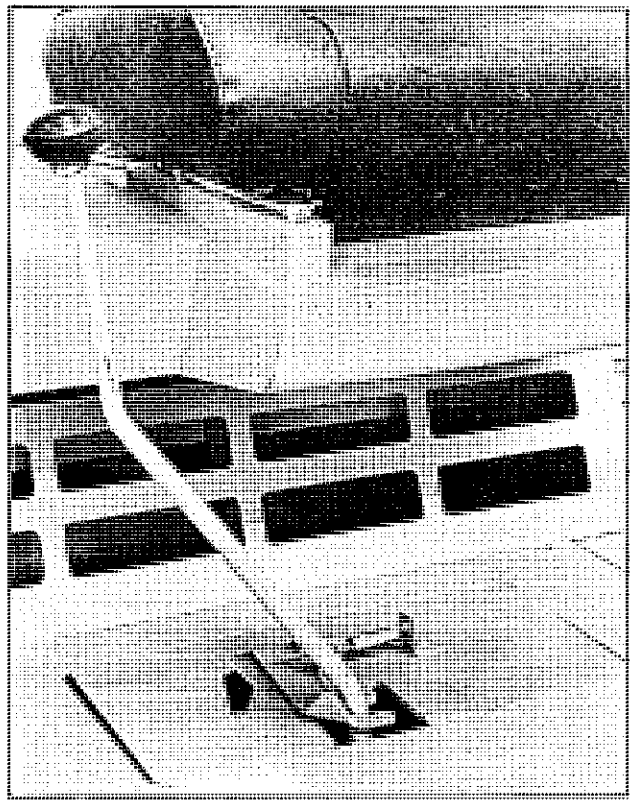


Plate 10733

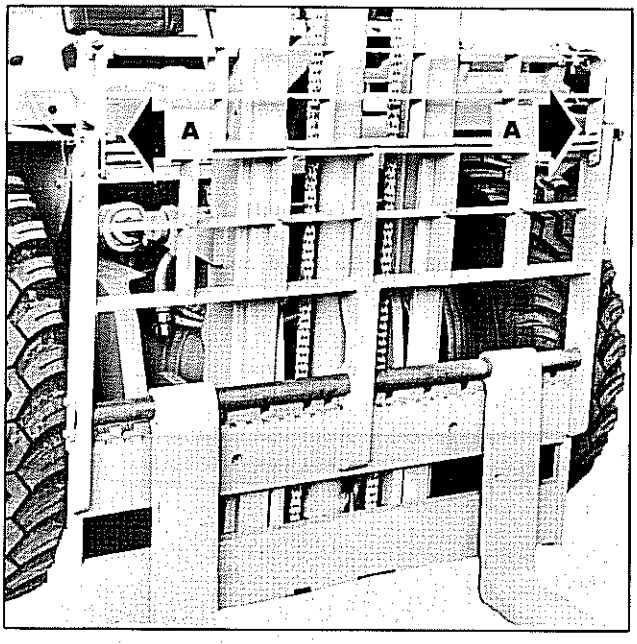


Plate 10734

PIVOTED FORKS

1. Pull pins (A)...one located on each side of the load backrest extension...near the top. Then...

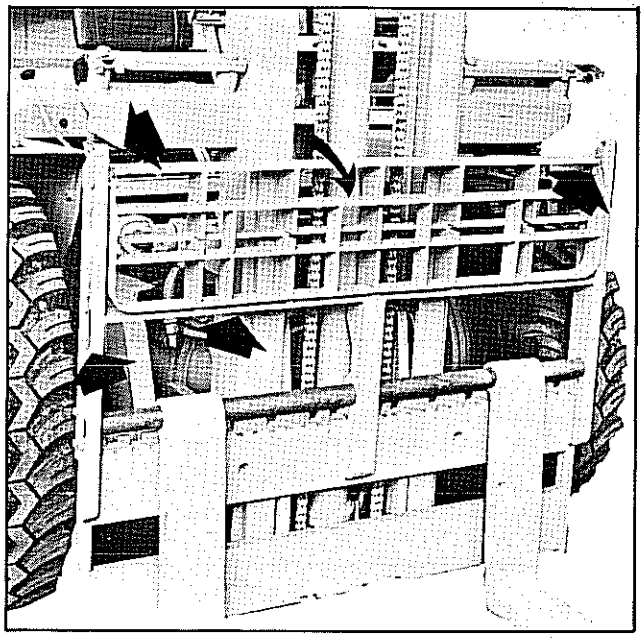


Plate 10735

...lower top portion of the backrest extension... replace pins in their respective holes. Next...

Fold forks back over hold down arms...pivot latch over fork and...

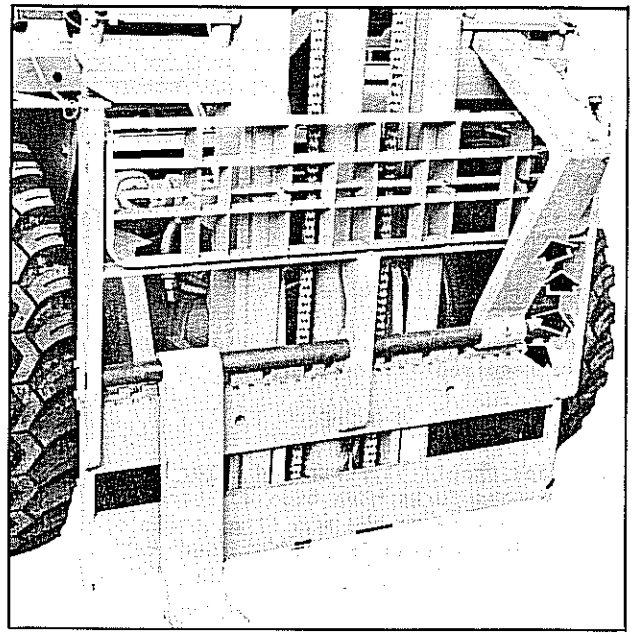


Plate 10736

...be sure to place washer (of latch pin) on top side of latch...slide latch into position and lock with pin.

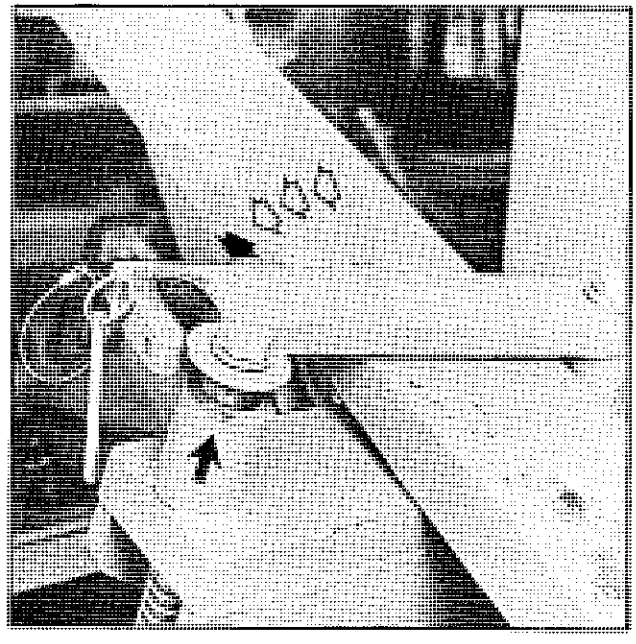


Plate 10737

Next...raise carriage just enough to compress the fork hold-down springs.

Connect lights (where required).

Connect tow brakes...break-away cable (where required).

N O T E

Mud flaps should be installed after upright, carriage and forks have been adjusted for towing. Damage to the mud flaps could occur if this instruction is not followed.

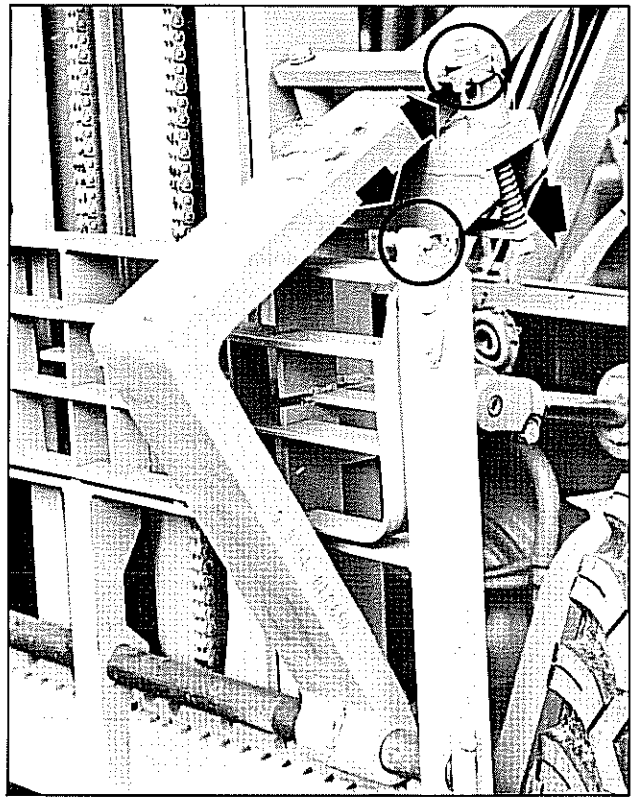


Plate 10738

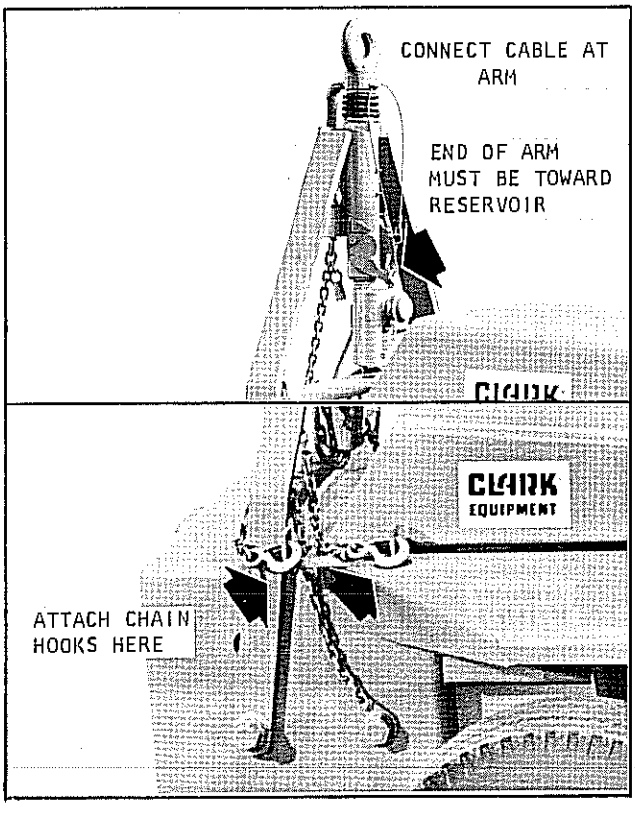


Plate 10739

When not towing be sure...

...tow bar is secured in vertical position with safety chains.
...excess slack is out of tow chains.
...break-away cable is looped back and secured with hook at brake cam (as shown).
...brake cam is pushed back so end of cam is next to brake cylinder reservoir.
...excess slack is out of light cable.
...cable connector is secured at bracket on tow bar.
...mud flaps are removed.

N O T E

Mud flaps are to be removed before lowering forks, or operating upright. Damage to the mud flaps could occur if this instruction is not followed.

INDUSTRIAL TRUCK DIVISION

DRIVER'S DAILY INSPECTION

One of your most important functions in making certain your vehicle is in safe and efficient operating condition is to make a quick and easy check of the vehicle at the beginning of your shift.

This should be viewed not only as a maintenance function but also as one of your most important steps in doing everything possible to improve safety.

The Daily Inspection Report, available at your Clark Dealer, should be used to check out the vehicle and then make certain it is given to the Maintenance Department. The various checks are as follows:

DRIVER'S DAILY CHECKLIST
Check Before Start of Each Shift

Truck No.:____ | Operator:____ | Date:____ | Supervisor's OK ____

Hour Meter Reading:

Start of day____ Hrs. for day____

End of day____

VISUAL CHECKS: Indicate "√" if okay; "X" if defective. Explain all "X's" in "Remark" area below:

- ☐ Engine oil level
- ☐ Radiator water level
- ☐ Fuel level
- ☐ Obvious damage and leaks
- ☐ Tire condition
- ☐ Head and tail lights
- ☐ Warning lights
- ☐ Hour meter
- ☐ Other gauges and instruments

OPERATIONAL CHECKS

- ☐ Horn
- ☐ Steering
- ☐ Service brakes
- ☐ Parking brake
- ☐ Hydraulic controls

REMARKS:____

Plate 10740

Walk around the truck and carefully check for any obvious damage and leaks.

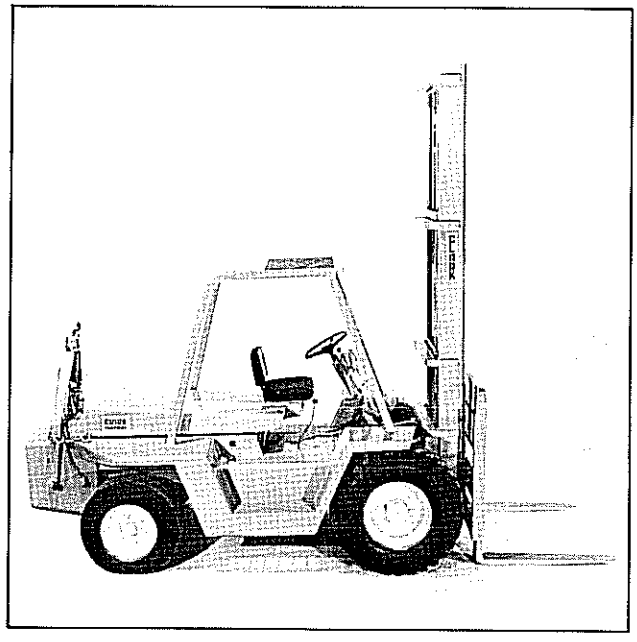


Plate 10741

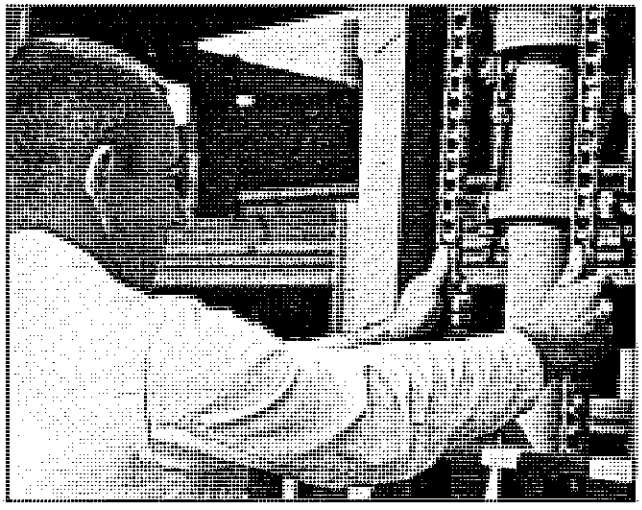


Plate 10742

Check lift chain tension...upright in full lowered position, there should be no excess slack in the chains...chains should have only slight deflection. Ref. Plate 10742.

Check engine crankcase oil level...oil level should be at or near the full mark on the dipstick. Ref. Plate 10743.

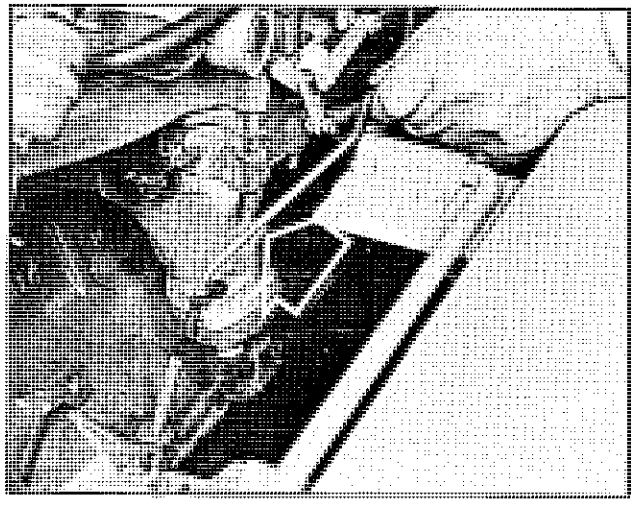


Plate 10743

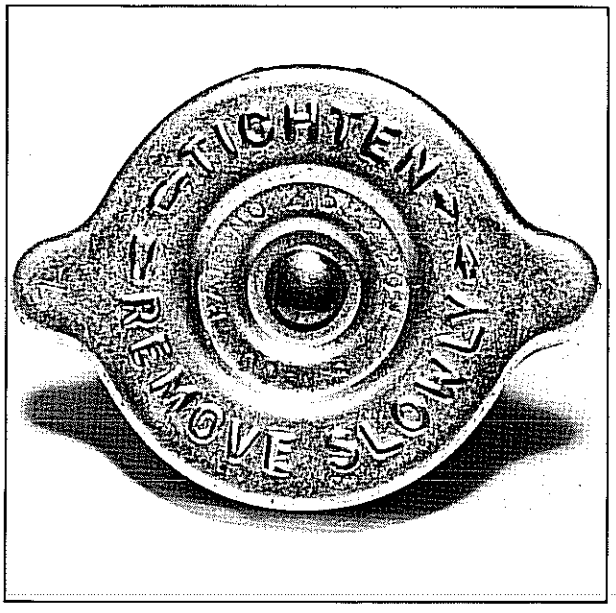


Plate 6458

Check the coolant level in the radiator... ...level should be approximately 1-inch from the top. Ref. Plate 6458.

Check fuel level.

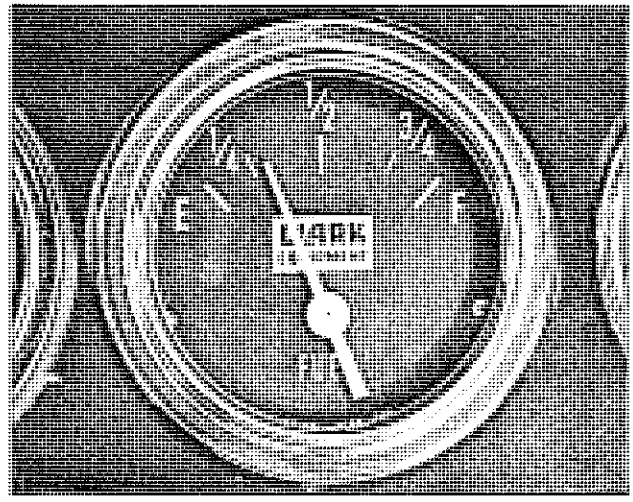


Plate 10744

Check the hydraulic sump tank fluid level... fluid level should be at bottom of filler screen. (With carriage in full lowered position.)

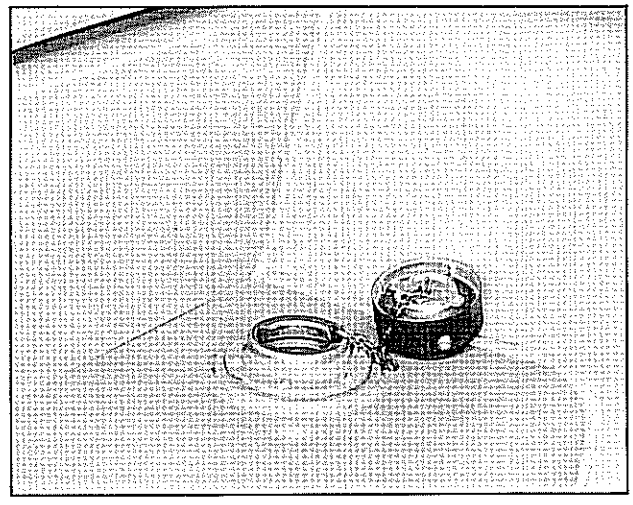


Plate 10745

Check forward and reverse unit fluid level... while occupying the driver's seat...

1. Block drive wheels.
2. Get into driver's seat.
3. Apply parking brake.
4. Start engine.
5. Place transmission selector in 4th gear.
6. Shift into forward...engine at idle (600 rpm).
7. Pull dipstick...fluid level should be at the full mark.
8. If level is low...add specified fluid.
9. Stop engine.

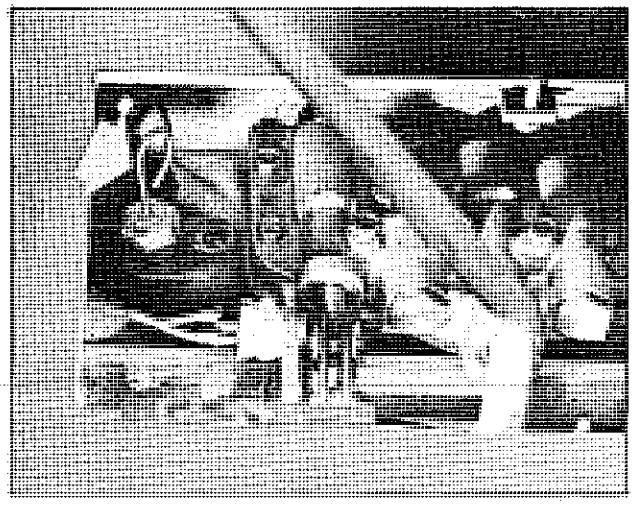


Plate 10746

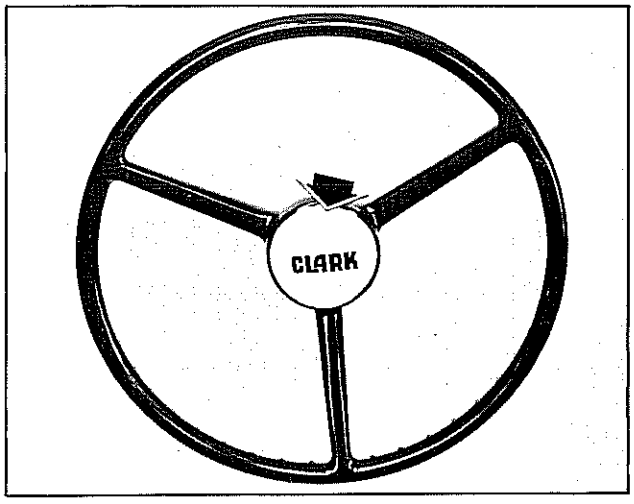


Plate 10713

Check the horn and other warning devices to be sure they are working correctly....

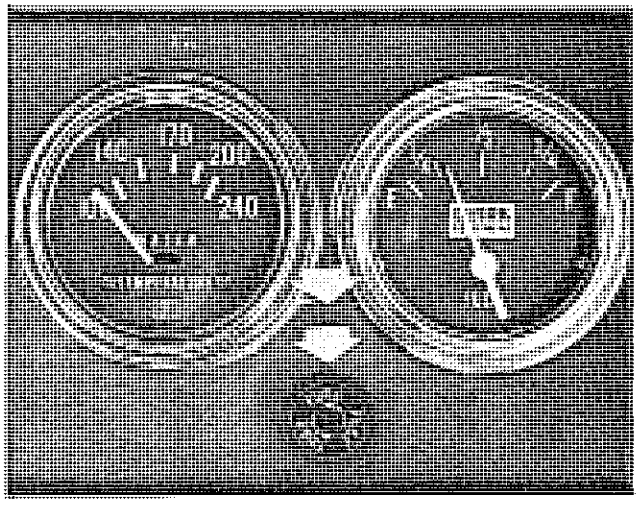


Plate 10747

....location of system fuses, one located at your instrument console, and the other....

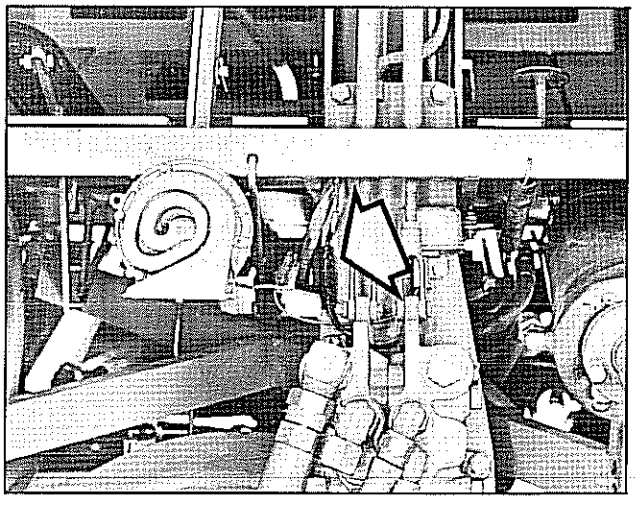


Plate 10748

....located below the steering column by the hydraulic control valve.

Check the engine hour meter and note its reading on the inspection report. Ref. Plate 10706.

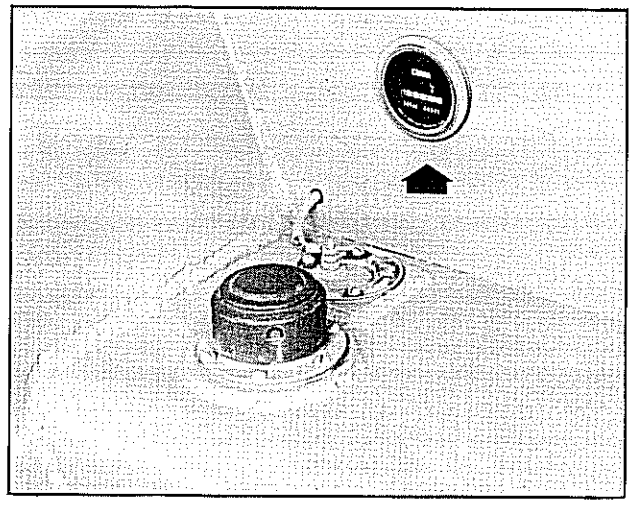


Plate 10706

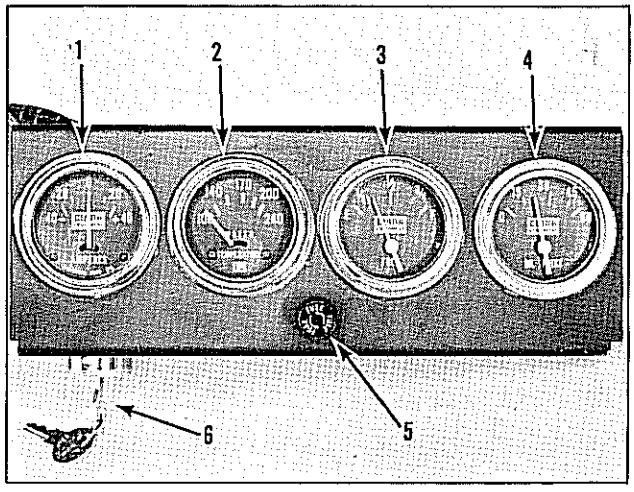


Plate 10705

Check all instruments to be sure they are functioning. Instruments should read in accordance with those instructions listed in operations. Ref. Plate 10705.

Check service brakes to be sure they are functioning....pedal must be solid, must not be spongy or drift under foot pressure. Ref. Plate 10716.

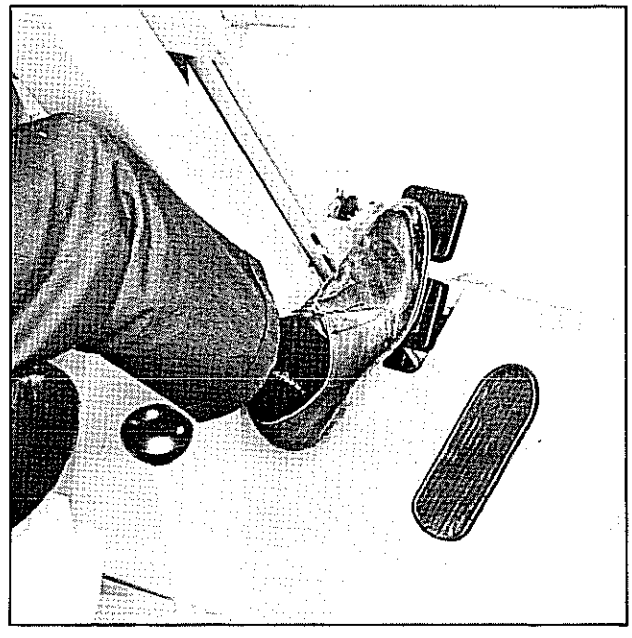


Plate 10716

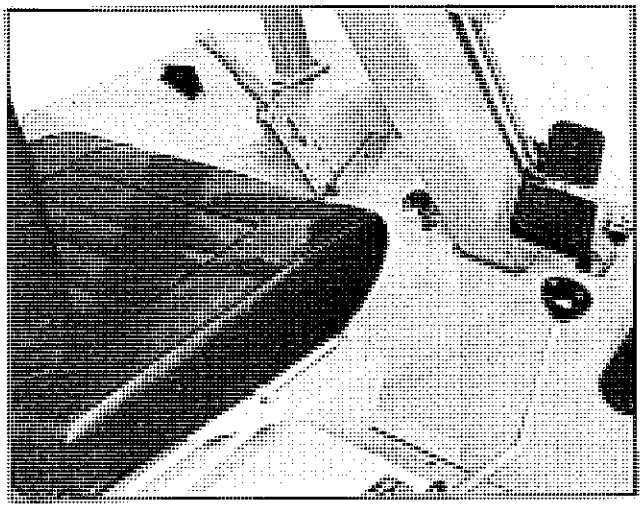


Plate 10750

Check the parking brake...pull lever from full forward to full vertical position...cable tension should be strong enough so that the lever hesitates or remains stationary until it passes into the applied position. Ref. Plate 10750.

Check the neutral starting switch with...parking and service brakes applied.

1. Place F & R level in forward position.
2. Turn key to start position...and hold.
3. Move selector lever to neutral...engine should start only in neutral...not before.
4. Repeat check in reverse.

If the engine starts out of neutral...it indicates that the neutral starting switch is faulty...or, it is out of adjustment. Report condition to designated person in authority. Ref. Plate 10752.

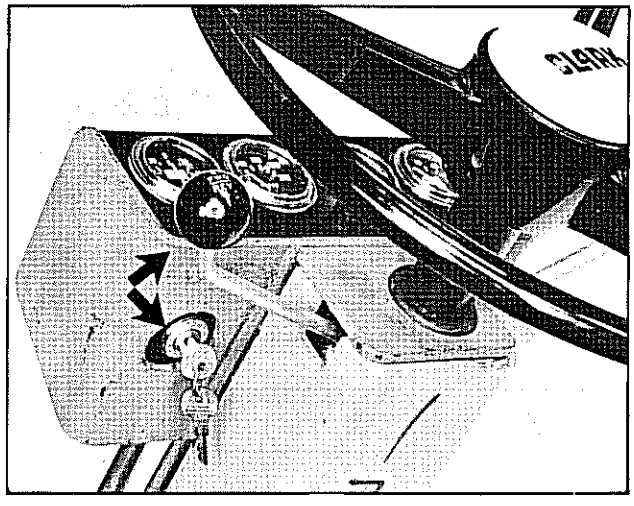


Plate 10752

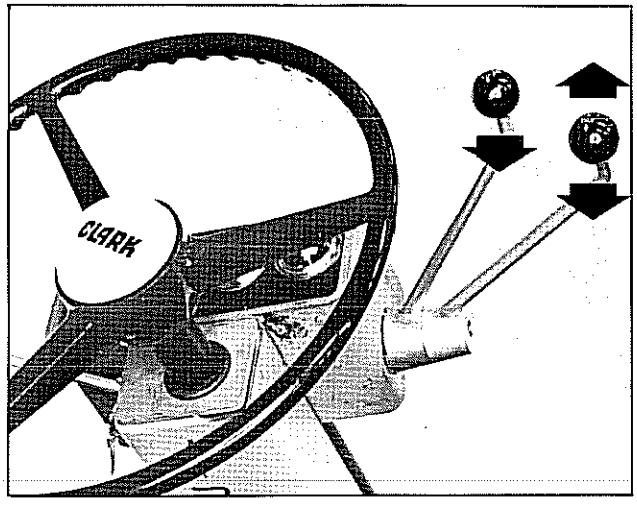


Plate 10753

Check the hydraulic control levers. When levers are moved either way from neutral position...the carriage and upright should move. Raise carriage to the upper limit, if after carriage reaches near maximum height it...
Ref. Plate 10753.

...slows way down or will not go to the upper limit...lower at once and have the maintenance department check the hydraulic system...you may be low on fluid or there may be a malfunction that needs repairing.

Upon extending the upright to the upper limit...slowly lower the assembly. Upright rail/s and carriage should be free to lower smoothly...without hesitation or hong-up.

If there is a bind...rail assembly hesitates or remains in one position and then breaks free as the lift cylinder retracts...improper roller adjustment is indicated and the condition should be reported to the maintenance department for corrective measures at the next P.M.

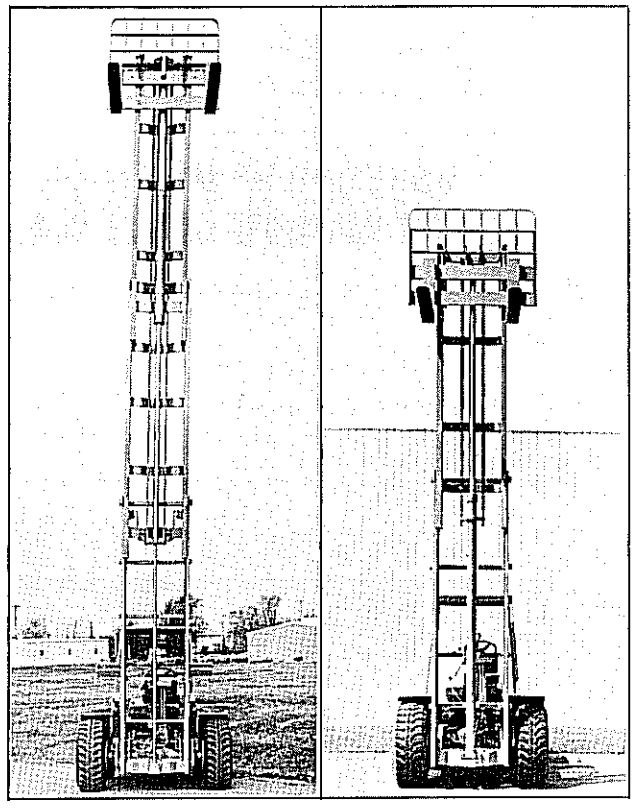


Plate 10751

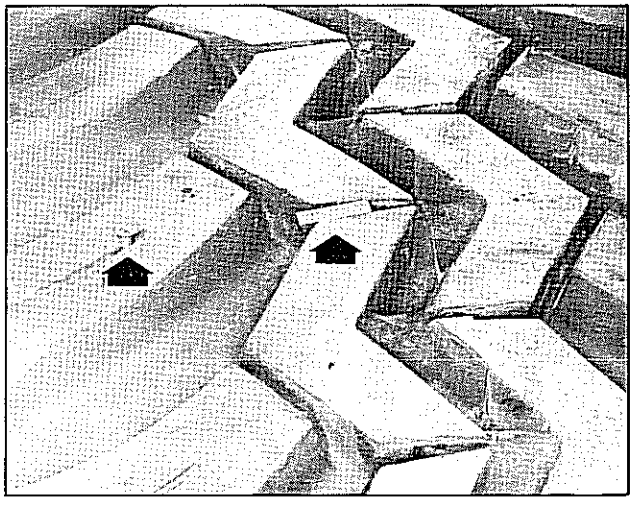


Plate 10756

Check tire condition.

IMPORTANT ... Check tire inflation.

IT50/60	Front Drive Tires:	60 PSI
	Rear Steer Tires:	40 PSI
IT70/80	Front Drive Tires:	75 PSI
	Rear Steer Tires:	60 PSI

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

CLARK EQUIPMENT

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CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

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WHEN ORDERING PARTS

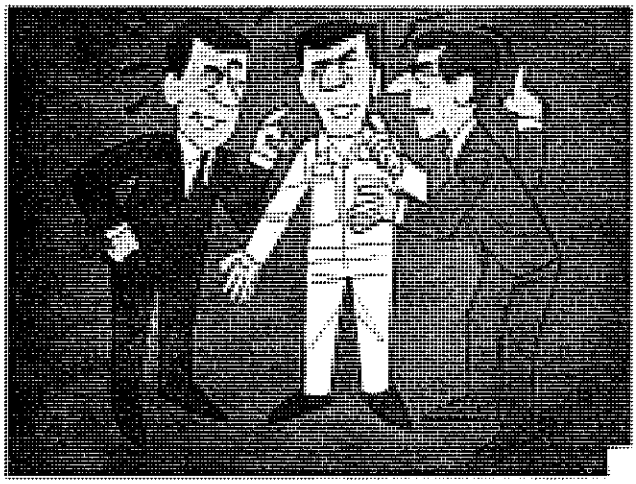


Plate 10884

Perhaps nothing has been so misunderstood, as planned maintenance. The hottest arguments revolve around ...

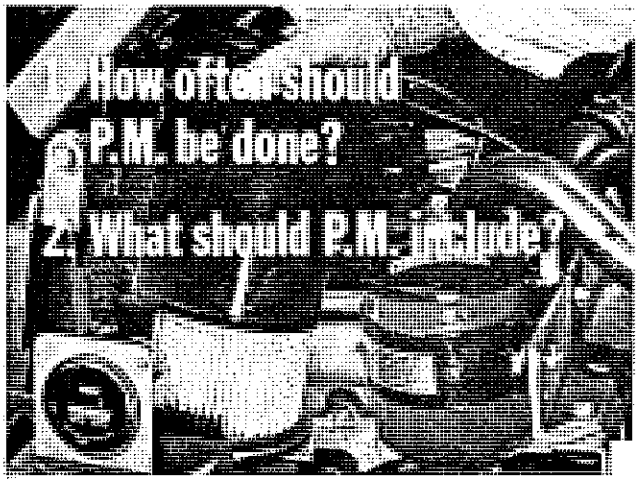


Plate 10885

... these basic questions — how often should P.M. be done? ... and what should it include? Before delving into these questions ... let's examine P.M. concepts and objectives.

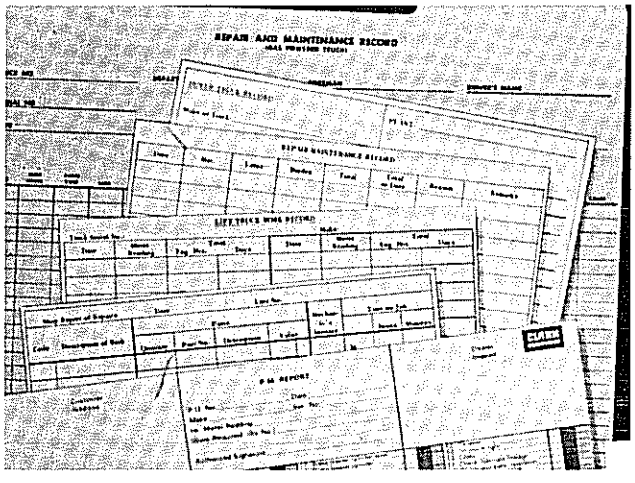


Plate 10886

Planned maintenance is a program in which inspections, minor adjustments, lubrication, oil changes, and replacement of filters are performed on a scheduled and systematic basis. The program incorporates ... a method for reporting truck condition and a system to help keep records which are essential in establishing a sensible P.M. schedule ...

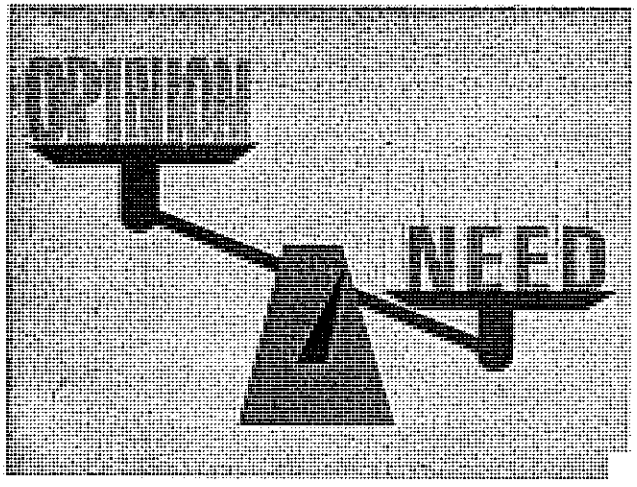


Plate 10887

...a schedule based upon real needs ... not opinion ... not arbitrary decision ...

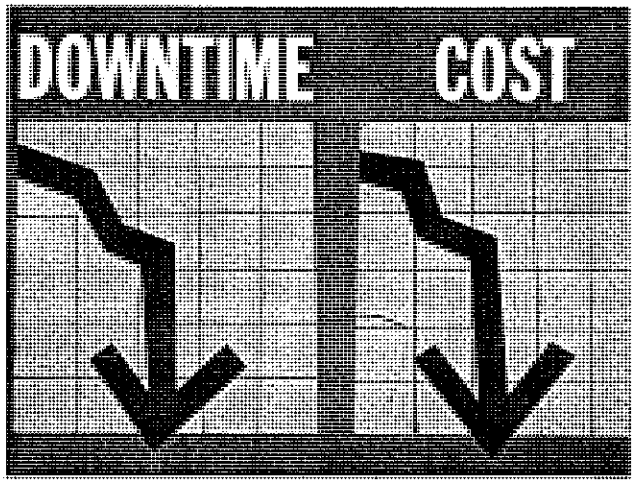


Plate 10888

...a schedule which contributes to maximum truck usage at the lowest possible cost.

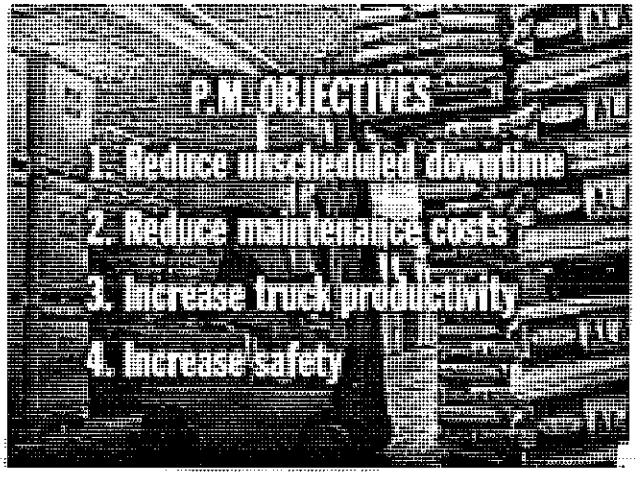
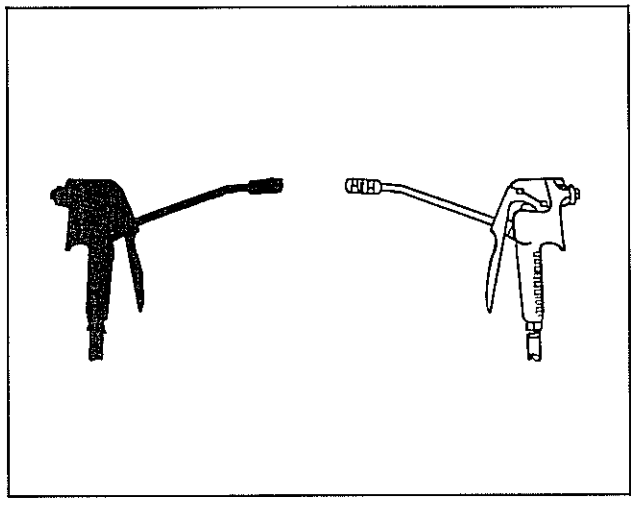


Plate 10889

P.M. OBJECTIVES? To reduce costly unscheduled downtime, reduce maintenance costs, increase truck productivity, and ... above all ... to increase personal safety of drivers and other personnel. These worthwhile ends can be met only through sensible, consistent measures which include ...

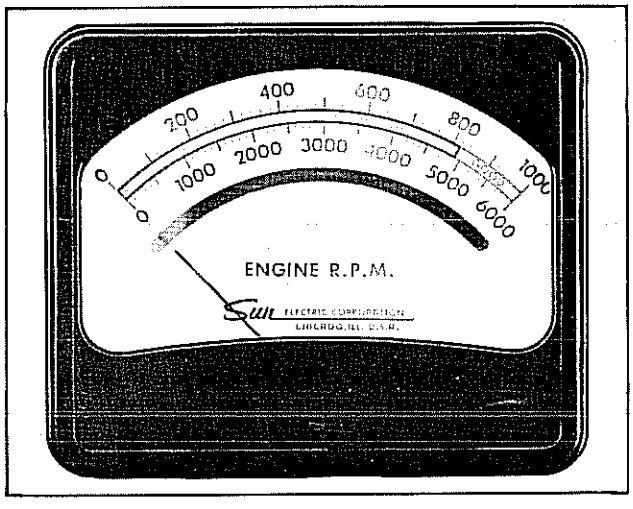
Parking Brake Effectiveness	Leaking Hydraulic Lines
	Damaged Wiring
Service Brake Performance	Damaged/Dirty Filters
Loose Fan Blades	Loose Wheel Bearings
Worn Drive Belts	Damaged Wheels
Leaking Radiator	Wheel Fastener Torque

...complete inspection to uncover minor or potential trouble before it becomes major...



...air cleaning and lubricating the machine to reduce dirt damage and excessive wear...

Plate 10890



...making adjustments to assure proper and safe functioning of systems and components.

Plate 10831.

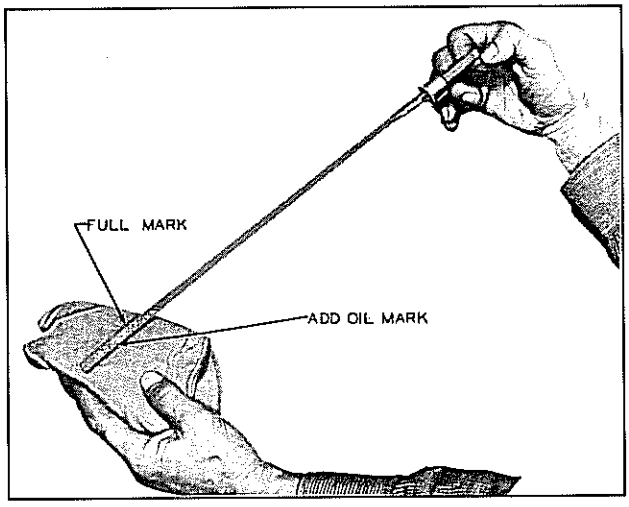


Plate 3145

...checking fluid, oil and water levels... and by changing oil and hydraulic fluid at proper intervals...

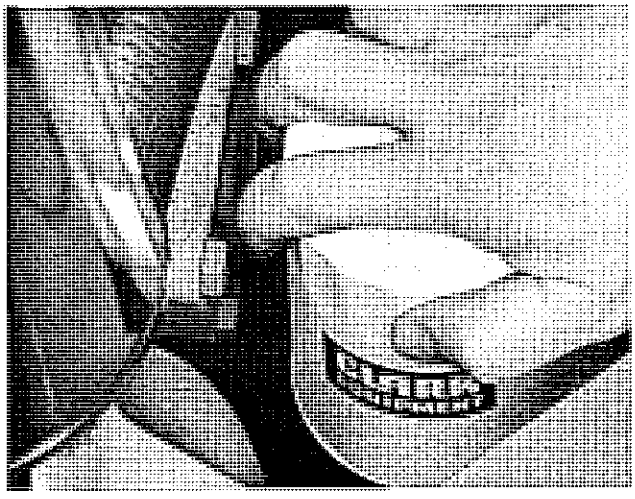


Plate 10892

...replacing filters as required.

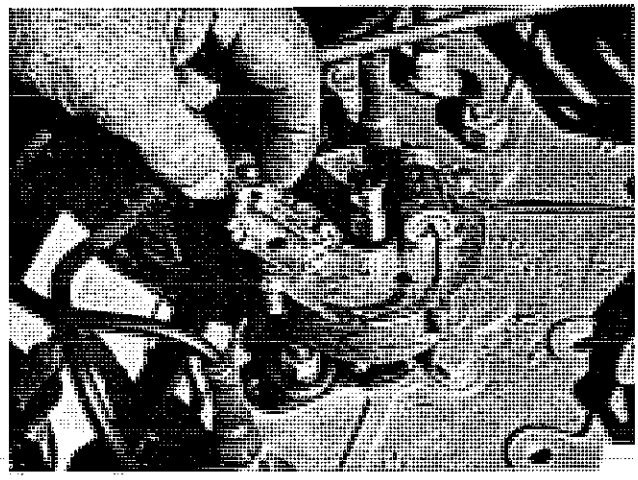


Plate 10893

Replace components and make minor repairs as they are required.

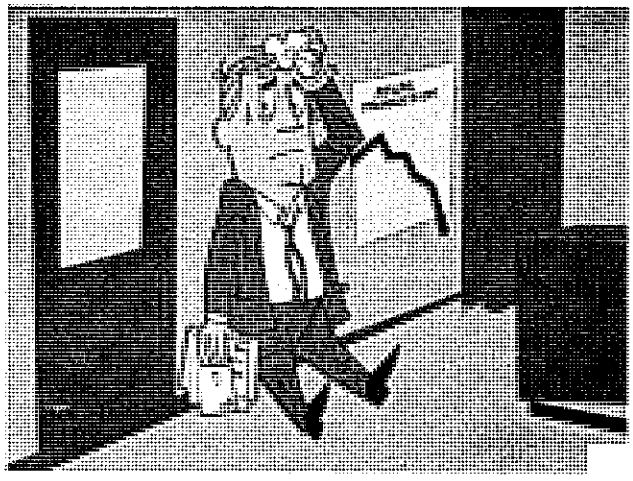


Plate 10894

Reduce chances of major breakdown, unscheduled downtime, and loss of production.

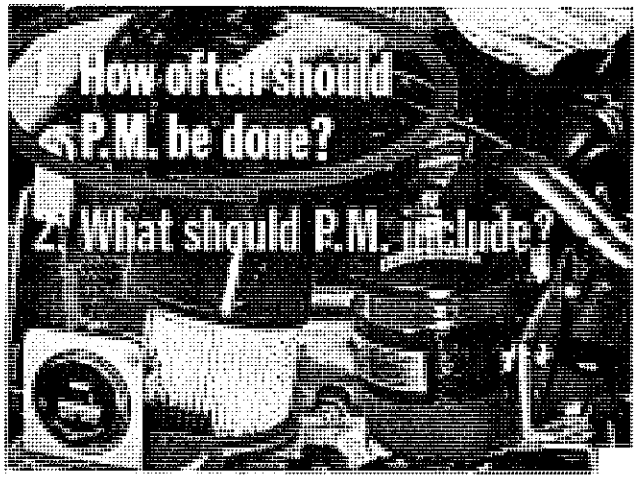
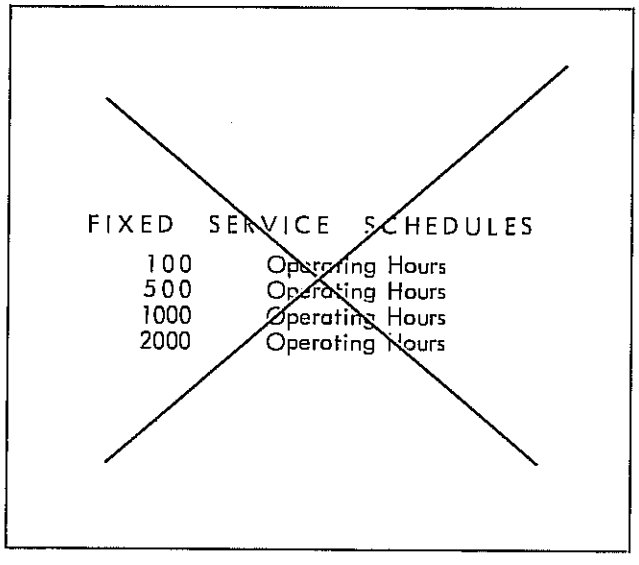


Plate 10895

Now, let's get into the specifics of P.M. ... ...how often should P.M. be done? The answer to this...



...is not a simple one of orbitrarily prescribed, inflexible time intervals in which certain maintenance is done every 100 hours ...and other work every 500 hours, 1000 operating hours and so on. This traditional concept is...

CONDITIONS

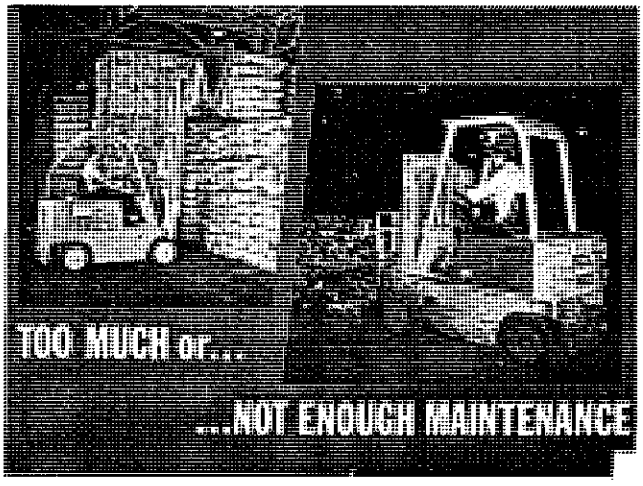
EXTREMELY CLEAN operation

- vs -

EXTREMELY DIRTY operation

OPERATING HOURS

...unrealistic for it does not take into consideration the conditions in which a truck works or the amount of use it gets. Thus...



...under the fixed-interval concept, trucks can receive maintenance they don't require, or fail to receive maintenance they do require. For instance...

Plate 10896

...a truck in a dirty operation can be neglected under an arbitrary fixed-interval maintenance program of 100, 500 and 1000 hour P.M. intervals while...

Plate 10897

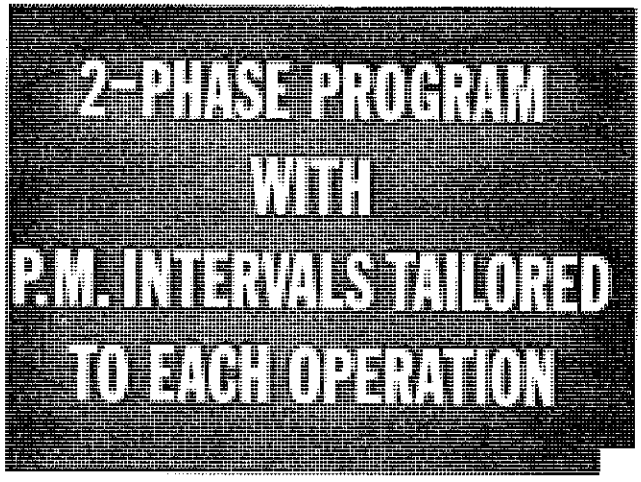


Plate 10898

...one in a clean operation can be over-maintained at unnecessary and excessive cost. This being the case, the realities of planned maintenance come into focus...

Plate 10899

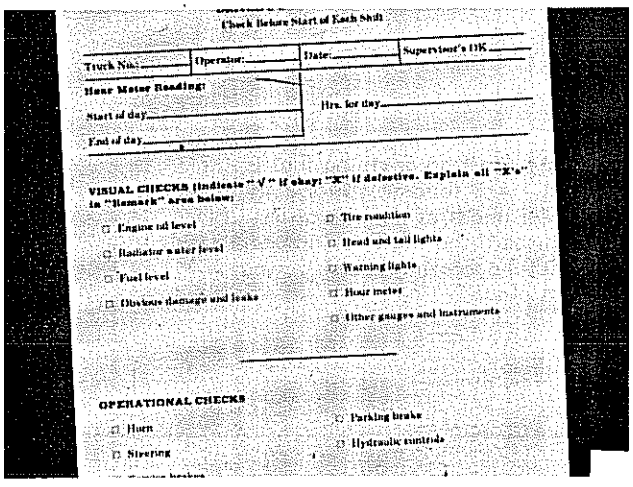
...first, don't do anything that is not needed. And second, tailor P.M. intervals to answer needs of the operation. Now... if we discard the old P.M. concept (100, 500, 1000 operating hours)...what will take its place?

Plate 10900

The answer is a two-phase program with P.M. intervals tailored to each operation. The first phase is...

Plate 10901

...the doily inspection performed by the driver or maintenance man at the beginning of the shift. This is a quick visual check for obvious damage and leaks...a check of engine oil and water levels...and an operational check of controls, brakes, lights, instruments and horn.


Check Before Start of Each Shift

Truck No.: Operator: Date: Supervisor's OK

Hour Meter Reading:
Start of day:
End of day:
Hrs. for day:

VISUAL CHECKS (Indicate "√" if okay; "X" if defective. Explain all "X's" in "Remark" area below):

- Engine oil level
- Radiator water level
- Fuel level
- Obvious damage and leaks
- Tire condition
- Head and tail lights
- Warning lights
- Hour meter
- Other gauges and instruments

OPERATIONAL CHECKS

- Horn
- Steering
- Parking brake
- Hydraulic controls

Plate 10902

This inspection ... detailed in Appendix 6 ... takes only a few minutes. The check list should be filled out ... noting any unusual condition ... and turned into the maintenance department or, authorized person in authority.

Plate 10903

The second phase of the program is the 50 to 250-hour P.M. ... with the interval being determined by operating conditions. Thus...

...if an operation is dirty and punishing, the P.M. interval may be 50 hours ...or even less in extreme conditions. but...

...if the operation is clean and not abusive, the interval could be as long as 250 hours. A helpful guide in determining the intervals...

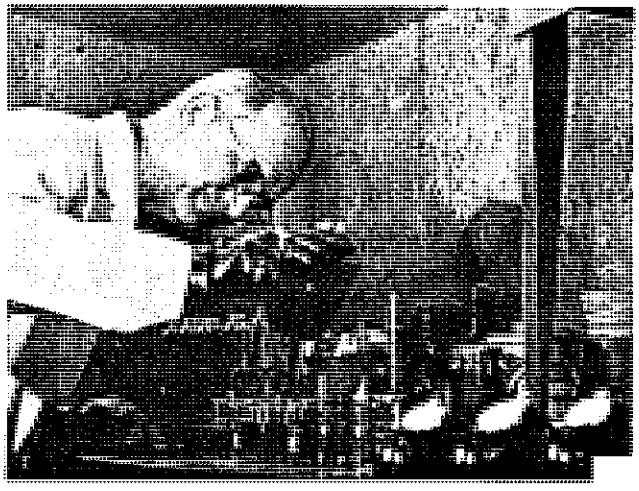


Plate 10904

...an engine oil analysis made several different times. Local oil distributors offer this service. And by using it we can set P.M. intervals with greater certainty.

The 50 to 250-hour P.M. includes complete inspection, minor adjustments, engine oil change, lubricotion, and replacement of oir cleaner and engine oil filters. So that's our P.M. program.

Just two phases ... that's all. Now ... you may ask what about 500, 1000, and 2000-hour P.M.s? The answer is simple. All P.M.s beyond the 50 to 250-hour P.M. can be, and have been, eliminated. For...

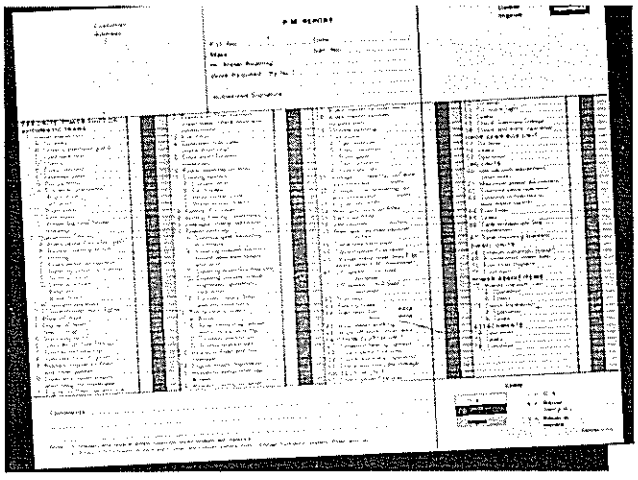


Plate 10905

...if the 50 to 250-hour P.M. is religiously followed, needs for repair, major adjustments, and component replacement will be discovered automatically... and such work will be done only as needed. For instance...

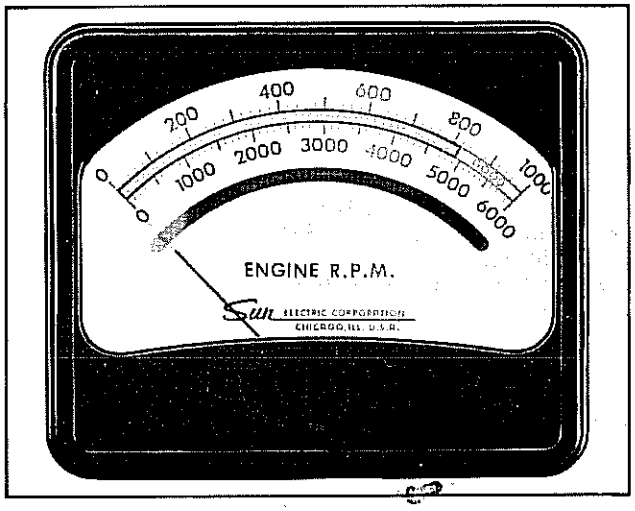


Plate 10831.

...stall tests, which are part of the 50 to 250-hour P.M., will uncover the need for...

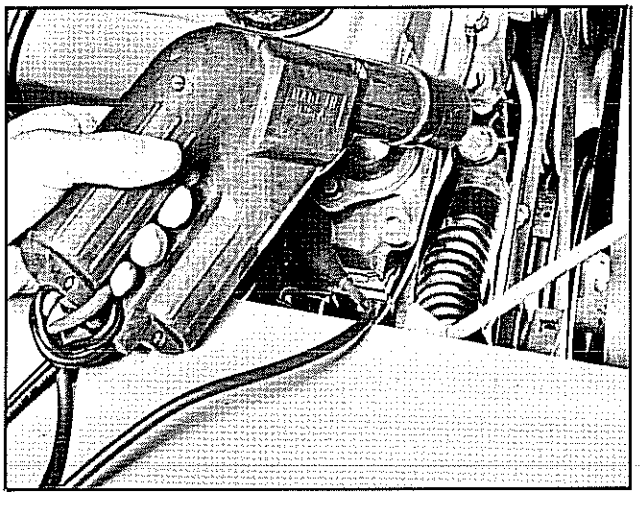


Plate 10906

...engine tune-up or repair which may be required at 1000 or 2000 hours. Who can say? The point is that this will be done only when needed...and that's true for all systems and components.

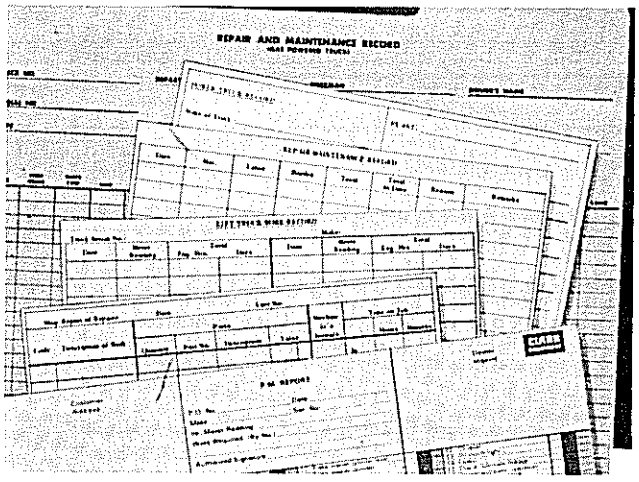


Plate 10886

Now...obviously you must keep records to make P.M. effective ... to enforce the daily inspection and...be prepared to make machines available for the time required to P.M. them...to gain full value from the program.

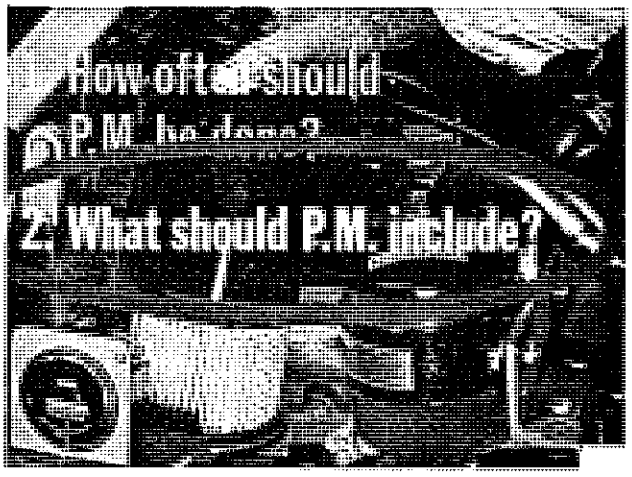


Plate 10907

This brings us to our second question...what should a P.M. include? The best answer is to go through a P.M....following the sequence of procedures provided on the...

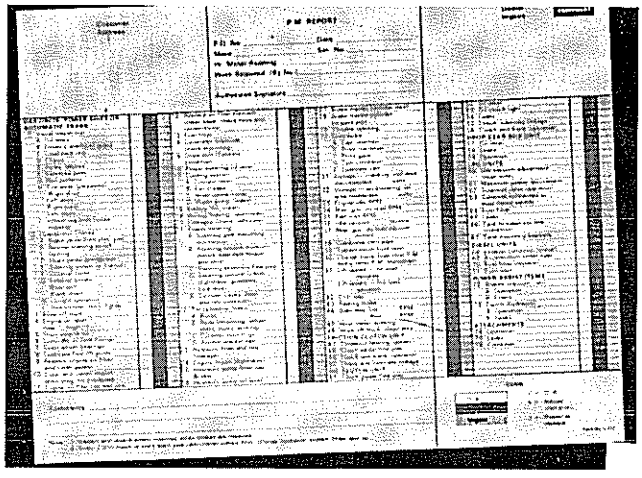


Plate 10905

...P.M. check sheet which is designed to eliminate backtracking and provide efficiency ...it's essential that you use the check sheet ...not only to stay on the track...but to have a record and a method of reporting.

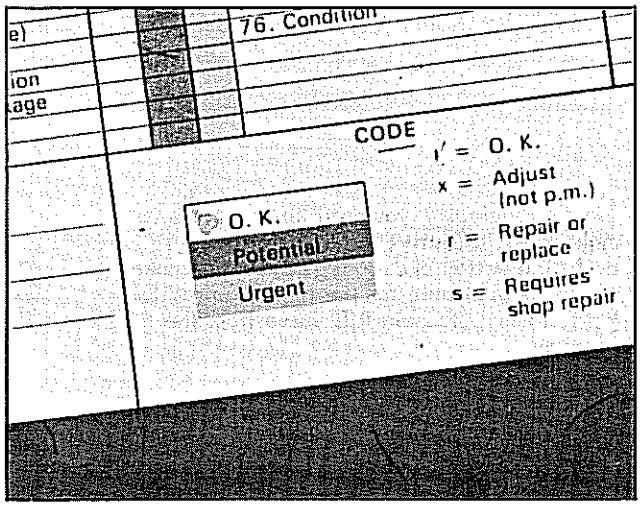


Plate 10908

A simple code enables you to note condition of components and work required. And...

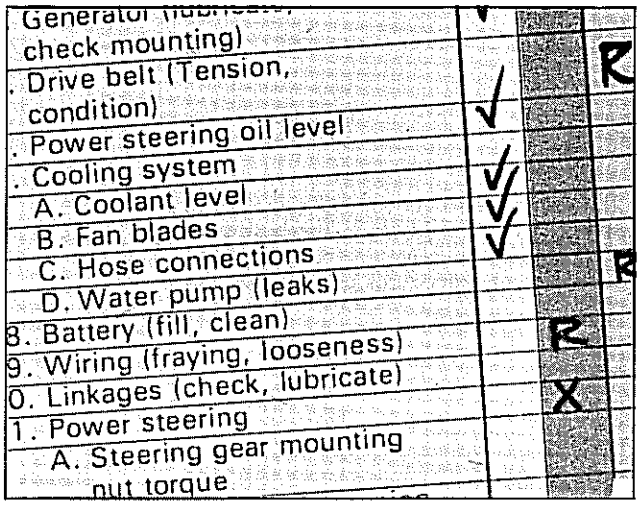


Plate 10907

...by noting needs in the yellow or red column, you indicate whether repairs should be made soon or immediately.

You can now have a graphic and full story on a truck ... with very little writing.

By faithful use of the check sheets ... you'll overlook nothing.

IMPORTANT ... when the driver brings the truck in for a PM, talk with him to find out how the truck is running ... the driver can give you good clues about what is wrong. Then, make a truck PM ... PM procedures are outlined on the following pages ... Section 6.

FORWARD

PLANNED MAINTENANCE SECTION

The purpose of this section is to provide the basic step by step procedures which should be followed in servicing the vehicle. The section is fully pictured and contains, in the Appendix/s, specifications and other data including lubrication guides.

About Planned Maintenance

Planned Maintenance is a program in which inspections, minor adjustments, lubrication, oil changes, and replacement of filters are performed on a scheduled and systematic basis. A solid PM program should incorporate a method of record keeping which enables you to better determine PM schedules and enables you to track the maintenance costs per machine.

An effective PM program should incorporate two basic phases:

1. An inspection performed by the driver or maintenance man at the beginning of each shift. This is a quick visual check for obvious damage and leaks ... a check of engine oil and water levels, lights, instruments and warning devices.
2. The Planned Maintenance routine is based on 50 to 250 operating hours ... with the interval being determined by operating conditions.

Records will tell you how often PM should be done. If an operation is clean and not punishing, a P.M. interval can be extended. If an operation is extremely dirty and punishing, the P.M. interval may have to be reduced. Thus the P.M. interval can be tailored to answer the needs of your operation.

If the PM is religiously followed, needs for repair, major adjustment and component replacement will be discovered automatically and such work will be done only as needed. For instance, stall tests which are part of the PM will uncover the need for engine repair which may be required at 1000 or 2000 hour intervals. Who can say? The point is that this will be done only when needed and that's true for all systems and components.

Thus in this program we are able to eliminate 500, 1000 and 2000 hour inspections and the things normally covered in these inspections will be done only when the PM uncovers the need for repairs.

The objectives of PM are: *

1. To reduce costly unscheduled downtime.
2. Reduce maintenance costs.
3. Increase vehicle productivity.
4. Above all, to increase personal safety of drivers and other personnel.

* Refer to Section 5 ... for detailed explanation of the PM program.

Inspection Forms

To insure that the daily inspection and PM are properly performed, we recommend the use of the inspection forms in the Appendix (6). Such forms not only provide a guide for the inspections and procedures but serve as a record in tracking maintenance requirements for each vehicle. Moreover, they will assist you in determining when to schedule a vehicle for major repairs, which can be done without the disruptive effect of unscheduled downtime.

Inspection Forms may be purchased from your local Clark Dealer.

Walk around the vehicle...make a quick visual check for signs of obvious and heavy leaks.

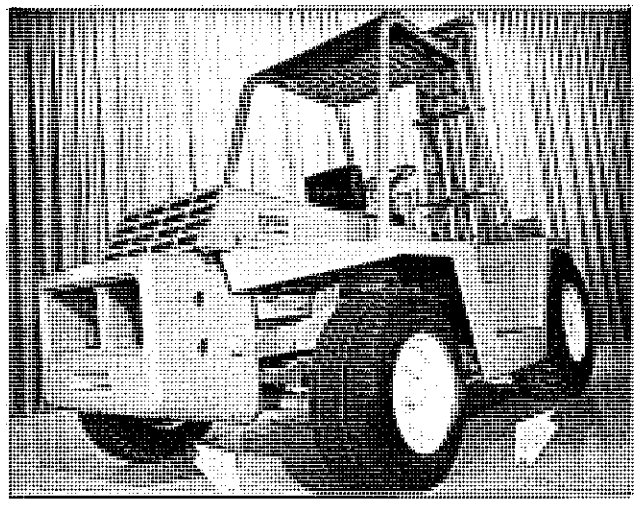


Plate 10833.

Check mounting and condition of the driver's overhead guard.

Check the condition of the load back rest...be sure it is securely mounted and not damaged.

Check the forks to make sure they are not bent or broken...push forks together when making this check.

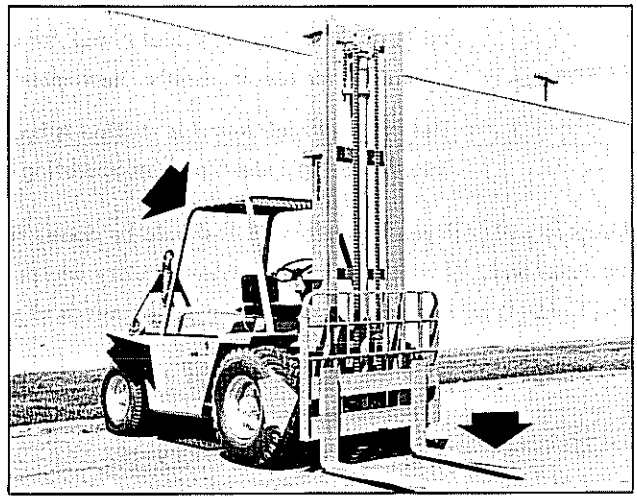


Plate 10834.

Check for excessive leakage at the lift cylinder ...pitting or scoring of the piston rod/s.

Check for damaged chains.

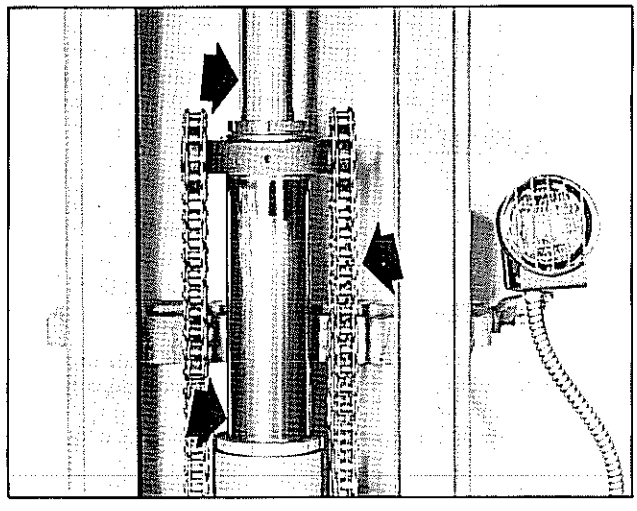


Plate 10762.

Check chain adjustment by making sure the chains are under equal tension...and by...

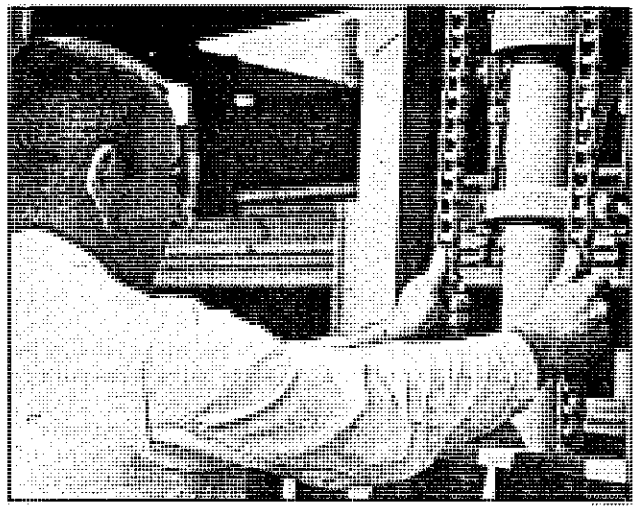


Plate 10742.

...checking wear patterns in the rails. A wear pattern like this indicates that chain adjustment is about right. But...

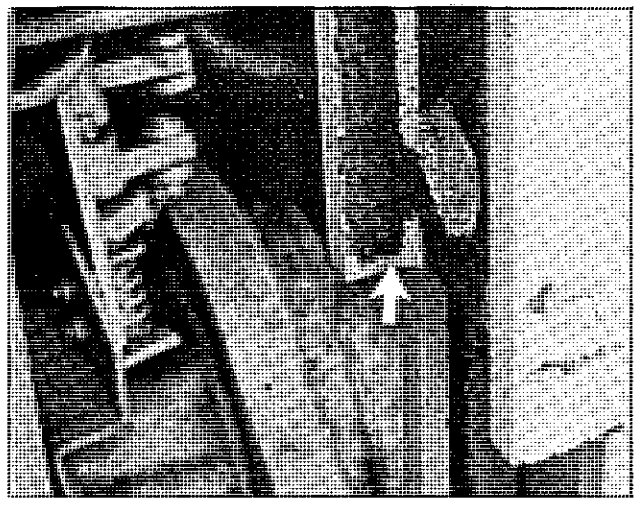


Plate 10846.

...a wear pattern like this means that the chains are too long and must be adjusted to correct length.

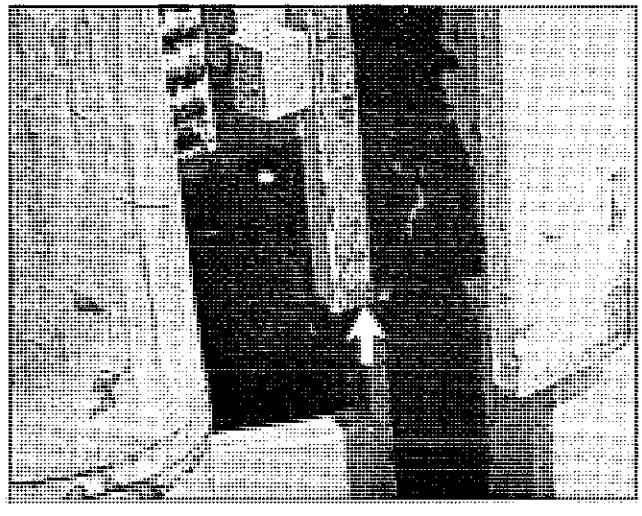


Plate 10837.

Now...check for upright free play and racking by tilting the upright fore and aft with the forks fully raised. If there is excessive free play between rails and channels, upright adjustment is required. If there is racking, adjustment of cylinder rod yokes is required. Lower carriage to full down position. Next...
Reference: Plate 10841.

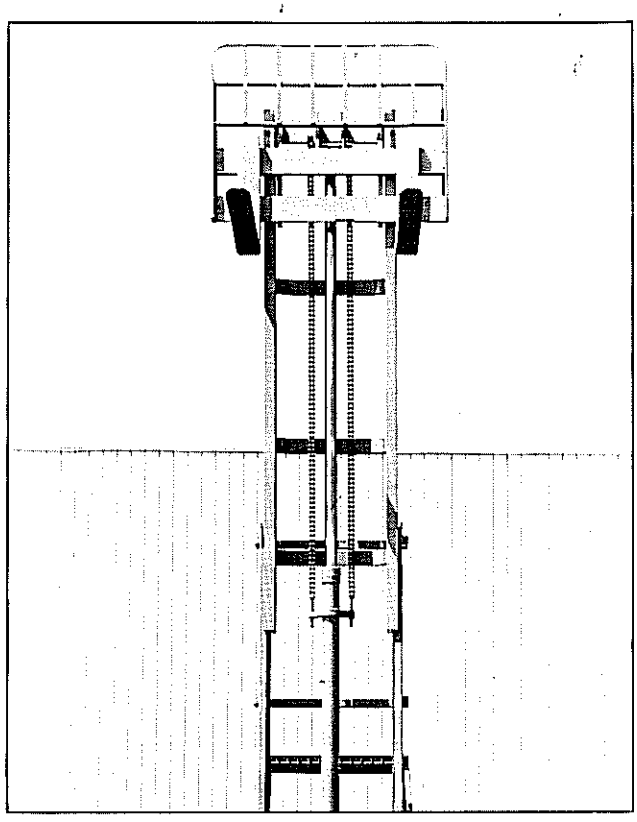


Plate 10841.

...check the fork latches to make sure they are working properly.
Reference: Plate 10842.

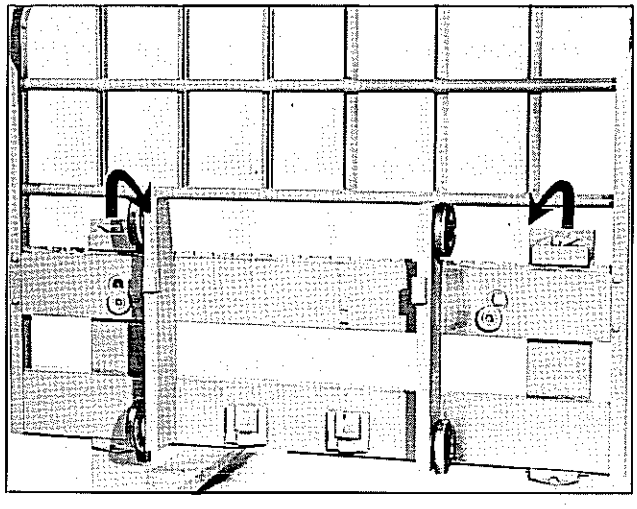


Plate 10842.

Check to make sure inner rails are not lower than outer channels...as shown.
Reference: Plate 10840.

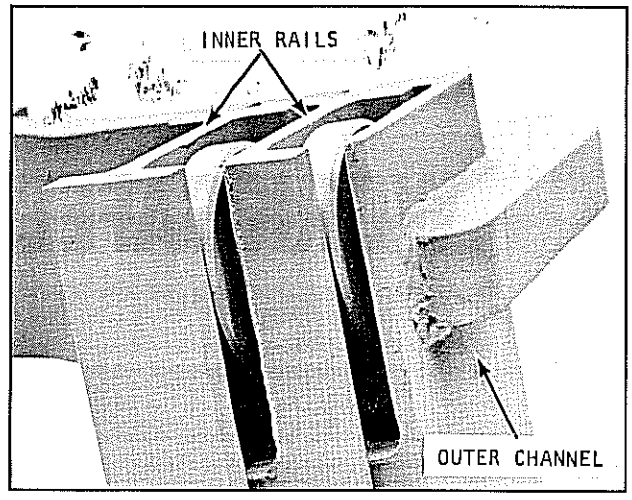


Plate 10840.

Standard Uprights...Deck Numbers beginning with an "F".

Check the Fabreeka (Stop) Pads for damage, and check to make sure the pads contact the rail tie bar...at the same time when lowering inner slide.
Reference: Plate 10910.

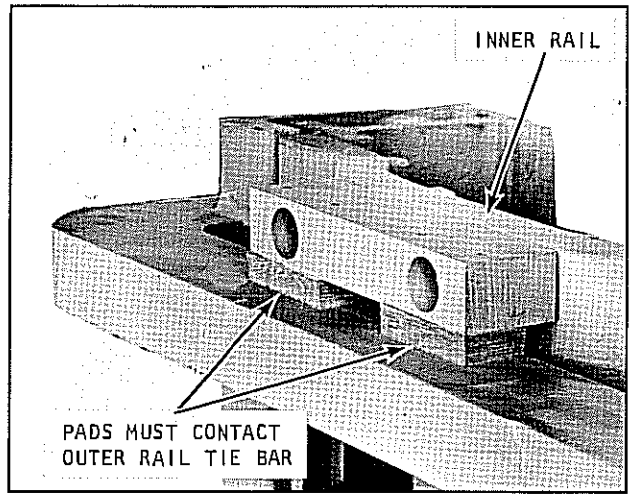


Plate 10910.

Full Free Lift Uprights...Deck Numbers beginning with an "M"

Check the Fabreeka (Stop) Pads for damage, and to see if there is some clearance between bottom of pad/s and tie bar...pads must not contact tie bar.
Reference: Plate 10911.

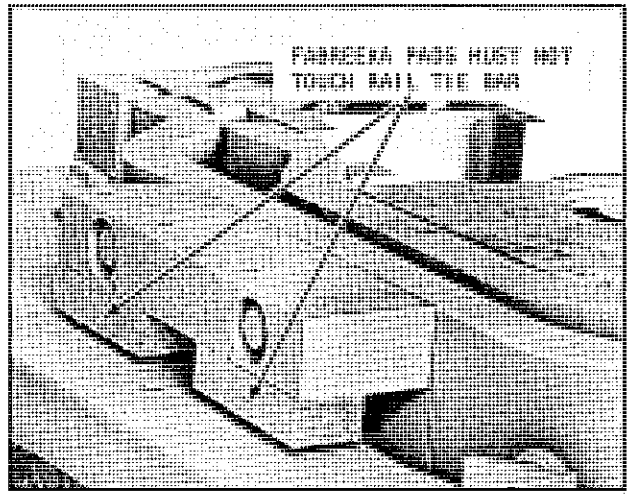


Plate 10911.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Check tires for excessive wear and cuts...pry out of tire treads any objects which could damage the tires.

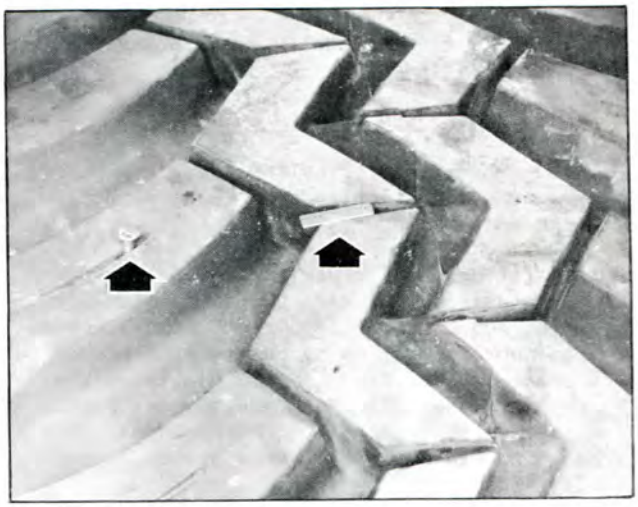


Plate 10756.

Check wheel lug nuts for tightness and to make sure none is missing...

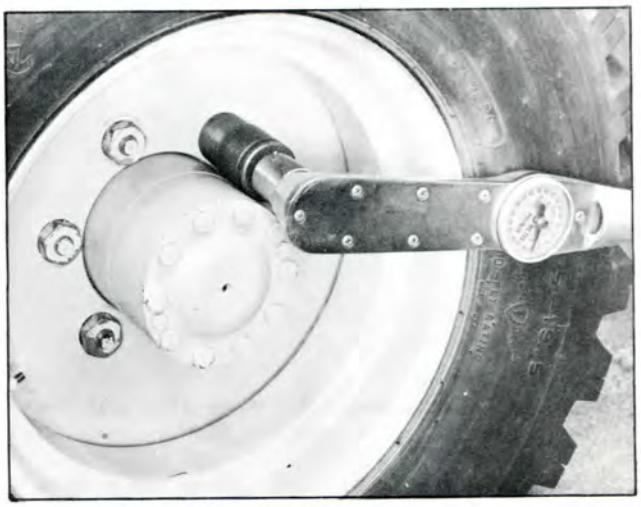


Plate 10763.

...check the steer wheels for security of lug nuts and to make sure none is missing.

Plate 10764.

Now...remove cover from floor plate exposing the master cylinder.

C A U T I O N

Before removing master cylinder cap...wipe off the cap and top of cylinder to keep dirt from falling into cylinder.

Remove filler cap...check the fluid level of the cylinder. Level must be within 1/4 inch from the top...add as required. Next...check by-pass port operation by pushing sharply on the brake pedal...fluid should bubble in the reservoir...indicating an open by-pass port. This port must be open to prevent undesirable pressure build-up in the brake system...causing faulty brakes.

Now...check the vent hole in the filler cap... the vent must be open at all times. Check cap gasket...replace if necessary. Install cap... be sure it is tightened securely.

Plate 10769

Now...check brake pedal for free play and the brake pedal pad for excessive wear.

Depress brake pedal by hand...when resistance is noticed (as master cylinder push rod makes contact with the cylinder piston) the distance traveled by the pedal pad should be 1/16" to 3/16"...1/8" NOMINAL.

Then...using your foot, depress pedal and hold for at least 10 seconds...pedal must be solid, must not be spongy or drift under foot pressure.

Immediately report to your maintenance department if any of the above checks are not as specified...adjustments or repairs should be made at once.

Plate 10768

Check fuel supply...use a good grade of...

...regular gasoline...85 octane minimum
(Gasoline Engines) Motor Method or
95 octane minimum
Research Method.

...liquid petroleum gas... Specification
(L.P.G. Engines) Propane HD-5

...diesel fuel oil...45 centane minimum
(Diesel Engines) ASTM #1 or #2.

Fuel to be automotive quality...refer to the Lube and Fuel Specifications found in Appendix "1", chart 869-L, section seven (7) in the rear of this manual.

Plate 10706.

Check the filler screen to be sure it is in place and not damaged...

Plate 10765.

...machines so equipped, check filler cap screen to be sure it is in place and not damaged...O-ring seal must be in place between cap screen and filler neck and must not be damaged.

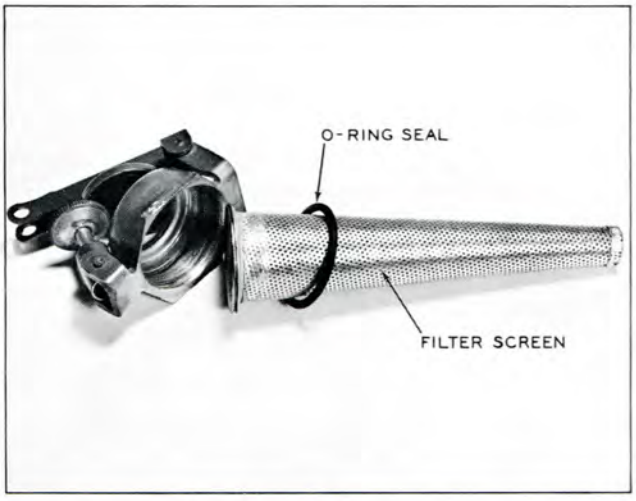


Plate 6627.

Now...while driving slowly forward...check the power steering system. To do this, cramp the hand wheel full right...to reduce tire windup.

Plate 10838

Then...check drive tire inside turning diameter.

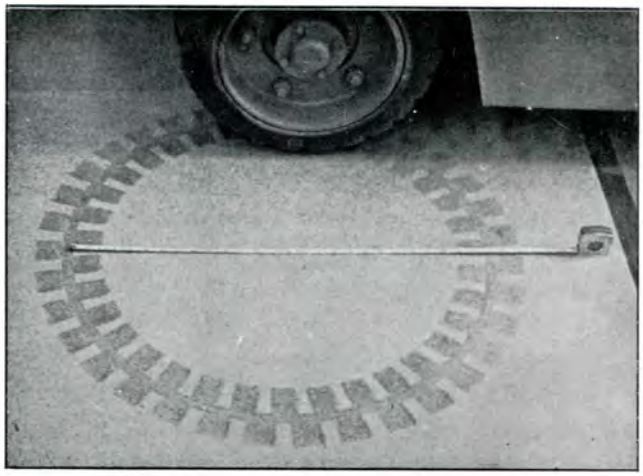


Plate 10839

Next...repeat check in full left turn. The turning diameters should be about equal in forward...full left and right turns. While driving, listen for unusual drive train noise.

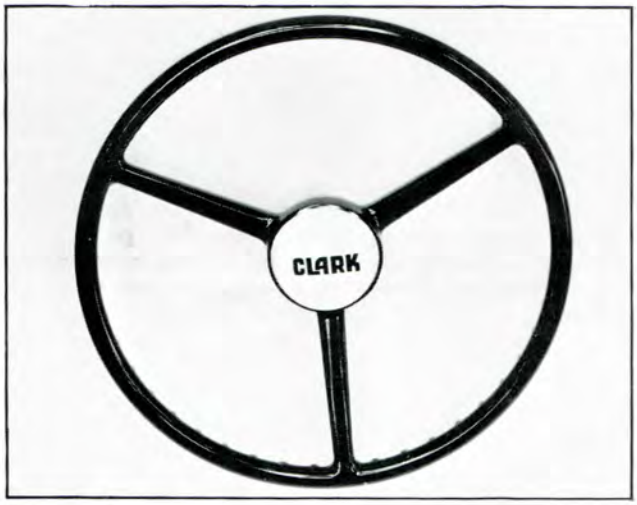


Plate 10720

Next...check instruments, horn, lights, warning lights and warning devices (when applicable).

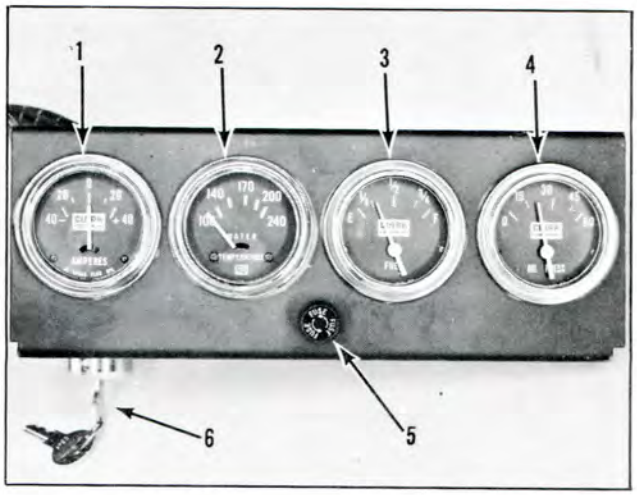


Plate 10705.

Check condition of towing chains, security of mounting, light cable, break-away cable, cylinder and lines. Check tow hitch for security of mounting and condition of boot.

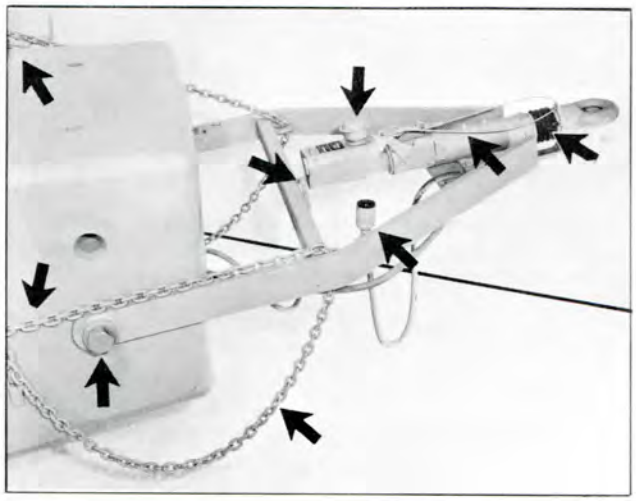


Plate 10843.

Check fork retainer pin and cables...replace any that are missing or damaged. Check fork retainer bolts for security of mounting...mud flaps; and check condition of lights and wiring.

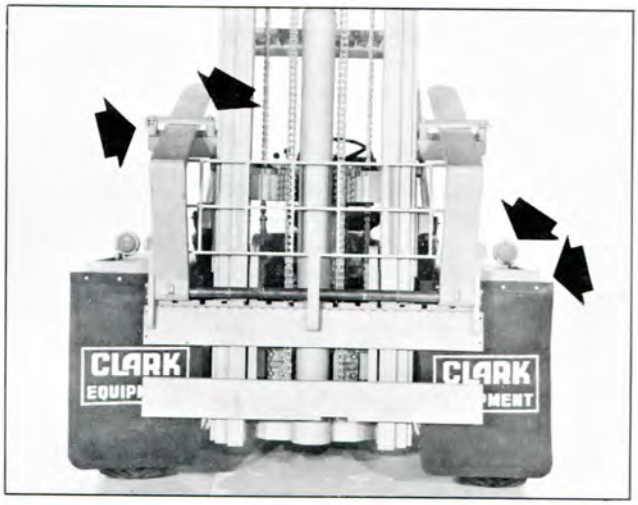


Plate 10844.

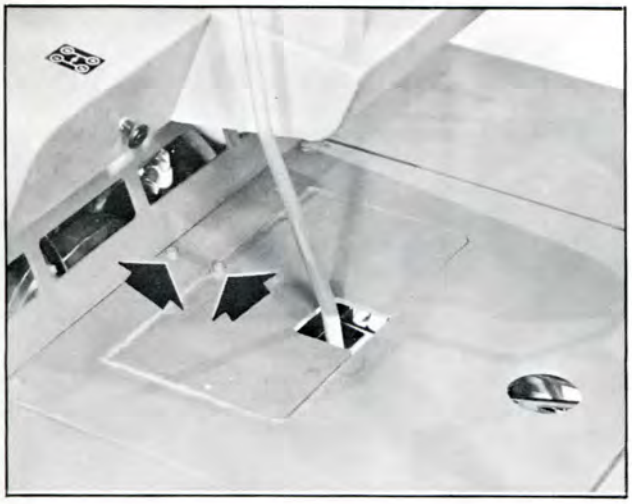


Plate 10770.

Plate 10847.

Ref. Plate 10770.

Remove fasteners from both floorplates and remove the plates. Note: Refer to next page prior to removing upper floorplate. Then...

Ref. Plate 10847.

...either raise the hood or, you can remove the hood...

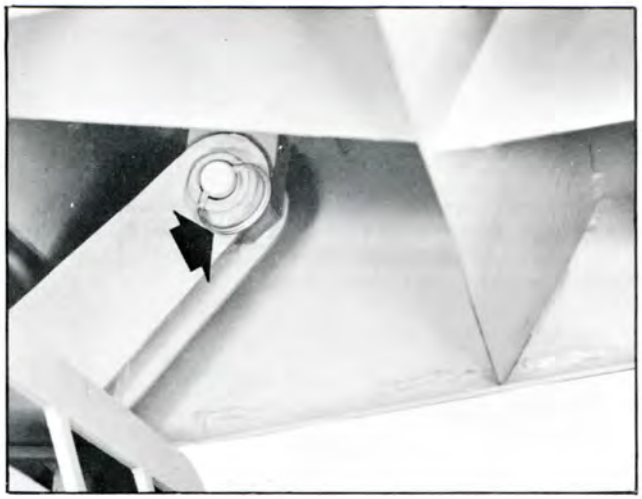


Plate 10771.

Ref. Plate 10771.

...disconnect the choke cable and pull both pivot pins...one located on each side of hood beneath driver's seat on bottom side of hood...

Ref. Plate 10848.

...remove hood and replace pins in brackets until the hood is again placed back on the machine.

Plate 10848.

Check transmission dump valve linkage adjustment by depressing pedal fully to the floor...with speed and directional levers in gear and engine accelerated...the vehicle should not move, if it does....

Plate 10725.

...adjust linkage between pedal and dump valve of control cover on top of converter. Now... remove the upper floor plate.

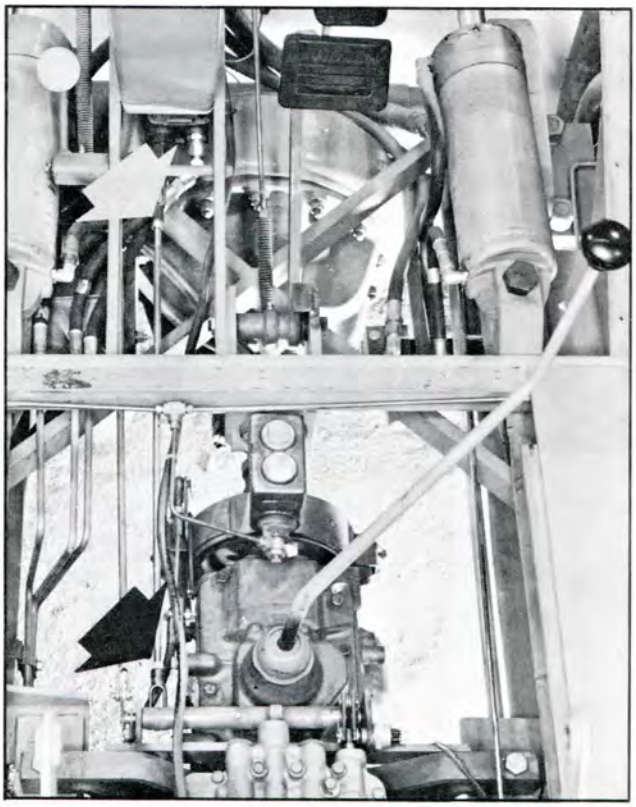


Plate 10772.

Plate 10779. Gasoline Models

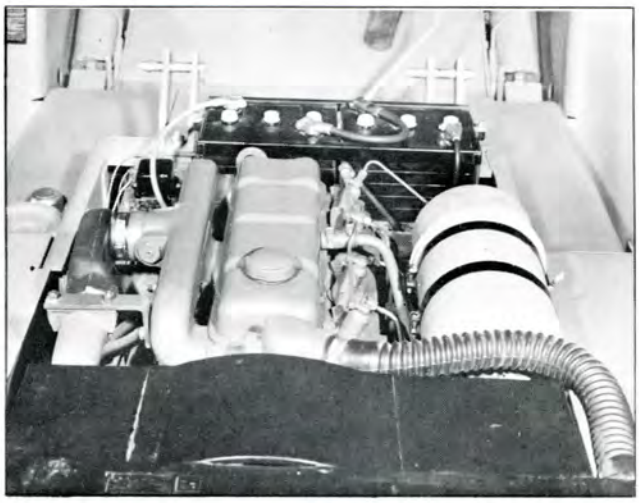


Plate 10845. Diesel Models

Now...using a two-foot extension on an air hose, blow through the radiator from the counterweight side and...

...blow through the radiator from the engine side. Blow off the engine...

...the upright...including chains and rollers. If the upright has a compound cylinder, air clean the tops of the outer cylinders.

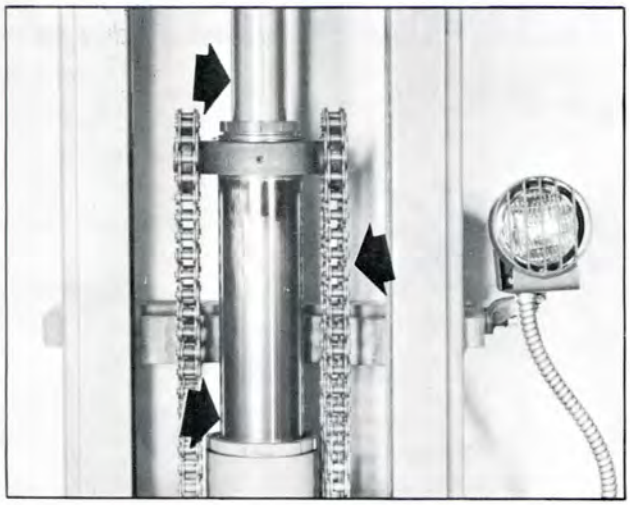


Plate 10762.

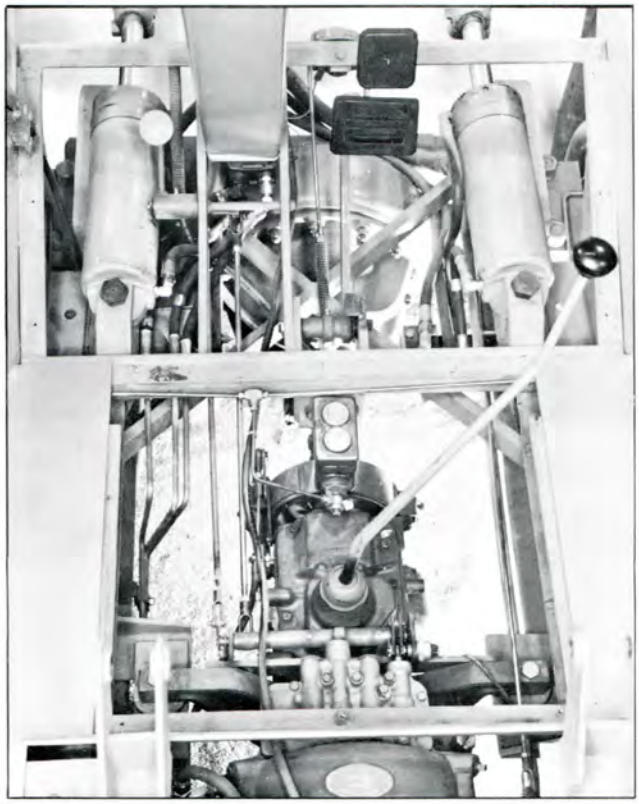


Plate 10778.

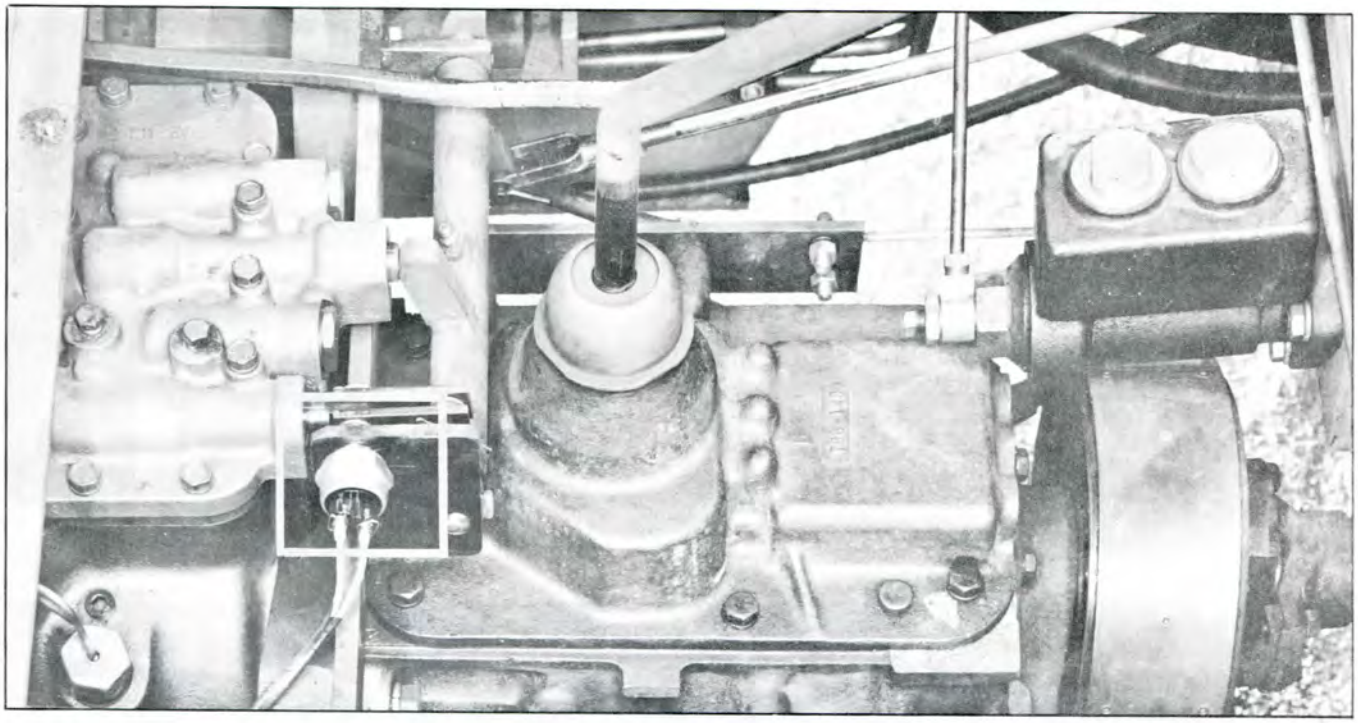


Plate 10780.

Next...check the neutral starting switch by trying to start the engine in forward and reverse. The engine should not start with the F & R lever in any position other than neutral. If it does, then...

WARNING

APPLY HAND BRAKE PRIOR TO CHECKING THE NEUTRAL STARTING SWITCH.

...check the neutral starting switch after the floorplates are removed. At that time, make sure the wires are spread as shown. If the engine still starts in gear, the switch must be adjusted or replaced. There is but one adjustment required, by adding or removing shims (A) until linkage will depress plunger ball (B)... with F & R lever in neutral.

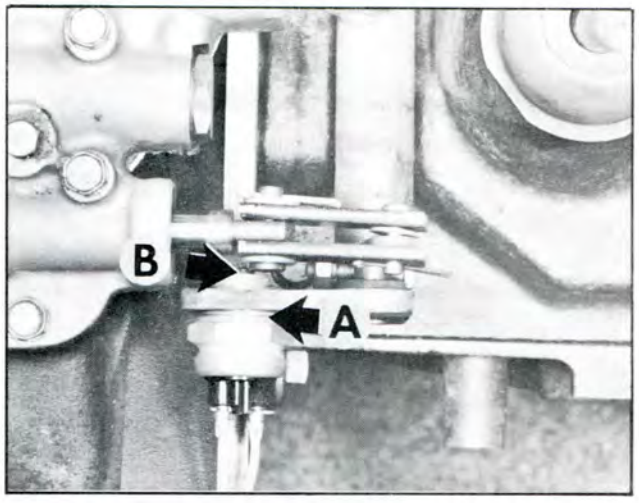


Plate 10782.

Check the rear engine/transmission mounts and, the front engine mount for tightness and condition. Plate 10781 & 10783, bottom and top view of rear mount. Plate 10761 & 10784 view top and bottom of front mount.

Plate 10783.

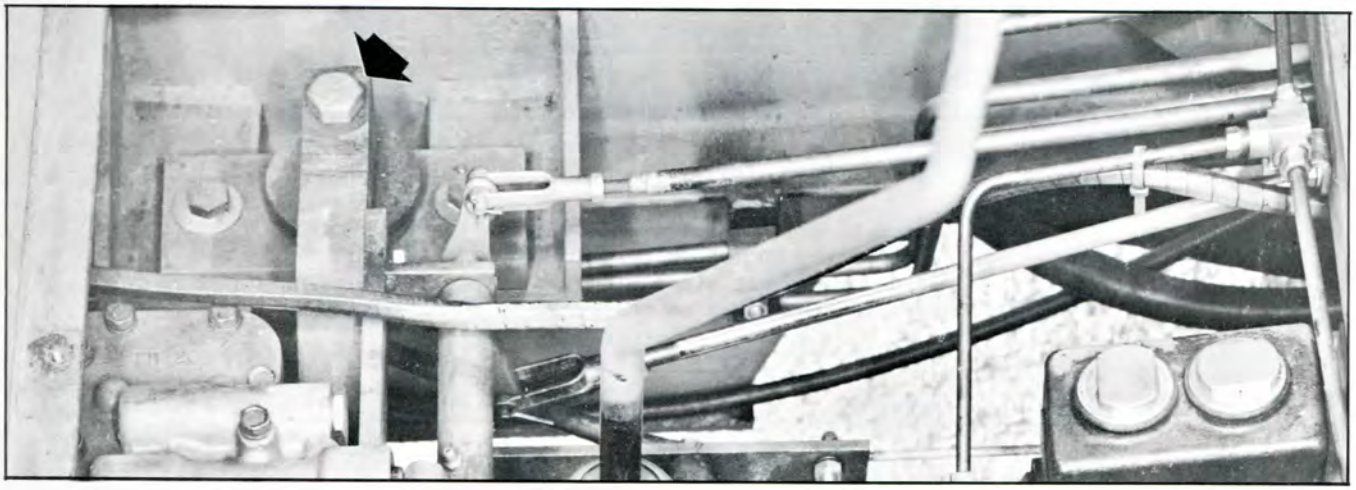


Plate 10781.

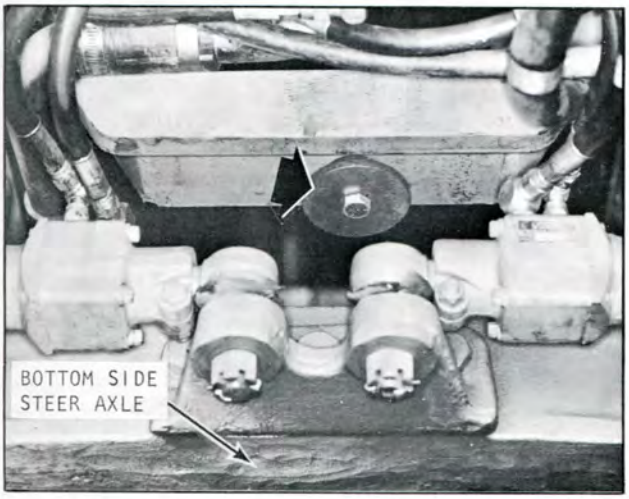


Plate 10761.

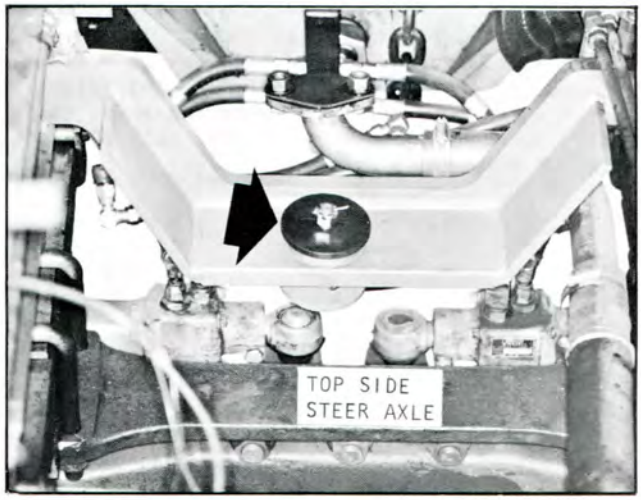


Plate 10784.

Check for leaks at the valve and connections... check for security of mounting.

Check for leaks at the tilt cylinder rods. If there is leakage...check the rods for scoring and nicks.

Check condition of tilt cylinder boots and...

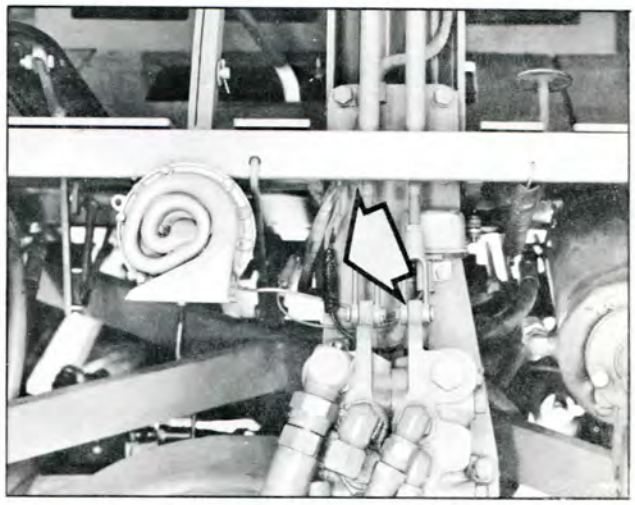


Plate 10748.

...check torque of yoke nuts...torque to 80 to 90 pound feet. The shoulder bolts at the anchor end of cylinder should be torqued until they bottom out.

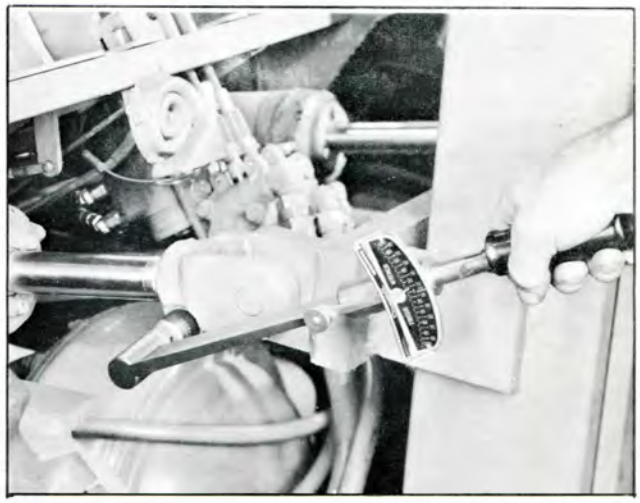


Plate 10773.

Check the power steering control valve and connections (located at end of steer column) for leakage...check for security of mounting.

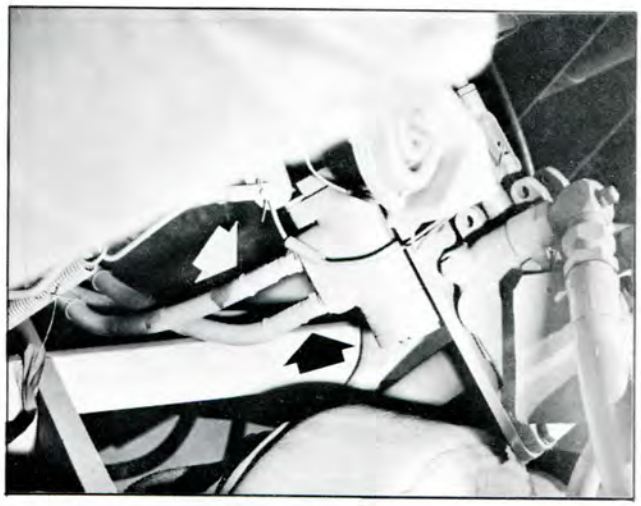


Plate 10774.

Plate 8251.

Check the differential vent to be sure it is not damaged or clogged full of dirt. Then...

Plate 10766.

...check the lubricant level in the differential and check around the unit for leaks. Also check for mounting of drive axle to frame.

Plate 10745.

Now...check the hydraulic sump fluid level ...with the carriage lowered. If necessary add fluid...bringing level to bottom of filler tube/screen.

Check filler screen...it must not be damaged. If found to be dirty, remove and clean...if it is damaged, replacement is required.

Check the hydraulic sump filler cap for damage ...replace if damaged. If cap is contaminated, full of dirt, try cleaning it...if it cannot be cleaned, replace it.

Change the hydraulic system filter once a year or every 2000 operating hours...whichever comes first.

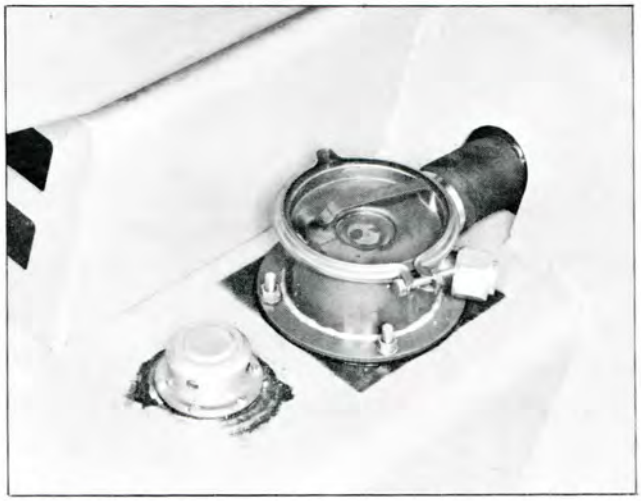


Plate 10812

Remove clamp bolt and nut from clamp and remove cover. Check cover seal for damage...replace if necessary...see below.

Pull element from case and discard.

Install new element...sealing area on top side of element to face upward into cover. Be sure element is correctly positioned over tube at bottom of filter case. Now...position cover over relief spring...spring to be located in center of cover hub...press downward on cover and secure in position with clamp. Tighten clamp bolt/nut to afford a positive seal.

Check fluid level.

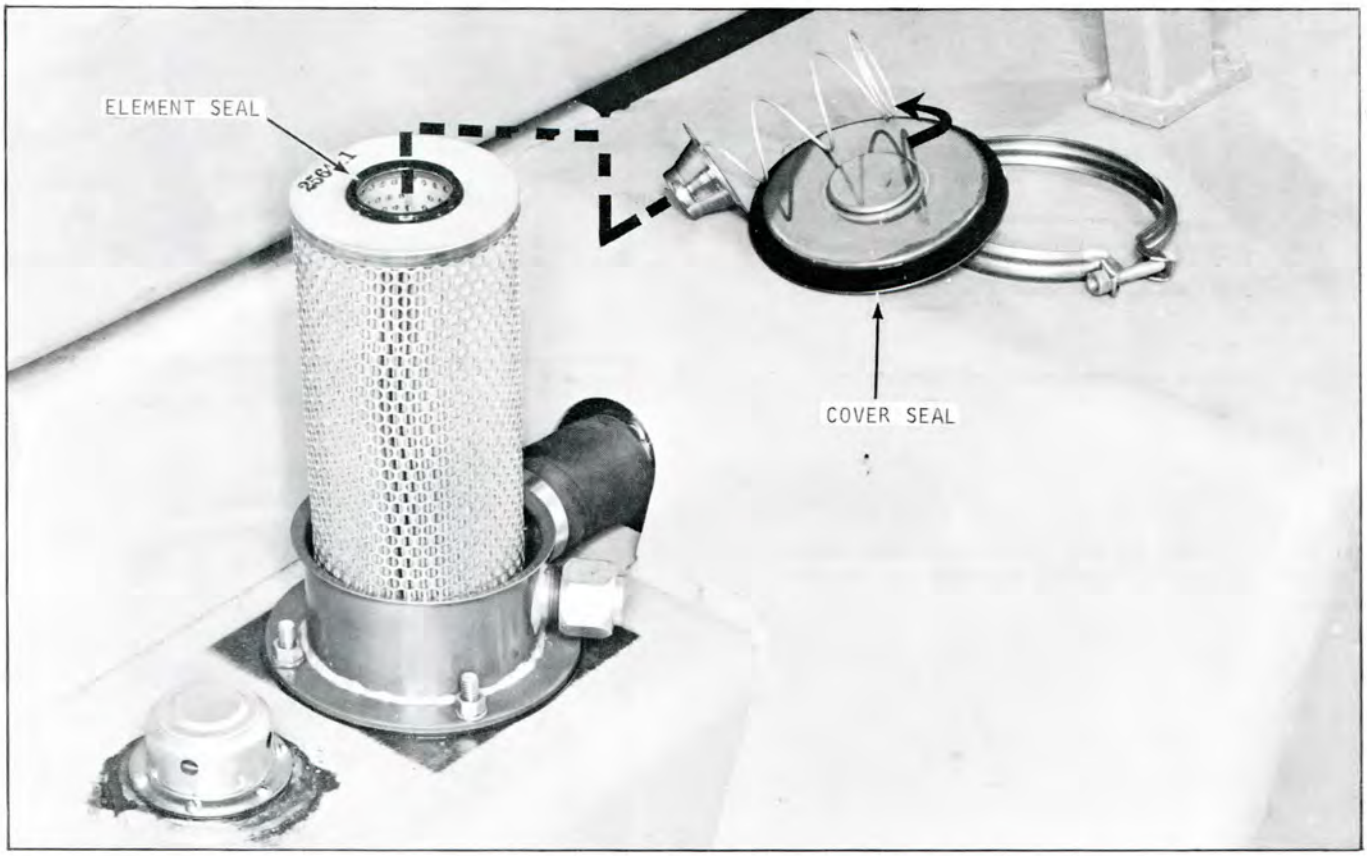


Plate 10813

Visually check for leaks under the engine and converter...

Plate 10775.

...and check for leakage at the hydraulic sump tank.

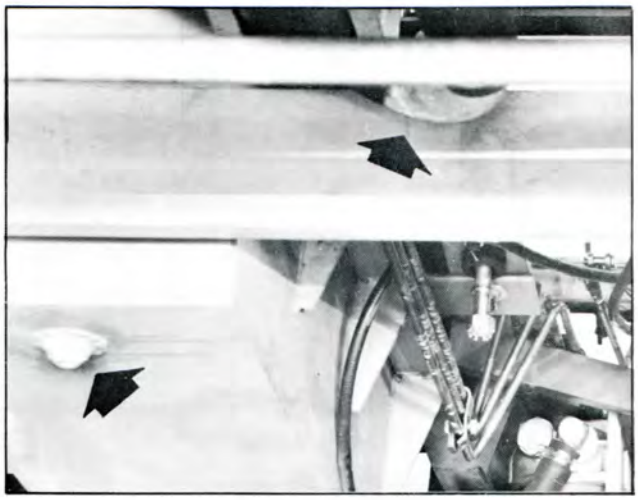


Plate 10776.

Check for leaks at the hydraulic pump...which may be viewed by looking through the counterweight.

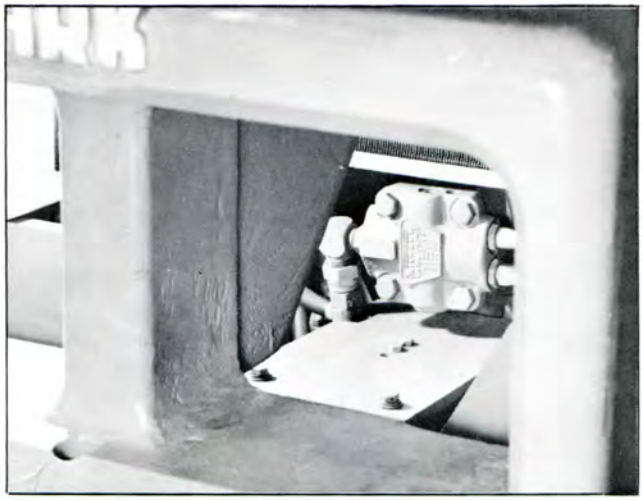


Plate 10777.

Change the converter filter during the vehicle's first P.M. ...and change it every other PM thereafter. First...

Plate 10787

...check forward and reverse unit fluid level... while occupying the driver's seat.

1. Block drive wheels.
2. Get into driver's seat.
3. Apply parking brake.
4. Start engine.
5. Place transmission selector in 4th gear.
6. Shift into forward...engine at idle (600 rpm).
7. Pull dipstick...fluid level should be at the full mark.
8. If level is low...add specified fluid.
9. Stop engine.

Now...check condition of fluid, if the fluid is found to be contaminated...

Plate 10746

...slip a shallow pan under the truck, remove the drain plug in the bottom of the converter... blow off the plug.

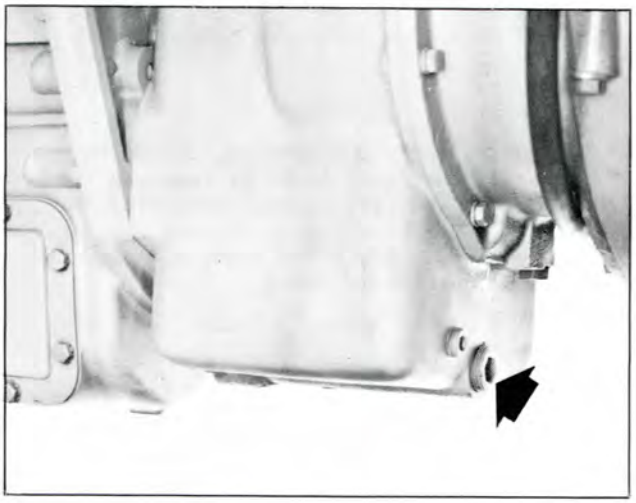


Plate 10788

Now...check the crankcase oil level to see whether it is too high or too low, and check the condition of the oil. Next...

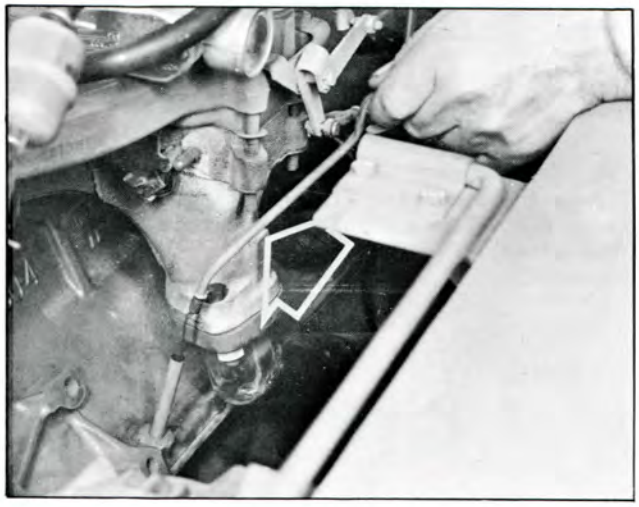


Plate 10743.

...slip a shallow pan under the truck, remove the crankcase drain plug and drain the engine oil.

Plate 10785.

While you are under the vehicle, check the transmission lubricant level by removing the level plug on the left side of transmission... lubricant should be at level of plug opening... add if required. Check for leaks at converter, lines and connections. Next...

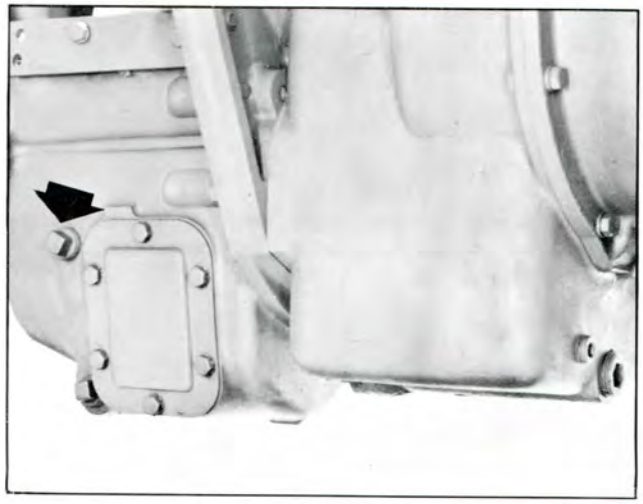


Plate 10786.

...remove the converter filter from the adaptor with a filter wrench--this filter is easier to get at from underneath the vehicle. Then...

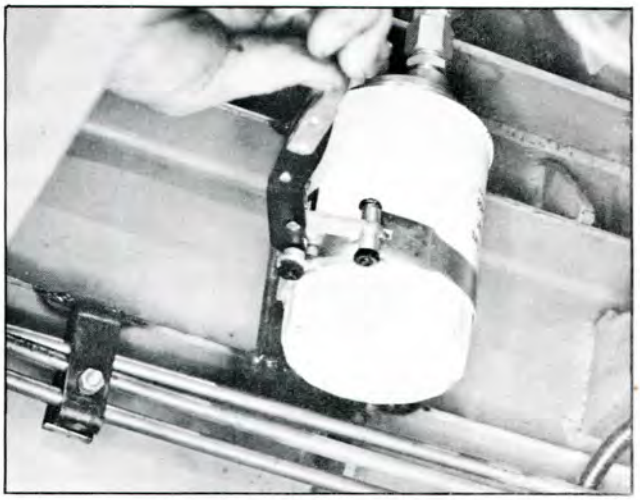


Plate 10789.

...coat the gasket on the new filter with fluid. Place filter in position on adaptor and hand tighten until gasket contacts adaptor face... then tighten an additional 3/4 turn.

CAUTION

DO NOT OVERTIGHTEN FILTER ASSEMBLY.

When converter sump has completely drained, install drain plug...coat threads with #2 permatex to afford a positive seal.

Plate 10790.

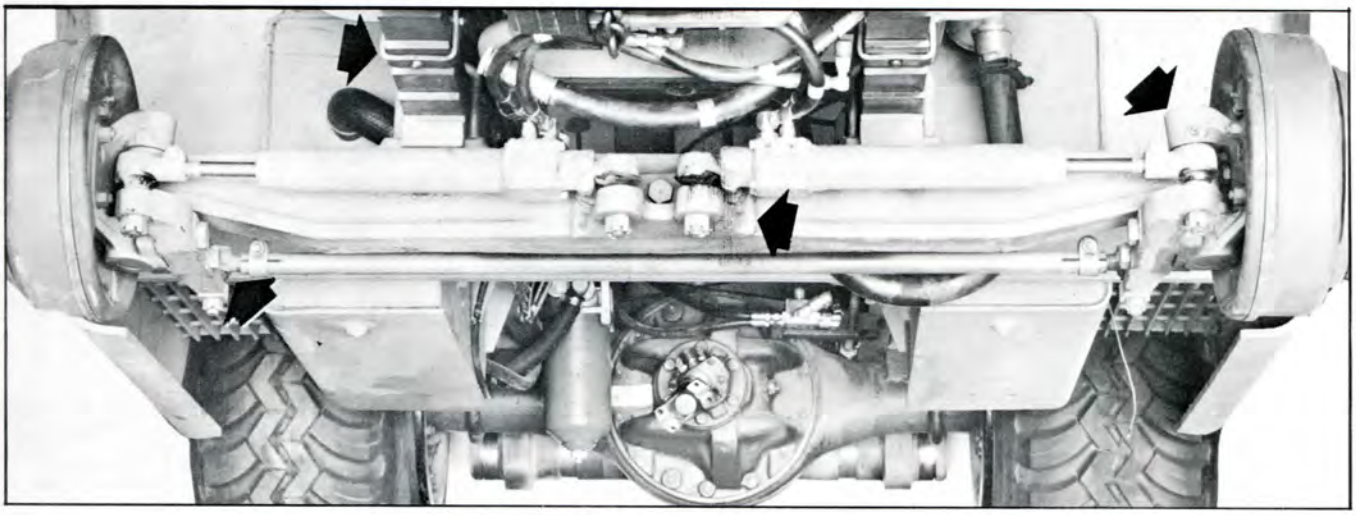


Plate 10791.

Allow the crankcase to thoroughly drain...while the oil drains, clean and lubricate all grease fittings... checking for leaks as you go. (Refer to Appendix "1" for lubrication charts and chart key/s). When you lubricate the steer wheels, check for loose wheel bearings (by trying to rock wheels), check steering components for looseness at rod ends, spring shackles, u-bolts and clips for damage and security of mounting... check power steer cylinders and connections for leaks.

Remove the engine oil filter...unscrew the filter from the cylinder block with a filter wrench. Then...

...coat the gasket on the new filter with oil. Place filter in position on block and hand tighten filter until gasket contacts adaptor face...then tighten 3/4 turn.

CAUTION

DO NOT OVERTIGHTEN FILTER ASSEMBLY.

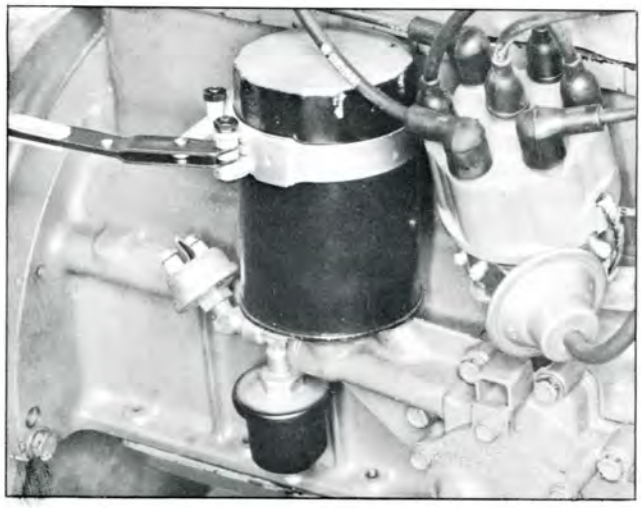


Plate 10792.

Remove breather cap and dislodge foreign particles by washing in a Stoddard type cleaning solvent until clean...air dry. Then...

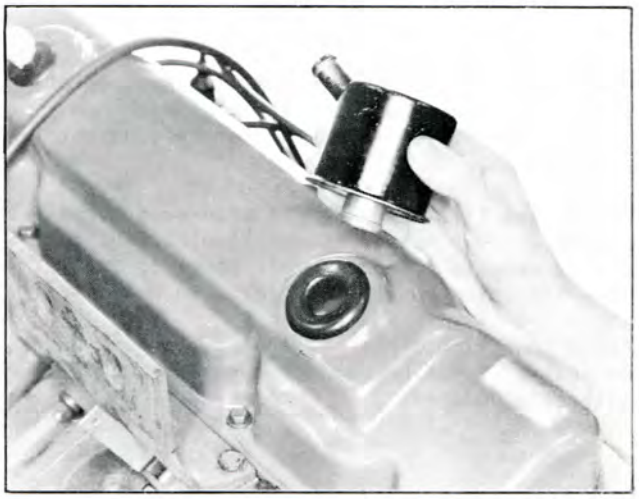


Plate 10793.

...remove line running from intake manifold to metering valve and clean in the same manner... next remove the metering valve, clean in Stoddard type cleaning solvent...air dry, and then install line so connection is air tight. Now...

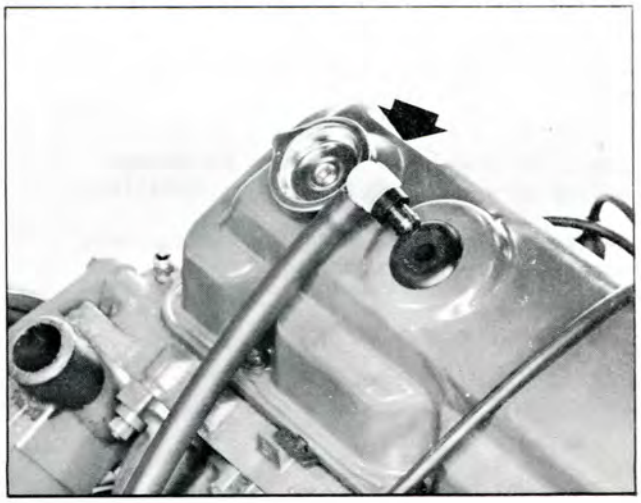


Plate 10794.

...install metering valve into rubber seat on valve cover...make sure valve lip is secure in rubber seat.

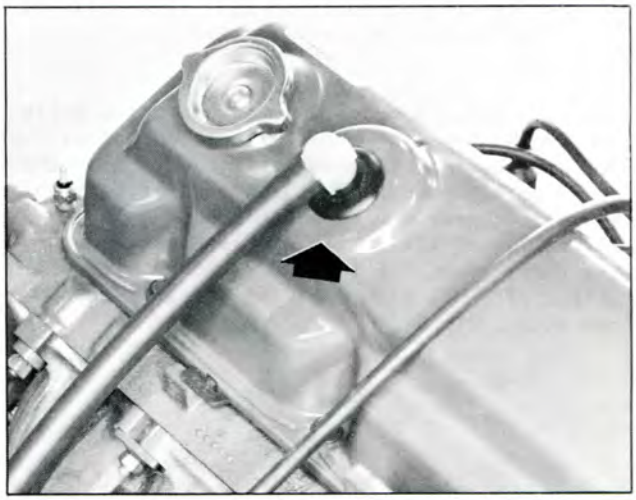


Plate 10795.

Now...clean off crankcase drain plug...replacing the plug if damaged. Install plug with new gasket and tighten to normal torque...do not overtighten.

Remove the fill cap and fill crankcase...run engine a few minutes...check level again, add oil as necessary to bring oil level to full mark indicated on the dipstick...do not overfill.

Check condition of oil fill cap...locking ears or seal must not be damaged...replace cap if either is damaged.

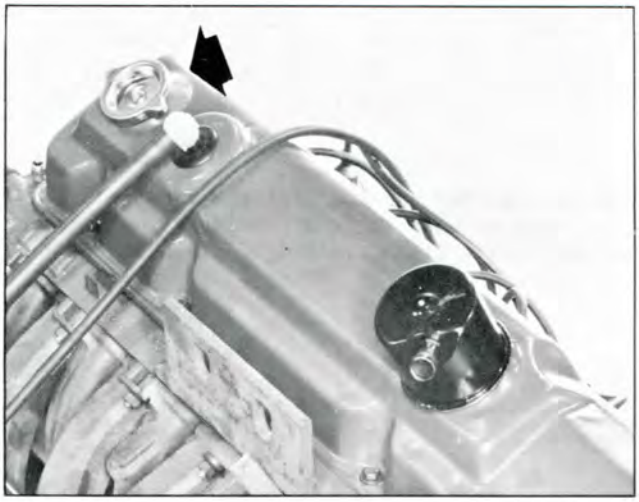


Plate 10796.

Check fan blades for loosness and damage... making sure the fan is properly installed.

Check the alternator mounting bolts...make sure they are secure and...

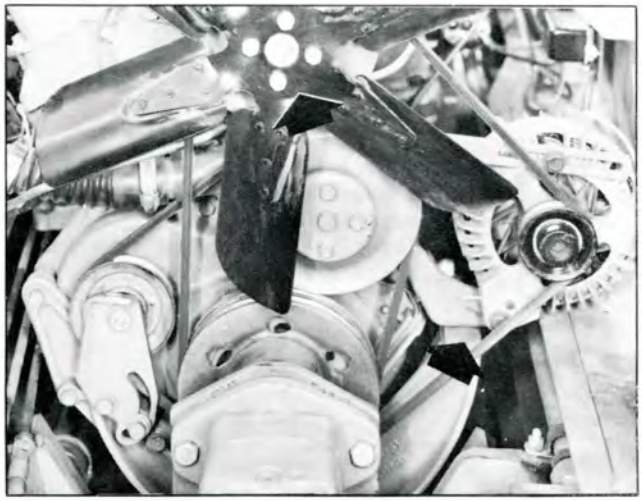


Plate 10797.

...check and, if necessary, adjust drive belts for proper tension which is 50 to 80 pounds for used belts...for new belts the tension should be 80 to 120 pounds when using a belt tension gauge. Otherwise, the belts should have a deflection of 1/4 to 1/2 inch as measured on the short span. If tension is low, belts will slip...if it is high, bearing and seal damage can occur.

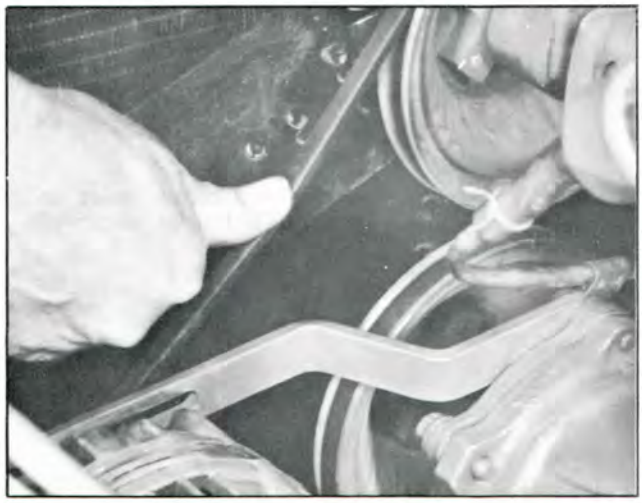


Plate 10798.

Drive belt using the idler pulley is adjusted at the pulley located on front face of engine and...

Plate 10799.

...the charging system drive belt is adjusted at the alternator strap.

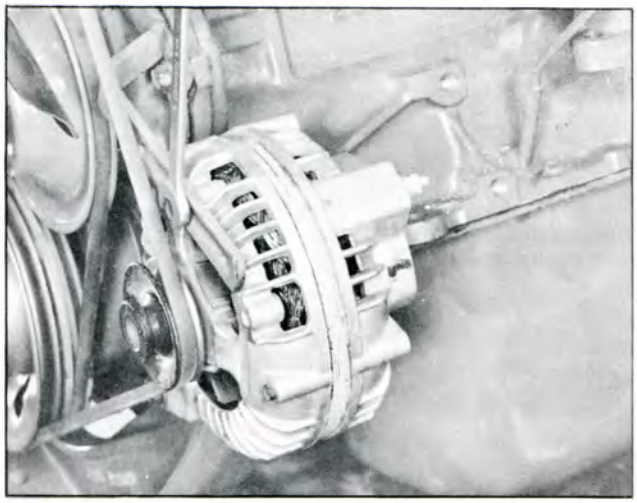


Plate 10800.

Check the water level which should be about one(1) inch from the top of tank. If the radiator requires much water and the engine has been overheating...

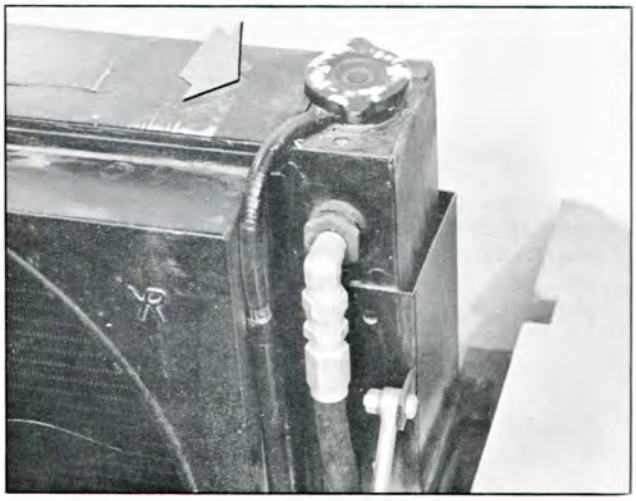


Plate 10801.

...pressure test the radiator cap...replacing cap if it is necessary.

Plate 10802.

Pressure test the cooling system...eliminating any leaks which are found and...

Plate 10803.

...check the tail pipe to make sure it is not damaged or obstructed...check mounting and clamps to be sure they are secure.

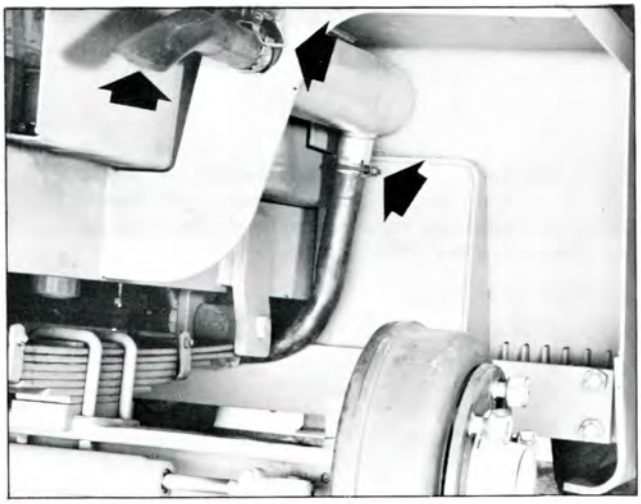


Plate 10804.

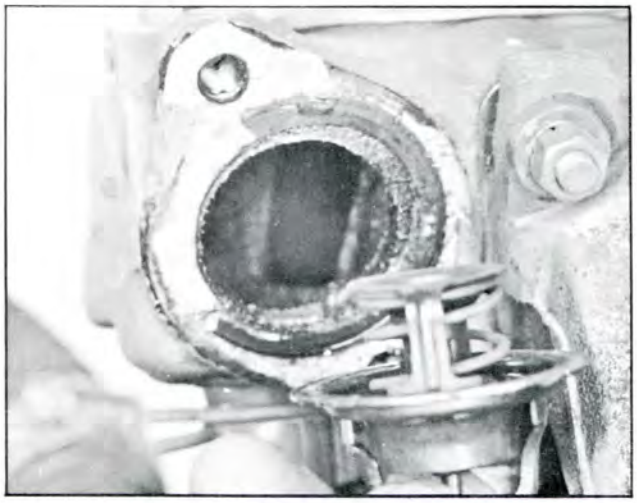


Plate 10428

Check the thermostat to be sure it is working properly...remove housing bolts...mark bolts in such a manner that upon reassembly, the same bolts are placed back in the same holes they came from. Inspect and test thermostat... if the radiator is clogged, it should be flushed ...refer to Appendix "1" for procedures. Now...

...holes...finger tight. "Gradually and Alternately" tighten bolts to normal torque.

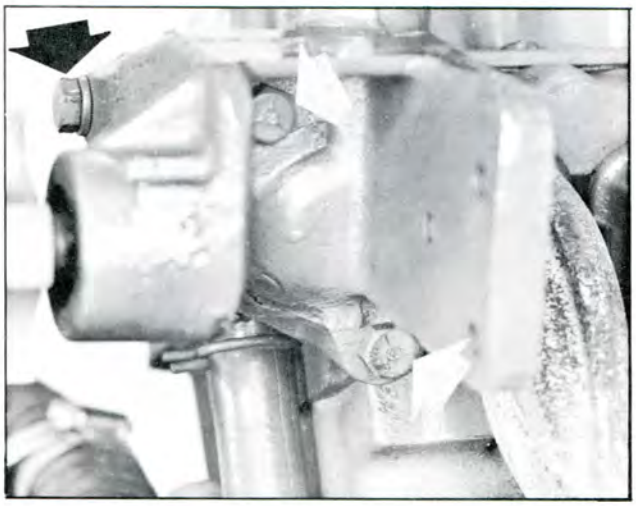


Plate 10427

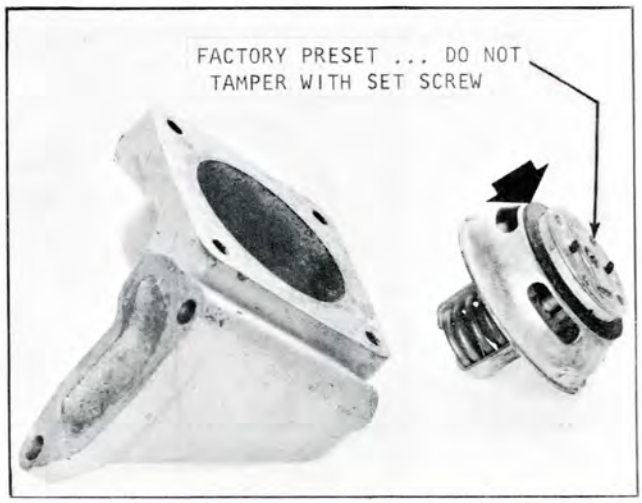


Plate 10849.

...using gasket sealer...affix gasket to the housing.

Place housing on cylinder head and against gasket...start bolts in their individual...

Now...check the oil cooler lines and connections for leakage and security of mounting.

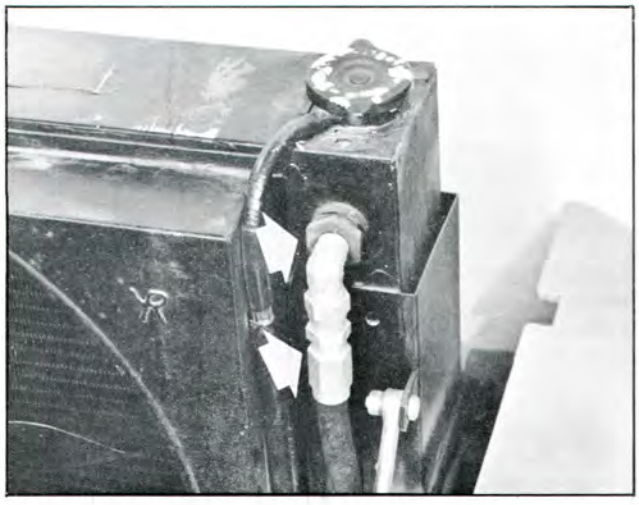


Plate 10807.

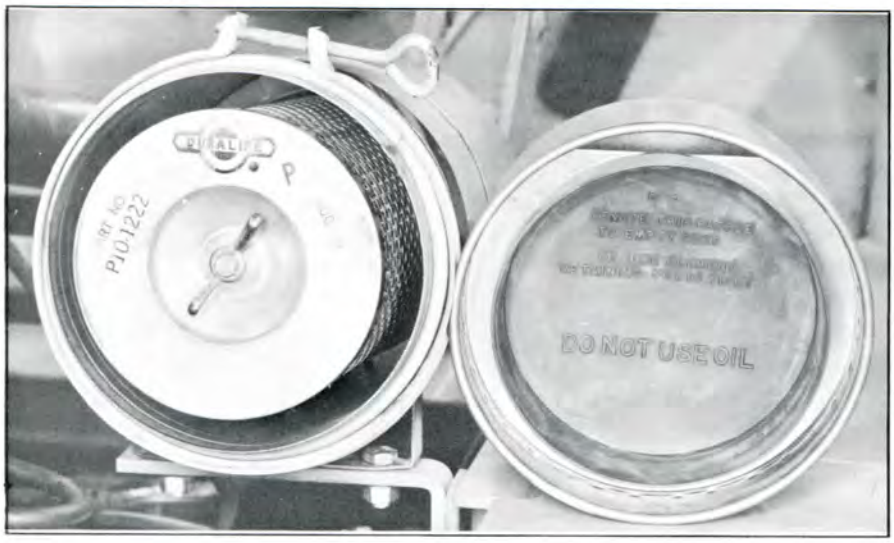


Plate 10808.

Remove air cleaner cover to expose baffle and twist until it is free... lift out.

Empty dust from cup...remove thumb screw and pull element out. Clean thoroughly by using the following methods:

1. With a dry dusty element use compressed air to blow...dry air (100 PSI) (or less) through the element opposite to direction of arrows on end of element.

2. With oily or sooty element...use a garden hose (40 PSI) (or less) to clean element.

Then...wash element in warm water...(120 degrees) (or less) containing a non-sudsing house detergent...if available...and dry thoroughly.

C A U T I O N

Do not rupture element, damage fins or sealing surfaces nor allow dust to deposit on clean air side...before placing element into air cleaner, inspect gasket and replace if damaged.

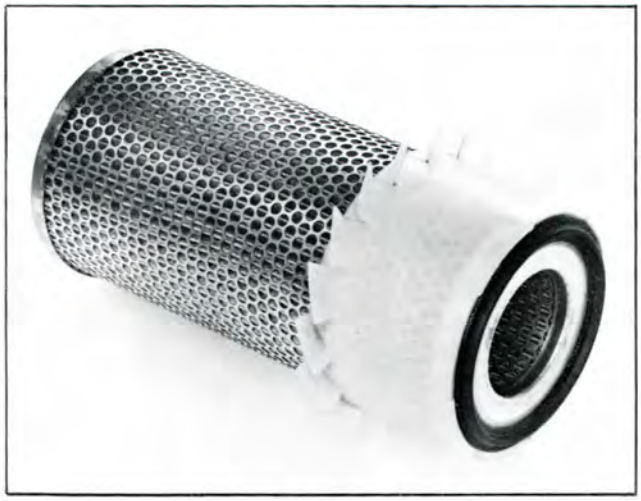


Plate 10809.

Clean cover, baffle and inside of cleaner housing ...install element making sure wing nut is tight. Install baffle...twist to lock in position. Install cup...arrows pointing up...tighten locking clamp.

Plate 10846.

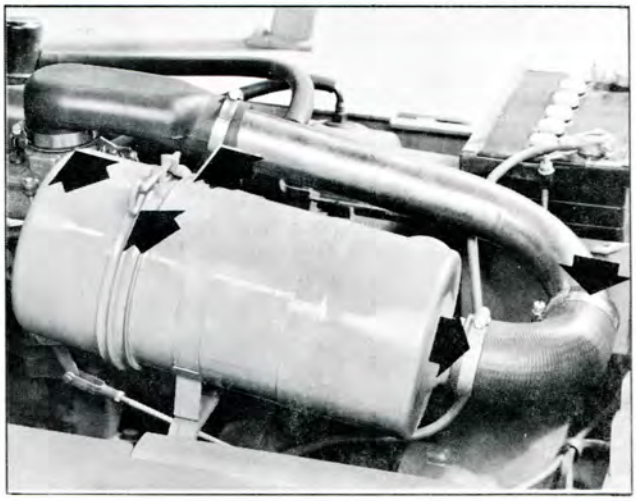


Plate 10810.

Now...check air cleaner hose connections to be sure they are tight. Check bracket for security of mounting.

N O T E

Do not use oil in cup...if element cannot be cleaned properly...replacement is required.

Periodically remove hose and check for signs of dust. If found...additional service intervals are indicated for the air cleaner...interior of hose should be absolutely clean.

Remove, discard and install a new fuel filter during the vehicles first PM...and change it every other PM thereafter.

Plate 10811.

Now...check the battery to make sure the cells are filled...and check for cracks.

Plate 10814.

I M P O R T A N T

If the top of the battery is wet and requires a lot of water, check voltage regulator output which should not exceed specifications...listed in Appendix "2" in the rear of this manual.

Use only pure distilled water. If the temperatures are freezing, operate vehicle for a period of time to make sure the added water mixes thoroughly with the battery electrolyte solution...otherwise the water may freeze and damage the battery.

If terminals are corroded, clean and protect them with battery saver... clean top of battery...be sure it is dry. Refer to the following page.

Check all wiring for fraying and loosness.

Take a hydrometer reading of electrolyte to determine state of charge. Charge battery if reading is below 1.265, if freezing temperatures are encountered...in tropical temperatures, the full charge specific gravity reading may be lowered from 1.365 to 1.225 by diluting the electrolyte with distilled water.

N O T E

Add distilled water before charging...DO NOT add distilled water immediately after a charge.

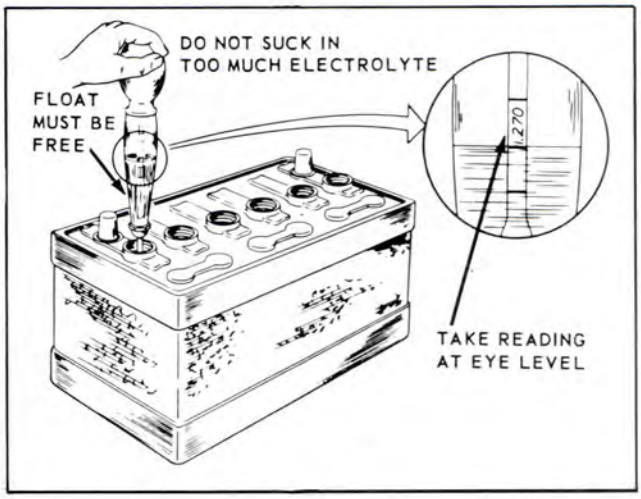


Plate 6271.

-continued next page-

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

Plate 10815.

N O T E

Corrosion can be removed from the battery cables and terminals with a solution of baking soda or ammonia and water. After cleaning, flush the top of the battery with clean water, and coat the parts with grease to retard further corrosion. Keep filler cap vents open at all times... wash vents in a solution described above and let dry before installing.

Battery Test Procedures:

A defective battery or a discharged battery may be found by performing the following "light load test":

N O T E

Until someone comes up with an instrument for checking cell voltage in the new "hard-top" batteries, don't attempt to measure individual cell voltage by "jabbing" a voltmeter prod through the battery cover.

When testing "hard-top" batteries, skip the cell voltage check...make your regular battery capacity test, then rely on total battery voltage and specific gravity readings to indicate battery condition. For example:

1. Hook up your battery tester and voltmeter leads to the battery terminals, and adjust the battery tester for 3 times the amp hour rating of the battery.

-continued-

Plate 10816.

2. After 15 seconds, (no longer) read the voltmeter. If the voltage is over 9.6 volts (4.8 for 6-volt battery) check...

BATTERY GOOD

...specific gravity.* If reading is below 1.230 charge the battery...it's OK for further service.

3. If voltage in Step 2 is less than 9.6 (or 4.8 for 6-volt battery) check specific gravity of each cell. If there is a difference of more than 50 points (.050) between any two cells, by a new battery...your old one has had it.

4. However, if the specific gravity tests shows less than 50 points difference between cells, charge the battery...

BATTERY DEFECTIVE

...refer to chart...after charging, make another capacity test...if voltage is now 9.6 (4.8) or more, the battery is OK. Less than 9.6 (4.8) your battery is "living on borrowed time"... replace battery.

* All specific gravity readings should be corrected for temperature.

** After specified charging time, charge at 5 Amps until specific gravity is 1.250.

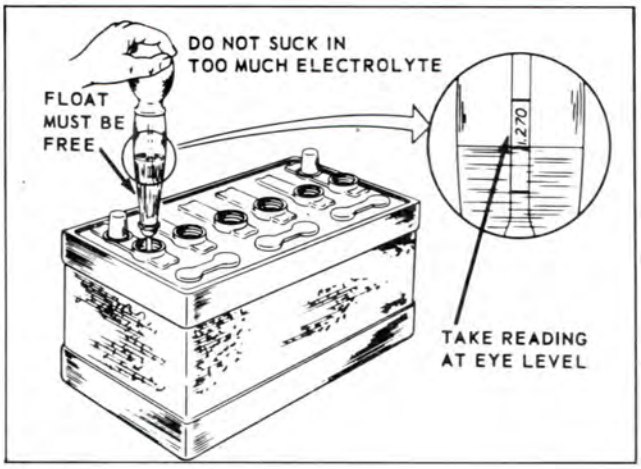


Plate 6271.

Plate 10816.

Specific Gravity...Fully Charged Batteries

Standard	Extra Water Capacity	Tropical
1.280	1.260	1.225

If Specific Gravity is	Charge at	Minutes of Charge Battery Capacity		
	Amps	45AH	55AH	70AH (Min)
1.125 or less	35**	65	80	100
1.125-1.150	35	65	80	100
1.150-1.175	35	50	65	80
1.175-1.200	35	40	50	60
1.200-1.225	35	30	35	45
1.225 or more	5 Amps to 1.250 Spec. Gr.			

Now...remove the distributor cap and check for visible damage of cap, rotor, spark plug wires and boots.

N O T E

Wipe cap inside and out to prevent arcing.

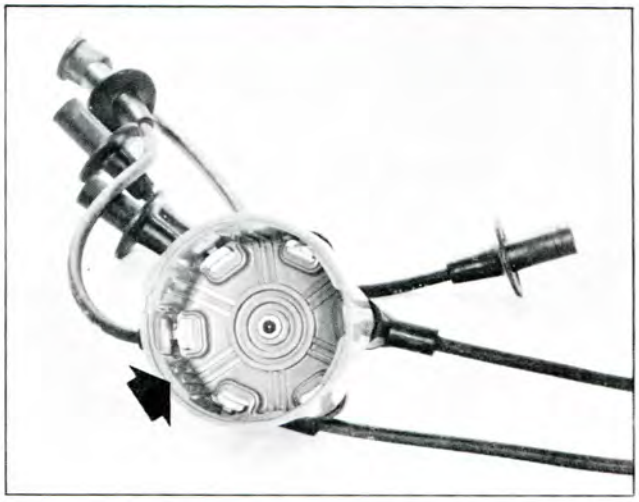


Plate 10817.

Check points for excessive pitting and burning ...and replace if necessary. If points are okay, check their gaps...

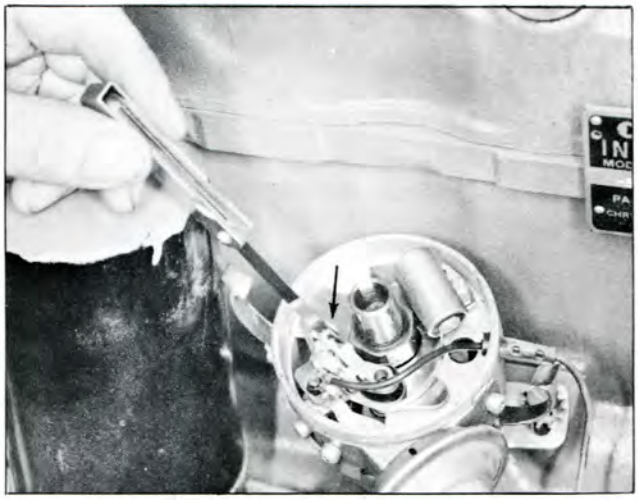


Plate 10818.

...make sure you lubricate the distributor drive shaft.

Plate 10819.

Now...disconnect the high tension coil, wipe, and install a ground wire to the coil...clipping one end of the wire to an engine bolt.

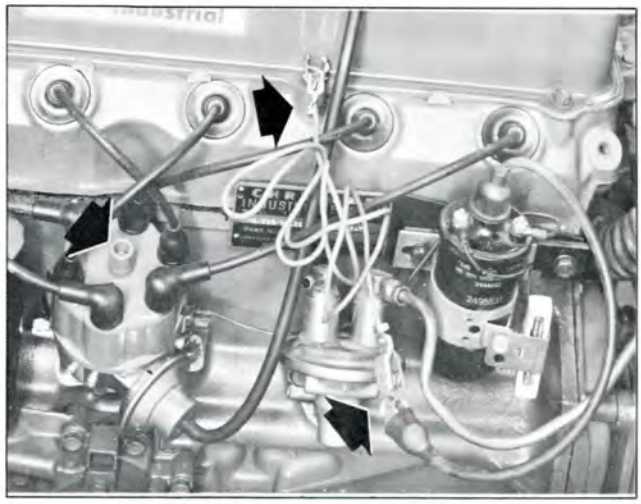


Plate 10820.

Then...connect a volt meter to the battery. Now...floorboard the accelerator to obtain higher compression and crank the starter for three to five seconds.

During cranking, voltage should exceed 9.6 volts. If it is low, there is trouble in the battery, cables, or starter. Immediately after cranking, no-load voltage should be at least 12 volts. Now...remove ground wire and connect the coil wire. Then...

Plate 10816.

...start and accelerate the engine. Charging system output should exceed 12-1/2 volts. These simple, quick tests show whether charging and cranking systems are okay or in need of repair. Remove the volt meter and...

N O T E

With engine at full throttle, voltage should not exceed values given in specifications.

...hook up your tachometer, vacuum gauge, and timing light. Start the engine and idle at 600 RPM. Next...remove one spark plug wire, which will cut engine RPM to about 550. Then...

Plate 10821.

...check engine timing which should be 2-1/2 degrees before top dead center. Stop the engine, connect spark plug wire, and remove timing light.

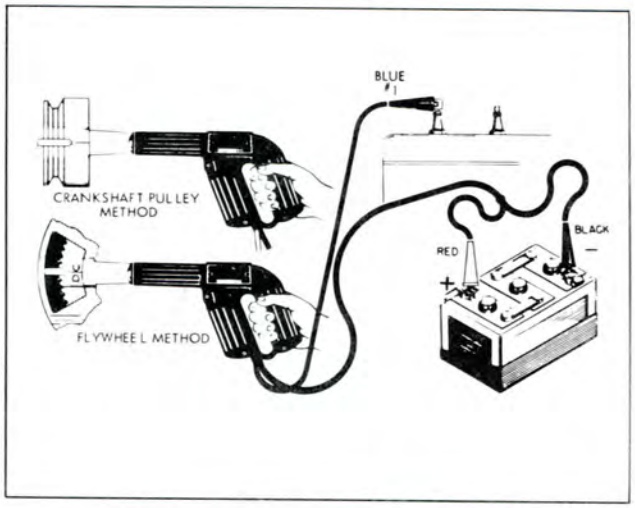


Plate 7818.

Now...check for leaks at the engine oil filter and crankcase drain plug.

Plate 10822.

Next...check engine oil level which must be at the full mark...not over. These checks are made at this time, because oil has had a chance to circulate and fill up the entire system.

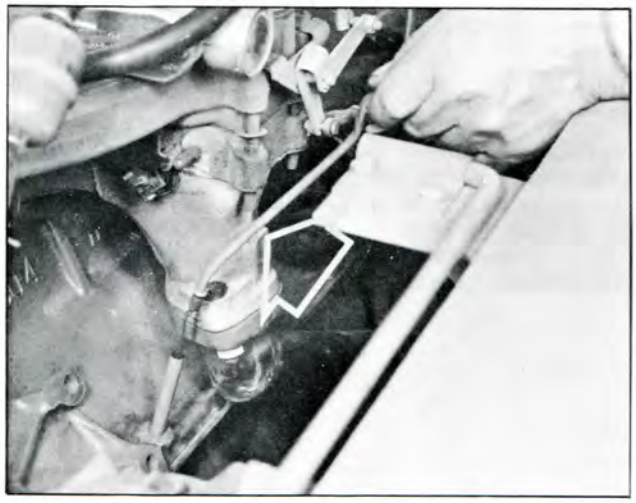


Plate 10734.

Now...with the engine running at idle...turn the idle air fuel bleed screw out until the vacuum drops. Then...turn the screw in to obtain maximum vacuum with the leanest possible mixture.

Plate 10823.

Next...check maximum governed no-load RPM which should be about 2600 RPM...at the same time...

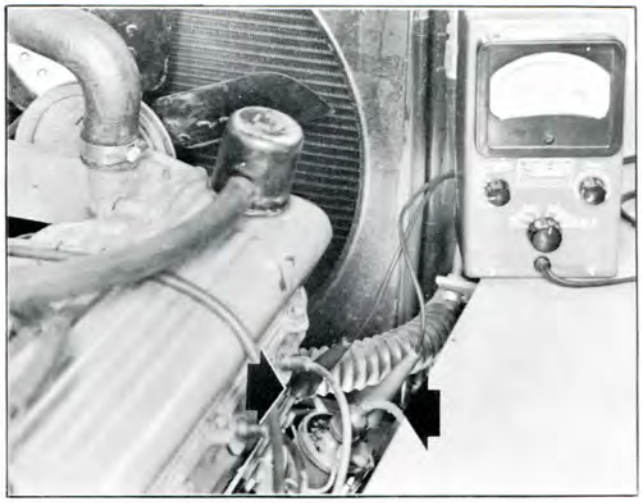


Plate 10821.

...read the vacuum to determine converter stator condition...14 to 16 inches indicates that the stator is okay...9 to 10 inches indicates that the stator is locked. This causes engine and converter overheating...and makes converter replacement necessary.

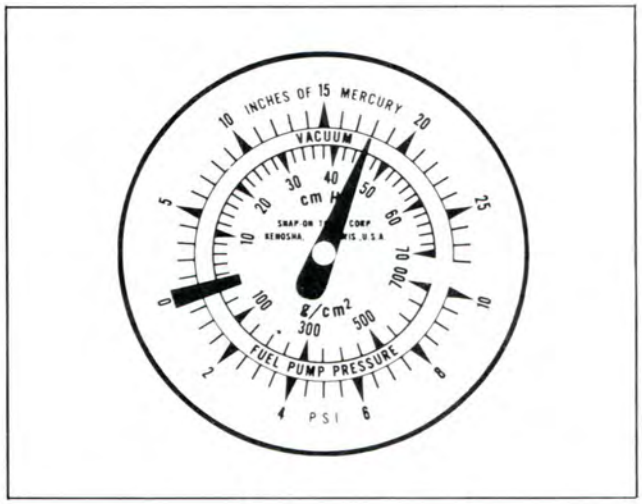


Plate 10824.

A stop screw at the throttle lever flange of the carburetor controls the engine idle speed... turn the screw until engine idle reads 600 RPM on the tachometer. Then...

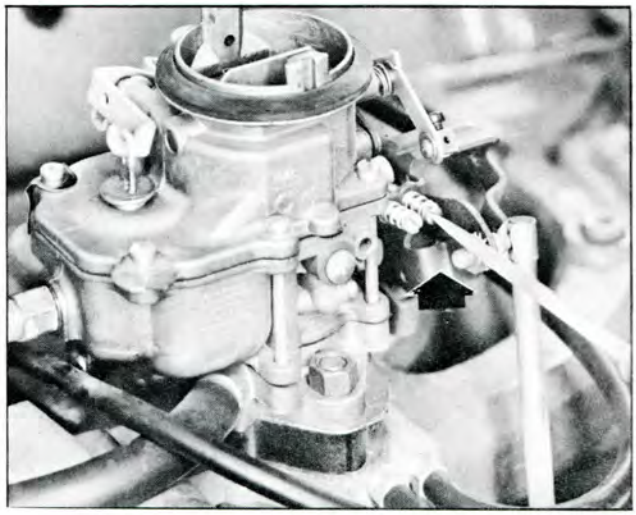


Plate 10825.

...position the choke control lever so that the mark on the cam contour is in line with the fast idle screw...rotate screw until it contacts cam contour...turn screw 1-1/2 additional turns. Now...

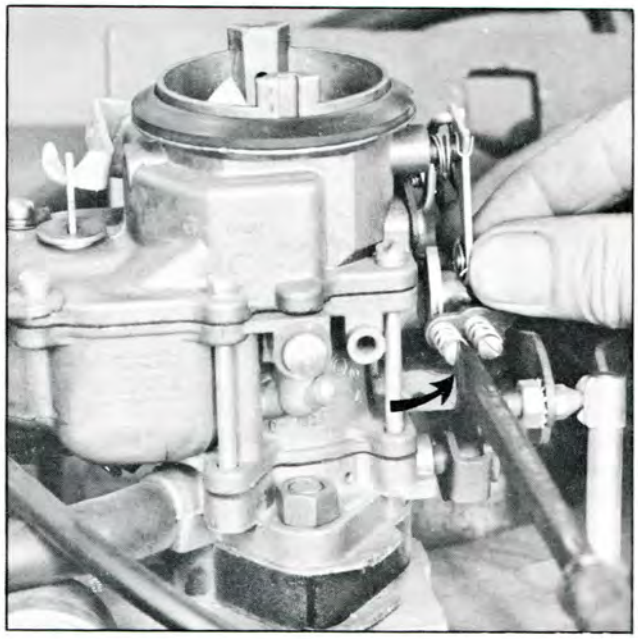


Plate 10826.

...be sure governor is adjusted properly. Rotating adjuster clockwise will increase RPM and counterclockwise will decrease engine RPM... if adjustment is necessary, be sure to lock adjuster with lock wire after adjustment has been completed.

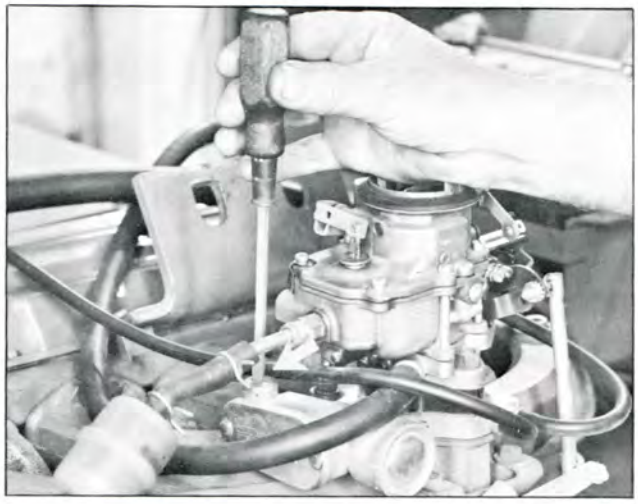


Plate 10827.

Check the heat riser valve...be sure it is free and working properly. If stuck free up ...lubricate.

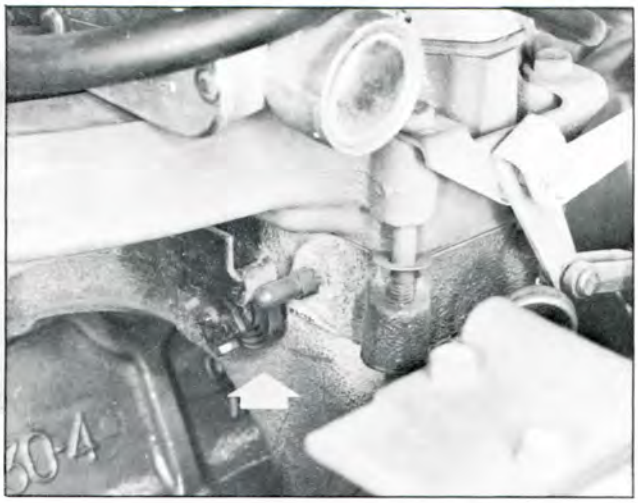


Plate 10828.

Now...check part-load RPM with the hydraulic system in by-pass. (Hold tilt, or lift lever forward operating system over by-pass.) This should be about 2100 RPM, stop engine and remove vacuum gauge...but leave the tachometer hooked up.

Plate 10821.

Next...check no-load lift speed at full Governed RPM...and record the time.

Then...check loaded lift speed...and record the time.

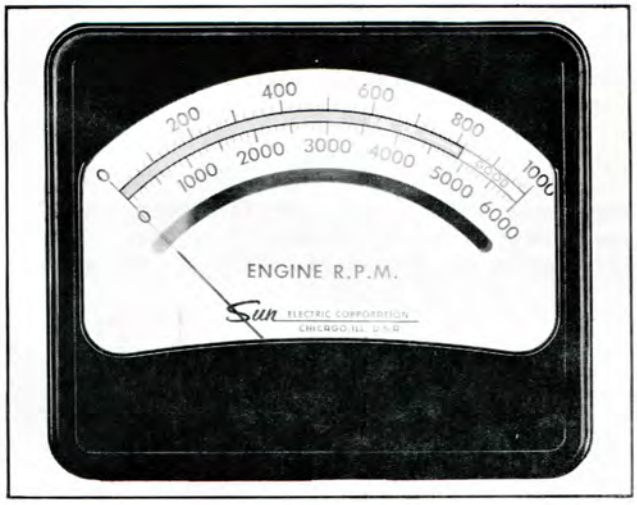


Plate 10831.

Loaded lift speed should be within 20 per cent of empty lift speed. If it isn't, pump wear and decreased flow are indicated.

Plate 10832.

Now...make a drift test. Drift should not exceed one inch per minute...if it does cylinder or control valve repair is indicated.

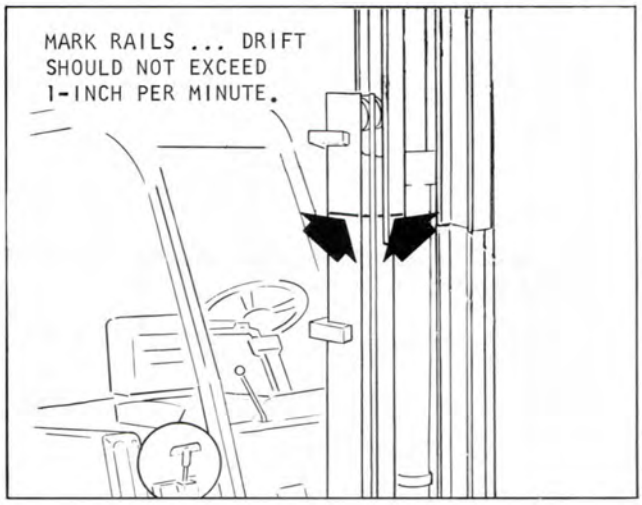


Plate 10852.

Next...set parking brake, start engine, shift into gear, and slowly rev up engine to make sure the brake holds...if it does not...it should be repaired at once.

Plate 10750.

Now...with forks loaded, parking brake set, and truck against a solid wall...stall test in forward and reverse. To do this...

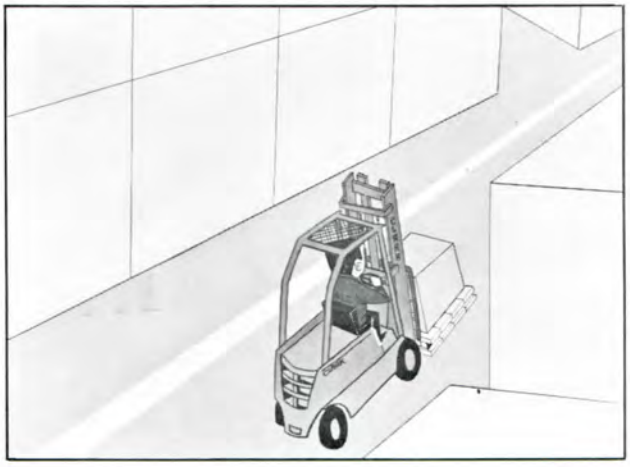


Plate 10729.

...start engine, shift into gear, accelerate to full throttle and observe tachometer speeds... revving up only long enough to get readings.

Plate 10714

Normal Stall: 1700 to 1800 R.P.M.

It should be noted that stall is that point which engine RPM and torque are maximum with only the converter pump and impeller rotating.

A stall of 1800 and above indicates low oil pressure, or converter fin damage...converter replacement is required.

A stall of 1200 and below indicates stator slippage...this causes engine power loss and over-heating...requires converter replacement.

After stall testing...return the load and remove the tachometer.

Now take the hour meter reading.

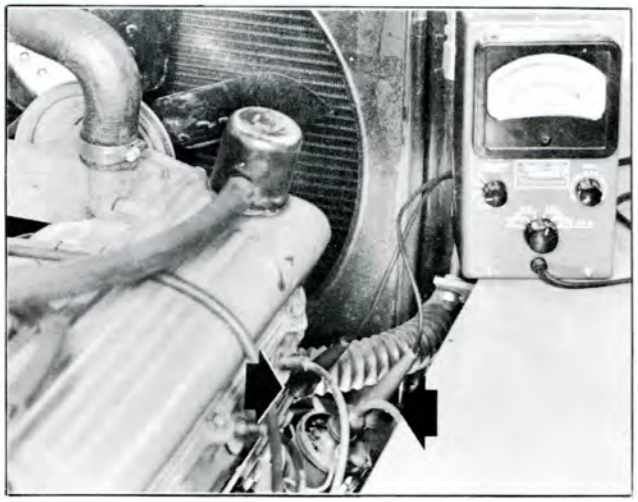


Plate 10821

Plate 10706

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

APPENDIX " 1 "

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

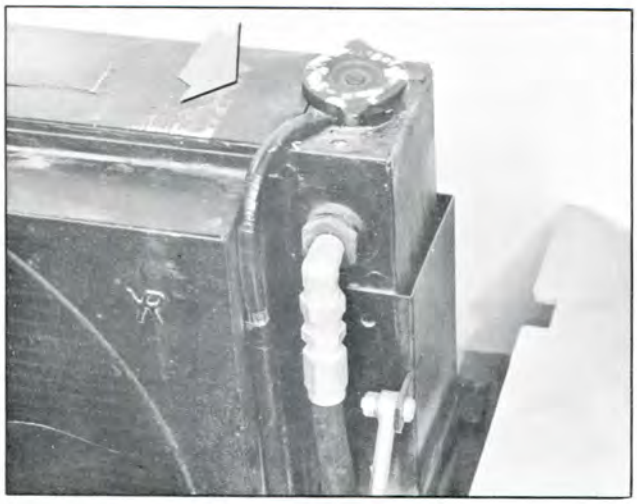


Plate 10801.

First...make these quick checks. Check to make sure the water level is correct.

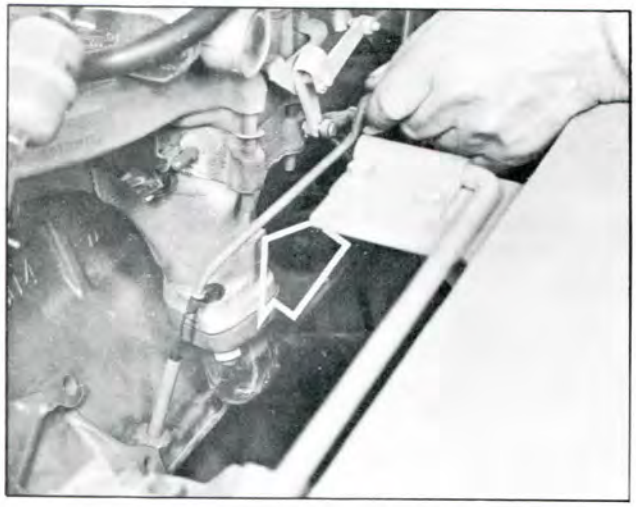


Plate 10734.

Check the engine crankcase oil level.

Plate 10809.

Remove and check the air cleaner element. If it is clogged, it will cause power loss. Check all parts to be sure they are clean...check to be sure connections are tight.

Check coil polarity, making certain the wire from the distributor is connected to the negative coil terminal. If the wire is connected to the positive coil terminal...short spark plug life will result.

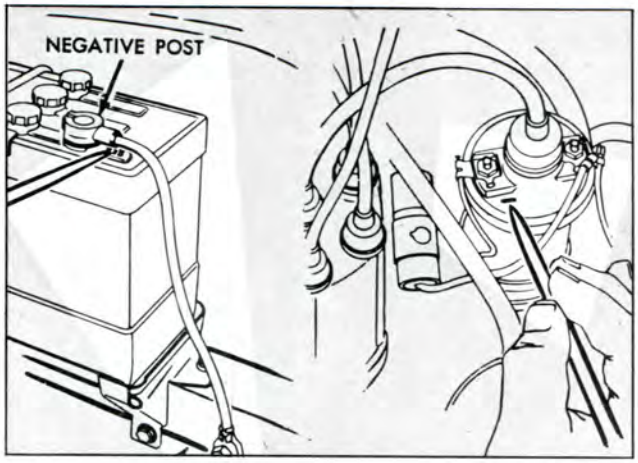


Plate 10912.

Start the engine and...using a spark indicator...check the coil and spark plug wires to make sure the coil is producing adequate voltage to all plugs. At the same time, check all the plug wire connections for tightness.

Check the battery for damage and cleanliness at terminals.

With the engine running, check the ammeter...to see whether the electrical system is charging.

Check the tightness of battery cable connections and make sure the negative ground wire is securely connected to a ground. If the cranking speed seems low...

...disconnect the high tension coil wire from the distributor cap, clip a jumper lead onto the coil wire and ground it on the engine block. Then...

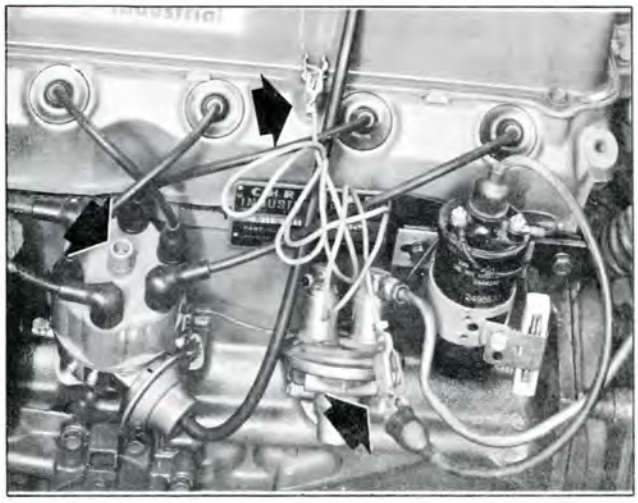


Plate 10820.

...hook up a voltmeter across the battery terminals. Now...floorboard the accelerator pedal to obtain higher compression and crank the engine for a few seconds. During cranking...the voltage should exceed 9.6 volts. If it doesn't, there is trouble in the battery, cables, or starter. Refer to 6-31 for complete test procedures.

Plate 10816.

Immediately after cranking, no-load voltage should be at least 12 volts. Now...connect the coil wire to the distributor cap and start and accelerate the engine. IF THIS VOLTAGE IS BELOW 12 VOLTS, IT INDICATES A BATTERY PROBLEM.

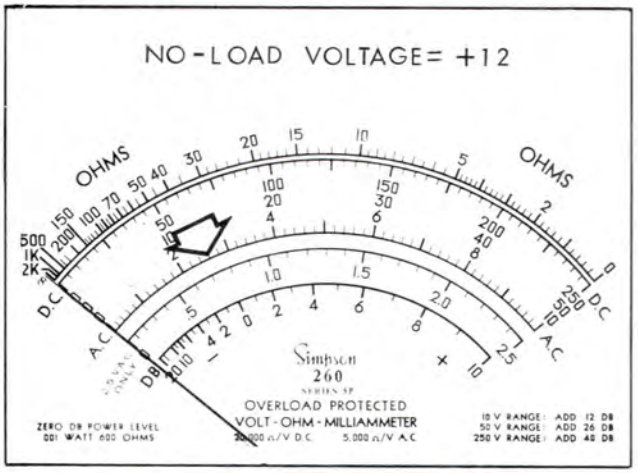


Plate 10913.

Charging system output should exceed 12-1/2 volts. These simple, quick tests show whether charging and cranking systems are okay or in need of repair. Remove the voltmeter after these tests are made.

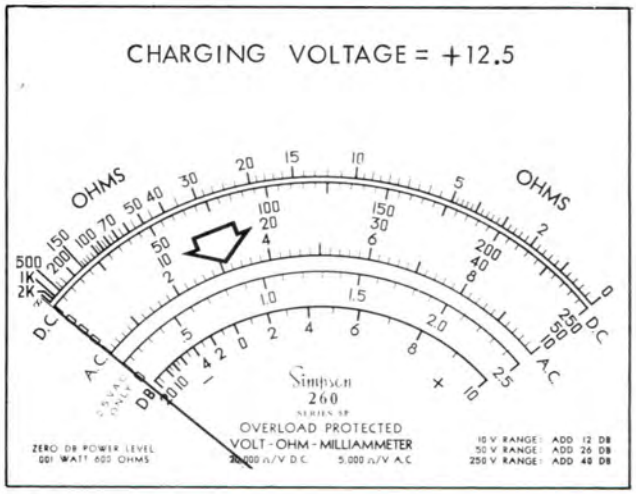


Plate 10914.

Check to make sure you have fuel. Check to make sure the fuel service valve...

...is in the full run position (machines so equipped).

Check the crankcase breather and, metering valve (machines so equipped)...to make sure the system is not clogged. Clean (or replace) if necessary.

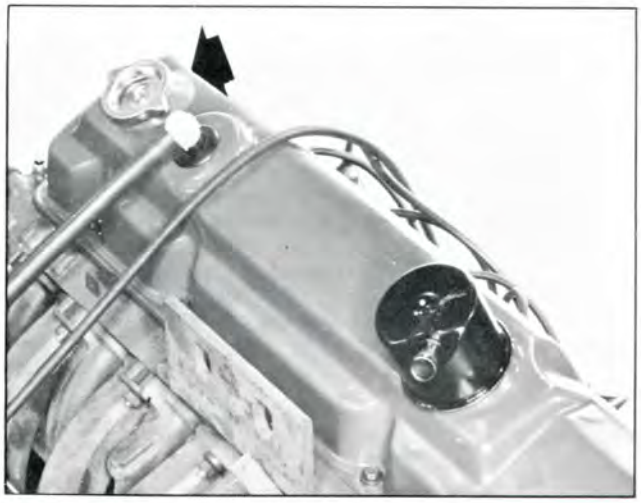


Plate 10796.

Check to make sure the choke linkage fully opens and closes the choke. If necessary, remove the air cleaner or hose so you can see whether the choke opens and closes.

N O T E

These quick simple checks should always be made to make sure that basic and easy-to-find troubles are not the cause of poor engine performance. Once you have eliminated these, then you can move into the other causes of poor engine performance.

(A)

Now...with these checks out of the way...start the engine, and let it warm up. While doing this...look for excessive blue exhaust smoke and listen for any unusual engine noise.

N O T E

Blue exhaust smoke indicates excessive oil consumption caused by faulty seating of piston rings, dirt or worn engine components such as rings, cylinders, pistons, or valve guides. Black smoke indicates excessive fuel consumption caused by faulty carburetion.

(B)

Check the instruments to be sure they are operating and note whether the temperature is within the range of 170 -to- 200 degrees. Now...

N O T E

The temperature should not drop below 170 degrees when the engine is idling. If it does, the thermostat is faulty and should be checked and replaced if necessary.

(C)

...check to make sure there is no fuel problem...by accelerating... with the choke knob in and the tilt lever fully forward to put the hydraulic system in by-pass to load the engine. If engine operation is erratic...

(D)

...pull the choke knob and again accelerate under hydraulic by-pass load. If the engine smoothes out ...there is a problem in the fuel system. To correct it...

(E)

...remove the fuel bowl (if so equipped) and...

(F)

...check the fuel filter. Clean or replace the filter, if necessary. Bowl & Element Type: wipe out the bowl and install the filter and bowl. Then...

Plate 10811.

...disconnect fuel line at carburetor and connect tester or...install a pressure gauge in the carburetor. Start engine, and with the engine idling...

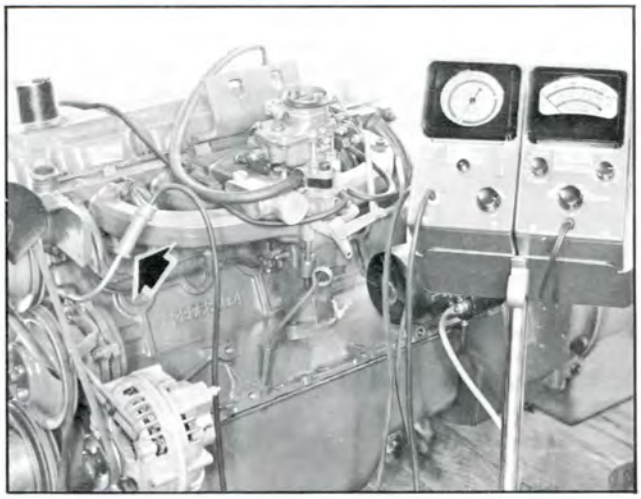


Plate 10916.

...check fuel pump pressure which should be 3-1/2 -to- 5 PSI. If it is too high or low ...fuel pump repair or replacement is indicated. Remove the pressure gauge. Now...

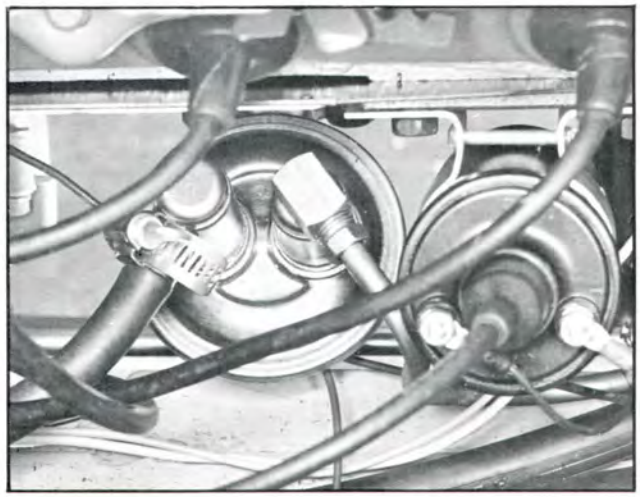


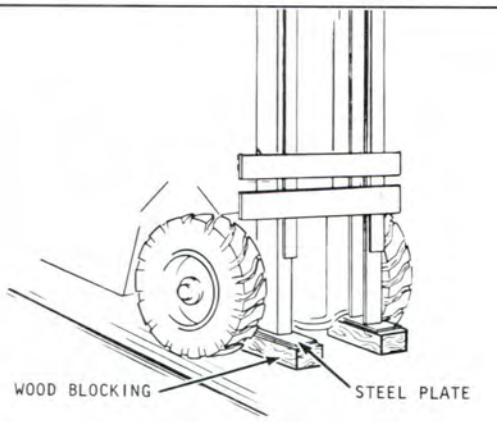
Plate 10915.

Plate 10821.

...hook up a tachometer and...

Plate 10823.

...install a vacuum gauge. Then set..



...the parking brake...raise drive wheels off floor...start engine and...

...check maximum governed speed under no load...which should be about 2600 RPM. If it isn't correct, shut off engine and...

...check pedal stop height...which should be one (1) inch.

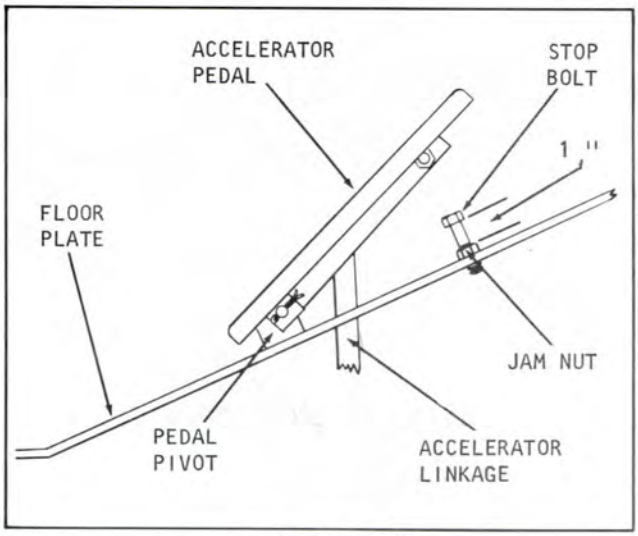


Plate 11149.

Now...floorboard the accelerator pedal and make sure the gap between the throttle shaft arm and the arm stop (on the carburetor) is about 1/32 of an inch. If it isn't...

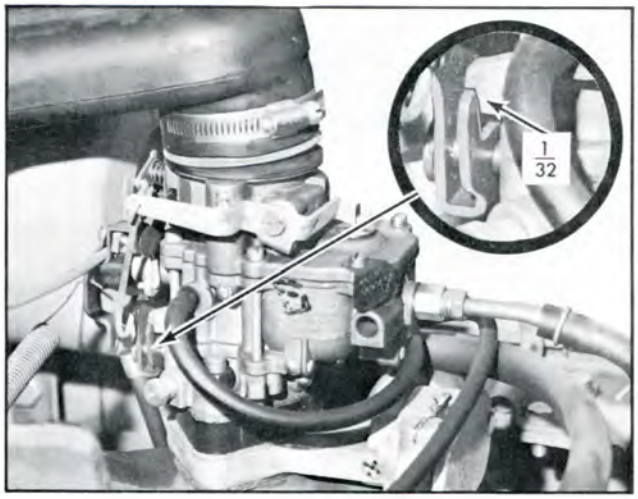


Plate 11150.

...adjust the throttle linkage. First...check to be sure bell crank arm "C" is adjusted in line with the brake pedal pivot pin...adjust at clevis C-1 if necessary.

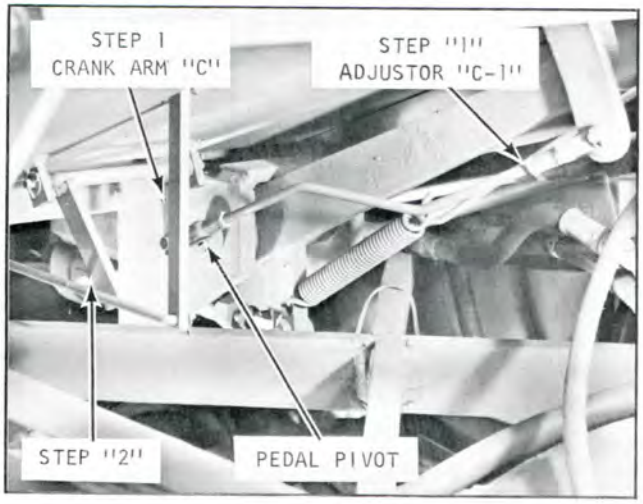


Plate 11151.

Next...see if bell crank arm C-2 is making contact with accelerator pedal rod "D". If it does not...

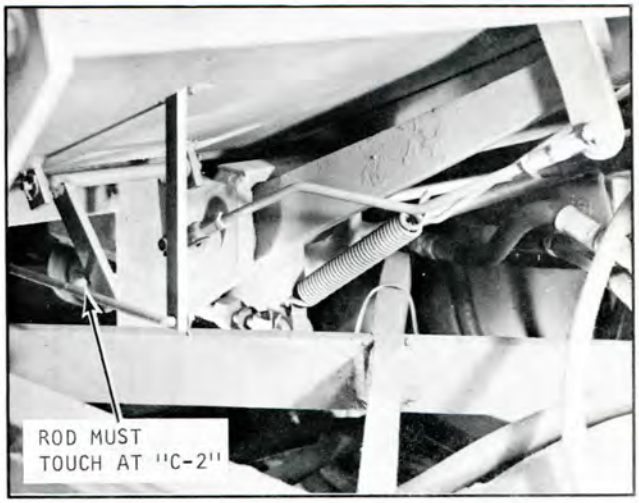


Plate 11152.

...adjust rod at clevis D-1 until it does contact. Now...

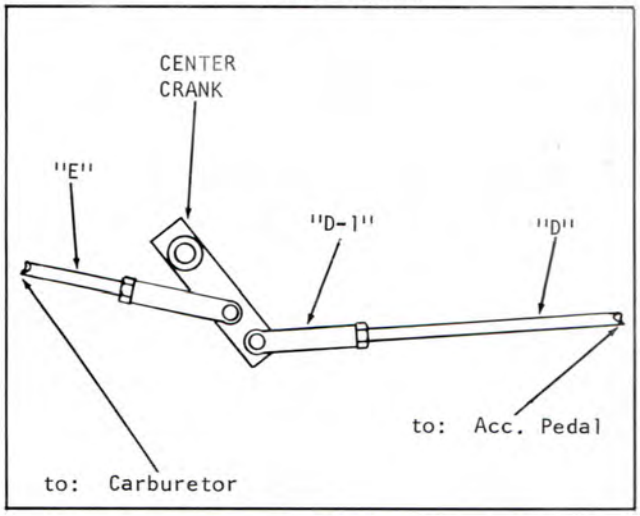


Plate 11153.

...adjust rod "E" to obtain proper gap between the throttle arm and it's stop. The 1/32 of an inch gap will allow the throttle plate to fully open without binding linkage when the accelerator pedal is fully depressed.

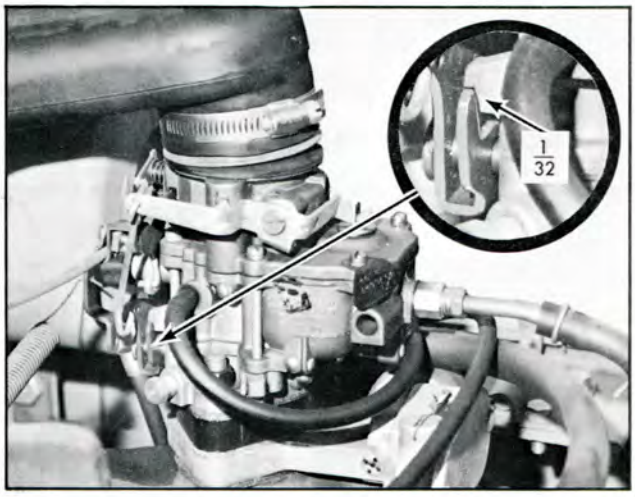


Plate 11150.

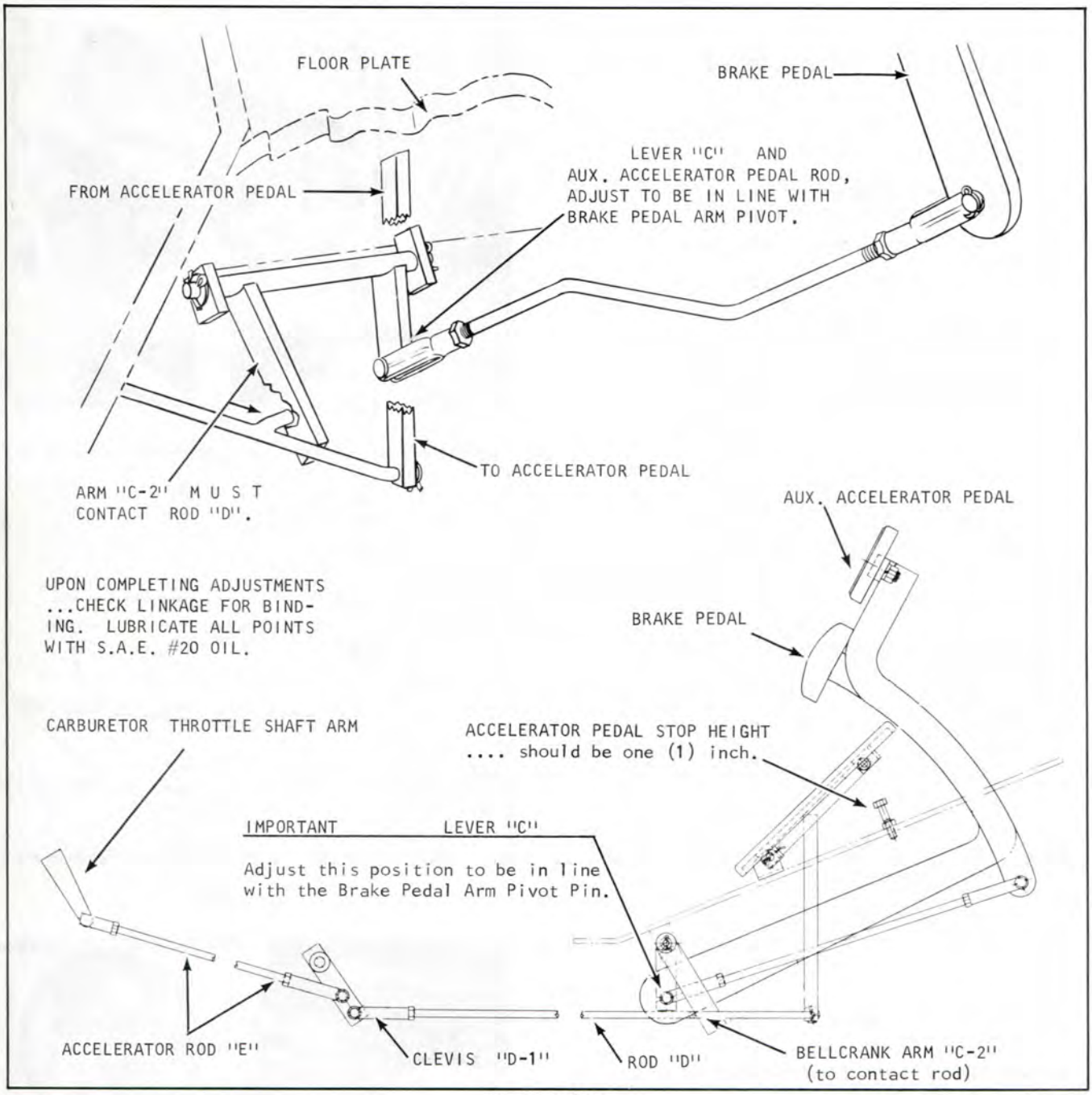


Plate 10891.

With the pedal fully up...check to make sure the throttle arm idle stop screw solidly contacts the idle stop plate. If the screw does not contact the stop...check for binding of linkage, or a weak return spring. Depress and release the accelerator pedal rapidly and slowly to make sure the linkage will return to idle position.

Check the governor adjustment. Start the engine, floorboard the accelerator pedal and check the no-load maximum governed speed which should be 2600 RPM. If the speed is too low, rotate the adjustor one-half turn at a time, counterclockwise to increase speed and clockwise to decrease speed. Each 1/2-turn will change engine speed approximately 150 RPM.

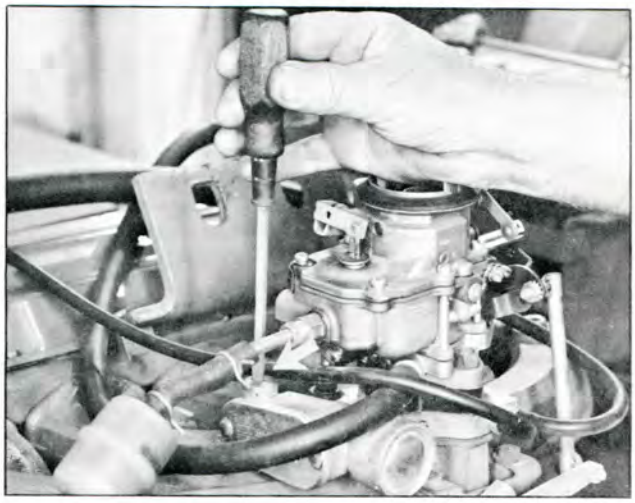


Plate 10827.

Now...check and, if necessary, set engine idle speed which should be about 600 RPM. Then, recheck your maximum governed no-load speed... and check your vacuum reading.

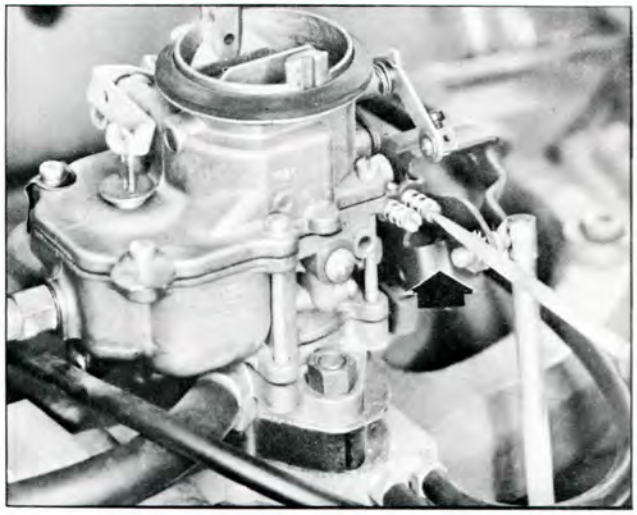


Plate 10825.

The vacuum reading at maximum governed speed should be 14 -to- 16 inches. If it ranges from 9 -to- 11 inches...it indicates the engine is not up to par. Next...

Plate 11173.

...check the vacuum with the hydraulic system in full by-pass and with the engine at full throttle. The vacuum reading should be 4 -to- 6 inches at about 2100 RPM. If it is low...engine performance is poor. Now...

(A)

...the vacuum should be 0 -to- 1-1/2 inches.

(D)

...check stall speeds in forward and reverse.

(B)

Below normal stall RPM...about 1100 -to- 1500 indicates that the engine needs tune-up or repair. However, it indicates that the transmission and converter are in good shape.

(E)

Normal stall RPM is about 1750. This indicates that the converter is working properly, clutch/s are not slipping, and that the engine is providing maximum torque. At stall speed...

(C)

An extremely low stall of about 700 -to- 1100 indicates converter or stator is faulty.

(F)

A stall RPM of more than 1800 indicates clutch slippage due to lack of pressure or glazing, or converter damage.

(G)

The stall checks and checks with the engine under load...are made to determine whether major components or systems are causing problems. If they are... then it may not be worthwhile to continue your tune-up...if tune-up will be worthwhile, then...

(K)

Check transmission pressures (Ref. Group 06, Page 1-1) and if they are correct, check for glazing or converter damage. To do this...

(H)

...install a timing light and...

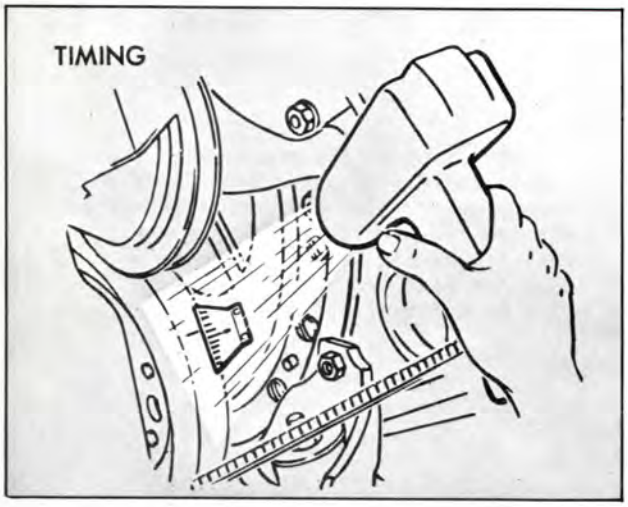
(L)

...stall the engine for 30 seconds ...and then idle the engine. Then accelerate slowly to full throttle. If stall returns to normal, the clutch/s are faulty. If stall is above normal, the converter is damaged.

(J)

...adjust the idle screw to obtain an idle speed of about 450 RPM. The reason for doing this is to make sure that spark advance has not begun.

(M)



With the engine running at 450 RPM...aim the light at the crankshaft pulley to check the timing which should be 2-1/2 degrees before top dead center.. as indicated by the alignment of the timing mark and the pointer. Now...slowly accelerate the engine to determine whether there is a steady spark advance as indicated by the mark on the pulley which will appear to drop below the pointer. If there is no advance or if it is erratic, the distributor advance mechanism must be repaired. If the advance is working properly...

Plate 10917.

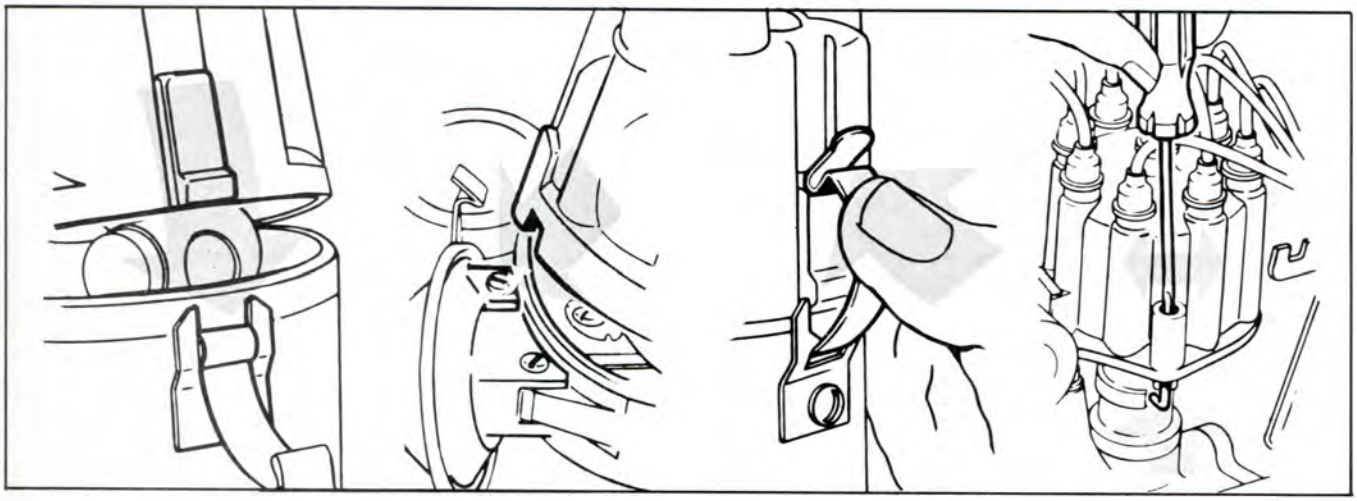
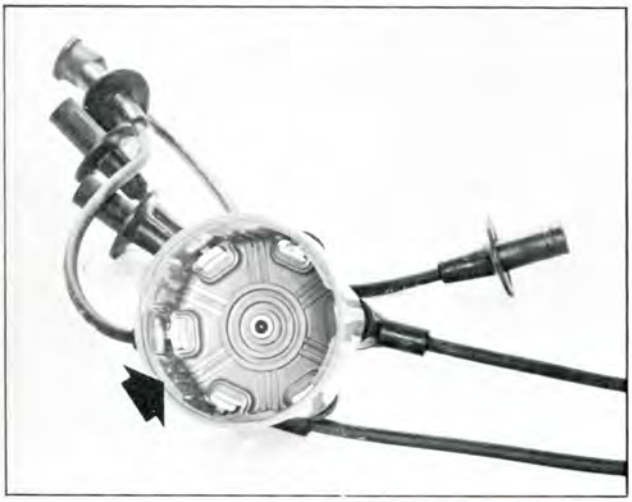


Plate 10918. ...check out the distributor. Remove the distributor cap. Then...



...check the cap for cracks, corrosion of terminals, and burnt center terminal. Now...

Plate 10817.

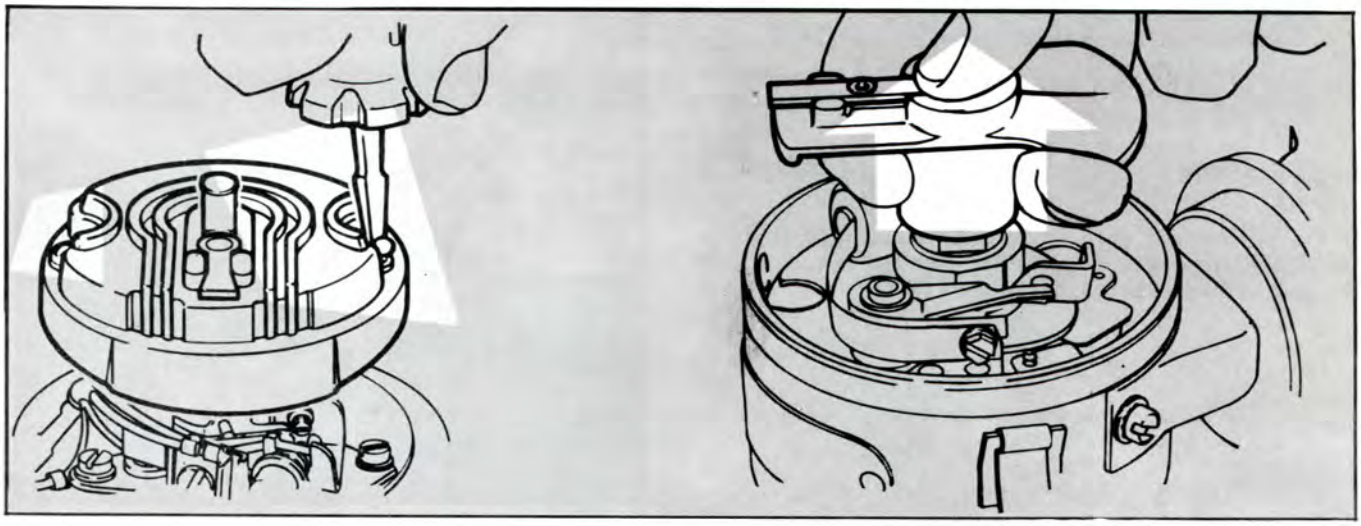


Plate 10920. Remove the rotor...dustshield...to expose the...

...points and condenser. Check the condition of the points. If they are pitted, burned, or worn replace them and the condenser.

CONDITION	CAUSED BY
 BURNED	Any discoloration other than a frosted slate grey shall be considered as burned points.
 EXCESSIVE METAL TRANSFER OR PITTING	Incorrect alignment. Incorrect voltage regulator setting. Radio condenser installed to the distributor side of the coil. Ignition condenser of improper capacity. Extended operation of the engine at speeds other than normal.

B1443-B

Plate 9262.

Plate 10919.

If the points are in good condition...check their gap .017 -to- .020 (dwell: 36 -to- 42 deg.) ... set gap, if necessary, to specifications.

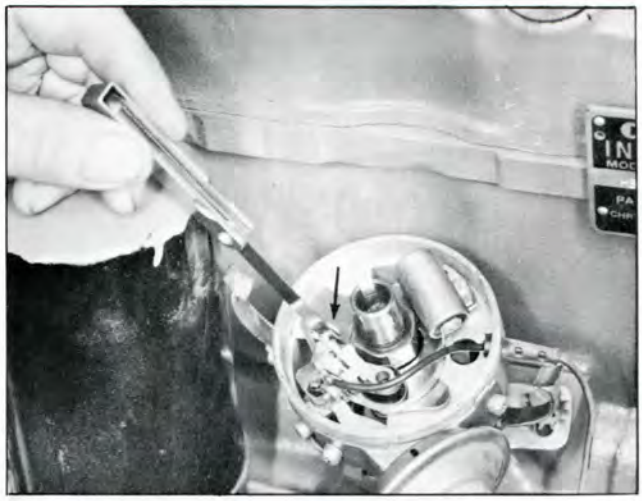


Plate 10818.

If points and condenser require replacing... remove them. Then...wipe off the cam to thoroughly clean it. If the distributor has a cam lubricating wick, rotate it to place an unworn portion of the wick in contact with the cam. If the distributor has no wick...

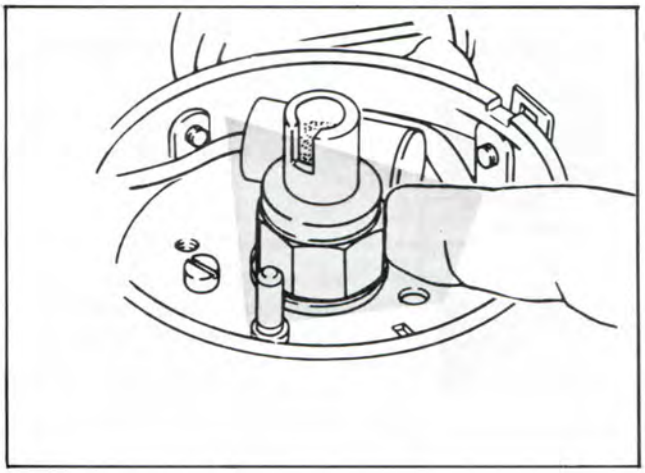


Plate 11137.

...lubricate the cam flats. Do not use chassis grease...but...use a special cam lubricant (Clark part number 1800636). Now...install the new points and condenser...securing them firmly.

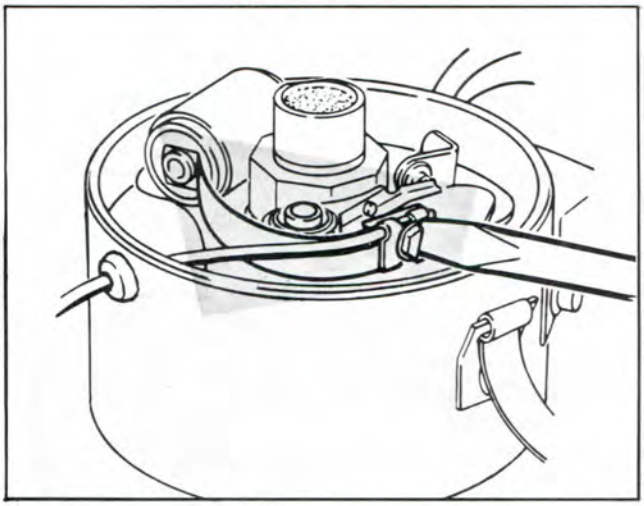


Plate 11138.

Set the gap between the points with the ignition point cam follower on the high point of a cam lobe. Be very careful not to get grease on the point faces. Finally..

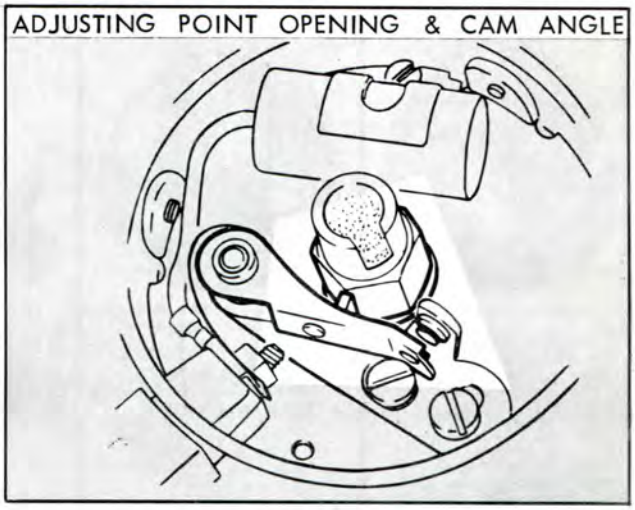


Plate 11139.

...install the shield, rotor and cap...make sure all wires are firmly seated in the cap. Now...

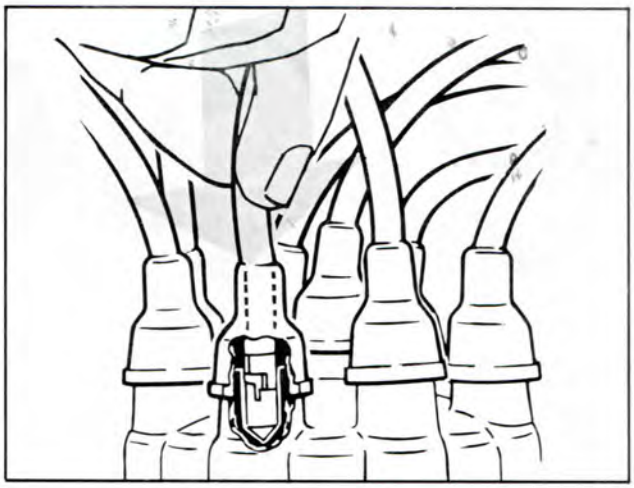


Plate 11140.

...recheck the timing and, if necessary, reset it. To set the timing...loosen the distributor base lock nut. Then with the engine idling at about 450 RPM...turn the distributor counter-clockwise to advance or. .clockwise to retard the timing. Turn the distributor one way or the other.. until the timing mark and pointer are perfectly aligned...at 450 RPM. Then...tighten the distributor base lock nut, recheck timing, and remove timing light. Now..

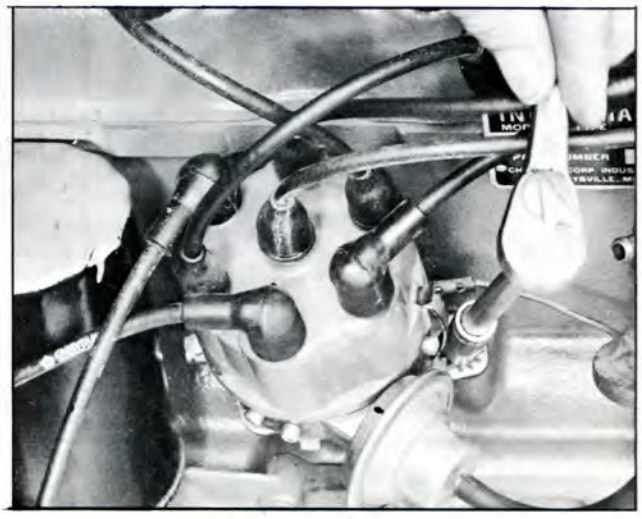


Plate 10433.

CARBON FOULED	OIL FOULED	GAP BRIDGED
		
IDENTIFIED BY BLACK, DRY FLUFFY CARBON DEPOSITS ON INSULATOR TIPS, EXPOSED SHELL SURFACES AND ELECTRODES. CAUSED BY TOO COLD A PLUG, WEAK IGNITION, DIRTY AIR CLEANER, DEFECTIVE FUEL PUMP, TOO RICH A FUEL MIXTURE, IMPROPERLY OPERATING HEAT RISER OR EXCESSIVE IDLING. CAN BE CLEANED.	IDENTIFIED BY WET, BLACK DEPOSITS ON THE INSULATOR, SHELL BORE AND ELECTRODES. CAUSED BY EXCESSIVE OIL ENTERING COMBUSTION CHAMBER THROUGH WORN RINGS AND PISTONS, EXCESSIVE CLEARANCE BETWEEN VALVE GUIDES AND STEMS, OR WORN OR LOOSE BEARINGS. CAN BE CLEANED.	IDENTIFIED BY DEPOSIT BUILD-UP CLOSING GAP BETWEEN ELECTRODES. CAUSED BY OIL OR CARBON FOULING. IF DEPOSITS ARE NOT EXCESSIVE, THE PLUG CAN BE CLEANED.
LEAD FOULED	**NORMAL**	**WORN**
		
IDENTIFIED BY DARK GRAY, BLACK, YELLOW OR TAN DEPOSITS OR A FUSED GLAZED COATING ON THE INSULATOR TIP. CAUSED BY HIGHLY LEADED GASOLINE. CAN BE CLEANED.	IDENTIFIED BY LIGHT TAN OR GRAY DEPOSITS ON THE FIRING TIP CAN BE CLEANED.	IDENTIFIED BY SEVERELY ERODED OR WORN ELECTRODES. CAUSED BY NORMAL WEAR. SHOULD BE REPLACED.
FUSED SPOT DEPOSIT	**OVERHEATING**	**PRE-IGNITION**
		
IDENTIFIED BY MELTED OR SPOTTY DEPOSITS RESEMBLING BUBBLES OR BLISTERS. CAUSED BY SUDDEN ACCELERATION. CAN BE CLEANED.	IDENTIFIED BY A WHITE OR OR LIGHT GRAY INSULATOR WITH SMALL BLACK OR GRAY BROWN SPOTS AND WITH BLUISH-BURNT APPEARANCE OF ELECTRODES. CAUSED BY ENGINE OVERHEATING, WRONG TYPE OF FUEL, LOOSE SPARK PLUGS, TOO HOT A PLUG, LOW FUEL PUMP PRESSURE OR INCORRECT IGNITION TIMING.	IDENTIFIED BY MELTED ELECTRODES AND POSSIBLY BLISTERED INSULATOR. METALLIC DEPOSITS ON INSULATOR INDICATE ENGINE DAMAGE. CAUSED BY WRONG TYPE OF FUEL, INCORRECT IGNITION TIMING OR ADVANCE, TOO HOT A PLUG, BURNT VALVES OR ENGINE OVERHEATING. REPLACE THE PLUG.

...check the spark plugs. To do this, remove the spark plug wires and loosen the plugs.

Then...blow dirt out of the spark plug wells.

N O T E

This is important to keep dirt from dropping into the spark plug holes.

Remove the plugs. If the plugs are badly fouled or burned, clean or replace them.

If plugs are in good condition, check their gaps and reset if necessary to .035 of an inch.

Finally...install the plugs and torque them to 35 pounds feet. Connect the spark plug wires. Now...

Plate 9272.

...with the engine idling, adjust the carburetor ...turning the idle screw to obtain 600 RPM. At the same time...

Plate 10825.

...turn the idle air-fuel ratio screw until the vacuum drops. Then...turn the screw back until the maximum vacuum with the leanest possible mixture is obtained. Next...

Plate 10823.

...recheck your stall reading...if it ranges from 1100 -to- 1500 or runs erratically... make a compression check. To do this...

Plate 10821.

...first...disconnect the high tension coil wire from the distributor cap and ground it. Then...

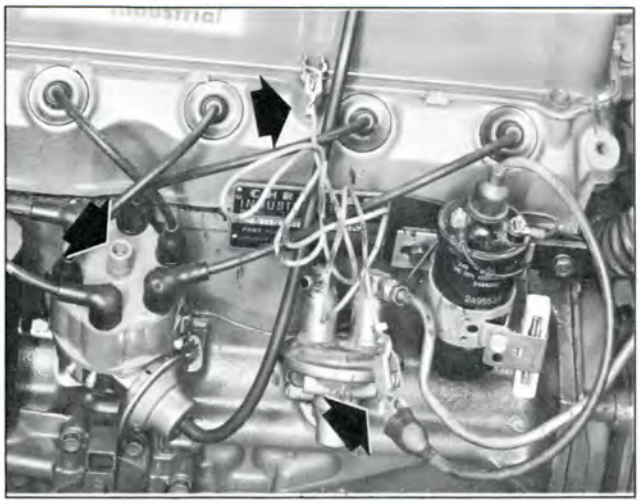


Plate 10820.

...remove a spark plug, as described before... attach a compression gauge...floorboard the accelerator pedal and crank the engine. The pressure reading should be about 140 (MINIMUM, 130, MAXIMUM 160 psi). Remove the gauge and install the spark plug...torquing it to 35 pound feet. Repeat this. .one cylinder at a time...for each of the other cylinders. If pressure variation across the cylinders is more than 20 PSI...

Plate 11142.

...squirt oil into the cylinder with a low reading and check the compression again. If the compression comes up to equal the other cylinders...it indicates faulty rings. If it does not rise...it indicates a sticking or burnt valve.

N O T E

A sticking valve is indicated by an irregular clatering noise and power loss. A burnt valve is indicated by a constant miss of one cylinder.

I M P O R T A N T

If the compression test indicates a valve problem...check and, if necessary, set tappet clearances. To do this, warm up the engine, turn it off, and remove the rocker arm cover.

An engine which is cold may run smoothly until it is warmed up ...and then it may begin to miss because the tappets have insufficient clearance and are holding valves open...never check tappet clearances until engine is warmed up...allowing internal components to expand.

Rotate the engine until the number 1 cylinder exhaust and intake valves are fully up...using a feeler gauge...check the clearance between the rocker arms and tappets. Exhaust tappet should be .020 of an inch...intake tappet should be .010 of an inch. If there is not a slight drag on the feeler gauge or if it can't be inserted between tappet and rocker arm...tappet adjustment is required.

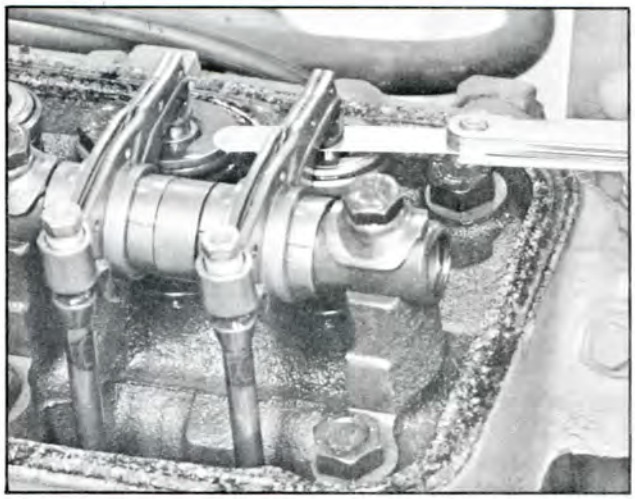


Plate 11143.

Before starting the adjustment procedure make two chalk marks on the crank pulley. Space the marks approximately 120 degrees apart (1/3 of circumference) so that with the timing mark the pulley is divided into three equal parts. Adjust tappets...starting with number 1 cylinder. Adjust valves in the firing order sequence of 153624...turning the crank 1/3 turn clockwise after adjusting valves of each cylinder.

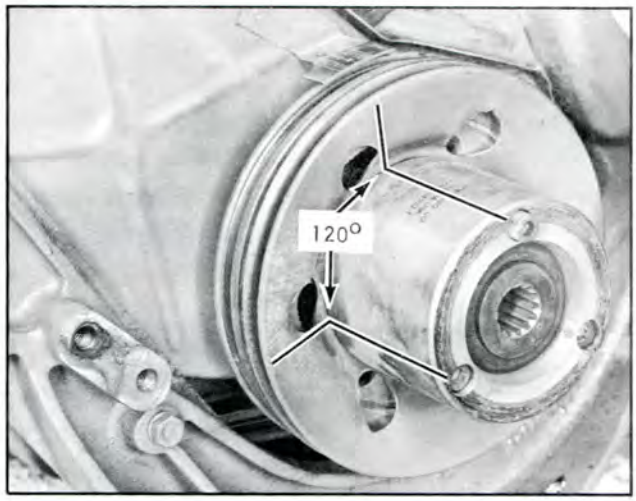


Plate 11147.

N O T E

Valve arrangement...front to rear...is illustrated in the opposite column.

Tappets may be adjusted without marking the crankshaft pulley. To adjust the tappets...

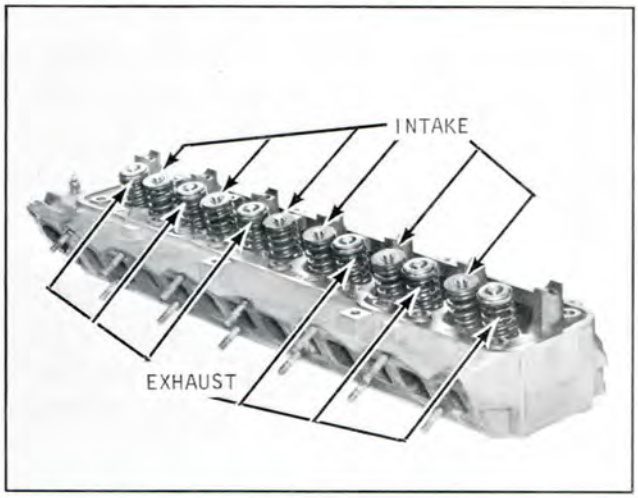


Plate 11148.

TWO COMPLETE REVOLUTIONS OF THE CRANKSHAFT WILL POSITION VALVES FOR TAPPET CLEARANCE ADJUSTMENT ... FOR EACH CYLINDER.

(Crankshaft Rotation ... Clockwise

Firing Order (Front -to- Rear) 1 - 5 - 3 - 6 - 2 - 4

VALVES ..... OF..... CYLINDERS			
"E" and "I" valves are fully closed ... rocker arms up ... ready to adjust when ...	1	5	3
	---	---	---
... "E" valve is fully open and the ... "I" valve is just starting it's downward stroke (starting to open).	6	2	4
"E" and "I" valves are fully closed ... rocker arms up ... ready to adjust when ...	6	2	4
	---	---	---
... "E" valve is fully open and the ... "I" valve is just starting it's downward stroke (starting to open).	1	5	3

PRIOR TO CHECKING VALVE LASH ADJUSTMENT ... WARM UP THE ENGINE ... (TO OPERATING TEMPERATURE) ... SHUT IT DOWN, THEN MAKE ADJUSTMENTS.

...insert a feeler gauge between the rocker arm and tappet...and turn the adjustor until there is just a slight drag on the feeler gauge. After adjusting the tappets of number 1 cylinder, crank...

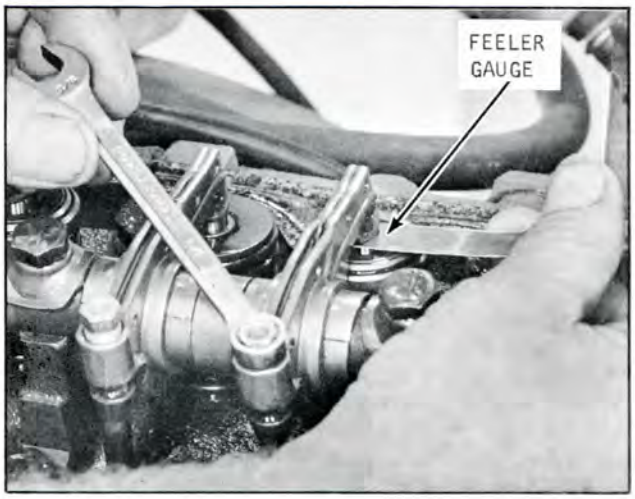


Plate 11144.

...the engine...clockwise two revolutions. The exhaust valve of number 2 cylinder should be fully (closed) up and the intake valve should be just starting to open, or starting its downward stroke. At this point both valves of number 5 will be fully closed ...check and if necessary, adjust these tappets. Now...

(A)

...again, crank engine two revolutions. The exhaust valve of number 4 cylinder should be up and the intake just starting down...both valves of number 3 cylinder will be fully open. Check and if necessary adjust the valve tappets of number 3 cylinder. Next...

(B)

...rotate engine two more revolutions...until the exhaust valve of number 1 cylinder is fully up...the intake valve just starting down. Check and if necessary, adjust the valves of number 6 cylinder. Again crank...

(C)

...the engine clockwise two revolutions. Number 5 cylinder exhaust valve should be up and the intake just starting to open. Check/adjust tappet clearances of the number 2 cylinder as described. Now...

(D)

...crank engine two more revolutions clockwise. The exhaust valve of number 2 cylinder should be fully closed and the intake valve should be just starting its downward travel...check the clearance between the exhaust and intake rocker arms and tappets...adjust if necessary.

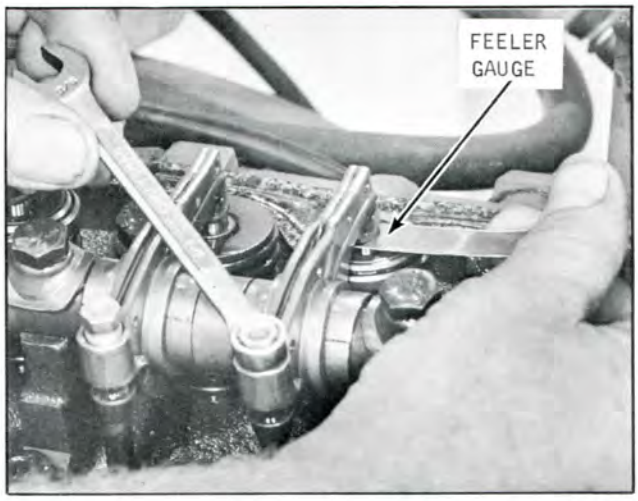


Plate 11144.

When clearances are all checked and adjusted, install the rocker arm cover. Finally...

(A)

...remove your tachometer, vacuum gauge, and timing light.

(B)

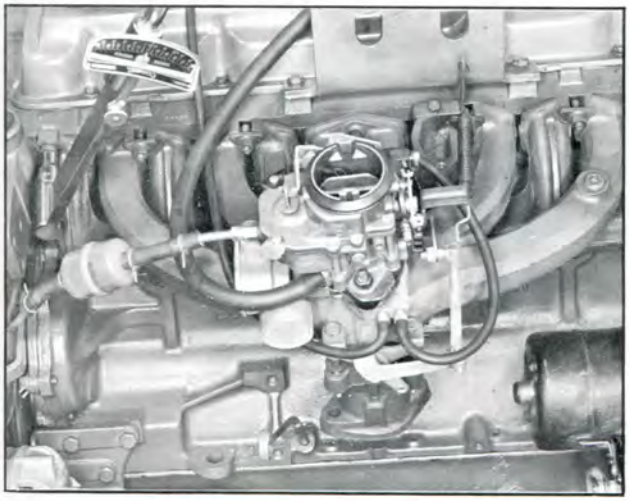


Plate 11145.

Check security of manifolds...torque requirements for both intake and exhaust manifolds... 10 pound feet.

Test action of the heat control valve. Start engine. .allow it to idle...accelerate momentarily to wide open throttle. The counterweight should respond by moving approximately 90 degrees or more (when cold) and return to its normal position. If no movement is observed, the shaft is frozen or the coil spring is weak or broken.

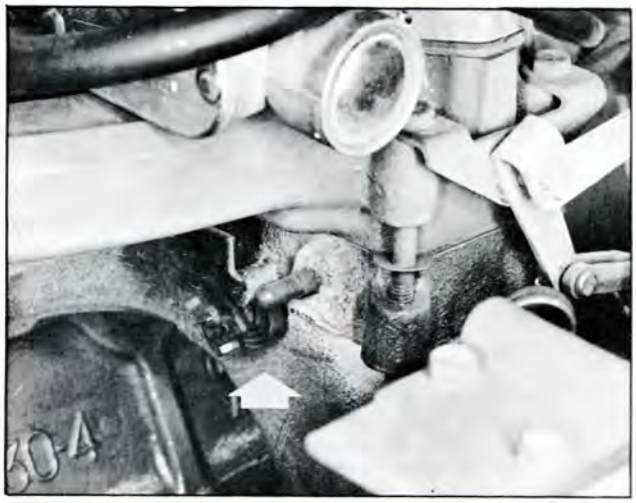


Plate 10828.

Move counterweight through its full travel until it is free to move by its own weight. To replace coil spring, loosen clamp bolt and remove counterweight, lock and stop as an assembly. Remove thermostat spring...turn shaft...

(A)

...to the right and install inner end of thermostatic spring to full depth in shaft slot with outer end toward engine. Wrap spring clockwise to tighten...hook it under stop pin. Locate counterweight assembly on shaft with the lock in shaft slot and the weight ...up toward engine. Press assembly on shaft until lock holds spring in bottom of slot...tighten clamp bolt to 50 inch-pounds.

(C)

If there is or has been any sign of engine overheating. .blow out the radiator...using a two-foot extension on the air hose. Blow, first, through the radiator from the counterweight side and...then from the engine side. Next...

(B)

...check to make sure the fan is installed properly and that its blades are not loose or damaged. Then check and, if necessary, adjust drive belts for proper tension which is 50 -to- 80 lbs for used belts... 80 -to- 120 lbs for new belts. If the tension is low, belts will slip...

(D)

...if it is high, bearing and seal damage can occur in the generator and water pump.

(A)

To use belt tension gauge... extend hook to extreme position by depressing handle all the way down. Make sure hook extends beyond legs of gauge. Next...slip belt between nose piece and hook...be sure the nose piece is centered over center of belt. Release handle with a rapid motion...a slow release...will result in a high reading because the small amount of internal friction will stop the hook from going all the way back. Read direct pounds tension opposite indicating point above dial.

(B)

New or used belt...a new belt for tension purposes is a belt with zero time. After a belt has been in operation for two minutes... it is considered used. As a rule of thumb, a new belt is set high by about 25% over the desired operating range to allow for stretch.

(C)

Pressure test the cooling system.

N O T E

If the pressure test reveals leaks, eliminate them.

(D)

Pressure test the radiator cap.

N O T E

All CLARK lift trucks have 7-pound pressure caps. Replace the cap if its pressure is not correct.

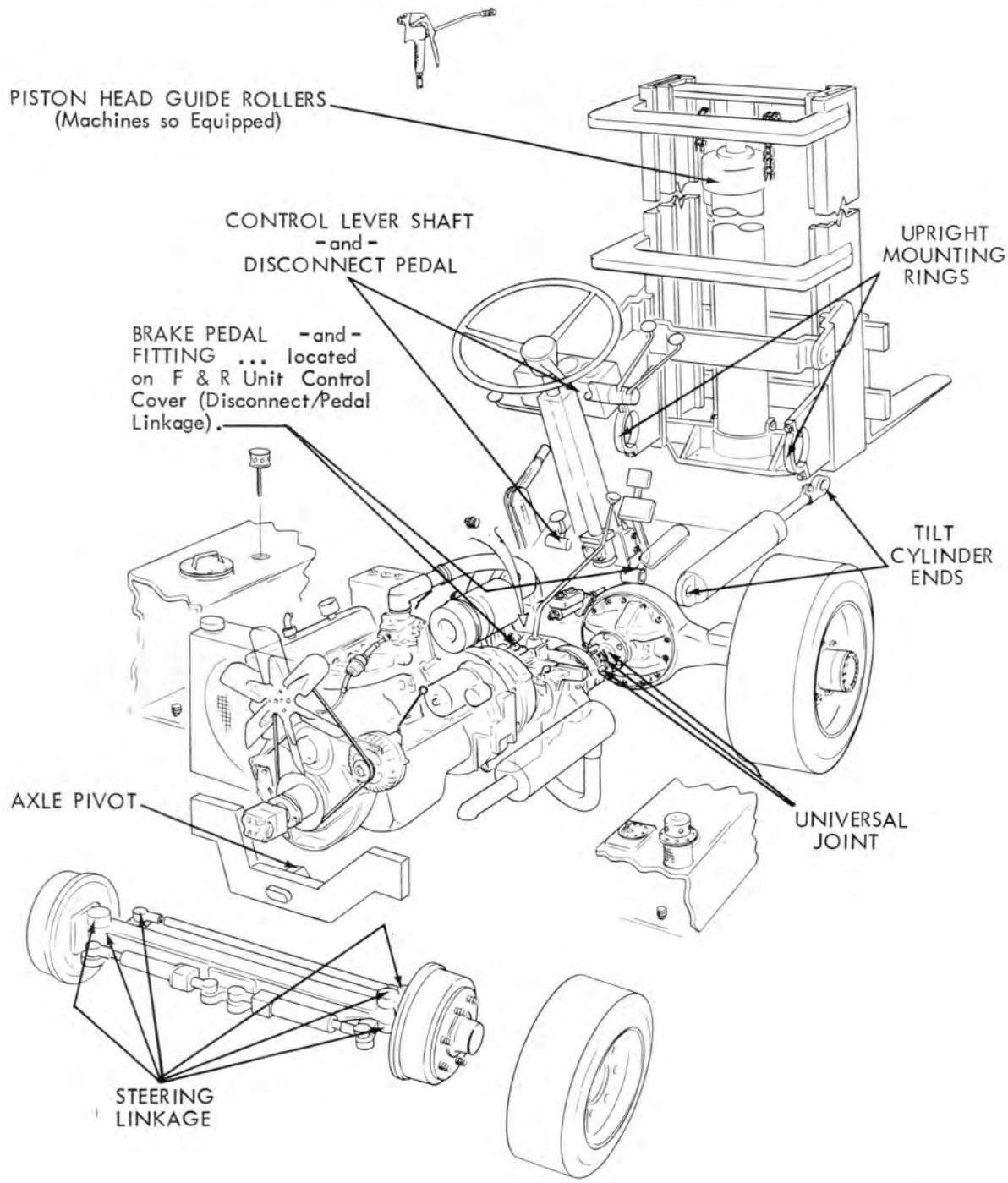
(E)

Service the crankcase breather, metering valve and lines...clean thoroughly and be sure they are properly installed.

(F)

EVERY 50 TO 250 OPERATING HOURS

WIPE FITTINGS CLEAN ... BEFORE APPLYING GREASE GUN



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CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

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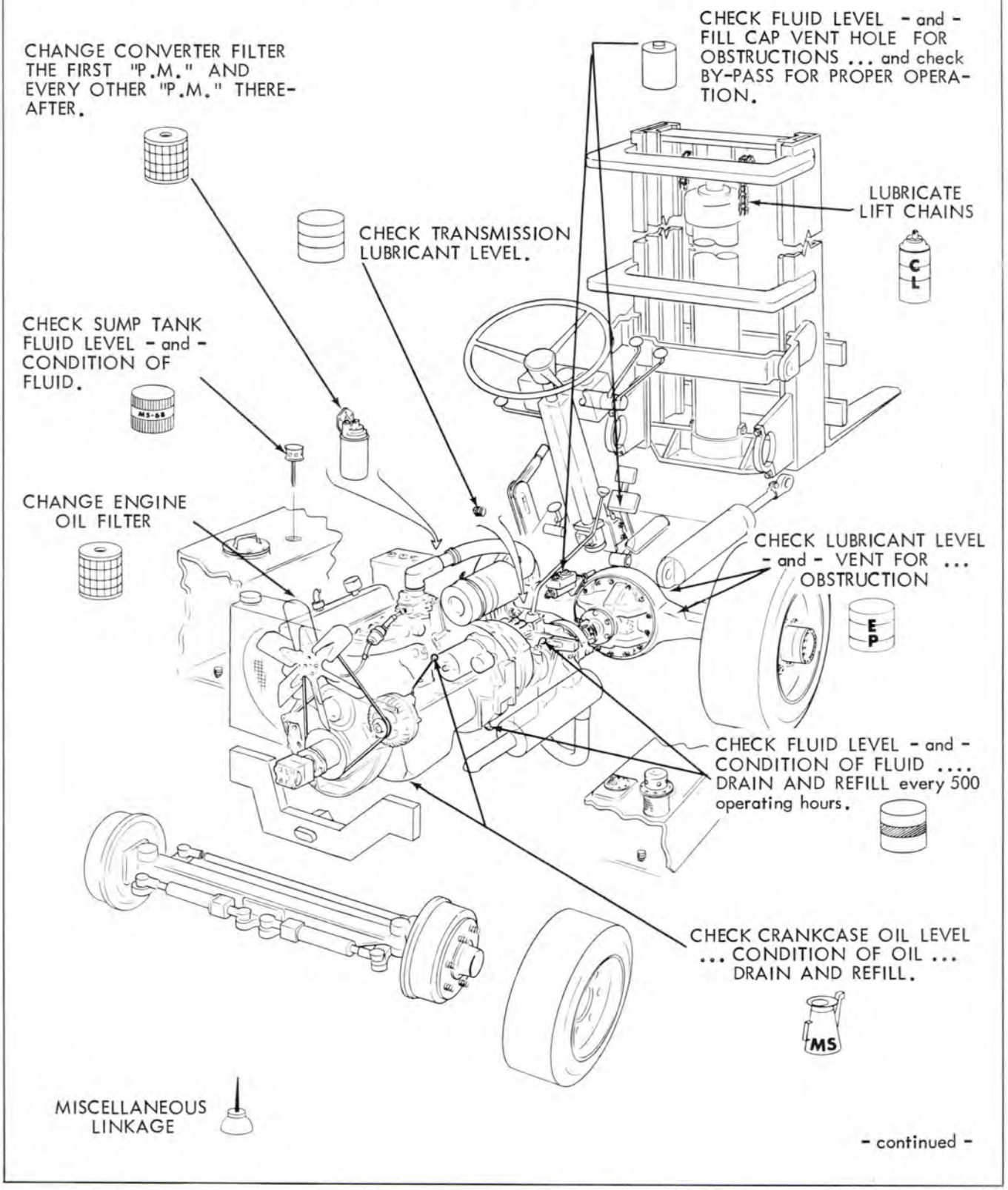
EVERY 50 TO 250 OPERATING HOURS



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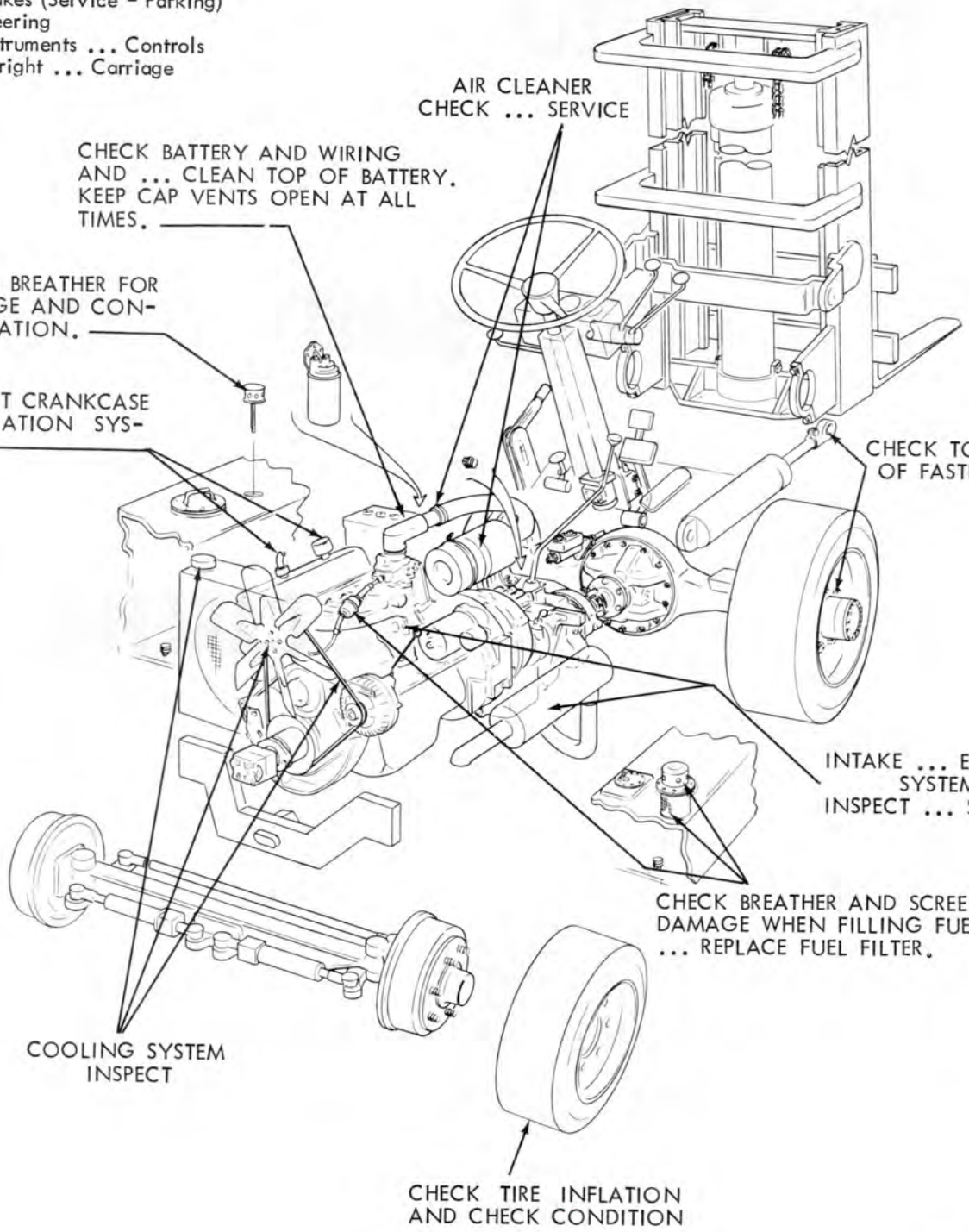
EVERY 50 TO 250 OPERATING HOURS

PERFORMANCE TESTS:

1. Stall (Engine - Transmission F & R)
2. Lift - Tilt Speeds
3. Brakes (Service - Parking)
4. Steering
5. Instruments ... Controls
6. Upright ... Carriage



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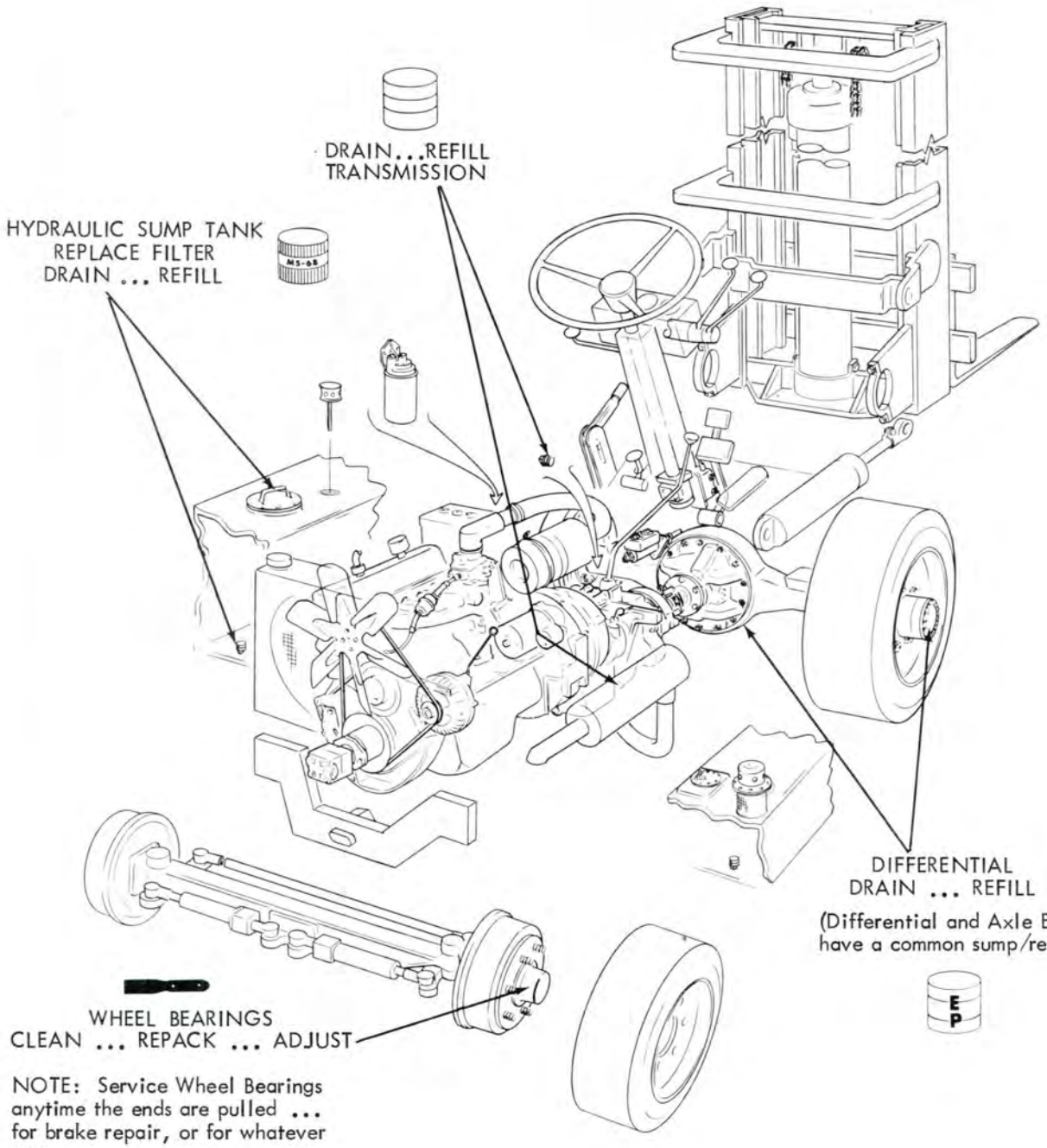
EVERY 2000 OPERATING HOURS OR ONCE A YEAR ... WHICHEVER COMES FIRST



NOTE: Service Wheel Bearings anytime the ends are pulled ... for brake repair, or for whatever reason.

- continued -

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INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(A) ENGINE CRANKCASE OIL

FOR ... GASOLINE, L.P. GAS ENGINES AND NATURALLY ASPIRATED DIESEL ENGINES.

SPECIFICATION TO MEET API Service Classification "CC" and "SC" per SAE Report J183 and/or MIL-L-2104B* Sulfated ash content 1.00% weight maximum. Zinc content 0.06 to 0.10% weight maximum.

This specification includes oils meeting Specification MIL-L-46152 when applicable. Also, API Service "SC"/"SD" (Formerly "MS") oils may be preferred under stop-and-go or light service conditions.

*Although Specification MIL-L-2104B has recently been superceded, oils of this quality will continue to be available.

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

Chevron RPM DELO Multi-Service Oil
Shell X-100 or Rotella, Rotella T
Sunfleet H.P. Motor Oil
ARCO Fleet X.H.D. Motor Oil
or ARCO Fleet H.D.
Gulflube Motor Oil X.H.D.
Citgo C300 Motor Oil
AMOCO 200 Motor Oil
Texaco Havoline
or URSA Extra Duty Motor Oil
Mobil Delvac 1100B
or 1200 Series Motor Oil
...or the equivalent to the above.

OILS FORMULATED FOR L.P.G. ENGINES

Cito L.P. Gas Engine Oil
Chevron Gas Engine Oil HDAX

(B) ENGINE CRANKCASE OIL (cont.)

FOR ... TURBOCHARGED DIESEL ENGINES or DIESEL ENGINES USING HIGH SULFUR CONTENT FUEL (OVER 0.5% SULFUR).

SPECIFICATION TO MEET API Service Classification "CD" per SAE Report J183 and equivalent Series 3 and/or MIL-L-45199B specifications. Also MIL-L-2104C when applicable. Sulfated ash content 1.65% maximum.

Chevron DELO Super 3 Oil
Shell Rimula Motor Oil
Sunfleet S-3 Motor Oil
ARCO Fleet MS-3 Motor Oil
Gulf Super Duty Motor Oil
AMOCO 300 Motor Oil
Citgo C-500 Motor Oil
Texaco URSA LA-3 Motor Oil
Mobil Delvac 1300 Series Motor Oil
...or the equivalent to the above.

FOR ALL OPERATIONS WITHIN NOMINAL TEMPERATURE RANGES, THE USE OF SINGLE-GRADED OILS IS RECOMMENDED...AS LISTED BELOW.

SAE 10W	...	0 deg -to- 32 deg F.
SAE 20/20W	...	33 deg -to- 75 deg F.
SAE 30	...	above 75 deg F.

SAE #30 OIL OF MIL-L-2104B PERFORMANCE LEVEL IS RECOMMENDED FOR YEAR AROUND USE IN DETROIT DIESEL ENGINES...(Limitations - Zinc . 0.10% maximum, sulfated ash 1.0% maximum.). The use of Multi-grade oils in Detroit Diesel engines is not recommended.

Oil Change Intervals ... a helpful guide in determing the intervals is an engine oil analysis made several different times. Local oil distributors offer this service. And by using it you can set P.M. intervals with greater certainty.

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INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(A/B) ENGINE CRANKCASE OIL

FOR ... MISCELLANEOUS LINKAGE

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

(C) TRANSMISSION LUBRICANT

FOR ... STANDARD MANUAL SHIFT (SYNCHROMESH) TRANSMISSIONS AND GEAR BOXES.

SPECIFICATION Regular type gear lubricant of straight mineral gear oil for API GL-1 Service per SAE Report J308a. ("EP" lubricants are not approved.)

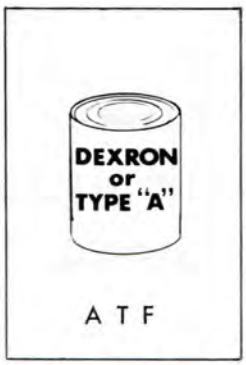
ABOVE 0 deg F. - SAE #90
BELOW 0 deg F. - SAE #80

Chevron RPM Gear Oil
Shell Dentax 90 Gear Oil
Sunoco Gear Oil
ARCO Mineral Gear Oil
Gulf Transmission Oil
AMOCO Gear Lubricant
Citgo Regular Gear Oil
Texaco Thuban 90
Mobilube C Gear Oil
Molub-Alloy Trans., Gear Lube
...or the equivalent to the above.

(D) TRANSMISSION FLUID

FOR ...
...POWRSHIFT FORWARD & REVERSE UNIT
...POWRWORKER HYDRAULIC SYSTEMS
...POWER STEERING RESERVOIRS
...POWRSHIFT TRANSMISSIONS
...HYDRACOOL (WET) CLUTCH TRANS.
...HYDRATORK TRANSMISSION
...AUTOMATIC TRANSMISSION
...FLUID COUPLING DRIVES
...TORQUE CONVERTERS
...ELECTRIC TRUCK DRIVE UNITS*
...(WHEN SPECIFIED ON LUBE CHARTS*)
...NARROW AISLE TRUCK HYDRAULIC SYS.

SPECIFICATION USE DEXRON AUTOMATIC TRANSMISSION FLUID or Type "A", Suffix "A" ATF (AQA-Armour Qualified) as available.



Shell Auto. Trans. Fluid Donax T-6, Dexron.
Sunoco Auto. Trans. Fluid, Dexron.
ARCO Auto. Trans. Fluid, Dexron.
Gulf Auto. Trans. Fluid, Dexron.
Mobil Auto. Trans. Fluid 220 Dexron.
Texaco 1859 Texamatic Fluid, Dexron.
Citgo Auto. Trans. Fluid, Dexron.
AMOCO Auto. Trans. Fluid, Dexron.
...or the equivalent to the above.

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LUBRICATION CHART KEY

(D) TRANS. FLUID - continued - DRIVE UNIT FLUID

FOR ... -COLD STORAGE OPERATION-

FOR ... DRIVE UNIT(S)
NARROW AISLE TRUCKS
POWRWORKERS
ELECTRIC RIDER TRUCKS

SPECIFICATIONS Refer to Specifications listed under Item "D" on the previous page.

COLD STORAGE

A T F

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

Refer to the previous page under Item "D".

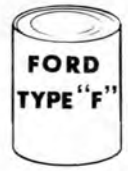
(E) TRANSMISSION FLUID - FORD

FOR ... ALL FORD AUTOMATIC TRANSMISSIONS AND CONVERTERS.

SPECIFICATIONS Automatic Trans., Fluid, Type "F", which meets FORD MOTOR COMPANY Specification:

M2C33E (UNDYED) -or-
M2C33F (RED DYED)

CAUTION



A T F

Shell Auto. Trans. Fluid Donax T-7, Type "F".
Sunoco Auto. Trans. Fluid, Type "F".
ARCO Auto. Trans. Fluid, Type "F".
Gulf Auto. Trans. Fluid, Type "F".
Citgo Auto. Trans. Fluid, Type "F".
Texaco 1876 Texamatic Fluid, Type "F".
Mobil Auto. Trans. Fluid 210, Type "F".
...or the equivalent to the above.

C A U T I O N

DEXRON AND TYPE "A" FLUIDS ARE NOT COMPATIBLE WITH TYPE "F" FLUIDS AND SHOULD NOT BE MIXED. DEXRON FLUID OR TYPE "A" FLUID SHOULD NOT BE USED IN THESE TRANSMISSIONS AND CONVERTERS ... (CTA "E" MODELS) ... TO DO SO WILL RUIN CLUTCH DISC FACINGS.

(F) HYDRAULIC BRAKE FLUID

FOR ... HYDRAULIC BRAKE SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON THE LUBRICATION CHART(S) AND NOT USED FOR COLD STORAGE.

SPECIFICATION Use only heavy-duty Hydraulic Brake Fluid which meets the requirements of SAE J1703b.

H B F

Shell Super Safety or Donax "B" Brake Fluid.
Gulf Super Heavy Duty Hydraulic Brake Fluid.
Atlas Heavy Duty Hydraulic Brake Fluid.
Texaco Super Heavy Duty Hydraulic Brake Fluid.
Mobil Hydraulic Brake Fluid.
ARCO Heavy Duty Brake Fluid.
Wagner 21B Hydraulic Brake Fluid.
Hollingshead 2665 Heavy Duty Brake Fluid.
...or the equivalent to the above.

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LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(F) HYDRAULIC BRAKE FLUID

FOR ... -COLD STORAGE OPERATION-

FOR ... ALL HYDRAULIC BRAKE SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON LUBRICATION CHART(S).

SPECIFICATION Use Fluid per CLARK Specification MS-92:

Recommended fluid: 85% by volume,
Isopropyl Alcohol: 15% by volume.

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

Extreme Low Temperature Hydraulic Brake Fluid:

Dow Chemical Company
(Pre-Blended
Clark Fluid Number 300)

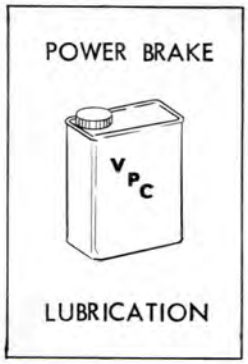
... Dow Chemical Fluid HD35-4
... Hollingshead Formula 2665

(G) POWER BRAKE VACUUM CYLINDER LUBRICANT

FOR ... BENDIX HYDROVAC UNIT

SPECIFICATION Bendix Vacuum Power Cylinder Oil or approved equivalent.

Apply after installation and periodic maintenance per instruction.



Bendix Vacuum Power Cyl Lubricant
Part No 377299(2 oz Tube)
Part No 377300(Quart Can)
Texaco Rabtex
AeroShell Fluid 4
...or the equivalent to the above.

(H) HYDRAULIC FLUID

FOR ... MAIN HYDRAULIC SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON THE LUBRICATION CHART(S).

SPECIFICATIONS Use only high quality hydraulic fluid with Zinc Anti-Wear Additive which meets Clark Specification MS-68.

Shell LO Hydrax 127
Sunvis Industrial Oil #816 WRP
Gulf Harmony 43 AW
AMOCO Industrial Oil RL #14A
Citgo Pacemaker XD-15 MS-68
Hydraulic Fluid.
Texaco 729 Rando Oil HD-A
ARCO Duro AW-16 or Duro AWS-150
Chevron EP Hydraulic Oil 9
Molub-Alloy Industrial Hydraulic
Oil #601.
...or the equivalent to the above.

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LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(H) -continued-

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

HYDRAULIC FLUID

FOR ... -COLD STORAGE OPERATION-

FOR ... MAIN HYDRAULIC SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON THE LUBRICATION CHART(S).

SPECIFICATIONS Use Hydraulic Fluid which meets MIL-H-5606A per CLARK Specification MS-226.

A petroleum base hydraulic fluid with additives to improve viscosity index, oxidation resistance, and anti-wear characteristics blended to form a stable product under storage and operational conditions between -65 and +160 deg. F. meeting MIL-H-5606A* per CLARK Specifications MS-226.

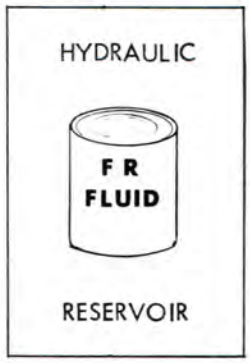
*The restrictive cleanliness specifications of later revisions is not required.

Shell Product #60421
AeroShell Hydraulic Fluid 4
...or the equivalent to the above.

HYDRAULIC FIRE RESISTANT FLUID

FOR ... SPECIAL APPLICATIONS

FOR ... MAIN HYDRAULIC SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON THE LUBRICATION CHART(S).



SPECIFICATIONS High quality Water-Glycol Fire Resistant Hydraulic Fluid composed of approximately 42% water and 58% glycol with a nominal viscosity of 200 SUS at 100F. Pour point -60 deg. F min. To contain proper additive balance to impart optimum stability, lubricity, wear and corrosion protection. Approved by Factory Mutual Insurance Underwriters.

Citgo Pacemaker Glycol - FR Fluid, Grade 20.
Houghto-Safe 620
Texaco Hydraulic Safety Fluid 200
...or the equivalent to the above.

NOTE

For data pertaining to the "testing" of Water-Glycol ... refer to the last page of this KEY.

CLARK EQUIPMENT

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INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(J) DRIVE AXLE GEAR LUBRICANT:

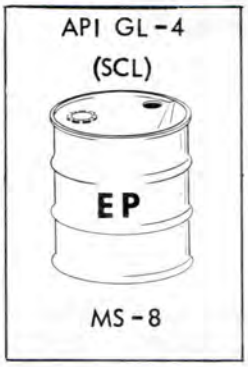
FOR: ... DRIVE AXLES,
HEAVY DUTY DIFFERENTIALS,
PLANETARY WHEEL ENDS.

SPECIFICATIONS: Extreme pressure type gear lubricant with sulfur-chlorine-lead (SCL) 'EP' additive for API GL-4 Service per SAE Report J308a. To meet CLARK Specification MS-8.

Below 0 to -10 de F -- SAE 80
Normal Temperature -- SAE 90
100 deg F and above -- SAE 140

NOTE

SAE 80 and SAE 140 viscosities, when used, should contain like additives as specified by MS-8 (SAE 90). DO NOT ADD (MIX) DIFFERENT TYPES OF LUBRICANT.



TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

Shell HDR Gear Oil 90 EP
Shell HDR Gear Oil 140 EP
Chevron RPM Special Gear Lube SCL
Sunoco XD Gear Lubricant
Gulf Hypoid Gear Lubricant A.P.T.
AMOCO Superla Gear Lubricant
Citgo Gear Oil Lead Base
Texaco Gear Lube HD 90
Molub-Alloy Drive Axle Lube #518
Mobilube 46
ELCO Gear Safety 28
...or the equivalent to the above.

(K) GENERAL PURPOSE GREASE:

FOR: ... CLARK AXLE ENDS
WHEEL BEARINGS
STEERING GEARS
JOINTS, LEVERS & BUSHINGS
POWRWORKER and NARROW AISLE TRUCKS - ALL POINTS

SPECIFICATIONS: NLGI #1 per MS-107B

GENERAL PURPOSE GREASE:

FOR: ... STEER AXLE TRUNNION BRGS.
UPRIGHT MAST ROLLERS & SLIDES.
UNIVERSAL JOINTS.
WATER PUMP BEARINGS.
GENERAL CHASSIS LUBRICATION.

SPECIFICATIONS: NLGI #2 per MS-107C

A multi-purpose grease of refined mineral oil blended with a lithium soap thickener or equal containing anti-wear, anti-rust and anti-oxidants with EP additives.

Clark Specification:
MS-107B - Grade No. 1
MS-107C - Grade No. 2

Shell Alvania EP Grease #1 or #2
Sun Prestige 741 EP #1 or #2
Gulfcrown Grease EP #1 or #2
AMOLITH GREASE EP #1 or #2
Citgo HEP Grease #1 or #2 or Citgo AP Grease.
Texaco Multifak EP #1 or Marfak ALL Purpose #2.
Molub-Alloy General Purpose Grease #1 or #2.
ARCO Litholine Ind. Grease #2 EP or Litholine EP #2 Grease.
Mobilgrease 76 or 77
...or the equivalent to the above.

REFER TO THE ABOVE FOR RECOMMENDED SUPPLIERS.

ADDITIONAL RECOMMENDATIONS

*Chevron BRB-2
*Shell AeroShell Grease 5

*Recommended for Water Pumps and Universal Joints.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

COOLING SYSTEM:

Pressure Cap:

‡ ‡ ‡ W A R N I N G ‡ ‡ ‡

USE EXTREME CARE IN REMOVING THE RADIATOR PRESSURE CAP. IN PRESSURE SYSTEMS...THE SUDDEN RELEASE OF PRESSURE CAN CAUSE A STEAM FLASH AND THE FLASH, OR THE LOOSENED CAP CAN CAUSE SERIOUS PERSONAL INJURY. LOOSEN CAP SLOWLY AND ALLOW STEAM TO ESCAPE...PLACE A RAG OVER THE CAP AND...THEN LOOSEN CAP.

‡ ‡ ‡ ‡ ‡ ‡

1. Inspect pressure cap gasket and 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.

2. Inspect pressure cap for freedom of operation. 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...7 pound cap.

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 pass thru 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 allows oxygen into the system which is a major factor in corrosion.

N O T E

Exhaust gas leakage between cylinder head and gasket also results in corrosion. If exhaust gas discharges into coolant...the coolant and the gas combine to form a variety of acids.

Plate 6458.

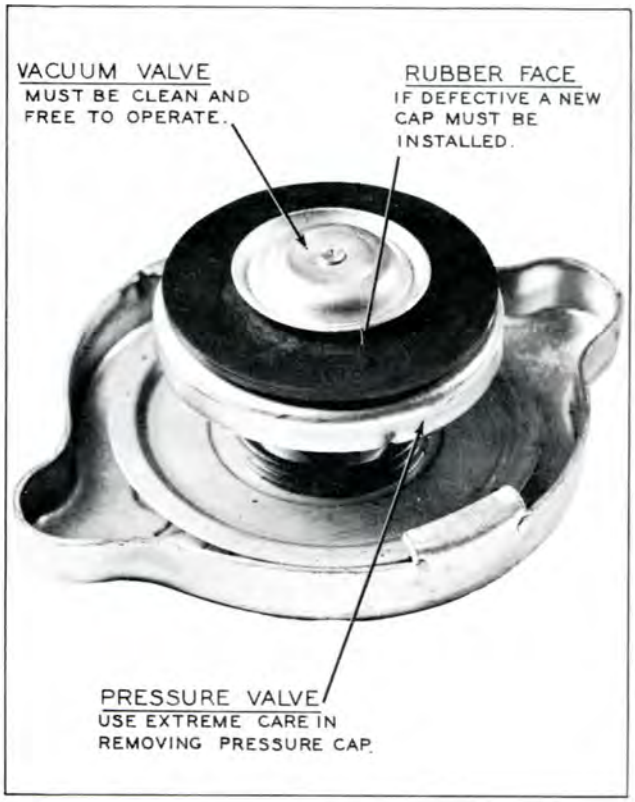


Plate 6459.

Important: torque cylinder head stud nuts to specifications. Flush system with a washing soda solution, then...drain system.

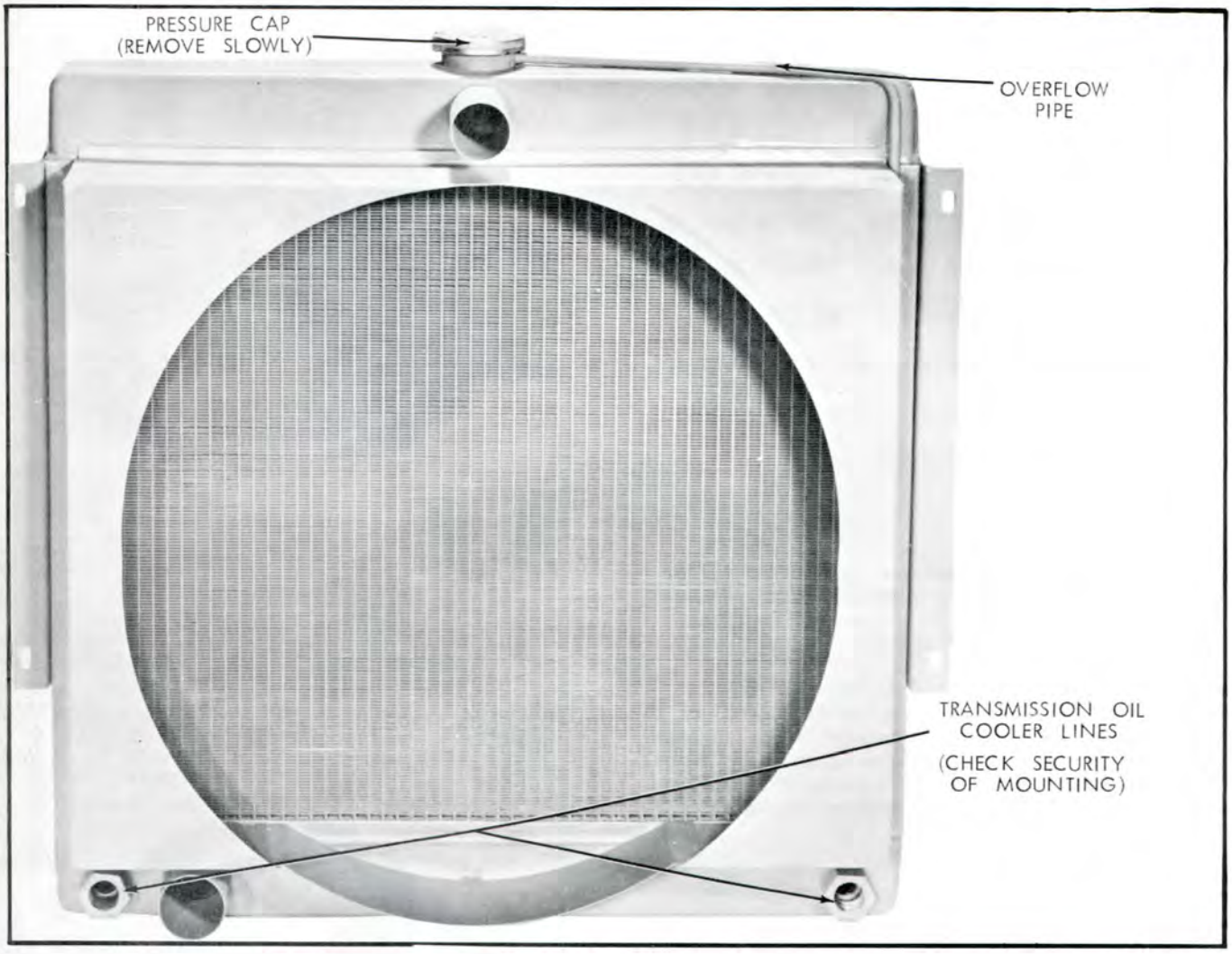


Plate 6460

2. Replace half of volume with fresh water.

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.

C A U T I O N

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 THE ENGINE RUNNING WHILE ADDING WATER...COOLANT.

DRIVE BELT REPLACEMENT

N O T E

To allow room for belt replacement you must loosen the hydraulic pump bracket and pull pump shaft splines free of an adaptor that is mounted to the crankshaft pulley. First...

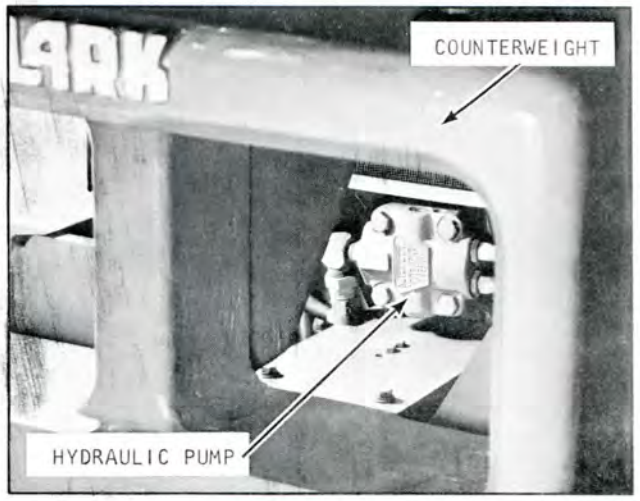


Plate 11160

...this is how the pump appears when assembled to bracket and pulley adaptor. Note arrow pointing to the hose connections of suction line. There is another connection just above the steer axle on the left hand side of the vehicle...accessible from underneath truck.

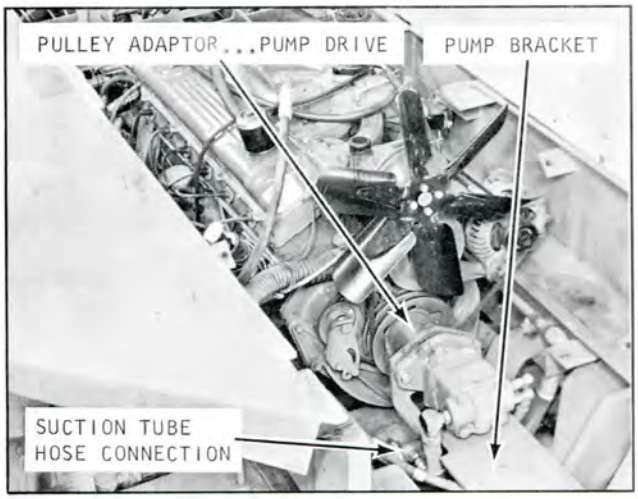


Plate 11161

Here is how the pump appears when pulled free of pulley adaptor and bracket for pump removal. Now...

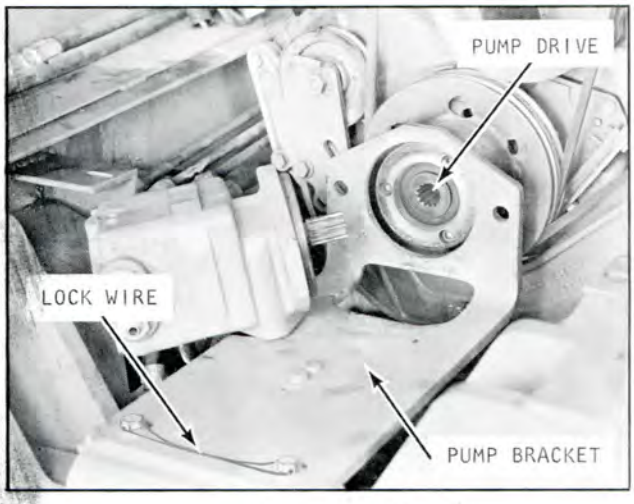


Plate 11162

...cut the lock wire (A) securing bracket to frame bolts. Loosen these bolts. Next...

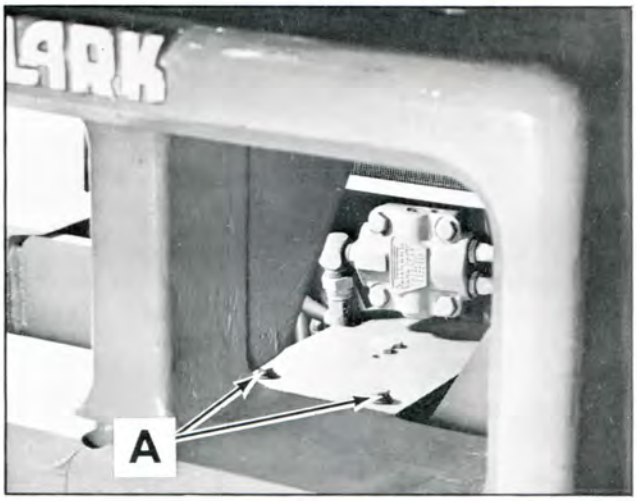


Plate 11164.

...loosen the two hose bracket bolts (B) that retain...

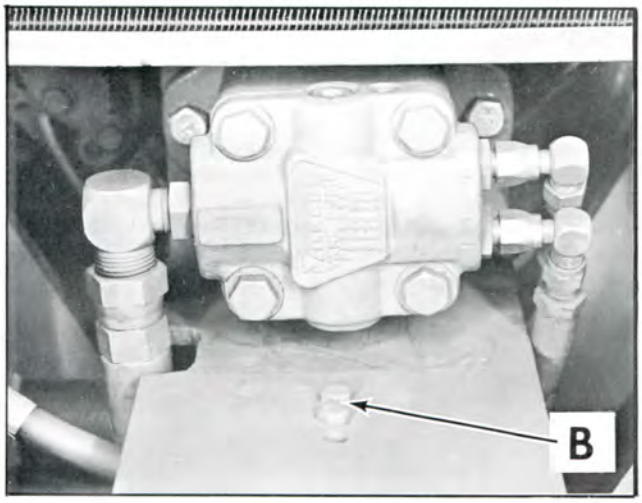


Plate 11165.

...hydraulic hose/s to bottom of pump bracket. It is not necessary to remove bracket. Now...

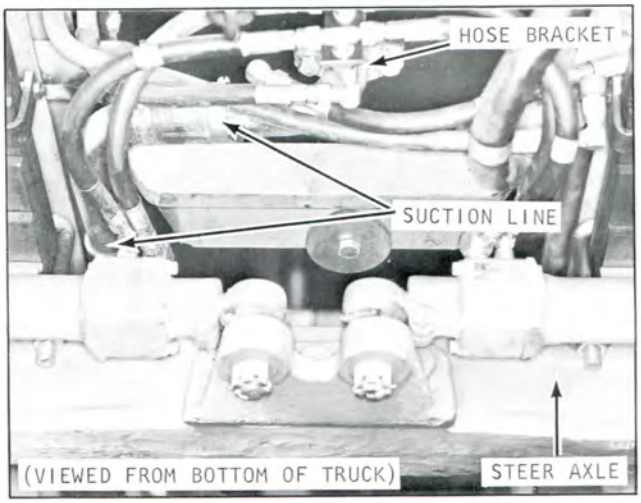


Plate 11166.

...you must loosen hose clamps at both ends of the pump suction tube and...carefully pull the suction tube (rearward) partially free of hose connections... DO NOT PULL TUBE ALL THE WAY OUT of hose connection/s. Next...

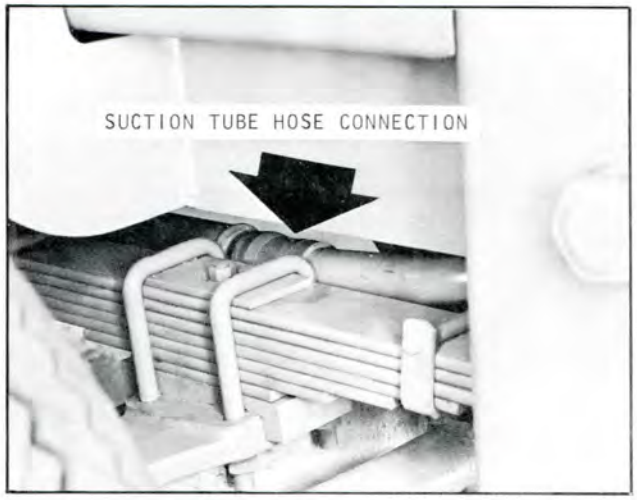


Plate 11167.

...loosen belt adjustor/s freeing belts of pulleys and then...

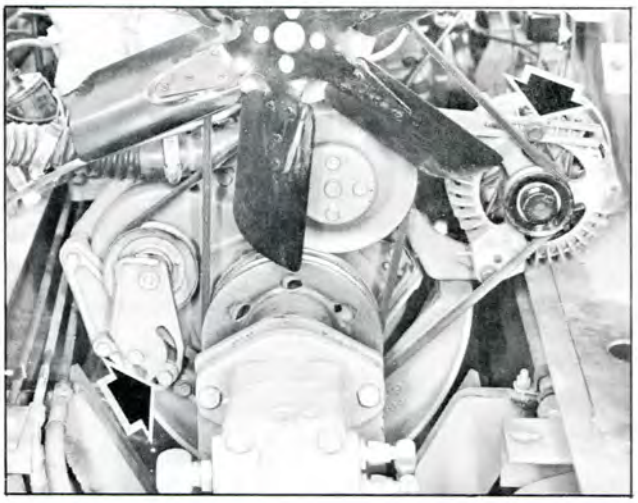


Plate 11168.

...drop belts...pull rearward on pump/bracket until shaft is moved far enough from adaptor to clear belts for removal.

I M P O R T A N T

If you remove the pump bracket mounting bolts ...be sure to note the number of shims beneath the bracket. The same number of shims must be used when placing pump back into position or pump alignment will be off.

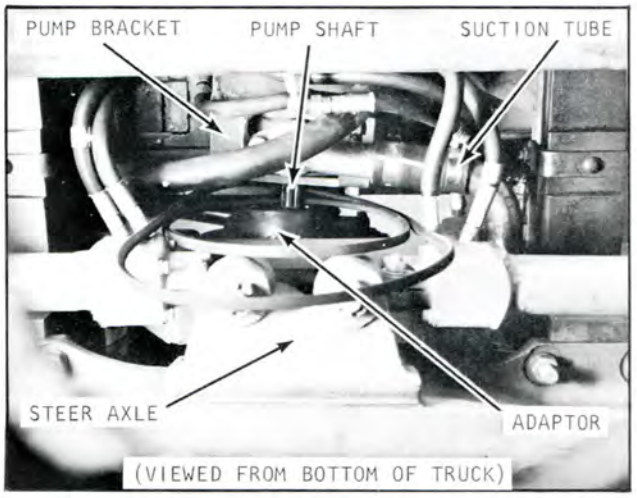


Plate 11169.

Install new belts. Then lubricate shaft splines with SAE #20 engine oil and shove pump/bracket as far forward as possible...engaging pump splines with those of the drive adaptor...while doing this...

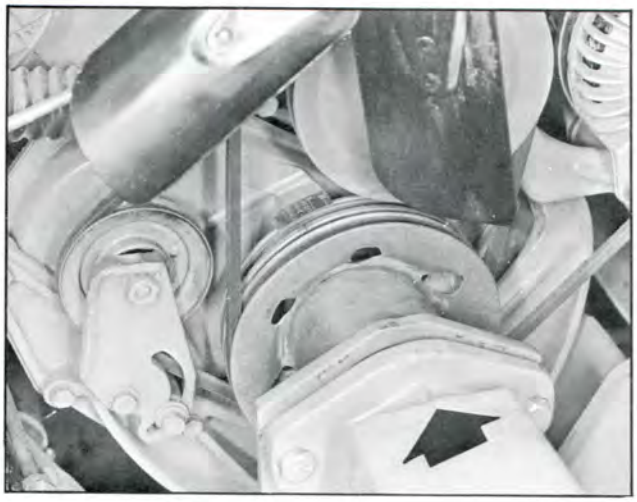


Plate 11170.

...inch the suction tube back into hose connections.

After the pump is fully engaged with the drive adaptor...tighten pump bracket mounting bolts and secure with lock wire.

Then...tighten suction tube hose connections.

Next...place hose bracket in position beneath pump bracket and tighten retainer (B).

Now...check hydraulic hose connections to be sure they are secure so that no leakage will occur.

Adjust drive belts to proper tension...refer to belt adjustment procedures in Appendix 1.

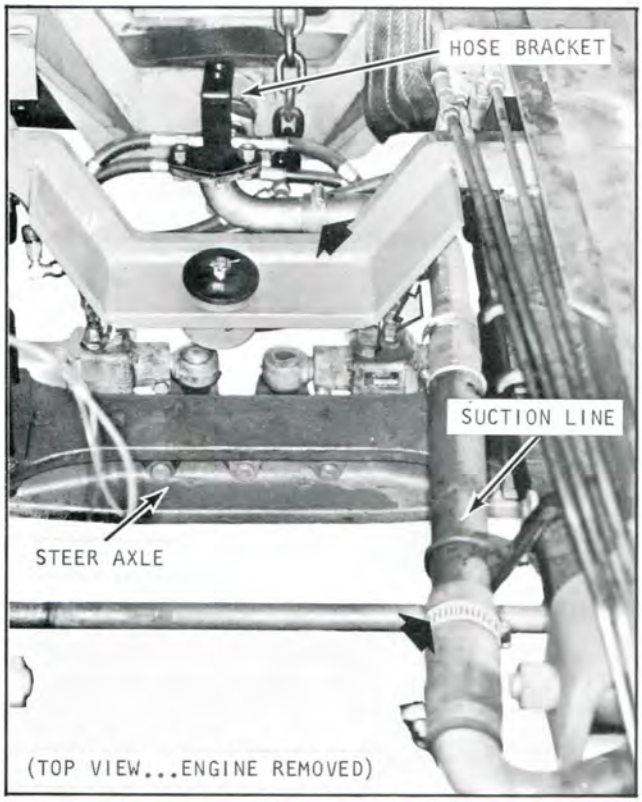


Plate 11171.

APPENDIX " 2 "

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

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WHEN ORDERING PARTS

Rev OCT 73 1127-Z

ENGINE/FORWARD AND REVERSE UNIT STALL AND F & R UNIT PRESSURE CHECKS

Minimum Tools Required

1 - Pressure Gauge
0 to 250 PSI

1 - Tachometer

Hand Tools

Open End Wrench

Allen Head Wrench

STEP 1:

Before making transmission checks, the truck should be:

Steam cleaned...it is important that the radiator be clean externally and internally so that it is capable of maintaining proper cooling for the engine and F & R unit.

Cooling system maintenance is found in Appendix 1.

STEP 2:

Check and make sure the brake system is properly bled, service brakes adjusted, pedal free travel correct and parking brake adjusted to specifications.

STEP 3:

Run vehicle until F & R unit operating temperature has been reached...this is important. The forward and reverse unit fluid temperature should be 200 degrees F., to obtain accurate readings and...the plumbing and converter must be fully charged.

STEP 4:

Check converter fluid level...while occupying the driver's seat...

1. Block drive wheels.
2. Get into driver's seat.
3. Apply parking brake.
4. Start engine.
5. Place transmission selector in 4th gear.
6. Shift into forward...engine at idle (600 rpm).
7. Pull dipstick...fluid level should be at the full mark.
8. If level is low...fill to full mark indicated on dipstick with Type "A" or DEXRON Automatic Transmission Fluid. Clark Part No. 879803.

STEP 5:

Make sure the engine is properly tuned. Engine Tune-Up is found in Appendix 1.

Now, check engine for governed speed at full throttle. Then check engine speed with partial load. To do this...

...connect a tachometer to the engine. Start engine and fully accelerate...the unloaded engine RPM should be set at 2600. Now...

...with engine at full throttle, move tilt lever to full forward position and hold. Engine rpm should register about 2100. Avoid holding the tilt lever longer than what is required to obtain reading. Release lever and accelerator.

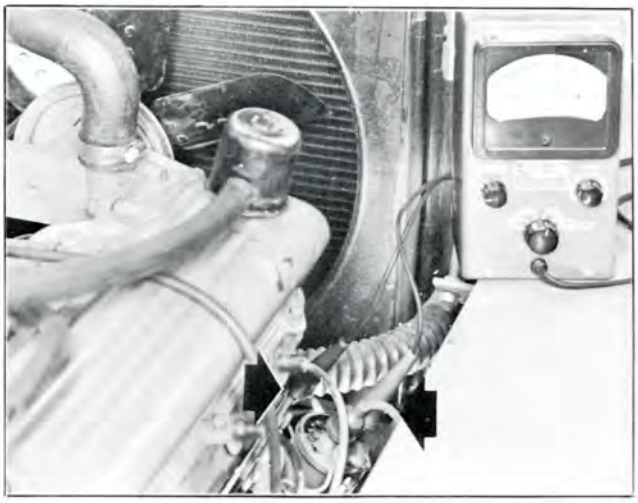


Plate 10821.

Next...set parking brake, shift into gear, and slowly rev up engine to make sure the parking brake holds...if it does not...it should be adjusted or repaired at once.

Now...with forks containing a capacity load, parking brake set, and truck against a solid wall...stall test in forward and reverse. Accelerate to full throttle...observe tachometer readings...revving up only long enough to obtain these readings. Normal stall is: 1750 RPM.

C A U T I O N

Prolonged stalling can cause internal damage to the converter...stall only long enough to attain the peak rpm reading...maximum 30 seconds.

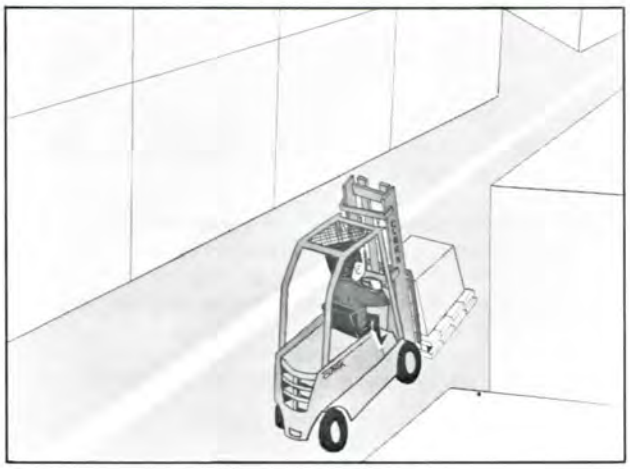


Plate 10729.

Low engine rpm indicates either loss of engine power or, converter malfunction.

High engine stall rpm is anything above 1750 rpm...either slippage of a clutch or low oil pressure is indicated.

N O T E

Any stall reading other than normal should be reported to designated person in authority.

STEP 6: N O T E

When a transmission malfunction is encountered, the following general procedure will aid in isolating the failure. Once again...

A. Be certain the proper operating temperature is attained...200 degrees F. Operate vehicle long enough to be assured that this temperature has been reached.

B. Check oil level as outlined in STEP 4...add as required.

Next...

C. Check external linkage connections to the selector valve and control valve.

D. Mount pressure gauges at appropriate locations and check for absence or the presence of proper operating pressures.

Now...refer to the outline below.

Main pressure should read 100 to 140 psi with 200 degree oil and engine operating at 1000 rpm.

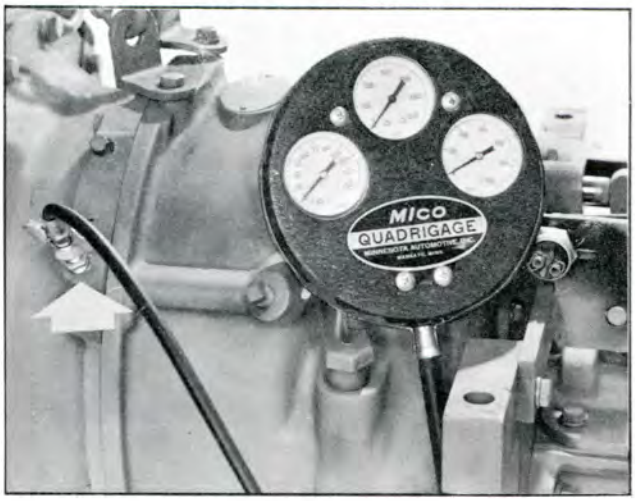


Plate 10873.

Converter out (or charging) pressure should read 55 to 80 psi with 200 degree oil and engine operating at 1000 rpm.

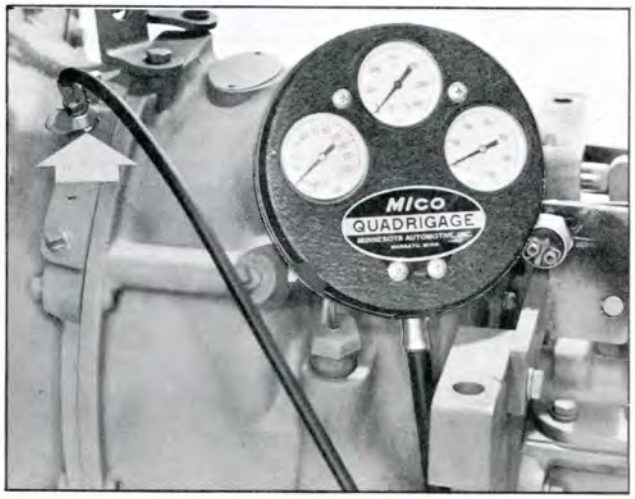


Plate 10874

Lube pressure to clutch assemblies should read 12 to 30 psi with 200 degree oil and engine operating at 100 rpm.

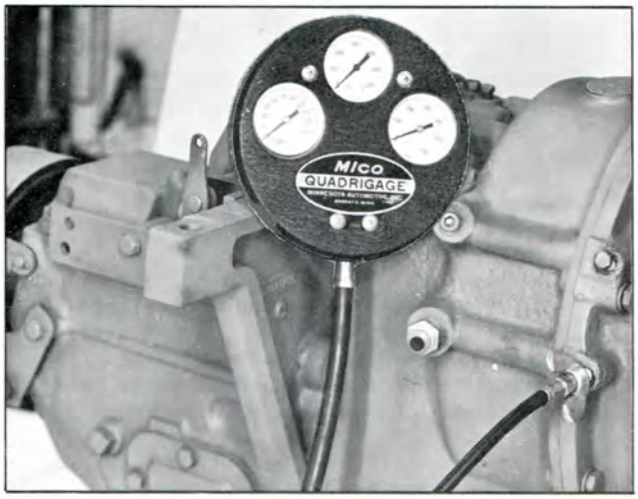


Plate 10875.

Reverse clutch pressure should read 100 to 140 psi with 200 degree oil and engine operating at 1000 rpm.

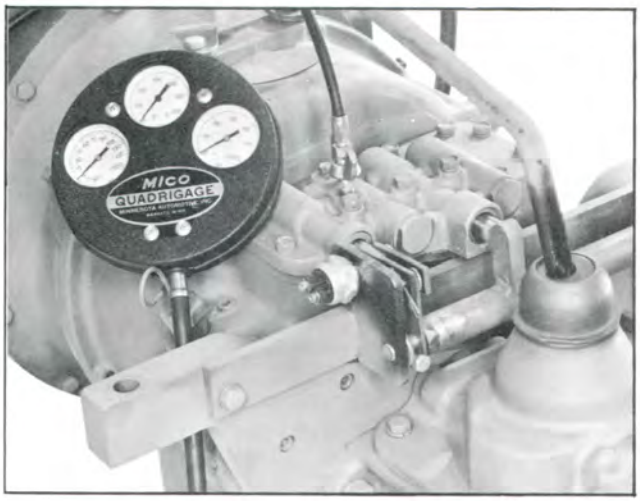


Plate 10876.

Forward clutch pressure should read 100 to 140 psi with 200 degree oil and engine operating at 1000 rpm.

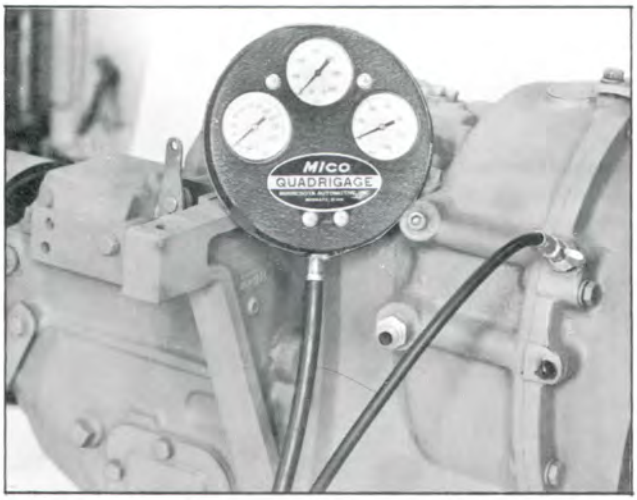


Plate 10877.

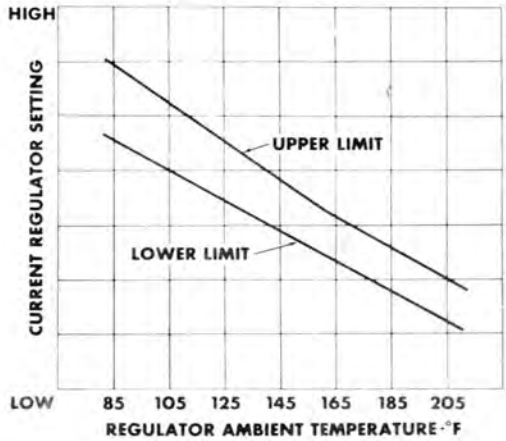
REGULATOR AMBIENT TEMPERATURE DEGREES FAHRENHEIT	TYPICAL 6-VOLT "A" & "B" CIRCUIT REGULATOR "NORMAL RANGE" (VOLTS)	TYPICAL 12-VOLT "A" & "B" CIRCUIT REGULATOR "NORMAL RANGE" (VOLTS)	TYPICAL 12-VOLT "DOUBLE CONTACT" REGULATOR "NORMAL RANGE" (VOLTS)
165	6.6-7.1	13.2 -14.2	13.5-14.4
155	6.7-7.2	13.35-14.35	
145	6.7-7.2	13.5 -14.5	13.7-14.5
135	6.8-7.3	13.65-14.65	
125	6.9-7.4	13.8 -14.8	13.8-14.7
115	7.0-7.5	13.95-14.95	
105	7.0-7.5	14.1 -15.1	14.0-14.9
95	7.1-7.6	14.25-15.25	
85	7.1-7.6	14.3 -15.3	14.1-15.1
75	7.2-7.7	14.45-15.45	
65	7.3-7.8	14.6 -15.6	14.2-15.3
55	7.4-7.9	14.75-15.75	
45	7.4-7.9	14.9 -15.9	14.4-15.5
35	7.5-8.0	15.05-16.05	
25	7.6-8.1	15.2 -16.2	14.5-15.7

Figure 2

Typical Regulator "Normal Range" Setting at 125° F (Ambient):
6-Volt "A" and "B" Circuit Regulator ..... 6.9- 7.4 volts
12-Volt "A" and "B" Circuit Regulator ..... 13.8-14.8 volts

TYPICAL TEMPERATURE-COMPENSATED CURRENT REGULATOR

Figure 3



VOLTAGE AND CURRENT VARIATION DUE TO BATTERY CHARACTERISTICS AND REGULATOR TEMPERATURE

Adjusting Voltage:

Voltage regulator specifications are given as a "Normal Range" and are based on the regulator operating in an ambient temperature of 125 degrees F. Ambient temperature is the temperature of the air surrounding the regulator and is measured by a thermometer approximately 1/4 of an inch from the regulator cover. After the regulator has reached a stabilized operating temperature (this occurs after 15 minutes of continual voltage regulator operation) and the ambient regulator temperature is known, the "Normal Range" setting for the voltage regulator can be taken from the above table.

The desirable voltage regulator setting is that which will keep the battery in a charged condition without excessive use of water. Normal water usage should not exceed one ounce of water per cell per 40 hours of service. If the water usage is too great or if the battery is consistently undercharged, the voltage regulator setting may need to be tailored, as follows, to correct these conditions.

1. If battery uses too much water at normal setting, reduce voltage setting 0.1 or 0.2 of a volt and check for improved condition over a reasonable service period. Repeat until battery remains charged with a minimum use of water. It rarely will be necessary to go below 13.8 volts on a 12-volt system or 6.9 volts on a 6-volt system @ 125 degrees F.

2. If battery is consistently undercharged at normal setting, increase the voltage setting... ...0.1 of a volt and check for improved condition over a reasonable service period. Repeat until the battery remains charged with a minimum use of water. It rarely will be necessary to increase the voltage above 14.8 on a 12-volt system or 7.5 volts on a 6-volt system @ 125 degrees F.

N O T E

On applications where no battery history is available any voltage regulator setting found within the normal range may be considered satisfactory unless local conditions or subsequent battery performance indicate the need for tailoring the voltage regulator setting.

Adjusting Current:

The effect of temperature is important and should be considered when setting and adjusting the current regulator units of those regulators having temperature compensation.

The current regulator specifications are published in a table in the Delco-Remy Specification Booklets, DR-324S and DR-324S-1. These booklets list the current regulator's "Allowable Limits" at various regulator ambient temperatures.

Regulator ambient temperature is that temperature of the air surrounding the regulator approximately 1/4 of an inch from the regulator cover. The current regulator must be brought to operating temperature before measuring the regulator ambient temperature. This is accom-

plished by operating the current regulator for at least 15 minutes with the regulator cover in place. The effect of regulator ambient temperature on the current regulator setting is shown in Figure 3. This is a typical curve illustrating how the current regulator limits vary with temperature.

APPENDIX " 3 "

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

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WHEN ORDERING PARTS

Rev OCT 73 1127-Z

BLEEDING BRAKE SYSTEM

Trucks Equipped With Tow Brakes

N O T E

The brake system is designed so that the forward surge of the lift truck activates or applies the (IT) brakes. The braking action is in exact proportion to the deacceleration of the towing vehicle. The (IT) brake system, however, is self-contained with no limiting connection to the towing vehicle.

The brake line of the tow brake (mounted on the towing bar/hitch) is connected to the (IT) brake system at a shuttle valve mounted by the converter just underneath the floor plate on the L.H. side of vehicle. This valve allows fluid from the tow brake to apply the (IT) service brakes. The brake line from the service brake master cylinder connects to this same valve. Upon applying the service brake pedal...the valve directs brake fluid to the service brakes only... it cannot flow thru the line to the tow brake cylinder. The diagram on Page 2-3 illustrates the complete system.

Pressure Bleeding System

If the vehicle is equipped with a tow brake...it is recommended that the system be pressure bled. If equipment is not available for pressure bleeding, refer to "manual bleeding" procedures on the following page.

First, clean dirt from around the cap of the tow brake cylinder...remove cap. Next...follow Steps 1 through 8 listed in the procedures for bleeding the service brakes, turn the page. Then...

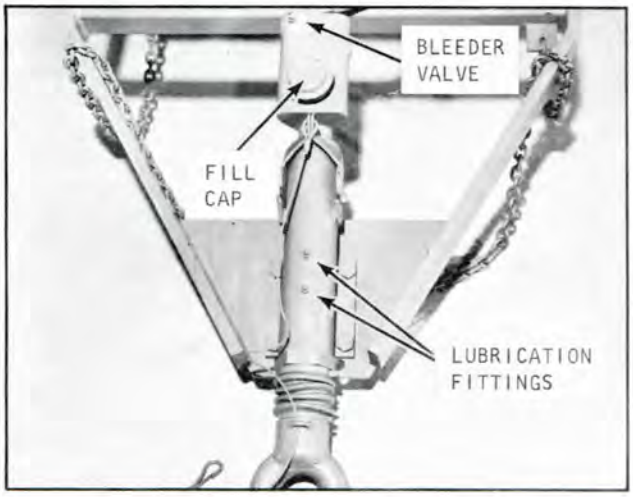

Plate 10865.

...bleed fluid at bleeder valve located on top of the tow brake cylinder (see below). Then bleed wheel cylinders as outlined in Steps 9 thru 13. When finished...do not shut off or disconnect the bleeder unit, but keep the system under pressure and bleed the system at the shuttle valve. You do this by depressing brake pedal and cracking the fitting of the cylinder line at the shuttle valve (Plate 10864, located Page 2-3)...tighten the fitting before pedal down stroke ends. Repeat procedure until line is free of air. Then follow steps 14, 15 and **16.** Now siphon out excess fluid in the tow brake cylinder...fluid level to be 1/4 of an inch from the top. Replace cylinder cap and tighten.

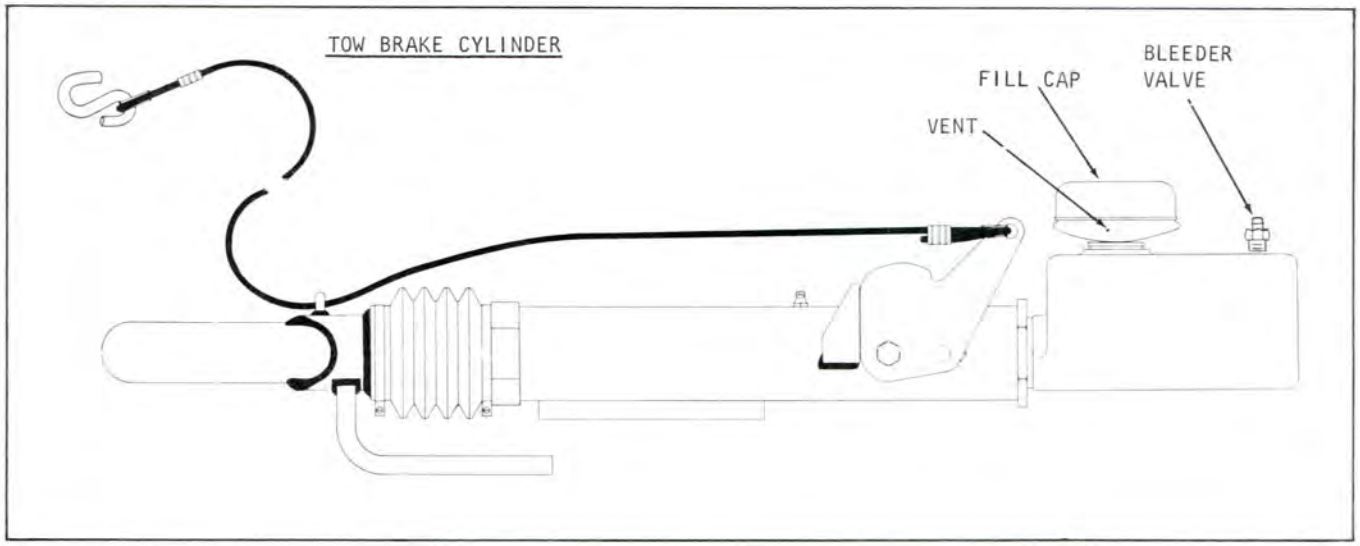

Plate 10867.

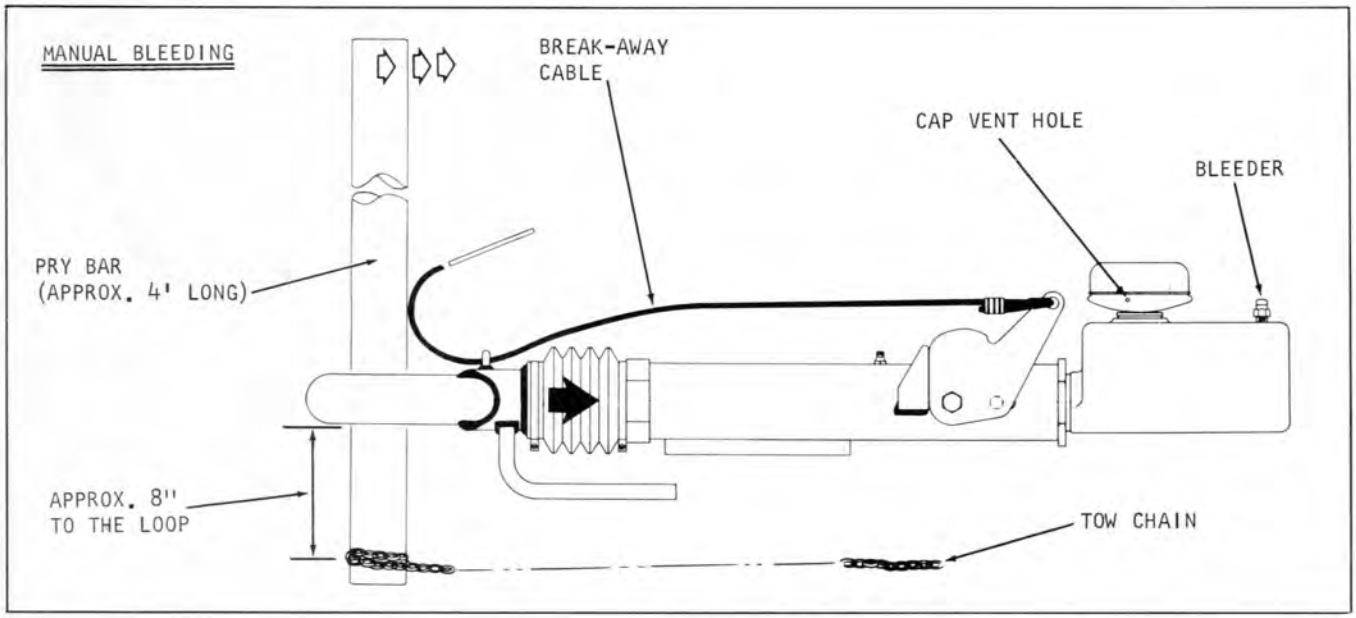

Plate 10866.

Manual Bleeding

Bleed the tow brake cylinder...using a pry bar about four (4) feet long. Place the bar into the eye of the tow bar/hitch with lower end of pry bar sticking far enough through the eye to wrap or loop one of the tow chains around the bar...approximately eight (8") inches down from the eye. (Refer to illustration above.) Now... beginning at the rear of the tow brake cylinder, remove hex head pipe plug indicated by arrow on actuator nameplate, and allow fluid to fill the chamber completely. Replace and tighten pipe plug.

Next, bleed the wheel cylinders by following Steps 1 thru 5 and Steps 7 thru 14...see opposite page.

Then...go back and again bleed the wheel cylinders using the service brake pedal. The line between the master cylinder and the shuttle valve will still have air trapped as there is no way for the tow brake cylinder to clear this line.

When bleeding is complete, loosen bleeder screw on top-rear side of master cylinder to check that no air is trapped in the cylinder accumulator... use pry bar and bleed fluid at this point... until fluid is free of bubbles. Then tighten bleeder screw.

Check both cylinder reservoirs and make sure fluid is within 1/4 of an inch from the top.

Check vent hole in both caps...make sure they are not clogged...replace caps and tighten securely.

I M P O R T A N T

1. Be careful not to pump the cylinders empty or air will be reintroduced into the system.

2. Unless the system is free of air...brakes will not function properly.

3. When system is completely bled, apply pressure and check for possible leaks. Recheck fluid level in master cylinder/s.

BLEEDING BRAKE SYSTEM - SERVICE BRAKES

The brake system may be bled manually, or bled with a pressure bleeder tank. If a bleeder tank is available...make sure the tank contains enough of the right type brake fluid to do the job. If a tank is not available...when bleeding the system manually...it must be remembered that the brake pedal should be depressed slowly and held until the line connections or bleeder screws are securely tightened. This prevents the possibility of air being drawn into the system during the bleeding operation.

1. Clean dirt, grime, etc., from around the master cylinder reservoir cap.

2. Remove the cap and fill reservoir with specified fluid...to within 1/4 of an inch from the top.

3. Depress and release brake pedal...a small displacement of fluid should be noticed in the cylinder reservoir. If this happens, the brake pedal (upon being released) is returning the cylinder piston to its normal position to open a master cylinder port. This port must be open or the brakes will not function properly.

Plate 10769.

4. If fluid is not displaced upon releasing the brake pedal... pedal adjustment is required.

5. Measure pedal free play (check pedal pad for excessive wear) by depressing pedal by hand. When resistance is noticed (as master cylinder push rod makes contact with the cylinder piston) ...the distance traveled by the pedal pad should be 1/16" to 3/16"...1/8" NOMINAL. Loosen jam nut on push rod...rotate rod until specified pedal travel is obtained. Then tighten jam nut.

6. Now...

Plate 10768.

...attach bleeder hose of tank to the master cylinder. Make sure the tank contains at least two (2) quarts of the specified brake fluid... do not intermix types of brake fluids. Never reuse brake fluid drained from any brake system.

7. Place a flat pan under the axle to catch fluid bled from system...

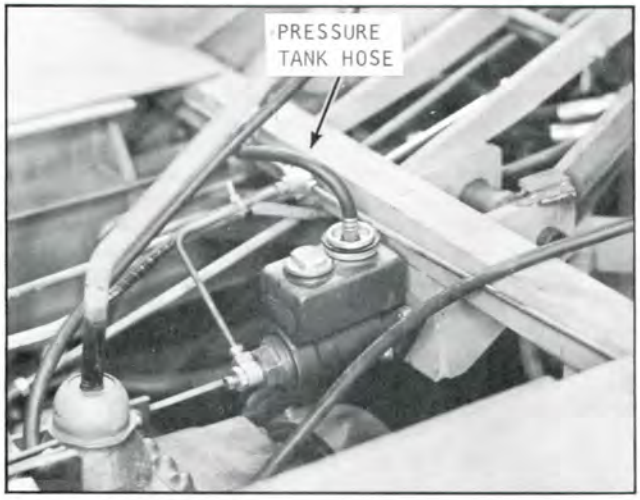

Plate 10862.

...a jar partially filled with fluid should be used when bleeding the system (manually or with a pressure bleeder unit) to tell when the system fluid is free of air bubbles.

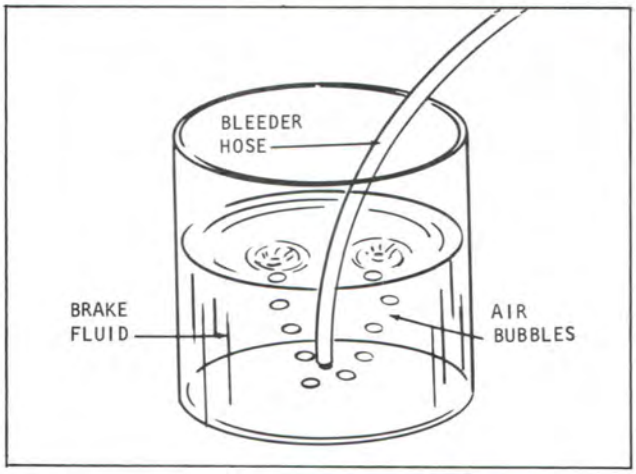

Plate 9746.

8. Apply air pressure of no more than 30 PSI to the bleeder tank.

W A R N I N G

Make sure pressure bleeder tank has been tested to withstand pressures to exceed 30 PSI.

9. Attach a small hose to the bleeder fitting of the wheel cylinder on the R.H. side of the vehicle...when viewing truck at the front.

Plate 10863.

10. Submerge opposite end of bleeder hose into the jar containing fluid.

11. With a open end wrench...open bleeder screw and watch fluid in jar.

12. When fluid is free of air bubbles...close bleeder screw.

13. Remove bleeder hose and attach it to the opposite wheel cylinder...bleed in the same manner.

I M P O R T A N T

Manual bleeding...make sure you close cylinder bleeder screw before releasing the brake pedal ...bleeder screw must be closed on the down stroke of the brake pedal or air will be drawn into the system.

14. When bleeding is completed...make sure the master cylinder is filled to within 1/4 of an inch from the top.

15. Pressure Bleeding...release air pressure from the bleeder unit and make sure shut off valve in the bleeder line is closed before removing bleeder hose and adaptor from the master cylinder.

16. Check the vent hole in the cylinder cap for obstructions before placing cap on cylinder. Clean vent if obstructed. Also, check cap gasket...replace if damaged.

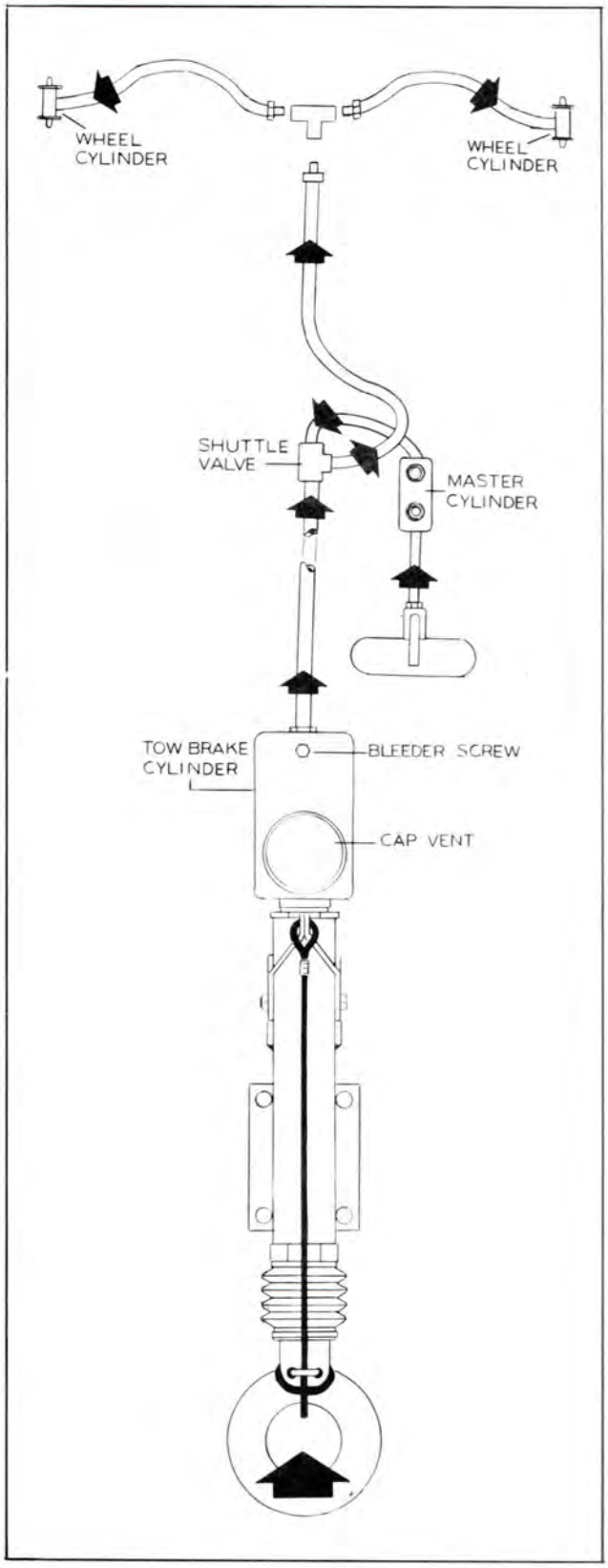

Plate 10864.

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BRAKE ADJUSTMENT

NOTE

If brake drums are hot...allow them to cool before making adjustments.

1. Adjust pedal free travel and make sure system is properly bled prior to making adjustments.

2. Raise vehicle until drive wheel tires clear the ground...make sure truck is properly blocked ...refer to warning.

3. Remove adjustment slot covers.

4. At each wheel insert adjusting tool and...

Plate 10869.

WARNING

AFTER RAISING MACHINE AND BEFORE MAKING ANY ADJUSTMENTS, ADJUSTMENT CHECKS OR BEFORE PERFORMING ANY MAINTENANCE...PLACE ADEQUATE BLOCKING (SUFFICIENT TO SUPPORT VEHICLE WEIGHT) UNDER THE FRAME AND AXLE TO PREVENT ACCIDENTAL LOWERING OF THE TRUCK...THUS PREVENTING PERSONAL INJURY TO MECHANIC OR BYSTANDERS.

...rotate star wheel until lining drags on drum. To tighten...tool handle is moved toward the axle when the inner edge of the adjuster slot is used as a fulcrum for the tool.

5. Rotate the star wheel in the opposite direction until drag is relieved. Operate the brake pedal several times to center the shoes ...then check adjustment. Provide running clearance after drag is relieved by...additionally backing off adjustment as follows:

NEW Lining	...	5 notches
WORN Lining	...	3 notches

6. After all shoes are adjusted, install adjustment slot covers.

7. Lower vehicle to ground...road test truck.

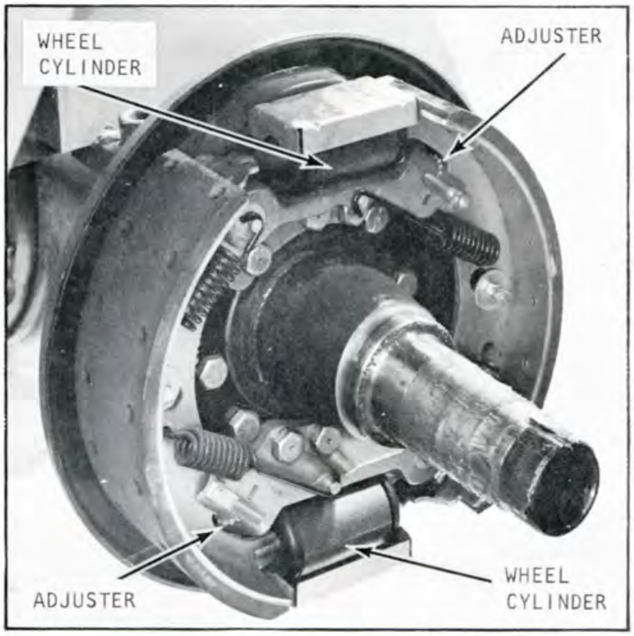

Plate 10870.

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PARKING BRAKE

The brake is located on the drive shaft between the front drive axle and transmission. The brake has two adjustments...minor adjustment may be made at the hand lever located in the driver's compartment. A major adjustment may be made at the brake assembly.

I M P O R T A N T

The parking brake must be capable of holding truck with full rated capacity load...on a 15% grade. Test adjustment while occupying the driver's seat.

Now, to make a...

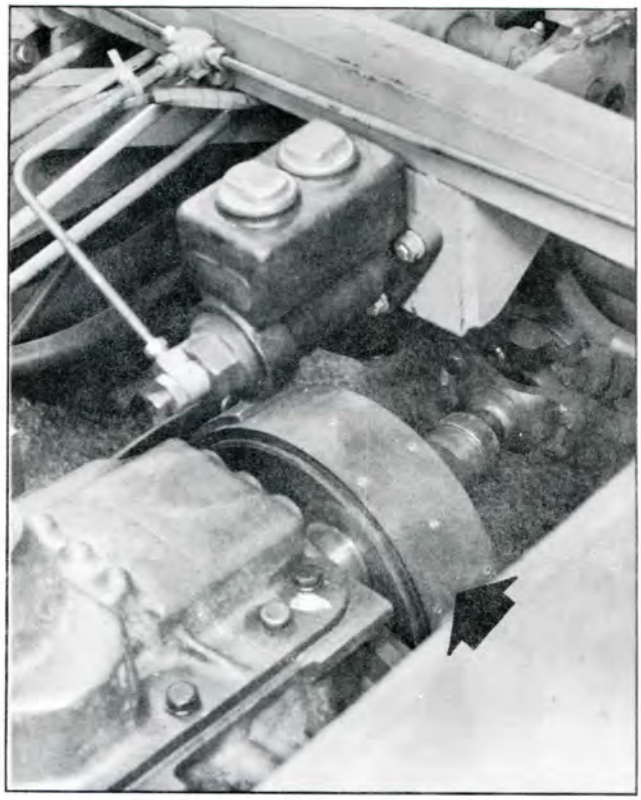

Plate 10868.

...minor adjustment, rotate knob on top of hand lever clockwise to increase tension...counter-clockwise to decrease tension. Adjustment should be made with hand lever in fully (forward) released position. Test adjustment...apply lever ... Tension should be strong enough to momentarily stop the lever in it's center position when pulling lever from full forward to full back position.

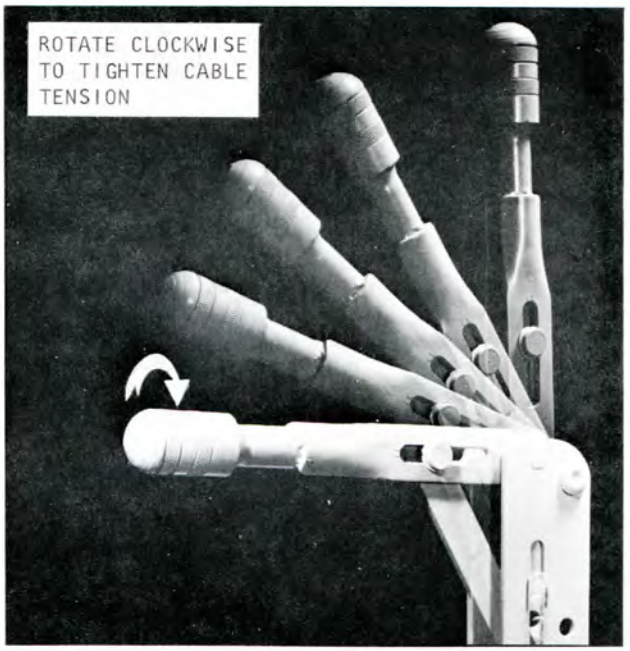

Plate 10755.

To make a major adjustment, set hand lever in fully released position and turn knob to end of travel...no cable tension should exist.

Turn brake band anchor clip bolt until feeler gauge placed between lining and drum indicates a .010 to .015 inch clearance.

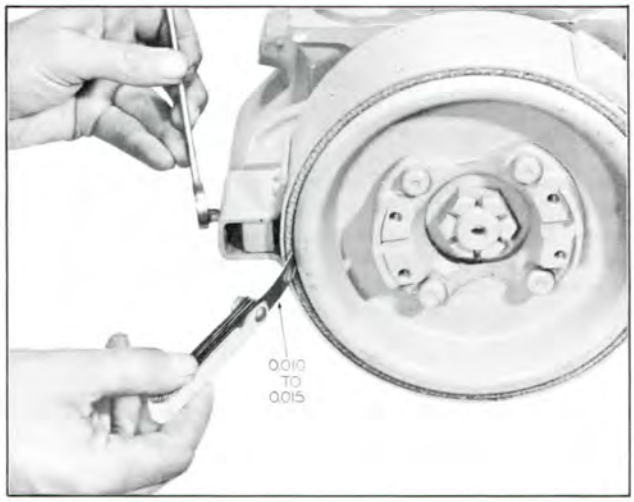

Plate 6291.

Loosen lock nut and tighten screw until feeler gauge placed between lower end of lining and brake drum indicates a .020 inch clearance. Tighten lock nut when this clearance is obtained. Now...

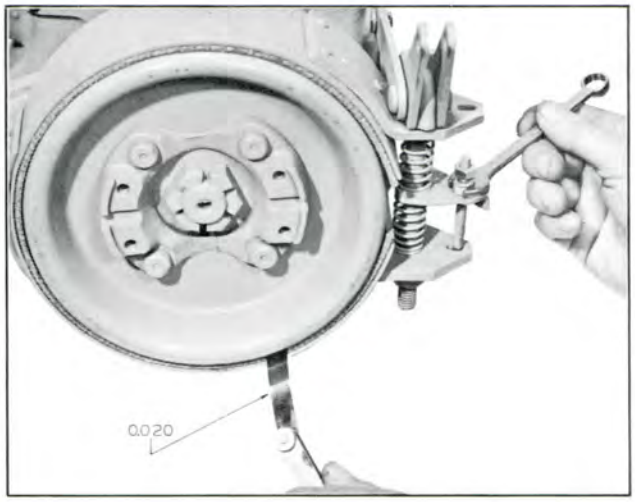

Plate 6290.

...loosen lock nut on end of adjusting bolt and tighten adjusting bolt until feeler gauge placed between upper end of lining and brake drum indicates a .020 inch clearance. Tighten lock nut when this clearance is obtained. Next...rotate knob until cable tension is as specified on previous page.

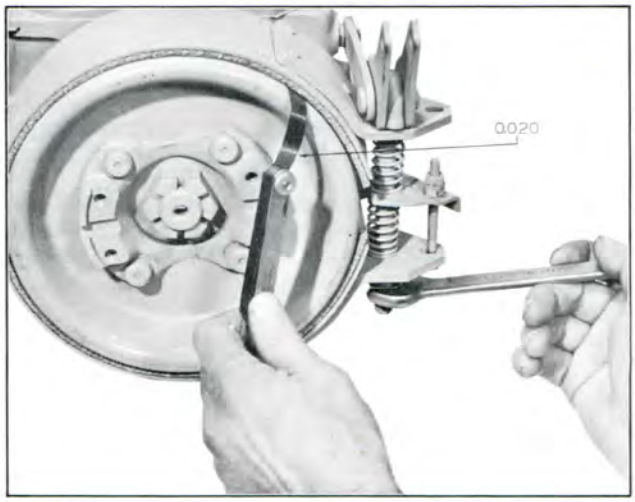

Plate 6289.

Check tires for excessive wear and cuts...pry out of tire treads any objects which could damage the tires.

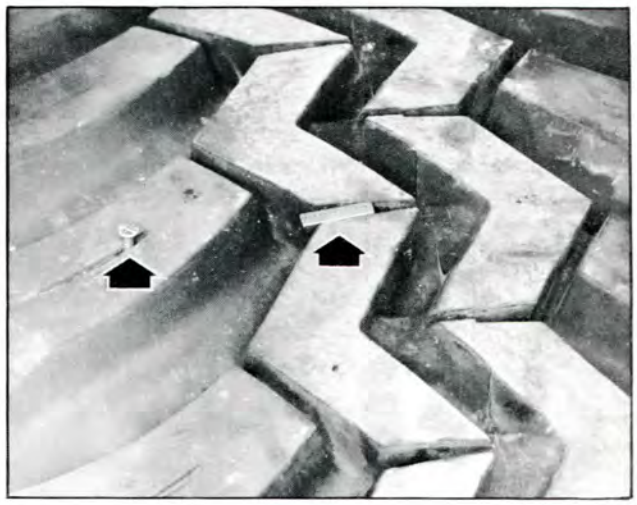

Plate 10756.

Check wheel lug nuts for tightness and to make sure none is missing...

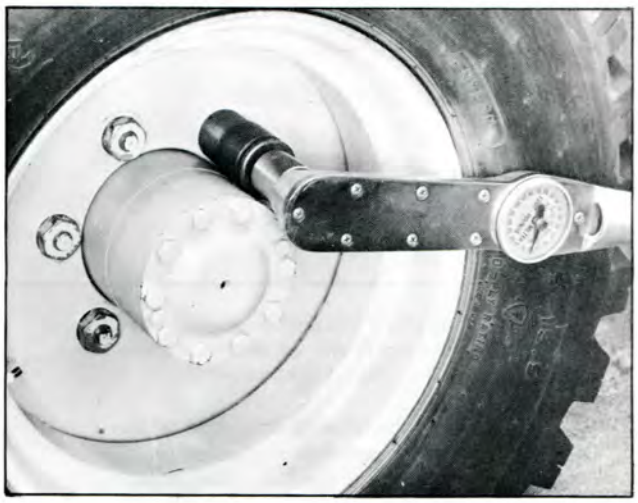

Plate 10763.

...check the steer wheels for security of lug nuts and to make sure none is missing.

Plate 10764.

IMPORTANT

Rim and Wheel Maintenance

Check all metal surfaces thoroughly while making tire inspections...watch for...

...fatigue cracks in metal.

...bent flanges, resulting from road obstructions.

...deep rim tool marks.

...loose, missing or damaged nuts.

...bent or stripped studs.

...excessive rust or corrosion.

Pull Damaged Rims or Wheels

WARNING

Deflate tires prior to the removal of rims or wheels from the vehicle.

Mark damaged or hazardous areas with chalk so that part will be removed from service... replace damaged parts.

Insure that replacements are made with the proper sizes and types...refer to your machine serial number when ordering replacement parts. 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.

Inflate tires only to recommended air pressure.

Check all metal surfaces, as listed above, and check for cracks. These are caused by deep rim tool marks, overloading and overinflating tires and using larger than recommended tire sizes.

Cracks in wheel between stud holes are caused by loose wheel nuts...improper installation procedures and use of incorrect sizes or types of attaching parts. Insufficient mounting torque can cause wheel shimmy, resulting in damage to parts and extreme tire tread wear. Excessive mounting torque can cause studs to break and disc to crack in the stud hole area.

NOTE

"In order to maintain and insure maximum service, a continuous maintenance program is advisable...maintenance procedures should be carried out both during tire inspections and during tire changes."

Thoroughly clean wheels...remove rust, dirt and other foreign materials from all surfaces. Hand or electric wire brushes, and blasting or chemical baths may be used.

Bead seat areas of the rim should be free of rust and rubber deposits. This is especially important for drop-center tubless rims...because of the air-sealing element.

Paint rim by brush or spray with a fast-drying metal primer. Surfaces should be clean and dry prior to painting. Insure that bare metal areas on outside or tire side of rim are covered. This is especially important on drop-center tubless rims, because warm and sometimes moist air is in constant contact with the metal surface on the tire side of the rim.

Lubricate tire side of rim base just prior to mounting tire...avoid the use of any lubricant which contains water or solvent that is injurious to rubber...a combination lubricant and rust-preventive compound is preferable. This protective measure is of particular importance with drop-center tubless rims as the air in the tire is contained by the tire-side rim surface.

NOTE

Rim Distributors can supply the proper compound that serves as a lubricant and rust preventive.

APPENDIX " 4 "

CLARK EQUIPMENT

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Check Steering System Pressure

The hydraulic relief valve setting may be checked with a Mico Quadrigage (Clark Part No. 1800106) or, with a conventional pressure gauge having a 0 -to- 3000 PSI scale...at the discharge (pressure) line of the hydraulic pump -to- steering control valve. Refer to following page for illustration.

1. Connect pressure line from gauge to test port at pump or valve by installing a Tee in the line.

Plate 11156.

2. Place blocking between axle and axle stop so that when the wheels are turned the pressure relief valve will move off its seat when pressure builds up.

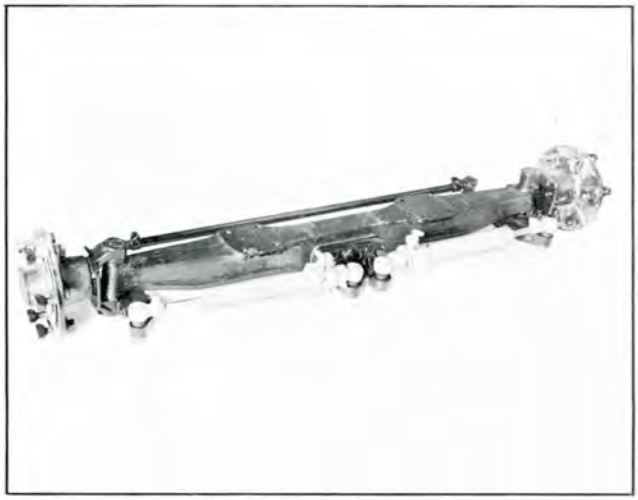
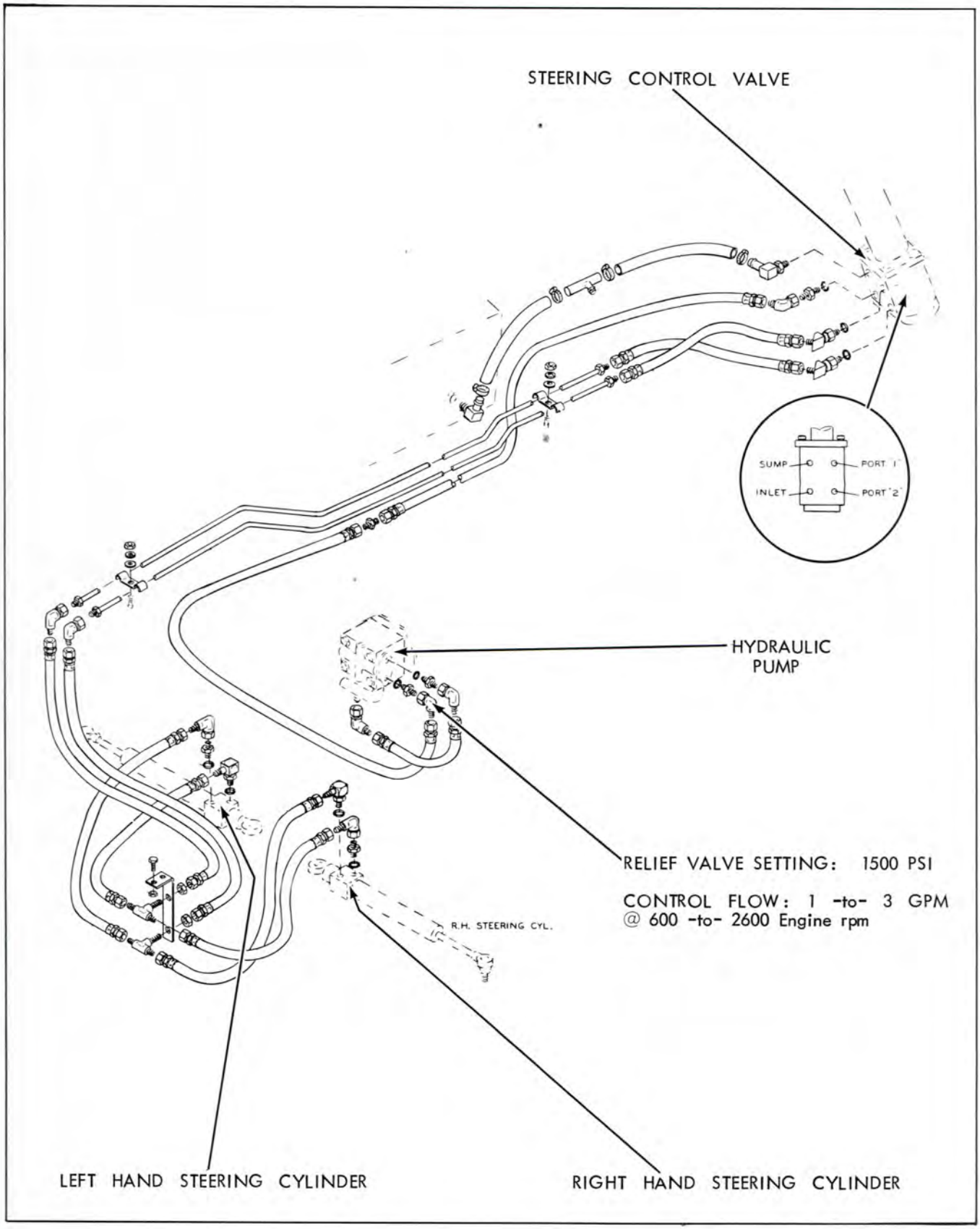


Plate 11172.

3. Apply parking brake...start engine and run at governed rpm. Rotate hand wheel all the way in one direction and hold...avoid holding the hand wheel (axle against stop) longer than is necessary to check pressure reading on gauge... take reading...release hand wheel and accelerator.

4. The pressure reading will indicate the setting of the relief valve. If reading taken is not reasonably close to those listed...appropriate repairs should be made. Report to designated person in authority.


STEERING CONTROL VALVE
SUMP
PORT 1
INLET
PORT 2
HYDRAULIC PUMP
RELIEF VALVE SETTING: 1500 PSI
CONTROL FLOW: 1 -to- 3 GPM @ 600 -to- 2600 Engine rpm
R.H. STEERING CYL.
LEFT HAND STEERING CYLINDER
RIGHT HAND STEERING CYLINDER

STEERING PERFORMANCE

Check drive tire inside turning diameters which...
...should be about equal in forward left and right turns.

1. Pattern to be made while driving vehicle with full right steer and full left steer.

2. Measurement to be made on inside turning diameter of each drive wheel...measure diameter (as shown) of tire pattern from center of tire mark to center of tire mark.

3. Compare diameter measurement taken... to the chart below.

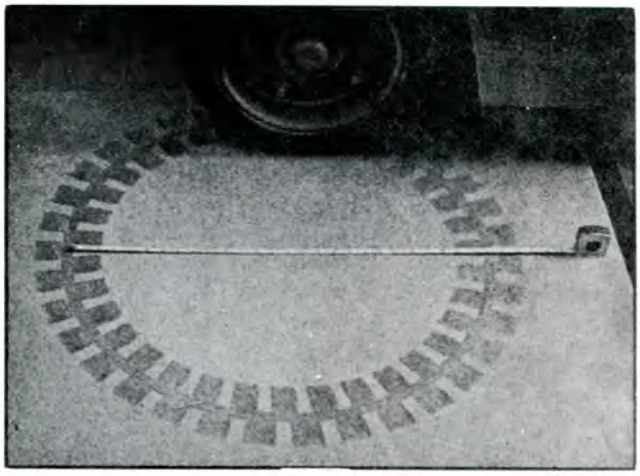


Plate 10839.

(A) If diameter is less than specified...adjust the stop screw by turning it out...until the correct turning diameter is obtained.

(B) If the diameter is greater than specified... adjust the stop screw by turning it in...until the correct turning diameter is obtained.

TURNING DIAMETERS PER MODELS

MODEL	"N" NARROW PROFILE TIRES	"W" WIDE PROFILE TIRES
IT-50	109 inches	
IT-60	109 inches	97 - 1/2 inches
IT-70	109 inches	97 - 1/2 inches

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CHECK MAIN HYDRAULIC SYSTEM PRESSURE AT THE HYDRAULIC PUMP OR VALVE.

The hydraulic relief valve setting may be checked with a Mico Quadrigage (Clark Part No. 1800106) or, by installing a conventional pressure gauge with a 0-4,000 PSI scale...at the discharge (pressure) line of the pump or at the valve.

If a Schroeder Hydraulic Circuit Tester (Clark Part No. 1800060) is available...the relief valve setting and the rate of flow being delivered by the pump may be checked as described on the following page.

When using a quadrigage or conventional pressure gauge you...

Plate 10871.

... 1. Remove test plug at line fitting and connect gauge to this port.

2. Apply parking brake...start engine and operate at governed rpm. Push tilt lever forward and hold...when pressure builds up and the relief valve off-seats (you can hear this happen), immediately take a reading. Release tilt lever and accelerator...avoid holding the tilt lever longer than necessary to check pressure reading on the gauge.

3. The pressure reading will indicate the setting of the relief valve. If reading taken is not reasonably close to those listed in specifications, appropriate repairs should be made...report to designated person in authority.

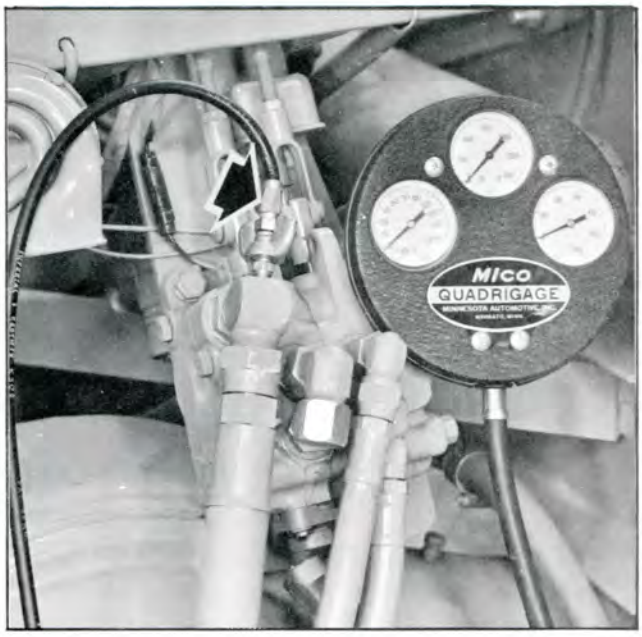

Plate 10872.

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APPENDIX " 5 "

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UPRIGHT CARRIAGE ROLLER ADJUSTMENT

A. CARRIAGE REMOVAL

Before working on the upright, set parking brake and block drive wheels.

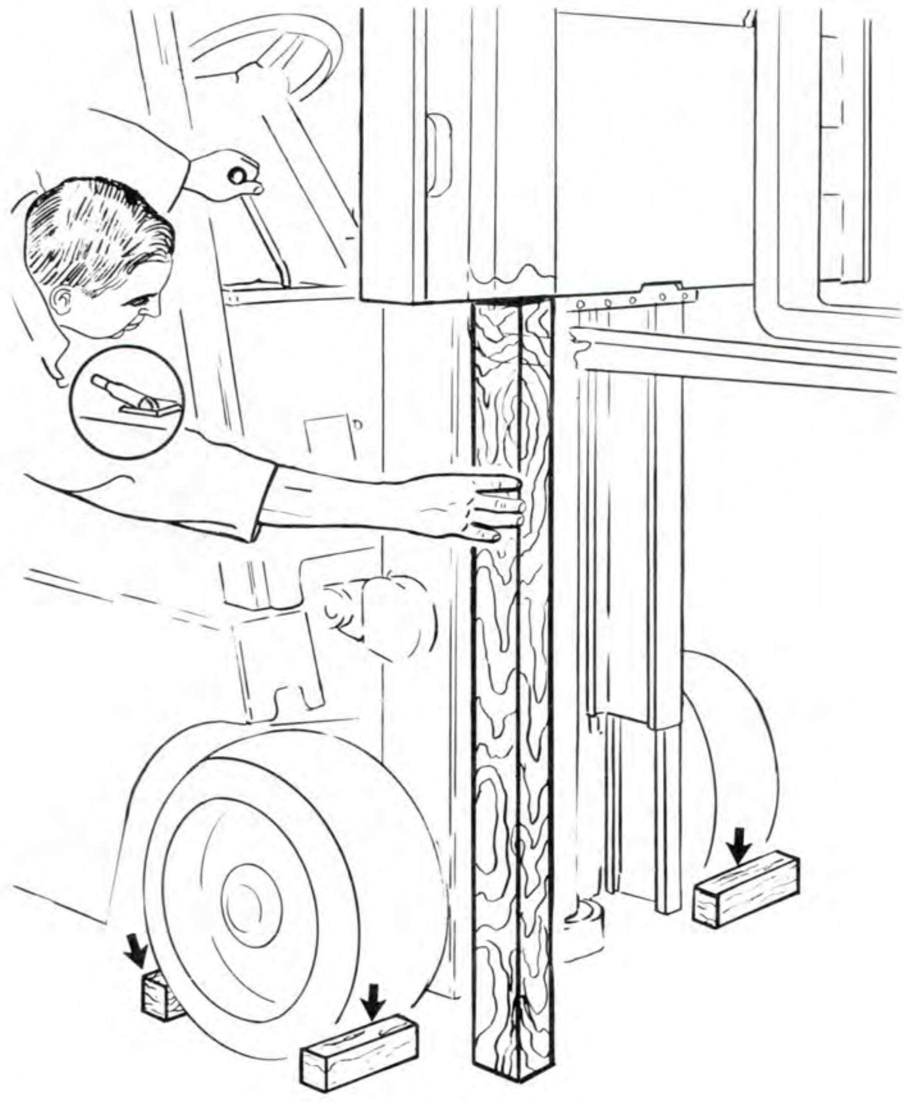


Plate 9559 Blocking Machine and Carriage

Step 1. Raise carriage about 4 feet. Place a 4" x 4" oak beam 3 to 4 feet in length between carriage and floor as shown. DO NOT STAND DIRECTLY UNDER FORKS. Standing to one side, lower carriage onto beam as shown.

WARNING

BEFORE WORKING ON UPRIGHT, SET PARKING BRAKE AND BLOCK DRIVE WHEELS AS SHOWN

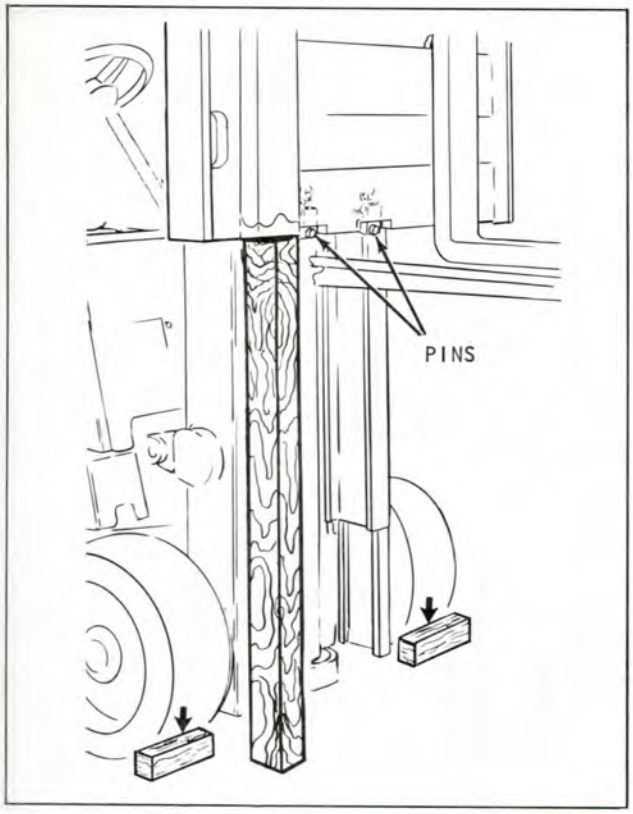


Plate 9593 Carriage Pin Replacement

Step 2. Remove anchor pins and replace with 3/8" x 2" bolts. FOR SAFETY REASONS, REMOVE ONLY ONE PIN AT A TIME. This will make pin removal easier when carriage is lowered.

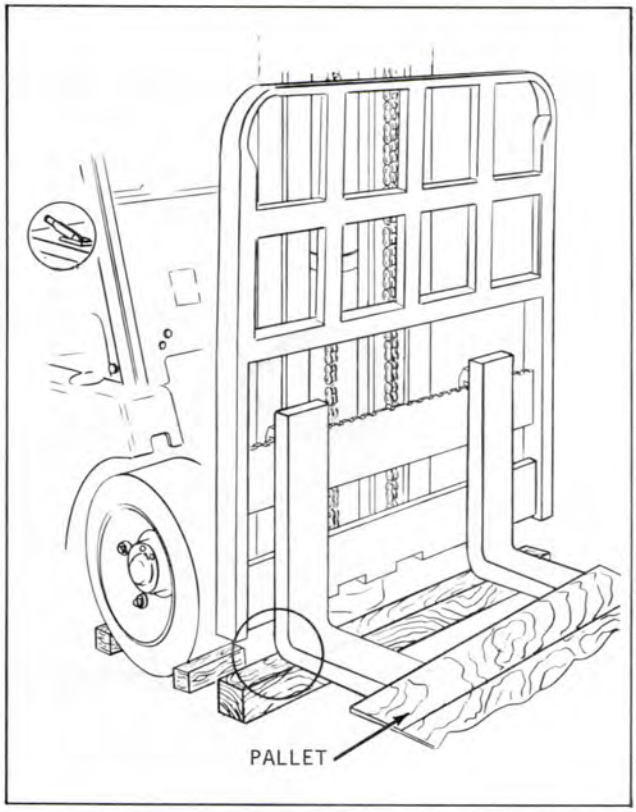


Plate 9560 Fork and Carriage Blocking

Step 3. Raise carriage off beam. Place beam on floor so, when lowered, the heal of the fork will rest on it as shown.

Step 4. Tilt upright full forward.

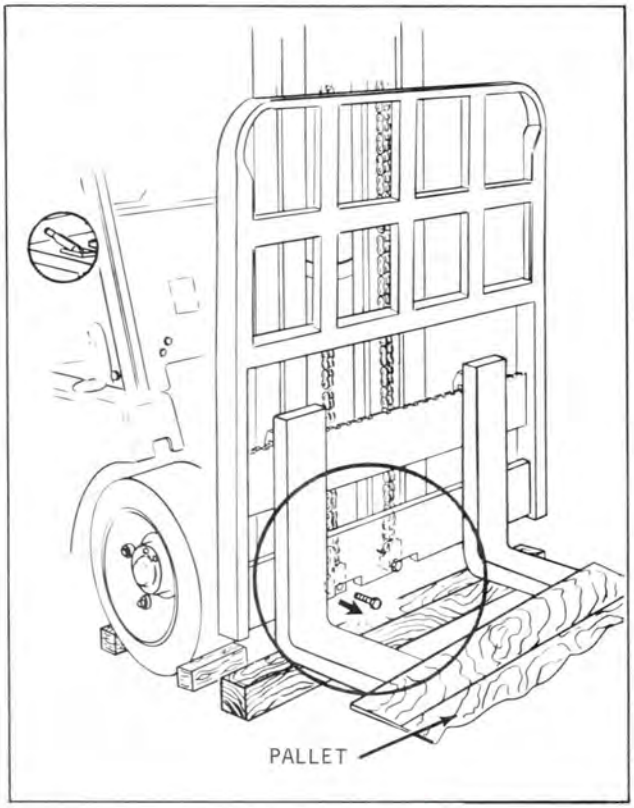


Plate 9561 Removing Bolts

Step 5. Remove 3/8" x 2" bolts. Place pallet on fork ends.

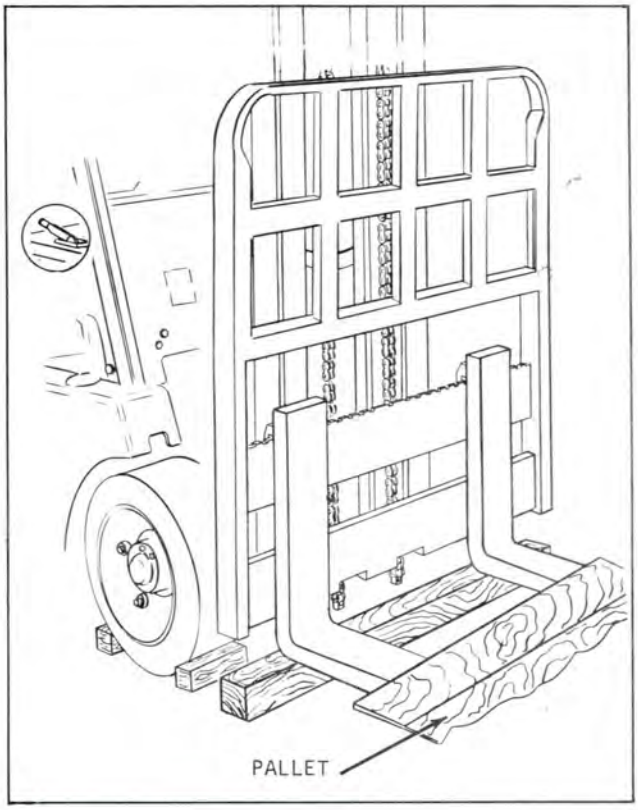


Plate 9562 Removing Chains From Anchors

Step 6. Pull chains out of carriage anchor brackets.

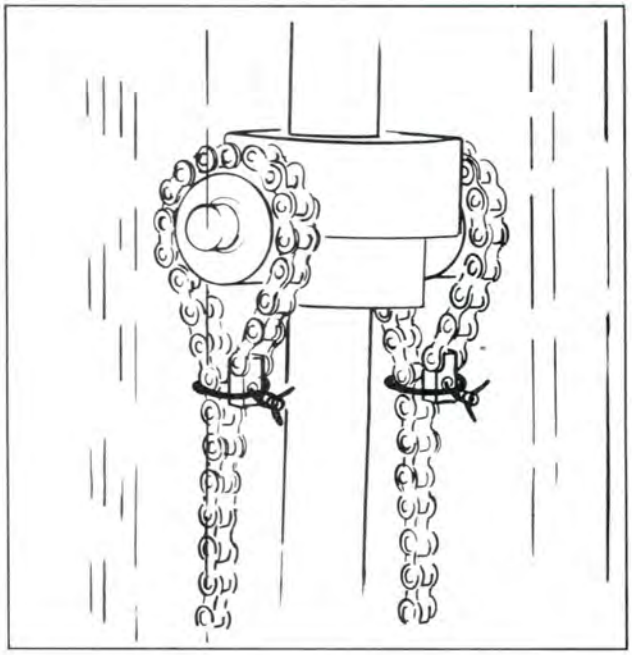


Plate 9563 Securing Chains (Typical)

Step 7. Wire chains around chain sheaves as shown

N O T E

Use the same method on all cylinders.

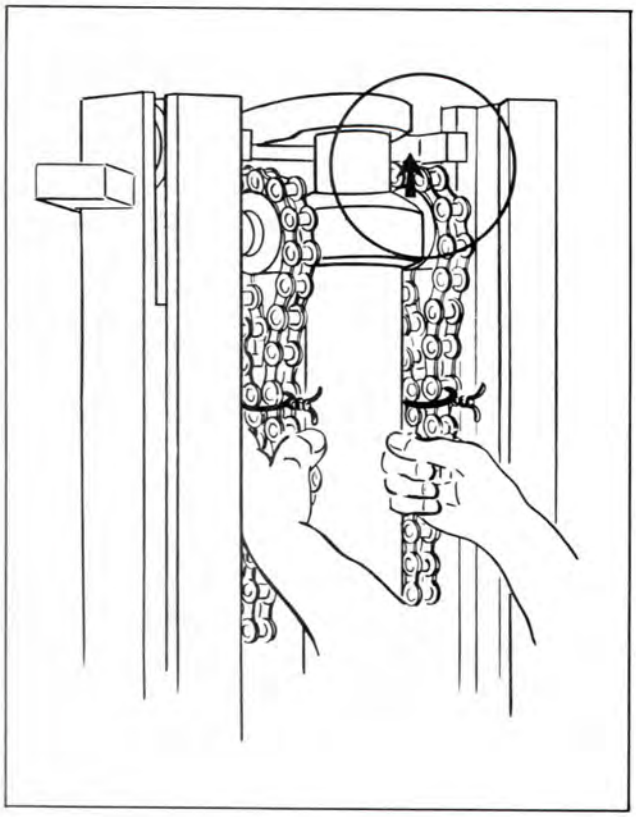


Plate 9564 Guiding Piston Head

Step 8. Guiding piston head with hands on chains raise piston to full up position.

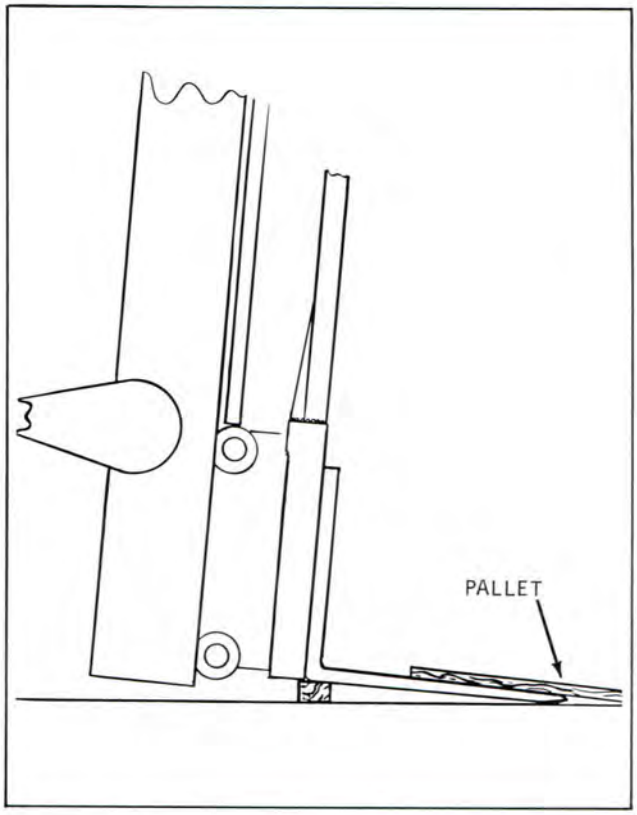


Plate 9565 Inner Rail Clearing Carriage Rollers

Step 9. Raise inner rail so it just clears upper carriage rollers. Leave upright at full forward tilt.

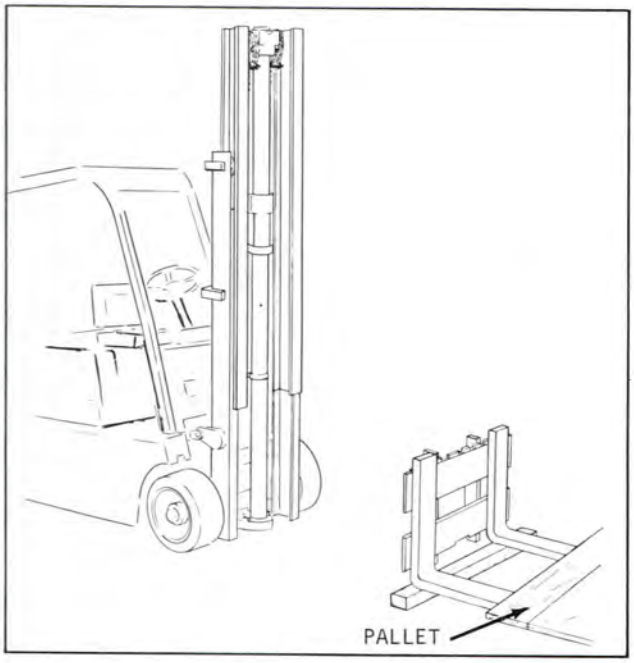


Plate 9566 Backing Machine Away From Carriage

Step 10. Remove blocks and release brake. Back machine away from carriage.

B. CARRIAGE ROLLER ADJUSTMENT

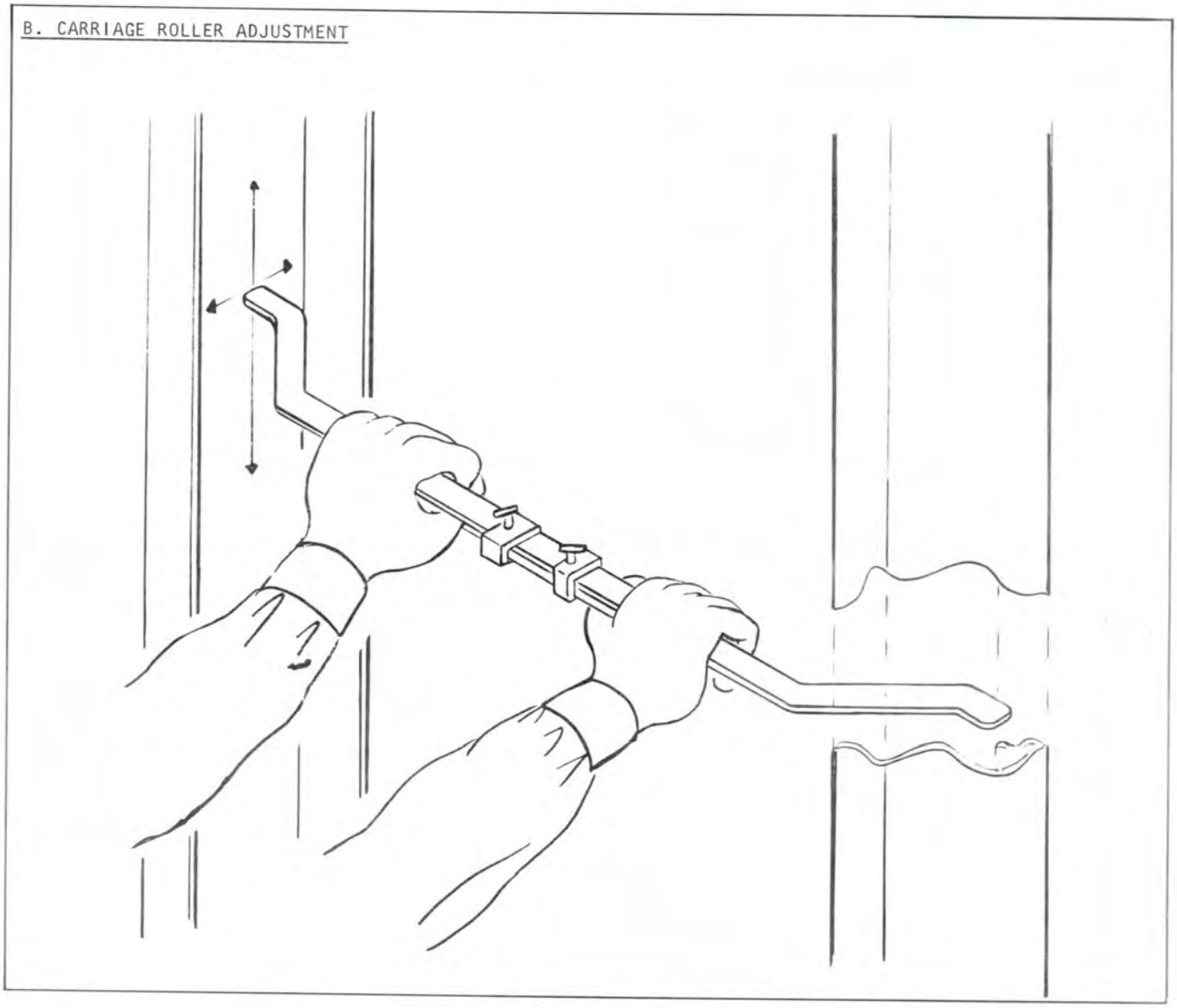


Plate 9567 Spanning Inner Rail

Step 1. Span inner rail with inside spanning tool to find the smallest distance between the rails. Lock tool in position.

N O T E

FOR SIX ROLLER CARRIAGE ONLY

After finding the smallest distance between rails, place a shim between the spanning tool and the inner rail, then lock spanning tool in position.

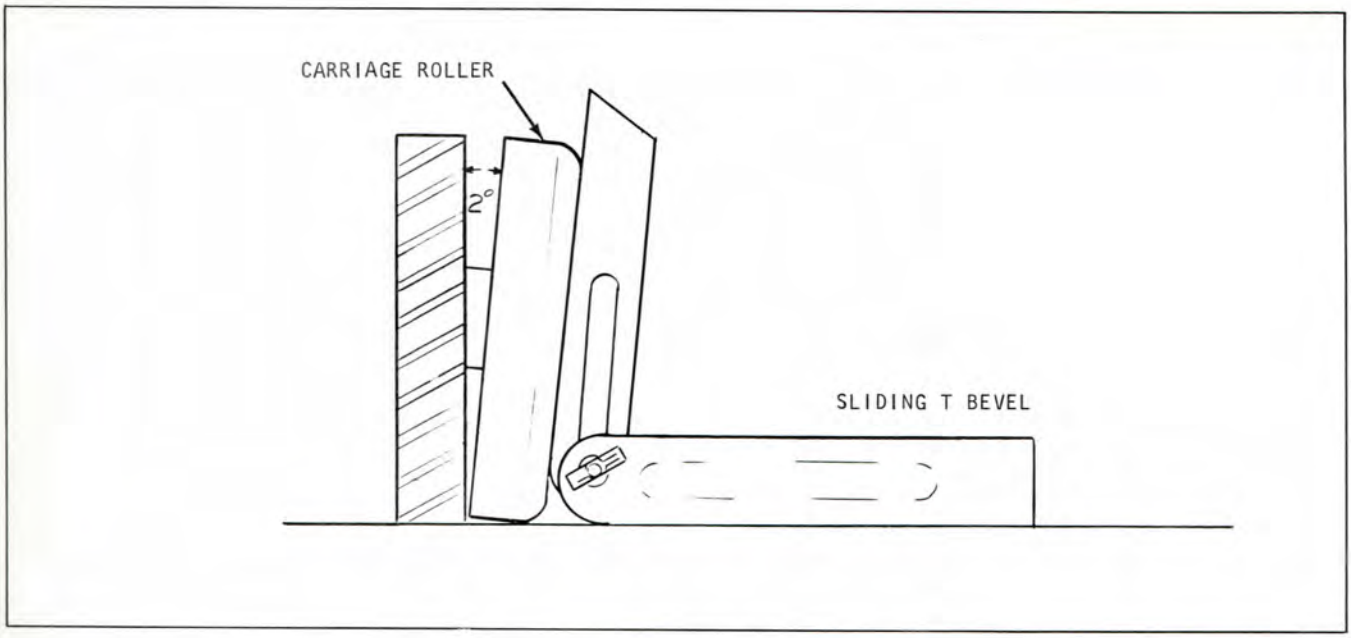


Plate 9589 Setting T Bevel

N O T E

Check angle of carriage rollers. Roller pin bosses are weled at $2^{o} \pm 1/2^{o}$ and if damaged, replace carriage roller pin boss assembly. To obtain this contact Central Parts.

To check roller angle use a Sliding T Bevel and Protractor. Lay one side against roller surface and lock in place.

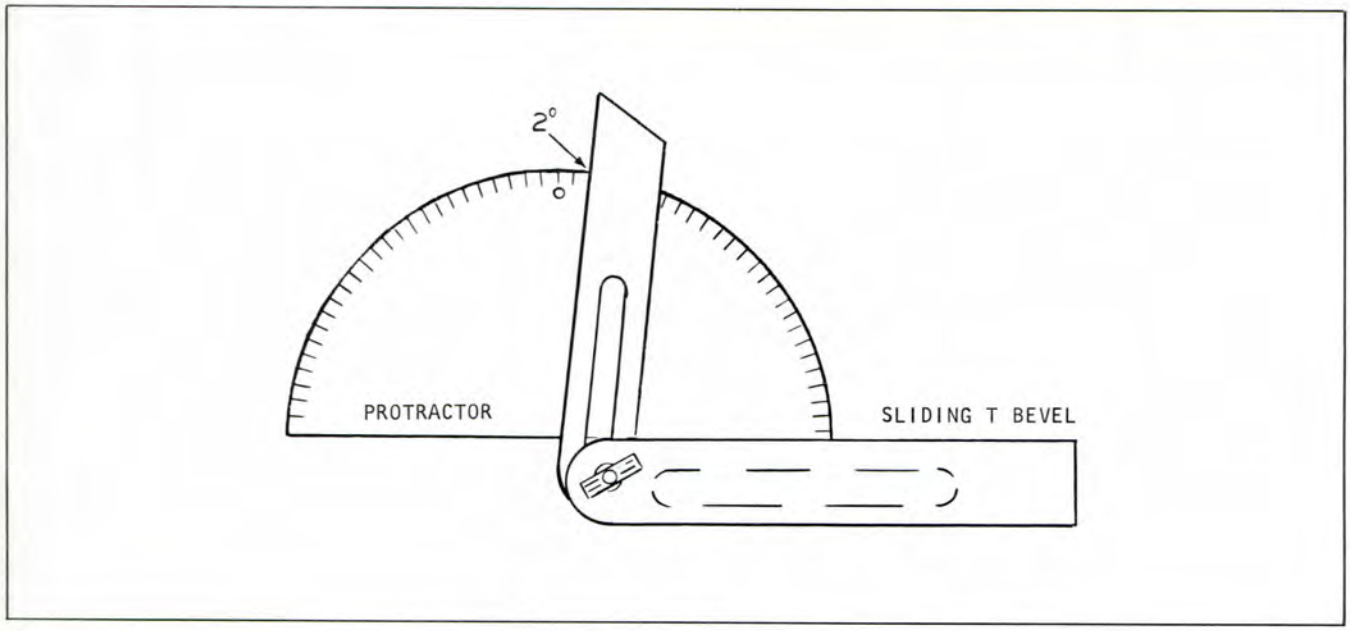


Plate 9590 Checking Roller Angle

Determine degree of angle by placing Protractor on Sliding T Bevel.

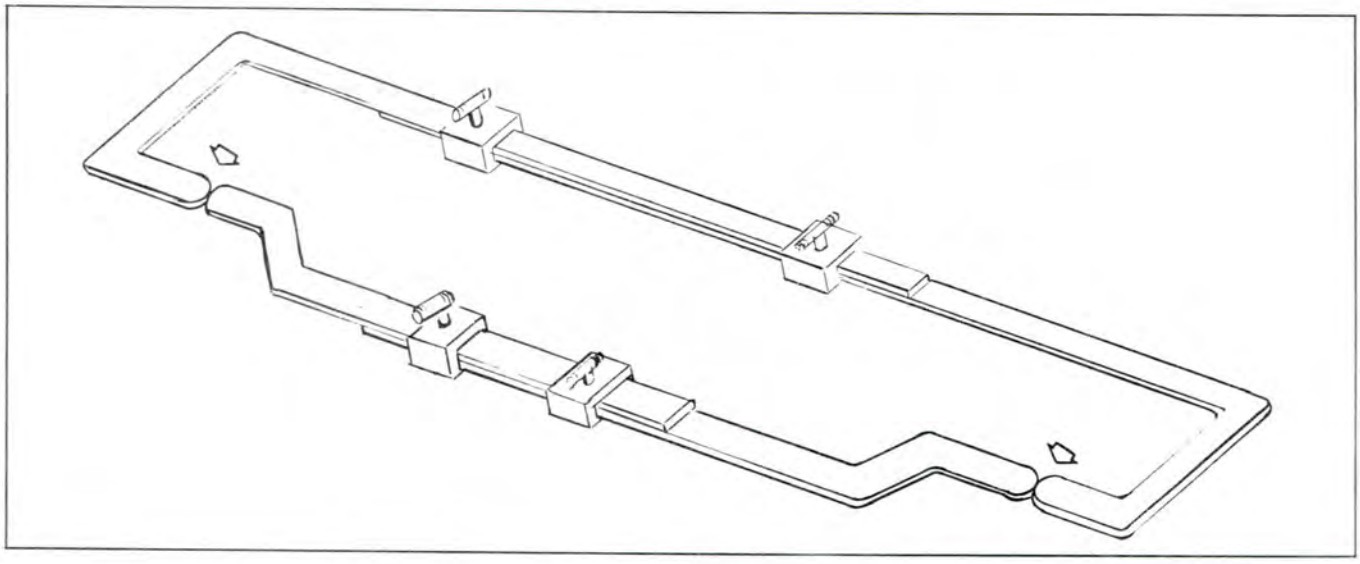


Plate 9568 Setting Outside Spanning Tool

Step 2. Set outside spanning tool to match inside spanning tool. Lock tool in position.

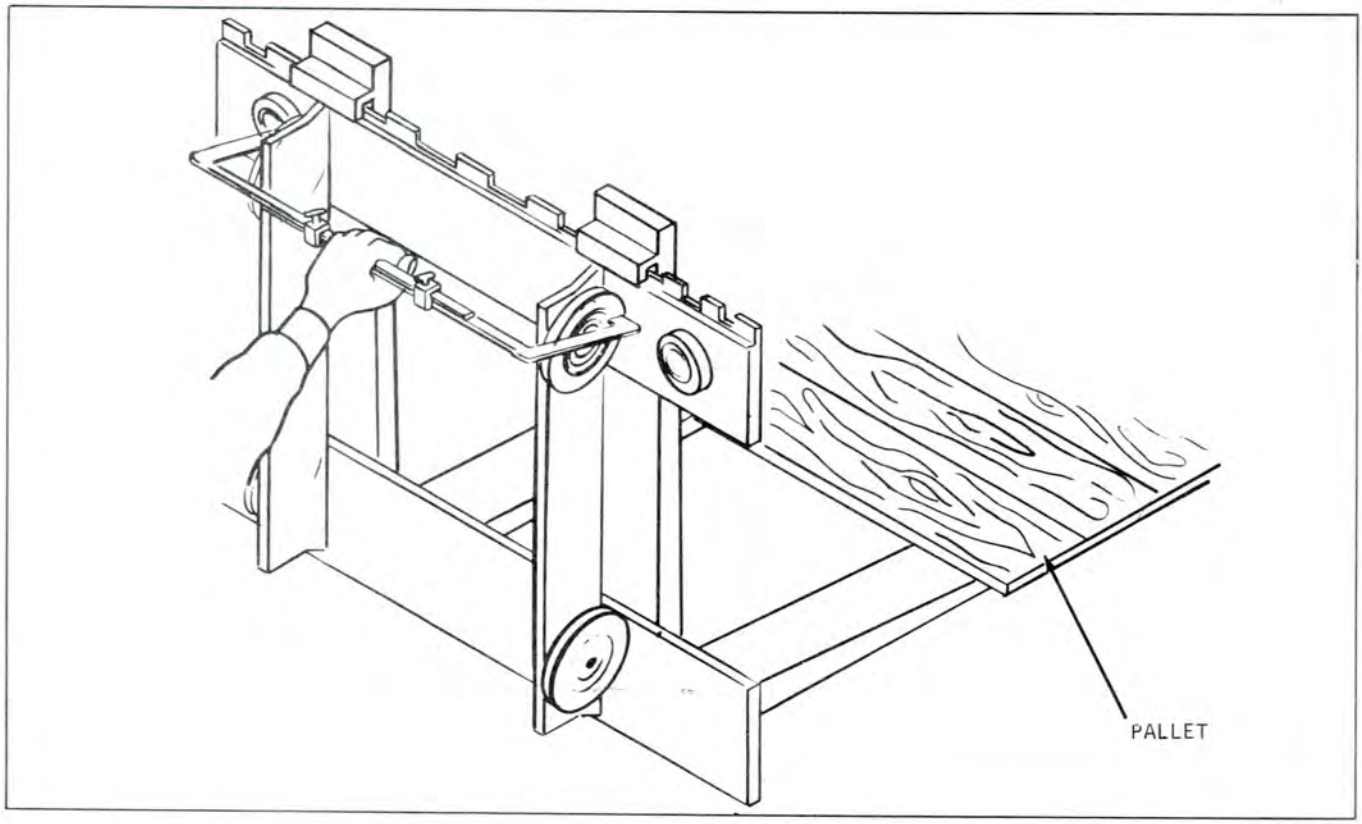


Plate 9569 Spanning Upper Rollers (Four Roller Carriage)

Step 3. Span upper carriage rollers at their outer most camber point. Add or subtract ...

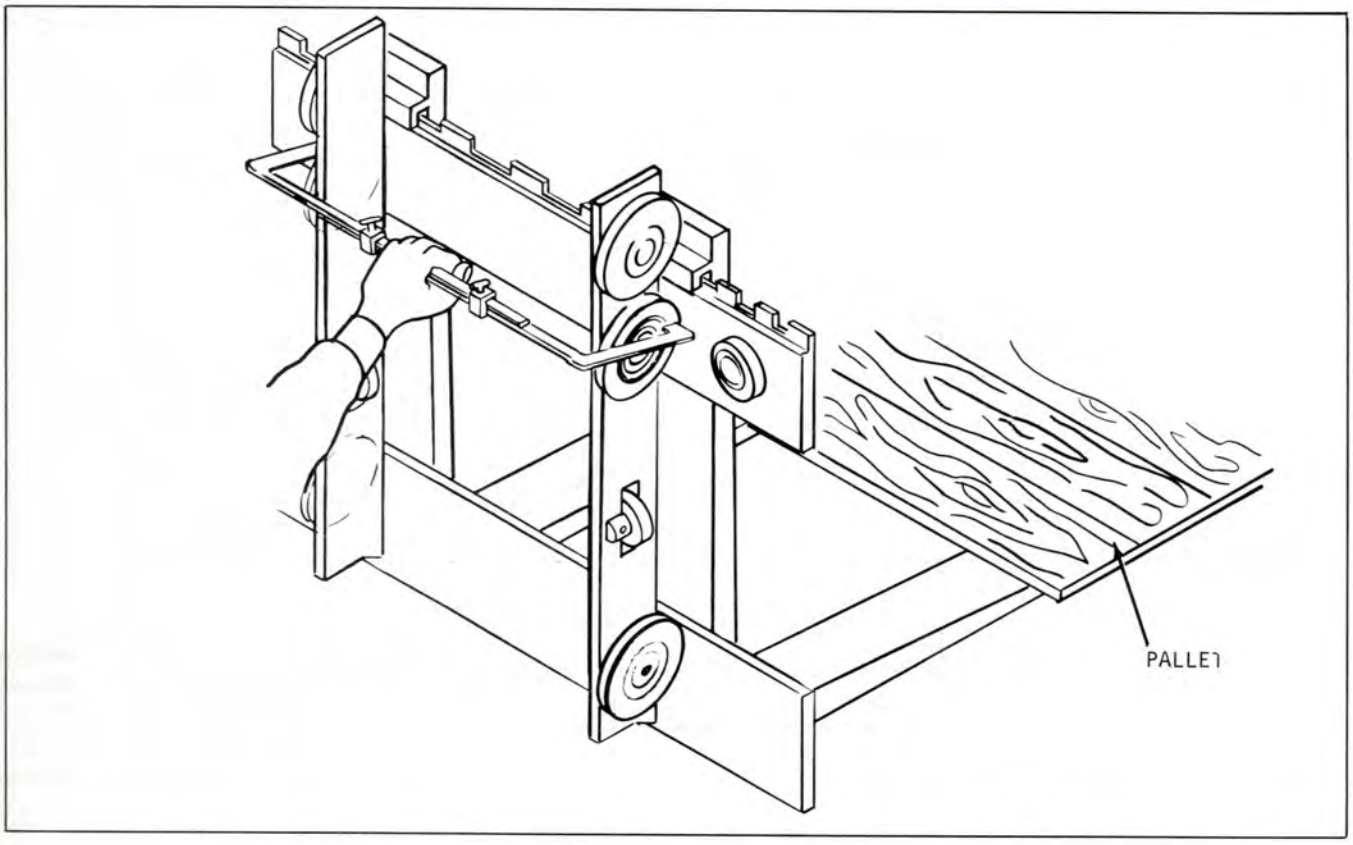


Plate 9570 Spanning Upper Rollers (Six Roller Carriage)

...shims at roller shaft to reach tool size.

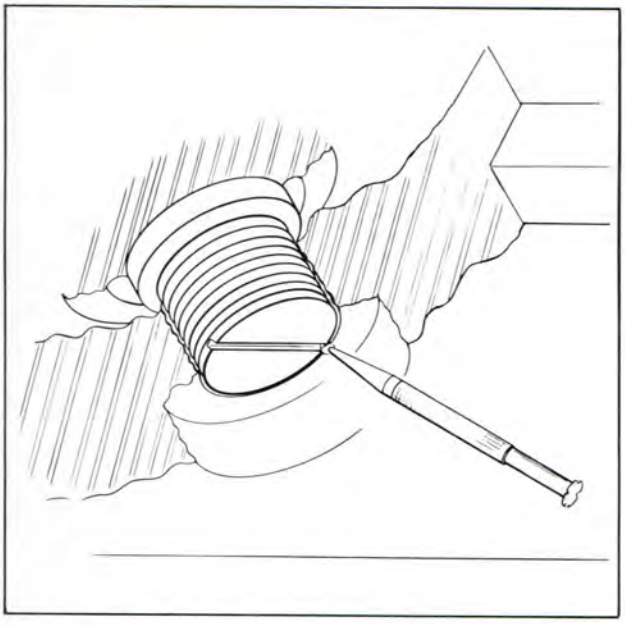


Plate 9571 Securing Outer Thrust Roller

N O T E

Before centering carriage rollers check outer thrust rollers for security and condition of bearings. If loose tighten and stake. If worn replace.

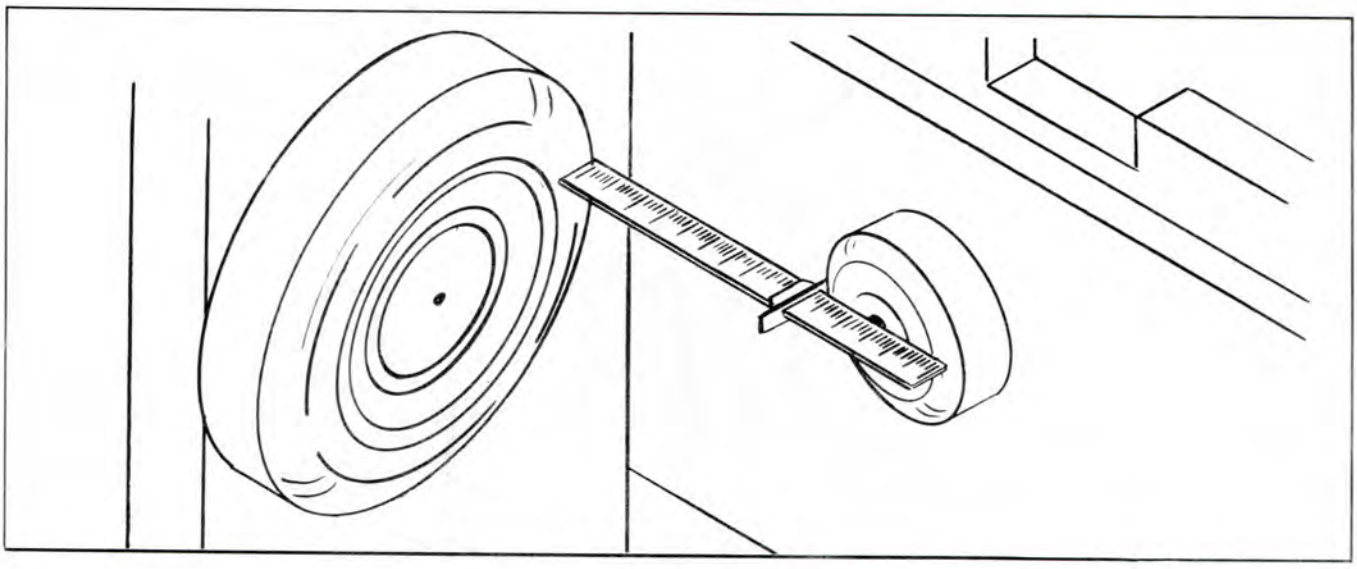


Plate 9572 Centering Carriage Rollers

Step 4. Center carriage rollers within outer thrust rollers by placing 6" scale on the carriage roller surface and measuring the distance to the outer thrust roller face. Add or subtract shims from one roller to the other to make measurement equal.

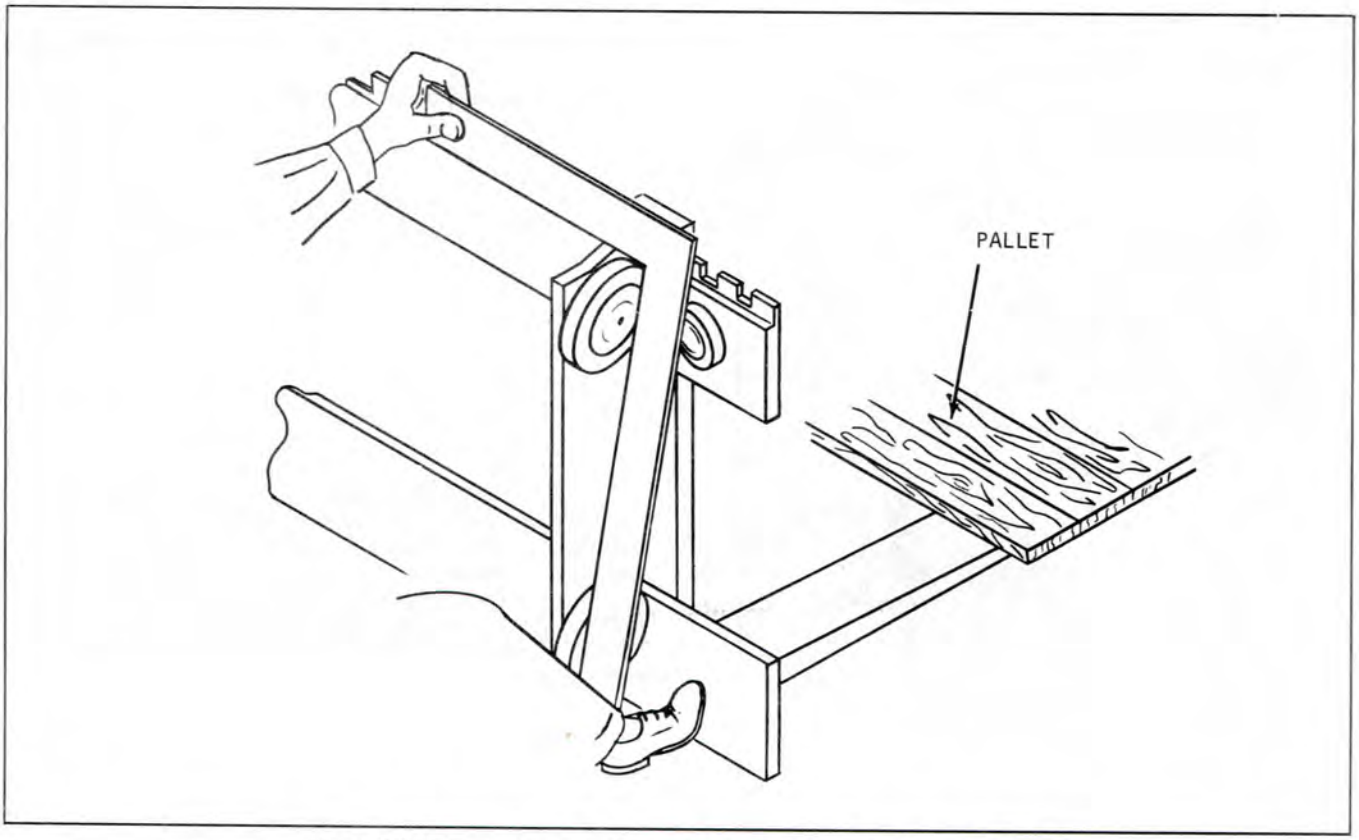


Plate 9573 Squaring Carriage Rollers (Four Roller Carriage)

Step 5. Square carriage rollers by placing carpenter's square at the outer most camber of the ...

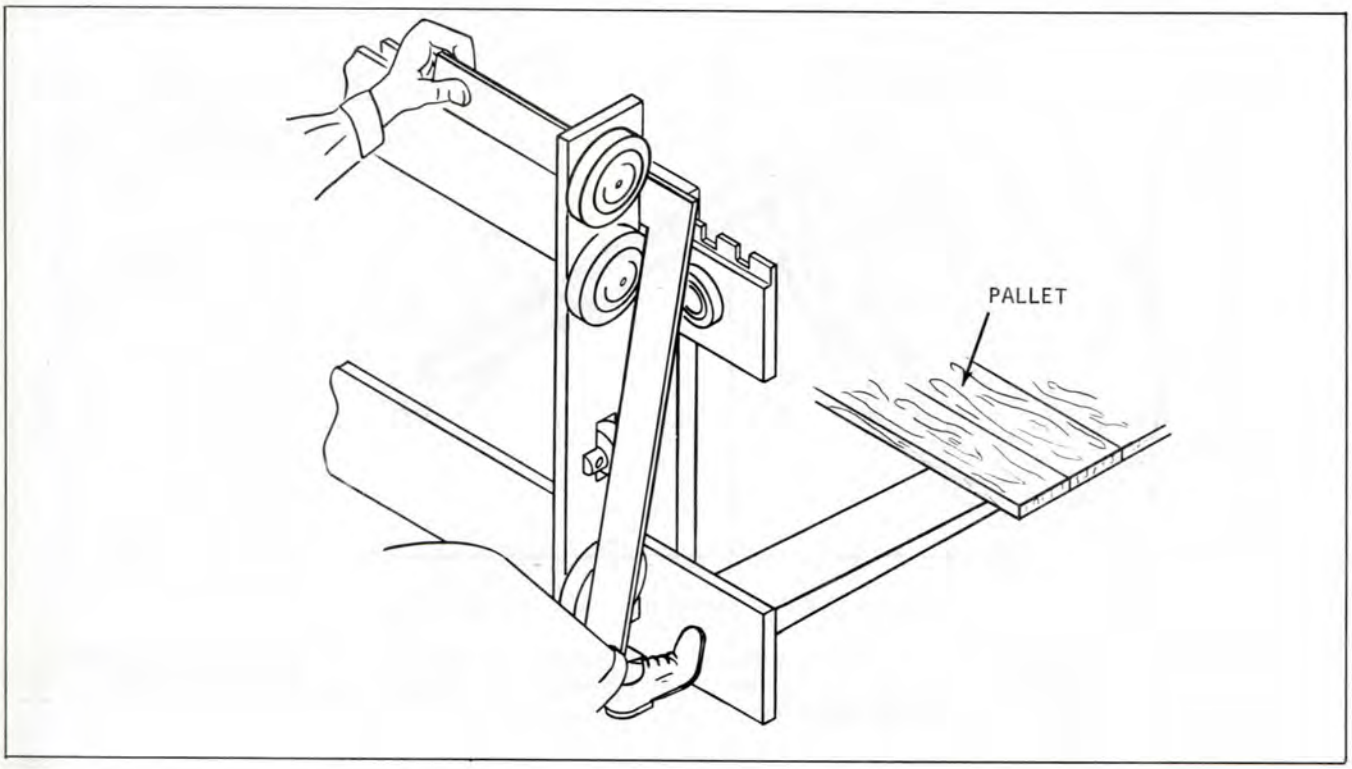


Plate 9574 Squaring Carriage Rollers (Six Roller Carriage)

... upper and lower rollers. Hold square in place with ankle and hand as shown.

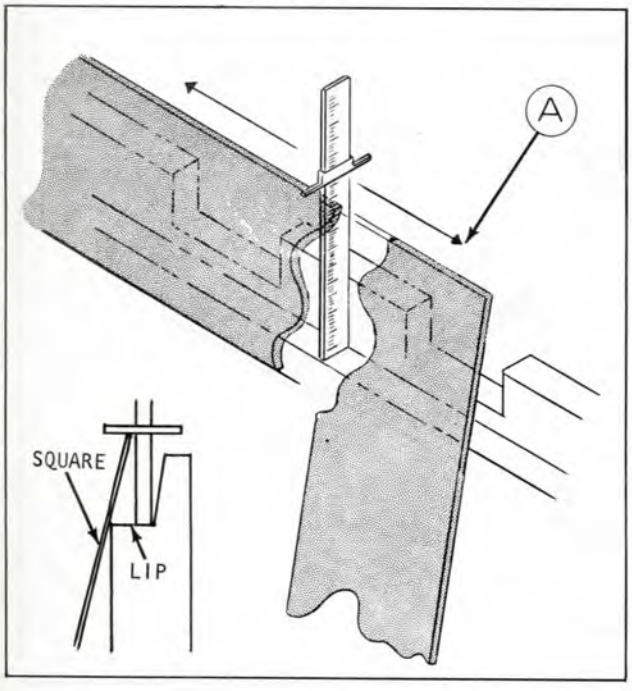


Plate 9575 Measuring For Squareness

Step 6. Hold square and measure the distance between the top face (or lip) of the upper fork bar to the edge of the square at Point A. Now take a measurement at opposite end of square .... these measurements should be the same. If they are not, add or remove shims on lower roller shaft until distance measured at each end is equal.

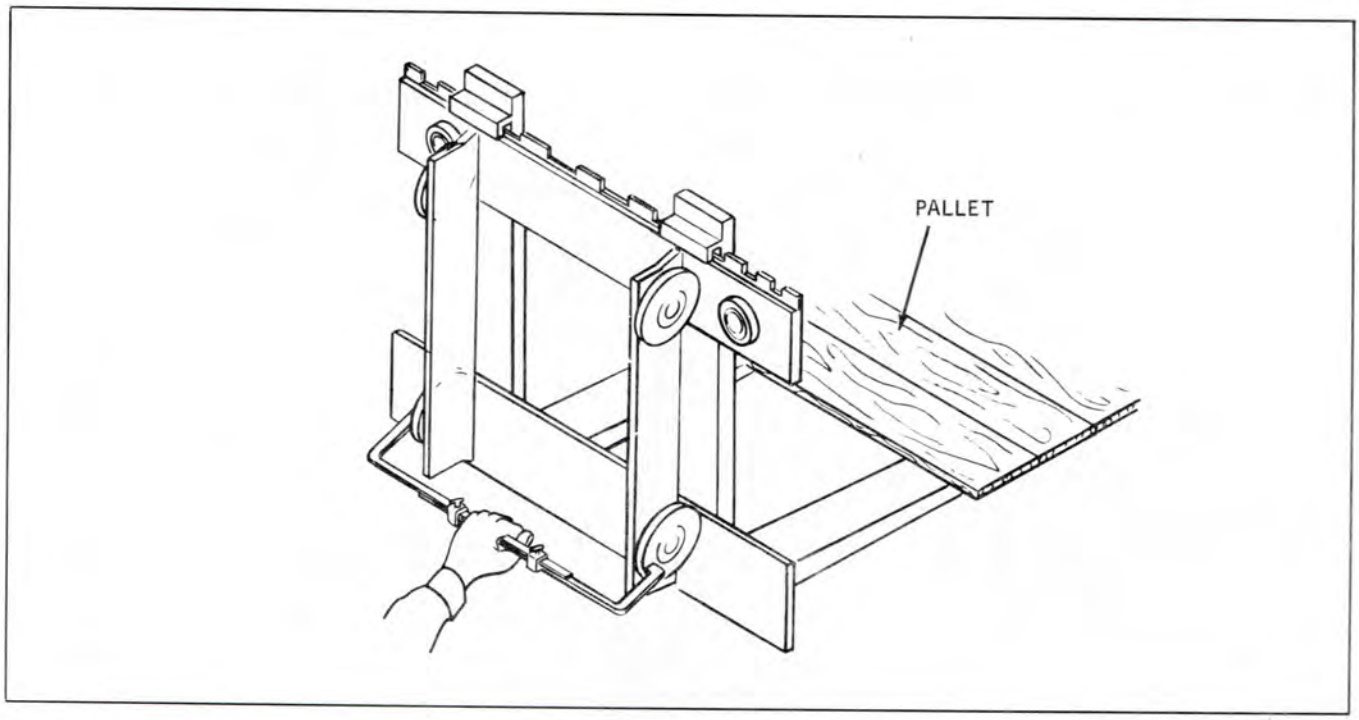


Plate 9576 Spanning Lower Rollers (Four Roller Carriage)

Step 7. Span lower rollers. Add or subtract shims to (the roller that has not been squared) ...

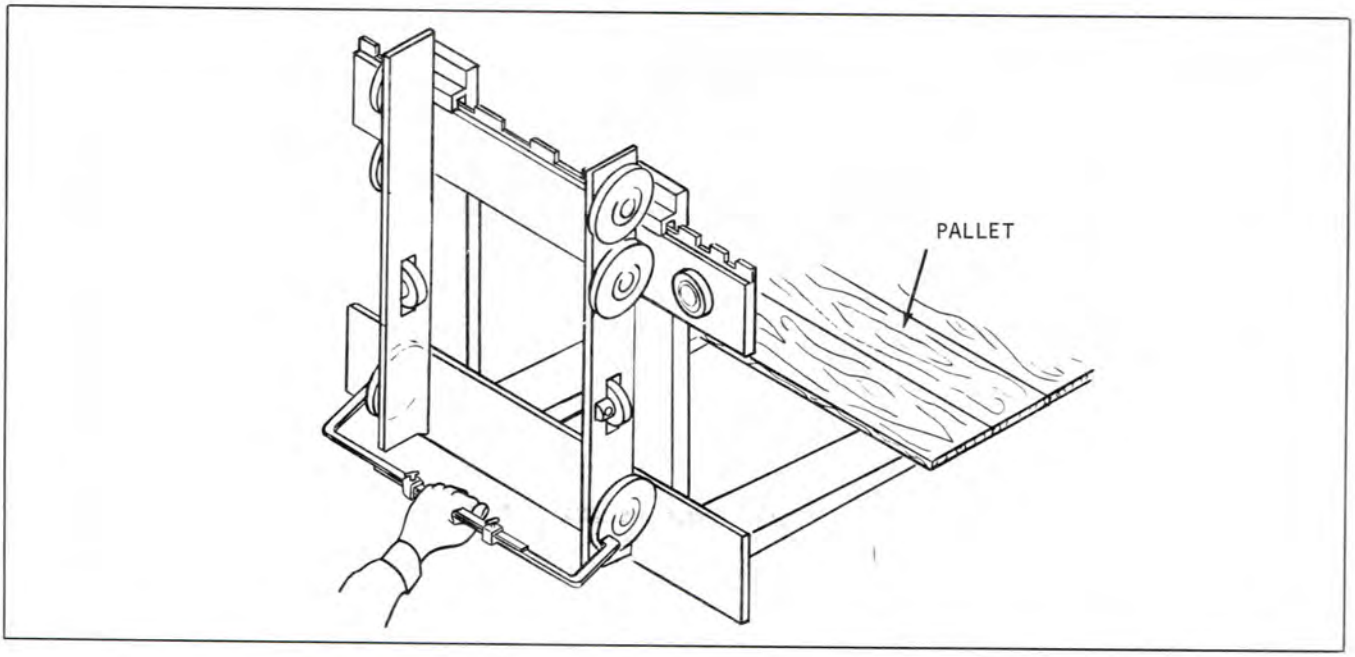


Plate 9577 Spanning Lower Rollers (Six Roller Carriage)

... reach the size of the outside spanning tool.

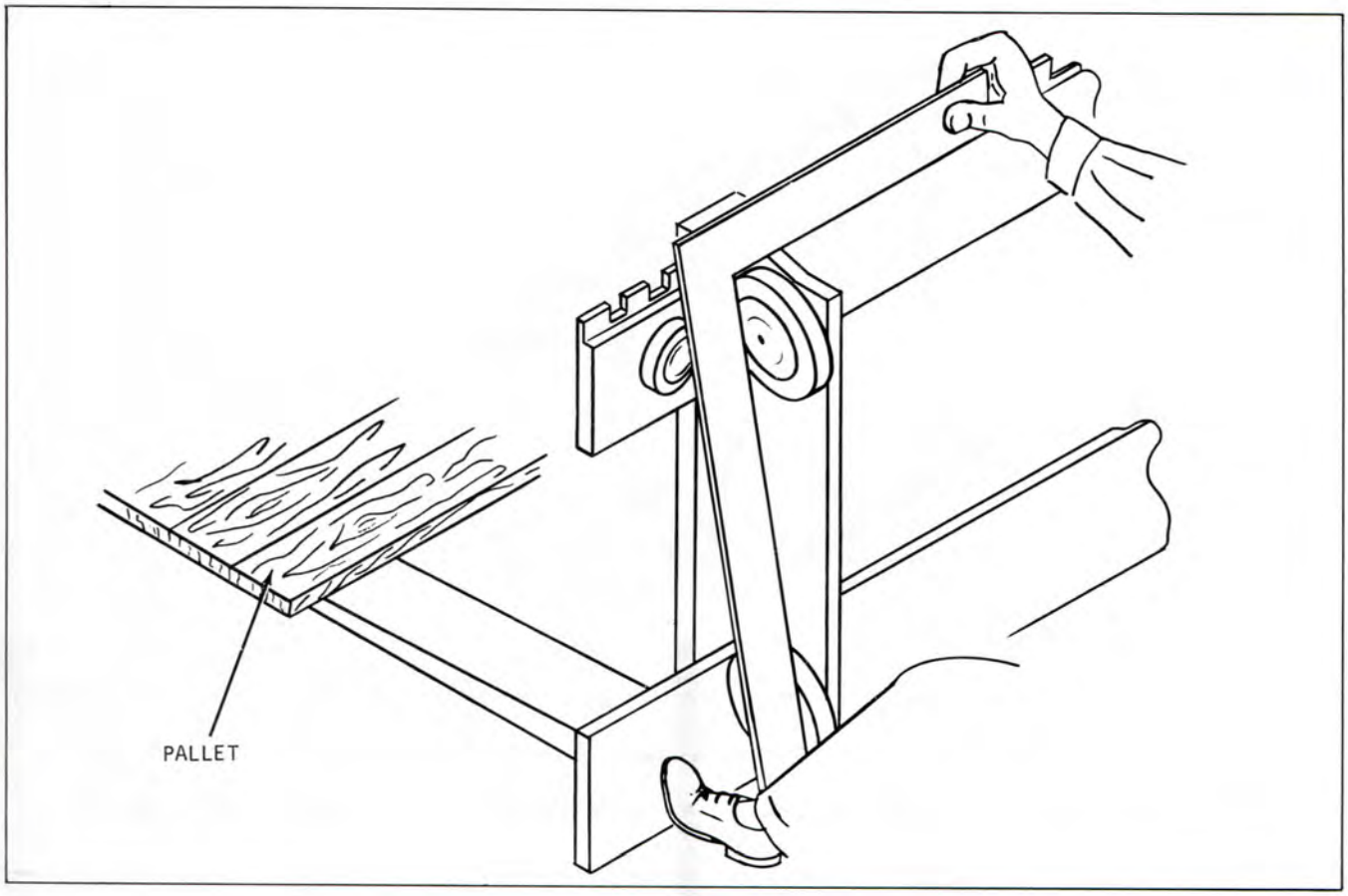


Plate 9578 Checking Squareness (Four Roller Carriage)

Step 8. Check opposite side for squareness (by holding square in the same manner as before and checking ...

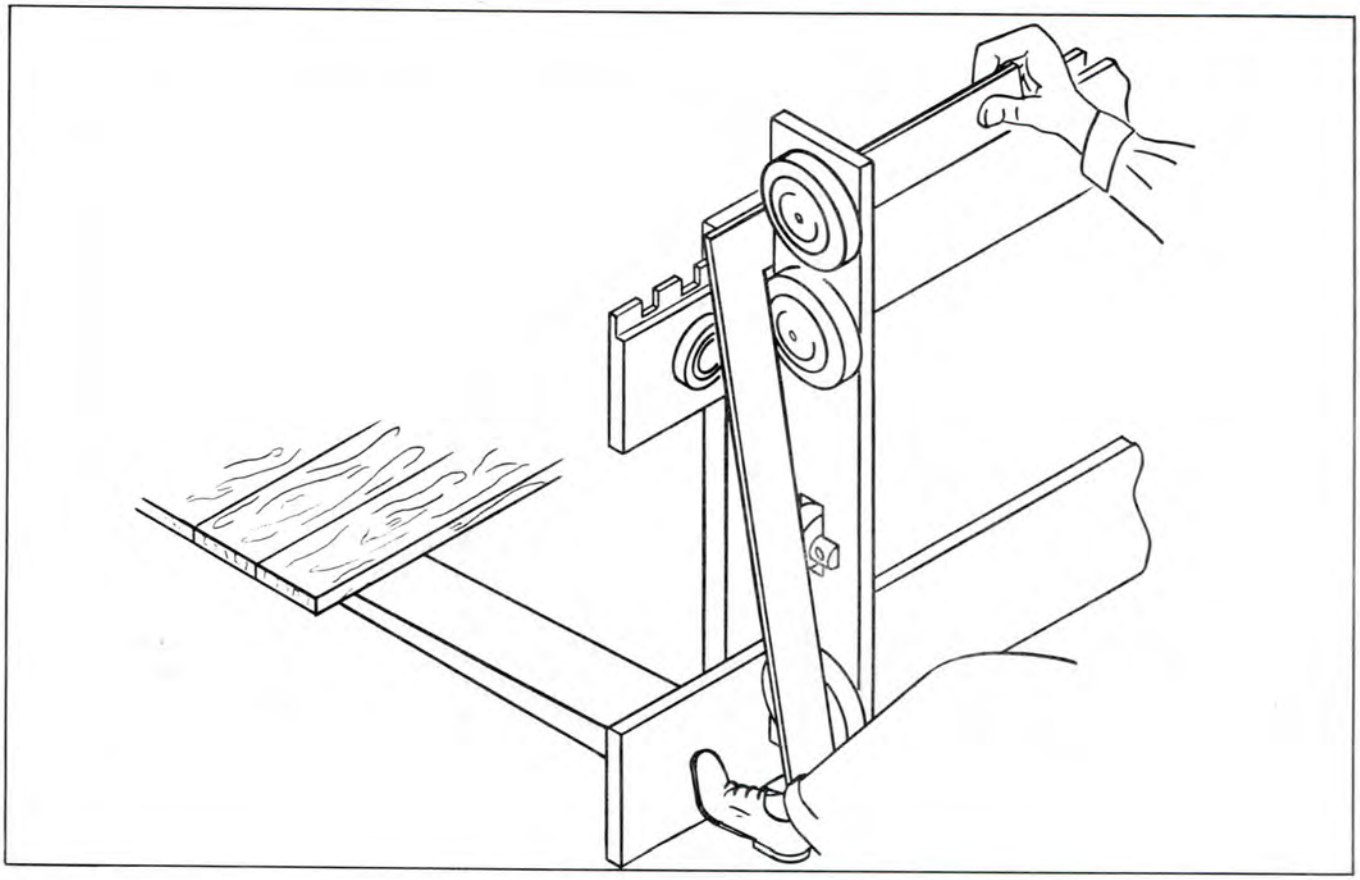


Plate 9579 Checking Squareness (Six Roller Carriage)

... measurement). This side will be square within 1/32"; if not, return to Step 5. and repeat procedure.

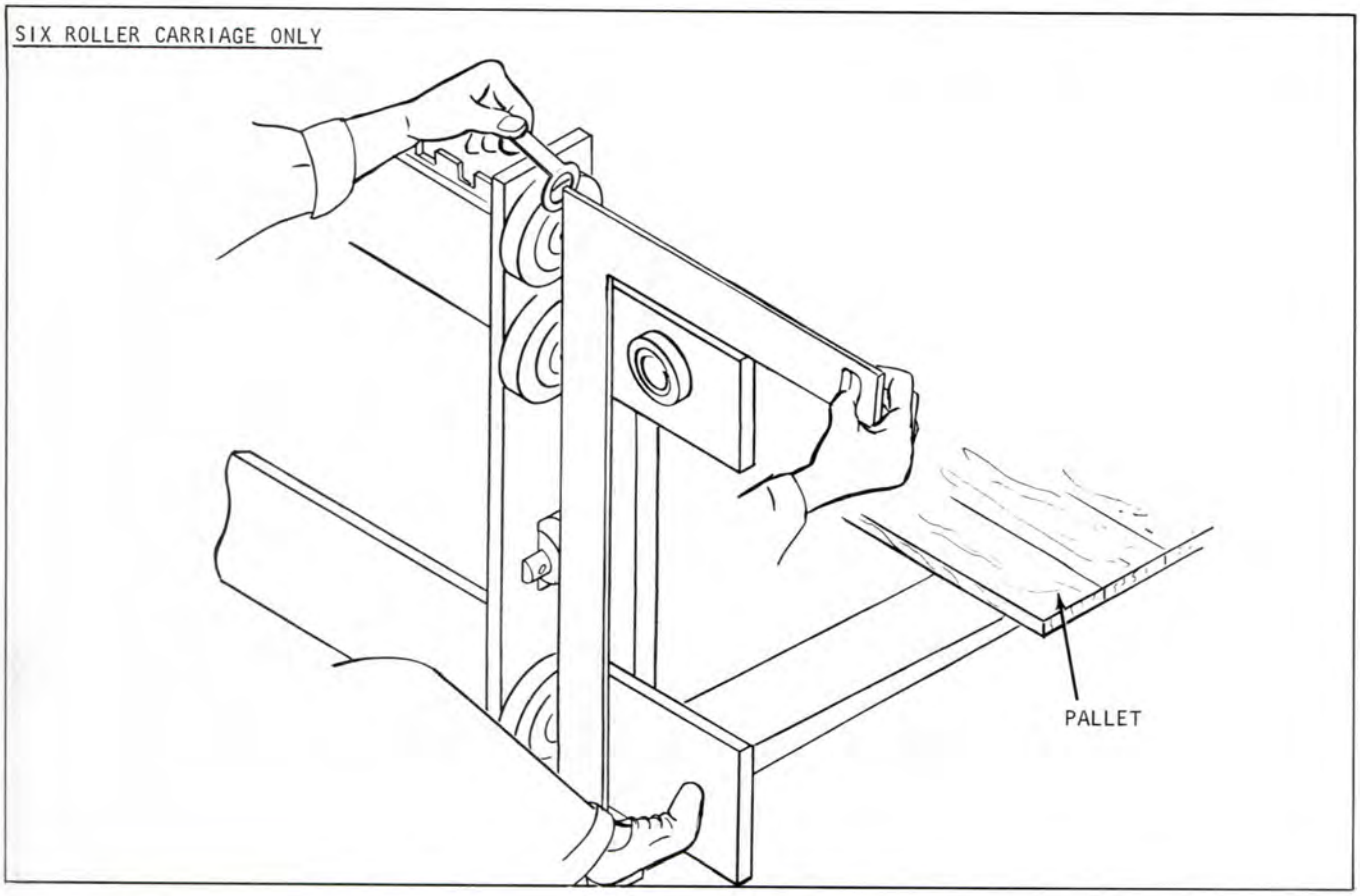


Plate 9580 Top Roller Clearance

Step 1. Place square on the vertical center line of the carriage rollers, as shown above. There must be some clearance between the square and the side surface of the top roller. This clearance should not exceed 1/32" or one shim

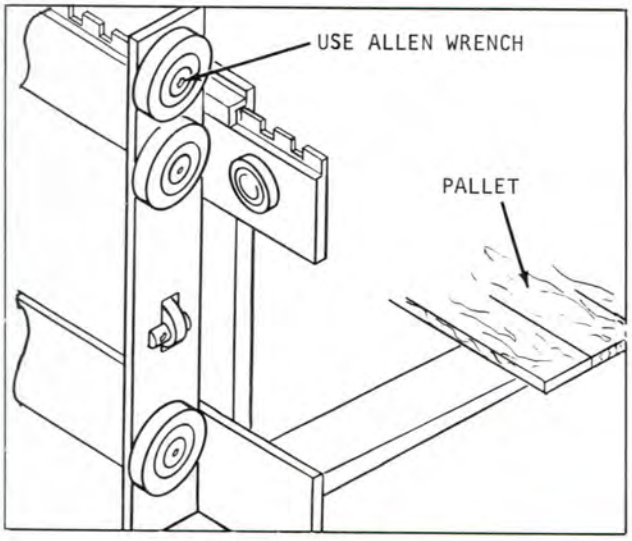


Plate 9581 Removing Top Roller

Step 2. If adjustment is necessary, remove allen screw, lock washer and flat washer to add or remove shims on shaft. Tighten screw securely after completing adjustment.

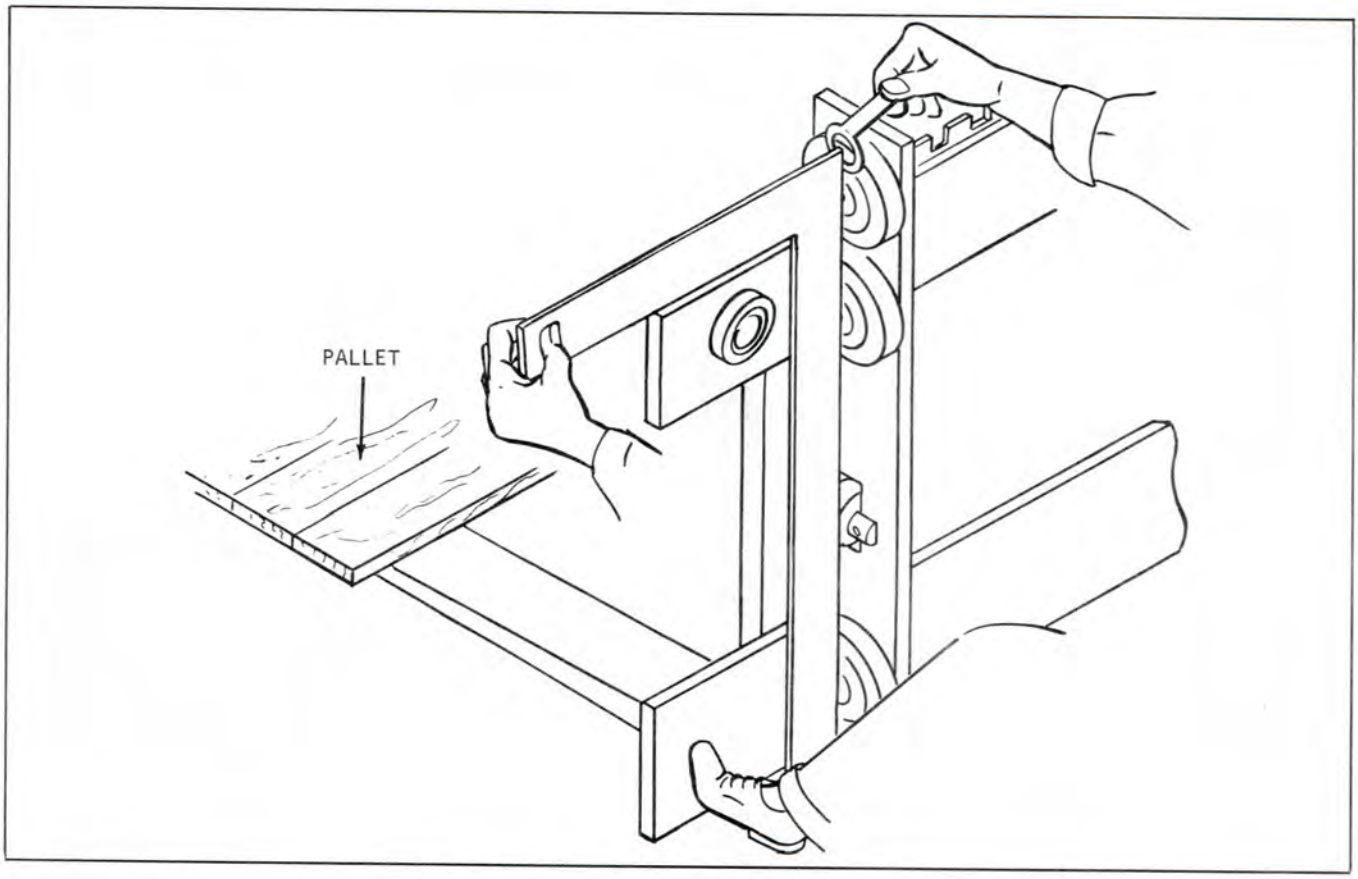


Plate 9582 Top Roller Clearance

Step 3. Check opposite upper roller in the same manner; adjust if necessary.

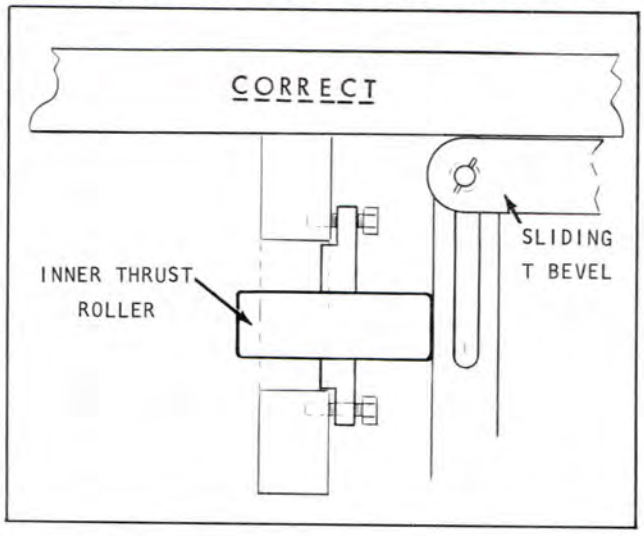


Plate 9583 Checking Squareness■CORRECT

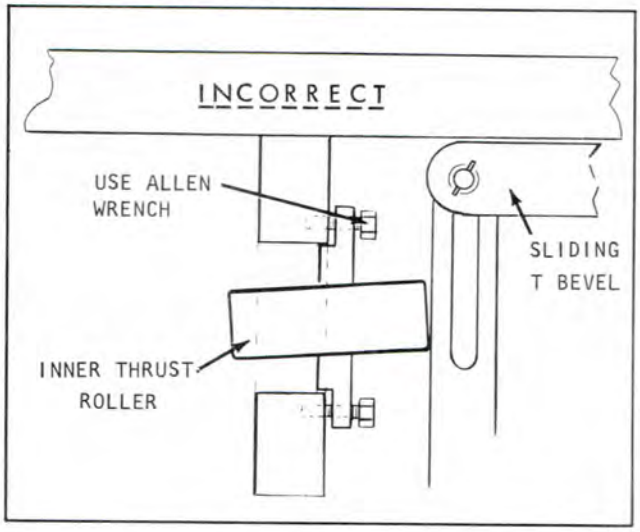


Plate 9584 Checking Squareness■INCORRECT

Step 4. Check squareness of inner thrust rollers with Sliding T Bevel. Set Sliding T Bevel to 90° using carpenter's square.

Step 5. Add or subtract shims for adjustment (Use allen wrench see Plate 9584).

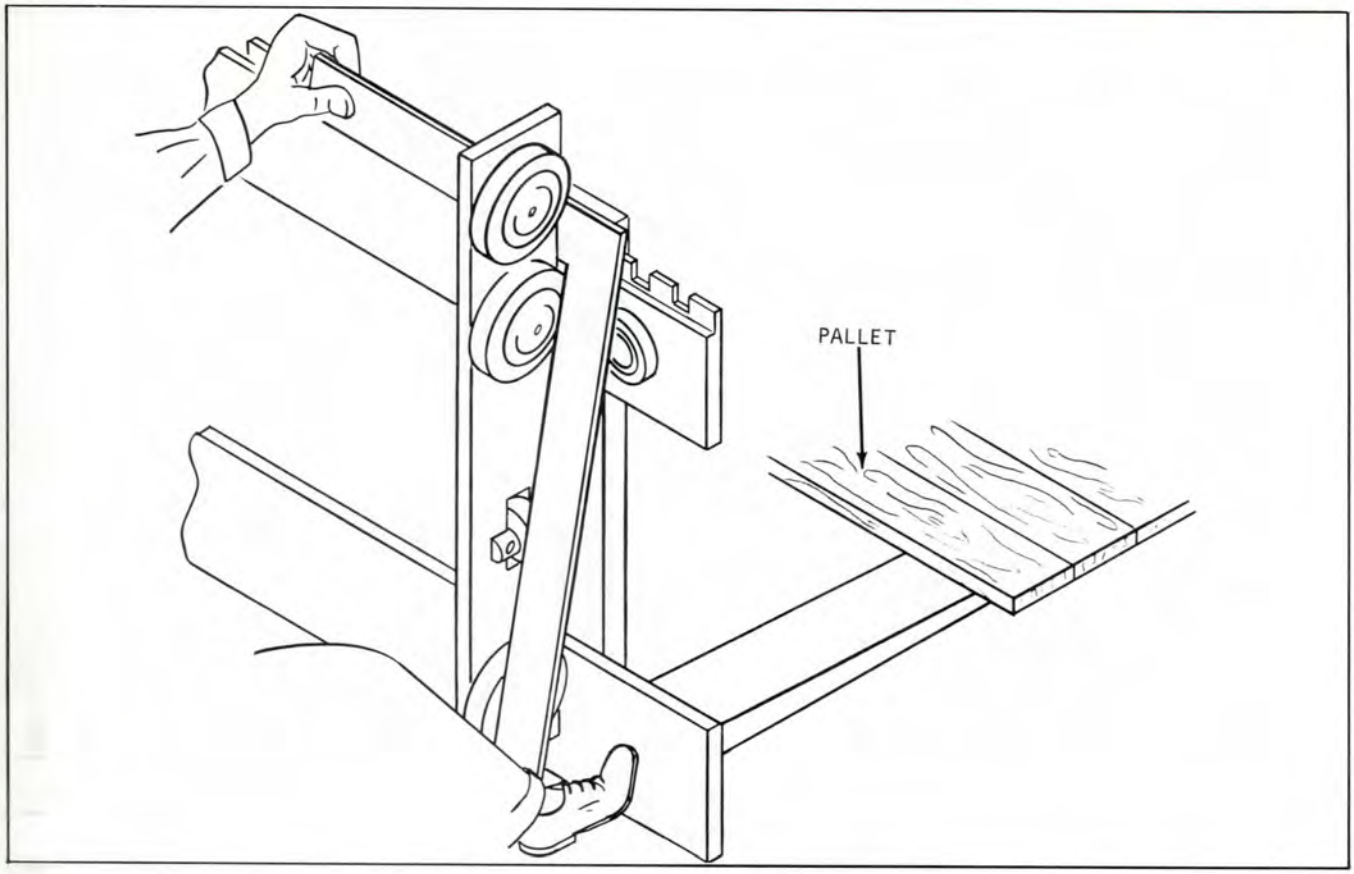


Plate 9574 Square And Side Thrust Roller

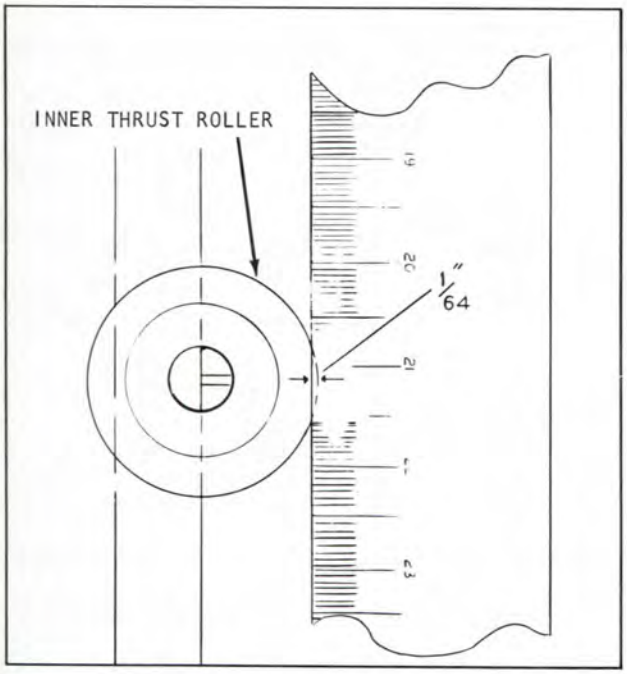


Plate 9585 Reading Roller Projection

Step 6. The inner thrust roller is to project 1/64" past line of square. Use one thrust roller shim and eyeball distance as shown (Plate 9573 and Plate 9585).

Step 7. Repeat Step 6. on opposite side.

C. CARRIAGE INSTALLATION

N O T E

Before installing carriage, check upright for proper shimming adjustment.

Step 1. Drive machine up to carriage and position upright to match tilt of carriage.

Step 2. Raise inner rails to just clear upper carriage rollers.

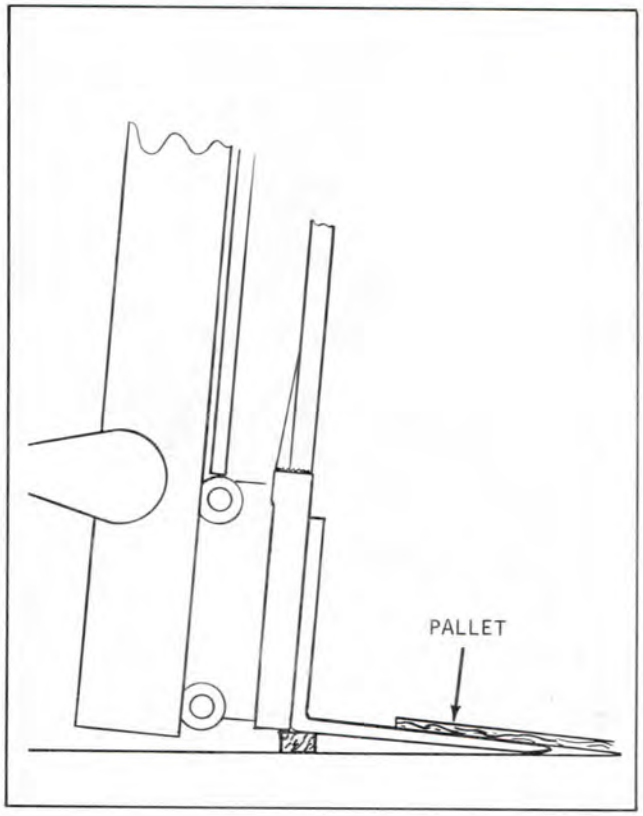


Plate 9565 Inner Rail Clearing Carriage Rollers

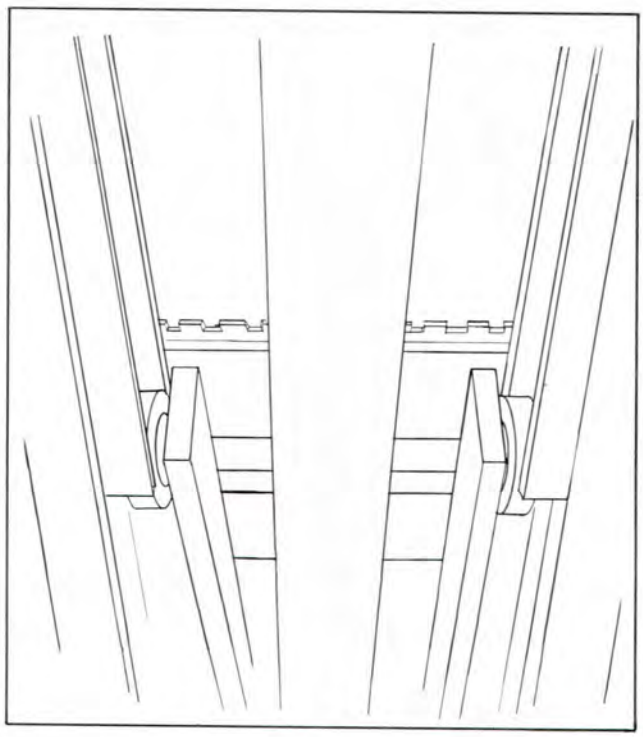


Plate 9591 Rollers Guiding Into Inner Rail

Step 3. Continue to drive machine forward until inner rails line up with upper carriage rollers, then.... slowly lower inner rails to full down position.

C A U T I O N

CHECK TO BE SURE THE TOP CARRIAGE ROLLERS ARE GUIDING INTO INNER RAIL.

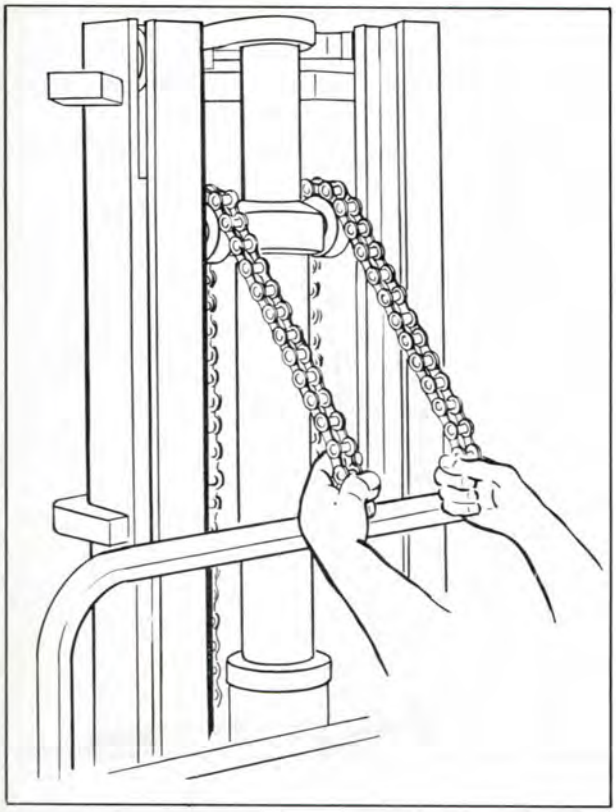


Plate 9586 Pulling Piston Head Down

Step 3(a). Remove wires holding lift chains.

(b). With a chain in each hand and someone holding the lift cylinder lever down, pull the piston to full down position. Place chains behind carriage.

Step 5. Raise carriage about 5' and place a 3' to 4' long 4"x4" wooden beam under it. DO NOT stand directly under forks. Lower carriage onto beam.

Step 6. Replace bolts with anchor pins.

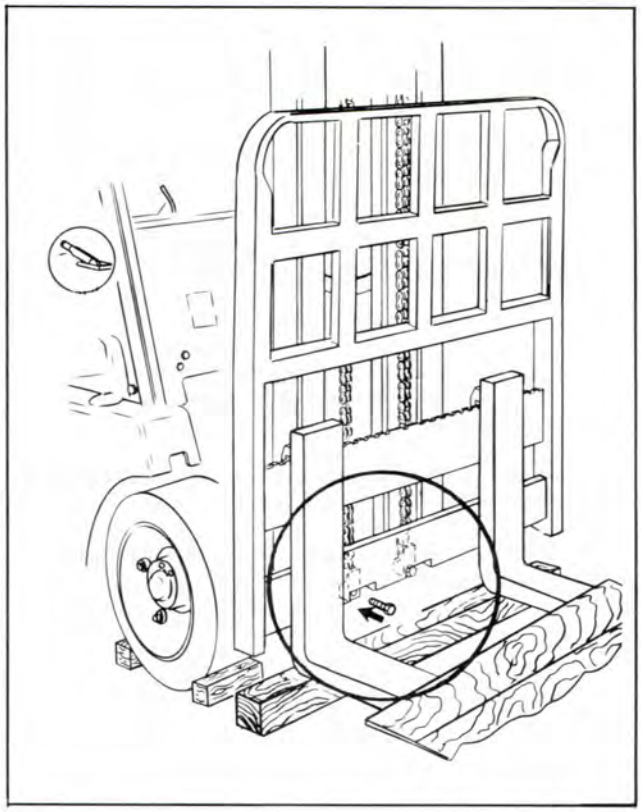


Plate 9587 Installing Bolts

Step 4. Put chain anchors in carriage anchor brackets and install 3/8" x 2" bolts in anchor pin holes.

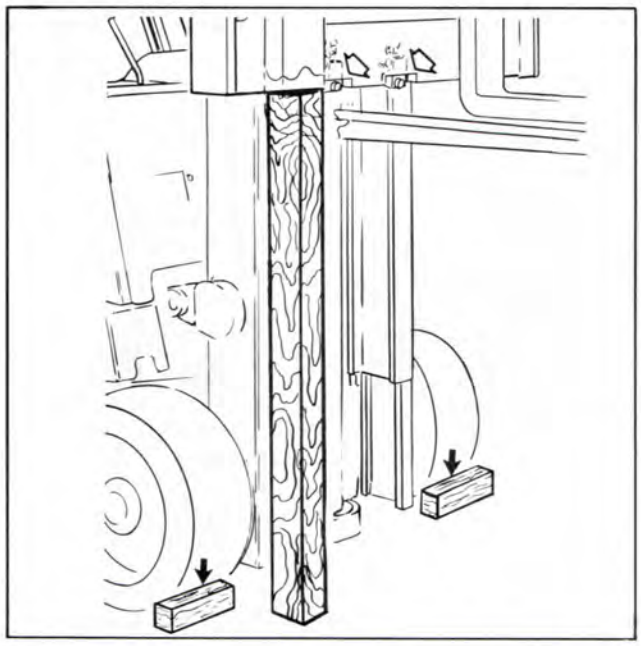


Plate 9593 Carriage Pin Replacement

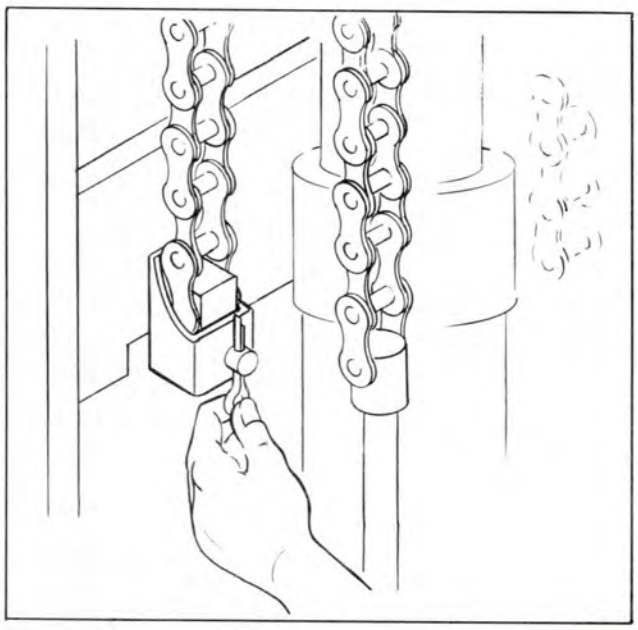
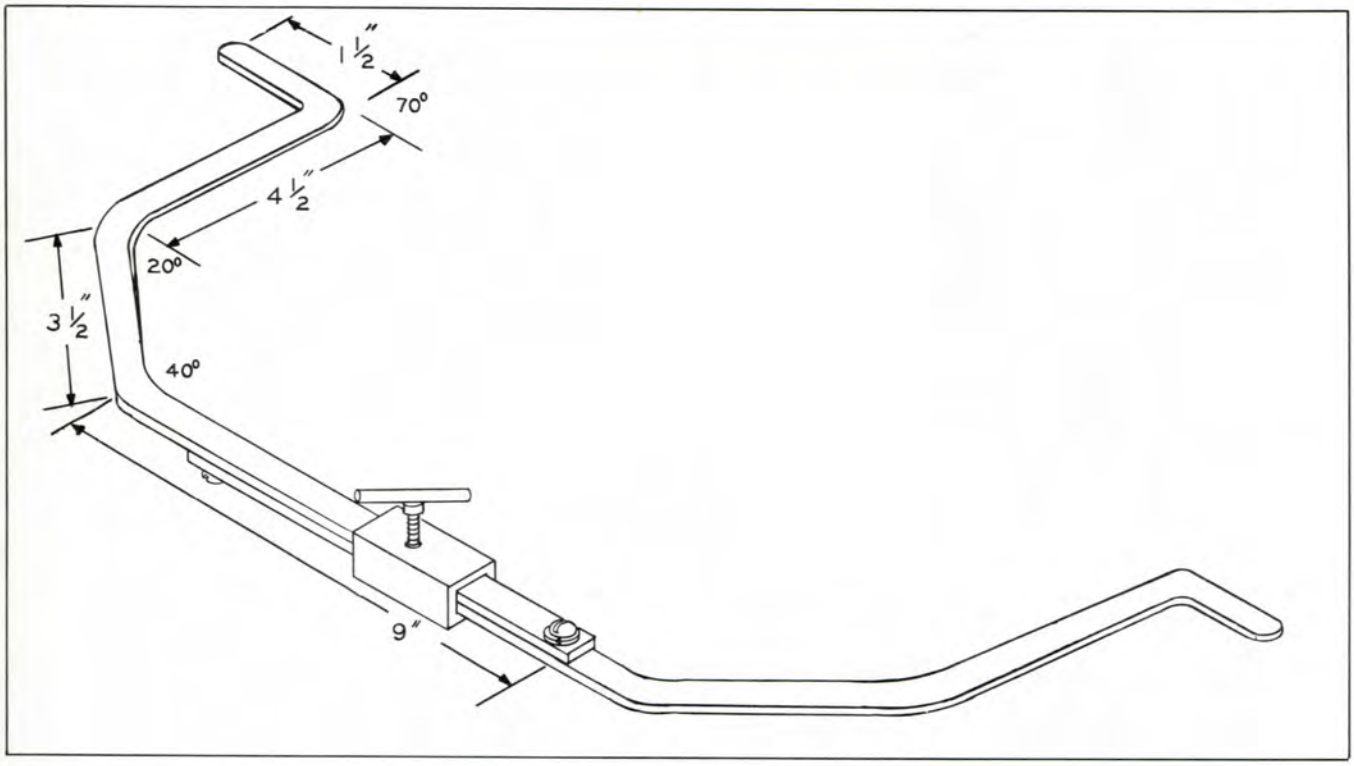


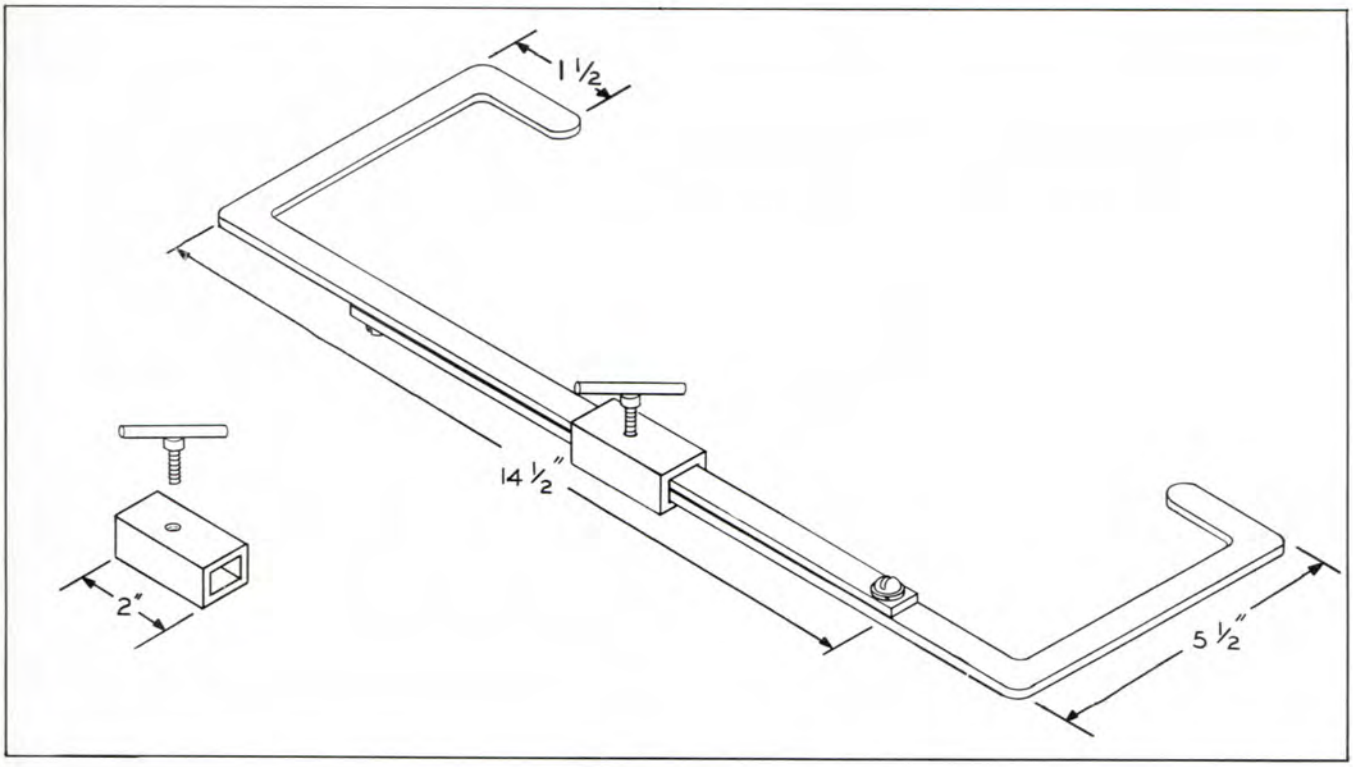
Plate 9588 Installing Cotter Pins

Step 7. Replace cotter pins in anchor pins.

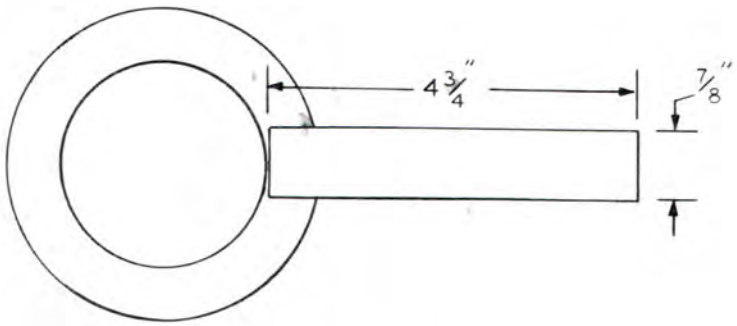
Step 8. Raise and lower carriage to full positions checking all phases of operation.

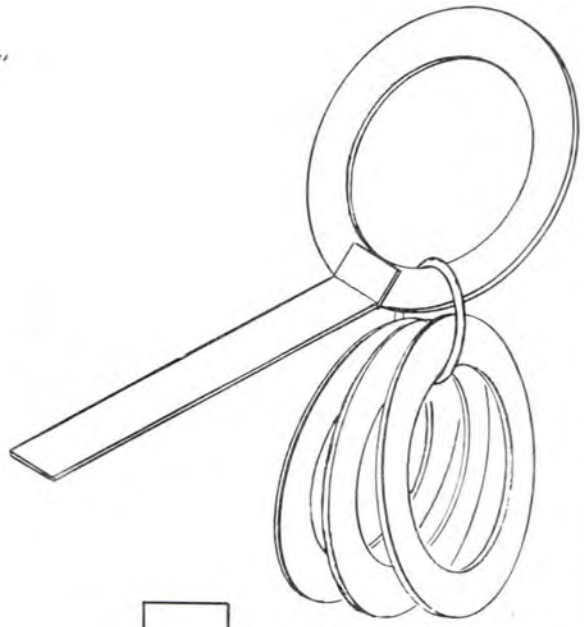


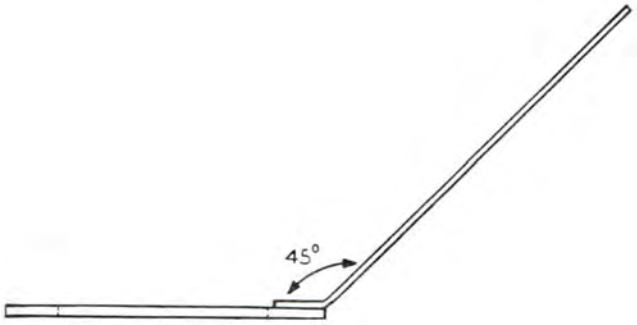
INSIDE SPANNING TOOL

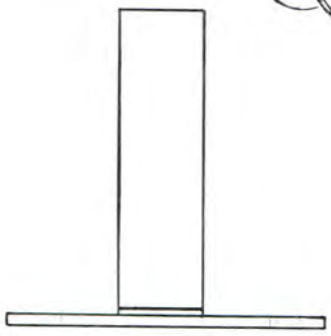


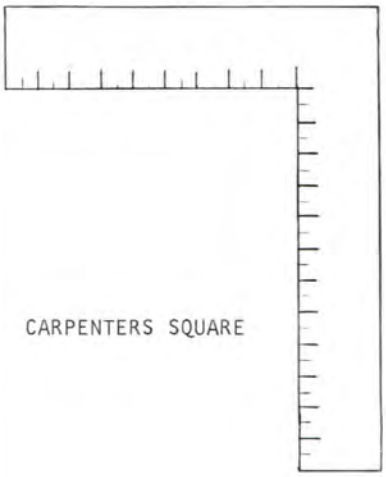
OUTSIDE SPANNING TOOL

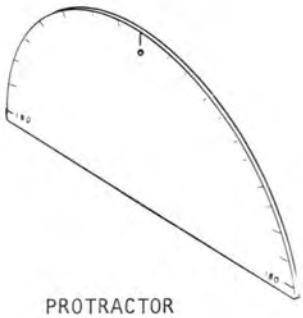


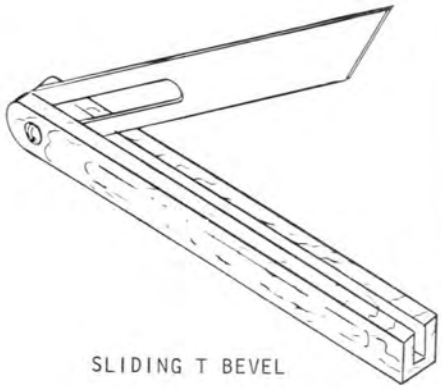







CARPENTERS SQUARE


PROTRACTOR


SLIDING T BEVEL

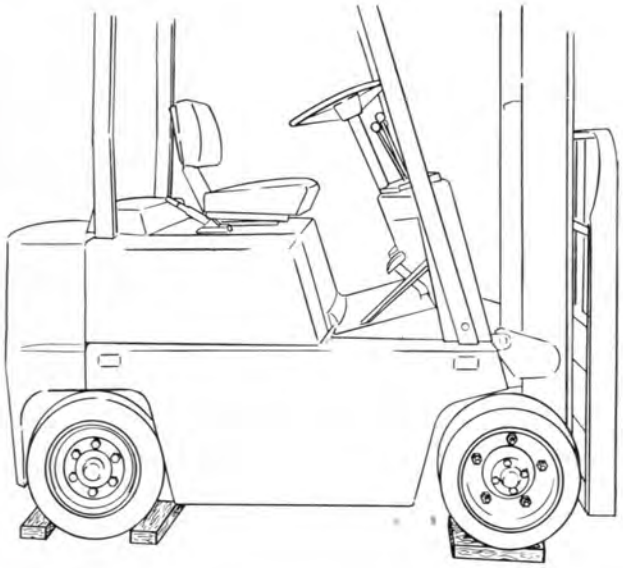


Plate 9811. Drive Wheels on Blocking, Block Steer Wheels

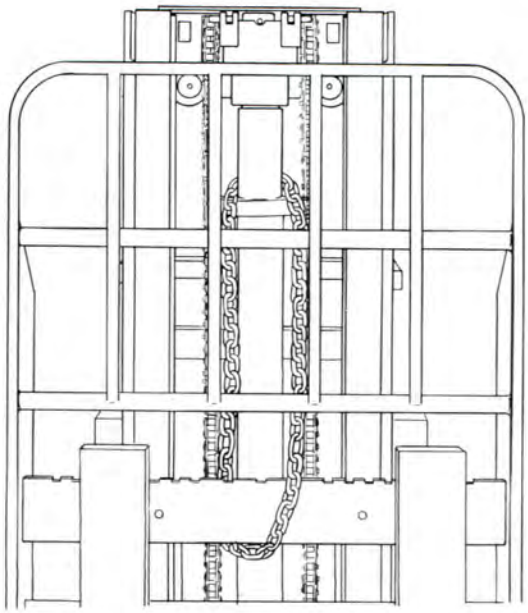
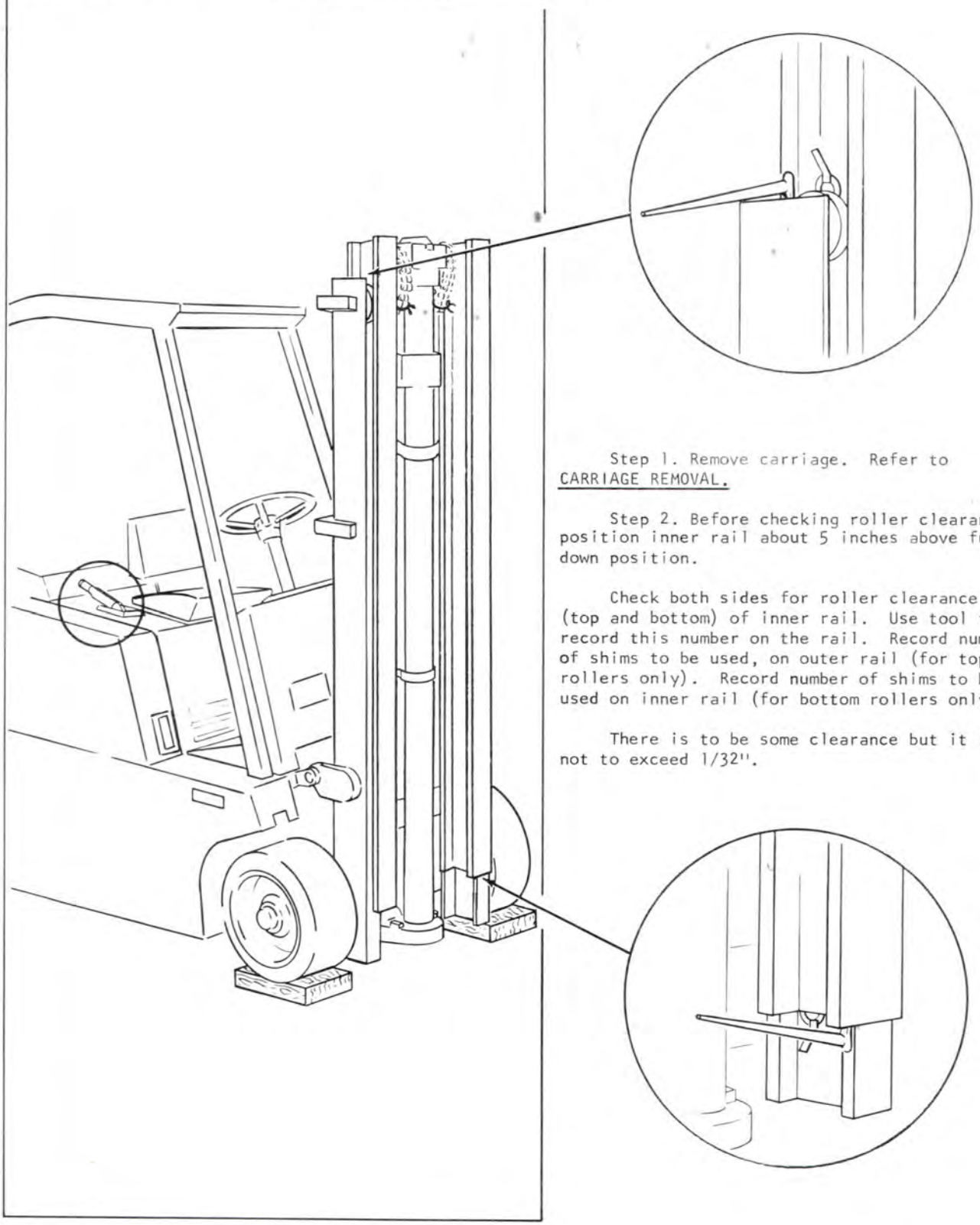


Plate 9807. Support Carriage with Chain

```
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 X X X X X
X                                                                     X
X                          W A R N I N G                              X
X                                                                     X
X IF CARRIAGE IS TO BE LEFT ON MACHINE, SUPPORT CARRIAGE              X
X                                                                     X
X BY PLACING CHAIN THROUGH LOWER CARRIAGE BAR AND RAPPING             X
X                                                                     X
X IT AROUND THE CYLINDER JUST ABOVE THE CYLINDER CHAIN                X
X                                                                     X
X ANCHOR BRACKET.                                                     X
X                                                                     X
X BE SURE TO BLOCK STEER WHEELS BEFORE WORKING ON UPRIGHT.            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 X X X X X X X X
```

UPRIGHT ROLLER ADJUSTMENT -- STANDARD AND HILO SERIES 500



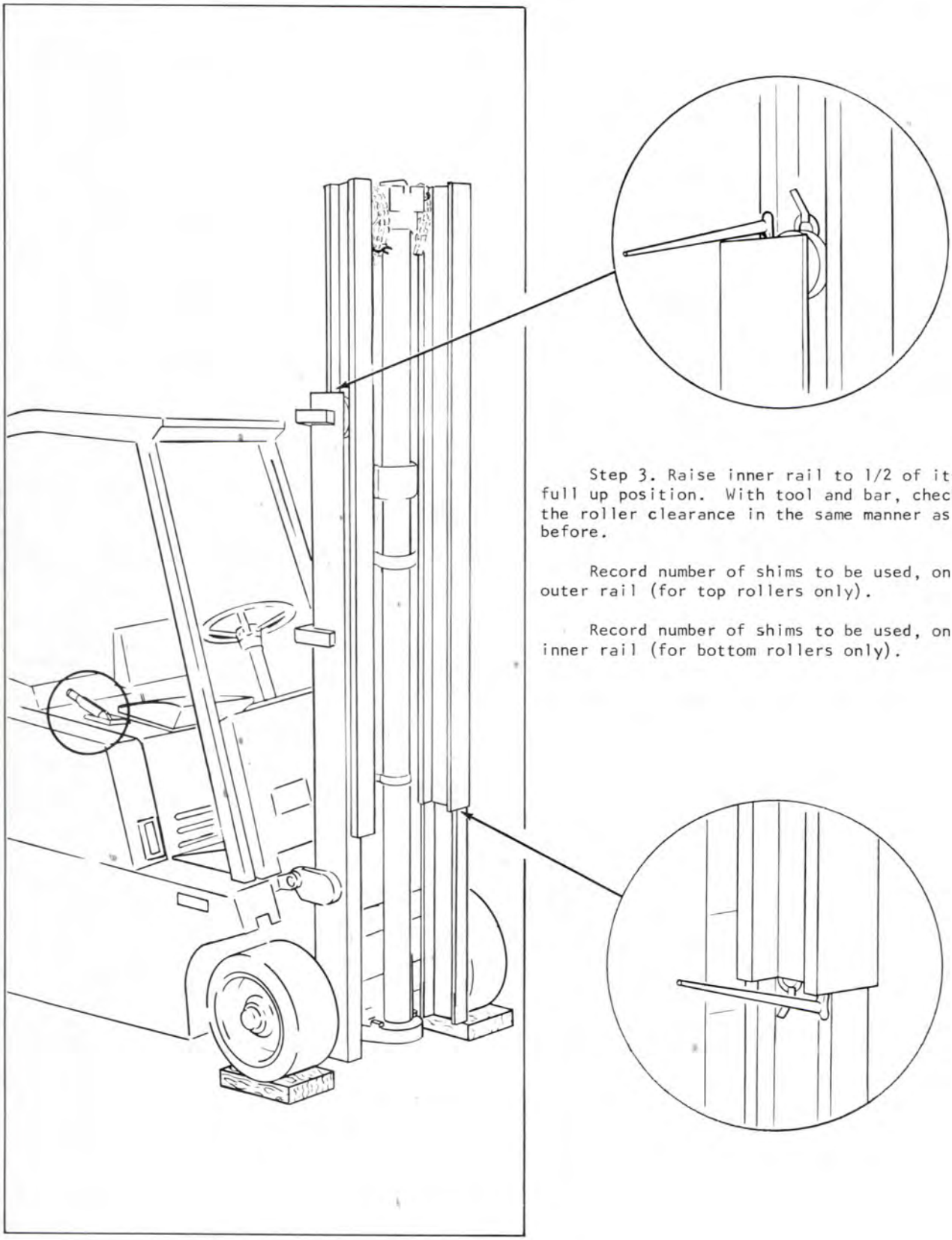
Step 1. Remove carriage. Refer to CARRIAGE REMOVAL.

Step 2. Before checking roller clearance, position inner rail about 5 inches above full down position.

Check both sides for roller clearance at (top and bottom) of inner rail. Use tool to record this number on the rail. Record number of shims to be used, on outer rail (for top rollers only). Record number of shims to be used on inner rail (for bottom rollers only).

There is to be some clearance but it is not to exceed 1/32".

Plate 9804

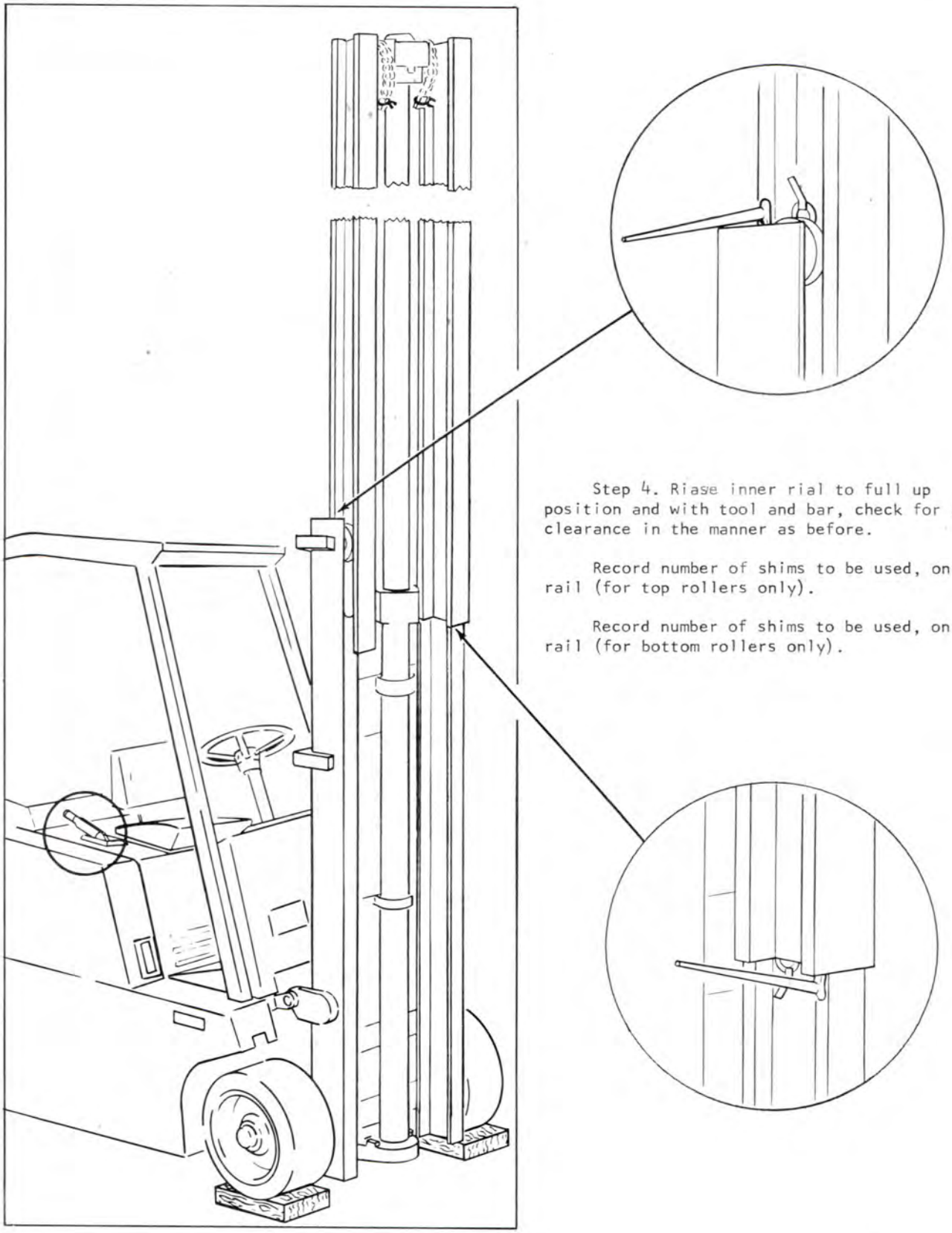


Step 3. Raise inner rail to 1/2 of its full up position. With tool and bar, check the roller clearance in the same manner as before.

Record number of shims to be used, on outer rail (for top rollers only).

Record number of shims to be used, on inner rail (for bottom rollers only).

Plate 9805



Step 4. Riase inner rial to full up position and with tool and bar, check for roller clearance in the manner as before.

Record number of shims to be used, on outer rail (for top rollers only).

Record number of shims to be used, on inner rail (for bottom rollers only).

Plate 9806

Step 5. Raise inner rail about 5 inches and remove stop block.

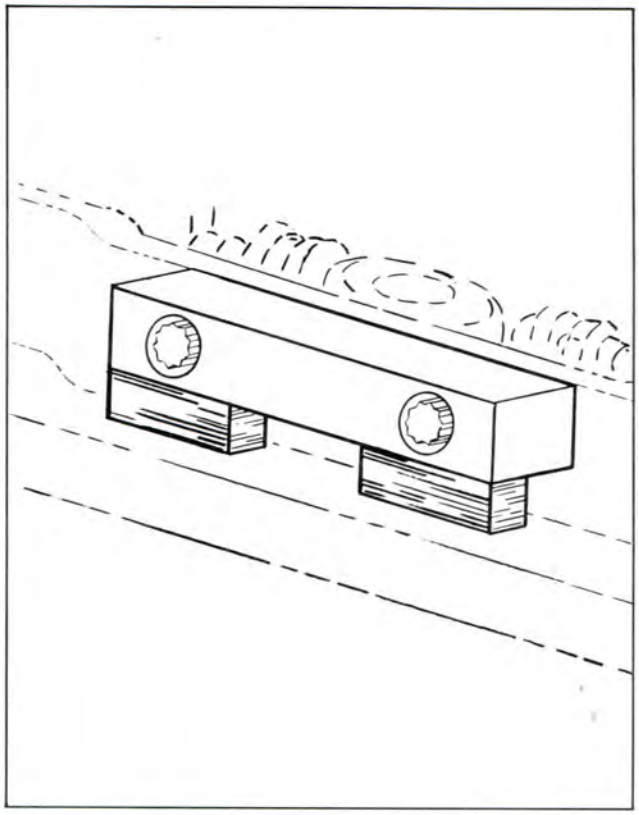
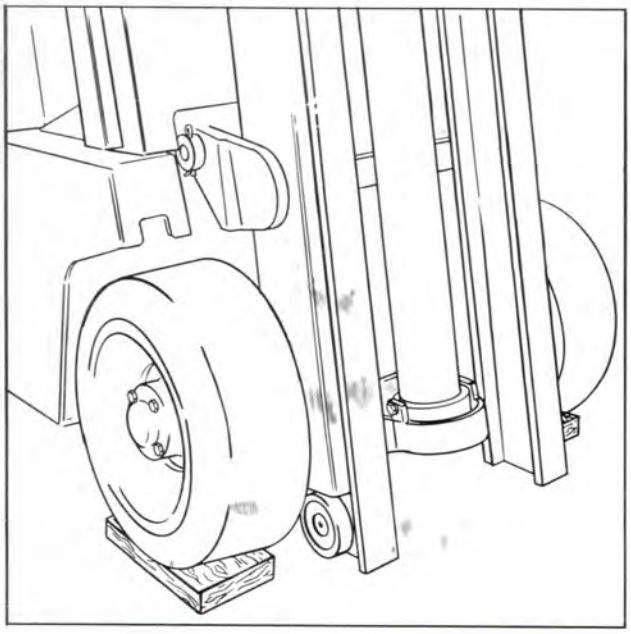


Plate 9808



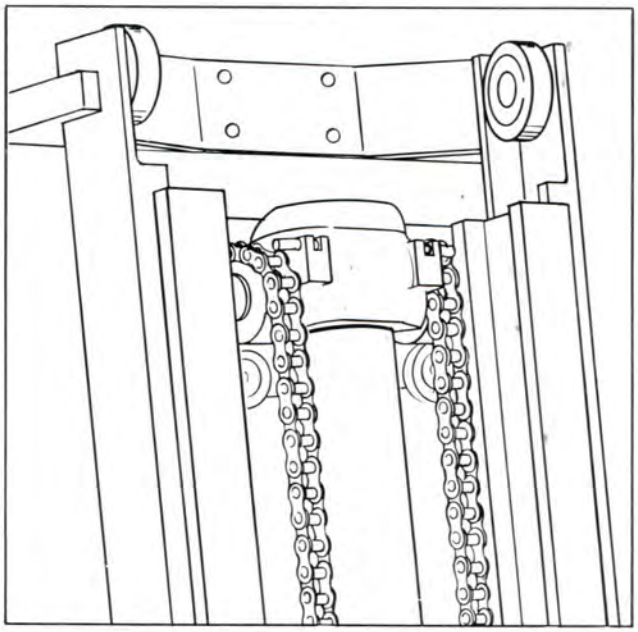


Plate 9809

Step 6. Lower inner rail until upper and lower rollers are clear for removal.

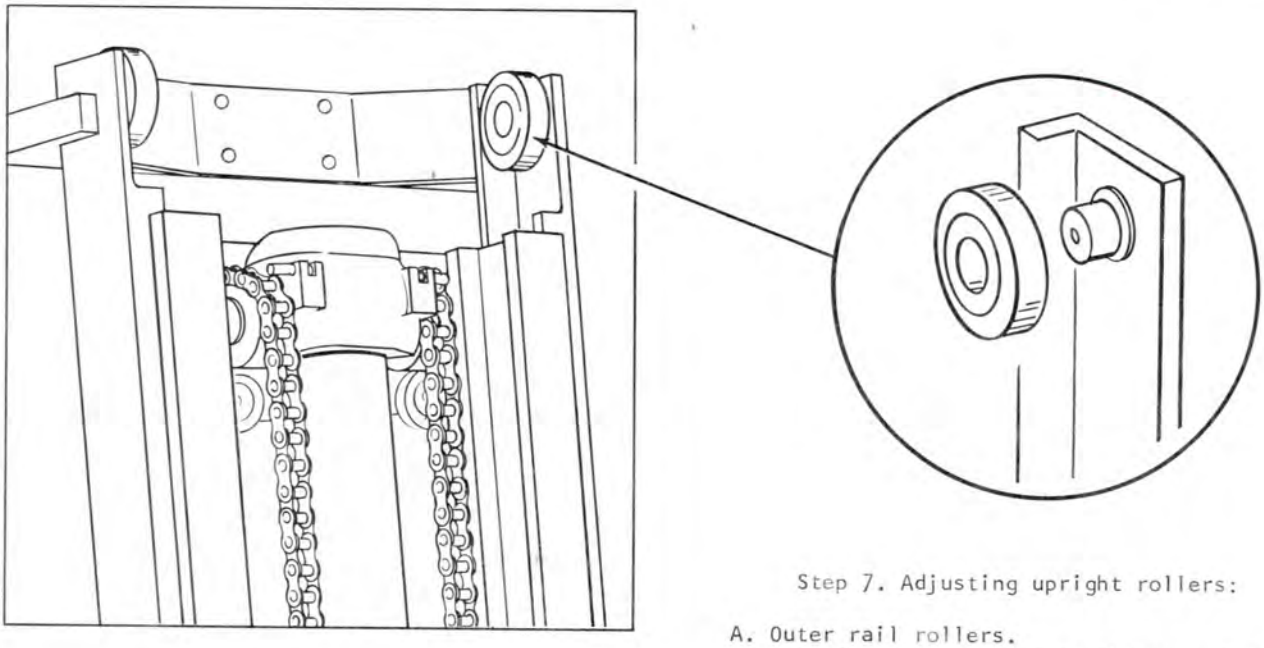


Plate 9810

Step 7. Adjusting upright rollers:

A. Outer rail rollers.

1. Count the number of shims at the right and left hand rollers.

2. Look at the three (3) numbers you recorded on the outer rail in Steps 2-3 & 4. The smallest of these numbers is the total number of shims to be added. A"0" means DO NOT add shims.

3. Your target for adjustment is to have the same number of shims at each upper roller. If you end up with an extra shim DO NOT remove it. Mark the side having an extra shim.

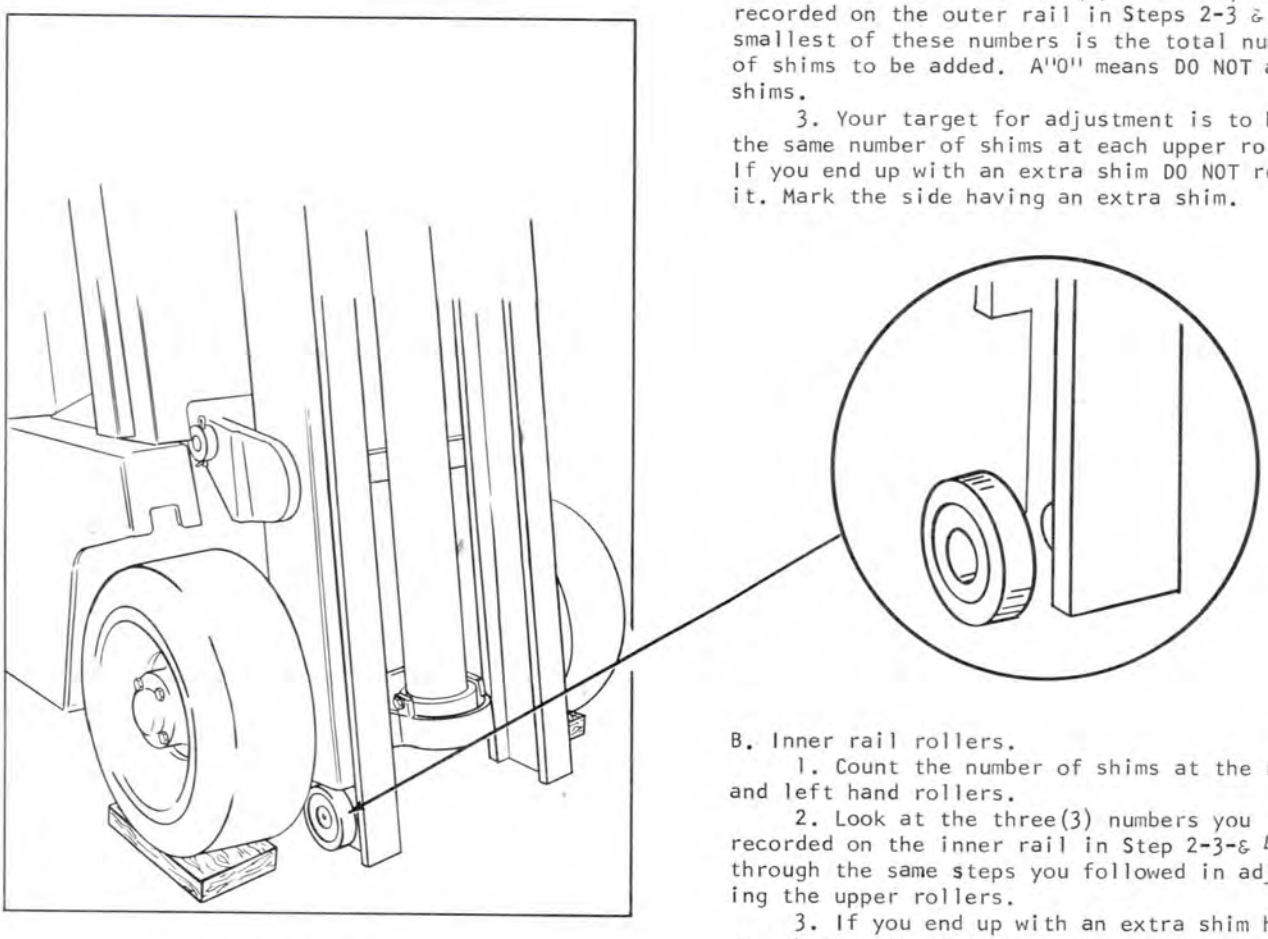


Plate 9812

B. Inner rail rollers.

1. Count the number of shims at the right and left hand rollers.

2. Look at the three(3) numbers you recorded on the inner rail in Step 2-3-& 4. Go through the same steps you followed in adjusting the upper rollers.

3. If you end up with an extra shim here too, besure it is on the same side as the extra upper shim.

Step 8. Raise inner rail about 5 inches above upper tie bar(of the outer rail) and install stop block and pad assembly.

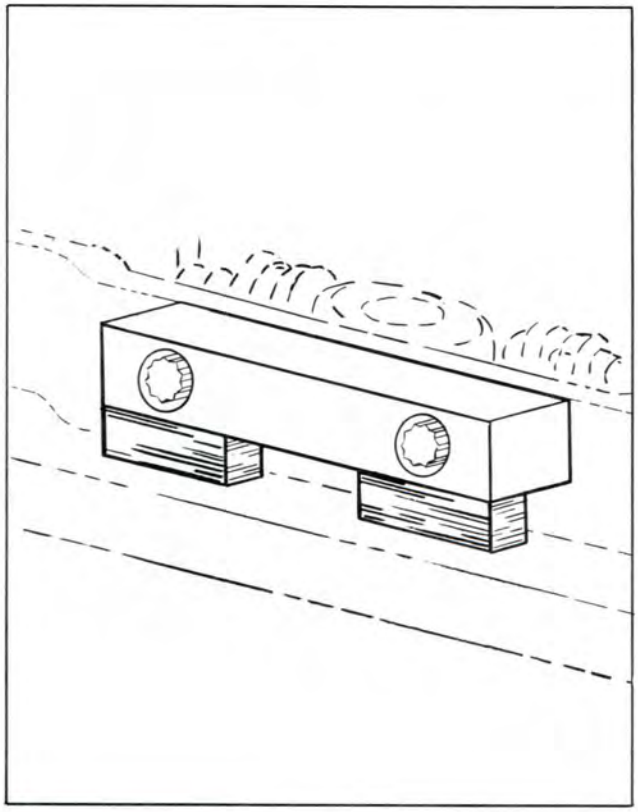


Plate 9808

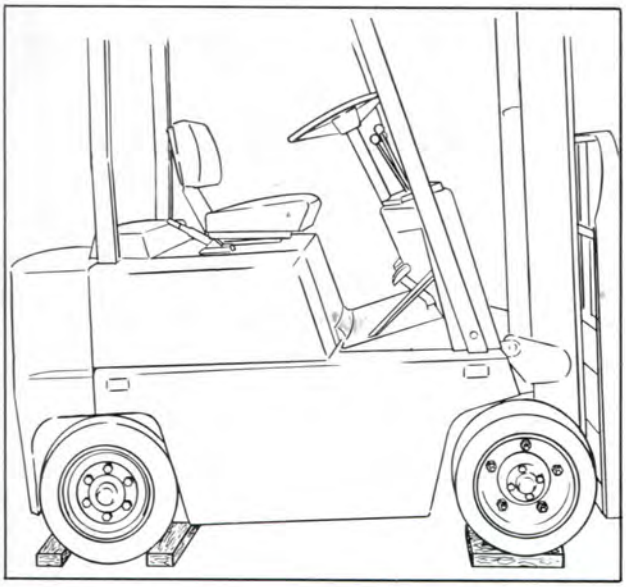


Plate 9811

Step 9. Remove carriage support chain and wheel blocks.

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.

If it becomes necessary to adjust the lift chains ...proceed as follows:

‡ ‡ ‡ ‡ ‡ ‡ W A R N I N G ‡ ‡ ‡ ‡ ‡ ‡

KEEP CLEAR OF LOAD AND CARRIAGE WHEN MAKING ANY ADJUSTMENTS OR ADJUSTMENT CHECKS...TO AVOID INJURY IF ANY MALFUNCTION SHOULD OCCUR AND CAUSE LOAD OR CARRIAGE TO FALL.

‡ ‡ ‡ ‡ ‡ ‡ ‡ ‡ ‡ ‡ ‡ ‡

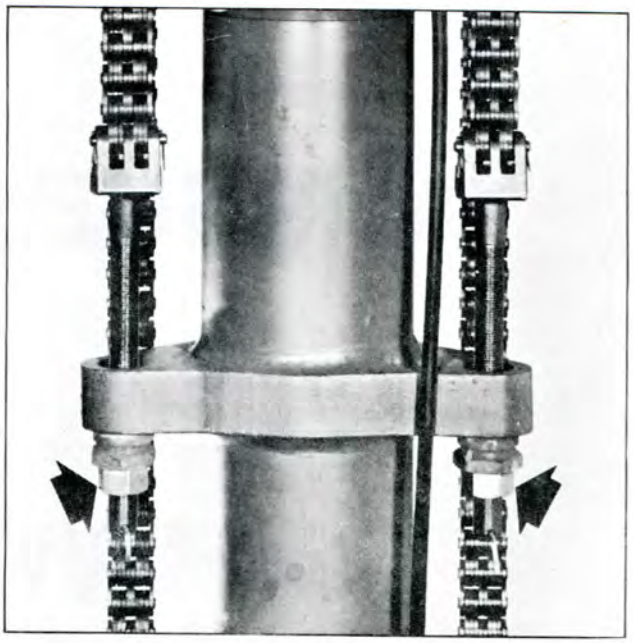


Plate 6634.

1. Elevate carriage to about four (4) feet.
2. Smear grease on the innerslide channel as shown in Plate 8622.
3. Pick up a capacity load.

N O T E

It is important that the chain adjustment be made with a capacity load. In this manner...you will allow for chain stretch.

4. Making sure upright is either vertical or aft of vertical...lower load to the down position.
5. Remove capacity load.
6. Raise carriage and measure the distance from where the center of the BOTTOM CARRIAGE ROLLER stopped...to the edge of the inner slide. Distance must not be less than 1/2 inch.

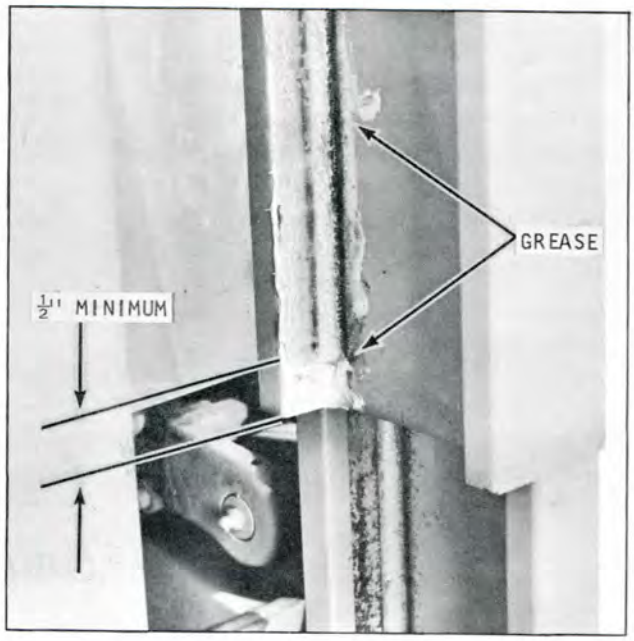


Plate 8622.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

APPENDIX " 6 "

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

REMOVAL OF COUNTERWEIGHT

1. IF the vehicle is equipped with a tow bar...

(A) Disconnect hydraulic brake line at connection in rear of counterweight (where applicable).

(B) Disconnect light cable (where applicable).

(C) Lower tow bar to ground...remove tow bar fasteners and tow bar.

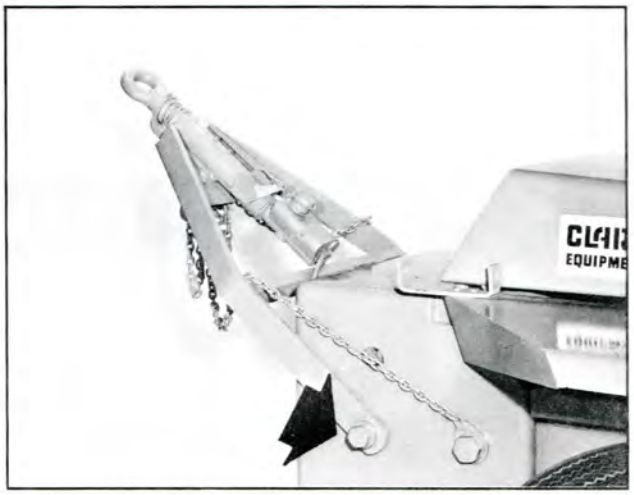


Plate 11157.

2. Install eye bolts...capable of lifting
5,000 pounds (if working on IT-50 model),
6,000 pounds (if working on IT-60 model),
7,000 pounds (if working on IT-70 model),
8,000 pounds (if working on IT-80 model).
Attach a chain fall...capable of lifting the capacity load and, remove counterweight fasteners.

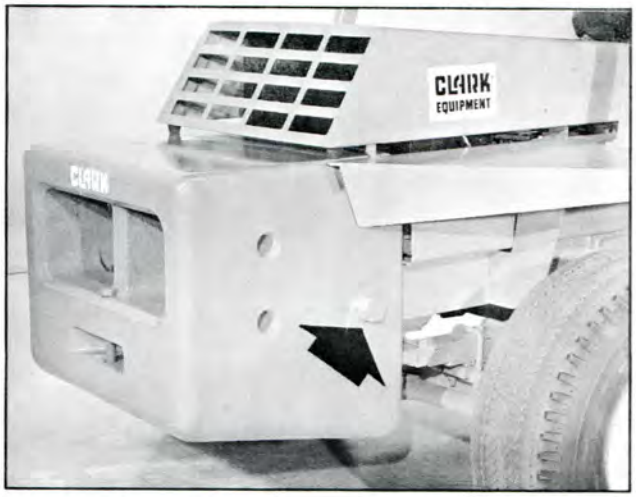


Plate 11158.

3. Standing to one side...push counterweight away from vehicle. Lower counterweight to the floor or ground.

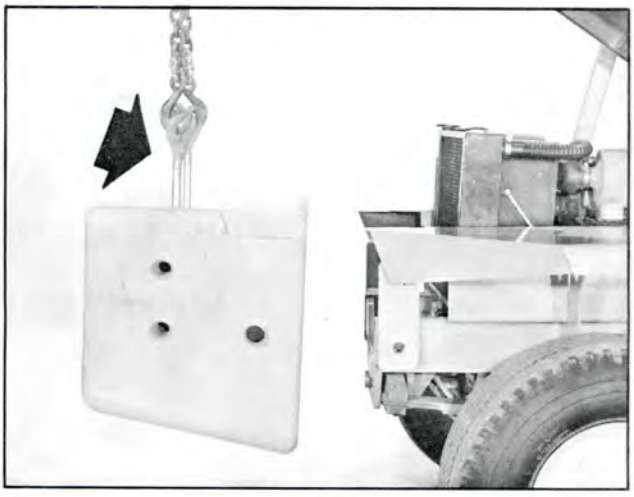


Plate 11159.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

Know the location of your ... Original Equipment Name Plate (Model Capacity and Serial Number) and...

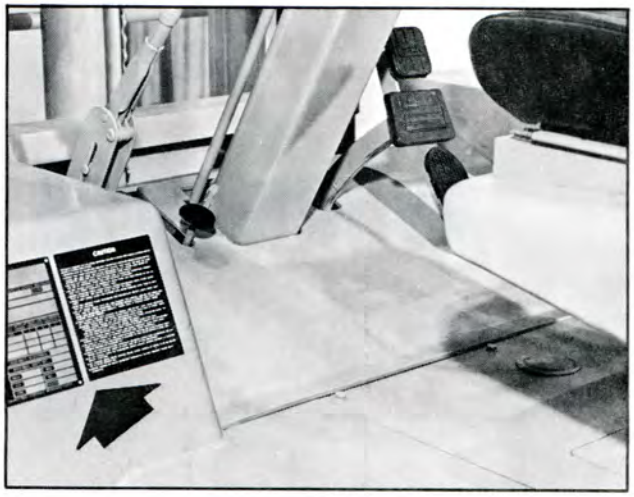


Plate 10850.

...machine serial number...stamped in the vehicle's frame.

Plate 10851.

Know the location of your ... Upright Deck Number...stamped in the outer rail assembly.

Plate 9475.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

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DRIVE SAFELY

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WHEN ORDERING PARTS

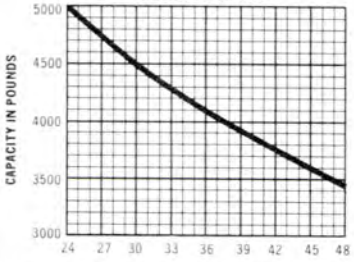
Rev OCT 73 1127-Z

DIMENSIONAL SPECIFICATIONS

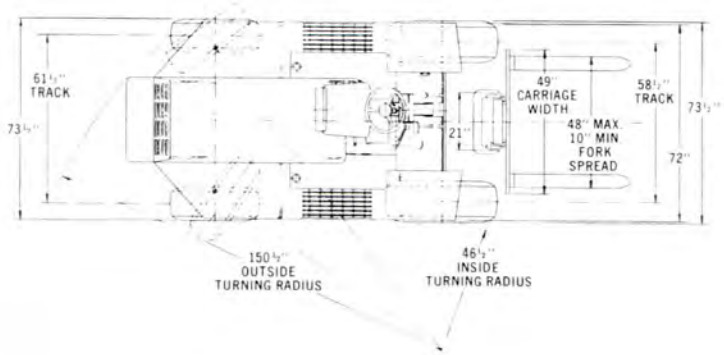
CLARKLIFT® IT-50

5,000 pounds capacity at 24" load center

CAPACITY CHART



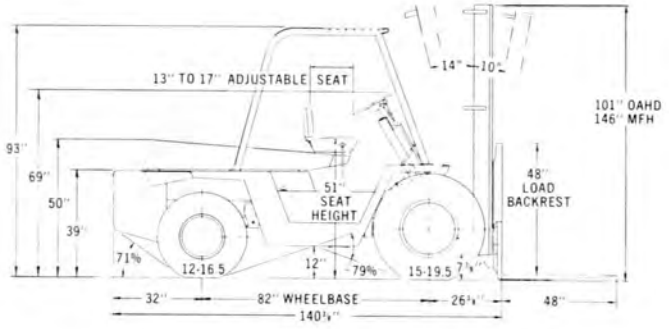
Load center in inches from front face of forks — Rated capacities shown above are computed with uprights in vertical position. Lifts above 147" maximum fork height, contact factory. Specific capacities will be shown on truck nameplate.



Clark products and specifications are subject to improvements and changes without notice.

UPRIGHT DIMENSION TABLE

STD. UPRIGHT		
MFH	OAHL	OAHR
146" 179"	101" 120"	174" 208"



CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

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WHEN ORDERING PARTS

Rev OCT 73 1127-Z

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

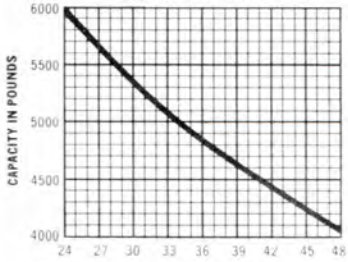
Rev OCT 73 1127-Z

DIMENSIONAL SPECIFICATIONS

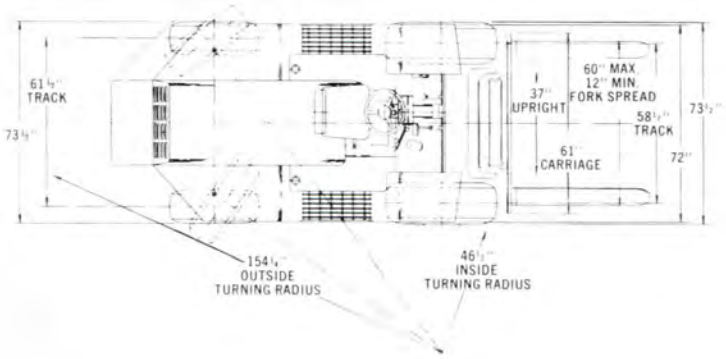
CLARKLIFT® IT-60N

6,000 pounds capacity at 24" load center

CAPACITY CHART



Load center in inches from front face of forks — Rated capacities shown above are computed with uprights in vertical position. Lifts above 147" maximum fork height, contact factory. Specific capacities will be shown on truck nameplate.



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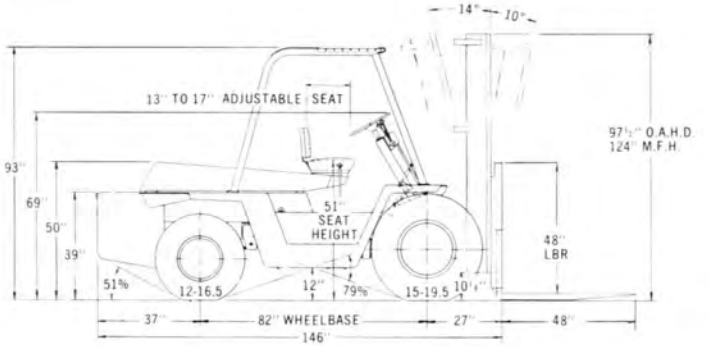
UPRIGHT DIMENSION TABLE

STD. UPRIGHT			FFL / TSU			
MFH	OAHL	OAHR	MFH	FFL	OAHL	OAHR
124"	97½"	159½"	123"	43½"	76"	158"
148"	109½"	183½"	252"	96½"	129"	287"
181"	126"	216½"				

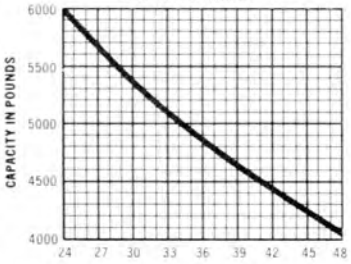


DIMENSIONAL SPECIFICATIONS

CLARKLIFT® IT-60W

6,000 pounds capacity at 24" load center

CAPACITY CHART



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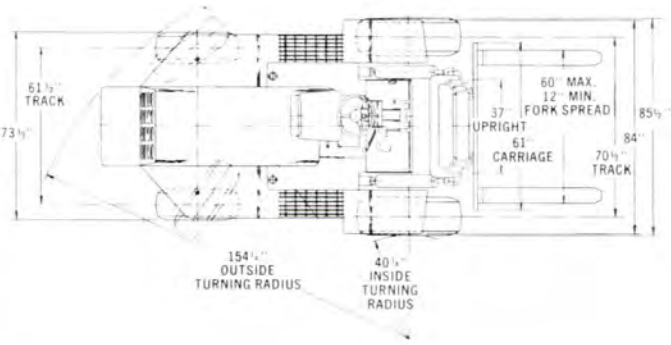
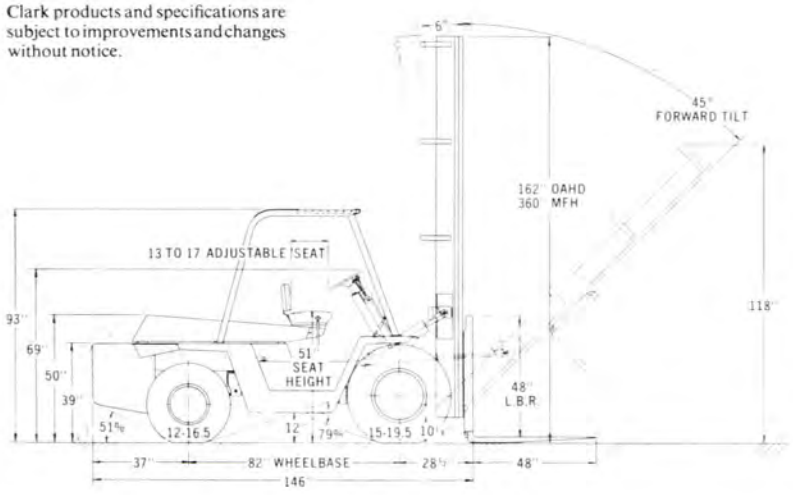


Clark products and specifications are subject to improvements and changes without notice.

UPRIGHT DIMENSION TABLE

FULL FREE LIFT TRIPLE STAGE UPR.			
MFH	FFL	OAHL	OAHR
288"	112½"	145"	323"
360"	129½"	162"	395"

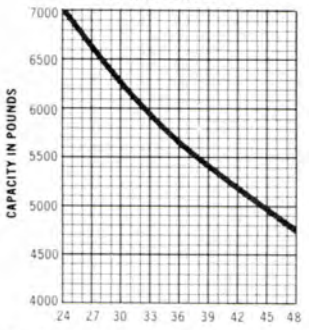


DIMENSIONAL SPECIFICATIONS

CLARKLIFT® IT-70N

7,000 pounds capacity at 24" load center

CAPACITY CHART



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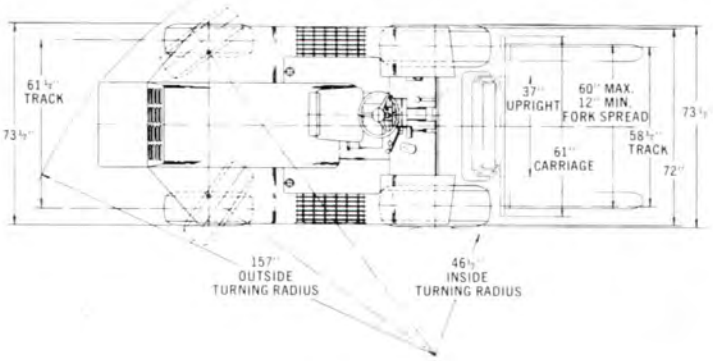

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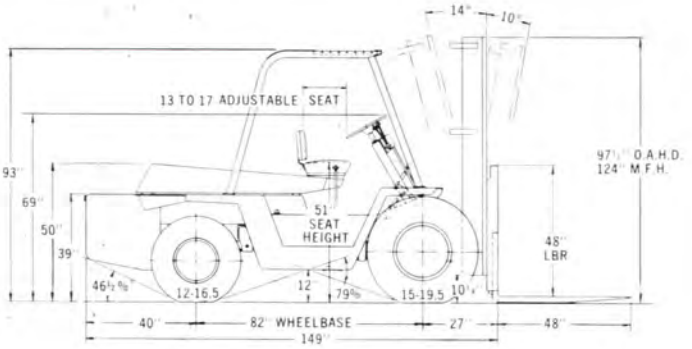
UPRIGHT DIMENSION TABLE

STD. UPRIGHT			FFL / TSU			
MFH	OAHL	OAHR	MFH	FFL	OAHL	OAHR
124" 148" 181"	97½" 109½" 126"	159½" 183½" 216½"	123" 252"	43½" 96½"	76" 129"	158" 287"

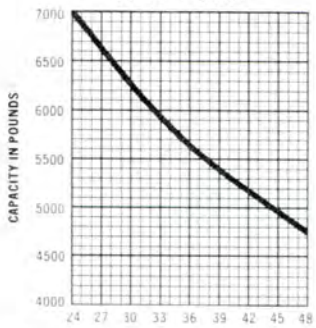


DIMENSIONAL SPECIFICATIONS

CLARKLIFT® IT-70W

7,000 pounds capacity at 24" load center

CAPACITY CHART



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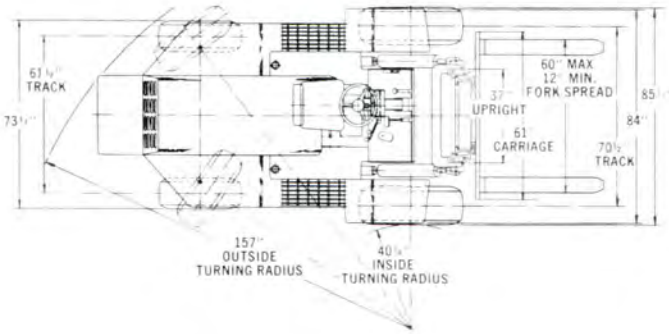

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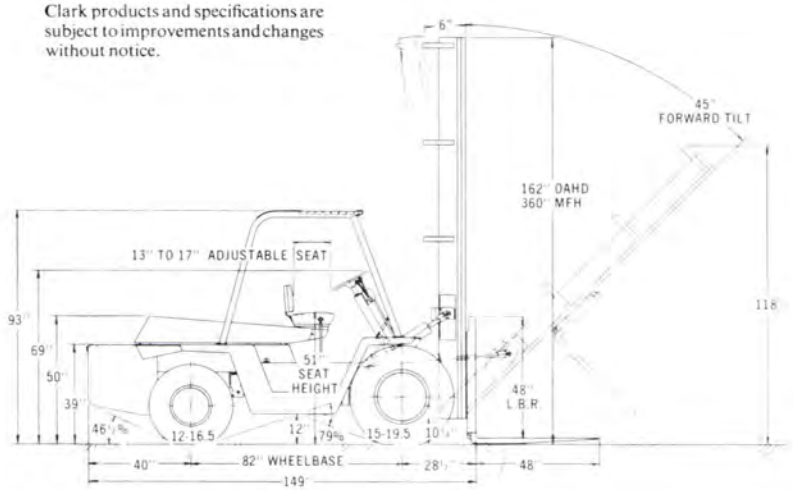
UPRIGHT DIMENSION TABLE

FULL FREE LIFT TRIPLE STAGE UPR.			
MFH	FFL	OAHL	OAHR
288" 360"	112" 129"	145" 162"	323" 395"



PERFORMANCE SPECIFICATIONS

(Chrysler H-225 IT-581 Series)

ENGINE			NOTE
1.	Timing, Ignition	2-1/2 degrees B.T.D.C.	Remove one (1) spark plug to cut engine rpm to 550...then check ignition timing.
2.	No Load Governed R.P.M.	2600	Check after engine has reached operating temperature.
3.	Idle R.P.M.	600	Refer to #2 above.
4.	Stall R.P.M.	1750	Refer to #2 above.
5.	Intake Tappets	.010 inch	Refer to #2 above.
6.	Exhaust Tappets	.020 inch	Refer to #2 above.
7.	Distributor Point Gap	.017 -to- .023 inch	First check points...old points in good condition...use wire feeler gauge only.
8.	Cam Dwell, Distributor	40 -to- 45 degrees	Wipe off breaker cam...apply cam lubricant...keep to a min. Crank engine until point of rubbing block is on peak of cam lobe. Tach/Dwell Meter.
9.	Rotation, Distributor	Clockwise	Viewed from cap end.
10.	Firing Order	1 - 5 - 3 - 6 - 2 - 4	Front -to- Rear.
11.	Spark Plug Gap	.035	Ref. Group 00, Page 1-18 Appendix " 1 "
12.	Compression P.S.I.	130 -to- 140 (approx. 140)	High tension coil wire disconnected...throttle wide open.
13.	Maximum variation between cylinders.	20	Remove/replace plug@each cyl. Check one cylinder at a time.
14.	Bare Engine Torque	200 ft lbs @ 1600 -to- 2400 RPM	Refer to #2 above.
15.	Vacuum @ 2600 R.P.M.	14 -to- 16 inches	Refer to #2 above.
16.	Partial Load @ 2600 RPM	2200 R.P.M.	Engine @ 2600 rpm...move tilt lever full forward and hold... as system operates over bypass you should obtain specified rpm.
17.	Governor	Clockwise -to- decrease RPM C-Clockwise -to- increase RPM	Refer to #2 above. Each 1/2 turn equals approx. 150 rpm. Sealed unit...no other adjustment.
18.	Number of Cylinders	6	
19.	Bore & Stroke - inches	3.4 x 4.125	
20.	Displacement - cu. in.	225	
21.	Bare Engine H.P.	91 @ 2400 R.P.M.	

Maximum Allowable Tilt Cylinder Drift
(Gasoline - L.P.Gas - Diesel Trucks)

IT-50 1/4 of an inch.

IT-60 7/16 of an inch.

IT-70 7/16 of an inch.

Inches of Tilt Cylinder Drift (in a 5 minute period)... upright in full back tilt with rated capacity load... hydraulic fluid at operating temperature.

Maximum Allowable Lift Cylinder Drift
Gasoline - L.P.Gas - Diesel Trucks)

IT-50
IT-60
IT-70

With capacity load...in full back tilt position... drift should not exceed... one (1) inch per minute.

Lifting and Lowering Speeds (F.P.M.)
(Gasoline - L.P.Gas - Diesel Trucks)

"LIFT"		MODELS	"LOWER"	
Loaded	Empty		Loaded	Empty
90	92	IT-50	123	59
60	63	IT-60 N	81	38
77	79	IT-60 W	80	74
60	63	IT-70 N	81	38
74	80	IT-70 W	77	74

HYDRAULIC SYSTEM SUMP TANK

Capacity: 20 gallons MS-68

FUEL TANK

Capacity: 20 gallons
Use a good grade of regular gasoline.
85 octane minimum Motor Method or,
95 octane minimum Research Method.
Liquid Petroleum Gas Engines: use...
95 octane minimum Motor Method
Propane HD-5 (ASTM)

COOLING SYSTEM

Capacity: 18 quarts
Coolant level...below cap seal: approx. 1 inch.
Pressure Cap: 7 pounds
Summer/Winter...water and Ethylene-Glycol Base Anti-Freeze. System must have at least 40% water...maximum protection is obtained at 60% by volume or 4.8 pints of Ethylene Glycol per gallon of water.

Belt Deflection: 1/4 -to- 1/2 inch (short span)
50 -to- 80 pounds (gauge reading)

TRANSMISSION

Capacity: 8 pints (SAE #90)

CAPACITIES

DIFFERENTIAL

Capacity: 17 pints
EPGL SAE #90

CONVERTER

Capacity: 6 quarts Automatic transmission fluid
Dexron or Type "A"

ENGINE (USE YOUR DIPSTICK)

Capacity: 5 quarts*
*add 1-quart for the filter.

TIRE INFLATION

IT-50/60	60 PSI, Drive Tire 40 PSI, Steer Tire
IT-70/80	75 PSI Drive Tire 60 PSI Steer Tire

IT-50/60	15 x 19.5 - 10 ply, Duplex ... Drive 12 x 16.5 - 8 ply, Duplex ... Steer
IT-70/80	15 x 19.5 - 14 ply, Duplex ... Drive 12 x 16.5 - 10 ply, Duplex ... Steer

TRAVEL SPEEDS
(Gasoline - L.P. Gas - Diesel Trucks)

"FORWARD"		MODELS	"REVERSE"	
Gear	Speed	IT-50 / 60 / 70 / 80 "B"	Gear	Speed
1	5.5		1	5.5
2	12		2	12
3	21		3	21
4	34		4	34

DRAWBAR PULL IN POUNDS *

LOADED	MODELS	EMPTY
6,800 lbs	IT-50	2,940 lbs
6,800 lbs	IT-60N	4,000 lbs
6,800 lbs	IT-60W	5,350 lbs
6,800 lbs	IT-70N	3,950 lbs
6,800 lbs	IT-70W	5,250 lbs

GRADEABILITY

LOADED @ 1 M.P.H.	MODELS	LOADED @ STALL
40%	IT-50	53%
30%	IT-60N	38%
27%	IT-60W	35%
27%	IT-70N	35%
25%	IT-70W	33%

*Drawbar pull at stall with capacity load (minimum) on forks.
*Drawbar pull in pounds - first (low) gear.

BRAKE PEDAL

Free Travel: 1/16 -to- 3/16 inch (1/8 inch NOMINAL)

PARKING BRAKE EFFECTIVENESS

Brake, when properly adjusted, must be capable of holding truck (with maximum capacity load on forks) on a 15% grade.

TRANSMISSION (F&R) DISCONNECT PEDAL

With pedal released...there should be approximately 1/2 of an inch between the underside of the floor-board and the top of the pedal arm.

ACCELERATOR PEDAL STOP BOLT

Adjust to be one (1) inch from floor plate to top of bolt.

ELECTRICAL SYSTEM

Alternator

Rated output: 35 amps

2.3 amps minimum -to- 2.7 amps maximum @ 12 volts ... rotating alternator by hand.

3.0 amps minimum -to- 3.5 amps maximum @ 15 volts @ 70 degrees F ... 750 RPM

Current Output: 34.5 ampers minimum @ 15 volts @ 1250 Engine RPM ... plus or minus 3 amperes allowed.

Starter

Type drive: Overrunning Clutch

Amps / Volts: 10.2 -to- 32.9 amps @ 6 volts ... to crank engine.

Ignition

Coil Polority: Negative to Distributor

Fuse Size

Ignition Switch "BAT" Terminal:	15 amps
Horn:	14 amps

Battery

Gasoline and L.P. Gas Models:	60 Amp Hour	12 Volt
Diesel (Perkins Engine) Models:	115 (two used)	6 Volt

TORQUE REQUIREMENTS (DRY)

Drive Wheel Nuts: 450 -to- 540 pound feet	Drive Axle -to- Frame: 280 -to- 360 pound feet
Steer Wheel Nuts: 450 -to- 540 pound feet	Steer Axle -to- Springs: 100 -to- 140 pound feet
Hand Wheel Shaft Nut: 40 -to- 50 pound feet	Counterweight Mounting Bolts: 800 -to- 1000 lb. ft.
Tilt Cylinder Yoke Clamp Bolts: 120 -to- 130 pound feet	

ENGINE TORQUE REQUIREMENTS (DRY)

Spark Plug:	30 pound feet (Long Reach ... 14mm)
Carburetor to Manifold Nut:	30 pound feet 3/8-16
Cylinder Head Cover Bolt:	40 inch pounds 1/4-20
Distributor Clamp Bolt:	200 inch pounds 5/16-18
Exhaust Manifold Nut:	10 pound feet 5/16-24
Exhaust Pipe Flange Nut:	30 pound feet 7/16-20
Exhaust Pipe Clamp Bolt:	20 pound feet 3/8-24
Exhaust Pipe Support Clamp Bolt:	20 pound feet 3/8-24
Fan Attaching Bolt:	200 inch pounds 5/16-18
Alternator Bracket Bolt:	30 pound feet 3/8-16
Fuel Pump Attaching Bolt:	30 pound feet 3/8-16

STEERING

STEER WHEEL TURNING DIAMETER (INSIDE DRIVE TIRE)	
IT-50	46-1/2 inches
IT-60N	46-1/2 inches
IT-60W	40-3/4 inches
IT-70N	46-1/2 inches
IT-70W	40-3/4 inches

STEERING AXLE ALIGNMENT	
Toe-in	0 degrees
Camber Angle (unloaded)	1 degree
Caster	4 degrees
Negative or Reverse - for Towing	
King Pin Inclination	5 degrees

STEERING SYSTEM RELIEF SETTING (LOCATION‡ PUMP)

Relief valve setting: 1500 PSI

Control flow from 600 -to- 2600 RPM‡ 1 -to- 3 GPM

STEERING SYSTEM FLUID

Fluid is supplied by the Main Hydraulic Sump Tank.

FORWARD & REVERSE UNIT PRESSURE SPECIFICATIONS

* Main Pressure:	100 -to- 140 PSI @ 2000 Engine RPM
* Converter Pressure:	55 -to- 80 PSI @ 2000 Engine RPM
* Lube to Clutch Assy:	12 -to- 30 PSI @ 2000 Engine RPM
* Forward & Reverse:	100 -to- 140 PSI @ 2000 Engine RPM
* Min. allowable F & R	100 PSI @ 2000 Engine RPM

* Pressure to be taken with fluid at operating temperature: 200 degrees

F & R Unit Pump Capacity: 8.7 GPM @ 2000 Engine RPM

STALL: 1750 Engine RPM

MAINTENANCE PRACTICES

NOTE ... The following is reproduced from:

American National Standard ...
Safety Standard for Powered Industrial Trucks
... USAS B56.1 - 1969.

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 shall be performed in conformance with the manufacturers recommendations and the following practices:

A. A scheduled preventive maintenance, lubrication, and inspection system shall be followed.

B. Only qualified and authorized personnel shall be permitted to maintain, repair, adjust, and inspect industrial trucks.

C. Before leaving the truck -

1. Stop truck
2. Fully lower the load engaging means
3. Place directional controls in neutral
4. Apply the parking brake
5. Stop the engine or turn off power
6. Lock the control or ignition circuit
7. Block the wheels if truck is on a ramp, or being worked on.

D. Before working on truck -

1. Raise wheels free of floor or disconnect power source.
2. Use chocks or other positive truck positioning devices.
3. Block load engaging means, innermast(s), or chassis before working under them.
4. Before working on engine fuel system of gasoline powered trucks with gravity-feed fuel systems, be sure shutoff is closed.
5. Before working on engine fuel system of LP gas-powered trucks, close LP gas-cylinder valve and run engine until fuel in system is depleted and engine stops running.
6. Operation to check performance of truck or attachments shall be conducted in an authorized safe clearance area.

E. Before starting to operate truck -

1. Be in operating position.
2. Depress clutch (or brake pedal on automatic transmissions).
3. Place directional controls in neutral.
4. Start engine.
5. Before operating truck, check functioning of lift and tilt systems, directional and speed controls, steering, warning devices, brakes, and any attachment (if used).

F. 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.

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

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

I. Brakes, steering mechanisms, control mechanisms, lift overload devices, guard, and safety devices shall be inspected regularly and maintained in a safe operating condition.

J. All parts of lift and tilt mechanisms and approved for hazardous area operation shall receive special attention to ensure that maintenance preserves the original approved safe operating features.

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

M. All hydraulic systems shall be regularly inspected and maintained in conformance with good practice. Tilt cylinders, valves, and other similar parts shall be checked to assure that "drift" has not developed

to the extent that it would create a hazard.

N. Capacity, operation and maintenance instruction plates, tags, or decals shall be maintained in legible condition.

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

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

Q. Modifications and additions which affect capacity and safe truck operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation, and maintenance instruction plates, tags or decals shall be changed accordingly.

R. Care shall 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

DRIVER'S DAILY CHECKLIST

Check Before Start of Each Shift

Truck No.:	Operator:	Date:	Supervisor's OK

Hour Meter Reading:

Start of day_____ Hrs. for day_____

End of day_____

VISUAL CHECKS: Indicate "√" if okay; "X" if defective. Explain all "X's" in "Remark" area below:

- ☐ Engine oil level
- ☐ Radiator water level
- ☐ Fuel level
- ☐ Obvious damage and leaks
- ☐ Tire condition
- ☐ Head and tail lights
- ☐ Warning lights
- ☐ Hour meter
- ☐ Other gauges and instruments

OPERATIONAL CHECKS

- ☐ Horn
- ☐ Steering
- ☐ Service brakes
- ☐ Parking brake
- ☐ Hydraulic controls

REMARKS: _____

Form No. C-635 Rev.

INDUSTRIAL TRUCK DIVISION

CLARK EQUIPMENT

Customer Address

P.M. REPORT

P.O. No: ____________ Date ____________
Make ____________ Ser. No. ____________
Hr. Meter Reading: ____________
Work Required: (By No.) ____________

Authorized Signature ____________
Special Instructions ____________

GAS UNITS (POWER SHIFT OR AUTOMATIC TRANS.)

1. Visual inspection
   - A. Oil leaks
   - B. Driver's overhead guard
   - C. Load back rest
   - D. Chains
   - E. Forks, latches
   - F. Fabreeka pads
   - G. Rail patterns
   - H. Tire wear (pressures)
     - Right drive
     - Left drive
     - Right steer
     - Left steer
   - I. Wheel lug nuts (loose, missing)
2. Operational Checks
   - A. Brake pedal (free play, pad)
   - B. Neutral starting switch
   - C. Inching
   - D. Brake pedal sponginess
   - E. Steering (power or manual)
   - F. Unusual noise
   - G. Exhaust smoke
     - Blue (oil) ☐
     - Black (fuel) ☐
   - H. Upright operation
   - I. Instruments, horn, lights
3. Blow off truck
4. Engine oil level before draining (low ☐, high ☐)
5. Drain engine oil
6. Lubricate all Zerk fittings
7. Steer wheel bearings
8. Lubricate free lift guide
9. Replace engine oil filter and cover gasket
10. Clean and install engine drain plug, fill crankcase
11. Engine oil filler cap and seal
12. Replace air filter element (clean base, check hose and connections)
13. Fuel filter
14. Generator (lubricate, check mounting)
15. Drive belt (Tension, condition)
16. Power steering oil level
17. Cooling system
    - A. Coolant level
    - B. Fan blades
    - C. Hose connections
    - D. Water pump (leaks)
18. Battery (fill, clean)
19. Wiring (fraying, looseness)
20. Linkages (check, lubricate)
21. Power steering
    - A. Steering gear mounting nut torque
    - B. Steering column trunnion mount draw bolt torque and shim
    - C. Steering assembly free play
    - D. Steering column U-bolt (tightness, grommet, lock nuts)
    - E. Cylinder (leaks, boot and rod condition)
22. Tilt cylinders (leaks)
    - A. Boots
    - B. Rods (mounting, adjustment, nicks, scoring)
    - C. Cylinder mountings
    - D. Anchor bracket key
23. Hydraulic filter and line (leakage)
24. Engine mount (tightness)
25. Hydraulic sump filler cap & seal
26. Hydraulic sump oil level
27. Brake master cylinder level
28. Brake master cylinder by-pass port
29. Throttle opening
30. Distributor
    - A. Cap condition
    - B. Rotor condition
    - C. Point gaps
    - D. Cam condition
    - E. Lubricate cam
31. Voltage — cranking, coil wire disconnected: volts
32. Voltage — accelerating, coil wire connected: volts
33. Engine idle RPM
34. Max. gov. no-load RPM
35. Part-load RPM
36. Idle vacuum: inches
37. Max. gov. no-load vacuum: inches
38. Crankcase vent pipe
39. Transmission fluid level
40. Change trans. filter (first P.M. - every other P.M. thereafter)
41. Lift speed — no load: seconds
    Lift speed — full load: seconds
42. Drift test
43. Parking brake
44. Stall test: For. RPM, Rev. RPM
45. Hour meter working
46. Wipe off truck, clean area

FRICTION CLUTCH UNIT

47. Throwout bearing (grease)
48. Clutch pedal free play
49. Clutch and trans. operation
50. Check and lubricate linkage

OIL CLUTCH UNIT

51. Clutch pedal free play
52. Oil level
53. Oil clutch light
54. Leaks
55. Check, lubricate linkage
56. Clutch and trans. operation

DROP GEAR BOX UNIT

57. Oil level
58. Leaks
59. Operation

LPG UNITS

60. Idle vacuum adjustment (lean side)
61. Maximum power adjustment
62. Solenoid valve operation
63. Solenoid connected to hour meter switch
64. Fuel filter
65. Leaks
66. Tank-to-vaporizer line (condition)
67. Tank mounting brackets

DIESEL UNITS

68. Exhaust condition (visual)
69. Acceleration under load
70. Fuel filter (replace)
71. Cold start

POWER ASSIST ITEMS

72. Brakes (vacuum - air)
    - A. Operation
    - B. Filters
73. Clutch (hydraulic)
    - A. Operation
    - B. Leaks

ATTACHMENTS

74. Operation
75. Leaks
76. Condition

Comments: ____________

Note: 1. Inspect and repack wheel bearings when brakes are repaired.
2. Every 2000 hours or once each year, whichever comes first, change hydraulic system filter and oil.

CODE

O. K. | Potential | Urgent

√ = O. K.
x = Adjust (not p.m.)
r = Repair or replace
s = Requires shop repair

Form No. C-772

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CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

To Move A Load.

The forks should be adjusted sidewise on the fork bars to obtain firm support and maximum balance of the load. Raise or lower the forks to the proper level and engage the load by driving forward. Tilt the upright backward sufficiently to adequately cradle the load, and raise load sufficiently to clear obstructions, accelerating engine slightly at the same time. Back away from stack.

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 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 into position. Disengage forks from the load by using necessary lift-tilt and then back away.

Loads will vary in size, shape, method of packaging, stacking procedures, etc. The best way to handle a load will depend on these factors. If in doubt, consult with your supervisor.

I M P O R T A N T

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. CHECK FOR NORMAL SEQUENCE OF OPERATION.

OPERATING SAFETY RULES AND PRACTICES.

1. Operators of powered industrial trucks should be physically qualified. An examination should be made on an annual basis and include such things as field of vision, hearing, depth perception and reaction timing.

2. Only trained and authorized operators should be permitted to operate a powered industrial truck. Methods should be devised to train operators in the safe operation of powered industrial trucks. It is recommended that badges or other visual indication of the operator's authorization should be displayed at all times during work period.

GENERAL.

1. Safeguard the pedestrians at all times. Do not drive a truck up to anyone standing in front of a bench or other fixed object.

2. Do not allow anyone to stand or pass under the elevated portion of any truck, whether loaded or empty.

3. Unauthorized personnel should not be permitted to ride on powered industrial trucks. A safe place to ride should be provided where riding of trucks is authorized.

4. Do not put arms or legs between the uprights of the mast or outside the running lines of the truck.

5. When leaving a powered industrial truck unattended, load engaging means should be fully lowered, controls should be neutralized, power shut off, brakes set, key or connector plug removed. Block wheels if truck is parked on an incline.

6. Maintain a safe distance from the edge of ramps or platforms and do not, while on any elevated dock or platform, push freight cars. Do not use trucks for opening or closing freight doors.

7. Have brakes set and wheel blocks in place to prevent movement of trucks, trailers, or railroad cars while loading or unloading. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. Check the flooring of trucks, trailers, and railroad cars for breaks and weakness before driving onto them.

8. Be sure of sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.

9. Use an Overhead Guard and Load Backrest Extension unless conditions prevent their use.

```
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  AN OVERHEAD GUARD IS INTENDED TO OFFER             x
x                                                     x
x  PROTECTION FROM THE IMPACT OF SMALL                x
x                                                     x
x  PACKAGES, BOXES, BAGGED MATERIAL, ETC.,            x
x                                                     x
x  REPRESENTATIVE OF THE JOB APPLICATION,             x
x                                                     x
x  BUT NOT TO WITHSTAND THE IMPACT OF A               x
x                                                     x
x  FALLING CAPACITY LOAD.                             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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10. Use only approved industrial trucks in hazardous locations.

11. Elevate personnel only on an approved safety platform firmly secured to the lifting carriage and/or forks.

12. Report all accidents involving personnel, building structures, and equipment.

13. Fire aisles, access to stairways, and fire equipment should be kept clear.

TRAVELING.

1. Observe all traffic regulations including authorized plant speed limits. Under normal traffic conditions, keep to the right. Maintain a safe distance, approximately three truck lengths from the truck ahead, and keep the truck under control at all times. Use of truck on public roads should conform to local traffic regulations.

2. Yield the right of way to ambulances, fire trucks, or other vehicles in emergency situations.

3. Do not pass another truck traveling in the same direction at intersections, blind spots, or at other dangerous locations.

4. Slow down and sound horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view travel with the load trailing.

5. Cross railroad tracks diagonally wherever possible. Do not park closer than 8 feet from center of railroad tracks.

6. Look in the direction of, and keep a clear view of the path of travel.

7. Ascend or descend grades slowly.

When ascending or descending grades in excess of 10%, loaded trucks should be driven with the load upgrade.

Unloaded trucks should be operated on all grades with the load engaging means downgrade.

On all grades the load and load engaging means should be tilted back if applicable, and raised only as far as necessary to clear the road surface.

8. Under all travel conditions the truck should be operated at a speed that will permit it to be brought to a stop in a safe manner.

9. Travel with load engaging means or load low and, where possible, tilted back. Do not elevate the load except during stacking.

10. Make starts, stops, turns or direction reversals in a smooth manner so as not to shift load and/or overturn the truck.

11. Stunt driving and horseplay should not be permitted.

12. Slow down for wet and slippery floors.

13. Before driving over a dockboard or bridgeplate, be sure that it is properly secured. Drive carefully and slowly across the dockboard or bridgeplate and never exceed its rated capacity.

14. Do not run vehicles onto any elevator unless specifically authorized to do so. Approach elevators slowly, and then enter squarely after the elevator car is properly leveled. Once on the elevator, neutralize the controls, shut off power, and set brakes. It is advisable that all personnel leave the elevator before a truck is allowed to enter or leave.

15. Avoid running over loose objects on the roadway surface.

LOADING.

1. Handle only stable or safely arranged loads. When handling off-center loads which cannot be centered, operate with caution.

2. Handle only loads within the rated capacity of the truck.

3. Adjust for long or high (including multiple tiered) loads which may affect capacity.

4. When attachments are used, particular care should be taken in securing, manipulating, positioning, and transporting the load. Operate trucks equipped with attachments as partially loaded trucks when not handling a load.

5. Place load engaging means under the load as far as possible and carefully tilt the mast backward to stabilize the load. Caution should be used in tilting backward with high or segmented loads.

6. Use extreme care when tilting load forward or backward particularly when high tiering. Do not tilt forward with load engaging means elevated except to pick up a load. Do not tilt an elevated load forward except when the load is in a deposit position over a rack or stack. When stacking or tiering use only enough backward tilt to stabilize the load.

OPERATOR CARE OF THE TRUCK.

1. Give special consideration to the proper functioning of tires, horn, lights, battery, controller, lift system (including load engaging means, chains, cable, and limit switches), brakes and steering mechanism. If at any time

OPERATOR CARE OF THE TRUCK (CONT.).

a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the matter should be reported immediately to the designated authority, and the truck should be taken out of service until it has been restored to safe operating condition.

2. Do not make repairs or adjustments unless specifically authorized to do so.

3. Do not fill fuel tanks while engine is running and avoid spillage.

4. Spilliage of oil or fuel should be carefully washed away or completely evaporated and fuel tank cap replaced before restarting engine.

5. Do not operate a truck with a leak in the fuel system until the leak has been corrected.

6. Do not use open flames for checking electrolyte level in storage batteries or gasoline level in fuel tanks.

NOTE

The preceding is reproduced from:

American National Standard ... Safety Standard for Powered Industrial Trucks. B56.1 - 1969

FUEL HANDLING AND STORAGE SAFETY

Liquefied Petroleum Gas Fuel (LPG Powered Trucks)

1. The storage and handling of liquefied petroleum gas (LP-Gas) should be in accordance with the Standard for Storage and Handling of Liquefied Petroleum Gases (NFPA No. 58, USA Standard Z106.1-1965).

2. Trucks using LP-Gas should be refueled only at locations designated for that purpose. Safe outdoor locations are preferable to indoor. Trucks should be refueled as provided in the Standard for the Storage and Handling of Liquefied Petroleum Gases (NFPA No. 58, USA Standard Z106.1-1965.)

3. Reasonable care should be exercised in handling of LP-Gas containers to avoid damage. Do not drop, throw, roll, or drag LP-Gas containers or any associated parts of the containers or fuel systems.

4. Do not over-fill LP-Gas containers.

5. Engine should be stopped and operator off the truck during refueling.

6. Trained and designated personnel should recharge or exchange LP-Gas containers.

7. Personnel engaged in recharging of LP-Gas containers should wear protective clothing such as face shield, long sleeves, and gauntlet gloves.

8. Never use a match or flame to check for leaks, use a soap solution.

9. LP-Gas powered trucks should not be refueled nor stored near underground entrances, elevator shafts nor any other place where LP-Gas could collect in a pocket causing a potentially dangerous condition.

10. Trucks equipped with permanently mounted LP-Gas containers should be refueled outdoors.

11. Exchange of removable LP-Gas containers preferably should be done outdoors, but may be done indoors. Means should be provided in the fuel system to minimize the escape of fuel when the containers are exchanged. This should be accomplished by either of the following methods:

A. Using an automatic quick closing coupling (a type closing in both directions when uncoupled) in the fuel line, or.....

B. Closing the valve at the LP-Gas container and allowing the engine to run until the fuel in the line is consumed.

12. When installing removable LP-Gas containers they should be so located on the truck that the safety pressure relief valve opening is always in contact with the vapor space (top) of the cylinder. This is accomplished by an indexing pin which, when the tank is properly installed, positions the container.

13. All reserve LP-Gas containers should be stored and transported with the service valve closed. Safety relief valves should have direct communication with the vapor space of the container at all times.

14. The careless handling of LP-Gas containers can result in a serious accident. Extreme care should be exercised when transporting containers so that they are not accidentally dropped or physically damaged. When it is necessary to move more than one container at one time, a proper carrying device should be provided.

15. Physical damage such as dents, scrapes, or gouges, may materially weaken the structure of the LP-Gas container and render it unsafe for use. All LP-Gas containers should be examined before recharging and again before reuse, for the following defects or damage:

A. Dents, scrapes, and gouges of the pressure vessel.

B. Damage to the various valves and liquid level gage.

C. Debris in the relief valve.

D. Indications of leakage at valves or threaded connections.

E. Deterioration damage or loss of flexible seals in the fill or servicing connections.

All defective or damaged LP-Gas containers should be removed from service.

16. Smoking should be prohibited in the refueling area.

17. Whenever vehicles using LP-Gas as a fuel are parked overnight or stored for protracted periods of time indoors, with the fuel container in place, the service valve on the fuel container should be closed.

When checking or adjusting L.P. Gas equipment be sure to:

1. Properly ventilate work area.

2. Eliminate ignition sources (sparks, pilot lights etc.).

3. Prohibit smoking.

4. Have fire fighting equipment present.

5. Check all equipment, lines, connections with soapy water. NEVER USE A MATCH OR FLAME WHEN CHECKING FOR LEAKS.

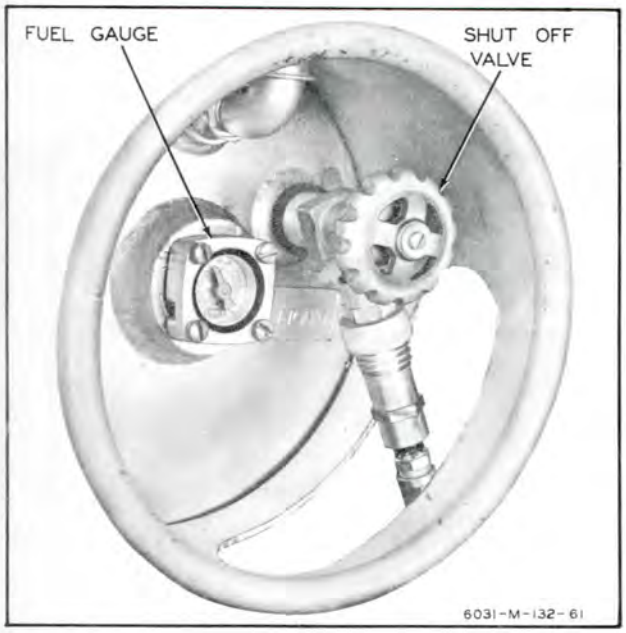

Plate 6031. Typical L.P. Gas Container

6. Check cylinder (container) for security of mounting.

7. Inspect hoses, grommets or whatever means is used to protect hoses from damage where they run through sheet metal etc. Replace any component that is unfit for further service.

8. Check all equipment for security of mounting.

9. Check the Solenoid Lock-Off Valve to be sure it is working. Upon turning off the ignition switch there should be an audible click indicating the valve has actuated shutting off the fuel flow at the valve. The valve should not open again until the ignition switch is turned on and the engine cranked. Cranking the engine provides oil pressure to the engine oil pressure sending unit which actuates completing an electrical circuit to the solenoid lock-off valve. The valve then opens allowing the L.P. Gas to pass through.

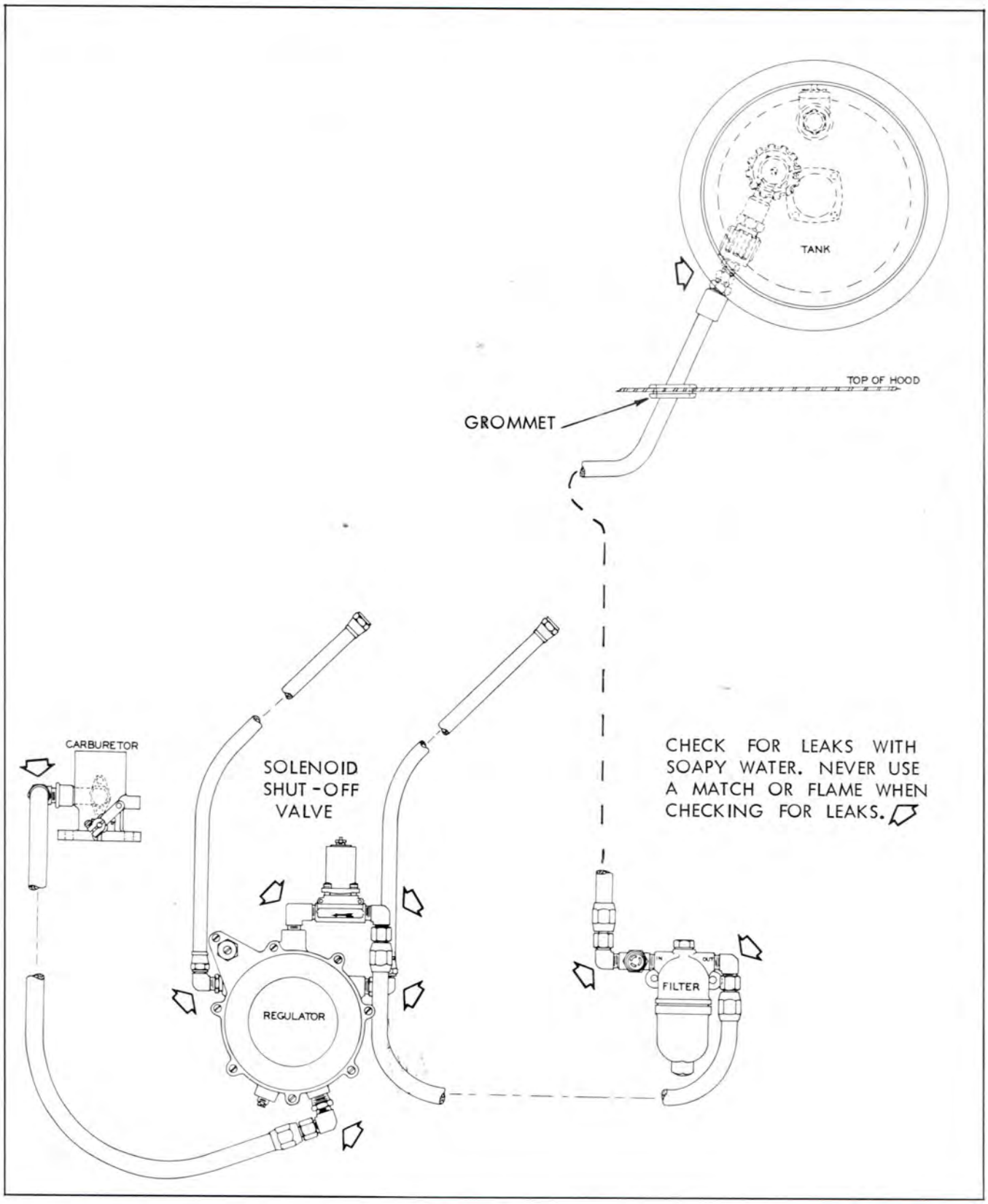

Plate 7405. Typical L.P. GAS Installation

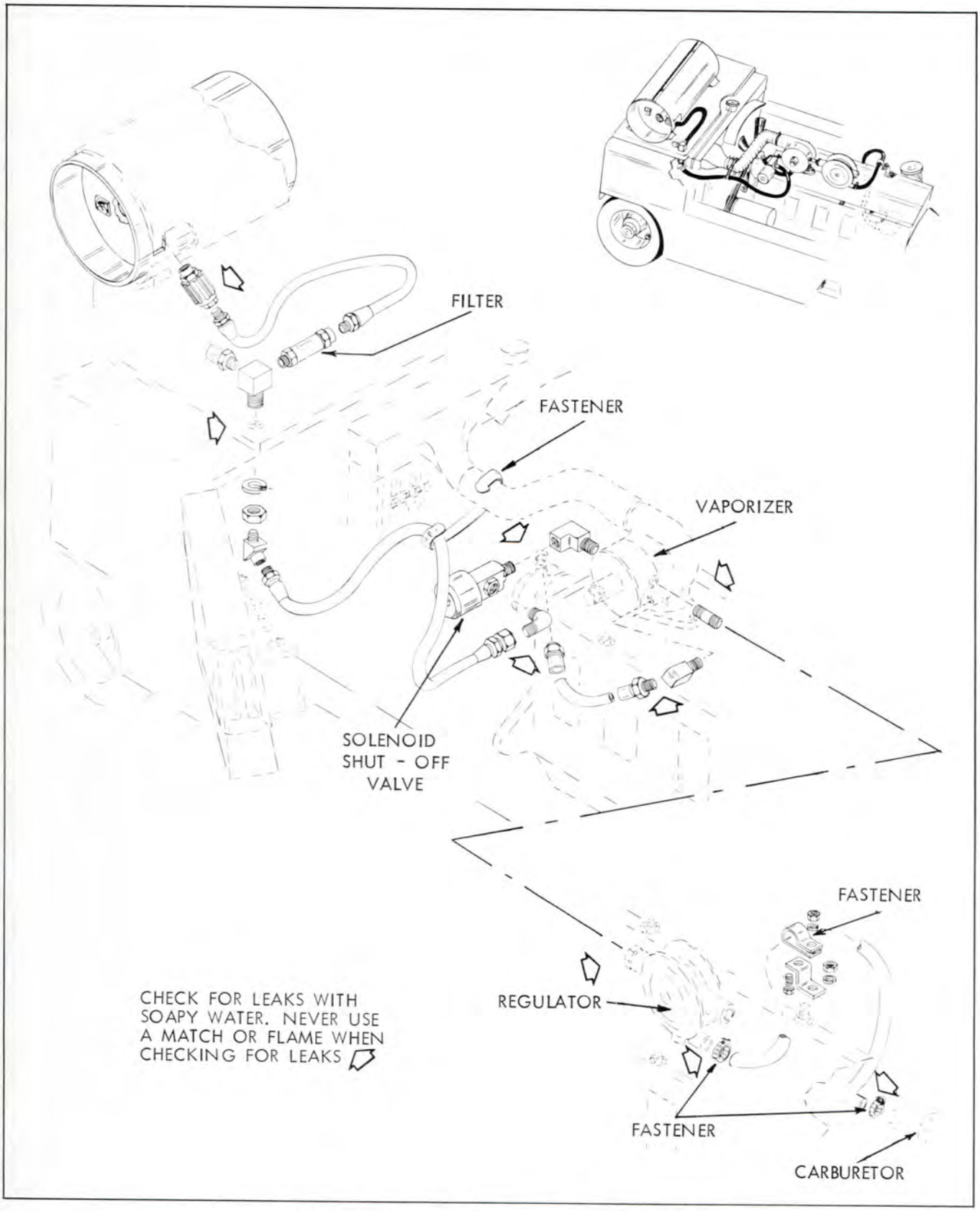

Plate 7406. Typical L.P. GAS Installation

FUEL HANDLING AND STORAGE SAFETY

(Gasoline Powered Trucks)

Liquid Fuels. (Such as Gasoline and Diesel Fuel).

1. The storage and handling of liquid fuels should be in accordance with the Flammable and Combustible Liquids Code. (NFPA No. 30).

2. Trucks using liquid fuels should be refueled only at locations designated for that purpose. Safe outdoor locations are preferable to those indoors. The Flammable and Combustible Liquids Code (NFPA No. 30), Paragraph 7211, outlines recommendations for arranging safe indoor fueling facilities.

3. Engines should be stopped and operator off the truck during refueling.

4. Liquid fuels not handled in approved dispensing pumps should be transported in safety cans. Safety cans should be inspected regularly for damage to closures and for leaks; faulty cans repaired or replaced. Care should be exercised in handling of safety cans to avoid damage.

5. Reasonable care should be exercised to prevent the spillage of fuel or overfilling either the vehicle fuel tanks or safety cans. Filler cap should be replaced and any spilled fuel disposed of by using a noncombustible adsorbent before the engine is restarted.

6. Smoking should be prohibited in the refueling area.

INDUSTRIAL TRUCK DIVISION

SPECIFICATIONS

DISTRIBUTOR (All FOUR and SIX Cylinder Engines)

N O T E

Distributors are equipped with either Standard or Heavy Duty Points. Heavy Duty Points are thicker (have more contact material) than Standard Points.

Heavy Duty Points - All FOUR Cylinder Engines
Set Dwell Angle at.....31° - 34°

Heavy Duty Points - All SIX Cylinder Engines
Set Dwell Angle at.....22° - 26°

Heavy Duty Points

When connecting leads, terminals must be back to back (flat sides together). Push into slot between insulator and spring. (DO NOT push lever spring.) Then push other terminal in place between first terminal and insulator. See following illustration.

WHEN CONNECTING LEADS, THE TERMINALS MUST BE BACK TO BACK (flat sides together).....

- FOUR (4) CYLINDER ENGINES, ONLY -

Point Opening (in.)	Dwell Angle (deg.)	Centrifugal Advance							
		START		INTERMEDIATE		INTERMEDIATE		MAXIMUM	
		Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.
.022*	31-34	600	1-5	800	6-10	1600	11-15	2200	15-19
.021**	31-34	600	1-5	800	6-10	1600	11-15	2200	15-19

- SIX (6) CYLINDER ENGINES, ONLY -

Point Opening (in.)	Dwell Angle (deg.)	Centrifugal Advance							
		START		INTERMEDIATE		INTERMEDIATE		MAXIMUM	
		Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.
.020*	28-32	600	1-5	800	6-10	1600	11-15	2200	15-19
.021**	22-26	600	1-5	800	6-10	1600	11-15	2200	15-19

N O T E

Time engine with timing light and tachometer at 400 engine RPM or below to the above specifications. The initial advance RPM range is 430 - 580. Distributor advance at 600 engine RPM should be 1° to 5°. Distributor rotation (as viewed from cap end) is counterclockwise.

When checking Distributor on a test stand, the above specifications are 1/2 that shown.

*..... Four (4) or Six (6) Cylinder Engine STANDARD Points.
**..... Four (4) or Six (6) Cylinder Engine HEAVY DUTY Points.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

RIM AND WHEEL MAINTENANCE:

N O T E

"In order to maintain and insure maximum service, a continuous maintenance program is advisable... maintenance procedures should be carried out both during tire inspections and during tire changes."

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 PULL DAMAGED RIMS OR WHEELS. DEFLATE x
x x
x TIRES PRIOR TO THE REMOVAL OF RIMS OR x
x x
x WHEELS FROM THE VEHICLE. 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

Check all metal surfaces thoroughly while making tire inspections...watch for...

1. Fatigue cracks in metal.
2. Bent flanges, resulting from road obstructions.
3. Deep rim tool marks.
4. Loose, missing or damaged nuts.
5. Bent or stripped studs.
6. Excessive rust or corrosion.

Mark damaged or hazardous areas with chalk so that part will be removed from service...replace damaged parts.

Insure that replacements are made with the proper sizes and types...refer to your machine serial number when ordering replacement parts. 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.

Check all metal surfaces, as listed above, and check for cracks. These are caused by deep rim tool marks, overloading and overinflating tires and using larger than recommended tire sizes.

Cracks in wheel between stud holes are caused by loose wheel nuts...improper installation procedures and use of incorrect sizes or types of attaching parts. Insufficient mounting torque can cause wheel shimmy, resulting in damage to parts and extreme tire tread wear. Excessive mounting torque can cause studs to break and disc to crack in the stud hole area.

Thoroughly clean wheels...remove rust, dirt and other foreign materials from all surfaces. Hand or electric wire brushes, and blasting or chemical baths may be used.

Bead seat areas of the rim should be free of rust and rubber deposits. This is especially important for drop-center tubless rims...because of the air-sealing element.

Paint rim by brush or spray with a fast-drying metal primer. Surfaces should be clean and dry prior to painting. Insure that bare metal areas on outside or tire side of rim are covered. This is especially important on drop-center tubless rims, because warm and somethimes moist air is in constant contact with the metal surface on the tire side of the rim.

Lubricate tire side of rim base just prior to mounting tire...avoid the use of any lubricant which contains water or solvent that is injurious to rubber...a combination lubricant and rust-preventive compound is preferable. This protective measure is of particular importance with drop-center tubless rims as the air in the tire is contained by the tire-side rim surface.

N O T E

Rim Distributors can supply the proper compound that serves as a lubricant and rust preventive.

TIRE MAINTENANCE:

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 (on machine using split rims), and lug nuts or bolts.

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

TIRE MAINTENANCE (CONTINUED):

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.

WARNING

IT IS NOT RECOMMENDED THAT TIRES WITH BREAKS BE USED AGAIN.

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

TIRE INFLATION:

Before inflating tires, make certain all wheel nuts are tightened to proper torque (see Specifications).

WARNING

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

WARNING

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 IS ACCOMPLISHED BY REMOVING THE VALVE CORE.

WARNING

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. If you have access to a steel cage...use it, (see next page)...otherwise turn rim and wheel over once again so that lock ring is on the bottom and inflate tire to proper pressure.

WARNING

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 exist, 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.

NOTE

Refer to WARNING on deflation of tires before removing wheels from machine.

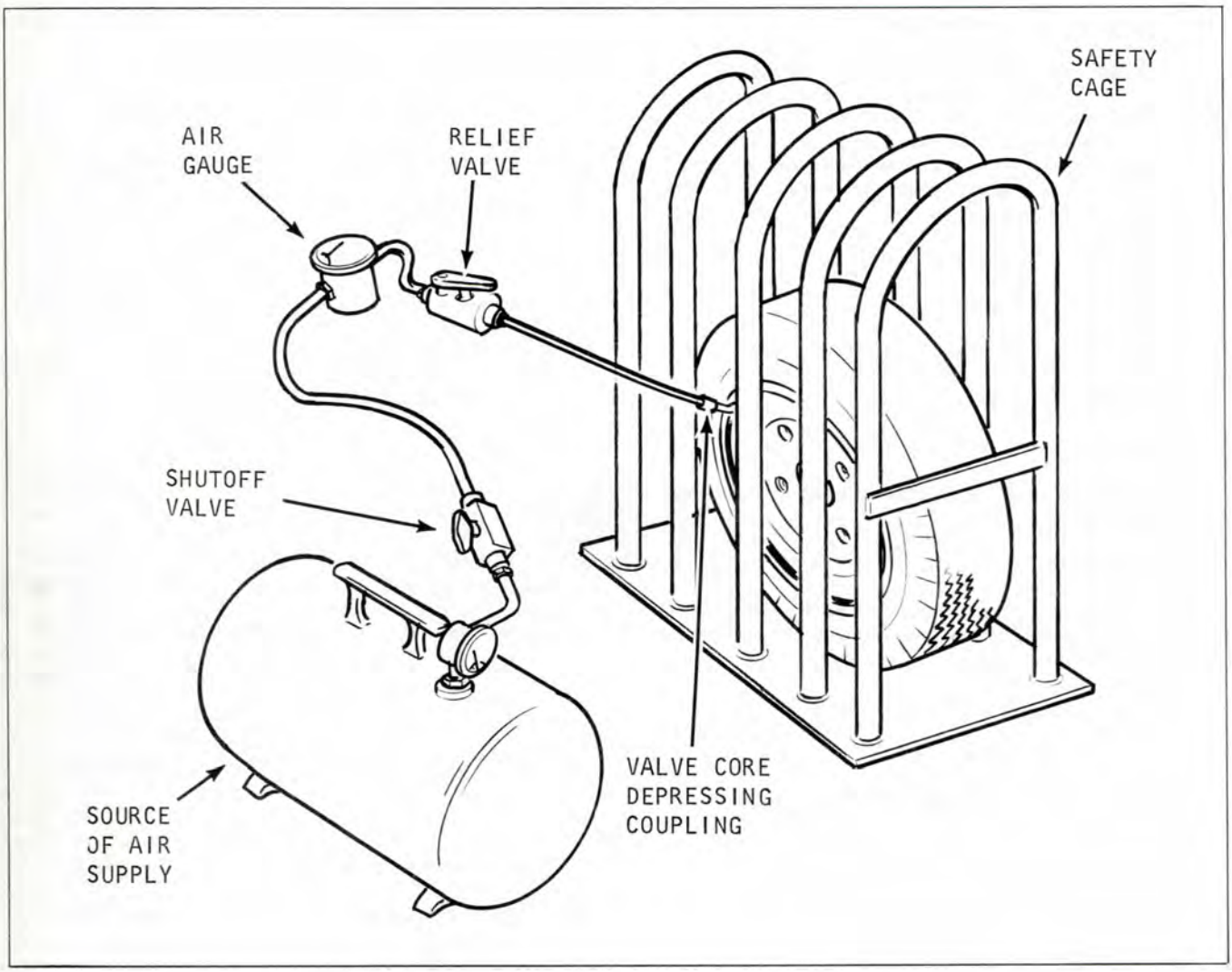

Plate 9702. Typical Tire Inflation Procedure

Torque wheel stud nuts or wheel bolts to the values listed in specifications. Excessive torque of wheel nuts can cause stud and rim damage.

Any replacement parts used should be of a quality equal to that provided in the original manufacture.

Inflation

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 CAUTION x
x x
x ALL FASTENERS SHOULD BE PROPERLY INSTALLED x
x x
x BEFORE INFLATING WHEEL/TIRE ASSEMBLY. 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

Tires with split wheels should be inflated in a safety cage or when properly installed on the vehicle. In either case, make sure all nuts and bolts are properly installed and torqued according to specifications.

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 CAUTION x
x x
x USE ONLY AN APPROVED SAFETY CAGE DESIGNED x
x x
x FOR THIS PURPOSE. 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

Tires used on lock-ring type wheels should be inflated in a safety cage (see previous caution) or use a clip-on type air chuck and stand aside (in-line with the tire tread) during inflation. Insure that rings are properly

Plate 7613. Typical Split Wheel

seated prior to inflation. An inflated tire contains potentially explosive energy that can blow rings loose.

All wheel/tire assemblies should be inflated in a safety cage. The air hose should have a special set-up as shown in Plate 9702. The hose should have an adapter so that it can be securely fastened to the valve stem. Using this set-up you would:

1. Attach air hose to valve stem.

2. Open shut-off valve allowing compressed air to enter tube.

3. Shut off air supply occasionally to check pressure in tube at air gauge.

4. Inflate to proper capacity. If pressure exceeds proper inflation capacity, depress the relief valve to release excess air pressure.

5. This alternating procedure is followed until proper inflation is reached. See specifications.

I M P O R T A N T

MAINTAIN UNIFORM INFLATION IN BOTH TIRES OF A

DUAL ASSEMBLY SO THAT WEIGHT IS EQUALLY SUSTAINED.

NEVER RE-INFLATE A TIRE THAT HAS GONE FLAT WITH-

OUT FIRST INSPECTING IT AND THE WHEEL ASSEMBLY.

The tire inflation arrangement as shown in Plate 9702 can be made up from local suppliers.

Parts can be ordered from the following suppliers:

Relief Valve - Model 250V-1/4"

Humphrey Products
P.O. Box 2008
Kilgore at Sprinkle Rd.
Kalamazoo, Mich.

Shut-Off Valve - Imperial #77E(1/4 to 1/4 1 PT)

Kendall Industrial Supplies, Inc.
702 N. 20th St.
Battle Creek, Mich. 49016

Air Gauge - Marshaltown #23 (160 lb, 1/4 1 PT, 2 1/2" diameter gauge)

Kendall Industrial Supplies, Inc.
702 N. 20th St.
Battle Creek, Mich. 49016

Safety Cage

Meyers Tire Supplies
6400 Epworth Blvd.
Detroit, Mich.

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 below.

Directional Tread Dual Tires:

1. Inside dual tire arrow to point in the direction of foward 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.)

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 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)

SOLID OR CUSHION TIRE AND RIM MAINTENANCE

1. Inspect tires regularly - remove all sharp objects picked up by treads before they have a chance to cut further into the rubber and cause chipping or possible separation of the rubber from the base metal.

2. Avoid overloading and do not allow vehicle to stand under heavy loads for prolonged periods as this will cause a "flat" spot on the tires.

3. Check steering axle alignment regularly to protect against fast, irregular tread wear and separation.

4. If rubber tires come in contact with oils, grease, and gasoline they should be wiped off without delay.

5. Regular lubrication of all wheel bearings will assure free-rolling and elimination of tire drag when stopping or starting.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

INDUSTRIAL TRUCK DIVISION

SAFETY TIPS

RIMS AND WHEELS

1. NEVER ATTEMPT TO WELD ON AN INFLATED TIRE/RIM ASSEMBLY.

2. ALWAYS EXHAUST ALL AIR FROM A SINGLE TIRE AND FROM BOTH TIRES OF A DUAL ASSEMBLY PRIOR TO REMOVING ANY RIM COMPONENTS, OR ANY WHEEL COMPONENTS, SUCH AS NUTS AND RIM CLAMPS.

   MAKE SURE TO REMOVE THE VALVE CORE AND EXHAUST ALL AIR FROM THE TIRE.

   REMOVE THE VALVE CORES FROM BOTH TIRES OF A DUAL ASSEMBLY.

   CHECK THE VALVE STEM BY RUNNING A PIECE OF WIRE THROUGH THE STEM TO MAKE SURE IT IS NOT PLUGGED.

3. CHECK RIM COMPONENTS PERIODICALLY FOR FATIGUE CRACKS. REPLACE ALL CRACKED, BADLY WORN, DAMAGED AND SEVEREL RUSTED COMPONENTS.

4. CLEAN RIMS AND REPAINT TO STOP DETRIMENTAL EFFECTS OF CORROSION. BE VERY CAREFUL TO CLEAN ALL DIRT AND RUST FROM THE LOCK RING GUTTER.

   THIS IS IMPORTANT TO SECURE THE LOCK RING IN ITS PROPER POSITION.

   A FILTER ON THE AIR INFLATION EQUIPMENT TO REMOVE THE MOISTURE FROM THE AIR LINE PREVENTS A LOT OF CORROSION. THE FILTER SHOULD BE CHECKED PERIODICALLY TO SEE THAT IT IS WORKING PROPERLY.

5. MAKE SURE CORRECT PARTS ARE BEING ASSEMBLED. CHECK YOUR DISTRIBUTOR OR THE MANUFACTURER IF YOU HAVE ANY DOUBTS.

6. DOUBLE CHECK TO MAKE SURE ALL COMPONENTS ARE PROPERLY SEATED PRIOR TO INFLATION.

7. MIXING PARTS OF ONE MANUFACTURER'S RIMS WITH THOSE OF ANOTHER IS POTENTIALLY DANGEROUS. ALWAYS CHECK MANUFACTURER FOR APPROVAL.

8. DON'T OVERLOAD OR OVER-INFLATE RIMS. CHECK YOUR RIM MANUFACTURER IF SPECIAL OPERATING CONDITIONS ARE REQUIRED.

9. DON'T REINFLATE A TIRE THAT HAS BEEN RUN FLAT WITHOUT FIRST INSPECTING THE TIRE, RIM, AND WHEEL ASSEMBLY.

   DOUBLE CHECK THE LOCK RING FOR DAMAGE...MAKE SURE THAT IT IS SECURE IN THE GUTTER BEFORE INFLATION.

S A F E T Y T I P S
- continued -

10. NEVER RUN A VEHICLE ON ONE TIRE OF A DUAL ASSEMBLY. THE CARRYING CAPACITY OF THE SINGLE TIRE AND RIM IS DANAGEROUSLY EXCEEDED, AND OPERATING A VEHICLE IN THIS MANNER CAN RESULT IN DAMAGE TO THE RIM.

11. DON'T BE CARELESS OR TAKE CHANCES. IF YOU ARE NOT SURE ABOUT THE PROPER MATING OF RIM AND WHEEL PARTS, CONSULT A WHEEL AND RIM EXPERT. THIS MAY BE THE TIRE MAN WHO IS SERVICING YOUR FLEET, THE RIM AND WHEEL DISTRIBUTOR IN YOUR AREA, OR THE CLARK DEALER.

12. DON'T USE UNDERSIZED RIMS. USE THE RIGHT RIMS FOR THE JOB.

13. DON'T SEAT RINGS BY HAMMERING WHILE THE TIRE IS INFLATED.

DON'T HAMMER ON AN INFLATED OR PARTIALLY INFLATED TIRE/RIM ASSEMBLY.

14. DON'T LET ANYONE MOUNT OR DEMOUNT TIRES WITHOUT PROPER TRAINING.

15. NEVER SIT ON OR STAND IN FRONT OF A TIRE AND RIM ASSEMBLY THAT IS BEING INFLATED. USE A CLIP-ON CHUCK AND MAKE SURE INFLATION HOSE IS LONG ENOUGH TO PERMIT THE PERSON INFLATING THE TIRE TO STAND TO THE SIDE OF THE TIRE, NOT IN FRONT OR IN BACK OF THE TIRE ASSEMBLY.

16. DO NOT, UNDER ANY CIRCUMSTANCES, ATTEMPT TO REWORK, WELD HEAT, OR BRAZE ANY RIM COMPONENTS THAT ARE CRACKED, BROKEN OR DAMAGED. REPLACE WITH NEW PARTS OR PARTS THAT ARE NOT CRACKED, BROKEN, OR DAMAGED, WHICH ARE OF THE SAME SIZE, TYPE AND MAKE.

17. INFLATE IN A SAFETY CAGE OR USE SAFETY CHAINS DURING INFLATION.

18. REGARDLESS OF HOW HARD OR FIRM THE GROUND APPEARS, PUT HARDWOOD BLOCKS UNDER THE JACK.

19. BLOCK THE TIRE AND WHEEL ON THE OTHER SIDE OF THE VEHICLE, BEFORE YOU PLACE THE JACK IN POSITION...ALWAYS CRIB UP WITH BLOCKS JUST IN CASE THE JACK MAY SLIP.

20. REMOVE THE BEAD SEAT BAND SLOWLY TO PREVENT IT FROM DROPPING OFF AND CRUSHING YOUR TOES. SUPPORT THE BAND ON YOUR THIGH AND ROLL IT SLOWLY TO THE GROUND THIS WILL PROTECT YOUR BACK AND TOES.

21. BEAD BREAKERS AND RAMS APPLY PRESSURE TO BEAD FLANGES. KEEP YOUR FINGERS CLEAR. SLANT BEAD BREAKER ABOUT 10 DEGREES TO KEEP IT FIRMLY IN PLACE. IF... ...IT SLIPS OFF, IT CAN FLY WITH ENOUGH FORCE TO KILL. ALWAYS STAND TO ONE SIDE WHEN YOU APPLY HYDRAULIC PRESSURE.

21. WHEN USING A CABLE OR CHAIN SLING, STAND CLEAR...IT MIGHT SNAP AND LASH OUT.

#11500. Clip-on Air Chuck & Nitrogen Cylinder

PRESSURIZING TIRES WITH NITROGEN:

The primary object in using nitrogen to pressurize tires is to gain the pressure desired in case shop pressure is inadequate.

Most shops have air pressure somewhere around 90-100 PSI, so if you have pneumatic tires on a machine that require more pressure than this, nitrogen cylinders can be used to finish the pressurization.

When using nitrogen:

1. Make sure the cylinder, gauges, regulator, hoses, etc. are all in good condition and U.L. approved. The regulator should be adequate for the pressure desired.

2. Set the regulator at the pressure required.

#11501. Shows Set-up Using Nitrogen Cylinder

3. Using a clip-on air chuck, attach this to the tire valve (#11500).

4. Then stand behind the truck as shown in #11501.

5. When other people are clear of the area, the tire can then be pressurized.

W A R N I N G

TIRES REQUIRING PRESSURIZATION IN

THIS MANNER MUST FIRST BE MOUNTED

PROPERLY ON THE TRUCK.

N O T E

The tank and regulator with gauges need a carrying device or a stand to protect them from falling over.

SERVICE RECORDER:

The service recorder records number of productive lifts in addition to busy and idle time of each truck. The records are made on a 6-inch diameter chart, revolving once. This model records the raising or lowering of a predetermined load. The limits generally are between 5% of the truck's capacity and a full load. Minimums may be established, and the chart will show only those lifts of the minimum weight or greater. Selective load records are made by using an adjustable pressure switch. This switch fits into the hydraulic system between the lift control and the cylinder. It is sensitive to system pressure changes but insensitive to surges or vibration. Switch setting can be adjusted externally and then sealed. The load recording stylus is always in contact with the chart. When the predetermined load or more is lifted, an electrical circuit is closed and this stylus is lifted up, making a record. A surge dampener is recommended particularly when lift trucks are in service where rough or uneven floors occur.

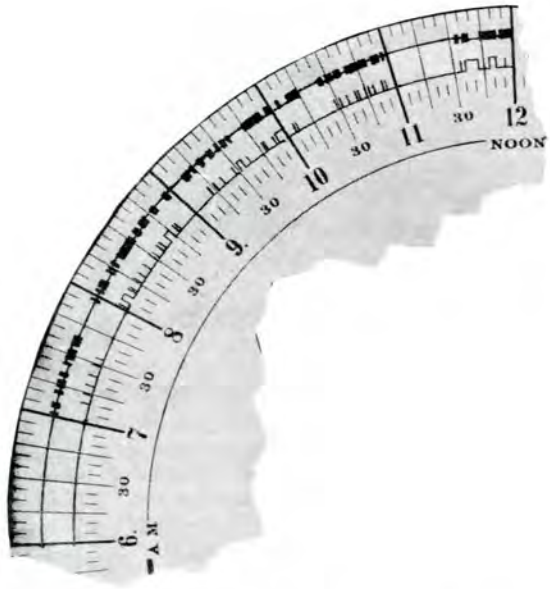

Plate 10161. Service Recorder Chart

HOW TO OPERATE SERVICE RECORDERS

Wind the Clock Movement: No key is needed. Turn the star-shaped winding disc clockwise until the movement is wound fairly tight. Do not over-wind. It is a good practice to wind the clock each time a chart is changed even if it is not run down.

Plate 10164

Place Chart in the Recorder: Snap up the two finger-like clamps. Slip the chart down over the now vertical clamps to the face of the winding disc.

Plate 10165

To Set the Chart: Before clamping it down, turn the chart so that the place on it that corresponds to the present time of the day is at the little white spot on rim of Recorder case. If this is not done correctly, the recorder will be "that much off" all day.

Plate 10166

Fasten the Chart in Place By snapping down the two clamping fingers. Now close and lock the Recorder and it is ready to operate for its full cycle, the length of time depending on the model and clock speed.

Plate 10167

HOW TO READ THE CHART:

This section of chart shows a typical record. The wide marks in the outer record band show when the truck was in motion. The fine line shows down time.

Inner record band shows lifts. Load recording stylus normally rests at lower or inner position. When activated by pressure switch, it is moved outward to record each lift.

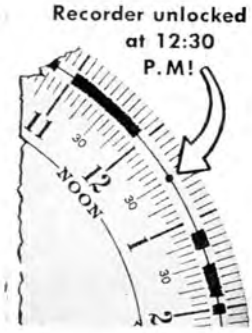

Plate 10162. Service Recorder Chart

When the key is turned to lock or unlock the Recorder, the stylus makes a round dot at the exact time of locking or unlocking. The mark appears on the face of the chart, and it is also embossed on the back. It is unmistakable.

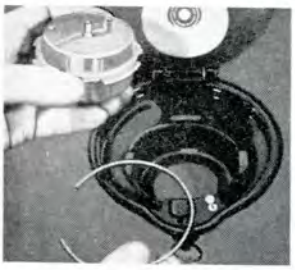

Plate 10163. Clock Exchange

HOW TO EXCHANGE CLOCK MOVEMENTS:

A clock movement is inherently a delicate mechanism that should receive reasonably good care. We have tried to make the clocks in Servis Recorders as rugged as possible to withstand the rough use they sometimes get. If the clock should fail, it can be easily lifted out and mailed in for repair or replacement. Merely unscrew the winding disc by turning it counter-clockwise and pry out wire retaining ring.

To replace the clock movement, first notice that one of the four retaining lugs in the Recorder case is wider than the rest. Match this wide space in movement top and settle movement into place. Then force wire retaining ring into place securely under lugs.

It is a good policy to have a spare clock movement in stock to insure uninterrupted service. Extra clocks are inexpensive.

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SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

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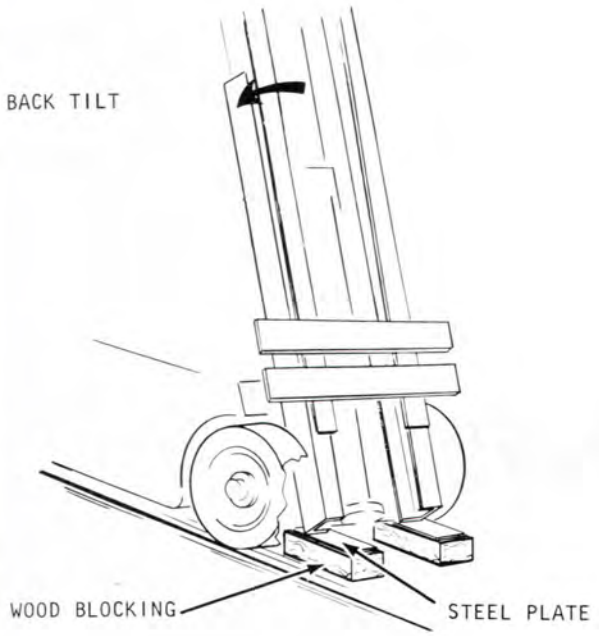
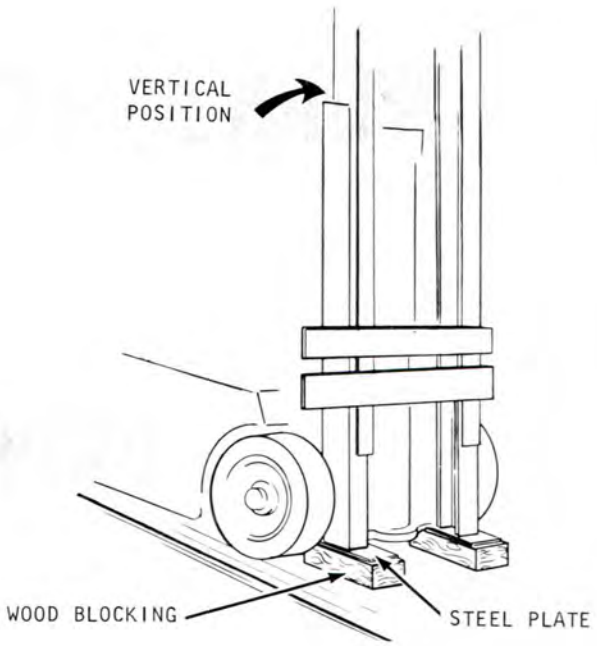
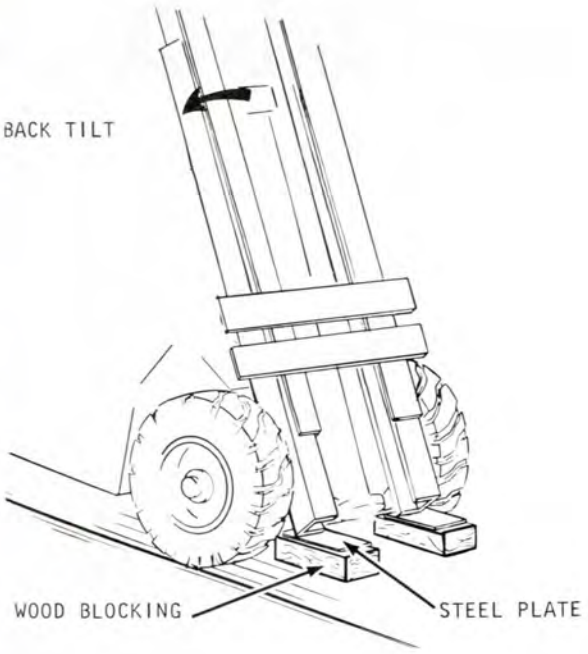
TO ELEVATE DRIVE WHEELS







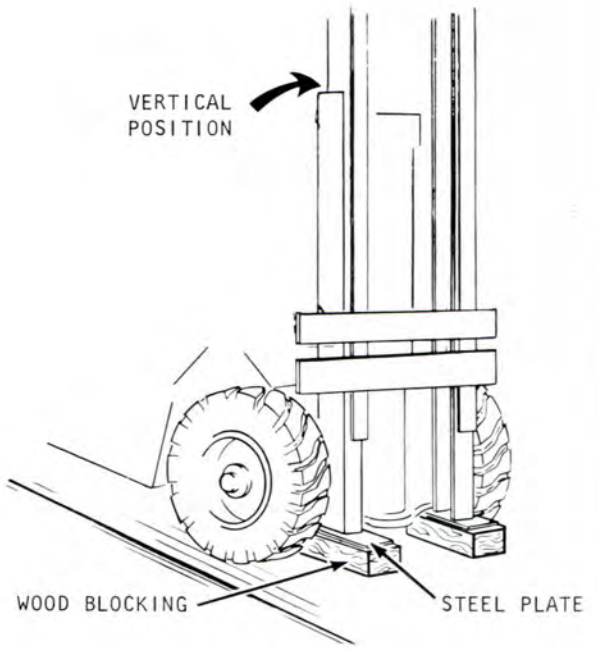


PLATE 10317. TO ELEVATE DRIVE WHEELS, PLACE UPRIGHT BLOCKING AS SHOWN ABOVE.

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