

TM/9-821x

WAR DEPARTMENT

DRIVER'S MANUAL

2 $\frac{1}{2}$ - TON TRUCK, 4 X 2

(Federal)

(X-Extracted from TM 9-821)

April 3, 1943

**EXTRACT FROM
TECHNICAL MANUAL
No. 9-821**



**WAR DEPARTMENT
Washington, April 3, 1943**

**2½ TON TRUCK, 4 X 2
(FEDERAL)**

**PREPARED UNDER THE DIRECTION OF THE
CHIEF OF ORDNANCE**

(With the cooperation of the Federal Motor Truck Company)

CONTENTS

SECTION	Paragraphs	Pages
I: Introduction	1 - 2	3 - 5
II: Operation	3 - 9	6 - 11
III: Preventive Maintenance and Inspection	10 - 15	12 - 33
IV: Operation Under Unusual Conditions	16 - 17	34 - 37
V: Tools and Equipment.....	18	38 - 39
VI: Emergency Repairs.....	19 - 28	40 - 48
VII: Vehicle Specifications	29	49 - 50
VIII: References	30	51
INDEX		52 - 56

TM 9-821x

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2½ TON TRUCK, 4X2 (FEDERAL)

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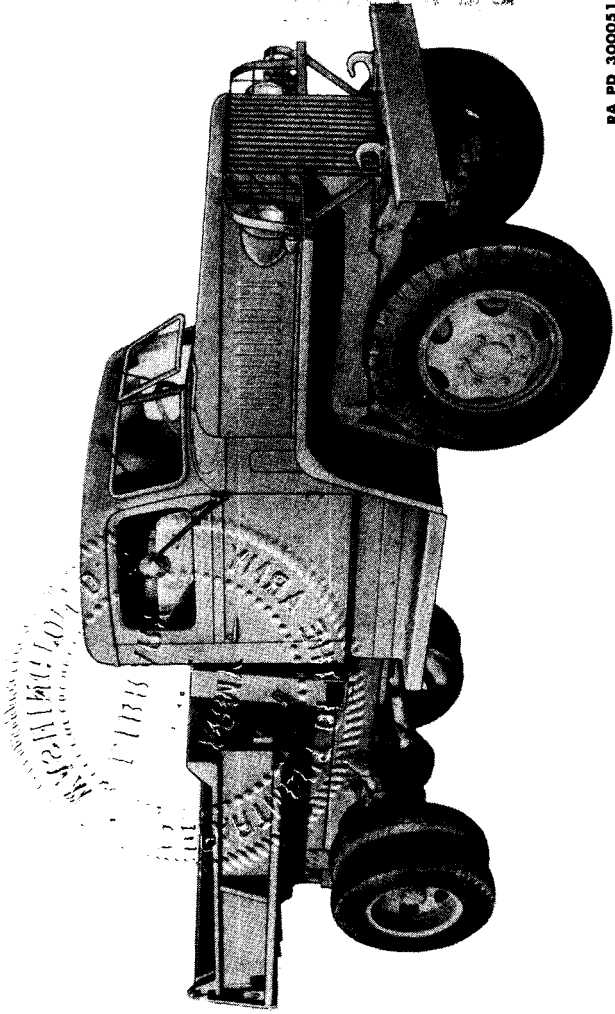


Figure No. 1—2½ Ton Truck 4X2 (Federal)

DRIVER'S MANUAL**Section I****INTRODUCTION**

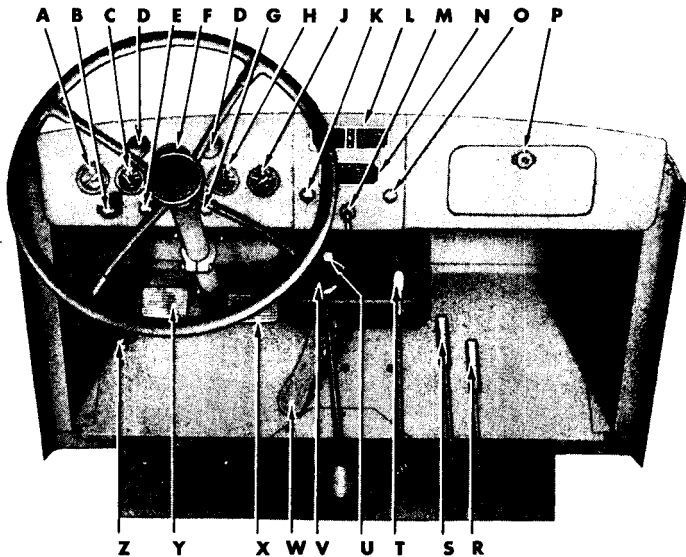
	Paragraph
Scope	1
Controls and location.....	2

1. **SCOPE**—This manual is prepared for the driver of the 2½ Ton, 4 X 2, Dump truck. It is a brief summary of the information given by the driver instructor for the safe and effective operation of the truck. See Figure 1.

2. **CONTROLS AND LOCATION**—a. **Controls.** Controls and instruments in the driver's compartment are identified and located in Fig. 2. Gear shift arrangement, power take-off lever position, and hoist valve positions are shown in Fig. 3 for the Anthony and the Galion body. Note that all positions are identical for both bodies with the exception of the hoist valve control lever.

b. **Caution plates and shifting diagrams.** Study the gear shift arrangement, power take-off positions, and note particularly the hoist valve "hold," "raise" and "lower" position for truck you are operating. Note the identity, significance and position of all instruments and controls.

2½ TON TRUCK, 4X2 (FEDERAL)

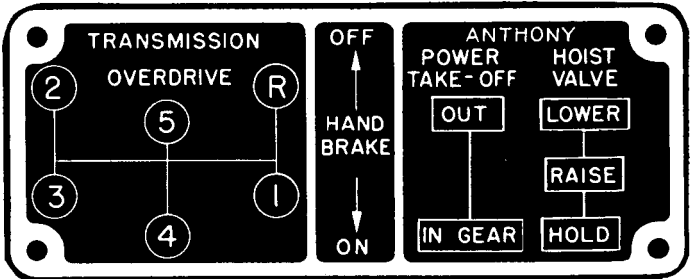


- | | |
|---------------------------------|----------------------------|
| A—TEMPERATURE GAGE | N—CAUTION PLATE |
| B—MAIN LIGHT SWITCH | O—THROTTLE |
| C—FUEL GAGE | P—GLOVE COMPARTMENT |
| D—PANEL LIGHT | R—HOIST CONTROL LEVER |
| E—BLACKOUT DRIVING LIGHT SWITCH | S—POWER TAKE-OFF LEVER |
| F—SPEEDOMETER | T—HAND BRAKE LEVER |
| G—PANEL LIGHT SWITCH | U—STARTING MOTOR SWITCH |
| H—AMMETER | V—TRANSMISSION SHIFT LEVER |
| J—OIL PRESSURE GAGE | W—ACCELERATOR |
| K—CHOKE | X—BRAKE PEDAL |
| L—SHIFTING DIAGRAM | Y—CLUTCH PEDAL |
| M—IGNITION SWITCH | Z—DIMMER SWITCH |

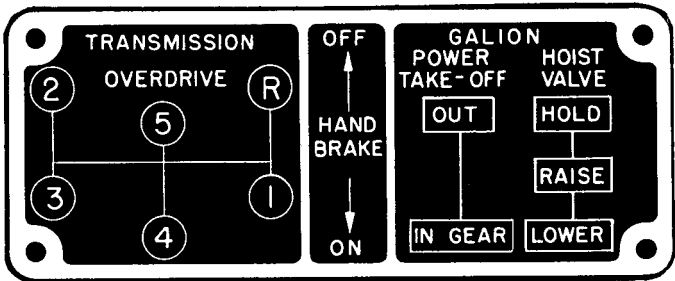
RA PD 300052

Figure No. 2—Controls and Instruments

INTRODUCTION



(Anthony)



(Galion)

RA PD 300053

Figure No. 3—Shifting Diagrams

MAXIMUM ROAD SPEEDS IN THE FOLLOWING GEAR POSITIONS			
OVERDRIVE			
5 TH.	51	2 ND.	12
4 TH.	41	1 ST.	6
3 RD.	23	REV.	6
2800 MAX. ENG. R.P.M.			
7.4 AX. RATIO 8:25-20 TIRES			

RA PD 300054

Figure No. 4—Caution Plate

DRIVER'S MANUAL

Section II

OPERATION

	Paragraph
How to start the engine.....	3
Moving the truck—forward.....	4
Moving the truck—reverse.....	5
Guide to gear shifting.....	6
Driving hints.....	7
How to shut down engine.....	8
Operation of hoist.....	9

3. HOW TO START THE ENGINE—a. Before starting. Perform the before starting inspection. See Paragraph 10.

b. Starting engine. (1) Pull hand brake lever back and leave applied.

(2) Move transmission shift lever to neutral position. (Refer to Fig. 3, Shifting Diagram). At this point lever should move freely from right to left without effort.

(3) Pull throttle button out about one-half inch.

(4) Pull choke button out about half way.

(5) Turn ignition switch lever to "on" position.

(6) Push down clutch pedal and hold down until engine starts. This is important in cold weather.

(7) Press firmly on starting motor switch until engine starts. This switch should not be engaged for longer than 10 to 15 seconds at a time.

(8) Push in throttle button until engine runs smoothly at a moderate speed. Step on accelerator to speed up if it shows signs of dying.

(9) Release clutch pedal.

(10) Push in choke button when engine is running smoothly and temperature gage indicates approximately 160°F.

(11) With engine running at rapid idle note readings on gages. Ammeter should show charge. After engine has warmed up oil pressure gage should indicate approximately 15 pounds. If pressure fails to show or falls suddenly stop engine at once and report condition.

OPERATION

4. MOVING THE TRUCK—FORWARD—a. **General.** When time permits allow engine to run for an initial warm up period until temperature gage shows 160°F. If time does not permit this run engine until temperature gage hand starts to move.

b. **Shifting up in forward speeds.** Truck operates in the same manner as conventional vehicle except that the transmission shift lever has five forward positions (fig. 3). Shifting is accomplished as follows:

(1) Push down clutch pedal.

(2) Refer to shifting diagram (fig. 3) and move gear shift lever as shown to extreme right and pull straight back engaging first speed or low gear.

(3) Gradually speed up engine by depressing foot accelerator pedal. Release clutch pedal gradually from depressed position and smoothly release hand brake. Once practiced a few times this operation becomes automatic and the three actions of accelerating engine, releasing the clutch pedal, and releasing the hand brake all blend smoothly causing the truck to move forward without undue engine stalling and jerking of the truck.

(4) As soon as truck is moving smoothly in first gear (never exceed allowable speed shown on caution plate (fig. 4) for any gear being used) depress clutch pedal and raise foot from accelerator pedal allowing engine to slow down. Refer to shifting diagram (fig. 3) and move shift lever forward from first gear position through neutral position to the extreme left of its travel and then push straight forward engaging second speed gear. Depress accelerator slightly and release clutch pedal gradually allowing engine to pick up the load of pulling the truck.

(5) In like manner as described in (4) above, shift truck successively into third and into fourth speed which is direct drive and is used for normal truck operations.

(6) The overdrive or fifth speed position is reached by shift-

2½ TON TRUCK, 4X2 (FEDERAL)

ing from fourth speed following the same steps as just outlined for other shifts, however fifth speed or overdrive is normally reserved for operating on the open road at high speed.

c. Shifting down in forward speeds. When necessitated by driving conditions, transmission may be shifted from higher to lower speeds using the following steps:

(1) Depress clutch pedal and release accelerator pedal and at the same time move shift lever into neutral (central) position.

(2) Release clutch pedal and accelerate to synchronize engine with truck speed. This step will require practice and judgment to acquire the knack of knowing when engine speed is high enough to synchronize gears and avoid clashing as shift is made to lower gear as outlined in next step.

(3) Depress clutch pedal, release accelerator and quickly and positively shift lever to next lower speed position.

(4) Step on accelerator pedal and gradually release clutch pedal. Operation may be continued in this gear or a shift to the next lower gear may be made in like manner.

5. MOVING THE TRUCK—REVERSE—a. Shifting into reverse speed. Transmission can be shifted into reverse speed as follows:

(1) Bring truck to complete stop.

(2) Depress clutch pedal and place transmission shift lever in reverse speed position (fig. 3) by moving lever to extreme right and shifting straight forward.

(3) Accelerate engine and gradually release clutch.

6. GUIDE TO GEAR SHIFTING—a. Forward upward shifts. When traveling on level or rising roadway always make forward upward shifts as soon as truck gains sufficient momentum to enable the engine to handle the load in the next higher speed without "lugging" or "laboring." Never exceed speed shown on caution plate for any gear. It is usually preferable to shift to higher gear at a speed slightly lower than shown on caution plate for the respective gear in which you are running. Most normal load operation will be with transmission in 4th speed or direct drive. The 5th speed or overdrive position is indicated for use where the roadway is open

OPERATION

and in first class condition, where the load is light and the engine can handle the load in overdrive without "lugging", and principally where high speed operation is desired for extra light load or empty body.

b. **Shifting down in forward speed.** The transmission should always be shifted down from higher to lower speed when the engine begins to "lug" or "labor". Shift to lower speed when descending a grade using the same speed which would be normally used in ascending the grade. In an emergency truck can be slowed down by shifting to lower speed gear. Be sure to keep truck speed below maximum permissible speed for that gear by intermittent use of foot brake. This is often helpful in controlling the truck on ice or other slippery road surfaces.

7. **DRIVING HINTS**—a. **General.** A good driver can be depended upon to accomplish any driving task in a safe and efficient manner without abusing his truck and endangering life or load. The practices outlined below are used by good drivers. Make a habit of using them.

(1) Avoid sharp turns which impose a severe strain on front axle.

(2) Remember that blame for accidents usually falls on the driver. Do not try to show off when driving your truck.

b. **Engine.** (1) Never race a cold engine.

(2) Push choke in as soon as engine is warmed up to approximately 160°F. This saves gasoline and reduces carbon formation.

(3) Do not idle engine for longer than five minutes. Shut the engine down or, if this is not possible, pull out hand throttle button about $\frac{1}{4}$ inch so that engine runs at about twice its normal idling speed.

(4) Always be on the alert for unusual noises or sounds which would indicate mechanical defects. Any suspected defects should be reported.

2½ TON TRUCK, 4X2 (FEDERAL)

c. Brakes. (1) Do not slam on brakes.

(2) Apply brakes only as rapidly as necessary for the conditions of the stops. When stop is made with a heavy load, down grade, over a great distance, intermittently release brakes to allow air to circulate around drums and shoes.

(3) The engine compression can be used as an aid to the brakes in keeping the truck in check on long steep hills. As a general practice select the same transmission speed going down hill that you would use going up a similar hill. Avoid the practice of allowing the truck to push the engine thereby driving it at higher than permissible speed for the gear engaged. Use the brakes to keep truck and engine at or below normal speed while descending grades in gear.

(4) When descending hills always keep clutch engaged and transmission in gear. Never coast down hill with transmission in neutral or with clutch pedal depressed.

(5) When truck skids, do not apply brakes suddenly. Reduce speed by releasing accelerator or shift to next lower transmission speed (par. 4c.) Apply brakes gently if at all. When truck slides attempt to get it back on its course by turning the front wheels in the same direction as the rear of the truck is sliding.

8. HOW TO SHUT DOWN ENGINE—a. **Stopping from low speed.**

(1) Depress clutch pedal.

(2) Remove foot from accelerator allowing engine to slow to idling speed.

(3) Move transmission shift lever to neutral position and release clutch pedal.

(4) Apply brake pressure until truck comes to a complete stop.

(5) If temperature gage shows between 160°F and 180°F and truck has been operating at medium and light loads, allow engine to idle momentarily at normal speed before shutting off ignition switch.

OPERATION

b. Stopping from high speed. (1) Remove foot from accelerator pedal.

(2) Gently apply pressure to brake pedal until engine and truck decelerates.

(3) Depress clutch pedal and move transmission shift lever to neutral position then release clutch pedal.

(4) Continue to apply pressure to brake pedal until truck comes to a complete stop.

(5) If engine temperature gage shows higher than about 180°F or if truck has been operated for a long period under heavy load, allow engine to idle at about twice normal speed for five minutes before turning off ignition switch.

9. OPERATION OF HOIST—a. **General.** The operation of the hoist is exceedingly simple and may be performed with the truck moving forward, backward or standing still. Engine must be running to provide necessary power for raising the body. Body may be lowered with or without the power take-off engaged (figs. 2 and 3).

(1) Release tail gate lever.

(2) Make sure hoist operating lever is in "hold" position.

(3) Depress clutch pedal.

(4) Pull back power take-off lever to "in gear" position.

(5) Move hoist operating lever to "raise" position while accelerating engine sufficiently to raise the load to desired height.

(6) Move hoist operating lever to "hold" position.

b. Lowering the body. (1) Move power take-off lever to "out" position.

(2) Move hoist operating lever through "raise" position to "lower" until desired lowering speed is attained.

(3) Bring body to a gentle rest on sub-frame.

(4) Move hoist operating lever to "hold" position.

(5) Secure tail gate in closed position.

c. Caution. Use extreme care in lowering loaded body to avoid damage to sub-frame and hinge brackets.

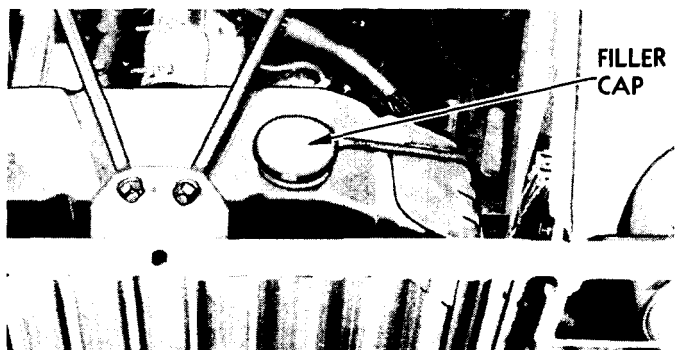
DRIVER'S MANUAL
Section III
PREVENTIVE MAINTENANCE AND
INSPECTION

	Paragraph
Before starting.....	10
During operation.....	11
At halt.....	12
After operation.....	13
Weekly.....	14
Additional lubrication.....	15

10. BEFORE STARTING—a. Look on ground for leaks of oil, water, or fuel; inspecting area beneath the radiator, engine, transmission, fuel tank and rear axle. Report any leakage.

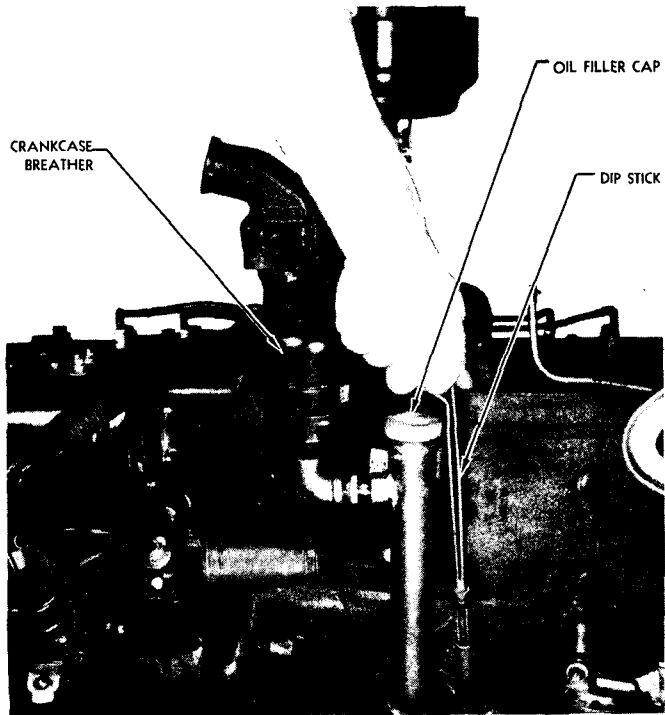
b. Inspect truck exterior and under hood for injury, signs of tampering or sabotage.

c. Remove radiator cap (fig. 5), add coolant to within one inch of filler neck if necessary. A heavy layer of oil on water



RA PD 300055

Figure No. 5—Radiator Filler Cap

PREVENTIVE MAINTENANCE AND INSPECTION

RA PD 300056

Figure No. 6—Inspect Oil Level

in radiator may indicate leaking gaskets or other injury in cooling system or engine lubricating system. Report if such a condition exists. If water in radiator is excessively low, examine hose connections, radiator core and water pump for leaks. When checking the oil level in crankcase be sure it has not risen due to water leaking in the crankcase. Report any defects.

d. Remove engine oil level dip stick (fig. 6) wipe clean with cloth and replace gage all the way, remove and note oil level indication. Note condition of oil, be sure it is free of dirt and

2½ TON TRUCK, 4X2 (FEDERAL)

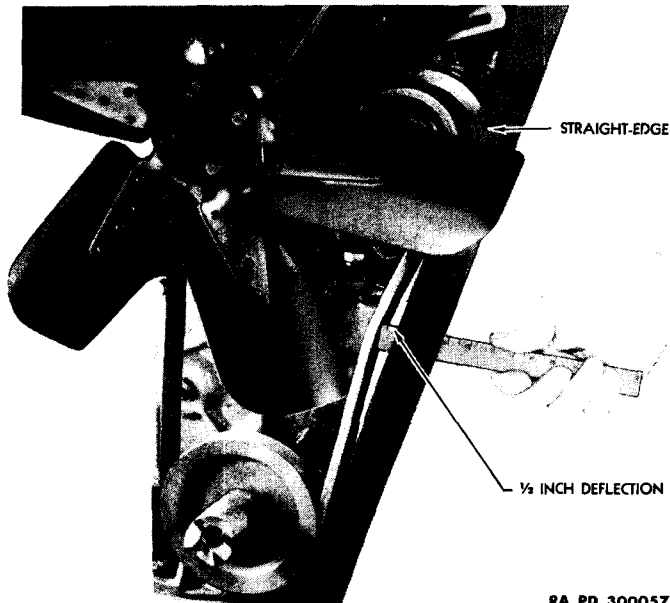
water. Pour engine oil into filler pipe to bring level to full mark on dip stick. If oil appears excessively low, examine for leaks in crankcase gasket, oil filter body and cover, oil pressure line and timing gear case.

e. Push fan belt half-way between pulleys. Correct deflection to ½ inch (fig. 7).

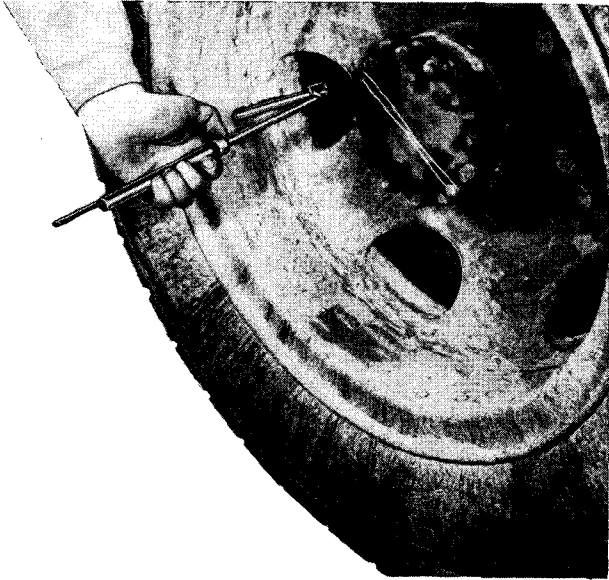
f. Shake steering drag link. Report any looseness.

g. Have assistant driver turn steering wheel from right to left, observe any excessive play in steering linkage or gear. Report any leakage of lubricant from steering gear housing.

h. Inspect tarpaulin and load. Check cargo carefully for damage. Check cargo for shifting and make sure all ropes are lashed securely. Check for tears or holes in tarpaulin, missing or worn straps, rings, ropes or rain gutters. Report any cargo disorder.

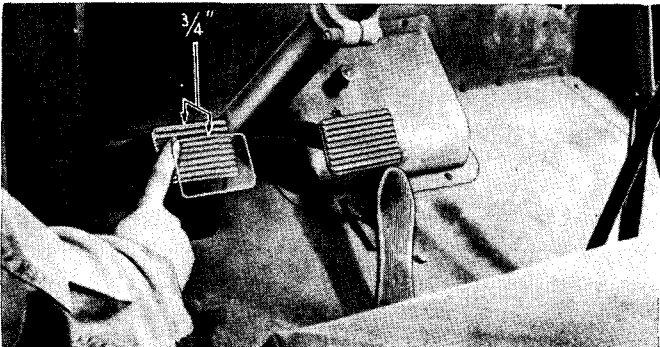
**RA PD 300057****Figure No. 7—Inspect Fan Belt Tension**

PREVENTIVE MAINTENANCE AND INSPECTION



RA PD 300058

Figure No. 8—Gage Tire Pressure



RA PD 300059

Figure No. 9—Feel Clutch Pedal Free Travel

2½ TON TRUCK, 4X2 (FEDERAL)

i. All tools, tire chains and other equipment assigned to the truck must be in place. Report any tools missing or not in usable condition.

j. Check tire pressure with gage (fig. 8) and inflate to 60 pounds. Replace missing valve caps and check for improperly located valve stems.

k. Clean windshields and check action of adjusting brackets. Report if inoperative.

l. Depress clutch pedal with one finger (fig. 9). Free travel should be approximately $\frac{3}{4}$ inch. Report if excessively over or under.

m. See that fire extinguisher is in bracket.

n. Inspect light switch at all positions. Be sure lights do not flicker or fail to light. Report faulty conditions.

11. DURING OPERATION—a. Apply foot brakes and use hand brake soon after first moving the truck to be sure the brakes will hold.

b. Frequently glance at instruments on dash to be sure that trouble is not developing. Under normal operating conditions instrument readings should be:

Temperature Gage.....Between 160°F. and 180°F.

Fuel Gage.....Amount of fuel in tank.

SpeedometerPermissible road speed.

AmmeterSlight charge (+).

Oil Pressure Gage.....At idle —10 pounds.

At road speed —26 pounds.

If readings vary greatly from above, stop and determine cause. Notify the motor officer if trouble cannot be remedied.

c. Be on the alert for unusual noises, odors, or vibrations which to the experienced driver are indications of impending trouble. Stop the truck, locate the source, and correct the condition if possible. The following conditions usually indicate the trouble specified:

PREVENTIVE MAINTENANCE AND INSPECTION

- (1) Squealing in engine.....(1) Generator or water pump trouble.
- (2) Spark ping.....(2) Engine overheating.
- (3) Hissing sound.....(3) Escape of steam due to overheating.
- (4) Tires squeal on turns.... (4) Underinflation, overload or excessive speed.
- (5) Tarry odor from under hood.....(5) Insulation burning from overheated wires.
- (6) Tarry odor from cab floorboard.....(6) Hand brake overheated.
- (7) Tarry odor from drive wheels.....(7) Service brake overheated.

d. Steering.

- (1) Excessive pull to either side or wander.....(1) Loss of pressure in tires.
- (2) Excessive play in steering mechanism or shimmy.....(2) Excessive wear, loose parts or improper adjustment.

e. Clutch.

- (1) Chatter, squeal or slip... (1) Underlubricated, damaged release bearing or worn drive disk.
- (2) Slip at high speeds and/or heavy loads..... (2) Out of adjustment.
- (3) Transmission gears clash on shift.....(3) Transmission out of alignment.

f. Transmission. Unusual noises indicate approaching failure of gears or bearings. Creeping out of gear indicates loose mounting, misalignment or tapered gears due to improper shifting.

g. Performance.

- (1) Lack of power.....(1) Dragging brakes, loss of engine oil, or water. Stop truck and correct condition.
- (2) Sudden increase of engine power.....(2) Loss of load.
- (3) Irregular, missing and gradual loss of power.... (3) Low fuel, leaks in fuel line, fuel pump trouble, or excessive vaporizing of fuel in lines, spark plug broken or fouled, etc. Stop truck and correct trouble before engine stops entirely.

2½ TON TRUCK, 4X2 (FEDERAL)

12. **AT HALT**—a. Take advantage of every halt to correct or report any condition noticed during operation which was not serious enough to require immediate action.

b. Look under truck for water, oil or gasoline leaks.

c. Remove radiator cap, if necessary add coolant until level is within one inch of the filler neck.

d. Remove dip stick from engine (fig. 6) and wipe off. Replace it in all the way and then remove stick and observe oil level. Pour engine oil into filler pipe to bring level in crankcase up to full mark on dip stick.

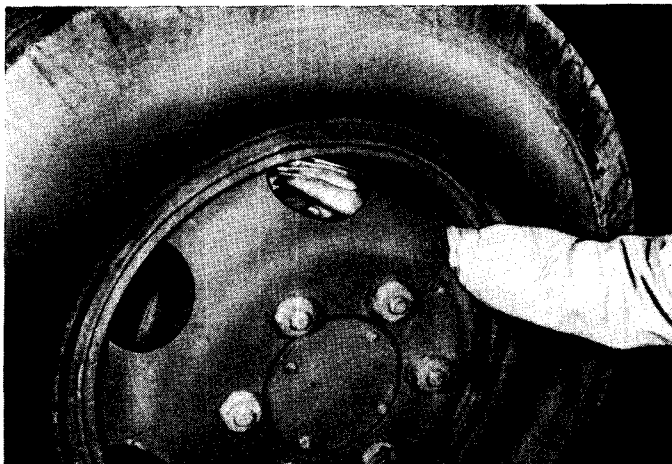
e. See that tires are not flat. Kick duals. Replace any missing valve caps. Correct any mislocated valve stems.

f. Clean windshield, lights and rear view mirror.

g. Feel brake drums (fig. 10). If one drum is much hotter than the others it may be necessary to ease it off. See Paragraph 20b (fig. 45).

h. Turn down plug on water pump grease cup one turn (fig. 33).

i. Tighten tarpaulin fastenings.



RA PD 300060

Figure No. 10—Feel Brake Drum

PREVENTIVE MAINTENANCE AND INSPECTION

13. **AFTER OPERATION**—a. Operate hand brake. Ratchet must keep lever in applied position and brake must hold truck.

b. Engine must idle smoothly. Investigate any unusual noises detected during operation. Correct and/or report.

c. Temperature gage must read between 160°F and 180°F as soon as engine begins to idle.

d. Oil pressure gage must register approximately 10 pounds when engine is idling.

e. Ammeter will show a slight positive (+) charge. Zero also is satisfactory.

f. Fuel gage must show amount of fuel in tank.

g. Operate windshield wipers. Be sure arms and blades are not missing; and that wipers move regularly through their complete arc.

h. Test horn operation.

i. Inspect rear view mirror. If broken, discolored or lost, report. If loose in bracket, tighten. Adjust for best vision.

j. Inspect light switch in all positions. During blackouts inspect with light switch in blackout position only. Be sure all switches are in "off" position after inspection. If lamps are loose, tighten. Report broken brackets and cracked lenses.

k. Clean windshield. Report if cracked or broken.

l. Tighten any loose nuts and bolts on wheels and axle flanges (fig. 11). Report any damaged wheels or rims, missing nuts or bolts; or grease leaks.

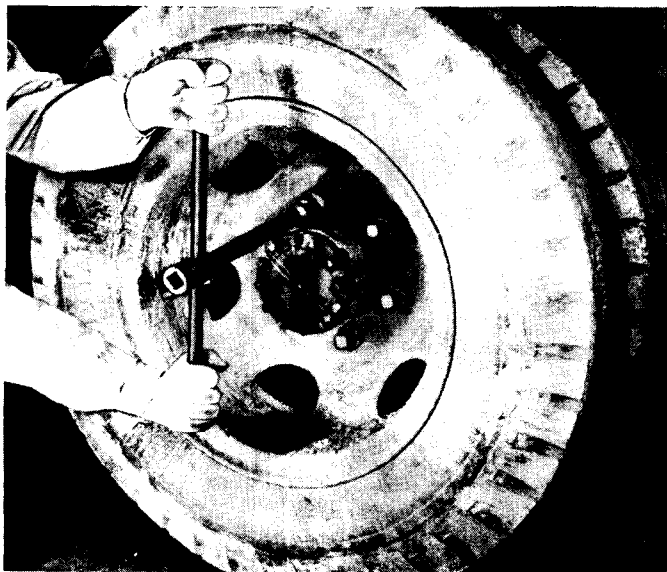
m. Examine hoist cylinder drive shaft and universal joints to be sure nothing is wound around them. Check cylinder for oil leaks.

n. Bumper and towing hooks must be tight. Pintle hook must lock freely. Report any missing parts or dangerous wear.

o. Examine load for shift or damage. See that tarpaulin fastenings are tight and that all ropes are lashed securely.

p. Look carefully for bent or loose steering knuckle arms, tie rod and drag link. Observe and report any slack in steering mechanism. Look for lubricant leaks from steering gear housing.

q. Remove all foreign matter such as nails, etc., from tires or from between duals. Inspect treads for signs of abnormal

2½ TON TRUCK, 4X2 (FEDERAL)

RA PD 300061

Figure No. 11—Tighten Wheel Nuts

wear. Kick all duals to detect flat. Replace missing valve caps, and relocate improperly located valve stems. If a tire was changed during the run observe that duals are properly matched. Tires with greatest wear must be on inside dual.

r. See that spare tire carrier holds tire securely, and is not damaged.

s. See that brake line brackets are in place and tight. Report if fluid is leaking from lines or connections.

t. Feel differential housing. Report if unusually hot or lubricant leaks.

u. Place hand on transmission housing. Report if unusually hot or lubricant leaks.

v. Remove any foreign matter found wound around propeller shafts. Report loose joints, bent shafts or missing parts.

w. Remove radiator cap. If necessary add coolant until

PREVENTIVE MAINTENANCE AND INSPECTION

level is within one inch from filler neck. Report any excessive loss of coolant or presence of oil films.

x. Push fan belt halfway between pulleys. Correct deflection to $\frac{1}{2}$ inch (fig. 7). See Paragraph 28.

y. Remove stick from engine (fig. 6) and wipe off. Replace it in all the way, then remove and observe oil level. Pour engine oil into filler pipe to bring level in crankcase up to "full" mark on dip stick. Report any excessive loss of oil or presence of water.

z. Remove crankcase breather cap (fig. 12). If element is dirty wash it in dry-cleaning solvent. Replenish oil after cleaning cup.

aa. Examine carburetor, fuel pump, and fuel filter for leaks or defective connections. Tighten any loose fittings and report any defective condition.



RA PD 300062

Figure No. 12—Inspect Crankcase Breather

2½ TON TRUCK, 4X2 (FEDERAL)

ab. Fill fuel tank by contacting filler nozzle to filler neck before fuel flows from nozzle. Otherwise static sparks may cause a fire or explosion. Be sure filler cap vent is open before replacing cap on tank.

ac. Make sure all tools assigned, tire chains and other equipment are with the truck, are clean and in good condition. Report any damaged tools.

14. WEEKLY—a. Perform the daily before starting inspection (par. 10).

b. Pull choke button out about 1½ inches. Choke control should not drag or slip. Make sure that it is fastened securely to the choke lever on carburetor.

c. Tighten the radiator mounting bolt (fig. 13). See that the engine mounting bolts are in place.

d. See that the battery is held securely but not so tight that the holding clamps are biting into the battery case. Clean corrosion from battery cable connections, coat terminals with petrolatum and tighten connections on terminals. Remove the battery filler caps, run a small wire through the vents. Add distilled water to bring level ¾ inch above separators.

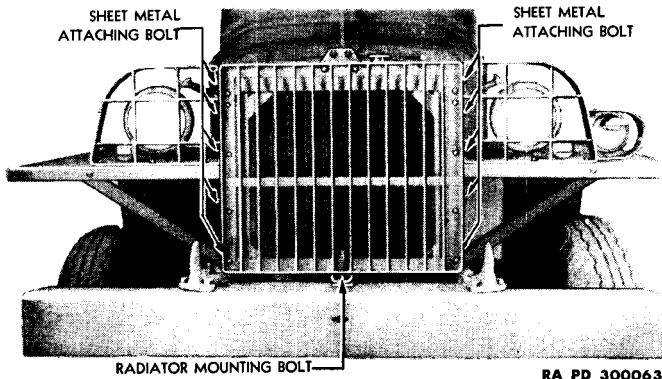


Figure No. 13—Radiator Mounting Bolt

PREVENTIVE MAINTENANCE AND INSPECTION

CAUTION: Do not add water in cold weather unless truck is to be operated immediately.

e. If operating in sandy or dusty terrain, disassemble and clean the air cleaner (fig. 14). To do this, loosen brace winged clamp screw on side of bowl. Remove wing bolt at center of air cleaner cover and lift cleaner bowl and element from support, holding level to avoid spilling. Lift element from bowl. Wash element in dry-cleaning solvent, then dry it with compressed air being careful not to wad the element wool. Scrape hardened dirt out of oil bowl and wash bowl in dry-cleaning solvent. Fill bowl to the indicated level with new or used engine oil. Assemble filter element and bowl and reinstall on support. Replace wing bolt to support and tighten clamp screw at support brace.

f. Remove all foreign material such as stones, glass, or nails from tires. Check tires for cuts and bruises. Report damage.

g. Tighten any loose nuts and bolts on wheels and axle flanges. Report damaged wheels, rims, missing nuts and bolts or grease leaks.

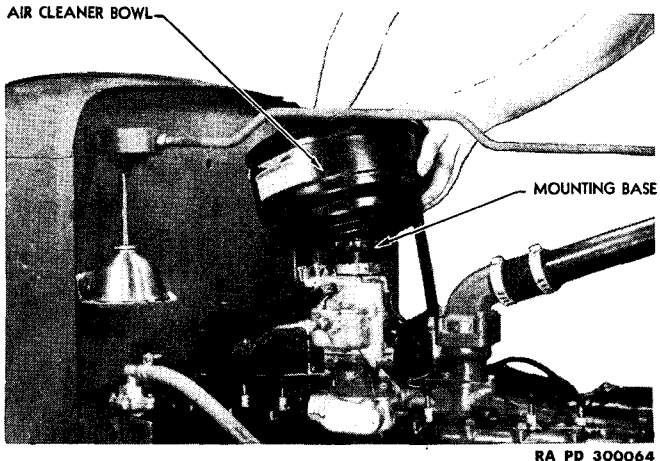
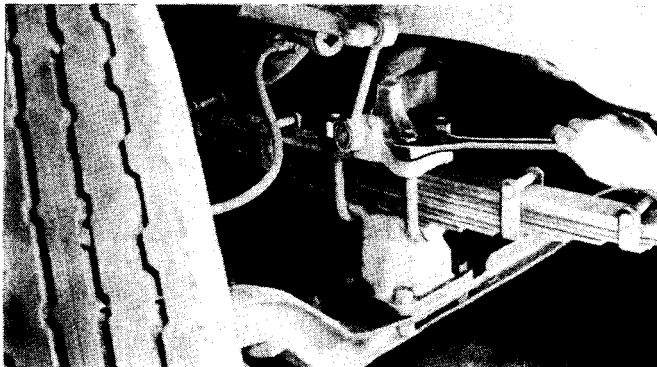


Figure No. 14—Service Air Cleaner

2½ TON TRUCK, 4X2 (FEDERAL)

RA PD 300065

Figure No. 15—Tighten Spring U Bolts

h. Examine springs for broken leaves. See that U-bolts are tight and have not shifted (fig. 15). Check for missing rebound clips.

i. Make sure bolts holding steering column to dash are tight. Check tightness of nuts and bolts holding steering gear housing to frame.

j. Remove fire extinguisher from its clamps, shake and judge from sound and weight whether it is full. Install filled fire extinguisher in brackets.

k. Sweep out interior of cab. Check presence and condition of floorboard. Report any rips or tears in seat cushions. Tighten body bolts (fig. 16).

l. See that the brush guards are not loose, bent or broken.

m. Check bumpers to see that they are not loose, bent or broken.

n. Shake pintle hook. Report if looseness of mounting is found. Check operation by lifting safety latch. Look hook over carefully for cracks.

o. Raise body. Listen for unusual noises in cross heads, hoist cylinder and power take-off. Report any leaks from cylinder.

p. Report any defects to the motor officer.

PREVENTIVE MAINTENANCE AND INSPECTION

RA PD 300066

Figure No. 16—Tighten Body Bolts

15. ADDITIONAL LUBRICATION—Additional lubrication and maintenance duties may be assigned by motor officer. Driver will usually accompany truck to assist when possible or provide a suitable report of truck operating conditions.

a. General. Inasmuch as lubrication is the most vital factor in the service-free life of a motor truck, periodic attention must always be given to the lubrication of all wearing parts of the truck. An important cause of wear is dirt and grit between moving parts. When the truck is used on dusty roads or rough terrain, lubrication operations should be performed with extra care. Sufficient lubricant must be forced through the fittings to push out any accumulated dirt and grit.

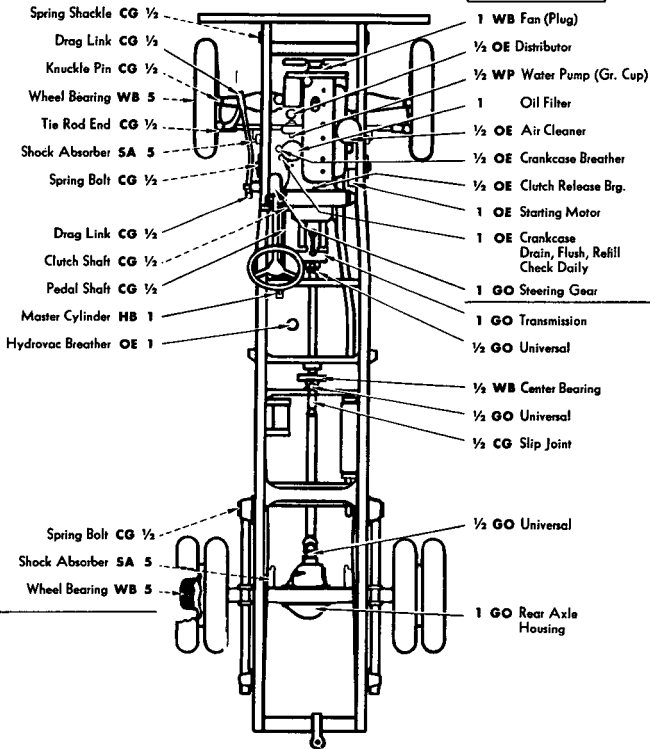
b. Reports and records. (1) Reports. At time of lubrication any condition noted beyond the scope of the using arms maintenance personnel will be reported to the ordnance officer responsible for the materiel.

(2) Records. A complete record of lubrication will be kept for every truck. Responsible personnel will make check at regular intervals to ascertain the actual mileage and date at which each component received such attention as prescribed.

2½ TON TRUCK, 4X2 (FEDERAL)

CAUTION—Lubricate Dotted Arrow Points on Both Sides of Truck

Serviced Under Hood



KEY

LUBRICANTS	
OE—OIL, engine, crankcase grade	HB—FLUID, brake, hydraulic
CG—GREASE, general purpose No. 1 (Above +32°F.) No. 0 (+32°F. to 0°F.)	SA—SHOCK ABSORBER FLUID, light
GO—LUBRICANT, gear, universal (Seasonal grade)	WB—GREASE, general purpose No. 2
	WP—GREASE, water pump

INTERVALS
½— 500 Miles
1— 1000 Miles
5— 5000 Miles
DAILY
Air Cleaner
Transmission
Water Pump

Figure No. 17—Lubrication Guide—Chassis

RA PD 300067

PREVENTIVE MAINTENANCE AND INSPECTION

TABLE OF CAPACITIES AND LUBRICANTS TO BE USED

	CAPACITY	ABOVE +32°F.	+32°F. to 0°F.	BELOW 0°F.
CRANKCASE	8 QTS.	CAUTION--USE U. S. ARMY SPEC. 2-104-A OE SAE 30		
TRANSMISSION	14 PINTS	GO SAE 90	GO SAE 80	SEE MOTOR OFFICER
REAR AXLE HOUSING	15 PINTS	GO SAE 90	GO SAE 80	

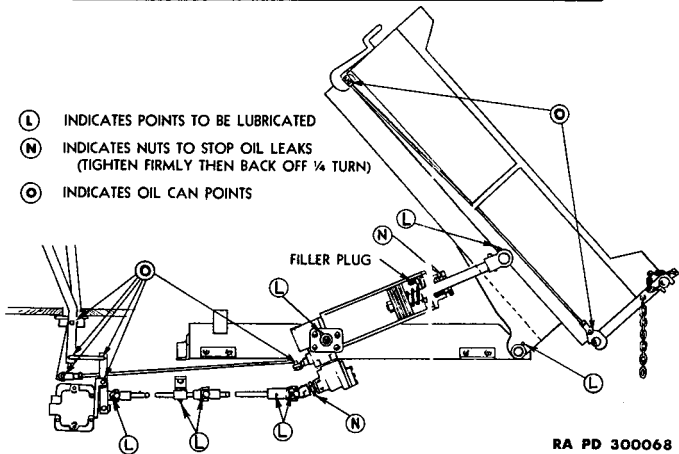


Figure No. 18—Lubrication Guide—Hoist and Body

c. Lubrication points and periods. (1) Lubrication instruction for all points to be serviced by the using arm are shown in the Lubrication Guides (figs. 17, 18).

(2) Intervals indicated are for normal service. For extreme conditions of speed, heat, water, sand, mud, snow, dust, etc., reduce interval by 1/3 or 1/2 or more if conditions warrant.

(3) Points and periods:

2½ TON TRUCK, 4X2 (FEDERAL)

SPRING SHACKLE—FRONT
(fig. 19)

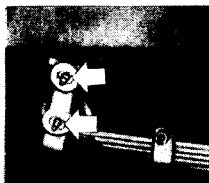
2 fittings, each side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300069

Fig. No. 19

KNUCKLE PINS (fig. 20)

2 fittings, each side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300070

Fig. No. 20

SPRING BOLTS—FRONT (fig. 21)

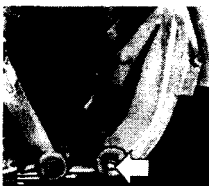
1 fitting, each side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300071

Fig. No. 21

TAIL GATE RELEASE LEVER BRACKET

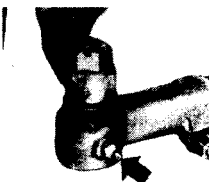
1 fitting, each side under body

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300072

Fig. No. 22

TIE ROD END (fig. 22)

1 fitting, each side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles

PREVENTIVE MAINTENANCE AND INSPECTION**STEERING DRAG LINK (fig. 23)**

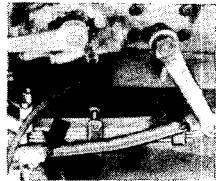
2 fittings, L.H. side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300073

Fig. No. 23

PEDAL SHAFT (fig. 24)

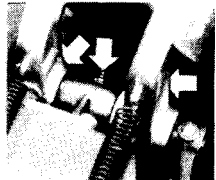
3 fittings, L.H. side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300074

Fig. No. 24

PROPELLER SHAFT SLIP JOINT (fig. 25)

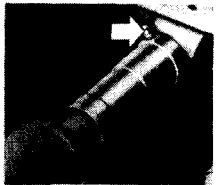
1 fitting

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300075

Fig. No. 25

DISTRIBUTOR SHAFT

1 oil cup

Oil can

OE—OIL, engine, crankcase grade

3 drops

500 miles

HOIST CYLINDER END YOKE (fig. 26)

1 fitting, under body

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300076

Fig. No. 26

2½ TON TRUCK, 4X2 (FEDERAL)

CLUTCH THROWOUT SHAFT (fig. 27)

1 fitting, each side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300077

Fig. No. 27

SPRING BOLTS—REAR (fig. 28)

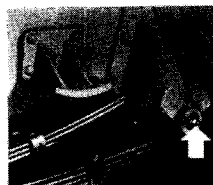
1 fitting, each side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300078

Fig. No. 28

HYDRAULIC HOIST UNIVER-SALS (fig. 29)

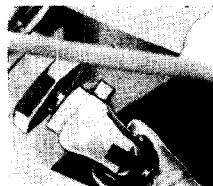
5 fittings, R.H. side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles



RA PD 300079

Fig. No. 29

BODY HINGE BRACKET

1 fitting, each side

Pressure gun

CG—GREASE, general purpose

Until grease shows

500 miles

PROPELLER SHAFT—CENTER BEARING (fig. 30)

1 fitting, on bracket

Pressure gun

WB—GREASE, general purpose

Limited filling fitting

500 miles



RA PD 300080

Fig. No. 30

PREVENTIVE MAINTENANCE AND INSPECTION**UNIVERSAL JOINT—NEEDLE BEARING (fig. 31)**

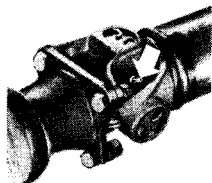
3 fittings

Pressure gun

GO—LUBRICANT, gear, universal

Until lubricant shows

500 miles



RA PD 300081

Fig. No. 31**REAR AXLE HOUSING (fig. 32)**

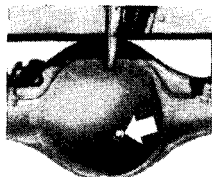
Filler plug

Filler gun

GO—LUBRICANT, gear, universal

Fill to ½ inch below plug level

1000 miles



RA PD 300082

Fig. No. 32**WATER PUMP (fig. 33)**

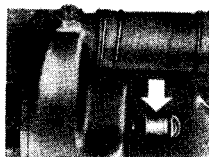
1 grease cup

Turn down cup daily

WP—GREASE, water pump

Refill and turn down cup

500 miles



RA PD 300083

Fig. No. 33**TRANSMISSION**

Filler plug

Filler gun

GO—LUBRICANT, gear, universal

Fill to ½ inch below plug level

1000 miles

FAN ASSEMBLY (fig. 34)

Install 1 fitting

Pressure gun

WB—GREASE, general purpose,
No. 2

2 or 3 squirts with gun

1000 miles



RA PD 300084

Fig. No. 34

2½ TON TRUCK, 4X2 (FEDERAL)

STEERING GEAR (fig. 35)

Filler plug

Filler gun

GO—LUBRICANT, gear, universal

Fill to plug level

1000 miles



RA PD 300085

Fig. No. 35

**LINKAGE, PINS, HINGES,
PINTLE HOOK, LATCHES**

Oil can

OE—OIL, engine, crankcase grade

500 miles

CLUTCH RELEASE BEARING

(fig. 36)

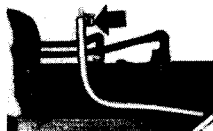
1 oil cup at rearmost cylinder head

Oil can

OE—OIL, engine, crankcase grade

6 drops

500 miles



RA PD 300086

Fig. No. 36

CRANKCASE BREATHER

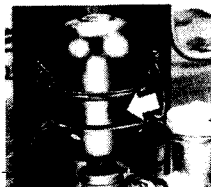
(fig. 37)

Reservoir

OE—OIL, engine, crankcase grade

Remove cup, flush and refill

500 miles



RA PD 300087

Fig. No. 37

WHEEL BEARINGS

Remove and repack

WB—GREASE, general purpose,
No. 2

5000 miles



RA PD 300088

Fig. No. 38

SHOCK ABSORBERS (fig. 38)

Filler plug

SA—SHOCK ABSORBER FLUID

—light

Check and refill

5000 miles

PREVENTIVE MAINTENANCE AND INSPECTION

HOIST CYLINDER (fig. 39)

Filler plate

OE—OIL, engine, crankcase grade

Replenish

1000 miles

CRANKCASE

Filler cap

OE—OIL, engine, crankcase grade

8 quarts

Check daily

Replace 1000 miles

AIR CLEANER (fig. 40)

Reservoir

OE—OIL, engine, crankcase grade

Remove cup, flush and refill

500 miles

STARTING MOTOR

1 oil cup

Oil can

OE—OIL, engine, crankcase grade

3 drops

1000 miles

OIL FILTER (fig. 41)

Remove plug

Drain case

Replace element

1000 miles

HYDROVAC BREATHER

Remove

Wash in SOLVENT, dry-cleaning

Oil and replace

1000 miles

BRAKE MASTER CYLINDER

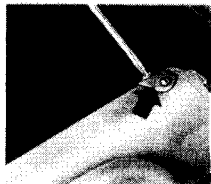
(fig. 42)

Filler plug

HB—FLUID, brake, hydraulic

Check and refill

1000 miles



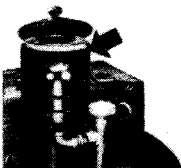
RA PD 300089

Fig. No. 39



RA PD 300090

Fig. No. 40



RA PD 300091

Fig. No. 41



RA PD 300092

Fig. No. 42

DRIVER'S MANUAL

Section IV

OPERATION UNDER UNUSUAL CONDITIONS

	Paragraph
Preparation for unusual conditions.....	16
Operation under unusual conditions.....	17

16. PREPARATION FOR UNUSUAL CONDITIONS—

a. General. These instructions are intended for the driver only. All other servicing must be done by organizational mechanics.

b. Preparation for extremely warm climate. (1) Perform the weekly inspection.

(2) If operating in sandy terrain, be careful to wipe off caps over access openings before removing them. Spouts of oil and gasoline containers must be wiped clean before use.

(3) Inspect entire cooling system for leaks particularly noting condition of gaskets, hose connections and water pump packing. Clean radiator exterior of mud and insects.

(4) Inspect engine oil filter and if loaded with dirt and sludge replace element. Take care to flush sludge from bottom of filter body before installing new element.

c. Preparation for extremely cold climate. (1) Perform the weekly inspection.

(2) Check level and condition of oil in hoist cylinder, remove plate and replenish oil if necessary.

(3) Inspect engine oil filter and if loaded with dirt and sludge replace element. Take care to flush sludge from bottom of filter body before installing new element.

(4) Drain cooling system (fig. 43), flush and refill with the correct solution of anti-freeze to protect against lowest anticipated temperature.

(5) Inspect entire cooling system for leaks particularly noting condition of gaskets, hose connections and water pump packing nut.

(6) Keep fuel tank full.

(7) If possible, after filling or moving a fuel container, allow the fuel to settle before filling the truck fuel tank.

OPERATION UNDER UNUSUAL CONDITIONS**17. OPERATION UNDER UNUSUAL CONDITIONS—**

a. **General.** The instructions contained herein are intended to supplement, not replace the operation instructions in Section II.

b. **Operating in extremely warm climate.** Intervals for servicing and inspection must be reduced by $\frac{1}{3}$ or $\frac{1}{2}$, or more if conditions warrant.

(1) After long periods of extremely difficult operation, halt



RA PD 300093

Figure No. 43—Drain Cooling System

2½ TON TRUCK, 4X2 (FEDERAL)

truck for a few minutes, running engine at about twice normal idling speed.

(2) If at any time the temperature gage indicates 200°F. or higher, stop truck and report.

c. Operation in extremely cold climate. (1) Never add water to battery until just before truck is to be operated. Operation of truck mixes water with electrolyte and avoids danger of freezing.

(2) When starting the truck, pull the choke button $\frac{3}{4}$ or all the way out to the limit of its travel. Do not use the starter for more than 10 second intervals. If truck does not start within a short time, have it towed to start it, rather than run the battery down.

(3) Give engine ample time to warm up, run the engine at a fast idle until the temperature gage reads 160°F.

(4) Handle the truck carefully, sudden shocks at low temperature may snap axles or springs.

(5) If at any time the temperature gage indicates 200°F. or higher, stop truck and report.

(6) When shutting down the truck, park in a building or in a sheltered place out of the wind. Run engine a few seconds at a fast idle, then turn off ignition switch.

(7) Park with brakes released to avoid binding. If brakes do bind, warm them slightly with a blowtorch prior to moving the truck.

(8) For periods of long shutdown, drain crankcase oil while still warm and store it in a warm place until truck is to be operated again. Be sure to tag engine and ignition switch to make others aware of the fact that oil has been drained. If the crankcase cannot be drained, cover the engine with a tarpaulin.

d. Operating on slippery road surfaces. (1) When operation over slippery or icy surfaces requires better traction install tire chains (figs. 49 and 50). Avoid running chains on dry surface longer than necessary.

(2) If truck is temporarily stalled with load due to slippery conditions, traction on rear wheels may be obtained by elevating loaded dump body to highest position. **CAUTION:** Do not dump cargo. Practice of raising dump body to increase traction on rear wheels will not be effective when road bed is extremely soft. Under these conditions load may require lightening.

OPERATION UNDER UNUSUAL CONDITIONS

e. **Operating in wet climate.** (1) During heavy rain or damp weather spark plugs may tend to short out. Wipe frequently with clean rag saturated with dry-cleaning solvent.

(2) If engine stalls due to extreme dampness, saturate clean rag with dry-cleaning solvent, wipe inside of distributor cap, and spark plugs. If engine still fails to run, wait a few minutes and warmth of engine may dry out ignition system sufficiently.

f. **Fording.** Vehicle will ford water up to 24 inches deep. Do not attempt to go deeper than this as water will choke exhaust system. Ford only at speeds below 4 m.p.h.

g. **Operating at extreme altitudes.** (1) More frequent inspection of cooling system is required. Check and replenish coolant if necessary.

(2) For continued operation at high altitude have distributor advanced to cause slight ping on acceleration. This assures maximum engine power.

DRIVER'S MANUAL

Section V

TOOLS AND EQUIPMENT

	Paragraph
Vehicle tools.....	18

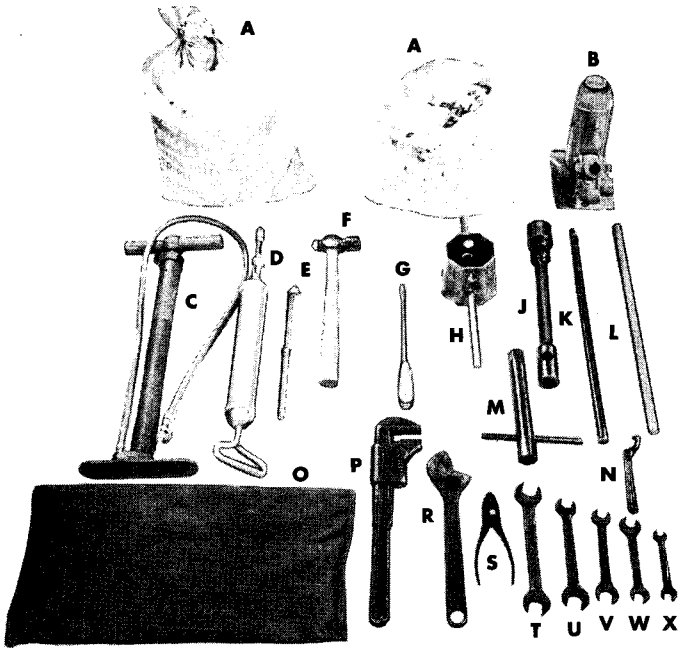
18. **VEHICLE TOOLS**—a. These tools (fig. 44) will be found in the tool box on the platform directly behind the cab.

b. **Vehicle equipment.** These items are part of the vehicle equipment.

Can, oil— $\frac{3}{4}$ pint	Manual, operator's
Chains, 8:25/20 dual tire	Padlock, 1 ea: spare tire and tool box
Extinguisher, fire—1 quart	Pump, hand tire
Gun, grease (Alemite 5257) 1 lb. capacity	Tire and tube assy., spare wheel
Holder, oil can	

c. **Care of tools and equipment.** An accurate record of all tools and accessories will be kept in order that their location and condition may be known at all times. Items which have been lost or rendered unserviceable must be replaced immediately. Clean all tools and equipment; condition (if necessary), and treat against rust or deterioration with light rust preventive compound before returning them to their location.

TOOLS AND EQUIPMENT



- A—DUAL TIRE CHAINS 8:25 x 20
- B—HYDRAULIC JACK—5 TON
- C—HAND TIRE PUMP
- D—GREASE GUN
- E—TIRE PRESSURE GAGE
- F—BALL PEEN HAMMER—16 OZ.
- G—SCREWDRIVER—6 INCH BLADE
- H—WHEEL BEARING NUT WRENCH
- J—WHEEL NUT WRENCH
- K—HYDRAULIC JACK HANDLE
- L—WHEEL NUT WRENCH HANDLE

- M—SPARK PLUG WRENCH
- N—WATER PUMP PACKING NUT WRENCH
- O—TOOL BAG ENVELOPE
- P—ADJUSTABLE WRENCH—15 INCH (AUTO TYPE)
- R—ALLOY ADJUSTABLE WRENCH—12 INCH
- S—PLIERS—6 INCH
- T—15° OPEN END WRENCH $\frac{3}{4}$ - $\frac{7}{8}$ INCH
- U—15° OPEN END WRENCH $\frac{5}{8}$ - $2\frac{5}{32}$ INCH
- V—15° OPEN END WRENCH $\frac{3}{16}$ - $1\frac{1}{16}$ INCH
- W—15° OPEN END WRENCH $\frac{1}{2}$ - $1\frac{3}{32}$ INCH
- X—15° OPEN END WRENCH $\frac{3}{8}$ - $\frac{7}{16}$ INCH

RA PD 300094

Figure No. 44—Vehicle Tools

DRIVER'S MANUAL

Section VI

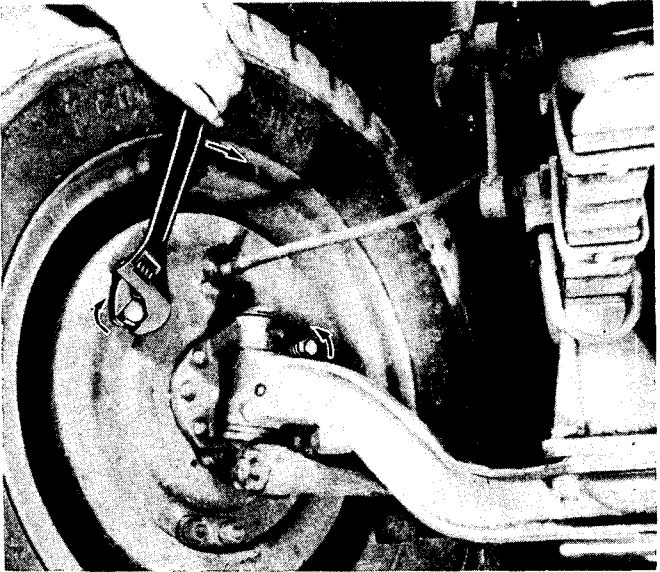
EMERGENCY REPAIRS

	Paragraph
Emergency repairs.....	19
Ease off hot brakes.....	20
Replace headlamp.....	21
Tighten U-bolt.....	22
Replace tire	23
Replace wheel and tire assy.....	24
Matching dual tires.....	25
Tire rotation.....	26
Tire chains.....	27
Fan belt adjustment.....	28

19. EMERGENCY REPAIRS—These operations consist of adjustments which the driver can carry out under field conditions. They are listed for the purpose of enabling the driver to keep the truck in operation until such time as more complete equipment for repair is available.

20. EASE OFF HOT BRAKE—a. Jack up wheel.

b. Turn adjusting cam at back of backing plate in direction indicated by arrow (fig. 45) until wheel turns freely by hand. If wheel does not turn freely after cam has been completely backed-off, proceed to loosen the other cam until the wheel turns freely. Rotate this cam in reverse direction until the shoe drags then back off just enough to entirely eliminate the drag. Repeat this procedure on the other cam. Remove jack.

EMERGENCY REPAIRS

RA PD 300095

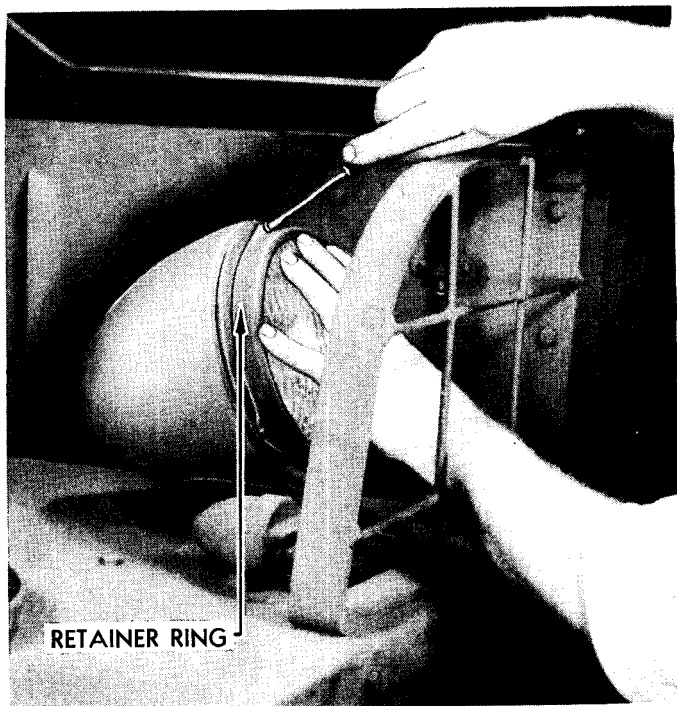
Figure No. 45—Ease Off Hot Brake

21. REPLACE HEADLAMP — a. Headlamp removal. Loosen headlight ball socket nut underneath fender. Tilt headlight assembly away from brush guard. Loosen lens rim clamp screw and remove rim. Remove 3 retainer screws and remove retainer ring. Pull sealed beam lamp unit out of lamp body and pull apart wiring connector (fig. 46).

b. Headlamp installation. Push wiring connector into place at back of unit. Place unit in lamp body, attach retainer ring and fasten lens rim in place.

c. Aiming lights. Turn on lights and use the undisturbed

2½ TON TRUCK, 4X2 (FEDERAL)



RA PD 300096

Figure No. 46—Remove Headlamp

unit as a guide for visually pointing the new unit. Hold firmly in place while tightening ball socket nut.

22. **TIGHTEN U-BOLTS** — Marks on spring leaves at clamp plates will indicate looseness of U-bolt nuts (fig. 15).

- a. Load truck to normal weight to flatten springs.
- b. Tighten all U-bolt nuts securely.
- c. Check tightness of rebound clips on spring leaves.

EMERGENCY REPAIRS

23. REPLACE TIRE—a. Tire removal (fig. 47).

- (1) Remove wheel as outlined in paragraph 24.
- (2) Deflate tire by removing valve cap and core from stem.
- (3) Lay tire on ground. Snap ring up.
- (4) Insert pry bar in notch in snap ring.
- (5) Drive opposite side of ring downward while lifting ring with pry bar.
- (6) Strike wheel rim with heavy hammer and continue prying rim off.
- (7) Remove snap ring completely from wheel and tire assembly.
- (8) Press valve stem inside of rim and pry tire from wheel.
- (9) Lift tube from tire.

b. Tire installation. (1) Place slightly inflated tube in tire.

- (2) Start the valve stem in its hole in wheel being careful to observe correct position for inflation.
- (3) Position tire and tube assembly over wheel using pry bar and heavy hammer to drive in place.
- (4) Place side of snap ring opposite notch in rim groove and force ring into position using pry bar while driving ring with heavy hammer.
- (5) Replace valve stem core and inflate tire to 60 lbs. pressure.
- (6) Replace valve stem caps and install wheel as outlined in paragraph 24.

24. REPLACE WHEEL AND TIRE ASSEMBLY — a. Wheel and tire removal.

- (1) Loosen six wheel stud nuts partial turn each using wheel nut wrench (fig. 11). If inner dual is to be removed loosen inner nuts also.
- (2) Jack up wheel to clear ground.
- (3) Completely remove six wheel stud nuts and lift wheel from truck.

2½ TON TRUCK, 4X2 (FEDERAL)

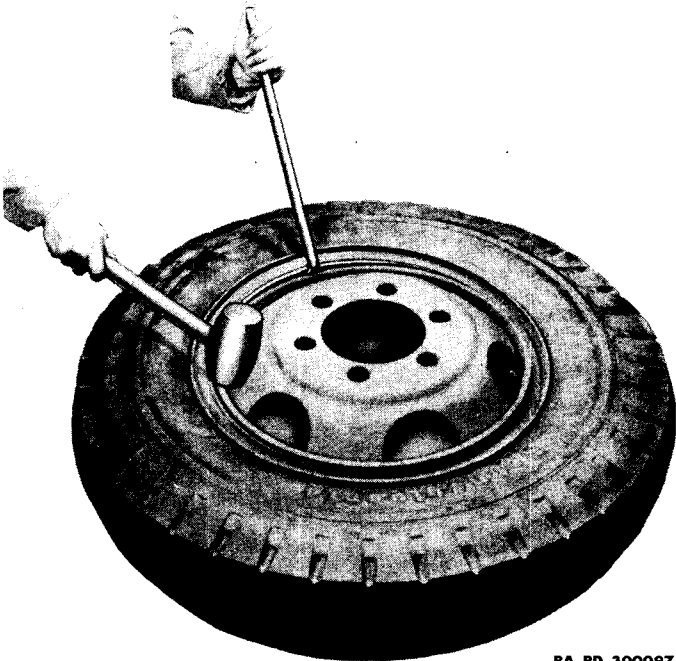
(4) Remove inner nuts and lift off inner dual.

b. Wheel and tire installation—(dual). (1) Place inner wheel and tire assembly over studs.

(2) Place inner wheel stud nuts in position and draw up snug.

(3) Place outer wheel in position over inner wheel nut, being careful to locate valve stem diametrically opposite inner wheel valve stem.

(4) Place outer wheel stud nuts in position and draw up snug.



RA PD 300097

Figure No. 47—Remove Tire

EMERGENCY REPAIRS

(5) Successively tighten opposite inner stud nuts to prevent cocking wheels. Finally tighten outer stud nuts following the same procedure. Remove jack.

c. **Wheel and tire installation—(single).** (1) Place wheel and tire assembly over studs.

(2) Place stud nuts in position and draw up snug.

(3) Successively tighten opposite stud nuts to prevent cocking wheel. Remove jack.

25. **MATCHING DUAL TIRES**—It is important that dual tires be properly mated, choosing pairs of equal diameter. Always place the best tire showing the least amount of wear on the outside wheel. This enables the tire surfaces to generally conform to the crown of the road.

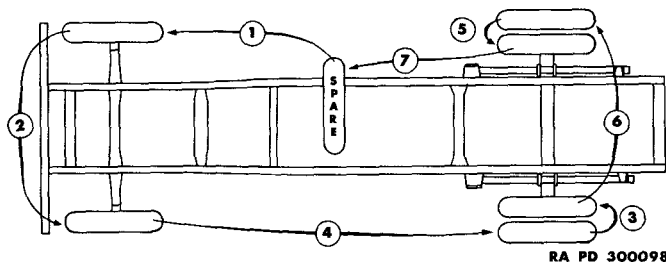


Figure No. 48—Rotate Tires

26. **TIRE ROTATION**—a. **General.** When tires are not periodically rotated as to their position on the truck, certain tires wear faster and fail sooner because of their continued wear in a fixed position. In order to effect uniform wear tires will be interchanged at 3000-mile intervals in the following manner. (See fig. 48.)

(1) Unlock carrier and remove spare tire.

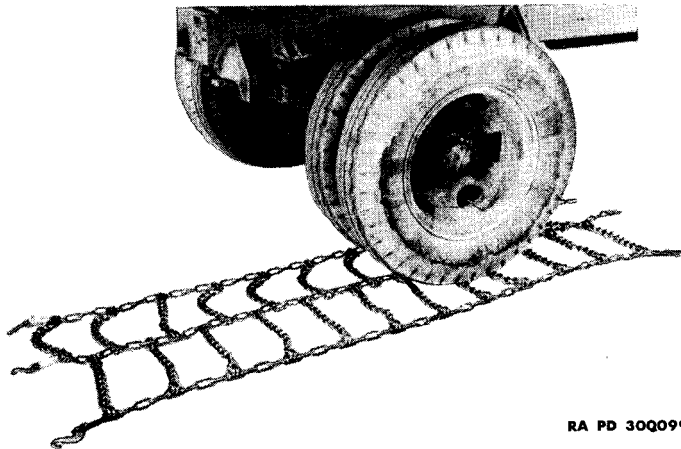
(2) Remove right front wheel and tire assembly.

(3) Install spare on right front hub.

(4) Remove tire and wheel from left front hub and install tire and wheel taken from right front hub.

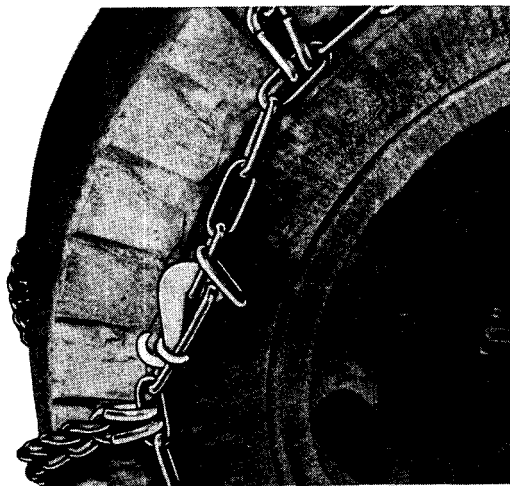
TM 9-821x
26

2½ TON TRUCK, 4X2 (FEDERAL)



RA PD 30Q099

Figure No. 49—Install Tire Chains



RA PD 300100

Figure No. 50—Fasten Tire Chain Clamps

EMERGENCY REPAIRS

- (5) Remove duals from left rear hub.
- (6) Re-install left outer dual as left inner dual.
- (7) Install tire and wheel from left front hub as left outer dual.
- (8) Remove duals from right rear hub.
- (9) Re-install outer dual as inner dual.
- (10) Install tire and wheel taken from left inner position as right outer dual.
- (11) Place tire from right inner dual position on spare tire carrier and lock securely in position.

27. TIRE CHAINS—a. **Installation.** (1) Remove chain from bag and lay inside of chain face up on ground directly behind each rear wheel.

(2) Back the truck over the chain until approximately 2/3 of the chain has been travelled on (fig. 49).

(3) Fasten each of the three chain links in turn, removing all slack from chain.

(4) Slide slotted locking ring in position over clamping hook (fig. 50).

b. Removal. (1) Unfasten each clamping hook by sliding the slotted locking ring to uppermost position and release each hook in turn.

(2) Lay chains flat on ground.

(3) Drive truck off chains.

(4) Clean and place chains in bags. Report any lost or broken links.

28. FAN BELT ADJUSTMENT—General. The tension should be adjusted whenever deflection varies from the prescribed $\frac{1}{2}$ to $\frac{3}{4}$ inch at a point midway between crankshaft pulley and generator pulley (fig. 7). Adjust fan belt tension as follows:

a. Loosen generator mounting. Loosen two generator

2½ TON TRUCK, 4X2 (FEDERAL)

mounting bolt nuts; loosen generator to adjusting arm bolt (fig. 51).

b. Position generator and adjust belt. Move generator towards or away from engine as necessary to obtain correct fan belt tension.

c. Secure generator. Tighten generator to adjusting arm bolt; (re-check belt tension) tighten the two generator mounting bolt nuts.

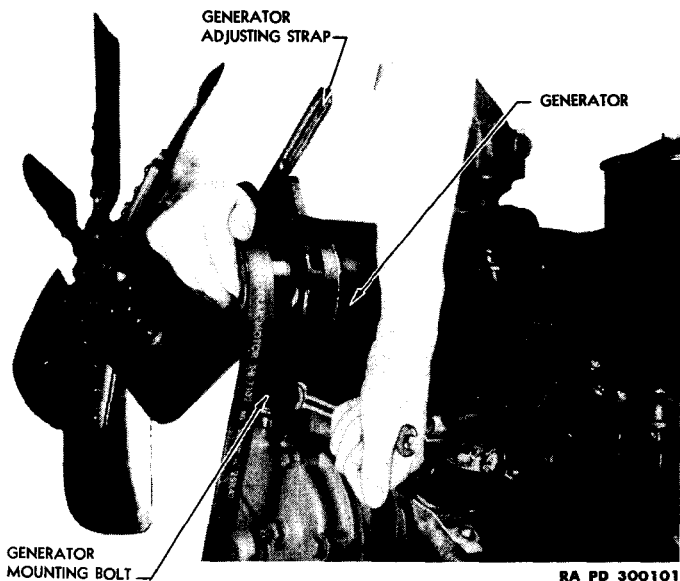


Figure No. 51—Adjust Fan Belt Tension

DRIVER'S MANUAL
Section VII
VEHICLE SPECIFICATIONS

Paragraph
 Tabulated data 29

29. TABULATED DATA—a. General.

Maximum over-all length.....	217 ⁵ / ₈ inches
Maximum over-all height—dump body up..	120 inches
Maximum over-all height—dump body down	89 inches
Maximum over-all width.....	90 inches
Nominal wheelbase	151 inches
Ground clearance.....	{ Rear 10 inches Front 11 ³ / ₄ inches
Tire track—front.....	63 ¹ / ₈ inches
Tire track—rear.....	65 ¹ / ₈ inches
Dump body capacity—water level.....	52 cubic feet
Tire size.....	8.25 x 20 inches

b. Weights (Approx.)

Chassis, including body and cab.....	7251 lbs.
Equipment, including water and oil.....	724 lbs.
Total weight, fully equipped.....	7975 lbs.
Cargo capacity.....	4825 lbs.
Total weight with load (Approximate).....	13000 lbs.

c. Capacities.

Cooling system.....	22 qts.
Engine crankcase oil—refill	6 qts.
dry	8 qts.
Transmission	14 pts.
Rear axle housing.....	15 pts.
Fuel tank.....	40 gals.
Oil bath air cleaner—crankcase breather ...	1/20 pts.
Oil bath air cleaner—carburetor	1 qts.
Hoist cylinder (Galion)	13 qts.
(Anthony)	12 qts.

2½ TON TRUCK, 4X2 (FEDERAL)**d. Engine specifications.**

Type	L. Head
Number of cylinders.....	6
Compression ratio.....	5.9
Octane rating of gasoline.....	70
Brake horsepower.....	97 at 2800 r.p.m.

e. Maneuverability.

Minimum turning circle diameter.....	50 ft.
Cruising range without refueling.....	250 miles
(Average road at 30 m.p.h... 13000 gross weight)	
Maximum permissible speed.....	51 m.p.h.
Fording depth.....	24 inches

f. Performance.

Maximum speed at 2800 r.p.m.	
Reverse speed.....	6 m.p.h.
First speed.....	6 m.p.h.
Second speed.....	12 m.p.h.
Third speed.....	23 m.p.h.
Fourth speed—direct.....	41 m.p.h.
Fifth speed—overdrive.....	51 m.p.h.
Maximum governed speed.....	51 m.p.h.

Section VIII**REFERENCES**

	Paragraph
Explanatory publications	30
30. EXPLANATORY PUBLICATIONS.	
a. 2½ ton truck, 4X2 (Federal).....	TM 9-821
b. Motor transport	FM 25-10
c. Driver's Manual	TM 10-460
d. The motor vehicle driver first echelon maintenance	TF 11-558

(A.G. 062.11 (4-2-43))

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

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(For explanation of symbols see FM 21-6)

INDEX

	Page No.
A	
Additional lubrication	25
Adjust—Brakes	40
Fan and generator belt	47
Headlamp beam	41
Air cleaner service	33
B	
Battery service	23
Brakes—Adjust	40
Driving hints	10
Hand lever action	5
Inspection	16-17
Proper use of	10
C	
Clutch pedal free travel	16
Controls	3-4
Cooling system—Clean and flush	34
Cold climate operation	36
Draining	34
Fan belt adjustment	47
Inspection	21
Warm climate operation	35
Warm climate preparation	34
Crankcase breather, service	21
D	
Data tabulated	49
Descending hills	10
Diagrams—Shifting	5
Direct drive	8
Distributor—Adjustment	37
Drag link inspection	19
Draining cooling system	34
Drive shaft, hoist inspection	19
Driving axle inspection	20
Driving hints	6
Dump body capacity	49
Controls	3-4
Difference between models	3
Inspection	24
Operation	11
E	
Ease off hot brake	40
Emergency repairs	40
Engine—Before starting	12
Carburetor air cleaner	23-33

INDEX

	Page No.
E—Cont'd	
Crankcase breather.....	21
Governed speed.....	50
Idling.....	9
Inspection.....	19-22
Noises and odors.....	17
Tabulated data.....	49-50
Starting.....	6
Stopping.....	10
Warm up.....	7
F	
Fan belt—Adjust.....	47
Inspect.....	21
Filler cap—Cooling system.....	12
Crankcase.....	13
Fuel tank.....	22
Fire extinguisher, inspection.....	24
Front axle, tie rod inspection.....	19
Front spring bolt, inspection.....	24
Shackle inspection.....	24
U Bolt, tighten.....	42
Fuel system—Accelerator.....	3
Air cleaner service.....	33
Fuel filter, inspection.....	21
Fuel gage.....	3
Fuel leaks.....	12
Free travel—Clutch pedal.....	16
Freezing battery.....	36
G	
Gages.....	3
Gasoline, octane.....	50
Gear shifting controls.....	4
Correct speed.....	5
Diagrams.....	5
Emergency.....	36
Forward.....	7
Guide to.....	8
Overdrive—use of.....	8
Reverse.....	3
Stopping.....	10
Greases.....	26
H	
Hand brake control lever.....	3
Inspection.....	24
Use of.....	8
Hook, pintle, inspection.....	19-24

INDEX

H—Cont'd		Page No.
Hoist, hydraulic, control.....		3
Drive shaft.....		20
Inspection.....		19-24
Operation.....		11
Service.....		33
Hydraulic lines, inspection.....		20
Hydrovac air cleaner.....		33
I		
Ignition system, inspection, unusual conditions.....		35-37
Inspection—after operation.....		12-19-20-21-22
At halt.....		12-18
Before operation.....		12-
During operation.....		12-14
Weekly.....		12-22
L		
Lighting system—inspection.....		19
Headlamp adjustment.....		41
Headlamp inspection.....		19
Headlamp replacement.....		41
Lubrication—capacities.....		26
General.....		25
Grades.....		27
Guides.....		26-27
Intervals.....		26
Points and periods.....		28 to 33
Records and reports.....		25
M		
Main light switch, inspection.....		19
Master cylinder, brake inspection.....		24
Service.....		33
Matching dual tires.....		45
Maximum load.....		49
Speed.....		50
O		
Oil in cooling system.....		12
Oil bath, air cleaner.....		23
Oil bath, breather.....		21
Oil capacities.....		49
Oil dip stick.....		33
Oil filter, service.....		33
Oil grades.....		27
Oil intervals.....		26
Oil leaks, inspection.....		12-19
Oil pressure, engine.....		16

INDEX

O—Cont'd

	Page No.
Oil pressure gage.....	3
Oil—unusual conditions.....	36
Operating—dump body.....	6-11
Truck.....	6
Operations—unusual conditions.....	36-37

P

Pedal, brake.....	15
Pintle hook.....	19-24
Power take-off.....	24
Preparation for unusual conditions.....	34
Preventive maintenance—after operation....	12-19-20-21-22
At halt.....	12-18
Before operation.....	12
During operation.....	12-14
Weekly.....	12-22
Ammeter.....	19
Axle flange nuts.....	19-23
Battery clamps.....	22
Corrosion.....	22
Service.....	23
Body bolts.....	24
Brake hand.....	24
Brake line brackets.....	20
Brush guards.....	24
Bumper.....	19-24
Cab interior.....	24
Carburetor.....	21
Cargo.....	19
Carrier, tire.....	20
Choke.....	22
Crankcase breather.....	21
Differential housing.....	20
Drag link.....	19
Dump body.....	24
Engine.....	19-22
Equipment.....	22
Fan belt tension.....	21
Fire extinguisher.....	24
Floor board.....	24
Fuel gage.....	19
Filter.....	21
Pump.....	21
Tank cap.....	22
Tank filling.....	22
Generator.....	21
Hoist, cylinder.....	19-24

INDEX

	Page No.
P—Cont'd	
Drive shaft.....	19
Universal joint.....	19
Horn.....	19
Light switch.....	19
Oil pressure gage.....	19
Pintle hook.....	19-24
Power take-off.....	24
Propeller shaft.....	20
Radiator.....	20-21
Mounting bolt.....	22
Rear axle.....	20
Rear view mirror.....	19
Rebound clips.....	24
Sandy, dusty terrain.....	23
Seat cushion.....	24
Shock absorber.....	32
Springs.....	24
Starting motor.....	12
Steering column.....	24
Knuckle arm.....	19
Gear housing.....	19-23
Tarpaulin.....	19
Temperature gage.....	19
Tie rod.....	19
Tires.....	19-23
Tire carrier.....	20
Tire chains.....	20
Tools.....	22
Tow hooks.....	19
Transmission.....	20
Universal joints.....	20
U Bolts.....	24
Valve caps and stems.....	20
Water in oil.....	21
Wheel nuts.....	19-23
Windshield.....	19
R	
Radiator, inspect.....	20-21
Rear axle, inspect.....	20
Rear springs, inspect.....	20
References.....	51
Refilling cooling system.....	12
Fuel tank.....	22
Replace, headlamp unit.....	41

INDEX

	Page No.
R—Cont'd	
Tire	43
Wheel	43
S	
Sealed beam unit, replace.....	41
Shock absorber, lubricate.....	32
Skidding	36
Soft road bed.....	36
Spark plug—maintenance.....	37
Springs, front, inspect.....	24
Bolt, inspect	24
Spring shackle, inspect.....	24
Starting motor, operation of.....	6
Starting motor, switch.....	3
Steering drag link, inspect.....	19
Gear, inspect	19-23
Knuckle, inspect	19
Stopping engine	10
Truck	11
Switch, inspect	19
T	
Tabulated data—capacities, etc.....	49-50
Tighten U Bolts	42
Tie rod, inspect	19
Tires, inspect	12-19-24
Matching duals	45
Mounting	43
Pressure	16
Rotation	45
Valve stem position.....	44
Tire chains	47
Tools	38
Transmission—Alignment	17
Inspect	20
Trouble indications	17
Turning circle	50
U	
Universal joints	20
U Bolt, spring	42
Under truck inspection	12-19-24
V	
Vehicle tools and equipment.....	38
W	
Wheels, inspect	19-23
Replace	43
Wheel nuts	44