

TM 9-2320-244-10

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S MANUAL

TRUCK CARGO:

1 1/4 TON, 4x4, M715

(FSN 2320-921-6365, FSN 2320-921-6366)

TRUCK, AMBULANCE:

1 1/4 TON, 4x4, M725

(FSN 2310—921—6369)

HEADQUARTERS, DEPARTMENT OF THE ARMY AUGUST 1968

WARNING:

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

CARBON MONOXIDE POISONING CAN BE DEADLY

DO NOT operate vehicle engine in an enclosed area unless the area is ADEQUATELY VENTILATED.

OPERATING PRECAUTIONS:

CAUTION

While driving, occasionally observe the temperature gauge, oil pressure gauge, and battery-generator indicator. Correct abnormal conditions promptly or equipment damage may result.

CAUTION

Tow the vehicle forward, for purposes other than starting, only with the transmission in neutral and the transfer in 2-wheel drive.

CAUTION

Never attempt to shift to a lower transmission gear with the vehicle traveling at a high rate of speed.

CAUTION

Never attempt to shift from 4-wheel drive high range to 4-wheel drive low range with the vehicle moving more than 4 or 5 miles per hour.

CAUTION

After driving in sand, mud or water up to the hubs, clean the brakedrums as soon as possible to prevent any abrasive material that may have entered from wearing the brake linings.

CAUTION

Do not travel diagonally across a hill unless absolutely necessary. The danger lies in losing traction and slipping sideways, with the possibility of tipping.

CAUTION

Whenever the air is noticeably dusty, have the air cleaner serviced daily.

CAUTION

Do not touch axle differentials with bare hands after vehicle has been operated a considerable distance as serious burns may result.

CAUTION

Use extreme care in removing radiator pressure cap when engine coolant is hot or boiling as serious burns may result. If necessary to add coolant while engine is overheated, idle engine and add coolant slowly.

## CAUTION

Prevent freezing of the coolant by adding antifreeze when temperatures can be expected to drop below 32 degrees F or bursting of the radiator and cylinder block may result.

## CAUTION

Polarity of the alternator and batteries must match up, as well as any booster battery or battery charger attached to the vehicles battery. Polarity must match positive to positive and negative to negative, or alternator diodes and wiring may be burned out.

## CAUTION

Do not allow flame or sparks near the vent openings of batteries or the batteries may explode. Do not allow battery acid to spill or spatter on the skin or eyes as bodily injury will result.

## CAUTION

Do not use diesel fuel oil, gasoline or benzene (benzol) for cleaning or personal injury may result.

## DON'TS

DO NOT operate vehicle at maximum speed over rough terrain.

DO NOT coast (clutch disengaged) downhill.

DO NOT ride engaged clutch.

DO NOT "rev" engine and "slip" clutch to gain power.

## DO'S

Operate with tires correctly inflated.

Keep vehicle under control at all times.

Stop completely before shifting into reverse.

Shift to lower gear before starting down hills or steep inclines.

Inspect and service vehicle daily.

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TM 9—2320—244—10 TECHNICAL MANUAL

HEADQUARTERS DEPARTMENT OF THE ARMY

WASHINGTON, D.C.. 13 August 1968

## OPERATOR'S MANUAL

TRUCK, CARGO: 1 1/4 -TON, 4X4, M715 (FSN 2320—921—6365, FSN 2320-921—6366)

TRUCK, AMBULANCE: 1 1/4-TON, 4X4, M725 (FSN 2310-921-6369)

<b>TABLE OF CONTENTS</b>
Front Cover Text and Carbon Monoxide Warning
Cautions and DO's and DON'TS
Chapter 1 GENERAL INFORMATION
SPECIFICATIONS, GETTING ACQUAINTED WITH YOUR VEHICLE, Serial number
Instruments
Switches and controls
Body controls and special equipment

## Chapter 2 OPERATION

Proper break-in, Making the vehicle ready, Starting the engine, Driving the vehicle, Towing the vehicle

Operation under unusual conditions

Troubleshooting

4-wheel drive

Driving techniques in 4-wheel drive

## Chapter 3 LUBRICATION

Engine lubrication, Chassis lubrication, Oil filter, Air cleaner, Brake master cylinder, Transmission, Differentials, Parts requiring no lubrication

## Chapter 4 MAINTENANCE

Preventive maintenance services

Fuel system

Exhaust system

Cooling system

Electrical system

Lighting system

Driving components, Steering system, Brakes, Wheels and tires, Suspension, Body

Destruction of material to prevent enemy use

## APPENDIX: BASIC ISSUE ITEMS LIST





## SPECIFICATIONS

Engine:	Capacities
Type: In Line, Overhead camshaft	Fuel Tank Approximate Capacity: 28 Gal.
Number of Cylinders 6	Crankcase:
Bore 3 11/32	Without Filter 5 Qt.
Stroke 4 3/8	With Filter 6 Qt.
Piston Displacement 230.5 cu.in.	Cooling System 12 Qt.
Compression Ratio 7.5:1	Steering Gear As Required
Compression Pressure 145 to 155 psi.	Differential 6 Pt.
Horsepower (Brake) 132.5 @ 4,000 rpm.	Transmission 6 1/2 Pt.
Horsepower (SAE) 26.77	Transfer Case 5 Pt.
Torque (Max. @ 2000 rpm.) 198 lb-ft.	Master Cylinder 1/2 Pt.
Ignition Timing 5° BTDC	
Wheelbase 126 in.	Servicing Data
Tread (front & rear) 67 in.	Gasoline (MIL-G-3056) Octane No. 85 min. Refueling Rate (max.) 20 gpm +
Road Clearance 10 in.	
Height (over-all) 95 in.	Approximate Weights
Length (over-all)	M715 (W/O/W)      Gvw      Payload

w/winch 220.75	8, 400 8, 900	2500 Cross country. 3000 Highway
w/o winch 200.75	M725	
Width (over-all) 85 in.	8, 800	2000

## Introduction

This manual contains instructions for operation and operator's maintenance for the 1 1/4-ton 4 x 4 M715 and M725 series vehicles. Essentially, this manual is a commercial type manual and is being used in order to provide timely field support for the vehicle. Several important features about this vehicle and related equipment are enumerated in order to provide information not normally included in a commercial type operator's manual. Instructions on lubrication, prescribed lubricants, and intervals are contained in this manual.

Note. The shifting instruction and publication data plate contains a reference to the Department of the Army Lubrication Order Number.

The basic issue items list (BIIL), which lists accessories, attachments, component assemblies, tools, and repair parts accompanying the equipment, is provided in the Appendix. This list also specifies the Troop Installed items, which when authorized are to be used with this vehicle.

Equipment Serviceability Criteria (ESC) applicable to this series vehicle is contained in TM 9-2320-244 ESC/1 and TM 9-2320-244 ESC/2, for the 1 1/4-ton cargo truck and 1 1/4-ton ambulance, respectively.

Vehicle identification markings are to be applied each time the vehicle is painted or markings become illegible. Refer to TB 746-93-1 for color and marking of military vehicles. Refer to TM 9—213 for painting instructions for field use. Spot painting and marking (stenciling) of tactical vehicles will be performed under the control of organizational maintenance personnel. For basic principles and field camouflage refer to FM 5-20. Refer to TM 9-2320-244-20 for domestic shipping instructions, including necessary loading and blocking specifications.

## Maintenance Allocation

The maintenance responsibilities for this vehicle are prescribed in the maintenance allocation chart (MAC), which is included in TM 9-2320-244-20. In all cases when the nature of the required repair is beyond the scope of the operator or crew the supporting unit should be informed in order that trained personnel with suitable tools and equipment may be provided, or other instructions issued.

## Forms, Records, and Reports

Authorized Forms. The forms applicable to this vehicle and instructions on their use are listed in TM 38-750.

Field Report of Accident. Injury to personnel or damage to the vehicle must be reported to the supporting unit. so that reports as prescribed in AIR 385-40 can be prepared.

Equipment Improvement Recommendations (FIR). Deficiencies detected in this vehicle should be reported using the Equipment Improvement Recommendation section of DA Form 2407 as prescribed in TM 38-750.

Report of Equipment Publication Improvement. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on PA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U.S. Army Tank-Automotive Command, ATTN: AMSTA-TP, Warren, Mich. 48090.

## Service on Receipt

Upon receipt of a new, used, or reconditioned vehicle, the following services must be performed. Refer to DA Forms 2408—3 and 2408—14 in the vehicle logbook to determine the services and corrective maintenance performed to the vehicle. Refer to TB ORT) 392 for vehicles in storage over 30 days.

Lubricate vehicle in accordance with instruction in this manual, excluding gear cases and engine. Check processing

tag for gear case and engine oil. If tag states that oil is suitable for 500 miles of operation and is of the proper viscosity for local climate, check level but do not change oil.

Schedule second (next) "S" PM Service on PD Form 314. Preventive Maintenance Schedule and Record and arrange for an oil change after 500 miles of operation.

## Fording Equipment

This vehicle is equipped with waterproofed components and is capable of fording hard bottom, shallow, fresh or salt water crossings to a depth of 30 inches. With a special kit which is available, the vehicle is capable of being forded to a depth of 60 inches. After fording, perform necessary cleaning and lubrication services to eliminate water from wheel bearing and gear cases. Refer to TM 9-238 for after fording maintenance. Refer to SB 9-155 for authorization criteria.

## GETTING ACQUAINTED WITH YOUR VEHICLE

This operator's manual is divided into four chapters. Each contains important information about the M715 cargo truck and M725 ambulance.

The first chapter pertains to serial number locations, instruments and their functions, and the location and operation of the various switches and controls.

The second chapter describes the proper vehicle operation, including the all-important break-in period.

The third chapter covers recommended lubrication procedures as well as a preventive maintenance service.

The fourth chapter explains the functions of the various systems and components of the vehicle and describes minor adjustments, services and maintenance procedures.

Proper service at each recommended frequency is of vital importance to assure dependable operation of the vehicle.

## VEHICLE SERIAL NUMBER

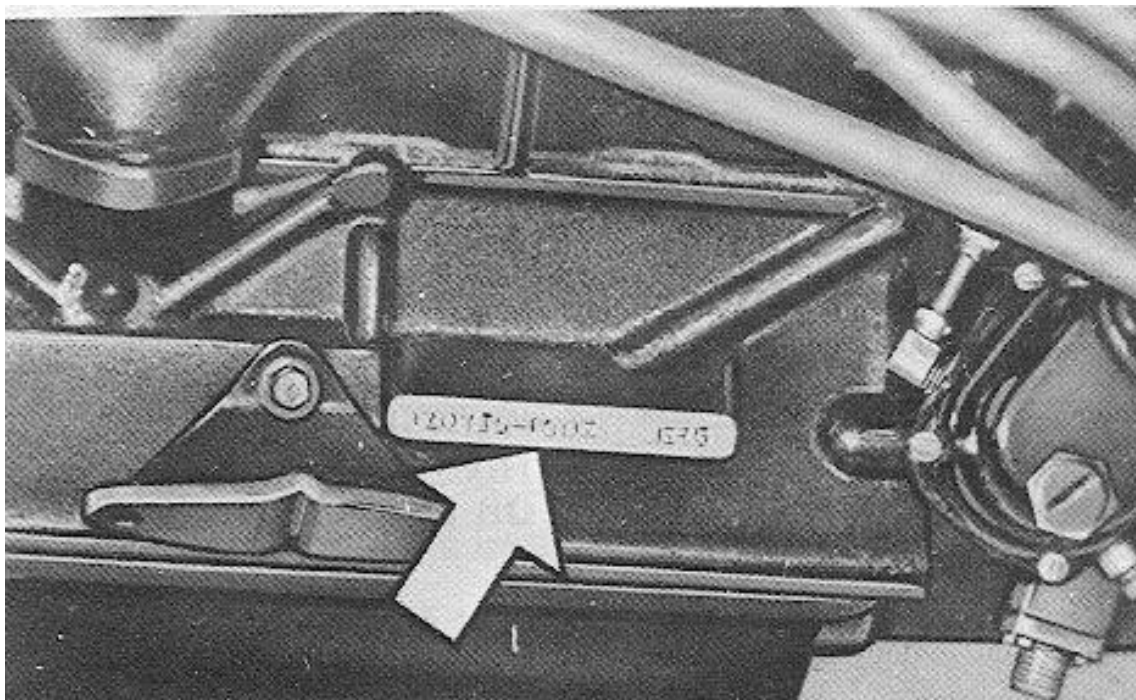
The vehicle serial number is stamped on a metal plate located at the center of the dashpanel.

<b>TRUCK, CARGO</b>	
<b>1¼ TON, 4 X 4, M-715, WO/WN</b>	
<b>FED. STOCK NO. 2320-921-6365</b>	
<b>MFD BY KAISER JEEP CORPORATION TOLEDO OHIO</b>	
<b>MFR. MODEL 3521</b>	<b>MFR. SER. NO.</b>
<b>MFR. PART NO. 1000545</b>	<b>DATE DEL.</b>
<b>CONT. NO.</b>	
<b>U.S. PROPERTY</b>	<b>INSPECTED</b>

**Figure 1. Vehicle serial number.**

## ENGINE CODE NUMBER

The engine code number is stamped on the lower right front of the cylinder block just behind the ignitor.



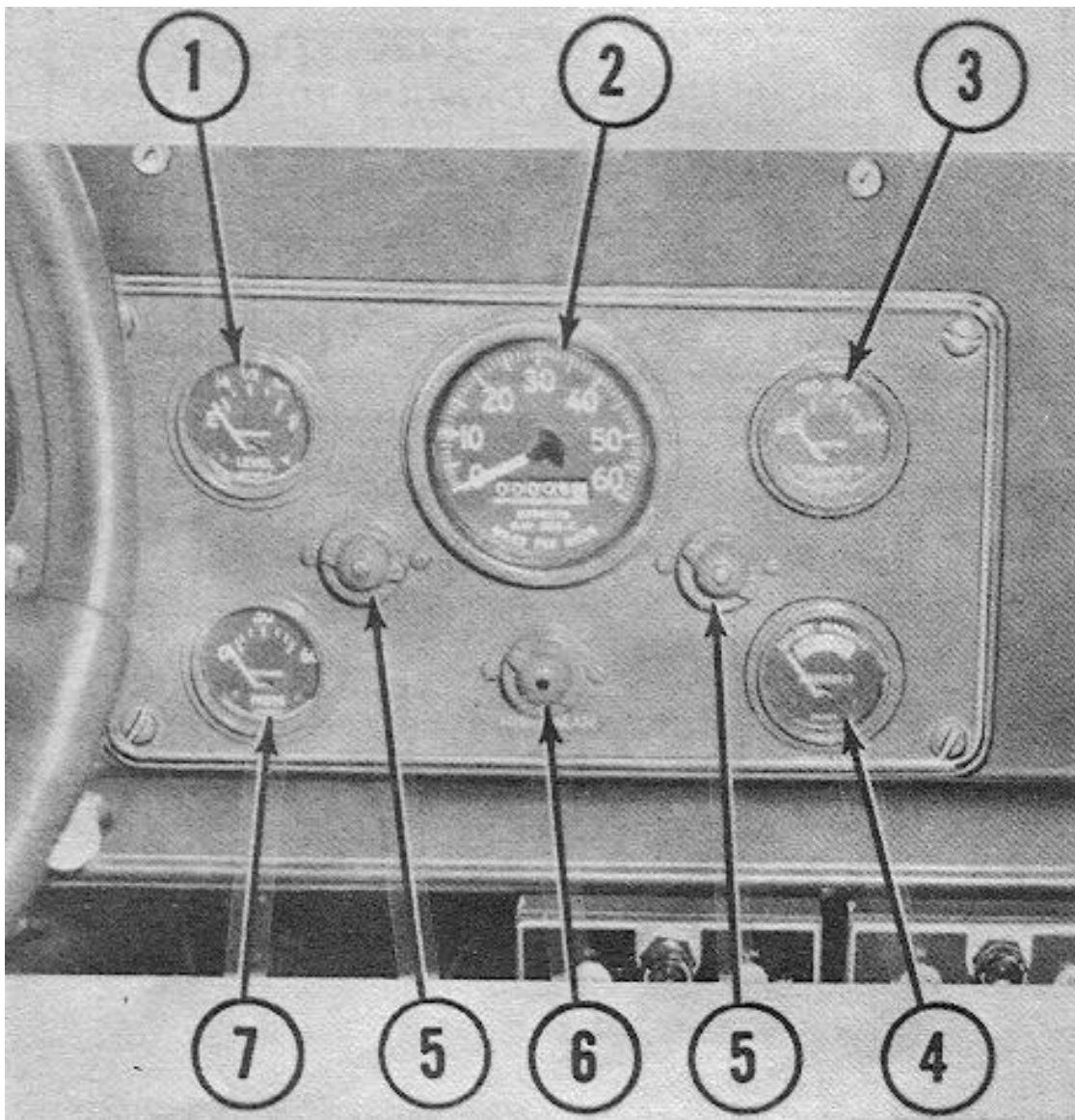
**Figure 2. Engine Code Number**

## INSTRUMENTS

### General

The operational instruments are conveniently grouped where they can be easily seen on the instrument panel. Each of the gauges indicates a critical function of the vehicle and warns of impending trouble in advance. Knowing the function of these gauges and observing them occasionally while driving or while the engine is running can enable you to prevent service problems that could result in expensive repairs.





**Figure 3. Instrument cluster.**

1. Fuel gauge
2. Speedometer
3. Temperature gauge
4. Battery-generator indicator
5. Instrument cluster light
6. High beam indicator
7. Oil pressure gauge

#### Speedometer

The speedometer sweep hand indicates vehicle speed in miles per hour. The odometer registers accumulated mileage traveled. The right-hand numeral of the odometer indicates tenths of a mile.

#### Oil Pressure Gauge

This gauge indicates the engine oil pressure when the engine is running. When the engine is started cold, the oil pressure may rise sharply, then recede to normal after the engine has warmed up. At idle speed the minimum indicated pressure should be 12 psi. At road speeds, the pressure gauge should indicate a minimum of 30 psi. If the indicated oil pressure is lower than these recommended minimums, stop the engine and investigate the cause of this low oil pressure



### Battery-Generator Indicator

The battery-generator indicator located on the instrument cluster is marker BATTERY-GENERATOR. This gauge indicates the charging activity of the charging system. The gauge should indicate GENERATOR (pointer in green arc) when the engine is started, and continue to indicate charging activity as the engine speed is increased depending on the amount of electrical power being used. When the battery is supplying normal current, the pointer should indicate BATTERY (yellow arc). An abnormal discharge reading (pointer in red arc), with the engine running at normal speed, indicates a deficiency in the charging system.

### Fuel Gauge

This gauge indicates how much fuel is in the fuel tank. The pointer drops to E (empty) when the ignition switch is turned off. It may take a moment for the gauge to indicate when the ignition switch is again turned on. It is normal for the pointer to fluctuate at times when the vehicle is driven over rough terrain.

### Temperature Gauge

The temperature gauge registers the temperature of the solution in the cooling system in degrees Fahrenheit. Operating temperature is normally between 170° F. and 190° F. Should the gauge register considerably higher, stop the engine and determine the cause. Excessively low operating temperatures may indicate a faulty cooling system

### Caution:

Always remove the radiator cap slowly to avoid possible injury from escaping steam or hot water. Never add water when the engine is overheated; allow the engine to cool first.

### High Beam Indicator

The high beam indicator light, located just below the speedometer, will glow when the headlights are on high beam and warn you that the headlights may be shining into the eyes of oncoming drivers. When the dimmer switch, located near the drivers left foot, is pushed once, the headlights switch back to low beam and the indicator light will go off.

## SWITCHES AND CONTROLS

### Ignition Switch

The ignition switch located to the left of the instrument cluster, is a two-position ON-OFF lever-type. This switch must be in the ON position to operate any of the electrical instruments or switches.

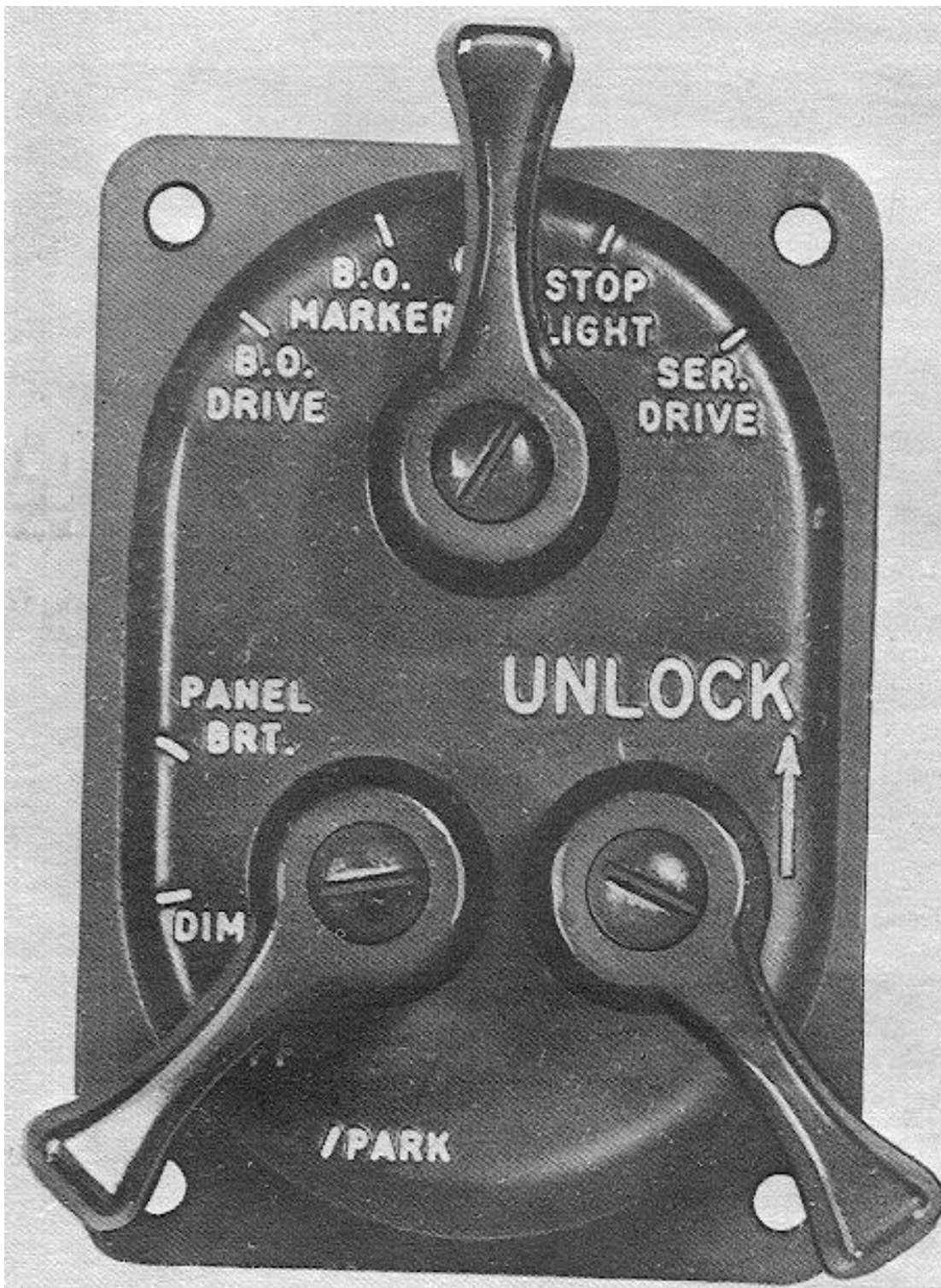
### Starter Switch

The starter switch, located to the right of the accelerator pedal, is operated by the drivers right foot. Push the switch hard enough to force the body against the seat back.

### Light Switch

The light switch, located to the right of the steering column, provides selective control of the various lighting circuits by means of two switches; main switch and auxiliary switch. An unlock switch limits free movements of the main switch. The main switch has five positions: BO DRIVE, BO MARKER, OFF, STOPLIGHT, and SERVICE DRIVE. To move the main switch to any position except BO MARKER, the unlock switch must first be moved to the UNLOCK position.

The auxiliary switch has four positions: PARK, OFF, DIM, and PANEL BRT. Movement of this switch is not restricted by the unlock switch, but circuits under its control are dependent on the position of the main switch.



**Figure 4. Main light switch**

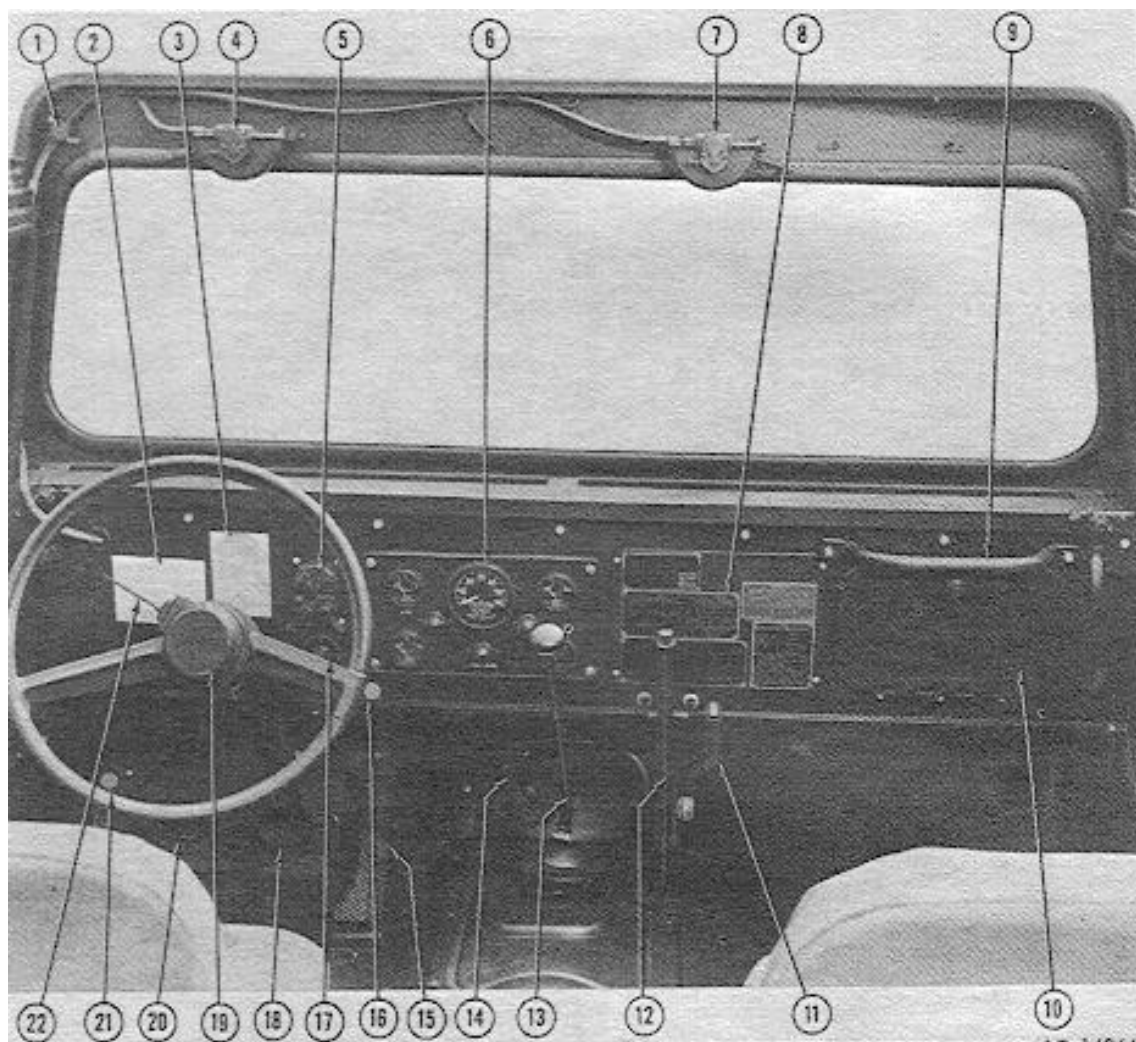
#### Dimmer Switch

The dimmer switch, accessible to the driver's left foot, is used to raise or lower the headlight beams.

#### Turn Signal Indicator

The turn signal lever is located on the left of the steering column. The UP position of the lever indicates a right turn; the DOWN position, a left turn.

A light in the indicator housing will flash if the lever is in either position. When the turn is completed, move the indicator lever back to the center position.



**Figure 5. Switches and controls.**

1 Windshield wiper control valve	12 Parking brake handle
2 warranty decal	13 Transmission gear shift lever
3 Driver instructions	14 Foot starter switch
4 Left windshield wiper motor	15 Accelerator pedal
5 Main light switch	16 Choke
6 instrument cluster	17 Ignition switch
7 Right windshield wiper motor	18 Brake pedal
8 Identification and data plates	19 Horn button
9 Safety rail	20 Clutch pedal
10 Glove box	21 Headlight dimmer switch
11 Transfer case shift levers	22 Directional signal switch

### Windshield Wipers

The windshield wiper control is located at the top left of upper windshield frame. The wipers may also be hand

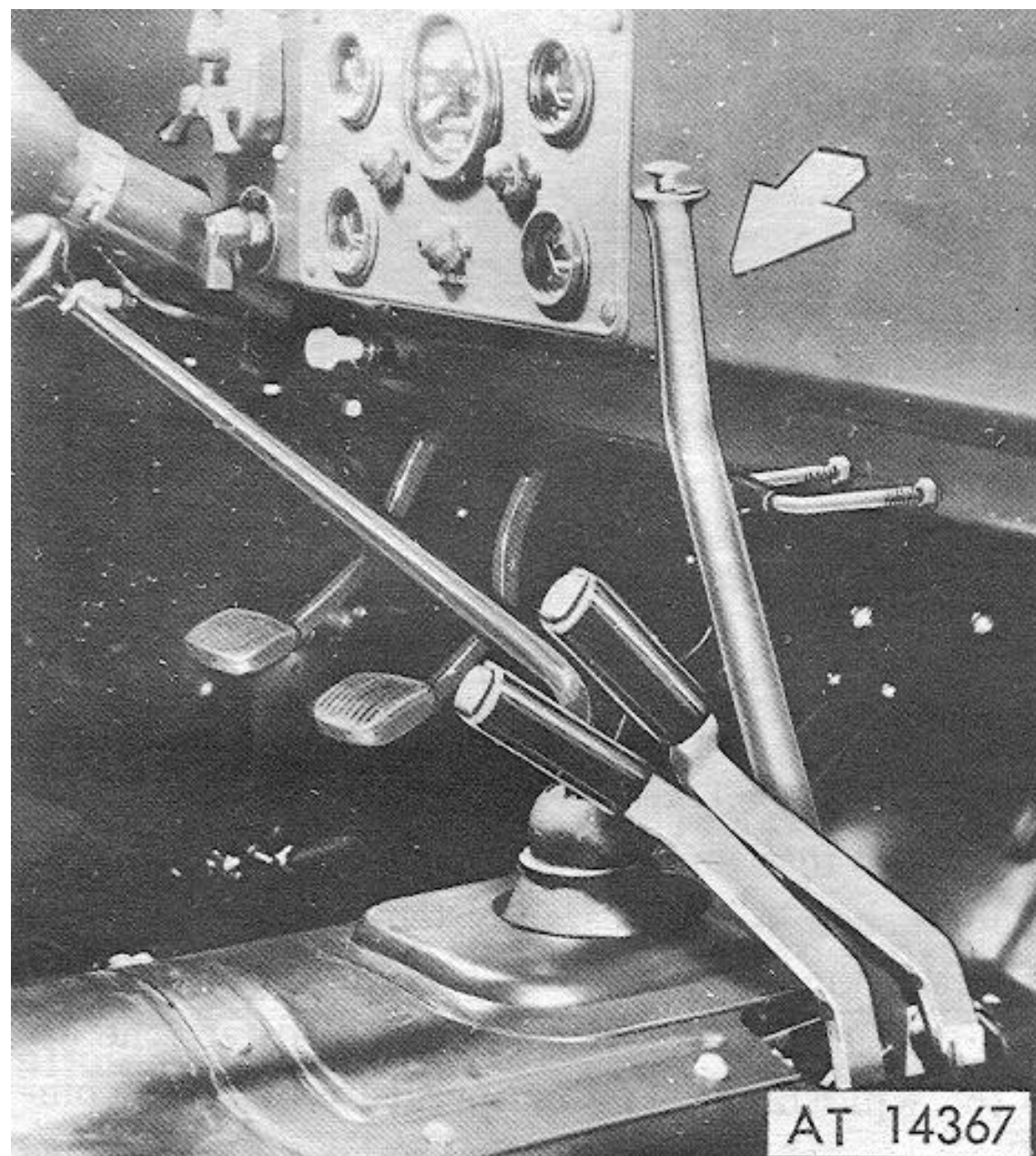
operated by means of a lever, located on each wiper motor, in the event of vacuum failure.

### Choke Control

The manually operated choke control, located on the lower edge of the instrument panel to the right of the steering column, is used to assist in starting the engine during cold weather. (See Extreme Cold Weather Operation.)

### Parking Brake Controls

To apply the parking brake, pull back control lever. It will automatically lock in place. To release, press down on release button on the top of the lever and push brake lever forward.

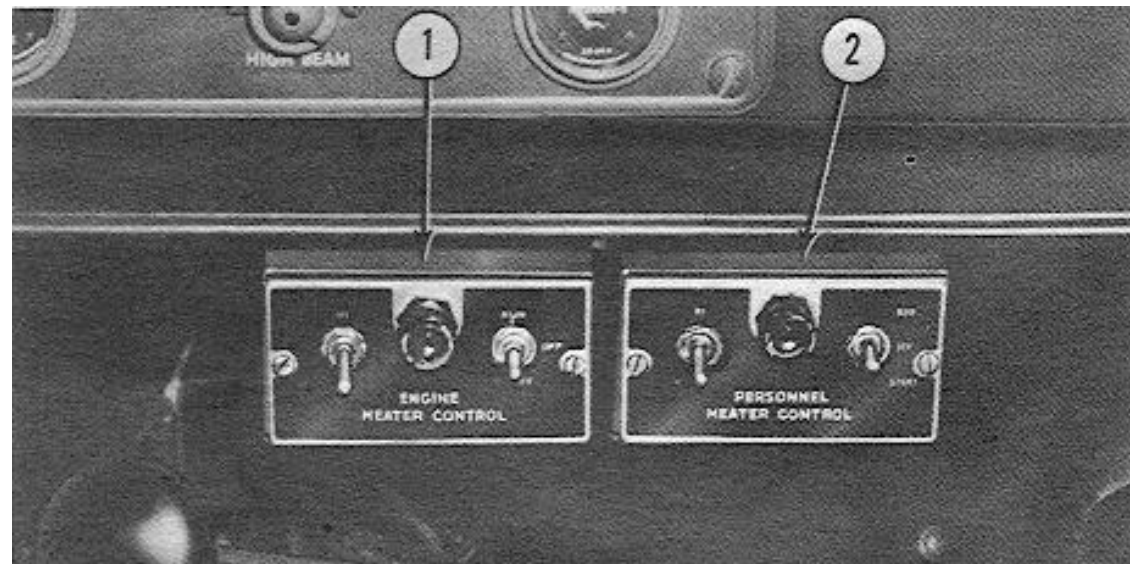


**Figure 6. Parking Brake Control.**

### Heaters and Winterization Equipment

The M715 series vehicles may be equipped with special purpose winterization equipment. A hot water type personnel heater for the cab is optional in temperatures down to -25 degrees F. A fuel burning personnel heater (reference heater operating instructions plate for operation of heater) and a powerplant heater is designed for operation of the vehicle in temperatures down to 40° F. (Reference-Heater Operating Instruction Plate mounted on glove box door for operation of heaters.) A tab hard top closure kit is also available. Winterization equipment is

authorized under criteria of SB 9-16.



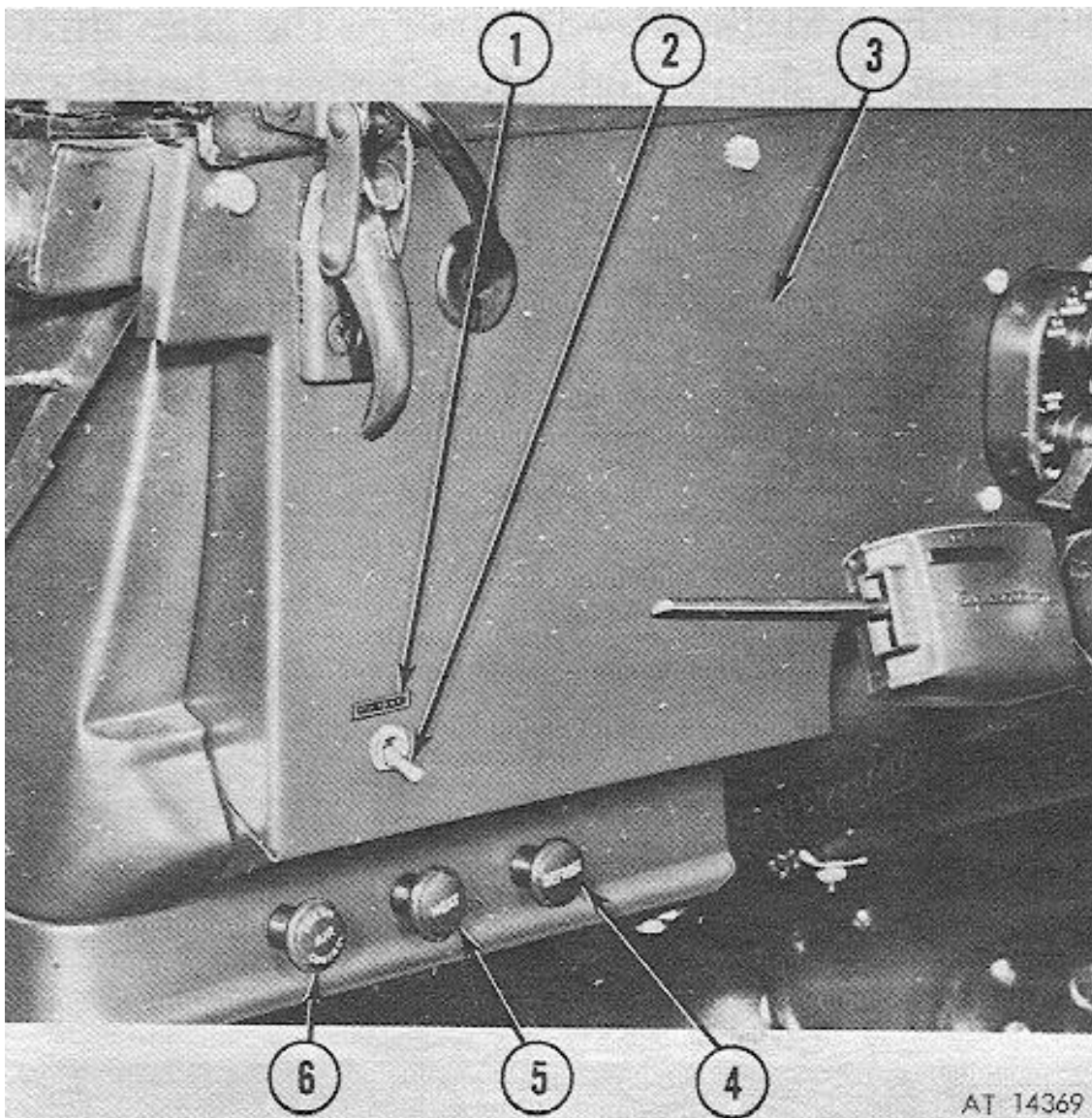
**Figure 7. Heater controls.**

- 1 Engine heater controls
- 2 Personnel heater controls

Personnel Heater (-25 degrees F.)

The controls for the hot water type personnel heater for the ('all are located at the lower left corner of the instrument panel. 'With the air control knob pushed in, the heater system will not operate. Pull the knob out to direct outside air into the cab. Pull the defroster knob out to direct the air to the windshield. The temperature of the incoming air is controlled by the heater switch. Move the switch to the ON position for maximum air.





**Figure 8. Personnel heater controls.**

- 1 Decal-blower switch
- 2 Blower switch
- 3 instrument panel
- 4 Defroster control knob
- 5 Heat control knob
- 6 Air control knob

#### Deep Water Fording System

A deep water fording system is available for installation on the vehicle. The only control applicable to the operator is the fording control handle. Pull the handle out before fording and push back in after leaving the water. Also install bell housing plug which is stored in the glove box. Remove plug after fording is completed. Plug should also be installed when driving in wet areas. Bell housing plug should be removed for draining during maintenance operation, so any oil accumulation will be removed.

#### Caution:

When fording in depths over 42 inches, engine fan belts must be loosened to allow slippage of fan.

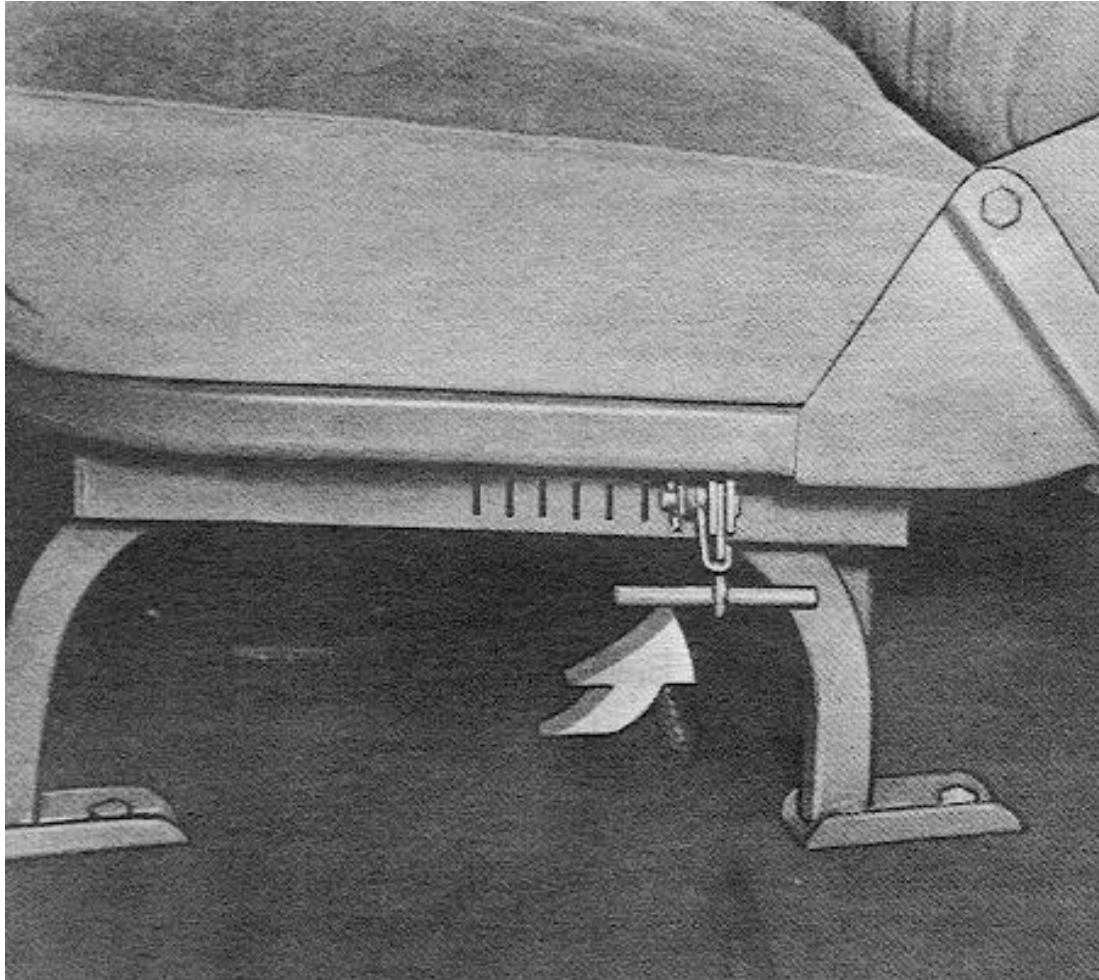
A visual pressure check of the deep water fording system may be made in the following manner:

With the engine running and fording valve pulled out (valves closed) observe the gear shift lever boot. It should

indicate a pressure build-up by blowing up into a ball and become hard to the touch. Shut off the engine and check the time for the pressure to completely leave the boot, that is, return to its original shape and be soft to the touch. If this time is at least 30 seconds, the unit is operational. If the 30 seconds are not reached, check lines, fittings, and seals using a soap solution to find excessive leakage points and correct.

### Seat Adjustment

The seat adjustment control handle, located on the left side of the drivers seat, is lifted to unlock the seat for adjustment. The handle is locked by pushing down until it engages one of the adjustment notches in the seat.

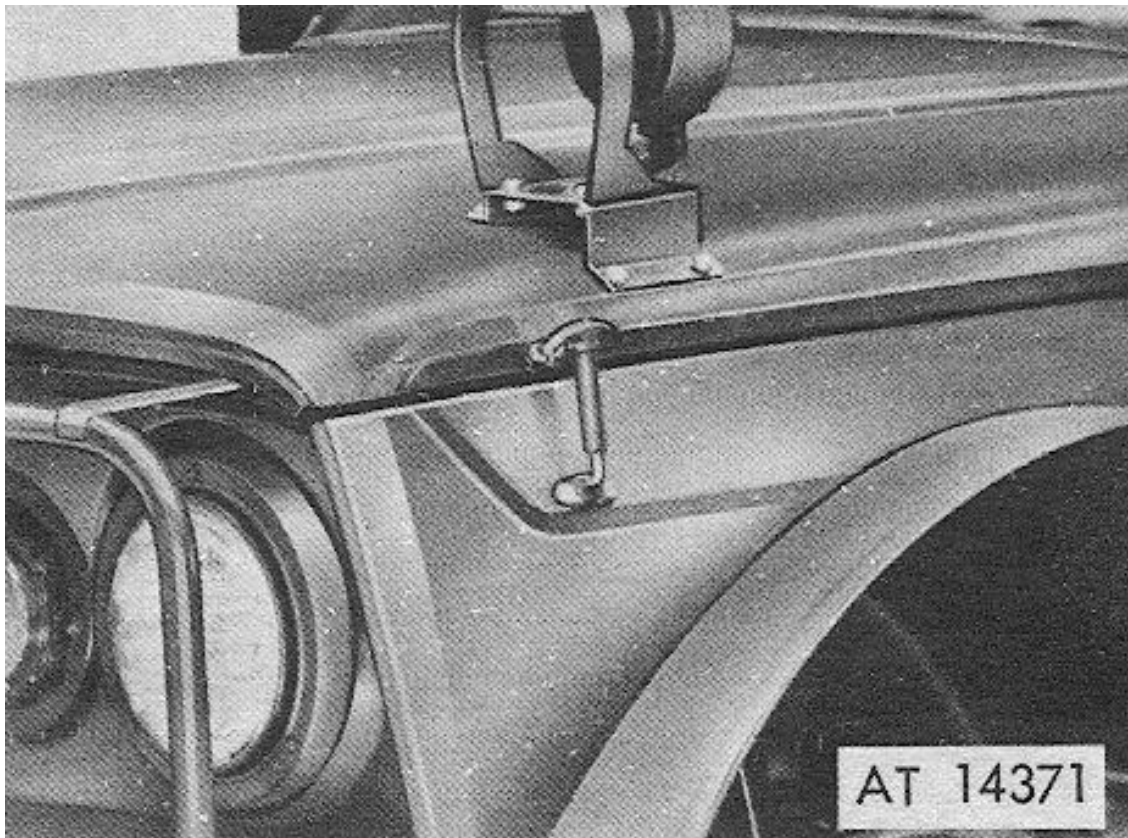


**Figure 9. Seat adjustment.**

### Hood Latch

Two hood latches, located on the front corners of the hood, are engaged to lock the hood in position. To unlock the latches, lift latches until they are clear of their catches and turn slightly. The hood may now be raised.



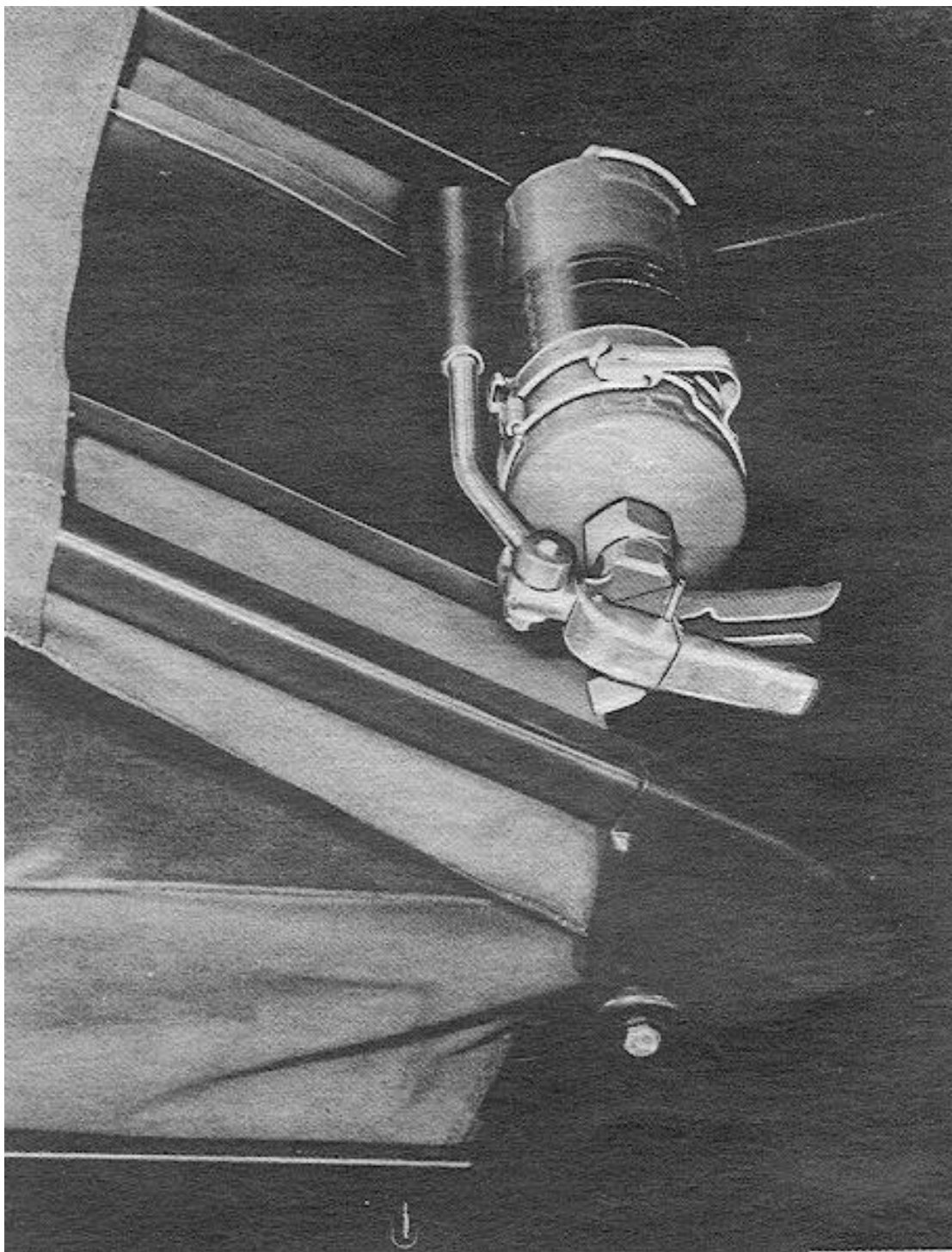


**Figure 10. Hood latch.**

## BODY CONTROLS AND SPECIAL EQUIPMENT

### Fire Extinguisher

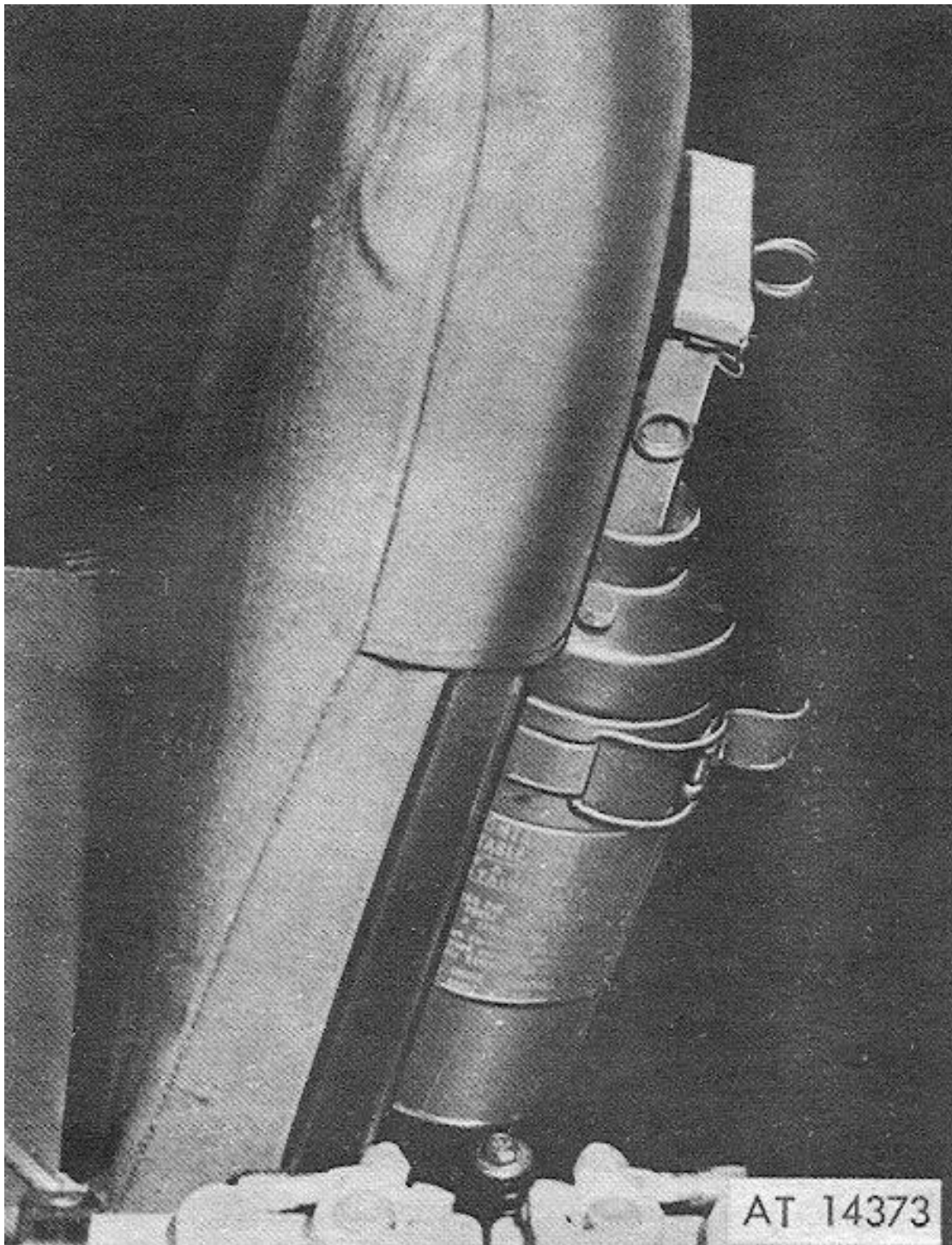
The fire extinguisher is located on the back of the drivers seat on Cargo Truck, M715, and at the left side of the drivers seat on Ambulance, M725. To operate the extinguisher, remove front the bracket. Read the instructions carefully. For best results, direct the discharge toward the base of the flames. To extinguish burning liquid in a container, direct the discharge against the inside of the container just above the burning liquid. Each time the extinguisher is used, refill with fire extinguisher liquid through the filler plug opening. After filling, lower the handle to the closed position. Keep the extinguisher clean, fully charged, and properly stowed.



**Figure 11. Fire extinguisher-M715**

#### Decontaminating Apparatus

The decontaminating apparatus is mounted on the back of the commander's seat Refer to TM 3-220 for instructions.

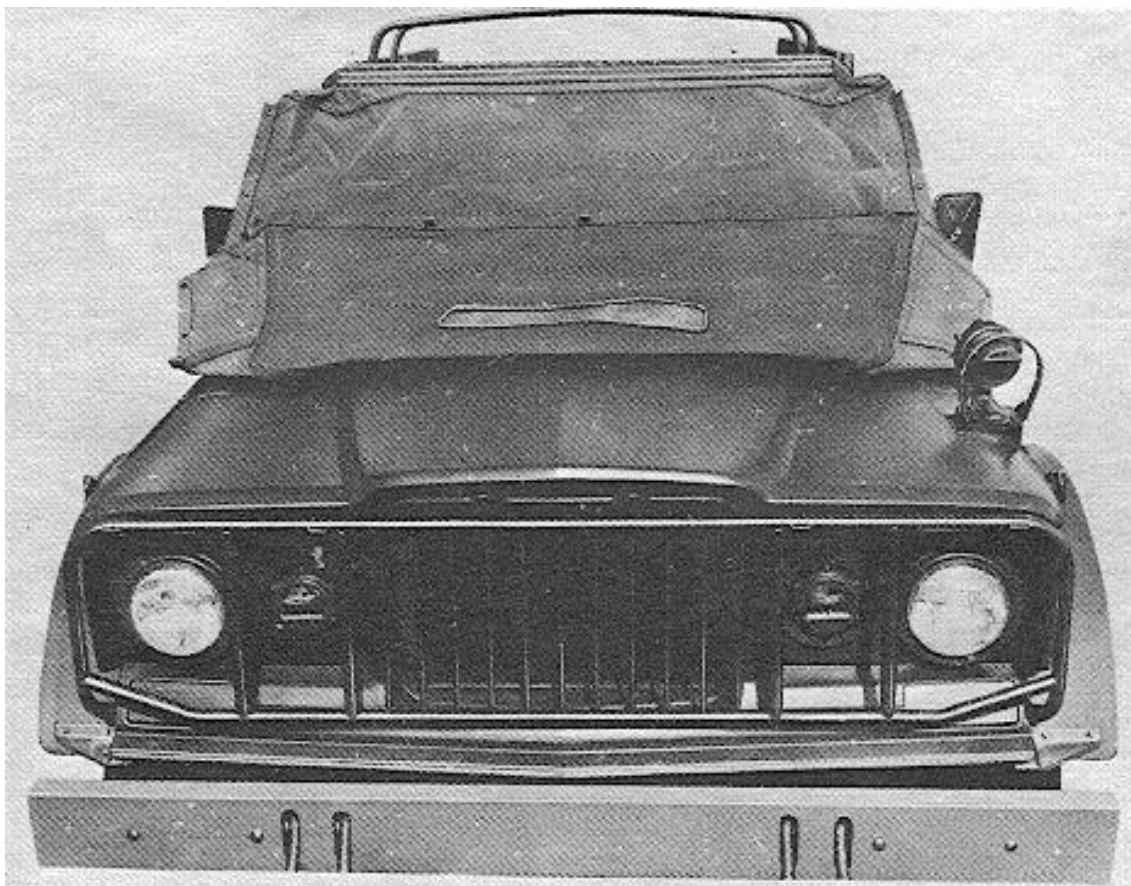


**Figure 12. Decontaminating apparatus.**

### Removing Cab Top and Lowering Windshield

The cab of the M 71 5 cargo truck is equipped with a folding windshield and a removable canvas top. When removed, the paulin and its supporting members are stowed behind the cab seats. Removal and stowage procedures are outlined below:

1. Unbuckle the three straps securing the paulin to the inside rear of the cab. Release the eighteen fasteners securing the paulin to the door window frame.
2. Throw paulin over the windshield and pull paulin edge from windshield channel. Remove paulin from vehicle and fold. See figure 13.



**Figure 13. Paulin over windshield.**

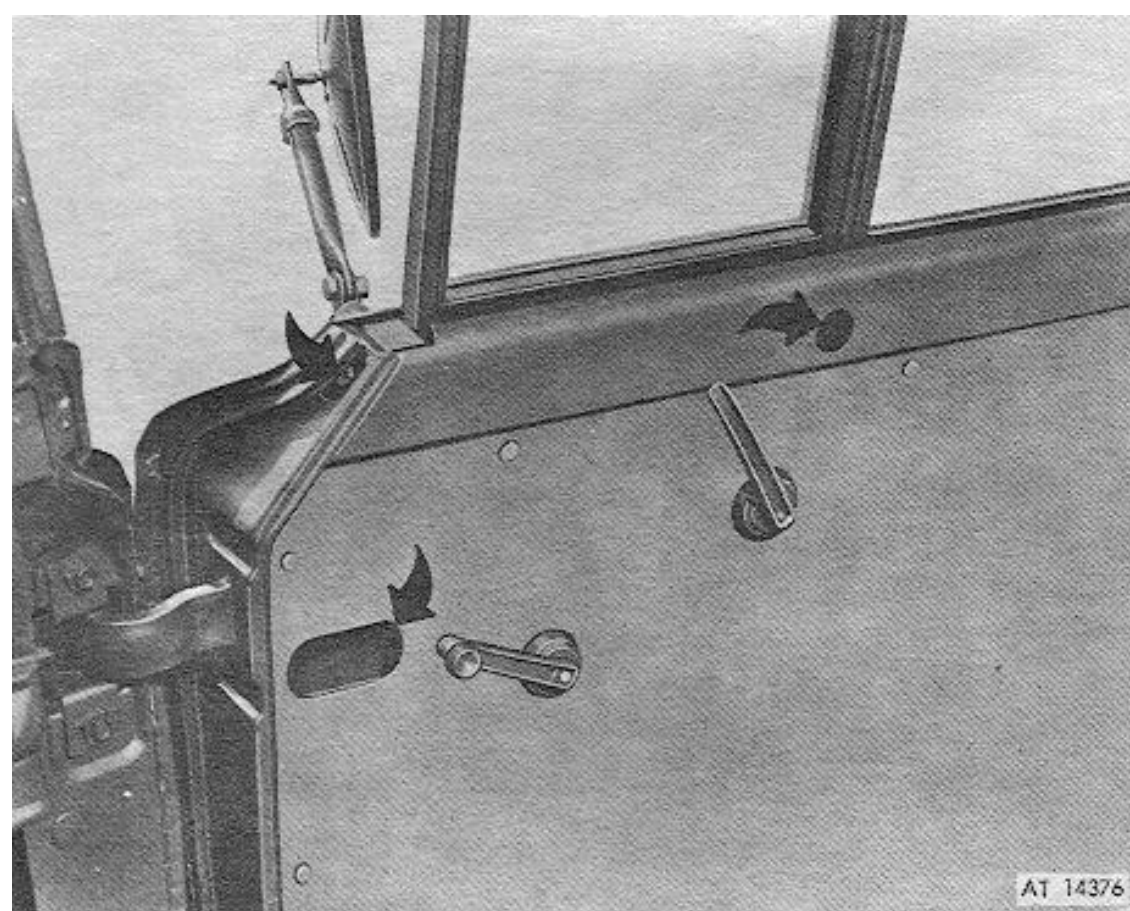
3. Lift the two roof bows from their sockets and remove from vehicle.
4. Remove the two door window frame-to-cab bolts and, the window frame-to-windshield bolt and nut from each door window frames from the vehicle. Replace the bolts and nuts in cab and windshield for storage. See figure 14.





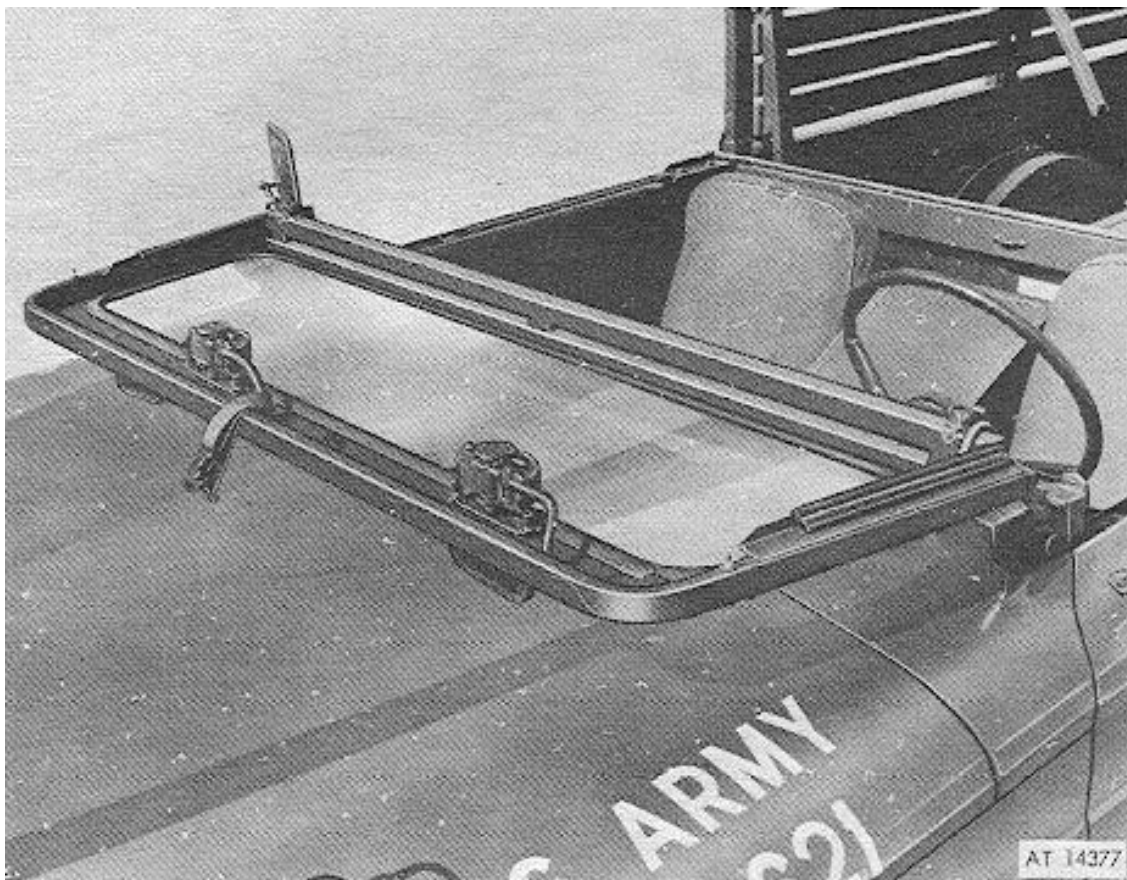
## Figure 14. Door window frame bolts.

5. Remove three screws attaching the channels of each door fixed window glass to the door. Screw locations are shown in figure 15. Lift fixed glass upward and out of door. Replace screws in channels for storage.



**Figure 15 Fixed widow glass screws.**

6. Release the clamps at the lower corners of the windshield. Lower windshield. Lower windshield onto hood and secure with one 1" x 18" strap. See figure 16.

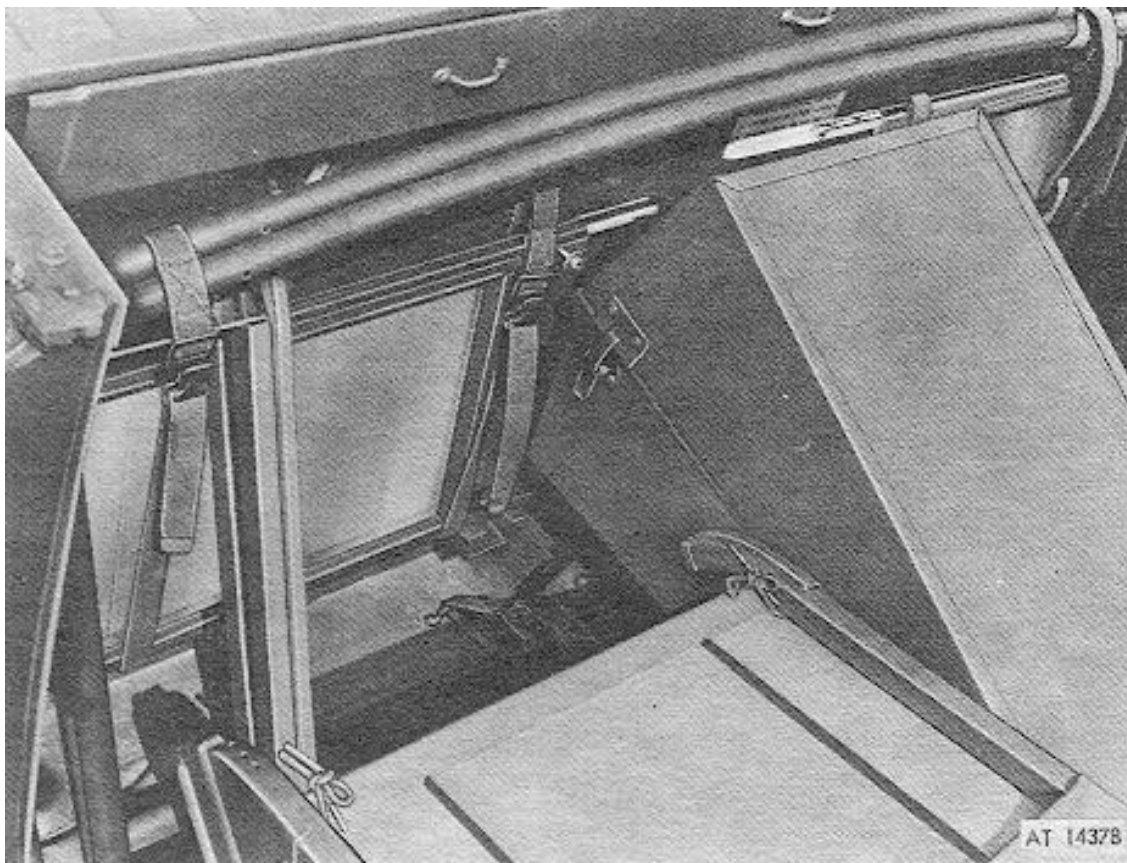


**Figure 16. Windshield lowered.**

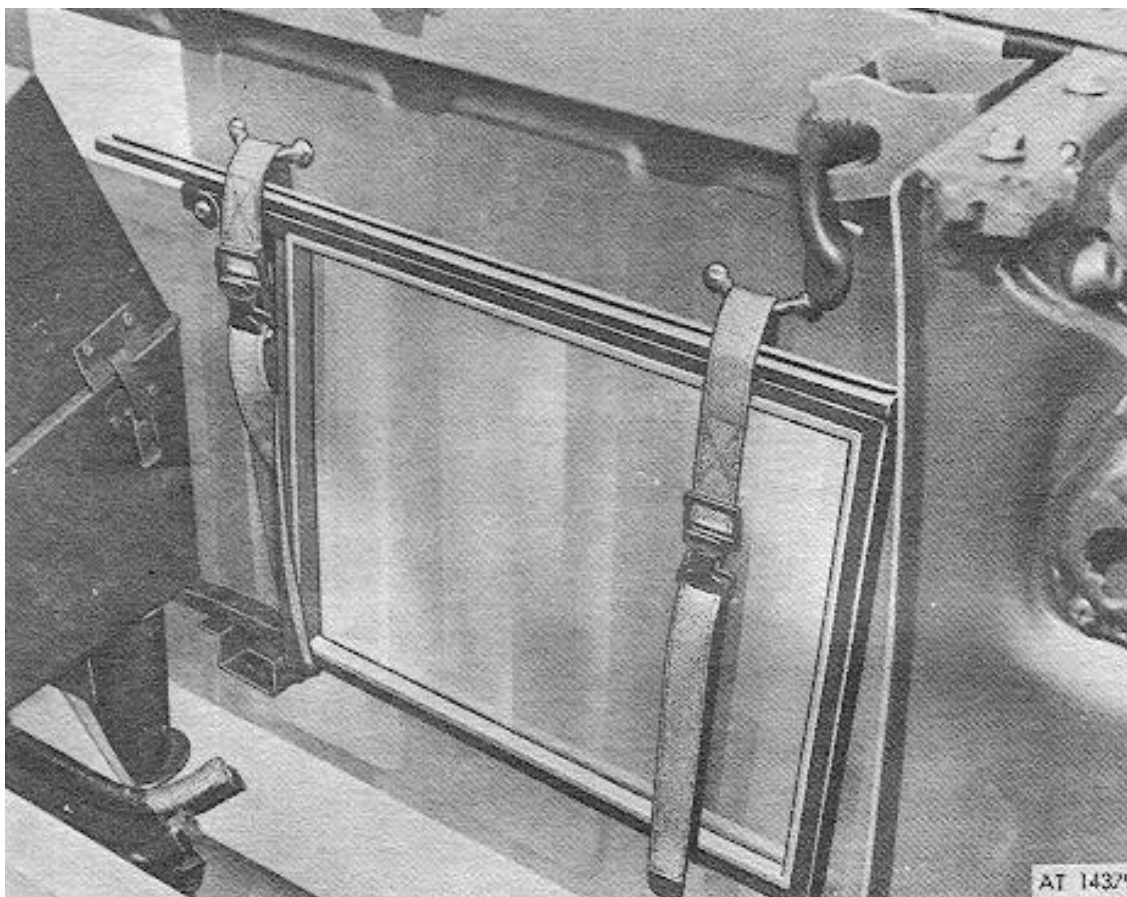
7. Stow both door window frames under battery box and behind commander's seat with one 1" x 28" strap. See figure 18.
8. Stow left door fixed window glass behind driver's seat with two 1" x 39" straps. See figure 17.
9. Stow right door fixed window glass behind commander's seat with one 1" x 42" strap. See figure 18.
10. Secure bows, frames and right window glass behind commander's seat with one 1" x 45" strap.
11. Secure bows behind driver's seat with one 1" x 22" strap. See figure 18.
12. Stow paulin behind commander's seat.
13. Once all items are stowed, it is recommended that all straps be checked to assure that they are tight and secure.

#### Installing Cab Top

To install the cab top, reverse the removal procedure given above.



**Figure 17. Left fixed window stowed.**



**Figure 18, Right fixed window, frames and cab bows stowed**



### Power Ventilator Controls—Ambulance M725

Two ventilator blowers are provided to draw hot air or odors from the patient compartment. Each blower motor is controlled by a switch. Openings in the blower ducts are controlled by the ventilator blower control valve handles. To operate either blower, turn the blower switch to the ON position. Turn the ventilator blower control valve handles to the desired position to regulate the valve. When the valve handles are in the horizontal positions, the valves are fully closed; when the handles are in the vertical position, the valves are fully open.

### Surgical Lamp—Ambulance M725

The surgical lamp is provided with a toggle switch to turn the lamp on or off. To direct the light beam, loosen the knurled thumb screw that secures the lamp in the shell and swing the lamp in the desired direction. When the lamp is not in use, position it in the shell and tighten the thumb screw.

### Dome Lamp—Ambulance M725

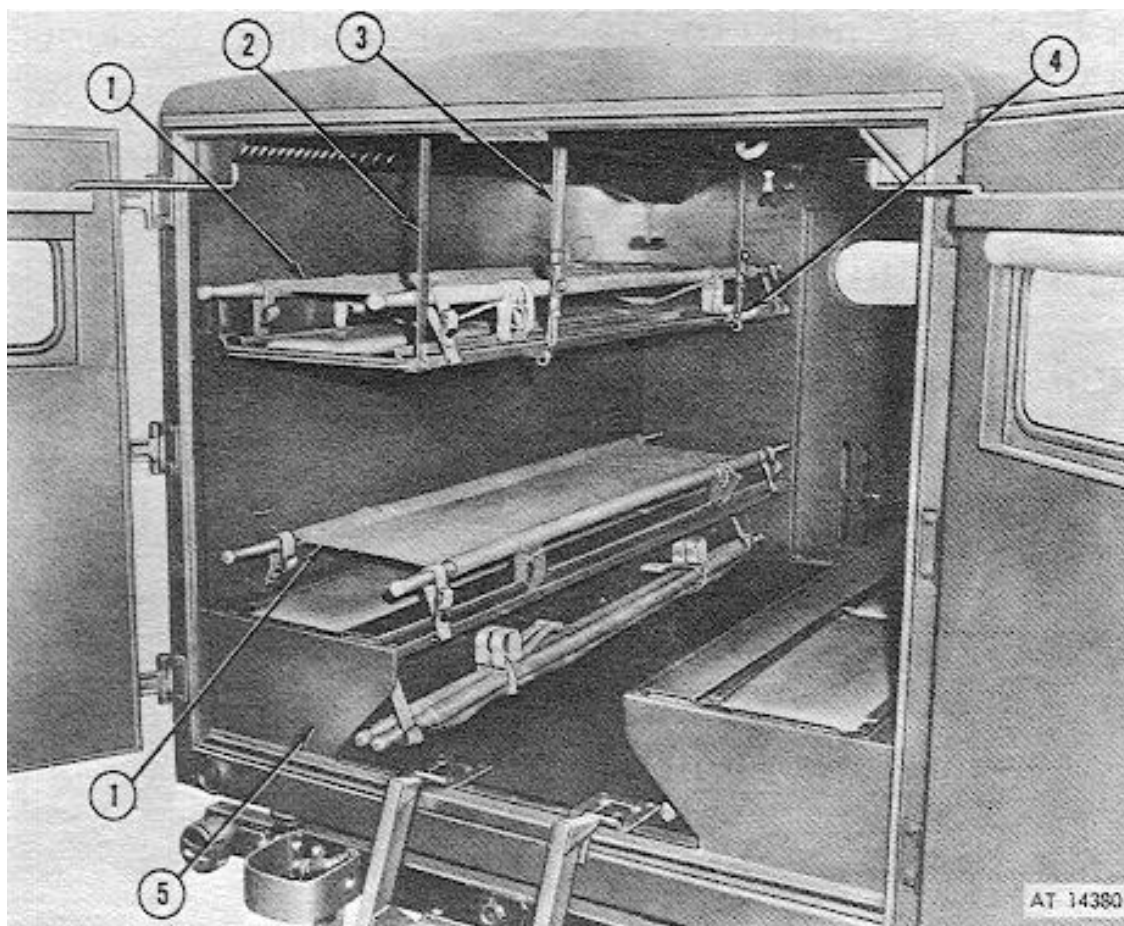
The dome lamp, located in the top of the vehicle, is controlled by an ON-OFF toggle switch.

### Spot Lamp—Ambulance M725

The spot lamp is mounted on the roof of the drivers compartment. Controls are operated by the driver. To operate, push the spotlight switch forward. Turning the handle raises or lowers the light beam; revolving the handle moves it to the right or left.

### Patient Compartment Heater—Ambulance M725

The personnel heater for the patient compartment of the M725 ambulance is controlled by a heater control box located on the inside wall of the compartment. The heater is located under the left front patient seat. To start the heater, move the HI-LO switch to the Hi position and hold the heater switch in the START position until the indicator lamp lights. When the indicator lights, snap the switch to RUN. Warm air should be felt at the heat outlet. The warm air output may be regulated by snapping the H I-LO switch from III to LO according to the heating requirement. To deflect the stream of heated air from the heater outlet, move the heat deflector handle to the desired position.



**Figure 19. Litters in position.**

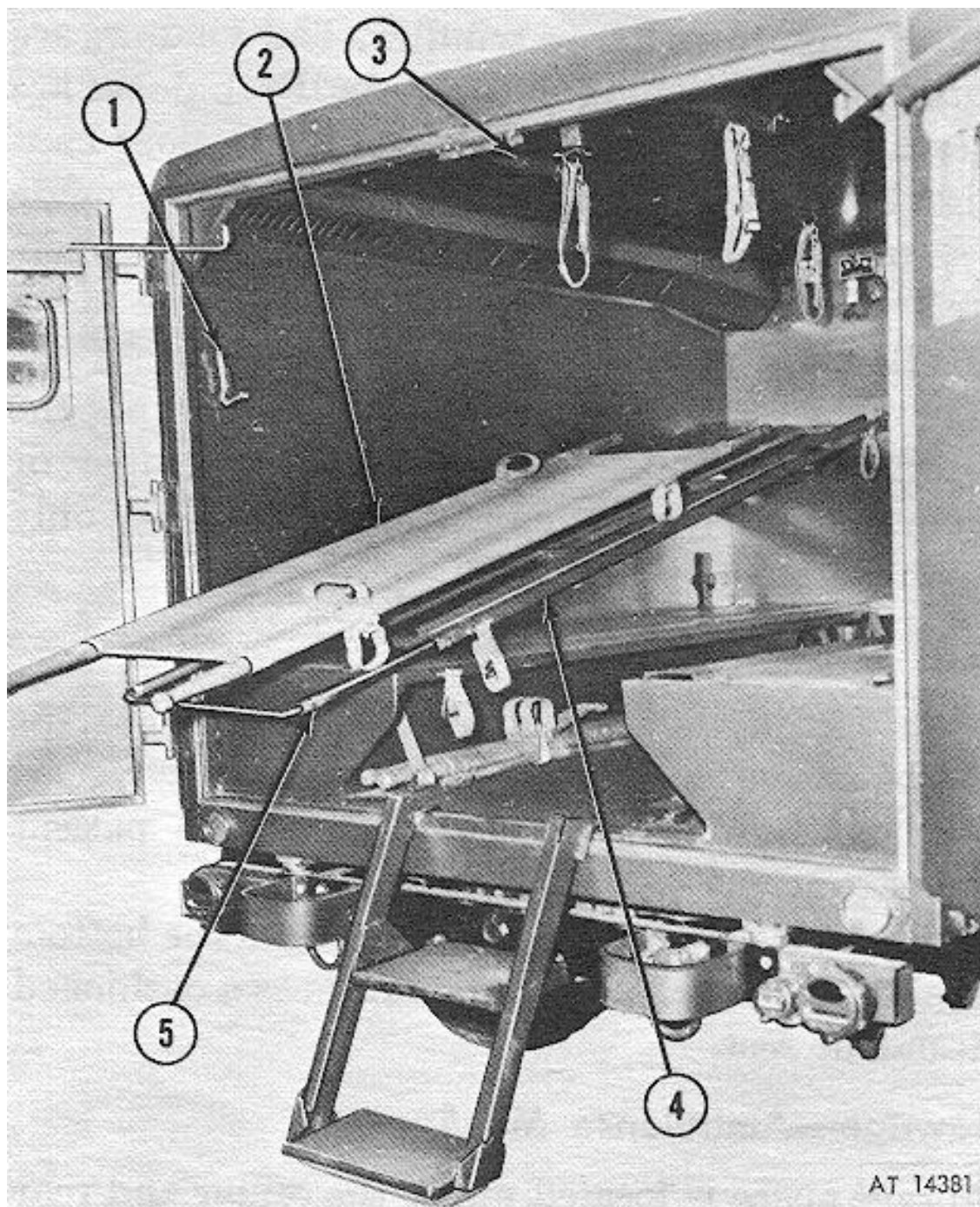
- 1 Litter
- 2 Litter rack support bar
- 3 Safety strap
- 4 Litter rack (seat back)
- 5 Seat

#### Litters-Ambulance M725

The interior of the ambulance body contains provisions for transporting seated or litter patients. Eight seated patients or five litter patients (two on seat rack, two on seat backrest rack when in raised position, one on floor), can be accommodated.

To raise seat backrest rack, first release the hold-down straps, securing lower ends of seat backrest-rack. Then swing lower edge of rack upward until rack is in a horizontal position. Raise latch on inboard support bracket on forward rail and insert stud at end of rack into bracket. Push entire rack toward outer rail and lower latch to retain stud in bracket. Swing support bar on ceiling to a vertical position by releasing latch at forward end and sliding bar forward to disengage stud. Engage keyhole slot in bar with stud on rack and lower latch against protruding stud. Rotate locking bar at rear outboard retainer loop to horizontal position.

To lower rack for loading of litter, first pull out lifting handles at rear of rack and release rear inboard support bar from stud on rack. Then raise locking bar over rear outboard retainer loop. Grasp lift handles, raise and swing rack inboard to disengage retainer loop from hinge bracket. Lower rear of rack until it rests on patient seat and engages with retainer loop on retainer bracket on wall at rear. Litter is loaded at this position. With litter on rack, grasp lifting handles, raise and swing rack outboard to engage retainer loop with hinge bracket. Engage rear inboard support bar with stud on rack and lower latch against stud. Lower locking bar over rear outboard retainer loop. Push lifting handles in. Secure litter to rack with hold-down straps provided at both ends. Engage safety straps with loops on inboard edge of rack.



**Figure 20. Litter receiving position.**

- 1 Rack hinge bracket
- 2 Litter
- 3 Rack support bar
- 4 Litter rack
- 5 Rack lifting handle

#### Bulkhead Door-Ambulance M725

The bulkhead door is a sliding door on the inside of the cab. The double catch on the door engages on the right in the closed position or on the left in the open position. The bulkhead door lock is located just below the handle on the cab side of the door. It can be locked from the patient compartment by pushing up the lock at the bottom of the door mechanism. The air inlet opening located on the bulkhead door has a control knob. Slide the knob left or right

to control airflow.

### Rear Doors-Ambulance M725

The double doors located at the rear of the patient compartment allow easy access in and out of the body. Both doors have a window. The windows are equipped with a blackout curtain. Both doors are weatherstripped and are equipped with door handles that operate top and bottom latches to provide a secure closure. The left door handle can be operated only from the inside. The right door has a handle both inside and outside. The right rear door can be locked by moving the lock catch on the inside before closing the door, or from inside after the door is closed. Use key only to unlock door from the outside.

### Rear Step—Ambulance M725

After opening the rear doors, the telescoping steps can be swung down into position at the center of the body, allowing easy access into the patient compartment.

When folded up with the doors closed, the bottom side of the telescoping step doubles as a cushioned attendant seat.

### Stowage—Ambulance M725

Storage space is located under the center and rear seat cushions on both the right and left side of the patient compartment

An outside stowage compartment is located below and to the rear of the right side door. The recessed swivel handle has a latch bar on the inside to keep it closed. Turn the handle to release the latch. A hasp is provided at the bottom for a padlock.

### Towing Shackles and Lifting Lugs

The M715 truck series is equipped with four wheel lifting hogs into which towing shackles can be installed, and four towing shackles which are also used as tiedowns. The tow and tiedown shackles are located two on the front of the vehicle extending through the front bumper, and two on the rear of the vehicle inside a bumperette at each end. When lifting the vehicle, the front and rear tow shackles are removed and installed into the wheel hub lug eye. The tow shackles are equipped with a shackle pin drilled with a hole for a safety wire pin to be used as a retainer. Never use the tiedowns for lifting lest the vehicle frame be distorted.

## OPERATION

### PROPER BREAK-IN

By taking reasonable precautions during the first few miles of driving and by giving the vehicle an opportunity to properly “break-in”, operation and life of the working parts will be greatly improved.

The drive train parts are precision fitted and close limits are maintained throughout. Therefore certain precautions should be observed to “break-in” the engine.

For the first 50 miles avoid opening the throttle fully while accelerating or hill climbing.

Keep under 50 miles per hour for the first 250 miles. Avoid full throttle accelerations.

Occasionally lift your foot off the accelerator, if driving at steady speeds to improve engine lubrication during break-in.

After 250 miles, short periods at increasingly higher speeds are permissible. Step up speeds gradually as mileage accumulates-operation at low speeds contributes little, if anything, to effective break-in.

The crankcase should be drained at 500 miles and refilled with engine oil of the viscosity recommended in the Lubrication Section. The oil filter should also be replaced at 500 miles.

During the first 1,000 miles of operation be alert for any indications of over-heating in any component of the vehicle.

### CARBON MONOXIDE

Carbon monoxide is a deadly gas. It has no odor, taste or color. It is in the exhaust fumes of all gasoline engines. Never start an engine in a closed garage. Always open the doors wide before starting the engine. Keep them open as long as the engine is running.

## MAKING THE VEHICLE READY

- Check the coolant level in the radiator.
- Put gasoline in the fuel tank.
- Check the oil level. (See Lubrication Section)
- Give the vehicle a complete lubrication, covering all the items in the Lubrication Section.
- See that all tires have the proper pressure.

## STARTING THE ENGINE

- Shift the transmission into Neutral.
- Pull the choke control out halfway.
- Turn the ignition switch on and push hard on the starter switch until the engine starts. If the engine fails to start in 30 seconds, release the starter switch and wait about one minute before attempting to start the engine again.
- If the engine fails to start in two or three attempts, consult the Troubleshooting Chart.
- Set the choke control at the best position to keep the engine running for warmup. Push the choke all the way in as soon as the engine reaches operating temperature.

## DRIVING THE VEHICLE

- Release hand brake, if set.
- Depress clutch pedal.
- Move transmission gear shift lever to the first position. (Note that front axle and transfer case shift levers are not used when the vehicle is driven on the highway in 2-wheel drive.)
- Depress foot accelerator pedal gradually and at the same time slowly release clutch pedal.
- Allow the vehicle to gain momentum (two or three vehicle lengths), then release the accelerator and depress clutch pedal at the same moment.
- Move shift lever promptly to the next higher speed position. Depress foot accelerator pedal gradually and at the same time slowly release the clutch pedal.
- Shift to each of the next higher speeds in the same manner, releasing the accelerator and depressing the clutch pedal before moving the shift lever.

## CHANGING TO LOWER SPEED

### Caution:

Never attempt to shift to a lower gear with the vehicle traveling at a high rate of speed.

- Depress clutch pedal.
- Move gearshift lever quickly into the next lower speed, increasing the engine speed slightly if traveling on level road, and release clutch pedal.
- It will be found advisable to make this change when the engine is placed under heavy pull or when dropping down to a very low speed, as when traveling up a steep grade, in sand, or in congested traffic.

## REVERSING THE VEHICLE

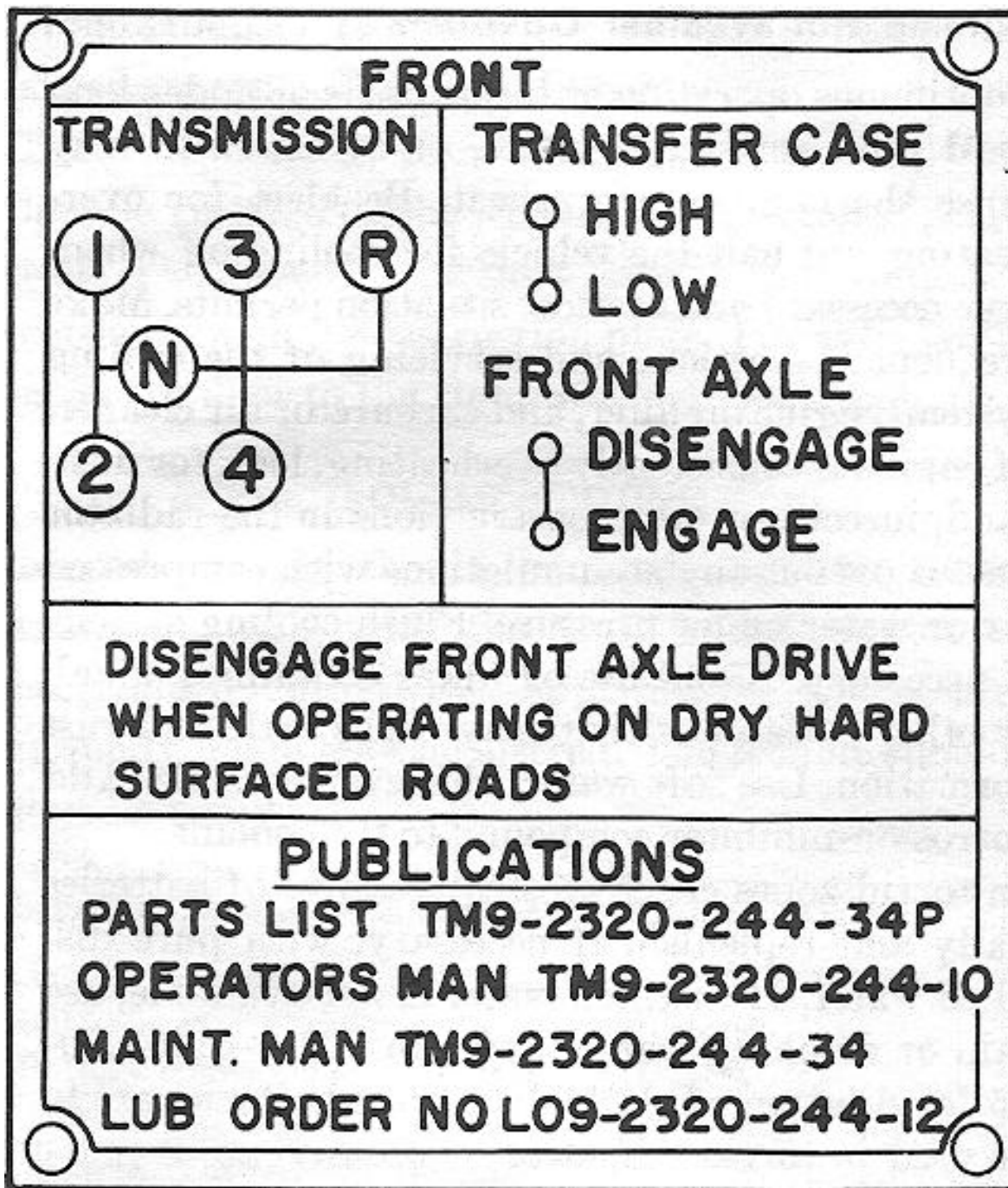
- With the vehicle at a standstill, depress the clutch pedal.
- Shift the gearshift lever into the reverse position and slowly release clutch pedal while regulating the vehicle speed with the foot accelerator.

## TOWING THE VEHICLE

The vehicle may be towed forward in the normal manner without damage to the 4-wheel drive mechanism. The gears in the transmission must be in neutral, and the gears in the transfer case in 2-wheel drive.

Should it be necessary, however, to lift the rear wheels and tow the vehicle in reverse, be sure to remove the front axle shaft driving flanges to prevent the front differential from rotating.

Should the driving flanges be removed, a cover should be improvised to prevent dirt from entering the wheel bearings.



**Figure 21. Shift pattern.**

## OPERATION UNDER UNUSUAL CONDITIONS

Refer to TM 21—300 and TM 21—305 for special driving instructions under unusual conditions.

### Extreme Cold Weather Operation

Refer to FM 31—70 and FM 31-71 for description of operation in extreme cold. Refer to TM 9-207 for operation and maintenance of automotive materiel in extreme cold (0° F. to —40° F.). Correct specific gravity reading of batteries exposed to extreme cold as outlined in TM 9—207. Also refer to TB ORI) 651 for instructions on use of antifreeze solutions and cleaning compounds in engine cooling systems.

For overnight or extended parking in temperatures at — 40 degrees F. or lower, overfill tires to 60 lbs. (size 9:00 x 16) to reduce flat spots. Reduce pressure to normal before operating vehicle.

If powerplant heater is not available, remove batteries and store in a warm place. It is not necessary to drain

subzero type engine oil, since it will remain fluid although unheated.

### Extreme Hot Weather Operation

Continuous operation at high speeds or under long hard pulls on steep grades, or soft terrain may cause the engine to overheat. Be alert for overheating and halt the vehicle for cooling off whenever necessary and tactical situation permits. Make frequent inspections and servicing of the cooling system, engine oil filter, and carburetor air cleaner. If engine is consistently overheating, look for dust, sand, insects, or other obstructions in the radiator fins. Blow out any accumulations with compressed air or water under pressure. Flush cooling system if necessary. Avoid use of water containing alkali or other substances that may cause scale and rust formation. Use soft water whenever possible. Add corrosion-inhibiter compound to the coolant.

In torrid zones check electrolyte level of batteries daily and replenish, if necessary, with pure distilled water. If distilled water is not available, use rain or drinking water. Refer to TM 9-6140-20015 for dilution of electrolyte when batteries are to be used in torrid climates.

### Operating on Unusual Terrain

Obtain tire chains for operation on snow or ice-covered terrain or in deep mud.

Lower tire pressure to travel over sand, ice, mud, and snow if tire chains are not available.

**Caution:** Do not lower tire pressure to extent that damage will result to tire. Restore to correct recommended tire pressure after emergency.

### Front Mounted Winch

The M715 front mounted winch has a 7,500 pound rated line pull at a minimum line speed of 15 feet per minute. The 150-foot wire rope is continuous in length with no splices and measures 7/16 inch in diameter. The rope is provided with a clevis assembly and has an end chain measuring four feet in length. The winch can be engaged or disengaged from the front bumper. The direction of rotation and the speed are controlled from the cab.

Before operating, place the winch clutch shifter handle (located on the winch) in the engaged position. Then operate the shift lever in the cab in accordance with the instruction plate. The shift lever is on the floor to the right of the driver's seat.

## TROUBLESHOOTING

No adjustment should be made, or any parts tampered with, until the cause of the trouble is ascertained; otherwise, adjustments which are properly made may be altered. The trouble should first be analyzed.

Condition	Possible cause	See paragraph	Possible cause	See paragraph
<b>Starting Motor Will Not Turn Engine</b>	Batteries discharged	Batteries	Battery connections dirty or loose	Batteries
	Battery cables defective	Batteries	Battery cable connections loose at ground starter switch	Starting Motor
	Wire connections loose at starter switch, starting motor voltage regulator, or ignition switch	Starting Motor	Starting motor inoperative	Starting Motor
<b>Engine Fails To Start</b>	No fuel	Fuel Gauge	No fuel to carburetor	Fuel System



	Cylinder or manifold flooded	Fuel System	Engine needs choking	Starting the Engine
	Plugged exhaust system	Exhaust System		
<b>Engine Stops</b>	Lack of fuel	Fuel Gauge	Lack of oil	Engine Lubrication
	Disconnected ignition wire	Ignition Wiring	Carburetor flooding	Fuel System and Carburetor
	Engine overheated	Cooling System	Distributor breaker points dirty or pitted	Ignitor
	Vapor lock	Fuel System		
<b>Engine Misses at All Speeds</b>	Faulty ignition wiring	Ignition Wiring	Fouled spark plugs	Spark Plugs
	Spark plug points improperly set	Spark Plugs	Spark plug porcelains dirty	Spark Plugs
	Distributor faulty	Ignitor	Water in fuel	Fuel Tank
	Engine overheated	Cooling System		
<b>Popping Back Through Carburetor</b>	Dirt in carburetor	Carburetor	Water in fuel	Fuel Tank
	Spark plug wires connected to incorrect plugs.	Ignition Wiring		
<b>Engine Overheating</b>	Low engine oil level	Engine Lubrication	Low coolant level	Radiator Pressure Cap
	Fan belt slipping	Fan Belt	Clogged radiator core	Radiator
	Faulty thermostat	Thermostat		
<b>Engine Misses at Low Speeds</b>	Intermittent flow of fuel	Fuel system and Ignitor	Poor ignition	Spark Plugs, Ignition and Wiring
	Distributor point improperly adjusted or making poor contact.	Ignitor	Spark plug point improperly set.	Spark Plugs
	Air leak at carburetor gasket	Carburetor		
<b>Loss of Power</b>	Lack of fuel	Fuel System and Fuel Pump	Carburetor flooding	Fuel System and Fuel Pump
	Engine overheated	Cooling System	Clutch slipping	Clutch
	Exhaust system obstructed	Exhaust System		

## 4-WHEEL DRIVE

### What Is 4-Wheel Drive?

All four wheels can exert driving force to the ground. A conventional vehicle is driven by the two rear wheels alone. The front wheels are merely pushed along by the rear wheels. A 4-wheel drive vehicle is propelled by all four wheels; the rear wheels are pushing and the front wheels are pulling. This gives four points of power and traction.

### How 4-Wheel Drive Works

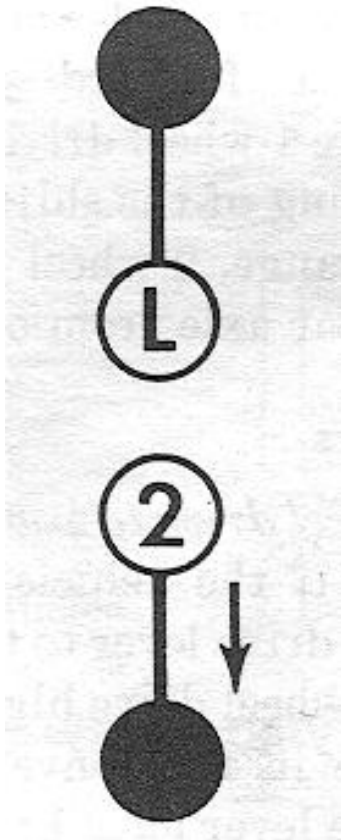
Engine power is transmitted to all four wheels by using “live” front and rear axles. The front axle is driven by a drive shaft and differential in the same manner as the rear axle. Power from the engine is delivered to the transmission and transfer case, which in turn drive both the front and rear wheels. The transfer case operates like a second transmission. It gives you your choice of either 2 or 4-wheel drive and an auxiliary range low gear. With auxiliary range low gear you have eight forward gear combinations.

### Transfer Case

The transfer case front axle drive lever gives you your choice of 2-wheel or 4-wheel drive. In the forward position you are in 2-wheel drive. Move the lever to the rear position for 4-wheel operation. The 4-wheel drive auxiliary range shift lever has two positions: low, and high. The rear position (low) gives you low-range 4-wheel drive for the toughest going. The forward position (high) gives you high-range 4-wheel drive for less difficult situations. Positioning of the shift levers prevents shifting into low range, 2-wheel drive. This feature protects the rear axle from overload.

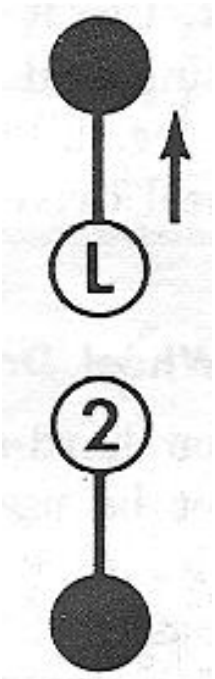
### How To Shift Gears

To shift from 2-wheel drive to 4-wheel drive, let up on the accelerator if the vehicle is moving, and shift the front-axle drive lever to the rear position. This puts you in 4-wheel drive high range and you operate the vehicle in the conventional manner. The auxiliary range lever must be in high position for all 2-wheel drive operations (fig. 22).



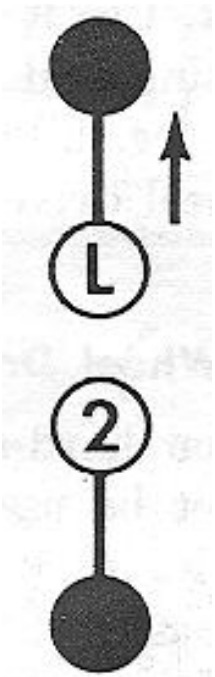
## Figure 22. 2 wheel to 4 wheel drive.

To shift front 4-wheel drive high range to 4-wheel drive low range, bring the vehicle to a virtual standstill. Never attempt to shift into low range with the vehicle moving more than 4 to 5 mph. Depress the clutch and move the auxiliary range lever to the rear (low) position. Release the clutch and proceed in the usual fashion. Your vehicle will move at a slower ground speed with higher engine rpm. because of the lower gear. You can now select any of the standard transmission gears to meet your power requirements (fig. 23).



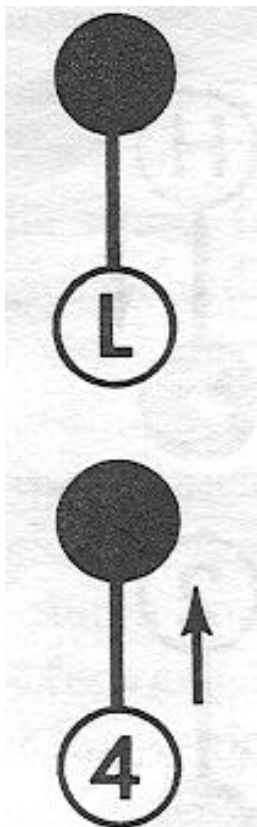
## Figure 23. 4-wheel drive high range to 4-wheel drive low range.

To shift front 4-wheel drive low to 4-wheel drive high, depress the clutch and move the auxiliary-range lever to the forward (high) position. This can be done only at low vehicle speeds. Engage the clutch and proceed in 4-wheel drive high range (fig. 24).



## Figure 24. 4-wheel drive low to 4-wheel drive high.

To shift from 4-wheel drive to 2-wheel drive, let up on the accelerator if the vehicle is moving and move the front-axle-drive lever to the forward position. The auxiliary range lever must be in high (forward) position before the front axle drive can be disengaged (fig. 25).



**Figure 25. 4-wheel drive to 2-wheel drive.**

#### When To Use 4-Wheel Drive

Use 4-wheel drive to provide additional traction and lower gearing for difficult terrain and to provide low speed pulling power. You should only use 4-wheel drive when greater traction and power are required than can be provided by the standard transmission low gear. Use 4-wheel drive off the road when you need it. Use it in snow. Use it to get heavy trailers rolling and for pulling heavy equipment. Use it on ice, hills, mud, sand, and wherever normal 2-wheel drive traction won't do the job.

#### When Not To Use 4-Wheel Drive

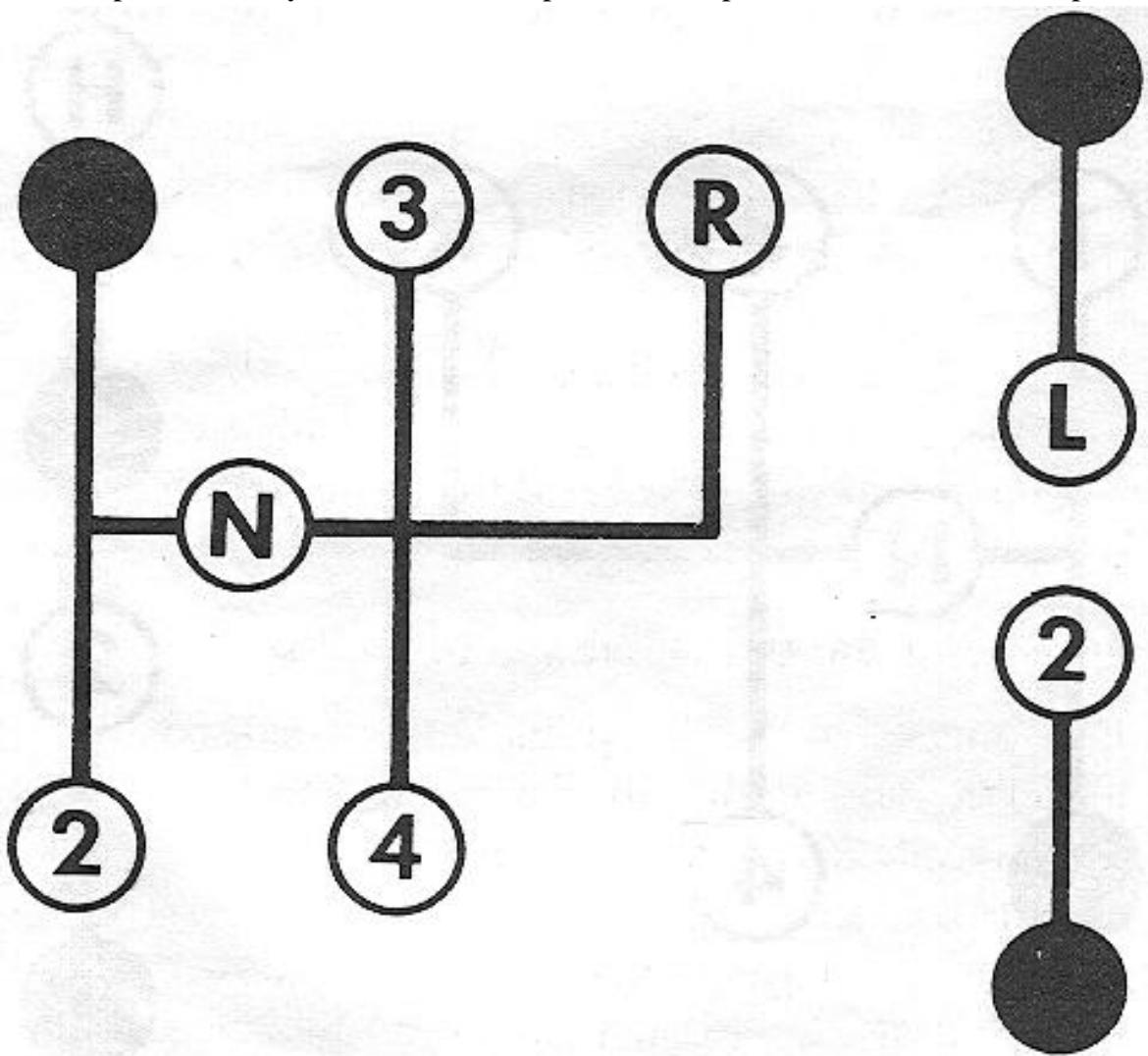
For normal driving on hard-surfaced roads, 4-wheel drive should not be used. The additional tractive effort it provides is not needed under such conditions. Prolonged use of 4-wheel drive on hard-surfaced roads may occasionally cause temporary difficulty in shifting out of 4-wheel drive. This condition is caused by a buildup of torsional stress in the drive train and results from normal variations in tire diameters under different load conditions. To relieve this buildup, simply drive the vehicle in reverse for several feet or drive off the hard surface momentarily to allow the tire to slip.

#### DRIVING TECHNIQUES IN 4-WHEEL DRIVE

##### Through Mud, Snow, and Sand

Shift to 4-wheel drive, high range, first gear when going through mud, snow, and sand without a load. Auxiliary low range is not necessary in such conditions unless a load is being pulled by the vehicle or unless it is desired to proceed more slowly because of changing road conditions. Don't shift into any lower gear than is necessary to maintain headway. Try to keep a constant engine speed. Over-revving the engine will cause the wheels to start spinning and traction will be lost.

The tire pressures may be reduced to 10 psi. front, 15 psi. rear, with maximum speed of 5 mph.



**Figure 26. 4 wheel drive, high range, first gear.**

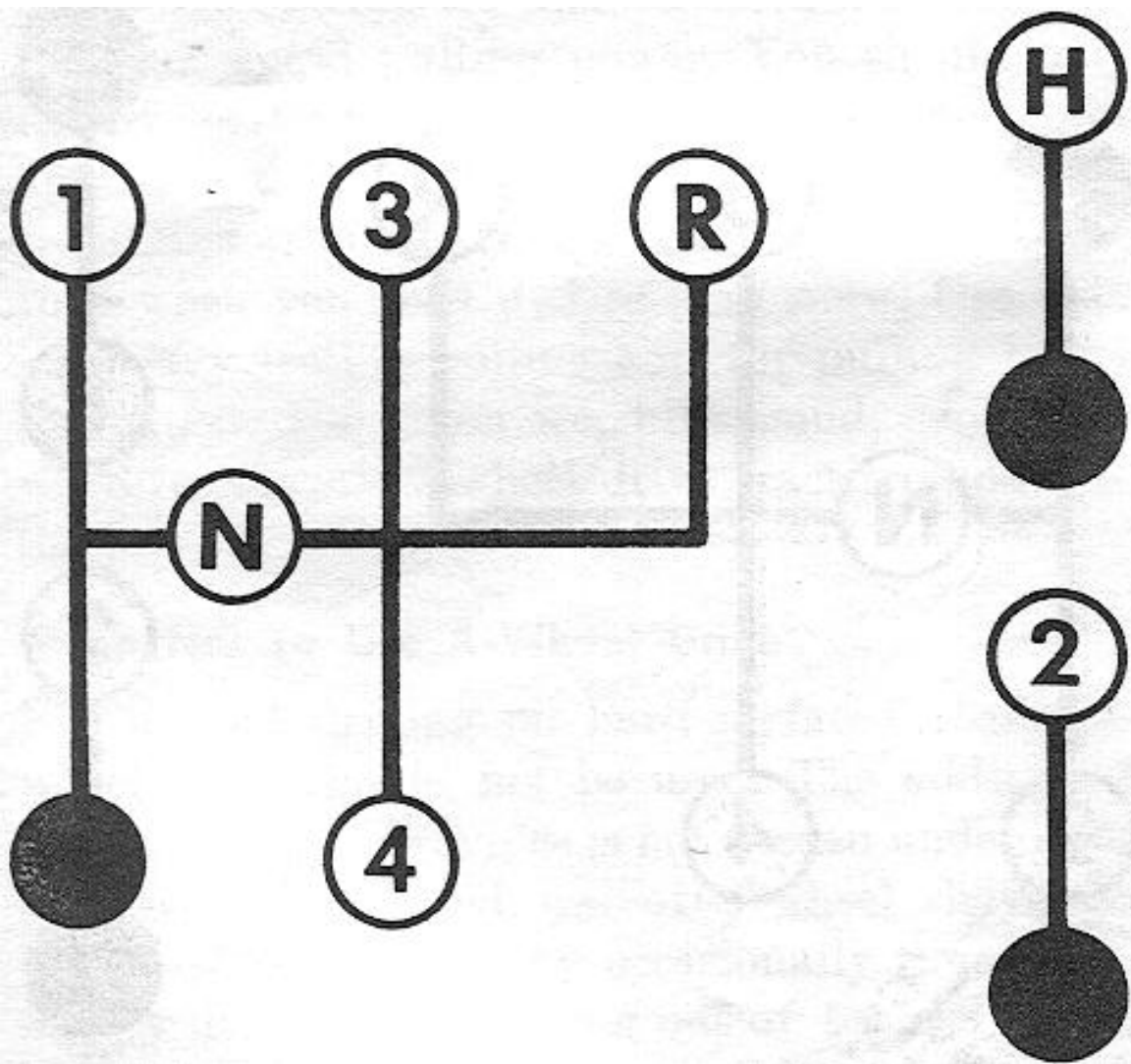
**CAUTION-Through Sand, Mud, or Water.**

The vehicle may on occasion be driven up to the hubs in sand, mud, or water. As soon as possible thereafter, clean the braked drums to prevent any abrasive material that may have entered from wearing the brake linings.

#### Uphill

Shift to 4-wheel drive, low range, second gear. Drop down to first gear only when it is apparent that the steepness of the ascent requires the lower gear to maintain headway.

Apply power smoothly. Don't lose traction by over-revving the engine. In certain conditions, headway can be maintained by using a mild pumping action on the accelerator. This action produces engine speeds slightly above and below the vehicle speed and gives increased "bite"



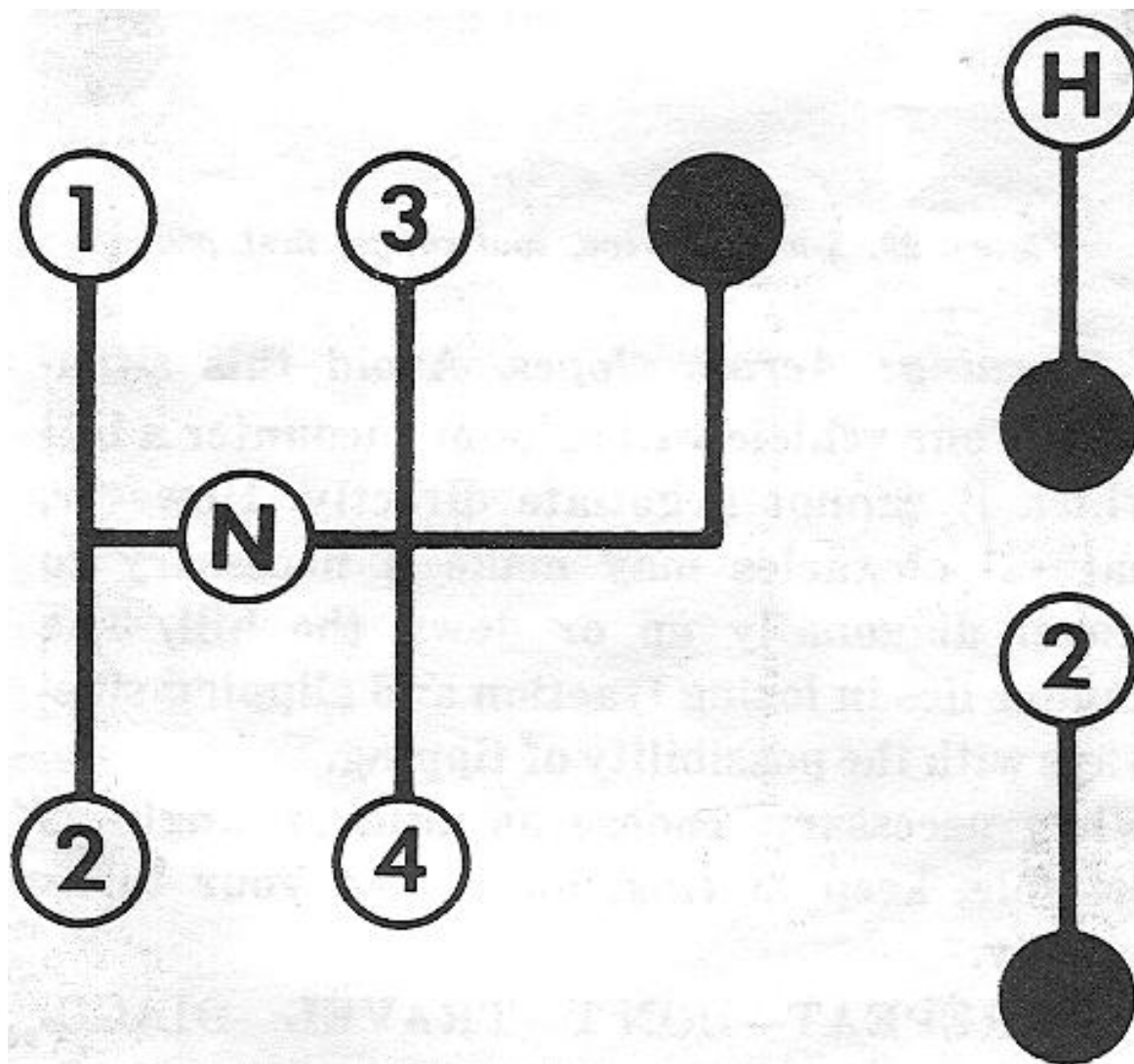
**Figure 27. 4-wheel drive low range, second gear.**

#### Getting Over the Hump

“Creep” the vehicle up the first few feet. If the wheels start to slip with only a few feet of the ascent remaining, headway may be maintained by swinging the front wheels sharply left and right. This will provide a fresh “bite” into the surface and will usually result in enough traction to complete the climb.

#### If You Stall

If the vehicle stalls or loses headway when climbing a steep hill, make a fast shift to reverse or first gear. Don't depress the clutch. Engine compression usually will hold the vehicle on the hill. Don't try to back down with the clutch released and only the brakes holding the vehicle. By shifting into reverse you can start the engine without depressing the clutch. Let the vehicle move backwards with the starter. When the engine starts you can control your downward speed with the accelerator

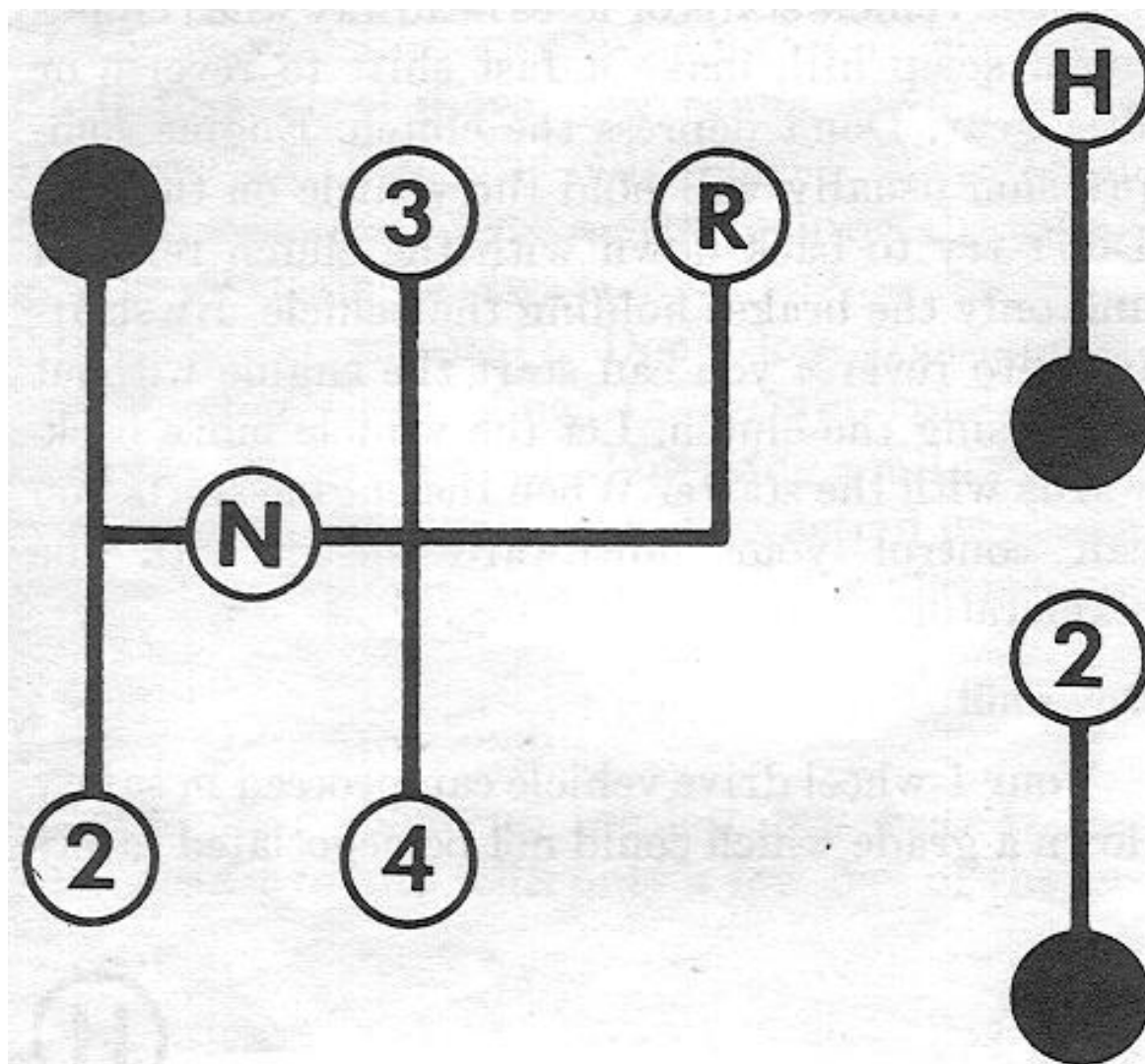


**Figure 28. 4-wheel drive. low range, reverse gear.**

#### Downhill

Your 4-wheel drive vehicle can proceed in safety down a grade which could not be negotiated safely by a conventional 2-wheel drive vehicle. Shift to low range, first gear and let the vehicle go slowly down the hill with all four wheels turning against engine compression. This will permit you to control the vehicle's speed and direction.





**Figure 29. 4-wheel drive, low range, first gear.**

**Warning:** Across slopes. Avoid this situation! Your vehicle will seldom encounter a hill which it cannot negotiate directly. However, natural obstacles may make it necessary to travel diagonally up or down the hill. The danger lies in losing traction and slipping sideways with the possibility of tipping.

When necessary, choose as mild an angle as possible, keep moving, and make your turns quickly.

**WE REPEAT—DON'T TRAVEL DIAGONALLY ACROSS A HILL UNLESS ABSOLUTELY NECESSARY.**

#### Safety and 4 Wheel Drive

Your vehicle has sufficient power and traction to take you safely through conditions which would be hazardous or impossible for conventional vehicles. A powerful, useful tool that will perform many difficult tasks, 4-wheel drive must be used with common sense and caution. Don't take unnecessary risks and don't attempt the impossible.

Knowledge of your vehicle and its abilities are your best insurance. Know your vehicle; use it wisely and you will enjoy safe, economical, and faithful service.

#### LUBRICATION

Regular application of high-grade lubricants when operating your vehicle is of vital importance because of the diversified type of service it performs. The amount of trouble-free service you receive will be in proportion to the care given. The type of service performed determines the frequency of lubrication. The following pages give the location and frequency of lubrication.

Because of the importance of lubrication, detailed recommendations are given in the following paragraphs.

#### ENGINE LUBRICATION

The engine is lubricated through a full pressure lubrication system. A progressing tooth gear pump circulates the oil.

The oil is drawn into the circulating system through a fixed intake screen.

The quantity of oil in the crankcase is measured by a bayonet-type oil level indicator located on the left side of the engine. The oil filler cap is located at the top-left front of the engine. Maintain the engine level between the "Add Oil" and "Full" marks on the indicator. It is not necessary or desirable to add oil when the level is above the "add 1 qt." mark.

Drain and refill every 6,000 miles or semiannually.

#### Fuel Filter

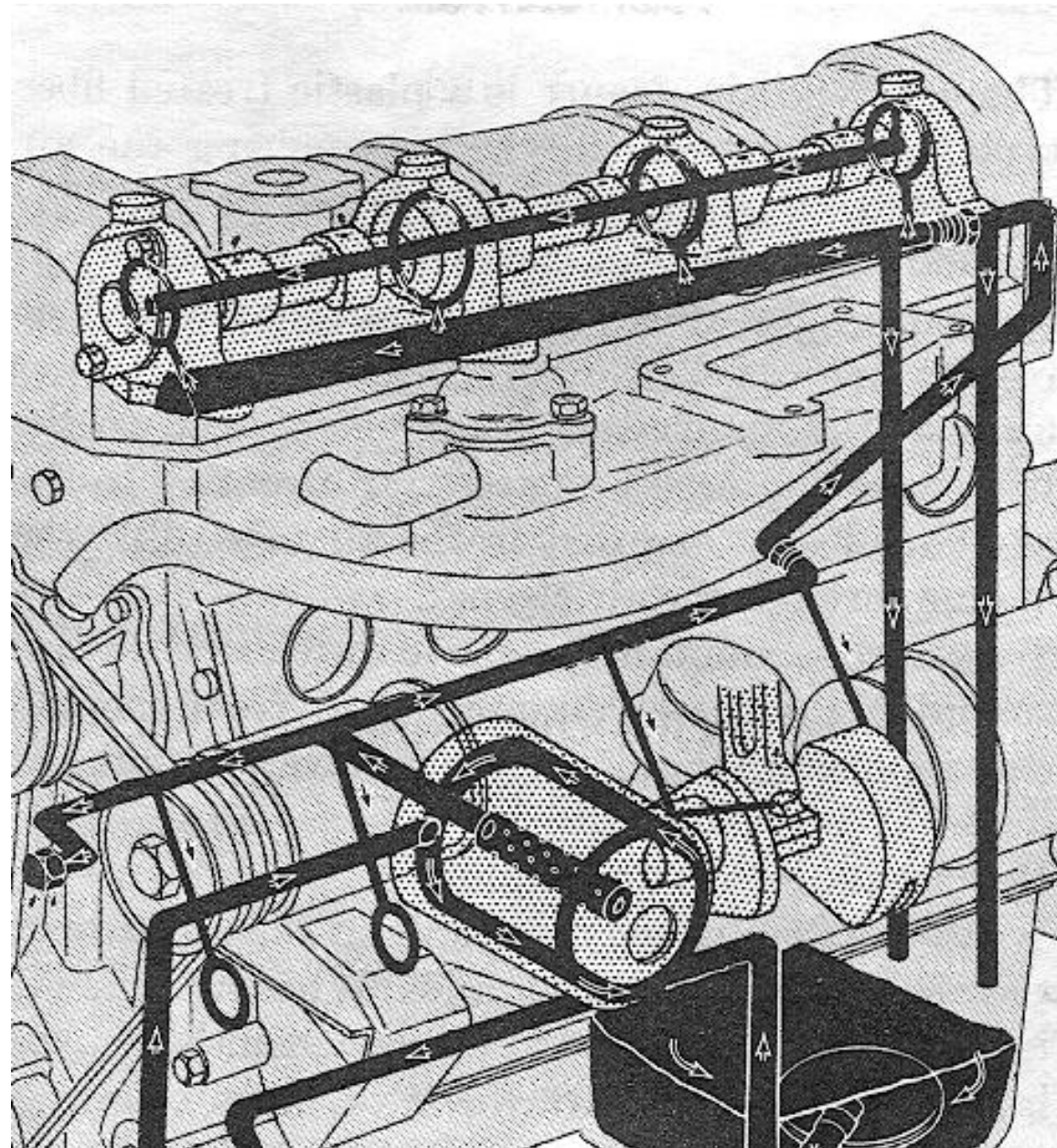
The in-line fuel filter is designed to filter out harmful particles which may cause fuel stoppage in tire fuel line or carburetor. The filter should be replaced each 12,000 miles or annually. The screen in the filler neck should also be cleaned.

### CHASSIS LUBRICATION

All chassis lubricating points have standard grease fittings and should be lubricated every 1,000 miles.

#### Spring Shackles and Pivot Bolts

Rear spring shackles and spring pivot bolts are provided with lubrication fittings.





**Figure 30. Engine lubrication**

## OIL FILTER

Replace the oil filter at the end of the first 500 miles. Thereafter replace the element each 6,000 miles.

Remove the oil filter by turning counterclockwise. Wipe the gasket area of the 'base clean. To install a new filter, lightly coat gasket area with engine oil, screw on the filter unit until gasket contacts the engine, and then turn one-half turn more.

HAND-tighten only; do not use tools.

Start engine. Accelerate engine slightly and check oil pressure gauge to be sure normal oil pressure is indicated. Check the filter area for leaks.

The dry-type air cleaner is a plastic treated fiber type. Dust particles in the air entering the air cleaner are deposited on the pleated paper. This accumulated dust can choke of the air supply to tire carburetor if the element is not cleaned at regular intervals.

Care of the air cleaner is extremely vital to the life of the engine. Pay particular attention to the amount of dust and dirt in the air taken into the engine through the air cleaner.

To service the unit, first remove the element by unsnapping the three retaining clips from the top cover. Then tap the element to remove accumulated dust. Reinstall the unit.

Replace the element as required.

When the dust is not noticeable in the air, service the air cleaner each 1,000 miles. Whenever the air is noticeably dusty (for example, when the vehicle is driven over dry dirt roads or cross country) service the air cleaner daily.

## Ignitor

Every 6,000 miles or semiannually remove ignitor. Remove plug under nameplate and withdraw felt wick. Soak wick in engine oil. Fill plug opening with grease. Insert wick, remove excess grease and install plug. Wipe breaker cam lightly with grease. Apply 1 to 2 drops engine oil to breaker arm pivot pin, operate arm once or twice and remove excess oil. Install ignitor.

## Steering Gear

Check tire lubricant level in tire steering gear housing every 1,000 miles to be sure that the lubricant is at the filler plug opening level. Add lubricant as required.

Replace filler plug.

## Propeller Shafts

The propeller shaft universal joints and slip joints are equipped with lubrication fittings. Lubricate U-joints every 1,000 miles until lubricant is visible coming out each of tire four bearing seals.

## Front Axle Steering Knuckles

The front axle steering knuckles are inclosed in housings which are filled with lubricant. Cheek each 1,000 miles to be sure the housings are filled to plug level. Each 12,000 miles the axle shafts and universal joints should he removed and thoroughly cleaned and the housings filled with fresh lubricant.

## Wheel Bearings

The wheel bearings should be removed, thoroughly cleaned, checked and repacked every 12,000 miles.

## BRAKE MASTER CYLINDER

Check the fluid level in the brake master cylinder every 1,000 miles. Clean the top of the filler cap and housing area. Replenish the brake fluid to a level 1/2" below the top of the fill hole. Use hydraulic brake fluid with non-petroleum base only. Replace and tighten filler cap.

## TRANSMISSION

Check the oil level every 1,000 miles by removing the fill plug located on the right side of the transmission housing. Lubricant should be level with fill hole. Add lubricant as required and replace fill plug. Drain and refill every 12,000 miles. Do not overfill, but allow excess oil to drain out.

## Transfer Case

Check the oil level every 1,000 miles by removing the fill plug located on the left side of the transfer case. Lubricant should be level with the filler plug openings. Add lubricant as required and replace filler plug. Drain and fill each 12,000 miles.

## DIFFERENTIALS

Check the level in the differential housings every 1,000 -miles. Lubricant should be level with the filler plug openings. Add lubricant as required and replace filler plug. Drain and fill each 12,000 miles.

## Body

At each 6,000 miles use a greaseless lubricant sparingly on the door lock striker plates. At each 12,000 miles lubricate the following: door and window weatherstrips, door latch rotors; door, tailgate, and hood hinge pivots.

## PARTS REQUIRING NO LUBRICATION

### Springs

The vehicle springs should not be lubricated. At assembly the leaves are coated with a long-lasting special lubricant designed to last the life of the springs. Spraying with the usual mixture of oil and kerosene has a tendency to wash this lubricant from between the leaves, making it necessary to relubricate often to eliminate squeaking.

### Water Pump and Clutch

The water pump and clutch release bearings are prelubricated for life when manufactured and cannot be relubricated.

### Starting Motor

The starting motor bearings are lubricated at assembly to last between normal rebuild periods.

### Alternator

The alternator bearings, lubricated at assembly, require no further lubrication.

### Shock Absorbers

Hydraulic direct-action shock absorbers are permanently sealed and require no periodic lubrication service. Shock absorber mounting bushings are not to be lubricated.

## MAINTENANCE

### PREVENTIVE MAINTENANCE SERVICES

#### General

The purpose of preventive-maintenance services is to detect first signs of electrical and mechanical failures of assemblies in the vehicle, and to insure that appropriate corrective action is taken before expensive and time consuming repairs or replacements are required. The system of preventive-maintenance services is based on frequent inspections and services accomplished by operators, company battalion, or regimental maintenance personnel under active supervision by all commanders and leaders.

## Responsibility

Operators and crew chiefs are charged with personal responsibility for assigned vehicles. Squad, section and platoon leaders are charged with supervisory responsibility for vehicles pertaining to their commands. Unit and organization commanders are required to insure that vehicles issued or assigned to their commands are properly maintained in a serviceable condition, and that they are properly cared for and used.

## Intervals

The mileage that a vehicle travels is the principal criterion for the frequency of preventive-maintenance service. Operation under adverse conditions, such as extreme temperature, dust, or mud, may require preventive-maintenance services to be performed more frequently. Reduce intervals between preventive-maintenance services when environmental conditions indicate the need. Do not extend intervals between preventive-maintenance services, except when authorized to do so.

## General Procedures for all Services and Inspections

a. The following general procedures apply to operator's preventive-maintenance services and to all inspections, and are just as important as the specific procedures.

b. Inspections to see if items are in good condition, correctly assembled or stored, secure, not excessively worn, not leaking, and adequately lubricated apply to most items in the preventive-maintenance and inspection procedures.

Any or all of these checks that are pertinent to any item (including supporting, attaching, or connecting members) will be performed automatically, as general procedures, in addition to army specific procedures given.

(1) Inspection for good condition is usually visual inspection to determine if the unit is safe or serviceable. Good condition is explained further as meaning: Not bent or twisted, not chafed or burned, not broken or cracked, not bare or frayed, not dented or collapsed, not torn or cut, not deteriorated.

(2) Inspection of a unit to see if it is correctly assembled or stored is usually a visual inspection to see if the unit is in its normal position in the vehicle and if all its parts are present and in their correct relative position.

(3) Excessively worn is understood to mean worn beyond serviceable limits or likely to fail, if not replaced before the next scheduled inspection. Excessive wear of mating parts or linkage connections is usually evidenced by too much play (lash or lost motion). It includes illegibility as applied to markings, data and caution plates, and printed matter.

c. Where the instruction "tighten" appears in the procedures it means tighten with a wrench, even if the item appears to be secure.

d. Such expressions as "adjust if necessary" or "replace if necessary" are not used in the specific procedures. It is understood that whenever inspection reveals the need of adjustments, repairs, or replacements the necessary action will be taken.

e. Any special cleaning instructions required for specific mechanisms or parts are contained in the pertinent section. General instructions are as follows:

(1) Use drycleaning solvent or mineral spirits paint thinner to clean or wash grease or oil from all parts of the vehicle.

(2) A solution of one part grease-cleaning compound to four parts of drycleaning solvent or mineral spirits paint thinner may be used for dissolving grease and oil from engine block, chassis, and other parts. Use cold water to rinse off any solution which remains after cleaning.

(3) After the parts are cleaned, rinse and dry them thoroughly. Apply a light grade of oil to all polished metal surfaces to prevent rusting.

(4) When authorized to install new parts, remove any preservative materials such as rust-preventive compound, protective grease etc.; prepare parts as required (oil seals etc.); and for those parts requiring lubrication, apply the lubricant prescribed in the lubrication order.

f. General precautions in cleaning are as follows:

(1) Drycleaning solvent or mineral spirits thinner is flammable and should not be used near an open flame. Fire extinguishers should be provided when this material is used. Use only in well ventilated places. Battery ground should be disconnected and taped.

(2) This cleaner evaporates quickly and has a drying effect on the skin. If used without gloves, it may cause cracks

in the skin and, in the ease on some individuals, a mild irritation or inflammation.

(3) Avoid getting petroleum products, such as drycleaning solvent or mineral spirits paint thinner, engine fuels, or lubricants on rubber parts as they will deteriorate the rubber.

**Warning:** The use of diesel fuel oil, gasoline or benzene (benzol) for cleaning is prohibited.

g. Nameplates, caution plates, and instruction plates made of steel, rust rapidly. When plates are found in a rusty condition, they should be thoroughly cleaned and heavily coated with an application of clear lacquer.

#### Daily Preventive-Maintenance Service

Each vehicle will be inspected and serviced by its assigned operator and crew each day that it is operated. The service is divided into three parts:

- a. **Before-Operation Service** This service is performed on the vehicle to ascertain whether the vehicle is ready for operation and if conditions affecting the vehicle's readiness have changed since the last after-operation service.
- b. **During-Operation Service.** This service consists of detecting any unsatisfactory performance. While driving, the driver or crew should be alert for any unusual noises or odors, abnormal instrument readings, steering irregularities, or any other indications of malfunction of the vehicle. Every operation should be considered a test and any unusual or unsatisfactory performance noted.
- c. **After-Operation Service.** This is the basic daily service for tactical vehicles. It consists of correcting, so far as possible, any operating deficiencies. Thus the vehicle is prepared to operate at a moment's notice.

#### Specific Procedures for Operator

Follow time procedures listed in table I, preventive maintenance checks and services, in the numerical order given.

#### Periodic Inspection

Proper maintenance demands that a thorough service inspection and lubrication be given each 1,000 miles of operation. Such an inspection consists of a careful road test and examination to locate and analyze any small faults that may have developed. The prompt correction of minor faults thus discovered will go far toward reducing maintenance and delays in operation.

**TABLE I. Preventive Maintenance Check and Service**

Interval and Sequence Number Before operation	Interval and Sequence Number During operation	Interval and Sequence Number After operation	Items to be inspected	Procedure
1			Oil and coolant	Check oil and coolant levels. Check spare containers for contents.
2		23	Water pump, fan belts, and pulleys	Inspect pulleys and fan for alignment and belt for tension. Inspect water pump for leaks.
3		24	Engine compartment	Inspect engine compartment for indications of fuel, engine oil, and water leaks. Look under the vehicle for indications of leaking gear oil or brake fluid.



*4		Batteries and electrical wiring	Remove battery filler caps and check electrolyte level. Inspect, clean, and tighten terminals as required. Inspect battery cables, electrical wiring, conduits, connectors and shielding.
5	26	Tires	Note any apparent loss of air. Remove penetrating objects such as nails or glass. Note unusual wear or missing valve caps. NOTE: If necessary, inflate tires for cross-country or highway driving and for mud, sand, or snow operations as specified.
6		Fire extinguisher	Visually inspect fire extinguisher (on vehicles so equipped) and vehicle publications. Note if fire extinguisher is charged and sealed.
7	29	Tools and equipment	Inspect vehicular tools and equipment for general conditions and proper stowage.
8	28	Vehicle body	General condition of body to include check for or damage that may have occurred since last inspection. tampering Inspect doors, windows, pintle, reflectors and lifting shackles.

9			Cab, doors, glass, top and frame, curtains and fasteners, seats and paint.	Inspect cab or body mountings, including springs. Test operation of doors, windows, hood hinges and fasteners. Observe seat mountings and upholstery. Inspect the litter racks and operation of personnel beater (Ambulance Truck M725). Generally inspect body, glass, panels, tops, fenders, running hoards, tailgate, chains, stakes, bows, paulins, and radiator and lamp guards. Examine condition of paint and legibility of markings and identification and caution plates.
10	18		Lights, horn, blowers, and heater.	If tactical situation permits, operate horn and windshield wipers. Inspect rear view mirrors. Check operation of exterior lights and light switches. Note whether the head- lights appear to be properly aimed. Note condition of all lights and reflectors. Test the spotlight switch and handle for proper operation (Ambulance Truck M725). Test operation of surgical light, dome light, blowers and heater (Ambulance Truck M725).
11	19	22	Service brake pedal and hand brake lever	Check service brake for proper pedal travel and hand brake for proper adjustment. (Correct service brake free travel is 1/2--inch). See references for hand-brake adjustments.

12			Starter and starter switch	<p>With the ignition off, note if the starter switch, requires more than normal pressure, and if the starter engages smoothly without unusual noise and turns the engine with adequate cranking speed. With ignition switch on, start engine.</p> <p>Caution: If there is excessively low or no indications of engine oil pressure after a lime lapse (10 seconds max.) stop engine and determine cause.</p>
13	20		Engine: idle, acceleration, power, noise	<p>In warming up engine, observe if the choke control operates satisfactorily. Note if idling speed is correct. Listen for any unusual noises at idle and higher speeds. When operating the vehicle, note if it has normal power and acceleration in each speed range. Listen for any unusual noises when the engine is under load.</p> <p>Note. Investigate and correct any operating deficiencies as they occur, if beyond the scope of the driver, report them to individuals in authority immediately.</p>
14		21	Exhaust pipe and muffler	<p>During engine warm up, listen for excessive or unusual noises and look for exhaust leaks.</p>

	27		<p>Temperature of brake drums, hubs, axles, transmission, transfer, differential. Immediately after the road test, feel these units cautiously. Warning: Full floating hypoid axles operate quite hot. If lubricant levels are correct and no unusual noises were observed during road test, assume axles are functioning properly. Do not touch hypoid axle with bare hand after vehicle has been operated a considerable distance, serious burns may result. An overheated wheel hub and brake drum indicates an improperly adjusted, defective or dry wheel bearing or a dragging brake. An abnormally cool condition indicates an inoperative brake. An overheated gear case indicates lack of lubrication, adjustment, or defective parts.</p>
	25	Radiator and cap	<p>Inspect radiator core for clogging with foreign matter or if fins are bent. Check gasket in the pressure cap. Observe coolant level and examine for contamination. In cold weather, test coolant with hydrometer to see if it contains sufficient antifreeze. Warning: If it is necessary to add coolant to the radiator while engine is overheated, idle engine and add coolant slowly. Use extreme care in removing pressure cap</p>

			as serious burns may result.
	30	Winch cable	Clean and oil winch cable in accordance with the current lubrication order.
15		Lubricate	Lubricate daily items specified on lubrication order.
16	31	Clean	Wash vehicle, clean inside of cab, glass, and mirror. Clean engine and engine compartment as required.
17	32	Fuel	Fill fuel tank as necessary.

**\*Operations** on batteries to be performed weekly.

## FUEL SYSTEM

The fuel system consists of the fuel tank, fuel lines, fuel filter, fuel pump, carburetor, and air cleaner. Care and maintenance of the air cleaner are covered in the lubrication section.

The most important maintenance checks are to keep the system clean and free of water, and to periodically inspect for leaks.

Should the engine fail to start when cranked by the starting motor, the trouble may be in the fuel system. To locate the trouble, first check the fuel gauge to be sure the fuel tank is not empty. If the fuel tank is not empty, check further to see if fuel is reaching the carburetor. Disconnect the fuel line at the carburetor. Place a container under the open line and briefly crank the engine with the starting motor. If fuel spurts from the end of the line, the fuel lines are clean and the fuel pump is operating properly.

If no fuel leaves the disconnected fuel line, the trouble is in the fuel line, fuel filter, or fuel pump. Clean the fuel pump filtering screen and sediment chamber. (See Fuel Pump.) Check fuel lines for kinks or sharp bends. Check fuel filter in line between pump and carburetor.

If fuel is reaching the carburetor the cylinders or manifold may be flooded with fuel. Flooding may usually be detected by a strong odor of fuel at the tail pipe or engine. Flooding is often, the result of excessive use of the choke control while attempting to start the engine, or repeated operation of the accelerator pedal before attempting to start the engine. To eliminate flooding push the choke control all the way in, hold the accelerator pedal all the way down, and crank the engine with the starting motor.

Should a hot engine stop, the trouble may be caused by vapor lock. 'Vapor lock is the vaporization of the fuel before it enters the carburetor Allow the engine to cool, then restart it.

Should the vehicle be stored for an extended period, the fuel system should first be completely drained and the engine started and allowed to run until the carburetor is emptied. This will avoid oxidation of the fuel, resulting in the formation of gum in the units of the system.

Gum formation is similar to hard varnish and can cause trouble. It may cause the fuel pump valves or the carburetor float valve to become stuck, or possibly block the filter screen. Gum formation can be dissolved by acetone or a good commercial fuel system solvent.

In extreme cases, it will be necessary to disassemble and clean the fuel system however; one pint of acetone placed in the fuel tank with about one gallon of gasoline will usually dissolve any deposits as it passes through the system with the fuel.

## Carburetor

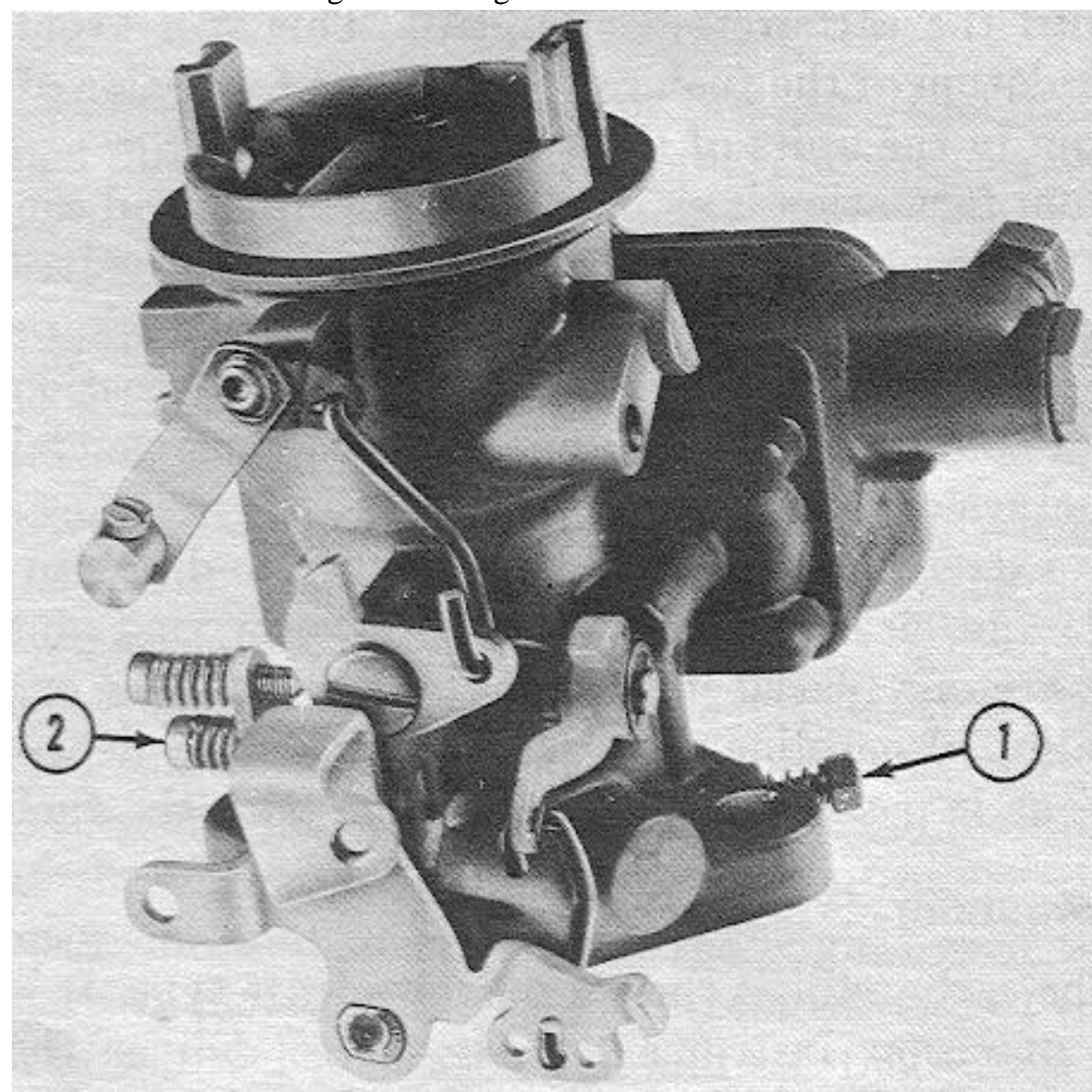
The carburetor is the single downdraft type. It is a precision instrument designed to deliver the proper fuel and air mixtures at all engine speeds. The chief cause of faulty carburetor operation is the accumulation of dirt and water. Usually poor engine performance is not caused by the carburetors. Do not disturb the carburetor until it is proven that the trouble is not elsewhere.

Lack of gasoline in the carburetor may be caused by the following conditions:

- Gasoline tank empty.
- Leaking tube or connections.
- Bent or kinked tubing.
- Sediment chamber cover on fuel pump loose.
- Clogged (or frozen) fuel lines.
- Dirty fuel filter.
- Carburetor inlet- valve stuck.

Should the carburetor flood, check to make certain that the needle valve is seating properly and that the float is not stuck.

An air leak in the carburetor gasket can cause the engine to misfire at low speeds. Replace faulty gaskets. Make sure carburetor attaching bolts are tight.



**Figure 31. Carburetor**

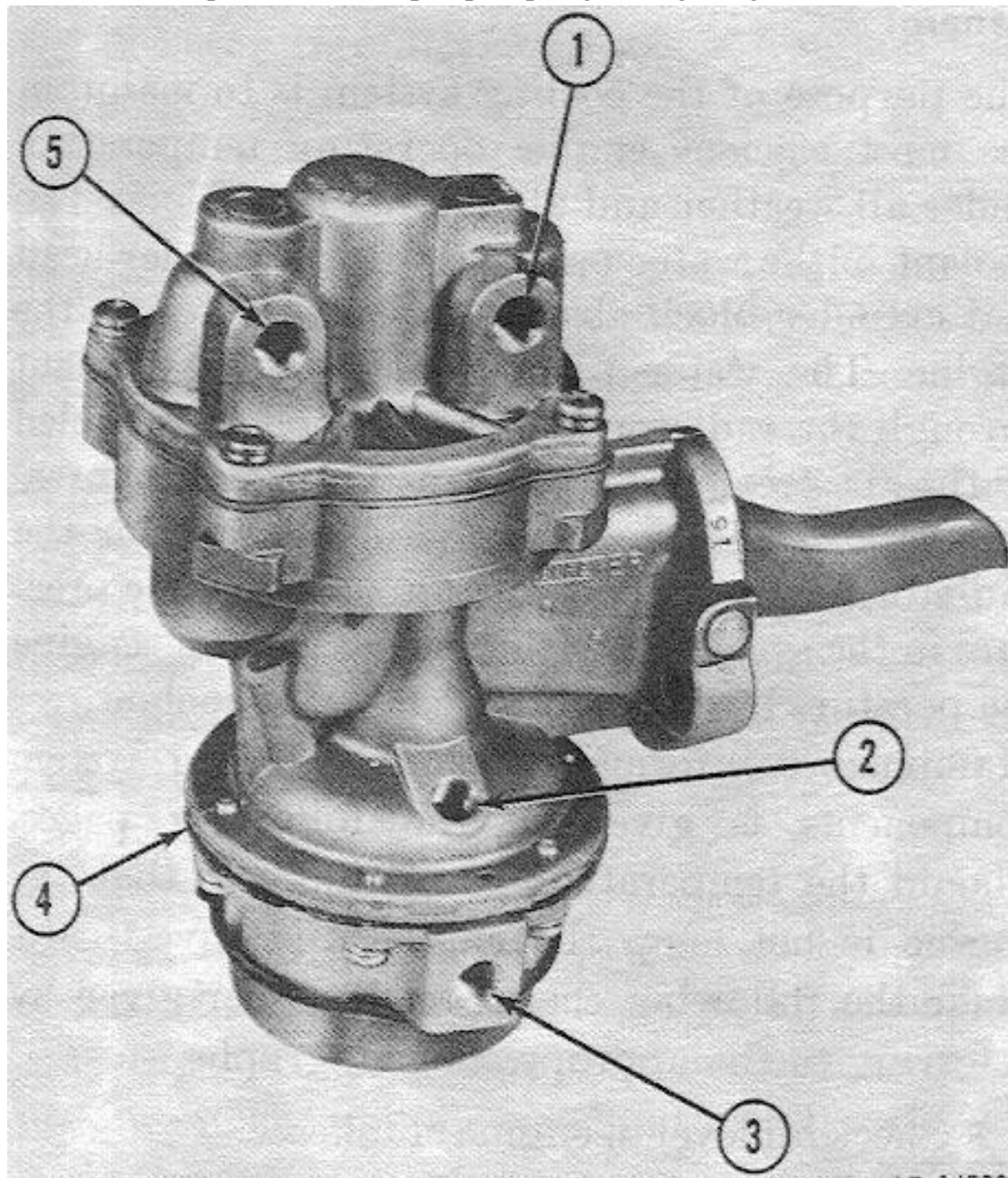
1 Idle Mixture Screw



## 2 Idle Speed Screw

## Fuel Pump

The fuel pump is a double action diaphragm-type operated from an eccentric on the camshaft. Should trouble develop, check all fuel hose connections for leaks with the engine running. Tighten any loose connections. Inspect for leaks at pump diaphragm flange. Tighten cover screws alternately and securely.



**Figure 32. Fuel pump.**

- 1 Vacuum Outlet
- 2 Vent Plug Connection
- 3 Fuel Outlet
- 4 Fuel Inlet
- 5 Vacuum Inlet

## Fuel Tank

Care should be used when filling the tank, that no foreign matter or water enters the tank. Once each season, at a

time when the fuel supply is low in the tank, remove the drain plug in the bottom to drain out sediment and water which will have accumulated.

### Fuel Screen

The fuel filler neck has a cone-shaped mesh fuel screen. This screen resists the passage of foreign matter into the fuel tank. Once each spring and fall remove the filter from the filler neck and clean the sediment from the filter.

## EXHAUST SYSTEM

The exhaust system consists of the exhaust pipe, muffler, tail pipe, and support straps. Periodically check the system for dents, rust, and loose or broken support straps. A severe dent in any part of the system can cause loss of engine power. Complete stoppage of the system, caused by a severe dent, or by a plugged tail pipe, can make the engine inoperative.

## COOLING SYSTEM

### General

The purpose of the cooling system is to maintain the most efficient engine operating temperature under all weather and all driving conditions. The coolant in the water passages of the cylinder head and cylinder block absorbs heat generated in the engine. The water pump circulates the coolant through the radiator, where the coolant is cooled by the air stream from the fan. The radiator pressure cap, in addition to providing a seal for the radiator filler neck opening, also controls the pressure in the system. The thermostat controls engine temperature by controlling the flow of coolant.

Maintenance information on the cooling system components is given in the following pages. Should the temperature gauge indicate that the engine is hot, stop the engine and investigate. Make the following checks in the order given by referring to the appropriate paragraphs.

Check oil level in engine crankcase.

Check coolant level.

Check for slipping fan belt.

Check for a clogged radiator.

Check for a faulty thermostat.

Check ignition timing.

### Radiator

Radiator maintenance consists of keeping the exterior of the radiator core clean, the interior free from rust and scale, and the radiator free from leaks. The exterior of the radiator core should be cleaned and the radiator inspected for leaks each 1,000 miles of normal service. If the vehicle is subjected to considerable off-the-road operation, this should be performed more frequently.

Cleaning should be performed by blowing out with air stream or water stream directed from the rear of the radiator. Visual inspection is not sufficient as the accumulation of small foreign particles on the core surfaces can restrict cooling without completely closing the core openings. Examine the radiator carefully for leaks before and after cleaning.

### Radiator Hoses

Examine radiator hoses spring and fall for possible need of replacement or tightening. Hoses that are collapsed, cracked, or indicate a soft condition on the inside should be replaced.

When installing a hose, clean pipe connections and apply a thin layer of nonhardening sealing compound. Hose clamps should be properly located over the connections to provide secure fastening. (The pressurized cooling system can blow off improperly installed hoses.)

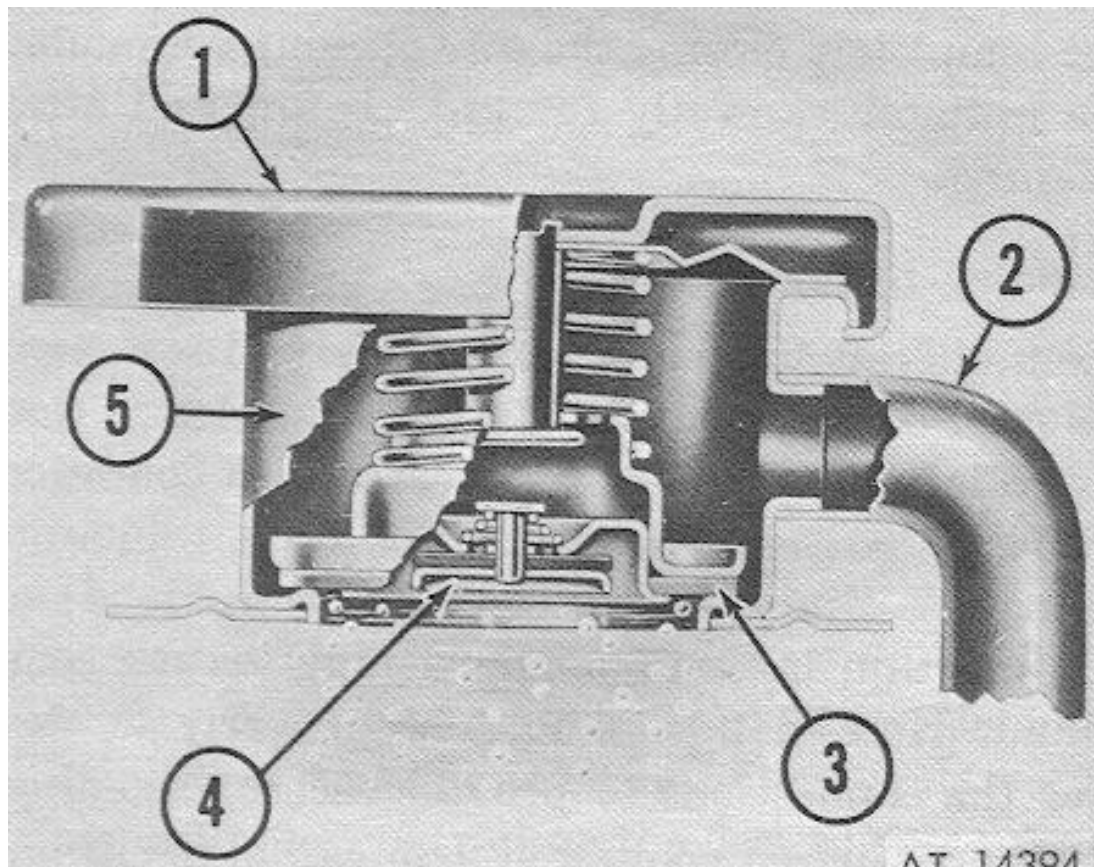
## Radiator Pressure Cap

The pressure cap helps to prevent coolant evaporation. It should never be replaced by a nonpressure type. The pressure cap, which maintains pressure in the cooling system (10 lbs.), makes the engine more efficient by permitting a slightly higher operating temperature. Vacuum in the radiator is relieved by a valve in the cap which operates at 1/2 to 1 psi. vacuum.

To remove the radiator pressure cap when the engine coolant -temperature is high or boiling, place a cloth over the cap and turn counterclockwise about 1/4 turn until the first (pressure release) stop is reached. Keep the cap in this position until all pressure is released. Then, push cap down and turn still further until cap can be removed.

To install, place the cap in position and turn it clockwise as far as it will go.

If necessary to replace the pressure cap, the replacement cap should have the same pressure ratings as the original cap. Using a cap with a higher rating may cause cooling system leakage, or a cap with a lower rating can result in excessive overflow loss of coolant.



**Figure 33. Radiator pressure cap.**

- 1 Pressure cap
- 2 Overflow tube
- 3 Pressure seal
- 4 Vacuum release valve
- 5 Radiator neck

## Draining and Filling the Cooling System

Remove the pressure cap and open both drains to completely drain the cooling system. A drain cock is located at the bottom of the radiator, and a drain plug on the left side of the cylinder block behind the starter. To fill the cooling system, remove the pressure cap and fill the tank from the top. Replace the cap and run the engine approximately one minute. Remove the cap and recheck the coolant level. Add coolant if necessary to bring the level to the top of the tank. If the cooling system is filled when the engine is cold, recheck the coolant level after the engine has reached operating temperature. This will insure that the thermostat has opened, allowing complete

cooling system circulation.

### Thermostat

The cooling system is designed to provide adequate cooling under most adverse conditions, however it is necessary to employ some device to provide quick warming and to prevent overcooling during normal operation. Automatic control of engine operating temperature is provided by a coolant flow control thermostat installed in the thermostat housing on top of the front end of the intake manifold. The thermostat is a heat-operated valve. It should always be in working order and the vehicle should never be driven without one installed, as there would then be no control of engine temperature. The temperature at which the thermostat opens is preset and cannot be altered. If the thermostat is faulty, it must be replaced. Should sudden heating of the cooling system occur, the thermostat should be checked first.

### Water Pump

The water pump is mounted on the timing chain cover and is driven by V-belts. The water pump bearing acts as the cooling fan bearing, as the cooling fan is mounted on the water pump drive pulley and shaft. The impeller of the water pump fits into a recess in the timing chain cover. It discharges coolant into the cylinder block through a port in the timing chain cover.

The water pump is serviced only as a unit, if defective; the entire unit should be replaced.

### Fan Belts

The fan and alternator are driven by three matched V-belts. The drive of a V-belt is on the sides of the V. Fan belts too tight will cause rapid wear of the alternator and water- pump bearings, If loose, they may slip, preventing the water pump or the alternator from operating properly.

Inspect the fan belts for serviceability and proper tension.

If necessary to replace one belt, then all three belts must be replaced, as they are a matched set.

To replace the fan belts, loosen the clamp bolt on the alternator brace and swing the alternator toward the engine until sufficient clearance is obtained to install the new belts. Position the new belts over the fan pulley, over the crankshaft pulley, then over the alternator pulley. Pull the alternator away from the engine until the belt tension is firm. Tighten the clamp bolt and check the belt tension.

### Cold Weather Precautions

In regions where winter temperatures can be expected to drop below 32 degrees F. precautions must be taken to prevent freezing of the coolant. Without the protection of sufficient antifreeze solution added, water in the cooling system will freeze and expand, possibly bursting the radiator and the cylinder block.

It is important that the cooling system be made leakproof before installing any antifreeze solution. Be sure that hose connections are tight and that the hoses are in good condition. Should there be doubt regarding the condition of either, replace them.

Immediately after adding antifreeze, run the engine a few moments to thoroughly mix the solution.

## ELECTRICAL SYSTEM

### General

The major electrical systems are the starting system, ignition system, charging system, lighting system and electrical instruments.

The starting system cranks the engine. The starting switch activates the starting motor. The starting motor drives the engine flywheel.

The ignition system furnishes the spark to the combustion chamber to ignite the fuel mixture. The ignition switch opens and closes the circuit. The igniter, composed of the ignition coil and distributor, combines the functions of these two components into a single unit. The ignition coil produces high secondary voltage while the distributor makes and breaks the primary circuit and distributes the high tension current in the secondary circuit.

Spark plugs provide the spark to the combustion chamber. The high tension wiring is an important part of this system.

The charging system consists of the alternator, ignition switch, battery generator indicator, and two 12-volt batteries hooked up in series to produce a 24-volt system. The batteries furnish current for starting the engine or operating at idle speed. The alternator furnishes current (both to operate the other systems and to recharge the batteries) at higher speeds.

The lighting system consists of switches, lamp bulbs and their sockets and wiring. The lighting circuit is protected by an overload circuit breaker.

## Batteries

**Caution: DUE TO THE CHARACTERISTICS OF AN ALTERNATOR, CHARGING CIRCUIT SERVICING CAN BE DANGEROUS TO THE VEHICLE'S ELECTRICAL SYSTEM, THE ALTERNATOR ITSELF, AND EVEN THE INDIVIDUAL, IF LEFT IN THE HANDS OF THE INEXPERIENCED WORKER.**

**PARTICULARLY IMPORTANT IS THE POLARITY OF THE ALTERNATOR AND BATTERY: THAT THESE POLARITIES MATCH-UP, AND THAT ANY BOOSTER BATTERY OR BATTERY CHARGER ATTACHED TO THE VEHICLE'S BATTERY BE ATTACHED POSITIVE TO POSITIVE AND NEGATIVE TO NEGATIVE; OTHERWISE, THERE IS A DANGER OF BURNING OUT THE DIODES IN THE ALTERNATOR OR THE WIRING.**

The batteries, located between the driver's and passenger's seats are secured in place by a two-piece holddown frame and four mounting bolts.

Keep the battery terminals and cables clean and tight. A light coat of chassis lubricant applied at the terminals will reduce corrosion. Occasional cleansing around the terminals with a soda solution or ammonia will prevent accumulation of corrosive deposits. Do not allow grease, soda or ammonia to get into the battery cells. Keep the cell caps in place and sealed during the cleaning.

Check the batteries every 1,000 miles with a hydrometer and at the same time check the electrolyte level in each cell; add distilled water to maintain the solution level  $\frac{3}{8}$ " above the plates. Avoid overfilling and do not fail to replace the filler caps and tighten securely. If the plates are exposed for any length of time, they can be seriously damaged; therefore, it is important to add enough water to keep the plates covered.

A hydrometer reading of 1.275 indicates that the battery is fully charged. Should the reading fall below 1.235 it will be necessary to recharge the battery or else use the lights and batteries sparingly until the batteries have had the opportunity to build up again.

Should the engine not turn over when the ignition is turned on and the starter is depressed, the batteries may be discharged. If so, lights will be dim and the horn will have a weak tone or none at all.

The engine also will not turn over if the battery cables are broken or defective or if the cable connections at the starting motor solenoid or at ground are loose. Defective cables must be replaced; loose connections cleaned and tightened.

**Warning: Do not allow flames or sparks to be brought near the vent openings of the batteries since hydrogen gas, produced in the course of the batteries normal operation in the vehicle, may be present in the batteries and might explode. The liquid in the batteries is a solution of sulphuric acid which, if accidentally spilled on the skin or spattered in the eyes should, as a first-aid measure, be flushed away promptly with quantities of clear water only. Seek medical aid if discomfort continues. If acid is spilled on the clothes, wet it thoroughly with a weak solution of ammonia, or with sodium bicarbonate or baking soda dissolved in water.**

The rubber engine mountings partially insulate the engine from the frame. To assure a positive electrical connection, a ground strap is provided from rear of transmission area to left frame side rail.

The two attaching screws must be kept tight and the connections clean. A loose or poor connection may result in hard engine starting, low alternator charging rate, or sluggish operation of the starting motor.

## Alternator

The alternator produces a charging current Whenever the engine is operating, which should be sufficient to continuously charge the battery under normal electrical loads. The alternator has sealed bearings that require no lubrication, and will seldom need service except for an occasional check of the charging circuit.

**Caution:** DUE TO THE CHARACTERISTICS OF AN ALTERNATOR, CHARGING CIRCUIT SERVICING CAN BE DANGEROUS TO THE VEHICLE'S ELECTRICAL SYSTEM, THE ALTERNATOR ITSELF, AND EVEN THE INDIVIDUAL, IF LEFT IN THE HANDS OF THE INEXPERIENCED WORKER. PARTICULARLY IMPORTANT IS THE POLARITY OF THE ALTERNATOR AND BATTERY: THAT THESE POLARITIES MATCH-UP, AND THAT ANY BOOSTER BATTERY OR BATTERY CHARGER ATTACHED TO THE VEHICLE'S BATTERY BE ATTACHED POSITIVE TO POSITIVE AND NEGATIVE TO NEGATIVE; OTHERWISE, THERE IS A DANGER OF BURNING OUT THE DIODES IN THE ALTERNATOR OR THE WIRING.

### Ignition Wiring

The ignition wiring includes the spark plug cables and wires between the distributor and ignition coil. The connections should be kept clean and tight. As the spark plug cables are completely waterproof and the distributor to coil wires are encased in the waterproof ignitor along with the distributor and coil, no maintenance should be required.

### Ignitor

The ignitor is composed of the ignition coil and distributor assembly contained in a common housing to ensure the waterproof requirements of the electrical system. The distributor portion of the ignitor delivers the spark to the proper cylinder at the right time. It is operated by a coupling on the oil pump shaft. A mechanical breaker, built in the distributor, opens and closes the primary circuit. The spark advance is controlled by built-in centrifugal weights. The distributor cap should be kept clean for efficient operation. It should be inspected periodically for cracks, carbon runners, evidence of arcing and badly corroded high tension terminals. If any of these conditions exist, the cap should be replaced.

### Spark Plugs

Spark plugs in any vehicle are expendable. They require occasional examination, adjustment, cleaning, and eventual replacement. Old spark plugs reduce engine efficiency and economy. Replace them when inspection indicates the old plugs cannot be reconditioned. It is recommended that spark plugs be replaced every 12,000 miles.

### Starting Motor

The starting motor is equipped with sealed-type bearings and requires no lubrication. The starting circuit should be checked periodically. The starting circuit includes the starter switch and wires to the battery, and ignition switch. All connections should be clean and tight. Insulation on the wires should not be worn or damaged. If the starting motor will not turn the engine, although the light and horn operate properly, check the starting switch. If the wiring is clean and tightly installed, the trouble is probably in the starter itself.

## LIGHTING SYSTEM

### General

The lighting circuit is protected by an overload circuit breaker built into the switch and no replaceable fuse is required. It clicks on and off in the event of a short circuit in the wiring. The upper and lower headlight beams are controlled by a foot switch located on the toe board at the left of the clutch pedal.

### Blackout Lights

The blackout lighting system is controlled by the light switch and furnishes diffused low-intensity light. The system is composed of the following components.

- Blackout headlight located on the left front fender has sealed beam-type lamp unit.
- Marker lights mounted adjacent to the service drive headlights. Three lamps in light housing are used for blackout marker, service parking, and signal lights.
- Tail and stoplights mounted at rear of vehicle. Service of the blackout lights is limited to replacement of burned out lamp units. Refer to Lamp Bulb Trade Numbers below, for the proper replacement lamps.



## Special Lamps

Maintenance of the surgical lamp, dome lamp and exterior mounted spot lamp is limited to the replacement of burned-out lamp bulbs.

## Lighting System Checks

If headlamps flicker on and off intermittently, the electrical system is overloaded.

If, when signaling a turn, the indicator light does not operate, a burned-out indicator bulb or malfunctioning flasher is indicated.

All other lamps may be visually checked by operating the light switch with the ignition switch turned on.

## Lamp Bulb Trade Number

The following bulb trade numbers should be used for replacements.

Head Lamps ---4801

Parking Lights ---1683

Park and Directional Signal ---1683, 1281

Stop, Tail and Directional Signal ---1683, 1281

Indicator Lamps:

Head Lamp Beam ---1829

Directional Signal ---313

Instrument Lamp ---1829

Dome Lamp ---1691, 623

Fuse Data:

Heater 9 amp.

## DRIVING COMPONENTS

The driving components consist of the engine, clutch, transmission, transfer case, propeller shafts, front and rear axles, brakes, and wheels. Maintenance information is given on the following pages.

### Clutch

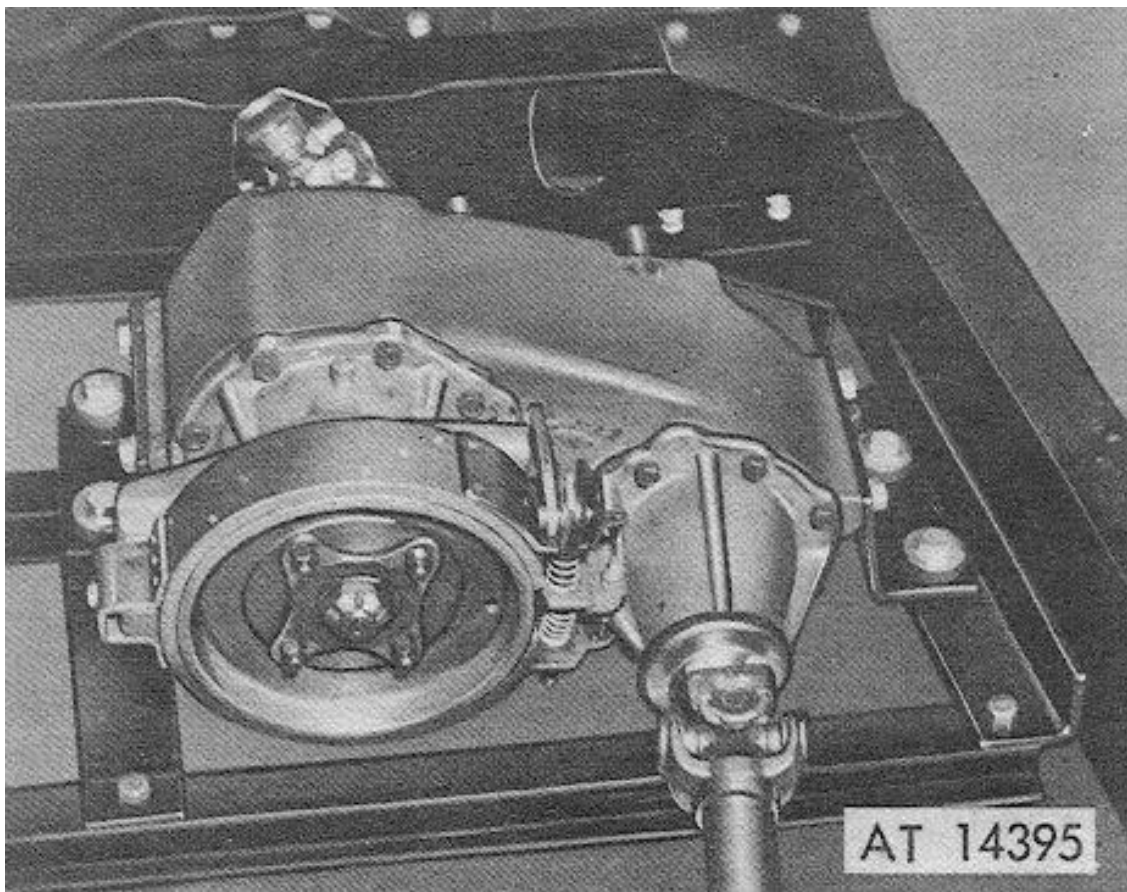
As the clutch facings wear, the free travel of the clutch pedal (the distance the pedal moves down before any resistance is felt) decreases. The standard free travel is 1". It is important to maintain this clearance to prevent clutch release bearing wear and clutch slippage. No adjustment of the clutch proper is required to compensate for wear of the facings.

### Transmission

No adjustment is necessary on the transmission as there is no shifting linkage used.

### Transfer Case

Transfer case shift rods are adjustable for overall length.

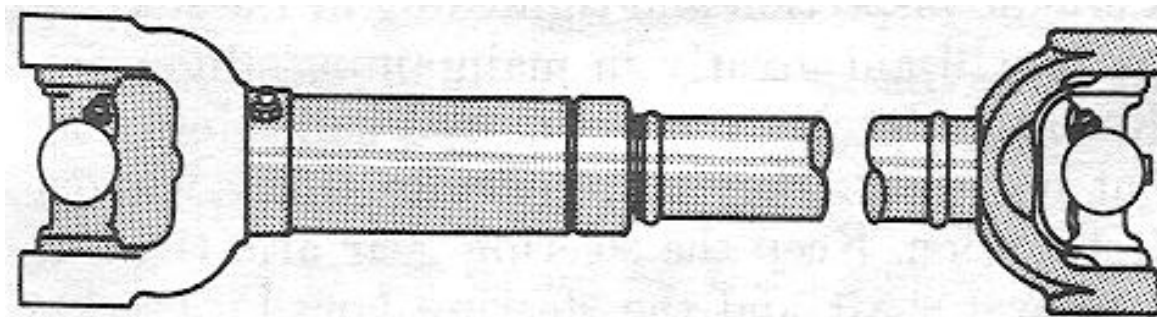


**Figure 34. Transfer case.**

#### Propeller Shafts

Examine all propeller shafts periodically for foreign matter which may become wrapped around them. Check for dents or a bent shaft and make sure that the universal joint attaching bolts are tight at all times.

The journal trunnion and needle bearings are the only parts subject to wear, and when it becomes necessary to replace these parts, the propeller shafts must be removed from the vehicle to make replacement.



**Figure 35. Propeller shaft.**

#### Front Axle

Each 12,000 miles remove the front axle universal joint and shaft assemblies to thoroughly wash out the steering knuckle housings. After cleaning, the universal joint housings must be refilled with good quality lubricant as specified in the Lubrication section.

The lubricant is retained in the steering knuckle housings by felt oil seals mounted in twin retainers attached to the inner face of the housing. These seals also prevent dirt and grit entering the housings. Inspect the seals regularly and replace them promptly if damaged.

Should the vehicle be stored for any length of time, coat the spherical surfaces of the steering knuckle housings

with light grease to prevent rusting.

Should water enter the steering knuckle housing, it may be drained by removing the front inboard lower king pin bearing bolt.

### Rear Axle

The rear axle requires little attention other than proper lubrication as specified in the Lubrication section.

## STEERING SYSTEM

The crossover steering system requires little attention other than proper lubrication and maintaining correct alignment.

Looseness through the steering system will affect alignment. It is impossible to satisfactorily align the front wheels without first adjusting the various connections, including the front wheel bearings. Correct toe-in of the front wheels is 3/32" to 5/32" which must be accurately measured for satisfactory front tire wear and steering. Toe in is adjusted by lengthening or shortening the steering tie rod. Periodic inspection and tightening of the steering parts will aid greatly in maintaining alignment. Keep the steering connecting rod ball joints snug but not tight; they must operate freely without lost motion. Keep the steering gear arm tight on the level shaft and the steering housing bracket tight on the frame.

Do not tighten the steering gear to dampen out steering gear trouble.

## BRAKES

The brakes are of the servo type, with star wheel adjustment.

In operation, pressure is applied to the hydraulic fluid in the master cylinder through the foot pedal, forcing the fluid through the lines, and into the wheel cylinders. The pressure forces the pistons outward in the wheel cylinders, expanding the brakeshoes against the drums. As the pedal is further depressed, higher pressure is built up within the hydraulic system, causing the brake shoes to exert greater pressure against the drum.

As the brake pedal is released, the brake shoe return springs pull the shoes together forcing the fluid out of the cylinders and back into the lines toward the master cylinder.

The hydraulic brake system must be bled whenever a fluid line is disconnected or air enters the system because of low fluid level in the master cylinder reservoir. Air in the system will be indicated by a "spongy" pedal. Air trapped in the system is compressible and does not permit pressure, applied to the brake pedal, to be transmitted solidly to the brake shoes.

### Brake Maintenance

No brake can be expected to work well when grease or oil is allowed to leak into the drum from the rear axle. Little braking friction can be obtained between the brakes and drums when the surface is covered with grease and oil. For this reason, take care not to overlubricate wheel bearings, forcing lubricant past seals. Also, check condition of seals if leak is suspected or whenever brake drums are pulled.

Whenever wheels are removed, it is advisable to wash the drums with a suitable solvent so that all grease and dirt are removed. Linings with any evidence of grease or oil on them should be replaced. The hydraulic system should be kept free of dirt and moisture. It is advisable to drain the system and flush with pure alcohol once a year.

Caution: Keep mineral oils, gasoline, or kerosene out of the system, as they cause rubber cups to soften, swell, and distort resulting in failure.

### Parking Brake

The external-type parking brake consists of a brake drum bolted to the transfer drive shaft rear companion flange, and an external contracting-type band mounted on the rear of the transfer. The band is connected to the parking brake lever by a mechanical linkage.

Parking brake drums should be replaced if drum braking surface is worn, rough, scored or damaged. Brake linings should be replaced if the distance between the lining brake surface and the top of the rivet head is less than 1/32 inch.

## WHEELS AND TIRES

### Mounting and Dismounting Wheels

#### Procedure:

Set hand brake. Block the wheels if on a grade.

- To remove the spare tire from the rear underbody, loosen the bolt and move the slotted bracket to one side with the vehicle wrench handle.
- Place jack under front spring plate or the rear axle housing near wheel to be dismounted. Raise the jack until it is in contact with the front spring plate or the rear axle housing.
- Loosen the wheel nuts before raising vehicle.
- Raise the vehicle until the tire is off the ground. Remove nuts and wheel.
- When mounting the wheel on the vehicle, first place the wheel on the studs and replace the stud nuts. Tighten the nuts enough to hold the wheel in the proper position. Tighten stud nuts alternately and evenly to prevent wheel run-out.
- Lower the vehicle and remove the jack. Tighten the wheel nuts securely, to 300 pounds-feet maximum. Do not exceed this torque.

### Tires

Tire pressure, tire rotation, wheel balance, and wheel alignment are the four vital factors that influence the extent of tire life and the ease and safety of vehicle control. Four common tire troubles are:

- Excessive wear around the outer edges resulting from under-inflation.
- Excessive wear in the center of the tread resulting from over-inflation.
- Tire tread worn on one side indicating wheels need realigning.
- Cuplike depressions on one side of the tread indicating wheels need balancing.

The recommended tire pressures are as follows:

25 psi. Front

45 psi. Rear

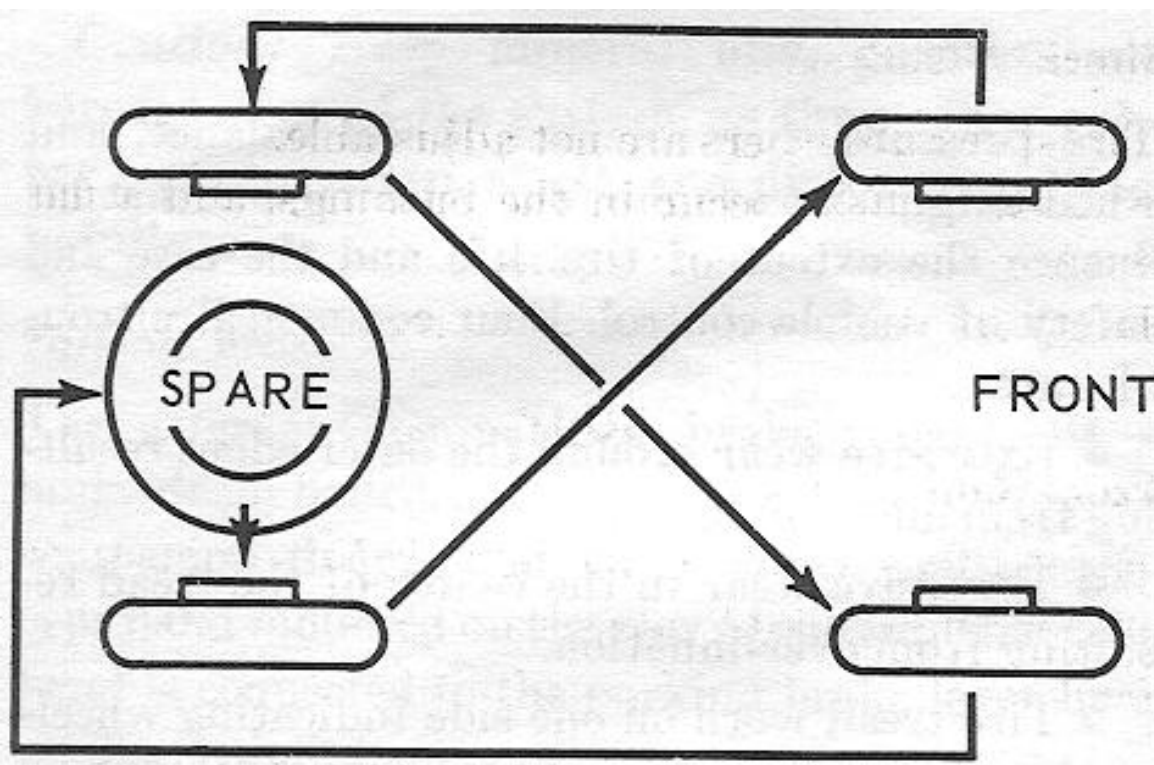
The importance of correct tire inflation cannot be over emphasized. To secure maximum tire life and most efficient vehicle operation, it is imperative that these pressures be maintained for all normal vehicle operation.

Should unusual operating conditions require reduction in pressure, use care that tires are inflated to recommended pressure immediately when normal operation is resumed.

Valve caps should always be used. They should be free of dents and damaged threads. Valve caps protect valve cores by keeping out dust, dirt and moisture.

Cross-switch the tires every 6,000 miles. This practice will even out differences in wear and make a set of tires last longer than they would without cross switching.

Refer to figure 36 for the recommended rotation method for all tires. When a method of tire rotation is selected, it should be used consistently or the full benefits of tire rotation may be lost.



**Figure 36. Tire rotation.**

### Tire Removal

To remove a tire from a semi-drop-center rim, first deflate the tire completely. Then force the tire away from the rim throughout the entire circumference until the lock ring is loosened. Using the slot near the split in the lock ring as a starting point, spring the lock ring off the wheel rim with a suitable tool. Remove the tire from the ring and remove the inner tube. To install a tire, first drop the tire onto the rim. Then spring the lock ring over the wheel rim with a suitable tool. For safety's sake, test the seating of the lock ring. Do this by first partially inflating the tire, then completely deflating the tire and checking the lock ring for proper seating. Then reinflate the tire to proper pressure.

## SUSPENSION

### Springs and Shackles

The springs should be periodically examined for broken or shifted leaves, loose or missing rebound clips, angle of the spring shackles and the position of the springs on the axle saddles. Springs with shifted leaves do not have their normal strength. Missing rebound clips may permit the leaves to fan out or break on rebound. Broken leaves may make the vehicle hard to handle or permit the axle to shift out of line. Keep the spring attaching bolts tight.

### Shock Absorbers

The shock absorbers are not adjustable. Should squeaks occur in the bushings, add a flat washer on the mounting pins. **DO NOT USE** mineral oil to remove squeaks.

## BODY

### Paint Care

Refer to introduction paragraph for instructions pertaining to paint care, methods, and material to be used.

## DESTRUCTION OF MATERIAL TO PREVENT ENEMY USE

Destruction of the vehicles covered in this manual when subject to capture or abandonment in the combat zone, will

be undertaken by the using arm only when, in the judgment of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by, the Army Commander. When authorized, destruction can be accomplished by mechanical means, burning, demolition, or gunfire. In general, destruction of essential parts, followed by burning will be sufficient to render the vehicles useless. Adequate destruction requires that all parts essential to the operation of the vehicles be destroyed beyond repair. In order to prevent repair by use of repair parts or cannibalization, destruction will be performed in the priorities established in the NATO Standardization Agreement 2113 (STANAG 2113) and will also include destruction of stocks of repair parts in the same priority as when mounted on the vehicle. Destruction will be performed in the following priority.

- a. Carburetor/Fuel Pump/Distributor.
- b. Engine block and cooling system.
- c. Tires/Suspension.
- d. Mechanical or hydraulic systems.
- e. Differentials.
- f. Frame.

By following the above priorities the same essential parts will be destroyed on all vehicles.