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TM 9-808

WAR DEPARTMENT TECHNICAL MANUAL

NON-CIRCULATING

3/4-TON  
4x4 TRUCK  
(DODGE)

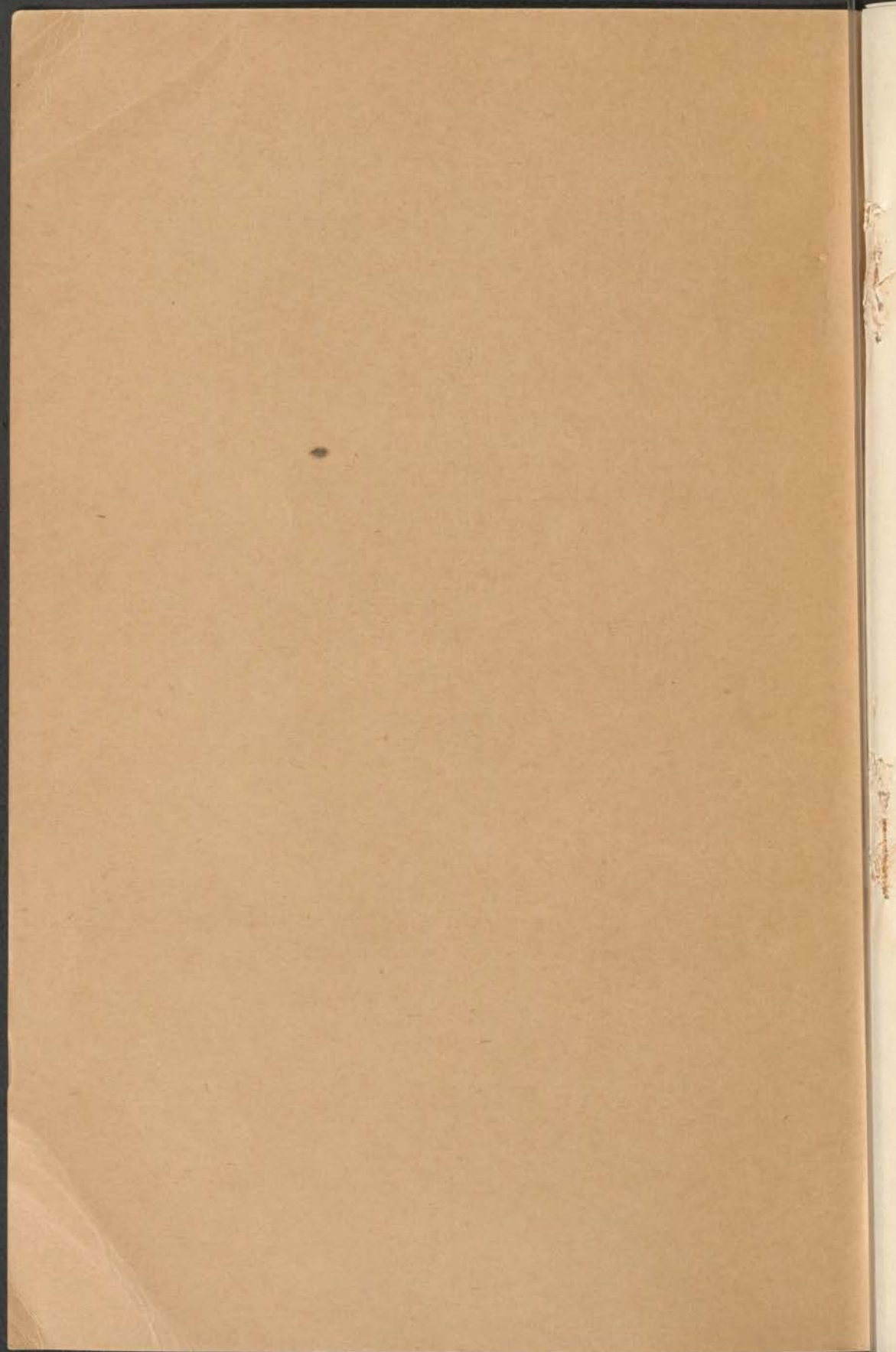
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WAR DEPARTMENT

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31 JANUARY 1944

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WAR DEPARTMENT TECHNICAL MANUAL

TM 9-808

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3/4 - TON  
4x4 TRUCK  
(DODGE)



**WAR DEPARTMENT**  
**Washington 25, D. C., 31 January 1944**

TM 9-808, 3/4-ton 4 x 4 Truck (Dodge), is published  
for the information and guidance of all concerned

[A.G. 300.7 (20 Oct. 43)]

By ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

J. A. ULIO,  
*Major General,*  
*The Adjutant General.*

DISTRIBUTION: B and H7 (5); B18 (2); R9 (4); Bn 6, 7, 9 and 18  
(2); C6, 7 and 18 (2), 9 (5).

(For explanation of symbols, see FM 21-6)



**3/4-TON 4 x 4 TRUCK (DODGE)**

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# PART ONE—VEHICLE OPERATING INSTRUCTIONS

## Section I

### INTRODUCTION

Paragraph

Scope ..... 1

#### 1. SCOPE.

a. This technical manual is published for the information and guidance of the using arm personnel charged with the operation and maintenance of this materiel.

b. In addition to a description of the  $\frac{3}{4}$ -ton 4 x 4 truck (Dodge), this manual contains technical information required for the identification, use, and care of the materiel. The manual is divided into three parts. Part One, section I through section VIII, contains vehicle operating instructions. Part Two, section IX through section XL, contains vehicle maintenance instructions for using arm personnel charged with the responsibility of doing maintenance work within their jurisdiction. Part Three, section XLI, contains instructions for the shipment and limited storage of this vehicle.

c. In all cases where the nature of the repair, modifications, or adjustment is beyond the scope or facilities of the unit, the responsible ordnance service should be informed so that trained personnel with suitable tools and equipment may be provided, or proper instructions issued.

d. This manual includes operating and organizational maintenance instructions from TM 10-1531, 1 October 1942. Together with TM 9-1808A and TM 9-1808B this manual supersedes TM 10-1531, 1 October 1942.

## 3/4-TON 4 x 4 TRUCK (DODGE)

## Section II

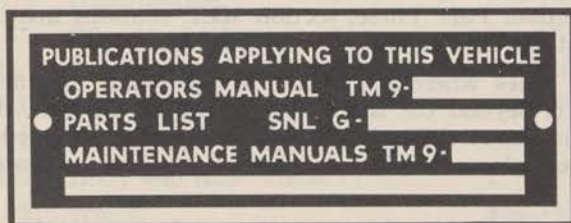
## DESCRIPTION AND TABULATED DATA

|                                | Paragraph |
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| Description .....              | 2         |
| Differences among models ..... | 3         |
| Data .....                     | 4         |

## 2. DESCRIPTION.

a. The following models of vehicles are covered by this manual:

| Type of Vehicle                 | Model | Type of Vehicle          | Model |
|---------------------------------|-------|--------------------------|-------|
| Weapon carrier .....            | WC-51 | Command .....            | WC-56 |
| Weapon carrier with winch ..... | WC-52 | Command with winch ..    | WC-57 |
| Carryall .....                  | WC-53 | Telephone maintenance .. | WC-59 |
| Ambulance .....                 | WC-54 | Emergency repair .....   | WC-60 |



RA PD 52784

Figure 1—Publication Identification Plate

b. All models are equipped with a liquid-cooled, 6-cylinder, L-head gasoline engine, located at the front of the vehicle. Engine power is transmitted from the four-speed transmission through a short propeller shaft to the transfer case, and thence to both front and rear axles. The vehicles may be driven with all four wheels or with rear wheels only.

c. A manual identification plate is attached to the instrument panel of each vehicle to designate the technical manual number and parts list number pertaining to the vehicle (fig. 1).

d. A serial number plate is attached to the instrument panel of each vehicle. This plate gives pertinent vehicle information such as model, serial number, weights, fuel and oil recommendations (fig. 2).

e. The steering gear of all models is mounted on the left side; therefore, all models are known as "left-hand drive" vehicles. Throughout this manual, the use of the terms "left" and "right" indicate positions in relation to the location of the steering gear; "left" means the steering gear side; "right" means the side opposite steering gear.

**DESCRIPTION AND TABULATED DATA****3. DIFFERENCES AMONG MODELS.**

a. **Weapon Carrier; Models WC-51 and WC-52** (figs. 3 and 4). The difference between models WC-51 and WC-52 is that the latter is equipped with a power take-off and a drive shaft for the winch mounted at the front of the vehicle. Both models can be identified

| <b>DODGE TRUCKS</b>                                |  |           |               |
|----------------------------------------------------|--|-----------|---------------|
| DIVISION OF CHRYSLER CORPORATION<br>DETROIT, MICH. |  |           |               |
| NOMENCLATURE                                       |  |           |               |
| MODEL                                              |  | SERIAL NO |               |
| SUPPLY ARM OR SERVICE MAINTAINING TRUCK            |  |           |               |
| GROSS WEIGHT                                       |  | LBS.      | MAX. PAYLOAD  |
| MAX. TRAILED LOAD                                  |  | LBS.      | DATE DELIVERY |
| RECOMMENDED OCTANE RATING GASOLINE 70 MIN.         |  |           |               |
| RECOMMENDED S.A.E. GRADE OIL SUMMER — 30           |  |           |               |
| RECOMMENDED S.A.E. GRADE OIL WINTER — 10           |  |           |               |

RA PD 52710

**Figure 2—Serial Number Plate**

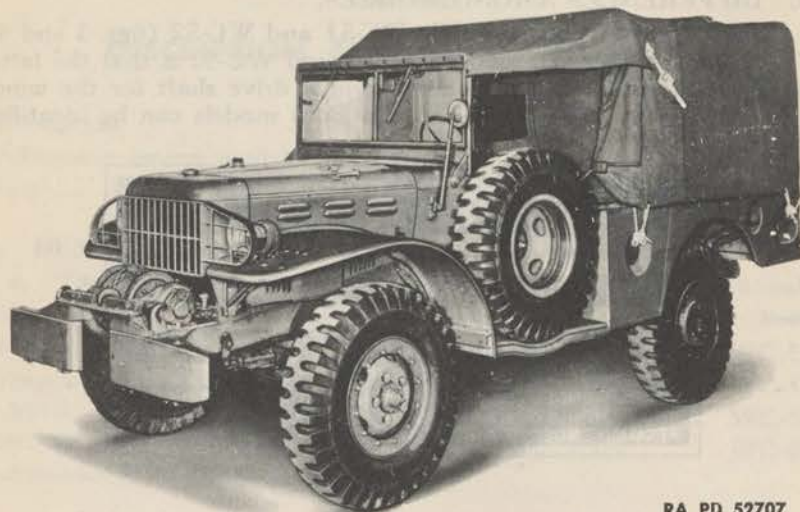
RA PD 52757

**Figure 3—Weapon Carrier (Model WC-51)—Left Front View**

by the open driver's compartment and weapon carrier body with tarpaulin mounted behind the driver's compartment. The electrical system of both models is 6-volt with the battery located under the hood.

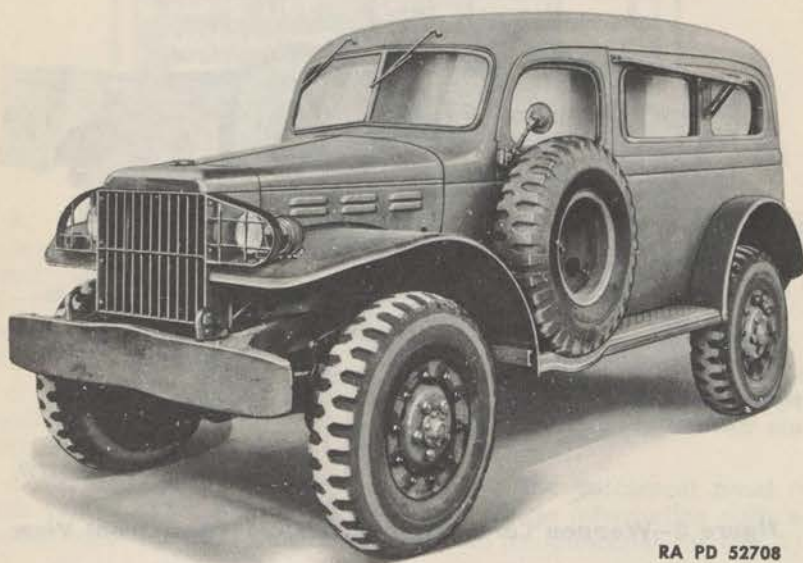
b. **Carryall; Model WC-53** (fig. 5). This model can be identified by its closed body with side windows. The electrical system is 12-volt

**3/4-TON 4 x 4 TRUCK (DODGE)**



RA PD 52707

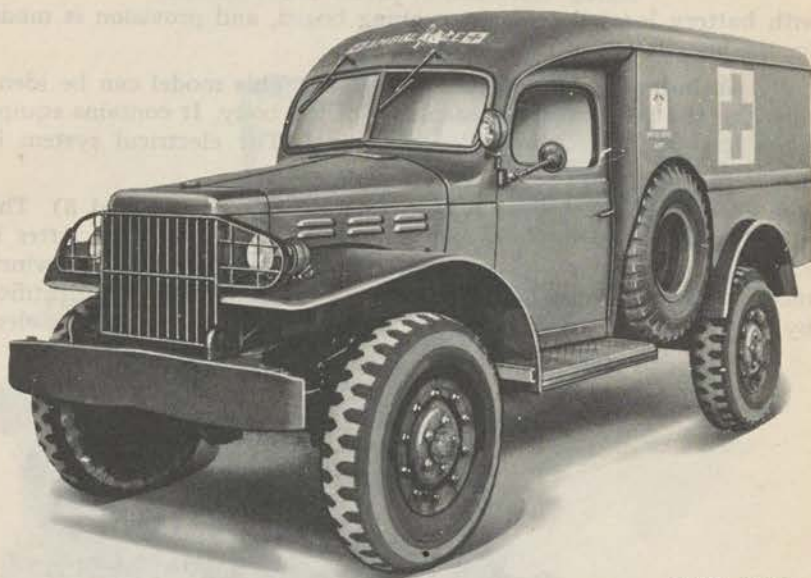
**Figure 4—Weapon Carrier (Model WC-52) with Winch—  
Left Front View**



RA PD 52708

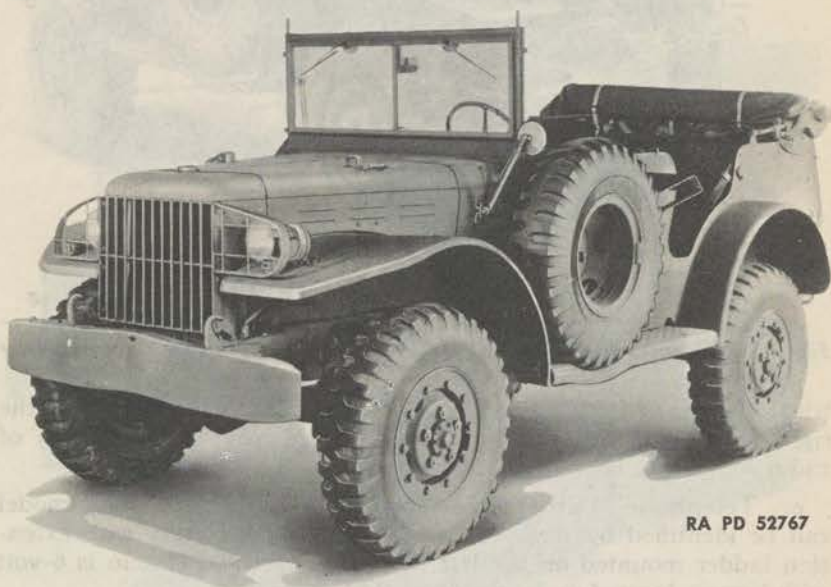
**Figure 5—Carryall (Model WC-53)—Left Front View**

# DESCRIPTION AND TABULATED DATA



RA PD 52706

**Figure 6—Ambulance (Model WC-54)—Left Front View**



RA PD 52767

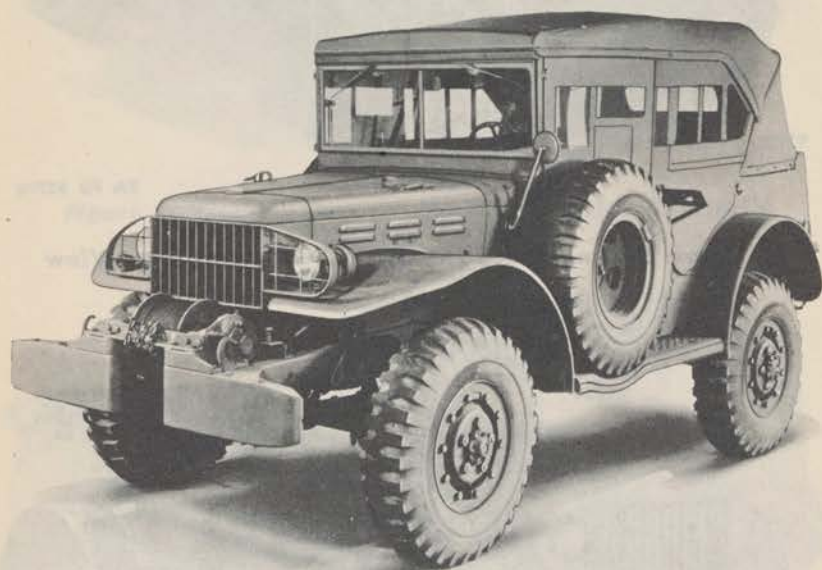
**Figure 7—Command (Model WC-56)—Left Front View**

**3/4-TON 4 x 4 TRUCK (DODGE)**

with battery located on right running board, and provision is made for the installation of radio equipment.

c. **Ambulance; Model WC-54** (fig. 6). This model can be identified by the large cross on each side of the body. It contains equipment for the care of wounded personnel. The electrical system is 6-volt with battery located under the hood.

d. **Command; Models WC-56 and WC-57** (figs. 7 and 8). The difference between models WC-56 and WC-57 is that the latter is equipped with a power take-off and a drive shaft for the winch mounted at the front of the vehicle. Both models can be identified by the open type body with folding top and side curtains. The elec-



RA PD 52760

**Figure 8—Command (Model WC-57) with Winch—Left Front View**

trical system of both models is 12-volt with battery located on the right running board and provision is made for the installation of radio equipment behind the front seat.

e. **Telephone Maintenance; Model WC-59** (fig. 9). This model can be identified by its open cab and box-shaped body with extension ladder mounted on the left side. The electrical system is 6-volt with battery located under the hood.

f. **Emergency Repair; Model WC-60** (fig. 10). This vehicle is equipped with a body containing ordnance repair equipment. The electrical system is 6-volt with battery located under the hood.

DESCRIPTION AND TABULATED DATA



RA PD 52798

**Figure 9—Telephone Maintenance (Model WC-59)—  
Left Front View**



RA PD 52907

**Figure 10—Emergency Repair (Model WC-60)—Right Rear View**

**3/4-TON 4 x 4 TRUCK (DODGE)****4. DATA.****a. Vehicle Specifications.**

|                                        |                      |
|----------------------------------------|----------------------|
| Engine (number of cylinders) .....     | 6                    |
| Transmission (number of speeds) .....  | 4 forward, 1 reverse |
| Transfer case (number of speeds) ..... | 1                    |
| Axle ratio (front and rear) .....      | 5.83 to 1            |

**Tires:**

|                |                      |
|----------------|----------------------|
| Size .....     | 9.00 x 16 in., 8 ply |
| Rim size ..... | 16 x 6.50 CS         |

**Electrical system voltage:**

|                                              |                |
|----------------------------------------------|----------------|
| Weapon carrier, with and without winch ..... | 6 to 8 volts   |
| Command, with and without winch .....        | 12 to 15 volts |
| Carryall .....                               | 12 to 15 volts |
| Ambulance .....                              | 6 to 8 volts   |
| Telephone maintenance .....                  | 6 to 8 volts   |
| Emergency repair .....                       | 6 to 8 volts   |

|                       |          |
|-----------------------|----------|
| Winch, capacity ..... | 5,000 lb |
|-----------------------|----------|

**Angle of approach and departure:**

|                                     | <b>Approach</b> | <b>Departure</b> |
|-------------------------------------|-----------------|------------------|
| Weapon carrier, without winch ..... | 54 degrees      | 31 degrees       |
| Weapon carrier, with winch .....    | 37 degrees      | 31 degrees       |
| Carryall .....                      | 54 degrees      | 28 degrees       |
| Ambulance .....                     | 53 degrees      | 24 degrees       |
| Command, without winch .....        | 54 degrees      | 31 degrees       |
| Command, with winch .....           | 37 degrees      | 31 degrees       |
| Telephone maintenance .....         | 53 degrees      | 29 degrees       |
| Emergency repair .....              | 53 degrees      | 32 degrees       |

**Weights (road weight of fully equipped vehicle without load or driver):**

|                                     |          |
|-------------------------------------|----------|
| Weapon carrier, without winch ..... | 5,250 lb |
| Weapon carrier, with winch .....    | 5,550 lb |
| Command, without winch .....        | 5,375 lb |
| Command, with winch .....           | 5,675 lb |
| Carryall .....                      | 5,750 lb |
| Ambulance .....                     | 5,920 lb |
| Telephone maintenance .....         | 5,400 lb |
| Emergency repair .....              | 5,950 lb |

**Over-all width:**

|                                              |                      |
|----------------------------------------------|----------------------|
| Weapon carrier, with and without winch ..... | 82 $\frac{3}{4}$ in. |
| Command, with and without winch .....        | 78 $\frac{5}{8}$ in. |
| Carryall .....                               | 78 $\frac{5}{8}$ in. |
| Telephone maintenance .....                  | 77 $\frac{3}{4}$ in. |
| Emergency repair .....                       | 81 $\frac{1}{2}$ in. |
| Ambulance .....                              | 77 $\frac{3}{4}$ in. |

## DESCRIPTION AND TABULATED DATA

|                                                                                                                                             |                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Tread, front and rear .....                                                                                                                 | 64 $\frac{3}{4}$ in.                 |
| Over-all length:                                                                                                                            |                                      |
| Weapon carrier, without winch .....                                                                                                         | 166 $\frac{7}{8}$ in.                |
| Weapon carrier, with winch .....                                                                                                            | 176 $\frac{1}{2}$ in.                |
| Command, without winch .....                                                                                                                | 166 in.                              |
| Command, with winch .....                                                                                                                   | 175 $\frac{5}{8}$ in.                |
| Carryall .....                                                                                                                              | 185 $\frac{5}{8}$ in.                |
| Ambulance .....                                                                                                                             | 194 $\frac{1}{2}$ in.                |
| Telephone maintenance .....                                                                                                                 | 191 $\frac{1}{2}$ in.                |
| Emergency repair .....                                                                                                                      | 186 in.                              |
| Over-all height:                                                                                                                            |                                      |
| Weapon carrier, with and without winch .....                                                                                                | 81 $\frac{7}{8}$ in.                 |
| Command, with and without winch .....                                                                                                       | 81 $\frac{1}{2}$ in.                 |
| Carryall .....                                                                                                                              | 80 $\frac{3}{4}$ in.                 |
| Ambulance .....                                                                                                                             | 90 $\frac{3}{8}$ in.                 |
| Telephone maintenance .....                                                                                                                 | 80 $\frac{3}{4}$ in.                 |
| Emergency repair .....                                                                                                                      | 89 in.                               |
| Road clearance, front and rear axle .....                                                                                                   | 10 $2\frac{3}{32}$ in.               |
| Turning radius:                                                                                                                             |                                      |
| Weapon carrier and command, with and without winch ..                                                                                       | 21 ft 2 in.                          |
| Carryall .....                                                                                                                              | 24 ft 6 in.                          |
| Ambulance, telephone maintenance, and emergency<br>repair .....                                                                             | 26 ft 3 in.                          |
| <b>b. Performance.</b>                                                                                                                      |                                      |
| Brake horsepower (gross) .....                                                                                                              | 92 at 3,200 rpm<br>54.5 at 1,600 rpm |
| Engine compression pressure at cranking speed .....                                                                                         | 98 to 118 lb                         |
| Engine oil pressure .....                                                                                                                   | 30 to 50 lb above 30 mph             |
| Maximum speed at 3,200 engine revolutions per minute<br>(all models):                                                                       |                                      |
| In fourth gear .....                                                                                                                        | 55 mph                               |
| In third gear .....                                                                                                                         | 33 mph                               |
| In second gear .....                                                                                                                        | 18 mph                               |
| In first gear .....                                                                                                                         | 9 mph                                |
| In reverse gear .....                                                                                                                       | 7 mph                                |
| Maximum grade ascending ability (all models) of fully<br>loaded vehicle (1,500 lb allowance for pay load,<br>driver, and assistant driver): |                                      |
| In transmission low gear .....                                                                                                              | 60 pct (approx)                      |
| In transmission high gear .....                                                                                                             | 7 to 8 pct (approx)                  |
| In transmission high gear when towing 1,000-lb<br>load .....                                                                                | 6 to 7 pct (approx)                  |
| Maximum grade descending ability with vehicle fully<br>loaded (all models) .....                                                            | 60 pct                               |

**3/4-TON 4 x 4 TRUCK (DODGE)**

**c. Capacities.**

|                                         |                                                                                                                                                                                                                        |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fuel tank .....                         | 30 gal                                                                                                                                                                                                                 |
| Crankcase (refill) .....                | 5 qt                                                                                                                                                                                                                   |
| Cooling system .....                    | 17 qt                                                                                                                                                                                                                  |
| Transmission .....                      | 23/4 qt                                                                                                                                                                                                                |
| Transmission, with power take-off ..... | 3 1/2 qt                                                                                                                                                                                                               |
| Carburetor air cleaner .....            | 1 qt                                                                                                                                                                                                                   |
| Front and rear axle differentials.....  | 2 1/4 qt for vehicles with serial numbers up to 81674747 (except serial numbers 81657582 through 81674101).<br>3 qt for vehicles with serial numbers after 81657582 (except serial numbers 81674101 through 81674747). |
| Transfer case .....                     | 1 1/2 qt                                                                                                                                                                                                               |
| Winch worm housing .....                | 1 qt                                                                                                                                                                                                                   |

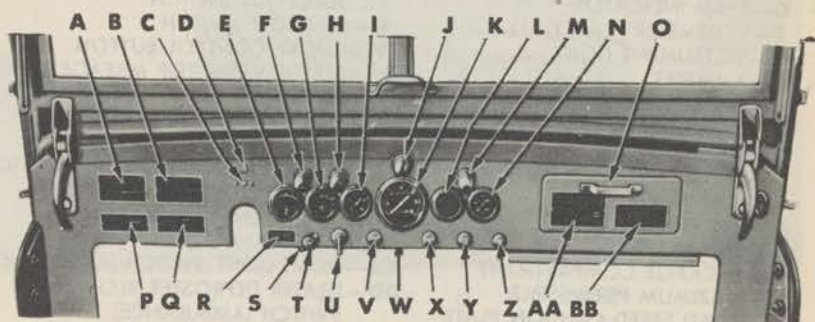
Section III

# DRIVING CONTROLS AND OPERATION

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| Instruments and controls .....                              | 5         |
| Preparation of new vehicle for service .....                | 6         |
| Use of instruments and controls in vehicular operation..... | 7         |
| Towing the vehicle .....                                    | 8         |
| Body equipment .....                                        | 9         |

## 5. INSTRUMENTS AND CONTROLS.

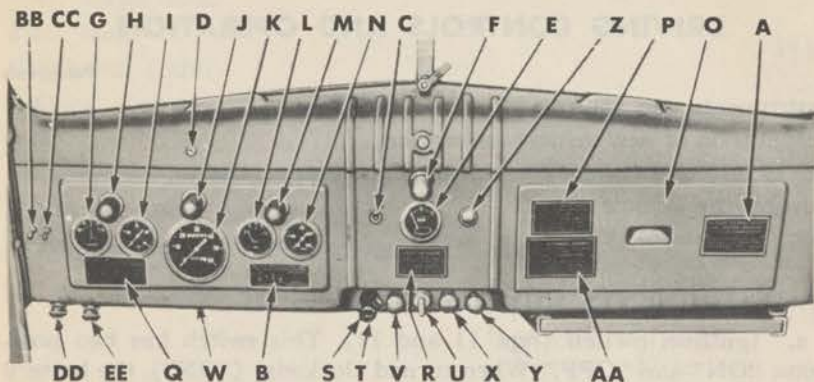
a. **Ignition Switch** (figs. 11 and 12). This switch has two positions, "ON" and "OFF." When turned clockwise ("ON"), the battery is connected with the ignition circuit and the engine may be started. With the switch "ON," the fuel gage registers the amount of fuel in the tank, and the heater, defroster, and roof ventilator, are also operative (if so equipped).



- |                                                                 |                                                     |
|-----------------------------------------------------------------|-----------------------------------------------------|
| <b>A</b> —COOLING SYSTEM<br>DRAIN CAUTION PLATE                 | <b>Q</b> —MANUAL IDENTIFICATION PLATE               |
| <b>B</b> —TRANSMISSION AND TRANSFER<br>CASE SHIFT DIAGRAM PLATE | <b>R</b> —VOLTMETER INSTRUCTION PLATE<br>(COMMAND)  |
| <b>C</b> —VOLTMETER SWITCH (COMMAND)                            | <b>S</b> —MAIN LIGHTING AND BLACKOUT<br>SWITCH LOCK |
| <b>D</b> —BEAM INDICATOR                                        | <b>T</b> —MAIN LIGHTING AND<br>BLACKOUT SWITCH      |
| <b>E</b> —VOLTMETER (COMMAND)                                   | <b>U</b> —IGNITION SWITCH                           |
| <b>F</b> —INSTRUMENT LIGHT                                      | <b>V</b> —CHOKE CONTROL BUTTON                      |
| <b>G</b> —AMMETER                                               | <b>W</b> —SPEEDOMETER TRIP MILEAGE<br>SET STEM      |
| <b>H</b> —INSTRUMENT LIGHT                                      | <b>X</b> —THROTTLE CONTROL BUTTON                   |
| <b>I</b> —OIL PRESSURE GAGE                                     | <b>Y</b> —INSTRUMENT LIGHT SWITCH                   |
| <b>J</b> —INSTRUMENT LIGHT                                      | <b>Z</b> —BLACKOUT DRIVING LIGHT SWITCH             |
| <b>K</b> —SPEEDOMETER                                           | <b>AA</b> —SERIAL NUMBER PLATE                      |
| <b>L</b> —FUEL GAGE                                             | <b>BB</b> —WINCH CAUTION PLATE                      |
| <b>M</b> —INSTRUMENT LIGHT                                      |                                                     |
| <b>N</b> —THERMOMETER                                           |                                                     |
| <b>O</b> —PACKAGE COMPARTMENT                                   |                                                     |
| <b>P</b> —MAXIMUM PERMISSIBLE<br>ROAD SPEED CAUTION PLATE       |                                                     |

RA PD 312544

Figure 11—Instrument Panel (Open Bodies)

**3/4-TON 4 x 4 TRUCK (DODGE)**

- |                                                                 |                                                          |
|-----------------------------------------------------------------|----------------------------------------------------------|
| <b>A</b> —COOLING SYSTEM<br>DRAIN CAUTION PLATE                 | <b>R</b> —VOLTMETER INSTRUCTION PLATE<br>(CARRYALL)      |
| <b>B</b> —TRANSMISSION AND TRANSFER<br>CASE SHIFT DIAGRAM PLATE | <b>S</b> —MAIN LIGHTING AND BLACKOUT<br>SWITCH LOCK      |
| <b>C</b> —VOLTMETER SWITCH (CARRYALL)                           | <b>T</b> —MAIN LIGHTING AND<br>BLACKOUT SWITCH           |
| <b>D</b> —BEAM INDICATOR *                                      | <b>U</b> —IGNITION SWITCH                                |
| <b>E</b> —VOLTMETER (CARRYALL)                                  | <b>V</b> —CHOKE CONTROL BUTTON                           |
| <b>F</b> —INSTRUMENT LIGHT                                      | <b>W</b> —SPEEDOMETER TRIP MILEAGE<br>SET STEM           |
| <b>G</b> —AMMETER                                               | <b>X</b> —THROTTLE CONTROL BUTTON                        |
| <b>H</b> —INSTRUMENT LIGHT                                      | <b>Y</b> —INSTRUMENT LIGHT SWITCH                        |
| <b>I</b> —OIL PRESSURE GAGE                                     | <b>Z</b> —BLACKOUT DRIVING LIGHT SWITCH                  |
| <b>J</b> —INSTRUMENT LIGHT                                      | <b>AA</b> —SERIAL NUMBER PLATE                           |
| <b>K</b> —SPEEDOMETER                                           | <b>BB</b> —ROOF VENTILATOR SWITCH<br>(AMBULANCE)         |
| <b>L</b> —FUEL GAGE                                             | <b>CC</b> —DOME LIGHT SWITCH (AMBULANCE)                 |
| <b>M</b> —INSTRUMENT LIGHT                                      | <b>DD</b> —HEATER DEFROSTER BLOWER<br>SWITCH (AMBULANCE) |
| <b>N</b> —THERMOMETER                                           | <b>EE</b> —HEATER SWITCH (AMBULANCE)                     |
| <b>O</b> —PACKAGE COMPARTMENT                                   |                                                          |
| <b>P</b> —MAXIMUM PERMISSIBLE<br>ROAD SPEED CAUTION PLATE       |                                                          |
| <b>Q</b> —MANUAL IDENTIFICATION PLATE                           |                                                          |

RA PD 312545

**Figure 12—Instrument Panel (Closed Bodies)**

**b. Choke Control Button** (figs. 11 and 12). This button controls the fuel mixture for starting the engine when cold.

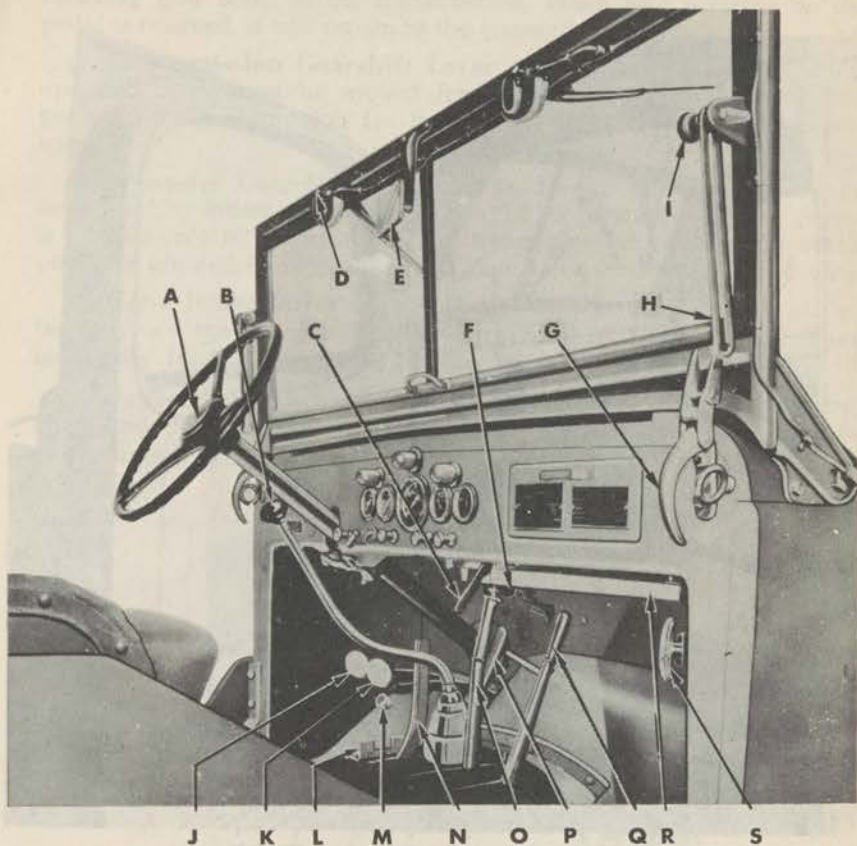
**c. Throttle Control Button** (figs. 11 and 12). This button controls the opening and closing of the throttle, which in turn controls engine speed.

**d. Accelerator Pedal** (figs. 13 and 14). This foot-operated pedal is used to control engine speed while driving the vehicle.

**e. Cranking Motor Pedal** (figs. 13 and 14). This foot-operated pedal actuates the starting motor for cranking the engine.

**f. Clutch Pedal** (figs. 13 and 14). When this foot-operated pedal is pressed downward, the clutch is disengaged, and the transmission gears may be shifted with the engine running without danger of

## DRIVING CONTROLS AND OPERATION

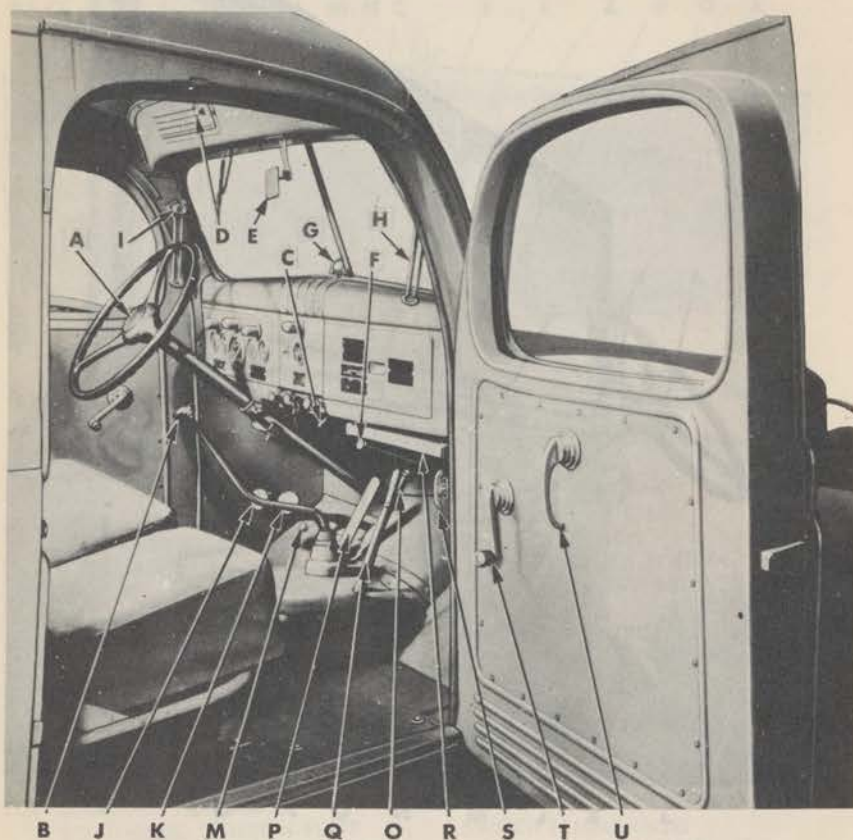


- A—HORN BUTTON
- B—TRANSMISSION GEARSHIFT LEVER
- C—COWL VENTILATOR HANDLE (RATCHET AND BRACE)
- D—WINDSHIELD WIPER CONTROL KNOB
- E—REAR VIEW MIRROR
- F—CRANKING MOTOR PEDAL ROD BUTTON
- G—WINDSHIELD CLAMP HANDLE
- H—WINDSHIELD ADJUSTING ARM
- I—WINDSHIELD ADJUSTING ARM LOCK NUT
- J—CLUTCH PEDAL
- K—BRAKE PEDAL
- L—POWER TAKE-OFF CONTROL LEVER SHIFT LOCK
- M—BEAM CONTROL SWITCH
- N—POWER TAKE-OFF CONTROL LEVER
- O—HAND BRAKE LEVER
- P—ACCELERATOR PEDAL
- Q—TRANSFER CASE HAND LEVER
- R—MAP TABLE BOARD
- S—FIRE EXTINGUISHER

RA PD 318322

Figure 13—Front Compartment (Open Bodies)

3/4-TON 4 x 4 TRUCK (DODGE)



- A—HORN BUTTON
- B—TRANSMISSION GEARSHIFT LEVER
- C—COWL VENTILATOR HANDLE (RATCHET AND BRACE)
- D—WINDSHIELD WIPER CONTROL KNOB
- E—REAR VIEW MIRROR
- F—CRANKING MOTOR PEDAL ROD BUTTON
- G—WINDSHIELD PULL-TO HANDLE
- H—WINDSHIELD ADJUSTING ARM
- I—WINDSHIELD ADJUSTING ARM LOCK NUT
- J—CLUTCH PEDAL
- K—BRAKE PEDAL
- M—BEAM CONTROL SWITCH
- O—HAND BRAKE LEVER
- P—ACCELERATOR PEDAL
- Q—TRANSFER CASE HAND LEVER
- R—MAP TABLE BOARD
- S—FIRE EXTINGUISHER (CARRYALL)
- T—DOOR WINDOW REGULATOR HANDLE
- U—DOOR REMOTE CONTROL HANDLE

RA PD 318323

Figure 14—Front Compartment (Closed Bodies)

## DRIVING CONTROLS AND OPERATION

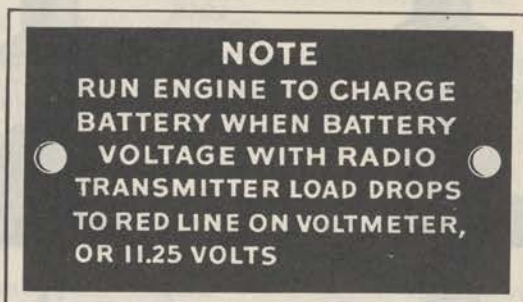
breaking gear teeth in the transmission. When foot pressure on the pedal is relieved, it will return to the engaged position.

**g. Transmission Gearshift Lever** (figs. 13 and 14). This hand-operated lever may be moved from neutral position to mesh the gears in the transmission for first, second, third, fourth, or reverse speeds.

**h. Transfer Case Hand Lever** (figs. 13 and 14). This lever may be moved to either of two positions. In its forward position, power is applied only to the rear axle. In its rear position (nearest the seat), power is applied to both front and rear axles for four-wheel driving.

**i. Hand Brake Lever** (figs. 13 and 14). When this lever is pulled back toward the seat, the hand brake is applied. Use the hand brake lever only for the purpose of holding the vehicle while parked.

**j. Brake Pedal** (figs. 13 and 14). When this foot-operated pedal is pressed downward, the brakes at each wheel are applied to slow down or stop the vehicle.



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**Figure 15—Voltmeter Instruction Plate**

### **k. Instruments.**

(1) **OIL PRESSURE GAGE** (figs 11 and 12). This gage indicates the pressure under which oil is pumped through the engine oiling system.

(2) **AMMETER** (figs. 11 and 12). This meter shows the amount of electricity flowing into or out of the battery. When the electrical units of the vehicle are using more electricity than the generator is supplying, the pointer of the ammeter will be on the negative (—) side of zero. When less electricity is being consumed than the generator is supplying, the pointer will be on the positive (+) side of zero.

(3) **VOLTMETER** (figs. 11 and 12). Some vehicles having 12-volt electrical systems are equipped with a voltmeter which may be switched in and out of the battery circuit to determine the voltage of the battery. A plate (fig. 15) attached to the instrument panel explains the use of the voltmeter. Leave the switch on only long enough to take a reading and then switch it off.

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(4) **THERMOMETER** (figs. 11 and 12). The thermometer shows the temperature of the cooling solution in the engine.

(5) **FUEL GAGE** (figs. 11 and 12). This gage indicates the quantity of fuel in the tank, when the ignition switch is turned on.

(6) **SPEEDOMETER** (figs. 11 and 12). The speedometer indicates the speed of the vehicle in miles per hour. The needle is of the luminous type, visible in the dark. The odometer at the top of the speedometer face registers the total mileage covered by the vehicle. The trip mileage odometer at the bottom of the speedometer face may be returned to a zero reading by pushing in and turning the set stem on the back of the speedometer.

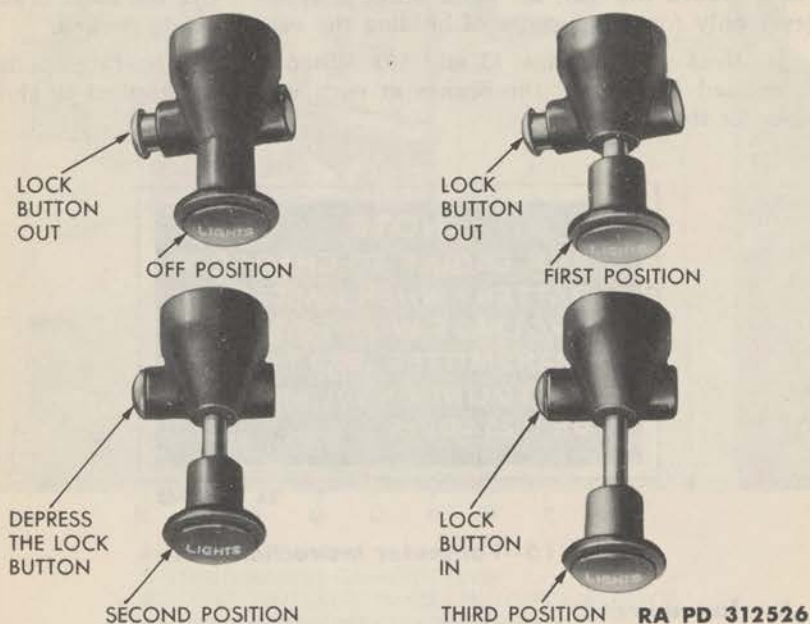


**Figure 16—Main Lighting and Blackout Switch Positions**

**1. Main Lighting and Blackout Switch** (fig. 16). This switch controls all vehicle lights except the dome lights in the Ambulance, which operate independently of the main lighting and blackout switch. The switch has four positions:

(1) **OFF POSITION.** All lights except Ambulance dome lights are inoperative. The Ambulance dome lights are controlled by a toggle switch on the left side of the instrument panel.

(2) **FIRST POSITION.** All blackout lights are operative. Service lights are inoperative except Ambulance dome lights.

(3) **SECOND POSITION.** All service lights are operative. Blackout lights are inoperative.

### DRIVING CONTROLS AND OPERATION

(4) **THIRD POSITION.** Service stop light is operative. All other lights, except Ambulance dome lights are inoperative.

**m. Instrument Light Switch** (figs. 11 and 12). This switch is the push-pull type. When pulled out, the instrument lights will light provided the blackout switch is pulled out to the second position (subpar. l above).

**n. Headlights.** The two headlights mounted on the front fenders are controlled by the main lighting and blackout switch (subpar. l above) and beam control switch (figs. 13 and 14), which controls the high and low beams of the headlights when they are turned on by the blackout switch. Press the button with the foot to raise or lower the headlight beams. The switch locks each time the button is pressed. The headlight beam indicator (figs. 11 and 12), is illuminated only when the high beam of the headlights is turned on.

**o. Blackout Parking Lights.** These lights (both head and tail) contain specially shaped openings which enable the driver of a vehicle to estimate the distance between his vehicle and another vehicle during blackout conditions.

**p. Blackout Driving Light.** The blackout driving light is located on the left front fender. It contains a sealed beam unit which is constructed so that the beam of light is diffused, casting a fine spray of limited illumination visible to the driver under blackout driving conditions. The light is controlled by a switch (figs. 11 and 12) of the push-pull type. When pulled out, the blackout driving light will light provided the blackout switch is pulled out to the first position (subpar. l above).

**q. Tail and Stop Lights.** These lights are controlled by the blackout switch (subpar. l above).

**r. Spotlight (Ambulance).** The spotlight will operate only when the blackout switch is pulled out to the second position (subpar. l above). The switch is mounted on the control handle.

**s. Dome Light Switch.**

(1) **AMBULANCE.** A toggle switch controls the dome lights in the roof of the Ambulance (fig. 12). These lights operate independently of the main lighting and blackout switch.

(2) **CARRYALL.** The dome light switch is incorporated in the dome light. It may be turned on only when the blackout switch is in the second position (subpar. l above).

**t. Trailer Wiring Connector (Weapon Carrier).** This connector is used for hooking up trailer lights with the vehicle lighting system. The blackout switch controls trailer lights in the same manner as other vehicle lights.

**u. Fuel Pump Hand Primer.** The fuel pump is equipped with a hand primer which permits manual operation of the fuel pump to force fuel to the carburetor in the event it runs dry.

**v. Horn Button** (figs. 13 and 14). This button operates the horn.

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w. **Roof Ventilator Switch (Ambulance)** (fig. 12). This toggle switch controls the roof ventilator when the ignition switch is turned on.

x. **Heater Switches (Ambulance).**

(1) **HEATER DEFROSTER BLOWER SWITCH** (fig. 12). This rheostat-type switch is operated by rotating the knob of the switch. A slight rotating motion of the knob puts the defroster motor in full speed operation, and turning it farther reduces its speed.

(2) **HEATER SWITCH** (fig. 12). This switch is operated by rotating the knob of the switch. A slight rotating motion of the knob puts the motor in fast speed operation. Rotating the switch farther decreases motor operation to medium speed and finally to slow speed.

y. **Windshield Wipers** (figs. 13 and 14). The windshield wiper motors are controlled by a push-pull type knob on the back of wiper body.



**Figure 17—Cooling System  
Drain Cocks**



**Figure 18—Hold-down Straps**

**6. PREPARATION OF NEW VEHICLE FOR SERVICE.**

a. **General.** Before placing a new vehicle into service, it should be completely inspected for evidence of damage or looseness of parts resulting during the transportation of the vehicle. Particular consideration should be given the following items during the inspection:

## DRIVING CONTROLS AND OPERATION

(1) **TIGHTEN COOLING SYSTEM DRAIN COCKS** (fig. 17). See that the radiator drain cock and the cylinder block drain cock are securely tightened.

(2) **TIGHTEN BATTERY CONNECTIONS.** See that cables at battery, cranking motor and ground at frame or engine are connected securely. Check electrolyte level in battery and fill to proper level.

(3) **INSPECT BRAKE MASTER CYLINDER.** Remove filler plug and inspect level of brake fluid. Level should be  $\frac{3}{4}$  inch below top of filler opening in reservoir cover. If so equipped, remove rubber nipple installed over vent opening for shipping purposes.

(4) **LUBRICATE VEHICLE.** Lubricate the vehicle completely. Refer to paragraph 24 for instructions.

(5) **INSPECT WHEELS AND TIRES.** Inflate or deflate tires to 40 pounds pressure. Tighten wheel stud nuts, front and rear axle drive flange nuts and rim nuts securely.

(6) **REMOVE HOLD-DOWN STRAPS** (fig. 18). On rail shipped vehicles, hold-down straps are fastened to the frame side members under each fender. Make sure the straps are removed to avoid interference between the straps and other vehicle parts.

(7) **PERFORM BEFORE-OPERATION SERVICE** (par. 19).

## 7. USE OF INSTRUMENTS AND CONTROLS IN VEHICULAR OPERATION.

a. **Starting the Engine.** Before attempting to start the engine, make sure the power take-off control lever for operation of winch on vehicles so equipped is in neutral position with safety catch locked. Then proceed as follows:

(1) Apply the hand brake.

(2) Put the transmission gearshift lever in neutral position.

(3) If the engine is cold, pull the choke button all the way out. *NOTE: If the engine is warm, see that the choke button is pushed all the way in.*

(4) Pull out the throttle control button about  $\frac{1}{3}$  of its total movement or to a point where the engine will run a little above idling speed.

(5) Depress the clutch pedal to relieve the engine of the load of turning the transmission gears.

(6) Turn on the ignition switch and push the cranking motor pedal with the foot. To prevent damage to the starting mechanism, release the cranking motor pedal immediately when the engine starts. If the pedal does not release under its own spring mechanism stop the engine immediately by turning off the ignition switch and pull the pedal back by hand.

(7) If the battery, ignition, and fuel systems are in good condition the engine should start immediately. If the engine does not start within 10 to 15 seconds, release the cranking motor pedal and wait a few seconds to prevent overheating and possible damage to the

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cranking motor. Then push the cranking motor pedal again for 10 to 15 seconds. If the engine does not start after several attempts, report the trouble to the proper officer.

(8) After the engine has started, release the clutch pedal. Then push the throttle control button part way in to reduce engine speed and push the choke control button in to a point where the engine runs smoothly. **CAUTION:** *Push the choke control button all the way in as soon as the engine will operate without stopping.*

**b. Starting the Engine after Running Out of Fuel.** If the vehicle has been run until the fuel tank is empty, fill the tank and use the fuel pump priming lever to force fuel up to the bowl of the carburetor (fig. 19) to avoid unnecessary use of the battery and starting motor. Operate the priming lever 30 to 40 strokes, or until

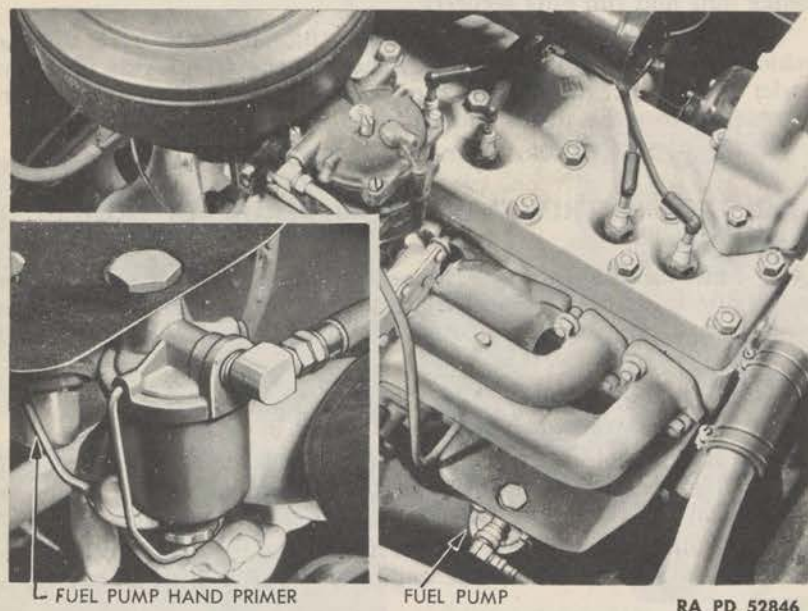


**Figure 19—Operating Fuel Pump Hand Primer**

the priming lever works freely and very little pressure is required to move it. Free movement of the lever indicates that the fuel tubes, filter, fuel pump, and carburetor bowl, are full of fuel. The engine may then be started in the usual manner. **NOTE:** *If the lever moves freely without actuating the diaphragm, crank the engine one revolution so that the fuel pump rocker arm will move off the high point of the cam on the camshaft.*

**c. Driving the Vehicle** (fig. 20). The best method of gearshifting the vehicle is known as double-clutching, and the following instructions are based on this method. Although the vehicle is equipped

## DRIVING CONTROLS AND OPERATION

with front and rear axles for four-wheel driving, the position of the transfer case hand lever, which controls engagement and disengagement of the front axle, does not alter the procedure of shifting transmission gears. Subparagraph e below contains instructions for driving in four-wheel drive.

- (1) Release the hand brake.
- (2) Disengage the clutch (depress clutch pedal) and move the transmission gear shifting lever to first or second speed forward position. If the vehicle is standing on rough terrain or facing upward on a grade, shift to first speed; if on a smooth hard level surface, shift to second speed.
- (3) Next, press the accelerator to speed up the engine a little and at the same time gradually relieve pressure on the clutch pedal.
- (4) When the clutch is fully engaged, press the accelerator until the vehicle attains the desired road speed.



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**Figure 20—Gearshift Diagram Plate**

(5) When the vehicle is in motion, shift into higher speeds as follows:

(a) Disengage the clutch and release the accelerator pedal at the same time.

(b) Move the gearshift lever to neutral and relieve pressure on the clutch pedal to allow the clutch to engage. This synchronizes the speed of transmission gears with the speed of the engine.

(c) Again disengage the clutch and move the gearshift lever to the next higher speed position.

(d) Relieve pressure on the clutch pedal and press the accelerator pedal to attain the desired road speed.

(e) Repeat steps in steps (a) through (d) above for successive shifts from first or second speed to higher speeds.

**d. Reversing.** Bring the vehicle to a complete stop before shifting into reverse speed. Depress the clutch pedal, move the gearshift lever to reverse position (fig. 20). Then release the clutch pedal and press the accelerator pedal at the same time until the desired speed is attained.

**e. Driving in Four-wheel Drive.** The purpose of four-wheel drive is to permit maximum traction at all four wheels when driving on

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icy roads, through snow or mud, or over rough unimproved terrain. On smooth, level, hard-surfaced roads and under ordinary conditions, disengage the front axle drive and drive with the rear wheels only. **CAUTION:** *Never operate the vehicle at speeds in excess of 25 miles per hour when the front axle is engaged.*

(1) **ENGAGE FRONT AXLE** (fig. 20). Shift the hand lever to the rear with the vehicle moving and engine under mild acceleration. The speed of the vehicle must not exceed 25 miles per hour when the shift is made. If resistance is felt midway in the shift, let up on the accelerator pedal and complete the shift. The shift may also be made with the vehicle standing still, but an easier shift can be accomplished with vehicle in motion.

(2) **DISENGAGE FRONT AXLE** (fig. 20). Push the hand lever forward.

| — CAUTION —                   |     |     |     |      |
|-------------------------------|-----|-----|-----|------|
| MAX. PERMISSIBLE ROAD SPEEDS  |     |     |     |      |
| TRANSMISSION                  |     |     |     |      |
| 4TH                           | 3RD | 2ND | 1ST | REV. |
| 55                            | 33  | 18  | 9   | 7    |
| DODGE TRUCKS                  |     |     |     |      |
| BUILT BY CHRYSLER CORPORATION |     |     |     |      |
| DETROIT, U.S.A.               |     |     |     |      |

RA PD 52712

**Figure 21—Speed Caution Plate****f. Driving Up or Down Steep Grades.**

(1) When driving down a steep grade, shift into a lower transmission gear. On exceptionally steep and long downgrades, shift the transmission to second speed so that the engine will help in slowing the vehicle down and reduce the necessity for continuous or severe application of the brakes.

(2) When driving up a long, steep grade, shift the transmission to a lower gear when vehicle speed begins to decrease, to permit driving the vehicle at the maximum possible governed speed with the least strain on engine and drive mechanism.

(3) To shift to lower gears with the vehicle in motion on a steep grade, use the double-clutch method, and start the shift to the lower gear at the speed shown on the "MAX PERMISSIBLE ROAD SPEEDS" caution plate (fig. 21) for the gear into which the shift is to be made. To double-clutch, proceed as follows:

(a) Disengage the clutch and move the gearshift lever to neutral position.

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(b) Quickly engage the clutch and accelerate the engine to governed speed so that the transmission gears can be meshed in the next lower gear.

(c) Then again disengage the clutch and shift immediately into the next lower gear.

(4) When shifting to a lower gear with vehicle in motion, engage the clutch before allowing the engine to slow down. If the engine is allowed to slow down and the clutch is then engaged, excessive strain will be applied to the clutch, transmission, and drive line, and breakage is very likely to occur.

g. **Stopping the Vehicle.** Relieve pressure on accelerator pedal and apply the brakes. When the vehicle has been slowed down to five or ten miles per hour, disengage the clutch and move the gear-shift lever to neutral position. Then bring the vehicle to a complete stop, release the clutch pedal and apply the hand brake.

h. **Stopping the Engine.** Allow the engine to slow down to idling speed and turn off the ignition switch.

i. **"Breaking-in" Speeds.** New vehicles should be driven carefully during the breaking-in period. Vehicle speed should not exceed 25 miles per hour during the first 500 miles of operation. Also, careless operation in the lower gears may result in excessive engine speed in spite of low vehicle speed. For example, the following vehicle speeds in the lower gears are comparable to 25 miles per hour in high gear:

|          |        |
|----------|--------|
| 3rd gear | 15 mph |
| 2nd gear | 8 mph  |
| 1st gear | 4 mph  |

During the next 1,500 miles of operation, the maximum speeds indicated above should be increased for brief periods, until the breaking-in process is completed. However, during this breaking-in, the vehicle should be driven carefully when under full throttle, as maximum power should not be required until vehicle has been driven 2,000 miles.

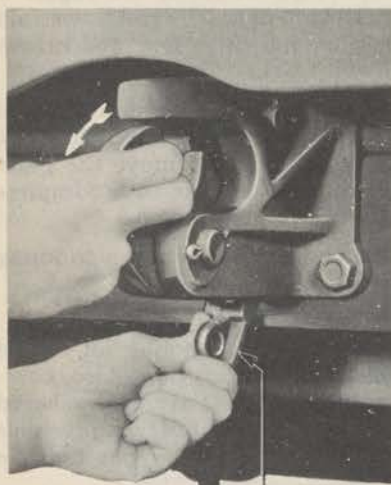
j. **Maximum Permissible Road Speeds** (fig. 21). The vehicle is equipped with a governor which limits the maximum road speed of the vehicle in the various gears as shown on the plate attached to the instrument panel of the vehicle. **CAUTION:** *Do not permit the vehicle to exceed maximum road speeds in any gear when driving downhill, because the excessive engine speed developed under such conditions might cause serious damage to the engine or power train.* To control the speed of the vehicle, use the foot brake intermittently in order to prevent excessive engine speeds. The clutch must never be disengaged when descending a hill in a low gear.

## 8. TOWING THE VEHICLE.

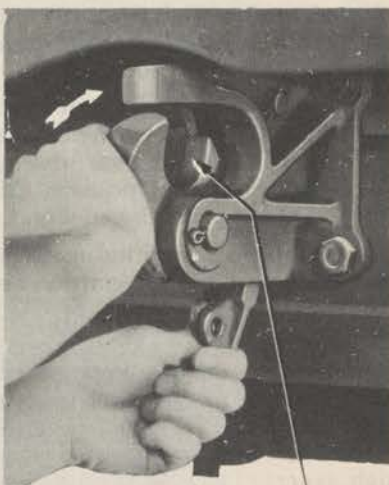
a. **Tow Hooks.** The two tow hooks bolted to the frame side members at the front of the vehicle can be used to attach towing chains or cables.

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b. **Pintle Hook.** The pintle hook (fig. 22), mounted on the frame rear cross member, can be used to attach the tow bar of a trailer, or to attach a towing chain or cable for towing another vehicle. To open, release the trigger underneath the hook and pull the jaw open. To close, engage the jaw with the trigger lock and push it to the closed position.



PRESS LATCH  
TO RELEASE JAW



JAW CAN BE CLOSED AND LOCKED  
BY BACKING OPEN JAW AGAINST  
A TRAILER TOW-BAR

RA PD 312527

**Figure 22—Pintle Hook**

c. **Towing Vehicle to Start Engine.** Turn the engine over 3 revolutions by hand. Attach a towing cable. Disengage the clutch and shift the transmission of the towed vehicle to high gear. If shifted to lower gears, the engine of the towed vehicle will turn over at a greater speed and more power will be required to tow it. Shift the transmission of the towing vehicle to low gear and begin towing. When the towed vehicle is in motion (five to ten miles per hour), slowly engage the clutch and turn on the ignition switch.

d. **Towing Precautions.**

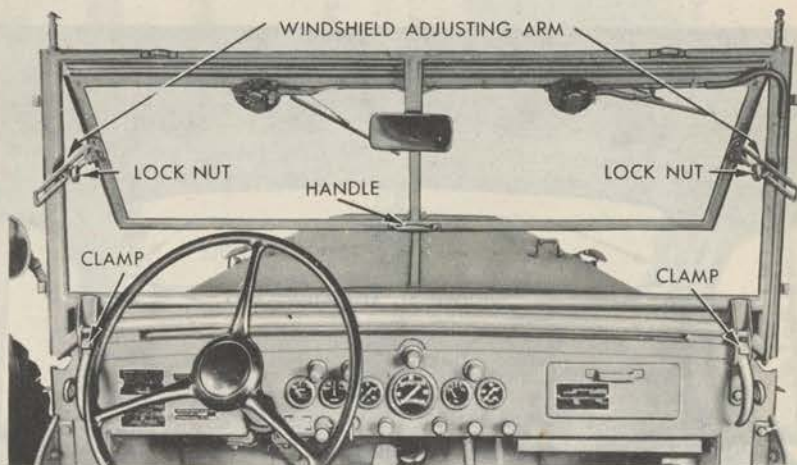
(1) When steering the towing vehicle in a different direction, make changes in direction in such a manner that the wheels of the towed vehicle will follow in the tracks of the towing vehicle.

(2) When entering soft or muddy terrain, see that the front wheels of both vehicles are in the straight ahead position, as it is more difficult to pull a towed vehicle with the front wheels at an angle.

(3) Use care to prevent front wheels of towed vehicle becoming entangled with towing cable.

**DRIVING CONTROLS AND OPERATION****9. BODY EQUIPMENT.****a. Windshield.**

(1) **OPEN CAB MODELS** (fig. 23). To open the windshield glass, loosen the lock nuts, pull up on the adjusting arms, and push the glass outward to the desired position. Then tighten the lock nuts. To lower the windshield assembly, pull up on the clamp handles which hold the windshield in an upright position. Push the windshield assembly forward to the pad on the hood and fasten the catch. To raise the windshield assembly, unhook the catches on the hood. Then pull the windshield to an upright position and push the clamp handles down to the locked position. Hook the catch on hood to the catch rest.



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**Figure 23—Windshield (Open Bodies)**

(2) **CLOSED CAB MODELS** (fig. 24). To open the windshield glass, pull the handle in the center of the windshield at the lower edge and turn it counterclockwise. Loosen the adjusting arms lock nuts, pull up on the adjusting arms, and push the glass outward to the desired position. Tighten the lock nuts. To close the windshield glass, loosen the lock nuts and pull the windshield to the closed position with the pull-to handle and turn it clockwise. Then tighten both lock nuts evenly to prevent looseness and strain on the windshield glass at the sides.

**b. Lowering Folding Top (Command) (fig. 25).**

(1) Loosen the lock nuts and set screws at the upper left and right sides of the windshield. Loosen the large hand-operated knobs in the top frame directly above the back of the front seat.

(2) Unsnap seven fasteners of rear curtain on each side. Do not unsnap the nine fasteners on the rear of the body. Unbuckle the two

## 3/4-TON 4 x 4 TRUCK (DODGE)

long straps between the top frame rear bow and the body and pass the ends without buckle under the top fabric fastened to the rear of body. Let the ends of the straps hang down over the rear of the body. Lift the top off the windshield stanchions and allow it to drop back toward the rear of the body.

(3) Fold the top frame down by pulling inward on each side at the location of the large hand knobs. To prevent cutting or chafing of fabric, allow the top decking to fall loosely over the rear of the body so that the fabric will not catch between the bows of the frame as it is folded back. **CAUTION:** *Pull the rear curtain back as far as possible to prevent breakage of the rear glass by the top frame as it is folded down.*



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**Figure 24—Windshield (Closed Bodies)**

(4) Tie the top frame down at the center with the short strap and fold the top decking neatly up over the top frame. Tuck the loose ends under the frame and tie down with the long straps.

**c. Raising Folding Top (Command) (fig. 25).**

(1) Unbuckle the long straps and let the loose ends hang down over rear of body. Unbuckle the short strap. Unfold the top fabric and let it hang down over the rear of the body. Raise the top frame and straighten out both sides at the location of the large hand-operated knobs.

# DRIVING CONTROLS AND OPERATION

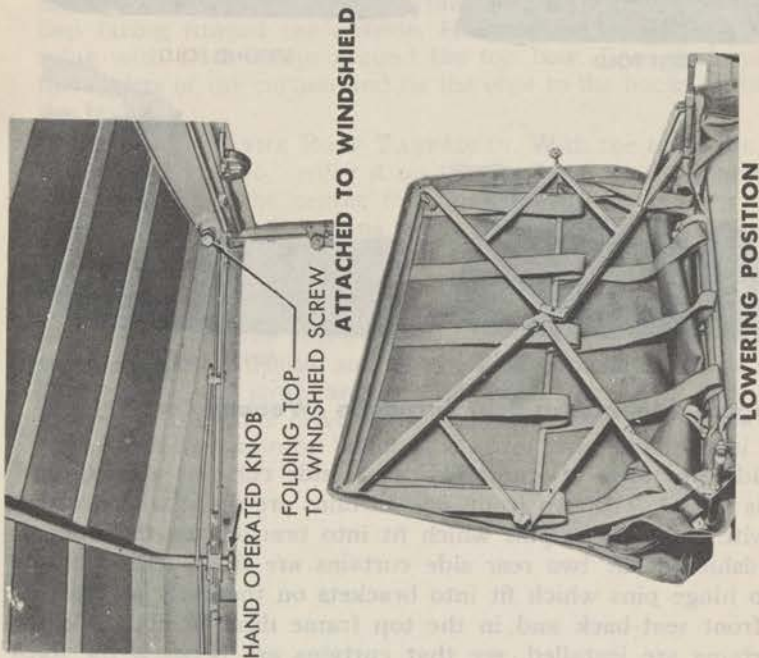


Figure 25—Folding Top Positions (Command)

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(2) Let the top frame rest on the windshield and tighten the large hand-operated knobs securely into position in the recesses in the top frame sides.

(3) Engage the hole in the top frame with the knob of one windshield stanchion, but do not force the frame all the way down on the stanchion. Force the other side of the top frame over the knob of the windshield stanchion. Spring the top frame as necessary to secure alinement between the stanchion knob and hole in the top frame.

(4) See that both sides of the top frame are pushed down until the stanchions are fully entered into the holes in the top frame. Tighten the lock nuts and set screws securely at the stanchions to prevent the top flying up when the vehicle is in motion. Place the long straps in position over the rear bow of the top frame to relieve strain on fabric and fasten the snap fasteners on each side of the top at the rear.



FIRST FOLD



SECOND FOLD



THIRD FOLD



FINAL FOLD RA PD 52726

**Figure 26—Folding Roof Tarpaulin (Weapon Carrier)**

d. **Side Curtains (Command).** Four side curtains are supplied with this model. The two front side curtains are fitted with a metal frame with three hinge pins which fit into brackets on the sides of the windshield. The two rear side curtains are fitted with a frame and two hinge pins which fit into brackets on the body at the rear of the front seat-back and in the top frame directly above. When side curtains are installed, see that curtains are between the flaps of the top and close all snap fasteners. To hold the side curtains in the closed position, turn the lock handles just inside the body open-

## DRIVING CONTROLS AND OPERATION

ing. When the side curtains are not in use, fold them carefully and place them in the storage space in the tail gate compartment.

### e. Removal of Tarpaulin (Weapon Carrier).

(1) Turn the fasteners on the front of the windshield and pull the driver's compartment cover off the fasteners. Unbuckle the straps on the roof tarpaulin and lift off the cover.

(2) Lift the front seats and untie the roof tarpaulin ropes at the two hooks on the front of the body. Untie the ropes at hooks on rear and sides of the body. Open the snap fasteners on the center bow. Remove the roof tarpaulin and fold as shown in figure 26.

(3) Untie the ropes for the front and rear end curtains at the hooks on the sides of the body. Remove the rope laced through the eyelets in the curtains and around the front and rear top bows.

(4) Remove the roof ridge pole. Lift the front and rear bows out of the brackets on the body and remove the center bow.

### f. Installation of Tarpaulin (Weapon Carrier).

(1) INSTALL THE TOP BOWS IN THE BRACKETS IN THE BODY. Install the bolts and nuts through the bracket for the center bow. Then install the ridge pole through the brackets on the top bows and fasten with bolts and wing nuts.

(2) INSTALL THE FRONT AND REAR END CURTAINS. Place the rope through the center eyelet in the end curtain. Adjust the two ends of the rope so that even amounts protrude from each side of the center eyelet. Place the end curtain on the top bow with the curtain flap facing toward the outside. Hold it in position temporarily by tying with cloth straps around the top bow. Lace the rope through the eyelets of the curtain and tie the rope to the hooks on the sides of the body.

(3) INSTALL THE ROOF TARPAULIN. With the tarpaulin folded as shown in figure 26, center it on the top bows at the juncture of the ridge pole and the center top bow. Unfold down over bows. See that the pads for the straps are on the outside, and the part of the tarpaulin labeled front is at the front of the vehicle. Adjust the position of the tarpaulin so that the three pads for the straps along each side of the tarpaulin are directly over the corners of the three top bows. Lace the ropes through the eyelets in the bottom of the front and rear curtains and tie the ropes on the hooks on the body. Place the cloth strap around the center bow and close the snap fastener. Attach the driver's compartment cover and fasten the cover to the roof tarpaulin by buckling the four straps to the roof tarpaulin.

**3/4-TON 4 x 4 TRUCK (DODGE)****Section IV****AUXILIARY EQUIPMENT CONTROLS AND OPERATION**

|                          | Paragraph |
|--------------------------|-----------|
| Winch controls .....     | 10        |
| Fire extinguishers ..... | 11        |

**10. WINCH CONTROLS.**

a. **General.** The Weapon Carrier and Command are equipped with a winch mounted on the front of the vehicle. Power for winch operation is supplied by the engine of the vehicle. The winch can be used as an auxiliary source of power to help lift or move a mired vehicle. It can be used to move another vehicle, or the vehicle on

**Figure 27—Winch Control Lever Positions**

which it is mounted, by rigging the winch cable and snatch block to suitable anchorage.

b. **Winch Controls** (fig. 27). The winch is controlled by a lever in the driver's compartment and a clutch shifter fork handle mounted on the winch. The lever is locked in neutral position by a safety catch, which must be lifted before the lever can be moved.

## AUXILIARY EQUIPMENT CONTROLS AND OPERATION



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Figure 28—Winch Clutch Shifter Fork Handle Positions



RA PD 52746

Figure 29—Winch Caution Plate

## c. To Hook On.

- (1) Make sure the transmission gearshift lever is in neutral position.
- (2) Disengage the clutch shifter fork handle at the winch (fig. 28) and pull out the cable.
- (3) If the cable is under a strain, depress the vehicle clutch pedal and move the control lever to the rear (unwind) position. Then run the engine at idling speed to relieve the strain on the cable.

**3/4-TON 4 x 4 TRUCK (DODGE)**

(4) Rig the cable to suitable anchorage. Always rig up the cable so that it will be pulled straight into the winch drum.

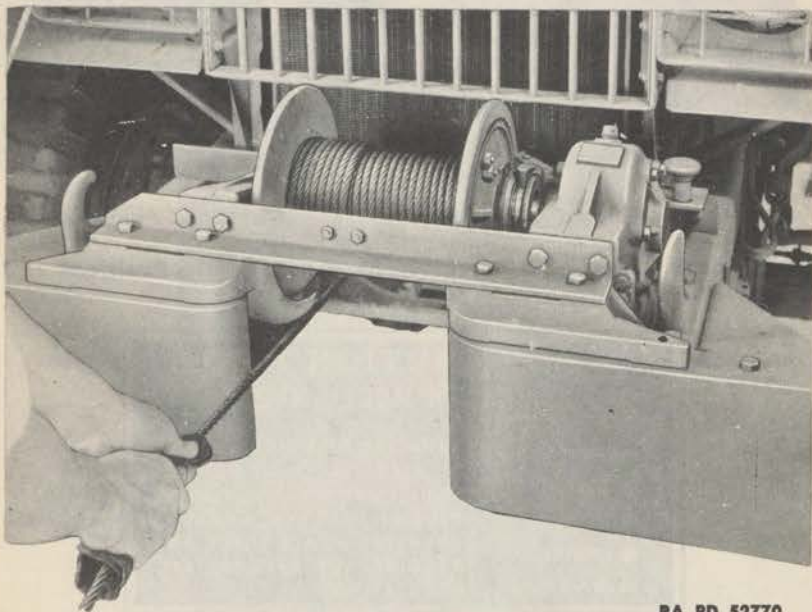
**d. To Pull.**

(1) When using the winch, operate the engine at a reasonable speed. High engine speeds are liable to damage the winch mechanism or cause other serious trouble. Note winch caution plate (fig. 29) which is attached to the instrument panel of each winch-equipped vehicle.

(2) Engage the clutch shifter fork handle (fig. 28).

(3) Depress the vehicle clutch pedal and shift the winch control lever to forward position (fig. 27).

(4) Release the vehicle clutch pedal and accelerate the engine to pull or lift the load.



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**Figure 30—Winding Winch Cable on Drum**

(5) If the winch is being used to assist the vehicle on which it is mounted, place the transmission gearshift lever in first speed (or reverse) and utilize the driving wheels of the vehicle to assist in pulling the vehicle. The transfer case control lever may be placed in position for four-wheel drive or rear wheel drive depending on the condition of the terrain.

**e. To Reverse Winch Operation.**

(1) With engine running at idling speed, depress the vehicle clutch pedal and move the winch control lever to the rear (unwind) position.

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(2) Release the vehicle clutch pedal. Do not accelerate the engine when reversing winch operation.

(3) Never try to lower load by disengaging clutch shifter fork.

#### f. Winding Cable on Drum (fig. 30).

(1) To wind the cable on the drum, secure the end of it to a suitable anchorage and allow the winch to pull the vehicle towards the anchorage. This will help maintain tension on cable as it is being wound on drum.

(2) Guide the cable as it winds on the drum so that the first layer of coils are very close together to prevent the next layer of cable pressing down between the coils of the first layer.

(3) After the first layer is correctly wound on drum, the cable will tend to follow the coils of the first layer, but start and end each successive layer at the extreme edge of the drum.

(4) If the cable shows signs of rust or is excessively dirty, unwind cable and clean. Lubricate with engine oil applied with a cloth as the cable is being rewound on drum.



**Figure 31—Operating Fire Extinguisher**

## 11. FIRE EXTINGUISHERS.

a. **Location.** The fire extinguisher is mounted on the right cowl side panel on all except the Ambulance, where it is located to the rear of the right front door. On later model Weapon Carriers, it is located on the front of the seat riser. To remove the fire extinguisher,

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release the spring lock at the extinguisher handle and lift it out of the bracket, or if equipped with a clamp type bracket, pull it out of clamp.

**b. Fire Classifications.** The fire extinguisher is the vaporizing liquid type. It may be used on any class of fire resulting from burning wood, textile, oil, grease, gasoline, flammable liquids, or electrical short circuits. It may be used on burning electrical equipment in the vehicle, such as generator, cranking motor, or wiring connections.

**c. Operation** (fig. 31). To operate the extinguisher, turn the handle and work it like a pump. To secure best results, direct the discharge at the base of the flame. When used on burning liquids in a container, direct the discharge against the inside of the container just above the burning liquid.

**d. Care.** Keep the extinguisher clean. Wipe the exterior at the top and around the handle to remove dirt and other matter which might tend to obstruct operation of the extinguisher. After use, exchange the extinguisher immediately for one that is fully charged.

**e. Test.** Test by pumping some of the fluid in a clean glass container. If the pump works satisfactorily, and the fluid in the glass container is clean and free of foreign matter, pour the liquid back into the extinguisher through the hole in the cap. Then, if the extinguisher is full of fluid (1 qt liquid capacity), it is in normal operating condition. If the pump does not operate satisfactorily, or the extinguisher contains insufficient or dirty fluid, exchange the extinguisher for one that is in satisfactory operating condition.

Section V

**OPERATION UNDER UNUSUAL CONDITIONS**

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**12. GENERAL.**

a. Vehicle operation over dusty terrain, through deep mud or in extreme temperatures imposes unusual demands on various parts of the vehicle and the necessary precautions should be taken before and during operation to avoid unnecessary failures.

**13. UNUSUAL OPERATION.**

a. Sand, Deep Mud, and Slippery Terrain.

(1) **PREPARATION.** Inspect and clean air cleaners and lubricate chassis lubricant fittings more frequently than under normal driving conditions.

(2) **DRIVING IN SAND OR SOFT TERRAIN.** Drive slowly in loose, dry sand or fresh, thick gravel. Even though greater vehicle speed can be attained on certain types of sand and gravel surfaces, such surfaces are unpredictable and great difficulty may be encountered in steering the vehicle. When starting the vehicle in loose sand or gravel, release pressure on the clutch pedal slowly so that the wheels will not spin. Spinning the wheels causes them to work farther down into the soft surface which may result in the vehicle becoming mired to such an extent that it will have to be towed or winched out.

(3) **DEEP MUD AND SLIPPERY TERRAIN.** When the vehicle becomes mired in soft terrain or deep mud, use good judgment if an attempt is made to drive the vehicle out under its own power. If the vehicle is pulling through soft mud with the front axle engaged, and the driving wheels start spinning, do not race the engine or attempt to "jump" the vehicle out of the mud by racing engine and suddenly engaging the clutch. Racing the engine usually results in digging the driving wheels deeper into the mud, and trying to "jump" the vehicle will lead to destruction of some part of the drive line, such as the clutch, transmission, propeller shafts, or axles. When the vehicle is hopelessly mired in deep mud, tow it out with a winch or with another vehicle.

**14. COLD WEATHER OPERATION.**

a. General.

(1) Operation and maintenance of automotive vehicles at low temperatures involve factors not found at normal operating tem-

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peratures, and operators must devote more time to protective maintenance. Failure to provide extra service will result in actual damage, unnecessary and unwarranted expense, and failure to start.

(2) Temperatures have been divided into two ranges: above 0°F, and below 0°F. Metals and lubricants undergo changes in their physical properties below 0°F. In subzero temperatures accessory equipment for supplying heat to engine, fuel, oil, and intake air, is required.

**b. Gasoline for Low Temperatures.**

(1) **SELECTION.** Use the winter grade of gasoline procured under U. S. Army Specification 2-103, grade C, latest revision.

(2) The formation of ice crystals from small quantities of water in the fuel sometimes causes considerable trouble. To keep water out of the fuel tank, observe the following precautions:

(3) Strain the gasoline through a filter paper or any other type of strainer that will prevent the passage of water. **CAUTION:** *Be sure to provide a positive metallic contact between fuel container and gasoline tank, unless both fuel tank and container are independently grounded.*

(4) In so far as possible, always keep the fuel tanks full. This will reduce the free air space above the fuel from which moisture can be condensed.

(5) Add one quart of denatured alcohol, grade 3, to fuel tank at start of winter season and 1 pint per month thereafter. This will reduce the hazard of ice formation in the fuel.

(6) Do not store fuel in old drums unless they are free from rust and have been thoroughly cleaned. If time is not an urgent factor, do not pump fuel from drum to vehicle until it has settled for 24 hours after filling or moving the drum. Keep portable fuel pumps clean and protected from snow and frost.

(7) When a drum has been opened, be sure to cover the opening or replace the bung to keep out snow, frost, or other foreign matter. Store drums in a covered building or cover them with a tarpaulin.

**c. Engine Lubrication.**

(1) Engine lubrication at temperatures above 0°F is covered in paragraph 24 and figure 32. The following instructions supplement this information and apply only to instances where the temperature falls below 0°F for long periods.

(2) Several methods of keeping engine oil sufficiently fluid for proper lubrication at temperatures below 0°F are listed below. Give preference to these methods in the order listed according to available facilities.

(a) Keep the vehicle in heated enclosure when not in operation.

(b) When engine is stopped, drain crankcase oil while it is hot, and store in a warm place until vehicle is to be operated again. If warm storage is not available, heat the oil before reinstalling. (Avoid overheating the oil; heat only to the point where the bare

### OPERATION UNDER UNUSUAL CONDITIONS

hand can be inserted without burning.) Tag the vehicle in a conspicuous place in the drive compartment to warn personnel that crankcase is empty.

(c) Dilute the crankcase oil with gasoline as follows:

1. Fill engine crankcase to the "FULL" mark with the grade of engine oil prescribed for use at temperatures from  $+32^{\circ}\text{F}$  to  $0^{\circ}\text{F}$ . Add  $1\frac{1}{2}$  quarts of gasoline to the crankcase.

2. Run the engine 5 to 10 minutes to mix the lubricant and diluent thoroughly.

3. Stop the engine and note that the level of the diluted oil is above the normal "FULL" mark on the oil gage. This level should be marked on the gage for future reference.

4. The presence of a large percentage of light diluent will increase oil consumption and, for that reason, the oil level should be checked frequently. Use the grade of engine oil prescribed for use between  $+32^{\circ}\text{F}$  to  $0^{\circ}\text{F}$  to maintain the oil level to manufacturer's "FULL" mark on the gage during operation.

5. If the vehicle is operated 4 hours or more at operating temperature, redilution will be necessary if it is anticipated that the vehicle will be left standing unprotected for 5 hours or more. This can be accomplished by adding engine oil prescribed for use between  $+32^{\circ}\text{F}$  to  $0^{\circ}\text{F}$  to the manufacturer's "FULL" mark; then adding gasoline to the dilution mark on the gage described in step 3 above.

#### d. Transmission, Transfer Case, and Differentials.

- (1) Where the use of SAE 10 engine oil is prescribed for use at temperatures  $+32^{\circ}\text{F}$  to  $0^{\circ}\text{F}$ , it will be used undiluted for operation below  $0^{\circ}\text{F}$ .

- (2) SAE 80 universal gear lubricant, where prescribed, is suitable for use at temperatures as low as  $-20^{\circ}\text{F}$ . If consistent temperature below  $0^{\circ}\text{F}$  is anticipated, drain the gear cases while warm and refill with grade 75 universal gear lubricant which is suitable for operation at all temperatures below  $+32^{\circ}\text{F}$ . If grade 75 universal gear lubricant is not available, SAE 80 universal gear lubricant, diluted with the fuel used in the engine in the proportion of 1 part fuel to 6 parts SAE 80 universal gear lubricant, shall be used. Make-up oil will be diluted in the same proportion before it is added to gear cases.

- (3) After engine has been warmed up, engage clutch and maintain engine speed at fast idle for 5 minutes until gears can be engaged. Put transmission in low (first) gear, and drive vehicle for 100 yards, being careful not to stall engine. This will heat gear lubricants to the point where normal operation can be expected.

#### e. Chassis Lubricants.

- (1) At temperatures below  $0^{\circ}\text{F}$  lubricate chassis points with No. 0 general purpose grease.

- (2) Brake bands, particularly on new vehicles, have a tendency to bind when they are very cold. Always have a blow torch handy

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to warm up these parts if they bind when you are attempting to move the vehicle. Parking the vehicle with the brake released will eliminate most of the binding. Precaution must be taken, under these circumstances, to block the wheels or otherwise prevent movement of the vehicle.

(3) Inspect the vehicle frequently. Shock resistance of metals, or resistance against breaking, is greatly reduced at extremely low temperatures. Operation of vehicles on hard, frozen ground causes strain and jolting which will result in screws breaking or nuts jarring loose.

(4) Disconnect oil-lubricated speedometer cables at the drive end when operating vehicles at temperatures of  $-30^{\circ}\text{F}$  and below. These cables often fail to work properly at these temperatures, and sometimes break due to the excessive drag caused by the high viscosity of the oil with which they are lubricated. Grease-lubricated cables should operate satisfactorily at all temperatures provided they are coated with No. 0 general purpose grease and there is no excess grease in the housing.

**f. Antifreeze.**

(1) Protect the cooling system with antifreeze compound for operation below  $+32^{\circ}\text{F}$ .

(2) Before adding antifreeze compound, be sure the cooling system is clean and completely free from rust.

(3) Inspect all hoses and replace if deteriorated. Inspect hose clamps, plugs, and petcocks, and tighten if necessary. Make sure radiator does not leak, before adding antifreeze compound.

(4) After the cooling system is clean and tight, fill with water to about  $\frac{1}{3}$  capacity. Then add antifreeze compound, in the quantity shown below:

**ANTIFREEZE TABLE**

| Lowest expected<br>Temperature | Quarts,<br>antifreeze compound |
|--------------------------------|--------------------------------|
| $+10^{\circ}\text{F}$ .....    | $4\frac{1}{2}$                 |
| $0^{\circ}\text{F}$ .....      | 6                              |
| $-10^{\circ}\text{F}$ .....    | 7                              |
| $-20^{\circ}\text{F}$ .....    | 8                              |
| $-30^{\circ}\text{F}$ .....    | $8\frac{3}{4}$                 |
| $-40^{\circ}\text{F}$ .....    | $9\frac{3}{4}$                 |
| $-50^{\circ}\text{F}$ .....    | $10\frac{3}{4}$                |

(5) After adding antifreeze compound, fill with water to slightly below the filler neck; then start and warm the engine to normal operating temperature.

(6) The engine should then be stopped and the solution checked with a hydrometer, adding antifreeze compound if required.

(7) Inspect the coolant weekly for strength and color. Rusty solution must be drained, the cooling system thoroughly cleaned, and new solution of the required strength added. **CAUTION:** Use an accurate hydrometer. To test a hydrometer, use 1 part antifreeze

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compound to 2 parts water. This solution should produce a hydrometer reading of 0°F.

#### g. Other Lubrication Points.

(1) Drain steering gear housing if possible, or use suction gun to remove as much lubricant as possible. Refill with grade 75 universal gear lubricant, or, if not available, with SAE 80 universal gear lubricant diluted with fuel used in the engine in the proportion of 1 part fuel to 6 parts SAE 80 universal gear lubricant. Make-up oil will be diluted in the same proportion before it is added to the housing.

(2) For oilcan points where engine oil is prescribed for above 0°F, use light preservative lubricating oil.

#### h. Protection of Electrical System.

(1) GENERATOR AND STARTER. Inspect the brushes, commutators, and bearings. See that the commutators are clean. The large surges of current which occur when starting a cold motor require good contact between brushes and commutators.

(2) WIRING. Inspect and clean all connections, especially the battery terminals. Take care that no short circuits are present, and that there is no ice on spark plugs, wiring, or other electrical equipment.

(3) COIL. Check coil for proper functioning.

(4) DISTRIBUTOR. Clean thoroughly, and replace points. Check the points frequently. In cold weather the current is heavier, and the points may pit and burn more than usual.

(5) SPARK PLUGS. Clean, test, and replace, if necessary. If it is difficult to make the engine fire, reduce the gap 0.005 inches. This will make sparking easier at the reduced voltages likely to prevail.

(6) TIMING. Check carefully. Take care that the spark is not unduly advanced or retarded.

(7) BATTERIES.

(a) The efficiency of batteries decreases sharply with decreasing temperatures and becomes practically nil at -40°F. Do not attempt to start the engine with the battery when it has been exposed to temperatures below -30°F, until the battery has been warmed, unless a warm slave battery is available.

(b) A fully charged battery will not freeze at temperatures likely to be found even in arctic climates, while a fully discharged battery will freeze and rupture at +5°F. See that the battery is always fully charged with a hydrometer reading between 1.275 and 1.300.

(c) Do not add water to a battery when it has been exposed to subzero temperatures unless the battery is to be charged immediately. If water is added and the battery not put on charge, the layer of water will stay at the top and freeze before it has a chance to mix with the acid. Keep vent holes in filler plugs open. Keep terminals tight and clean. At regular intervals, apply a coating of No. 0 general purpose grease, or light, rust-preventive compound.

(8) LIGHTS. Inspect lights carefully.

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#### i. General Conditions.

(1) Make sure that no heavy grease or dirt has been left on the starter throwout mechanism. Heavy grease or dirt may keep the gears from being meshed, or cause them to remain in mesh after the engine starts and thus ruin the starter.

(2) Pull the choke control all the way out to secure the air-fuel ratio required for cold weather starting. Make sure the butterfly valve in the carburetor closes all the way and otherwise functions properly.

(3) Remove or bypass oil filters at temperatures below  $-30^{\circ}\text{F}$ , because the viscous oil will not flow freely through them.

(4) Remove and clean sediment bulb, strainer, etc., at frequent intervals.

#### j. Starting and Operation.

(1) It is possible to start gasoline engines with batteries at temperatures as low as  $-30^{\circ}\text{F}$ , if the engines are properly lubricated and in good mechanical condition.

(2) To insure that the engine will start on the first attempt, proper preparation of the engine is very important. Should the engine fire a few times and stop, water vapor which is a product of combustion, may form frost in the combustion chamber and make it impossible to start without heating the engine to above  $32^{\circ}\text{F}$ . Prolonged starting efforts wear down the battery.

(3) Pull the choke lever all the way out for starting, and keep it partially pulled out until the engine has warmed up. Since only the lightest components of the gasoline vaporize in a cold engine, a very rich mixture is necessary. Depress the clutch pedal to ease the starting load.

(4) After the engine is started, idle it at 800 to 1,000 revolutions per minute until it has warmed up enough to run smoothly. Do not place the vehicle in operation under its own power until its operating temperature of  $160^{\circ}\text{F}$  has been reached. Maintain this temperature by covering or partially covering the radiator.

(5) Cover engine with tarpaulin, tent, or portable shed. Place oil stoves, fire pots, or four or five ordinary kerosene lanterns, under the covering about three hours prior to starting time.

(6) Keep vehicles in sheltered areas shielded from wind. Cold winds increase starting difficulties.

**k. Stopping.** Increase engine speed before turning off ignition. Then turn off ignition and release throttle at the same time. As the engine coasts to a stop, it will blow out all the residual products of combustion, including water vapor, and leave only air and gasoline vapor in the engine.

### 15. HOT WEATHER OPERATION.

**a. Lubrication Attention.** Lubricate the vehicle for hot weather operation as instructed in paragraph 24. Do not use engine oil heavier than that recommended on the Lubrication Guide.

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**b. Cooling System.** Use the correct radiator cap to prevent the loss of cooling solution. Keep the fan belt tension properly adjusted. Keep the radiator core clean. Remove insects or other foreign material lodged between the fins of the core. To do this, direct a stream of water under pressure through the openings in the core from the engine side of the core.

**c. Manifold Heat Control.** Change the position of the manifold heat control to the summer setting (par. 56).

**d. Ignition System.** During wet or damp weather, dry the distributor cap, spark plugs, and wires with a clean rag if hard starting is experienced.

**e. Fuel and Exhaust Systems.** A heat shield is used over the fuel pump to prevent heat reaching the fuel pump. See that the heat shield is kept in place to prevent engine stopping as a result of vapor lock. A clogged or damaged muffler or tail pipe will cause back pressure and overheating of the engine. If the muffler or tail pipe is damaged during operation, report the condition.

## 16. FLOOD AND SUBMERSION.

**a. General.** When a vehicle has been driven through deep water heavily laden with dirt and abrasives or completely submerged, certain precautions must be taken to avoid serious damage to the engine, clutch, transmission, transfer case, axles, universal joints, winch, steering gear, battery, fuel tank, brakes, wheel bearings, etc. If it is known that water, dirt, abrasives, or salt water have contaminated the various units of the vehicle, notify the proper authority at once. Each unit which has been submerged must be completely dismantled, cleaned, and lubricated. If units of the vehicle have been subjected to salt water, certain units will be damaged beyond repair.

**b. Emergency Procedure.** If emergency requirements make complete dismantling and cleansing of units impossible, each unit subjected to water should be inspected, cleansed, and lubricated to defer as much damage as possible. *CAUTION: Emergency cleansing cannot be considered as assurance that further damage will not result, and if the damage is great, notify the proper officer at once that complete dismantling and cleansing of affected units is necessary to avoid serious damage.*

(1) **INSPECT BATTERY.** Remove filler plugs. Check electrolyte for level and appearance. Normal level after immersion indicates little or no water has entered battery. Clean electrolyte solution, even though slightly high, indicates no absorption of excess dirt or damaging foreign material. If solution is dirty, replace battery. Test gravity. If the battery is discharged, recharge or replace.

(2) **LUBRICATE VEHICLE COMPLETELY** (par. 24).

(3) **FUEL FILTERS.** Clean fuel filters on dash and in fuel pump (pars. 75 and 76). If fuel tank has been submerged, drain and refill, run engine, and clean fuel filters again.

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(4) **AIR CLEANERS.** Clean and reoil carburetor air cleaner (par. 72), breather pipe air cleaner (par. 65), and ventilator outlet pipe air cleaner (par. 66).

(5) **WHEEL BEARINGS.** Remove all wheel bearings, clean and re-pack with lubricant and reassemble. Replace the oil seals in the wheel hubs, if they are contaminated with dirt, to avoid damage to seal surfaces and lubricant leakage (pars. 144 and 150).

(6) **CLUTCH.** If the clutch has been submerged, notify higher authority that complete dismantling and cleansing is required. Do not attempt to flush the clutch.

(7) **BRAKE MASTER CYLINDER.** If the brake master cylinder has been submerged, notify higher authority, as it will be necessary to drain and flush the brake system completely with alcohol, at least twice, and then refill with fresh brake fluid.

(8) **STARTING MOTOR GENERATOR, DISTRIBUTOR, AND CARBURETOR.** If these units have been submerged, notify higher authority.

(9) **ENGINE.** If it is known that water or dirt has entered engine, drain engine oil, fill crankcase with five quarts of engine oil SAE 10, and run engine for several minutes at just above idling speed, with clutch released. Before draining engine oil and refilling with correct grade of fresh engine oil, remove valve cover plates and, if necessary, clean chamber with dry-cleaning solvent. If this inspection reveals a dirty condition, notify higher authority, as it will be necessary to remove the oil pan and clean the pan and strainer.

(10) **OIL FILTER.** If water or dirt has entered engine, replace oil filter after flushing engine (step (9) above).

(11) **DRIVE LINE UNITS.** If the transmission, transfer case or winch (if so equipped) has been submerged, drain lubricant and refill, using engine oil, SAE 10. Drain front and rear axles completely, and refill with 1/2 gallon of engine oil, SAE 10. Next, with front and rear axle on jacks, drive all four wheels at a speed of approximately 15 miles per hour for 5 minutes to flush the drive line units. Also run the winch to flush it. Then drain all units thoroughly and refill with correct grade of lubricant (par. 24).

## 17. DECONTAMINATION.

a. Refer to Armored Force Field Manual FM 17-59, covering decontamination of Armored Force Vehicles.

## Section VI

**FIRST ECHELON PREVENTIVE MAINTENANCE SERVICES**

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**18. PURPOSE.**

a. To insure mechanical efficiency it is necessary that the vehicle be systematically inspected at intervals each day it is operated and weekly, so defects may be discovered and corrected before they result in serious damage or failure. Certain scheduled maintenance services will be performed at these designated intervals. The services set forth in this section are those performed by driver or crew Before-operation, During-operation, At-halt and After-operation and Weekly.

b. Driver Preventive Maintenance Services are listed on the back of "Driver's Trip Ticket and Preventive Maintenance Service Record" W. D. Form No. 48 to cover vehicles of all types and models. Items peculiar to specific vehicles but not listed on W. D. Form No. 48 are covered in manual procedures under the items with which they are related. Certain items listed on the form that do not pertain to the vehicle involved are eliminated from the procedures as written into the manual. Every organization must thoroughly school each driver in performing the maintenance procedures set forth in manuals whether they are listed specifically on W. D. Form No. 48 or not.

c. The items listed on W. D. Form No. 48 that apply to this vehicle are expressed in this manual to provide specific procedures for accomplishment of the inspections and services. These services are arranged to facilitate inspection and conserve the time of the driver and are not necessarily in the same numerical order as shown on W. D. Form No. 48. The item numbers, however, are identical with those shown on that form.

d. The general inspection of each item applies also to any supporting member or connection, and generally includes a check to see whether the item is in good condition, correctly assembled, secure, or excessively worn.

(1) The inspection for "good condition" is usually an external visual inspection to determine whether the unit is damaged beyond safe or serviceable limits. The term "good condition" is explained further by the following: Not bent or twisted, not chafed or burned, not broken or cracked, not bare or frayed, not dented or collapsed, not torn or cut.

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(2) The inspection of a unit to see that it is "correctly assembled" is usually an external visual inspection to see whether it is in its normal assembled position in the vehicle.

(3) The inspection of a unit to determine if it is "secure" is usually an external visual examination, a wrench, hand-feel, or a pry-bar check for looseness. Such an inspection should include any brackets, lock washers, lock nuts, locking wires, or cotter pins, used in assembly.

(4) "Excessively worn" will be understood to mean worn close to or beyond serviceable limits, and likely to result in a failure if not replaced before the next scheduled inspection.

e. Any defects or unsatisfactory operating characteristics beyond the scope of first echelon to correct must be reported at the earliest opportunity to the designated individual in authority.

## 19. BEFORE-OPERATION SERVICE.

a. This inspection schedule is designed primarily as a check to see that the vehicle has not been damaged, tampered with, or sabotaged, since the After-operation Service was performed. Various combat conditions may have rendered the vehicle unsafe for operation and it is the duty of the driver to determine whether or not the vehicle is in condition to carry out any mission to which it is assigned. This operation will not be entirely omitted, even in extreme tactical situations.

b. **Procedures.** Before-operation Service consists of inspecting items listed below according to the procedure described, and correcting or reporting any deficiencies. Upon completion of the service, results should be reported promptly to the designated individual in authority.

(1) **ITEM 1, TAMPERING AND DAMAGE.** Look for any injury to vehicle, its accessories or equipment, caused by tampering or sabotage, collision, falling debris, or shell fire, since parking. Look within engine compartment for evidence of these conditions, and for loosened or damaged engine accessories or drive belt, loose fuel, oil or coolant lines, or disconnected control linkage.

(2) **ITEM 2, FIRE EXTINGUISHER.** See that extinguisher is securely mounted and not damaged, and look for evidence of opened operating valve or leakage.

(3) **ITEM 3, FUEL, ENGINE OIL, AND COOLANT SUPPLY.** Check supply of fuel, oil and coolant and add as necessary to bring to proper levels. *NOTE: Any appreciable drop in levels since After-operation Service should be investigated and cause corrected or reported.* During freezing weather when antifreeze solution is in use, if any appreciable addition of water is needed, antifreeze value should be tested by second echelon and added if necessary. Be sure spare fuel, oil and water cans are full and securely mounted.

(4) **ITEM 4, ACCESSORIES AND DRIVES.** Examine units, such as carburetor, generator, cranking motor, fan, and air cleaners for

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looseness, damage or leaks. Be sure drive belt is in good condition and has approximately  $\frac{1}{2}$  inch finger pressure deflection.

(5) **ITEM 6, LEAKS (GENERAL).** Look on ground and under vehicle and within engine compartment for leaks, particularly at fuel tanks and lines, crankcase and oil filters, radiator, water pump, water lines and connections, brake fluid lines, shock absorbers, and all gear cases. Trace any leaks found to their source, and correct or report them.

(6) **ITEM 7, ENGINE WARM-UP.** Start engine, noting any tendency toward hard starting. Observe action of cranking motor, particularly if it has adequate cranking speed, and engages, and disengages without unusual noise when in operation. Set hand throttle so engine runs at fast idle, and during warm-up proceed with following Before-operation Services. *NOTE: If oil pressure is not evident in 30 seconds, stop engine and investigate.*

(7) **ITEM 8, CHOKE.** When starting engine, check operation of choke. As engine warms up, reset choke as required for engine to run smoothly and to prevent overchoking and oil dilution.

(8) **ITEM 9, INSTRUMENTS.**

(a) *Oil Gage.* Pressure above 30 miles per hour should be 30 to 50 pounds; at idle speed, at least 15 pounds.

(b) *Ammeter.* Ammeter should show a high positive (+) charge immediately after starting engine at fast idle. High charge readings may continue if battery is low or electrical load heavy.

(c) *Engine Temperature Gage.* Reading should increase gradually after starting, to normal operating range, 160°F to 185°F. Maximum safe operating temperature 200°F.

(d) *Fuel Gage.* Ordinarily, tank will be filled after operation and gage should register "full."

(9) **ITEM 10, HORN AND WINDSHIELD WIPERS.** If tactical situation permits, test horn for proper operation and tone. Test wiper operation and observe if blades contact glass evenly and arms travel through full stroke. Inspect for damage.

(10) **ITEM 11, GLASS AND REAR-VISION MIRROR.** Clean all glass and inspect for damage. Aim rear-vision mirror and tighten if loose.

(11) **ITEM 12, LAMPS (LIGHTS) AND REFLECTORS.** Clean all lamps and warning reflectors. Examine them for looseness or damage. If tactical situation permits, check operation of all lights.

(12) **ITEM 13, WHEEL AND FLANGE NUTS.** See that all wheel side ring, mounting, and axle flange nuts are present and secure.

(13) **ITEM 14, TIRES.** Pressure 40 pounds (maximum) cool. Inspect tires for damage, and remove any objects lodged in carcass.

(14) **ITEM 15, SPRINGS AND SUSPENSIONS.** Inspect springs and shock absorbers to see that they are secure and not damaged. Examine shocks for leaks.

(15) **ITEM 16, STEERING LINKAGE.** Inspect gear case for lubricant leaks and all linkage connections for looseness or damage.

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(16) ITEM 17, FENDERS AND BUMPERS. Inspect these units for looseness or damage.

(17) ITEM 18, TOWING CONNECTIONS. Inspect all towing devices for looseness or damage. Examine pintle to be sure it operates freely and locks securely.

(18) ITEM 19, BODY LOAD AND TARPS. Inspect cab, body, and tarpaulins, for looseness and damage. See that any cargo is secure and properly distributed; that doors, windows, and windshield, operate properly and latch securely, and that stretchers or other special ambulance equipment is properly stowed.

(19) ITEM 20, DECONTAMINATOR. Be sure unit is present, fully charged, and secure.

(20) ITEM 21, TOOLS AND EQUIPMENT. Be sure all items are present, serviceable, and properly mounted or stowed.

(21) ITEM 22, ENGINE OPERATION. Before vehicle is put in motion, be sure oil gage registers 30 to 50 pounds at normal operating speed. Accelerate and decelerate and listen for any unusual vibration or noise. Note any unsatisfactory operating characteristics or excessive exhaust smoke.

(22) ITEM 23, DRIVER'S PERMIT AND FORM 26. Driver must have his operator's permit on his person. Check to see that Standard Accident Report Form No. 26, operator's manual, Lubrication Guide and W. D. Form No. 478 are present in vehicle, legible, and properly stowed.

(23) ITEM 25, DURING-OPERATION CHECK. The During-operation Services and observations start immediately the vehicle is put in motion as follows.

**20. DURING-OPERATION SERVICE.**

a. While vehicle is in motion, listen for any unusual sounds that may indicate trouble. Be on the alert to detect any odor of overheated components or units such as generator, brakes or clutch, fuel vapor from a leak in fuel system, exhaust, gas, smoke, or other signs of trouble. Any time the brakes are used, gears shifted, or vehicle turned, consider this a test and notice any unsatisfactory or unusual performance. Watch the instruments constantly.

b. **Procedures.** During-operation Services consist of observing items listed below according to the procedures following each item, and investigating any indications of serious trouble. Notice minor deficiencies to be corrected or reported at earliest opportunity, usually next scheduled halt.

(1) ITEM 27, FOOT AND HAND BRAKES. Foot brakes should stop vehicle smoothly on about  $\frac{1}{2}$  of the total pedal travel. Pedal should have  $\frac{7}{16}$  inch free travel before meeting resistance, and return to off position immediately foot pressure is released. Hand brake should lock and hold vehicle on a reasonable incline, leaving  $\frac{1}{4}$  to  $\frac{1}{3}$  of ratchet travel in reserve.

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(2) ITEM 28, CLUTCH. Clutch should release fully to allow easy gear shifting, must not grab during engagement, or slip when fully engaged under load. Pedal should have  $1\frac{1}{8}$  inch free travel before meeting resistance and must release fully without striking bottom of floor plate.

(3) ITEM 29, TRANSMISSION. Gears should shift easily and not creep out of mesh during operation.

(4) ITEM 30, TRANSFER. Transfer unit should shift easily and not creep out of mesh during operation.

(5) ITEM 31, ENGINE AND CONTROLS. Be on the alert for deficiencies in engine performance such as lack of usual power, misfiring or stalling, unusual noise or vibration, indications of overheating or excessive exhaust smoke. Observe if engine responds to all controls and if controls appear to be in proper adjustment, and not excessively loose or binding. NOTE: *If radio interference is reported during operation, the driver will cooperate with the radio operator in locating its sources (par. 42).*

(6) ITEM 32, INSTRUMENTS. Observe readings of all instruments frequently during operation to be sure units to which they apply are functioning satisfactorily.

(a) *Oil Pressure Gage.* Reading should show 30 to 50 pounds above 30 miles per hour.

(b) *Ammeter.* During operation with all lamps and accessories turned off, ammeter should indicate a positive (+) charge above 20 miles per hour, or with fully charged battery it may register zero. Investigate or report excessive negative (-) readings.

(c) *Engine Temperature Gage.* Reading should increase gradually during warm-up to normal operating range, 160°F to 185°F. Maximum safe temperature 200°F.

(d) *Speedometer.* Pointer should indicate actual vehicle speed and odometer should register total accumulated mileage.

(7) ITEM 33, STEERING GEAR. Note any indication of looseness or binding, pull to one side, wandering, shimmy, wheel tramp, or unusual noise.

(8) ITEM 34, RUNNING GEAR. Be on alert for any unusual operating characteristics or noise from wheels, axles, or suspension units, that might indicate looseness or damage, or under-inflated tires.

(9) ITEM 35, BODY. Note any noise or abnormal condition that might indicate shifting, loose top tarpaulin or curtains, loose or damaged doors, hardware, load, or mounted body attachments.

## 21. AT-HALT SERVICE.

a. At-halt Services may be regarded as minimum maintenance procedures and should be performed under all tactical conditions even though more extensive maintenance services must be slighted or omitted altogether.

b. *Procedures.* At-halt Services consist of investigating any deficiencies noted during operation, inspecting items listed below ac-

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cording to the procedures following the items, and correcting any deficiencies found. Deficiencies not corrected should be reported promptly to the designated individual in authority.

(1) ITEM 38, FUEL, OIL, AND WATER SUPPLY. See that fuel, engine oil, and coolant supply, is adequate to operate the vehicle to the next stop. Install all caps securely. If engine is hot, fill radiator slowly while engine is running at a fast idle.

(2) ITEM 39, TEMPERATURES: HUBS, BRAKE DRUMS, TRANSFER, TRANSMISSION, AND AXLES. Place hand cautiously on each brake drum and wheel hub to see if it is abnormally hot. Inspect transfer case, transmission and axle housings for excessive lubricant leakage.

(3) ITEM 40, AXLE AND TRANSFER VENTS. Inspect vents for damage or clogging.

(4) ITEM 41, PROPELLER SHAFTS. Inspect all drive shafts and universal joints for any foreign matter wound around shafts or joints.

(5) ITEM 42, SPRINGS AND SUSPENSIONS. Inspect for broken or shifted spring leaves or damaged spring parts.

(6) ITEM 43, STEERING LINKAGE. Examine all steering control mechanism and connections for looseness or damage. Investigate any unusual condition noted during operation.

(7) ITEM 44, WHEEL AND FLANGE NUTS. See that all wheel side ring mounting, and axle flange nuts are present and secure.

(8) ITEM 45, TIRES. Inspect all tires for under-inflation or damage. Remove objects lodged in carcasses. See that spare is inflated and secure in carrier.

(9) ITEM 46, LEAKS (GENERAL). Look under vehicle and within engine compartment for indications of leakage of fuel, oil, or coolant. Trace any found to their source and correct or report them.

(10) ITEM 47, ACCESSORIES AND BELTS. Examine all accessible units for looseness or damage. Be sure fan belt is adjusted to 1/2 inch finger pressure deflection. If radio interference was reported, examine the wiring, and noise suppression units in engine compartment for loose connections or mountings. Give special attention to resistor-suppressors at spark plugs and distributor.

(11) ITEM 48, AIR CLEANERS. If operating under extremely dusty or sandy condition, inspect air cleaner and breather cap to see that they are in condition to deliver properly. Service as necessary.

(12) ITEM 49, FENDERS AND BUMPER. Inspect front and rear bumpers and fenders for looseness or damage.

(13) ITEM 50, TOWING CONNECTIONS. Inspect all connections for looseness or damage. Be sure locking devices are secure.

(14) ITEM 51, BODY, LOAD, AND TARPAULINS. Inspect all items for damage, or indications of looseness or shifting.

(15) ITEM 52, GLASS. Clean all windshield, door, window, mirror, light, and warning reflector glass and inspect for damage.

**FIRST ECHELON PREVENTIVE MAINTENANCE SERVICES****22. AFTER-OPERATION AND WEEKLY SERVICE.**

a. After-operation Servicing is particularly important because at this time the driver inspects his vehicle to detect any deficiencies that may have developed and corrects those he is permitted to handle. He should report promptly to the designated individual in authority the results of his inspection. If this schedule is performed thoroughly, the vehicle should be ready to roll again on a moment's notice. The Before-operation Service, with a few exceptions, is then necessary only to ascertain whether the vehicle is in the same condition in which it was left upon completion of the After-operation Service. The After-operation Service should never be entirely omitted even in extreme tactical situations, but may be reduced to the bare fundamental services outlined for the At-halt Service if necessary.

b. **Procedures.** When performing the After-operation Service the driver must remember and consider any irregularities noticed during the day in the Before-operation, During-operation, and At-halt Services. The After-operation Service consists of inspecting and servicing the following items. Those items of the After-operation Service that are marked by an asterisk (\*) require additional weekly services, the procedures for which are indicated in step (b) of each applicable item.

(1) **ITEM 55, ENGINE OPERATION.** Accelerate and decelerate engine and note any tendency to miss or back-fire. Listen for any unusual noise or vibration that may indicate worn or inadequately lubricated parts, loose mountings, incorrect fuel mixture or faulty ignition. Note any unusual exhaust smoke. Investigate and correct or report any deficiencies noted during operation.

(2) **ITEM 56, INSTRUMENTS.** Check all instruments to be sure they register and indicate correct engine performance. Inspect them for looseness or damage. Stop engine.

(3) **ITEM 54, FUEL, OIL, AND WATER SUPPLY.** Fill fuel tank and check fuel gage for fuel indication. Check crankcase oil and coolant supply and add as necessary to bring to correct level. In freezing weather if any appreciable amount of coolant is necessary, have antifreeze value checked and add sufficient to protect cooling system against freezing. Do not add coolant while engine is too hot. Fill all spare fuel, oil, and water cans, if supply has been used.

(4) **ITEM 57, HORN AND WINDSHIELD WIPERS.** Inspect to see if these items are loose or damaged. If tactical conditions permit, test horn for proper operation and tone.

(5) **ITEM 58, GLASS AND REAR VISION MIRROR.** Clean all glass and inspect for looseness or damage.

(6) **ITEM 59, LAMPS (LIGHTS) AND REFLECTORS.** Inspect for looseness or damage. If tactical situation permits, test all lamps and switches for proper operation. Clean lenses.

(7) **ITEM 60, FIRE EXTINGUISHER.** Inspect for looseness or damage and full charge. If extinguisher has been in use or valves opened, report for refill or exchange.

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(8) ITEM 61, DECONTAMINATOR. Inspect for looseness or damage and full charge; if used, report for refill or exchange.

(9) ITEM 62, \*BATTERY AND VOLTMETER.

(a) Inspect battery to see that it is clean, secure, and not leaking or damaged. See that filler caps are fingertight.

(b) *Weekly.* Clean top of battery. If terminal connections or posts are corroded, clean and apply fresh, thin coating of grease and tighten. Check level of solution and add water if required. During freezing weather, do not add water until just before operation. Battery and carrier should be secure, and battery not bulging or leaking. Tighten any loose mountings cautiously so as not to damage the battery case.

(10) ITEM 63, ACCESSORIES AND BELTS. Inspect units such as carburetor and air cleaner, generator, starting motor, fan, water pump, distributor, regulator unit, and oil filter, for looseness, damage, or leakage. Check condition and adjustment of fan belt. Should have 1/2 inch finger pressure deflection. Investigate and correct or report any deficiencies noted during operation.

(11) ITEM 64, ELECTRICAL WIRING. Inspect all ignition and accessible low voltage wiring for looseness or damage; wipe off grease or moisture. Be sure all wiring is supported, so as not to chafe against other vehicle parts. Examine resistor-suppressors at spark plugs and distributor to see if they are scorched or damaged.

(12) ITEM 65, \*AIR CLEANER AND BREATHER CAP.

(a) Inspect for looseness or damage. Examine oil in reservoirs for correct level and excessive dirt. When operating in sandy or dusty conditions, clean and service engine air cleaner, crankcase ventilator breather cap, and ventilator outlet filter element as often as necessary.

(b) *Weekly.* Remove engine air cleaner and crankcase breather reservoirs and elements, wash in dry-cleaning solvent, refill oil-bath type reservoirs with clean oil and install securely. On element type ventilators, wash in dry-cleaning solvent, dry, dip in clean engine oil, and install. Be sure all gaskets seal properly and that joints and connections are secure.

(13) ITEM 66, \*FUEL FILTER.

(a) Inspect for looseness, damage, and fuel leaks.

(b) *Weekly.* Remove drain plug and drain off all accumulated dirt and water. If draining shows excessive dirt or water, remove bowl and clean filter element in dry-cleaning solvent. Do not disassemble element. Replace all unserviceable gaskets. *NOTE: If excessive water is present, report to higher echelon for cleaning of fuel tank.*

(14) ITEM 67, ENGINE CONTROLS. Examine all engine operating control linkage for looseness, damage, excessive wear, and adequate lubrication.

(15) ITEM 68, \*TIRES.

(a) Examine all tires, including spares, for damage and excessive wear. Remove all embedded foreign matter, such as nails, glass, or

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stones from carcasses. Check for low pressures and proper position of valve stem and presence of valve caps. Inflate to 40 pounds pressure as needed (cool).

(b) *Weekly*. Replace badly worn or otherwise unserviceable tires. Serviceable tires which show abnormal wear should be relocated to other wheels to even wear. Apparent mechanical deficiencies causing such wear should be reported for attention by higher echelon.

(16) ITEM 69, SPRINGS AND SUSPENSIONS. Inspect for looseness or damage, abnormal spring sag, shifted spring leaves, and shock absorber leakage. Investigate any noise or unusual condition noted during operation.

(17) ITEM 70, STEERING LINKAGE. Inspect for looseness, damage, and proper lubrication. Investigate any unusual operating condition noted during operation.

(18) ITEM 71, PROPELLER SHAFTS. Inspect all drive shafts and universal joints for looseness or damage and excessive oil leaks. Remove any foreign material wound around shafts or joints.

(19) ITEM 73, \*AXLE AND TRANSFER VENTS.

(a) See that all axle housing and transfer case vents are present, in good condition and clean. Inspect for indications of excessive lubricant leakage from vents.

(b) *Weekly*. Remove accessible vents, clean out passages and install securely.

(20) ITEM 73, LEAKS (GENERAL). Look in engine compartment and under vehicle for indications of fuel, engine oil, coolant, shock absorber or brake fluid, or gear oil leaks.

(21) ITEM 74, GEAR OIL LEVELS. Check gear oil levels in differentials, transfer case, transmission and steering gear housing, and report if low. Correct levels are from lower edge of filler hole (hot) to  $\frac{1}{2}$  inch below (cold).

(22) ITEM 76, FENDERS AND BUMPERS. Inspect front and rear fenders and bumpers for looseness or damage.

(23) ITEM 77, TOWING CONNECTIONS. Inspect towing hooks, pintle hook and lock pins and chains for looseness, excessive wear or damage.

(24) ITEM 78, BODY, LOAD, AND TARPS. Inspect cab and body carefully for damage or loose parts. Examine top tarpaulin and side or end curtains for worn spots or other damage, and see that they are secure. See that any cargo is secure and properly distributed. Inspect doors or windows and their hardware to see if they are in good condition, and securely mounted, and that they operate properly.

(25) ITEM 79, \*WINCH.

(a) Examine winch assembly for looseness or damage and excessive oil leaks at worm gear housing. See that winch drive shaft shear pin is secure. Be sure sliding clutch operates freely and locks securely.

(b) *Weekly*. If vehicle has been operated in deep water, sample lubricant for contamination. If water is present, report condition.

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Pull the vehicle up a steep bank with the winch. Release engine clutch; if vehicle starts to back down, the brake needs adjusting. If winch cable is dry or wound unevenly, unwind entire length, clean with thin oil or kerosene, rewind evenly on winch drum, applying a thin coat of engine or gear oil while winding, and secure cable chain and hook securely to front tow hooks. NOTE: *Clean, used oil is satisfactory.*

**(26) ITEM 82, \*TIGHTENING.**

(a) Tighten any mounting or external assembly nuts or screws where inspection of vehicle has indicated the necessity.

(b) *Weekly.* Tighten wheel side ring, mounting and axle flange nuts and cap screws; spring U-bolts, shackles and rebound clips; universal joint companion flanges; engine mountings, transfer case mountings; steering arms, towing connections, or any other mounting or assembly nuts or screws that inspection or experience indicates are necessary on a weekly or mileage basis.

**(27) ITEM 83, \*LUBRICATE AS NEEDED.**

(a) Lubricate all items such as shackles, hinges, latches, control linkage frictional joints, or any point where inspection has indicated oilcan or hand greasing is needed.

(b) *Weekly.* Lubricate all points of the vehicle indicated on the Lubrication Guide, figure 71, as needing lubrication on a weekly or a mileage basis.

**(28) ITEM 84, \*CLEAN ENGINE AND VEHICLE.**

(a) Clean dirt and grease or oil drippings from inside cab and body, and from engine compartment and exterior of engine. Wipe off excess dirt and grease from entire vehicle.

(b) *Weekly.* Wash vehicle when possible or wipe off thoroughly. Inspect paint or camouflage pattern for rust or for bright spots which might cause light reflections. See that vehicle markings are legible unless covered for tactical reasons. CAUTION: *If vehicle is driven into water for washing, care must be taken to see that water or dirt does not get into wheel bearings, gear cases or brakes, or on electrical units or wiring.*

**(29) ITEM 85, \*TOOLS AND EQUIPMENT.**

(a) Check vehicle stowage and tool lists to see that all items are present. Inspect items to see that they are in good condition and properly mounted or stowed (pars. 25 and 26).

(b) *Weekly.* Clean all tools and equipment of rust or dirt, and apply preservative where necessary, when possible. See that tools with cutting edges are sharp and properly protected and that all items are securely mounted or stowed.

Section VII

# LUBRICATION

|                         | Paragraph |
|-------------------------|-----------|
| Introduction .....      | 23        |
| Lubrication Guide ..... | 24        |

## 23. INTRODUCTION.

a. Lubrication is an essential part of preventive maintenance, determining to a great extent the serviceability of parts and assemblies.

## 24. LUBRICATION GUIDE.

a. Lubrication instructions for this materiel are consolidated in a Lubrication Guide (fig. 32). These specify the points to be lubricated, the periods of lubrication, and the lubricant to be used. In addition to the items on the Guide, other small moving parts, such as hinges and latches, must be lubricated at frequent intervals.

b. **Supplies.** In the field it may not be possible to supply a complete assortment of lubricants called for by the Lubrication Guide to meet the recommendations. It will be necessary to make the best use of those available, subject to inspection by the officer concerned, in consultation with responsible ordnance personnel.

c. **Lubrication Notes.** The following notes apply to the Lubrication Guide (fig. 32). Figures 33 through 38 illustrate in detail various points to be lubricated. All note references in the Guide itself (fig. 32) are to the subparagraph below having the corresponding number:

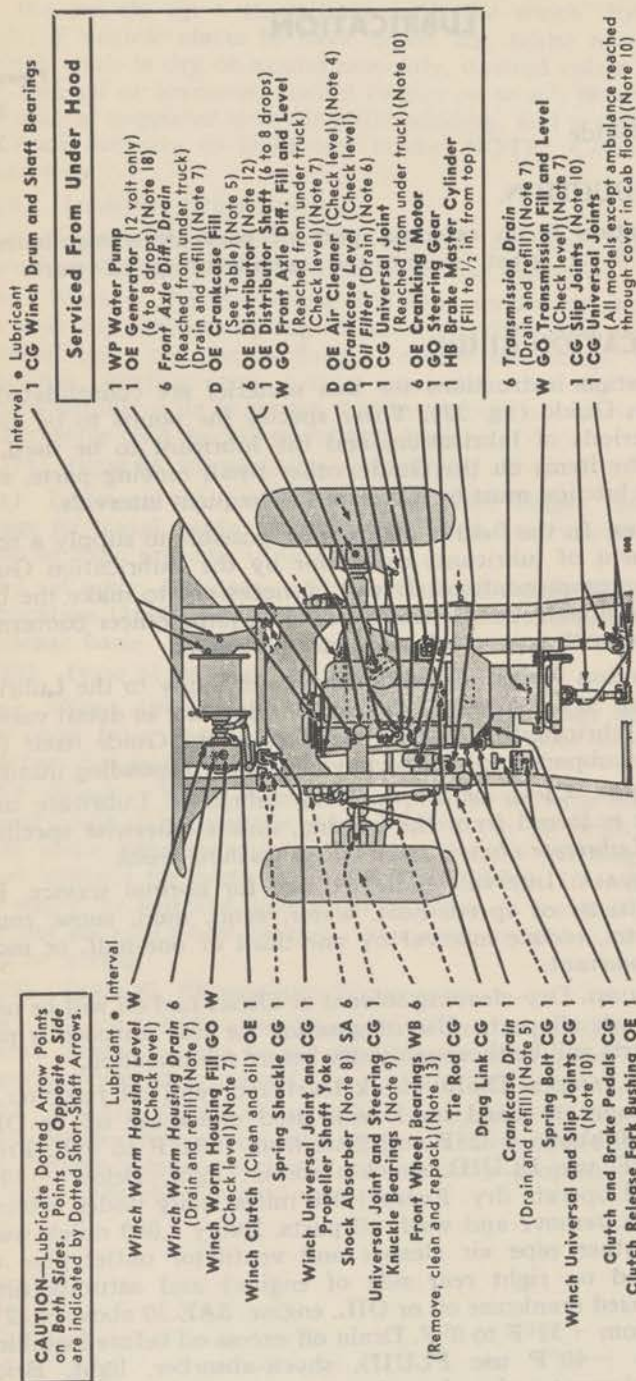
(1) **FITTINGS.** Clean before applying lubricant. Lubricate until new lubricant is forced from the bearing, unless otherwise specified. **CAUTION:** *Lubricate chassis points after washing truck.*

(2) **INTERVALS.** Intervals indicated are for normal service. For extreme conditions of speed, heat, water, sand, mud, snow, rough roads, dust, etc., reduce interval by one-third or one-half, or more, if conditions warrant.

(3) **CLEANING.** Dry-cleaning solvent or Diesel fuel oil will be used to clean or wash all parts. Use of gasoline for this purpose is prohibited. All parts will be thoroughly dry before relubrication.

(4) **AIR CLEANERS.** Daily, check level and refill oil reservoir of engine air cleaner to bead level with used crankcase oil or OIL, engine, SAE 30 above +32°F and SAE from +32°F to 0°F. From 0°F to -40°F use FLUID, shock-absorber, light. Below -40°F remove oil and operate dry. Every 1,000 miles, daily under extreme dust conditions, remove and wash all parts. Every 1,000 miles, wash crankcase breather pipe air cleaner and ventilator outlet pipe air cleaner (located on right rear side of engine) and saturate filter element with used crankcase oil or OIL, engine, SAE 30 above +32°F and SAE 10 from +32°F to 0°F. Drain off excess oil before installing. From 0°F to -40°F use FLUID, shock-absorber, light. Below -40°F wash element and replace dry.

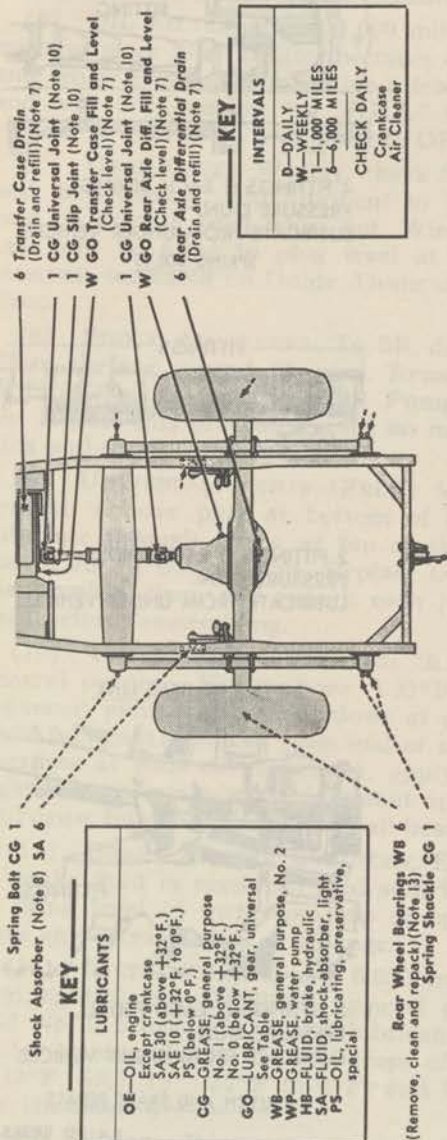
3/4-TON 4 x 4 TRUCK (DODGE)



M-6256—First Revise—12-8-43—QQ79

RA PD 312581

# LUBRICATION



## KEY

### LUBRICANTS

OE—OIL, engine  
 EC—Grease, engine  
 SAE 10 (above +32°F.)  
 SAE 10 (below +32°F.)  
 PS (below 0°F.)  
 CG—GREASE, general purpose  
 No. 1 (above +32°F.)  
 No. 0 (below +32°F.)  
 GO—LUBRICANT, gear, universal  
 See Table  
 WB—GREASE, general purpose, No. 2  
 WP—GREASE, water pump  
 HB—FLUID, brake, hydraulic  
 PA—FLUID, shock-absorber, light  
 PS—OIL, lubricating, preservative,  
 special

## KEY

### INTERVALS

D—DAILY  
 W—WEEKLY  
 1—1,000 MILES  
 6—6,000 MILES

CHECK DAILY  
 Crankcase  
 Air Cleaner

TABLE OF CAPACITIES AND LUBRICANTS TO BE USED

| UNIT                               | CAPACITY (Approx.) | LOWEST EXPECTED AIR TEMPERATURE |                  |                    |
|------------------------------------|--------------------|---------------------------------|------------------|--------------------|
|                                    |                    | +32° F. and above               | +32° F. to 0° F. | Below 0° F.        |
| Crankcase                          | 5 qt.              | OE SAE 30                       | OE SAE 10        | Refer to OFSB 6-11 |
| Transmission (With Power Take-off) | 2 3/4 qt.          |                                 |                  |                    |
| Transfer Case                      | 2 qt.              |                                 |                  |                    |
| Differentials (each)               | 2 1/4 qt.          |                                 |                  |                    |
| Winch Worm Housing                 | 1 qt.              |                                 |                  |                    |

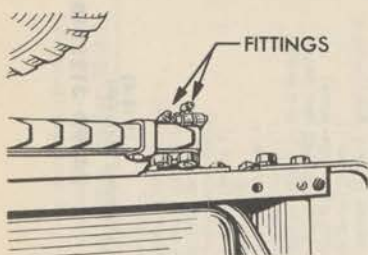
M-6256—First Revise—12-8-43—Q079

12-18-43  
 Supersedes all previous instructions.

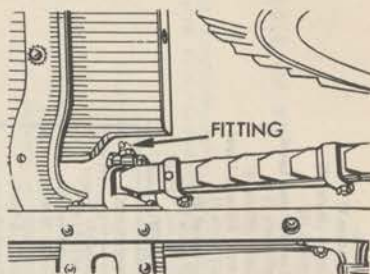
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Figure 32—Lubrication Guide

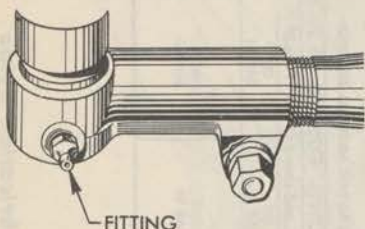
**3/4-TON 4 x 4 TRUCK (DODGE)**



8 FITTINGS (2 EACH SHACKLE).  
PRESSURE GUN.  
LUBRICATE FROM UNDER VEHICLE.  
SPRING SHACKLES

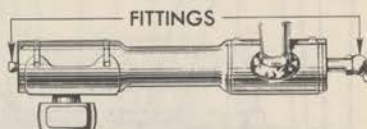


4 FITTINGS (1 EACH SPRING)  
PRESSURE GUN.  
LUBRICATE FROM UNDER VEHICLE.  
SPRING BOLTS



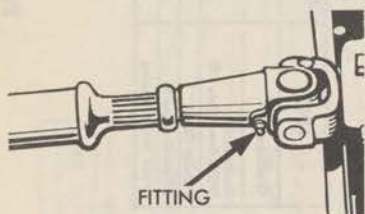
2 FITTINGS (1 EACH END).  
PRESSURE GUN.  
LUBRICATE FROM UNDER VEHICLE.

TIE ROD ENDS



2 FITTINGS (1 EACH END).  
PRESSURE GUN.  
LUBRICATE FROM UNDER VEHICLE.

STEERING DRAG LINK



3 FITTINGS (1 EACH SHAFT).  
5 FITTINGS IF EQUIPPED WITH  
WINCH (1 EACH END OF  
WINCH DRIVE SHAFT).  
PRESSURE GUN.  
LUBRICATE FROM UNDER VEHICLE.

PROPELLER SHAFT SPLINE YOKE



2 FITTINGS (1 EACH PEDAL).  
PRESSURE GUN.  
LUBRICATE FROM UNDER VEHICLE.

CLUTCH AND BRAKE PEDALS

RA PD 58345

**Figure 33—Lubrication Fittings**

## LUBRICATION

(5) **CRANKCASE.** Drain only when engine is hot. To aid in complete draining, the front end of the truck should be slightly higher than the rear. Refill to "FULL" mark on gage. Run engine a few minutes and recheck oil level. **CAUTION:** Level should be at "running level," or center mark between "FULL" and " $\frac{1}{2}$  FULL" marks on gage. Be sure pressure gage indicates oil is circulating.

(6) **OIL FILTER.** Every 1,000 miles, drain sediment. Every 6,000 miles or more often if filter becomes clogged, drain filter, clean inside and renew element. Run engine a few minutes, check crankcase level and add OIL, engine, to "FULL" mark on gage (SAE 30 above  $+32^{\circ}\text{F}$  to  $0^{\circ}\text{F}$ , below  $0^{\circ}\text{F}$ , refer to OFSB 6-11).

(7) **GEAR CASES.** Weekly, check level with truck on level ground and, if necessary, add lubricant to  $\frac{1}{2}$  inch below plug level when cold or to plug level when hot. Winch gear case and steering gear case will be filled to plug level at all times. Drain and refill at intervals indicated on Guide. Drain only after operation. Keep vents clean.

(8) **SHOCK ABSORBERS.** To fill, disconnect linkage at lower end. Clean surface around fill plug. Remove plug and fill to level with FLUID, shock-absorber, light. Pump arm up and down to expel air. Repeat this procedure until no more fluid can be added. Install plug and connect linkage.

(9) **UNIVERSAL JOINTS (FRONT WHEELS).** With truck on level ground, remove plug at bottom of ball end of axle housing and lubricate through fitting at top of steering knuckle until lubricant comes out of bottom hole. Replace bottom plug. Every six months, disassemble, clean and repack each joint with one pound of lubricant before reassembling.

(10) **UNIVERSAL JOINTS AND SLIP JOINTS.** Apply GREASE, general purpose, No. 1 above  $+32^{\circ}\text{F}$  and No. 0 below  $+32^{\circ}\text{F}$ , to universal joints until it overflows at ends of cross and to slip joint until lubricant is forced from end of slip joint. If lubricant does not overflow at ends of all crosses, apply "C" clamp if available and tighten on bearings where lubricant appeared; then relubricate. This will cause lubricant to flow into all bearings.

(11) **BRAKE MASTER CYLINDER.** Every 1,000 miles, inspect level of brake fluid in reservoir. Add sufficient FLUID, brake, hydraulic, to bring level  $\frac{1}{2}$  inch from top of opening in reservoir. Report at once any excessive loss or leakage.

(12) **DISTRIBUTOR.** Every 6,000 miles, wipe distributor breaker cam lightly with GREASE, general purpose, No. 1 above  $+32^{\circ}\text{F}$  and No. 0 below  $+32^{\circ}\text{F}$  and lubricate breaker arm pivot and wick under rotor with one to two drops of OIL, engine, SAE 30 above  $+32^{\circ}\text{F}$ , SAE 10  $+32^{\circ}\text{F}$  to  $0^{\circ}\text{F}$ ; and OIL, lubricating, preservative, special, below  $0^{\circ}\text{F}$ .

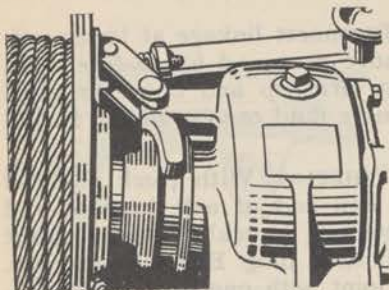
(13) **WHEEL BEARINGS.** Remove bearing cone assemblies from hub and wash spindle and inside of hub. Inspect bearing races and replace if necessary. Wet the spindle and inside of hub and hub cap with GREASE, general purpose, No. 2, to a maximum thickness of

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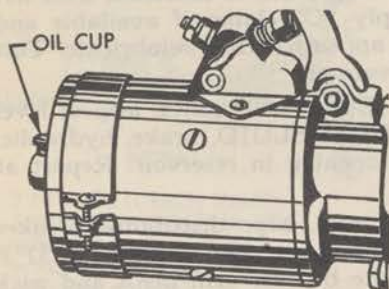
2 FITTINGS (1 EACH SIDE).  
PRESSURE GUN.  
LUBRICATE FROM FRONT OF VEHICLE.

WINCH DRUM BEARINGS



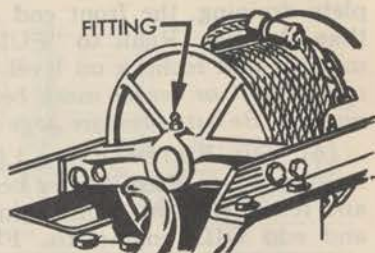
SLIDING SURFACE OF JAW CLUTCH  
AND LINKAGE.  
OIL CAN.  
LUBRICATE FROM FRONT OF VEHICLE.

WINCH CLUTCH



OIL CUP.  
OIL CAN.  
LUBRICATE FROM UNDER  
LEFT SIDE OF HOOD.

CRANKING MOTOR



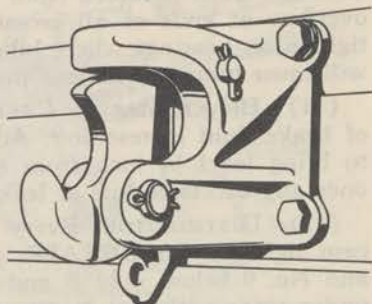
1 FITTING.  
PRESSURE GUN.  
LUBRICATE FROM ABOVE FRONT  
OF VEHICLE.

WINCH SHAFT



1 FITTING.  
PRESSURE GUN.  
LUBRICATE FROM UNDER  
LEFT SIDE OF HOOD.

WATER PUMP

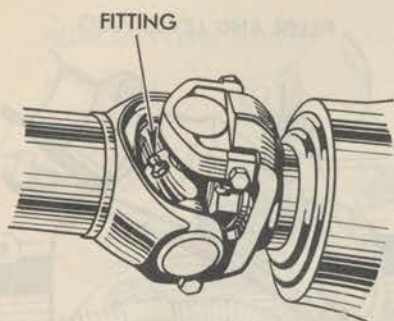


PINS AND CONNECTIONS.  
OIL CAN.  
LUBRICATE FROM REAR OF VEHICLE.

PINTLE HOOK RA PD 318325

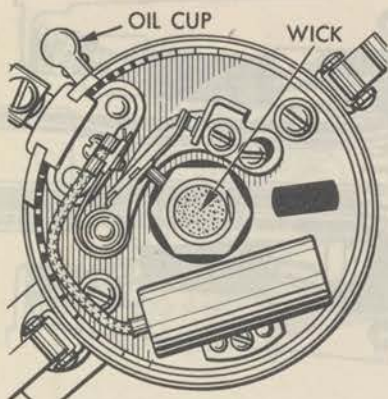
**Figure 34—Lubrication Fittings**

## LUBRICATION



6 FITTINGS (1 EACH JOINT CROSS), 8 FITTINGS IF EQUIPPED WITH WINCH. PRESSURE GUN.

LUBRICATE FROM UNDER VEHICLE. THE FRONT JOINT FITTING ON THE TRANSMISSION TO TRANSFER CASE SHAFT IS LUBRICATED THROUGH COVERED OPENING IN FLOOR OF FRONT COMPARTMENT, EXCEPT AMBULANCE.

UNIVERSAL JOINTS

OIL CUP AND WICK.

OIL CAN.

LUBRICATE FROM UNDER LEFT SIDE OF HOOD.

REMOVE CAP AND ROTOR AND APPLY 2 OR 3 DROPS OF ENGINE OIL TO WICK BENEATH ROTOR. SEE THAT NO OIL IS ON OR NEAR BREAKER POINTS. CLEAN VENT HOLE IN CAP.

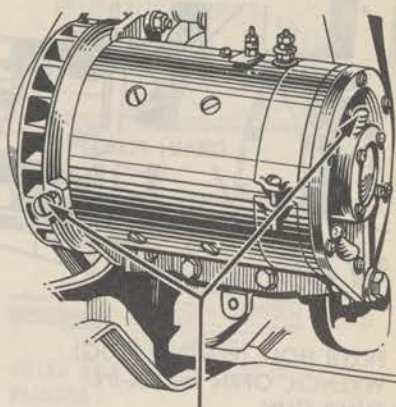
DISTRIBUTOR

1 FITTING. PRESSURE GUN.

LUBRICATE THROUGH COVERED OPENING IN FRONT COMPARTMENT FLOOR. LOOSEN COVER SCREWS AND SLIDE COVER FROM OPENING.

SCREW DRIVER.

RETURN COVER AND TIGHTEN SCREWS.

FRONT JOINT  
(EXCEPT AMBULANCE)

OIL CUPS

2 OIL CUPS (1 ON EACH END).

OIL CAN.

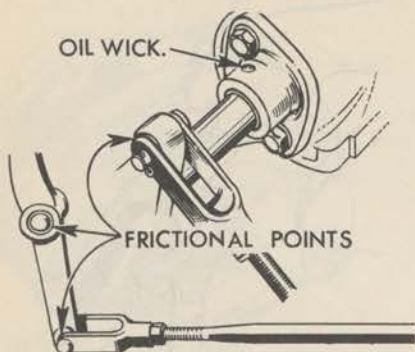
LUBRICATE FROM UNDER LEFT SIDE OF HOOD.

GENERATOR (12 VOLT)

RA PD 58347

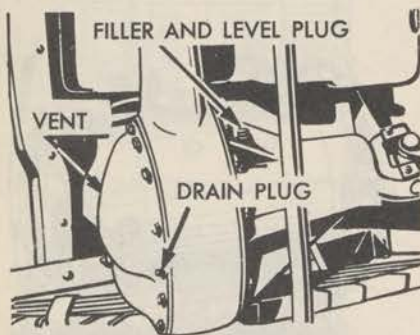
Figure 35—Lubrication Fittings

**3/4-TON 4 x 4 TRUCK (DODGE)**



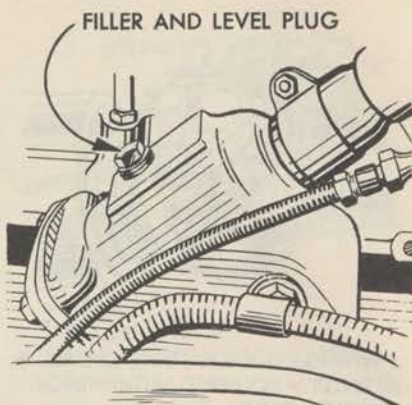
TRANSFER CASE SHIFT, HAND BRAKE CONTROL, FOOT PEDAL LINKAGE AND CLUTCH RELEASE FORK BUSHING WICK. OIL CAN. LUBRICATE FROM UNDER VEHICLE. OIL CLEVIS PINS, ROD CONNECTIONS AND WICK IN CLUTCH RELEASE FORK FLANGE AT LEFT SIDE OF CLUTCH HOUSING.

LINKAGE



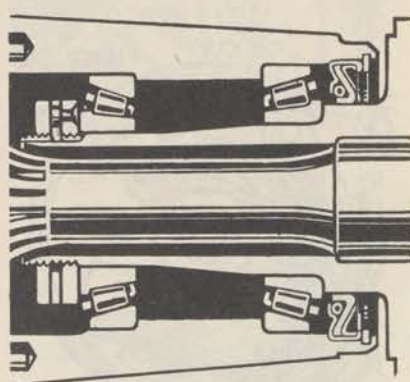
FILLER HOLE (REMOVE PLUG). WRENCH, OPEN END 5/8-IN. PUMP GUN. LUBRICATE FROM UNDER VEHICLE. REMOVE AND CLEAN VENT. WRENCH, OPEN END 5/8-IN. DRAIN AND FLUSH, REMOVE DRAIN PLUG. WRENCH, OPEN END 5/16-IN. INSTALL PLUGS AND VENT.

FRONT AND REAR AXLES



FILLER HOLE (REMOVE PLUG). WRENCH, OPEN END 5/8-IN. PUMP GUN. LUBRICATE FROM UNDER LEFT SIDE OF HOOD. INSTALL PLUG.

STEERING GEAR



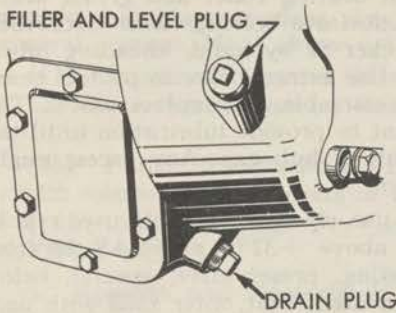
REMOVE HUB AND BEARINGS. WRENCHES, WHEEL BEARING ADJUSTING NUT AND OPEN END 5/8, 1/2 AND 3/8-IN. CLEAN AND REPACK. LUBRICATE FROM SIDES OF VEHICLE. ASSEMBLE AND ADJUST.

WHEEL BEARINGS

RA PD 58348

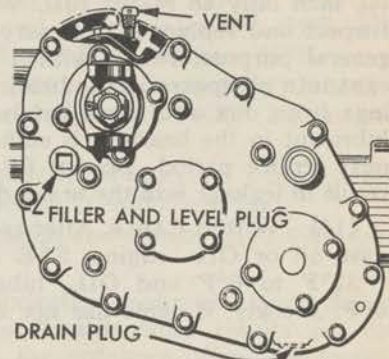
**Figure 36—Lubrication Fittings**

# LUBRICATION



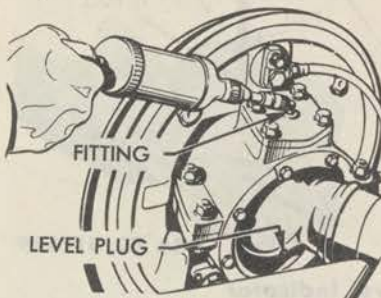
FILLER HOLE (REMOVE PLUG).  
WRENCH, OPEN END  $\frac{5}{8}$ -IN.  
PUMP GUN.  
LUBRICATE FROM UNDER VEHICLE.  
DRAIN AND FLUSH, REMOVE DRAIN  
PLUG.  
WRENCH, OPEN END  $\frac{5}{8}$ -IN.  
INSTALL PLUGS.

## TRANSMISSION



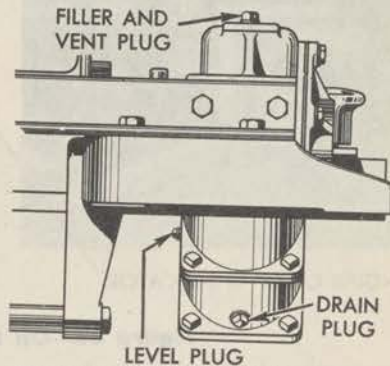
FILLER HOLE IN REAR OF CASE (RE-  
MOVE PLUG).  
WRENCH, OPEN END  $\frac{5}{8}$ -IN.  
PUMP GUN.  
LUBRICATE FROM UNDER VEHICLE.  
REMOVE AND CLEAN VENT.  
PLIERS.  
DRAIN AND FLUSH, REMOVE DRAIN  
PLUG.  
WRENCH, DRIVE END  $\frac{3}{8}$ -IN.  
INSTALL PLUGS AND VENT.

## TRANSFER CASE



4 PLUGS (2 EACH JOINT), UNSCREW  
PLUGS AND SCREW ANGLE FITTING  
IN TOP HOLE IF TOP HOLE IS NOT  
EQUIPPED WITH FITTING.  
SCREW DRIVER AND WRENCH, OPEN  
END  $\frac{7}{16}$ -IN.  
PRESSURE GUN.  
LUBRICATE FROM UNDER VEHICLE.  
INSTALL PLUGS.

## FRONT AXLE UNIVERSAL



FILLER AND LEVEL HOLES (REMOVE  
PLUGS).  
WRENCHES, OPEN END,  $\frac{9}{16}$  AND  $\frac{3}{16}$ -IN.  
PUMP GUN.  
LUBRICATE FROM FRONT OF VEHICLE.  
CLEAN VENT HOLE IN FILLER PLUG.  
TO DRAIN AND FLUSH, REMOVE DRAIN  
PLUG.  
WRENCH, OPEN END  $\frac{9}{16}$ -IN.  
INSTALL PLUGS.

## WINCH HOUSING

RA PD 58349

Figure 37—Lubrication Fittings

**3/4-TON 4 x 4 TRUCK (DODGE)**

1/16 inch only to retard rust. Wash bearing cones and grease seals. Inspect and replace if necessary. Lubricate bearings with GREASE, general purpose, No. 2, with a packer or by hand, kneading lubricant into all spaces in the bearing. Use extreme care to protect bearings from dirt and immediately reassemble and replace wheel. The lubricant in the bearings is sufficient to provide lubrication until the next service period. Do not fill hub or hub cap. Any excess might result in leakage into the brake drum.

(14) WINCH CABLE. After each use, clean and oil with used crankcase oil or OIL, engine, SAE 30 above +32°F and SAE 10 from +32°F to 0°F and OIL, lubricating, preservative, special, below 0°F. Weekly, if cable has not been used, coat outer coils with used

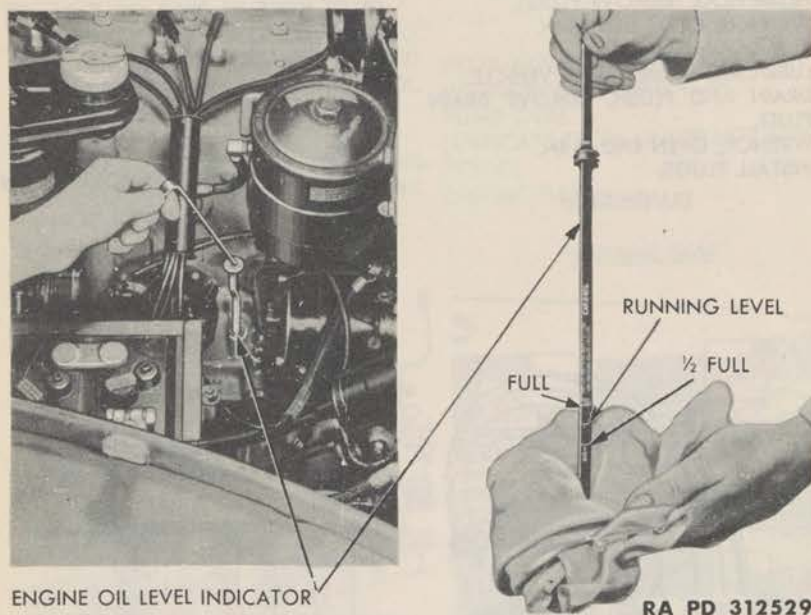


**Figure 38—Oil Level Indicator**

crankcase oil or OIL, engine, SAE 30 above +32°F and SAE 10 from +32°F to 0°F and OIL, lubricating, preservative, special, below 0°F. Monthly, unwind entire cable, clean and oil.

(15) CLUTCH PILOT BEARING. When clutch is disassembled for any other purpose, clean and repack with GREASE, general purpose, No. 2.

(16) OILCAN POINTS. Every 1,000 miles lubricate transfer case shift, hand brake control, foot pedal linkage, winch control linkage, pintle hook, hood and windshield hinges and locks, and ambulance rear folding step joints with OIL, engine, SAE 30 above +32°F; SAE 10 +32°F to 0°F and OIL, lubricating, preservative, special.

## LUBRICATION

below 0°F. **CAUTION.** Do not oil throttle control linkage. Also coat door latches, hinges, wedges, checks and striker plates with GREASE, general purpose, No. 1 above +32°F and No. 0 below +32°F.

(17) **RUBBER BUSHINGS.** Every 1,000 miles, apply FLUID, brake, hydraulic, to shock absorber link bushings. **CAUTION:** Do not use oil.

(18) **POINTS REQUIRING NO LUBRICATION SERVICE.** These are the clutch release bearing, generator bearings (6-volt), and fan.

(19) **COLD WEATHER.** For lubrication and service below 0°F, refer to OFSB 6-11.

**d. Reports and Records.** If lubrication instructions are closely followed, proper lubricants used, and satisfactory results are not obtained, a report will be made to the ordnance officer responsible for the maintenance of the materiel. A complete record of lubrication servicing will be kept.

**3/4-TON 4 x 4 TRUCK (DODGE)****Section VIII****TOOLS AND EQUIPMENT STOWAGE ON THE VEHICLE**

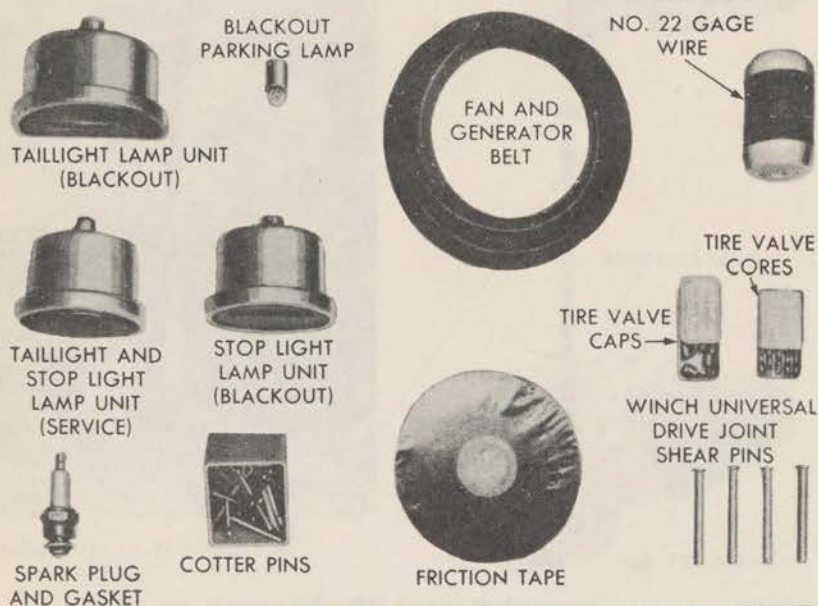
Paragraph

Vehicle tools and equipment..... 25

**25. VEHICLE TOOLS AND EQUIPMENT.**

a. **Vehicle Tools.** The tools and equipment supplied with all vehicles are listed and illustrated in figure 40. Space for carrying tools and equipment is provided in each vehicle as follows:

(1) **WEAPON CARRIER, TELEPHONE MAINTENANCE, AND EMERGENCY REPAIR:** In space provided under front seats.



RA PD 312547

**Figure 39—Spare Parts Kit**

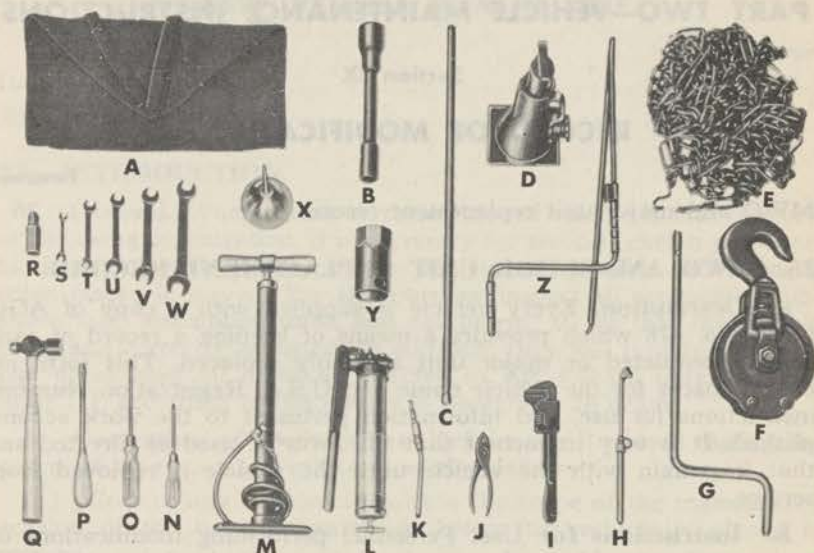
(2) **CARRYALL:** In the tool box built under the driver's seat. Store tire chains in the space provided to the rear of the right wheel housing.

(3) **AMBULANCE:** In the locker boxes along the right and left sides in the interior of the body.

(4) **COMMAND:** In the rear deck compartment.

b. **Spare Parts Kit.** Each vehicle is equipped with a kit, containing spare parts as illustrated in figure 39. The kit is located in the spare parts box, under the map board.

## TOOLS AND EQUIPMENT STOWAGE ON THE VEHICLE



- A—BAG, TOOL  
 B—WRENCH, WHEEL SOCKET  
 C—HANDLE, WHEEL WRENCH  
 D—JACK  
 E—CHAINS, TIRE  
 F—BLOCK, SNATCH  
 (WINCH EQUIPPED VEHICLES)  
 G—CRANK, STARTING  
 H—GAGE, TIRE PRESSURE  
 I—WRENCH, ADJUSTABLE  
 J—PLIERS  
 K—ADAPTER, GREASE GUN  
 L—GUN, GREASE  
 M—PUMP, TIRE  
 N—SCREWDRIVER, CROSS RECESS,  
 SMALL  
 O—SCREWDRIVER, CROSS RECESS,  
 LARGE

- P—SCREWDRIVER, PLAIN  
 Q—HAMMER  
 R—WRENCH, SPARK PLUG  
 S—WRENCH, OPEN END,  $\frac{1}{32}$  IN.  
 AND  $\frac{3}{8}$  IN.  
 T—WRENCH, OPEN END,  $\frac{7}{16}$  IN.  
 AND  $\frac{1}{2}$  IN.  
 U—WRENCH, OPEN END,  $\frac{9}{16}$  IN.  
 AND  $\frac{5}{8}$  IN.  
 V—WRENCH, OPEN END,  $\frac{19}{32}$  IN.  
 AND  $\frac{11}{16}$  IN.  
 W—WRENCH, OPEN END,  $\frac{3}{4}$  IN.  
 AND  $\frac{7}{8}$  IN.  
 X—CAN, OIL  
 Y—WRENCH, WHEEL BEARING  
 ADJUSTING NUT  
 Z—HANDLE, JACK

RA PD 312546

Figure 40—Vehicle Tools and Equipment

c. **Care of Tools and Equipment.** Tools subjected to water and dirt will rust if not cleaned and wiped dry. After using tools and equipment, clean and dry them thoroughly and store in the spaces provided on vehicles.

d. **Pioneer Equipment.** The following pioneer equipment is on the vehicle:

AX, 41-A-1277  
 CONTAINER, 5 gal,  
 42-D-1280

MATTOCK, 41-M-720,  
 with handle  
 SHOVEL, 41-S-3170

**3/4-TON 4 x 4 TRUCK (DODGE)****PART TWO—VEHICLE MAINTENANCE INSTRUCTIONS****Section IX****RECORD OF MODIFICATIONS**

Paragraph

MWO and major unit replacement record ..... 26

**26. MWO AND MAJOR UNIT REPLACEMENT RECORD.**

**a. Description.** Every vehicle is supplied with a copy of AGO Form No. 478 which provides a means of keeping a record of each MWO completed or major unit assembly replaced. This form includes spaces for the vehicle name and U.S.A. Registration Number, instructions for use, and information pertinent to the work accomplished. It is very important that the form be used as directed and that it remain with the vehicle until the vehicle is removed from service.

**b. Instructions for Use.** Personnel performing modifications or major unit assembly replacement must record clearly on the form a description of the work completed and must initial the form in the columns provided. When each modification is completed, record the date, hours and/or mileage, and MWO number. When major unit assemblies, such as engines, transmissions, transfer cases, are replaced, record the date, hours and/or mileage and nomenclature of the unit assembly. Minor repairs and minor parts and accessory replacements need not be recorded.

**c. Early Modifications.** Upon receipt by a third or fourth echelon repair facility of a vehicle for modification or repair, maintenance personnel will record the MWO numbers of modifications applied prior to the date of AGO Form No. 478.

## Section X

## NEW VEHICLE RUN-IN TEST

|                              | Paragraph |
|------------------------------|-----------|
| Introduction .....           | 27        |
| Run-in test procedures ..... | 28        |

**27. INTRODUCTION.**

a. **General.** When a new or reconditioned vehicle is first received at the using organization, it is necessary for second echelon personnel to determine whether or not the vehicle will operate satisfactorily when placed in service. For this purpose, inspect all accessories, sub-assemblies, assemblies, tools, and equipment, to see that they are in place and correctly adjusted. In addition, they will perform a run-in test of at least 50 miles as directed in AR 850-15, paragraph 25, table III, according to procedures in paragraph 28 below.

b. **Correction of Deficiencies.** Deficiencies disclosed during the course of the run-in test will be treated as follows:

(1) Correct any deficiencies within the scope of the maintenance echelon of the using organization before the vehicle is placed in service.

(2) Refer deficiencies beyond the scope of the maintenance echelon of the using organization to a higher echelon for correction.

(3) Bring deficiencies of serious nature to the attention of the supplying organization.

**28. RUN-IN TEST PROCEDURES.****a. Preliminary Service.**

(1) **FIRE EXTINGUISHER.** See that the portable extinguisher is present and in good condition. Test it momentarily for proper operation, and mount it securely.

(2) **FUEL, OIL, AND WATER.** Fill fuel tank. Check crankcase oil and coolant supply, add oil and coolant as necessary to bring to correct levels. Allow room for expansion in fuel tank and radiator. During freezing weather, test value of antifreeze and add as necessary to protect cooling system against freezing. **CAUTION:** *If there is a tag attached to filler cap or steering wheel concerning engine oil in crankcase, follow instructions on tag before driving the vehicle.*

(3) **FUEL FILTER.** Inspect fuel filter for leaks, damage, and secure mountings and connections. Drain filter sediment bowl. If any appreciable amount of water or dirt is present, remove bowl, and clean bowl and element in dry-cleaning solvent. Also drain accumulated water or dirt from bottom of fuel tank. Drain only until fuel runs clean.

(4) **BATTERY.** Make hydrometer and voltage test of battery, and add clean water to bring electrolyte  $\frac{3}{8}$  inch above plates.

(5) **AIR CLEANER AND BREATHER CAP.** Examine carburetor air cleaner, crankcase filler breather cap, and ventilator outlet filter

**3/4-TON 4 x 4 TRUCK (DODGE)**

unit, to see if they are in good condition and secure. Clean elements and reservoirs. Fill oil bath cleaners to proper level with fresh oil. Dip ventilator outlet element in clean oil. Reinstall all units securely. Be sure all gaskets are in good condition and that ducts and air horn connections are tight.

(6) **ACCESSORIES AND BELTS.** See that accessories such as carburetor, generator, regulator, cranking motor, distributor, fan, water pump, and oil filter are securely mounted. Make sure fan and generator drive belt is in good condition, and adjusted to have  $\frac{1}{2}$  inch finger pressure deflection.

(7) **ELECTRICAL WIRING.** Examine all accessible wiring and conduits to see if they are in good condition, securely connected, and properly supported.

(8) **TIRES.** See that all tires, including spare, are properly inflated to 40 pounds, cool; that stems are in correct position; all valve caps present and fingertight. Inspect for damage, and remove objects lodged in treads and carcasses.

(9) **WHEEL AND FLANGE NUTS.** See that all wheel mounting and axle flange nuts are present and secure.

(10) **FENDERS AND BUMPER.** Examine fenders and front bumper for looseness and damage.

(11) **TOWING CONNECTIONS.** Inspect tow hooks and pintle hook for looseness or damage. See that pintle hook operates properly and latches securely.

(12) **BODY AND TARPULINS.** Inspect body for damage and loose mountings. See that all attachments and items of special equipment are in good condition, and examine tarpaulins and curtains where used for damage and loose fastenings. Be sure doors fit, close, and latch properly. Inspect glass for damage. See that any window lift mechanism and all hardware is in good operating condition and secure. Examine seats, safety straps, floorboards and skid strips, and stowage compartments for good condition, correct assembly, and secure mounting.

(13) **WINCH.** Inspect winch for damage, secure mounting, and oil leaks. Test winch clutch mechanism for proper operation. Test drag brake to see if it holds drum for spinning and as cable is unwound; inspect it for wear, damage, and adequate lubrication. Test winch automatic brake by placing vehicle at top of steep incline and attaching cable to another vehicle at bottom. While drawing towed vehicle uphill, release engine clutch; if towed vehicle backs downhill, brake needs adjustment. Start lowering vehicle downhill with winch; throw out engine clutch; if towed vehicle does not stop or drifts more than one or two inches, brake needs adjustment (par. 189). After test, rewind cable evenly and tightly on drum and as winding, clean cable thoroughly and apply a film of engine oil.

(14) **LUBRICATE.** Perform a complete lubrication of the vehicle, covering all intervals, according to the instructions on the Lubrication Guide (par. 24), except gear cases, wheel bearings, and other

**NEW VEHICLE RUN-IN TEST**

units lubricated in items (1) to (13). Check all gear case oil levels, and add as necessary to bring to correct level. Change only if condition of oil indicates the necessity, or if gear oil is not of proper grade for existing atmospheric temperature. Perform items (15) to (18) during lubrication.

(15) **SPRINGS AND SUSPENSIONS.** Inspect front and rear springs and shocks to see that they are in good condition, correctly assembled, secure, and that bushings and shackle pins are not excessively loose, or damaged.

(16) **STEERING LINKAGE.** See that all steering arms, rods and connections are in good condition and secure; and that gear case is securely mounted and not leaking excessively.

(17) **PROPELLER SHAFTS.** Inspect all shafts and universal joints to see if they are in good condition, correctly assembled, aligned, secure, and not leaking excessively.

(18) **AXLE AND TRANSFER VENTS.** See that axle housing and transfer case vents are present, in good condition, and not clogged.

(19) **CHOKE.** Examine choke to be sure it opens and closes fully in response to operation of choke button.

(20) **ENGINE WARM-UP.** Start engine and note if cranking motor action is satisfactory, and engine has any tendency toward hard starting. Set hand throttle to run engine at fast idle during warm-up. During warm-up, reset choke button so engine will run smoothly, and to prevent overchoking and oil dilution.

(21) **INSTRUMENTS.**

(a) *Oil Pressure Gage.* Immediately after engine starts, observe if oil pressure is satisfactory. (Normal operating pressure, hot, at running speeds is 40 to 50 pounds, at idle speed 15 pounds.) Stop engine if pressure is not indicated in 30 seconds.

(b) *Ammeter.* Ammeter should show slight positive (+) charge. High charge may be indicated until generator restores to battery, current used in starting.

(c) *Temperature Gage.* Engine temperature should rise gradually during warm-up period, to normal range, 160°F to 185°F.

(d) *Fuel Gage.* Fuel gage should register "FULL" if tank has been filled.

(22) **ENGINE CONTROLS.** Observe if engine responds properly to controls and if controls operate without excessive looseness or binding.

(23) **HORN AND WINDSHIELD WIPERS.** See that these items are in good condition and secure. If tactical situation permits, test horn for proper operation and tone. See if wiper arms will operate through their full range and that blade contacts glass evenly and firmly.

(24) **GLASS AND REAR-VIEW MIRROR.** Clean all body glass and rear-view mirror and inspect for looseness and damage. Adjust mirror for correct vision.

(25) **LAMPS (LIGHTS) AND REFLECTORS.** Clean lenses and inspect all units for looseness and damage. If tactical situation permits,

**3/4-TON 4 x 4 TRUCK (DODGE)**

open and close all light switches to see if lamps respond properly.

(26) **LEAKS (GENERAL).** Look under vehicle, and within engine compartment, for indications of fuel, oil, coolant, and brake fluid leaks. Trace any leaks found to source and correct or report them to designated authority.

(27) **TOOLS AND EQUIPMENT.** Check tools shown in figures 39 and 40, to be sure all items are present, and see that they are serviceable and properly mounted or stowed.

**b. Run-in Test.** Perform the following procedures (1) to (10) inclusive during the road test of the vehicle. On vehicles which have been driven 50 miles or more in the course of delivery from the supplying to the using organization, reduce the length of the road test to the least mileage necessary to make observations listed below. **CAUTION:** *Continuous operation of the vehicle at speeds approaching the maximums indicated on the caution plate should be avoided during the test.*

(1) **DASH INSTRUMENTS AND GAGES.** Do not move vehicle until engine temperature reaches 135°F. Maximum safe operating temperature is 190°F. Observe readings of ammeter, oil, temperature, and fuel gages to be sure they are indicating the proper function of the units to which they apply. Also see that speedometer registers the vehicle speed and that odometer registers accumulating mileage.

(2) **BRAKES: FOOT AND HAND.** Test service brakes to see if they stop vehicle effectively, without side pull, chatter, or squealing, and observe if pedal free travel is  $\frac{7}{16}$  inch before meeting resistance and pedal to under side of floor plate clearance is  $\frac{1}{2}$  inch. Parking brake should hold vehicle on a reasonable incline, with  $\frac{1}{4}$  to  $\frac{1}{3}$  lever ratchet travel in reserve. **CAUTION:** *Avoid long application of brakes until shoes become evenly seated to drums.*

(3) **CLUTCH.** Observe if clutch operates smoothly, without grab, chatter, or squeal on engagement, or slippage under load, when fully engaged. See that pedal has  $1\frac{1}{8}$  inch free travel before meeting resistance. **CAUTION:** *Do not ride clutch pedal unnecessarily, and do not engage or disengage new clutch severely, until driven and driving disks have become properly worn in.*

(4) **TRANSMISSION AND TRANSFER.** Gearshift mechanism should operate easily and smoothly, and gears should operate without unusual noise, and not slip out of mesh. Test front axle declutching, and power take-off mechanism (on vehicles so equipped) for proper operation.

(5) **STEERING.** Observe steering action for binding or looseness, and note any excessive pull to one side, wander, shimmy, or wheel tramp. See that column, bracket, and wheel are secure.

(6) **ENGINE.** Be on the alert for any abnormal engine operating characteristics or unusual noise, such as lack of pulling power or acceleration, backfiring, misfiring, stalling, overheating, or excessive exhaust smoke. Observe if engine responds properly to all controls.

(7) **UNUSUAL NOISE.** Be on the alert throughout road test for any unusual noise from body and attachments, running gear, suspen-

## NEW VEHICLE RUN-IN TEST

sions, or wheels, that might indicate looseness, damage, wear, inadequate lubrication, or underinflated tires.

(8) **HALT VEHICLE AT 10-MILE INTERVALS FOR SERVICES (9) AND (10) BELOW.**

(9) **TEMPERATURES.** Cautiously hand-feel each brake drum and wheel hub for abnormal temperatures. Examine transmission, transfer case, and differential housings, for indications of overheating and excessive lubricant leaks at seals, gaskets, or vents. **NOTE:** *Transfer case temperatures are normally higher than other gear cases.*

(10) **LEAKS.** With engine running, and fuel, engine oil, and cooling systems under pressure, look within engine compartment and under vehicle for indications of leaks.

c. Upon completion of run-in test, correct or report any deficiencies noted. Report general condition of vehicle to designated individual in authority.

**3/4-TON 4 x 4 TRUCK (DODGE)****Section XI****SECOND ECHELON PREVENTIVE MAINTENANCE**

Paragraph

Second echelon preventive maintenance services ..... 29

**29. SECOND ECHELON PREVENTIVE MAINTENANCE SERVICES.**

a. Regular scheduled maintenance inspections and services are a preventive maintenance function of the using arms, and are the responsibility of commanders of operating organizations.

(1) **FREQUENCY.** The frequency of the preventive maintenance services outlined herein is considered a minimum requirement for normal operation of vehicles. Under unusual operating conditions, such as extreme temperatures, dusty or sandy terrain, it may be necessary to perform certain maintenance services more frequently.

(2) **FIRST ECHELON PARTICIPATION.** The drivers should accompany their vehicles and assist the mechanics while periodic second echelon preventive maintenance services are performed. Ordinarily, the driver should present the vehicle for a scheduled preventive maintenance service in a reasonably clean condition; that is, it should be dry and not caked with mud or grease to such an extent that inspection and servicing will be seriously hampered. However, the vehicle should not be washed or wiped thoroughly clean, since certain types of defects, such as cracks, leaks, and loose, or shifted parts or assemblies are more evident if the surfaces are slightly soiled or dusty.

(3) If instructions other than those which are contained in the general procedures in step (4) or the specific procedures in step (5) which follow, are required for the correct performance of a preventive maintenance service, or for correction of a deficiency, other sections of this manual pertaining to the item involved, or a designated individual in authority, should be consulted.

(4) **GENERAL PROCEDURES.** These general procedures are basic instructions which are to be followed when performing the services on the items listed in the specific procedures. *NOTE: The second echelon personnel must be thoroughly trained in these procedures so that they will apply them automatically.*

(a) When new or overhauled subassemblies are installed to correct deficiencies, care should be taken to see that they are clean, correctly installed, properly lubricated, and adjusted.

(b) When installing new lubricant retainer seals, a coating of the lubricant should be wiped over the sealing surface of the lip of the seal. When the new seal is a leather seal, it should be soaked in SAE 10 engine oil (warm if practicable) for at least 30 minutes. Then the leather lip should be worked carefully by hand before installing the seal. The lip must not be scratched or marred.

## SECOND ECHELON PREVENTIVE MAINTENANCE

(c) The general inspection of each item applies also to any supporting member or connection, and usually includes a check to see whether or not the item is in good condition, correctly assembled, secure, or excessively worn. The mechanic must be thoroughly trained in the following explanations of these terms:

1. The inspection for "good condition" is usually an external visual inspection to determine if the unit is damaged beyond safe or serviceable limits. The term "good condition" is explained further by the following terms: not bent or twisted, not chafed or burned, not broken or cracked, not bare or frayed, not dented or collapsed, not torn or cut.

2. The inspection of a unit to see that it is "correctly assembled" is usually an external visual inspection to see whether or not it is in its normal assembled position in the vehicle.

3. The inspection of a unit to determine if it is "secure" is usually an external visual examination, a wrench, hand-feel or a pry-bar check for looseness. Such an inspection should include any brackets, lock washers, lock nuts, locking wires, or cotter pins used in assembly.

4. "Excessively worn" will be understood to mean worn close to, or beyond, serviceable limits, and likely to result in a failure if not replaced before the next scheduled inspection.

(d) *Special Services.* These are indicated by repeating the item numbers in the columns which show the interval at which the services are to be performed, and show that the parts, or assemblies, are to receive certain mandatory services. For example, an item number in one or both columns opposite a tighten procedure, means that the actual tightening of the object must be performed. The special services include:

1. *Adjust.* Make all necessary adjustments in accordance with the pertinent section of this manual, special bulletins, or other current directives.

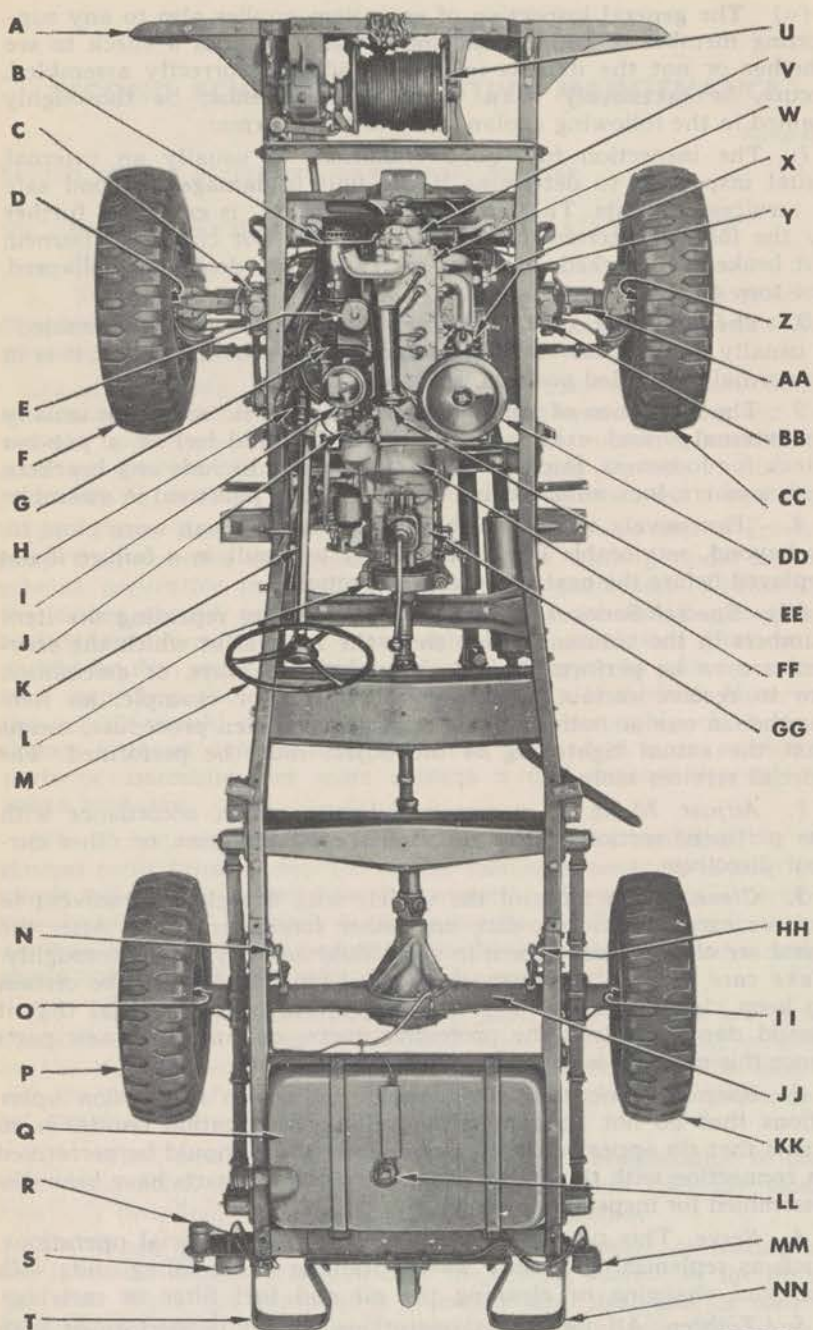
2. *Clean.* Clean units of the vehicle with dry-cleaning solvent to remove excess lubricant, dirt, and other foreign material. After the parts are cleaned, rinse them in clean fluid and dry them thoroughly. Take care to keep the parts clean until reassembled and be certain to keep cleaning fluid away from rubber or other material that it would damage. Clean the protective grease coating from new parts since this material is usually not a good lubricant.

3. *Special lubrication.* This applies either to lubrication operations that do not appear on the vehicle Lubrication Guide, or to items that do appear on such guides, but which should be performed in connection with the maintenance operations, if parts have been disassembled for inspection or service.

4. *Serve.* This usually consists of performing special operations, such as replenishing battery water, draining and refilling units with oil, and changing or cleaning the oil and fuel filter or cartridge.

5. *Tighten.* All tightening operations should be performed with sufficient wrench torque (force on the wrench handle) to tighten the unit according to good mechanical practice. Use a torque-indicating

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Figure 41—Top View of Chassis

## SECOND ECHELON PREVENTIVE MAINTENANCE

|                                                      |                                                          |
|------------------------------------------------------|----------------------------------------------------------|
| <b>A</b> —FRONT BUMPER                               | <b>V</b> —WATER PUMP                                     |
| <b>B</b> —GENERATOR                                  | <b>W</b> —ENGINE                                         |
| <b>C</b> —SHOCK ABSORBER—LEFT FRONT                  | <b>X</b> —FUEL PUMP                                      |
| <b>D</b> —BRAKE WHEEL CYLINDER—LEFT FRONT            | <b>Y</b> —CARBURETOR AND GOVERNOR                        |
| <b>E</b> —BREATHING PIPE AIR CLEANER                 | <b>Z</b> —BRAKE WHEEL CYLINDER—RIGHT FRONT               |
| <b>F</b> —WHEEL, TIRE, HUB AND BRAKE DRUM—LEFT FRONT | <b>AA</b> —FRONT AXLE HOUSING                            |
| <b>G</b> —DISTRIBUTOR                                | <b>BB</b> —SHOCK ABSORBER—RIGHT FRONT                    |
| <b>H</b> —IGNITION COIL                              | <b>CC</b> —WHEEL, TIRE, HUB AND BRAKE DRUM—RIGHT FRONT   |
| <b>I</b> —OIL FILTER                                 | <b>DD</b> —CARBURETOR AIR CLEANER                        |
| <b>J</b> —CRANKING MOTOR                             | <b>EE</b> —HORN                                          |
| <b>K</b> —STEERING GEAR COLUMN JACKET                | <b>FF</b> —CLUTCH HOUSING                                |
| <b>L</b> —HAND BRAKE BAND                            | <b>GG</b> —TRANSMISSION GEARSHIFT LEVER HOUSING OR COVER |
| <b>M</b> —STEERING WHEEL                             | <b>HH</b> —SHOCK ABSORBER—RIGHT REAR                     |
| <b>N</b> —SHOCK ABSORBER—LEFT REAR                   | <b>II</b> —BRAKE WHEEL CYLINDER—RIGHT REAR               |
| <b>O</b> —BRAKE WHEEL CYLINDER—LEFT REAR             | <b>JJ</b> —REAR AXLE HOUSING                             |
| <b>P</b> —WHEEL, TIRE, HUB AND BRAKE DRUM—LEFT REAR  | <b>KK</b> —WHEEL, TIRE, HUB AND BRAKE DRUM—RIGHT REAR    |
| <b>Q</b> —FUEL TANK                                  | <b>LL</b> —FUEL GAGE (TANK UNIT)                         |
| <b>R</b> —TRAILER WIRING CONNECTOR                   | <b>MM</b> —TAIL AND SIGNAL LAMP—RIGHT                    |
| <b>S</b> —TAIL AND SIGNAL LAMP—LEFT                  | <b>NN</b> —REAR BUMPER—RIGHT                             |
| <b>T</b> —REAR BUMPER—LEFT                           |                                                          |
| <b>U</b> —WINCH CABLE AND DRUM                       |                                                          |

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*Legend for Figure 41—Top View of Chassis*

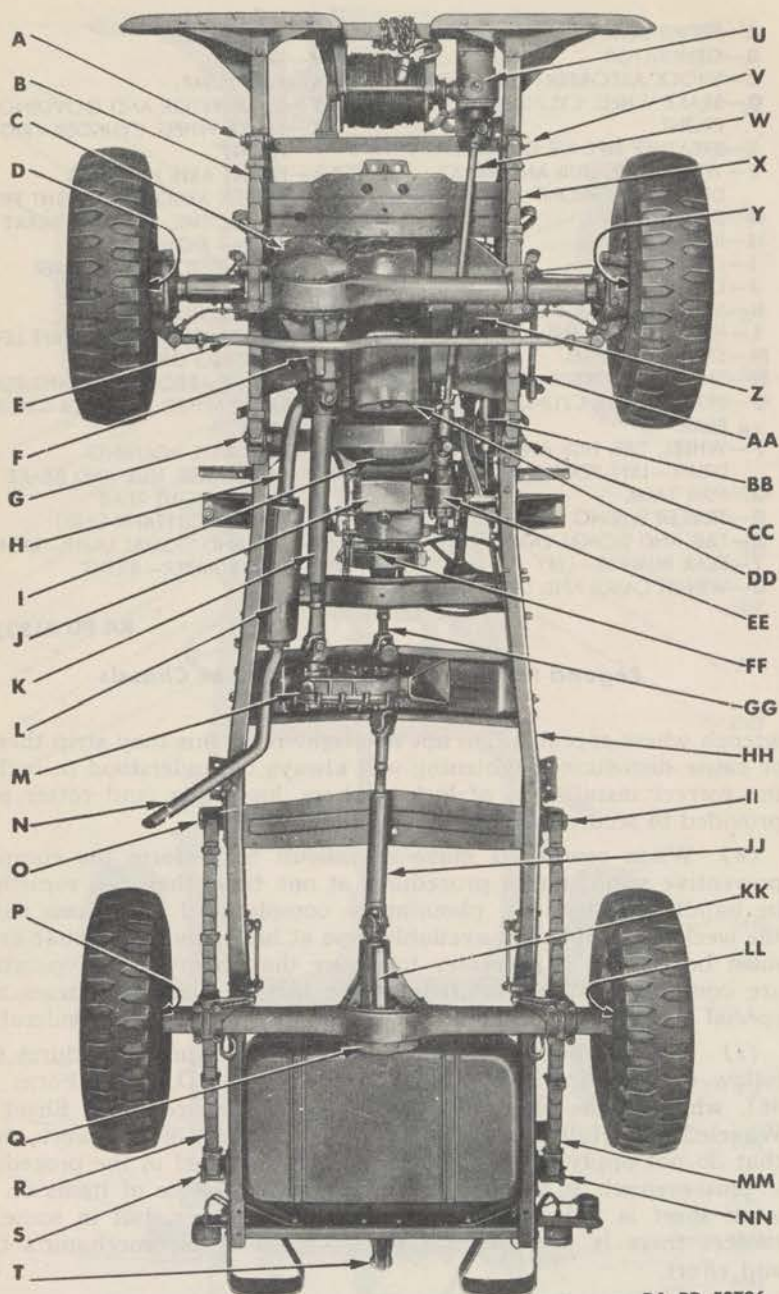
wrench where specified. Do not overtighten, as this may strip threads or cause distortion. Tightening will always be understood to include the correct installation of lock washers, lock nuts, and cotter pins, provided to secure the tightening.

(e) When conditions make it difficult to perform the complete preventive maintenance procedures at one time, they can sometimes be handled in sections, planning to complete all operations within the week if possible. All available time at halts, and in bivouac areas, must be utilized if necessary to assure that maintenance operations are completed. When limited by the tactical situation, items with special services in the columns, should be given first consideration.

(f) The numbers of the preventive maintenance procedures that follow are identical with those outlined on W.D. AGO Form No. 461, which is the Preventive Maintenance Service Work Sheet for Wheeled and Half-track Vehicles. Certain items on the work sheet, that do not apply to this vehicle, are not included in the procedures in this manual. In general, the numerical sequence of items on the work sheet is followed in the manual procedures, but in some instances there is deviation for conservation of the mechanic's time and effort.

(5) SPECIFIC PROCEDURES. The procedures for performing each item in the 1,000-mile (monthly) and 6,000-mile (six-month) maintenance procedures are described in the following chart. Each page

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Figure 42—Bottom View of Chassis

## SECOND ECHELON PREVENTIVE MAINTENANCE

|                                                         |                                                                 |
|---------------------------------------------------------|-----------------------------------------------------------------|
| <b>A</b> —FRONT SPRING SHACKLE                          | <b>V</b> —FRONT SPRING SHACKLE                                  |
| <b>B</b> —FRONT SPRING                                  | <b>W</b> —WINCH DRIVESHAFT AND<br>UNIVERSAL JOINTS              |
| <b>C</b> —ENGINE DUST PAN—RIGHT                         | <b>X</b> —FRONT SPRING                                          |
| <b>D</b> —BRAKE SUPPORT AND ADJUSTING<br>PINS           | <b>Y</b> —BRAKE SUPPORT AND ADJUSTING<br>PINS                   |
| <b>E</b> —STEERING TIE ROD                              | <b>Z</b> —ENGINE DUST PAN—LEFT                                  |
| <b>F</b> —FRONT AXLE DIFFERENTIAL AND<br>CARRIER        | <b>AA</b> —STEERING DRAG LINK                                   |
| <b>G</b> —FRONT SPRING REAR BOLT                        | <b>BB</b> —BRAKE MASTER CYLINDER                                |
| <b>H</b> —EXHAUST PIPE                                  | <b>CC</b> —FRONT SPRING REAR BOLT                               |
| <b>I</b> —CLUTCH HOUSING PAN                            | <b>DD</b> —ENGINE OIL PAN                                       |
| <b>J</b> —TRANSMISSION                                  | <b>EE</b> —POWER TAKE-OFF                                       |
| <b>K</b> —FRONT PROPELLER SHAFT AND<br>UNIVERSAL JOINTS | <b>FF</b> —HAND BRAKE DRUM                                      |
| <b>L</b> —MUFFLER                                       | <b>GG</b> —INTERMEDIATE PROPELLER SHAFT<br>AND UNIVERSAL JOINTS |
| <b>M</b> —TRANSFER CASE                                 | <b>HH</b> —FRAME                                                |
| <b>N</b> —MUFFLER TAIL PIPE                             | <b>II</b> —REAR SPRING FRONT BOLT                               |
| <b>O</b> —REAR SPRING FRONT BOLT                        | <b>JJ</b> —REAR PROPELLER SHAFT AND<br>UNIVERSAL JOINTS         |
| <b>P</b> —BRAKE SUPPORT AND ADJUSTING<br>PINS           | <b>KK</b> —REAR AXLE DIFFERENTIAL AND<br>CARRIER                |
| <b>Q</b> —HOUSING COVER                                 | <b>LL</b> —BRAKE SUPPORT AND ADJUSTING<br>PINS                  |
| <b>R</b> —REAR SPRING                                   | <b>MM</b> —REAR SPRING                                          |
| <b>S</b> —REAR SPRING SHACKLE                           | <b>NN</b> —REAR SPRING SHACKLE                                  |
| <b>T</b> —PINTLE HOOK                                   |                                                                 |
| <b>U</b> —WINCH WORM HOUSING                            |                                                                 |

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## Legend for Figure 42—Bottom View of Chassis

of the chart has two columns at its left edge corresponding to the 6,000-mile and the 1,000-mile maintenance respectively. Very often it will be found that a particular procedure does not apply to both scheduled maintenances. In order to determine which procedure to follow, look down the column corresponding to the maintenance due, and wherever an item number appears perform the operations indicated opposite number.

## ROAD TEST

| MAINTENANCE  |              |
|--------------|--------------|
| 6000<br>Mile | 1000<br>Mile |
| 1            | 1            |
| 3            | 3            |

**NOTE:** When the tactical situation does not permit a full road test, perform those items which require little, or no, movement of the vehicle. When a road test is possible, it should be for preferably 5 miles and not over 10 miles.

**Before-operation Service.** Perform the Before-operation Service as described in paragraph 19.

**Dash Instruments and Gages.**

**OIL PRESSURE GAGE.** Oil pressure should be 30 to 50 pounds above 30 miles per hour; and at least 15 pounds at normal idling speed. Stop engine if oil pressure is too low.

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| MAINTENANCE  |              |
|--------------|--------------|
| 6000<br>Mile | 1000<br>Mile |
| 4            | 4            |
| 5            | 5            |
| 6            | 6            |
| 7            | 7            |
| 8            | 8            |

**AMMETER.** Ammeter should show a positive (+) charge immediately after starting engine. With battery fully charged, ammeter may show zero or only slight charge. Stop engine and investigate discharge (-) readings with lights and accessories turned off.

**ENGINE TEMPERATURE GAGE.** Reading should increase gradually after starting to normal operating temperature, 160°F to 185°F. Maximum safe temperature is 200°F.

**SPEEDOMETER.** See that speedometer and odometer are functioning.

**FUEL GAGE.** Gage should register approximate amount of fuel in tank.

**Horns, Mirrors, and Windshield Wipers.** If tactical situation permits, test horn for proper operation and tone. See that rear vision mirror and wipers are in good condition and secure. Test operation of wiper motors and see that wiper blades contact glass evenly and operate through their full range.

**Brakes.** Operate brakes at various speeds during road test.

**FOOT BRAKS.** Test brakes for effectiveness, pull to one side, unusual noise, or chatter. Pedal should have  $\frac{7}{16}$  inch free travel before meeting resistance, and should return to off position when released without striking rear engine support.

**HAND BRAKE.** Stop vehicle on reasonable incline; apply hand brake and observe if it latches and holds vehicle effectively; that lever has  $\frac{1}{4}$  to  $\frac{1}{3}$  travel in reserve.

**Clutch.** Pedal free travel should be  $1\frac{1}{8}$  inch before meeting resistance. Clutch should stop transmission entirely when vehicle is standing. Note any unusual noise when pedal is depressed which may indicate unsatisfactory release bearing. With transmission in gear, note any tendency to chatter or grab when clutch is engaged or to slip when fully engaged under load.

**Transmission and Transfer Case.** Transmission lever should move into each gear range position easily. Test transfer case shift lever to see that front axle engages. Note any noise or vibration that may indicate loose mountings, excessively worn or inadequately lubricated parts.

**Steering.** With vehicle in motion, observe whether there is any indication of looseness or binding or any tendency to wander, shimmy, or pull to one side.

## SECOND ECHELON PREVENTIVE MAINTENANCE

| MAINTENANCE                       |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile                      | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 9                                 | 9            | <p><b>Engine.</b> Observe engine operating characteristics as follows:</p> <p><b>IDLE.</b> Engine should idle smoothly without stalling.</p> <p><b>UNUSUAL NOISES.</b> Accelerate and decelerate, and listen for knocks and rattles while the engine is under both light and heavy loads.</p> <p><b>ACCELERATION AND POWER.</b> Note if engine has normal pulling power and acceleration or any tendency to stall while shifting. A slight ping during fast acceleration is normal.</p> <p><b>GOVERNED SPEED.</b> With the vehicle in low gear, observe the speedometer reading to see if the vehicle reaches, but does not exceed, 9 miles per hour with no load. Engine must not surge at full throttle.</p> |
| 10                                | 10           | <p><b>Unusual Noises.</b> Be on alert during road test for any noise that might indicate loose or damaged attachments mounted on vehicle, loose cab or body mountings, floor plates, doors, windshield, or hardware.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 13                                | 13           | <p><b>Temperatures.</b> Place hand cautiously on all brake drums and wheel hubs to see if they are abnormally hot. Inspect axle housings, transmission, and transfer case, for indications of overheating. <i>NOTE: Transfer case will run considerably hotter than the other units.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 14                                | 14           | <p><b>Leaks.</b> Look in engine compartment, and under vehicle for indications of engine oil, coolant, or fuel leaks.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>MAINTENANCE OPERATIONS</b>     |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Raise Vehicle—Block Safely</b> |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 16                                | 16           | <p><b>Gear Oil Level and Leaks.</b> Check lubricant levels in front and rear axles, transmission, and transfer case. Proper level is from lower edge of filler hole (hot) to <math>\frac{1}{2}</math> inch below (cold). Note condition of lubricant. If an oil change is due in any of these units or condition of lubricant indicates an oil change is necessary, drain and refill units. Notice any indications of excessive lubricant leaks at oil seals or gaskets. <i>NOTE: Slight seepage at seals is not considered as leakage.</i></p>                                                                                                                                                                |
| 17                                | 17           | <p><b>Unusual Noises.</b> Trace and correct any unusual noises noted during road test.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 18                                | 18           | <p><b>Cylinder Heads and Gaskets.</b> Look for cracks or indications of oil, coolant, or compression leaks around</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

### 3/4-TON 4 x 4 TRUCK (DODGE)

| MAINTENANCE  |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|              |              | studs, nuts, and gaskets. CAUTION: <i>Cylinder heads should not be tightened unless there is definite evidence of leaks. If tightening is necessary, use torque-indicating wrench, and tighten head nuts in the proper sequence and to 52.5 to 57.5 foot pounds tension (par. 58).</i>                                                                                                                                                                                            |
|              | 19           | <b>Valve Mechanism.</b> Adjust valve stem clearance only if noisy. Intake and exhaust clearance, 0.010 inch "go", 0.012 inch "no go" (hot).                                                                                                                                                                                                                                                                                                                                       |
| 19           |              | <b>ADJUST.</b> Set valve stem clearances to above specifications. Install covers securely with new gaskets.                                                                                                                                                                                                                                                                                                                                                                       |
| 22           | 22           | <b>Battery.</b> Clean top of battery. Inspect case for cracks and leaks. Inspect cables, terminals, bolts, straps, and hold-downs, for good condition. Test specific gravity and voltage (par. 88) and record on W.D. AGO Form No. 461. Specific gravity readings below 1.225 indicate battery should be recharged or replaced. For extremely hot weather (95°F and above) see paragraph 88. Add distilled or clean water to bring battery solution 1/2 inch above top of plates. |
| 22           |              | Perform high-rate discharge test according to instructions for "condition" test which accompany test instrument and record voltage on W.D. AGO Form No. 461. Cell variation should not be more than 30 percent. NOTE: <i>Specific gravity must be above 1.225 to make this test.</i>                                                                                                                                                                                              |
|              | 20           | <b>Spark Plugs.</b> Without removal, wipe off plugs and examine insulation for damage or indications of compression leaks.                                                                                                                                                                                                                                                                                                                                                        |
| 20           |              | Blow dirt from spark plug depressions in cylinder head and remove all plugs. Look for broken insulators, excessive carbon or oxide deposits, and for burned electrodes. Clean plugs thoroughly. If plug cleaner is not available, install new or reconditioned plugs. NOTE: <i>Do not install plugs until item 21 has been performed.</i> Set plug gaps to 0.025 inch by bending only grounded electrodes.                                                                        |
| 21           |              | <b>Compression Test.</b> Test compression with all spark plugs removed. Compression pressure at cranking speed is normally 98 to 118 pounds. There should not be more than 20 pounds variation between cylinders. Record compression pressures on back of work sheet, Form No. 461.                                                                                                                                                                                               |
| 23           | 23           | <b>Crankcase.</b> With engine idling, examine exterior of engine for oil leaks. Stop engine and check to see if oil is at proper level. If an oil change is due, or condition of                                                                                                                                                                                                                                                                                                  |

## SECOND ECHELON PREVENTIVE MAINTENANCE

| MAINTENANCE  |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 24           | 24           | oil indicates the necessity, drain crankcase and refill to correct level. NOTE: <i>Do not again start engine until item 24 has been performed.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|              |              | <b>Oil Filter and Lines.</b> Inspect filter and external engine oil lines to see if they are in good condition, secure, and not leaking. Remove filter body drain plug and drain off contents. Remove filter cartridge and check condition. If cartridge change is due, or condition indicates the necessity, replace with new cartridge being sure gaskets are in place and tighten cover and drain plug securely.                                                                                                                                                                                                                                                                                                                                                                             |
| 25           | 25           | <b>Radiator (Core, Shell, Mountings, Hose, Cap and Gasket, Antifreeze Record, Overflow Pipe).</b> Inspect all parts of cooling system to see that they are in good condition, secure, and not leaking. Examine condition of coolant to see whether it is contaminated and system should be cleaned. If cleaning is necessary, proceed only according to current directives covering proper procedure and recommended cleaner, neutralizer, and inhibitor materials. Clean all insects, dirt, or grease deposits, from core air passages and inspect for bent cooling fins. CAUTION: <i>Use only a suitably shaped piece of wood or blunt instrument to straighten fins.</i> If antifreeze is in use, test its protective value and record in space provided on back of work sheet Form No. 461. |
| 25           |              | <b>TIGHTEN.</b> Tighten all loose radiator mountings, water connections, hose clamps and radio noise suppression bond straps (particularly points where toothed lock washers are used), for bonding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 26           | 26           | <b>Water Pump and Fan.</b> Inspect pump to see if it is in good condition, secure, and not leaking. Inspect fan to see if it is in good condition, and that blades and hub are secure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 26           |              | <b>TIGHTEN.</b> Tighten water pump, fan and mounting nuts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 27           | 27           | <b>Generator, Starter, and Switch.</b> Inspect generator, starter, and switch, to see if they are in good condition, securely mounted, and if wiring connections are clean and secure. See that radio noise suppression condenser on cranking motor is securely mounted and connected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|              |              | Remove generator and starter inspection covers and examine commutators and brushes for excessive wear. See that brushes are free in holders and connection wires are secure and not chafing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 27           |              | <b>CLEAN.</b> Blow out commutator end of generator and starter with compressed air. If brushes or commutators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**3/4-TON 4 x 4 TRUCK (DODGE)**

| MAINTENANCE  |              |                                                                                                                                                                                                                                                                                                                                                                    |
|--------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                    |
| 27           |              | are worn excessively, replace unit.                                                                                                                                                                                                                                                                                                                                |
| 29           | 29           | <b>TIGHTEN.</b> Tighten starter mounting bolts securely.                                                                                                                                                                                                                                                                                                           |
|              |              | <b>Drive Belt and Pulleys.</b> Examine fan belt for good condition. Inspect all drive pulleys and hubs to see if they are in good condition and securely mounted.                                                                                                                                                                                                  |
|              |              | <b>ADJUST.</b> Adjust fan belt for 1/2 inch finger pressure deflections (par. 82).                                                                                                                                                                                                                                                                                 |
| 31           | 31           | <b>Distributor.</b> Observe if distributor body and external attachment are in good condition and secure. Examine other parts as follows:                                                                                                                                                                                                                          |
|              |              | <b>CAP, ROTOR, AND POINTS.</b> Remove cap and clean. Look for cracks and carbon streaks in cap and rotor, corrosion of terminals and connections. See that points are well aligned and adjusted to 0.020 inch, when wide open.                                                                                                                                     |
|              |              | If inside of distributor is dirty, remove assembly, clean in dry-cleaning solvent, dry thoroughly with compressed air and lubricate according to Lubrication Guide. If breaker points are pitted, burned or worn to an unserviceable degree, replace. When cleaning points use contact point dresser (never use emery) and blow out filings with compressed air.   |
|              |              | <b>SHAFT.</b> Test shaft by hand-feel for excessive wear in shaft for bushings.                                                                                                                                                                                                                                                                                    |
|              |              | <b>CENTRIFUGAL ADVANCE.</b> Install rotor on shaft and turn clockwise as far as it will go and note if it will return to its original position when released without hang up or binding.                                                                                                                                                                           |
| 31           |              | <b>ADJUST.</b> Set breaker point gaps to 0.020 inch, when wide open.                                                                                                                                                                                                                                                                                               |
| 32           | 32           | <b>Coil and Wiring.</b> Inspect coil, ignition wiring including shielding or conduits to see if they are in good condition, clean, securely connected, and properly mounted. Inspect all low voltage wiring in engine compartment in like manner.                                                                                                                  |
| 33           | 33           | <b>Manifolds and Gaskets.</b> Inspect for looseness, damage, or exhaust leaks at gaskets. Examine for evidence of cracks or sand holes usually indicated by carbon streaks. Make sure spark plugs and distributors to coil wire resistor-suppressors are firmly attached to wires, and not scorched or cracked, and that coil ground strap connections are secure. |
| 33           |              | <b>TIGHTEN.</b> Tighten all manifold assembly and mounting nuts securely.                                                                                                                                                                                                                                                                                          |
| 34           | 34           | <b>Air Cleaner.</b> Inspect carburetor air cleaner to see if it is in good condition, securely mounted and connected,                                                                                                                                                                                                                                              |

## SECOND ECHELON PREVENTIVE MAINTENANCE

| MAINTENANCE  |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 35           | 35           | <p>and not leaking. Remove reservoir and element, wash in dry-cleaning solvent, dry, fill reservoir to proper level with clean engine oil and reassemble. Be sure gaskets are in place and all joints and air horn connections tight.</p> <p><b>Breather Cap and Ventilator.</b> Inspect crankcase breather cap and ventilator outlet to see if they are in good condition, secure, and not leaking. Remove oil reservoir and element, or filter type elements, wash clean in dry-cleaning solvent, refill reservoir with fresh engine oil and reassemble securely. If not oil bath type, dip elements in clean engine oil, drain off excess and reinstall securely. If engine is equipped with a positive type ventilator, remove metering valve and tube assembly. Disassemble and clean all parts with dry-cleaning solvent to remove carbon and gum deposits and assemble to engine.</p> |
| 36           | 36           | <p><b>Carburetor and Governor.</b> See if they are in good condition, correctly assembled, and securely installed; that carburetor does not leak; that control linkage, including choke and throttle shaft, is not excessively worn; if choke valve opens fully when the control is in its released position; if throttle valve opens fully when the accelerator is fully depressed; and if the governor is secure and properly sealed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 37           | 37           | <p><b>Fuel Filter and Lines.</b> Examine filter to see if it is in good condition, securely mounted and connected, and not leaking.</p> <p>CLEAN. Remove sediment bowl and element. Wash clean in dry-cleaning solvent and reassemble securely with gasket in place. <b>CAUTION:</b> <i>If element cannot be cleaned without disassembly by loosening, separating, and washing disk, replace unit. Do not scrape element to clean.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 38           | 38           | <p><b>Fuel Pump (pressure).</b> Inspect pump to see if it is in good condition, securely mounted and not leaking. Remove sediment bowl and screen and wash in dry-cleaning solvent. Be sure gasket is in place and serviceable when bowl is reinstalled.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 38           |              | <p>Attach a test gage to pressure side of fuel pump and after starting engine in item 39 see that pressure is 3 pounds minimum to 5½ pounds maximum at idle speed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 39           | 39           | <p><b>Cranking Motor.</b> Start the engine, observing if general action of cranking motor is satisfactory, has adequate cranking speed; and if the engine starts readily.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 40           | 40           | <p><b>Leaks.</b> Recheck all points for leaks, with engine running. Trace any found to source and correct or report them.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 41           | 41           | <p><b>Ignition Timing.</b> With engine running and a neon timing light connected, observe if ignition timing is</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**3/4-TON 4 x 4 TRUCK (DODGE)**

| MAINTENANCE  |              |
|--------------|--------------|
| 6000<br>Mile | 1000<br>Mile |
| 41           |              |
| 42           | 42           |
| 42           | 42           |
| 43           | 43           |
| 43           |              |
| 47           | 47           |

correct. Also note whether automatic controls advance the timing as engine is accelerated gradually.

Adjust ignition timing according to instructions (par. 99).

**Engine Idle and Vacuum Test.** Inspect as follows:

**ADJUST.** See paragraph 70. Adjust engine to its normal idle speed and then adjust the idle-mixture until vacuum gage indicates a steady maximum reading.

**VACUUM TEST.** See paragraph 70. With the engine running at normal idling speed, vacuum gage should read not less than 17 inches at sea level with a reduction of approximately 3½ inches for each 5,000 feet altitude and pointer should be steady. At full throttle, vacuum reading should be at least 16 inches at sea level.

**Regulator Unit.** Inspect generator regulator to see if it is in good condition, securely mounted, and connected. Be sure radio noise suppression filter is securely mounted and connected.

**TEST.** Connect a low-voltage-circuit tester and observe if voltage regulator, current regulator, circuit breaker and control generator output properly. Follow instructions in paragraph 36. Replace if test shows faulty operation.

**Tires and Rims.** Inspect as follows:

**VALVE STEMS AND CAPS.** Observe if all valve stems and caps are in good condition and in correct position.

**CONDITION.** Examine all tires for cuts, bruises, breaks, and blisters. Remove embedded glass, nails, and stones. Look for irregular tread wear, watching for any sign of flat spots, cupping, feather edges, and one-sided wear. Remove tires worn thin at center of tread (or other unserviceable tires) and exchange for new or retreaded tires. Any mechanical deficiencies causing such conditions should be determined and corrected or reported. Wheel positions of tires with irregular wear should be relocated to even up wear (par. 162).

**DIRECTION.** Directional tires and non-directional tires should not be installed on same vehicle. Directional tires on rear wheels should be mounted so that the "V" of chevron will point down when viewed from the front. Directional tires on all front wheels will ordinarily be mounted so that "V" of chevrons will point up when viewed from front of vehicle.

**MATCHING.** With tires properly inflated, inspect them to see if they are matched according to over-all circumference and type of tread.

## SECOND ECHELON PREVENTIVE MAINTENANCE

| MAINTENANCE  |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|              | 47           | <p><b>SPARE TIRE CARRIERS.</b> See whether spare tire carriers are in good condition and secure.</p> <p><b>RIMS.</b> All rims and side lock rings and flanges should be in good condition and secure.</p> <p><b>TIGHTEN.</b> Tighten all wheel side ring, mounting and flange nuts securely.</p> <p><b>SERVE.</b> With all tires properly inflated to 40 pounds (cold), check over-all circumference, including spares. Select tires to be mounted on driving axles, so that difference in over-all circumference does not exceed the <math>\frac{3}{4}</math>-inch limits specified in current directives and bulletins. <i>NOTE: Spares must be matched properly and mounted for use on one of the road wheels at intervals not exceeding 90 days.</i> A convenient time to do this is during these maintenance services. <i>CAUTION: After performing the tire-matching service do not reinstall until wheel bearing services are completed.</i></p> |
| 47           |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 48           |              | <p><b>Rear Brakes.</b> Inspect and service as follows: Remove rear wheels.</p> <p><i>NOTE: On 6,000-mile maintenance several wheel bearings and brake items up to 52 are group services and overlap. Perform in best order for economy of time and orderly reassembly.</i></p> <p><b>DRUMS AND SUPPORTS.</b> Clean dirt and grease from drums and supports (dust shields) keeping dry-cleaning solvent away from linings. Examine drums and supports to see if they are in good condition, securely mounted, and if drums are excessively worn or scored.</p> <p><b>WHEEL CYLINDERS.</b> Inspect cylinders to see if they are in good condition, securely mounted, connected, and if leaking. See if rubber end covers are deteriorated.</p> <p><b>TIGHTEN.</b> Tighten front brake support cap screws and all hubs to drum screws securely.</p>                                                                                                        |
|              | 49           | <p><b>Rear Brake Shoes.</b> Examine linings through inspection holes to determine if satisfactory for another 1,000 miles of operation. If vehicle has been operated in deep water, mud, or loose sand, remove one of the brake drums and examine lining for damage. If damaged, remove all drums and service brakes as necessary.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 49           |              | <p><b>ADJUST.</b> Adjust shoes if necessary (par. 151). Remove rear wheels, hubs, and drums and inspect linings to see if they are in good condition. Also see if shoes are in good condition. Thickness of lining at most worn point should be enough for at least 1,000 miles of service before rivet heads are likely to contact drums.</p> <p><b>CLEAN.</b> Remove all dirt from linings with wire brush, cloth, or compressed air. If there is evidence of grease or brake fluid, reline brakes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**3/4-TON 4 x 4 TRUCK (DODGE)**

| MAINTENANCE  |              |
|--------------|--------------|
| 6000<br>Mile | 1000<br>Mile |
| 52           | 52           |
|              | 52           |
| 52           |              |
| 52           |              |
| 52           |              |
|              | 53           |
| 53           |              |
|              | 54           |
| 54           |              |
| 54           | 54           |
| 55           | 55           |

**ADJUST.** After subsequent related items to 60 inclusive are completed, adjust shoes (par. 151).

**Rear Wheels.** Inspect and service as follows:

**WHEELS.** Inspect wheels to see if they are in good condition and secure.

**BEARINGS AND SEALS.** Check for looseness of wheel bearing adjustment. Revolve wheels and listen for evidence of dry or damaged bearings. Inspect around flanges and brake supports for lubricant leaks.

**DRIVE FLANGES AND NUTS.** Note if they are in good condition and if nuts are tightened securely.

**CLEAN.** Disassemble rear wheel bearings and oil seals. Clean thoroughly in dry-cleaning solvent and examine bearing cups and cones to see if they are in good condition; if machined surfaces they contact are in good condition and if there is any excessive wear.

**LUBRICATION.** When all of the related items are performed to the point where wheel bearings are to be reinstalled, lubricate bearings according to Lubrication Guide (par. 24).

**ADJUST.** After lubricating wheel bearings, reassemble hub-and-drum assemblies into place and adjust wheel bearings correctly according to paragraph 147.

**Front Brakes.** Inspect front brake hose to see if it is in good condition, correctly assembled, and secure.

Remove front wheels, hubs and drums and inspect and service as follows:

**DRUMS AND SUPPORTS.** Clean and inspect in same manner as in item 48.

**WHEEL CYLINDERS.** Inspect in same manner as in item 48.

**Front Brake Shoes.** Inspect in same manner as in item 49.

**ADJUST.** Adjust if necessary (par. 151). Inspect shoes, linings, anchors, and springs, in same manner as in item 49 at 6,000-mile service.

**CLEAN.** Clean in same manner as in item 49.

**ADJUST.** Adjust in same manner as in item 49 after subsequent related items to 60 inclusive are completed (par. 151).

**Steering Knuckles (Joints, Bearings, Seals).** Inspect to see if knuckle housings are in good condition. Look particularly for cracks around steering arms. See if outside knuckle felt seals and seal flanges are in good

# SECOND ECHELON PREVENTIVE MAINTENANCE

| MAINTENANCE  |              |                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                                                                |
| 55           |              | condition and secure. Remove lower lubrication level plug and examine sample of lubricant to see if it appears to be contaminated.                                                                                                                                                                                                                                                                             |
|              |              | CLEAN. Remove constant velocity universal joint assembly. Wash thoroughly in dry-cleaning solvent, and without disassembly of universal joint, inspect parts to see if they are in good condition and not excessively worn. Pay particular attention to universal joint balls and races, axle splines, flanges, and pivot bearings or bushings.                                                                |
| 55           |              | LUBRICATION. Pack new lubricant well into constant velocity universal joint until it fills all space between balls and races. Reassemble steering knuckle, taking care to replace any unserviceable lubricant retainer seals, boots, or gaskets.                                                                                                                                                               |
| 55           |              | ADJUST. Adjust knuckle bearing to 25 to 27½ foot-pounds. Install shims under upper bearing retainer plate or steering arm to insure correct alinement of parts (par. 143).                                                                                                                                                                                                                                     |
| 56           | 56           | <b>Front Springs.</b> See if they are in good condition, correctly assembled, and secure. Spring leaves should not be shifted out of their correct position; this may be an indication of a sheared center bolt. Note if deflection of both springs is approximately the same. Test hangers and bolts for excessive wear by means of a pry bar.<br>TIGHTEN. Tighten all spring U-bolts securely and uniformly. |
| 57           | 57           | <b>Steering.</b> See if all parts of steering mechanism are in good condition, correctly and securely assembled and mounted, if steering gear case is leaking lubricant and if lubricant is at proper level. Pay particular attention to pitman arm to see if it is securely mounted and not bent out of its normal shape. Also observe if steering system is in good adjustment.                              |
| 57           |              | TIGHTEN. Tighten steering arm shaft nut securely. Loosen steering column bracket and tighten steering gear case assembly mounting bolts. Tighten steering column bracket.                                                                                                                                                                                                                                      |
| 58           | 58           | <b>Front Shock Absorbers and Links.</b> See if bodies are in good condition, secure to frame, and not leaking; if links are secure and not damaged. If rubber bushings are hard or cracked, apply brake fluid to exposed surfaces.                                                                                                                                                                             |
| 58           |              | SERVE. Fill shock absorber bodies with specified fluid (par. 176).                                                                                                                                                                                                                                                                                                                                             |
| 60           | 60           | <b>Front Wheels.</b> Inspect front wheels, bearings, seals                                                                                                                                                                                                                                                                                                                                                     |

**3/4-TON 4 x 4 TRUCK (DODGE)**

| MAINTENANCE |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000 Mile   | 1000 Mile |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 60          |           | drive flanges, and nuts in same manner as in item 52 for similar rear wheel items.<br><br>CLEAN. Disassemble, clean, and inspect the front wheel bearings and oil seals in the same manner as described in item 52.<br>LUBRICATION. Apply in same manner as described in item 52.                                                                                                                                                                              |
| 60          |           | ADJUST. Adjust wheel bearings in same manner as described in item 52 (par. 142), and adjust brake shoes as described in item 49 (par. 151).                                                                                                                                                                                                                                                                                                                    |
| 61          | 61        | <b>Front Axle.</b> If front axle appears to be out of line, measure distance from front spring eyebolt to center of axle spring pad on each side. Distance should be equal. Inspect axle housing to see if it is in good condition and not leaking. Examine pinion shaft for excessive end play and seal for leaks.<br>CLEAN. Clean axle housing vent thoroughly.                                                                                              |
| 62          | 62        | <b>Front Propeller Shaft.</b> See if universal joints are in good condition, correctly and securely assembled and mounted; if the universal joints are properly aligned with each other and are not excessively worn; that the slip joint is free, not excessively worn, and well lubricated; and that the seals on slip joint do not leak.<br>NOTE: <i>Slight seepage at seals is not considered as leakage.</i>                                              |
| 62          |           | TIGHTEN. Tighten all universal joint assembly and companion flange bolts securely.                                                                                                                                                                                                                                                                                                                                                                             |
| 63          | 63        | <b>Engine (Mountings, Ground Strap, Side Pans).</b> These items should be in good condition and securely mounted and connected. Be sure to examine both front and rear engine mountings; and to see that rubber is not separating from its metal backing. If mounting bolts are loose, tighten them properly, taking care not to overtighten (par. 67). Remove oil or grease from rubber mountings. Apply a film of brake fluid if rubber is hard or cracking. |
| 64          | 64        | <b>Hand Brake.</b> Examine to see if ratchet, pawl, and linkage are in good condition, secure and not excessively worn; that drum is not scored or oily; and that lining is not oil soaked or worn too thin.                                                                                                                                                                                                                                                   |
| 64          |           | ADJUST. Set clearance between brake drum and lining to 0.010 inch to 0.012 inch (par. 157).                                                                                                                                                                                                                                                                                                                                                                    |
| 65          | 65        | <b>Clutch Pedal.</b> Check pedal free travel. Should be 1 1/8 inch before meeting resistance. Examine to see if pedal is securely mounted to shaft, if clutch operating linkage is in good condition, secure and not excessively                                                                                                                                                                                                                               |

## SECOND ECHELON PREVENTIVE MAINTENANCE

| MAINTENANCE  |              |                                                                                                                                                                                                                                                                                                                                               |
|--------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                               |
| 65           |              | worn at friction joints. See if return spring has proper tension to bring pedal to correct released position, and that stop is set to allow $\frac{1}{2}$ inch between pedal and bottom of floor plate.                                                                                                                                       |
|              |              | ADJUST. Adjust clutch pedal free travel to $1\frac{1}{8}$ inches (par. 130).                                                                                                                                                                                                                                                                  |
| 66           | 66           | <b>Brake Pedal.</b> Pedal should not bind on support shaft. Be sure return spring has tension to bring pedal to correct released position. Set pedal-stop screw so that pedal does not strike engine support when released. There should be $\frac{7}{16}$ inch free travel before pedal starts to apply master cylinder push rod (par. 151). |
| 67           | 67           | <b>Brake Master Cylinder.</b> Cylinder should be in good condition and secure. Filler plug vent must be open and boot properly installed. Inspect for fluid leaks. See that stop light switch is securely mounted and connected.                                                                                                              |
| 67           | 67           | SERVE. Wipe dirt from around filler plug, remove plug and fill master cylinder reservoir to correct level with specified fluid. Clean out filler plug vent hole. Install plug securely, using new gasket if needed.                                                                                                                           |
| 71           | 71           | <b>Transmission.</b> Note if transmission case is in good condition, securely mounted, and inspect for lubricant leaks at seals and gaskets. NOTE: <i>Slight seepage at seals is not considered as leakage.</i>                                                                                                                               |
| 72           | 72           | <b>Transfer Case.</b> See if case is in good condition, securely mounted, that shift control linkage and mechanism is securely connected and not damaged. Look for evidence of lubrication leaks at seals and gaskets. NOTE: <i>Slight seepage at seals is not considered as leakage.</i> Clean vent passage if clogged.                      |
| 72           |              | TIGHTEN. Draw up all external assembly and mounting nuts securely.                                                                                                                                                                                                                                                                            |
| 73           | 73           | <b>Rear Propeller Shaft.</b> Inspect in same manner as in item 62.                                                                                                                                                                                                                                                                            |
|              |              | TIGHTEN. Draw up all universal joint and companion flange bolts securely.                                                                                                                                                                                                                                                                     |
| 75           | 75           | <b>Rear Axle.</b> Inspect in the same manner as in item 61 for front axle.                                                                                                                                                                                                                                                                    |
|              |              | CLEAN. Clean axle housing vent thoroughly.                                                                                                                                                                                                                                                                                                    |
| 77           | 77           | <b>Rear Springs.</b> Inspect and tighten in same manner as in item 56.                                                                                                                                                                                                                                                                        |
| 78           | 78           | <b>Rear Shock Absorbers and Links.</b> Inspect in same manner as in item 58.                                                                                                                                                                                                                                                                  |
| 78           |              | SERVE. Service and make operating check in same manner as in item 58.                                                                                                                                                                                                                                                                         |
| 79           | 79           | <b>Cab and Body Mountings.</b> Examine all mountings to see if they are in good condition and properly compressed (par. 185).                                                                                                                                                                                                                 |

## 3/4-TON 4 x 4 TRUCK (DODGE)

| MAINTENANCE                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5000<br>Mile                   | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 80                             | 80           | <b>TIGHTEN.</b> Tighten cab and body mounting bolts securely (par. 185), taking care to loosen the steering column clamp before alining or tightening cab. Be sure to tighten steering column clamp.                                                                                                                                                                                                                       |
| 81                             | 81           | <b>Frame.</b> Inspect frame, brackets, side rails, and cross members to see if they are in good condition, secure and correctly alined. If the frame appears to be out of line, report to higher echelon.                                                                                                                                                                                                                  |
| 82                             | 82           | <b>Wiring, Conduit, and Grommets.</b> Observe these items underneath the vehicle, to see if they are in good condition, properly supported, connected, and secure.                                                                                                                                                                                                                                                         |
| 82                             | 82           | <b>Fuel Tank, Fittings, and Lines.</b> Inspect fuel tank to see if it is in good condition and securely mounted. Examine cap for defective gasket. See that filler neck is in good condition and that cap fits securely.                                                                                                                                                                                                   |
| 82                             |              | Remove fuel tank drain plug and drain off accumulated water and dirt in bottom of tank. Drain only until fuel runs clear. Use necessary precautions against fire.                                                                                                                                                                                                                                                          |
| 83                             | 83           | <b>Brake Lines.</b> Examine all lines, fittings, and brake hose under vehicle to see if they are in good condition, securely connected, so that they do not leak, and supported so lines or hose will not chafe against other vehicle parts.                                                                                                                                                                               |
| 84                             | 84           | <b>Exhaust Pipes and Muffler.</b> Examine exhaust pipe to see if it is securely attached to exhaust manifold, that gasket or packing does not show evidence of leakage, and that the other end is clamped securely to muffler. Inspect muffler to see if it is in good condition and securely mounted. Check tail pipe to see if it is securely clamped to muffler, properly supported, and unobstructed at its outer end. |
| 85                             | 85           | <b>Vehicle Lubrication.</b> Lubricate all points of vehicle in accordance with Lubrication Guide (par. 24) and current lubrication bulletins or directives, using only clean lubricants and omitting items that have had lubrication during this service. Replace damaged or missing fittings, vents, or plugs.                                                                                                            |
| <b>LOWER VEHICLE TO GROUND</b> |              |                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 86                             | 86           | <b>Toe-in and Turning Stops.</b> With front wheels in straightahead position, check toe-in which should be 0 to $\frac{1}{8}$ inch, $\frac{1}{16}$ preferred (par. 141). Turn wheels fully in both directions and see if turn is limited by stops. In this position note if tires clear all parts of vehicle. If tires touch any part of the vehicle, report for check of turning angle by higher echelon.                 |
| 87                             | 87           | <b>Winch.</b> On winch-equipped vehicles (Weapons Carrier and Command), inspect winch, drive, and controls to                                                                                                                                                                                                                                                                                                              |

## SECOND ECHELON PREVENTIVE MAINTENANCE

| MAINTENANCE  |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|              |              | see if they are in good condition, correctly assembled, and secure. See if clutch moves freely and locks securely. Test safety brake. Pull the vehicle up a steep bank with the winch. Release engine clutch; if vehicle does not stop or drifts more than one or two inches, brake needs adjusting. Test drag brake to see that it holds drum from spinning when cable is unwound. Inspect winch drive shaft in same manner as in item 62. Note if cable is wound evenly and tightly, and properly secured. Add or drain worm gear housing oil as necessary to bring to correct level. If an oil change is due, or condition of lubricant warrants, drain gear case and refill to proper level. |
| 87           |              | <b>CLEAN AND SERVE.</b> Unwind cable and inspect for excessive wear, damage, and rust. Clean entire length of cable. As cable is rewound evenly, apply a film of engine oil. Fasten cable securely to front tow hooks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 91           | 91           | <b>Lamps (Lights).</b> Operate all switches and note if lamps respond. See if foot switch controls head lamp beams properly and if beams are aimed so as not to blind oncoming traffic. Examine all lights to see if they are in good condition and securely mounted and whether lenses are dirty or reflectors discolored.                                                                                                                                                                                                                                                                                                                                                                      |
| 91           |              | <b>ADJUST.</b> Adjust head lamp beams.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 92           | 92           | <b>Safety Reflectors.</b> See if they are all present, in good condition, clean, and secure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 93           | 93           | <b>Front Bumper Tow Hooks, Brush Guards, and Grille,</b> See if they are in good condition, secure, and that radiator grille is not obstructed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 94           | 94           | <b>Hood and Fasteners.</b> Inspect engine hood and fasteners to see if they are in good condition and that fasteners operate properly and hold hood securely. Also be sure all radio suppression units not covered in the foregoing procedures are in good condition and securely mounted and connected (figs. 112 to 120).                                                                                                                                                                                                                                                                                                                                                                      |
| 95           | 95           | <b>Front Fenders and Running Boards.</b> Examine fenders and running boards to see if they are in good condition and securely mounted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 96           | 96           | <b>Cab or Passenger Body.</b> Inspect doors, hardware, windshield and glass, top and frame, side curtains, seats, safety straps and grab rails, floor boards, ventilators, map compartment and tables, to see if they are in good condition and secure; that the hardware and ventilators operate properly and are adequately lubricated; and if the doors engage their bumpers and strikers and latch properly in the closed position. See that the doors are properly aligned with their openings. <b>NOTE:</b>                                                                                                                                                                                |

### 3/4-TON 4 x 4 TRUCK (DODGE)

| MAINTENANCE  |              |
|--------------|--------------|
| 6000<br>Mile | 1000<br>Mile |
| 97           | 97           |
| 97           |              |
| 98           | 98           |
| 99           | 99           |
| 100          | 100          |
| 101          | 101          |
| 103          | 103          |
| 104          | 104          |
| 131          | 131          |

*Glass need not be replaced as unserviceable even though cracked or if laminated layers have separated, unless condition constitutes a safety hazard or obstructs vision of driver or crew.*

**Heater, Fan, and Defroster.** On vehicles equipped with any or all of these items, inspect them to see if they are in good condition, securely mounted and connected, and if they function satisfactorily. Examine heaters for leaks. See that vent fan (Ambulance) opening is not obstructed.

**SPECIAL LUBRICATION.** Apply a few drops of light oil to fan motor bearings.

**Circuit Breaker.** Observe if in good condition, clean, dry, and securely connected and mounted.

**Rear Fenders.** See that they are in good condition and securely mounted.

**Body (Panels, Rear Doors, Tailgate and Chains, Floor, Skid Strips, Bows, Top Tarpaulins, Curtains, Troop Seats, Stowage Compartments, Stretchers).** Inspect all applicable items on each type of vehicle, to see that they are in good condition, correctly and securely assembled and mounted, and adequately lubricated. Any hinges and latches must be free but not excessively worn.

**Pintle Hook.** Examine pintle to see if it is in good condition and securely mounted to frame. Test pintle and latch to see if they operate properly; are adequately lubricated, and if lock pin is present and securely attached by chain. Pay particular attention for broken spring or worn draw bar.

**Paint and Markings.** Examine paint of entire vehicle to see if it is in good condition, paying particular attention to any bright spots in finish or camouflage pattern, that might cause glare or reflection. Inspect vehicle markings and identification, unless covered for tactical reasons, for legibility. Include identification plates and their mountings if furnished.

**Radio Bonding (Suppressors, Filters, Condensers, and Shielding).** See that all radio suppression units not covered in the foregoing procedures are in good condition and securely mounted and connected (figs. 112 to 120).

### TOOLS AND EQUIPMENT

**Tools (Vehicle and Pioneer).** Inspect standard vehicle and pioneer tools to see if they are all present in good condition, clean, and properly stowed or securely

## SECOND ECHELON PREVENTIVE MAINTENANCE

| MAINTENANCE  |              |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6000<br>Mile | 1000<br>Mile |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|              |              | mounted (pars. 25 and 26). Also examine tools which have cutting edges to see that they are sharp. Any tools mounted on outside of vehicle which have bright or polished surfaces, should be painted or otherwise treated to prevent rust, glare, or reflection.                                                                                                                                                    |
| 132          | 132          | <b>Fire Extinguisher.</b> See if it is in good condition, securely mounted, and fully charged. The charge may be determined on gas-type extinguishers by weighing with a scale and on liquid-type by shaking. Also be sure nozzles are free from corrosion.                                                                                                                                                         |
| 133          | 133          | <b>Decontaminator.</b> See if it is in good condition, securely mounted and fully charged. Make the latter check by removing filler plug. NOTE: <i>This solution must be replaced every three months, as it deteriorates.</i>                                                                                                                                                                                       |
| 134          | 134          | <b>First Aid Kit (if specified).</b> See if it is in good condition, and that all of its items are present and properly packed. Report any deficiencies immediately.                                                                                                                                                                                                                                                |
| 135          | 135          | <b>Publications and Form No. 26.</b> The vehicle and equipment manuals, Lubrication Guide, and Standard Form No. 26 (Accident Report Form) should be present, legible, and properly stowed.                                                                                                                                                                                                                         |
| 136          | 136          | <b>Traction Devices (Chains).</b> Examine tire chains to be sure they are in good condition, clean (if not in use), not excessively worn, protected against rust, and properly mounted or stowed.                                                                                                                                                                                                                   |
| 137          | 137          | <b>Tow (Chains, Cables, Rope, Snatch Blocks).</b> See if the provided towing devices are in good condition, clean, and properly stowed. Tow chains or cables should be properly protected against rust when not in use. If snatch blocks are furnished, check to see that they operate freely.                                                                                                                      |
| 139          | 139          | <b>Fuel and Water Cans and Brackets.</b> Observe if they are in good condition, secure; if the caps fit tightly and are secured to the can with a chain; and if cans are leaking.                                                                                                                                                                                                                                   |
| 141          | 141          | <b>Modifications (MWO's Completed).</b> Inspect vehicle to determine that all MWO's have been completed and entered on W.D., A.G.O. Form No. 478. Enter any modifications on Major Unit Assembly Replacements made during this service.                                                                                                                                                                             |
| 142          | 142          | <b>Final Road Test.</b> Make a final road test, rechecking items 2 to 15 inclusive, and also be sure to recheck the transmission, transfer case, and all driving axles to see that the lubricant is at the correct level and not leaking. Confine this road test to the minimum distance necessary to make satisfactory observations. NOTE: <i>Correct or report all deficiencies found during final road test.</i> |

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## Section XII

### ORGANIZATION TOOLS AND EQUIPMENT

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#### 30. STANDARD TOOLS AND EQUIPMENT.

a. All standard tools and equipment available to second echelon are listed in SNL N-19. These tools and equipment have been utilized in describing maintenance operations on the materiel covered by this manual.

#### 31. SPECIAL TOOLS.

| Tool                                                             | Federal Stock Number |
|------------------------------------------------------------------|----------------------|
| DRIFT, front axle shaft, inner oil seal, and bushing, installing | 41-D-1535-25         |
| DRIFT, front wheel, inner bearing oil seal, installing           | 41-D-1535-50         |
| FIXTURE, engine lifting                                          |                      |
| PULLER, rear spring front hanger bolt                            | 41-P-2951-70         |
| WRENCH, governor adjusting                                       | 41-W-3734            |

Section XIII

**TROUBLE SHOOTING**

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**32. INTRODUCTION.**

a. This section contains trouble shooting information and tests which can be made to help determine the causes of some of the troubles that may develop in vehicles used under average climatic conditions (above 32°F). Each symptom of trouble given under the individual unit or system is followed by a list of possible causes of the trouble. The tests necessary to determine which one of the possible causes is responsible for the trouble are explained after each possible cause.

**33. ENGINE.**

**a. Engine Will Not Turn.**

- (1) **STARTER INOPERATIVE.** See paragraph 37.
- (2) **INCORRECT OIL VISCOSITY.** Drain and refill with proper grade of oil (par. 24).
- (3) **SEIZURE.** Attempt to turn engine with hand crank. If engine will not turn, seizure is indicated; notify higher authority.

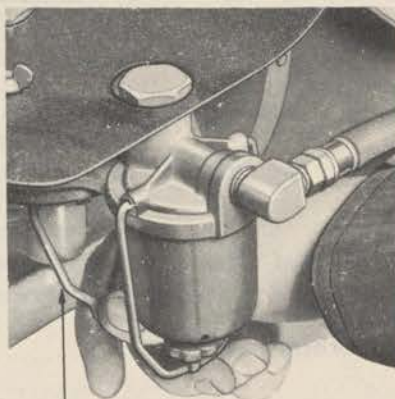
**b. Engine Turns but Will Not Start.**

- (1) **COMBUSTION CHAMBERS FLOODED WITH FUEL.** If the choke

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has been used excessively when cranking engine, fuel may flood the combustion chambers and cause hard starting. Push choke button all the way in, pull throttle button all the way out and crank engine to clear out excessive fuel in cylinders. If flooding continues and engine will not start, check fuel system (par. 34).

(2) **FUEL DOES NOT REACH CARBURETOR** (fig. 43). Disconnect fuel tube at carburetor and operate hand priming lever on fuel pump. This should cause fuel to flow from the open tube. (If the lever operates freely without actuating the diaphragm, turn the crankshaft one revolution by hand as fuel pump rocker arm may be on the high point of cam on camshaft.) If free flow of fuel is not evident, fuel is not reaching carburetor. See paragraph 34.



FUEL PUMP  
HAND PRIMER

RA PD 52737

**Figure 43—Fuel Delivery Test**

(3) **IMPROPER IGNITION.** Remove wire from spark plug, hold end of wire about ¼ inch from cylinder head and crank engine. If spark does not jump ¼-inch gap, ignition is inadequate (par. 38).

(4) **SLOW CRANKING SPEED.** See paragraph 37.

**c. Engine Misfires at High Speed.**

(1) **IMPROPER IGNITION.** Inspect distributor breaker points for evidence of burning and measure gap; clean and adjust or replace points. Test breaker arm spring tension and adjust with spring scale (par. 101). Inspect for loose wiring connections in distributor and between coil, distributor, and spark plugs. With distributor rotor

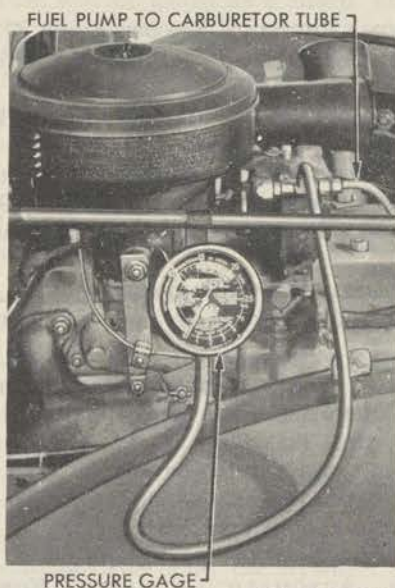
## TROUBLE SHOOTING

removed, check for play in distributor drive shaft bushings; if excessive, replace distributor. Clean and inspect spark plugs for wide gaps; inspect for broken porcelains (par. 100). Test ignition coil and condenser (par. 35).

(2) VALVES STICKING; VALVE SPRINGS WEAK OR BROKEN. If ignition system is functioning properly (step (1) above) and engine still misfires, notify higher authority.

**d. Engine Misfires on Acceleration.**

(1) IMPROPER IGNITION. Clean and inspect spark plugs for wide gaps; inspect for damaged porcelains (par. 100). Test ignition coil (par. 35). Inspect for loose wiring connections in distributor and



RA PD 52896

**Figure 44—Fuel Pump Pressure Test**

between coil, distributor, and spark plugs. Inspect distributor breaker points and measure gap (par. 101).

(2) INSUFFICIENT FUEL DELIVERY. Clean fuel filter (par. 74). Test fuel pump (par. 34 a (3)). If engine continues to misfire on acceleration, carburetor may be at fault; notify higher authority.

**e. Engine Does Not Idle Properly.**

(1) CARBURETOR IMPROPERLY ADJUSTED. Adjust throttle stop screw and idle adjustment screw with vacuum gage (par. 70).

(2) AIR LEAKING INTO INTAKE MANIFOLD. Apply a small amount of oil at carburetor and intake manifold flanges; if oil is sucked in, air is leaking into manifold. Tighten flange nuts or replace gaskets.

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Remove windshield wiper tube and hold finger over manifold connection; if idling improves, air is leaking through windshield wiper connections or tube is broken.

(3) **IMPROPER IGNITION.** Check ignition timing (par. 99). Clean and space spark plugs; inspect for broken porcelains (par. 100).

(4) **INTAKE MANIFOLD OVERHEATED.** Check setting of heat control valve (par. 56).

(5) **COMPRESSION LOW.** Test (par. 55). If low, notify higher authority.

**f. Engine Does Not Develop Full Power.**

(1) **IMPROPER FUEL MIXTURE.** Inspect air cleaner for restriction of air due to accumulation of dirt in oil reservoir (par. 69). Clean fuel filter (par. 74).

(2) **LOW FUEL PUMP PRESSURE.** See paragraph 34 a (3).

(3) **INTAKE MANIFOLD OVERHEATED.** Check setting of heat control valve (par. 56).

(4) **IGNITION TIMING LATE.** Check with timing light and adjust (par. 99).

(5) **RESTRICTED EXHAUST.** Inspect tail pipe for damage; muffler for clogging and repair or replace (pars. 77, 78, and 79).

(6) **COMPRESSION LOW.** Test (par. 55). If low, notify higher authority.

(7) **VALVES STICKING; VALVE SPRINGS BROKEN.** If causes listed in steps (1) through (5) above are not evident, notify higher authority.

**g. Spark Knock or Ping.** (A sharp metallic knock occurring on acceleration or when operating under heavy load.)

(1) **IGNITION TIMING TOO EARLY FOR GRADE OF FUEL USED.** Check with timing light and adjust (par. 99).

(2) **CARBON ACCUMULATION IN COMBUSTION CHAMBERS.** Remove cylinder head and clean carbon (par. 58).

(3) **ENGINE OVERHEATING.** See paragraph 36.

(4) **DISTRIBUTOR AUTOMATIC ADVANCE FUNCTIONING IMPROPERLY.** If the causes listed in steps (1) through (3) above are not evident, notify higher authority.

**h. Valve Noise.**

(1) **VALVE TAPPETS IMPROPERLY ADJUSTED.** Check adjustment (par. 57).

(2) **VALVE SPRING COCKED OR BROKEN.** Align or replace (par. 57).

(3) **VALVE STEMS OR TAPPETS WORN.** Notify higher authority.

**i. Piston Slap.** Piston slap is a clear metallic knock when engine is under load at low speed but may not be heard at higher speed or at idling speed. Noise noticeable when engine is cold; will diminish as engine temperature increases.

**j. Piston Noise Due to Scored or Worn Pistons or Cylinders.** Scored or worn cylinders will cause a noise similar to piston slap after engine has reached operating temperature and vehicle is acceler-

## TROUBLE SHOOTING

ated under load. The noise can be heard through the oil breather pipe after removing breather pipe air cleaner.

**k. Piston Pin Noise.** Piston pin noise is a metallic knock, usually occurring when idling with engine hot. The noise will come and go as the piston pin turns or shifts in piston. Notify higher authority.

### **l. Bearing Noise.**

(1) **LOOSE BEARING.** A loose bearing is usually heard when accelerating at about  $\frac{2}{3}$  maximum engine speed. The noise is usually heard momentarily in a series of rapid, distinct knocks. It is difficult to distinguish by sound between main and connecting rod bearing noise. Notify higher authority.

(2) **BURNED-OUT CONNECTING ROD BEARING.** A burned-out connecting rod bearing will be heard as a sharp, distinct knock at most engine speeds, especially noticeable on quick acceleration. The bearing responsible for the knock can usually be determined by shorting the ignition at the spark plugs. Notify higher authority.

(3) **BURNED-OUT MAIN BEARING.** A burned-out main bearing will cause a knock at moderate speeds, especially under acceleration. If the front or intermediate main bearing is responsible, the noise usually can be shorted out; if in the rear main bearing, the knock will have a duller sound, due to the additional area of that bearing. Notify higher authority.

**m. Other Engine Noises.** Other noises that are frequently confused with bearing or piston noise are listed below.

(1) **FAN BELT PARTIALLY BROKEN OR GLAZED.** A partially broken fan belt will cause a rhythmic metallic noise. A glazed fan belt will cause an intermittent squeal. Replace belt (par. 82).

(2) **SPARK PLUG LOOSE IN CYLINDER HEAD.** A loose spark plug will cause a sharp metallic knock at piston speed frequently confused with other internal engine troubles.

(3) **FLYWHEEL RUBBING CLUTCH HOUSING PAN.** If the clutch housing pan is damaged or bent, the flywheel may rub against the pan causing a scraping sound. The sound may be intermittent when driving over rough terrain.

### **n. Low or No Oil Pressure.**

(1) **ENGINE OIL LEVEL BELOW OIL PUMP STRAINER.** Fill crankcase with oil to proper level (par. 24).

(2) **OIL LEAKAGE.** Inspect for leakage at oil tubes and connections at filter, gage, and cylinder block. Tighten connections or replace tube. If external leakage is not apparent, remove oil pan and tighten oil pump suction and outlet pipe connections.

(3) **OIL PRESSURE RELIEF VALVE PLUNGER NOT SEATING.** Remove and clean (par. 61).

(4) **OIL PUMP GEARS WORN OR DRIVE SHAFT BROKEN; EXCESSIVE CLEARANCE IN ENGINE BEARINGS.** If causes listed in subparagraphs (1) through (3) above are not evident, notify higher authority.

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#### **o. Excessive Oil Consumption.**

(1) OIL SUPPLY ABOVE RECOMMENDED LEVEL. Keep oil level at "running level" on oil level indicator (par. 24).

(2) EXTERNAL OIL LEAKAGE. Inspect for leakage at external oil tubes and connections, chain case cover and oil pan. Tighten connections and attaching cap screws.

(3) EXCESSIVE CLEARANCE IN ENGINE BEARINGS, PISTONS AND CYLINDER WALLS; LEAKAGE DUE TO WORN OIL SEALS. If causes listed in steps (1) and (2) above are not evident, notify higher authority.

### **34. FUEL SYSTEM.**

#### **a. Fuel in Tank Does Not Reach Carburetor.**

(1) PRESSURE FUEL CAP NOT FUNCTIONING. Replace cap.

(2) FUEL FILTER CLOGGED WITH DIRT. Clean filter (par. 74).

(3) FUEL PUMP INOPERATIVE (fig. 44). Connect low pressure gage between the fuel tube and the carburetor and start the engine. If 3 to 5½ pounds pressure is shown on the gage, the fuel pump is operating satisfactorily. If the pressure shown by the gage is less than 3 pounds, inspect the fuel tubes and filter between pump and tank for leaks or obstruction. If fuel tubes and filter are clear and tight, replace fuel pump (par. 73)

#### **b. Fuel Does Not Enter Cylinders.**

(1) CHOKE DOES NOT CLOSE. Remove air cleaner. Pull out choke button and note whether choke closes. If not, connect or adjust linkage (par. 70).

(2) CARBURETOR FUEL PASSAGES CLOGGED OR FLOAT VALVE STUCK. If fuel reaches carburetor (subpar. a above) and choke closes properly (step (1) above), replace the carburetor or notify higher authority.

#### **c. Fuel Flooding Cylinders.**

(1) FUEL TANK CAP VENT CLOGGED. Replace cap.

(2) CHOKE DOES NOT OPEN FULLY. Remove air cleaner. Push choke button in as far as possible and note whether choke opens. If not, connect or adjust linkage (par. 70).

(3) CARBURETOR FLOAT VALVE NOT SEATING. If causes listed under steps (1) and (2) above are not evident, replace the carburetor or notify higher authority.

#### **d. Excessive Fuel Consumption.**

(1) AIR CLEANER RESTRICTED. Service (par. 69).

(2) IGNITION TIMING LATE. Test with timing light (par. 99).

(3) CHOKE DOES NOT OPEN FULLY. See subparagraph c (1) above.

(4) CARBURETOR IMPROPERLY ADJUSTED. Adjust (par. 70).

(5) BRAKES DRAGGING. Check brake adjustment (par. 150).

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(6) LUBRICANT TOO HEAVY IN TRANSMISSION, FRONT AND REAR AXLES. Use proper grade (par. 24).

(7) LOW ENGINE OPERATING TEMPERATURE. See paragraph 14. Inspect cooling system thermostat (par. 84).

(8) FUEL PUMP PRESSURE TOO HIGH. Test pump (par. 34 a (3)).

(9) CARBURETOR FLOAT LEVEL TOO HIGH; LOW ENGINE COMPRESSION. If the causes listed in steps (1) through (8) above are not evident, notify higher authority.

### e. Governor Not Functioning Properly.

(1) MAXIMUM ENGINE SPEED INCORRECT. Adjust governor (par. 70 b).

(2) ENGINE SURGES AT MAXIMUM SPEED. Adjust governor (par. 70 b).

(3) GOVERNOR LAGS IN CONTROLLING MAXIMUM SPEED. Adjust governor (par. 70 b).

## 35. EXHAUST SYSTEM.

### a. Exhaust Fumes Entering Body, or Noisy Exhaust.

(1) TAIL PIPE LOOSE OR OUT OF MUFFLER. Tighten or replace (par. 77).

(2) MUFFLER DAMAGED. Replace (par. 78).

(3) MANIFOLD GASKETS LEAKING. Replace (par. 59).

b. Exhaust System Restricted. Restricted exhaust is indicated by continuous blow or "hiss" from the tail pipe rather than normal intermittent exhaust noise.

(1) TAIL PIPE KINKED OR PLUGGED WITH DIRT. Repair or replace pipe (par. 77).

(2) MUFFLER CLOGGED. Replace muffler (par. 78).

## 36. COOLING SYSTEM.

### a. Overheating.

(1) INSUFFICIENT COOLING SOLUTION. Replenish solution.

(2) FAN BELT LOOSE OR BROKEN. Adjust or replace belt.

(3) HOSE CONNECTIONS COLLAPSED OR OBSTRUCTED. Replace hose.

(4) DIRT OR OTHER FOREIGN MATTER LODGED BETWEEN RADIATOR FINS. Blow out with compressed air or flush from engine side with water from hose.

(5) THERMOSTAT DAMAGED, BLOCKING CIRCULATION. Replace thermostat (par. 84).

(6) WATER PUMP INOPERATIVE OR CIRCULATION OBSTRUCTED IN CYLINDER BLOCK OR RADIATOR CORE. If causes listed under steps (1) through (5) above are not evident, notify higher authority.

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**b. Engine Runs too Cold.**

- (1) THERMOSTAT DOES NOT CLOSE. Replace thermostat (par. 84).
- (2) THERMOSTAT OPENS AT TOO LOW TEMPERATURE. Test thermostat (par. 84).
- (3) THERMOSTAT GASKET LEFT OUT. Install gasket (par. 84).
- (4) LOW ATMOSPHERIC TEMPERATURES. Use partial cover over radiator (par. 14).

**c. Loss of Coolant.**

- (1) HOSE CONNECTION LEAKS. Tighten clamps or replace hose.
- (2) DRAIN COCKS LEAK. Tighten or replace.
- (3) CYLINDER HEAD GASKET LEAKS. Replace gasket (par. 58).
- (4) RADIATOR CAP INOPERATIVE. Replace cap.
- (5) WATER PUMP OR RADIATOR CORE LEAKS. Replace pump (par. 85) or radiator (par. 86).

**37. STARTING SYSTEM.**

**a. Cranking Motor Will Not Crank Engine.**

- (1) BATTERY DISCHARGED. Test (par. 88).
- (2) LOOSE OR CORRODED CONNECTIONS. Clean and tighten battery cable connections at battery and ground (engine or chassis). Examine cables for damaged terminal connections.
- (3) ENGINE SEIZURE. See paragraph 33 a (3).
- (4) SWITCH OR CRANKING MOTOR INOPERATIVE. Disconnect battery positive cable. Disconnect cable at cranking motor switch. Remove switch and hold battery cable tightly against cranking motor terminal post. Then touch the other end of the battery cable to battery post. If cranking motor runs, replace switch; if cranking motor does not run, replace cranking motor.

**b. Slow Cranking Speed.**

- (1) ENGINE OIL TOO HEAVY. In cold weather heavy oil will retard cranking speed and cause voltage drop, especially when engine is cold. Use correct grade of oil (par. 24).
- (2) LOOSE OR CORRODED CONNECTIONS. Clean and tighten battery cable connections at battery and ground (engine or chassis). Examine cables for damaged terminal connections.
- (3) CRANKING MOTOR SWITCH CONTACTS BURNED OR DIRTY. Disconnect battery cable; remove switch and examine contacts. If burned or dirty, replace switch or clean contacts.
- (4) INTERNAL FRICTION OR VOLTAGE DROP IN CRANKING MOTOR. If the causes listed in steps (1) through (3) above are not evident, replace cranking motor or notify higher authority.

**c. Cranking Motor Operates and Engages Flywheel but Will Not Turn Engine.**

- (1) SEIZURE. See paragraph 33 a (3).
- (2) BATTERY RUN DOWN. Test (par. 88).

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(3) **CRANKING MOTOR CLUTCH OR SPRING BROKEN OR STUCK.** If the causes listed in steps (1) and (2) above are not evident, replace cranking motor or notify higher authority.

### 38. IGNITION SYSTEM.

#### a. Improper Ignition.

(1) **MOISTURE ON IGNITION UNITS.** Wipe distributor cap terminals, cables, spark plugs, and coil thoroughly dry with cloth or cloth saturated with carbon tetrachloride.

(2) **DISTRIBUTOR FAULTY.** Remove distributor cap and rotor; inspect for cracks or carbon runners. Clean contact points and adjust or replace if excessively burned. Examine condenser lead wire for breakage or loose connection. Crank engine and note whether distributor shaft turns; if not, shaft may be broken; replace distributor or notify higher authority.

(3) **IGNITION HIGH-TENSION CIRCUIT INOPERATIVE.** Remove cable from a spark plug. With the ignition switch turned on and the engine being cranked, hold the loose end of the spark plug cable about  $\frac{1}{4}$  inch from the cylinder head. If current jumps from the cable to the cylinder head, the ignition circuit is complete through cable tested. Test other cables in the same manner. Test spark plugs in spark plug tester.

(4) **IGNITION PRIMARY CIRCUIT INOPERATIVE** (fig. 45). If the headlights burn fairly bright, there will be ample current in the ignition primary circuit at least as far as the ammeter. If the headlights do not burn, but the cranking motor will crank the engine, test for current through wire from cranking motor switch to ammeter. Then test primary circuit from ammeter to coil and distributor. Remove the distributor cap and rotor and turn the engine until the distributor breaker points are definitely closed. Turn on the ignition switch and push the breaker points apart with finger. If there is a slight arc of current as the points open, the primary circuit is complete and will function if the points make and break properly when the engine is cranked. If no current is indicated by making and breaking contact of the breaker points when the ignition switch is on, turn the engine until the breaker points are open and connect the negative lead from a voltmeter to any part of the chassis that will provide a definite ground, and make the following tests:

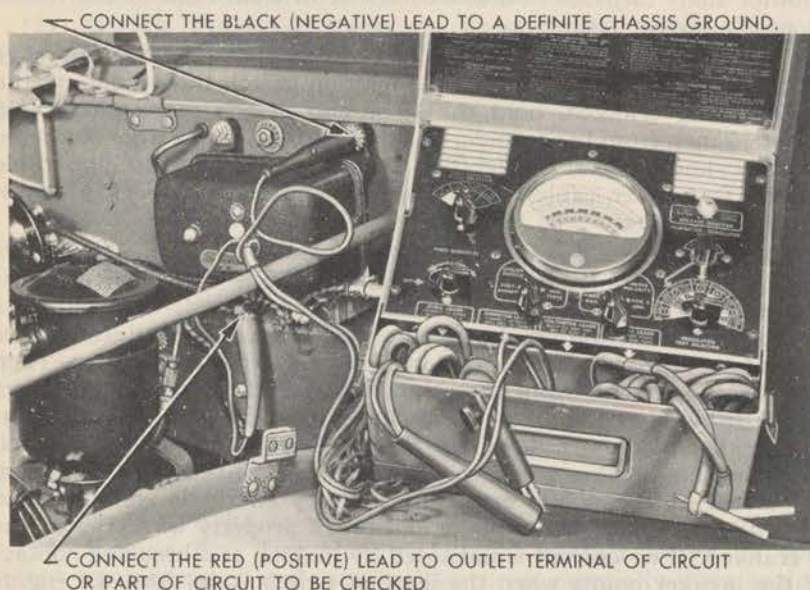
(a) Test the wire and connections between the ammeter and the ignition switch by holding the positive lead from the voltmeter against the left post of the ignition switch. If approximate battery voltage is shown on the voltmeter, the circuit is complete to the switch.

(b) Test the switch by moving the voltmeter positive lead to the right post of the switch. If about the same voltage is shown, current is passing through the switch.

(c) Test primary wires and connections from ignition switch through radio filter to the coil by moving the voltmeter positive lead to the lower left post of the coil. If battery voltage is again shown, current is reaching that post.

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(d) Test primary circuit from coil to distributor breaker points by moving the voltmeter positive lead to the lower right post of the coil, to each side of the distributor filter (if so equipped) and finally to the distributor breaker arm. If battery voltage is shown at any of these points of test and not at the next point, the trouble will be located between these two points. If very little or no voltage is shown at any point between the coil and breaker arm, disconnect the condenser lead wire from the distributor body and connect the voltmeter positive lead to the breaker arm. A normal battery voltage reading then would show a shorted condenser. No voltage reading at any of the points between the coil and breaker arm (with the breaker points open and the condenser lead disconnected), would indicate a broken primary circuit in the coil.



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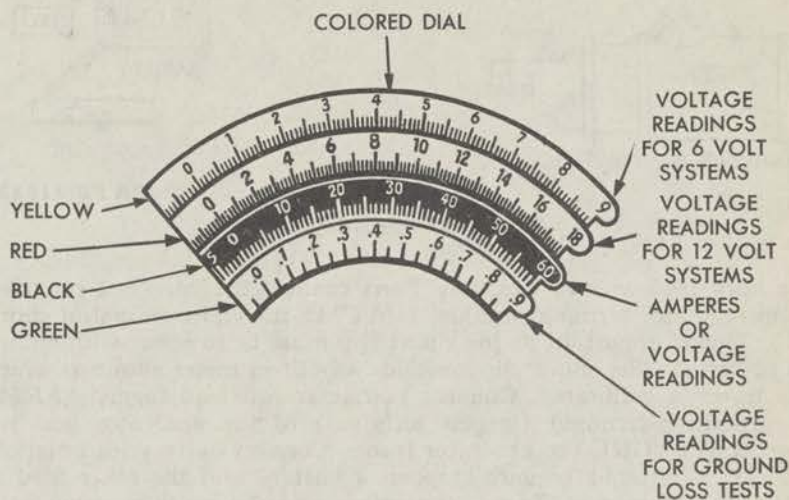
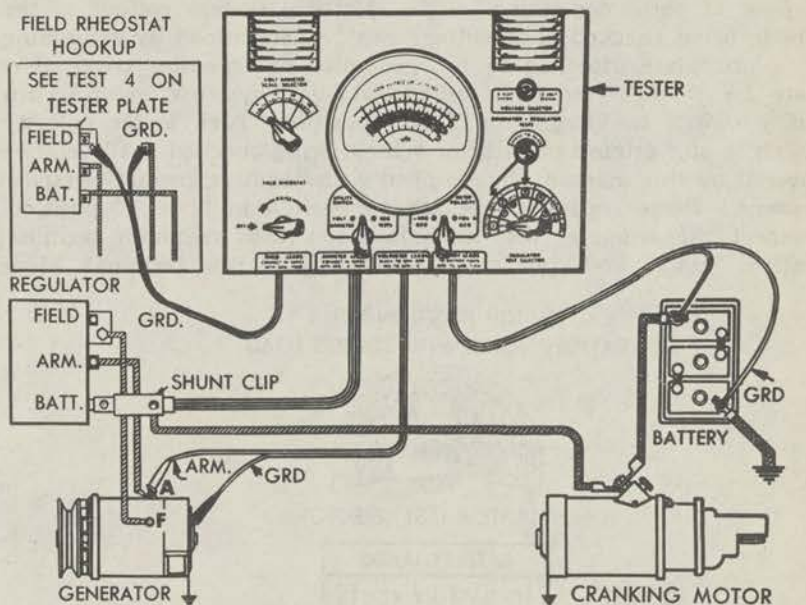
**Figure 45—Checking Ignition Primary Circuit**

**39. BATTERY AND GENERATING SYSTEM.**

a. **General Information.** All tests described below to determine causes of trouble in the battery and generating system are based on the use of the low voltage circuit tester (17-T-5575). This tester contains a voltmeter, ammeter, and switches, for making the various tests described.

(1) **TESTER CONNECTIONS** (fig. 46). A diagram of the connections for the low voltage circuit tester is shown on a plate attached to the cover of the tester. Make all connections shown except those for the field rheostat. Use this hookup only when making test described in

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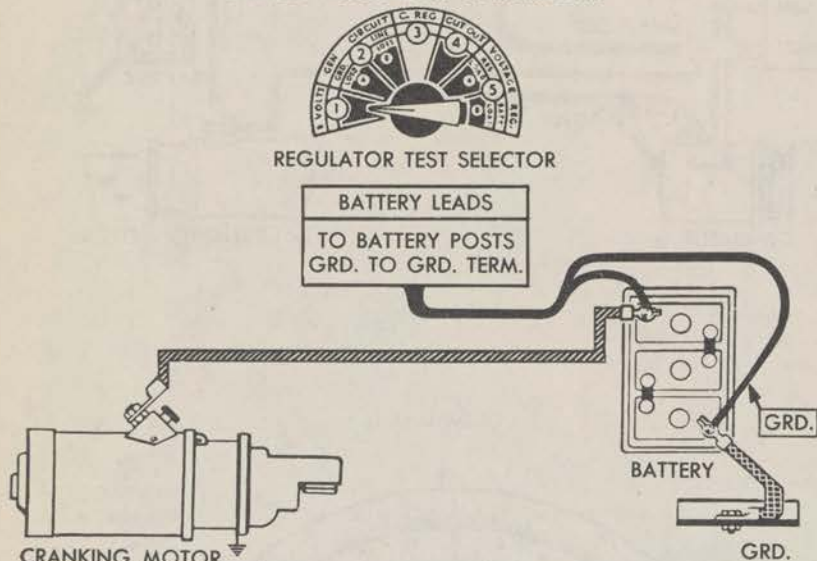
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Figure 46—Test Connections for Low Voltage Circuit Tester

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subparagraph i which follows. Place knob of voltage selector switch at 6 or 12 volts, depending on the electrical system voltage of the vehicle being checked. The voltage can be determined by examining the name plate attached to the generator or regulator cover. The plate for 6-volt systems is red; for 12-volt systems, green. Turn utility switch to "Regulator Tests" position. Turn meter polarity switch to suit ground polarity of vehicle being checked. (All vehicles covered by this manual are equipped with negative ground electrical systems.) Place regulator test selector switch in "No. 1" position. Connect the ammeter test leads in series with regulator terminal marked "BAT" and connect the shunt clip to that terminal. Move

SWITCH POSITION NO. 1  
BATTERY VOLTS WITH STARTER LOAD



RA PD 318328

**Figure 47—Battery Test**

the horn feed wire to one side. Then connect the wire just removed from regulator terminal marked "BAT" to the end terminal of shunt clip. This is important as the shunt clip must be in series with circuit to be tested. The shunt clip contains a built-in meter shunt to which the tester is calibrated. Connect voltmeter test lead tagged "ARM" to armature terminal (largest terminal) of the generator and the lead tagged "GRD" to generator frame. Connect battery lead marked "GRD" to ground (negative) post of battery and the other lead to positive battery post. These connections must be made by driving the pins securely into the center of the battery posts in order to make a good connection. False readings will be obtained if the connections are not tight.



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should be recharged. A voltage reading below 4.5 volts on 6-volt systems, or 8.5 on 12-volt systems, with the cranking motor cranking the engine, usually indicates a discharged or defective battery. If the battery is fully charged and in good condition, however, the cranking motor may be the cause of excessive voltage drop. See paragraph 34 b.

(3) **POSSIBLE CAUSES OF DISCHARGED BATTERY.**

- (a) Excessive use of cranking motor, or electrical accessories.
- (b) Ignition switch left on with engine not running.

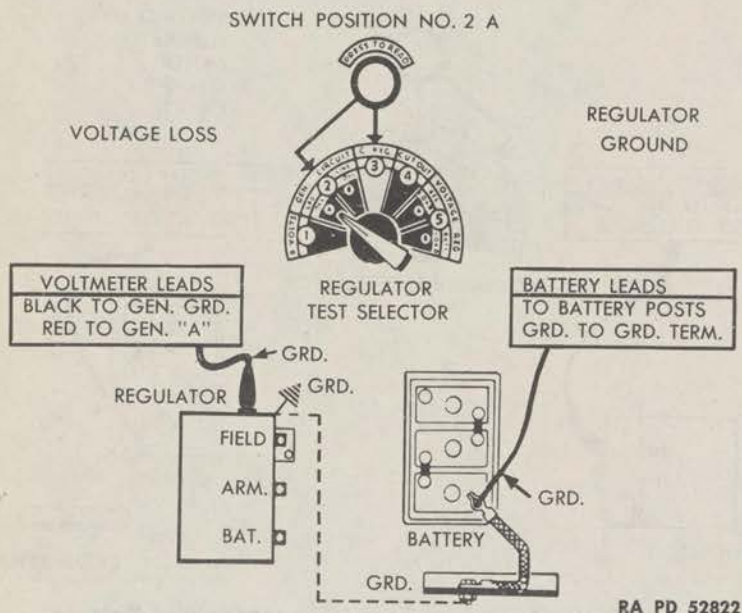


**Figure 49—Voltage Loss Test (Regulator Ground Circuit)**

- (c) Broken or loose fan belt.
- (d) Short circuits or voltage loss which will be determined on tests which follow.
- (e) Improper operation of generator regulator which will be determined by tests which follow.
- (f) Generator not charging due to improper operation of the generator which will be determined by tests which follow.
- (g) Battery in such condition that it will not take or hold a full charge.

**c. Voltage Loss Test (Generator and Battery Ground Circuit) (fig. 48).**

(1) **TEST PROCEDURE.** Place regulator test selector switch in "No. 2A" position. Run engine at about 2,000 revolutions per minute

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(approximately half speed), then press black push button marked "PRESS TO READ." The meter reading should not exceed 0.05 volt (one division) on the green scale if the ground circuit is in good condition. A reading higher than this indicates a loss of voltage due to poor ground connections.

(2) POSSIBLE CAUSES OF VOLTAGE LOSS IN GENERATOR AND BATTERY GROUND CIRCUIT.

(a) Poor contact between generator housing and engine due to accumulation of grease, paint, or rust.

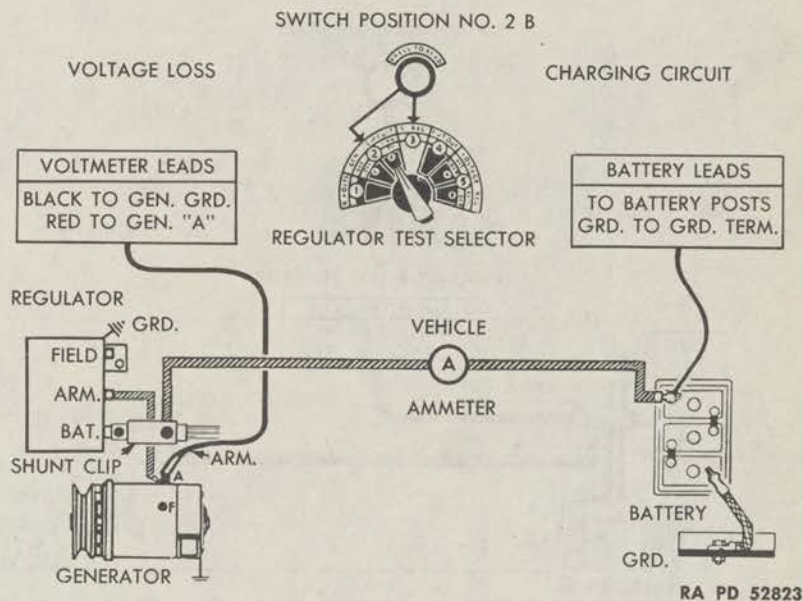


**Figure 50—Voltage Loss Test (Charging Circuit)**

(b) Battery ground cable corroded or loose.

(c) Generator charging rate too high, causing increased voltage loss in proportion to excessive charging rate. This will be determined on tests which follow.

**d. Voltage Loss Test (Regulator Ground Circuit) (fig. 49).**

(1) TEST PROCEDURE. Leave regulator test selector switch in "No. 2A" position with the engine running. Disconnect the voltmeter "GRD" test cable which was connected to the generator frame and connect it to the regulator base and again press the black button. Reading should not exceed 0.05 volt (one division) on the green scale. A higher reading indicates voltage loss in the regulator ground

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circuit. NOTE: After completing this test, leave "GRD" cable in this position for all succeeding tests.

(2) POSSIBLE CAUSES OF VOLTAGE LOSS IN REGULATOR GROUND CIRCUIT. Poor ground at either end of wire shielding at regulator and generator. Tighten wire shielding securely and repeat test.

**e. Voltage Loss Test (Charging Circuit) (fig. 50).**

(1) TEST PROCEDURE. Determine charging rate (subpar. f below). Place regulator test selector switch in "No. 2B" position with the engine running. Press the black button and note voltage loss on the

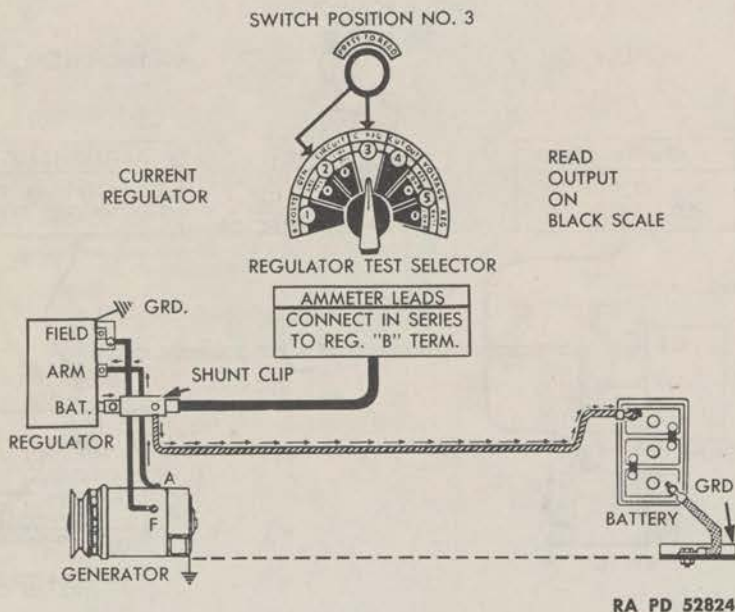


**Figure 51—Current Regulator Test**

yellow scale. Maximum loss should not exceed 0.35 volt for each 10 amperes of current flowing in the circuit.

(2) POSSIBLE CAUSES OF VOLTAGE LOSS IN CHARGING CIRCUIT.

(a) Damaged battery cable, loose or corroded terminals or connections between positive battery post, generator and regulator.

(b) Loose or corroded connections at ammeter; or high internal resistance in ammeter. To test ammeter, place a jumper wire across ammeter and repeat test.

(c) Internal trouble within the generator regulator assembly itself.

(d) Use of undersize replacement cables or wires between battery, generator and regulator.

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(e) Generator charging rate too high, causing increased voltage loss in proportion to excessive charging rate.

f. **Current Regulator Test** (fig. 51). Set regulator test selector switch to "No. 3" position. Run engine at about 2,000 revolutions per minute and press the black push button. Note charging rate (amperes) on black scale. Charging current should approximately coincide with the rated capacity of the generator as shown on rating plate on regulator. If charging current is higher or lower than capacity of generator, the fan belt is loose or the current regulator is incorrectly set. If no charge, or a low charge is indicated, make

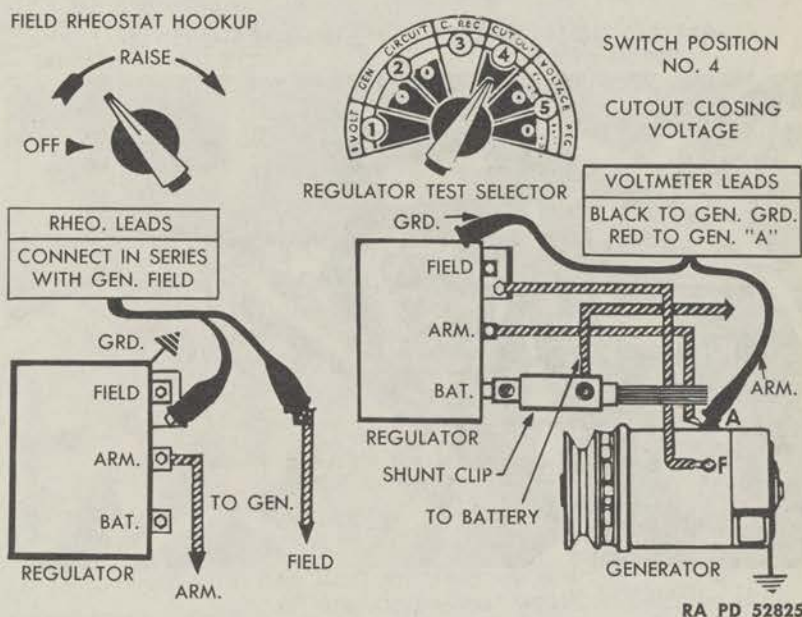


**Figure 52—Circuit Breaker Closing Voltage Test**

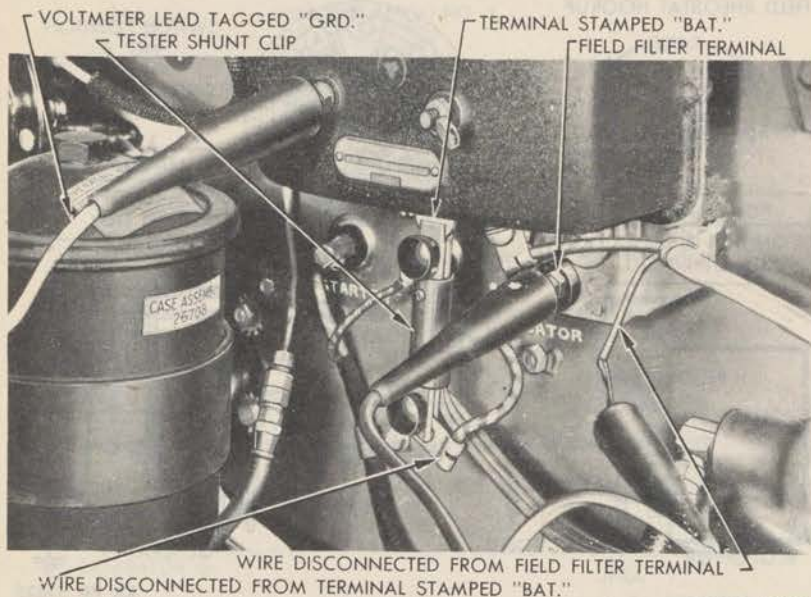
the following test to determine whether the generator or generator regulator is at fault. Connect a jumper between "A" and "F" terminal regulator and operate the engine at slow speed. Under this condition the generator may produce a dangerously high output if the speed is carried too high, and if run for too long a period of time, may result in burned armature or field.

(1) If the ammeter indicates no amperage is flowing in the circuit, it will be necessary to take a voltage reading to determine whether the generator or the regulator is at fault. To take a voltage reading, place the utility switch in the "volt-ammeter" position. Turn the volt-ammeter scale selector to "18 VOLTS" range. **NOTE:** Operate the engine at slow speed, as too high a speed may damage generator armature or field, as explained in subparagraph f above.

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(2) If the voltmeter (red scale) indicates a voltage in excess of 8.0 volts for 6-volt systems or 15.0 volts for 12-volt systems, the generator is functioning properly and the fault is in the generator regulator.

(3) With no voltage indication or with a voltage reading below 6.4 volts for 6-volt systems or 13.0 volts for 12-volt systems, the generator is at fault. After making this test, remove jumper wire across "A" and "F" terminals and change utility switch and volt-ammeter scale selector back to original setting for all succeeding tests



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**Figure 53—Field Rheostat Connections**

g. **Circuit Breaker Reverse Current Test** (fig. 51). Leave regulator test selector in "No. 3" position. Gradually reduce engine speed and note reverse current on the black scale. If the circuit breaker is opening properly, the reverse current should not exceed 0.5 to 4.0 amperes (6-volt systems) or 0.5 to 6.0 amperes (12-volt systems) before the points open and reverse current stops. It may be necessary to stop the engine and read the discharge current as the engine slows down to a stop. If it is known that the circuit breaker is not functioning properly, replace the generator regulator assembly.

h. **Circuit Breaker Closing Voltage Test** (figs. 52 and 53). Place regulator test selector switch in "No. 4" position. Connect field rheostat in series with the field terminal of the generator at the

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regulator as shown in figure 53. The field rheostat is provided for controlling the voltage of generators at idling speed to check the circuit breaker closing voltage. Maintain engine speed at fast idle. Then gradually increase generator output with field rheostat by rotating knob in the direction of arrow until meter pointer kicks back slightly. The position on the dial where the meter pointer kicks back and remains steady is the closing voltage which should be 6.4 to 6.8 volts for 6-volt systems (read yellow scale) or 12.8 to 13.6 volts for 12-volt systems (read red scale). **CAUTION:** *Circuit breaker closing voltage should always be above that of the battery and at least 0.5 volt under voltage setting of generator regulator.* If the setting is incorrect, replace regulator.

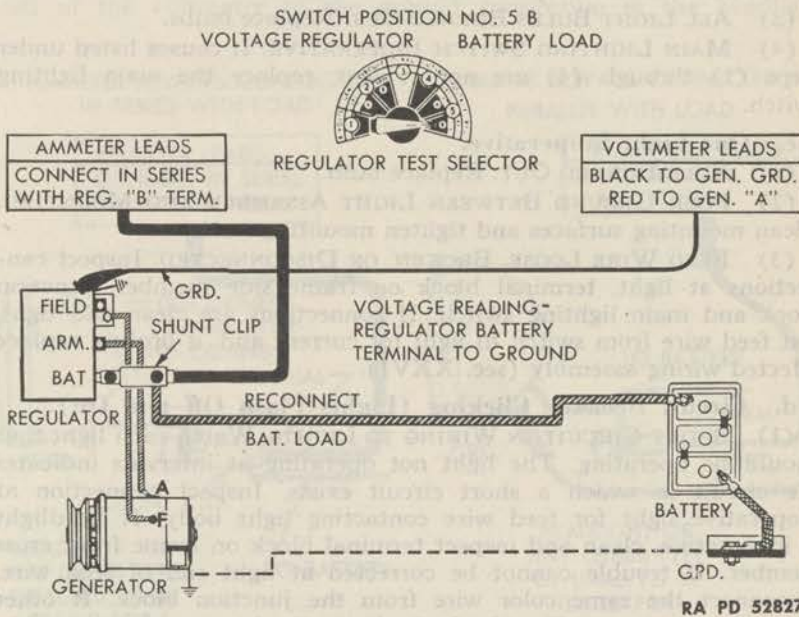


**Figure 54—Voltage Regulator Test**

i. **Voltage Regulator Test** (figs. 51 and 54). Disconnect the field rheostat used in previous test (subpar. h above) and reconnect the field terminal at the regulator. Set regulator test selector switch in "No. 3" position (fig. 51) and run engine at about 2,000 revolutions per minute for approximately 15 minutes with the hood closed, as engine and regulator must be at normal operating temperature to make accurate tests. Run engine until the charging rate drops below 15 amperes, as battery must be fully charged for accurate check. Then move regulator test selector switch to "No. 5B" position (fig. 54). Read the yellow scale for 6-volt systems or the red scale for 12-volt systems. The voltage should check within 7.2 to 7.3 volts for the 6-volt systems and 14.3 to 14.5 volts on the 12-volt systems

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at normal room temperature. If the voltage does not check within these limits, replace generator regulator assembly.

**40. LIGHTING SYSTEM.**

a. **General Information.** If the engine cranks and starts there will be current in the lighting circuit at least as far as the ammeter, and light failure will be caused by some difficulty in the lighting circuit, lights, bulbs or switches. (See wiring diagram in sec. XXV.)

b. **All Lights Inoperative (with Main Lighting Switch On).**

(1) **FEED WIRE DISCONNECTED FROM CIRCUIT BREAKER.** The circuit breaker is mounted on the main lighting switch. Connect wire.

(2) **CIRCUIT BREAKER POINTS NOT MAKING CONTACT.** If points do not make contact, replace circuit breaker.

(3) **ALL LIGHT BULBS BURNED OUT.** Replace bulbs.

(4) **MAIN LIGHTING SWITCH INOPERATIVE.** If causes listed under steps (1) through (4) are not evident, replace the main lighting switch.

c. **One Light Inoperative.**

(1) **BULB BURNED OUT.** Replace bulb.

(2) **POOR GROUND BETWEEN LIGHT ASSEMBLY AND MOUNTING.** Clean mounting surfaces and tighten mounting nuts.

(3) **FEED WIRE LOOSE, BROKEN, OR DISCONNECTED.** Inspect connections at light, terminal block on frame side member, junction block and main lighting switch. If connections are clean and tight, test feed wire from switch to light for current and, if broken, replace affected wiring assembly (sec. XXVI).

d. **Circuit Breaker Clicking (Lights Flash Off and On).**

(1) **SHORT CIRCUIT IN WIRING TO LIGHTS.** Watch each light that should be operating. The light not operating at intervals indicates the circuit in which a short circuit exists. Inspect connection at inoperative light for feed wire contacting light body. If headlight is inoperative, clean and inspect terminal block on frame front cross member. If trouble cannot be corrected at light end of feed wire, disconnect the same color wire from the junction block. If other lights then burn steadily, the feed wire in the lower wiring assembly is grounded. Replace wiring assembly (par. 127). Temporary repairs can be made by leaving both ends of the grounded wire disconnected and running another wire from junction block to light connection.

e. **Lamp Bulbs or Sealed Beam Units Fail Repeatedly.**

(1) **GENERATOR REGULATOR INADEQUATELY GROUNDED.** Tighten wire shielding to regulator base and generator.

(2) **GENERATOR REGULATOR IMPROPERLY ADJUSTED.** Test regulator (par. 39) and replace if faulty.

f. **Sealed Beam Unit or Bulb Burns Out Immediately After Installed with Light Switch On.**

(1) **SIX-VOLT BULB USED WITH 12-VOLT SYSTEM.** Install correct bulb (par. 104).