

## TROUBLE SHOOTING

(2) **GENERATOR REGULATOR NOT CONTROLLING CHARGING RATE.** Test regulator (par. 39) and replace if faulty.

**g. Headlights Dim.**

(1) **HEADLIGHTS IMPROPERLY AIMED.** Aim (par. 105).

(2) **LOW VOLTAGE AT HEADLIGHT** (fig. 55). Lighting system voltage may be checked with the low voltage circuit tester. Change the tester controls so that the instrument can be used as a voltmeter.

(a) Remove the headlight door and partially pull out the sealed beam unit from the wire connector. With the sealed beam unit mounted in its correct position, the top prong supplies current for the low beam. The right prong supplies current for the high beam and the left prong is the ground connection. Connect the negative lead of the voltmeter to the ground connection in the headlight

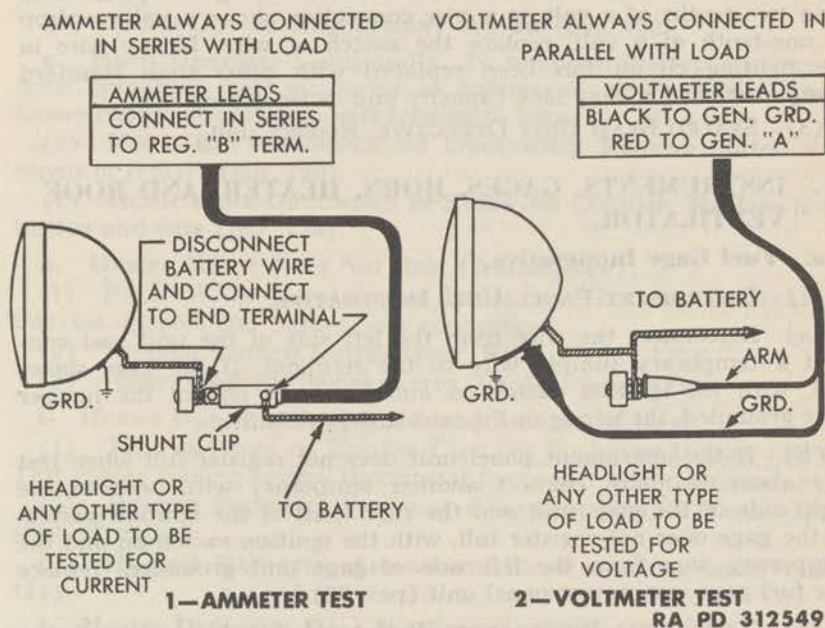


**Figure 55—Volt-ammeter Tests**

body and the positive voltmeter lead to the right prong which supplies current for the high beam.

(b) After the lights have burned for five minutes (engine not running), the voltage at the headlights, with the high beam filament burning, should not be less than 5.25 volts on vehicles with a 6-volt battery or less than 10.5 volts on vehicles with a 12-volt battery. With the lights burning, and the engine warmed up and running at a speed equivalent to a vehicle speed of about 20 miles per hour, the voltage at the headlights should not be less than 6.3 volts with 6-volt battery or 12.6 volts with 12-volt battery; nor more than

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

6.9 volts with 6-volt battery or 13.8 volts with 12-volt battery, with battery and generator at room temperature of approximately 70°F.

(c) If voltage is low at either headlight socket, with only standard equipment in the circuit, test voltage output of battery—it should be 6.0 to 6.5 volts with 6-volt battery (12.0 to 13.5 volts with 12-volt battery). Clean and tighten battery terminals and ground cable. Check wires and connections to all lamps, also main lighting and blackout switch and headlight beam control switch for high resistance.

(d) When a voltmeter is placed between the ground and input side of a switch and then between the ground and output side of the switch, with the lights burning, the difference in the readings will represent the voltage drop in the switch. The same method may be used in checking voltage drop in wires by taking a reading at each end of the wire. If a switch shows a voltage drop of more than two-tenths of a volt or a wire connection shows a voltage drop of one-tenth of a volt, replace the switch or wire. If any wire in the lighting circuit has been replaced with other than standard equipment wire, it may lack capacity and cause voltage drop.

(3) SEALED BEAM UNIT DEFECTIVE. Replace unit.

#### **41. INSTRUMENTS, GAGES, HORN, HEATER, AND ROOF VENTILATOR.**

##### **a. Fuel Gage Inoperative.**

###### **(1) INSTRUMENT PANEL UNIT INOPERATIVE.**

(a) Disconnect the wire from the left side of the unit and connect a temporary jumper wire to the terminal. If the gage shows full, with the ignition switch on and the loose end of the jumper wire grounded, the wiring or the tank unit is at fault.

(b) If the instrument panel unit does not register full when test (a) above is made, connect another temporary wire between the right side of the gage unit and the right post of the ignition switch. If the gage does not register full, with the ignition switch on and the temporary wire from the left side of gage unit grounded, replace the fuel gage instrument panel unit (par. 72).

(2) TANK UNIT INOPERATIVE. If test (1) (a) above proved that the instrument panel unit is operating, disconnect wire from the tank unit and ground the wire to bare metal of the chassis. If the gage does not show full, with the ignition switch on and the tank unit wire grounded, the wire is broken. If the gage does show full, replace the fuel gage tank unit (par. 72).

##### **b. Oil Gage Inoperative.**

(1) NO OIL PRESSURE. See paragraph 33 n.

(2) SMALL ORIFICE IN GAGE CONNECTION CLOGGED WITH DIRT OR ICE. Remove connection, blow out, clean, and dry thoroughly.

(3) GAGE DAMAGED. Replace (par. 117).

**TROUBLE SHOOTING****c. Thermometer Inoperative.**

(1) THERMOMETER HEAD, TUBE OR BULB DAMAGED. Replace (par. 118).

**d. Speedometer Does Not Register Speed or Mileage.**

(1) SPEEDOMETER CABLE BROKEN. Replace (par. 119).

**e. Speedometer Registers Either Speed or Mileage, But Not the Other.**

(1) SPEEDOMETER HEAD INOPERATIVE. Replace (par. 119).

**f. Horn Does Not Operate.**

(1) WIRE CONNECTOR BETWEEN HORN AND STEERING COLUMN PULLED APART. Push connector together.

(2) HORN WIRE DISCONNECTED FROM HORN BUTTON. Remove horn button and resolder wire.

(3) HORN FEED WIRE LOOSE OR DISCONNECTED. Tighten or connect wire.

(4) HORN OUT OF ADJUSTMENT. Adjust (par. 120).

**g. Horn Operates Continually.** To temporarily stop continuous horn operation, pull connector at bottom of steering gear apart. Leave rubber insulator on wire leading to horn.

(1) HORN BUTTON STUCK OR GROUNDED. Remove button and repair or replace (par. 120).

(2) HORN WIRE GROUNDED IN STEERING COLUMN. Replace horn button and wire (par. 120).

**h. Heater Motor Does Not Run (Ambulance).**

(1) FEED WIRE CONNECTION LOOSE AT HEATER OR HEATER SWITCH. Inspect and tighten wire connections.

(2) HEATER SWITCH INOPERATIVE. Replace (par. 121).

(3) HEATER MOTOR INOPERATIVE. Replace (par. 121).

**i. Heater Does Not Supply Normal Amount of Heat.**

(1) TEMPERATURE OF ENGINE COOLING SOLUTION BELOW 150°F. Test engine cooling system thermostat for proper operation (par. 84).

(2) HEATER SHUT-OFF VALVE AT CYLINDER HEAD CLOSED. Open shut-off valve.

(3) HEATER RADIATOR AIR-BOUND. Bleed air from heater (par. 121).

**j. Heater Defroster Does Not Function.**

(1) DEFROSTER BLOWER DOES NOT RUN. Tighten wire connections at defroster and switch. If blower then does not operate, replace switch or defroster (par. 121).

(2) DEFROSTER OUTLET TUBES DISCONNECTED. Connect tubes.

**k. Roof Ventilator Does Not Run.**

(1) WIRE CONNECTION LOOSE AT VENTILATOR OR SWITCH. Tighten or connect wires.

(2) VENTILATOR SWITCH INOPERATIVE. Replace ventilator switch (par. 122).

(3) VENTILATOR ASSEMBLY INOPERATIVE. Replace (par. 122).

**3/4-TON 4 x 4 TRUCK (DODGE)****42. RADIO INTERFERENCE SUPPRESSION.**

a. **Causes of Interferences.** Electrical interference of the type to be dealt with by suppression on the vehicle has two general causes. It may be caused by sparks in the normal operation of the vehicle's ignition system or the generator or voltage regulator. It may be a static discharge between component parts of the vehicle, especially the body and its attachments, while the vehicle is in motion or for a brief period after it comes to a halt. In either case it may be recognized by the type of noise it causes in the radio receiver. *NOTE: If radio interference is repeated during operation, the driver will cooperate with the radio operator in locating its sources (par. 42).*

**b. Location and Possible Elimination of Interference.**

(1) **STATIC INTERFERENCE.** If the interference is in the form of a "frying" or "scratching" sound or irregularly spaced "pops" or "clicks" which stop when the vehicle (engine running) comes to a halt, or shortly after, it is probably caused by static discharges between component parts of the vehicle. This type of interference is eliminated by bonding, which consists of grounding or electrically connecting the various vehicle components. Bonding-braid straps are used in making this connection. Make sure that both ends of bonding straps are thoroughly clean and securely fastened. When replacing a bonding strap or when tightening a loose strap, remove all grease and dirt from the end of the strap, then thoroughly scrape it so that it will make a good electrical connection or, if available, use a toothed lock washer between the parts. Clean all nuts and washers used in fastening the strap and replace them in exactly the same position as originally found. Bonding straps should be found at the following locations:

- (a) Front fenders to splash aprons at rear.
  - (b) Headlights to frame.
  - (c) Hood bumper to lower hood section.
  - (d) Hood, across center hinge and to cowl.
  - (e) Lower hood sections to upper hood sections.
  - (f) Ignition coil and steering column to dash.
  - (g) Splash shield to frame.
  - (h) Steering column to instrument panel.
  - (i) Throttle rod, thermostat cable, speedometer cable, choke rod to dash.
  - (j) Body to rear bumperette (Ambulance and Carryall).
  - (k) Battery tray to splash shield and generator cable shielding to battery hold-down bolt (Weapon Carrier and Ambulance).
  - (l) Cylinder head to dash at rear of head.
  - (m) Frame to motor support (clutch housing), right side.
  - (n) Cab to frame, both sides.
  - (o) Rear of body to chassis, both sides.
- (2) Bonding is also formed by use of toothed lock washers in many other places on the vehicle, particularly in the fastening of

**TROUBLE SHOOTING**

sheet metal and electrical units. This type washer "bites" into metal surfaces and forms a good ground. Be sure to install washers of this type in their original positions. See figures 112 through 120 for location of all bonds.

(3) **IGNITION AND GENERATING SYSTEM INTERFERENCE.** If interference is present in the receiver when the vehicle is stationary with the engine running, it is probably due to improper suppression of sparks involved in the operation of the engine or generator. Suppression filters and condensers are used at or near the point of origination to eliminate or at least reduce interference (par. 103). The following steps should be taken to determine causes of ignition or generating system interference:

(a) Clean and tighten battery terminals. Replace cables if damaged due to corrosion.

(b) Clean spark plugs and adjust gaps to 0.025 inch.

(c) Clean distributor cap if dirty; replace if cracked.

(d) Inspect distributor rotor; replace if burned or cracked.

(e) Inspect and clean distributor breaker points; adjust to 0.020 inch.

(f) Inspect resistor-suppressors installed on each of the six spark plug wires at plugs; also resistor-suppressor installed in high-tension wire connected to center terminal of distributor cap. Remove any moisture present by wiping dry with cloth; if corrosion or oxidation is present, clean and scrape. Test by substituting suppressors known to be satisfactory; if faulty, replace. Screw suppressors firmly on wires to completely seat connections.

(g) Test ignition coil; replace if faulty.

(h) Inspect and clean generator commutator and brushes.

(i) Inspect shielding on generator armature and field wires for frayed, broken, or loose connections; inspect for broken or damaged wires between generator and regulator; tighten shielding ground connections or replace wires.

(j) Inspect for loose ground or terminal connections at filter and regulator; tighten connections and mounting bolts.

(k) Inspect for broken wires in generator and ignition circuits; repair or replace.

(l) Inspect switches for faulty contacts; replace if faulty.

(m) Inspect filters for shorted or open circuits. Test for continuous circuit by connecting test unit to each terminal of filter. If current does not pass through filter, an open circuit is indicated; replace filter with identical new part. Test for short by disconnecting wiring from filter and connecting test unit from either terminal to filter body. Passage of current between terminal and body indicates a short within filter; replace unit. This same procedure can be used to test condensers.

**3/4-TON 4 x 4 TRUCK (DODGE)****43. CLUTCH.****a. Clutch Chatter.**

(1) GREASE ON DISK, FLYWHEEL, OR PRESSURE PLATE. Replace disk (par. 131) and thoroughly clean other parts.

(2) BINDING OF CLUTCH RELEASE LINKAGE. Clean and free up linkage.

(3) DISK FACINGS LOOSE ON DISK. Replace disk (par. 131).

(4) BROKEN PRESSURE PLATE. Replace pressure plate assembly (par. 131).

(5) RELEASE LEVERS OUT OF ADJUSTMENT. Replace pressure plate assembly (par. 131).

(6) ENGINE MOUNTINGS LOOSE. Tighten engine mounting bolts (par. 67 b).

**b. Clutch Grabbing.**

(1) GREASE ON DISK, FLYWHEEL, OR PRESSURE PLATE. Replace disk (par. 131) and thoroughly clean other parts.

(2) CLUTCH DISK OR PRESSURE PLATE BROKEN. Replace damaged parts (par. 131).

(3) HUB OF DISK NOT SLIDING FREELY ON SPLINED SHAFT. Remove and free up.

(4) RELEASE LINKAGE BINDING. Free up linkage.

**c. Clutch Slippage.**

(1) LACK OF PEDAL FREE PLAY. Adjust pedal free play (par. 130).

(2) RELEASE LINKAGE BINDING. Free up linkage.

(3) PRESSURE SPRINGS WEAK OR BROKEN. Replace pressure plate assembly (par. 131).

(4) DISK FACINGS WORN. Replace disk (par. 131).

(5) PRESSURE PLATE WORN. Replace (par. 131).

**d. Clutch Dragging.**

(1) EXCESSIVE PEDAL FREE PLAY. Adjust pedal free play (par. 130).

(2) CLUTCH DISK BENT OR DISHED. Replace disk (par. 131).

(3) CLUTCH DISK FACINGS LOOSE OR BROKEN. Replace disk (par. 131).

(4) RELEASE LEVERS IMPROPERLY ADJUSTED. Replace pressure plate assembly (par. 131).

(5) FRICTION IN CRANKSHAFT PILOT BUSHING. Notify higher authority.

**e. Gear Clash.** Gear clash caused by the spinning of the clutch is frequently confused with clutch dragging. A clutch disk which releases perfectly will naturally spin under its own weight and momentum immediately after being released, if the transmission gears are in the neutral position. When shifting from neutral to first speed, or to reverse, wait for the clutch to stop to avoid gear clash.

**TROUBLE SHOOTING****44. TRANSMISSION.****a. Hard Gear Shifting.**

- (1) TOO MUCH CLUTCH PEDAL FREE PLAY. Adjust (par. 130).
- (2) CLUTCH DISK HUB BINDS ON DRIVE PINION SPLINES. Remove disk and free up (par. 92).
- (3) CLUTCH DISK OR OTHER CLUTCH PARTS DAMAGED. Replace disk or clutch pressure plate assembly (par. 131).

**b. Slips Out of High Gear.**

- (1) TRANSMISSION CASE NOT TIGHT ON CLUTCH HOUSING. Tighten attaching cap screws.
- (2) DIRT BETWEEN TRANSMISSION AND CLUTCH HOUSING FACES. Remove transmission (par. 133) and clean surfaces.
- (3) TRANSMISSION PARTS WORN OR DAMAGED; CLUTCH HOUSING DAMAGED. Notify higher authority.

**c. Slips Out of Gear Other Than High.**

- (1) TRANSMISSION INTERNAL PARTS WORN OR DAMAGED. Notify higher authority.

**d. Engagement of Two Speeds.**

- (1) INTERLOCK PIN OR PLUNGERS IN TRANSMISSION MISSING. Notify higher authority.

**e. Lubricant Leakage.**

- (1) LUBRICANT LEVEL TOO HIGH IN TRANSMISSION. Correct level is from lower edge of filler hole (hot) to  $\frac{1}{2}$  inch below (cold).
- (2) LEAK AROUND BEARING RETAINER CAP SCREWS. Remove screws, dip in white lead or paint, and install.
- (3) MAINSHAFT REAR BEARING OIL SEAL WORN OR DAMAGED; GASKET AT DRIVE PINION BEARING RETAINER DAMAGED. Notify higher authority.
- (4) POWER TAKE-OFF LOOSE ON TRANSMISSION CASE. Tighten attaching cap screws.
- (5) GASKETS BETWEEN POWER TAKE-OFF AND TRANSMISSION DEFECTIVE. Notify higher authority.
- (6) POWER TAKE-OFF CASE DAMAGED; BEARING CAP GASKETS OR OIL SEALS LEAKING. Notify higher authority.

**f. Power Take-off Overheats.**

- (1) TRANSMISSION LUBRICANT LOW. Replenish lubricant.
- (2) IMPROPER CLEARANCE BETWEEN POWER TAKE-OFF GEAR AND TRANSMISSION GEAR; BEARINGS ADJUSTED TOO TIGHTLY. Notify higher authority.

**g. Power Take-off Slips Out of Gear.**

- (1) GEARSHIFT ROD IMPROPERLY ADJUSTED NOT ALLOWING FULL MESH OF GEARS. Adjust gearshift rod (par. 134).
- (2) POWER TAKE-OFF PARTS WORN OR DAMAGED. Notify higher authority.

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

**45. TRANSFER CASE.**

a. **Excessive Noise.** Due to the severe operating conditions under which the vehicle must necessarily operate, the transfer case is sturdily constructed for dependability rather than for quietness of operation. Consequently, some gear noise will be audible, especially when the engine is under load with the transmission in high gear at low or medium speeds, and should be considered normal.

(1) **LUBRICANT LOW.** Replenish lubricant.

(2) **INTERNAL PARTS WORN OR DAMAGED.** Notify higher authority.

b. **Hard Shifting To or From Front Axle Drive.**

(1) **CONTROL LEVER SEIZED TO SUPPORT PIN ON TRANSMISSION COVER.** Free up and lubricate lever.

(2) **SHIFTER RAIL TIGHT IN CASE.** Free up rail by lubricating without disassembling.

(3) **INTERNAL PARTS WORN OR DAMAGED.** Notify higher authority.

c. **Lubricant Leakage.**

(1) **LUBRICANT LEVEL TOO HIGH.** Correct level is from lower edge of filler hole (hot) to 1/2 inch below (cold).

(2) **VENT ON TOP OF CASE CLOGGED.** Remove and clean vent.

(3) **OIL SEALS OR GASKETS LEAK; PROPELLER SHAFT COMPANION YOKE SCORED OR GROOVED; BEARINGS LOOSE OR DAMAGED.** Notify higher authority.

d. **Overheating.** The normal operating temperature of the transfer case is high, therefore, the assembly should not be considered as overheated unless an abnormal gear noise or lubricant leakage past the oil seals develop.

(1) **LUBRICANT LEVEL TOO HIGH OR TOO LOW.** Drain or fill to proper level.

(2) **VENT ON TOP OF CASE CLOGGED.** Remove vent and clean.

(3) **BEARINGS ADJUSTMENT TOO TIGHT.** Notify higher authority.

e. **Front Axle Drive Disengages.**

(1) **CONTROL ROD IMPROPERLY ADJUSTED.** Adjust rod (par. 136).

(2) **TRANSFER CASE PARTS WORN OR DAMAGED.** Notify higher authority.

f. **Backlash.**

(1) **TRANSFER CASE LOOSE IN MOUNTING BRACKETS.** Tighten cap screws.

(2) **PROPELLER SHAFT COMPANION YOKE LOOSE ON TRANSFER CASE SHAFT.** Notify higher authority.

(3) **TRANSFER CASE PARTS WORN OR DAMAGED.** Notify higher authority.

**46. PROPELLER SHAFTS.**

a. **Backlash or Noise in Joint.**

(1) **CROSS BEARINGS OR YOKE WORN OR DAMAGED.** Replace propeller shaft assembly (par. 139).

## TROUBLE SHOOTING

### b. Lubricant Leaks from Joint.

(1) OIL SEALS DEFECTIVE. Replace propeller shaft assembly (par. 159).

(2) LUBRICANT FITTING LEAKS OR LOST. Replace fitting.

### c. Vibration in Propeller Shaft.

(1) WORN OR DAMAGED UNIVERSAL JOINTS; PROPELLER SHAFT SPRUNG. Replace propeller shaft assembly (par. 139).

(2) ASSEMBLY ARROWS ON SHAFT AND SPLINED YOKES NOT IN LINE. Line up arrows (par. 139).

## 47. FRONT AND REAR AXLES.

a. General. The differential and carrier assemblies used in the front and rear axles are identical. Both axles are of the full-floating type (driving power through axle drive shafts).

### b. Lubricant Leakage at Drive Pinion.

(1) LUBRICANT LEVEL TOO HIGH. Correct level is from lower edge of filler hole (hot),  $\frac{1}{2}$  inch below (cold).

(2) AXLE HOUSING VENT CLOGGED. Remove and clear vent (par. 145).

(3) PINION BEARING OIL SEAL, SLINGER, OR PROPELLER SHAFT COMPANION YOKE WORN OR DAMAGED. Notify higher authority.

### c. Differential Lubricant Passes into Front Axle Universal Drive Joint Housing.

(1) DIFFERENTIAL LUBRICANT LEVEL TOO HIGH. Drain to level of  $\frac{1}{2}$  inch below filler plug hole.

(2) AXLE HOUSING VENT CLOGGED. Remove and clear vent.

(3) UNIVERSAL DRIVE SHAFT OIL SEAL WORN OR DAMAGED. Replace seal.

### d. Lubricant Leakage into Brake Drum.

(1) LOOSE WHEEL BEARINGS. Adjust bearings (par. 142 or 147).

(2) WHEEL BEARING OIL SEAL (INNER) WORN OR DAMAGED. Replace oil seal (par. 142 or 147).

(3) WHEEL BEARINGS PACKED WITH IMPROPER OR EXCESSIVE LUBRICANT. Clean and repack wheel bearings (par. 24).

(4) FRONT AXLE ONLY: DIFFERENTIAL AND/OR UNIVERSAL JOINT LUBRICANT LEAKING PAST STEERING KNUCKLE BUSHING CAUSING EXCESSIVE LUBRICANT IN WHEEL BEARINGS. Check lubricant level in differential; if correct, replace bushing.

(5) REAR AXLE ONLY: DIFFERENTIAL LUBRICANT LEAKING PAST WHEEL BEARING OIL SEAL (OUTER) CAUSING EXCESSIVE LUBRICANT IN WHEEL BEARINGS. Clean bearings and hub; repack with lubricant; replace oil seal (par. 147).

### e. Backlash Between Propeller Shaft and Wheels.

(1) PROPELLER SHAFT UNIVERSAL JOINT WORN OR DAMAGED. Replace propeller shaft assembly (par. 139).

(2) PROPELLER SHAFT COMPANION YOKE LOOSE ON PINION SHAFT. Remove universal joint and tighten yoke.

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

(3) **FRONT AXLE ONLY: UNIVERSAL DRIVE ASSEMBLY WORN OR DAMAGED.** Notify higher authority.

(4) **REAR AXLE ONLY: AXLE DRIVE SHAFT FLANGE LOOSE.** Tighten or replace flange nuts.

(5) **WORN OR DAMAGED PARTS IN DIFFERENTIAL CARRIER.** Notify higher authority.

**f. Noise in Axle.** Certain road surfaces cause tire noise that may seem to come from the axle. Before attempting to eliminate axle noise be sure the noise is not caused by the tires. A certain amount of gear noise in the transfer case is also normal (par. 45), and should not be confused with axle noises. Do not attempt to locate axle noise by operating the vehicle with the wheels off the ground.

(1) **LACK OF LUBRICATION.** Replenish lubricant.

(2) **WHEEL BEARINGS WORN OR DAMAGED.** Replace (pars. 142 and 147).

(3) **INTERFERENCE BETWEEN BRAKE PARTS AND WHEEL HUB OR DRUM.** Remove wheel and inspect for loose or damaged parts (par. 153).

(4) **WORN OR DAMAGED PARTS IN DIFFERENTIAL CARRIER ASSEMBLY.** Notify higher authority.

**48. FOOT BRAKES.**

**a. Brakes Fail Completely (Pedal Goes to Floorboard and Fails to Give Braking Effect).**

(1) **MECHANICAL LINKAGE BETWEEN PEDAL AND MASTER CYLINDER, PISTON DISCONNECTED OR BROKEN.** Connect or replace linkage.

(2) **FLUID LINE OR HOSE BROKEN.** Replace line or hose.

(3) **PISTON CUP IN MASTER OR WHEEL CYLINDER DAMAGED.** Inspect for leakage of fluid at boot on rear end of master cylinder. Inspect for leakage at wheel cylinders. Replace master cylinder (par. 155) or wheel cylinder (par. 154).

**b. Brakes Fail on First Pedal Operation but Function After Several Quick Operations.**

(1) **BRAKE SHOE CLEARANCE EXCESSIVE.** Adjust brake shoe cams (par. 151).

(2) **FLUID PASSING PISTON CUP IN MASTER OR WHEEL CYLINDER.** Inspect for leakage of fluid at boot on rear end of master cylinder. Inspect for leakage at wheel cylinders. Replace master cylinder (par. 155) or wheel cylinder (par. 154).

(3) **FLUID LINE, CONNECTION, OR HOSE LEAKING.** Tighten or replace necessary part.

**c. Hard Pedal and Poor Brakes.**

(1) **ANCHOR BOLTS IMPROPERLY ADJUSTED.** Adjust (par. 151).

(2) **BRAKE LINING WORN OR GLAZED.** Replace brake shoe and lining assemblies (par. 153).

(3) **BRAKE DRUMS EXCESSIVELY SCORED.** Replace drums (par. 153).

## TROUBLE SHOOTING

### d. Spongy Brake Pedal.

- (1) ANCHOR BOLTS IMPROPERLY ADJUSTED. Adjust (par. 151).
- (2) INSUFFICIENT FLUID IN BRAKE SYSTEM. Replenish and bleed brake system (par. 152).

### e. Pedal Goes Slowly to Floor under Application.

- (1) FLUID LINE, CONNECTION OR HOSE LEAKING. Tighten or replace necessary part.
- (2) FLUID PASSING PISTON CUP IN MASTER OR WHEEL CYLINDER. Inspect for leakage of fluid at boot on rear end of master cylinder. Inspect for leakage at wheel cylinders. Replace master cylinder (par. 155) or wheel cylinder (par. 154).

### f. Brakes Grab, Chatter, or Brake Unevenly.

- (1) GREASE OR BRAKE FLUID ON BRAKE LINING. Replace shoes and lining (par. 153).
- (2) LINING LOOSE ON SHOE. Replace shoe and lining (par. 153).
- (3) ANCHOR BOLTS IMPROPERLY ADJUSTED OR LOOSE. Adjust (par. 151).
- (4) SHOES NOT ALL EQUIPPED WITH SAME KIND OF LINING. Use shoes with one make and type of lining.
- (5) WHEEL CYLINDER PISTONS STICKING. Replace wheel cylinder (par. 154).
- (6) SPRING CLIPS LOOSE. Tighten clips.

### g. Brakes Drag.

- (1) SHOES ADJUSTED TOO CLOSE TO DRUM. Adjust brake shoe cams and anchor bolts, if necessary (par. 151).
- (2) SHOE RETURN SPRING BROKEN. Replace spring (par. 153).
- (3) SHOES STICKING ON ANCHOR BOLTS. Free shoes on bolts.
- (4) WHEEL BEARINGS LOOSE. Adjust wheel bearings (par. 142 or 147).
- (5) WHEEL CYLINDER PISTON STICKING. Replace wheel cylinder (par. 154).
- (6) MASTER CYLINDER PISTON CUP HELD OVER RELIEF PORT. Check brake pedal free travel adjustment (par. 151). If there is no free travel, the master cylinder piston cup will cover relief port and brakes will not release.

## 49. HAND BRAKE.

### a. Hand Brake Does Not Hold Parked Vehicle.

- (1) BRAKE BAND IMPROPERLY ADJUSTED. Adjust (par. 157).
- (2) BRAKE LINING WORN OR DAMAGED. Replace band and lining (par. 158).
- (3) BRAKE DRUM SCORED. Replace brake drum (par. 160).

### b. Hand Brake Drags and Overheats.

- (1) BRAKE PARTIALLY APPLIED. Release lever fully.
- (2) BAND IMPROPERLY ADJUSTED. Adjust (par. 157).
- (3) LINING LOOSE AND DAMAGED. Replace band and lining (par. 158).

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

**50. WHEELS AND TIRES.**

**a. Abnormal Tire Wear.**

(1) **USE OF FOUR-WHEEL DRIVE ON HARD SURFACED ROADS AND AT SPEEDS IN EXCESS OF 25 MILES PER HOUR.** Use four wheel drive only when maximum traction is needed at speeds below 25 miles per hour (par. 7).

(2) **TIRE PRESSURE LOW.** Keep tires inflated to 40 pounds pressure.

(3) **IMPROPER TOE-IN.** If front wheels, adjust toe-in (par. 141); if rear wheels notify higher authority.

(4) **WHEEL AND TIRE ASSEMBLIES OUT OF BALANCE.** Notify higher authority.

(5) **FRONT AND REAR AXLES NOT PARALLELED WITH EACH OTHER.** Inspect for broken spring center bolt; if broken, replace spring (par. 175).

(6) **DAMAGED AXLE HOUSING OR FRAME.** Notify higher authority.

**51. STEERING.**

**a. Backlash in Steering.**

(1) **DRAG LINK ENDS IMPROPERLY ADJUSTED.** Adjust drag link ends (par. 169).

(2) **STEERING GEAR (PITMAN) ARM LOOSE.** Tighten steering gear arm nut.

(3) **STEERING GEAR ADJUSTED TOO LOOSELY.** Adjust (par. 167).

(4) **WORN OR DAMAGED PARTS IN STEERING GEAR.** Notify higher authority.

**b. Hard Steering.**

(1) **TIRES UNDERINFLATED.** Test tire pressure with reliable gage.

(2) **LACK OF LUBRICATION.** Lubricate steering gear, knuckles and linkage (par. 24).

(3) **STEERING GEAR ADJUSTED TOO TIGHTLY.** Adjust (par. 167).

(4) **EXCESSIVE FRICTION IN STEERING POST BRACKET.** Align steering post (par. 167); if this does not correct, notify higher authority.

**c. Shimmy.** (An oscillating motion of the front wheels making it difficult to hold the steering wheel steady.)

(1) **UNDERINFLATED TIRES.** Inflate tires to 40 pounds pressure.

(2) **STEERING GEAR LOOSE ON FRAME.** Tighten attaching bolts.

(3) **DRAG LINK OR TIE ROD ENDS LOOSE.** Adjust link ends (par. 169) or replace tie rod ends (par. 144).

(4) **FRONT SPRING LEAVES BROKEN.** Replace springs (par. 175).

(5) **SPRING BOLTS, BUSHINGS OR SHACKLES WORN.** Replace worn parts.

(6) **SPRING CLIPS (U-BOLTS) LOOSE OR BROKEN.** Tighten or replace.

## TROUBLE SHOOTING

- (7) **SPRING CENTER BOLT BROKEN.** Replace spring (par. 175).
- (8) **SHOCK ABSORBERS NOT FUNCTIONING.** Service shock absorbers (par. 176).

(9) **STEERING KNUCKLE FLANGE BEARINGS LOOSE; WHEEL AND TIRE ASSEMBLIES OUT OF BALANCE; AXLE HOUSING OR FRAME DAMAGED.** Notify higher authority.

**d. Steering Wander.** (A tendency of the vehicle to steer itself off a straight course.)

(1) **EXCESSIVE FRICTION IN STEERING MECHANISM.** Locate and eliminate excessive friction (par. 167).

(2) **WHEEL BEARINGS LOOSE.** Adjust wheel bearings (par. 142).

(3) **TOE-IN INCORRECT.** Adjust (par. 141).

(4) **STEERING KNUCKLE FLANGE BEARINGS ADJUSTED TOO TIGHTLY.** Notify higher authority.

**e. Steering Dive.** (A tendency of the vehicle, when turned in any direction, to turn more rapidly than intended.)

(1) **STEERING GEAR LOOSE ON FRAME.** Tighten attaching bolts.

(2) **FRONT SPRING LEAVES BROKEN.** Replace front springs (par. 175).

(3) **SPRING BOLTS, BUSHINGS OR SHACKLES WORN.** Replace worn parts (pars. 173 and 174).

(4) **SPRING CLIPS (U-BOLTS) LOOSE OR BROKEN.** Tighten or replace.

(5) **SPRING CENTER BOLT BROKEN.** Replace spring (par. 175).

(6) **AXLE HOUSING OR FRAME DAMAGED.** Notify higher authority.

## 52. SPRINGS AND SHOCK ABSORBERS.

### a. Spring Breakage.

(1) **EXTREMELY ROUGH HANDLING OF VEHICLE OVER ROUGH TERRAIN.** Reduce vehicle speed over rough terrain when possible.

(2) **LOOSE SPRING CLIPS (U-BOLTS).** Keep clips tightened, to prevent breakage between clips.

(3) **EXCESSIVE FRICTION AT SPRING BOLT OR SHACKLES.** Free up and lubricate bolts and shackles and adjust front shackles if too tight to prevent breakage at or near spring eye (par. 173).

(4) **LACK OF SHOCK ABSORBER CONTROL.** Service shock absorbers (par. 176).

(5) **OVERLUBRICATION OF SPRING LEAVES.** Lubricate bolts and shackles only.

### b. Noise in Springs or Shock Absorbers.

(1) **SPRING SHACKLES WORN OR DAMAGED.** Replace worn or damaged parts (par. 173).

(2) **SPRING BOLTS WORN.** Replace bolt (par. 174).

(3) **SHOCK ABSORBER LINK BUSHING WORN OR DAMAGED.** Replace link and eye assembly (par. 176).

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

(4) NO FLUID IN SHOCK ABSORBERS. Refill shock absorbers (par. 176).

#### c. Lack of Spring Control.

(1) NO FLUID IN SHOCK ABSORBER. Refill shock absorber (par. 176).

(2) SHOCK ABSORBER LINKAGE BROKEN. Replace link and eye assembly (par. 176).

(3) SHOCK ABSORBER INOPERATIVE. Replace shock absorber (par. 176).

(4) CHASSIS SPRINGS OVERLUBRICATED. Do not lubricate spring leaves.

## 53. WINCH.

#### a. Winch Fails to Operate.

(1) POWER TAKE-OFF NOT ENGAGED. Engage power take-off (par. 10).

(2) SLIDING CLUTCH DISENGAGED. Move clutch shifter lever to forward position and engage pin in hole.

(3) SHEAR PIN BROKEN. Replace (par. 169).

#### b. Noisy Operation of Winch.

(1) INSUFFICIENT LUBRICATION OF CABLE DRUM SHAFT. Lubricate through fittings (par. 24).

(2) LUBRICANT LOW IN WORM HOUSING. Fill housing to level of filler plug.

(3) TOO MUCH OR TOO LITTLE CLEARANCE BETWEEN POWER TAKE-OFF AND TRANSMISSION GEARS CAUSING "HUM" OR "WHINE." Notify higher authority.

(4) EXCESSIVE END PLAY IN WINCH WORM SHAFT. Notify higher authority.

Section XIV

**ENGINE—DESCRIPTION, MAINTENANCE, AND  
ADJUSTMENT IN VEHICLE**

|                                              | Paragraph |
|----------------------------------------------|-----------|
| Description and tabulated data .....         | 54        |
| Engine tune-up .....                         | 55        |
| Manifold heat control valve .....            | 56        |
| Valves and springs .....                     | 57        |
| Cylinder head gasket .....                   | 58        |
| Manifolds and gaskets .....                  | 59        |
| Oil pan .....                                | 60        |
| Oil pressure relief valve and oil pump ..... | 61        |
| Oil filter .....                             | 62        |
| Oil tubes (external) .....                   | 63        |
| Breather pipe air cleaner .....              | 64        |
| Crankcase ventilator .....                   | 65        |

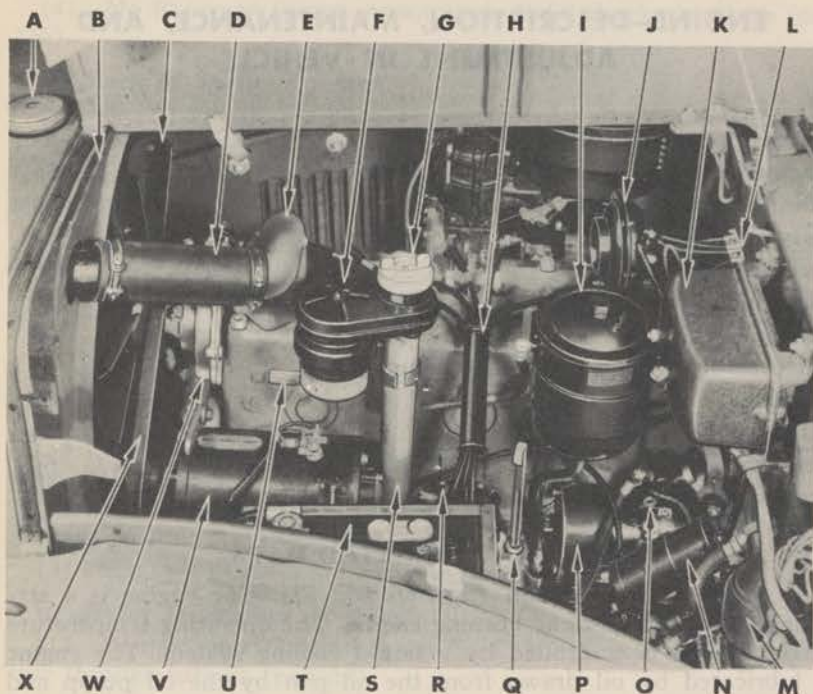
**54. DESCRIPTION AND TABULATED DATA.**

a. **General Description** (figs. 56 and 57). The engine is a six-cylinder, L-head gasoline burning engine. The operating temperature of the engine is controlled by a liquid cooling system. The engine is lubricated by oil drawn from the oil pan by the oil pump and forced under pressure through drilled passages in the cylinder block to the crankshaft and camshaft bearings. Passages are drilled in the crankshaft to allow oil to be forced through the crankshaft bearings to the connecting rod bearings. A limited amount of oil is forced from the camshaft front bearing to the chain case to lubricate the timing chain and sprockets. The cylinder walls, the pistons, the piston pins, and valve tappets, are lubricated by an oil spray from the connecting rod bearings.

b. **Engine Numbers.** The engine number is stamped on a boss on the left side of the engine block opposite No. 1 cylinder (U, fig. 56). The letters in the circular bosses on the block are for the use of factory inspectors only, and are not to be used with the engine number.

**c. Tabulated Data.**

|                             |              |
|-----------------------------|--------------|
| Engine type .....           | L-head       |
| Number of cylinders .....   | 6            |
| Bore .....                  | 3¼ in.       |
| Stroke .....                | 4⅝ in.       |
| Displacement .....          | 230.2 cu in. |
| Compression ratio .....     | 6.7 to 1     |
| Engine governed speed ..... | 3200 rpm     |
| Engine firing order .....   | 1-5-3-6-2-4  |

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

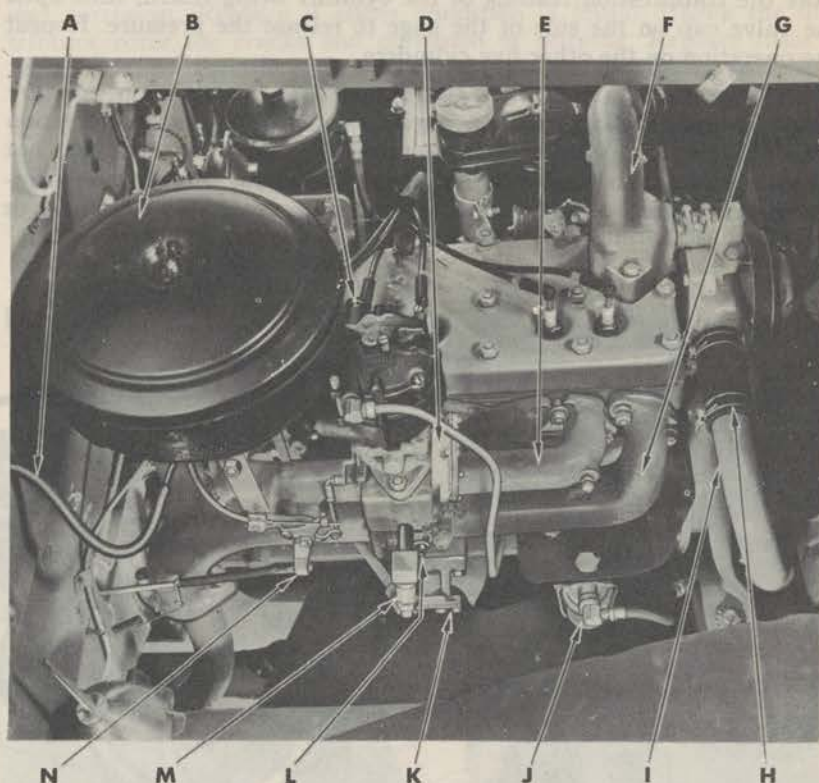
**A**—RADIATOR FILLER CAP  
**B**—FAN SHROUD  
**C**—FAN BLADE  
**D**—RADIATOR INLET HOSE  
**E**—CYLINDER WATER OUTLET ELBOW AND THERMOSTAT  
**F**—BREATHER PIPE AIR CLEANER  
**G**—ENGINE OIL FILLER CAP  
**H**—IGNITION CABLE TUBE AND BRACKET  
**I**—ENGINE OIL FILTER  
**J**—HORN  
**K**—GENERATOR REGULATOR

**L**—CONTROL TUBE DASH GROMMET—CLAMP TYPE  
**M**—FUEL LINE FILTER  
**N**—IGNITION COIL  
**O**—CRANKING MOTOR SWITCH  
**P**—CRANKING MOTOR  
**Q**—OIL LEVEL INDICATOR  
**R**—DISTRIBUTOR  
**S**—BREATHER PIPE  
**T**—BATTERY  
**U**—ENGINE SERIAL NUMBER  
**V**—GENERATOR  
**W**—WATER PUMP  
**X**—FAN AND GENERATOR BELT  
**RA PD 312550**

**Figure 56—Engine—Left Side View****55. ENGINE TUNE-UP.**

- a. **Clean Engine.** Clean the exterior of the engine with dry-cleaning solvent.
- b. **Service Air Cleaner** (par. 69).
- c. **Tighten Cylinder Head, Manifolds, and Oil Pan.** Tighten the cylinder head stud nuts and cap screw, in the order shown in figure 69, to 52.5 to 57.5 foot-pounds, while the engine is warm. Tighten

# ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE



A—WINDSHIELD WIPER HOSE  
B—CARBURETOR AIR CLEANER  
C—CARBURETOR  
D—CARBURETOR GOVERNOR  
E—INTAKE MANIFOLD  
F—CYLINDER WATER OUTLET ELBOW  
AND THERMOSTAT  
G—EXHAUST MANIFOLD

H—RADIATOR WATER OUTLET HOSE  
I—RADIATOR WATER OUTLET TUBE  
J—FUEL PUMP  
K—OIL PUMP  
L—MANIFOLD HEAT CONTROL  
M—CRANKCASE VENTILATOR  
METERING VALVE  
N—THROTTLE CONTROL LINKAGE

RA PD 312551

**Figure 57—Engine—Right Side View**

the manifold stud nuts. Tighten carburetor to manifold nuts. Tighten oil pan attaching screws.

d. Adjust Valve Tappets (par. 57).

e. Test the Battery and Line Voltage (par. 88).

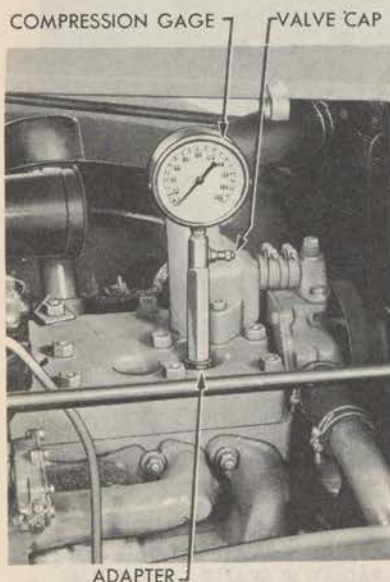
f. Test Compression (fig. 58).

(1) PROCEDURE. Run the engine long enough to establish normal operating temperature. If the battery is not fully charged, install a fully charged battery. Remove all spark plugs. Insert compression gage into No. 1 cylinder. Hold throttle wide open and crank

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

engine with cranking motor until maximum reading is obtained. Note the compression reading of the cylinder being tested, then open the valve cap on the side of the gage to release the pressure. Repeat the operation on the other five cylinders.

(2) **INTERPRETATION OF GAGE READINGS.** Compression pressure depends upon cranking speeds, engine temperature, and compression ratio. If the compression is reasonably high (98 to 118 lb), not varying more than 10 pounds between cylinders, compression pressure can be considered normal. If the pressure in any cylinder is



RA PD 52874

**Figure 58—Compression Test**

RA PD 52875

**Figure 59—Vacuum Test**

weak, inject oil in the spark plug hole on top of the piston with piston down. Wait a few minutes for oil to run down and seal rings and to prevent oil getting on valves. Then repeat test (subpar. (1) above). A low reading on the first test, which remains low on the second test, indicates leaky valves. A low reading on the first test, which becomes a high reading on the second test, indicates leaky rings. If either of these conditions is found, notify higher authority. An extremely low compression reading on two adjacent cylinders indicates a leaking cylinder head gasket. A gasket which has blown out between cylinders will cause erratic explosions between the two cylinders.

g. **Service Ignition System.** Clean and adjust spark plugs (par. 100). Inspect distributor breaker points and adjust or replace (par.

## ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE

101). Clean the distributor cap with a cloth and inspect for cracks and corrosion. Replace if either condition is found. Check the distributor rotor for cracks and corrosion or burning. Replace rotor if either of these conditions is found. Adjust ignition timing (par. 99).

h. **Test Vacuum** (fig. 59). Disconnect the windshield wiper hose at the tube leading to the intake manifold. Connect vacuum gage to the tube. Start the engine and allow it to run at idling speed. A steady reading of more than 17 inches of vacuum at sea level with a reduction of approximately  $3\frac{1}{2}$  inches for each 5,000 feet altitude indicates normal performance of the engine at idling speed. Fluctu-

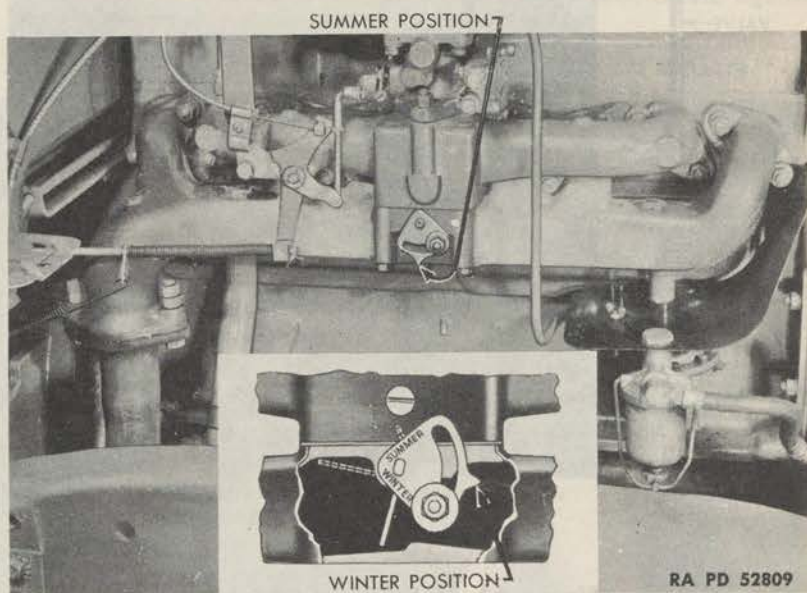


**Figure 60—Manifold Heat Control**

ation of the pointer of the gage indicates too rich or too lean a fuel mixture. Adjust the idle adjusting screw on the carburetor (par. 70). If this adjustment does not cause a normal reading on the vacuum gage, notify higher authority.

### 56. MANIFOLD HEAT CONTROL VALVE.

a. The heat control valve plate located in the exhaust manifold regulates the amount of hot exhaust gases bypassed around the intake manifold heat body. The valve plate is manually controlled. Loosen locking plate cap screw and turn position of valve plate according to season. Summer and winter positions are marked on the locking plate (fig. 60).

**3/4-TON 4 x 4 TRUCK (DODGE)****57. VALVES AND SPRINGS.**

a. **Removal.** If it is necessary to replace a valve or valve spring in an emergency, notify higher authority so that repairs can be completed by a higher echelon.

- (1) REMOVE CYLINDER HEAD AND GASKET (par. 58).
- (2) REMOVE RIGHT FRONT WHEEL (par. 163).
- (3) REMOVE RIGHT FRONT FENDER SPLASH SHIELD (par. 178).

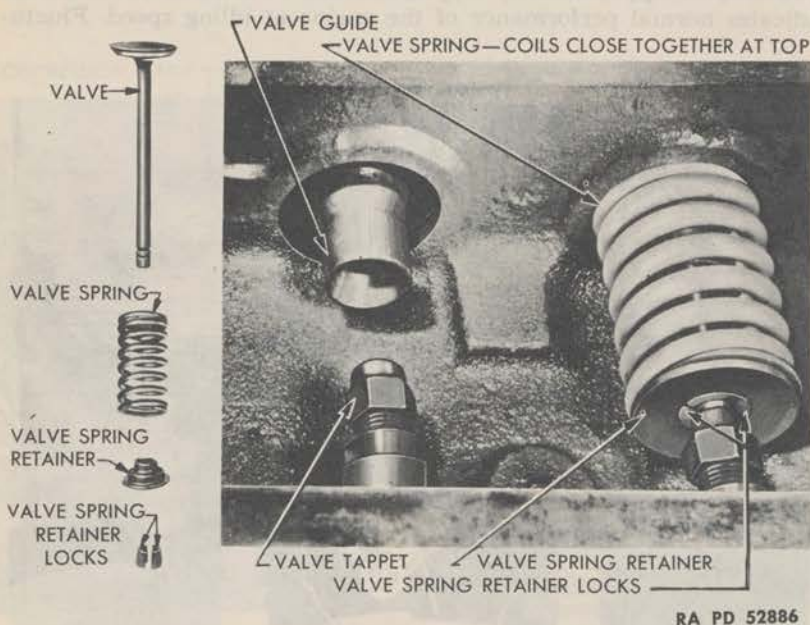


**Figure 61—Valves and Springs**

(4) REMOVE VALVE SPRINGS (fig. 62). If valve to be removed is in front half of engine, remove fuel pump heat shield. If valve to be removed is in rear half of engine, remove ventilator outlet pipe and air cleaner. Remove the valve spring cover. If cover studs interfere with use of lifter on valve to be removed, lock two nuts together on the stud and remove the stud. Tuck small cloth in the oil return hole in the valve tappet compartment to prevent valve spring retainer locks falling into crankcase. If valve is not all the way down on its seat, turn engine until it is. Insert jaws of valve lifter between the lower end of the valve spring and the cylinder block, with the cupped jaw up. Hold the valve down and screw up valve lifter until valve spring is fully compressed. Remove the two valve retainer locks from the lower end of the valve stem. Lower and remove the valve lifter and lift the valve out. Raise the lower end

## ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE

of the valve spring above the tappet screw and pull the spring retainer and the spring out between the tappet screw and the lower end of the valve stem guide.

### b. Installation.

(1) **INSTALL VALVE SPRINGS** (figs. 61 and 62). Turn the crankshaft to bring the tappet down. Insert the valve spring and retainer into position with the coils which are closest toward cylinder head. Be sure the spring retainer is in position between the spring and the top of the spring seats in the recess in the cylinder block. Oil the valve stem and install the valve. Raise the valve spring and retainer with valve lifter and insert the split locks, large ends down, against

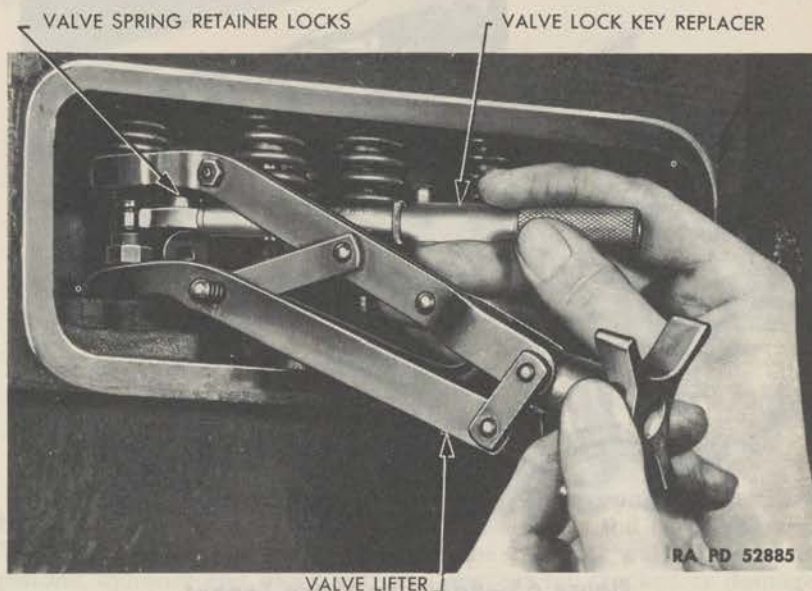


**Figure 62—Installing Valve Spring Retainer Locks**

the stops on the valve lock key replacer, and move the locks into position on the valve stem. Lower the valve spring until the valve spring retainer slides down over the top of the locks. Remove replacer from the valve stem. Lower the valve spring and remove the lifter. **CAUTION:** Remove the small cloth from the oil return hole.

(2) **ADJUST VALVE TAPPETS** (fig. 63). Run the engine at idling speed until it reaches normal temperature. Hold the tappet with wrench and adjust the screw until a 0.010-inch feeler gage will not go between the adjusting screw and valve stem, but a 0.012-inch feeler gage will not go between the adjusting screw and valve stem on both intake and exhaust valves.

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

- (3) **INSTALL VALVE COVERS.** Screw the valve spring cover stud into the cylinder block, if it was removed. Install the cover with a new gasket on the cover and the screw and stud to prevent oil leakage. Tighten the screw, install a plain washer over the gasket on the end stud, and tighten the nut. Install ventilator outlet pipe and air cleaner if removed. Install fuel pump heat shield if removed.
- (4) **INSTALL RIGHT FRONT FENDER SPLASH SHIELD** (par. 178).
- (5) **INSTALL RIGHT FRONT WHEEL** (par. 163).
- (6) **INSTALL CYLINDER HEAD AND GASKET** (par. 58).

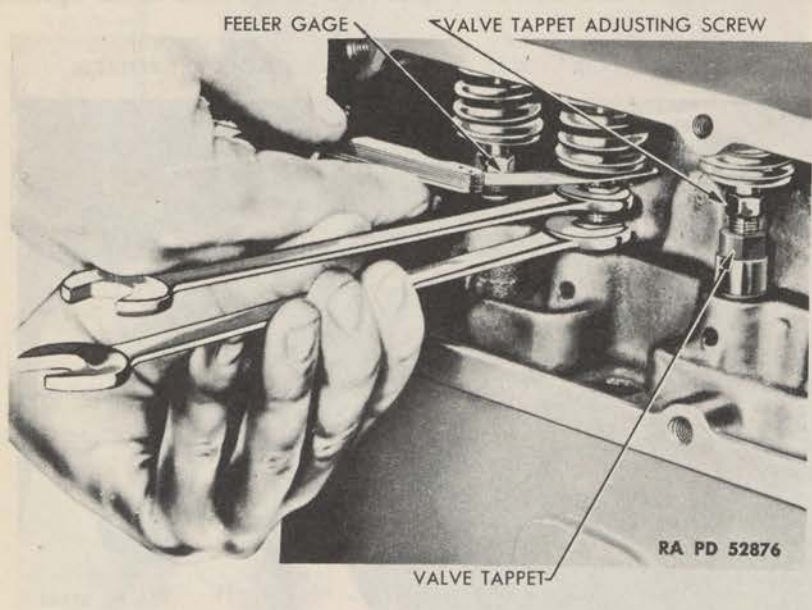


**Figure 63—Adjusting Valve Tappet**

**58. CYLINDER HEAD GASKET.**

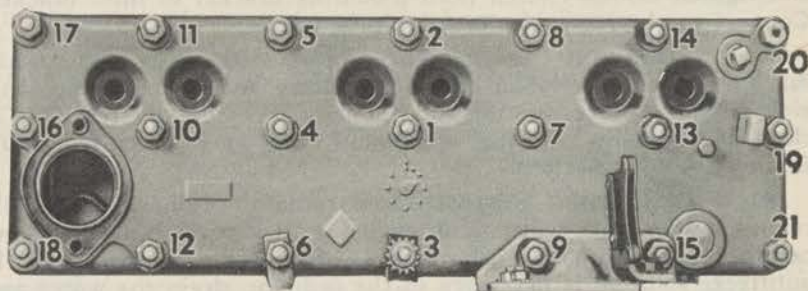
**a. Removal.**

- (1) **DRAIN COOLING SYSTEM** (par. 81).
- (2) **REMOVE AIR CLEANER** (par. 69).
- (3) **DISCONNECT ELECTRICAL CONNECTIONS.** Disconnect battery cable (par. 88). Lift spark plug wires off spark plugs. Remove cap screw located in right rear cylinder head cap screw and disconnect ground strap.
- (4) **DISCONNECT WATER HOSE.** If vehicle is equipped with heater, release heater hose clamps at shut-off valve at rear of cylinder head and pull hose off connections on cylinder head. Loosen the two clamps and slide cylinder head outlet elbow to radiator water hose farther down outlet elbow. Disconnect bypass elbow from top of water pump.

## ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE

(5) **DISCONNECT HORN, THERMOMETER BULB, AND CHOKE WIRE.** Remove the two nuts which hold horn to mounting bracket. Open clip which holds horn wire at oil filter bracket and move horn to one side. Open clip on cylinder head which holds thermometer wire, and remove thermometer bulb from cylinder head. Disconnect choke control wire and guide housing at the carburetor.

(6) **REMOVE CYLINDER HEAD.** Remove 20 cylinder head nuts and one cap screw. Lift off oil filter and bracket assembly, spark plug cable tube and bracket and clip for thermometer wire. Loosen breather bracket to breather pipe nut and slide bracket up pipe until it clears stud on cylinder block. Remove No. 5 spark plug and install lifting eye. Lift cylinder head from block and remove gasket.



RA PD 312552

**Figure 64—Cylinder Head Nut Tightening Sequence**

**b. Cleaning and Inspection.** Loosen carbon from cylinder head, block, and tops of pistons with a stiff wire brush and carbon scraper. Thoroughly clean loose carbon from the cylinder walls, tops of the pistons, cylinder and block surfaces. Inspect for cracked or damaged surfaces.

**c. Installation (fig. 64).**

(1) **INSTALL GASKET AND CYLINDER HEAD.** Wipe the surfaces of the cylinder head and block with a clean cloth. Apply a thin coating of engine oil to the gasket surface of the cylinder block. Put the new gasket on the block and coat the top of the gasket with oil. Place the cylinder head in position on the block. Install spark plugs. Place filter and horn bracket assembly on studs 9 and 15, figure 64. Place toothed lock washer on stud 6, then put breather pipe bracket in place. Place toothed lock washer on stud 3, place spark plug cable tube and bracket on stud, and another toothed lock washer on bracket. Place thermometer wire clip on stud 19. Slide cylinder head outlet to radiator hose into place and tighten clamps. Install new gasket between bypass and water pump and attach bypass connection. Install the cylinder head nuts and cap screw. Tighten nuts and

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

cap screw in the order shown in figure 64 with a torque wrench to 52.5 to 57.5 foot-pounds.

(2) **CONNECT GROUND STRAP, CHOKE WIRE, AND THERMOMETER BULB.** Place a toothed lock washer on each side of ground strap and attach with cap screw to head of cap screw in cylinder head. Connect choke guide housing in clamp. Push choke button all the way in and back off about  $\frac{1}{16}$  inch. Then, with choke valve fully open, attach choke wire to choke valve at carburetor. Insert thermometer wire in clip and bend clip over. Install thermometer bulb in place and tighten.

(3) **ATTACH HEATER HOSE (IF SO EQUIPPED), HORN, AND SPARK PLUG CABLES.** Connect lower heater hose to valve at rear of cylinder block and tighten clamp. Then attach support clamp to stud at air cleaner support. Connect upper heater hose to take-off pipe at bypass and tighten clamp. Attach horn mounting bracket to filter bracket. Connect spark plug cables to spark plug terminals.

(4) **INSTALL AIR CLEANER AND CONNECT BATTERY TERMINAL.** Place air cleaner body on carburetor elbow and install screws and lock washers. Place oil reservoir in body. See that oil reservoir is clean and contains sufficient oil. Install cover and tighten wing nut. Connect cable to battery.

(5) **FILL COOLING SYSTEM.** Close radiator drain cock and fill cooling system with water. Run engine until it reaches normal temperature (approximately 20 minutes). Retighten cylinder head. If antifreeze solution is necessary in the radiator, drain the water and fill radiator with antifreeze solution. Make sure sufficient antifreeze solution is used to protect the cooling system at the lowest anticipated temperature (par. 81). Install radiator cap and tighten securely.

## 59. MANIFOLDS AND GASKETS.

### a. Removal.

(1) **DRAIN COOLING SYSTEM AND DISCONNECT HEATER HOSE (IF VEHICLE IS EQUIPPED WITH HEATER).** Open radiator drain cock and release radiator cap. If cooling solution contains antifreeze, drain in pan and save. Remove nut at top air cleaner bracket and disconnect lower heater hose support clamp. Disconnect heater hose at shut-off valve at rear of cylinder head and at bypass.

(2) **DISCONNECT FUEL LINE AND THROTTLE AND CHOKE WIRES.** Unscrew fuel pump to carburetor fuel line connection at carburetor. Remove hand throttle control wire and guide housing at carburetor. Disconnect hand choke control wire and guide housing at carburetor.

(3) **DISCONNECT WINDSHIELD WIPER HOSE AND BELL CRANK ROD.** Pull windshield wiper rubber hose from tube at manifold. Remove cotter pin from end of bell crank rod at bell crank and remove bell crank rod spring.

(4) **DISCONNECT EXHAUST PIPE AND LOOSEN FUEL PUMP HEAT SHIELD.** Remove the four nuts and two bolts which hold the exhaust pipe to the manifold. Remove the two nuts at muffler front support

## ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE

to allow the exhaust pipe flange to clear manifold. Loosen wing nut which holds fuel pump heat shield to the pump.

(5) **REMOVE MANIFOLD ASSEMBLY.** Remove the 13 nuts and 8 washers which hold manifolds to cylinder block. Slide manifold assembly off studs and place upright on bench. Remove gaskets from cylinder block and/or manifolds. If gaskets only are being replaced, proceed with installation of parts removed (subpar. e (3) below).

(6) **REMOVE CARBURETOR FROM MANIFOLD.** Remove air cleaner support bracket cap screw at the manifold and remove bracket. Remove cotter pin which holds throttle control rod to bell crank and disconnect. Remove the two manifolds to carburetor stud nuts while lifting off carburetor and air cleaner assembly from manifold. Remove gaskets. Stand air cleaner and carburetor assembly in upright position to prevent oil spilling from air cleaner.

(7) **DISASSEMBLE EXHAUST AND INTAKE MANIFOLDS.** Remove the four cap screws on bottom side of exhaust manifold and pull manifolds apart. Remove gasket. Remove windshield wiper tube and connections from intake manifold. Remove throttle control wire and guide housing bracket nut, bell crank, throttle control lever and lever stud.

### b. Installation.

(1) **ASSEMBLE INTAKE AND EXHAUST MANIFOLDS.** See that mating surfaces of intake and exhaust manifold are clean. Install new gasket and connect manifolds together with the four cap screws. Bring cap screws up snug but not tight. Install windshield wiper tube and fittings. Hold throttle control wire and guide housing bracket in position and install cap screw and lock washer closest to the dash; then install lever type stud and lock washer. Place bell crank in position on stud lever, then throttle control lever, spring washer, plain washer, and cotter pin.

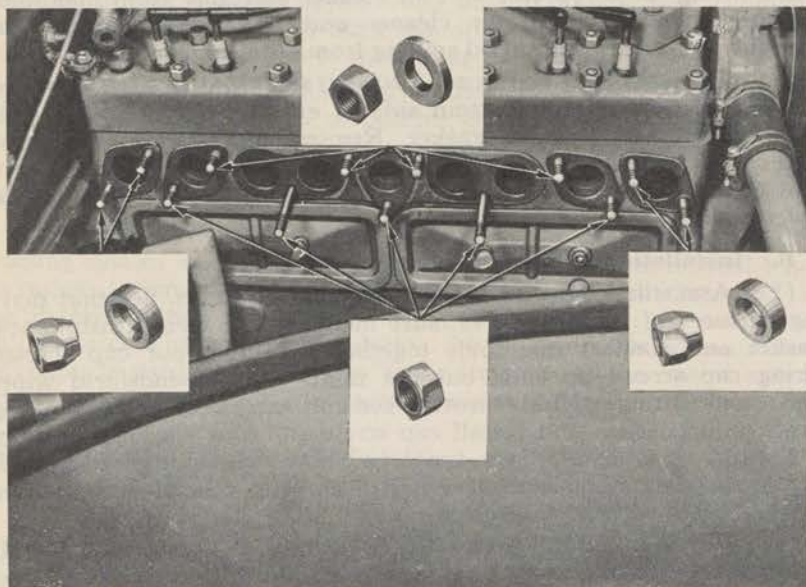
(2) **INSTALL CARBURETOR AND AIR CLEANER ASSEMBLY.** Install new gasket between carburetor and manifold. Before lowering carburetor assembly flush with manifold, start nut on outside stud; then install both nuts. Attach manifold to air cleaner bracket with cap screw at manifold. Attach bell crank to carburetor throttle control rod and insert cotter pin.

(3) **INSTALL MANIFOLDS ON CYLINDER BLOCK.** Clean mating surfaces of manifold and cylinder block. Place new gaskets over manifold studs and slide manifolds into position over studs. Slide fuel pump heat shield into position. Install 13 nuts and 8 lock washers, as shown in figure 65, and tighten. Tighten the four cap screws that hold the intake and exhaust manifolds together. Tighten wing nut that holds fuel pump heat shield.

(4) **ATTACH EXHAUST PIPE TO MANIFOLD FLANGE.** Install new gasket between exhaust pipe and manifold flange. Then install bolts, nuts and lock nuts which connect these parts together. Install the two nuts that attach the front muffler bracket to the frame.

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

(5) CONNECT WINDSHIELD WIPER HOSE, CHOKE CONTROL, BELL CRANK ROD, THROTTLE CONTROL, AND FUEL LINE. Slide windshield wiper flexible hose on manifold tube. Connect hand choke control guide housing in clamp, push choke button all the way in and back off about  $\frac{1}{16}$  inch. With choke valve fully open, attach choke wire to choke valve, at carburetor. Put spring on bell crank rod, insert rod in bell crank and install cotter pin. Connect hand throttle control guide housing in clamp. With throttle control button on dash pushed all the way in, hold throttle control lever back against its stop, insert wire in hole and tighten. Connect fuel pump to carburetor fuel line at carburetor.



RA PD 52722

**Figure 65—Manifold Stud Nut and Washer Locations**

(6) ATTACH HEATER HOSE (IF SO EQUIPPED). Connect lower heater hose to shut-off valve at rear of cylinder head and tighten clamp. Attach hose support clamp to stud at air cleaner elbow and install plain washer, lock washer, and stud nut. Connect upper heater hose to take-off pipe at bypass and tighten clamp.

(7) FILL COOLING SYSTEM. Close radiator drain cock and fill cooling system. If antifreeze solution was drained out, use it again, but make sure sufficient antifreeze solution is used to protect cooling system at the lowest anticipated temperature (par. 81). Install radiator cap and tighten securely.

# ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE

## 60. OIL PAN.

a. **Removal.** Remove drain plug and drain engine oil in pan. As soon as the oil is drained, install drain plug and tighten securely. Remove oil level indicator. Remove the oil pan attaching cap screws. Remove center screws last and lower pan. Pull out cotter pin and remove oil strainer (fig. 66) from oil pump suction pipe. Open the lips on the strainer plate.

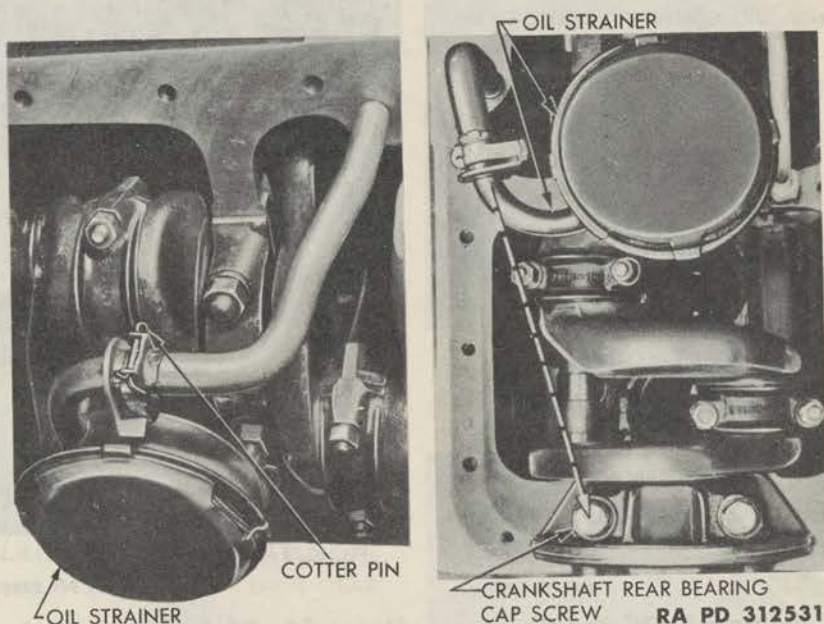


**Figure 66—Floating Oil Strainer**

b. **Cleaning.** Scrape all traces of the old gaskets from the oil pan. Clean and wash strainer and oil pan thoroughly with dry-cleaning solvent.

### c. Installation.

(1) **INSTALL OIL STRAINER** (fig. 66). Position plate on strainer and close the plate lips. Then connect strainer to the oil pump suction pipe and insert new cotter pin. Make sure the strainer is positioned so that its movement is not restricted by the oil pan baffles. Aline strainer assembly so that pipe is in relation to crankshaft rear bearing cap screw as shown in figure 66.

(2) **INSTALL OIL PAN GASKETS AND OIL PAN** (fig. 67). Install new gaskets on the pan. Install the end gaskets first. They will protrude  $\frac{1}{8}$  inch to  $\frac{1}{4}$  inch above the oil pan. Do not cut off the ends of the gaskets as they will compress into place when the oil pan screws are tightened. Place side gaskets over the ends of end gaskets. Hold

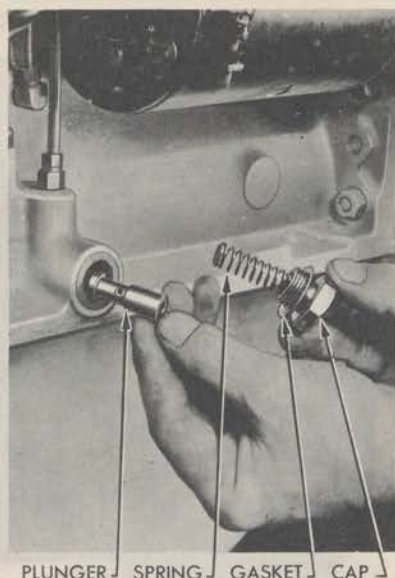
### 3/4-TON 4 x 4 TRUCK (DODGE)

the side gaskets in place with heavy cup grease or tie in place with light string through several bolt holes. Lift the pan into position, being careful that the pan gaskets remain in position and that the felt dust seal at the clutch housing is not interfered with. Install and tighten the attaching cap screws with lock washers. Remove the breather pipe air cleaner and fill the crankcase with engine oil (par. 24). Install oil level indicator.



RA PD 52780

**Figure 67—Oil Pan Gaskets**



RA PD 52889

**Figure 68—Oil Pressure Relief Valve**

## 61. OIL PRESSURE RELIEF VALVE AND OIL PUMP.

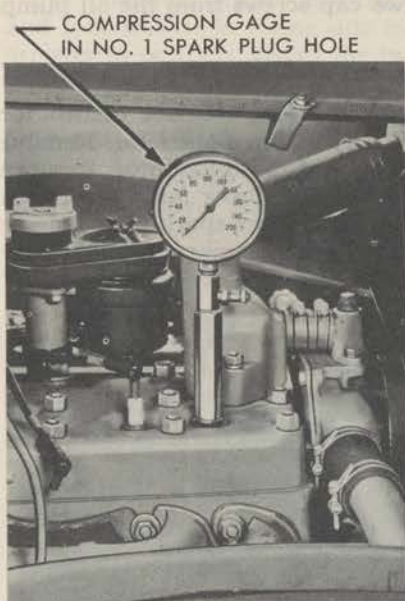
a. **Removal of Relief Valve** (fig. 68). The oil pressure relief valve is located directly below the oil filter at juncture of oil pan and cylinder block. Remove oil pressure relief valve cap, gasket, and plunger spring. Insert sharp end of small prick punch into opening in plunger and remove.

b. **Cleaning and Inspection.** Clean and inspect plunger spring and plunger seat for proper seating.

c. **Installation of Relief Valve.** Install plunger, flat end first and place plunger spring in position. Then install new gasket and original cap.

d. **Removal of Oil Pump.** Remove the two cap screws which attach the engine dust pan to frame side member. Remove the two nuts from the bolts which hold the dust pan and front spring torque

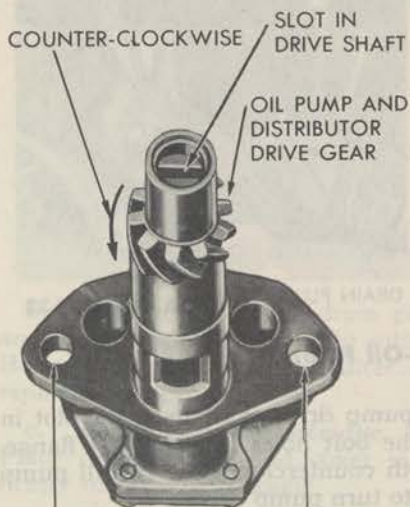
# ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE



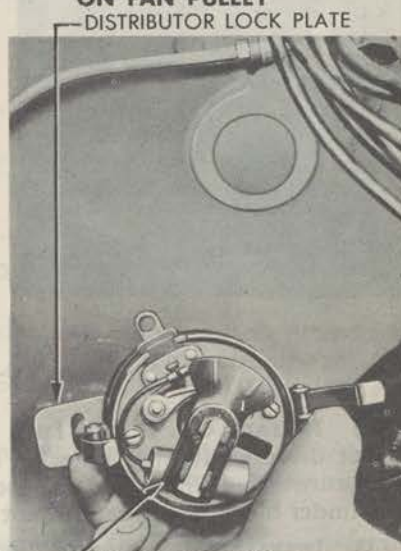
**1—LOCATING COMPRESSION STROKE IN NO. 1 CYLINDER**



**2—LOCATING TIMING MARK ON FAN PULLEY**



**3—LINING UP SLOT IN OIL PUMP SHAFT**



**4—INSTALLING DISTRIBUTOR AFTER INSTALLING OIL PUMP**

RA PD 312553

**Figure 69—Installation of Oil Pump**

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

arrester to frame side member. Lower dust pan sufficiently to permit removal of oil pump. Remove the two cap screws from the oil pump mounting flange and remove pump.

**e. Installation of Oil Pump (fig. 69).**

(1) **SET CRANKSHAFT IN PROPER POSITION.** Remove distributor cap and disconnect the primary lead wire at the distributor. Remove the distributor lock plate screw and lift out the distributor. Remove No. 1 spark plug. Crank engine by hand and check for compression on No. 1 cylinder by holding thumb tightly over spark plug hole or by installing a compression gage in hole. When compression is felt by thumb or shows on gage, turn crank until indicator points to "DC" on crankshaft fan pulley (fig. 69).

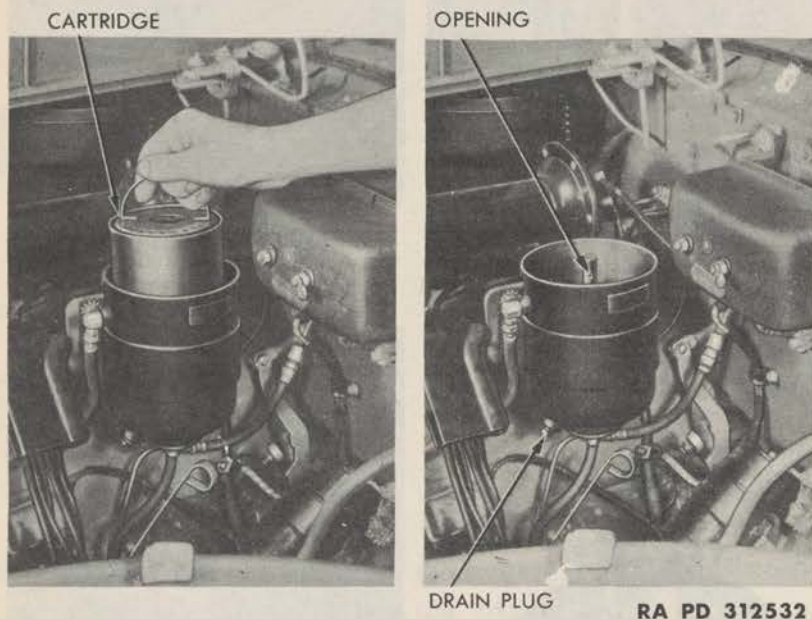


**Figure 70—Oil Filter**

(2) **INSTALL OIL PUMP.** Turn pump drive shaft until the slot in end of drive shaft lines up with the bolt holes in mounting flange. Then turn drive shaft gear one tooth counterclockwise. Install pump in cylinder block, being careful not to turn pump drive gear.

(3) **INSTALL DISTRIBUTOR.** Install distributor with the lock plate in position. Turn distributor rotor so that it points to seven o'clock. Rotate the rotor a little one way or the other to allow the distributor shaft to mesh with the oil pump shaft. Install the distributor lock plate screw. Attach distributor primary lead wire to distributor filter and install distributor cap. Install spark plug. Adjust ignition timing (par. 99).

## ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE

(4) **INSTALL RIGHT ENGINE DUST PAN.** Install two cap screws and lock washer in frame side member. Hold the front spring torque arrester in position, install the two toothed lock washers and nuts on the bolts and tighten.

### 62. OIL FILTER.

a. **Removal of Cartridge (fig. 70).** Unscrew the cover retaining nut, remove cover and lift out cartridge.

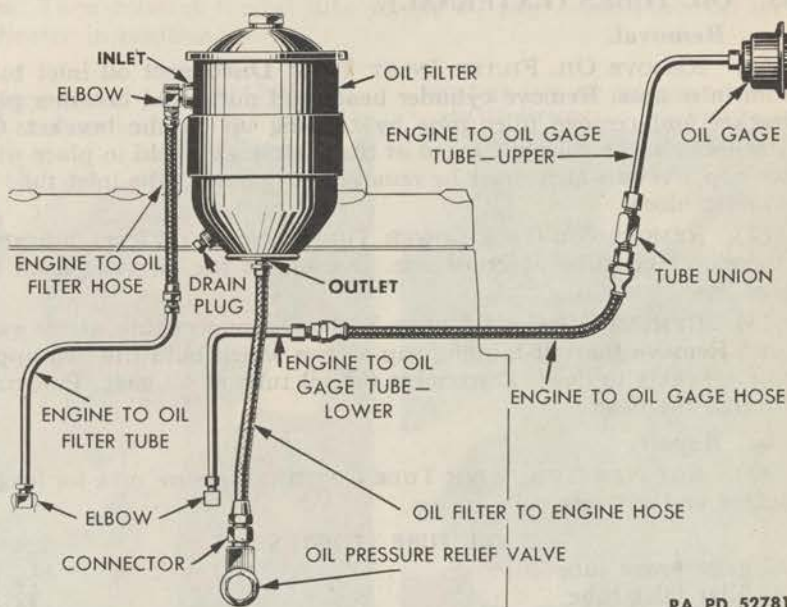


**Figure 71—Oil Filter and Oil Gage Hose and Tubing**

b. **Cleaning.** Remove drain plug from bottom of oil filter body and clean inside of filter body with rag wet with dry-cleaning solvent. Be sure oil outlet hole in filter outlet tube is open (fig. 70), and replace drain plug.

c. **Installation of Cartridge.** Install new cartridge in filter body. Place cover gasket and cover in place, and tighten retaining nut firmly to prevent leakage.

d. **Removal of Oil Filter Assembly (fig. 71).** Disconnect oil filter inlet hose at top of filter body. Disconnect oil filter outlet hose at crankcase. Remove two front bolts which attach the oil filter clamp to the oil filter bracket. Loosen oil filter clamp bolt until filter body is free to lift out. Remove outlet hose from filter body. Screw lower end of outlet tube into inlet fitting and tighten to avoid damage to inlet fitting and remove fitting.

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

e. **Installation of Oil Filter Assembly** (fig. 71) Install inlet fitting in top of filter body and remove outlet hose from inlet fitting. Then install outlet hose to bottom of filter body. Place filter assembly in bracket with inlet fitting facing front of vehicle. Tighten oil filter clamp bolt. Insert clamp to bracket attaching bolts with toothed lock washer under head of each bolt. Install another toothed lock washer under nuts and tighten. Attach oil filter inlet hose to fitting at top of filter body. Attach oil filter outlet hose to fitting in crankcase.

**63. OIL TUBES (EXTERNAL).****a. Removal.**

(1) **REMOVE OIL FILTER INLET TUBE.** Disconnect oil inlet tube from inlet hose. Remove cylinder head stud nut. Hold breather pipe bracket and remove filler pipe by tapping up on the bracket. On later models, the tube is flanged at the bottom and held in place with two cap screws which must be removed. Disconnect the inlet tube at cylinder block.

(2) **REMOVE OIL GAGE LOWER TUBE.** Remove oil level indicator. Disconnect oil tube at crankcase. Disconnect the oil tube from oil gage hose.

(3) **REMOVE OIL GAGE UPPER TUBE.** Disconnect tube at the gage hose. Remove the self-tapping cap screws which hold the two upper tube brackets to dash. Disconnect the oil tube at oil gage. Pull tube through the dash.

**b. Repair.**

(1) **CUT NEW TUBE WITH TUBE CUTTER.** Measure tube for length desired and cut with tube cutter.

**OIL TUBE LENGTHS**

|                                                     |         |
|-----------------------------------------------------|---------|
| Oil gage lower tube                                 | 8½ in.  |
| Oil filter inlet tube                               | 12 in.  |
| Oil gage upper tube (except Ambulance and Carryall) | 26¾ in. |
| Oil gage upper tube (Ambulance and Carryall)        | 34 in.  |

(2) **BEND TUBING WITH TUBING BENDER.** Use removed tube as a template or guide and form the tube to the same shape as the tube removed.

(3) **FLARE ENDS OF TUBE WITH FLARING TOOL.** Slide the attaching nuts on each end of the oil tube and flare each end of the tube with flaring tool.

**c. Installation.**

(1) **INSTALL OIL FILTER INLET TUBE.** Connect inlet tube at cylinder block. Hold breather pipe and bracket in position with bracket over cylinder head stud, and tap breather pipe into crankcase, if it is the "slip-in" type. Install "slip-in" type pipes with offset to the rear on vehicles with 6-volt generator and with offset to front on vehicles with 12-volt generator. Later models are equipped with breather pipes which are flanged at the bottom. Two types are used: for vehicles with 6-volt generator, install with offset to the rear; for

## ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE

vehicles with 12-volt generator, install with offset to front. Install cylinder head stud nut and tighten to 52.5 to 57.5 foot-pounds with torque wrench. Connect oil inlet tube to inlet hose.

(2) **INSTALL OIL GAGE UPPER TUBE.** Push oil tube through the dash and connect at oil gage. Install the two brackets which hold the upper tube to the dash with the self-tapping cap screws, and toothed lock washer between each bracket and the dash. Connect tube to the gage hose.

(3) **INSTALL OIL GAGE LOWER TUBE.** Connect oil tube at crankcase. Then connect the oil tube to the oil gage hose. Place oil level indicator in position.

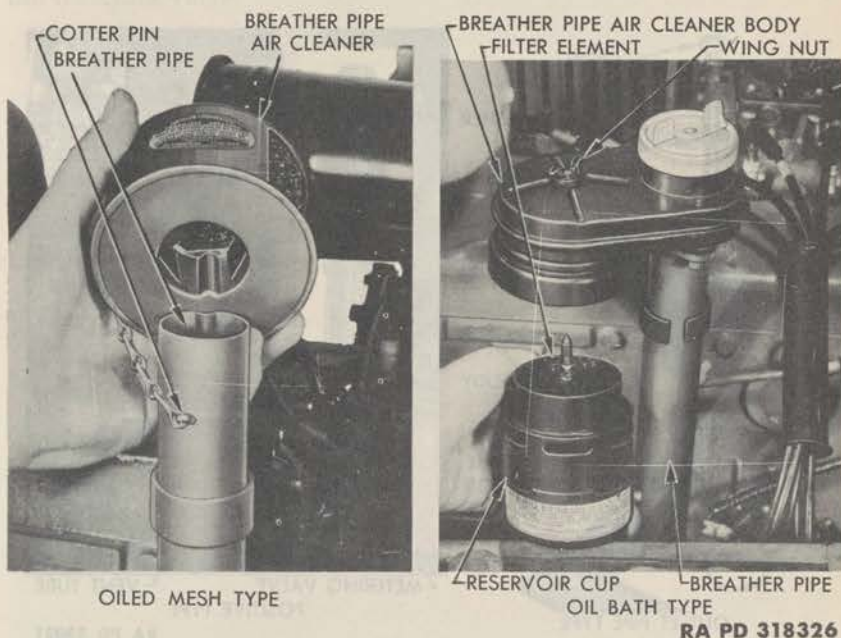


**Figure 72—Breather Pipe Air Cleaners**

### 64. BREATHING PIPE AIR CLEANER.

a. **Cleaning Procedure (Oiled Mesh Type)** (fig. 72). Lift the air cleaner off the breather pipe and remove cotter pin from the attaching chain. Wash the filter element in dry-cleaning solvent and dry. Dip the element in fresh engine oil and drain off the surplus oil. Connect the attaching chain and install the cleaner on the breather pipe.

b. **Cleaning Procedure (Oil Bath Type)** (fig. 72). Hold the oil cup and turn the wing nut on the cleaner counterclockwise to release the oil reservoir cup and the filter element. Wash the filter element

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

in dry-cleaning solvent and dry. Fill the oil reservoir cup to the level mark with fresh engine oil. Install the filter element over the stud in oil reservoir cup. Insert the stud into the cleaner body, install the wing nut, and tighten securely.

## 65. CRANKCASE VENTILATOR.

a. **Cleaning Procedure (Outlet Pipe Type with Air Cleaner)** (fig. 73). Remove the outlet pipe bracket to crankcase cap screw. Remove the air cleaner to crankcase cap screw. Lift the filter element from the filter body. Wash the element and filter body in dry-cleaning solvent. Dip the element in fresh engine oil and drain off surplus oil.

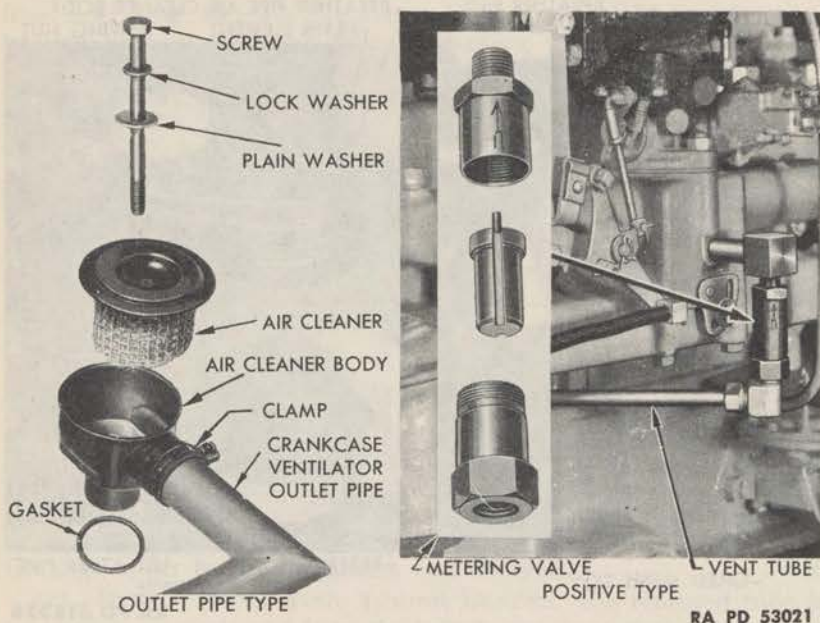


**Figure 73—Crankcase Ventilators**

Place the filter element into the cleaner body. Insert the screw through the cleaner with a plain washer next to the element and a lock washer under the screwhead. Install the oil cleaner-to-crankcase cap screw. Install the outlet pipe bracket-to-cylinder head cap screw.

b. **Cleaning Procedure (Positive Type Connected to Intake Manifold)** (fig. 73).

(1) **REMOVE METERING VALVE.** Remove the cap screw and plain washer which attaches the tube to the crankcase. Disconnect the tube from the metering valve. Screw the metering valve assembly from the manifold connection and remove the connection from the manifold.

## ENGINE—DESCRIPTION, MAINTENANCE, AND ADJUSTMENT IN VEHICLE

(2) **CLEAN METERING VALVE AND VENT TUBE.** Clamp the lower end of the metering valve in a vise and screw off the upper part of the body. Wash the valve, vent tube, and the manifold connection, with dry-cleaning solvent and remove any carbon or gum. Assemble the metering valve in the valve body with the pintle end up and screw the upper part of the valve body into place.

(3) **INSTALL METERING VALVE.** Screw the manifold connection into the manifold. Install the metering valve with the arrow up. Place the vent tube connection in position at the rear of the crankcase and install the attaching cap screw with plain washer under the head of the cap screw. Connect the forward end of the vent tube to the metering valve.

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

**Section XV**

**ENGINE REMOVAL AND INSTALLATION**

|                    | Paragraph |
|--------------------|-----------|
| Removal .....      | 66        |
| Installation ..... | 67        |

**66. REMOVAL.**

- a. Remove Hood (par. 178).
- b. Drain Cooling System (par. 81).
- c. Remove Fenders, Radiator Shell, and Core Assembly.

(1) **DISCONNECT RADIATOR.** Disconnect the tie rods at the radiator shell. Loosen the front tie rod nut at the cowl bracket. Hold the rear nut and turn the tie rod out of the nut. Loosen the upper radiator hose clamp at the cylinder head water outlet elbow and the lower radiator hose clamp at the water pump. Leave the hose attached to the radiator core. Remove radiator drain cock, if vehicle is equipped with a winch.

(2) **DISCONNECT OR REMOVE BATTERY.** Remove battery if vehicle is equipped with 6-volt electrical system (par. 88). Disconnect cable from battery if vehicle is equipped with 12-volt electrical system.

(3) **DISCONNECT GENERATOR TO REGULATOR WIRING AT GENERATOR.** Disconnect the wiring clip from the generator. Disconnect the two wires of the generator to regulator wiring assembly at the regulator and also remove the wiring to regulator clip screw. Leave the generator to regulator wiring assembly attached to the left front fender splash shield.

(4) **DISCONNECT LIGHT WIRES.** Pull the blackout light wires from their sockets on each side at the connections near the terminal blocks on the front cross member. Remove the nuts attaching the light wires to the terminal blocks. Remove the wires from the clips on the cross member.

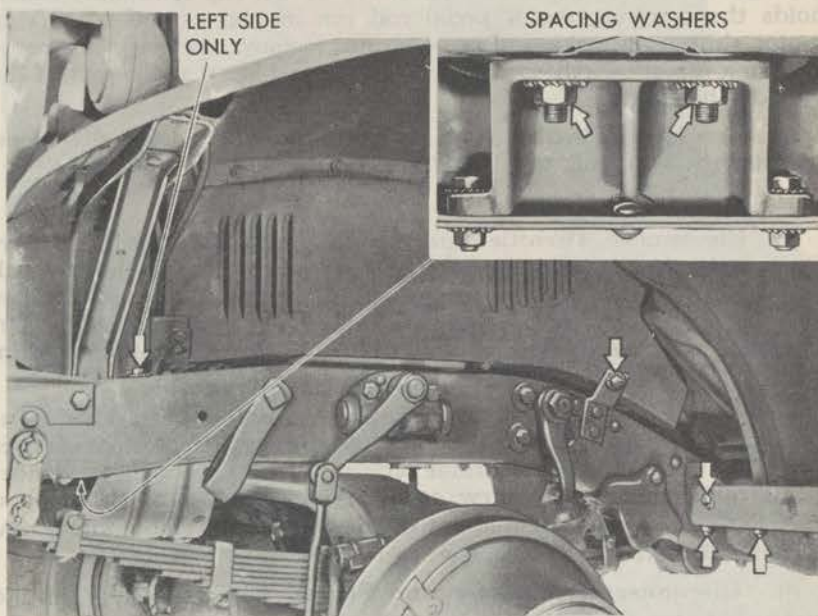
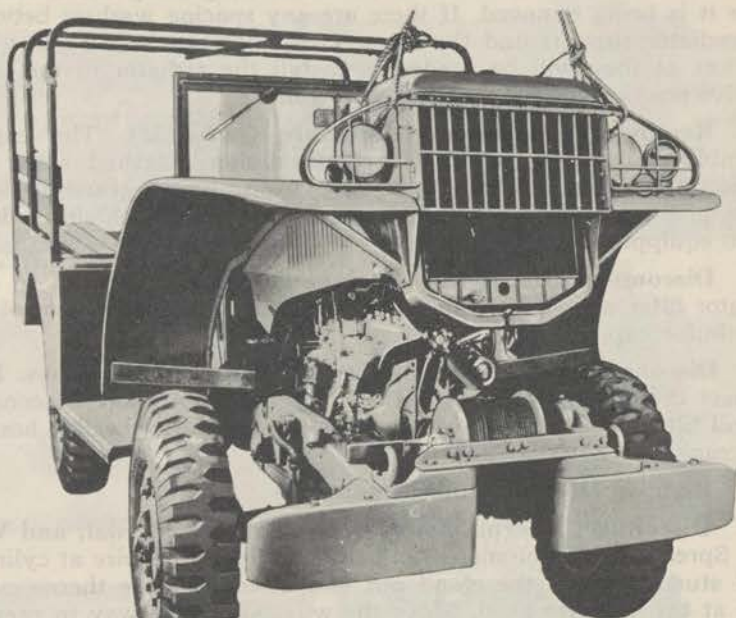
(5) **DISCONNECT SPLASH SHIELD GROUND STRAP AND BATTERY TRAY.** Disconnect the ground strap at the front of the fender splash shield. Remove the nut from the bolt attaching the battery tray to fender splash shield ground strap at the splash shield. If vehicle is equipped with 6-volt electrical system, remove the 3 bolts that attach the battery tray to the frame.

(6) **DISCONNECT SPLASH SHIELDS AND FENDERS (fig. 74).** Disconnect the left and right front fender splash shield at frame rear brackets. Disconnect the front fender rear supports at the front fender rear support brackets. Disconnect the radiator shell assembly at the frame front cross member.

(7) **VEHICLES EQUIPPED WITH FAN SHROUD.** Remove fan and pulley (par. 85).

(8) **REMOVE ASSEMBLY (fig. 74).** Attach chain fall to the radiator, shell, and fender assembly, and lift it off the vehicle. Have a helper

# ENGINE REMOVAL AND INSTALLATION



RA PD 312533

**Figure 74—Removing Fenders and Radiator**

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

at the rear of each front fender to assist in guiding the assembly while it is being removed. If there are any spacing washers between the radiator support and the frame cross member, be sure they are not lost as they will be needed to install the radiator in the same relative position for proper hood alinement.

**d. Remove Transmission Assembly** (par. 133). The engine assembly may be removed with transmission attached after disconnecting propeller shaft, removing transmission gearshift lever housing, hand brake lever, transfer case lever and winch shifter lever (if so equipped).

**e. Disconnect Distributor Wiring.** Disconnect the coil to distributor filter wire at the filter. Pull the high tension cable out of the distributor cap.

**f. Disconnect Oil Gage Tube and Filter Flexible Hoses.** Disconnect the oil gage tube at the flexible hose connection. Disconnect the oil filter inlet flexible hose at the filter and outlet flexible hose at the crankcase.

**g. Remove Horn Assembly** (par. 120).

**h. Disconnect Thermometer, Cranking Motor Pedal, and Wiring.** Spread the thermometer wire clip to release the wire at cylinder head stud. Unscrew the gland nut and disconnect the thermometer wire at the cylinder head. Move the wire out of the way to prevent damage when the engine is removed. Pry off the clip or retainer which holds the cranking motor pedal rod pin in place on the cranking motor shift lever yoke and remove pin. Remove the wires from the cranking motor switch. Disconnect the ground strap at the rear of the cylinder head.

**i. Disconnect Flexible Hose at Fuel Pump.** Hold the elbow and unscrew the attaching nut.

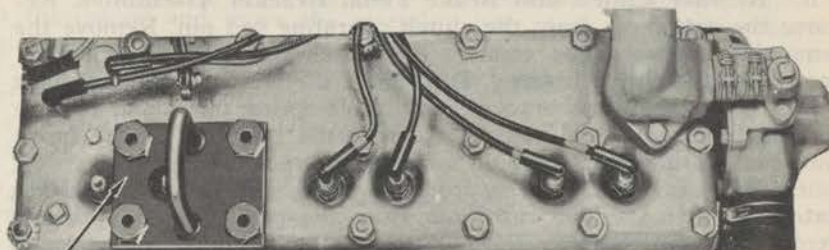
**j. Remove Carburetor Air Cleaner** (par. 69).

**k. Disconnect Throttle and Choke and Windshield Wiper.** Disconnect the throttle wire and guide housing at the throttle bell crank which is mounted on the manifold bracket. Loosen the screws and disconnect the choke wire and guide housing at the carburetor. Disconnect the windshield wiper flexible hose at the manifold vacuum tube.

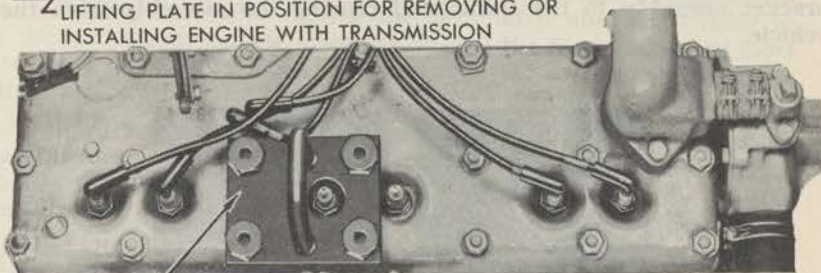
**l. Remove Exhaust Pipe and Right Engine Dust Pan.** Disconnect the exhaust pipe at the manifold. Remove the torque arrester from the underside of the frame side member. Pry open the fender lamp cable clip at the screw attaching the pan to the front cross member and move the cable out of the way, then remove the screw. Remove the two front pan screws and remove dust pan.

**m. Disconnect Engine Ground Straps.** Disconnect the ground straps between the clutch housing and the right and left sides of the frame. The strap on the left is attached with one of the screws holding the clutch pedal bracket. The ground strap on the right side is attached to the clutch housing.

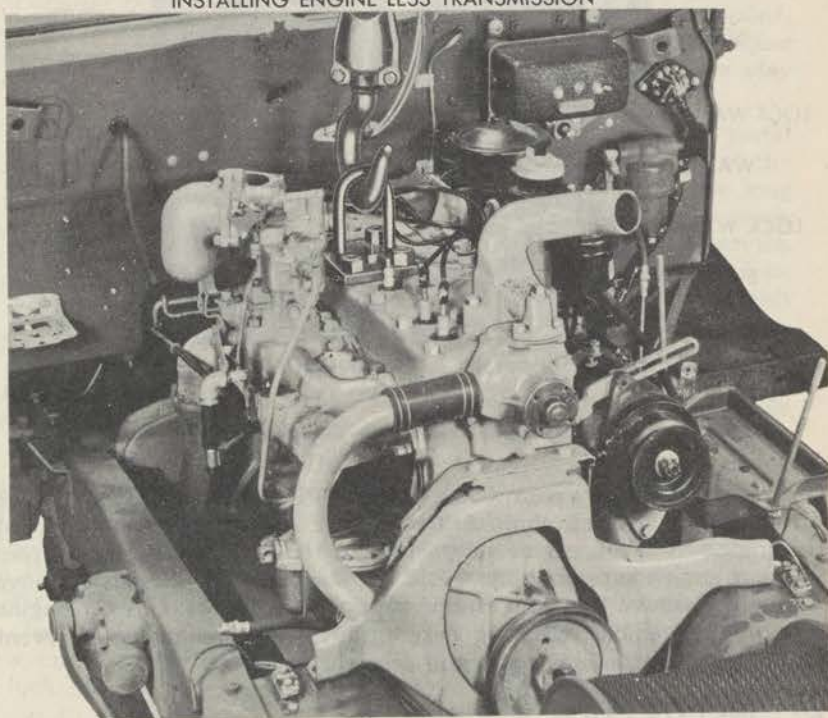
# ENGINE REMOVAL AND INSTALLATION



LIFTING PLATE IN POSITION FOR REMOVING OR  
INSTALLING ENGINE WITH TRANSMISSION



LIFTING PLATE IN POSITION FOR REMOVING OR  
INSTALLING ENGINE LESS TRANSMISSION



RA PD 312554

Figure 75—Removing Engine

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

n. **Remove Clutch and Brake Pedal Bracket Assemblies.** Remove the cotter pin from the clutch operating rod pin. Remove the remaining screws which connect the clutch pedal and bracket assembly to the clutch housing. Disconnect the clutch pedal pull-back spring from the frame bracket with brake spring pliers and remove the assembly from the vehicle. Remove the rear end of the brake pull-back spring from the pull-back spring bracket with brake spring pliers, and unhook the spring from the brake pedal pull-back spring extension. Remove the cotter pin from the push rod end pin and remove the pin. Remove the bolts that attach the brake pedal and bracket assembly to the frame and remove the assembly from the vehicle.

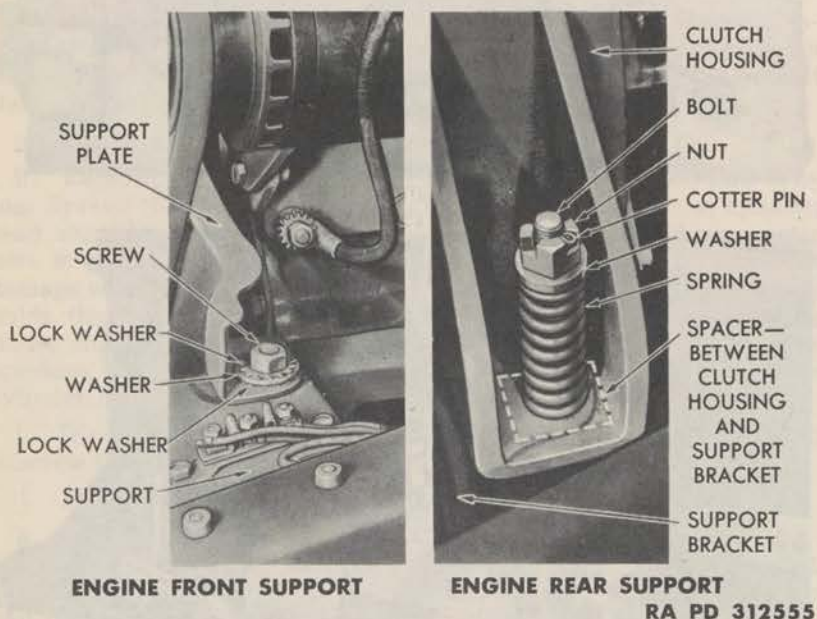


**Figure 76—Engine Supports**

o. **Lift Engine From Frame** (figs. 75 and 76). Install engine lifting fixture. Attach chain fall to fixture and relieve the weight of the engine from the engine support bolts. Remove the cotter pin from the rear engine support bolts. Hold the support bolt nuts and remove the bolt. Remove the front engine support cap screws. Lift the engine out of the vehicle. Exercise care in lifting the engine to prevent damaging the attaching parts and accessories.

## 67. INSTALLATION.

a. **Install Engine in Chassis** (figs. 75 and 76). Place the two small fabric pads or spacers on the rear motor support frame

## ENGINE REMOVAL AND INSTALLATION

brackets. Install engine lifting fixture. Attach chain fall to fixture. Lift the engine and move the assembly into place so that the rear engine support bolts as well as the front engine support screws can be inserted. Guide the accelerator rod into the body opening as the engine is moved into the frame. Be careful that none of the parts are damaged or broken as a few minutes of careful handling will save a great deal of trouble.

**b. Install Mounting Bolts (fig. 76).** Insert the rear engine support bolts through the frame brackets and engine support from underneath and install the rear support bolt springs, washers, and nuts. Hold the bolts and tighten the castellated nuts sufficiently so that the cotter pins can be installed. Install the front engine support screws with a toothed lock washer, a plain washer, and another toothed lock washer and tighten.

**c. Install Brake Pedal and Bracket Assembly.** Place the brake pedal bracket on the frame side member. Install toothed lock washer under each bolt head and one under each nut. Install the master cylinder push rod on the brake pedal lever and install the push rod end pin and cotter pin. Attach the brake pull-back spring to the brake pull-back spring extension and connect it to the brake pedal pull-back spring bracket with brake spring pliers. *NOTE: Due to a slight change that may take place in the position of the engine mountings when installing an engine assembly, it may be necessary to adjust the brake pedal free travel (par. 151) and the clutch pedal free play (par. 130).*

**d. Install Clutch Pedal and Bracket.** Position the clutch pedal and bracket assembly on the rear motor support. Insert one of the short screws with lock washer in the upper right hole, the one long screw with lock washer in the lower left hole and another short screw with lock washer in the lower right hole. Tighten the three screws. The fourth screw attaches the ground strap. Place toothed lock washer on each side of the ground strap and tighten screw. Connect the clutch pedal pull-back spring to the frame bracket with brake spring pliers. Connect the clutch operating rod. Insert the operating rod pin in the yoke and install the cotter pin. Connect the engine to frame ground strap to the right side of the clutch housing. Assemble a toothed lock washer on each side of the strap and install the screw.

**e. Install Right Engine Dust Pan.** Attach the dust pan to the frame side member at the front with two screws and lock washers. Then attach the pan at the front cross member and at the same time fasten the light wire clip. Move the light wire under the clip and bend the clip over the wire. Install the torque arrester and tighten the two front dust pan screws.

**f. Install Exhaust Pipe.** Lift the exhaust pipe into position with a new exhaust pipe flange gasket and install the lock washers, nuts, and lock nuts.

**g. Connect Throttle, Choke, Windshield Wiper, and Cylinder Head Ground Strap.** Insert the choke control wire in the choke air shutter lever swivel and the guide housing in the clip on the bracket

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

so that the housing is flush with the forward end of the clip. Tighten the clip. Connect the throttle control wire and guide housing to the manifold and tighten the clip screw. Insert the throttle control wire in the block on the throttle control bell crank. See that the throttle button on the dash is pushed in completely and tighten the set screw on the block. Connect the windshield wiper flexible hose to the manifold vacuum tube. Connect dash to cylinder head ground strap to cylinder head screw with toothed lock washers on top and bottom of strap.

**h. Install Carburetor Air Cleaner** (par. 69).

**i. Connect Flexible Hose at Fuel Pump.** Hold the elbow with wrench and connect the attaching nut.

**j. Connect Thermometer, Cranking Motor Pedal and Wiring at Cranking Motor Switch.** Place the ammeter and cranking motor filter wires on the cranking motor switch terminal and tighten the terminal nut. Position the cranking motor pedal rod in the cranking motor shift lever yoke. Insert the pin and install the pin retainer. Slide the thermometer bulb into the cylinder head fitting and tighten nut. Attach the tube to the clip at cylinder head stud and close the clip.

**k. Install Horn Assembly** (par. 120).

**l. Connect Oil Gage and Distributor Wires.** Connect the oil gage tube at the flexible hose connection. Connect the oil filter inlet flexible hose at the filter and the outlet flexible hose at the crankcase. Connect the coil to distributor filter wire at the filter. Push the high tension cable into the distributor cap.

**m. Install Transmission Assembly** (par. 133).

**n. Install Fenders, Radiator Shell and Core Assembly.**

(1) **LOWER ASSEMBLY INTO POSITION** (fig. 74). If there were any spacing washers between the radiator support and the frame cross member when the fenders, radiator shell, and core assembly were removed, slip them into place as the assembly is being lowered. Attach chain fall to the assembly and lower it into position. Have a helper at the rear of each front fender to assist in guiding the assembly into place.

(2) **CONNECT RADIATOR, FENDERS, AND SPLASH SHIELDS.** Install toothed lock washers and start the nuts on the studs which attach the radiator shell assembly to the frame front cross member, but do not tighten until after the hood has been installed. Install the six screws with toothed lock washers that fasten the front fender rear supports to the front fender rear support brackets. Install the screws with toothed lock washers that attach the left and right fender splash shields to the front fender rear support.

(3) **CONNECT BATTERY TRAY AND GROUND STRAPS.** If the vehicle is equipped with 6-volt electrical system, install the three bolts that hold the battery tray to the frame, and at the same time slip the fuel tube clip on the center bolt with a toothed lock washer under the bolt head and one under the nut. Attach the battery tray to

## ENGINE REMOVAL AND INSTALLATION

fender splash shield ground strap at the splash shield with a toothed lock washer under the bolt head and one behind the nut. Connect the ground strap with the screw and toothed lock washers to the frame side member at the front of the left fender splash shield.

(4) **CONNECT LIGHT WIRES.** Push the blackout parking lamp wires into their sockets on each side of the connections near the terminal blocks on the front cross member. Place the light wires on the terminal block. Connect each wire to the terminal that carries the same color wire at block on the frame. Place the wire in the clip to hold the wire to the cross member and close the clip.

(5) **CONNECT GENERATOR TO REGULATOR WIRING AT GENERATOR.** Connect the wiring clip at the generator. Connect the two wires of the generator to regulator assembly at the regulator. Install the small green wire to the terminal marked "GEN" and the larger red wire to the terminal marked "ARM." Install wiring to regulator clip screw.

(6) **CONNECT OR INSTALL BATTERY.** Connect battery cable if vehicle is equipped with 12-volt electrical system. Install battery if vehicle is equipped with 6-volt electrical system (par. 88).

(7) **CONNECT WATER HOSE.** Tighten the upper radiator hose clamp at the cylinder head water outlet elbow and the lower radiator hose clamp at the water pump. Install radiator drain cock, if vehicle is equipped with a winch.

(8) **VEHICLES EQUIPPED WITH FAN SHROUD.** Install fan and pulley (par. 85). Adjust fan belt (par. 82).

o. **Install Hood** (par. 178).

p. **Install Radiator Tie Rods.** Attach the front end of the tie rods to the radiator shell and install the radiator shell bolts and nuts with a toothed lock washer under each bolt head and one behind each nut. Tighten nuts. Place the nuts with toothed lock washers on the rear end of the tie rods at the dash bracket. On vehicles not equipped with a fan shroud, adjust the radiator tie rods so that the clearance between fan and flange on radiator top tank is at least  $\frac{5}{16}$  inch, and the hood lines up with the radiator core shell equally on both sides. On vehicles equipped with a fan shroud, adjust tie rods so that hood lines up properly at both ends. Tighten the radiator shell support stud nuts.

q. **Fill Cooling System** (par. 81).

r. **Fill Engine Crankcase With Engine Oil** (par. 24).

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

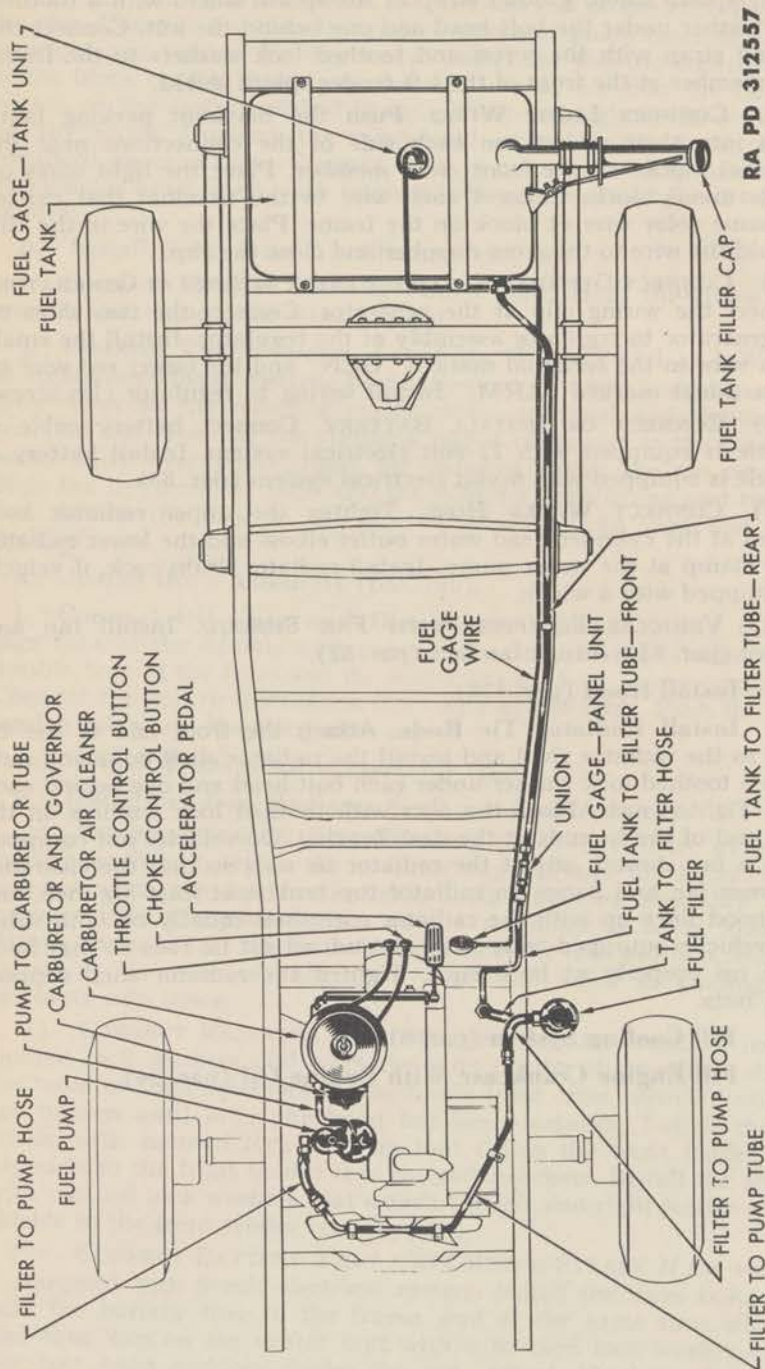
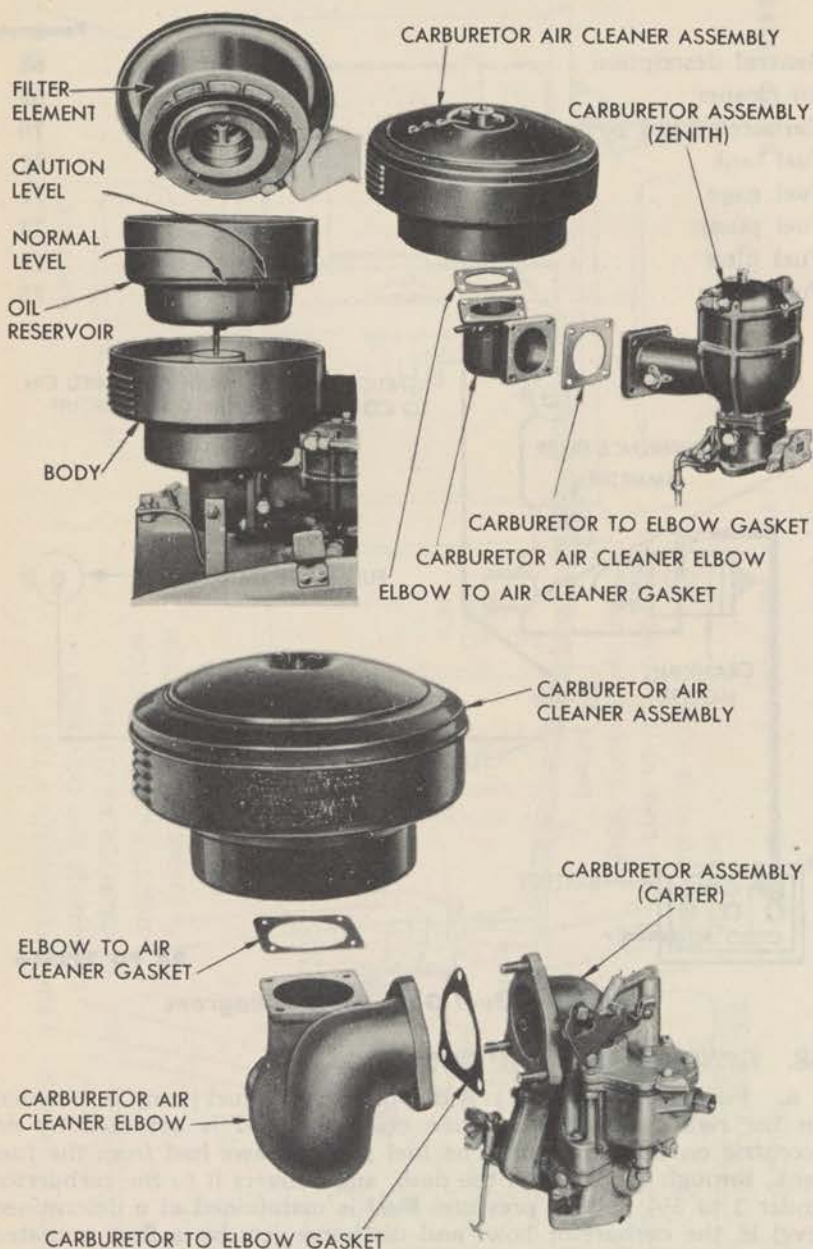


Figure 77—Fuel System



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



RA PD 312558

Figure 79—Carburetor Air Cleaner

## FUEL SYSTEM

gasoline in the fuel mixture is governed by the amount of air passing through the air cleaner, the height of the float level, and the calibration of the carburetor jets.

**b. Fuel Gage (fig. 78).** The electrically operated fuel gage consists of two units; a float unit mounted in the tank and the gage unit mounted on the instrument panel.

**c. Tabulated Data.**

|                        |                                     |
|------------------------|-------------------------------------|
| Carburetor .....       | Zenith (Series 29) or Carter (ETW1) |
| Fuel pump .....        | A-C model 1537715                   |
| Fuel line filter ..... | Zenith F36B-2                       |
| Air cleaner .....      | AC-A20263B                          |
| Fuel gage:             |                                     |
| Panel unit .....       | Auto-Lite NG10020-D                 |
| Tank unit .....        | Auto-Lite NG9967-T                  |

## 69. AIR CLEANER.

**a. Removal of Filter Element (fig. 79).** Back off the wing nut and lift out the filter element which is attached to the cover. Do not allow the oil collected on the baffle to drip into the air cleaner elbow. Lift out the oil reservoir.

**b. Cleaning of Filter Element.** Wash the filter element thoroughly in dry-cleaning solvent and dry. Empty the old oil and clean out accumulation of dirt in the oil reservoir.

**c. Installation of Filter Element (fig. 79).** Place the oil reservoir in the cleaner body and fill to the marked level with fresh engine oil. Install the filter element and cover assembly. Tighten the wing nut.

**d. Removal of Air Cleaner Assembly (fig. 79).**

(1) **REMOVE AIR CLEANER.** Remove filter element (subpar. a above). Remove the four screws which attach the air cleaner body to the air cleaner elbow and stud assembly and lift off the cleaner body.

(2) **REMOVE AIR CLEANER ELBOW.** Remove the nut from the stud that holds the air cleaner elbow support bracket to the elbow and the screw that attaches the support bracket to the manifold. Remove the nuts from the carburetor studs which hold the air cleaner elbow to the carburetor and slide the elbow off the studs.

**e. Installation of Air Cleaner Assembly (fig. 79).**

(1) **INSTALL AIR CLEANER ELBOW.** Place the gasket on the carburetor studs and assemble the elbow to the carburetor. Fasten the elbow in place with the lock washers and nuts. Slide the support bracket on the elbow stud and install the screw with a toothed lock washer which attaches the bracket to the intake manifold. If vehicle is equipped with a heater, place the heater hose clamp on elbow stud, then the plain washer, lock washer, and nut.

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

(2) **INSTALL AIR CLEANER.** Place a new air cleaner body to elbow gasket on the elbow, then the cleaner body. Install the four cleaner body to elbow screws with toothed lock washers. Install the filter element (subpar. c above).

**70. CARBURETOR AND GOVERNOR.**

a. **Throttle Stop Screw and Idling Adjustments** (fig. 80). The idle adjusting screw controls the mixture of air and fuel used for closed throttle operation. Run the engine until the normal operating temperature is reached. Disconnect the windshield wiper hose at the tube leading to the intake manifold, and attach vacuum gage to the

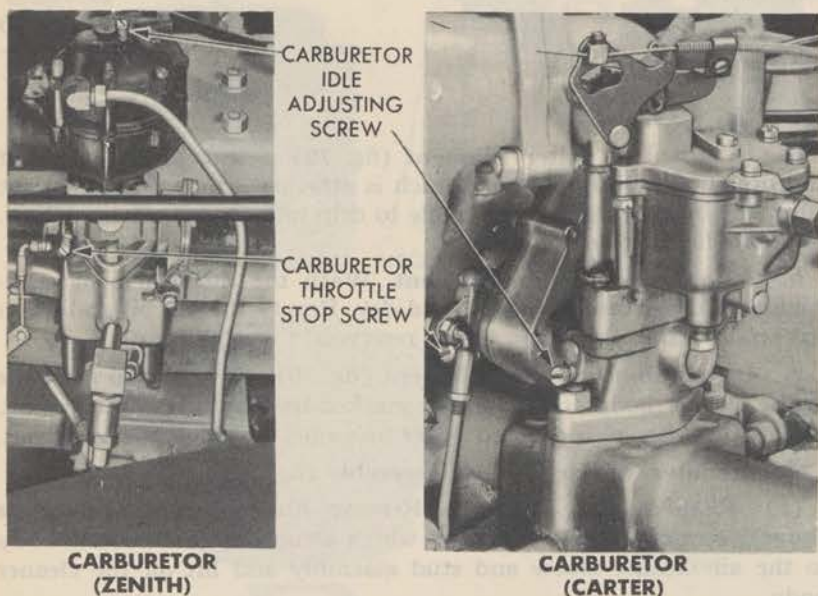


**Figure 80—Carburetor Adjustments**

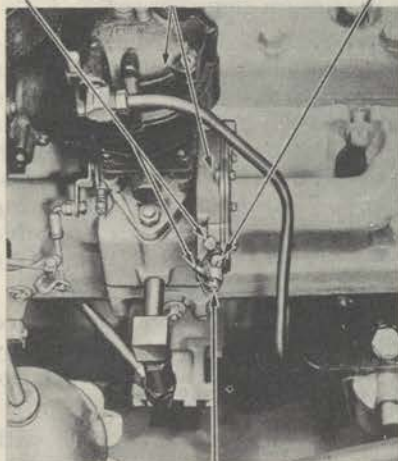
tube. On the Zenith carburetor, turn the idle adjusting screw clockwise to make a richer mixture of fuel or counterclockwise to make a leaner mixture of fuel. On the Carter carburetor, turn screw counterclockwise for richer mixture; clockwise for leaner mixture. Turn the idling adjusting screw until the pointer on the gage shows maximum reading. If this changes the idling speed of the engine, adjust the throttle stop screw to obtain desired idling speed (clockwise to increase the engine idling speed or counterclockwise to decrease speed).

b. **Adjustment of Governor on Engine.**

(1) **WARM UP ENGINE AND TEST MANIFOLD VACUUM.** Run engine until normal operating temperature is reached. Manifold

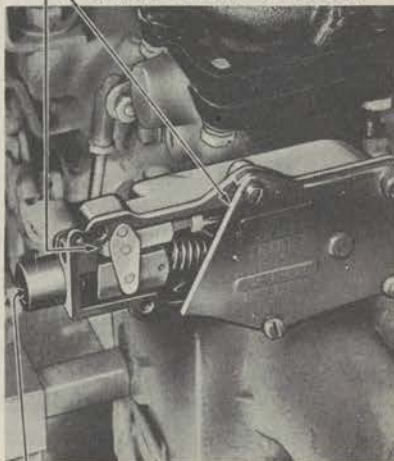
# FUEL SYSTEM

COMPENSATING CHANNEL PLUG,  
GOVERNOR SEAL  
GOVERNOR AND CARBURETOR



MAIN CHANNEL PLUG

COMPENSATING SPRING  
ADJUSTING SCREW  
COVER SHOWN CUTAWAY



MAINSRING ADJUSTING SCREW

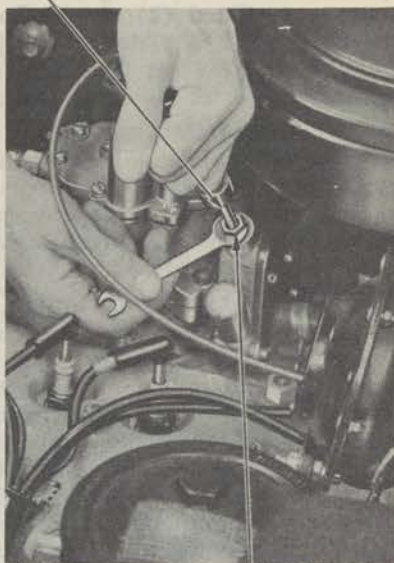
## CARBURETOR (ZENITH)

ADJUSTING SCREW PASSAGE PLUG,  
GOVERNOR SEAL



GOVERNOR AND CARBURETOR

SCREWDRIVER ENGAGING  
SLOT IN ADJUSTING SCREW



GOVERNOR ADJUSTING NUT WRENCH

## CARBURETOR (CARTER)

RA PD 312582

**Figure 81—Governor Adjustments with Wrench 41-W-3734**

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

vacuum should be at least 16 inches with engine operating at full throttle (governor operating) and at least 17 inches at idling speed, with an allowable reduction for altitude. The adjusting screw, which is attached to the spring, controls the maximum engine speed.

(2) **ADJUSTMENTS OF ENGINE SPEED (fig. 81).** Remove the adjusting screw passage plug and turn the screw clockwise to decrease, or counterclockwise to increase the maximum engine speed. Adjust the governor to maximum engine speed of 3,000-3,200 revolutions per minute or a road speed of  $6\frac{1}{2}$  to  $7\frac{1}{2}$  miles per hour, low gear with no load. *NOTE: The screw adds to or subtracts from the number of active coils in the spring when it is turned, automatically calibrating the tension and stability of the spring so that it is generally possible to regulate the maximum engine speed over a considerable range by means of the adjusting screw.*

(3) **ADJUSTMENT FOR SURGE (CARTER).** If surge (continued rapid rise and fall of engine speed over a considerable range by means of throttle at full throttle) is present or occurs through change of the screw adjustment, eliminate as follows:

(a) Move the adjusting nut clockwise  $\frac{1}{4}$  turn at a time with special wrench (41-W-3734), correcting the engine speed with the adjusting screw, until the surge is eliminated.

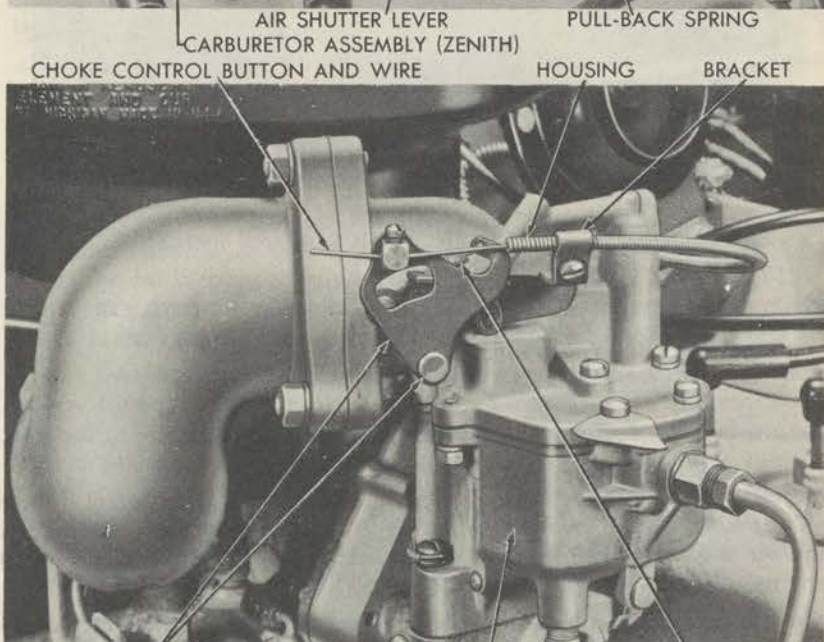
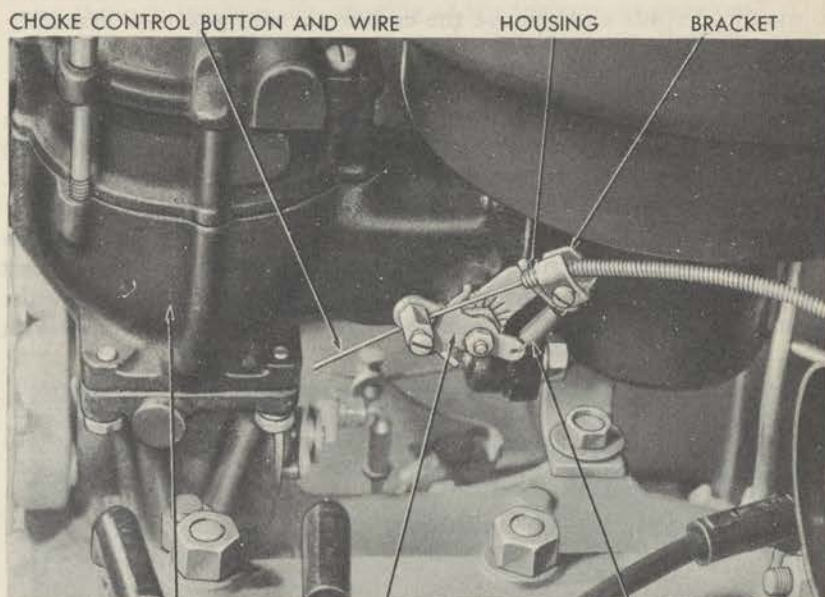
(b) *If Governor is Slow Acting* (governor too "flat"). Move the adjusting nut counterclockwise  $\frac{1}{4}$  turn at a time, correcting the engine speed with the adjusting screw until surge is apparent, then remove surge as outlined (2) above. Engines operate most efficiently when the governor is adjusted to the point which just eliminates surge at full throttle. Do not forget to install adjustment passage plug and sealing wire after making adjustment.

(4) **ADJUSTMENT OF ENGINE SPEED (ZENITH) (fig. 81).** Remove the seal and main channel plug. Turn the main spring adjusting screw clockwise to increase engine speed and counterclockwise to decrease engine speed. Adjust the governor to a maximum engine speed of 3,200 revolutions per minute or to a road speed of nine miles per hour in low gear with no load.

(5) **ADJUSTMENT FOR SURGE (ZENITH) (fig. 81).** The compensating spring adjusting screw which is located under the compensating channel plug provides an adjustment to eliminate surge (continued rapid rise and fall of engine speed). If surge is experienced at full throttle and no engine deficiencies are responsible, remove the seal and plug and adjust the compensating spring adjusting screw  $\frac{1}{2}$  turn at a time until the surge is just eliminated. The governor operates most efficiently when the adjusting screw is turned clockwise only far enough to eliminate the surge. If the screw is turned too far clockwise, the governor will lag at full throttle. When the adjustment is satisfactory, install plug and seal with new lock wire.

c. **Removal of Carburetor Assembly.** Remove air cleaner assembly (par. 69). Disconnect and remove the choke control wire and tube at the carburetor. Disconnect the fuel tube at the carburetor. Disconnect the throttle control bell crank to carburetor rod from

# FUEL SYSTEM



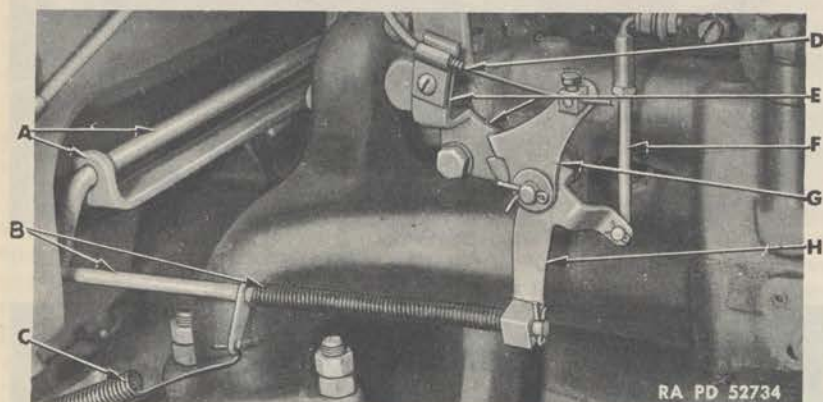
RA PD 312530

**Figure 82—Choke Control Linkage**

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

the carburetor throttle lever. Remove the nuts from the carburetor to manifold studs and remove the carburetor and governor assembly from the engine.

**d. Installation of Carburetor Assembly.** Install a new carburetor flange gasket and place the carburetor over the manifold studs with the carburetor air intake facing the rear of the vehicle. Install the lock washers and nuts on the carburetor flange studs and tighten. Attach the throttle control bell crank to carburetor rod at the carburetor throttle lever. Install the lock washer and nut and tighten (fig. 83). Connect the fuel tube to the carburetor and tighten. Insert the choke control wire in the choke shutter lever swivel and the housing in the clip on the bracket so that the housing is flush with



- A—ACCELERATOR SHAFT AND BRACKET
- B—ACCELERATOR SHAFT TO BELL CRANK ROD AND SPRING
- C—THROTTLE CONTROL SPRING
- D—HAND THROTTLE CONTROL WIRE AND HOUSING
- E—HAND THROTTLE CONTROL BRACKET AND WIRE HOUSING CLIP
- F—BELL CRANK TO CARBURETOR ROD
- G—HAND THROTTLE CONTROL LEVER
- H—BELL CRANK

**Figure 83—Throttle Control Linkage**

the forward end of the clip. Tighten the clip. Push the control button all the way in and back off about  $\frac{1}{16}$  inch, then tighten the wire in the air shutter swivel. Install air cleaner assembly (par. 69). Adjust engine idling speed (subpar. a above).

**e. Removal of Choke Control Wire (fig. 82).** Disconnect battery cable to prevent short circuit. Disconnect choke control wire and housing at the carburetor. Pull wire and housing from the short piece of loom holding the choke housing to the throttle housing. Straighten the housing and pull the control button and wire from the housing.

## FUEL SYSTEM

f. **Installation of Choke Control Wire** (fig. 82). Push control wire through the housing, starting at the instrument panel end. Then push the housing and wire through the loom on throttle control housing and into its original position. Insert the choke control wire in the choke air shutter lever swivel and the housing in the clip on the bracket so that the housing is flush with the forward end of the clip. Tighten the clip. Push dash control button all the way in and back off about  $\frac{1}{16}$  inch. Hold the choke air shutter lever forward and tighten the wire in the air shutter swivel. Connect battery cable. Adjust engine idling speed (subpar. a above).

g. **Removal of Throttle Control Wire** (fig. 83). Disconnect battery cable to prevent short circuit. Disconnect the throttle wire and housing at the throttle bell crank which is mounted on the manifold bracket. Then pull the wire and housing from the short piece of loom holding the throttle housing to the choke housing. Straighten the housing and pull the control button and wire from the housing.

h. **Installation of Throttle Control Wire** (fig. 83). Push control wire through the housing, starting at the instrument panel end. Push the housing and wire through the loom on choke housing and into its original position. Connect the throttle control wire and housing to the manifold and tighten the clip screw. Insert the throttle control wire in the block on the throttle control bell crank. With the throttle button on the dash pushed in and the throttle closed, tighten the set screw on the block. Connect battery cable. Adjust engine idling speed (subpar. a above).

## 71. FUEL TANK.

a. **Removal.** Remove the fuel tank drain plug and drain the fuel from the tank. Disconnect the filler tube hose between the tank and the filler tube by loosening the clamp screws and separating the hose from the tank connection and filler tube. Disconnect the fuel filter to tank tube at the fuel tank. Remove the fuel tank rear support strap cap screws. Disconnect the fuel gage wire as the tank is being removed.

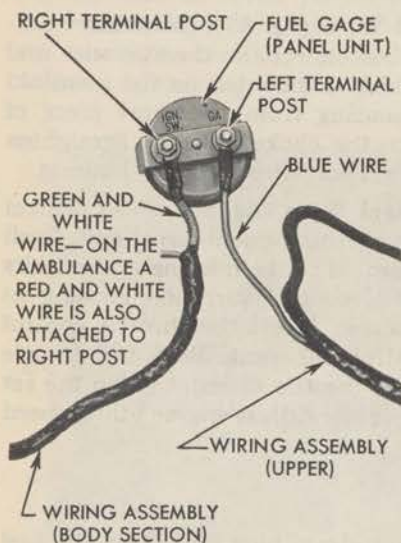
b. **Installation.** Connect the fuel gage wire and lift the tank into place. Install the fuel tank rear support lock washers and cap screws. Install the drain plug. Connect the tank to fuel filter tube at the tank. Insert filler tube and hose. Connect the hose to the filler tube and tank connection and tighten the two clamp screws. Make sure that the filler pipe is installed in the flexible hose connection, so that at least  $\frac{5}{8}$  inch to  $\frac{3}{4}$  inch space exists between the filler pipe and the fuel tank connection, particularly on the Ambulance model.

## 72. FUEL GAGE.

a. **Removal of Instrument Panel Unit.** Disconnect wires from the gage. Remove the two nuts which hold the mounting bracket to the instrument panel and remove the gage from driver's side of the instrument panel.

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

b. **Installation of Instrument Panel Unit** (fig. 84). Place gage in the instrument panel from the driver's side and install the mounting bracket on the two studs of the gage. Install the two attaching nuts with a standard lock washer under each nut. Connect the small blue wire to the left post of the gage unit. On all models except the Ambulance, connect green and white wire to the right post of the unit. On the Ambulance, connect green and white wire, also red and white wire, to right post of the unit.



RA PD 52901

**Figure 84—Fuel Gage Terminals**



RA PD 52794

**Figure 85—Fuel Gage (Tank Unit)**

c. **Removal of Tank Unit** (fig. 85). Remove the screws which hold the fuel gage inspection plate. Disconnect the gage wire and remove the five screws from gage. Lift the gage out through the inspection hole.

d. **Installation of Tank Unit** (fig. 85). It is important that the gage gasket form a tight seal in order to prevent fuel leakage. If the gasket is not in good condition, use a new one. Assemble the tank unit to the fuel tank and tighten the fastening screws. Connect the wire and install the inspection plate.

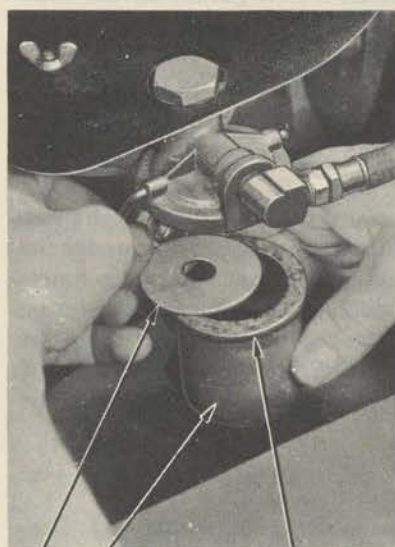
## 73. FUEL PUMP.

a. **Cleaning of Strainer Bowl and Screen** (fig. 86). Loosen the strainer bowl bail screw by hand and swing the bowl bail out of the

## FUEL SYSTEM

way. Remove bowl, gasket, and screen from the fuel pump body. Wash the strainer screen and bowl in dry-cleaning solvent. Assemble the screen in the pump top cover, making certain that it fits snugly around the gasoline inlet and the edges of the casting. Then place a new bowl gasket next to the screen. Hold the bowl firmly to the gasket, move the bail in place, and tighten the bail screw securely by hand.

**b. Removal of Fuel Pump Assembly.** Remove the heat shield stud wing nut and loosen the nut on the exhaust manifold stud. Disconnect the fuel pump to carburetor tube at the fuel pump. Discon-



STRAINER BOWL BOWL GASKET  
STRAINER SCREEN

RA PD 52793



FILTER ELEMENT RETAINER CUP AND NUT  
FILTER ELEMENT HEAD STUD  
BOWL STUD NUT AND GASKET  
BOWL BOWL GASKET

RA PD 52791

**Figure 86—Removing Fuel Pump Bowl and Strainer Screen** **Figure 87—Removing Fuel Line Filter Element**

nect the fuel filter to fuel pump flexible tube at the fuel pump. Remove the fuel pump mounting cap screws and lift off the fuel pump.

**c. Installation of Fuel Pump Assembly.** Place the fuel pump in position on the engine with a new gasket between fuel pump flange and cylinder block. Install the lock washers and cap screws and tighten. Connect the fuel filter to fuel pump flexible tube at the fuel pump. Connect the fuel pump to carburetor tube at the fuel pump. Slide the heat shield into position between the manifold stud washer and manifold stud flange, also over the stud on the fuel pump. Hold shield in place and tighten manifold stud nut. Install the lock washer and wing nut on fuel pump stud.

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

**74. FUEL FILTER.**

**a. Draining of Filter.** Remove drain plug in filter bowl to drain accumulated water or dirt from bowl.

**b. Cleaning of Filter Element** (fig. 87). Remove the filter bowl nut and pull filter bowl and gasket off filter. Turn the filter element knurled nut counterclockwise until the element can be removed from the element stud. Wash the element in dry-cleaning solvent. Separate the disks to remove all dirt and lint between the disk surfaces. *Do not disassemble the element.* Assemble the filter element to the filter head and tighten the element nut fingertight. *Use no tools and never twist the element.* Install a new gasket on the filter bowl and install bowl. Insert the bowl nut gasket over the stud and install and tighten the bowl nut.

**c. Removal of Fuel Filter Assembly.** Disconnect the two flexible tubes at the filter. Open the clip held by the filter mounting flange cap screw and move the wires out of the way. Remove the two cap screws from the fuel filter mounting flange.

**d. Installation of Fuel Filter Assembly.** Insert the right cap screws through mounting flange with a toothed lock washer under the cap screw head. Insert the left cap screw through mounting flange with the wire clip between the toothed lock washer and mounting flange. Place toothed lock washer on each cap screw so that it will be between the mounting flange and dash. Hold the filter in place against dash and tighten cap screws. Bend the clip over wiring. Connect the two flexible tubes to the filter.

**75. FUEL TUBES.**

**a. Removal of Tank to Fuel Filter Tube (Rear Section).** Disconnect the fuel tube at the tank. Disconnect the tube at the union near the brake pedal pivot bracket. Open the three clips holding the fuel tube to the lower flange of the frame side member and remove tube.

**b. Installation of Tank to Fuel Filter Tube (Rear Section).** Place the fuel tube in position and bend the three clips over the tube. Connect the tube at the tank. Connect the tube rear section to the front tube union near the brake pedal pivot bracket.

**c. Removal of Tank to Fuel Filter Tube (Front Section).** Disconnect the fuel tube at the union near the brake pedal pivot bracket. Disconnect the fuel tube from the flexible hose near the filter. Open the clip holding the fuel tube at master cylinder bracket. Back off the front wheel brake shoe cams so that the brake pedal can be depressed to the floor panel. Push the brake pedal all the way down and pull out the cotter pin and clevis pin which connects brake master cylinder push rod end to the brake pedal. Release the brake pedal and slide the push rod clevis end off its connection at the pedal and

## FUEL SYSTEM

push it back past the pedal so that the front end of the push rod can be lowered slightly, creating sufficient clearance to permit the removal of the tube without bending or distorting it.

**d. Installation of Tank to Fuel Filter Tube (Front Section).** Position the fuel tube and connect at the union near the brake pedal pivot bracket. Connect the tube at the flexible hose near the filter. Then bend the clip over the tube located at the master cylinder bracket. Move brake pedal and push rod end forward so clevis pin can be installed. Insert new cotter pin in clevis pin and spread cotter pin. Adjust front wheel brake shoes (par. 151).

**e. Removal of Fuel Filter to Fuel Pump Tube.**

- (1) REMOVE BATTERY (6-VOLT SYSTEM ONLY) (par. 88).
- (2) REMOVE HOOD (par. 178).
- (3) REMOVE WATER PUMP ASSEMBLY (par. 85).
- (4) REMOVE RADIATOR CORE (par. 86).
- (5) REMOVE FUEL TUBE. Disconnect fuel tube from the flexible hose at the fuel filter end. Disconnect fuel tube from the flexible hose at the fuel pump end. Remove the two fuel tube clip self-tapping cap screws at the frame front cross member. If vehicle is equipped with 6-volt electrical system, remove the fuel tube clip bolt and nut at the battery tray and remove the tube. If vehicle is equipped with 12-volt electrical system, remove the fuel tube clip bolt and nut from the frame left side member and remove the tube.

**f. Installation of Fuel Filter to Fuel Pump Tube.**

(1) INSTALL FUEL TUBE. Work the fuel pump end of the tube down between engine and left dust shield and up between the engine and right dust shield, then push in position over frame front cross member. Install the two fuel tube clip self-tapping cap screws with a toothed lock washer between each screw head and clip. Connect the fuel tube to the flexible hose at the fuel filter end. Connect fuel tube to the flexible hose at water pump end. If vehicle is equipped with 6-volt electrical system, install the fuel tube bolt and nut with a toothed lock washer under the bolt head and a toothed lock washer under the nut at the battery tray. If the vehicle is equipped with 12-volt electrical system, install the fuel tube bolt and nut with a toothed lock washer under the bolt head and a toothed lock washer under the nut at the frame left side member.

- (2) INSTALL RADIATOR CORE (par. 86).
- (3) INSTALL WATER PUMP ASSEMBLY (par. 85).
- (4) INSTALL BATTERY (6-VOLT SYSTEM ONLY) (par. 88).
- (5) INSTALL HOOD (par. 178).

**g. Fuel Tube Repair.**

(1) CUT NEW TUBE WITH TUBE CUTTER. Measure tube for length desired and cut with tube cutter.

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

## FUEL TUBE LENGTHS

|                                           |                                            |
|-------------------------------------------|--------------------------------------------|
| Fuel pump to carburetor tube .....        | 22 in.                                     |
| Fuel filter to fuel pump tube .....       | 46½ in.                                    |
| Fuel tank to fuel filter front tube ..... | 31 in.                                     |
| Fuel tank to fuel filter rear tube .....  | 91¾ in. (Carryall)                         |
| Fuel tank to fuel filter rear tube .....  | 98¾ in. (Ambulance)                        |
| Fuel tank to fuel filter rear tube .....  | 75¾ in.<br>(Command and<br>Weapon Carrier) |

(2) BEND TUBING WITH TUBING BENDER. Use removed tube as a template or guide and form the tube to the same shape as the tube removed.

(3) FLARE ENDS OF TUBE WITH FLARING TOOL. Slide the attaching nuts on each end of the fuel tube and flare each end of the tube with flaring tool.

Section XVII

# EXHAUST SYSTEM

|                           | Paragraph |
|---------------------------|-----------|
| General description ..... | 76        |
| Tail pipe .....           | 77        |
| Muffler .....             | 78        |
| Exhaust pipe .....        | 79        |

## 76. GENERAL DESCRIPTION.

a. The purpose of the exhaust system is to carry the burned gases away from the vehicle and reduce exhaust noise.

## 77. TAIL PIPE.

a. **Removal** (fig. 88). Remove the muffler tail pipe bracket and the lower part of the muffler rear support bracket. Remove the support clamp bolts and pull the tail pipe off muffler.

b. **Installation** (fig. 88). Slide the tail pipe on the muffler flange and fasten the tail pipe bracket to the frame side member. Assemble the lower half of the muffler rear bracket to the frame side member and install the rear support clamp bolts, lock washers, and nuts.

## 78. MUFFLER.

a. **Removal** (fig. 88). Remove the muffler tail pipe (par. 77). Remove the U-clamp at the front of the muffler and pull the muffler from the exhaust pipe.

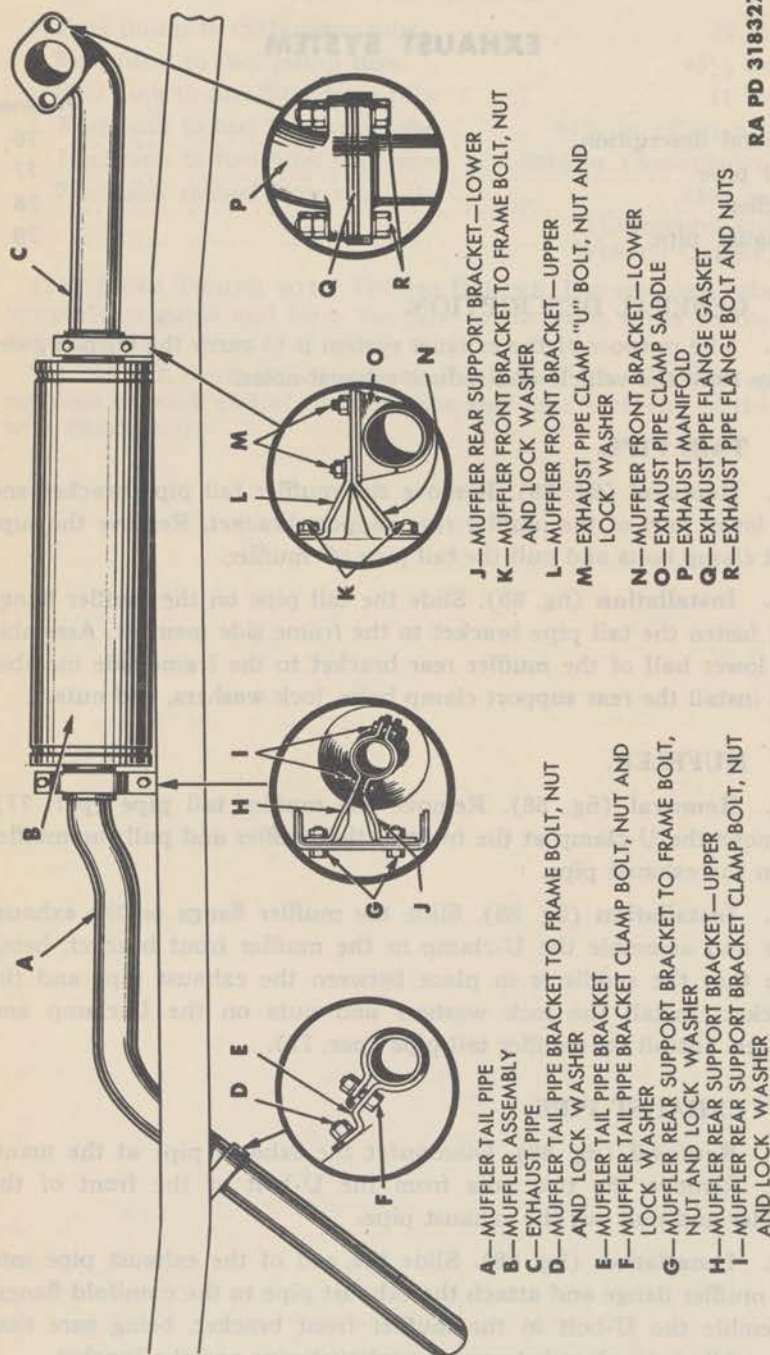
b. **Installation** (fig. 88). Slide the muffler flange on the exhaust pipe and assemble the U-clamp in the muffler front bracket, being sure that the saddle is in place between the exhaust pipe and the bracket. Install the lock washers and nuts on the U-clamp and tighten. Install the muffler tail pipe (par. 77).

## 79. EXHAUST PIPE.

a. **Removal** (fig. 88). Disconnect the exhaust pipe at the manifold. Remove the two nuts from the U-bolt at the front of the muffler and pull out the exhaust pipe.

b. **Installation** (fig. 88). Slide the end of the exhaust pipe into the muffler flange and attach the exhaust pipe to the manifold flange. Assemble the U-bolt in the muffler front bracket, being sure that the saddle is in place between the exhaust pipe and the bracket.

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



RA PD 318327

Figure 88—Exhaust System

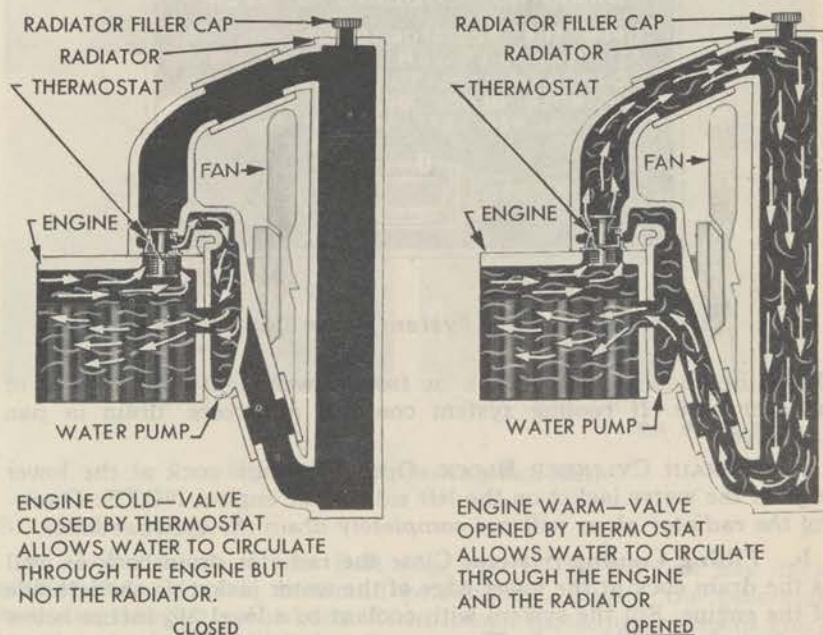
Section XVIII

# COOLING SYSTEM

|                           | Paragraph |
|---------------------------|-----------|
| General description ..... | 80        |
| Maintenance .....         | 81        |
| Fan belt .....            | 82        |
| Hose .....                | 83        |
| Thermostat .....          | 84        |
| Water pump and fan .....  | 85        |
| Radiator .....            | 86        |

## 80. GENERAL DESCRIPTION.

a. **General** (fig. 89). The purpose of the cooling system is to maintain efficient operating temperature of the engine. This is accomplished by thermostatically controlling the circulation of coolant around the cylinder walls and through the radiator.



RA PD 58353

**Figure 89—Cooling System Thermostat Operation**

b. **Thermostat Control** (fig. 89). When a cold engine is started, a thermostat prevents the circulation of the cooling solution through the radiator. A bypass allows the coolant to circulate only in the water jackets of the engine until normal operating temperature has

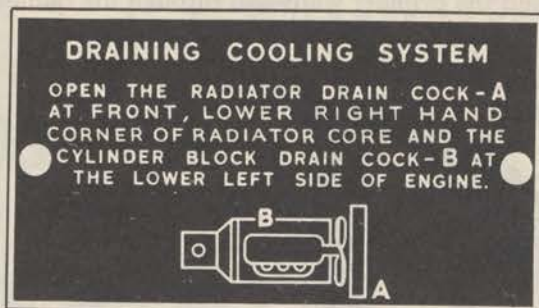
**¾-TON 4 x 4 TRUCK (DODGE)**

been reached. When the temperature as shown by the thermometer on the instrument panel reaches approximately 157°F, the thermostat starts to open, allowing some of the coolant to circulate through the radiator. At approximately 183°F the thermostat is fully open, allowing unrestricted circulation of the coolant.

c. **Radiator Cap.** The radiator cap is spring-loaded, forming a closed cooling system to prevent loss of cooling liquids. Should excessive pressure develop, the radiator cap releases at a pressure from 1½ to 2½ pounds allowing the system to vent through the overflow pipe in the radiator filler neck above the radiator cap seat.

**81. MAINTENANCE.****a. Draining Cooling System (fig. 90).**

(1) **DRAIN RADIATOR.** Remove the filler cap slowly to permit pressure to escape through the vent in the cap if the radiator is hot.



RA PD 52790

**Figure 90—Cooling System Drain Caution Plate**

Open the radiator drain cock at front lower right-hand corner of radiator core. If cooling system contains antifreeze, drain in pan and save.

(2) **DRAIN CYLINDER BLOCK.** Open the drain cock at the lower edge of the water jacket on the left side of the engine. *NOTE: Draining the radiator alone will not completely drain the cylinder block.*

b. **Filling Cooling System.** Close the radiator drain cock as well as the drain cock at the lower edge of the water jacket on the left side of the engine. Fill the system with coolant to a level 2¼ inches below the top of the filler neck. The capacity of the cooling system is 18 quarts. Turn filler cap all the way to the right to seal the system.

c. **Flushing Cooling System.** If dirty water has been used in the cooling system, the system can be flushed to some extent if water supply and hose are available.

(1) **REMOVE RADIATOR HOSE—UPPER AND LOWER** (par. 83).

(2) **REMOVE THERMOSTAT FROM CYLINDER HEAD** (par. 84). Then install thermostat housing without thermostat.

## COOLING SYSTEM

(3) **FLUSH RADIATOR CORE AND ENGINE WATER JACKETS.** Place end of water hose in radiator filler opening and wrap cloth around connection to hold some of the water pressure. Turn on water and allow water to flow through radiator until water is clean as it leaves radiator. Place end of water hose in opening at the thermostat housing and allow water to flow through the engine water jackets until water is clean as it leaves water jackets.

(4) **INSTALL THERMOSTAT** (par. 84).

(5) **INSTALL RADIATOR HOSE—UPPER AND LOWER** (par. 83).

(6) **FILL COOLING SYSTEM** (subpar. b above).

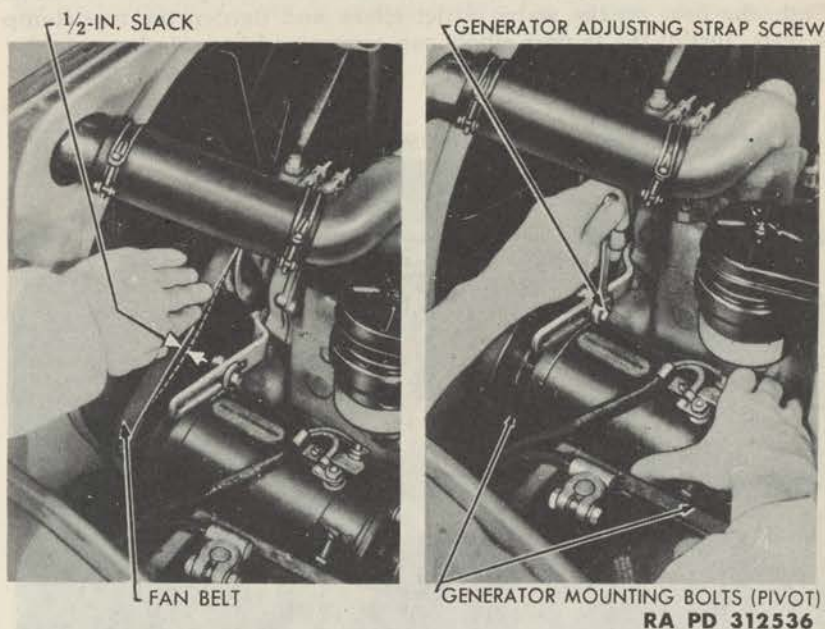


**Figure 91—Adjusting Fan Belt**

### 82. FAN BELT.

a. **Adjustment of Fan Belt** (fig. 91). If the fan belt has slack greater than  $\frac{1}{2}$  inch, it should be adjusted. Loosen the generator mounting bracket pivot bolts. Then loosen the adjusting strap locking screw or bolt. Pull out on the generator until the belt is just snug. Hold the generator in this position and tighten the adjusting strap lock screw and the generator bracket pivot bolts. Do not overtighten the belt by moving the generator with a pry bar, as too tight a belt will damage the generator or water pump bearings.

b. **Replacement of Fan Belt.** Loosen the generator to mounting bracket pivot bolts and adjusting strap screw or bolt. Push the generator toward the engine as far as it will go and remove belt. Then install new belt and adjust as explained in subparagraph a above.

**3/4-TON 4 x 4 TRUCK (DODGE)****83. HOSE.****a. Replacement Procedure.**

- (1) DRAIN RADIATOR (par. 81).
- (2) REPLACE INLET AND OUTLET HOSE (fig. 92). Loosen hose clamp screws and pull off hose. Install new hose and tighten clamp screws securely.
- (3) REPLACE BYPASS HOSE. Loosen the two hose clamp screws connecting the hose to water pump bypass elbow and the cylinder head water outlet elbow. Remove bypass elbow cap screws and pull the bypass elbow off the cylinder head water outlet elbow. Slide a new hose on the bypass elbow, then the two clamps over the hose. Slide the hose on the water outlet elbow and tighten the two clamp screws. Install the bypass elbow cap screws and lock washers.
- (4) FILL RADIATOR (par. 81).



RA PD 52919

**Figure 92—Cooling System Hose****84. THERMOSTAT.**

**a. Removal** (fig. 93). Drain the radiator (par. 81). Loosen the radiator inlet hose clamp screws. Remove the two bypass elbow to water pump cap screws. Then remove the two cylinder head water outlet elbow cap screws and remove the elbow assembly, being careful not to damage the thermostat. Lift the thermostat from the cylinder head (fig. 93).

**b. Testing.** Heat a pan of water to 160°F by the thermometer, suspend thermostat in water and note whether it begins to open.

## COOLING SYSTEM

Remove thermostat, heat the water to 185°F and suspend thermostat in water. If it opens fully, it is functioning properly.

### c. Installation (fig. 93).

(1) **INSTALL THERMOSTAT.** Place a new outlet elbow gasket on cylinder head; also a new bypass elbow gasket on the water pump. Install the thermostat in the cylinder head, bellows down. Turn the thermostat so that the bypass openings face toward the radiator and to the rear of the vehicle, leaving the two wide faces to the right and left. Place the upper gasket on the top shoulder of the thermostat.

(2) **INSTALL WATER OUTLET AND BYPASS ASSEMBLY.** Place the water outlet elbow and bypass elbow assembly in position and slide the radiator inlet hose in place. Install the bypass elbow to water

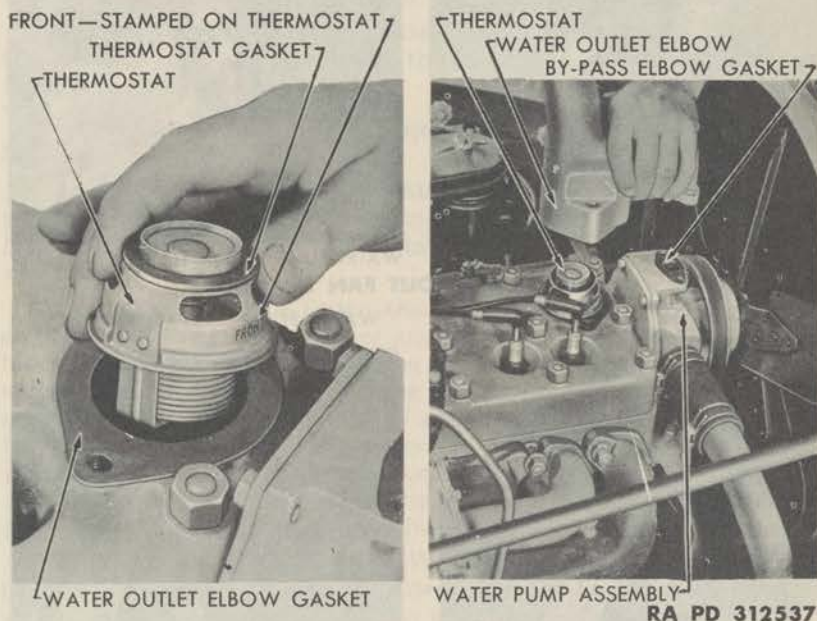


**Figure 93—Installing Thermostat**

pump cap screws and lock washers. Then install the water outlet elbow cap screws and lock washers. Tighten the radiator inlet hose clamp screws.

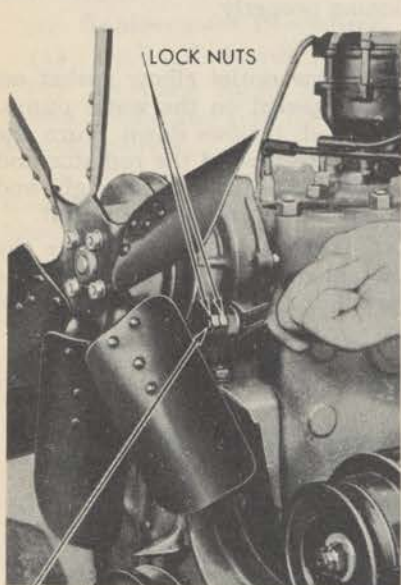
### (3) FILL COOLING SYSTEM (par. 81).

## 85. WATER PUMP AND FAN.

### a. Removal of Water Pump and Fan (Vehicles without Fan Shroud).

(1) **DRAIN RADIATOR AND DISCONNECT WATER HOSE.** Open the radiator drain cock and drain radiator. Disconnect radiator inlet hose

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

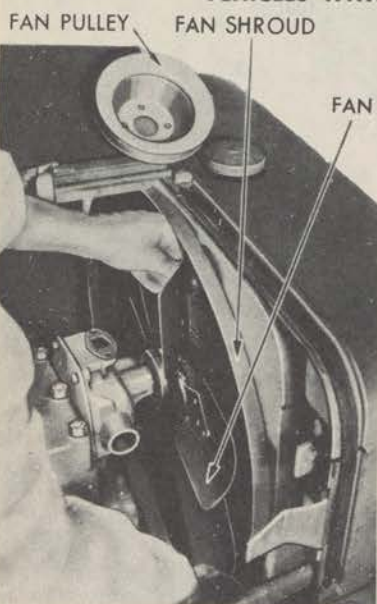


WATER PUMP BODY STUD



WATER PUMP PUMP TO BLOCK GASKET

**VEHICLES WITHOUT FAN SHROUD**



**VEHICLES WITH FAN SHROUD**

RA PD 312538

**Figure 94—Removing Water Pump**

## COOLING SYSTEM

at radiator and radiator outlet hose at water pump. Also disconnect heater hose at water pump if vehicle is equipped with heater.

(2) **REMOVE GENERATOR ADJUSTING STRAP AND FAN BELT.** Loosen the generator mounting pivot bolt nuts. Remove the adjusting strap from the water pump mounting stud. Push the generator toward the engine and remove the fan belt.

(3) **REMOVE CYLINDER HEAD WATER OUTLET ELBOW ASSEMBLY.** Remove the bypass elbow to water pump cap screws. Remove the two cap screws from cylinder head water outlet elbow and carefully lift off the elbow assembly. Do not damage the thermostat.

(4) **REMOVE WATER PUMP AND FAN BLADE ASSEMBLY (fig. 94).** Install two nuts on each stud and lock the nuts together. Turn the inside nut counterclockwise and screw the studs out of the block. Lift the water pump and fan blade assembly from the cylinder block.

(5) **REMOVE FAN BLADE ASSEMBLY FROM WATER PUMP.** Remove the fan hub cap screws and lift the fan blade assembly and pulley from the water pump.

### **b. Installation of Water Pump and Fan (Vehicles without Fan Shroud).**

(1) **INSTALL FAN BLADE ASSEMBLY ON WATER PUMP.** Place the pulley and fan blade with reinforcing plate toward pulley on the fan hub, install lock washers and attaching cap screws and tighten the cap screws.

(2) **INSTALL WATER PUMP AND FAN ASSEMBLY.** Hold the pump and fan blade assembly in place and screw the studs into the cylinder block. Place the short stud nearest the manifold, the medium length stud at bottom center, and the long stud at the point where the generator adjusting strap is fastened. Tighten each of the studs by locking two nuts together. Place the generator adjusting strap on the water pump mounting stud. Install a toothed lock washer and nut on the mounting stud holding the adjusting strap, but do not tighten. Then place a lock washer and nut on the other two studs and tighten.

(3) **INSTALL CYLINDER HEAD WATER OUTLET ASSEMBLY.** Place a new outlet elbow gasket on cylinder head, also a new bypass elbow gasket on the water pump. See that the upper gasket on the top shoulder of the thermostat is in good condition, then place the water outlet elbow and bypass elbow assembly in position and slide the radiator inlet hose in place. Install the bypass elbow to water pump cap screws and lock washers and tighten. Then install the water outlet elbow cap screws and lock washers and tighten.

(4) **INSTALL GENERATOR ADJUSTING STRAP AND FAN BELT.** Attach the adjusting strap to the generator bracket with toothed lock washer between the cap screw and generator bracket. If a bolt and nut is used, install a toothed lock washer between bolt head and strap and one between bolt nut and generator bracket. Tighten the strap at the water pump mounting stud. Push the generator toward the engine as far as it will go, and install and adjust fan belt (par. 82).

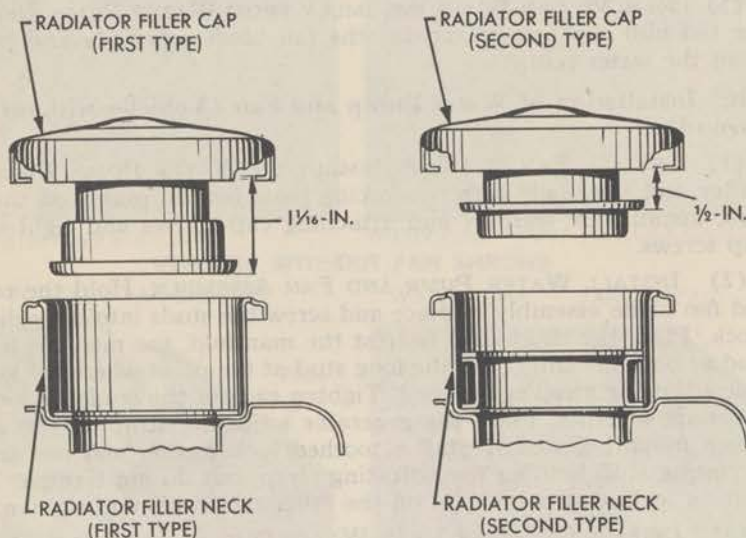
**3/4-TON 4 x 4 TRUCK (DODGE)**

(5) **CONNECT WATER HOSE AND FILL RADIATOR.** Connect and tighten radiator inlet hose at radiator, and outlet hose at water pump. Connect and tighten heater hose at water pump if vehicle is equipped with heater. Close radiator drain cock and fill with coolant.

**c. Removal of Water Pump and Fan (Vehicles with Fan Shroud).**

(1) **DRAIN RADIATOR AND DISCONNECT HOSE.** Drain the radiator. Remove upper radiator hose and disconnect lower hose from water pump. Remove two cap screws which hold the bypass hose elbow to the top of the water pump.

(2) **REMOVE FAN AND PULLEY** (fig. 94). Remove fan belt. Disconnect the right radiator tie rod at the radiator. Remove cap screws



RA PD 52918

**Figure 95—Radiator Filler Caps**

which hold fan and pulley to fan pulley hub. Move the fan assembly toward radiator and remove pulley. Tip fan blade assembly as shown in figure 94 and lift it out.

(3) **REMOVE WATER PUMP** (fig. 100). Remove the nuts and lock washers from the water pump attaching studs and move the pump forward and off the studs.

**d. Installation of Water Pump and Fan (Vehicles with Fan Shroud).**

(1) **INSTALL WATER PUMP.** Slide the pump over the attaching studs and install standard lock washers and nuts.

## COOLING SYSTEM

(2) **INSTALL FAN BLADES** (fig. 94). Place pulley in position. Insert fan between radiator shroud and water pump as shown in figure 94, with reinforcing plate toward pulley. Move fan into position over water pump hub and install four attaching cap screws with standard lock washer under the head of each cap screw. Attach radiator tie rod to radiator. Install fan belt.

(3) **CONNECT HOSE AND FILL RADIATOR.** Install the two cap screws which hold the bypass elbow to the water pump. Connect lower hose to water pump and install upper hose. Fill cooling system (par. 81).

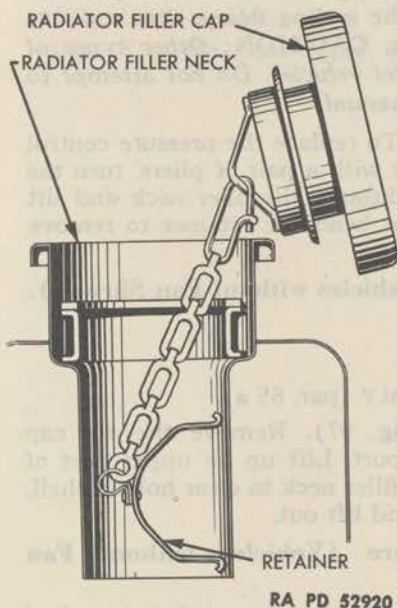


**Figure 96—Installing Radiator Cap**



**Figure 97—Installing Radiator Core**

### 86. RADIATOR.

a. **Radiator Cap.** Radiators of all vehicles covered by this manual are equipped with pressure control radiator caps. Very little loss of coolant will result if the normal operating temperature is not exceeded. The radiator cap is equipped with a spring-loaded valve that seals the overflow pipe opening from the radiator proper, when the correct cap is installed with the gasket in the radiator filler neck. The spring-loaded valve must be tight against the gasket to seal the cooling system. The valve in the cap remains on its seat until the pressure in the cooling system exceeds  $1\frac{1}{2}$  to  $2\frac{1}{2}$  pounds per square inch. Only when the pressure is great enough to raise the valve from its seat, can any vapor escape through the overflow from the cooling

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

system. Whenever the cooling system is filled or a vehicle inspected, note the condition of the gasket and tighten cap securely. Replace the gasket whenever it becomes warped or when the valve is not making complete contact with the gasket.

**b. Types of Filler Caps Used** (fig. 95). Two types of pressure control caps have been used on vehicles covered by this manual. The correct type cap must be used to prevent loss of coolant. The first type pressure control cap has a measurement of  $1\frac{1}{16}$  inches from the top of the cap engaging lugs to the bottom of the sealing flange that contacts the gasket in the radiator filler neck. The second type pressure control cap has a measurement of  $\frac{1}{2}$  inch from the top of the cap engaging lugs to the bottom of the sealing flange that contacts the gasket in the radiator filler neck. **CAUTION:** *Other types of caps have been used on previous model vehicles. Do not attempt to use these on vehicles covered by this manual.*

**c. Replacement of Cap** (fig. 96). To replace the pressure control cap, grip the retainer in the filler neck with a pair of pliers, turn the retainer so that both ends will pass through the filler neck and lift out. It is not necessary to compress or bend the retainer to remove or install it.

**d. Removal of Radiator Core (Vehicles without Fan Shroud).**

- (1) DRAIN RADIATOR (par. 81).
- (2) REMOVE HOOD (par. 178).
- (3) REMOVE WATER PUMP ASSEMBLY (par. 85 a).
- (4) REMOVE RADIATOR CORE (fig. 97). Remove the six cap screws that hold the core to the support. Lift up on upper part of shell at filler neck hole to permit core filler neck to clear hole in shell, then push top of core toward engine and lift out.

**e. Installation of Radiator Core (Vehicles without Fan Shroud).**

- (1) INSTALL RADIATOR CORE (fig. 97). Lower core between shell and engine, placing bottom of core in position, then lift up on upper part of shell at filler neck hole to permit core filler neck to clear hole in shell and pull top of core forward into place. Install three toothed lock washers and cap screws at each side of core.

- (2) INSTALL WATER PUMP ASSEMBLY (par. 85).

- (3) INSTALL HOOD (par. 178).

**f. Removal of Radiator Core (Vehicles with Fan Shroud).**

- (1) DRAIN RADIATOR (par. 81).
- (2) REMOVE HOOD (par. 178).
- (3) REMOVE FAN BLADES (par. 85 c (2)).
- (4) REMOVE RADIATOR CORE. Remove hose at top and bottom of radiator core. Disconnect both radiator tie rods at the radiator. Remove the six cap screws that hold the fan shroud and radiator core to the support and remove the shroud. Lift up on the upper part

## COOLING SYSTEM

of shell at filler neck hole to permit core filler neck to clear hole in shell, then push top of core toward engine and lift out (fig. 97).

### g. Installation of Radiator Core (Vehicles with Fan Shroud).

(1) **INSTALL RADIATOR CORE.** Lower core between shell and engine, placing bottom of core in position, then lift up on upper part of shell at filler neck hole to permit core filler neck to clear hole in shell and pull top of core forward into place (fig. 97). Install the fan shroud. Install three toothed lock washers and cap screws at each side of shroud and tighten shroud and core to support. Install hose at top and bottom of radiator. Connect left radiator tie rod.

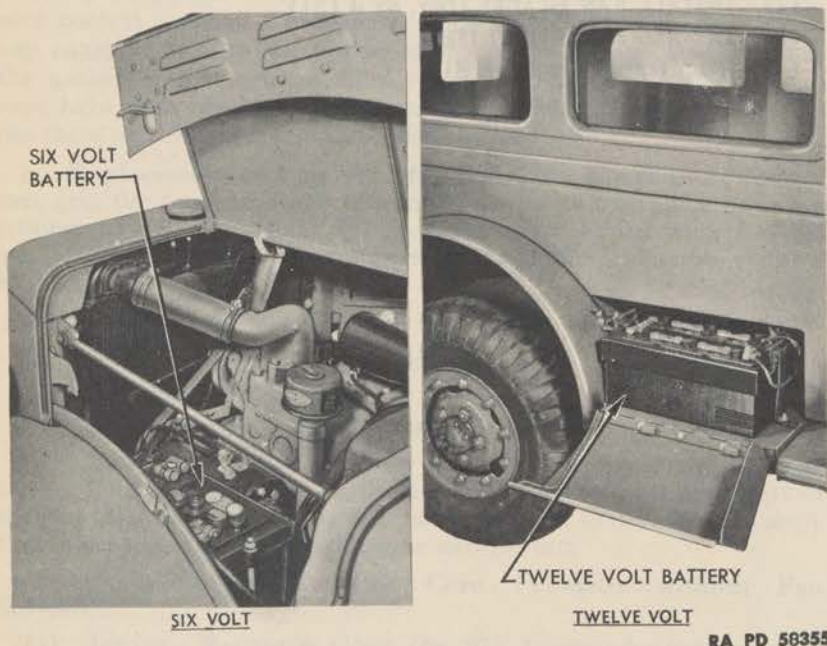
(2) **INSTALL FAN BLADES** (par. 85 d (2)).

(3) **INSTALL HOOD** (par. 178).

(4) **FILL RADIATOR** (par. 81).

**3/4-TON 4 x 4 TRUCK (DODGE)****Section XIX****BATTERY**

|                           | Paragraph |
|---------------------------|-----------|
| General description ..... | 87        |
| Battery .....             | 88        |
| Battery cables .....      | 89        |



RA PD 58355

**Figure 98—Battery Location****87. GENERAL DESCRIPTION.**

a. The vehicles covered by this manual are equipped with either 6-volt or 12-volt batteries as listed below:

| 6-VOLT ELECTRICAL SYSTEM        |       | 12-VOLT ELECTRICAL SYSTEM |       |
|---------------------------------|-------|---------------------------|-------|
| Type of Vehicle                 | Model | Type of Vehicle           | Model |
| Weapon carrier .....            | WC-51 | Carryall .....            | WC-53 |
| Weapon carrier with winch ..... | WC-52 | Command .....             | WC-56 |
| Ambulance .....                 | WC-54 | Command with winch ..     | WC-57 |
| Telephone maintenance ..        | WC-59 |                           |       |
| Emergency repair .....          | WC-60 |                           |       |

## BATTERY

**b. Battery Location** (fig. 98). The location of the battery offers a simple means of determining the voltage of the electrical system. On vehicles with 6-volt systems, the battery is located under the engine hood on the driver's side. On vehicles with 12-volt systems, the battery is mounted on the rear end of the running board on the side opposite the driver.

### c. Data.

Battery capacity, ampere hour:

6-volt ..... 116 (20 hr rate)

12-volt ..... 204 (20 hr rate)

Battery terminal grounded ..... negative

## 88. BATTERY.

### a. Battery Tests.

(1) **HYDROMETER TEST.** The following hydrometer readings show the charge condition of the battery:

Fully charged ..... 1.275 to 1.300

Half charged ..... 1.225

Dangerously low ..... 1.150

(2) **SPECIFIC GRAVITY FOR HOT CLIMATES.** In hot climates (95°F and above), lower specific gravity electrolyte (1.245) is recommended to avoid excessive deterioration of plates and separators. When transferring batteries that have previously been in service in a temperate climate, to a tropical climate, first make sure the battery is fully charged. Then remove electrolyte to top of plates and fill with pure water. Charge the battery for two hours at 10 to 15 amperes and repeat procedure until a specific gravity of 1.245 is obtained.

(3) **VOLTAGE TEST.** To test the voltage output of the battery with a voltmeter, connect the positive lead from the voltmeter to the positive post of the battery and negative lead from the meter to the negative post of the battery. Read the voltage output on the voltmeter. A reading of 6.0 to 6.5 volts on a 6-volt battery or 12.0 to 13.5 volts on a 12-volt battery indicates normal voltage output.

**b. Electrolyte Level.** Add pure water to the battery as often as necessary to keep the battery plates covered with the electrolyte solution.

(1) **BATTERIES WITH VENT PLUGS.** Six-volt batteries and some 12-volt batteries are filled by removing the filler plugs and placing them over the vents. Fill each cell with pure water to top of filler opening. Then remove the filler caps from the vents and the electrolyte solution will drop to the proper level.

(2) **BATTERIES WITHOUT VENT PLUGS.** Twelve-volt batteries not equipped with vent plugs are filled by removing the filler plugs and adding sufficient pure water to each cell to bring the level of the electrolyte solution  $\frac{3}{8}$  inch above the top of the battery plates.

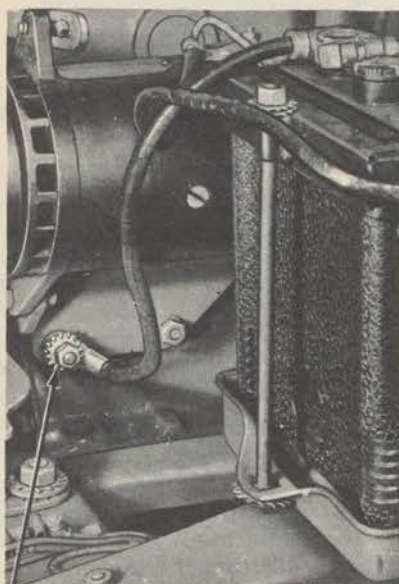
**3/4-TON 4 x 4 TRUCK (DODGE)**

c. **Temperature at Which Battery Will Freeze.** A fully charged battery with a specific gravity of 1.260 to 1.300 will not freeze except in temperatures below  $-75^{\circ}\text{F}$  but a discharged battery with specific gravity of 1.100 to 1.120 will freeze at  $14^{\circ}\text{F}$  to  $18^{\circ}\text{F}$ , above zero. For this reason, the battery should be kept fully charged when temperatures fall below freezing ( $32^{\circ}\text{F}$ ).

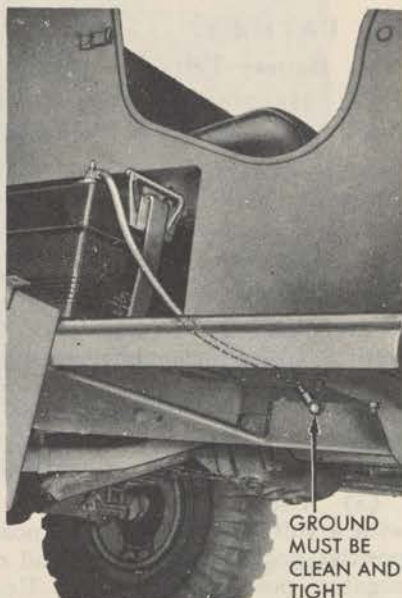
d. **Removal of Battery.**

(1) **DISCONNECT CABLES FROM BATTERY.** CAUTION: Always remove ground cable first.

(a) **Six-volt Battery.** Loosen terminal bolt nuts and lift terminals off battery posts.



GROUND, MUST BE CLEAN AND TIGHT  
SIX VOLT



TWELVE VOLT

GROUND  
MUST BE  
CLEAN AND  
TIGHT

RA PD 58360

**Figure 99—Battery Ground (Negative) Cable**

(b) **Twelve-volt Battery.** Remove two cap screws which hold battery cover in place and swing cover down. Then loosen battery terminal wing nut and lift off terminal.

(2) **REMOVE BATTERY FROM MOUNTING.** Remove two hold-down clamp bolt nuts, clamp or clamps. Then lift out battery.

e. **Installation of Battery.**

(1) **INSTALL BATTERY IN MOUNTING.**

(a) **Six-volt Battery.** Set battery in mounting with negative post forward and install hold-down clamp. Install toothed lock washer on front hold-down bolt and toothed lock washer on rear hold-down

## BATTERY

bolt. Install generator wire bracket over front hold-down bolt with another toothed lock washer on top of bracket. Install and tighten nuts on both hold-down bolts.

(b) *Twelve-volt Battery.* Set battery in mounting with posts forward and install hold-down clamps. Install toothed lock washer on each hold-down clamp bolt. Then install and tighten nuts on both hold-down bolts.

### (2) CONNECT BATTERY CABLES.

(a) *Six-volt Battery.* Lubricate terminals with a thin coating of chassis grease. Press terminals down on battery posts and tighten terminal bolt nuts.

(b) *Twelve-volt Battery.* Lubricate terminals with a thin coating of chassis grease. Install smaller single cable and longer one of pair of cables on negative terminal of battery. Install larger single cable and shorten one of pair of cables on positive terminal of battery. Then put wing nuts on battery terminal screws and tighten. Close battery cover. Install cap screws with toothed lock washer under the head of each cap screw and tighten cover.

## 89. BATTERY CABLES.

### a. Removal of Battery Ground Cable.

(1) DISCONNECT CABLE FROM BATTERY (par. 88 d (1)).

(2) DISCONNECT GROUNDED END OF CABLE (fig. 99).

(a) *Six-volt Battery.* Remove nut from generator hinge bracket stud and remove cable.

(b) *Twelve-volt Battery.* Remove nut and bolt from frame side member and remove cable.

### b. Installation of Battery Ground Cable (fig. 99).

(1) ATTACH GROUNDED END OF CABLE.

(a) *Six-volt Battery.* Install one toothed lock washer, then cable terminal on generator hinge bracket stud. Install another toothed lock washer and nut on stud and tighten securely.

(b) *Twelve-volt Battery.* Place one toothed lock washer on attaching bolt, then insert bolt through cable terminal and frame side member. Install another toothed lock washer and nut and tighten securely.

(2) CONNECT CABLE TO BATTERY (par. 88 e (2)).

### c. Removal of Battery to Cranking Motor Cable.

(1) DISCONNECT CABLE FROM BATTERY (par. 88 d (1)).

(2) DISCONNECT CABLE FROM CRANKING MOTOR SWITCH. Remove nut from cranking motor switch terminal and lift off ammeter and radio interference wires and battery to cranking motor cable.

(3) DISCONNECT CLIPS WHICH HOLD CABLE TO CHASSIS (12-VOLT BATTERY ONLY). Remove clip on running board bracket. Open

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

two clips on frame cross member over front of transfer case. Remove clip on frame cross member at rear of transmission. Open clip on engine crankcase and remove cable.

**d. Installation of Battery to Cranking Motor Cable.**

(1) **CONNECT CABLE TO CRANKING MOTOR SWITCH.** Place cable terminal on cranking motor switch with ammeter and interference filter wire terminals on top of cable terminal. Install standard lock washer and nut.

(2) **CONNECT CABLE TO BATTERY** (par. 88 e (2)).

(3) **CONNECT CLIPS WHICH HOLD CABLE TO CHASSIS** (12-VOLT BATTERY ONLY). Close clip on engine crankcase. Install clip on frame cross member at rear of transmission. Close two clips on frame cross member over front of transfer case. Install clip on running board bracket.

Section XX

# STARTING SYSTEM

|                             | Paragraph |
|-----------------------------|-----------|
| General description .....   | 90        |
| Cranking motor switch ..... | 91        |
| Cranking motor pedal .....  | 92        |
| Cranking motor .....        | 93        |

## 90. GENERAL DESCRIPTION.

a. The starting system (fig. 100) consists of the battery, the battery and ground cables, the cranking motor switch and the cranking motor. The starting system operates entirely independently of all other electrical equipment and wiring of the vehicle.

b. Two different types of cranking motors are used, depending on the voltage of the electrical system. The cranking motor used on vehicles with 12-volt electrical systems has a green plate with voltage shown on plate. Six-volt system cranking motors are equipped with a red plate showing the voltage.

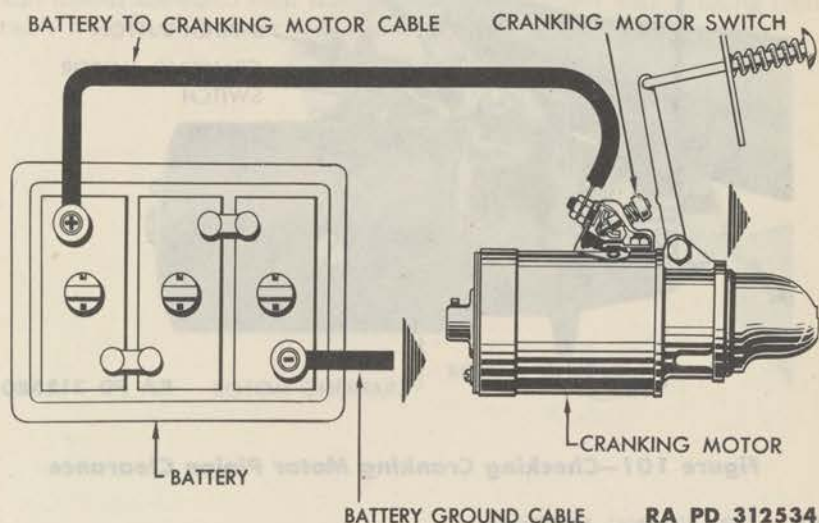


**Figure 100—Cranking Circuit Diagram**

## 91. CRANKING MOTOR SWITCH.

### a. Removal.

- (1) DISCONNECT CABLE FROM BATTERY (par. 88 d).
- (2) REMOVE SWITCH. Remove terminal nut, ammeter, radio interference filter wires, and cable. Remove two screws which hold switch to cranking motor. Outside screw also holds radio interference filter in place.

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

**b. Installation.**

(1) **INSTALL SWITCH.** Install screws which hold switch to cranking motor, place radio interference filter bracket under outer screw with a toothed lock washer under bracket and a toothed lock washer on top of bracket. Place cable, also ammeter and filter wire terminals, on post of switch and install standard lock washer and nut.

(2) **CONNECT CABLE TO BATTERY** (par. 88 e).

**92. CRANKING MOTOR PEDAL.**

**a. Removal Procedure.** Unscrew button from end of rod and spring will slip off. Disconnect rod from cranking motor switch lever and pull rod from front of dash.

**b. Installation.** Insert rod through dash from the front and connect to cranking motor switch lever. Place spring over rod and install button on end of rod.

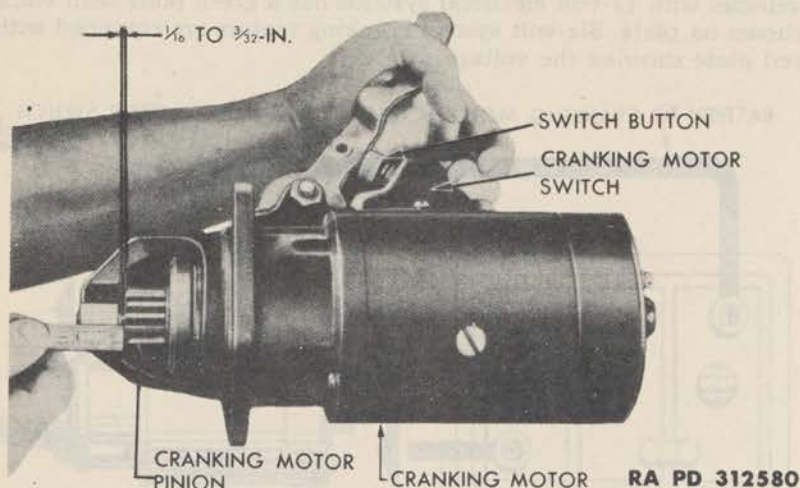


**Figure 101—Checking Cranking Motor Pinion Clearance**

**93. CRANKING MOTOR.**

**a. Removal.** Disconnect cable from battery to avoid damage from short circuit. Remove nut from switch and lift off radio filter wire, ammeter wire and battery cable. Disconnect wire running from radio filter to coil, at the coil. Remove two screws which hold switch and radio interference filter to cranking motor. Remove oil level indicator and disconnect lower end of oil filter to engine hose. Disconnect engine to oil gage tube and hose at engine and dash, and remove tube and hose. Disconnect cranking motor pedal rod at clevis. Remove two cap screws which hold cranking motor to clutch housing and lift out cranking motor.

## STARTING SYSTEM

## b. Installation.

(1) CHECK PINION CLEARANCE (fig. 101). When the cranking motor pinion is fully engaged, there should be  $\frac{1}{16}$  to  $\frac{3}{32}$  inch clearance between the pinion and the pinion housing. Push the shift yoke assembly to its extreme limit of travel, or until the cranking motor switch has made contact. Then measure the clearance between the end of the pinion and the rear thrust washer. The cranking motor switch button may be screwed into or out of the switch assembly as required for proper pinion adjustment. **NOTE:** *Do not attempt to change the cranking motor switch button adjustment without removing the cranking motor to verify proper setting.*

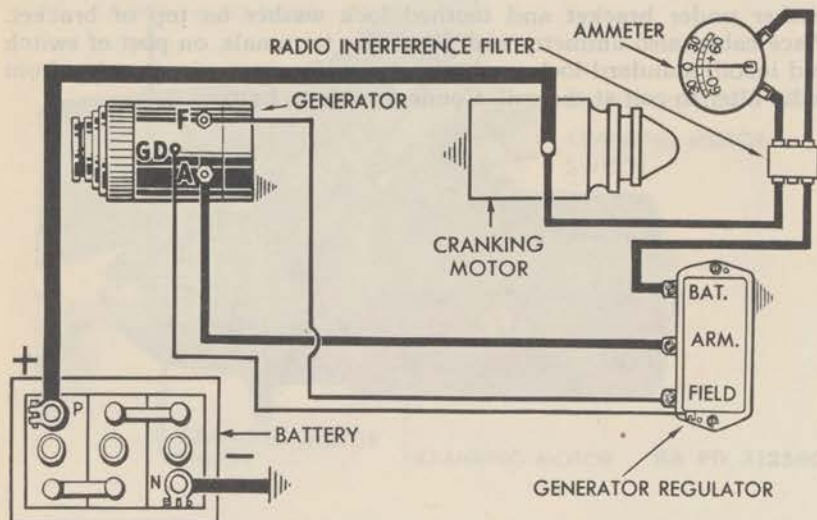
(2) INSTALL CRANKING MOTOR. Place motor in clutch housing and install two cap screws which hold cranking motor in place. Connect pedal rod at clevis. Install engine to oil gage tube and hose. Connect lower end of oil filter to engine hose. Install oil level indicator. Install screws which hold switch to cranking motor. Place radio interference filter bracket under outer screw with toothed lock washer under bracket and toothed lock washer on top of bracket. Place cable, also ammeter and filter wire terminals, on post of switch and install standard lock washer and nut. Connect wire running from radio filter to coil at the coil. Connect cable to battery.

**3/4-TON 4 x 4 TRUCK (DODGE)****Section XXI****GENERATING SYSTEM**

|                           | Paragraph |
|---------------------------|-----------|
| General description ..... | 94        |
| Generator (6-volt) .....  | 95        |
| Generator (12-volt) ..... | 96        |
| Generator regulator ..... | 97        |

**94. GENERAL DESCRIPTION.**

a. **Types Used.** The vehicles covered by this manual are equipped with either a 6-volt or 12-volt generator. Six-volt generators can be identified by the red plate mounted on the generator. Twelve-volt



RA PD 312559

**Figure 102—Generating Circuit Diagram**

generators are equipped with a green plate. These plates show the model number, amperage, and voltage of the generator.

b. **Voltage Regulation.** The output of the generator is controlled in relation to the voltage requirements by the generator regulator, mounted on the engine side of the dash, keeping the battery fully charged and maintaining proper voltage under normal driving conditions. This means that the pointer of the ammeter mounted on the instrument panel of the vehicle may gradually approach zero, as the

## GENERATING SYSTEM

battery becomes fully charged. This indicates that the generator output has dropped to a small sustaining charge necessary for a fully charged battery to prevent overcharge. The regulator contains three units, each performing a distinct and independent function. The three units of the regulator are known as the circuit breaker, the voltage regulator and the current regulator.

c. **Generating Circuit.** The generating circuit for both 6-volt and 12-volt vehicles is illustrated in figure 102.

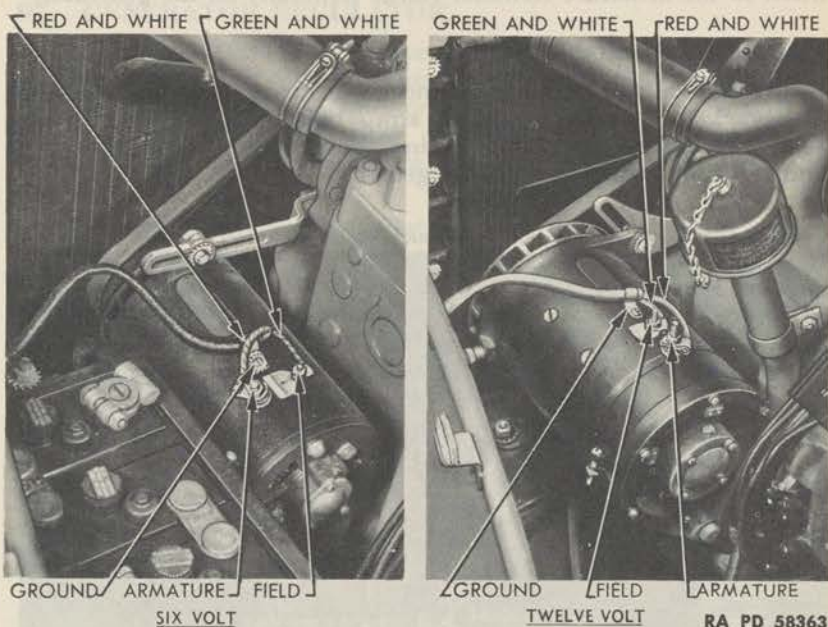


**Figure 103—Six-volt and Twelve-volt Generators**

### 95. GENERATOR (6-VOLT).

a. **Removal** (fig. 103). Disconnect wires from generator. Remove wire bracket. Remove adjusting strap cap screw. Push generator toward engine and remove belt. Remove two generator hinge bolts and lift out generator.

b. **Installation.** (fig. 103).

(1) **INSTALL GENERATOR HINGE BOLTS.** Place generator in mounting bracket and install hinge bolts with standard lock washers and nuts, but do not tighten securely. See that mounting brackets, hinge bolts, and nuts are clean and free of grease, paint or rust, so that a good ground connection will be made at these points.

(2) **INSTALL FAN BELT AND CONNECT WIRES.** Install adjusting strap cap screw with plain washer and standard lock washer under

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

head of cap screw. Do not tighten. Put belt in pulley and swing generator out to adjust belt (par. 82). When belt is adjusted tighten cap screw in strap and securely tighten nuts on hinge bolts. Connect wires to generator as shown in figure 103. Attach wire bracket to generator, placing one toothed lock washer under bracket and another toothed lock washer on top of bracket.

(3) **POLARIZE GENERATOR.** After installing the generator and before the engine is started, polarize the generator with the battery by momentarily connecting a jumper wire from the starting motor switch to the armature terminal (large terminal) on the generator.

**96. GENERATOR (12-VOLT).**

a. **Removal** (fig. 103). Disconnect wires from generator. Remove wire bracket. Remove adjusting strap bolt and loosen two hinge bolts. Push generator toward engine and remove belt. Remove two generator hinge bolts, and lift out generator.

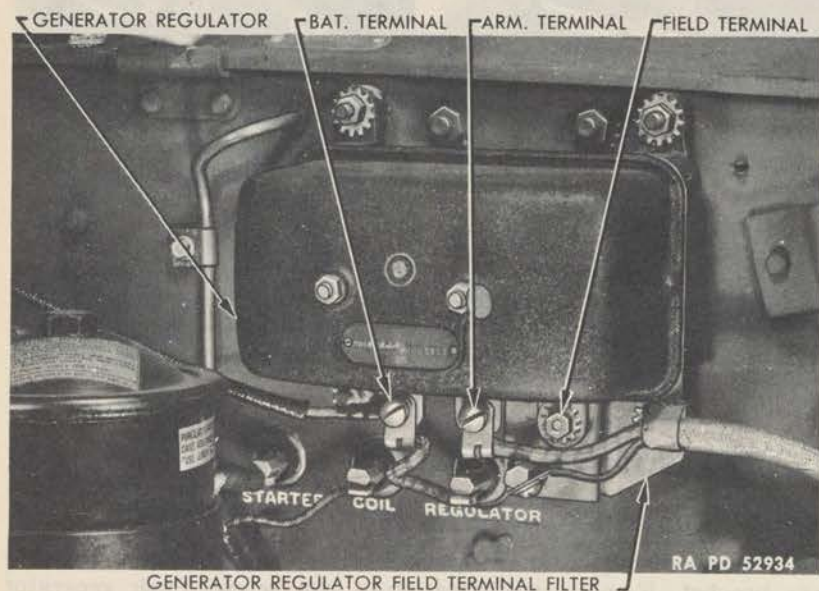


**Figure 104—Generator Regulator**

b. **Installation** (fig. 103).

(1) **INSTALL GENERATOR HINGE BOLTS.** Place generator in mounting bracket and install hinge bolts (from front). Insert front hinge bolt through support strap as well as bracket, install standard lock washers and nuts but do not tighten securely. See that mounting brackets, hinge bolts and nuts are clean and free of grease, rust or paint so that a good ground connection will be made at these points.

## GENERATING SYSTEM

(2) **INSTALL FAN BELT AND CONNECT WIRES.** Install adjusting strap bolt and nut with one toothed lock washer under head of bolt and another toothed lock washer under nut. Do not tighten. Put belt in pulley and swing generator out to adjust belt (par. 82). When belt is adjusted, tighten bolt in strap. Securely tighten nuts on hinge bolts. Connect wires to generator as shown in figure 103, and attach wire bracket to generator, placing one toothed lock washer under bracket and another toothed lock washer on top of bracket.

(3) **POLARIZE GENERATOR** (par. 95 b (3)).

### 97. GENERATOR REGULATOR.

a. **Removal** (fig. 104). Disconnect cable from battery to avoid damage from short circuit. Disconnect wires and wire shielding bracket from regulator. Identify or tag four wires as they are removed to simplify installing in proper place. Remove attaching nuts and lock washers from four mounting studs and remove regulator from dash.

b. **Installation** (fig. 104). Place one toothed lock washer on each of the four mounting studs and push washers against dash. Install regulator assembly on mounting studs. Then place another toothed lock washer on each stud, install attaching nuts and tighten. Place attaching screw through wire shielding bracket, with a toothed lock washer above and below bracket. Attach bracket to regulator body and tighten screw. Connect four wires in proper places (fig. 104) with lock washers under heads of terminal screws. Connect cable to battery.

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

Section XXII

IGNITION SYSTEM

|                          | Paragraph |
|--------------------------|-----------|
| General description      | 98        |
| Ignition timing          | 99        |
| Spark plugs and cables   | 100       |
| Distributor              | 101       |
| Ignition coil and switch | 102       |

98. GENERAL DESCRIPTION.

a. The ignition system contains the battery, distributor, ignition coil, spark plugs and necessary high- and low-tension wires, to com-

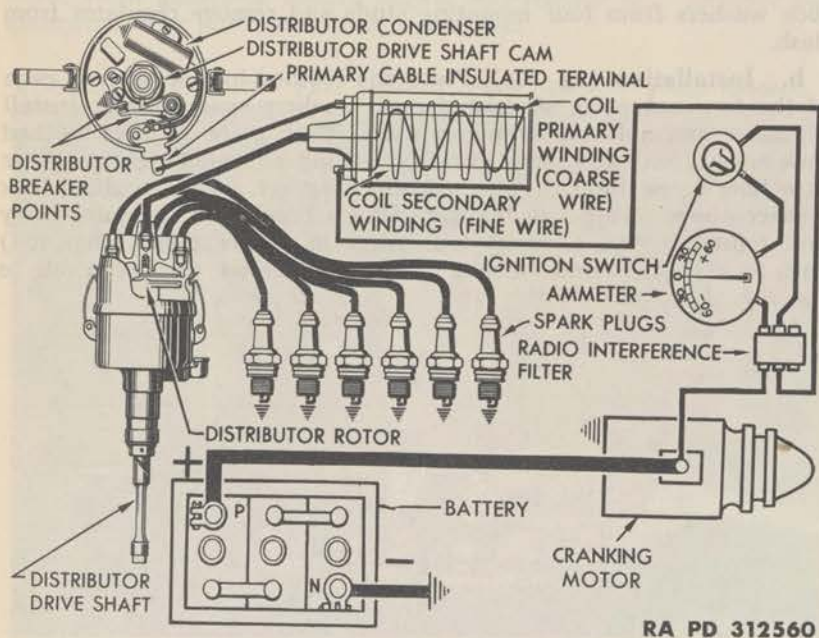


Figure 105—Ignition Circuit Diagram

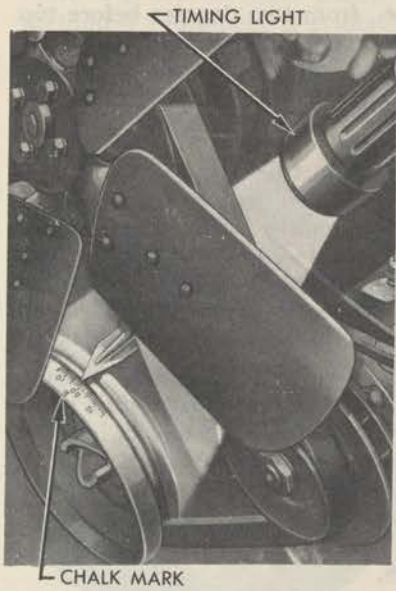
plete the circuit for these units of the ignition system. The complete ignition circuit (fig. 105) consists of two separate circuits; the primary circuit and the secondary circuit. Briefly, these circuits function as follows:

(1) With the ignition switch turned on and the distributor breaker points closed, current flows through the primary winding of the ignition coil and builds up a strong magnetic field in the coil. When the breaker points open, the primary circuit is broken, collapsing the magnetic field and inducing a high voltage in the secondary

## IGNITION SYSTEM

winding of the coil. This induced high voltage is distributed to the spark plugs by the distributor cap and rotor and the high-tension wiring between the distributor cap and spark plugs.

(2) To prevent arcing across the distributor breaker points as they open, a condenser is connected in parallel with the points. The purpose of the condenser is to provide a place for the primary current to flow until the points have separated far enough to prevent an arc across the points. The condenser brings the flow of current through the primary circuit to a quick stop. The quick stop of the current flow collapses the magnetic field and induces the high voltage necessary to provide a spark at the spark plug.



RA PD 52937

**Figure 106—Checking Ignition Timing**



RA PD 52938

**Figure 107—Ignition Timing Adjustments**

### b. Data.

Spark plugs:

|                               |                    |
|-------------------------------|--------------------|
| Size                          | 14 mm              |
| Type                          | Auto-Lite A7 or A5 |
| Gap                           | 0.025 in.          |
| Distributor breaker point gap | 0.020 in.          |

## 99. IGNITION TIMING.

### a. Timing Specifications.

(1) In low altitudes, gasoline of 70 octane rating will give best engine performance with timing set at two degrees after top dead

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

center. With this timing, there will be a trace of spark ping from 10 to 30 miles per hour when accelerating with wide-open throttle.

(2) When using lower grade fuels, or after carbon has accumulated, spark ping may be excessive with the engine timed at two degrees after top dead center. In such cases, retard the timing not to exceed six degrees after top dead center.

(3) In high altitudes there is less tendency for spark ping, and the same thing is true in low altitudes when using fuel with a higher octane rating than 70. In such cases, improved performance may be obtained by advancing the spark not to exceed two degrees before top dead center.

(4) Within the foregoing limits, i.e., from two degrees before top dead center to six degrees after top dead center, a good rule to follow is to set the ignition timing at a point where a slight ping is audible when accelerating from 10 miles per hour with wide-open throttle.

#### **b. Checking Timing with Timing Light.**

(1) **CONNECT TIMING LIGHT** (fig. 106). Connect one lead from the timing light to a spark plug and the other lead to a convenient ground. Place a chalk mark on crankshaft pulley at two degrees after top dead center and run engine at idling speed. Point light at the chalk mark on the pulley. The neon light will flash when the chalk mark is opposite pointer over pulley, indicating position of piston when firing occurs.

(2) **ADJUST TIMING** (fig. 107). To advance or retard the timing, loosen the major adjustment lock screw and rotate distributor body until correct timing is obtained. To make a minor change in ignition timing, loosen the minor adjustment lock screw and rotate the distributor body slightly in the proper direction. Rotate distributor body clockwise to retard, and counterclockwise to advance ignition timing.

### **100. SPARK PLUGS AND CABLES.**

**a. Adjustment of Spark Plugs.** Adjust spark plug gaps to 0.025 inch with a round feeler gage. Make all adjustments on the side wire of the plug. If the center electrode is bent, the porcelain may crack, resulting in plug failure.

**b. Installation of Spark Plugs.** Use a new gasket and tighten spark plugs with a torque-indicating wrench to 26 to 32 foot-pounds.

**c. Removal of Spark Plug Cables.** Unscrew suppressor from spark plug end of cable. Raise terminal nipple and pull cable out of distributor cap. Then pull cable through cable tube and nipple.

**d. Installation of Spark Plug Cables.** Slide terminal nipple, small end first, over lower end of cable, attach terminal to lower end of cable, then push cable through cable tube. Screw spark plug suppressor on upper end of wire. Connect suppressors to spark plugs and cables to distributor cap in the order shown in figure 117. Slide terminal nipples down over connections at distributor cap.

## IGNITION SYSTEM

### 101. DISTRIBUTOR.

a. **Adjustment of Breaker Points** (fig. 108). Remove distributor cap and rotor and inspect points. If redressing is required, turn engine until points are closed. Open points with finger and place the contact point dresser between the points. Move the dresser back and forth until the points are clean and excessive roughness is removed. Turn the engine until distributor breaker point rubbing block is on a high point of distributor cam. Loosen the lock screw and turn adjusting screw until the gap between the breaker points is 0.020 inch. Tighten the lock screw and recheck the adjustment. Install distributor rotor and cap. Breaker points may be adjusted by the "cam angle" method if equipment is available. The cam angle is 38 degrees.

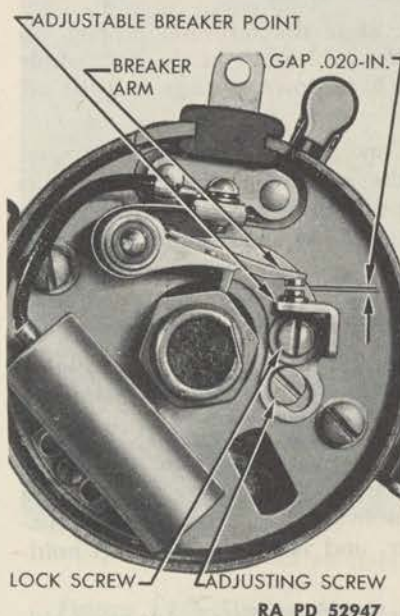


**Figure 108—Distributor Breaker Point Adjustment**

**Figure 109—Distributor With Cap and Rotor Removed**

b. **Removal of Breaker Points** (fig. 109). Remove the distributor cap and rotor. Remove the screw and clip which hold the condenser lead wire and breaker arm spring to the distributor plate and lift the breaker arm off its pivotal post. Remove the breaker point lock screw and lift off the breaker point plate.

c. **Installation of Breaker Points** (fig. 108).

(1) **INSTALL BREAKER POINTS.** Place the breaker point plate over the adjusting screw and install lock screw. Place breaker arm over pivotal post and install screw which holds breaker arm spring and

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

condenser lead wire to distributor plate. Put one drop of engine oil on pivotal post.

(2) **ADJUST BREAKER POINTS** (subpar. a above).

(3) **ADJUST BREAKER ARM SPRING TENSION.** Turn the engine until the breaker points are closed. Hook a spring scale to the point end of the breaker arm and hold the scale at right angle to the point surfaces. Pull the breaker points open with the scale. Adjust by loosening the screw holding the end of the breaker point spring and slide the end of the spring in or out of the clip so that 18 to 20 ounce pull will be required to open the breaker points. When spring tension has been properly adjusted, tighten screw securely and install distributor rotor and cap.

(4) **ADJUST IGNITION TIMING** (par. 99).

**d. Removal of Distributor Cap.** Slide the terminal nipples up the spark plug and coil cables. Pull the cables out of the distributor cap. Unlatch the two distributor cap hold-down springs and lift off the distributor cap.

**e. Installation of Distributor Cap.** Place distributor cap on distributor body making sure that the section of the cap which is not bored out like the rest of the opening, registers with the notch in the top of the distributor body. Latch the two distributor cap hold-down springs. Place the terminal nipples on each cable and connect the spark plug cables. Connect the cable from the coil to center of distributor and move the terminal nipple down over connection.

**f. Removal of Distributor Rotor.** Unlatch the two distributor cap hold-down springs and lift distributor cap and cable assembly off distributor. Lift rotor straight off distributor drive shaft.

**g. Installation of Distributor Rotor.** Place rotor over distributor drive shaft with flat in bore of rotor registering with flat on distributor drive shaft and push rotor into place. Place cap on distributor body so that notches register, and latch the two cap hold-down springs.

**h. Removal of Condenser.** Unlatch the two distributor cap hold-down springs and lift off distributor cap and cable assembly. Lift rotor straight off distributor shaft. Disconnect condenser lead wire and remove screw which holds condenser to distributor plate.

**i. Installation of Condenser.** Install condenser mounting screw and connect lead wire to distributor plate. Adjust distributor breaker arm spring tension (subpar. c (3) above). Install distributor cap and cable assembly.

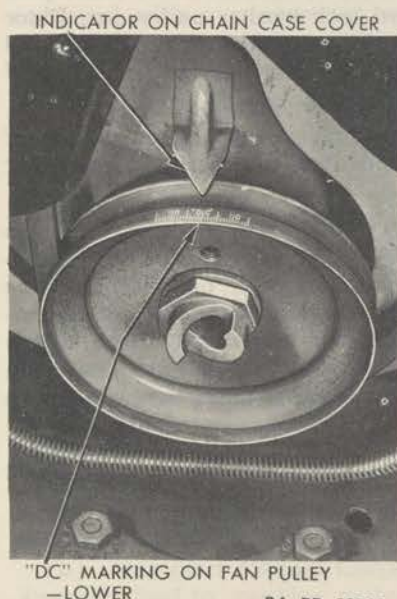
**j. Removal of Distributor Assembly.** Slide terminal nipples up spark plug to coil cables, and pull cables out of distributor cap. Disconnect wire which runs from coil to distributor filter at the filter. Remove distributor lock plate hold-down cap screw and lift distributor out.

## IGNITION SYSTEM

### k. Installation Procedure.

(1) **SET CRANKSHAFT IN PROPER POSITION** (fig. 110). Crank engine by hand and check for compression on number one cylinder. Hold thumb over spark plug hole while cranking or use compression gage. When compression is indicated, turn crank until "DC" mark on fan drive pulley registers with the pointer on the chain case. Number one piston will then be at the top of its firing stroke.

(2) **INSTALL DISTRIBUTOR** (fig. 111). Place distributor in position with lock plate over hold-down screw hole. Remove distributor cap and turn rotor until it points to about seven o'clock, then push distributor assembly down and move rotor back and forth slightly to



RA PD 52782

**Figure 110—Timing Mark Location**



RA PD 52778

**Figure 111—Installing Distributor**

allow tongue on distributor shaft to engage in slot of oil pump drive shaft. Install lock plate hold-down cap screw with a toothed lock washer under head of screw. Connect coil wire to distributor filter.

- (3) **INSTALL DISTRIBUTOR CAP AND CABLES** (subpar. e above).
- (4) **ADJUST IGNITION TIMING** (par. 99).

## 102. IGNITION COIL AND SWITCH.

a. **Removal of Coil.** Disconnect, at the coil, wires which run from filters at the dash and distributor. Disconnect the ground strap from upper end of coil. Pull cable out of lower end of coil. Remove two nuts which hold coil to mounting bracket studs.

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

**b. Installation of Coil.** The voltage capacity of coil is shown on the coil body. **CAUTION:** *Be sure capacity of coil is correct for electrical system of vehicle.*

(1) **MOUNT COIL ON BRACKET.** Place coil on mounting bracket studs and install the nuts with wire clip and standard lock washer under nut on the outer stud and standard lock washer under nut on the inner stud.

(2) **CONNECT WIRES AND GROUND STRAP.** Push cable which runs to center of distributor cap into lower end of coil. Connect ground strap to post at upper end of coil, placing toothed lock washer between coil and strap and another toothed lock washer between strap and nut. Connect wire which runs from filter at distributor to inner post at lower end of coil, placing standard lock washer under nut. Place wire which runs from filter on dash in clip at coil mounting stud and close the clip. Then connect that wire to outer post at lower end of coil, placing standard lock washer under nut.

**c. Removal of Switch.** Unscrew switch mounting nut on face of instrument panel using screwdriver as drift to loosen ring. Disconnect wire from switch.

**d. Installation of Switch.** Connect single wire from ammeter to left post of switch with standard lock washer under nut. Connect two wires, one which runs to radio interference filter on dash and one which runs to fuel gage, to right post of switch (nearest throttle control button), placing standard lock washer under nut. Place switch in instrument panel so that small lip on switch body enters notch in panel. Screw mounting nut onto switch body, using screwdriver as drift to tighten ring.

## Section XXIII

**RADIO INTERFERENCE SUPPRESSION**

Paragraph

Radio interference suppression ..... 103

**103. RADIO INTERFERENCE SUPPRESSION.**

**a. General.** When the engine of a vehicle is running, the electrical system of that vehicle is a source of radio interference; it is actually broadcasting radio waves in various frequencies and wave form that interfere with the radio receiving equipment in that vehicle as well as in nearby radio-equipped vehicles or signal apparatus. In order to reduce such interference, vehicles covered by this manual are equipped with a suppression system consisting of various types of suppression units incorporated throughout the vehicle. These units are described in the following steps:

(1) **RESISTOR-SUPPRESSORS** (fig. 112). The resistor-suppressor is a high resistant element designed to suppress ignition noise. It is mounted securely in an insulated housing having accessible electrical connections in both ends. Seven resistor-suppressors are installed in the ignition circuit. Six are installed on the spark plug wires (one at each plug) and one is installed in the high tension wire (center terminal) two inches from the distributor cap.

(2) **FILTERS AND CONDENSERS** (fig. 112). The purpose of the filters and condensers is to decrease interferences set up by the ignition and electrical systems. Three filters are mounted in a metal housing, located on the left side of the dash above the clutch and brake pedals. The housing is mounted with cadmium plated bolts and nuts and toothed lock washers in direct contact with the metal of the dash. These three filters are connected in the circuit as follows:

(a) One filter (Signal Corps Type FL-12 or 19) is located in generator regulator battery B terminal lead to ammeter.

(b) One filter (Signal Corps Type FL-12 or 19) is located in the ammeter lead to cranking motor terminal.

(c) One filter (Signal Corps Type FL-14 or 19) is located in the ignition switch to coil primary circuit.

Additional filters are located as follows:

(d) One filter (Signal Corps Type FL-13) is connected in the generator field lead to regulator at the regulator.

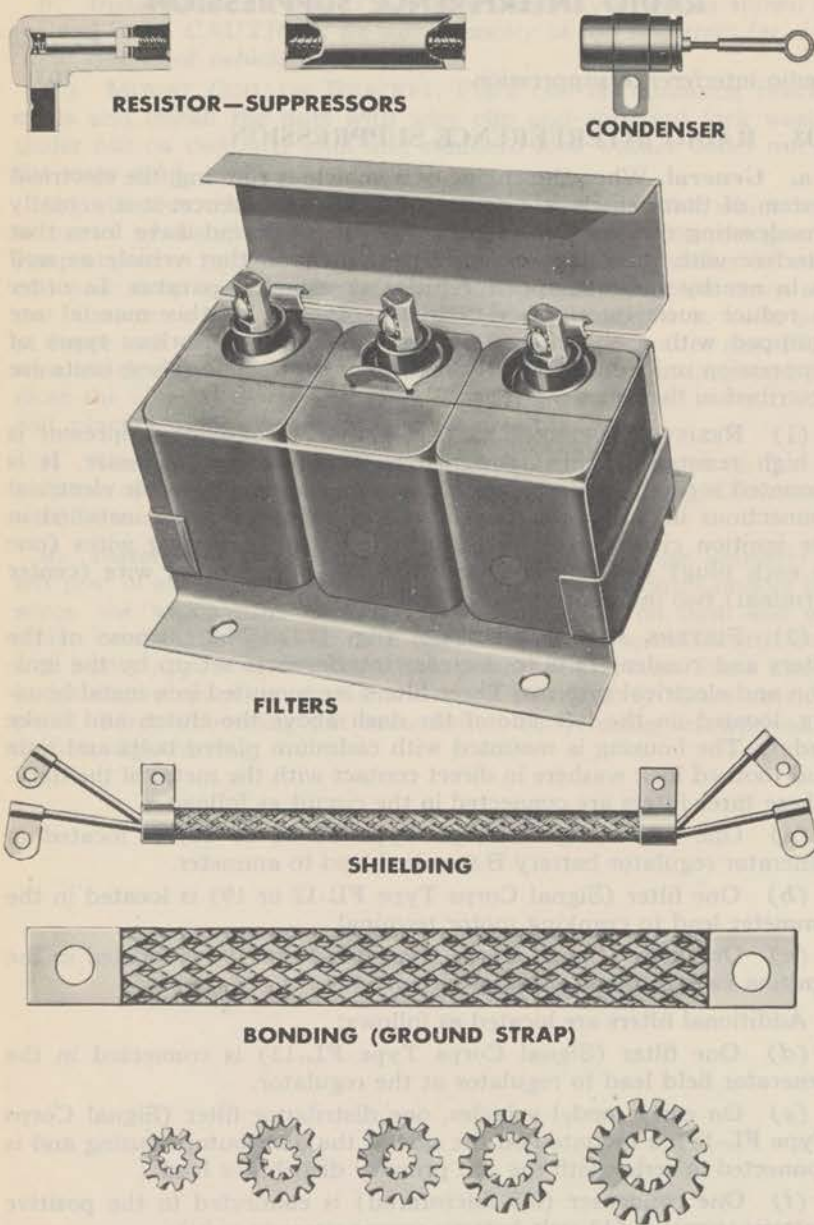
(e) On early model vehicles, one distributor filter (Signal Corps Type FL-15) is mounted on the side of the distributor housing and is connected in series with the coil primary distributor lead.

(f) One condenser (0.5 microfarad) is connected to the positive battery terminal (12-volt battery-reconnaissance only).

(g) One condenser (0.5 microfarad) is connected from the cranking motor frame to the switch terminal.

(h) One condenser (0.5 microfarad) is connected in the radio terminal box (on Carryall only).

$\frac{3}{4}$ -TON 4 x 4 TRUCK (DODGE)



RA PD 312569

Figure 112—Radio Interference Suppression Components

# RADIO INTERFERENCE SUPPRESSION

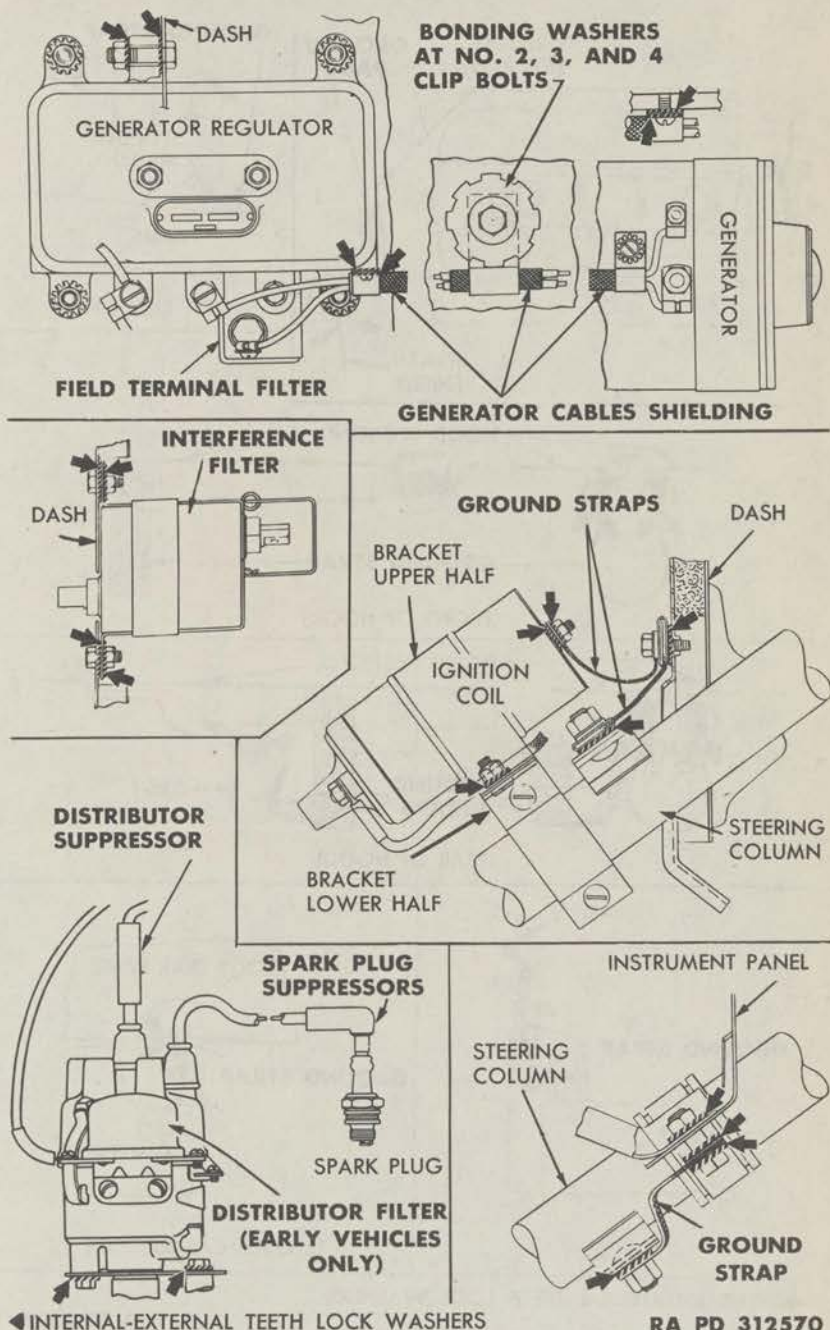
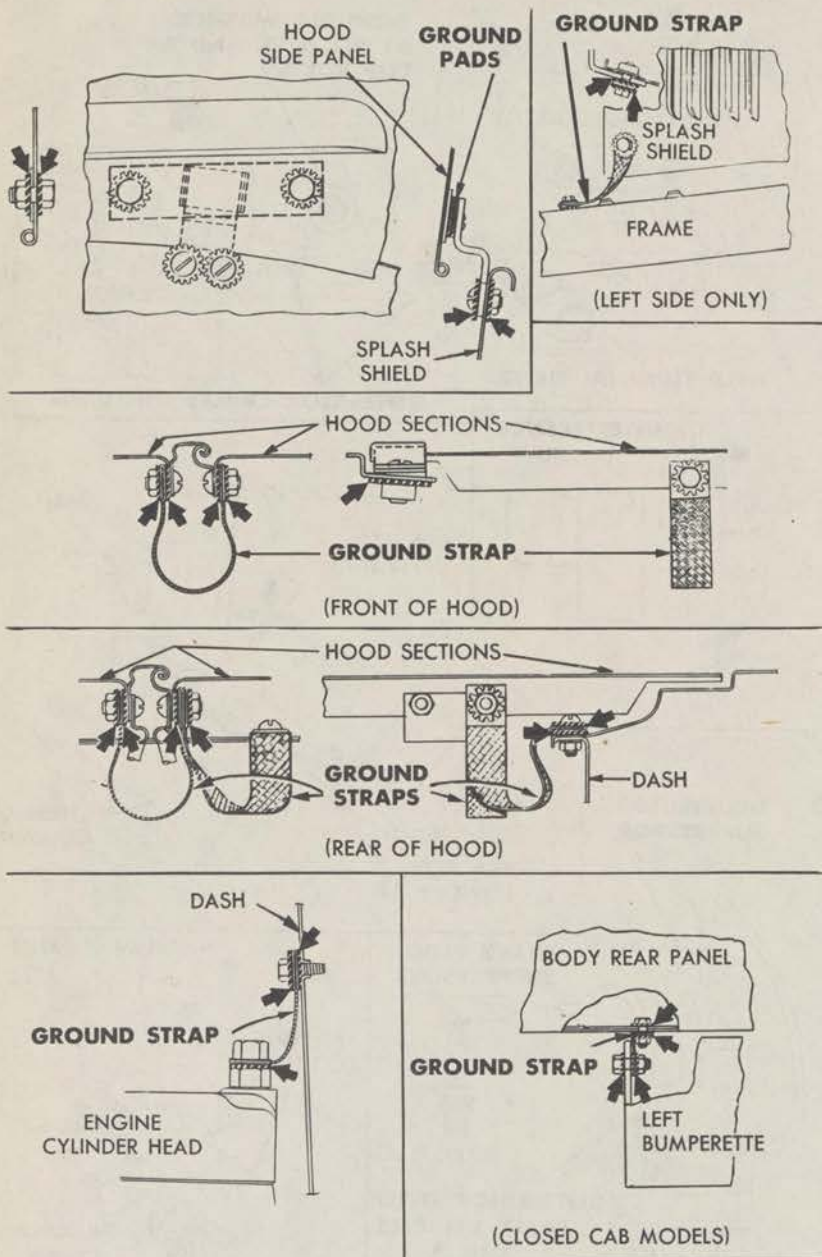


Figure 113—Location of Radio Interference Suppression Bonds

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



◀ INTERNAL-EXTERNAL TEETH LOCK WASHERS

RA PD 312571

**Figure 114—Location of Radio Interference Suppression Bonds**

# RADIO INTERFERENCE SUPPRESSION

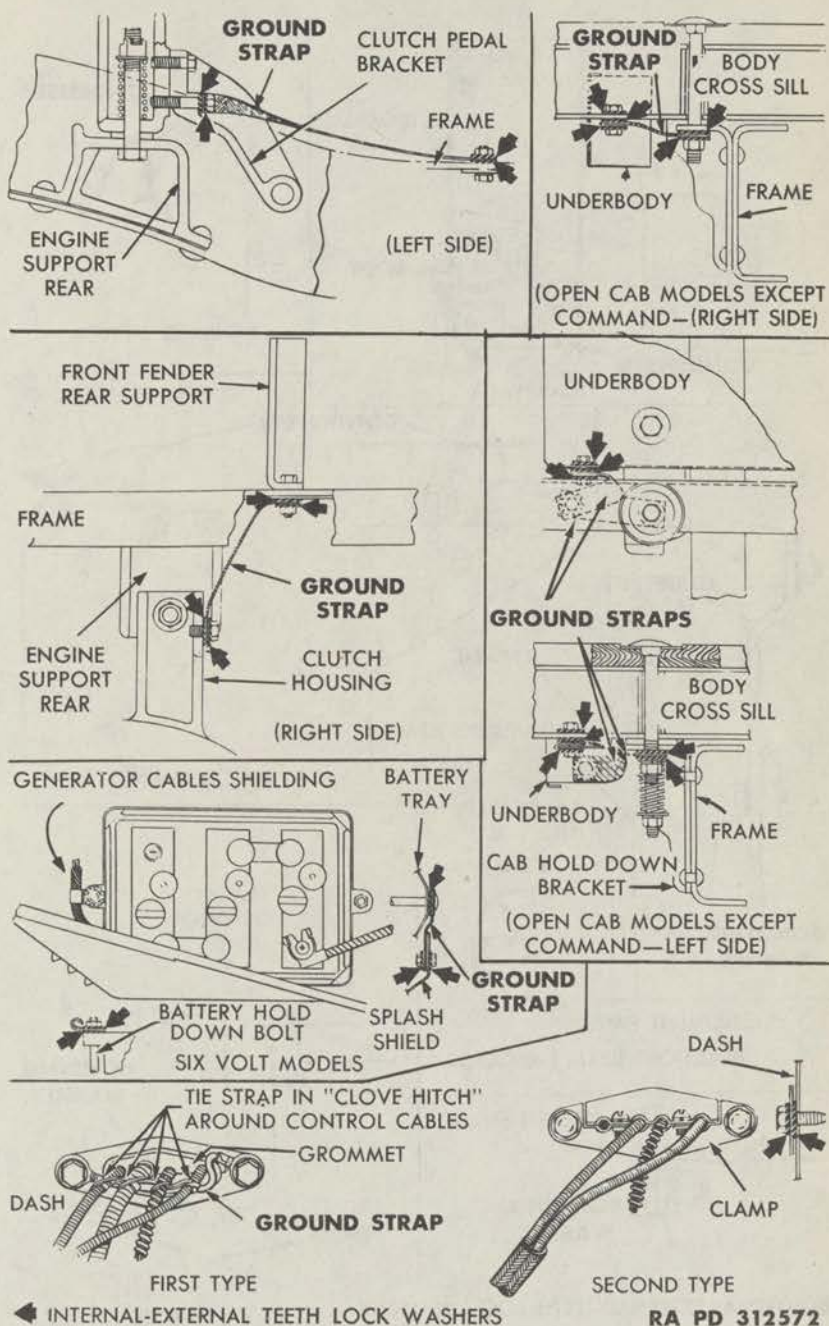


Figure 115—Location of Radio Interference Suppression Bonds

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

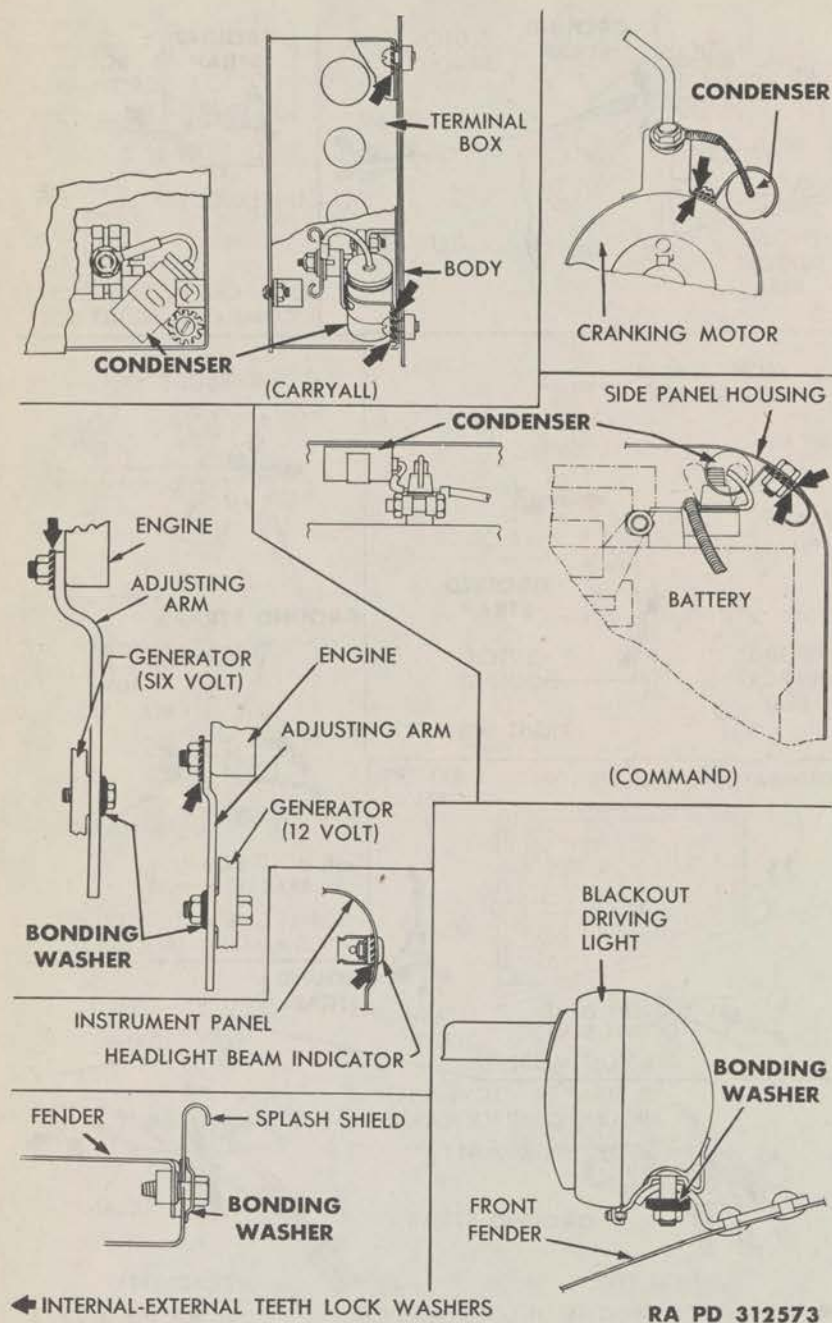
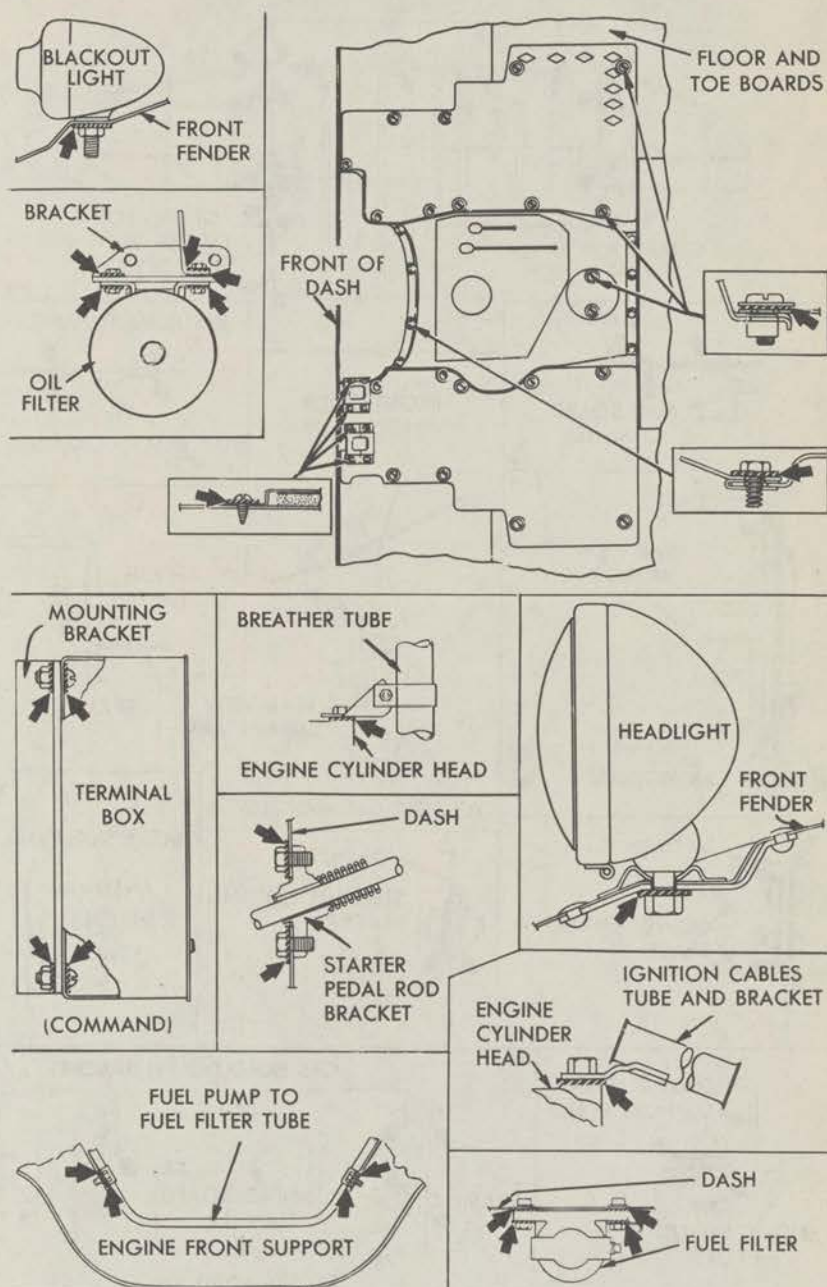


Figure 116—Location of Radio Interference Suppression Bonds

# RADIO INTERFERENCE SUPPRESSION

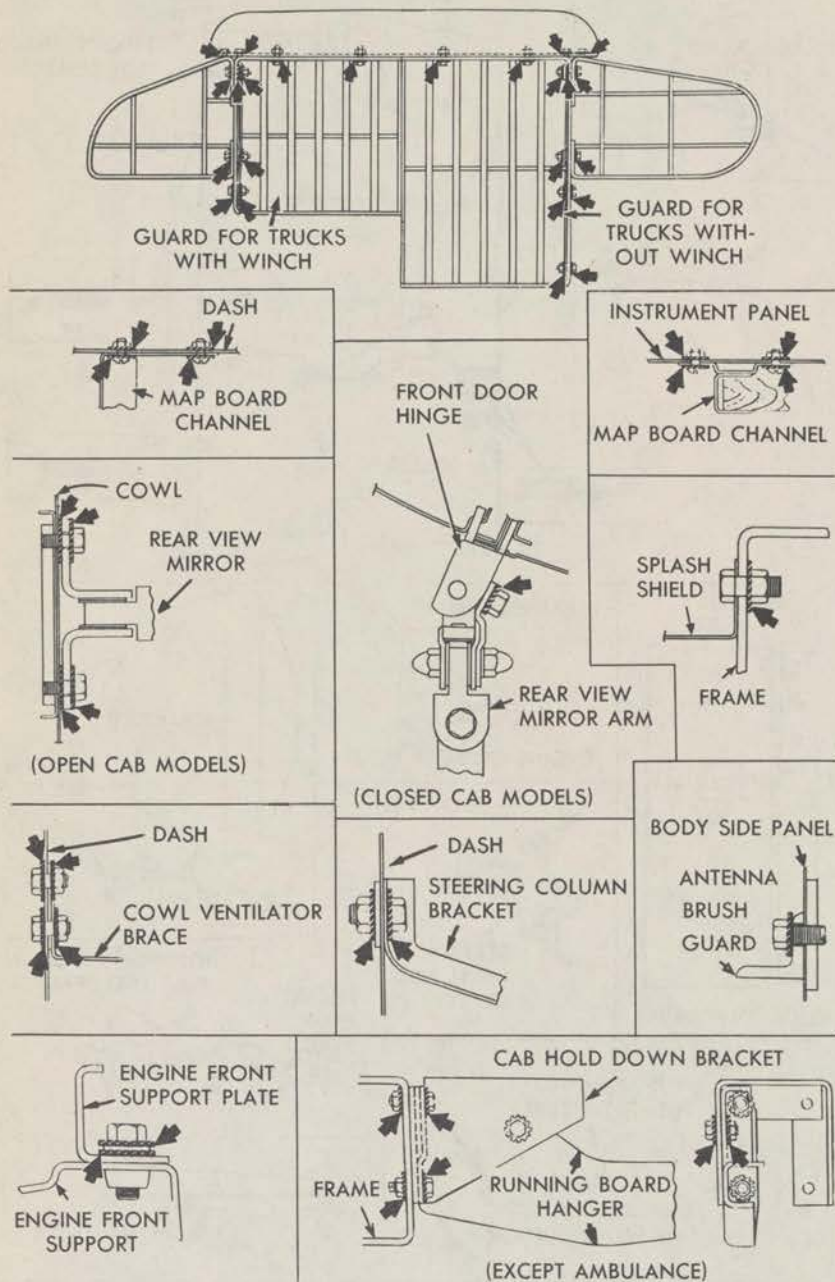


◀ INTERNAL-EXTERNAL TEETH LOCK WASHERS

RA PD 312574

Figure 117—Location of Radio Interference Suppression Bonds

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



◀ INTERNAL-EXTERNAL TEETH LOCK WASHERS

RA PD 312575

Figure 118—Location of Radio Interference Suppression Bonds

# RADIO INTERFERENCE SUPPRESSION

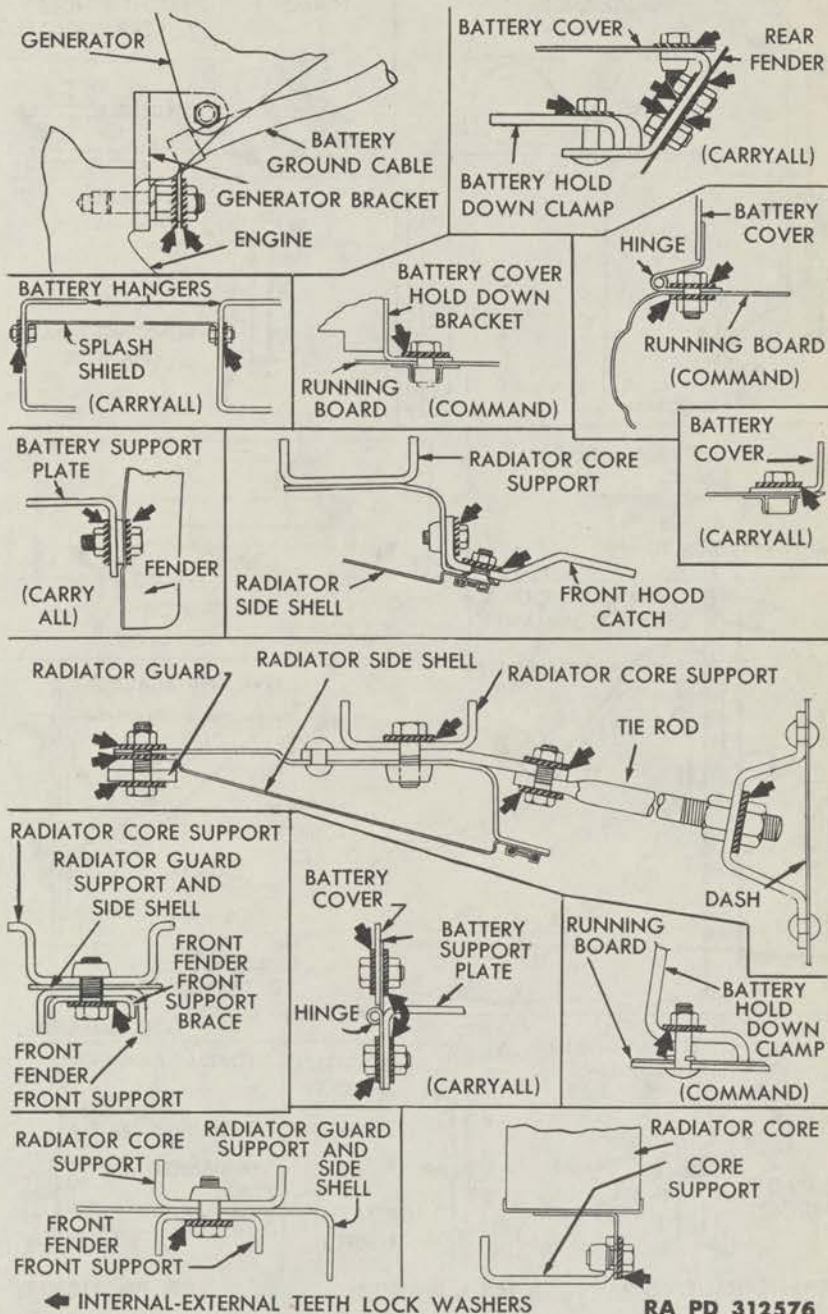


Figure 119—Location of Radio Interference Suppression Bonds

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

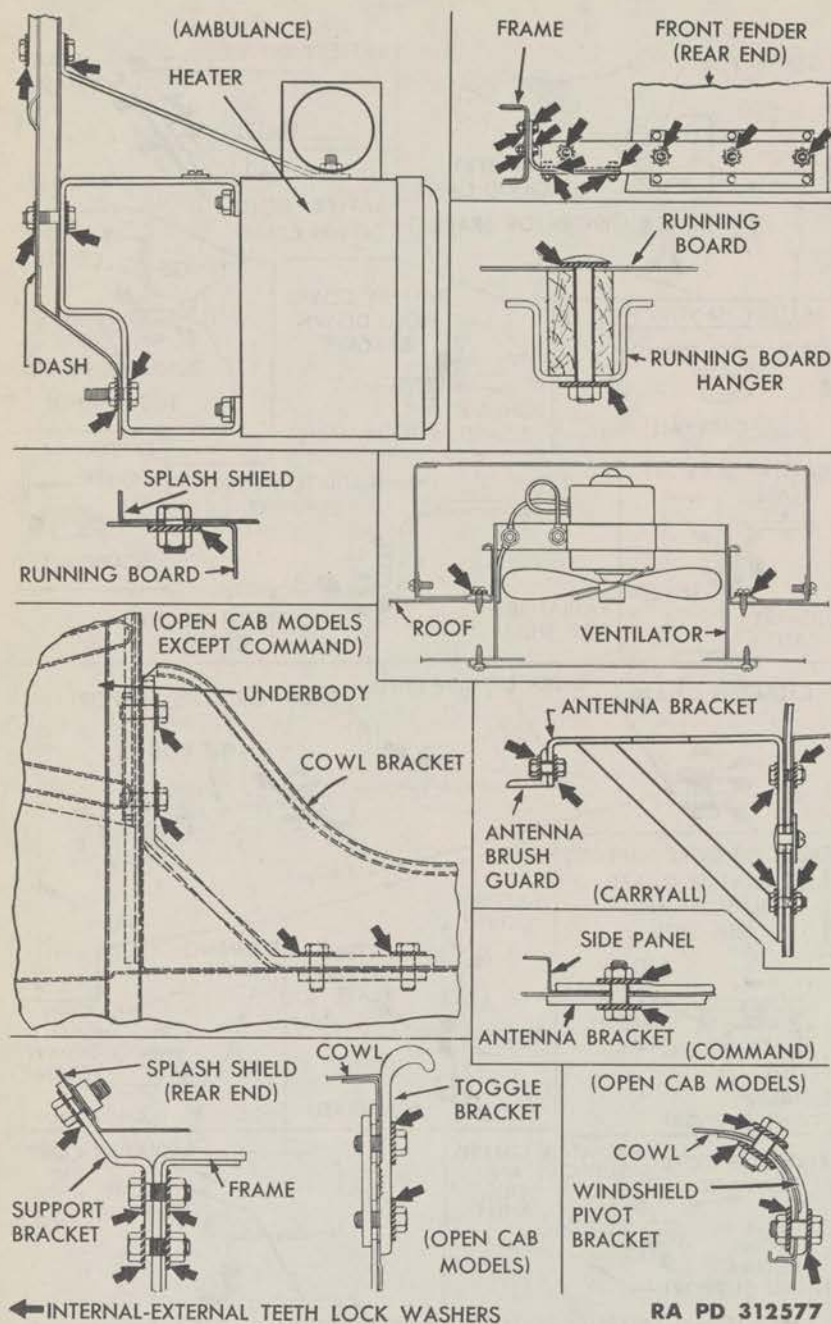


Figure 120—Location of Radio Interference Suppression Bonds

### RADIO INTERFERENCE SUPPRESSION

(3) **SHIELDING** (fig. 112). Shielding is accomplished by encasing wires of the electrical system in a metal braid and grounding the braid at both ends to keep the wires and braid from radiating interference.

(4) **BONDING** (fig. 112). Bonding is an electrical contact of extremely low resistance, between two or more metal parts. Various points of the vehicle are bonded by means of tinned copper braid ground straps. These straps are fastened to their respective points by cadmium plated bolts and nuts or screws and toothed lock washers. Fenders, shields and other sheet metal parts are fastened together by means of cadmium plated fastening bolts and toothed lock washers; these lock washers when drawn up tight "bite" into the metal surfaces which they contact and form a good ground.

**b. Servicing and Replacing Bonded Parts** (figs. 113 through 120). Before replacing bonded parts, clean off all paint and dirt from the mounting surfaces, tops and bottoms of both ends of bonds and their placement position on the vehicle. Replace any broken or frayed bonds. Exercise special care when replacing bonded parts to be sure they are installed in exactly the same manner as they were assembled before removal. Install toothed lock washers in their original sequence and draw up mounting bolts very tight to form a good ground. All important points of bonding are illustrated in figures 113 through 120.

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

**Section XXIV**

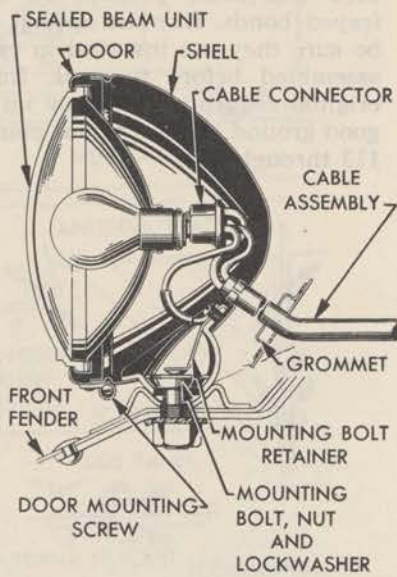
**LIGHTING SYSTEM**

|                                           | Paragraph |
|-------------------------------------------|-----------|
| General description .....                 | 104       |
| Headlights .....                          | 105       |
| Headlight beam indicator and switch ..... | 106       |
| Blackout parking lights .....             | 107       |
| Blackout driving light and switch .....   | 108       |
| Tail and stop lights .....                | 109       |
| Instrument lights and switch .....        | 110       |
| Dome lights .....                         | 111       |
| Spotlight (Ambulance) .....               | 112       |
| Main lighting and blackout switch .....   | 113       |



RA PD 52954

**Figure 121—Installing Right Headlight Sealed Beam Unit**



RA PD 52953

**Figure 122—Headlight Assembly**

**104. GENERAL DESCRIPTION.**

a. All lights, except the Ambulance dome light, operate through the main lighting and blackout switch (fig. 127). A circuit breaker mounted on the switch protects the lighting system against damage caused by short circuits. The circuit breaker automatically opens the circuit if any light wire becomes grounded.

## LIGHTING SYSTEM

**105. HEADLIGHTS.**

a. **Removal of Sealed Beam Lamp-unit** (fig. 121). Remove the headlight door. Lift out the sealed beam unit and pull the cable connector straight off. When removing the sealed beam unit in the right headlight, loosen the mounting bolt nut and turn the headlight away from the radiator to make the mounting screw in the door accessible.

b. **Installation of Sealed Beam Lamp-unit** (fig. 121). Hold the sealed beam lamp-unit with the word "TOP" (on the lens) up and push the cable connector over the prongs on the lamp-unit. Place the unit in the headlight shell so that the long lug on the unit registers with the notch at the right side of the body. Install the headlight door and the mounting screw at the bottom. If the sealed beam unit has been replaced in the right headlight, turn it back into position, aim the light (subpar. e below) and tighten mounting bolt nuts.

c. **Removal and Disassembly of Headlight** (fig. 122).

(1) **REMOVE HEADLIGHT AND SEALED BEAM UNIT.** Remove nut from headlight mounting bolt and lift headlight off the fender. Remove the door. Pull the cable connector straight off the three prongs of the sealed beam unit.

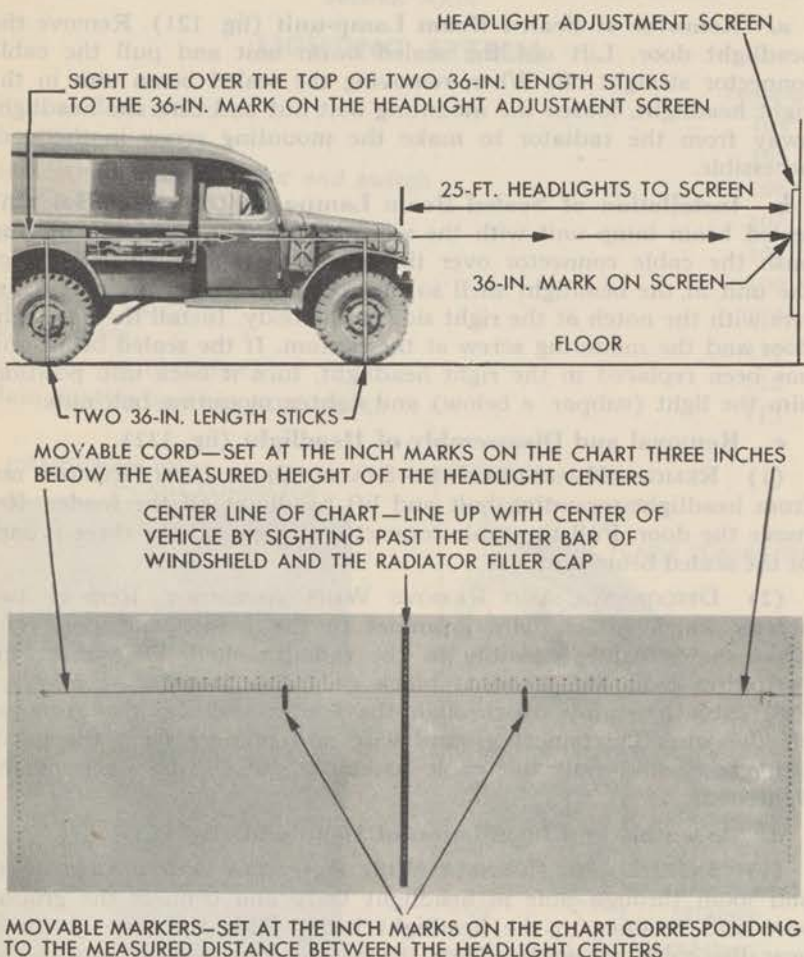
(2) **DISCONNECT AND REMOVE WIRE ASSEMBLY.** Remove two screws which attach wire grommet to the fender and open clip which holds cable assembly to the radiator shell. Disconnect the two wires from the terminal block on frame front cross member. Pull cable assembly up through the fender and slip the grommet off the wire. Disconnect ground wire and retainer from the headlight body and pull the cable assembly out of the back of the light body.

d. **Assembly and Installation of Headlight** (fig. 122).

(1) **INSTALL AND CONNECT WIRE ASSEMBLY.** Put the two wires and loom through hole in headlight body and connect the ground wire and retainer to the headlight body. Slide the wire grommet over the cable assembly. Then thread the wires down through the fender and clip on the radiator shell and connect each wire to the terminal block that carries the same color wire at the terminal block on the frame. Install a standard lock washer under each nut and tighten. Close wire clip and attach grommet to fender.

(2) **INSTALL SEALED BEAM UNIT AND HEADLIGHT.** Hold the sealed beam unit with the word "TOP" (on the lens) up and push the cable connector over the prongs on the unit. Place the unit in the headlight so that the long lug on the unit registers with the notch at the right side of the body. Install the headlight door and mounting screw at bottom of the door. Place headlight mounting bolt through plate and fender and install toothed lock washer and nut.

(3) **AIM HEADLIGHTS** (subpar. e below).

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

RA PD 312539

**Figure 123—Headlight Aiming****e. Headlight Aiming (fig. 123).**

(1) **PREPARE VEHICLE AND SCREEN FOR AIMING.** Inflate all tires on vehicle to 40 pounds pressure. Mount the headlight screen on a movable frame and draw the screen taut on the frame. Place the vehicle on the most level floor or surface available.

(2) **LOCATE AND CENTER SCREEN.** Hang or locate the screen at right angles to the vehicle exactly 25 feet ahead of the headlights. Move the screen so that the heavy vertical line on the screen is directly in line with center line of the vehicle. Sight past the center

## LIGHTING SYSTEM

bar of the windshield and the radiator filler cap to establish alinement.

(3) **LEVEL SCREEN.** Stand two sticks, 36 inches long, at the front and rear wheels on one side of the vehicle. Sight over the two sticks and adjust the screen vertically so that the 36-inch mark on the screen is on a line with the top of the two sticks. Repeat the operation on the other side of the vehicle.

(4) **LOCATE CORRECT HEADLIGHT POSITION ON SCREEN.** Measure the distance from the center of the headlights to the floor and hook the cord to both ends of the screen at the inch marks three inches below the measured height of the headlight centers. Do not measure height from floor to cord. Measure the distance between the headlight centers and slide the two vertical markers on the horizontal cord to the inch marks on the screen corresponding to the measured distance between the headlight centers.

(5) **AIM HEADLIGHTS.** Loosen headlight mounting bolt nut and turn on the headlight bright beam. Cover one light and aim the other so that the center of zone of highest intensity falls on the screen at the intersection of the horizontal cord and the vertical marker directly in front of the light. Tighten the headlight mounting bolt nut securely and aim the other light in the same manner.

### 106. HEADLIGHT BEAM INDICATOR AND SWITCH.

a. **Replacement of Lamp.** Pull the socket and lamp forward and off the body. Turn lamp counterclockwise and pull it from socket. To install, push lamp into the socket and turn in clockwise. Push the socket into the body.

b. **Removal of Headlight Beam Indicator Assembly.** Remove lamp (subpar. a above). Push the socket up the wire and pull the small tip off the wire. Then slide fiber insulator, spring and socket off the wire. Unscrew the body from light outlet in instrument panel.

c. **Installation of Headlight Beam Indicator Assembly.** Insert light outlet through instrument panel. Install tapered washer over light outlet with the thin side up. Screw the light body into place. Slide socket, spring, and fiber insulator, over the end of the wire. Round up the wire tip so the wire will enter the tip. Place tip on end of wire, pinch the tip to the wire and solder the tip to the wire. Install socket and lamp (subpar. a above).

d. **Replacement of Headlight Beam Control Switch.** Raise left upper corner of floor mat and remove the two screws which hold the switch to the toeboard. Pull the switch down through toeboard and disconnect the wires. To install, hold the switch in the position it will be installed, with the wire terminals away from the center of the vehicle. Connect the single black wire to the rear terminal of the switch, the red wire and brown wire to center terminal, and the

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

other two wires to the front terminal. Insert switch button up through toeboard and install the two mounting screws in the toeboard with a toothed lock washer under the head of each screw.

**107. BLACKOUT PARKING LIGHTS.**

a. **Replacement of Lamp.** Loosen nut on mounting stud and turn front of light away from radiator guard. Remove light door. Remove lamp and install a new lamp, hang door in place, and install mounting screw at bottom of the door. Turn light so that it faces directly forward and tighten the mounting stud nut.

b. **Removal of Parking Light Assembly.** Slide rubber insulator along wire and disconnect wire at connector near terminal block on frame front cross member. Open wire clip on radiator shell and pull wire and loom out under light. Screw the loom off the light mounting bolt, then slide it off the wire. Remove nut from light mounting stud and lift light off fender.

c. **Installation of Parking Light Assembly.** Insert mounting stud through fender and install toothed lock washer and nut. Slide loom over wire and screw end of loom over mounting stud. Thread wire and loom over fender bracket and through clip on radiator shell and close the clip. Push wire terminal into connector and slide the rubber insulator over the connector.

**108. BLACKOUT DRIVING LIGHT AND SWITCH.**

a. **Removal of Sealed Beam Unit** (fig. 124). Remove screw at bottom of door and lift off door. Disconnect cable from center of sealed beam unit and release three wire clips which hold the retaining ring and sealed beam unit to door.

b. **Installation of Sealed Beam Unit** (fig. 124). Place sealed beam unit, then retaining ring in door, and spring the three retaining ring clips into place. Connect cable to the sealed beam unit, hang the door in place, and install the mounting screw at bottom of the door.

c. **Removal of Blackout Driving Light Switch.** Loosen set screw in switch button and unscrew knob from switch shaft. Remove nut which holds switch to instrument panel. Disconnect wires from switch.

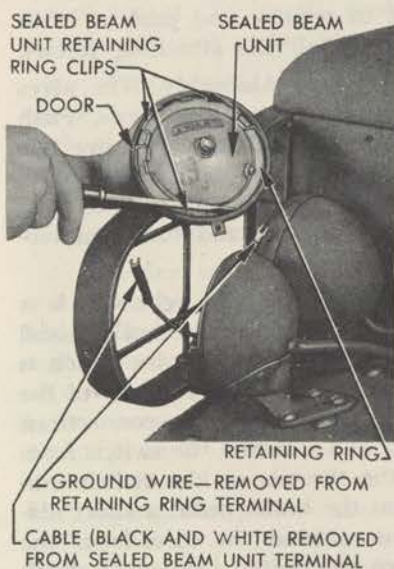
d. **Installation of Blackout Driving Light Switch.** Connect wires to switch. Put switch shaft through instrument panel and install toothed lock washer and nut which holds switch to panel. Screw switch knob onto switch shaft and tighten set screw.

e. **Removal of Blackout Driving Light Assembly** (fig. 125). Remove mounting screw at bottom of door and lift out the door and sealed beam unit. Then disconnect cable from the center of the

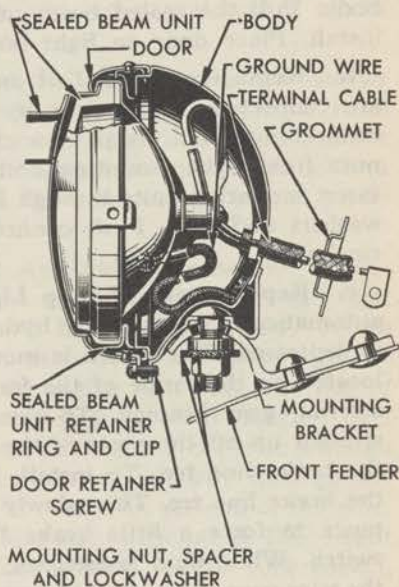
## LIGHTING SYSTEM

sealed beam unit. Close the clip on the end of wire loom to allow the cable to be pulled out of the light. Remove the nut from the light mounting bolt and lift the body off the fender.

f. **Installation of Blackout Driving Light Assembly** (fig. 125). Insert light mounting bolt through fender and install a lock washer and nut on mounting bolt. Push loom end of cable through hole in rear of light body and spread clip so that the loom cannot slide out of light. Connect the cable to center of sealed beam unit, hang the door in place, and install mounting screw at bottom of the door. Aim lamp (subpar. g below).



RA PD 52960



RA PD 52959

**Figure 124—Installing Blackout Driving Light Sealed Beam Unit**

**Figure 125—Blackout Driving Light**

**g. Aiming of Blackout Driving Light.**

- (1) PREPARE VEHICLE AND SCREEN FOR AIMING (par. 105 e (1)).
- (2) LOCATE AND CENTER SCREEN (par. 105 e (2)).
- (3) LEVEL SCREEN (par. 105 e (3)).
- (4) LOCATE CORRECT LIGHT POSITION ON SCREEN. Measure the distance from the top of the opening in the light to the floor. Hook the cord to the screen at the inch marks five inches below measured height of the light. Do not measure height of the cord from floor. Measure the distance from the center of the light to the center of the vehicle. Measure the same distance to the left of the heavy

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

vertical center line on the screen and slide one of the vertical markers along the horizontal cord to that point.

(5) **AIM BLACKOUT DRIVING LIGHT.** Loosen blackout driving light mounting bolt nut and turn on the light. Aim the light so that the center of zone of highest intensity falls on the screen at the intersection of the horizontal cord and the vertical marker. Tighten the light mounting bolt nut securely.

## **109. TAIL AND STOP LIGHTS.**

a. **Replacement of Sealed Beam Unit.** Remove two long mounting screws which hold light door in place and pull the door off the body. Pull the sealed beam unit out to remove and push it in to install. Place door on light body and install the attaching screws.

b. **Replacement of Tail and Stop Light Assembly.** The wires are connected to the light by two bayonet-type connectors. Push connector toward lamp, turn clockwise, then pull out. Remove two nuts from light mounting bolts and remove the light. To install, insert mounting bolts through light bracket and install toothed lock washers and nuts. Push connectors into sockets and turn counterclockwise.

c. **Replacement of Stop Light Switch.** The stop light switch is automatically operated by hydraulic pressure when the brake pedal is depressed. The switch is mounted on the brake line tee which is located on the inside of the frame side member just forward of the steering gear housing. To remove, pull the two wire connections straight up off the posts of the switch and unscrew the switch from the brake line tee. To install, start the threads on the switch into the brake line tee. Then slowly depress the brake pedal a short distance to force a little brake fluid out around the threads of the switch. While fluid is escaping, tighten the switch into place. Push the wire connectors straight down on posts of the switch.

## **110. INSTRUMENT LIGHTS AND SWITCH.**

a. **Replacement of Lamp.** Pull the assembly sharply to one side to release its mounting prongs from the instrument panel. Pull the socket from the light body. Then turn the lamp counterclockwise and pull it from the socket. To install, push the lamp into the socket and turn it clockwise. Push the socket into the light body. Then push the assembly into the instrument panel with the slot straight down.

b. **Replacement of Instrument Light Switch.** Loosen set screw in switch knob and screw knob off switch shaft. Remove nut which holds switch to instrument panel. Then disconnect wires from switch. To install, connect wires to switch. Insert switch shaft through the instrument panel and install toothed lock washer and nut. Screw knob on switch shaft and tighten the set screw.

**LIGHTING SYSTEM**

c. **Replacement of Instrument Light Socket.** Remove lamp (subpar. a above). Slide the socket up the wire and pull small tip from end of wire. Then slide the fiber insulator, spring and socket off the wire. To install, slide the socket, spring and fiber insulator over the wire. Round up the wire tip so the wire will enter the tip. Place tip on end of wire and pinch tip to wire. Solder the tip to the wire. Install lamp (subpar. a above).

**111. DOME LIGHTS.**

a. **Replacement of Lamp.** Remove two screws which hold glass and bezel to the light body. Turn lamp counterclockwise and pull out of socket. To install, push lamp into socket and turn it clockwise. Install cork gasket, glass and bezel.

b. **Replacement of Dome Light Switch.** Remove two screws which hold switch to the instrument panel. Remove switch from back of instrument panel and disconnect wires. To install, connect wires to the switch. Hold the switch against instrument panel and install the two mounting screws with the toothed lock washer under the head of each screw.

c. **Replacement of Dome Light Assembly (Ambulance).** Remove the two screws which hold the glass and bezel to the light body. Then remove four screws which hold the light body to the roof. Remove lamp from socket and push body and socket up the wire. Then cut wire off close to fiber washer and pull wire out of light. To install, clear old wire out of hole in fiber washer. Peel about  $\frac{1}{8}$  inch insulation off the wire. Then insert the wire through the socket and spring. Stick the bare end of the wire through the fiber washer and place a small drop of solder on the end of the wire. Pull socket down over fiber washer and install the lamp. Place light body in place in roof and install four screws. Install cork gasket, glass and bezel on light body and install two screws.

d. **Replacement of Dome Light Assembly (Carryall).** Remove screws which hold glass and bezel to light body and pull bezel straight down off body. Then remove screws which hold body to roof. Disconnect wire from light socket. To install, connect wire to lamp socket. Install two screws which hold light body to roof, then install two screws which hold glass and bezel to light body.

**112. SPOTLIGHT (AMBULANCE).**

a. **Replacement of Lamp (fig. 126).** Remove the door, lens, bulb, and reflector, as a unit. Unhook the three springs which hold the reflector to the door and lift the reflector and lamp away from the door and lens. Then remove the lamp from the socket by turning it counterclockwise. To install, place the flange of the lamp over the three prongs of the socket and turn the lamp clockwise. Place the

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

lens and reflector with gasket into the door and connect the three retaining springs. Assemble the door, lens, lamp, and reflector, to the body as a unit and install the door.

**b. Removal of Spotlight Assembly.**

(1) **REMOVE CONTROL BODY AND GRIP.** Remove flat head screw directly over control grip and pull the grip down and out of control body. Then remove the small clamp which holds the wire to the shaft. Disconnect the wire from the main lighting and blackout switch. Remove the terminal from the wire and pull the wire through the instrument panel. Remove the nut and clamp bolt which holds the control body to the shaft and pull the control body off end of shaft.

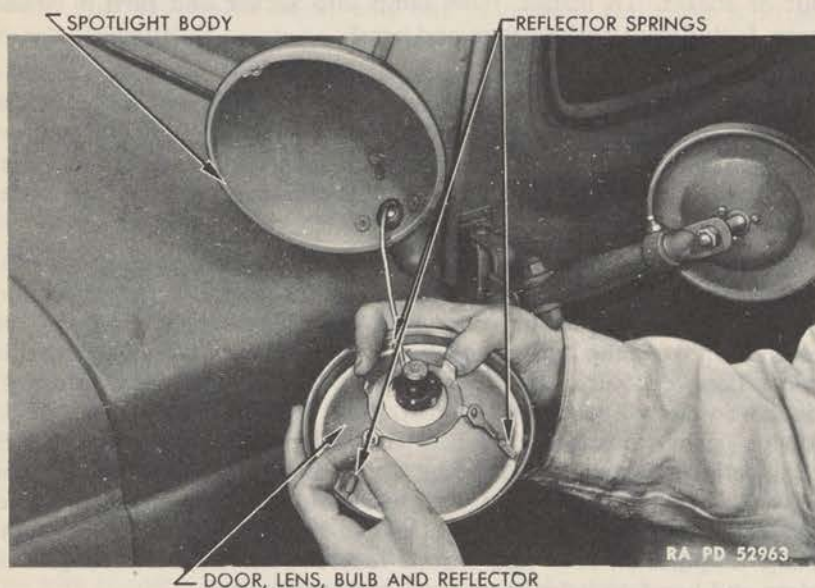


**Figure 126—Installing Spotlight Lamp (Ambulance)**

(2) **REMOVE SPOTLIGHT AND SHAFT.** Remove screw which holds bracket to instrument panel. Loosen clamp bolt and pull the bracket off end of shaft. Unscrew large nut from bracket at outside of body post and pull spotlight and shaft away from body.

**c. Installation of Spotlight Assembly.** If spotlight is assembled, remove control body and grip from shaft (subpar. **b** (1) above).

(1) **INSTALL SPOTLIGHT AND SHAFT.** Insert the shaft through the body post and screw large nut into bracket on body post. If there is misalignment, loosen the bracket from the body post. Slide inner bracket over the shaft and install screw in instrument panel and tighten the screws in the outer bracket if loosened. Then tighten the

## LIGHTING SYSTEM

clamp bolt in the inner bracket enough to hold the spotlight in any position but still let the shaft be turned by the control grip.

(2) **INSTALL CONTROL BODY AND GRIP.** Turn the face of the spotlight at right angle to the shaft so that the gear racks on the inner ends of the small control shafts are even at the ends. Slide the control grip body over the shafts and into place so that the clamp bolt will slide through the notch in the shaft. Push the control grip into the control body and between the gear racks on the small control shafts. Install tension spring and screw in top of the control grip. Install and tighten nut on clamp bolt in the control body.

(3) **CONNECT WIRE AND WIRE CLAMP.** Insert wire through instrument panel, install terminal on wire and connect wire to headlights and taillight post of the main lighting and blackout switch (HT, fig. 127). Install clamp which holds wire to spotlight shaft.

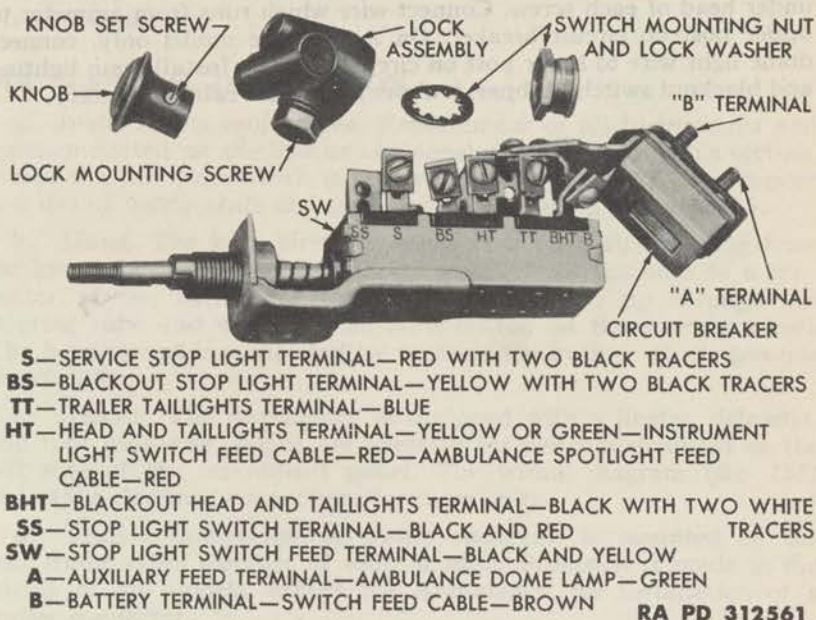


**Figure 127—Main Lighting and Blackout Switch Wire Connections**

### 113. MAIN LIGHTING AND BLACKOUT SWITCH.

a. **Removal of Switch Assembly.** Disconnect cable from battery to avoid damage from short circuit. Loosen set screw in switch knob and screw knob off switch shaft. Loosen mounting screw in lock assembly. Push lock assembly in to remove it. Unscrew mounting nut which holds switch to panel. Disconnect all wires from switch. Identify or tag wires as they are removed to insure proper assembly on terminals.

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

**b. Installation of Switch (fig. 127).** Connect wires to proper terminals. Insert switch shaft through instrument panel and install toothed lock washer and mounting nut that holds switch in place. Push lock assembly in and install it over switch shaft with the lock button to the left. Hold lock assembly against instrument panel and tighten mounting screw. Screw knob onto switch shaft and tighten set screw. Connect battery cable to battery.

**c. Removal of Circuit Breaker (fig. 127).** Disconnect cable from battery to avoid damage from short circuit. Remove main lighting and blackout switch (subpar. a above). Disconnect wire from circuit breaker. Then remove two screws which hold circuit breaker to switch body.

**d. Installation of Circuit Breaker (fig. 127).** Install two screws which hold circuit breaker to switch, placing standard lock washer under head of each screw. Connect wire which runs from ammeter to upper post on circuit breaker. On Ambulance model only, connect dome light wire to lower post on circuit breaker. Install main lighting and blackout switch (subpar. b above). Connect cable to battery.

## Section XXV

## INSTRUMENTS, GAGES, AND MISCELLANEOUS ELECTRICAL EQUIPMENT

|                                        | Paragraph |
|----------------------------------------|-----------|
| General description .....              | 114       |
| Ammeter .....                          | 115       |
| Voltmeter (Command and Carryall) ..... | 116       |
| Oil gage .....                         | 117       |
| Thermometer .....                      | 118       |
| Speedometer .....                      | 119       |
| Horn .....                             | 120       |
| Heater (Ambulance) .....               | 121       |
| Roof ventilator (Ambulance) .....      | 122       |
| Trailer connector .....                | 123       |

### 114. GENERAL DESCRIPTION.

a. **Instruments and Gages.** Replacement of all instruments and gages, mounted on the instrument panel, is described in this section, except the fuel gage which is covered in paragraph 72. The purpose and use of instruments and gages are explained in paragraph 5.

b. **Horn.** The horn circuit consists of a feed wire running from the generator regulator to the horn, a wire from the horn to a connector at the bottom of the steering gear, and up through the steering tube and worm to the horn button on the steering wheel. The horn circuit is completed by pressing the button, which grounds the circuit.

c. **Heater.** The Ambulance is equipped with a heater, defroster, and roof ventilator, which are operated by switches mounted on the left side of the instrument panel. The wiring diagram (fig. 137) shows the electrical connections for these units.

d. **Trailer Connector.** A trailer connector is mounted on the rear frame cross member of some models. Provision is made in the wiring of all models, except the Ambulance, for installation of a trailer connector.

### 115. AMMETER.

a. **Removal.** Disconnect cable from battery to avoid damage from short circuit. Disconnect wires from back of ammeter. Remove two nuts which hold mounting bracket against rear of instrument panel, and remove ammeter.

#### b. Installation.

(1) **INSTALL AMMETER.** Place ammeter in instrument panel from driver's side, and install the mounting bracket and round fiber disk over the two wire posts with the legs of the bracket against the instrument panel. Install a nut on each post and tighten.

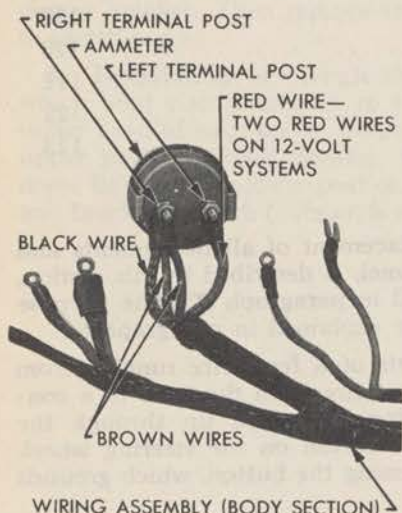
### 3/4-TON 4 x 4 TRUCK (DODGE)

(2) CONNECT WIRES TO AMMETER (fig. 128).

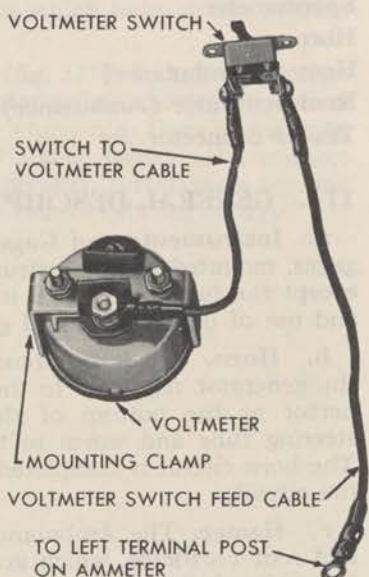
(a) *Six-volt System.* Connect single red wire to left post of ammeter. Connect two brown wires and one black wire to right post of ammeter.

(b) *Twelve-volt System.* Connect one large red wire and one small red wire to left post of ammeter. Connect large black wire and two brown wires to right post of ammeter. Put standard lock washer under each terminal nut.

(3) CONNECT CABLE TO BATTERY (par. 88).



RA PD 52980



RA PD 52981

**Figure 128—Ammeter Terminals**      **Figure 129—Voltmeter and Switch Wiring**

### 116. VOLTMETER (COMMAND AND CARRYALL).

a. Later production Command and Carryall vehicles are not equipped with a voltmeter.

b. **Removal of Voltmeter.** Turn voltmeter switch to "OFF" position and disconnect single wire from meter. Remove two nuts which hold the mounting bracket to back of the instrument panel and remove the voltmeter from the driver's side of instrument panel.

c. **Installation of Voltmeter** (fig. 129). Place the voltmeter in the instrument panel from the driver's side and install the mounting bracket over the two studs on the meter with the legs of the bracket against the instrument panel. Install the two attaching nuts with a standard lock washer under each nut. Connect the wire from the voltmeter switch.

## INSTRUMENTS, GAGES, AND MISCELLANEOUS ELECTRICAL EQUIPMENT

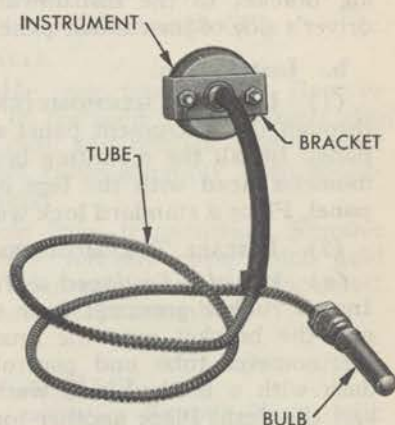
d. **Replacement of Voltmeter Switch** (fig. 129). Remove two screws which hold switch to the instrument panel. Remove switch from back of instrument panel and disconnect the two wires. To install, connect wires to the switch. Hold the switch against instrument panel and install the two mounting screws with a toothed lock washer under the head of each screw.

### 117. OIL GAGE.

a. **Removal.** Disconnect oil tube from gage. Remove two nuts which hold mounting bracket to instrument panel and remove gage from driver's side of instrument panel.



**Figure 130—Dash Control Tube Covers**



DO NOT DISASSEMBLE THE BULB  
OR TUBE FROM THE INSTRUMENT

RA PD 52979

**Figure 131—Thermometer**

b. **Installation.** Place gage in the instrument panel from driver's side, and install the mounting bracket on the two studs on the gage with the legs of the bracket against the instrument panel. Install the two attaching nuts with a standard lock washer under each nut. Connect the oil tube to the gage.

### 118. THERMOMETER.

a. **Removal.**

- (1) DRAIN COOLING SYSTEM (par. 81).
- (2) DISCONNECT CABLE FROM BATTERY (par. 88).

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

(3) REMOVE THERMOMETER BULB (fig. 131). Unscrew nut and pull thermometer bulb from left side of cylinder head. Open the clip which holds the tube to the cylinder head rear stud.

(4) REMOVE THERMOMETER TUBE AND BRACKET.

(a) *Vehicles Equipped with Ground Strap and Bracket* (fig. 130). Remove the two cap screws which hold the bracket to the dash and untie the ground strap. Remove the bracket and rubber grommet.

(b) *Vehicles Equipped with Clamp Bracket* (fig. 130). Remove the two screws which hold the upper part of the bracket to the lower part. Remove one and loosen the other cap screw which holds the bracket to dash and swing the lower part of bracket down.

(5) REMOVE ASSEMBLY. Remove two nuts which hold the mounting bracket to the instrument panel. Remove assembly from the driver's side of instrument panel.

**b. Installation.**

(1) INSTALL THERMOMETER. Insert the bulb end of the assembly through the instrument panel and dash from the driver's side of the panel. Install the mounting bracket over the two studs on the thermometer head with the legs of the bracket against the instrument panel. Place a standard lock washer and nut on each stud.

(2) INSTALL THERMOMETER TUBE AND BRACKET.

(a) *Vehicles Equipped with Ground Strap at Bracket* (fig. 130). Install rubber grommet over thermometer tube and control cables and the bracket over the grommet. Tie a new bond strap to the thermometer tube and control cables. Install the bracket to the dash with a toothed lock washer between each end of the bracket and the dash. Place another toothed lock washer and one end of the bond strap over each cap screw which holds the bracket to the dash. Install the screws and tighten securely.

(b) *Vehicles Equipped with Bond Clamp* (fig. 130). Swing lower part of the bracket up into place and install cap screw with a toothed lock washer under head of cap screw, tightening both cap screws securely. Place upper part of bracket over thermometer tube and control cables and install two screws with a toothed lock washer under head of each screw.

(3) INSTALL THERMOMETER BULB. Make a loop approximately two inches in diameter in the tube and place the looped tube in the clip at the cylinder head rear stud and close the clip. Install the bulb in the cylinder head and tighten the nut.

(4) CONNECT CABLE TO BATTERY (par. 88).

(5) FILL COOLING SYSTEM (par. 81).

**119. SPEEDOMETER.**

a. **Removal of Head.** Disconnect speedometer drive cable from speedometer. Open wire clip and move wiring assembly away from upper wing nut on mounting bracket. Remove the two wing nuts which hold mounting bracket to back of instrument panel and

## INSTRUMENTS, GAGES, AND MISCELLANEOUS ELECTRICAL EQUIPMENT

remove the speedometer from the driver's side of the instrument panel.

**b. Installation of Head.** Place the speedometer in the instrument panel from the driver's side and install the mounting bracket with the wire clip and a plain washer on the upper stud and a standard lock washer under each wing nut. Put the wiring assembly in the wire clip and close the clip. Insert the squared speedometer drive shaft into the speedometer head so that the flange on the cable housing is against the speedometer. Then screw the connecting nut into place.

### **c. Removal of Cable.**

- (1) DISCONNECT CABLE FROM BATTERY (par. 88).
- (2) REMOVE FLOOR PLATES (par. 133 a (1) through (3)).
- (3) DISCONNECT AND REMOVE CABLE.

(a) *Early Models.* Disconnect cable from transmission. Remove clip which holds cable to underside of toeboard riser. Remove clip which holds cable to engine side of dash and remove control cable bracket at dash (fig. 131). Disconnect cable assembly from speedometer head and remove cable assembly.

(b) *Late Models.* Disconnect cable from transmission. Remove spare parts kit box under map board. Remove clips which hold cable to driver's side of dash and frame side member. Disconnect cable from speedometer head and remove cable assembly.

### **d. Installation of Cable.**

- (1) CONNECT CABLE TO SPEEDOMETER HEAD.

(a) *Early Models.* String cable assembly through dash, with smaller connecting nut to driver's side. Insert square end of speedometer drive shaft into speedometer head so that flange on the cable housing is against the speedometer, then screw the connecting nut into place. Install control cable bracket (par. 118 b (2)).

(b) *Late Models.* String cable assembly along driver's side of dash and insert square end of drive shaft into speedometer head so that flange on cable is against the speedometer, then screw connecting nut into place.

- (2) CONNECT CABLE TO TRANSMISSION.

(a) *Early Models.* Make loop in cable housing, between control cable bracket and clip on dash, as large as possible to prevent breakage of drive cable. Install clip which holds cable to engine side of dash, and clip which holds cable to underside of toeboard riser. Connect speedometer cable to transmission.

(b) *Late Models.* Install clips which hold cable in position on driver's side of dash and frame cross member and connect cable to transmission. Position cable so that it lies along top of frame side member.

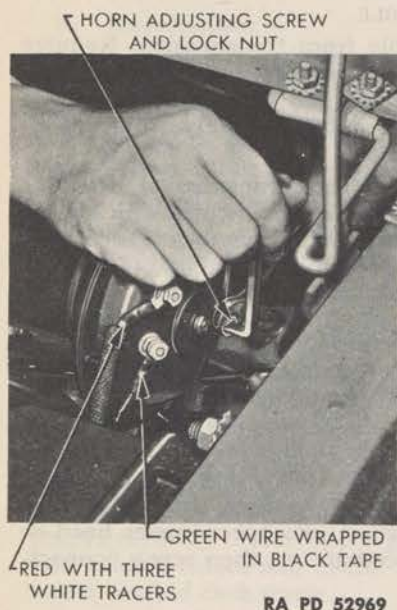
- (3) INSTALL FLOOR PLATES (par. 133 b (8) through (10)).
- (4) CONNECT CABLE TO BATTERY (par. 88).

**3/4-TON 4 x 4 TRUCK (DODGE)****120. HORN.**

a. **Removal of Horn.** Remove cable from battery to avoid damage from short circuit. Remove two nuts which hold wires to terminal posts on horn. Remove two nuts which hold horn to bracket and remove horn.

b. **Installation of Horn.** Insert horn mounting studs through bracket and install a toothed lock washer and nut on each stud. Connect horn button wire to lower post and wire from regulator to upper post of horn. Connect cable to battery.

c. **Horn Adjustment (fig. 132).** Loosen the lock nut and turn the adjusting screw counterclockwise until the motor is actuated but the horn does not vibrate. Then turn the screw approximately  $\frac{1}{4}$  turn clockwise and tighten the lock nut.

**Figure 132—Adjusting Horn****Figure 133—Installing Horn Button Cable**

d. **Removal of Horn Button and Wire (fig. 133).** Disconnect horn wire at the connector near bottom of steering housing, slide the rubber insulator along the wire and pull the connector apart. Tie a string securely to the lower end of the wire so it will be pulled into the steering column as the wire is pulled out. The string can be used to pull the new wire down through the column. Press down on the horn button and turn it clockwise, release the pressure and the button will pop out. Pull the horn wire out the top of the column and untie the string.

**INSTRUMENTS, GAGES, AND MISCELLANEOUS  
ELECTRICAL EQUIPMENT**

e. **Installation of Horn Button and Wire** (fig. 133). If a pilot string has been left in the steering column, run the string through the horn button spring and tie the string securely to the end of the horn wire and pull the wire down through the column. Place the horn button over the spring in the steering wheel and press it down, then turn it counterclockwise and release the pressure. Remove the string from the lower end of the wire, push the wire connector together, and slide the rubber insulator over the connector.

**121. HEATER (AMBULANCE).**

a. **Removal of Heater Switch.** Pull switch knob straight down and off switch. Remove nut which holds switch to instrument panel. Then disconnect wires from switch.

b. **Installation of Heater Switch.** Connect the two single wires to the left post of the switch and the double wire connection to the right post. (Right and left posts viewed from front of switch when installed in vehicle.) Insert shank of switch through instrument panel and install nut. Place the switch knob over the end of the switch shaft so that the small boss in the hub of the knob registers with slot in the switch shaft. Then push the knob into place.

c. **Removal of Defroster Assembly.** Disconnect the feed wire from the defroster switch and disconnect the inlet and output tubes from the defroster blower. Remove two mounting stud nuts from engine side of dash, and remove the defroster from driver's side of the dash.

d. **Installation of Defroster Assembly.** Insert the mounting studs through the dash. Place dash ground strap over lower mounting stud, a toothed lock washer over each stud, and install the nuts. Connect the inlet and two output tubes to the defroster. Then connect the feed wire to the defroster switch.

e. **Removal of Defroster Switch.** Pull switch knob straight down and off switch. Remove nut which holds switch to the instrument panel. Pull switch out of instrument panel and disconnect wires.

f. **Installation of Defroster Switch.** Connect the larger wire to the left post of the switch and the smaller wire to the right post. Insert the shank of the switch through the instrument panel and install the nut which holds the switch in place. Place the knob over the end of the switch shaft so that the small boss in hub of the knob registers with the slot in the shaft, and push the knob into place.

g. **Removal of Heater Assembly.** Drain the radiator (par. 81). Disconnect the feed wire from the starting switch and disconnect the two hose from heater at engine side of dash. Remove four nuts and bolts which hold the heater to the dash and remove the heater.

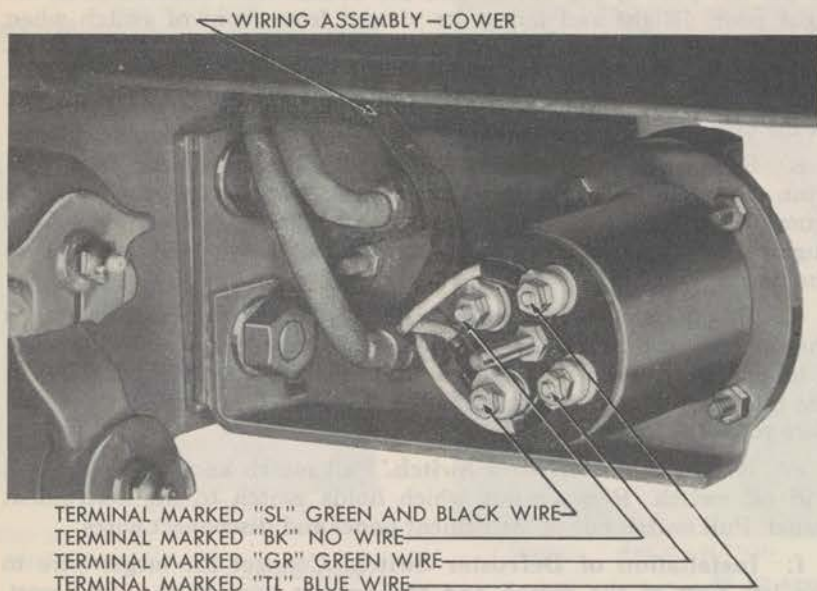
h. **Installation of Heater Assembly.** Insert the heater water tubes through the dash and install the five mounting bolts with a toothed lock washer under each nut. Connect the water hose which runs from

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

front of engine to the upper tube of heater and the hose which runs from rear of the engine to the lower tube of heater. Connect the feed wire to the heater switch. Fill the radiator (par. 81). If water does not circulate through heater radiator when engine is warmed up and running, loosen hose connection at upper heater tube and allow air to bleed out of heater radiator.

**122. ROOF VENTILATOR (AMBULANCE).**

a. **Replacement of Switch.** Remove two screws which hold switch to the instrument panel. Remove switch from back of instrument panel and disconnect wires. To install, connect wires to the switch. Hold the switch against instrument panel and install the two mounting screws with a toothed lock washer under the head of each screw.



RA PD 312562

**Figure 134—Trailer Connector Wiring**

b. **Removal of Roof Ventilator Assembly.** Remove three screws which hold the ventilator deflector to the top of the roof. Remove eight screws which hold the ventilator assembly to the roof and lift the ventilator out through the top of roof. After lifting the ventilator assembly out of the roof, disconnect the feed wire from the ventilator.

c. **Installation of Roof Ventilator Assembly.** Connect the feed wire to the terminal on the ventilator. Lower the ventilator into