WAR DEPARTMENT TECHNICAL MANUAL

TM 9-803

**This manual supersedes TB 9-803-4, 5 January 1944. For supersession of Quartermaster Corps 10-series technical manuals, see paragraph 1*

¼-TON 4 x 4 TRUCK (WILLYS-OVERLAND MODEL MB and FORD MODEL GPW)

WAR DEPARTMENT • FEBRUARY 1944

United States Government Printing Office
Washington : 1947

DESCRIPTION AND TABULATED DATA

Weights:	
Road, including gas and water	2,453 lb
Gross (loaded)	3,253 lb
Shipping (less water and fuel)	2,337 lb
Boxed gross	3,062 lb
Maximum pay load	800 lb
Maximum trailed load	1,000 lb
Ground clearance	8¾ in.
Pintle height (loaded)	21 in.
Kind and grade of fuel (octane rating)	Gasoline (68 mm)
Approach angle	45 deg
Departure angle	35 deg
Shipping dimensions—cubic feet	331
—square feet	57

b. **Performance.**

Maximum allowable speeds (mph) with transfer case in "HIGH" range:	
High gear (3rd)	65
Intermediate gear (2nd)	41
Low gear (1st)	24
Reverse gear	18
Maximum allowable speeds (mph) with transfer case in "LOW" range:	
High gear (3rd)	33
Intermediate gear (2nd)	21
Low gear (1st)	12
Reverse gear	9
Maximum grade ability	60 pct
Minimum turning radius—right	17½ ft
—left	171/2 ft
Maximum fording depth.	21 in.
Towing facilities—front	none
—rear	pintle hook
Maximum draw-bar pull	1,930 lb
Engine idle speed	600 rpm
Miles per gallon—(high gear—high range) average conditions	20
Cruising range—(miles) average conditions	20

c. Capacities.

Engine crankcase capacity—dry	5 qt
—refill	4 qt
Transmission capacity	% qt
Transfer case capacity	1 ı/ı qt

Section IV

OPERATION UNDER UNUSUAL CONDITIONS

7. OPERATION IN COLD WEATHER.

a. Purpose. Operation of automotive equipment at subzero temperatures presents problems that demand special precautions and extra careful servicing from both operation and maintenance personnel, if poor performance and total functional failure are to be avoided.

b. Gasoline. Winter grade of gasoline is designed to reduce cold weather starting difficulties; therefore, the winter grade motor fuel should be used in cold weather operation.

c. Storage and Handling of Gasoline. Due to condensation of moisture from the air, water will accumulate in tanks, drums, and containers. At low temperatures, this water will form ice crystals that will clog fuel lines and carburetor jets, unless the following precautions are taken:

(1) Strain the fuel through filter paper, or any other type of strainer that will prevent the passage of water. CAUTION: *Gasoline flowing over a surface generates static electricity that will result in a spark, unless means are provided to ground the electricity. Always provide a metallic contact between the container and the tank, to assure an effective ground.*

(2) Keep tank full, if possible. The more fuel there is in the tank, the smaller will be the volume of air from which moisture can be condensed.

(3) Add ½ pint of denatured alcohol, Grade 3, to the fuel tank each time it is filled. This will reduce the hazard of ice formation in the fuel.

(4) Be sure that all containers are thoroughly clean and free from rust before storing fuel in them.

(5) If possible, after filling or moving a container, allow the fuel to settle before filling fuel tank from it.

(6) Keep all closures of containers tight to prevent snow, ice, dirt, and other foreign matter from entering.

(7) Wipe all snow or ice from dispensing equipment and from around fuel tank filler cap before removing cap to refuel vehicle.

d. Lubrication.

(1) TRANSMISSION AND DIFFERENTIAL.

(17) ITEM 18, TOWING CONNECTIONS. Examine pintle hook for secure mounting and serviceable condition. Be sure pintle latches properly and locks securely.

(18) ITEM 19, BODY AND LOAD. Examine body and load (if any) for damage. Be sure there is a cap on front drain hole under fuel tank. See that rear drain hole cap is available in glove compartment. CAUTION: *Rear drain hole cap should be installed when about to pass through deep water.*

(19) ITEM 20, DECONTAMINATOR. Examine decontaminator for full charge and secure mountings.

(20) ITEM 21, TOOLS AND EQUIPMENT. See that tools and equipment are all present, properly stowed, and serviceable.

(21) ITEM 23, DRIVER'S PERMIT AND FORM 26. Driver must have his operator's permit on his person. See that vehicle manuals, Lubrication Guide, Form No. 26 (accident report) and W.D. AGO Form No. 478 (MWO and Major Unit Assembly Replacement Record) are present, legible, and properly stowed.

(22) ITEM 22, ENGINE OPERATION. Accelerate engine and observe for unusual noises indicating compression or exhaust leaks; worn, damaged, loose, and inadequately lubricated parts or misfiring.

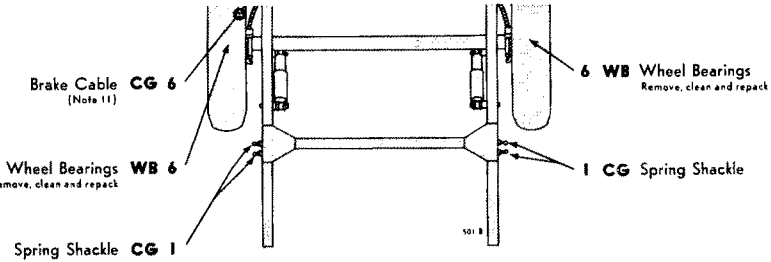
(23) ITEM 25, DURING-OPERATION SERVICE. Begin the During-operation Service immediately after the vehicle is put in motion.

14. DURING-OPERATION SERVICE.

a. While vehicle is in motion, listen for any sounds such as rattles, knocks, squeals, or hums that may indicate trouble. Look for indications of trouble in cooling system, and smoke from any part of the vehicle. Be on the alert to detect any odor of overheated components or units such as generator, brakes, or clutch; check for fuel vapor from a leak in fuel system, exhaust gas, or other signs of trouble. Any time the brakes are used, gears shifted, or vehicle turned, consider this a test and notice any unsatisfactory or unusual performance. Watch the instruments frequently. Notice promptly any unusual instrument indication that may signify possible trouble in system to which the instrument applies.

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

(1) ITEM 27, FOOT AND HAND BRAKES. Foot brakes must stop vehicle smoothly without side pull and within reasonable distance. There should be at least $\frac{1}{3}$ reserve brake pedal travel and $\frac{1}{2}$-inch free travel. Hand brake must securely hold vehicle on reasonable incline with $\frac{1}{3}$ reserve ratchet travel. There must be $\frac{1}{2}$-inch clearance (on cable) between relay crank and lower end of hand brake conduit.



TRAILER, 1/4 TON, 2-WHEEL

NOTES Additional Lubrication and Service Instructions on Individual Units and Parts NOTES

COLD WEATHER: For Lubrication and Service below 0°F., refer to OFSB 6-11.

(Notes continued from Reverse Side)

hot. Refill to FULL mark on gage. Run engine a few minutes and recheck oil level. CAUTION: Be sure pressure gage indicates oil is circulating.

6. OIL FILTER—Every 1,000 miles, drain sediment. Every 6,000 miles or more often if filter becomes clogged, drain filter, clean inside and renew element. Run engine a few minutes, check crankcase level, add OE to FULL mark on gage.
7. GEAR CASES—Weekly, check level with truck on level ground and, if necessary, add lubricant to plug level. Check only before operation while lubricant is cold. Drain and refill at intervals indicated on guide. Drain only after operation. On early WILLYS models, skid plate must be removed to reach drain plug.
8. UNIVERSAL JOINT AND STEERING KNUCKLE BEARINGS—Every 1,000 miles, remove plug at rear and add CG to level of filler plug hole. Every 6,000 miles, remove, clean, dry, inspect and refill to plug level.
9. UNIVERSAL JOINTS AND SLIP JOINTS—Apply CG to joints until it shows at joint cross and to slip joint until it shows at the end of spline. Use hand gun only.
10. DISTRIBUTOR—Every 6,000 miles, wipe distributor breaker cam lightly with CG and lubricate breaker arm pivot and wick under rotor with 1 to 2 drops of OE.
11. TRAILER BRAKE CABLES — Every 6,000 miles, slide cable conduit forward, clean and coat with CG.
12. SPEEDOMETER CABLE—Every 6,000 miles, remove core and coat lightly with CG No. 0.
13. RUBBER BUSHINGS — Every 1,000 miles, apply HB to shock absorber linkage. CAUTION: Do not use oil.
14. OIL CAN POINTS — Every 1,000 miles, lubricate all carburetor, clutch, brake and throttle linkages, pintle hook, handbrake cable, trailer handbrake connections and linkage with OE.
15. POINTS REQUIRING NO LUBRICATION SERVICE—Clutch Release Bearing, Water Pump, Fan, Shock Absorbers and Linkage on all FORD and early WILLYS models, Generator (late models).
16. POINTS TO BE SERVICED AND/OR LUBRICATED BY ORDNANCE MAINTENANCE PERSONNEL — Shock Absorbers (late WILLYS). (Refer to TM.)

Copy of this Guide will be carried on the materiel at all times. These lubrication instructions are binding on all echelons of maintenance.

By Order of the Secretary of War:
G. C. Marshall, Chief of Staff.

Requisition replacement guides from the Commanding Officer, Fort Wayne Ordnance Depot, Detroit, Michigan.

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24 Jan 44
Supersedes all previous issues.

RA PD 330851B

Figure 14—Lubrication Guide—Trailer, 1/4-Ton, 2-wheel

TOOLS AND EQUIPMENT STOWAGE ON THE VEHICLE

Name of Spare Part	Federal Stock No.	Where Carried
LAMP, elec. incand. 6-8V sing-tung-fil., 3 cp (MZ63)	17-L-5215	Parts bag
LAMP-UNIT, blackout, stop, sealed, one opng., 6-8V, 3 cp	8-L-421	Parts bag
LAMP-UNIT, blackout, tail, sealed, 4 opngs., 6-8V, 3 cp	8-L-415	Parts bag
LAMP-UNIT, service tail and stop, sealed, 6-8V, 21-3 cp	8-L-419	Parts bag
PIN, cotter, split, s. type B boxed ass't.	42-P-5347	Parts bag
PLUG, spark, with gasket	17-P-5365	Parts bag

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE	
6000 Mile	1000 Mile

directional tires should not be installed on same vehicle. If equipped with directional tires, open end of chevron should meet ground first on front tires, and last on rear tires. Tires should match on all wheels within ¾-inch over-all circumference, and as to type of tread. Take measurements with all tires equally inflated. Inspect tire carrier for looseness and damage. Tighten all lug nuts securely. Inflate tires to 35 pounds (cold).

48	48

Rear Brakes. Remove grease and dirt from brake drums and backing plates, and inspect for excessive wear or scoring and loose mounting bolts. Inspect brake hose for proper fit and for deterioration. Inspect wheel cylinders (exterior) for good condition, secure mounting, and for leaks. Tighten brake support and drum mounting bolts securely.

49	49

Rear Brake Shoes. Remove right rear wheel and inspect linings for wear, oil, and dirt, and possibility of rivets scoring drum before next 1,000-mile inspection. If lining on right rear wheel requires replacement, remove all wheels for lining inspection.

49	

SERVE. Remove all wheels and drums. Observe linings for wear, oil, and dirt, and determine if shoes are secure and guided by anchor pins. Inspect return springs for good action. Lightly lubricate anchor pins. Adjust brake shoes to 0.005 inch at heel, and 0.008 inch at toe.

	52

Rear Wheels. Inspect wheel for good condition and, without removal, test for evidence of looseness of wheel bearing adjustment, and dry or damaged bearings. Inspect around drive flanges, brake supports, and drums for lubricant or brake fluid leaks. Tighten drive flange and wheel nuts. CAUTION: *If it is known that vehicle has operated in deep water which may have entered wheel bearings, inspect right wheel bearing for contamination. Remove, clean, repack, and adjust as for 6,000-mile service. If contamination of lubricant has occurred, service other wheel bearings likewise.*

52	

CLEAN. Disassemble wheel bearings and seals, clean, and inspect for damage.

SPECIAL LUBRICATION. Pack wheel bearings, install new seals, and adjust bearings.

53	53

Front Brakes. Examine brake hose for chafing, leakage, and deterioration. Inspect wheel cylinders (exterior) for good condition, secure mounting, and leaks.

53	

DRUMS AND SUPPORTS. Clean drums and backing plates thoroughly, and tighten backing plate bolts. Inspect drums for damage, looseness, excessive wear, and scoring. Lightly lubricate anchor pins.

54	

Front Brake Shoes. Inspect brake shoes, linings, and anchors for damage or looseness. Replace worn parts

NEW VEHICLE RUN-IN TEST

b. Run-in Test. Perform the following procedures, steps (1) to (11) inclusive, during the road test of the vehicle. On vehicles which have been driven 50 miles or more in the course of delivery from the supplying to the using organization, reduce the length of the road test to the least mileage necessary to make observations listed below. CAUTION: *Continuous operation of the vehicle at speeds approaching the maximum indicated on the caution plate should be avoided during the test.*

(1) DASH INSTRUMENTS AND GAGES. Do not move vehicle until engine temperature reaches 135°F. Maximum safe operating temperature is 200°F. Observe readings of ammeter, oil temperature, and fuel gages to be sure they are indicating the proper function of the units to which they apply. Also see that speedometer registers the vehicle speed, and that odometer registers accumulating mileage.

(2) BRAKES: FOOT AND HAND. Test service brakes to see if they stop vehicle effectively, without side pull, chatter, or squealing; and observe if pedal has at least ½-inch free travel before meeting push rod-to-piston resistance. Parking brake should hold vehicle on reasonable incline, leaving one-third lever ratchet travel in reverse. CAUTION: *Avoid long application of brakes until shoes become evenly seated to drums.*

(3) CLUTCH. Observe if clutch operates smoothly without grab, chatter, or squeal on engagement, or slippage (under load) when fully engaged. See that pedal has ¾-inch free travel before meeting resistance. CAUTION: *Do not ride clutch pedal at any time, and do not engage and disengage new clutch severely or unnecessarily.*

(4) TRANSMISSION AND TRANSFER. Gearshift mechanism should operate easily and smoothly, and gears should operate without excessive noise, and not slip out of mesh. Test front axle declutching for proper operation.

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

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

(7) UNUSUAL NOISE. Be on the alert throughout road test for any unusual noise from body and attachments, running gear, suspension, or wheels, that might indicate looseness, damage, wear, inadequate lubrication, or underinflated tires.

(8) HALT VEHICLE AT 10-MILE INTERVALS FOR SERVICES (steps (9) and (10) below).

(9) TEMPERATURES. Cautiously hand-feel each brake drum and wheel hub for abnormal temperatures. Examine the transmission, transfer case, and differential housing for indications of overheating

TROUBLE SHOOTING

Possible Cause	Possible Remedy
Valves sticking—weak or broken springs.	Report to higher authority.
Fuel supply lacking at carburetor.	Check fuel system (par. 71 a).
Heat control valve faulty.	Free-up and adjust (par. 53).
Air cleaner dirty.	Clean and reoil (par. 73).
Carburetor metering rod incorrectly set.	Report to higher authority.

j. Engine Pings (Spark Knock).

Ignition timing early.	Reset (par. 65).
Distributor automatic spark advance stuck in advance position or spring broken.	Replace distributor (par. 64).
Overheated engine.	Check (subpar. l below).
Excessive carbon deposit in cylinders.	Remove cylinder head and clean (par. 54).
Heat control valve faulty.	Free-up and adjust (par. 53).
Wrong type spark plug.	Replace (par. 67).
Old or incorrect fuel.	Drain and use correct fuel (par. 3).

k. Engine Lacks Power.

Ignition timing late.	Reset (par. 65).
Ignition system faulty.	Check (subpar. c above).
Old or incorrect fuel.	Use correct gasoline.
Leaky gaskets.	Replace.
Engine overheated.	Check (subpar. l below).
Excessive carbon formation.	*Remove cylinder head and clean* (par. 54).
Engine too cold.	Test thermostat (par. 85); in cold weather, cover radiator.
Insufficient oil or improper grade.	Use correct grade (par. 18).
Oil system failure.	Report to higher authority.
Air cleaner dirty.	Clean; change oil in reservoir (par. 73).
Spark plug gaps too wide.	Reset (par. 67).
Choke valve partially closed or throttle does not open fully.	Adjust (par. 72).
Manifold heat control inoperative.	Check valve operation; see that spring is in proper position (par. 53).

TROUBLE SHOOTING

Possible Cause	Possible Remedy
Faulty bearings, improperly seated brushes, or armature rubbing on field poles.	Replace generator (par. 93).
c. Generator Regulator Troubles.	
Loose connections or mounting.	Clean and tighten.
Regulator internal defect.	Replace regulator (par. 94).

37. TRANSMISSION.

a. Excessive Noise.	
Incorrect driving practice.	Correct practice (par. 5).
Insufficient lubricant.	Add lubricant (par. 18).
Incorrect lubricant.	Use correct lubricant (par. 18).
Gears or bearings broken or worn; shift fork bent; gears worn on splines.	Replace transmission (pars. 115 and 116).
Overheated transmission.	Check lubricant grade and supply (par. 18).
b. Hard Shifting.	
Clutch fails to release.	Adjust clutch pedal free travel (par. 109).
Clutch driven plate binds on splines, or pressure plate faulty.	Report to higher authority.
Gearshift binding in housing.	Lubricate and free-up.
Shift rods binding in case.	Report to higher authority.
Transmission loose on bell housing.	Tighten.
Clutch shaft pilot binding in bushing case or shift housing damaged.	Report to higher authority.
c. Slips Out of Gear.	
Weak or broken poppet spring.	Report to higher authority.
Interlock plunger not in place.	Install plunger (par. 116).
Transmission gears or bearings worn.	Replace transmission (pars. 115 and 116).
Shift fork bent, causing partial gear engagement.	Report to higher authority.
Transmission loose on bell housing.	Tighten.
Damaged bell housing.	Report to higher authority.
d. Loss of Lubricant.	
Worn or damaged seals or gaskets.	Report to higher authority.

TROUBLE SHOOTING

Possible Cause	Possible Remedy
Spring hangers loose on frame.	Report to higher authority.
Spring clips loose, broken, or lost.	Tighten or replace.
Spring center bolt broken and/or clips loose.	Replace.
Axle housing on frame damaged.	Report to higher authority.

i. Unequal Steering (Right and Left).

Pitman arm not installed in proper position on steering gear.	Remove and install in correct position (par. 162).
Drag link bent.	Straighten or replace.

46. BODY AND FRAME.

a. Body.

Worn or damaged seat cushion.	Replace.
Badly damaged fender, radiator guard, hood, fuel can rack, seats, top, or windshield.	Replace; report minor damage to higher authority.
Windshield wiper faulty.	Service or replace.

b. Frame.

Badly damaged bumpers and pintle hook.	Replace; report minor damage to higher authority.
Damaged frame.	Report to higher authority.

47. BATTERY AND LIGHTING SYSTEM.

a. Battery.

(1) BATTERY DISCHARGED.

Battery solution level low.	Add distilled water to bring level above plates; check for cracked case.
Short in battery cell.	Replace battery (par. 97).
Generator not charging.	Check generator, fan belt and regulator (par. 92).
Loose or dirty connections; broken cables.	Clean and tighten connections; replace cables.
Excessive use of cranking motor.	Tune up engine; charge battery.
Idle battery, or excessive use of lights.	Replace or charge battery.

(2) BATTERY (OTHER TROUBLES.)

Overheated battery.	Check for short circuit or excessive generator charge.

and accelerator at carburetor. Loosen fuel line at fuel pump, and disconnect at carburetor. Remove two nuts attaching carburetor to intake manifold, and remove carburetor with accelerator spring clip. Loosen the valve spring cover front screw to relieve any pull on crankcase ventilator tube, and then remove the tube. Disconnect exhaust pipe at the manifold. Remove all nuts and washers from manifold studs in cylinder block, remove manifolds as an assembly, and remove ventilator valve.

c. Separate Intake Manifold from Exhaust Manifold. Remove four screws holding intake and exhaust manifolds together, and remove intake to exhaust manifold gasket.

d. Assemble Intake Manifold to Exhaust Manifold. Attach intake manifold to exhaust manifold loosely, using a new gasket. Tighten screws only slightly until manifolds are installed on cylinder block. Install ventilator valve.

e. Install Intake and Exhaust Manifolds. Clean contact surfaces of manifolds and cylinder block. Place new gasket on studs in cylinder block, and install manifold. Install washers and nuts with convex side of washers against manifolds, and tighten evenly (torque wrench reading 31 to 35 ft-lb). Tighten the four screws attaching intake manifold to exhaust manifold. Attach exhaust pipe to manifold, using new gasket, and tighten in place with nut and screw. Install ventilator tube, and tighten valve spring cover front screw. Install carburetor, accelerator clip, and spring. Attach fuel line at carburetor, and tighten at fuel pump. Connect accelerator rod, hand throttle, and choke at carburetor. Push controls in on instrument panel (throttle closed and choke fully open). Install carburetor air horn and secure in place. Operate fuel pump priming lever to put fuel in carburetor, then start engine, and check for leaky gaskets.

53. MANIFOLD HEAT CONTROL VALVE.

a. Description. The heat control valve (figs. 23 and 24) is controlled thermostatically by a bimetal spring. This valve diverts exhaust gases around the central portion of the intake manifold during the warm-up period of the engine. NOTE: *The manifold heat control valve is an integral part of the exhaust manifold. For replacement follow procedure outlined in paragraph 52.*

54. CYLINDER HEAD GASKET.

a. Removal. Drain the cooling system by opening the drain cock under the radiator at the left front. If there is antifreeze in the cooling system, drain into a pan so it can be used again. Disconnect spark plug wires at the plugs, and remove distributor cap from distributor. Remove two nuts on cylinder studs holding air cleaner tube bracket, and remove bracket with wires and distributor cap. Remove radiator upper tube with hoses attached. Disconnect oil filter upper tube, remove two nuts holding filter to engine, and remove filter. Remove all cylinder head screws and nuts. Remove cylinder head and bond-

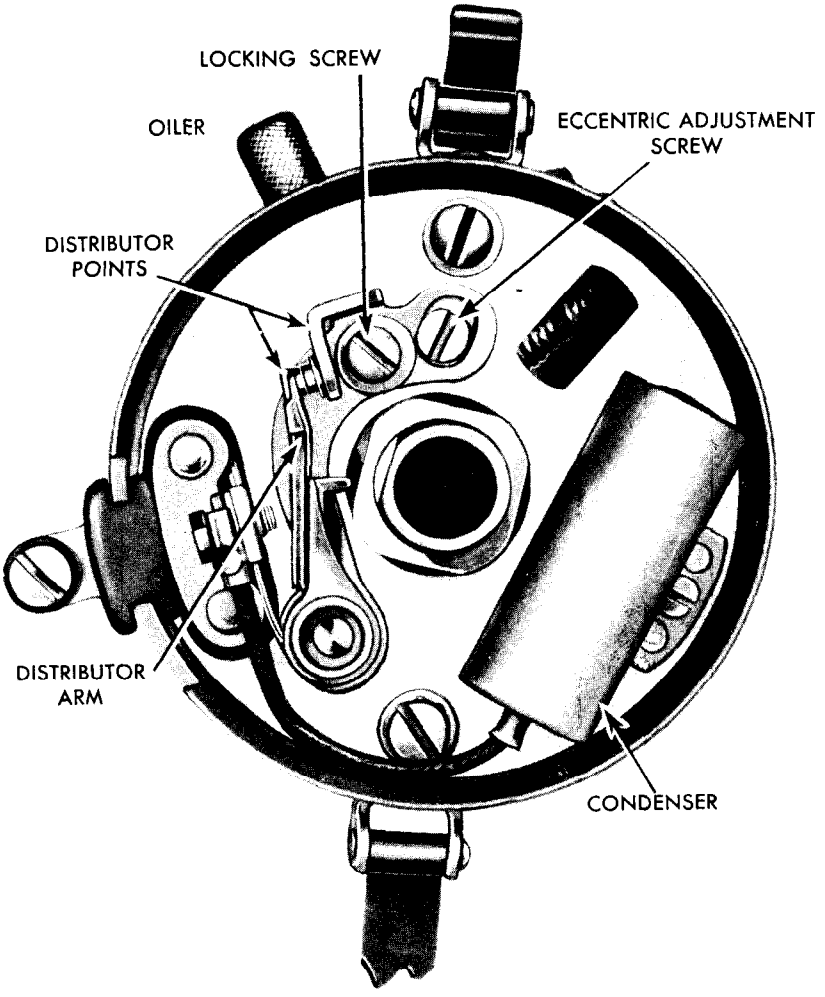

Figure 31—Distributor Points and Condenser

d. Distributor Points.

(1) ADJUSTMENT. Slip off the two clips holding the distributor cap in place and remove cap. Lift off rotor. Crank engine until point arm rubbing block is on top of a cam. Loosen lock screw (fig. 31), and turn eccentric screw until point gap is 0.020 inch measured with a thickness gage. Tighten lock screw and recheck gap. Install rotor and cap. Push wires well down into cap.

(2) REMOVAL. Slip off the two clips holding the distributor cap in place and lift off cap, then remove rotor (fig. 31). Using a small screwdriver, unscrew condenser lead which will release breaker arm

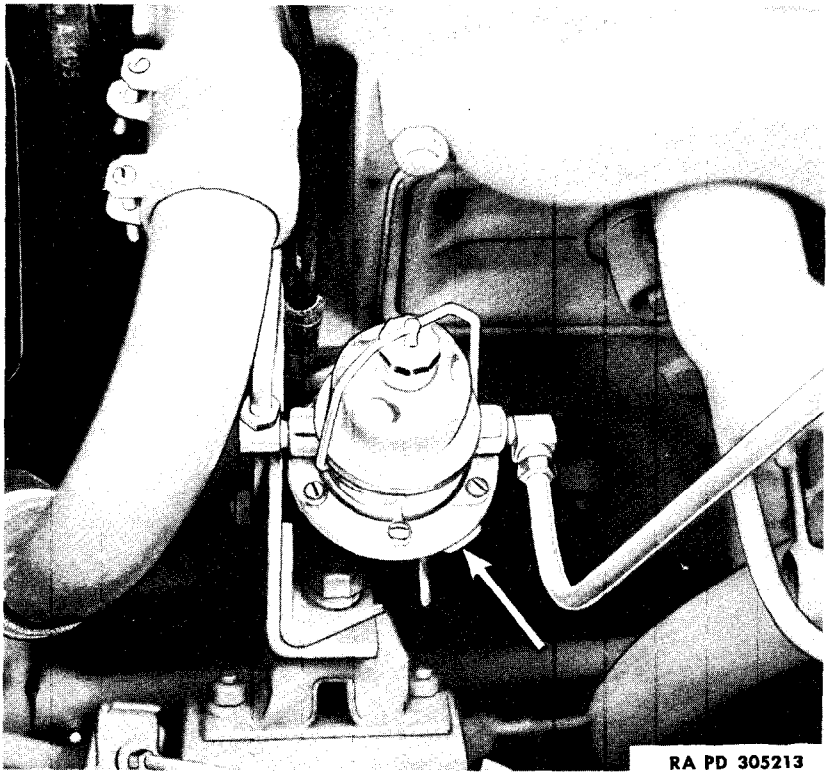

Figure 38—Fuel Pump

c. Removal. Remove the inlet and outlet lines, remove two screws holding pump to side of engine and remove pump.

d. Installation. Install pump in place on crankcase and tighten securely with two screws. Inspect gasket and replace if unserviceable. Attach inlet and outlet lines and tighten. Prime pump by operating priming lever, start engine, and check connections for leaks.

75. FUEL TANK.

a. Description. The fuel tank (fig. 39) is located under the driver's seat. An extension filler neck can be pulled up to facilitate filling the tank from a container. After removing the filler cap, pull up on the filler extension, and turn to the right to lock it in place. To remove the filler extension from the tank turn it to the left and pull up.

b. Removal. Drain fuel by removing drain plug in left side of tank. Remove bolts in seat rear flange and front legs, then lift out seat. Remove filler cap. Disconnect fuel gage wire and remove fuel

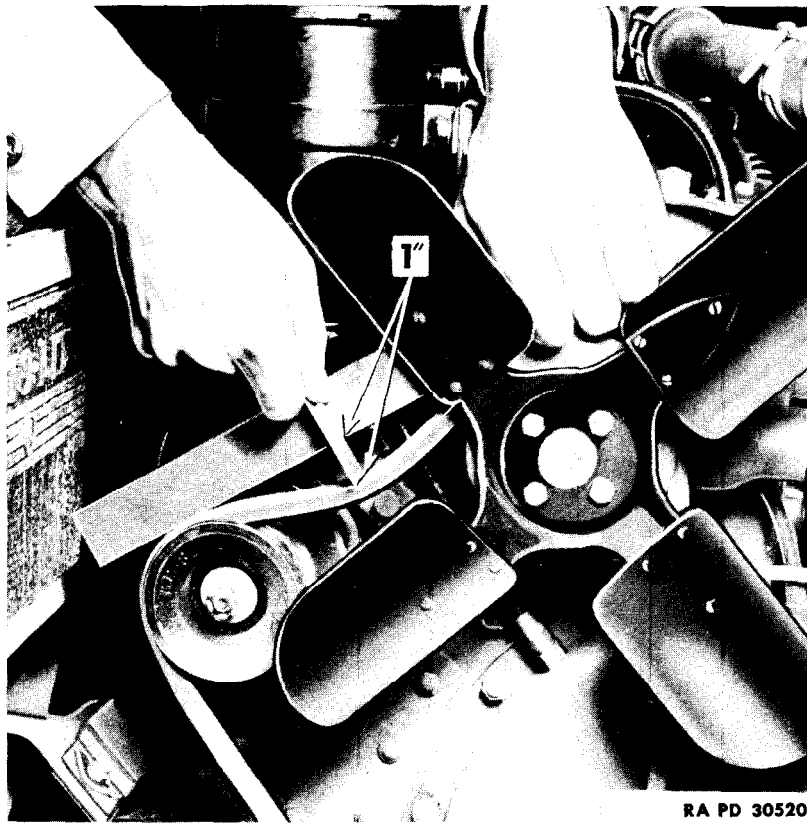

Figure 45—Fan Belt Deflection

b. Removal. Open the radiator drain cock in outlet pipe at lower left corner of radiator, and also drain cock in right side of cylinder block at forward end. Remove radiator filler cap. Pull up on handle of generator brace to loosen fan belt, and slip off belt. Loosen pump hose clamp and remove hose. Remove fan blade screws. Remove screws holding water pump in cylinder block, and remove water pump.

c. Installation. Check condition of pump to cylinder block gasket. Replace if damaged. Install pump in cylinder block, and tighten with screws. Install fan and screws. Install fan belt, and pull out generator until brace drops into position. Attach hose connection. Fill radiator, install cap, and check system for leaks. Start engine and check radiator coolant level after engine is warmed up.

83. FAN BELT.

a. Description. The fan belt (fig. 45) is of the V-type and drives the fan, water pump, and generator. Proper adjustment is necessary

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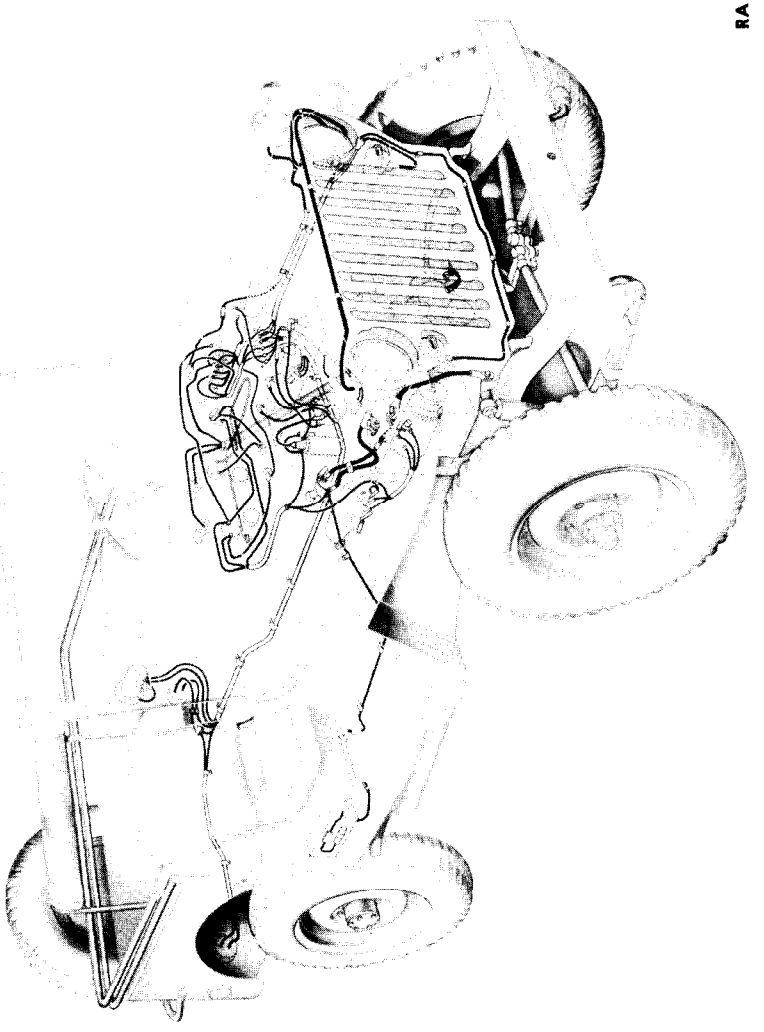
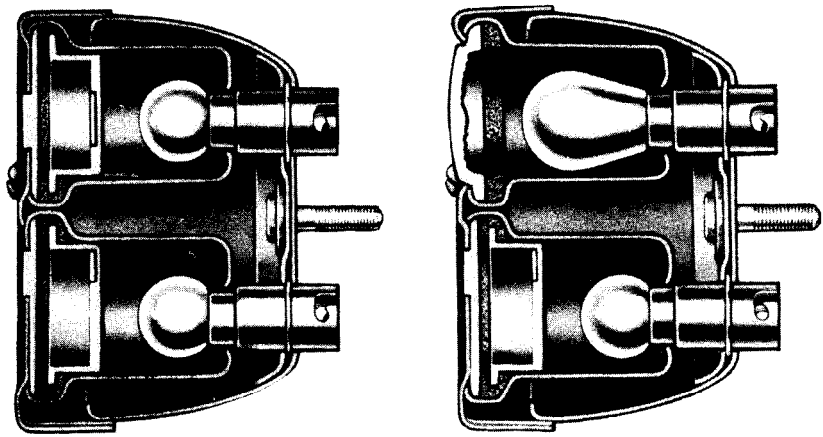


Figure 50—Wiring System—Phantom View

the taillight lens, gasket, reflector, and a 21-3-candlepower lamp. The lower unit consists of blackout lens, gasket, reflector, and 3-candlepower lamp. The right-hand light contains a blackout stop light unit in the upper part, and a blackout taillight in the lower part. The upper unit consists of the blackout stop light lens, gasket, reflector, and 3-candlepower lamp. The lower unit is the same as the lower unit in the left light. When a lamp burns out, the unit must be replaced. These lights are controlled by the blackout (main) light switch.

b. Removal of Light Unit. Remove two screws in light door, and remove door (fig. 60). Pull each unit straight out of socket.

c. Installation of Light Unit. Be sure that unit is correct type, and push into socket. Install light door and screws.



RA PD 305223

Figure 59—Taillights and Stop Lights

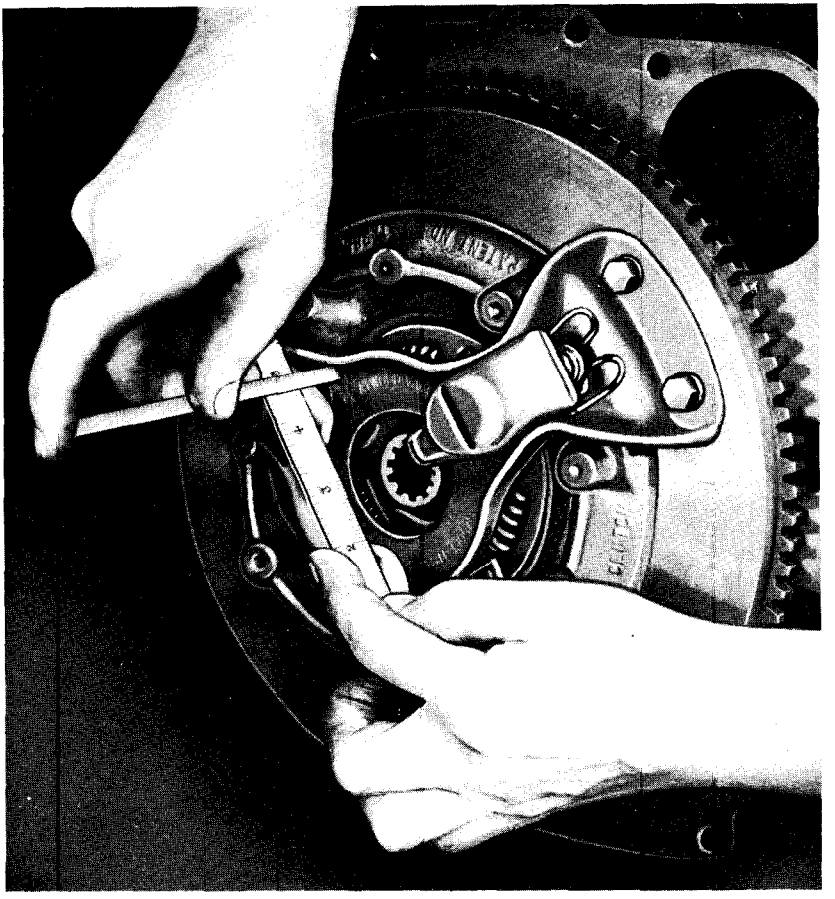
d. Removal of Light. Reach up under body and disconnect wire connector; push in on connector, turn counterclockwise and pull connector out of socket. Remove two nuts holding light to bracket, and remove light.

e. Installation of Light. Place light in position and secure with nuts. Attach connectors. Double contact connector goes in upper socket of left light. Turn on blackout (main) light switch to blackout position to see if right blackout taillight (lower unit) lights; if not, interchange connectors in sockets.

103. INSTRUMENT PANEL LIGHTS.

a. Description. There are two instrument panel lights (fig. 5) located above instruments and on the outside of the instrument panel. They are controlled by the panel light switch when the blackout (main) light switch is in service position.

69), which should be $^{27}/_{32}$ inch. To adjust clutch fingers, loosen lock nut on adjusting screws, and turn screws until measurements from face of fingers (release bearing contacts) to face of clutch bracket measures $^{27}/_{32}$ inch; set lock nuts. Install engine (par. 61), or transmission and transfer case assembly (par. 116), as required.



RA PD 305229

Figure 69—Clutch Finger Adjustment

112. CLUTCH RELEASE BEARING.

a. Removal. Follow procedure outlined in paragraph 60 for removing engine. After release bearing can be reached, unhook release bearing carrier spring, and pull off bearing and carrier (fig. 66). Press carrier out of bearing.

b. Installation. Press carrier into bearing. Slip bearing and carrier onto transmission bearing retainer, install release lever on fulcrum, and hook spring to bearing carrier. Follow the procedure outlined in paragraph 61 for completion of assembly.

Section XXV

FRONT AXLE

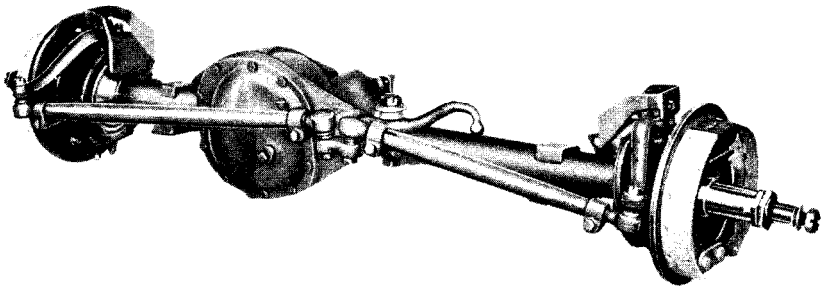


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Figure 75—Front Axle

126. DESCRIPTION AND DATA.

a. Description. The front axle (fig. 75) is a full-floating type enclosing a front wheel driving unit having a single-reduction, two-pinion differential, and hypoid drive gears. The differential carrier housing is offset to the right so that the propeller shaft is located to the right of the engine for maximum ground clearance. A cover provides easy access to the differential unit. The front wheels are driven by axle shafts, each equipped with a constant-velocity type universal joint enclosed within a steering knuckle at the outer end of the axle housing. The differential assembly is the same as used in the rear axle. Power is transmitted by a propeller shaft from the transfer case, where a shift lever permits the vehicle operator to engage or disengage the drive.

b. Data.

Make and model	Spicer—25
Drive gear ratio	4.88 to 1

b. Installation. Install new axle shaft flange gasket. Install axle shaft in axle housing, rotating shaft so that shaft will enter differential side gear. Take care not to damage inner oil seal in axle housing. Install axle flange screws and lock washers, and tighten securely.

141. WHEEL BEARINGS.

a. Adjustment. Place jack under axle housing, and raise wheel so that tire clears floor. Remove axle shaft (par. 140 **a**). Bend lip of lock washer away from lock nut, and remove nut with box-type socket wrench (fig. 78). Remove lock washer. Spin wheel, and tighten wheel bearing nut until wheel just binds. Back off nut one-sixth turn or more, if necessary, until wheel turns freely. Install lock washer and lock nut. NOTE: *Bend over lip of lock washer against lock nut.* Check adjustment by shake of wheel. Install axle shaft (par. 140 **b**). Lower vehicle to floor.

b. Removal. Loosen wheel stud nuts. NOTE: *Wheel studs have left-hand threads on left side of vehicle.* Raise vehicle so that tire clears floor. Remove wheel stud nuts, and remove wheels. Remove axle shaft (par. 140 **a**). Bend lip of lock washer away from lock nut, and remove nut with box-type socket wrench (fig. 78). Remove lock washer. Remove bearing adjusting nut and bearing lock washer. Shake wheel until outer bearing comes free of hub, and lift off wheel. Drive or press out inner bearing along with oil seal from wheel hub. Drive or press out bearing cups from hub. Clean old lubricant out of hub, and wash all parts in dry-cleaning solvent. Examine parts for excessive wear or damage, and replace if unserviceable.

c. Installation. Press bearing cups solidly into place in hub. Spread $\frac{1}{16}$-inch layer of lubricant inside of hub to prevent rust. Thoroughly lubricate inner bearing cone and roller assembly. NOTE: *Pack lubricant into bearing cage.* Install bearing in hub. Press oil seal into hub (with lip of seal toward bearing) until seal is even with end of hub. NOTE: *Before installation, soak seal in oil to soften leather.* Lubricate outer bearing cone and roller assembly. Install wheel on axle. Install outer bearing lock washer and nut. Adjust wheel bearings, and complete installation of parts (par. 141 **a**).

142. WHEEL BEARING GREASE RETAINER.

a. Removal. Remove retainer as outlined in paragraph 141 **b**.

b. Installation. Install retainer as outlined in paragraph 141 **c**.

143. WHEEL HUB.

a. Removal. Remove wheel and hub as outlined in paragraph 141 **b**. To remove brake drum from hub, support brake drum at hub, and drive out studs.

b. Installation. Place brake drum on hub. Install new wheel studs. NOTE: *Left-hand thread studs are used in wheels on left side of vehicle.* Support studs and swedge shoulder over against tapered hole in hub. Install hub on axle and mount wheel (par. 141 **c**). Tighten wheel stud nuts securely. Check brake action.

backing plate. Remove two screws holding cylinder to backing plate, and remove cylinder.

b. Installation. Place cylinder in position on backing plate, and attach with two screws and lock washers. Attach brake tube. Enter brake shoes in slots of cylinder pistons (fig. 89). Install brake shoe return spring. Replace wheel and hub (pars. 128 and 141). Bleed brake (par. 151). Apply foot brake pedal to test brakes. If soft pedal is experienced, bleed all brakes. Lower vehicle to floor.

151. FLEXIBLE LINES, HOSES, AND CONNECTIONS.

a. Removal of Brake Hose at Front Wheels. Remove brake tube connections at each end. With screwdriver slip hose lock off ends of hose fitting, and remove hose.

b. Installation of Brake Hose at Front Wheels. Place hose in brackets and drive locks into place in the fittings. Attach brake tube connections. Bleed brake. Press brake pedal; if soft pedal is experienced, bleed all brakes (subpar. s below).

c. Removal of Brake Hose at Frame and Front Axle. Remove brake tube connection at frame bracket, upper end of hose. With screwdriver, remove hose spring lock from fitting at bracket. Remove fitting from bracket. Unscrew brake hose lower fitting from T-connection on axle and remove.

d. Installation of Brake Hose at Frame and Front Axle. Screw brake hose lower fitting into T-connection on axle. Insert upper fitting into bracket, and install spring lock. Attach brake tube connection. Bleed both front brakes (subpar. s below). Press brake pedal; if soft pedal is experienced, bleed all brakes.

e. Removal of Rear Brake Hose. Remove brake tube connection frame cross member. With screwdriver, drive brake hose spring lock off hose fitting. Remove hose from frame. Unscrew hose fitting from T-connection on rear axle housing.

f. Installation of Rear Brake Hose. Screw brake hose into T-connection on rear axle housing. Insert hose fitting into frame, and drive spring lock into fitting. Attach tube connection. Bleed both rear brakes (subpar. s below). Press brake pedal; if soft pedal is experienced, bleed all brakes.

g. Removal of Master Cylinder to Front Hose Brake Tube. Remove clip from frame. Disconnect tube from brake hose fitting (frame to axle). Disconnect tube from master cylinder connection, and remove tube.

h. Installation of Master Cylinder to Front Hose Brake Tube. Connect tube at master cylinder. Connect tube at brake hose (frame to front axle). Install tube clip at frame. Bleed front brakes (subpar. s below). Press brake pedal; if soft pedal is experienced, bleed all brakes.

i. Removal of Master Cylinder to Rear Hose Brake Tube. Remove clip on underside of frame rear cross member. Remove clip

Section XXIX

STEERING GEAR

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Figure 97—Steering Gear—Phantom View

158. DESCRIPTION AND DATA.

a. Description. The steering gear (figs. 97 and 99) is of the conventional type, mounted on the left frame side member, and connected to the front axle steering ball crank by a Pitman arm and steering connecting rod (fig. 98). The steering gear is of the cam and lever type with a variable-ratio cam. The steering wheel is of the

Section XXXI

RADIO INTERFERENCE SUPPRESSION SYSTEM

176. DESCRIPTION.

a. Description. Radio noise suppression is the elimination, or minimizing, of electrical disturbances which interfere with radio reception, or disclose the location of the vehicle to sensitive electrical detectors. Electrical disturbances or radio frequency waves may originate as static discharges between adjoining parts of the vehicle, or may be given off by the electrical systems during operation of the vehicle. These waves are actually radiated as disturbing signals that interfere with any radio receiving apparatus that may be operating in the vehicle or immediate vicinity. Each disturbance (at plugs, breaker points, generator brushes, or elsewhere) creates a surge of electricity, which produces interfering radio waves. Their origin can generally be determined by the nature of the noise heard in the receiver. Radio interference suppression, therefore, involves the suppression of these waves at their sources, or confining them within an area where they cannot be picked up by the antenna of a radio-equipped vehicle. Suppression is accomplished by the use of resistor-suppressors, and condensers. In addition, the hood and other metal parts in the vicinity of the engine are made to form a shield by the use of internal-external toothed lock washers and bond straps; thus, the hood and side panels form a box within which radio frequency waves are confined to prevent their acting on the antenna of receiving equipment. Wiring that may carry interfering surges to a point where interference will affect radio reception, is shielded. In attaching condensers and bond straps, the lock washers must be placed between the parts to be grounded, and tinned spots must be cleaned, but not painted. This is necessary to obtain good connections between the component parts, and to permit electrical energy to dissipate without causing electrical disturbances. The suppression components have no effect on engine performance as long as they are maintained in good condition. The sources of electrical noise interference may be basically divided into three groups: the ignition system, including coil, distributor, and spark plugs; the generator system, including generator and regulator; and the wiring.

177. DATA.

a. Ignition (both high-tension and primary-circuit suppression).

(1) High-tension suppression is of the resistor-suppressor type and consists of:

(a) Coil to distributor high-tension wire at distributor, resistance 10,000 ohms.

SHIPMENT AND TEMPORARY STORAGE

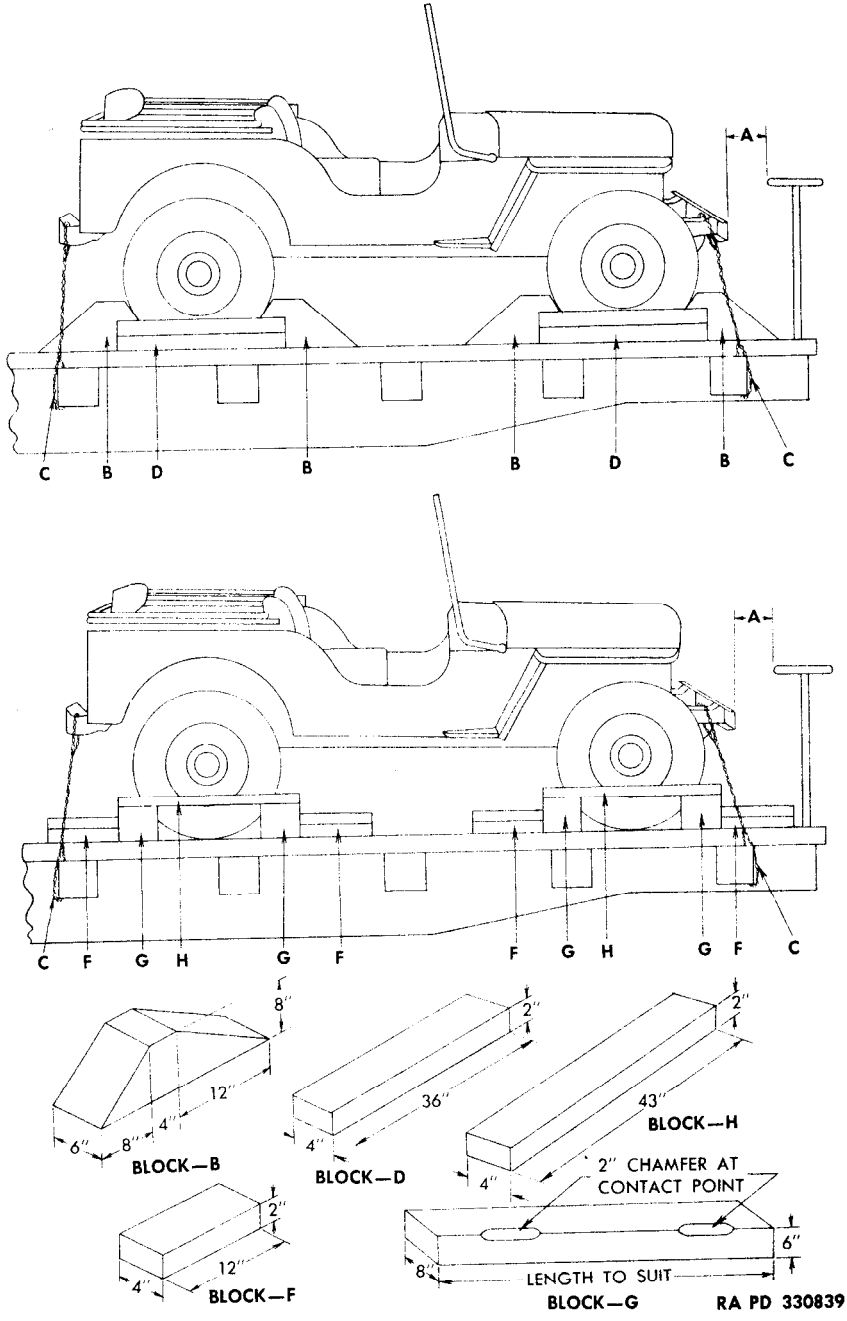

Figure 103—Blocking Requirements for Securing Wheeled Vehicles on Railroad Cars