

6.VA4.G.AT.2.1/011

19-63

TM 9-817

R

WAR DEPARTMENT TECHNICAL

K2-15

5- to 6-Ton 4x4 Ponton Tractor Truck (Autocar Model U8144T)

GEREG
21 AUG. 1956
MRS. STAG. 1956

WAR DEPARTMENT

• 10 APRIL 1944

WAR DEPARTMENT TECHNICAL MANUAL

TM 9-817

SGV TD

5- to 6-Ton
4x4 Ponton Tractor Truck
(Autocar Model U8144T)



WAR DEPARTMENT

10 APRIL 1944

WAR DEPARTMENT
Washington 25, D. C., 10 April 1944

TM 9-817, 5- to 6-Ton 4x4 Ponton Tractor Truck (Autocar Model U8144T), is published for the information and guidance of all concerned.

[A.G. 300.7 (13 Dec 43)
O.O.M. 461/Rar. Ars. (4-10-44)]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

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

DISTRIBUTION: X.

(For explanation of symbol, see FM 21-6.)

CONTENTS

PART ONE — VEHICLE OPERATING INSTRUCTIONS

SECTION		Paragraphs	Pages
I.	Introduction	1	5
II.	Description and tabulated data	2- 4	5- 9
III.	Driving controls and operation	5- 7	10- 18
IV.	Auxiliary equipment controls and operation	8- 10	19- 20
V.	Operation under unusual condi- tions	11- 14	20- 25
VI.	First echelon preventive main- tenance services	15- 19	26- 38
VII.	Lubrication	20- 21	38- 51
VIII.	Tools and equipment stowage on the vehicle.....	22	52- 54

PART TWO — VEHICLE MAINTENANCE INSTRUCTIONS

SECTION	IX. Vehicle modification records....	23	55
	X. New vehicle run-in test.....	24- 26	55- 60
	XI. Second echelon preventive maintenance	27	61- 90
	XII. Organization tools and equip- ment	28	91
	XIII. Trouble shooting	29- 51	91-113
	XIV. Engine description, data, main- tenance, and adjustment in vehicle	52- 61	113-127
	XV. Engine — removal and installa- tion	62- 63	127-141
	XVI. Fuel system	64- 69	141-152
	XVII. Intake and exhaust system.....	70- 72	152-155

★This manual supersedes all pertinent information from TB ORD 20, dated 24 January 1944, and TB 800-21, dated 30 November 1943. This manual, together with TM 9-1817 and TM 9-1832A, supersedes TM 10-1497, dated 1 July 1942.

CONTENTS - Contd.

	Paragraphs	Pages
XVIII. Cooling system	73- 79	156-166
XIX. Ignition system	80- 86	166-175
XX. Starting and generating system	87- 93	175-185
XXI. Battery and lighting systems....	94-112	185-204
XXII. Radio interference suppression system	113-115	204-212
XXIII. Clutch and clutch linkage.....	116-123	212-219
XXIV. Transmission and power take-off	124-127	219-227
XXV. Transfer case and linkage.....	128-132	227-232
XXVI. Drive shafts	133-136	232-235
XXVII. Front axle	137-140	235-239
XXVIII. Rear axle	141-143	239-243
XXIX. Service (air) brakes	144-160	243-268
XXX. Drive shaft hand brake.....	161-165	268-272
XXXI. Wheels, brake drums, hubs, wheel bearings, and tires.....	166-168	272-277
XXXII. Springs and shock absorbers....	169-171	277-283
XXXIII. Steering gear	172-176	283-288
XXXIV. Frame, cab, and body.....	177-186	288-295
XXXV. Instruments	187-195	296-303
XXXVI. Winch	196-201	303-307
XXXVII. Fifth wheel	202-207	307-310
XXXVIII. Shipment and temporary storage	208-210	311-315
REFERENCES		316-318
INDEX		319-333

PART ONE — VEHICLE OPERATING INSTRUCTIONS

Section I

INTRODUCTION

1. SCOPE.*

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

b. In addition to the description of the 5- to 6-ton, 4 x 4, Ponton Tractor Truck (Autocar Model U8144T), this manual contains technical information required for the identification, use, and care of the materiel. This manual is divided into two parts. Part One, section I through section VIII, contains vehicle operating instructions. Part Two, section IX through section XXXVIII contains vehicle maintenance instructions for using arm personnel charged with the responsibility of doing maintenance work within their jurisdiction. Part Two, section XXXVIII, contains instructions for shipment and temporary storage. A list of references and an index follow Part Two.

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

Section II

DESCRIPTION AND TABULATED DATA

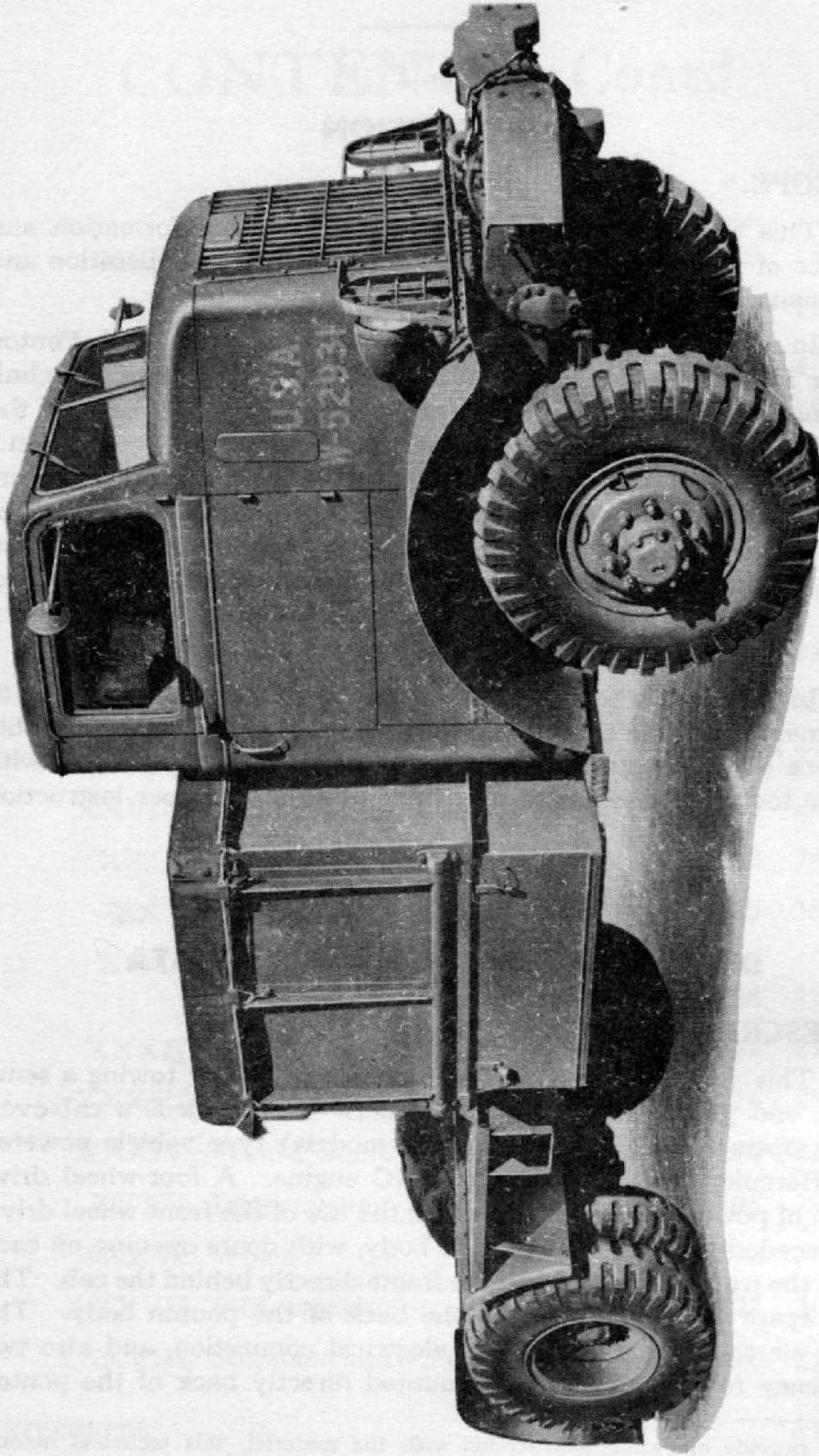
2. DESCRIPTION.

a. This vehicle is equipped with a fifth wheel for towing a semi-trailer, and pintle for towing full trailer. The truck is a cab-over-engine, open-cab (closed-cab on some models) type vehicle powered by a Hercules, 6-cylinder, model RXC engine. A four-wheel drive system of power transmission permits the use of the front wheel drive, when needed. An all-steel ponton body, with doors opening on each side of the truck, is mounted on the frame directly behind the cab. The single spare tire is mounted on the back of the ponton body. The trailer air connection, the trailer electrical connection, and also two emergency fuel containers are mounted directly back of the ponton

*To provide operating instructions with the materiel, this technical manual has been published in advance of complete technical review. Any errors or omissions will be corrected by changes or, if extensive, by an early revision.

TM 9-817
2

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 322126

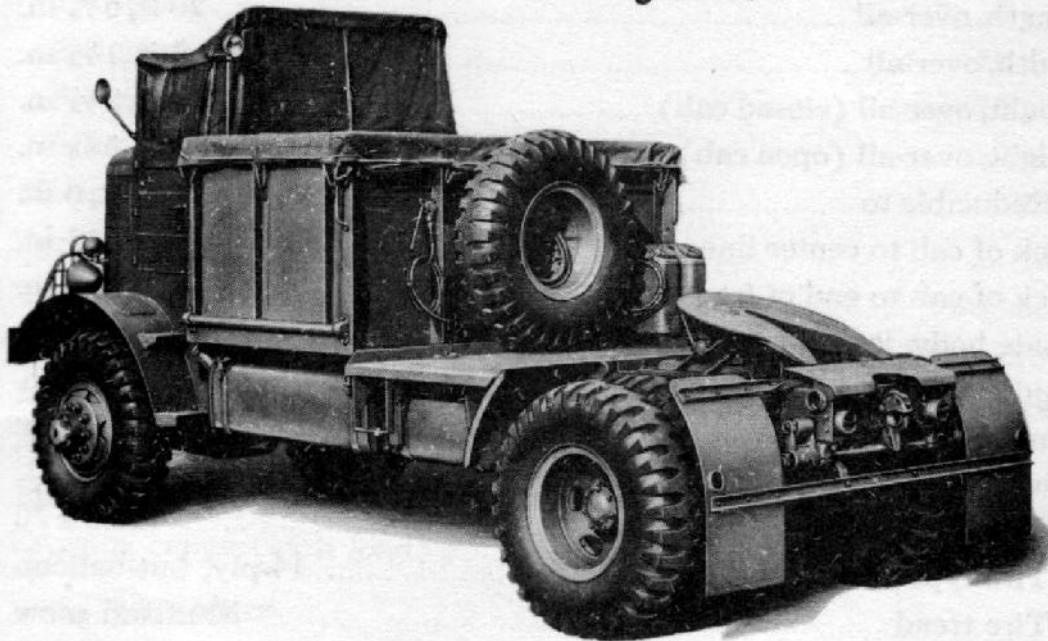
Figure 1 — 5-to 6-ton, 4 x 4, Ponton, Tractor Truck (Closed Cab) — Front Side View — Right Side

DESCRIPTION AND TABULATED DATA



RA PD 321945

*Figure 2 — 5- to 6-ton, 4 x 4, Ponton, Tractor Truck (Open Cab) —
Front Side View — Right Side*



RA PD 321946

*Figure 3 — 5- to 6-ton, 4 x 4, Ponton, Tractor Truck (Open Cab) —
Rear Side View — Left Side*

body. A steel platform is mounted over the frame between the ponton body and the rear dual wheels. The fifth wheel, which is used for connecting the trailer, is mounted on the frame, above the rear axle. A 60-gallon and a 30-gallon fuel tank are mounted at frame height on

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

the left side of the truck. At the corresponding position below the ponton body, and on the right side of the frame, is the tool storage box. A slightly sloping, vertical bar—protective radiator brush guard—gives the truck a massive front appearance.

3. DIFFERENCES AMONG MODELS.

a. Vehicles have either an open cab or closed cab. On the closed-cab models, the spotlight is located outside and above the rear window. On the open-cab models, the spotlight is located on the left outside panel of the cab. The winch is not included on some models.

b. **Winch.** The winch, with cable, is mounted on the front when supplied with vehicle. The winch is not supplied with all vehicles.

4. DATA.

a. Vehicle Specifications.

Make	Autocar
Truck, model No.	U8144T
Wheelbase	263½ in.
Length, over-all	20 ft, 6½ in.
Width, over-all	8 ft, 1½ in.
Height, over-all (closed cab)	9 ft, 2½ in.
Height, over-all (open cab)	9 ft, 6⅜ in.
Reducible to	7 ft, 6 in.
Back of cab to center line of rear axle	9 ft, 11 in.
Back of cab to end of frame	12 ft, 6 in.
Inside body, length (closed cab)	3 ft, 10½ in.
Inside body, width (closed cab)	7 ft, 6 in.
Panel height	3 ft, 1 in.
Wheel Size:	
Tire size	12.00 x 20
Tire type	14-ply, bus-balloon
Tire tread	Mud and snow
Tread (center-to-center) front	5 ft, 11¾ in.
Tread (center-to-center) rear	6 ft, ¼ in.
Width between inside of inside rear tires or track	3 ft, 11 in.
Width between outside of outside rear tires or track	8 ft, 1½ in.
Crew	2
Weight of vehicle — empty (closed cab)	16,600 lb
Weight of vehicle — empty (open cab)	16,100 lb

DESCRIPTION AND TABULATED DATA

Ground clearance, minimum	10 ¹³ / ₁₆ in.
Pintle height	38 in.
Octane rating of gasoline	68 min
Approach angle	32½ deg
Departure angle	54 deg
Trench crossing ability	1 ft, 10 in.

b. Performance.

Speeds allowable without front wheels driving:

1st gear	5 mph
2nd gear	9 mph
3rd gear	18 mph
4th gear	33 mph
5th gear	42 mph

Speeds allowable with front wheels driving

(maximum desirable speed):

1st gear	5 mph
2nd gear	9 mph
3rd gear	10 mph
4th gear	10 mph
5th gear	10 mph

Minimum turning radius	35 ft
Fording depth	2 ft
Towing facilities (front)	Two hooks
Towing facilities (rear)	One pintle
Maximum grade ascending ability	30 percent
Miles per gallon (hard-surfaced roads) with towed load	2.6
Miles per gallon without towed load	5.3
Cruising range (with load)	234 miles

c. Capacities.

Fuel tanks	90 gal
Cooling system	38 qt
Crankcase	12 qt
Transmission	8 to 10 qt
Transfer case	2 qt
Front axle	12 pt
Rear axle	8 pt

Section III

DRIVING CONTROLS AND OPERATION**5. INSTRUMENTS AND CONTROLS.**

a. Gages, switches, and controls for operating the vehicle are located in the driver's compartment (fig. 4).

b. **Gages, Switches, and Instruments** (fig. 4).

(1) **VISCOMETER.** The viscometer, located on left side of instrument panel, is connected to a unit on engine. The gage registers "THIN," "IDEAL," or "HEAVY" oil condition.

(2) **AMMETER.** The ammeter, located on left side of instrument panel indicates the rate of electric current flow being applied to battery by generator, or the rate of battery discharge. The ammeter covers a discharge or charging range of zero to 30 amperes.

(3) **AUXILIARY AMMETER.** The auxiliary ammeter, located on left side of instrument panel, indicates "CHARGE" or "DISCHARGE" operation of the auxiliary 6-volt storage battery.

(4) **AIR PRESSURE GAGE.** The air pressure gage, located on left side of instrument panel, indicates the air pressure in the service (air) brake system. The gage registers from 80 to 150 pounds of pressure per square inch.

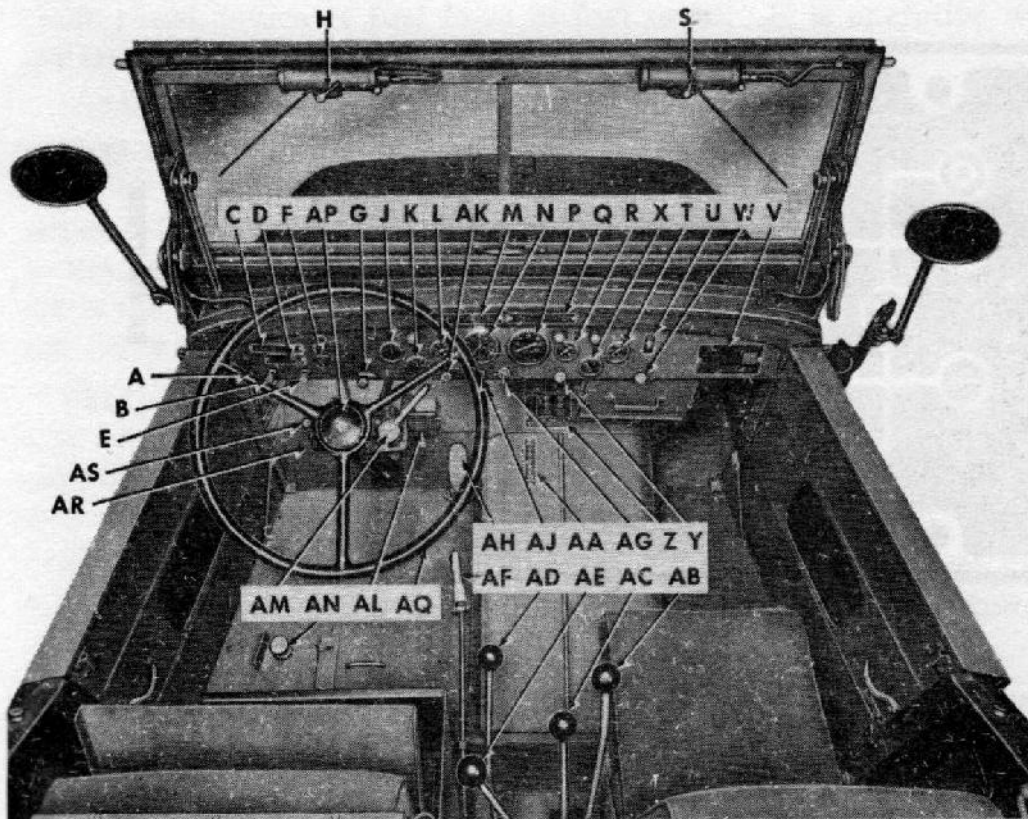
(5) **TACHOMETER.** The tachometer, located on the instrument panel, indicates the engine speed in revolutions per minute. The highest permissible speed is 2,300 revolutions per minute, as indicated on the engine speed caution plate attached to the panel. An indicating hand (white) indicates the speed at all times, and moves a maximum speed hand (red) to the highest speed attained. A key is provided to reset the maximum speed hand when desired.

(6) **SPEEDOMETER.** The speedometer, located in center of instrument panel, indicates the road speed of vehicle in miles per hour, and records both trip and total mileage. The trip indicator can be reset by turning the button located on underside of speedometer head.

(7) **OIL PRESSURE GAGE.** The oil pressure gage, located on right side of instrument panel, indicates the pressure of the engine lubricating oil. It covers a range of from zero to 80 pounds per square inch. The gage registers from 30 to 50 pounds at normal engine speeds. At idling speed, when the engine is warm, the gage indicates a minimum of 5 pounds.

(8) **WATER TEMPERATURE GAGE.** The water temperature gage, located on right side of instrument panel, indicates the temperature of the water in the engine. Normal operating temperature is approximately 160° F. The gage covers a range of 100° F to 220° F.

DRIVING CONTROLS AND OPERATION



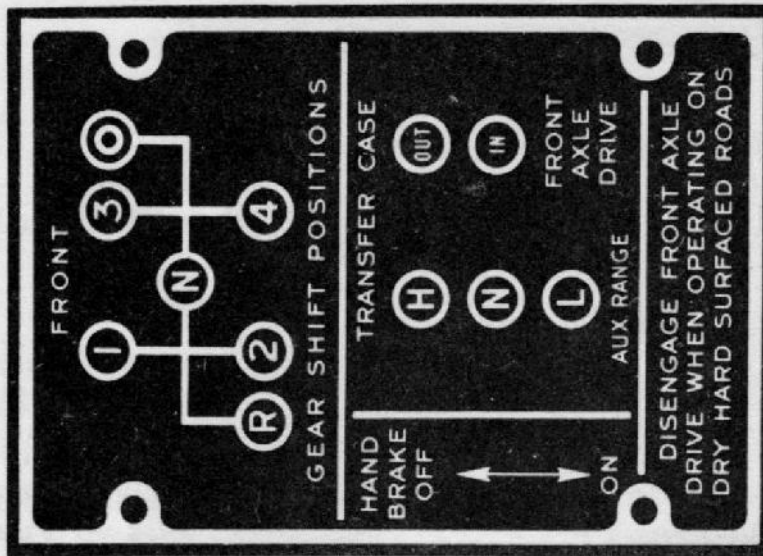
- A—BLACKOUT DRIVING LIGHT SWITCH
- B—LEFT-HAND WINDSHIELD WIPER CONTROL VALVE
- C—DRAIN CAUTION PLATE
- D—PUBLICATIONS REFERENCE PLATE
- E—RIGHT-HAND WINDSHIELD WIPER CONTROL VALVE
- F—VISCOMETER
- G—BLACKOUT SWITCH
- H—WINDSHIELD WIPER
- J—AMMETER
- K—AUXILIARY AMMETER
- L—AIR PRESSURE GAGE
- M—ENGINE SPEED CAUTION PLATE
- N—TACHOMETER
- P—SPEEDOMETER
- Q—BUZZER CAUTION PLATE
- R—OIL PRESSURE GAGE
- S—WINDSHIELD WIPER
- T—HEAT INDICATOR
- U—SPOTLIGHT SWITCH
- V—NAME PLATE

- W—INSTRUMENT PANEL LIGHT SWITCH
- X—GAS GAGE
- Y—THROTTLE BUTTON
- Z—TRANSMISSION AND TRANSFER CASE-DIAGRAM PLATE
- AA—WINCH CONTROL DIAGRAM PLATE
- AB—FRONT AXLE DECLUTCHING LEVER
- AC—TRANSFER CASE GEARSHIFT LEVER
- AD—MAIN TRANSMISSION GEARSHIFT LEVER
- AE—WINCH CONTROL LEVER
- AF—HAND BRAKE LEVER
- AG—IGNITION SWITCH
- AH—ACCELERATOR PEDAL
- AJ—TACHOMETER RESET KEY
- AK—CARBURETOR CHOKE
- AL—FOOT BRAKE PEDAL
- AM—AIR BRAKE HAND CONTROL VALVE
- AN—CRANKING MOTOR SWITCH BUTTON
- AP—HORN BUTTON
- AQ—STEERING WHEEL
- AR—CLUTCH OPERATING PEDAL
- AS—FOOT DIMMER SWITCH

RA PD 322005

Figure 4 — Operator's Compartment (From Rear) — Open Cab

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 77889

IF THE ENGINE IS OPERATED FOR ANY LENGTH OF TIME AT A SPEED GREATER THAN 2400 R. P. M. AS SHOWN BY THE ENGINE SPEED RECORDER ON THE INSTRUMENT PANEL, THE ENGINE WILL BE SERIOUSLY DAMAGED.

WARNING - BUZZER OPERATION IS AN INDICATION THAT THE TRUCK MUST IMMEDIATELY BE BROUGHT TO A STOP AND THE CAUSE OF LOSS OF BRAKE AIR PRESSURE DETERMINED.

TO DRAIN COOLING SYSTEM: OPEN DRAIN COCKS AT BOTTOM OF RADIATOR AND ABOVE WATER PUMP IN CYLINDER BLOCK.

Figure 5 — Instruction Plates

DRIVING CONTROLS AND OPERATION

(9) **FUEL GAGE.** The fuel gage, located on right side of instrument panel, indicates fuel level in fuel tanks. It is operative when the ignition switch is turned on.

(10) **WINDSHIELD WIPER CONTROL VALVES.** Windshield wiper control valves consist of two small knobs located on the instrument panel at the left of the steering column. The left knob controls the wiper in front of the driver's seat, and the right knob controls the wiper to the right. Turning the knob counterclockwise opens the air valve, starts the wiper, and also controls its speed; turning it clockwise closes the valve and stops the wiper.

(11) **BLACKOUT SWITCH.** The blackout switch, located on left side of instrument panel, is a three-position push-pull switch. It controls the service and blackout headlight, also the service, blackout stop, and taillights.

(12) **CARBURETOR CHOKE CONTROL.** The choke control knob, located on left side of instrument panel, is used to operate carburetor choke.

(13) **TACHOMETER LOCK SWITCH.** A key-operated switch, located directly below the tachometer, is used for resetting the maximum speed hand (red) on the tachometer.

(14) **IGNITION SWITCH.** The ignition switch located in center of instrument panel, controls the engine electrical supply. Turn the switch to "ON" position before starting engine. Keep the switch in "OFF" position except when starting engine, operating engine, or checking gage readings. In open-cab models, the switch is operated by a lever. In closed-cab models, the switch is operated by a key.

(15) **THROTTLE CONTROL.** The throttle control knob is located on right side of the instrument panel. It is operated by a push-pull knob, and can be used to set the throttle at a sustained speed. The knob can be pulled out in varying degrees, accelerating the engine from idling speed to maximum governed speed.

(16) **INSTRUMENT PANEL LIGHT SWITCH.** The instrument panel light switch is located on right side of instrument panel. It is of rheostat type and controls the instrument panel lights, after the main blackout switch is placed in service position.

(17) **AIR BRAKE HAND CONTROL VALVE.** The air brake hand control valve is a hand-operated valve located on the steering column directly below the steering wheel. It is used for independent trailer brake control. It can also be applied when vehicle is parked.

(18) **HORN BUTTON.** The horn button is the round molded disk located at center of steering wheel. Depress the button to operate the horn.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(19) **SPOTLIGHT SWITCH.** The spotlight switch is a toggle-type switch located on right side of instrument panel on open-cab models. On closed-cab models, switch is located on spotlight control handle. It controls current to spotlight after blackout switch is pulled to service position.

(20) **DIMMER SWITCH.** The dimmer switch is a foot-operated switch located on toeboard insert and accessible to driver's left foot. It is used to control upper and lower headlight beams. Use of this switch permits driver to dim lights when passing other vehicles, or to turn on bright lights when needed.

(21) **CRANKING MOTOR SWITCH.** The cranking motor switch is a foot-operated switch located in the floorboard, accessible to left heel. Pressing the switch engages cranking motor pinion with flywheel ring gear and operates the cranking motor.

(22) **BLACKOUT DRIVING LIGHT SWITCH.** Blackout driving light switch, located at extreme left of the instrument panel, controls the blackout driving light attached to the cowling above the left headlight.

c. Vehicle Operating Controls.

(1) **ACCELERATOR PEDAL.** The accelerator pedal, located on the left-hand floorboard between brake pedal and engine cover, is operated by driver's right foot.

(2) **CLUTCH OPERATING PEDAL.** The clutch pedal, located at left side of steering column, is operated by driver's left foot. Depress the pedal to disengage the engine from transmission so that transmission gears may be shifted.

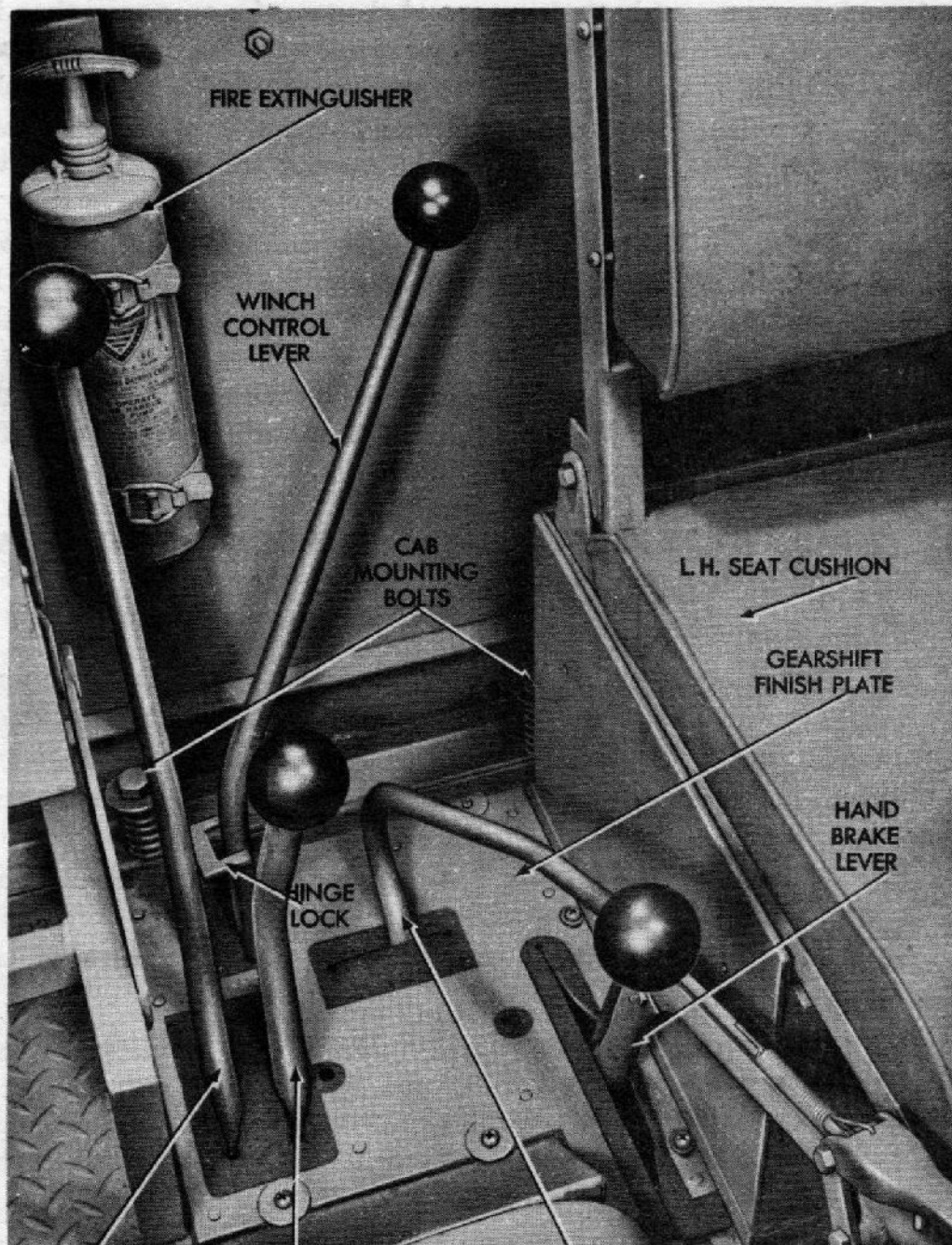
(3) **SERVICE BRAKE PEDAL.** The service brake pedal, located at right side of steering column, is operated by driver's right foot. It actuates the air-operated brake shoes at each wheel. The amount of pressure applied to the pedal determines the degree of braking action on the vehicle. In its normal position, the brakes are released.

(4) **HAND BRAKE LEVER.** The hand brake lever, located at driver's right hand, is used to apply and hold the propeller shaft brake. The brake is primarily used to hold the vehicle in parked position. When the lever is pulled back, the spring-loaded latch will hold it in its applied position.

(5) **TRANSFER CASE GEARSHIFT LEVER.** The transfer case gearshift lever is positioned between main transmission gearshift lever and front axle declutching lever. It is used to shift the transfer case into "HIGH," "NEUTRAL," or "LOW" speeds. Unless it is in either "HIGH" or "LOW," the axles will not operate. When driving with the rear axle only, the "HIGH" speed gear must be engaged. When driving with both the front and rear axles, either the "HIGH" or "LOW" speed gear may be engaged.

DRIVING CONTROLS AND OPERATION

(10) Front Axle Declutching Lever. The declutching lever is located in the right and adjustment of the declutching lever is made by turning the front axle drive housing clockwise to engage the front axle drive.



FRONT AXLE
DECLUTCHING
LEVER

TRANSFER CASE
GEARSHIFT LEVER

MAIN TRANSMISSION
GEARSHIFT LEVER

FIRE EXTINGUISHER

WINCH
CONTROL
LEVER

CAB
MOUNTING
BOLTS

L. H. SEAT CUSHION

GEARSHIFT
FINISH PLATE

HINGE
LOCK

HAND
BRAKE
LEVER

RA PD 321908

Figure 6 – Gearshift Levers Installed

5. TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(6) **FRONT AXLE DECLUTCHING LEVER.** The front axle declutching lever is located at the right and adjacent to the transfer case shift lever. This lever is used to engage or disengage the front axle drive. It has an "IN" and "OUT" position. When shifted to "IN," the front axle and rear axle are both driving, and the transfer case may then be shifted to "HIGH" or "LOW." When shifted to "OUT," the rear axle only is driving, and the transfer case can be shifted to "HIGH" only.

(7) **MAIN TRANSMISSION GEARSHIFT LEVER.** The main transmission gearshift lever is used to select the various speeds or gear ratios in the transmission. It has five speeds forward and one reverse.

(8) **STEERING WHEEL.** The steering wheel is located on the top of the steering column in front of the driver's seat, and controls the steering gear. The front wheels are turned or steered by means of the steering gear assembly.

(9) **ROOF VENTILATOR.** The cab roof ventilator, located in the roof of closed cab models, is provided with an adjustable shutter for regulating amount of air exhausted from cab.

6. USE OF INSTRUMENTS AND CONTROLS IN VEHICULAR OPERATION.**a. Starting the Engine.**

(1) **BEFORE-OPERATION INSPECTION.** Perform the Before-operation Service in paragraph 16 before attempting to start the engine.

(2) **STARTING THE ENGINE.**

(a) Set propeller shaft brake (fig. 6) to prevent vehicle from moving.

(b) Place main transmission gearshift lever in "NEUTRAL" position (figs. 4 and 6).

(c) Pull choke out all the way if engine is cold; otherwise, use part choke or none at all.

(d) Pull out throttle control about $\frac{1}{2}$ inch. Less throttle will be needed for a warm engine.

(e) Turn ignition switch to "ON" position.

(f) Depress clutch pedal (fig. 4) and hold it down until engine starts.

(g) Depress cranking motor switch (fig. 4) until engine fires; then release immediately, and push choke control part way in.

(h) After the engine has started, read the gages and instruments. The oil pressure gage should register not less than 40 pounds; if less, stop the engine immediately and investigate. The ammeter should read on the charge side; tachometer should register about 750 revolutions per minute; and the water temperature gage should show a grad-

DRIVING CONTROLS AND OPERATION

ual rise to 150 to 180 degrees when engine has warmed up. The fuel gage should register at "F."

(i) During the warm-up period, a buzzing noise will be heard. This indicates insufficient air pressure to operate service brakes. Do not operate vehicle, except in an emergency, until this noise stops. Increase engine speed slightly to hasten building up air pressure. If buzzer sounds while vehicle is in operation, stop immediately, and determine cause of loss of air pressure. After engine has warmed up, push choke control all the way in to normal position.

b. Driving the Vehicle. Disengage clutch by depressing clutch pedal. Place transfer case shift lever in either "HIGH" or "LOW" position (figs. 5 and 6), depending on load and road conditions. For heavy load, use "LOW"; for light load, use "HIGH." Vehicle cannot be moved while this lever is in "NEUTRAL" position. Move main transmission gearshift lever to the first gear position (figs. 5 and 6). Release propeller shaft brake lever (figs. 4 and 6). Depress accelerator pedal to gradually increase engine speed, and slowly release clutch pedal until clutch is fully engaged. Increase engine speed until truck gets under way. Shift main transmission into second gear as follows: Depress clutch pedal, place gearshift lever in "NEUTRAL" position and engage clutch momentarily. Depress clutch pedal again, and place gearshift lever in second position (figs. 5 and 6). Release clutch and increase engine speed. *NOTE: Do not exceed 2,300 revolutions per minute as indicated by tachometer (fig. 4).* Repeat this operation, passing through the gears consecutively, until the highest gear at which the engine pulls without laboring is reached. To shift to a lower gear, use the same procedure as for shifting to a higher gear, with the following exception: When gearshift lever is in "NEUTRAL" position and clutch is momentarily engaged, accelerate engine to approximate speed required to propel vehicle at the same speed in the lower gear. Then disengage clutch, and quickly shift to lower gear. To shift into reverse, vehicle must be completely stopped. Disengage clutch, place gearshift lever in "NEUTRAL" position, and hold clutch disengaged. Place gearshift lever in reverse position. Release clutch, and increase engine speed by depressing accelerator pedal.

c. Stopping the Vehicle. Close throttle by removing foot from the accelerator pedal. Apply brake carefully by depressing service brake pedal. When the vehicle is nearly stopped, disengage clutch and move main transmission gearshift lever into "NEUTRAL" position. When truck is completely stopped, apply propeller shaft brake. Release clutch and service brake pedals.

d. Stopping the Engine. To stop engine, turn ignition switch to "OFF" position. *NOTE: Make sure switch is completely open; otherwise battery will be run down, and starting engine will be difficult.*

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)**7. TOWING THE VEHICLE.**

a. Towing to Start Vehicle. Attach towing cable to towing hooks. If possible, attach air line from towing truck to air line of truck to be towed. Place front axle declutch lever (figs. 4 and 6) in "OUT" position (fig. 5). Move transfer case shift lever to "HIGH" position (figs. 5 and 6). Shift main transmission gearshift lever to the No. 5, or "OVERDRIVE" position (figs. 5 and 6). Pull out choke and throttle into same position as for starting. Turn ignition switch to "ON" position. Release propeller shaft brake lever, and depress clutch pedal. Release clutch pedal slowly when a reasonable speed is reached. As soon as engine starts, disengage clutch, and adjust controls as necessary to provide a smoothly running engine. If it becomes necessary to stop vehicle before engine starts, and air is not available from towing vehicle, use propeller shaft brake. Exercise extreme care in applying this brake.

b. Towing Disabled Vehicle. Check tires for proper inflation to make towing easier (par. 168). Attach towing cable to towing hooks. Be sure cable is long enough to make harsh usage of brakes unnecessary. Connect air supply from towing vehicle, if any, to trailer connections behind front bumper of vehicle to be towed. This will enable operator of disabled vehicle to use service brakes. Move the front axle declutch lever to the "OUT" position (fig. 5). Place main transmission gearshift lever in "NEUTRAL" position (fig. 5). Push propeller shaft brake lever all the way down to the released position. If air supply is not connected, the propeller shaft brake provides the only possible means for stopping. Because this brake is extremely severe, utmost care must be observed in using it. If necessary to hoist front end of truck, attach lifting tackle to bumper. Be careful in wrapping chain around bumper to avoid crushing air tubing. Use necessary blocking between tow truck and bumper to prevent vehicle from running into tow truck. If necessary to hoist rear of truck, wrap chain around the entire frame immediately in front of rear spring rear bracket. Be sure to get chain between spring and frame so that frame will carry the load. Attach necessary blocking between tow truck and rear frame rail to prevent damage through collision of tow truck and vehicle being towed. Straighten front wheels, and clamp the steering wheel to prevent turning.

Section IV

AUXILIARY EQUIPMENT CONTROLS AND OPERATION**8. WINCH.**

a. **Operating Controls** (fig. 6). The winch is controlled by power take-off shifter lever in cab, operating the take-off in either of two forward speeds or one reverse speed. Neutral points are between each of the gear speeds. A lock is provided to secure control lever in one of the neutral points. An adjustable drag brake bears against drum to keep drum from spinning while pulling off cable by hand.

b. Operation.

(1) **To HOOK ON.** Pull out jaw clutch and cable, hook onto load, then return jaw clutch to "IN" position, with poppet locked.

(2) **To PULL.** Depress engine clutch pedal, and shift take-off into high or low forward speed. (High for light pulls; low for heavy pulls. If in doubt, use low.) Release engine clutch foot pedal, and winch will wind in cable.

(3) **To STOP.** Depress engine clutch pedal, and shift take-off into neutral. Worm shaft automatic brake will hold tension on line until take-off is put into reverse or until winch truck is driven forward.

(4) **To LOWER OR TO RELEASE TENSION ON LINE.** Depress engine clutch pedal, put take-off into reverse, and release pedal. Winch will now operate in reverse and pay out the winch line. **CAUTION:** *Never try to lower a load with the jaw clutch out; always use reverse.*

(5) **To COIL CABLE WITH NO LOAD (TWO METHODS).** First method: Pull out winch line and secure to a tree. Put jaw clutch in mesh and, with slight pressure on truck brake pedal, allow winch line to pull ahead. Second method: Pull out winch line, fasten it to front bumper of another truck that is properly lined up with the winch truck, and start winch pulling. The driver of the truck that is being pulled should keep light pressure on the truck brake pedal. **CAUTION:** *Winding on the first layer is most important. The coils of the cable must be tight against each other so the coils on the next layer cannot jam down between them. As the cable is wound on, it should be tapped on every few inches. Use a wooden block between hammer and cable to prevent flattening the wires. After the first layer is on, watch the beginning and end of each layer, and keep the tracks lined up properly. When winch is not in use, and with line properly coiled in place, keep sliding jaw clutch in mesh, and lock power take-off lever in neutral.*

(6) **PULLING SPEEDS.** Winch pulling speeds are based on a maximum engine speed of 1,000 revolutions per minute which must not be exceeded when using winch. When winch is being used to assist the vehicle with the wheels driving, always have the take-off in low speed. The transmission and transfer case must also be in low range.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)**9. PONTON BODY.**

a. **Endgate Control** (fig. 1). Endgates are hinged at the bottom and provided with eyelet bars on upper corners. With endgate in closed position, a single chain link attached to ponton body is hooked over eyelet bar on endgate. An "S" hook, attached to a chain, is inserted into endgate eyelet bar to secure this locking arrangement.

10. FIFTH WHEEL.

a. **Operation.** Coupler jaws are held in locked position by a plunger lock which extends into cutaway section on coupler jaws. A safety latch, attached to the base and extending over end of plunger lock, prevents unlocking of jaws. When safety latch is swung aside and operating handle is pushed forward, a plunger lock latch, actuated by a spring, snaps against the side of plunger lock, holding it in receiving position. A pin on the left coupler jaw releases the plunger lock latch when jaws are spread. This allows plunger lock to enter recess in jaws and lock them in coupling position. Side motion is allowed by leveling springs under the walking beam, and is controlled by adjusting wedges on each side of the beam.

Section V**OPERATION UNDER UNUSUAL CONDITIONS****11. DECONTAMINATION.**

a. Decontamination is covered in the Armored Force Field Manual No. 17-59.

12. CARE AND OPERATION IN HOT, DRY CLIMATES.

a. Pay particular attention to cooling and lubrication systems. Be sure each is filled to correct capacity with proper fluid. Note engine temperature frequently as shown by temperature gage. If temperature rises to 212° F, stop engine and inspect cooling system. Flush if necessary. Look for sand in radiator fins. Blow out with compressed air if available.

b. If desert conditions are encountered, check oil filter, carburetor, air cleaner, and air compressor air filter every 4 hours. Service each as necessary.

c. Under sandy conditions, avoid excessive use of lubricants. Exposed grease and oil become grit-laden, and may work into fittings,

OPERATION UNDER UNUSUAL CONDITIONS

causing unnecessary wear. Clean all sand from fittings before lubricating.

d. When making repairs, avoid touching machined surfaces. Perspiration contains acid which may cause rust.

e. Avoid parking vehicle for prolonged periods exposed to direct rays of the sun. Tire life is seriously shortened by intense heat and light. If possible, place vehicle under cover to protect it from sand and dust. Cover inactive vehicles with tarpaulins if no suitable building is available.

13. CARE AND OPERATION IN HOT, DAMP CLIMATES.

a. Keep cooling system clean and filled with clean, fresh (not salt) water. Use soft water if possible. Frequently note engine temperature as registered by temperature gage. Stop vehicle immediately if temperature of engine reaches 212° F.

b. Keep exterior surfaces protected from atmosphere. Repaint surfaces from which paint has worn off or has been removed by other causes. Keep a film of light engine oil applied to unfinished metal exterior surfaces.

c. Flush, with fresh water, metal surfaces which have been exposed to salt water. Apply a film of light engine oil to unfinished metal parts.

d. Vehicles stored in hot, damp climates must be inspected frequently for corrosion. Remove corrosion from exterior surfaces with flint paper 2/0 and from machined surfaces with crocus cloth. Apply a protective coating of paint, oil, or rust-preventive compound to check corrosion.

14. CARE AND OPERATION IN EXTREMELY COLD CLIMATES.

a. **Subzero Temperatures.** Operation of automotive equipment in subzero temperatures presents problems which do not exist in moderate temperatures. Consequently, operators and maintenance personnel must provide special precautions and extra careful servicing to avoid functional failure. Systems most likely to suffer from extreme cold are lubrication, fuel, cooling, and electrical (battery). In addition, strength of metals is seriously lowered by extremely low temperatures.

b. **Deep Mud, Snow, and Ice.** When operating in deep mud, snow, and ice, clean off caked mud or ice frequently. Do not allow mud, snow, or ice to cake on the wheels, slack adjusters, steering knuckles, and steering arms. Do not allow ice or mud to gather on the air system

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

safety valve, oil filler, or air filter openings. Inspect and clean mud, snow, or ice off radiator core, fan, and fan belts. Keep mud, snow, or ice off all electrical connections.

c. Precautions.

(1) Take care in moving a vehicle from a warm place into sub-zero temperature. Moisture will immediately condense and freeze on all surfaces.

(2) Remove all oil from carburetor air cleaner for operation at temperatures below -40°F .

(3) To eliminate any possibility of brake freezing, park vehicle without setting propeller shaft brake. Block wheels to prevent rolling of vehicle. Keep a blowtorch handy to thaw frozen propeller shaft or service brakes.

(4) Inspect vehicle frequently for broken screws, bolts, or other metal parts, and for loosened nuts. Shock resistance of metals is greatly lowered by extremely low temperatures, and yet the strain and stress, due to jolting on frozen ground, is increased.

(5) Disconnect speedometer cable at drive end if vehicle is operated in temperatures of -30°F or below. These cables often fail to function properly at such temperatures, and frequently break because of excessive drag due to high viscosity of lubricating oil.

d. Lubrication System. Check all lubrication for subzero temperatures against the Lubrication Guide (par. 21). Observe the following precautions:

(1) Keep vehicle in a heated enclosure when not in use.

(2) When engine is stopped, drain crankcase oil while still hot. Tag vehicle in a conspicuous place in the cab, to warn personnel that crankcase is empty. Store oil in a warm place if possible. Otherwise, heat oil before reinstalling. Do not get oil too hot; heat only enough so that the bare hand can be inserted without burning.

(3) Cover entire cab and engine section with a tarpaulin. About 3 hours before engine is to be started, place fire pots under tarpaulin. A Van Prag, Primus type, or other type blowtorch, and ordinary kerosene lanterns may be used. With due consideration of the fire hazard involved, the flame may be applied directly to the oil pan.

(4) Dilute crankcase oil with gasoline or, in an emergency, with Diesel fuel. After 4 or more hours of operation, redilute oil if vehicle is to be left standing unprotected 3 or more hours. Turn engine over several times to mix oil and diluent. Use quantity of diluent as follows:

OPERATION UNDER UNUSUAL CONDITIONS

Temperature (degrees F)	Diluent	Quantity
0 to -20	gasoline	1/2 qt to each 4 1/2 qt of engine oil
0 to -20	Diesel fuel	1/2 qt to each 3 1/2 qt of engine oil
Below -20	gasoline	1 qt to each 5 qt of engine oil
Below -20	Diesel fuel	1 qt to each 4 qt of engine oil

NOTE: *Presence of oil diluent increases engine oil consumption. Check oil level frequently.*

e. Fuel System.

(1) If possible, use a winter grade gasoline. When within continental limits of the United States, a winter grade of gasoline meeting U.S. Army Specification 2-114 must be used. Regardless of the fuel used, a certain amount of condensation from moisture in the air can be expected. At low temperatures, this water will form ice crystals which will clog fuel lines and carburetor jets. To overcome this difficulty, observe the following precautions:

(a) Strain fuel through a chamois skin or other type strainer that will prevent passage of water. **WARNING:** *Provide a metallic contact between container and tank to "ground" static electricity.*

(b) Keep fuel tanks full at all times if possible. The more fuel there is in a tank, the smaller will be the volume of air from which moisture can condense.

(c) Keep all containers clean and free from rust.

(d) If possible, after filling or moving a container, allow fuel to settle before filling vehicle from it.

(e) Keep all containers tight to prevent entrance of snow, ice, dirt, or other foreign matter.

(2) Full choke is necessary to obtain required fuel-air ratio for cold weather starting. Therefore, occasionally check butterfly valve to see that it closes all the way, and otherwise functions properly.

(3) Carburetion trouble encountered with lowered temperatures may be due to a faulty carburetor. A carburetor which gives no appreciable trouble at normal temperatures may not operate satisfactorily at lower temperatures. Replace faulty carburetors.

(4) A fuel pump, which delivers enough gasoline for normal starting at 500 revolutions per minute, may have leaky valves or a faulty diaphragm. Either would prevent it from delivering sufficient fuel for cold weather starting. Replace fuel pump, if necessary.

(5) Remove and clean fuel filter sediment bowl and strainers daily.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

f. Cooling System.

(1) Ethylene glycol is the only compound prescribed for use in radiator antifreeze solutions. Do not use alcohol unless other materials are unavailable. Alcohol is objectionable because it boils at 173° F.

Temperature (degree F)	Pints of Ethylene Glycol per Gallon of System Capacity
30	1
20	1½
10	2
0	2½
-10	3
-20	3½
-30	4
-40	4½
-50	4½
-60	5
-70	5

(2) Observe the following precautions before installing antifreeze solution:

(a) Flush entire cooling system with fresh water. Flush radiator and engine separately, in order to prevent transfer of residue from one to another. In order to accomplish this, disconnect hose connections. Inject water into cylinder block from top connection; inject water into radiator from bottom opening. Use a flushing gun if available.

(b) Inspect entire system. Replace checked, rotted, or injured hose connections. Tighten all connections.

(c) Lubricate water pump (par 21).

(3) In an emergency, the vehicle can be operated without anti-freeze solution in moderately freezing temperature (above 0° F) by use of radiator covers improvised locally. Drain system upon stopping engine, and refill upon starting. Keep radiator covered sufficiently to keep heat indicator in high operating range (about 150° to 170° F).

g. Electrical System. Battery efficiency decreases sharply with decreasing temperatures and, without special care, becomes practically nil at -40° F. To overcome this, observe the following precautions:

(1) Keep batteries fully charged (hydrometer reading between 1.275 and 1.300) at all times. A fully charged battery will not freeze

OPERATION UNDER UNUSUAL CONDITIONS

at temperatures likely to be encountered even in arctic climates, but a fully discharged battery will freeze and break at 5° F.

- (2) Do not add water to batteries in subzero weather unless they are to be charged immediately.
- (3) At temperatures of -30° F and below, heat batteries before trying to start engine with them.
- (4) Keep all wiring connections and battery terminals clean and tight.
- (5) Check generator and cranking motor brushes, commutator, and bearings. Replace brushes if worn. Keep commutator clean. Replace assembly if bearings "drag." If cranking motor fails to engage flywheel, remove cranking motor, and clean grease and dirt from throw-out mechanism.
- (6) Check ignition coil for proper functioning. Replace coil and condenser if spark is weak.
- (7) Keep distributor clean and points properly adjusted (par. 83 b (2)). Replace points (par. 83 b (4)) if worn or pitted.
- (8) Keep spark plugs clean and in adjustment. Reduce gap by 0.005 inch if it is difficult to make engine fire.
- (9) Check timing carefully (par 83 b (1)). Adjust if unduly advanced or retarded.
- (10) Inspect lights carefully for short circuits or presence of moisture around sockets. Perform needed repairs.
- (11) Before every start, see that spark plugs, wiring, and other electrical equipment are free from ice.

h. Cold Weather Accessories.

- (1) Cold weather kits are furnished with some vehicles. Use of its components will simplify cold weather operation and maintenance.
- (2) Listed below are other cold weather accessories commonly used. They are listed merely as suggestions to be employed at the discretion of the officer in charge of materiel.
 - (a) Tarpaulins, tents, or collapsible sheds may be used to shelter the vehicle.
 - (b) Extra batteries and equipment for changing batteries quickly are useful to aid in starting the vehicle.
 - (c) Steel drums may be used in heating oil.
 - (d) Insulation of fuel lines helps prevent ice formation inside lines.
 - (e) Radiator covers, improvised locally, may be used to help control engine temperature.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

Section VI

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICES**15. PURPOSE.**

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

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

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

d. The general inspection of each item applies also to any supporting member or connection, and generally includes a check to see whether or not the item is in good condition, correctly assembled, secure, or excessively worn.

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

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

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICES

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

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

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

16. BEFORE-OPERATION SERVICE.

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

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

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

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

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

(4) **ITEM 4, ACCESSORIES AND DRIVES.** Examine units, such as

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

carburetor, generator, cranking motor, air compressor, fan, and air cleaners for looseness, damage, or leaks. Be sure drive belts are in good condition and that adjustment is satisfactory. Belts should have 1/2- to 3/4-inch finger-pressure deflection.

(5) **ITEM 5, AIR BRAKE TANKS.** Check the air brake reservoir tanks to see that they are secure and undamaged. Make sure that all air line connections are tight. Also be sure that water (condensation) has been drained from the tanks and that drain cocks are closed.

(6) **ITEM 6, LEAKS, GENERAL.** Inspect ground under vehicle, and inside of engine compartment for indications of fuel, engine oil, coolant, and gear oil leaks. Pay particular attention to fuel tanks and lines, crankcase and oil filters, radiator, water pump, water lines and connections, and all gear cases. Trace any leaks found to their sources, and correct or report them to designated authority.

(7) **ITEM 8, CHOKE.** As engine is being started, check operation of choke to see that valve opens and closes in response to choke control.

(8) **ITEM 7, ENGINE WARM-UP.** Start engine, and note any tendency toward hard starting. Observe action of cranking motor, particularly if it has adequate cranking speed and engages and disengages without unusual noise when in operation. Set the hand throttle so that engine idles from 450 to 600 revolutions per minute, and proceed with the following Before-operation Service. As engine warms up, reset choke as required for engine to run smoothly and to prevent overchoking and oil dilution. **NOTE:** *If oil pressure is not evident in 30 seconds, stop engine and investigate.*

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

(a) **Oil Gage.** The pressure at normal operating engine speed is 30 to 50 pounds, and 5 pounds minimum at idle speed with engine warm.

(b) **Ammeters.** Regular ammeter should show positive (+) with engine at fast idle, and at slower speeds with lights on, it may show on negative (—) side. "B" ammeter indicates that second battery or "B" battery is charging or discharging. High charge readings may be indicated until generator restores to batteries the current used in starting engine.

(c) **Engine Temperature Gage.** Reading should increase gradually during warm-up period to normal operating range, 157° F to 183° F. Maximum safe temperature 200° F. **NOTE:** *Do not move vehicle until temperature reaches minimum operating range, 135° F.*

(d) **Viscometer.** After engine has reached operating temperature, reading should be in "IDEAL" range.

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICES

(e) *Tachometer.* White pointer should indicate actual engine revolutions per minute at any given time engine is running. Red hand indicates, and remains at, highest engine revolutions per minute reached (should not exceed 2,300 rpm).

(f) *Air Pressure Gage.* This gage must register 60 pounds before vehicle is moved. Warning indicator (buzzer) should sound at pressures below 55 pounds and cut out at 60 pounds. Maximum governed pressure is 105 pounds.

(g) *Fuel Gage.* Inspect gage to see that it registers the approximate amount of fuel in tanks. Ordinarily tanks will be filled at After-operation Service, and gage should register "FULL."

(10) **ITEM 10, HORN AND WINDSHIELD WIPERS.** If tactical situation permits, test horn for proper operation and tone. Test wipers to see that they operate, and observe whether or not the blades contact glass evenly and the arms travel through full stroke. Inspect for damage.

(11) **ITEM 11, GLASS AND REAR VISION MIRROR.** Clean all glass, and inspect for damage. Aim rear vision mirror properly, and see that it is secure.

(12) **ITEM 12, LAMPS (LIGHTS) AND REFLECTORS.** See that all lights and warning reflectors are clean. Examine them for looseness or damage. If tactical situation permits, open and close switches, and observe if lights respond properly. Include stop, spot, and blackout lights.

(13) **ITEM 13, WHEEL AND FLANGE NUTS.** Make sure that all wheel mounting and axle flange nuts are present and secure.

(14) **ITEM 14, TIRES.** The tire pressure is 80 pounds (maximum) when cool. Inspect tires for damage, and remove any embedded objects from treads, carcass, or between duals.

(15) **ITEM 15, SPRINGS AND SUSPENSIONS.** Inspect springs and shock absorbers to see that they are secure and not damaged and that all assembly and mounting nuts and screws are tight. Examine shocks for leaks.

(16) **ITEM 16, STEERING LINKAGE.** Inspect gear case and all rods and joints for looseness or damage. Look for excessive lubricant leaks at gear case.

(17) **ITEM 17, FENDERS AND BUMPERS.** Inspect fenders and bumpers for looseness or damage.

(18) **ITEM 18, TOWING CONNECTIONS.** Inspect all connections for looseness or damage. Examine pintle hook to be sure it operates freely and locks securely. Examine fifth wheel to see that it is secure, tilts freely, is clean and well lubricated, and protected against dirt. If

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

fifth wheel is in use, make sure that it is properly connected and securely locked and that trailer brake and light connections are secure.

(19) **ITEM 19, BODY, LOAD, AND TARPAULIN.** Inspect cab and top tarpaulin for damage. Be sure that doors and latches operate properly, and that floor plates and engine cover are secure. Inspect ponton body (box) for looseness and damage. Make sure that any load in box is properly distributed, secure, and, if covered, that tarpaulin is properly lashed.

(20) **ITEM 20, DECONTAMINATOR.** Be sure decontaminator is present, fully charged, and secure.

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

(22) **ITEM 22, ENGINE OPERATION.** Before vehicle is put in motion, be sure engine has reached operating temperature and idles smoothly. Accelerate and decelerate, and listen for any unusual noise. Note any unsatisfactory operating characteristics or excessive exhaust smoke.

(23) **ITEM 23, DRIVER'S PERMIT AND FORM No. 26.** Driver must have his operator's permit on his person. Check to see that all vehicle and equipment manuals, Lubrication Guides, Form No. 26 (Accident-Report), Form No. 478 (MWO and Major Unit Assembly Replacement Record), are present, legible, and safely stowed.

(24) **ITEM 25, DURING-OPERATION CHECK.** The During-operation Service and observations start immediately after the vehicle is put in motion.

17. DURING-OPERATION SERVICE.

a. While vehicle is in motion, listen for such sounds as rattles, knocks, squeals, or hums that may indicate trouble. Look for indications of trouble in cooling system, or for 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, 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 constantly. Notice promptly any unusual instrument indication that may signify possible trouble in system to which that instrument pertains.

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 next scheduled halt.

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICES

(1) **ITEM 27, FOOT AND HAND BRAKES.** Foot brakes should stop vehicle smoothly and effectively with normal pedal pressure, and return to off position immediately after foot pressure is released. If towed vehicle is connected, test hand-operated application valve separately, and note if brake action on trailer is satisfactory. Hand brake must hold vehicle on a reasonable incline, leaving one-half ratchet travel in reserve, and must lock securely in applied position.

(2) **ITEM 28, CLUTCH.** Clutch must not grab, chatter, or squeal during engagement, or slip when fully engaged under load. Pedal must have 1-inch free travel before meeting resistance.

(3) **ITEM 29, TRANSMISSION AND POWER TAKE-OFF.** Gears must shift smoothly, without unusual noise, and not slip out of mesh during operation of vehicle or winch.

(4) **ITEM 30, TRANSFER.** Transfer unit range gears and declutching mechanism must shift easily, without unusual noise, and not creep out of mesh during operation.

(5) **ITEM 31, ENGINE AND CONTROLS.** The driver must be on the alert for deficiencies in engine performance, such as lack of usual power, misfiring or stalling, unusual noise, indications of overheating, or excessive exhaust smoke. Observe if engine responds to all controls and if controls are in proper adjustment, and not excessively loose or binding. If radio noise is reported during operation of the vehicle, the driver will cooperate with complaining radio operator in locating the interference. Refer to paragraphs 113 and 115.

(6) **ITEM 32, INSTRUMENTS.** Observe the readings of all instruments frequently during operation to be sure units to which they apply are functioning satisfactorily. Be sure that speedometer registers vehicle speed and that odometer records accumulating mileage.

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

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

(9) **ITEM 35, BODY.** Note any noise or abnormal condition that might indicate shifting, loose top tarpaulin or curtains, loose or damaged doors, hardware, floor or inspection plates, or mounted body attachments. Also observe body (box), mounted at rear of cab, for any indications of looseness or shifting of load, or loose tarpaulin if in use.

18. AT-HALT SERVICE.

a. At-halt Service may be regarded as minimum maintenance procedures and should be performed under all tactical conditions, even

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

though more extensive maintenance services must be slighted or omitted altogether.

b. **Procedures.** At-halt Service consists of investigating any deficiencies noted during operation, inspecting items listed below according to the procedures following the items, and correcting any deficiencies found. Deficiencies not corrected should be reported promptly to the designated individual in authority.

(1) **ITEM 38, FUEL, OIL, AND WATER SUPPLY.** Check the fuel, engine oil, and coolant supply to see that they are adequate to operate the vehicle to the next refueling point, and add as necessary to bring to correct levels. When refueling, use safety precautions for grounding static electricity. Vent cooling system before fully removing pressure filler cap. Filler cap vents must be open, pressure cap valves must be free, and cap must be replaced securely. Do not fill fuel tanks or radiator to overflowing, but leave sufficient space for expansion. If engine is hot, fill radiator slowly while engine is running at a fast idle.

(2) **ITEM 39, TEMPERATURES: HUBS, BRAKE DRUMS, TRANSFER, TRANSMISSION, AXLES, AND WINCH.** Place hand cautiously on each brake drum and wheel hub to see if it is abnormally hot. Inspect transfer case, transmission, and axle housings for overheating, and note any excessive lubricant leaks. If winch is in use, place hand cautiously on power take-off and winch worm gear housings to see if they are abnormally hot. Inspect winch for excessive oil leaks.

(3) **ITEM 40, AXLE AND TRANSFER VENTS.** Wipe clean, and inspect vents for damage or clogging. Vents must be kept open.

(4) **ITEM 41, PROPELLER SHAFTS.** Inspect all drive shafts and universal joints for looseness, damage, and excessive lubricant leaks. Remove any foreign matter wound around shafts or joints. Examine winch shaft shear pin to see that it is in place and in good condition.

(5) **ITEM 42, SPRINGS AND SUSPENSIONS.** Inspect for broken or shifted spring leaves, damaged or loose U-bolts, eye bolts, shackles, rebound clips or shock absorber bodies and linkage, or excessive shock fluid leaks.

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

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

(8) **ITEM 45, TIRES.** Inspect all tires for underinflation or damage. Remove embedded objects in treads or carcasses, and from between duals. See that spare tire is inflated and secure in carrier.

(9) **ITEM 46, LEAKS, GENERAL.** Look under vehicle and within engine compartment for indications of fuel, oil, or coolant leaks. Trace

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICES

those found to their sources, and correct or report them to designated authority.

(10) **ITEM 47, ACCESSORIES AND BELTS.** Examine all accessible units for looseness or damage. Be sure generator, fan, and compressor drive belt tension is satisfactory, $\frac{1}{2}$ - to $\frac{3}{4}$ -inch finger-pressure deflection. If radio interference is reported that may be caused by operation of the engine, examine all wiring and radio noise suppression units in engine compartment for damage and loose connections or mountings, particularly resistor-suppressors at spark plugs and distributor.

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

(12) **ITEM 49, FENDERS AND BUMPER.** Inspect front bumper, fenders, and rear splash guards for looseness or damage.

(13) **ITEM 50, TOWING CONNECTIONS.** Inspect all connections for looseness or damage. Be sure locking devices are secure, and that air hose is supported so that it will not chafe on other vehicle parts.

(14) **ITEM 51, BODY, LOAD, AND TARPAULIN.** Inspect for damage and for indications of shifting of the cab, the ponton body (box) mounted at rear of cab, or the load. Be sure that tarpaulin, if in use, is properly secured.

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

19. AFTER-OPERATION AND WEEKLY SERVICE.

a. After-operation Service is particularly important because, at this time, the driver inspects his vehicle to detect any deficiencies that may have developed, and corrects those he is permitted to handle. He should report promptly, to the designated individual in authority, the results of his inspection. If this schedule is performed thoroughly, the vehicle should be ready to roll again on a moment's notice. The Before-operation Service, with a few exceptions, is then necessary only to ascertain whether or not the vehicle is in the same condition in which it was left upon completion of the After-operation Service. The After-operation Service should never be entirely omitted, even in extreme tactical situations, but may be reduced to the bare fundamental services outlined for the At-halt Service, if necessary.

b. **Procedures.** When performing the After-operation Service, the driver must remember and consider any irregularities noticed during the day in Before-operation, During-operation, and At-halt Services. The After-operation Service consists of inspecting and servicing the following items. Those items of the After-operation Service that

5. TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

are marked by an asterisk (*) require additional weekly services, the procedures for which are indicated in subparagraph (b) of each applicable item.

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

(2) **ITEM 56, INSTRUMENTS.** Check pertinent instruments to be sure that all are operating properly and registering or indicating correct performance of the units to which they pertain. Stop engine, first allowing it to cool off for 4 or 5 minutes if it is at, or beyond, normal operating temperature, 180° F.

(3) **ITEM 54, FUEL, OIL, AND WATER SUPPLY.** Fill fuel tanks. Check crankcase oil and coolant supply, and add as necessary to bring to correct levels. *NOTE: Do not overfill fuel tanks or radiator. Allow room for expansion.* In freezing weather, if any appreciable amount of coolant is necessary, have antifreeze value checked, and add enough to protect cooling system against freezing. Do not add coolant while engine is too hot. Fill all spare fuel, oil, and water cans if supply has been used.

(4) **ITEM 57, HORN AND WINDSHIELD WIPERS.** Inspect these items to make sure they are secure and not damaged. If tactical conditions permit, test horn for proper operation and tone.

(5) **ITEM 58, GLASS AND REAR VISION MIRROR.** Clean windshield and mirror glass, and inspect for damage. Make sure that mountings are secure.

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

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

(8) **ITEM 61, DECONTAMINATOR.** Inspect decontaminator for looseness or damage and for full charge. If it has been used, report for refill or exchange.

(9) **ITEM 62, *BATTERIES.**

(a) Inspect batteries to see that they are clean, secure, and not leaking or damaged. Make sure that cell caps are fingertight.

(b) *Weekly.* Clean dirt from top of battery. If terminal connections or posts are corroded, clean them thoroughly, and apply

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICES

fresh, thin coating of grease. Tighten terminal bolts if loose. Remove vent caps, and check level of electrolyte. Add water if required, taking precautions so that battery will not be damaged during freezing temperatures. Battery must be secure, not bulging or cracked, or leaking electrolyte. Battery carrier must be secure, clean, free of rust, and well painted. If mountings are loose, tighten them cautiously so as not to damage the battery case. Report defects to designated authority.

(10) **ITEM 63, ACCESSORIES AND BELTS.** Inspect units, such as carburetor, generator, cranking motor, fan, water pump, compressor, distributor, regulator unit, and oil filters, for looseness, damage, or leaks. Check condition and adjustment of drive belts for $\frac{1}{2}$ - to $\frac{3}{4}$ -inch finger-pressure deflection. Investigate and correct, or report to designated authority, any deficiencies of accessory units or drives noted during operation.

(11) **ITEM 64, ELECTRICAL WIRING.** Inspect all ignition wiring for looseness or damage, and wipe off excess grease or moisture. Also make an inspection of all accessible low-voltage wiring and connections for looseness or damage. Be sure all wiring is supported, so that it will not chafe against other vehicle parts. Examine resistor-suppressors at spark plugs and distributor for scorch or damage.

(12) **ITEM 65, *AIR CLEANERS AND BREATHER CAPS.**

(a) Inspect air cleaners and breather caps for looseness or damage. Examine oil in reservoirs for correct level and excessive dirt. When operating under sandy or dusty conditions, clean and service air cleaners and breather caps as often as necessary.

(b) *Weekly.* Remove cleaner reservoirs and elements, wash in dry-cleaning solvent, refill reservoirs with clean oil, and reinstall securely. Be sure all gaskets seal properly, and that joints and connections are secure.

(13) **ITEM 66, *FUEL FILTER.**

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

(b) *Weekly.* Remove sediment bowl drain plug, and drain off all accumulated dirt and water. If fuel pump sediment bowl shows dirt or water, remove and clean.

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

(15) **ITEM 68, *TIRES.**

(a) Examine all tires, including spares, for damage and excessive wear. Remove all embedded foreign matter, such as nails, glass, or stones, from treads, carcasses, and from between duals. Check for low pressures and proper position of valve stems, and for presence

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

of valve caps. Inflate as needed to correct pressure, 80 pounds (maximum) when cool.

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

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

(17) **ITEM 70, STEERING LINKAGE.** Inspect for looseness or damage. Examine steering gear case and joints for excessive lubricant leakage, or lack of lubrication. Investigate any unusual operating condition noted during operation.

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

(19) **ITEM 72, *AXLE AND TRANSFER VENTS.**

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

(b) *Weekly*: Remove vents and clean out passages. Reinstall securely.

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

(21) **ITEM 74, GEAR OIL LEVELS.** Check gear oil levels in differentials, transfer case, transmission, steering gear housing, and winch worm gear housing. If low, report to designated authority. If vehicle has been in operation in deep water, sample the lubricant in these units for contamination. Correct levels are from $\frac{1}{2}$ inch below, when cool, to lower edge of filler hole, when hot.

(22) **ITEM 75, *AIR BRAKE TANKS.**

(a) Inspect tanks and lines for looseness or damage. Open reservoir drain cocks, and drain off all accumulated condensate.

(b) *Weekly*: Tighten tank mountings and line connections. Clean air line rubber hose of all grease or oil.

(23) **ITEM 76, FENDERS AND BUMPER.** Inspect front fenders, bumper, and rear splash guards for looseness or damage.

(24) **ITEM 77, *TOWING CONNECTIONS.**

(a) Inspect towing hooks, tractor truck fifth wheel, or pintle hook and safety chains for looseness or damage. Also check to see that the safety chains are connected correctly to vehicle and trailer.

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICES

(b) *Weekly*: Lower the trailer landing gear, observing whether or not it operates properly, is adequately lubricated, not damaged, and secure. Disconnect the trailer. Clean the contacting surfaces of the fifth wheel, upper plate, and kingpin thoroughly. Inspect them for wear and damage, and apply a fresh coating of clean grease. Tighten all mounting bolts, and connect the trailer. Notice whether or not the hand lever works easily and whether or not the latching mechanism closes completely and latches securely.

(25) ITEM 78, BODY, LOAD, AND TARPAULIN. Inspect cab and box carefully for damaged or loose parts. Examine top tarpaulin and side curtains for worn spots or other damage, and make sure they are secure. Look load over carefully for damage or shifting, and make sure that it is properly stowed. If it is perishable, make sure that it is protected against the elements.

(26) ITEM 79, WINCH. Inspect winch worm gear housing, drum, and mountings for looseness or damage. Check housing for excessive oil leaks. Make sure that clutch is in good condition and operates freely, that cable is evenly and tightly wound on drum, and that cable chain and hook are properly mounted on front tow hooks and secured.

(27) ITEM 82, *TIGHTENING.

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

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

(28) ITEM 83, *LUBRICATE AS NEEDED.

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

(b) *Weekly*: Lubricate all points of the vehicle indicated on the Lubrication Guide (par. 21) as needing lubrication on a weekly or on a mileage basis.

(29) ITEM 84, *CLEAN ENGINE AND VEHICLE.

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

(b) *Weekly*: Wash vehicle when possible or, if not possible, wipe off thoroughly. Inspect paint or camouflage pattern for rust or for

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

bright spots which might cause reflections. Make sure that vehicle markings are legible unless covered for tactical reasons. **CAUTION:** *If vehicle is driven into water for washing, care must be taken to see that water or dirt does not get into wheel bearings, gear cases or brakes, or on electrical units or wiring.*

(30) ITEM 85, *TOOLS AND EQUIPMENT.

(a) Check vehicle stowage and tool lists (par. 22) to see that all items are present. Inspect items to see that they are in good condition and properly mounted or stowed.

(b) *Weekly:* Clean all tools and equipment of rust or dirt, and apply preservative where necessary when possible. See that tools with cutting edges are sharp and properly protected, and that all items are securely mounted or stowed. **NOTE:** *When services are completed, be sure all inspection plates are replaced securely.*

Section VII

LUBRICATION

20. INTRODUCTION.

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

21. LUBRICATION GUIDES.

a. **General.** Lubrication instructions for this materiel are consolidated in Lubrication Guides (figs. 7 and 8). In addition to the items on the Guides, other small moving parts, such as hinges and latches, must be lubricated at frequent intervals. Localized lubrication points are illustrated in figures 9 to 16, inclusive.

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

c. **Lubrication Notes for 5- to 6-ton, 4 x 4, Ponton, Tractor Truck With Winch (Autocar Model U8144T).** The following notes apply to the Lubrication Guide shown in figure 7. All note references in the Guide itself are to the subparagraph below having the corresponding number. Additional lubrication and service instructions are on individual units and parts. For cold weather lubrication and service below 0° F, refer to OFSB 6-11.

LUBRICATION

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

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

(3) **CLEANING.** **SOLVENT**, dry-cleaning, or **OIL**, fuel, Diesel, must be used to clean or wash all parts. Use of gasoline for this purpose is prohibited. Dry all parts thoroughly before relubrication.

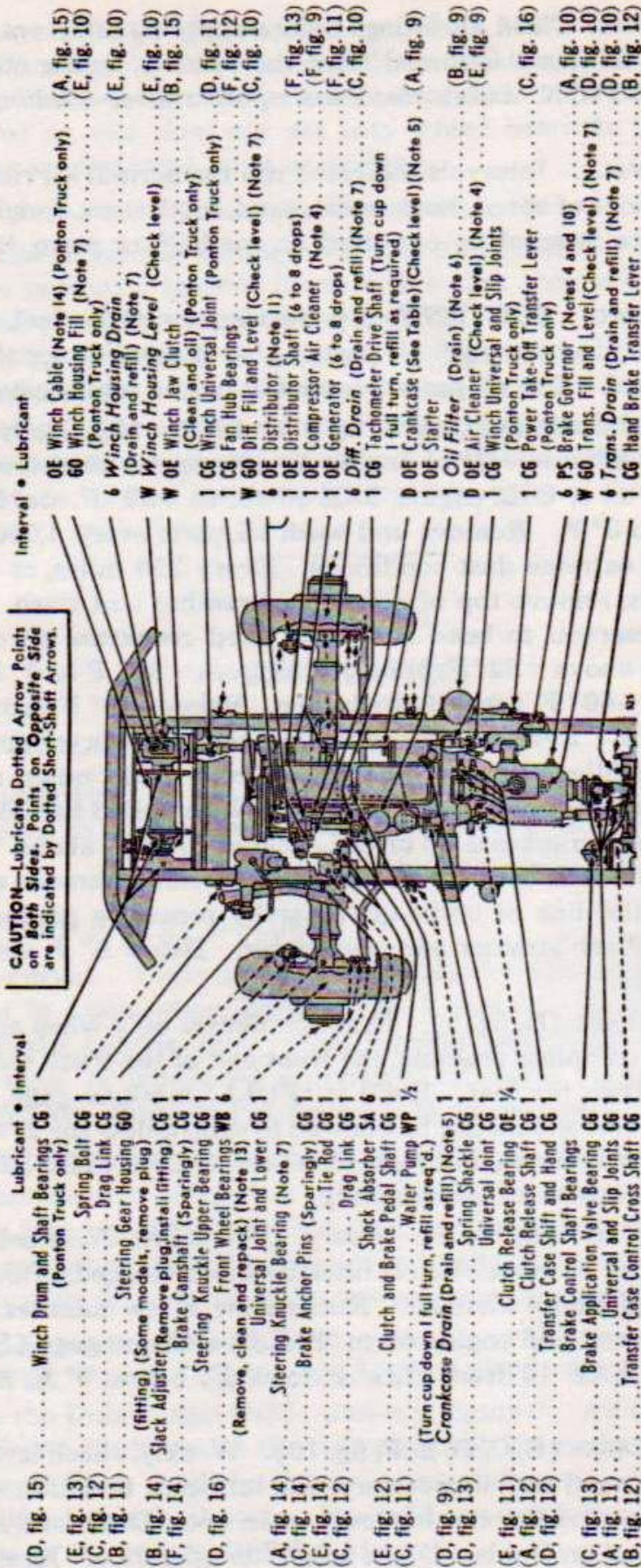
(4) **AIR CLEANERS** (E, C, A, F, fig. 9; and A, fig. 10). Daily, check level and refill oil reservoir of engine air cleaner to bead level with used crankcase oil or **OIL**, engine, SAE 30 above +32° F, and SAE 10 from +32° F to 0° F. Remove and wash all parts every 1,000 miles, or daily, under extreme dust conditions. Every 250 miles, or weekly on some models, remove top of crankcase breather and wash. Clean and refill oil reservoir to bead level with used crankcase oil or **OIL**, engine, SAE 30 above +32° F, and SAE 10 from +32° F to 0° F. Between 0° F and -40° F, use **OIL**, hydraulic. Below -40° F, remove oil and operate dry. Every 6,000 miles, in some models, remove and wash crankcase filler cap and breather. Every 1,000 miles, remove compressor air cleaner and wash all parts. Wash curled hair, dry, and saturate with used crankcase oil or **OIL**, engine, SAE 30 above +32° F and SAE 10 from +32° F to 0° F. Every 6,000 miles, remove strainer in governor outlet line of brake governor by removing pressure line and retainer. Wash strainer and reassemble. Below 0° F, wash and replace when dry.

(5) **CRANKCASE** (D, fig. 9). Drain crankcase only when engine is hot. To aid in complete draining, the front end of the truck should be slightly higher than the rear. Refill to "FULL" mark on gage, or 4/4 level. The oil level should not be allowed to drop below the 2/4 mark. Run engine a few minutes, and recheck oil level. *CAUTION: Be sure pressure gage indicates oil is circulating.*

(6) **OIL FILTER** (B, fig. 9). Every 1,000 miles, drain sediment. Every 6,000 miles or more often if filter becomes clogged, drain filter, clean inside, and renew element. Run engine a few minutes, check crankcase level, and add engine oil to "FULL" mark on gage (SAE 30 above +32° F; SAE 10 from +32° F to 0° F; below 0° F, refer to OFSB 6-11).

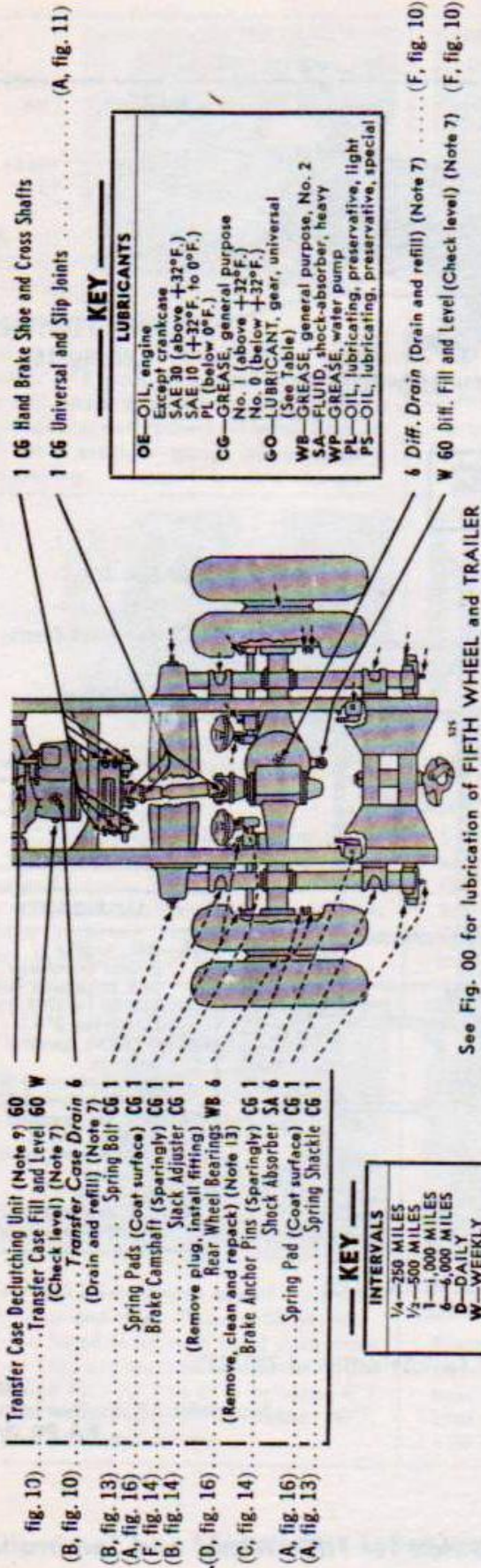
(7) **GEAR CASES** (B, C, D, E, F, fig. 10). Weekly, check level with truck on level ground and, if necessary, add lubricant to within 1/2 inch of plug level when cold or to plug level when hot. Drain and refill at intervals indicated on Guide. Drain only after operation. Keep hous-

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 318275

LUBRICATION



- Transfer Case Declutching Unit (Note 9) 60
- Transfer Case Fill and Level (Check level) (Note 7) 60 W
- Transfer Case Drain (Drain and refill) (Note 7) 6
- Spring Bolt CG 1
- Spring Pads (Coat surface) CG 1
- Brake Camshaft (Sparingly) CG 1
- Stack Adjuster CG 1
- (Remove plug, install fitting)
- Rear Wheel Bearings WB 6
- (Remove, clean and repack) (Note 13)
- Brake Anchor Pins (Sparingly) CG 1
- Shock Absorber SA 6
- Spring Pad (Coat surface) CG 1
- Spring Shackles CG 1

KEY

INTERVALS

- 1/4—250 MILES
- 1/2—500 MILES
- 1—1,000 MILES
- 6—6,000 MILES
- D—DAILY
- W—WEEKLY

KEY

LUBRICANTS

- OE—OIL, engine
- Except crankcase
- SAE 30 (above +32°F.)
- SAE 10 (+32°F. to 0°F.)
- PL (below 0°F.)
- CG—GREASE, general purpose
- No. 1 (above +32°F.)
- No. 0 (below +32°F.)
- GO—LUBRICANT, gear, universal
- (See Table)
- WB—GREASE, general purpose, No. 2
- SA—FLUID, shock-absorber, heavy
- WP—GREASE, water pump
- PL—OIL, lubricating, preservative, light
- PS—OIL, lubricating, preservative, special

- 6 Diff. Drain (Drain and refill) (Note 7) (F, fig. 10)
- W 60 Diff. Fill and Level (Check level) (Note 7) (F, fig. 10)

See Fig. 00 for lubrication of FIFTH WHEEL and TRAILER

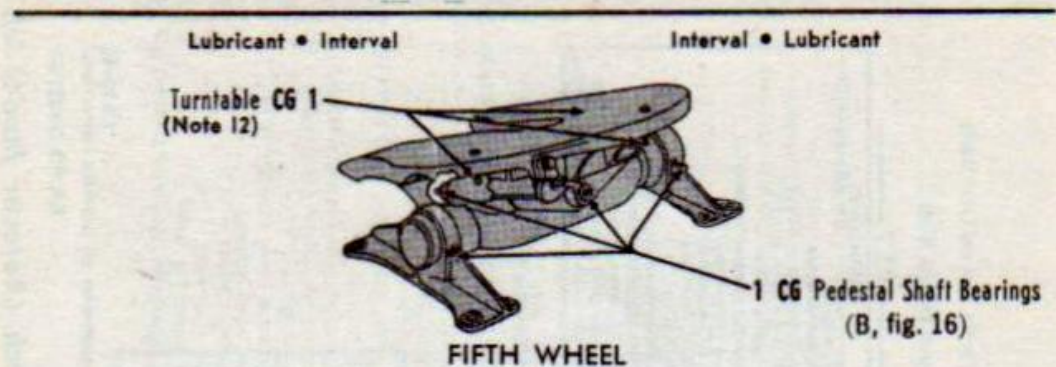
TABLE OF CAPACITIES AND LUBRICANTS TO BE USED

UNIT	CAPACITY (Approx.)	LOWEST EXPECTED AIR TEMPERATURE	
		+32°F. and above	+32°F. to 0°F. Below 0°F.
Crankcase	12 qt.	OE SAE 30	OE SAE 10 Refer to OFSB 6-11
Transmission and Power Take-Off	Summer, 8 qt. Winter, 10 qt.		
Transfer Case	2 qt.		
Differential (Front)	8 qt.	GO SAE 90	GO SAE 80
Differential (Rear)	10 qt.		
Winch Drive Housing	2 qt.		GO Grade 75

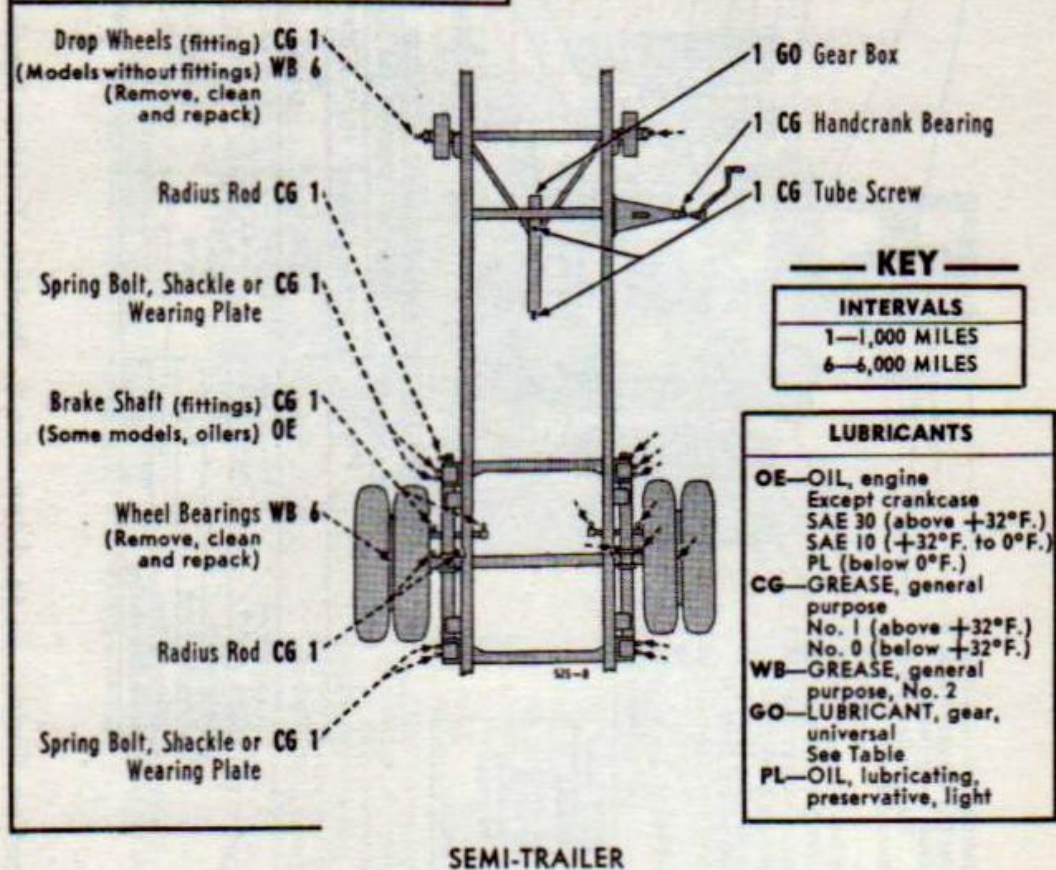
525
10-15-43
Supersedes all previous instructions.
RA PD 318275B

Figure 7 — Lubrication Guide, 5- to 6-ton, 4 x 4, Ponton, Tractor Truck With Winch (Autocar Model U8144T)

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



CAUTION—Lubricate Dotted Arrow Points on *Both Sides*. Points on *Opposite Side* are indicated by Dotted Short-Shaft Arrows.

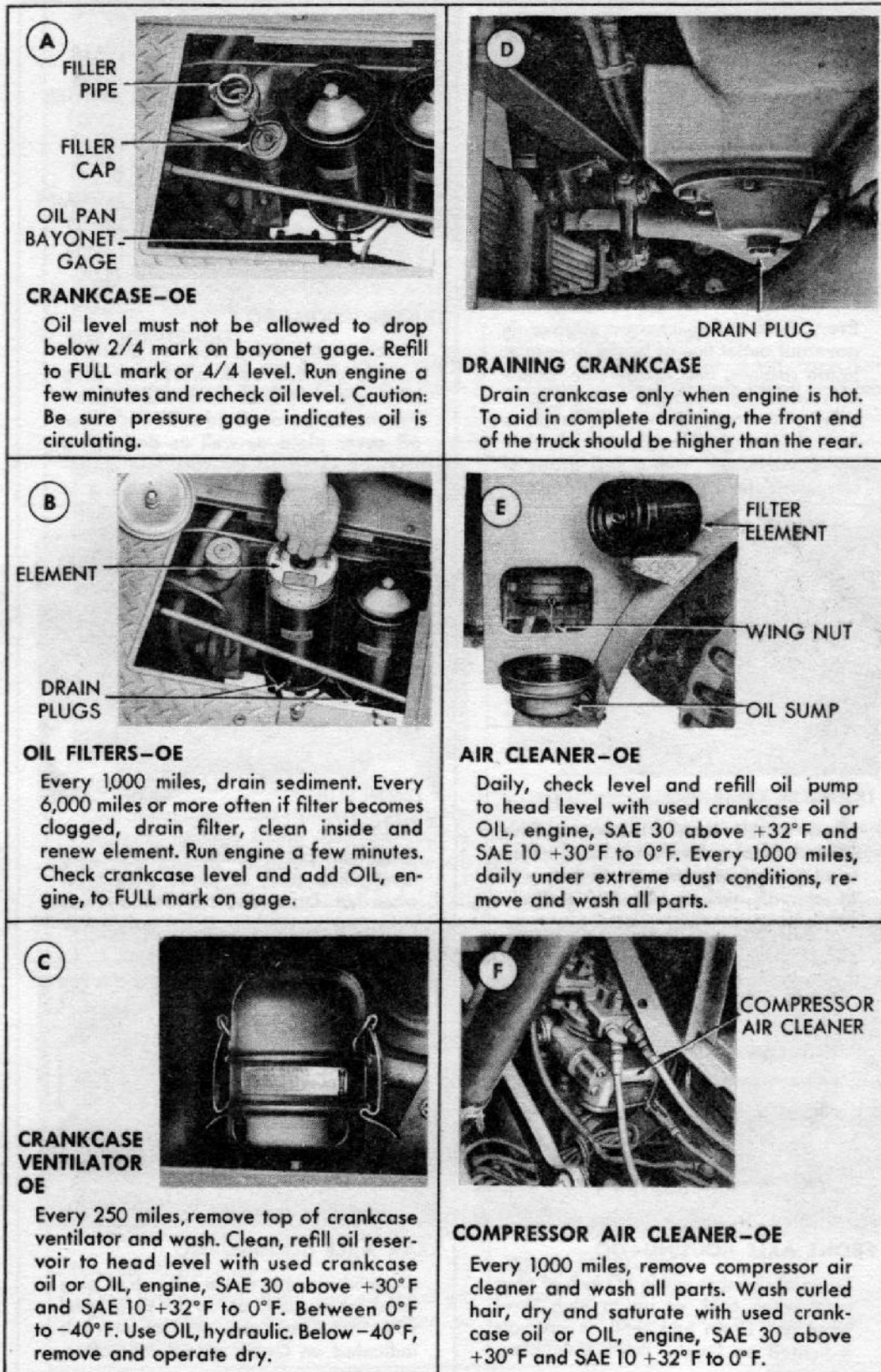


See Fig. 7 for lubrication of TRUCK

10-15-43
Supersedes all previous instructions.
RA PD 318276

Figure 8 — Lubrication Guide for Fifth Wheel and Semitrailer

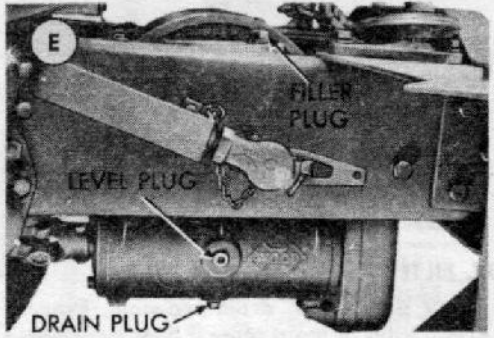
LUBRICATION



RA PD 322006

Figure 9 - Lubrication Points

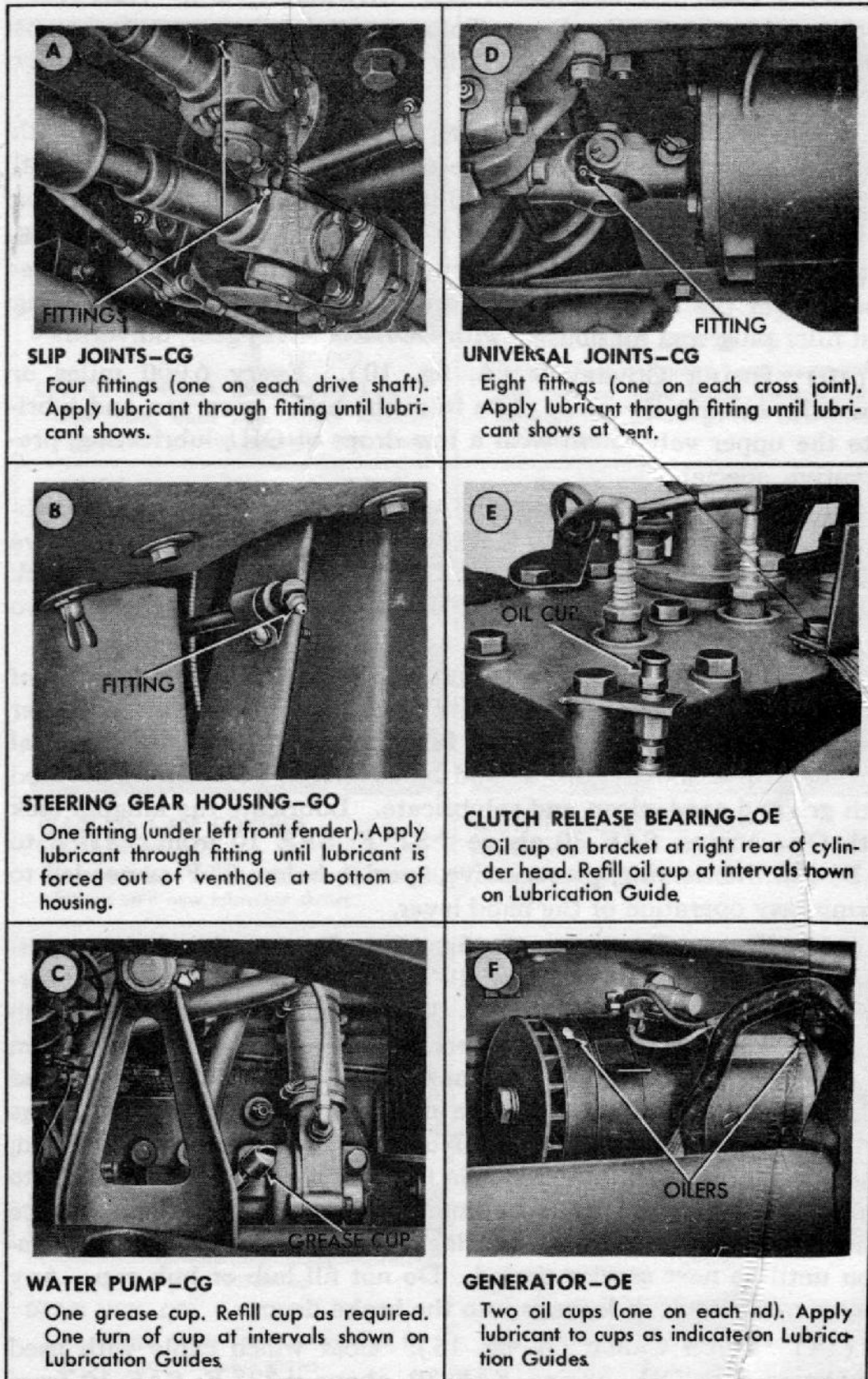
5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

 <p>A</p> <p>VALVE STEM</p> <p>STRAINER</p>	 <p>D</p> <p>FILLER PLUG (WINTER LEVEL)</p> <p>LEVEL PLUG (SUMMER LEVEL)</p> <p>DRAIN PLUG</p>
<p>BRAKE GOVERNOR-PL</p> <p>Every 6000 miles, remove strainer in governor outlet line of brake governor. Wash strainer, and reassemble. Below 0°F, wash and replace dry. Every 6000 miles or 6 months, remove cover plate from brake governor, and lubricate upper valve stem with a few drops of Oil, lubricating, preservative, special.</p>	<p>TRANSMISSION-GO</p> <p>Check weekly. Keep lubricant at winter plug level when cold, or summer plug level when hot. Drain and refill at intervals indicated on Guide. Power take-off cover plate as well as drain plug must be removed for complete draining. Drain only after operation.</p>
 <p>B</p> <p>FILLER PLUG</p> <p>DRAIN PLUG</p>	 <p>E</p> <p>FILLER PLUG</p> <p>LEVEL PLUG</p> <p>DRAIN PLUG</p>
<p>TRANSFER CASE-GO</p> <p>Check weekly. Keep lubricant to within 1/2 inch of plug level when cold, or up to plug level when hot. Drain and refill at intervals indicated on Guide. Drain only after operation.</p>	<p>WINCH-GO</p> <p>Keep lubricant to within 1/2 inch of plug level when cold, or up to plug level when hot. Drain and refill at intervals indicated on Guide. Drain only after operation.</p>
 <p>C</p> <p>LEVEL PLUG</p> <p>DRAIN PLUG</p>	 <p>F</p> <p>FILL AND LEVEL PLUG</p> <p>DRAIN PLUG</p>
<p>FRONT AXLE HOUSING-GO</p> <p>Keep lubricant to within 1/2 inch of plug level when cold, or up to plug level when hot. Drain and refill at intervals indicated on Guide. Drain only after operation.</p>	<p>REAR AXLE HOUSING-GO</p> <p>Keep lubricant to within 1/2 inch of plug level when cold, or up to plug level when hot. Drain and refill at intervals indicated on Guide. Drain only after operation.</p>

RA PD 321994

Figure 10 - Lubrication Points

LUBRICATION



A PD 322000

Figure 11 — Lubrication Points

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

ing vents clean. Transmission has "SUMMER" and "WINTER" level markings at fill plug. To completely drain transmissions equipped with power take-off, it is necessary to remove the power take-off cover plate.

(8) **UNIVERSAL JOINTS (FRONT WHEELS)** (A, fig. 14). With truck on level ground, remove inspection plug on under side of joint; also remove plug in wheel hub, and install fitting. Fill through fitting to level of inspection plug holes. Remove fitting, and reinstall plug.

(9) **TRANSFER CASE DECLUTCHING UNIT** (B, fig. 10). Upon re-assembly of the transfer case, before operating, remove declutching unit filler plug, and fill housing with LUBRICANT, gear, universal.

(10) **BRAKE GOVERNOR** (A, fig. 10). Every 6,000 miles or 6-months, remove the cover plate from the brake governor, and lubricate the upper valve stem with a few drops of OIL, lubricating, preservative, special.

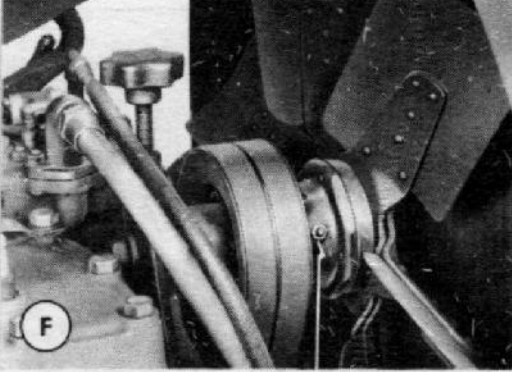
(11) **DISTRIBUTOR** (F, fig. 13). Every 6,000 miles, wipe distributor breaker cam lightly with GREASE, general purpose, No. 1 above +32° F, and No. 0 below +32° F. Lubricate breaker arm pivot, wick under rotor, and governor weight pivots and slots with one to two drops of OIL, engine, SAE 10.

(12) **TURNTABLE (FIFTH WHEEL)** (B, fig. 16). Some types of early models have two additional fittings. Keep the turntable, coupler pin locking jaws and guides well lubricated with GREASE, general purpose, No. 1 above +32° F, and No. 0 below +32° F. If covered with grit and sand, clean and relubricate. Lubricate the kingpin lock with OIL, engine, SAE 30 above +32° F; SAE 10 from +32° F to 0° F; OIL, lubricating, preservative, special, below 0° F as needed to permit easy operation of the hand lever.

(13) **WHEEL BEARINGS** (D, fig. 16). Remove bearing cone assemblies from hub, and wash spindle and inside of hub. Inspect bearing races, and replace if necessary. Wet the spindle and inside of hub and hub cap with GREASE, general purpose, No. 2, to a maximum thickness of $\frac{1}{16}$ inch only to retard rust. Wash bearing cones and grease seals. Inspect, and replace if necessary. Lubricate bearings with GREASE, general purpose, No. 2, with a packer or by hand, kneading lubricant into all spaces in the bearing. Use extreme care to protect bearings from dirt, and immediately reassemble and replace wheel. The lubricant in the bearings is sufficient to provide lubrication until the next service period. Do not fill hub or hub cap. Any excess might result in leakage into the brake drum.

(14) **WINCH CABLE** (A, fig. 15). Coat winch cable with used crankcase oil or OIL, engine, SAE 30, above +32° F; SAE 10 from +32° F to 0° F; OIL, lubricating, preservative, special, below 0° F after each period of use. When not in use, coat outer coils frequently.

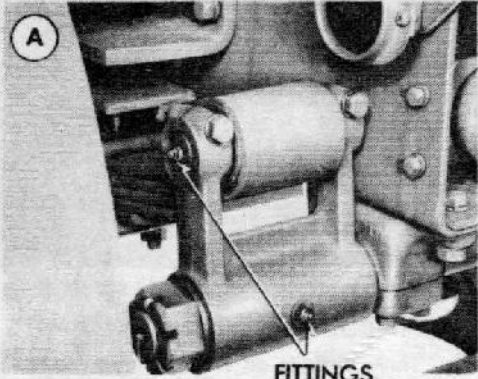
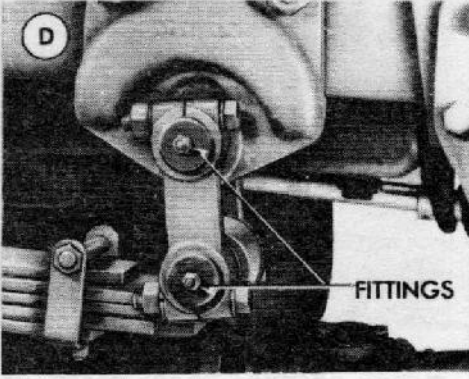
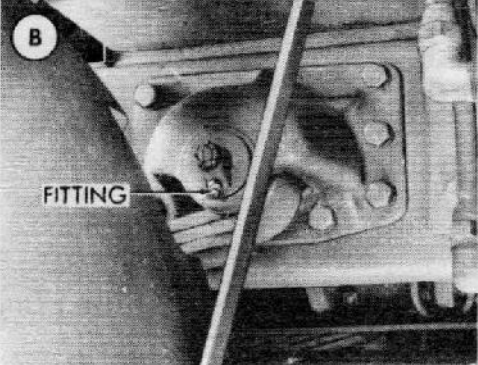
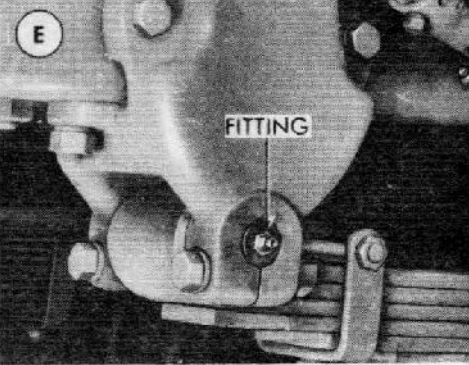
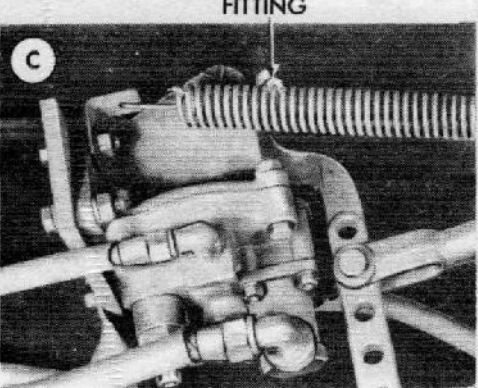
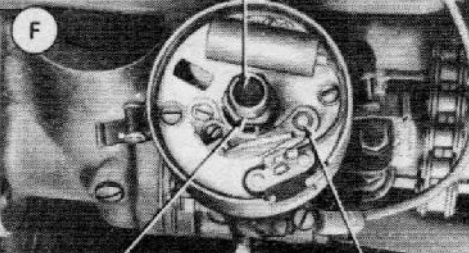
LUBRICATION

 <p>A</p> <p style="text-align: center;">FITTING</p> <p>CLUTCH CONTROL CROSS SHAFT-CG One fitting each side. Apply lubricant through fittings until new lubricant shows.</p>	 <p style="text-align: center;">FITTINGS</p> <p>D</p> <p style="text-align: center;">FITTING FITTING</p> <p>CONTROL CROSS SHAFTS-CG Three fittings on control hand lever shaft and two on hand brake shaft. Apply lubricant through fittings until new lubricant shows.</p>
 <p style="text-align: center;">FITTINGS FITTING</p> <p>B</p> <p>TRANSFER CASE CONTROL CROSS SHAFT-CG Three fittings. Apply lubricant through fittings until new lubricant shows.</p>	 <p style="text-align: center;">FITTINGS</p> <p>E</p> <p>CLUTCH AND BRAKE PEDAL LEVERS-CG Two fittings. Lubricate until lubrication shows.</p>
 <p>C</p> <p style="text-align: center;">FITTINGS</p> <p>DRAG LINK-CG Two fittings. Apply lubricant through fittings until new lubricant shows.</p>	 <p>F</p> <p style="text-align: center;">FITTING</p> <p>FAN-CG One fitting. Apply lubricant through fitting. Do not overfill or lubricant may be forced through oil seal onto fan pulley.</p>

RA PD 321998

Figure 12 – Lubrication Points

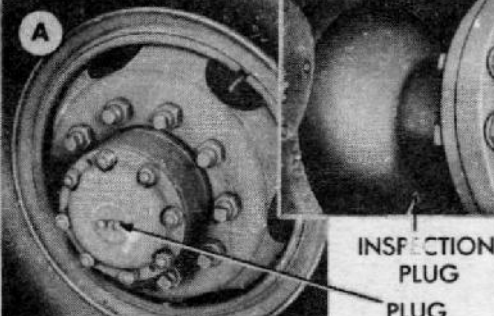
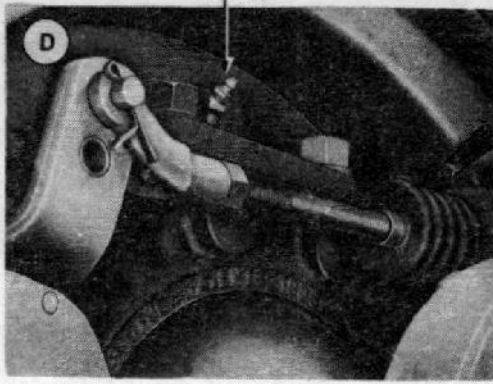
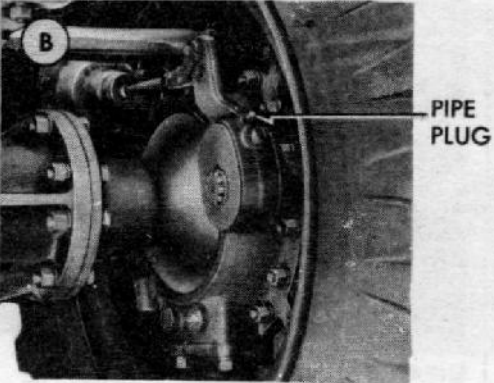
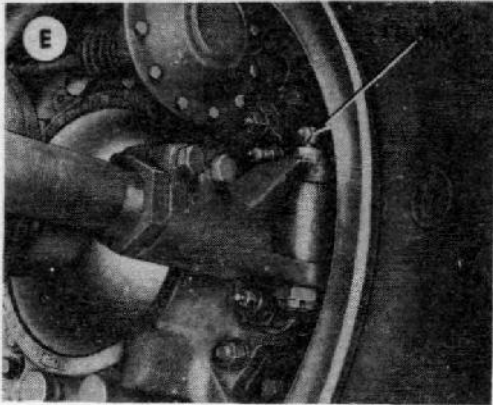
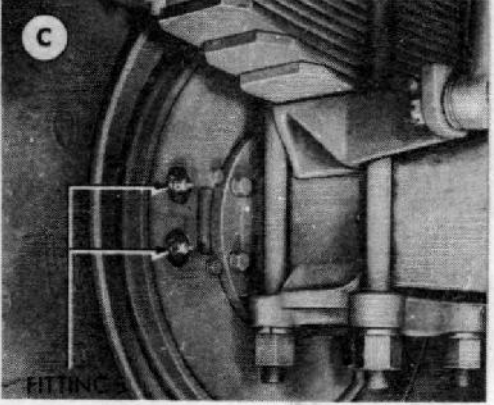
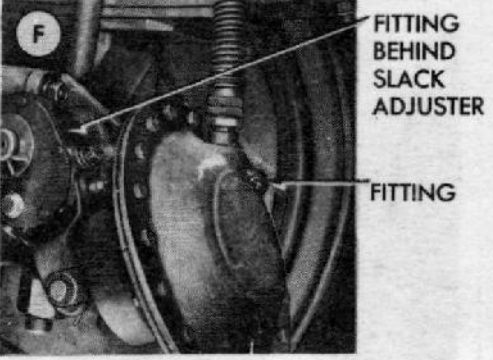
5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

 <p>A</p> <p>FITTINGS</p> <p>REAR SPRING SHACKLE-CG</p> <p>Four fittings (two each rear spring). Apply lubricant through fittings until new lubricant shows on both sides of shackle.</p>	 <p>D</p> <p>FITTINGS</p> <p>FRONT SPRING SHACKLE-CG</p> <p>Four fittings (two each front spring). Apply lubricant through fittings until new lubricant shows on both sides of shackle.</p>
 <p>B</p> <p>FITTING</p> <p>REAR SPRING BRACKET PIN-CG</p> <p>Two fittings (one each rear spring). Apply lubricant through fittings until new lubricant shows on both sides of pin.</p>	 <p>E</p> <p>FITTING</p> <p>FRONT SPRING BRACKET PIN-CG</p> <p>Two fittings (one each front spring). Apply lubricant through fittings until new lubricant shows on both sides of pin.</p>
 <p>C</p> <p>FITTING</p> <p>BRAKE APPLICATION VALVE-CG</p> <p>One fitting. Lubricate through fitting until lubricant shows.</p>	 <p>F</p> <p>WICK</p> <p>BREAKER CAM BREAKER ARM PIVOT</p> <p>DISTRIBUTOR-CG-OE</p> <p>Every 6000 miles, wipe breaker cam lightly with GREASE, general purpose, No. 1 above +32°F and No. 0 below +32°F. Lubricate breaker arm pivot, wick under rotor and governor weight pivots and slots with 1 to 2 drops of OIL, engine, SAE 10.</p>

RA PD 322007

Figure 13 — Lubrication Points

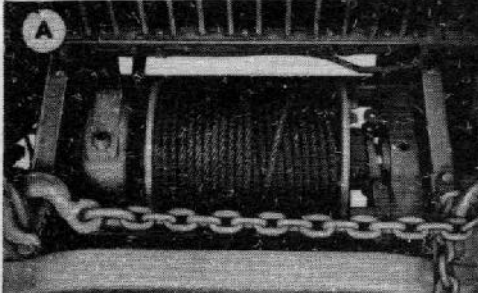
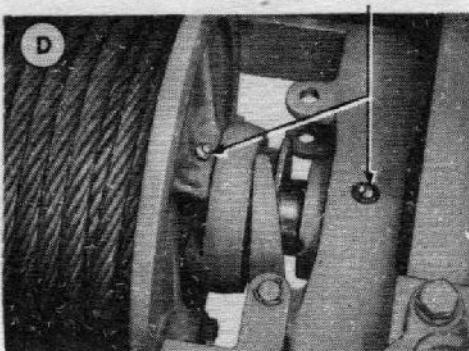
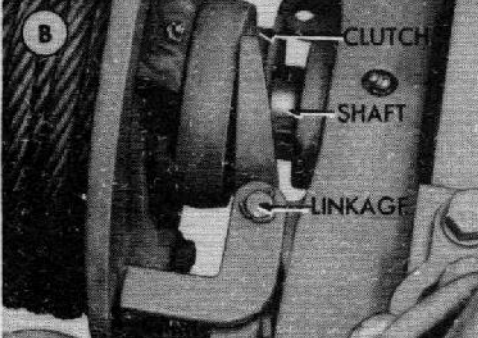
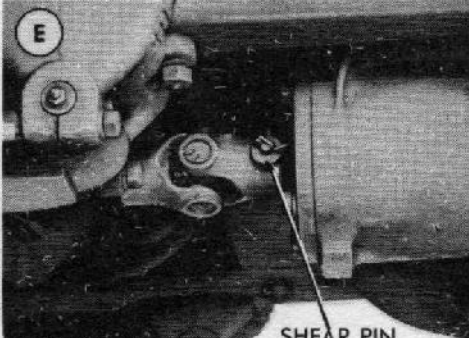
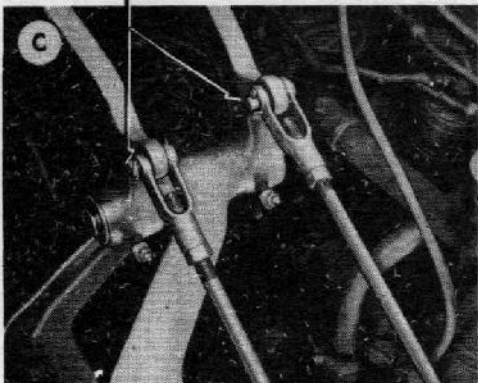
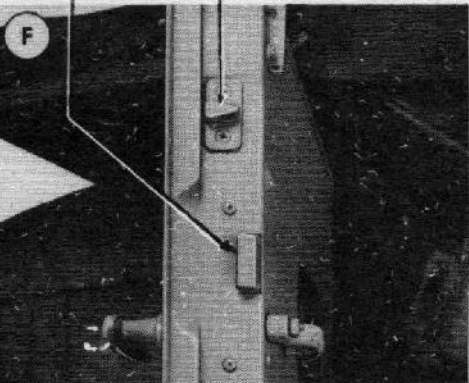
LUBRICATION

 <p>A</p> <p>INSPECTION PLUG PLUG</p> <p>FRONT AXLE UNIVERSALS—CG Two inspection plugs on under side of joints. Two plugs in wheel hubs. Remove wheel hub plugs and insert fittings. Fill through fittings to level of inspection plug hole. Remove fittings. Reinstall plugs.</p>	 <p>D</p> <p>FITTING</p> <p>KING PINS—CG Two fittings (one each end of front axle). Apply grease through fittings.</p>
 <p>B</p> <p>PIPE PLUG</p> <p>SLACK ADJUSTERS—CG Four pipe plugs (one on each adjuster). Remove plugs. Insert fittings. Apply lubricant until new lubricant shows.</p>	 <p>E</p> <p>TIE RODS—CG Two fittings (one each side). Apply lubricant until lubricant shows on both sides.</p>
 <p>C</p> <p>FITTING</p> <p>BRAKE ANCHOR PINS—CG Four fittings on each axle. Apply lubricant until lubricant shows.</p>	 <p>F</p> <p>FITTING BEHIND SLACK ADJUSTER</p> <p>FITTING</p> <p>BRAKE CAMSHAFTS—CG Two fittings on front axle, six fittings on rear axle. Apply lubricant until lubricant shows except on fittings next to wheels, which are "one-shot" fittings.</p>

RA PD 321999

Figure 14 — Lubrication Points

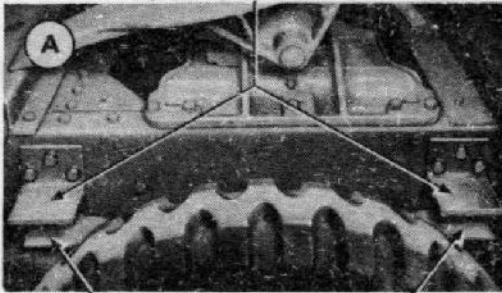
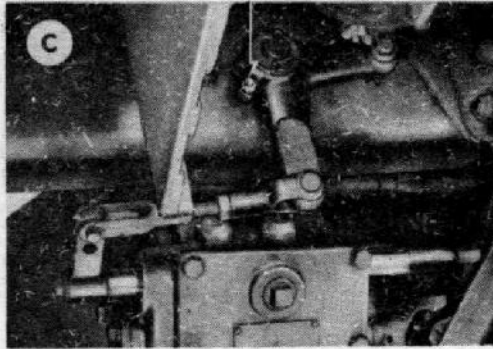
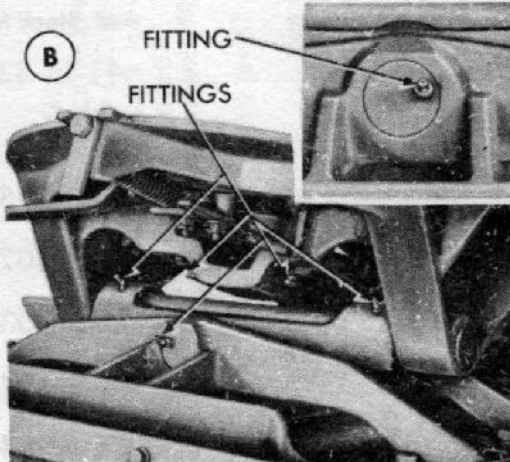
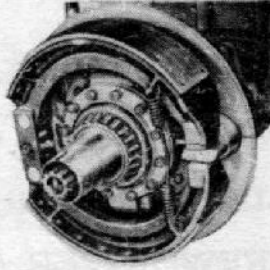
5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

 <p>WINCH CABLE-OE Coat winch cable with used crankcase oil or OIL, engine, SAE 30 above +32°F; SAE 10 +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F after each period of use. When not in use, coat outer coils frequently.</p>	 <p>WINCH DRUM BEARINGS and SHAFT-CG Two fittings on winch drum and one on shaft. Lubricate through fittings until lubricant shows.</p>
 <p>WINCH CLUTCH-OE Lubricate sliding surfaces of jaw clutch and linkage. If clutch sticks, clean shaft and relubricate.</p>	 <p>SHEAR PIN-OE Apply lubricant to both ends of pin and between yoke and worm shaft. If corroded, remove shear pin and yoke from shaft. Clean, lubricate and reassemble.</p>
 <p>LINKAGE-OE Oil all clevis pins, rod connections, etc.</p>	 <p>DOOR HINGES, LATCHES, WEDGES-OE Oil door hinges, latches and wedges.</p>

RA PD 322002

Figure 15 - Lubrication Points

LUBRICATION

<p style="text-align: center;">SPRING BRACKETS</p>  <p style="text-align: center;">AUXILIARY SPRING TOP LEAF</p> <p>SPRING PADS-CG Four pads above rear springs. Apply lubricant to top of auxiliary spring top leaf and under side of brackets.</p>	<p style="text-align: center;">FITTING</p>  <p>POWER TAKE-OFF CONTROL-CG One fitting. Apply lubricant through fitting until lubricant shows.</p>
<p style="text-align: center;">B</p>  <p style="text-align: center;">FITTING FITTINGS</p> <p>FIFTH WHEEL-CG Six fittings. Apply lubricant through fitting until lubricant shows.</p>	<p style="text-align: center;">D</p>  <p>WHEEL BEARINGS-CG Remove wheels, hubs and bearings. Clean and lubricate. Wet the spindle, inside of hub and hub cap with GREASE, general purpose, No. 2, to retard dust. Lubricate bearings with GREASE, general purpose, No. 2, kneading lubricant into all spaces in bearing. Protect bearings from dirt and immediately reassemble and install wheel. Do not fill hub or hub cap.</p>

RA PD 321977

Figure 16 - Lubrication Points

(15) OILCAN POINTS (B, C, E, and F, fig. 15). Every 1,000 miles, lubricate throttle and spark control rod ends, clevises, hinges, latches, air compressor rocker arm shaft, power take-off shifter shaft, pintle hook, power take-off shift lever support bracket, and hand brake linkage with OIL, engine, SAE 30, above +32° F; SAE 10 from +32° F to 0° F; OIL, lubricating, preservative, special, below 0° F.

(16) RUBBER BUSHINGS. Every 1,000 miles, apply FLUID, brake, hydraulic, to rubber bushings in shock absorber linkage. CAUTION: Do not use oil.

(17) POINTS REQUIRING NO LUBRICATION SERVICE. The following points do not require lubrication service: Engine governor, air compressor crankcase, cranking motor (Delco-Remy), cranking motor outboard bearing (Auto-Lite), cranking motor pinion housing bearing, and Bendix drive.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

Section VIII

TOOLS AND EQUIPMENT STOWAGE ON THE VEHICLE

22. VEHICLE TOOLS AND EQUIPMENT (figs. 17 and 18).

a. All tools are stowed in a tool box attached to frame on right-hand side of truck. A 1-quart carbon tetrachloride, plunger type fire extinguisher is stored on a bracket between the two seats. Tools and equipment are listed below for information only, not as a basis for requisition.

b. Tools.

Vehicular Tools	Fed. Stock No.
HAMMER, machinists, ball peen, 16-oz	41-H-523
HANDLE, wrench, wheel nut	
PLIERS, combination, slip joint, 6-in.	41-P-1650
SCREWDRIVER, common, heavy-duty, 6-in. blade	41-S-1076
SCREWDRIVER, recessed, Phillips type No. 2	41-S-1638
SCREWDRIVER, recessed, Phillips type No. 3	41-S-1640
WRENCH, adjustable, auto. type, 11-in.	41-W-448
WRENCH, adjustable, auto. type, 15-in.	41-W-450
WRENCH, adjustable, crescent type, 8-in.	41-W-486
WRENCH, adjustable, crescent type, 12-in.	41-W-488
WRENCH, engineers, 15 deg, open-end, $\frac{3}{8}$ - and $\frac{7}{16}$ -in.	41-W-991
WRENCH, engineers, 15 deg, open-end, $\frac{1}{2}$ - and $\frac{19}{32}$ -in.	41-W-1003
WRENCH, engineers, 15 deg, open-end, $\frac{9}{16}$ - and $\frac{11}{16}$ -in.	41-W-1005-5
WRENCH, engineers, 15 deg, open-end, $\frac{5}{8}$ - and $\frac{25}{32}$ -in.	41-W-1008-10
WRENCH, engineers, 15 deg, open-end, $\frac{3}{4}$ - and $\frac{7}{8}$ -in.	41-W-1012-5
WRENCH, spark plug	
WRENCH, water pump nut	
WRENCH, wheel bearing nut	
WRENCH, wheel nut socket	

TOOLS AND EQUIPMENT STORAGE ON THE VEHICLE

- A—HYDRAULIC JACK
- B—SNATCH BLOCK ASSEMBLY
- C—TIRE INFLATION HOSE ASSEMBLY
- D—HYDRAULIC JACK HANDLE
- E—FIRE EXTINGUISHER
- F—FIRE EXTINGUISHER BRACKET
- G—TOOL BAG
- H—WINCH DRIVE SHAFT SHEAR PIN, WASHERS, AND COTTER PIN
- J—OILER
- K—HYDRAULIC CHASSIS LUBRICATING GUN
- L—HYDRAULIC CHASSIS LUBRICATING GUN ADAPTER
- M—ENGINE STARTING CRANK
- N—8-INCH CRESCENT WRENCH
- P—11-INCH CRESCENT WRENCH
- Q—12-INCH CRESCENT WRENCH
- R—15-INCH AUTOMOBILE TYPE ADJUSTABLE WRENCH
- S—SPARK PLUG WRENCH
- T—SPARK PLUG WRENCH HANDLE
- U—WATER PUMP NUT WRENCH
- V—16-OZ. MACHINIST BALL PEEN HAMMER
- W—HEAVY-DUTY SCREWDRIVER
- X—NUMBER 3, PHILLIPS TYPE SCREWDRIVER
- Y—NUMBER 2, PHILLIPS TYPE SCREWDRIVER
- Z—WHEEL BEARING ADJUSTING NUT WRENCH
- AA—WIRE CUTTING, SLIP JOINT COMBINATION PLIERS
- AB— $\frac{3}{8}$ - $\frac{7}{16}$ OPEN-END, DOUBLE HEAD 15-DEGREE ENGINEER WRENCH
- AC— $\frac{1}{2}$ - $\frac{19}{32}$ OPEN-END, DOUBLE HEAD 15-DEGREE ENGINEER WRENCH
- AD— $\frac{9}{16}$ - $\frac{11}{16}$ OPEN-END, DOUBLE HEAD 15-DEGREE ENGINEER WRENCH
- AE— $\frac{3}{8}$ - $\frac{23}{32}$ OPEN-END, DOUBLE HEAD 15-DEGREE ENGINEER WRENCH
- AF— $\frac{3}{4}$ - $\frac{7}{8}$ OPEN-END, DOUBLE HEAD 15-DEGREE ENGINEER WRENCH
- AG—TIRE PRESSURE GAGE
- AH—WHEEL NUT WRENCH
- AJ—WHEEL NUT WRENCH HANDLE
- AK—SOCKET HEAD SCREW WRENCH

RA PD 321988

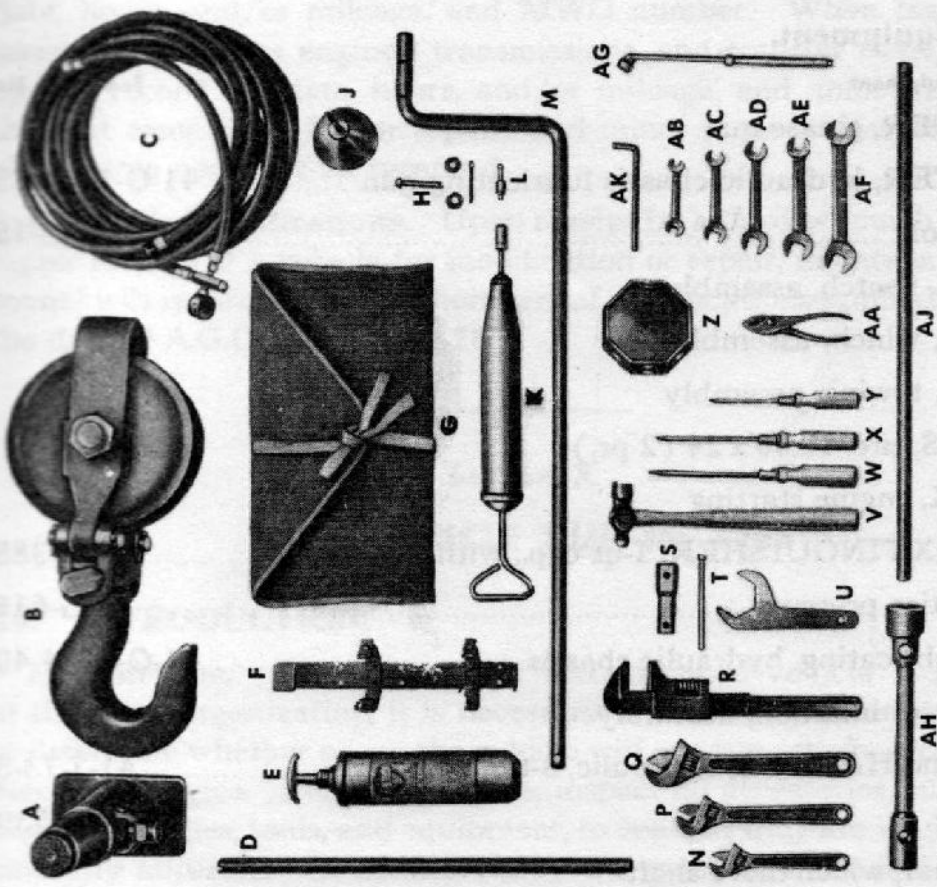


Figure 17 — Tools and Equipment

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 321939

Figure 18 – Towing and Tire Chains

c. Equipment.

Vehicle Equipment

Fed. Stock No.

ADAPTER, grease gun	
ADAPTER, hydraulic chassis lubricating gun	41-G-1344-35
BAG, tool	41-B-15
BLOCK, snatch, assembly	
CABLE, winch, assembly	
CHAIN, towing, assembly	
CHAINS, tire, 13.00 x 24 (2 pr.)	
CRANK, engine starting	
FIRE EXTINGUISHER, 1-qt cap., with bracket	38-B-385
GAGE, tire pressure	8-G-615
GUN, lubricating, hydraulic chassis	41-G-1344-40
HOSE, tire inflation, assembly	
JACK and HANDLE, hydraulic, 8-ton	41-J-73-5
OILER	13-O-1530
PIN, shear, winch drive shaft	

PART TWO — VEHICLE MAINTENANCE INSTRUCTIONS

Section IX

VEHICLE MODIFICATION RECORDS

23. MWO AND MAJOR UNIT ASSEMBLY REPLACEMENT RECORD.

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

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

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

Section X

NEW VEHICLE RUN-IN TEST

24. INTRODUCTION.

a. **Purpose.** When a new or reconditioned vehicle is received at the using organization, it is necessary for second echelon personnel to determine whether or not the vehicle will operate satisfactorily when placed in service. For this purpose, inspect all accessories, subassemblies, assemblies, tools, and equipment, to see that they are in place and correctly adjusted. In addition, they will perform a run-in test of at

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

least 50 miles, as directed in AR 850-15 according to procedures in paragraph 26, below.

25. CORRECTION OF DEFICIENCIES.

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

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

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

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

26. RUN-IN TEST PROCEDURES.

a. **Preliminary Service.**

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

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

(3) **FUEL FILTERS.** Inspect fuel filter for leaks, damage, and secure mountings and connections. Remove drain plug and drain, if any appreciable amount of water or dirt is present. Remove elements, and clean cases and elements in dry-cleaning solvent. Replace elements, using new gaskets.

(4) **BATTERIES.** Make hydrometer and voltage test of batteries, and add clean water, if needed, to level electrolyte to $\frac{3}{8}$ inch above top of plates.

(5) **AIR BRAKE TANKS.** Drain air brake reservoir tanks. Close valves securely.

(6) **AIR CLEANER AND BREATHER CAP.** Examine carburetor, air compressor, air cleaners, and crankcase ventilator breather cap to see if they are in good condition and secure. Remove element from these units, and wash thoroughly in dry-cleaning solvent. Apply a film of oil to breather elements, and fill air cleaner reservoir to bead level with fresh oil. Reinstall securely, making sure all gaskets are in good condition, and ducts and air horn connections are tight.

NEW VEHICLE RUN-IN TEST

(7) **ACCESSORIES AND BELTS.** Be sure that accessories such as carburetor, generator, regulator, cranking motor, distributor, water pump, fan, oil filter, and air compressor are securely mounted. Check the fan, generator, and air compressor belts for good condition and adjustment. Belts must have $\frac{1}{2}$ - to $\frac{3}{4}$ -inch finger-pressure deflection.

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

(9) **TIRES.** Be sure that all tires, including spare, are properly inflated to 80 pounds when cool; also that stems are in correct position, and that all valve caps are present and fingertight. Remove objects lodged in threads, carcasses, and between duals, and inspect for damage.

(10) **WHEEL AND FLANGE NUTS.** Make sure that all wheel mounting and axle flange nuts are present and secure.

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

(12) **TOWING CONNECTIONS.** Inspect towing hooks, tractor truck fifth wheel, and pintle hook for looseness or damage.

(13) **BODY (CAB).** Make sure that all cab and body mountings are secure. Inspect attachments, hardware, glass, doors and windows, to see that they are in good condition, secure, and operate properly. Make sure that fifth wheel is properly assembled, in good condition, and securely mounted. Be sure trailer connecting mechanism operates properly and latches securely. Note if trailer brake lines and connections are in good condition and securely connected or supported. Test all hinges, locks, windshield, and window lift mechanism, to see that they function satisfactorily.

(14) **LUBRICATE.** Perform a complete lubrication of the vehicle, covering all intervals, according to the instructions on the Lubrication Guide (par. 21), except gear cases, wheel bearings, and other units lubricated in items (1) to (13). Check all gear case oil levels, and add as necessary to bring to correct level; change only if condition of oil indicates the necessity, or if gear oil is not of proper grade for existing atmospheric temperature. **NOTE:** *Perform items (15) through (18) during lubrication.*

(15) **SPRINGS AND SUSPENSIONS.** Inspect springs for sag, broken or shifted leaves, and loose clips. Check shock absorbers for secure mountings and linkage.

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

(17) **PROPELLER SHAFTS AND UNIVERSAL JOINTS.** Inspect all propeller shafts and universal joints to see if they are in good condi-

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

tion, correctly assembled, alined, secure, and not leaking excessively.

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

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

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

(21) **INSTRUMENTS.**

(a) **Oil Gage.** Immediately after engine starts, observe if oil pressure is satisfactory. (Normal operating pressure, hot, is 30 to 50 pounds at operating speed—5 pounds minimum at idle speed.) Stop engine if pressure is not indicated in 30 seconds.

(b) **Ammeters.** Main ammeter should show slight positive charge for a short period after starting engine, until generator restores to battery the current used in starting. "B" ammeter should show charge to indicate "B" battery is receiving current from generator.

(c) **Temperature Gage.** Engine temperature should rise gradually during warm-up to normal operating range, 153° F to 183° F.

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

(e) **Viscometer.** With engine oil at normal operating temperature, indicator should remain in ideal range. If pointer remains in heavy range, inspect oil for dirt or sludge. If pointer goes to thin range, it may indicate oil dilution.

(f) **Tachometer.** White pointer should indicate actual engine revolutions per minute at any given time. Red pointer indicates and remains at highest revolutions per minute attained. It should not exceed recommended governed engine speed of 2,300 revolutions per minute.

(g) **Air Pressure Gage.** During warm-up period, operate engine at fast idle long enough to observe whether or not air brake pressure builds up a normal rate to specified maximum (105 pounds), and whether or not governor then cuts off air from compressor. With the engine at normal idling speed, bleed air pressure from system by repeated brake applications, and observe if compressor cuts in at 85 pounds. Low pressure indicator (buzzer) should sound at pressures below 60 pounds.

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

NEW VEHICLE RUN-IN TEST

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

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

(25) **LAMPS (LIGHTS) AND REFLECTORS.** Clean lenses and inspect all units for looseness and damage. If tactical situation permits, open and close all light switches to see if lamps respond properly.

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

(27) **TOOLS AND EQUIPMENT.** Check tools and On Vehicle Stowage Lists, paragraph 22, to be sure all items are present, and see that they are serviceable and properly mounted or stowed.

b. Run-in Test. Perform the following procedures, (1) to (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 maximums indicated on the caution plate should be avoided during the test.*

(1) **DASH INSTRUMENTS AND GAGES.** Do not move vehicle until engine temperature reaches 135° F. Maximum safe operating temperature is 200° F. Observe readings of oil gage, ammeters, temperature gage, air pressure gage, tachometer, viscometer, and fuel gage, to be sure they are indicating proper functioning 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. Parking brakes should hold vehicle on a reasonable incline with one-third ratchet travel in reserve. Apply hand application valve to see if it functions without binding.

(3) **CLUTCH.** Observe if clutch operates smoothly without grab, chatter or squeal on engagement, or slippage when fully engaged, under load. See that pedal has 1½-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 until driven and driving disks have become properly worn in.* **NOTE:** *Never allow pedal free play to become less than ½ inch. Adjust only according to instructions in paragraph 117.*

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(4) **TRANSMISSION AND TRANSFER.** Gearshift mechanism should operate easily and smoothly, and gears should operate without unusual noise, and should 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. Pay particular attention to Pitman arm, to see that it is 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. Do not run engine above governed speed of 2,300 revolutions per minute.

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

(8) **HALT VEHICLE AT 10-MILE INTERVALS FOR SERVICES (9) TO (11) BELOW.**

(9) **AIR BRAKE SYSTEM LEAKS.** With the air pressure at governed maximum and the brakes applied, stop engine. There should not be a noticeable drop in pressure within one minute.

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

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

c. Vehicle Publications and Reports.

(1) **PUBLICATIONS.** See that vehicle technical manuals, Lubrication Guide, Standard Form No. 26 (Driver's Accident Report, Motor Transportation) and W. D., A.G.O. Form No. 478 (MWO and Major Unit Assembly Replacement Record), are in the vehicle, legible, and properly stowed. **NOTE:** *U. S. A. registration number and vehicle nomenclature must be filled in on Form No. 478, for new vehicles.*

(2) **REPORTS.** Upon completion of the run-in test, correct or report any deficiencies noted. Report general conditions of the vehicle to designated individual in authority.

Section XI

SECOND ECHELON PREVENTIVE MAINTENANCE**27. SECOND ECHELON PREVENTIVE MAINTENANCE SERVICES.**

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

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

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

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

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

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

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

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

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

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

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

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

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

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

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

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

3. *Special lubrication.* This applies either to lubrication operations that do not appear on the vehicle lubrication chart, or to items that do appear on such charts, and should be performed in connection with the maintenance operations if parts have to be disassembled for inspection or service.

SECOND ECHELON PREVENTIVE MAINTENANCE

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

5. *Tighten.* All tightening operations should be performed with sufficient wrench torque (force on the wrench handle) to tighten the unit according to good mechanical practice. Use torque-indicating wrench where specified. Do not overtighten, as this may strip threads or cause distortion. Tightening will always be understood to include the correct installation of lock washers, lock nuts, and cotter pins provided to secure the tightening.

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

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

(5) **SPECIFIC PROCEDURES.** The procedures for performing each item in 1,000 mile (monthly) and 6,000-mile (six-month) maintenance procedures are described in the following chart. Each page of the chart has two columns at its left edge corresponding to the 6,000-mile and the 1,000-mile maintenance respectively. Very often it will be found that a particular procedure does not apply to both scheduled maintenances. In order to determine which procedure to follow, look down the column corresponding to the maintenance due, and wherever an item number appears, perform the operations indicated opposite the number.

MAINTENANCE	
6,000-Mile (six month)	1,000-Mile (monthly)
1	1

ROAD TEST

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

Before-operation Service. Perform the before-operation service as described in paragraph 16.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
2	2	<p>Air Pressure (Build-up, Governor Cut-off, Low-pressure Indicator). During warm-up period, operate engine at fast idle long enough to observe whether or not air brake pressure builds up at normal rate to specified maximum (105 pounds) and whether or not governor then cuts off air from compressor. With the engine at normal idling speed, bleed air pressure from system by repeated brake application, and observe if compressor cuts in at 85 pounds. Low-pressure indicator (buzzer) should sound at pressures below 60 pounds. Any abnormal drop in air pressure, except from brake application, should be investigated by making elimination soap-suds tests.</p>
3	3	<p>Dash Instruments and Gages.</p> <p>OIL PRESSURE GAGE. Oil pressure should be 30 to 50 pounds at operating speeds, and 5 pounds minimum at normal idling speed. CAUTION: <i>Stop engine if oil pressure is too low for safe engine operation at any speed.</i></p> <p>AMMETERS. Main ammeter should show a positive (+) charge for short period after starting engine, until generator restores to batteries the current used in starting. Time will depend on condition of charge of batteries and electrical load carried. With batteries fully charged and regulator unit cut in, ammeter may show zero or only slight charge. "B" ammeter should show charge to indicate "B" battery is receiving current from generator. Stop engine and investigate discharge (-) readings with engine running and lights and accessories turned off.</p> <p>SPEEDOMETER. When vehicle is in motion, speedometer should indicate vehicle speed, and odometer should register total accumulating mileage. Note any unusual noise in head or flexible drive shaft, or excessive fluctuation of pointer.</p> <p>VISCOMETER. With engine oil at normal operating temperature, indicator should remain in "IDEAL" range. If pointer remains in "HEAVY" range, inspect oil for dirt or sludge. If pointer goes to "THIN" range, it may indicate oil dilution.</p>

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
		<p>ENGINE TEMPERATURE GAGE. Reading should increase gradually during warm-up to normal operating temperature, 153° F to 183° F. CAUTION: <i>Do not move vehicle until engine temperature has reached 135° F. Maximum safe temperature is 200° F.</i></p> <p>TACHOMETER. White pointed should indicate actual engine revolutions per minute at any given time. Red pointer indicates and remains at highest revolutions per minute attained and should not exceed recommended governed engine speed, 2,300 revolutions per minute.</p> <p>FUEL GAGE. Fuel gage should register approximate amount of fuel in tank at all times, when ignition switch is closed.</p> <p>AIR PRESSURE GAGE. Refer to item 2 for specifications and tests of air pressure gage.</p>
4	4	<p>Horns, Mirrors, and Windshield Wipers. If tactical situation permits, test horns for proper operation and tone. Examine rear vision mirror and wipers to see that they are in good condition and secure. Adjust mirror for correct rear vision. Make sure that wiper blades contact glass evenly and operate through their full range without indications of loose wiper motor mountings.</p>
5	5	<p>Brakes (Service and Parking, Braking Effect, Feel, Side Pull, Noise, Chatter, Pedal Travel, Hand Control). Operate brakes at various speeds during road test.</p> <p>SERVICE BRAKES. Apply foot pedal sufficiently to stop vehicle in minimum distance and observe its effectiveness, any pull to one side, unusual noise, or chatter. Pedal should depress with little effort, and should return to off position when released. Apply hand application valve to see that it functions without binding.</p> <p>PARKING BRAKE. Stop vehicle on reasonable incline, and apply parking brake. Observe if it holds vehicle effectively, also observe whether or not the lever has at least one-third travel in reserve, and if the ratchet and pawl latch the applied brake securely.</p>

5. TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
6	6	<p>Clutch (Free Travel, Drag, Noise, Chatter, Grab, Slip). Pedal free travel should be 1½ inch before meeting resistance. Test clutch for drag when shifting into low gear. Clutch should stop transmission entirely, and shift into low should be made without clashing. When pedal is depressed note any unusual noise which may indicate defective or dry release bearing. With transmission in gear, note any tendency to chatter or grab when clutch is engaged, or slippage when fully engaged under load. NOTE: Never allow pedal free play to become less than ½ inch.</p>
7	7	<p>Transmission and Transfer (Lever Action, De-clutching, Vibration, Noise). Levers should move into each gear range position easily and quietly. Test declutching lever to see that front axle engages properly. Note any vibration that may indicate loose mountings, or any noise that may indicate damaged, excessively worn, or inadequately lubricated parts.</p>
8	8	<p>Steering (Free Play, Bind, Wander, Shimmy, Side Pull, Column, and Wheel). With vehicle in motion, move steering wheel fully in both directions, and observe whether or not there is any indication of looseness or binding. Note any tendency to wander, shimmy, or pull to one side. See that steering column and wheel are in good condition and secure.</p>
9	9	<p>Engine (Idle, Acceleration, Power, Noise, and Governed Speed). Observe engine operating characteristics as follows:</p> <p>UNUSUAL NOISES. Listen for knocks and rattles as the engine is accelerated and decelerated, and while it is under both light and heavy loads.</p> <p>ACCELERATION AND POWER. Operate the engine at various speeds in all gear ratios, noting whether or not the vehicle has normal pulling power and acceleration. Note any tendency to stall while shifting. A slight ping during fast acceleration is normal. Continued or heavy ping may indicate early timing or heavy accumulation of carbon.</p> <p>GOVERNED SPEED. With the vehicle in a low gear, slowly depress the accelerator to the toeboard, and,</p>

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six-month)	1,000-Mile (month-ly)	
		by observing the speedometer reading, see if the vehicle reaches, but does not exceed, the governed speed specified on the caution plate. If the vehicle is equipped with a tachometer, observe whether or not the engine speed exceeds the specified 2,300 revolutions per minute.
10	10	Unusual Noises (Attachments, Cab, Wheels). Be on alert during road test for any noise that may indicate loose or damaged attachments mounted on vehicle, loose cab mountings, floor plates, doors, windshield, or hardware. Listen particularly for indications of loose wheel mountings.
12	12	Air Brake System Leaks. With the air pressure at the governed maximum and the brakes applied, stop the engine. There should not be a noticeable drop in pressure within one minute. If any pressure drop occurs during this check, test the air brake system for leaks by the soapsuds method.
13	13	Temperatures (Brake Drums, Hubs, Axles, Transmission, Transfer). Place hand cautiously on all brake drums and wheel hubs to see if they are abnormally hot. Inspect axle housings, transmission, and transfer case for indications of overheating.
14	14	Leaks (Engine Oil Water, Fuel). Look in engine compartment, and under vehicle for indications of engine oil, coolant, or fuel leaks. Trace any leaks found to their source and correct or report them.
16	16	Gear Oil Level and Leaks (Axles, Transmission, and Transfer). Remove filler plugs in front and rear axles, transmission, and transfer case, and check lubricant levels. Proper level is from lower edge of filler hole when hot, to $\frac{1}{2}$ inch below when cold. Allow sufficient time for foaming to subside before checking levels. Note condition of lubricant. If an oil change is due in any of these units or condition of lubricant indicates an oil change is necessary, drain and refill units with fresh specified oil. Note any indications of excessive lubricant leaks at oil seals or gaskets.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE	
6,000-Mile (six month)	1,000-Mile (monthly)
17	17
18	18
19	19

MAINTENANCE OPERATIONS

Raise Vehicle Block Safely

Unusual Noises (Engine, Belts, Accessories, Transmission, Transfers, Shafts and Joints, Axles and Wheel Bearings). With engine running, observe as follows:

ENGINE, BELTS, AND ACCESSORIES. Accelerate and decelerate the engine momentarily, and listen for any unusual noise in these units that might indicate damaged, loose, or excessively worn engine parts, drive belts, or accessories. Also be sure to locate and correct, or report, any unusual engine noise heard during the road test.

TRANSMISSION, TRANSFER, PROPELLER SHAFTS AND JOINTS, AXLES AND WHEEL BEARINGS. With the transmission in an intermediate gear, and front driving axles engaged, operate these units at a constant, moderate speed by use of the hand throttle, and listen for any unusual noise that might indicate damaged, loose, or excessively worn unit parts. Also observe all propeller shafts and wheels for vibrations and runout, and for vibrations in the other units which may indicate looseness or unbalance. Also be sure to locate, correct, or report any noise noted during road test.

Cylinder Heads and Gaskets. Look for cracks or indications of oil, coolant, or compression leaks around studs, cap screws, and gaskets. **CAUTION:** *Cylinder heads should not be tightened unless there is definite evidence of leaks. If tightening is necessary, use torque-indicating wrench. Tighten head nuts in the proper sequence and to 630 inch-pounds tension. Be sure bond straps from heads to cab are secure.*

19 Valve Mechanism (Clearance, Cover Gaskets). Adjust valve stem clearance only if noisy, or if performance indicates a necessity. Intake clearance is 0.006 inch hot. Exhaust clearance is 0.010 inch hot.

ADJUST. Set valve stem clearance to above specifications. See that valve stems, springs, seats and locks are in good condition, correctly assembled, and secure. Inspect valve covers to be sure they are in good con-

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
		dition. Reinstall them securely, using new gaskets, if necessary.
20	20	Spark Plugs (Gaps, Deposits). Without removal, wipe off plugs and examine insulators for damage or indications of compression leaks. Remove all plugs, and examine to see that they are in good condition. Pay particular attention to broken insulators, excessive carbon or oxide deposits, and to electrodes burned thin. Clean plugs thoroughly. If plug cleaner is not available, install new or reconditioned plugs. <i>NOTE: Do not install plugs until item 21 has been performed. Set plug gaps to 0.025 inch by bending only ground electrodes.</i>
21		Compression Test. Test compression, with all spark plugs removed. Compression pressure at cranking speed is normally 90 to 95 pounds. There should not be more than 10 pounds variation between cylinders. Record compression pressures on space provided on back of work sheet, Form No. 461.
22	22	Battery (Cables, Hold-down, Carrier, and Record of Gravity and Voltage). Inspect battery case for cracks and leaks. Clean top of battery. Inspect cables, terminals, bolts, posts, straps, and hold-downs for good condition. Test specific gravity and voltage, and record on W.D., A.G.O. Form No. 461. Specific gravity readings below 1.225 indicate battery should be recharged or replaced. Electrolyte level should be above top of plates and may extend 1/2 inch above plates.
22		Perform high-rate discharge test according to instructions for "condition" test which accompany test instrument, and record voltage on W.D., A.G.O. Form No. 461. Cell variation should not be more than 30 percent. <i>NOTE: Specific gravity must be above 1.225 to make this test.</i>
22	22	Bring electrolyte to proper level by adding distilled or clean water. Clean entire battery and carrier. Repaint carrier, if corroded. Clean battery cable terminals, terminal bolts and nuts, and battery posts, and

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
		grease lightly. Inspect bolts for serviceability. Tighten terminals and hold-downs carefully to avoid damage to battery.
23	23	Crankcase (Leaks, Oil Level). With engine idling, examine crankcase, valve covers, timing-gear cover, and clutch housing for oil leaks. Stop engine, and, after oil has drained into crankcase, check to see if it is up to proper level. If an oil change is due, or condition of oil indicates the necessity, drain crankcase, and refill to correct level with fresh specified oil. See that bond strap from crankcase to frame is secure. <i>NOTE: Do not again start engine until item 24 has been performed.</i>
24	24	Oil Filters and Lines. Inspect filters and external engine oil lines to see that they are in good condition, secure, and not leaking. Remove filter body drain plugs, and drain off contents. Remove filter cartridge, and check condition. If cartridge change is due, or condition indicates the necessity, replace with new cartridge. Make sure gaskets are in place, and tighten the covers and drain plugs securely.
25	25	Radiator (Core, Shell, Mountings, Hose, Cap and Gasket, Antifreeze Record, Overflow Pipe). Inspect all applicable items to see that they are in good condition, secure, and not leaking. Be sure overflow pipe is not kinked or clogged. Examine condition of coolant to see whether or not it is so contaminated that cooling system should be cleaned. If cleaning is necessary, proceed only according to current directions covering proper procedure, and use recommended cleaner, neutralizer, and inhibitor materials. Clean all insects, dirt, or grease deposits from core air passages, and inspect for bent cooling fins. <i>CAUTION: Use only a suitably shaped piece of wood or a blunt instrument to straighten fins.</i> If antifreeze is in use, test its protective value, and record in space provided on back of work sheet, Form No. 461.
25		TIGHTEN. Carefully tighten all loose radiator mountings, hose clamps, and bond strap from radiator to frame.

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (month- ly)	
26	26	Water Pump and Fan. Inspect pump to see that it is in good condition, secure and not leaking. Examine shaft for end play or bearing looseness. Inspect fan to see if it is in good condition and that blades and hub are secure. Loosen drive belts and examine fan for hub or bearing wear. Leave drive belts loose until adjustment is made (item 29).
26	26	TIGHTEN. Carefully tighten water pump, fan assembly, and mounting nuts.
27	27	Generator, Cranking Motor and Switch. Inspect generator, cranking motor and cranking motor switch to see that they are in good condition, securely mounted, and that wiring connections, radio noise condenser, and bond strap from generator to frame are clean and secure.
27		REMOVE generator and cranking motor inspection covers, and examine commutators and brushes to see that they are in good condition and clean, that brushes are free in brush holders and have sufficient spring tension to hold them in proper contact with commutators, and that brush connecting wires are secure and not chafing.
27		CLEAN. Blow out commutator end of generator and cranking motor with compressed air. If commutators are dirty, clean only with No. 00 flint paper (do not use emery) placed over end of suitably sized piece of wood, and again blow out with air.
27		TIGHTEN. Carefully tighten cranking motor mounting bolts securely.
28	28	Air Compressor (Unloader Valve, Governor, Lines). Examine the air compressor to see that it is in good condition, properly alined with its drive pulleys, and secure. Observe the unloader valve for satisfactory valve clearance. See that the governor is to be in good condition and secure, that all the compressor water, oil, and air lines within the engine compartment are in good condition and secure, and that the oil and water lines do not leak. CLEAN. Clean governor air strainer in dry-cleaning solvent, dry, and reinstall.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
28		<p>SPECIAL LUBRICATION. Apply a few drops of engine oil on the unloader valve fulcrum pin. Apply a few drops of preservative oil, kerosene, or dry-cleaning solvent on upper valve stem of governor.</p> <p>ADJUST. Adjust unloader valve clearances to 0.010 inch to 0.015 inch.</p>
29	29	<p>Drive Belts and Pulleys. Observe all drive belts for evidence of fraying condition, excessive wear, and deterioration. Set adjustment so drive belts have 1/2- to 3/4-inch finger-pressure deflection. Inspect all drive pulleys and hubs to see that they are in good condition and securely mounted.</p>
30	30	<p>Tachometer Drive and Adapter. See that tachometer drive and adapter are in good condition, correctly assembled, and secure. Inspect the flexible drive shaft connection for indications of oil leaks.</p>
31	31	<p>Distributor (Cap, Rotor, Points, Shaft, Advance Units). Observe whether or not distributor body and external attachments are in good condition and secure. Examine other parts as follows:</p> <p>CAP, ROTOR, AND POINTS. Clean dirt from cap and remove. Inspect cap, rotor and breaker plate to see that they are in good condition, secure, and serviceably clean. Pay particular attention to cracks in cap and rotor, corrosion of terminals and connections, and to burned rotor bar or contact points. See that points are well aligned and adjusted to 0.020 inch when wide-open. If inside of distributor is dirty, remove assembly, clean in dry-cleaning solvent, dry thoroughly with compressed air, and lubricate its friction parts very lightly. When cleaning, remove wick and lubrication cup, clean, reoil, and replace them after cleaning distributor. If breaker points are pitted, burned or worn to an unserviceable degree, replace. Also replace condenser if points are pitted, as this may be the cause. When cleaning points, use fine file, or No. 2/0 flint paper (never use emery), and blow out filings with compressed air.</p>

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
		<p>SHAFT. Test shaft by hand-feel for excessive wear in shaft or bushings.</p> <p>CENTRIFUGAL ADVANCE. Install rotor on shaft, and test distributor governor by finger-force for normal range of movement permitted by mechanism. Note whether or not rotor returns to original position, when released, without hang-up or binding.</p>
31	31	<p>SPECIAL LUBRICATION. Lubricate cam surfaces, breaker arm pin, and wick according to Lubrication Guide instructions.</p>
31		<p>ADJUST. Set breaker point gaps to 0.020 inch.</p>
32	32	<p>Coil and Wiring. Inspect coil, ignition wiring, including shielding or conduits and radio noise resistor-suppressors, at spark plugs and distributor to see that they are in good condition, clean, securely connected, and properly mounted, and see that filter and radio noise condenser are secure. Inspect all low-voltage wiring in engine compartment in like manner.</p>
33	33	<p>Manifolds and Gaskets. Inspect manifolds and gaskets for looseness, damage, or exhaust leaks at gaskets. Examine for evidence of cracks or sand holes, usually indicated by carbon streaks.</p>
33		<p>TIGHTEN. Carefully tighten all manifold assembly and mounting nuts securely.</p>
34	34	<p>Air Cleaner. Inspect carburetor air cleaner to see that it is in good condition, securely mounted and connected, and not leaking. Remove reservoir and element, clean in dry-cleaning solvent, dry, fill reservoir to proper level with clean engine oil, and reassemble. Be sure that gaskets are in place and that all joints and air horn connections tight.</p>
35	35	<p>Breather Cap. Inspect crankcase breather cap to see if it is in good condition, secure, and not leaking. Remove oil reservoir and element, wash clean in dry-cleaning solvent, refill reservoir with fresh engine-oil, and reassemble securely.</p>

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
36	36	Carburetor (Choke, Throttle, Linkage, and Governor). See that choke, throttle, linkage, and governor are in good condition, correctly assembled and securely installed. Also see that the carburetor does not leak, that the control linkage, including the choke and throttle shaft, is not excessively worn, that the choke valve opens fully when the control is in its released position, that the throttle valve opens fully when the accelerator is fully depressed, and that the governor is properly sealed.
37	37	Fuel Filter and Lines. Examine filter to see that it is in good condition, securely mounted and connected, and not leaking. CLEAN. Close fuel shut-off, and remove filter sediment bowl and element. Wash clean in dry-cleaning solvent, and reassemble securely, being sure gaskets are in place. CAUTION: <i>If element cannot be cleaned by washing, replace unit. Do not scrape element.</i> Turn on fuel supply, and recheck for leaks.
38	38	Fuel Pump (Pressure). Inspect pump to see that it is in good condition, securely mounted, and not leaking. Remove glass sediment bowl, and wash in dry-cleaning solvent. Be sure gasket is in place and serviceable when bowl is reinstalled. Attach a test gage to pressure side of fuel pump, and, after starting engine as in item 39, see that pressure is satisfactory. Pressure should be 2 pounds minimum, 3¾ pounds maximum.
39	39	Cranking Motor (Action, Noise, Speed). Start the engine, observing whether or not the general action of the cranking motor is satisfactory, particularly whether or not it engages and operates properly without excessive noise, and has adequate cranking speed, and whether or not the engine starts readily. Also, as soon as the engine starts, note whether or not the oil pressure gage and ammeter indications are satisfactory.
40	40	Leaks (Engine Oil, Fuel, and Water). With engine running, recheck all points of oil, fuel, and cooling

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
		system for leaks. Trace any leaks found to their source, and correct or report them.
41	41	Ignition Timing (Advance). With the engine running and the neon timing light connected, observe if the ignition timing is correct. Also note whether or not automatic controls advance the timing as the engine is accelerated gradually.
41		ADJUST. Adjust the ignition timing to the specifications in the vehicle manual (par. 83 b).
42	42	Engine Idle and Vacuum Test. Inspect as follows: ADJUST. Connect a vacuum gage to the intake manifold, adjust the engine to its normal idle speed by means of the throttle stop screw, and then adjust the idle-mixture adjusting needle until the vacuum gage indicates a steady maximum reading. If this latter adjustment changes the idle speed appreciably, reset the idle speed and mixture until both are satisfactory. If the two adjustments are made simultaneously, time will be saved.
42	42	VACUUM TEST. With the engine running at normal idling speed, the vacuum gage should read about 18 to 21 inches, and the pointer should be steady. A badly fluctuating needle between 10 and 15 inches may indicate a defective cylinder head gasket or valve. An extremely low reading may indicate a leak in the intake manifold or gasket. Accelerate and decelerate the engine quickly. If the gage indicator fails to drop about 2 inches as throttle is opened, and to recoil to at least 24 inches as the throttle is closed, it may be an indication of diluted oil, poor piston ring sealing, or abnormal restriction in the carburetor, air cleaner, or exhaust. NOTE: <i>The above readings apply to sea level. There will be approximately a 1-inch drop for each 1,000 feet of altitude.</i>
43	43	Regulator Unit (Connections, Voltage, Current, and Cut-out). Inspect regulator unit and radio noise filter to see that they are in good condition, securely mounted and connected, and clean. See that bond strap to radiator is secure.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
43		<p>TEST. Connect the low-voltage circuit tester, and observe whether or not the voltage regulator, current regulator, and cut-out properly control the generator output. Follow the instructions in the vehicle manual, or those which accompany the test instrument. Replace, if test shows faulty operation. CAUTION: <i>This test should be made only after the regulator unit has reached normal operating temperature.</i></p>
44	44	<p>Power Tire Inflation (Connection, Line). Inspect tire inflation connection at reserve tank to see that it is in good condition and clean. Be sure cap is present and connected by safety chain. Note if valve turns easily and is not excessively worn. Examine air hose for deterioration, and check for damage or clogging. Connect hose, and test system for proper functioning when performing item No. 47.</p>
47	47	<p>Tires and Rims (Valve Stems and Caps, Condition, Direction, Matching Spare Tire Carrier). Inspect as follows:</p> <p>VALVE STEMS AND CAPS. Observe whether or not all valve stems are in good condition and in correct position, and that all valve caps are present and installed securely. Do not tighten with pliers.</p> <p>CONDITION. Examine all tires for cuts, bruises, breaks, and blisters. Remove embedded glass, nails, and stones. Look for irregular tread wear, watching for any sign of flat spots, cupping, feather edges, and one-sided wear. Remove tires worn thin at center of tread (or other unserviceable tires) and exchange for new or retreaded tires. Any mechanical deficiencies causing such conditions should be determined and corrected or reported. The wheel positions of tires with irregular wear should be changed to even up the wear. Front tires, worn irregularly, should be moved to rear.</p> <p>DIRECTION. Directional tires and non-directional tires should not be installed on the same vehicle. Directional tires on rear wheels should be mounted so that the "V" of the chevron will point down when</p>

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
		viewed from the front. Directional tires on front wheels, will ordinarily be mounted so that the "V" of the chevron will point up when viewed from the front.
		MATCHING. With the tires properly inflated, inspect them to see if they are matched according to over-all circumference and type of tread.
		SPARE TIRE CARRIERS. See whether or not spare tire carriers are in good condition and secure.
		RIMS. All rims and their lock rings or flanges should be in good condition and secure.
	47	TIGHTEN. Tighten wheel mounting nuts securely.
47		SERVE. With the tires properly inflated, measure the over-all circumference of all tires, including spares. Select the tires to be mounted on duals or on driving axles, so that they will not have differences in over-all circumference exceeding the 3/4-inch limits specified in current directives and bulletins. Mount all dual tires with the larger tire outside. The valve stem on the inner wheel should point out and the valve stem on the outer wheel should point in, and they should be opposite each other. <i>NOTE: The spares must be matched properly, and mounted for use on one of the road wheels, at intervals not exceeding 90 days. A convenient time to do this is during these maintenance services.</i> CAUTION: After performing the tire-matching service, do not reinstall the wheels until the wheel bearing services are completed.
48	48	Rear Brakes (Drums, Supports, Cams and Shafts). Inspect and service the rear brakes as follows: Remove rear wheels. <i>NOTE: On 6,000-mile maintenance, several wheel bearing and brake items up to 52 are group services, and overlap. Perform in best order for economy of time and orderly reassembly.</i>
		DRUMS AND SUPPORTS. Clean dirt and grease from drums and supports (dust shields), keeping dry-cleaning solvent away from lining. Examine drums and supports to see that they are in good condition,

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE	
6,000-Mile (six month)	1,000-Mile (monthly)
49	49

securely mounted, and if drums are excessively worn or scored.

CAMS AND SHAFTS. See whether or not cams and shafts are excessively worn where they contact, whether cam shafts operate free in collar, and whether or not shaft and collars are worn.

TIGHTEN. Tighten brake support cap screws and hub to drum nuts securely.

Rear Brake Shoes (Linings, Anchors, Springs). Examine linings through inspection holes to see whether or not they are so worn that rivet heads may contact drums within the next 100 miles of operation. If vehicle has been operated in deep water, mud, or loose sand, remove right rear wheel, and examine lining for damage. If this lining must be replaced, remove all wheels, check their brakes, and service as necessary, being sure to clean, lubricate, and adjust all removed wheel bearings as described in item 52 below for 6,000-mile service.

ADJUST. Adjust shoes by minor method if necessary.

Remove rear wheels, and check linings to see if they are in good condition, tightly secured to brake shoes, in good wearing contact with drums, free of dirt or lubricant, and not excessively worn. Also see that shoes are in good condition, properly secured to anchors, guides, and retracting springs, and that springs have sufficient tension to return shoes properly to released position. Thickness of lining at most worn point should be enough for at least 1,000 miles of service before rivet heads are likely to contact drums.

CLEAN. Clean all dirt and grease from linings with wire brush, cloth, or compressed air.

ADJUST. After subsequent related items, to 60 inclusive, are completed, adjust shoes by minor method. If new linings have been installed, adjust by major method described in paragraph 159 b. Adjust slack adjusters so that diaphragm push-rod travel is at minimum as described in paragraph 159 b (5).

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
52	52	<p>Rear Wheels (Bearings, Seals, Drive Flanges and Nuts). Inspect and service as follows:</p> <p>WHEELS. Inspect wheels to see that they are in good condition and secure.</p> <p>BEARINGS AND SEALS. Check for looseness of wheel bearing adjustment. Revolve wheels, and listen for evidence of dry or damaged bearings. Inspect around flanges and brake supports for lubricant leaks.</p> <p>DRIVE FLANGES AND NUTS. Note whether or not drive flanges and nuts are in good condition, and whether or not nuts are tightened securely.</p>
52		<p>CLEAN. Disassemble rear wheel bearings and oil seals. Clean thoroughly in dry-cleaning solvent, and examine bearing cups and cones to see that they are in good condition, that machined surfaces they contact are in good condition, and that there is no excessive wear.</p>
52		<p>SPECIAL LUBRICATION. When all of the related items are to the point where the wheel bearings are to be reinstalled, lubricate the bearings as follows: Take care to have all parts clean and dry, the hands clean, and to use clean lubricant. To retard rusting, the inside of the wheel hub, and hub cap or hub flange, and outside of spindle or axle must be coated with lubricant to a thickness of $\frac{1}{16}$-inch minimum. Bearing must be either machine-packed or hand-packed by kneading lubricant into all spaces in the bearings. Coat the cups, or outer races, and the lips of the oil seals with lubricant, and install new lubricant retainer seals, if necessary. CAUTION: <i>Do not pack the large cavity in the wheel hubs, between the wheel bearings, with lubricant, as this would cause leakage past the seals.</i></p>
52		<p>ADJUST. After lubricating the wheel bearings, reassemble the hub and drum assemblies into place, and adjust the wheel bearings correctly according to vehicle manual instructions. After the bearings have been adjusted and the adjustment securely locked, the bearings should be neither loose nor so tight that they bind.</p>

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
	53	Front Brakes (Drums, Supports, Cams and Shafts, Hose, Air Chambers, Push Rods and Seals, Slack Adjusters). Inspect brake hose, chambers, push rods and seals, and slack adjusters to see that they are in good condition, correctly assembled, and secure.
53		REMOVE. Remove front wheels, and inspect and service as follows: DRUMS AND SUPPORTS. Clean and inspect in same manner as in item 48. CAMS AND SHAFTS. Inspect in same manner as in item 48.
	54	Front Brake Shoes (Linings, Anchors, Springs). Inspect in same manner as in item 49. ADJUST. Adjust by minor method if necessary.
54		REMOVE. Remove front wheels and inspect shoes, linings, anchors and springs in the same manner as in item 49 at 6,000-mile service. CLEAN. Clean in same manner as in item 49.
54	54	ADJUST. Adjust in same manner as in item 49, after subsequent related items to 60 inclusive are completed.
55	55	Steering Knuckles (Joints, Bearings, Seals). Inspect to see that knuckle housings are in good condition. Look particularly for cracks around steering arms. See that outside knuckle felt seals and seal flanges are in good condition and secure. Remove lubrication plug, and examine sample of lubricant to see if it is contaminated.
55		CLEAN. Remove constant-velocity universal joint assembly. Wash thoroughly in dry-cleaning solvent, and, without disassembly of universal joint, inspect parts to see that they are in good condition and not excessively worn. Pay particular attention to universal joint washers, balls and races, axle splines, flanges, and pivot bearings or bushings.
55		SPECIAL LUBRICATION. Pack new lubricant well into constant-velocity universal joint until it fills all space

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
		between balls, cages, and races. Reassemble steering knuckle, taking care to replace any unserviceable lubricant retainer seals, boots, or gaskets.
55		ADJUST. Use every precaution to reinstall shims and spacers in the original position, from which they were removed at disassembly, to ensure correct pivot bearing and axle end play adjustment.
56	56	Front Springs (Clips, Leaves, U-bolts, Hangers, and Shackles). See that they are in good condition, correctly assembled, and secure. Spring clips and bolts should be in place, and spring leaves should not be shifted out of their correct position. This may be an indication of a sheared center bolt. Note whether or not the deflection of both springs is normal and approximately the same. Test the hangers and bolts for excessive wear by means of a pry bar. TIGHTEN. Tighten all spring U-bolts securely and uniformly.
57	57	Steering (Arms, Tie Rods, Drag-Link, Seals and Boots, Pitman Arm, Gear, Column, and Wheel). See that these items are in good condition, correctly and securely assembled and mounted, whether or not the steering gear case is leaking lubricant, and that the lubricant is at the proper level. Pay particular attention to the Pitman arm to see that it is securely mounted and not bent out of its normal shape. Also observe whether or not the steering system is well adjusted.
57		TIGHTEN. Tighten the Pitman arm shaft nut securely. Also tighten the steering gear case assembly and mounting nuts or screws, taking care not to disturb the adjusting screws and lock nuts. CAUTION: <i>Loosen the steering column bracket when tightening the steering case mounting nuts, so as not to distort the column.</i>
58	58	Front Shock Absorbers and Links. See that bodies are in good condition, secure to frame, and not leaking, that links are secure and not damaged, and, if rubber bushings are hard or cracked, apply brake fluid to exposed surfaces.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
58		SERVE. Fill shock absorber bodies with specified fluid. Work arm several times, and add more fluid. Repeat operation until all air is expelled and reservoir is full. Then disconnect link, and observe if action is normal. When arm is moved by hand, there should be resistance both ways.
60	60	Front Wheels (Bearings, Seals, Flanges, Axle End Play, and Nuts). Inspect front wheels, bearings, seals, drive flanges, and nuts in same manner as in item 52 for similar rear wheel items.
60		CLEAN. Disassemble, clean, and inspect the front wheel bearings and oil seals in the same manner as described in item 52, taking care to check the universal joint end play as the drive flanges are removed, so that the end play adjustment may be made when reassembling.
60		SPECIAL LUBRICATION. Apply in same manner as described in item 52.
60		ADJUST. Adjust wheel bearings in same manner as described in item 52, and adjust brake shoes as described in item 49.
61	61	Front Axle (Pinion End Play, Seal, Vent, and Alinement). If front axle appears to be out of line, measure distance from front spring eye bolt to center of axle spring pad on each side. Distance should be equal. Inspect axle housing to see that it is in good condition and not leaking. Examine pinion shaft for excessive end play, and examine seal for leaks. CLEAN. Clean axle housing vent thoroughly.
62	62	Front Propeller Shaft (Joints, Alinement, Seals, and Flanges). See that these items are in good condition, correctly and securely assembled and mounted; that the universal joints are properly alined with each other and are not excessively worn; that the slip joint is free, not excessively worn, and well lubricated, and that the seals on the universal joints and slip joint do not leak.

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
62		TIGHTEN. Tighten all universal joint assembly and companion flange bolts securely.
63	63	Engine (Mountings, Ground Strap, Side Pans). The engine should be in good condition and securely mounted and connected. Be sure to examine both front and rear engine mountings, and to see, on rubber type mountings, that rubber is not separating from its metal backing. If the mounting bolts are loose, tighten them properly, taking care not to overtighten any rubber spacer type or spring type mountings. Remove oil or grease from rubber type mountings. See that bond straps from engine mountings to frame are secure.
64	64	Hand Brake (Ratchet and Pawl, Linkage, Disk, and Linings). Examine to see that ratchet and pawl and linkage are in good condition, secure and not excessively worn; that disk is not scored or oily, and that lining is not oil-soaked or worn too thin.
64		ADJUST. Set clearance between brake disk and lining to $\frac{1}{32}$ inch when brake lever is released.
65	65	Clutch Pedal (Free Travel, Linkage, Return Spring). Check pedal free travel. It should be $1\frac{1}{2}$ inch before meeting resistance. Examine to see that pedal is securely mounted to shaft and that clutch operating linkage is in good condition, secure, and not excessively worn at friction joints. See that return spring has proper tension to bring pedal to correct released position.
65		ADJUST. Adjust plate so clutch pedal free travel is $1\frac{1}{2}$ inches. CAUTION: <i>No pedal adjustment should be made. For correct procedure, see paragraph 117.</i>
66	66	Brake Pedal (Linkage and Return Spring). Pedal should operate easily. Inspect all linkage to see that it is in good condition, securely connected, and not excessively worn at friction joints. Be sure return spring has tension to bring pedal to correct released position.
69	69	Air Brake Application Valve. See that application valve and linkage are in good condition, correctly assembled, and secure.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (month-ly)	
70	70	Air Brake Reservoirs. Observe whether or not they are in good condition and secure. Open the drain cocks and drain off condensate.
71	71	Transmission (Mountings, Seals, Linkage, and Power Take-off). Inspect to see that transmission case and power take-off housing are in good condition, securely mounted, and not leaking lubricant at seals or gaskets. Examine shift mechanism for damage and excessive wear.
72	72	Transfer (Mountings, Linkage, Seals, Vent). See that case is in good condition, securely mounted; that declutching control linkage and shift mechanism are securely connected and not damaged, and that vent is open. Also look for evidence of lubrication leaks at seals and gaskets. Clean vent passage if clogged.
72		TIGHTEN. Draw up all external assembly and mounting nuts securely.
73	73	Rear Propeller Shaft. Inspect rear propeller shaft in same manner as in item 62.
73		TIGHTEN. Draw up all universal joint and companion flange bolts securely.
75	75	Rear Axle (Pinion End Play, Seals, Vent, and Alinement). Inspect rear axle in the same manner as in item 61 for front axle. CLEAN. Clean axle housing vent thoroughly.
76	76	Rear Air Brakes (Chambers, Rods, Seals and Slack Adjusters). See that all items are in good condition, securely connected and mounted. Examine rods for excessive wear, and seals for lubricant leaks.
77	77	Rear Springs (Clips, Leaves, U-bolts). Inspect and tighten rear springs in same manner as in item 56.
78	78	Rear Shock Absorbers and Links. Inspect in same manner as in item 58.
78		SERVE. Service and make operating check in same manner as in Item 58.

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
79	79	<p>Cab and Body Mountings. Inspect cab and ponton body box (at rear of cab) mountings to see that they are in good condition and secure. On cab mountings using coil springs, be sure springs are in good condition and properly compressed. They should be snug but not fully compressed.</p> <p>TIGHTEN. Tighten cab and body mountings, taking care to loosen steering column clamp before alining or tightening cab. Do not fully compress spring-loaded cab mountings. Be sure to retighten steering column clamp. See that bond straps from cab to frame, supports, and ponton body are secure.</p>
80	80	<p>Frame (Side and Crossmembers). Inspect frame, brackets, side rails, and crossmembers to see that they are in good condition, secure, and correctly alined. If the frame is out of line, report the condition to the designated authority.</p>
81	81	<p>Wiring, Conduits, and Grommets. Observe these items underneath the vehicle, to see that they are in good condition, properly supported, connected and secure.</p>
82	82	<p>Fuel Tanks, Fittings, and Lines. Inspect fuel tanks to see that they are in good condition and securely mounted. Examine cap for defective gasket or plugged vent. Remove strainer on forward tank, and clean thoroughly. See that filler neck is in good condition and that cap fits securely. Remove fuel tank drain plugs, and drain off the accumulated water and dirt in bottom of tanks. Drain only until fuel runs clear. Use necessary precautions against fire.</p>
83	83	<p>Brake Lines (Fittings and Hose). Examine all lines and fittings, and air brake hose under vehicle, to see that they are in good condition, securely connected, and supported so lines or hose will not chafe against other vehicle parts.</p>
84	84	<p>Exhaust Pipes and Muffler. Examine the exhaust pipe to see that it is securely attached to the exhaust manifold, that the gasket or packing does not show visible evidence of leakage, and that the other end is</p>

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (month-ly)	
		clamped securely to the muffler. Inspect the muffler to see that it is in good condition and securely mounted. Check the tail pipe to see that it is securely clamped to the muffler, properly supported, and unobstructed at its outer end. See that the drain holes in the muffler are at lowest point, and are not clogged.
85	85	Vehicle Lubrication. Lubricate all points of the vehicle in accordance with instructions on vehicle Lubrication Guide (pars. 20 and 21). Omit only those items that have been given attention during these inspections and services. Replace missing or damaged lubrication fittings, and wipe off all excess lubricant that may get onto brakes and rubber parts, or that may soil clothes or equipment, or detract from the vehicle's good appearance.
		LOWER VEHICLE TO GROUND
86	86	Toe-in and Turning Stops. With front wheels on ground and in straight-ahead position, use the toe-in gage to determine whether or not adjustment is as specified. Should be $\frac{3}{16}$ to $\frac{5}{16}$ inch. See that wheel turning stops are present, secure, and tack welded. Turn front wheels fully in both directions and see whether or not turn is limited by stops. In this position, note whether or not tires clear all parts of vehicle. If there is any indication that turning angle exceeds specified limits (inside wheel 28 degrees, outside wheel 24 degrees), such as loose wheel stops, scuffing of tires against vehicle, or abnormal front drive universal joint wear, report for check of turning angle by higher echelon.
87	87	Winch (Clutch, Drive, Shear Pin, Cable). Observe whether or not all items are in good condition, correctly assembled, and secure. See that clutch moves freely and latches securely. Inspect propeller shaft in same manner as in item 62, and see that proper shear pin is installed. Propeller shaft front yoke should slide freely on worm shaft to insure safety feature of shear pin. Check safety collar clearance on shaft. Inspect cable to see that it is in good condition, evenly wound, and note whether or not cable

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
		chain and hook are securely attached. Lubricate winch clutch, shaft on which it slides, and operating arm, moving the clutch back and forth to be sure it is free.
87		CLEAN AND SERVE. Unwind cable and inspect for broken or frayed strands and for flat or rusty spots. Clean entire length of cable with a cloth saturated with very thin oil or kerosene. Remove excess oil, and, as cable is rewound evenly on drum, apply a thin film of engine or gear oil. Sample the oil in worm gear housing for contamination. If oil change is due or condition of oil warrants, drain and refill with specified oil.
88	88	Fifth Wheel (Bed Plate and Bolts). Observe the fifth-wheel rocker plate and bed plate to see that they are in good condition, securely assembled, and mounted. Examine the kingpin lock to see that it operates properly, locks securely and that the kingpin is not excessively worn. TIGHTEN. Tighten all assembly and mounting bolts. SPECIAL LUBRICATION. Clean fifth-wheel plate, and lubricate with chassis lubricant. Lubricate all fifth-wheel assembly grease fittings. Also hand-pack lubricant into the latching mechanism. CAUTION: <i>When the trailer is not attached, the fifth wheel should be covered to prevent accumulation of dirt.</i>
89	89	Tractor-to-Trailer Brake Hose and Connections. Examine brake hose to see that they are in good condition, properly supported, and that connecting fittings are in good condition and not excessively worn.
91	91	Lamp (Lights) (Head, Tail, Body, Stop, and Blackout). Operate all switches, and note whether or not lamps respond. Include stop and blackout lamps. See whether or not foot switch controls head lamp beams properly and that beams are aimed so as not to blind oncoming traffic. Examine all lights to see that they are in good condition and securely mounted, and whether or not lenses are dirty or reflectors discolored.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
91		ADJUST. Adjust lamp-unit beams.
92	92	Safety Reflectors. See that they are all present, in good condition, clean, and secure.
93	93	Front Bumper Tow Hooks, Brush Guards, and Grille. See that they are in good condition, secure, and that radiator grille is not obstructed.
94	94	Hood and Fasteners. Inspect engine hood (cover) in cab to see that it is in good condition, and that fasteners operate properly and hold hood securely.
95	95	Front Fenders and Running Boards. Examine fenders, running boards, and steps to cab to see that they are in good condition and securely mounted.
96	96	Cab (Doors, Hardware, Windshield and Glass, Top and Frame, Side Curtains, Seats, Gun Racks, Grab Rails, Floorboards, Ventilators, Platforms). Inspect these items to see that they are in good condition and secure, that the hardware and ventilators operate properly and are adequately lubricated, and whether or not the doors engage their bumpers and strikers and latch properly in the closed position. See that the doors are properly alined with their openings. Be sure ponton body box at rear of cab is securely bolted and not damaged.
98	98	Circuit Breakers. Observe whether or not they are in good condition, clean, dry, and securely connected and mounted.
99	99	Rear Splash Guards. See if splash guards and bond straps to frame are in good condition and securely mounted.
101	101	Pintle Hook. Examine pintle to see that it is in good condition and securely mounted to frame. Test pintle and latch to see if they operate properly, are adequately lubricated, and if lock pin is present and securely attached by chain. Pay particular attention for broken spring or worn draw bar.
103	103	Paint and Markings. Examine the paint of entire vehicle to see that it is in good condition, paying particular attention to any bright spots in finish that

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
104	104	<p>might cause glare or reflection. Inspect vehicle markings and identification for legibility. Include identification plates and their mountings if furnished.</p> <p>Radio Bonding (Suppressors, Filters, Condensers, and Shielding). See that all units not covered in the foregoing specific procedures are in good condition and securely mounted and connected. Be sure all additional bond straps and toothed lock washers, listed in paragraphs 113 to 115, are inspected for looseness or damage, and see that contact surfaces are clean. <i>NOTE: If objectionable radio noise from vehicle has been reported, make test in accordance with paragraphs 113 to 115.</i> If cleaning and tightening of mountings and connections, and replacement of defective radio noise suppression units do not eliminate trouble, the condition should be reported to the designated individual in authority.</p> <p style="text-align: center;">TOOLS AND EQUIPMENT</p>
131	131	<p>Tools (Vehicle and Pioneer). Inspect all the standard vehicle and Pioneer tools to see that they are all present (see vehicle stowage list, par. 22), in good condition, clean, and properly stowed and securely mounted, and that tool box is in good condition, and securely mounted and locked. Also examine the tools which have cutting edges to see that they are sharp. Any tools, mounted on the outside of the vehicle, which have bright or polished surfaces, should be painted or otherwise treated to prevent rust, glare, or reflection.</p>
132	132	<p>Fire Extinguisher. See that fire extinguisher is in good condition, securely mounted, and fully charged. The charge may be determined on gas-type extinguishers by weighing with a scale, and on liquid-type extinguishers by removing filler plug. Also be sure the nozzles are free from corrosion.</p>
133	133	<p>Decontaminator. Note whether or not decontaminator is in good condition, securely mounted, and fully charged. Make the latter check by removing the filler plug. <i>NOTE: The solution must be replaced every 3 months, as it deteriorates.</i></p>

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

MAINTENANCE		
6,000-Mile (six month)	1,000-Mile (monthly)	
134	134	First Aid Kit (if Specified). See that first aid kit is in good condition, and that all of its items are present and properly packed. Report any deficiencies immediately.
135	135	Publications and Form No. 26. See that all vehicle and equipment manuals, Lubrication Guides, Form No. 26 (accident report), Form No. 478 (MWO and major unit assembly replacement record) are present, legible, and properly stowed.
136	136	Traction Devices (Chains). Examine tire chains to be sure they are in good condition, clean (if not in use), not excessively worn, protected against rust, and properly mounted or stowed.
137	137	Tow (Chains, Cables, Rope, Snatch Blocks). See that the provided towing devices are in good condition, clean, and properly stowed. Tow chains or cables should be properly protected against rust when not in use. If snatch blocks are furnished, check to see that they operate freely.
139	139	Fuel and Water Cans and Brackets. Observe whether or not fuel and water cans and brackets are in good condition and secure, that the caps fit tightly and are secured to the can with a chain, and whether or not the cans are leaking.
141	141	Modifications (MWO's Completed). Inspect the vehicle to determine whether all Modification Work Orders have been completed and entered on Form No. 478. Enter any modifications or major unit assembly replacements, made at time of this service, on Form No. 478.
142	142	Final Road Test. Make a final road test, rechecking items 2 to 16 inclusive, and also be sure to recheck the transmission, transfer case, and all driving axles to see that the lubricant is at the correct level and not leaking. Confine this road test to the minimum distance necessary to make satisfactory observations. <i>NOTE: Correct or report all deficiencies found during final road test. CAUTION: Be sure all inspection plates on cab floor and under front fenders are replaced and securely fastened.</i>

Section XII

ORGANIZATION TOOLS AND EQUIPMENT

28. LIST OF SPECIAL OVERHAUL TOOLS.

a. The list in this section is for information only. It is not to be used as a basis for requisition.

Name	Federal Stock No.
EYE, engine lifting, 1/2-inch, 13-NC	41-E-628-306
PULLER, clutch pilot bearing	41-P-2906-15
WRENCH, engineer's, 15- and 60-degree angle, open-end, 3/4-inch	41-W-1468-475

Section XIII

TROUBLE SHOOTING

29. GENERAL.

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

30. ENGINE.

a. Engine Will Not Turn.

(1) **HYDROSTATIC LOCK OR SEIZURE.** Remove spark plugs (par. 84 b) and attempt to turn engine with hand crank to check for excess fuel, water, or oil in cylinders. If engine turns, the lock will be relieved. If engine does not turn, test for jammed cranking motor throw-out mechanism. See step following:

(2) **CRANKING MOTOR THROW-OUT MECHANISM JAMMED.** Remove cranking motor (par. 90 b (4)). Clean grease and dirt from throw-out mechanism. Inspect mechanism for broken parts. Replace broken parts and install cranking motor (par. 90 c). If engine still will not turn, seizure due to internal damage is indicated. Notify higher authority.

(3) **INCORRECT OIL VISCOSITY.** Drain crankcase and refill with proper grade oil (par. 21 c (5)).

b. Engine Turns but Will Not Start.

(1) **INOPERATIVE FUEL SYSTEM.** Remove fuel line from carburetor. With ignition switch off, turn engine over with the cranking motor.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

If free flow of fuel is not evident, fuel is not reaching carburetor (par. 69 b). If fuel flows freely, trouble in the carburetor is indicated. Repair or replace faulty carburetor (par. 65 b and c).

(2) **INOPERATIVE IGNITION SYSTEM.** Remove a cable from a spark plug. Turn on ignition switch. Hold spark plug cable terminal $\frac{1}{4}$ inch from engine casting, and crank engine. If spark does not jump the $\frac{1}{4}$ -inch gap, the ignition is inadequate (pars. 81, 82, and 83).

(3) **SLOW CRANKING SPEED** (par. 94).

c. Engine Does Not Develop Full Power.

(1) **IMPROPER IGNITION** (pars. 81 and 83).

(2) **ENGINE OVERHEATED** (par. 77 b).

(3) **IMPROPER VALVE ADJUSTMENT.** Check clearance and adjust if necessary (par. 57 f).

(4) **USE OF IMPROPER TYPE OF FUEL.** Use fuel of higher octane rating.

(5) **PREIGNITION.** If proper octane fuel is being used and the ignition system is functioning satisfactorily, spark plug of improper heat range may be the cause of the trouble (par. 84 a and b). Otherwise, internal engine troubles would be indicated. Notify higher authority.

(6) **AIR LEAKS AT CARBURETOR OR MANIFOLD FLANGES.** With engine running at 800 revolutions per minute, apply a small amount of oil at carburetor and manifold flange gaskets. If oil is sucked in, there is evidence of a leak. Tighten flange bolt nuts, and test again. If leak persists, replace gaskets.

(7) **LOW ENGINE COMPRESSION OR IMPROPER VALVE TIMING.** If the engine does not develop full power, with fuel reaching combustion chambers, adequate ignition and the proper grade and quantity of oil in crankcase, low compression or improper valve timing is indicated. Notify higher authority.

(8) **INCORRECT GOVERNOR SETTING.** Disconnect governor linkage at the carburetor, and check for spring linkage or stuck throttle. If throttle and linkage operate freely, start and accelerate the engine, with the governor disconnected. If a speed of 2,400 revolutions per minute is reached, the governor is faulty. Refer to higher authority for repair.

d. Engine Misfires.

(1) **FAULTY IGNITION SYSTEM** (pars. 81, 82, and 83).

(2) **LOW ENGINE COMPRESSION** (par. 53 c).

(3) **INCORRECT CARBURETOR ADJUSTMENT.** Adjust carburetor (par. 65 b).

(4) **CLOGGED FUEL TANK CAP VENT.** Open vents or replace cap.

(5) **RESTRICTED FUEL FLOW** (par. 69 b).

TROUBLE SHOOTING

(6) **WATER IN FUEL.** Remove drain plug from bottom of carburetor and inspect for water. If water is present, drain all fuel from system and refill with pure gasoline.

e. Excessive Oil Consumption.

(1) **OIL VISCOSITY TOO LOW.** Drain crankcase and refill with proper oil (par. 21 c (5)).

(2) **EXTERNAL OIL LEAKS.** Inspect for oil leaks at oil connections and at gaskets. Tighten loose connections. If leakage is detected at oil pan gasket or at main bearing flanges, notify higher authority.

(3) **PISTON RINGS WORN OR DAMAGED.** If high oil consumption continues, with proper oil in crankcase and with no external leaks, faulty piston rings are indicated. Blue smoke in the exhaust also indicates worn or damaged piston ring. Notify higher authority.

f. Engine Will Not Stop.

(1) **DEFECTIVE IGNITION SWITCH.** Replace switch (par. 85).

(2) **ENGINE OVERHEATED** (par. 77b).

31. CLUTCH.

a. Clutch Slips.

(1) **CLUTCH OUT OF ADJUSTMENT.** Adjust clutch (par. 117).

(2) **CLUTCH PEDAL OR LINKAGE BENT OR BINDING.** Disconnect linkage, and inspect for bent or binding part. Replace defective parts (pars. 122 and 123).

(3) **CLUTCH WORN OR BROKEN INTERNALLY.** If linkage is in satisfactory condition and slippage cannot be removed through adjustment, internal wear or breakage is indicated. Notify higher authority.

b. Clutch Grabs.

(1) **LOOSE MOUNTING.** Tighten external mounting nuts.

(2) **INTERNAL DIFFICULTY.** If tightening external mounting nuts fails to remove trouble, internal difficulty is indicated. Notify higher authority.

c. Clutch Rattles.

(1) **LOOSE OR WORN CONTROL LINKAGE.** Inspect clutch linkage. Replace worn parts. Tighten loose parts.

(2) **INTERNAL DIFFICULTY.** If rattle persists, with linkage in satisfactory condition, internal difficulty is indicated. Notify higher authority.

d. Clutch Will Not Release.

(1) **CLUTCH LINKAGE OUT OF ADJUSTMENT.** Bent or binding. Adjust clutch linkage to eliminate looseness. Replace defective parts of linkage (par. 123).

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

- (2) **CLUTCH OUT OF ADJUSTMENT.** Adjust clutch (par. 117).
- (3) **INTERNAL DIFFICULTY.** If clutch cannot be adjusted to release, and linkage is in satisfactory condition and adjustment, internal difficulty is indicated. Notify higher authority.

e. Clutch Makes a Scrubbing Noise.

- (1) **CLUTCH SLEEVE SCORED OR RIDGED.** Notify higher authority.

32. FUEL SYSTEM.

a. Fuel Does Not Reach Carburetor.

(1) **LACK OF FUEL.** Check gage on instrument panel and replenish fuel.

(2) **CLOGGED FUEL TANK VENT.** Remove obstruction from vent, or replace cap.

(3) **INOPERATIVE FUEL PUMP; CLOGGED FUEL FILTER OR LINES.** Remove drain plug from fuel filter and check passage from tank by blowing through line. If passage to fuel pump is unobstructed, reconnect fuel line. Disconnect fuel line to carburetor from fuel pump. Turn engine over by means of cranking motor. If fuel does not flow from pump, a defective pump is indicated. Otherwise, the fuel line from pump to carburetor is obstructed. Repair or replace defective parts (par. 69).

b. Fuel Does Not Reach Cylinders.

(1) **CARBURETOR STRAINER CLOGGED.** Clean or replace carburetor (par. 65 c and d).

(2) **THROTTLE NOT OPENING.** Adjust throttle (par. 65 b).

(3) **CARBURETOR JETS CLOGGED.** Replace carburetor (par. 65 c and d).

33. INTAKE AND EXHAUST SYSTEMS.

a. Air Passage to Carburetor Restricted.

(1) **AIR CLEANER DIRTY.** Service air cleaner (par. 71 b).

(2) **AIR PIPE CRUSHED.** Visually inspect air pipe. Replace if damaged (par. 71 d (2)).

b. Dirt Laden Air Entering Carburetor.

(1) **AIR CLEANER DIRTY.** Service air cleaner (par. 71 b).

(2) **NO OIL IN AIR CLEANER.** Service air cleaner (par. 71 b).

(3) **AIR PIPE DISCONNECTED OR LOOSELY CONNECTED.** Connect air pipe tightly (par. 71 d (2)).

c. Exhaust Makes Excessive Noise and/or System Emits Unpleasant Gas.

TROUBLE SHOOTING

(1) **MANIFOLD GASKETS LEAKING.** Visually inspect gaskets, with engine running. If gaskets are leaking, tighten manifold attaching nuts. If leak persists, notify higher authority.

(2) **LEAK AT EXHAUST PIPE FLANGE.** Visually inspect connection, with engine running. If gasket leaks, tighten nuts. If leak persists, replace gasket (par. 72 c (3)).

(3) **EXHAUST PIPE BROKEN OR BENT AND PULLED FROM MUFFLER.** Visually inspect pipe, with engine running. Replace pipe if broken or bent (par. 72 b and c).

(4) **TAIL PIPE PULLED FROM MUFFLER, LOST OR BROKEN.** Visually inspect tail pipe. Connect if disconnected. Replace if lost or broken.

(5) **MUFFLER DEFECTIVE.** If other parts of system are in satisfactory condition and excessive noise persists, a defective muffler is indicated. Replace muffler (par. 72 b and c).

34. COOLING SYSTEM.

SGV TD

a. Engine Overheats.

(1) **INSUFFICIENT COOLANT.** Check quantity of coolant and fill cooling system (par. 73).

(2) **FAN BELT LOOSE OR BROKEN.** Inspect fan belt. Replace if broken (par. 79 d). Adjust tension if loose (par. 79 b).

(3) **THERMOSTAT STICKING SHUT.** Remove (par. 77 c) and test thermostat by dropping it in water heated to 180° F. If it fails to open, replace it.

(4) **COOLING SYSTEM CLOGGED.** Fill system to capacity. Start and accelerate engine. Water flowing from the radiator overflow indicates clogged radiator. Flush system.

(5) **WATER PUMP INOPERATIVE.** Disconnect upper hose connection (par. 75 e (1)). Fill both engine and radiator as full as possible, with hose disconnected. Start engine. If water fails to flow from upper hose connection for a brief period, an inoperative water pump is indicated. Replace water pump (par. 75 d (1)).

(6) **CAUSED BY CONDITION EXTERNAL TO COOLING SYSTEM.** Some conditions external to cooling system which can cause engine overheating are incorrect ignition timing, dragging brakes, insufficient lubrication, and incorrect valve timing. If the cause for overheating cannot be isolated within the cooling system, check each of these.

b. Engine Slow To Warm Up.

(1) **THERMOSTAT DEFECTIVE.** Remove thermostat (par. 77 c). Test and replace if defective (par. 77 b).

(2) **TEMPERATURE GAGE DEFECTIVE.** If this condition should exist, the gage might indicate a cold engine while the engine would

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

really be warm. If this condition is suspected, remove the instrument and install one known to be accurate.

c. System Leaks Coolant.

(1) **DEFECTIVE HOSE CONNECTION.** Inspect hose connection. Tighten leaking connections. If leak persists, replace hose (par. 76 c).

(2) **WATER PUMP PACKING WORN.** This condition is indicated by leakage from water pump. Refer to higher authority.

(3) **RADIATOR CORE LEAKING.** Inspect core. Replace radiator if leak is detected (par. 74 b and c). Refer radiator to higher authority for repair.

35. IGNITION SYSTEM.**a. Improper Ignition.**

(1) **SPARK PLUGS FAULTY.** Uneven operation at idle speed, misfiring at high speed, or loss of power may be due to faulty spark plugs. Remove and inspect spark plugs (par. 84 c (1)). Replace faulty plugs.

(2) **DISTRIBUTOR POINTS FAULTY.** Hard starting, or complete failure to start on the part of the engine, may be due to faulty distributor points. Remove distributor cap and inspect points. Measure gap. Crank engine and observe opening and closing of points. Adjust points if out of adjustment (par. 83 b (2)). Refer old distributor to higher authority for repair or rebuilding.

(3) **IGNITION COIL OR CONDENSER FAULTY.** Weak or no spark, with fully charged battery and serviceable spark plugs and distributor points installed, may indicate a faulty ignition coil or condenser. Remove suspected coil and/or condenser, and replace with parts known to function properly (pars. 81 b and 82 b).

36. STARTING AND GENERATING SYSTEMS.**a. Low Generator Output.**

(1) **BATTERY FULLY CHARGED.** This is a natural condition due to the action of the voltage regulator. No repair is necessary.

(2) **DIRT ON COMMUTATOR.** Remove inspection cover from generator.

(3) **BRUSHES WORN.** Inspect brushes (par. 88 b (1)). Replace if they are so worn that they no longer fit snugly in their holders (par. 88 b (3)).

(4) **VOLTAGE REGULATOR OUT OF ADJUSTMENT.** If none of the conditions enumerated above are found, improper adjustment of the generator regulator is indicated. Replace generator regulator (par. 89 b).

TROUBLE SHOOTING

(5) **CAUSES EXTERNAL TO GENERATOR.** Low generator output could be caused by high resistance in either the battery or wiring between the generator and the batteries. It can also be caused by a faulty supply filter or generator condenser. Check all wiring connections to be sure they are clean and tight. Check filter and condenser by replacing with parts known to function correctly (par. 115 b). Test individual wires with a test lamp. If trouble persists, replace the batteries (par. 94 d).

b. Unsteady or No Generator Output.

(1) **DIRT ON COMMUTATOR** (par. 88 b (2)).

(2) **BRUSHES WORN** (par. 88 b (3)).

(3) **SHORTED, OPEN, OR GROUNDED WIRING: LOOSE, OPEN, OR DIRTY CONNECTIONS.** Inspect all wiring. Use test lamp to test individual wires. Clean and tighten all connections. Replace or repair broken or poorly insulated wires.

(4) **GENERATOR REGULATOR INOPERATIVE.** Replace generator regulator (par. 89 b).

(5) **FAULTY RADIO NOISE SUPPRESSION UNIT.** Short out supply filter. Disconnect generator condenser. Replace unit which proves defective (par. 115 b).

c. High Generator Output.

(1) **LOW BATTERY.** Test battery with a hydrometer. If specific gravity is below 1.275, high generator output is normal. No repair is necessary.

(2) **HIGH RESISTANCE WIRING.** Inspect wiring. Use test lamp on individual wires. Clean and tighten all connections. Replace wires found to be defective.

(3) **OVERHEATED BATTERY.** Feel of battery case. If battery feels hot, allow it to cool. Add water before using battery again (par. 94 c (4)).

(4) **GENERATOR REGULATOR INOPERATIVE.** Replace generator regulator (par. 89 b).

(5) **SHORTED OR GROUNDED GENERATOR FIELD CIRCUIT.** If none of the above is the cause of the difficulty, a shorted or grounded field circuit is indicated. Replace generator (par. 88 c) and refer old generator to higher authority for repair.

d. Noisy Generator.

(1) **MOUNTING BOLTS LOOSE.** Attempt to tighten mounting bolts. If trouble disappears, no further correction is necessary.

(2) **LACK OF LUBRICATION.** Lubricate generator (F, fig. 11). If noise disappears, no further correction is necessary.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(3) **WORN COMMUTATOR OR BEARINGS.** If noise persists after tightening and lubricating, replace generator (par. 88 c).

e. Cranking Motor Inoperative.

(1) **DISCHARGED BATTERY.** Check battery (par. 94 c).

(2) **BROKEN BATTERY CABLE OR TERMINAL.** Inspect cables from batteries to ground, and from batteries to cranking motor. Replace broken cables (par. 93 c).

(3) **INOPERATIVE SWITCH.** Short-circuit terminals of switch with a heavy metal tool pressed firmly across terminals. If cranking motor operates, an inoperative switch is indicated. Replace switch (par. 92 b).

(4) **INTERNAL DEFECT IN CRANKING MOTOR.** Disconnect cable from cranking motor. Press on cranking motor switch. Touch end of cable to frame of vehicle for an instant. Presence of sparks indicates inoperative cranking motor has internal defect. Replace cranking motor (par. 90 b).

(5) **FAULTY RADIO NOISE SUPPRESSION UNIT.** Short out dual unit filter. Disconnect generator condenser. Replace unit which proves defective (par. 115 b).

37. TRANSMISSION AND POWER TAKE-OFF.

a. Transmission Noisy.

(1) **INCORRECT OR INSUFFICIENT LUBRICANT.** Check lubricant and lubricate if necessary (par. 21 c (7)).

(2) **TRANSMISSION CASE LOOSE ON CLUTCH HOUSING.** Tighten housing. If noise disappears, further corrective measures are unnecessary.

(3) **CLUTCH HOUSING LOOSE ON ENGINE.** Tighten housing. If noise disappears, condition is corrected.

(4) **INTERNAL DEFECT.** If noise persists after above measures have been taken, report trouble to higher authority.

b. Gears Slip Out of Mesh.

(1) **INTERNAL DEFECT.** Report condition to higher authority.

c. Lubricant Leaks From Case.

(1) **LOOSE CASE BOLTS.** Tighten case bolts.

(2) **INTERNAL DEFECT.** Report condition to higher authority.

d. Power Take-off Lubricant Leaks From Case.

(1) **LOOSE CASE BOLTS.** Tighten case bolts.

e. Gears Fail To Mesh.

(1) **INTERNAL DEFECT.** Report condition to higher authority.

TROUBLE SHOOTING

38. TRANSFER CASE.

a. Transfer Case Noisy.

- (1) **LOOSE MOUNTING.** Tighten mounting bolts.
- (2) **INCORRECT OR INSUFFICIENT LUBRICANT.** Check lubricant and lubricate if necessary (par. 21 c (9)).
- (3) **CONNECTING DRIVE SHAFT LOOSE.** Tighten drive shaft. If noise stops, no further correction is needed.
- (4) **INTERNAL DEFECT.** If noise persists after the above checks, report the condition to higher authority.

b. Transfer Case Slips Out of Gear.

- (1) **LINKAGE BROKEN OR OUT OF ADJUSTMENT.** Inspect linkage. Replace broken parts. Adjust linkage (par. 130 a).

39. DRIVE SHAFTS AND UNIVERSAL JOINTS.

a. Drive Shaft Rattles When Vehicle Is Coasting.

- (1) **WORN SPLINES OR BEARING CUPS.** Replace drive shaft and attached universal joints (pars. 133 b, 134 b, 135 b, and 136 b). Refer old shaft to higher authority for repair.

b. Drive Shaft Vibrates.

- (1) **LOOSE BOLTS AT UNIVERSAL JOINT COMPANION FLANGES.** Tighten loose bolts.
- (2) **DRIVE SHAFT OUT OF BALANCE OR MISALINED.** Replace drive shaft and attached universal joints (step a (1), above).

c. Backlash in Drive Shaft.

- (1) **WORN BEARING IN UNIVERSAL JOINT.** Replace assembly (step a (1)).
- (2) **LOOSE BOLTS AT UNIVERSAL JOINT COMPANION FLANGES.** Tighten loose bolts.

40. FRONT AXLE.

a. Continuous Humming Noise.

- (1) **LACK OF LUBRICATION.** Lubricate properly (par. 21 c (7)).
- (2) **WHEEL BEARINGS TOO TIGHT.** Adjust wheel bearing (par. 167 b).
- (3) **BEVEL OR SPUR PINION BEARINGS TOO TIGHT.** Notify higher authority.

b. Humming Noise Noticeable Only When Coasting.

- (1) **WHEEL BEARINGS WORN.** Replace wheel bearings (par. 167 c).
- (2) **INTERNAL PARTS WORN OR OUT OF ADJUSTMENT.** Notify higher authority.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

c. Humming Noise Noticeable Only When Pulling.

(1) **INCORRECT BACKLASH ADJUSTMENT BETWEEN BEVEL GEAR AND PINION.** Notify higher authority.

d. Backlash Noticeable in Front Wheels When Stopping and/or Starting.

(1) **DRIVE SHAFT LOOSE.** Tighten drive shaft.

(2) **INTERNAL PART WORN OR MALADJUSTED.** Notify higher authority.

e. Lubricant Leaks From Housing.

(1) **LOOSE HOUSING BOLTS.** Tighten loose housing bolts.

(2) **DEFECTIVE GASKET, OIL SEAL, OR GREASE RETAINER.** Notify higher authority.

41. REAR AXLE.

a. Continuous Humming Noise.

(1) **LACK OF OR IMPROPER LUBRICATION.** Lubricate properly (par. 21 c (7)).

(2) **BEARINGS TOO TIGHT.** Notify higher authority.

b. Humming Noise Noticeable Only When Pulling.

(1) **INCORRECT BEVEL GEAR AND PINION ADJUSTMENT.** Notify higher authority.

c. Humming Noise Noticeable Only When Coasting.

(1) **WORN BEARINGS OR INCORRECT BEVEL GEAR AND PINION ADJUSTMENT.** Notify higher authority.

d. Backlash Noticeable When Stopping and/or Starting.

(1) **LOOSE DRIVE SHAFT.** Tighten drive shaft (par. 133 c).

(2) **CLUTCH OUT OF ADJUSTMENT OR WORN.** Adjust clutch (par. 117 b). If trouble persists, notify higher authority.

(3) **INTERNAL MALADJUSTMENT OR WEAR.** Notify higher authority.

e. Lubricant Leaks From Housing.

(1) **LOOSE HOUSING BOLTS.** Tighten loose bolts.

(2) **WORN OR DAMAGED GASKET, OIL SEAL, OR GREASE RETAINER.** Notify higher authority.

42. SERVICE (AIR) BRAKE SYSTEM.

a. Brake Pedal Goes to Floorboard.

(1) **NORMAL WEAR OF BRAKE LINING.** Adjust brakes (par. 159 b). If worn so that adjustment fails to eliminate trouble, notify higher authority.

TROUBLE SHOOTING

(2) **LOW AIR PRESSURE.** Observe pressure as indicated on gage. If less than 105 pounds, start engine and build up pressure. Should pressure fail to build up, check system for leaks or inoperative units.

(3) **WATER TRAPPED IN SYSTEM.** Drain reservoir tank (par. 147 b).

b. Brakes Drag.

(1) **BRAKE CONTROL ROD ADJUSTED TOO SHORT.** Remove clevis pin and loosen lock nut. Turn yoke counterclockwise to lengthen rod. Tighten lock nut and connect rod.

(2) **BRAKE CONTROL ROD RETURN SPRING WEAKENED OR BROKEN.** Remove spring from control rod and brake application valve bracket. Replace with serviceable spring.

(3) **WATER TRAPPED IN SYSTEM.** Drain reservoir tank (par. 147 b).

c. One Brake Drags.

(1) **GREASE IN BRAKE LINING.** Replace brake shoes (par. 160 b). Return old shoes to third echelon for relining. Check condition of grease retainers. Replace if defective.

(2) **BRAKE SHOES OUT OF ADJUSTMENT.** Adjust brakes (par. 159 b).

(3) **LINING LOOSENED FROM SHOE.** Replace brake shoes (par. 160 b).

(4) **BRAKE SHOE SPRING WEAKENED OR BROKEN.** Replace brake shoe spring (par. 160 b (3)).

(5) **CLOGGED AIR TUBE OR HOSE.** Clean or replace obstructed part.

(6) **WHEEL BEARINGS OUT OF ADJUSTMENT.** Adjust wheel bearings (par. 167 b).

d. Truck Pulls to Right or Left When Brakes Are Applied and/or Brakes Are Uneven.

(1) **BRAKE ON FRONT WHEEL DRAGGING** (step c above).

(2) **BRAKES NEED ADJUSTING OR LUBRICATING.** Adjust (par. 159 b) and/or lubricate brakes.

(3) **BRAKES NEED RELINING.** Report to higher authority.

(4) **GREASE ON BRAKE LINING.** Report to higher authority.

(5) **BRAKE SHOE RELEASE SPRING OR BRAKE DIAPHRAGM CHAMBER RELEASE SPRING BROKEN.** Replace broken spring.

(6) **BRAKE DRUM OUT OF ROUND.** Replace drum (par. 167 d).

(7) **LEAKING BRAKE CHAMBER DIAPHRAGM.** Replace diaphragm (par. 155 b).

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

e. Brakes Take Hold Slowly.

- (1) **BRAKES OUT OF ADJUSTMENT.** Adjust brakes (par. 159 b).
- (2) **BRAKE LINING WORN.** Replace brake shoes (par. 160 b).
- (3) **BRAKE DRUMS WORN.** Replace hubs (par. 167 c). Return used parts to higher authority for repair.
- (4) **RESTRICTION IN AIR LINE.** Remove obstruction from air line or hose, or replace offending part.
- (5) **BRAKE MECHANISM NEEDS LUBRICATION.** Lubricate vehicle (par. 21 c).
- (6) **LOW AIR PRESSURE IN BRAKE SYSTEM** (step (7) below).
- (7) **BRAKE VALVE DELIVERY LOW.** Check brake valve delivery pressure. Adjust brake valve linkage or replace brake valve (par. 149 b).
- (8) **EXCESSIVE LEAKAGE WITH BRAKES APPLIED** (step o below).
- (9) **RESTRICTION IN TUBING LINES.** Disconnect both ends of suspected line. Apply air pressure to blow out obstruction. Replace line if impossible to remove obstruction.
- (10) **RESTRICTION IN HOSE LINE.** Disconnect both ends of suspected line. Apply air pressure to blow out obstruction. Replace line if impossible to remove obstruction.

f. Brakes Release Slowly.

- (1) **BRAKE CONTROL ROD NOT RETURNING PROPERLY.** Check adjustment of control rod. Adjust if necessary (par. 159 b (5)). Check condition of brake control rod return spring. Replace spring if weak or broken.
- (2) **RESTRICTION IN AIR TUBE OR HOSE.** Remove obstruction (step e (9) and (10) above) or replace faulty tube or hose (par. 157 b).
- (3) **DEFECTIVE AIR VALVE.** Replace defective valve (par. 149 b).
- (4) **BRAKE CAMSHAFT BINDING.** Lubricate brake cam with engine oil. Do not get oil on lining.
- (5) **BRAKES NEED ADJUSTING OR LUBRICATING.** Adjust (par. 159 b) and/or lubricate (par. 21 e (15)) brakes.
- (6) **OBSTRUCTION IN EXHAUST PORT OF BRAKE VALVE, QUICK RELEASE VALVE, OR RELAY VALVE.** Remove obstruction.
- (7) **DEFECTIVE BRAKE VALVE, QUICK RELEASE VALVE, OR RELAY VALVE.** Replace defective valve (pars. 149 b, 152b, and 151 b).

g. Insufficient Brakes.

- (1) **BRAKES NEED ADJUSTING, LUBRICATING, OR RELINING.** Adjust brakes (par. 159 b), lubricate brakes, or report to higher authority.
- (2) **LOW AIR PRESSURE** (step (3) below).

TROUBLE SHOOTING

(3) **BRAKE VALVE DELIVERY PRESSURE LOW.** Check brake valve delivery pressure. Adjust valve linkage or replace valve (par. 149 b).

h. Brakes Do Not Apply.

(1) **NO AIR PRESSURE.** Start engine and build up air pressure.

(2) **RESTRICTED OR BROKEN TUBING OR HOSE.** Disconnect both ends of restricted line and apply air pressure. Replace line, if impossible to remove obstruction or if line is broken.

(3) **DEFECTIVE BRAKE VALVE.** Replace valve (par. 149 b).

i. Brakes Do Not Release.

(1) **BRAKE RIGGING BINDING.** Straighten or replace bent parts. Replace worn or broken parts. Lubricate rigging (par. 21 c (15)).

(2) **BRAKE VALVE NOT RETURNING TO FULL RELEASED POSITION.** Adjust retracting spring tension. Check control rod and pedal to see if either is binding. Free and lubricate binding parts.

(3) **BRAKE VALVE IN APPLIED POSITION.** Move valve to released position.

(4) **BRAKE VALVE DEFECTIVE.** Replace valve (par. 149 b).

(5) **RESTRICTION IN TUBING OR HOSE.** Disconnect both ends of suspected line and blow out with compressed air. Replace line if impossible to remove obstruction.

(6) **AIR TRAPPED IN FRONT SERVICE LINE BEYOND DOUBLE CHECK VALVE.** This is caused by obstruction, or absence, of vent hole in dummy coupling. Clear vent hole in dummy coupling, or replace dummy coupling with one having vent hole.

j. Brakes Grab.

(1) **GREASE ON LINING.** Report to higher authority.

(2) **BRAKE DRUM OUT OF ROUND.** Replace drum (par. 167 d).

(3) **DEFECTIVE BRAKE VALVE.** Replace valve (par. 149 b).

(4) **BRAKE RIGGING BINDING.** Straighten or replace bent parts. Replace broken and worn parts. Lubricate rigging (par. 21 c (15)).

k. Air Pressure Will Not Rise to Normal (80 to 105 Pounds).

(1) **DEFECTIVE AIR GAGE REGISTERING INCORRECTLY.** Replace gage (par. 193 b).

(2) **EXCESSIVE LEAKAGE.** Start engine, and build up as much pressure as possible. Check all connections and units for leaks, with brakes applied and not applied. Use soapy water to detect leaks which cannot be felt or heard. Tighten loose connections, and replace defective parts.

(3) **RESERVOIR TANK DRAIN COCK OPEN.** Close drain cock on bottom of each tank.

5. TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

- (4) **GOVERNOR OUT OF ADJUSTMENT.** Adjust governor.
- (5) **NO CLEARANCE AT COMPRESSOR UNLOADING VALVES.** Adjust clearance to 0.010-inch minimum, 0.015-inch maximum (par. 145 b (2)).
- (6) **FAN BELTS SLIPPING ON COMPRESSOR PULLEY.** Adjust fan belt tension (par. 79 b).
- (7) **DEFECTIVE COMPRESSOR.** Replace compressor (par. 145 c).

l. Air Pressure Rises Too Slowly to Normal (80 to 105 Pounds).

- (1) **EXCESSIVE LEAKAGE.** Check for leakage and service or replace defective units.
- (2) **CLOGGED COMPRESSOR AIR STRAINER.** Service air strainer (par. 145 b (1)).
- (3) **NO CLEARANCE AT COMPRESSOR UNLOADING VALVES.** Adjust clearance to 0.010-inch minimum, 0.015-inch maximum (par. 145 b (2)).
- (4) **ENGINE SPEED TOO LOW.** Increase engine speed.
- (5) **COMPRESSOR DISCHARGE VALVES LEAKING.** Replace compressor cylinder head or compressor (par. 145 c).
- (6) **EXCESSIVE CARBON IN COMPRESSOR CYLINDER HEAD OR DISCHARGE LINE.** Replace compressor cylinder head, compressor, or discharge line (par. 145 c (5) and (6)).

m. Air Pressure Rises Above Normal (80 to 105 Pounds).

- (1) **DEFECTIVE AIR GAGE REGISTERING INCORRECTLY.** Replace gage (par. 193 b).
- (2) **DEFECTIVE GOVERNOR.** Replace governor.
- (3) **GOVERNOR OUT OF ADJUSTMENT.** Adjust governor (par. 146 b).
- (4) **RESTRICTION IN GOVERNOR TO COMPRESSOR TUBE.** Disconnect both ends of tube and apply compressed air. If impossible to remove obstruction, replace tube (par. 157 b).
- (5) **TOO MUCH CLEARANCE AT COMPRESSOR UNLOADING VALVES.** Adjust clearance to 0.010-inch minimum, 0.015-inch maximum (par. 145 b (2)).
- (6) **UNLOADING VALVE CAVITIES OR UNLOADING PASSAGE BLOCKED WITH CARBON.** Replace compressor cylinder head or compressor (par. 145 c).
- (7) **UNLOADING VALVES STUCK CLOSED.** Replace compressor cylinder head or compressor (par. 145 c).

n. Air Pressure Drops Quickly With Engine Stopped and Brakes Released.

- (1) **LEAKING BRAKE VALVE.** Replace valve (par. 149 b).

TROUBLE SHOOTING

- (2) **LEAKING RELAY VALVE.** Replace valve (par. 151 b).
- (3) **LEAKING TUBING OR HOSE.** Service or replace line (par. 157 c).
- (4) **COMPRESSOR DISCHARGE VALVES LEAKING.** Replace compressor cylinder head or compressor (par. 145 c).
- (5) **GOVERNOR LEAKING.** Service or replace governor (par. 146 b).
- (6) **EXCESSIVE LEAKAGE ELSEWHERE IN SYSTEM** (step k (2) above).

o. Air Pressure Drops Quickly With Engine Stopped and Brakes Fully Applied.

- (1) **LEAKING BRAKE CHAMBER DIAPHRAGMS.** Replace diaphragm chambers (par. 155 b).
- (2) **LEAK IN BRAKE VALVE, RELAY VALVE, TUBING OR HOSE.** Service or replace leaking part.
- (3) **DRAIN COCK OR CUT-OUT COCK LEFT OPEN.** Close cock.

p. Compressor Knocks.

- (1) **LOOSE DRIVE PULLEY.** Tighten pulley.
- (2) **BACKLASH IN DRIVE GEARS OR DRIVE COUPLING.** Report to higher authority or replace compressor (par. 145 c).
- (3) **WORN BEARINGS.** Replace compressor (par. 145 c).
- (4) **EXCESSIVE CARBON IN COMPRESSOR CYLINDER HEAD.** Replace compressor cylinder head or compressor (par. 145 c).

q. Brake Valve "Groans" When Brakes Are Applied. Replace brake valve (par. 149 b).**r. Relay Valve "Groans" or "Chatters" When Brakes Are Applied.** Replace relay valve (par. 151 b).**s. Quick Release Valve "Blasts" When Brakes Are Released.** Replace quick release valve (par. 152 b).**t. Safety Valve "Blows Off."**

- (1) **SAFETY VALVE OUT OF ADJUSTMENT.** Replace safety valve (par. 148 b). Refer original valve to higher authority for adjustment.
- (2) **AIR PRESSURE ABOVE NORMAL** (step (1) above).

43. DRIVE SHAFT HAND BRAKE SYSTEM.**a. Brake Does Not Hold.**

- (1) **BRAKE OUT OF ADJUSTMENT.** Adjust brake (par. 162 b).
- (2) **BRAKE LINING WORN.** Try adjusting brakes (par. 162 b). If trouble persists, replace shoes (par. 162 c).
- (3) **BRAKE SHOE LINING GLAZED OR GREASED.** Replace brake shoes (par. 162 c).

TROUBLE SHOOTING

- (2) **SPRING REBOUND CLIPS LOOSE OR BROKEN.** Tighten loose clips. If clips are broken, replace spring.
- (3) **BROKEN SPRING OR SHACKLE.** Replace broken parts (pars. 169 b and 170 b).

46. STEERING GEAR.

a. Front Wheels Shimmy.

- (1) **WHEEL AND TIRE OUT OF BALANCE.** Inspect tire. If incorrectly mounted (with valve and balancing mark on tire not alined), dismount tire and assemble correctly (par. 168 c and d). If this does not remedy the trouble, refer the wheel and tire to higher authority for balancing.
- (2) **DRAG LINK LOOSE.** Shake drag link. Tighten and adjust if loose (par. 173 b (3)).
- (3) **STEERING GEAR OUT OF ADJUSTMENT.** Adjust steering gear (par. 173 b).
- (4) **STEERING GEAR WORN.** Refer to higher authority for repair.
- (5) **FRONT WHEEL BENT.** Jack up front of truck. Spin wheels and look for wobble. Replace bent wheel (par. 166 b).
- (6) **LOOSE FRONT WHEEL BEARINGS.** Jack up truck. Check bearings for play. Adjust loose bearing (par. 167 b).
- (7) **FRONT TIRE, WHEEL AND/OR HUB OUT OF BALANCE.** Jack up front of truck. Spin wheels repeatedly, and notice if they always stop and rock at same point. If out of balance, check mounting of tire. Dismount and mount correctly if valve and balancing mark on tire are not alined (par. 168 d). If trouble persists refer entire assembly to higher authority for balancing.
- (8) **IMPROPER CASTER OR CAMBER.** Notify higher authority.
- (9) **BENT FRAME.** Notify higher authority.

b. Front Wheel Wander.

- (1) **DRAG LINK LOOSE.** Shake drag link. Tighten and adjust if loose (par. 173 b (3)).
- (2) **WORN STEERING GEAR.** Refer to higher authority for repair.
- (3) **FRAME OF VEHICLE BENT.** Notify higher authority.

c. Vehicle Steers Hard.

- (1) **STEERING GEAR AND/OR FRONT AXLE LACK PROPER LUBRICATION.** Lubricate vehicle correctly (par. 21 c (7)).
- (2) **TIRES UNDERINFLATED.** Inflate tires correctly (par. 168 b).
- (3) **FRONT SPRING CLIPS LOOSE OR BROKEN.** Inspect front spring clips. Tighten if loose. If clips are broken, replace spring (pars. 169 b and 170 b), and refer used spring to higher authority for repair.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(4) **WORN STEERING GEAR.** Refer to higher authority for repair.

(5) **FRAME OF VEHICLE BENT.** Notify higher authority.

d. Road Shocks Felt at Steering Wheel.

(1) **DRAG LINK ADJUSTED TOO TIGHT.** Adjust drag link (par. 173 b (3)).

(2) **WORN STEERING GEAR.** Refer to higher authority for repair.

e. Truck Pulls to Right or Left. Inflate tires properly (par. 168 b).

f. Vehicle Hard to Straighten Out After Turn to Right or Left. Inflate tires properly (par. 168 b).

47. BODY AND FRAME.

a. Windshield Wiper Inoperative.

(1) **LEAK IN TUBING FROM MANIFOLD TO WIPER.** Start engine and inspect tubing. Place a liquid on doubtful spots. If it bubbles, a leak is indicated. Replace punctured or defective tubing.

(2) **KINKED HOSE OR TUBING.** Visually inspect tubing and hose. Straighten out kinks. Replace hose or tubing if it cracks or breaks.

(3) **DIRT ON EXTERIOR OF WIPER CASE BLOCKING AIR INTAKE.** Blow dirt from outside wiper motor case with compressed air.

(4) **INTERNAL DIRT OR WEAR.** Replace wiper (par. 178 c).

b. Vehicle Steers Hard, Shimmies, Wanders, or Wheels Do Not Track. If frame is bent, notify higher authority.

48. BATTERY AND LIGHTING SYSTEM.

a. Battery Cells All Test Over 1.250 Specific Gravity and Within 15 Points of Each Other. If battery is normal, no corrective measures are necessary in summer. For cold weather operation, give batteries booster charge if cells are under 1.275.

b. Battery Cells All Test Under 1.250 Specific Gravity and Within 15 Points of Each Other.

(1) **BATTERY WILL NOT HOLD A CHARGE.** Replace battery (par. 94 d).

(2) **DEMAND FROM BATTERIES EXCEEDS INPUT FROM GENERATOR.** Recharge batteries. Check electrical system for short circuits, loose connections, and low generator output. Refer to higher authority for increase in charging rate.

c. Frequent Additions of Water Necessary.

(1) **EXCESSIVE GENERATOR CHARGING RATE.** Adjust generator charging rate.

(2) **BROKEN BATTERY CASE.** Replace battery. Refer used battery to higher authority for repair.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

- (4) **WORN STEERING GEAR.** Refer to higher authority for repair.
- (5) **FRAME OF VEHICLE BENT.** Notify higher authority.

d. Road Shocks Felt at Steering Wheel.

(1) **DRAG LINK ADJUSTED TOO TIGHT.** Adjust drag link (par. 173 b (3)).

- (2) **WORN STEERING GEAR.** Refer to higher authority for repair.

e. Truck Pulls to Right or Left. Inflate tires properly (par. 168 b).

f. Vehicle Hard to Straighten Out After Turn to Right or Left. Inflate tires properly (par. 168 b).

47. BODY AND FRAME.

a. Windshield Wiper Inoperative.

(1) **LEAK IN TUBING FROM MANIFOLD TO WIPER.** Start engine and inspect tubing. Place a liquid on doubtful spots. If it bubbles, a leak is indicated. Replace punctured or defective tubing.

(2) **KINKED HOSE OR TUBING.** Visually inspect tubing and hose. Straighten out kinks. Replace hose or tubing if it cracks or breaks.

(3) **DIRT ON EXTERIOR OF WIPER CASE BLOCKING AIR INTAKE.** Blow dirt from outside wiper motor case with compressed air.

- (4) **INTERNAL DIRT OR WEAR.** Replace wiper (par. 178 c).

b. Vehicle Steers Hard, Shimmies, Wanders, or Wheels Do Not Track. If frame is bent, notify higher authority.

48. BATTERY AND LIGHTING SYSTEM.

a. Battery Cells All Test Over 1.250 Specific Gravity and Within 15 Points of Each Other. If battery is normal, no corrective measures are necessary in summer. For cold weather operation, give batteries booster charge if cells are under 1.275.

b. Battery Cells All Test Under 1.250 Specific Gravity and Within 15 Points of Each Other.

(1) **BATTERY WILL NOT HOLD A CHARGE.** Replace battery (par. 94 d).

(2) **DEMAND FROM BATTERIES EXCEEDS INPUT FROM GENERATOR.** Recharge batteries. Check electrical system for short circuits, loose connections, and low generator output. Refer to higher authority for increase in charging rate.

c. Frequent Additions of Water Necessary.

(1) **EXCESSIVE GENERATOR CHARGING RATE.** Adjust generator charging rate.

(2) **BROKEN BATTERY CASE.** Replace battery. Refer used battery to higher authority for repair.

TROUBLE SHOOTING

d. Bulge in Battery Case. If excessive temperature is due to overcharging, treat battery as outlined in step c above. Refer to higher authority for decrease in charging rate.

e. Corrosion on Battery Terminals.

(1) **EXCESSIVE CHARGING RATE CAUSING ACID TO SPRAY ON TERMINALS.** Remove terminals from posts. Clean posts and terminals thoroughly. Replace cable if terminal is weakened by corrosion. Connect terminals and apply a film of No. 2 general purpose grease, or vaseline, to exposed metal. Refer to higher authority for decrease in charging rate.

(2) **LEAD COATING ON TERMINALS DESTROYED.** Proceed as directed in step (1) above.

f. Broken Terminal Post on Battery.

(1) **LOOSE BATTERY INSTALLATION.** Replace battery (par. 94 d).

(2) **BATTERY CABLE TOO SHORT.** Replace battery cable (par. 93 c).

g. All Lamps Fail To Light.

(1) **CIRCUIT BREAKER OPEN.** Close circuit breaker. If it snaps open again, look for a short circuit.

(2) **BATTERIES DEAD.** Check for cause. Eliminate short circuits. Recharge or replace batteries.

(3) **OPEN CIRCUIT IN CABLES OR WIRES.** Inspect wiring. If visual inspection reveals no open circuit, locate with test lamp. Connect disconnected wires or cables. Replace broken wires or cables.

h. One Lamp Fails To Light.

(1) **BURNED OUT LAMP.** Replace lamp.

(2) **LAMP LOOSE IN SOCKET.** Install lamp properly.

(3) **OPEN CIRCUIT IN CIRCUIT TO LAMP.** Proceed as directed in step g (3) above.

(4) **LIGHT NOT GROUNDED.** Remove light. Clean points of contact on light and vehicle until shiny. Install light.

49. INSTRUMENTS.

a. Ammeter Inoperative.

(1) **WIRE DISCONNECTED OR BROKEN.** Connect disconnected wire. Splice or replace broken wire.

(2) **INTERNAL DEFECT.** Replace ammeter (par. 187 b).

b. Fuel Gage Apparently Inoperative.

(1) **NO FUEL IN TANK.** Fill fuel tank.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(2) **OPEN CIRCUIT IN WIRING.** Visually inspect wires to see if any are broken or disconnected. Use a test lamp if open circuit cannot be located visually. Connect disconnected wires and replace broken wires.

(3) **FUEL GAGE TANK UNIT INOPERATIVE.** Replace tank unit (par. 188 c).

(4) **GAGE INOPERATIVE.** Replace gage (par. 188 d).

c. Tachometer Pointer Noisy and/or Fluctuates and Jumps.

(1) **FLEXIBLE SHAFT KINKED.** Examine cable. Remove kinks. Replace cable if permanently distorted (par. 189 f).

(2) **FLEXIBLE SHAFT WORN AND BINDING.** Replace cable (par. 189 f).

(3) **TACHOMETER HEAD WORN.** Replace tachometer head (par. 189 b).

d. Tachometer Inoperative.

(1) **FLEXIBLE SHAFT BROKEN.** Examine shaft and replace if broken (par. 189 f).

(2) **DRIVE UNIT INOPERATIVE.** Replace drive unit.

(3) **HEAD INOPERATIVE.** Replace tachometer head (par. 189 b).

e. Speedometer Fluctuates and Jumps and/or Is Noisy.

(1) **CABLE KINKED.** Examine cable and eliminate kinks. Replace cable if permanently bent (par. 190 d).

(2) **CABLE WORN AND BINDING.** Replace cable (par. 190 d).

(3) **SPEEDOMETER WORN.** Replace speedometer (par. 190 b).

f. Speedometer Inoperative.

(1) **CABLE DISCONNECTED.** Connect cable (par. 190 e).

(2) **CABLE BROKEN.** Replace cable (par. 190 d).

(3) **DRIVE UNIT INOPERATIVE.** Replace drive unit (par. 190 f).

(4) **INSTRUMENT INOPERATIVE.** Replace speedometer (par. 190 b).

g. Oil Gage Apparently Inoperative.

(1) **OIL PUMP INOPERATIVE OR ENGINE WITHOUT OIL PRESSURE FOR OTHER REASON.** Stop engine. Inspect oil lines to see if any are broken. Look for signs of oil leakage. Replace broken lines. If lines are apparently in satisfactory condition, an inoperative oil pump is indicated. Notify higher authority.

(2) **LINE TO GAGE PLUGGED.** Remove line and remove obstruction or replace line (par. 191 b).

(3) **GAGE DEFECTIVE.** Replace gage (par. 191 b).

TROUBLE SHOOTING

h. Temperature Gage Inoperative.

(1) **TUBE BROKEN OR DISCONNECTED.** Trace tube from gage to left side of rear cylinder head. Replace if broken. Connect if disconnected (par. 192 d).

(2) **OBSTRUCTION IN LINE TO GAGE.** Disconnect line from gage and run engine. If air fails to come from line, an obstruction is indicated. Disconnect tubing from connecting hose. Remove obstruction or replace plugged tubing or hose.

(3) **DEFECTIVE GAGE.** Perform test in step (2) above. If air is emitted from tubing, a defective gage is indicated. Replace gage (par. 192 b).

i. Viscosity Gage Apparently Inoperative.

(1) **NO OIL IN CRANKCASE.** Check engine oil, and add oil if necessary (par. 21 c (5)).

(2) **VISCOSITY GAGE OIL LINE OBSTRUCTED.** Disconnect line at gage and at viscosity gage instrument, near rear of left side of oil pan. Attempt to blow through line. If plugged, remove obstruction or replace line.

(3) **VISCOSITY GAGE INSTRUMENT DEFECTIVE.** If line was unobstructed but empty, a defective viscosity instrument is indicated. Remove instrument from near the rear left side of oil pan, and replace with a serviceable unit.

(4) **VISCOSITY GAGE DEFECTIVE.** If tubing and instrument are in satisfactory condition, as determined in the two preceding steps, a defective gage is indicated. Replace gage (par. 195 b).

50. WINCH.

a. Winch Drum Fails To Operate with Drive Shaft Turning. Remove broken shear pin (par. 200 e). Install new shear pin (par. 201 e).

b. Winch Clutch Sticks on Drum Shaft. Clean and lubricate drum shaft and winch clutch, if rusty or dirty (par. 21 c (14)).

c. Brake Band Does Not Hold Load.

(1) **BRAKE ADJUSTMENT TOO LOOSE.** Adjust brake (par. 197 a).

(2) **BRAKE LINING WORN.** Report condition to higher authority.

d. Oil Leaks From Gear Case.

(1) **OIL PLUGS LOOSE.** Tighten oil plugs.

(2) **WORM CAPS LOOSE.** Tighten caps.

(3) **OIL SEALS WORN.** Report condition to higher authority.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)**51. RADIO INTERFERENCE SUPPRESSION.**

a. General. Electrical disturbances which cause radio interference are generally found in loose bonds, loose toothed lock washers, broken or cracked resistor suppressors, loose connections or faulty filters. Following are tests which can be made to determine the cause of interference. Place a radio-equipped vehicle about 10 feet from the vehicle to be tested, and use it as a test instrument to localize troubles and to determine when faulty parts or conditions have been eliminated or corrected. Here the cooperation of the radio operator is required. Determine the circuits causing the noise by checking as follows:

(1) Operate engine while listening to radio. A regular clicking, which varies with engine speed and ceases the instant the ignition is shut off, is caused by the ignition circuit.

(2) An irregular clicking, which continues a few seconds after the ignition is shut off, is caused by the regulator.

(3) A whining noise, which varies with engine speed and continues a few seconds after the ignition is shut off, is caused by the generator.

b. Noise Caused by Ignition Circuit.

(1) Make certain ignition system is functioning properly (sec. XIX). (Improper plug gaps, late timing, poor adjustment of breaker points, and damaged or worn distributor will affect the suppression system.)

(2) Inspect resistor-suppressors in spark plug leads. Replace any that are scorched, cracked, or otherwise faulty. Be sure wires are screwed in tightly.

(3) Inspect resistor-suppressor at distributor. Replace if necessary.

(4) Inspect and tighten all bonds in engine compartment.

(5) Inspect capacitive type filters in primary circuit at ignition coil and on dash. Make certain mounting bolts are tight. Replace filter and test for noise.

c. Noise Caused by Regulator.

(1) Check all connections to regulator.

(2) Check capacitive type filler mounting bolts for tightness and correct placement of lock washers.

(3) Check regulator mounting bolts for tightness and correct placement of lock washers.

(4) Test for noise.

(5) If noise is still present, replace battery circuit dual unit filter attached to regulator (B) terminal. Test for noise.

(6) Replace armature circuit filter attached to generator (A) terminal. Test for noise.

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

d. Noise Caused by Generator.

- (1) Check to make certain there is no excessive sparking at brushes. Correct if necessary.
- (2) Inspect filter mounting, and check placement of lock washers. Tighten.
- (3) Inspect ground strap.
- (4) Replace filter.

e. Noise Observed While Vehicle Is in Motion, but Not When Stopped.

- (1) Inspect and tighten all body bonds (par. 114) (fig. 76).
- (2) Inspect and tighten all points where toothed lock washers are used (fig. 76).

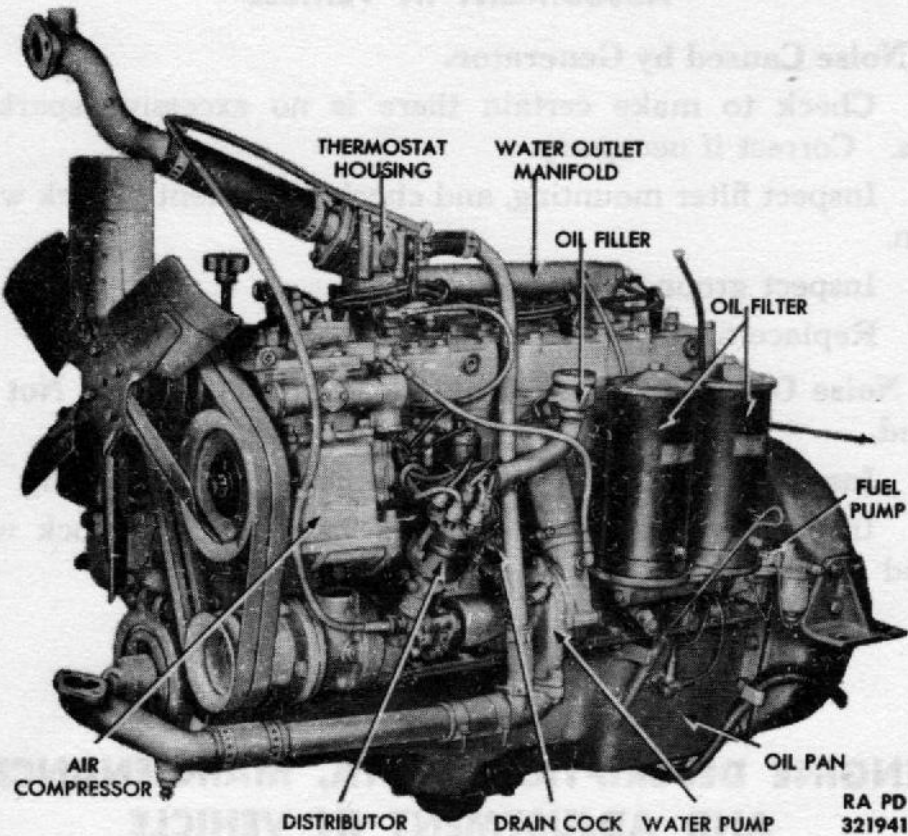
Section XIV

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

52. DESCRIPTION AND TABULATED DATA.

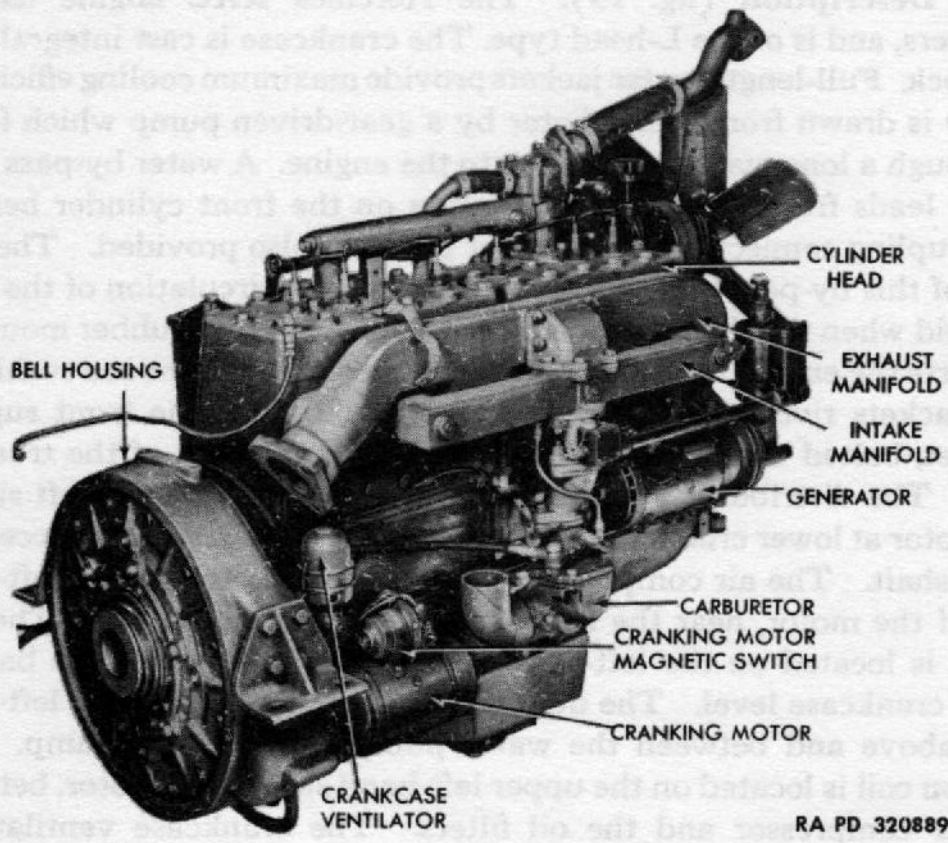
a. Description (fig. 19). The Hercules RXC engine has six cylinders, and is of the L-head type. The crankcase is cast integral with the block. Full-length water jackets provide maximum cooling efficiency. Water is drawn from the radiator by a gear-driven pump which forces it through a long water manifold into the engine. A water by-pass tube, which leads from the water connection on the front cylinder head to the coupling connection at the water pump, is also provided. The purpose of this by-pass tube is to provide adequate circulation of the cooling fluid when the thermostat is closed. A three-point rubber mounting supports the engine in the chassis. The rear support arms are cushioned on brackets riveted to the side frame members. The front support bracket, bolted to the engine support crossmember, is of the trunnion type. The distributor and water pump are located on the left side of the motor at lower crankcase level. They are mounted on the accessory drive shaft. The air compressor motor is also located on the left-hand side of the motor, near the front and above the distributor. The fuel pump is located on the left-hand side of the motor, near the back at lower crankcase level. The dual oil filters are located on the left-hand side, above and between the water pump and the fuel pump. The ignition coil is located on the upper left-hand side of the motor, between the air compressor and the oil filters. The crankcase ventilator is located above the front end of the front cylinder head. The thermostat

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD
321941

Figure 19 — Engine — Left Front View



RA PD 320889

Figure 20 — Engine — Right Rear View

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

is located above the cylinder block and back of the crankcase ventilator. The exhaust and intake manifolds are located on the right-hand side of the motor. Below the manifolds and in the lower center is the carburetor. The governor and the generator are also on the right-hand side, in front of the carburetor. The cranking motor is located on the right-hand lower part of the motor, and is connected to the bell housing. The cranking motor solenoid switch is mounted on the upper part of the cranking motor.

b. Data.

Make	Hercules
Model	RXC
Number of cylinders	6
Bore	4 ⁵ / ₈ in.
Stroke	5 ¹ / ₄ in.
Firing order	1-5-3-6-2-4
Displacement	529 cu in.
Rated net horsepower at 2,300 rpm	131
Maximum permissible engine speed:	
Short periods	2,400 rpm
Sustained	1,900 rpm
Oil capacity (to refill engine)	12 qt
Cooling system capacity	40 qt
Octane rating of fuel necessary for maximum efficiency	72 to 87
Serial number located	Left-hand side of cylinder block. Also stamped in cylinder block at upper right-hand corner in front.

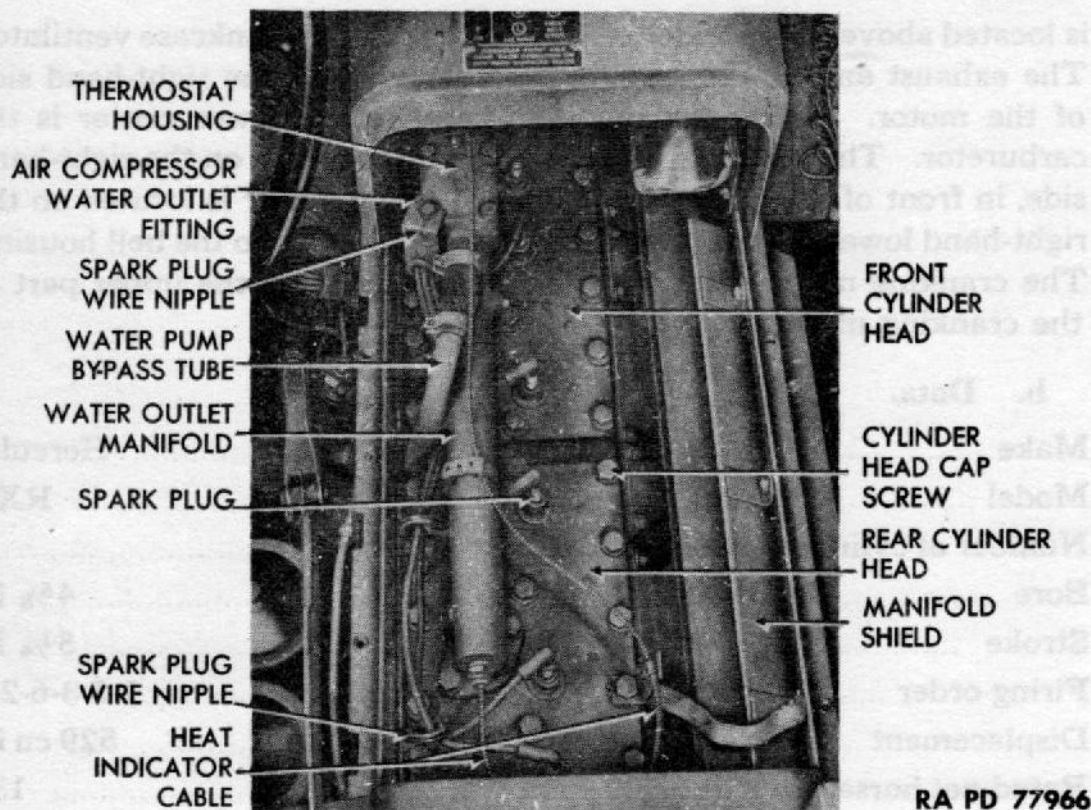
53. TUNE-UP.

a. General. Engine tune-up consists of a systematic series of adjustments to ensure efficient engine operation. Tune up engine after installation and every 1,000 miles, or every month, whichever comes first. To avoid hit-and-miss tuning, make adjustments in the order given below.

b. Adjust Valve Tappets (par. 57).

c. Test Engine Compression. Remove spark plugs (par 84 b). Insert a compression gage into a spark plug hole. Crank engine and observe gage reading. Repeat test on each cylinder. If compression is below 85 pounds in any cylinder, or if it varies as much as 10 or 15 pounds between cylinders, notify higher authority. It is not possible

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 77966

Figure 21 - Cylinder Heads Installed

to tune an engine which still has faulty compression after valves are properly adjusted.

d. Clean and Adjust Spark Plugs. Clean each plug in a sandblast spark plug cleaner. Measure gap between electrodes. Bend outside electrode to secure 0.025-inch gap. Test each plug in a spark plug testing machine. Replace plug if spark fails to flow freely across gap while under 105 pounds air pressure. Install spark plugs (par. 84 d).

e. Clean and Tighten Cables. Clean terminals, and tighten connections of battery cables and ignition wires.

f. Adjust Distributor Points. Check condition of distributor points and adjust if necessary (par. 83 b).

g. Adjust Carburetor (par. 65 b).

54. CYLINDER HEAD AND GASKET REMOVAL.

a. Drain Cooling System. Open the two drain cocks. One is located on radiator outlet elbow, the other is on side of cylinder block above the water pump (fig. 19).

b. Remove Engine Hood (fig. 30). Disengage the two latches and remove the three screws, lock washers, and flat washers which hold hood to floorboard. Lift hood from vehicle.

ENGINE DESCRIPTION, DATA, MAINTENANCE, AND
ADJUSTMENT IN VEHICLE

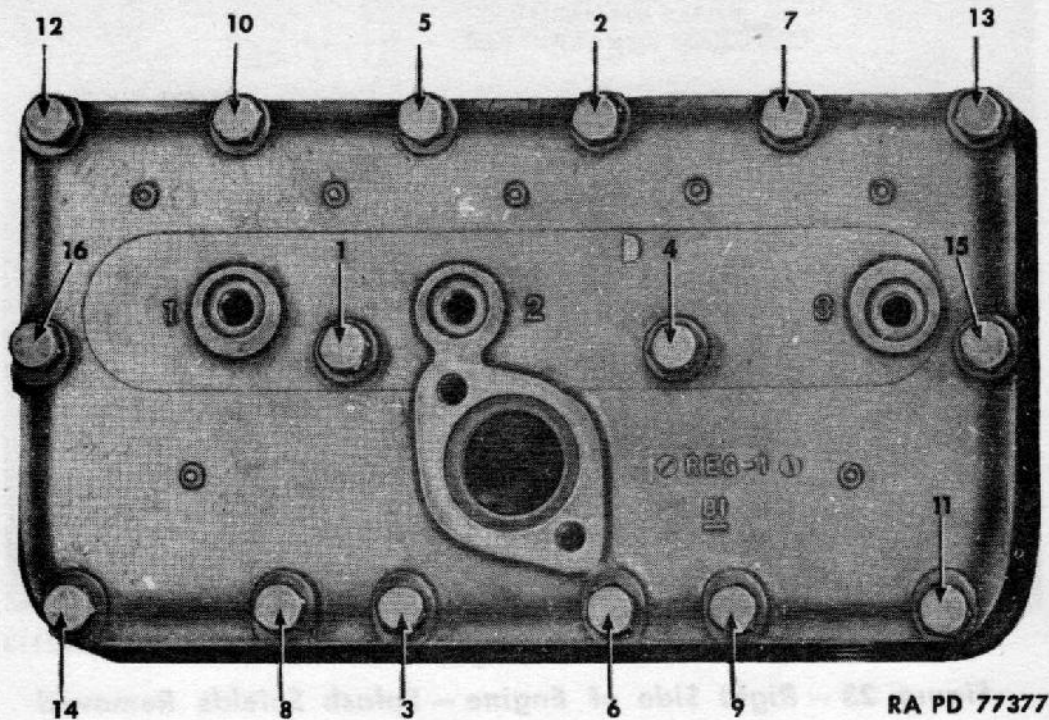


Figure 22 — Sequence for Tightening Cylinder Head Cap Screws

c. **Remove Water Outlet Manifold** (fig. 21). Remove the two cap screws and lock washers which secure water outlet hose flange to manifold. Remove gasket between flange and manifold. Disconnect air compressor water outlet tube from manifold. Loosen hose clamp and disengage water pump by-pass pipe from thermostat housing. Remove left rear thermostat housing cap screw and lock washer, and lift spark plug wire nipple (bracket) from screw. Screw heat indicator cable from rear end of manifold. Remove the four cap screws and lock washers which attach manifold to the two cylinder heads. Lift manifold from cylinder heads.

d. **Remove Spark Plugs** (par. 84 b) (fig. 21).

e. **Remove Cylinder Heads** (fig. 21). Remove the 16 cylinder head cap screws and lock washers from each cylinder head. Lift both cylinder heads and gaskets from cylinder block.

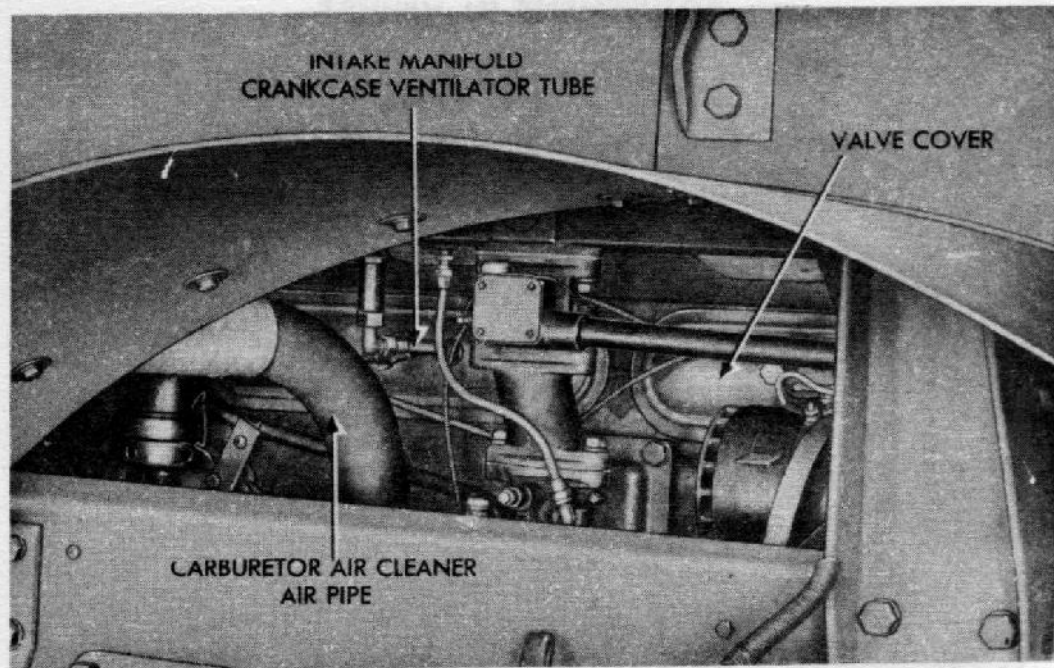
55. CARBON REMOVAL.

a. **Remove Cylinder Heads** (par. 54).

b. **Remove Carbon.** Scrape carbon from top of cylinder block with an electric drill and wire brush, being careful to get all carbon from around valve seats. Do not allow carbon to enter water jacket openings. Remove carbon from undersides of cylinder heads in the same manner.

c. **Install Cylinder Heads** (par. 56).

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 322113

Figure 23 — Right Side of Engine — Splash Shields Removed

56. CYLINDER HEAD AND GASKET INSTALLATION.

a. **Connect Cylinder Heads to Cylinder Block** (fig. 21). Soak cylinder head gaskets in water for about 15 minutes. Place gaskets in position on top cylinder block. Place front cylinder head in position on its gasket. Place rear cylinder head in position on its gasket. Insert the 16 cylinder head cap screws into their openings on each cylinder head. Place bond strap and heat indicator cable bracket under third cap screw from rear on right-hand side of rear cylinder head. On left-hand side of rear cylinder head, place spark plug wire nipples (brackets) under second screw from front and second screw from rear. Beginning at center and working toward ends of each cylinder head (fig. 22), tighten cylinder head cap screws to 52½ foot-pounds tension.

b. **Install Water Outlet Manifold** (fig. 21). Use new gaskets, and coat them with a film of No. 2 general purpose grease. Place gaskets in position on cylinder heads. Position manifold on gaskets. Install the four lock washers which attach manifold to cylinder heads. Screw heat indicator cable into fitting on rear end of manifold. Place lock washer and spark plug wire nipple on left rear thermostat housing screw, and install screw. Work by-pass tube hose fitting onto thermostat housing boss, and tighten clamp. Connect air compressor water outlet tube to manifold. Position a new gasket, covered with a film of No. 2 general purpose grease, between water outlet hose flange and manifold. Install the two lock washers and cap screws which attach flange to manifold.

ENGINE DESCRIPTION, DATA, MAINTENANCE, AND
ADJUSTMENT IN VEHICLE

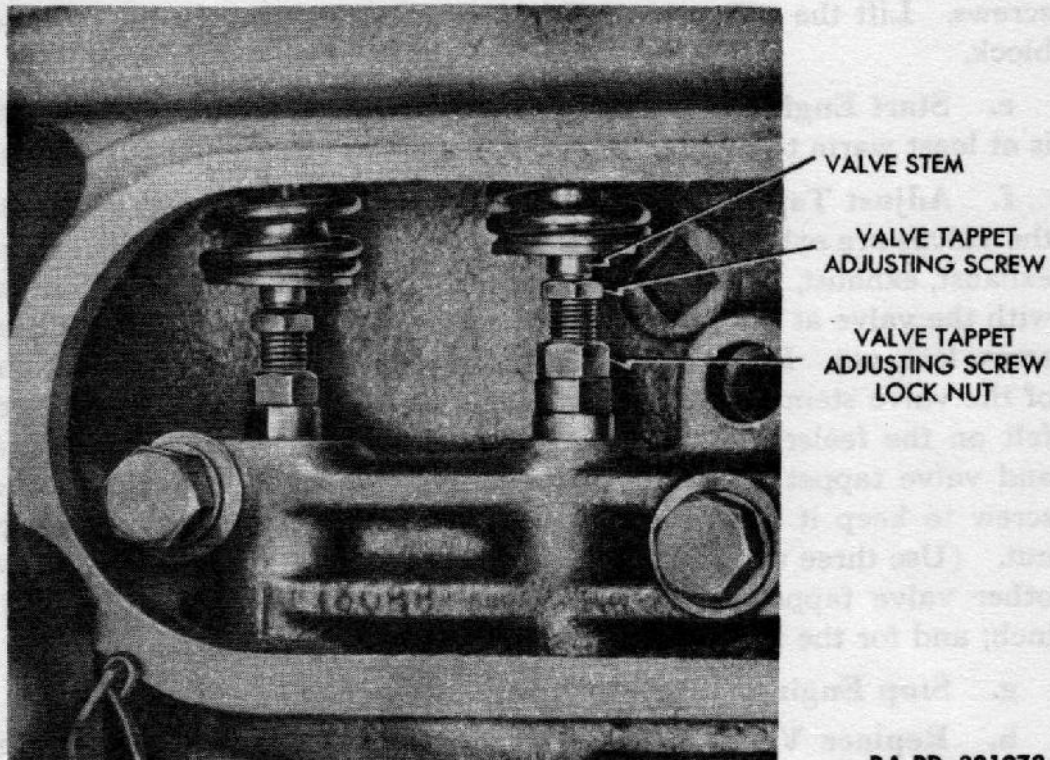


Figure 24 — Valve Tappet Adjustment Provisions

c. **Install Spark Plugs** (par. 84 d) (fig. 21). Connect wires to adjacent spark plugs. In case of question as to which wire to install on a given spark plug, refer to wiring diagram of ignition system (fig. 55).

d. **Fill Cooling System.** Close drain cocks on radiator outlet elbow and left side of cylinder block. Fill system to capacity (40 quarts) with coolant.

e. **Test Installation.** Start engine. Proper functioning of engine, without compression or water leaks, indicates satisfactory installation.

f. **Install Engine Hood** (fig. 30). Position hood on floorboards over engine. Install the three flat washers, lock washers and screws. Engage the two latches.

57. VALVE TAPPET ADJUSTMENT.

a. **Remove Splash Shield** (fig. 31). Remove the four wing screws, lock washers, and flat washers which attach splash shield to underside of right front fender. Lift shield from fender.

b. **Remove Air Cleaner Air Pipe** (par. 71 c).

c. **Disconnect Intake Manifold Crankcase Ventilator Tube** (fig. 23). Screw tube from valve on intake manifold.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

d. **Remove Valve Covers** (fig. 23). Remove the four valve cover screws. Lift the two valve covers and two gaskets from the cylinder block.

e. **Start Engine.** Start engine and run until the intake manifold is at least warm to the hand. Allow engine to idle during adjustment.

f. **Adjust Tappets** (fig. 24). Beginning at either end of engine, the valves are exhaust, intake, intake, exhaust, exhaust, intake, intake, exhaust, exhaust, intake, intake, and exhaust, respectively. Beginning with the valve at the extreme front of the engine, loosen the adjusting screw lock nut. Insert a 0.010-inch feeler gage between the lower end of the valve stem and the valve tappet until just a slight drag can be felt on the feeler gage as it is pulled from between the valve stem and valve tappet adjusting screw. Hold the valve tappet adjusting screw to keep it from turning, and tighten the adjusting screw lock nut. (Use three wrenches.) Repeat the process to adjust each of the other valve tappets. Proper clearance for exhaust valves is 0.010 inch; and for the intake valves, 0.006 inch.

g. **Stop Engine.** Turn off ignition switch.

h. **Replace Valve Covers** (fig 23). Place valve cover gaskets in position on cylinder block. Place valve covers in position on gaskets. Install the two valve cover flat washers and screws.

i. **Connect Intake Manifold Crankcase Ventilator Tube** (fig. 23). Connect tube to valve on intake manifold.

j. **Install Air Cleaner Air Pipe** (par. 71 d).

k. **Install Splash Shield** (fig. 31). Position shield to underside of fender, and install the four flat washers, lock washers, and wing screws.

58. INTAKE AND EXHAUST MANIFOLDS AND GASKETS.**a. Removal.**

(1) **REMOVE ENGINE HOOD** (par. 54 b) (fig. 30).

(2) **REMOVE RIGHT-HAND FLOORBOARD** (fig. 30). Remove the six screws and lock washers which attach floorboard to cab. Lift floorboard from cab.

(3) **REMOVE MANIFOLD SHIELD** (fig. 21). Remove the three nuts, lock washers, and bolts which attach shield to cab frame structure. Remove shield.

(4) **REMOVE SPLASH SHIELD** (fig. 31). Remove the four wing screws, lock washers, and flat washers which attach shield to underside of right front fenders. Lower shield from fender.

(5) **DISCONNECT CARBURETOR CONTROLS** (fig. 42). Disconnect throttle and choke control wires from carburetor. Pull both cables up

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

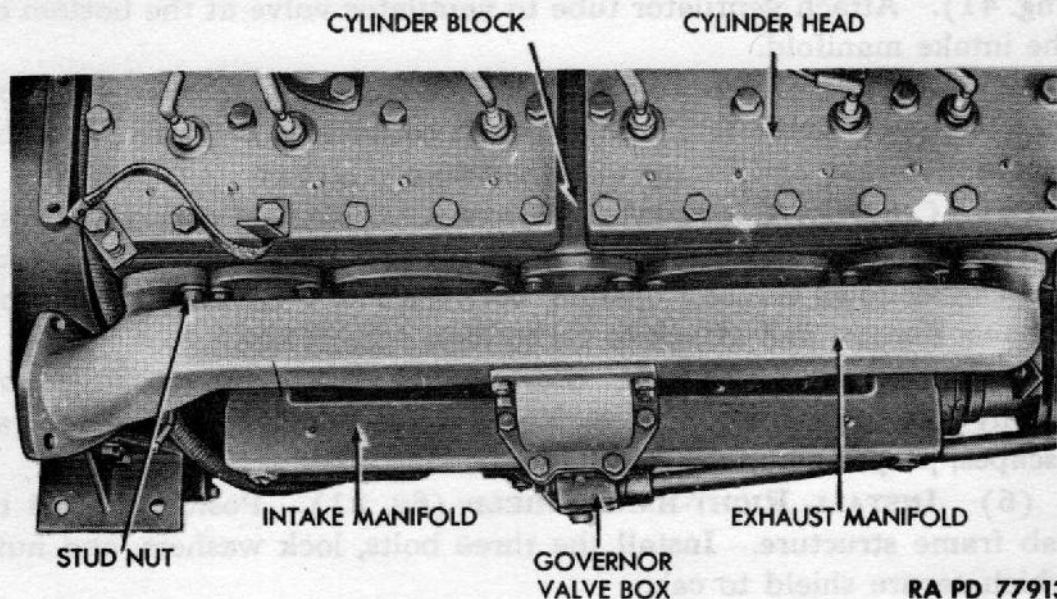


Figure 25 — Engine Manifolds Installed

through opening in manifold. Disconnect carburetor control rod from carburetor throttle lever.

(6) **DETACH GOVERNOR VALVE BOX** (fig. 25). Remove the two cap screws which secure the valve box to intake manifold. Pull valve box, gasket, and attached carburetor free of intake manifold.

(7) **DISCONNECT INTAKE MANIFOLD CRANKCASE VENTILATOR TUBE** (fig. 23). Detach ventilator tube from ventilator valve on the bottom of the intake manifold.

(8) **DISCONNECT EXHAUST PIPE** (fig. 87). Remove the three flange bolts and nuts which secure the exhaust manifold to the exhaust pipe and slide flange down.

(9) **REMOVE MANIFOLDS AND GASKETS** (fig. 25). Remove the 14 stud nuts and flat washers which hold the intake and exhaust manifolds to the cylinder block, and remove manifolds through cab skirt opening. Remove the seven gaskets from the manifolds or from engine block.

b. Installation.

(1) **ATTACH GASKETS AND MANIFOLD TO CYLINDER BLOCK, AND CONNECT EXHAUST PIPE** (figs. 25 and 87). Use seven new gaskets. Through the engine inspection plate opening, slide end of exhaust manifold over exhaust pipe, and fit manifolds in position to the engine block. Secure manifolds to block with the six stud nuts and flat washers. Connect exhaust pipe to manifold (par. 72 c (3)).

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(2) **CONNECT INTAKE MANIFOLD CRANKCASE VENTILATOR TUBE** (fig. 41). Attach ventilator tube to ventilator valve at the bottom of the intake manifold.

(3) **ATTACH GOVERNOR VALVE BOX** (fig. 41). Place valve box gasket (new), valve box, and attached carburetor in position on the intake manifold, and secure with the two cap screws.

(4) **CONNECT CARBURETOR CONTROLS**. Connect carburetor control rod to carburetor throttle lever. Pull both throttle and choke control cables down through opening between No. 1 cylinder intake and exhaust flanges, and attach to carburetor.

(5) **TEST INSTALLATION**. Start engine. Inspect manifolds to see if any gas is escaping. If engine runs satisfactorily and if no gas escapes, proper manifold installation is indicated.

(6) **INSTALL RIGHT-HAND SHIELD** (fig. 21). Position shield to cab frame structure. Install the three bolts, lock washers, and nuts which secure shield to cab.

(7) **INSTALL RIGHT-HAND FLOORBOARD** (fig. 30). Position floorboard in cab, and install the six lock washers and screws.

(8) **INSTALL ENGINE HOOD** (fig. 30). Position hood on floorboards over engine. Install the three flat washers, lock washers, and screws. Engage the two latches.

(9) **INSTALL SPLASH SHIELD** (fig. 31). Position shield under right front fender, and install the four flat washers, lock washers, and wing screws.

59. OIL PAN.**a. Cleaning.**

(1) **DRAIN OIL** (fig. 26). Remove drain plug from center of oil pan strainer and water trap, and remove drain plug from rear of oil pan.

(2) **REMOVE STRAINER AND WATER TRAP** (fig. 26). Remove six cap screws and lock washers. Lift strainer and water trap and its gasket from oil pan.

(3) **WIPE SLUDGE FROM INSIDE OIL PAN**. Turn crankshaft so throw arms are horizontal (across). Reach through strainer and water trap hole, and clean interior of pan with a clean cloth.

(4) **CLEAN STRAINER AND WATER TRAP** (fig. 26). Wash the assembly in dry-cleaning solvent. Dry it with a clean cloth.

(5) **INSTALL STRAINER AND WATER TRAP** (fig. 26). Examine the gasket carefully. Replace if torn or crushed. Place serviceable gasket and strainer and water trap assembly in position in oil pan. Install the six lock washers and cap screws.

(6) **REFILL WITH ENGINE LUBRICANT**. Replace both drain plug gaskets and plugs, and refill with engine lubricant (par. 21 c (5)). Replace cap.

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

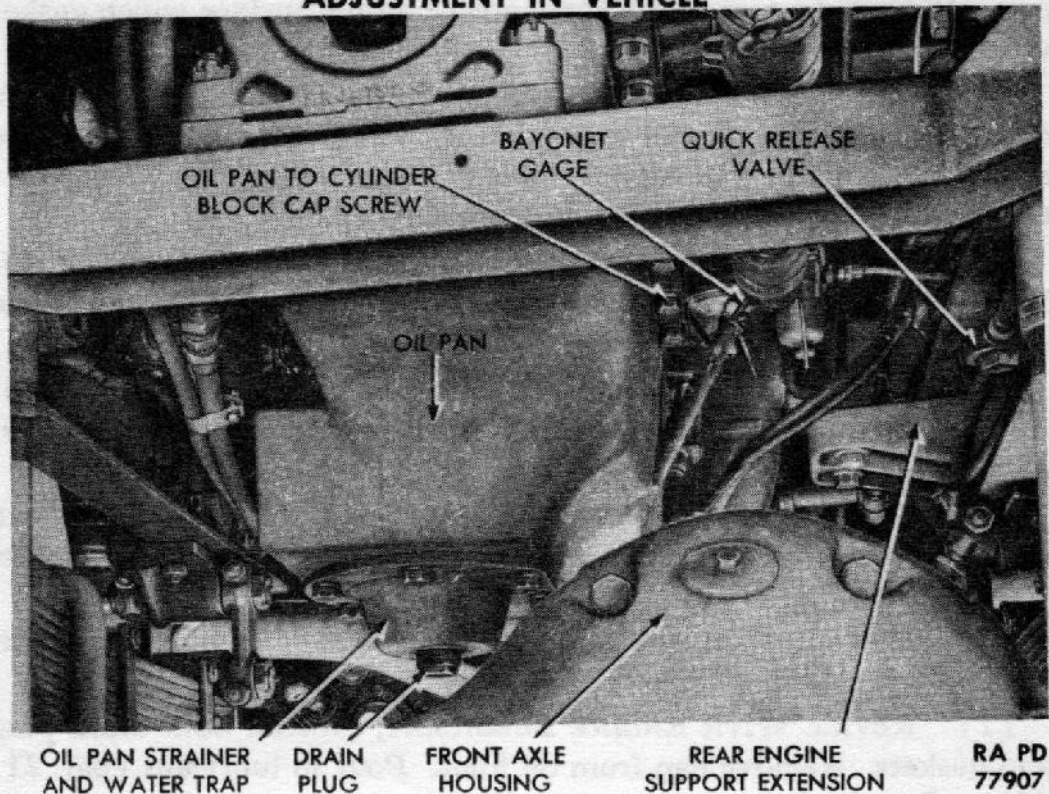


Figure 26 – Oil Pan Installed

b. Removal.

(1) **REMOVE BAYONET GAGE.** Remove floorboard insert (fig. 30), and pull bayonet gage (fig. 26) from its box in oil pan.

(2) **DRAIN ENGINE OIL** (fig. 26). Remove two drain plugs and gaskets from oil pan strainer and water trap. Remove drain plug and gasket from rear of oil pan.

(3) **DISCONNECT OIL OVERFLOW PIPE AND VISCOMETER GAGE TUBE** (fig. 28). Lines run from oil filter fitting on left side of oil pan. Screw both from fitting.

(4) **REMOVE SIX OIL PAN TO BELL HOUSING CAP SCREWS AND LOCK WASHERS** (fig. 26).

(5) **REMOVE 26 OIL PAN TO CYLINDER BLOCK CAP SCREWS AND LOCK WASHERS** (fig. 26).

(6) **REMOVE OIL PAN AND GASKETS** (fig. 26). Lower oil pan to floor. Remove the two side gaskets and front cork. Do not damage or attempt to remove cork from bell housing.

c. Installation.

(1) **INSTALL GASKETS.** Coat gaskets with a film of No. 2 general purpose grease. Place side gaskets and front cork in position on oil

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

pan. Put a light coat of the same grease on the surface which gaskets will contact on cylinder block.

(2) **PLACE OIL PAN IN POSITION** (fig. 26). Use care to keep from dislodging gaskets. Install to crankcase two cylinder block cap screws and lock washers. Tighten screws only finger-tight. Their function is to hold oil pan in approximately correct position.

(3) **INSTALL OIL PAN TO BELL HOUSING CAP SCREWS** (fig. 26). Each of the seven screws must have a lock washer. Tighten screws alternately and securely.

(4) **INSTALL OIL PAN TO CYLINDER BLOCK CAP SCREWS** (fig. 26). Each of the 26 screws must have a lock washer. Tighten screws alternately and securely.

(5) **CONNECT OIL OVERFLOW PIPE AND VISCOMETER GAGE TUBE**. These lines run from fitting on left side of oil pan. Tighten both securely.

(6) **INSTALL BAYONET OIL GAGE** (fig. 26). Insert gage into its boss on left side of oil pan.

(7) **REFILL WITH ENGINE LUBRICANT**. Install both drain plugs and gaskets. Remove cap from oil filler. Pour in lubricant (par. 21 c (5)). Install cap.

(8) **CHECK INSTALLATION**. Start engine and inspect oil pan to see if oil leaks. Absence of leakage indicates satisfactory installation.

(9) **INSTALL FLOORBOARD INSERT** (fig. 30). Position insert on left-hand floorboard, and tighten the two screws which clamp it in place.

60. OIL FILTER.

a. Filter Elements (fig. 27). Two large filters are secured to a single bracket mounted on the left side of the engine toward the rear. Under normal conditions, replace the two elements at time of oil change. Under extreme dust conditions, replace elements oftener. During desert operation, inspect often, and change elements when grit is found.

(1) **REMOVE OIL FILTER ELEMENT** (fig. 27). Remove floorboard insert (fig. 30). Completely unscrew oil filter case cover screw. Lift cover and gasket from case. Grasp handle on top of oil filter element, and pull element from case.

(2) **INSTALL OIL FILTER ELEMENT** (fig. 27). Insert oil filter element, handle end up, into oil filter case. Place oil filter case cover gasket and cover in position on top of case. Tighten oil filter case cover screw. Check quantity of oil in crankcase, and add if low (par. 21 c (6)). Install floorboard insert.

b. Adjust Oil Pressure (fig. 28). Remove the oil filter pressure relief valve adjusting screw cap (acorn nut) from filter bracket. Loosen

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

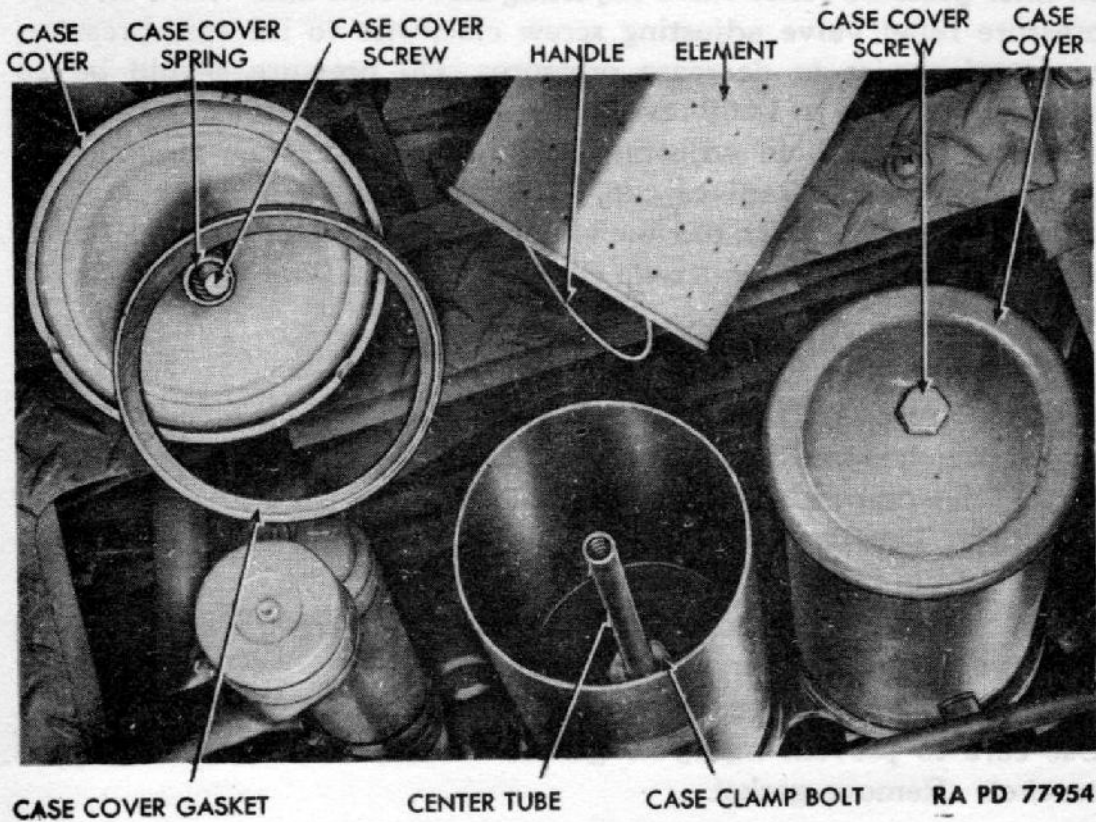


Figure 27 – Oil Filters – Top View

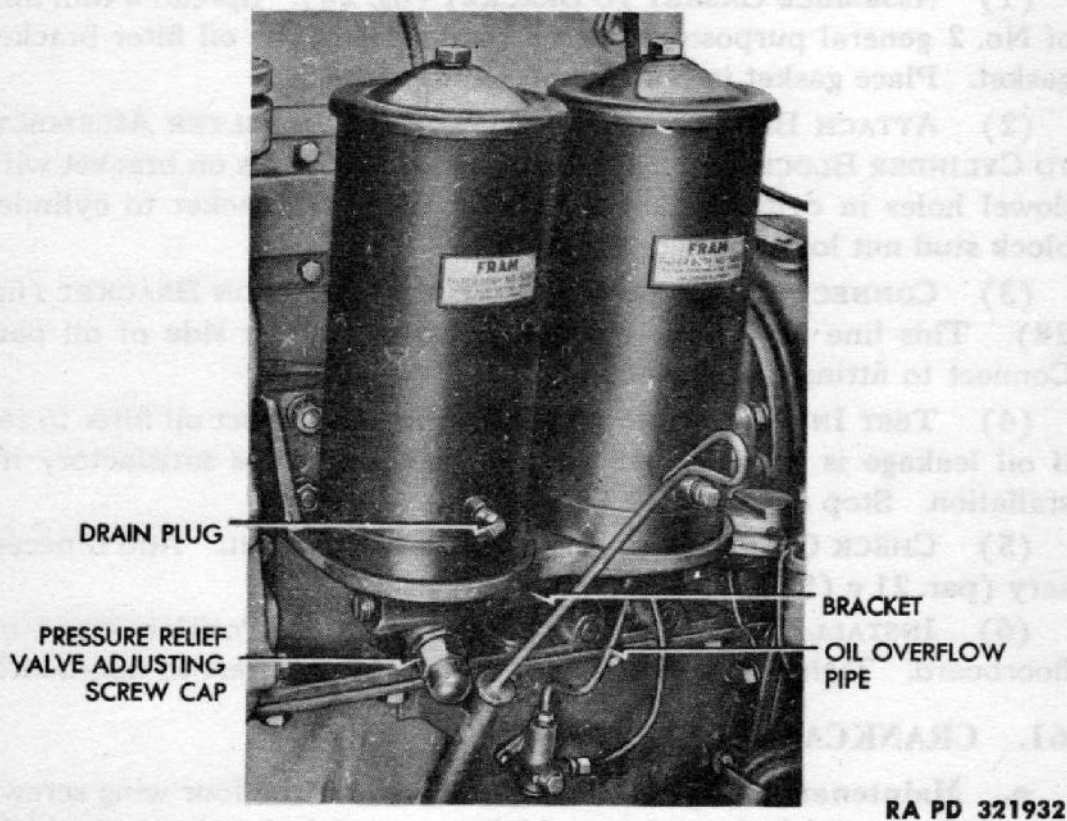


Figure 28 – Oil Filters Installed

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

oil filter pressure relief valve adjusting screw lock nut. Turn oil filter pressure relief valve adjusting screw clockwise to increase pressure, counterclockwise to decrease pressure. Oil pressure should be 26 pounds minimum to 1,600 revolutions per minute. After desired pressure is attained, hold adjusting screw to keep it from turning and tighten lock nut. Replace cap. *NOTE: Low oil pressure may be caused by bearing wear, too low viscosity oil, worn-out oil, etc. Therefore, do not adjust pressure until cause of drop has been ascertained and corrected.*

c. Removal.

(1) REMOVE FLOORBOARD INSERT (fig. 30). Loosen the two screws which clamp insert in place. Lift insert from floorboard.

(2) DISCONNECT OIL OVERFLOW PIPE FROM OIL FILTER BRACKET (fig. 28). This line runs from bracket to fitting on left side of oil pan. Screw it from fitting on bracket.

(3) REMOVE BRACKET TO CYLINDER BLOCK STUD NUTS (fig. 28). Remove the four nuts and lock washers.

(4) LIFT OIL FILTER ASSEMBLY FROM CYLINDER BLOCK (fig. 28). Use care to prevent injury to gasket. Remove filter with attached bracket. Remove gasket.

d. Installation.

(1) ASSEMBLE GASKET TO BRACKET (fig. 28). Spread a thin film of No. 2 general purpose grease on both sides of the oil filter bracket gasket. Place gasket in position on oil filter bracket.

(2) ATTACH BRACKET, WITH ATTACHED OIL FILTER ASSEMBLY, TO CYLINDER BLOCK (fig. 28). Carefully aline dowels on bracket with dowel holes in cylinder block. Install the four bracket to cylinder block stud nut lock washers and nuts.

(3) CONNECT OIL OVERFLOW PIPE TO FITTING ON BRACKET (fig. 28). This line runs from bracket to fitting on left side of oil pan. Connect to fitting on bracket.

(4) TEST INSTALLATION. Start engine and inspect oil filter to see if oil leakage is present. Absence of leaks indicates satisfactory installation. Stop engine.

(5) CHECK QUANTITY OF CRANKCASE ENGINE OIL. Add if necessary (par. 21 e (5)).

(6) INSTALL FLOORBOARD INSERT (fig. 30). Position insert on floorboard. Tighten the two screws which clamp insert to floorboard.

61. CRANKCASE VENTILATOR.

a. Maintenance (figs. 63 and 29). Remove the four wing screws, flat washers, and lock washers which secure right-hand splash shield to fender. Remove shield. Disengage the two spring clips which hold

ENGINE — REMOVAL AND INSTALLATION

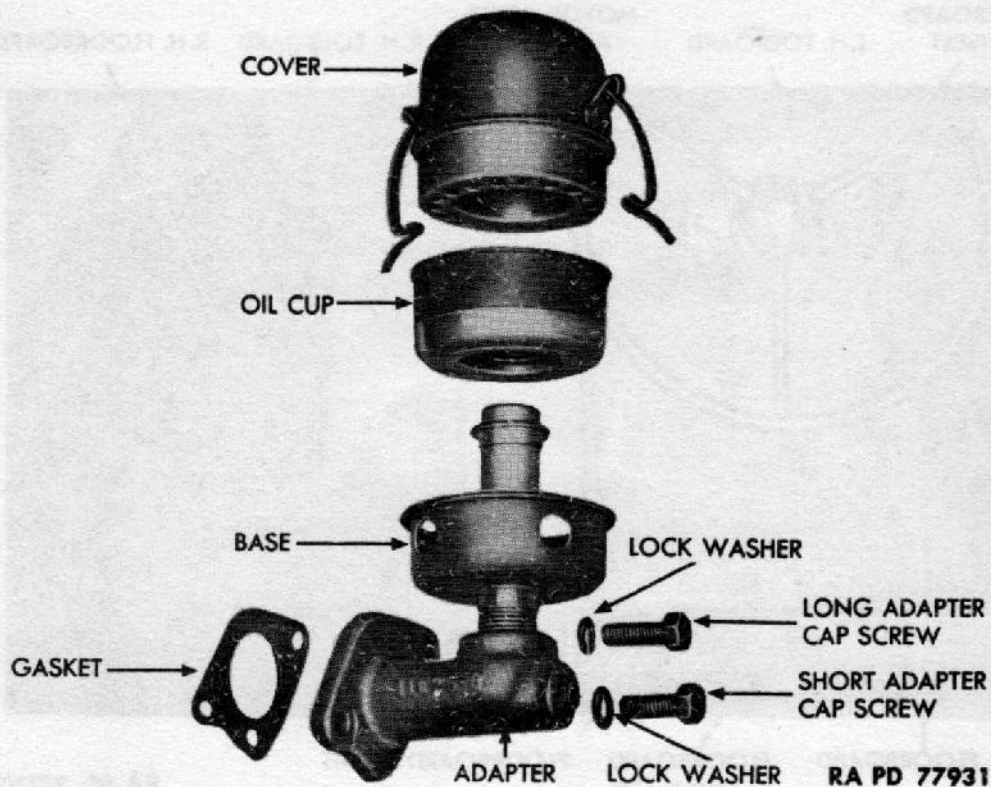


Figure 29 — Crankcase Ventilator Disassembled

cover on breather. Lift cover off. Clean out oil cup. Refill cup to oil level (about $\frac{1}{8}$ pt). Install cover and fasten securely with spring clip. Install splash shield. Under severe dust conditions, service breather every few hours.

b. Removal (fig. 63). Remove the four wing nuts, flat washers, and lock washers which secure splash shield to fender. Pull shield from fender. Remove the two cap screws and lock washers which secure crankcase ventilator to crankcase. Remove assembly and gasket.

c. Installation (fig. 63). Check oil cup to see that it is clean and filled to oil level with engine oil. Position gasket and crankcase ventilator to crankcase. Secure with the two cap screws and lock washers. Position right-hand splash shield to fender. Install the four wing screws, flat washers, and lock washers which secure it.

Section XV

ENGINE — REMOVAL AND INSTALLATION

62. REMOVAL.

a. Position Vehicle. Place vehicle under suitable lifting equipment. Arrange to have tools, lifting slings, wood blocking and supports available for use when needed. Block vehicle to prevent vehicle from moving.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

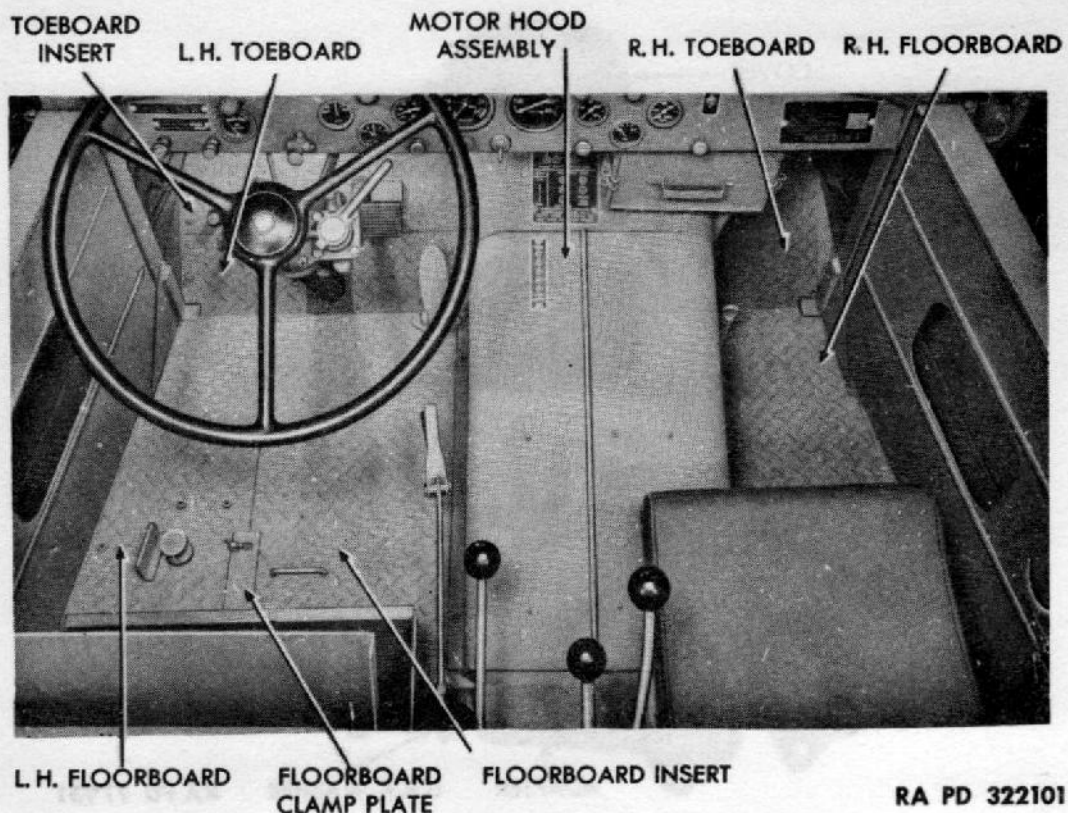


Figure 30 — Floorboards Installed

b. **Drain Radiator and Cylinder Block.** Open drain cocks at base of radiator outlet elbow and in left side of cylinder block (fig. 25). **NOTE:** *If cooling system contains antifreeze, use suitable containers to save it.*

c. **Drain Engine Lubricant** (fig. 26). Place a suitable container under engine oil pan. Remove drain plug from rear bottom of pan. Remove drain plug from sump at center of pan. Drain lubricant from crankcase. Replace plugs.

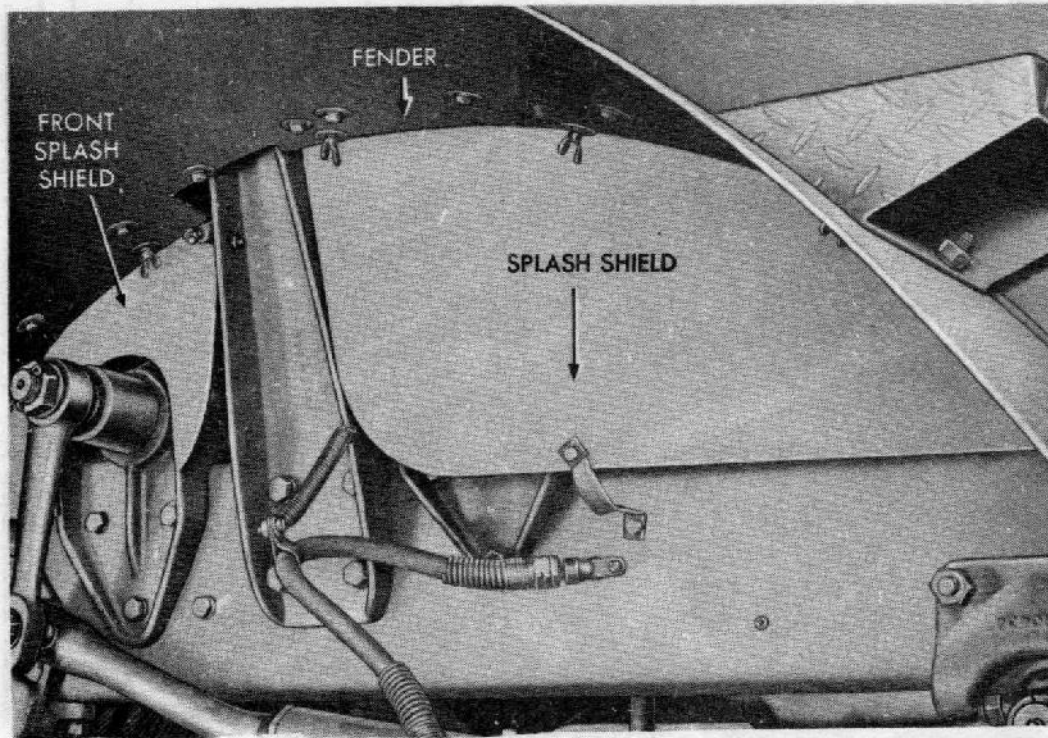
d. **Remove Cab.**

(1) **DISCONNECT BATTERIES** (par. 94 d).

(2) **REMOVE TOEBOARDS AND FLOORBOARDS** (figs. 6 and 30). Remove the screws, flat washers, and lock washers which secure left side of engine hood to floorboard frame. Disengage the two latches on right-hand side of hood. Lift out engine hood. Remove the screws, flat washers, internal toothed washers, and lock washers which secure floorboards and toeboards to cab frame. Remove screws, flat washers, and internal toothed washers which secure gearshift finish plate. Lift out gearshift finish plate (fig. 6).

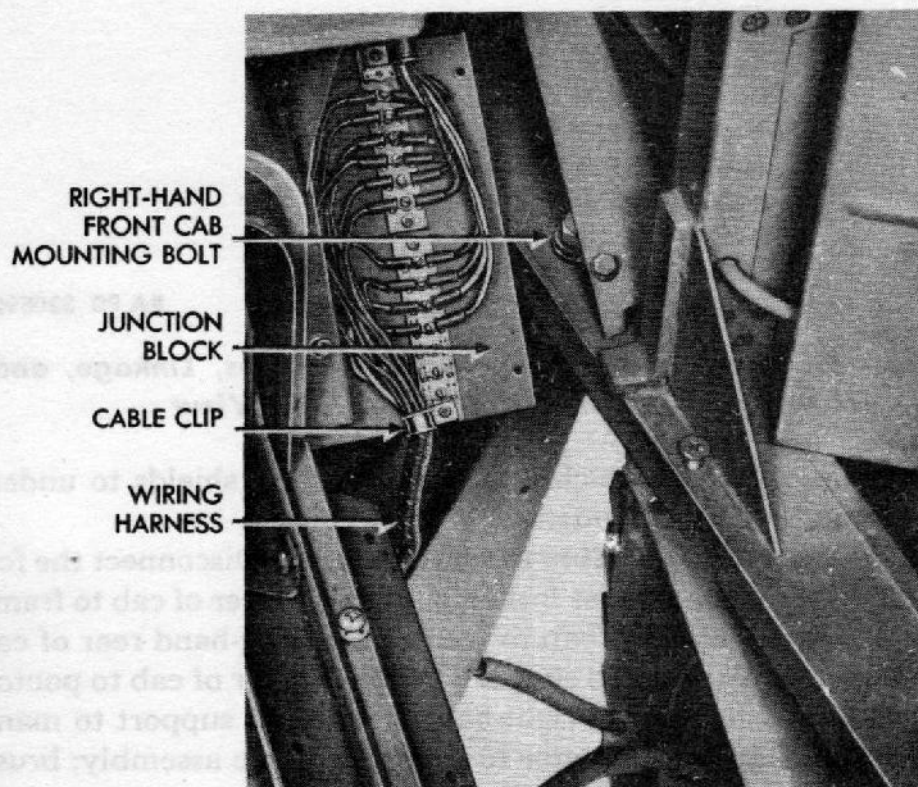
(3) **REMOVE SPLASH SHIELDS** (fig. 31). Remove the four wing screws, flat washers, and lock washers which attach splash shields to underside of right and left front fenders. Remove wing screws, flat

ENGINE — REMOVAL AND INSTALLATION



RA PD 321919

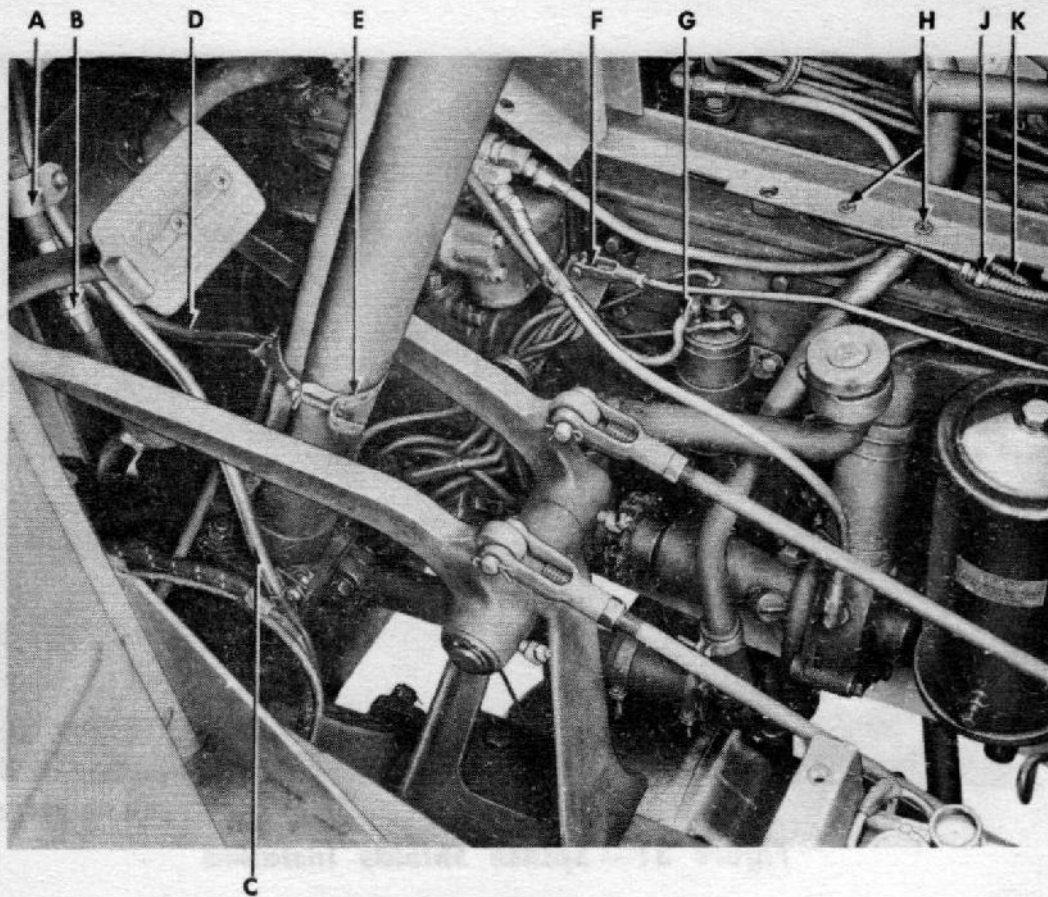
Figure 31 — Splash Shields Installed



RA PD 321936

Figure 32 — Junction Block Installed

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



- A—TUBING CLIP
- B—AIR GAGE HOSE UNION
- C—SPEEDOMETER CABLE
- D—TACHOMETER CABLE
- E—TACHOMETER WIRE CLIP
- F—CARBURETOR CONTROL ROD CLEVIS
- G—IGNITION SWITCH TO COIL WIRE
- H—OIL TUBE CLIPS
- J—VISCOSITY GAGE TUBE CONNECTOR
- K—OIL PRESSURE GAGE TUBE CONNECTOR

RA PD 320892

Figure 33 — Floorboards Removed To Show Cables, Linkage, and Miscellaneous Connections — Left Side View

washers, and lock washers which attach front splash shields to underside of right and left front fenders.

(4) **DISCONNECT RADIO SUPPRESSION BONDS.** Disconnect the following radio suppression bonds: front right-hand corner of cab to frame rail; front left-hand corner of cab to frame rail; right-hand rear of cab to ponton body and to rear cab support; left-hand rear of cab to ponton body and to rear cab support; right-hand floorboard support to manifold shield; condenser on generator to generator cable assembly; brush guard to frame crossmember.

(5) **DISCONNECT WIRING HARNESS (fig. 32).** Remove screws and lock washers securing cover to junction block. Disconnect ten wiring

ENGINE — REMOVAL AND INSTALLATION

harness terminals from left side of junction block. Remove wiring harness clip from lower end of junction block.

- (6) **DISCONNECT WIRING FROM GENERATOR** (par. 88 c (2)).
- (7) **DISCONNECT WIRING FROM CRANKING MOTOR SWITCH.** Remove red wires from top and bottom of switch.
- (8) **DISCONNECT WIRE FROM COIL.** Disconnect the ignition switch to coil wire from the coil (G, fig. 33).
- (9) **DISCONNECT HORN WIRE.** Separate horn wire by pulling apart the snap socket at base of steering column. Remove clamp bolt, nut, and lock washers, and free horn wire from steering gear case.
- (10) **DISCONNECT CHOKE CONTROL WIRE.** Loosen screw and clamp securing choke control wire to carburetor (fig. 42). Pull out wire. Loosen bolts on brackets securing choke control wire and throttle control wire to front valve cover plate and engine manifold. Free the wires.
- (11) **DISCONNECT THROTTLE CONTROL WIRE FROM CARBURETOR** (par. 65 c (1)).
- (12) **DISCONNECT SPEEDOMETER CABLE FROM SPEEDOMETER** (par. 190 b).
- (13) **DISCONNECT TACHOMETER CABLE FROM TACHOMETER** (par. 189 b).
- (14) **REMOVE SPEEDOMETER AND TACHOMETER CABLES FROM COWL.** Remove screw and lock washer, and open cable clamp on cowl. Free speedometer and tachometer cables, and lay them aside.
- (15) **DISCONNECT AIR GAGE HOSE.** Separate air gage hose at union located between clutch and brake pedal (B, fig. 33).
- (16) **REMOVE AIR CLEANER AIR PIPE** (fig. 48). Loosen clamps at each end of air pipe. Remove air pipe (par. 71 c).
- (17) **DISCONNECT HEAT INDICATOR CABLE** (fig. 21). Loosen the nut securing cable to rear end of water outlet manifold. Pull tube from manifold. Remove nut, lock washer, clip, and screw securing cable to engine and to lower end of upper hose connection. Pull cable free.
- (18) **DISCONNECT VISCOMETER AND OIL PRESSURE GAGE TUBES** (fig. 33). Remove two bolts and lock washers from cab floor support, and release oil tubes from clips. Disconnect tubes at connections. Disconnect tubes from viscometer and oil pressure gages located on instrument panel.
- (19) **REMOVE STEERING WHEEL** (par. 174).
- (20) **REMOVE STEERING COLUMN TOP BRACKET.** Remove two bracket cap screws and lock washers from steering column top bracket (fig. 129).

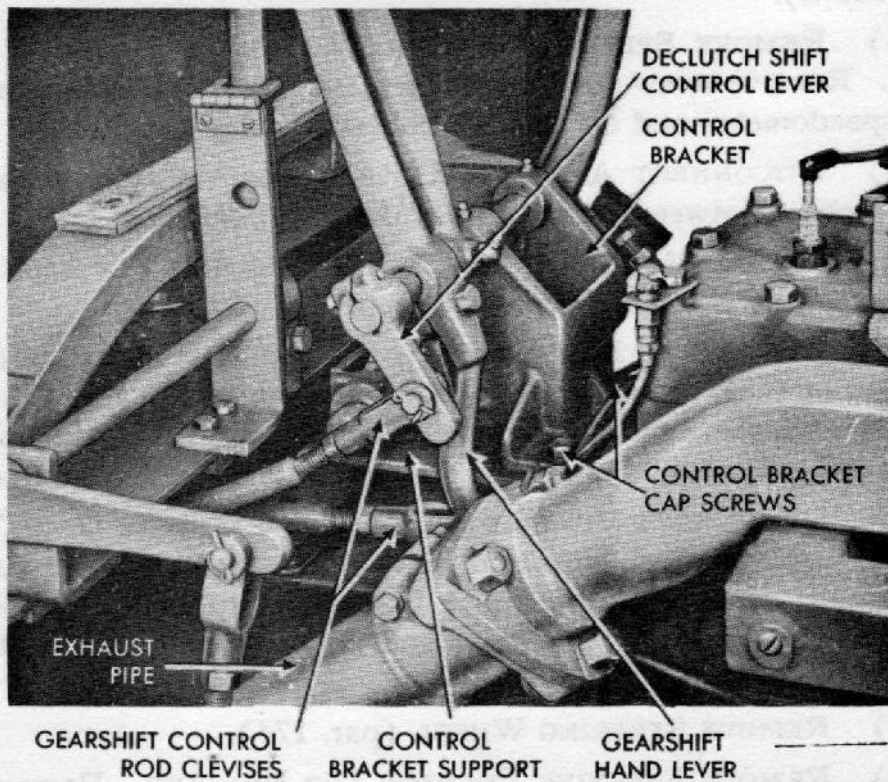
TM 9-817
62

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 321912

Figure 34 — Removing Open Cab



RA PD 321910

Figure 35 — Control Bracket Installed

ENGINE — REMOVAL AND INSTALLATION

(21) **DISCONNECT RADIATOR TOP BRACE.** Remove cap screw and lock washer securing radiator inlet elbow to radiator top brace. This will also disconnect radio suppression bond.

(22) **DISCONNECT CAB FROM SUPPORT BRACKETS** (figs. 32 and 39). Remove cotter pin, nut, bolt, springs, and flat washers securing cab to right and left front cab support brackets, and to rear cab support bracket.

(23) **DISCONNECT HAND BRAKE FORWARD ROD CLEVIS** (fig. 89). Disconnect hand brake forward rod clevis from hand brake shaft lever by removing cotter pin and clevis pin.

(24) **REMOVE GEARSHIFT LEVER** (fig. 88). Remove gearshift lever cap screw, nut, and lock washer at lower end of gearshift lever. Lift off gearshift lever.

(25) **REMOVE BATTERY GROUND CABLE.** Remove cap screw, nut, and toothed lock washer securing battery ground cable to left-hand frame side rail, and lift out battery ground cable.

(26) **DISCONNECT BATTERY TO MAGNETIC SWITCH CABLE.** Remove battery to magnetic switch cable from battery box and cap by pushing it down (fig. 65).

(27) **REMOVE CAB** (fig. 34). Open the cowl side nuts, and pass a rope across the cab through both vents. Attach rope to chain fall. Attach a second rope or chain to grab-handles on each side of cab, and to chain fall. Raise cab straight up, with a man at each corner to keep cab from fouling. When lower part of cab is clear of engine and radiator, roll the chassis back from under cab. Lower cab to floor.

e. Remove Control Bracket (fig. 5). Disconnect gearshift control rod clevises from declutch shift control rod lever and gearshift hand lever by removing clevis pins. Tie the two rods up out of the way. Remove two control bracket cap screws, lock washers, and nuts. Lift off the control bracket.

f. Remove Transmission (par. 125). Lift off control bracket support.

g. Remove Radiator (fig. 36). Follow procedure in paragraph 74 b. Pull top of radiator forward, and lift up until studs are out of radiator support brackets. Lift off radiator.

h. Disconnect Clutch and (Air) Brake Control Rods. Disconnect clutch control rod clevis from clutch pedal lever by removing cotter pin and clevis pin. Disconnect (air) brake control rod clevis from brake application valve by removing cotter pin and clevis pin (fig. 106).

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

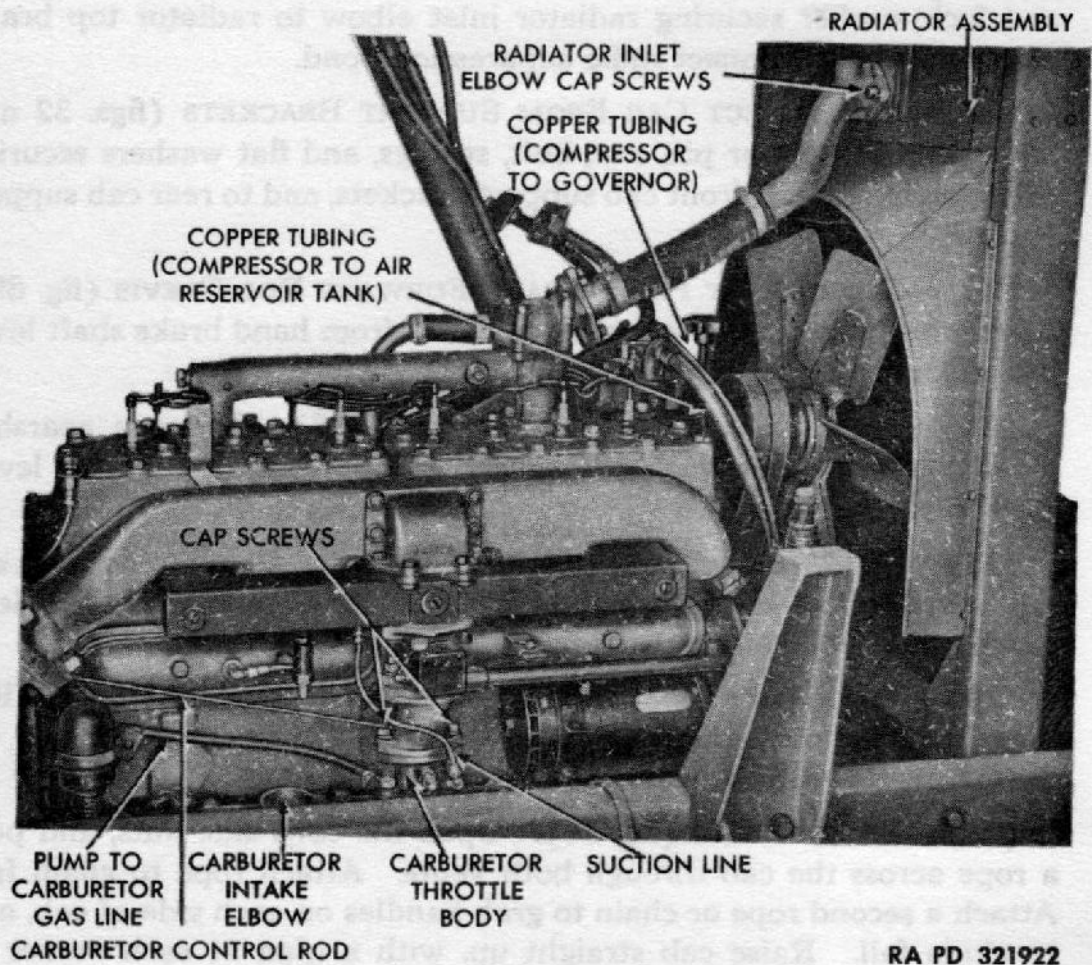


Figure 36 - Engine Installed - Right Side View

i. **Remove Distributor Cap.** Remove distributor to ground wire, at distributor (fig. 57). Open spring clips and remove distributor cap. Remove rotor to prevent it from being damaged. Place distributor cap where it will not be damaged when engine is being removed.

j. **Remove Engine Mountings** (fig. 37). Remove cotter pins, nuts, and washers from left-hand and right-hand rear engine support cap screws. Remove cotter pins and nuts from front engine support bracket cap screws. Remove cap screws and washers.

k. **Remove Carburetor** (fig. 42). Remove pump to carburetor gas line at the carburetor. Disconnect carburetor control rod at carburetor by removing cotter pin. Remove suction line from intake manifold and carburetor. Loosen carburetor intake elbow cap screw nut, and pull elbow off carburetor. Remove carburetor throttle body cap screws and lock washers. Remove carburetor. Pull off gasket from throttle body on carburetor adapter.

l. **Disconnect Copper Tubing** (fig. 37). Disconnect copper tubing (compressor to air reservoir tank) at union located between right

ENGINE — REMOVAL AND INSTALLATION

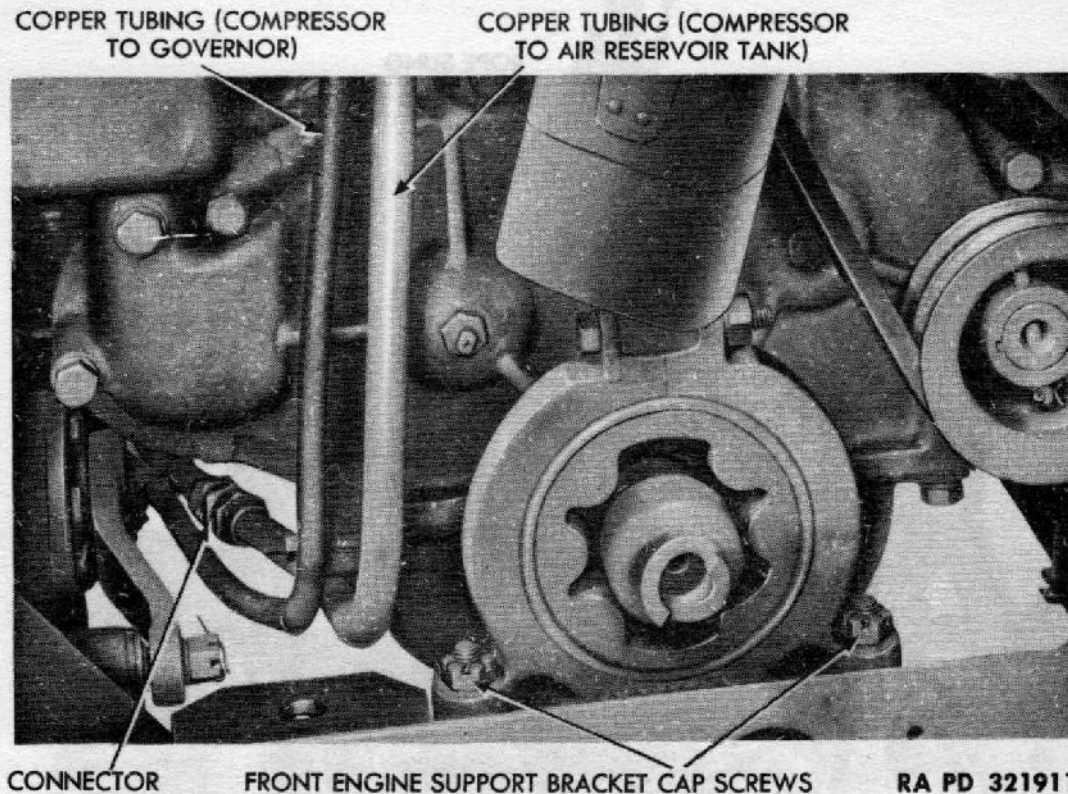


Figure 37 — Engine Installed — Front View

side of engine and right-hand frame rail (fig. 37). Remove tubing clip securing tubing (compressor to governor) to lower right-hand corner of engine (fig. 37). Disconnect upper end of tubing from compressor. Bend tubing away from engine.

m. **Remove Fuel Pump** (par. 66 c).

n. **Remove Engine** (fig. 38). Place a rope under flywheel bell housing and pass it up on each side of engine. Cross two ends of rope above engine, and pass rope down on each side of engine, under and behind front engine support bracket. Make sure that rope presses against solid castings and does not bend copper pipes on parts that might be damaged. Using a chain fall, raise engine from mountings. Have a man on each side to check for interferences as the engine is raised. Place engine on blocking and brace it securely before removing chain fall and sling.

63. **INSTALLATION.**

a. **Attach Rope Sling** (par. 62 n).

b. **Place Engine on Engine Supports.** Position front engine support bracket spacer on front engine support. **NOTE: Top surface of bracket is marked "TOP."** Place four rear engine support blocks

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

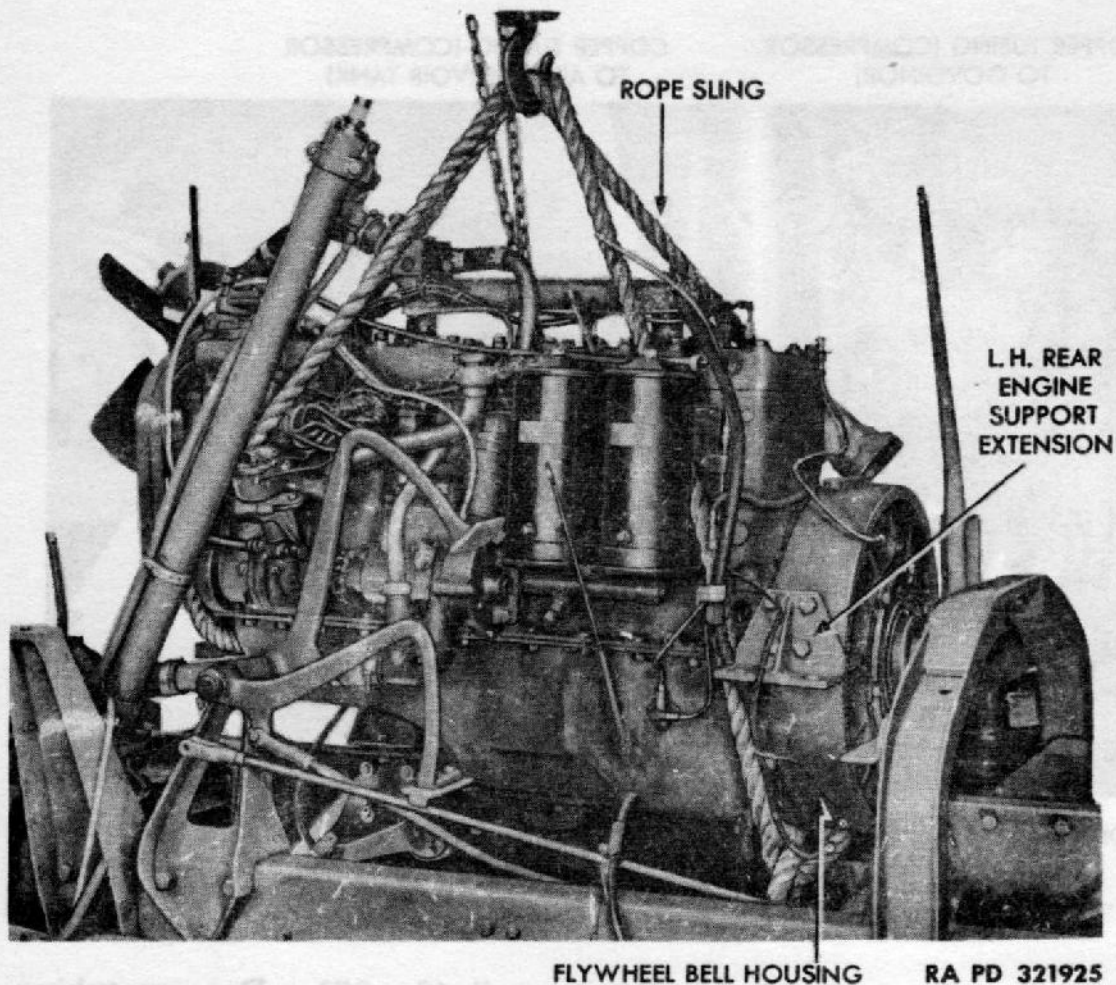


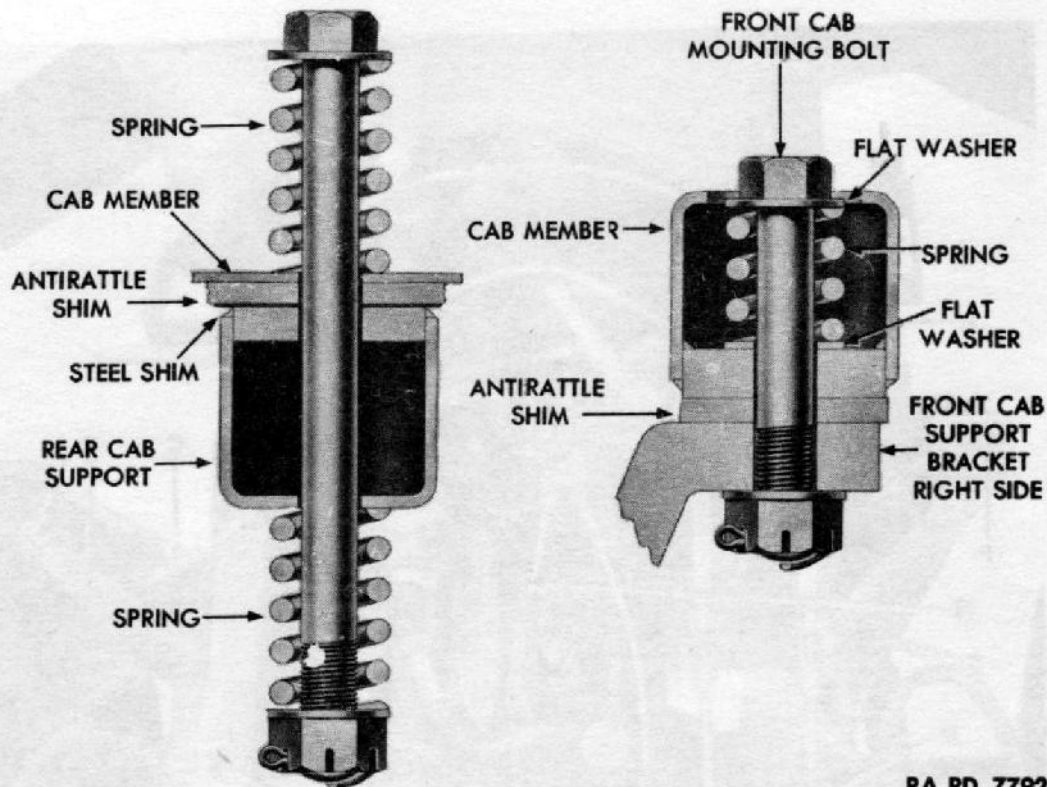
Figure 38 — Removing Engine

and four top insulators on the left-hand and right-hand engine supports. Place engine on vehicle.

c. **Install Mounting Bolts (fig. 39).** From underneath left-hand rear engine support, install cap screw, flat steel washer, bottom insulator, flat steel washer. From upper side of support, install flat steel washer, slotted nut and cotter pin on cap screw. Install second cap screw in a similar manner. Secure engine to right rear engine support by following same procedure as for left-hand support. Install two cap screws from underneath front engine support through support bracket spacer and front engine support bracket. Install slotted nuts and cotter pins on cap screws.

d. **Connect Copper Tubing (fig. 37).** Remove rope sling. Connect upper end of tubing (compressor to governor) to compressor (fig. 36). Connect copper tubing (compressor to air reservoir tank) at union located between right side of engine and right-hand frame rail (fig. 37). Install tubing clip securing tubing (compressor to governor) to lower right-hand corner of engine (fig. 37).

ENGINE — REMOVAL AND INSTALLATION



RA PD 77921

Figure 39 — Cab Mountings — Sectionalized View

e. **Install Carburetor (fig. 42).** Place new gasket on top of carburetor adapter and secure with two cap screws and lock washers. Connect pump to carburetor gas line at carburetor. Install carburetor intake elbow on carburetor, and tighten elbow cap screw and nut. Connect carburetor control rod to carburetor. Insert cotter pin. Install suction line between intake manifold and carburetor.

f. **Install Distributor Cap.** Place rotor on distributor cam and stop plate. Place distributor cap over body and secure with two spring clips. Connect distributor to ground wire to the distributor (fig. 57).

g. **Install Fuel Pump and Filter.** Install fuel pump and filter (pars. 66 d and 67 d). Install cable clip which secures gas line to battery cable.

h. **Connect Clutch and (Air) Brake Control Rods (fig. 106).** Connect (air) brake control rod clevis to brake application valve (par. 158 c (2)). Connect clutch control rod clevis to clutch pedal, and install clevis pin and cotter pin (par. 123 e and f).

i. **Install Radiator.** Place radiator with studs in radiator support brackets. Connect radiator by following procedure in paragraph 74 c.

j. **Install Transmission (par. 126).**

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

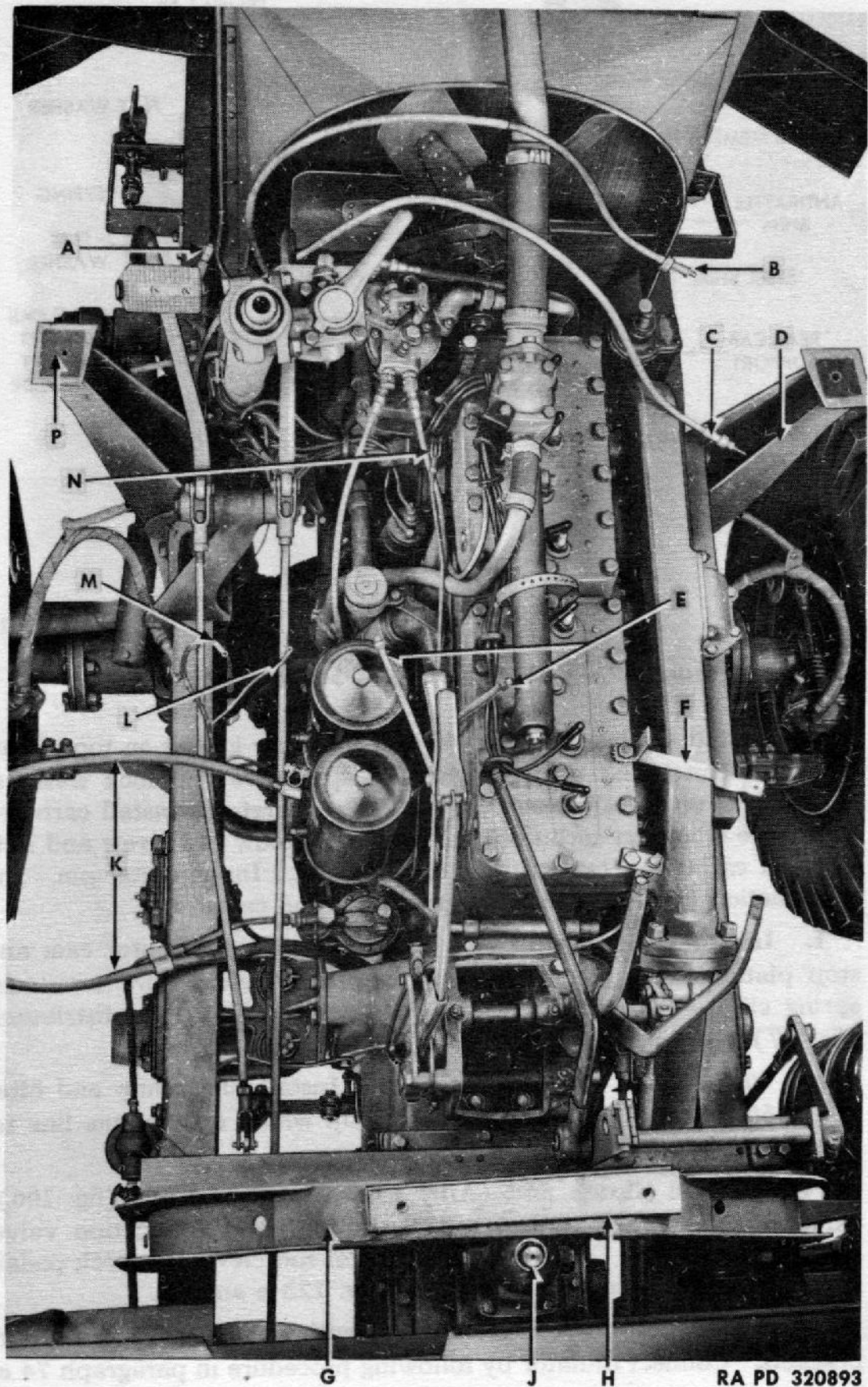


Figure 40 — Engine Installation — Cab Removed — Top View

ENGINE — REMOVAL AND INSTALLATION

- A—AIR GAGE HOSE UNION
- B—TACHOMETER CABLE
- C—SPEEDOMETER CABLE
- D—RIGHT-HAND FRONT CAB SUPPORT BRACKET
- E—VISCOMETER AND OIL PRESSURE GAGE TUBES
- F—RADIO BOND
- G—REAR CAB SUPPORT
- H—ANTIRATTLE SHIM
- J—GEARSHIFT LEVER STUB
- K—BATTERY TO MAGNETIC SWITCH CABLE
- L—CRANKING MOTOR SWITCH TO MAGNETIC SWITCH WIRE
- M—CRANKING MOTOR SWITCH TO CRANKING MOTOR TERMINAL POST WIRE
- N—CARBURETOR CONTROL ROD CLEVIS
- P—ANTIRATTLE SHIM

RA PD 320893B

Legend for Figure 40 — Engine Installation — Cab Removed — Top View

k. **Install Control Bracket** (fig. 35). Place control bracket support in position on top of flywheel housing. Install two cap screws and lock washers securing it to transmission. Place control bracket on support. Install two control bracket cap screws. Connect gearshift control rod clevises to gearshift hand lever and declutch shift control lever by installing clevis pins and cotter pins.

l. Install Cab.

(1) **INSTALL SLINGS TO CAB** (par. 62 d (27)). Lower the cab over the engine and position it on supporting brackets. Raise rear of cab sufficiently to insert the steel shim and the fabric antirattle shim between the cab and the rear cab support. Install two rear cab mounting bolts from above (fig. 6). Each bolt has a spring on each end (fig. 39). Raise each side of the cab, and insert the antirattle fabric shim between the cab and the front cab support brackets. Insert cab mounting bolts, springs, flat washers, nuts, and cotter pins. Insert right-hand cab mounting bolt from above (fig. 32), and insert left-hand bolt from below. Install one spring on the upper part of each bolt (fig. 39).

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(2) **CONNECT BATTERY TO MAGNETIC SWITCH CABLE.** Insert battery to magnetic switch cable through floor plate and slot in battery box (fig. 65).

(3) **ATTACH BATTERY GROUND CABLE.** Install battery ground cable on left-hand frame side rail with cap screw, nut, and toothed lock washer. Insert battery end of cable through floor plate and battery box.

(4) **INSTALL GEARSHIFT LEVER.** Place gearshift lever on gearshift lever stub and attach with cap screw, lock washer, and nut.

(5) **ATTACH HAND BRAKE FORWARD ROD CLEVIS (fig. 89).** Connect hand brake forward rod clevis to hand brake shaft lever. Insert clevis pin and cotter pin. Check adjustment of hand brake (par. 162 b).

(6) **CONNECT RADIATOR TOP BRACE.** Install cap screw, and lock washer securing radiator top brace to radiator inlet elbow. Radio suppression bond is also attached to this cap screw.

(7) **INSTALL STEERING COLUMN TOP BRACKET (fig. 129).** Install top bracket and two bracket cap screws and lock washers.

(8) **INSTALL STEERING WHEEL (par. 174).**

(9) **CONNECT VISCOMETER AND OIL PRESSURE GAGE TUBES.** Connect two ends of viscometer tube and oil pressure gage tube (J and K, fig. 33). Attach both tubes to cab floor support by clips (H, fig. 33). Connect tubes to viscometer and oil pressure gages located on instrument panel.

(10) **CONNECT HEAT INDICATOR CABLE (fig. 21).** Insert tube in rear end of water outlet manifold. Tighten nut securing cable to manifold. Install clip, nut, lock washer, and screw securing cable to engine head and lower end of upper base connection.

(11) **INSTALL AIR CLEANER AIR PIPE.** Install air pipe between air cleaner and carburetor. Tighten clamps at each end of air pipe.

(12) **CONNECT AIR GAGE HOSE.** Connect air gage hose at union between clutch and brake pedal (B, fig. 33).

(13) **INSTALL SPEEDOMETER AND TACHOMETER CABLES.** Install cable clip which secures speedometer and tachometer cables to cowl.

(14) **CONNECT TACHOMETER CABLE TO TACHOMETER (par. 189 c).**

(15) **CONNECT SPEEDOMETER CABLE TO SPEEDOMETER (par. 190 c).**

(16) **CONNECT THROTTLE CONTROL WIRE TO CARBURETOR (par. 65 d (3)).**

(17) **CONNECT CHOKE CONTROL WIRE.** Connect choke control wire to carburetor (par. 65 d (3)). Attach throttle and choke control wires to clip on front valve cover plate. Tighten clamp bolt.

FUEL SYSTEM

(18) **CONNECT HORN WIRE.** Connect ends of horn wire by joining snap connection at base of steering column.

(19) **CONNECT WIRE TO COIL.** Connect ignition switch to coil wire to the coil (G, fig. 33).

(20) **CONNECT WIRING TO STARTER MOTOR SWITCH.**

(21) **CONNECT WIRING TO GENERATOR** (par. 88 d (3)).

(22) **CONNECT WIRING TO JUNCTION BLOCK** (fig. 32). Connect ten wiring harness terminals to left side of junction block (fig. 32), matching color of wires attached to right side of junction block. Secure wiring harness to lower end of junction block by harness clip. Install junction block cover.

(23) **CONNECT RADIO SUPPRESSION BONDS.** Connect radio suppression bonds, which were removed, as described in paragraph 115 c.

(24) **INSTALL TOEBOARDS AND FLOORBOARDS** (fig. 30). Position, toeboards, floorboards, and gearshift finish plate to cab frame. Install screws, flat washers, toothed lock washers, and lock washers. Position engine hood over engine. Secure left-hand side with three screws, lock washers, and flat washers. Secure right-hand side with the two latches.

(25) **INSTALL SPLASH SHIELDS** (fig. 31). Position the four splash shields to underside of right and left front fenders and secure with wing screws, flat washers, and lock washers.

(26) **CONNECT BATTERIES** (par. 94 e).

m. Replace Engine Lubricant. Install drain plug at rear bottom of oil pan. Install plug in bottom of sump at center of oil pan. Remove cap from oil filler. Pour in lubricant. Install cap.

n. Replace Cooling Fluid. Close drain cocks at base of radiator outlet elbow, and on left side of cylinder block (fig. 19). Remove radiator cap. Fill system. Install cap. Remove tools, blocking, and supports.

o. Adjust Clutch (par. 117 a and b).

Section XVI

FUEL SYSTEM

64. DESCRIPTION AND DATA.

a. Description (fig. 41).

(1) **FUEL SYSTEM.** Components of the fuel system are: carburetor, fuel pump, fuel filter, fuel tank, auxiliary fuel tank, three fuel lines, and governor. Fuel lines conduct the gasoline from the fuel tank to the fuel filter, and thence to the fuel pump. The fuel pump

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

forces fuel to the carburetor where it is mixed with air that has been cleaned by the air cleaner, and the mixture is then drawn into the combustion chamber of the engine by vacuum caused by the down stroke of the pistons.

(2) **GOVERNOR.** The governor controls the maximum engine speed by controlling a butterfly valve located between the carburetor and the intake manifold. This limits the fuel mixture passing to the engine when the controlled engine speed is reached. In case of governor failure, notify higher authority.

b. Data.

Carburetor:

Make Zenith
 Model 457-2
 Type Updraft

Fuel Pump:

Make AC Spark Plug Co.
 Model D
 Manufacturer's number 1537722
 Driven by Camshaft
 Maximum capacity 1 pt per min

Fuel Filter:

Make Zenith
 Model F 328

Fuel Tanks:

Capacity
 Large tank 60 gal
 Small tank 30 gal
 Location Left-hand frame side rail

65. CARBURETOR (fig. 41).

a. Description. The carburetor is the updraft type and is located on the right-hand side of the engine between the engine and frame. It is reached from under the truck and through the right-hand cab splash shield opening under the fender. The carburetor is the plain tube type with adjustable main jet, accelerating pump, and economizing device.

b. Adjustment.

(1) **ADJUST THROTTLE STOP SCREW.** Remove splash shield from under right-hand front fender. Start engine and allow it to run during adjustment. Wait until intake manifold is at least warm to

FUEL SYSTEM

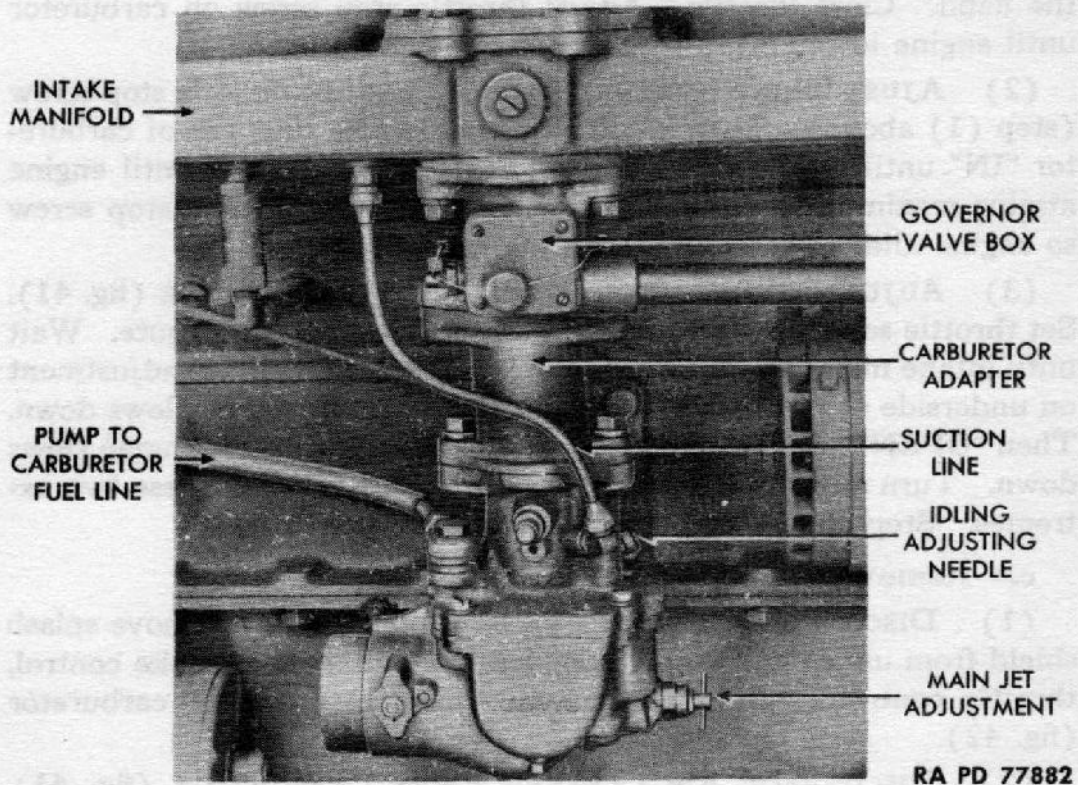


Figure 41 - Carburetor

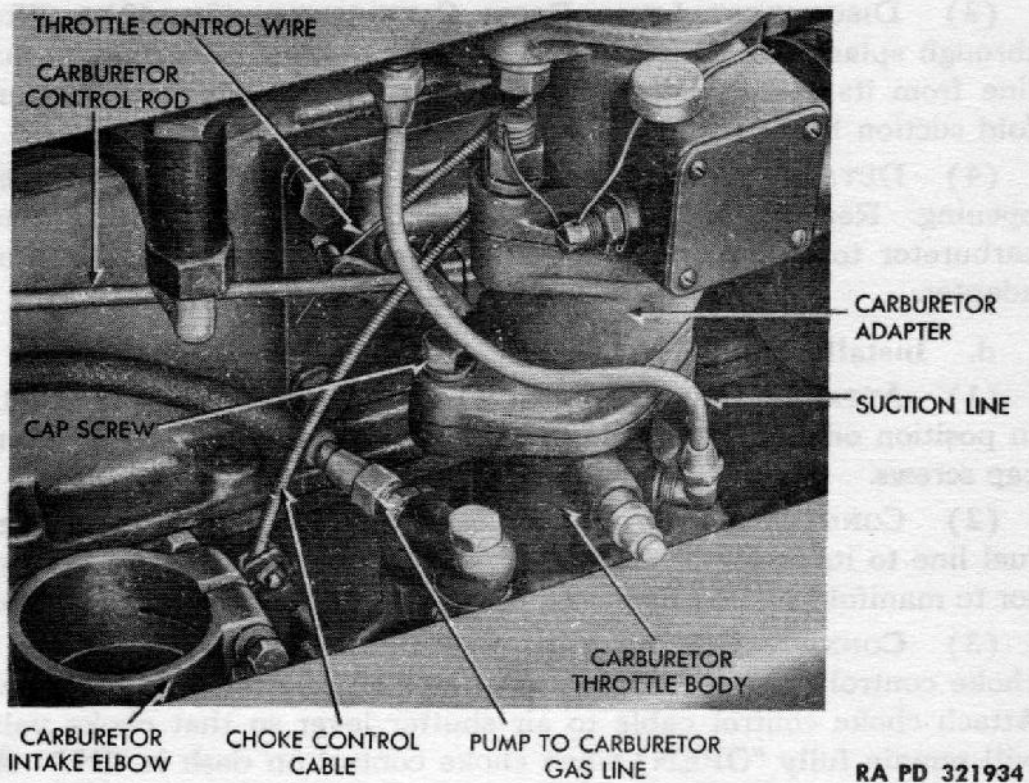


Figure 42 - Carburetor Controls Installed
143

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

the hand. Close throttle. Adjust throttle stop screw on carburetor until engine idles at 350 revolutions per minute.

(2) **ADJUST IDLING MIXTURE** (fig. 41). Adjust throttle stop screw (step (1) above). Turn idling adjusting needle near top of carburetor "IN" until engine slows down. Back needle "OUT" until engine attains maximum speed for throttle setting. Set throttle stop screw so engine idles at 350 revolutions per minute.

(3) **ADJUST INTERMEDIATE AND HIGH-SPEED MIXTURE** (fig. 41). Set throttle so tachometer registers 550 revolutions per minute. Wait until intake manifold is warm to the hand. Turn main jet adjustment on underside of carburetor "IN" (clockwise) until engine slows down. Then "OPEN" adjustment (turn counterclockwise) until engine slows down. Turn adjustment to a position halfway between these two extremes. Stop engine and install cab splash shield.

c. Removal.

(1) **DISCONNECT CONTROLS FROM CARBURETOR.** Remove splash shield from under right-hand front fender. Disconnect choke control, throttle control cable, and accelerator control rod from carburetor (fig. 42).

(2) **DISCONNECT AIR CLEANER FROM CARBURETOR** (fig. 41). From under truck, loosen carburetor to air cleaner elbow screw nut and disengage elbow from carburetor.

(3) **DISCONNECT LINES FROM CARBURETOR** (fig. 42). Work through splash shield opening. Disconnect pump to carburetor fuel line from its fitting on carburetor. Disconnect carburetor to manifold suction line (fig. 41) from its fitting on carburetor.

(4) **DETACH CARBURETOR** (fig. 41). Work through splash shield opening. Remove the two cap screws and lock washers which attach carburetor to carburetor adapter. Lift carburetor and gasket from adapter.

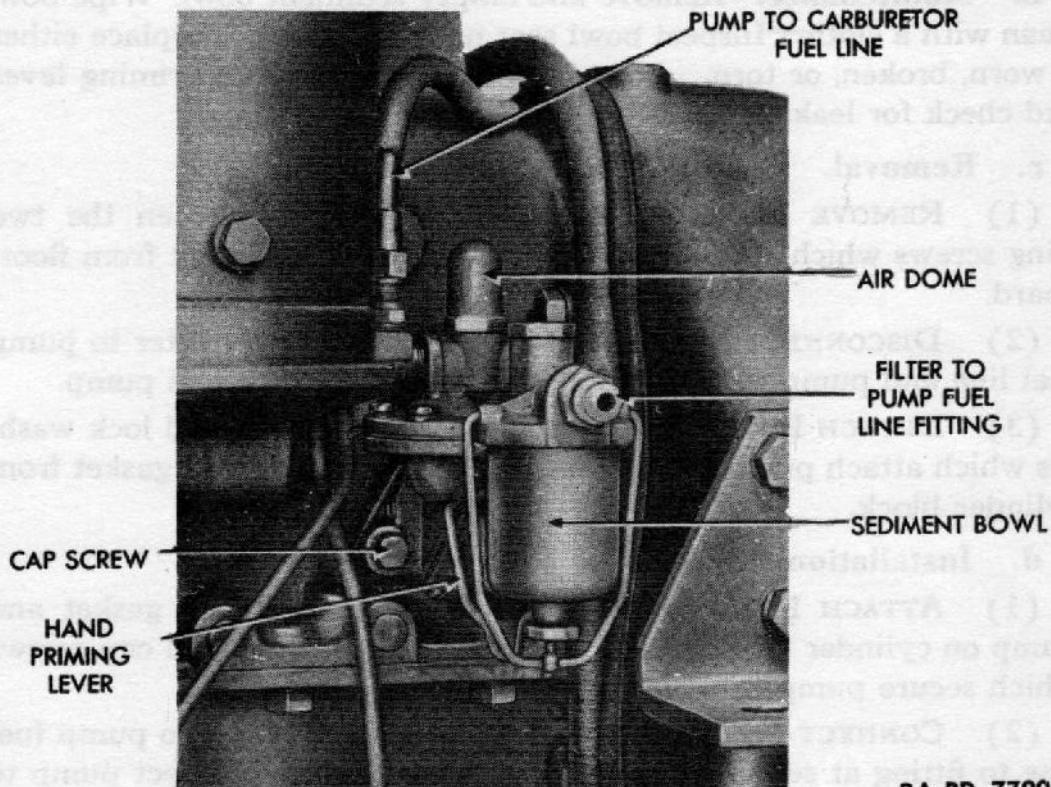
d. Installation.

(1) **ATTACH CARBURETOR** (fig. 41). Place gasket and carburetor in position on carburetor adapter. Install the two lock washers and cap screws.

(2) **CONNECT LINES TO CARBURETOR** (figs. 41 and 42). Connect fuel line to its fitting on inside of carburetor. Connect carburetor to manifold suction line to its fitting on outside front of carburetor.

(3) **CONNECT CONTROLS TO CARBURETOR** (fig. 42). Push in choke control on dash. Open carburetor air shutter or choke valve. Attach choke control cable to air shutter lever so that choke valve will remain fully "OPEN" when choke control on dash is "IN." Attach throttle control wire to carburetor throttle lever. Be sure throttle is "CLOSED," and set control wire to hold it closed when

FUEL SYSTEM



RA PD 77905

Figure 43 – Fuel Pump Installed

throttle control on dash is "IN." Connect carburetor control rod to throttle lever.

(4) **CONNECT AIR CLEANER** (fig. 42). Position carburetor intake elbow on rear of carburetor. Tighten intake elbow clamp screw nut.

(5) **TEST INSTALLATION.** Start engine. Satisfactory engine performance indicates proper carburetor installation.

(6) **INSTALL SPLASH SHIELD** (fig. 31). Position splash shield under right front fender. Install the four flat washers, lock washers and wing screws which attach shield. Install bond strap from shield to frame if it was removed.

66. FUEL PUMP.

a. Description (fig. 43). Fuel pump is mounted on the left side of the engine, approximately level with the top of the chassis frame. It is reached through the floorboard insert assembly opening, through the left-hand splash shield opening, or from under the truck. The pump is the diaphragm type and is equipped with a sediment bowl and a hand priming lever. Its function is to pump gasoline from the fuel tank (via fuel filter) to the carburetor. In operation, the rocker arm is actuated by a cam on the engine camshaft.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

b. Maintenance. Remove and empty sediment bowl. Wipe bowl clean with a cloth. Inspect bowl seat nut and gasket. Replace either if worn, broken, or torn. After installation, work hand priming lever and check for leakage.

c. Removal.

(1) **REMOVE FLOORBOARD INSERT** (fig. 30). Loosen the two wing screws which clamp insert to floorboard. Lift insert from floorboard.

(2) **DISCONNECT FUEL LINES** (fig. 43). Unscrew filter to pump fuel line and pump to carburetor fuel line from fittings on pump.

(3) **DETACH PUMP.** Remove the two cap screws and lock washers which attach pump to cylinder block. Lift pump and gasket from cylinder block.

d. Installation.

(1) **ATTACH PUMP TO ENGINE** (fig. 43). Position gasket and pump on cylinder block. Install the two lock washers and cap screws which secure pump to cylinder block.

(2) **CONNECT FUEL LINES** (fig. 43). Connect filter to pump fuel line to fitting at sediment bowl end of fuel pump. Connect pump to carburetor fuel line to fitting adjacent to air dome.

(3) **TEST INSTALLATION.** Work hand priming lever (fig. 43) to fill pump and fuel lines. Start engine and run for 15 minutes at 550 revolutions per minute. Satisfactory engine performance indicates proper pump installation.

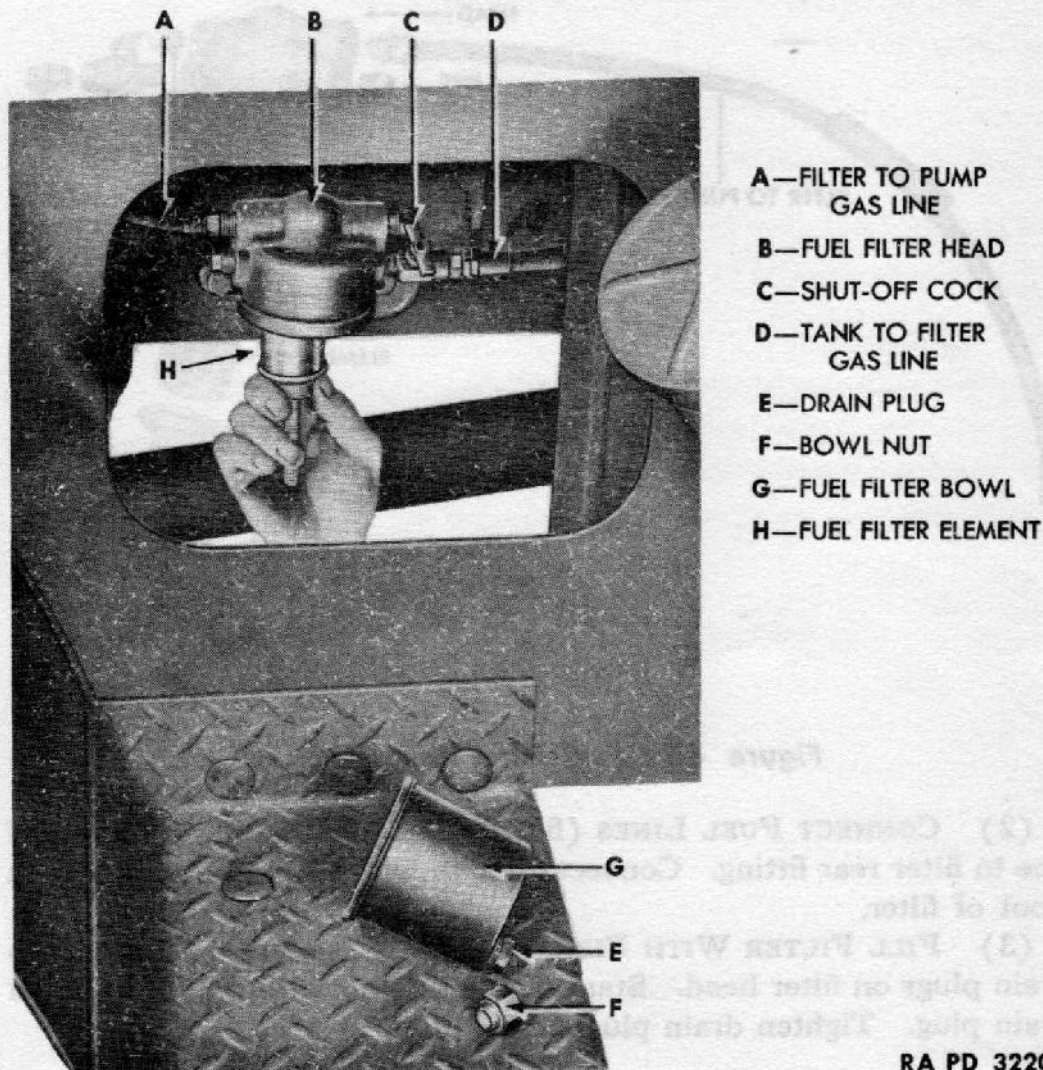
(4) **INSTALL FLOORBOARD INSERT** (fig. 30). Place insert in position on floorboard. Tighten the two wing screws which clamp insert to floorboard.

67. FUEL FILTER.

a. Description (figs. 44 and 45). The fuel filter is mounted on the outside of main frame left side rail. It can be reached through an opening provided for the purpose immediately above the left-hand lower step. Gasoline flowing from the fuel tank to fuel pump is routed through the filter. Fuel flows through an inlet fitting into a metal bowl. From the bowl, it is drawn through a cylindrical laminated element and out through an outlet fitting. A shut-off cock is provided on the inlet fitting.

b. Maintenance. Service fuel filter at time of chassis lubrication. Remove bowl nut from bottom center of bowl. Lower bowl and bowl gasket from filter head. Screw element nut from stud. Lower element from stud. Wash all parts in dry-cleaning solvent and dry with compressed air. Inspect element and gasket. Replace broken, bent, or torn parts. Place element in position on stud, and install element nut.

FUEL SYSTEM



RA PD 322003

Figure 44 - Servicing Fuel Filter

Position gasket on top of bowl. Place bowl in position on underside of filter head. Loosen one of the two pipe plugs on side of filter head, and start engine. Tighten pipe plug when fuel drips from it.

c. Removal.

(1) **DISCONNECT FUEL LINES** (fig. 44). Unscrew tank to filter fuel line and filter to pump fuel line from filter fittings.

(2) **DETACH FILTER** (fig. 44). Remove the two nuts, lock washers, and bolts which attach filter to frame side rail.

d. Installation.

(1) **ATTACH FILTER TO FRAME** (fig. 44). Place filter in position on main frame left side rail. Install the two bolts, lock washers, and nuts which secure filter to frame.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

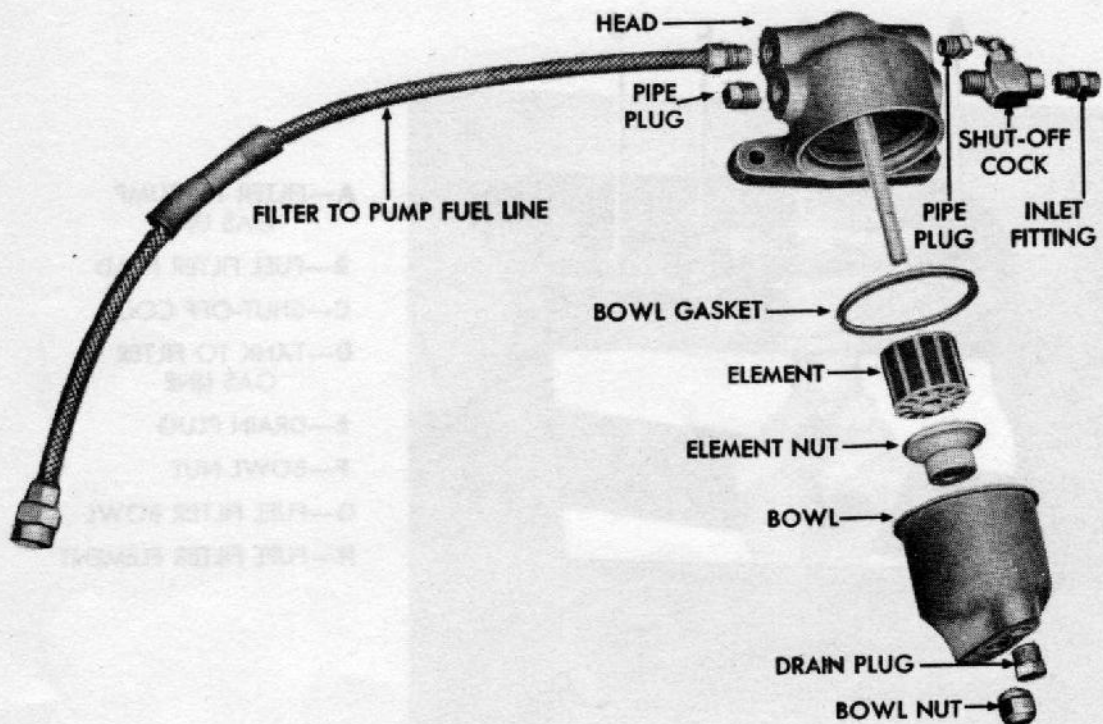


Figure 45 — Fuel Filter Disassembled

RA PD 77891

(2) **CONNECT FUEL LINES** (fig. 44). Connect tank to filter fuel line to filter rear fitting. Connect filter to pump fuel line to fitting on front of filter.

(3) **FILL FILTER WITH FUEL** (fig. 44). Loosen one of the two drain plugs on filter head. Start engine and run until fuel drips from drain plug. Tighten drain plug.

68. FUEL TANKS.

a. **Description** (fig. 46). Rectangular fuel tanks of 60- and 30-gallon capacity are attached to the outside of the chassis frame ahead of the left rear wheel. They are heavy sheet-metal weld assemblies and are connected by a valve and full tank inlet tube. Two bracket castings, bolted to the frame side rail, extend out over each tank. Two steel straps run around each tank and secure it to the brackets. The two tanks are connected by a tube in which is located a shut-off valve, thus permitting the smaller tank to be used as an auxiliary or emergency tank. The fuel outlet elbow and gage connection are on top of the forward tank. A drain plug is provided on each tank. It is located in a sump at the underside of each tank. The filler neck, which is equipped with an external air outlet tube, is an integral part of the 60-gallon forward tank. It extends obliquely from the tank near its upper left corner. The neck contains a removable tank filler sleeve which acts as a strainer. A chain attaches the tank cap to the tank filler sleeve.

FUEL SYSTEM

RA PD 321948

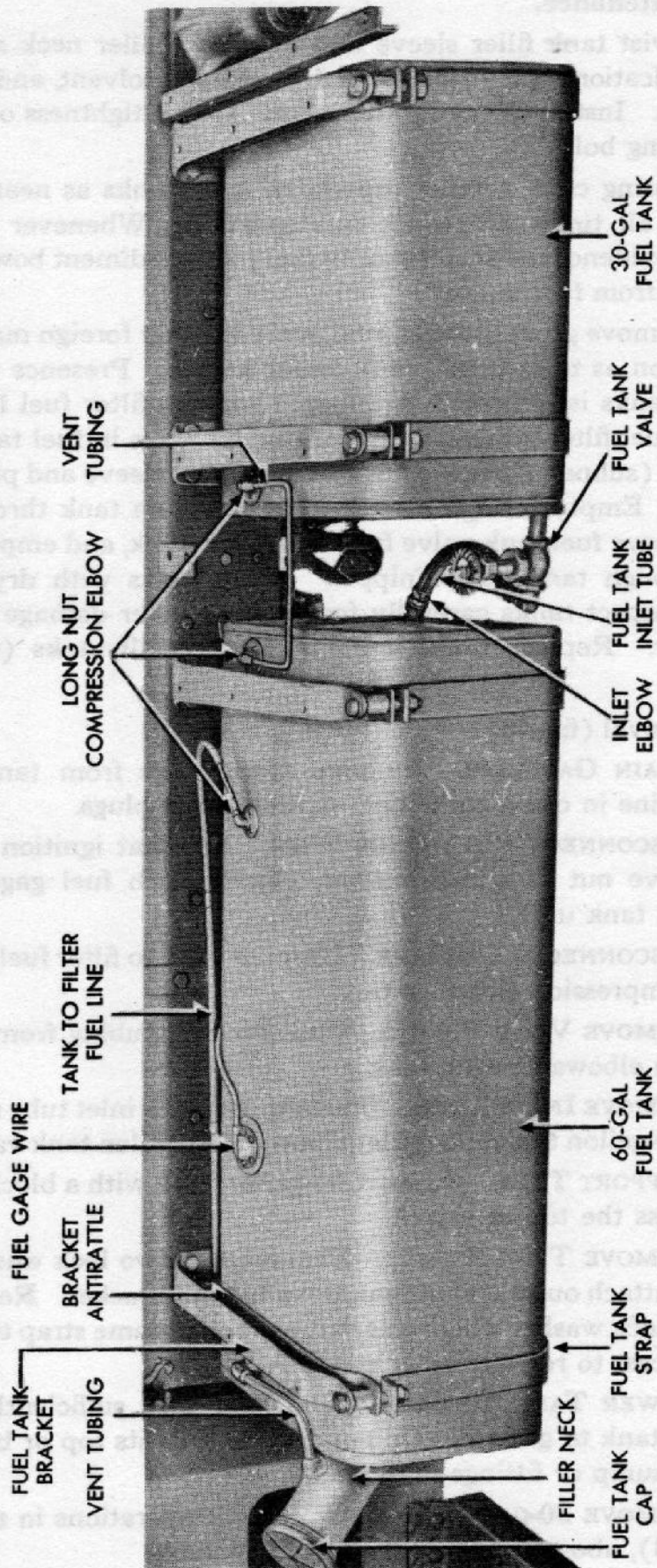


Figure 46 — Fuel Tanks Installed (Ponton Body and Deck Plate Removed)

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)**b. Maintenance.**

(1) Twist tank filler sleeve and pull from filler neck at time of chassis lubrication. Clean sleeve in dry-cleaning solvent, and dry with an air blast. Install sleeve in filler neck. Check tightness of all strap and mounting bolts.

(2) During cold weather especially, keep tanks as nearly full as possible at all times, to reduce condensation. Whenever excessive water is in evidence in fuel filter or in fuel pump sediment bowl, remove drain plugs from fuel tanks.

(3) Remove gravel, stones, rust, scale or other foreign matter from tanks as soon as their presence becomes known. Presence of foreign matter in tanks is indicated by clogged tank to filter fuel line, rapid fouling of fuel filter, plugging of drain, or by noise in fuel tanks. Remove tanks (subpar. c below). Twist tank filler sleeve and pull it from filler neck. Empty foreign matter from 60-gallon tank through filler neck. Remove fuel tank valve from 30-gallon tank, and empty foreign matter through tank outlet nipple. Rinse tanks with dry-cleaning solvent. Inspect tanks carefully for leaks or other damage from foreign matter. Replace tanks if damaged. Install tanks (subpar. d below).

c. Removal (fig. 46).

(1) **DRAIN GASOLINE.** Remove drain plugs from tank sumps. Catch gasoline in clean container. Install drain plugs.

(2) **DISCONNECT FUEL GAGE WIRE.** See that ignition switch is off. Remove nut and lock washer which attach fuel gage wire to terminal on tank unit.

(3) **DISCONNECT FUEL LINE.** Unscrew tank to filter fuel line from long nut compression elbow on tank.

(4) **REMOVE VENT TUBING.** Unscrew vent tubing from long nut compression elbows on each tank.

(5) **REMOVE INLET TUBE.** Unscrew fuel tank inlet tube from inlet elbow on 60-gallon tank and outlet elbow on 30-gallon tank valve.

(6) **SUPPORT TANK.** Support 60-gallon tank with a block of wood placed across the top of a jack.

(7) **REMOVE TANK STRAPS.** Remove nut, two lock washers, and bolt which attach outer end of tank strap to tank bracket. Remove cap screws and lock washer which attach inner end of same strap to bracket. Repeat process to remove other strap.

(8) **LOWER TANK TO GROUND.** Lower jack sufficiently to free tank. Lift tank to ground. Do not rest tank on its top or bottom, as damage to sump or fittings may result.

(9) **REMOVE 30-GALLON TANK.** Repeat operations in steps (6), (7), and (8), above, and remove 30-gallon tank.

FUEL SYSTEM

d. Installation (fig. 46).

(1) **POSITION REAR TANK.** Place a jack on floor, midway between tank brackets. Place a hardwood board across top of jack. Set 30-gallon fuel tank on the board. Raise jack sufficiently to hold tank in position under its brackets.

(2) **INSTALL TANK STRAPS.** Place a tank strap in position around end of tank. Install lock washer and cap screw which secure inner end of strap to bracket. Install bolt, two lock washers, and nut which hold outer end of strap to bracket. Repeat process to install other strap on its bracket. Remove jack and hardwood board from under tank.

(3) **INSTALL 60-GALLON TANK.** Repeat operations in steps (1) and (2) above, and install 60-gallon fuel tank.

(4) **INSTALL INLET TUBE.** Position inlet tube against inlet elbow on 60-gallon tank and outlet elbow on 30-gallon tank valve. Tighten inlet tube nuts.

(5) **INSTALL VENT TUBING.** Attach vent tubing to long nut compression elbows on each tank.

(6) **CONNECT FUEL LINE.** Position fuel line against long nut compression elbow on top of 60-gallon tank, and tighten sleeve nut.

(7) **CONNECT FUEL GAGE WIRE.** Place wire on its terminal on fuel gage tank unit. Install lock washer and nut which secure wire to terminal. Install lock washer and screw which secure wire clip to tank unit.

(8) **TEST INSTALLATION.** See that all fittings and plugs are tight. Fill tank with 68 octane (minimum) gasoline. Check fittings and plugs for leakage. Absence of leakage indicates satisfactory installation.

69. FUEL LINES.

a. **Description.** Gasoline is conducted from the 30-gallon fuel tank to the 60-gallon tank through a valve and flexible woven tube. Gasoline is conducted from the 60-gallon fuel tank to carburetor through three fuel lines. Tank to filter fuel line (fig. 46) and pump to carburetor fuel line are made of steel. They have ferruled ends. Filter to pump fuel line is flexible woven metal (fig. 45). Brass sleeve coupling nuts are used throughout. Both rigid lines are protected by loom. In appearance and fittings, the lines are similar to those of the brake system.

b. Maintenance.

(1) **CLEANING.** If fuel line becomes plugged, disconnect both ends of line. Apply compressed air at one end to blow obstruction from line. Do not apply air to any line if other end is connected.

(2) **CUTTING AND BENDING TUBING AND INSTALLING FITTINGS** (fig. 114). If a complete tubing assembly is not available for replace-

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

ment purposes, cut new tubing to same length as original part. Place a sleeve coupling nut and ferrule over each end, and install tubing (subpar. d, below).

c. **Removal** (figs. 46, 41, and 45). Completely unscrew sleeve coupling nut from each end of tubing. Remove clips along tubing. Work tubing from vehicle.

d. **Installation** (fig. 136). Place tubing in position occupied by original installation. Connect sleeve coupling nut at each end of tubing. Install clips along length of tubing.

Section XVII

INTAKE AND EXHAUST SYSTEM

70. DESCRIPTION.

a. Intake system consists of an oil-bath type carburetor air cleaner which cleans the air. The air is then conducted to the carburetor by tube or pipe.

b. Exhaust system consists of exhaust pipe, muffler, and tail pipe. Its purpose is to remove exhaust gases and to lessen exhaust noises.

71. CARBURETOR AIR CLEANER.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 48). Air cleaner is attached to a bracket mounted outside the right-hand frame side rail at rear of engine. Access to cleaner is provided by an opening in cab skirt. Connection with the carburetor is provided through an air pipe clamped to cleaner and an intake elbow attached to carburetor. Purpose of cleaner is to remove foreign matter from air drawn into engine through the carburetor. This is accomplished by drawing the air through a mass of fine metal shavings. Foreign matter flows down to the oil in the bottom of cleaner where it is trapped.

(2) **TABULATED DATA.**

Manufacturer United Specialties Co.
Oil capacity 3 pt

b. **Maintenance** (figs. 47 and 48). Loosen the two wing nuts which secure reservoir to body of cleaner, and remove. Clean out reservoir, and refill with engine oil to "OIL LEVEL" mark (3 pt). Position reservoir to body of cleaner, and secure with the two wing nuts. Wash air cleaner element in gasoline or other suitable solvent every third time reservoir oil is replaced, or oftener, depending on dust conditions.

INTAKE AND EXHAUST SYSTEM

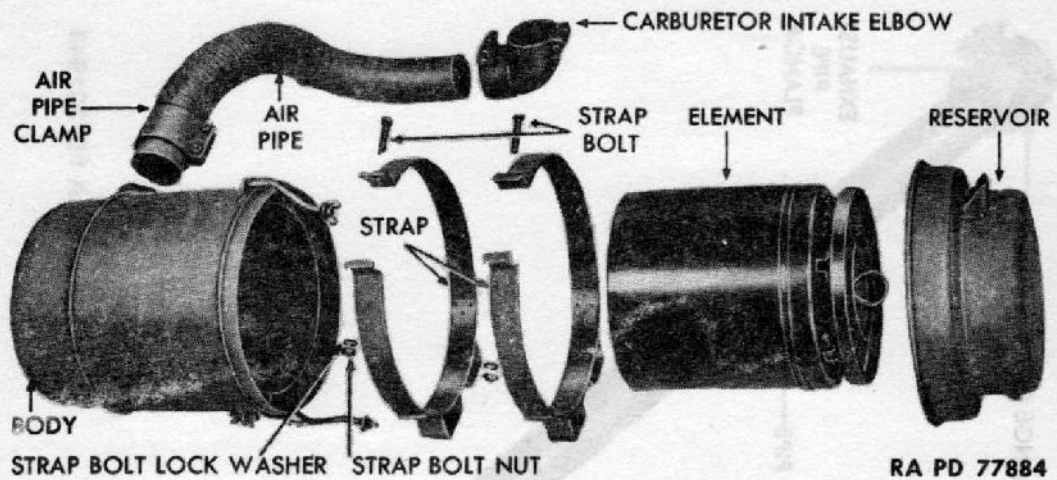


Figure 47 — Carburetor Air Cleaner Disassembled

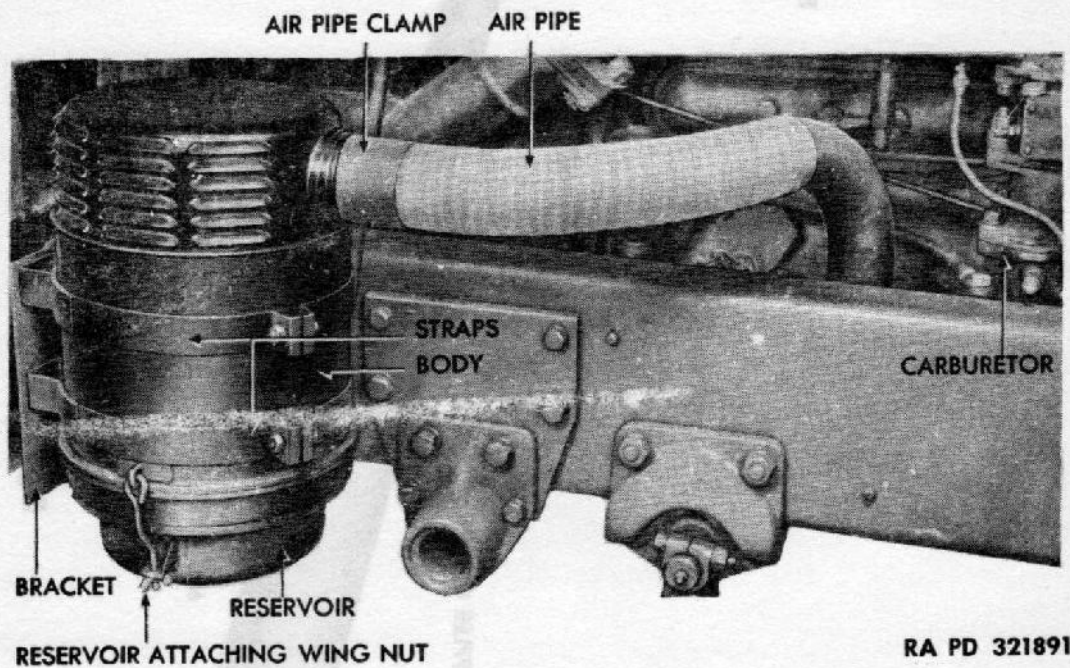


Figure 48 — Carburetor Air Cleaner Installed

c. Removal.

(1) DISCONNECT AIR PIPE FROM CARBURETOR (fig. 48). Loosen carburetor intake elbow clamp screw (fig. 47). Pull elbow from carburetor.

(2) REMOVE CLEANER FROM BRACKET (fig. 48). Remove the four nuts, toothed lock washers, and bolts which secure air cleaner straps to bracket. Remove cleaner.

d. Installation.

(1) INSTALL AIR CLEANER (fig. 48). Position cleaner straps to bracket. Secure with the four bolts, toothed lock washers, and nuts.

TM 9-817
71

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

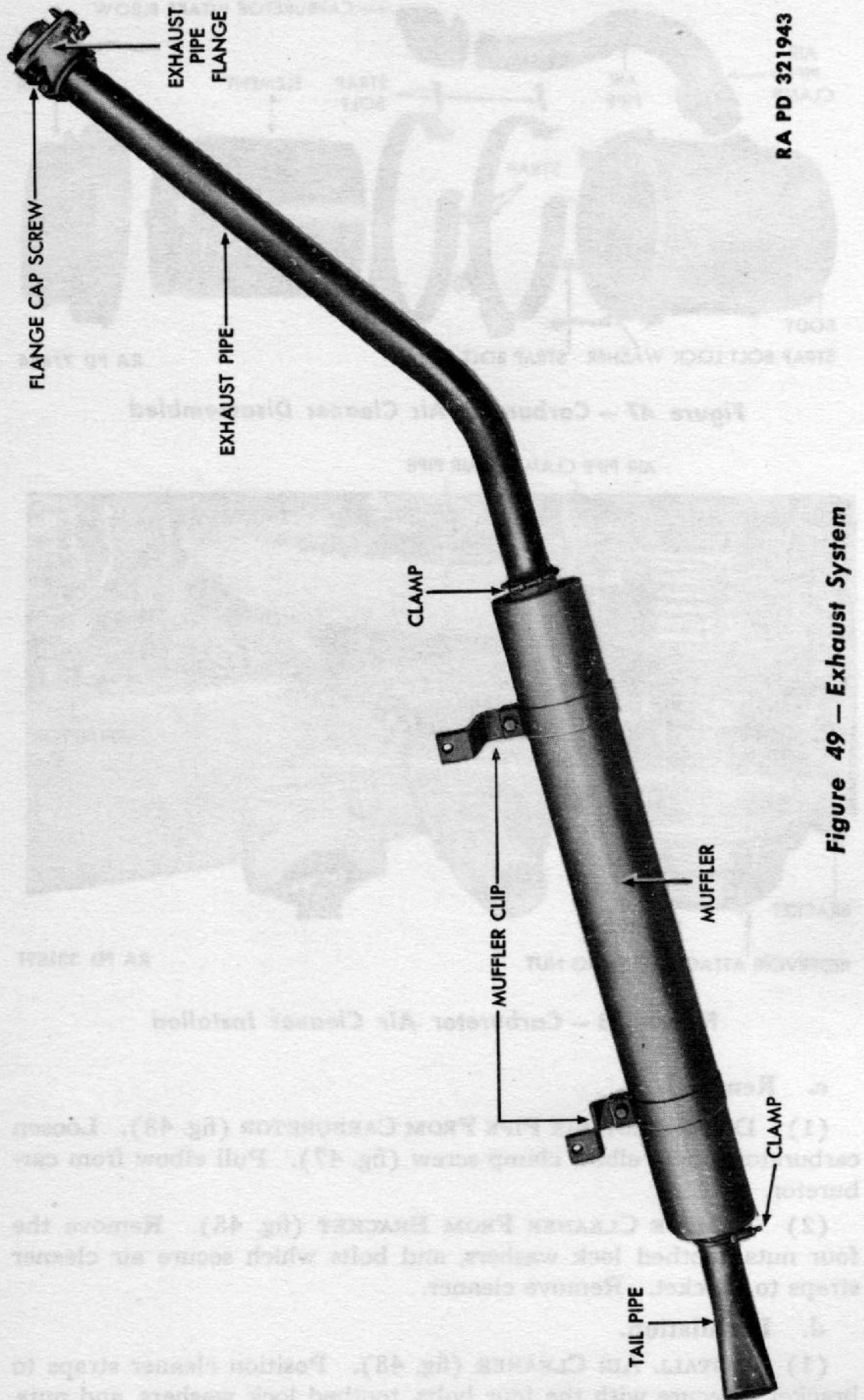


Figure 49 — Exhaust System

INTAKE AND EXHAUST SYSTEM

(2) **CONNECT AIR PIPE TO CARBURETOR** (fig. 48). Fit pipe to carburetor and tighten elbow clamp screw.

72. MUFFLER, EXHAUST, AND TAIL PIPES.

a Description (fig. 49). The exhaust pipe, muffler, and tail pipe conduct exhaust gases from the engine and discharge the gases into the atmosphere at a point directly in front of the right rear wheels.

b. Removal (fig. 49).

(1) **REMOVE EXHAUST PIPE.** Remove splash shield from under right front fender. Remove three nuts, six lock washers, and three bolts which secure flange to exhaust manifold. Loosen screw which clamps flange to exhaust pipe. Loosen muffler clamps, and slide muffler back, away from exhaust pipe. Slide exhaust pipe flange from manifold, and remove it.

(2) **REMOVE MUFFLER** (fig. 49). Mark ends of muffler to facilitate correct installation. Loosen the bolt, nut, and lock washer which secure sleeve to exhaust pipe. Remove the two nuts, lock washers, and bolts which secure muffler clips to frame side rail. Pull muffler from exhaust pipe.

(3) **REMOVE TAIL PIPE** (fig. 49). Loosen tail pipe clamp. Pull tail pipe from muffler.

c. Installation.

(1) **INSTALL TAIL PIPE.** Insert tail pipe into muffler sleeve and position it so that discharge end is in front of right rear wheels. Tighten clamp which secures pipe to muffler.

(2) **INSTALL MUFFLER** (fig. 49). Position muffler to frame side rail. (Note markings for correct installation.) Slide muffler sleeve over end of exhaust pipe. Install the two bolts, nuts, and lock washers which secure muffler clips to frame side rail. Tighten bolt, nut, and lock washer which secure sleeve to exhaust pipe. Install tail pipe (step c (1), above).

(3) **INSTALL EXHAUST PIPE** (fig. 49). Use new gasket. Position exhaust pipe at front end to manifold. Secure with three bolts, six lock washers, and three nuts. Tighten cap screw which secures flange to exhaust pipe. Tighten nuts alternately, a few turns at a time, until all are tight.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

Section XVIII

COOLING SYSTEM**73. DESCRIPTION AND MAINTENANCE.**

a Description. The cooling system consists of three major units: radiator, water pump, and fan. Cooling fluid drawn from the base of radiator is circulated through the engine. It absorbs engine heat and passes to top of radiator for recooling. Temperature of the fluid is kept within a desired range by a thermostat located in a housing mounted on water outlet manifold. A metal by-pass tube permits fluid to be recirculated through the engine until engine warms up. Thermostat then opens and passes fluid to radiator, at the same time closing off by-pass. Keep the radiator filled at all times with proper fluid to ensure cooling efficiency. Capacity is 40 quarts.

b. Maintenance.

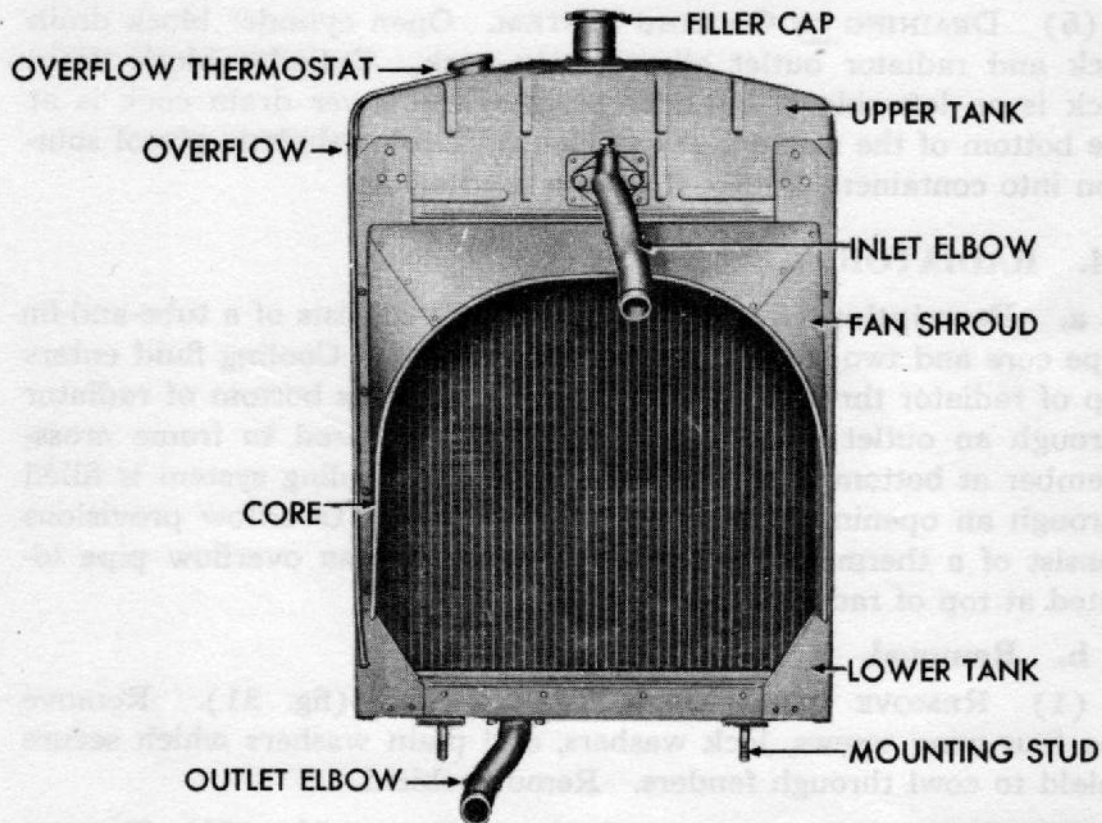
(1) **FILLING COOLING SYSTEM.** NOTE: *Do not fill radiator when engine is overheated. Cylinder heads or block may crack by cooling too rapidly. Allow engine to cool ½ hour, then run at idling speed while gradually filling radiator. To drain cooling system thoroughly, open the two pet cocks—one on cylinder jacket above water pump, the other on radiator bottom outlet elbow.* CAUTION: *Attach a "NO WATER" warning card to steering wheel when cooling system is empty. Remove cover from radiator cap opening, and then remove radiator cap. Fill cooling system. Start engine, and allow to run until water temperature gage reads 180° F. Shut off engine, and fill cooling system again.*

(2) **INSPECTION OF COOLING SYSTEM UNITS.** Inspect all hose connections and hose connection clamps. Clamps must be tight, and hose connections must not leak. Inspect drain cocks on radiator outlet elbow and cylinder block for leakage. Examine all gaskets at water connections for leaks, and tighten all bolts and nuts at these water connections.

(3) REVERSE FLUSHING.

(a) **Radiator.** Open drain cock on radiator outlet elbow, and drain water (step (6) below). Remove upper and lower radiator hose, and replace radiator cap. Attach a length of hose to the radiator top connection, then attach a length of hose to the radiator outlet elbow connection, and insert a reverse flushing gun in this hose. Connect the water hose of the gun to a water tap and the air hose to a compressed air line. Turn on the water, and, when the radiator is full, turn on the air in short blasts. Allow radiator to fill with water between blasts of air. Continue this flushing until water from top hose runs clear.

COOLING SYSTEM



RA PD 77961

Figure 50 — Radiator

(b) *Cylinder.* Remove hose from water pump inlet, and attach a length of hose to the inlet, then remove hose from water pump outlet, and attach a length of hose to the outlet, then insert gun in this hose. Repeat procedure (step (a) above).

(c) *Refill Radiator.* Connect hose connections, close drain cock, and refill radiator.

(4) **ANTIFREEZE.** Ethylene glycol is the only antifreeze prescribed for use in Ordnance vehicles. Pour solution into radiator until radiator appears to be full. Start engine and run until water temperature gage registers 185° F. Pour remainder of solution into radiator.

(5) **ANTIFREEZE CHART.**

Ethylene Glycol (Quart)	Water (Quart)	Protects to Zero F	Gravity
0	40	32	1.000
4	36	26	1.016
8	32	16	1.031
12	28	3	1.045
16	24	11	1.058
20	20	31	1.070

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(6) **DRAINING OF COOLING SYSTEM.** Open cylinder block drain cock and radiator outlet elbow drain cock. Cylinder block drain cock is on left side of cylinder block. The lower drain cock is at the bottom of the radiator outlet elbow. Drain ethylene glycol solution into containers so that it can be used again.

74. RADIATOR.

a. **Description** (fig. 50). The radiator consists of a tube-and-fin type core and two tanks constructed integrally. Cooling fluid enters top of radiator through an inlet elbow and leaves bottom of radiator through an outlet elbow. The radiator is secured to frame cross-member at bottom and to cowl at top. The cooling system is filled through an opening at top center of radiator. Overflow provisions consist of a thermostat-controlled opening and an overflow pipe located at top of radiator.

b. **Removal.**

(1) **REMOVE LEFT-HAND SPLASH SHIELD** (fig. 31). Remove the four wing screws, lock washers, and plain washers which secure shield to cowl through fenders. Remove shield.

(2) **DRAIN RADIATOR AND CYLINDER BLOCK** (fig. 19). Remove radiator cap. Open the two pet cocks—one on cylinder jacket above water pump, the other on bottom of radiator outlet elbow. If radiator contains antifreeze, drain into suitable containers. **CAUTION:** *If radiator is not immediately filled, attach a warning card to steering wheel, reading "NO WATER."*

(3) **REMOVE RADIATOR BRUSH GUARD.** Remove the 4 bolts, 4 nuts, and 8 lock washers which secure light wires to inside base of brush guard. Pull wires free. Remove the 4 screws, 4 nuts, and 8 lock washers which secure blackout marker light to each side of brush guard assembly. Remove the 8 bolts, 8 nuts, and 16 lock washers which secure brush guard to fender bracket on each side. Remove the 11 bolts, 6 nuts, and 17 lock washers which secure brush guard assembly to cowl. Remove brush guard assembly.

(4) **REMOVE ENGINE HOOD.** Disengage the two latch catches on right-hand side of hood. Remove the three screws, flat washers, and lock washers which secure left side of hood to floorboard. Remove hood.

(5) **DISCONNECT RADIATOR INLET ELBOW** (fig. 50). Remove the two cap screws and lock washers which secure inlet elbow and gasket to radiator. Pull elbow free of radiator. Remove gasket.

(6) **REMOVE RADIATOR OUTLET ELBOW** (fig. 50). Remove the two cap screws and lock washers which secure elbow and gasket to bottom of radiator. Pull elbow free of radiator. Remove gasket.

COOLING SYSTEM

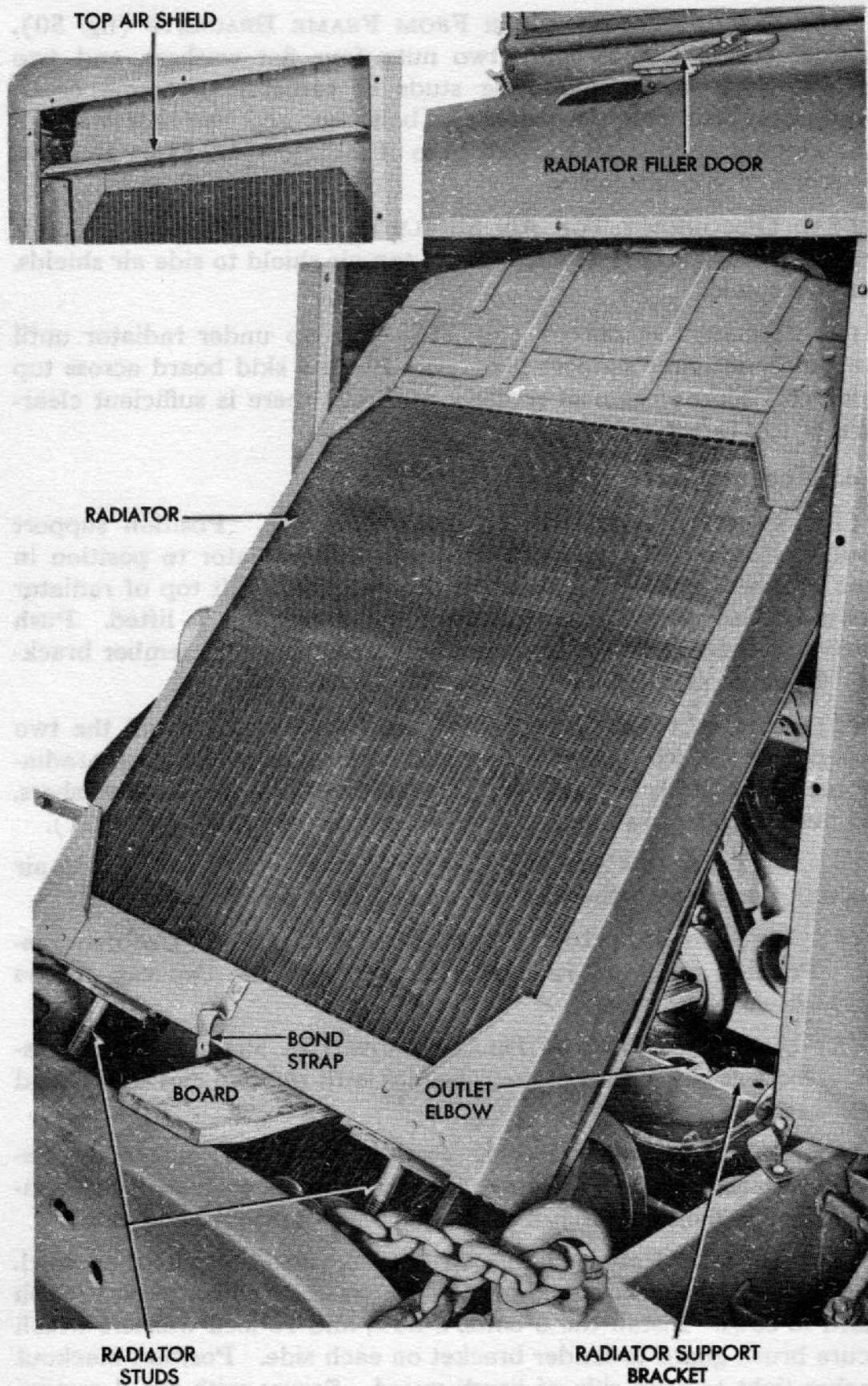


Figure 51 — Removing Radiator

RA PD 321883

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(7) **DISCONNECT RADIATOR FROM FRAME BRACKETS** (fig. 50). Remove the two cotter pins, two nuts, four flat washers, and two springs which secure mounting studs of radiator to frame cross-member on each side. Remove the bolt, nut, and two lock washers which secure bond strap to front base of radiator (fig. 51). Remove radiator support insulators.

(8) **DISCONNECT TOP AIR SHIELD** (fig. 51). Remove the four screws and lock washers which secure top air shield to side air shields. Remove shield.

(9) **REMOVE RADIATOR** (fig. 51). Pry up under radiator until studs clear radiator support brackets. Place a skid board across top of winch. Skid bottom of radiator out until there is sufficient clearance at top to lift radiator out.

c. Installation.

(1) **POSITION RADIATOR IN COWL** (fig. 51). Position support insulators on radiator support brackets. Lift radiator to position in front of cowl. Place skid board under radiator. Tilt top of radiator forward. Guide neck through filler neck as radiator is lifted. Push bottom of radiator to position on frame front support member brackets. Remove skid board.

(2) **CONNECT RADIATOR TO FRAME BRACKETS**. Install the two springs, four flat washers, two nuts, and cotter pins which secure radiator mounting studs to brackets. Install the bolt, two lock washers, and nut which secure bond strap to front base of radiator (fig. 51).

(3) **ATTACH TOP AIR SHIELD**. Position shield to top of side air shields. Secure with the four screws and lock washers.

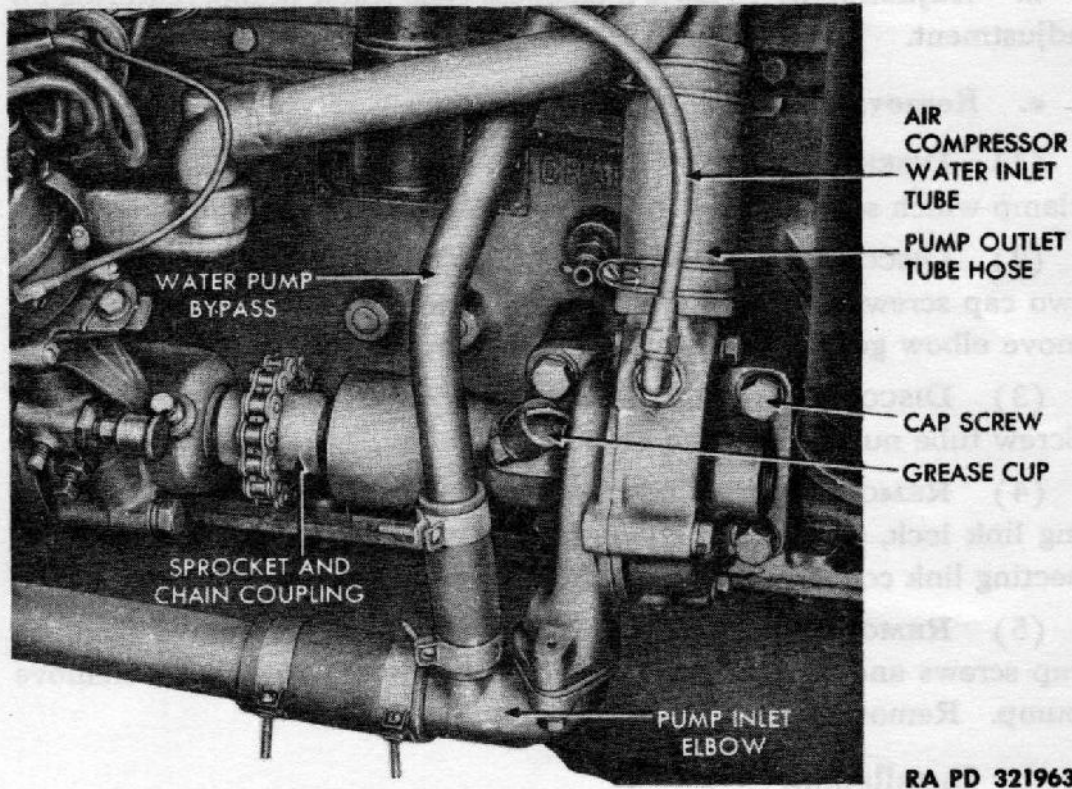
(4) **ATTACH RADIATOR OUTLET ELBOW** (fig. 50). Use new gasket. Position elbow to radiator. Secure with the two cap screws and lock washers.

(5) **INSTALL RADIATOR INLET ELBOW** (fig. 50). Use new gasket. Position elbow to radiator. Secure with the two cap screws and lock washers.

(6) **INSTALL ENGINE HOOD**. Position hood on floorboard. Secure left-hand side with the three screws, flat washers, and lock washers. Engage the two catch latches which secure right-hand side.

(7) **INSTALL RADIATOR BRUSH GUARD**. Position guard to cowl. Install the 11 bolts, 6 nuts, and 17 lock washers which secure brush guard to cowl. Install the 8 bolts, 8 nuts, and 16 lock washers which secure brush guard to fender bracket on each side. Position blackout marker light to each side of brush guard. Secure with the 4 screws, 4 nuts, and 8 lock washers. Install the 4 bolts, 4 nuts, and 8 lock washers which secure light wires to inside base of brush guard.

COOLING SYSTEM



RA PD 321963

Figure 52 — Water Pump Installed

(8) **FILL COOLING SYSTEM.** Close the two drain cocks—one in cylinder jacket above water pump (fig. 19), the other at bottom of radiator outlet elbow (fig. 19). Remove filler cap. Fill system. Install filler cap.

(9) **INSTALL LEFT-HAND SPLASH SHIELD** (fig. 31). Position shield to cowl and fender. Install the four plain washers, lock washers, and wing screws which secure shield to cowl.

75. **WATER PUMP.**

a. **Description and Tabulated Data.**

(1) **DESCRIPTION** (fig. 52). Pump is mounted on engine at center of left side. It is driven from an accessory shaft by means of a sprocket and chain coupling. It serves to aid circulation of cooling fluid through the engine.

(2) **TABULATED DATA.**

Manufacturer	Hercules
Model	17165-CS
Type	Packless
Drive	Gear
Location	LH side of engine

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

b. Adjustment. This is a packless type water pump, requiring no adjustment.

c. Removal.

(1) **DISENGAGE PUMP OUTLET TUBE** (fig. 52). Loosen hose clamp which secures hose to pump. Work hose from pump.

(2) **DISCONNECT PUMP INLET ELBOW** (fig. 52). Remove the two cap screws and lock washers which secure elbow to pump. Remove elbow gasket. Pull elbow free from pump.

(3) **DISCONNECT AIR COMPRESSOR WATER INLET TUBE** (fig. 52). Screw tube nut from fitting on pump.

(4) **REMOVE PUMP COUPLING CHAIN** (fig. 52). Drive connecting link lock, on front of chain, from connecting link. Remove connecting link cover, and pry link from chain. Remove chain.

(5) **REMOVE PUMP FROM ENGINE** (fig. 52). Remove the four cap screws and lock washers which secure pump to block. Remove pump. Remove gasket.

d. Installation.

(1) **INSTALL PUMP ON ENGINE** (fig. 52). Use new gasket. Use dowel guide to position pump on engine. Install the four cap screws and lock washers which secure pump to cylinder block.

(2) **INSTALL PUMP COUPLING CHAIN** (fig. 52). Position chain to pump coupling sprocket. Insert connecting link, and secure with lock. Install cover on link.

(3) **CONNECT PUMP INLET ELBOW** (fig. 52). Use new gasket. Position elbow to pump. Secure with the two cap screws and lock washers.

(4) **CONNECT PUMP OUTLET TUBE** (fig. 52). Fit hose over tube, and tighten hose clamp.

(5) **CONNECT AIR COMPRESSOR WATER INLET TUBE** (fig. 52). Screw tube nut to fitting on pump. Tighten nut securely.

76. PIPE AND HOSE CONNECTIONS.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (figs. 19 and 52). Connections consist chiefly of several lengths of straight pipe, elbows, and hose, of different diameters and lengths, connecting engine, radiator, air compressor, and pump. Metal clamps secure the connections.

COOLING SYSTEM

(2) TABULATED DATA.

	Material	Number Required	Diameter	Length
Hose	Rubber	1	1 ³ / ₄ in.	9 ¹ / ₂ in.
	Rubber	2	1 ³ / ₄ in.	4 in.
	Rubber	2	1 in.	3 in.
	Rubber	1	1 ³ / ₄ in.	5 ¹ / ₈ in.
Pipes	Steel	1	1 ³ / ₄ in.	14 ⁷ / ₈ in.
	Steel	1	1 ³ / ₄ in.	16 ⁷ / ₈ in.
By-pass	Steel	1	1 in.	
Air compressor	Copper	1	1/2 in.	21 in.
	Copper	1	1/2 in.	27 in.
Cylinder block drain..	Steel	2	1 in.	
Elbows	Cast iron	3	1 ¹ / ₂ in.	
	Cast iron	1	3/8 in.	
	Cast iron	2	1/2 in.	
Clamps	Steel	12		

b. **Removal** (figs. 19 and 52). Disengage connections secured by clamps as follows: Loosen clamp screw. Slide clamp away from hose end. Work hose free. Remove cap screws and lock washers to disengage other connections.

c. **Installation** (figs. 19 and 52). Install hose secured by clamps as follows: Slide clamp to position at end of hose. Tighten clamp screw. Install other connections as follows: Use new gasket. Position parts to be connected to each other. Install cap screws and lock washers.

77. THERMOSTAT.

a. **Description and Tabulated Data.**

(1) **DESCRIPTION** (fig. 53). The thermostat is mounted in the front of the water outlet manifold at top of the cylinder heads. It is an automatic type valve, and serves to control the circulation to keep the temperature of cooling fluid in the engine between 157° F and 183° F. This control shortens the engine warm-up period by keeping the cooling fluid in the engine until it is warm. The thermostat, when closed, allows the cooling fluid to circulate through the thermostat bottom opening and out the side vents into the by-pass tube. When the thermostat opens, the thermostat side vents are closed, and the cooling fluid circulates through the radiator instead of through the by-pass tube.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

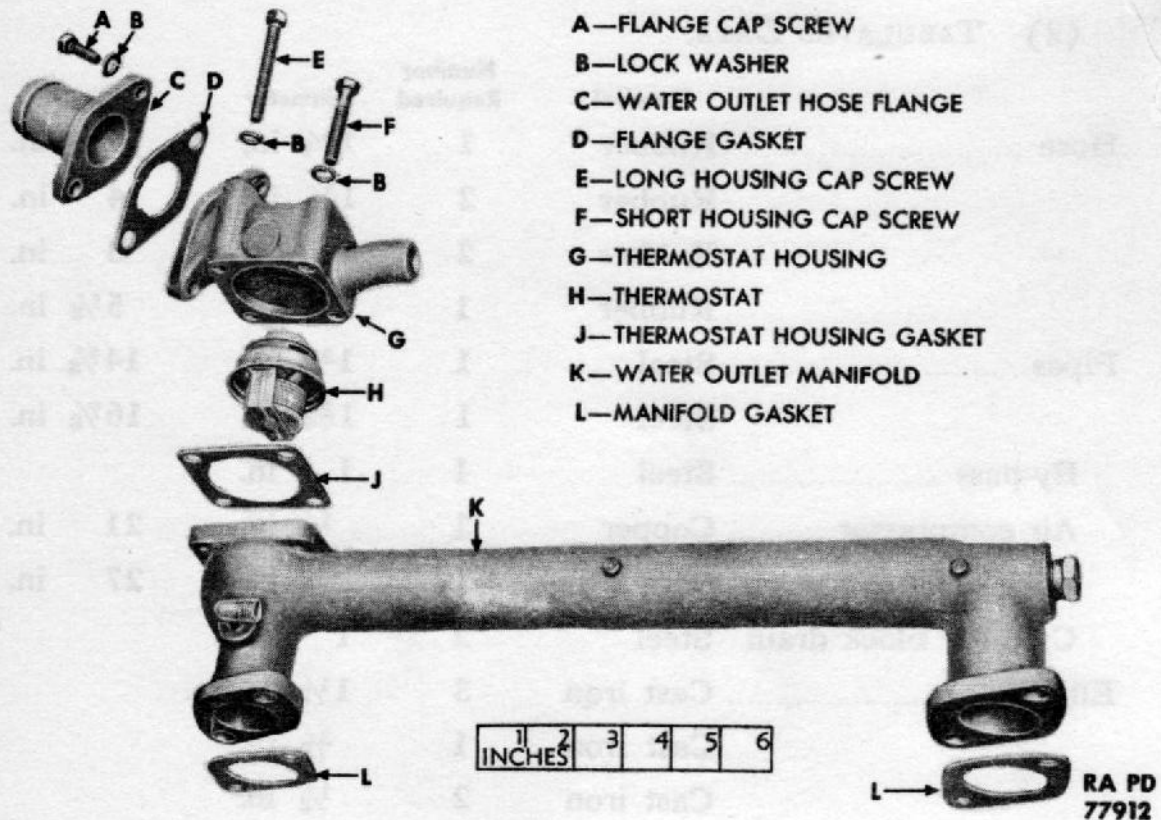


Figure 53 — Thermostat Housing Disassembled

(2) TABULATED DATA.

Manufacturer	Bishop and Babcock
Model	3710-B
Opens	183° F
Closes	157° F

b. **Maintenance** (fig. 53). If thermostat does not function properly, place it in a container of water. Place a thermometer, or other satisfactory heat-gaging device, in water. Apply heat to water. Thermostat should start to open within 5° F of 157° F, and open fully within 5° F of 183° F. Replace thermostat if it does not open and close at these temperatures.

c. **Removal.**

(1) **DISCONNECT BY-PASS TUBE FROM THERMOSTAT HOUSING** (fig. 53).

(2) **DISCONNECT WATER OUTLET HOSE FLANGE FROM THERMOSTAT HOUSING** (fig. 53) (par. 76 b). Remove the two flange cap screws and lock washers. Lift flange and gasket from housing.

(3) **DISCONNECT THERMOSTAT HOUSING FROM WATER OUTLET MANIFOLD** (fig. 53). Remove the four cap screws and lock washers which secure thermostat housing to manifold. Remove thermostat housing, gasket, and thermostat.

COOLING SYSTEM

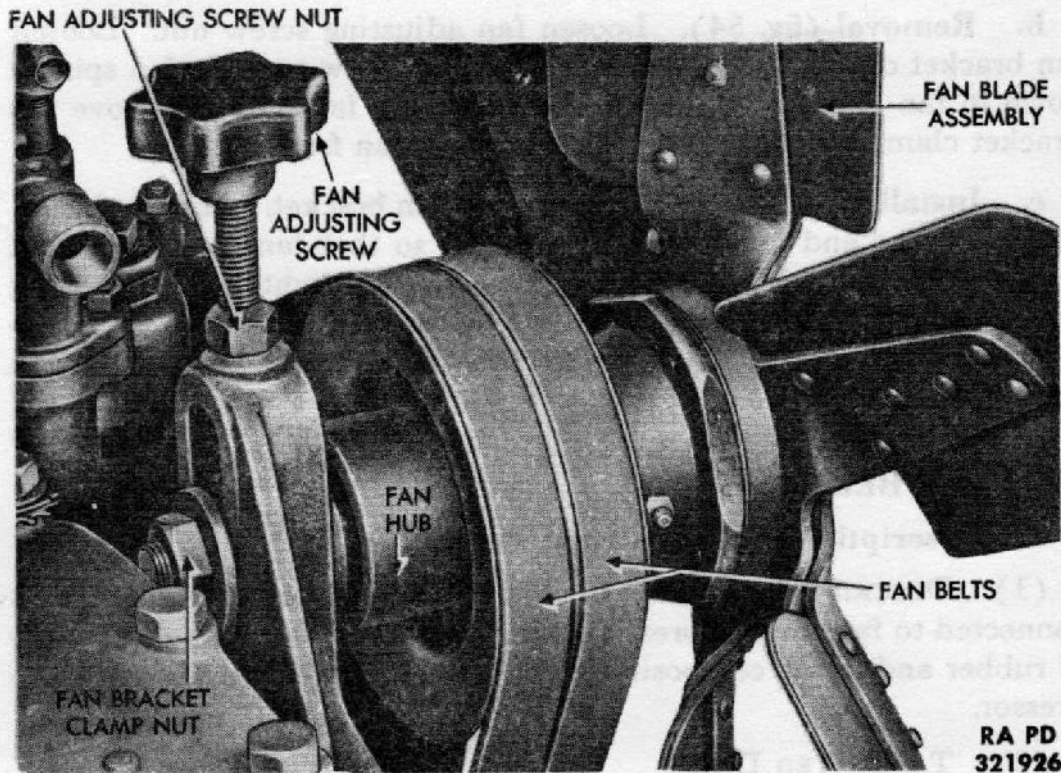


Figure 54 — Fan Belt Adjustment

d. Installation.

(1) **INSTALL THERMOSTAT AND HOUSING** (fig. 53). Place thermostat in position, bellows down, on water outlet manifold. Use new gasket, and position housing on water outlet manifold. Secure with the four lock washers and cap screws.

(2) **CONNECT WATER OUTLET HOSE FLANGE TO THERMOSTAT HOUSING** (fig. 53). Position flange gasket and flange on housing. Install the two lock washers and cap screws.

(3) **CONNECT BY-PASS TUBE TO THERMOSTAT HOUSING** (fig. 53).

78. FAN.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 54). The fan is mounted on a bracket at front of the engine. It is a roller bearing type, and is belt driven by a double V-belt pulley on the engine accessory shaft. Its purpose is to cool liquid coolant by drawing air through the radiator core and by keeping air circulating through the engine compartment.

(2) **TABULATED DATA.**

Manufacturer	Schwitzer-Cummins
Model	A-111545
Number of blades	6
Drive	Double V-belts

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

b. Removal (fig. 54). Loosen fan adjusting screw nut. Loosen fan bracket clamp nut. Turn fan adjusting screw to force fan spindle down in fan bracket. Remove fan belts from fan hub. Remove fan bracket clamp nut and clamp washer. Lift fan from bracket.

c. Installation (fig. 54). Position fan in bracket. Loosely install clamp washer and fan bracket clamp nut so that fan may be moved freely in bracket. Place fan belts on pulleys. Tighten fan adjusting screw until fan belts flex $\frac{1}{2}$ to $\frac{3}{4}$ inch when pressed with fingers midway between pulleys. Tighten fan bracket clamp nut. Tighten fan adjusting screw nut.

79. FAN BELT.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 54). Fan belts are mounted on pulleys connected to fan, air compressor, and accessory drive shaft. They are of rubber and fabric composition, and serve to drive fan and air compressor.

(2) **TABULATED DATA.**

Manufacturer **Hercules**
Model **77280B**

b. Adjustment (fig. 54). Loosen fan adjusting screw nut. Loosen fan bracket clamp nut. Turn fan adjusting screw clockwise to tighten, counterclockwise to loosen. Belt deflection permissible is between $\frac{1}{2}$ and $\frac{3}{4}$ inch. After adjustment is made, tighten bracket clamp nut and fan adjusting screw nut.

c. Removal (fig. 54). Loosen fan bracket clamp nut and fan adjusting screw. Turn adjusting screw to force spindle down. Lift belts from pulleys.

d. Installation (fig. 54). Position belts on pulleys. Turn adjusting screw until belts have $\frac{1}{2}$ to $\frac{3}{4}$ flex at middle position when pressed with fingers. Tighten fan bracket clamp and fan adjusting screw nut.

Section XIX

IGNITION SYSTEM

80. DESCRIPTION.

a. This vehicle uses a conventional type, 6-volt ignition system. Components of the system are ignition coil, coil condenser, distributor, spark plugs, ignition switch, and high- and low-tension wiring.

IGNITION SYSTEM

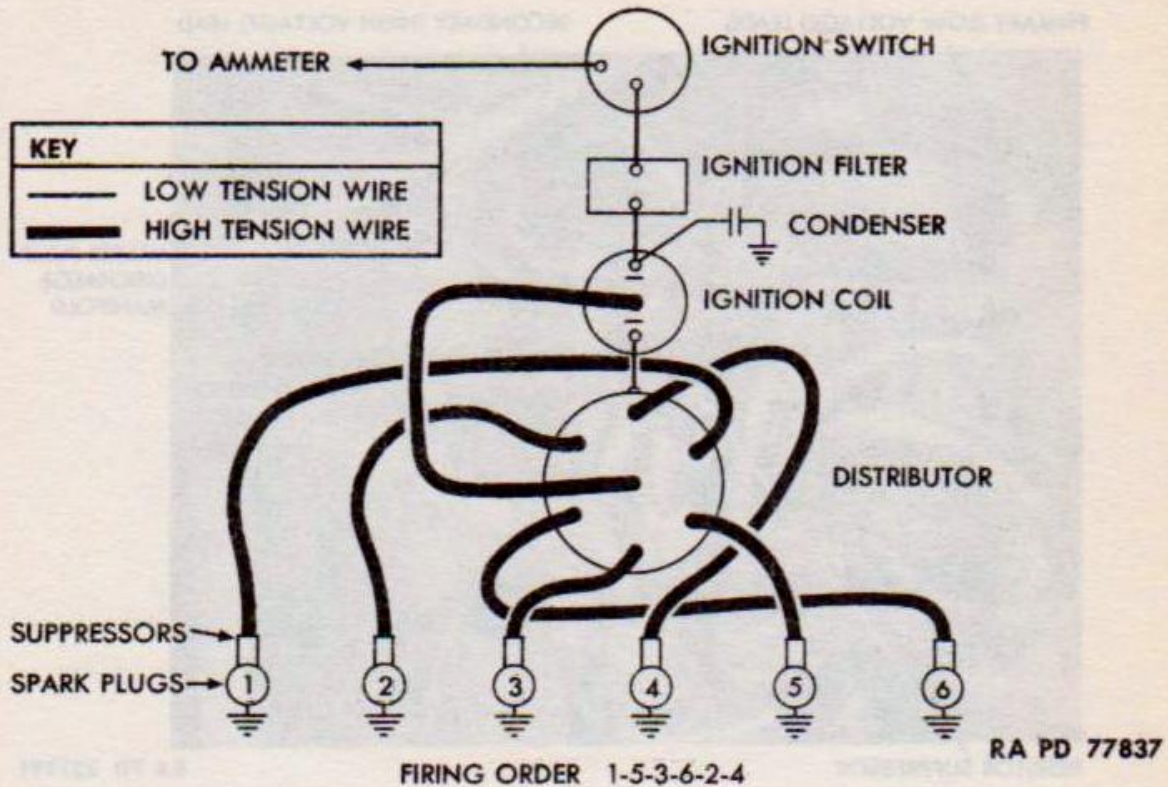


Figure 55 — Ignition System Wiring Diagram

81. IGNITION COIL.

a. Description and Tabulated Data.

(1) **DESCRIPTION.** The ignition coil is mounted on a bracket which is attached to the left side of the engine near the rear of the front cylinder head. It may be reached through the floorboard insert. Its function is to "step up" voltage for ignition.

(2) **TABULATED DATA.**

Manufacturer Auto-Lite
Model 6-volt, 19-40470-H

b. Removal.

(1) **REMOVE FLOORBOARD INSERT** (fig. 30). Loosen two wing screws which clamp insert in position. Lift insert from floorboard.

(2) **DISCONNECT WIRING** (fig. 56). Pull secondary (high-voltage) lead from tower on end of coil. Lift one wire from each terminal. Tag wires to aid in correct assembly.

(3) **REMOVE COIL** (fig. 56). Remove the two cap screws and lock washers which attach coil bracket to water pump discharge manifold.

c. Installation.

(1) **ATTACH COIL TO ENGINE** (fig. 56). Place coil in position on

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

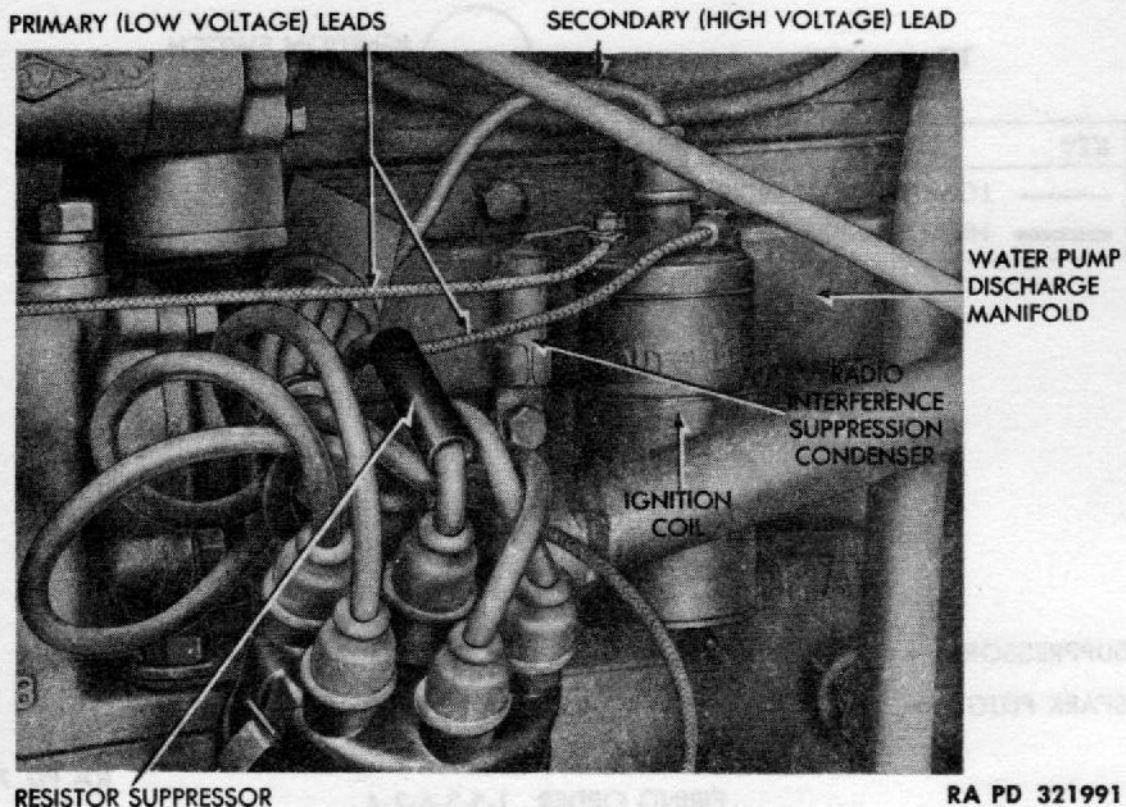


Figure 56 – Ignition Coil Installed

water pump discharge manifold. Install the two lock washers and cap screws.

(2) **CONNECT WIRING** (fig. 56). Place low-tension wire from ignition filter on coil low-tension terminal marked “+.” Place low-tension wire from ignition filter and lead from condenser on coil low-tension terminals. Plug high-tension wire from center tower of distributor cap into tower on coil.

(3) **TEST OPERATION.** Start engine. Proper functioning of engine indicates correct coil installation.

(4) **INSTALL FLOORBOARD INSERT** (fig. 30). Position insert on floorboard. Tighten the two wing screws which clamp insert to floorboard.

82. COIL CONDENSER.

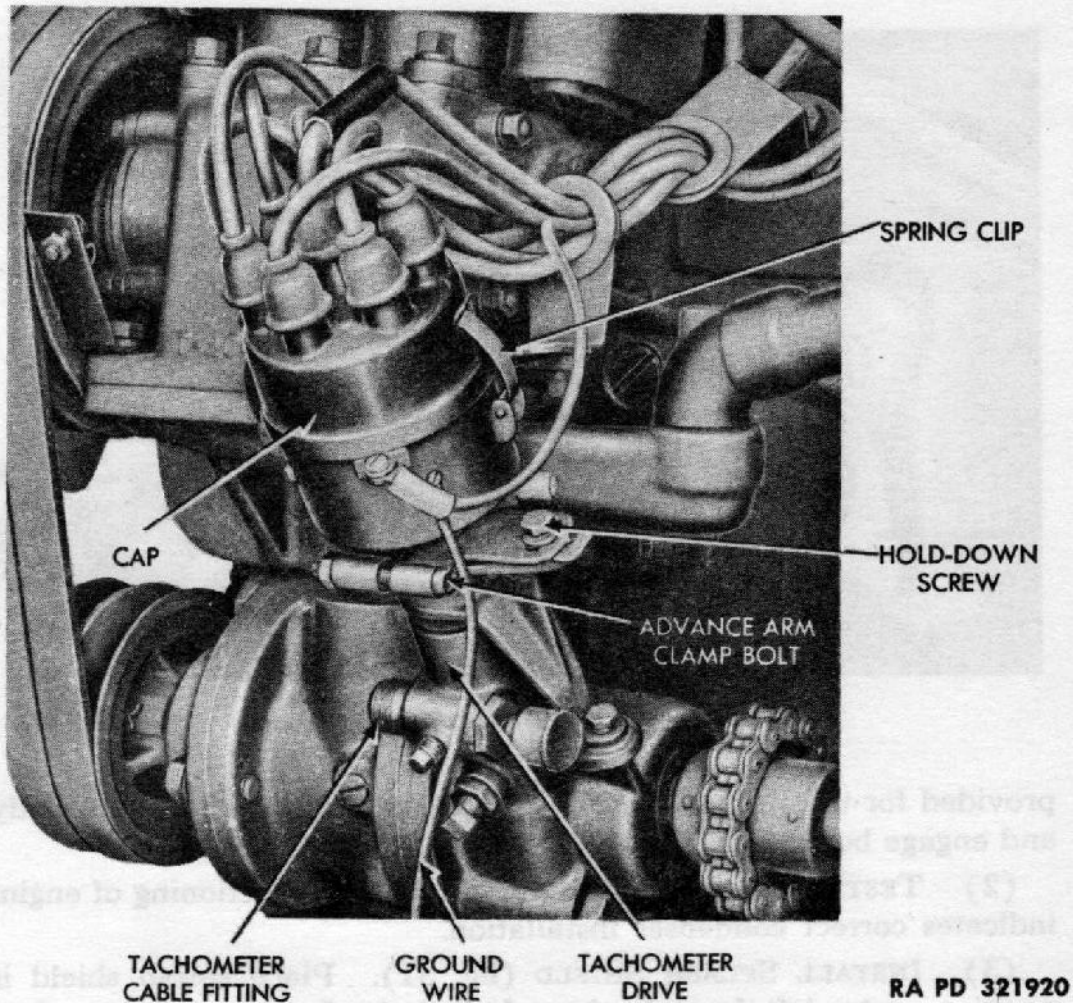
a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 59). A conventional automotive type distributor condenser is used. Its function is to prevent excessive arcing at the contact. The condenser is located on the distributor breaker plate. It can be reached through the left splash shield opening.

(2) TABULATED DATA.

Manufacturer Auto-Lite
Model IGW-3139

IGNITION SYSTEM



RA PD 321920

Figure 57 – Distributor Installed

b. Removal (fig. 59).

(1) REMOVE SPLASH SHIELD (fig. 31). Loosen the four wing screws, lock washers, and flat washers which attach shield to underside of left front fender.

(2) REMOVE DISTRIBUTOR CAP. Unsnap both spring clips, and lift cap from distributor.

(3) REMOVE COIL CONDENSER (fig. 59). Remove screw and lock washer which attach condenser wire to breaker arm spring clip. Remove screw and lock washer which connect condenser to breaker plate. Lift condenser from distributor.

c. Installation.

(1) INSTALL CONDENSER IN DISTRIBUTOR (fig. 59). Place condenser in position on distributor breaker plate. Install lock washer and screw which attach condenser to breaker plate. Connect condenser wire to breaker arm spring clip with lock washer and screw

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

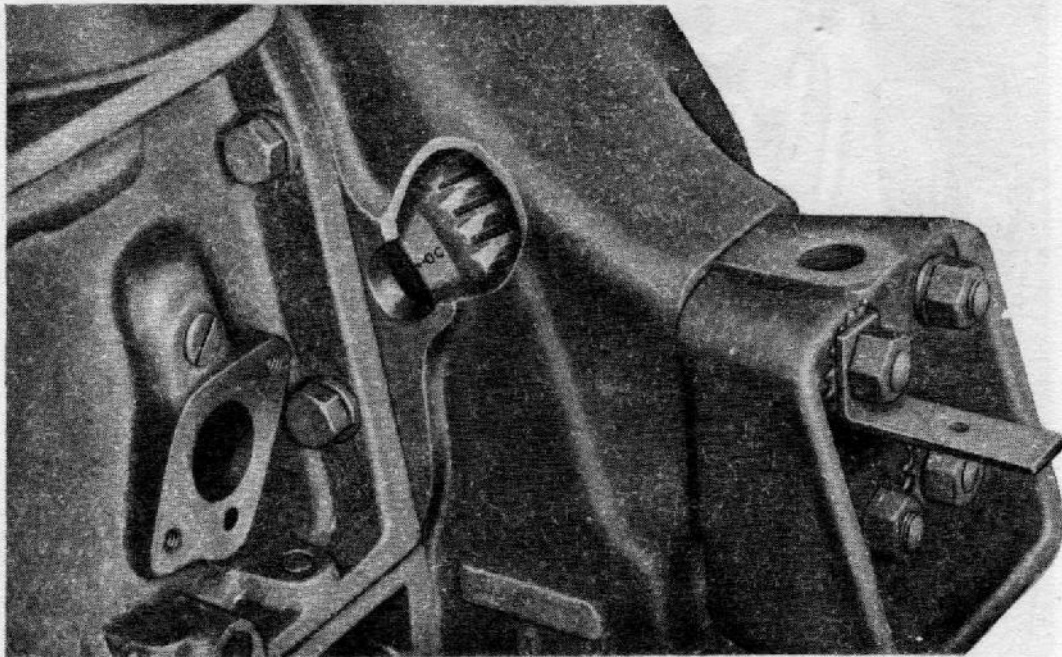


Figure 58 — Flywheel Timing Mark

RA PD 77400

provided for the purpose. Place distributor cap in position on body, and engage both spring clips.

(2) **TEST OPERATION.** Start engine. Proper functioning of engine indicates correct condenser installation.

(3) **INSTALL SPLASH SHIELD** (fig. 31). Place splash shield in position under left front fender. Install the four flat washers, lock washers, and wing screws which secure shield to fender.

83. DISTRIBUTOR.

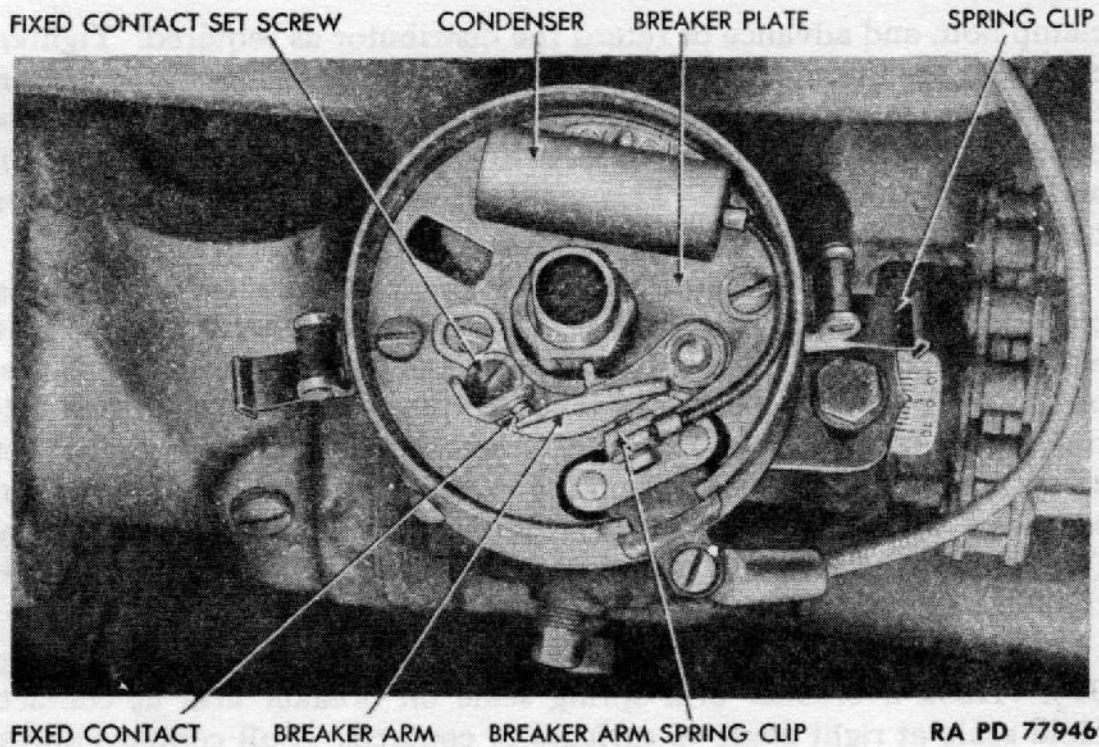
a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 57). The distributor is located on the left side of the engine toward the front. It is reached through the left-hand splash shield opening. It is gear-driven from the accessory shaft. Its function is to distribute high-tension voltage to the various spark plugs at the proper instant. The major components are: the base, drive shaft and governor, cam, breaker plate, cap and rotor.

(2) TABULATED DATA.

Manufacturer	Auto-Lite
Model	IGC-4701-1
Rotor rotation (viewed from top)	Clockwise
Type	Semiautomatic
Timing provisions	Adjustable base
Point gap	0.020 in.
Breaker arm spring tension	17 to 20 oz.

IGNITION SYSTEM



RA PD 77946

Figure 59 — Distributor With Cap and Rotor Removed

b. Maintenance and Adjustment.

(1) **SET IGNITION TIMING** (fig. 57). Remove No. 1 spark plug, and turn the engine over by hand until No. 1 piston comes up on the compression stroke. Continue to turn the engine slowly until the "DC" line on the flywheel registers with the timing line on the flywheel housing. Make sure the distributor points are clean, free of pits, and make good contact when closed. Using a dial indicator or wire feeler gage, adjust the points to 0.020-inch gap. Loosen cap screw and clamp bolt on the distributor advance arm. Move the pointer on the advance arm to the center of the scale, and lock in this position with screw. With the engine still on dead center, rotate the distributor in a counter-clockwise direction until the points just break. Use a test light in checking this setting. Lock the clamp bolt after the setting is complete. See that the rotor brush is in position. Replace the distributor cap, and check the ignition wires. Starting with No. 1 wire and following around the distributor in a clockwise direction, the firing order is 1-5-3-6-2-4. To check the ignition setting, make a chalk-mark over the "DC" line on the flywheel as well as over the timing line on the flywheel housing. Replace No. 1 spark plug, and connect a neon timing light to this plug. Start the engine and set at an idling speed of 350 to 400 revolutions per minute, holding the neon light in line with the timing hole in the flywheel housing. If the ignition timing is correct, the chalk-mark on the flywheel will be in line with the chalk-mark on the housing. If the two chalk-marks do not line up, loosen the

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

clamp bolt, and advance or retard the distributor as required. Tighten clamp when finished. For the final setting of the distributor, loosen the cap screw on the advance arm, and move the pointer three scale divisions, in a counterclockwise direction (toward the cylinder block), and lock in this position. This gives an ignition timing of 6 degrees before dead center, which is correct.

(2) **ADJUST BREAKER POINT GAP** (fig. 59). Loosen both spring clips, and lift cap from distributor. Lift rotor from distributor. Rotate engine with hand crank until points are opened to widest gap. Measure gap. It should be 0.020 inch. If within 0.002 inch of correct setting, no adjustment is necessary. Otherwise, loosen fixed contact set screw and move fixed contact until gap measures 0.020 inch. Tighten set screw. Check breaker arm spring tension, and adjust if necessary (step (3) below). Push rotor into place on shaft. Place cap in position on body, and engage spring clips.

(3) **CHECK AND ADJUST BREAKER ARM SPRING TENSION** (fig. 59). Hook a breaker arm spring scale on breaker arm at contact. Hold scale at right angle to surfaces of contacts. Pull contacts apart, and observe scale reading. It should be 17 to 20 ounces. If not within these limits, loosen screw holding breaker arm spring clip. Slide spring in or out to increase or decrease tension. Tighten screw, and again check tension. Repeat process until tension is right. This is an important adjustment, as low tension causes misfiring, and high tension causes undue distributor point wear.

(4) **REPLACE BREAKER POINTS** (fig. 59). Unsnap spring clips, and lift cap from distributor. Lift off rotor. Remove breaker arm and condenser wire screw. Lift breaker arm from pivot. Remove fixed contact set screw, and lift out contact plate. Place new contact plate in position, and install fixed contact set screw finger-tight. Place breaker arm in position on pivot. Install breaker arm and condenser wire screw. Adjust breaker arm spring tension (step (3) above). Place rotor in position on shaft. Place cap in position on body and engage both spring clips.

c. Removal.

(1) **REMOVE SPLASH SHIELD** (fig. 31). Remove the four wing screws, lock washers, and flat washers which secure shield to fender. Pull shield from fender.

(2) **DISCONNECT WIRES** (fig. 57). Unsnap spring clips, and remove distributor cap. Leave high-tension wires attached to cap. Disconnect low-tension primary lead wire from terminal on side of distributor.

(3) **DETACH DISTRIBUTOR** (fig. 57). Loosen advance arm clamp bolt. Remove hold-down screw. Lift distributor from tachometer adapter.

IGNITION SYSTEM

d. Installation.

(1) **ATTACH DISTRIBUTOR TO TACHOMETER ADAPTER** (fig. 57). Insert base of distributor into its boss in tachometer adapter. Install hold-down screw.

(2) **TIME IGNITION** (step b (1), above).

(3) **CONNECT WIRES** (fig. 57). Connect low-tension primary lead to terminal on side of distributor. Connect ground wire to terminal on side of distributor. Place cap (with attached wires) in position on distributor, and engage spring clips.

(4) **TEST OPERATION**. Start engine. Satisfactory performance indicates correct distributor installation and timing.

(5) **INSTALL SPLASH SHIELD** (fig. 31). Place shield in position under left front fender. Install the four flat washers, lock washers, and wing screws which secure shield to fender. Install shield to frame bond strap, if removed.

84. SPARK PLUGS.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 21). Each cylinder is equipped with one conventional one-piece spark plug. All spark plugs project from the top of the cylinder heads and are easily reached by lifting right-hand side of engine hood.

(2) TABULATED DATA.

Manufacturer	Champion
Type	J-10
Gap setting	0.025 in.

b. **Removal** (fig. 21). Loosen the two spring catches, and open right-hand side of engine hood. Pull spark plug wires straight up to remove them from plugs. Remove spark plugs with gaskets from cylinder heads.

c. Maintenance and Adjustment.

(1) **INSPECT SPARK PLUGS**. Examine spark plugs upon removal. Note condition of electrodes; replace plug if electrodes are burned. Examine porcelain; replace plug if porcelain is cracked or broken. Note color of porcelain tip adjacent to electrode. A light brown color indicates plug is operating normally. A dead white color indicates need of a colder type spark plug. A glossy black deposit indicates piston is "pumping oil." A dull black deposit indicates carburetor out of adjustment, poor ignition, or low compression. If spark plug coloration indicates presence of malfunction, trace source of trouble (sec. XIII).

(2) **CLEAN, ADJUST, AND TEST SPARK PLUGS**. Clean spark plugs with plug cleaner. Adjust gap to 0.025 inch. Use a round type (not

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

flat) feeler gage. Bend only outside electrode to make adjustment. Test cleaned and adjusted spark plugs under 105 pounds air pressure. If spark fails to flow freely, replace plug.

d. Installation (fig. 21). Place a gasket on each spark plug. Screw plugs into thin openings on top of cylinder heads. Push spark plug wires down onto spark plug terminals. Close engine hood and engage spring catches. Start engine. Satisfactory performance indicates correct installation.

85. IGNITION SWITCH.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 136). The lever type ignition switch is located near the lower center of the instrument panel. No lock or key is provided. The "live" wire is connected to the ammeter battery post (T, fig. 136) and the lead wire to the filter below the ignition coil. Another wire from the lead terminal diverts current to operate the fuel gage.

(2) **TABULATED DATA.**

Manufacturer	Delco
Type	Lever
Model	1997756

b. Removal (fig. 136). Disconnect all three wires from the two terminals on rear of switch. Screw switch retaining nut from face of instrument panel. Pull switch from reverse side of panel.

c. Installation (fig. 136). Insert switch, lever first, through its opening in instrument panel, from reverse side of panel. Turn switch so lever points down, and install switch retaining nut. Connect white wire from circuit breaker (R, fig. 136), red wire with black tracer from filter (S, fig. 136), and red wire with black tracer to right-hand terminal on switch. Connect wire from ammeter battery post (T, fig. 136) to left-hand terminal on switch. Start engine. Satisfactory engine performance indicates proper switch installation.

86. WIRING.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 57). High-tension wires are used to conduct high-voltage current from ignition coil to distributor and from distributor to resistor-suppressors on spark plugs. The low-tension part of the ignition system ties into the wiring harness described in paragraph 81 c (2). The spark plug wires leave the distributor through seven nipples (brackets) which guide them from the distributor. Each nipple is equipped with a rubber grommet to protect the wires from wear.

STARTING AND GENERATING SYSTEM

(2) **TABULATED DATA.**

High-tension Wire	Approx. Length Inches	Autocar Part Number
Ignition wire No. 1.....	24	8-0300-24A
Ignition wire No. 2.....	29	8-0300-29A
Ignition wire No. 3.....	34	8-0300-34A
Ignition wire No. 4.....	42	8-0300-42A
Ignition wire No. 5.....	49	8-0300-49A
Ignition wire No. 6.....	50	8-0300-50A
Coil to distributor wire.....	6	16BB9623

b. Maintenance. Wipe all dirt from high-tension ignition wires. Observe condition of insulation. Replace wires having worn or cracked insulation. Inspect tips. If corroded, clean with flint paper.

c. Remove Spark Plug Wire. Loosen both wing screws, and lift floorboard insert from floorboard. Loosen both spring catches and open right-hand side of engine hood. Pull wire from distributor and pull resistor-suppressor from spark plug. Unscrew wire from suppressor. Pull wire from nipples (brackets) which hold it in position between distributor and spark plug.

d. Install Spark Plug Wire. Screw tips of wire into resistor-suppressors and into tower in distributor cap. Push suppressors onto spark plugs. Close engine hood, and engage both spring catches. Install floorboard insert, and tighten both wing screws. Thread wire through nipples (brackets) which hold wire in position between distributor and spark plug.

Section XX

STARTING AND GENERATING SYSTEM

87. DESCRIPTION AND DATA.

a. Description.

(1) **STARTING SYSTEM.** The starting system consists of a 12-volt cranking motor controlled by a foot-operated, series-parallel switch which connects the two 6-volt batteries in series with the 12-volt cranking motor. When the cranking motor switch is released, it connects the two 6-volt batteries in parallel with the 6-volt generator and lighting system. The switch is protected against short circuits by a circuit breaker.

(2) **GENERATING SYSTEM.** The generating system consists of a 6-volt generator, and a separate voltage and current regulator. Action of the series-parallel cranking motor switch keeps the batteries hooked

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

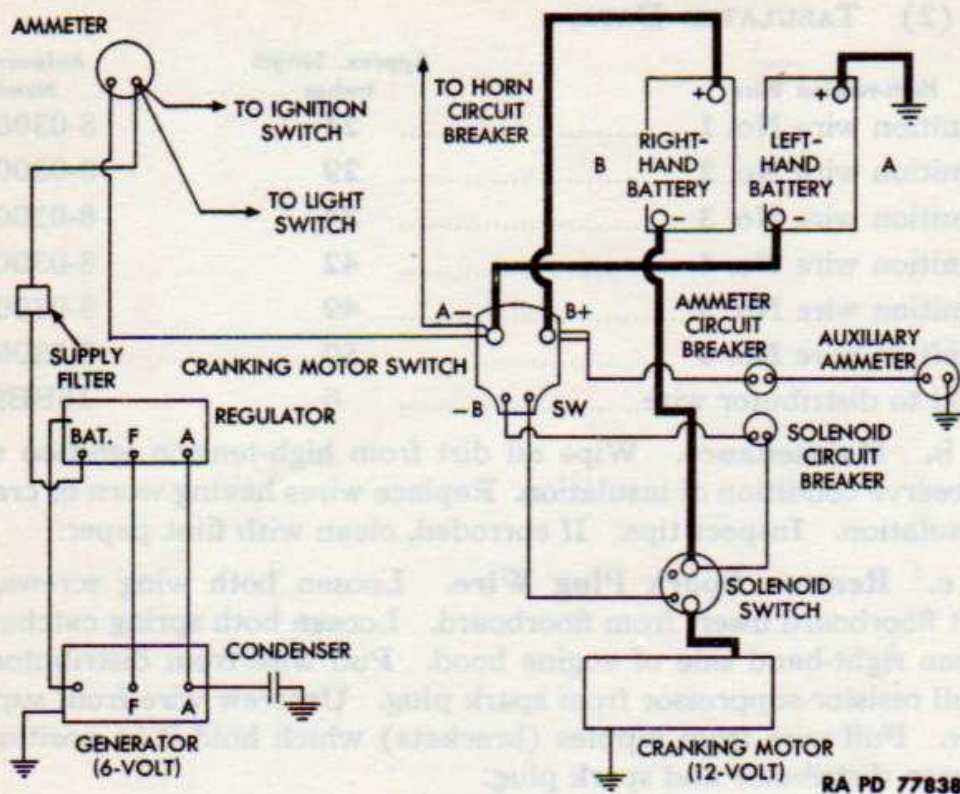


Figure 60 - Wiring Diagram of Starting and Generating System

in parallel (6-volt) while charging, and hooked in series (12-volt) during cranking motor operation. The generator charges both batteries at the same time. Except for the presence of two batteries, the circuit is conventional.

b. Data.

Generator:

Make Electric Auto-Lite
 Model GEW-4802
 Type Third brush

Voltage regulator:

Make Electric Auto-Lite
 Model VRY-4201A
 Type 3-unit

Cranking motor:

Make Electric Auto-Lite
 Model ML-4209
 Type 12-volt
 Drive Bendix

STARTING AND GENERATING SYSTEM

Magnetic switch:

Make Delco-Remy
 Model XA-569
 Type 12-volt

Cranking motor switch:

Make Electric Auto-Lite
 Model XA-570
 Type Series-parallel

88. GENERATOR.

a. **Description** (fig. 61). A heavy-duty, two-brush type, 6-volt generator is used. It is located on the right front of the engine, between the engine and frame side rail. It can be reached through the splash shield opening under the right front fender. It is gear-driven from the engine gear case. A conventional head band is provided. Removal of head band gives access to commutator and two brushes. The armature shaft rides on two ball bearings which are lubricated through two built-in oilers. The function of the generator is to furnish electrical energy to keep the batteries charged and to operate the vehicle's electrical system.

b. Maintenance.

(1) **INSPECT GENERATOR** (fig. 61). Remove generator head band. Note condition of commutator. If dirty or discolored, clean commutator (step (2) below). If commutator is rough, out-of-round, or if it has high mica, notify higher authority. Hook a spring scale to brush holder and pull scale at right angles to holder. Note reading as holder lifts from brush. It should be 64 to 68 ounces. If it does not fall within these limits, notify higher authority. Inspect brushes. If worn to one-half original length, replace brushes (step (3) below). Check brush lead connections to be sure they are clean and tight. Replace head band.

(2) **CLEAN COMMUTATOR.** Remove head band. Hold a piece of No. 00 flint paper against commutator, and crank engine. Blow dust from commutator with a dry air blast. Replace head band.

(3) **REPLACE BRUSHES.** Remove head band. Remove screw and lock washer which secure brush lead to brush holder. Lift up on brush holder lever, and pull brush from holder. Raise lever, and insert new brush into position in holder. Connect brush lead to holder with lock washer and screw provided for the purpose. Draw a strip of No. 00 flint paper, sanded side up, around commutator, under brush, to correct brush to commutator contact. Avoid excessive sanding. Repeat the procedure to install other brush. Install head band.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

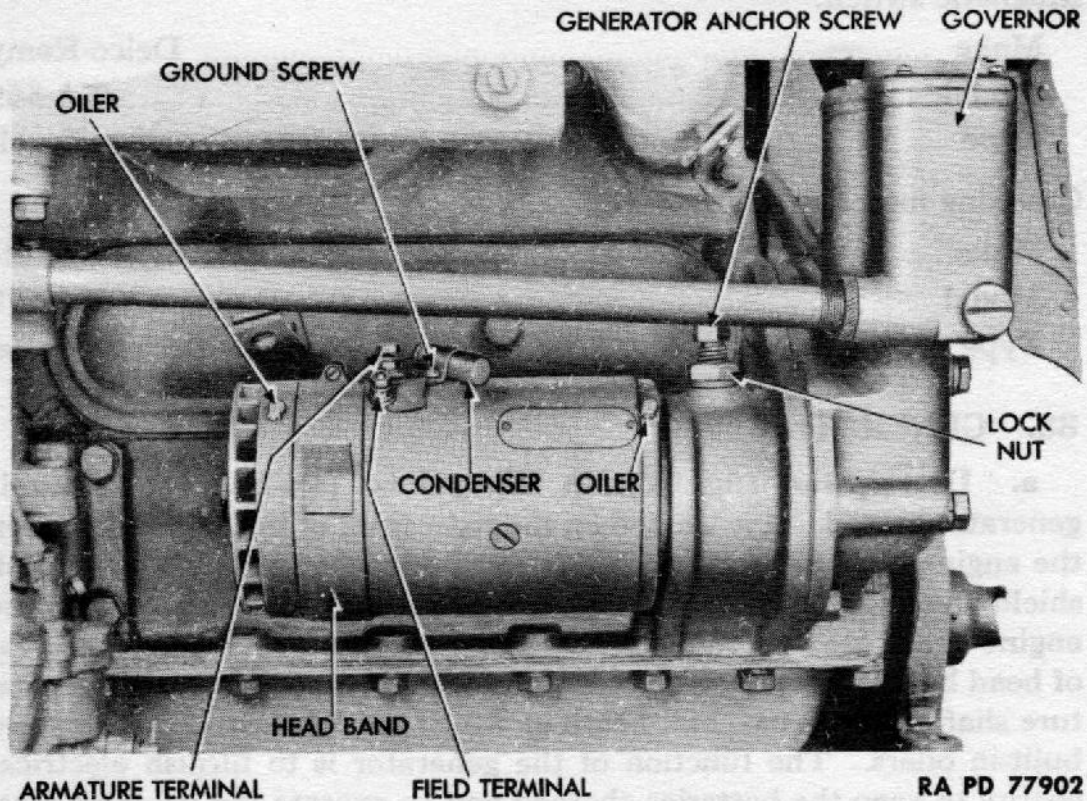


Figure 61 – Generator Installed

c. Removal.

(1) **REMOVE SPLASH SHIELD** (fig. 31). Remove four wing screws, lock washers, and flat washer which secure splash shield to underside of right front fender. Push shield from fender.

(2) **DISCONNECT WIRES.** Disconnect three wires and radiator suppression bond from top of generator. Tag wires to facilitate installation.

(3) **DETACH GENERATOR** (fig. 61). Loosen lock nut and generator anchor screw. Work generator back carefully until generator and governor gears are out of mesh. Hand generator to a man under the vehicle.

d. Installation.

(1) **CHECK GOVERNOR GEAR.** Observe governor gear to be certain it is properly mounted and that drilled head cap screws are wire-locked.

(2) **ATTACH GENERATOR TO ENGINE** (fig. 61). Insert generator into engine opening, and carefully work gear into mesh with camshaft and governor gears. Tighten anchor screw and lock nut.

(3) **CONNECT WIRES.** Three wires project from harness at generator. Connect as follows: black to ground screw, yellow to field

STARTING AND GENERATING SYSTEM

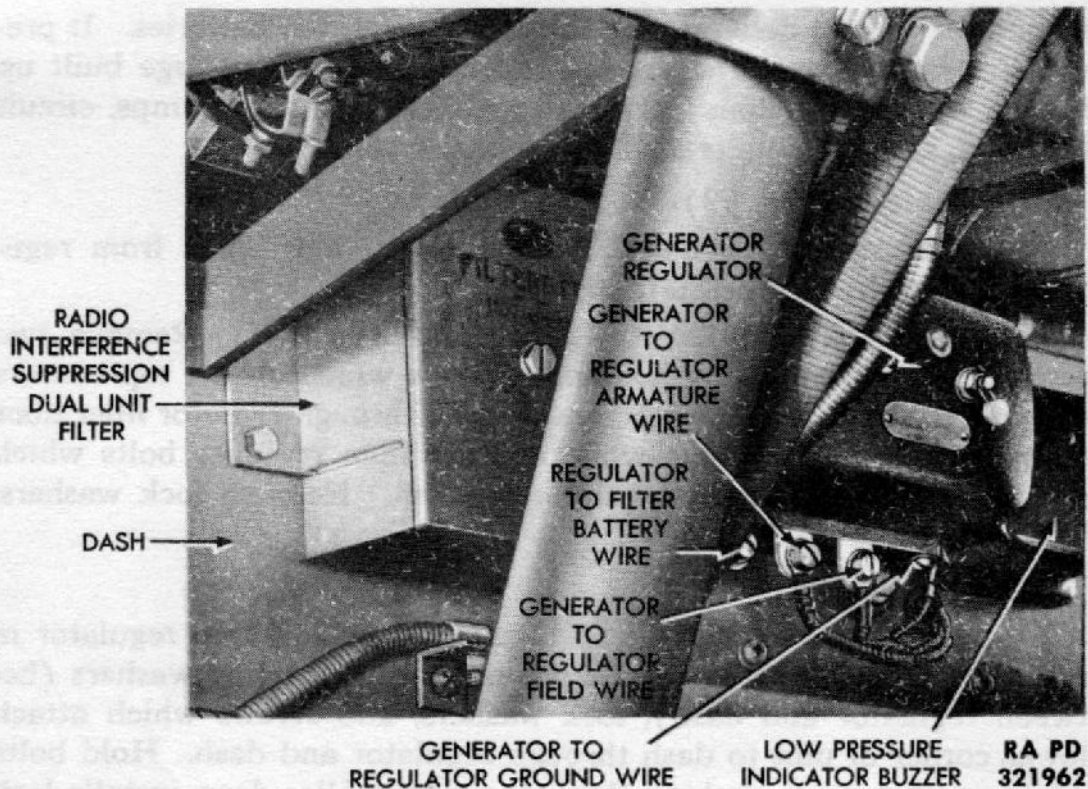


Figure 62 — Generator Regulator Installed

(small) terminal, and red to armature (large) terminal. If a capacitor (or condenser) is used, mount it on ground screw, and connect its lead to armature terminal. Connect bond strap (generator to frame side rail) to ground screw.

(4) **POLARIZE GENERATOR.** Momentarily connect a jumper wire between armature terminals on generator (fig. 61) and generator regulator (fig. 62). Remove jumper.

(5) **TEST OPERATION.** Start engine and observe ammeters. Eight amperes at 600 revolutions per minute indicates correct installation.

(6) **INSTALL SPLASH SHIELD** (fig. 31). Place shield in position under fender. Install the four flat washers, lock washers, and wing screws which hold shield to fender.

89. GENERATOR REGULATOR.

a. **Description** (fig. 62). The current and voltage regulator is mounted in the driver's compartment, on the dash, under the center of the instrument panel. It is composed of three units—circuit breaker, current limiting regulator and voltage regulator. The circuit breaker operates the same as a conventional cut-out relay. It prevents the battery from discharging through the generator when the engine is not running. The current-limiting regulator controls the

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

amount of current delivered by the operation of the batteries. It prevents overcharging. The voltage regulator controls voltage built up by the electrical system. It thus prevents damage to lamps, circuit breakers, and other units of the electrical system.

b. Removal (fig. 62).

(1) **DISCONNECT WIRES.** Disconnect all four wires from regulator. Tag wires to facilitate installation.

(2) **DETACH REGULATOR FROM DASH (fig. 62).** Remove two screws, lock washers, and bonding washers which attach top corners of regulator to dash. Have one man work through radiator filler door to keep nuts from turning while another man removes bolts which attach bottom corners of regulator to dash. Remove lock washers. Lift regulator from dash.

c. Installation.

(1) **ATTACH REGULATOR TO DASH (fig. 62).** Place regulator in position on dash, with terminals down. Install bonding washers (between regulator and dash), lock washers, and screws which attach lower corner of unit to dash through regulator and dash. Hold bolts while another man, working through radiator filler door, installs lock washers and nuts.

(2) **CONNECT WIRES (fig. 62).** Connect wires to regulator as follows: blue wire from generator armature terminal to armature terminal, yellow wire from generator field terminal to field terminal, green wire from supply filter to battery terminal, black wire from generator ground screw to ground (side) terminal.

90. CRANKING MOTOR.

a. Description (fig. 63). A 12-volt cranking motor is installed on the right side of the engine, between engine and frame side rail. It can be reached through the right-hand splash shield opening and from under the truck. Engagement is with the gear on engine flywheel, and cranking is accomplished by means of a Bendix drive. This drive is attached to the end of the armature shaft and enclosed in a cast-iron housing. The drive housing is attached to the cranking motor by means of the main frame screws.

b. Removal.

(1) **REMOVE SPLASH SHIELD.** Remove four wing screws from right-hand splash shield. Lift down splash shield.

(2) **REMOVE CARBURETOR AIR CLEANER AIR TUBE (par. 71 c).**

(3) **DISCONNECT MAGNETIC SWITCH FROM CRANKING MOTOR (par. 91 b (4)).**

(4) **DETACH CRANKING MOTOR FROM ENGINE (fig. 63).** Remove three cap screws and lock washers which attach cranking motor

STARTING AND GENERATING SYSTEM

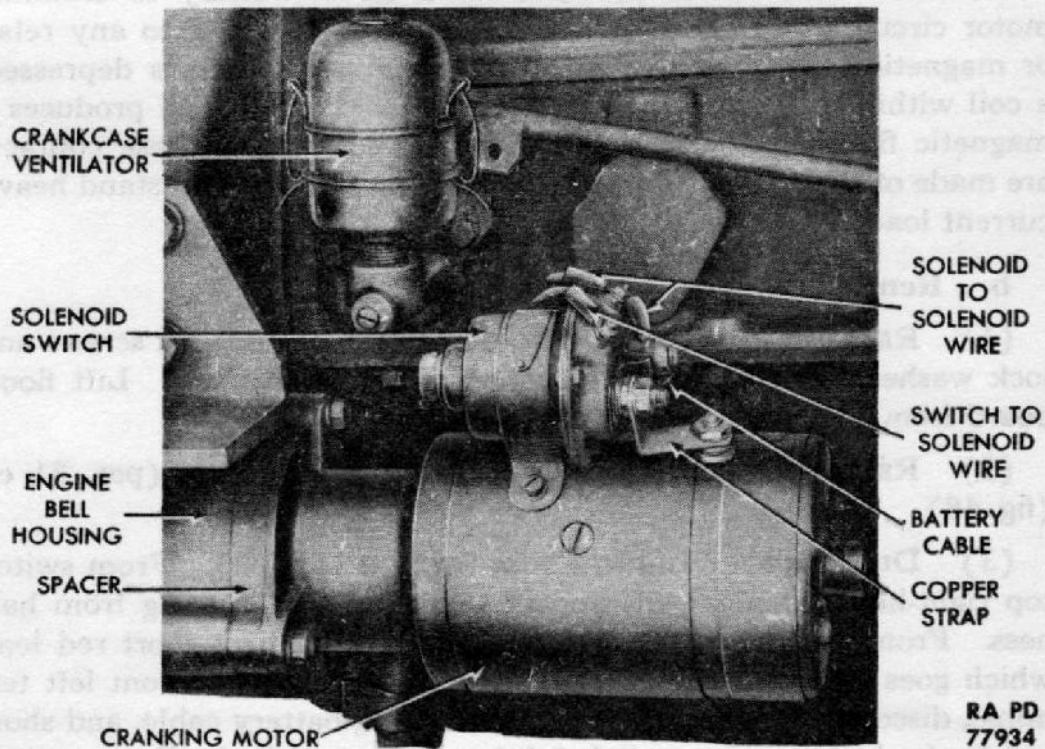


Figure 63 — Cranking Motor and Solenoid Switch

to engine bell housing. Two are accessible through splash shield opening, and one from under truck. Lift cranking motor and spacer from engine, from under truck.

c. Installation.

(1) **ATTACH CRANKING MOTOR TO ENGINE** (fig. 63). From under truck, place spacer and cranking motor in position on engine bell housing. Install three lock washers and cap screws which secure motor to engine. One can be installed from under truck, and two through splash shield opening.

(2) Connect magnetic switch to cranking motor with two lock washers and screws.

(3) **TEST OPERATION.** Push cranking motor switch. If engine cranks, satisfactory connection is indicated.

(4) **CONNECT CARBURETOR AIR CLEANER AIR TUBE** (par. 71 d).

(5) **INSTALL SPLASH SHIELD.** Place shield in position on opening under fender. Install the four flat washers, lock washers, and wing screws which attach shield to fender. Install shield to frame bond strap, if it was removed.

91. SOLENOID SWITCH.

a. Description (fig. 63). Located directly on top of cranking motor the magnetic switch may be reached by removing right-hand

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

floorboard. This switch provides for a direct battery to cranking motor circuit when starting. In operation, it is similar to any relay or magnetic switch. When the cranking motor switch is depressed, a coil within the magnetic switch is energized. This coil produces a magnetic field which closes the magnetic contacts. These contacts are made of heavy-duty, high arc resisting material to withstand heavy current load.

b. Removal.

(1) **REMOVE RIGHT-HAND FLOORBOARD.** Remove six screws and lock washers which attach right-hand floorboard to cab. Lift floorboard from cab.

(2) **REMOVE CARBURETOR AIR CLEANER AIR PIPE** (par. 71 c) (fig. 48).

(3) **DISCONNECT WIRING FROM SWITCH** (fig. 63). From switch top right-hand terminal, disconnect small red lead coming from harness. From switch top left-hand terminal, disconnect short red lead which goes to switch front left terminal. From switch front left terminal, disconnect large red lead from harness, battery cable, and short red lead which goes to switch left-hand top terminal. From switch front right terminal, disconnect flat copper strap which goes to cranking motor terminal.

(4) **DETACH SWITCH FROM CRANKING MOTOR** (fig. 63). Remove two screws and lock washers which secure switch to cranking motor. Lift switch from motor.

c. Installation.

(1) **ATTACH SWITCH TO CRANKING MOTOR** (fig. 63). Place switch in position on cranking motor, and install two lock washers and screws.

(2) **CONNECT WIRING TO SWITCH** (fig. 63). On switch front right-hand terminal, install flat copper strap from cranking motor terminal, lock washer, and nut. On switch front left-hand terminal, install large red lead from harness, short red lead which goes to switch left-hand top terminal, battery cable, lock washer, and nut. On switch left-hand top terminal (adjacent to engine), install short red lead from front terminal. On switch right-hand top terminal (adjacent to frame side rail), install lead from harness, lock washer, and nut.

(3) **TEST OPERATION.** Depress cranking motor switch. Normal operation of cranking motor indicates correct switch installation.

(4) **INSTALL CARBURETOR AIR CLEANER AIR TUBE** (par. 71 d).

(5) **INSTALL RIGHT-HAND FLOORBOARD** (fig. 30). Place right-hand floorboard in position and install the six lock washers and screws which attach it to cab.

STARTING AND GENERATING SYSTEM

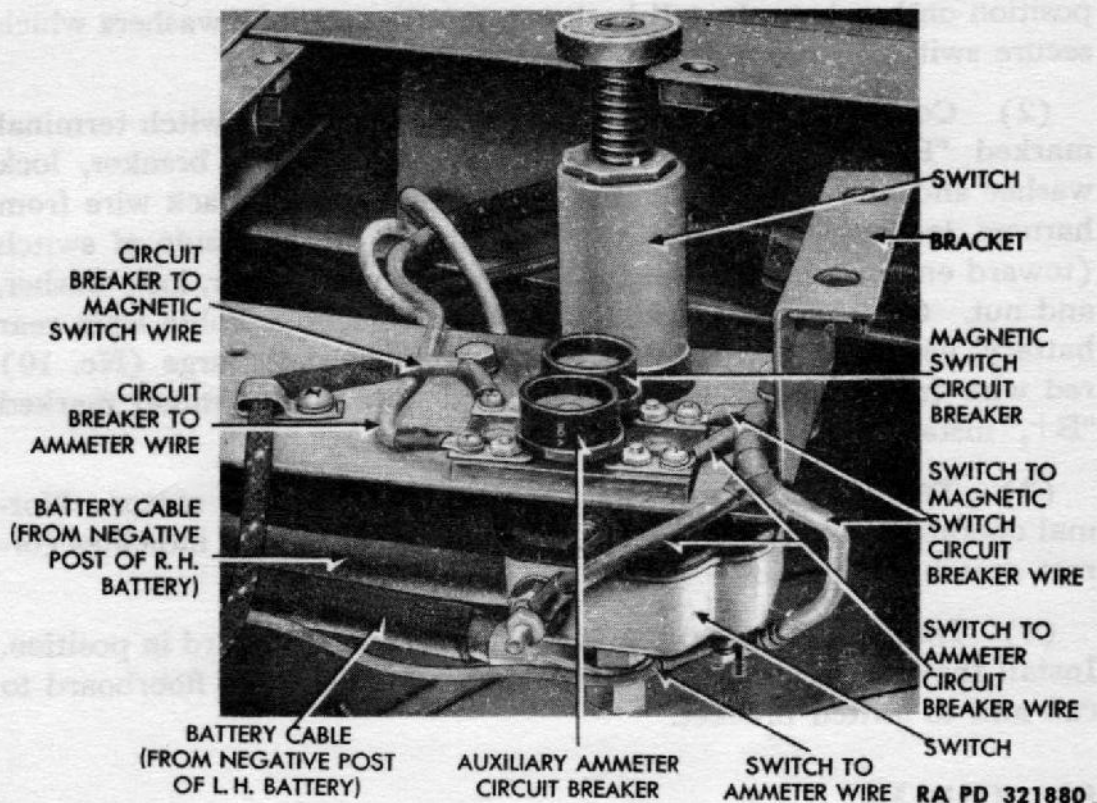


Figure 64 - Cranking Motor Switch

92. CRANKING MOTOR SWITCH.

a. **Description** (fig. 64). The cranking motor switch is located on the cab floor to the left of the driver's seat. The main body of the switch is on a bracket immediately below the left-hand floorboard. The push button extends through the floorboard into the driver's compartment. Access to the main body is through the left-hand floorboard opening. This manually operated switch is of the series-parallel type. When depressed, the switch connects the batteries in series for 12-volt cranking motor operation. When released, the switch connects the batteries in parallel for 6-volt generator operation.

b. **Removal** (fig. 64).

(1) **REMOVE LEFT-HAND FLOORBOARD.** Remove seven screws and lock washers which attach floorboard to cab and switch bracket. Lift floorboard from cab.

(2) **DISCONNECT WIRES FROM SWITCH** (fig. 64). Disconnect all wires from switch. Tag wires to facilitate installation.

(3) **DETACH SWITCH FROM BRACKET** (fig. 64). Remove the two cap screws and lock washers which secure switch to bracket. Lift switch from bracket.

c. **Installation.**

(1) **ATTACH SWITCH TO BRACKET** (fig. 64). Place switch in

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

position on bracket. Install both cap screws and lock washers which secure switch to bracket.

(2) **CONNECT WIRING TO SWITCH** (fig. 64). On switch terminal marked "B," install red wire from left-hand circuit breaker, lock washer and nut. On terminal marked "SW," install black wire from harness, lock washer, and nut. On terminal on right side of switch (toward engine), install green wire from circuit breaker, lock washer, and nut. On terminal marked "A-," install negative cable from rear battery, yellow wire with black tracer from harness, large (No. 10) red wire from harness, lock washer, and nut. On terminal marked "B+," install positive cable from front battery.

(3) **TEST OPERATION.** Start engine with cranking motor. Normal operation of cranking motor and generating system indicates correct switch installation.

(4) **INSTALL FLOORBOARD** (fig. 30). Place floorboard in position. Install the seven lock washers and screws which attach floorboard to cab and to switch bracket.

93. CABLES.

a. **Description** (fig. 65). Four heavy, high-amperage battery cables are used. They are of similar constructions but of different lengths. Each consists of multiple strands of braided copper wire protected by an insulating covering. Each has a battery terminal, soldered on one end, and a lug on its other end. One leads from the negative post of the right-hand battery to the cranking motor magnetic switch. Another leads from the positive terminal of the right-hand battery to the cranking motor switch. The third leads from the negative post of the left-hand battery to the cranking motor switch. The remaining cable grounds the positive post of the right-hand battery to the frame.

b. **Maintenance.** At time of chassis lubrication, inspect battery cables. Be sure terminals are tight. Clean corrosion from connections. Apply a film of grease to connections which have a tendency to corrode. Note condition of insulation. If signs of wear are evident, install new loom, wrap with tape, or replace cable.

c. **Removal** (fig. 65). Remove driver's seat cushion. Lift seat. Disconnect battery cable from battery. Trace cable toward its other end, and open all clips along length of cable. Disconnect cable at remaining end. Work cable from vehicle. For any cable but battery to magnetic switch, work from under truck. In the case of battery to magnetic switch cable, remove right-hand floorboard and disconnect cable from switch on top of cranking motor.

BATTERY AND LIGHTING SYSTEMS

d. **Installation** (fig. 65). Work cable in position in vehicle. If battery to magnetic switch cable is being installed, connect the two clips which hold cable in position across rear of oil pan. Connect end of cable away from battery first. Connect cable to battery. Test installation by depressing cranking motor switch. Operation indicates satisfactory cable installation. Place a film of grease on connection at battery. Close driver's seat and install cushion. Install floorboard, if removed.

Section XXI

BATTERY AND LIGHTING SYSTEMS

94. BATTERIES.

a. **Description** (fig. 65). Two 19-plate, 6-volt batteries are used in this vehicle. They are mounted in a steel battery box located in the cab beneath the operator's seat. Easy access to batteries is provided by merely raising the hinged operator's seat cover. Batteries are held in position by hold-down frames which fit around top edge of battery, and are clamped to box.

b. Tabulated Data.

Manufacturer	Exide
Model	XH-194
Voltage	6
Ground	Positive
Number used	2
Specific gravity:	
Full charge	1.275 to 1.285
Recharge	1.225

c. Maintenance.

(1) **TEST ELECTROLYTE.** Use a hydrometer to test specific gravity. A reading of 1.275 or more in each cell indicates that battery is fully charged. A reading of less than 1.225 (1.250 in cold weather) indicates that battery needs charging. A difference of 20 points or more between cells indicates a faulty battery; notify a higher authority.

(2) **TEST FOR HIGH RESISTANCE.** Slow cranking motor action and brighter lights, with increased engine speed, indicate high resistance in battery circuit. If these conditions exist, check resistance with a low-reading voltmeter. Check voltage drop between grounded battery terminal (positive post at rear of left-hand battery) and frame. Position voltmeter on grounded post and on frame. With ignition switch off, crank engine with cranking motor. Reading in excess of

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

RA PD 322106

- A—CABLE (TO "B + " TERMINAL OF CRANKING MOTOR SWITCH)
- B—POSITIVE POST
- C—LEFT-HAND BATTERY
- D—GROUND CABLE
- E—CABLE (BATTERY TO MAGNETIC SWITCH)
- F—CABLE (TO "A - " TERMINAL OF CRANKING MOTOR SWITCH)
- G—RIGHT-HAND BATTERY
- H—SEAT PAN AND BATTERY BOX
- J—BATTERY HOLD-DOWN FRAME

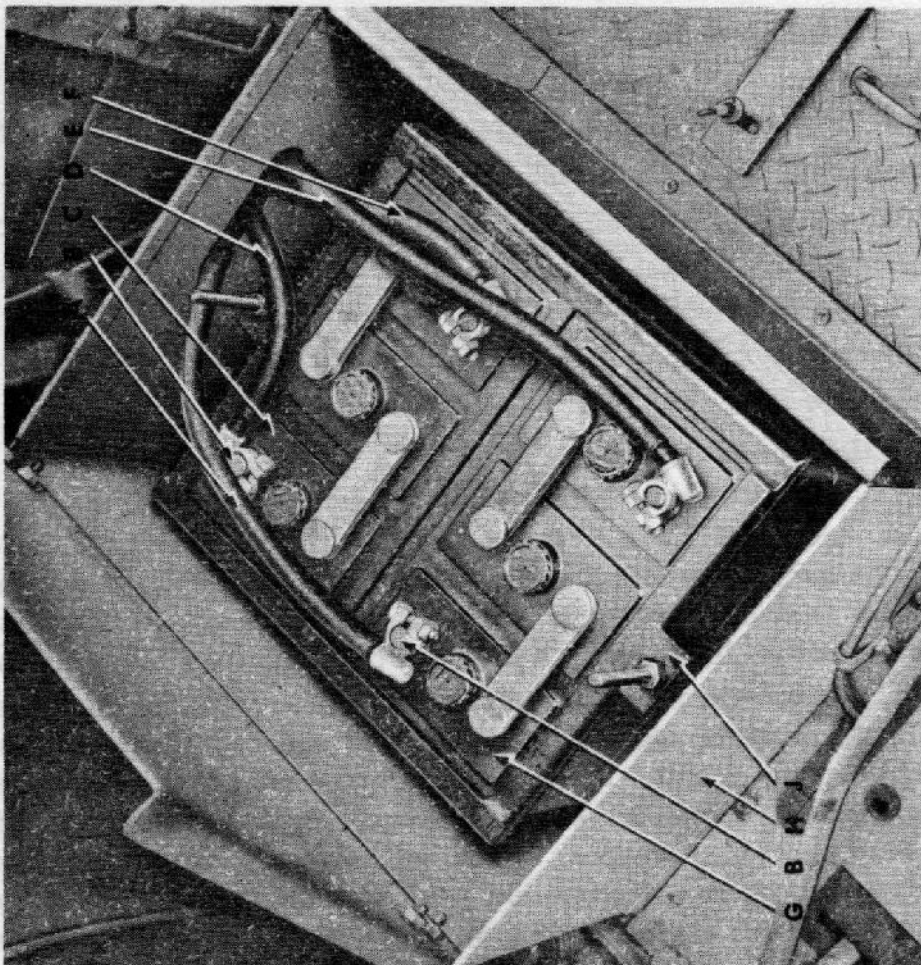


Figure 65 — Batteries Installed

BATTERY AND LIGHTING SYSTEMS

$\frac{1}{10}$ volt signifies high resistance in this circuit. Use same method to check voltage drop between negative post of left-hand battery and positive post of right-hand battery; negative post of right-hand battery and copper connector between cranking motor solenoid switch and cranking motor. High resistance in circuit is indicated by a reading greater than $\frac{1}{10}$ volt.

(3) **REMOVE HIGH RESISTANCE IN BATTERY CIRCUIT.** Disengage cables in faulty circuit, and clean connections. Replace cables that are worn or damaged. If high resistance still exists, replace series-parallel cranking motor switch (par. 92 b) and/or cranking motor magnetic switch (par. 91 b).

(4) **ADD WATER TO BATTERY** (fig. 65). Weekly or oftener, under conditions of severe use or excessively high temperatures, remove vent caps from battery, and check level of electrolyte in cells. If level is less than $\frac{3}{8}$ inch above separators, add pure distilled water.

d. Removal. Lift our driver's seat cushion and lift up seat pan. Disconnect four cables from battery terminals (fig. 65). Remove nuts and lock washers from battery hold-down studs. Lift out battery hold-down frame assembly. Remove batteries from vehicle.

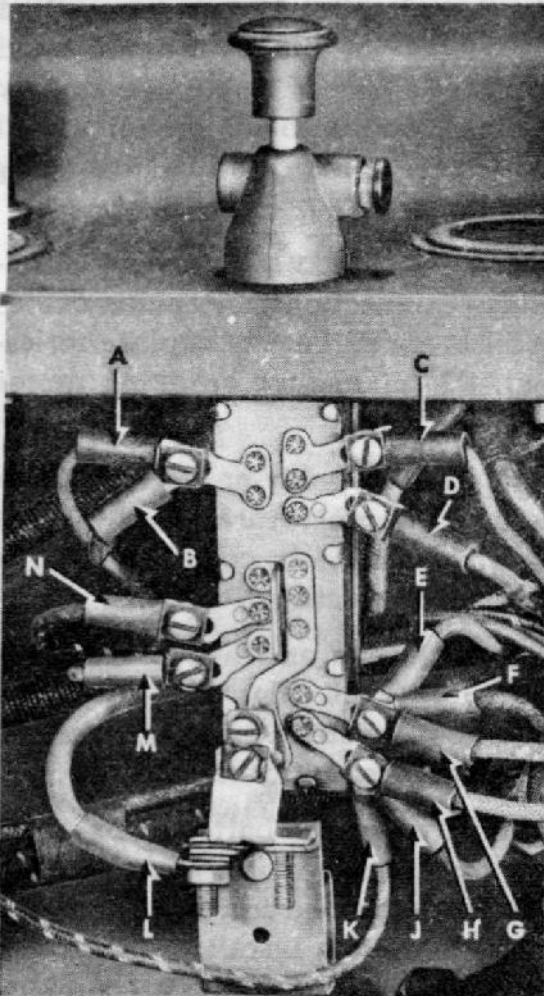
e. Installation (fig. 65). Place batteries in battery box, with positive posts (slightly larger posts) toward the rear. Place battery hold-down frame on batteries. Secure with the two stud nuts and lock washers. Draw nuts up snug but not tight. To install the left-hand battery, connect as follows: cable from "A-" terminal of cranking motor switch to negative post; ground cable to positive post. To install the right-hand battery, connect as follows: cable from cranking motor magnetic switch to negative post; cable from "B+" terminal of cranking motor switch to positive post. Lightly grease exposed metal parts of cable terminals and posts after connection is made. Lower seat pan and install cushion. Check installation of batteries; start engine with cranking motor. Satisfactory starting and a "CHARGE" reading on ammeter indicate satisfactory installation.

95. BLACKOUT SWITCH.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 66). The blackout switch is push-pull type and is located on instrument panel. It controls both service and blackout headlights, service and blackout stop and taillights. The switch is locked in first stage (all blackout lights on) by a spring plunger lock. This prevents operator from accidentally turning on other lights, and thus exposing vehicle to observation. Pushing in lock permits switch to be pulled out to the second stage (service lights on). In this position, the instrument panel lights and spotlight may be

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



- A—"SS" TERMINAL TO JUNCTION BLOCK (BLUE)
- B—"SS" TERMINAL TO JUNCTION BLOCK (GREEN-RED)
- C—"S" TERMINAL TO JUNCTION BLOCK (GREEN)
- D—"BS" TERMINAL TO JUNCTION BLOCK (GREEN-YELLOW)
- E—"HT" TERMINAL TO INSTRUMENT PANEL LIGHT SWITCH (RED)
- F—"HT" TERMINAL TO JUNCTION BLOCK (BLACK)
- G—"HT" TERMINAL TO HEADLIGHTS (ORANGE-BLACK)
- H—"BHT" TERMINAL TO BLACKOUT LIGHTS (ORANGE)
- J—"BHT" TERMINAL TO JUNCTION BLOCK (BLUE-RED)
- K—"BHT" TERMINAL TO BLACKOUT DRIVING LIGHT SWITCH (BLACK-WHITE WIRE)
- L—"B" TERMINAL TO AMMETER (RED NO. 10 WIRE)
- M—"SW" TERMINAL TO TERMINAL BLOCK (YELLOW-BLACK)
- N—"TT" TERMINAL TO TERMINAL BLOCK (BLACK-YELLOW)

RA PD 321944

Figure 66 — Blackout Switch Installed

turned on by their separate switches. Pull switch out to the third stage to permit operation of the service stop light only.

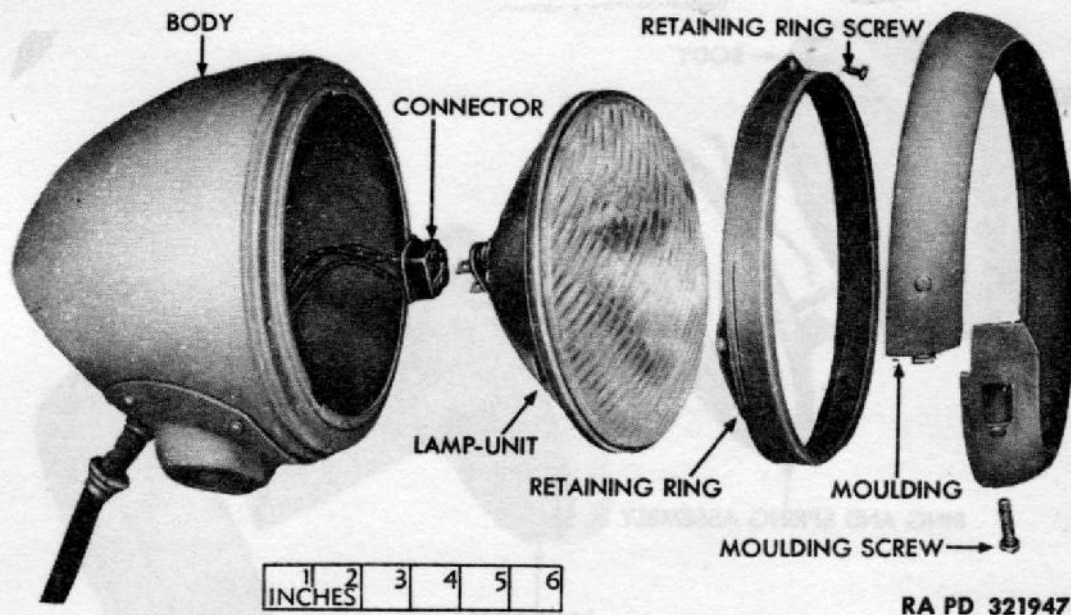
(2) TABULATED DATA.

Manufacturer Delco-Remy
Type Push-pull

b. **Removal** (fig. 66). Disconnect batteries (par. 94 d). Disconnect all wires from switch (fig. 66). Loosen set screw on knob. Screw knob from switch shaft. Loosen set screw on underside of push button housing. Pull housing from switch shaft. Remove nut and washer from switch collar. Pull switch from reverse side of instrument panel.

c. **Installation** (fig. 66). Position switch to instrument panel. Secure with washer and nut. Depress button at side of push button housing, and slide into position on switch shaft. Tighten set screw on underside of housing. Screw knob on shaft, and tighten knob set screw. Connect wires to switch terminals as follows: green wire from junc-

BATTERY AND LIGHTING SYSTEMS



RA PD 321947

Figure 67 – Headlight Disassembled

tion block to “S” terminal; green-yellow wire from junction block to “BS” terminal; black wire from junction block; red wire from instrument panel light switch, orange-black wire from headlights to “HT” terminal; orange wire from blackout lights, blue-red wire from junction block, and black-white wire from blackout driving light switch to “BHT” terminal; red No. 10 wire from ammeter to “B” terminal; yellow-black wire from terminal block to “SW” terminal; black-yellow wire from terminal block to “TT” terminal; blue wire and green-red wire from junction block to “SS” terminal. Test correct installation of wires by operating switch in each of its four positions and noting which lights are on. Proper functioning of lights indicates correct installation.

96. HEADLIGHTS.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 67). Two sealed-beam headlights are mounted outside cowl above front fenders. The lens, lamp, and reflector are built as a unit. The unit is held in place by a retaining ring which, in turn, is covered by molding.

(2) TABULATED DATA.

Type	Sealed beam
Low beam	35 watts
High beam	45 watts

b. Replace Lamp-unit (fig. 67). Loosen molding screw, and pull molding from body. Remove three retaining ring screws, and lift re-

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

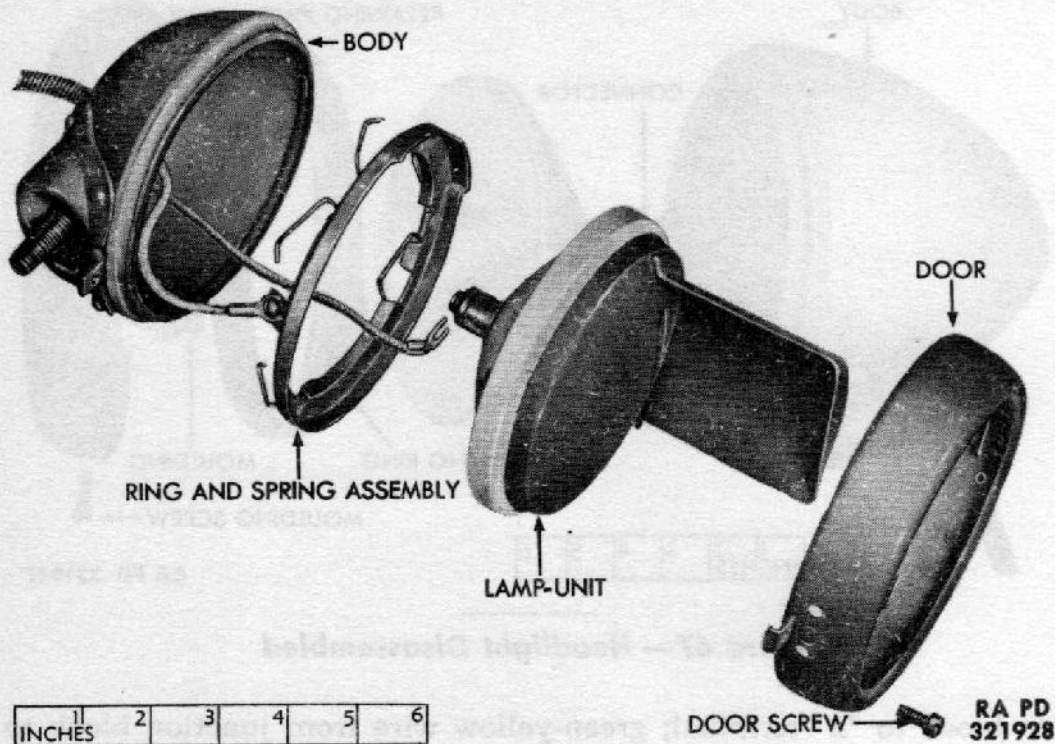


Figure 68 – Blackout Driving Light Disassembled

taining ring from body. Carefully pull sealed beam lamp-unit several inches out, and pull connector from prongs on unit. Remove unit. Position new unit to light. Push connector on prongs, and adjust unit to position in light. Position retaining ring on body, and secure with three retaining ring screws. Push molding onto body, and tighten molding screw.

c. Removal (fig. 67).

(1) **REMOVE SPLASH SHIELD EXTENSION.** Remove two wing screws, flat washers, and lock washers which secure splash shield extension to cowl. Remove extension.

(2) **DISCONNECT WIRES.** Remove friction tape from wires where they join at frame side rail behind brush guard. Remove three bolts and nuts which join wires together.

(3) **DETACH LIGHT.** Remove nut and lock washer which secure headlight to bracket. Lift light from bracket and pull wires free.

d. Installation (fig. 67).

(1) **ATTACH LIGHT.** Position headlight to bracket. Secure with nut and lock washer. **NOTE: Attach ground wire to lower bolt inside cowl.**

(2) **INSTALL WIRES.** Push wires through cowl opening behind light. From underneath, pull wires in position to join wires of oppo-

BATTERY AND LIGHTING SYSTEMS

site headlight. Connect wires from light to wires of similar color projecting from cable harness. Secure wires together with three bolts and nuts. Insulate wires from one another with friction tape. Wrap the three wires together, and protect them from weather with friction tape.

(3) **TEST INSTALLATION.** Turn lights on. Operate foot dimmer switch. Installation is correct if lights function properly.

(4) **INSTALL SPLASH SHIELD EXTENSION.** Position extension to cowl. Secure with two wing screws, flat washers, and lock washers.

97. BLACKOUT DRIVING LIGHT.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 68). Blackout driving light is attached to cowl above left headlight. It is used during blackouts to give enough light to operate vehicle without being observed from above. The lens is opaque, except for a small area at the top which is covered by a shield. Bulb, reflector, lens, and shield are constructed to constitute one sealed beam lamp-unit.

(2) TABULATED DATA.

Manufacturer	Guide
Model	3012-B
Type	Sealed beam

b. **Replace Sealed Beam Unit** (fig. 68). Remove the screw which secures door to body. Remove door and sealed beam lamp-unit from body. Remove ring and spring assembly from door. Lift sealed beam unit from door. Disconnect wire from terminal at rear center of unit. Attach wire to terminal of new unit. Position unit in door. Install ring and spring assembly. Position door to body, and secure with door screw.

c. Removal (fig. 68).

(1) **DISCONNECT WIRE.** Disengage wire from blackout driving light switch (fig. 68). Attach a 6-foot wire or cord to end of wire. Attach other end of cord to steering tube support bracket.

(2) **DETACH LIGHT.** Remove nut and lock washer which secure light to bracket. Lift light from bracket and pull wire from cowling. Detach cord from end of wire.

d. Installation (fig. 68).

(1) **ATTACH LIGHT.** Position light on bracket, and secure with lock washer and nut.

(2) **CONNECT WIRE.** Attach free end of cord to end of wire. Pull cord from end in cab, and guide wire through cowl opening

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

behind light to switch on instrument panel. Detach cord from wire and remove. Connect wire to terminal on switch (fig. 66).

(3) **TEST OPERATION.** Turn switch on. Satisfactory operation of light indicates correct installation.

98. BLACKOUT DRIVING LIGHT SWITCH.

a. Description and Data.

(1) **DESCRIPTION** (A, fig. 4). This switch is push-pull type. It is installed on left side of instrument panel, and operates the blackout driving light independently when the blackout light switch is pulled to first stage (blackout).

(2) **TABULATED DATA.**

Manufacturer Delco-Remy

b. Removal (fig. 136). Disconnect two wires from switch terminals. Remove set screw from knob. Pull off knob. Back off lock nut. Remove switch from rear of panel.

c. Installation (fig. 136). Position switch to back of instrument panel, with terminals up. Install lock nut and knob. Install knob set screw. Attach black wire (blackout driving light switch to blackout driving light) to left-hand terminal. Attach black wire with white tracer (blackout driving light switch to blackout switch) to right-hand terminal.

d. Test Operation. Turn switch on, with blackout switch pulled to first stage. Satisfactory operation of blackout driving light indicates satisfactory installation.

99. BLACKOUT PARKING LIGHTS.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 69). Two blackout parking lights are mounted—one on each side—on the brush guard at front of the vehicle. The lens in the door of the light is covered except for two small translucent triangular portions. The door is shaped so that triangles are visible only from a straight-ahead position; thus no beam is cast, and light serves only as a marker. Light contains a conventional single-contact socket.

(2) **TABULATED DATA.**

Manufacturer Guide

Lamp:

Make Mazda 63

Candlepower 3

Base Single-contact

BATTERY AND LIGHTING SYSTEMS

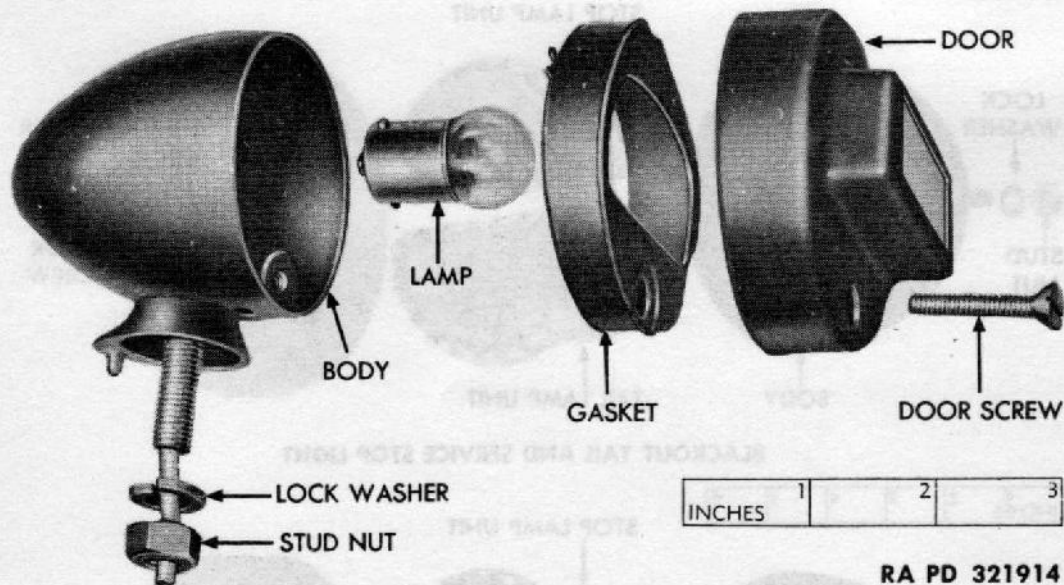


Figure 69 - Blackout Parking Light

b. Replace Lamp (fig. 69). Remove screw which secures door to body. Remove door. Turn lamp and pull from socket. Push new lamp into socket and turn. Position door to body, and secure with door screw.

c. Removal (fig. 69).

(1) **DISCONNECT WIRE.** Disconnect small black-yellow wire at connection behind brush guard.

(2) **DETACH LIGHT.** Remove nut and lock washer which secure light to bracket. Lift light from bracket, and pull wire from cowl.

d. Installation (fig. 69).

(1) **ATTACH LIGHT.** Thread wire through opening in bracket. Position light on bracket. Secure with lock washer and nut.

(2) **CONNECT WIRE.** Push wire through cowl opening nearest light. Connect wire behind brush guard.

(3) **TEST OPERATION.** Turn blackout lights on. Installation is correct if light functions properly.

100. BLACKOUT TAIL AND SERVICE STOP LIGHT.

a. Description and Tabulated Data.

(1) **DESCRIPTION (fig. 70).** This light is attached to the bracket on the frame near crossmember at the left of the pintle hook. It contains two sealed beam lamp-units. Each unit consists of a lens, lamp, and reflector but is replaceable only as a unit. Blackout tail-light emits two small red triangles of light, visible only from the rear. This light operates only when the blackout light switch is in the first

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

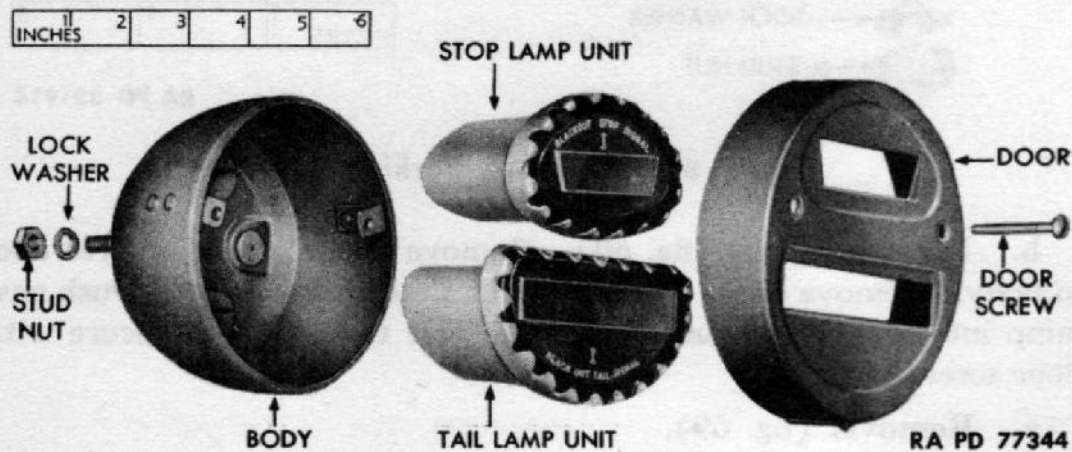
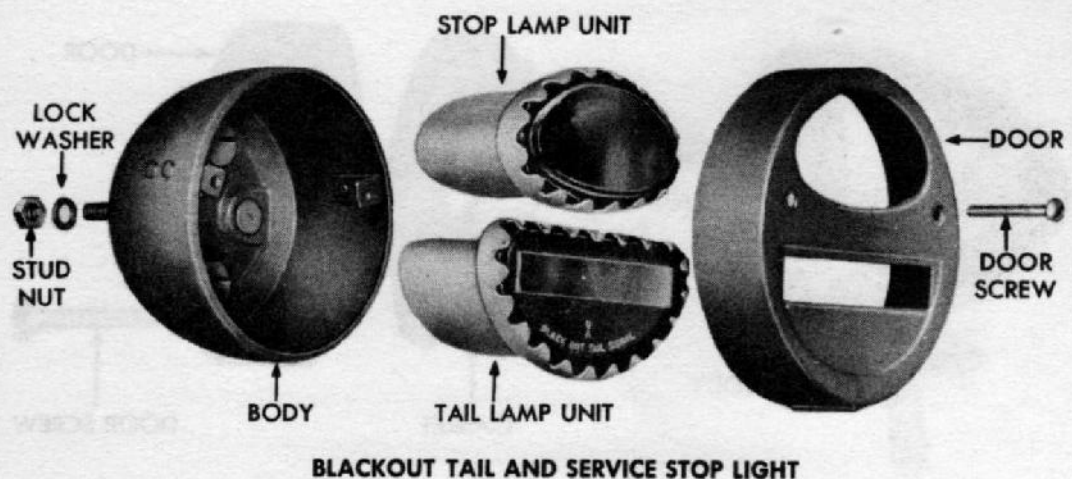


Figure 70 – Tail and Stop Lights Disassembled

(blackout) position. Service stop light has a red oval lens. It operates with the other service lights when blackout light switch is in second (service) position, or independently in third (service stop light only) position.

(2) TABULATED DATA.

Manufacturer	Guide
Type	Sealed beam
Taillight:	
Model	5933078
Candlepower	3
Base	Single control
Service stop light:	
Model	5933104
Candlepower	21
Base	Double control

BATTERY AND LIGHTING SYSTEMS

b. Replace Lamp (fig. 70). Remove two screws which secure door to body. Remove door. Pull lamp-unit from body. Insert new unit and push completely into socket. Position door on body and secure with two screws.

c. Removal (fig. 70). Disconnect both plugs at rear of light. Remove two nuts and lock washers which secure light to bracket. Remove light.

d. Installation (fig 70). Position light on bracket. Secure with two lock washers and nuts. Attach both plugs to sockets at rear of light, plug with two wires attached to top socket, plug with one wire to bottom. Test operation of lights. Proper functioning of lights indicates proper installation.

101. BLACKOUT TAIL AND BLACKOUT STOP LIGHT.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 70). This light is attached to a bracket at the right of the pintle hook. Description is almost similar to that of blackout tail and service stop light (par. 100), except that blackout stop light emits a small triangle of well-shielded light, visible only from direct rear when brakes are applied.

(2) **TABULATED DATA.**

Manufacturer	Guide
Type	Sealed beam
Taillight:	
Model	5933078
Candlepower	3
Base	Single-contact
Stop light:	
Model	5933121
Candlepower	3
Base	Single-contact

b. Replace Lamp (par. 100 b) (fig. 70).

c. Removal (par. 100 c) (fig. 70). Tag wires for correct installation.

d. Installation (fig. 70). Position light on bracket, and secure with the two lock washers and nuts. Install wires. If wires were not tagged, correct installation will have to be determined by test. Bottom light should be on, with four-position light switch in the first (locked) position. Proper functioning of lights indicates proper installation.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

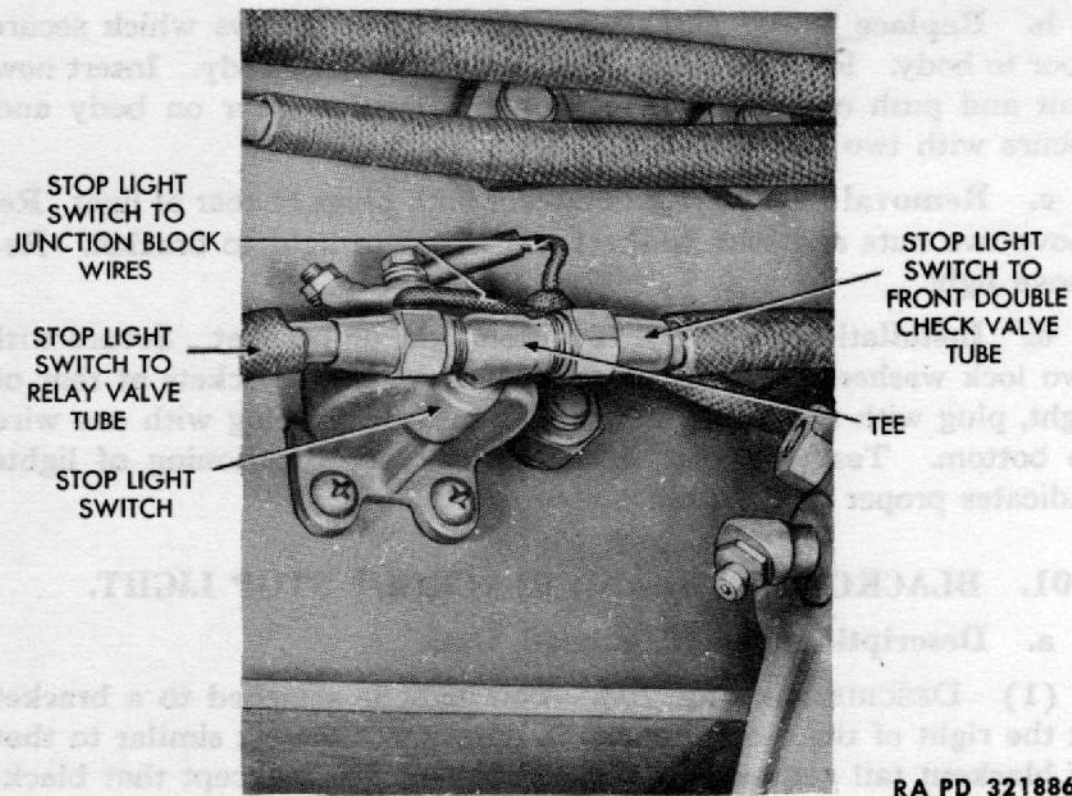


Figure 71 - Stop Light Switch

102. STOP LIGHT SWITCH.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 71). The stop light switch is mounted on left-hand frame side rail behind the transfer case rear crossmember. The switch is air-operated. Its working parts consist of a diaphragm, two contact points, and a coil spring. When the brakes are applied, air enters the switch and lifts diaphragm. This closes the contacts, and lights the stop light. When the brakes are released, pressure is removed. The coil spring then pushes diaphragm down, the contact points open, and stop light goes out.

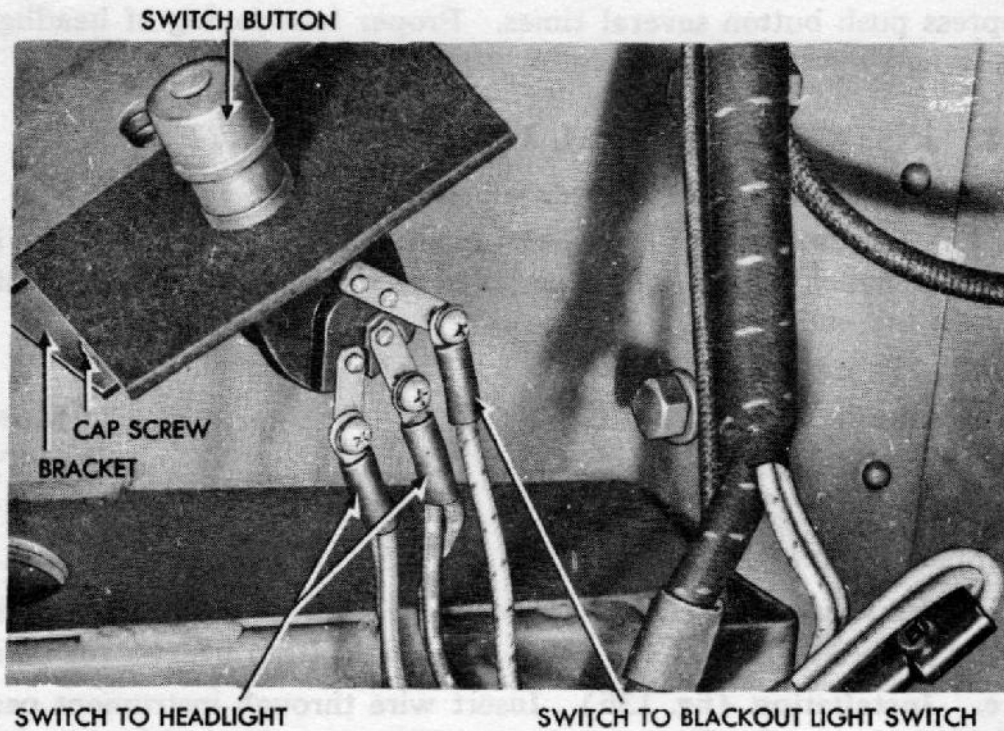
(2) TABULATED DATA.

Manufacturer Westinghouse
 Model 215537

b. Removal (fig. 136). Disconnect wires from terminals on switch. Remove hose from tubing on switch. Remove two nuts, bolts, and four lock washers which secure switch to frame.

c. Installation (fig. 136). Position switch to frame. Secure with the two bolts, two nuts, and four lock washers. Connect air tubes to tee on switch. Connect the two wires to switch terminals (either wire on either terminal). Test operation of stop lights. Check switch for

BATTERY AND LIGHTING SYSTEMS



RA PD 321917

Figure 72 — Foot Dimmer Switch Installed

air leakage. Proper functioning of lights and absence of air leaks indicate proper installation.

103. FOOT DIMMER SWITCH.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 72). The dimmer switch is mounted on a bracket on the left inner side of cab. The main body of the switch is under the toeboard insert, but the push button extends through into driver's compartment. Access to the main body is through the toeboard insert. The switch is operated by left foot to select the upper or lower headlight beam.

(2) TABULATED DATA.

Manufacturer	Delco-Remy
Model	1997007

b. Removal (fig. 72). Remove toeboard insert. Disconnect wires from terminals on switch. Remove two cap screws which hold switch to bracket.

c. Installation (fig. 72). Position switch on bracket. Secure with two cap screws. Connect orange-black wire to front terminal. Connect two black-yellow wires to middle terminal. Connect two green wires to rear terminal. Install toeboard insert. Turn on headlights.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

Depress push button several times. Proper functioning of headlight upper and lower lamps indicates proper installation.

104. INSTRUMENT PANEL LIGHT ASSEMBLY.

a. Description and Tabulated Data.

(1) **DESCRIPTION.** Five instrument lights are mounted on instrument panel. Each light is installed as a unit. When a light fails, replace the entire unit.

(2) **TABULATED DATA.**

Manufacturer	Mazda
Model	T51
Candlepower	1
Number of wires to light.....	1

b. Removal (fig. 136). Disconnect wire at connector behind light (J, N, W, AA, HH, fig. 136). Pull light from instrument panel.

c. Installation (fig. 136). Insert wire through instrument panel light hole in panel. Connect wire at connector. Push light into hole in panel. Pull out four-position light switch to third position. Turn on instrument light switch. Correct functioning of light indicates proper installation.

105. INSTRUMENT PANEL LIGHT SWITCH.

a. Description and Tabulated Data.

(1) **DESCRIPTION (fig. 136).** This is a rheostat type switch, attached to the instrument panel at right-hand side. It operates instrument panel lights independently when the blackout switch is in the second (service) position.

(2) **TABULATED DATA.**

Manufacturer	Delco-Remy
Type	Rheostat

b. Removal (fig. 136). Disengage wires from switch. Loosen knob set screw, and unscrew knob from switch shaft. Remove switch retaining nut and lock washer. Pull switch from rear side of instrument panel.

c. Installation (fig. 136). Position switch to instrument panel. Secure with lock washer and retaining nut. Screw knob on switch shaft, and tighten knob on set screw. Connect red wire from blackout switch and black wire from spotlight switch terminal on left-hand side of vehicle; connect black wire from instrument panel lights to other terminal. Test operation of switch. Proper functioning of lights indicates correct installation.

BATTERY AND LIGHTING SYSTEMS

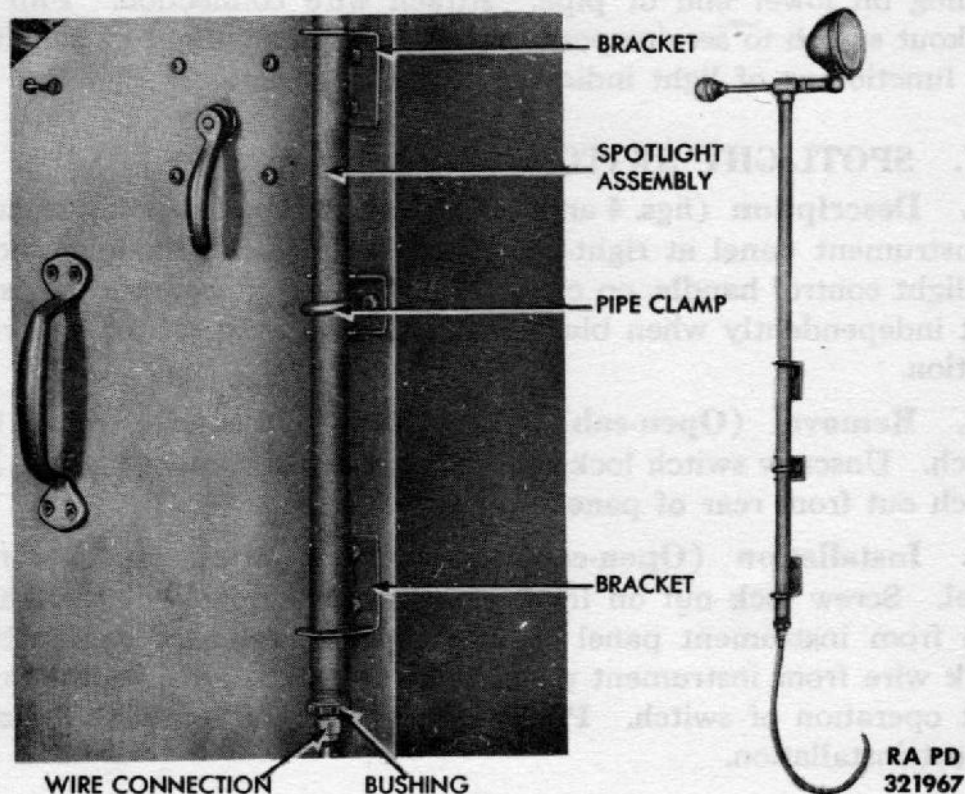


Figure 73 — Spotlight Installed

106. SPOTLIGHT.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 73). On open-cab models, the spotlight is mounted on upper end of a pipe which is attached to left rear outside of the cab by two brackets and a pipe clamp. Height of spotlight can be adjusted by loosening the pipe clamp and sliding the pipe up or down in the brackets. On closed-cab models, the spotlight is mounted directly on rear of cab. The spotlight is focused by means of split knob on end of control handle. Rotating outer end of knob pivots on its axis. Rotating inner half of knob pivots spotlight around axis of control handle.

(2) TABULATED DATA.

Manufacturer	Thomson
Model	1600 SPL

b. Removal (Open-cab) (fig. 73). Disconnect wire by unscrewing wire connection from spotlight light assembly at lower end. Unscrew bushing from lower end of pipe. Loosen wing nut securing pipe clamp. Slide spotlight assembly up out of brackets.

c. Installation (Open-cab) (fig. 73). Slide spotlight pipe through brackets. Tighten wing nut securing pipe clamp. Screw

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

bushing on lower end of pipe. Attach wire connection. Pull out blackout switch to service position and turn on spotlight switch. Correct functioning of light indicates proper installation.

107. SPOTLIGHT SWITCH.

a. Description (figs. 4 and 136). A toggle type switch is attached to instrument panel at right-hand side on open-cab models; and on spotlight control handle, on closed-cab models. It operates the spotlight independently when blackout switch is in the second (service) position.

b. Removal (Open-cab) (fig. 136). Disengage wires from switch. Unscrew switch lock nut on front of instrument panel. Pull switch out from rear of panel.

c. Installation (Open-cab). Position switch on instrument panel. Screw lock nut on front of instrument panel. Attach black wire from instrument panel lights to right-hand terminal. Attach black wire from instrument panel light switch to left-hand terminal. Test operation of switch. Proper functioning of spotlight indicates correct installation.

108. TWIN HORNS.

a. Description and Tabulated Data.

(1) **DESCRIPTION.** Two twin horns are mounted on the cab beneath the battery box. Horns are the vibrator type. The high pitch of one is tuned to the low pitch of the other to produce the most noticeable type of warning sound. Current to operate the horns is drawn directly from the ammeter through a relay switch controlled by the horn button.

(2) **TABULATED DATA.**

Manufacturer Delco
Model 1880391

b. Adjust Horns (fig. 74). Horns do not require adjustment unless they have been tampered with or otherwise damaged. If adjustment is necessary, adjust as follows: Remove horn cover screw, and lift cover from horn. Loosen adjusting nut lock nut. Screw or unscrew adjusting nut until desired pitch is obtained. Keep adjusting nut from turning, and tighten lock nut. Position cover on horn, and secure with cover screw.

c. Removal (fig. 74). Disconnect wire from horn terminal. Remove the two nuts, bolts, and four lock washers which secure horn to supporting bracket. Remove horn.

d. Installation (fig. 74). Position horn on bracket. Secure with

BATTERY AND LIGHTING SYSTEMS

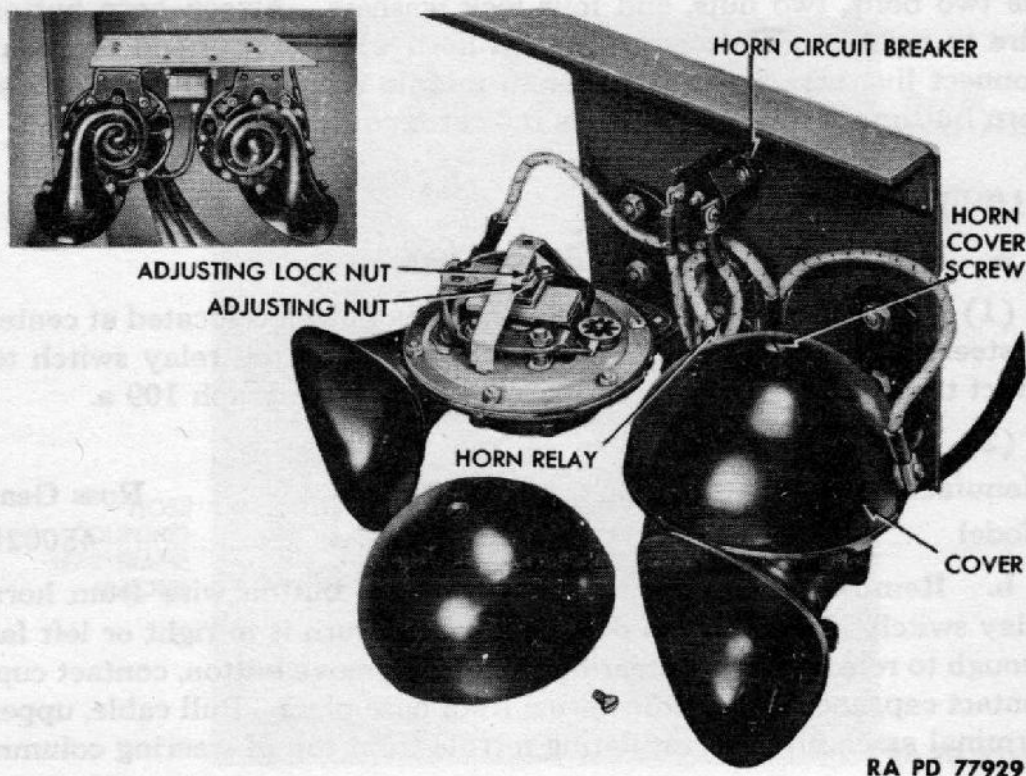


Figure 74 - Twin Horns

the two bolts, two nuts, and four lock washers. Attach horn wire to terminal. Press horn button. Sounding of horn indicates correct installation.

109. HORN RELAY.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 74). A standard magnetic relay switch is attached to horn support bracket between horns. It serves to supply current directly from the ammeter to horns when horn button is depressed. Operation of horn button closes a circuit through the switch. This sends current through a coil in the relay, and thus creates a magnetic field. Magnetic field closes contacts to the horns, and thus completes the circuit.

(2) TABULATED DATA.

Manufacturer Delco
Model 1116818

b. Removal (fig. 74). Disconnect wires from terminals on relay switch. Remove the two nuts, two bolts, and four lock washers which secure switch to bracket. Remove switch.

c. Installation (fig. 74). Position switch on bracket. Secure with

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

the two bolts, two nuts, and four lock washers. Attach horn button wire to right-hand terminal. Attach horn wire to left-hand terminal. Connect live wire from ammeter to middle relay terminal. Depress horn button. Sounding of horns indicates correct installation.

110 HORN BUTTON.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 130). The horn button is located at center of steering wheel. Depressing the button causes the relay switch to direct the current to the horns, as described in paragraph 109 a.

(2) **TABULATED DATA.**

Manufacturer Ross Gear
Model 450029

b. Removal (fig. 130). Disengage horn button wire from horn relay switch. Press button down firmly and turn it to right or left far enough to release it from steering wheel. Remove button, contact cup, contact cap, and horn button spring from base plate. Pull cable, upper terminal assembly, and insulating ferrule from top of steering column.

c. Installation (fig. 130). Thread cable and upper terminal assembly through insulating ferrule, down into steering column. Position horn button spring, contact cap, and contact cup on base plate. Position horn button on contact cup. Depress button firmly, and turn to right or left until button is secured to steering wheel. Contact horn button wire to relay switch.

111. CIRCUIT BREAKERS.

a. Description and Tabulated Data.

(1) **DESCRIPTION.** Five circuit breakers are mounted on the vehicle as follows: The ammeter circuit breaker and the magnetic switch circuit breaker are attached to cranking motor switch bracket under floorboard in front of operator's seat; the buzzer and fuel gage circuit breaker is attached to center of cowl over generator regulator (fig. 62); horn circuit breaker is attached to horn supporting bracket above horns (fig. 74); light circuit breaker is an integral part of the regulator which is attached to cowl dash at center (fig. 62). All circuit breakers are of the thermal type. Heat, produced by passage of excessive current due to a short circuit, causes the breaker to open and close intermittently until the short circuit is eliminated.

(2) **TABULATED DATA.**

Manufacturer Delco-Remy
Type Thermal cut-out

BATTERY AND LIGHTING SYSTEMS

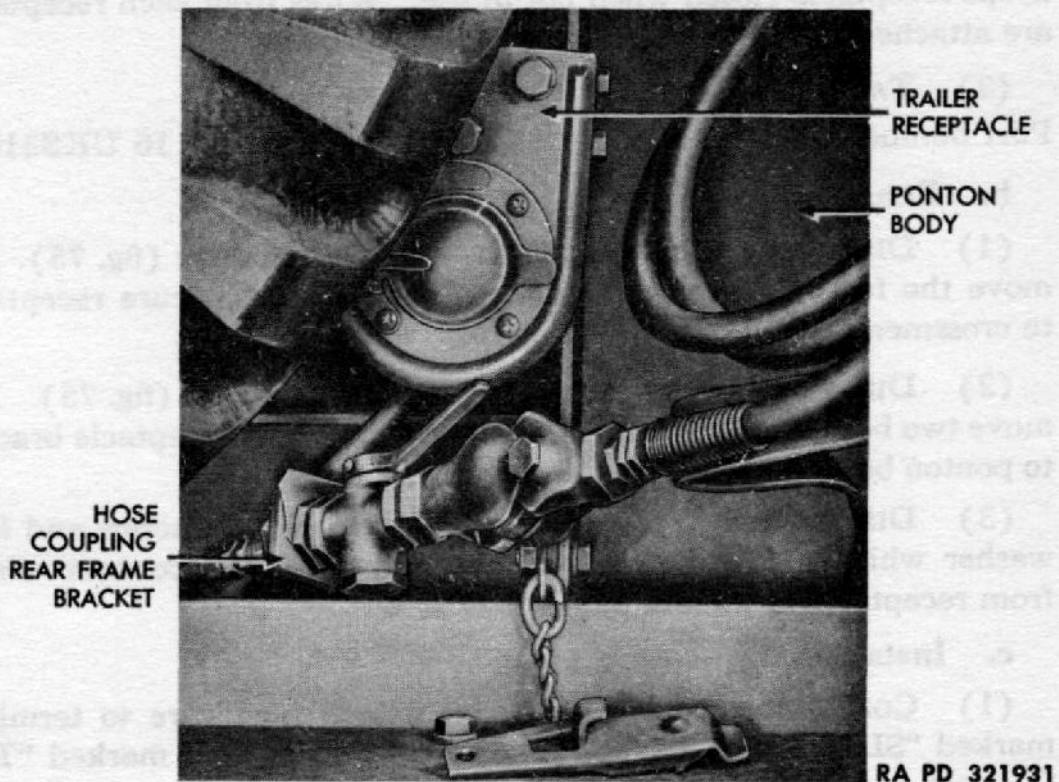


Figure 75 - Trailer Receptacle

Capacity:

Horn circuit	30 amp
Ammeter circuit	60 amp
Light circuit	30 amp
Magnetic switch circuit	60 amp
Buzzer and fuel gage	30 amp

b. **Removal.** Remove each circuit breaker as follows: Remove both wires from terminals at circuit breakers; remove the two nuts, lock washers, and bolts which attach breaker to vehicle.

c. **Installation.** Place circuit breaker in position and install two attaching bolts, lock washers, and nuts. Connect wire to each terminal on circuit breaker.

112. TRAILER RECEPTACLE.

a. **Description and Tabulated Data.**

(1) **DESCRIPTION.** Two trailer light receptacles are used. One, for use with semitrailer, is attached to a bracket on the rear of the ponton body (fig. 75). A second receptacle, for use with vehicle towed by pintle hook, is attached to frame rear crossmember. Receptacles are of the female type with metal contact blades. A spring metal cover

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

keeps receptacle closed when not in use. Wires from each receptacle are attached to the stop light and lighting circuits.

(2) **TABULATED DATA.**

Part number (Autocar) 16 UKS31098

b. Removal.

(1) **DISENGAGE RECEPTACLE FROM CROSSMEMBER (fig. 75).** Remove the four nuts, lock washers, and bolts which secure receptacle to crossmember.

(2) **DISENGAGE RECEPTACLE FROM PONTON BODY (fig. 75).** Remove two bolts, lock washers, and nuts which attach receptacle bracket to ponton body.

(3) **DISCONNECT WIRING (fig. 75).** Remove the screw and lock washer which secure back cover to receptacle. Disconnect wiring from receptacle terminals.

c. Installation.

(1) **CONNECT WIRING (fig. 75).** Attach blue wire to terminal marked "SL." Connect black-yellow wire to terminal marked "TL." Connect ground wire to terminal marked "GR." Position back cover to receptacle. Secure with the lock washer and screw.

(2) **ATTACH RECEPTACLE TO CROSSMEMBER (fig. 75).** Position receptacle on crossmember. Secure with the four bolts, lock washers, and nuts.

(3) **ATTACH RECEPTACLE TO PONTON BODY (fig. 75).** Position receptacle bracket on rear of ponton body to right of spare wheel. Secure with two bolts, lock washers, and nuts.

(4) **TEST INSTALLATION.** Insert trailer male plug into receptacle. Start engine, and build up air pressure. Turn lights on, and apply brakes. Operation of trailer stop lights and marker lights indicates proper installation.

Section XXII

RADIO INTERFERENCE SUPPRESSION SYSTEM

113. DESCRIPTION AND DATA.

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 system during operation of the

RADIO INTERFERENCE SUPPRESSION SYSTEM

vehicle. These waves are actually radiated as disturbing signals that interfere with any radio receiving apparatus which may be operating in the vehicle or in the immediate vicinity. Each disturbance (at plugs, breaker points, generator brushes, or elsewhere) creates a surge of electricity which produces interfering radio waves. The origin can generally be determined by the nature of the noise heard in the receiver. Radio interference suppression, therefore, involves suppressing 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 cab and body are made to form a shield by the use of toothed lock washers and bond straps, thus forming 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 such a point that 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, in order to obtain good connections between the component parts and thereby 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.

b. Data (fig. 76).

(1) IGNITION (BOTH HIGH-TENSION AND PRIMARY CIRCUIT SUPPRESSION).

(a) High-tension suppression is of the resistor-suppressor type.

1. Resistor-suppressor on high-tension wire to distributor.
2. Resistor-suppressor on each spark plug terminal.

(b) Primary circuit suppression is of the capacitive-filter type.

1. Condenser-ignition coil terminal (-) to cylinder block.
2. Filter-ignition coil terminal (-) to ignition switch.

(2) CHARGING CIRCUITS (INCLUDES GENERATOR REGULATOR, AMMETER, AND BATTERY).

(a) Generator suppression is of the capacitive-filter type. Condenser-generator armature terminal (A) to ground on generator.

(b) Regulator suppression is of the capacitive-filter type. Filter-battery terminal on regulator to ammeter.

(3) BONDING.

(a) *Bond Straps (Ground Straps)*. NOTE: All key letters in this step and step (b) refer to figure 76.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

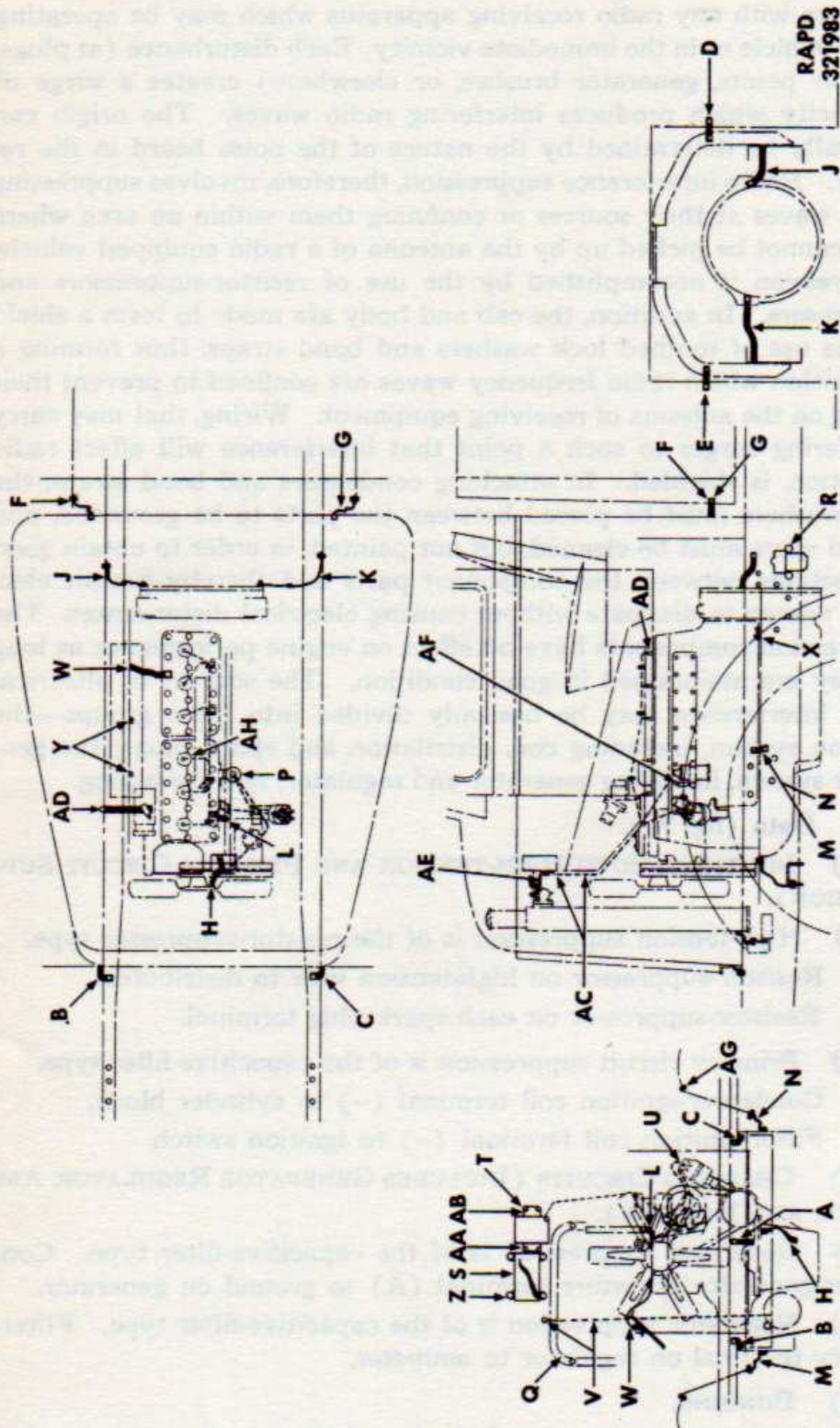


Figure 76 — Bonding and Suppressor Locations

RADIO INTERFERENCE SUPPRESSION SYSTEM

- A—FLEXIBLE BOND—RADIATOR TO CROSSMEMBER
- B—FLEXIBLE BOND—FRONT R. H. CORNER OF CAB TO FRAME RAIL
- C—FLEXIBLE BOND—FRONT L. H. CORNER OF CAB TO FRAME RAIL
- D—FLEXIBLE BOND—CAB TO REAR CAB SUPPORT, R. H. SIDE
- E—FLEXIBLE BOND—CAB TO REAR CAB SUPPORT, L. H. SIDE
- F—FLEXIBLE BOND—CAB SUPPORT TO PONTON BODY, R. H. SIDE
- G—FLEXIBLE BOND—CAB SUPPORT TO PONTON BODY, L. H. SIDE
- H—FLEXIBLE BOND—CRANK CASE TO FRAME RAIL
- J—FLEXIBLE BOND—ENGINE SUPPORT TO R. H. FRAME RAIL
- K—FLEXIBLE BOND—ENGINE SUPPORT TO L. H. FRAME RAIL
- L—FLEXIBLE BOND—ENGINE CYLINDER HEAD TO CAB ANGLE, L. H. SIDE
- M—FLEXIBLE BOND—R. H. SPLASH GUARD TO FRAME RAIL
- N—FLEXIBLE BOND—L. H. SPLASH GUARD TO FRAME RAIL
- P—BOND BY BOLTING—IGNITION COIL TO ENGINE
- Q—BOND BY BOLTING—ENGINE COVER TO DASH
- R—BOND BY BOLTING—FUEL FILTER TO FRAME RAIL
- S—BOND BY BOLTING—VOLTAGE REGULATOR TO DASH
- T—BOND BY BOLTING—DUAL UNIT FILTER ASSEMBLY TO DASH
- U—RESISTOR-SUPPRESSOR-DISTRIBUTOR HIGH TENSION WIRE
- V—CONDENSER-GENERATOR, ALSO SHIELDED CABLE ASSEMBLY, GENERATOR TO REGULATOR
- W—FLEXIBLE BOND—ENGINE CYLINDER HEAD TO CAB ANGLE, R. H. SIDE
- X—BOND BY BOLTING—BATTERY GROUND CABLE TO L. H. FRAME RAIL
- Y—BOND BY BOLTING—ENGINE MANIFOLD SHIELD TO CAB FLOOR-BOARD SUPPORT
- Z—JUMPER ASSEMBLY—VOLTAGE REGULATOR TO FILTER
- AA—JUMPER ASSEMBLY—FILTER TO AMMETER
- AB—JUMPER ASSEMBLY—FILTER TO IGNITION SWITCH
- AC—JUMPER ASSEMBLY—FILTER TO IGNITION COIL
- AD—FLEXIBLE BOND—GENERATOR TO FRAME RAIL
- AE—FLEXIBLE BOND—RADIATOR TO REGULATOR
- AF—CONDENSER—IGNITION COIL
- AG—BOND BY BOLTING—FENDER TO CAB
- AH—RESISTOR-SUPPRESSOR—SPARK PLUGS

RA PD 321983B

Legend for Figure 76 — Bonding and Suppressor Locations

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

1. Radiator to crossmember (A).
2. Front right-hand corner of cab to frame rail (B).
3. Front left-hand corner of cab to frame rail (C).
4. Cab to rear cab support, right-hand side (D).
5. Cab to rear cab support, left-hand side (E).
6. Cab support to ponton body, right-hand side (F).
7. Cab support to ponton body, left-hand side (G).
8. Crankcase to frame rail (H).
9. Engine support to right-hand frame rail (J).
10. Engine support to left-hand frame rail (K).
11. Engine cylinder head to cab angle, left-hand side (L).
12. Right-hand splash guard to frame rail (M).
13. Left-hand splash guard to frame rail (N).
14. Engine cylinder head to cab angle, right-hand side (W).
15. Generator to frame rail (AD).
16. Radiator to regulator (AE).

(b) Toothed Lock Washers

1. Ignition coil to engine (P).
2. Engine cover to dash (Q).
3. Fuel filter to frame rail (R).
4. Voltage regulator to dash (S).
5. Dual unit filter to dash (T).
6. Battery ground cable to left-hand frame rail (X).
7. Engine manifold shield to cab floor board support (Y).
8. Fender to cab (AG).

114. MAINTENANCE.

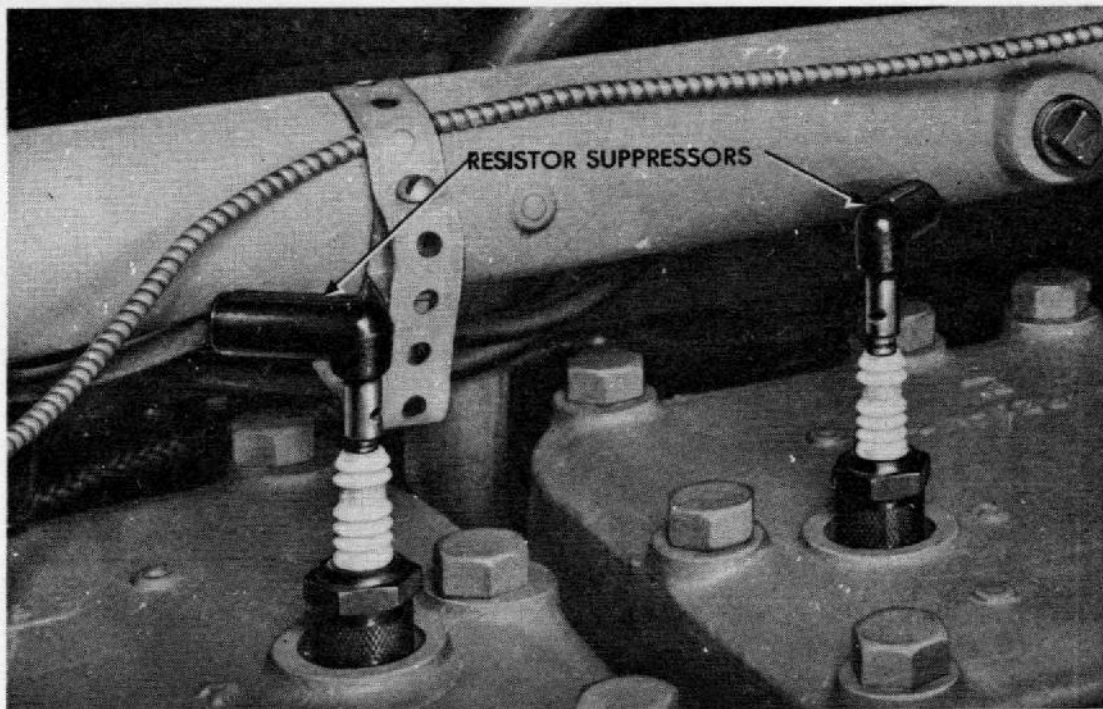
a. **General.** General maintenance of the radio suppression system must be made in connection with preventive maintenance items particularly in regard to spark plugs, distributor and wires, late ignition timing, generator brushes, loose switch contacts and discharged battery causing high generator charging rate.

b. **Ignition Circuits** (fig. 76).

(1) Resistor-suppressors, of which there are seven—one at each spark plug and one at the distributor—consist of a high-resistance element in an insulated housing. Inspect each suppressor for cracked or broken housing. Each suppressor must be threaded tightly into end of spark plug wire so screw enters strands of cable. Wire terminals must be tight, well pushed down into place, and free of corrosion and dirt.

(2) Capacitive-filters, of which there are two in the ignition circuit, are located at the ignition coil and at the left half of the dual

RADIO INTERFERENCE SUPPRESSION SYSTEM



RA PD 321993

Figure 77 — Resistor Suppressors on Spark Plugs

unit filter mounted on the dash. Replace filters, if faulty (par. 115 b (2)).

c. Charging Circuit (fig. 76).

(1) A capacitor-filter is mounted on the generator and attached to the armature "A" terminal. The mounting screw must be tight with the internal-external toothed lock washer between the filter bracket and the generator housing and the external toothed lock washer under the screwhead.

(2) The capacitive-filter used on the regulator circuit is the right half of the dual unit filter mounted on the dash. Terminal connections and wiring should make good electrical contact. Mounting and grounding bolts should be kept drawn tight. Mounting surfaces, tops and bottoms of filter, and their placement positions on the vehicle must be clean and free from paint and accumulated dirt.

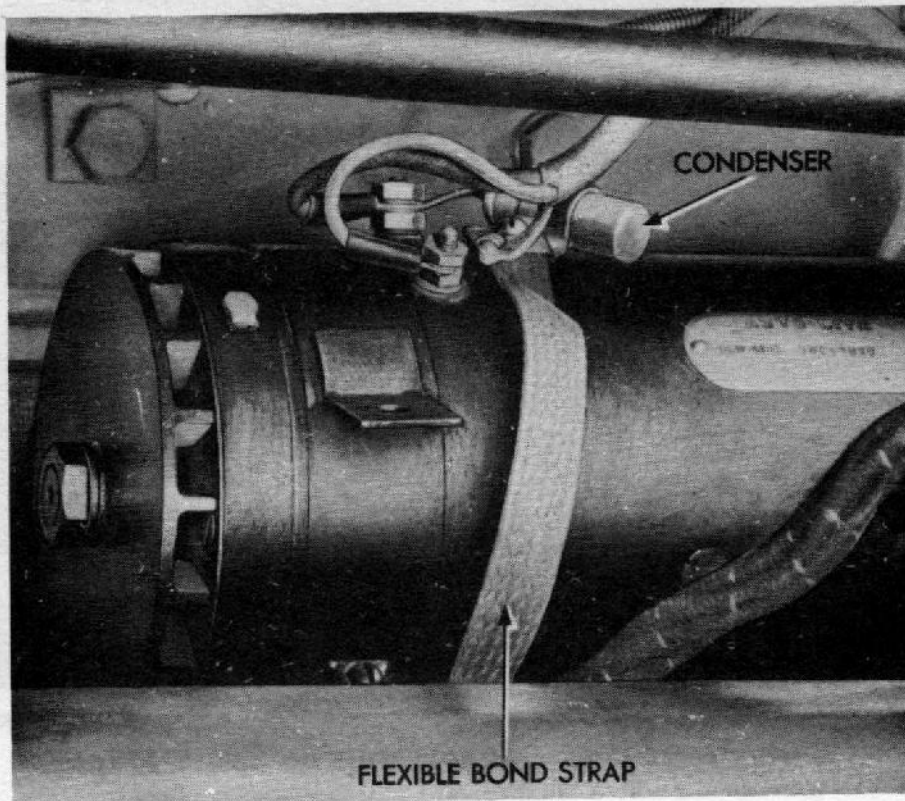
d. **Bonding** (fig. 76): Bonding points must be clean and tight. Tinned spots must be clean, but not painted. Where bonding is obtained by use of an internal-external toothed lock washer, the lock washer must be between the parts to be grounded.

115. REMOVAL AND REPLACEMENT.

a. Ignition Circuits.

(1) **RESISTOR-SUPPRESSORS ON SPARK PLUGS** (fig. 77). Pull resistor-suppressor terminal from spark plug. Unscrew suppressor

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 321997

Figure 78 – Condenser Mounted on Generator

from spark plug wire. Replace by screwing suppressor tightly onto end of spark plug wire so screw enters strands of cable. Push terminal over terminal of spark plug.

(2) **RESISTOR-SUPPRESSOR AT THE DISTRIBUTOR** (fig. 56). Pull high-tension lead from distributor cap. Unscrew suppressor from upper part of wire. Unscrew suppressor from lower part of wire. To replace, screw suppressor tightly onto lower part of high-tension wire, and screw onto upper part of wire. Push end of lead into position in distributor cap.

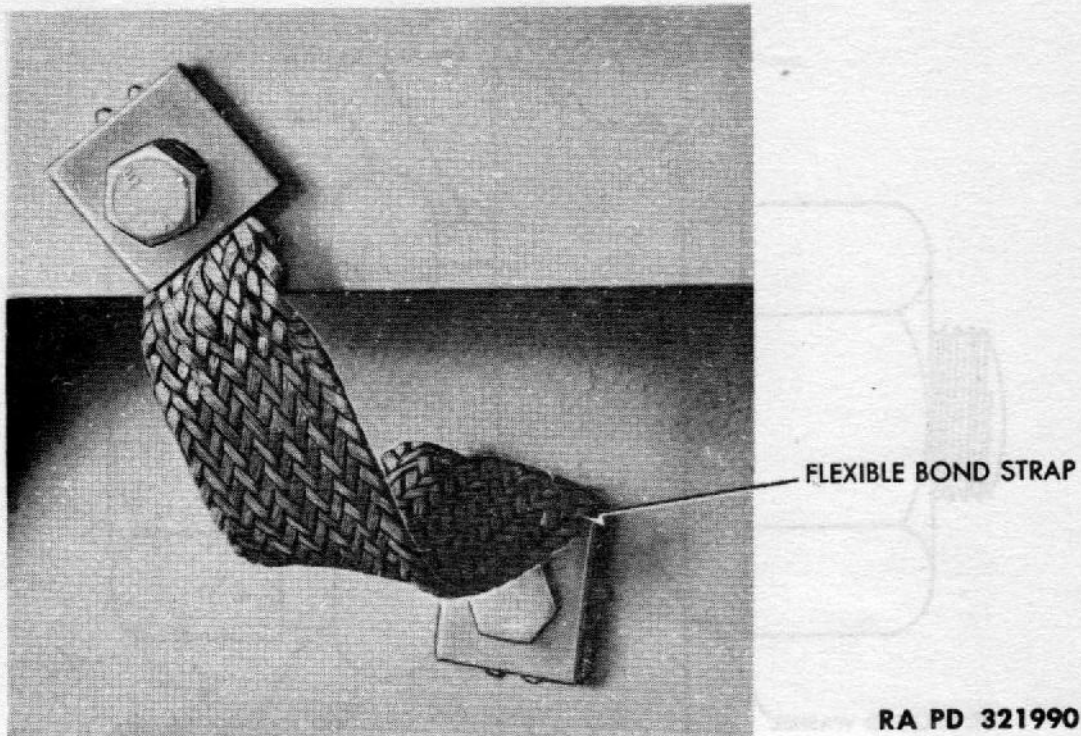
(3) **CONDENSER AT COIL** (fig. 56). Remove nut from ignition coil terminal (-). Lift off condenser lead. Remove cap screw, internal toothed lock washer, spacer, and condenser. To replace, position condenser and install spacer, condenser, internal toothed lock washer, and cap screw. Attach condenser lead to coil terminal (-). Install terminal nut.

(4) **FILTER ON DASH.** For replacement, refer to step b (2), below.

b. Charging Circuits.

(1) **CONDENSER ON GENERATOR** (fig. 78). Remove screw securing condenser to generator. Lift off ground wire, flexible bond strap, condenser and internal-external toothed lock washer. Remove top

RADIO INTERFERENCE SUPPRESSION SYSTEM



RA PD 321990

Figure 79 — Radio Suppression Bond Installed

nut from generator armature terminal. Remove condenser lead from terminal. To replace, install condenser lead on generator armature terminal. Install nut, and tighten. Install internal-external toothed lock washer, condenser bracket, flexible bond strap and ground wire on generator. Install screw, and draw tight.

(2) **FILTER ON DASH** (fig. 62). Turn cover screw, and pull off filter cover. Disconnect wires from filter terminals. Remove four bolts, internal toothed lock washers, and nuts which secure filter unit to dash. To replace, position filter to dash, with lettering for ignition switch and ammeter at the top. Install four bolts, internal toothed lock washers, and nuts, with washers between filter and dash. Connect wires to terminals as follows: green wire from ammeter to filter upon right terminal, green wire from regulator battery terminal to filter lower right terminal, red wire from coil primary terminal (-) to filter lower left terminal, red and black wire from ignition switch to filter upper left terminal. Install cover, and turn cover screw to lock cover in place.

c. Bonding.

(1) **BONDING STRAPS** (figs. 79 and 80). Remove bonding straps by removing cadmium-plated nuts, internal toothed lock washers, and bolts, which attach flexible bond strap in vehicle. When installing, all toothed lock washers must be replaced in their original sequence. An internal-external toothed lock washer is placed next to metal of

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

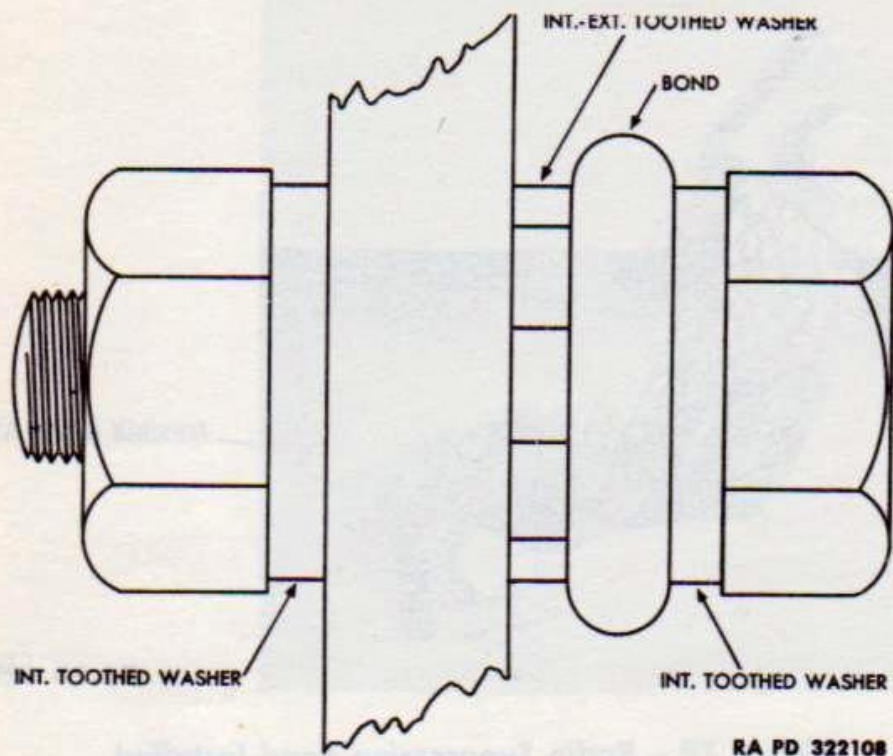


Figure 80 — Arrangement of Bolt and Washers at Bond

chassis, and bond strap against toothed lock washer. Internal toothed lock washers are used under head of bolt and nut. Always draw connections tight.

(2) **BOLTED BONDS.** Install bolted bonds, using toothed lock washer between chassis metal and attached part. Always replace in original sequence. Draw up connections tight.

Section XXIII

CLUTCH AND CLUTCH LINKAGE

116. DESCRIPTION AND TABULATED DATA.

a. **Description** (fig. 81). The clutch is a 2-plate, single dry disk type. The inside face of the flywheel forms the one drive plate, and pressure plate forms the other. The dry disk, which is the driven plate, is located and held by spring action between the two driving plates. The driven plate, in turn, drives the transmission through the splined end of the transmission drive gear. Depressing the clutch pedal relieves the pressure of the driving plates, allowing the driven disk to revolve or stop independently of the driving plates. The flow of engine power is thereby interrupted.

CLUTCH AND CLUTCH LINKAGE

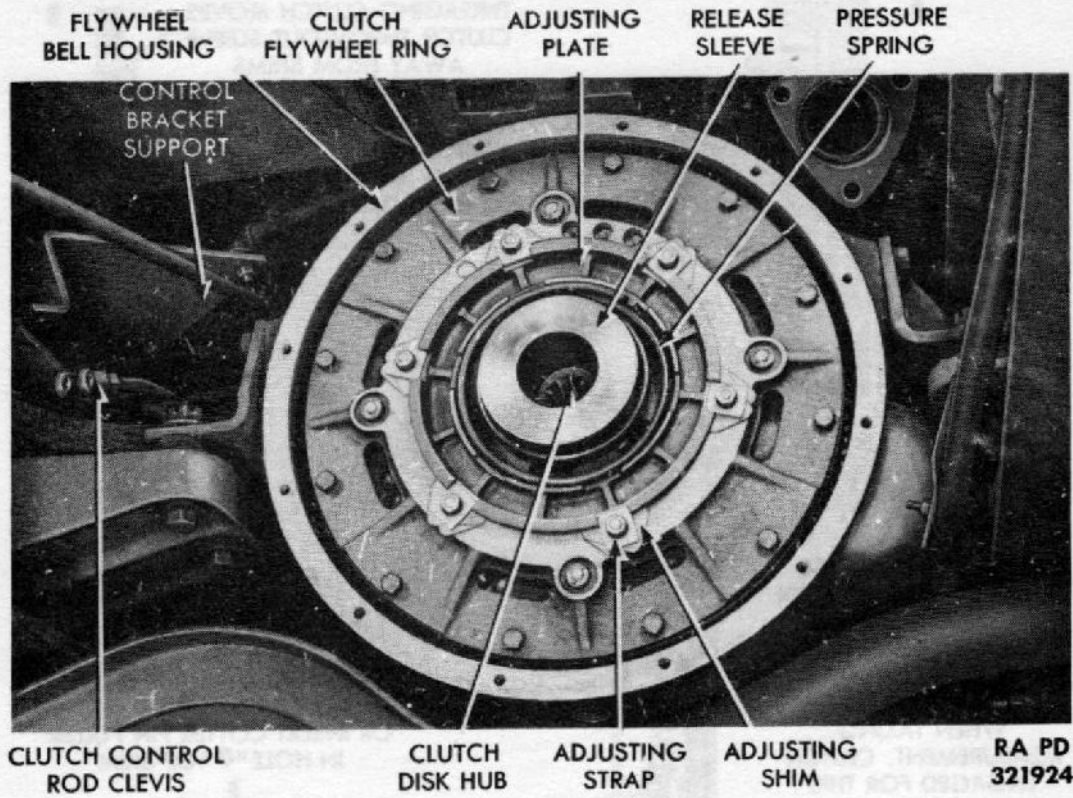


Figure 81 – Clutch Installed – Transmission Removed

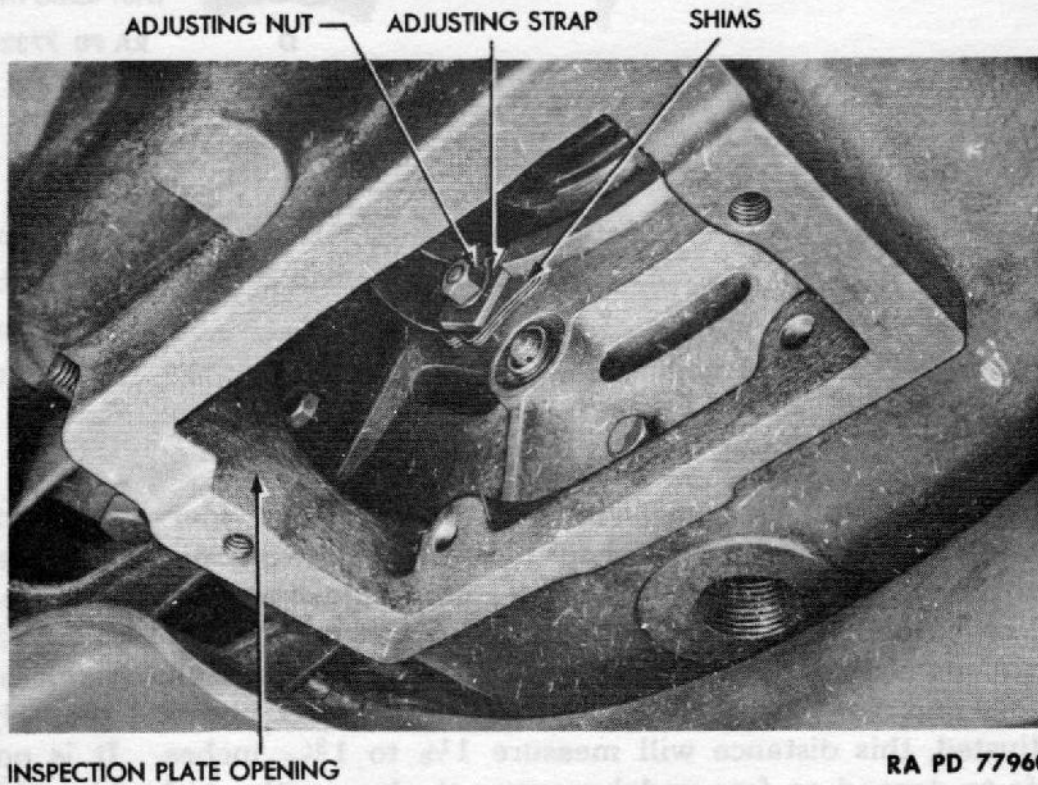


Figure 82 – Clutch Adjustment Provisions

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

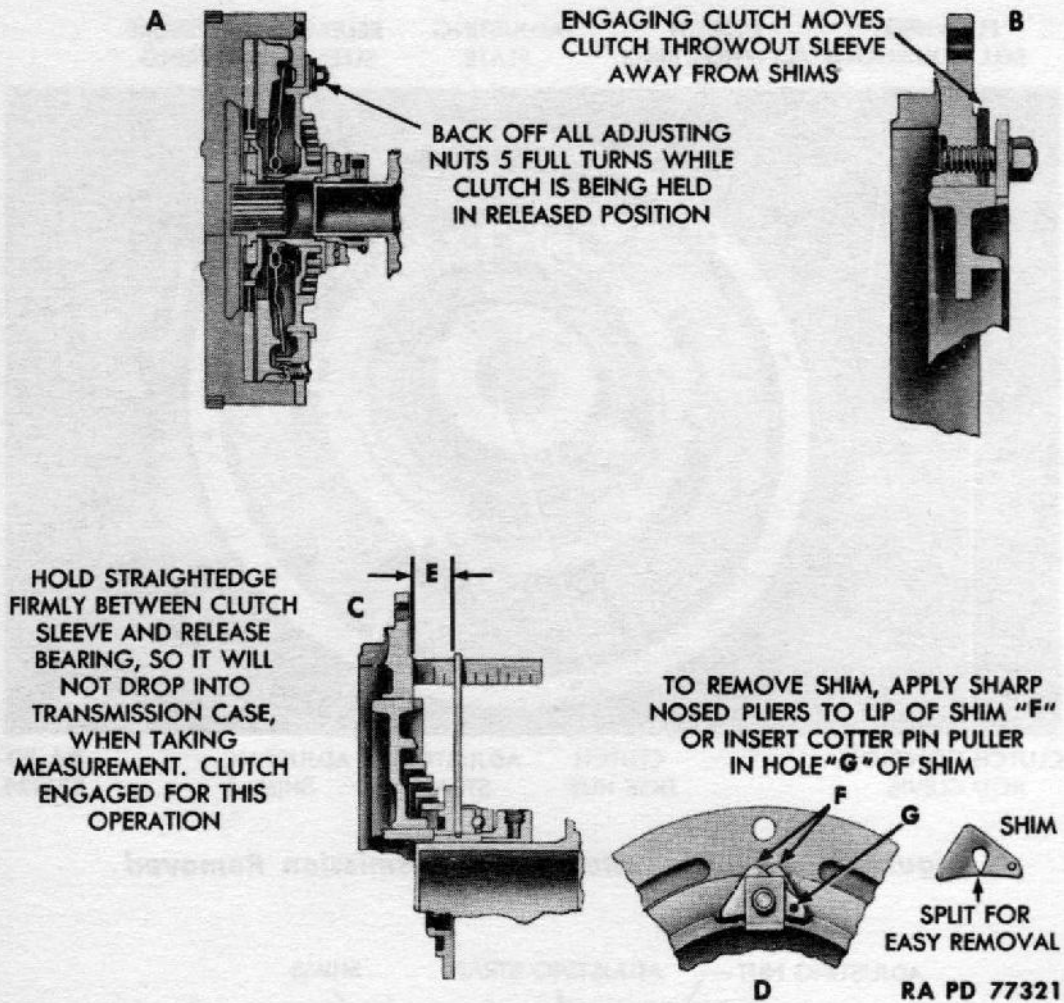


Figure 83 - Steps in Adjusting Clutch

b. Tabulated Data.

Manufacturer	W. C. Lipe
Model	Z-42-S cover and Z-15-2 driven plate
Clutch adjustment	Shims
Free travel of clutch pedal	1½ in.

117. MAINTENANCE AND ADJUSTMENT.

a. General. Original setting of the clutch provides for approximately 1½ inches of free pedal movement between pedal and toe-board or stop. First indication of a clutch adjustment being required is the reduction of this clearance to ¾ inch or less. No pedal adjustment should be made. Check distance between clutch release sleeve and rear face of clutch flywheel ring. When clutch is properly adjusted, this distance will measure 1⅛ to 1⅜ inches. It is not safe to depend on free pedal movement alone without checking this dimension. Distance between clutch release sleeve and rear face

CLUTCH AND CLUTCH LINKAGE

of clutch flywheel ring is controlled by flywheel ring adjusting shims. On this clutch, one shim moves the clutch release sleeve $\frac{7}{64}$ inch. Movement of sleeve should not be less than $\frac{1}{2}$ inch and not more than $\frac{9}{16}$ inch in order to obtain proper clutch release. If less than $\frac{1}{2}$ inch, one shim must be added, and if more than $\frac{9}{16}$ inch, one shim must be removed.

b. Adjusting the Clutch (fig. 82).

(1) **REMOVE CLUTCH HOUSING COVER PLATE.** Remove top and bottom clutch housing cover plates.

(2) **DISCONNECT LINKAGE.** Disconnect clutch control rod clevis from clutch throw-out shaft lever by removing cotter pin and clutch control rod clevis pin.

(3) **BLOCK LEVER IN RELEASE POSITION.** Block clutch throw-out shaft lever in full release position.

(4) **TURN ENGINE.** Use hand crank, and turn engine until adjusting strap and shim pack are accessible through clutch housing opening.

(5) **LOOSEN ADJUSTING NUTS.** With clutch in released position, back off the six adjusting (clutch flywheel ring stud) nuts above five full turns.

(6) **REMOVE BLOCKING.** Remove blocking from clutch throw-out shaft lever. This will move clutch adjusting plate away from shims.

(7) **REMOVE SHIMS.** Remove shims, as necessary, to obtain $1\frac{1}{8}$ - to $1\frac{3}{16}$ -inch clearance between face of clutch release sleeve and rear face of clutch flywheel ring. To ensure full contact between pressure plate and clutch disk, always remove the same number of shims from each pack.

c. **Check Clutch Trunnion Levers (fig. 86).** Check contact of clutch trunnion levers and lugs on clutch release trunnion block. Insert a feeler gage between each lug and lever at the same time. Uneven contact will not permit the block to slide freely, and poor clutch engagement will result. Levers can be bent to provide even engagement.

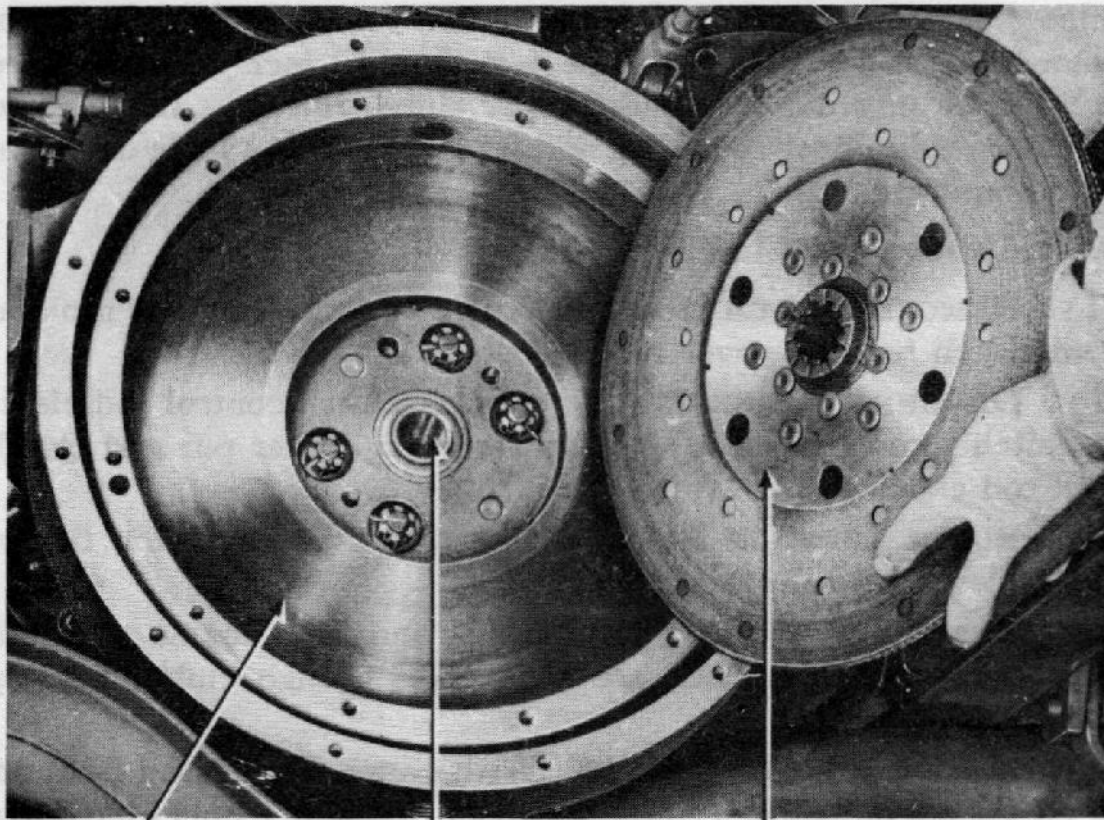
118. REMOVAL OF CLUTCH DISK.

a. **Remove Transmission (par. 125).**

b. **Remove Clutch Pressure Plate Assembly.** Remove cap screws and toothed lock washers attaching pressure plate assembly to engine flywheel. Lift out pressure plate assembly.

c. **Remove Clutch Disk.** Lift clutch disk from inside of engine flywheel.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



FLYWHEEL

CLUTCH PILOT BEARING

CLUTCH DISK

RA PD 77874

Figure 84 — Removing Clutch Disk**119. INSTALLATION OF CLUTCH DISK (fig. 84).**

a. **Install Clutch Disk.** Place clutch disk against engine flywheel. Tapered ends of splines in disk hub must face away from flywheel. A pilot may be used for alinement of disk with clutch pilot bearing. If a pilot is not available, proper alinement can be obtained after installation of pressure plate assembly.

b. **Install Pressure Plate Assembly.** Lift pressure plate assembly into position against clutch disk, and install toothed lock washers and cap screws. Before fully tightening cap screws, bring the clutch disk into perfect alinement with clutch pilot bearing. A clutch pilot or a spare main drive gear can be used. Insert spline on main drive gear into spline in clutch disk hub, and push bearing surface on end of main drive gear into clutch pilot bearing. Clutch disk is now centered. Tighten cap screws to securely attach clutch pressure plate assembly to engine flywheel, and remove clutch pilot or spare main drive gear, whichever was used.

c. **Install Transmission (par. 126).**

CLUTCH AND CLUTCH LINKAGE

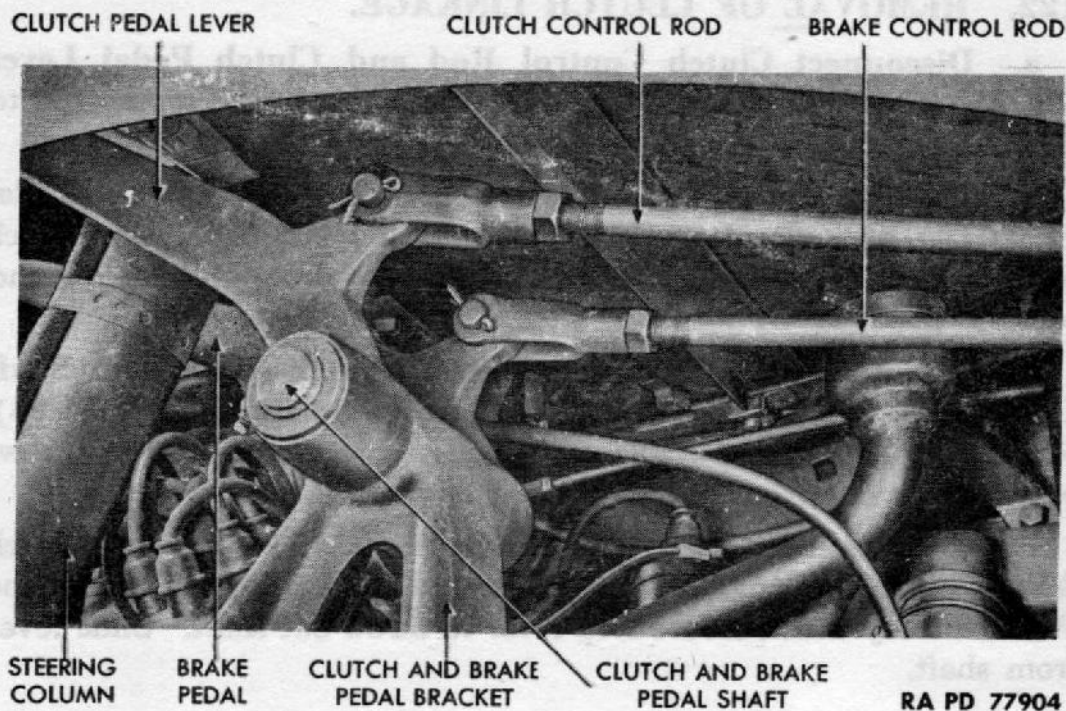


Figure 85 – Clutch and Brake Pedals and Linkage

120. REMOVAL OF PILOT BEARING (fig. 84).

- a. **Remove Transmission** (par. 125).
- b. **Remove Clutch Pressure Plate Assembly** (par. 118 b).
- c. **Remove Clutch Disk** (par. 118 c).
- d. **Remove Clutch Pilot Bearing.** Using clutch pilot bearing puller (41-P-2906-15), remove clutch pilot bearing from seat in engine flywheel.

121. INSTALLATION OF PILOT BEARING (fig. 84).

- a. **Install Pilot Bearing.** Care must be taken when installing clutch pilot bearing into engine flywheel. Bearing must be seated perfectly in order to maintain alignment of main drive gear, clutch disk, and pilot bearing. Pack bearing with lubricant. Use a clutch pilot if available. If pilot is not available, carefully tap clutch pilot bearing into seat in flywheel with a brass drift. Open side of bearing must face toward engine. Make certain bearing is started into flywheel evenly before forcing it fully into seat.
- b. **Install Clutch Disk** (par. 119 a).
- c. **Install Clutch Pressure Plate Assembly** (par. 119 b).
- d. **Install Transmission** (par. 126).

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)**122. REMOVAL OF CLUTCH LINKAGE.**

a. **Disconnect Clutch Control Rod and Clutch Pedal Lever** (fig. 85). Remove the cotter pin and clevis pin which secure rod to lever.

b. **Remove Clutch Pedal Lever From Clutch and Brake Pedal Shaft** (fig. 85). Remove taper pin, lock ring, and flat washer which connect lever to shaft. Slide shaft over, away from clutch side, and remove pedal lever.

c. **Disconnect Clutch Control Rod, Clutch Throw-out Shaft Lever, and Clutch Throw-out Shaft Lever Spring Link** (fig. 86). Remove cotter pin and clevis pin which secure control rod to throw-out shaft lever. Remove control rod and spring link.

d. **Disconnect Clutch Throw-out Shaft Lever From Clutch Throw-out Shaft** (fig. 86). Remove the hex cap screw, spring, and Woodruff key which secure stop lever to throw-out shaft. Slide lever from shaft.

123. INSTALLATION OF CLUTCH LINKAGE.

a. **Install Clutch Throw-out Shaft Stop Lever on Clutch Throw-out Shaft** (fig. 86). Position lever on shaft. Insert Woodruff key. Secure with cap screw and spring.

b. **Install Clutch Throw-out Shaft and Connect Clutch Throw-out Shaft Lever on Clutch Throw-out Shaft** (fig. 86). Install shaft. Insert Woodruff key, and fit lever on clutch end of shaft. Secure with hex cap screw and spring.

c. **Adjust Throw-out Shaft Stop Lever.** Back off set screw on stop lever. Move clutch throw-out shaft lever forward until clutch trunnion lever is in contact with clutch release bearing. Tighten screw to give $\frac{1}{16}$ -inch clearance between end of set screw and edge of clutch housing.

d. **Connect Clutch Throw-out Shaft Lever Spring Link and Clutch Control Rod to Clutch Throw-out Shaft Lever** (fig. 86). Insert clevis pin through holes at the end of spring link, control rod, and shaft lever. Secure with cotter pin.

e. **Install Clutch Pedal Lever on Clutch and Brake Pedal Shaft** (fig. 85). Slide pedal shaft over, away from clutch pedal side. Position pedal rod on end of shaft. Secure with the flat washer, lock ring, and taper pin.

f. **Connect Clutch Control Rod and Clutch Pedal Lever** (fig. 85). Pull clutch pedal back to toeboard. Position clutch control rod, and adjust length to exactly fit between clutch pedal and clutch

TRANSMISSION AND POWER TAKE-OFF

throw-out shaft lever. Insert clevis pin and secure with cotter pin.
CAUTION: *Never adjust clutch by changing length of control rod.*
 g. **Adjust Clutch** (par. 117 b).

Section XXIV

TRANSMISSION AND POWER TAKE-OFF

124. DESCRIPTION AND TABULATED DATA.

a. **Description** (fig. 86). Transmission is attached to clutch bell housing at rear of engine. It has five forward speeds and one reverse. The silent helical gears run in constant mesh in third speed and overdrive. Fourth speed is direct drive and fifth speed is overdrive. Gears are selected manually by a conventional type gearshift lever. A power take-off is mounted on a special adapter on the right-hand side of the transmission. The power take-off drives the winch at the front of the vehicle, through a propeller shaft. It has two lifting speeds and one lowering speed.

b. **Tabulated Data.**

Manufacturer	Autocar
Part No.—Assembly, complete	3UU6530
Gear ratio	7.37 to 1
First speed	5.90 to 1
Second speed	3.60 to 1
Third speed	1.84 to 1
Fourth speed (direct)	1.00 to 1
Fifth speed (overdrive)	0.75 to 1
Power take-off	0.621 to 1
Oil capacity:	
Summer	8 qt
Winter	10 qt

125. REMOVAL.

a. **Disconnect Front Drive Shaft.** Disconnect front drive shaft by removing bolts, nuts, and lock washers from joint flange at front end of drive shaft (fig. 87). Move drive shaft to left side of vehicle, out of way of transmission.

b. **Remove Intermediate Drive Shaft** (par. 134 b).

c. **Disconnect Power Take-off Control.** Remove cotter pin and clevis pin from rear shift rod lower clevis (fig. 87).

d. **Disconnect Winch Drive Shaft** (par. 136 b).

e. **Disconnect Clutch Throw-out Shaft Lever** (par. 122 c).

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

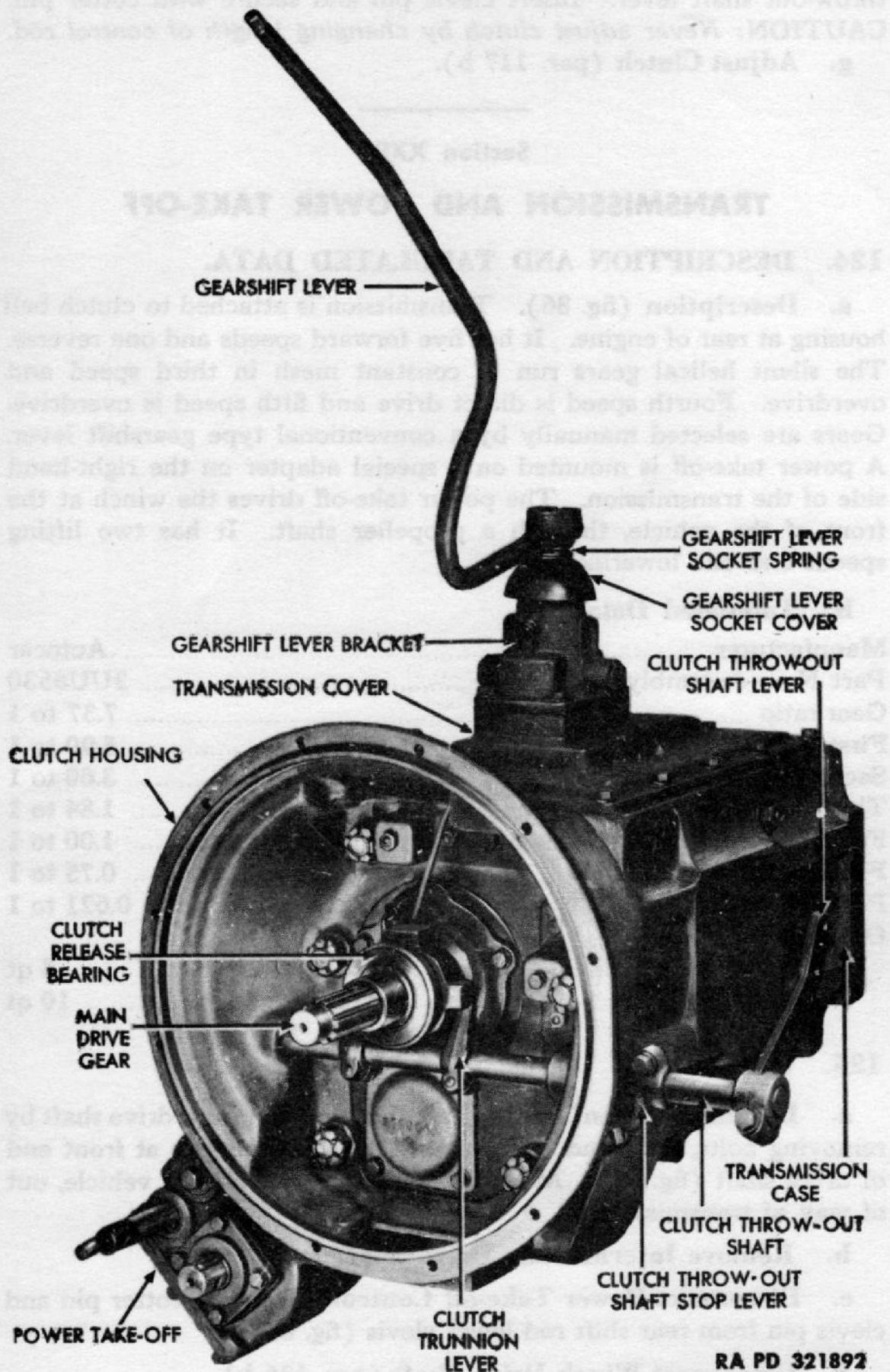


Figure 86 — Transmission Removed

TRANSMISSION AND POWER TAKE-OFF

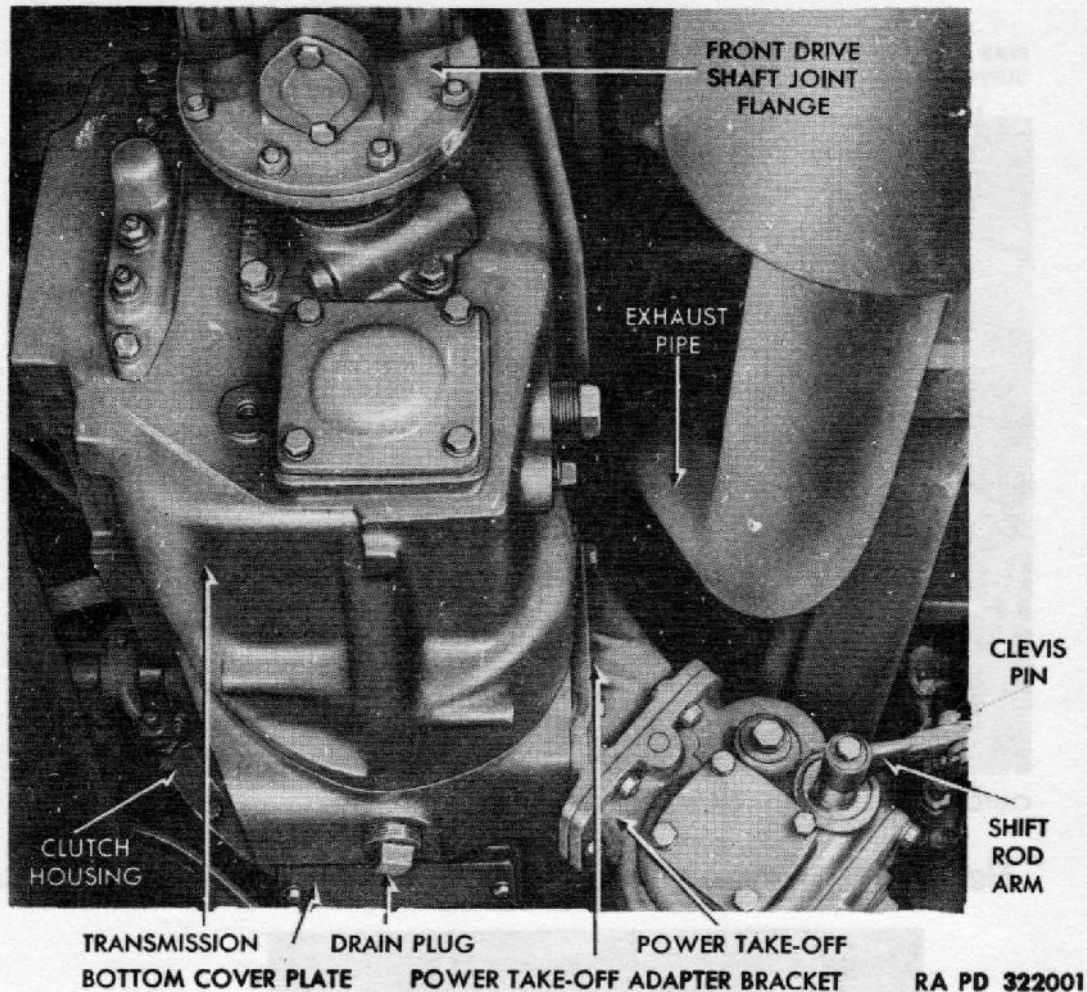


Figure 87 – Transmission Installed – Lower Rear View

f. **Disconnect Clutch Housing (fig. 87).** Remove cap screws and toothed lock washers which secure clutch housing to bell housing. Remove clutch housing bottom cover plate to reach lower housing cap screws. Upper two cap screws can be reached after removing control bracket support (subpar. 1 below).

g. Move Ponton Body.

(1) **REMOVE TOOL BOX.** Lift tools out of tool box. Remove four bolts at each end of tool box. Lower tool box to floor.

(2) **DISCONNECT FLEXIBLE BONDS.** Disconnect two flexible bonds, cab to body.

(3) **REMOVE PONTON BODY MOUNTING BOLTS.** From right side of ponton body, remove four mounting bolts, nuts, lock washers, and mounting bolt plates. From left side, remove four mounting bolts, flat washers, body hold-down springs and nuts, and one mounting bolt plate.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

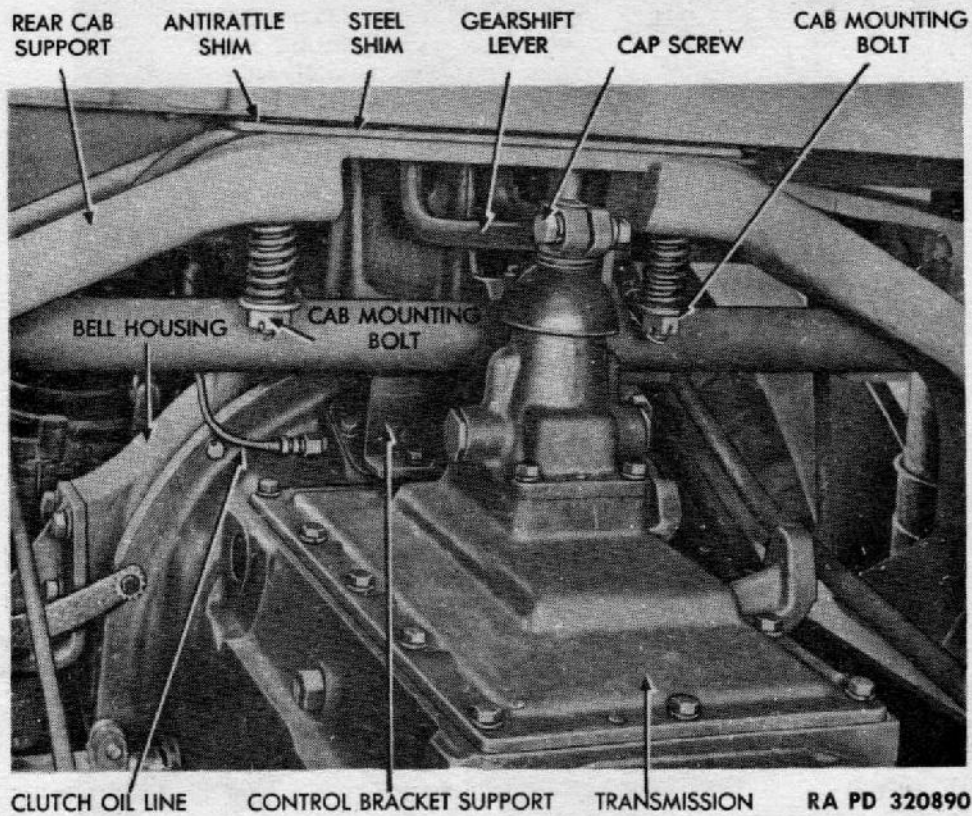


Figure 88 — Transmission Installed — Upper Rear View

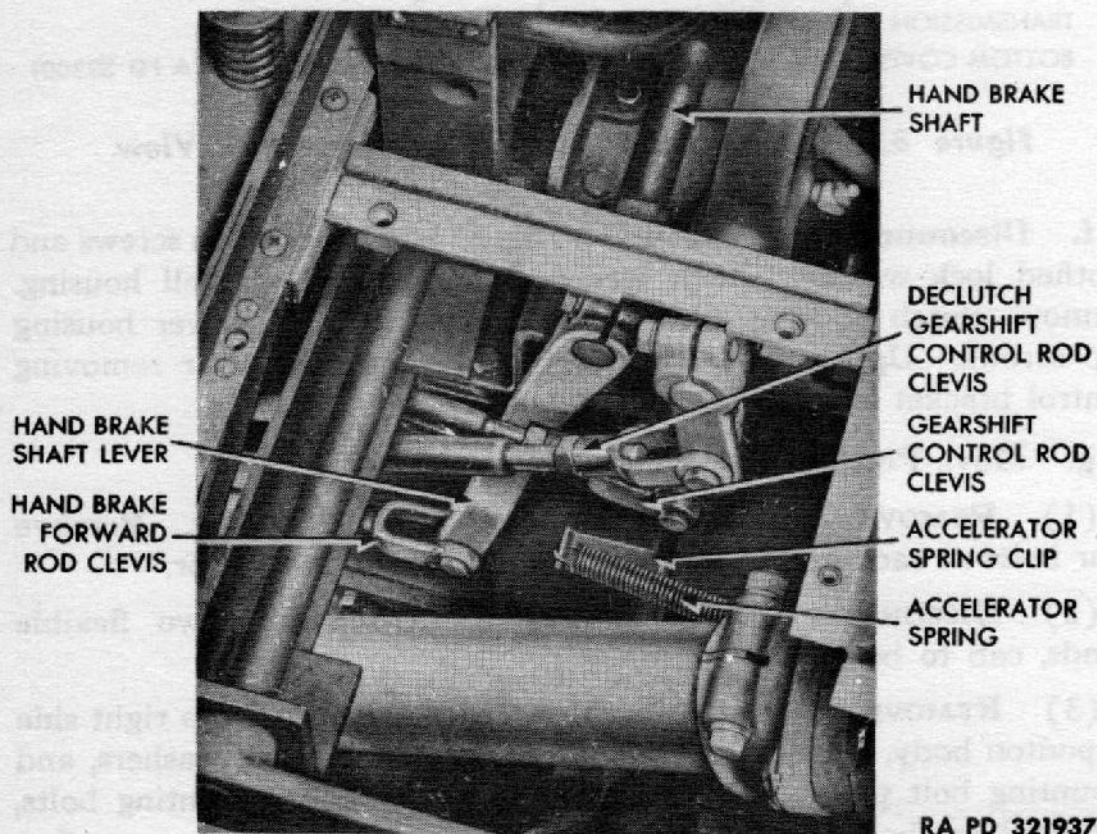


Figure 89 — Gearshift Control Rods and Linkage

TRANSMISSION AND POWER TAKE-OFF

(4) **REMOVE SPARE TIRE AND WHEEL.** Remove three wheel nuts attaching spare wheel and tire to carrier bracket at rear of ponton body. Lift off spare wheel and tire.

(5) **DISCONNECT HOSE COUPLING REAR FRAME BRACKETS** (fig. 75). Remove bolts, nuts, and lock washers which secure left- and right-hand hose coupling rear frame brackets to ponton body.

(6) **REMOVE RIGHT-HAND WOOD BODY SILL.** Pry up ponton body and pull out right-hand wood body sill.

(7) **ROLL PANTON BODY AWAY FROM CAB.** Place roller under ponton body, and roll body back about three feet. Body must be moved to right to provide clearance past the body locating plate which is bolted to the left-hand frame rail.

h. Remove Exhaust Pipe (par. 72 b (1)).

i. Remove Clutch Oil Line (fig. 88). Disconnect clutch oil line from transmission by screwing out brass union.

j. Remove Gearshift Lever (fig. 88). Remove nut, lock washer, and cap screw at bottom end of gearshift lever. Lift off gearshift lever.

k. Remove Hand Brake Shaft Lever (fig. 89). Disconnect hand brake forward rod clevis from hand brake shaft lever by removing cotter pin and clevis pin (fig. 89). Remove cap screw and lock washer at upper end of hand brake shaft lever. Tap hand brake shaft lever off hand brake shaft.

l. Disconnect Control Bracket Support (figs. 88 and 81). Remove four cap screws and lock washers securing control bracket to control bracket support, and two cap screws, lock washers, and spacers, securing control bracket support to transmission. Leave two front cap screws in place. Disconnect rear end of carburetor control rod and accelerator control rod by removing cotter pins. Raise the control bracket, and work the control bracket support to the left side of the transmission (fig. 81).

m. Lift Out Transmission (fig. 90). Wrap a length of chain around the front and rear of the transmission. Using an overhead hoist, take up weight of unit. Pry transmission away from clutch housing and move it back about eight inches. Lower unit to ground between chassis frame side rails. Slide transmission out from under vehicle.

126. INSTALLATION.

a. Position Transmission to Clutch Bell Housing (fig. 90). Slide transmission under vehicle. Attach rope sling, and raise to position about a foot behind bell housing. Push transmission forward to position against bell housing. Do not allow main drive gear to drag

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

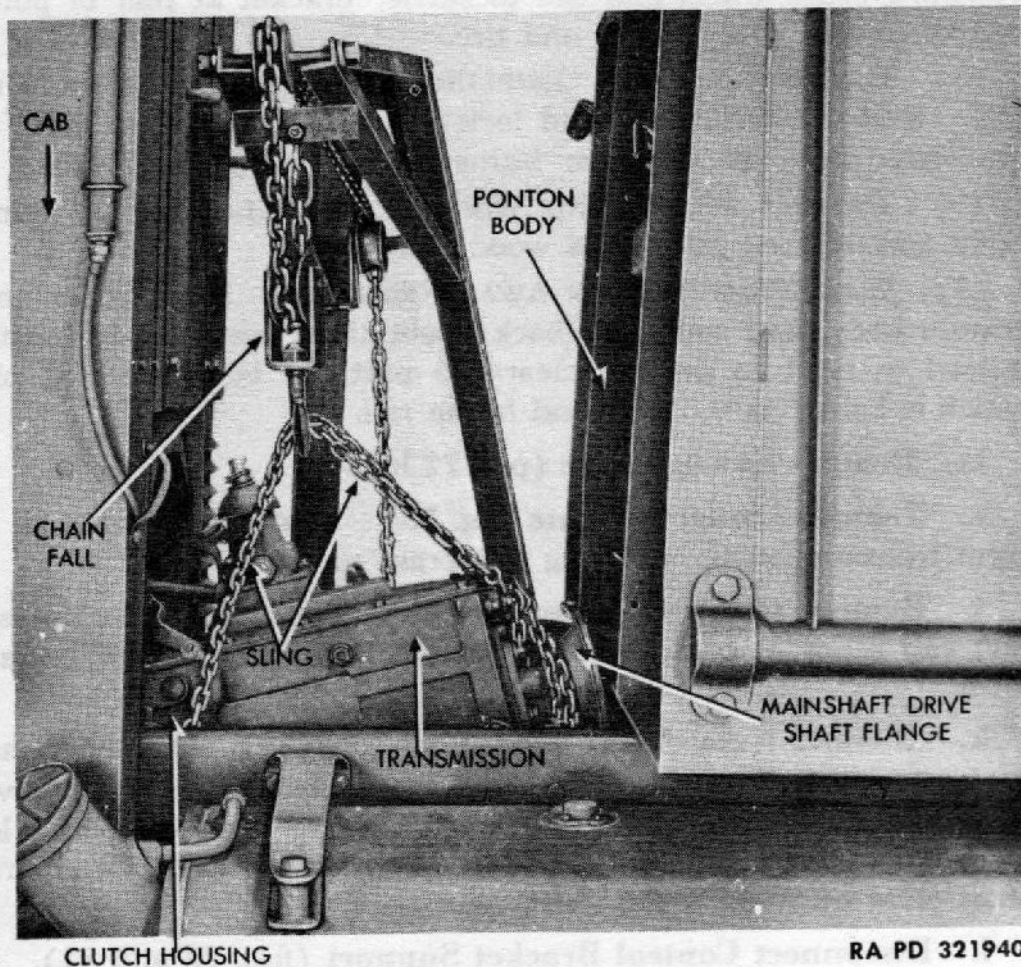


Figure 90 — Removing Transmission

on clutch. Install the ten cap screws and lock washers which secure transmission to housing. On the second cap screw on right side, counting from top, attach accelerator spring clip (fig. 89). On the third cap screw on left-hand side, counting from the top, install bond strap and toothed lock washers. On the third cap screw on right-hand side, counting from top, install bond strap and toothed lock washers.

b. **Install Control Bracket Support** (fig. 88). Position control bracket support under control bracket. Install two cap screws, lock washers, and spacers which secure control bracket support to transmission. Install four cap screws and lock washers which secure control bracket to control bracket support and to transmission. Attach rear end of carburetor control rod and accelerator control rod to carburetor control rod lever and accelerator cross shaft lever.

c. **Install Hand Brake Shaft Lever**. Install Woodruff key on end of hand brake shaft lever. Tap hand brake shaft lever on hand brake shaft. Install cap screw and lock washer through hand brake

TRANSMISSION AND POWER TAKE-OFF

shaft lever. Install hand brake forward rod clevis on end of hand brake shaft lever. Insert clevis pin and cotter pin.

d. **Install Gearshift Lever** (fig. 88). Tap gearshift lever on stub. Tighten bolt and nut which secure lever to lever stub.

e. **Connect Clutch Oil Line** (fig. 88). Position tube to transmission, and screw on union which secures tube to transmission.

f. **Install Exhaust Pipe** (par. 72 c (3)).

g. **Install Ponton Body.**

(1) Place rollers under ponton body, and roll it into position on frame side rails. Body must be moved to right to provide clearance past the body locating plate which is bolted to the left-hand frame rail.

(2) **INSTALL BODY SILLS.** Pry up body, and insert right-hand wood body sill and left-hand sill.

(3) **INSTALL PANTON BODY MOUNTING BOLTS.** Insert rear right-hand mounting bolts in lower mounting bolt plate. Position bolts on each side of right-hand frame side rail. Install top mounting bolt plate, lock washers, and nuts. Install front right-hand mounting bolts in a similar manner. Install four left-hand body mounting bolts, mounting bolt plates, body hold-down springs, flat steel washers, and nuts. Tighten nuts until length of each spring is two inches.

(4) **CONNECT HOSE COUPLING REAR FRAME BRACKETS** (fig. 75). Install right- and left-hand hose coupling rear frame brackets to ponton body with bolts, lock washers, and nuts.

(5) **INSTALL SPARE TIRE AND WHEEL.** Lift spare wheel and tire into position on bracket in rear of ponton body, and secure with three wheel nuts.

(6) **CONNECT FLEXIBLE BONDS.** Connect two cab to body flexible bonds to ponton body at right and left side of front end of body.

(7) **INSTALL TOOL BOX.** Position tool box on right side of vehicle. Install four bolts at each end of tool box. Replace tools and equipment in tool box.

h. **Connect Clutch Throw-out Shaft Lever** (par. 123 b).

i. **Connect Winch Drive Shaft** (par. 136 c).

j. **Connect Power Take-off Control** (fig. 87). Install rear shift rod lower clevis on shift rod arm. Install clevis pin and cotter pin.

k. **Install Intermediate Drive Shaft** (par. 134 c).

l. **Connect Front Drive Shaft** (par. 135 c).

TM 9-817
126

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

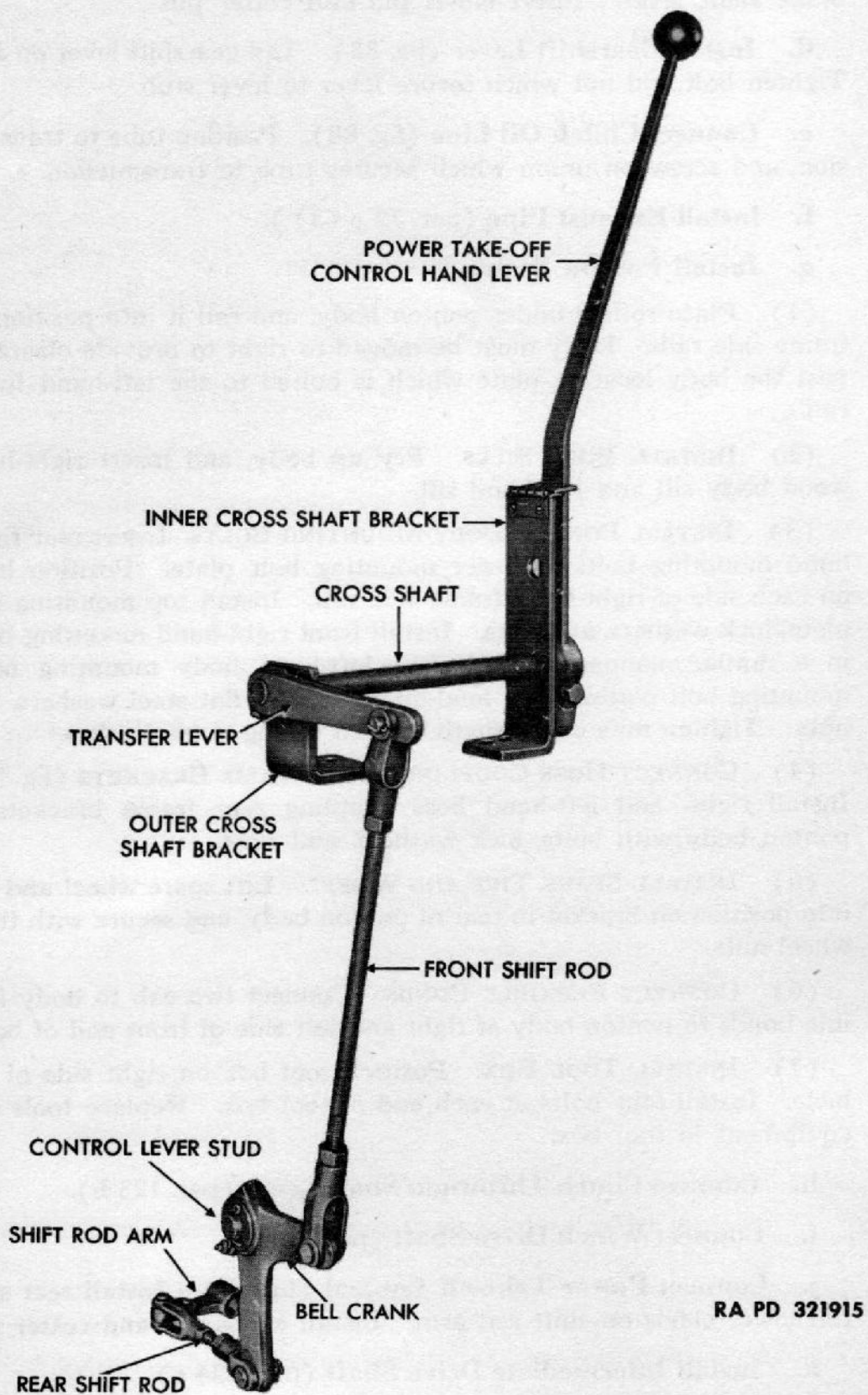


Figure 91 - Power Take-off Controls

TRANSFER CASE AND LINKAGE

127. POWER TAKE-OFF CONTROLS.

a. **Removal** (fig. 91). Remove cotter pins and clevis pins from rear end of shift rod. Remove cotter pins and clevis pins from each end of front shift rod and lift off rod. Remove cotter pin from end of control lever stud and lift off bell crank.

b. **Installation** (fig. 91). Attach rear shift rod clevis to shift rod arm with clevis pin and cotter pin. Attach front shift rod arm to transfer lever at top, and bell crank at bottom, with clevis pins and cotter pins. Attach bell crank to control lever stud with flat washer and cotter pin.

Section XXV

TRANSFER CASE AND LINKAGE

128. DESCRIPTION AND TABULATED DATA.

a. **Description** (fig. 93). The transfer case is mounted at the rear of the main transmission. It transfers engine power through the propeller shafts from the transmission to the front and rear axles. Gears are arranged for two speeds—one direct (high range) and the other (low range) underdrive. Selection of speed is provided through linkage attached to a lever in the cab. Provision is also made to engage or disengage the front axle through linkage attached to the declutch lever in the cab. The truck cannot be operated in low range with the front axle disengaged. Make range changes when the vehicle is stopped.

b. **Tabulated Data.**

Manufacturer	Timken-Detroit
Model	T-76-2
Gear ratios:	
High range	1.00 to 1
Low range	1.72 to 1

129. REMOVAL OF LINKAGE (fig. 92).

a. **Remove Declutch Shift and Gearshift Control Rods.** Remove cotter pins and clevis pins from each end of declutch shift and gearshift control rods. Lift out control rods.

b. **Remove Declutch Control Cross Shaft.** Disconnect forward and rear hand brake rod from disk brake link operating lever by removing cotter pin and clevis pin. Disconnect declutch shift lever from declutch shift control link by removing cotter pin and clevis pin. Remove safety wires, cap screws, and lock washers attaching support brackets to transfer case front support. Lift off brackets, and lower the declutch control cross shaft assembly.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

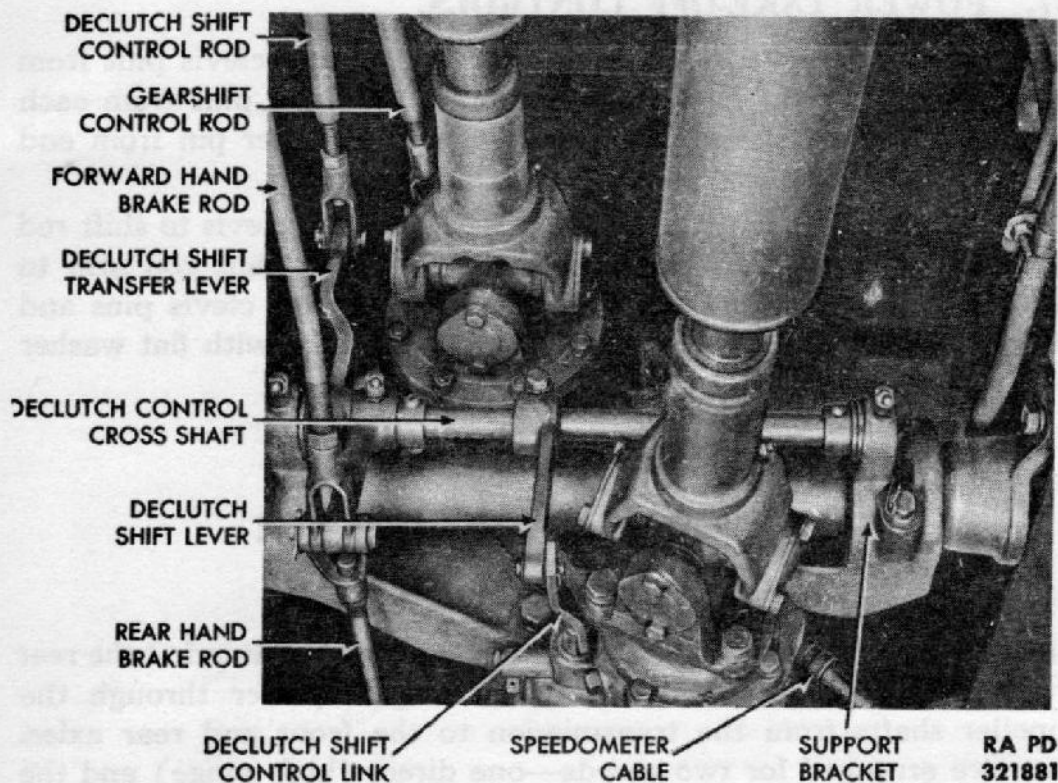


Figure 92 - Transfer Case Linkage

130. INSTALLATION OF LINKAGE (fig. 92).

a. **Install Declutch Control Cross Shaft.** Position declutch control cross shaft to transfer case front support. Attach support brackets by installing cap screws and lock washers. Install safety wires. Connect declutch shift lever to declutch shift control link by installing clevis pin and cotter pin. Connect forward and rear hand brake rod to disk brake link operating lever by inserting clevis pin and cotter pin.

b. **Install Declutch Shift and Gearshift Control Rods.** Position declutch shift rod between declutch shift hand lever and declutch shift transfer lever. Secure with clevis pin and cotter pin at each end. Position gearshift control rod between gearshift hand lever and gearshift shaft. Secure with clevis pin and cotter pin.

131. REMOVAL OF TRANSFER CASE.

a. **Remove Ponton Body.** Disconnect ponton body (par. 125 g). Lift off ponton body, using chain fall.

b. **Remove Linkage** (par. 93). *NOTE: Front ends of declutch shift control rod and gearshift control rod are not disconnected.*

c. **Remove Drive Shafts.** Remove intermediate drive shaft (par. 134 b). Detach front drive shaft from transfer case declutch shaft

TRANSFER CASE AND LINKAGE

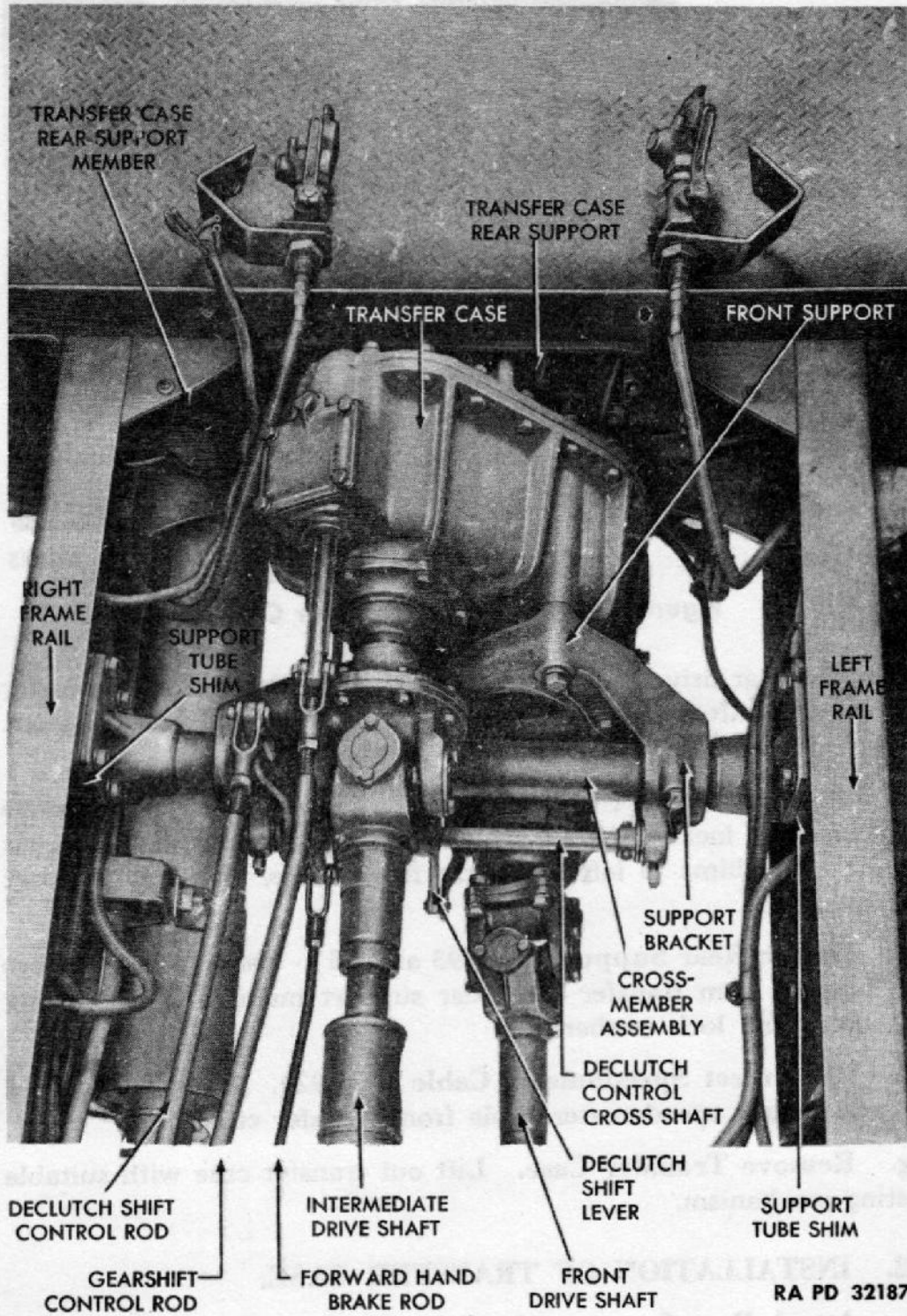


Figure 93 — Transfer Case Installed

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

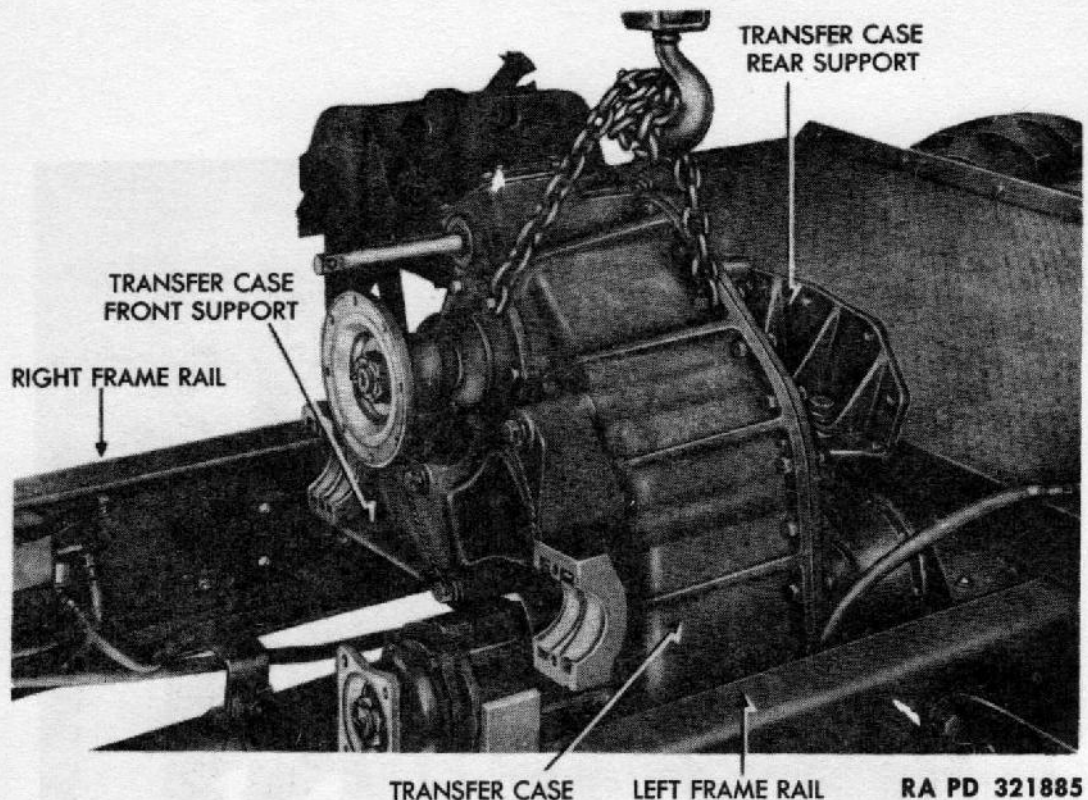


Figure 94 — Removing Transfer Case

flange, and rear drive shaft from drive shaft brake disk and transfer case driven shaft flange by removing nuts, bolts, and lock washers. Lower front and rear drive shafts to floor.

d. **Remove Support Tube and Shims** (figs. 93 and 95). Remove nuts, bolts, and lock washers attaching transfer case support tube and support tube shims to left and right frame rails. Lift out support tube and shims.

e. **Detach Rear Support** (figs. 93 and 95). Detach transfer case rear support from transfer case rear support member by removing nuts, bolts, and lock washers.

f. **Disconnect Speedometer Cable** (fig. 92). Back off knurled nut, and detach speedometer cable from transfer case.

g. **Remove Transfer Case.** Lift out transfer case with suitable hoisting mechanism.

132. INSTALLATION OF TRANSFER CASE.

a. **Attach Rear Support** (fig. 94). Use a hoist, and lift transfer case into position between frame rails. Attach rear support to transfer case rear support member with lock washers, nuts, and bolts.

TRANSFER CASE AND LINKAGE

RA PD 32188

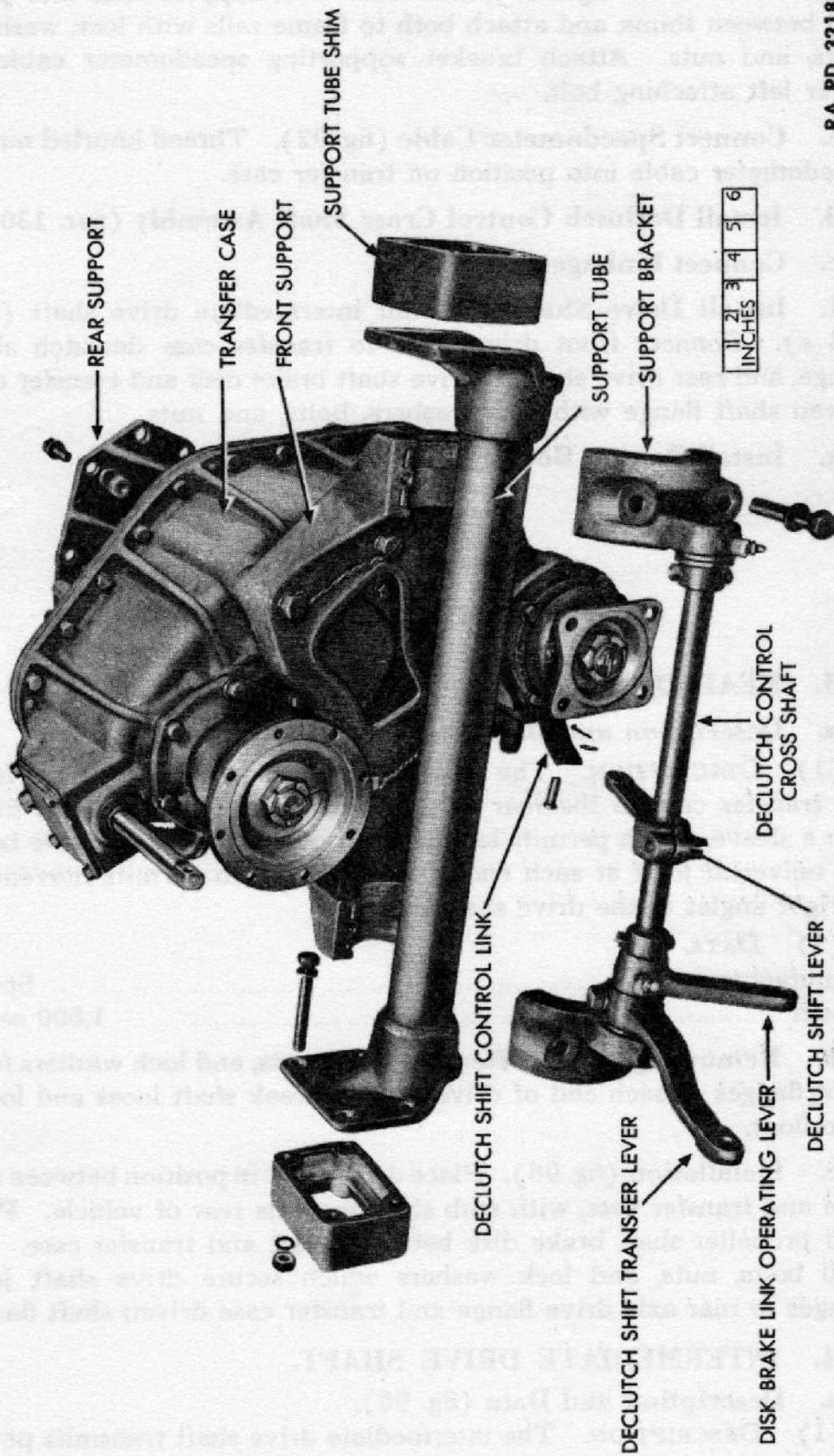


Figure 95 - Transfer Case Assemblies

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

b. Install Support Tube and Shims (figs. 93 and 95). Place support tube shims against frame rails. Lift support tube into position between shims, and attach both to frame rails with lock washers, bolts, and nuts. Attach bracket supporting speedometer cable to lower left attaching bolt.

c. Connect Speedometer Cable (fig. 92). Thread knurled nut on speedometer cable into position on transfer case.

d. Install Declutch Control Cross Shaft Assembly (par. 130 a).

e. Connect Linkage (par. 130 b).

f. Install Drive Shafts. Install intermediate drive shaft (par. 134 c). Connect front drive shaft to transfer case declutch shaft flange, and rear drive shaft to drive shaft brake disk and transfer case driven shaft flange with lock washers, bolts, and nuts.

g. Install Ponton Body (par. 126 g).

Section XXVI

DRIVE SHAFTS

133. REAR DRIVE SHAFT.

a. Description and Data (fig. 96).

(1) **DESCRIPTION.** The rear drive shaft transmits power from the transfer case to the rear axle. It consists of a stub shaft fitted into a sleeve, which permits lengthwise movement, and a needle bearing universal joint at each end of the unit, which permits movement at right angles to the drive shaft.

(2) **DATA.**

Manufacturer Spicer
Model 1,600 series

b. Removal (fig. 96). Remove bolts, nuts, and lock washers from joint flanges at each end of drive shaft. Break shaft loose and lower it to floor.

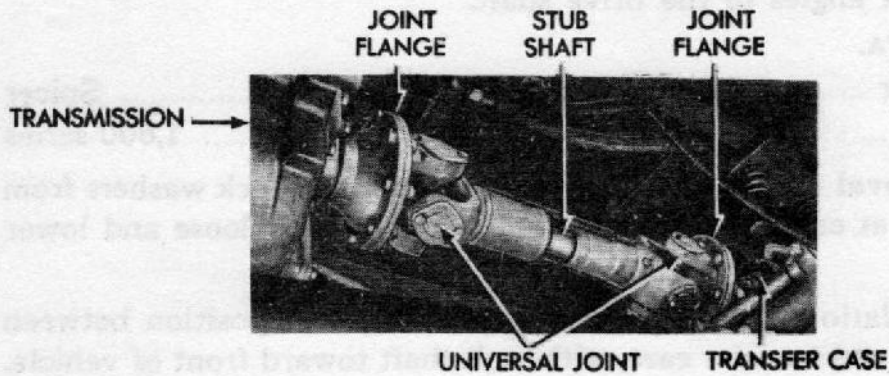
c. Installation (fig. 96). Place drive shaft in position between rear axle and transfer case, with stub shaft towards rear of vehicle. Position propeller shaft brake disk between shaft and transfer case. Install bolts, nuts, and lock washers which secure drive shaft joint flanges to rear axle drive flange and transfer case driven shaft flange.

134. INTERMEDIATE DRIVE SHAFT.

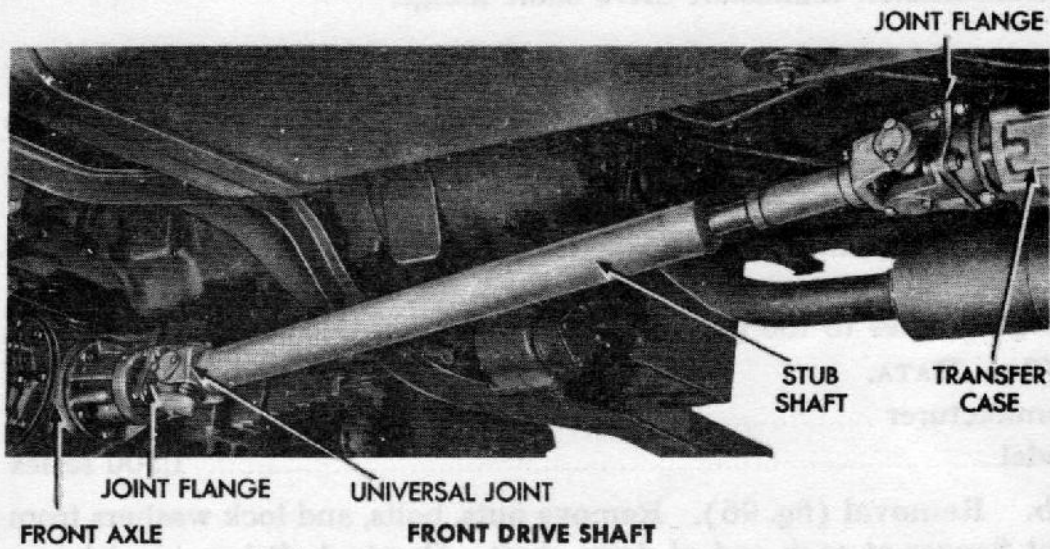
a. Description and Data (fig. 96).

(1) **DESCRIPTION.** The intermediate drive shaft transmits power from the transmission to the transfer case. It consists of a stub shaft

DRIVE SHAFTS



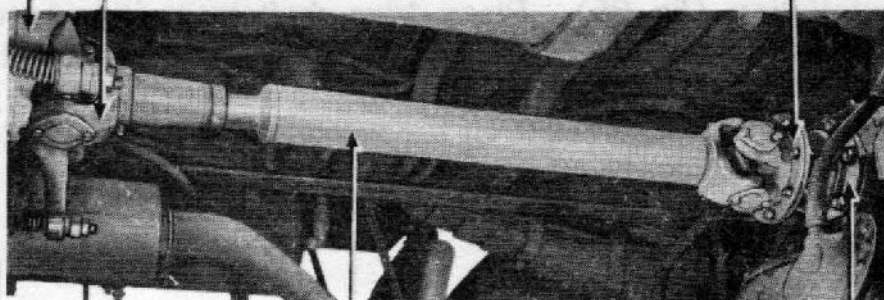
INTERMEDIATE DRIVE SHAFT



DISK BRAKE

UNIVERSAL JOINT

JOINT FLANGE



STUB SHAFT

REAR AXLE

REAR DRIVE SHAFT

RA PD 321898

Figure 96 — Drive Shafts Installed

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

fitted into a sleeve, which permits lengthwise movement, and a needle bearing universal joint at each end of the unit, which permits movement at right angles to the drive shaft.

(2) DATA.

Manufacturer Spicer
 Model 1,600 series

b. Removal (fig. 96). Remove bolts, nuts, and lock washers from joint flanges at each end of drive shaft. Break shaft loose and lower it to floor.

c. Installation (fig. 96). Place drive shaft in position between transmission and transfer case, with stub shaft toward front of vehicle. Install bolts, lock washers, and nuts which secure drive shaft joint flange to transfer case mainshaft flange, and drive shaft joint flange to transmission mainshaft drive shaft flange.

135. FRONT DRIVE SHAFT.

a. Description and Data (fig. 96).

(1) DESCRIPTION. The front drive shaft transmits power from the transfer case to the front axle. It consists of a stub shaft fitted into a sleeve, which permits lengthwise movement, and a needle bearing universal joint at each end of the unit, which permits movement at right angles to the drive shaft.

(2) DATA.

Manufacturer Spicer
 Model 1,500 series

b. Removal (fig. 96). Remove nuts, bolts, and lock washers from joint flanges at each end of drive shaft. Break shaft loose and lower it to floor.

c. Installation (fig. 96). Place drive shaft in position between transfer case and front axle, with stub shaft toward front of vehicle. Install bolts, lock washers, and nuts which secure drive shaft joint flange to transfer case declutch shaft flange, and drive shaft joint flange to front axle driving flange.

136. WINCH DRIVE SHAFT.

a. Description and Data.

(1) DESCRIPTION. The winch drive shaft transmits power from the power take-off to the winch. It consists of a splined shaft with a universal joint at each end. The rear end of the shaft is a slip fit in the universal joint, which permits lengthwise movement. The front universal joint is fitted with a shear pin to prevent overload of power take-off.

FRONT AXLE

(2) DATA.

Manufacturer	Gar Wood
Model:	
Take-off joint	6Y1911
Worm joint	6Y1931A
Drive shaft	6Y1255A
Shear pin	6Y1295

b. **Removal.** Loosen set screw in drive shaft collar. Remove cotter pin from shear pin and drive out shear pin. Pry worm joint off worm. Pull worm joint and shaft away from power take-off joint. Loosen set screw in power take-off joint, and pry joint off power take-off shaft. Remove key.

c. **Installation.** Install feather key in power take-off shaft. Drive on take-off joint. Tighten set screw. Slide shaft collar on drive shaft. Insert rear end of drive shaft into take-off joint until worm joint will clear worm. Slide shaft forward, with worm joint on worm. Install shear pin, flat washers, and cotter pin. Place shaft collar $\frac{3}{4}$ inch from take-off joint. Tighten shaft collar set screw.

Section XXVII

FRONT AXLE

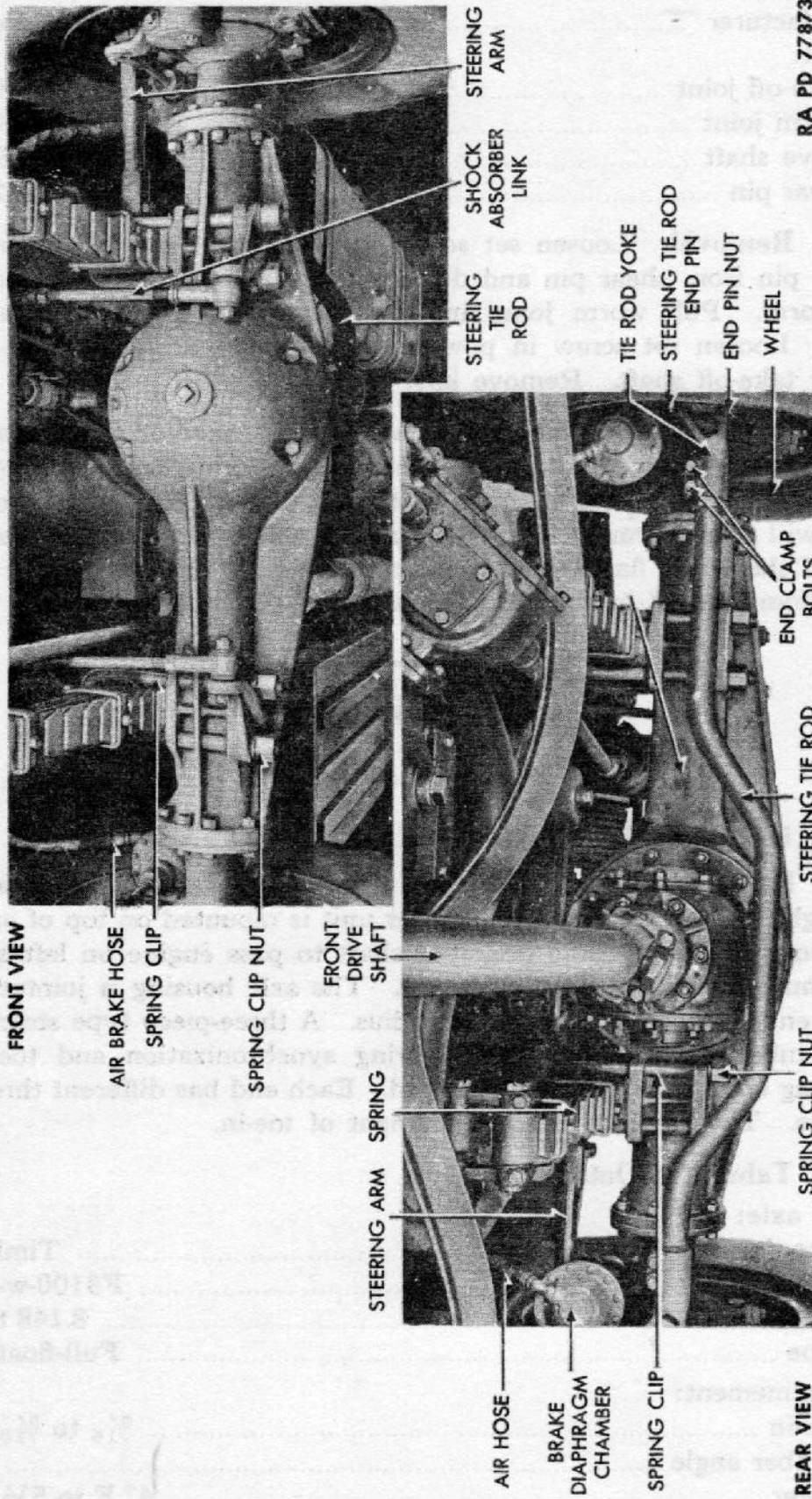
137. DESCRIPTION AND TABULATED DATA.

a. **Description** (fig. 97). The front axle is attached to frame through front springs. A gear carrier unit is mounted on top of axle, off center. This permits propeller shaft to pass engine on left side and thus provide full road clearance. The axle housing is jointed at outer ends to permit full turning radius. A three-piece type steering cross tube (tie rod) controls steering synchronization and toe-in. Steering cross tube ends are threaded. Each end has different thread pitches. This permits close adjustment of toe-in.

b. **Tabulated Data.**

Front axle:	
Manufacturer	Timken
Model	F3100-w-x-5
Ratio	8.148 to 1
Type	Full-floating
Axle alinement:	
Toe-in	$\frac{3}{16}$ to $\frac{5}{16}$ in.
Camber angle	0°
Caster	4° F to 5½° F

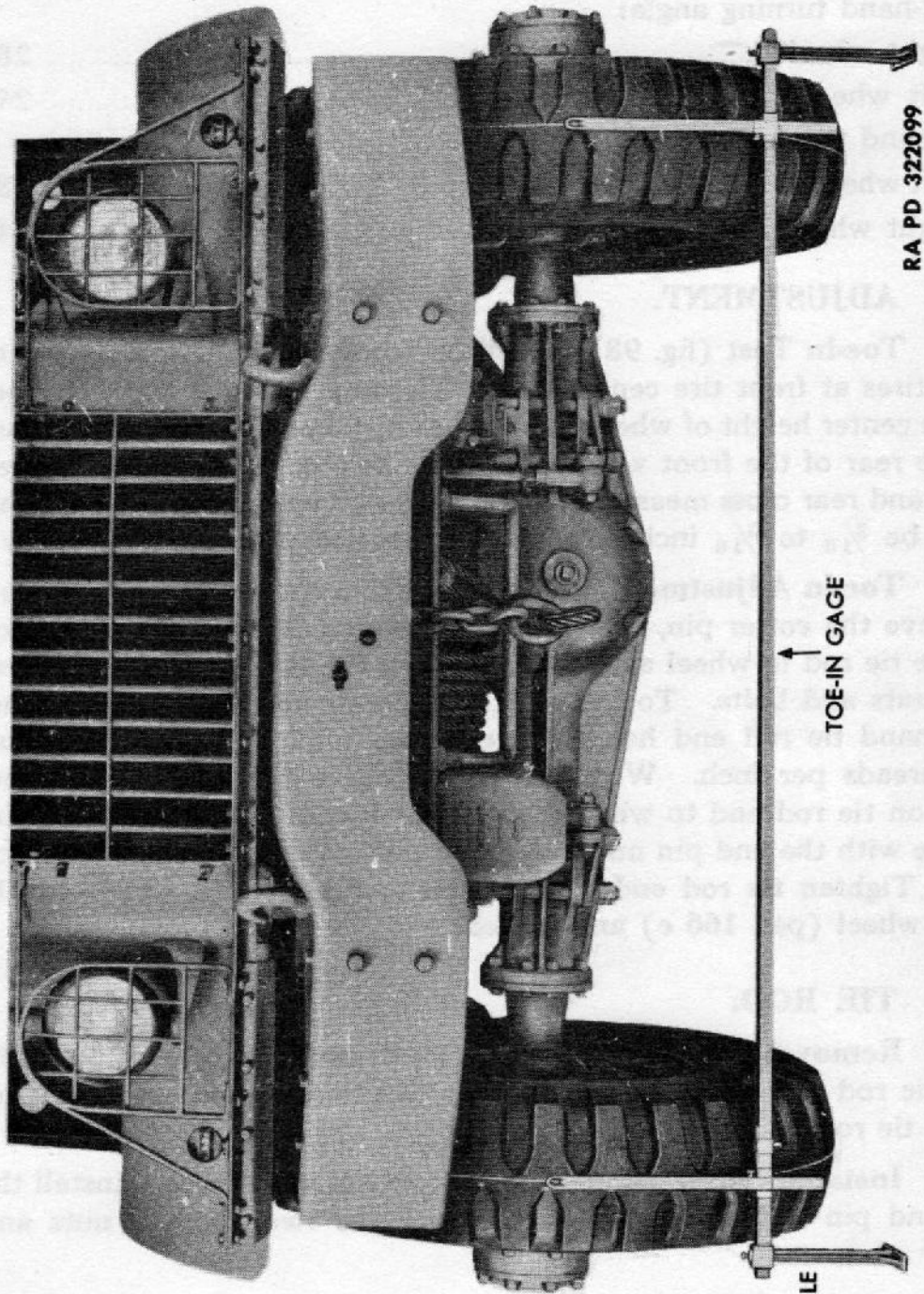
5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 77873

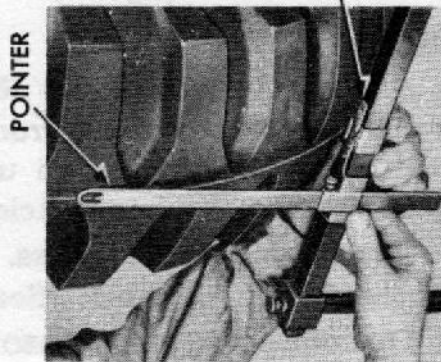
Figure 97 — Front Axle Installed

FRONT AXLE



RA PD 322099

TOE-IN GAGE



POINTER

SCALE

Figure 98 — Toe-in Test

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

Right-hand turning angle:

Right wheel	28°
Left wheel	24°

Left-hand turning angle:

Left wheel	28°
Right wheel	24°

138. ADJUSTMENT.

a. **Toe-in Test** (fig. 98). Position wheels straight ahead. Mark both tires at front tire center lines. Measure distance between lines at the center height of wheels. Measure distance between center lines at the rear of the front wheels at center height. Difference between front and rear cross measurements determines amount of toe-in. This must be $\frac{3}{16}$ to $\frac{5}{16}$ inches. Adjust if necessary (subpar. b, below).

b. **Toe-in Adjustment.** Remove right front wheel (par. 166 b). Remove the cotter pin, lock nut, and steering tie rod end pin which secure tie rod to wheel assembly. Loosen the two tie rod end clamp bolt nuts and bolts. To increase or decrease toe-in, turn yoke end. Left-hand tie rod end has 12 threads per inch; right-hand end has 16 threads per inch. When toe-in of $\frac{3}{16}$ to $\frac{5}{16}$ inch is attained, position tie rod end to wheel assembly. Install tie rod end pin and secure with the end pin nut and cotter pin. Tighten tie rod end lock nut. Tighten tie rod end clamp bolts and bolt nuts. Install right front wheel (par. 166 c) and recheck.

139. TIE ROD.

a. **Removal.** Remove the two cotter pins, tie rod end pin nuts, and tie rod end pins which secure tie rod to wheel assemblies. Remove tie rod.

b. **Installation.** Position tie rod to wheel assemblies. Install the rod end pin at both ends. Secure with the two end pin nuts and cotter pins.

140. FRONT AXLE (fig. 97).

a. **Removal.**

(1) **ANCHOR VEHICLE, AND RAISE FRONT END.** Set propeller shaft brake to prevent vehicle from moving. Attach suitable lifting tackle to bumper. If jacks are used, position to frame at rear of front spring. Raise vehicle sufficiently to take weight off springs.

(2) **DISCONNECT AIR BRAKES.** Unscrew nut from air brake tube fitting at diaphragm chamber. Seal opening with tape or cloth.

(3) **DISCONNECT SHOCK ABSORBERS** (par. 171 c).

REAR AXLE

- (4) **DISCONNECT FRONT DRIVE SHAFT.** Remove four nuts, bolts, and lock washers from front drive shaft front flange, and drop drive shaft to floor.
- (5) **DISCONNECT STEERING DRAG LINK AT AXLE BALL ARM.** Remove cotter pin and nut which secure drag link to steering arm ball.
- (6) **REMOVE SPRING CLIPS (U-BOLTS)** (par. 169 b (3), and (6)).
- (7) **REMOVE AXLE FROM VEHICLE.** Lift chassis high enough to disengage springs from axle. Pull axle assembly from vehicle.
- (8) **REMOVE STEERING TIE ROD.** Remove two cotter pins, tube end pin nuts, and end pins which secure tie rod to wheel assemblies. Remove tie rod.
- (9) **REMOVE FRONT WHEELS** (par. 166 b).

b. Installation.

- (1) **INSTALL FRONT WHEELS** (par. 166 c).
- (2) **INSTALL STEERING TIE ROD.** Position tie rod to wheel assembly. Install the rod end pin at both ends. Secure with the two end pin nuts and cotter pins.
- (3) **POSITION AXLE UNDER VEHICLE.** Roll axle to position under front springs so that spring clips (U-bolts) may be installed. Lower chassis so springs contact axle housing.
- (4) **INSTALL SPRING CLIPS (U-BOLTS).** Position clip keeper and clips to spring and spring clip plate. Secure with four lock washers and clip nuts.
- (5) **CONNECT STEERING DRAG LINK AT AXLE BALL ARM** (par. 175 b).
- (6) **CONNECT FRONT DRIVE SHAFT.** Position front drive shaft front flange to front axle differential flange and secure with four bolts, lock washers, and nuts.
- (7) **CONNECT SHOCK ABSORBERS** (par. 171 d).
- (8) **CONNECT AIR BRAKES.** Position brake tube on diaphragm chamber. Connect nut.
- (9) **REMOVE LIFTING APPARATUS.** Lower vehicle to floor. Remove lifting device. Release propeller shaft brake.

Section XXVIII

REAR AXLE

141. DESCRIPTION AND TABULATED DATA.

a. **Description** (fig. 99). Rear axle is of conventional double reduction type. The "unicast" axle housing has inserted tubes which

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

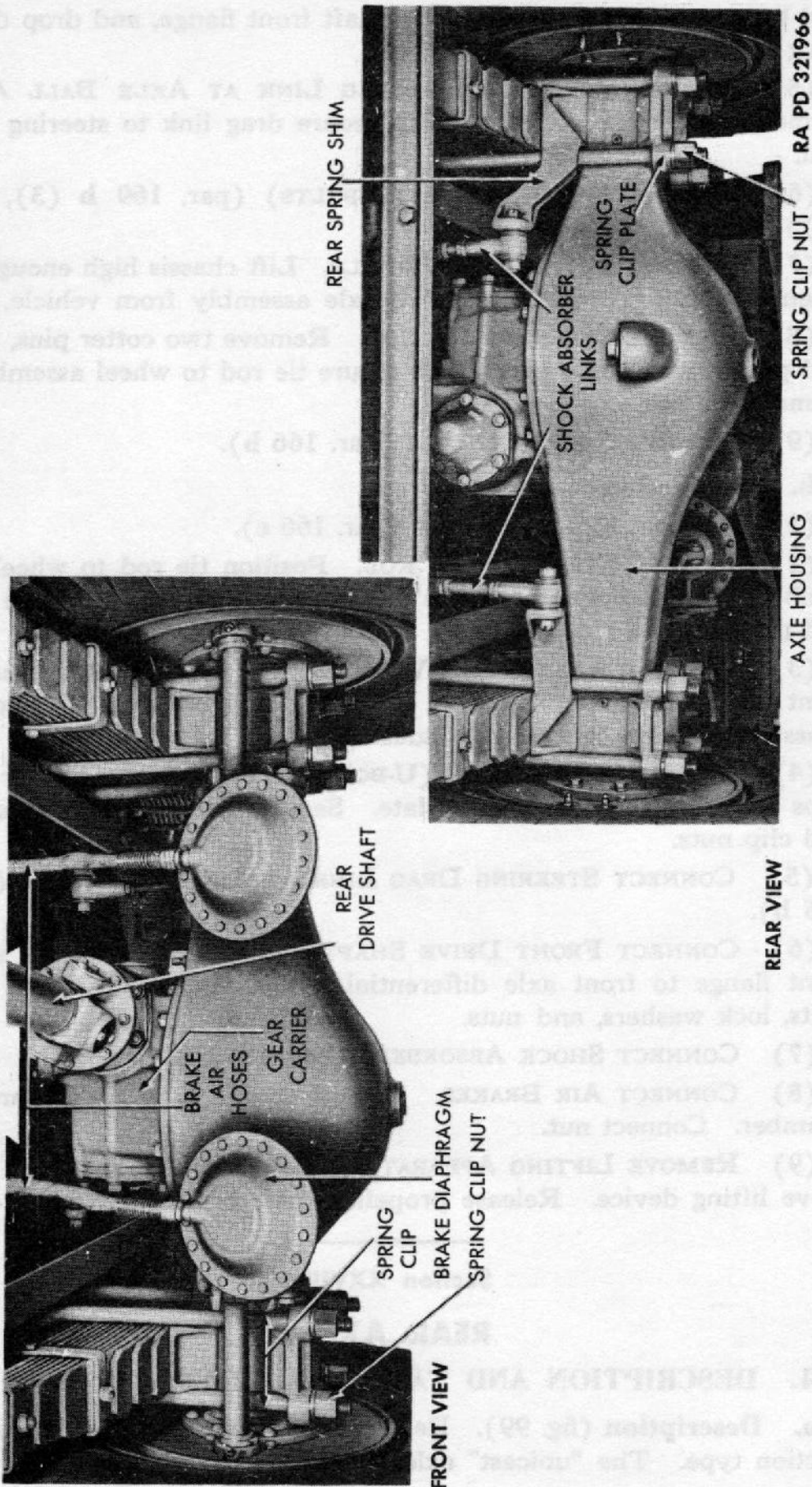


Figure 99 — Rear Axle Installed

REAR AXLE

carry the vehicle weight, and thus provide a full-floating drive. A detachable gear set unit is mounted in a gear carrier on the axle housing.

b. Tabulated Data.

Manufacturer	Timken
Model	R-3100-w-x-z
Ratio	8.148 to 1
Type	Full-floating
Differential:	
Type	Full-floating

142. REAR AXLE.

a. Removal.

(1) REMOVE REAR SHOCK ABSORBER LINKS (fig. 99). Remove nut, lock washer, and flat washer attaching right-hand link end to rear spring shim at bottom and to shock absorber arm at top. Remove outer rubber bushings from top and bottom link ends. Pry link ends off top and bottom bolts. Follow same procedure to remove left-hand shock absorber link.

(2) DETACH AIR BRAKE HOSE. Detach air brake hose from two rear brake diaphragms by backing off hose connecting nut, and pulling hose off connection on each diaphragm. Seal opening on diaphragms with tape or cloth to prevent entrance of dust or dirt.

(3) DETACH REAR DRIVE SHAFT. Remove nuts, bolts, and lock washers attaching rear drive shaft to rear axle drive flange. Lift off rear drive shaft, and secure to one side with rope or wire.

(4) BLOCK UP REAR AXLE. Place wooden blocks on a jack or dolly, and support rear axle behind brake diaphragms. This must be done to prevent differential from tipping to floor when axle is detached from chassis.

(5) REMOVE SPRING CLIPS AND PLATES. Remove nuts and lock washers from spring clips. Tap up, and remove spring clips. Tap off rear spring clip plate from each side.

(6) REMOVE REAR AXLE ASSEMBLY. Lift or jack up rear of vehicle sufficiently to allow rear axle assembly to be rolled from under vehicle.

(7) REMOVE WHEELS (par. 166 b).

b. Installation.

(1) INSTALL WHEELS (par. 166 c).

(2) LOWER CHASSIS TO AXLE. Position axle under rear end of chassis so that spring clips line up with holes in rear spring clip plate. Lower chassis to axle.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

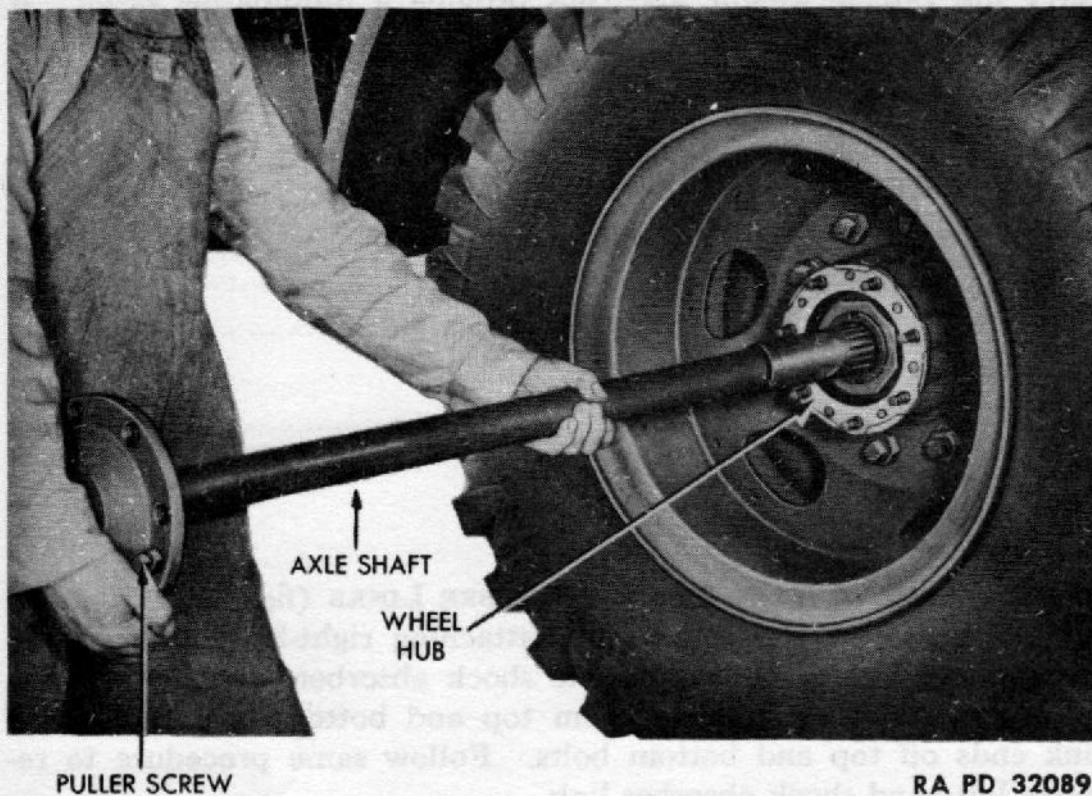


Figure 100 — Removing Axle Shaft

(3) **INSTALL SPRING CLIP NUTS.** Position clip keeper and clips to spring and clip plate on axle housing. Secure with four lock washers and clip nuts.

(4) **ATTACH REAR DRIVE SHAFT.** Install bolts, lock washers, and nuts securing rear drive shaft to rear axle drive flange.

(5) **CONNECT AIR BRAKE HOSES.** Remove seals. Position end of hose on diaphragm. Replace nut.

(6) **CONNECT REAR SHOCK ABSORBER LINKS** (figs. 126 and 127). Position shock absorber to frame. Install two bolts, lock washers, and nuts which secure it. Install link to spring clip plate, and secure with lock washers and jam nut.

143. AXLE SHAFT.

a. Removal. Remove lock wire attached to puller screws. Remove seven stud nuts, four lock washers, three toothed lock washers, and three dowels attaching axle shaft to wheel hub. Back off two puller screw nuts about three turns. Turn puller screws to partly draw axle shaft out of wheel hub. Lift out axle shaft.

b. Installation. Slide axle shaft into wheel hub, and position end of shaft on studs. Install three dowels into tapered holes in end of shaft. Place toothed lock washers against dowels, and install nuts.

SERVICE (AIR) BRAKES

Install remaining four lock washers and nuts. Turn puller screws until they touch wheel hub, and tighten puller screw nuts. Install safety wire.

Section XXIX

SERVICE (AIR) BRAKES

144. DESCRIPTION (fig. 101).

a. Air-controlled service brakes serve both tractor and trailer. Emergency connections on front of the vehicle make it possible to use service brakes when a disabled tractor is being towed. The brakes themselves are conventional shoe type mechanical brakes, controlled and applied by compressed air of the air system. Air is stored under pressure and admitted by valves to brake diaphragm chambers mounted on axles. Chambers are connected by push rods and slack adjusters which transmit motion to brake shoes.

145. AIR COMPRESSOR.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 102). The air compressor unit is mounted on left side of engine, and is driven by engine fan belts. It can be reached by removing left-hand toeboard and toeboard insert. The function of this two-cylinder pump is to charge the two reservoir tanks with pressure needed to operate brakes and air accessories. Lubrication is obtained from the engine pressure system by direct connections. Cooling is accomplished by tying into engine cooling system. One water line discharges water into water outlet manifold on top of the engine while another receives it from engine water pump.

(2) TABULATED DATA.

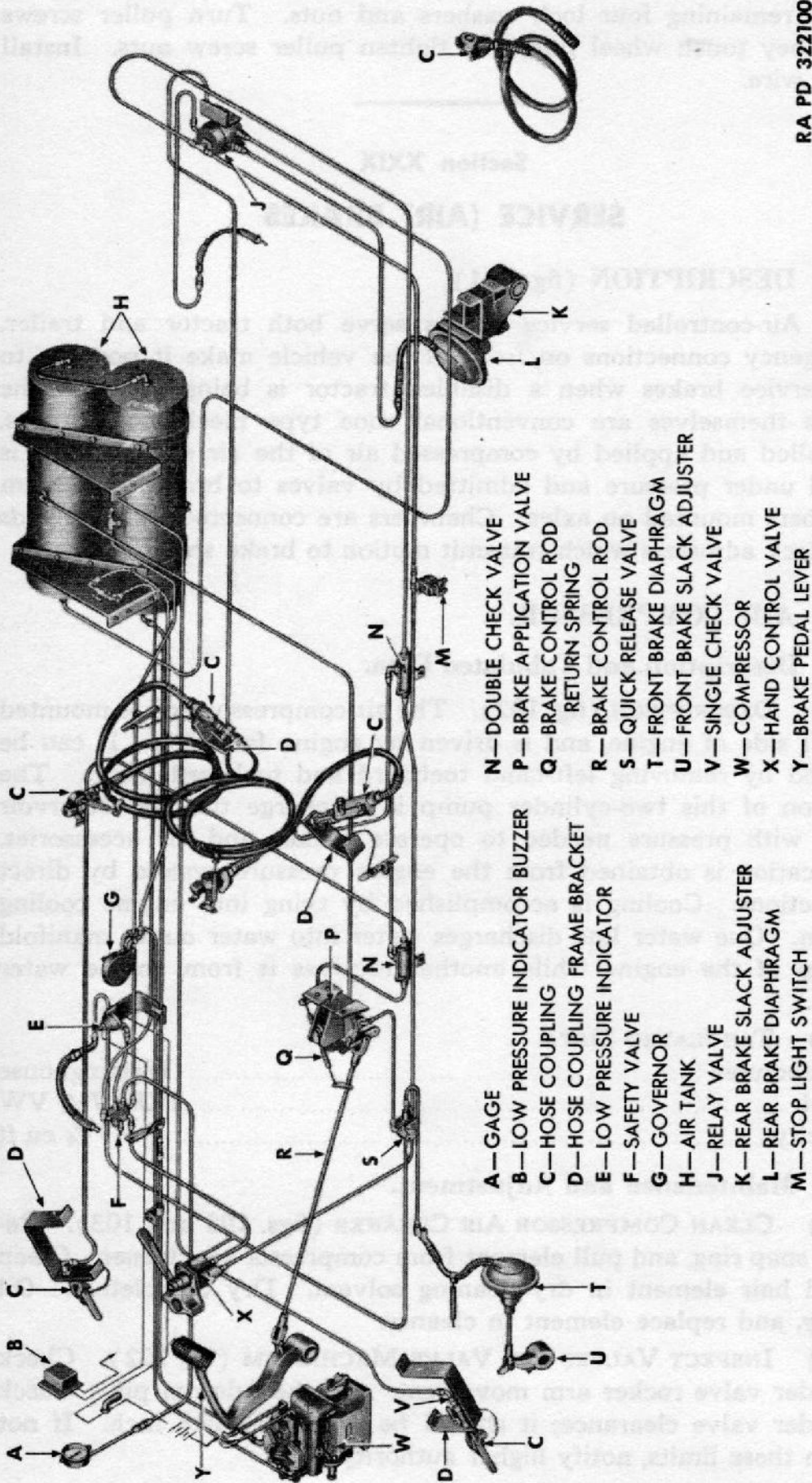
Manufacturer	Westinghouse
Model	2 UE 7 $\frac{1}{4}$ VW
Capacity	7 $\frac{1}{4}$ cu ft

b. Maintenance and Adjustment.

(1) CLEAN COMPRESSOR AIR CLEANER (figs. 102 and 103). Remove snap ring, and pull element from compressor air cleaner. Clean curled hair element in dry-cleaning solvent. Dry completely. Oil lightly, and replace element in cleaner.

(2) INSPECT VALVES AND VALVE MECHANISM (fig. 102). Check unloader valve rocker arm movement. Oil the fulcrum pin. Check unloader valve clearance; it should be 0.010 to 0.015 inch. If not within these limits, notify higher authority.

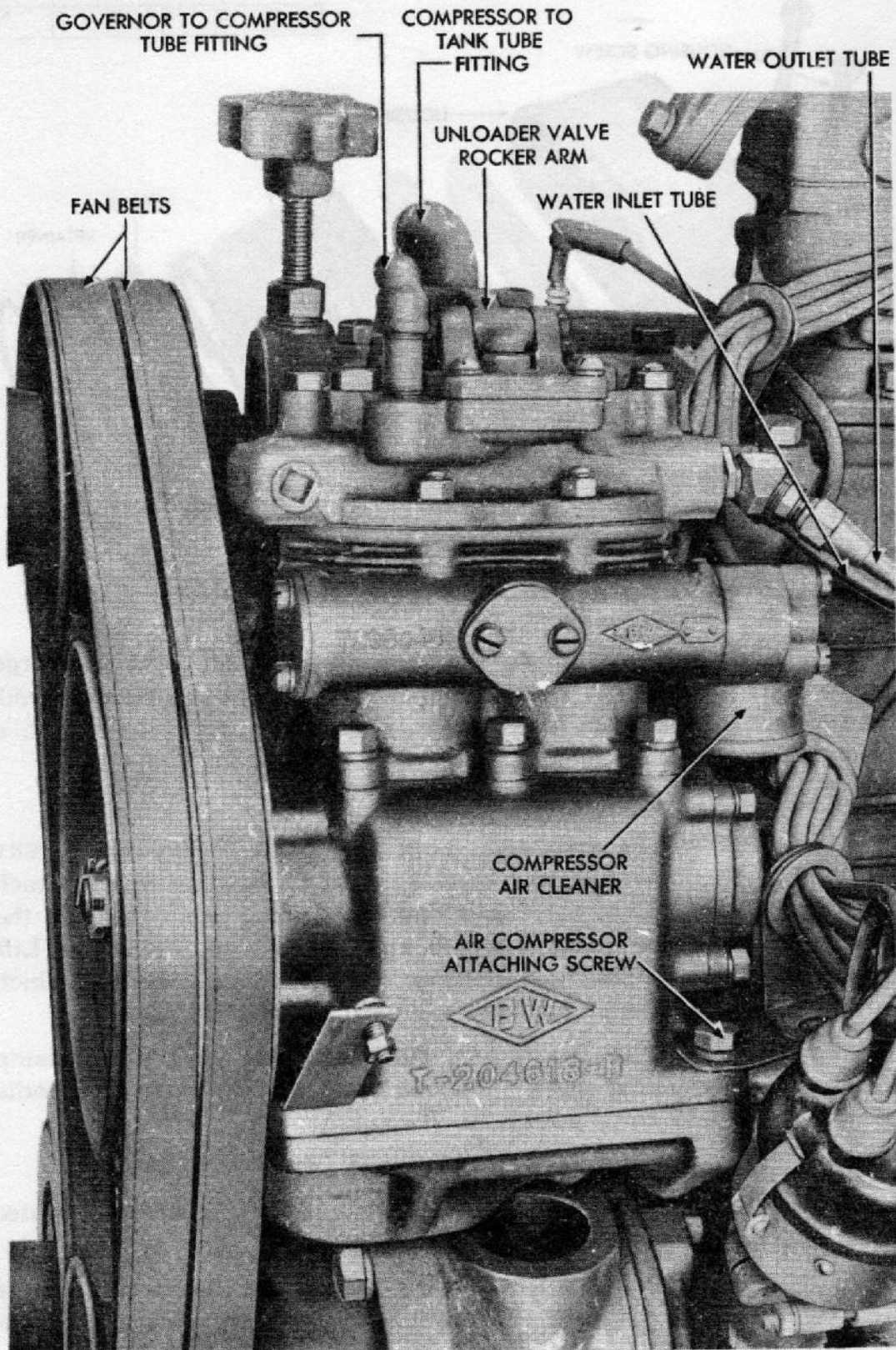
5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 322100

Figure 101 — Service Air Brake System

SERVICE (AIR) BRAKES



RA PD 77898

Figure 102 – Air Compressor Mounted on Engine

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

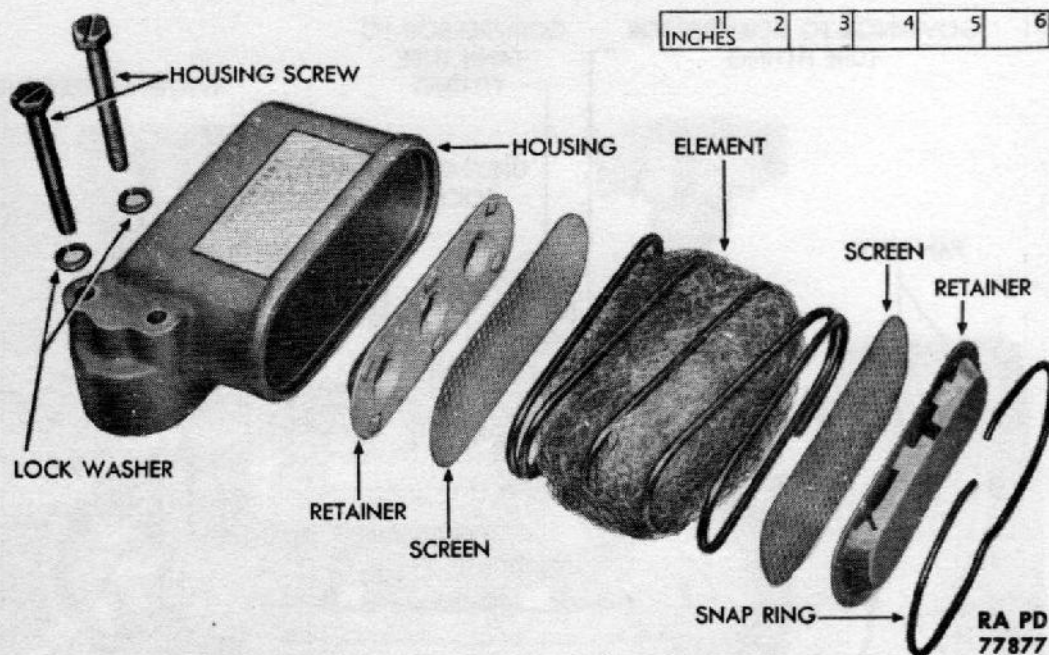


Figure 103 — Air Compressor Air Cleaner Disassembled

(3) CHECK FOR CARBON. Remove cap nuts, and check discharge valve seats for carbon. If carbon is excessive, remove cylinder head, and clean carbon from valve seats, chambers, and springs with a wire brush. Use new gasket, and install head.

c. Removal.

(1) REMOVE FLOORBOARD, TOEBOARD, AND TOEBOARD INSERT (fig. 30). Remove the seven screws and lock washers which attach left-hand floorboard to cab. Lift floorboard from cab. Remove the six screws and lock washers which attach left-hand toeboard. Lift toeboard from cab. Remove the four screws and lock washers which attach toeboard insert. Remove toeboard insert from cab.

(2) REMOVE FAN BELTS (fig. 102). Loosen fan bracket clamp nut and fan adjusting screw. Turn adjusting screw to force spindle down. Lift belts from pulley.

(3) DRAIN ENGINE COOLING SYSTEM (par. 74 b (2)).

(4) DISCONNECT WATER LINES (fig. 102). Disconnect water inlet and outlet lines from fittings on compressor.

(5) DISCONNECT AIR LINES (fig. 102). Disconnect compressor to tank tube and governor to compressor tube from fittings on compressor.

(6) DETACH COMPRESSOR (fig. 102). Remove the four air compressor attaching screws and lock washers. Lift compressor and gasket from bracket.

SERVICE (AIR) BRAKES

d. Installation (fig. 102).

(1) Spread a thin film of No. 2 general purpose grease over both sides of new air compressor bracket gasket. Place gasket in position on bracket. Position compressor on gasket. Install the four lock washers and air compressor attaching screws.

(2) **CONNECT AIR LINES** (fig. 102). Connect compressor to tank tube to main discharge fittings. Connect governor to compressor tube to its outlet elbow.

(3) **CONNECT WATER LINES** (fig. 102). Connect water inlet tube (from water pump) to air compressor inlet elbow. Connect water outlet tube to compressor water discharge connector.

(4) **INSTALL FAN BELTS** (fig. 102). Place belts in position, and tighten adjusting screw to give $\frac{1}{2}$ - to $\frac{3}{4}$ -inch movement in center. Lock bracket clamp nut.

(5) **FILL ENGINE COOLING SYSTEM**. Close both drain cocks, and fill system completely (par. 74 d (8)).

(6) **TEST INSTALLATION**. Start engine, and allow to run until a full 105 pounds air pressure builds up. Inspect connections for leaks. Satisfactory compressor operation and absence of leaks indicate correct installation.

(7) **INSTALL TOEBOARD INSERT, TOEBOARD, AND FLOORBOARD** (fig. 30). Place toeboard insert in position, and install the four lock washers and screws which hold it to cab. Position toeboard, and install the six lock washers and screws which secure it to cab. Place floorboard in position, and install the seven lock washers and screws which attach it to cab.

146. GOVERNOR.

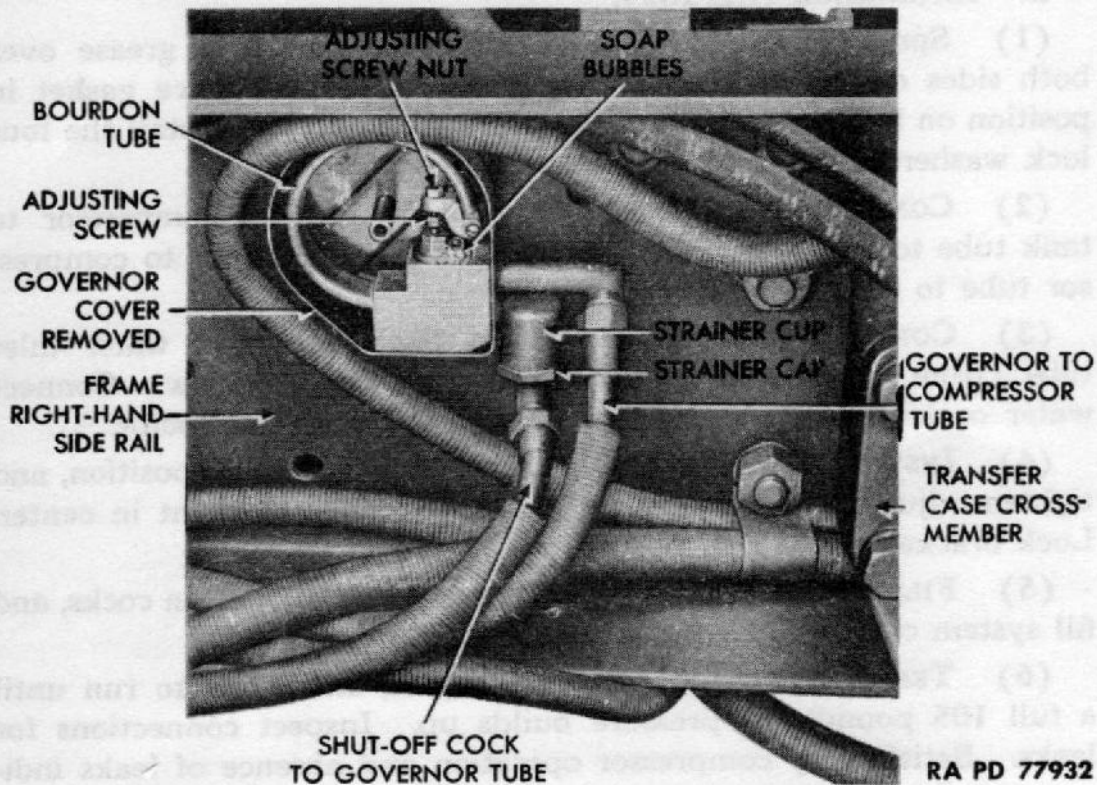
a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 104). The governor is located on inside of main frame right-hand side rail, approximately at center of ponton body. It can be reached from under the tank. Two lines connect to it. One line leads to the compressor; the other leads to the manifold by way of a shut-off cock in front of the two reservoir tanks. The governor controls the pressure of air in the system by opening the unloader valves in the compressor and rendering the compressor inoperative when a pressure of 105 pounds is attained. When a minimum pressure of 85 pounds is reached, the governor closes unloader valves, which again starts the compressor. Pressure from the air reservoir tanks, routed through the manifold, operates the governor.

(2) TABULATED DATA.

Manufacturer Westinghouse
Model 0-1

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 77932

Figure 104 - Testing Governor for Leakage

b. Maintenance and Adjustment (fig. 104). Close shut-off cock on bracket in front of reservoir tanks. Remove shut-off cock to governor tube from governor. Screw strainer cap from strainer cup. Pull strainer from cup. Wash strainer in gasoline. Install strainer and strainer cup. Connect tube to governor, and open shut-off cock. Start engine, and observe pressures at which governor cuts out and in. It should cut in at 85 pounds, and cut out at 15 to 20 pounds higher pressure. If not within these limits, remove case cover. Loosen adjusting screw nut. Turn adjusting screw clockwise to raise cut-in pressure, counterclockwise to lower cut-in pressure. Tighten adjusting screw nut. Install case cover. Allow governor to cut out, and check upper valve for leakage by covering exhaust port with soapsuds. Allow governor to cut in, and test lower port in same manner. Leakage of a three-inch bubble in three seconds is permissible. In case of excessive leakage, replace governor (subpars. c and d, below).

c. Removal.

(1) **DISCONNECT TUBING (fig. 104).** Screw shut-off cock to governor tube from governor. Screw governor to compressor tube from governor.

(2) **DETACH GOVERNOR FROM FRAME (fig. 104).** Remove the two nuts, lock washers, and bolts which attach governor to frame. Lift governor from frame.

SERVICE (AIR) BRAKES

d. Installation.

(1) **ATTACH GOVERNOR TO FRAME** (fig. 104). Place governor in position on frame. Install the two bolts, lock washers, and nuts which attach governor to frame.

(2) **CONNECT TUBING** (fig. 104). Screw governor to compressor tube nut onto upper fitting on governor. Screw shut-off cock to governor tube nut onto strainer cap (lower fitting).

(3) **TEST OPERATION.** Start engine and observe pressure at which governor cuts out and in. Satisfactory governor operation indicates correct installation. Adjust if necessary (subpar. b, above).

147. RESERVOIR TANKS.

a. Description and Tabulated Data.

(1) **DESCRIPTION.** Two reservoir tanks are provided. They are attached to brackets on the outside of main frame right-hand side rail, at rear of tool box. Each is equipped with a drain cock. A tank-to-tank tube connects the tanks together at the rear. The function of tanks is to store a sufficient quantity of air to operate service brakes and air accessories.

(2) **TABULATED DATA.**

Manufacturer	Westinghouse
Model	217321
Length	26 in.
Diameter	8 in.

b. Removal. Open drain cock on lower center of tank, and allow all air to escape. Disconnect all tubing (three tubes on outside tank, four on inside tank) from fittings on tank. Remove the two nuts, lock washers, and clamp bolts which clamp tank straps together under tank. Spread straps and lower tank from brackets.

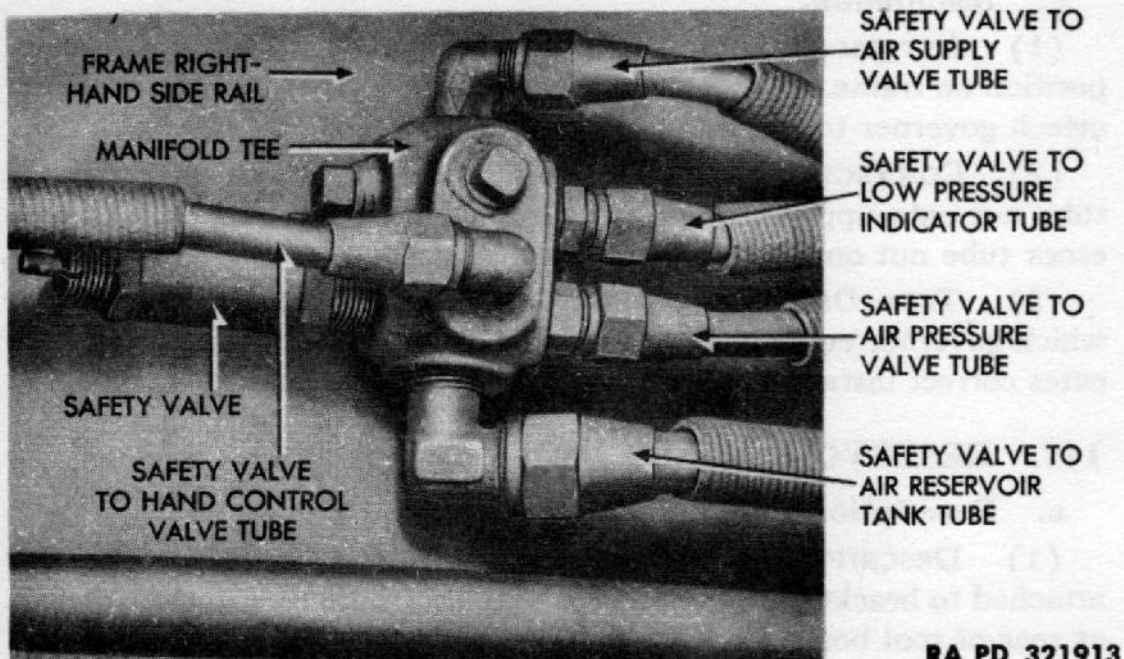
c. Installation. Place tank in position under its brackets. Install the two clamp bolts, lock washers, and nuts which clamp tank straps together under tank. Connect tubing (three tubes on outside tank, four on inside tank) to fittings on tank.

148. SAFETY VALVE.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 105). A safety valve is screwed into one of the openings on the manifold tee. Its function is to protect air system from damage due to excessive pressure in case the pressure control system fails. It does not function if pressure control system is working properly. A coil spring holds a ball valve on its seat. An adjustable spring seat regulates spring tension. When pressure exceeds 150 pounds, ball lifts off its seat and allows air to escape.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 321913

Figure 105 - Safety Valve

(2) TABULATED DATA.

Manufacturer Westinghouse
Model 205105
Operating pressure 150 lb

b. **Removal.** (fig. 105). Open drain cock on a reservoir tank. Work from under truck. Unscrew valve from manifold tee.

c. **Installation** (fig. 105). Screw valve into its opening on manifold tee. Close drain cock on bottom of reservoir tank.

149. BRAKE APPLICATION VALVE.

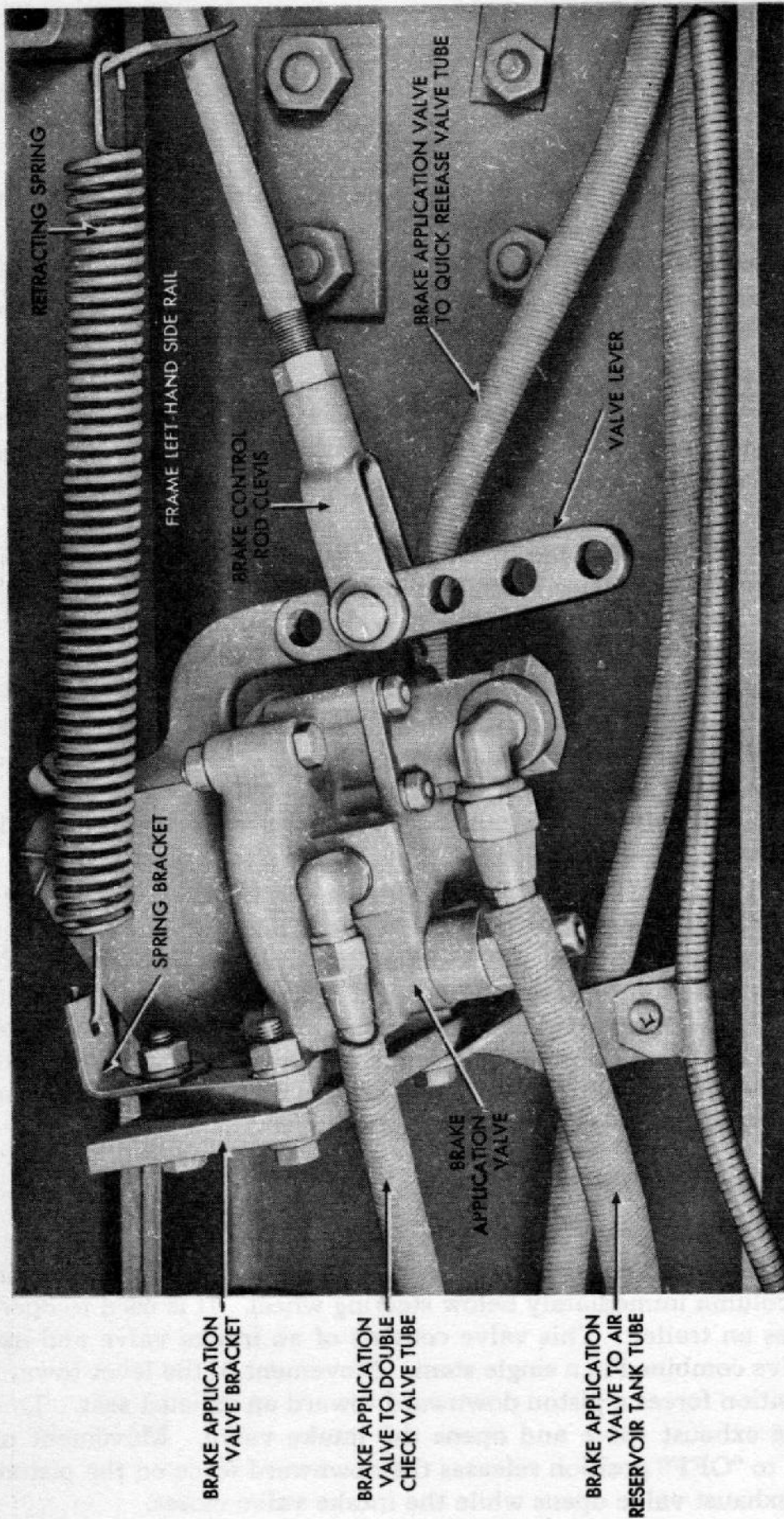
a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 106). The brake application valve is mounted on a bracket on the inside of the main frame left-hand side rail under the ponton body. A rod connects it to the brake pedal. When the pedal is depressed, the valve admits air to the brake diaphragm chambers to operate the brakes. When the pedal is released, the valve exhausts pressure from the brake diaphragm chambers to release the brakes. The amount of pressure built up or exhausted is in direct proportion to the amount of pedal travel.

(2) TABULATED DATA.

Manufacturer Westinghouse
Type B4A
Model 216213

SERVICE (AIR) BRAKES



RA PD 321927

Figure 106 — Brake Application Valve

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

b. Removal (fig. 106).

(1) **DETACH BRAKE CONTROL ROD.** Snap retracting spring from pull-back clip on brake control rod, and from bracket on valve. Remove cotter pin, flat washer, and clevis pin which attach rod to valve lever.

(2) **DISCONNECT AIR LINES.** Disconnect all three air tubes from fittings on valve.

(3) **DETACH VALVE FROM BRACKET.** Remove all four nuts, lock washers, and bolts which attach valve to bracket. Lift valve and spring bracket from valve bracket.

c. Installation (fig. 106).

(1) **ATTACH VALVE TO BRACKET.** Position valve on bracket. Install the four bolts, lock washers, and nuts which attach valve to bracket. Place spring bracket under the nut and washer on the top right bolt.

(2) **CONNECT AIR LINES.** Connect double check valve to application valve tube to fitting on right-hand side of valve. Connect tank to valve tube to fitting on bottom of valve. Connect quick release valve to application valve tube to fittings on left side of valve.

(3) **CONNECT BRAKE CONTROL ROD.** Place yoke on end of rod in position on the second hole from top in valve lever. Install clevis pin, flat washer, and cotter pin. Slide pull-back clip toward valve on brake control rod. Hook retracting spring onto pull-back clip and onto bracket on valve. Slide pull-back clip on brake control rod until spring is under definite tension.

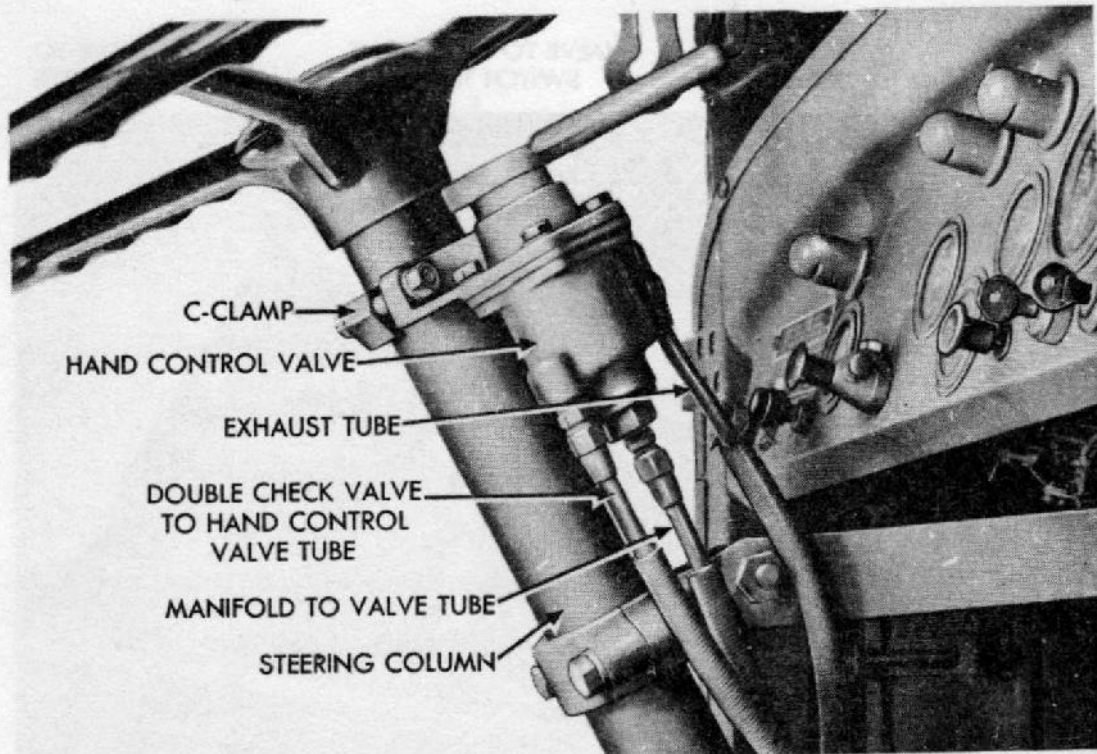
(4) **TEST INSTALLATION.** Start engine and build up 105 pounds pressure. Operate brakes. Check the valve fittings for leaks. Proper brake operation and absence of leaks indicate proper installation. If greater brake action is desirable, connect brake control rod yoke to top hole in valve lever. If less brake action is desirable, connect yoke to one of lower holes. Lowest hole connection gives least brake action. Lengthen or shorten control rod if necessary, so that, in "OFF" position, rod will fit between brake pedal and brake lever.

150. HAND CONTROL VALVE.

a. Description and Tabulated Data.

(1) **DESCRIPTION (fig. 107).** A hand control valve is located on steering column immediately below steering wheel. It is used to operate brakes on trailer. This valve consists of an intake valve and exhaust valve combined in a single stem. Movement of the lever toward "ON" position forces a piston downward toward an exhaust seat. This closes the exhaust valve and opens the intake valve. Movement of the lever to "OFF" position releases the downward force on the piston, and the exhaust valve opens while the intake valve closes.

SERVICE (AIR) BRAKES



RA PD 77958

Figure 107 — Air Brake Hand Control Valve

(2) TABULATED DATA.

Manufacturer Westinghouse
Type HP
Model 215748

b. **Removal** (fig. 107). Disconnect all three air tubes from fittings on valve. Remove the two nuts, lock washers, and bolts which hold valve to steering column. Lift valve and "C" clamp from steering column.

c. **Installation** (fig. 107). Place valve and "C" clamp in position on steering column. Install two bolts, lock washers, and nuts which clamp valve and "C" clamp together around steering column. Connect manifold to valve tube to fitting on bottom center of valve. Connect double check valve to hand control valve tube to fitting at edge of underside of valve. Connect exhaust tube to elbow on side of valve. Start engine and build up 105 pounds pressure. Apply trailer brakes. Check valve connections for leaks. Proper operation of brakes and absence of leaks indicate correct installation.

151. RELAY VALVE.

a. **Description and Tabulated Data.**

(1) **DESCRIPTION** (fig. 108). The relay valve is attached to the right-hand frame side rail, near the air tanks. It can be reached from under the truck in front of rear axle. This valve acts as a relay station to speed up application and release of the rear wheel brakes

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

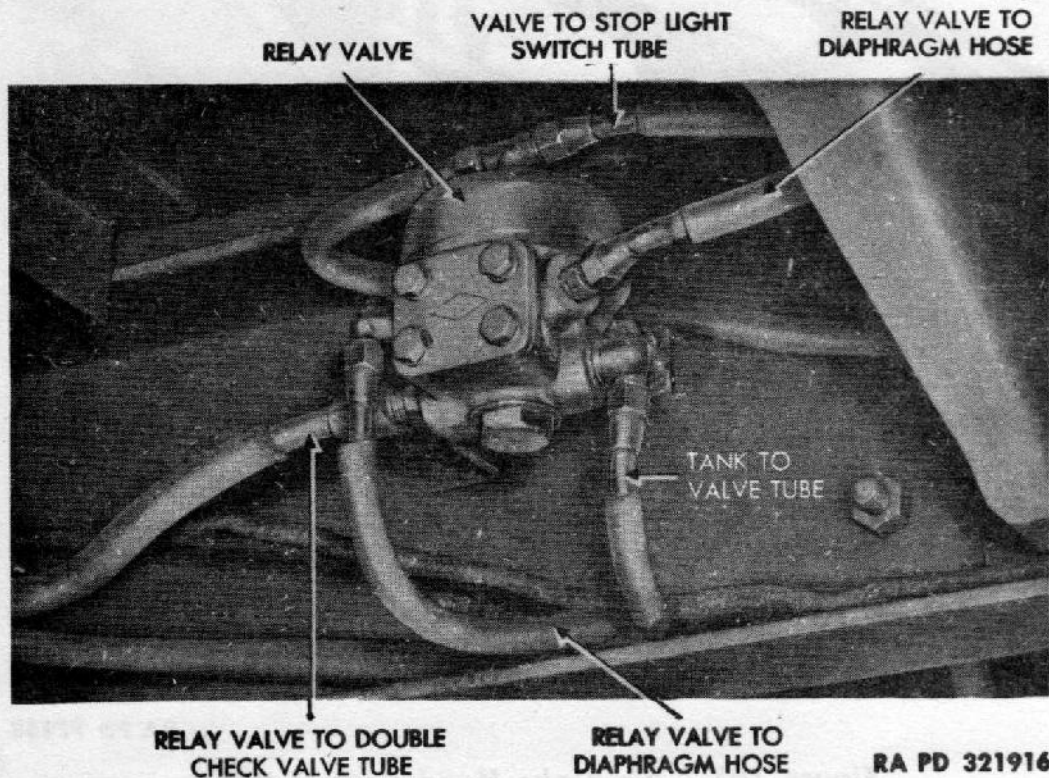


Figure 108 – Relay Valve Installed

and trailer brakes. Air from brake application valve enters an upper chamber and actuates a diaphragm which operates the relay valve. The valve action permits direct entry of a large volume of air (required for brake operation) from the air system to the diaphragm chambers. Quick brake application results. Fast brake release is obtained through this valve because exhaust air is vented directly to the atmosphere instead of traveling back through brake application valve.

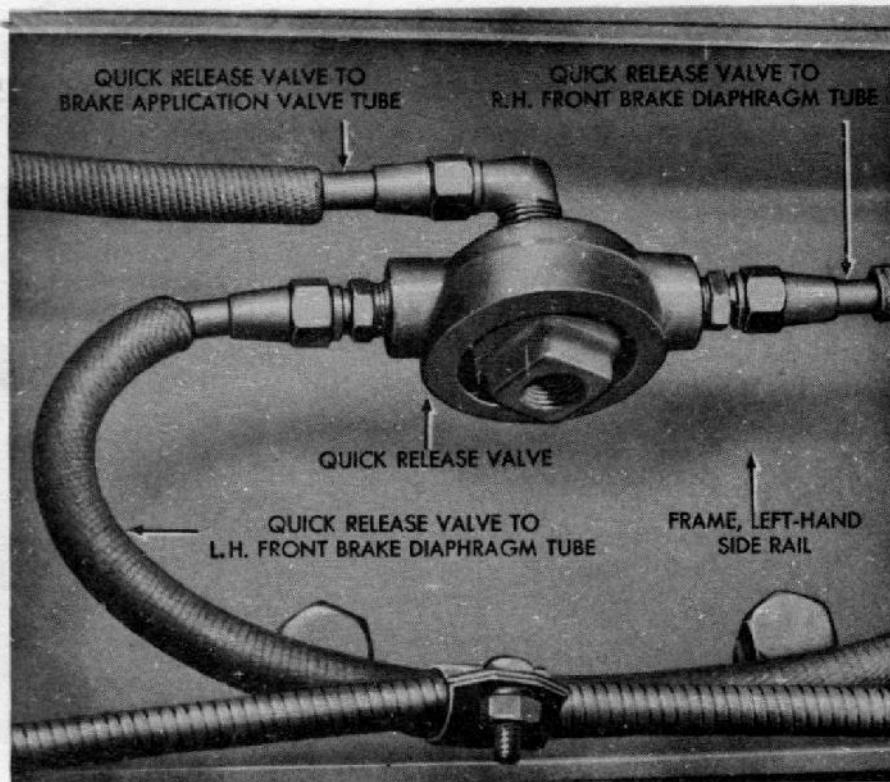
(2) **TABULATED DATA.**

Manufacturer Westinghouse
Model 217383

b. Removal (fig. 108). Disconnect all six air lines from valve. Remove the nuts, lock washers, and bolts which secure valve to bracket. Lift valve from bracket.

c. Installation (fig. 108). Position valve on bracket. Install the two bolts, lock washers, and nuts which attach valve to bracket. Connect the two relay valve to diaphragm hoses to the large fittings on sides of valve. To the tee on top of valve, connect valve to stop light switch tube and double check valve to relay valve tube. To the fitting on right-hand side of valve, connect valve to trailer coupling tube. To the fitting on left-hand side of valve, connect tank to

SERVICE (AIR) BRAKES



RA PD 321942

Figure 109 – Quick Release Valve

valve tube. Start engine, and build up maximum air pressure. Apply brakes, and check the valve for leaks. Proper brake application and absence of leakage indicate satisfactory installation.

152. QUICK RELEASE VALVE.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 109). The quick release valve is attached to the inside of the frame left-hand side rail. It is approximately even with engine oil filter. This valve is connected in the line from the brake application valve to the front wheel brake diaphragm chambers. Function of the valve is to speed up the front wheel brake release by discharging exhaust air to the atmosphere. Thus, time is saved which would otherwise be required for the exhaust air to travel back to brake application valve.

(2) TABULATED DATA.

Manufacturer	Westinghouse
Model	205000

b. Removal (fig. 109). Disconnect all three air tubes from fittings on valve. Remove the two nuts, lock washers, and bolts which attach valve to frame.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

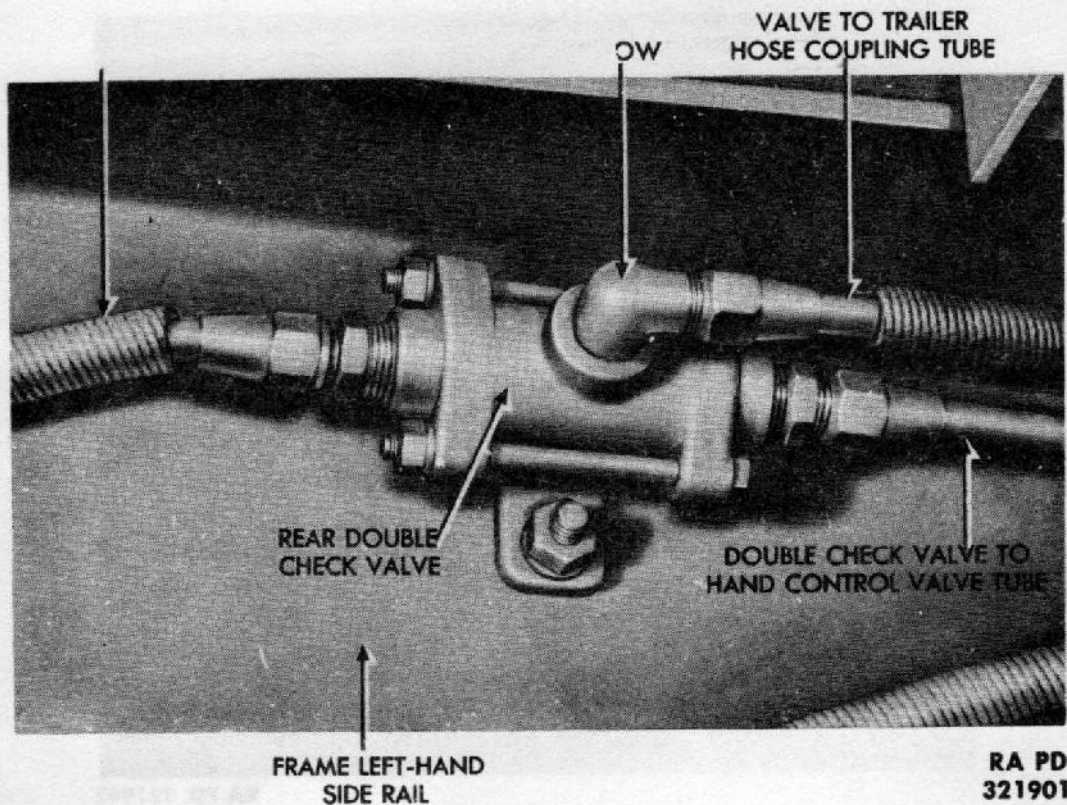


Figure 110 — Rear Double Check Valve

c. **Installation** (fig. 109). Position valve on frame. Install the two bolts, lock washers, and nuts which attach valve to frame. Connect brake application valve to quick release valve tube to fitting on top of valve. Connect tubes leading to front brake diaphragm chamber hoses to fittings on ends of valve. Start engine, and build up maximum air pressure. Apply brakes, and inspect valve for leakage. Satisfactory brake application and absence of leakage indicate correct valve installation.

153. DOUBLE CHECK VALVE.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 110). Two double check valves are attached to left-hand frame side rail, opposite transmission and transfer case respectively. These valves consist of a free-moving piston in a cylinder. The cylinder opens into the tube fittings at each end and at the center. When the piston is at either end of the cylinder, free air enters the cylinder at the opposite end and passes out through fitting at center of cylinder. Pressure from the operation of the foot control valve forces back piston of the front valve. This permits air to pass to the relay valve to apply rear brakes. Air also passes to a second relay valve and drives its piston backward. This permits air to pass to rear trailer connections to operate trailer brakes.

SERVICE (AIR) BRAKES

Pressure from the operation of the hand control valve forces back piston in the rear valve. This cuts off the line relay valve and loads the service line to the trailer. Thus, the trailer brakes are applied and the truck brakes remain inoperative. When the truck is being towed, the double check valves operate as follows: Air pressure from the towing vehicle is supplied to the right-hand front connection of service line. Pressure forces ahead the piston of the front double check valve. This admits air to the rear axle relay valve but not to the front wheel brakes. Air is also admitted through the relay valve to the rear double check valve. This arrangement permits braking control of two or more vehicles while they are being towed.

(2) **TABULATED DATA.**

Manufacturer Westinghouse
Model 217698
Number used 2

b. Removal (fig. 110). Disconnect the three air tubes from fittings at each end of valve and from elbow at center. Remove the two nuts, lock washers, and bolts which secure valves to frame side rail.

c. Installation (fig. 110). Position valve to frame side rail. Install the two bolts, lock washers, and nuts which secure valve to frame. Connect air tube to fitting at each end of valve. Connect air tube to elbow at center of valve. In case of question as to where to connect tubes, refer to system diagram (fig. 136). Start engine, and build up air pressure. Check connections for leakage. Test operation of brakes. Leaks can be detected by applying soapy water to connections. If leak is present, bubble will be formed. Absence of leaks and proper functioning of brakes indicate proper installation.

154. SINGLE CHECK VALVE.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 111). The single check valve is attached to the air line at shut-off cock behind front left hose coupling. It is a one-way ball type check valve. Its purpose is to prevent leakage of air system in case of coupling breakage while the truck is being towed.

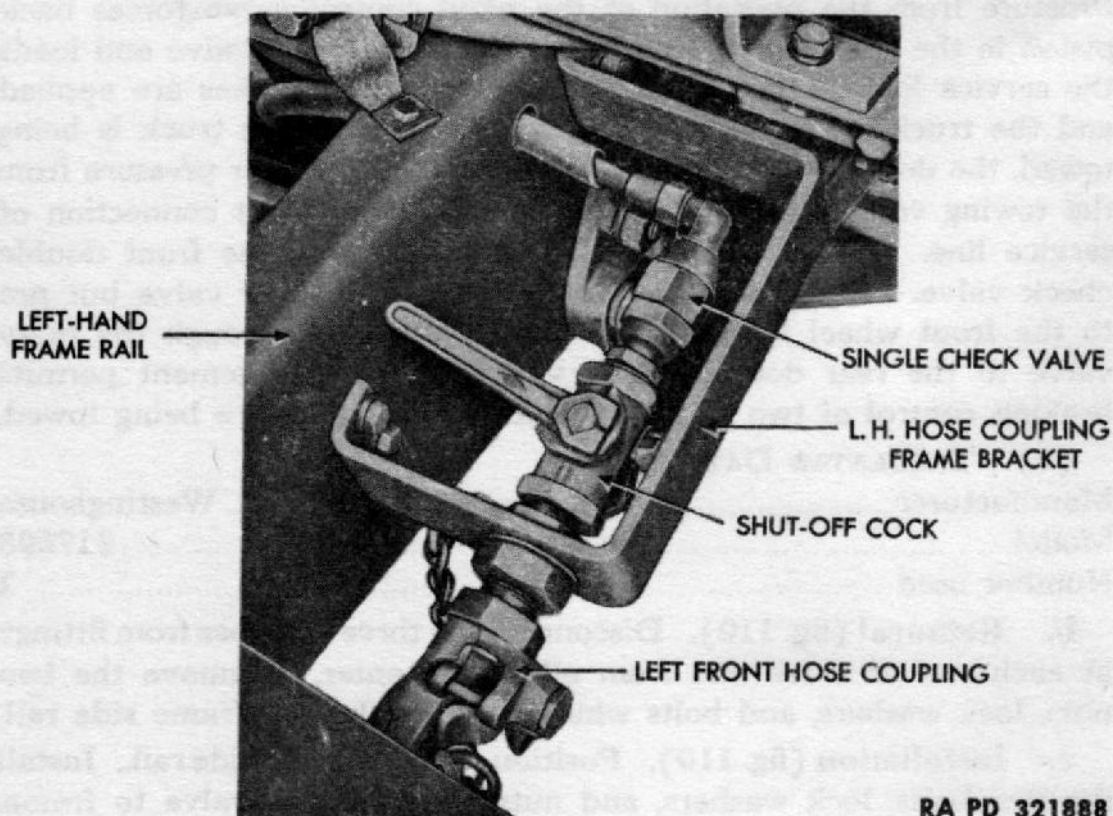
(2) **TABULATED DATA.**

Manufacturer Westinghouse
Model 220306

b. Removal (fig. 111). Disconnect air tube from elbow at rear end of valve. Unscrew valve from fitting on shut-off cock.

c. Installation (fig. 111). Screw valve to connection on shut-off cock. Connect air line to elbow at rear of valve. Start engine, and build up pressure to 105 pounds. Inspect valve for leaks. Absence of leaks indicates proper installation.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 321888

Figure 111 — Single Check Valve and Attaching Parts

155. BRAKE DIAPHRAGM CHAMBERS.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 112). One brake diaphragm is attached to vehicle, adjacent to each of the four wheels. They serve to convert air pressure to mechanical motion in applying brakes. Depressing the brake pedal admits air pressure to each diaphragm chamber. Pressure causes diaphragm motion which is transmitted to brake cam by means of a push rod and slack adjuster. When the brake pedal is released, pressure is exhausted from the chamber. The brakes are then released by a spring which returns slack adjuster, push rod, and diaphragm to their original positions.

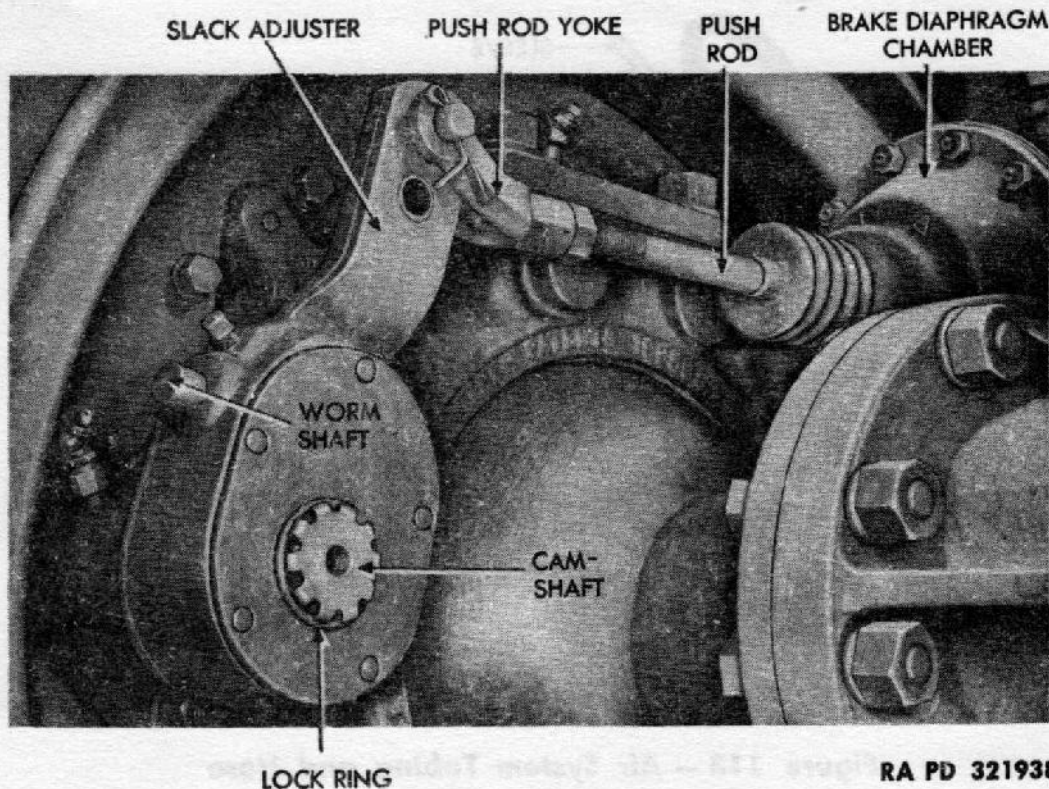
(2) TABULATED DATA.

Manufacturer	Westinghouse
Type:	
Front	E
Rear	B
Diameter:	
Front	6 in.
Rear	9 ³ / ₁₆ in.

b. Removal.

(1) DISCONNECT SLACK ADJUSTER (fig. 112). Remove cotter pin and clevis pin which connect slack adjuster to push rod yoke.

SERVICE (AIR) BRAKES



RA PD 321938

Figure 112 — Front Brake Diaphragm Chamber and Slack Adjuster Installed

(2) **DISCONNECT AIR HOSE.** Unscrew hose nut from fitting on chamber.

(3) **DETACH CHAMBER.** Remove stud nut and lock washer which secure chamber at front wheel brake, or remove the four nuts, lock washers, and bolts which secure chamber at rear wheel brake. Lift chamber from vehicle.

c. Installation.

(1) **ATTACH CHAMBERS.** Position chamber on backing plate (front wheel brake) or on bracket (rear wheel brake). Install stud nut which secures chamber at front wheel brake, or the four bolts, lock washers, and nuts which secure chamber at rear wheel brake.

(2) **CONNECT AIR HOSE.** Screw air hose to fitting on chamber.

(3) **CONNECT SLACK ADJUSTER** (fig. 112). Position slack adjuster to push rod yoke. Secure with the clevis pin and cotter pin.

(4) **TEST INSTALLATION.** Start engine, and build up pressure to 105 pounds. Test operation of brakes. Inspect chamber hose connection for leaks while brakes are in operation. Proper functioning of brakes and absence of leaks indicate correct installation.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

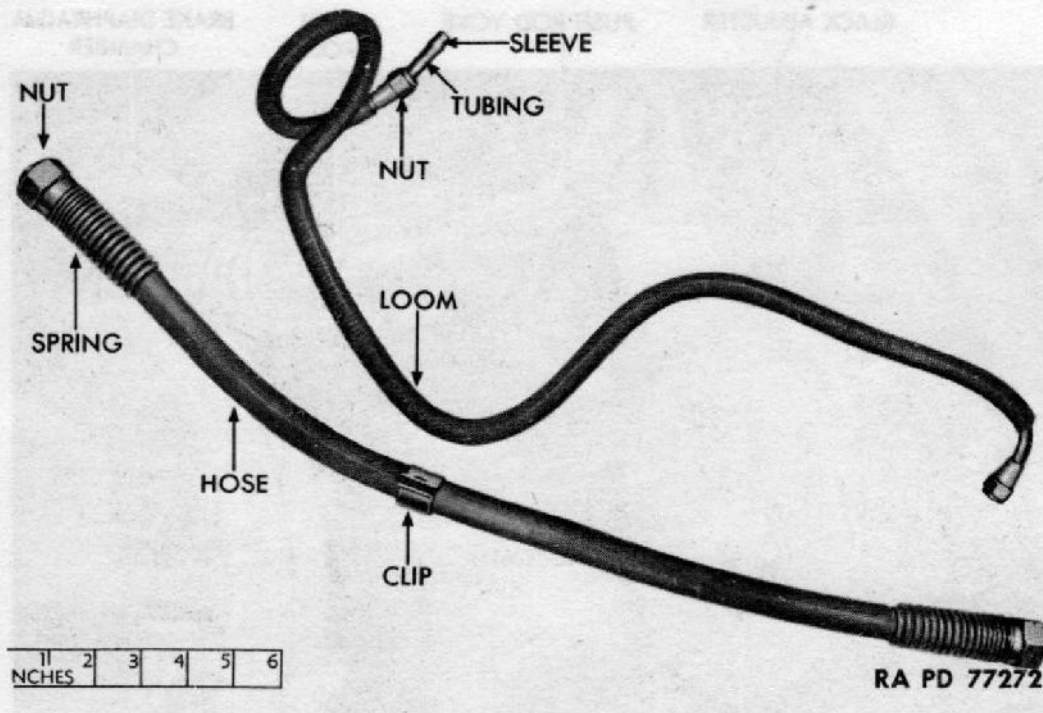


Figure 113 – Air System Tubing and Hose

156. MANIFOLD TEE.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 105). Manifold tee is attached to inside of right-hand frame side rail, opposite the transmission. It consists of a hollow metal block equipped with fittings to which air tubes are connected. Its function is to connect air tubes together so air pressure in all tubes is equalized.

(2) TABULATED DATA.

Part number 25E235

b. Removal (fig. 105). Disconnect the five air lines from fittings on manifold. Unscrew safety valve from manifold. Remove the two nuts, lock washers, and bolts which secure tee to frame side rail. Remove tee.

c. Installation (fig. 105). Position tee to frame side rail. Secure with the two bolts, lock washers, and nuts. Connect the five air lines to fittings on tee. Screw safety valve into its opening on manifold. Start engine, and build up pressure to 105 pounds. Check connections for leaks. Apply soapy water. Bubbles indicate leaks. Absence of leaks indicates proper installation.

SERVICE (AIR) BRAKES

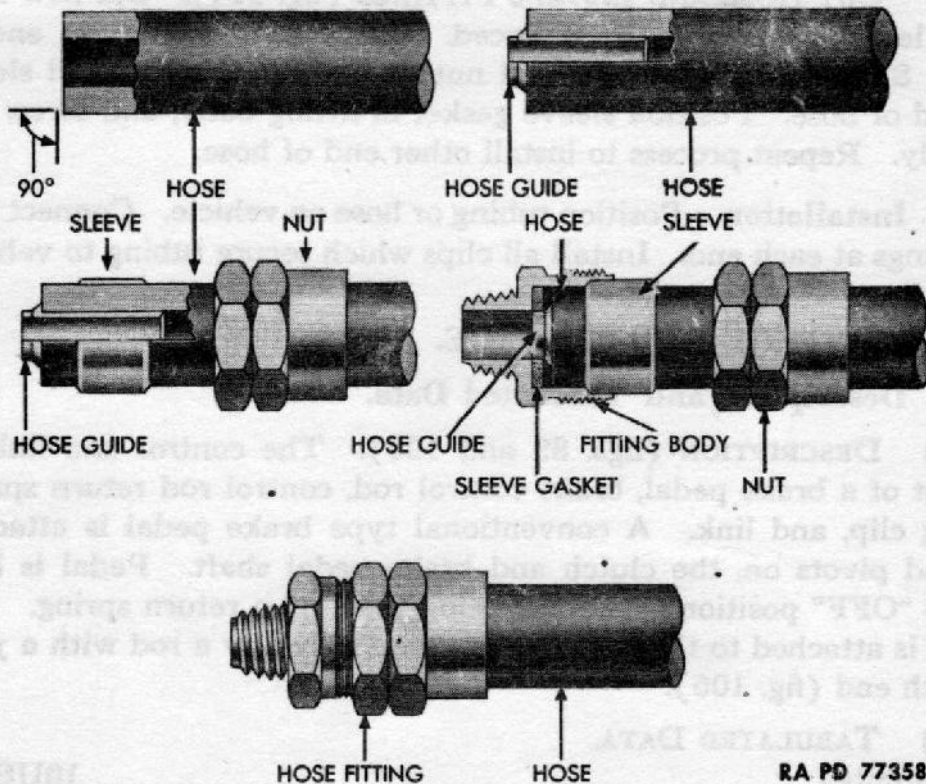


Figure 114 - Installation of Fitting on Hose

157. TUBING AND HOSE.

a. Description and Tabulated Data.

(1) DESCRIPTION. Copper tubing is used throughout for air brake system. The tubing is heat-treated to withstand vibration. Connections are of the sleeve (ferrule) and nut type. Points requiring flexible couplings are provided with heavy rubber hose furnished with detachable fittings.

(2) TABULATED DATA.

Tubing	Heat-treated copper
Hoses	Heavy rubber
Fittings	Brass nut and sleeve

b. Removal. Unscrew nut from fitting at each end of tubing or hose. Remove all clips holding tubing or hose to vehicle. Pull tubing or hose from vehicle.

c. Maintenance.

(1) CUT TUBING AND INSTALL FITTING (fig. 114). Cut new tubing same length as that being replaced. Cut ends square and smooth with a file. Slide nut and sleeve (ferrule) on each end.

(2) SHAPE TUBING. Bend tubing to shape of original piece. Avoid sharp bends. Bend tubing $\frac{3}{8}$ inch in diameter on a 3-inch radius; tubing $\frac{1}{2}$ inch in diameter on a 4-inch radius.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(3) **CUT HOSE AND INSTALL FITTINGS** (fig. 114). Cut new hose same length as hose to be replaced. Screw hose guide into end of hose. Slide spring (if used) and nut on end of hose. Install sleeve on end of hose. Position sleeve gasket in fitting body, and screw nut to body. Repeat process to install other end of hose.

d. Installation. Position tubing or hose on vehicle. Connect nuts to fittings at each end. Install all clips which secure tubing to vehicle.

158. CONTROL AND LINKAGE.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (figs. 85 and 106). The control and linkage consist of a brake pedal, brake control rod, control rod return spring, spring clip, and link. A conventional type brake pedal is attached to, and pivots on, the clutch and brake pedal shaft. Pedal is kept in the "OFF" position, when not being used, by a return spring. The pedal is attached to the brake application valve by a rod with a yoke at each end (fig. 106).

(2) **TABULATED DATA.**

Part number 10UB554

b. Removal.

(1) **REMOVE TOEBOARD** (par. 145 c (1)).

(2) **DETACH PEDAL** (fig. 85). Disengage control rod return spring from brake control rod. Remove cotter pin and clevis pin which secure control rod to brake pedal. Remove the lock ring and flat washer which hold brake pedal on shaft. Pull or pry pedal from shaft.

(3) **DETACH CONTROL ROD.** Remove cotter pin and clevis pin which secure control rod to valve lever. Lift out control rod.

c. Installation.

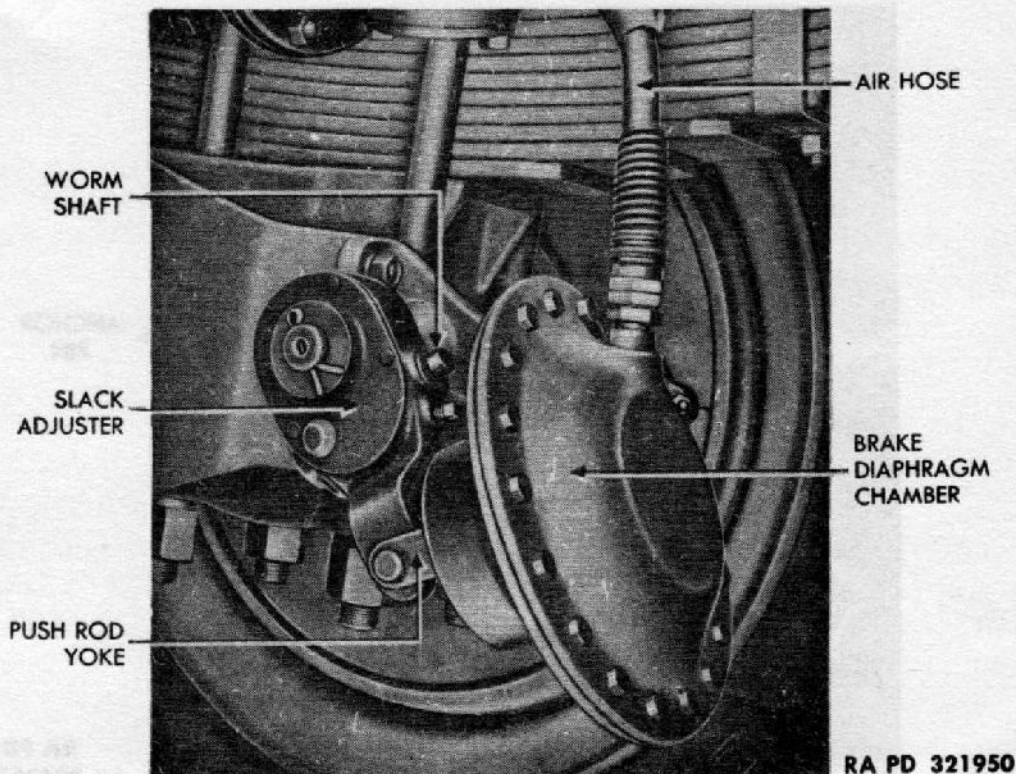
(1) **ATTACH PEDAL** (fig. 85). Slide pedal on shaft. Install flat washer and lock ring which hold pedal on shaft.

(2) **ATTACH CONTROL ROD.** Position control rod yokes to pedal and to second hole from top on valve lever. Adjust length of control rod, if necessary, to fit it exactly between retracted pedal and valve lever. Install the clevis pins and cotter pins which secure rod to pedal and to valve. Connect return spring to spring clip on control rod. Check spring tension and shorten if necessary to keep pedal in "OFF" position.

(3) **TEST INSTALLATION** (par. 149 c (4)).

(4) **INSTALL TOEBOARD** (par. 145 d (7)).

SERVICE (AIR) BRAKES



RA PD 321950

Figure 115 — Rear Brake Diaphragm Chamber and Slack Adjuster

159. SLACK ADJUSTERS.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 115). One slack adjuster fits on the spline on the shaft of each brake cam. They are the special levers which connect the brake diaphragm chamber push rods to the brake camshafts. Brake adjustment, to compensate for lining wear, is made with the slack adjuster at each wheel. An adjustable worm meshes with a worm gear within each adjuster. Turning the worm shaft pivots the entire slack adjuster about the shaft of the brake cam. In this way, brake adjustment is made.

(2) TABULATED DATA.

Manufacturer	Westinghouse
Model:	
Front:	
Left-hand	216782
Right-hand	216781
Rear:	
Left-hand	220483
Right-hand	220484
Length:	
Front	6 in.
Rear	5¼ in.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

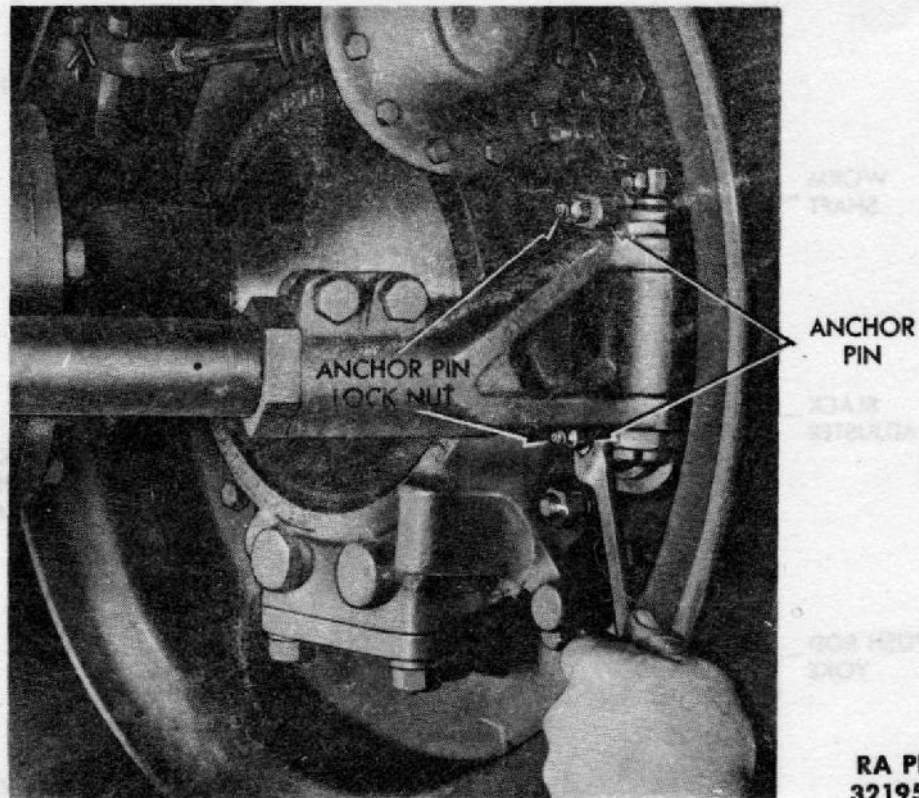


Figure 116 – Adjusting Anchor Pin

b. Adjustment.

(1) **GENERAL.** Adjustment described here concerns chiefly the adjustment made by slack adjusters. Check service brake adjustment every 1,000 miles, or oftener with severe service (step (2), below). First adjustment consists of steps (3), (4), and (5), below; subsequent checks and adjustments normally consist of steps (2), (3), (4), and (6), below.

(2) **CHECK BRAKE ADJUSTMENT.** Measure push rod travel. If this exceeds original measurement (step (5), below) adjust brakes (steps (3), (4), and (6), below).

(3) **ADJUST ANCHOR PINS (FRONT BRAKES ONLY)** (fig. 116). Loosen anchor pin lock nut. Remove inspection hole cover on brake drum. Place 0.008-inch feeler gage through inspection hole under heel of shoe. Turn pin slowly; a barely perceptible drag is felt when gage is moved. Hold anchor pin, and tighten anchor pin lock nut. Recheck clearance, and readjust if necessary. Repeat process to adjust other anchor pin on same wheel. Continue process to adjust anchor pins on other front wheel.

(4) **BUILD UP AIR PRESSURE.** Start engine and build up pressure to at least 80 pounds. Maintain at least 60 pounds pressure throughout adjustment.

SERVICE (AIR) BRAKES

(5) **ADJUST BRAKES AND RECORD PUSH ROD TRAVEL (FIRST ADJUSTMENT ONLY)** (fig. 115). Jack up each wheel. Turn slack adjuster worm shaft until brake shoes are tight against drum. Back off worm shaft until wheel is free. Insert feeler gage between toe end of shoe and drums. Turn worm shaft until 0.008- to 0.010-inch clearance is obtained. Apply brakes, and measure brake diaphragm push rod travel. Record measurement for future use in checking (step (2), above) and adjusting (step (6), below) brakes. **NOTE:** *If adjustment is correct, push rod travel will be same for both wheels on an axle. Dimension^s will be about $\frac{5}{8}$ inch on rear brakes.*

(6) **ADJUST BRAKES (ALL SUBSEQUENT ADJUSTMENTS)** (fig. 115). Turn slack adjuster worm shaft until brake diaphragm chamber push rod travel measures same as in original adjustment (step (5), above), and, if measurements are not available, adjust as outlined for first adjustment (step (5), above). Record dimensions to aid future adjustments.

c. Removal (fig. 115). Use pointed tool to mark relative positions of slack adjuster and camshaft. Remove cotter pin and clevis pin which secure push rod to slack adjuster. On front slack adjuster, pry lock ring from brake camshaft. Tap adjuster from shaft. On rear right-hand adjuster, remove hub and bearing (par. 167 c); remove brake shoe springs (par. 160 b (3)); remove cotter pin and clevis pin which secure push rod to slack adjuster; remove cotter pin and slack adjuster washer; remove safety wire, and back off camshaft collar screw about two turns; tap camshaft out until enough clearance is obtained to lift slack adjuster and spacing washers from camshaft splines. On rear left-hand slack adjuster, remove cotter pin and slack adjuster washer; remove cotter pin and clevis pin from push rod; tap off slack adjuster.

d. Installation (fig. 115). On front adjusters, position slack adjuster on protruding end of brake camshaft as originally installed. Note marks made before removal. Pry lock ring into position on end of shaft. On rear left-hand slack adjuster, install slack adjuster washer and cotter pin. Position push rod yoke to slack adjuster. Install clevis pin and cotter pin which attach rod and adjuster. On rear right-hand slack adjuster, position adjuster and push camshaft through adjuster in original position. Install slack adjuster washer and cotter pin. Position camshaft collar. Tighten set screw, and install safety wire. Install clevis pin and cotter pin which attach push rod yoke to adjuster. Install brake shoe springs. Adjust slack adjuster until shoes are at lowest point on cam. Install drum (par. 167 e).

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

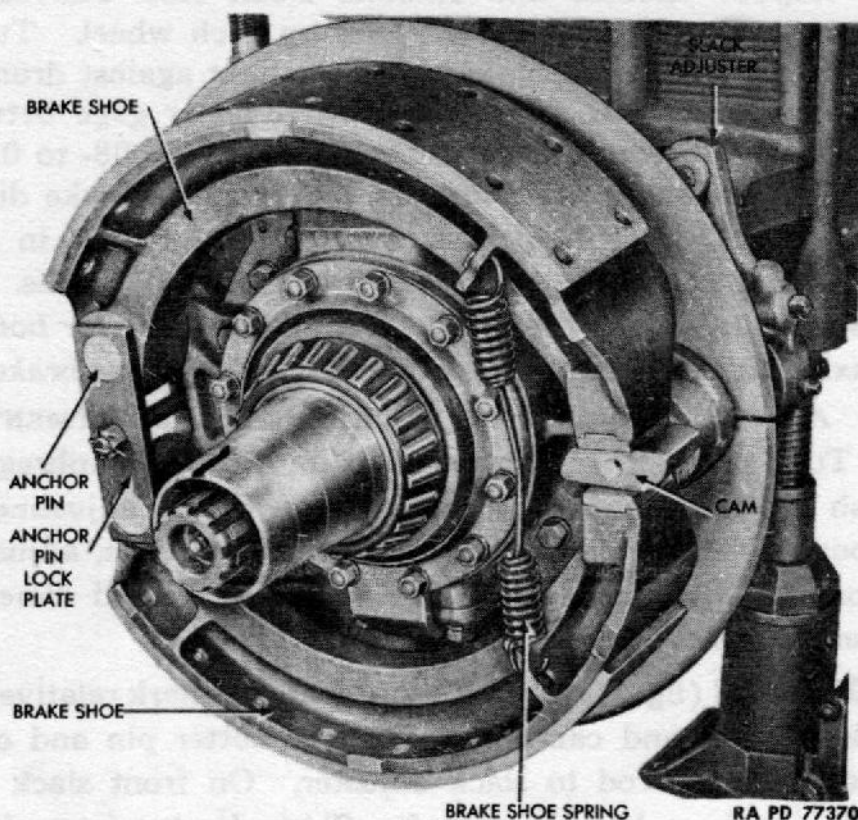


Figure 117 — Front Brake Shoes Installed

160. BRAKE SHOES.

a. Description and Tabulated Data.

(1) DESCRIPTION (figs. 117 and 118). Two brake shoes are attached to a backing plate inside each of the four brake drums. Two anchor pins hold the adjacent ends of the shoes in place. Opposite ends of the shoes are pulled together by a brake shoe spring. A cam, located between these ends, pivots when the brakes are applied and pushes the ends of shoes apart. This presses the lining, riveted to shoes, against brake drums. This action creates braking action. When the brakes are released, the cam pivots back to its original position, and the brake shoe spring draws the shoes toward each other. Thus the shoe linings are pulled away from the drums, and braking action ceases. Front shoes are slightly different from rear shoes, due to space limitations which require a shorter lift on the operating cases. Also, front shoes are mounted on eccentric pins which can be rotated to bring shoes closer to the drum at the anchor pin end.

(2) TABULATED DATA.

Manufacturer	Timken
Model—front brakes:	
Right-hand upper	A2 — 3822F6
Right-hand lower	A1 — 3822E5

SERVICE (AIR) BRAKES

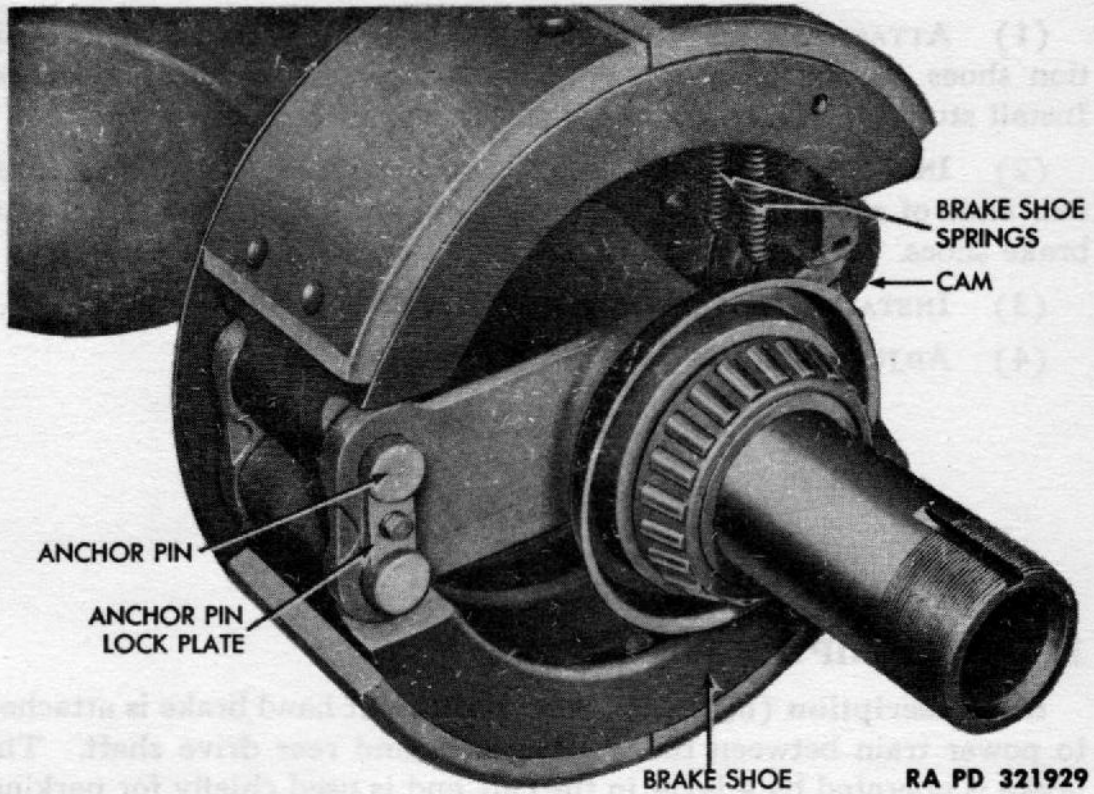


Figure 118 — Rear Brake Shoes Installed

Left-hand upper	A2 — 3822E5
Left-hand lower	A1 — 3822F6
Model—rear brakes:	
Upper	A28 — 32225253
Lower	A29 — 3222S-253

b. Removal.

- (1) REMOVE WHEEL AND HUB (par. 167 c).
- (2) LOWER ANCHOR PINS (FRONT WHEELS ONLY) (fig. 116). Loosen anchor pin lock nuts, and turn pin to lowest point.
- (3) REMOVE BRAKE SHOE SPRING (figs. 117 and 118). Use slack adjuster to turn camshaft until shoes are at lowest point on cam. Slide brake shoe spring from holes in shoes. **NOTE: Rear wheel brakes have two springs.**
- (4) REMOVE ANCHOR PIN LOCK PLATE (figs. 117 and 118). Remove cotter pin and stud nut which hold lock plate on pins. Lift plate from pins.
- (5) REMOVE SHOES (figs. 117 and 118). Pull both shoes from anchor pins.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

c. Installation.

(1) ATTACH SHOES TO ANCHOR PINS (figs. 117 and 118). Position shoes on anchor pins. Position lock plate on pins and shoes. Install stud nut and cotter pin which secure lock plate to pins.

(2) INSTALL BRAKE SHOE SPRING (figs. 117 and 118). Pull free ends of shoes together. Insert spring end clips through holes in brake shoes. On rear wheel brake, install two springs.

(3) INSTALL HUB AND WHEEL (par. 167 f).

(4) ADJUST BRAKES (par. 159 b).

Section XXX

DRIVE SHAFT HAND BRAKE

161. DESCRIPTION.

a. Description (fig. 119). The drive shaft hand brake is attached to power train between the transfer case and rear drive shaft. The brake is operated by a lever in the cab, and is used chiefly for parking. If the brake is used to halt a moving vehicle, it exerts a severe strain on all parts of the power train. Therefore, it must be used carefully and sparingly to make emergency stop in case of service brake failure.

162. SHOES.

a. Description and Tabulated Data.

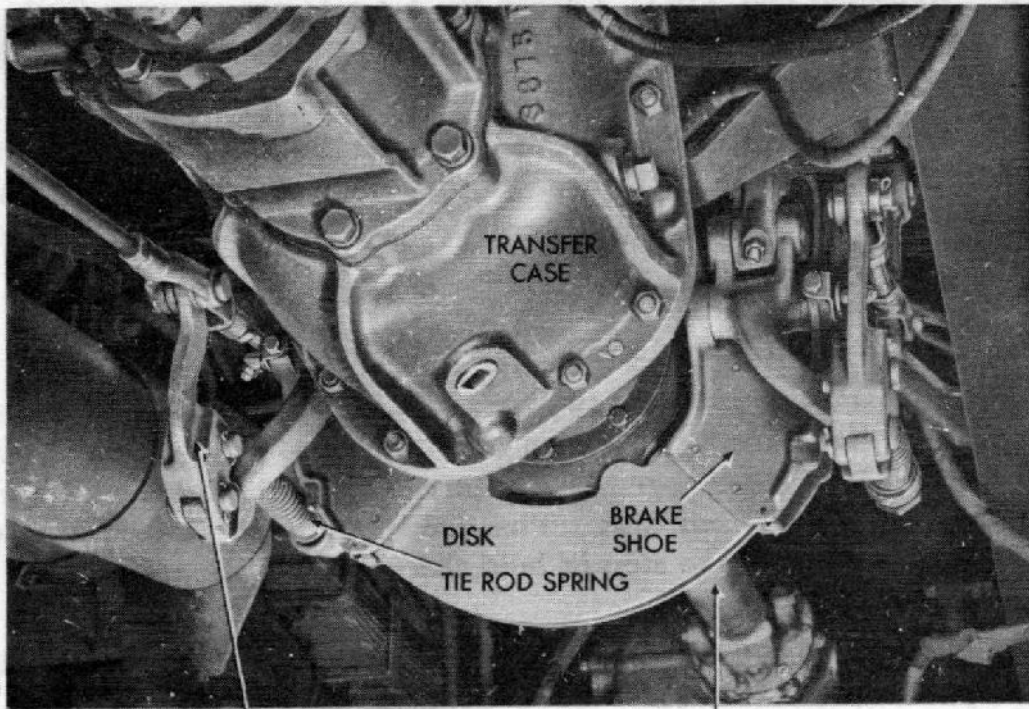
(1) DESCRIPTION (fig. 119). Braking power is obtained by action against the brake disk of four brake shoes. Two shoes are attached to front of brake, one on each side, and two at back of brake. The shoes are flat and elliptical. The brake lining is attached to each shoe with eight rivets.

(2) TABULATED DATA.

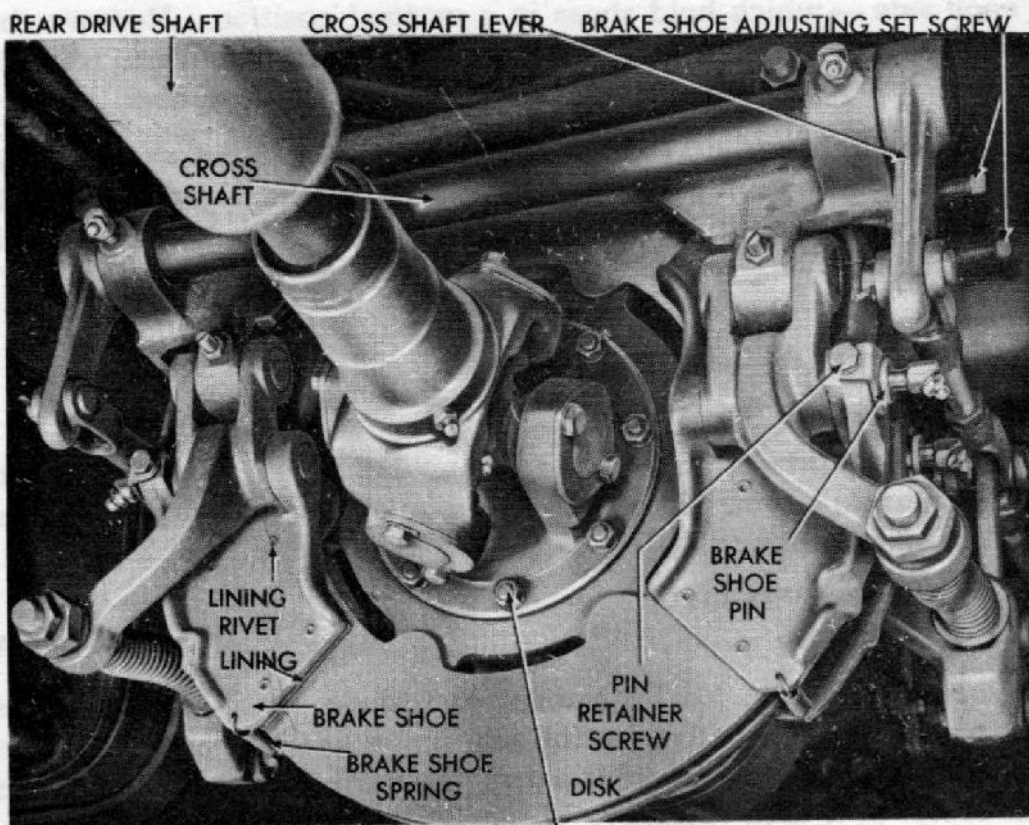
Manufacturer	American Cable
Brake shoe, part No. (Autocar)	10S0913
Lining, part No. (Autocar)	10S0912

b. Adjustment (fig. 119). Release drive shaft hand brake lever (fig. 6). Tighten brake shoe adjusting set screws until $\frac{1}{32}$ -inch clearance is obtained between disk and top of shoes on both sides. Use feeler gage to measure clearance. Tighten tie rod nut to get $\frac{1}{32}$ -inch clearance between disk and bottom of shoes. Recheck top clearance, and continue procedure until top and bottom clearance are equal. Follow same procedure for pair of brake shoes on the opposite side. Never shorten brake rod to adjust brake. Use procedure described above.

DRIVE SHAFT HAND BRAKE



FRONT VIEW OPERATING LEVER REAR DRIVE SHAFT



REAR VIEW DISK TO DRIVING FLANGE BOLT RA PD 321905

Figure 119 — Drive Shaft Hand Brake

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

c. **Removal** (fig. 119). Loosen the pin retainer screw at back of each shoe. Drive out brake shoe pin which secures each shoe to brake assembly. Remove the four shoes.

d. **Installation** (fig. 119). Position shoes on brake assembly. Install brake shoe pin in each shoe. Secure the four pins with the four pin retainer screws.

163. DISK.

a. **Description and Data.**

(1) **DESCRIPTION** (fig. 119). The brake disk is located at the center of brake assembly, between the four shoes. It consists of two flat metal disks welded together at intervals through bosses which are an integral part of each disk. The disk provides a surface against which brake shoes act to stop or hold the vehicle.

(2) **DATA.**

Manufacturer American Cable
Disk, part No. (Autocar) 3TA 4381

b. **Removal** (fig. 119). Remove the two brake shoe springs — one on each side — which hold shoes in a vertical position. Remove the eight nuts, lock washers, and bolts which secure brake disk to transfer case and rear axle drive shaft driving flanges. Remove disk.

c. **Installation** (fig. 119). Position disk between transfer case and rear drive shaft driving flanges. Secure with the eight bolts, lock washers, and nuts. Install the two springs which hold shoes in a vertical position.

164. LEVER.

a. **Description and Tabulated Data.**

(1) **DESCRIPTION** (figs. 6 and 120). The lever is located in cab beside operator's seat. It consists of a solid bar which pivots on a shaft beneath floorboard.

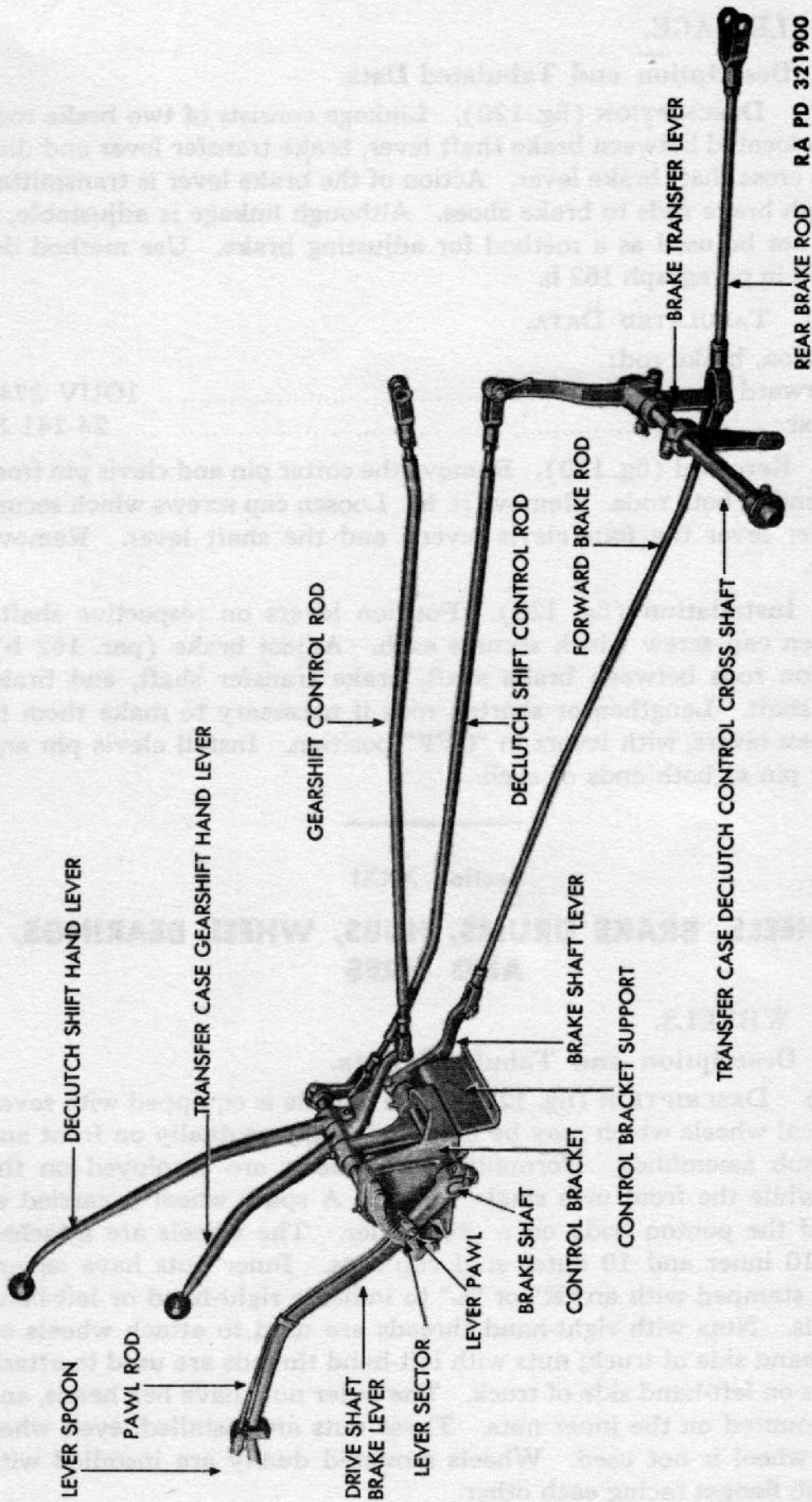
(2) **TABULATED DATA.**

Part No. (Autocar) 10UV 422A

b. **Removal** (fig. 120). Loosen cap screw which clamps brake lever to brake shaft. Remove the cap screw and lock washer which secure lever sector to control bracket. Remove lever, pawl rod, and lever sector as a unit. Remove Woodruff key from shaft.

c. **Installation** (fig. 120). Insert Woodruff key in brake shaft. Position brake lever on brake shaft, and lever sector to control bracket. Install cap screw and lock washer which secure lever sector to bracket. Tighten cap screw which secures lever to brake shaft.

DRIVE SHAFT HAND BRAKE



RA PD 321900

Figure 120 — Propeller Shaft Brake Lever and Linkage

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

165. LINKAGE.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 120). Linkage consists of two brake rods and is located between brake shaft lever, brake transfer lever and disk brake cross shaft brake lever. Action of the brake lever is transmitted through brake rods to brake shoes. Although linkage is adjustable, it must not be used as a method for adjusting brake. Use method described in paragraph 162 b.

(2) TABULATED DATA.

Part Nos., brake rod:

Forward	10UV 3747
Rear	24-241-17

b. Removal (fig. 120). Remove the cotter pin and clevis pin from each end of both rods. Remove rods. Loosen cap screws which secure transfer lever the four clevis levers, and the shaft lever. Remove levers.

c. Installation (fig. 120). Position levers on respective shafts. Tighten cap screw which secures each. Adjust brake (par. 162 b). Position rods between brake shaft, brake transfer shaft, and brake cross shaft. Lengthen or shorten rods if necessary to make them fit between levers, with levers in "OFF" position. Install clevis pin and cotter pin at both ends of each.

Section XXXI

**WHEELS, BRAKE DRUMS, HUBS, WHEEL BEARINGS,
AND TIRES**

166. WHEELS.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 121). The vehicle is equipped with seven identical wheels which may be mounted singly or dually on front and rear hub assemblies. Normally, dual wheels are employed on the rear, while the front uses single wheels. A spare wheel is carried at rear of the ponton body on a tire carrier. The wheels are attached with 10 inner and 10 outer stud cap nuts. Inner nuts have square heads stamped with an "R" or "L" to indicate right-hand or left-hand threads. Nuts with right-hand threads are used to attach wheels on right-hand side of truck; nuts with left-hand threads are used to attach wheels on left-hand side of truck. The outer nuts have hex heads, and are mounted on the inner nuts. These nuts are installed, even when outer wheel is not used. Wheels mounted dually are installed with the hub flanges facing each other.

WHEELS, BRAKE DRUMS, HUBS, WHEEL BEARINGS, AND TIRES

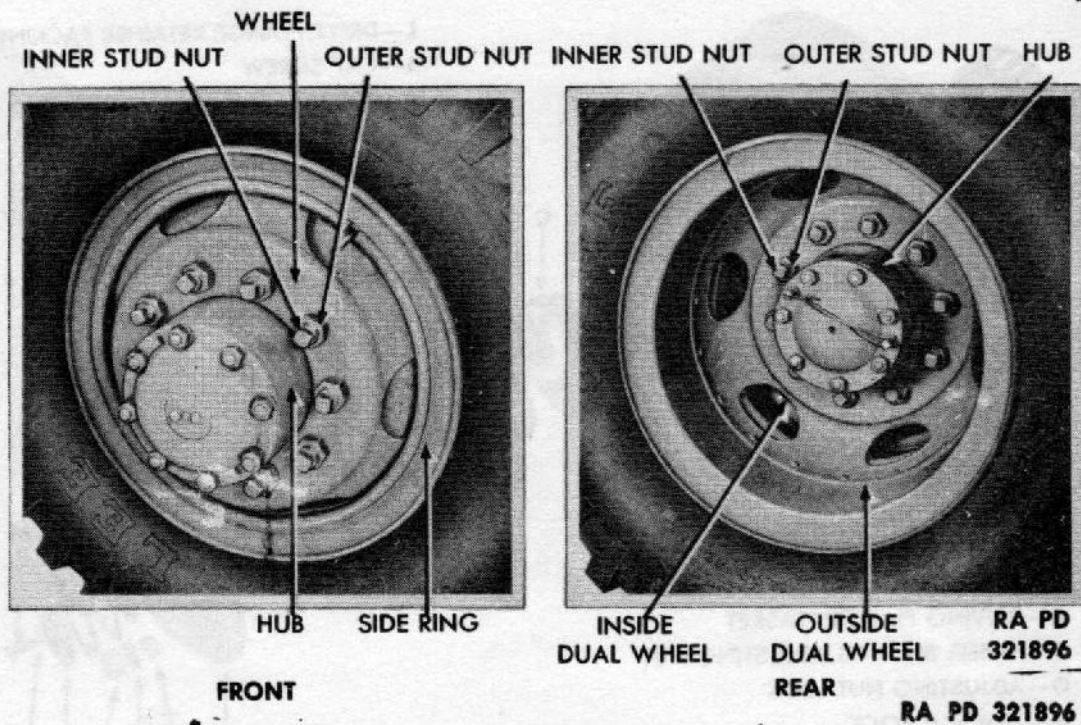


Figure 121 – Front and Rear Wheels Installed

(2) TABULATED DATA.

Manufacturer Budd
Size 12 x 20

b. Removal (fig. 121). Set propeller shaft brake, and block wheels to prevent vehicle from moving. Loosen the 10 stud cap nuts which secure wheel to hub assembly. Using a suitable lifting device, lift wheel clear of floor. Remove the 10 stud nuts. If two wheels are mounted dually, remove the outer hex-head stud nuts first. Remove outer wheel. Remove inner wheel as described above.

c. Installation (fig. 121). Position wheel on hub assembly. If wheel is to be mounted alone, install the 10 inner and 10 outer stud cap nuts. If wheel is to be mounted dually, install the 10 inner stud cap nuts. Mount second wheel, and install the 10 outer stud cap nuts. Tighten nuts, in opposite positions alternately, to insure proper alignment of wheel and hub. Lower wheel to floor. Release brake, and remove blocks from wheels.

167. BRAKE DRUMS, HUBS, AND WHEEL BEARINGS.

a. Description and Tabulated Data.

(1) DESCRIPTION (figs. 122 and 123). The hubs and wheel bearings are attached at each end of the front and rear axle shafts. The bearings, cups, and cones are snug fit to the axle shaft. The hub assembly is installed on the bearings, and secured by a bearing nut.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

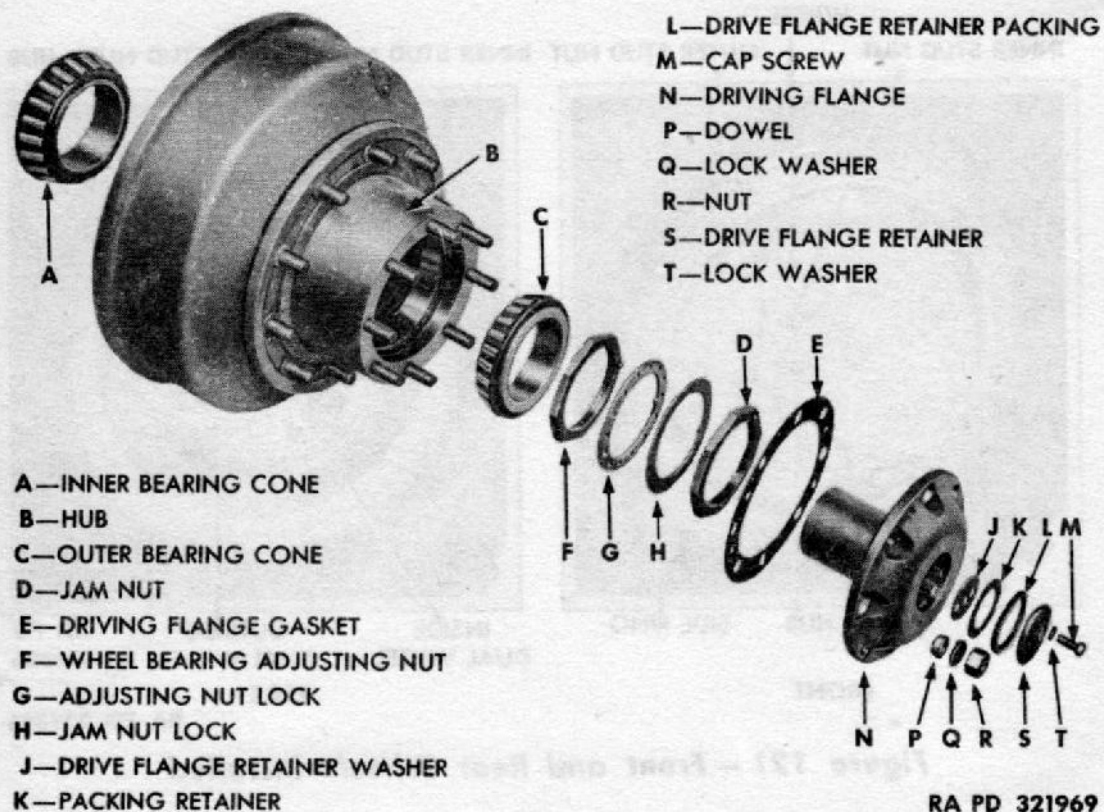


Figure 122 — Front Hub and Bearings Disassembled

The bearings are packed with lubricant to reduce friction. A felt oil seal and two retainer washers between bearing cone and brake housing assembly prevent lubricant from passing to brake drum.

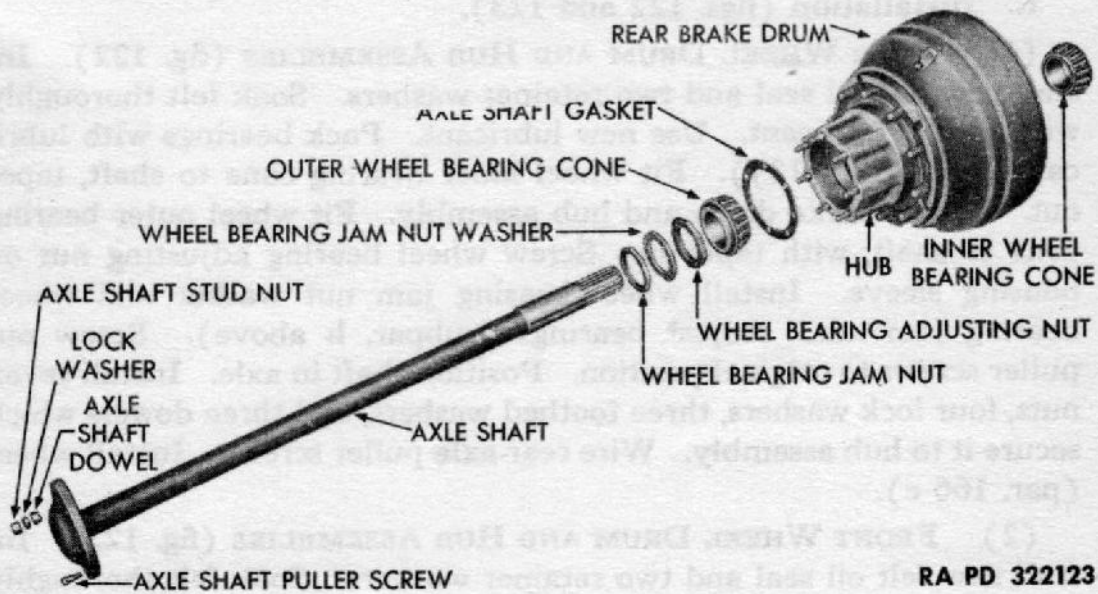
(2) TABULATED DATA.

Wheel bearings:

Manufacturer Timken
 Type Adjustable tapered roller
 Number of bearings 2

b. Adjustment (figs. 122 and 123). Block wheels to prevent vehicle from moving. Use suitable lifting device to raise wheel from floor. Remove the eight stud nuts, eight lock washers, and four dowels which secure axle shaft driving flange to hub assembly. Remove flange and gasket. (For rear axle, remove axle and remove axle shaft as described in paragraph 167 c (2).) Remove wheel bearing jam nut and nut lock (called jam nut washer on rear axle). Rotate wheel alternately in both directions while tightening wheel bearing adjusting nut until wheel binds. Back nut off about one-quarter turn to permit free rotation of wheel without excessive play. Lift hub with a bar, to test for excessive play. Tighten nut enough to eliminate play but not enough to cause binding. Install nut lock (jam nut washer) and jam nut. Recheck wheel adjustment. Install driving flange (or axle shaft)

WHEELS, BRAKE DRUMS, HUBS, WHEEL BEARINGS, AND TIRES



RA PD 322123

Figure 123 – Rear Hub and Bearings Disassembled

and new gasket. Secure with the stud nuts, lock washers, and dowels. Lower wheel to floor, and remove blocks from wheels.

c. Removal (figs. 122 and 123).

(1) **FRONT WHEEL DRUM AND HUB ASSEMBLIES (fig. 122).** Remove wheel (par. 166 b). Remove front axle driving flange and gasket, jam nut, and jam nut lock. Remove adjusting nut lock and wheel bearing adjusting nut. Pry wheel outer bearing cone alternately on each side and remove. Pull out hub and brake drum assembly. Pry off wheel inner bearing cone. Remove felt oil seal and the two retaining washers. Use a clean cloth to wipe lubricant from all parts.

(2) **REAR WHEEL DRUM AND HUB ASSEMBLIES (fig. 123).** Remove wheel (par. 166 b). Remove wire, attached to the two axle shaft puller screws. Remove seven nuts, four lock washers, three toothed washers, and three dowels which secure flange to hub assembly. Tighten puller screws to start shaft out. Pull shaft and attached flange and gasket from axle. Remove wheel bearing jam nut. Remove wheel bearing jam nut washer and adjusting nut. Pry wheel outer bearing cone alternately on each side and remove. Pull hub and brake drum assembly out. Pry off wheel inner bearing cone. Remove felt oil seal and two retaining washers. Use a clean cloth to wipe lubricant from all parts.

d. Remove Brake Drum From Hub (figs. 122 and 123). Remove the 10 stud nuts from inner ends of wheel attaching studs, and lift brake drum from hub.

e. Installation of Brake Drum (figs. 122 and 123). Position brake drum on hub, and install the 10 stud nuts which attach drum to hub. Peen ends of studs to hold nuts in place.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

f. Installation (figs. 122 and 123).

(1) **REAR WHEEL DRUM AND HUB ASSEMBLIES (fig. 122).** Install new felt oil seal and two retainer washers. Soak felt thoroughly with engine lubricant. Use new lubricant. Pack bearings with lubricant (par. 21 c (13)). Fit wheel inner bearing cone to shaft, taper out. Install brake drum and hub assembly. Fit wheel outer bearing cone to shaft, with taper in. Screw wheel bearing adjusting nut on housing sleeve. Install wheel bearing jam nut washer and wheel bearing jam nut. Adjust bearings (subpar. b above). Screw out puller screws to original position. Position shaft in axle. Install seven nuts, four lock washers, three toothed washers, and three dowels which secure it to hub assembly. Wire rear axle puller screws. Install wheel (par. 166 c).

(2) **FRONT WHEEL DRUM AND HUB ASSEMBLIES (fig. 123).** Install new felt oil seal and two retainer washers. Soak felt thoroughly with engine lubricant. Use new lubricant. Pack bearings with lubricant (par. 21 c (13)). Fit wheel inner bearing cone to shaft, with taper out. Install brake drum and hub assembly. Fit wheel outer bearing cone to shaft, with taper in. Screw wheel bearing adjusting nut on housing sleeve. Install wheel bearing adjusting nut, adjusting nut lock jam nut, and jam nut lock. Adjust bearings (subpar. b above). Position driving flange and gasket. Install dowels, lock washers, and nuts securing driving flange to hub. Install wheel (par. 166 c).

168. TIRES.

a. Description and Tabulated Data.

(1) **DESCRIPTION (fig. 2).** The tires are 14-ply, mud and snow type tread, bus-balloon type. They are mounted on the seven wheels described in paragraph 166 a (1).

(2) **TABULATED DATA.**

Manufacturer	Lee
Type	Bus-balloon, mud and snow
Size	12.00 x 20
Air pressure:	
Hard-surface road operation	70 lb
Off-road operation	60 lb

b. Maintenance. Proper care of tires determines to a great extent the efficiency and usefulness of the vehicle. Check tire pressures, wheel alinement, and load distribution frequently. Inner tires often carry an overload, due to high road crown. Outer tire sidewalls are damaged through cuts and scraping. Shift tires periodically to distribute wear. See recommended pressure for proper inflation under "Tabulated Data" above.

SPRINGS AND SHOCK ABSORBERS

c. Removal. Remove wheel (par. 166 b). Lay tire flat on floor, with valve pointing up. Remove valve core to release air from tire. Remove side ring from wheels as follows: Insert tire iron in groove at end of ring; pound iron all the way around, between ring and wheel; remove ring. Force tire iron between tire casing and wheel. Pound iron all the way around. Be careful not to damage valve. Push valve back through opening, and remove tire and tube from wheel. Carefully pull flap and tube from tire.

d. Installation. Install tube and flap in tire casing, with valve stem next to balancing mark on wall of casing. Install valve core. Partially inflate tube. Check tube to see that it is not twisted or buckled, and that flap entirely covers exposed side of tube. Position tire on wheel. Pull valve through opening. Install side ring. Check valve to see that it does not touch wheel. Inflate tire to proper pressure (subpar. a (2) above). Mount wheel on hub assembly (par. 166 c).

Section XXXII

SPRINGS AND SHOCK ABSORBERS

169. FRONT SPRINGS.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 124). The front springs are attached to the front of the frame side rails and front axle housing. Two spring clips (U-bolts) secure the center of spring to the housing. The rear of the spring is attached to the frame by a shackle; the front is attached by a bracket. Keep slip nuts tight at all times, to insure proper wheel alinement, facilitate steering, and prevent leaf breakage.

(2) **TABULATED DATA.**

Center to center of eyes	43 1/2 in.
Center of eye to seat center	21 3/4 in.
Width	3 in.
Rebound clips	4
Number of leaves	12

b. Removal. (fig. 124).

(1) **LUBRICATE REMOVAL POINTS.** Set propeller shaft brake. Use gasoline or other suitable soluble to remove dirt and grease from spring. Lubricate spring clips, clip nuts, and spring pins with penetrating oil, or kerosene, to facilitate removal.

(2) **DISCONNECT SHOCK ABSORBER LINK AT SPRING CLIP PLATE.** Remove the jam nut and lock washer which secure link to spring clip plate.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

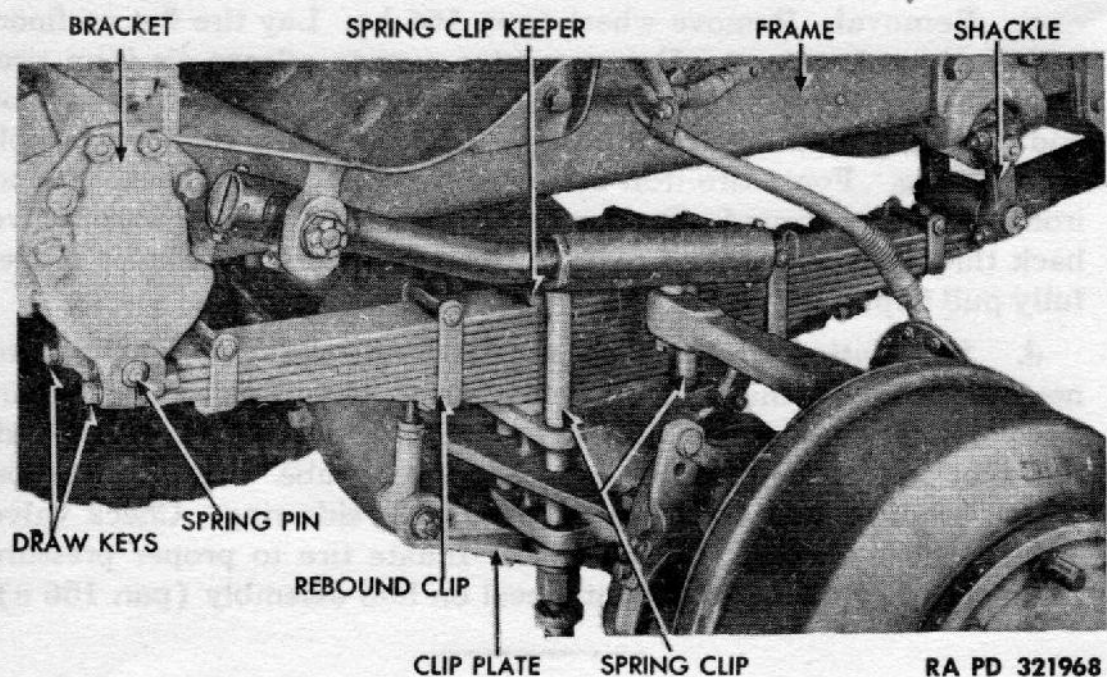


Figure 124 – Front Spring Installed

(3) **DISCONNECT SPRING CLIPS.** Remove the four clip nuts and lock washers which secure clips to axle housing. Disengage shock absorber link from plate.

(4) **REMOVE LUBRICATION FITTING.** Unscrew fitting from front of spring.

(5) **REMOVE DRAW KEYS.** Remove the four nuts and lock washers which secure the two draw keys at each end of spring. Drive out keys.

(6) **REMOVE SPRING CLIPS AND CLIP KEEPER.** Raise vehicle with a hoist, or jack, to take weight off spring, and to permit weight of axle to disengage clips from axle housings. Remove clips and clip keeper.

(7) **REMOVE SPRINGS.** Lower vehicle until weight of spring is supported by axle. Drive spring pins out from inner end. Remove spring.

(8) **REMOVE SPRING SHACKLE.** Remove lubrication fitting from shackle pin. Remove four nuts and four lock washers which secure the two draw keys to upper end of spring shackle; drive out keys. Drive shackle pin out of front spring bracket, from inner end. Follow same procedure to remove opposite spring shackle.

c. Installation (fig. 124).

(1) **INSTALL SPRING SHACKLE.** Position shackle to each side of shackle bracket. Drive in shackle pin from outer side, through shackle and shackle bracket, with slotted side up. Drive in two new

SPRINGS AND SHOCK ABSORBERS

draw keys. Install four nuts and lock washers which secure draw keys. Install lubrication fitting in shackle pin.

(2) **INSTALL SPRINGS.** Use new parts when they show wear or do not fit snugly. Use new draw keys and nuts. Position spring to shackle and bracket. Insert spring pins from outer end, slotted side down.

(3) **INSTALL DRAW KEYS.** Wedge draw keys against slotted side of pin. Install the four nuts and lock washers which secure draw keys.

(4) **INSTALL SPRING CLIPS AND CLIP KEEPER.** Place shock absorber link on spring clip plate. Position clip keeper and clips to spring and spring clip plate. Secure with the four lock washers and clip nuts.

(5) **CONNECT SHOCK ABSORBER LINK AT SPRING CLIP PLATE.** Install link to spring clip plate, and secure with lock washer and jam nut.

(6) **REMOVING LIFTING APPARATUS.** Lower vehicle until full weight rests on springs. Remove lifting apparatus. Release propeller shaft brake.

170. REAR SPRINGS.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 125). Springs are attached to frame side rails by a bracket at front and a shackle at the rear. Attachment of springs to axle housing is made by two spring clips (U-bolts) which clamp center of spring to spring clip plate on housing. Auxiliary springs, which help to carry heavy loads, are mounted above rear springs. These springs contact special brackets, attached to frame, when rear springs flatten out.

(2) **TABULATED DATA.**

Center of eye to center of load	53 in.
Center of eye to seat center	26½ in.
Width	3½ in.
Number of rebound clips	4
Number of leaves	12
Total thickness	5¼ in.
Auxiliary springs:	
Load center	37½ in.
Load center to seat center	18¾ in.
Width	3½ in.
Number of leaves	5
Total thickness	1⅞ in.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

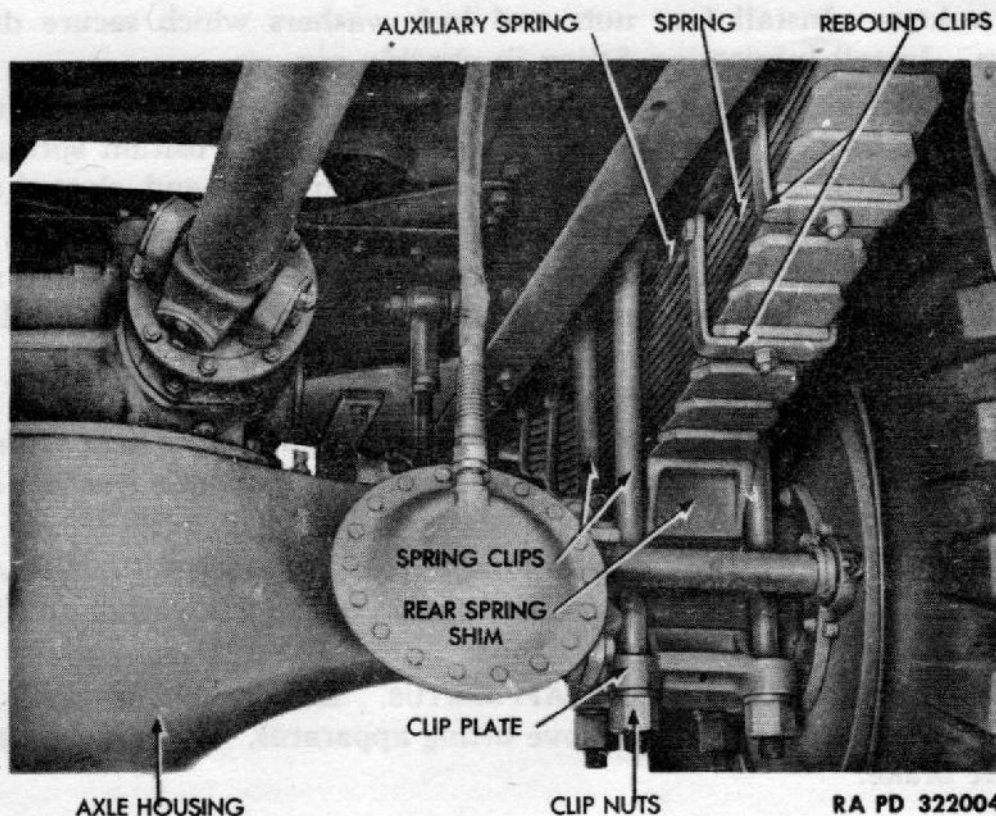


Figure 125 — Rear Spring Installed

b. Removal (fig. 125).

(1) LUBRICATE SPRING ATTACHING PARTS. Clean spring. Squirt penetrating oil or kerosene to clip nuts and spring pins.

(2) DISCONNECT SHOCK ABSORBER. Remove the jam nut and lock washer which secure link to rear spring shim. Remove the jam nut and lock washer which secure link to arm. Remove link.

(3) DISCONNECT SPRING CLIPS. Remove the four clip nuts and lock washers which secure clips to axle housing. Lift rear end of truck until clips are pulled free from axle housing. Remove clips and clip keepers.

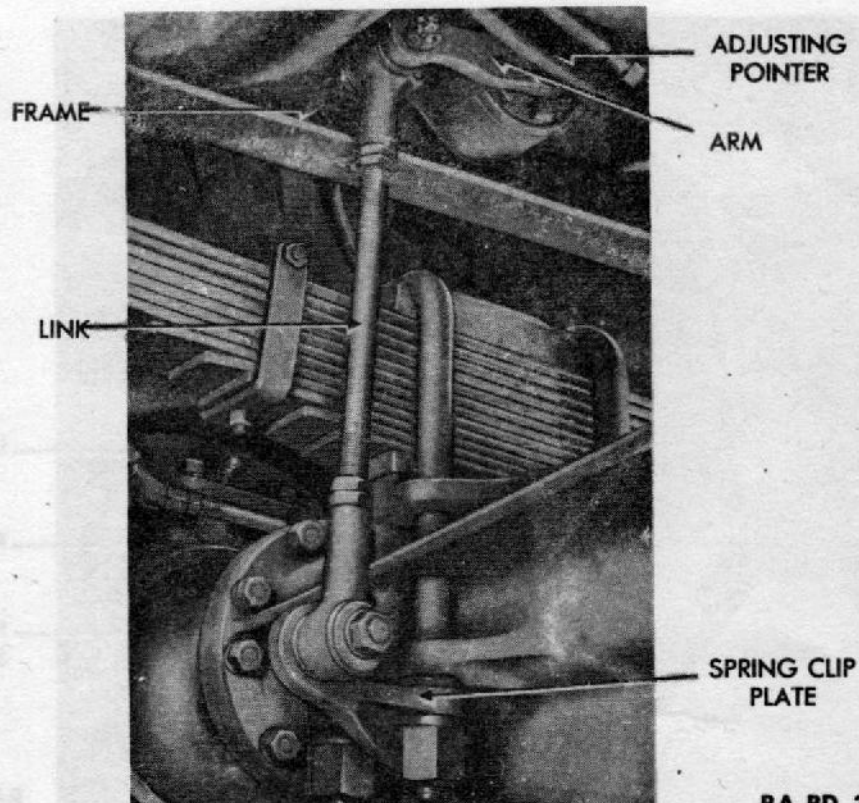
(4) REMOVE LUBRICATION FITTINGS. Unscrew fittings from outer side at each end of spring.

(5) REMOVE FRONT PIN. Remove the two nuts and lock washers which secure the draw keys at front end of spring. Drive out keys. Drive front pin out from inner side of spring.

(6) REMOVE REAR PIN. Move spring to rear until rear spring pin is clear of frame rail. Remove rear pin by same procedure as step (5) above.

(7) REMOVE SPRING SHACKLE. Remove three bolts, lock washers, and nuts securing rear quarter fender to rear lower support, so

SPRINGS AND SHOCK ABSORBERS



RA PD 320888

Figure 126 – Front Shock Absorber Installed

that fender can be moved aside to allow shackle to pass. Remove cotter pin, nut, and washer from rear spring cross shaft. Pull off spring shackle and washer.

c. Installation (fig. 125).

(1) **INSTALL SHACKLE.** Move rear quarter fender aside. Install washer, shackle, washer, nut, and cotter pin on rear spring cross shaft. Install three bolts, lock washers, and nuts which secure rear quarter fender to rear lower support.

(2) **INSTALL SPRING.** Use new parts when old parts show wear or do not fit snugly. Use new draw keys and nuts. Position spring between shackle and bracket. Insert spring pins—slotted side down—from outer side of spring at each end.

(3) **INSTALL DRAW KEYS.** Wedge draw keys at each end against slotted side of pin. Secure with the four nuts and lock washers.

(4) **INSTALL SPRING CLIPS AND CLIP KEEPER.** Position clip keeper, and clips to spring and clip plate, on axle housing. Secure with the four lock washers and clip nuts.

(5) **CONNECT SHOCK ABSORBER LINK AT REAR SPRING SHIM** (par. 171 d). Position shock absorber link, and secure with two lock washers and jam nuts.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

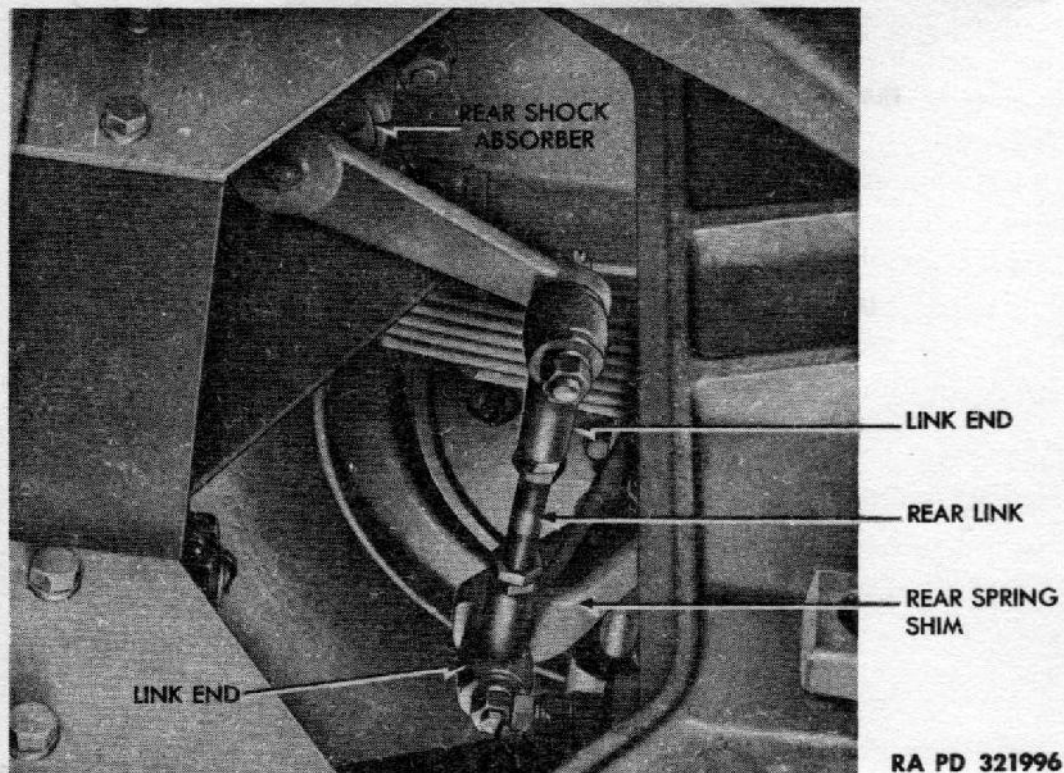


Figure 127 - Rear Shock Absorber Installed

(6) REMOVE LIFTING APPARATUS. Lower vehicle so that full weight rests on springs. Remove apparatus. Release propeller shaft brake.

171. SHOCK ABSORBERS.

a. Description and Tabulated Data.

(1) DESCRIPTION (figs. 126 and 127). Four shock absorbers are attached to inside of the frame side rails. The front shock absorbers are in front of the front axle. The rear shock absorbers are behind the rear axle. Shock absorbers are a double-acting, oscillating-vane type. They are used to control spring action, and provide more resistance to spring recoil than to spring compression.

(2) TABULATED DATA.

Manufacturer Houdaille

b. Maintenance and Adjustment.

(1) MAINTENANCE (figs. 126 and 127). Inspection of fluid is normally the only care which shock absorbers require. Check fluid level and refill, if necessary. To refill shock absorber, observe the following procedure: Remove the jam nut, lock washer, and tapered bolt which secure shock absorber link to spring clip plate or rear spring shim (fig. 126); clean dirt and grease from around filler plug;

STEERING GEAR

remove filler plug; fill reservoir to bottom of filler hole with shock absorber fluid; do not fill above this level; work shock absorber arm up and down several times to expel air from system; add more fluid, if necessary. When air is removed and shock absorber is properly filled, install filler plug. Connect shock absorber link with the one nut and lock washer.

(2) **ADJUSTMENT** (figs. 126 and 127). No adjustment of links is required. Shock absorber arm tension is increased or decreased by turning an adjusting pointer outside the shock absorber. Turn pointer counterclockwise to increase resistance or clockwise to decrease resistance. Make adjustment one mark, or $\frac{1}{16}$ inch, at a time. Full range of adjustment is one-half turn, or between the two stops. Do not turn pointer beyond these stops.

c. Removal (fig. 126).

(1) **FRONT SHOCK ABSORBER.** Remove the jam nut and lock washer which secure link to spring clip plate. Remove the two nuts, lock washers, and bolts which secure shock absorber to frame. Disengage link from plate. Remove shock absorber, arm, and link as a unit.

(2) **REAR SHOCK ABSORBER.** Remove jam nut and lock washers which secure link to rear spring shim. Remove the two nuts, lock washers, and bolts which secure shock absorber to frame. Disengage link from rear spring shim. Remove shock absorber, arm, and link as a unit.

d. Installation (fig. 127).

(1) **FRONT SHOCK ABSORBER.** Install link to spring clip plate, and secure with the lock washer and jam nut. Position shock absorber to frame. Install the two bolts, lock washers, and nuts which secure it.

(2) **REAR SHOCK ABSORBER.** Install link to rear spring shim, and secure with lock washer and jam nut. Position shock absorber to frame. Install two bolts, lock washers, and nuts which secure it.

Section XXXIII

STEERING GEAR

172. DESCRIPTION AND TABULATED DATA.

a. **Description** (figs. 128 and 129). The steering gear is attached to frame side rail at front left-hand side of vehicle. It extends from the steering arm, attached to left front wheel assembly, through the steering gear housing to the steering wheel in the cab. The gear is the conventional roller-mounted, twin-lever type. Turning action of

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

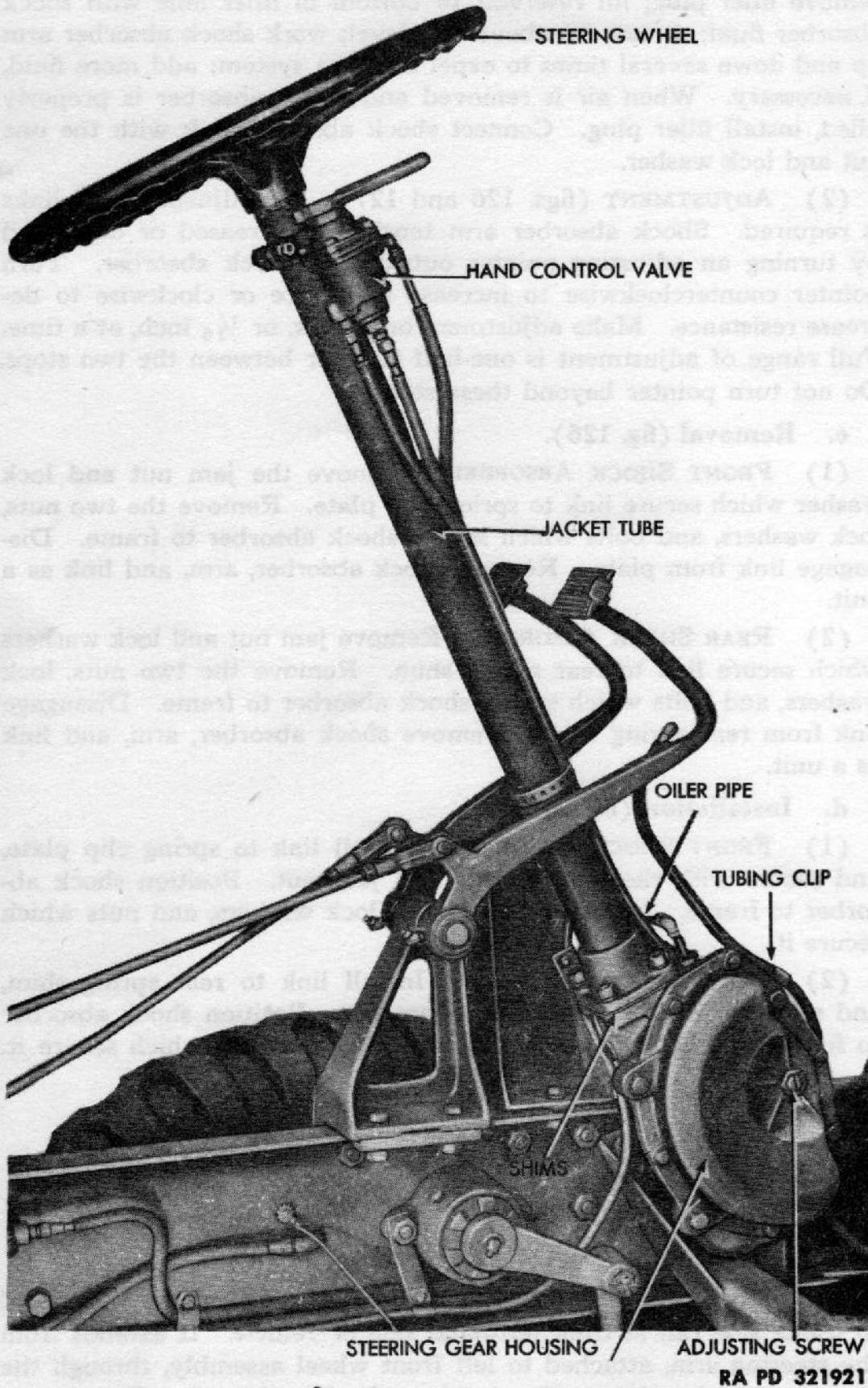


Figure 128 - Steering Gear Installed

STEERING GEAR

steering wheel is relayed to the steering arm through a cam engaged to two studs mounted in tapered roller bearings on the lever shaft.

b. Tabulated Data.

Manufacturer	Ross
Model	T 74
Type	Cam and lever
Backlash (tapered studs in cam groove).....	Barely perceptible
Cam thrust	Barely perceptible drag
Shims available	0.002, 0.003, 0.010 in. thickness
Stud roller	5 to 11 in.-lb

173. MAINTENANCE AND ADJUSTMENT.

a. **Maintenance** (figs. 131 and 128). Periodically, check the drag link for excess slack or end play. Check steering jacket tube assembly for end play by attempting to move it back and forth on its axis. Keep steering gear housing filled with proper lubricant.

b. **Adjustment.** There are two principal adjustments on this steering gear and a supplemental adjustment on the stud-roller bearing unit in the lever shaft. Principal adjustments are: the adjustment of upper and lower cup ball bearings on cam, and the adjustment of the tapered ball stud in the cam groove for backlash. If an adjustment is required on the stud-roller bearing unit in the lever shaft, report condition to higher authority. When making adjustments outlined in steps (1) and (2) below, free the steering gear of all load by disconnecting the drag link from the left front wheel steering arm ball (par. 175 a).

(1) **ADJUST UPPER AND LOWER CUP BALL BEARINGS ON CAM.** Remove screws which secure the left-hand floorboards. Remove floorboards from cab. Remove screws which secure both left-hand splash shields under right fender. Remove both shields. Loosen housing side cover adjusting screw to relieve pressure of ball stud against grooves in cam. Turn steering wheel with thumb and forefinger. If more than a slight drag is felt, loosen the four upper cover plate hex nuts, lift the cover plate up, and add a thin shim. Shims are 0.002, 0.003 and 0.010 inch thick and must be cut at the holes to permit installation or removal without completely removing jacket tube. Tighten the hex nuts, to draw cover plate tightly against the shims, and test again by turning steering wheel. If looseness is felt when turning steering wheel with thumb and forefinger, repeat the above operation, but remove a shim, then tighten the upper cover plate, and recheck action of steering wheel. When this adjustment is completed, adjust the tapered ball stud for backlash (step (2) below).

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

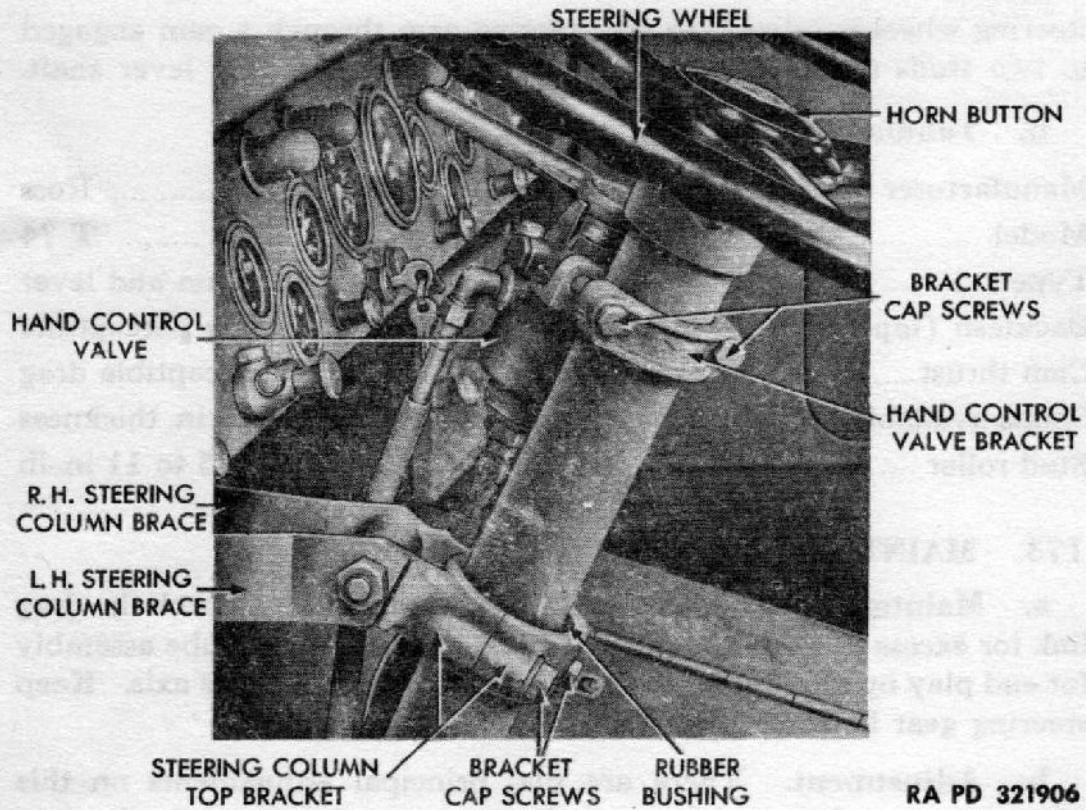


Figure 129 — Upper End of Steering Column

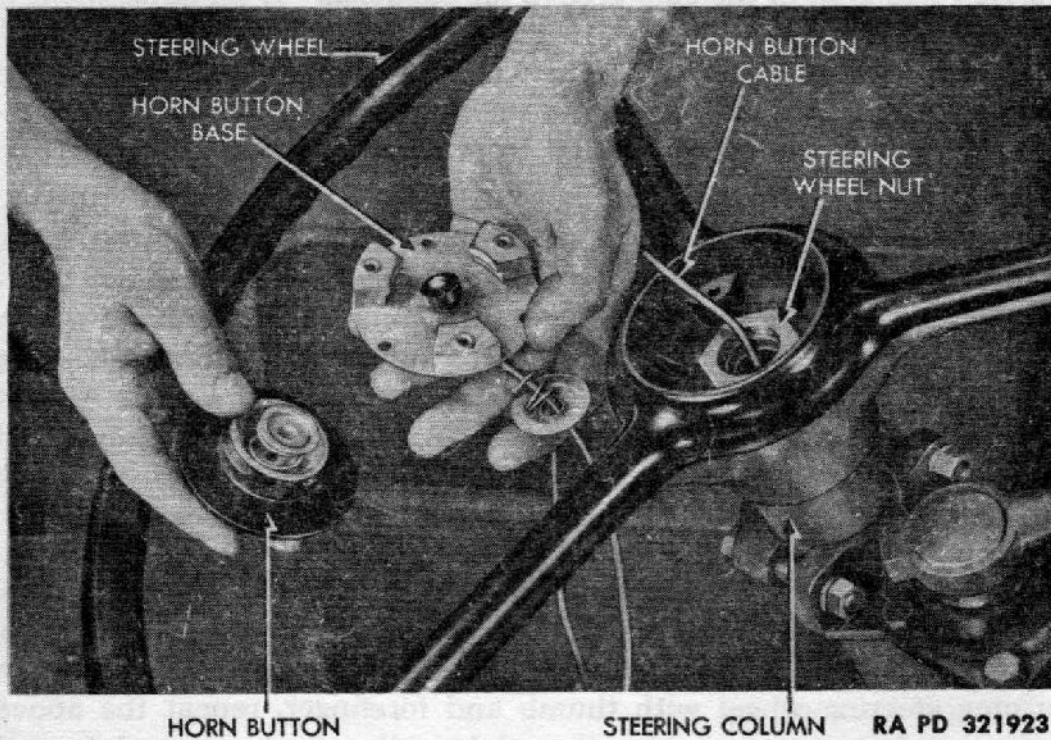


Figure 130 — Removing Horn Button

STEERING GEAR

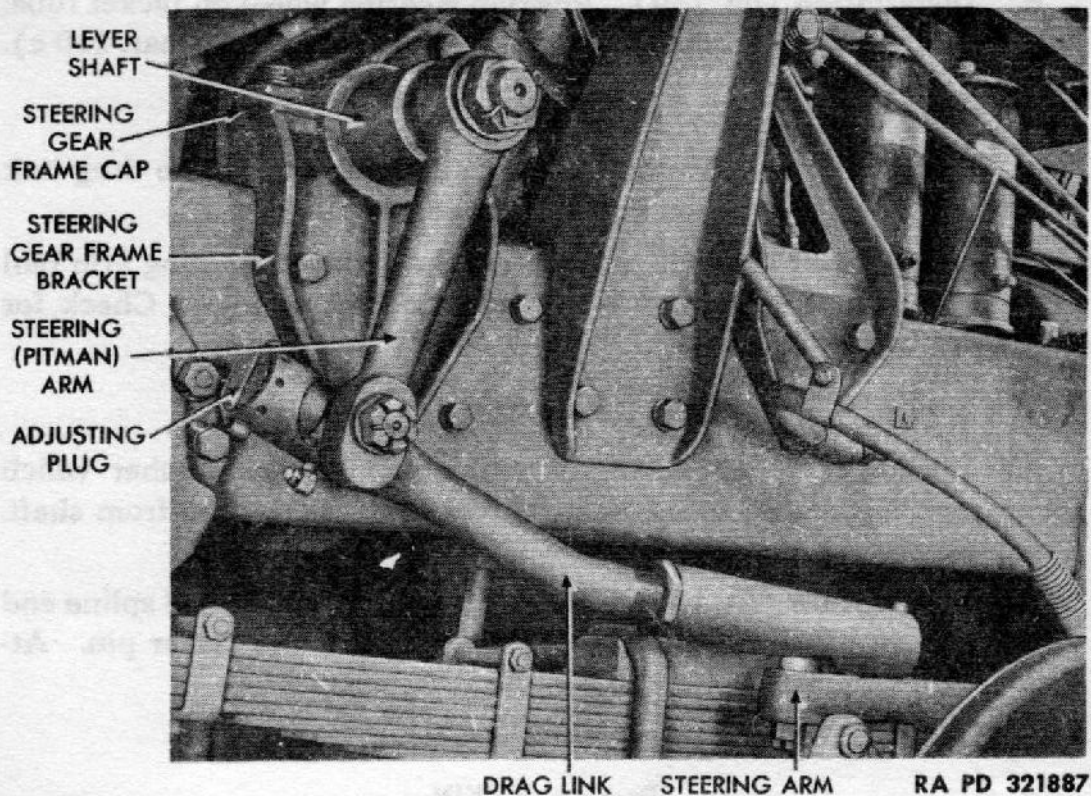


Figure 131 — Drag Link Installed

(2) **ADJUST TAPERED BALL STUD FOR BACKLASH.** Backlash of the stud in the cam groove shows up as end play of lever shaft and as backlash at steering wheel and ball on steering arm. Adjustment must be made with steering gear in midposition. Backlash in the end positions is normal, and not objectionable. Test for backlash by turning steering wheel slowly from one extreme position to the other. A very slight drag must be felt in midposition. If no drag is felt, turn adjusting screw clockwise. If too much drag is felt, turn the adjusting screw counterclockwise. When adjustment is completed, lock the adjusting screw in position by tightening adjusting screw lock nut. Recheck drag by turning steering wheel. Connect drag link (par. 175 b). Replace floorboards and splash shields.

(3) **ADJUST DRAG LINK END PLAY** (fig. 131). Remove the nut, lock washer, and bolt from adjusting plug at the end of the drag link where adjustment is to be made. Screw in adjusting end plug until slack is removed. Do not tighten more than necessary. Install bolt, lock washer, and nut which keep adjusting end plug from turning.

174. STEERING WHEEL (figs. 129 and 130).

a. **Remove Steering Wheel.** Remove horn button assembly (par. 110 b). Remove wheel nut. Using steering wheel puller, lift steering wheel from jacket tube.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

b. **Installation** (fig. 130). Position steering wheel on jacket tube. Screw on steering wheel nut. Install horn button assembly (par. 110 c).

175. DRAG LINK (fig. 131).

a. **Removal**. Remove cotter pin and nut which secure drag link to steering arm ball at each end. Remove drag link.

b. **Installation** (fig. 131). Position drag link to steering arm ball at each end. Secure with the two nuts and cotter pins. Check for proper adjustment (par. 173 b (3)).

176. STEERING (PITMAN) ARM (fig. 131).

a. **Removal**. Remove cotter pin, nut, and lock washer which secure arm to tapered spline end of lever shaft. Tap arm from shaft. Disconnect arm from drag link.

b. **Installation** (fig. 131). Tap steering arm on tapered spline end of lever shaft. Secure with the lock washer, nut, and cotter pin. Attach drag link to arm (par. 175 b).

Section XXXIV**FRAME, CAB, AND BODY****177. DESCRIPTION** (fig. 1).

a. The cab is mounted at front of truck, over engine. Access to engine is obtained by removing the engine hood inside the cab, and removing the fender splash shields beneath front fenders. Removable fabric top, rear curtain, and side curtains completely enclose cab interior. Other parts include an adjustable windshield, two windshield wipers, doors, rear-vision mirrors, grab handles, fenders, and steps. The ponton body is mounted directly behind cab. Lash hooks are provided around the body for installation of tarpaulin. Frame attachments include a bumper, two towing hooks, and a pintle hook.

178. WINDSHIELD WIPERS.**a. Description and Tabulated Data.**

(1) **DESCRIPTION** (fig. 132). Two wipers are mounted at top center of windshields—one on each side. The motor of each is supported by a bracket attached to inside top of windshield frame. Power of motor is transmitted through a shaft extending from motor to wiper arm outside windshield. A removable blade is attached to end of each arm. The wiper motors are individually air-operated. They are controlled by two valves attached to the instrument panel (fig. 4). Opening the valves permits air from air brake system to operate the motors.

FRAME, CAB, AND BODY

The degree of the valve opening determines the speed of the wiper action.

(2) **TABULATED DATA.**

Manufacturer Trico-Folberth
Part No. FP657
Number of assemblies 2

b. Maintenance. Check air lines periodically for plugged line or fittings, kinked hose or tubing, and leaks. Tighten all connections. Lubricate felt seals around shaft with light engine oil at each lubrication period. If wiper fails to operate after line has been thoroughly checked, replace motor assembly. Replace worn wiper blades or blades that do not clean windshield properly.

c. Removal (fig. 132). Disconnect hose from air line. Remove the arm nut which secures wiper arm to motor shaft. Remove arm and blade as a unit. Remove the two screws and lock washers which secure motor bracket to windshield frame. Remove motor assembly.

d. Installation (fig. 132). Position wiper motor assembly on windshield frame. Secure with the two screws and lock washers. Position wiper arm on motor shaft. Install lock washer and nut. Connect hose to tube.

179. WINDSHIELD ASSEMBLY.

a. Description and Tabulated Data.

(1) **DESCRIPTION (fig. 132).** The windshield is attached at the top rear of the cowl assembly. Manually operated quadrant arms permit varied degrees of opening.

(2) **TABULATED DATA.**

Part No. 15UKSF497

b. Removal (fig. 132). Disconnect air hose front tube at each side of windshield. Remove the five hex cap screws and lock washers which secure each of the windshield frame side brackets to cowl. Remove the two bolts, nuts, and lock washers which secure each bracket to cowl front riser plate. Remove windshield assembly.

c. Installation (fig. 132). Position windshield assembly on cowl. Secure brackets to cowl with the 10 hex cap screws and lock washers. Install the two bolts, lock washers, and nuts which secure brackets to cowl front riser plate.

180. CAB TOP, REAR AND SIDE CURTAINS.

a. Description and Tabulated Data (figs. 2 and 133).

(1) **DESCRIPTION.** The cab curtains include: a fabric top attached between the windshield frame and the top bow, a fabric rear

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

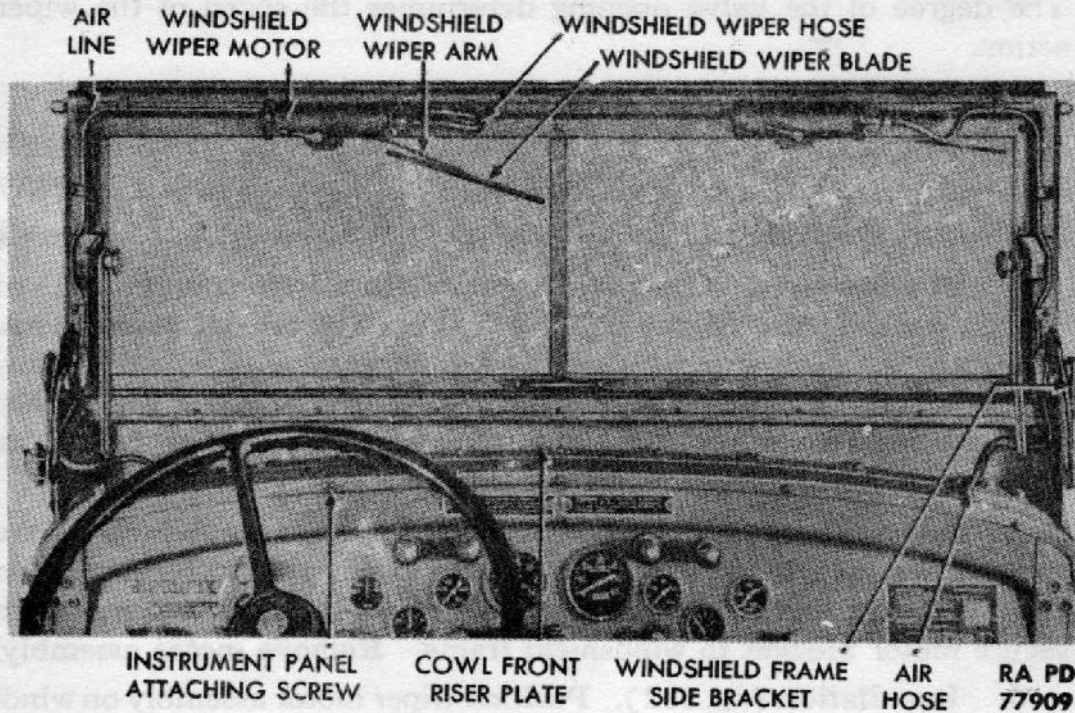


Figure 132 - Windshield Installed

curtain attached between the top bow and the rear top of cab, and two fabric side curtains attached between the windshield frame and the rear curtain (one on each side). Side curtains are windowed to allow side vision when curtains are installed. Top and sides are attached to windshield frame through a bead and tube connection. Ropes secure top and rear curtain to top bow and rear of cab.

(2) TABULATED DATA.

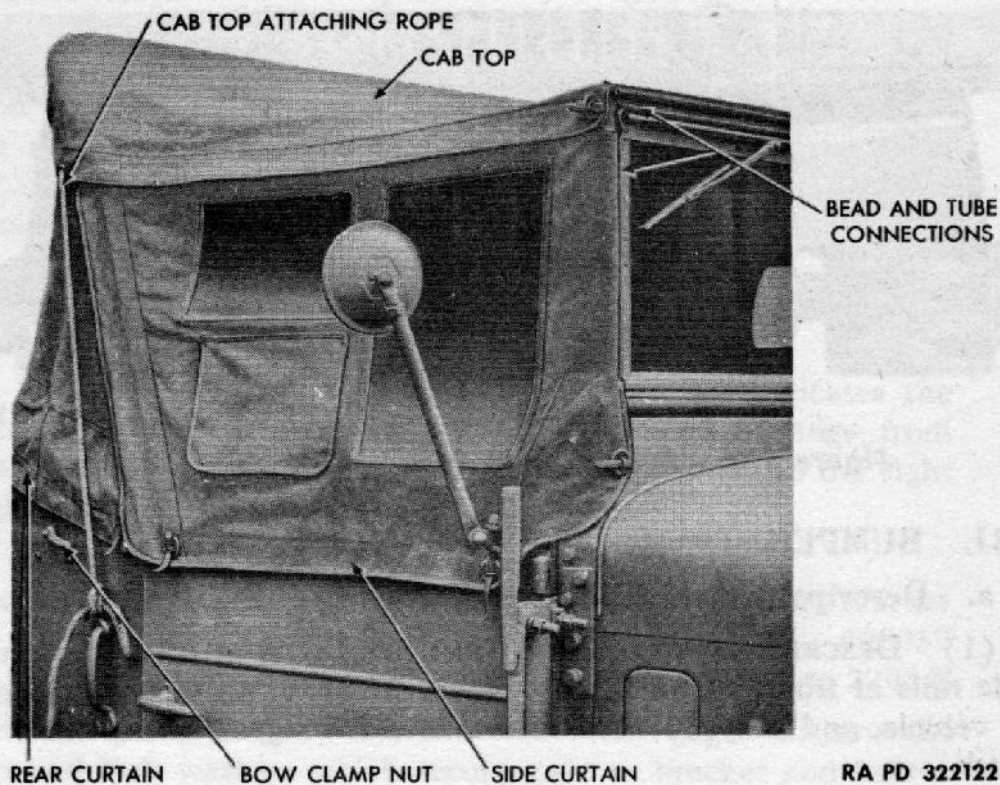
Part Nos.:

Cab top assembly, complete	15UKSF 72480
Side curtain assembly, right-hand	15UKSF 4510
Curtain rod, right-hand	15UKSF 3362
Side curtain assembly, left-hand	15UKSF 4520
Curtain rod, left-hand	15UKSF 32262
Rear curtain assembly	15UKSF 4630
Cab top assembly	15UKSF 42450
Cab top bow	15UKSF 589
Cab top bow handle clamp nut	15UKSF 23079

b. **Maintenance.** Keep curtains and top securely fastened when installed. When side curtains are removed, stow carefully in tool box so they will not be damaged. Do not fold top or curtains when wet.

c. **Removal** (figs. 2 and 133). Untie cab top attaching rope. Disengage top from the grommet which secures it to windshield frame on each side. Pull top over windshield assembly. Slide bead at front of

FRAME, CAB, AND BODY



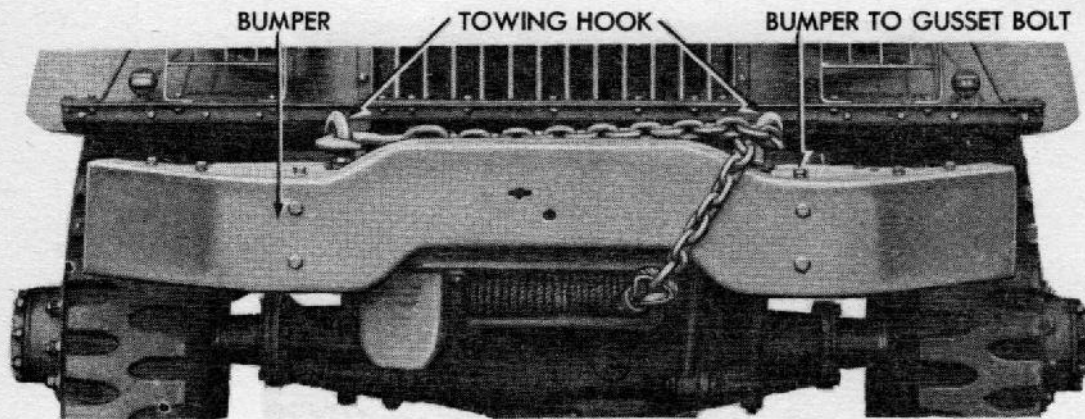
RA PD 322122

Figure 133 – Exterior of Cab Top

top from tube at top of windshield. Remove top. Disengage side curtains from the four grommets which secure them to windshield frame, cowl, and door on each side. Slide curtain support rod from bracket on door. Pull rod from curtain. Slide bead at front edge of curtain from tube at side of windshield frame. Remove curtain. Disengage rear curtain from grommet which secures it to cab on each side. Loosen and unhook rope which secures curtain to rear top of cab. Loosen clamp nut which secures top bow to cab on each side. Remove cotter pin and flat washer at bottom of top bow on each side. Slide bow from bracket. Remove rear curtain and top bow as a unit.

d. Installation (figs. 2 and 133). Position top bow, with rear curtain attached in bracket on cab. Install flat washer and cotter pin which hold bow in bracket. Tighten clamp nuts. Engage rope threaded through grommets in curtain to hooks on cab. Tighten rope and secure. Fasten curtain to grommet on each side of cab. Slide bead at front of side curtain through tube on windshield frame. Slide support rod in curtain, and position rod end in door bracket. Fasten curtain to the four grommets which secure it to door, cowl, and windshield frame. Slide bead at front of top through tube on windshield frame. Fasten grommet on each side to windshield frame. Pull top over top bow. Pull rope tight, and tie it to grab handle on each side.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 321935

Figure 134 – Bumper and Towing Hooks Installed

181. BUMPER.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 134). The bumper is attached to frame side rails at front of vehicle. It provides partial protection to front of vehicle, and may be used to attach a towing or lifting cable to truck.

(2) **TABULATED DATA.**

Part No. 12UY402A

b. Removal (fig. 134). Remove winch chain from stowed position around bumper and towing hooks. Remove bolts, nuts, and lock washers attaching bumper to gusset plates. Remove bolts, nuts, and lock washers attaching bumper to left and right bumper brackets. Lift off bumper.

c. Installation (fig. 134). Position bumper over gusset plates against bumper brackets. Install bolts, lock washers, and nuts securing bumper to bumper brackets and gusset plates.

182. TOWING HOOKS.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 134). Two towing hooks are attached to bumper gussets at front of vehicle. The hooks are used for attaching towing apparatus when the vehicle is towed, and for securing the winch chain in stowed position.

(2) **TABULATED DATA.**

Part Nos.:

Left-hand 12H3129
 Right-hand 12H3128

FRAME, CAB, AND BODY

b. **Removal** (fig. 134). Remove the bolts, nuts, and lock washers which secure hooks to bumper gusset on each side. Remove hooks.

c. **Installation** (fig. 134). Position hooks on bumper gussets. Install the bolts, nuts, and lock washers which secure hook to gusset on each side.

183. PINTLE HOOK.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (fig. 135). The pintle hook is attached to the two bearing plates mounted on the two frame crossmembers at the rear of truck. The top of the hook operates as a lever which can be pushed back to provide a 2-inch opening. The lever is locked in either open or closed position by means of the engagement of a square-shaped tooth in the lever to a square-shaped recess in the body of the hook. Engaged parts are held in engagement by a spring attached to lever. When closed, the lever can be locked with a latch pin which is attached by a chain to the pintle body. A heavy coil spring is mounted on the pintle shaft between the bearing plates. It serves to reduce shocks in stopping and starting.

(2) TABULATED DATA.

Part Nos.:

Pintle hook	16W2790A
Bearing plates	12UU2702

b. **Removal** (fig. 135). Remove cotter pin, pintle hook nut, and flat washer which secure pintle assembly to frame crossmembers. Pull assembly from crossmembers.

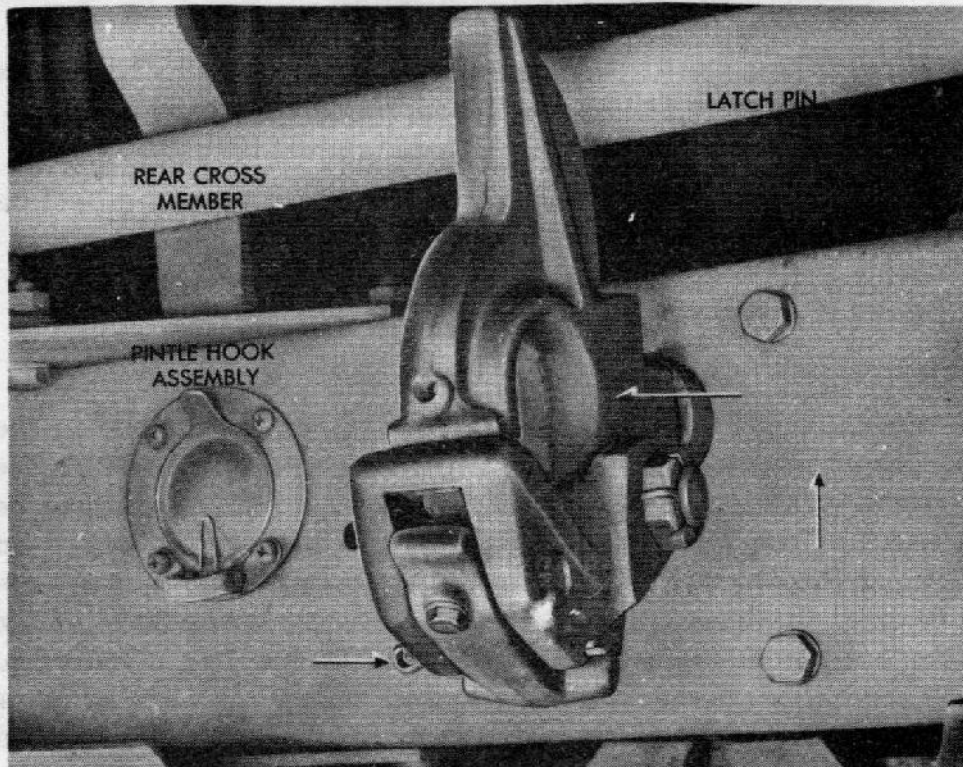
c. **Installation** (fig. 135). Position pintle assembly on frame crossmembers. Install spring on shaft between bearing plates. Secure with the flat washer, nut, and cotter pin.

d. **Maintenance**. If the pintle hook latch pin and latch pin lock screw are worn, replace them. Replace latch pin with a $\frac{7}{8}$ -inch hexagon-head steel bolt $3\frac{3}{4}$ inches long, 2 tapered washers, a castellated nut, and lock washer. When installing the bolt, be sure to lock the pintle latch. Plug the latch pin lock screw hole with a wooden plug.

184. FENDERS.

a. **Description** (fig. 2). The front fenders are attached to the cowl and cab above the front wheels. They are attached to the steps at the rear and to the brush guard bracket at the front. They serve to protect the vehicle from road dirt, and act as steps for entering and leaving cab. Rear quarter forward fenders are attached to deck plate by means of fender irons and support brackets. Rear quarter rearward

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 321949

Figure 135 – Pintle Hook Installed

fenders are attached to two support brackets extending across the width of the vehicle. Fender flaps are attached to rear fenders and to lower support bracket.

b. Maintenance (fig. 2). Keep painted surfaces clean, and repaint when paint wears off. Keep mounting bolts and nuts tight at all times to prevent vibration, cracking, and rattling.

c. Removal.

(1) **FRONT FENDERS** (fig. 2). Remove splash shields. Remove wing screws, flat washers, and lock washers which attach shields to fenders. Disconnect radio suppression bond from large shield. Remove nuts, bolts, and lock washers which attach fender to cowl, cab, step, and brush guard bracket. Lift off front fender.

(2) **REAR FENDERS** (fig. 2). Remove nuts, bolts, and lock washers which attach rear quarter forward fender to fender irons at bottom, and to support brackets and the deck plate at top. Lift off rear quarter forward fender. Remove nuts, bolts, and lock washers attaching rear quarter rearward fenders to upper and lower support brackets. This will free fender flaps and fender.

d. Installation.

(1) **FRONT FENDERS** (fig. 2). Position front fender to cab and cowl. Attach fender to brush guard bracket at front, to step at rear,

FRAME, CAB, AND BODY

and to cab and cowl at top, with bolts, lock washers, and nuts. Install splash shields. Attach shields to fenders with lock washers, flat washers, and wing screws. Connect radio suppression bond.

(2) **REAR FENDERS** (fig. 2). Attach rear quarter forward fender to fender irons and the deck plate at top, and to support brackets at bottom, by installing bolts, lock washers, and nuts. Attach rear quarter rearward fenders to upper support bracket. Position fender flap between fender and lower support bracket, and install bolts, lock washers, and nuts.

185. STEPS.

a. **Description** (fig. 2). To facilitate mounting and demounting from vehicle, two steps are provided on each front fender. Upper steps are attached directly to fender. Lower steps are attached to rear of cab, bottom of front fender, and to a fender support bracket extending from left to right fender underneath the cab.

b. **Maintenance**. Keep attaching bolts tight to prevent vibration, cracking, and rattling.

c. **Removal** (fig. 2). Remove nuts, bolts, flat washers, and lock washers attaching upper step to front fender. Lift off upper step. Remove nuts, bolts, and lock washers attaching lower steps to fender and cab. Lift off lower steps and the attached fender support bracket as a unit.

d. **Installation** (fig. 2). Position upper steps to front fender, and install flat washers, lock washers, bolts, and nuts. Position lower steps and attached fender support bracket, and secure to cab and front fenders with lock washers, bolts, and nuts.

186. PONTON BODY TARPAULIN (fig. 2).

a. **Description**. A tarpaulin is provided for covering of ponton body. Lash hooks, on the end gates and the body, are provided for securing the tarpaulin draw-rope which is threaded through tarpaulin grommets.

b. **Maintenance**. Keep drawrope securely tightened when tarpaulin is installed. When removed, stow in the tool box to prevent being damaged. Do not fold tarpaulin when wet.

c. **Installation** (fig. 2). Thread drawrope through grommets in tarpaulin so that ends of rope are located in one corner. Center tarpaulin over ponton body and hook drawrope under lash hooks. Tighten drawrope and secure to corner lash hook.

d. **Removal** (fig. 2). Untie drawrope end from lash hook. Lift drawrope from under lash hooks around ponton body. Remove tarpaulin.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

Section XXXV

INSTRUMENTS

187. AMMETERS.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (figs. 4 and 136). Two ammeters are used. The ammeter is the upper instrument of the two located on the instrument panel directly in front of the steering column. It registers generator output by means of a hand, and covers a discharge or charge range from zero to 50 amperes. The auxiliary ammeter is located directly below the ammeter. Its purpose is to indicate charge or discharge operation of the auxiliary storage battery.

(2) **TABULATED DATA.**

Manufacturer Stewart-Warner
Model:

Ammeter 400056
Auxiliary ammeter 440008

b. Removal (fig. 136). Disconnect the four wires attached to ammeter. Disconnect the two wires attached to auxiliary ammeter. Remove two nuts and lock washers securing each ammeter to bracket and instrument panel. Pull brackets from ammeters. Pull ammeters from front of panel.

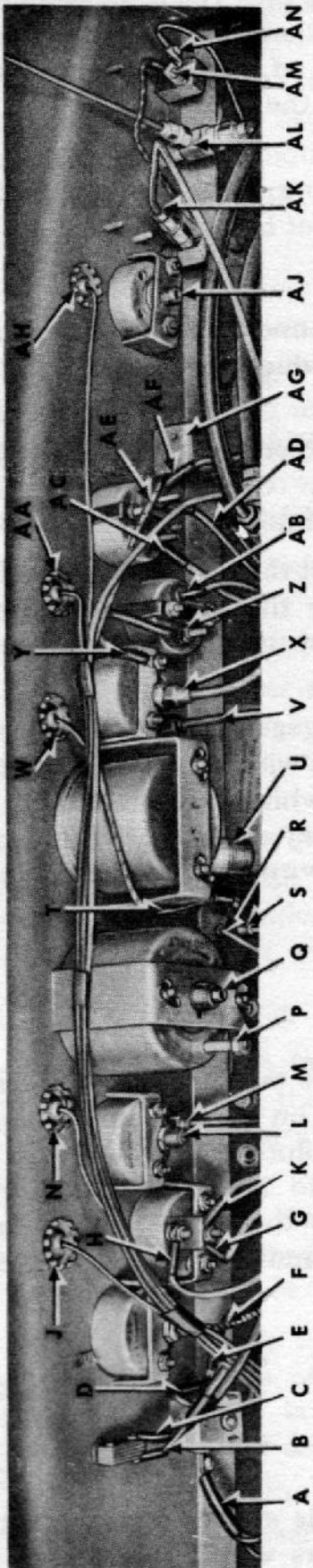
c. Installation (fig. 136). Position each ammeter on instrument panel. Place brackets on back of each, and install two lock washers and nuts. Connect ammeter wires as follows: red No. 14 wire from cranking motor switch to terminal on right-hand side of vehicle; red No. 10 wire from blackout switch, green No. 10 wire from filter, and red No. 10 wire with blackout tracer from ignition switch to terminal on left-hand side of vehicle. Connect auxiliary ammeter wires as follows: green wire from air pressure gage to terminal on right-hand side of vehicle; green wire from automatic circuit breaker to terminal on left-hand side of vehicle. Turn lights on to test operation. "NO CHARGE" indicates proper installation. Turn lights off. Start engine. "CHARGE" indicates correct installation.

188. FUEL GAGE.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (figs. 4, 136, and 137). The fuel gage system consists of a gage in the instrument panel and a tank unit installed in the fuel tank, interconnected electrically. The gage is located at right side of instrument panel, between and slightly below the oil

INSTRUMENTS



- A—INSTRUMENT PANEL LIGHT SWITCH TO PANEL LIGHTS (BLACK)
- B—SPOTLIGHT SWITCH TO INSTRUMENT PANEL LIGHT SWITCH (BLACK)
- C—SPOTLIGHT SWITCH TO SPOTLIGHT (BLACK)
- D—INSTRUMENT PANEL LIGHT SWITCH TO BLACKOUT SWITCH "HT" TERMINAL (RED)
- E—INSTRUMENT PANEL LIGHT SWITCH TO SPOTLIGHT SWITCH (BLACK)
- F—HEAT INDICATOR CABLE
- G—GAS GAGE TO LOW PRESSURE INDICATOR BUZZER (WHITE)
- H—GAS GAGE TO TERMINAL BLOCK (YELLOW)
- J—INSTRUMENT PANEL LIGHT
- K—GAS GAGE TO IGNITION FILTER (WHITE)
- L—OIL PRESSURE GAGE TUBE CONNECTION
- M—THROTTLE CONTROL WIRE
- N—INSTRUMENT PANEL LIGHT
- P—TRIP INDICATOR KNOB
- Q—SPEEDOMETER CABLE CONNECTION
- R—IGNITION SWITCH TO CIRCUIT BREAKER (WHITE)
- S—IGNITION SWITCH TO FILTER (RED-BLACK)
- T—IGNITION SWITCH TO AMMETER (RED-BLACK)
- U—TACHOMETER CABLE CONNECTION
- V—CARBURETOR CHOKE WIRE
- W—INSTRUMENT PANEL LIGHT
- X—AIR PRESSURE GAGE TUBE
- Y—AIR PRESSURE GAGE TO AUXILIARY AMMETER (GREEN)
- Z—AUXILIARY AMMETER TO AIR PRESSURE GAGE (GREEN)
- AA—INSTRUMENT PANEL LIGHT
- AB—AUXILIARY AMMETER TO AUTOMATIC CIRCUIT BREAKER (GREEN)
- AC—AMMETER TO CRANKING MOTOR SWITCH (RED)
- AD—AMMETER TO FILTER (GREEN)
- AE—AMMETER TO IGNITION SWITCH (RED-BLACK)
- AF—AMMETER TO BLACKOUT SWITCH (RED)
- AG—BLACKOUT SWITCH
- AH—INSTRUMENT PANEL LIGHT
- AJ—VISCOMETER TUBE CONNECTION
- AK—R.H. WINDSHIELD WIPER CONTROL VALVE
- AL—L.H. WINDSHIELD WIPER CONTROL VALVE
- AM—BLACKOUT DRIVING LIGHT SWITCH TO BLACKOUT SWITCH
- AN—BLACKOUT DRIVING LIGHT SWITCH TO BLACKOUT DRIVING LIGHT SWITCH

Figure 136 — Instrument Panel and Wiring — Rear View

RA PD 321933

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

pressure and heat indicator gages. It is operative when ignition switch is turned on. The tank unit consists of a rheostat located in an opening in the top of the 60-gallon fuel tank. A float on the end of the rheostat lever controls the amount of current to the gage, thereby registering the amount of fuel in the fuel tank.

(2) TABULATED DATA.

Manufacturer Stewart-Warner
 Model (gage) 441002
 Type (gage) dial

b. Tank Unit Removal (fig. 46). Disconnect wire from terminal. Remove the four screws and lock washers which secure tank unit to tank. Lift unit out.

c. Tank Unit Installation (fig. 46). Position unit in tank and secure with four screws and lock washers. Connect tank unit to junction block yellow wire to terminal on tank unit.

d. Gage Removal (fig. 136). Disconnect the three wires attached to gage (G, H, and K, fig. 136). Remove the two nuts and lock washers which secure gage to bracket and instrument panel. Remove bracket. Pull gage from front of panel.

e. Gage Installation (fig. 136). Place gage in instrument panel. Position bracket on back of gage, and secure with the two lock washers and nuts. On lower terminal, install white wire from ignition filter and white wire from low pressure indicator buzzer, lock washer, and nut. On upper terminal, install yellow wire from terminal block, lock washer, and nut.

189. TACHOMETER.

a. Description and Tabulated Data.

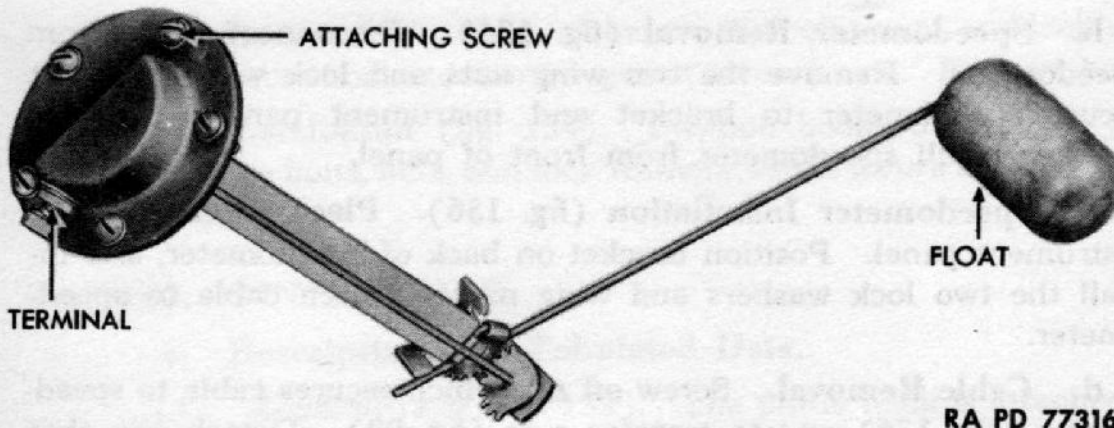
(1) DESCRIPTION (figs. 4 and 136). The tachometer is the large instrument located at left of the speedometer on the instrument panel. Its purpose is to register engine speed in revolutions per minute. The indicating hand covers a range from zero to 2,500 revolutions per minute. The key control, located just below the tachometer, is used to reset the red hand which registers the maximum engine speed reached since the last reset.

(2) TABULATED DATA.

Manufacturer Stewart-Warner
 Model (Autocar) 16UKS 31210
 Range 0 to 2,500 rpm

b. Removal (fig. 136). Disconnect cable at rear of tachometer. Remove the two wing nuts and lock washers which secure gage to

INSTRUMENTS



RA PD 77316

Figure 137 — Fuel Gage Tank Unit

bracket and instrument panel. Remove bracket. Pull gage from front of panel.

c. **Installation** (fig. 136). Place gage in instrument panel. Position bracket on back of gage, and secure with two lock washers and wing nuts. Attach cable to rear of tachometer.

d. **Drive Gear Removal.** Disconnect tachometer cable on drive end. Remove drive adapter. Remove drive gear.

e. **Drive Unit Installation.** Position drive gear, and secure with drive adapter. Connect tachometer drive cable.

f. **Cable Removal.** Disconnect cable from rear of tachometer on instrument panel, and from tachometer drive unit on left side of engine. Remove two cable clips which secure cable to dash. Pull cable from vehicle.

g. **Cable Installation.** Position cable between rear of tachometer head on instrument panel, and tachometer drive unit on left side of engine. Tighten nut which secures ends of cable to tachometer and to drive unit. Attach cable clips to dash.

190. SPEEDOMETER AND CABLE.

a. **Description and Tabulated Data.**

(1) **DESCRIPTION** (figs. 4 and 136). The speedometer indicates road speed in miles per hour, and records both trip and total mileage. It is located in the center of the instrument panel.

(2) **TABULATED DATA.**

Manufacturer	Stewart-Warner
Model	590-X
Range	0 to 60 mph

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

b. **Speedometer Removal** (fig. 136). Disconnect cable from speedometer. Remove the two wing nuts and lock washers which secure speedometer to bracket and instrument panel. Remove bracket. Pull speedometer from front of panel.

c. **Speedometer Installation** (fig. 136). Place speedometer in instrument panel. Position bracket on back of speedometer, and install the two lock washers and wing nuts. Attach cable to speedometer.

d. **Cable Removal**. Screw off nut which secures cable to speedometer (fig. 136) and to transfer case (fig. 92). Detach clip that holds cable to frame side rail. Remove cable.

e. **Cable Installation** (figs. 92 and 136). Position cable between transfer case and speedometer. Tighten screw which secures cable to each. Attach clip which holds cable to frame side rail.

f. **Drive Gear Removal**. (Located on left side of transfer case.) Disconnect drive end of cable. Remove drive adapter. Remove drive gear.

g. **Drive Gear Installation**. Position drive gear. Secure drive gear with drive adapter. Connect cable at drive end.

191. OIL PRESSURE GAGE.

a. **Description and Tabulated Data.**

(1) **DESCRIPTION** (figs. 4 and 136). The oil pressure gage is located on the instrument panel at the right and adjacent to the speedometer. It indicates engine oil pressure and covers a range from zero to 80 pounds per square inch.

(2) **TABULATED DATA.**

Manufacturer	Stewart-Warner
Model	400060
Range	0 to 80 lb

b. **Removal** (fig. 136). Remove nut which secures tube to rear of gage. Remove two nuts and lock washers which secure gage to bracket and instrument panel. Remove bracket. Pull gage from front of panel.

c. **Installation** (fig. 136). Place gage in instrument panel. Position bracket on back of gage. Install the two lock washers and nuts which secure gage to bracket and panel. Attach tube to rear of gage.

d. **Oil Tube Removal**. Remove nut which secures tube to rear of gage. Trace oil tube back to connection under left-hand floorboard (fig. 33). Remove bolts and lock washers which secure oil tube clips to cab floor support. Disconnect oil tube connector. Pull out tube.

INSTRUMENTS

Trace engine section of oil tube back to connection on oil filter. Unscrew connector from fitting.

e. **Oil Tube Installation.** Install engine section of oil tube in fitting on oil filter. Position gage section of oil tube between oil pressure gage on instrument panel and engine section of oil tube. Connect oil tube to gage and to engine section of oil tube (fig. 33). Attach oil tube clips which secure oil tube to cab floor support.

192. TEMPERATURE GAGE.

a. Description and Tabulated Data.

(1) **DESCRIPTION** (figs. 4 and 136). This gage indicates the temperature of the water in the engine. It covers a range from 100° F to 220° F. It is located on the instrument panel to the right and slightly above the fuel gage.

(2) TABULATED DATA.

Manufacturer	Stewart-Warner
Model	400059
Range	100° F to 220° F

b. **Removal** (fig. 136). Disconnect cable from gage. Remove the two nuts and lock washers which secure gage to bracket and instrument panel. Remove bracket. Pull gage from front of panel.

c. **Installation** (fig. 136). Place gage in instrument panel. Position bracket on rear of gage. Secure with two lock washers and nuts. Attach cable to rear of gage.

d. **Temperature Gage Cable Removal.** Disconnect cable from gage. Disconnect cable from rear end of water outlet manifold. Pull tube from manifold. Remove cable clips. Pull cable free.

e. **Temperature Gage Cable Installation.** Position cable between instrument panel and rear of engine. Connect gage end of cable to temperature gage. Insert tube in rear end of water outlet manifold, and connect it to water manifold by tightening nut. Attach cable clips.

193. AIR PRESSURE GAGE.

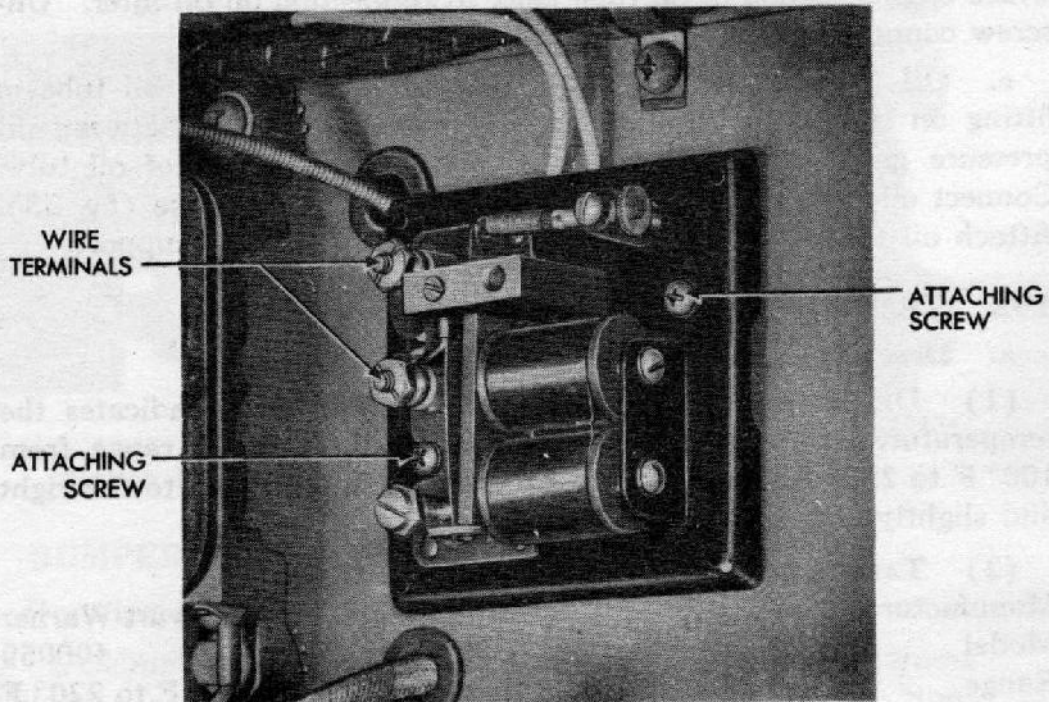
a. Description and Tabulated Data.

(1) **DESCRIPTION** (figs. 4 and 136). This gage is located at the left of the tachometer on the instrument panel. It shows the amount of air pressure available in the service brake system. The gage registers from zero to 150 pounds air pressure per square inch.

(2) TABULATED DATA.

Manufacturer	Stewart-Warner
Model	400057
Range	0 to 150 lb

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 321989

Figure 138 - Low Pressure Indicator Buzzer - Cover Removed

b. Removal (fig. 136). Disconnect tube from gage. Remove two nuts and lock washers which secure gage to bracket and instrument panel. Remove bracket. Pull gage from front of panel.

c. Installation (fig. 136). Place gage in instrument panel. Position bracket on back of gage. Secure with two lock washers and nuts. Connect tube to gage.

194. LOW PRESSURE INDICATOR BUZZER.

a. Description and Tabulated Data.

(1) DESCRIPTION (fig. 138). This unit is located on the cab cowling, behind the tool compartment. It is interconnected electrically to the service brake system. When ignition switch is turned on, a buzzing noise warns the driver of insufficient air pressure to operate the vehicle. Buzzer circuit is broken when air pressure is built up to 60 pounds.

(2) TABULATED DATA.

Manufacturer Faraday
Model 6-volt

b. Removal (fig. 138). Remove tool compartment by pulling out drawer and removing four screws and washers which attach compartment to bracket on engine hood assembly. Remove cover from low

WINCH

pressure indicator buzzer by removing one screw from center of cover. Disconnect two wires. Remove screws that hold buzzer to cab cowling. Lift off buzzer.

c. **Installation** (fig. 138). Attach cover to cab cowling. Connect two wire leads. Install buzzer cover. Install tool compartment on bracket of engine head assembly. Install tool compartment drawer.

195. VISCOMETER.

a. **Description and Tabulated Data.**

(1) **DESCRIPTION** (fig. 4). The viscometer gage indicates the condition of the oil in the crankcase in terms of "THIN," "IDEAL," or "HEAVY." It is located on the left side of the instrument panel.

(2) **TABULATED DATA.**

Manufacturer Visco Meter Corp.
Range "THIN"—"IDEAL"—"HEAVY"

b. **Removal** (fig. 136). Disconnect tube from rear of gage. Remove two nuts and lock washers which secure gage to bracket and instrument panel. Remove bracket. Pull gage from front of panel.

c. **Installation** (fig. 136). Place gage in instrument panel. Position bracket on back of gage. Install two lock washers and nuts which secure gage to bracket and panel. Tighten tube nut which secures tube to gage.

Section XXXVI

WINCH

196. DESCRIPTION AND DATA.

a. **Description.** The winch is mounted behind front bumper, and supported between the two side frame rails. It is a jaw-clutch, worm-gear type. Power is transmitted from the main transmission, through the power take-off unit and drive shaft, to the worm shaft of the winch. The worm gear is keyed to the drum shaft, and the connection between drum shaft and cable winding drum is by means of a movable jaw clutch. This clutch slides on feather keys on the drum shaft, and meshes with fixed jaws on the drum hub.

b. **Data.**

Make Gar Wood
Model 3165 U
Drive Power take-off to jaw clutch on end frame
Control Power take-off control in cab

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

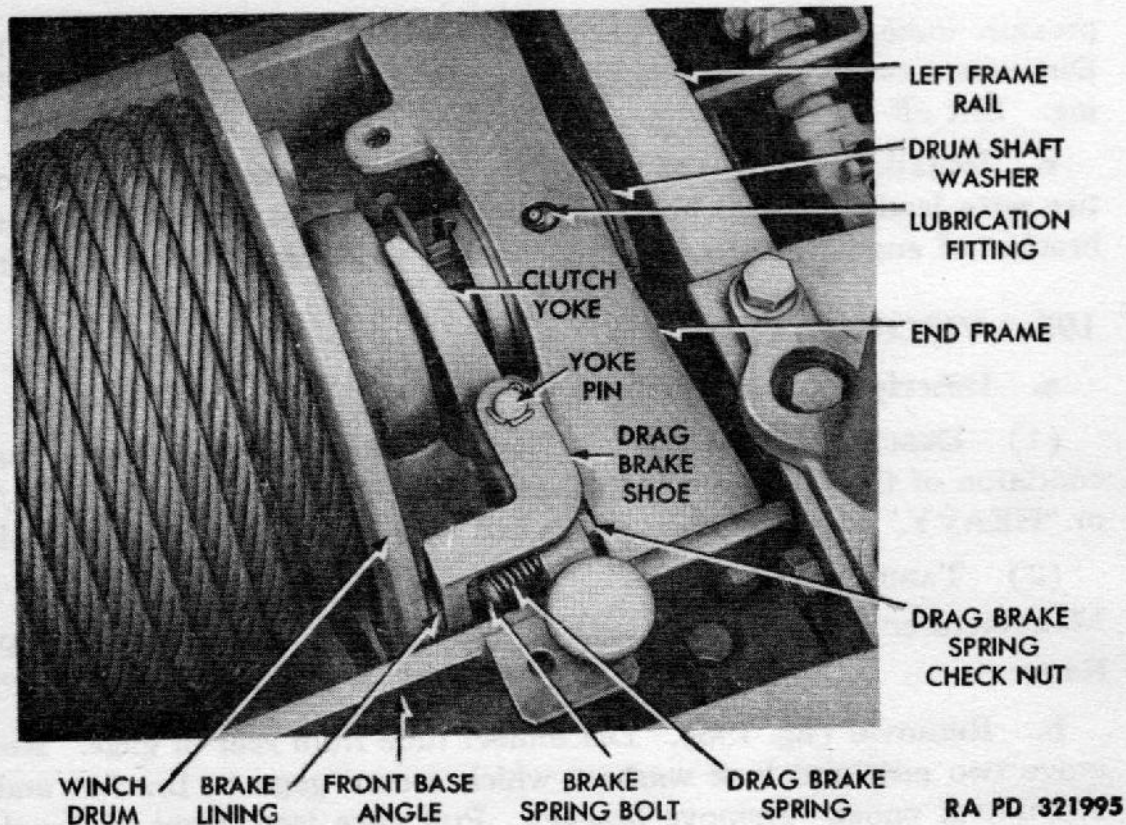


Figure 139 - Winch Jaw Clutch and Drag Brake

Cable:

Length	300 ft
Diameter	5/8 in.
Load capacity, low pull (first layer on drum).....	15,000 lb

197. WINCH BRAKE.

a. **Brake Band Adjustment.** To test, have truck at the top of a steep grade, fasten winch line to another truck at the bottom, and start pulling it up grade. After a short haul, depress engine clutch pedal. The winch will stop pulling, and the truck being pulled should not roll backward. If it does, tighten the adjusting nut under the brake case by one-half turn, set the check nut up tight, and repeat the pulling and stopping test. When test is completed and brake properly adjusted, be sure that check nut is tight.

b. **Brake Band Removal** (fig. 140). Remove cap screws and lock washers which attach brake case and front base angle. Tap off brake case assembly. Remove two brake adjusting nuts, spring washer, and brake spring. Remove dead-end brake nut, and lift brake band out of case.

c. **Brake Band Installation.** Install dead-end brake nut on short threaded rod on brake band outside the brake case. Install brake

WINCH

spring, spring washer, and two brake adjusting nuts on long end of brake band. Set brake adjusting nuts at extreme end of brake band end. Tighten them against each other to hold this position. Attach brake case to gear case and front base angle with lock washers and cap screws.

198. DRAG BRAKE.

a. **Brake Shoe Adjustment** (fig. 139). If brake does not give sufficient drag, loosen check nut, then tighten adjusting nut enough to prevent drum from spinning. Secure with check nut.

b. **Brake Shoe Removal.**

(1) **REMOVE YOKE PIN** (fig. 139). Pull out cotter pin, and tap out yoke pin through clutch yoke and drag brake shoe.

(2) **LOOSEN DRUM SHAFT CAP SCREW.** Loosen cap screw at end of drum shaft five or six turns to allow room for end frame to be pulled toward left frame rail.

(3) **REMOVE LUBRICATION FITTING.** Remove lubrication fitting from top of end frame sleeve.

(4) **DETACH END FRAME** (fig. 139). Remove cap screws and lock washers which secure end frame to rear and front base angles. Pry end frame toward left frame rail until drag brake shoe can be lifted from its seat on clutch yoke.

(5) **REMOVE DRAG BRAKE** (fig. 139). Lift out drag brake.

c. **Brake Shoe Installation.**

(1) **INSTALL BRAKE SHOE ON CLUTCH YOKE** (fig. 139). Position brake shoe on clutch yoke. Install yoke pin, and secure with cotter pin.

(2) **MOVE END FRAME** (fig. 139). Pry end frame into position toward winch drum. Attach end frame to front and rear base angles with lock washers and cap screws.

(3) **TIGHTEN DRUM SHAFT CAP SCREW** (fig. 139). Tighten cap screw at end of drum shaft to secure drum shaft washer to shaft.

(4) **INSTALL LUBRICATION FITTING** (fig. 139). Install lubrication fitting in top of end frame sleeve.

199. CABLE.

a. **Removal.** Release clutch on winch drum, and lock in released position. Pull chain hook, chain, and cable off winch drum. Lay cable out straight, with no coils or kinks. Disconnect end of cable from winch drum by removing two rope clamp nuts and toothed lock washers. Remove rope clamp and end of cable.

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

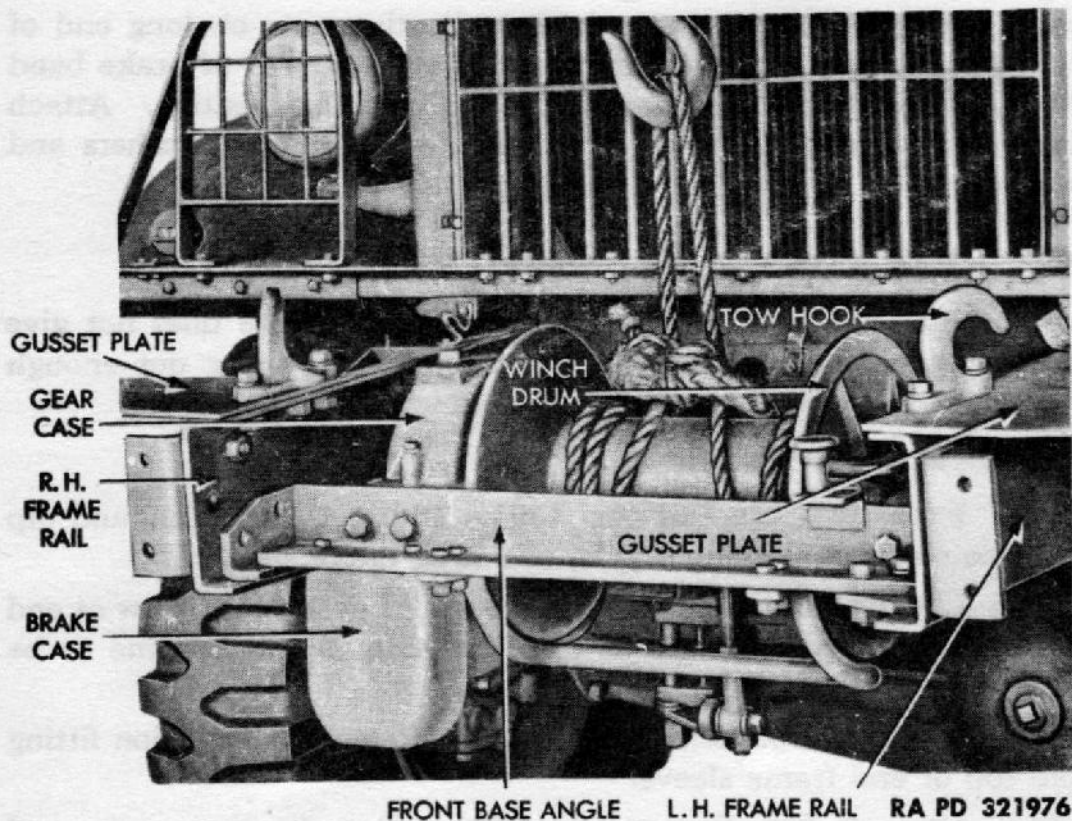


Figure 140 — Removing Winch

b. Installation. Insert plain end of cable in rope clamp. Pry rope clamp and cable tight against drum flange. Install two rope clamp nuts and washers, and tighten. Wind cable on drum (par. 8). Attach cable chain and hooks to front bumper tow hooks to prevent cable from uncoiling off drum.

200. REMOVAL OF WINCH ASSEMBLY.

a. Remove Front Bumper. Remove nuts, bolts, and lock washers that attach bumper to gusset plates and bumper brackets on each side. Lift off bumper.

b. Unwind Cable. Release clutch on winch drum, and lock in released position. Pull chain hook, chain, and cable off winch drum. Lay cable out straight, with no coils or kinks. Disconnect end of cable from winch drum by removing two rope clamp nuts and toothed lock washers. Remove rope clamp and end of cable.

c. Disconnect Winch Drive Shaft. Remove cotter pin, flat washers, and shear pin which attach worm joint of drive shaft to worm shaft on winch. Loosen drive shaft collar set screw, and slide collar forward far enough to permit drive shaft to be pulled back and off winch worm shaft.

FIFTH WHEEL

d. **Remove Winch Assembly** (fig. 140). Remove nuts, bolts, and lock washers which attach front and rear winch base angles to left and right frame rails. Lift out winch assembly.

e. **Remove Winch Shear Pin.** Remove cotter pin and washer from shear pin. Drive out shear pin from universal joint and worm shaft.

201. INSTALLATION OF WINCH ASSEMBLY.

a. **Install Winch Assembly** (fig. 140). Lift winch assembly into position between left and right frame rails. Attach front and rear winch base angles to frame rails with bolts, lock washers, and nuts.

b. **Install Winch Drive Shaft.** Slide worm joint of drive shaft on worm shaft of winch. Install shear pin, flat washers, and cotter pin. Slide drive shaft collar into position $\frac{3}{4}$ inch from take-off joint hub. Tighten collar set screw.

c. **Wind Cable on Drum.** Insert plain end of cable in rope clamp. Pry rope clamp and cable tight against drum flange. Install two rope clamp nuts and washers, and tighten. Wind cable on drum (par. 8).

d. **Install Front Bumper.** Position bumper to gusset plates and bumper brackets on each side, and secure with bolts, lock washers, and nuts. Attach cable chain, and hook to front bumper tow hooks.

e. **Installation of Winch Shear Pin.** Drive shear pin through universal joint and winch worm shaft. Install washer and cotter pin.

Section XXXVII

FIFTH WHEEL

202. DESCRIPTION AND TABULATED DATA.

a. **Description** (fig. 141). The fifth wheel is bolted to the frame side rails at the rear of the truck. It is used to couple the tractor and trailer together. The wheel is a swivel-mounted, flat, round steel plate. The rear half of plate forms a V-shaped opening which serves to guide the kingpin neck of the trailer coupling to the coupler jaws at the center of the plate. Contact of neck snaps the jaws shut, and releases a lever handle to position which locks jaw shut. Disengagement is made by swinging the lock latch aside and pushing operating lever toward front of vehicle until safety latch drops in place. This opens jaws, and permits tractor to be pulled from trailer.

b. **Tabulated Data.**

Manufacturer Dayton

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

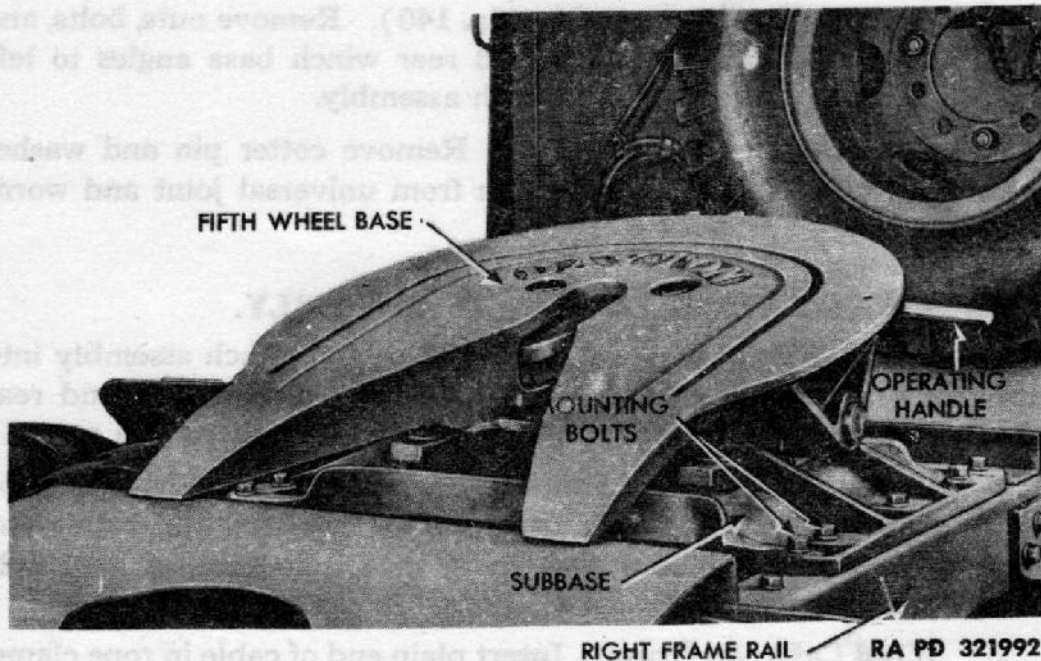


Figure 141 - Fifth Wheel Installed

203. REMOVAL (fig. 141).

a. Remove 10 fifth wheel mounting nuts, bolts, and lock washers which hold the unit to side frame rails. Lift off assembly, using available hoisting equipment.

204. DISASSEMBLY.

a. **Remove Base Assembly.** Remove nut, lock washer, and bolt which secure support bracket shaft to fifth wheel base. Tap out support bracket shaft, and remove shims. Lift fifth wheel base assembly from seat on subbase.

b. **Disassemble Fifth Wheel Base (fig. 142).**

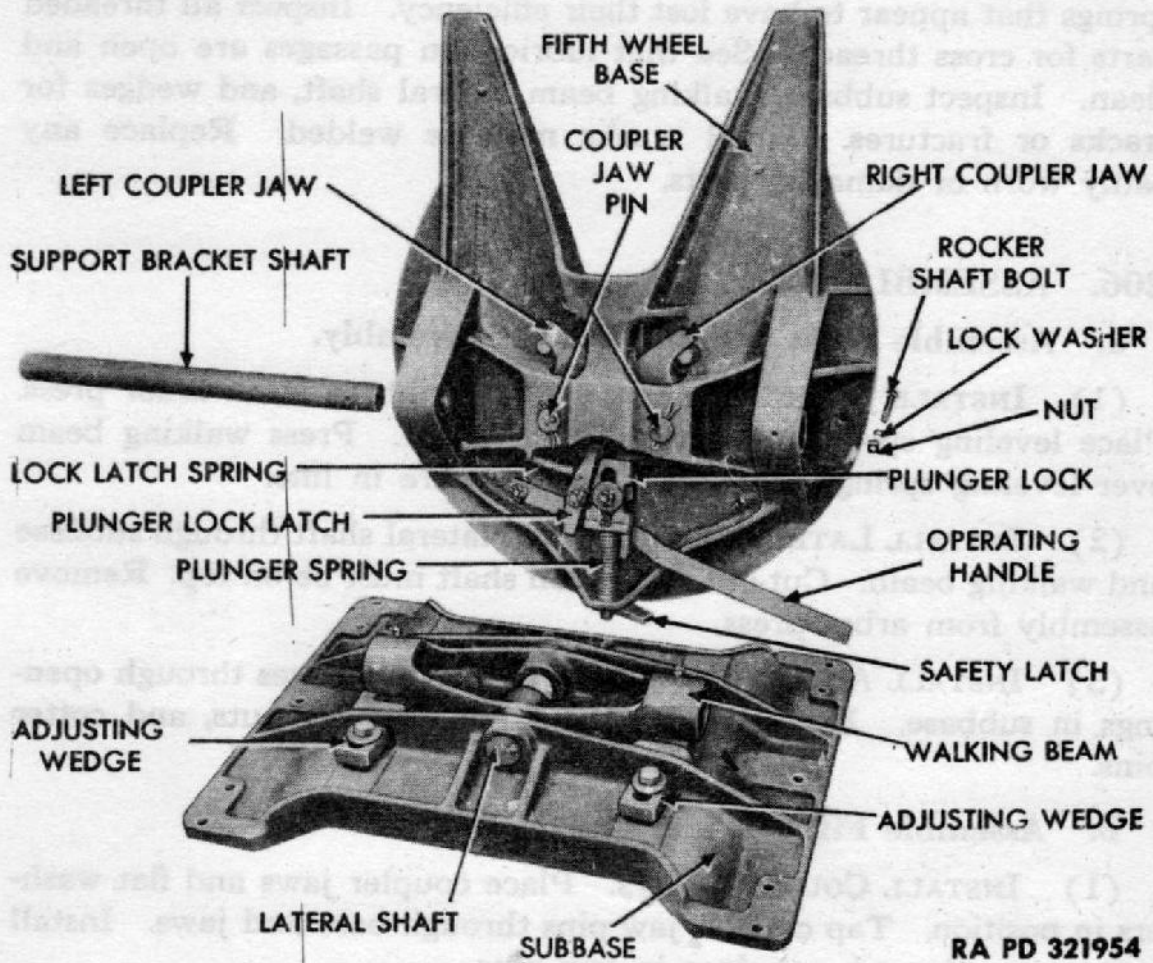
(1) **REMOVE PLUNGER LOCK LATCH.** Release plunger lock latch spring. Remove cotter pin, nut, and flat washer which hold latch to base. Lift out plunger lock latch and spring.

(2) **REMOVE PLUNGER LOCK.** Remove cotter pin, nut, and flat washer from fifth wheel plunger stud. Lift out plunger lock and spring.

(3) **REMOVE COUPLER JAWS.** Remove cotter pins, and tap out coupler jaw pins. Lift out pin washers and coupler jaws.

(4) **REMOVE OPERATING HANDLE.** Remove cotter pin, nut, and flat washer which attach operating handle to base stud. Lift off operating handle.

FIFTH WHEEL



RA PD 321954

Figure 142 - Fifth Wheel Base and Subbase Assemblies

(5) REMOVE SAFETY LATCH. Back off safety latch screw, and remove plunger safety latch.

c. Disassemble Fifth Wheel Subbase Assembly (fig. 142).

(1) REMOVE ADJUSTING WEDGES. Remove nuts, lock washers, bolts, and flat washers which attach wedges to subbase. Tap out adjusting wedges.

(2) REMOVE LATERAL SHAFT. Press down on walking beam with an arbor press. Tap out lateral shaft.

(3) REMOVE WALKING BEAM. Release pressure on arbor press, and lift off walking beam and leveling springs.

205. CLEANING, INSPECTION, AND REPAIR.

a. Wash all parts with dry-cleaning solvent. Scrub thoroughly to remove all traces of old lubricant. Coupler jaws are subjected to hard wear. Inspect them carefully for cracks and fractures. If jaws are cracked, fractured, or worn to a point where backlash in engagement with towed vehicle is apparent, replace jaws. Examine coupler jaw pins for cracks. Replace broken or damaged pins. Replace any

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

springs that appear to have lost their efficiency. Inspect all threaded parts for cross threads. See that lubrication passages are open and clean. Inspect subbase, walking beam, lateral shaft, and wedges for cracks or fractures. Small cracks may be welded. Replace any badly worn or damaged parts.

206. ASSEMBLY.

a. Assemble Fifth Wheel Subbase Assembly.

(1) **INSTALL WALKING BEAM.** Place subbase in an arbor press. Place leveling springs in position on subbase. Press walking beam over leveling springs until shaft openings are in line.

(2) **INSTALL LATERAL SHAFT.** Tap lateral shaft through subbase and walking beam. Cut-out section on shaft must be on top. Remove assembly from arbor press.

(3) **INSTALL ADJUSTING WEDGES.** Position wedges through openings in subbase. Install wedge bolts, flat washers, nuts, and cotter pins.

b. Assemble Fifth Wheel Base.

(1) **INSTALL COUPLER JAWS.** Place coupler jaws and flat washers in position. Tap coupler jaw pins through base and jaws. Install cotter pins through openings in jaw pins.

(2) **INSTALL PLUNGER LOCK.** Slide plunger spring on plunger lock. Insert plunger lock into cutaway opening between coupler jaws. Secure with flat washer, nut, and cotter pin.

(3) **INSTALL PLUNGER LOCK LATCH.** Position plunger lock latch on base stud. Install flat washer, nut, and cotter pin. Attach plunger lock latch spring to base.

(4) **INSTALL OPERATING HANDLE.** Position operating handle over plunger spring and on fifth wheel base stud. Secure with flat washer, nut, and cotter pin.

(5) **INSTALL SAFETY LATCH.** Place safety latch in position over end of plunger. Attach latch to base with safety latch screw.

c. Install Base Assembly. Place base assembly in position between walking beam and over subbase assembly. Tap support bracket shaft through base and walking beam. Install bolt, lock washer, and nut through end of shaft.

207. INSTALLATION (fig. 141).

a. Place fifth wheel assembly on chassis frame rails, and install mounting bolts, lock washers, and nuts.

Section XXXVIII

SHIPMENT AND TEMPORARY STORAGE

208. GENERAL INSTRUCTIONS.

a. Preparation for domestic shipment of the vehicle is the same as preparation for temporary storage or bivouac. Preparation for shipment by rail includes instructions for loading and unloading the vehicle, blocking necessary to secure the vehicle on freight cars, clearance, weight, and other information necessary to properly prepare the vehicle for rail shipment. For more detailed information and for preparation for indefinite storage, refer to AR 850-18.

209. PREPARATION FOR TEMPORARY STORAGE OR DOMESTIC SHIPMENT.

a. Vehicles to be prepared for temporary storage or domestic shipment are those ready for immediate service but not used for less than thirty days. If vehicles are to be indefinitely stored after shipment by rail, they will be prepared for such storage at their destination.

b. If the vehicles are to be temporarily stored or bivouacked, take the following precautions.

(1) **LUBRICATION.** Lubricate the vehicle completely (par. 21).

(2) **COOLING SYSTEM.** If freezing temperature may normally be expected during the limited storage or shipment period, test the coolant with a hydrometer, and add the proper quantity of antifreeze to afford protection from freezing at the lowest temperature anticipated during the storage or shipping period. Completely inspect the cooling system for leaks.

(3) **BATTERY.** Check battery and terminals for corrosion, and, if necessary, clean and thoroughly service battery (par. 94).

(4) **TIRES.** Clean, inspect, and properly inflate all tires. Replace tires, requiring retreading or repairing, with serviceable tires. Do not store vehicles on floors, cinders, or other surfaces which are soaked with oil or grease. Wash off immediately any oil, grease, gasoline, or kerosene which comes in contact with the tires under any circumstances.

(5) **ROAD TEST.** The preparation for limited storage will include a road test of at least 5 miles, after the battery, cooling system, lubrication, and tire service, to check on general condition of the vehicle. Correct any defects noted in the vehicle operation before the vehicle is stored, or note on a tag, attached to the steering wheel, stating the repairs needed or describing the condition present. A written report of these items will then be made to the officer in charge.

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

(6) **FUEL IN TANKS.** It is not necessary to remove the fuel from the tanks for shipment within the United States, nor to label the tanks under Interstate Commerce Commission Regulations. Leave fuel in the tanks except when storing in locations where fire ordinances or other local regulations require removal of all gasoline before storage.

(7) **EXTERIOR OF VEHICLES.** Remove rust appearing on any part of the vehicle with flint paper. Repaint painted surfaces whenever necessary to protect wood or metal. Coat exposed polished metal surfaces susceptible to rust, such as winch cables and chains, with medium grade preventive lubricating oil. Close firmly all cab doors, windows, and windshields. Vehicles equipped with open-type cabs with collapsible tops will have the tops raised, all curtains in place, and the windshield closed. Make sure paulins and window curtains are in place and firmly secured. Leave rubber mats, such as floor mats, where provided, in an unrolled position on the floor, and not rolled or curled up. Equipment such as pioneer and truck tools, tire chains, and fire extinguishers will remain in place in the vehicle.

(8) **INSPECTION.** Make a systematic inspection just before shipment or temporary storage to make sure that all above steps have been covered and that the vehicle is ready for operation on call. Make a list of all missing or damaged items and attach it to the steering wheel. Refer to "Before-operation Service" (par. 16).

(9) **ENGINE.** To prepare the engine for storage, remove the air cleaner, start the engine, and set the throttle to run the engine at a fast idle. Pour 1 pint of medium grade preservative lubricating oil, Ordnance Department Specification AXS-674, of the latest issue in effect, into the carburetor throat, being careful not to choke the engine. Turn off the ignition switch as quickly as possible after the oil has been poured into the carburetor. With the engine switch off, open the throttle wide, and turn the engine five complete revolutions by means of the cranking motor. If the engine cannot be turned by the cranking motor with the switch off, turn it by hand or disconnect the high-tension lead and ground it before turning the engine by means of the cranking motor. Then reinstall the air cleaner.

(10) **BRAKES.** Release brakes, and check the wheels.

c. Inspections in Limited Storage. Vehicles in limited storage will be inspected weekly for conditions of tires and battery. If water is added to battery when freezing weather is anticipated, recharge the battery with a portable charger, or remove the battery for charging. Do not attempt to charge the battery by running the engine.

SHIPMENT AND TEMPORARY STORAGE

210. LOADING AND BLOCKING FOR RAIL SHIPMENT.

a. **Preparation.** In addition to the preparation described in paragraph 209, when Ordnance vehicles are prepared for domestic shipment, the following preparations and precautions will be taken.

(1) **EXTERIOR.** Cover the body of the vehicle with a canvas cover supplied as an accessory.

(2) **TIRES.** Inflate pneumatic tires from 5 to 10 pounds above normal pressure.

(3) **BATTERY.** Disconnect the battery to prevent its discharge by vandalism or accident. This may be accomplished by disconnecting the positive lead, taping the end of the lead, and tying it back away from the battery.

(4) **BRAKES.** The brakes must be applied and the transmission placed in low gear after the vehicle has been placed in position with a brake wheel clearance of at least 6 inches (fig. A, 143). The vehicles will be located on the car in such a manner as to prevent the car from carrying an unbalanced load.

(5) All cars containing Ordnance vehicles must be placarded "DO NOT HUMP."

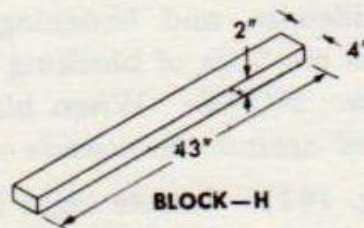
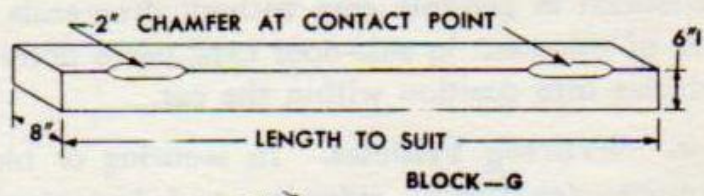
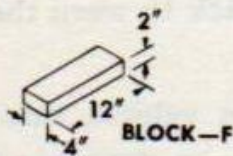
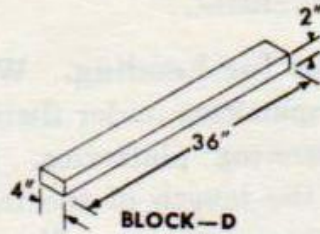
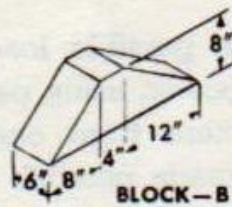
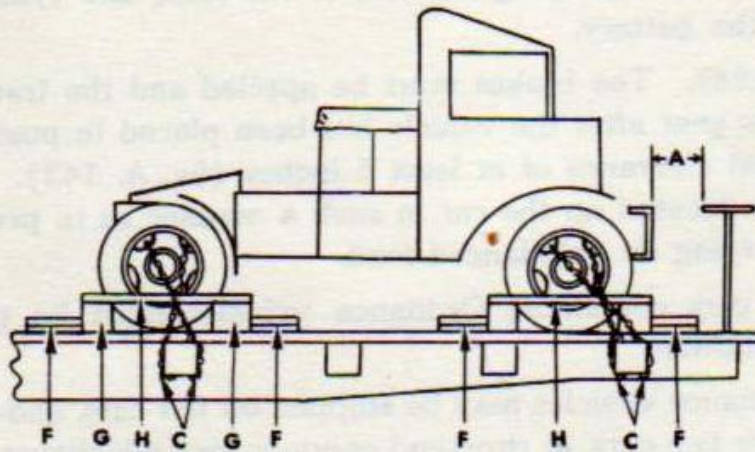
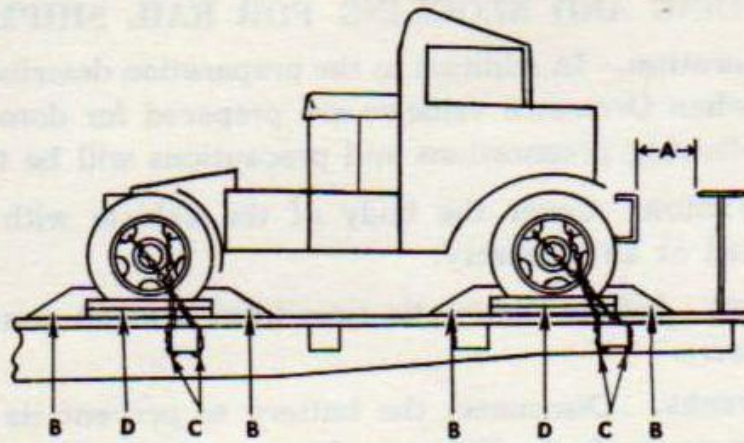
(6) Ordnance vehicles may be shipped on flat cars, end-door box cars, side-door box cars, or drop-end gondola cars, whichever type car is the most convenient.

b. **Facilities for Loading.** Whenever possible, load and unload vehicles from open cars under their own power, using permanent end ramps and spanning platforms. Movement from one flat car to another along the length of the train is made possible by crossover plates or spanning platforms. If no permanent end ramp is available, an improvised ramp can be made from railroad ties. Vehicles may be loaded in gondola cars without drop-ends by using a crane. In case of shipment in side-door cars, use a dolly-type jack to warp the vehicles into position within the car.

c. **Securing Vehicles.** In securing or blocking a vehicle, three motions—lengthwise, sidewise, and bouncing—must be prevented. There are two approved methods of blocking the vehicles on freight cars, as described below. **NOTE:** *When blocking dual wheels, all blocking must be located against the outside wheel of the dual.*

(1) **METHOD 1** (fig. 143). Locate eight blocks "B"—one to the front and one to the rear of each wheel. Nail the heel of each block to the car floor, using five 40-penny nails to each block. That por-

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)



RA PD 330875

Figure 143 - Blocking Requirements for Securing Wheeled Vehicles on Railroad Cars

SHIPMENT AND TEMPORARY STORAGE

tion of the block under the tread will be toenailed to the car floor with two 40-penny nails (each block). Locate two blocks "D," against the outside face of each wheel. Nail the lower block to the car floor with three 40-penny nails and the top block to the lower block with three 40-penny nails. Pass four strands, two wrappings, of No. 8 gage, black annealed wire "C," around the bumper support bracket at the front of the vehicle and then through a stake pocket on the railroad car. Perform the same operation at the rear of the vehicle, passing the wire through the opening in the rear bumper. Duplicate these two operations on the opposite side of the vehicle. Tighten the wires enough to remove slack. When a box car is used, this strapping must be applied in a similar fashion and attached to the floor by the use of blocking or anchor plates. This strapping is not required when gondola cars are used.

(2) **METHOD 2** (fig. 143). Place four blocks "G"—one to the front and one to the rear of each set of wheels. These blocks are to be at least 8 inches wider than the over-all width of the vehicle at the car floor. Using 16 blocks "F," locate two against blocks "G," to the front of each wheel, and two against blocks "G," to the rear of each wheel. Nail the lower cleat to the floor with three 40-penny nails, and the top cleat to the cleat below with three 40-penny nails. Locate four cleats, "H," on the outside of each wheel to the top of each block "G," and secure with two 40-penny nails. Pass four strands, two wrappings, of No. 8 gage, black annealed wire "C" around the bumper support bracket (front) and also through opening in the rear bumper (rear), as described in Method 1 above.

d. Shipping Data.

Length over-all	20 ft 6½ in.
Width over-all	8 ft 1½ in.
Height, over-all (closed-cab)	9 ft 2½ in.
Shipping weight (closed-cab)	16,600 lb
Shipping weight (open-cab)	16,100 lb
Approximate floor area per vehicle.....	166.15 sq ft
Approximate volume per vehicle	1,523 cu ft

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

REFERENCES

PUBLICATIONS INDEXES.

The following publications indexes should be consulted frequently for latest changes to, or revisions of, the publications given in this list of references and for new publications relating to materiel covered in this manual:

Introduction to Ordnance Catalog (explaining SNL system)	ASF Cat. ORD 1 IOC
Ordnance Publications for Supply Index (index to SNL's)	ASF Cat. ORD 2 OPSI
Index to Ordnance Publications (listing FM's, TM's, TC's, and TB's of interest to ordnance personnel, OPSR, MWO's BSD, S of SR's, OSSC's, and OFSB's; and includes Alphabetical List of Major Items with Publications Pertaining Thereto).....	OFSB 1-1
List of Publications for Training (listing MR's, MTP's, T/BA's, T/A's, FM's, TM's, and TR's concerning training)	FM 21-6
List of Training Films, Film Strips, and Film Bulletins (listing TF's, FS's, and FB's by serial number and subject)	FM 21-7
Military Training Aids (listing Graphic Training Aids, Models, Devices, and Displays).....	FM 21-8

STANDARD NOMENCLATURE LISTS.

Cleaning, preserving, and lubrication materials, recoil fluids, special oils, and miscellaneous related items	SNL K-1
Soldering, brazing, and welding materials, gases and related items	SNL K-2
Tool sets—motor transport	SNL N-19
Truck, 5- to 6-ton 4x4, C.O.E (Autocar Model U8144T)	SNL G-511

REFERENCES

EXPLANATORY PUBLICATIONS.

Fundamental Principles.

Automotive electricity	TM 10-580
Automotive lubrication	TM 10-540
Basic maintenance manual.....	TM 38-250
Driver's manual	TM 10-460
Driver selection and training.....	TM 21-300
Electrical fundamentals	TM 1-455
Military motor vehicles	AR 850-15
Motor vehicle inspection and preventive main- tenance service	TM 9-2810
Precautions in handling gasoline.....	AR 850-20
Standard military motor vehicles.....	TM 9-2800
The internal combustion engine.....	TM 10-570

Maintenance and Repair.

Cleaning, preserving, lubricating, and welding materials, and similar items issued by the Ord- nance Department	TM 9-850
Cold weather lubrication and service of combat vehicles and automotive materiel.....	OFSB 6-11
Maintenance and care of pneumatic tires and rubber treads	TM 31-200
Ordnance maintenance: 5- to 6-ton, 4 x 4, ponton, tractor truck (Autocar Model U8144T)	TM 9-1817
Ordnance maintenance: Carburetors (Zenith)....	TM 9-1826C
Ordnance maintenance: Electrical equipment (Auto-Lite)	TM 9-1825B
Ordnance maintenance: Electrical equipment (Delco-Remy)	TM 9-1825A
Ordnance maintenance: Fuel Pumps.....	TM 9-1828A
Ordnance maintenance: Power brake systems (Bendix-Westinghouse).	TM 9-1827A

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

Protection of Materiel.

Camouflage	FM 5-20
Chemical decontamination, materials and equipment	TM 3-220
Decontamination of armored force vehicles.....	FM 17-59
Defense against chemical attack	FM 21-40
Explosives and demolitions.....	FM 5-25

Storage and Shipment.

Ordnance storage and shipment chart, group G —Major items	OSSC-G
Registration of motor vehicles.....	AR 850-10
Rules governing the loading of mechanized and motorized army equipment, also major caliber guns, for the United States Army and Navy, on open top equipment published by Operations and Maintenance Department of Association of American Railroads.	
Storage of motor vehicle equipment	AR 850-18

INDEX

A	Page	Page	
Acceleration and power, engine.....	66	road test	73
Accelerator pedal	14	run-in test	56
Accessories		Air compressor	
after-operation service	35	description, data, maintenance,	
at-halt service	33	and adjustment	243
before-operation service	27	road test	71
cold-weather	25	Air pressure	
road test	68	build up	264
run-in test	57	road test	64
Adapter, tachometer (See Tachometer adapter)		trouble shooting	100, 103, 104
Adjusters, slack		Ammeters	
adjustment	264	before-operation service	28
description and data.....	263	capacity of circuit.....	203
removal and installation.....	265	description, data, removal, and	
Adjustments (See under specific items)		installation	296
Air brake system		inoperative	109
connect control rods.....	137	radio interference suppression....	205
description		road test	64
air brakes	243	run-in test	58
hand control valve.....	13	Anchor pins	
detach hose	241	adjustment	264
disconnect control rods.....	133	attach brake shoes to.....	268
road test		Antifreeze compound	
application valve	83	chart and use of.....	157
leaks	67	data	24
rear brakes and reservoirs.....	84	road test	70
run-in test (leaks).....	60	Axle, front	
trouble shooting	100	adjustment	238
(See also Brakes)		alinement	235
Air brake tanks		cleaning	82
after-operation and weekly service	36	description and data	
before-operation service	28	declutching lever	16
run-in test	56	front axle	235
Air cleaners		installation	239
after-operation and weekly service	35	removal	238
at-halt service	33	road test	82
cleaning compressor	243	trouble shooting	99
description, data, and maintenance	152	Axle, rear	
disconnect from carburetor.....	144	cleaning	84
installation	153	data, removal, and installation....	241
lubrication	39	description	239
removal		road test	84
air cleaner	153	trouble shooting	100
air pipe	131	Axles	
		after-operation and weekly service	
		ice (axle vents).....	36
		at-halt service	32
		removal and installation (axle	
		shaft)	242

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

A — Cont'd	Page		Page
Axles — Cont'd		removal and installation	
road test		blackout switch	188
axle bearings	68	driving light	191
axles	67	driving light switch.....	192
check end play.....	82	parking lights	193
temperatures	67	tail and service stop light.....	193
run-in test (axle vents).....	58	tail and stop light.....	195
(See also Axle, front and Axle, rear)		replacement	
		driving light sealed beam unit..	191
		parking lights (lamps).....	193
		tail and service stop lights	
		(lamps)	195
		Blocking (rail shipment).....	313
B		Body (cab)	
Ball bearings, adjust on cam.....	285	after-operation service	37
Batteries		at-halt service	33
after-operation and weekly serv-		before-operation service	30
ice	34	description	288
add water to.....	187	during-operation service	31
description, data, and mainte-		road test (body mountings).....	85
nance	185	run-in test	57
installation	187	trouble shooting	108
radio interference suppression.....	205	(See also Cab)	
removal		Body (ponton)	
batteries	187	attach trailer receptacle.....	204
battery cables	133	endgate control	20
road test	69	installation	225
run-in test	56	remove mounting bolts.....	221
storage and shipment.....	311, 313	to roll away from cab.....	223
test for high generator output....	97	Brake drums	
trouble shooting	108	adjustment	274
Bearings (See under Wheels)		at-halt service	32
Belts		description	273
after-operation service	35	removal and installation.....	275
at-halt service	33	road test	
road test	68	drums and supports.....	77
run-in test	57	temperatures	67
Blackout lights		Brake lines (road test).....	85
data		Brake pedal (road test).....	83
blackout switch	188	Brake shoe	
driving light	191	adjustment	
driving light switch.....	192	drag brake	305
parking lights	192	front brakes	80
tail and service stop light.....	193	hand brakes	268
tail and stop light.....	195	cleaning	
description		front brakes	80
blackout switch	13, 187	rear brakes	78
driving light	191	description and data.....	266, 268
driving light switch.....	14, 192		
parking lights	192		
tail and service stop light.....	193		
tail and stop light.....	195		

INDEX

B — Cont'd	Page		Page
Brake shoe — Cont'd		at-halt service	33
removal and installation		before-operation service	29
brakes	267, 268	description and data.....	292
drag brake	305	installation	292, 307
hand brakes	270	removal	292, 306
road test		road test	88
front brakes	80	run-in test	57
rear brakes	78	Bushings (rubber), lubrication.....	51
Brakes		Buzzer, low pressure indicator.....	303
adjustment of brake band.....	304	Buzzer capacity	203
description and data			
application valve	250	C	
control and linkage.....	262	Cab	
diaphragm chambers	258	description	
hand brake linkage.....	272	cab	288
during-operation service.....	31	roof ventilator	16
removal and installation		disconnect from support brackets	133
application valve	252	installation	139
brake band	304	removal	128, 133
control and linkage.....	262	road test	67, 85, 88
diaphragm chambers	258, 259	(See also Body (cab))	
hand brake linkage.....	272	Cables	184, 185
road test		Cams and shafts	
front brakes	80	adjustment (cam ball bearings)..	285
hose and connections (tractor-		road test	78, 80
to-trailer)	87	Cans and brackets, fuel and water..	90
rear brakes	77	Capacities (data)	9, 115
service and parking brakes.....	65	Carbon removal	117, 246
run-in test	59	Carburetor	
storage and shipment.....	313	air leaks	92
(See also Air brake system,		air passage restricted or air dirt-	
Hand brakes, and Service		laden	94
brakes)		attach or detach.....	144
Breaker arm, adjustment of spring		clogged strainer or jets.....	94
tension	172	connect controls and lines....	122, 144
Breaker point		data, description, and adjustment	142
adjust gap	73, 172	disconnect controls, lines and air	
replace points	172	cleaner	120, 144
Breather caps		installation	137
after-operation and weekly serv-		removal	134
ice	35	road test	74
road test	73	Centrifugal advance (distributor)..	73
run-in test	56	Charging circuit	
Brush guards (bumper).....	88	radio interference suppression....	209
Brush guards (radiator)		replacements	210
installation	160	Chassis (lower to axle)	241
removal	158	Choke	
Brushes (generator), replace.....	177	before-operation service	28
Bumper		disconnect choke control wire....	131
after-operation service	36	road test	74
		run-in test	58

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

C — Cont'd	Page		Page
Circuit breakers		Controls, engine	
description and data.....	202	after-operation service	35
removal and installation.....	203	description	14
road test	88	during-operation service	31
Cleaning		run-in test	58
all parts	39	use of	16
road test	71, 78, 79	Controls, winch	19
second-echelon service	62	Coolant supply (See Fuel, oil, and coolant supply)	
(See also under specific items)		Cooling system	
Clutch		capacity	115
adjustment		description and maintenance.....	156
clutch	215	draining	116, 158
pedal	83	filling	119, 156, 161
throw-out shaft stop lever.....	218	inspection	156
check trunnion levers.....	215	operation under unusual condi- tions	24
connect control rods.....	137	storage and shipment.....	311
data	214	trouble shooting	95
description		Cowl, removal of speedometer and tachometer cables	131
clutch	212	Crankcase	
operating pedal	14	lubrication	39
disconnect		road test	70
control rods	133	(See also Ventilator, crankcase)	
housing	221	Cranking motor	
during-operation service	31	cleaning	71
installation		data	176, 177
clutch-disk	216	description	
pressure plate assembly.....	216	motor	180
maintenance	214	switch	14, 183
position transmission to bell hous- ing	223	disconnect wire from switch.....	131
removal		inoperative	98
clutch-disk	215	removal and installation	
clutch linkage	218	motor	180, 181
pilot bearing	217	switch	183
pressure plate assembly	215	road test	71, 74
road test	66, 83, 86	throw-out mechanism jammed....	91
run-in test	59	Curtains (cab)	
trouble shooting	93	data, maintenance, and removal	290
Commutator, cleaning	177	description	289
Compression, engine		installation	291
low compression	92	Cylinder block	
test	115	attach gaskets and manifold to....	121
Compression test	69	connect cylinder head to.....	118
Conduits	85	drain	158
Control bracket		installation of oil pan to cap screws	124
disconnect support	223		
installation			
bracket	139		
support	224		
removal	133		

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

H — Cont'd	Page	Page
Hood, engine		
installation	119, 122, 160	
removal	116, 158	
road test	88	
Horn		
after-operation service	34	
before-operation service	29	
capacity of circuit.....	203	
disconnect wire	131	
road test	65	
run-in test	59	
Horn button	13, 202	
Horn relay	201	
Horns, twin	200	
Hose (See Tubing and hose)		
Hose connections (See Pipe and hose connections)		
Hubs		
adjustment	274	
at-halt service	32	
description	273	
installation	276	
removal	275	
road test	67	
temperatures	32, 67	
trouble shooting	106	
Hydrostatic lock or seizure.....	91	
I		
Idle, engine.....	75	
Ignition system		
description and data		
coil	167	
coil condenser	168	
ignition system	166	
switch and wiring.....	174, 175	
inoperative	92	
noise caused by circuit.....	112	
preignition	92	
radio interference suppression	205, 208	
removal and installation		
coil	167	
coil condenser	169	
switch and wiring.....	174, 175	
replacement		
condenser at coil.....	210	
resistor suppressors.....	209, 210	
road test	73	
timing	75, 171	
trouble shooting	96	
(See also Distributor and Spark plugs)		
Inspection		
storage and shipment.....	312	
(See also under specific items)		
Instruments		
after-operation service	34	
before-operation service	28	
description	10	
during-operation service	31	
road test	64	
run-in test	58, 59	
trouble shooting	109	
use of	16	
Intake and exhaust system		
description	152	
trouble shooting	94	
(See also Manifolds, intake and exhaust and Exhaust pipe)		
J		
Junction box (connect wiring).....	141	
L		
Lamps (See Lights)		
Leaks		
after-operation service	36	
air brake system		
road test	67	
run-in test	60	
at-halt service	32	
before-operation service	28	
carburetor and manifold flanges..	92	
cooling system	96	
crankcase	70	
excessive engine leaks	103	
external oil leaks.....	93	
gear case	111	
road test	67, 70, 74	
run-in test	59, 60	
Lights		
after-operation service	34	
before-operation service	29	
capacity of circuit.....	203	
description, data, removal, and installation		
foot dimmer switch.....	197	
instrument panel lights and switch	13, 198	
stop light switch.....	196	

INDEX

L — Cont'd	Page		Page
Lights — Cont'd		road test	73
road test	87	Manifolds, intake and exhaust	
run-in test	59	installation	121
trouble shooting	108	removal	120
(See also Headlights, Spot light switch, and Blackout lights)		Marking (See Paint and markings)	
Links	81, 84	Mirrors (See Glass and mirrors)	
Load		Misfires, engine	92
after-operation service	37	Mixtures, idling, intermediate, and high speed	144
at-halt service	33	Muffler	
before-operation service	30	defective	95
Loading (rail shipment).....	313	description, installation, and re- moval	155
Low pressure indicator buzzer.....	302	road test	85
Lubrication			
after-operation and weekly serv- ice	37	O	
guides and notes.....	38	Oil, engine (See Fuel, oil, and coolant supply)	
oilcan points	51	Oil consumption, excessive.....	93
operation under unusual condi- tions	22	Oil filter	
points requiring none.....	51	adjustment of oil pressure.....	124
road test	73, 79, 80, 86	lubrication	39
run-in test	57	removal and installation	
second echelon service.....	62	element	124
(See also under specific items)		oil filter	126
M		road test	70
MWO (Modification Work		Oil gage	
Orders)	55, 90	before-operation service	28
Magnetic switch	177, 203	installation	124
Maintenance		run-in test	58
after-operation and weekly serv- ice	34	Oil level (crankcase).....	70
at-halt service	31	Oil level (gear)	
before-operation service	27	after-operation and weekly serv- ice	36
during-operation service	30	road test	67
first echelon participation in sec- ond echelon service	61	Oil lines	70
first echelon service.....	26	Oil pan	
second echelon service.....	61	cleaning	122
(See also under specific items)		installation	
Major unit assembly replacement		oil pan	123
record	55	strainer and water trap.....	122
Manifold, water outlet		removal	
disconnect thermostat housing....	164	oil pan and gaskets.....	123
installation	118	strainer and water trap.....	122
removal	117	Oil tube	
Manifold flanges (Air leaks).....	92	installation	301
Manifold tee	260	removal	300
Manifolds		Oil viscosity	
leaking gaskets	95	incorrect	91
		too low	93

5- TO 6-TON 4 x 4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

O — Cont'd	Page		Page
Oilcan points	51	Pump, water	
Operation under unusual conditions	21	adjustment, installation, and re-	
		moval	162
		description and data.....	161
		inoperative	95
		road test	71
		P	
Paint and markings.....	88		
Parking lights (See Blackout lights)			
Performance data	9		
Pintle hook	88, 293		
Pipe and hose connections.....	162, 163		
Piston rings, worn or damaged.....	93		
Pitman arm			
removal and installation.....	288		
road test	81		
Ponton body (See Body, ponton)			
Power take-off			
description, data, and removal....	219		
during-operation service	31		
removal and installation of con-			
trols	227		
trouble shooting	98		
Pressure, air (See Air pressure)			
Pressure, oil			
adjustment	124		
engine without pressure.....	110		
Pressure gage, air			
before-operation service	29		
description and data.....	10, 301		
disconnect hose	131		
removal and installation.....	302		
road test	65		
run-in test	58		
Pressure gage, oil			
connect tube	140		
description, data, removal, and			
installation	10, 300		
disconnect tube	131		
road test	64		
Propeller shaft			
after-operation service	36		
at-halt service	32		
road test	68, 82, 84		
run-in test	57		
Pulleys	72		
Pump, fuel			
data	142		
description	145		
inoperative	94		
installation	137, 146		
maintenance and removal.....	146		
road test	74		
		R	
		Radiator	
		connect and disconnect from	
		frame brackets	160
		description and removal.....	158
		disconnect top brace.....	133
		leaking core	96
		removal	133
		reverse flushing	156
		road test	70
		Radio bonding	89, 205, 209, 211
		Radio interference suppression	
		system	
		data	205
		description	204
		disconnect bonds	130
		faulty unit	97, 98
		maintenance	208
		removal and replacement.....	209
		trouble shooting	112
		Records (See Reports and records)	
		Reflectors	
		after-operation service	34
		before-operation service	29
		noise caused by.....	112
		road test	88
		run-in test	59
		Regulator unit	75
		Relay valve	253, 254
		Reports and records	
		road test	90
		run-in test	60
		Resistance (batteries), high	
		remove	187
		test for	185
		Rims (wheel)	77
		Road test	
		final test	90
		maintenance operations	
		raised vehicle	68
		vehicle on ground.....	86

INDEX

R — Cont'd	Page		Page
Road test — Cont'd		removal	
test	63	cables from cowl.....	131
tools and equipment.....	89	speedometer	300
storage and shipment.....	311	trouble shooting	110
Run-in test (new vehicle)		Speeds, maximum permissible en-	
preliminary service	56	gine	115
publications and reports.....	60	Splash shield	
run-in test	59	installation	120, 122, 145
Running boards	88	removal	119, 120, 128
Running gear	31	road test	88
S		Spotlight and switch.....	14, 199, 200
Seals, oil	81	Springs	
Service brake		after-operation and weekly serv-	
description of pedal.....	14	ice	36
road test	65	at-halt service	32
trouble shooting	100	before-operation service	29
(See also Air brakes)		description and data	
Shimmy (front wheels)	66, 107	front springs	277
Shipment (See Storage and ship-		rear springs	279
ment)		installation	
Shock absorbers		front springs	278
adjustment	283	rear springs	281
connect links	242	lubrication	277
description, data, and mainte-		removal	
nance	282	front springs	277
installation	283	rear springs	280
removal		road test	
links	241	front springs	81
shock absorbers	283	rear springs	84
road test		run-in test	57
front shock absorbers.....	81	Starting system	
rear shock absorbers.....	84	data	176
Solenoid switch	181, 182	description	175
Spare tires (See under Tires)		trouble shooting	96
Spare wheel (See under Wheels)		Starting the engine	
Spark plugs		failure to start.....	91
cleaning, adjustment, and inspec-		starting	16
tion	116, 173	Starting the vehicle by towing.....	18
description, data, removal.....	173	Steering	
faulty plugs	96	difficulty in	107
installation		road test	66, 81
spark plugs	119, 174	run-in test	60
wires	175	Steering arm	81
removal		(See also Pitman arm)	
resistor-suppressors	209	Steering column top bracket, re-	
wires	175	moval	131
road test	69	Steering gear	
Speedometer		data, maintenance, and adjust-	
description and data.....	10, 299	ment	285
installation	300	description	283

INDEX

T — Cont'd	Page		Page
Toeboards		trouble shooting	99
installation	141, 247	Transfer vents	
removal	128, 246	after-operation and weekly serv-	
Toeboard insert		ice	36
installation	247	at-halt service	32
removal	246	run-in test	58
Toe-in (front axle).....	237, 238	Transmission	
Toe-in and turning stops.....	86	at-halt service	32
Tool box installation.....	225	data and removal.....	219
Tools and equipment		description	
after-operation and weekly serv-		gearshift lever	16
ice	38	transmission	219
before-operation service	30	during-operation service	31
road test	89	installation	223
run-in test	59	road test	66, 67, 68, 84
special overhaul tools.....	91	run-in test	60
stowage on vehicle.....	52	trouble shooting	98
Tow hooks		Trouble shooting	
description and data.....	292	air brake system.....	100
removal and installation.....	293	axles	
road test	88	front	99
Towing connections		rear	100
after-operation and weekly serv-		battery and lighting system.....	108
ice	36	body and frame.....	108
at-halt service	33	clutch	93
before-operation service	29	cooling system	95
run-in test	57	drive shafts and universal joints	99
Towing devices	90	engine	91
(See also Towing hook)		fuel system	94
Towing the vehicle.....	18	ignition system	96
Traction devices	90	instruments	109
Trailer receptacle		intake and exhaust systems.....	94
data, removal, and installation....	204	radio interference suppression.....	112
description	203	starting and generating system....	96
Transfer		steering gear	107
at-halt service	32	transfer case	99
during-operation service	31	winch	111
road test	66, 67, 68, 84	Tubing, copper	134, 136
run-in test	60	Tubing and hose.....	261, 262
Transfer case		Turntable (fifth wheel), lubrication	46
description and data			
gearshift lever	14		
transfer case	227		
installation	230		
lubrication of declutching unit....	46		
removal			
linkage	227		
transfer case	228		
run-in test	60		

U

Universal joints	
lubrication (front wheels).....	46
road test	68, 82
run-in test	57
(See also Drive shafts and universal joints)	

5- TO 6-TON 4x4 PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

U — Cont'd		Page			Page
Unloader valve		71	connect oil overflow pipe and		
Unusual noise (engine and			tube		124
vehicle)	60, 66, 67, 68		Voltage regulator data.....		176
V			W		
Vacuum test, engine		75	Water supply (See Fuel oil, and		
Valve, brake application			coolant supply)		
description and data.....		250	Wheel and flange nuts		
removal and installation.....		252	at-halt service		32
Valve, double check		257	before-operation service.....		29
Valve, hand control	252, 253		run-in test		57
Valve, quick release	255, 256		Wheels		
Valve, safety	249, 250		adjustment	82, 274	
Valve, single-check	257		assembly of fifth wheel	310	
Valve covers, replacement of.....	120		cleaning		
Valve mechanism			fifth wheel	309	
adjustment	68		front wheels	82	
inspection	243		rear wheels	79	
Valve stems and caps.....	76		data		
Valve tappet, adjustment of....	119, 120		fifth wheel	307	
Valve timing, improper	92		wheels	8, 274	
Valves, compressor, inspection of..	243		description		
Vehicle			fifth wheel	307	
after-operation and weekly clean-			steering wheel	16	
ing	37		wheels	272, 273	
data and differences among			disassembly (fifth wheel).....	308	
models	9		inspection and repair (fifth		
description	5		wheel)	309	
driving	17		lubrication		
lubrication	86		bearings	46	
operation under unusual condi-			fifth wheel	87	
tions	20		front wheels	82	
run-in test	55		rear wheels	79	
towing	18		operation (fifth wheel).....	20	
use of instruments and controls....	16		removal and installation		
Vehicular specifications	8		drum and hub assemblies	275, 276	
Ventilator, cab roof.....	16		fifth wheel	308, 310	
Ventilator, crankcase	126, 127		spare tire wheel.....	223, 225	
Vents (See Transfer vents and			steering wheel	287, 288	
Axles)			wheels	273	
Viscometer			road test		
before-operation service	28		bearings	68	
connect tube	140		fifth wheel.....	87	
data, removal, and installation....	303		rear wheels	79	
description	10, 303		steering wheel	81	
disconnect tube	131		unusual noises	67	
road test	64		shimmy and wander	107	
run-in test	58		trouble shooting	106	
Viscosity gage			(See also Turntable, fifth wheel)		
apparently inoperative	111				

INDEX

W — Cont'd	Page	Page	
Winch		wipers 288	
after-operation service	37	inoperative 108	
at-halt service	32	road test 65	
cleaning	87	run-in test 59	
description and data		Wiring, electrical	
operating controls	19	after-operation service	35
winch	303	connect wiring	
installation		cranking motor switch.....	184
cable	306	distributor	173
winch assembly	307	ignition coil	168
lubrication of cable.....	46	junction box	141
operation of controls.....	19	solenoid switch	182
removal of cable		description and data (ignition	
cable	305	system)	166
winch assembly	306	disconnect wires	
road test	86	distributor	172
trouble shooting	111	ignition coil	167
Windshield assembly	289	solenoid switch	182
Windshield wipers		disconnect wires and wiring	
after-operation service	34	harness	130
before-operation service	29	installation, removal, and mainte-	
data, maintenance, removal, and		nance (ignition system).....	175
installation	289	road test	73, 85
description		run-in test	57
control valves	13		